

LAF Deb Mitchell Research Grant

Philadelphia, PA

This study focused on a quantitative assessment of heavy metals and polycyclic aromatic hydrocarbons accumulations in Philadelphia’s public landscapes in order to better understand exposure to near-road pollution.

As urban populations continue to grow, landscapes that are located in close proximity to major highways are becoming a more familiar location for public parks and activation. Major roadways are primary sources for traffic-related air pollution (TRAP), with numerous negative health outcomes linked to TRAP.

Based in Philadelphia along a segment of the I-95 corridor, the study evaluates the dangers to quality of life, air quality, and the human body in relation to public spaces within close proximity of major roadways. Sites near sources of traffic pollution are prone to the settlement of airborne pollutants, creating secondary inhalation and tactile exposure of particulate matter (PM). Accumulation of adverse PM can occur in absorptive materials, such as soils in community gardens, and on interactive surfaces, such as play equipment. By utilizing a variety of research methods, OJBLAB and Braun Intertec are collecting and interpreting data to better understand how quickly sites are becoming permanently impacted by settled PM in soil and collected on surfaces. Field-testing, including monitoring air quality and conducting soil and swab testing, interdisciplinary engagement, and development of multi-group engagement methods will create multi-dimensional results that will provide pivotal insight into the future of landscape design and programmatic recommendations. This study adds to the limited existing research on rates of deposition in urban parks over time to increase understanding of how a new site accumulates contaminants.

Client

Landscape Architecture Foundation (LAF)

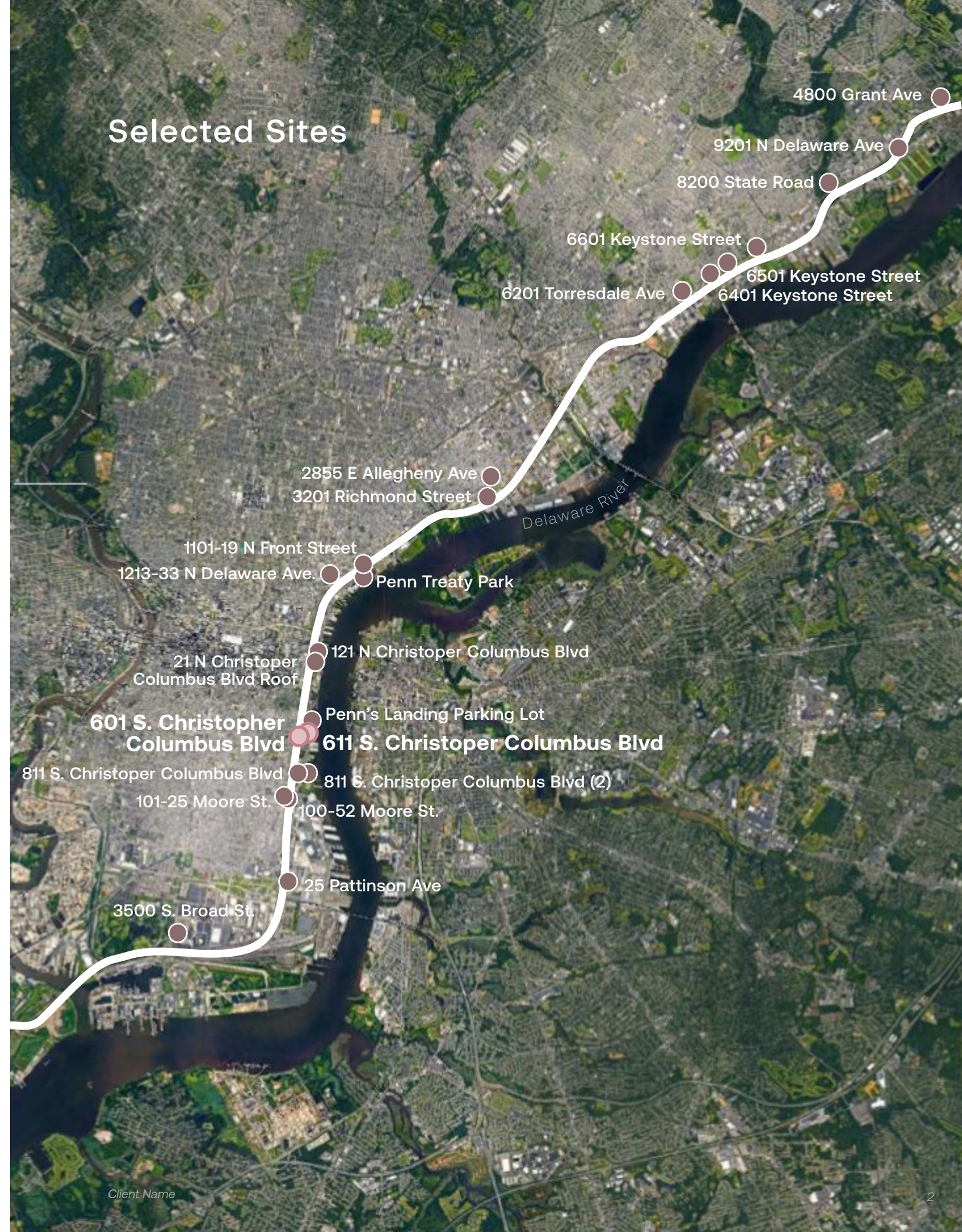
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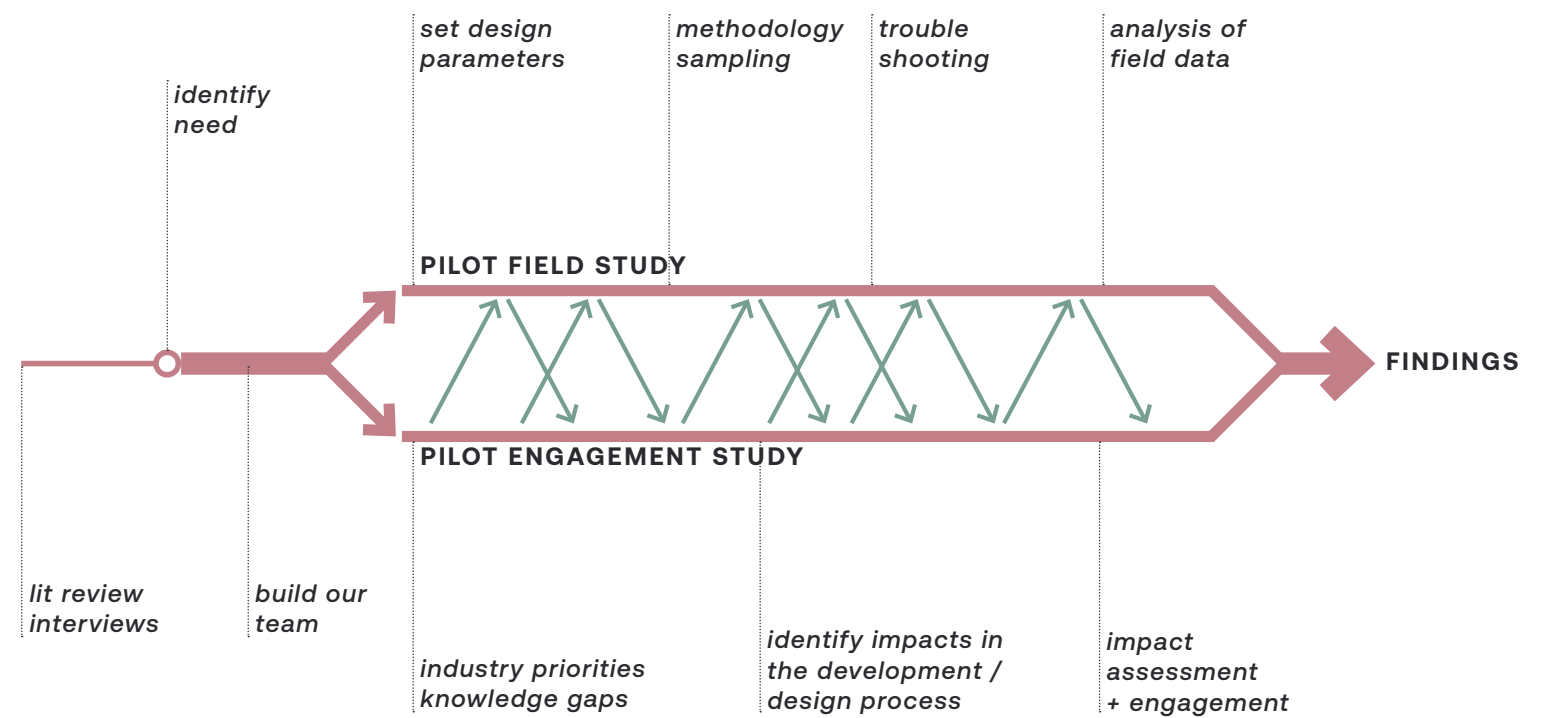
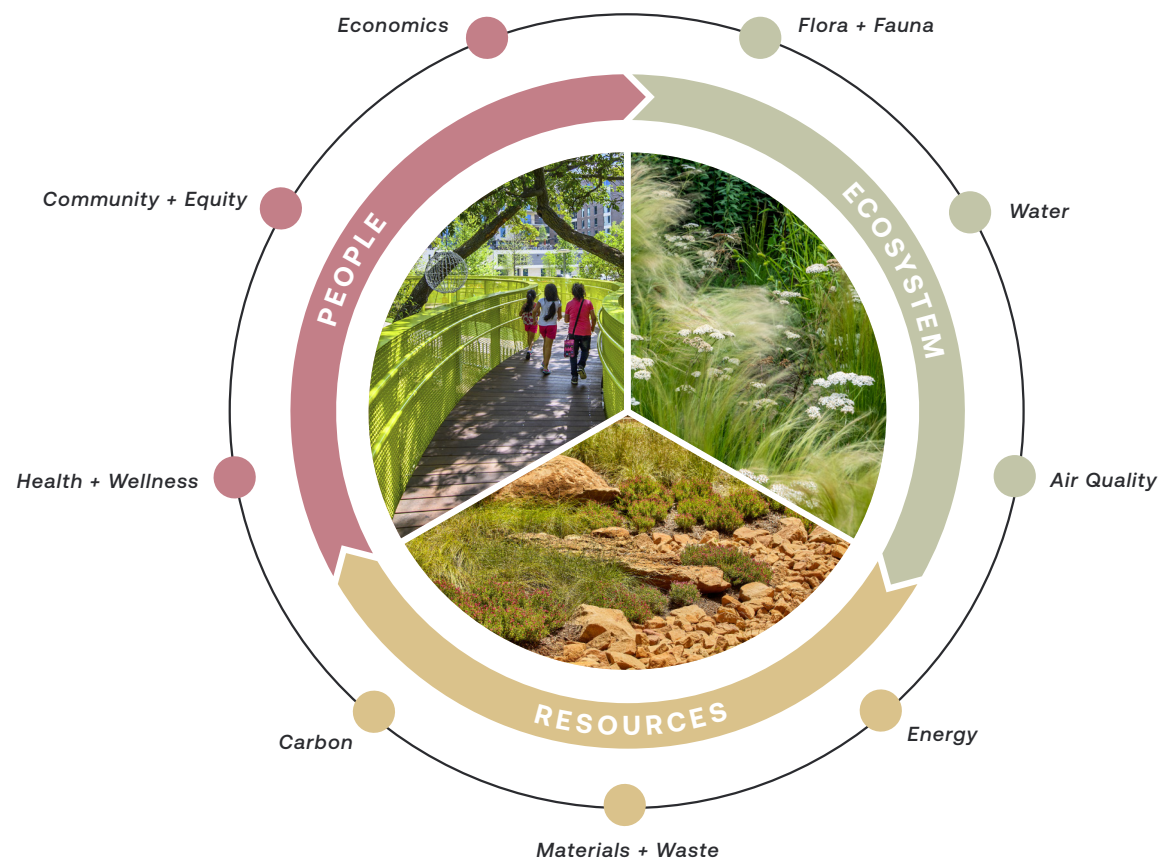
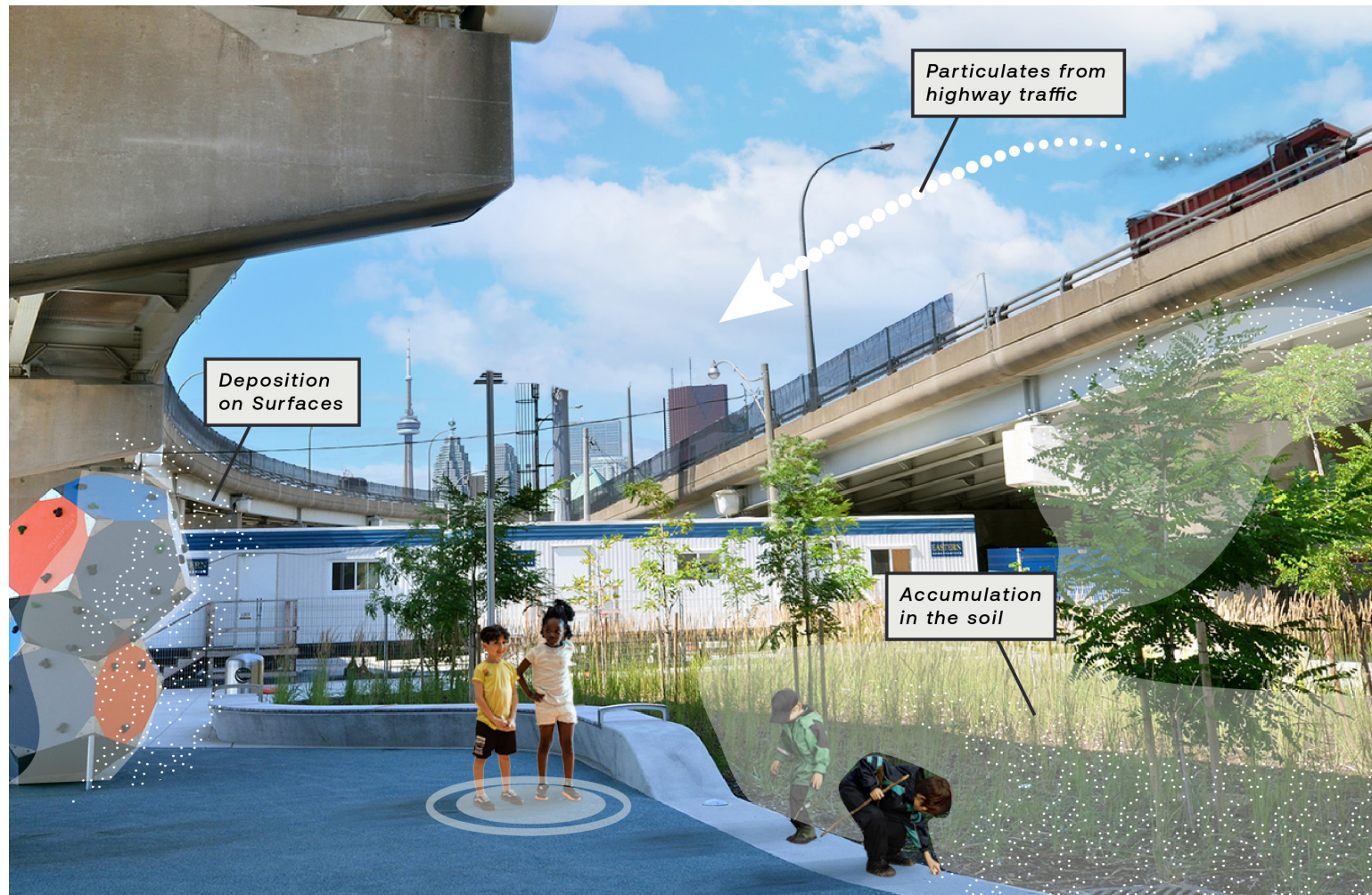
2021 - 2022

Team

Braun Intertec
EPA
Penn State University
Delaware River Waterfront Corporation
City of Philadelphia
Perelman School of Medicine, University of Pennsylvania
Clean Air Council
Drexel University
The Ian L. McHerg Center for Urbanism + Ecology

Selected Sites





PILOT FIELD STUDY: SAMPLING METHODS



Vegetation Swabs

STERILE WIPES
HEAVY METALS
PAH'S



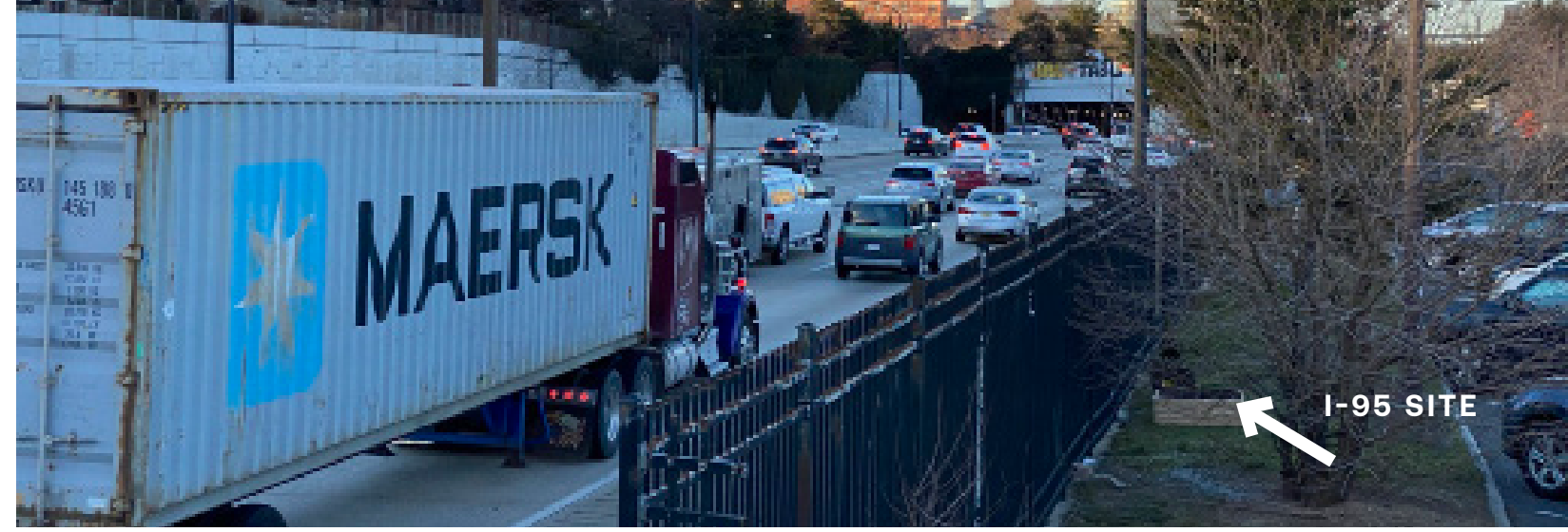
Air Monitor

PURPLE AIR
AIR NOTE
PM2.5



Soil Samples

TOP 1" OF SOIL
HEAVY METALS
PAH'S





ADJACENT SITES SOIL HEALTH
- HEAVY METALS

Higher concentration of heavy metals in adjacent sites. The contribution is a result of legacy materials like paints in case of lead.

● Race Street Pier

● Korean Memorial

● Vietnam Memorial

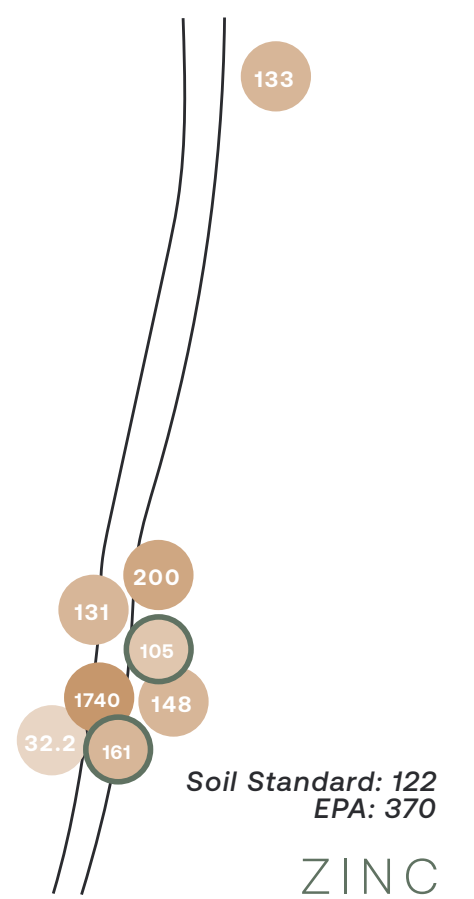
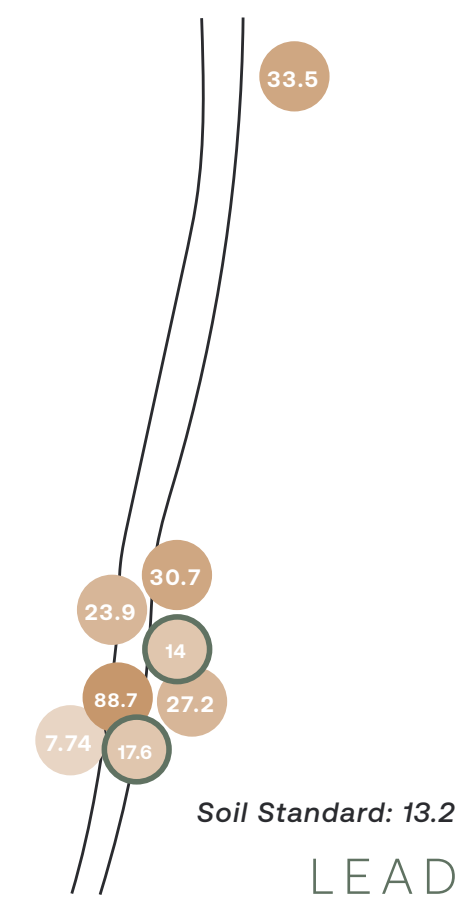
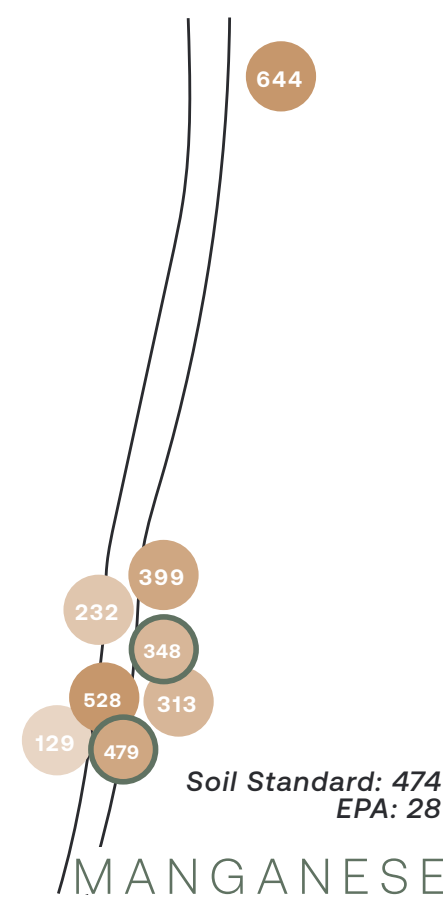
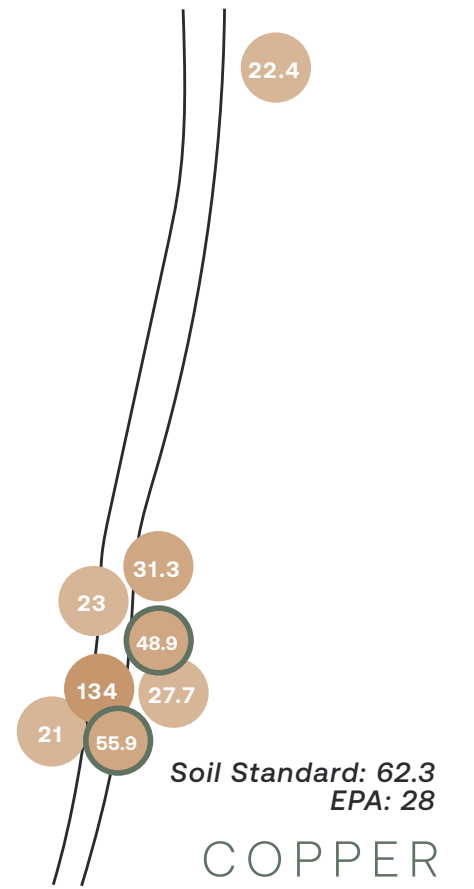
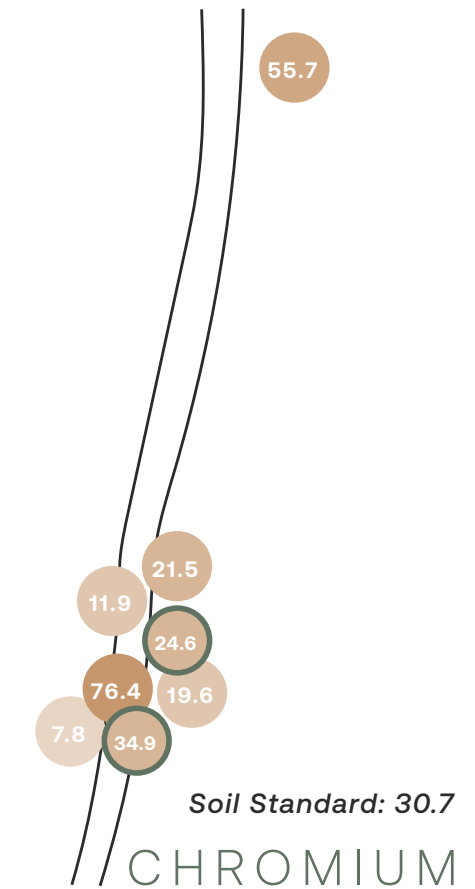
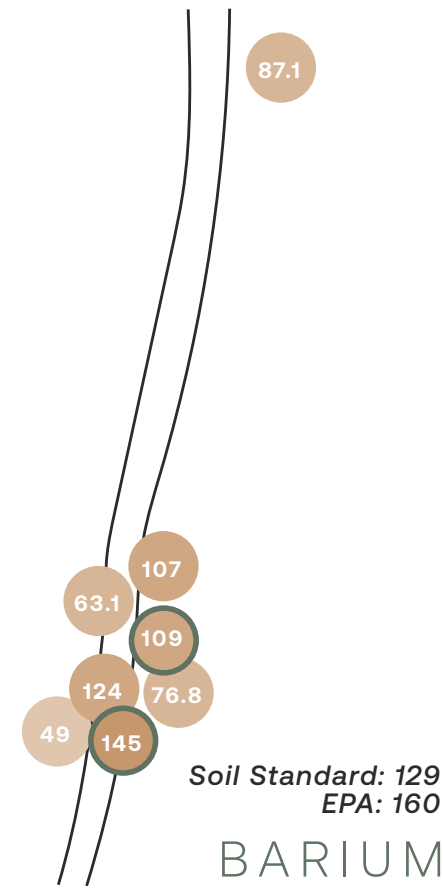
● I-95 Corner Plot

● Columbus Plot

● I-95 Plot

● Columbus Corner Plot

● South Street



THE ENGAGEMENT PILOT - ADVISORY GROUP VISIONING

1 Current State of the Problem <ul style="list-style-type: none"> • Industry Priorities • Shared Interests • Gaps in Knowledge 	2 Opportunities to Change Current Practices <ul style="list-style-type: none"> • Opportunities for collaboration • Impacting development / design processes 	3 Risk Mitigation + Outreach <ul style="list-style-type: none"> • Opportunities for collaboration • Impacting development / design processes
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ENGAGEMENT FINDINGS

 <p>Land development, zoning + programming based on risk assessment of the site.</p>	 <p>Perform a pre-evaluation of site from human health perspective at project planning stage. This should include air + sound sampling.</p>	 <p>Need for regulations that ensure a site is assessed for any risks based on site history of contamination activities, proximity to a pollution source etc.</p>
 <p>Need for development of community baseline for a site for both public, as well as private projects a site-based on standard risk assessment.</p>	 <p>Educating community of the risks, and developing community benefits agreement including site cleanup and other ways of mitigating risks.</p>	 <p>Need for non-traditional collaborations at different stages of a projects with experts.</p>
 <p>Continued air quality as well as soil contamination monitoring of a site which further informs future baseline studies/standards.</p>		

	<h3>KEY TAKEAWAYS - COLLABORATION</h3> <ul style="list-style-type: none"> + Need toolkits (risk assessment, design strategies, community engagement/education) + Engage with research institutions on local health issues, AQ issues, and other pollutants of concern + More multi-industry research project teams + Policy matrix, in lack of policy + Standards that go beyond agency requirements and intervene to address the specific community's needs
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	<h3>KEY TAKEAWAYS - PILOT STUDY</h3> <ul style="list-style-type: none"> + Results from the field study (some matching hypothesis, some not) + Next iterations needs to be longer and in a more controlled environment (less rain, more wind, less dense) + Efficient air monitoring confirmed decay was real, need to refine + Some accumulation from swabs is real + Soil accumulation is undetermined and potentially regulated by environment + Other industries are poised to work with landscape architects in a research capacity (multiple perspectives are vital)
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	<h3>KEY TAKEAWAYS - DESIGN</h3> <ul style="list-style-type: none"> + Understand the principles of how particulates move and can get trapped in landscapes + Engagement approach was very successful/informative (design becomes stronger through collaboration, goes both ways) + Designers need to incorporate AQ site analysis + Program sites based on measured trends in AQ + Further investigate maintenance practices to wash down equipment, plants, and soils + Perform early risk assessments
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