

Greater Baltimore Wilderness Coalition:

Green Infrastructure for Regional Resilience and Equity



Kristin Baja
Climate and Resilience Planner
City of Baltimore, Office of Sustainability



Overview

- Baltimore
- Climate Impacts
- Resiliency
- Green Infrastructure
- Equity

Baltimore City Intro

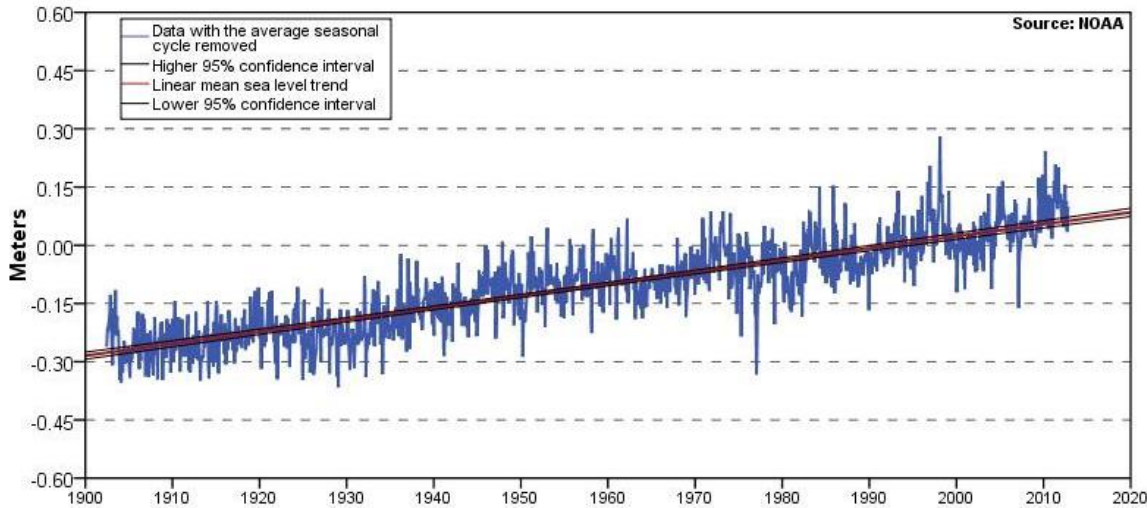


- Most heavily developed area in Maryland- population 622,000
- Port and waterfront are extremely important assets
- Home to many Universities and Health Institutions
- Known as the City of Neighborhoods
- 64% African American, 4% Hispanic or Latino, 31% White

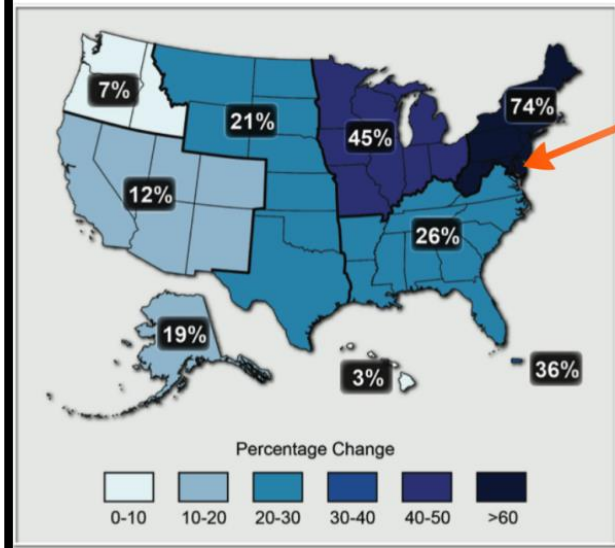


Baltimore, MD 3.08 +/- 0.15 mm/yr

Source: NOAA

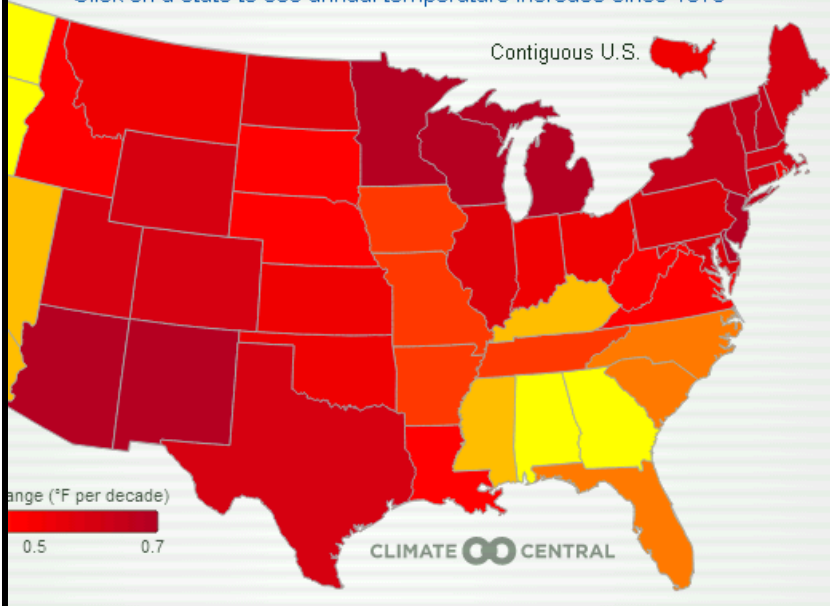


Percentage Change in Very Heavy Precipitation



Some States Warming at Twice Global Rate

Click on a state to see annual temperature increase since 1970



Quick Review of Hazards



Coastal Storms

more severe

Floods

more extensive

Severe Thunderstorms

more severe

Wind

increase intensity

Winter Storms

less snow, more flooding

Extreme Heat/Drought

more severe and intense

Sea Level Rise

increased threat

Air Quality

lower quality and increase risk

Baltimore's Unique Approach



All Hazard Mitigation Plan

(Current and Historical Hazards)

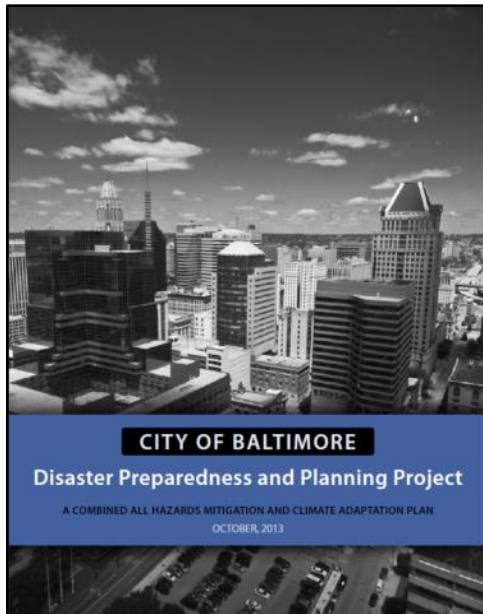
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Resilience

Climate Adaptation Plan


(Adapt to new and predicted climate conditions)



100 BALTIMORE DISASTER PREPAREDNESS AND PLANNING PROJECT
STRATEGIES AND ACTIONS 101

IN-15 Conduct an assessment that evaluates and improves all pipes' ability to withstand extreme heat and cold

Much of Baltimore's water system is dated and in need of upgrades. It is important to build extreme weather resilience and disaster prevention into water and wastewater systems by using both adaptation and mitigation actions. Additionally, structural and infrastructural upgrades must be made to reduce loss of water supply from the distribution system.



1. Replace old and malfunctioning pipes with new pipes or retrofit existing pipes with new lining
Pipes that have already begun experiencing problems, or older pipes which are more vulnerable to the impacts of hazards, should be upgraded using the best available technology.

2. Evaluate and utilize new technology that allows for greater flexibility in pipes as they are replaced
It is essential to prepare for future changes in hazard events and proactively upgrade pipe systems to prevent cracking and bursting.

| IMPLEMENTATION GUIDELINES | |
|----------------------------------|--|
| Lead Agency | DPW |
| Stakeholders | DOT, DPW, Water and Wastewater Utilities |
| Alignment with Goals | Goal 3 |
| Connection with Existing Efforts | GAP, CRP, MD DNR, ESF-3, ESF-4 |
| Timeline | |

Baltimore Water Pipe Source: Baltimorean

IN-16 Enhance and expand stormwater infrastructure and systems

Future changes in precipitation frequency and intensity may require reconsideration of the design of existing stormwater infrastructure systems.

Increase resiliency and disaster prevention measures related to stormwater systems by enhancing drainage systems in stream corridors and improving and repairing stormwater conveyance pipes and outfalls.

1. Implement the requirements of Baltimore's MS4 (separate stormwater and sewer system) permit (5)
The City of Baltimore operates under a Municipal Separate Stormwater and Sewer System (MS4) permit, which protects water-quality and requires that Baltimore prevent pollution as much as possible. It is critical that the requirements of these permits are fully met.

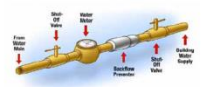
2. Prioritize storm drain upgrades and replacement in areas with recurring flooding (5)
While proximity to a floodplain or floodway can increase vulnerability to flooding, certain measures can reduce this vulnerability. Inadequate or older pipes, which cannot accommodate the excessive amounts of stormwater, should be upgraded so as to handle extreme rainfall and storm surge events.

3. Install backflow-prevention devices or other appropriate technology along waterfront to reduce flood risk (M-1)
Backflow-prevention devices are used to ensure that water does not flow back through drainage infrastructure. Through the installation of backflow-prevention devices, the City can improve the performance of the drainage network and prevent risk of flooding impact along the waterfront.

4. Preserve and protect natural drainage corridors (5)
It is important to utilize natural drainage corridors and green infrastructure to capture more stormwater runoff and enhance the ability of the existing infrastructure to cope with environmental changes.

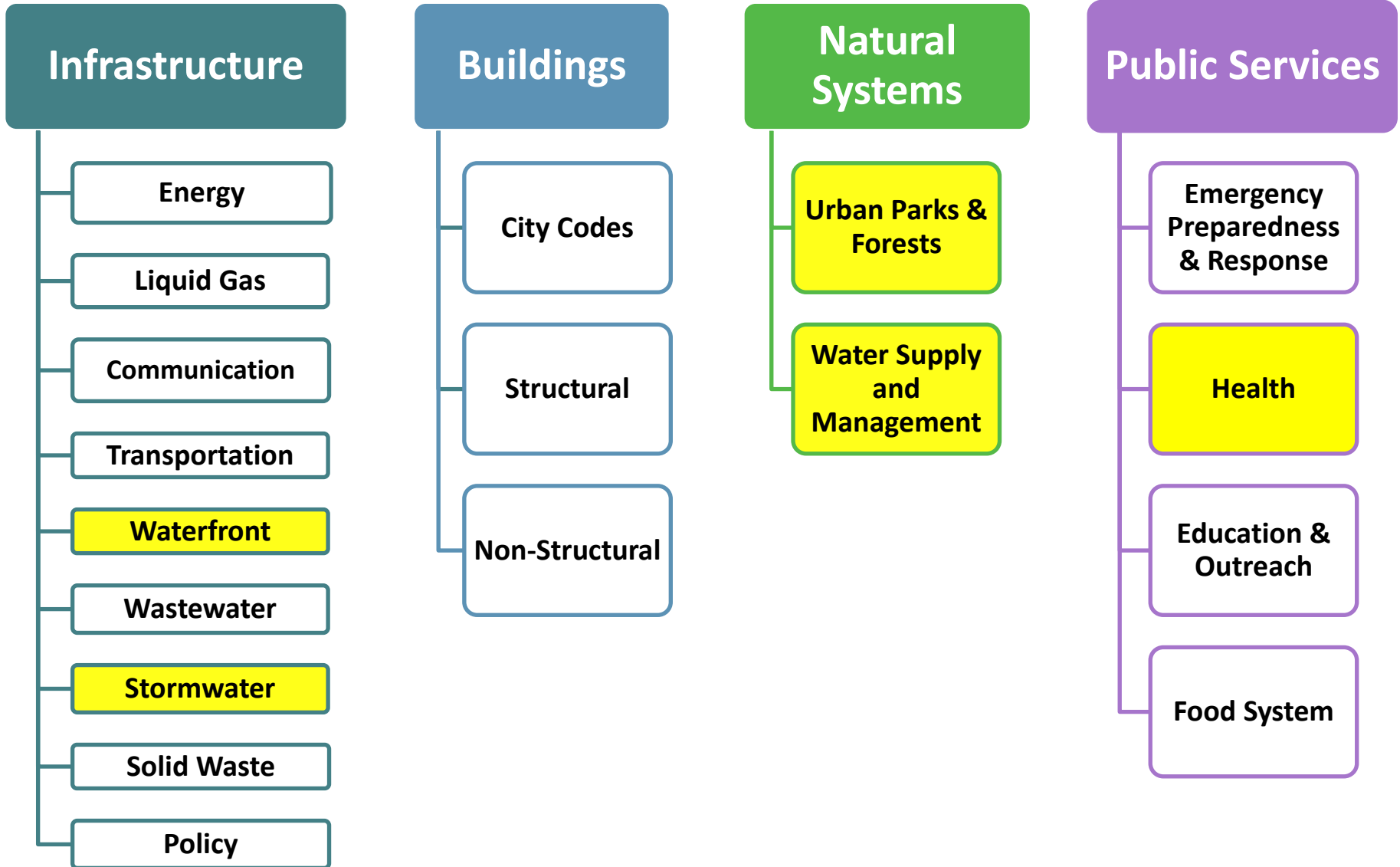
5. Review and revise storm drain design on a continuous basis, to accommodate projected changes in intense rainfall (O)
The City's storm drains will require continual revision to incorporate new and projected changes in intense rainfall. This will ensure that the storm drains maintain adequate capacity.

| IMPLEMENTATION GUIDELINES | |
|----------------------------------|---|
| Lead Agency | DPW |
| Stakeholders | Community Group, DOT, DPW, MCHM, MCHRE, NSGM, Private Developer, Stormwater Utility |
| Alignment with Goals | Goals 1, 3, and 6 |
| Connection with Existing Efforts | CRP, MD DNR |
| Timeline | |



Backflow Preventer Source: DcmPumpingNYC

Structure





Using Green Infrastructure as part of a comprehensive strategy for rebuilding Baltimore

- Provides economic, environmental, and social benefits
- Capacity to support the missions and goals of multiple agencies by addressing issues including stormwater management, health issues, and economic development.



Vacants to Values



Vacants to Values

- Demolish 4,000 vacant, blighted buildings over the next ten years, and create new green spaces in their place
- Cleaning up and redeveloping these properties can help raise property values, create community amenities, increase local tax revenue, and attract new residents and businesses

power in
dirt

Power in Dirt

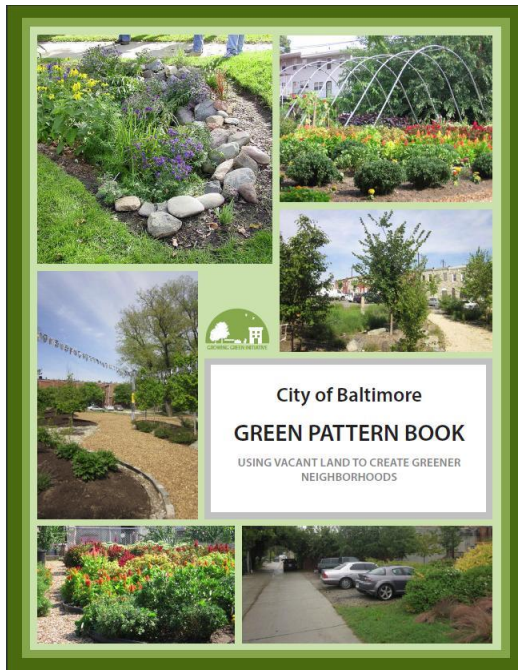
- Helps residents and businesses adopt city-owned vacant lots for urban greening and gardening
- Revitalizes communities and reduces the impacts of poverty.
- Since started in 2011, over 1100 lots have been adopted, totaling 49 acres. Nine of these acres are growing food.
- Communities with adopted lots have seen a 35 percent overall reduction in service requests to clean up trash.



Growing Green



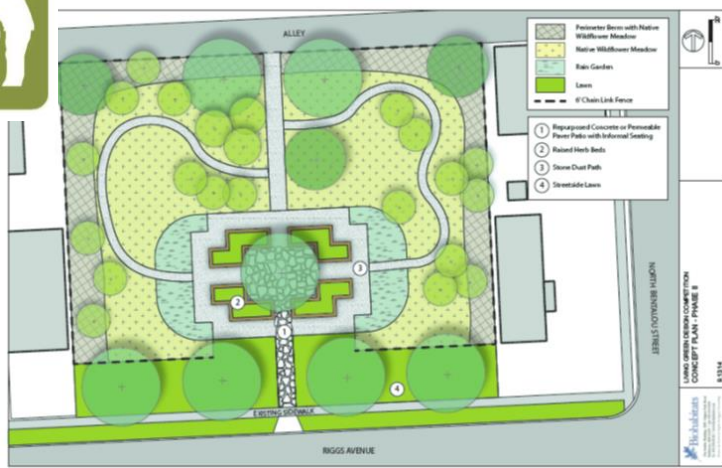
Effort focused on re-using vacant land to green neighborhoods, reduce stormwater runoff, grow food, and create community spaces that mitigate the negative impacts of vacant properties



Growing Green Competition



Bridgeview Greenlawn Community



Real Food Farm's Flower Factory



SITE PLAN (WITHOUT TREES)



32nd and Harford Road Gateway Garden



Civic Work's Green Parking Lot



Whole Block Approach

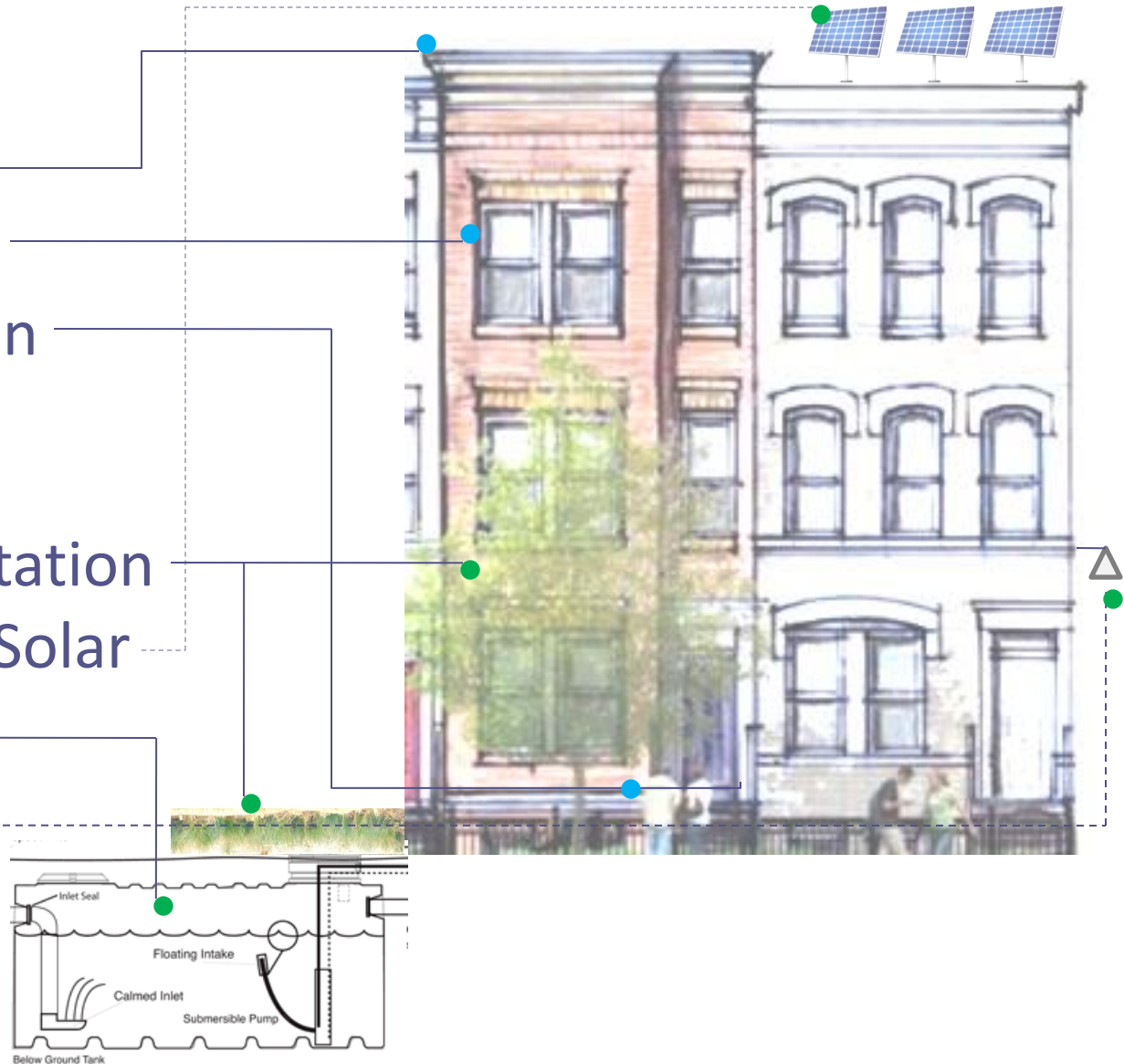


Energy

- Cool Roofs
- Weatherization
- Energy Education

Greening

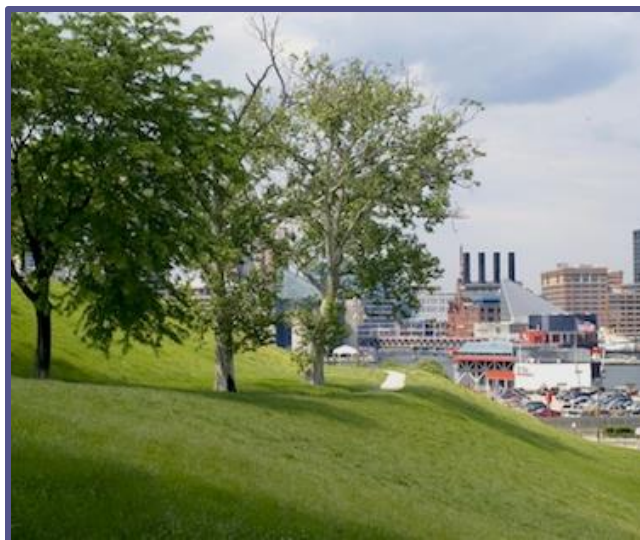
- Trees and Vegetation
- Green Roofs & Solar
- Stormwater
- Heat sensors





Urban Heat Island Sensors

- Track changes in surface temperatures
- Block by block actual and real-feel temperatures
- Show that trees and greening properly placed around buildings can significantly reduce heat



Tree Database/Spatial Analysis Tool

- Climate Conditions now and predicted
- Plan for new species and hardiness zones
- Maintenance, soil and planting requirements
- Overlay areas at risk of specific climate threats, soils, demographic information, water/salt water, and pest information

Tree Canopy



TreeBaltimore

- Goal of 40% tree canopy cover by 2030
- Partner with individual homeowners as well as communities, schools, and businesses
- Over half of the environmental values are provided by seven species (based on tree structure and abundance): red maple, linden, Norway maple, London plane, green ash, sugar & silver maple

TreeKeepers

- Several levels and types of classes that teach citizens to care for their trees and environment

Weed Warriors

- Removal of invasive species by trained environmental stewards



Stormwater Management

Resiliency & Restoration

- Stream Restoration
- Stormwater Capture Systems
- Impervious Surface Removal
- Erosion Control
- DAMS
- Wastewater Treatment Plants
- Blue Alley Projects
- Replace and upgrade pipes



Urban Agriculture



- Soil Safety Policy and Guidance Document
- Two new farm leases and multiple other sites under consideration
- Assessing underused parkland for flower farming
- Using funds for soil testing to support new farm sites
- Bill to reduce tax burden on urban farms

Equity



- Prioritize neighborhoods with highest vulnerability to impacts from climate change
- Provide job training and green job opportunities
- Improve water and air quality (health)
- Economic benefit- lower electricity costs





Thank you!

Kristin Baja
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Kristin.Baja@baltimorecity.gov