



TOWN OF NEWINGTON – MASTER PLAN UPDATE 2017/2018 CLIMATE CHANGE ADAPTATION AND RESILIENCY RECOMMENDATIONS

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Submitted to the Newington Master Plan Subcommittee by
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The following text is recommended for incorporation into the 2017/2018 Newington Master Plan update to address impacts related to climate change and opportunities for adaptive implementation to create a more resilient and sustainable community.

1. SUGGESTED NEW SECTION FOR THE VISION CHAPTER

Coastal Hazards, Climate Change and Adaptation

Vision Statement:

Proactive strategies are identified and implemented that address the impacts of coastal hazards, and ensure the community is better prepared to protect the security, health and safety of its citizens, provide for a stable and viable economic future, and create a more sustainable and climate resilient community.

The town's primary goals relating to coastal hazards and climate adaptation are to:

- Protect important infrastructure.
- Ensure the safety of residents and businesses.
- Identify areas at high risk to coastal hazards including storm flooding and erosion.
- Manage development and use of land and resources in high risk areas.
- Adapt built landscapes and natural landscapes to changing conditions.

Like other coastal municipalities in New Hampshire, Newington is confronted by a challenging set of concerns relating to coastal hazards and climate change that include exposure to storms, coastal erosion and flooding, damage to critical infrastructure, and impacts to key coastal resources. Newington has not experienced significant impacts during extreme and moderate coastal storm events in the past. However projected increases in extreme rainfall events, and localized flooding from storms and seasonal highest tides may increase impacts in the future both in immediate coastal areas and inland. These observed impacts may also be exacerbated by changes in climate including increases in the frequency and intensity of storms and rates of sea-level rise. Flooding is compounded by increased stormwater runoff from development and impervious surfaces.

Projected changes in climate and coastal conditions will present challenges to many sectors of municipal governance, asset and infrastructure management, sustainability of recreation and tourism, and protection of natural resources and coastal ecosystems. Adapting to changing conditions will play an important part in Newington’s strategic planning and actions in the future. Effective preparedness and proactive land use management can help the town reduce its future exposure and improve resilience to increased flood risks and thus minimize economic, social, and environmental impacts.

Ways of Adapting and Being Resilient

Incorporating the latest future projections of sea-level rise and storm flooding into municipal planning and projects will minimize vulnerability and prove beneficial even if future hazards turn out to be less extreme than anticipated. **Adapting** to changing conditions means designing buildings and facilities that account for flooding or modifying uses of land that are compatible under a wide range of conditions. The process of adapting creates buildings and systems that are more **resilient** and better able to perform with fewer impacts.

Adaptation – adjustments in ecological, social, or economic systems in response to actual or expected climatic change and their effects or impacts. It refers to changes in processes, practices, and structures to moderate potential damages or to benefit from opportunities associated with climate change. [<http://unfccc.int/focus/adaptation/items/6999.php>]

Resilience - a capability to anticipate, prepare for, respond to, and recover from significant multi-hazard threats with minimum damage to social well-being, the economy, and the environment. [EPA <http://epa.gov/climatechange/glossary.html>]

It is important for the Town to fully understand future climate related impacts and issues effecting land use, growth and development, and asset and resource management including: present and future coastal hazards; impacts to coastal assets and resources; climate related impacts such as temperature; future growth demands; and community adaptation and resilience strategies.

Recommendations that address climate change related issues are presented in this chapter and in the Existing Land Use Chapter and Future Land Use Chapter.

2. SUGGESTED NEW SECTION FOR THE EXISTING LAND USE CHAPTER

Coastal Hazards, Climate Change and Adaptation

Results from the C-RiSe (Climate Risk in the Seacoast, 2017) Vulnerability Assessment for Newington show that Newington has low risk for flooding from sea-level rise and storm surge due to the relatively steep topography, rocky shorelands and saltmarsh along its coastal areas. The Newington report and map set are available at <http://www.rpc-nh.org/regional-community-planning/climate-change/crise>.

The C-RiSe maps indicate several waterfront businesses may experience modest to moderate flood impacts from sea-level rise and coastal storms. In the fall of 2017, members of the Master Plan subcommittee and staff from the Rockingham Planning Commission met with representatives from Great Bay Marine, Sprague Energy and Little Bay Lobster Company to present results from the C-RiSe assessment report and review maps of high potential flood risk areas. The goal of these meetings was to

facilitate discussion about the working waterfront and how best to protect its sustained use by commercial businesses.

Few residential parcels are impacted by projected sea-level rise and storm related flooding. No homes are directly impacted but rather flood inundation is limited to undeveloped portions of residential lots. From a land use perspective, any new subdivision of land should utilize the C-RiSe maps to determine if any high risk flood areas are present. These high risk flood areas should be designated as “no build” areas including roads, buildings, structures and septic systems, and driveways except where crossing is necessary to gain access to buildable land. Any crossings within high risk flood areas should be designed to accommodate future projected sea-level rise and storm surge conditions.

3. SUGGESTED NEW SECTION FOR THE FUTURE LAND USE CHAPTER

Coastal Hazards, Climate Change and Adaptation

The C-RiSe Vulnerability Assessment (Climate Risk in the Seacoast, 2017) for Newington should be used in future land use planning, land development, road placement and design, and drainage infrastructure management to identify areas at high for flooding from sea-level rise and storm surge. The Assessment can also inform investment in land and resource conservation to preserve sensitive coastal ecosystems, such as saltmarsh, and protect highly vulnerable areas from development. Additionally, the Assessment can help guide future development and redevelopment of the commercial working waterfront areas. The commercial businesses are vital economic assets for Newington, providing commodities, recreational facilities, and deepwater port facilities that serve the state and New England.

The goal of applying the C-RiSe assessment to future planning is to:

- reduce the town’s exposure to climate related and flood risk and hazards,
- preserving ecosystems functions and critical habitats,
- protect public health and safety through improved emergency management and response, and
- minimize the cost of repair and rebuilding from flood and storm events over time.

4. CLIMATE CHANGE ADAPTATION AND RESILIENCY RECOMMENDATIONS

Based on the C-RiSe (Climate Risk in the Seacoast, 2017) Vulnerability Assessment results and local knowledge of coastal hazards, the following are identified strategies and actions of local and regional significance that should be addressed in future policy, planning, regulatory and non-regulatory initiatives by the Town of Newington and the community. These strategies and actions are organized under 7 primary Goals.

Goal 1. Protect municipal and state roads, bridges, culverts, and supporting infrastructure. [Municipal]

- R1.1 Coordinate with the NH Department of Transportation on anticipated improvements to state and local roadways most vulnerable to flooding and leverage funding necessary for such improvements.
- R1.2 Conduct detailed drainage analyses to evaluate freshwater/stormwater and tidal flooding impacts.

R1.3 Evaluate whether replacement of culverts is necessary in high flood risk areas to ensure proper drainage of stormwater and flood water.

R1.4 Keep stormwater drainage infrastructure maintained and clear of debris.

Goal 2. Protect drinking water supplies and sources and maintain its infrastructure. [Research, Municipal]

R2.1 Evaluate future drinking water and wastewater needs for the town, residents and businesses.

R2.2 Identify and prioritize actions to protect water quality and water quantity of local aquifers.

R2.3 Prepare a map of areas served by private wells and public water systems.

R2.4 Compile ongoing research in the region about the future effects of rising groundwater levels on drinking water supplies, natural systems and wildlife habitats, and the developed landscape.

Goal 3. Increase resilience of municipal infrastructure and facilities. [Municipal]

R3.1 Utilize the best available climate science and flood risk information for the siting and design of new, reconstructed, and rehabilitated municipal structures and facilities.

R3.2 Incorporate infrastructure assessments and improvements in the Capital Improvement Plan by dedicating funds for improvements to infrastructure and facilities.

R3.3 Incorporate vulnerability assessment information and adaptation strategies for structures and facilities planning and investment for long term capital projects in municipal Capital Improvement Programs (CIPs).

R3.4 Apply for FEMA pre-disaster mitigation grant funds for infrastructure systems improvements, and other sources of funding to implement climate adaptation and planning strategies that reduce or eliminate flooding impacts.

R3.5 Be proactive about acquiring funds to implement flood risk reduction projects.

R3.6 Evaluate federal and state funding options for shoreline management and protection projects.

R3.7 Encourage adoption of buffers and setbacks that better account for risk and vulnerability of municipal structures and facilities, and maintain ecosystem services (e.g. flood storage, storm surge protection).

R4.8 Incorporate solar energy installations for municipal buildings and facilities.

Goal 4. Implement sound land use and development standards that minimize risk and impacts to public and private property. [Regulatory, Land Use]

Land Use and Development

R4.1 Begin discussions with elected officials, planning board and zoning board of adjustment about long term options for management and regulation of land uses, development and natural resources in areas at high risk of flooding and erosion (e.g. land use development standards, building code, and zoning).

- R4.2 Revise building codes to enable adaptive construction techniques and designs, considering increases in maximum building height standards to allow elevating structures above the base flood elevation.
- R4.3 Revise zoning ordinances and regulations to incorporate flood-smart stormwater controls (e.g. reduce stormwater volume and impervious cover) and enforce implementation of low impact development standards.
- R4.4 Track cumulative improvements to structures in the Special Flood Hazard Area designated on the FEMA Flood Insurance Rate Maps.
- R4.5 Improve management of coastal shoreline protection structures and natural features (e.g. revetments, sea walls, beaches, wetlands and marshes), and evaluate areas where construction of sea walls may be needed to protect infrastructure, property and natural resources.
- R4.6 Amend existing floodplain ordinances; this may require adjustment of limits on maximum building height.
- R4.7 Consider adopting freeboard (+2-4 feet) and elevation of utilities above the Base Flood Elevation for all new construction and substantial improvements to residential and non-residential structures.
- R4.8 Conduct outreach to property owners, land use boards, staff and elected officials about what freeboard would look like on shoreline landscapes.
- R4.9 Adopt land development regulations aimed at minimizing impervious surfaces and stormwater flooding, and reducing or preventing non-point source pollution.
- R4.10 Require development project approvals to include drainage maintenance plans for stormwater infrastructure and streams or open drainage ways on site.

Goal 5. Protect natural resources and recreational assets from impacts of coastal hazards.

Collaboration & Research

- R5.1 Coordinate with the state, state agencies and coastal municipalities to manage coastal lands and resources to adapt to future conditions.
- R5.2 Support efforts to prepare a comprehensive shoreline management plan that includes protection and restoration of living shorelines.
- R5.3 Protect future marsh migration areas identified by marsh migration modeling.
- R5.4 Identify areas where erosion and shoreline instability exist, and prioritize areas for nature-based approaches (e.g. beach nourishment, marsh restoration and living shorelines).
- R5.5 Assess existing and future recreational areas for their potential to provide storage for flood waters and stormwater runoff.

Policy

- R5.6 Enable the Conservation Commission to formally comment on development applications by defining their role with respect to the Planning Board’s review and approval process.

R5.7 Revise land conservation priorities to incorporate criteria in the selection process to consider the value and benefits of protecting critical ecosystems and flood storage areas, and increasing land protection efforts in areas of high flood risk in the future.

R5.8 Preserve open space and recreational areas that serve to minimize climate change impacts.

Practices

R5.9 Engage in best practices for invasive species planning and removal and incorporate climate considerations in invasive species removal plans.

R5.10 Utilize existing state and federal grant programs for natural resource restoration.

R5.11 Provide recommendations and incentives for removal of structures and facilities, such as freshwater and tidal crossings, that create barriers to tidal flow and habitat migration, particularly those that will be impaired or severely impacted by sea-level rise, storm surge, or extreme precipitation.

Planning

R5.12 Develop natural resource restoration plans that explicitly consider future coastal risk and hazards, and the ecological services that they provide.

R5.13 Incorporate in plans and implement strategies to prepare and adapt coastal recreational resources based on best available climate science.

Regulatory

R5.14 Encourage adoption of buffers and setbacks that restore and maintain ecosystem services (e.g. flood storage, storm surge protection, habitat, recreation).

R5.15 Improve design standards for dams, culverts and bridges to maintain existing function and reconnect fragmented surface waters (wetlands, lakes, ponds, rivers and streams) and protect high quality habitat for aquatic organisms.

Goal 6. Increase hazards preparedness and response capability across all municipal functions and services. *[Municipal]*

Emergency Management

R6.1 Incorporate coastal hazards and risks assessments in municipal emergency management and hazard mitigation plans, and improve connections and efficiencies between these plans.

R6.2 Collaborate with private sector representatives to evaluate and identify necessary improvements to emergency communications systems preparedness to ensure 911 and other critical communications services remain operational during emergencies and disasters.

R6.3 Update municipal evacuation plans (e.g. maps of vulnerable areas, methods to deliver warnings and announcements and when most appropriate, outreach to affected property owners as needed) and coordinate plans with those of adjacent municipalities.

R6.4 Incorporate early communication and notification protocols into local and regional evacuation route planning.

R6.5 Enhance communication infrastructure (e.g. cell towers/coverage) and planning before and during emergency events and incorporate new technologies.

R6.6 Update emergency preparedness plans, master plans and regulations to address coastal hazards and adaptation.

Outreach

R6.7 Conduct outreach to property owners, land use boards, staff and elected officials about the benefits of the National Flood Insurance Program.

R6.8 Provide training to elected officials and land use boards and commissions about climate related hazards and impacts.

Planning & Assessment

R6.9 Prepare a Response and Recovery Plan or Policy to guide rebuilding, redevelopment and reuse of lands and resources following a catastrophic event.

R6.10 Develop a Comprehensive Coastal Adaptation Implementation Plan.

- Include descriptions of actions, timeline, budget and assigned lead.
- Coordinate this Plan with state comprehensive shoreline management.

R6.11 Evaluate deficiencies and barriers in municipal regulations, plans and policies, and their implications for local and regional vulnerability.

R6.12 Consider vulnerabilities of local tax base, state economic development plan, retention or replacement of economic resources, at risk populations and population migration as a result of coastal flooding.

R6.13 Adapt economic development planning approaches to respond to changing environmental conditions, leverage shifting opportunities, and promote resilience and sustainability planning as economic development strategies.

R6.14 Maintain and expand partnerships with state and federal agencies to obtain grants, technical assistance, and coordinate land use, transportation and natural resource planning.

Goal 7. Support community preparedness and awareness of coastal hazards. *[Municipal/Community Based]*

R7.1 Provide information to residents and businesses about adaptation options to reduce flood risk and lowering insurance premiums through adaptation (e.g. the benefits of voluntarily elevating structures above the current base flood elevation).

R7.2 Conduct outreach to current and future affected property owners about potential flood risks to inform decisions about their property and investments.

R7.3 Provide informational materials about flood risk reduction at public and community events.

R7.4 Schedule events at the library or other public venues featuring topics relating to coastal hazards and preparedness, and climate adaptation.

- R7.5 Provide outreach and information to residents about how to clean up after a storm event (e.g. drainage ways, driveway culverts etc.)
- R7.6 Encourage homeowners to obtain flood insurance through the National Flood Insurance Program, and in moderate- to low-risk areas, to purchase a Preferred Risk Policy.
- R7.7 Encourage landowners to preserve the beneficial functions of natural features like wetlands and to restore and protect coastal habitats and living shorelines.
- R7.8 Provide information through outreach to residents and businesses about the benefits of living shorelines.
- R7.9 Partner with federal and state agencies as well as regional and local organizations to expand resources for education, outreach, and coordination.
- R7.10 Encourage the incorporation of climate science and information about the risks and hazards associated with changing climatic conditions in public school curriculum.
- R7.11 Engage youth and young adults about climate change issues through social media.
- R7.12 Improve information available to property owners and prospective buyers about coastal hazards and vulnerabilities.
- R7.13 Improve consumer protection disclosure for properties sold in areas vulnerable to coastal flooding.

CLIMATE ADAPTATION AND RESILIENCE GLOSSARY

100-year Coastal Floodplain

Includes flood hazard areas subject to tidal flooding and storm surge and identified on the FIRMs as a Special Flood Hazard Area (SFHA). SFHA are defined as the area that will be inundated by the flood event having a 1-percent chance of being equaled or exceeded in any given year. The 1-percent annual chance flood is also referred to as the base flood or 100-year flood. In coastal areas, these SFHAs are defined as specific zones on the FIRM's: In most communities, there are two areas or flood zones within the SFHA:

- A zone – an area subject to a 1 percent annual chance of a flood event but does not have a mapped elevation and;
- AE zone – an area that has the same 1 percent annual chance of a flood event and a corresponding mapped flood elevation of 9 feet.

Accommodate

Measures that manage risk by requiring development to be built and retrofitted to be more resilient to impacts and by limiting certain types or all development in highest risk areas, favoring adaptive uses (i.e. passive uses such as recreation) and gradual modification of structures and uses as conditions change over time.

Adaptation

Adaptation refers to adjustments in ecological, social, or economic systems in response to actual or expected climatic change and their effects or impacts. It refers to changes in processes, practices, and structures to moderate potential damages or to benefit from opportunities associated with climate change.

[<http://unfccc.int/focus/adaptation/items/6999.php>]

Climate Change

Climate change refers to any significant change in the measures of climate lasting for an extended period of time. In other words, climate change includes major changes in temperature, precipitation, or wind patterns, among others, that occur over several decades or longer.

[EPA <http://epa.gov/climatechange/glossary.html>]

Coastal Flooding

Upland areas inundated by tides, storm surge, and projected sea-level rise.

Coastal Hazards

Natural or human-induced physical events (e.g. hurricanes, nor'easters, storm surge, sea-level rise, extreme precipitation) that may cause damage or impacts to natural systems, structures or humans.

Extreme Rainfall Event

As defined by the 2014 National Climate Assessment, the largest one percent of daily precipitation events in a year.

Freeboard

Elevating a structure above the base flood elevation which is the water elevation for a 100-year/1% chance flood as reported on a FEMA Flood Insurance Rate Map (FIRM) or other local or site specific flood study.

High Risk Areas

Areas within or outside a floodplain subject to periodic or routine flooding or active erosion.

Impervious Surface

Mainly artificial structures or surfaces - such as pavements, roads, sidewalks, driveways and parking lots - that are covered by impenetrable materials such as asphalt, concrete, brick, stone, and rooftops that prevent water from infiltrating into the soil.

Mean Higher High Water (MHHW)

The average of the higher high water height of each tidal day observed over the National Tidal Datum Epoch. The National Tidal Datum Epoch (NTDE) refers to the specific 19-year period adopted by the National Ocean Service as the official time segment over which tide observations are taken. The present NTDE is 1983 through 2001 and is considered for revision every 20-25 years (the next revision would be in the 2020-2025 timeframe).

Resilience

A capability to anticipate, prepare for, respond to, and recover from significant multi-hazard threats with minimum damage to social well-being, the economy, and the environment.

[EPA <http://epa.gov/climatechange/glossary.html>]

Retreat

Often the last action before abandonment, retreat follows an incremental path of planning for the eventual relocation of structures to upland areas as properties become threatened or directly impacted by rising sea level, erosion and coastal storms. Such measures may include rolling setbacks and buffers, transfer of development rights, and property acquisition/buyout programs.

Riverine (and Freshwater) Flooding

Areas inundated adjacent to freshwater drainage systems not affected by coastal flooding, including the 100-year flood plain and other areas subject to flooding from precipitation and snow melt.

Sea-level rise

Sea level is measured in various ways. Relative Sea Level refers the measurement of sea level at a local tide gauge station which is referenced relative to a specific point on land. These

measurements at any given local tide gauge station include both measurements of global sea-level rise and local vertical land movement, such as subsidence, glacial rebound, or large-scale tectonic motion. Because the heights of both the land and the water are changing, the land-water interface can vary spatially and temporally and must be defined over time. The term *Mean Sea Level* (MSL) refers to a tidal datum (which a frame of vertical reference) defined by the average tide over a specific period of time. *Global Sea-level rise* (or eustatic sea-level rise) refers to the increase currently observed in the average *Global Sea Level Trend*, which is primarily attributed to changes in ocean volume due to two factors: ice melt and thermal expansion. [NOAA <http://www.tidesandcurrents.noaa.gov/est/faq>]

Storm Surge

Storm surge is the rise of water level accompanying intense events such a tropical storm, hurricane or Nor'easter, whose height is the difference between the observed level of the sea surface and the level that would have occurred in the absence of the storm event.

[EPA <http://epa.gov/climatechange/glossary.html>]

Vulnerability Assessment

An evaluation of the degree to which a system is susceptible to, or unable to cope with, adverse effects of climate change, including climate variability and extremes. Vulnerability is a function of the character, magnitude, and rate of climate variation to which a system is exposed, its sensitivity, and its adaptive capacity. [www.ipcc.ch/pub/syrgloss.pdf]