



City of Cambridge
Community Development Department

Climate Resilience Zoning Task Force

Summary of Key Discussion Themes – Flooding
May 29, 2019





Discussion on flooding (4/24/19)

1. What type of flooding should this process focus on?
2. What levels of flooding (e.g. % storm per time horizon) should be prioritized for protection and/or recovery?
3. What flooding impacts should this group focus on? What flooding impacts are of most concern?
4. What strategies might property owners employ to mitigate flooding impacts, and what are the relevant benefits and costs of these strategies?



Key Discussion Themes

1. Understanding the nature of flooding
2. How public infrastructure addresses flooding
3. How flooding impacts residential uses in ways that are a potential public concern
4. How flooding impacts commercial uses in ways that are a potential public concern
5. Choices and tradeoffs
6. Principles to guide zoning strategies



Theme 1: Understanding the nature of flooding

- Precipitation:
 - Growing near-term issue
 - More widely scattered, more localized, recede more quickly
- Sea level rise and storm surge (SLR/SS)
 - Longer-term, timing is less certain, but could have greater impact
 - More localized in Alewife
 - More difficult to manage water on-site, dams and elevation can provide protection
- Unknowns:
 - Impacts not yet studied – e.g., combined impacts
 - City’s focus is 2070 projections, but only a relative sense of impact – could be sooner or later
 - City has recommended protecting against “10% events,” recovering from “1% events”



Theme 2: How public infrastructure addresses flooding

- City investments in infrastructure:
 - Drainage improvements address precipitation, can't manage SLR/SS
 - Building to 2070 10% projections, 4% where feasible
 - Developers are contributing with new projects
 - Can't entirely build our way out of the issue because there is only so much capacity in the system (including waterways) that needs to collect the water.
 - Because of combined sewer, flooding due to storm sewer backups will have contamination – sewer separation reduces but does not eliminate
- Non-city interventions
 - Properties managing water on-site helps reduce pressure on the infrastructure system
 - Protecting against SLR/SS flooding involves dams, which are a regional effort



Theme 3: Impacts on residential uses

- Access during street flooding:
 - Residents may need to shelter in place – timeframe? (3 days? 5 days?)
 - Base level of need in terms of emergency services, food, water, lighting, ventilation.
- Power outages:
 - Disruption to lighting, ventilation, life safety systems
 - Backup power not always feasible
 - “Passive resilience” design approaches can allow building to function with less power
- Long-term health impacts:
 - Mold exposure, air quality, contaminants
 - Basements are most vulnerable, especially bedrooms – storage or accessory spaces can recover
- Displacement of residents: Temporary or permanent
- Property damage: Value of potential damage is growing as people use basements more intensively
- Mobility/evacuation: Auto-dependency can further complicate flood risks (e.g., Houston), policies should not advantage auto-dependent mobility.



Theme 4: Impacts on commercial uses

- Many businesses can close without immediate health and safety impacts
- CCPR work has shown that costs of economic disruption exceed the cost of property damage
- Small businesses more vulnerable if they lack resources to withstand loss of business, property damage, &c.
- Broader potential risks for businesses that provide necessary goods and services (Chelsea food market noted as example)



Theme 5: Choices and tradeoffs

- Housing stock (market and affordable) is limited. If flooding causes displacement, it impacts the city at large. But if flood protection measures make housing too difficult to create or maintain, can also constrain the supply of suitable housing.
- Most new housing is being created in large buildings, where many residents could be at risk. However, flooding across a neighborhood of smaller homes can have similar effects, and it might be more difficult to implement protection and mitigation measures.
- Residents of public housing or affordable housing might have unique vulnerability due to limited personal resources. However, public housing (and some other large-scale housing) can provide common resources and services to its residents that can also benefit the neighborhood at large.
- Homeowners will make personal choices and tradeoffs. Space is limited, and if basements provide the only opportunity for additional space, homeowners must weigh their relative need for living space, the potential of future flood risk, and the cost of improvement to mitigate risks.
- Renters – whether in affordable or market-rate units – might not have adequate insurance to protect against flooding impacts, but the cost of insurance impacts affordability.



Theme 6: Principles to guide zoning strategies

- Focus on people and lives
 - Because this effort is about land use and development, human needs should be thought of in relation to the physical environment.
 - People will be most directly impacted in their residences, but impacts on commercial properties can have significant economic repercussions.
 - Lower-income people might not have the same networks and resources to cope with the impacts of flooding as higher-income people.
- Avoid being too prescriptive
 - Incrementalism: Given future uncertainty, consider what can be done today that can lead to future improvements (e.g., “solar-ready roofs” as a concept), mindful of the balance of risks and costs
 - Differentiation: Strategies won’t be universally applicable to all scenarios – e.g., new buildings can be elevated, but elevating existing buildings or systems is more difficult
 - Optionality: There should be choices since the economics may be different for different scenarios – e.g., floodproofing in some cases might be to withstand damage, in other cases it might make more sense to replace



Theme 6: Principles to guide zoning strategies (cont.)

- Relative scale of impact of different zoning strategies
 - How much new housing is expected to be built in new development compared to existing housing that will be renovated? How does that break down among small-scale, mid-rise, high-rise?
 - Older buildings do get renovated frequently, new codes might take longer to catch on but eventually they do. Timing is paramount, important to have rules in place before major changes are made.
 - What could reasonably be done to existing housing of different types (small scale, mid-rise, high-rise) if it is incentivized through zoning – e.g., raising buildings?
 - Recent zoning changes exempting basement space from zoning limitations have demonstrated a demand for renovation and greater use of basements.
- Performance vs. prescriptive standards
 - Performance allows for a range of possible solutions, options.
 - Use tested and established frameworks (e.g. LEED resilience credits as a starting point).
 - Performance standards work better with larger development that undergoes review; for standards that apply more universally a prescriptive approach might be needed.
 - How can programmatic approaches (e.g., emergency preparedness plans) be incorporated into zoning?



Theme 6: Principles to guide zoning strategies (cont.)

- Durability and flexibility in changing circumstances
 - Standards might change over time as projections, risks change.
 - Whatever is adopted should have a check-in after some number of years.
- Interaction with other regulatory strategies
 - Floodwater and stormwater management involves other regulatory agencies outside of zoning (FEMA, DPW, ConsComm).
 - Utilities – DPW supposed to review any building with a basement fixture, but difficult when there are no clear requirements.

