



# **Wicked Hot Chelsea**

## *Mapping Urban Heat & Implementing UHI Reduction Strategies*



**MVP**  
Municipal Vulnerability  
Preparedness





# Overview



Project Summary



Urban Heat Island



Community Engagement



Cooling Strategies



Implementation



Boston University School of Public Health



# URBAN HEAT ISLAND



## Impervious Surfaces

Building roofs, roadways, sidewalks, and masonry that absorb heat



## Urban Heat Island Effect (UHI)

Increased ambient air temperatures in dense, urban areas with high concentrations of impervious surfaces



## Extreme Heat

Prolonged period of weather that is much hotter than the average for a particular time and place



## Heat Waves

In Massachusetts, a heat wave is three or more consecutive days above 90°F

In the last 30 years, heat was related to 3 of every 100,000 deaths in Boston; by 2100, that number is expected to increase to 20 per

# URBAN HEAT ISLAND



Throughout Chelsea land surface temperatures are often 75% higher than the ambient air temperatures (2017, Trust for Public Land), as impervious surface cover comprises over 80% of the City's geography.



## Urban heat islands

- Increase summertime energy usage
- Elevate levels of air pollution
- Impair water quality
- Cause heat related illnesses, such as respiratory illness, kidney failure, dehydration, heart disease, and asthma
- Inhibit cognitive functions
- Severely erode the public health of a population with underlying health conditions, due to decades of inequitable public policy, planning, and investment.

*(2020, EPA; 2020, CDC)*



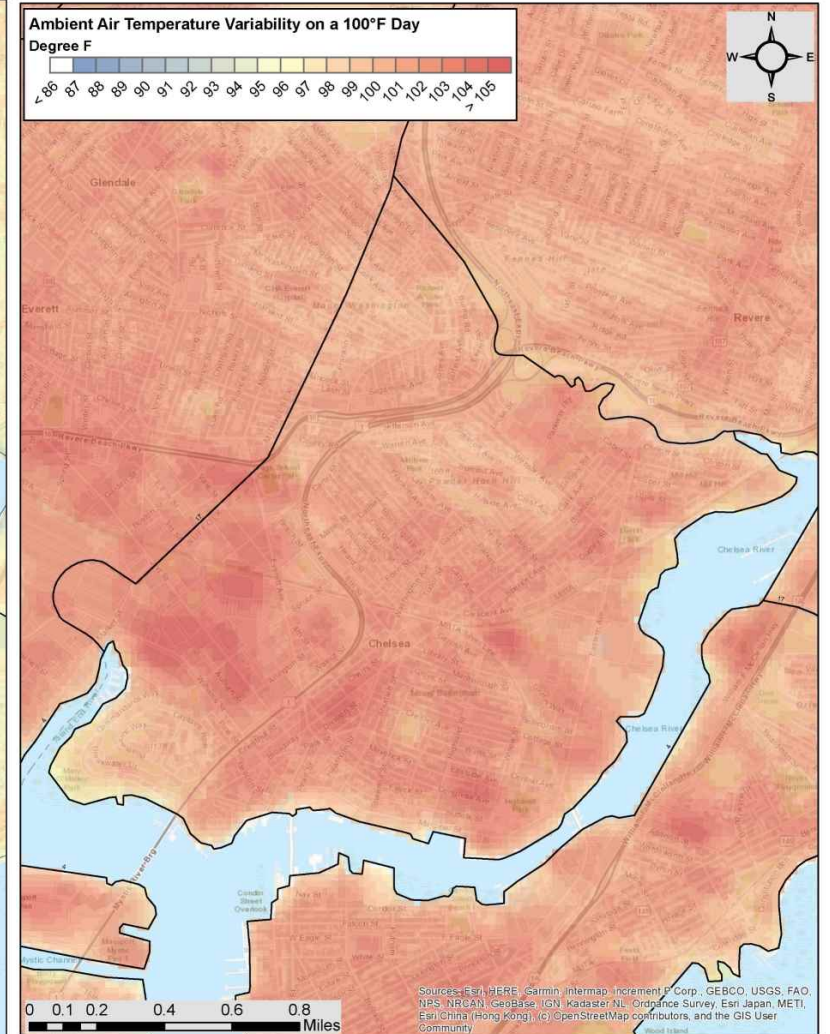
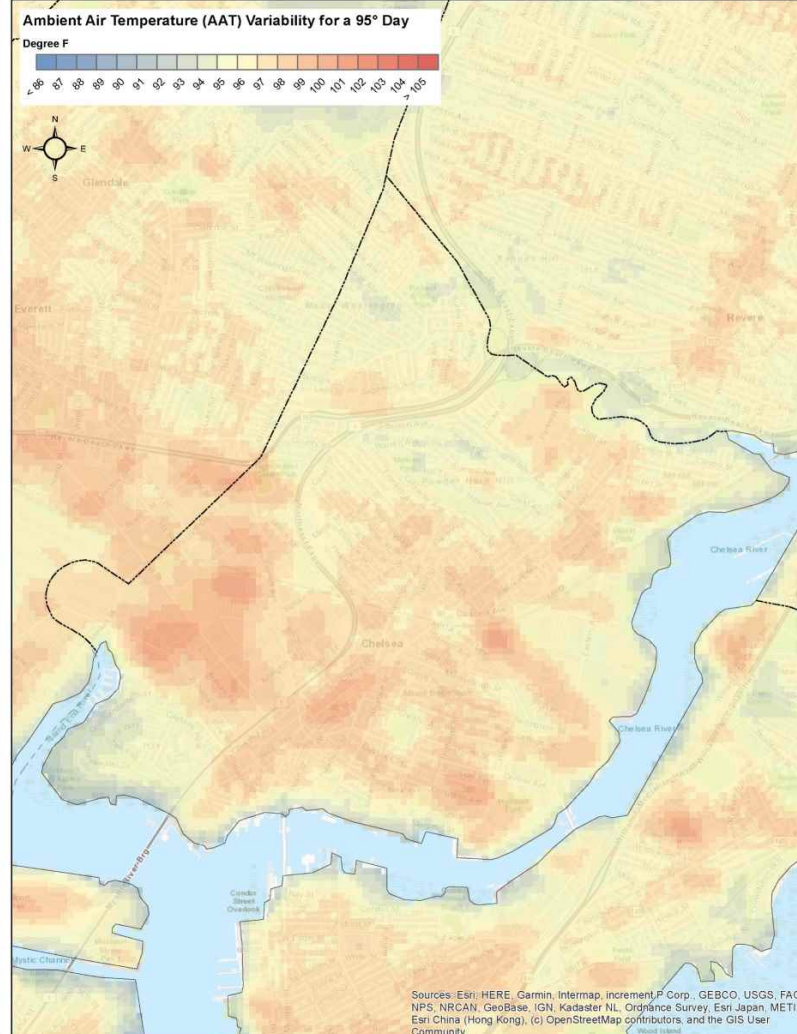
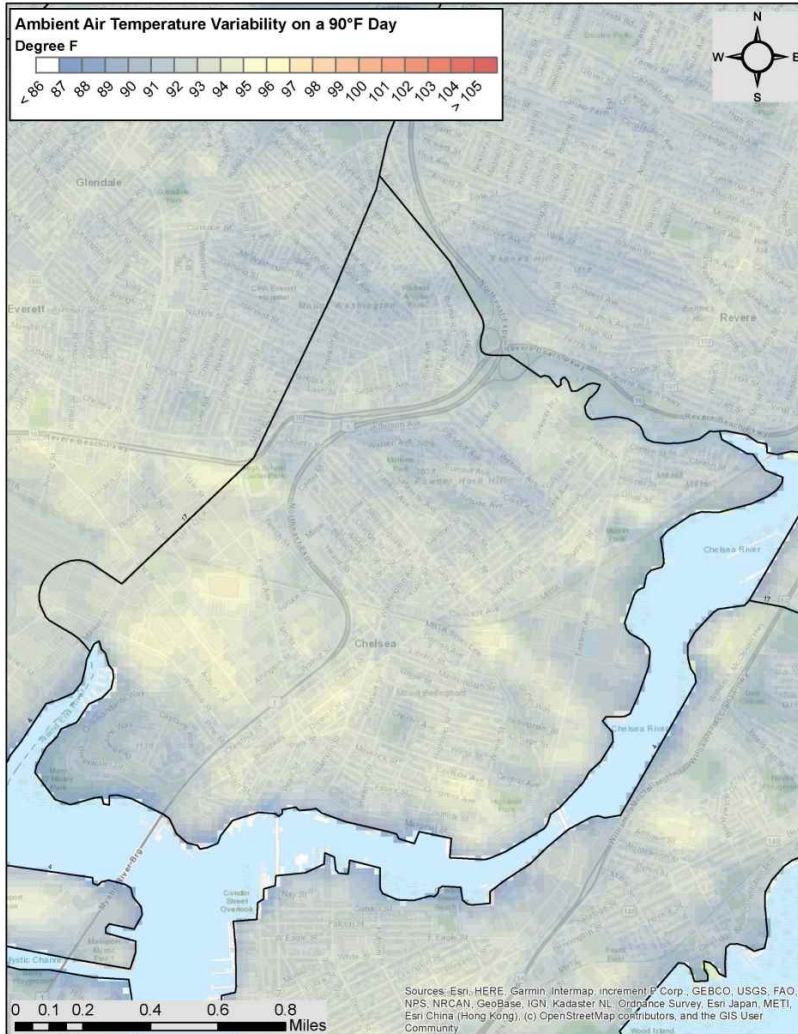
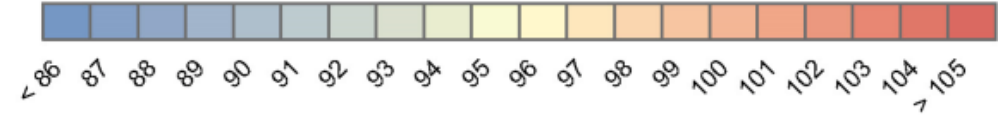
# URBAN HEAT ISLAND



Ambient Air Temperature Variability on Citywide Scale on 90°, 95°, and 100° F days (Left to Right)

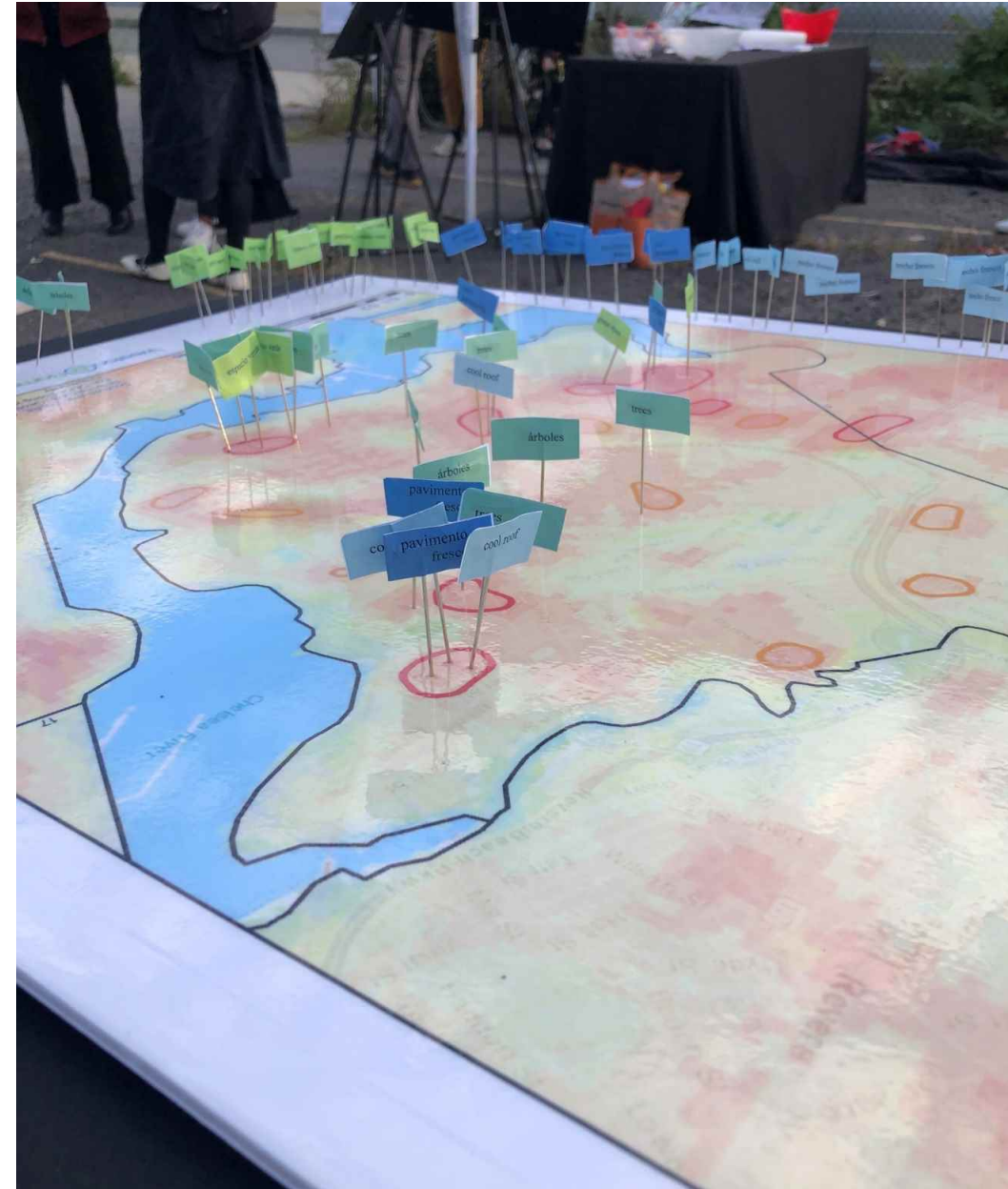
### Ambient Air Temperature (AAT) Variability for a 95° Day

Degree F





# COMMUNITY ENGAGEMENT



- ~40,000 residents
- Environmental Justice communities
- 67% Latin-x
- > 45% foreign born
- 54% Spanish as a first language



# COOLING STRATEGIES



## Increase tree canopy

- Reduces Urban Heat Island impacts
- Improved air quality
- Improved health and well-being of residents



## Reduce impervious cover

- Reduces Urban Heat Island impacts
- Increases walkability and cyclability of City
- Improved health and well-being of residents



## Light colored paving and roofing materials

- Reduces Urban Heat Island impacts
- Promotes local artists
- Increases safety



## Green infrastructure in ROW and open spaces

- Reduces Urban Heat Island impacts
- Mitigates flooding
- Improved water quality
- Improved health and well-being of residents

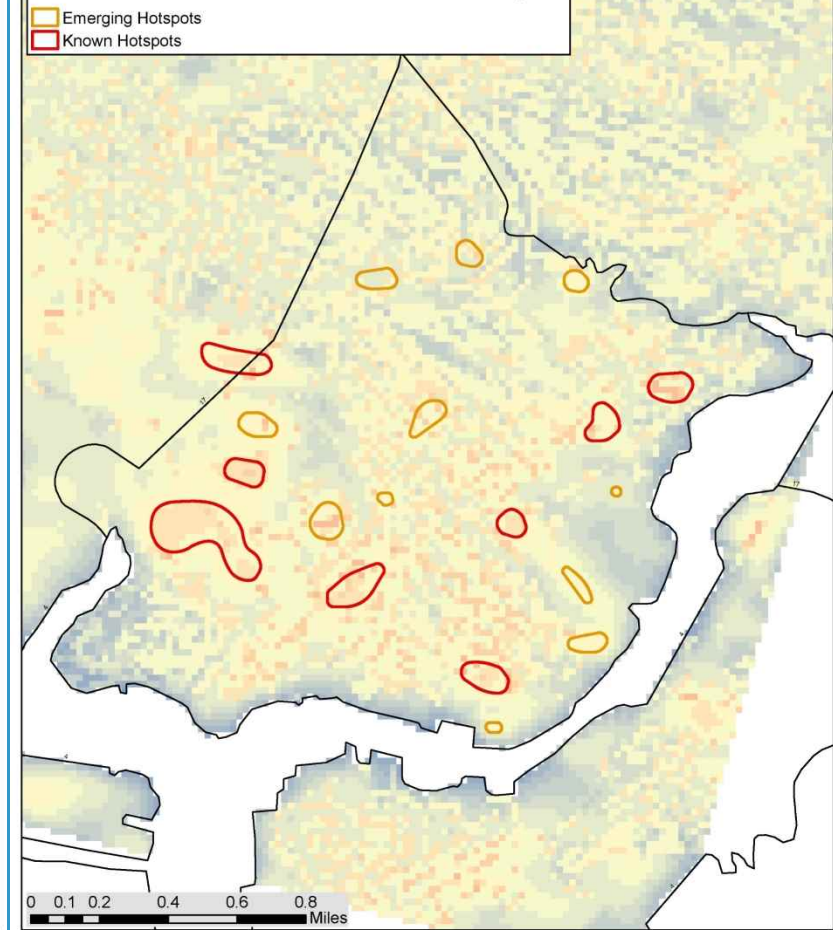
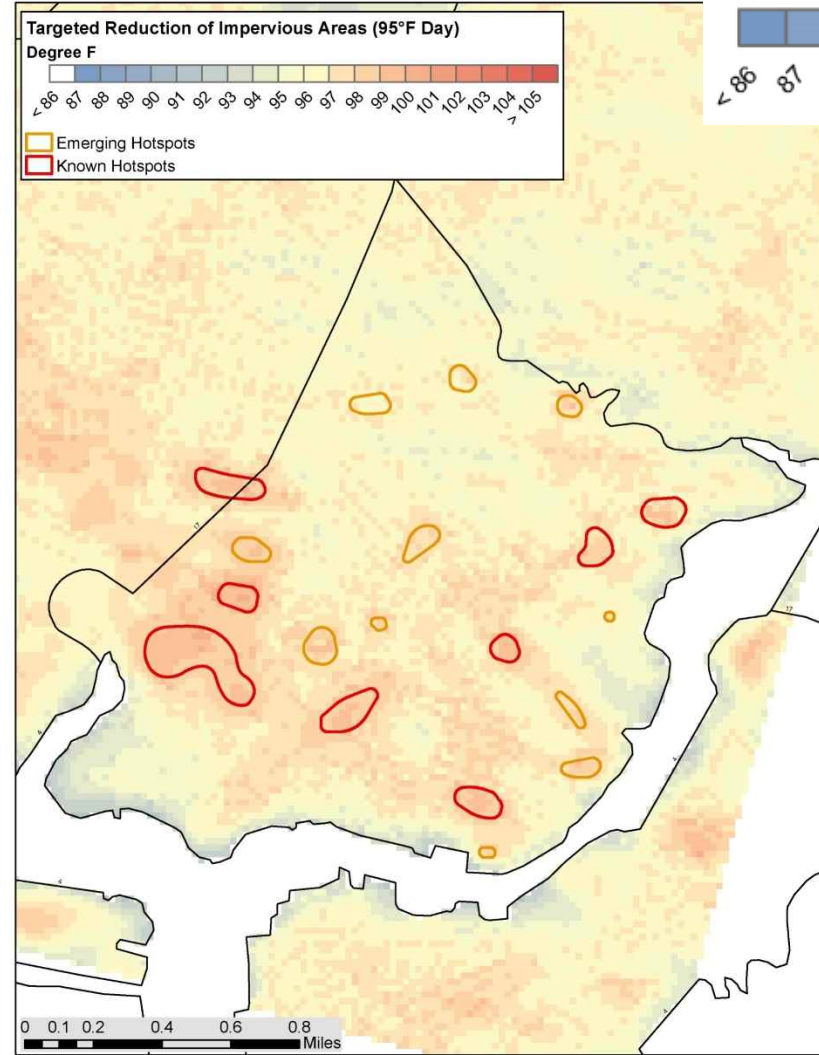
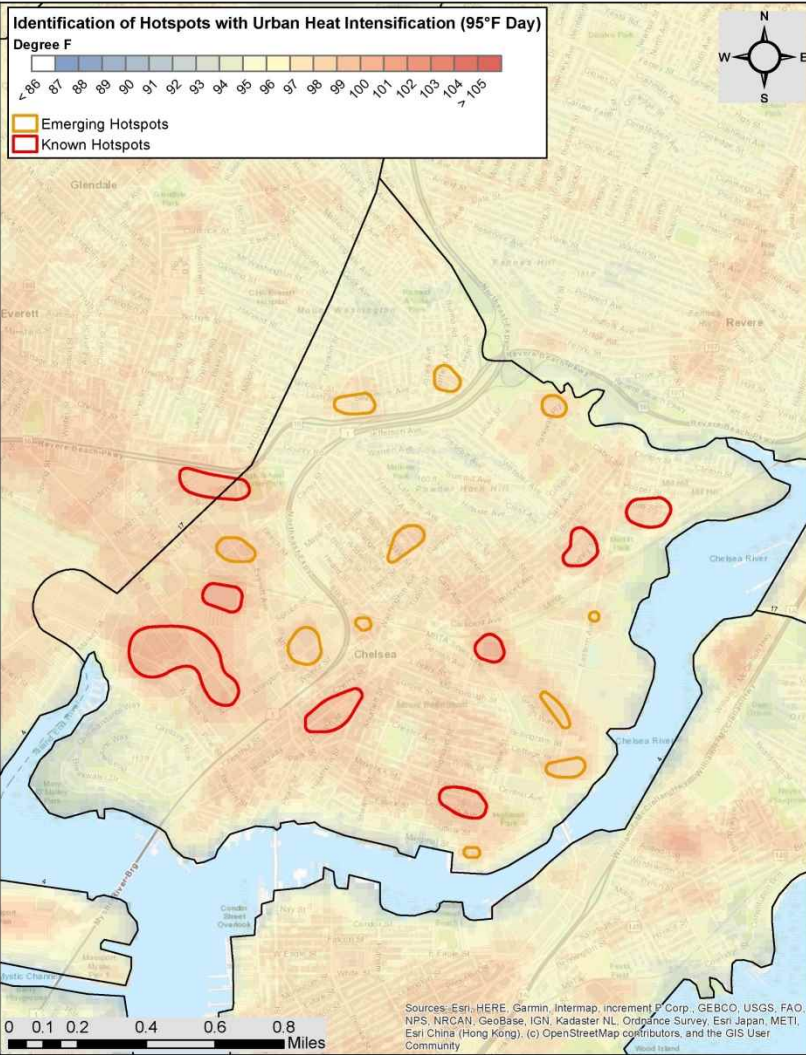
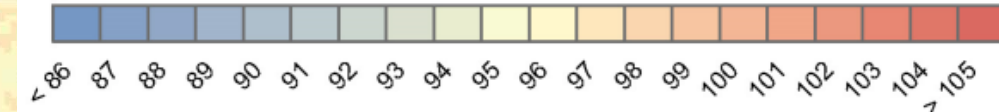


# COOLING STRATEGIES



## Ambient Air Temperature (AAT) Variability for a 95° Day

Degree F



Existing Conditions

Impervious Reduction  
City-wide 10%

Increase Tree Canopy  
City-wide 10%



# IMPLEMENTATION



The pilot design included:

- **Reflective roof** coating technologies
- **Reconstructed roadways and crossings** with light pavement aggregates and reflective surface treatments
- **Reconstructed sidewalks and curb** with right-of-way filtration swales
- **Added tree canopy** and shade features.

*These systems address community feedback over surface condition, traffic speed/safety, and shading.*



## Pilot Project: Boys & Girls Club



# IMPLEMENTATION



## Co-benefits of the proposed scope include:

- Enriching important community spaces around the Boys & Girls Club of Chelsea
- Fixing sidewalk and roadway surface consistency issues, improving drainage
- Improving pedestrian safety in crossings and walks
- Safety improvements through traffic calming



Cool Solutions / Soluciones Frescas

Weston & Sampson  
transform your environment



# IMPLEMENTATION




Home // Local Coverage // Health


## In Chelsea, cooling an urban heat island one block at a time

04:34

May 12, 2022 By Martha Rebinget



 Increase tree canopy

 Reduce impervious surfaces



# IMPLEMENTATION



Use lighter color paving materials



High Velocity Impact Method (HVMI) Blast Treatment

Traditional hot-mix asphalt



# IMPLEMENTATION



**Increase green infrastructure in public right-of-way and public open spaces**



# IMPLEMENTATION



The “Cool Block” pilot project serves as a proof-of-concept for modeling urban heat, identifying heat mitigation strategies that are informed by the community, and testing and implementing new strategies. A key part of climate resilience is monitoring, so the work continues in the City of Chelsea. BU and Greenroots are working to place ambient and surface sensors throughout the city and in this pilot area to monitor the impacts of our work here.



Boston University School of Public Health



- ★ Ambient sensors
- Surface sensors (envloggers and/or handheld sensors)



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Bellingham Sq. & Bosson Playground (left), “Cool Block” at Maverick, Willow, Highland and Congress Streets (middle), Quigley Park (right)





# Wicked Hot Chelsea

*Thank you!*

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