NEW JERSEY'S REGULATORY RESPONSE TO A CHANGING CLIMATE

NJPACT REAL
NJ Protecting Against Climate Threats
Resilient Environments and Landscapes
20 May 2024

WEBINAR 1: SEA LEVEL RISE AND THE INUNDATION RISK ZONE

NJPACT:
Resilient Environment And Landscapes (REAL) Reforms

To address the unavoidable impacts of climate change, such as sea-level rise, extreme weather, and chronic flooding, NJDEP is pursuing targeted regulatory reforms that will modernize the land use rules and focus on increased resilience throughout the State.

Quick Overview:

- **Developed in response to Governor Murphy's 2020 EO**
- **50+ stakeholder sessions since 2020**
  - **Industry groups**
  - **Federal, State and local government agencies**
  - **Environmental groups**
  - **Insurance and investment agencies**
- **Proposal amends:**
  - FHACA Rules
  - Stormwater Management Rules
  - Coastal Zone Management Rules
  - Freshwater Wetlands Protection Act Rules
  - All other NJDEP rules that reference flooding
- **Purpose:**
  - Address impacts of sea level rise
  - Improve land and water resource protection

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Anticipated Schedule:

- **5.2.24: Proposal filed with Office of Administrative Law**
  - Courtesy copy posted on DEP website
- **5.20.24 through 5.29.24: Webinars**
  - 5.20: Session 1: Sea Level Rise and Inundation Risk Zone
  - 5.22: Session 2: Environmental Enhancements
  - 5.23: Session 3: Coastal Climate Protection
  - 5.29: Session 4: Stormwater
- **July 2024: Anticipated Publication in New Jersey Register**
  - Three public hearings
  - 90-day comment period
- **Summer/Fall 2025: Anticipated Adoption**
  - Rule adoption documents must be filed with OAL within one year of New Jersey Register publication

Scope of Rulemaking

- **New standards will apply only to:**
  - New development
  - Redevelopment
  - Substantial improvements to buildings

- **Rulemaking will not:**
  - Affect existing development
  - Create "no-build" zones
  - Require roads and buildings to be elevated when doing so is impracticable

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Coastal Inundation & Flood Damage

Rutgers University's Science and Technical Advisory Panel (STAP) Report indicates a 50% probability that sea level rise will exceed 3.3 feet and a 17% probability that sea level rise will exceed 5.1 feet by 2100 assuming moderate emissions.

Sea-level rise:

Table ES-1: New Jersey Sea-Level Rise above the year 2000 (1991-2009 average) baseline (ft)*

		2030	2050	2070			2100			2150		
				Emissions								
	Chance SLR Exceeds			Low	Mod.	High	Low	Mod.	High	Low	Mod.	High
Low End	> 95% chance	0.3	0.7	0.9	1	1.1	1.0	1.3	1.5	1.3	2.1	2.9
Likely Range	> 83% chance	0.5	0.9	1.3	1.4	1.5	1.7	2.0	2.3	2.4	3.1	3.8
	~50 % chance	0.8	1.4	1.9	2.2	2.4	2.8	3.3	3.9	4.2	5.2	6.2
	<17% chance	1.1	2.1	2.7	3.1	3.5	3.9	5.1	6.3	6.3	8.3	10.3
High End	< 5% chance	1.3	2.6	3.2	3.8	4.4	5.0	6.9	8.8	8.0	13.8	19.6

**2010 (2001-2019 average) Observed = 0.2 ft*

https://njclimateresourcecenter.rutgers.edu/resources/nj-sea-level-rise-reports/

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Coastal Inundation & Flood Damage

Background on STAP Report: "New Jersey's Rising Seas and Changing Coastal Storms: Report of the 2019 Science and Technical Advisory Panel"

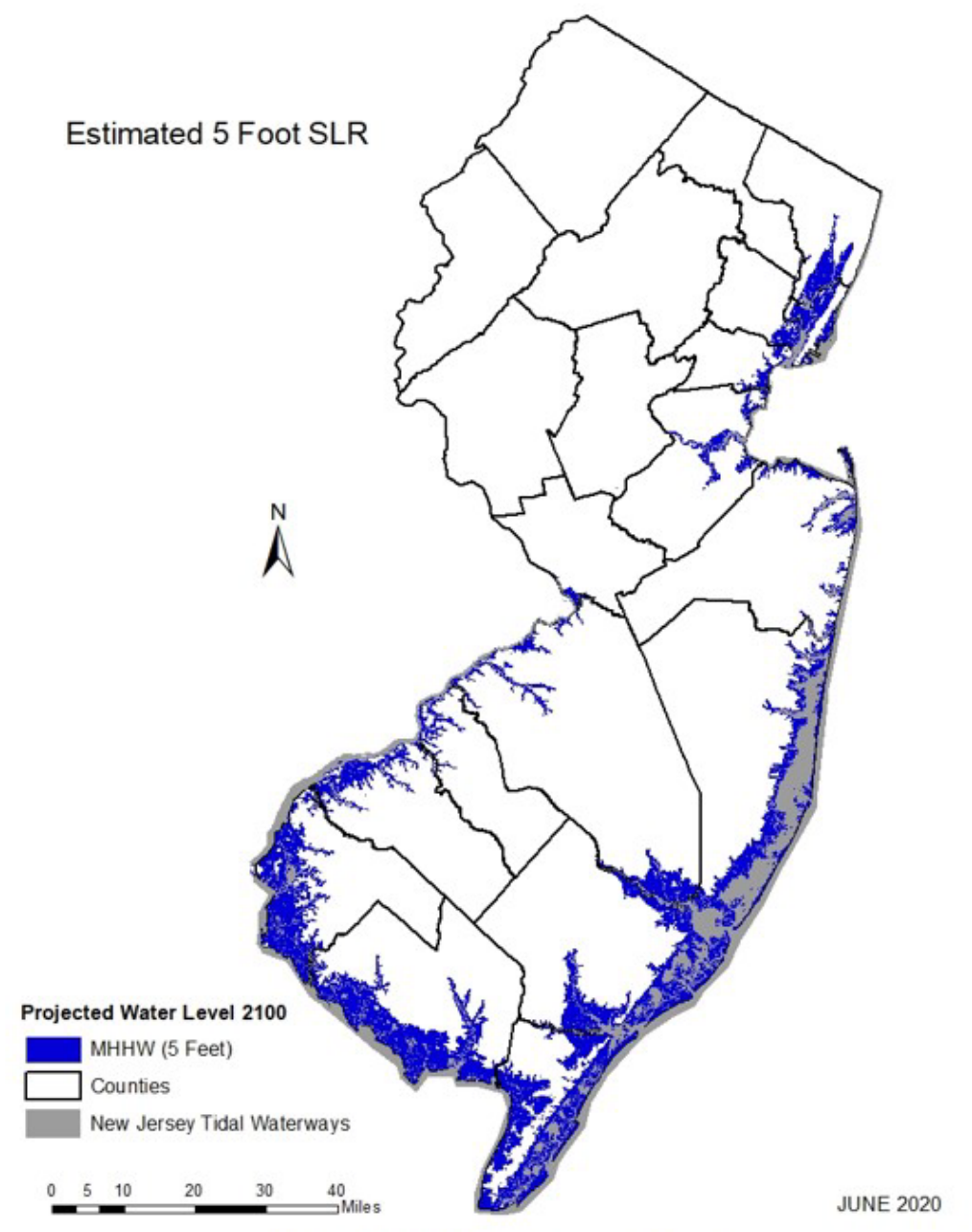
- Broad Expert Panel Authorship: The report was authored by a large panel with collective expertise that is unparalleled.
- The nineteen authors represent research universities, federal institutions, professional associations and consulting firms.
- Representation includes Rutgers University, Princeton University, Stevens Institute of Technology, Drexel University, Rowan University, National Oceanic and Atmospheric Administration (NOAA), U.S. Environmental Protection Agency, U.S. Army Corps of Engineers, New York City, New Jersey Association of Floodplain Management and Atmospheric and Environmental Research

Coastal Inundation & Flood Damage

Background on STAP Report: "New Jersey's Rising Seas and Changing Coastal Storms: Report of the 2019 Science and Technical Advisory Panel"

- Peer-reviewed Underlying Data: This 2019 STAP report builds upon a prior STAP report produced for the New Jersey Climate Change Alliance in 2016.
- The scientific basis of the 2016 effort was based entirely on Professor Kopp's 2014 peer-reviewed, published work. Thus, the underlying data for both the 2016 and 2019 reports have already been subjected to a thorough peer review.
- The technical material added to the 2019 report, including the basis for accelerated melting from polar ice sheets and multiple future temperature scenarios, is also drawn from peer reviewed publications in very reputable scientific journals. Kopp, R. E., Horton, R. M., Little, C. M., Mitrovica, J. X., Oppenheimer, M., Rasmussen, D. J., et al. (2014). Probabilistic 21st and 22nd century sea-level projections at a global network of tide-gauge sites. *Earth's Future*, *2*(8), 383-406.

Fixing Data Gaps to Protect Coastal Investments



Sea Level Rise = More land regularly or permanently inundated

More Inundation = Higher flood elevations

Higher Elevations = More recurring flood damage

- Existing flood standards are based on outdated historical trends that do not account for sea-level rise and attendant storm surge.
- Roads and buildings built today are likely to be serviceable in 2100.
- Reliance on incomplete and inaccurate data leads to inadequate risk assessment and substandard design criteria for buildings and infrastructure.

Inundation Risk Zone

Two options for determining the extent of the inundation risk zone:

1. **Use DEP's online mapping tool at:**
   - https://dep.nj.gov/gis/nj-geoweb/
2. **Compute it using site-specific topography and NOAA data:**
   - Based on local mean higher high-water (MHHW) elevation
   - Proposed method outlined in the FHACA rules at N.J.A.C. 7:13-3.4(c)

dep.nj.gov/gis/nj-geoweb/

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Governor Phil Murphy • Lt. Governor Tahesha Way

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Department of Environmental Protection

Geographic Information Systems

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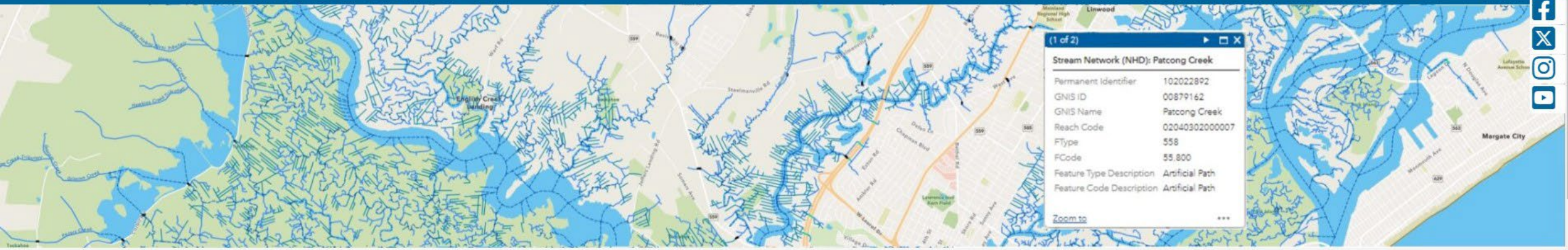
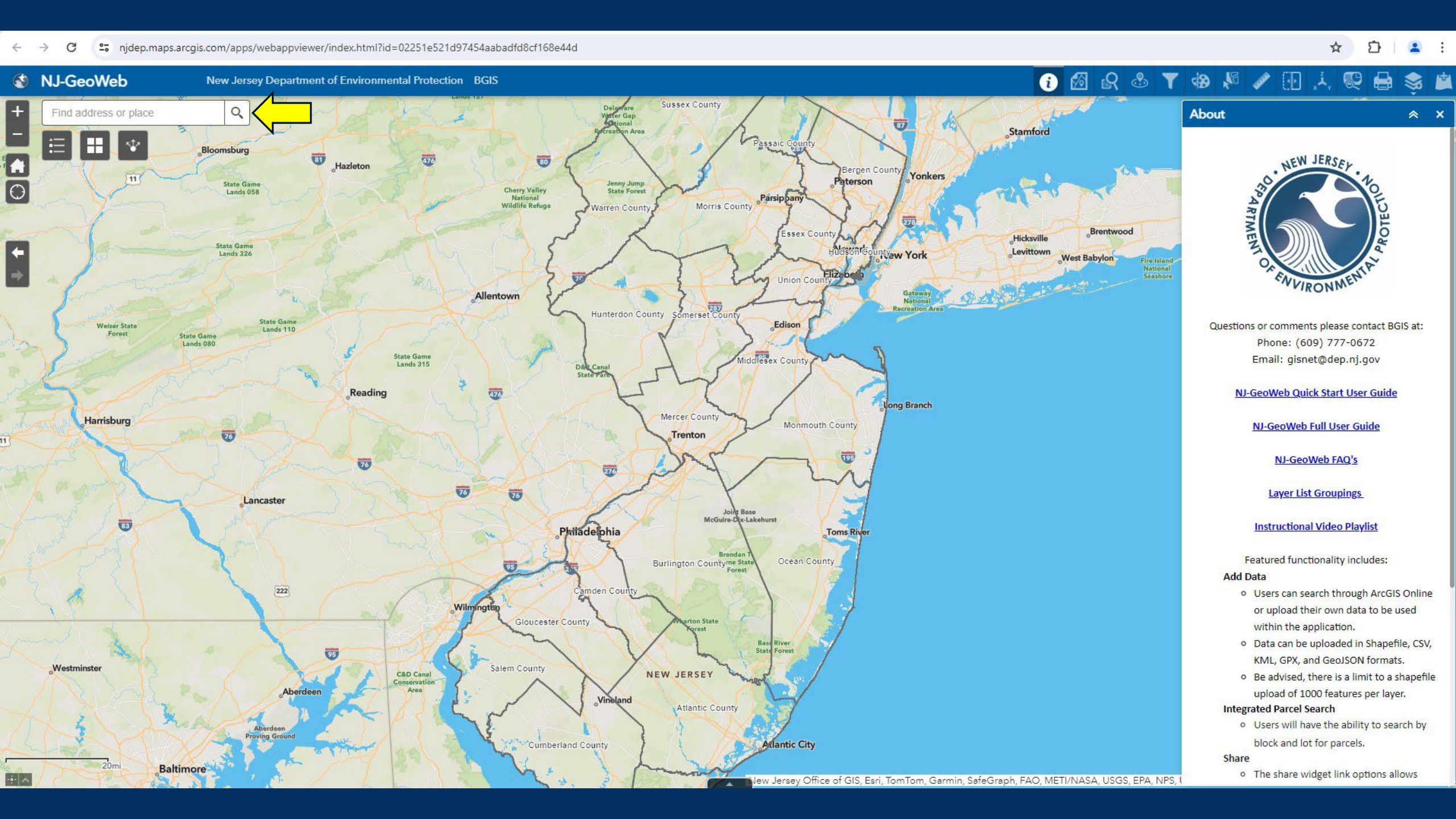


Home / **NJ-GeoWeb**

Launch NJ-GeoWeb

This application provides users access to NJDEP GIS data on the Internet. Users can view, query and analyze the Department's GIS data with related environmental information. One major enhancement is the ability to upload Shapefiles from a local drive, and data from other sources for viewing within the application.

View Quick Start Guide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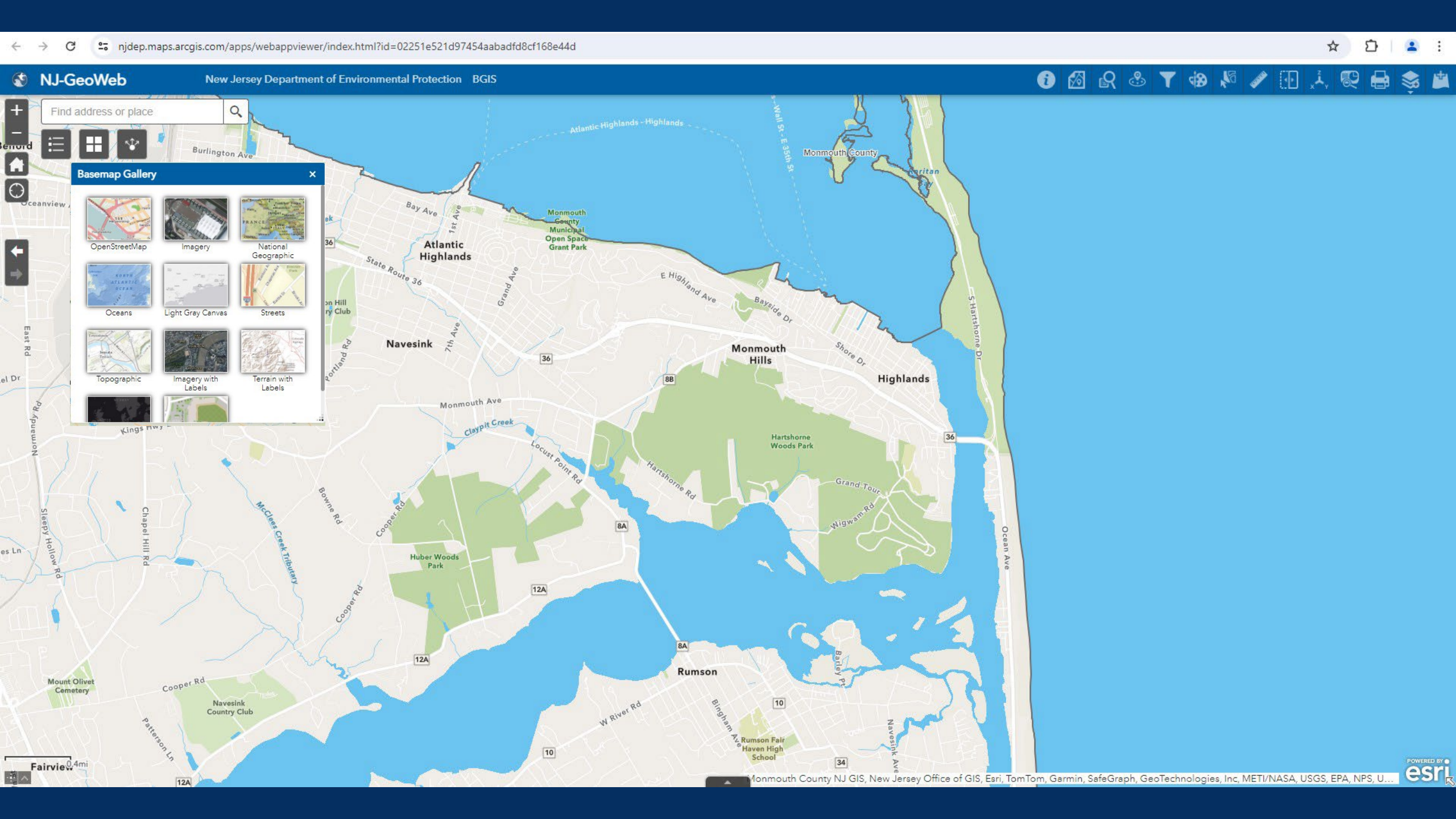
NEW JERSEY DEPARTMENT OF ENVIRONMENTAL PROTECTION
Questions or comments please contact BGIS at:
Phone: (609) 777-0672
Email: gisnet@dep.nj.gov
NJ-GeoWeb Quick Start User Guide
NJ-GeoWeb Full User Guide
NJ-GeoWeb FAQ's
Layer List Groupings
Instructional Video Playlist
Featured functionality includes:
Add Data
Users can search through ArcGIS Online or upload their own data to be used within the application.
Data can be uploaded in Shapefile, CSV, KML, GPX, and GeoJSON formats.
Be advised, there is a limit to a shapefile upload of 1000 features per layer.
Integrated Parcel Search
Users will have the ability to search by block and lot for parcels.
Share
The share widget link options allows
Bloomsburg
Hazleton
Allentown
Reading
Harrisburg
Lancaster
Philadelphia
Trenton
Wilmington
Westminster
Aberdeen
Baltimore
Sussex County
Passaic County
Bergen County
Paterson
Yonkers
Stamford
Parsippany
Warren County
Morris County
Essex County
Hudson County
New York
Hicksville
Levittown
Brentwood
West Babylon
Union County
Elizabeth
Hunterdon County
Somerset County
Edison
Middlesex County
Long Branch
Monmouth County
Mercer County
Toms River
Ocean County
Burlington County
Camden County
Gloucester County
Salem County
NEW JERSEY
Vineland
Atlantic County
Cumberland County
Atlantic City
Cherry Valley National Wildlife Refuge
Jenny Jump State Forest
Weiser State Forest
State Game Lands 058
State Game Lands 326
State Game Lands 110
State Game Lands 080
State Game Lands 315
D&R Canal State Park
Gateway National Recreation Area
Fire Island National Seashore
Joint Base McGuire-Dix-Lakehurst
Brendan T. Byrne State Forest
Wharton State Forest
Bass River State Forest
C&D Canal Conservation Area
Aberdeen Proving Ground
20mi
New Jersey Office of GIS, Esri, TomTom, Garmin, SafeGraph, FAO, METI/NASA, USGS, EPA, NPS,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Basemap Gallery
OpenStreetMap
Imagery
National Geographic
Oceans
Light Gray Canvas
Streets
Topographic
Imagery with Labels
Terrain with Labels
Atlantic Highlands - Highlands
Monmouth County
Raritan
Burlington Ave
Bay Ave
1st Ave
Monmouth County Municipal Open Space Grant Park
Atlantic Highlands
State Route 36
Grand Ave
E Highland Ave
Bayside Dr
Shore Dr
S Hartshorne Dr
Navesink
7th Ave
Portland Rd
Monmouth Hills
Highlands
Monmouth Ave
Claypit Creek
Locust Point Rd
Hartshorne Woods Park
Hartshorne Rd
Grand Tour
Wigwam Rd
Ocean Ave
East Rd
Normandy Rd
Sleepy Hollow Rd
Chapel Hill Rd
McClees Creek Tributary
Bowne Rd
Cooper Rd
Huber Woods Park
Rumson
Mount Olivet Cemetery
Navesink Country Club
Patterson Ln
W River Rd
Bingham Ave
Rumson Fair Haven High School
Navesink Ave
Fairview
0.4mi
Monmouth County NJ GIS, New Jersey Office of GIS, Esri, TomTom, Garmin, SafeGraph, GeoTechnologies, Inc, METI/NASA, USGS, EPA, NPS, U...
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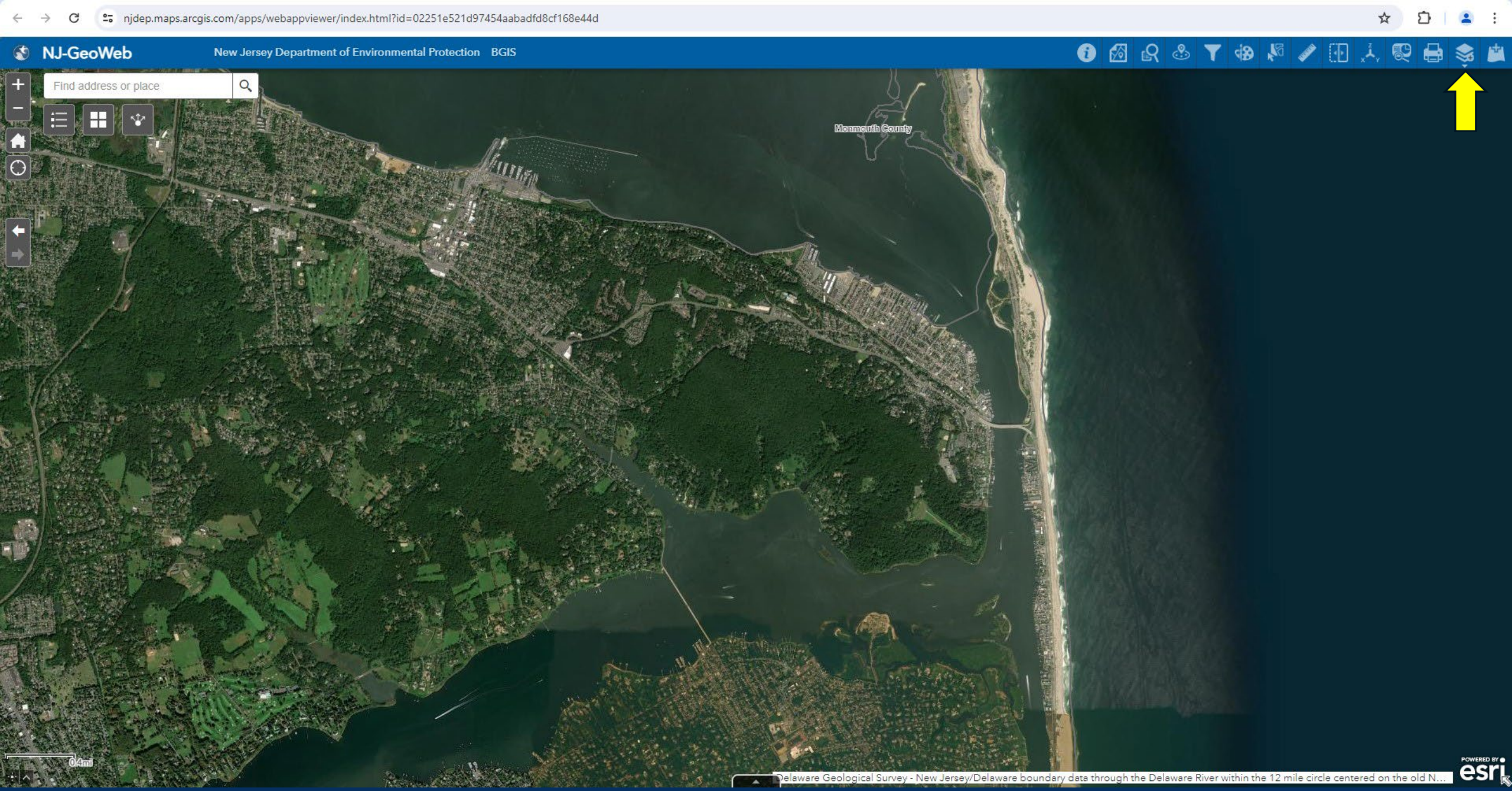
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Delaware Geological Survey - New Jersey/Delaware boundary data through the Delaware River within the 12 mile circle centered on the old N...
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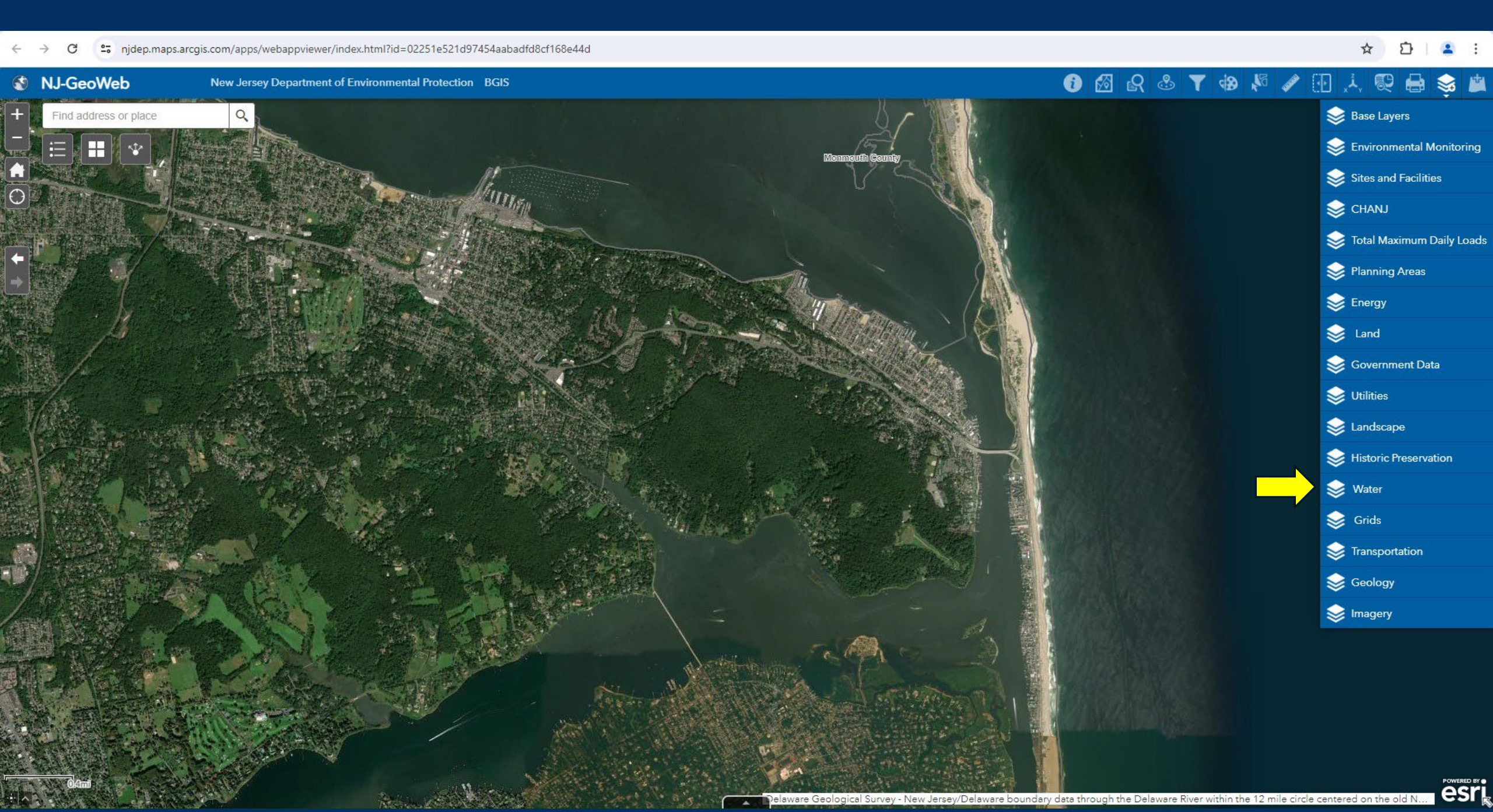
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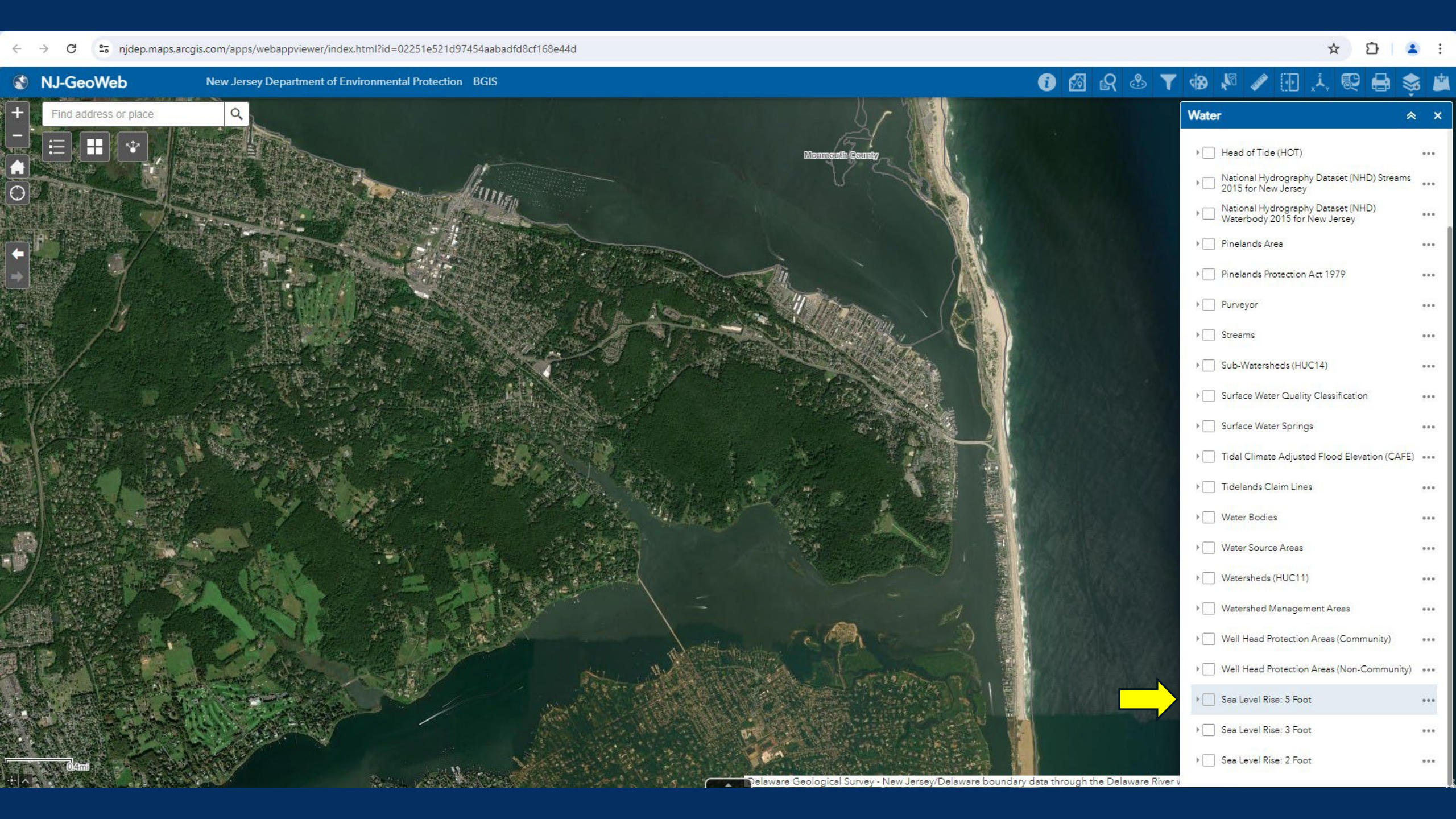
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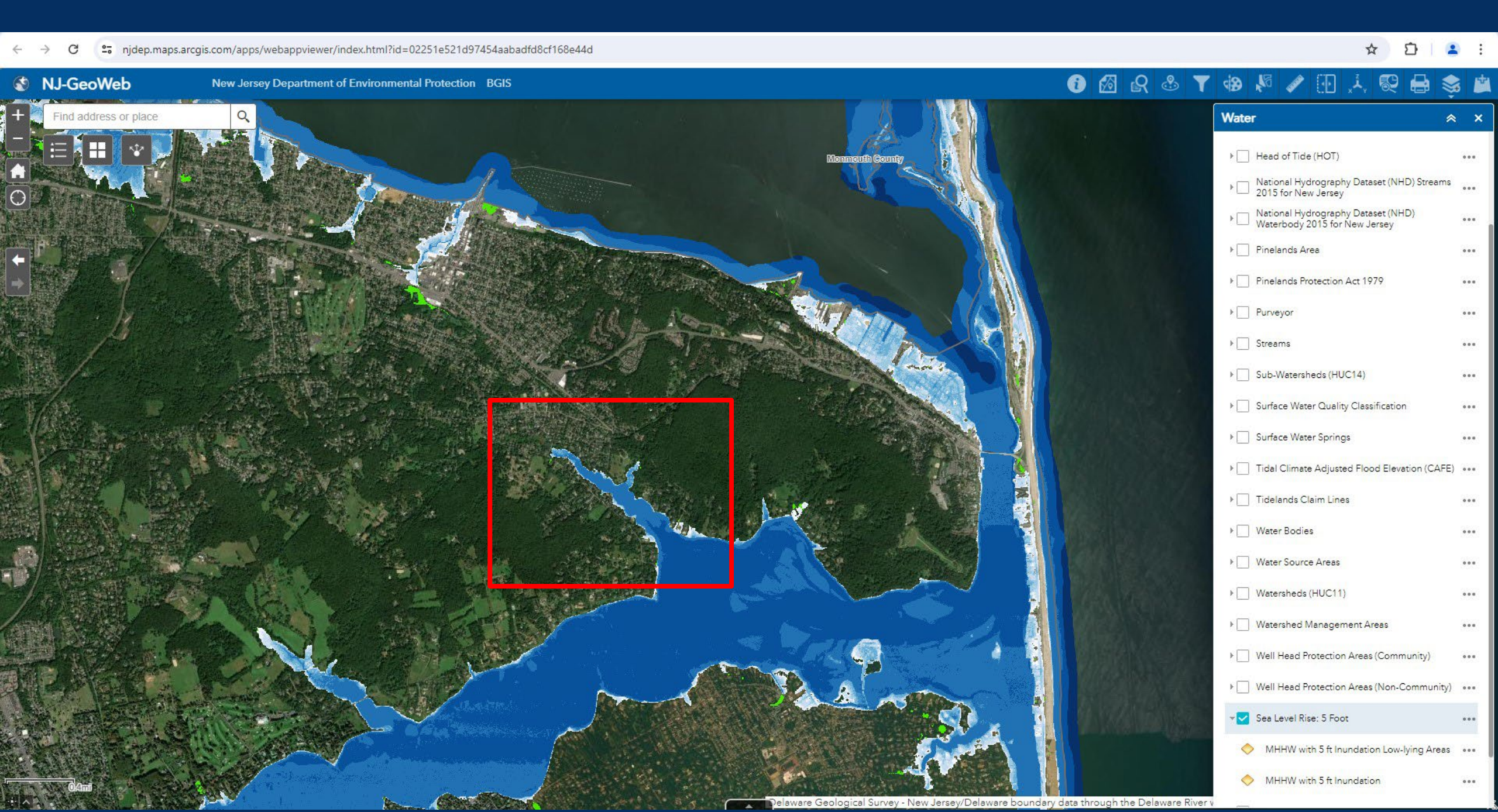
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MHHW with 5 ft Inundation Low-lying Areas
MHHW with 5 ft Inundation
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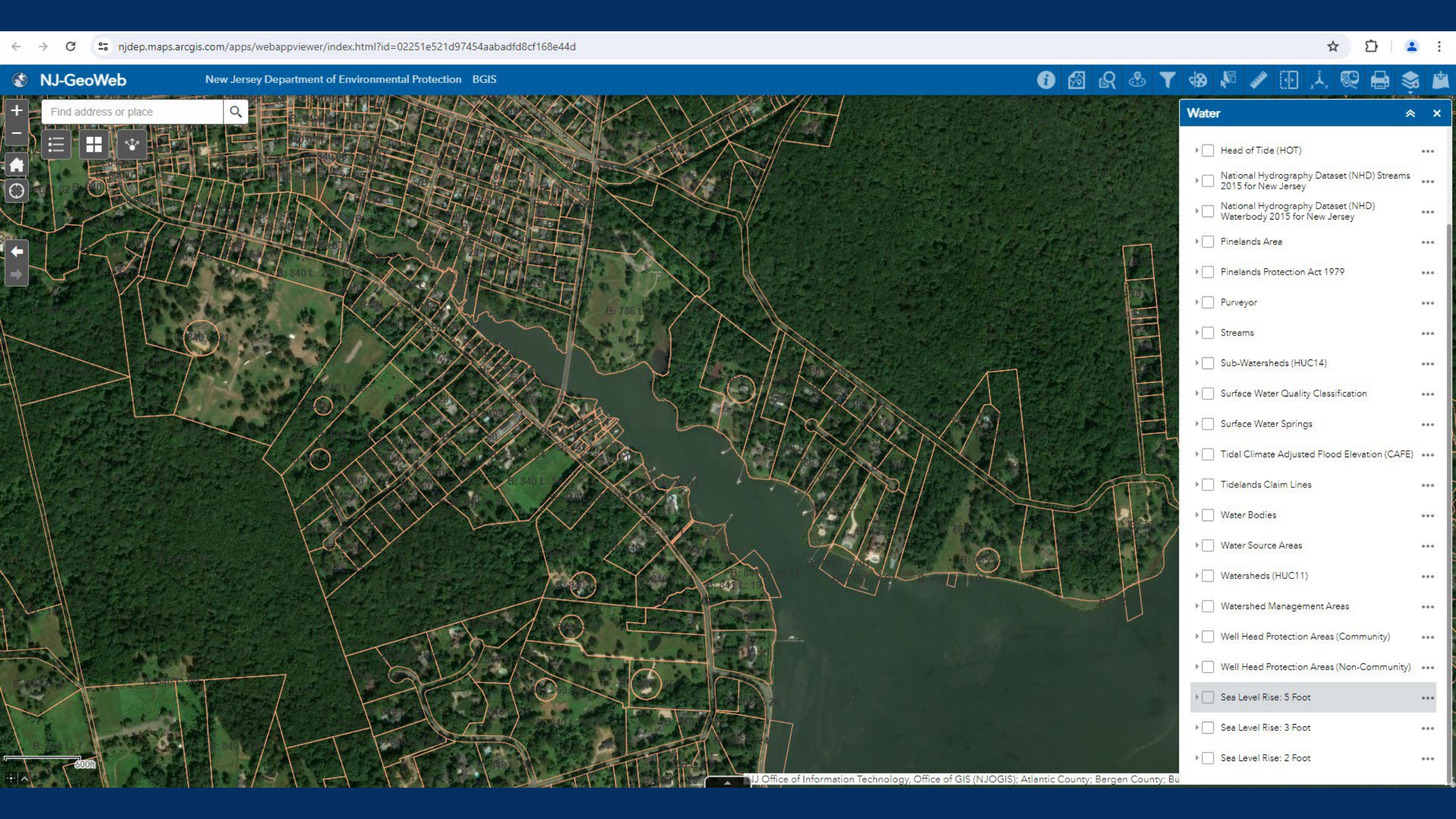
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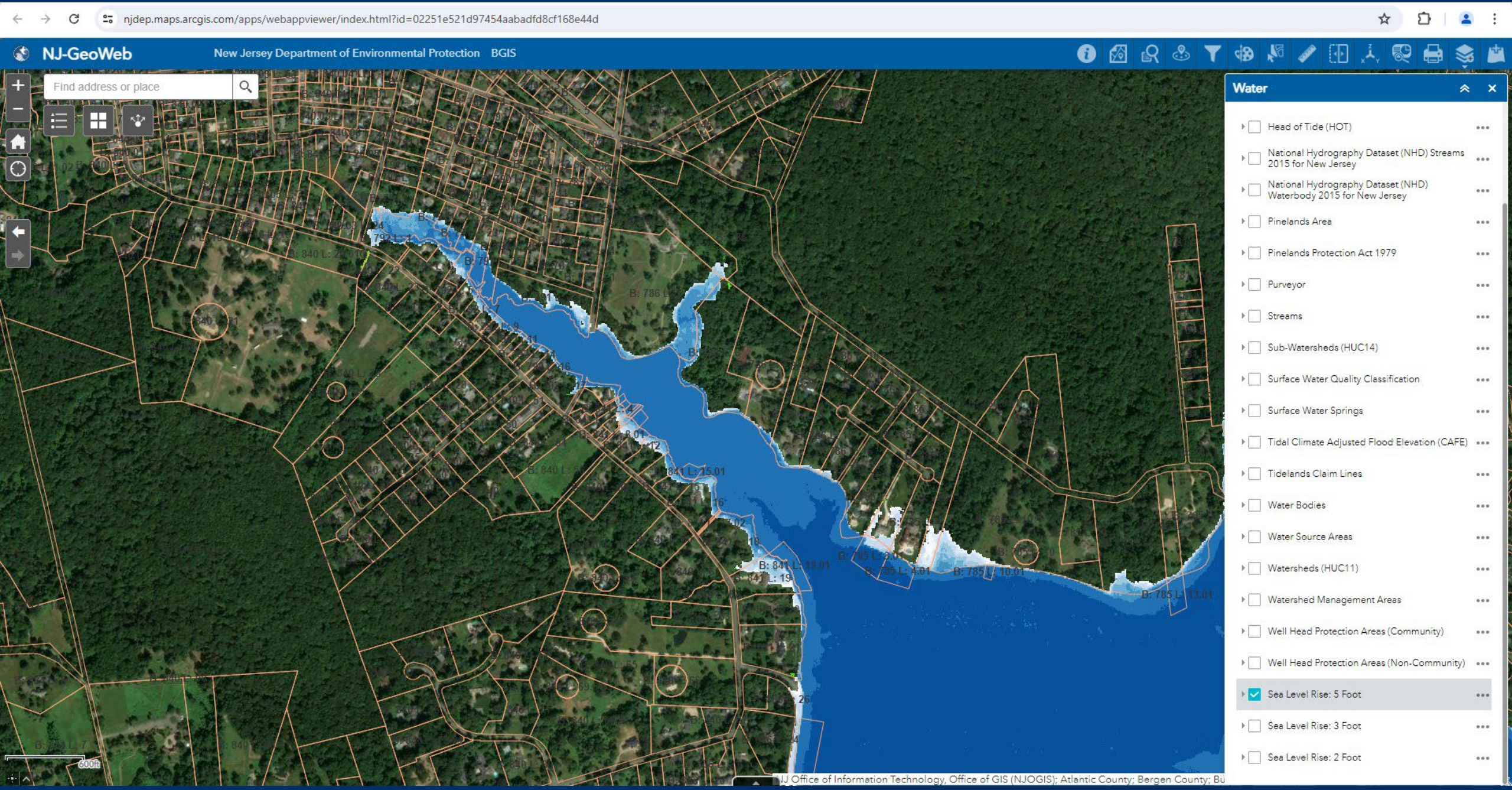
NJ Office of Information Technology, Office of GIS (NJOGIS); Atlantic County; Bergen County; Bu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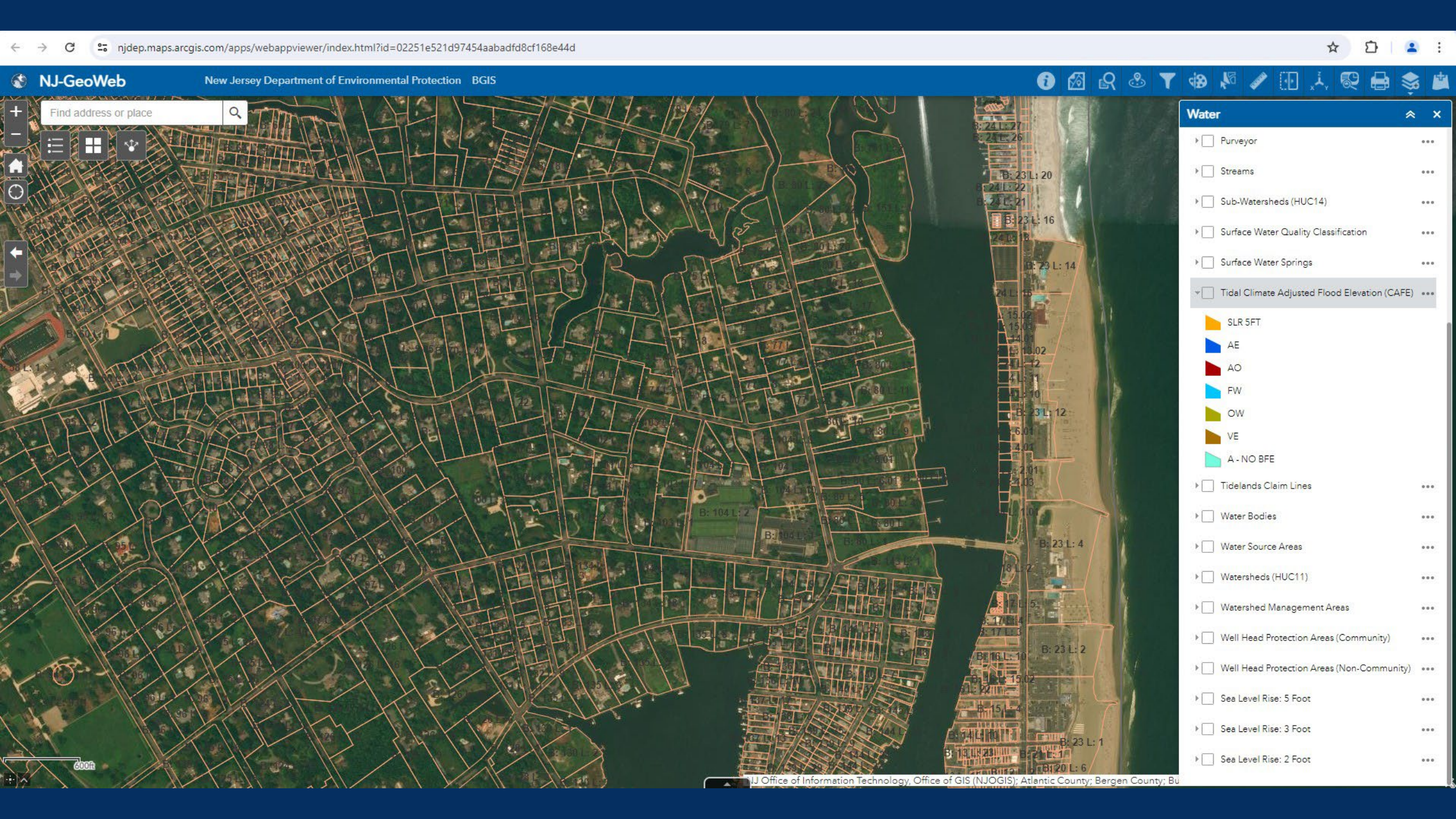
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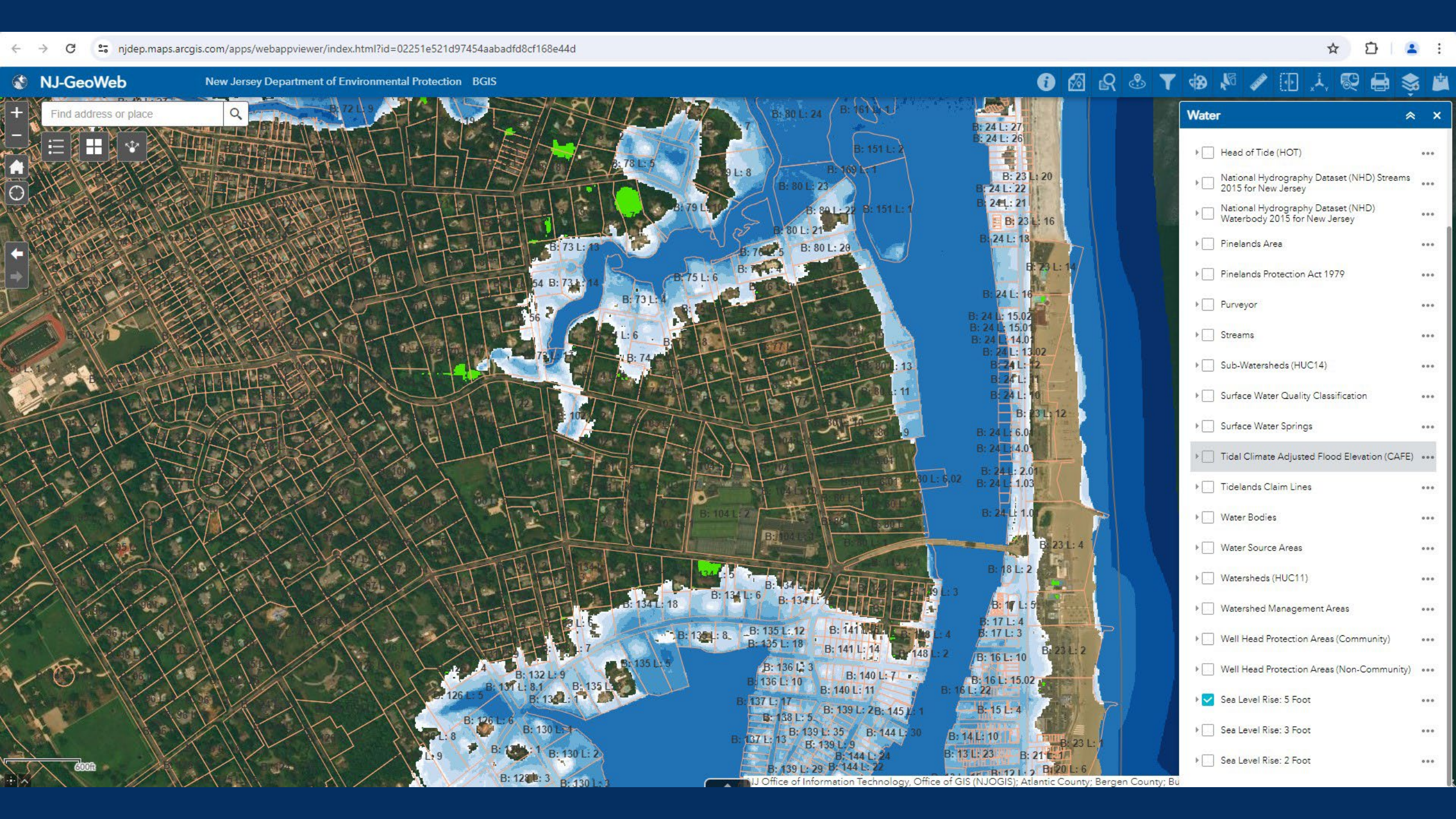
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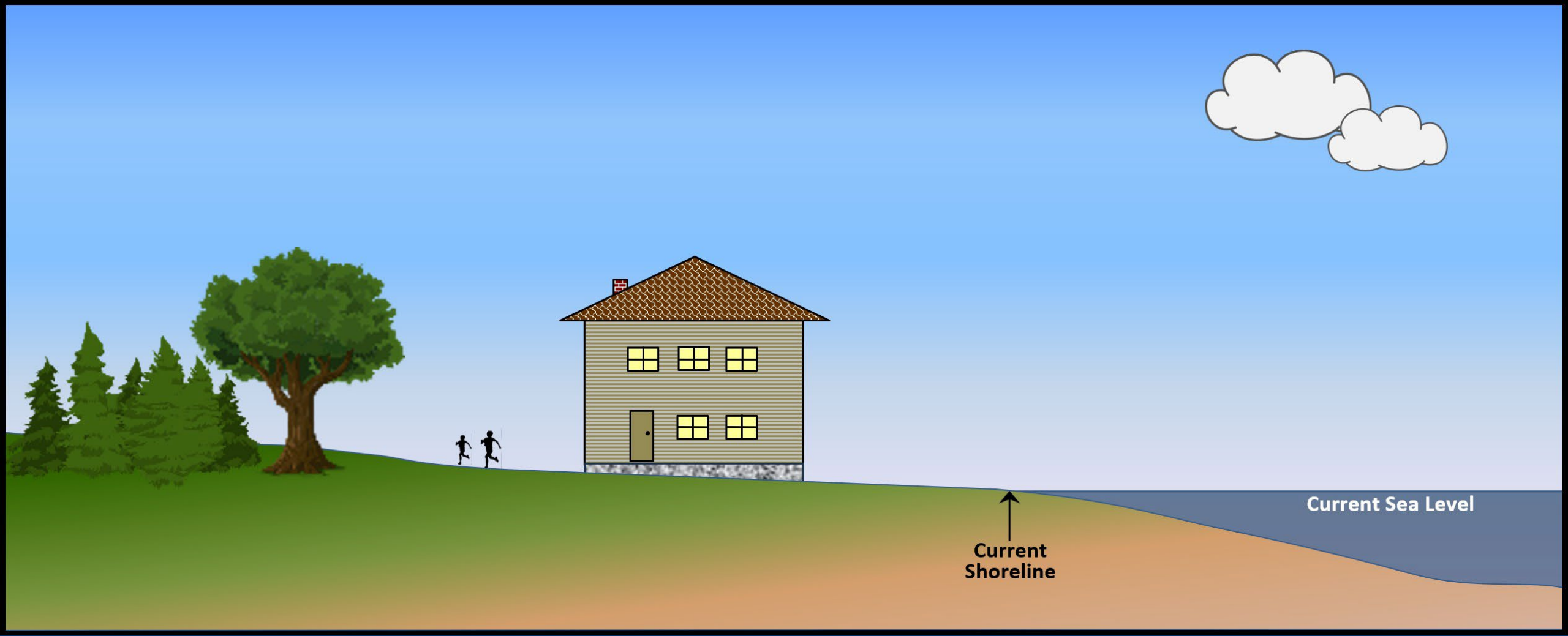
End of Section 1

QUESTIONS?

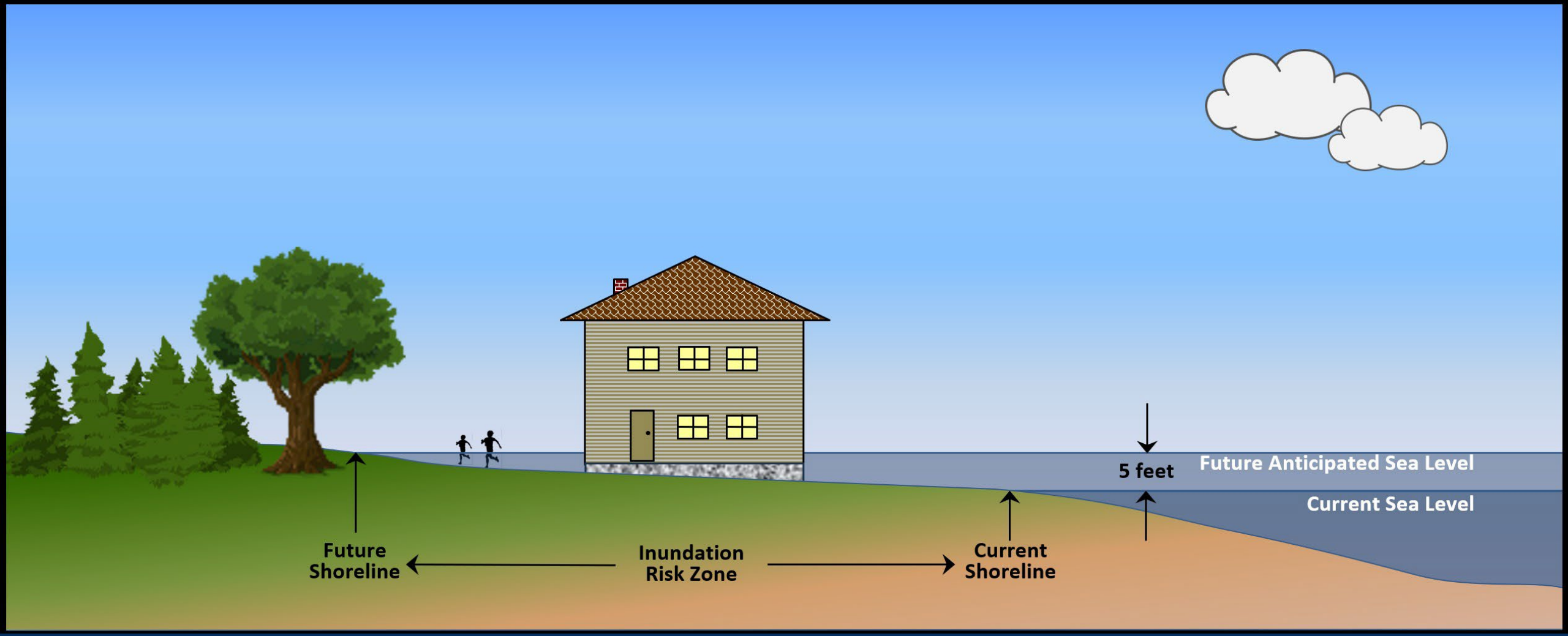
Inundation Risk Zone

- An applicant asserting that DEP mapping is not accurate can determine the IRZ limits based on site specific survey data.
- See proposed N.J.A.C. 7:13-3.4(c)1 and 2.
- A New Jersey licensed professional land surveyor must determine the elevation of the ground at the mean higher high water (MHHW) line along the tidal waterway(s) in proximity to the site in question to the nearest 0.1 foot.
- In cases where multiple elevations determined in this manner are within proximity of the site, the highest ground elevation of the surveyed points shall be selected.
- IRZ incudes all land that lies within 5 feet vertically of the MHHW elevation.

Inundation Risk Zone



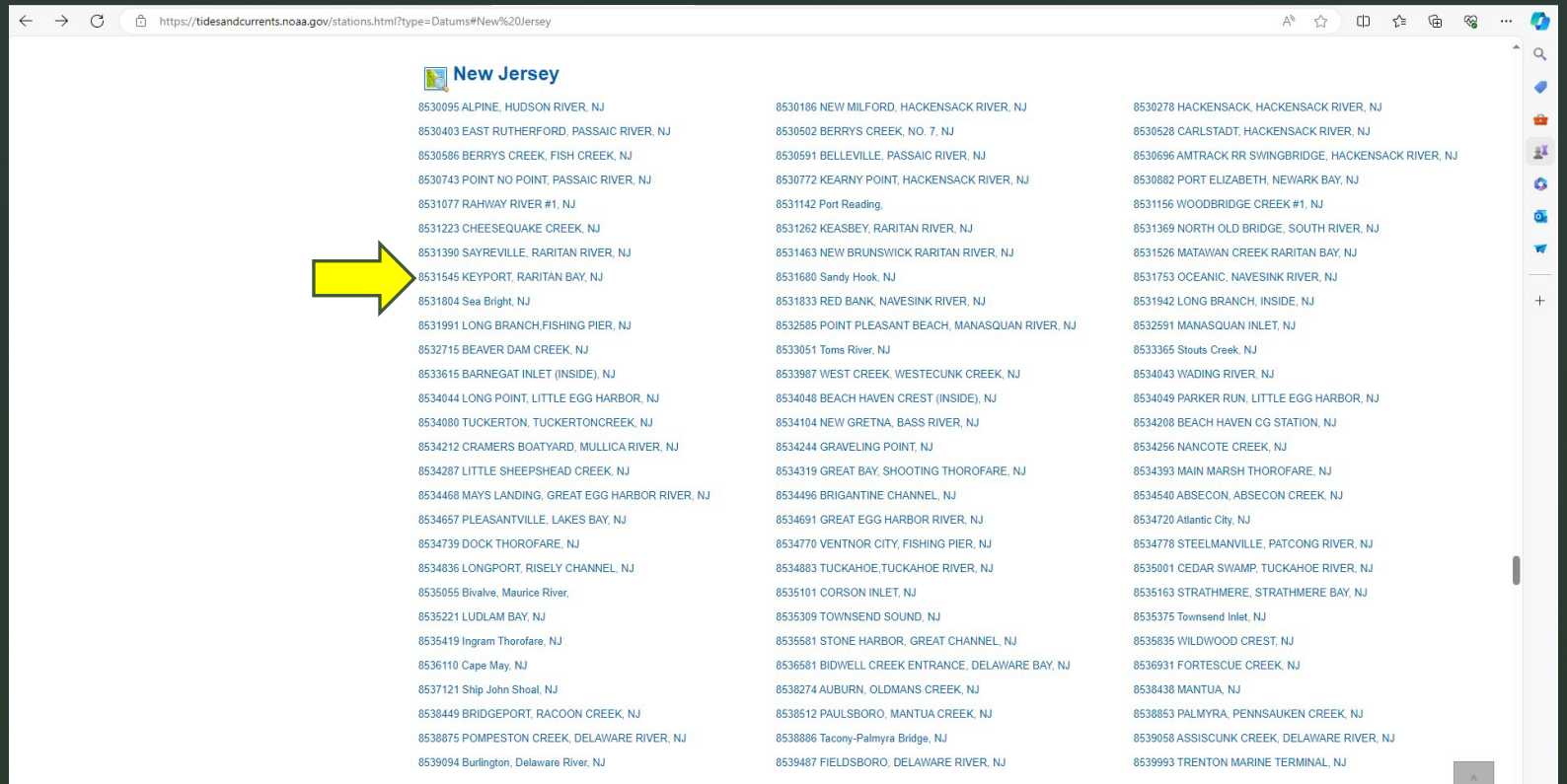
Inundation Risk Zone



Inundation Risk Zone

Determining the MHHW elevation via survey data:

- Go to NOAA website:
- https://tidesandcurrents.noaa.gov/stations.html?type=Datums
- Select New Jersey to see list of stations



Datums for 8531545, KEYPORT, RARITAN BAY NJ

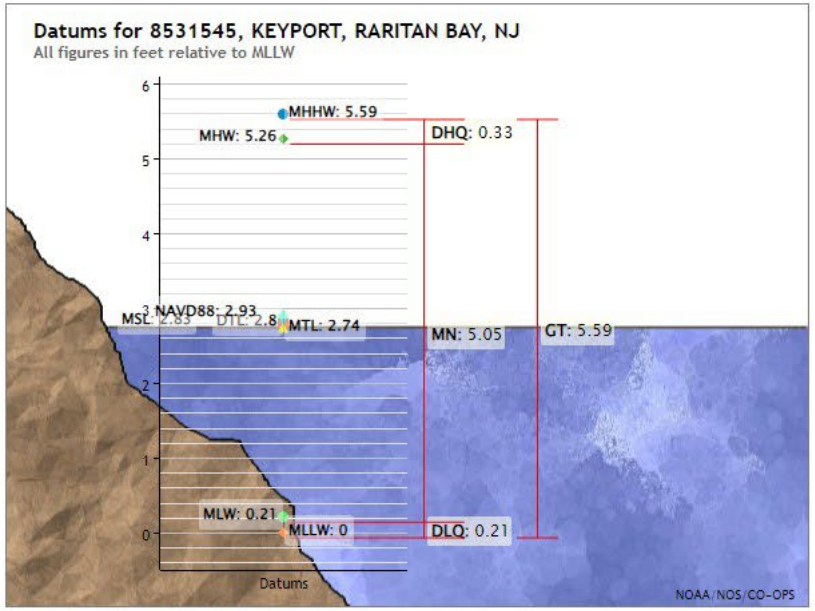
NOTICE: All data values are relative to the MLLW.

Elevations on Mean Lower Low Water

Station: 8531545, KEYPORT, RARITAN BAY, NJ
Status: Accepted (Jun 12 2003)
Units: Feet
Control Station: 8531680 Sandy Hook, NJ

T.M.: 75
Epoch: 1983-2001
Datum: MLLW

Datum	Value	Description
MHHW	5.59	Mean Higher-High Water
MHW	5.26	Mean High Water
MTL	2.74	Mean Tide Level
MSL	2.83	Mean Sea Level
DTL	2.80	Mean Diurnal Tide Level
MLW	0.21	Mean Low Water
MLLW	0.00	Mean Lower-Low Water
NAVD88	2.93	North American Vertical Datum of 1988
STND	-3.12	Station Datum
GT	5.59	Great Diurnal Range
MN	5.05	Mean Range of Tide
DHQ	0.33	Mean Diurnal High Water Inequality
DLQ	0.21	Mean Diurnal Low Water Inequality
HWI	0.22	Greenwich High Water Interval (in hours)



Showing datums for

8531545 KEYPORT, RARITA...

Elevations on Mean Lower Low Water

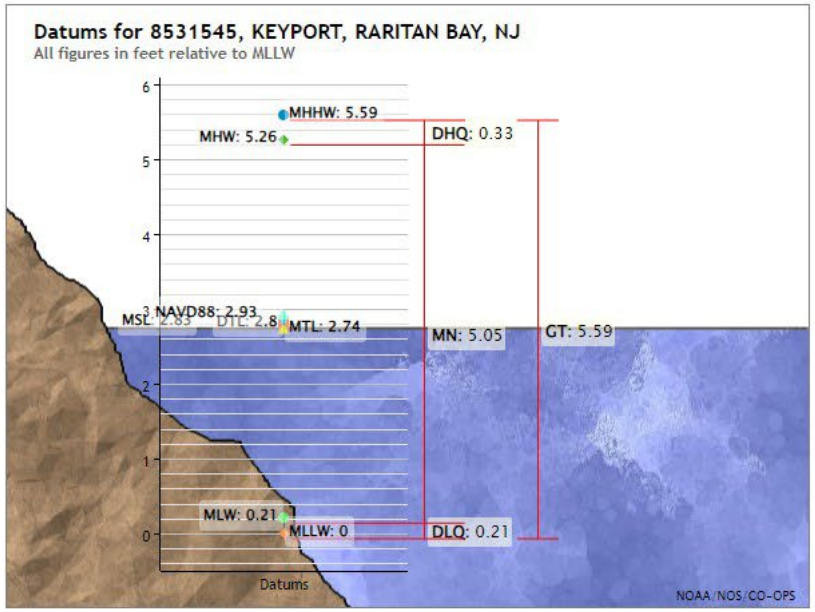
Station: 8531545, KEYPORT, RARITAN BAY, NJ
Status: Accepted (Jun 12 2003)
Units: Feet
Control Station: 8531680 Sandy Hook, NJ

T.M.: 75
Epoch: 1983-2001
Datum: MLLW

Datum	Value	Description
MHHW	5.59	Mean Higher-High Water
MHW	5.26	Mean High Water
MTL	2.74	Mean Tide Level
MSL	2.83	Mean Sea Level
DTL	2.80	Mean Diurnal Tide Level
MLW	0.21	Mean Low Water
MLLW	0.00	Mean Lower-Low Water
NAVD88	2.93	North American Vertical Datum of 1988
STND	-3.12	Station Datum
GT	5.59	Great Diurnal Range
MN	5.05	Mean Range of Tide
DHQ	0.33	Mean Diurnal High Water Inequality
DLQ	0.21	Mean Diurnal Low Water Inequality
HWI	0.22	Greenwich High Water Interval (in hours)
LWI	6.74	Greenwich Low Water Interval (in hours)
Max Tide		Highest Observed Tide
Max Tide Date & Time		Highest Observed Tide Date & Time
Min Tide		Lowest Observed Tide
Min Tide Date & Time		Lowest Observed Tide Date & Time
HAT		Highest Astronomical Tide
HAT Date & Time		HAT Date and Time
LAT		Lowest Astronomical Tide
LAT Date & Time		LAT Date and Time

Tidal Datum Analysis Periods

03/01/1976 - 11/30/1976



Showing datums for

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Datum

MLLW

Data Units ◉ Feet ○ Meters

Epoch ◉ Present (1983-2001) ○ Superseded (1960-1978)

Submit

Elevations on Mean Lower Low Water

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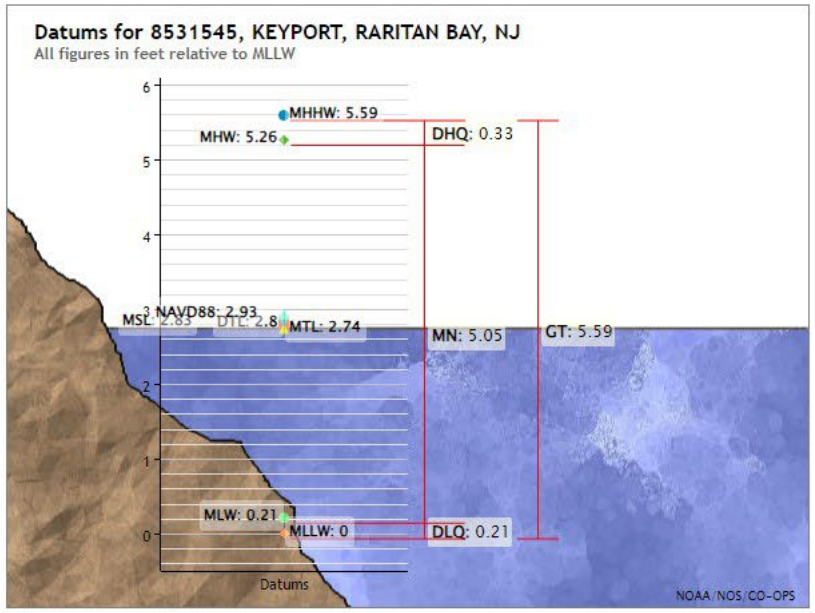

Showing datums for

8531545 KEYPORT, RARITA...

Datum

MLLW

STND
MHHW
MHW
DTL
MTL
MSL
MLW
MLLW
NAVD88

Submit

https://tidesandcurrents.noaa.gov/datums.html?datum=NAVD88&units=0&epoch=0&id=8531545&name=KEYPORT%2C+RARITAN+BAY&state=NJ

Elevations on NAVD88

Station: 8531545, KEYPORT, RARITAN BAY, NJ
Status: Accepted (Jun 12 2003)
Units: Feet
Control Station: 8531680 Sandy Hook, NJ

T.M.: 75
Epoch: 1983-2001
Datum: NAVD88

Datum	Value	Description
MHHW	2.66	Mean Higher-High Water
MHW	2.33	Mean High Water
MTL	-0.19	Mean Tide Level
MSL	-0.10	Mean Sea Level
DTL	-0.13	Mean Diurnal Tide Level
MLW	-2.72	Mean Low Water
MLLW	-2.93	Mean Lower-Low Water
NAVD88	0.00	North American Vertical Datum of 1988
STND	-6.05	Station Datum
GT	5.59	Great Diurnal Range
MN	5.05	Mean Range of Tide
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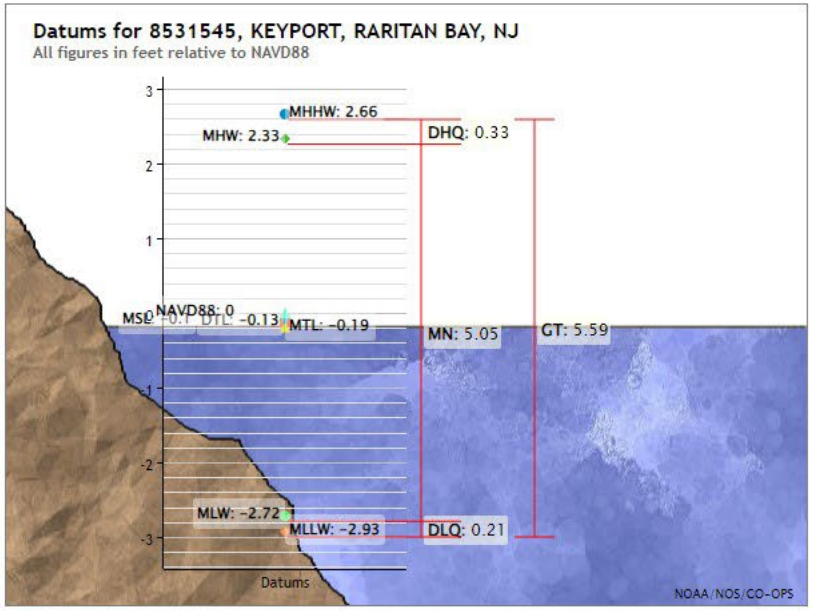
LAT Date & Time		LAT Date and Time

Tidal Datum Analysis Periods

03/01/1976 - 11/30/1976



Showing datums for

8531545 KEYPORT, RARITA...

Datum

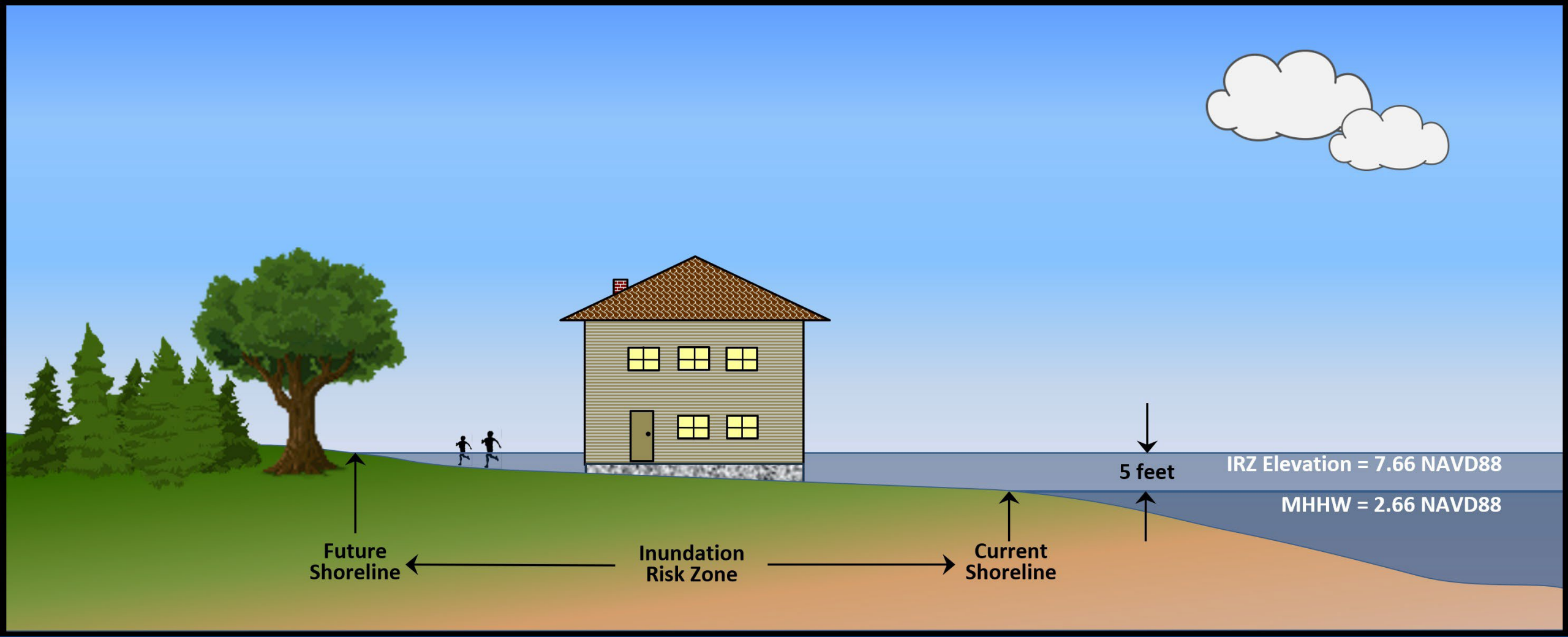
NAVD88

Data Units (•) Feet ( ) Meters

Epoch (•) Present (1983-2001) ( ) Superseded (1960-1978)

Submit

Inundation Risk Zone



End of Section 2

QUESTIONS?

RISK-BASED PROCEDURAL DIFFERENCES

INUNDATION RISK ZONE

Permanent standing water due to sea-level rise.

- **Inundation Risk Assessment**, narrative response to risk of loss/damage questions
  - **Not decisional**; for notice purposes
- **On-Site Alternatives Analysis**, examines on-site design alternatives to avoid or minimize risks for residential and critical buildings. Not required for:
  - Commercial development
  - Recreation and entertainment
  - Hospitality and gaming
- **Risk Acknowledgement**, adds narrative disclosure based on Inundation Risk Assessment, recorded with FHA notice (existing requirement) in title

COASTAL FLOOD HAZARD AREA

Annual risk of storm-induced flooding exacerbated by sea-level rise. This flooding retreats. Inundation does not.

Less process; shorter permit application

- No Inundation Risk Assessment
- No Alternatives Analysis

Short form Risk Acknowledgement, recorded with FHA notice in title (existing requirement)

INUNDATION RISK ZONE

- **Standards are commensurate with the scope and purpose of the development, its susceptibility to inundation, and impact on the public**
- **New standards apply to new/reconstructed/improved:**

Residential buildings

- Exception: repair & maintenance activities that do not alter the building's height, footprint area, or habitable area.

Critical buildings

- ASCE Flood Design Class 3 and 4 buildings.
- Includes schools, fire and police stations, medical facilities, correctional facilities, power generating stations, critical aviation facilities.

Critical infrastructure

- Infrastructure necessary for emergency response and recovery during and after a flood, or that poses a risk to public health, safety, and welfare should it be damaged or unable to perform its intended functions.

INUNDATION RISK ZONE

Exception proposed for:

- **Drainage improvements** and associated stormwater management structures, necessary to ameliorate periodic inundation along a roadway.
- **Safety or state of good repair improvements** along a railroad or public roadway, such that there is no reasonable opportunity to meet the IRZ requirements as part of the project's overall scope and purpose.
- **Any project by a Public Transportation Entity that reached a milestone in its development and design, prior to adoption date**, such that meeting the IRZ requirements would necessitate reevaluation of the selected preferred alternative or equivalent milestone, a significant redesign, or significant modifications or additions to private land acquisition plans, whether in fee or easement.

INUNDATION RISK ZONE

Applicants would be required to:

1. Provide the following data regarding potential permanent or daily inundation:

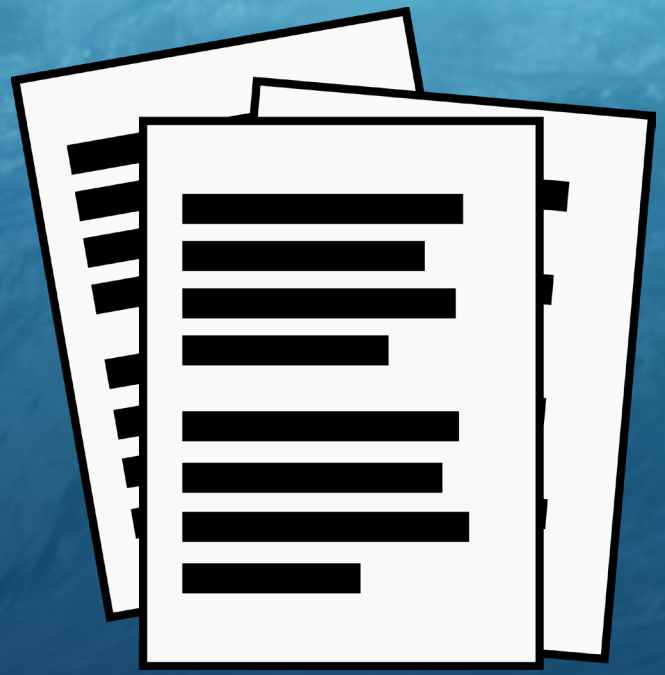
- The mean higher high-water elevation(s) nearest the site.
- The minimum amount of inundation that would cause the lowest portion of the project site to be inundated on a regular basis, such as during daily or seasonal high tides, and the corresponding maximum depth of inundation on the site.
- Where the project involves construction of or improvements to a building, the minimum amounts of inundation that would cause the lowest portion of the primary roadway providing regular or emergent access to the site to be inundated daily and the corresponding maximum depth of inundation on the roadway.

INUNDATION RISK ZONE

Applicants would be required to:

2. Prepare an Inundation Risk Assessment that analyzes the potential adverse impacts of inundation on the site of the regulated activity, including the risk of:

- Injury to, or loss of life of, people inhabiting or relying upon the subject building or infrastructure due to inundation, including the risk that individuals may become isolated from evacuation routes.
- Damage to, or loss of use of, the subject building or infrastructure due to inundation, including the potential for disruption of public transportation, government services, or commerce.
- Increases in short- and long-term costs due to inundation, such as potential costs associated with evacuation, storm response and recovery, including the potential costs of operation, maintenance, repair, replacement, reconstruction, demolition, and removal of structures.



INUNDATION RISK ZONE

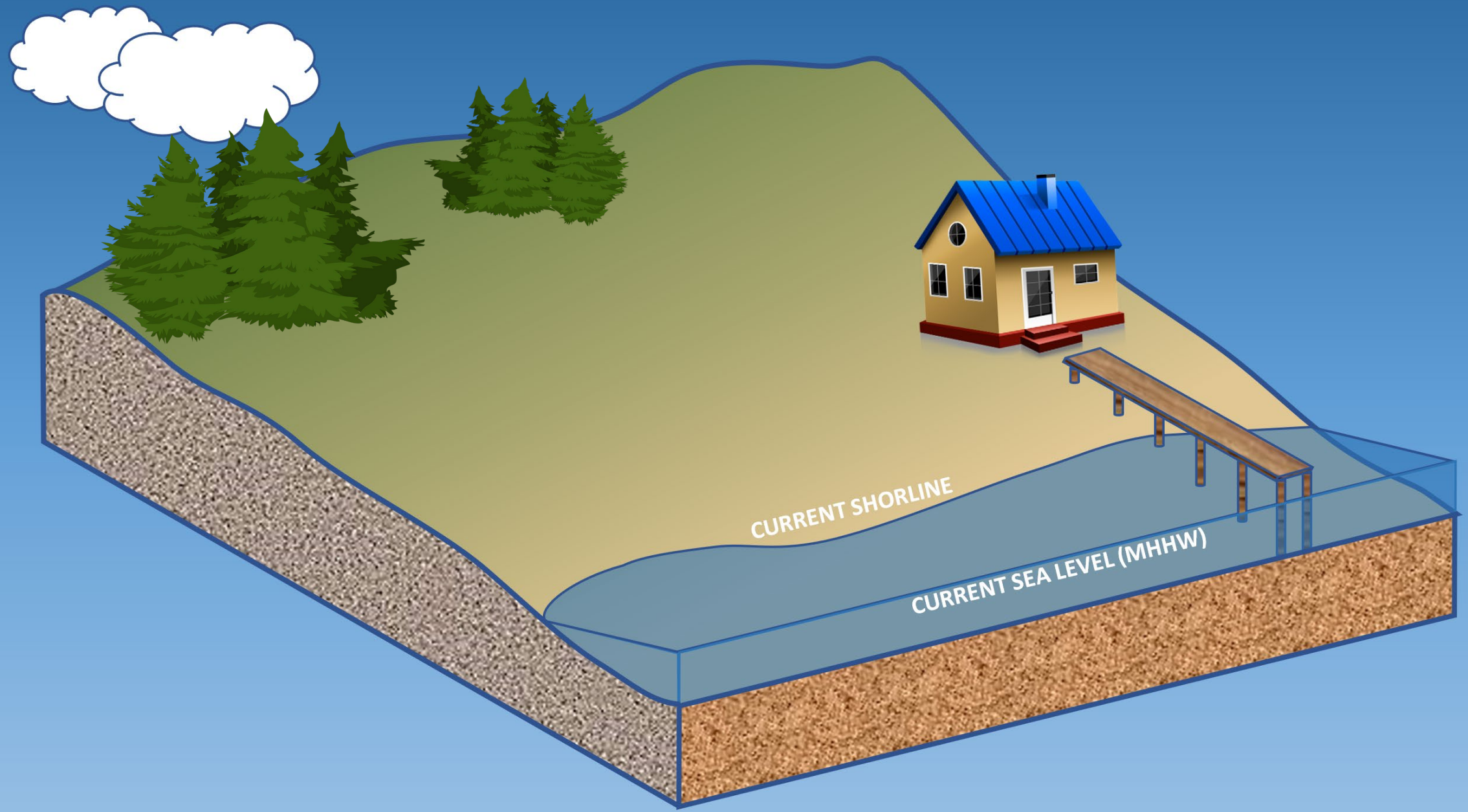
Applicants would be required to:

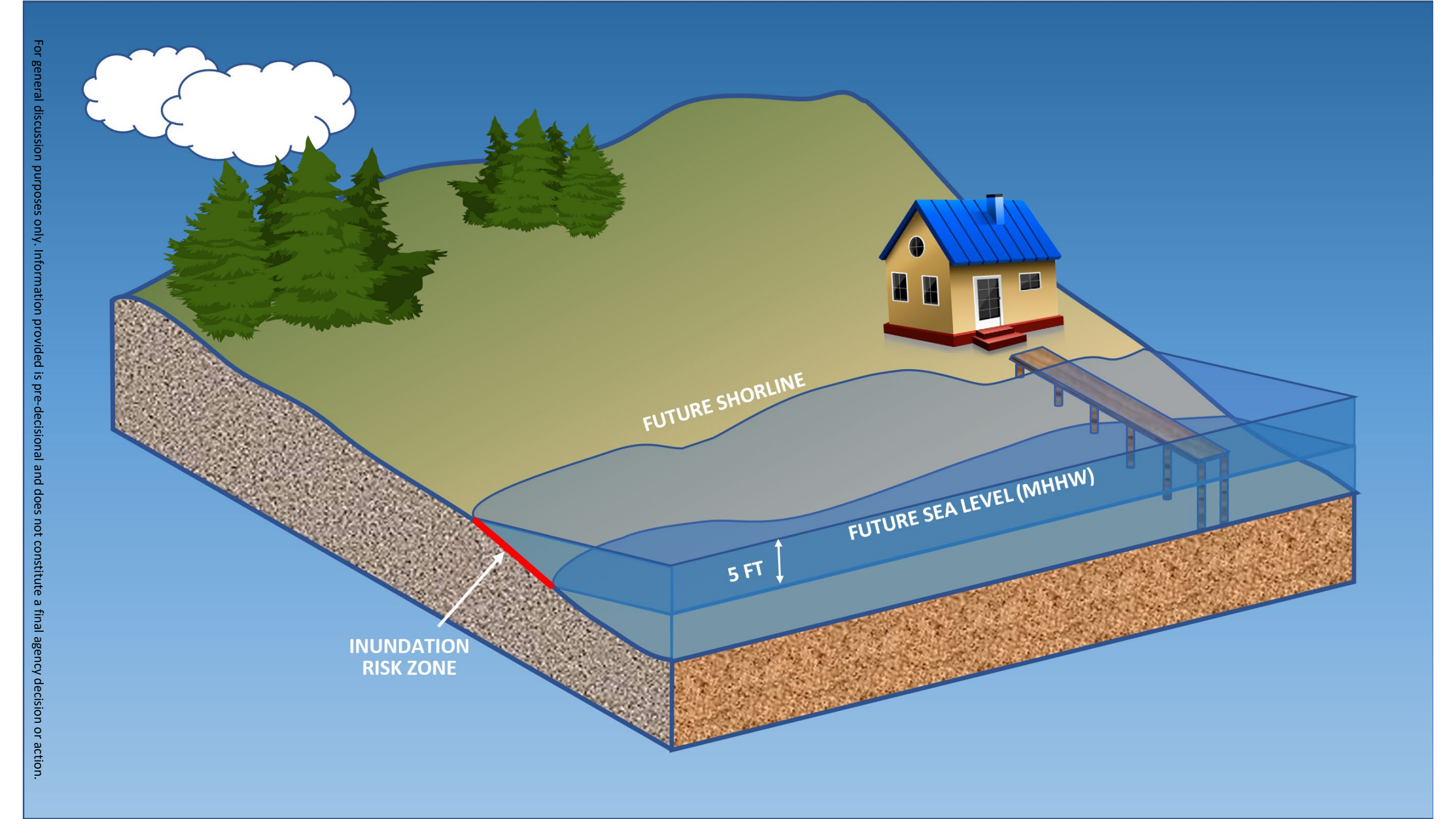
3. Demonstrate the use of all reasonable measures for accomplishing the basic purpose of the project in a manner that is likely to avoid or substantially reduce the potential for adverse impacts on public health, safety, and welfare, and the environment, including:

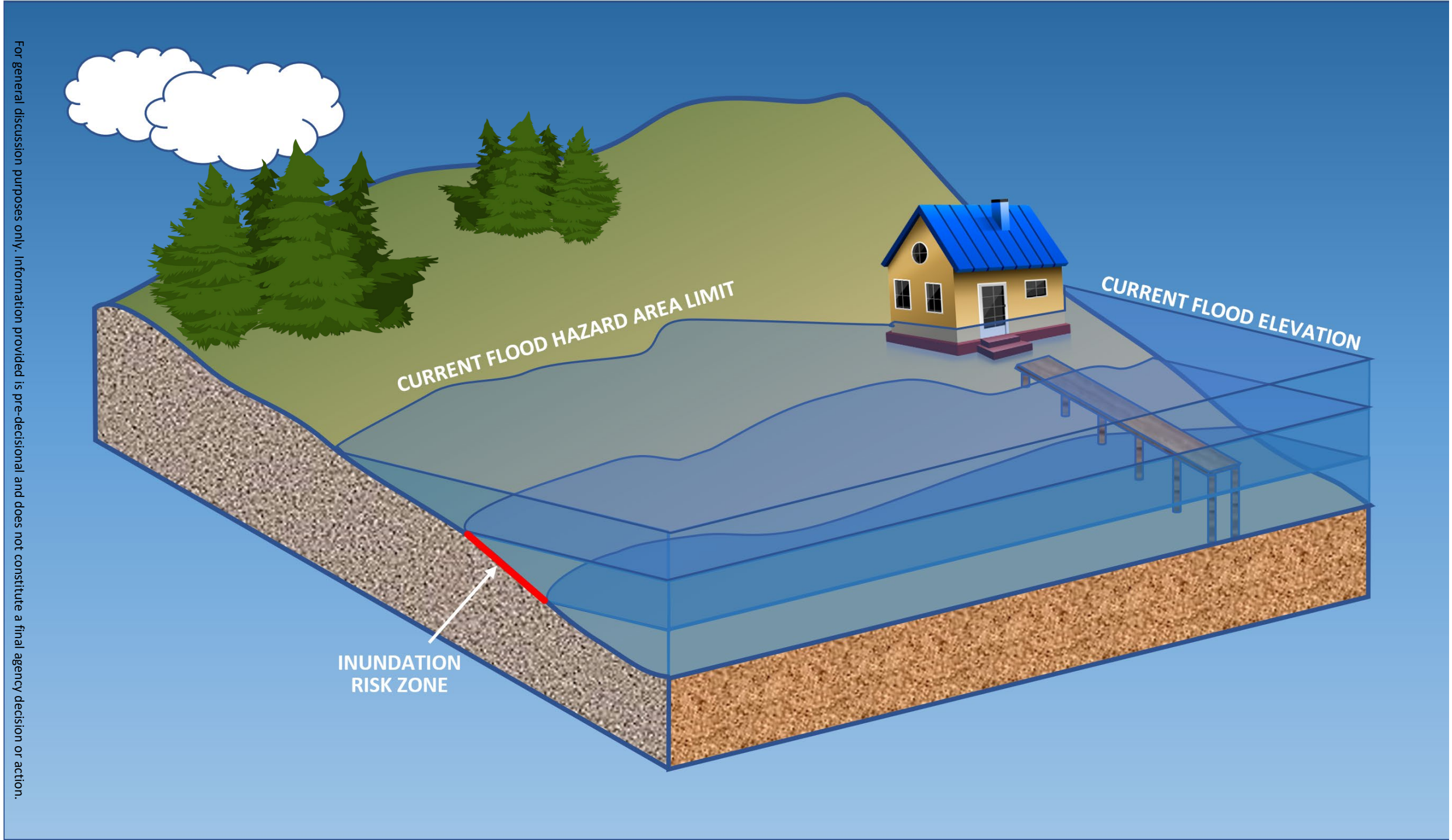
- Alteration of **onsite** topography that reduce or eliminate inundation of the project.
- Alternative **onsite** configurations that reduce or eliminate inundation of the project, such as onsite configurations that locate as much of the project as practicable outside the inundation risk zone or upon portions of site where less inundation is anticipated.
- For buildings designated as Flood Design Class 4, and critical infrastructure, the applicant demonstrates that there are no practicable alternative **offsite** locations to accomplish the purpose of the proposed regulated activity that would meet the requirements of this section.

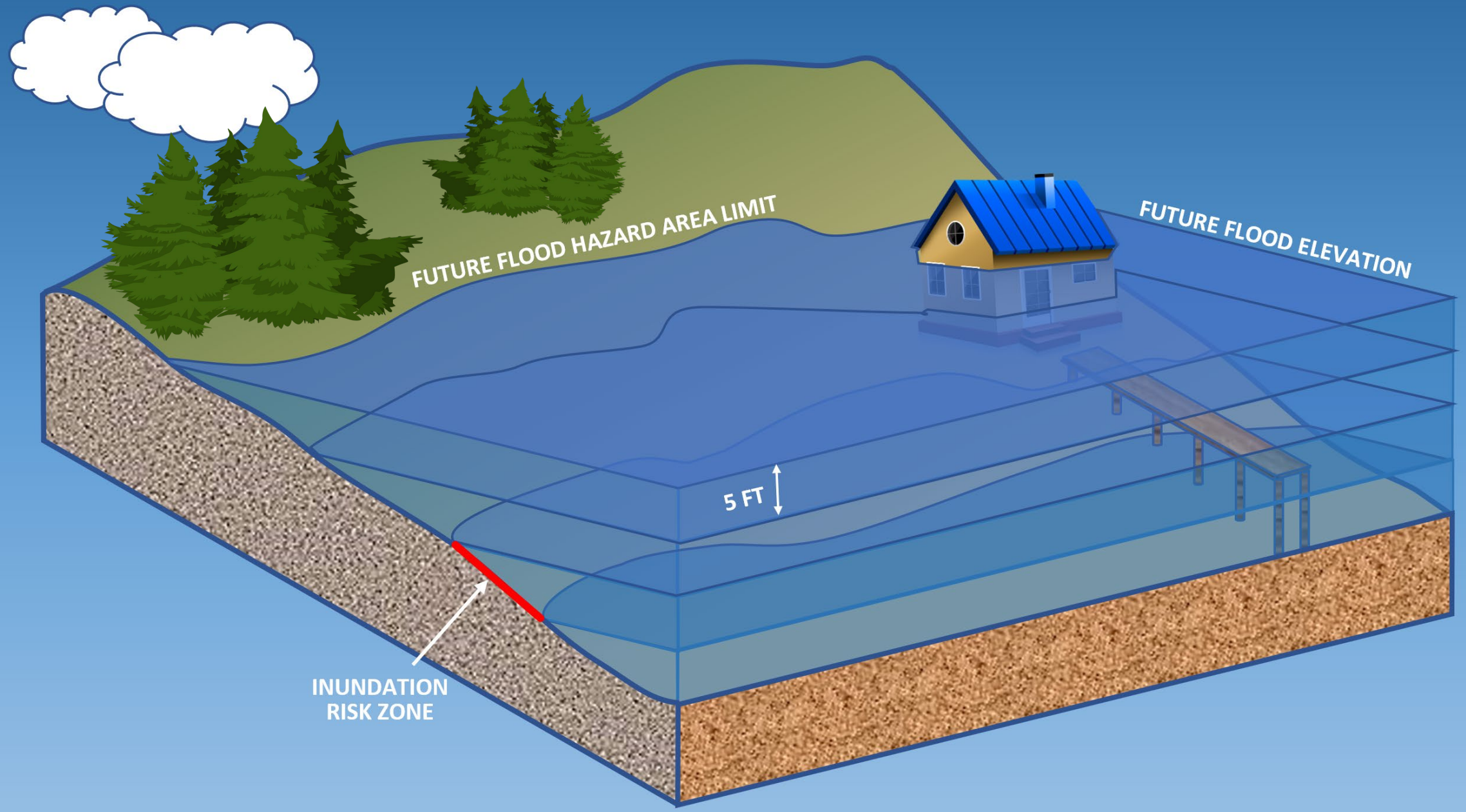
End of Section 3

QUESTIONS?









CLIMATE ADJUSTED FLOOD ELEVATION (CAFE)
IN COASTAL FLOOD HAZARD AREAS

CURRENT

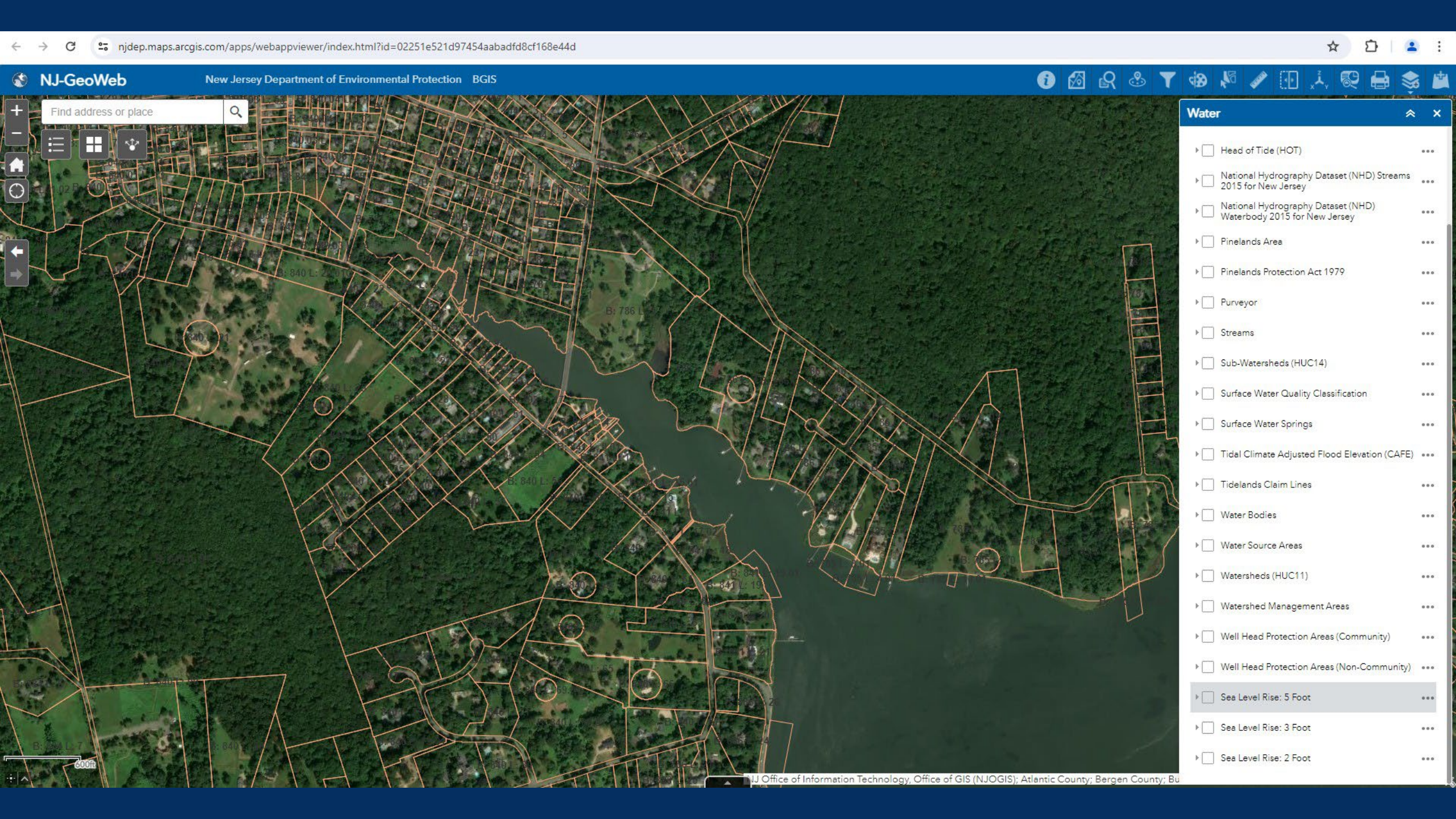
Approximately 16% of NJ lies in a FEMA-mapped floodplain

- Regulatory flood is equal to FEMA's 100-year flood elevation (BFE)
- One-foot of freeboard added for roads and buildings

PROPOSED

Would add approximately 1.5% more land area into regulatory floodplain

- New Coastal flood elevation will be equal to FEMA+5, plus one-foot of freeboard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New Jersey Department of Environmental Protection
BGIS
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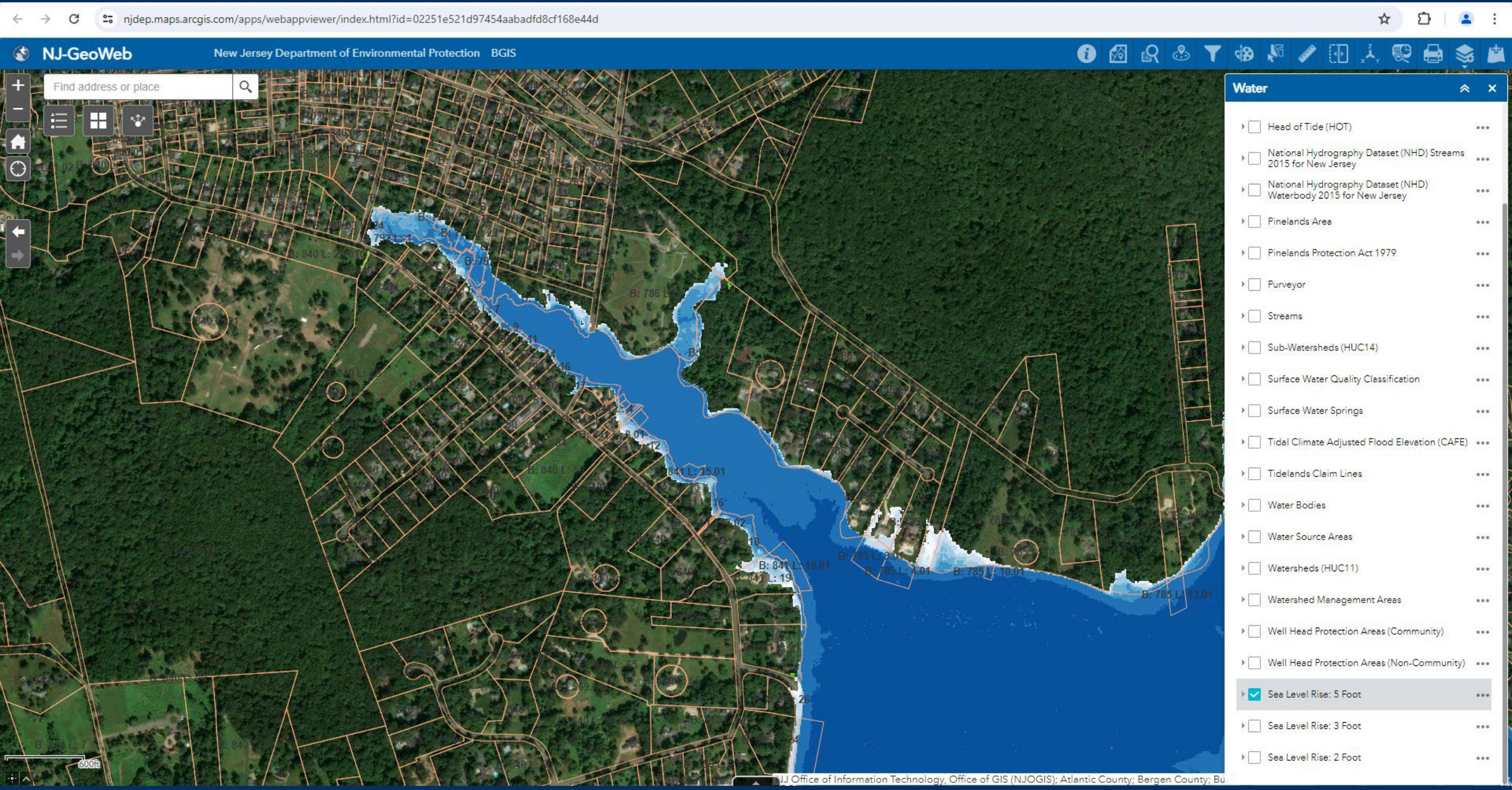
Water
Head of Tide (HOT)
National Hydrography Dataset (NHD) Streams 2015 for New Jersey
National Hydrography Dataset (NHD) Waterbody 2015 for New Jersey
Pinelands Area
Pinelands Protection Act 1979
Purveyor
Streams
Sub-Watersheds (HUC14)
Surface Water Quality Classification
Surface Water Springs
Tidal Climate Adjusted Flood Elevation (CAFE)
Tidelands Claim Lines
Water Bodies
Water Source Areas
Watersheds (HUC11)
Watershed Management Areas
Well Head Protection Areas (Community)
Well Head Protection Areas (Non-Community)
Sea Level Rise: 5 Foot
Sea Level Rise: 3 Foot
Sea Level Rise: 2 Foot
600ft
NJ Office of Information Technology, Office of GIS (NJOGIS); Atlantic County; Bergen County; Bu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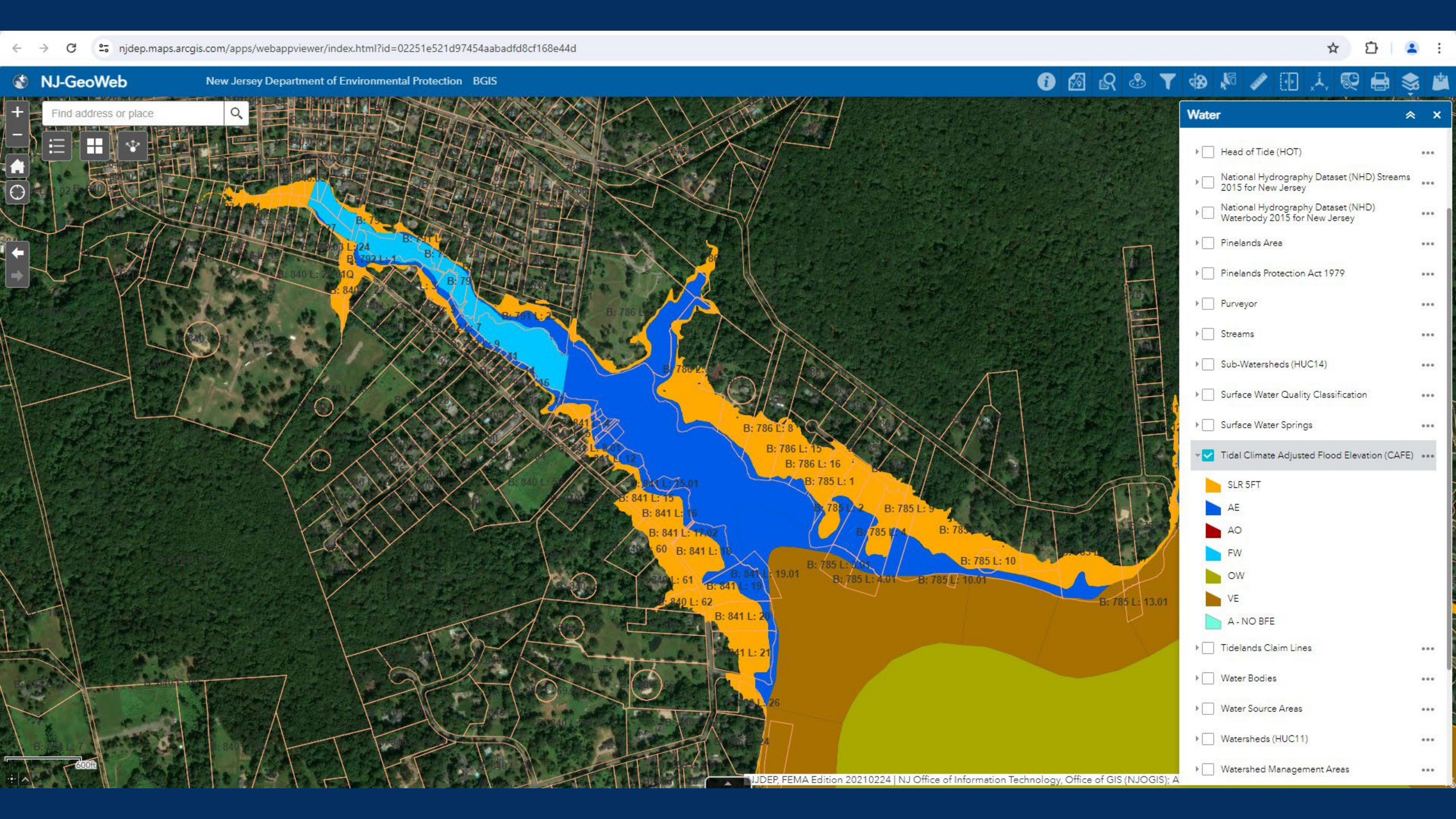
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B: 786 L: 16
B: 785 L: 1
B: 785 L: 10
B: 785 L: 13.01
B: 785 L: 10.01
B: 785 L: 4.01
B: 841 L: 15
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B: 841 L: 17.02
B: 841 L: 19.01
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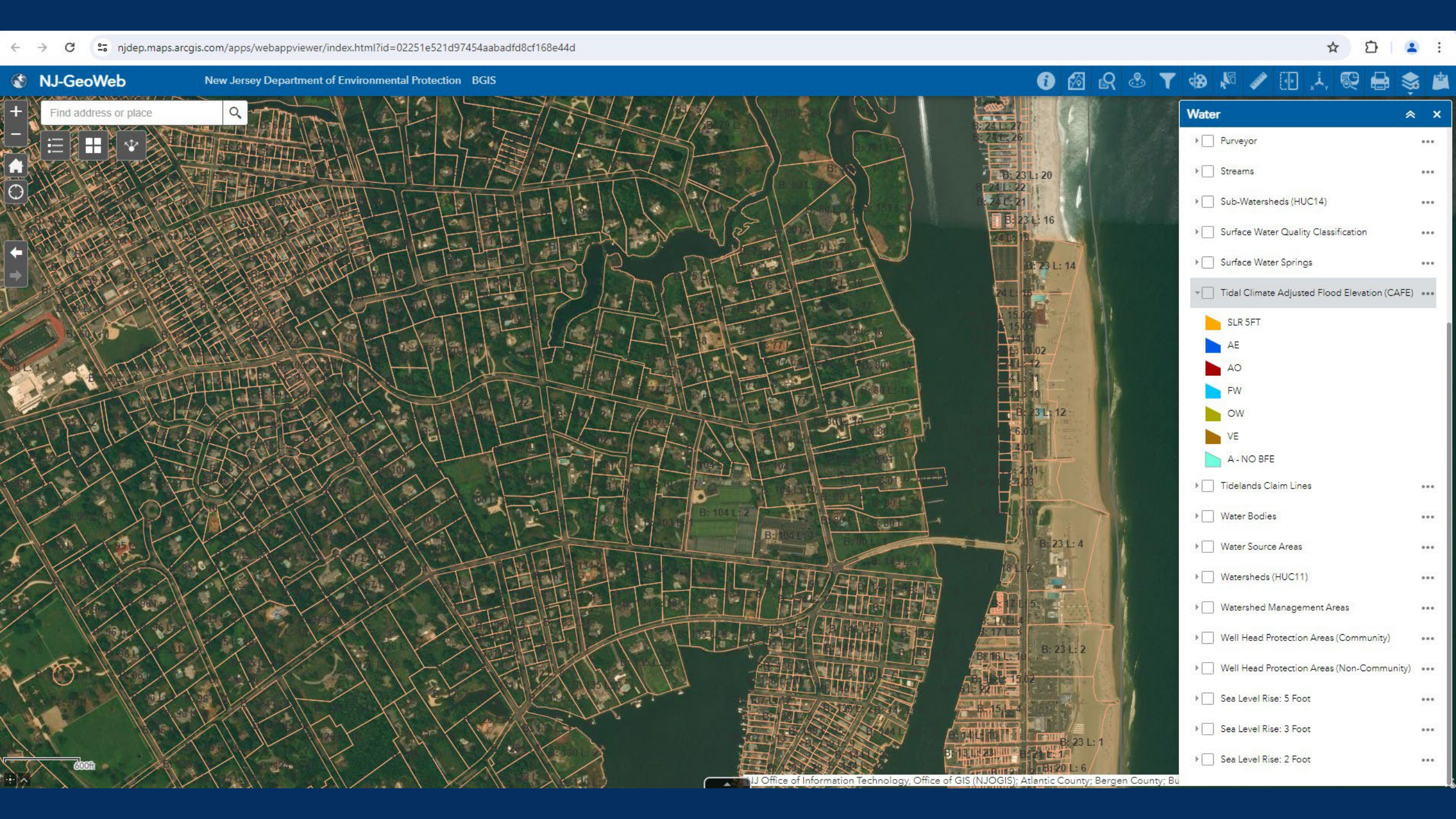
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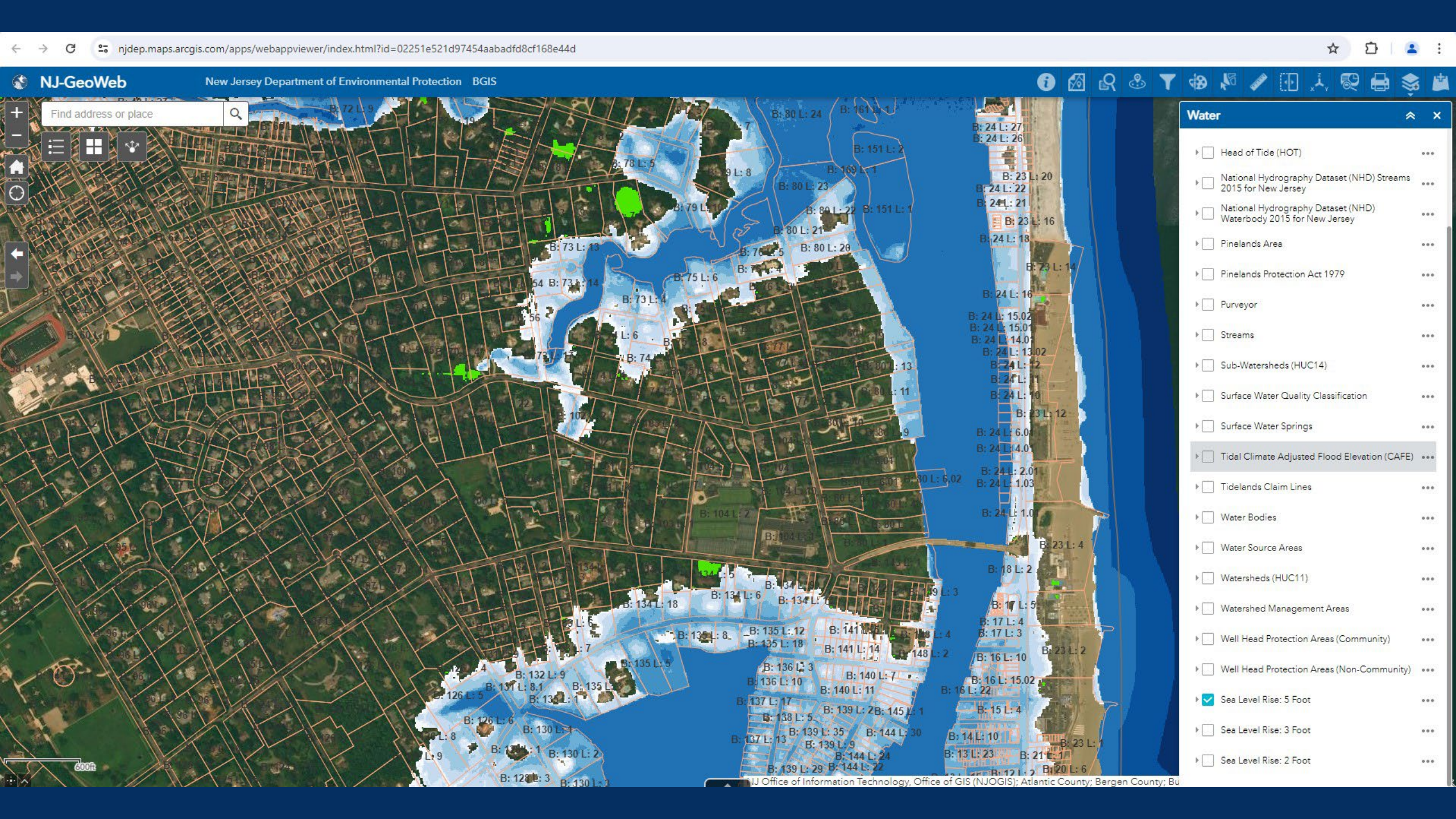
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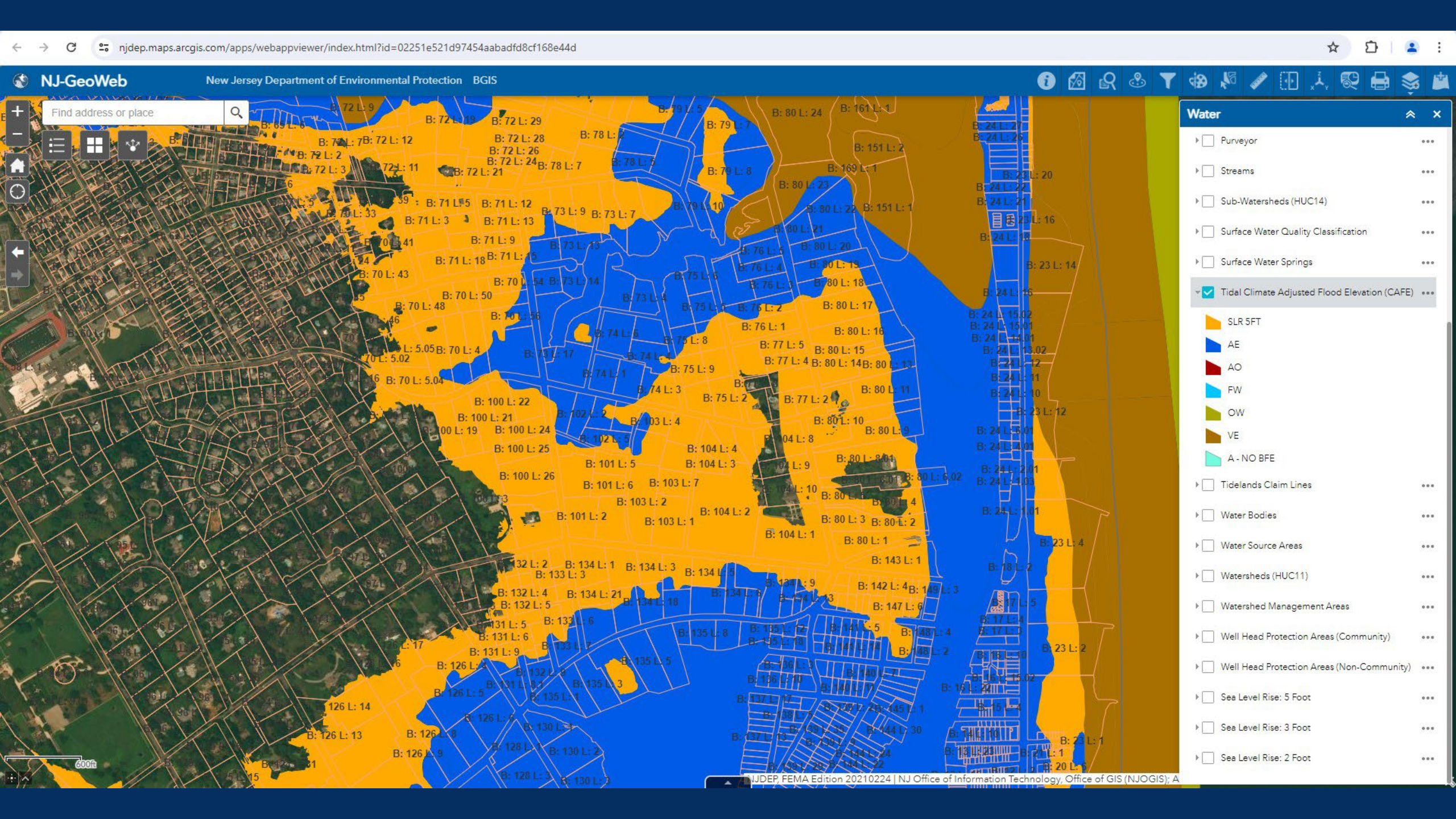
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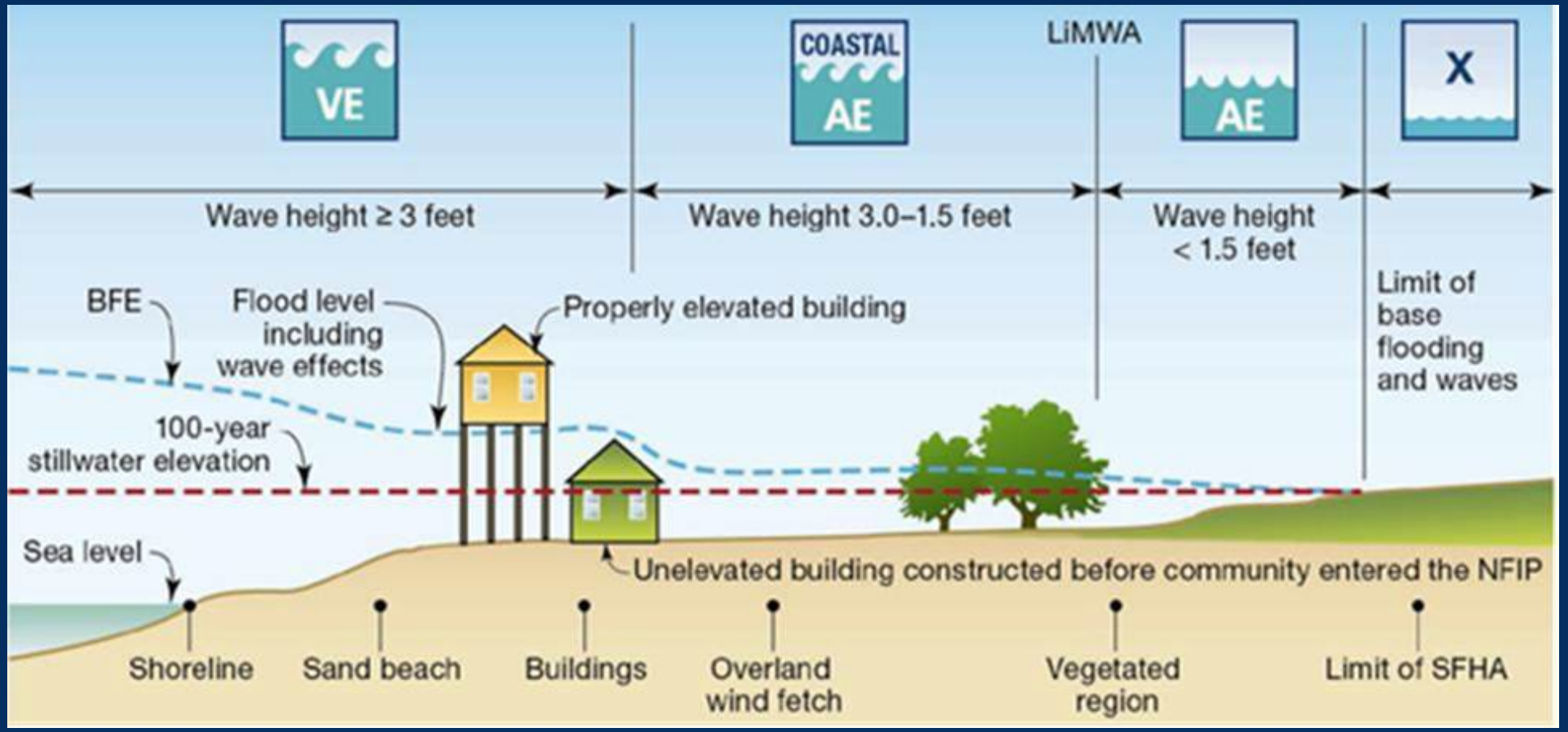
End of Section 4

QUESTIONS?

Lowest Floor Requirements N.J.A.C. 7:13-12.5

RESIDENTIAL & CRITICAL BUILDINGS:

- AE Zone: Floor surface must be at or above CAFE+1
- Coastal AE and VE Zones: bottom of lowest horizontal structural member must be at or above CAFE+1


VE
COASTAL
AE
LiMWA
AE
X
Wave height ≥ 3 feet
Wave height 3.0–1.5 feet
Wave height
< 1.5 feet
BFE
Flood level
including
wave effects
Properly elevated building
Limit of
base
flooding
and waves
100-year
stillwater elevation
Sea level
Unelevated building constructed before community entered the NFIP
Shoreline
Sand beach
Buildings
Overland
wind fetch
Vegetated
region
Limit of SFHA

Lowest Floor Requirements N.J.A.C. 7:13-12.5

OTHER BUILDINGS (COMMERCIAL, INDUSTRIAL):

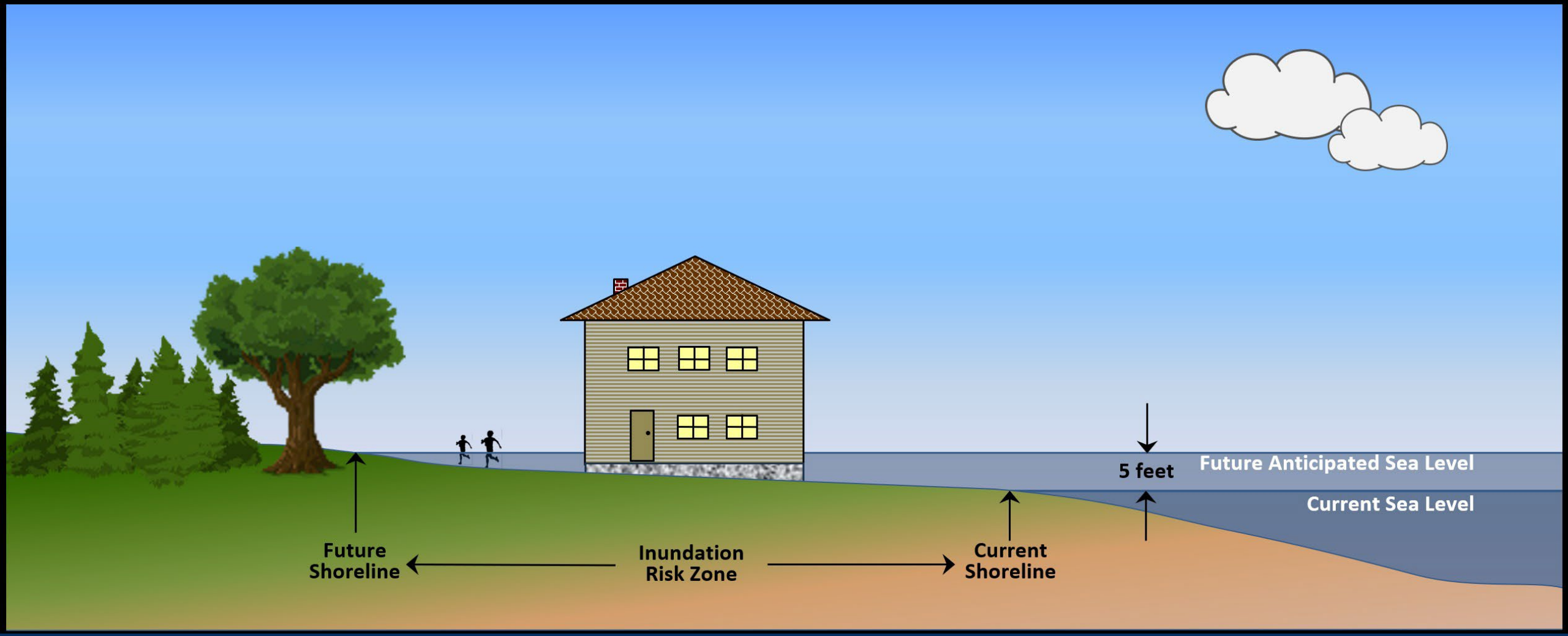
- Can be elevated like residential or floodproofed or both
- Habitable areas must be dry floodproofed
  - Designed to keep water out of building
- Enclosed areas below lowest floor can be wet floodproofed (crawl space with flood vents)
  - Allows water to enter building and balance hydrostatic pressure

Lowest Floor Requirements N.J.A.C. 7:13-12.5

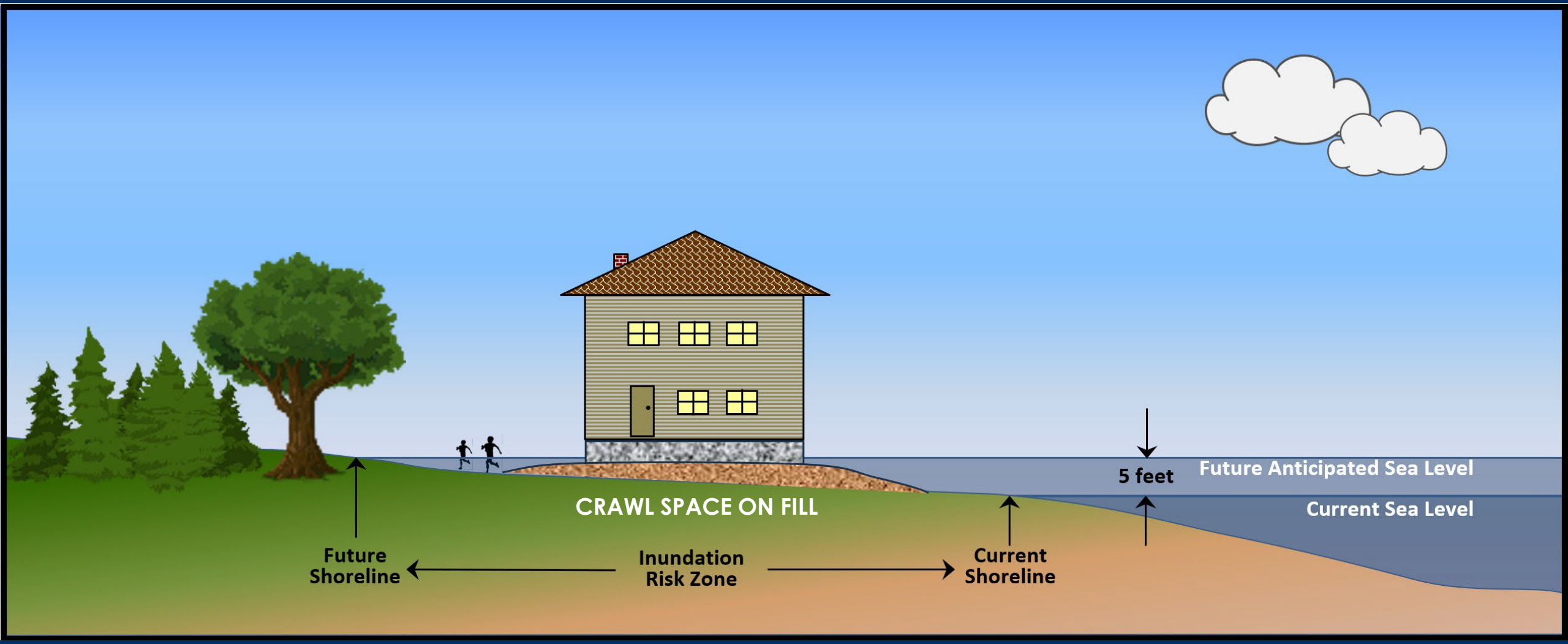
FOR ALL BUILDINGS:

- No permanent enclosures below CAFE+1 in VE zones
- No permanent enclosures below CAFE+1 in Coastal AE Zones (some exceptions)
- Habitable areas cannot be wet floodproofed
- Area beneath lowest floor can be used only for parking, building access and limited storage

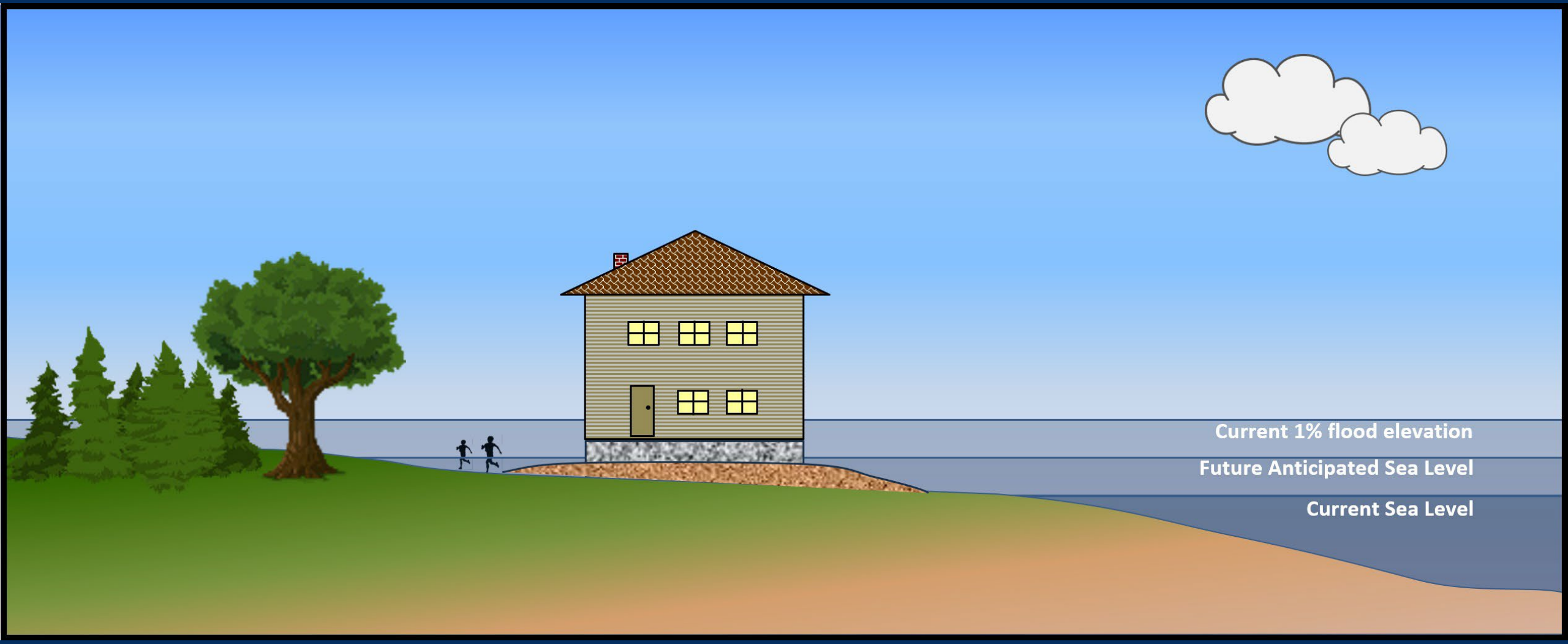
Inundation Risk Zone



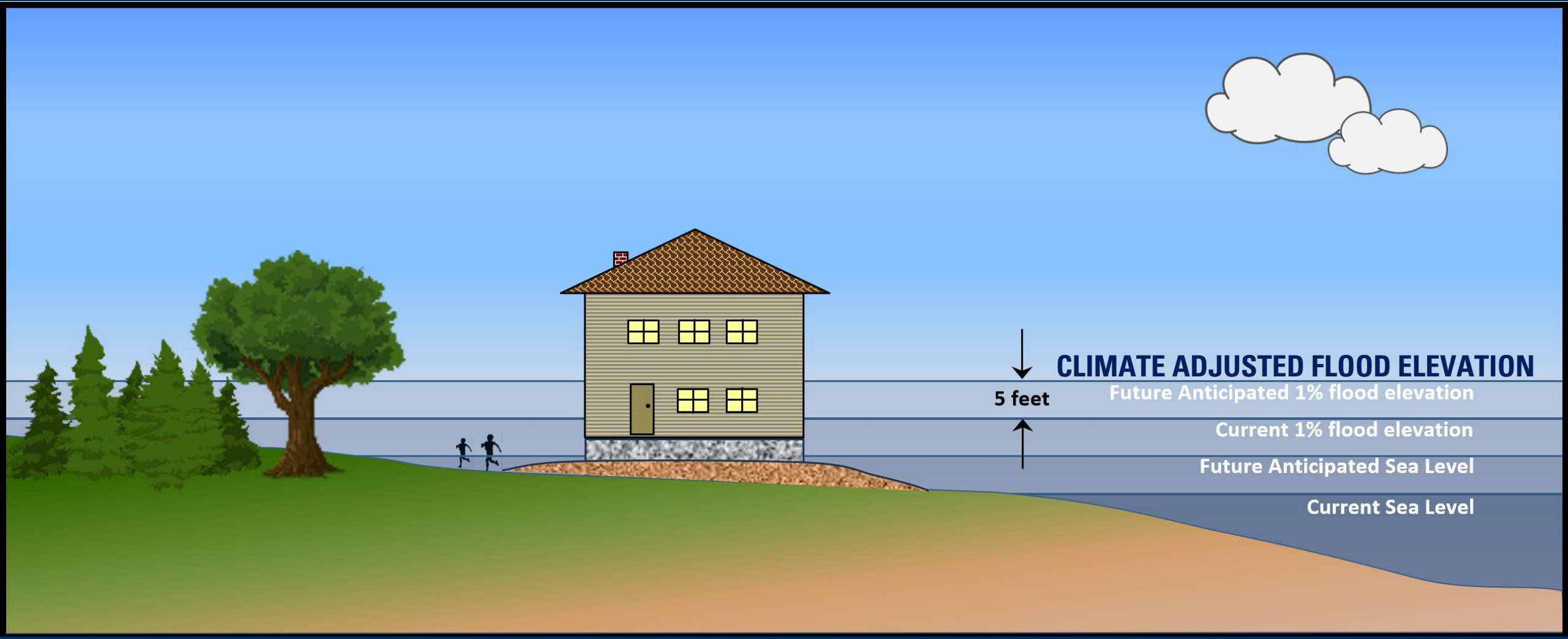
Inundation Risk Zone



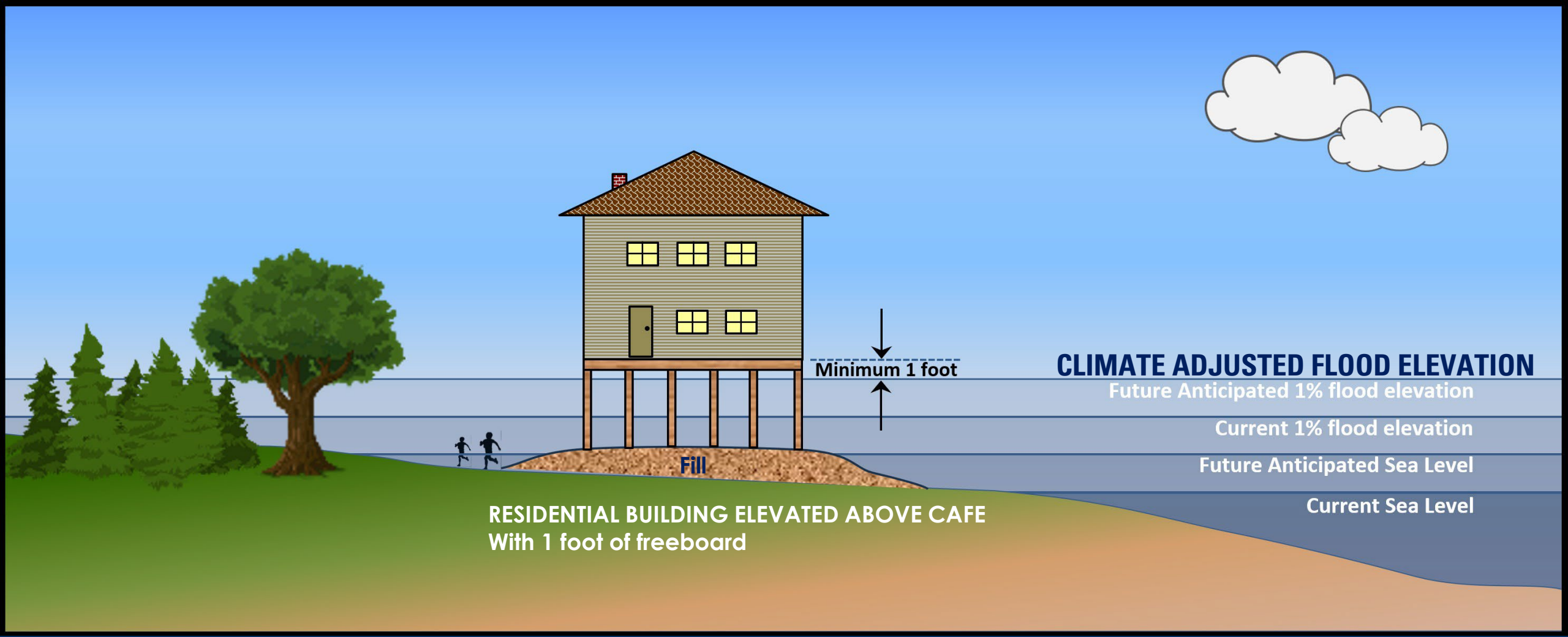
Inundation Risk Zone and Future Flood Elevation



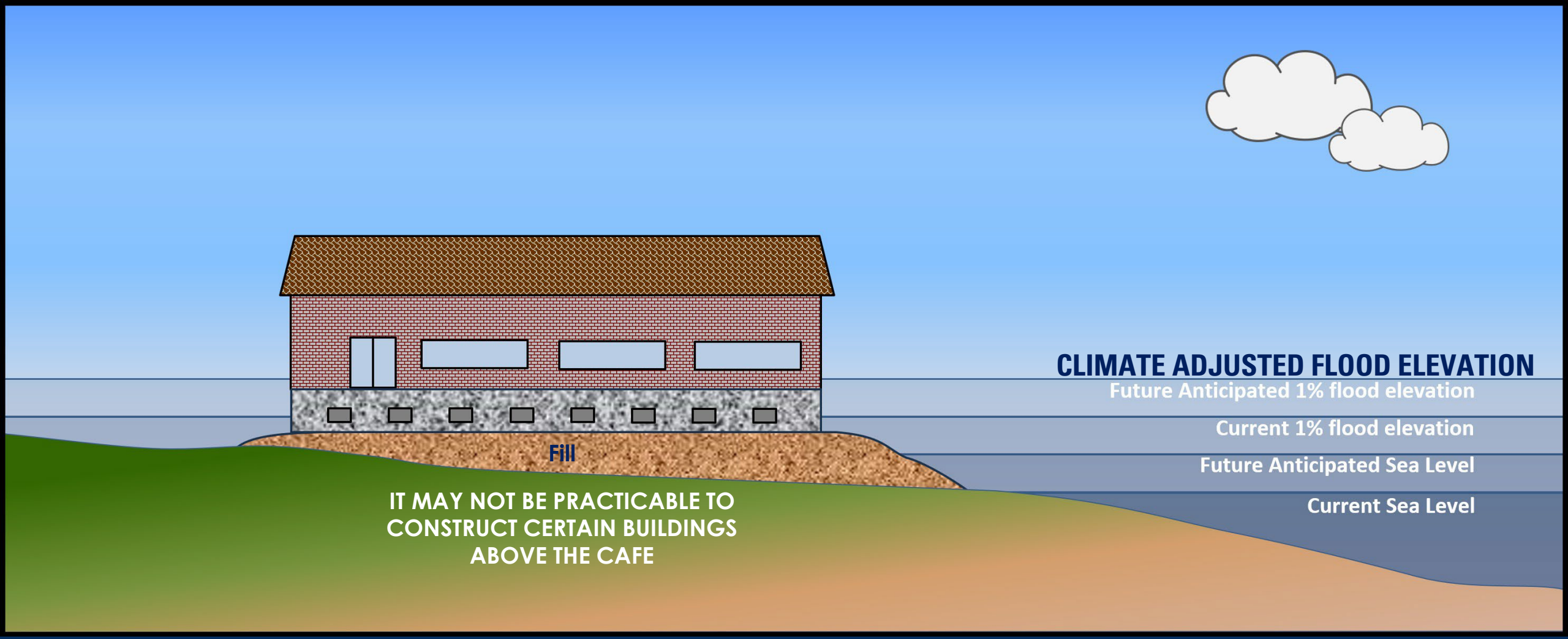
Inundation Risk Zone and Future Flood Elevation



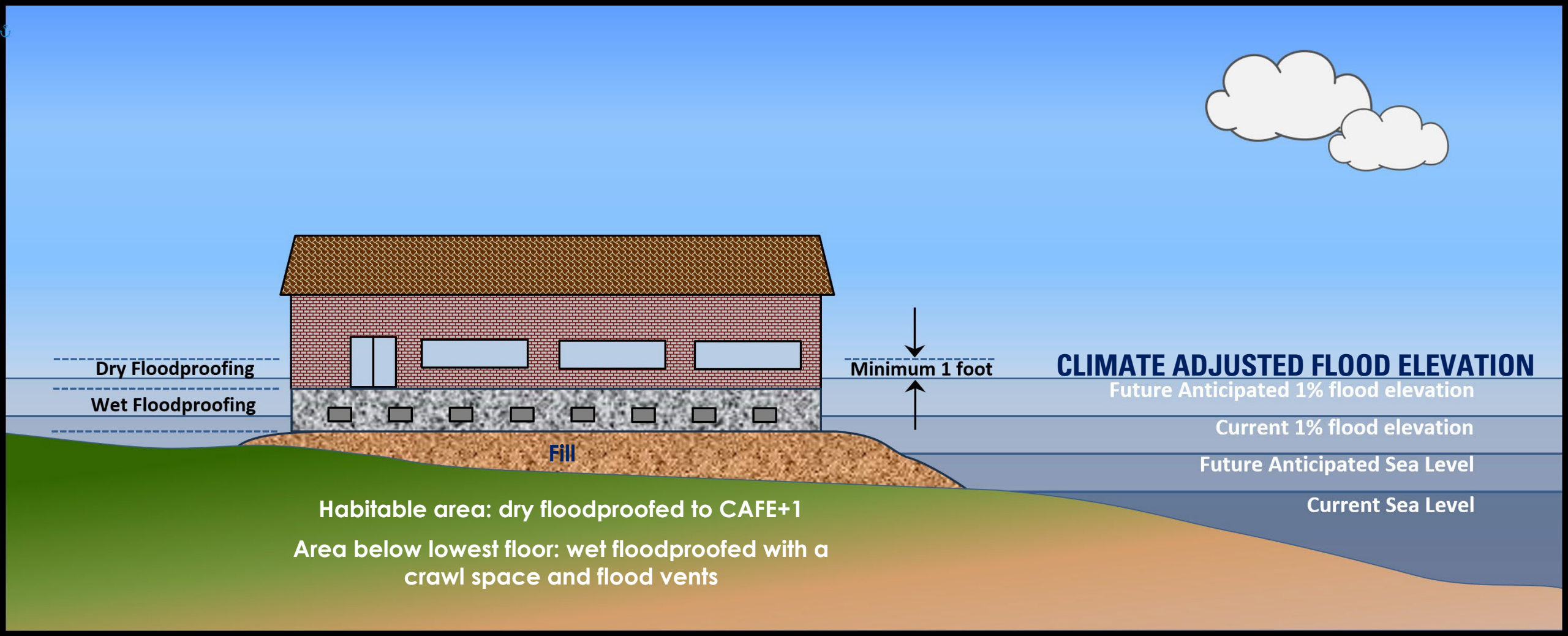
Inundation Risk Zone and Future Flood Elevation



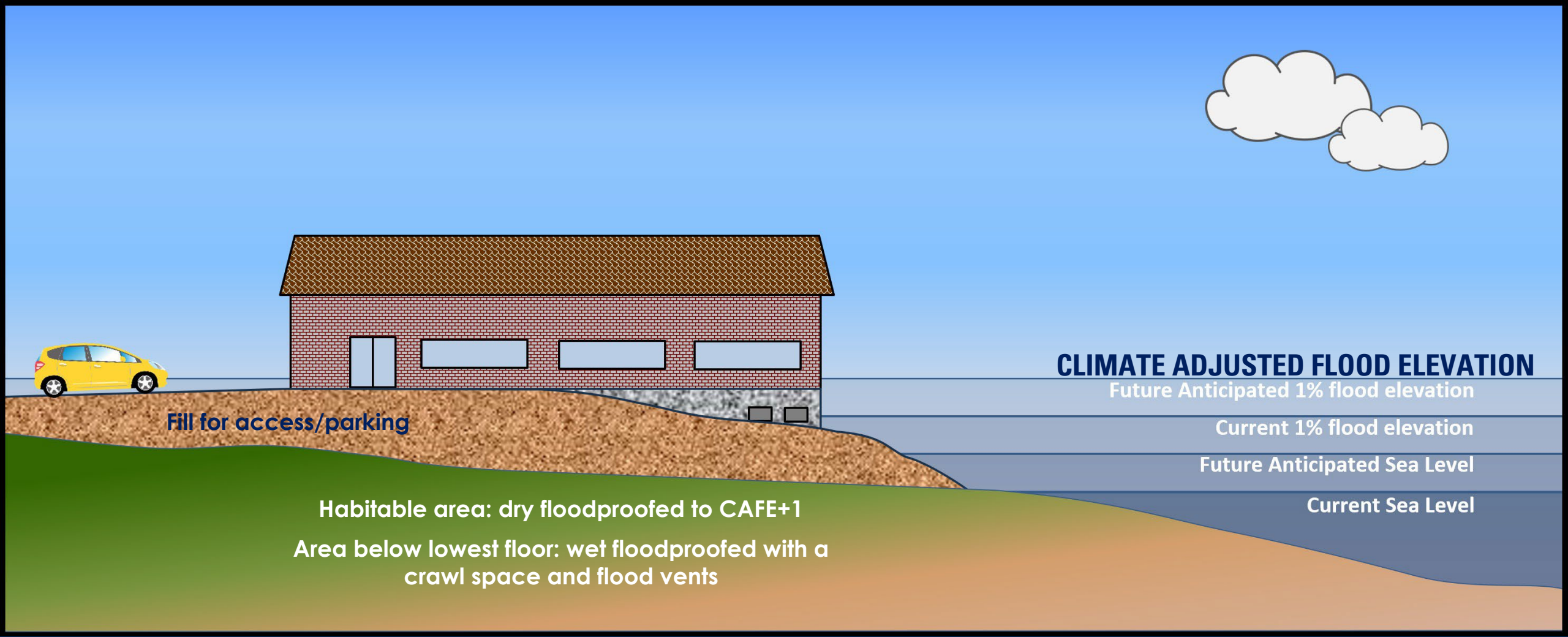
Inundation Risk Zone and Future Flood Elevation



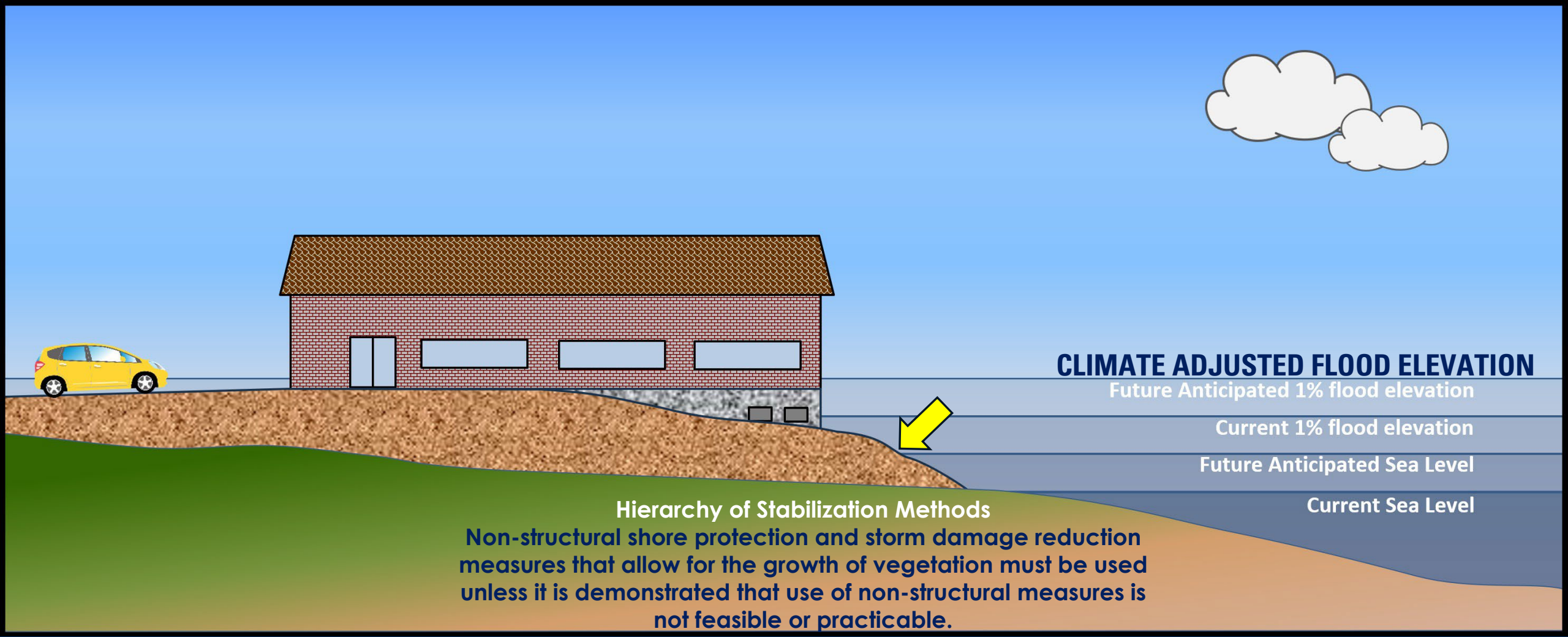
Inundation Risk Zone and Future Flood Elevation



Inundation Risk Zone and Future Flood Elevation



Inundation Risk Zone and Future Flood Elevation



Hierarchy of Stabilization Methods

Non-structural shore protection and storm damage reduction measures that allow for the growth of vegetation must be used unless it is demonstrated that use of non-structural measures is not feasible or practicable.

(See Coastal Engineering Rule at Proposed N.J.A.C. 7:7-15.11(b))

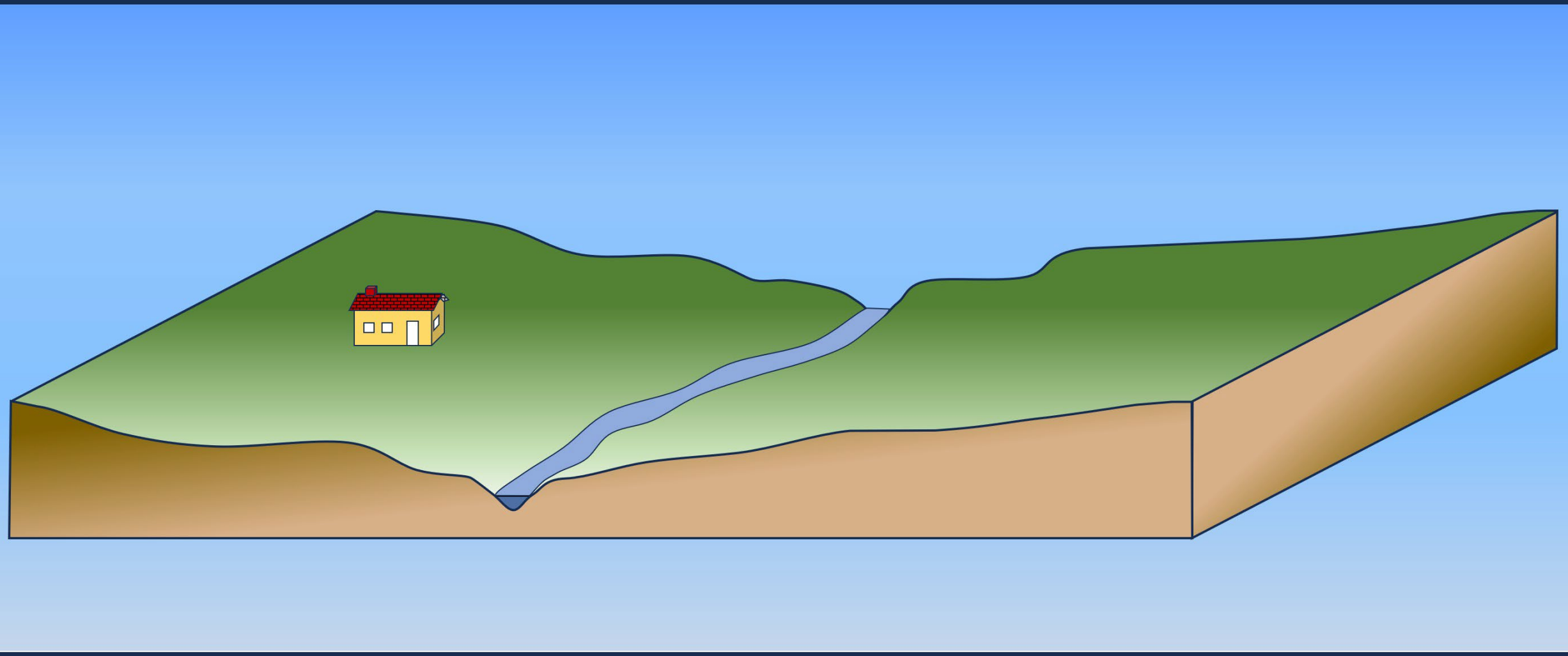
End of Section 5

QUESTIONS?

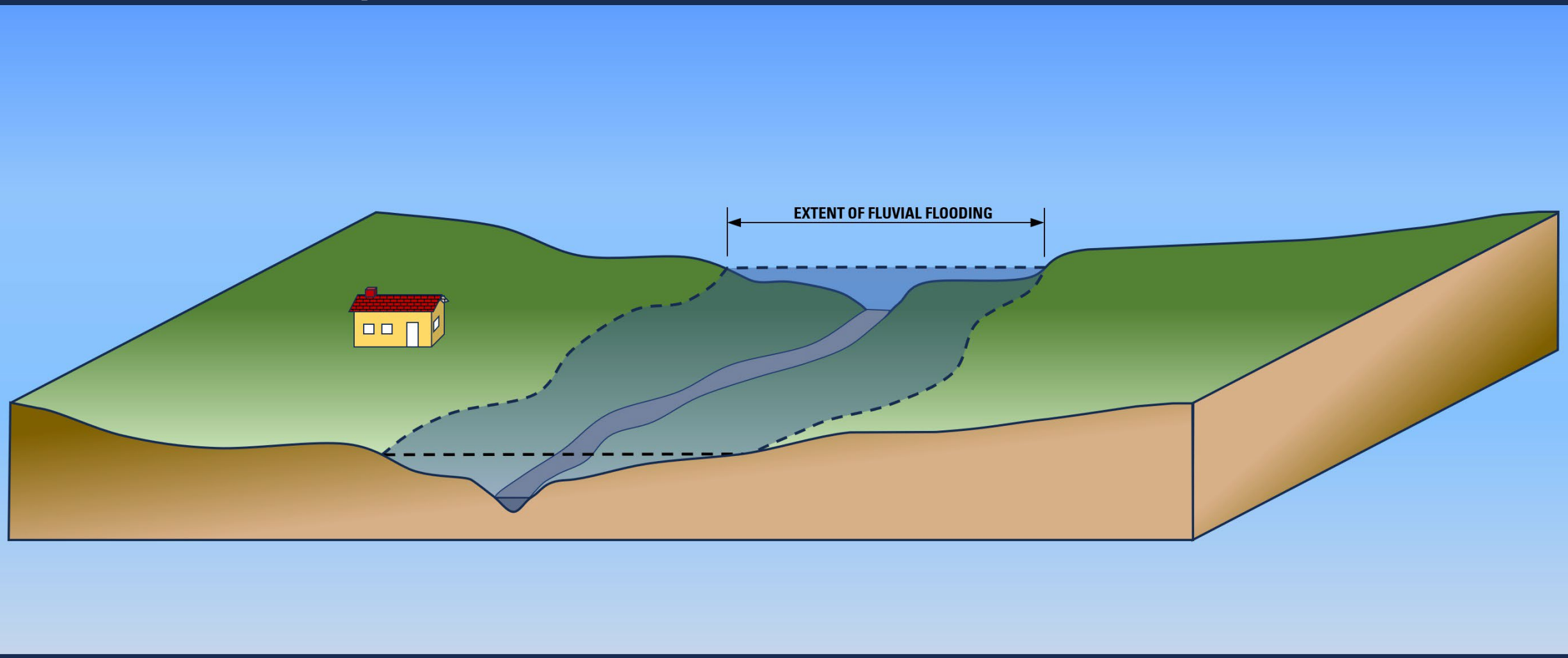
TIDAL/FLUVIAL OVERLAP

- In some cases, an area can be subject to both fluvial flooding and tidal flooding.
- Especially the case with the proposed climate adjusted flood elevation.
- Implications where fluvial flooding is present:
  - Flood Storage Displacement (Net-Fill)
  - Dry Access (Access to buildings during a flood event)

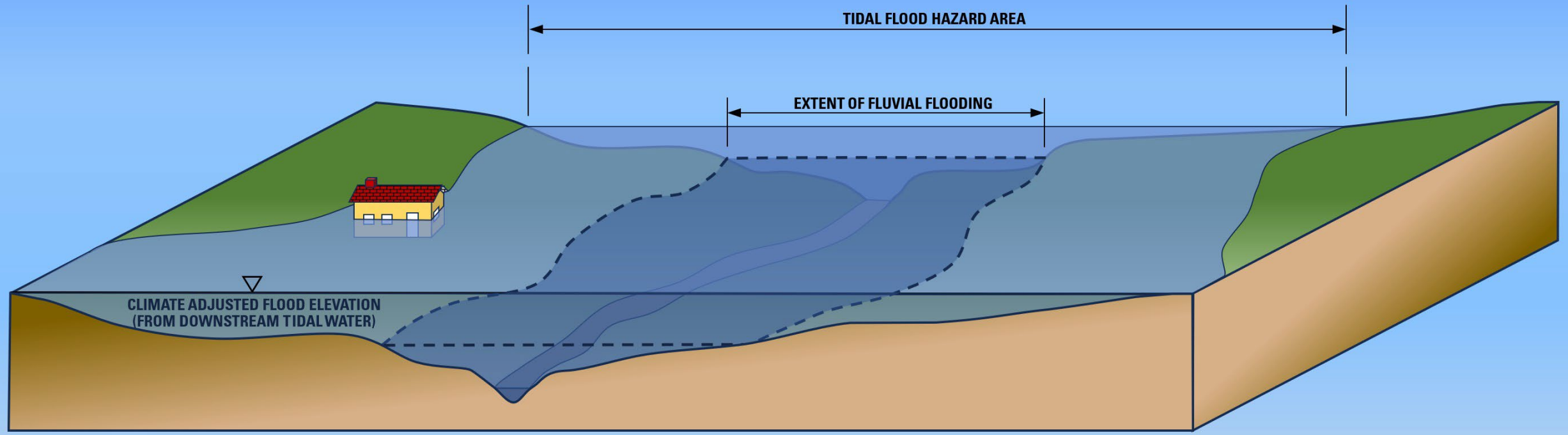
Tidal/Fluvial Overlap

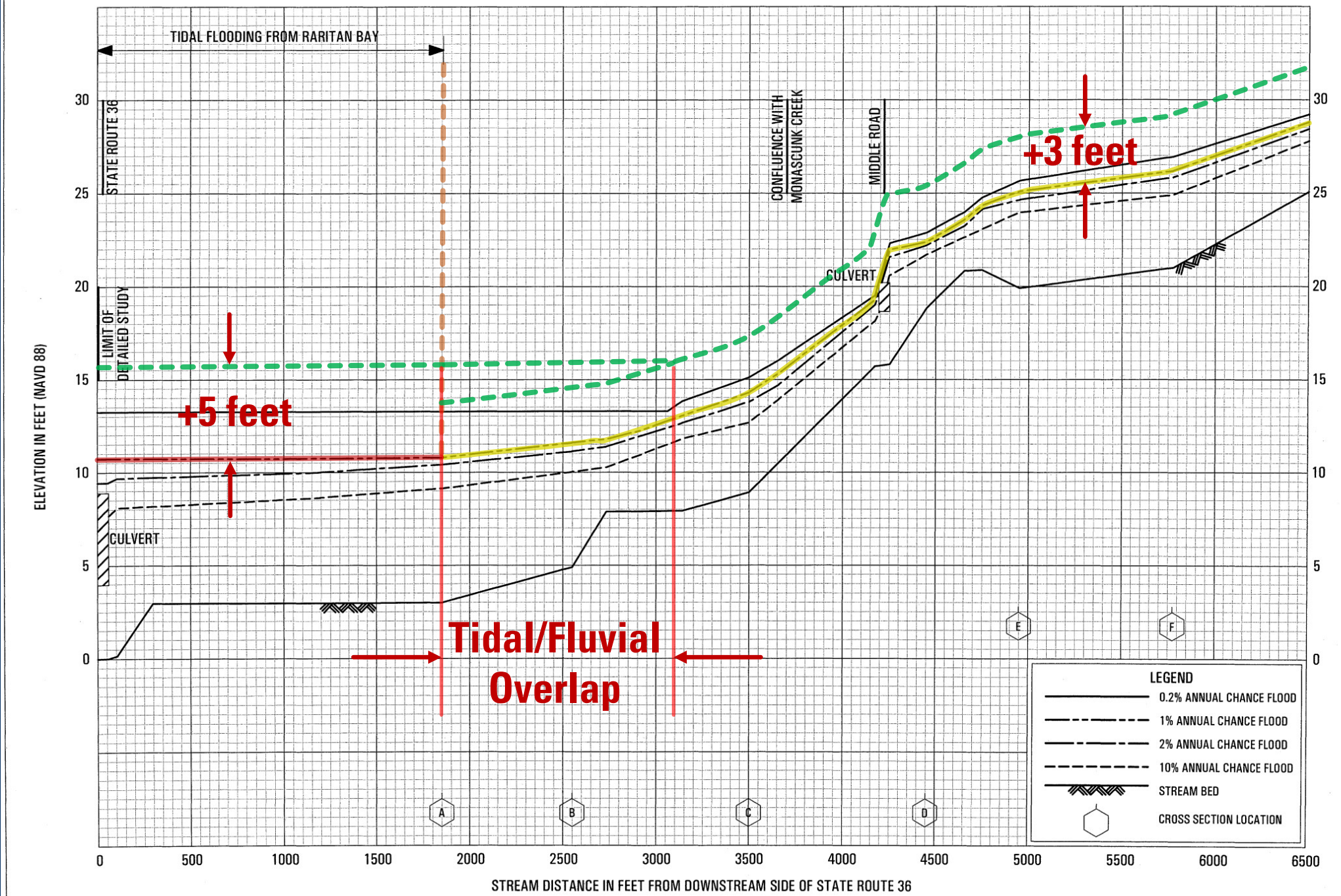


Tidal/Fluvial Overlap



Tidal/Fluvial Overlap



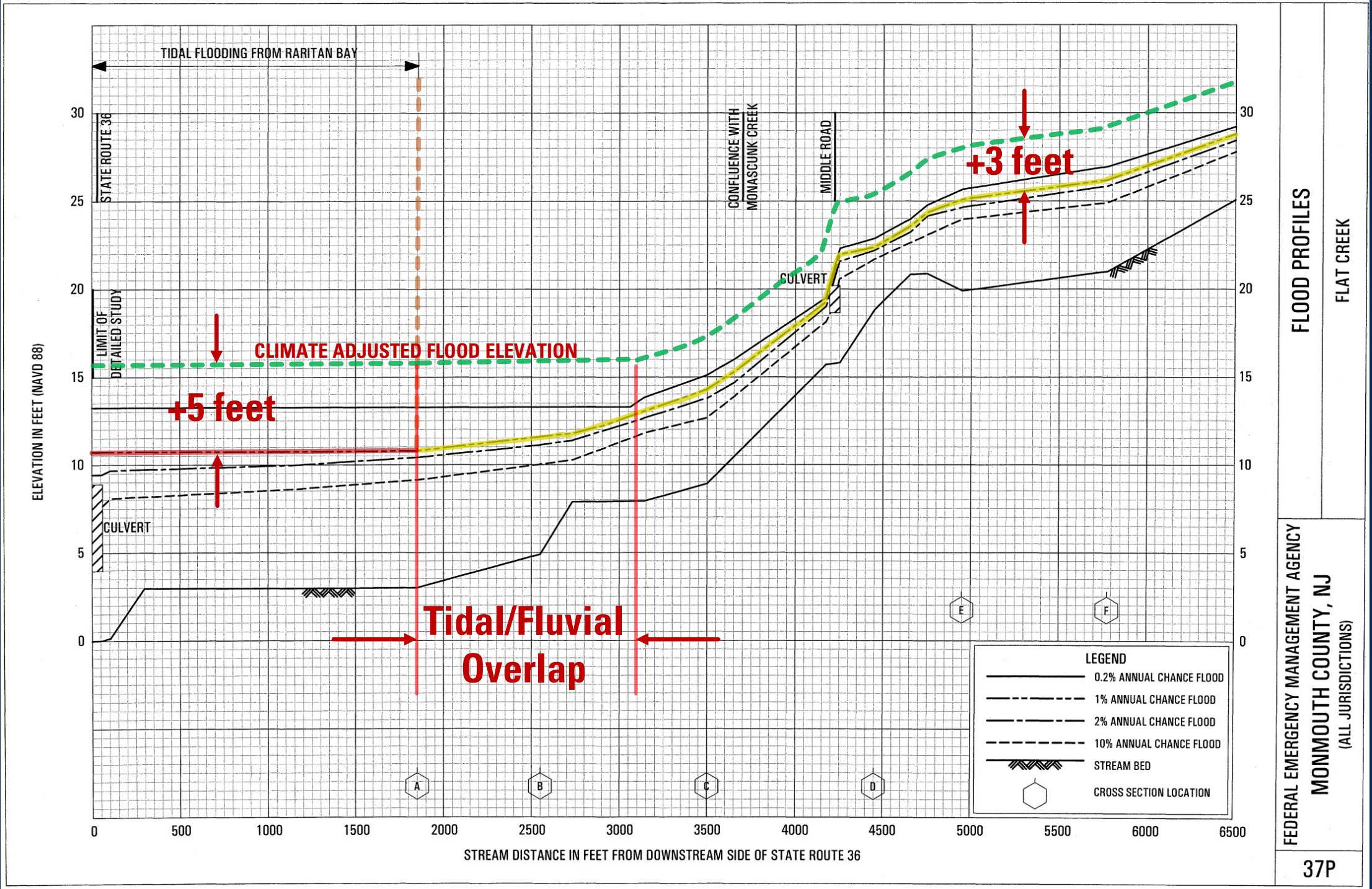


FLOOD PROFILES

FLAT CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY
MONMOUTH COUNTY, NJ
(ALL JURISDICTIONS)

37P

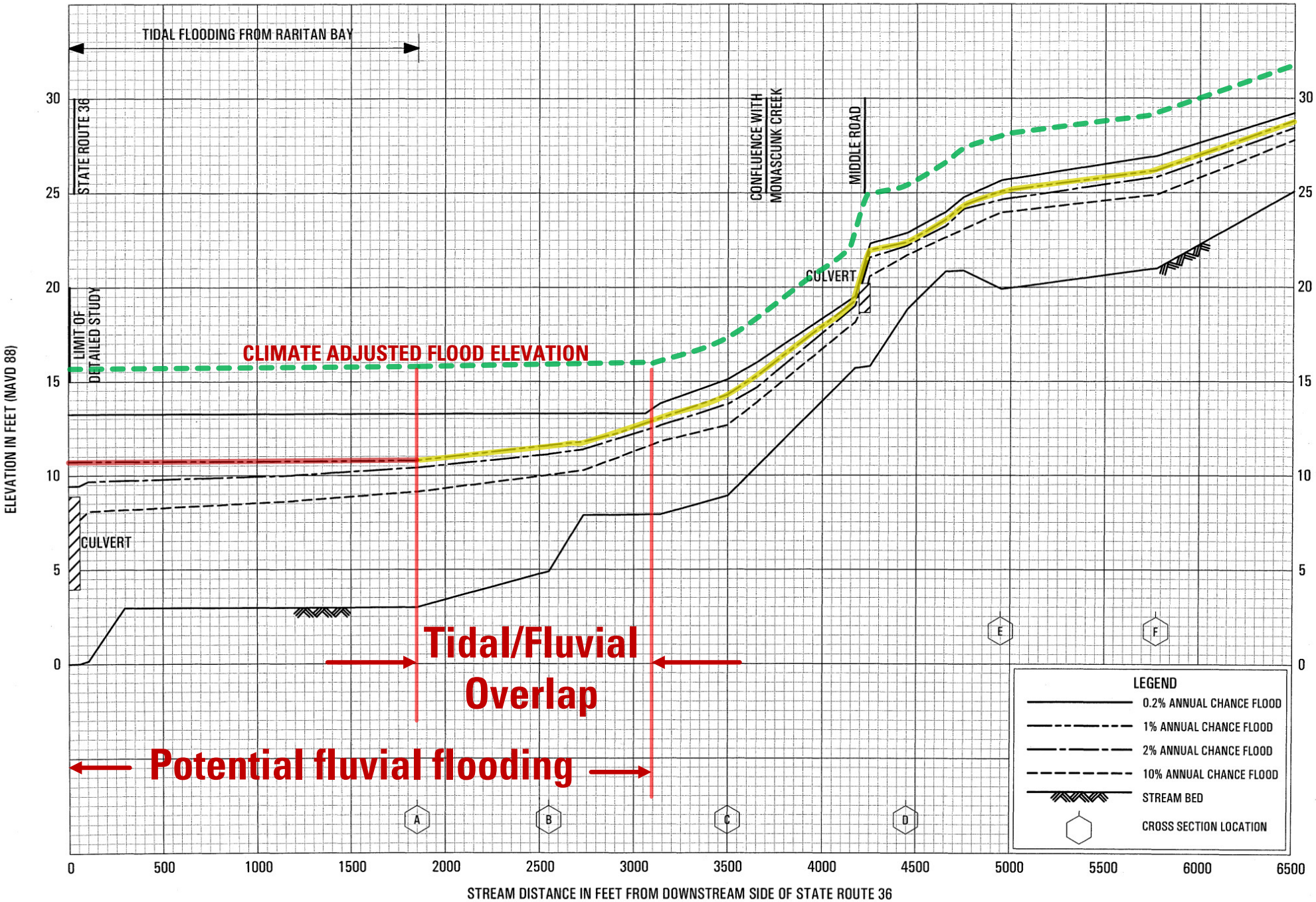


FLOOD PROFILES

FLAT CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY
MONMOUTH COUNTY, NJ
(ALL JURISDICTIONS)

37P



FLOOD PROFILES

FLAT CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY
MONMOUTH COUNTY, NJ
(ALL JURISDICTIONS)

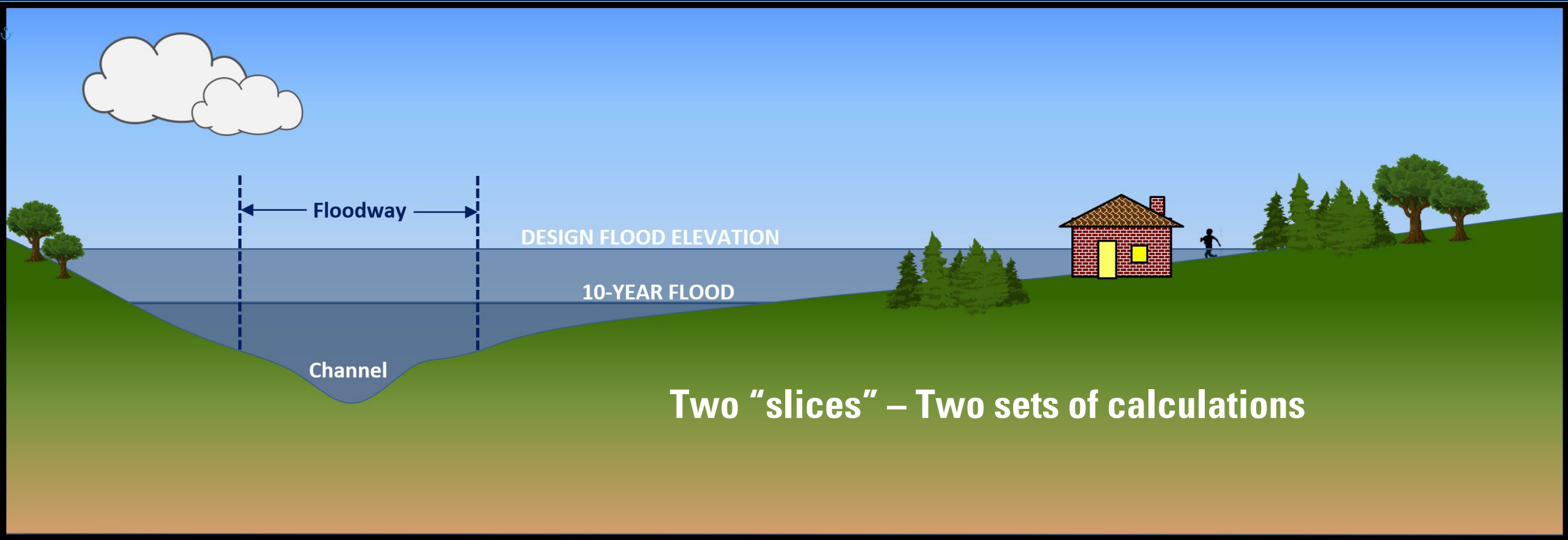
FLOOD STORAGE DISPLACEMENT
N.J.A.C. 7:13-11.4

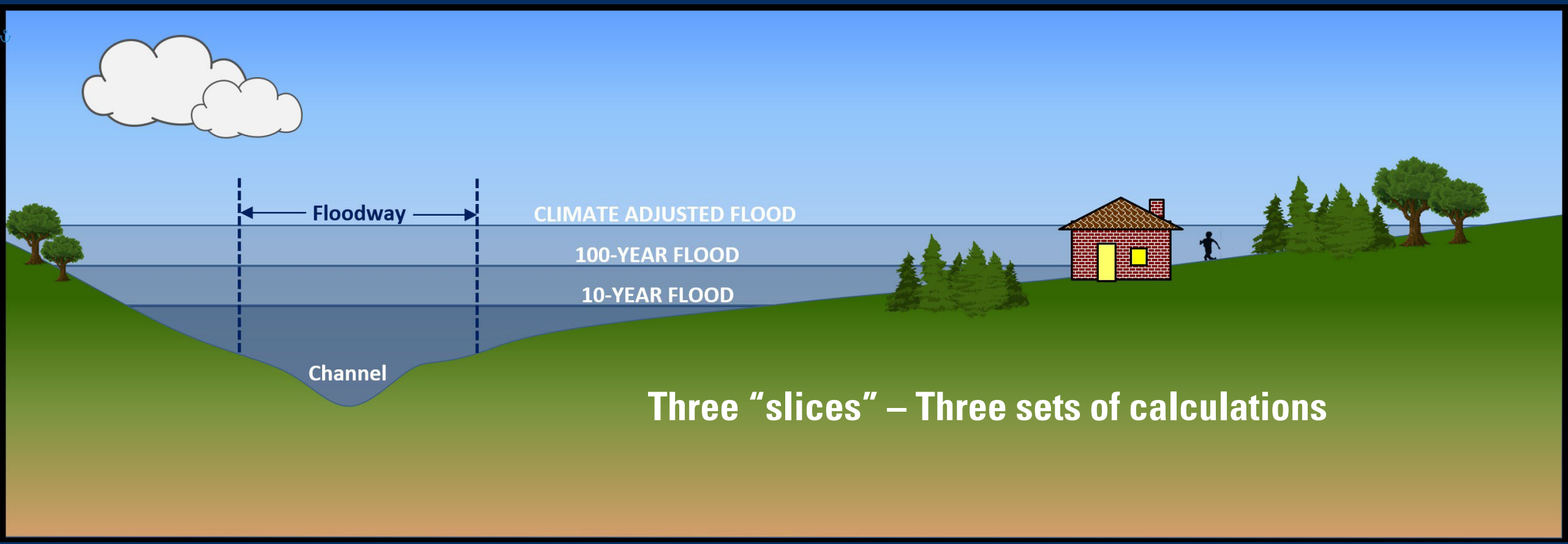
CURRENT – Must calculate flood storage displacement within flood fringe for the volume between:

- The design flood elevation and the 10-year flood
- The 10-year flood and the ground

PROPOSED – Must calculate flood storage displacement within flood fringe for the volume between:

- The climate adjusted flood elevation and the 100-year flood
- The 100-year flood and the 10-year flood
- The 10-year flood and the ground


Floodway
DESIGN FLOOD ELEVATION
10-YEAR FLOOD
Channel
Two “slices” – Two sets of calculations

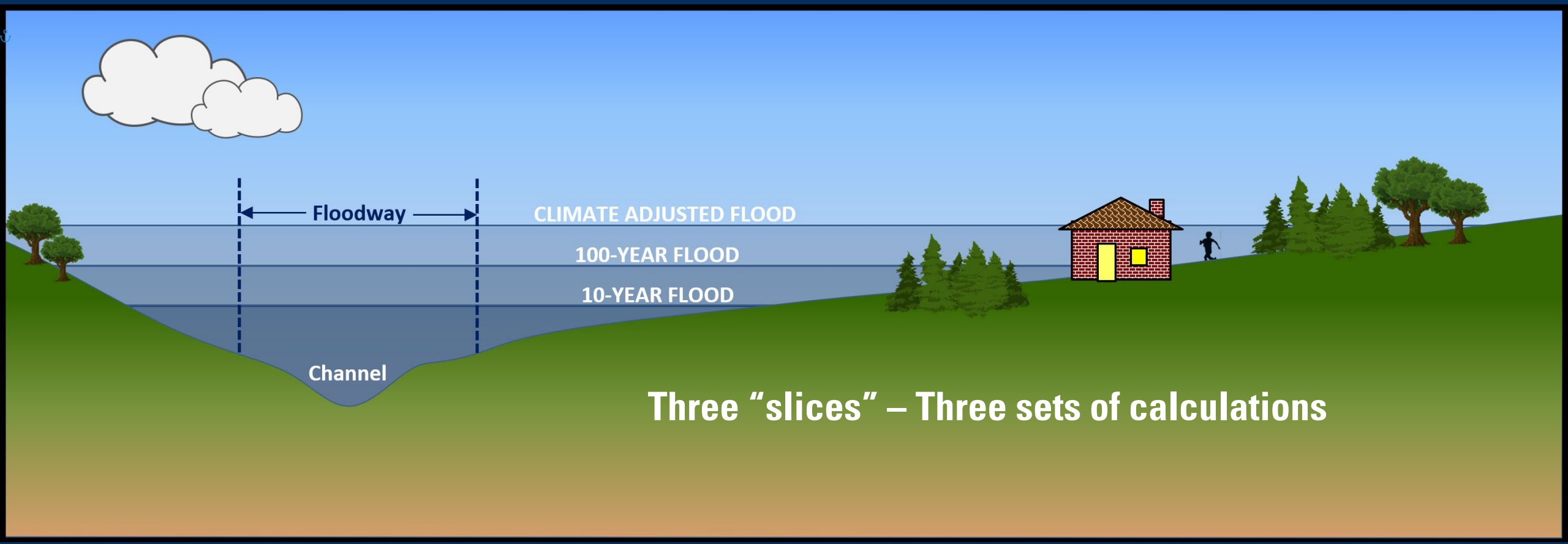

Floodway
CLIMATE ADJUSTED FLOOD
100-YEAR FLOOD
10-YEAR FLOOD
Channel
Three “slices” – Three sets of calculations

FLOOD STORAGE DISPLACEMENT

N.J.A.C. 7:13-11.4

Exemption: Any activity located in a flood hazard area that is tidally controlled for the 10-year flood, the 100-year flood, and flooding to the climate adjusted flood elevation.

- If one or more of these floods is fluvial, then the regulated activity must meet net fill requirements for the fluvial portion of the flood hazard area.
- For example, if an area is subject to fluvial flooding up to the 100-year flood elevation but is tidally controlled between the 100-year flood elevation and the climate adjusted flood elevation, flood storage displacement calculations would be necessary only for that portion of the flood hazard area below the 100-year flood elevation.


Floodway
CLIMATE ADJUSTED FLOOD
100-YEAR FLOOD
10-YEAR FLOOD
Channel
Three “slices” – Three sets of calculations

End of Section 6

QUESTIONS?

DRY ACCESS
N.J.A.C. 7:13-12.5(m)2 & 12.6(e)

Proposed N.J.A.C. 7:13-12.5(m)2

The Department shall issue an individual permit to construct any:

- Critical building
- Multi-residence building
- Two or more single-family homes or duplexes

or to convert any building into any of these uses, only if:

DRY ACCESS
N.J.A.C. 7:13-12.5(m)2 & 12.6(e)

Proposed N.J.A.C. 7:13-12.5(m)2

2. Each building is served by at least one existing or proposed roadway, the travel surface of which is constructed at least one foot above the climate adjusted flood elevation, and which is of adequate size and capacity to accommodate two-way traffic of motor vehicles providing access to and from each building for the duration of the flood, unless:

- The building is located within a tidal flood hazard area that is not additionally subject to fluvial flooding **and**
- The applicant demonstrates that providing such access is not feasible in accordance with N.J.A.C. 7:13-12.6(d)2 **and**
- The applicant discloses within a deed notice the maximum depth of floodwaters through which motor vehicles would be required to pass in order to access the site, as determined by the depth of the climate adjusted flood elevation above the travel surface of private or public roadways accessing the site.

DRY ACCESS
N.J.A.C. 7:13-12.5(m)2 & 12.6(e)

Proposed N.J.A.C. 7:13-12.6(e)

(e) In no case shall the travel surface of a private roadway or parking area in an area subject to fluvial flooding, which serves a critical building, multi-residence building, or residential subdivision of two or more single-family homes or duplexes, be constructed below the 100-year flood elevation unless:

- The applicant demonstrates that each building is served by at least one existing or proposed roadway, the travel surface of which is constructed at least one foot above the climate adjusted flood elevation, and which is of adequate size and capacity to accommodate two-way traffic of motor vehicles providing access to and from each building for the duration of the flood.
- Note that this standard applies both to fluvial flood hazard areas as well as to areas that are subject to both tidal and fluvial flooding.

ROADWAYS, RAILROADS, PARKING AREAS, AND AIRPORT RUNWAYS & TAXIWAY

N.J.A.C. 7:13-12.6

(b): The travel surface of the structure must be constructed at least one foot above the climate adjusted flood elevation.

(c): Two exceptions:

1. **The applicant is a public transportation entity and one of the following applies:**
   - **Drainage improvements** and associated stormwater management structures are proposed, which are necessary to ameliorate periodic inundation along a lawfully existing roadway;
   - The project is limited in scope and consists solely of **safety or state of good repair improvements** to a lawfully existing structure, such that there is no reasonable opportunity to elevate the roadway as part of the project's overall scope and purpose; **or**
   - Prior to July 17, 2023, in fluvial areas or [date of adoption] in tidal areas, the project reached a **milestone in its development and design** such elevating the roadway would necessitate reevaluation of the selected preferred alternative or equivalent milestone, a significant redesign, or significant modifications or additions to private land acquisition plans.

ROADWAYS, RAILROADS, PARKING AREAS, AND AIRPORT RUNWAYS & TAXIWAY

N.J.A.C. 7:13-12.6

Exceptions (continued):

2. The applicant demonstrates that strict compliance with the elevation requirements of this section would result in one or more of the following:

- **Prohibitively high construction costs** or construction costs that are disproportionately high compared with any benefit that would be obtained by strict compliance with the requirements of (b) above;
- A design that necessitates **excessive volumes of fill** that exceed the flood storage displacement limits at N.J.A.C. 7:13-11.4, for which flood storage cannot feasibly be created in compensation either onsite or offsite;
- A design that **does not meet necessary transportation safety, geometric design, or access point requirements**, such as those adopted by the American Association of State Highway and Transportation Officials, or the requirements of the Federal Aviation Administration;
- A design that causes **unavoidable adverse environmental impacts** (including, but not limited to, impacts to the channel, riparian zone, or aquatic or terrestrial resources) that cannot be adequately mitigated; **or**
- A design that **unavoidably exacerbates flooding** or causes adverse impacts to existing drainage patterns, presents compelling obstacles to design geometry or access, or necessitates adverse impacts to offsite properties adjacent to the structure.

ROADWAYS, RAILROADS, PARKING AREAS, AND AIRPORT RUNWAYS & TAXIWAY

N.J.A.C. 7:13-12.6

Where flexibility on the travel surface elevation is being sought, a PE must certify (and provide supporting documentation) that:

1. **Every reasonable effort** has been taken to construct or elevate as much of the structure **as close as practicable to the required elevation**, given the scope of the project.

2. The structure is designed to the maximum extent practicable to **resist damage, displacement, and loss of service** due to anticipated flooding based on the projected rainfall depths used in this chapter.

3. **No extraordinary risk** is posed to any person using each proposed structure that is constructed below the required elevation.

4. The **project meets one of the cases** where flexibility is allowed.

ROADWAYS, RAILROADS, PARKING AREAS, AND AIRPORT RUNWAYS & TAXIWAY

N.J.A.C. 7:13-12.6

An adequate number of permanent signs must be posted in prominent locations along any new, reconstructed, or expanded section of roadway or parking area that is not elevated, alerting the public to the likelihood of flooding based on the projected rainfall depths.

QUESTIONS?