

Mobile Air Quality Mapping in the District

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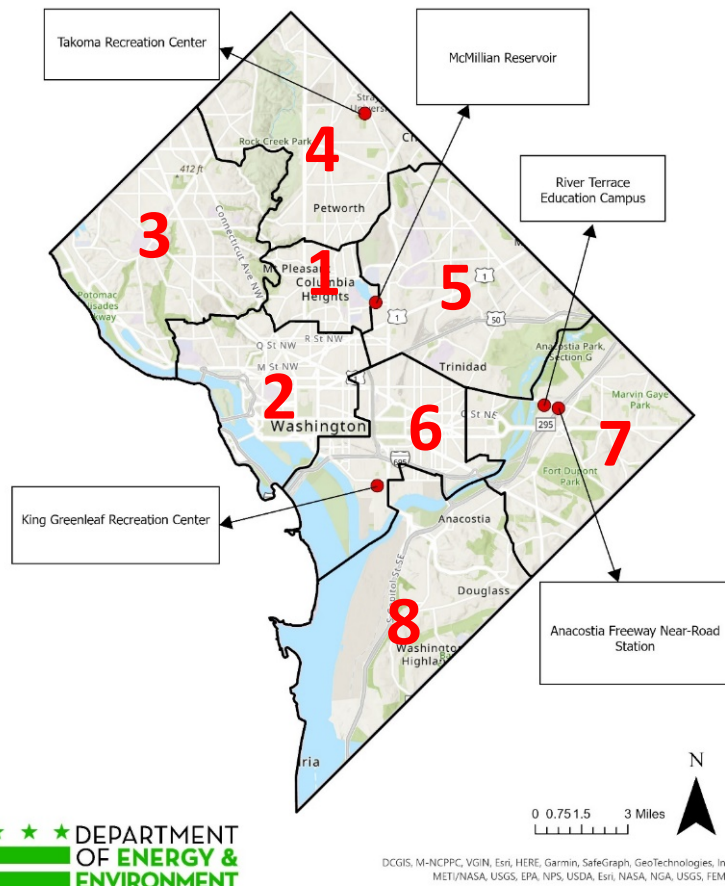
Branch Chief, Air Quality Planning Branch, DOEE

December 2023



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Washington DC's Ambient Air Monitoring Network



Site Location	Address	Location Setting*
Takoma Rec Center	301 Van Buren St NW	
McMillan Reservoir	2500 First St NW	
River Terrace Education Campus	405 Anacostia Ave NE	Historically overburdened community
Anacostia Freeway Near-Road Station	Benning Rd NE @ I-295 On-ramp	Historically overburdened community
King Greenleaf Rec Center	201 N St SW	Historically overburdened community
Ward 8 Site	TBD	Historically overburdened community

*All stations considered urban

What is DOEE doing to Assess Air Quality in Overburdened Communities?

- Reorienting and expanding the regulatory network
 - Currently 3 (of 5) stations in overburdened communities
 - Another station in Ward 8 this fiscal year
- Community-scale hyper-local air monitoring to identify hot-spots
 - Mobile platform monitoring- Aclima Pilot Study
 - Emerging technology low-cost sensors
 - 3 park bench emerging technology air monitoring stations
- Community Involvement
 - Stakeholder engagement on Ward 8 location
 - Shared governance for 3 park-bench monitor
 - Training “Air Ambassadors” to understand local air quality issues
 - Examining Air Ambassadors as an avenue for low-cost-sensor network hosting



Introduction to Aclima Mobile Monitoring

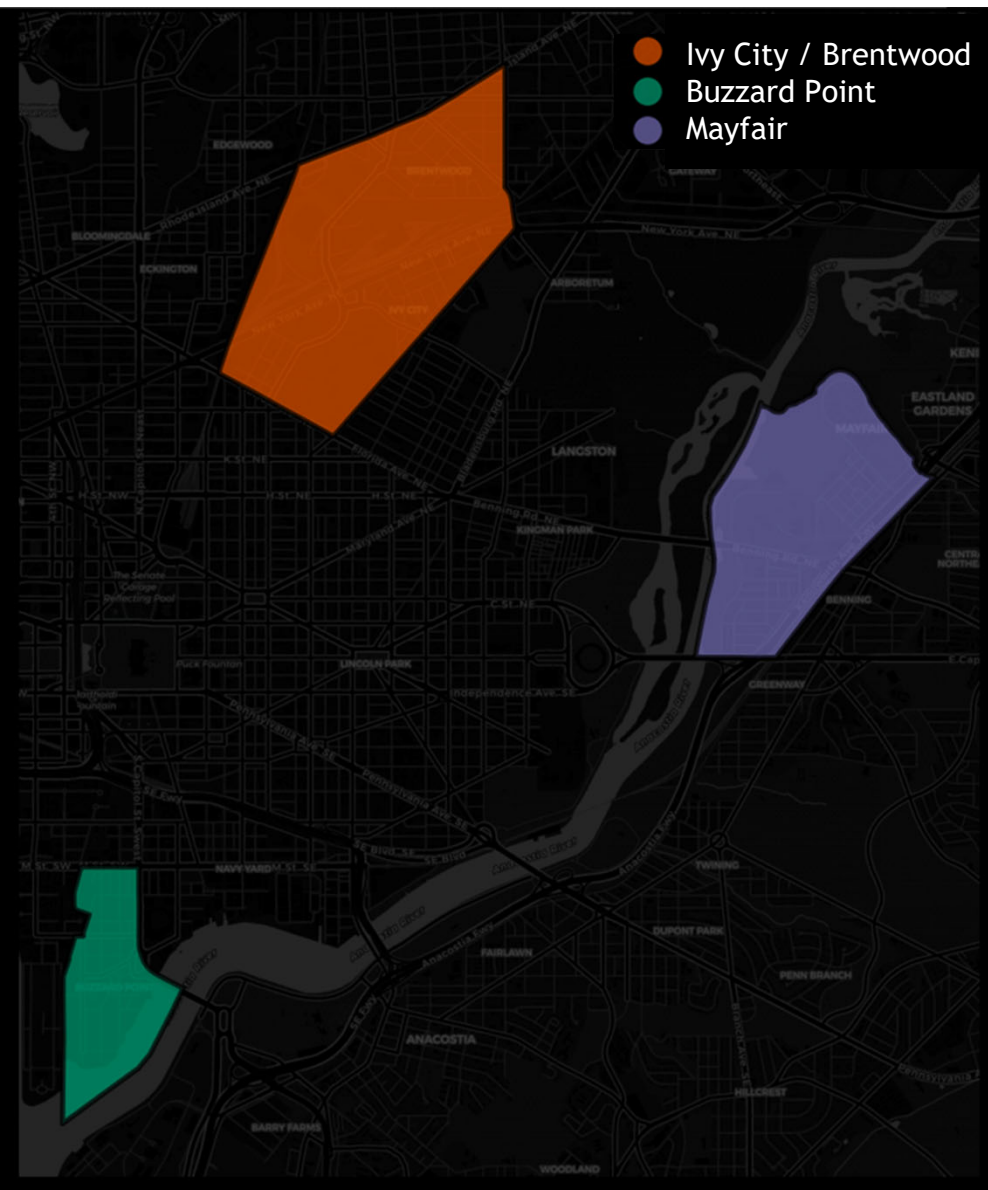
Aclima uses mobile mapping and analysis to generate maps that show typical pollution concentrations with high spatial resolution (**hyperlocal maps**)

These maps highlight typical concentrations over a defined measurement period, in this case two weeks for the DC Pilot, illustrating high and low pollution concentrations at the street level.

All 1-second measurements are assigned to a ~100m road segment based on the location (latitude and longitude) of the data point.



1 second data points as red dots aligned to the route of the car.



PILOT OVERVIEW

In June 2023, Aclima conducted two weeks of hyperlocal mobile air quality measurement across 3 neighborhoods specified by DC-DOEE:

Mayfair, Ivy City/Brentwood, and Buzzard Point (5 census tracts total).

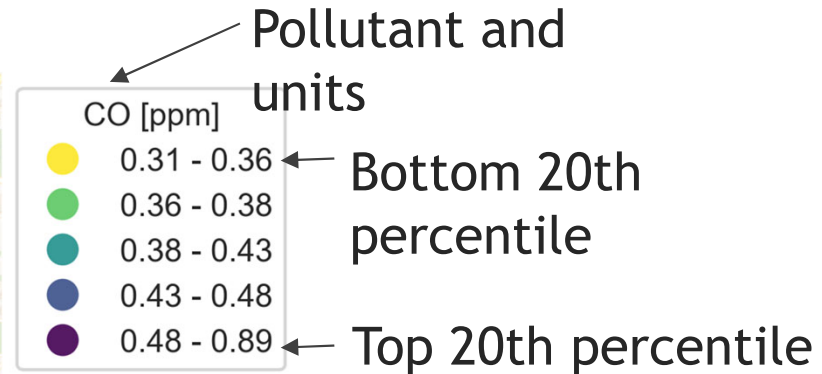
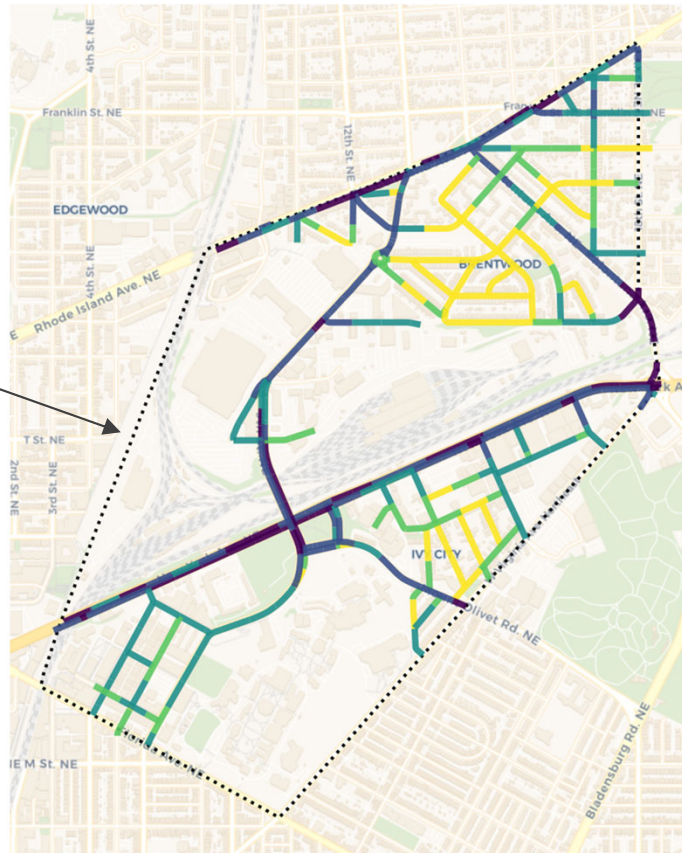
Measurement included:

Carbon dioxide, fine particulate matter, nitrogen dioxide, carbon monoxide, ozone, black carbon, methane, and TVOCs.

How to interpret the following maps:

Measurements collected June 15 - 28, 2023

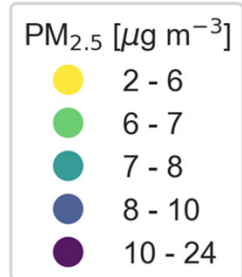
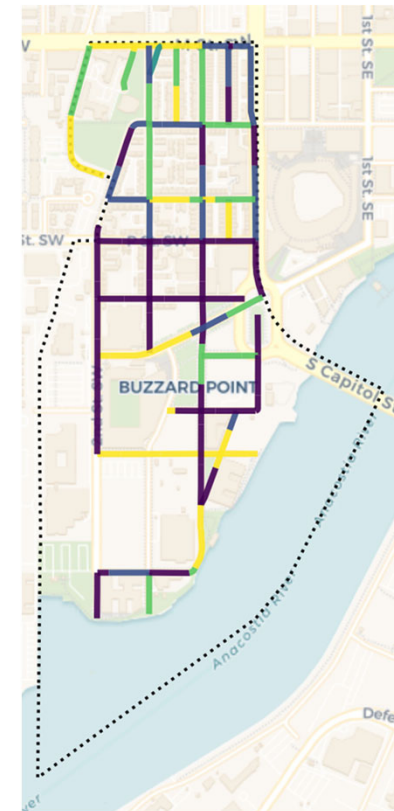
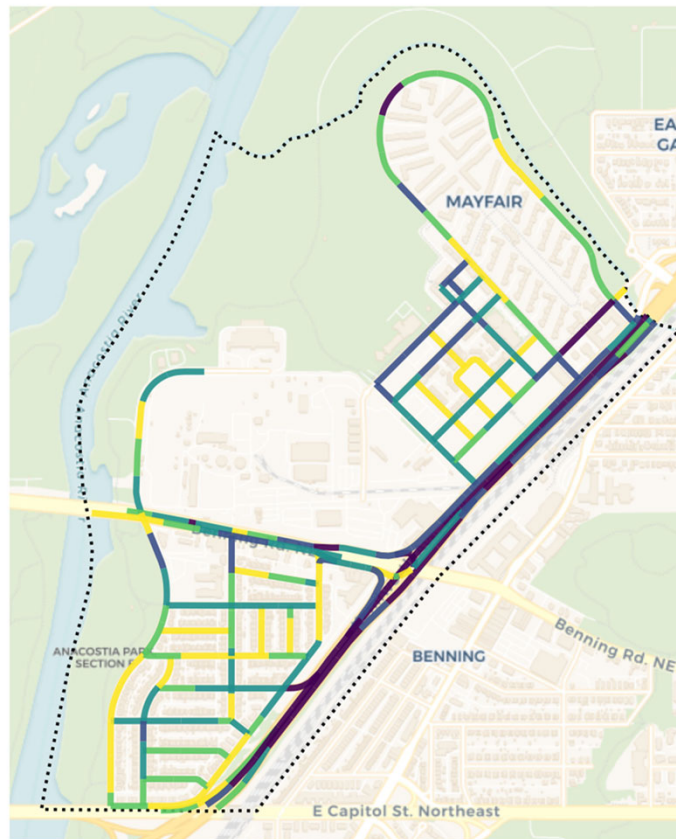
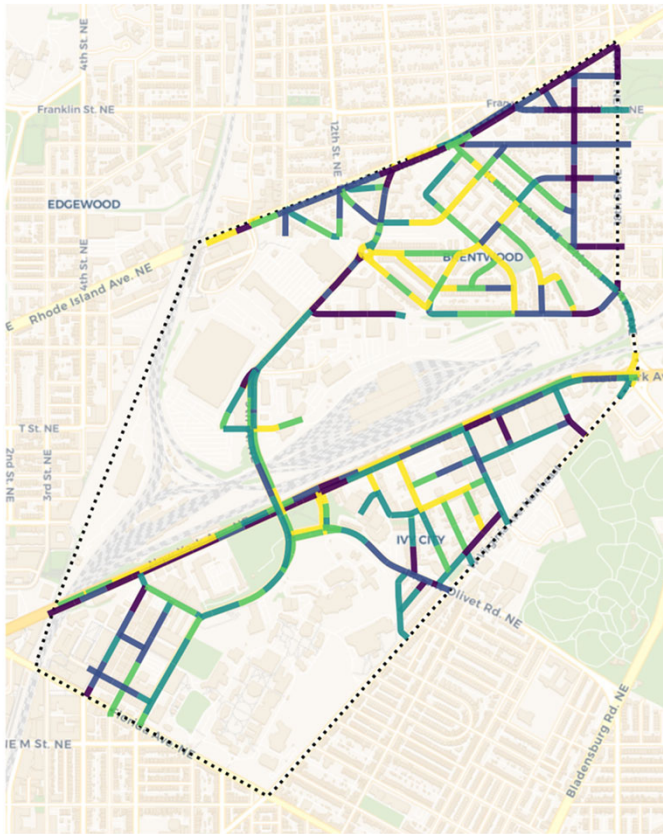
Measurement area bounds



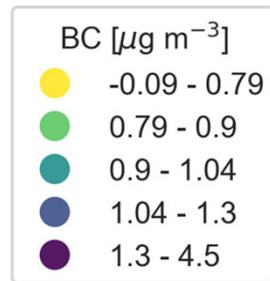
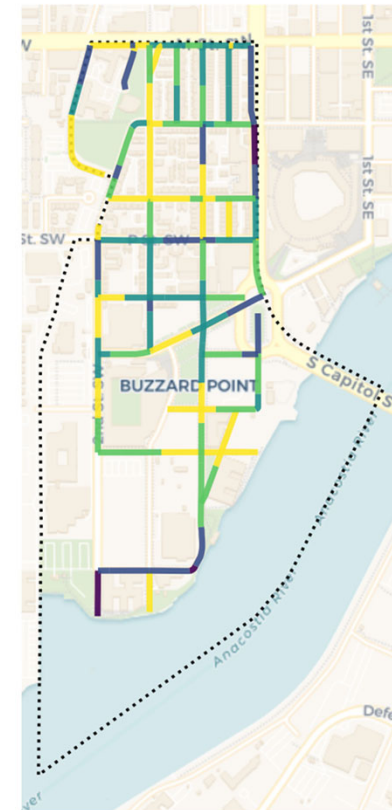
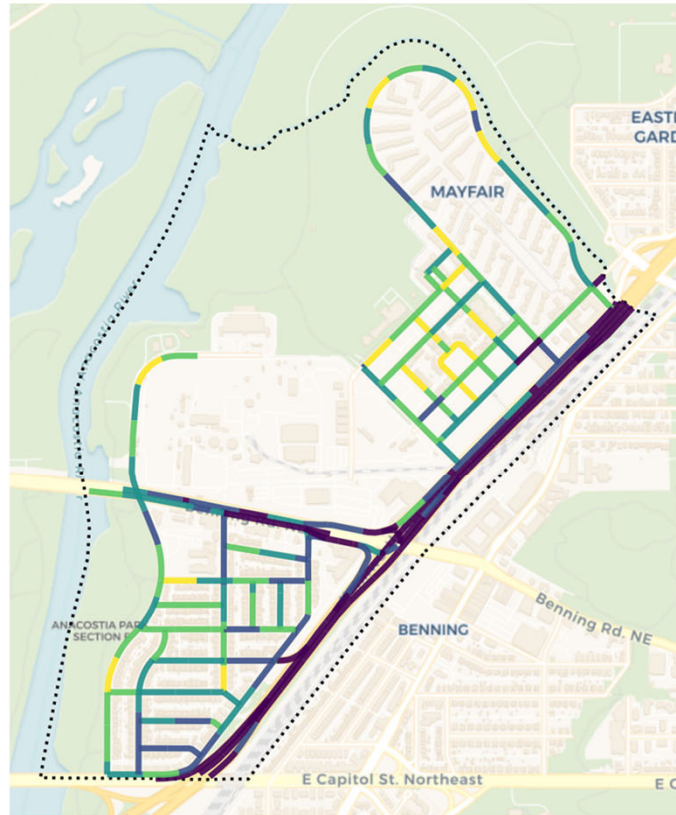
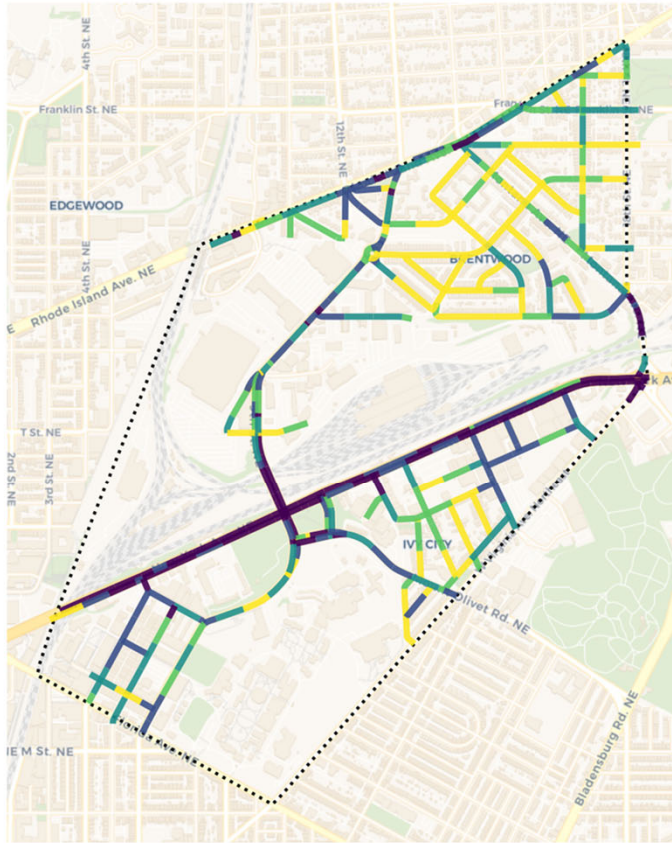
Median concentration color scale grouped by 20th percentile intervals

PM_{2.5} (Fine particulate matter)

Standard: 35 $\mu\text{g}/\text{m}^3$ (24 hr); 12 $\mu\text{g}/\text{m}^3$ (annual)

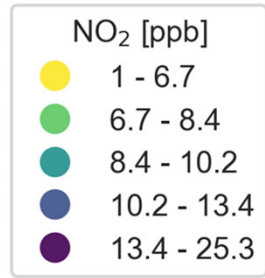
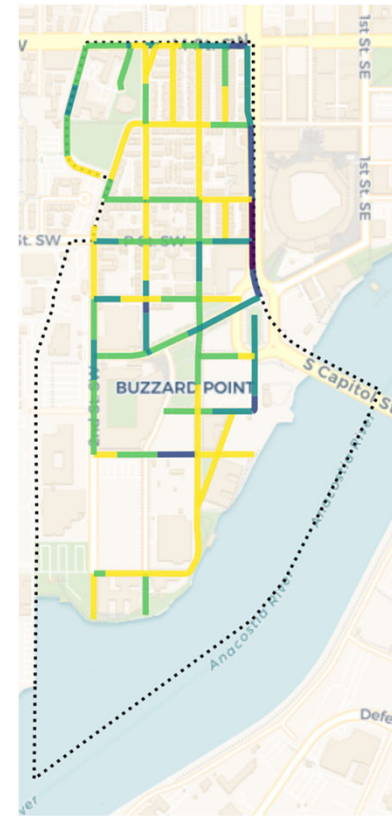
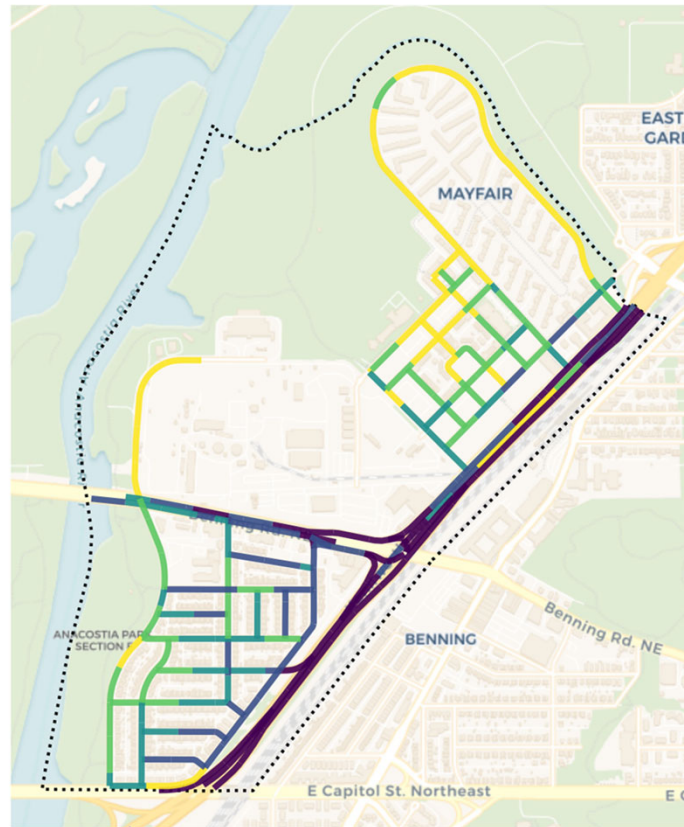
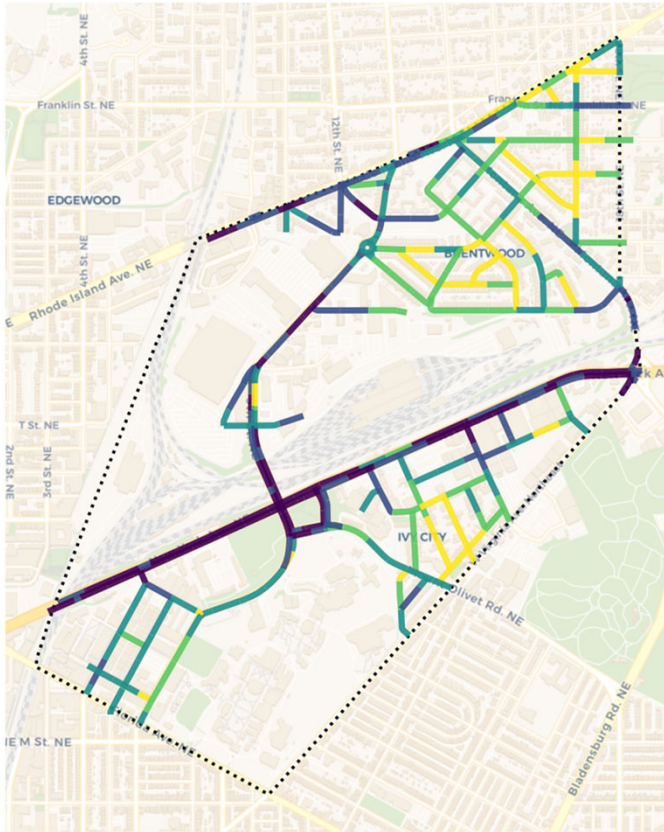


Black Carbon (BC)



Nitrogen Dioxide (NO₂)

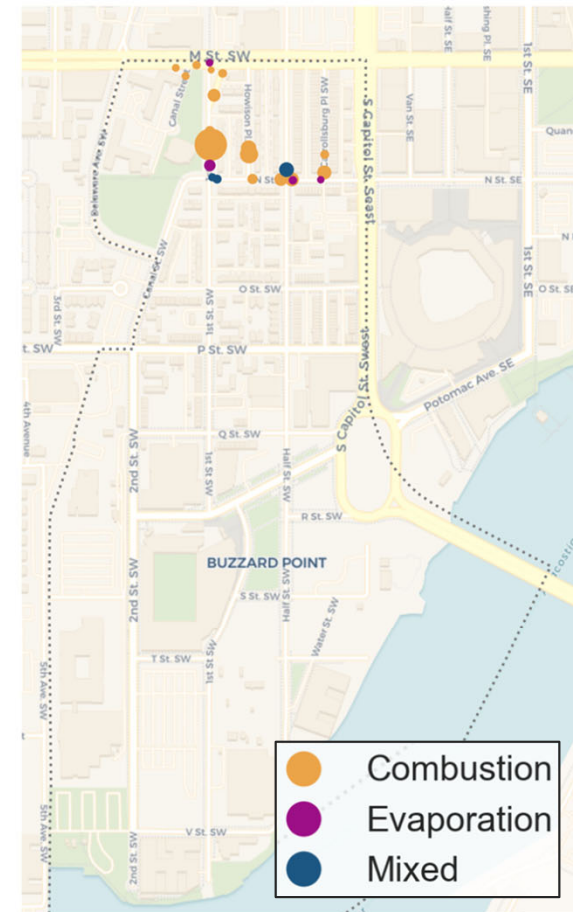
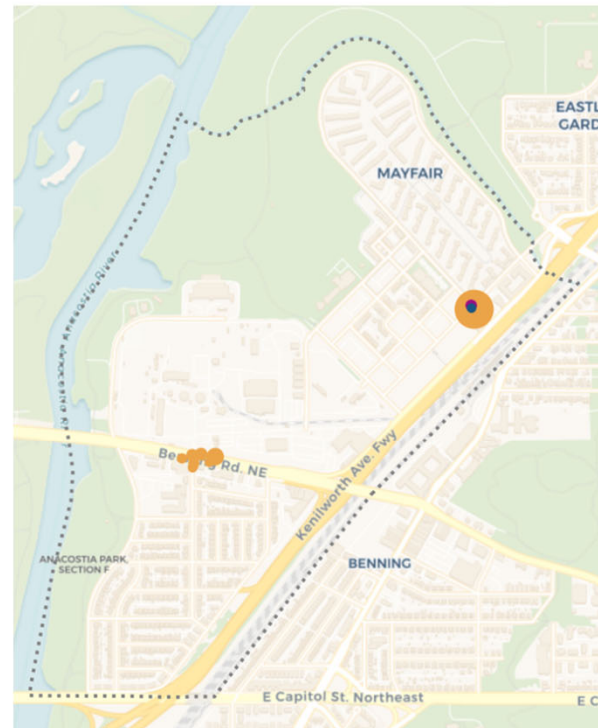
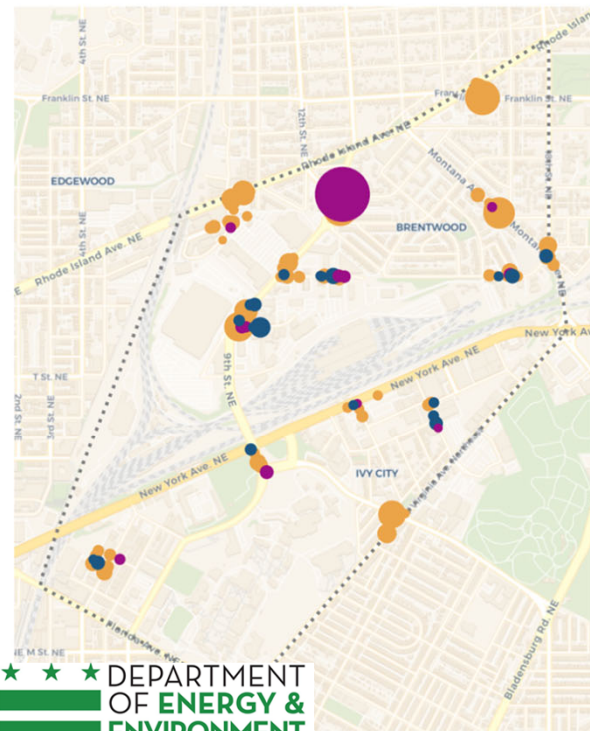
Standard: 100 ppb (1 hr); 53 ppb (annual)



Total Volatile Organic Compounds (TVOC) measurements

Combustion-related (orange), off-gassing-related (purple), and a combination of the two (blue) TVOC enhancements

Size of the circle increases with concentration



Questions

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