

# “Strategies for Flood-risk Mitigation: Who Pays – and How?”

*presented at the*

**PennDesign CPLN 600 Planning Workshop, March 28, 2019**

**Allen Kratz, Principal, Resilience Works, LLC**

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I’m Allen Kratz. I help municipalities find funding to protect property against flooding from sea level rise and adverse rain events. My firm is Resilience Works, LLC. I help clients develop and fund a climate-adaptation based on my experience...

## Strategies for Flood-Risk Mitigation – Who Pays? How?

PennDesign Planning Workshop  
Thursday, March 28, 2019

Allen Kratz, Resilience Works, LLC

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...securing more than \$2 million to dry-floodproof a historic public library and being a champion for seven flood-mitigation projects that HUD, state and city governments funded with \$1.2 billion following Superstorm Sandy in 2012.

### Hoboken Public Library & Rebuild by Design



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Today’s focus is developing a concrete understanding of the role that planning plays in protecting communities and making them more resilient. Key to any plan is funding. We’ll discuss the increasingly important question: “Who pays for resilience – and how?”

### Today’s Objectives

- Planning’s key role in creating resilient communities
  - Funding’s key role in creating viable plans
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First up: this eight-minute presentation to address the questions that you asked about funding: federal and state funding sources Non-traditional sources of funding? How a municipality best competes for grants? How funding realities influence the plans you prepare?

### Your questions about funding

- Federal, state, county, non-traditional
  - How municipalities can compete for funding
  - How funding realities affect planning
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After that we'll go *virtually* go to Burlington and Bordentown to discuss your questions about how these cities can blend resilience with historic preservation, including opportunities for the city's historic districts, economic development, branding and historic preservation tax credits.

### **Burlington, NJ**

- Historic Districts
- Resilience + Preservation
- Branding
- Economic Development
- Tax Credits



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We'll then talk about design guidelines and examples of successfully implementing green infrastructure into historic Transit Oriented Development in flood-prone areas, commercial corridor resilience plans that are good models, and managed retreat from repetitive flooding.

### **Big issues**

- Transit-Oriented Development
- Green infrastructure
- Commercial corridors
- Economic Development
- Managed retreat



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Throughout today, I encourage you to envision yourselves in new field, a new vocational opportunity: the role of Chief Resilience Officer for a municipality, a role that some of you may consider as you plan the next step in your vocation.

### **Emerging career opportunity**

## **Chief Resilience Officer (CRO)**

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A Chief Resilience Officer is the person who reports to the mayor and is responsible for integrating all of the city's planning and funding related to making the community resilient against floods, earthquakes, wildfire, sea level rise and other impacts from climate change.

### **Chief Resilience Officer's duties**

- Establish a compelling resilience vision
- Work across departments and
- Work with local community to
- Maximize innovation and
- Minimize impact of unforeseen events

Source: 100 Resilient Cities, Rockefeller Fund

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Because securing funding is a CRO's key accountability, let's look at 12 potential funding mechanisms, starting at the beginning of the alphabet with...

## 12 Funding Mechanisms

1. Bonds
2. Bundling
3. Capital planning
4. Community Development Block Grants (CDBG)
5. Federal Emergency Management Agency
6. Low-Interest Loans
7. Non-traditional insurance
8. Open space trust funds
9. Regional cost-sharing
10. Revolving loan funds
11. Stormwater utilities
12. Tax credits/incentives

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**Bonding**, which entails borrowing funds from investors for capital improvements like bridges, roads, and, in Bridgeport, Connecticut the state's share of a project that will protect a new mixed-use development with temporary rain-water detention and improved sewer capacity.

### Bonding



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The advantage of bonding is that it enables the borrower to spread the spread the cost of a major investment over the expected life of the project. Disadvantage? Resistance to raising taxes for debt service.

### Bonding pros and cons

+ Amortizes long-lasting projects long term

*but*

- Creates or increases debt service costs

12

**Bundling** a resilience project into a corollary capital project can achieve economies of scale. In Hoboken, New Jersey, a total overhaul of the city's main thoroughfare became an opportunity to install an underground microgrid linking essential services on the city's spine: a shelter, pharmacies, and food stores.

### Bundling multiple goals



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**13** **Capital planning:** Most municipalities reserve a portion of anticipated tax revenues for future capital upgrades. A CRO's challenge is to reserve funds for flood mitigation infrastructure in the capital budget – and shield that reserve from elected officials who prefer to lower taxes or maintain taxes at their current level.

## Capital Planning

Long-term budgeting for resilience is prudent

*but*

Reserving capital means less tax relief now

13

**14** **Community Development Block Grants** assist municipalities with many quality-of-life programs. After Sandy, Congress authorized \$1.2 billion for seven HUD flood-mitigation projects in New York, New Jersey and Connecticut funded through the CDBG program.

## Community Development Block Grants (CDBG)

\$1.2B – HUD, NY State, NYC, New Jersey, Connecticut

Bridgeport, CT	Lower East Side, NYC
Hoboken, NJ	Tottenville, Staten Is., NYC
Hunts Point, Bronx, NYC	Hempstead, Long Island, New York State
Meadowlands, NJ	

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**15** **FEMA**, the Federal Emergency Management Agency, provides grants up to \$10 million for pre-disaster mitigation planning and projects. The goal: “raise public awareness about reducing future losses before disaster strikes.”

## FEMA

New paradigm:

“Raise public awareness about reducing future losses before disaster strikes.”

- Federal Emergency Management Agency

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**16** **Low-cost loans** are useful, like \$5 million from the New Jersey Water Bank, part of the state's Department of Environmental Protection, that helped Hoboken fund its stormwater resilience park. Underneath the park, a 190,000-gallon cistern detains excess rain.

## Low-cost loans



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17 Still under development is **non-traditional insurance**, still under development, in which the insurer calculates the expected financial benefit of a planned sea wall or levee and lowers the premium accordingly. The municipality uses that cost saving to fund its seawall or levee investment.

### Non-traditional insurance

- Insurer estimates economic value of flood-protected municipal assets
- Insurer lowers premium accordingly
- Municipality uses that saving for resilience infrastructure

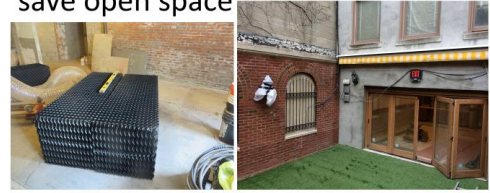
17

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18 **Open-space trust funds** enable many counties in New Jersey to make grants like Hudson County's \$124,000 to the Hoboken Public Library for a garden that temporarily holds rainwater in two feet of gravel buried beneath a permeable top layer of artificial grass.

### Open space trust funds

- Counties levy tax surcharge to buy, save open space

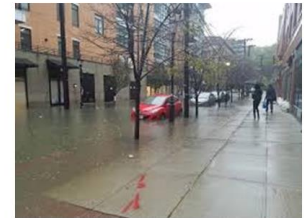


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19 **Regional cost-sharing** offsets municipal spending. To mitigate rain-event flooding in a low-lying part of Hoboken, the City convinced the regional sewer authority to split the cost of upgrading sewers, roadways, curbs, and sidewalks: \$2.5 million from the City, \$3 million from the regional authority.

### Regional cost sharing

North Hudson Sewerage Authority: \$3M  
City of Hoboken: \$2.5M



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20 **Revolving loan funds** are a strategy promoted by Philadelphia's own Pew Charitable Trusts. The goal: Lend money at low interest. As borrowers pay off their loans, interest payments and repaid principal support loans to other recipients. In that way, the money "revolves" through various projects.

### Revolving Loan Fund

Concept:

- Lend money at low interest.
- Interest payments and repaid principal support loans to other recipients
- Money "revolves" through various projects.

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**21** **Stormwater utilities** levy a fee on property owners to fund capacity upgrades and detention infrastructure, a fee directly proportional to the property's impervious surface. In Maine, six municipalities, 15% of the population, have stormwater utilities. Two weeks ago, despite critics' objections to a "rain tax." New Jersey Governor Murphy signed a bill enabling municipalities to create stormwater utilities in, dare we say it, the "Rain Garden State!"

## Stormwater Utilities

Maine – six municipalities, 15% of population  
Portland, South Portland,  
Lewiston, Bangor,  
Scarborough, Westbrook  
Connecticut – New London  
New Jersey – authorized



Map by Wikimedia Author's format 2017 CC BY-SA 2.0

**22** Finally: **tax incentives**. Under a proposal by Governor Murphy, owners of commercial historic properties could receive a 16% to 20% credit against New Jersey's corporate business tax by restoring their properties to historic standards. Developers in flood-prone areas might use a state historic tax credit to make a project economically viable.

## Tax credit for historic preservation



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**23** That's a high-level summary, so let's get into you questions for the next few minutes. Then, those of us who have visited Burlington will share our perspectives. So, thinking of yourselves as preparing to become a Chief Resilience Officer, what questions do you have?

## In your new role as CRO...

- Questions so far?
- Then, Burlington, NJ:  
here we come!
- With a "train window look" at Bordentown



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**Burlington, NJ**  
**Bordentown, NJ**  
**Saturday, March 23, 2019**

**Preliminary Thoughts and Questions**

- 1 Thinking in the way a Chief Resilience Officer thinks, I'm ready for my first walk-through of Burlington, with a quick view of Bordentown through the window of the light-rail train. I start "reading" the city, making mental notes that I'll use as the basis for detailed research back at my office.

25

- 2 Stepping off the RiverLINE, I vector over to High Street. "Historic Burlington": brand identity! Look at the sailing ship at top of the sign! Will I see any rivercraft down by the waterfront? Not a lot of people on this sunny, windy Saturday afternoon.

High Street



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- 3 At water's edge, the Delaware River doesn't look threatening today. I'll need to check the northern and southern ends of the bulkhead to see how securely it ties into the upland's natural flood-resisting topography.

Delaware River

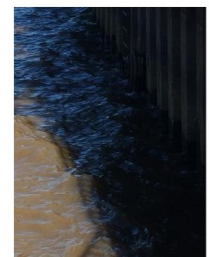


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Come to think of it, walking down High Street, I didn't see any flood gauges (like the one in Bridgeport, CT) or buildings marked with lines denoting the highest level of the "Flood of 19??"

- 4 Well, what's happening here? New fencing, but no signs explaining what's going on. As CRO, my job is to keep the public informed – to stay ahead of questions and any negative media.

Delaware River



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I spot an outfall from what I assume is the city's storm sewer. During storms, does it convey water back into the city? I'd better check.

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Yes, Historic Burlington! Impressive Federalist brick home and its neighbor, the Victorian-Gothic eponymous Stone Cottage.

- 5 Both have for-sale signs? Hmm. Are the owners afraid of flooding? Are they selling ahead of the next flood? Or are these dual sales just coincidental?



Riverfront homes



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One block in from the river, I'm drawn to this historic neighborhood. I'd be interested in knowing about the typical household income, rent/own ratio, and measures of stability. I wonder how this neighborhood shows up on the FEMA flood map. This looks like a community – is it a resilient community in multiple ways? Very important: I'd like to know how residents see themselves and their future.

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Inland homes



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This wood frame house – “built in 1852” by the lumberman could use a modern-day carpenter for some repairs. Does the City provide low-cost loans to help owners of properties pay for repairs that maintain the value of the neighborhood as a whole?

- 7

Inland homes



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As a chief resilience officer, I pay lots of attention to infrastructure, like storm sewers.

- 8 Also, to the storm sewer outfall protruding from the bulkhead along the river: unless the outfall is equipped with a backflow preventer, during high-water levels in the river, storm sewer might send water in the reverse direction into.....

Storm sewer



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- ...the window wells that admit light into the basements of these historic High Street homes.
- 9** These historic architectural features would very efficiently convey water into the basements and cellars of these dwellings.



Exposed basement windows



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- 10** Utilities occupy a lot of my attention as CRO. Here's highly exposed electrical equipment just behind the house that Philadelphia architect Frank Furness designed down on the waterfront.

Exposed electrical equipment



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- 11** The firehouse was built in 1967, close to the waterfront. I see no external flood mitigation measures. I assume Burlington has a volunteer firefighting force. If the streets around the firehouse flood, will firefighters be able to get to their headquarters here? As a vital civic asset, this firehouse could be an attractive candidate for external funding. I'll review those opportunities.



Firehouse

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- 12** New construction – right by the waterfront park! Is it going to be constructed above the design floor elevation – to reduce the risk of flooding? Will it be built with extra protections – flood gates, for example? And with emergency generators placed above a worst-case flood level?

And perhaps not so incidentally, this is going to block the view from the Riverview Restaurant, which seems to be a popular gathering place. That's an economic impact.

Riverfront construction



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And speaking of economic wellbeing, retail is hard in most communities. Malls, and now online shopping, have made their mark. Here on High Street, literally side by side, three storefronts illustrate the challenge: one business has closed, the other is open, and the third promises to open.

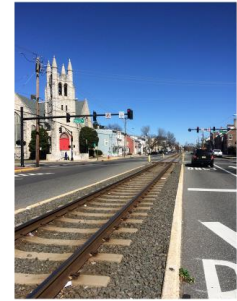
Businesses past, present and future



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Attentive to the importance of social resilience – the social infrastructure that Eric Klinenberg details in *Palaces for the People*, I, as CRO want to explore the role that faith communities, community organizations and other civic groups play in creating a resilient Burlington.

Community assets;  
Social infrastructure



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Does NJ Transit's RiverLINE offer the potential for transit-oriented development along this historic thoroughfare? Historic preservation tax credits? Work-live opportunities? I wonder if that's an earlier firehouse – away from the water! Maybe this underperforming upland commercial corridor warrants new investment.

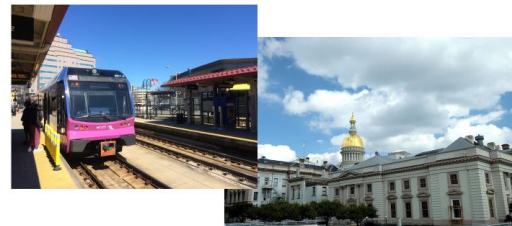
Transit Oriented Development, Economic Development



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The RiverLINE takes just 24 minutes to arrive at NJ Transit's Trenton Transit Center, with bus connections to the state capitol and other government buildings. Are there opportunities for Burlington to become a bedroom community for state workers? Are there benefits from Burlington's proximity to Trenton that Burlington can use to its advantage?

Transit opportunities



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Although Burlington’s historic brand includes a sailing vessel, I saw no modern-day continuation of that part of the city’s waterfront history: an easy, active connection to the Delaware. By contrast, several miles up the river, I saw from the RiverLINE that the Bordentown Yacht Club was alive with members preparing boats and floats for summertime recreation on the river.

17 Are there similar possibilities in Burlington? Can the river – now a flood risk -- become Burlington’s friend: a magnet for external investment and impetus for community-building? As Chief Resilience Officer, I’m eager to assemble a team to propose opportunities, run benefit-cost analyses and engage the community in planning a new future for Burlington.

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Bordentown  
Yacht Club



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Flood-prone communities that also have a historic built environment face a dual adaptation challenge: adapting historic preservation standards, regulations and design guidelines to climate adaption. Hoboken's adopted a Flood Damage Prevention Ordinance in 2013. The New Jersey Historic Preservation Office has looked at 1,600 properties in Hoboken and identified four approaches to flood mitigation in the city.

#### Flood Mitigation in Hoboken Historic District

1. **Landscaping** adjacent to foundation
2. Basement window **infill**
3. "First floor abandoned – **residential uses moved above** Design Flood Elevation (DFE)"
4. **Rooftop addition**

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The owner of this property traded an impervious front courtyard (either cement or stone) for rain-absorbing vegetation.

1. Landscaping adjacent to foundation



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During reconstruction of this dwelling, the basement was filled in. For some property owners, relinquishing a basement may be economically feasible. In the hands of a skilled architect, the results can be aesthetically pleasing.

2. Basement window infill



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Nonetheless, is there an ethical dimension to filling in basements. Diverted rainwater goes somewhere – perhaps into the basement apartments that are common in Hoboken.

2. Basement window infill



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Diverting water to less-prepared, less fortunate neighbors reminds me of the 1960s – underscored by this vestigial Civil Defense sign on High Street. Americans were encouraged to build backyard fallout shelters – ready to protect themselves against a Soviet nuclear attack – and presumably to protect themselves against friends and neighbors who had not built their own shelters. In short, is a piecemeal approach to flood mitigation ethically sound?

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2. Basement window infill



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A third intervention is to abandon the first floor for habitable use. In these two properties – one a former manufactory and the other a residence – the ground level is reserved for garage use. Residential space is situated above the design flood elevation.

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3. 1st floor abandoned; DFE residential use



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One of the most controversial effects of Hoboken's 2013 Flood Damage Prevention Ordinance has been the trend to allow rooftop additions in return for abandoning the basement. Historic preservation purists object to these additions, but perhaps sacrificing historic integrity is the price a community pays to fortify itself against sea level rise.

4. Rooftop addition



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Here's another under construction around the corner. One could even characterize this obviously modern addition as satisfying the Secretary of the Interior's standard for new construction: to differentiate new construction from the original resource. The photo on the right shows a slightly earlier rooftop addition. Those non-original mansard roofs create a false sense of history, an alteration disfavored by the Secretary of the Interior's standards for the treatment of historic properties.

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4. Rooftop addition



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In historic communities throughout the Delaware Valley and beyond, planners, architects, historic preservationists, chief resilience officers, their colleagues and their communities will do well to develop the skill of flexible thinking as they themselves adapt to climate adaptation.

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This photo and the ones on the next slide suggest an evolving change in attitude. When the owners of this corner property topped their late 19<sup>th</sup>-century home in the late 1970s, the community reacted with horror. Shunned by neighbors, the husband and wife sold their and moved away from civic opprobrium.

4. Rooftop addition



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Four decades later, rooftop additions down the same block and across the street evoke more concern than scorn. Perhaps the evolving – and grudging – acceptance of new rooftop additions indicates a new paradigm: a flexibility intended to give the past a future -- and to give the future a future.

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4. Rooftop addition



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