



Appendix B

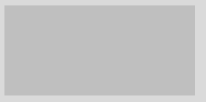
Thematic Adaptation Maps and Dynamic Adaptation Pathway Diagrams



Appendix B-0 Keys for Thematic Maps and DAP Diagrams



Strategy is effective in reducing impacts from a 1 % chance storm event **OR**
 Strategy is effective in reducing impacts from tidal inundation



Strategy may be effective for some storm protection

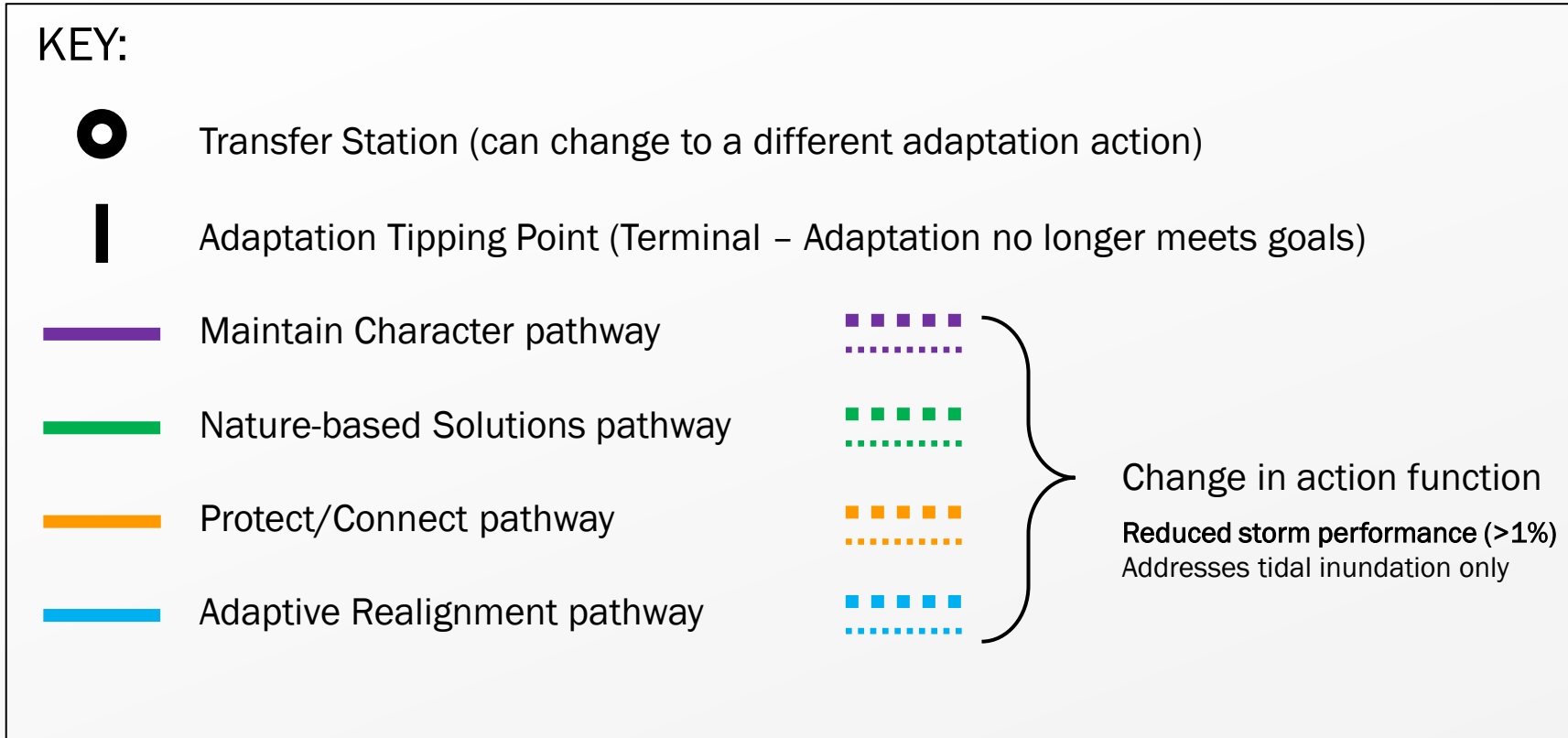


Strategy is no longer effective for reducing impacts from storm or tidal inundation



Strategy could be effective at an earlier time frame but is not necessary

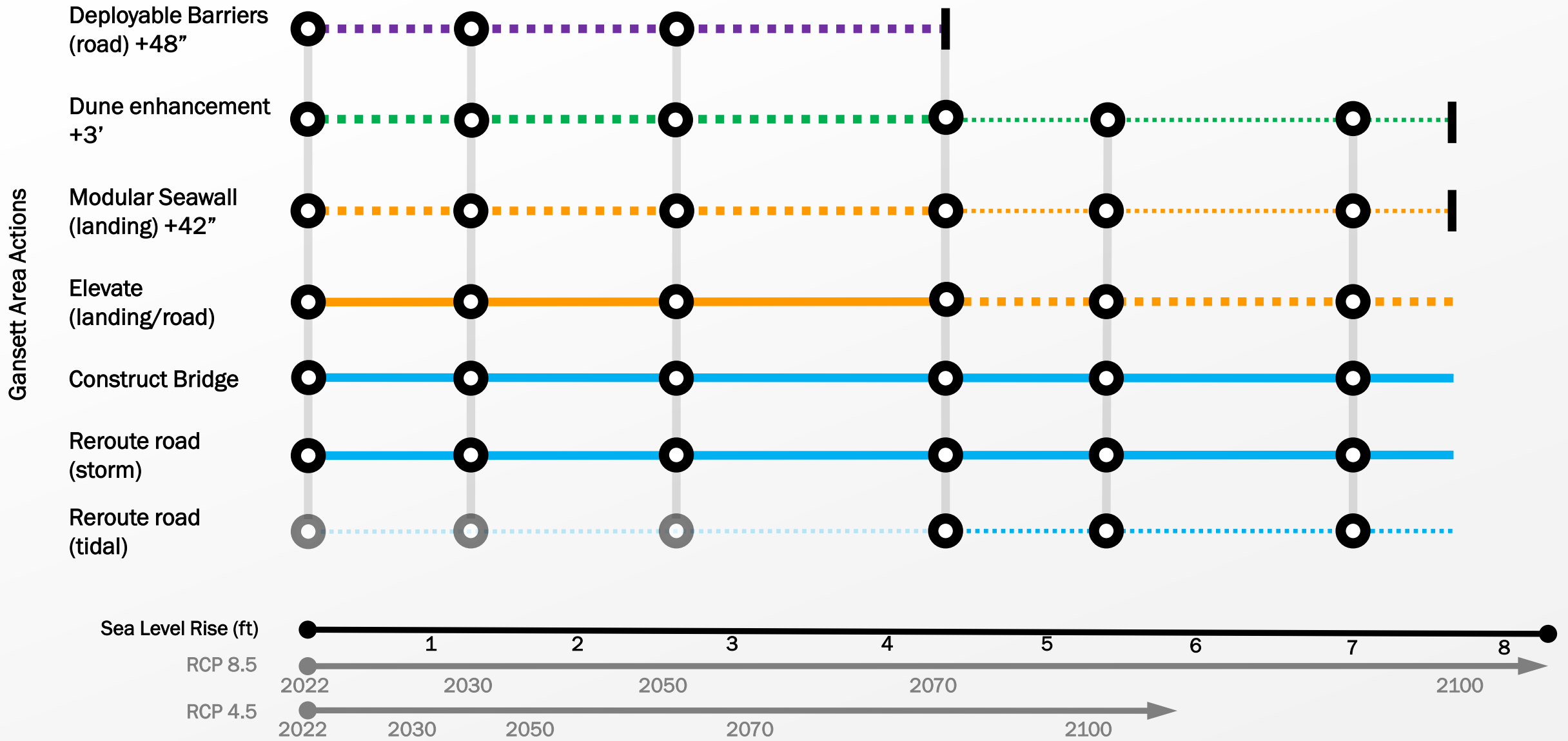
Dynamic Adaptation Pathways for Woods Hole





Appendix B-1 Gansett Management Area

Gansett Area



Management Area Gansett

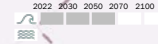


- DEP Wetlands**
- Coastal Beach or Dune
 - Open Water
 - Rocky Intertidal
- Management Area**
- Parcel Boundaries
 - Coastal Infrastructure

Maintain Character

Deployable Barriers

Use deployable barriers (48")
at lower Gansett Road





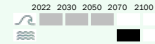
Management Area Gansett

Dune Enhancement

- DEP Wetlands
- Coastal Beach or Dune
 - Open Water
 - Rocky Intertidal
 - Management Area
 - Parcel Boundaries
 - Coastal Infrastructure

Nature-based Solutions

Beach nourishment and dune enhancement at lower Gansett Road landing (+3 ft).



Management Area Gansett



- DEP Wetlands**
- Coastal Beach or Dune
 - Open Water
 - Rocky Intertidal
- Management Area**
- Management Area
 - Parcel Boundaries
 - Coastal Infrastructure

Protect/Connect

Modular Seawall

Install modular seawall (up to 42") at lower Gansett Road landing

Elevate Road/Landing

Raise parking lot and road at lower Gansett Road landing and tie back to high ground

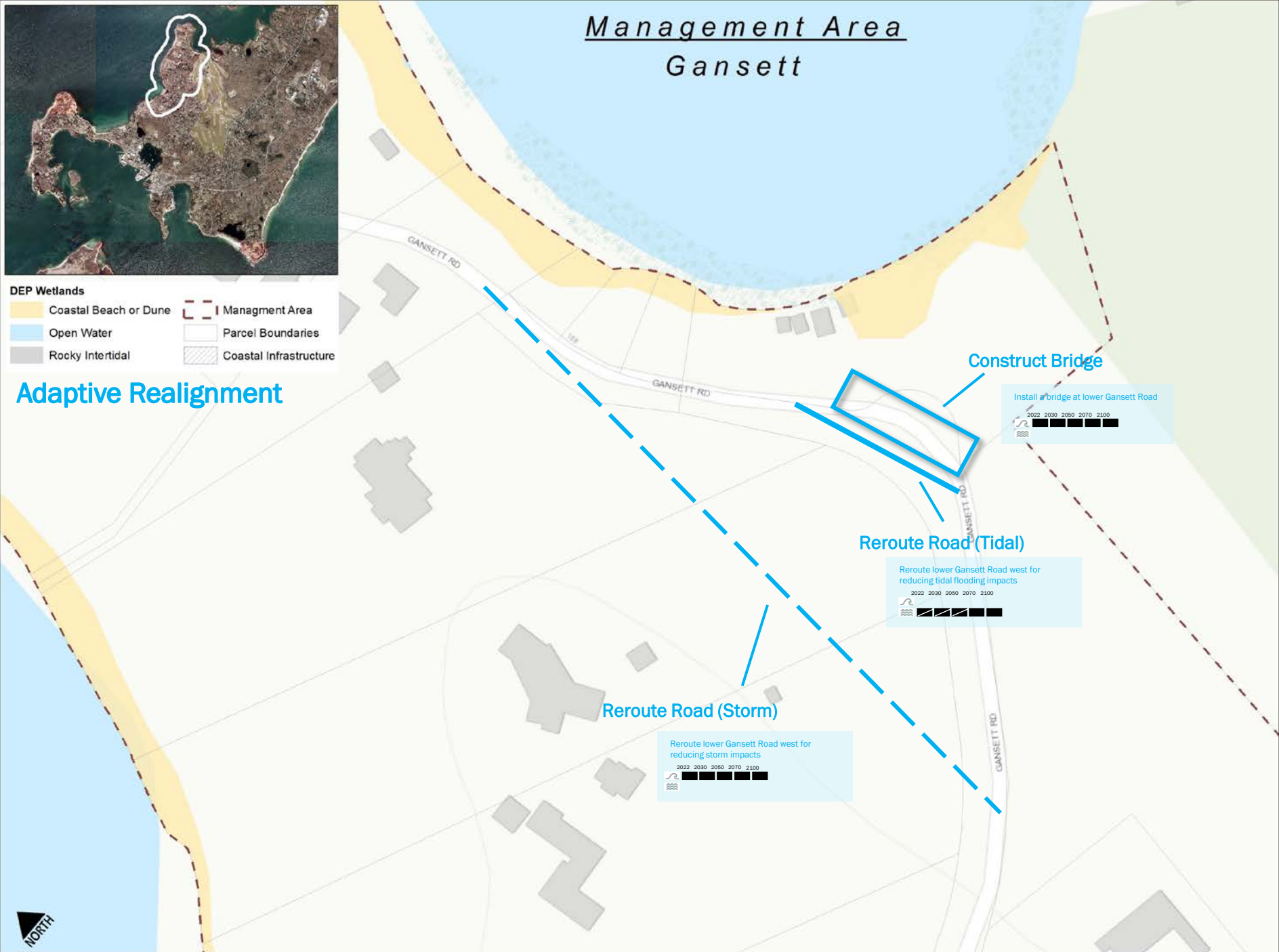




Management Area Gansett

- DEP Wetlands**
- Coastal Beach or Dune
 - Open Water
 - Rocky Intertidal
- Management Area**
- Parcel Boundaries
 - Coastal Infrastructure

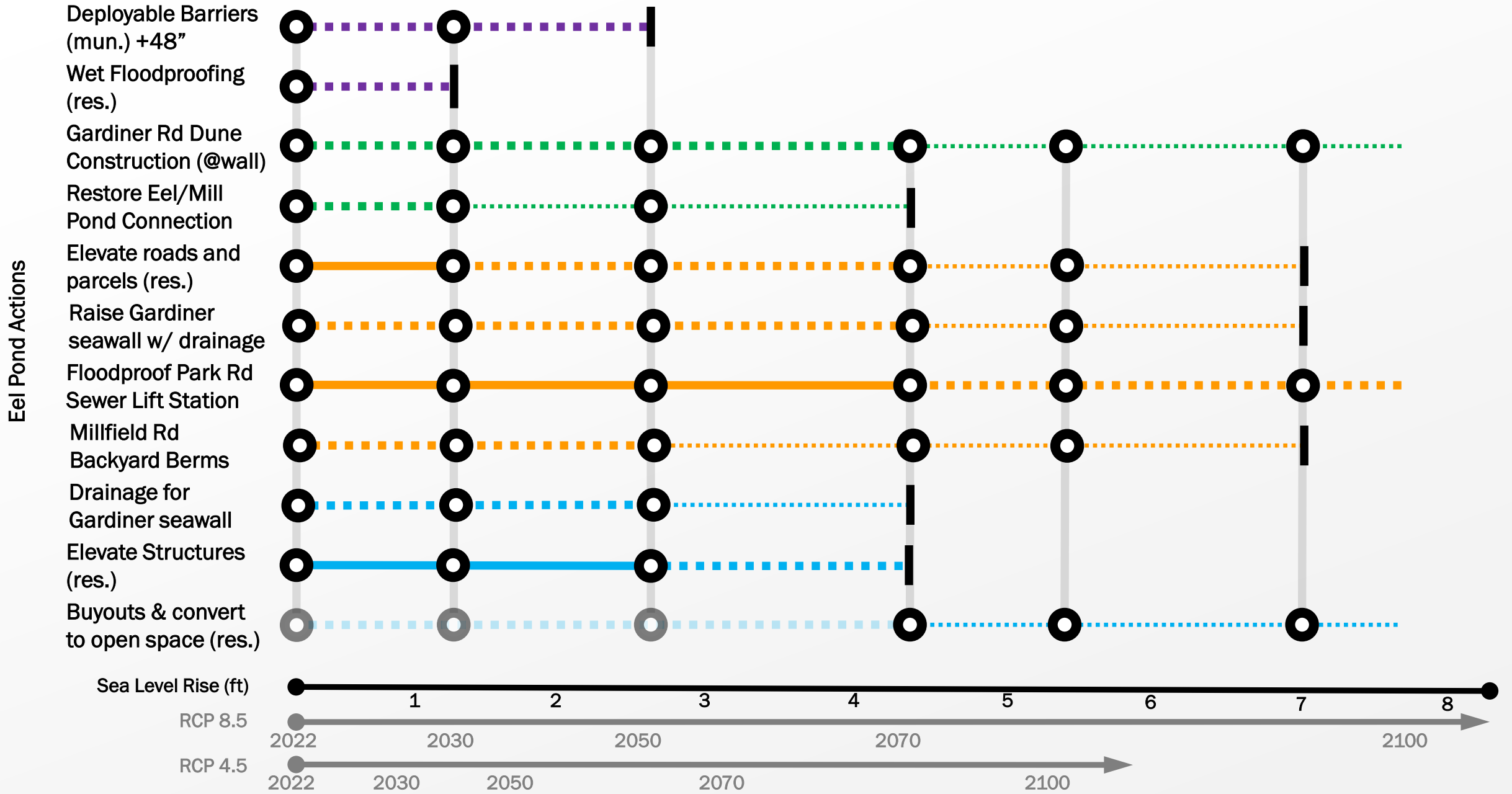
Adaptive Realignment





Appendix B-2 Mill Pond Management Area

Mill Pond Area





Management Area Woods Hole Park Mill Pond

DEP Wetlands	
	Coastal Beach or Dune
	Open Water
	Rocky Intertidal
	Management Area
	Parcel Boundaries
	Coastal Infrastructure

Maintain Character

Deployable Barriers

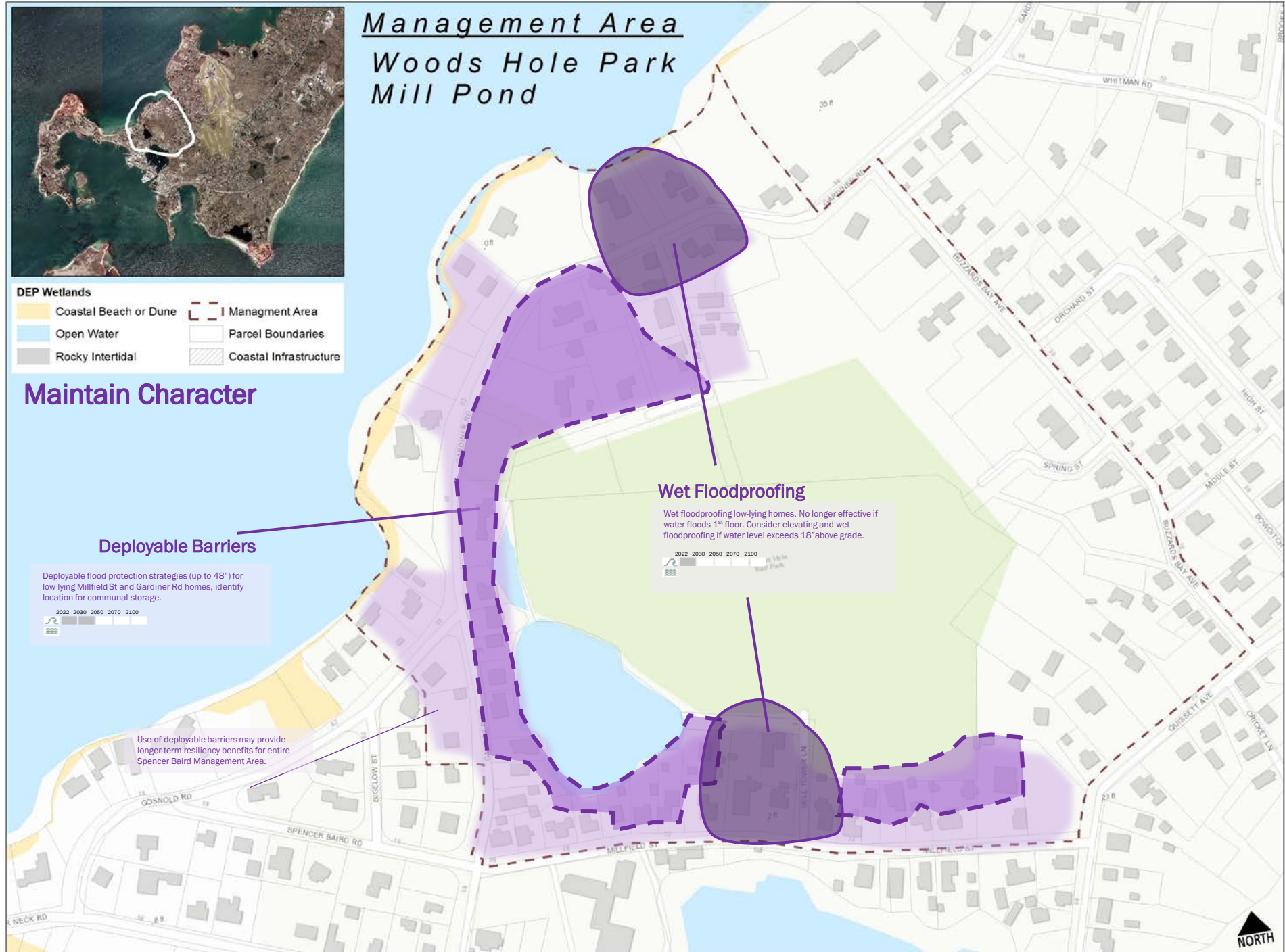
Deployable flood protection strategies (up to 48") for low lying Millfield St and Gardiner Rd homes, identify location for communal storage.



Use of deployable barriers may provide longer term resiliency benefits for entire Spencer Baird Management Area.

Wet Floodproofing

Wet floodproofing low-lying homes. No longer effective if water floods 1st floor. Consider elevating and wet floodproofing if water level exceeds 18" above grade.





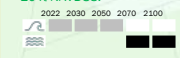
Management Area Woods Hole Park Mill Pond

- DEP Wetlands**
- Coastal Beach or Dune
 - Open Water
 - Rocky Intertidal
- Management Area**
- Parcel Boundaries
 - Coastal Infrastructure

Nature-based Solutions

Dune Construction at Wall

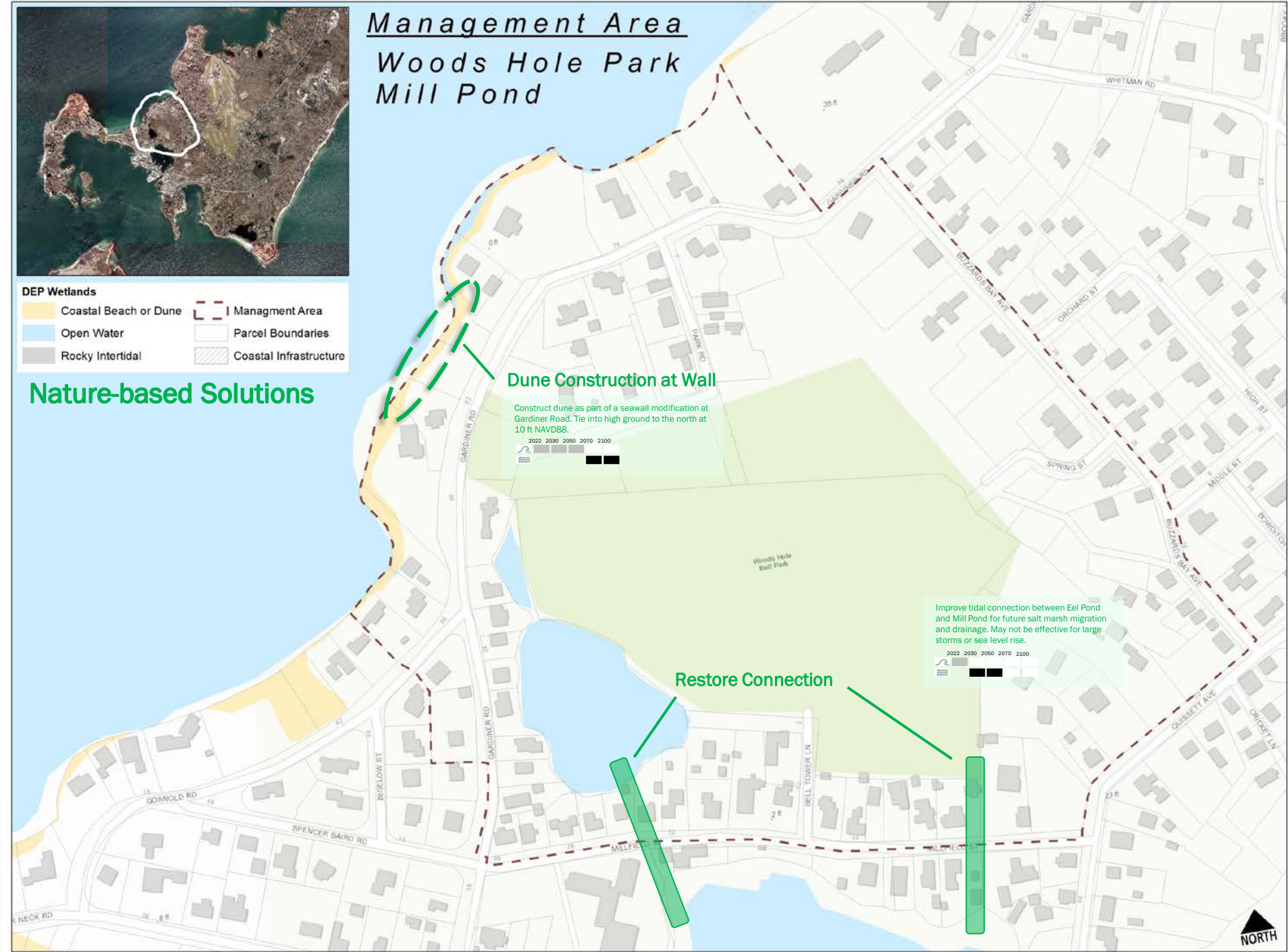
Construct dune as part of a seawall modification at Gardiner Road. Tie into high ground to the north at 10 ft NAVD88.



Improve tidal connection between Eel Pond and Mill Pond for future salt marsh migration and drainage. May not be effective for large storms or sea level rise.









Restore Connection





Management Area Woods Hole Park Mill Pond


DEP Wetlands

 Coastal Beach or Dune	 Management Area
 Open Water	 Parcel Boundaries
 Rocky Intertidal	 Coastal Infrastructure

Protect/Connect

Raise Seawall with Drainage

Raise seawall at Gardiner road, install drainage outlet for wetland. Tie into high ground to the north at 10 ft NAVD88. Drainage does not add storm protection but may reduce residence time if wall is overtopped.




Dry floodproof and/or elevate Park Road Sewer Lift Station




Floodproof Park Rd Sewer Lift Station

Install landscape berms or elevated bulkhead systems along Mill Pond and Woods Hole Park. Assume build no higher than 3 ft above existing grade to preserve views and fit small backyards. Build berms to 7 ft NAV88 for backyards at 4 ft NAVD88.

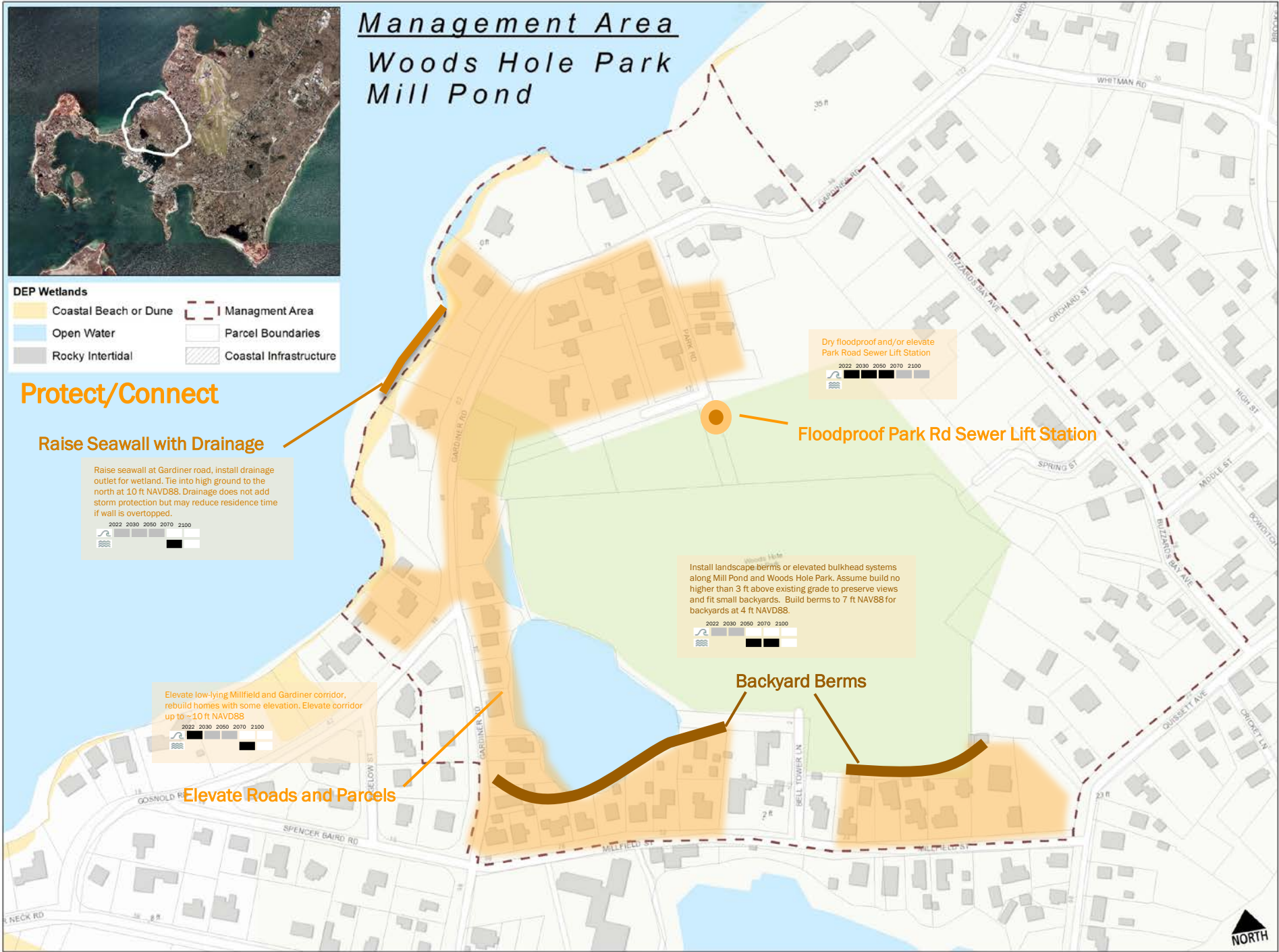


Backyard Berms

Elevate low-lying Millfield and Gardiner corridor, rebuild homes with some elevation. Elevate corridor up to ~10 ft NAVD88



Elevate Roads and Parcels





Management Area Woods Hole Park Mill Pond

- DEP Wetlands**
- Coastal Beach or Dune
 - Open Water
 - Rocky Intertidal
- Management Area**
- Parcel Boundaries
 - Coastal Infrastructure

Adaptive Realignment

Drainage for Gardiner Seawall

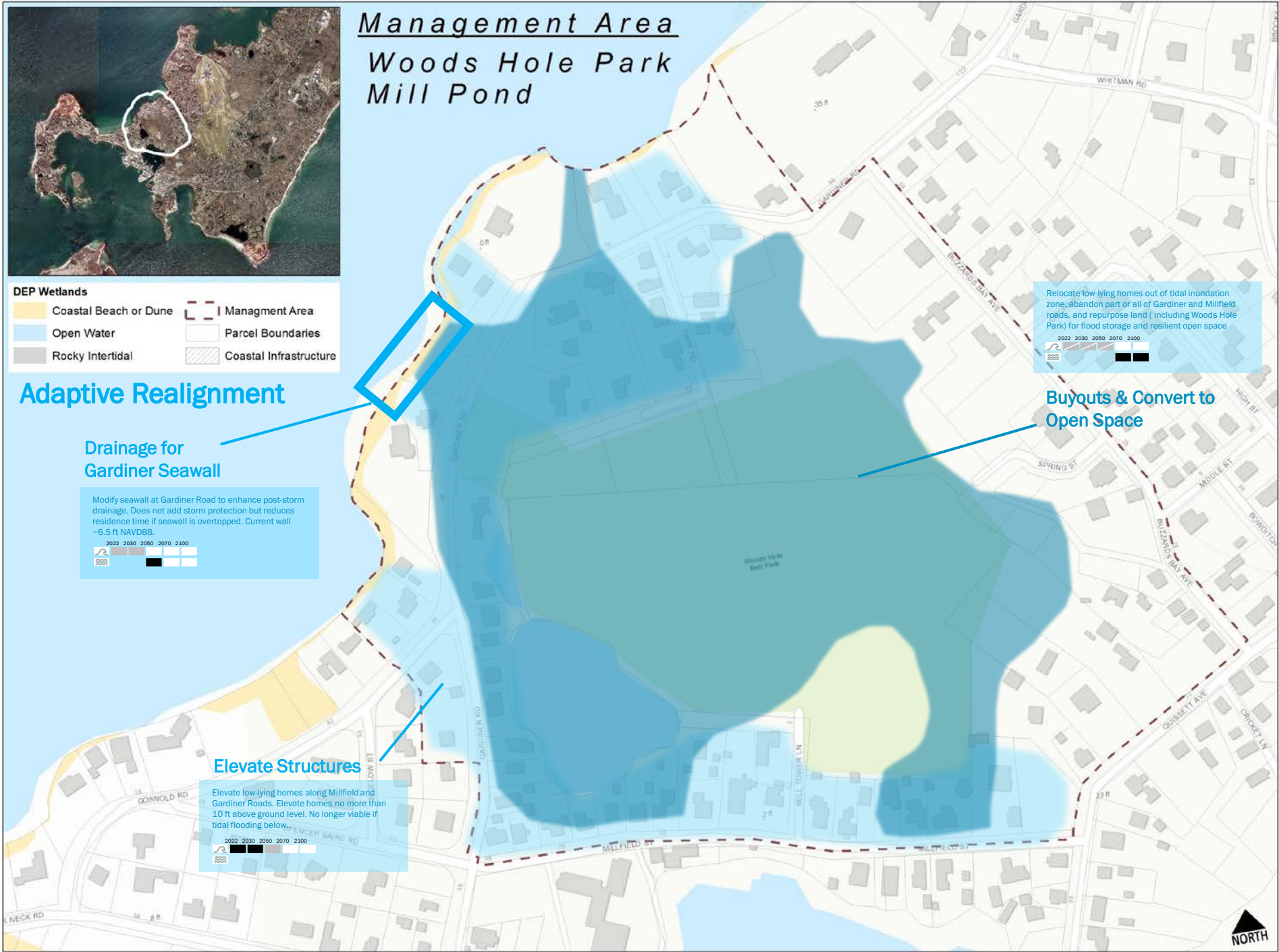
Modify seawall at Gardiner Road to enhance post-storm drainage. Does not add storm protection but reduces residence time if seawall is overtopped. Current wall ~6.5 ft NAVDSS.

Elevate Structures

Elevate low-lying homes along Millfield and Gardiner Roads. Elevate homes no more than 10 ft above ground level. No longer viable if tidal flooding below.

Buyouts & Convert to Open Space

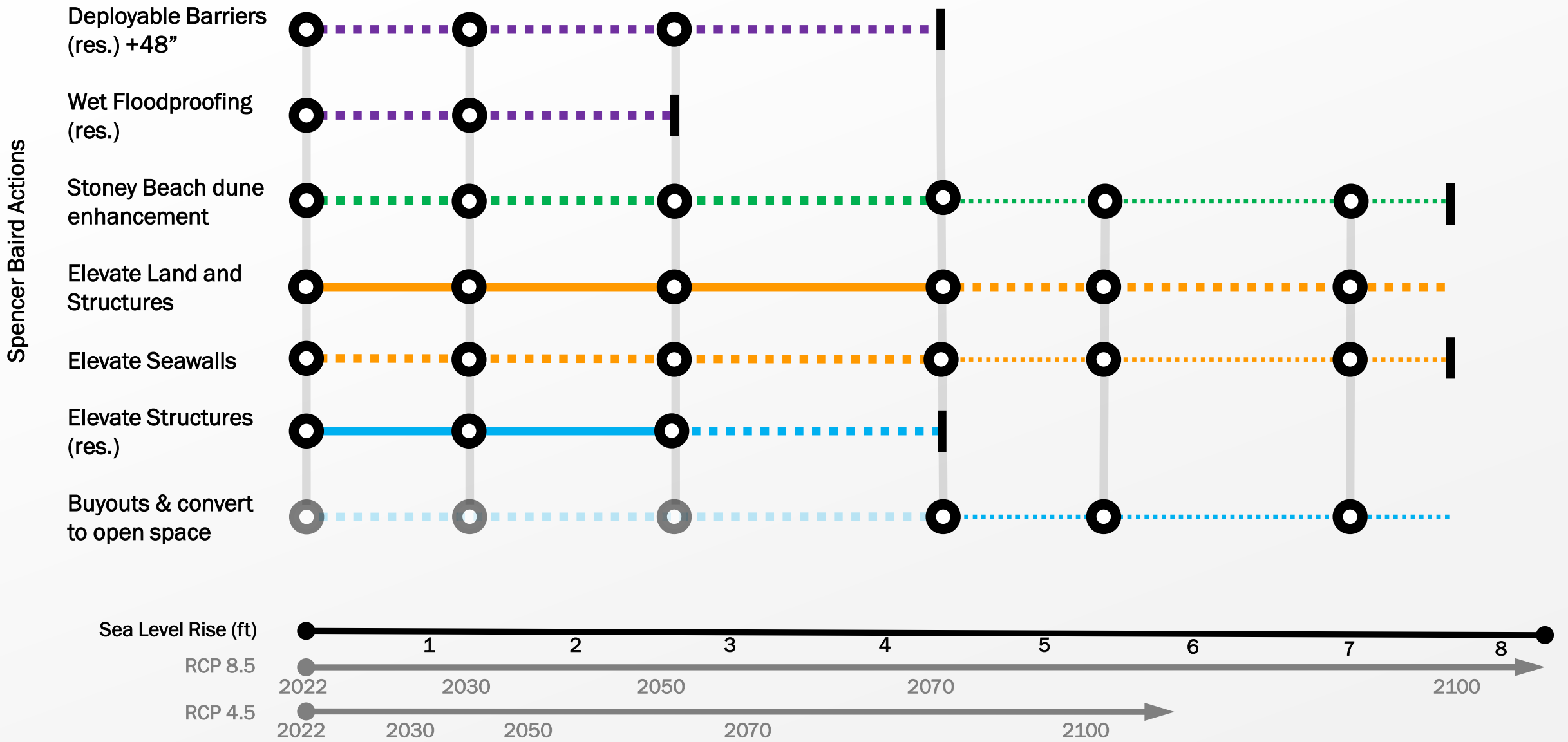
Relocate low-lying homes out of tidal inundation zone, abandon part or all of Gardiner and Millfield roads, and repurpose land (including Woods Hole Park) for flood storage and resilient open space.





Appendix B-3 Spencer Baird Management Area

Spencer Baird Area





Management Area Spencer Baird

- DEP Wetlands**
- Coastal Beach or Dune
 - Open Water
 - Rocky Intertidal
 - Management Area
 - Parcel Boundaries
 - Coastal Infrastructure

Coordinated deployable flood protection strategies (up to 48") for low lying homes and identify location for communal storage.

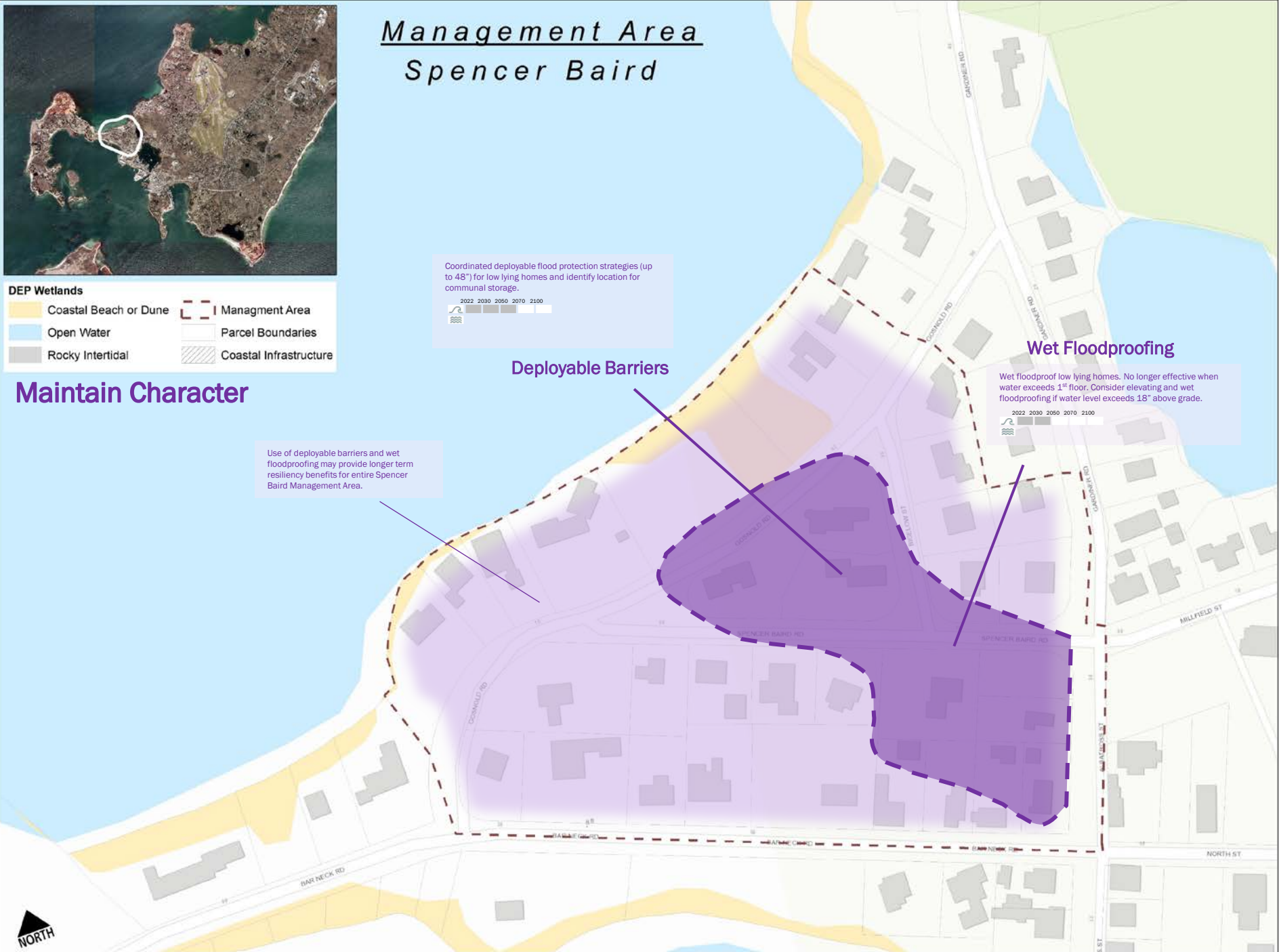
Maintain Character

Use of deployable barriers and wet floodproofing may provide longer term resiliency benefits for entire Spencer Baird Management Area.

Deployable Barriers

Wet Floodproofing

Wet floodproof low lying homes. No longer effective when water exceeds 1st floor. Consider elevating and wet floodproofing if water level exceeds 18" above grade.





Management Area Spencer Baird

- DEP Wetlands**
- Coastal Beach or Dune
 - Open Water
 - Rocky Intertidal
- Management Area**
- Parcel Boundaries
 - Coastal Infrastructure

Nature-based Solutions

Stoney Beach Dune Enhancement







Beach nourishment and dune enhancement at Stoney Beach. Dune ties into adjacent high ground (~10ft NAVD8S).



Management Area Spencer Baird



DEP Wetlands

 Coastal Beach or Dune	 Management Area
 Open Water	 Parcel Boundaries
 Rocky Intertidal	 Coastal Infrastructure

Protect/Connect

Elevate existing Buzzards Bay seawalls to 10 ft NAVD88 tying into adjacent high areas

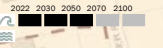


Year	Sea Level Rise (ft)
2022	0.0
2030	0.5
2050	1.0
2070	1.5
2100	2.0

Elevate Seawalls

Elevate Land and Structures

Elevate parcels and roads of low-lying corridor, rebuild homes with some elevation. Raise Spencer Baird Rd, Gosnold Rd, and Albatross Rd to 12 ft NAVD88.



Year	Sea Level Rise (ft)
2022	0.0
2030	0.5
2050	1.0
2070	1.5
2100	2.0





Management Area Spencer Baird

- DEP Wetlands**
- Coastal Beach or Dune
 - Open Water
 - Rocky Intertidal
 - Management Area
 - Parcel Boundaries
 - Coastal Infrastructure

Adaptive Realignment

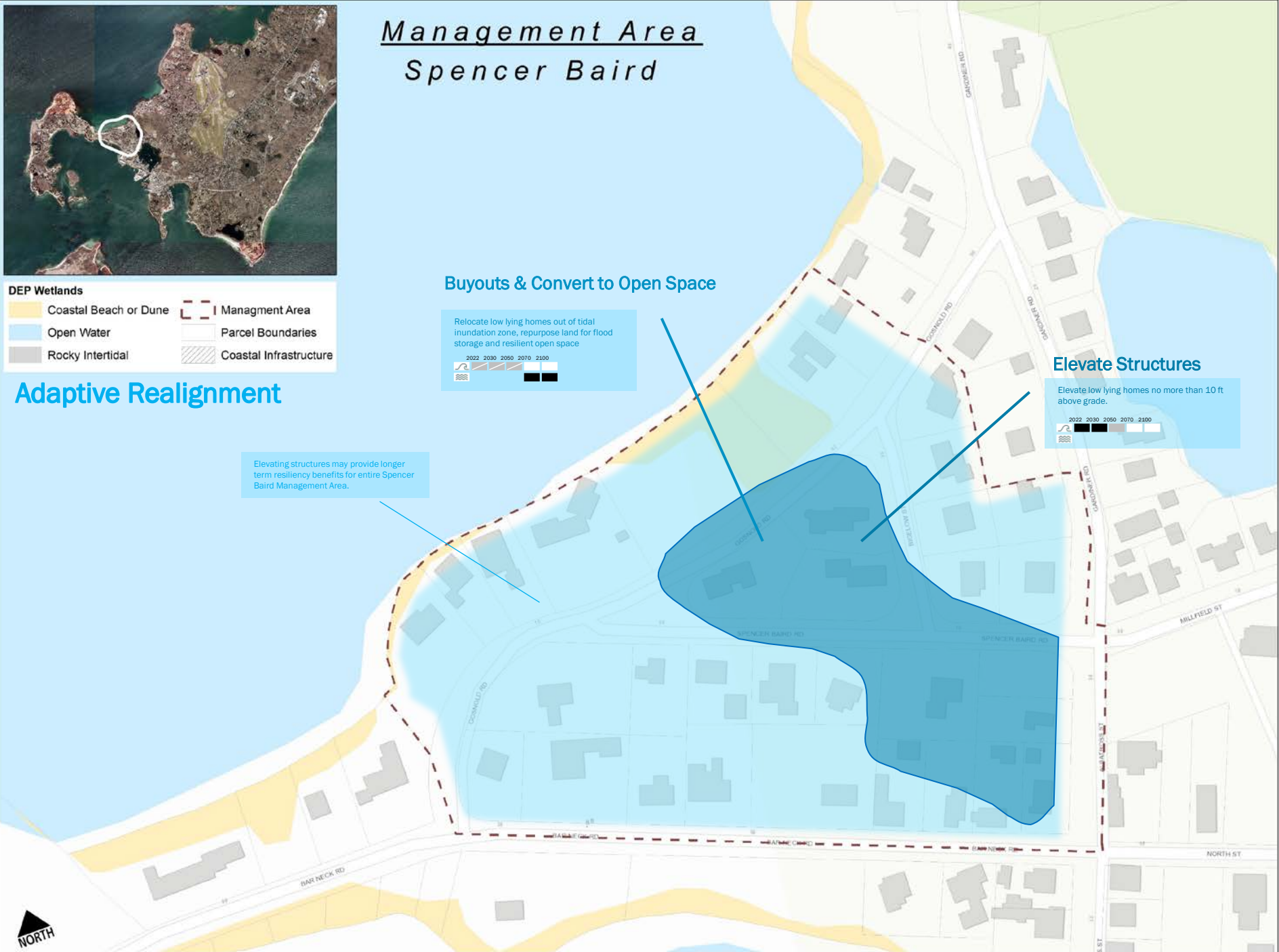
Elevating structures may provide longer term resiliency benefits for entire Spencer Baird Management Area.

Buyouts & Convert to Open Space

Relocate low lying homes out of tidal inundation zone, repurpose land for flood storage and resilient open space

Elevate Structures

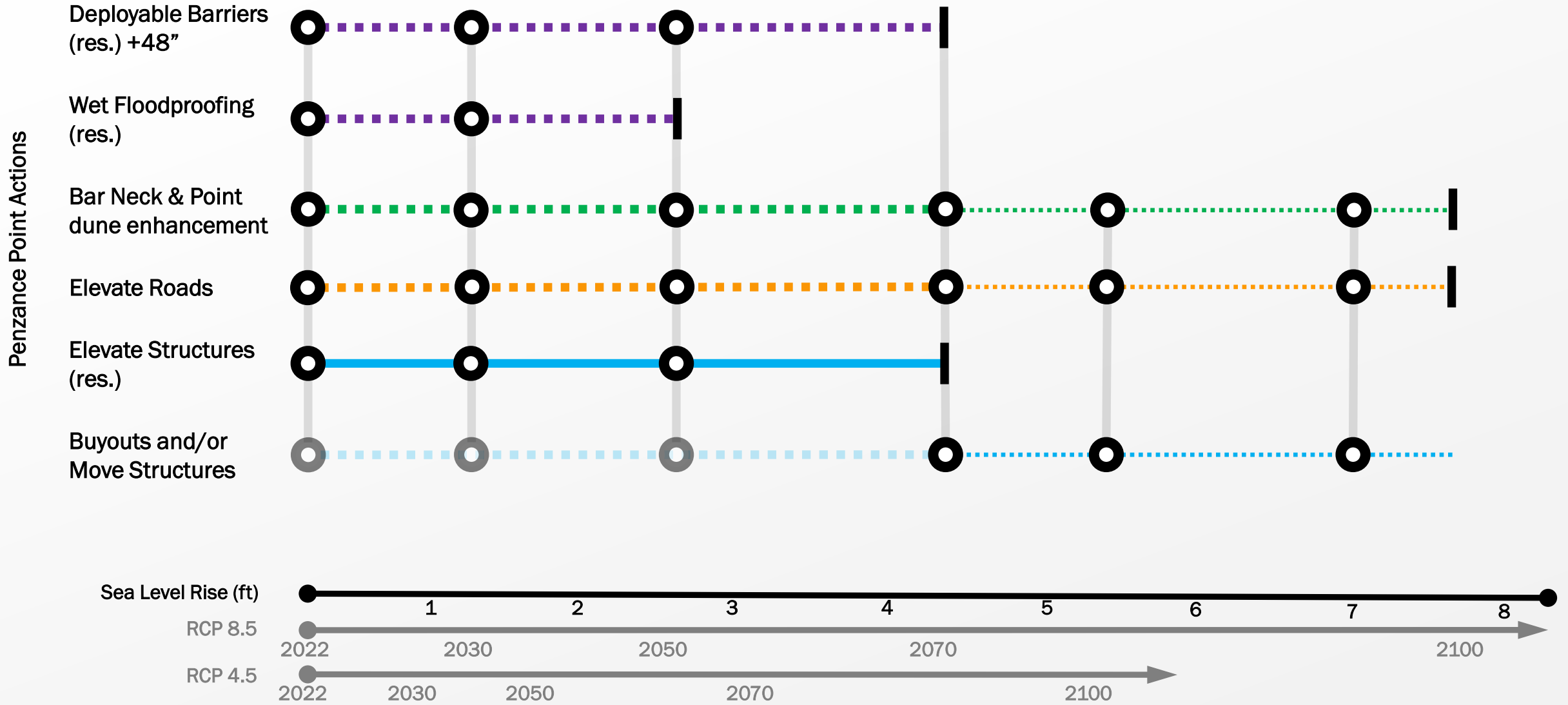
Elevate low lying homes no more than 10 ft above grade.





Appendix B-4 Penzance Point Management Area

Penzance Point Area



Management Area Penzance

Buzzards Bay

Coordinate deployable flood protection strategies (up to 48") for low lying homes.



Deployable Barriers

Wet Floodproofing

Wet floodproof low lying homes. No longer effective when water level reaches 1st floor. Consider elevating and wet floodproofing if water level exceeds 18" above grade.



Maintain Character



DEP Wetlands

- Coastal Beach or Dune
- Open Water
- Rocky Intertidal
- Management Area
- Parcel Boundaries
- Coastal Infrastructure



Management Area Penzance

Buzzards Bay

Nature-based Solutions



DEP Wetlands

- | | |
|---|--|
|  Coastal Beach or Dune |  Management Area |
|  Open Water |  Parcel Boundaries |
|  Rocky Intertidal |  Coastal Infrastructure |



Management Area Penzance

Buzzards Bay

Protect/Connect



DEP Wetlands

- | | |
|---|--|
|  Coastal Beach or Dune |  Management Area |
|  Open Water |  Parcel Boundaries |
|  Rocky Intertidal |  Coastal Infrastructure |



Management Area Penzance

Buzzards Bay

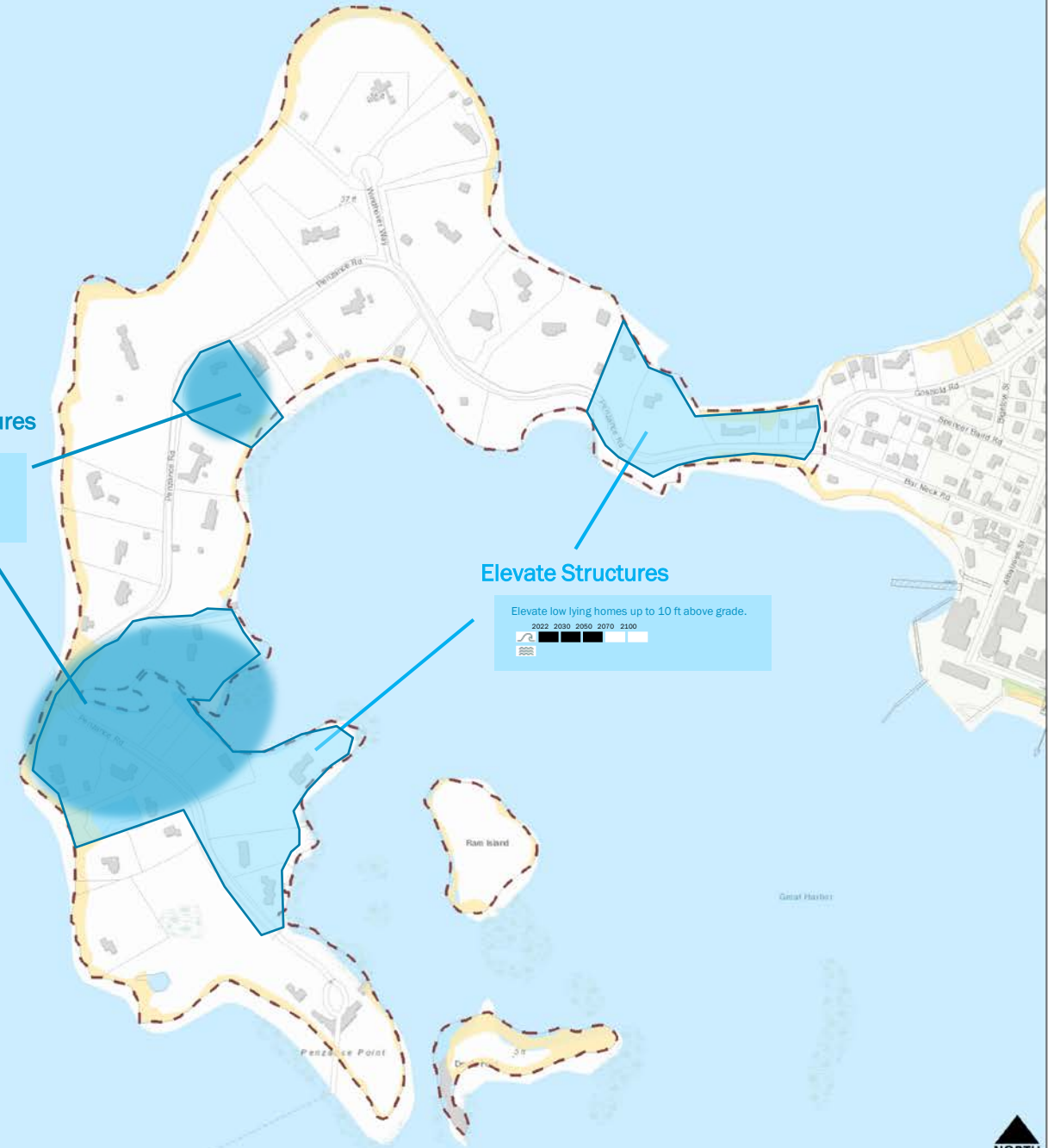
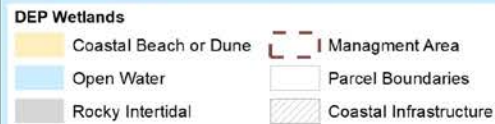
Buyouts and/or Move Structures



Elevate Structures



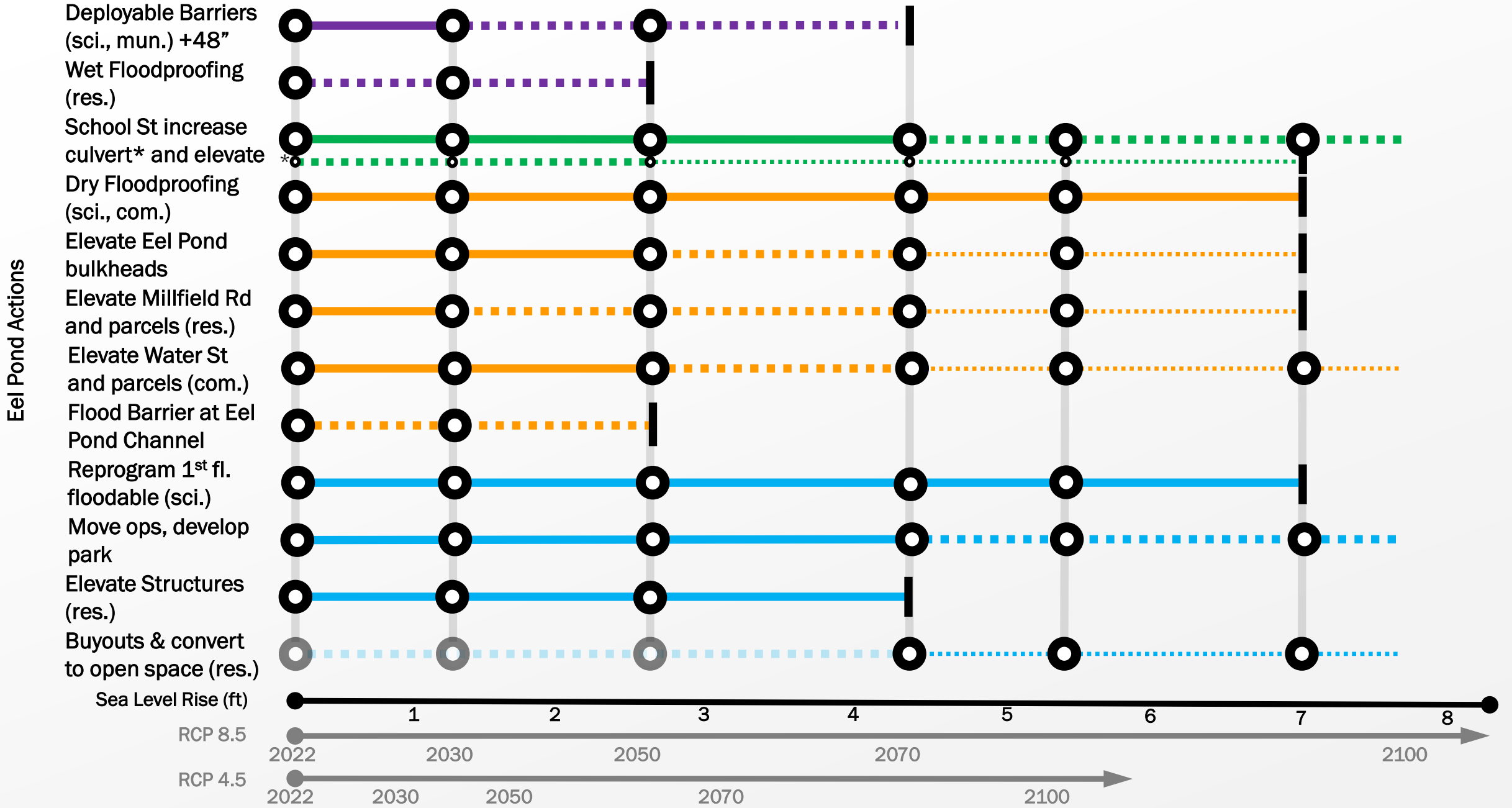
Adaptive Realignment





Appendix B-5 Eel Pond Management Area

Eel Pond Area





Wet Floodproofing

Wet floodproofing low-lying homes. No longer effective if water floods 1st floor. Consider elevating and wet floodproofing if water level exceeds 18" above grade.

2022 2030 2050 2070 2100

Deployable Barriers

Deployable flood protection strategies (up to 48") for low lying Millfield St homes and structures along southwest Eel pond and Water Street. Identify location for communal storage.

2022 2030 2050 2070 2100



- DEP Wetlands**
- Coastal Beach or Dune
 - Open Water
 - Rocky Intertidal
 - Management Area
 - Parcel Boundaries
 - Coastal Infrastructure

Management Area

Eel Pond
School Street

Maintain Character



- DEP Wetlands**
- Coastal Beach or Dune
 - Open Water
 - Rocky Intertidal
- Management Area**
- Management Area
 - Parcel Boundaries
 - Coastal Infrastructure



Elevate low-lying Millfield corridor and rebuild homes with some elevation. Elevate corridor up to ~10 ft NAVD88.

Elevate Millfield Road and Parcels

Elevate Eel Pond Bulkheads

Elevate Eel Pond seawalls and bulkheads (~42") backing parcels with commercial, residential and scientific use. Brings new critical elevation to ~8.5 ft NAVD88.

Dry Flood Proofing

Dry flood proof structures (Scientific and Commercial). No longer viable if tidal inundation impacts the structures.

Elevate Water St and Businesses

Elevate Water Street and businesses no higher than 9.5 ft NAVD88 tying into high spot on north side of water street.

Flood Barrier

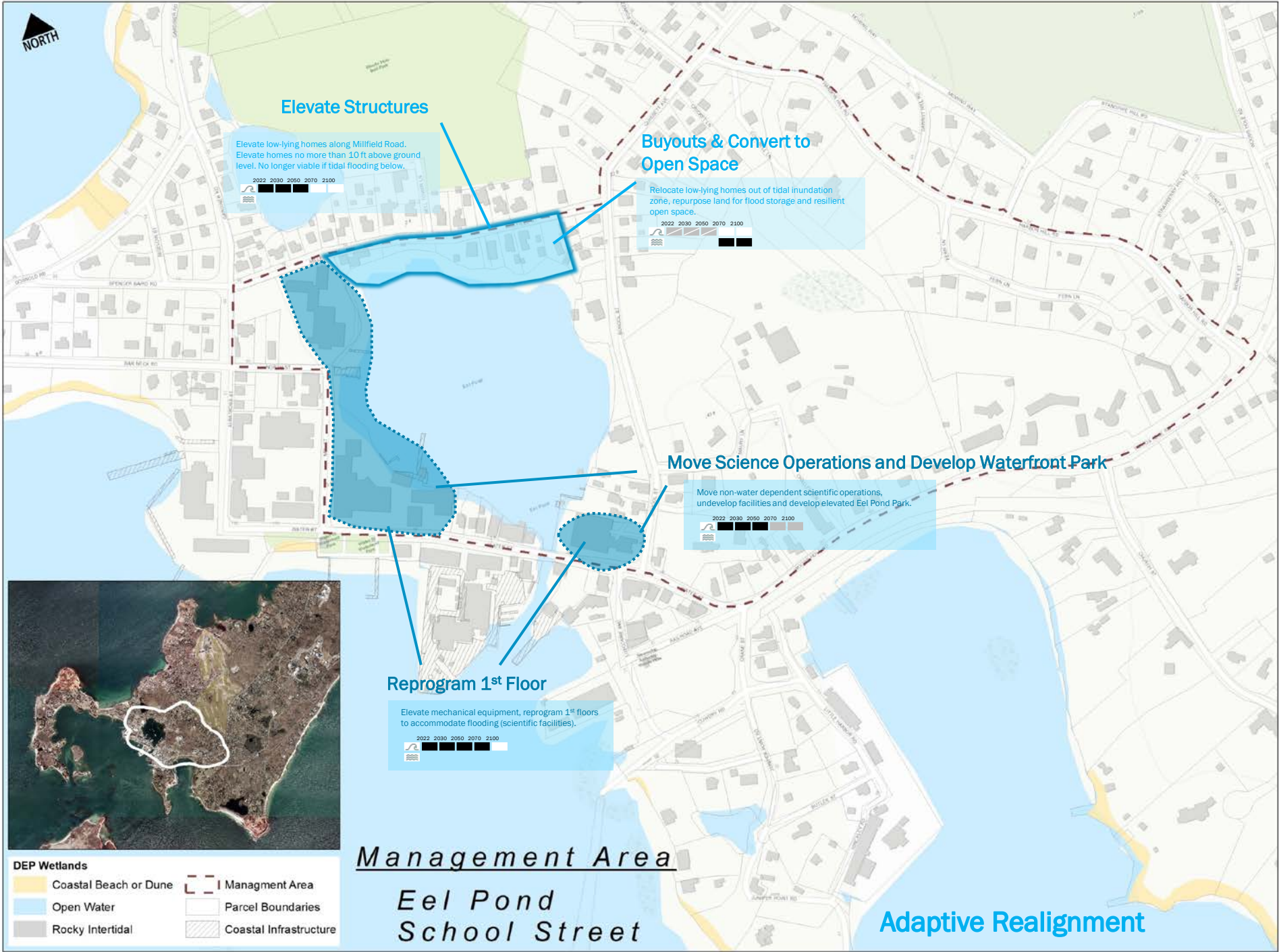
Construct flood control barrier at Eel Pond Channel at existing elevation of 7.75 ft NAVD88. Would need to be coordinated with other areas to prevent flanking.



- DEP Wetlands**
- Coastal Beach or Dune
 - Open Water
 - Rocky Intertidal
 - Management Area
 - Parcel Boundaries
 - Coastal Infrastructure

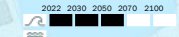
Management Area
Eel Pond
School Street

Protect/Connect



Elevate Structures

Elevate low-lying homes along Millfield Road. Elevate homes no more than 10 ft above ground level. No longer viable if tidal flooding below.



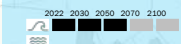
Buyouts & Convert to Open Space

Relocate low-lying homes out of tidal inundation zone, repurpose land for flood storage and resilient open space.



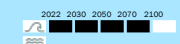
Move Science Operations and Develop Waterfront Park

Move non-water dependent scientific operations, undevelop facilities and develop elevated Eel Pond Park.



Reprogram 1st Floor

Elevate mechanical equipment, reprogram 1st floors to accommodate flooding (scientific facilities).



- DEP Wetlands**
- Coastal Beach or Dune
 - Open Water
 - Rocky Intertidal
 - Management Area
 - Parcel Boundaries
 - Coastal Infrastructure

Management Area

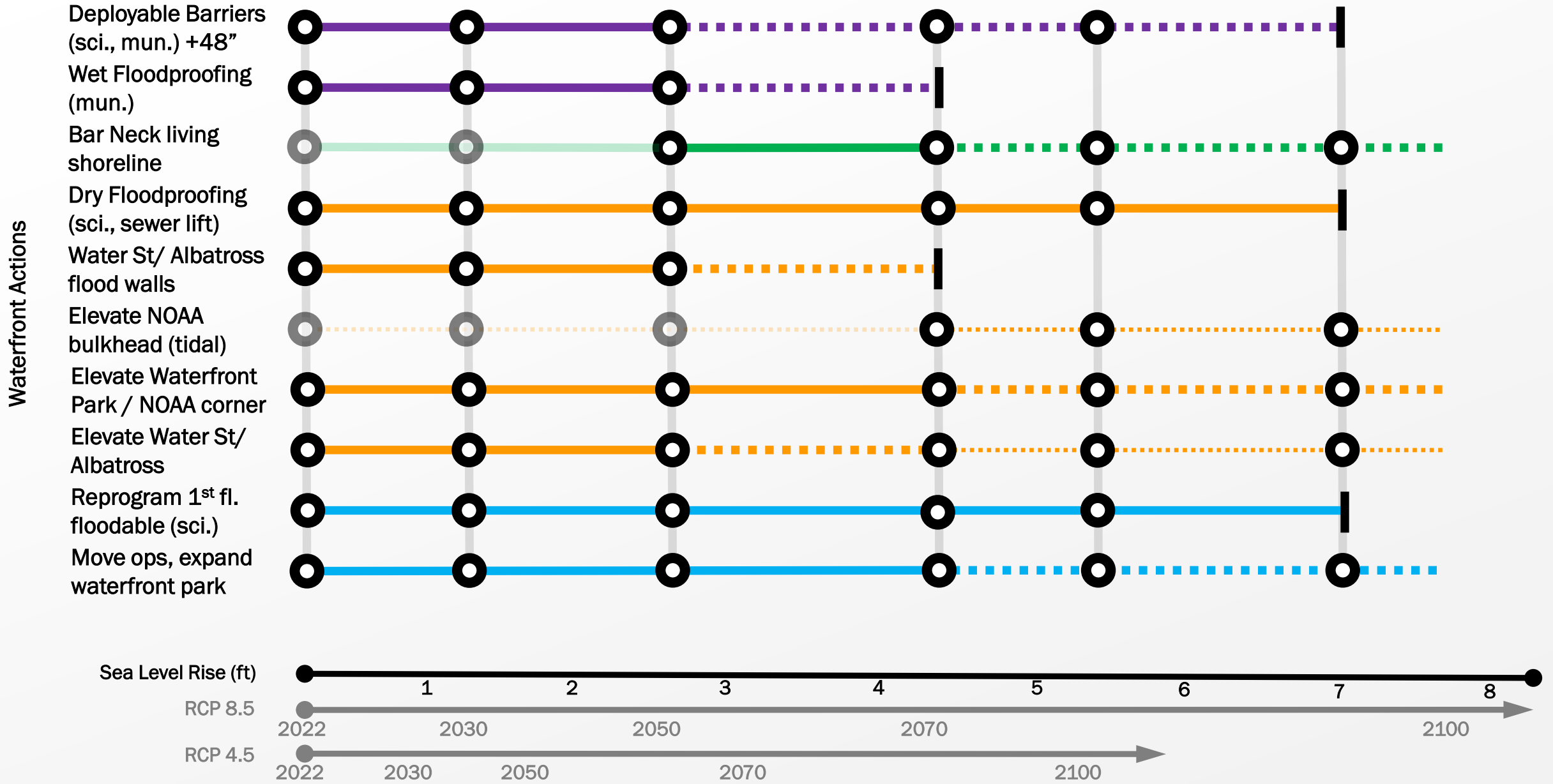
*Eel Pond
School Street*

Adaptive Realignment

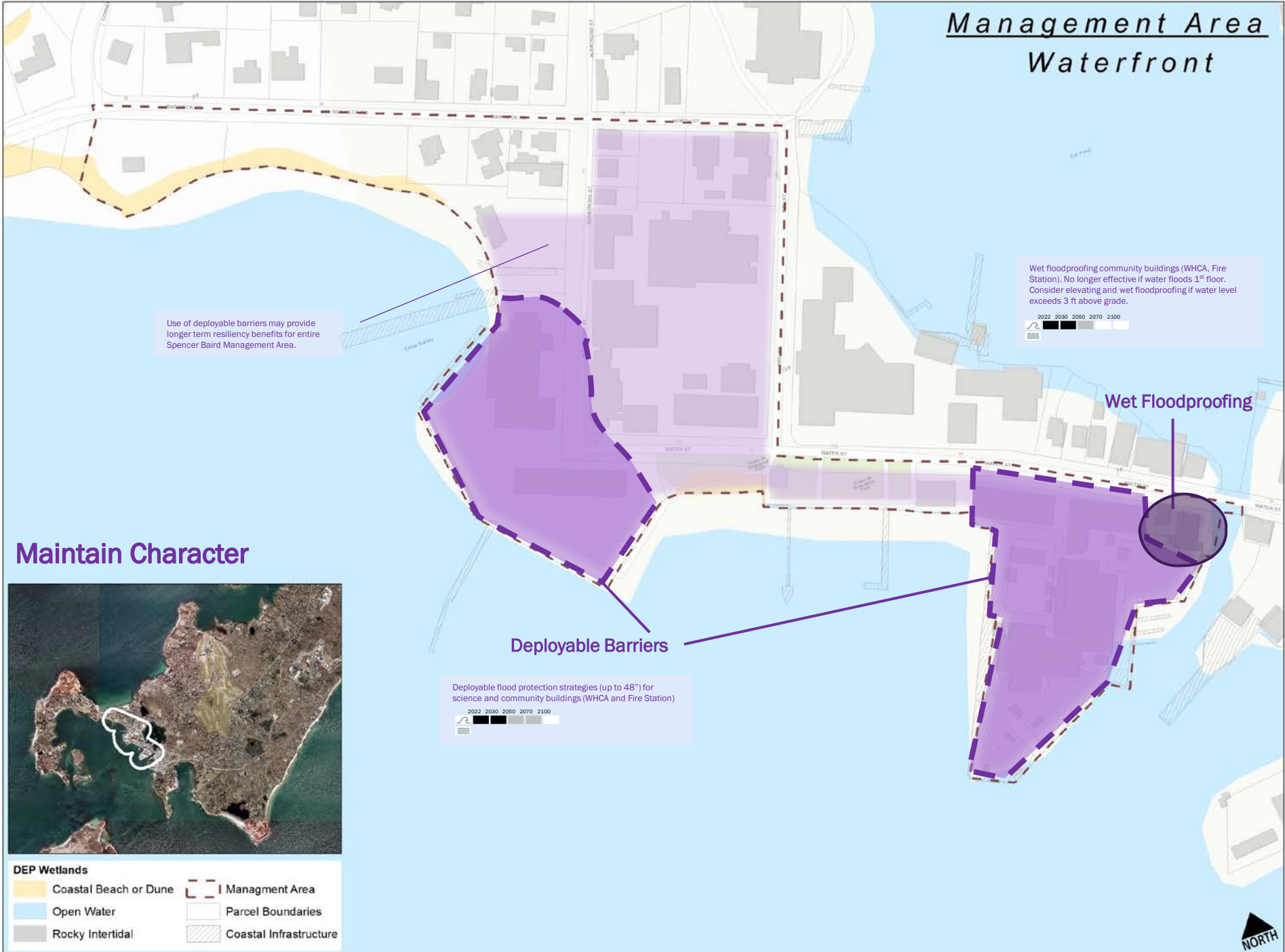


Appendix B-6 Waterfront Management Area

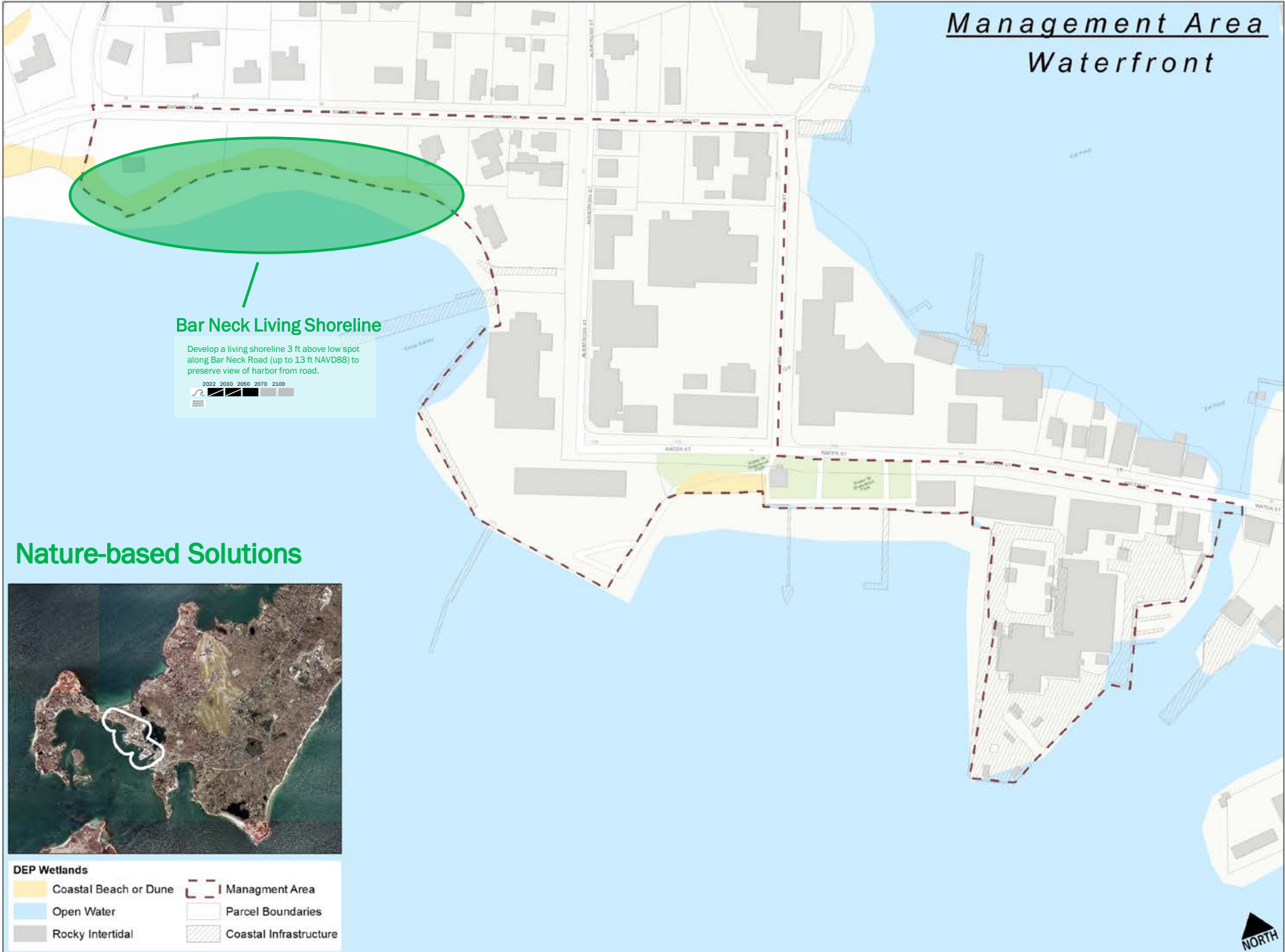
Waterfront Area



Management Area Waterfront

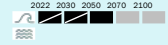


Management Area
Waterfront



Bar Neck Living Shoreline

Develop a living shoreline 3 ft above low spot along Bar Neck Road (up to 13 ft NAVD88) to preserve view of harbor from road.



Nature-based Solutions

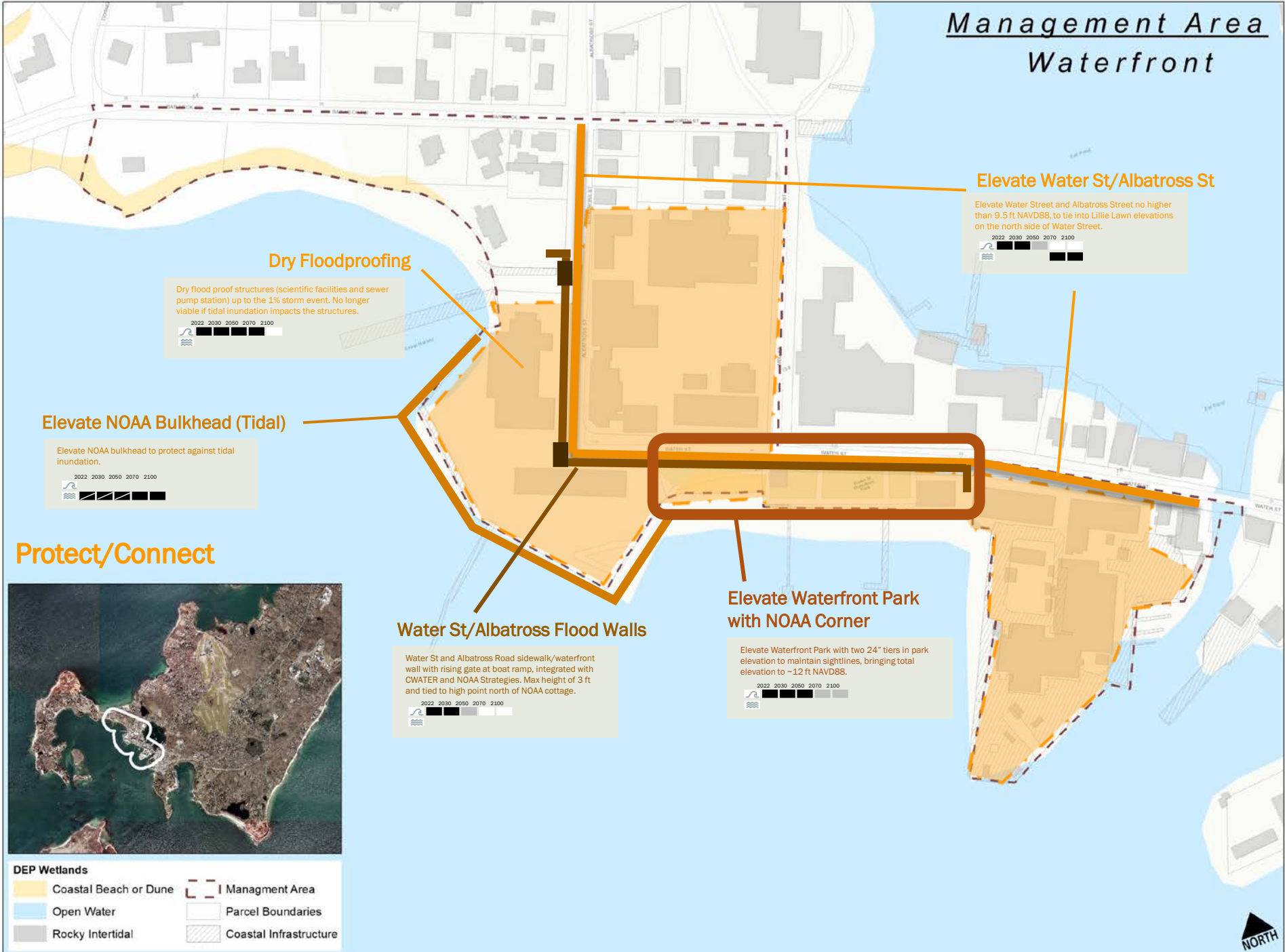


DEP Wetlands

Coastal Beach or Dune	Management Area
Open Water	Parcel Boundaries
Rocky Intertidal	Coastal Infrastructure



Management Area Waterfront



Dry Floodproofing

Dry flood proof structures (scientific facilities and sewer pump station) up to the 1% storm event. No longer viable if tidal inundation impacts the structures.

2022 2030 2050 2070 2100

Elevate Water St/Albatross St

Elevate Water Street and Albatross Street no higher than 9.5 ft NAVD88, to tie into Little Lawn elevations on the north side of Water Street.

2022 2030 2050 2070 2100

Elevate NOAA Bulkhead (Tidal)

Elevate NOAA bulkhead to protect against tidal inundation.

2022 2030 2050 2070 2100

Protect/Connect



Water St/Albatross Flood Walls

Water St and Albatross Road sidewalk/waterfront wall with rising gate at boat ramp, integrated with CWATER and NOAA Strategies. Max height of 3 ft and tied to high point north of NOAA cottage.

2022 2030 2050 2070 2100

Elevate Waterfront Park with NOAA Corner

Elevate Waterfront Park with two 24" tiers in park elevation to maintain sightlines, bringing total elevation to ~12 ft NAVD88.

2022 2030 2050 2070 2100

DEP Wetlands

- Coastal Beach or Dune
- Open Water
- Rocky Intertidal
- Management Area
- Parcel Boundaries
- Coastal Infrastructure



Management Area Waterfront

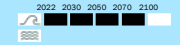
Adaptive Realignment



- DEP Wetlands**
- Coastal Beach or Dune
 - Open Water
 - Rocky Intertidal
 - Management Area
 - Parcel Boundaries
 - Coastal Infrastructure

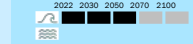
Reprogram 1st Floor

Elevate mechanical equipment, reprogram 1st floors to accommodate flooding (scientific buildings). Assume 1st floors are 10ft high on ~6.5 ft NAVD88 decks, so no impacts until water level exceeds 16.5 ft NAVD88. Usable until tidal inundation impacts occur.



Move Science Operations and Expand Waterfront Park

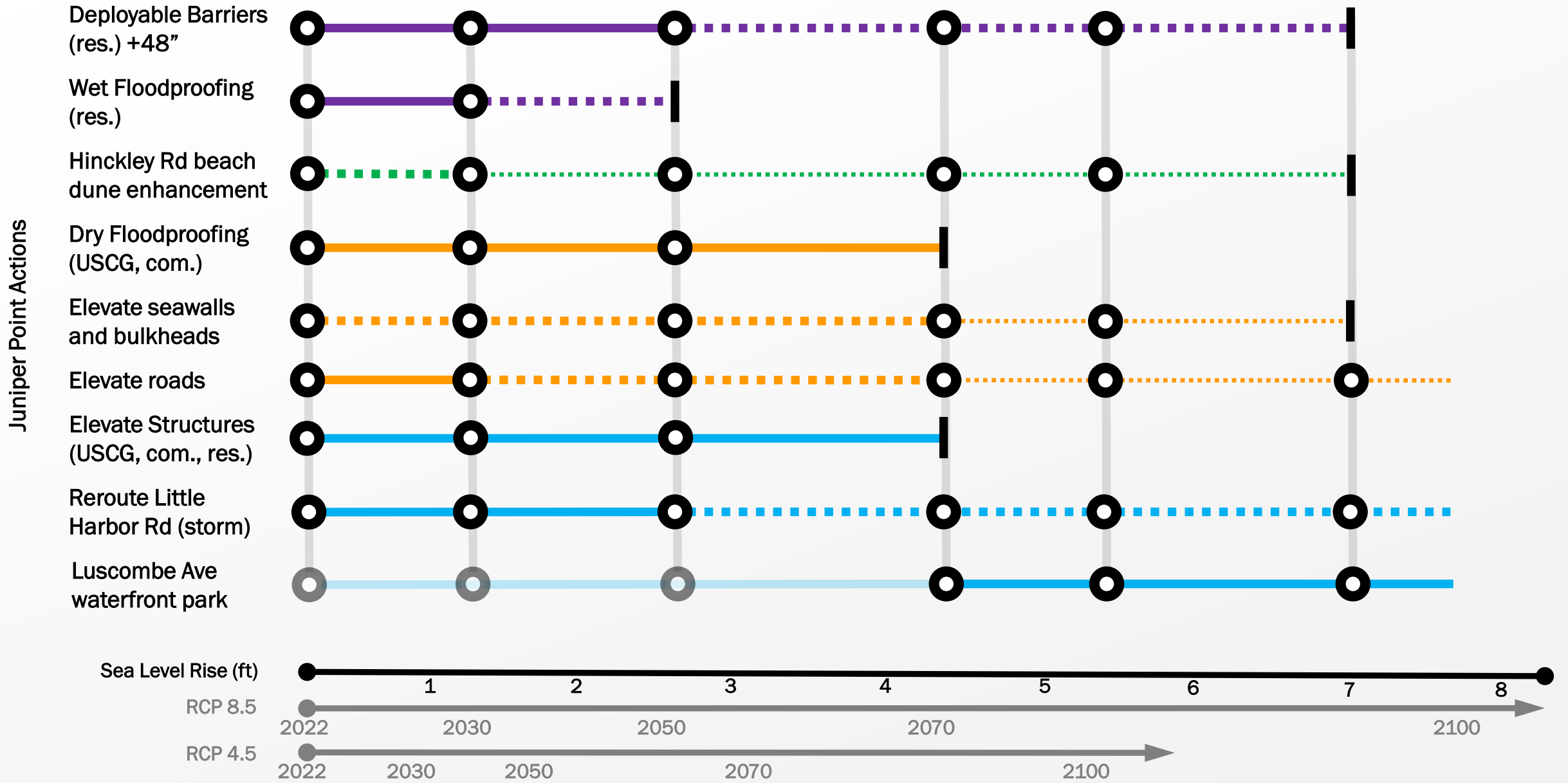
Move non-water dependent scientific operations, undevelop facilities and expand elevated Waterfront Park.

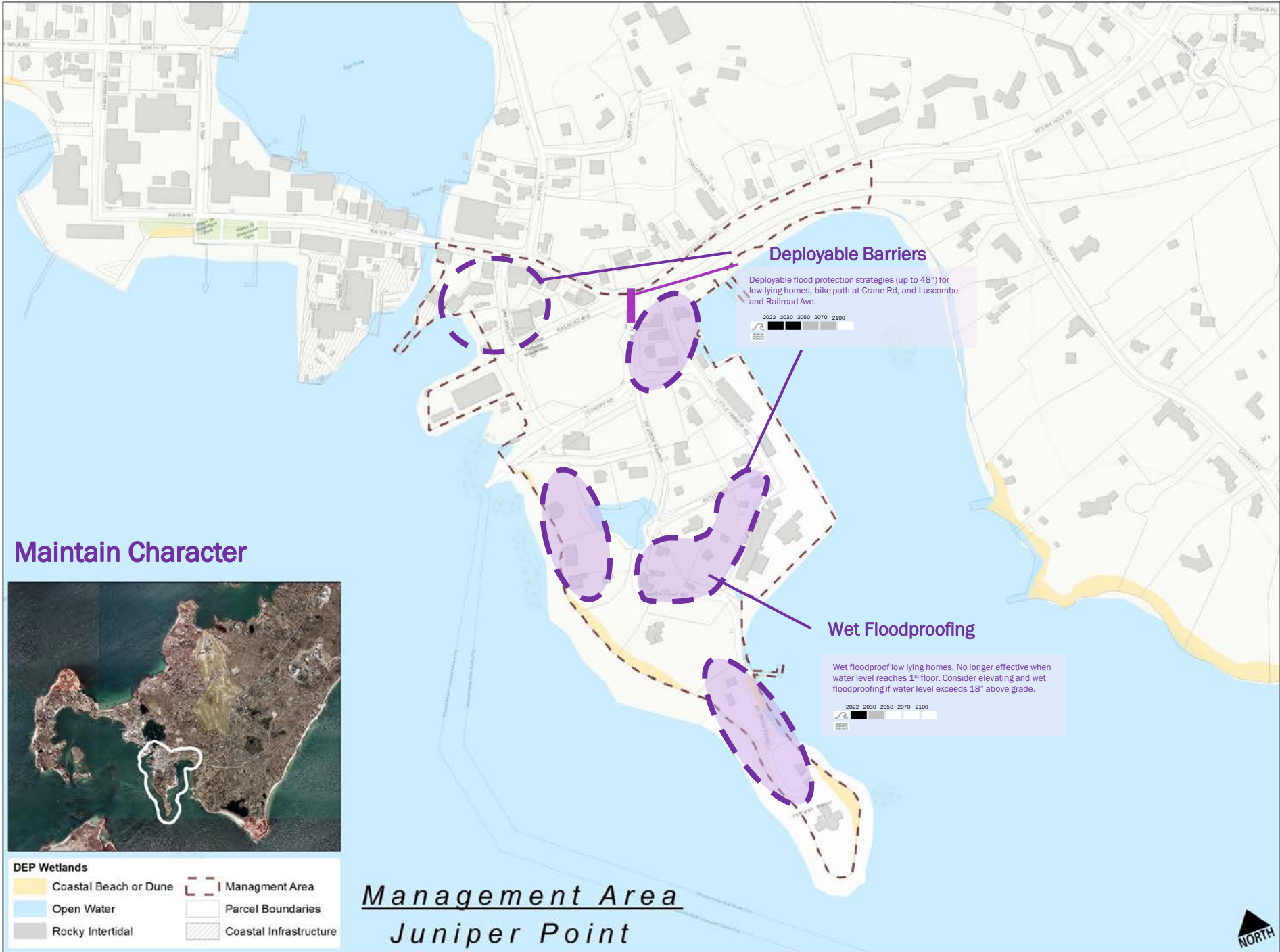




Appendix B-7 Juniper Point Management Area

Juniper Point Area



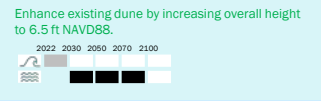




Nature-based Solutions



Hinkley Rd Beach/Dune Enhancement



DEP Wetlands

Coastal Beach or Dune	Management Area
Open Water	Parcel Boundaries
Rocky Intertidal	Coastal Infrastructure

Management Area
Juniper Point







Luscombe Ave Waterfront Park

Pull development back from water to Luscombe Ave and create tiered waterfront resilient open space.

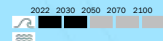


Adaptive Realignment



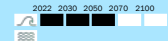
Reroute Little Harbor Rd (Storm)

Reroute Little Harbor and Hinkley Roads using the high spine on Juniper Pt. Limited to elevation 11 ft NAVD88 near perched wetland.



Elevate Structures

Elevate USCG, commercial and residential structures to no more than 10 ft above ground level.



DEP Wetlands		Management Area
Coastal Beach or Dune	Open Water	Parcel Boundaries
Rocky Intertidal	Coastal Infrastructure	

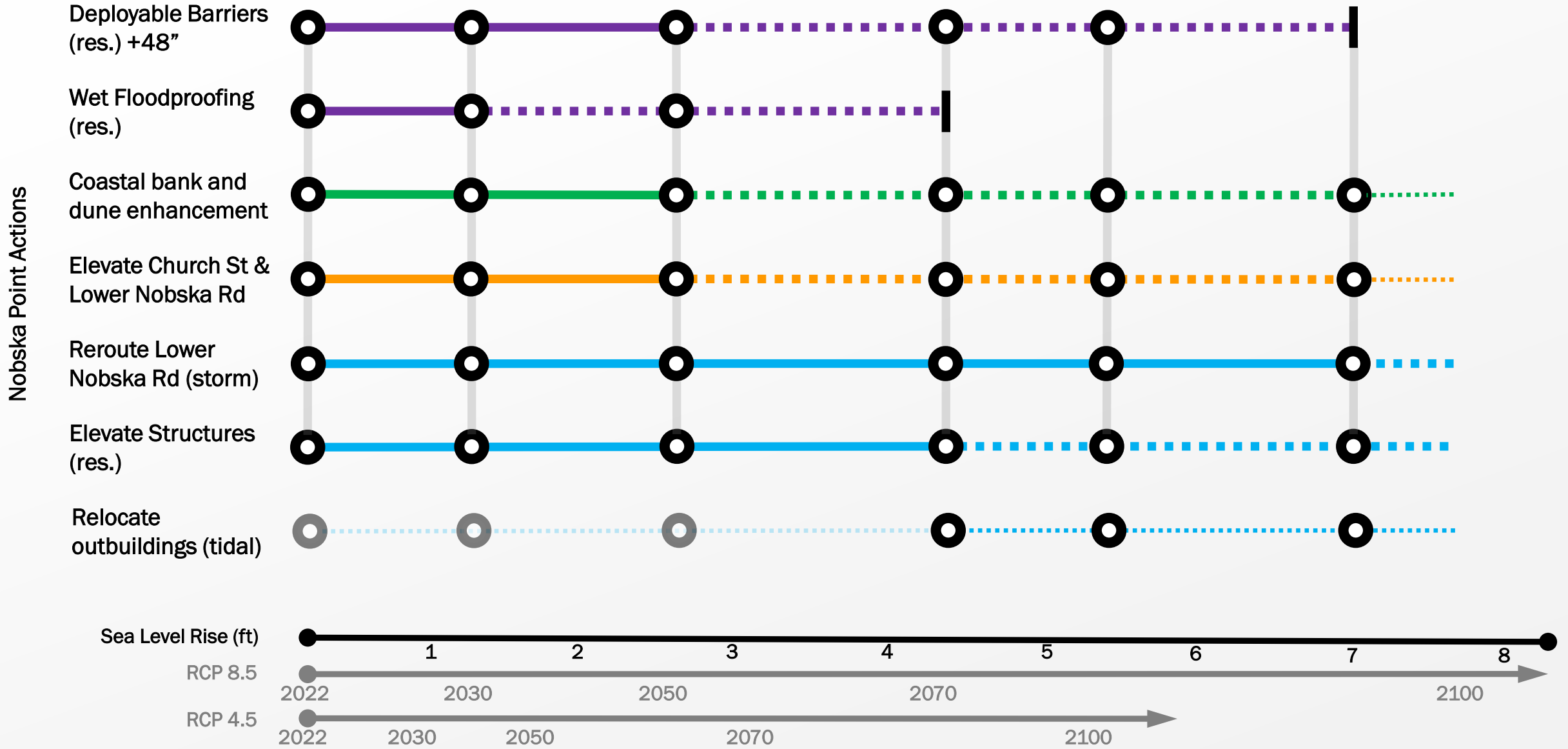
Management Area Juniper Point





Appendix B-8 Nobska Point Management Area

Nobska Point Area





Wet Floodproofing

Wet floodproof low lying homes. No longer effective when water level reaches 1st floor. Consider elevating and wet floodproofing if water level exceeds 1.8' above grade.

2022 2030 2050 2070 2100

Deployable Barriers

Coordinate deployable flood protection strategies for low lying homes (up to 48").

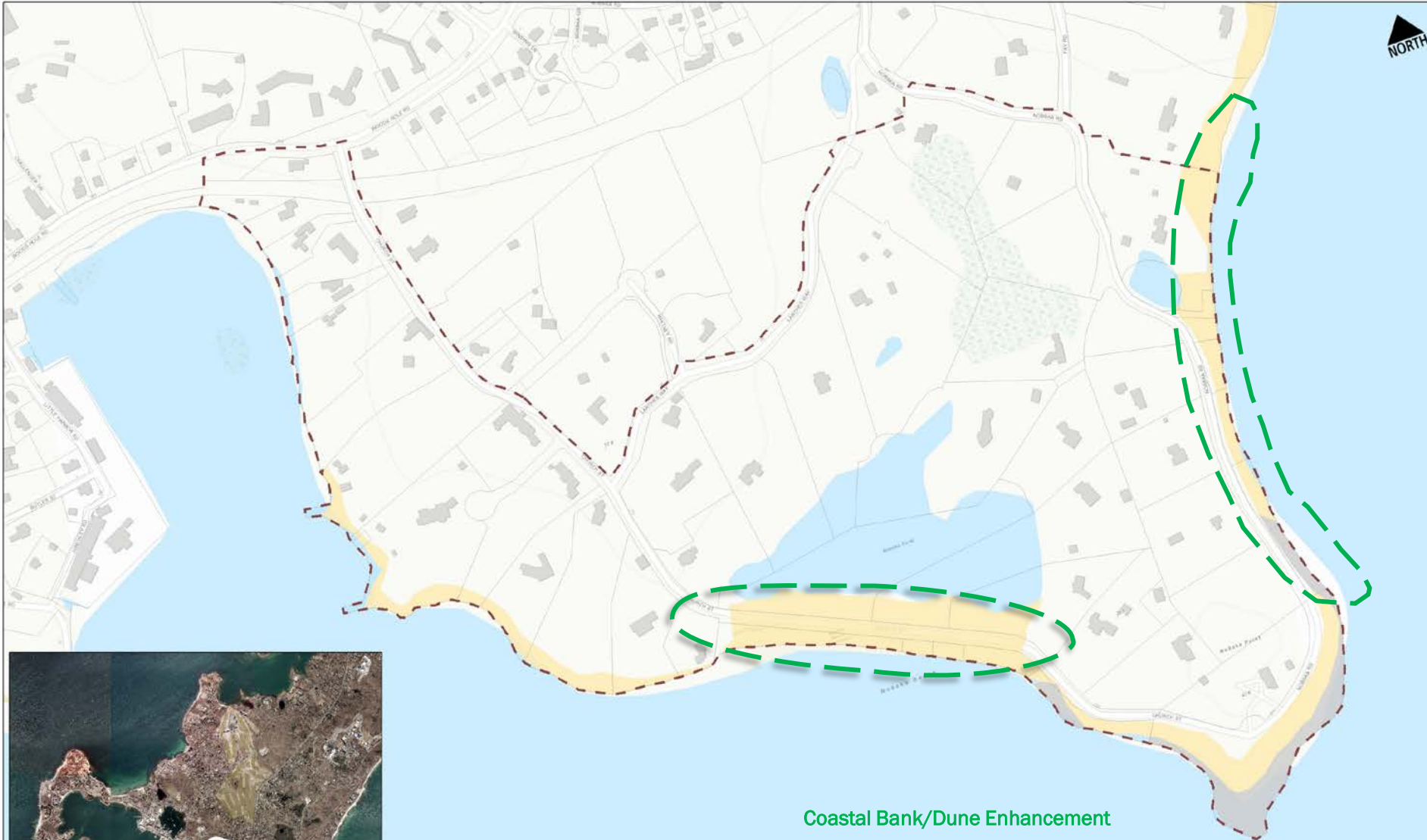
2022 2030 2050 2070 2100



- DEP Wetlands**
- Coastal Beach or Dune
 - Open Water
 - Rocky Intertidal
 - Management Area
 - Parcel Boundaries
 - Coastal Infrastructure

Management Area
Nobska Point

Maintain Character



Coastal Bank/Dune Enhancement

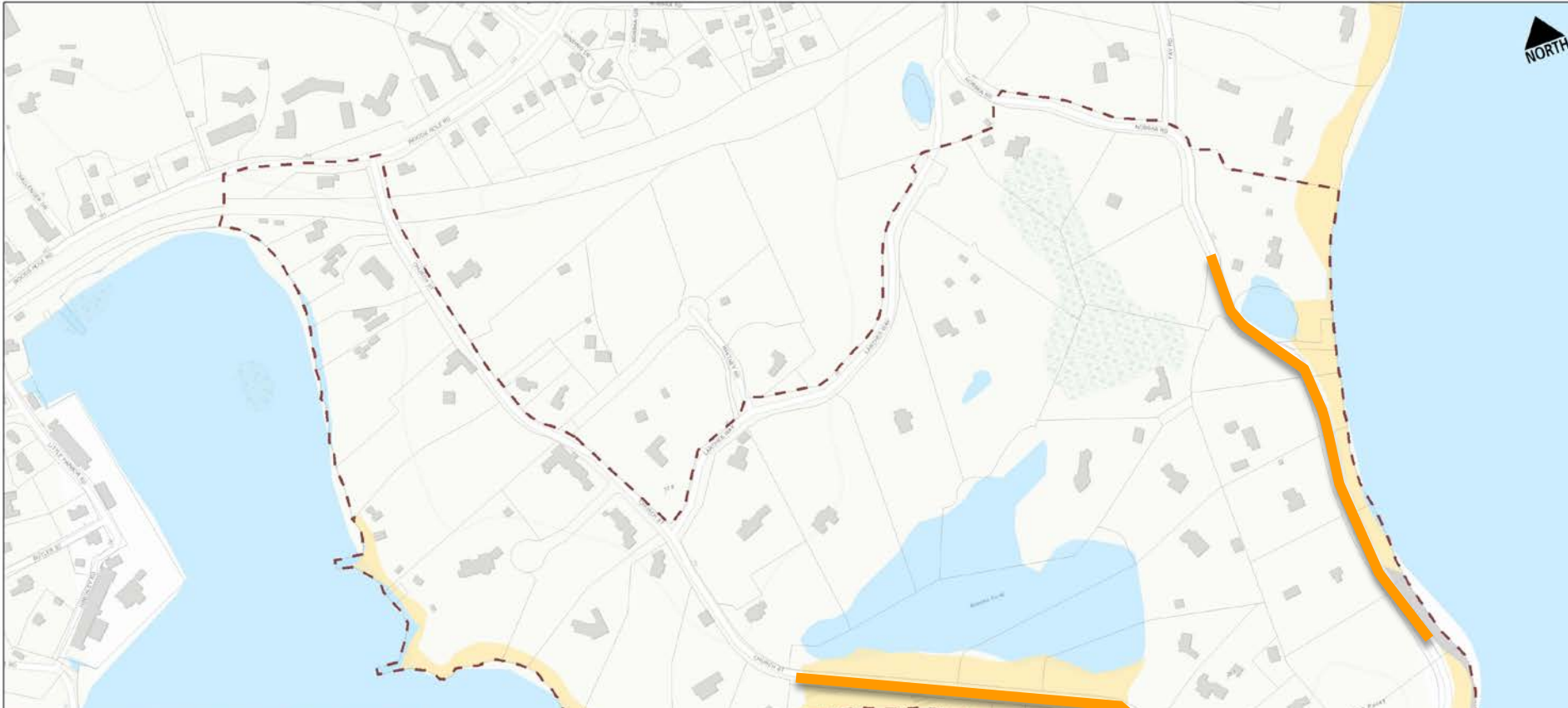
Enhance coastal bank or dune at Nobska Beach and lower Nobska Road. Build up to 10 ft NAVD88 and tie into existing high spots.

2022 2030 2050 2070 2100

- DEP Wetlands**
- Coastal Beach or Dune
 - Open Water
 - Rocky Intertidal
 - Management Area
 - Parcel Boundaries
 - Coastal Infrastructure

Management Area
Nobska Point

Nature-based Solutions



Elevate Church St & Lower Nobska Road

Elevate Church St and lower Nobska Rd up to 10 ft NAVD88 and tie into existing high spots

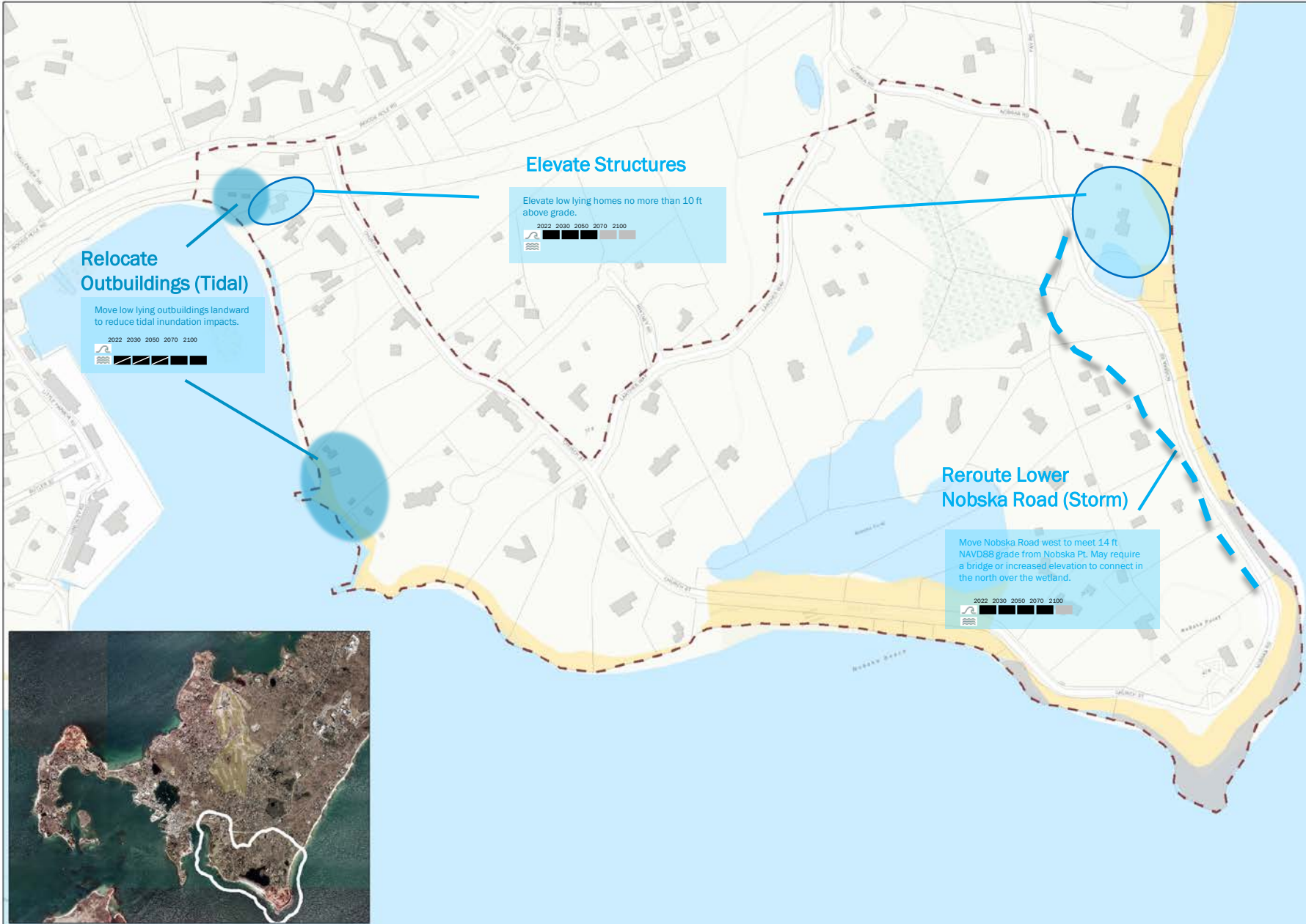


DEP Wetlands

- Coastal Beach or Dune
- Open Water
- Rocky Intertidal
- Management Area
- Parcel Boundaries
- Coastal Infrastructure

Management Area
Nobska Point

Protect/Connect



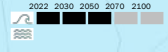
Relocate Outbuildings (Tidal)

Move low lying outbuildings landward to reduce tidal inundation impacts.



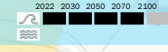
Elevate Structures

Elevate low lying homes no more than 10 ft above grade.



Reroute Lower Nobska Road (Storm)

Move Nobska Road west to meet 14 ft NAVD88 grade from Nobska Pl. May require a bridge or increased elevation to connect in the north over the wetland.



DEP Wetlands		Management Area
Coastal Beach or Dune	Open Water	Parcel Boundaries
Rocky Intertidal	Coastal Infrastructure	

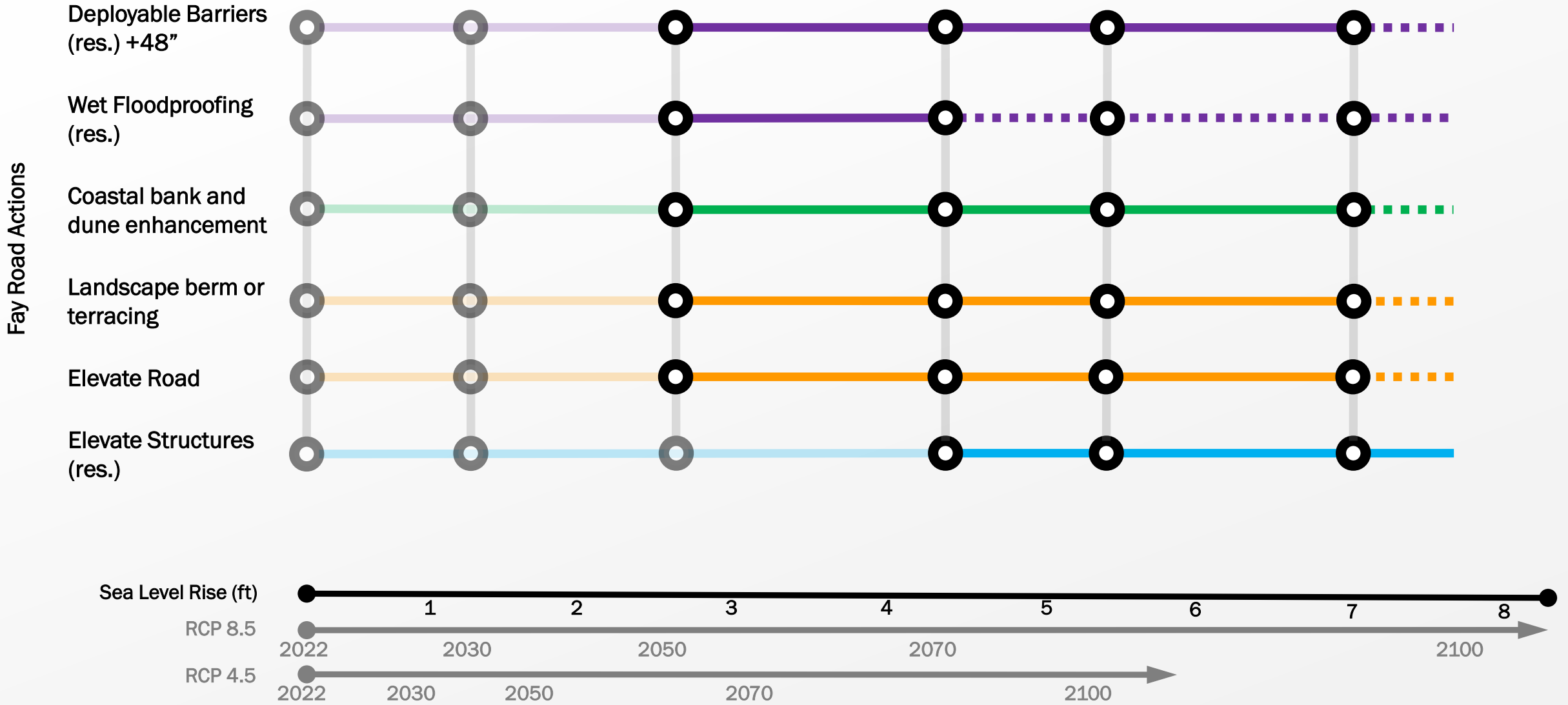
Management Area
Nobska Point

Adaptive Realignment

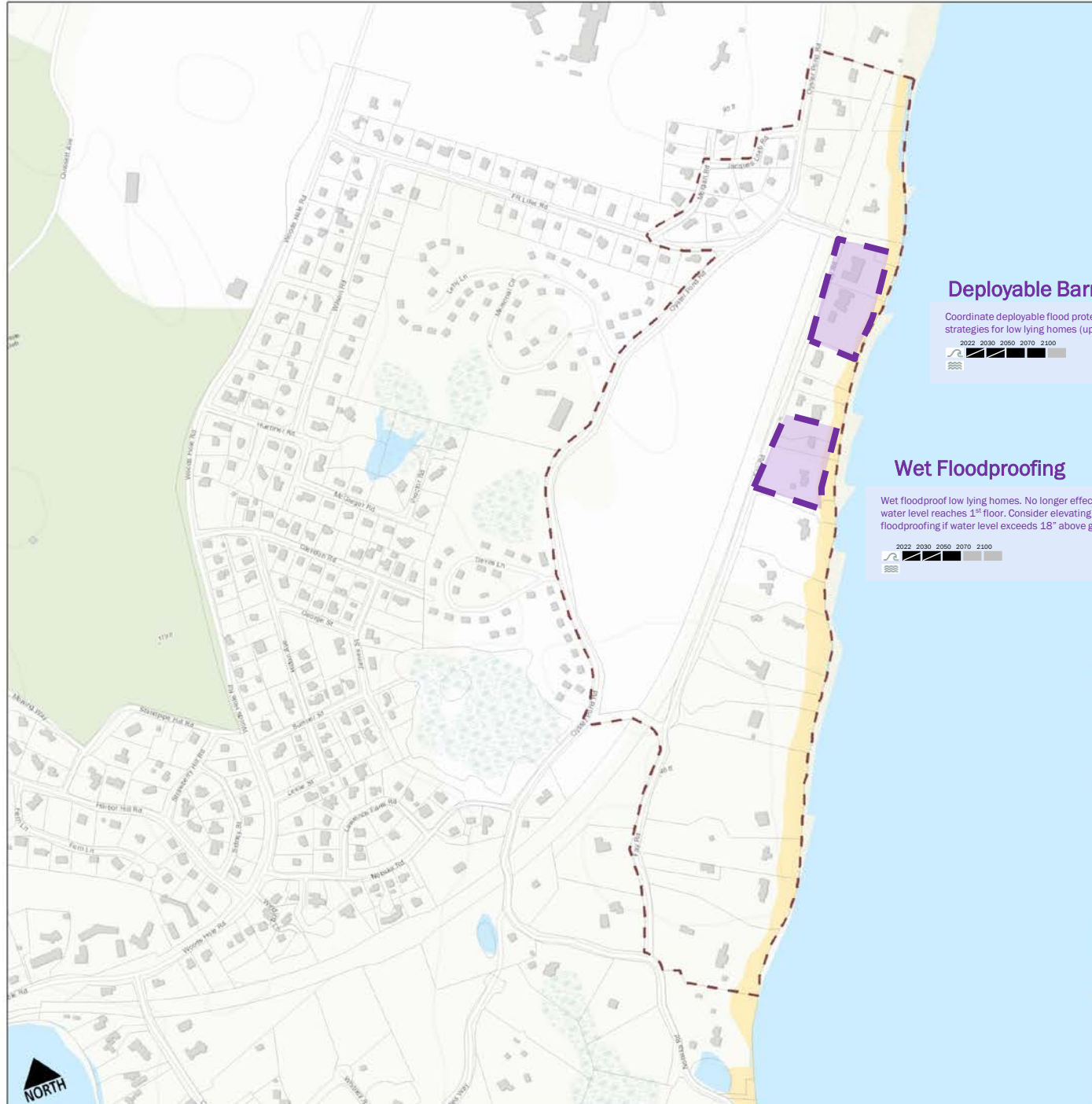


Appendix B-9 Fay Road Point Management Area

Fay Road Area



Management Area Fay Road



Deployable Barriers

Coordinate deployable flood protection strategies for low lying homes (up to 48").

Wet Floodproofing

Wet floodproof low lying homes. No longer effective when water level reaches 1st floor. Consider elevating and wet floodproofing if water level exceeds 18" above grade.

Maintain Character

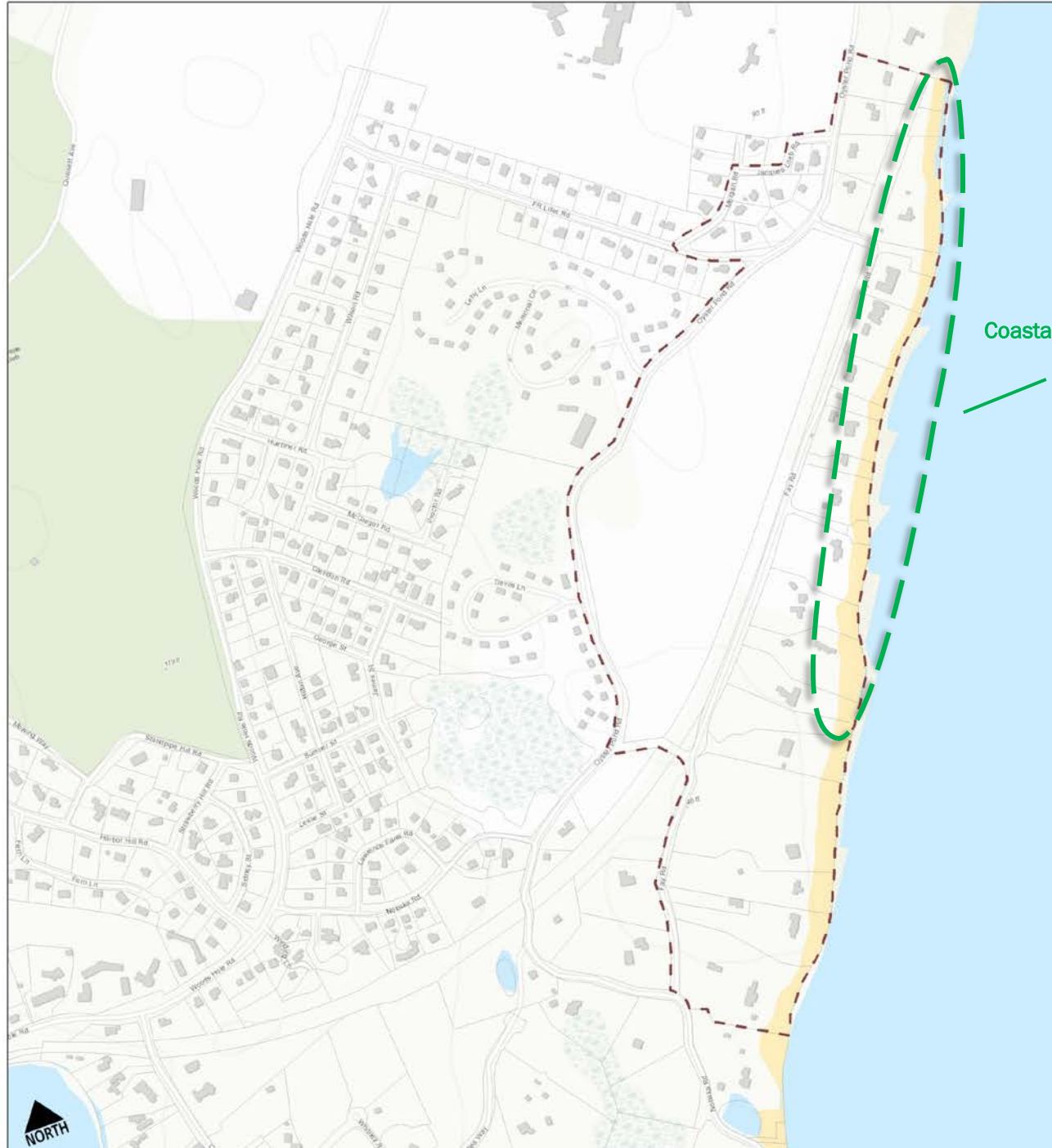


DEP Wetlands

- Coastal Beach or Dune
- Open Water
- Rocky Intertidal
- Management Area
- Parcel Boundaries
- Coastal Infrastructure



Management Area Fay Road



Coastal Bank/Dune Enhancement

Enhance coastal bank or dune up to 1.5 ft NAVD88 and tie into existing neighborhood high spots.

Nature-based Solutions



DEP Wetlands

Coastal Beach or Dune	Management Area
Open Water	Parcel Boundaries
Rocky Intertidal	Coastal Infrastructure

Management Area Fay Road

Elevate Low-Lying Road Segments

Elevate roadway to ~15 ft NAVD88 and tie into existing high grade along Fay Rd

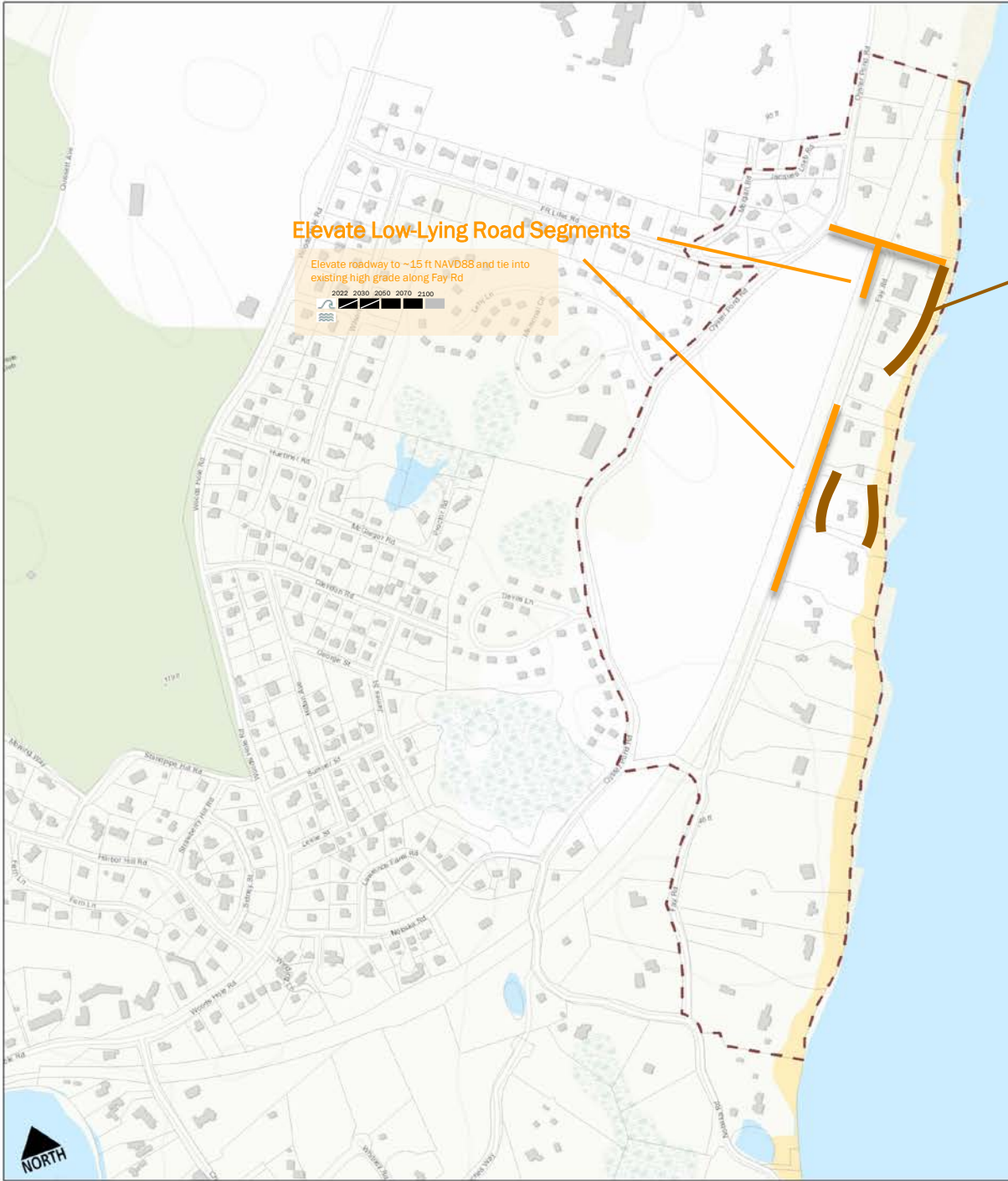
Landscape Berm or Terracing

Install landscape berm or terrace through existing lawns and tie into existing neighborhood high spots. For lawns currently at 10 ft NAVD88, berms should be built to 15 ft NAVD88 (5 ft berm).

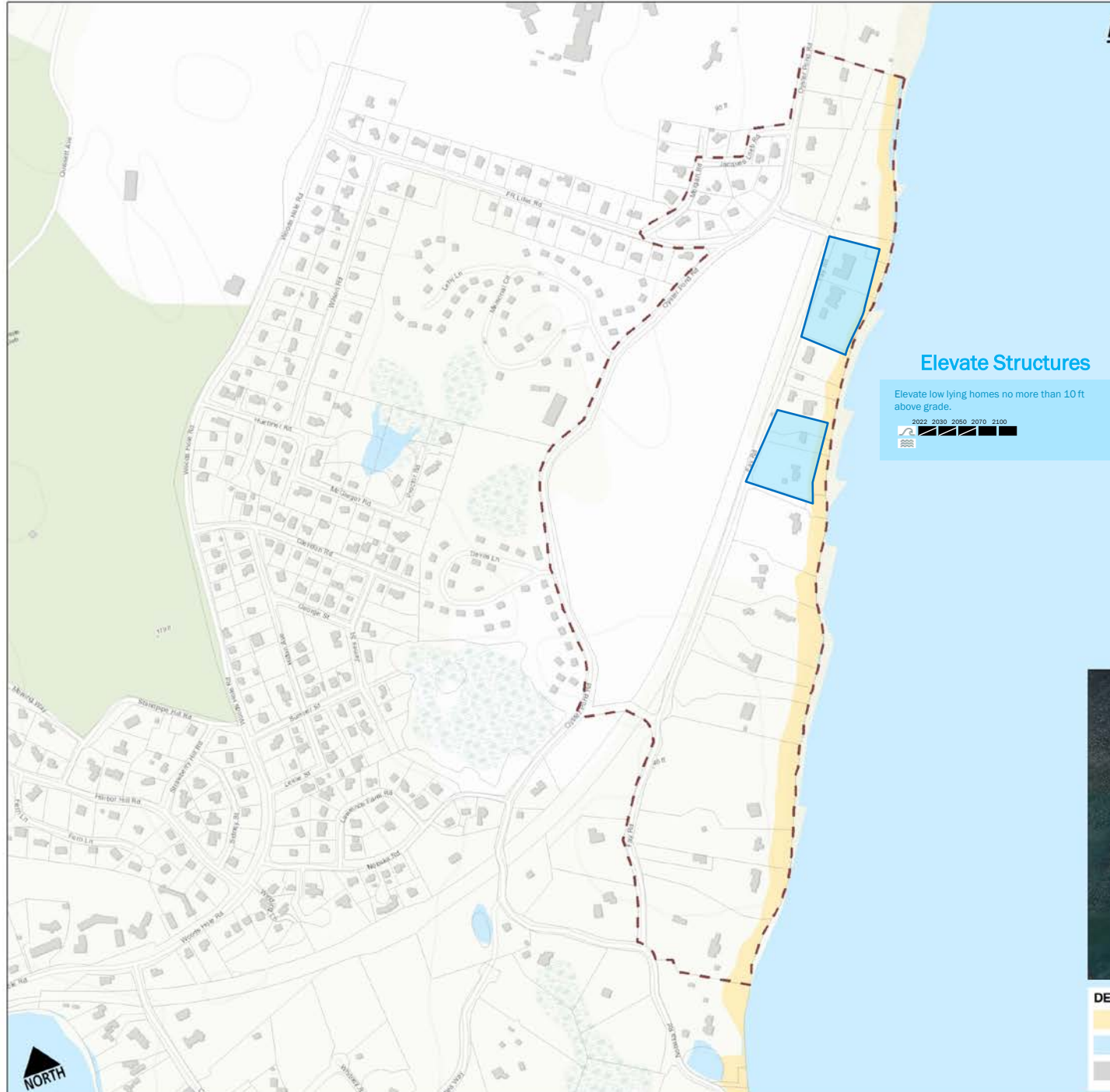
Protect/Connect



- DEP Wetlands**
- Coastal Beach or Dune
 - Open Water
 - Rocky Intertidal
 - Management Area
 - Parcel Boundaries
 - Coastal Infrastructure



Management Area Fay Road



Elevate Structures

Elevate low lying homes no more than 10 ft above grade.



Adaptive Realignment



- DEP Wetlands**
- Coastal Beach or Dune
 - Open Water
 - Rocky Intertidal
- Management Area**
- Parcel Boundaries
 - Coastal Infrastructure