

Section V. Definitions

AH-zones. Areas subject to inundation by 1-percent-annual-chance shallow flooding (usually areas of ponding) where average depths are between one and three feet.

Competent Source. For the purposes of the performance standards for all resource areas and interests protected by the Ordinance and these Regulations, evidence that is submitted by Commissioners, Commission staff, or staff of the City of Boston (the “City”), its departments, agencies, quasi-city agencies, or boards, including, but not limited to, the Environment Department (the “Department”), the Boston Redevelopment Authority d/b/a Boston Planning and Development Agency (BPDA), and the Boston Water and Sewer Commission (BWSC), is presumed to be from a competent source.

Section XIV. Isolated Vegetated Wetlands

A. Preamble

Isolated Vegetated Wetlands (IVW) include but are not limited to Wet Meadows, Marshes, Swamps, Bogs, and Vernal Pools. IVW are likely to be significant to the Ordinance’s protected interests of public and private water supply, to ground water supply, to flood control, to storm damage prevention, to prevention of pollution, to the protection of fisheries, and to wildlife habitat.

The plants and soils of IVW remove or detain sediments, nutrients (such as nitrogen and phosphorus) and toxic substances (such as heavy metal compounds) that occur in run-off and flood waters. Some nutrients and toxic substances are detained for years in plant root systems or in the soils. Others are held by plants during the growing season and released as the plants decay in the fall and winter. This latter phenomenon delays the impacts of nutrients and toxins until the cold weather period, when such impacts are less likely to reduce water quality.

IVW are areas where groundwater discharges to the surface and where, under some circumstances, surface water discharges to the groundwater.

Vegetation in IVW acts to slow down and reduce the passage of flood waters during periods of peak flows by providing temporary flood water storage and by facilitating water removal through evaporation and transpiration. This process enhances flood storage capacity and may prevent damage to private and public property.

The Ordinance defines Freshwater Wetlands, including IVW, by hydrology and vegetation. Soil saturation or inundation is the driving force which creates IVW, but it is a transient, temporal characteristic. The presence of

water at or near the ground surface during a significant portion of the year supports and in fact promotes the growth of wetland indicator plants. Prolonged or frequent saturation or inundation produces hydric soils and creates anaerobic conditions that favor the growth of wetland indicator plants. Hydric soils are direct indicators of long-term hydrologic conditions and are present throughout the year.

IVW vegetation supports a wide variety of insects, reptiles, amphibians, small mammals, and birds, which are a source of food for important game fish. Bluegills (*Lepomis macrochirus*), pumpkinseeds (*Lepomis gibbosus*), yellow perch (*Perca flavescens*), rock bass (*Ambloplites rupestris*) and all trout species feed upon non-aquatic insects. Large-mouth bass (*Micropterus salmoides*), chain pickerel (*Esox niger*) and northern pike (*Esox lucius*) feed upon small mammals, snakes, non-aquatic insects, birds, and amphibians.

IVW vegetation provides shade, which moderates water temperatures important to fish life. The hydrologic regime, plant community composition and structure, soil composition and structure, topography, and water chemistry of IVW provide important food, shelter, migratory and overwintering areas, and breeding areas for many birds, mammals, amphibians, and reptiles. A wide variety of vegetated wetland plants, the nature of which are determined in large part by the depth and duration of water as well as soil and water composition, are utilized by various species as important areas for mating, nesting, brood rearing, shelter, and food. The diversity and interspersed structure of the vegetative structure is also important in determining the nature of its wildlife habitat. Different habitat characteristics are used by different wildlife species during summer, winter, and migratory seasons.

Although the vegetational community can often be analyzed to establish an accurate wetland boundary, sole reliance on the presence of wetland indicator plants can be misleading because some species thrive in uplands and wetlands.

B. Definition, Critical Characteristics, and Boundary

1. IVW is defined by the Ordinance as a Freshwater Wetland, of at least one thousand (1,000) square feet in areas that do not border creeks, rivers, streams, ponds, or lakes. The types of IVW may include wet meadows, marshes, swamps, and bogs. In addition to the minimum size requirement, IVW must also meet the definition and characteristics of Bordering Vegetated Wetlands (BVW) stated in 310 Code Mass. Regs. 10.55(2) with the exception that IVW do not border any creeks, rivers, streams, ponds, lakes, or other water bodies.

2. The boundary of IVW is the line within which 50 percent or more of the vegetational community consists of wetland plants and saturated or inundated conditions exist. Wetland plants are defined by the Ordinance as any plant listed in the U.S. Fish and Wildlife Service *National List of Plant Species That Occur in Wetlands: Massachusetts 1988*, including the publication as condensed by the Massachusetts Department of Environmental Protection, Division of Wetlands and Waterways, April 1995, having an indicator category of obligate wetland, facultative wetland, or facultative.
 - i. Areas containing a predominance of wetland plants (50 percent or more) are presumed to indicate the presence of saturated or inundated conditions. Therefore, the boundary as determined by 50 percent or more wetland plants shall be presumed accurate when:
 - a. all dominant species have an indicator status of obligate, facultative wetland +, facultative wetland, or facultative wetland -, and the slope is distinct or abrupt between the upland plant community and the wetland plant community;
 - b. the area where the work will occur is clearly limited to the buffer zone; or,
 - c. the Commission determines that sole reliance on wetland plants will yield an accurate delineation.
 - ii. When the boundary is not presumed accurate as described in Section XIV(B)(2)(i)(a) through (c) or in order to overcome the presumption set forth in Section XIV(C), credible evidence, which may include relevant expert reports, plans, or photographs, shall be submitted by a competent source demonstrating whether the boundary of IVW is the line within which 50 percent or more of the vegetational community consists of wetland plants and saturated or inundated conditions exist. The Commission must evaluate vegetation and indicators of saturated or inundated conditions if submitted by a competent source, or the Commission may require credible evidence of saturated or inundated conditions when determining the boundary of IVW.
 - iii. For the purposes of Section XIV(B)(2)(ii), indicators of saturated or inundated conditions sufficient to support wetland plants shall include one or more of the following:

- a. groundwater, including the capillary fringe, within a major portion of the root zone;
 - b. observation of prolonged or frequent flowing or standing surface water;
 - c. characteristics of hydric soils.
3. Where an area has been disturbed (e.g. by cutting, filling, or cultivation), the boundary is the line within which there are indicators of saturated or inundated conditions sufficient to support a predominance of wetland plants, a predominance of wetland plants, or credible evidence, including relevant expert reports, plans, or photographs, from a competent source that the area supported or would support under undisturbed conditions a predominance of wetland plants prior to the disturbance of the IVW.
- C. Presumption. Where a proposed activity involves the removing, filling, dredging, building upon, over or under, degrading, discharging into, or otherwise altering or posing a significant threat to alter an IVW, the Commission shall presume that such area is significant to the interests specified in Section XIV(A). This presumption is rebuttable and may be overcome upon a clear showing that the IVW does not play a role in the protection of said interests.

D. Performance Standards

- 1. Where the presumption set forth in Section XIV(C) is not overcome, any proposed work or activity, as those terms are defined by the Ordinance, shall not destroy or otherwise impair any portion of said area.
- 2. Notwithstanding the provisions of Section XIV(D)(1), the Commission may issue an Order of Conditions (OOC) permitting work or activity which results in the loss of up to 50 percent of IVW, but not to exceed 5,000 square feet, when said area is replaced in accordance with the following general conditions and any additional, specific conditions the Commission deems necessary to ensure that the replacement area will function in a manner similar to the area that will be lost:
 - i. the surface of the replacement area to be created (the “replacement area”) shall be two times that of the area that will be lost (the “lost area”);
 - ii. the groundwater and surface elevation of the replacement area shall be approximately equal to that of the lost area;

- iii. the overall horizontal configuration and location of the replacement area shall be similar to that of the lost area;
 - iv. the replacement area shall be located within the same general area as the lost area to the extent feasible and in the following order of preference within the City: on-site; within the same sub-watershed; or within the same watershed as the lost area.
 - v. at least 75 percent of the surface of the replacement area shall be reestablished with indigenous wetland plant species of the lost area within three growing seasons, and prior to said vegetative reestablishment any exposed soil in the replacement area shall be temporarily stabilized to prevent erosion in accordance with standard U.S. Soil Conservation Service methods;
 - vi. the replacement area shall be provided in a manner that is consistent with all other provisions of the Ordinance, the Act, and the regulations and performance standards promulgated thereunder; and,
 - vii. a monitoring report based upon observations made near the end of each growing season shall be submitted to the Commission annually for at least three years following a year in which construction and planting of the replacement area was completed. The Commission may include a continuing condition in the OOC or Certificate of Compliance (COC) for continued annual reporting concerning the replacement area.
3. In the exercise of the Commission's discretion under Section XIV(D)(2), the Commission shall consider the magnitude of the alteration and the significance of the affected area to the interests specified in Section XIV(A), the extent to which adverse impacts can be avoided, the extent to which adverse impacts are or could be minimized, and the extent to which mitigation measures, including replication or restoration, are provided by the project to contribute to the protection of the interests identified in Section XIV(A).
4. If the applicant provides credible evidence, including relevant expert reports from a competent source that replication is not feasible, the Commission may, in its sole discretion, require the applicant to restore or improve those portions of the affected resource area that are not affected by the proposed activity or work.

5. Notwithstanding the provisions of Section XIV(D)(1), the Commission may issue an OOC permitting work without replication or restoration which results in the loss of a portion of IVW when:
 - i. said portion has a surface area less than 500 square feet;
 - ii. said portion extends in a distinct linear configuration (“finger-like”) into adjacent uplands;
 - iii. alteration of said portion will not remove the IVW from jurisdiction; and,
 - iv. in the judgment of the Commission it is not reasonable to scale down, redesign, or otherwise change the proposed work or activity so that it could be completed without loss of said portion of IVW.
6. Where the Commission permits work or activity in a resource area or Buffer Zone under Sections XIV(D)(2), (5), or (7) that results in the removal of trees that have six-inch or larger diameters at breast height (DBH), the Commission may, in its discretion, require the planting of one or more trees of which the total DBH will equal or exceed the combined DBH of the trees removed, and of which no single tree shall have a DBH less than one-inch.
7. Notwithstanding the provisions of Section XIV(D)(1), the Commission may issue an OOC and impose such conditions as will contribute to the interests identified in the Ordinance and permit limited projects as specified in the Act at 310 Code Mass. Regs. 10.53(3).
8. Notwithstanding the provisions of Section XIV(D)(2) through (4) and (7), no project may be permitted that will have any adverse effect on specified habitat sites of rare vertebrate or invertebrate species indicated on the most recent Estimated Habitat Map of State-listed Rare Wetlands Wildlife (if any) published by the Massachusetts Natural Heritage and Endangered Species Program (NHESP).
9. Any proposed work or activity shall not destroy or otherwise impair any portion of an IVW that is within an Area of Critical Environmental Concern (ACEC). An ACEC is defined by the Ordinance as an area so designated by the Secretary of Environmental Affairs of the Commonwealth of Massachusetts (the “Secretary”) pursuant to regulations (301 Code Mass. Regs. 12.00), said designation being due to the particular environmental factors which impact upon the areas in question and which highlight the importance of each area so designated, or an area so designated by the City of Boston according to criteria and

guidelines established by the Commission and distinct from those used by the Secretary.

10. Section XIV(D)(9) shall supersede the provisions of Section XIV(D)(2) through (5), but it shall not apply:

i. if the presumption set forth in Section XIV(C) is overcome; and/or,

ii. to work proposed under 310 Code Mass. Regs. 10.53(3)(l).

11. If the IVW affected by proposed work or activity is significant to the interests described in Section XIV(A), the applicant shall take into consideration the impacts of climate change on IVW and its Buffer Zone and integrate climate resilience and adaptation strategies to protect the resource area and properties adjacent to said area. The Ordinance defines Impacts of Climate Change to include, without limitation: extreme heat; the timing, frequency, intensity, and amount of precipitation, storm surges, and rising water levels; increased intensity or frequency of storm events or extreme weather events; and frequency, intensity, and duration of droughts. A Notice of Intent (NOI) must include a narrative that describes the Impacts of Climate Change on the site and surrounding resource areas that are reasonably expected to occur within the next 50 years based on the best available data and projections of the future Impacts of Climate Change. In the event that the proposed work or activity is temporary in nature, the narrative must describe the Impacts of Climate Change on the site and surrounding resource areas for the determined duration of the temporary work. At a minimum, the Impacts of Climate Change narrative may rely on available and most recent data and projections of Impacts of Climate Change made available by the Department and the Climate Ready Boston initiative or any successor initiative and must meet the requirements set forth in the Commission's filing guidelines. The NOI shall propose specific mitigation against and/or adaptation to the Impacts of Climate Change to IVW, such mitigation and/or adaptation to include the incorporation of building or site measures to reduce heat island effect; reduction of stormwater runoff that will result from increasing precipitation, sea level rise, and storm surge events; adaptation to increasing sea level rise, precipitation, and storm surge events; and minimization of lateral displacement of storm or flood water to surrounding resource areas or properties.

12. An Applicant's failure to take into account Impacts of Climate Change and incorporate mitigation, resiliency, and/or adaptation to the Impacts of Climate Change shall be an independent basis for the Commission to determine that a NOI is incomplete or will otherwise adversely impact the interests protected by the Ordinance and these Regulations.

E. Effective Date

1. Section XIV shall become effective 60 days following the Commission's approval of the Final Regulations and the posting of the Final Regulations, the Statement of Fiscal Effect, and the Amended Small Business Impact Statement with the City Clerk and shall apply to all Notices of Intent filed on or after that date and any subsequent procedures related to such filings made on or after that date.
2. Section XIV shall not apply to any Notice of Intent filed prior to the effective date, or to any extensions of any Order of Conditions the Notice of Intent for which was filed prior to said effective date.

Section XV. Vernal Pools and Vernal Pool Habitat

A. Preamble

Vernal Pools are significant to the Ordinance's protected interests of flood control and storm damage prevention because they serve as a ponding area for run-off or high groundwater that has risen above the ground surface. Vernal Pools provide a temporary storage area where run-off and high groundwater pond and slowly evaporate or percolate into the substrate. Filling of Vernal Pools causes lateral displacement of the ponded water onto contiguous properties, which may in turn result in damage to said properties.

In addition, where such areas are underlain by pervious material, they are likely to be significant to the interests of public or private water supply and to groundwater supply. Where such areas are underlain by pervious material covered by a mat of organic peat and muck, they are also likely to be significant to the interest of prevention of pollution. Vernal Pools that are underlain by pervious material provide a point of exchange between ground and surface waters. Contaminants introduced into said area, such as herbicides, pesticides, fertilizers, septic system discharges and road salts, find easy access into the groundwater. Where these conditions occur and a mat of organic peat or muck covers the substrate of the area, said mat serves to detain and remove contaminants, which might otherwise enter the groundwater.

Finally, Vernal Pools and Vernal Pool Habitat are significant to the interest of protection of wildlife habitat and they serve essential habitat functions. Vernal Pools are an essential breeding site for certain amphibians that require isolated areas that are generally flooded for at least two continuous months in the spring and/or summer and are free from fish predators. Vernal Pools are significant in the support of duckweed, caddis flies, and mollusks, thus providing habitat for members of the fingernail and pea clam family (*Sphaeriidae*), amphibians, reptiles, and other animals. Most of the

amphibians that rely on Vernal Pools remain near the breeding pool during the remainder of their lifecycle. Specifically, the Jefferson salamander (*Ambystoma jeffersonianum*), blue-spotted salamander (*A. laterale*), marbled salamander (*A. opacum*), spotted salamander (*A. maculatum*), and wood frog (*Rana sylvatica*) rely on Vernal Pools for critical breeding habitat. Furthermore, Vernal Pools provide feeding and occasional breeding habitat for the gray treefrog (*Hyla versicolor*), spring peeper (*H. crucifer*), American toad (*Bufo americanus*), and four-toed salamander (*Hemidactylium scutatum*). Many reptiles, birds, and mammals also feed at Vernal Pools.

B. Definition, Critical Characteristics, and Boundary

1. Vernal Pool is defined in the Ordinance to mean:
 - i. those areas defined as Vernal Pool under the Act and its regulations at 310 Code Mass. Regs. 10.00 et seq.; or
 - ii. any confined basin or depression not occurring in existing lawns, gardens, landscaped areas, or driveways which, at least in most years, holds water for a minimum of two continuous months during the spring and/or summer, contains at least 200 cubic feet of water at some time during most years, is free of adult predatory fish populations, and provides breeding and rearing habitat functions for amphibians, reptile, or other Vernal Pool community species, regardless of whether the site has been certified by the Massachusetts Division of Fisheries and Wildlife.
2. Vernal Pool Habitat is defined in the Ordinance to mean the area adjacent to a Vernal Pool. The Commission shall presume that the Vernal Pool Buffer Zone, as defined in Section 7-1.4(b) of the Ordinance, consists of Vernal Pool Habitat and performs essential habitat functions.
3. Vernal Pools are characterized by a depression or closed basin that holds water, for an extended period of time or continuously, but are too small to be called a pond or a lake. The depression may occur in otherwise flat topography where the water may pool to the surface at least once a year or may occur on a downslope of a sidehill steep.
4. Vernal Pools typically produce a well-developed layer of organic matter, primarily through trapping airborne leaves in the fall. The presence of water-stained leaves in a dry depression is a good indicator that the area temporarily serves to pool water, which may suggest the presence of a Vernal Pool.

5. The vegetation and hydrology of a Vernal Pool may be like the vegetative community and hydric soil found in a Freshwater Wetland, but it need not be.
6. The boundary of a Vernal Pool shall be the mean annual high-water line defining the depression, or, if such data is not available, the maximum observed or recorded water level in a topographic depression, so long as such depression meets the other criteria described in Section XV(B)(1) and such information is supported by credible evidence, including relevant expert reports, photographs, or plans, and provided from a competent source.
7. Many of the indicators of Vernal Pool and Vernal Pool Habitat are seasonal. Consequently, failure to find evidence of breeding or the presence of the indicator species specified in Section XV(A) only has evidentiary value if the investigation is conducted during those periods in which breeding is likely to occur or when the indicator species are likely to be present. Prior to making a determination of the existence of a Vernal Pool or Vernal Pool Habitat in response to a Request for Determination of Applicability (RDA), NOI, ANRAD, or enforcement inquiry, the Commission may require that the pool be investigated by a competent source at least two times in the spring and/or summer, but not two days within the same week. In the case of challenges to the presumptions of Vernal Pool or Vernal Pool Habitat in Section XV(C), the Commission may require that a determination on any proposed work or activity under Section XV be postponed until such time period that investigation may be made during those time periods in which breeding is likely to occur or when indicator species are likely to be present notwithstanding any other provisions of these Regulations concerning time periods for the Commission to render determinations.
8. Should any area that the Commission believes may function as a Vernal Pool contain any of the following characteristics when dry, the area shall be presumed to contain a Vernal Pool and shall be investigated in the spring and/or summer during Vernal Pool breeding season:
 - i. Stained leaves in a depression;
 - ii. Water stains or siltation marks on surrounding tree trunks or vegetation;
 - iii. Trees with buttressed trunks or stilt trunks;
 - iv. Wetland plants growing in a dry depression;
 - v. Hydric soils;

- vi. Cases of caddisfly larvae;
- vii. Adults, juveniles, or shells of either freshwater clams or amphibious, air-breathing snails;
- viii. The skins or exuviae of dragonfly or damselfly larvae on vegetation along the edge of the dry depression.

C. Presumptions.

1. Where a proposed activity involves the removing, filling, dredging, building upon, over or under, degrading, discharging into, or otherwise altering or posing a significant threat to alter a Vernal Pool or Vernal Pool Habitat, the Commission shall presume that such area is significant to the interests specified in Section XV(A). Except as otherwise provided in Section XV(C)(2), this presumption is rebuttable and may be overcome upon a clear showing that the Vernal Pool or Vernal Pool Habitat do not play a role in the protection of said interests.
2. Where an area has been determined by the Commission to meet the definition of Vernal Pool, including the adjacent area known as Vernal Pool Habitat, the Commission shall presume that said area performs essential habitat functions. This presumption is rebuttable only upon the presentation and preponderance of credible evidence that the basin or depression or surrounding area does not provide essential habitat functions. Any evaluation of whether said area provides essential habitat functions should be performed by an individual who at least meets the qualifications outlined in 310 Code Mass. Regs. 10.60(1)(b).

D. Performance Standards

1. Where the presumptions set forth in Section XV(C) are not overcome, any proposed work or activity, as those terms are defined by the Ordinance, shall not destroy or otherwise impair any Vernal Pool or Vernal Pool Habitat area.
2. Notwithstanding the provisions of Section XV(D)(1), the Commission may issue an OOC permitting work or activity in said area so long as any proposed work permitted by the Commission shall not result in any of the following:
 - i. any impairment of the capacity of the Vernal Pool or Vernal Pool Habitat to provide wildlife habitat;

- ii. flood damage due to filling that causes lateral displacement of water that would otherwise be confined within said area;
 - iii. any adverse effect on public or private water supply or groundwater supply, where said area is underlain by pervious material;
 - iv. any adverse effect on the capacity of said area to prevent pollution of groundwater, where said area is underlain by pervious material covered by a mat of organic peat or muck;
 - v. any adverse effect on specified wildlife habitat of rare vertebrate or invertebrate species indicated on the most recent Estimated Habitat Map of State-listed Rare Wetlands Wildlife (if any) published by the Massachusetts NHESP; or
 - vi. any impairment to any portion of a Vernal Pool or Vernal Pool Habitat that is within an ACEC.
3. In the exercise of the Commission's discretion under Section XV(D)(2), the Commission shall consider the magnitude of the alteration and the significance of the affected area to the interests specified in Section XV(A), the extent to which adverse impacts can be avoided, the extent to which adverse impacts are or could be minimized, and the extent to which mitigation measures, including replication or restoration, are provided by the project to contribute to the protection of the interests identified in Section XV(A).
4. If the Commission permits work or activity in accordance with Section XV(D)(2), the Commission may, in its sole discretion, require that the area affected be replaced in accordance with the following general conditions and any additional, specific conditions the Commission deems necessary to ensure that the replacement area will function in a manner similar to the area that will be lost:
 - i. the surface of the replacement area to be created (the "replacement area") shall be equal to that of the area that will be lost (the "lost area");
 - ii. the groundwater and surface elevation of the replacement area shall be approximately equal to that of the lost area;
 - iii. the surface hydrology of the depression shall not be altered and the permitted work or activity will not impair the ability of the Vernal Pool to receive precipitation or stormwater runoff;

- iv. the overall horizontal configuration and location of the replacement area with respect to the depression shall be similar to that of the lost area;
 - v. the replacement area shall be located within the same general area as the lost area to the extent feasible.
 - vi. the replacement area shall provide and maintain corridors for the migration of wildlife for feeding and breeding to a substantially similar extent as the lost area;
 - vii. the replacement area shall be provided in a manner which is consistent with all other provisions of the Ordinance, the Act, and the regulations and performance standards promulgated thereunder; and,
 - viii. a monitoring report based upon observations made near the end of each growing season shall be submitted to the Commission annually for at least three years following construction of the replacement area. The Commission may include a continuing condition in the OOC or COC for continued annual reporting concerning the replacement area.
5. If the applicant provides credible evidence, including relevant expert reports, from a competent source that replication is not feasible, the Commission may, in its sole discretion, require the applicant to restore or improve those portions of the affected resource area that are not affected by the proposed activity or work.
 6. Where the Commission permits work or activity in a Vernal Pool or Vernal Pool Habitat under Sections XV(D) that results in the removal of trees that have six-inch or larger diameters at breast height, the Commission may, in its discretion, require the planting of one or more trees of which the total DBH will equal or exceed the combined DBH of the trees removed, and of which no single tree shall have a DBH less than one-inch.
 7. If the Vernal Pool or Vernal Pool Habitat affected by proposed work or activity is significant to the interests described in Section XV(A), the applicant shall take into consideration the impacts of climate change on Vernal Pool and Vernal Pool Habitat and integrate climate resilience and adaptation strategies to protect the resource area and properties adjacent to said area for the entire design life of the project. The Ordinance defines Impacts of Climate Change to include, without limitation: extreme heat; the timing, frequency, intensity, and amount of precipitation, storm surges, and rising water levels; increased intensity or frequency of storm events or extreme weather events; and frequency, intensity, and duration

of droughts. A Notice of Intent (NOI) must include a narrative that describes the Impacts of Climate Change on the site and surrounding resource areas that are reasonably expected to occur within the next 50 years based on the best available data and projections of the future Impacts of Climate Change. In the event that the proposed work or activity is temporary in nature, the narrative must describe the Impacts of Climate Change on the site and surrounding resource areas for the determined duration of the temporary work. At a minimum, the Impacts of Climate Change narrative may rely on available and most recent data and projections of Impacts of Climate Change made available by the Department and the Climate Ready Boston initiative or any successor initiative and must meet the requirements set forth in the Commission's filing guidelines. The NOI shall propose specific mitigation against and/or adaptation to the Impacts of Climate Change to Vernal Pool and Vernal Pool Habitat, such mitigation and/or adaptation to include the incorporation of building or site measures to reduce heat island effect; reduction of stormwater runoff that will result from increasing precipitation, sea level rise, and storm surge events; adaptation to increasing sea level rise, precipitation, and storm surge events; and minimization of lateral displacement of storm or flood water to surrounding resource areas or properties.

8. An Applicant's failure to take into account Impacts of Climate Change and incorporate mitigation, resiliency, and/or adaptation to the Impacts of Climate Change shall be an independent basis for the Commission to determine that a NOI is incomplete or will otherwise adversely impact the interests protected by the Ordinance and these Regulations.

E. Effective Date

1. Section XV shall become effective 14 days following the Commission's approval of the Final Regulations and the posting of the Final Regulations, the Statement of Fiscal Effect, and the Amended Small Business Impact Statement with the City Clerk and shall apply to all Notices of Intent filed on or after that date and any subsequent procedures related to such filings made on or after that date.
2. Section XV shall not apply to any Notice of Intent filed prior to the effective date, or to any extensions of any Order of Conditions the Notice of Intent for which was filed prior to said effective date.

Section XVI. Restoration

- A. For the purposes of these Regulations, restoration shall mean measures that improve, restore, and protect Resource Areas and further the interests to which each Resource Area is significant. Such measures

include but are not limited to planting native vegetation, grading, improving site drainage and infiltration, and removing trash and debris.

- B. If an Applicant proposes, or the Commission requires, restoration of a Resource Area or Buffer Zone, as those terms are defined in the Ordinance, as mitigation for work or activities in a Resource Area or Buffer Zone, the following standards and conditions shall apply:
1. Where planting native vegetation is incorporated, an Applicant shall combine re-seeding plantings, transplanting, and new plantings of native species in order to reestablish the vegetated community. Invasive species and poor soils shall be removed. The Applicant shall submit to the Commission's staff for review and approval a restoration plan that details the species and location of invasive species to be removed and the restoration plantings.
 2. The Applicant shall grade the area to be restored to a topography that reduces runoff and increases infiltration.
 3. The Applicant shall place topsoil coverage at a depth that is consistent with natural conditions at the site of the restored Resource Area.
- C. Any OOC for permitted work or activity that includes restoration shall include a continuing condition that prohibits any work or activity within the restored Resource Area or Buffer Zone, except as needed to maintain the Resource Area or Buffer Zone in its restored condition.

Section XVII. Land Subject to Coastal Storm Flowage

A. Preamble

Land Subject to Coastal Storm Flowage (LSCSF) is significant to the Ordinance's protected interests of storm damage prevention, flood control, protection of wildlife and wildlife habitat, prevention of pollution, and erosion and sedimentation control.

Velocity ("V") Zones and A-zones of LSCSF are areas which are subject to hazardous flooding, wave impact, and, in some cases, significant rates of erosion as a result of storm wave impact and scour. V- and A-zones in coastal areas are generally subject to repeated storm damage which can result in loss of life and property, increasing public expenditures for storm recovery activities, historic taxpayer subsidies for flood insurance and disaster relief, and increased risks for personnel involved in emergency relief programs. Alteration of land surfaces in A-zones could change drainage characteristics that could cause increased flood damage on adjacent properties.

The topography, soil characteristics, vegetation, potential for erosion and permeability of the land surface within V- and A-zones are critical characteristics that determine how effective an area is in dissipating wave energy and in protecting areas within and landward of these zones from storm damage and flooding. The gentler and more permeable that a seaward-sloping land surface is, the more effective that land surface is at reducing the height and velocity of incoming storm waves. Wave energy may be expended in eroding and transporting materials comprising the land surface within the V- and A-zones, as well as by percolation or the downward movement of the stormwater through more permeable land surfaces, thereby lessening the effects of backrush, scour, and erosion. Development in V- and A-zones may impair or destroy said characteristics of LSCSF, which are critical to the interests described in this Section XVI(A).

Dredging or the removal of materials within V- and A-zones may increase the landward velocity and height of storm waves, thereby allowing storm waves to break further inland and to impact upland wetland resource areas which might not otherwise be impacted. Filling and the placement of solid fill structures within V- and A-zones may cause refraction, diffraction, or reflection of waves, thereby forcing wave energy onto adjacent properties, natural resources, and public or private ways resulting in storm damage. When struck with storm waves, solid structures within V- and A-zones may increase localized rates of erosion and scour. In some cases, the placement of fill within hydraulically constricted portions of LSCSF may increase flood levels in conjunction with heavy rainfall events. The placement of fill within A-zones, where ponding occurs generally as a result of over-wash in LSCSF, may increase flood levels on the subject and adjacent properties above pre-fill flood levels.

LSCSF may also be significant to the protection of wildlife and wildlife habitat. LSCSF is often made up of low-lying areas that are ecologically transitional areas between marine and estuarine ecosystems and upland areas. Resource areas within LSCSF are often important habitats for a large variety of wildlife species. For example, salt marshes provide habitat for many crustaceans and mollusks and serve as critical nursery areas for numerous fin fish species which in turn provide food for those species higher-up in the food chain. These resource areas provide important over-wintering and stopover areas for many species of waterfowl. LSCSF that is adjacent to other wetland resource areas provide important wildlife functions, such as nesting and roosting habitat, and also serve as wildlife corridors connecting coastal zone resources with freshwater wetland resources. In addition, these adjacent areas within LSCSF serve as transitional zones which are needed to protect the coastal wetland resource's ability to provide essential habitats.

LSCSF is also significant to the prevention of pollution. LSCSF can mitigate adverse effects associated with human disturbance and pollutants. Natural or relatively undisturbed LSCSF can reduce erosion and sedimentation, and, in a vegetated state, can prevent pollutants contained in surface runoff from directly entering waterways and other wetland resource areas during flood events.

B. Special Considerations for Sea Level Rise and other Impacts of Climate Change

1. If LSCSF is affected by proposed work or activity that is significant to the interests described in Section XVI(A), the applicant shall take into consideration the impacts of climate change on LSCSF and integrate climate resilience and adaptation strategies to protect the resource area and properties adjacent to said area for the entire design life of the project. The Ordinance defines Impacts of Climate Change to include, without limitation: extreme heat; the timing, frequency, intensity, and amount of precipitation, storm surges, and rising water levels; increased intensity or frequency of storm events or extreme weather events; and frequency, intensity, and duration of droughts. Consideration should also be given to the depth of flood waters and duration of a flooding event.
2. Sea Level Rise (SLR), specifically, is defined by the Ordinance as the rise in sea level over time. Due to climate change, the warming of global ocean water and consequent thermal expansion, subsidence, and the melting of glaciers, ice caps, and the Greenland and Antarctic ice sheets, SLR will continue to accelerate and pose greater risks overtime to human safety and infrastructure, and the City of Boston will experience more frequent and increased coastal inundation, elevated storm surge flooding levels, saltwater intrusion to public and private water supply, loss of coastal recreational resources, coastal erosion, and loss of coastal habitats and resources.
3. All applicants proposing work or activities in LSCSF must include in the NOI a narrative that describes the Impacts of Climate Change on the site and surrounding resource areas that are reasonably expected to occur within the next 50 years based on the best available data and projections of the future Impacts of Climate Change. In the event that the proposed work or activity is temporary in nature, the narrative must describe the Impacts of Climate Change on the site and surrounding resource areas for the determined duration of the temporary work. At a minimum, the Impacts of Climate Change narrative may rely on available and most recent data and projections of Impacts of Climate Change made available by the Department and the Climate Ready Boston initiative or any successor initiative and must meet the requirements set forth in the Commission's filing guidelines. The NOI shall propose specific mitigation

against and/or adaptation to the Impacts of Climate Change employing such strategies and details as are suggested through the Climate Ready Boston initiative or other successor initiative of the City, which may include improvements and enhancements to the resource area to protect LSCSF from the Impacts of Climate Change; the incorporation of building or site measures to reduce heat island effect; reduce stormwater runoff as a result of increasing precipitation, sea level rise, and storm surge events; adapt to increasing sea level rise, precipitation, and storm surge events; and prevent the lateral displacement of storm or flood water to surrounding resource areas or properties.

4. In determining whether to permit proposed work or activities in LSCSF, the Commission shall consider current and anticipated SLR for the design life of such project, the Applicant's inclusion of resilience and adaptation planning in the design and proposed construction of the project, and the adverse impacts of the project on LSCSF and wetland resource areas within LSCSF as they currently exist and as are reasonably expected to exist based on projected impacts of SLR to such resource areas at the end of the design life of the project. An Applicant's failure to take into account Impacts of Climate Change and incorporate mitigation, resiliency, and/or adaptation to the Impacts of Climate Change shall be an independent basis for the Commission to determine that a NOI is incomplete or will otherwise adversely impact the interests protected by the Ordinance and these Regulations.

C. Definition, Critical Characteristics, and Boundary

1. LSCSF is defined by the Ordinance 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. The seaward limit of LSCSF is mean low water.
2. For the purposes of Section XVI(C)(1), the 100-year storm means the storm that results in a base flood having a one percent chance of being equaled or exceeded in any given year. The Commission shall presume that the 100-year storm is that which is designated as the Area of Special Flood Hazard by the Federal Emergency Management Agency (FEMA) Flood Insurance Rate Maps (FIRM) for Boston. If such data is unavailable or deemed by the Commission to be outdated, inaccurate, or not reflective of current or reasonably anticipated conditions, the boundary of LSCSF may be determined from other evidence, including the best available data provided by the City or the Commonwealth of Massachusetts on expected conditions due to climate change.
3. The topography, soil characteristics, vegetation, potential for erosion, and permeability of LSCSF allow for the dissipation of storm wave energy and,

therefore, are the physical characteristics of LSCSF that are critical to the protection of LSCSF values described in Section XVI(A). In addition, for areas in AH-zones that are subject to ponding or A-zones that are hydraulically constricted areas, the ability to store a volume of flood water is a critical characteristic. Hydraulically constricted A-zones are those in which the base flood elevation (BFE) is lower on the landward side of the structure.

- D. Presumption. Where a proposed activity involves the removing, filling, dredging, building upon, over or under, degrading, discharging into, or otherwise altering or posing a significant threat to alter LSCSF, the Commission shall presume that such area is significant to the interests specified in Section XVI(A). This presumption is rebuttable and may be overcome upon a clear showing that the LSCSF does not play a role in the protection of said interests.

- E. Performance Standards
 - 1. When the Commission determines that LSCSF overlays or overlaps with other resource areas protected under the Ordinance, the applicable performance standards for each resource area shall be independently as well as collectively applied, and the project shall be conditioned to protect the interests of all resource areas affected by the project and the ability of such other resource areas to protect the interests described in Section XVI(A).
 - 2. If LSCSF affected by proposed activity or work is significant to the interests described in Section XVI(A), such activity shall not have an adverse effect on the subject site, adjacent properties, properties located in the adjacent Coastal Flood Resilience Zone, or any public or private way by increasing the elevation or velocity of flood or storm waters or by increasing flows due to a change in drainage or flowage characteristics.
 - 3. If LSCSF is significant to flood control or storm damage prevention, the proposed activity or work shall not result in flood damage due to filling, which causes lateral displacement of flood waters that, in the judgment of the Commission, would otherwise be confined within said area. The Commission, in its sole discretion, may permit such activity so long as the activity will not have an adverse effect on said area's ability to provide storm damage prevention and flood control; provided, further, that the activity or work incorporate best management practices to reduce or eliminate damage resulting from SLR and coastal storms.
 - 4. If LSCSF receives and holds coastal flood waters, the proposed activity or work shall not impact the ability of the area to receive, hold, and laterally

spread flood waters without causing unnatural redirection, refraction, diffraction, or reflection of coastal flood waters and waves.

5. If LSCSF receives coastal flood waters that naturally flow across the landform surface without redirecting or channeling the flow, the proposed activity or work shall not cause flood water to become redirected or channeled or increase in velocity, which may cause erosion, scour, and increased storm damage to the project's locus and adjacent areas.
6. If LSCSF is significant to wildlife and their habitat, proposed activity or work shall not impair the capacity of those portions of LSCSF to provide important wildlife habitat functions.
7. If LSCSF is significant to the prevention of pollution, proposed activity or work shall not have an adverse effect on the characteristic of the LSCSF to remove suspended solids and other contaminants from runoff before entering into other wetland resource areas or a body of water.
8. Proposed work or activity in LSCSF which results in alteration to vegetative cover, interruptions in the supply of sediment to other wetland resource areas, or changes to the form or volume of a dune or beach, and such result will have an adverse effect on said dune or beach's ability to provide storm damage prevention and flood control, is prohibited.
9. Notwithstanding Sections XVI(E)(1) through (8), the Commission may, in its sole discretion, permit the following activities provided that the applicant demonstrates to the satisfaction of the Commission that best available measures, as defined by the Ordinance, are utilized to minimize adverse effects on the critical characteristics of and interests protected by LSCSF described in Section XVI(A) herein, and provided further that all other performance standards for overlapping or overlaying wetland resource areas are met:
 - i. Limited projects as specified in the Act at 310 Code Mass. Regs. 10.24(7);
 - ii. Beach and bank nourishment and restoration projects, including fencing, native plantings, and other projects designed to increase resource area stabilization and decrease erosion;
 - iii. Pedestrian walkways for public shoreline access and non-motorized use;

- iv. Improvements necessary to maintain or improve the structural integrity or stability of an existing coastal engineering structure, as that term is defined by the Ordinance;
- v. Projects which will protect, restore, rehabilitate, or create a wetland resource area;
- vi. Projects that are approved, in writing, or conducted by the Commonwealth of Massachusetts Division of Marine Fisheries that are specifically intended to increase the productivity of land containing shellfish, including aquaculture, or to maintain or enhance marine fisheries;
- vii. Projects that are approved, in writing, or conducted by the Commonwealth of Massachusetts Division of Fisheries and Wildlife that are specifically intended to enhance or increase wildlife habitat; and,
- viii. Projects that are designed and intended to reduce the risk of coastal flooding, inland flooding, extreme weather events, SLR, and other adverse impacts of climate change, including, but not limited to, strategies and plans described in Climate Ready Boston or any successor initiative of the City.

10. In the interest of storm damage prevention, flood control, and prevention of pollution, should the Commission permit activity or work in LSCSF that is part of new construction or constitutes substantial improvement to an existing structure, the Commission may condition the permitted activity or work so that any critical building systems, infrastructure, or equipment is located two (2) feet above the anticipated BFE expected to occur within the next 50 years based on the best available data and projections of SLR.

- i. In the event that the proposed work or activity is temporary, then any critical building systems, infrastructure, or equipment shall be located two (2) feet above the anticipated BFE at the conclusion of the project's determined duration of the temporary work.
- ii. At a minimum, the anticipated BFE shall be based on the best available and most recent data and projections for SLR made available by the City or any of its agencies, boards, commissions, or quasi-City agencies, including, but not limited to, data and information made available through the Climate Ready Boston initiative or any successor initiative.

- iii. In the event that elevating or relocating critical building systems, infrastructure, or equipment is not practicable, as determined by the Commission, the Commission may require the Applicant to employ other floodproofing strategies such as floodwalls or shields, and the Applicant shall, at a minimum, secure such equipment with anchors or tie-downs to prevent flotation.

11. Any proposed work or activity in LSCSF shall not destroy or otherwise impair any portion of LSCSF that is within an ACEC.
12. Section XVI(E)(11) shall supersede the provisions of Section XVI(E)(9)(i) through (viii), but it shall not apply if the presumption set forth in Section XVI(D) is overcome.
13. Notwithstanding the provisions of Section XVI(E)(2) through (X), no project may be permitted which will have any adverse effect on specified habitat sites of rare vertebrate or invertebrate species indicated on the most recent Estimated Habitat Map of State-listed Rare Wetlands Wildlife (if any) published by the Massachusetts NHESP.

F. Redevelopment Within Previously Developed LSCSF

1. For purposes of this section, Redevelopment shall mean work or activity that constitutes previously developed or degraded areas prior to December 19, 2019.
2. Notwithstanding the provisions of Section XVII(E), the Commission may permit work or activity that constitutes a Redevelopment, provided that the work or activity shall conform to the following criteria:
 - i. At a minimum, proposed work or activity shall result in an improvement over existing conditions of the capacity of LSCSF to protect the interests described in Section XVII(A) and/or adaptations to or mitigation against the impacts of SLR on the project and the area of the proposed work or activity;
 - ii. Stormwater management is provided according to the performance standards established in 310 Code Mass. Regs. 10.05(6)(k), including such performance standards as are applicable to proposed Redevelopment.
 - iii. The proposed work or activity shall not inhibit any planned flood resilience, adaptation, or mitigation solutions and shall not inhibit the ability to enact such solutions in a timely and

practical manner as referenced by Climate Ready Boston or any successor initiative of the City.

3. Notwithstanding the provisions of Section XVII(E)(12), the provisions of Section XVII(E)(9), (10), (11), and (13) shall apply to proposed Redevelopment.

G. Effective Date

1. Section XVII shall become effective 90 days following the Commission's approval of the Final Regulations and the posting of the Final Regulations, the Statement of Fiscal Effect, and the Amended Small Business Impact Statement with the City Clerk and shall apply to all Notices of Intent filed on or after that date and any subsequent procedures related to such filings made on or after that date.
2. Section XVII shall not apply to any Notice of Intent filed prior to the effective date, or to any extensions of any Order of Conditions the Notice of Intent for which was filed prior to said effective date.