# RESPONDING TO NUISANCE FLOODING OF COASTAL HIGHWAYS: OPTIONS FOR MUNICIPALITIES

**Read Porter**
**Marine Affairs Institute / Rhode Island Sea Grant Legal Program**

*Climate Adaptation Academy Workshop:*
*Legal Issues in the Age of Climate Adaptation III: Road Flooding*
*January 2019*

Marine Affairs Institute

Roger Williams University School of Law

Sea Grant Rhode Island

NOAA

The University of Rhode Island

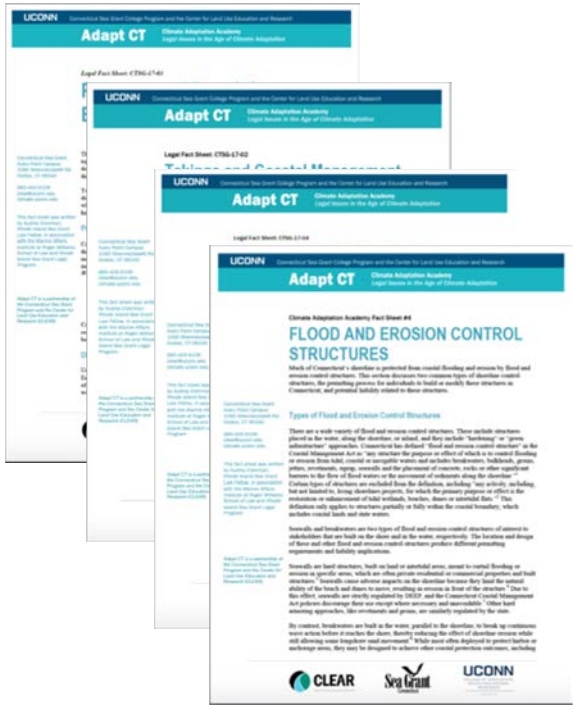
# RHODE ISLAND SEA GRANT LAW FELLOW PROGRAM

Law Fellows contributing to this project:
Olivia Thompson '20 (pictured)
Joseph Bingaman '19

- Matches highly-qualified law students with outside organizations
- Provides legal research and analysis on topics related to ocean and coastal law and policy
- Non-partisan and non-advocacy: no litigation or lobbying

# COASTAL ADAPTATION IN CONNECTICUT: LEGAL FACT SHEETS

- Based on questions asked by Climate Adaptation Academy workshop participants
- Topics:
  - Property and Permitting Boundaries at the Shoreline
  - Takings and Coastal Management
  - Governmental Tort Liability for Disclosure of Flood Hazard Information
  - Flood and Erosion Control Structures
  - Nuisance Flooding of Coastal Highways



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# THE PROBLEM OF COASTAL HIGHWAYS

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# COASTAL HIGHWAYS ARE ALREADY AFFECTED BY NUISANCE ("SUNNY-DAY") FLOODING

"Tidal nuisance flooding across the East Coast of the U.S. threatens 7,508 miles (12,083 km) of roadways and nearly 15,000 individual roadway segments. . . . most of the roadways at risk are not interstates. . . . **Of the five coastal New England states, Connecticut has the greatest vulnerability.**"

**Table 1.** Miles of Roadway by State and FC Located in Nuisance-Flood Zones

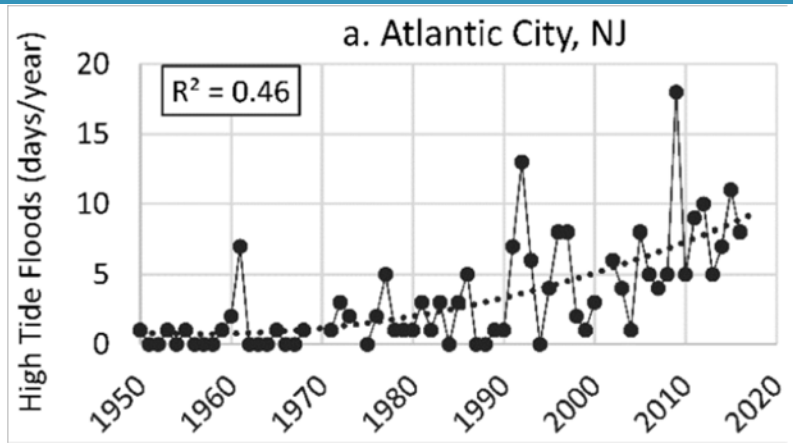
| State | Functional Class 1 & 2 | Functional Class 1 & 2 ramps | Functional Class 3, 4, & 5 | Functional Class 6 & 7 | Total | Percent of total road miles |
|---|---|---|---|---|---|---|
| ME | 8.7 | 0.8 | 188.6 | N/A[a] | 198.1 | 2.8% |
| NH | 0.4 | 0.3 | 12.4 | 21 | 34.2 | 0.2% |
| MA | 0 | 7.6 | 73 | 159 | 239.6 | 0.5% |
| RI | 1.2 | 1.3 | 57.4 | 5.7 | 65.6 | 3.1% |
| CT | 5.9 | 4 | 117.1 | 13.8 | 140.9 | 1.7% |
| NY | 32 | 19.3 | 133 | N/A[a] | 184.3 | 0.6% |
| NJ | 77.6 | 34.3 | 416.3 | 7.6 | 535.8 | 4.6% |
| PA | 21 | 14.9 | 74.1 | N/A[a] | 110 | 0.2% |
| DE | 7.7 | 0.7 | 58.5 | 121.5 | 188.5 | 2.8% |
| MD | 5.8 | 1.7 | 72 | 548 | 627.6 | 1.7% |
| DC | 5.3 | 3.3 | 1.2 | 8 | 17.7 | 1.5% |
| VA | 18.7 | 11.7 | 145.9 | 234 | 410.3 | 0.6% |
| NC | 3.2 | 3.3 | 315.2 | 1796.5 | 2118.2 | 1.4% |
| SC | 31.6 | 6.4 | 262.9 | 288.6 | 627.2 | 0.9% |
| GA | 65.4 | 4.8 | 53 | 102 | 225.3 | 0.2% |
| FL | 121 | 52.9 | 1195.3 | 453.9 | 1823.1 | 4.7% |
| Total | 405.6 | 167.3 | 3175.9 | 3759.6 | 7508.4 | 1.1% |

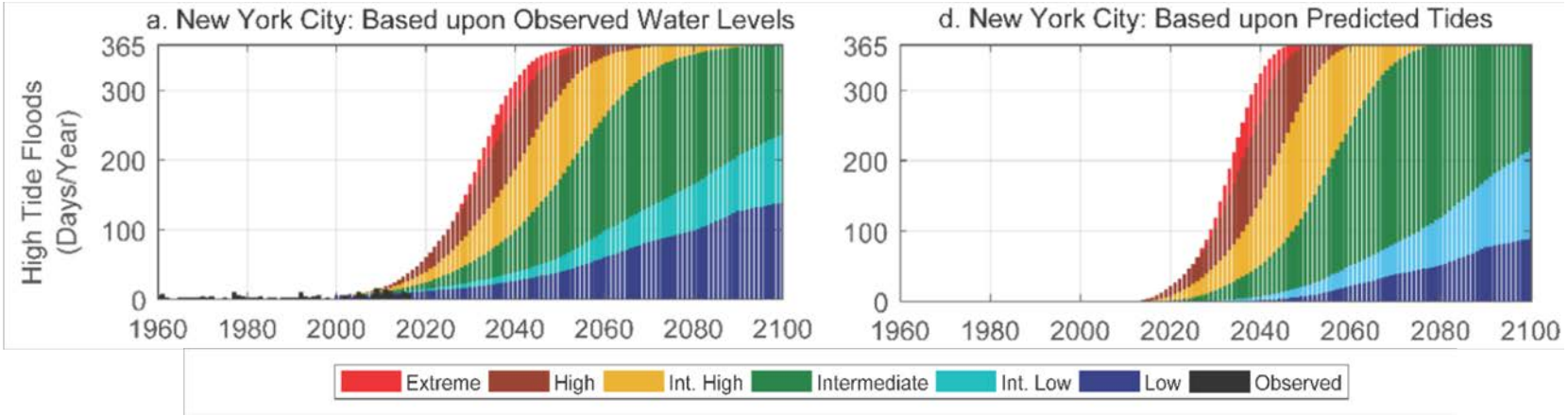
*Note:* 1 mile = 1.61 km.
[a]FC 6 and 7 roadway data were missing.

Table 1. Miles of Roadway by State and FC Located in Nuisance-Flood Zones

Jennifer M. Jacobs et al., *Recent and Future Outlooks for Nuisance Flooding Impacts on Roads on the U.S. East Coast*, 2762 TRANSPORTATION RESEARCH RECORD, no. 2, 2018, at 1-10.

# SUNNY-DAY FLOODING IS BECOMING MORE COMMON DUE TO SEA-LEVEL RISE




William V. Sweet et al., PATTERNS AND PROJECTIONS OF HIGH TIDE FLOODING ALONG THE U.S. COASTLINE USING A COMMON IMPACT THRESHOLD, NOAA Technical Report NOS CO-OPS 086 (2018)

# PREDICTED NUISANCE-FLOOD DAYS IN CONNECTICUT

**Table 3.** Observations and Projections of Annual Nuisance-Flood Days for Various SLR Scenarios at Various Locations[a]

| St. | Location Name | Station ID | Nuisance Level | Observed | Obs. | Intermediate Low | | | Intermediate | | | Extreme | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | (m, MHHW) | 2000 | 2010 | 2020 | 2060 | 2100 | 2020 | 2060 | 2100 | 2020 | 2060 | 2100 |
| 1 | Boston, MA | 8443970 | 0.68 | 2 | 6 | 10 | 53 | 115 | 16 | 155 | 359 | 40 | 364 | 365 |
| 2 | Providence, RI | 8454000 | 0.66 | 1 | 2 | 4 | 36 | 109 | 7 | 155 | 362 | 22 | 365 | 365 |
| 3 | New London, CT | 8461490 | 0.60 | 1 | 2 | 4 | 38 | 165 | 6 | 243 | 365 | 21 | 365 | 365 |
| 4 | Montauk, NY | 8510560 | 0.60 | 1 | 2 | 4 | 50 | 223 | 8 | 262 | 365 | 25 | 365 | 365 |
| 5 | Kings Point, NY | 8516945 | 0.52 | 8 | 15 | 23 | 106 | 214 | 37 | 254 | 363 | 75 | 365 | 365 |
| 6 | Battery (NYC), NY | 8518750 | 0.65 | 2 | 4 | 6 | 50 | 162 | 10 | 197 | 363 | 28 | 365 | 365 |
| 7 | Sandy Hook, NJ | 8531680 | 0.45 | 14 | 22 | 43 | 194 | 320 | 66 | 330 | 365 | 121 | 365 | 365 |
| 8 | Atlantic City, NJ | 8534720 | 0.43 | 13 | 22 | 49 | 214 | 330 | 69 | 334 | 365 | 127 | 365 | 365 |
| 9 | Philadelphia, PA | 8545240 | 0.49 | 6 | 11 | 20 | 137 | 283 | 32 | 305 | 364 | 85 | 365 | 365 |
| 10 | Lewes, DE | 8557380 | 0.41 | 12 | 21 | 40 | 192 | 323 | 57 | 330 | 365 | 123 | 365 | 365 |
| 11 | Baltimore, MD | 8574680 | 0.41 | 7 | 14 | 31 | 202 | 321 | 49 | 330 | 365 | 130 | 365 | 365 |
| 12 | Annapolis, MD | 8575512 | 0.29 | 24 | 41 | 87 | 292 | 351 | 122 | 354 | 365 | 224 | 365 | 365 |
| 13 | Washington DC | 8594900 | 0.31 | 21 | 30 | 72 | 259 | 336 | 102 | 342 | 365 | 196 | 365 | 365 |
| 14 | Norfolk, VA | 8638610 | 0.53 | 5 | 8 | 16 | 142 | 323 | 22 | 318 | 365 | 59 | 365 | 365 |
| 15 | Wilmington, NC | 8658120 | 0.25 | 23 | 43 | 71 | 275 | 356 | 108 | 361 | 365 | 204 | 365 | 365 |
| 16 | Charleston, SC | 8665530 | 0.38 | 16 | 25 | 53 | 183 | 309 | 70 | 311 | 365 | 125 | 365 | 365 |
| 17 | Savannah, GA | 8670870 | 0.46 | 10 | 17 | 37 | 139 | 265 | 51 | 267 | 365 | 94 | 365 | 365 |
| 18 | Fernandina Beach, FL | 8720030 | 0.59 | 1 | 2 | 7 | 48 | 139 | 11 | 151 | 362 | 32 | 364 | 365 |
| 19 | Mayport, FL | 8720218 | 0.44 | 2 | 6 | 14 | 94 | 245 | 23 | 254 | 365 | 63 | 365 | 365 |
| 20 | Key West, FL | 8724580 | 0.33 | 1 | 4 | 18 | 195 | 354 | 35 | 357 | 365 | 100 | 365 | 365 |
| 21 | St Petersburg, FL | 8726520 | 0.84 | 0 | 0 | 0 | 1 | 15 | 0 | 16 | 355 | 1 | 362 | 365 |

*Note*: 1 m = 0.305 ft.
[a]All counts are annual totals estimated as the decadal average decadal (10-yr) value centered on year (i.e., 2000 is 1996–2005), except 2100, which is a 5-year average (2096–2100).

Table 3. Observations and Projections of Annual Nuisance-Flood Days for Various SLR Scenarios at Various Locations

Jennifer M. Jacobs et al., *Recent and Future Outlooks for Nuisance Flooding Impacts on Roads on the U.S. East Coast*, 2762 TRANSPORTATION RESEARCH RECORD, no. 2, 2018, at 1-10.

# CONSTRUCTION AND MAINTENANCE COSTS

- Flooding and associated erosion will increase roadway maintenance costs and shorten infrastructure life
- "[C]limate change, if unchecked, will increase the annual costs of keeping paved and unpaved roads in service by **$785 million** in present value terms by 2050."
  - Paul S. Chinowsky et al., *Assessment of Climate Change Adaptation Costs for the U.S. Road Network*, 23 GLOBAL ENVTL. CHANGE 764 (2013).

# IMPACTS ON PUBLIC SAFETY

"In New England, winter flooding can create sheets of ice on roadways, adding another, dangerous, consequence to street flooding."

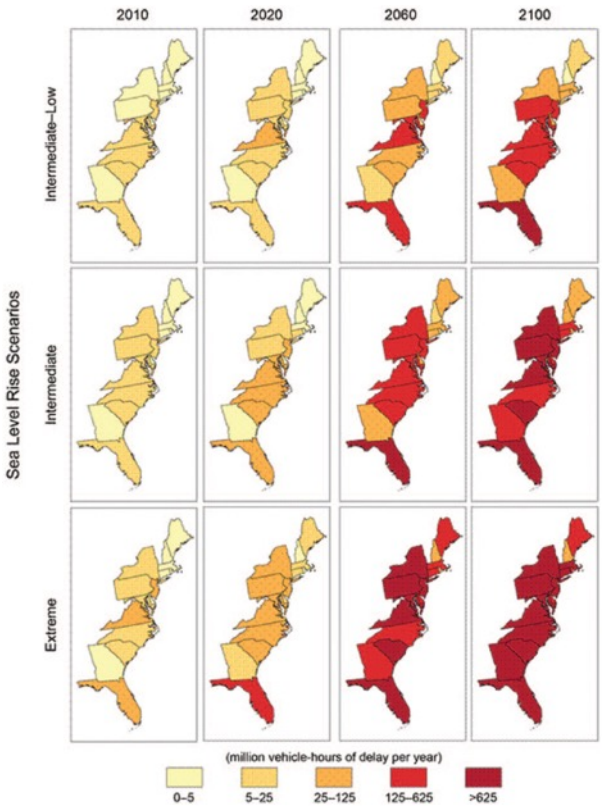
- Jason McAlpine, *Rising Seas Swallow $403 Million in New England Home Values*, First Street Foundation (Jan. 22, 2019)

*FEMA Photo by Barry Bahler*

# IMPACTS ON PROPERTY VALUES

- "[I]n response to sea level rise, nuisance flooding (NF) could generate property value exposure comparable to, or larger than, extreme events."
  - Hamed R. Moftakhari et. al., *Cumulative Hazard: The Case of Nuisance Flooding*, 5 EARTH'S FUTURE, 214, 218-19, (2017)
- "It's not just property lot flooding that leads to home value loss, persistent flooding of nearby roads has a significant impact as well . . . . Road flooding affects commutes and school bus access, and because it's on display for everyone to see, it can give an area a negative reputation."
  - Jason McAlpine, *Rising Seas Swallow $403 Million in New England Home Values*, First Street Foundation (Jan. 22, 2019)

# DISRUPTION OF ECONOMIC ACTIVITY




Annual vehicle-hours of delay for FC 1–5 roads due to tidal nuisance flooding by state, year, and sea-level-rise scenario.

Jacobs et al., *Recent and Future Outlooks for Nuisance Flooding Impacts on Roads on the U.S. East Coast*, 2762 TRANSP. RES. RECORD, no. 2, 2018, at 1, fig. 3.

"Some trips will be cancelled because either the origin location or the destination location is flooded. . . . Some trips will not occur because flooding of links has made it impossible for the traveler to get from origin to destination. Many trips that occur despite the flooding will take much longer."

- Suarez et al., *Impacts of flooding and climate change on urban transportation: A systemwide performance assessment of the Boston Metro Area*, 10 TRANSP. RES. PART D: TRANSP. & ENV'T 231 (2005).

# COASTAL ROADS ARE VALUABLE!

- "Generally, home buyers are willing to pay a premium for living near the water. Property values are negatively related to distance from the coastline, and this relationship is a nonlinear one in the sense that **the coastal premium is significantly greater at the waterfront**. Both a water view and a wide beach have positive impacts on property values."
  - Di Jin et al., *Shoreline Change, Seawalls, and Coastal Property Values*, 114 OCEAN & COASTAL MGMT. 185 (2015).
- Coastal property taxes are important for municipal finances and properties must be serviced by roads
- Recreational uses also served

# COASTAL MANAGEMENT ACT: STATE POLICIES

- Municipal planning and zoning requirements must be consistent with state policies in coastal areas
- Policies include "rehabilitation, upgrading and improvement of existing transportation facilities" to meet "transportation needs"

*WHAT TO DO?*


# THE LEGAL CONTEXT

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# TYPES OF ROADS

*Read Porter*

- State highways
- Municipal highways
- Private roads

*Different roads serve different functions*

# WHERE ARE ROADS REQUIRED?

- Location and design of roads is generally discretionary
- Mechanism for court to appoint a committee to determine and lay out roads "of common convenience and necessity" (CGS 13a-63)

# DUTY TO MAINTAIN

- Courts can order repairs upon failure to keep roads in "good and sufficient repair"
- Injured persons can sue municipalities for failure to maintain a highway
  - Town must know about the defect and fail to remedy it
  - Regular nuisance flooding could satisfy standard

# THREE OPTIONS IN RESPONSE TO NUISANCE FLOODING

- **Elevate** the road so it is no longer flooded
- **Discontinue** the road through a legal process
- **Abandon** the road – cease maintenance and allow it to degrade

*Abandonment and discontinuance may be part of new construction or realignment work.*

# ELEVATION

- Benefit: Preserves access, ends nuisance flooding
- No legal requirement for minimum elevation relative to current or future sea level
  - Elevation may be driven by cost
  - Sea level rise may affect design life

# ELEVATION AND PERMITTING

- Elevation may require widening the right-of-way to maintain slope
- Fill seaward of coastal jurisdiction line or in wetlands triggers permitting
  - DEEP
  - USACE

# ELEVATION AND TAKINGS

- Widening may encroach on private property to landward: eminent domain
- Foreseeable flooding caused by road design could be a trespass or taking ("bathtub effect")
  - *St. Bernard Parish v. U.S.*: Temporary flooding is a taking if it is foreseeable and a 'direct, natural, or probable result of an authorized activity.' (Fed. Cir. 2018)
- "Change in grade" is a taking if property "sustains special damage"
  - *Corbin Dev. Co. v. Commissioner:* change in grade caused loss of access to driveway (Conn. 1978)

# DISCONTINUANCE

- Process:
  - Report by planning commission
  - Majority vote of selectmen/council
  - Abutters must receive prior notice of meeting
- Effect:
  - Municipality no longer has duty to maintain
  - Abutters receive a right-of-way to travel over and improve the roadbed
  - Generally does not affect title, but municipality can transfer the property to the abutters
  - Can be converted to sidewalk, bike / bridle path

# IS DISCONTINUANCE A TAKING?

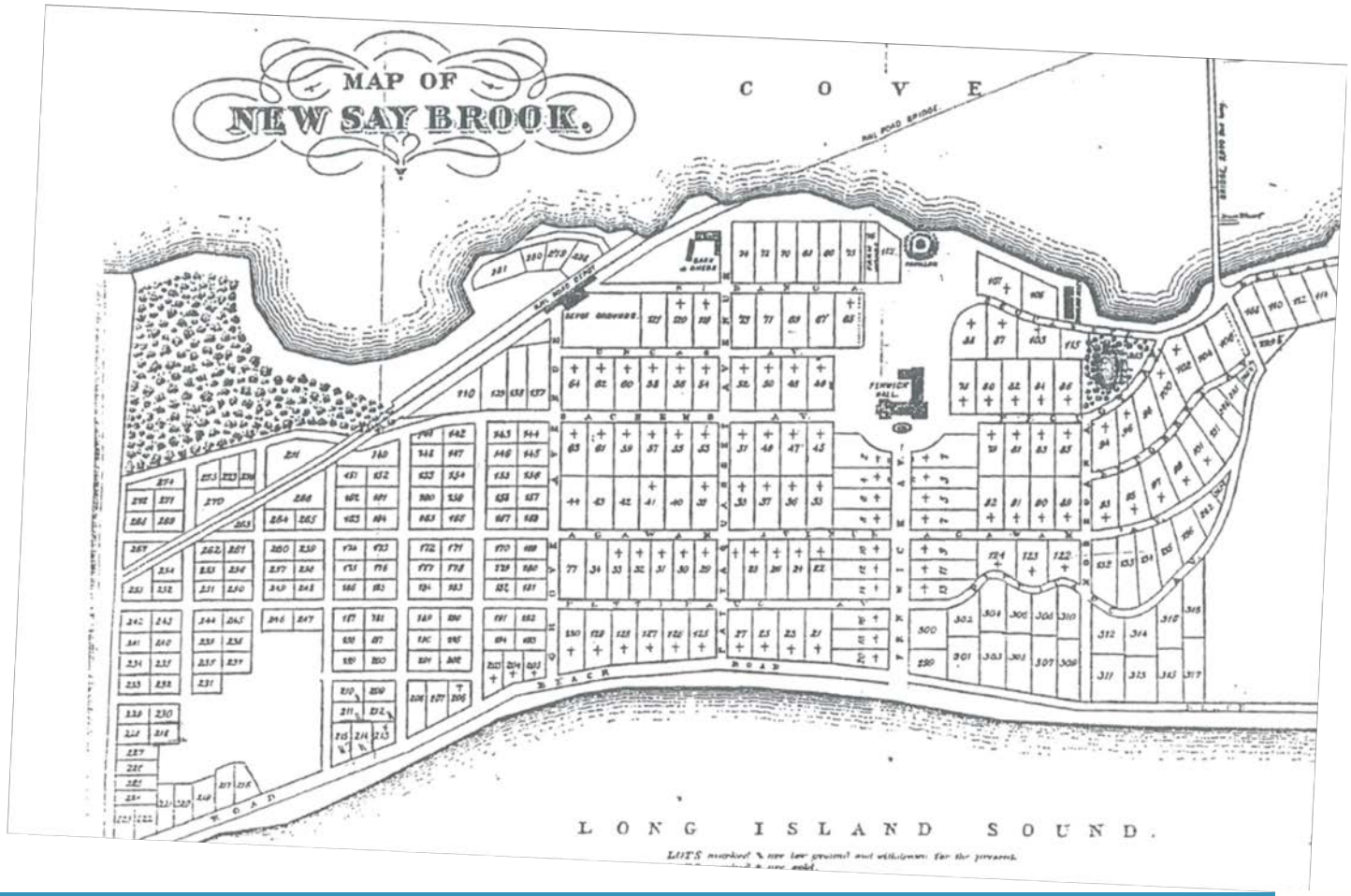
- *Luf v. Southbury* (Conn. 1982): Not a taking!
  - Small diminution in property value
  - Some impairment of access rights
  - No damages because kept access rights via easement

# ABANDONMENT

- Occurs when public ceases use "for a long period of time with the intention to abandon."
  - May be affirmative indication of intent to abandon, but not required
- Towns use primarily as *defense* to tort claims: abandonment requires a court determination
  - *Stohlts v. Gilkinson*: highway not abandoned because property owner received driveway permit 17 years before case (Conn. App. 2005)
  - *Nichols v. Town of Oxford*: highway abandoned because little use and "sporadic but insubstantial" maintenance for 60 years (Conn. App. 2018)
- Effect: same easement as discontinuance

# KEY LEGAL QUESTIONS TO CONSIDER

- Jurisdiction
  - Whose road is it?
  - Roads cross boundaries: what about neighbors?
- Liability: will compensation be required?
  - Loss of access to property?
  - Eminent domain required?
- Permitting: what can be authorized?




# PRACTICAL APPLICATIONS

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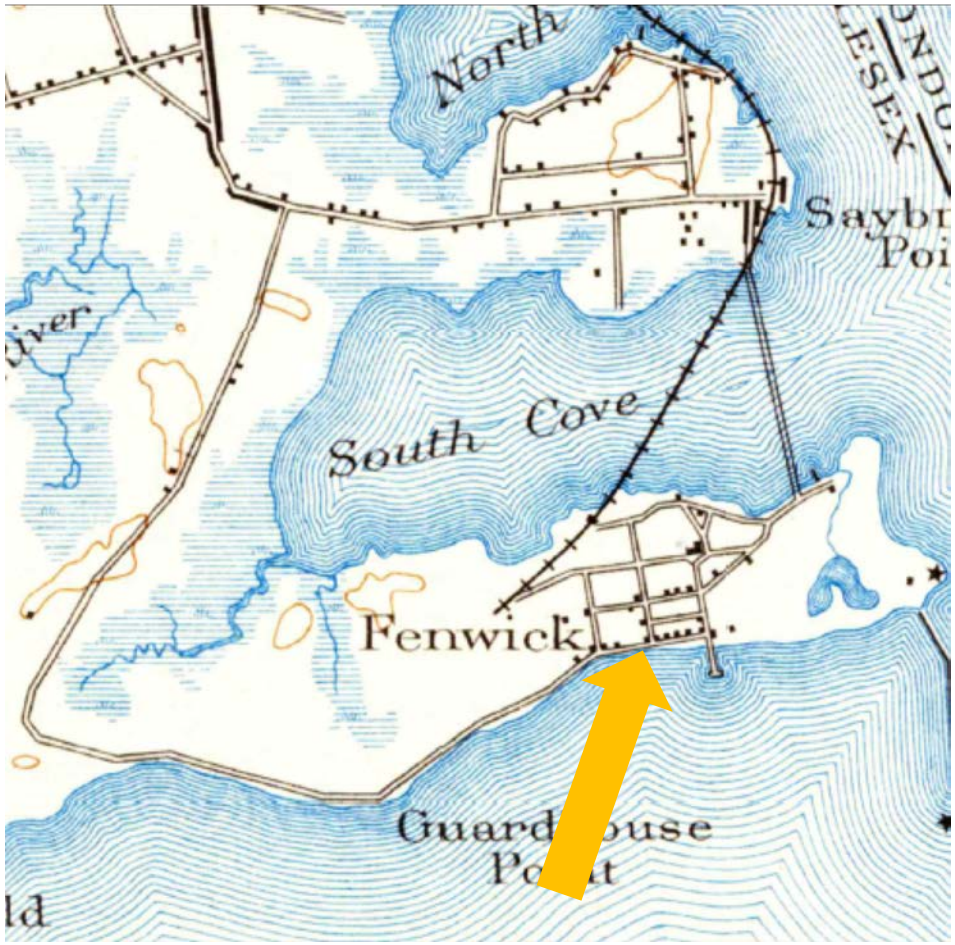
# FENWICK – A CASE STUDY




1898


1944

# IMPACTS OF COASTAL EROSION


- Beach road eroded rapidly after houses constructed
- Was not critical for access to outside road system
- Discontinued by 1925

# DISCONTINUANCE OF BEACH ROAD & CONNECTIONS

BOOK 322 PAGE 0933

Borough of Fenwick

Notice of Discontinuance of Streets

NOTICE IS HEREBY GIVEN, that at a meeting held on December 3, 1994, the Board of Warden and Burgesses of the Borough of Fenwick, as authorized by Sections 22-27 of the Special Act incorporating the Borough of Fenwick, did discontinue the following portions of the following roads, all as originally laid out and shown on that plan referred to as "MAP OF NEW SAYBROOK NO. 2", a copy of which plan is on file on Map Book Page Number 29 in the office of the Town Clerk of the Town of Old Saybrook:

1. All that portion of Mohegan Avenue located South of Agawam Avenue, which portion is bounded as follows:

NORTHERLY: By Agawam Avenue;

SOUTHERLY: By beachfront land adjacent to the Long Island Sound, described as "Beach Road" on said map;

EASTERLY: By Lots 132, 311, 312, and a portion of

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# ELEVATION OF NIBANG AVENUE

- Only existing access to eastern properties across marsh
- Erosion could move coastal jurisdiction line on to road and require permits
- Golf tee threatened
- Elevation project designed to available fiscal resources

# SITE VIEW AFTER ELEVATION

# LESSONS LEARNED

Appropriate responses are site-specific, depending on:

- Access/egress needs – can other roads provide links to road system?
- Costs and available resources – *how can municipality pay for the work?*
- Permitting can affect project timing and design

- Combining approaches may yield best outcomes

# ACKNOWLEDGEMENTS

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Bruce Hyde

Jane Stahl

*For a copy of the fact sheet:*

https://climate.uconn.edu/

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