

Adaptation strategies to improve a community's resilience to sea-level rise (SLR) include balancing:

- Protection** of people, property and infrastructure;
- Adaptation** in where and how one builds;
- (Planned) retreat** from areas of high risk of flooding; and
- Preservation** of natural resources.

FEMA's 2012 flood modeling puts the 1%-annual chance Stillwater flooding level on Dewey Beach's bayside at 4.8' to 5.0' (NAVD88); Oceanside at 7.4' to 7.9' (NAVD88).

The closest USGS tide gauge to Dewey Beach is Hydrologic Unit 02060010, on the north shore of Rehoboth Bay at Head of Bay Cove, at the south end of Venetian Drive on the bulkhead of a boat slip (Lat 38°41'39.2", long 75°05'03.2"). The datum of this gauge is referenced to the National Geodetic Vertical Datum of 1929, and is -0.78' above NAVD88. The maximum elevation recorded during Super Storm Sandy was 5.34'. Flood marks from the Storm of 1962 correspond to a maximum elevation of 7.0'.

Items for discussion, to implement immediately:

1. **Amend 101-6. Coastal Floodplain Area sub-sections A., B. and C. to explicitly mention VE, AE and AO special hazard areas.** Possible amendments include:
 - Simple amendments to clarify that "coastal high hazard area" designates all VE zones; "general floodplain areas", all AE zones; and "areas of shallow flooding", all AO zones. In 101-4 "coastal floodplain area" includes VE and AE zones.
 - Alternative definition of "coastal high hazard" to include all property seaward/channelward of the FEMA limit of moderate wave action (note: proposed limit of moderate wave action is landward of the boundaries of VE zones).
2. **Amend Sections 101-11. A. and B. of Town Code to increase freeboard¹ requirements** within the general floodplain ~~area~~ and coastal high hazard areas to two feet from one foot in recognition of the likelihood of more severe storm-driven flooding, as shown below:

101-11 Elevation, floodproofing and constructions standards within coastal high hazard and general floodplain areas.

- A. Residential structures. Within the general floodplain area the lowest floor, including the basement, of all new or substantially improved residential structures shall be elevated to at least ~~one foot~~ two feet above the one-hundred-year flood elevation.
- B. Nonresidential structures. Within the general floodplain area the lowest floor, including the basement, of all new or substantially improved nonresidential structures shall be constructed at least ~~one foot~~ two feet above the one-hundred-year flood elevation, or such structure shall be

1. FEMA defines freeboard as a factor of safety usually expressed in feet above a flood level for purposes of floodplain management. "Freeboard" tends to compensate for the many unknown factors that could contribute to flood heights greater than the height calculated for a selected size flood and floodway conditions, such as wave action, bridge openings, and the hydrological effect of urbanization of the watershed.

designed and constructed so that the space enclosed shall remain completely dry during any flood up to that height.

Questions and discussion points:

- Should we explicitly move items such as this from 101 Floodplain Management to 185 Zoning, or include duplicate language in 185?
- Should we re-define those portions of current RB-2, RB-3, RR and NR zoning districts that are in VE or AE flood zones?
- Should we recommend a one-foot relaxation of current minimum height standards (35') for those businesses and/or residences impacted concurrent with any recommendation for a required base elevation requirement?
- Should we similarly increase the freeboard requirements in 101-13. A. and B. by one foot for areas of shallow flooding (i.e., AO zones)?

3. **Exempt at-risk and/or repetitive-loss structures from prohibitions in 185-60B. regarding extension of buildings that are non-conforming due to encroachment in required setbacks** with respect to raising to FEMA minimum base plus one – or two – foot elevation.

“185-60 B. A building nonconforming only as to height, area, or bulk requirements may be altered or extended, provided such alteration or extension does not increase the degree of nonconformity in any respect. A building which does not conform to the required setbacks in any respect shall not be expanded either vertically or horizontally in the setback area.”

This could be a critical change for properties suffering a substantive loss due to flooding to receive insurance reimbursement from the National Flood Insurance Program.

Questions and discussion points:

- Should any form of relief be provided if the structure in question could be moved in its existing form to another location on the same parcel or lot whereupon it would no longer encroach into a required setback?
- Should we treat “at risk” and “substantial loss or repetitive loss” properties differently; for example providing height relief for properties that have suffered substantial flood damage, but not for properties that are at risk of future flooding?
- Should we provide a mechanism for some or all of such properties to be elevated above FEMA + one (or FEMA + two), and if so under what circumstances and to what base elevation? Of course, the property owner can always go before the Board of Adjustment for a variance to elevate within setbacks.
- What should the requirements be for retaining the “original building envelope”, e.g., habitable area, ceiling heights, and staircase access?
- Should we allow an older building to be razed and rebuilt to its original envelope at the new base elevation using modern materials and meeting modern building codes?
- How should we deal with structures that are currently built to the 35' maximum height and/or structures that would exceed 35' if elevated to FEMA + one (or two)? Would these provision be equally applied to businesses and residences? What about structures having sustained a substantial flood loss versus properties just “at risk” in the “hundred-year storm”?
- Should we specify a range, e.g., more than 2.00' and less than 2.10', or leave to discretion of Building Official (as is height and setbacks now)?

- Should this type of relief only be available as a conditional use, requiring review and a recommendation following a public hearing by the Planning Commission and approval following a public hearing by the Town Commissioners?

4. Amend 185-59 Damage or destruction of nonconforming use or building to prohibit repair or reconstruction in “essentially the same configuration” of any structure in a coastal floodplain area substantially damaged by flood, and require elevation or relocation to comply with FEMA base flood plus 2 feet standards.

185-59 Damage or destruction of nonconforming use or building. If a nonconforming building is damaged by fire, storm, infestation or other peril not caused intentionally by the property owner, it may be repaired or reconstructed to essentially the same configuration as existed prior to the damage, provided that any repair or reconstruction must be completed within one year and six months of the date of the damage. If a different configuration or an expansion of the original building is proposed, it must conform to all applicable regulations, including all applicable setbacks, height and elevation requirements.

- Except that any nonconforming building located in a coastal floodplain area that is substantially damaged due to flooding shall not be permitted to be repaired or reconstructed except in a location and/or manner so as to be in compliance with all Town and FEMA/NFIP requirements to mitigate against future flood loss.
- If a building which does not conform to all setback requirements sustains substantial flood loss and cannot be moved to a different location of the same property and/or repaired or reconstructed so as to be compliant with Town/FEMA/NFIP base elevation requirements, then ... (copy in relief from item 3 above.

Has all the questions and issues of previous item, and issue of defining/re-defining “substantial” damage.

5. Amend 101-15 A. for enlargement of existing structures seaward or channelward of mean high tide as:

101-15 Existing structures in coastal floodplain areas.

Structures existing in any coastal floodplain area prior to the enactment of this chapter, but which are not in compliance with these provisions, may continue to remain subject to the following:

- Within the coastal high hazard area existing structures located seaward or channelward of the reach of mean high tide shall not be expanded or enlarged.

Questions and issues:

- Existing language only bears on Oceanside; new proposed flood maps now have VE zone on bayside
- Should we extend to all coastal floodplain areas, i.e., VE and AE?

6. Amend 101-15. B. to redefine “substantial improvement” to existing structures in coastal floodplain areas (VE and AE zones), as:

- B. Any modification, alteration, reconstruction, or improvement of any kind to an existing structure; to an extent or amount of ~~50% or more~~ that exceeds one-third of the market value of the existing structure, as measured by the current property value less the value of the unimproved lot, or that within a period of ten years exceeds a cumulative total amount of 50% of said market value, shall be undertaken (only in full compliance) with the provisions of this chapter.

Questions and discussion points:

- 101-15 B. seems to address improvements to existing structures. Should we draft a new 101-15 C. that parallels B. but addresses reconstruction following substantial flood damage?
- Should we incorporate this new definition of “substantial damage/improvement” elsewhere in the code?

7. Prohibit littering, dumping and discharge in ditches, storm sewers, bay and lakes, and the ocean, possibly under an expanded 185-20 Sewage or wastewater holding tanks and dumping.

8. Waive or reduce building permit fees for new and retrofit projects that improve resilience to SLR, or for repairs following substantial flood-damage, under 185-80 Building Permit Fees.

Table until after DNREC Oct 5, 2013 meeting re: Silver Lake & Lake Comegys**9. Lake-side building restriction zone**

- A. Add a row labeled “Lake-side no build zone” in Table 2 Bulk zoning Standards in All Districts, immediately after the “Minimum setback requirements (Feet)” row.

The area within 10 feet of the undisturbed, natural shoreline of Silver Lake and Lake Comegys is designated a no-build zone, see section 185-49. F.

- B. Add a new 185-49. F.

No permanent structure shall be constructed or placed landward within 10 feet of the undisturbed, natural shoreline of Silver Lake or Lake Comegys, nor shall this buffer be used for a driveway or parking area. Temporary accessory structures, such as a child’s play area or shed not exceeding 40 square feet in area or 8 feet in height may be placed in this no-build zone provided there is no excavation for footings or pilings or any in-ground structure such as a kiddie-swimming pool or fish pond, and that no portion of this area is re-graded or paved. This restriction shall supersede any provision of this Code which might otherwise permit a structure, a part of a structure, projection from a structure, fence or screen to occupy any portion of the required no-build buffer zone.

- a. No more than 10% of this no-build zone shall be covered with such accessory structures as mentioned above. All remaining areas of this no-build zone shall be left open to the sky and remain a natural area as defined in Section 1-16 of the Dewey Beach municipal code.
- b. Nourishment or re-nourishment of an existing lake-side shore line shall be prohibited, as shall grading or paving of any portion of the above defined lake-side no build zone, or any other action that might negatively affect surface-water runoff or increased pollution of these lakes.
- b.c. This building restriction zone shall not restrict the construction of any dock or pier that would otherwise be permitted by DNREC or other cognizant state regulatory agency.

10. **Bay-side no-build zone.** Develop similar language to 101-9. B. (5), that defines a no build zone within 10 feet of a defined line at elevation MHHT plus 2 feet along Rehoboth Bay. Would need to spend some money to establish the coordinates of this line (similar to the building line shown on DNREC Coastal Zone Map No 15479-19554B)

Items for implementation possibly following a cumulative SLR of 0.5 meter (approx. 1.5 feet).

Questions and discussion points:

- How to define “average sea level” pertinent to Dewey Beach; mean high tide, mean higher high tide, mean low tide, ...?
- Who will be reliable source for this value?
- When and how will this value be updated and subsequently reported to property owners?
- Incorporate into the code now or draft for inclusion in updated Comprehensive Plan (and subsequent inclusion in the code)?

11. Amend 101-15 A. for enlargement of existing structures seaward or channelward of mean high tide, in anticipation of SLR, as:

101-15 Existing structures in coastal floodplain areas.

Structures existing in any coastal floodplain area prior to the enactment of this chapter, but which are not in compliance with these provisions, may continue to remain subject to the following:

- B. Within the coastal high hazard area existing structures located seaward or channelward of the reach of mean high tide plus 2 feet elevation shall not be expanded or enlarged.

Questions and discussion points:

- This proposed language increases the area in which no expansion is permitted.
- Should we retain the limitation of this sub-section to “coastal high hazard” areas, i.e., VE zones, or expand to all coastal floodplain areas (VE and AE zones)?
- Adding the language “plus X feet elevation” takes a proactive stance against SLR, but possibly confounds issues of elevation (an absolute) and “reach” (which involves the details of local topography) and might not be easy to enforce or adjudicate.

Table for later meetings

12. Prohibit hard armoring of bay- and lake-front properties, perhaps by amending 185-52 Boathouses, piers, ~~and~~ bulkheads and other forms of hard armoring sub-section 185-52. B. (2) as:

- (1) Groins, levees, bulkheads, piling, breakwaters, and other similar structures shall be erected and maintained in accordance with applicable location and constructions standards of the county, state and United States Army Corps of Engineers, except that construction or relocation of hard armoring or repair/replacement of storm damaged hard armoring on any lake- or bay-front property or development shall be prohibited.
- a. For the purpose of this section hard armoring shall include all hard-engineered structures whether located on shore or offshore, including but not limited to bulkheads, sea walls, revetments, dikes, tide gates, storm surge barriers, and groins.

Need definition of “hard armoring”, prohibition of building up in floodplain, definition of role and restrictions of DNREC, topography of existing bayside elevations (hard armor, soft armor and natural shoreline), conditional use with removal upon permanent inundation.

13. Amend Section 101-10. H. of Town Code to require elevation of service equipment, as:

- H. For all new or substantially improved buildings, electrical, heating, ventilation, plumbing, and air conditioning equipment and other service facilities shall be ~~designed and~~ located two feet above the one-hundred-year flood elevation and designed so as to prevent water from entering or accumulating within the components during ~~base~~ severe flood conditions.

And similarly for 101-10. E. (3)

Be constructed with electrical, heating, ventilation, plumbing, and air-conditioning equipment and other service facilities that are ~~designed and/or~~ located two feet above the one-hundred-year flood elevation and designed so as to prevent water from accumulating within the components during conditions of severe flooding conditions.

14. Amend 101-10. A. Drainage Facilities, to read:

- (2) Drainage facilities. Adequate storm drainage shall be provided for all new development and substantial improvement of existing structures within coastal floodplain areas. Storm drainage facilities shall be designed to convey the flow of stormwater runoff in a safe and efficient manner. The system shall insure drainage at all points along streets, and provide positive drainage away from buildings. The system shall also be designed to prevent the discharge of excess runoff into adjacent properties.
- a. Roof-top drainage systems for individual properties and developments shall be designed to result in negligible discharge onto any public space or neighboring property through the use of rain barrels, rain gardens or other catchment and storage systems as might be appropriate.
- b. Landscaping, grading and paving shall be done in a manner to result in negligible surface-water discharge onto any public space or neighboring property through the use of rain gardens, permeable paving or other catchment and storage systems as might be appropriate.

(Note: this will likely require amending 185-89 Grading and erosion control)

15. **Extend the new proposed language of 101-10. A. to all of Dewey**, perhaps by incorporating into Article VIII Supplemental Height, Area and Bulk Regulations

16. **Amend 101-16 to extend restrictions to deck construction on the Bay, as:**
 - A. No person shall commence the construction of any structure, or portion thereof, ~~seaward of the DNREC Building Restriction Line~~ channelward of the Rehoboth Bay no-build line on any parcel of real property, except where one or more of the following conditions exist: Whenever a deck is being constructed along with a new building, and said deck is located at or above the lowest living floor of the building and said deck is also making use of the foundation of said building, said deck shall not extend beyond the most ~~seaward~~ channelward point of any lawfully constructed building or deck of a similar nature that is already existing on any immediately adjacent parcel of real property located within the same subdivision as the parcel of real property on which the building or deck is proposed.

(Note: might want to clean up this language here and in the existing sub-section)

17. **Add the requirement for property owners to inform the town of any and all significant storm and/or flood damage regardless of whether or not repairs are made, possibly as 101-9. C.**

18. **Establish a town priority/goal of zero surface water discharge** into lakes, bay or ocean from the non-Rehoboth Bay basin portion of town (i.e., all land areas except that west of Coastal Highway and south of Bellevue). Achieve through re-grading and the use of rain gardens and vaulted permeable paving to eliminate transport of surface water along King Charles, Bayard and side streets. This will proof these culverts and storm drains from sea-level rise and maintenance.

19. **Establish a town priority/goal to eliminate all bay-side VE special hazard areas.** The May 17, 2013 preliminary Flood Insurance Risk map shows the extreme bay side between Dagsworthy and Anchor Way in a VE 7 SHA, including residences on Read, Rodney and Anchor way. The town should develop a plan based, perhaps an extended beach area, dunes and wetlands to protect properties and infrastructure in this SHA.

20. **Establish a plan to revert all repetitive loss properties in SHA to open space.** This will likely require code changes and money.
 - Include a plan to retain all existing open space, especially open space in floodplains, as open space. This will help create critical habitat and help mitigate flooding.
 - Document all historic storm and flooding damage to property, with an eye to establishing a plan for mitigating future damage.
 - Require all repetitive loss properties to elevate or relocate, to comply with current FEMA SHA requirements

21. **Establish regulations to minimize erosion** from land disturbed due to construction, and regulations that improve the quality of stormwater runoff, possibly under 185-89 Grading and erosion control.

22. **Amend requirements in 185-87 (Design Guidelines) Streets and right-of-ways for Driveways (H.) and Sidewalks (I.) to prohibit surface-water run off** from the individual property or development.

23. **Revisit 185-88 Stormwater management, 185-89 Grading and erosion control, and 185-91 Landscaping**, to see how these might be amended to clearly extend best management practices to individual properties upon new construction or significant renovations.

DRAFT