Steering Change from the Shore: The Working Waterfronts of Marine Highway 95

by

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B.A. University Major
Wesleyan University
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Submitted to the Department of Urban Studies and Planning
in partial fulfillment of the requirements for the degree of

MASTER IN CITY PLANNING

at the

MASSACHUSETTS INSTITUTE OF TECHNOLOGY

June 2018

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ABSTRACT

The primary contribution of this research is to discover, describe and argue for urban design strategies that connect public ports to their urban context in a way that improves environmental performance, clarifies freight circulation, and enhances workforce accessibility.

The thesis begins at a regional scale looking at the networks and norms that effect maritime freight logistics along the Atlantic Coast of the US with an eye to how those networks and norms translate into site design and urban relationships. The regional scale analysis is then balanced with a in-depth site-specific case study focusing on the range of working waterfront conditions of the public port authority of Philadelphia, Pennsylvania. This case study serves as an entry point to transition from observations on the existing relationship of ports and their urban context into speculation and design of the future relationship of ports to their urban context. The Philadelphia case study explores the shore-side development implications of changes in the volume and type of cargo moving through Philadelphia's public port authority and concludes with a proposal for what types of urban design interventions would improve the port's environmental performance, clarify its freight circulation, and enhance its workforce accessibility. I then generalize from this case study to offer working waterfront intervention typologies as defined by the spatial, political and operational relationships observed in Philadelphia. These intervention typologies are then keyed to a series of precedent projects that demonstrate how the proposed interventions might come to life.

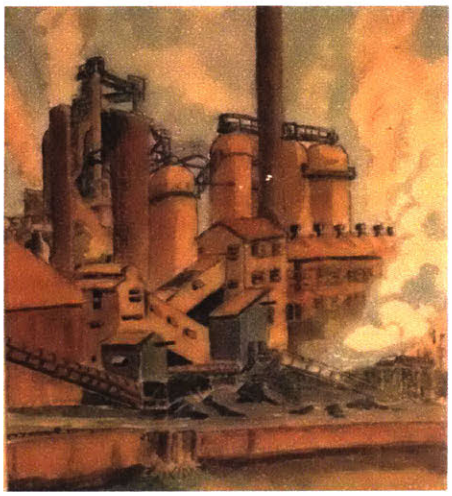
Through observational and spatial analysis, this thesis seeks to explore the social value of selective integration of maritime industrial systems with urban public life. Overall, I hope these models for selective integration of industrial use will challenge inherited notions about industrial urban form and the relationship of white collar and blue collar work.

Thesis Supervisor: Marie Law Adams
Title: Lecturer of Urban Design and Planning

Steering Change from the Shore

The Working Waterfronts of Marine Highway 95

DEDICATION



To my late grandmother, Franny Taft.

In stark contrast to her fierce determination and unrelenting capacity for work and drudgery, she often snuck off with pen, paper and brush set in hand. She'd find some bustling square or some quiet corner of a harbor and let her experience flow through her pen onto the page with no expectation of grandeur, audience or recognition. Just a humble creative practice. I held her contrast with me throughout this project.

ACKNOWLEDGMENTS

A special thanks to **Greg Iannarelli** of PhilaPort who has spent a great deal of time bringing me up to speed on the plans, priorities and particularities of PhilaPort's operations.

An additional thanks to all of the Philadelphia planners who helped me develop a more holistic understanding of how all these issues intersect at Philadelphia's industrial waterfront.

Connie Bird, Philadelphia Water Department
Tom Dalfo, Philadelphia Industrial Development Corporation
Marian Hull, I-95 Revive Project / AECOM
Nicole Ozdemir, Philadelphia City Planning Commission
Scott Page, Interface Studio
Mike Ruane, Office of Freight and Aviation Planning at Delaware Valley Regional Planning Commission
Lizzie Woods, Delaware River Waterfront Corporation

Finally, thank you to **Marie Law Adams**, my thesis advisor, for sharing your curiosity and enthusiasm, your depth of knowledge, your thoughtful critiques and your patience as I slowly narrowed down what remains a topic too big to handle well in a semester's time.

To **Eran Ben Joseph**, **Alan Berger**, and **Fred Salvucci**, thank you for generously offering your time to critique my work and help make it better.

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01. INTRODUCTION

Working Waterfronts as Sites of Multi-Directional Transformation

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Guiding Question(s)

Why should planners and port authorities care about the land use and urban design around working waterfronts?

FOUNDATIONAL CONTEXT

For American cities that grew up around dynamic ports, the evolution of maritime trade has had a profound, persistent and often painful impact on the social, economic and spatial fabric of the urban regions that supported and depended on those industrial and mercantile businesses. This thesis addresses how the public sector can help shape a mutually beneficial relationship between 21st century cities and their rapidly transforming working waterfronts through targeted urban design interventions developed in partnership with public port authorities and other key local actors.

Maritime industrial sites are defined by disconnected street grids, irregular superblocks, compounding infrastructural barriers such as highways and rail lines with minimal if any penetration of public transit, contaminated land that frequently was man-made through filling of marshes and wetlands, and most importantly the water itself and it's hard infrastructural edge. Furthermore, these sites have often had a detrimental impact on neighboring communities due to uncontrolled pollution and unmitigated freight traffic circulation patterns. The history of use on these sites matters when considering what they can and should be in the future. Even in the case of continued industrial use, investment in working waterfront sites must not only meaningfully address this physical legacy of their original purpose it must also address past wrongdoings through more equitable and sensitive redevelopment.

PRESSURES DRIVING TRANSFORMATION OF WORKING WATERFRONTS

Substantial real estate pressure on urban production-distribution-repair (PDR) districts in self-described "post industrial" cities is accelerating displacement of these uses by an essentially permanent spread of housing and commercial uses into urban areas that are uniquely well suited to industrial use. The intensification of this displacement pattern has been escalating as reinvestment and real estate market speculation in major American cities has picked up pace. These external pressures from non-industrial land uses interact in irregular ways with the simultaneous internal churn and transformation within the industrial businesses that occupy urban industrial lands. As more industrializing economies have opened themselves to international corporations and global trade, industrialized economies with high standards for environmental impact and high prices for land and labor are increasingly unable to retain traditional industrial businesses. Offshoring combined with increasing automation are resulting in rapidly evolving systems of work that have spatial implications as well as workforce implications. In most settings, it means a shift within the industrial system to supply chain management and logistics and more human-capital-intensive forms of advanced manufacturing and biotech which have different economic drivers and synergistic relationships than the traditional industries that are losing ground. In aggregate, these external and internal pressures are fundamentally altering the economic geography of industrial businesses in American cities at a rapid pace with profound implications for the urban fabrics they occupy and social communities they serve.

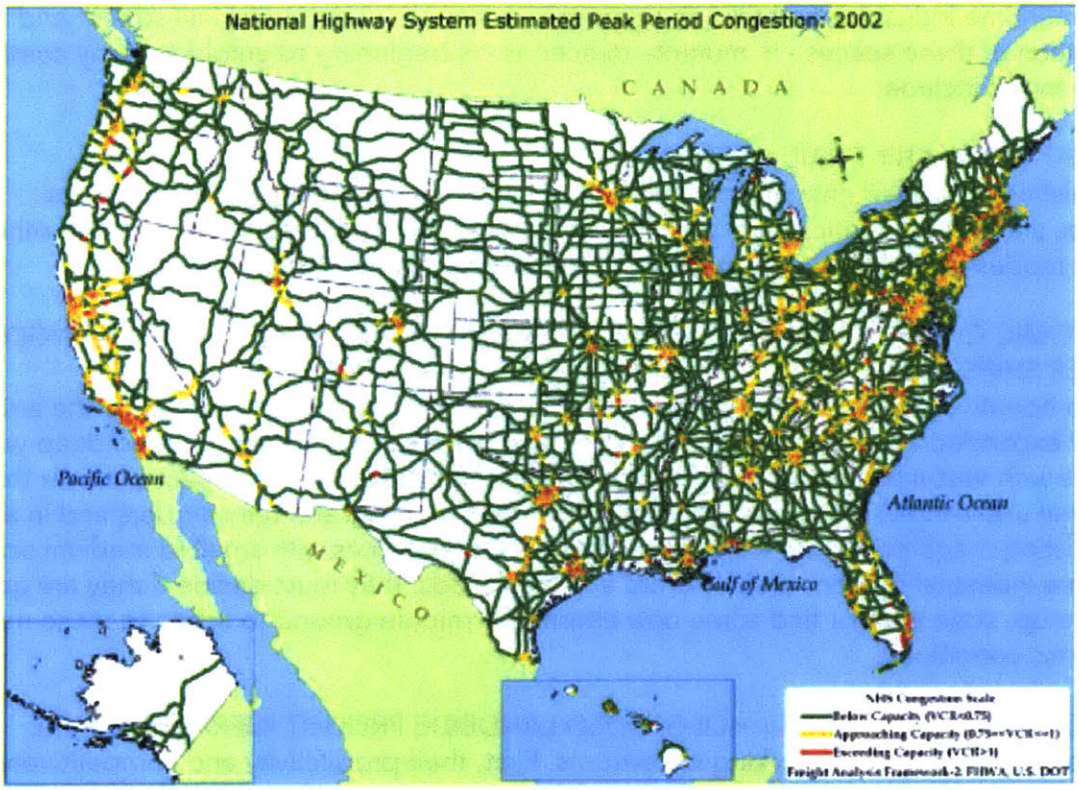
Working waterfronts in particular have had to constantly reinvent themselves at a local level to secure their shifting seat at the table of global trade. Maritime industrial lands in American cities are contending with a dizzying array of pressures exerting contradicting forces on maritime industrial land that, in aggregate, mean that substantial investment and transformation of these spaces - in multiple directions - is beginning to unfold in many coastal cities. The forces include:

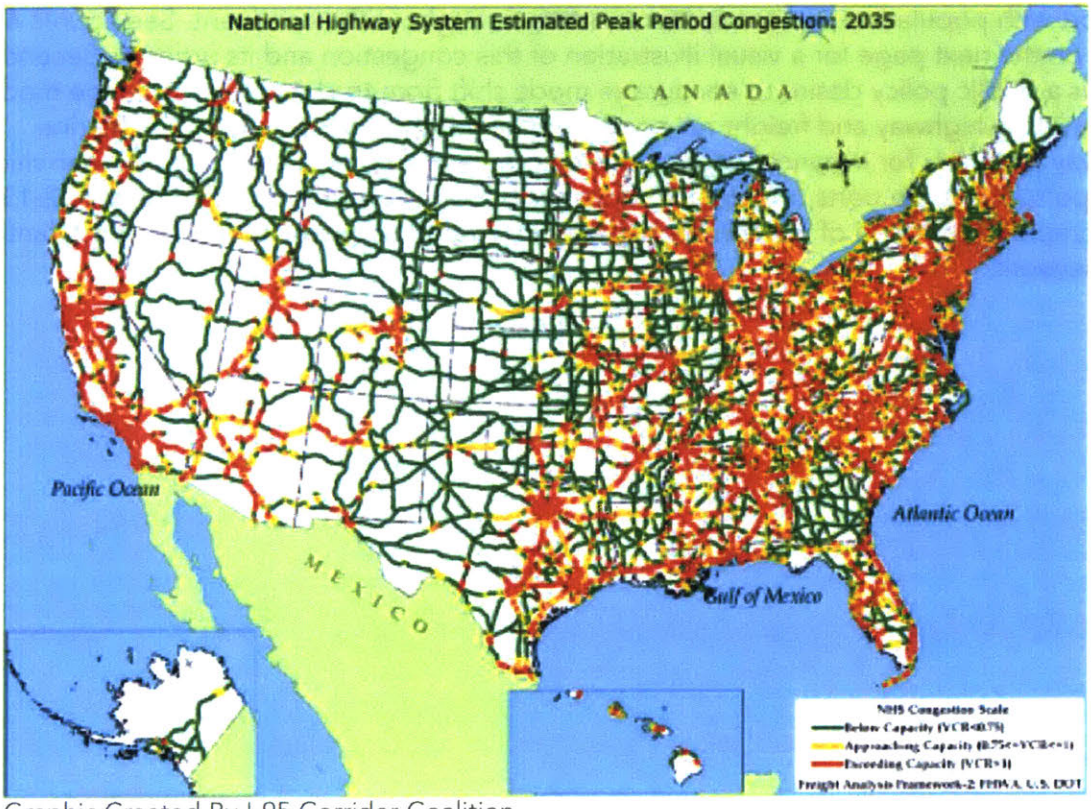
1. FREIGHT MODE SHIFT RAIL > TRUCK
   The existing dispersed network of small to medium scale maritime industrial logistics facilities along the Atlantic coast is having a hard time competing economically with other freight modes - primarily the dominance of trucking within the continental US.

2. ECONOMIC COMPETITIVENESS DEPENDS ON ABILITY TO CATER TO INCREASINGLY LARGER SHIPS
   This competitive disadvantage compared with trucking is further exacerbated by the arrival of new expanded Panamax vessels which demand large scale highly automated deep-water harbors with vast multi-modal back-of-port logistics facilities. The net impact of this is that industrial use is intensifying primarily along suburban highway and rail corridors and in a few existing mega-ports with expansion capacity. Coastal cities with small to medium scale maritime industrial facilities are therefore at a crossroads: they must decide if they are going to scale up, scale back or find some new alternative middle ground to adapt to these new economic conditions.

3. INCREASINGLY CONGESTED + DEGRADED LANDSIDE FREIGHT INFRASTRUCTURE
   This has a dual impact on working waterfronts. First, their productivity and competitiveness is impacted by the capacity and reliability of the rail and trucking corridors that connect the port with population and production centers throughout the continent. See figures 4 and 5 on the next page for a visual illustration of this congestion and its urgency. Second, there is a public policy desire to encourage mode shift from truck to rail and marine modes to relieve the highway and freight rail congestion along the Atlantic coast. The Marine Highway program, for instance, encourages barging and short-sea shipping between mid-sized ports and large ports of entry for container and vehicular imports. See pages 12-13 for a graphic illustration of the Marine Highway Program's potential impact on the Atlantic port network..

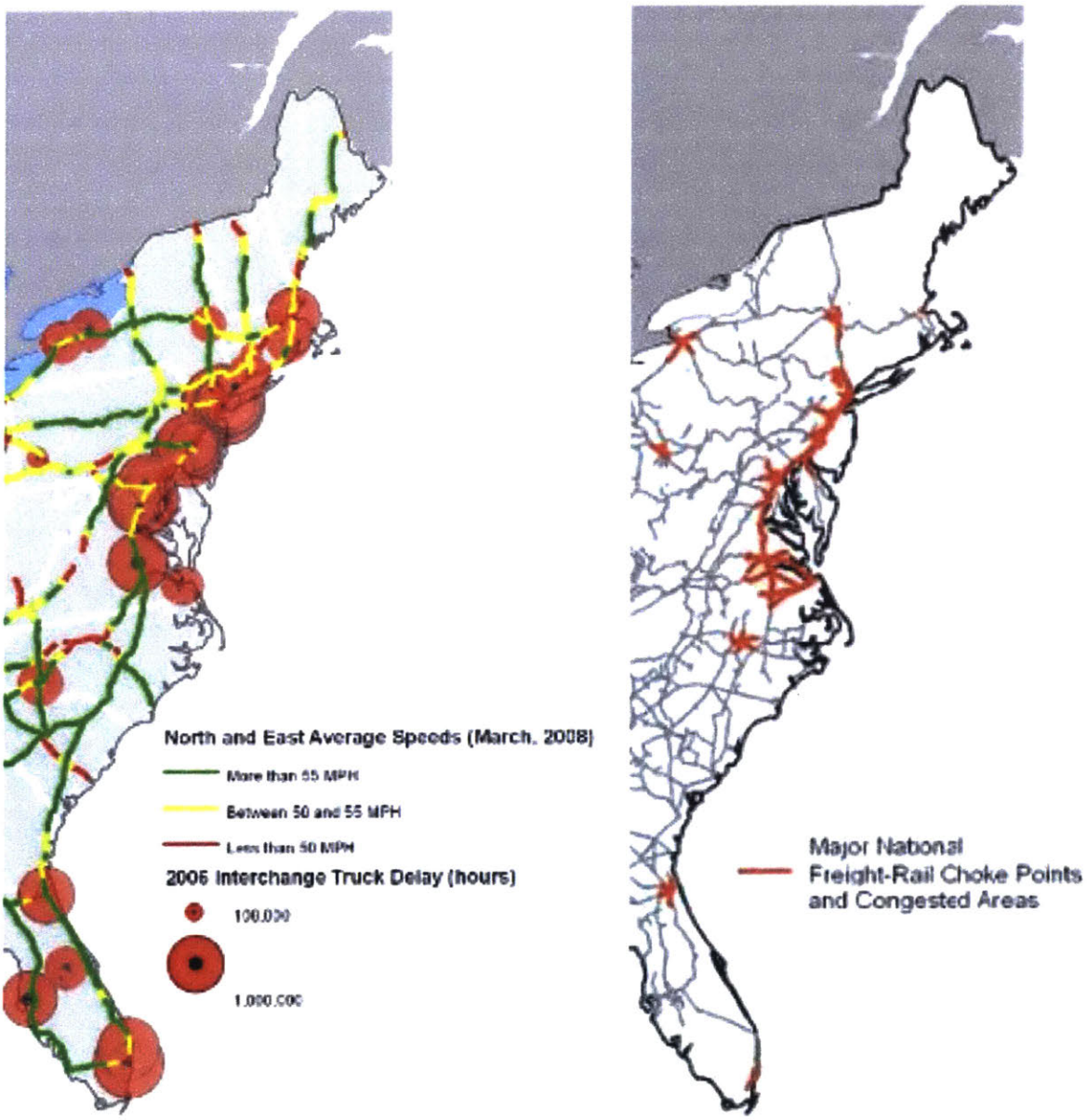
Figure 4 National Highway System Congestion in 2002 and 2035



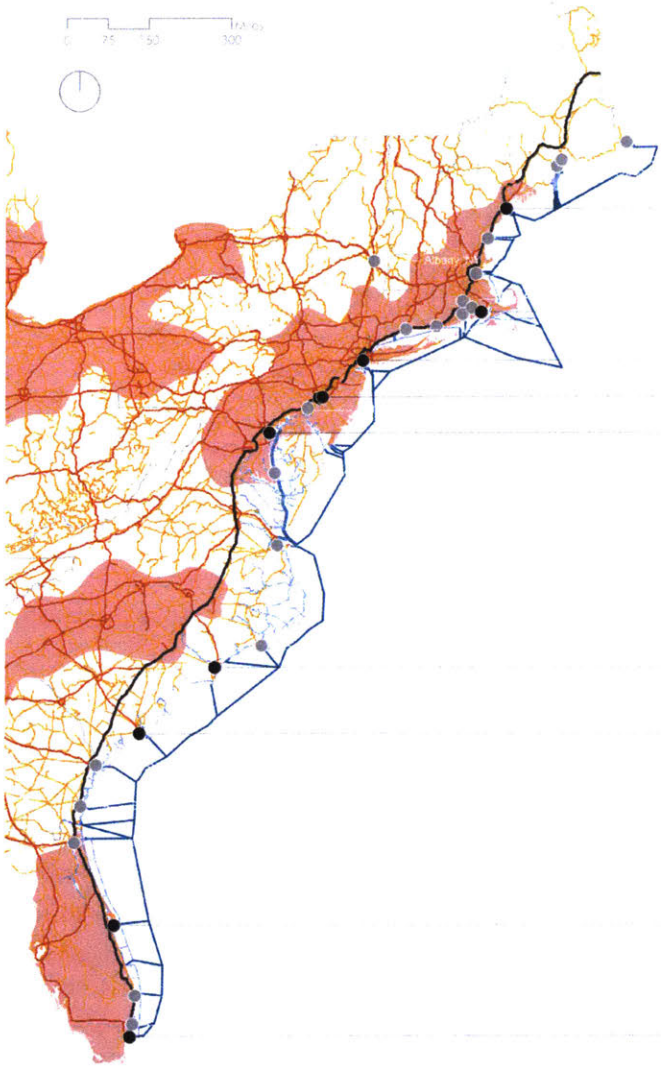


Graphic Created By I-95 Corridor Coalition

Figure 5 Major Chokepoints in the Surface Transportation System



Source: I-95 Corridor Coalition
Graphic Created By I-95 Corridor Coalition



MARINE TRANSPORTATION OPPORTUNITY

At a federal level, there is interest in investing to make marine transportation carry a larger share of freight traffic in order to free up surface transportation capacity.

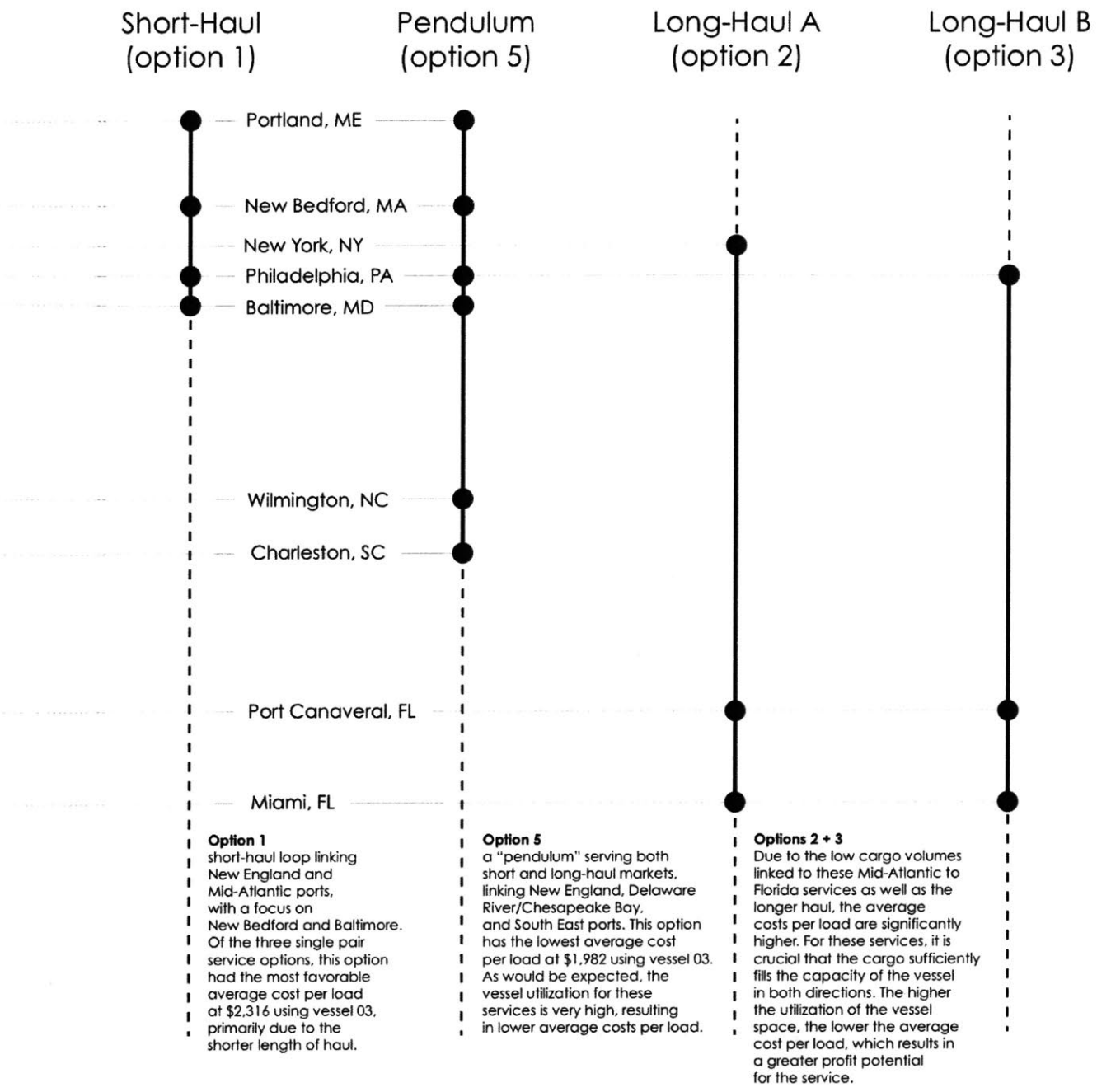
The I-95 highway corridor is a particularly high-priority area to encourage freight mode shift from trucking to rail and marine routes, and it has the benefit of a vast network of publically owned ports in close proximity to the I-95 highway corridor.

The diagram above shows the four marine highway services that seem economically desireable, and the port facilities they would connect with.

- Primary M-95 Port
- Secondary M-95 Port
- National Primary Roads
- National Rail

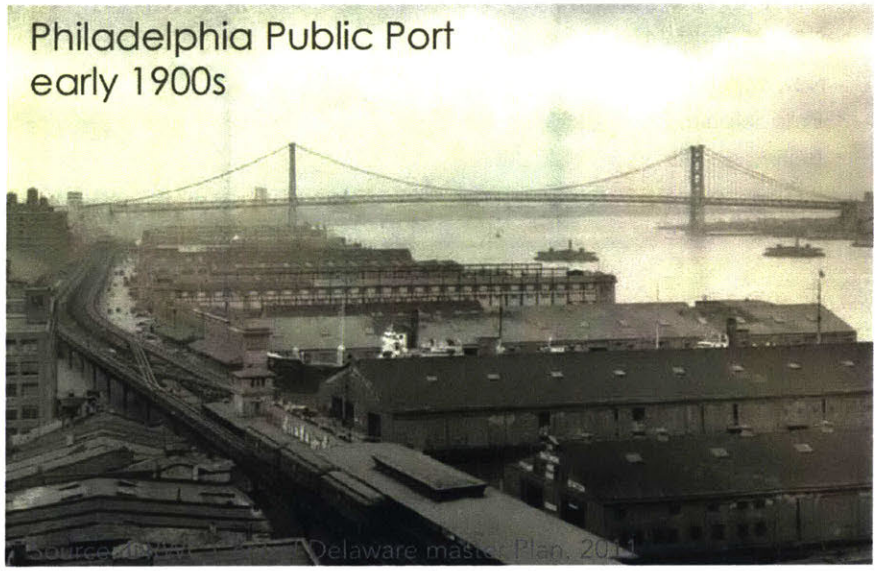
Navigable Waterways

- up to 10'
- 11' - 40'
- Panamax (41' - 50')
- Post-Panamax (51' - 100')
- Population Mega Regions
- State Boundaries



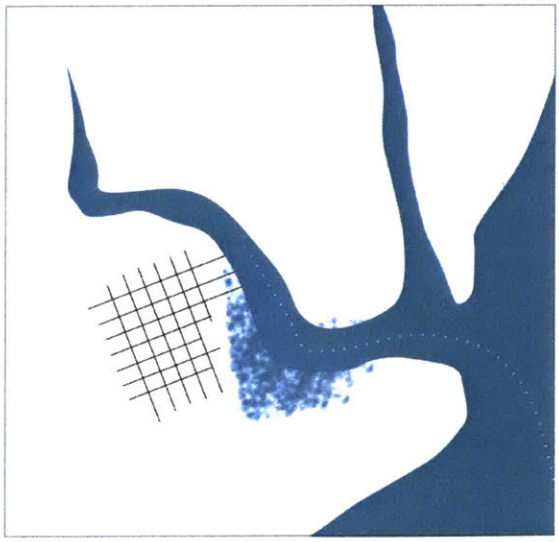
Graphic Created By Zoë Taft Mueller.

4. ERODING INDUSTRIAL LAND USE COMPLICATES POLITICS FOR THOSE THAT REMAIN
As urban industry initially developed along the Atlantic Coast, it typically began with a naturally sheltered deep-water harbor and then filled in marsh with finger pier development off of an extra wide mixed-function boulevard that served as a chaotic and exciting front door to the city. Much of the former industrial users of the coastal land have left our national economy or cannot pay the premium to remain in their waterfront location.

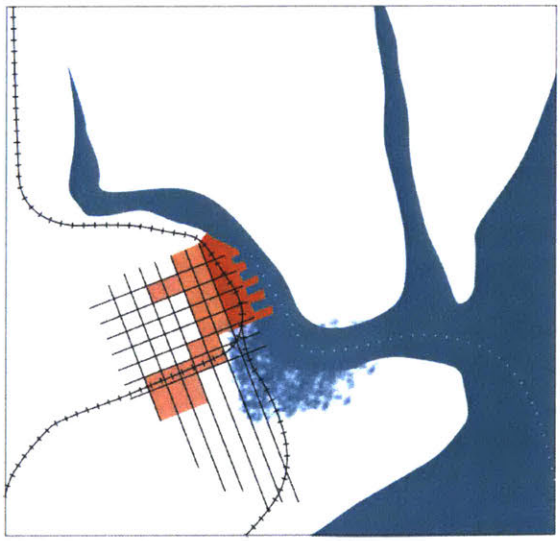


Source: DRBC Delaware Master Plan, 2011

Early Coastal
Colonial Settlement



19th-20th Century
Industrialization



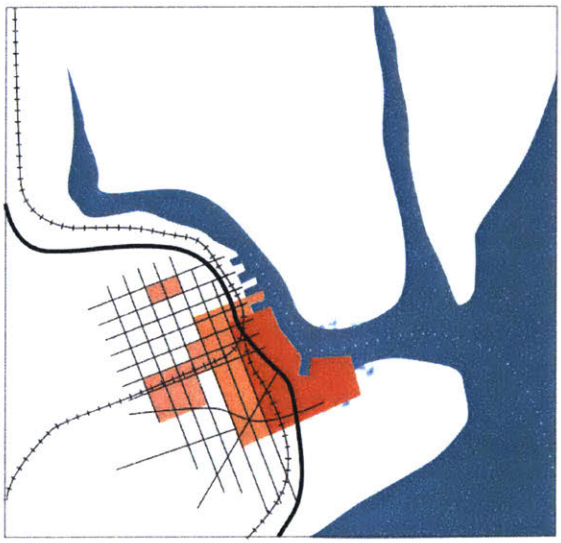
port land
industrial land
non-industrial land

Graphics Created By Zoë Taft Mueller.

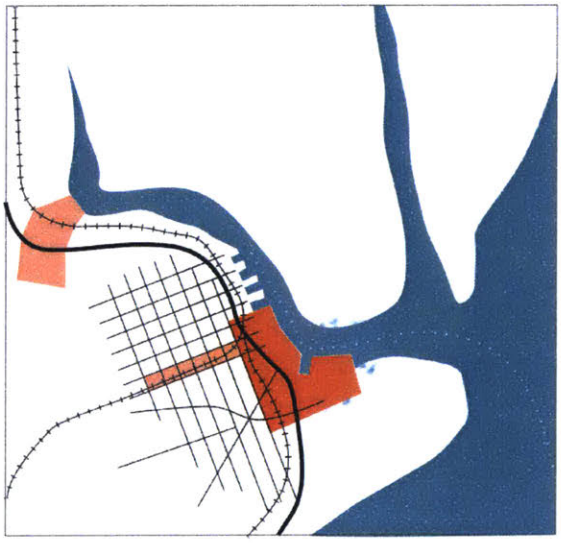
Maritime-dependent industrial uses, municipal industrial facilities (waste management, water treatment, public works) and local construction services (concrete batch plants) cannot be offshored and therefore still need in-tact local industrial systems. Therefore, as urban industry contracts and consolidates in highway-accessible districts, urban ports and other remaining urban industrial users must take a more active role in managing their relationship with increasingly non-industrial neighboring land uses.

PhilaPort documentation of port crane arrival.

Late 20th Century Industrial Change



Contemporary Industrial Erosion



port land
industrial land
non-industrial land

Graphics Created By Zoë Taft Mueller.

5. WATERFRONT INDUSTRIAL REAL ESTATE PRESSURE INCREASING
   Maritime industrial lands must now compete against an increasingly powerful demand for waterfront public green space (especially in the wake of Sandy which inspired many to envision coastal wetland restoration) AND increasing demand for luxury waterfront residential mixed use development, both of which are in direct conflict with industrial use. Additionally, despite the continued loss of traditional industry to emerging/industrializing economies around the world, the US economy is increasingly demanding high-tech and advanced manufacturing "flex space" which often benefits from an underlay of traditional industrial capacity - both in terms of workforce and facilities. This has a dual impact - first, it introduces high-value uses into formerly low-value industrial land markets and second, it creates a renewed pressure to invest in public transit and bike and pedestrian networks that directly serve industrial districts.

6. INCREASING FLOOD RISK
   Sea level rise and increased storm surge events expose maritime industrial areas to greater risk of loss and spread their environmental impact (hazardous materials etc) beyond traditional buffer areas. This increased risk of inundation impacts the bottom line of maritime industrial businesses and inhibits their ability to compete with non-water-dependent modes.

7. HIGHER STANDARDS FOR CONTROLLING ENVIRONMENTAL IMPACT
   As our public policies have caught up with the documented negative impacts of uncontrolled industrial development, contemporary investments in industrial uses have become more complex and expensive. This is, on balance, an indication of a positive direction in our industrial development norms, but it does impact the bottom line of industrial businesses that in many case are hanging on with thin margins and unstable footing already.

Regardless of the direction of public policy, adapting to the new economic conditions of maritime trade will require substantial investment to transform maritime industrial urban fabric and its relationship to the districts and neighborhoods that abut waterfront industrial areas. Thus, whether or not the public sector intervenes, working waterfronts of the Atlantic Coast of the US will undergo vast transformations in the years and decades to come. Given the intensity and pace of this investment, there is some urgency to developing a coherent and strategic planning response.

A coherent and strategic planning response to the challenges facing working waterfronts must start from an understanding of the following:

PORTS ARE IN A STATE OF CONSTANT INTERNAL RE-DESIGN.

- ports cannot easily relocate due to expense of water infrastructure.
- most Atlantic coast ports have no land to expand into.
- growth therefore means optimizing existing land + filling waterways.
- ports must handle large swings in the use of their space.

PORT COMPETITIVENESS IS IMPACTED BY THEIR URBAN CONTEXT.

- port competitiveness depends on the efficiency of infrastructure networks that serve them.
- most Atlantic coast ports are publicly owned. Therefore, their competitiveness depends on their ability to raise capital through federal, state + local political process.

PORT DEVELOPMENT IMPACTS URBAN QUALITY OF LIFE.

- our quality of life is impacted by the congestion of the transportation infrastructure we share, the health of our air, water and soil, and the flood resilience of our coast.
- ports anchor complex networks of supply chain management and logistics jobs that are accessible to low-skill workers and pay a family wage, therefore their continued presence and integration with local public transit, road, bike and pedestrian systems has a significant impact on the employment landscape and economic health of a region.

Graphic Created By PhilaPort

- as economic forces push industrial uses further outside of central urban areas, our goods will have to travel further to reach their end user resulting in more congested roadways and less environmentally sustainable practices.

This research therefore accepts as a starting point that there is an inherent value to maintaining the connection of ports to population centers because of the potential to minimize goods travel to the end user, maximize workforce accessibility, and minimize the use of trucking where more sustainable modes are economically viable. The map to the right illustrates emerging mega-regions as a proxy for consumer base, workforce density and an indication of where transportation networks may be stressed by widespread commuting patterns. This can and should be seen as one multi-modal system that connects goods and people with each mode serving a role and contributing to the system.

This map serves as the foundation of the research in the next chapter. The next chapter will delve into the as-found relationships between industrial and non-industrial districts within a multi-modal metropolitan system that connects goods and people. The intention of this exploration is to discover what patterns exist in current urban and suburban industrial development and whether those patterns reveal a desirable or undesirable relationship between industrial and non-industrial users of the land.

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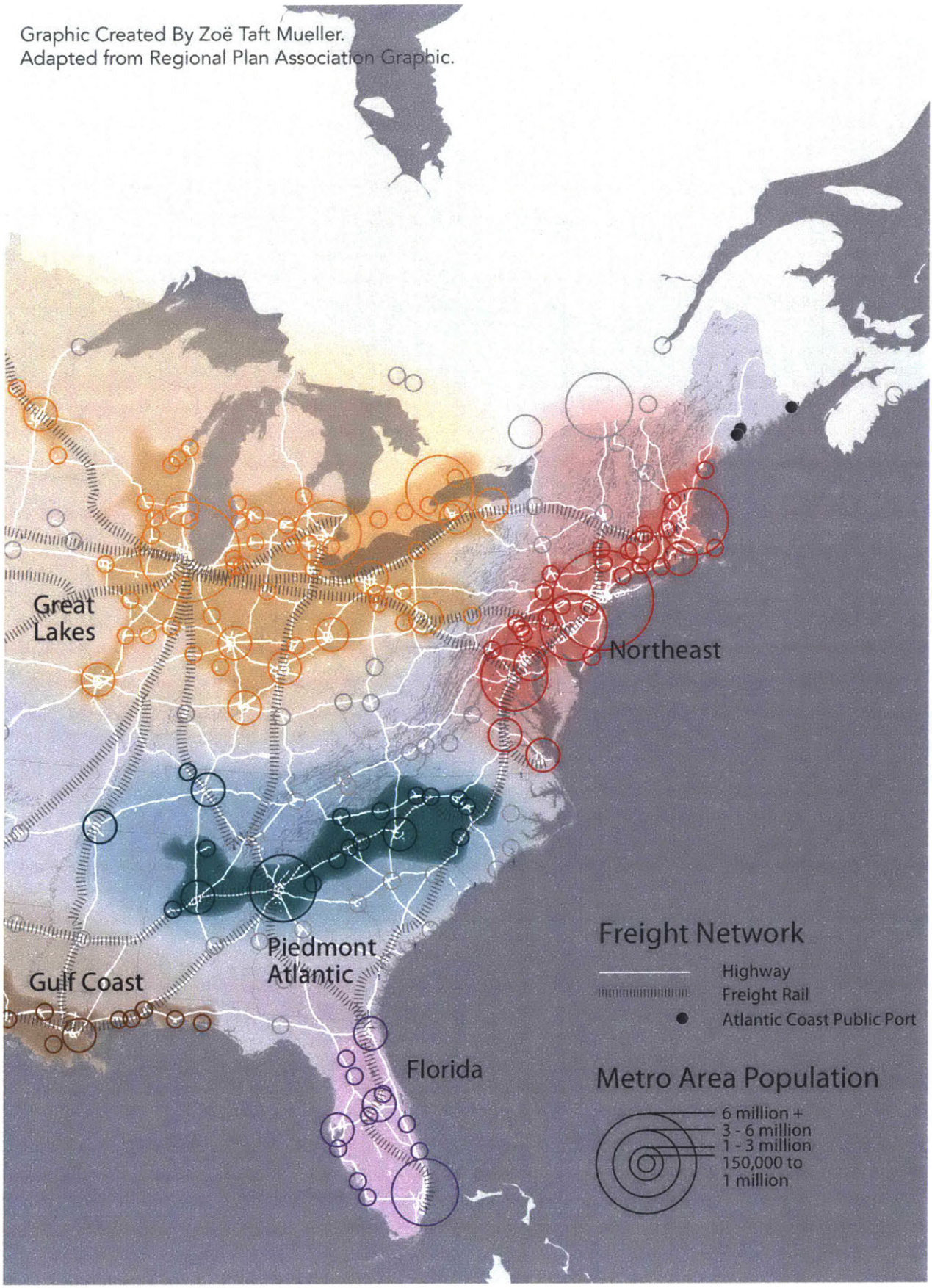
Graphic Created By Zoë Taft Mueller.
Adapted from Regional Plan Association Graphic.



02. INDUSTRIAL URBANISM

Legacy Port City Typologies of the Atlantic Coast

Guiding Question(s)

How are existing patterns of industrial development conditioning the ways ports operate?

What opportunities and challenges do these development patterns create for future port transformations?

WHY INDUSTRIAL DEVELOPMENT PATTERNS MATTER

Typically industrial systems are described in an aggregated way in terms of jobs, productivity, volume or quantity of goods produced or processed, and other statistical measures of scale and performance. This way of reporting on and describing industrial system, however, does not offer much insight into the on-the-ground relationship of industry to its urban context.

It is often quite difficult to get a sense of how an industrial system is physically patterned in an urban area because industry spans multiple municipalities and occupies diverse zoning categories that are not entirely translatable between different municipalities. Additionally, zoning does not necessarily reflect current land use and so zoning is not always an appropriate starting point for the study of existing relationships between industrial and non-industrial land uses. Therefore, in order to better understand the physical rather than statistical presence of industry throughout the Atlantic Coast port cities, I turned to a qualitative observational method grounded in aerial imagery and Google maps pins to unearth the characteristics and key adjacencies of industrial land uses throughout this network of port cities.

TECHNIQUE TO IDENTIFY INDUSTRIAL USE DISTRICTS

Because I was most interested in current land use, more so than zoning, I strongly weighted Google maps "pins", aerial imagery and Google streetview showing the current use of land. Most of this imagery was collected between 2014-2018. In major metropolitan areas I cross-referenced my observations against zoning maps available online. I considered anything involved in extraction, production, distribution or repair (PDR) or waste management to be industrial. I considered areas where these uses consisted of more than half of the land area to be a dominant industrial district with supporting services such as dining and gas stations. This is more art than science and is meant to show concentrations or clustering of industrial land use as an overall pattern or system within a metro area.

I then used port and airport websites to develop outlines approximating the location and extent of those facilities in each port city considered.

I then overlaid this with nationally maintained geographic information system shapefiles for:

- National Shoreline
- State Boundaries (2016 US Census)
- National Primary Roads (2016 TIGER dataset)
- National Rail (2016 TIGER dataset)
- Navigable Waterways (Bureau of Transportation Statistics)
- Contiguous Densely populated areas (2010 Census Major Urban Areas, Bureau of Land Management, 2010 census year update of the following: U.S. 2000 Census Urbanized Areas consists of contiguous, densely settled census block groups (BGs) and census blocks that meet minimum population density requirements (1000ppsm /500ppsm), along with adjacent densely settled census blocks that together encompass a population of at least 50,000 people.)

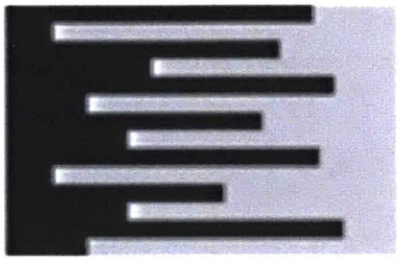
THEORETICAL FRAMEWORK

Beyond the district-level granular observations on the relationships of nearby industrial and non-industrial land uses, my intention with this mapping exercise is to describe the metropolitan-scale patterns that shape the strengths and weaknesses of the industrial system as a whole. To abstract these patterns into meaningful categories, I used Eran Ben Joseph and Tali Hatuka's industrial urbanism typologies of integrated, adjacent and autonomous industry-city relationships. The following descriptions are adapted from their joint publication of this framework in volume 43, number 1 of Built Environment.

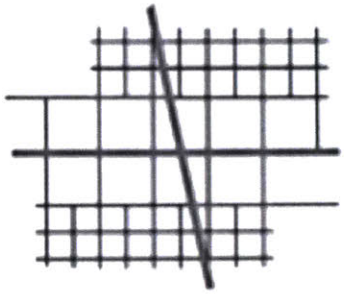
INTEGRATED

Close proximity and integration of living and working. Spatially, often functioning as an enclave within a city. The city takes on the responsibility of managing nuisance and adverse impacts of close proximity.

program



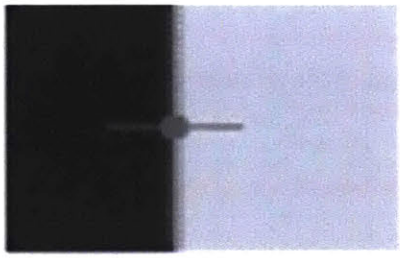
infrastructure



ADJACENT

Zoning-enforced separation of living and working, with the division often spatially reinforced by interurban roads, rails and open spaces, defined architecturally through a sprawling field of uneven often low structures at the periphery of urban areas, more than one municipal entity has a relationship with the industrial district.

program



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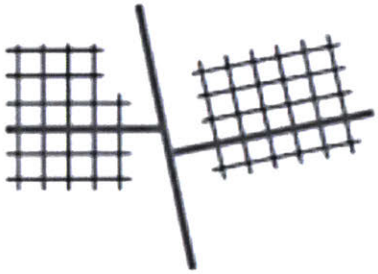
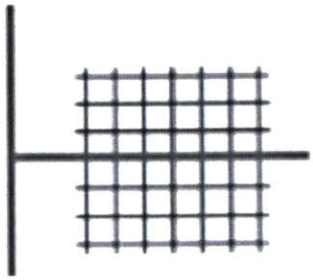


AUTONOMOUS

Large-scale zones occupied by uniform industrial buildings and surrounded by physical boundaries, defined more by national and regional freight transportation network convergence than by local workforce and political relationships, workforce typically commutes regionally by car and the industrial area does not have a strong municipal identity.

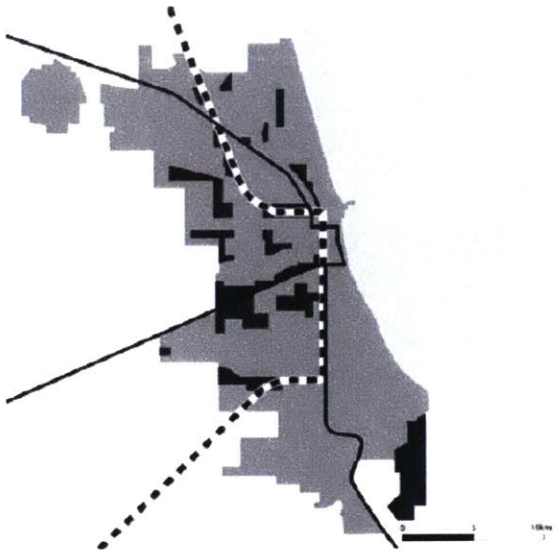
program

infrastructure



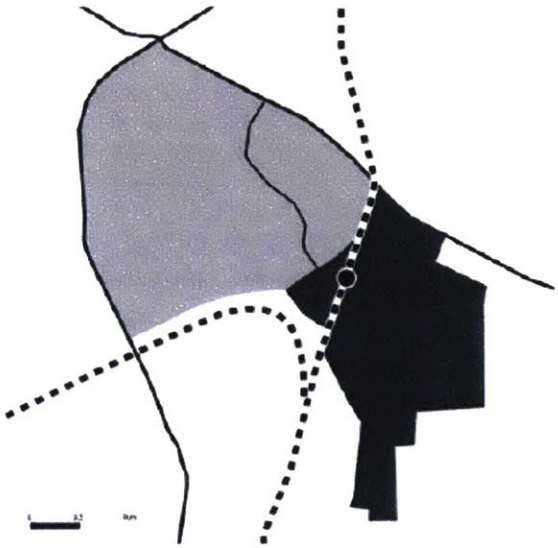
INTEGRATED

EXAMPLE: Chicago, IL, USA



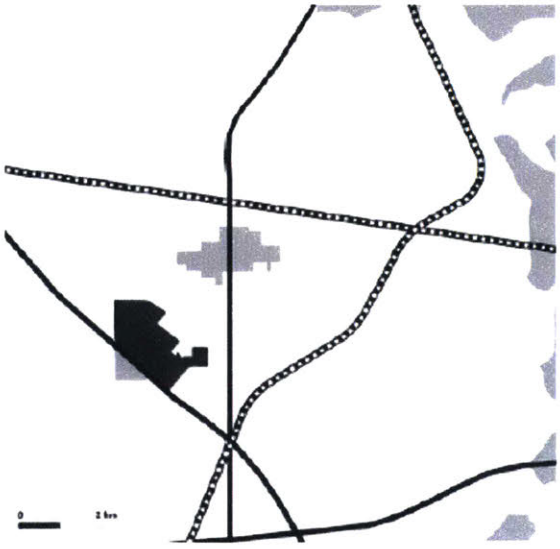
ADJACENT

EXAMPLE: Kiryat Gat, Israel

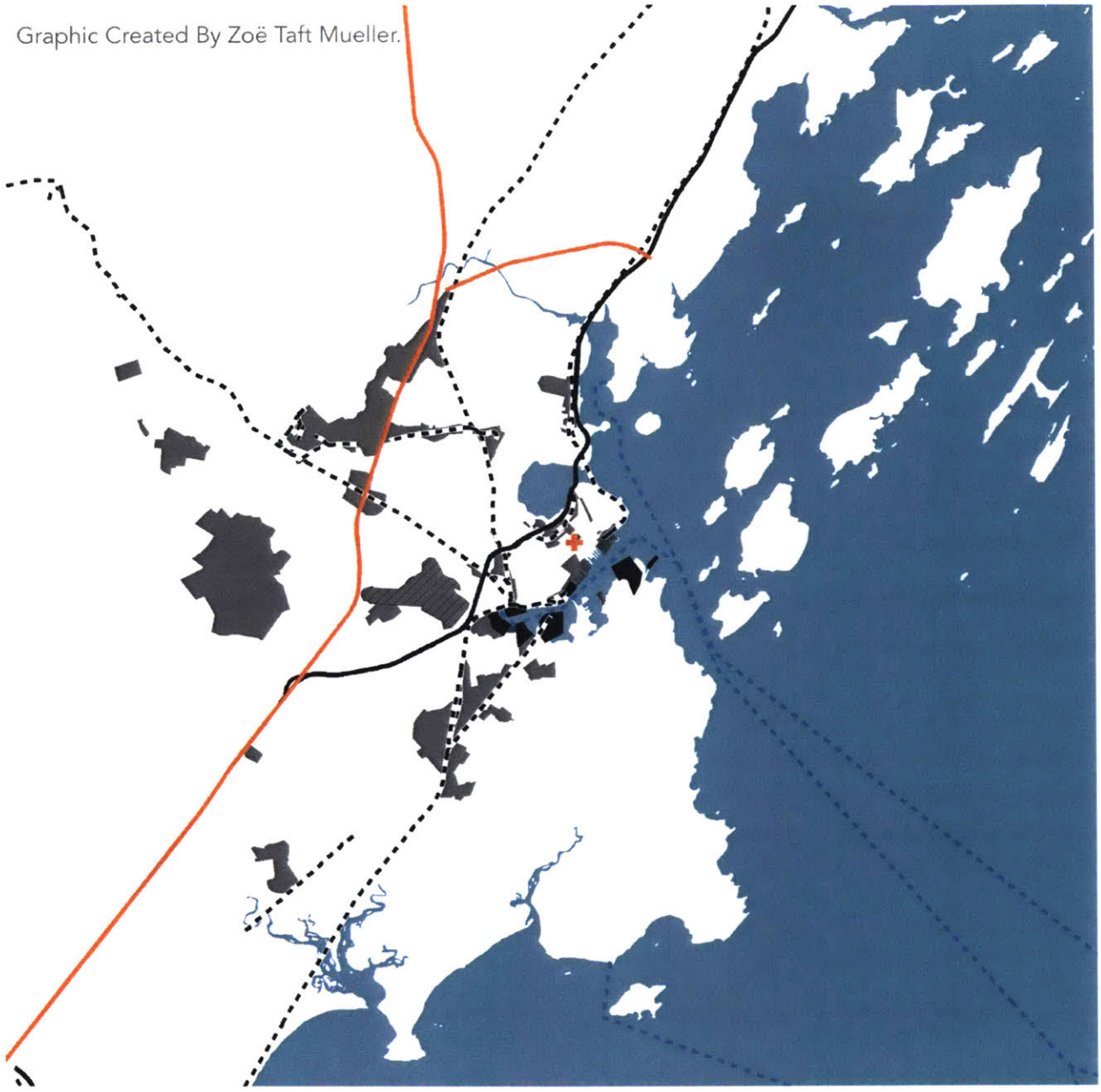


AUTONOMOUS

EXAMPLE: Lordstown, OH, USA

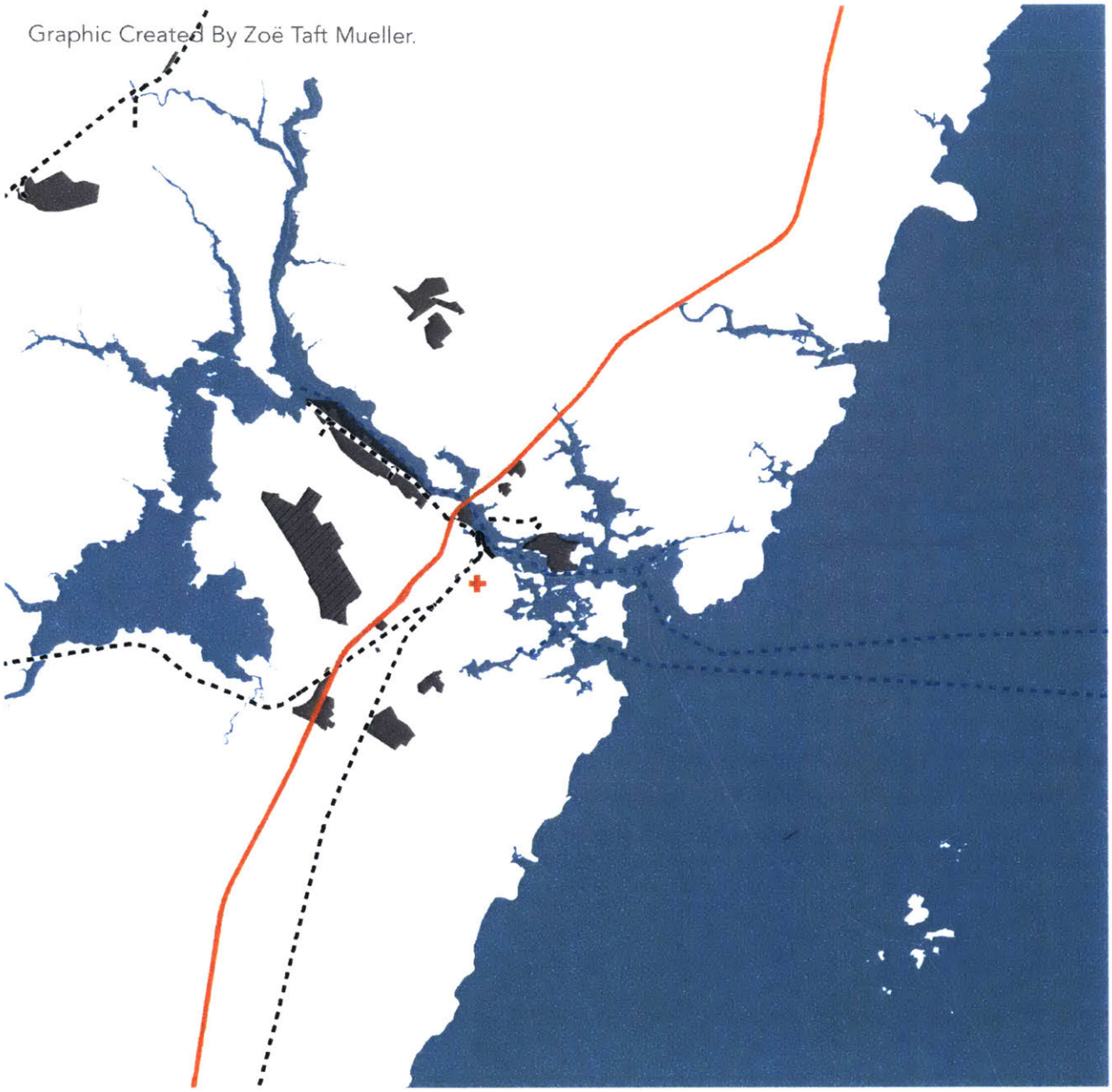


Graphics Created By Eran Ben Joseph + Tali Hatuka



PORTLAND, ME

INTEGRATED INDUSTRIAL URBANISM



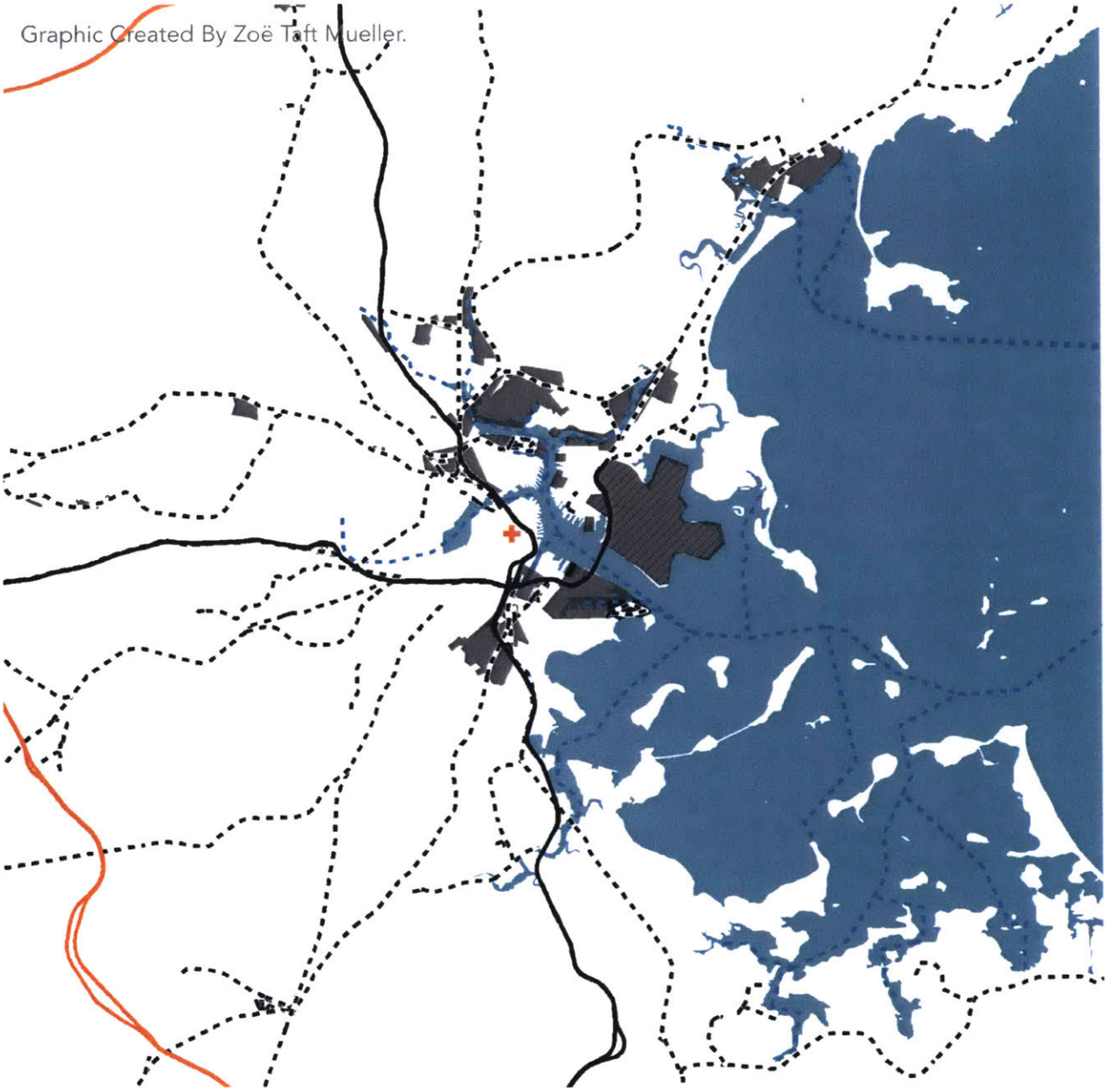
PORTSMOUTH, NH

INTEGRATED INDUSTRIAL URBANISM

City Center
I-95
National Primary Roads
National Rail
Navigable Waterways

Port Areas
Airports
Industrial Areas
Residential Areas
State Boundaries

0 2 4 8 Miles



BOSTON, MA

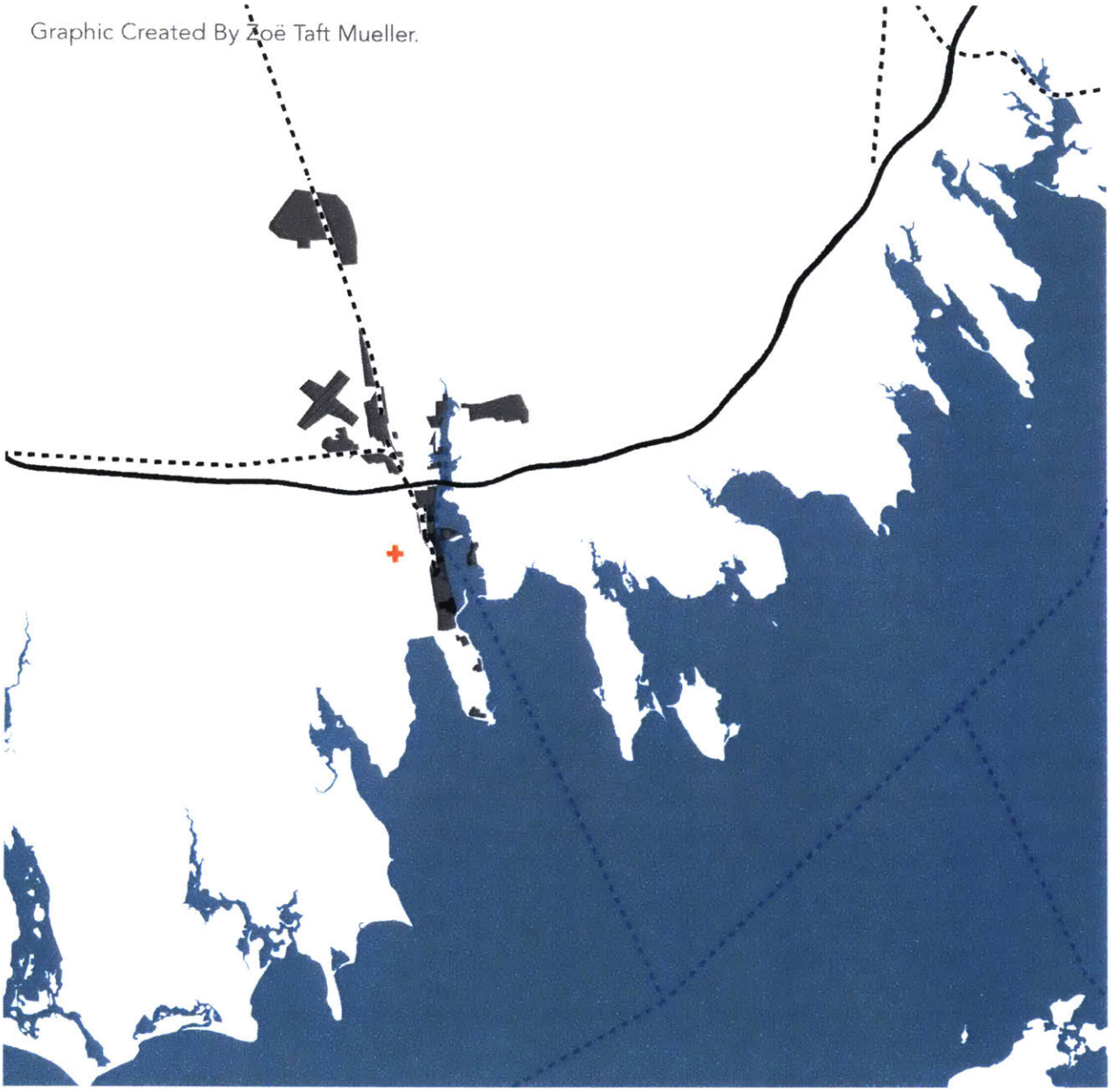
INTEGRATED INDUSTRIAL URBANISM

City Center
I-95
National Primary Roads
National Rail
Navigable Waterways

Port Areas
Airports
Industrial Areas
Residential Areas
State Boundaries

0 2 4 8 Miles

Graphic Created By Zoë Taft Mueller.



NEW BEDFORD, MA

INTEGRATED INDUSTRIAL URBANISM

City Center
I-95
National Primary Roads
National Rail
Navigable Waterways

Port Areas
Airports
Industrial Areas
Residential Areas
State Boundaries

0 2 4 8 Miles

Graphic Created By Zoë Taft Mueller.

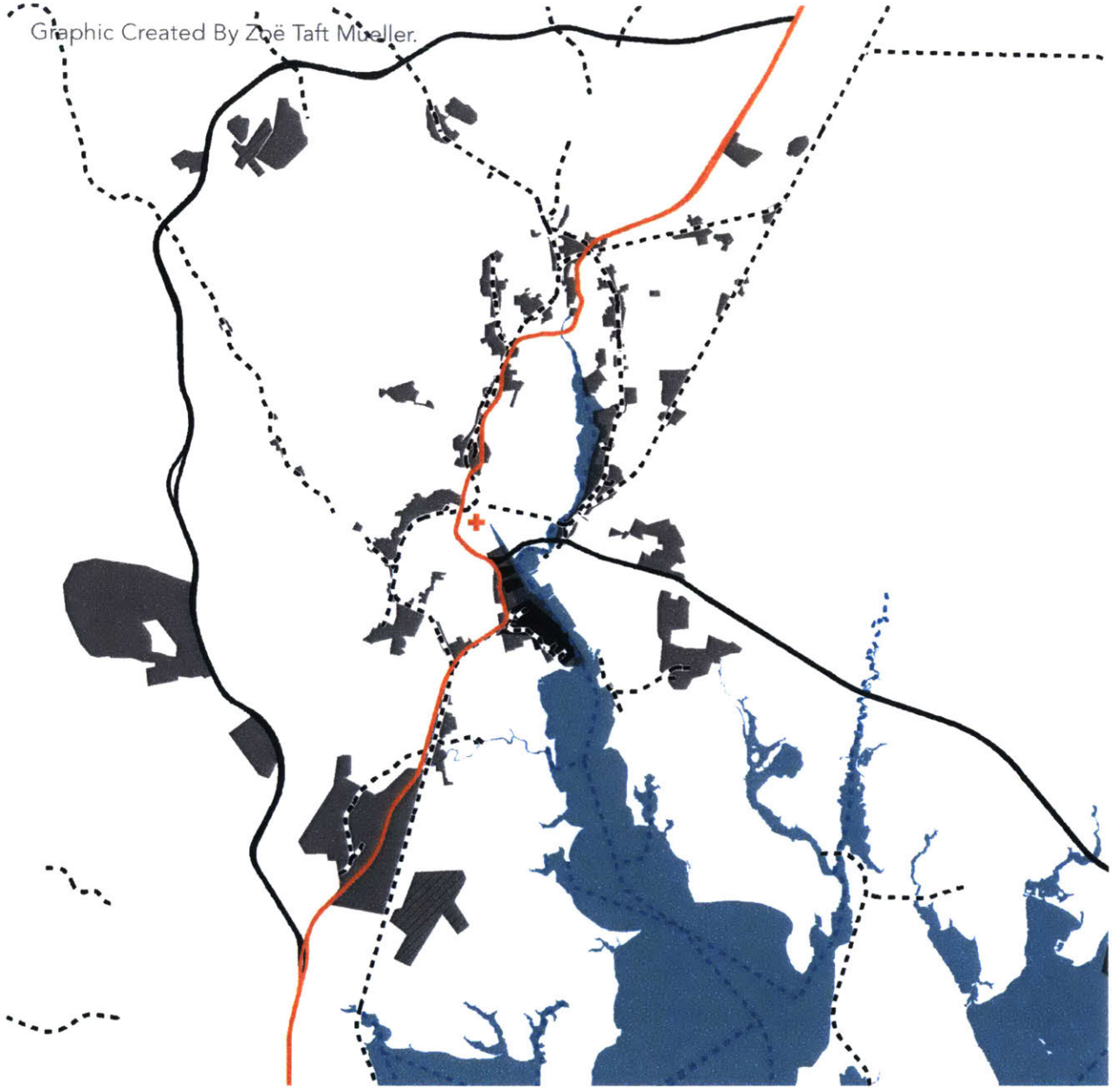
FALL RIVER, MA

INTEGRATED INDUSTRIAL URBANISM

City Center
I-95
National Primary Roads
National Rail
Navigable Waterways

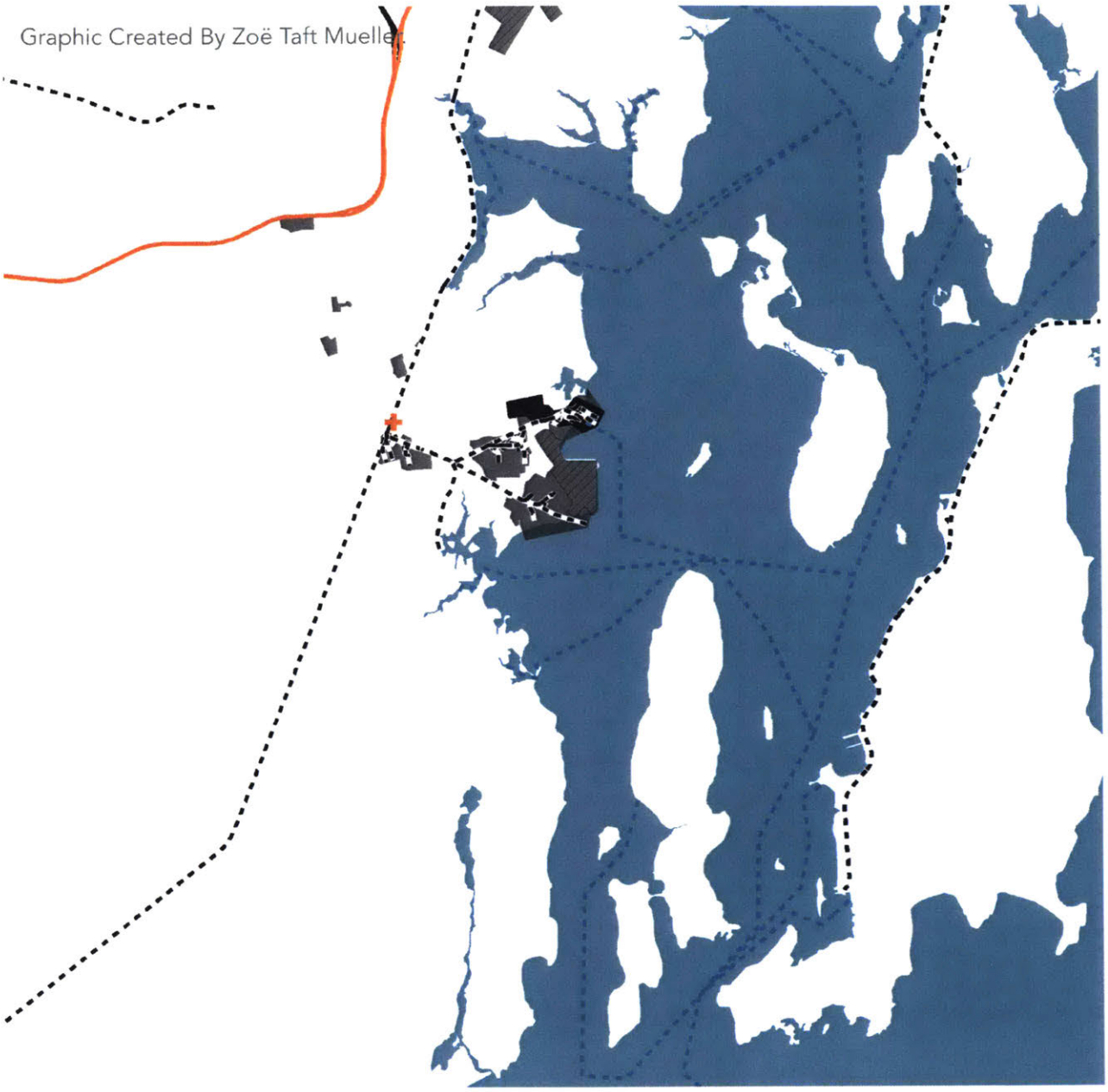
Port Areas
Airports
Industrial Areas
Residential Areas
State Boundaries

0 2 4 8 Miles



PROVIDENCE, RI

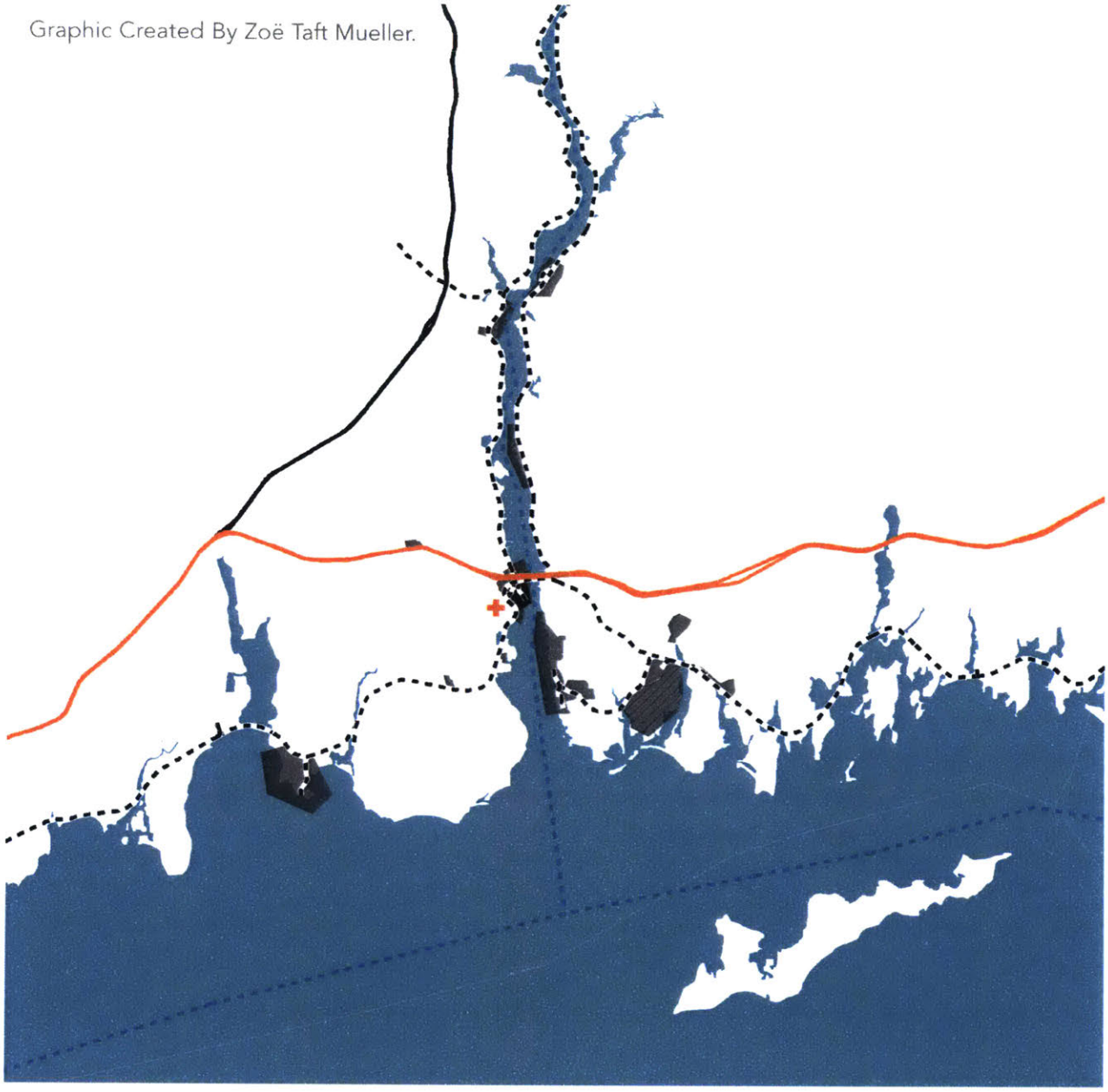
INTEGRATED INDUSTRIAL URBANISM



DAVISVILLE, RI

INTEGRATED INDUSTRIAL URBANISM

Graphic Created By Zoë Taft Mueller.



NEW LONDON, CT

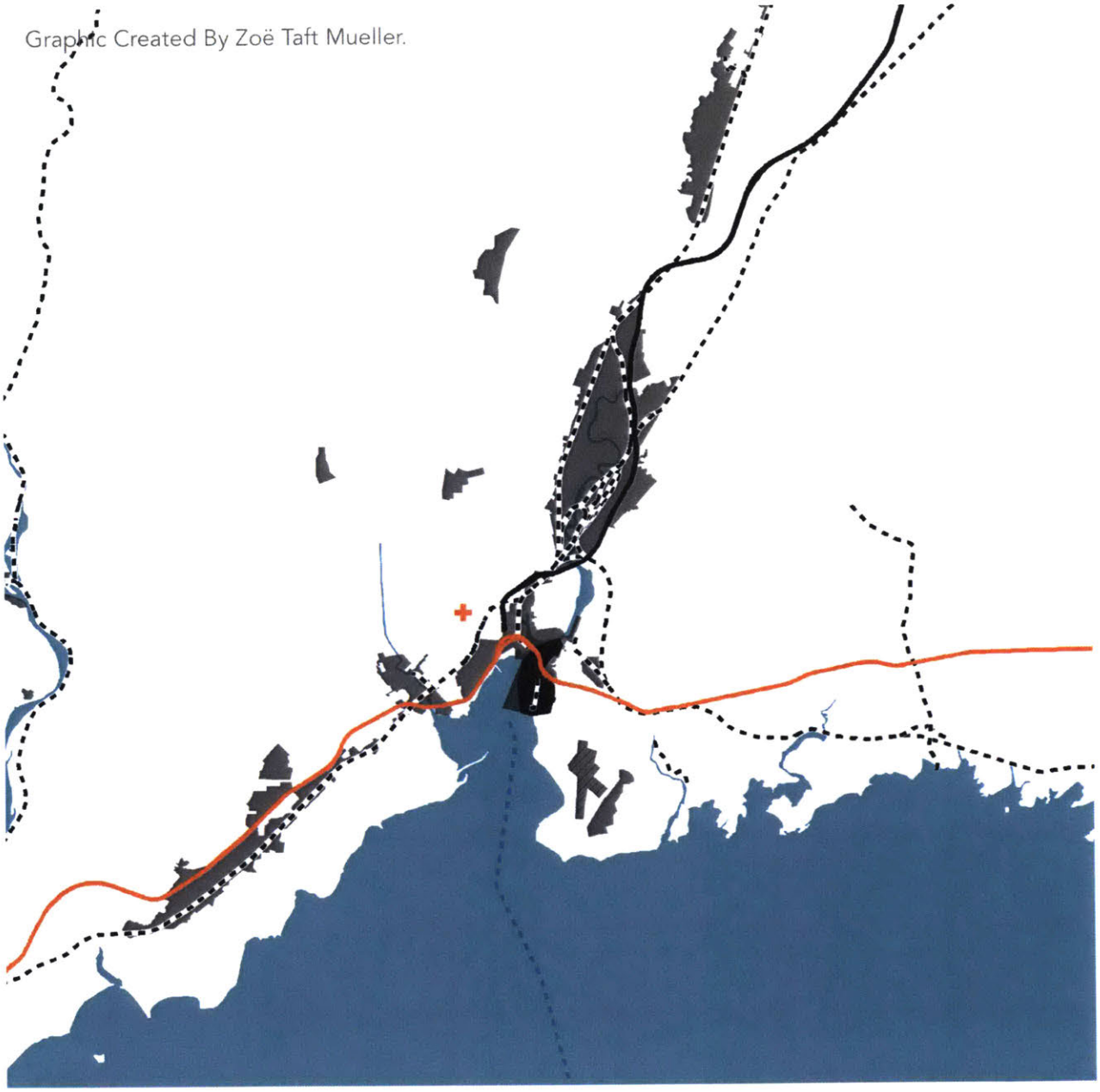
INTEGRATED INDUSTRIAL URBANISM

City Center
I-95
National Primary Roads
National Rail
Navigable Waterways

Port Areas
Airports
Industrial Areas
Residential Areas
State Boundaries

0 2 4 8 Miles

Graphic Created By Zoë Taft Mueller.



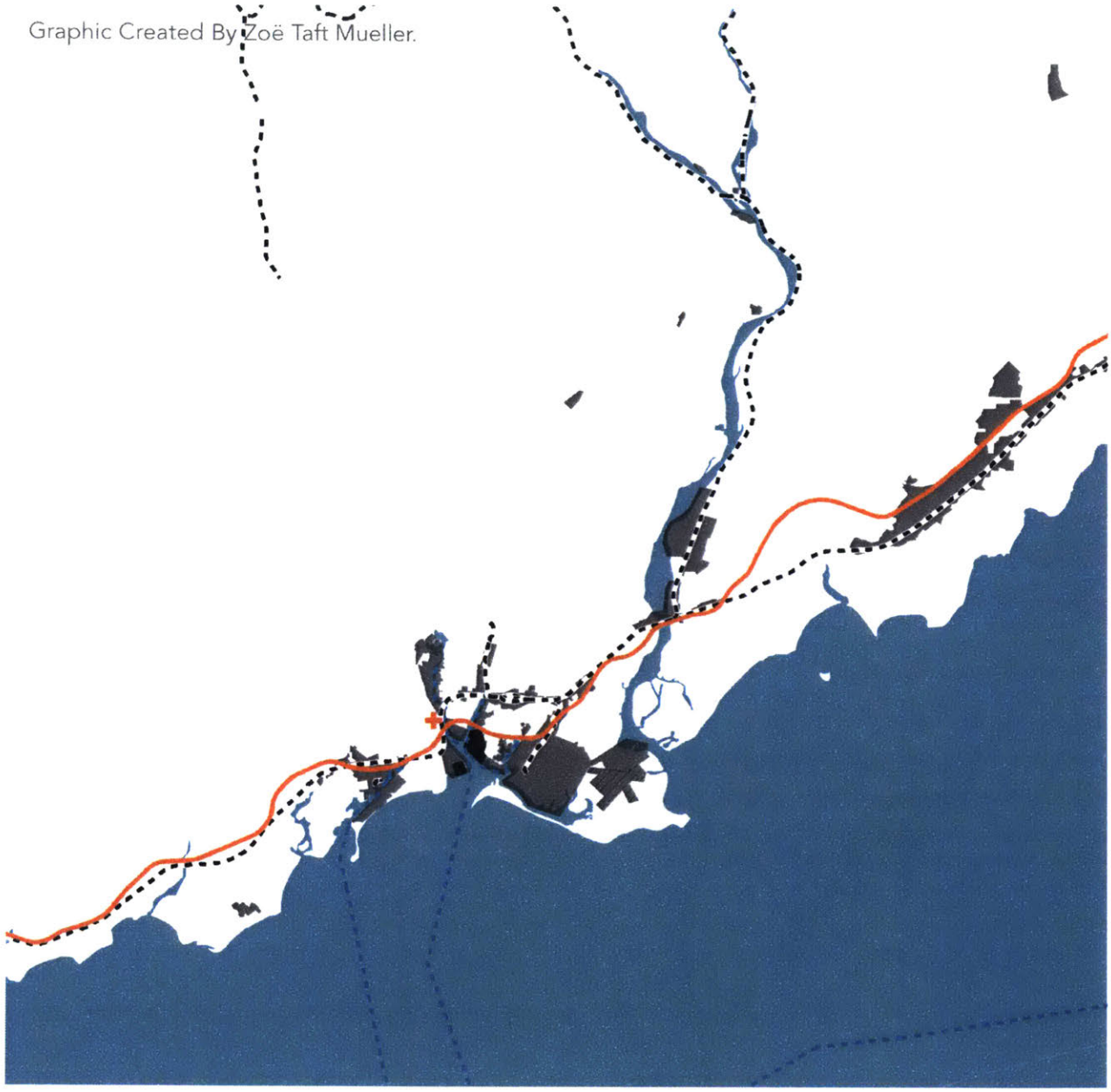
NEW HAVEN, CT

INTEGRATED INDUSTRIAL URBANISM

City Center
I-95
National Primary Roads
National Rail
Navigable Waterways

Port Areas
Airports
Industrial Areas
Residential Areas
State Boundaries

0 2 4 8 Miles



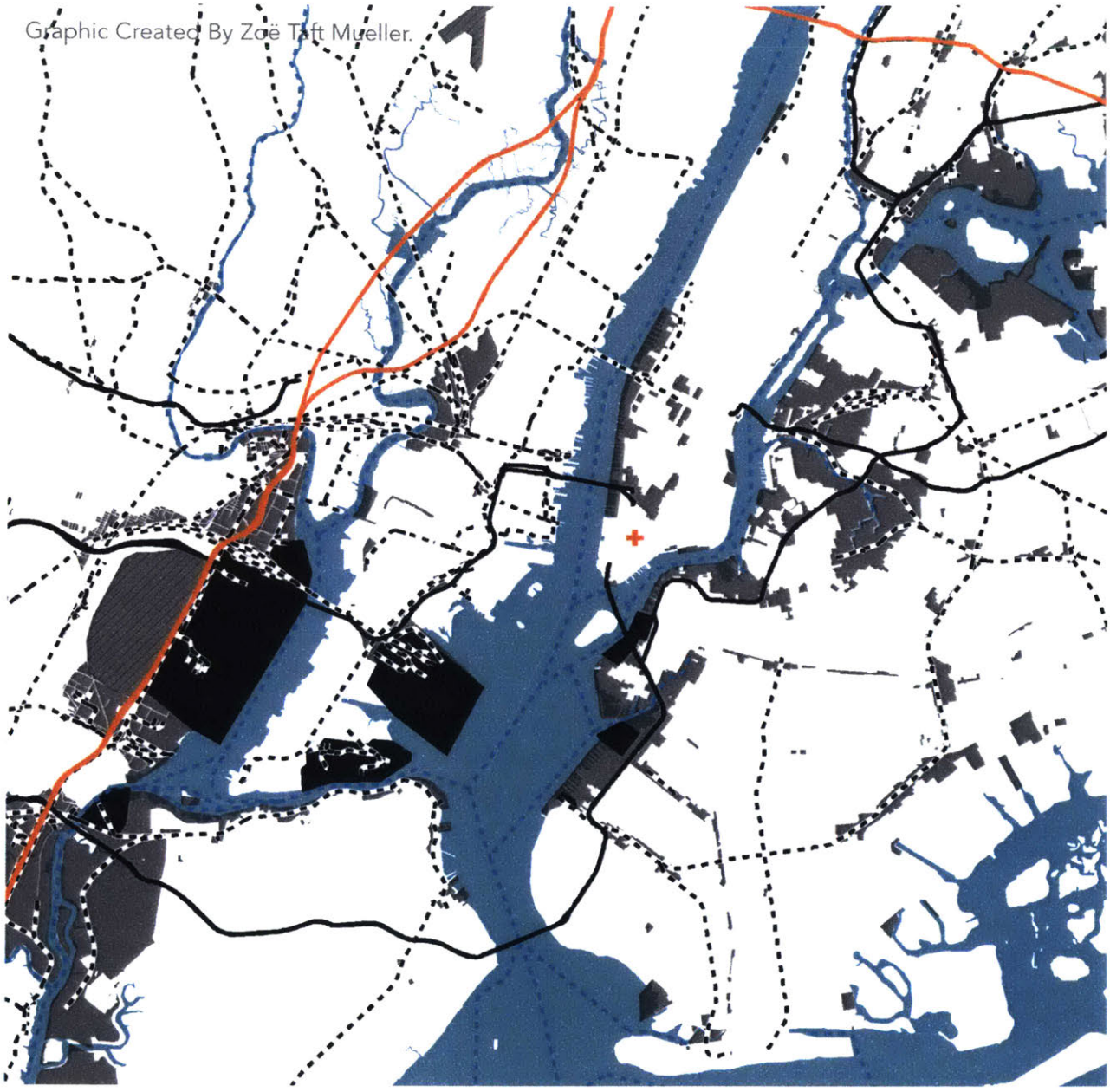
BRIDGEPORT, CT

INTEGRATED INDUSTRIAL URBANISM

ALBANY, NY

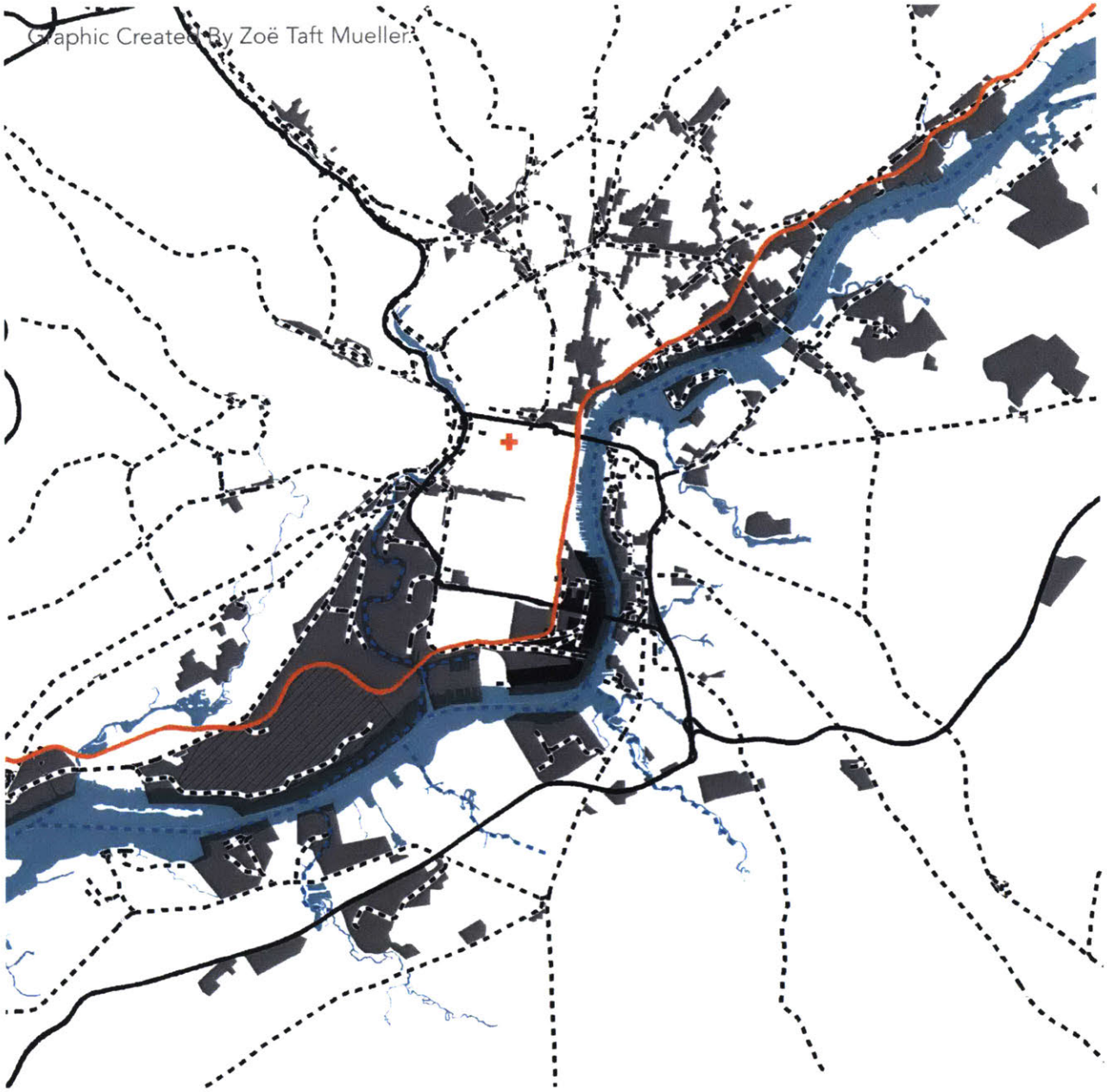
INTEGRATED INDUSTRIAL URBANISM

City Center
I-95
National Primary Roads
National Rail
Navigable Waterways
Port Areas
Airports
Industrial Areas
Residential Areas
State Boundaries
0 2 4 8 Miles



NEW YORK, NY

INTEGRATED INDUSTRIAL URBANISM



PHILADELPHIA, PA

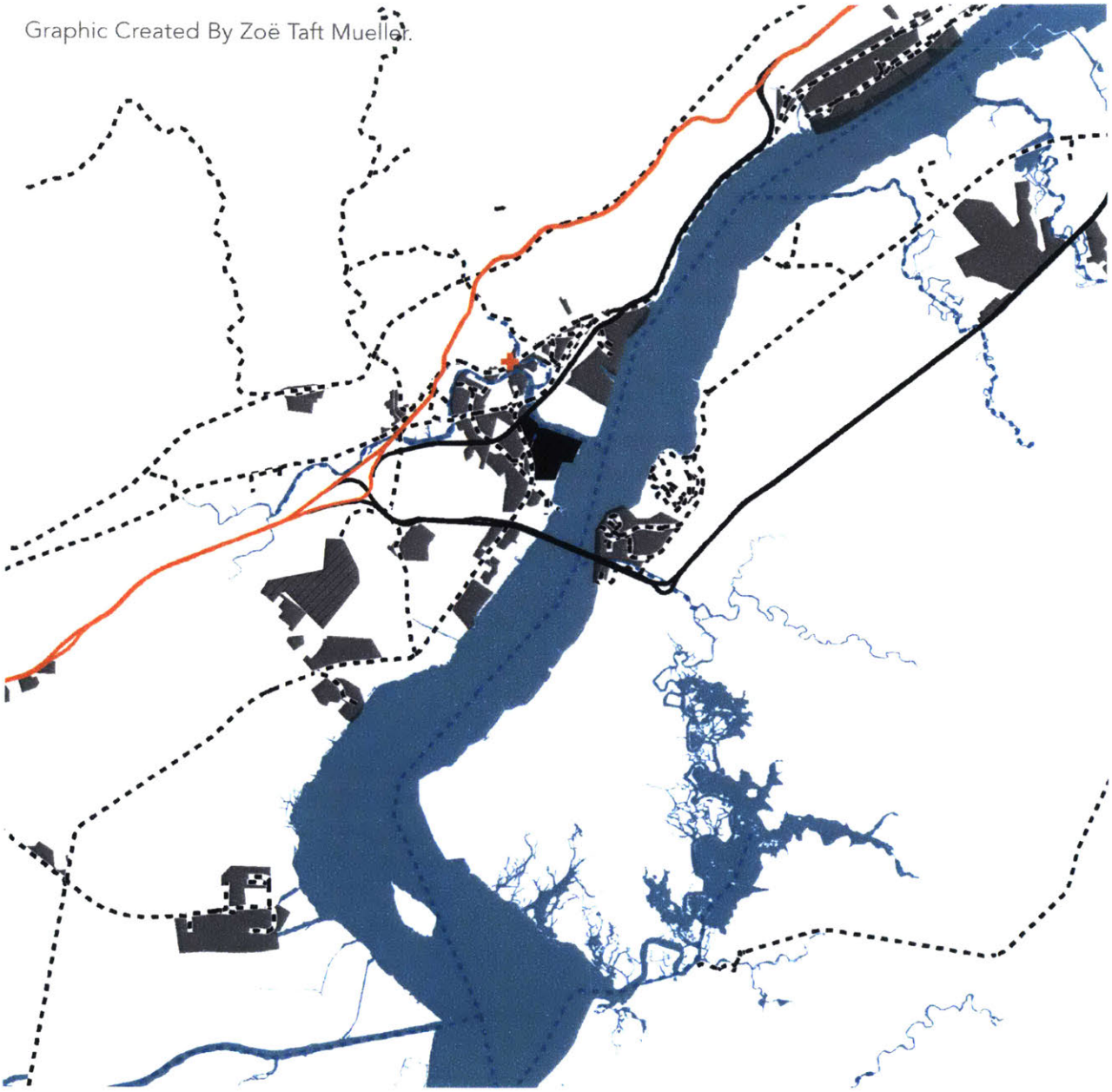
INTEGRATED INDUSTRIAL URBANISM

City Center
I-95
National Primary Roads
National Rail
Navigable Waterways

Port Areas
Airports
Industrial Areas
Residential Areas
State Boundaries

0 2 4 8 Miles

Graphic Created By Zoë Taft Mueller.



WILMINGTON, DE

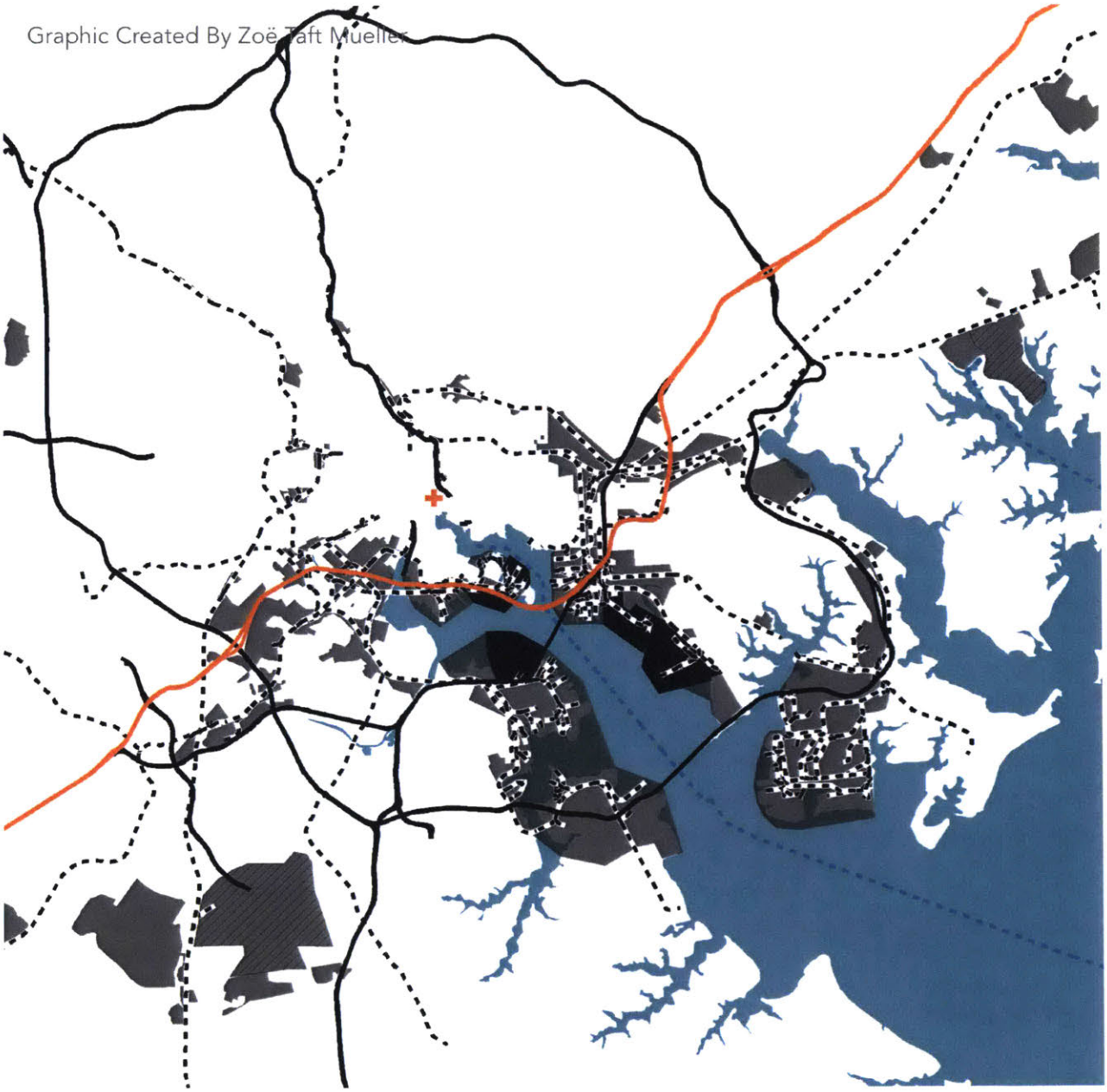
INTEGRATED INDUSTRIAL URBANISM

City Center
I-95
National Primary Roads
National Rail
Navigable Waterways

Port Areas
Airports
Industrial Areas
Residential Areas
State Boundaries

0 2 4 8 Miles

Graphic Created By Zoë Taft Mueller



BALTIMORE, MD

INTEGRATED INDUSTRIAL URBANISM

City Center
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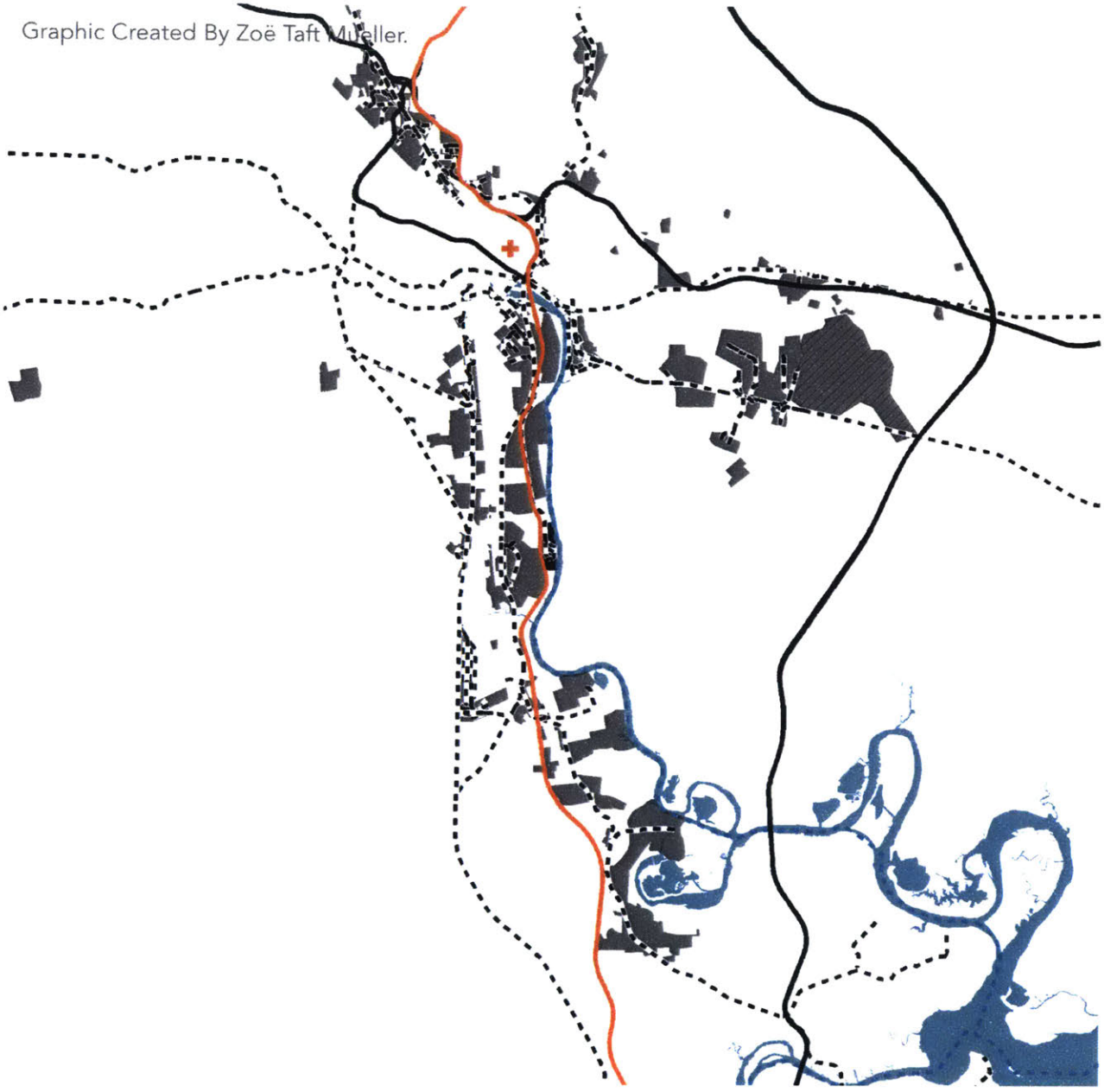
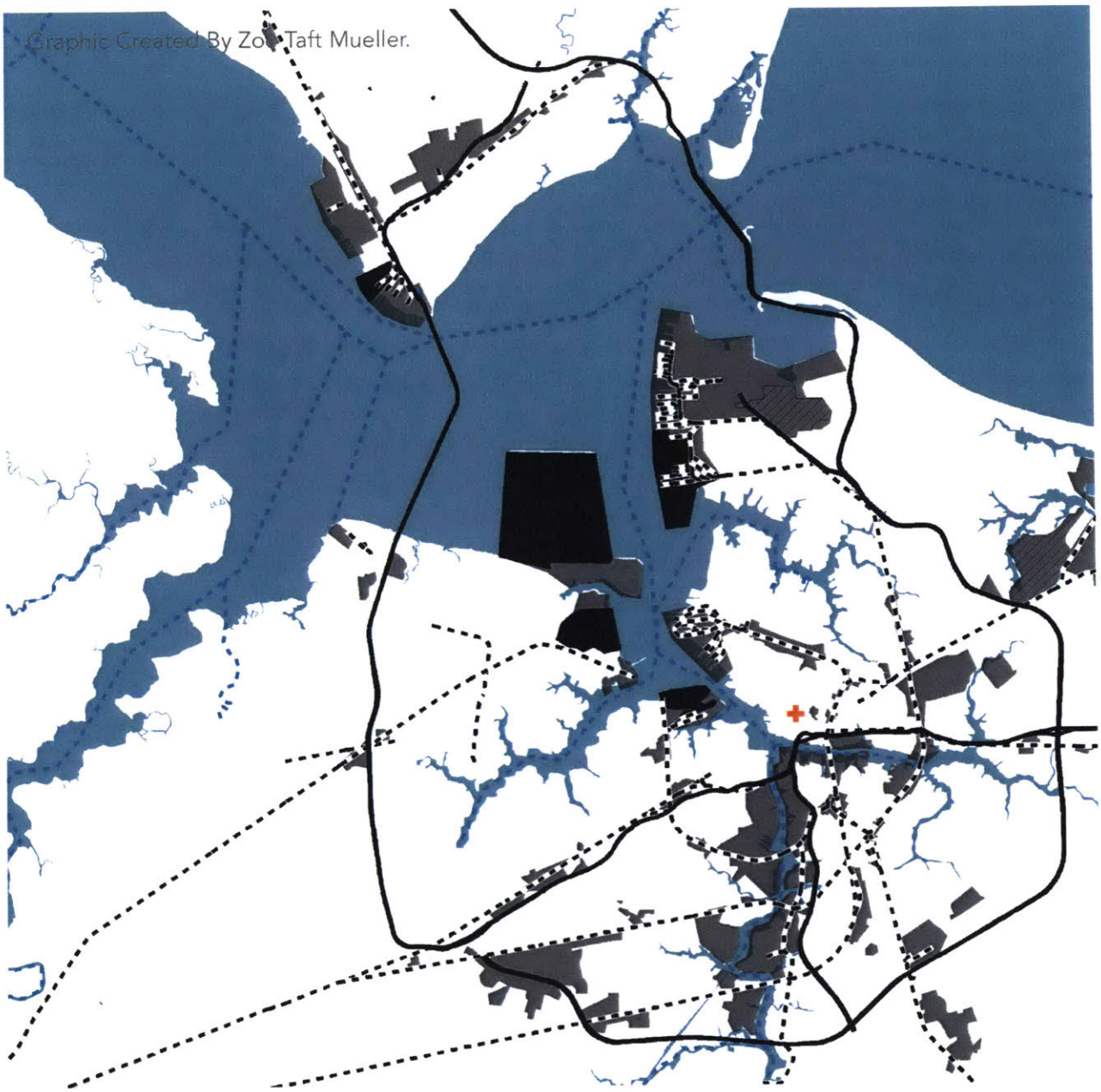


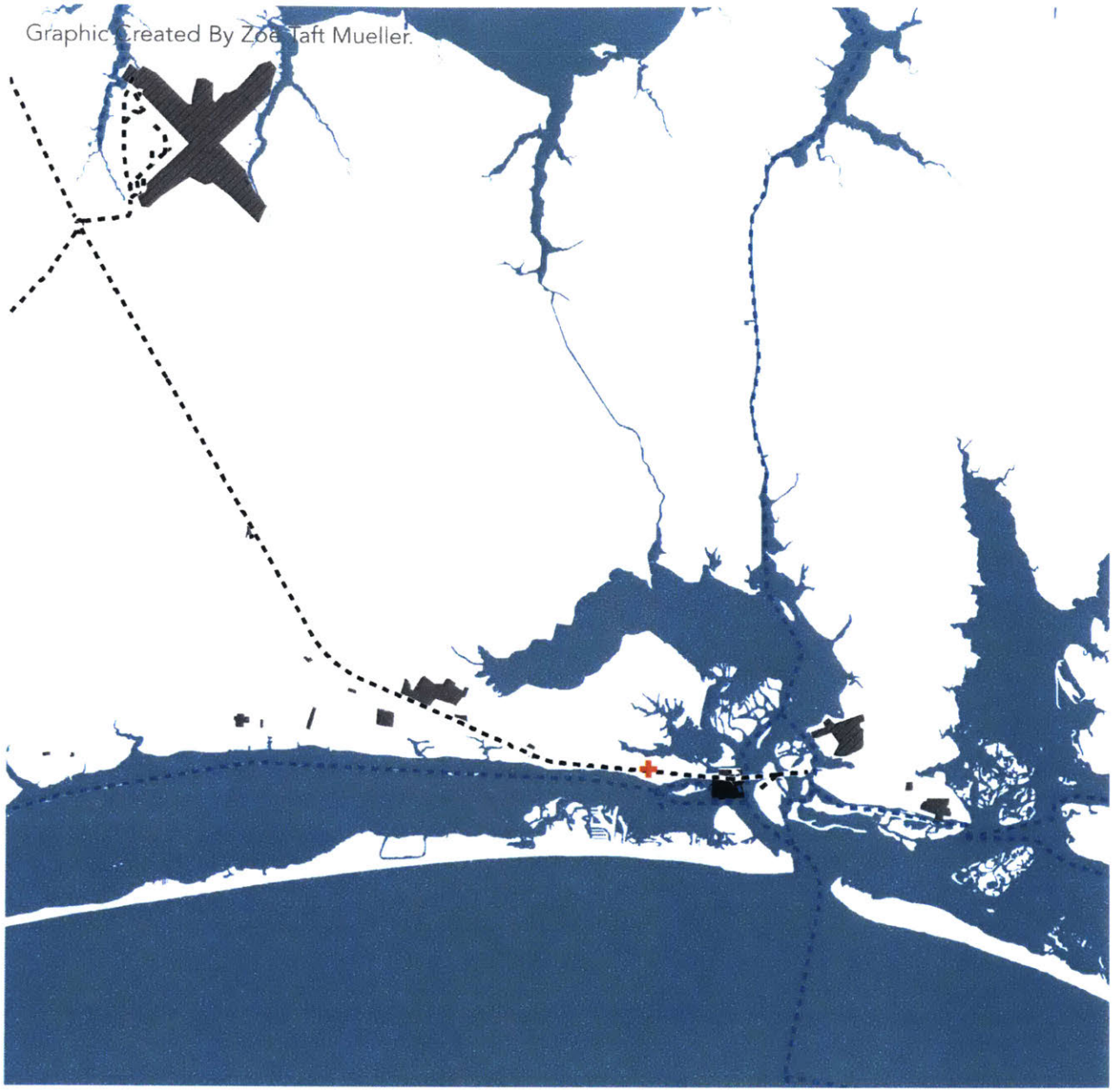
RICHMOND, VA

INTEGRATED INDUSTRIAL URBANISM



NORFOLK, VA

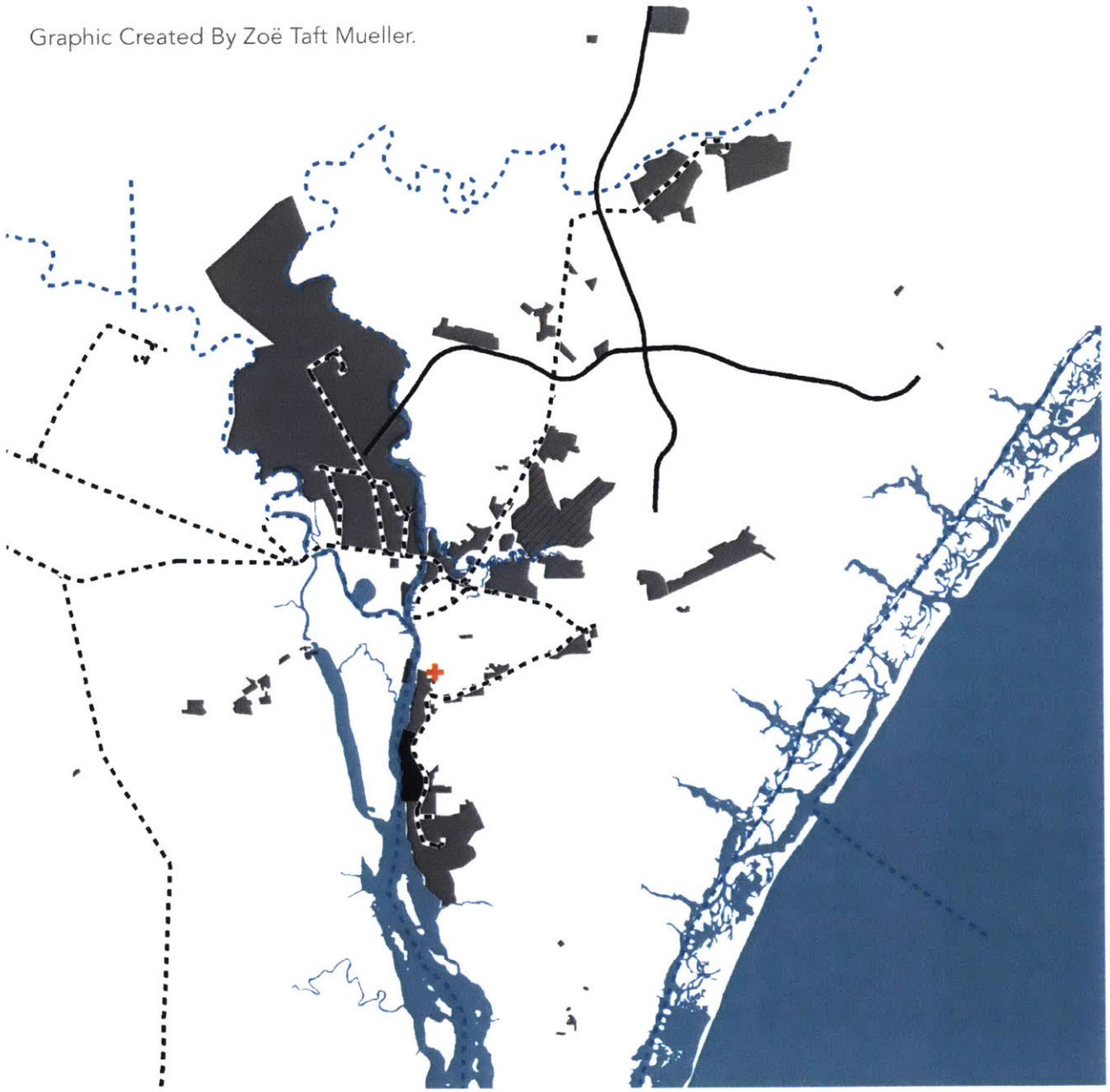
INTEGRATED INDUSTRIAL URBANISM



MOREHEAD CITY, NC

INTEGRATED INDUSTRIAL URBANISM

Graphic Created By Zoë Taft Mueller.



WILMINGTON, NC

INTEGRATED INDUSTRIAL URBANISM

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National Primary Roads
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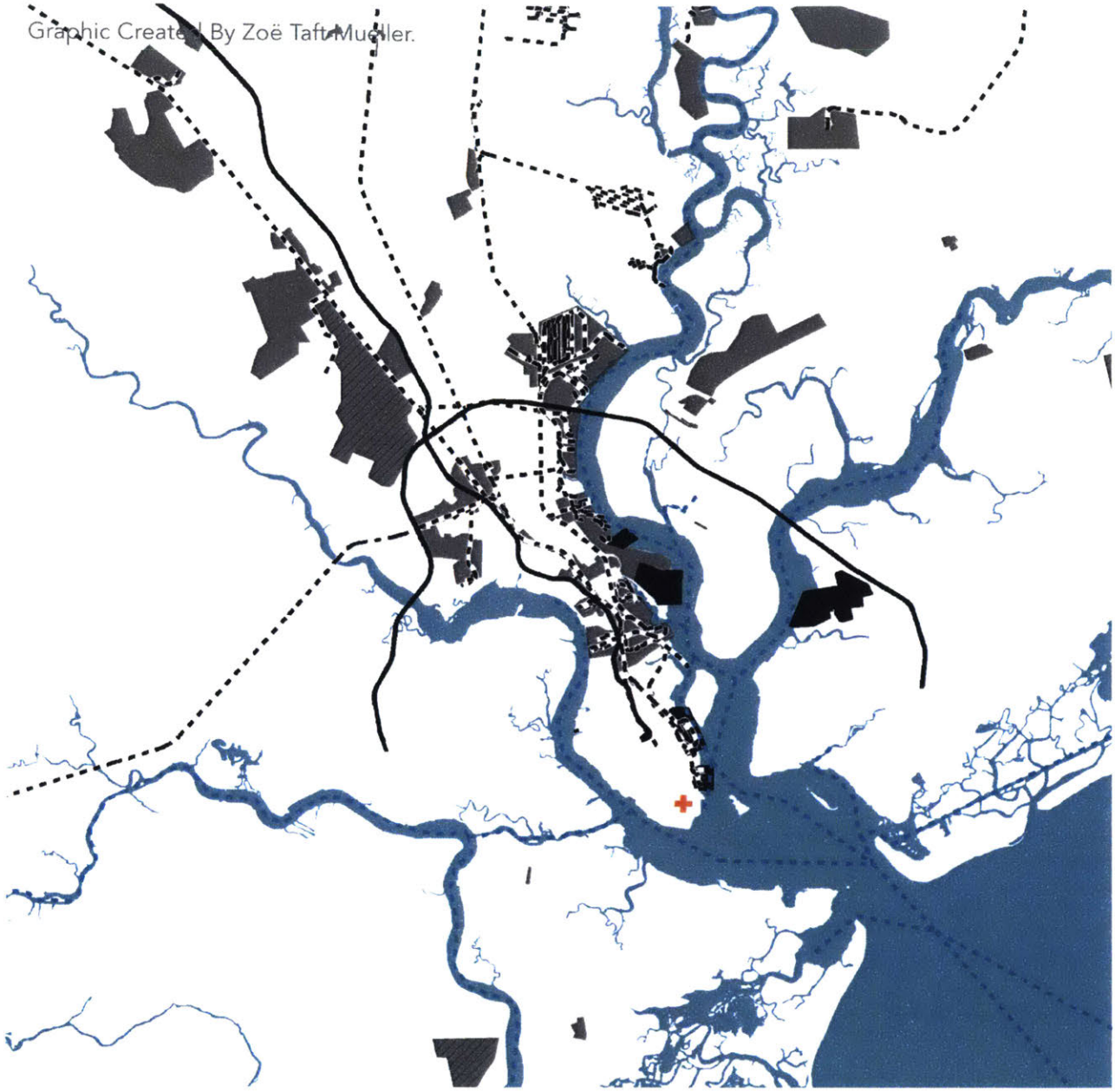
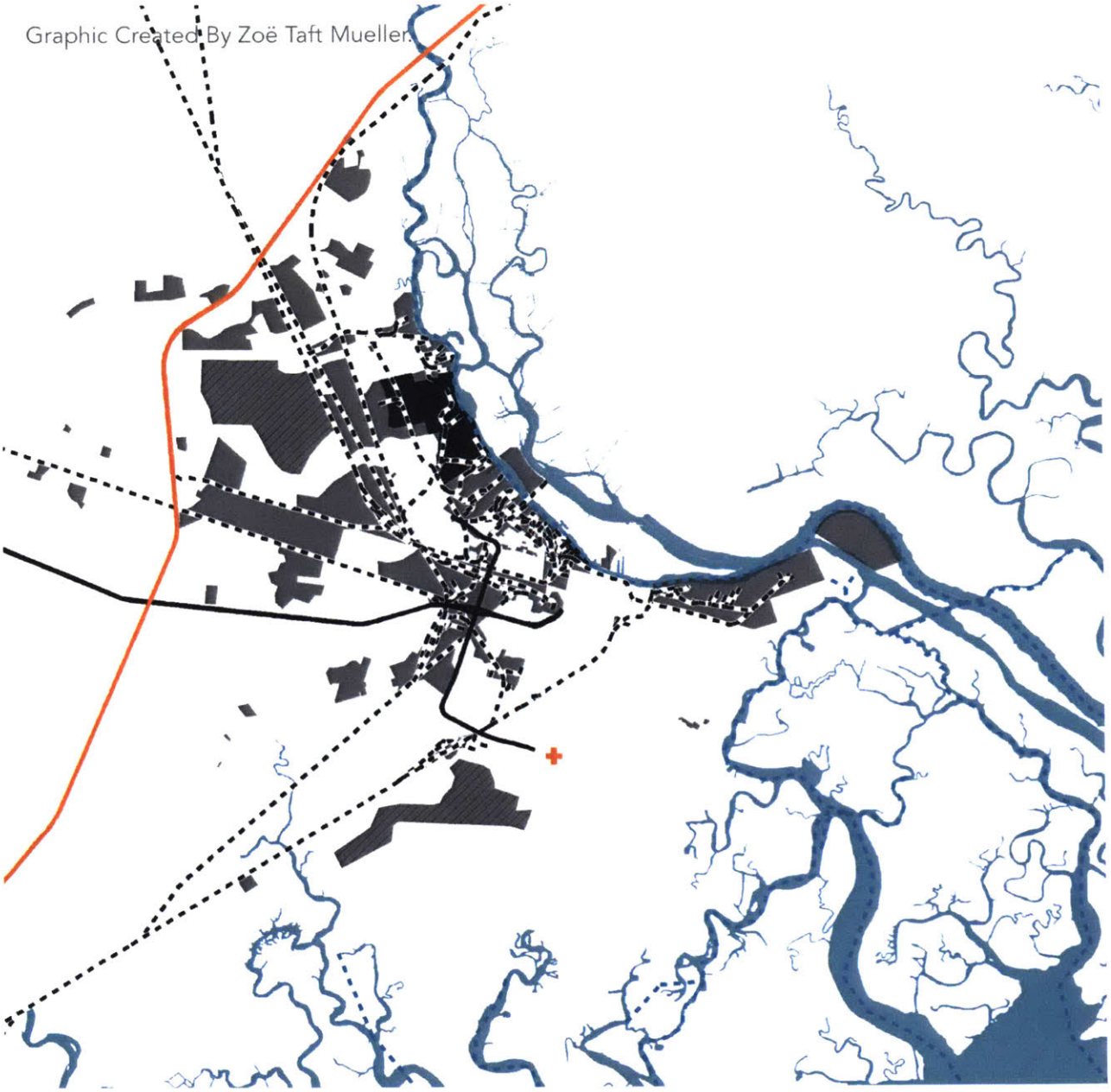


CHARLESTON, SC

INTEGRATED INDUSTRIAL URBANISM



SAVANNAH, GA

INTEGRATED INDUSTRIAL URBANISM

City Center
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National Primary Roads
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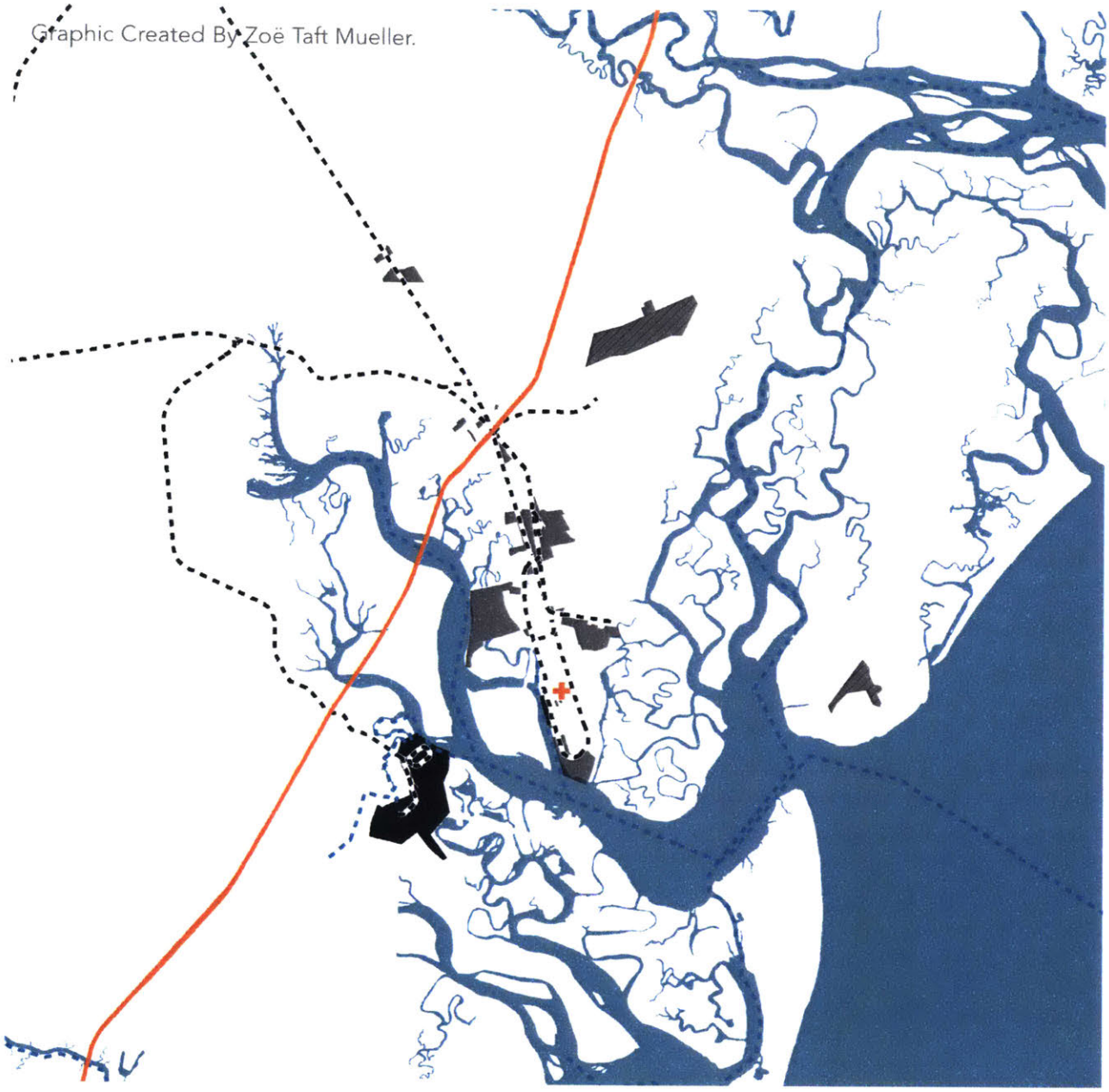
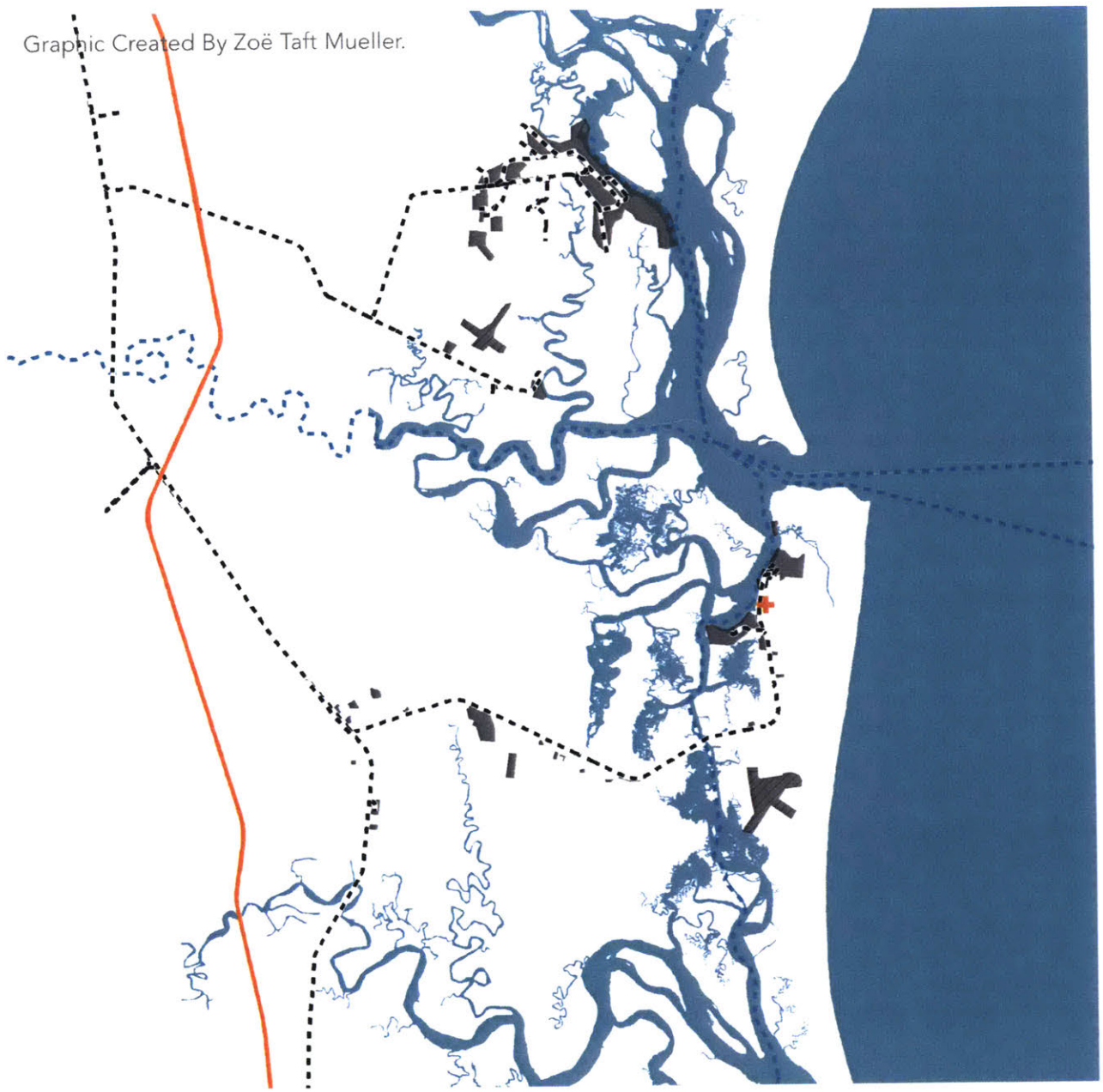
Industrial Areas
Residential Areas
State Boundaries

0 2 4 8 Miles



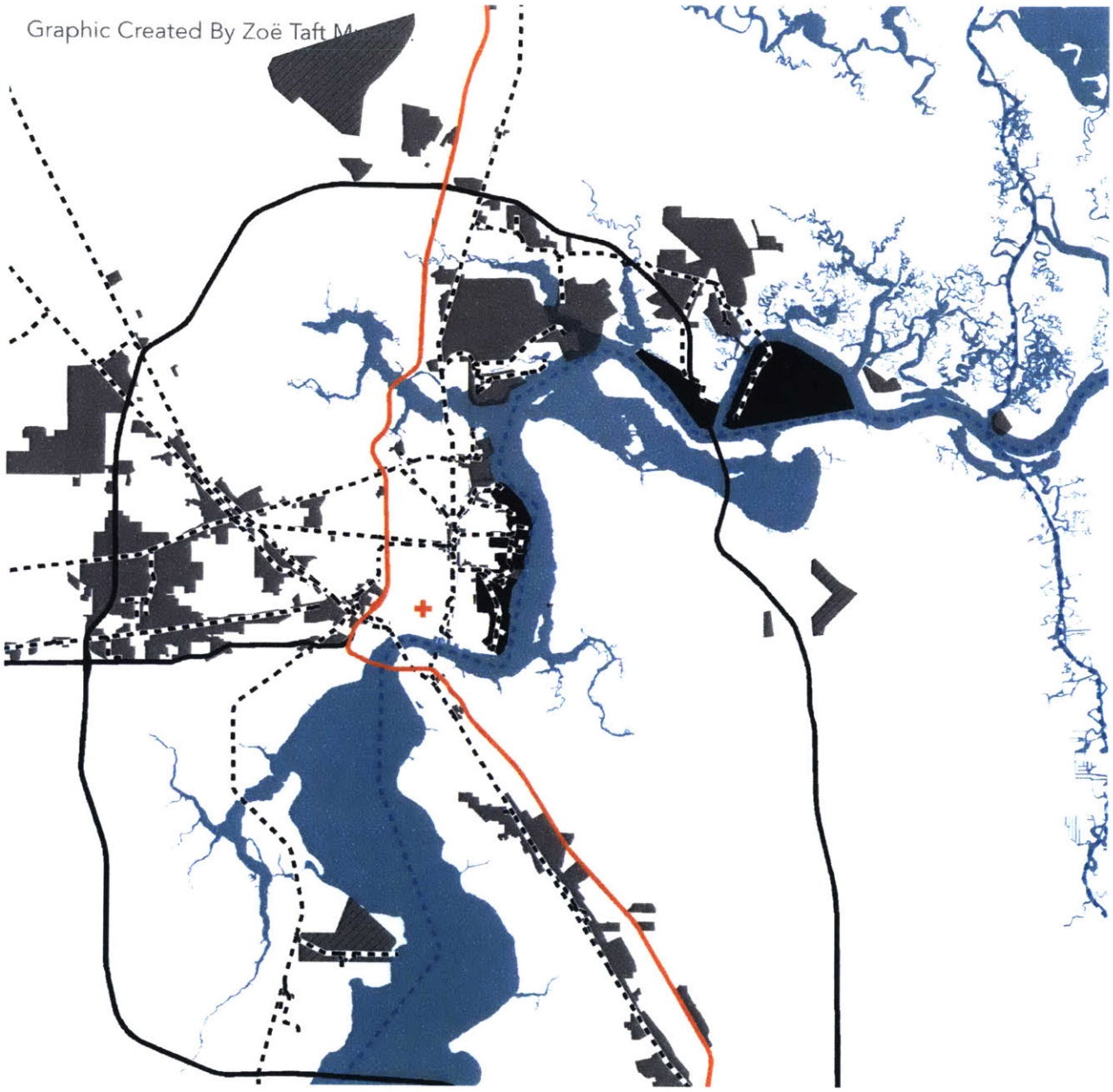
BRUNSWICK, GA

INTEGRATED INDUSTRIAL URBANISM



FERNANDINA BEACH, FL

INTEGRATED INDUSTRIAL URBANISM



JACKSONVILLE, FL

INTEGRATED INDUSTRIAL URBANISM

CAPE CANAVERAL, FL

INTEGRATED INDUSTRIAL URBANISM

City Center
I-95
National Primary Roads
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Navigable Waterways

Port Areas
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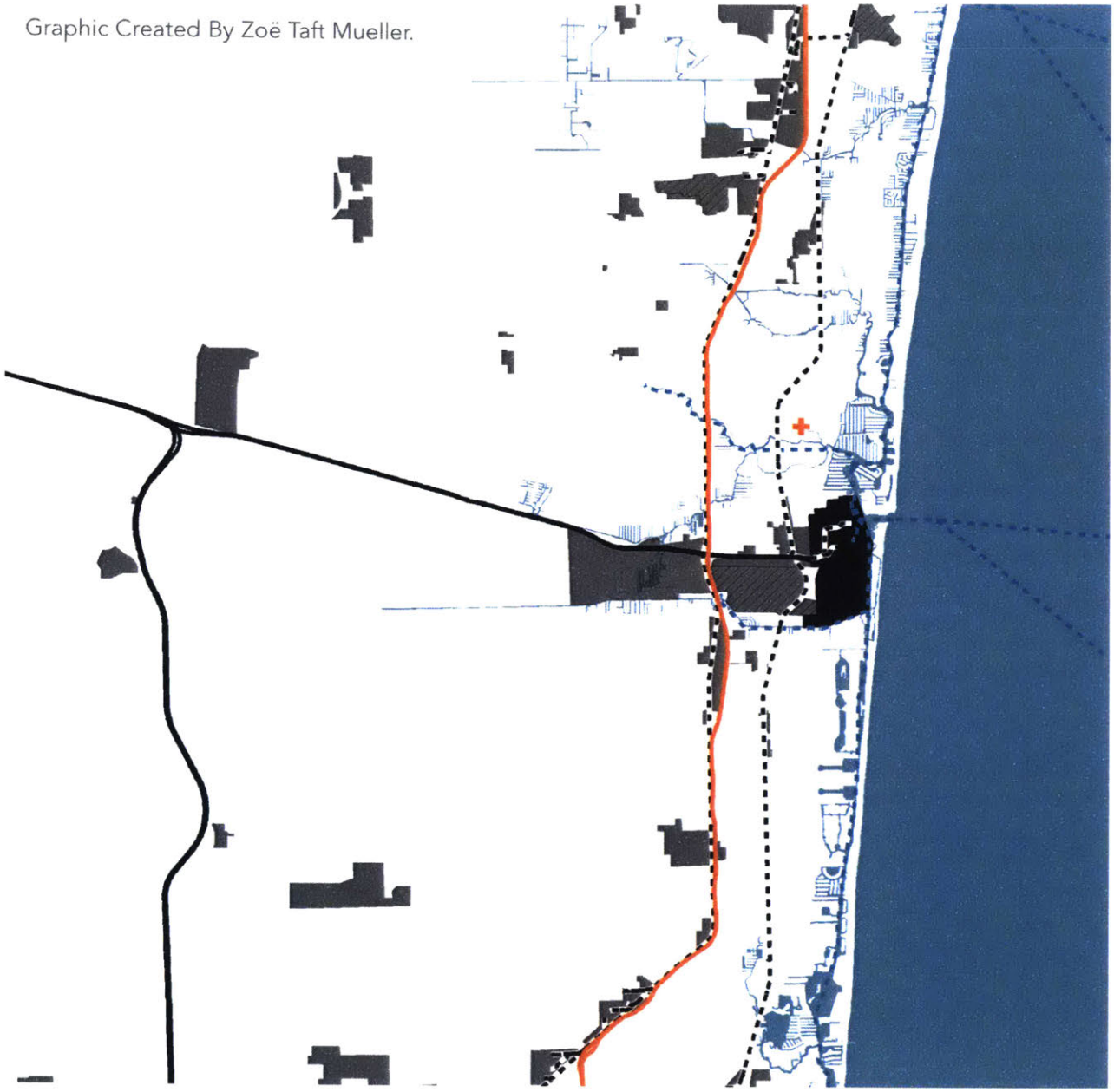
Residential Areas
State Boundaries

0 2 4 8 Miles

Graphic Created By Zoë Taft Mueller.



FORT LAUDERDALE, FL

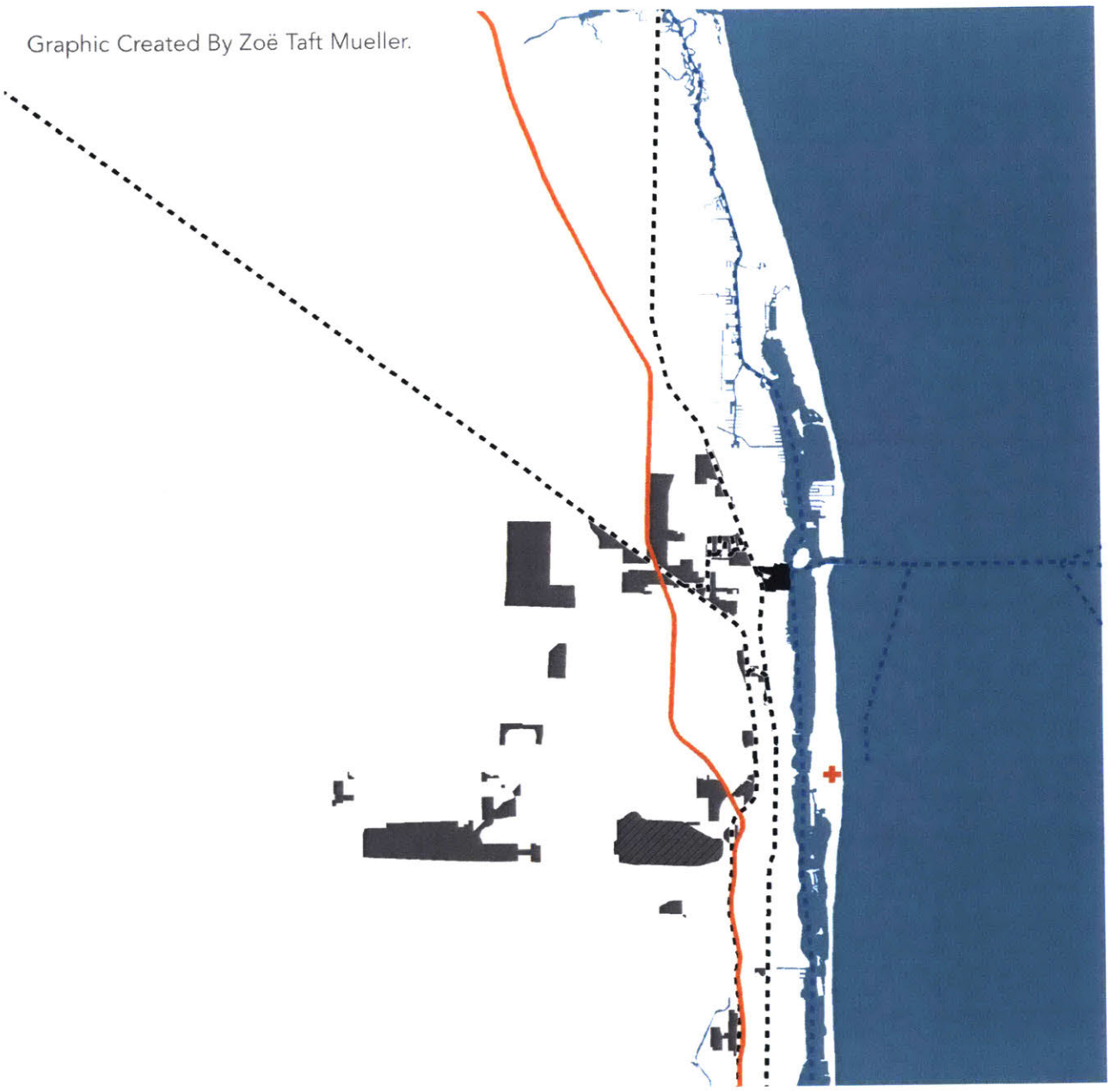
INTEGRATED INDUSTRIAL URBANISM

City Center
I-95
National Primary Roads
National Rail
Navigable Waterways

Port Areas
Airports
Industrial Areas
Residential Areas
State Boundaries

0 2 4 8 Miles

Graphic Created By Zoë Taft Mueller.



PALM BEACH, FL

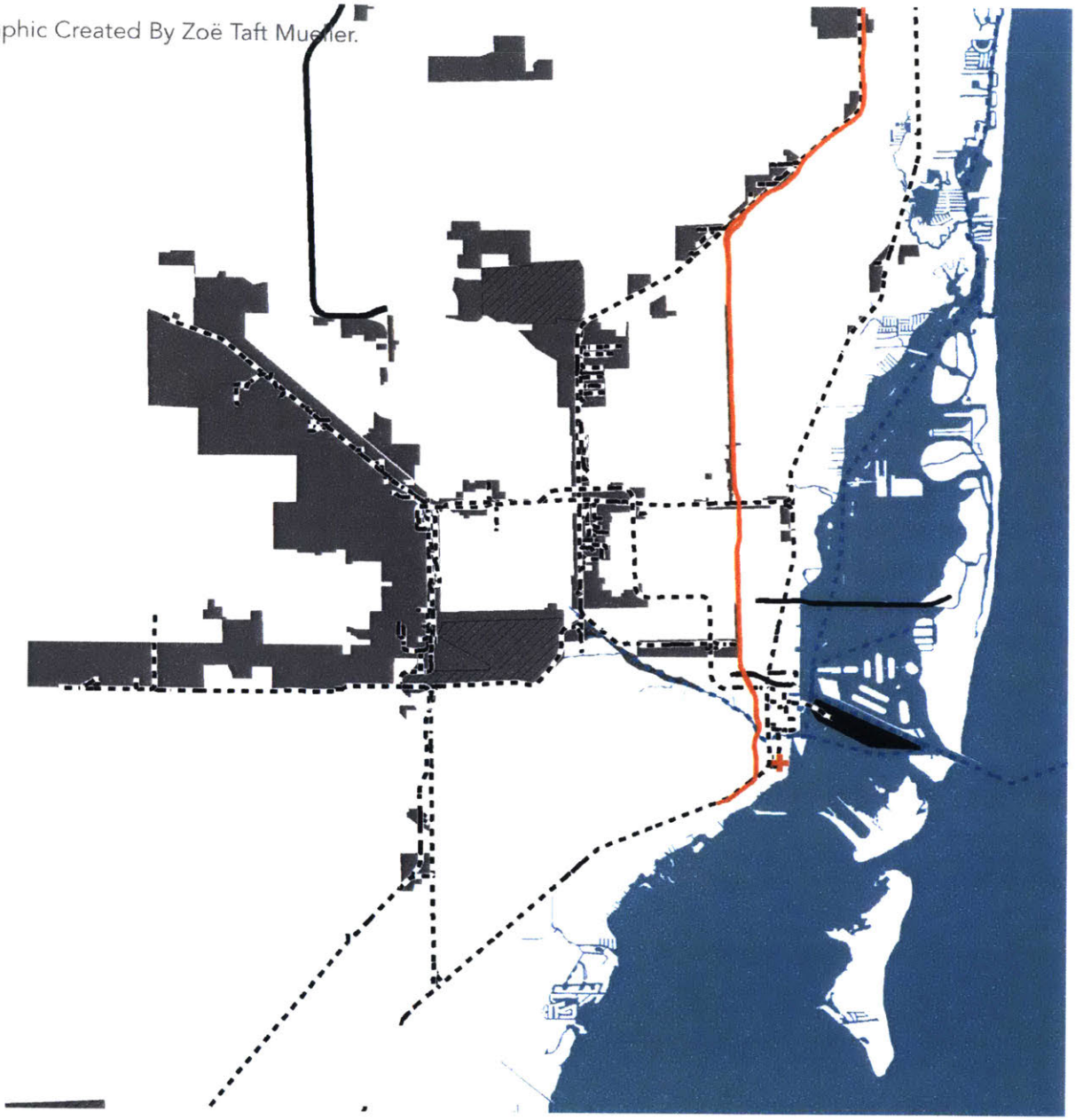
INTEGRATED INDUSTRIAL URBANISM

City Center
I-95
National Primary Roads
National Rail
Navigable Waterways

Port Areas
Airports
Industrial Areas
Residential Areas
State Boundaries

0 2 4 8 Miles

Graphic Created By Zoë Taft Mueller.



MIAMI, FL

INTEGRATED INDUSTRIAL URBANISM

City Center
I-95
National Primary Roads
National Rail
Navigable Waterways

Port Areas
Airports
Industrial Areas
Residential Areas
State Boundaries

0 2 4 8 Miles

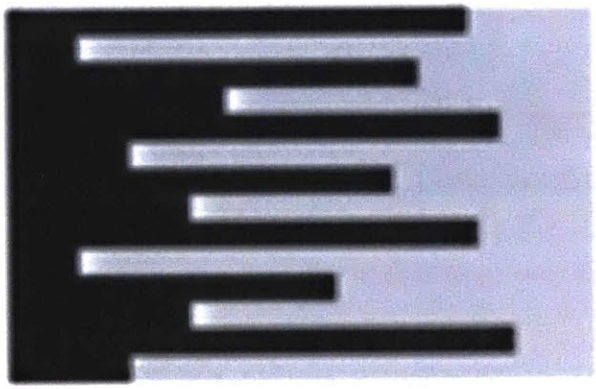
US ATLANTIC PORT CITIES DISPLAY INTEGRATED INDUSTRIAL URBANISM.

All the major metro areas along the Atlantic Coast exhibit, at a metropolitan scale, an integrated industrial urbanism typology due (I think) to the period in which industrial development occurred - these were almost all industrializing pre-zoning and so zoning mostly formalized the existing ad-hoc industrial network rather than forcing those networks to consolidate and segregate themselves from the residential fabric.

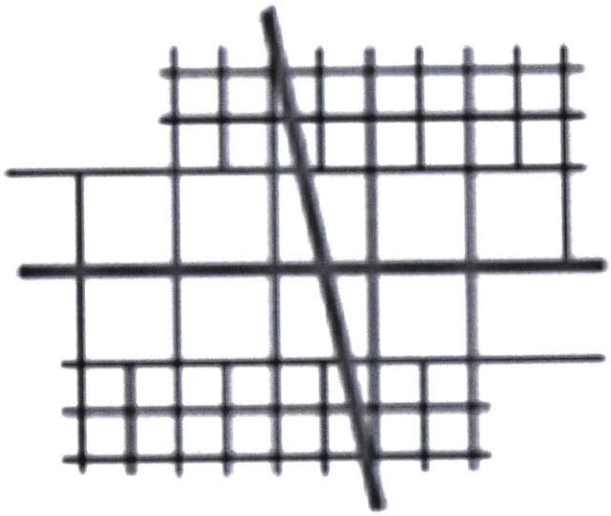
In general, this industrial development pattern means that the industrial system shares infrastructure with non-industrial users and is often close enough to have a significant impact on air, water and soil pollution levels in neighboring residential and commercial districts. However, this proximity also is a strength - it offers greater workforce accessibility and allows for greater agglomeration benefits for 21st century advanced manufacturing and biotech.

The following three pages offer a comparison of the industrial development patterns across all 27 urban areas considered showing the range within the integrated industrial urbanism typology. Some cities display an in-tact linear rail oriented network while. Others exhibit more of a patchwork highway-oriented network with large tracts at the periphery. Most display a bit of both.

program



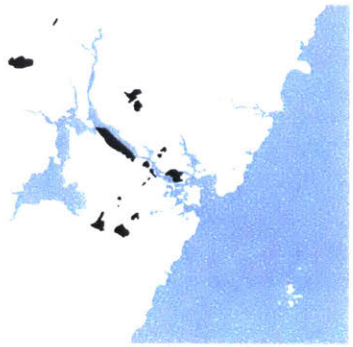
infrastructure



Graphics Created By Eran Ben Joseph + Tali Hatuka

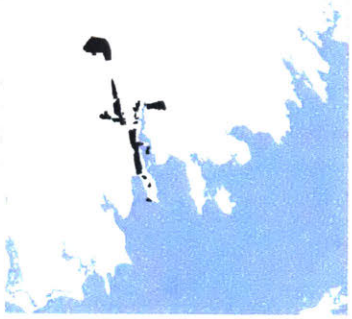
Graphics Created By Zoë Taft Mueller.

Portland, ME



Portsmouth, NH

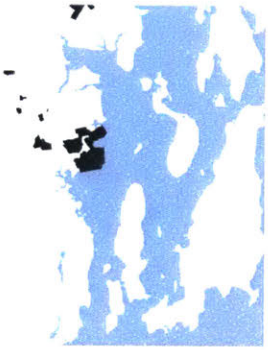
Boston, MA



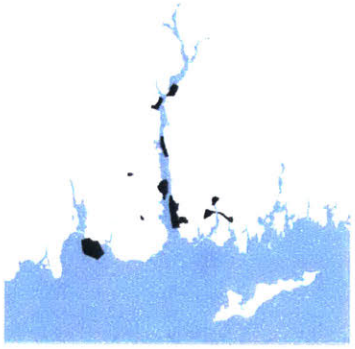
New Bedford, MA

Fall River, MA

Providence, RI



Davisville, RI



New London, CT

New Haven, CT

Bridgeport, CT

Albany, NY

Graphics Created By Zoë Taft Mueller.

New York City, NY

Philadelphia, PA

Wilmington, DE

Baltimore, MD

Richmond, VA

Norfolk, VA

Morehead City, NC

Wilmington, NC

Georgetown, SC

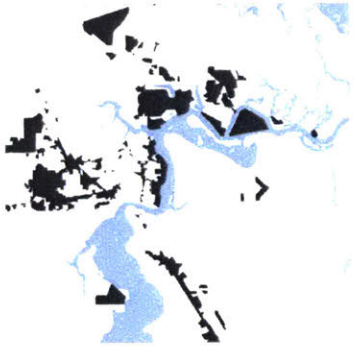
Charleston, SC

Savannah, GA

Brunswick, GA

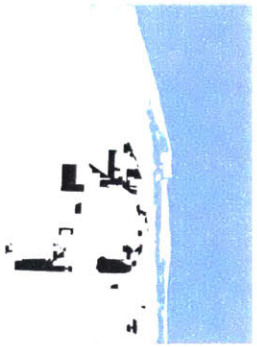
Graphics Created By Zoë Taft Mueller.

Fernandina Beach, FL

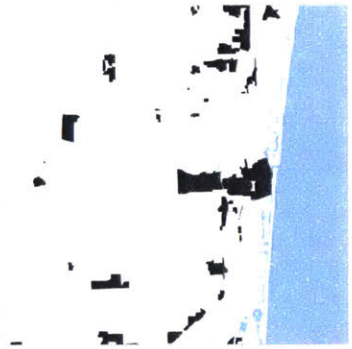


Jacksonville, FL

Cape Canaveral, FL



Palm Beach, FL



Fort Lauderdale, FL

Miami, FL

The next chapter will shift scale to consider the ways the district level relationships have evolved to compensate for the pervasive physical proximity of industrial and non-industrial uses in these "integrated" metropolitan scale systems. When you look at any of these cities and zoom into the district/facility scale, you can see the physical and perceptual isolation tactics employed to reduce, hide and disguise the impact of industrial land uses on nearby non-industrial uses. The variety and ingenuity of these buffer and isolation tactics is especially apparent in the urban periphery of cities with a long history of industrial development spanning multiple periods and styles of development.

03. CATALOG OF ISOLATION TACTICS

Tactics that Have Isolated Industry from its City

Guiding Question(s)

Given pervasive physical proximity of industrial and non-industrial land uses along the Atlantic Coast, how has the built environment been used to structure the relationship between industrial and non-industrial uses?

The prolonged examination of aerial imagery and Google map pins throughout the Atlantic Coast yielded insights beyond the mapping of plan-view patterns at the metropolitan scale. The texture and district-scale relationships of industrial and non-industrial land uses reveals that there is already a rich palette of tactics being used to negotiate the transition between uses that may not share space well. Below are observations of how land use and the built environment are already being deployed as mechanisms to structure the relationship between industrial and non-industrial uses where they are close enough to feel the impact of the other.

COMMON INDUSTRIAL USES

- Logistics
- Auto Repair
- Construction Services (concrete, woodworking, tile + stone, welding + machining)
- Small-Scale Lumber + Stone/Aggregates Raw Goods Processing
- Paper and Gypsum Factories
- Bottling Facilities (e.g. beer, spirits, soft drinks)
- Power Generation
- Recycling and Scrap Material Reclamation
- Solid Waste and Sewer Treatment Facilities
- Warehousing + Self-Storage
- Moving Services (Uhaul and For-Hire)

COMMON SYNERGISTIC RELATIONSHIPS

- Airports
- Coast Guard Stations
- Army/Navy Stations
- NASA facilities

COMMON "BUFFER" USES

In rough order of commonality:

- Self-Contained Business/Office Parks
- Shopping Malls and other auto-oriented retail and commercial services
- Municipal offices and services
- Institutional (especially hospital + medical services, and universities/colleges or adult education)
- Cemeteries
- Gyms
- Churches
- Vets and Animal Care
- Prisons, Jails, Correctional Facilities
- Addiction and Social Welfare Services
- Veterans Clubs

COMMON PHYSICAL/VISUAL DIVIDERS

- Highways and arterial roads
- Railroads
- Water bodies
- Utility lines (esp. overhead electrical transmission corridors)
- Street Grid Shifts (back-of-block, dead end streets and cul-de-sacs)
- Municipal Political Boundaries

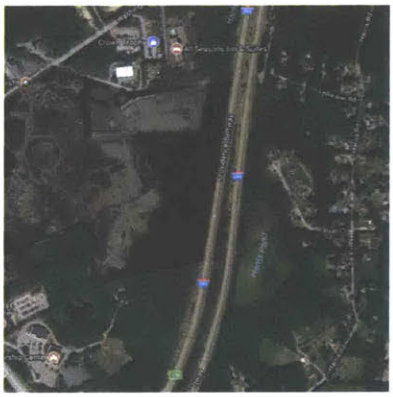
COMMON POLITICAL CONDITION

- Hugging Municipal Political Boundaries

In the following pages, I will illustrate these takeaways in detail using drawn diagrams and aerial imagery to bring the relationships to life.

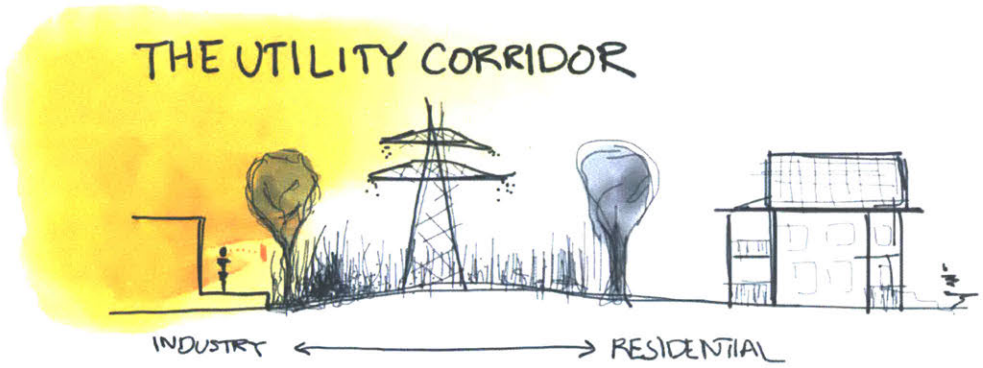
Graphic Created By Zoë Taft Mueller.

Highways not only serve as infrastructure supporting relationships within the industrial system - they also serve as useful perceptual dividers between starkly different environments. In the aerial imagery pictured below you can see the scale shift and, in many cases, the contrast in tree canopy cover between industrial land uses on one side of a highway and residential land uses on the other side of the highways. Highways themselves have varying conditions (at-grade, bermed, trenched, elevated and decked-over) which result in differing degrees of physical and perceptual permeability across the highway. In these cases, the highway is largely bermed - a condition that results in a controlled set of crossings that reinforce selected connections and negate or de-emphasize others.



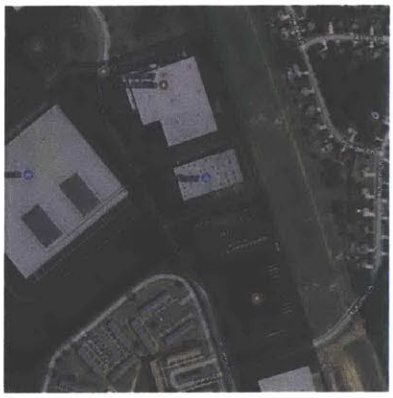
Graphic Created By Zoë Taft Mueller.

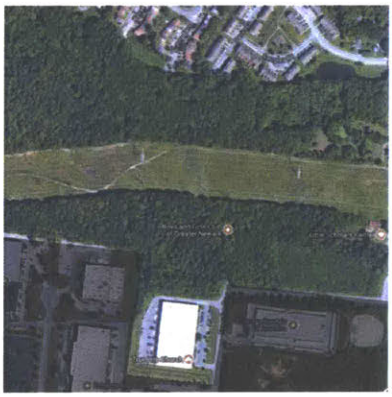
Rail corridors often serve as a spine with industrial development on both sides, but in some cases rail corridors operate in the same way as highways - they constrain and funnel circulation across them and result in two largely independent systems of circulation with a few overlaps on key cross-streets. Most often bermed or trenched to provide gradual elevation adjustments, rail lines have varying impacts on the urban areas around them because the frequency and type of use varies so widely across the country's rail corridors with some being at capacity with nearly constant use and others barely being used at all. Because it is often possible to cross railroads at non-designated locations, the frequency of active rail use has a significant impact on the degree to which the railroad acts as a divider or barrier.

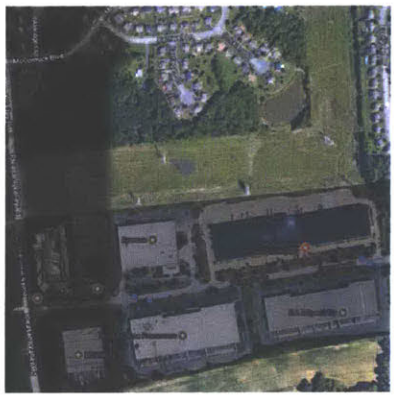


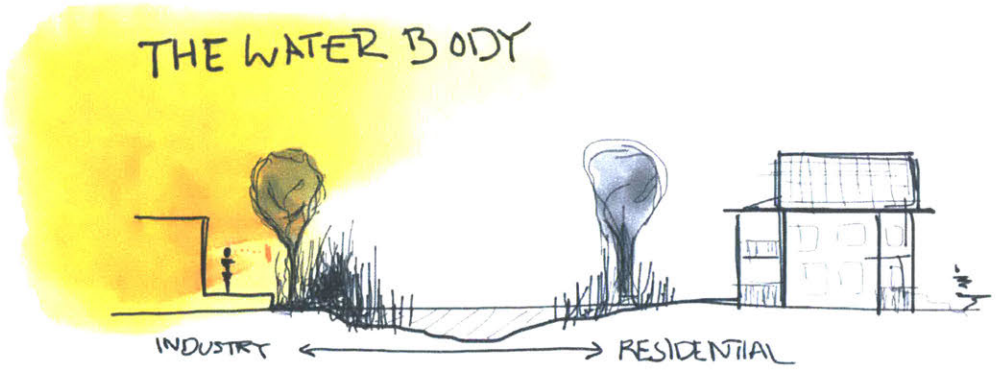
Graphic Created By Zoë Taft Mueller.

The utility corridor is most prevalent in peripheral areas and close to major energy generation and transformer stations. Depending on the edge condition and relationship to local roadways these utility corridors do not necessarily create a physical barrier to movement - they are more used as visual markers to delineate different development norms and often end up being the back side of two differing development typologies.



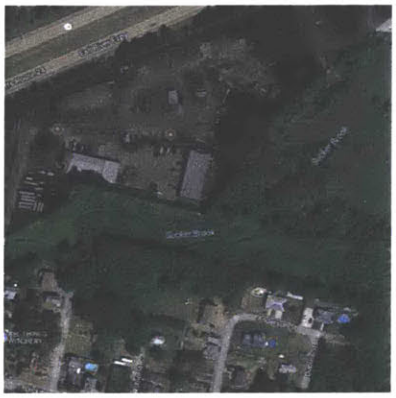


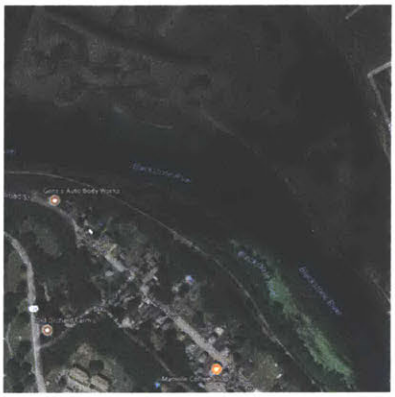


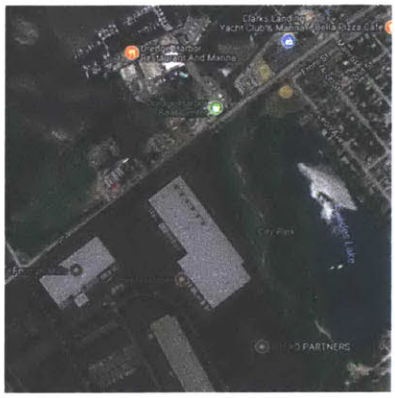


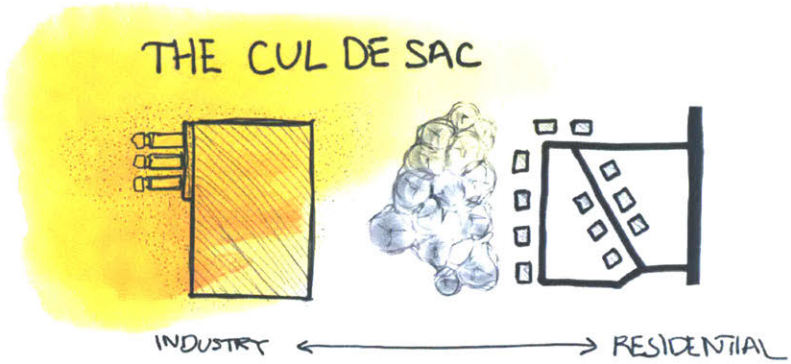
Graphic Created By Zoë Taft Mueller.

Industry often located near water bodies for energy generation and industrial process inputs - for some this remains the case, but in many cases, proximity to water is merely a byproduct of historical industrial development priorities and now largely serves as a method of buffering between industrial and residential use. Vegetated banks often serve as visual screens disguising industrial use. Depending on the water quality and recreational access to the water body, this can offer controlled public experiences of industrial systems, but in many cases the water body is treated as a back alley of sorts. This condition is becoming more precarious as residential and commercial developments are increasingly demanding public water access and treating water bodies as a front door more so than a back door.



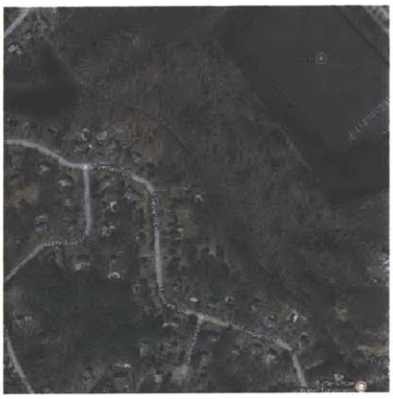


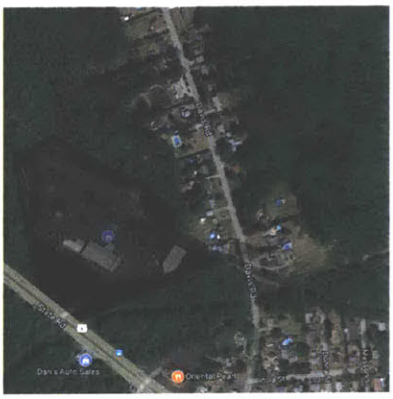




Graphic Created By Zoë Taft Mueller.

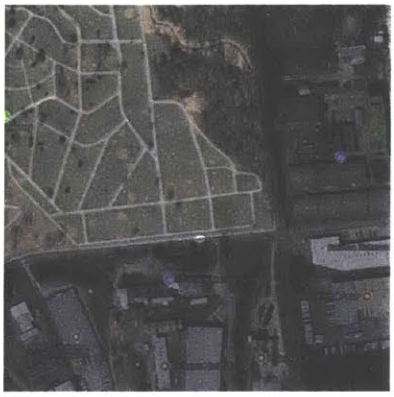
By far the most prevalent strategy, shifts in and fragmentations of the street grid that isolate industrial and residential circulation systems are often used in combination with the other physical isolation tactics described up until this point.





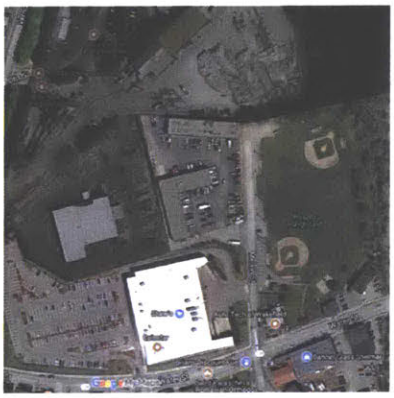
LAND USE TRANSITION : CEMETERIES

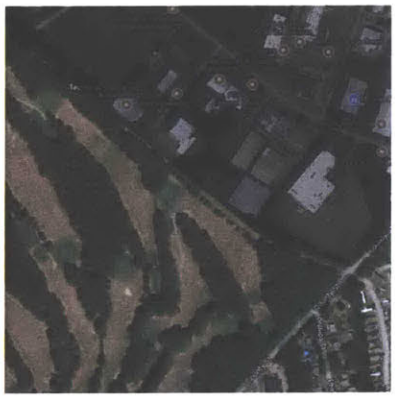
While a bit morbid, the dead and their visitors are in many cases the perfect neighbor for industrial land uses - they offer a landscape buffer and are used occasionally for short visits by different people rather than sustained use by the same people.

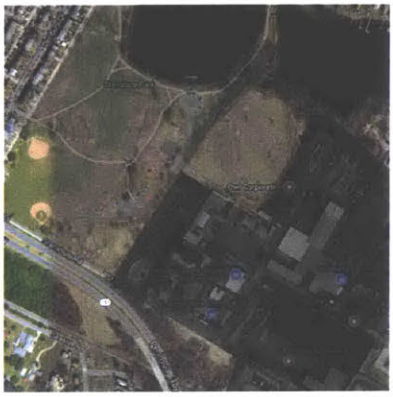
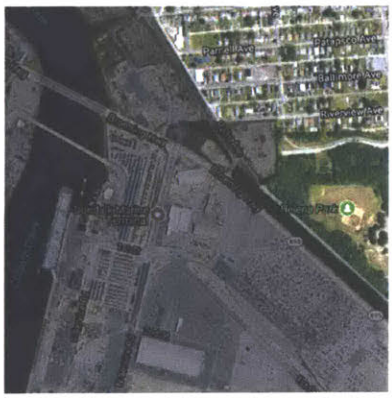
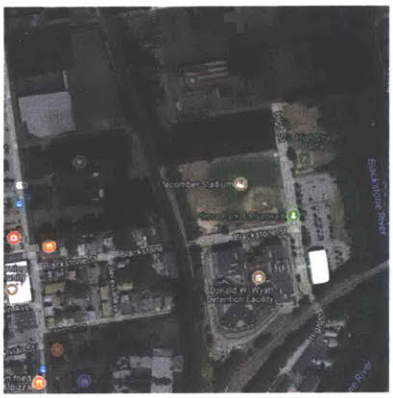


LAND USE TRANSITION : GOLF COURSES/SPORT FIELDS

While golf courses and sports files offer a landscape buffer that can absorb noise and air pollution, they also are explicitly places that encourage sustained outdoor use and so potentially result in increased exposure of humans to the negative impacts of poor air quality and loud noises.

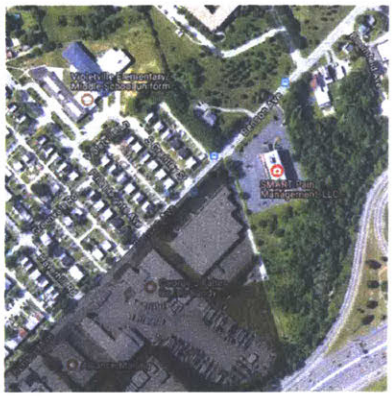


LAND USE TRANSITION : MEDICAL + FLEX OFFICE

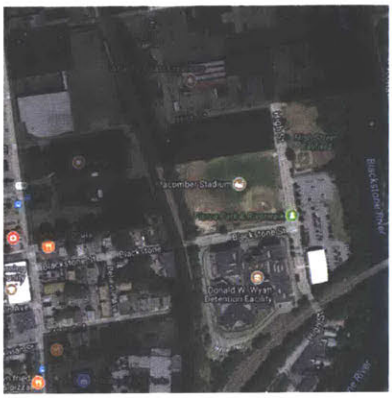
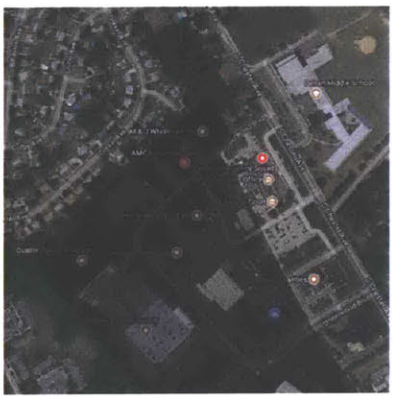
These auto-oriented uses value the large-scale superblocks and large floor plates that industrial users also tend to value. For some medical services, the proximity to industrial areas with degraded air quality should be a cause for concern, but for many medical services patients arrive by car, spend a limited time outside and then spend most of their visit in a tightly climate-controlled interior environment. Flex office space can cause some congestion and mobility conflicts depending on the dominant mode office workers use to get to and around the district, but this suburban adjacency should broadly be taken as an indication that flex office space uses are tolerant of sharing space with industrial users - especially the logistics and distribution industry.



LAND USE TRANSITION : SOCIAL SERVICES + PUNITIVE

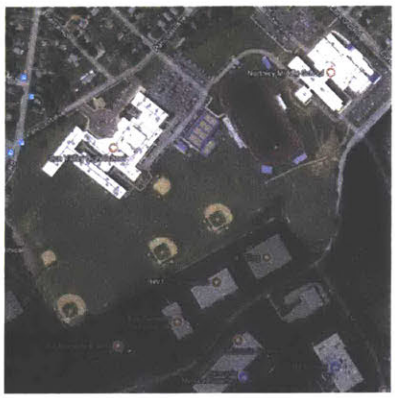
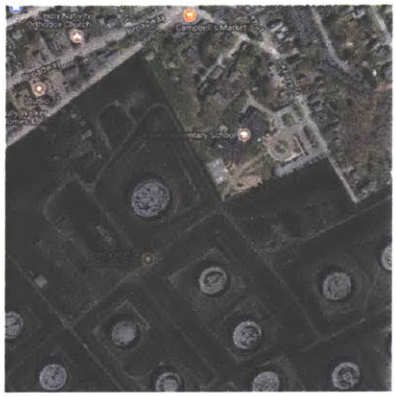
The proximity of social services, substance abuse recovery centers, jails, parole offices, and correctional facilities to industrial land uses should immediatly trigger questions about equity and environmental justice because the users of these services and residents of these facilities do not have the agency to choose this location - it is being chosen for them. My assumption is that these facilities end up near industrial uses because of political pressure from powerful resident advocacy groups to push these uses to non-residential areas where their interaction with residents will be minimized. This is particularly of concern when considered in the framework of transformative justice, re-entry and accessibility of supportive services to those that need them most, and especially to those that do not have access to a personal car.

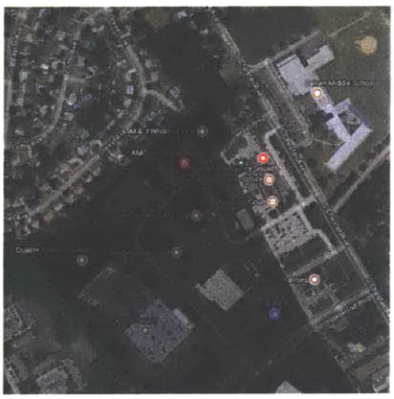
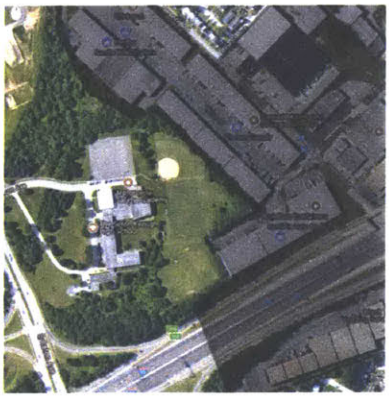



LAND USE TRANSITION : EDUCATION

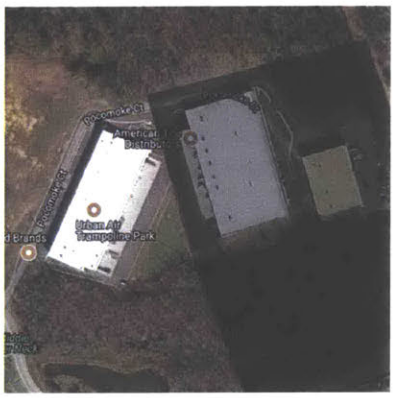
The proximity of educational facilities and industrial uses is a double-edged sword - on one hand it offers the opportunity for increased interaction and human-centric industrial workforce development programming, but on the other hand it increases the daily exposure of children, teens and young adults to air and noise pollution that can have lasting impacts on their health outcomes. Furthermore, it increases the risk of pedestrians, cyclists and young drivers being injured in conflicts that arise on heavy trucking corridors.

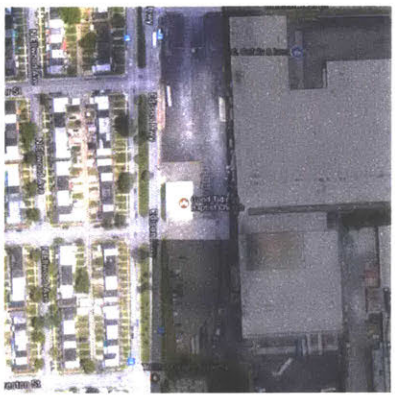
LAND USE TRANSITION : GYMS, UNION/VETERAN CLUBS

Gyms, union halls and veteran clubs offer, in many cases, an ideal land use transition between industrial and residential uses. These are places people typically visit for a relatively brief period of time and are largely indoor programs where air and noise pollution can be more effectively controlled. They also have the potential to extend the active hours of industrial areas beyond the work day and so can help improve after-hours safety by increasing the number of people spending time in the district beyond the work day.



LAND USE TRANSITION : PLACES OF WORSHIP

Places of worship offer the same benefits as gyms, union halls and veteran clubs in that they generally host periodic events and people spend a limited amount of time there (and therefore have minimal risk of harmful exposure). However, places of worship are more likely to have outdoor programming and so air quality and noise pollution levels in industrial areas are more of a cause for concern with this land use transition.

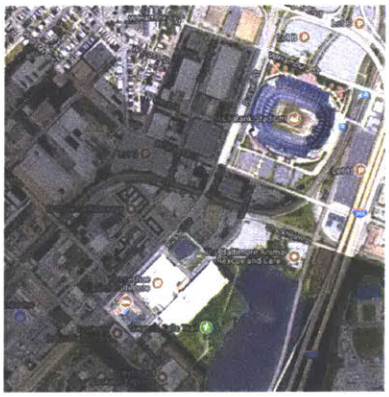


LAND USE TRANSITION : PET CARE

Pet care facilities are often are considered to be light industrial land uses due to their noise impact (from dogs barking) and in places that provide medical care and end-of-life services these facilities may also have biohazardous byproducts. Generally speaking, therefore, they are a good match for land use transitions that occupy the edge between residential and industrial areas. The only persistent conflict here comes from the need to give dogs daily walks nearby, which exposes regular caretakers to air and noise pollution and may be in conflict with freight circulation patterns.

LAND USE TRANSITION : STADIUMS, CASINOS, HOTELS

Stadiums, casinos and hotels are common but challenging neighbors to industrial businesses. The transportation system congestion and extreme fluctuation in that congestion can negatively impact the reliability and efficiency of industrial operations that rely on that transportation infrastructure. Furthermore, these land uses create considerably higher land values that can ultimately displace industrial businesses unable to pay a premium for their land. Finally, the heavy drinking that accompanies many sport events and nightlife districts increases the chance of cyclists, pedestrians and drivers getting into crashes with trucks due to their decreased awareness of their surroundings and slower response times.



A RATIONALE FOR INTERVENTION

Given these found conditions, the next section will consider which of these isolation or buffer tactics are worth reinforcing and replicating versus pursuing alternatives. Suburban industrial development offers a wealth of isolation tactics that can help keep physically close systems separate where needed. However, in urban areas that are not exclusively auto-oriented, that segregation can cause a lot of harm, particularly in terms of workforce accessibility and transportation demand management in constrained public right of ways. Furthermore, it is politically challenging for the public sector to invest in districts that are exclusively industrial because businesses do not vote and so politicians must weigh the aggregate benefits of industrial investments against the perceived impact of those investments to residents that have minimal interaction with those industrial districts.

As these multi-faceted pressures continue to converge on working waterfronts across the Atlantic Coast of the United States, it is becoming important for the public sector to play a more proactive role in identifying, positioning and shaping the future of their maritime industrial properties. Many have already pointed out that the displacement and fragmentation of the existing network of small to medium scale maritime industrial facilities is of concern and that the public sector has a role in the protection and reinvention of these facilities. However, without a vision of what 21st century working waterfronts can and should be, it is very difficult for the public sector to intervene in a coherent, efficient and effective way.

Arguments for selective protection and retention of working waterfront spaces tend to point out that there is an aggregate economic and societal value to the retention of urban industrial uses along the waterfront, but often stop short of describing what these working waterfronts should include and how they should connect with and contribute to the residential and commercial uses that abut them and are sometimes in conflict with them.

The case study of Philadelphia will offer insight on how the public sector can guide maritime industrial investment at the site and district scales where frictions between industrial use and recreational use intensify. This case study will therefore start with the following questions:

- What kind of working waterfront belongs in a 21st century American city?
- What standards are we going to hold them to and what goals to we expect them to achieve?

I want to offer a sense of what these working waterfronts could be and what kind of framework might support and guide public sector intervention to bring about the kind of working waterfronts that contemporary "knowledge economy" cities want and need.

I believe a 21st Century working waterfront should:

- Reduce pollution through more efficient, closed-loop and contained systems
- Advance coastal resiliency + emergency readiness
- Bring production closer to consumption
- Retain and grow blue-collar job base
- Relieve unmanageable congestion on interstate highway network
- Provide public experience and engagement with waterfront to the extent possible
- Facilitate public experiences of industrial spaces as an integrated part of the city's physical and social fabric.

My analysis of PhilaPort's interaction with the city of Philadelphia's urban dynamics will serve as a testing ground for how this vision of a 21st Century Working Waterfront might actually manifest in a specific context. This fine-grain site analysis, stakeholder engagement process and site-specific integration tactics will then inform the development of a more translatable process and menu of tactics that can be deployed in other working waterfront contexts.

04. CASE STUDY

Public Port Expansion Planning in Philadelphia

Guiding Question(s)

Given that Philadelphia's port is in a period of growth and change, what interventions in PhilaPort's immediate surroundings would increase their environmental performance, economic efficiency and workforce accessibility while positioning the port for a future of sustained growth?

THE ROLE OF THIS CASE STUDY

Up until this point, the analysis conducted has been at a regional scale looking at the networks and norms that effect maritime freight logistics along the Atlantic Coast of the US with an eye to how those networks and norms translate into site design and urban relationships.

What follows from this point is an in-depth site-specific case study focusing on the range of working waterfront conditions of the public port authority of Philadelphia, Pennsylvania. This case study is designed as an entry point to transition from observations on the existing relationship of ports and their urban context into speculation and design of the future relationship of ports to their urban context. Throughout this chapter I will explore the shore-side development implications of changes in the volume and type of cargo moving through Philadelphia's public port authority. The existing conditions analysis that follows focuses on the following elements in order to gradually build up a holistic understanding of the pressures and potentials that converge at the edge of PhilaPort's facilities:

- Public port operations profile
- Geology, ecology and risk profile
- Historic working waterfront structure
- Economic geography profile
- Industrial development policy profile
- Port-adjacent development plans
- Public-access path analysis
- Infrastructural barrier analysis
- Mass transit capacity and demand analysis

This existing conditions analysis is conducted with an eye to developing a proposal for what types of urban design interventions would improve the PhilaPort's environmental performance, clarify its freight circulation, and enhance its workforce accessibility. I see this close up observational and spatial analysis as a way to explore the social value of selective integration of maritime industrial systems with urban public life.

Sources Consulted:

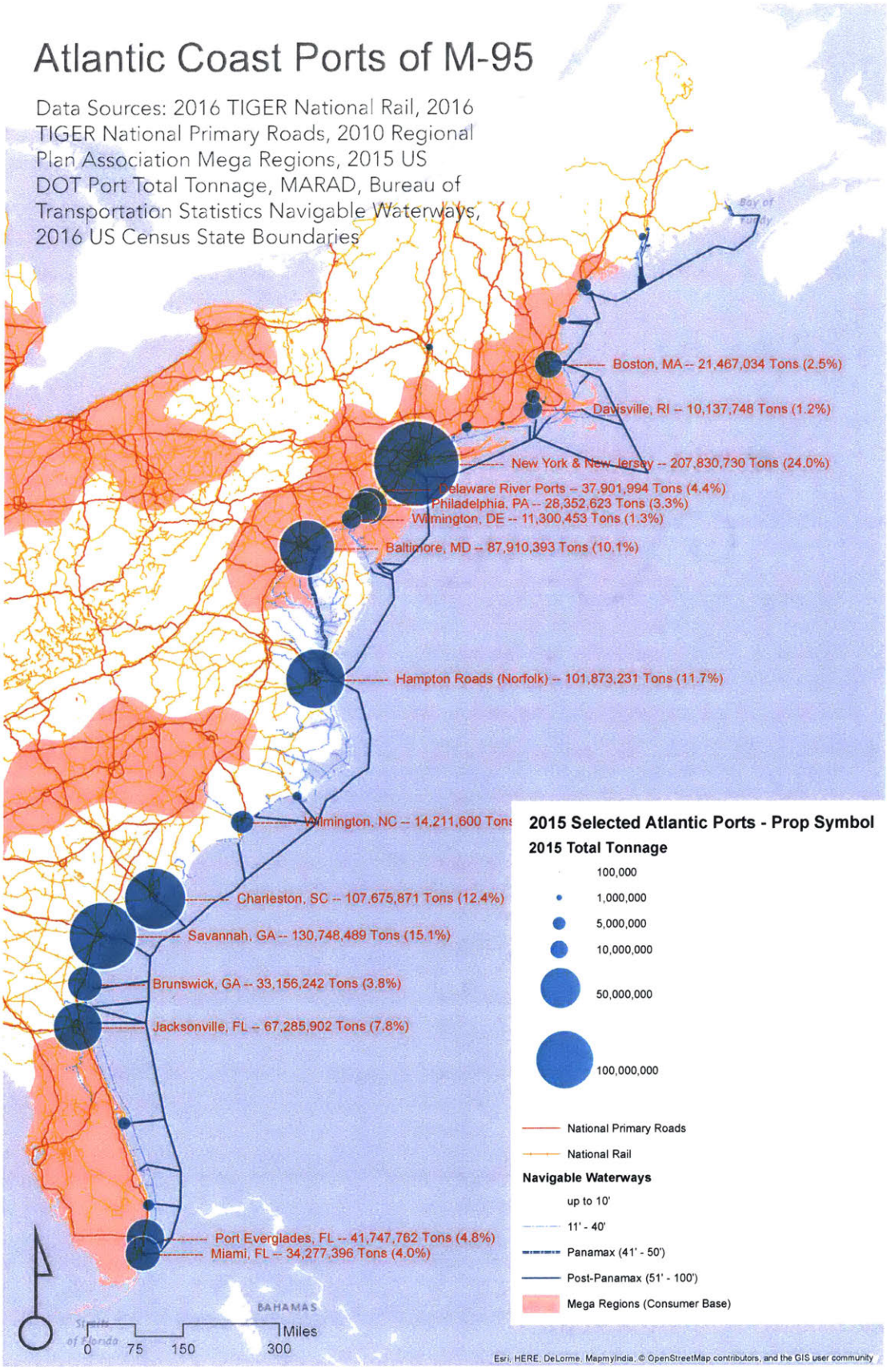
Philadelphia Industrial Development Corporation. "An Industrial Land and Market Strategy for the City of Philadelphia," September 2010. https://www.phila.gov/commerce/Documents/Philadelphia%20Industrial%20Land%20and%20Market%20Strategy.pdf

PhilaPort. "The port for all reasons," 2017. http://www.philaport.com/wp-content/uploads/2017/10/PhilaPort-2017-Brochure-Web.pdf

PUBLIC PORT OPERATIONS PROFILE

To understand the role and strategic trajectory of any one port along the Atlantic Coast, it is crucial to first understand its position relative to other Atlantic Coast ports. Ports compete with one another to attract importers and exporters and so they necessarily position themselves to compete directly with or specialize away from the dominant players in their network. This network-scale analysis will help reveal what types of cargo and scale of infrastructure are needed to be competitive.

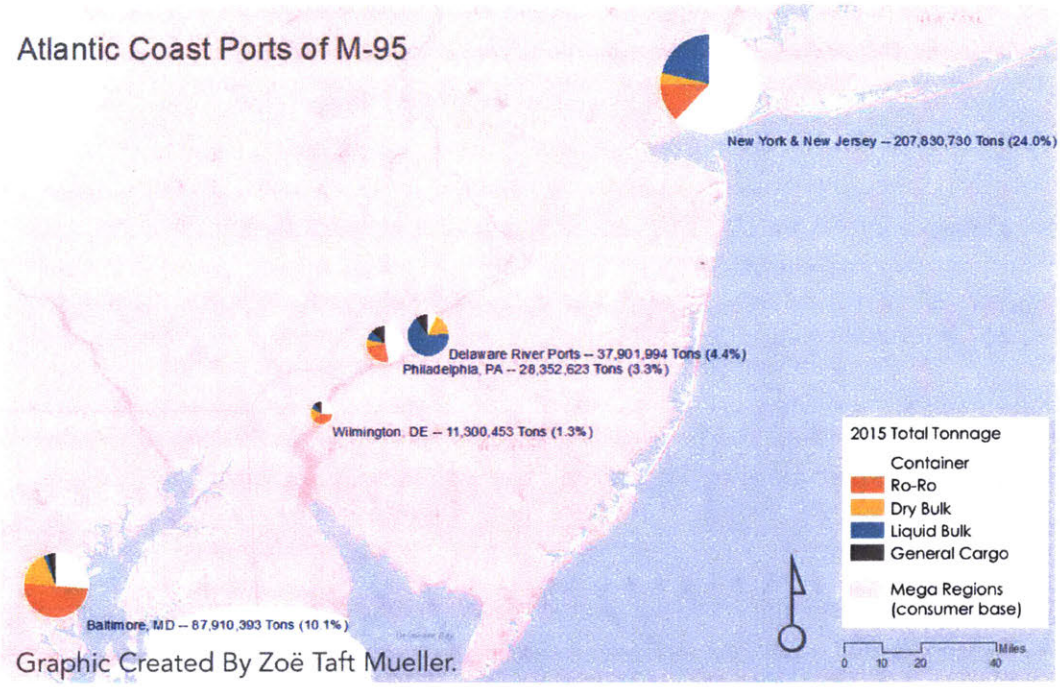
Moving from the network scale to the local implications requires an understanding of how those cargo types and infrastructure needs relate to the existing land holdings, capital investments, institutional relationships and resources of a given port. The combination of network-level analysis and local constraints and opportunities analysis will together make clear what port-related land will require the most change in the years to come and what types of changes would yield the greatest competitive advantage for the port. This then has ripple effects in terms of workforce, transportation, environmental impact, and social fabrics.



Graphic Created By Zoë Taft Mueller.

COMPETITION : NEW YORK + BALTIMORE

Looking at the map to the left, you can see that, in terms of total tonnage, the Port Authority of New York and New Jersey is the dominant player in the Atlantic Coast I-95 port network. The next tier includes Baltimore, Norfolk, Charleston, and Savannah. Locally, PhilaPort is competing with New York and Baltimore to serve the consumer base denoted by the pink "Mega Region" polygon. The key competition is in container (white) and vehicular (orange) cargo types.



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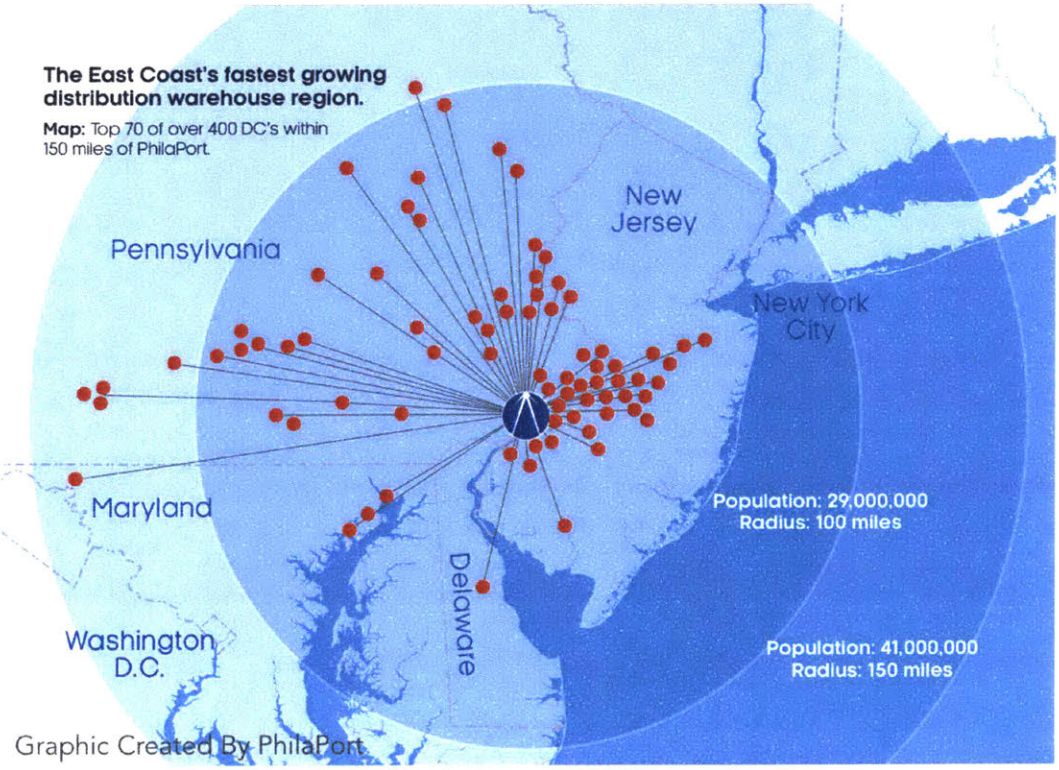


Graphic Created By PhilaPort

MARINE HIGHWAY 95
SERVICE OPTIONS, CARGO + SHIP TYPES

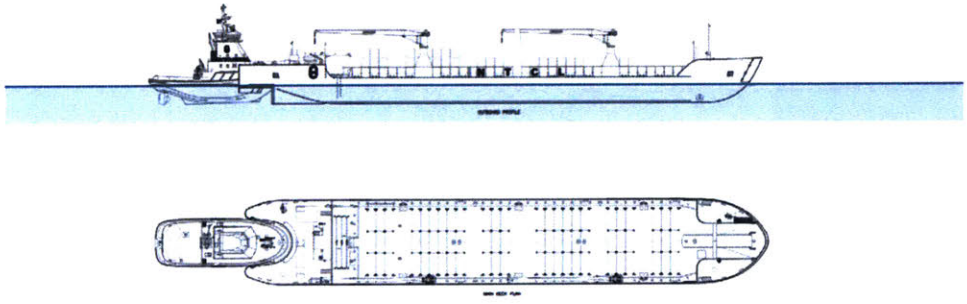
In a recent economic feasibility study for speculative Atlantic Coast short-sea shipping services (collectively referred to as Marine Highway 95 or M95), Philadelphia was an economically competitive choice for 3 of the 4 services considered. These services are all designed to operate in parallel to Interstate Highway 95, and to strategically attract freight users of I-95 to marine freight in order to alleviate unworkable congestion on I-95. Regardless of whether these services are implemented, the economic competitivity of PhilaPort is validated by this study, meaning that Philadelphia is likely to play an increasingly important role in the atlantic coast port network as landside congestion intensifies and mega-ships begin to shift the underlying economics driving supply chain management.

If a new marine highway service were to be developed, it would connect to shore-side infra-structure and operations via a roll-on-roll-off (ro/ro) or lift-on-lift-off (lo/lo) type of service that transported containers and truck trailers. See the M-95 multipurpose vessel design concept on the right.

Container-on-barge services are also a common way of transporting short-haul cargo, especially for inland and calmer waters or shallower ports. Container-on-barge services typically have a hard time maneuvering rough water conditions due to their more limited steering controls and less stable hull profile. See drawing below for a typical container-on-barge vessel design.

Regardless of whether these particular short-sea-shipping vessels gain traction, it is a safe assumption that container and vehicular (ro-ro) cargo are likely to be the major growth areas for philadelphia whether or not the marine highway concept spurs new economic activity.

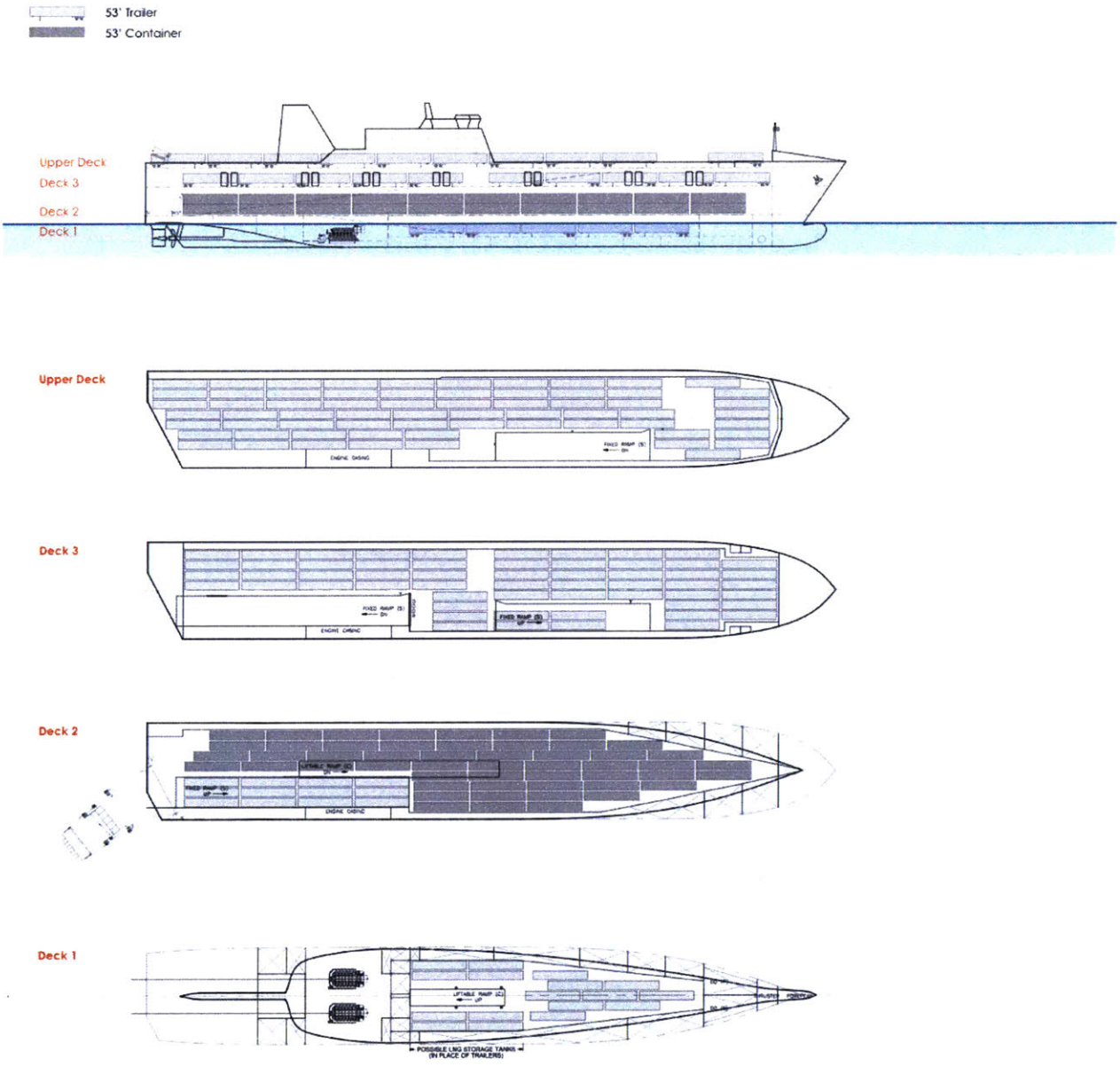
Typical Container Barge with Tug



Graphic Created By Zoë Taft Mueller.

M-95 Vessel Design Concept

American Marine Highway Vessel 03, RoRo Medium 24 knot, 23' draft



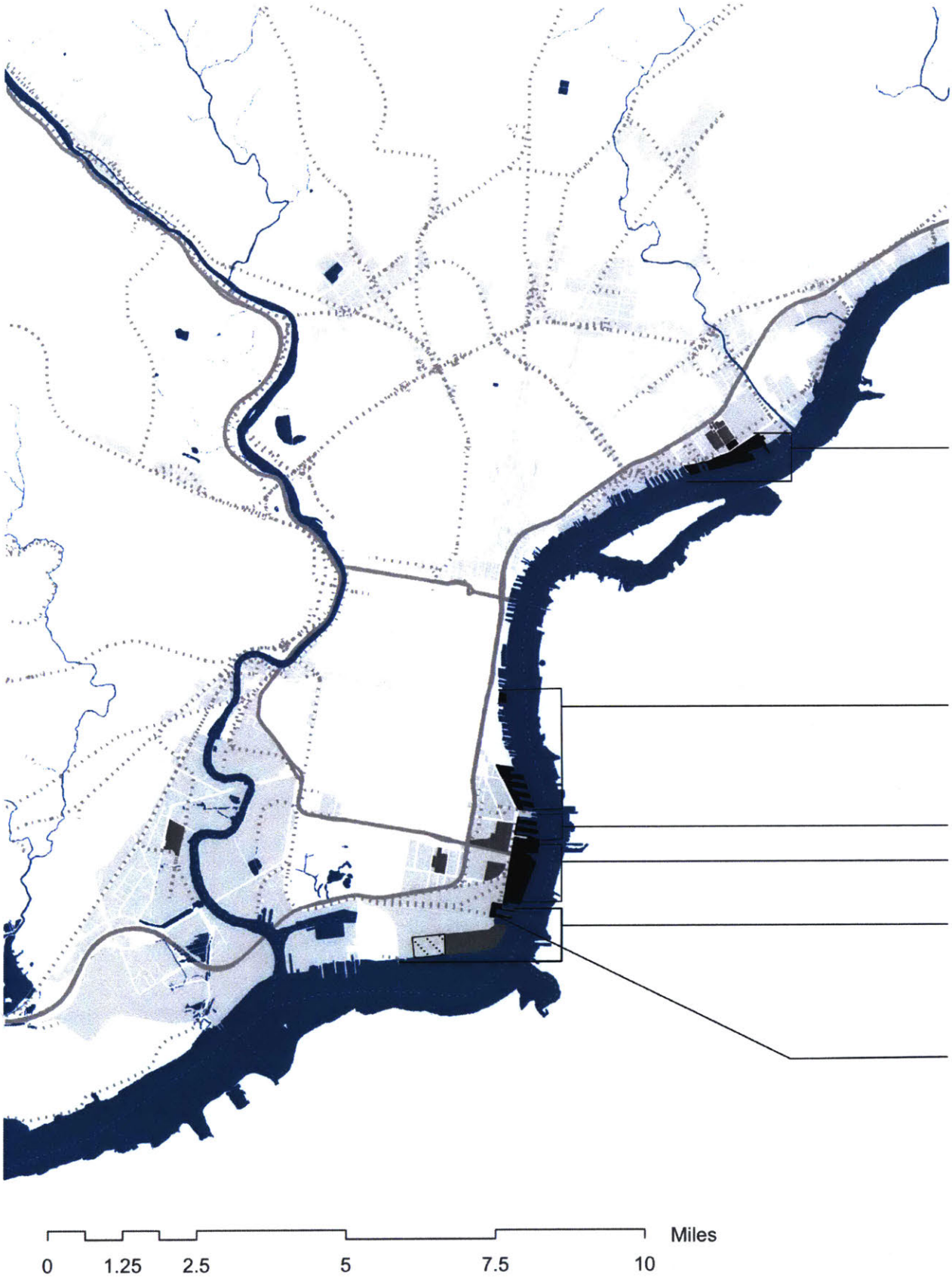
Graphic Created By Zoë Taft Mueller.

Sources Consulted:

"America's Marine Highway Program – MARAD." Accessed October 10, 2017. https://www.marad.dot.gov/ships-and-shipping/dot-maritime-administration-americas-marine-highway-program/.

"East Coast Marine Highway Initiative M-95 Study Final Report," October 2013.

i95 Corridor Coalition. "Application for Designation of the I-95 Marine Highway Corridor," May 2009.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Note where the vehicular (roll-on, roll-off) and container facilities are. These are the most likely to change soon. Others will change in a cascade following container and vehicular terminal investments as the finger piers and up-river terminals specialize away from these more standard cargos in order to take advantage of the peculiarities of any given facility. Packer Ave, Tioga and Southport are the terminals that are likely to see the most investment in order to position them to compete against Baltimore's RoRo dominance and New York's container dominance.

_____ **LIQUID BULK** - Tioga Liquid Bulk Terminal

BREAKBULK + CONTAINER - Tioga Marine Terminal
SPECIALTIES: Woodpulp, Project Cargoes, Steel

_____ **BREAKBULK** - Finger Piers 38, 40, 74, 78, 82, & 84
SPECIALTIES: Produce, Cocoa, Forest Products

_____ **INACTIVE** - Finger Piers 96, 98, & 100

_____ **CONTAINER** - Packer Ave Marine Terminal + Publicker Container Yard

_____ **ROLL-ON, ROLL-OFF** - Finger Pier 122,
Partially Built-out Southport Marine Terminal Complex

_____ **LIQUID BULK** - Finger Pier 124

Graphic Created By Zoë Taft Mueller.

GEOLOGY, ECOLOGY + RISK PROFILE

Geology, ecology and risk show up in the economics and politics (and therefore in the decision-making) of any industrial business. It shows up in terms of soil load bearing capacity, refrigeration and temperature-controlled processes, loss of inventory and capital investments due to flooding and political resistance. Furthermore, because of the environmental and land use policies that apply to all development, the ecological value and risks of any given development site become embedded in the cost of development through environmental impact mitigation. This is especially true for industries that are actively making land acquisitions and capital investments in that land. Because ports are constantly repositioning themselves and making investments to facilitate that repositioning, these issues show up at every juncture in the political process required to approve major investments like dredging a navigation channel, rebuilding a pier, creating new land, investing in new infrastructure.

1992 IAN MCHARG "DESIGN WITH NATURE" ANALYSIS

This is some of the most in-depth analysis of the geology and ecology of the Philadelphia region with an eye to how that should inform urban development.

The most notable aspect of this map, in terms of port-related development, is that all of PhilaPort's southern piers and terminals fall within the 50 year floodplain and are PhilaPort's northern Tioga Terminal complex is close to aquifer recharge areas. This underscores the not surprising importance of hydrology for both their daily operations and their long-term environmental impact.

WATER FEATURES

Surface Water and Riparian Lands
RECOMMENDED LAND USES: ports, harbors, marinas, water-treatment plants, water-related industry, open space for institutional and housing use, agriculture, forestry, and recreation.

Marshes
RECOMMENDED LAND USES: recreation.

50-year Floodplains
RECOMMENDED LAND USES: ports, harbors, marinas, water-treatment plants, water-related and water-using industry, agriculture, forestry, recreation, institutional open space, open space for housing.

Aquifers
RECOMMENDED LAND USES: agriculture, forestry, recreation, industries that do not produce toxic or offensive effluents. All land uses within limits set by percolation.

Aquifer Recharge Areas
RECOMMENDED LAND USES: as aquifers.

LAND FEATURES

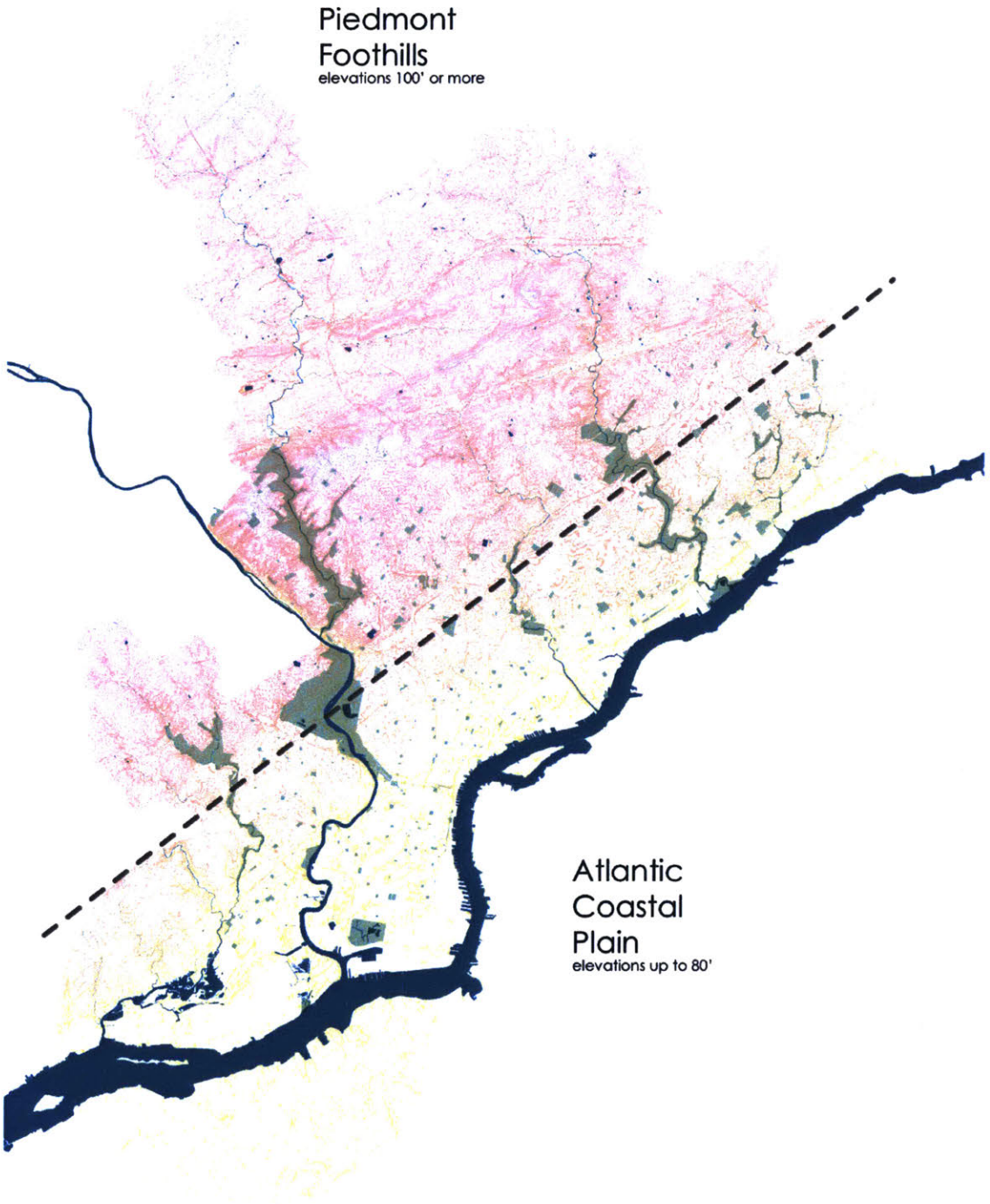
Prime Agricultural Lands
RECOMMENDED LAND USES: agriculture, forestry, recreation, open space for institutions, housing at 1 house per 25 acres.

Steep Lands
RECOMMENDED LAND USES: forestry, recreation, housing at maximum density of 1 house per 3 acres, where wooded.

Forests and Woodlands
RECOMMENDED LAND USES: forestry, recreation, housing at densities not higher than 1 house per acre.

TOPOGRAPHY

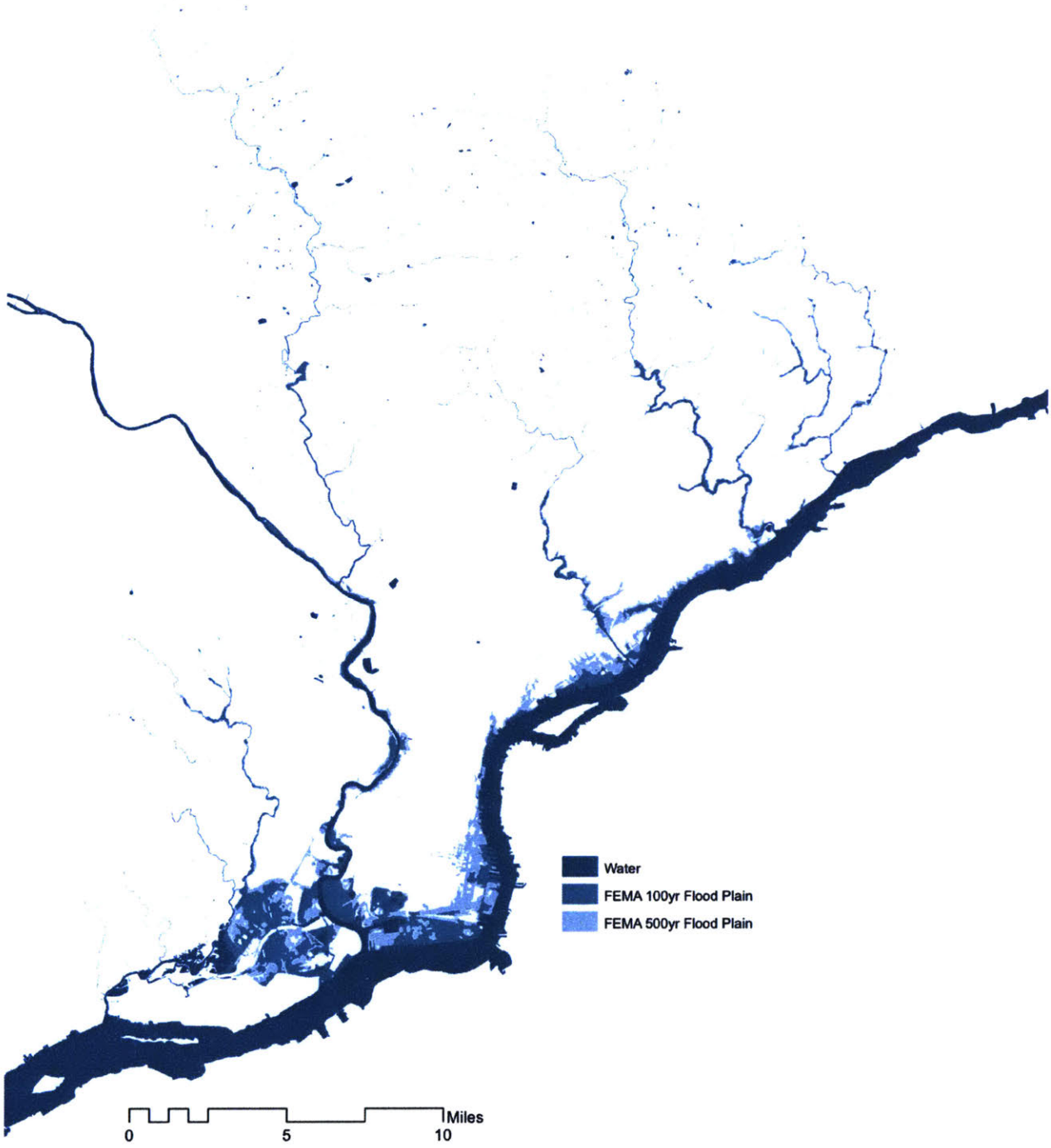
The elevation contours of the Philadelphia region are so striking as to be diagramatic -- there is a very clear and strong diagonal dividing the foothills from the coastal plain. The takeaway of this is to understand the volume of water draining to from the purple highlands to the yellow lowlands.



Graphic Created By Zoë Taft Mueller.

HYDROLOGY

The hydrology confirms the significance of the topography. The lowlands - formerly vast marshes - read strongly in the figure of the FEMA 100yr and 500 yr flood plains, both of which reach through the full extent of the southern port areas, and penetrating inland into some of the residential areas of south philadelphia.

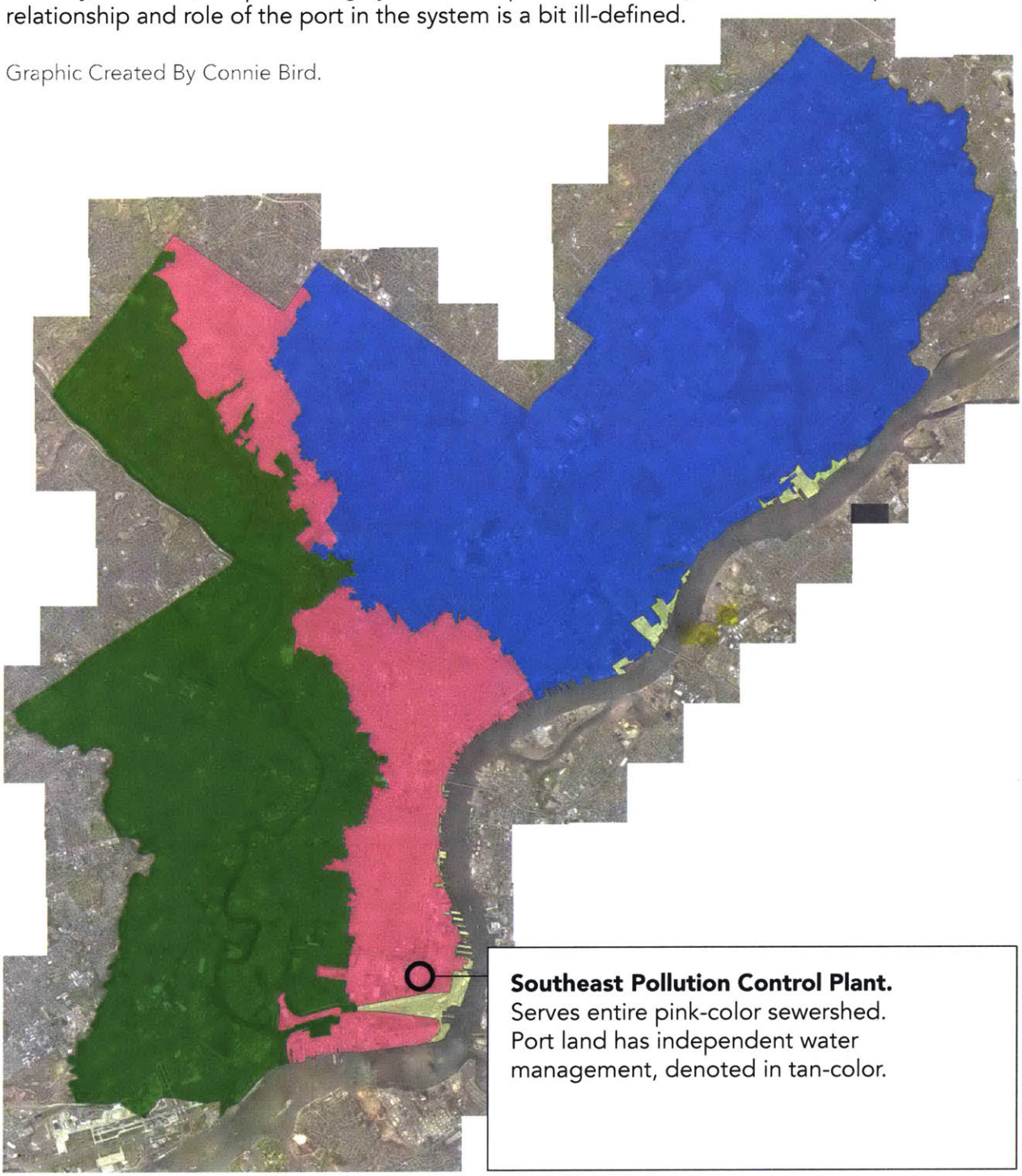


Graphic Created By Zoë Taft Mueller.

POLLUTION CONTROL PLANT SEWERSHEDS

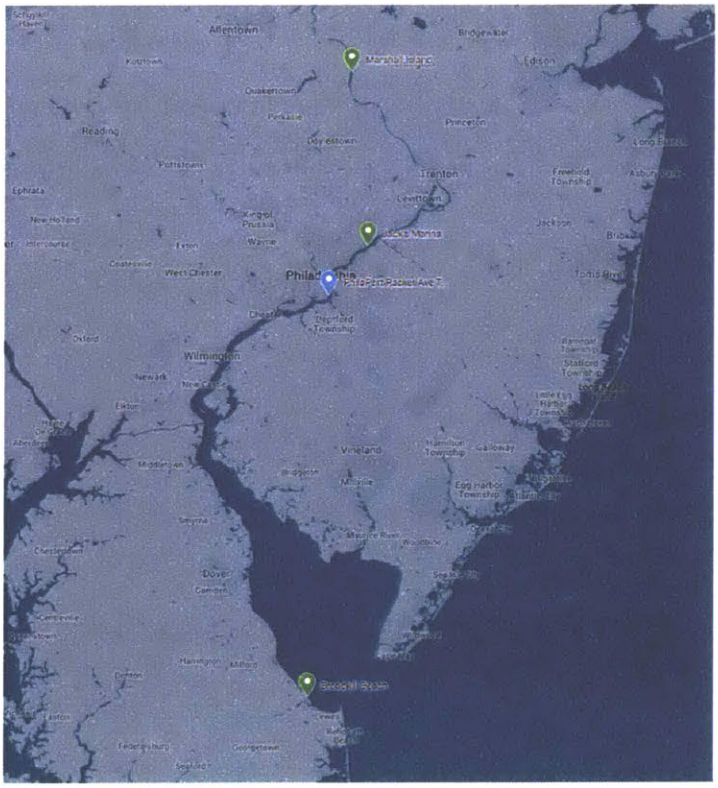
Note the geography of the sewer system reinforces the diagonal from the foothills to the coastal plain - the pink sewershed is essentially a sliver running from high to low through some of the most populous parts of Philadelphia and terminating at the Southeast Pollution Control Plant adjacent to the port's southern terminals. This is significant for understanding the combined sewer overflow event pattern in the aftermath of major precipitation events. Notably, however, the port is largely on an independent sewer system and so the political relationship and role of the port in the system is a bit ill-defined.

Graphic Created By Connie Bird.



EXISTING PHILAPORT ENVIRONMENTAL IMPACT MITIGATION PROJECTS

The port already has a strong framework for environmental stewardship and environmental impact mitigation through habitat restoration and wetland maintenance, however that framework is agnostic about siting of the mitigation projects. Thus far the three most notable impact mitigation projects have taken place from 14 up to 111 miles from the center of PhilaPort's operations. Reconnecting these impact mitigation projects with the specificity of the port's local surroundings represents a major opportunity for innovative intervention in the districts most directly impacted by the Port's operations.



Marshall Island
141 acres 57 miles from PhilaPort Packer Ave Marine Terminal

Jack's Marina
35 acres 14 mi from PhilaPort Packer Ave Marine Terminal

Broadkill Beach
111 mi from PhilaPort Packer Ave Marine Terminal

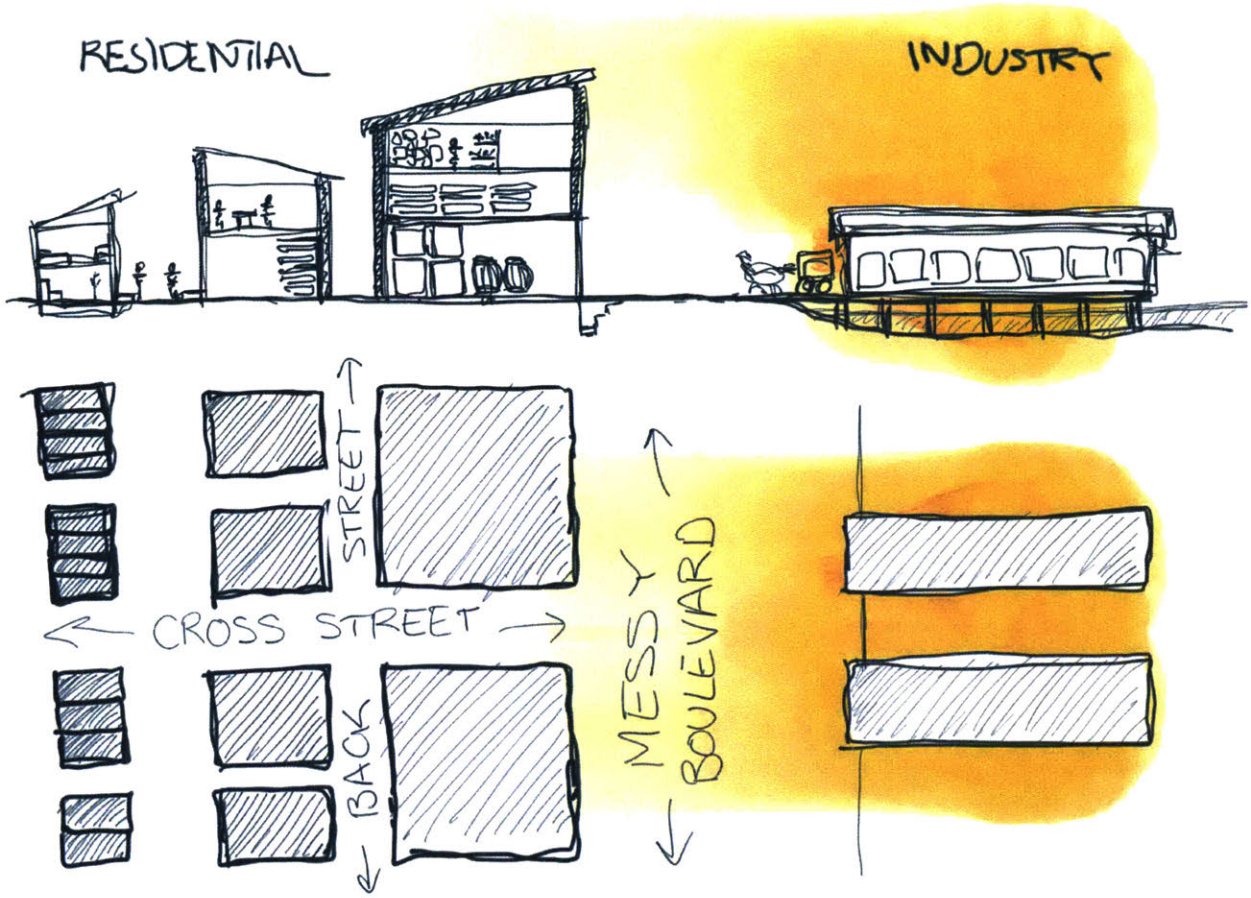
This analysis of the geology, ecology and risk landscape of the port area reveals that water management must be a key component of any investment in the southern container and vehicular terminals. Additionally, because of the simultaneous adjacency with and independence from the Southeast Pollution Control Plant, the port has an unclear role in stormwater infrastructure investments despite its physical position at a critical point of flood risk and pollution control opportunity.

HISTORIC WORKING WATERFRONT STRUCTURE

The historic working waterfront structure of any city is important to understand because it often times remains in some form as a shadow of itself -- people have expectations that derive from past norms and current operational bottlenecks often derive from the challenges of adapting outdated urban systems to serve modern freight circulation needs. In some cases, the early working waterfront structure can also offer lessons in how freight and human-centric uses can work in closer quarters.

The images used for this analysis are drawn from the Philadelphia Free Library digital archives.

CENTRAL DELAWARE RIVER WATERFRONT: FINGER PIER + MESSY BOULEVARD STRUCTURE



Graphic Created By Zoë Taft Mueller.

Philadelphia's industrial waterfront grew up along the Delaware river, beginning at the narrowest point between the Delaware and its smaller tributary, the Schuylkill river. This area is now known as Center City and has long since lost its industrial businesses. However, the structure of that early industrial system remains in the buildings and street grids. Finger piers extended from Columbus Boulevard (then known as Delaware Ave) with occasional passenger ferry terminals that recieved passengers from nearby Camden, NJ. The boulevard itself accomodating a messy and often chaotic variety of uses from pedestrian to horse and cart to train to bike. The first block was commonly large block warehouses, with a narrow back alley and then a series of slightly smaller buildings facing the next street. These slightly smaller buildings seem to be built to accomodate a mix of warehousing, wholesale and office use. Two blocks in a fine-grain residential fabric consistent with the low-rise row-house typology of the rest of the city picks up and continues at a steady rhythm. This scale shift in the buildings complemented the land use transition inside of them and presumably helped to signal where pedestrians and outdoor markets were welcome and where goods movement was the priority.

Columbus Boulevard continues to have this confounding messy and chaotic quality to it and now - as cars and trucks have become the dominant users of the boulevard - the speed of traffic and the danger it poses to pedestrians has made the city's "front door" feel more like a wall than a landing zone.

WIDE + MESSY WATERFRONT BOULEVARD

An example of Columbus Blvd's messy multi-use quality, balanced by the pavement deliniation of movement vs. loading zones. Note that pedestrians are clustering close to buildings and support columns where they are more protected from the horse and cart movement.

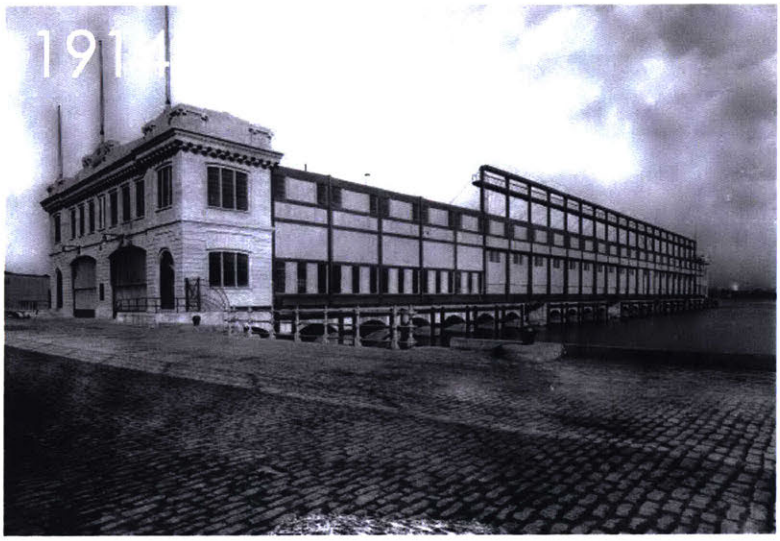
An example of the immediacy and intimacy of contact between the shipping activities on the water and Columbus Blvd.

WATERFRONT PIER-WHOLESALE MARKET RELATIONSHIP ON PERPENDICULAR STREETS

The Dock street market, located on a side street near Columbus Blvd in Center City, was a wholesale produce and dry goods market that leveraged proximity to the port but was tucked out of the way.

WATERFRONT PIER-STREET RELATIONSHIP

A series of standard finger pier structures that lined Columbus Blvd in center city.



WATERFRONT FERRY PIER-STREET RELATIONSHIP

This is an image of the pedestrian crossing to the roof of the Chestnut Street passenger ferry pier. Passengers would enter via the pavillion on the roof and then descend into the building to board the ferry. This is perhaps one of the more relevant precedents for contemporary logistics buildings that have flat roofs and low profiles.

The historical structure of the Delaware River industrial waterfront reveals that Columbus Ave has a symbolic importance, that more of it was devoted to freight loading in the past rather than through-movement, and that elevated structures like bridges and elevated rail lines provided pedestrian shelter in stretches of the waterfront that were particularly chaotic with persistent conflicting perpendicular movement patterns.

Finally, the building structure transition, the Dock Street market and the use of the back streets offer lessons about how to structure land use transitions to maximize active uses while preserving space for goods movement.

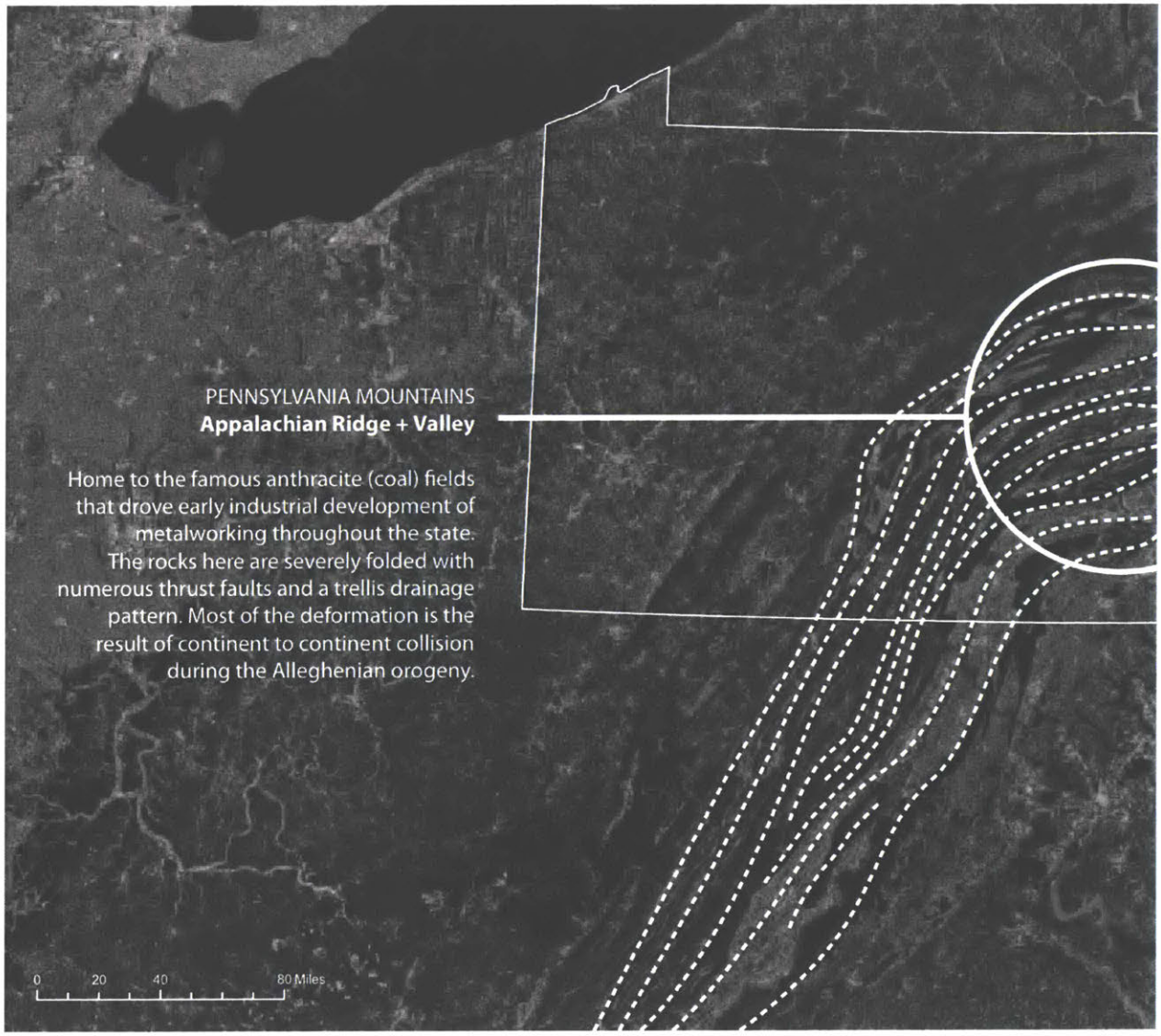
ECONOMIC GEOGRAPHY PROFILE

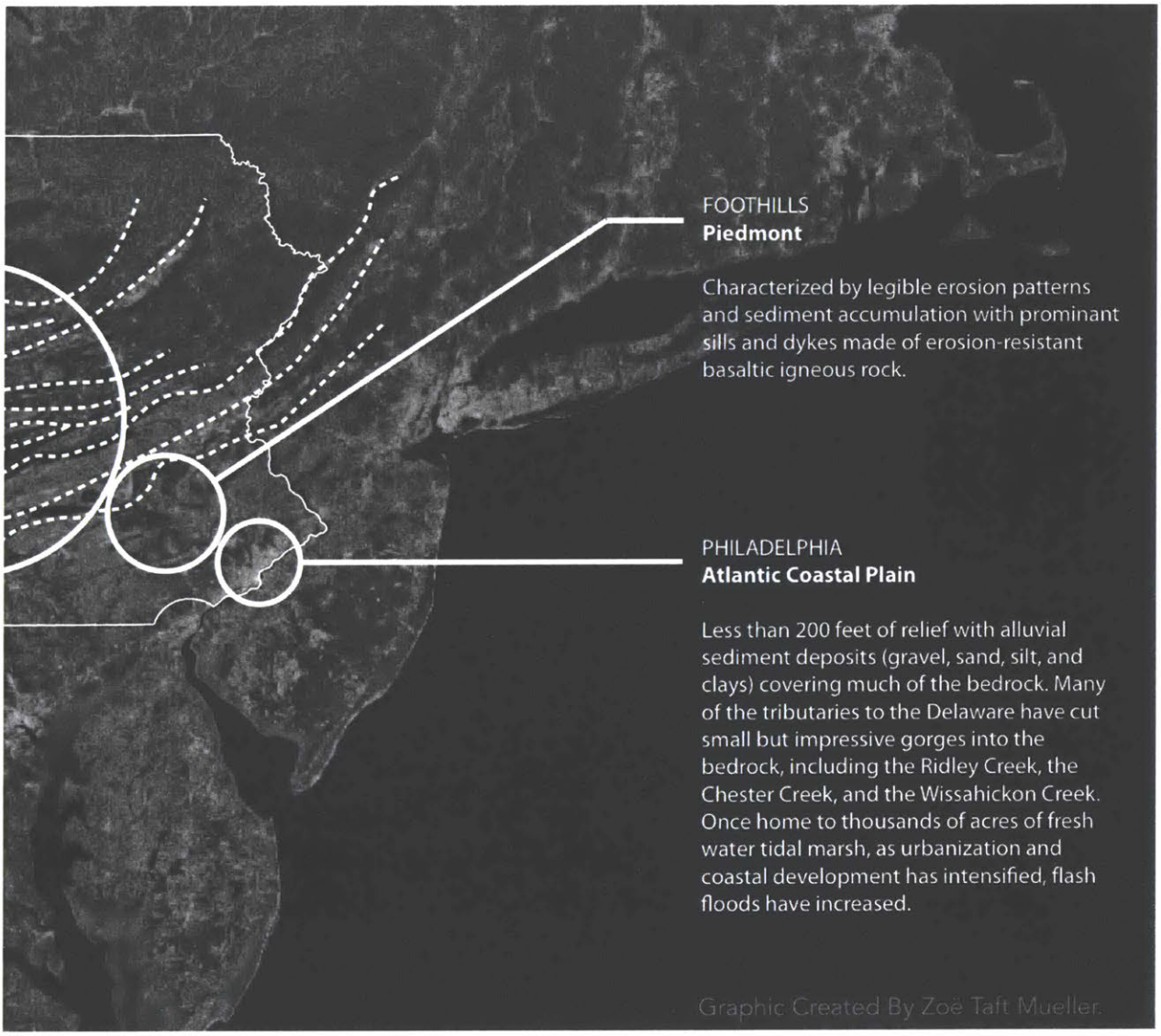
Cities with a long history of industrial development typically have infrastructure systems that were designed to serve a purpose that has little relationship to current needs. And yet, the institutional and physical legacy of this original logic typically continues to constrain and direct future industrial development. It is important, therefore, to develop an understanding of the momentum and frictions generated by the interaction of former economic geography and contemporary economic geography.

TIMBER, COAL AND MACHINING

Industries that defined Philadelphia's EARLY Industrial Development

- Woodworking (from the forests of the foothills)
- Metal forging (from the coal of the mountains)
- Machining
- Steam engineering
- Shipbuilding + ship repair
- Petroleum + chemical refining (from the petroleum extracted in the mountains)
- Food processing




FOOTHILLS
Piedmont
Characterized by legible erosion patterns and sediment accumulation with prominant sills and dykes made of erosion-resistant basaltic igneous rock.
PHILADELPHIA
Atlantic Coastal Plain
Less than 200 feet of relief with alluvial sediment deposits (gravel, sand, silt, and clays) covering much of the bedrock. Many of the tributaries to the Delaware have cut small but impressive gorges into the bedrock, including the Ridley Creek, the Chester Creek, and the Wissahickon Creek. Once home to thousands of acres of fresh water tidal marsh, as urbanization and coastal development has intensified, flash floods have increased.
Graphic Created By Zoë Taft Mueller

PHILADELPHIA, PA

INTEGRATED INDUSTRIAL URBANISM TYPOLOGY

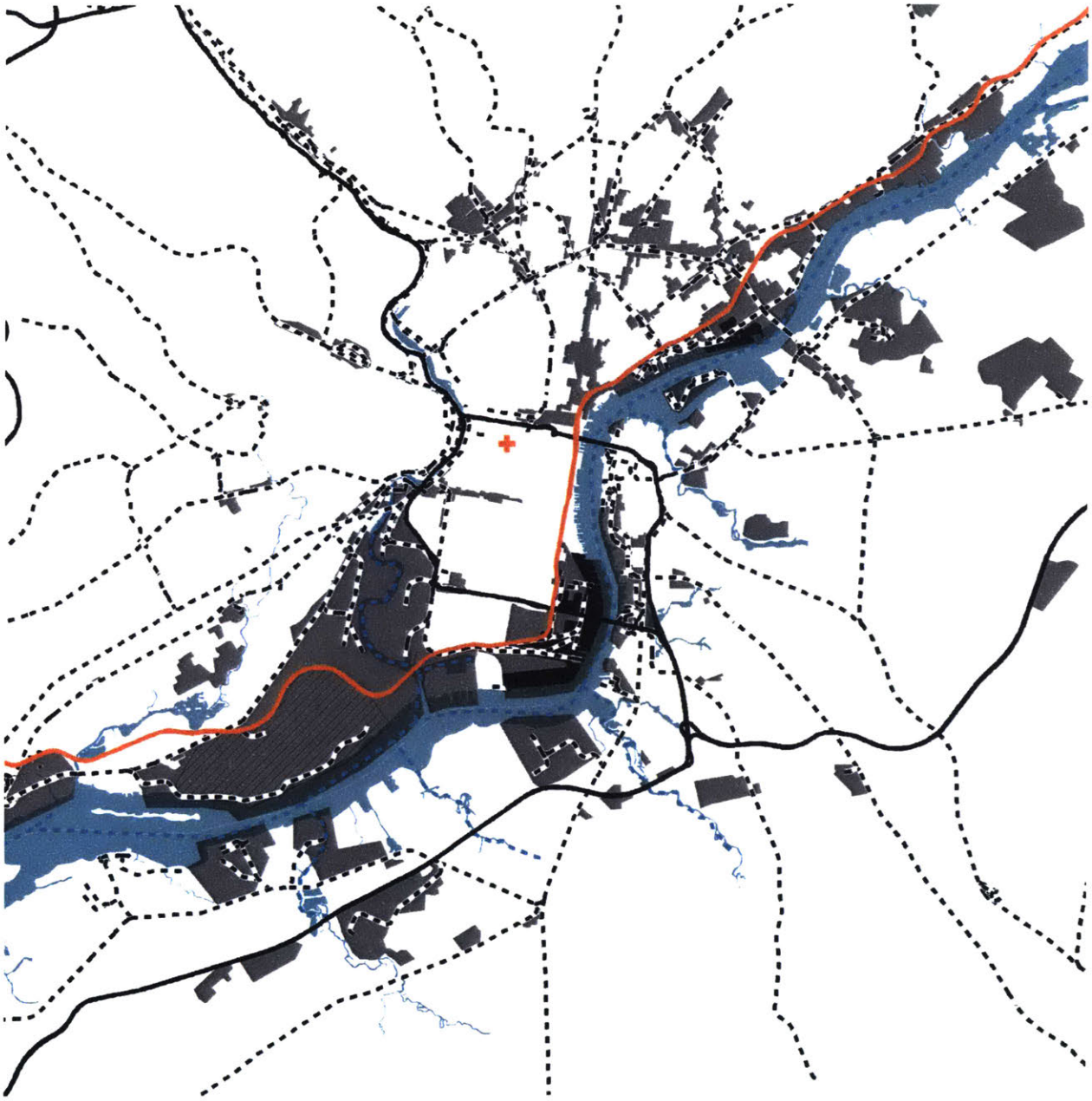
The current pattern is a product of the logic of the early industrial development reconciled with and modified by the current industrial markets that want to be in Philadelphia. Note the northwest to southeast diagonal rail and highway patterning designed to link the raw materials of the interior with the resources and consumer markets at the coasts. Note the northeast to southwest highway and rail diagonals designed to facilitate movement of goods and people along the major coastal urban areas.

Industries that defined Philadelphia's EARLY Industrial Development

- Woodworking
- Metal forging
- Machining
- Steam engineering
- Shipbuilding + ship repair
- Petroleum + chemical refining
- Food processing

Industries that dominate Philadelphia's CURRENT Industrial Development

- TRANSPORTATION:
  Logistics + Wholesale
- TRADITIONAL MANUFACTURING:
  Apparel, Building Fixtures + Equipment, Construction, Housing + Real Estate, Publishing and Printing, Meat Fabrication, and Processed Food.
- ADVANCED MANUFACTURING:
  Biopharmaceuticals, Energy, Medical Devices.

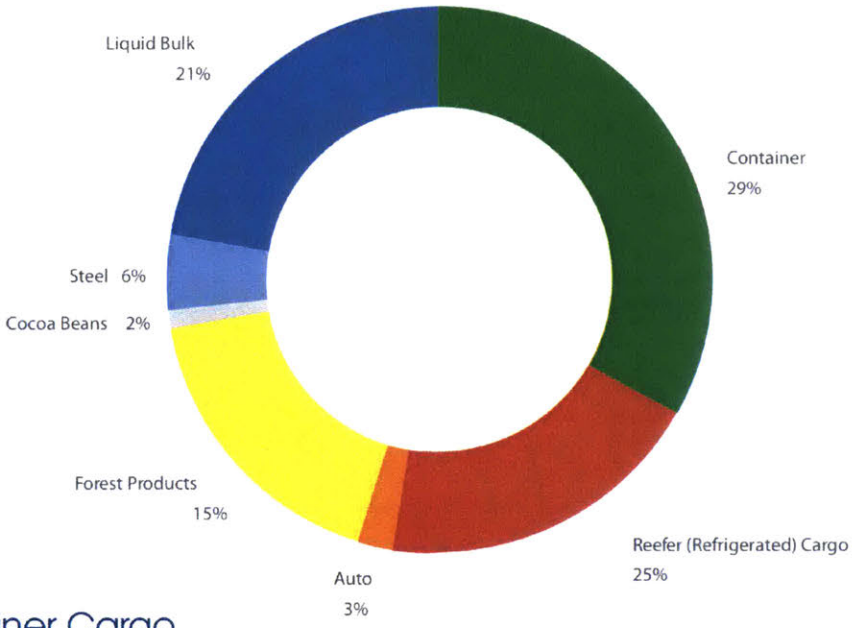


Graphic Created By Zoë Taft Mueller.

PHILAPORT CARGO HANDLING TONNAGE BY COMMODITY

Following Main Channel Deepening, PhilaPort is investing to grow container and automotive cargo by 2x, and increase breakbulk cargo by 21%. They grew their total tonnage by 19% in the last year. Additionally, PhilaPort is already a recognized leader in specialty markets: refrigerated, forest products, cocoa beans and steel. Lack of NYC-level congestion is a key competitive advantage.

Graphic Adapted from PhilaPort.



Container Cargo

PhilaPort is deep enough to handle larger ships that come through the Panama Canal and we're equipped with super post-Panamax cranes, plenty of warehousing, staging and laydown areas. Add two Class I railroads and truck turn times under an hour, PhilaPort becomes your ideal choice for ensuring cargoes get to manufacturers, distribution centers and consumer markets as quickly as possible.

Automotive

Philadelphia is an efficient gateway for both importers and exporters of all types of roll on/roll off cargoes. On-terminal rail access and close proximity to the docks helps to expedite transfers. For importers, dealership preparation services including accessorizing and detailing helps to speed cars directly to consumers throughout the Eastern U.S. and Canada.

Refrigerated Cargoes

The Greater Philadelphia port complex is the #1 fruit gateway in the U.S., and one of the leading entry points in North America for meat and dairy products. We maintain excellent relationships with government food regulators and inspectors and our terminals have thousands of refrigerated plugs ready for use. Public and private warehouses in our region provide millions of square feet of freezer and refrigerated warehousing, and significant increases in temperature-controlled warehouse space are in construction. PhilaPort is home to the Philadelphia Wholesale Produce Market – the world's largest fully-enclosed, fully-refrigerated wholesale produce market.

Forest Products

PhilaPort terminals process more than one million tons of paper, pulp and wood cargo a year. We have on-dock rail, trucks and lift equipment with specialized paper handling capabilities – plus dedicated indoor loading for both truck and rail. Special forest products services include stripping and stuffing of containers and rail cars, transloading and distribution support.

Breakbulk and Bulk Cargoes

Importers and exporters have trusted their breakbulk and bulk cargoes to PhilaPort for hundreds of years. From cocoa to steel to liquid bulk, we have the terminal capacity, facilities, equipment and most importantly, the expertise required for the efficient and safe handling of each cargo type. Our terminal operators and logistics coordinators rely on long-standing partnerships with transport providers to smoothly manage breakbulk and bulk cargoes from origination to destination.

INDUSTRIAL MARKET TRENDS FOR PHILADELPHIA

Graphic Created By Interface Studio for PIDC

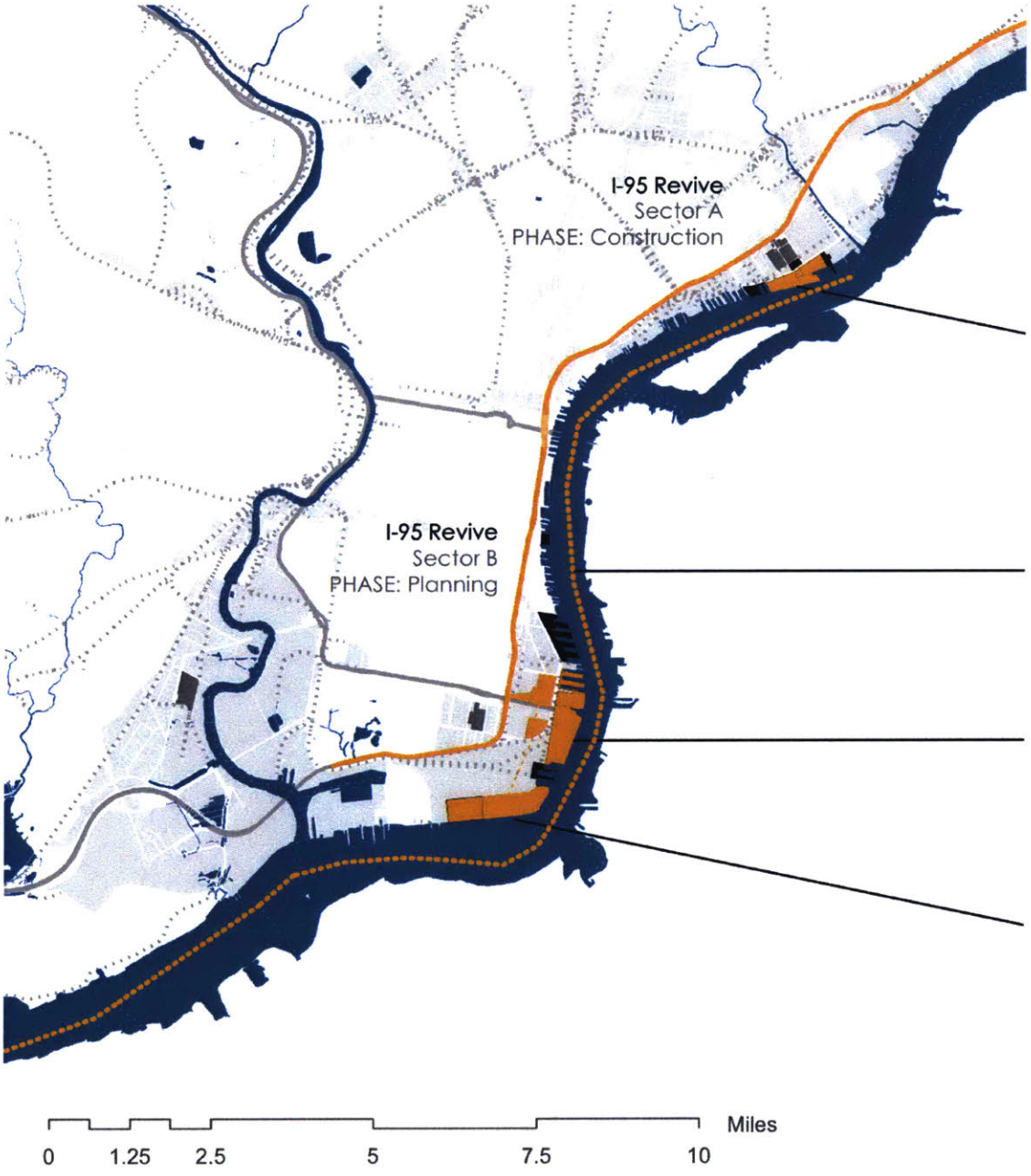
Based on the 2010 industrial market analysis referenced above, the largest growth sector will be transportation and logistics which has a direct relationship to the port, so the port and the city would do best to capitalize on this growth potential and drive that market to the appropriate parts of the city. This has a particularly direct relationship to container shipping patterns, and therefore to the container terminals, especially Packer Ave - the primary container terminal at the southeastern edge of the city. All together this means that there is some urgency to strengthen institutional relationships between major actors in the southeastern part of the city in order to develop a targeted plan that addresses inefficient and problematic legacies of previous industrial development and lays a strong foundation for transportation and logistics investment in the industrial districts surrounding the port.

INDUSTRIAL DEVELOPMENT POLICY PROFILE

If we are going to consider growth scenarios for the port and the transportation and logistics industries that relate to it, it very quickly becomes important to understand the financial and political context in which that growth would have to occur. This section of analysis is intended to tease out political priorities and power relationships by examining major capital investments, public transportation capacity, real estate development patterns and land use regulation.

PORT-RELATED INVESTMENTS

The Governor of Pennsylvania, PennDOT and the Army Corps of Engineers are all making investments that support PhilaPort's effort to expand its container, roro and breakbulk capacity.



Graphic Created By Zoë Taft Mueller.

Investment Breakdown

Packer Avenue Marine Terminal:	Approx. $188 million
Tioga Marine Terminal:	Approx. $12 million
Southport Auto Terminal:	Approx. $93 million

	Current	Future
Capital - Estimated	--	**$293M**
Growth in Container Capacity	--	2X
Growth in Breakbulk Capacity	--	21%
Growth in Automotive Capacity	--	2X
Annual Revenue @ Capacity	$5.7m	$18.9m
Direct Jobs (70% increase)	3,124	5,378
Total Employment(65% increase)	10,341	17,020
State/Local Taxes (56% increase)	$69.6m	$108.4m

Tioga Marine Terminal
Construct new 100,000 sqft warehouse
Erect new office building
BUSINESS GOAL: expand and secure wood pulp as base cargo, maintain breakbulk versatility/capacity.

Newly Dredged Main Channel
45' Depth

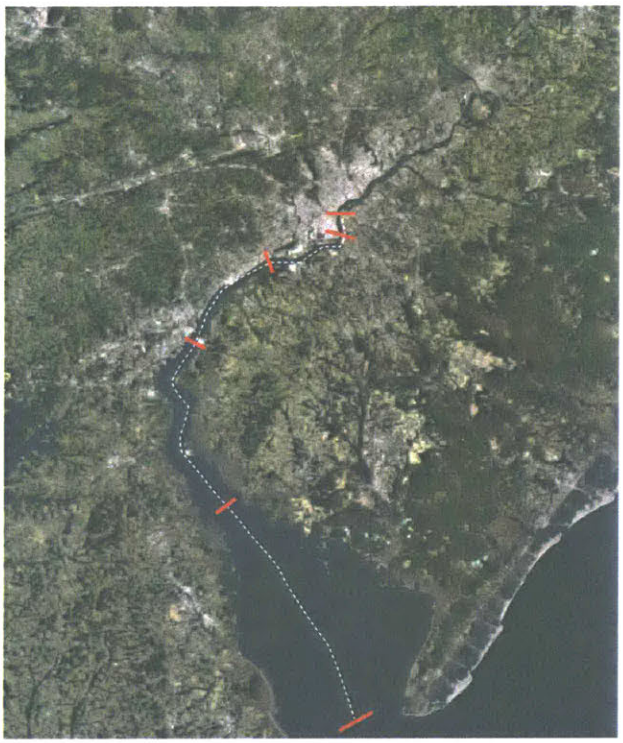
Packer Ave Marine Terminal
New Berths @ 45' Depth, Berth infrastructure and fendering improvements
Crane updates to electric post-Panamax (4 new, convert 2 existing from diesel to electric)
Upgrade electric grid to handle larger ships and cold-storage hookups
Relocate 365,000 sqft warehouse space off of terminal.
BUSINESS GOAL: double on-site container capacity to aggressively compete for container market share.

Southport Auto Terminal
Grading, paving, fencing and lighting of 155 additional acres for auto
Erect second processing location
Install new car wash station
Relocate existing employee parking lot.
BUSINESS GOAL: create cost-competitive auto port that meets the needs of Hyundai + Kia, while enabling future potential to expand into auto exporting.

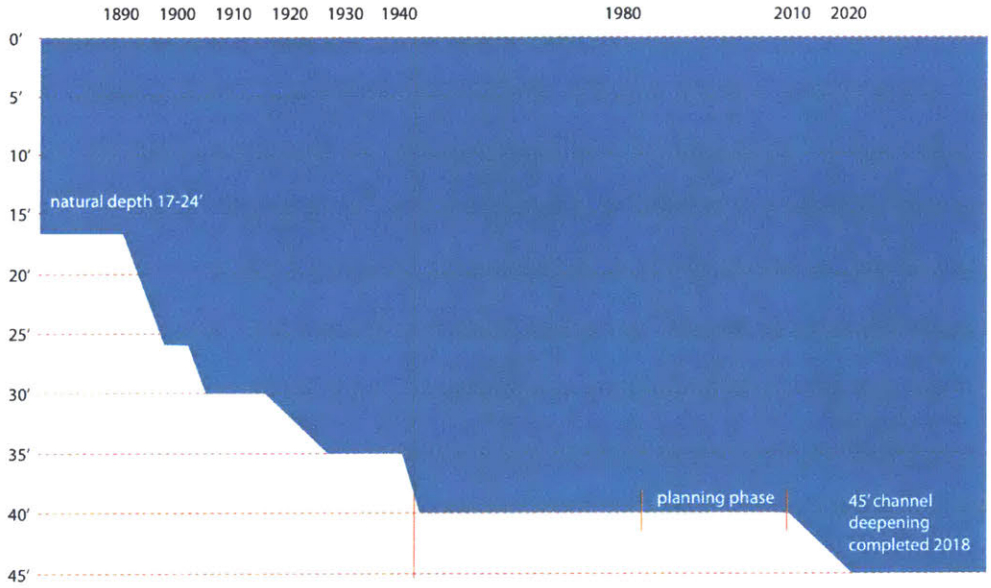
NOTE: in the long-term the Southport Auto Terminal would likely become part of an expanded container port, since the auto (ro/ro) cargo is more inherently flexible in terms of the laydown area's shore proximity.

NATIONAL-SCALE INFRASTRUCTURE INVESTMENT

MAIN NAVIGATION CHANNEL DEEPENING TO 45' FOR LARGER SHIPS



The deepening of the main navigation channel along the length of the Delaware River from its mouth to just past Tioga Marine Terminal will enable PhilaPort to receive many of the post-panamax large ships that carry containers in higher volumes at more competitive rates. This investment is critical to catch up with and compete with New York and Baltimore's ports. This also represents a major infusion of money after a long lag in investment (see the chart below), and so if done right it has the potential to recapture market share that has been diverted away from PhilaPort during the decades in which the port did not invest enough to keep pace with its peers.



$300 million project
PhilaPort is project sponsor (35% cost share)
Federal Army Corps of Engineers (65% cost share)

102.5 mile project deepening existing 40' channel to 45'
approximately 50% of channel required dredging. A small portion required blasting.

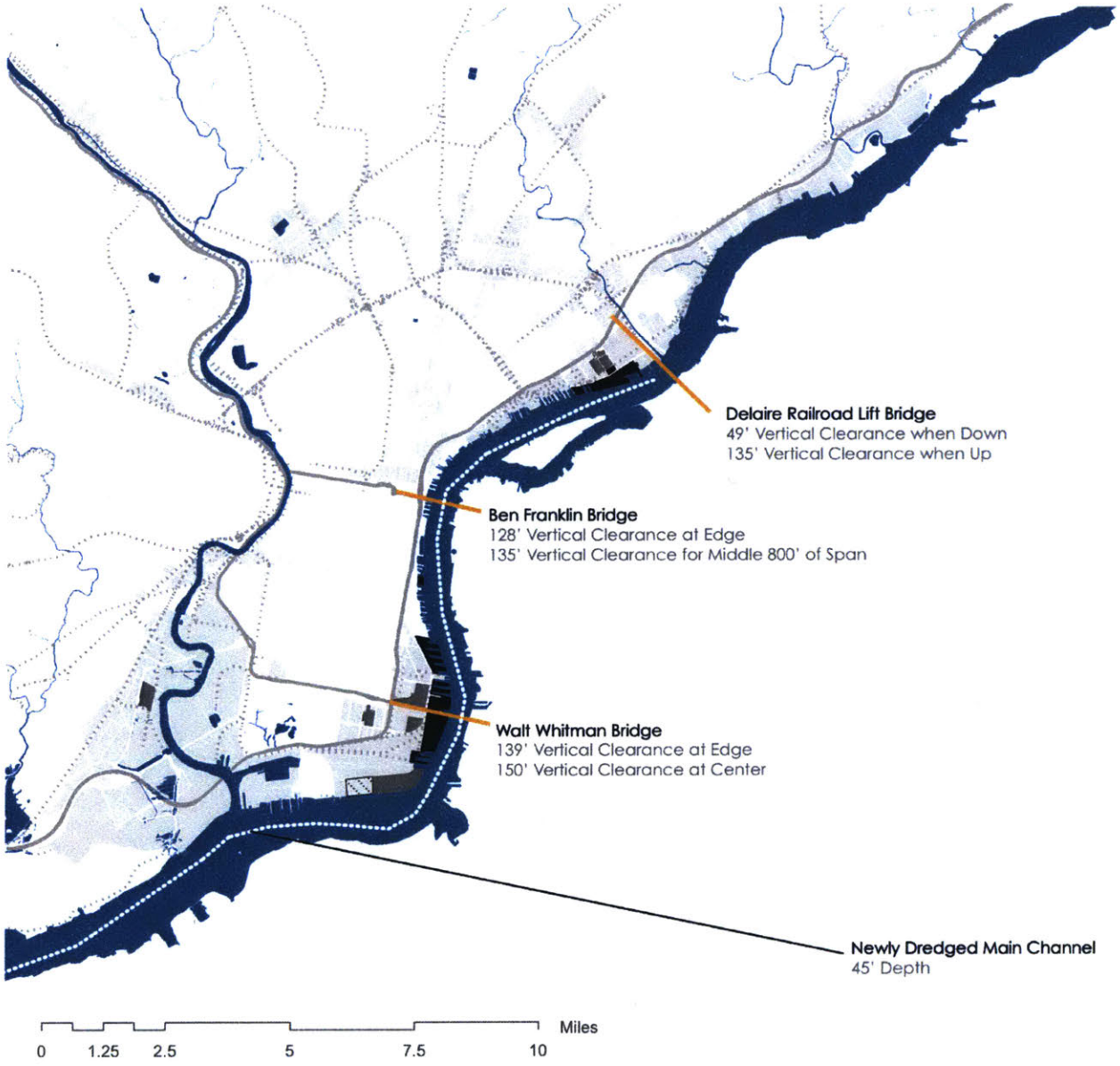
Total estimated dredging volume is 16 million cubic yards (CY) consisting of silt, clay, sand and gravel. 2 million CY of sand will go to a local beach replenishing project while the remaining 14 million CY will go to Federal Confined Disposal Facilities, some local some not.

Graphics Created By Zoë Taft Mueller.

CONSTRAINTS TO SHIP MOVEMENT

CONSTRAINTS BEYOND WATER DEPTH OF MAIN NAVIGATION CHANNEL

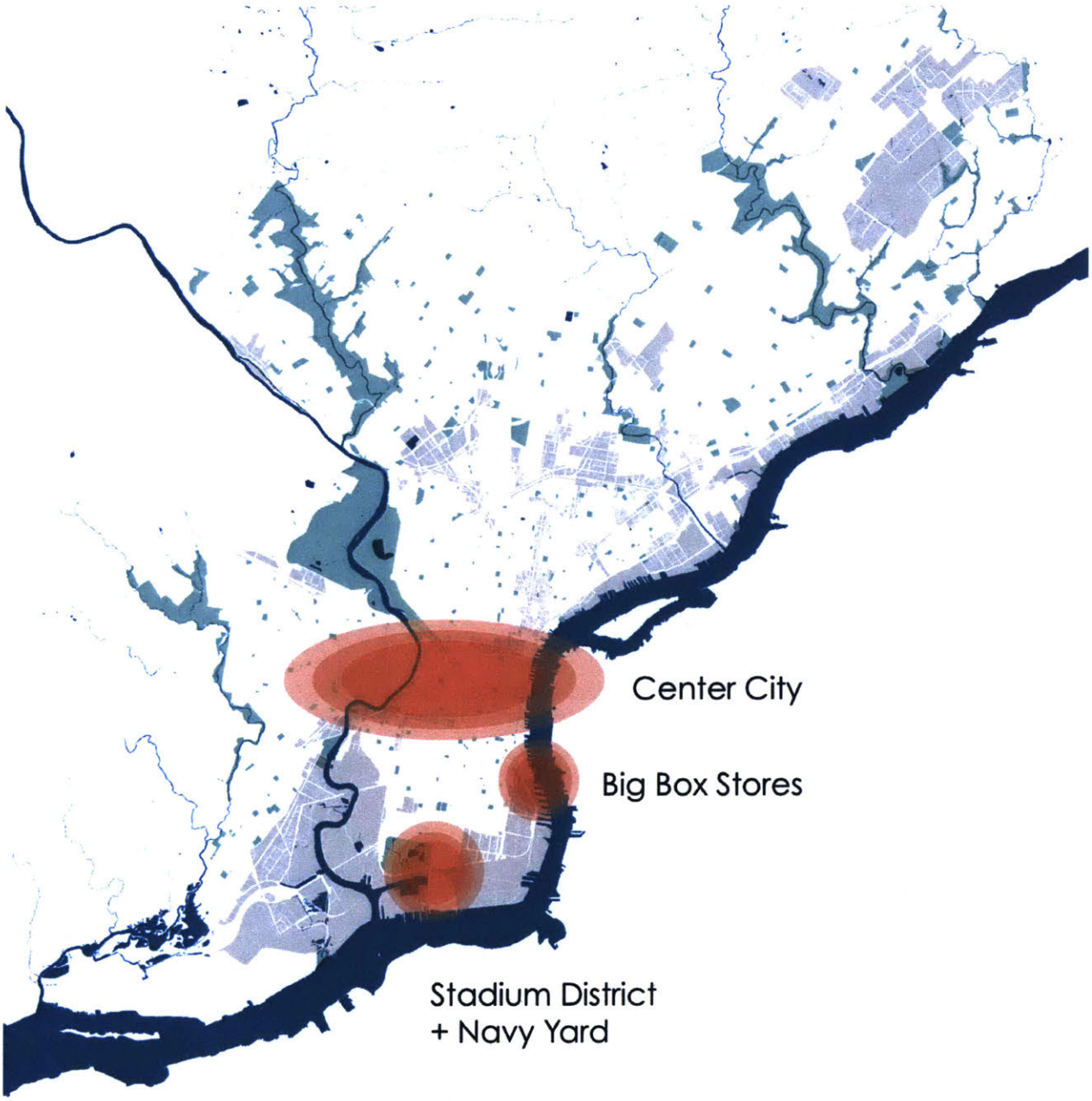
However, despite the main channel deepening, Walt Whitman Bridge will continue to be a major barrier for the large ships navigating the Delaware. Ben Franklin and Delaire bridges pose more significant barriers. An investment in raising or altering the profile of Walt Whitman would change this dynamic, but that investment does not seem forthcoming. In aggregate, this means that the PhilaPort's land south of Walt Whitman is the most valuable and flexible in its maritime industrial use for the forseeable future.



Graphic Created By Zoë Taft Mueller.

REAL ESTATE PRESSURE

Center City Philadelphia is the center of government, the central business district (as clearly indicated by the concentration of employment in the map on page 132) and a vibrant center of culture and nightlife with unrivaled public transit service. Accordingly, Center City continues to be the dominant center of real estate investment and speculation. The only other notable nodes of investment where land values jump are the big box store district and the stadium and navy yard districts highlighted below. These nodes are of particular interest and concern because of their proximity to PhilaPort's core container operations. If not strategically managed, these two nodes could constrain PhilaPort's long-term development potential.



Graphic Created By Zoë Taft Mueller.

LAND USE POLICY FOCUS

This map, produced for the Philadelphia Industrial Development Corporation's 2010 "Industrial Land Market Strategy" shows the intentions behind the City of Philadelphia's 2012 industrial zoning overhaul. Note that the port's properties are all in grey areas. This means that they are stable and performing, are not acutely threatened by adjacent real estate development, and do not have the characteristics that would allow for higher-density and advanced manufacturing industries. Note, however, the orange at the borders of Tioga Marine Terminal and purple at the borders of the southern port terminals.

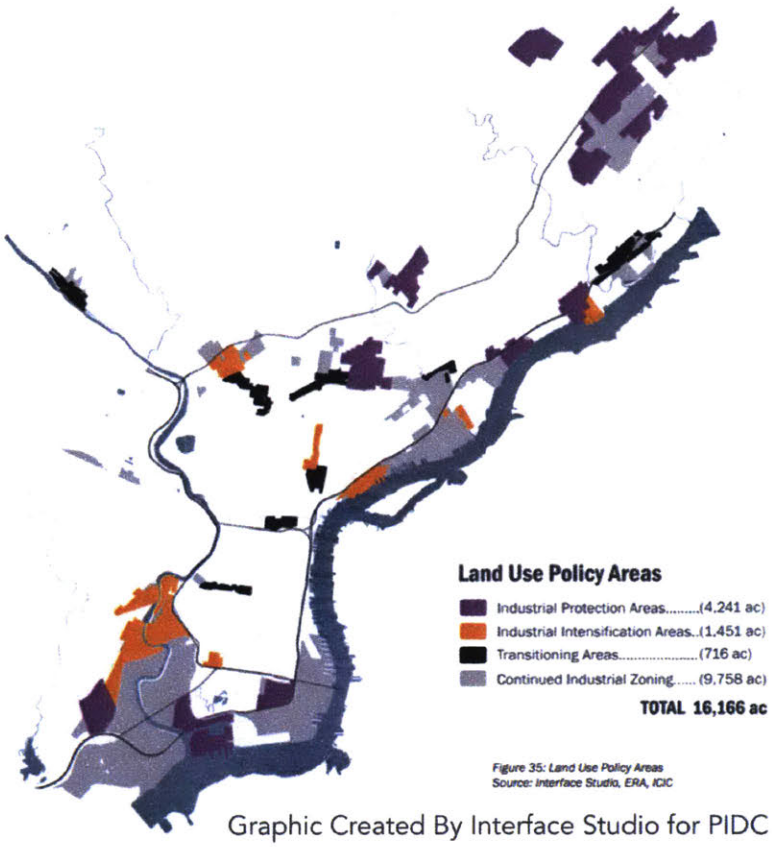


Figure 35: Land Use Policy Areas
Source: Interface Studio, ERA, ICIC

Graphic Created By Interface Studio for PIDC

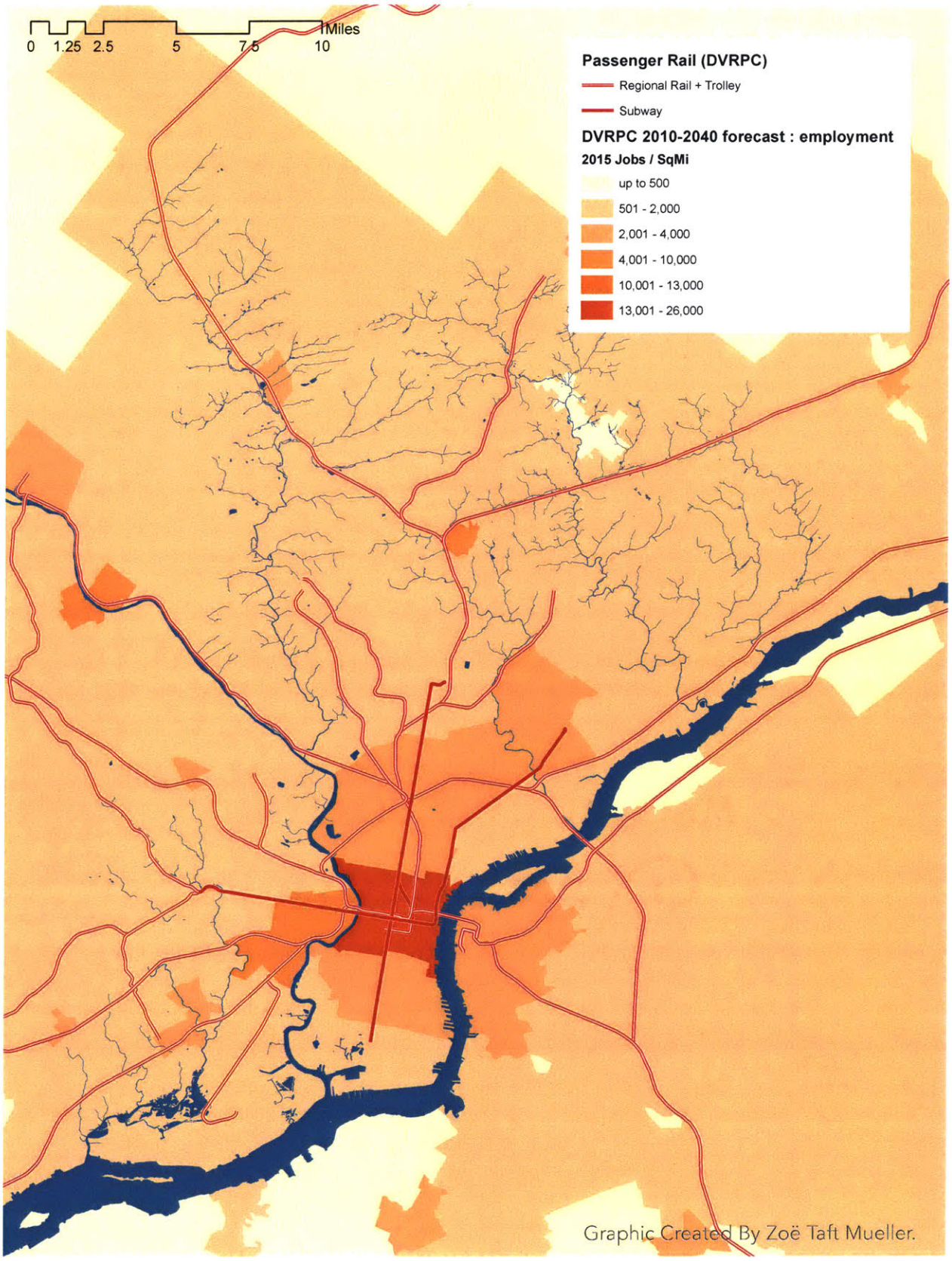
Industrial Intensification Areas (orange) - indicates industrial areas that, with careful planning, marketing and investment, can accommodate more "dense and productive" industrial development.

Industrial Protection Areas (purple) - indicates industrial areas that are vibrant and employment-rich but that need support to fight back encroachment of non-industrial uses and market-based displacement of valuable existing businesses.

Transitioning Areas (black) - indicates industrial areas that are "not suitable for continued industrial use" and are desirable locations for non-industrial development. Mixed-use zoning allowances in these districts will facilitate what the real estate market is already pushing towards, which will eventually result in these areas cycling out of the industrial land supply.

In summary, the port is supported by the zoning code but its immediate surroundings are not the focus of resources and strategic support. Depending on the direction and momentum of real estate development in the next few years, there is a chance that the port will also require the resources and strategic support that nearby purple "protection areas" are receiving to ensure their continued security, viability and competitivity. City support of the port can and should be framed in terms of job retention and sustainable freight planning. The risk of the port's current land use policy context is that the city will not be focused on shaping or leveraging the port's investment, and will therefore miss out on strategic coordination opportunities that could yield increased long-term benefits to the city.

WORKFORCE COMMUTING DYNAMICS



With all this coordinated investment targeted at scaling up and modernizing PhilaPort's facilities, the hope is that more accessible family-wage jobs will be created in response to this growth. However, the lack of reliable and high-capacity public transit serving the port and navy yard limits their potential in two ways:

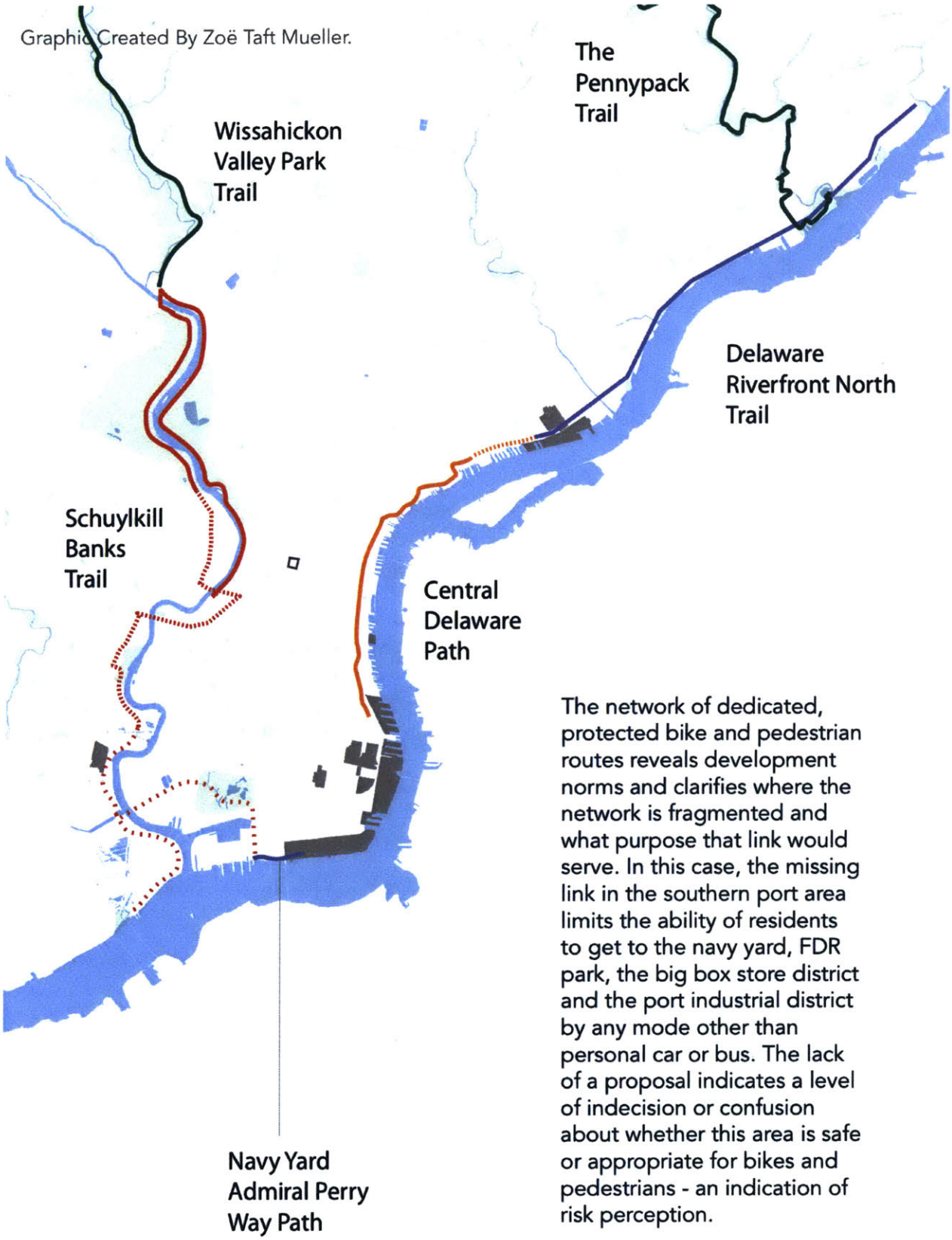
(1) Many Philadelphia and Camden area residents will not be able to reach these jobs easily by transit and so may not be able to benefit from the new jobs despite how close they are.
(2) Many employees will likely choose to drive in a personal vehicle meaning road congestion that will slow freight movement and requiring prime industrial land to be set aside for employee parking.

The rebuilding of I-95 in Sector B has the potential to help enhance the transit accessibility of port-related jobs by rebalancing the relationship of I-95 and Columbus Blvd so that Columbus can accommodate bus rapid transit or at least a more frequent and high-capacity service than exists now.

WATERFRONT DESIGN ZONE FRAMEWORK

Based on anchor industrial uses, transportation infrastructure and permeability of the street system it would be useful to establish some broad categories for port-related investments that can help clarify priorities and limitations in any given district.

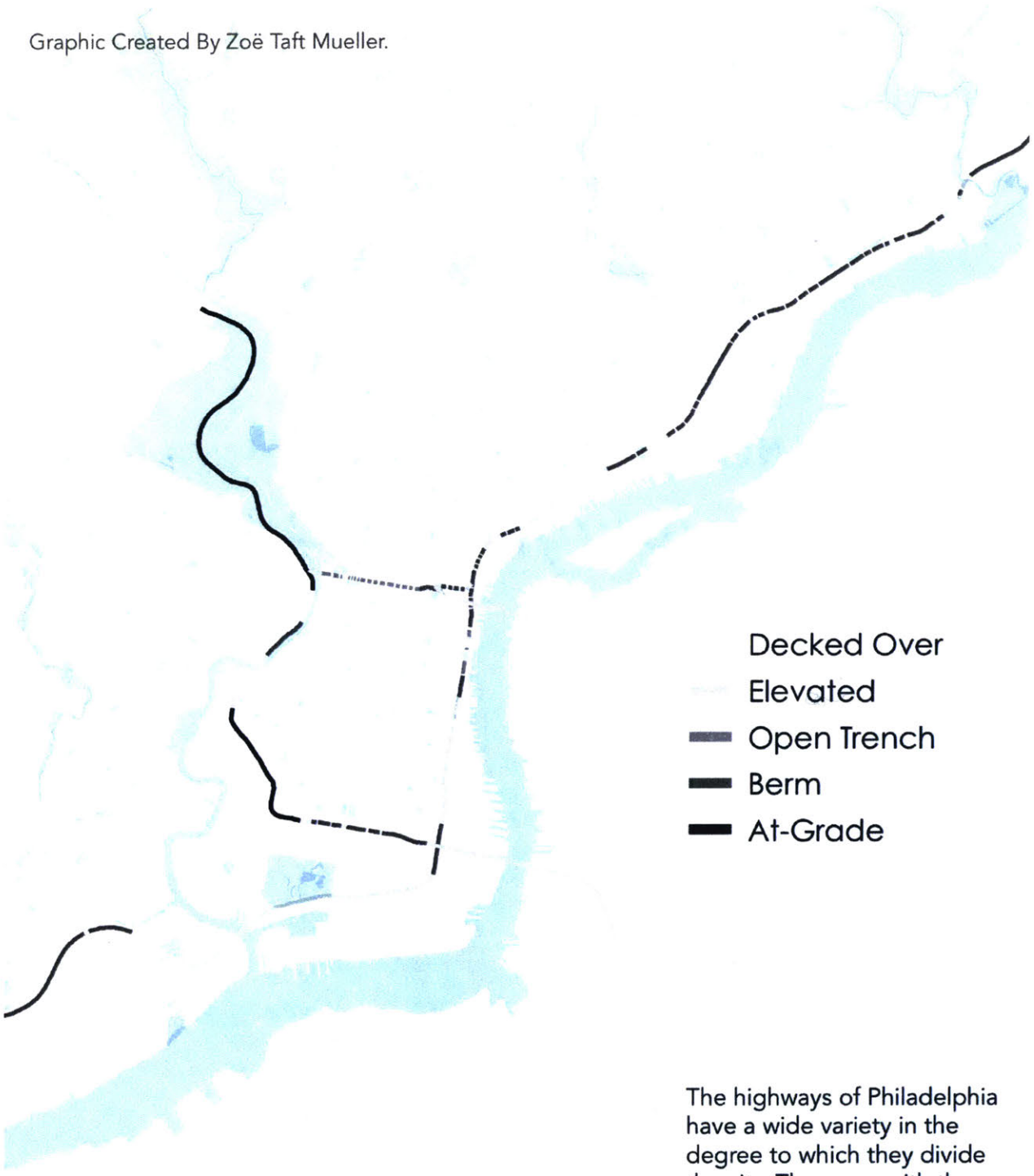
PUBLIC ACCESS PATHS



The network of dedicated, protected bike and pedestrian routes reveals development norms and clarifies where the network is fragmented and what purpose that link would serve. In this case, the missing link in the southern port area limits the ability of residents to get to the navy yard, FDR park, the big box store district and the port industrial district by any mode other than personal car or bus. The lack of a proposal indicates a level of indecision or confusion about whether this area is safe or appropriate for bikes and pedestrians - an indication of risk perception.

HIGHWAY BARRIERS

Graphic Created By Zoë Taft Mueller.



The highways of Philadelphia have a wide variety in the degree to which they divide the city. The areas with the worst permeability (indicated in darker colors) have the least potential for long-term continuity of use and fluidity of movement.

PORT DESIGN ZONES

Based on the risk of the waterfront industrial use, the degree to which that use's risk profile fluctuates, and the degree of permeability in the public access pathways and street grid, I developed these design zones that clarify the distinctive challenges and opportunities associated with that district and recommend ways of improving the relationship between industrial and non-industrial users of that district.

Graphic Created By Zoë Taft Mueller.

WATERFRONT DESIGN ZONES

A **Civic Waterfront**
continuous public access with strong sightlines from core commercial/residential neighborhoods.

B **Dynamic Integration :** low, fluctuating risk profile
at grade linear paths punctuated by point access public spaces, path winds to water and back depending on shore-side land use. Space changes based on operations and time of day.

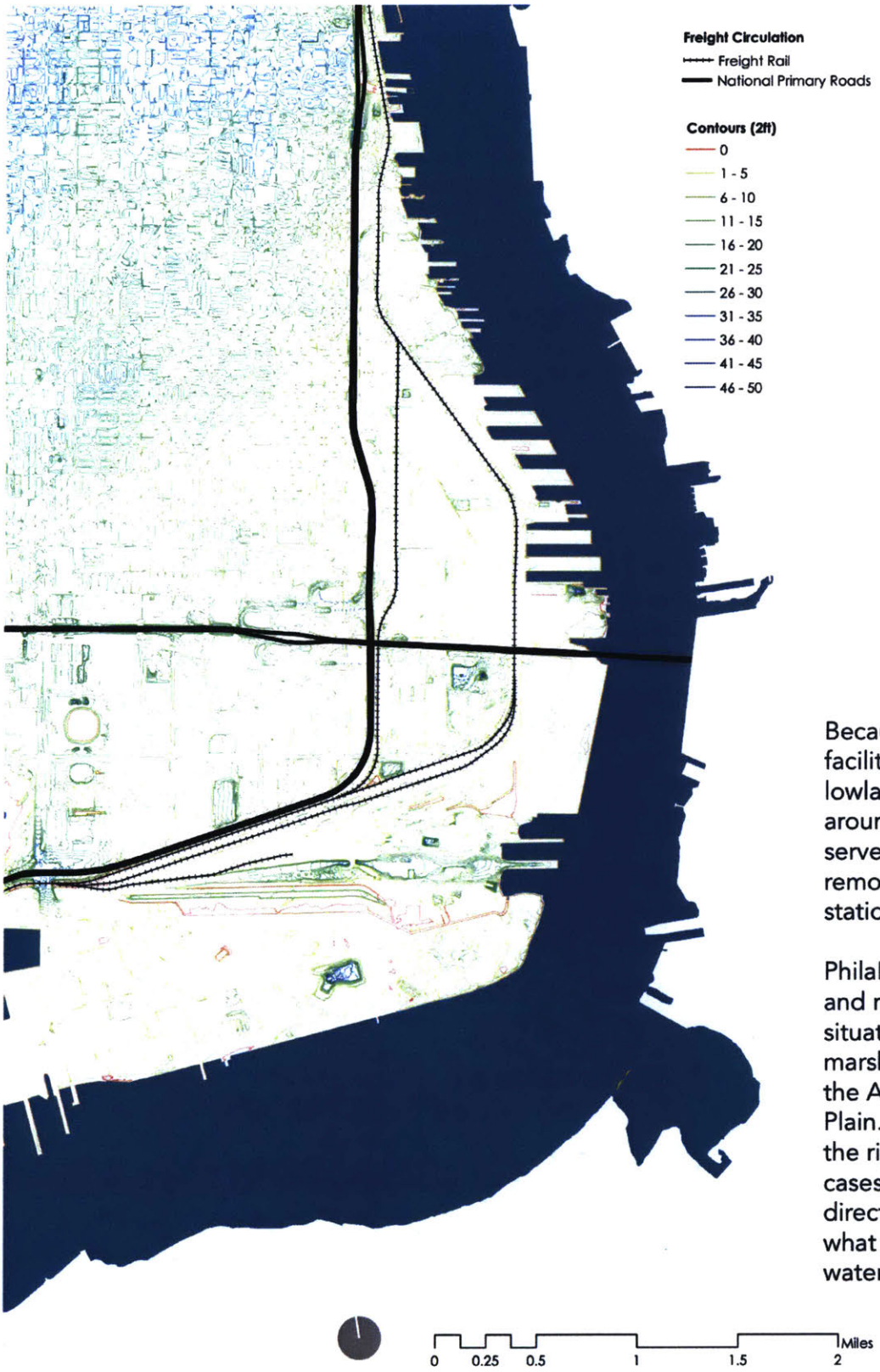
C **Phased Crossfade :** medium risk profile
Managed development of buffer light industrial and mixed use to restructure transitioning industrial district. Particularly relevant for petroleum "tank farms" and other out-moded industrial processes on sub-optimal land near the CBD.

D **Remote Spectacle :** high, steady risk profile
above grade linear public access removed from shoreline and elevated to allow only visual and not physical access.

PROPOSED PHILAPORT SOUTHERN TERMINAL BUFFER + INTEGRATION TACTICS

Based on the port design zones described below and the growth trajectory of PhilaPort, I will zoom into the southern terminals to develop a site-specific series of tactics that strategically manage the relationship of PhilaPort's southern terminal operations with the daily life of those who live, work and play nearby. This section will specifically identify what interventions in PhilaPort's immediate surroundings would increase environmental performance, economic efficiency and workforce accessibility while positioning the port for a future of sustained growth.

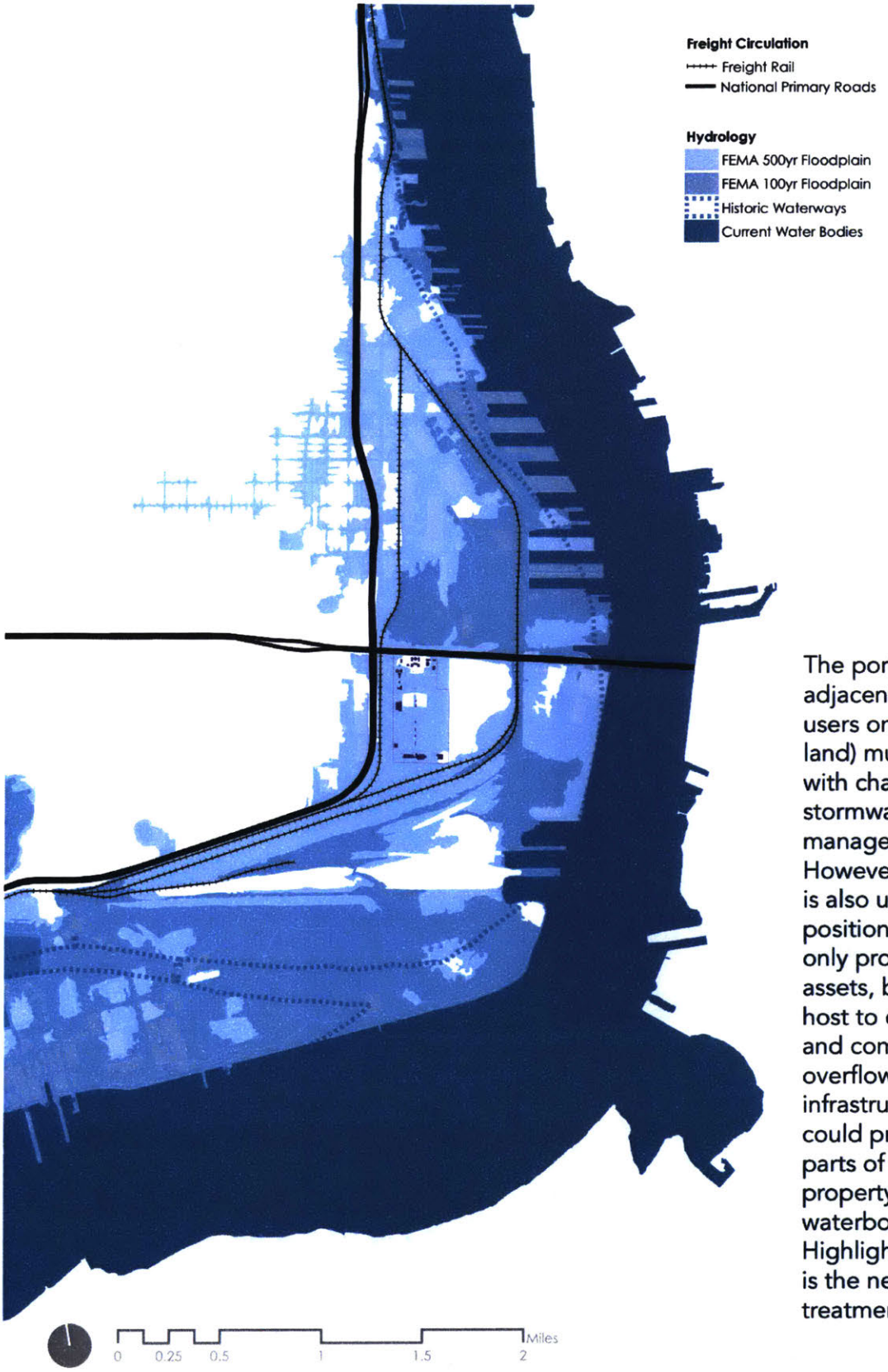
TOPOGRAPHY + HYDROLOGY CONSIDERATIONS



Because PhilaPort's facilities are in the lowlands, highpoints around them can serve as good remote viewing stations.

PhilaPort's container and ro-ro facilities are situated in the former marshy lowlands of the Atlantic Coastal Plain. As pictured on the right, in some cases the port is directly on top of what was once a waterway.

Data Source: Philly Open Data, 2ft Contours



The port (as well as adjacent industrial users on unsewered land) must contend with challenging stormwater and flood management issues. However, the port is also uniquely well positioned to not only protect its own assets, but also to be host to citywide flood and combined sewer overflow mitigation infrastructure that could protect other parts of the city from property damage and waterborne pollution. Highlighted in purple is the nearest water treatment plant.

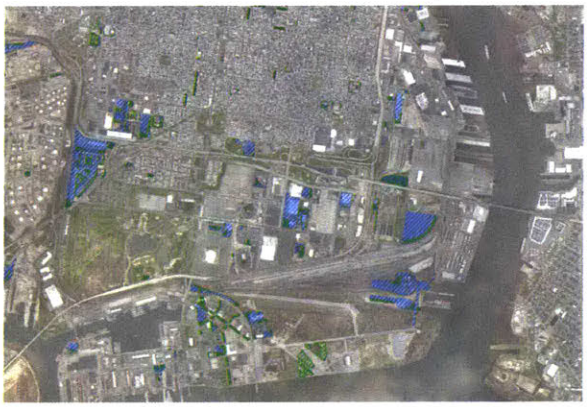
Data Source: Philly Open Data, FEMA Flood 100yr, 500yr, Historic Waterways

SEWER + STORMWATER CONSIDERATIONS

The maps below, courtesy of Connie Bird with Philadelphia Water Department, indicate that stormwater infrastructure projects are reducing flood risk, but the density of projects in industrial areas is lagging and may require an incentive system or a coordinated effort to reach sufficient scale to significantly reduce flooding and CSO overflows in the district.

PHILADELPHIA WATER DEPARTMENT LED STREET RECONSTRUCTION PROJECTS

CONSTRUCTED PRIVATE GREEN STORMWATER INFRASTRUCTURE PROJECTS (15,000 SQFT+)

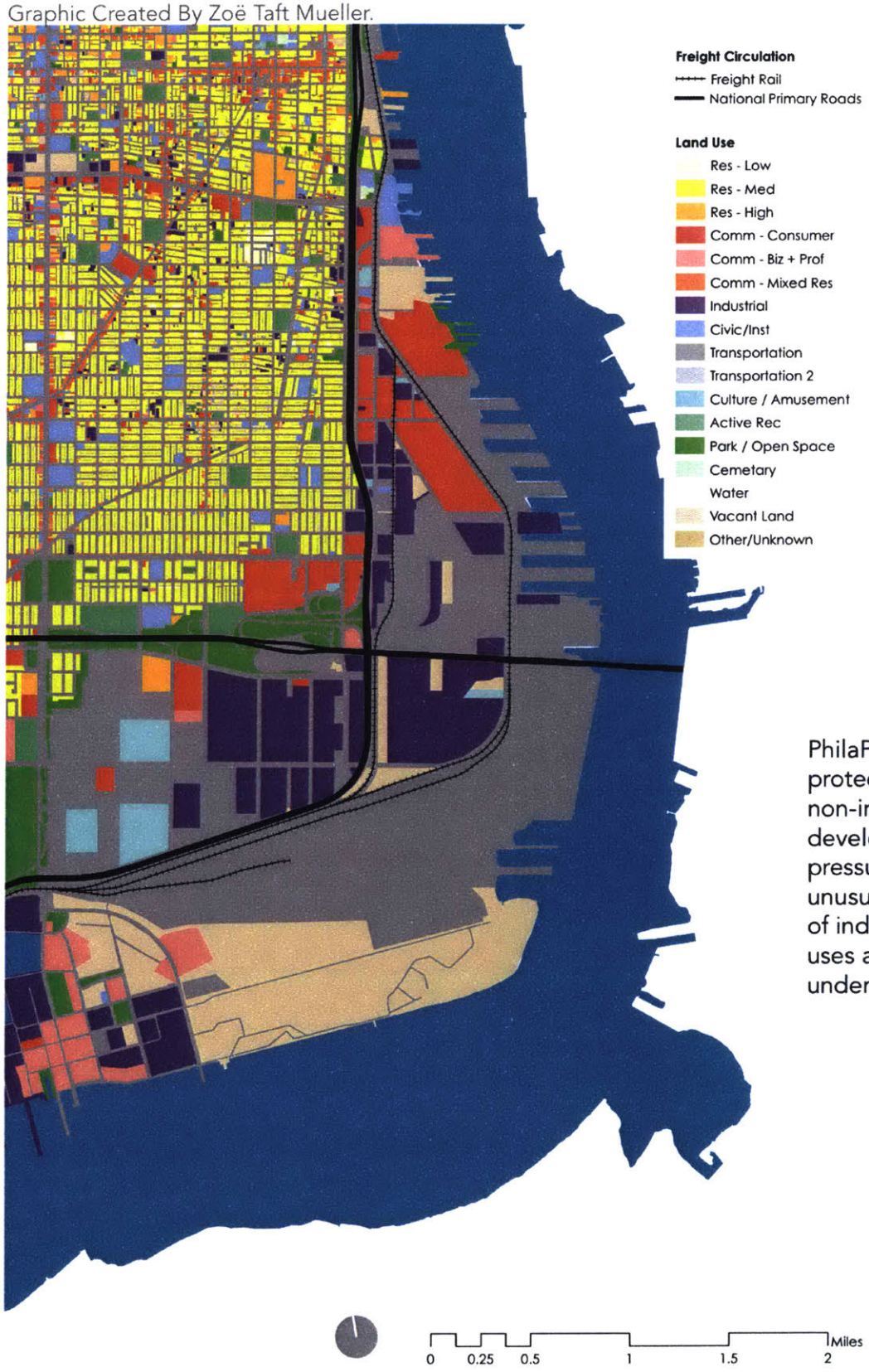


PENDING PRIVATE GREEN STORMWATER INFRASTRUCTURE PROJECTS (15,000 SQFT+)

Graphics Created By Connie Bird.

LAND USE + LAND VALUE CONSIDERATIONS

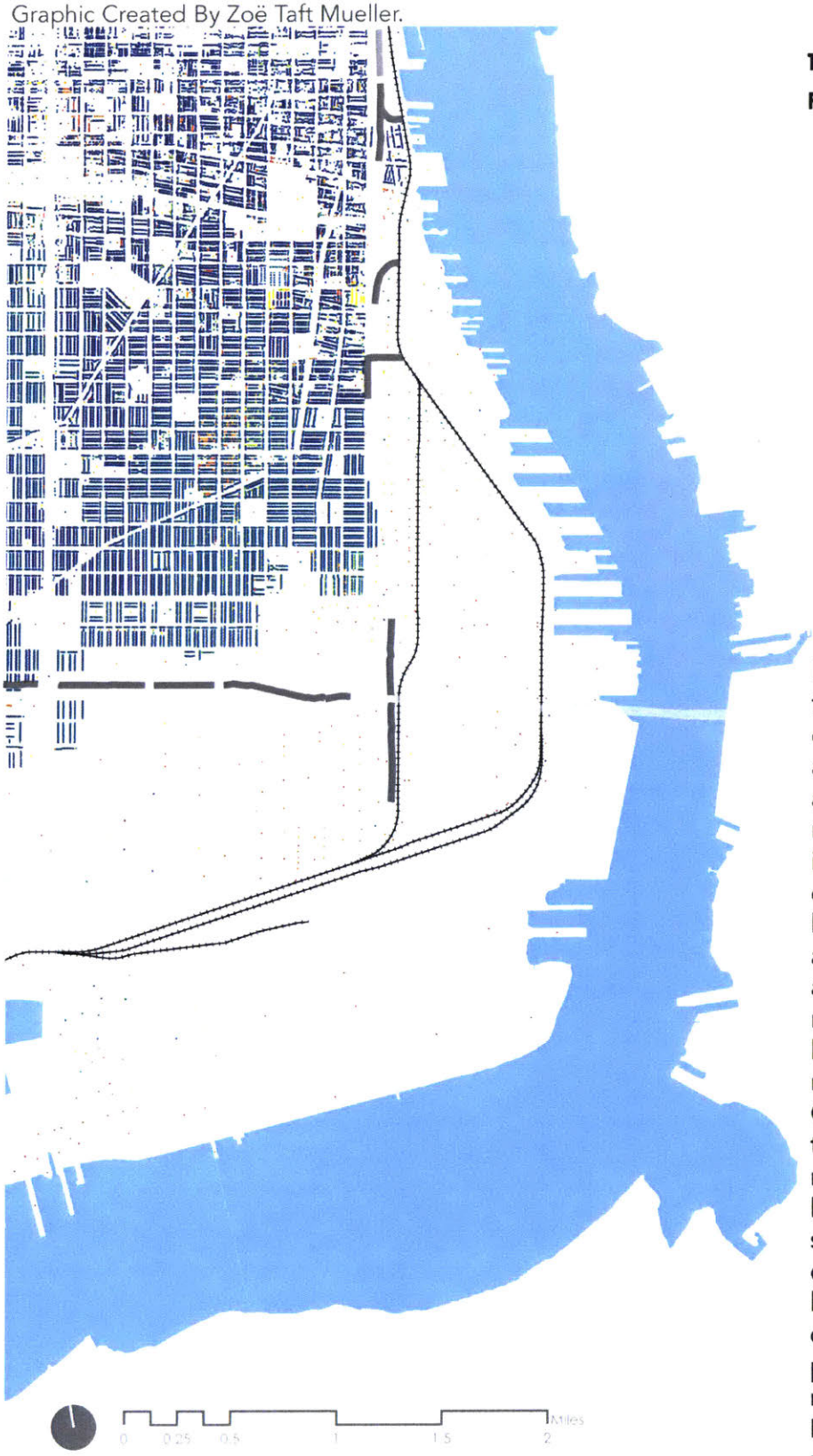
Graphic Created By Zoë Taft Mueller.



PhilaPort is currently protected from non-industrial development pressures by an unusually wide buffer of industrial land uses and vacant or underutilized land.

LAND USE + LAND VALUE CONSIDERATIONS

Graphic Created By Zoë Taft Mueller.



Tax Assessed Value (2017)

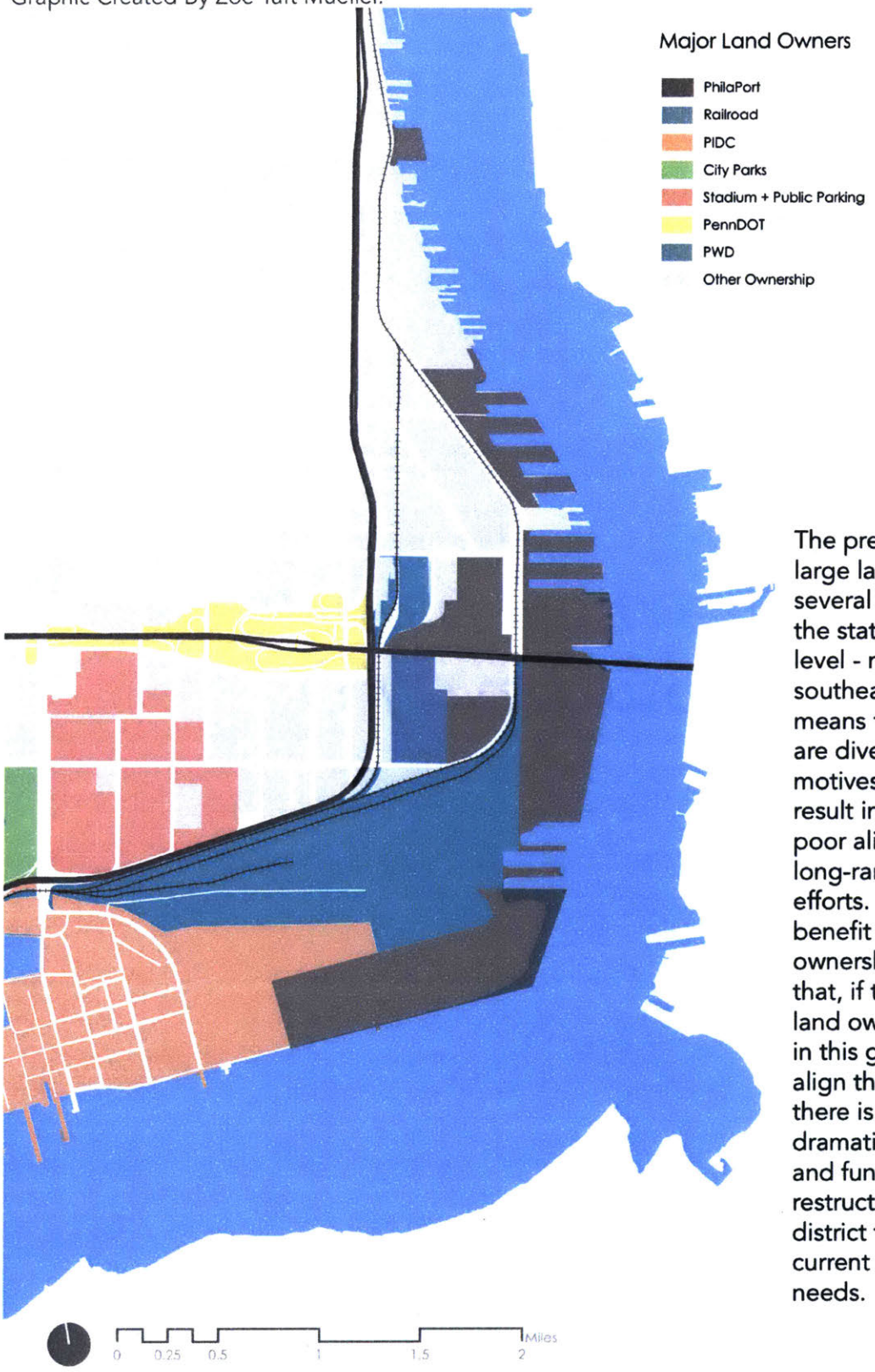
Property Value / sqft

- up to $22.12
- $22.13 - $38.21
- $38.22 - $49.05
- $49.06 - $57.92
- $57.93 - $67.13
- $67.14 - $77.96
- $77.97 - $92.69
- $92.70 - $124.5
- $124.60 - $232.30
- over $232.30

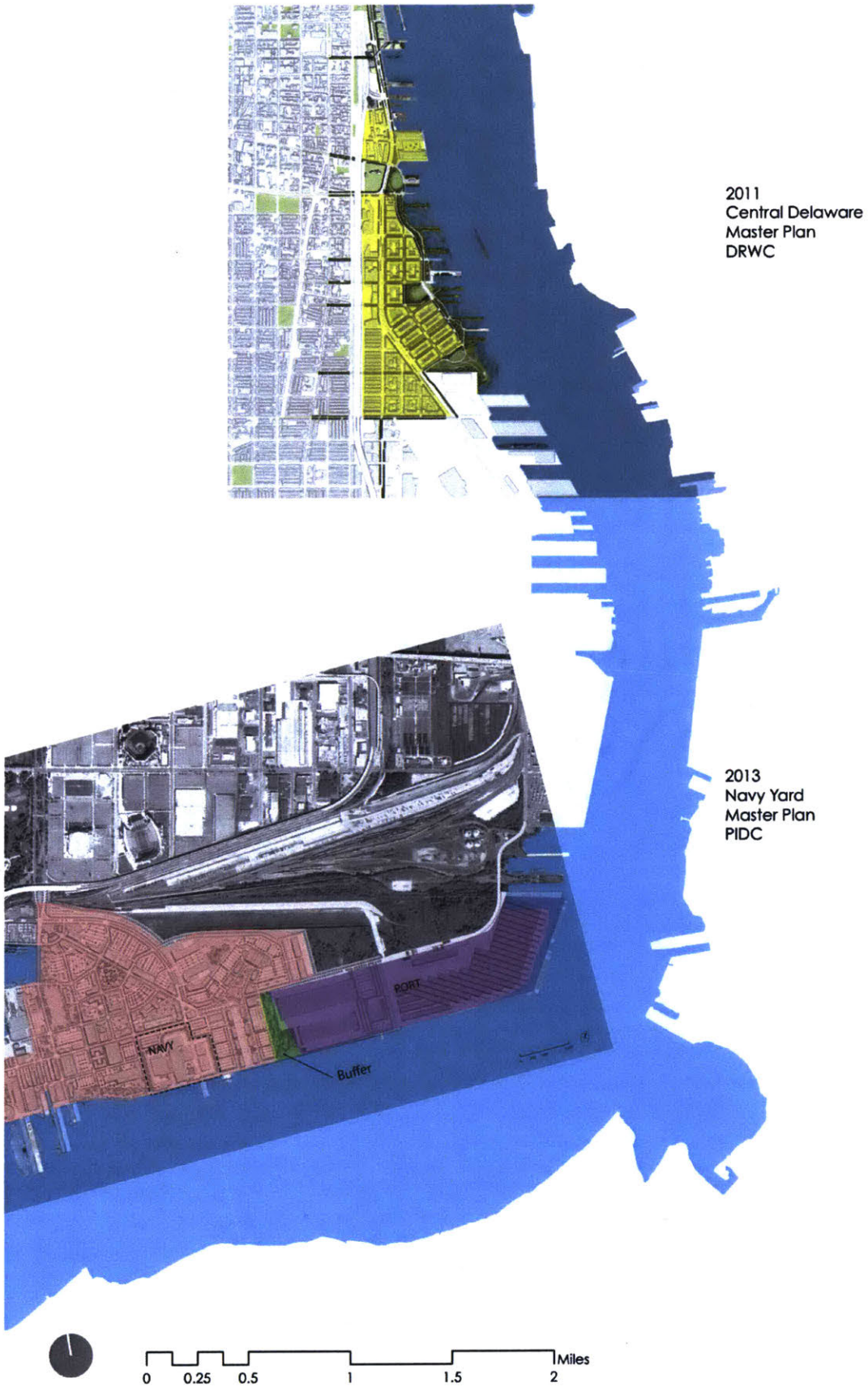
Land values appear to generally trend downwards as you approach the port district and the highway and rail barriers that precede it. There is also a sharp distinction in values between residential areas and commercial-industrial areas. However, there is reason to believe that land values are increasing radiating out from Center City and reaching into the South Philadelphia neighborhoods that have historically been strongholds of working class housing. As land values rise and displacement picks up pace, real estate values may begin threatening PhilaPort's operations in more ways than one.

LAND OWNERSHIP CONSIDERATIONS

Graphic Created By Zoë Taft Mueller.



The presence of many large land owners - several of which are at the state or national level - near PhilaPort's southeast facilities means that there are diverse political motives that tend to result in conflict and poor alignment of long-range planning efforts. However, the benefit of this land ownership pattern is that, if the seven major land owners highlighted in this graphic can align their strategies, there is a potential for dramatic transformation and fundamental restructuring of the district to best serve current and future needs.



Graphic Created By Zoë Taft Mueller. via overlay.

REAL ESTATE DEVELOPMENT CONSIDERATIONS

Recent plans for the Central Delaware Riverfront as well as the plans for the Navy Yard redevelopment indicate that real estate development activity is approaching the borders of PhilaPort's land and that the port will have to be strategic in the way it coordinates development with its neighbors - the Stadium District, the Navy Yard, the current Big Box store district and the growing South Philadelphia residential community. Pictured below is the current agreed-upon relationship between the Southport Terminal expansion and the adjacent Navy Yard commercial office development.

PORT EXPANSION:
PORT BUFFER ZONE

A 140-foot buffer zone is provided between the far eastern parking area of the Canal District and the tern edge of the Port Expansion Area. Although this area will be free of buildings or other structures, it needs to be developed with a low-maintenance landscape that will create an effective transition between two vastly different scales of use. As with the Mustin Park District, the overall elevation will be raised to provide greater range of experience and a more effective separation between the two areas.

Initial plantings will include a large proportion of meadow grasses, punctuated by periodic groves of trees and shrubs. The overall effect will be a naturalized landscape, with mown path rather than paved walkways.

The raised elevation of the southern edge of the Port Buffer Zone will produce an unparalleled prospect out across the river. At its riverfront edge, it will connect into a continuous waterfront circulation network that will provide direct pedestrian access between the Port Expansion Area, the Canal District, and the Historic Core.

Figure 7.2 Cross-Section through swale

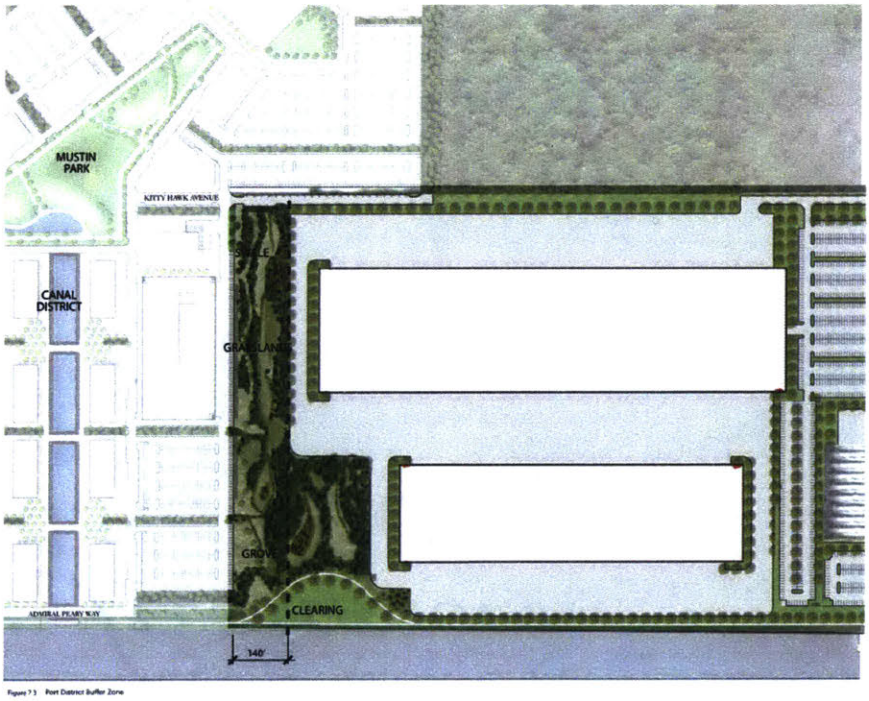
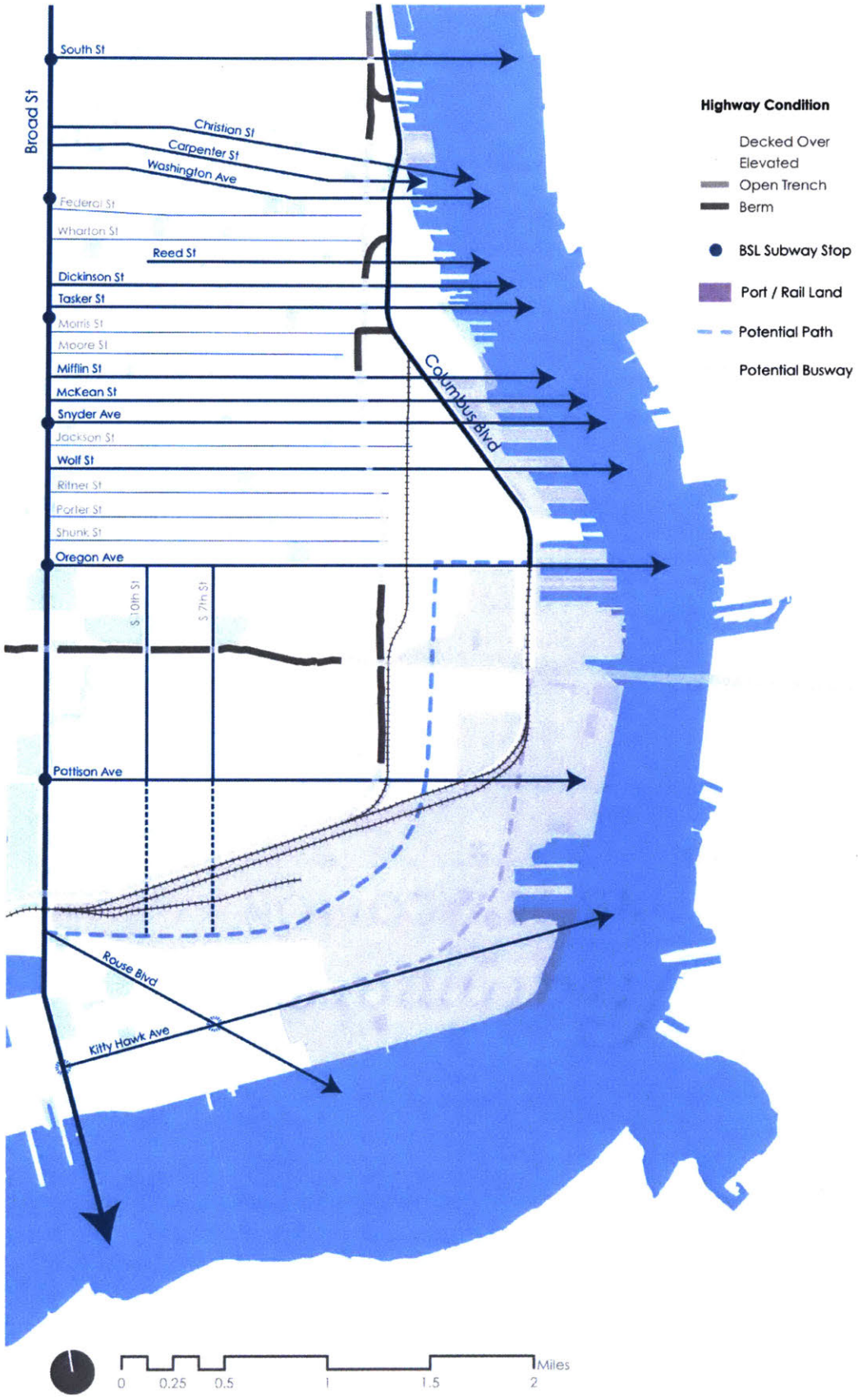


Figure 7.3 Port District Buffer Zone

Graphic Created for PIDC.

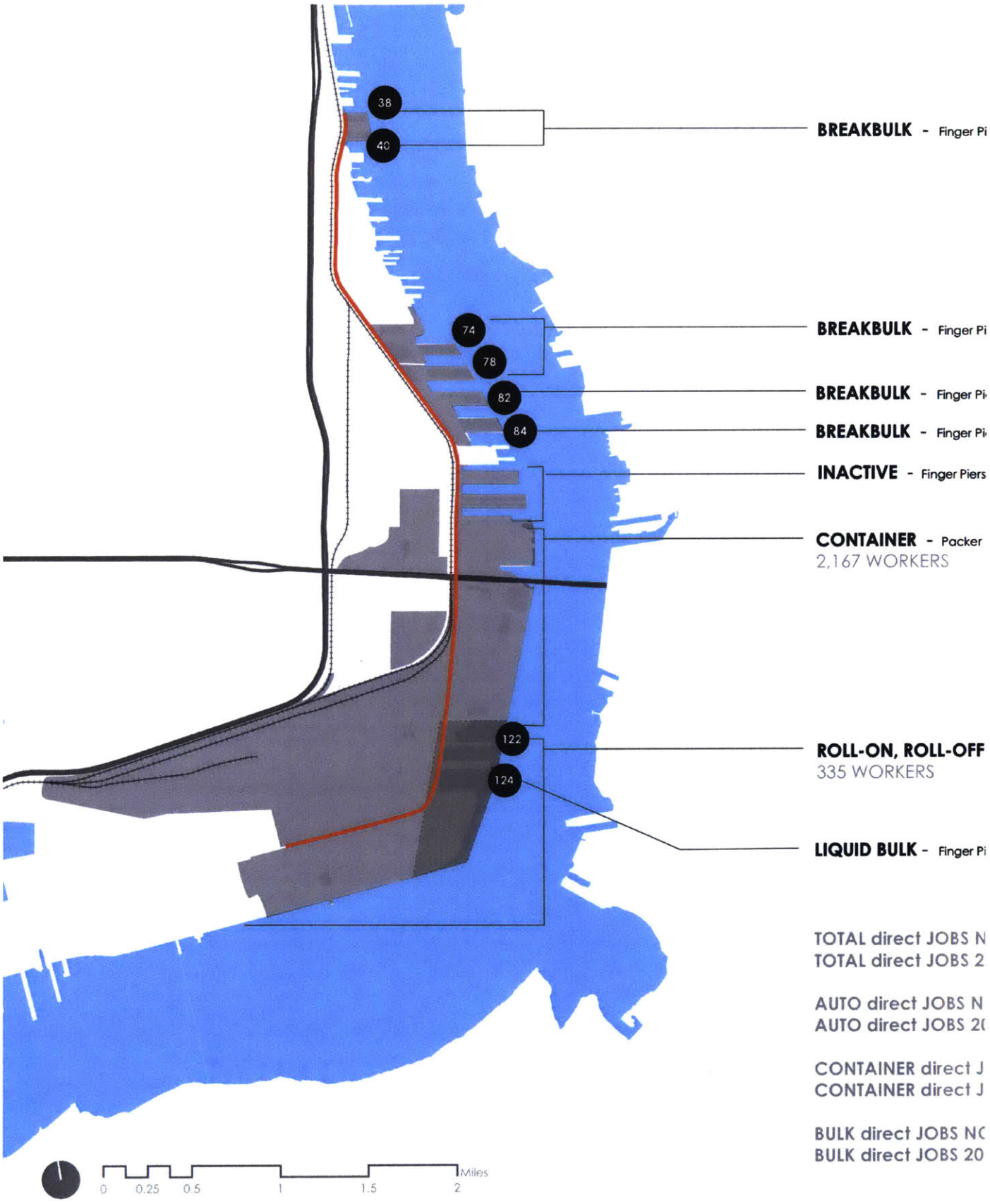


Graphic Created By Zoë Taft Mueller.

MULTI-MODAL TRANSPORTATION CONSIDERATIONS

The blue lines on the diagram to the left highlight the non-freight desire lines - pathways that connect mass transit stations (subway, bus and shuttle) with popular destinations and valuable views along active corridors.

These represent the areas that are most likely to generate conflicts and tensions between freight circulation and bus, bike and pedestrian circulation in the port area.



Graphic Created By Zoë Taft Mueller.

FREIGHT CIRCULATION + JOB CONCENTRATION

40 specialize in Forest Products.

78 specialize in Forest Products.

ecializes in refrigerated cargos (produce, perishables).

ecializes in cocoa imports

100

ine Terminal + Publicker Container Yard

er Pier 122, Southport Marine Terminal Complex

3,124
5,378

335
860

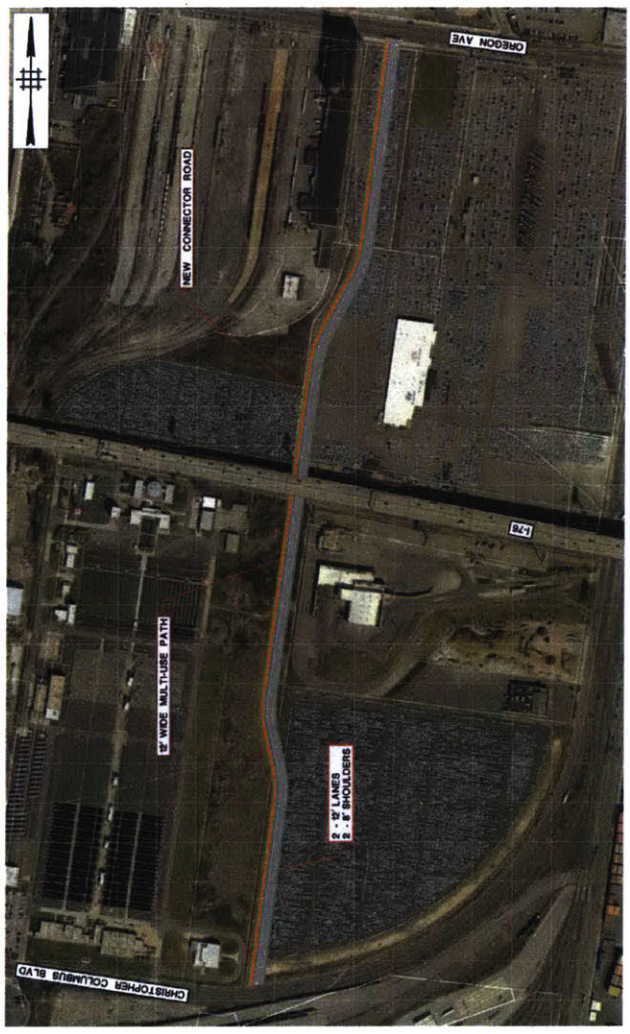
OW - 2,167
033 - 3,711

622
307

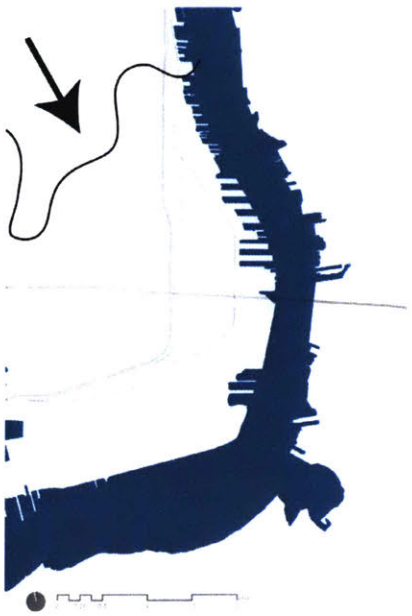
The container terminal is both the biggest job center and one of the heaviest sites for truck movement. Trucks circulate goods between all of these terminals but operate independently from the Tioga terminal freight patterns to the north. The port is currently making an effort to clarify and separate circulation in this section in order to improve truck movement in this high-volume part of their facility.

Graphic Created for PhilaPort.

PHILAPORT PROPOSED CIRCULATION CHANGE



PORT DISTRICT PRESSURE MAPPING

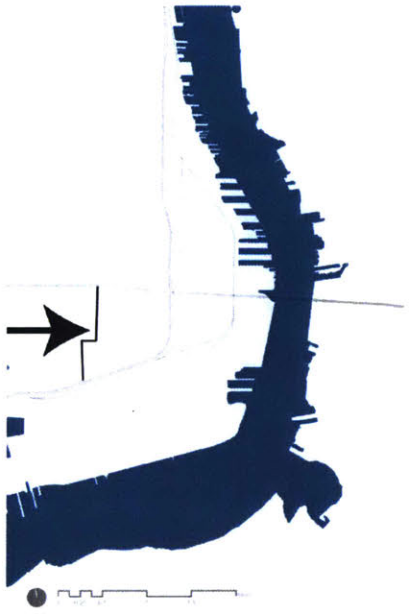


RESIDENTIAL GENTRIFICATION + DISPLACEMENT RISK

As real estate values south of Center City are increasing, the risk of displacement of the historically working class residents of South Philadelphia's port-adjacent neighborhoods is increasing. This risk of market-based displacement threatens the existing workforce relationship between residents of these neighborhoods and the port-centric employment available just on the other side of I-95. As residents are displaced to further corners of the Philadelphia-Camden metro area, these port-related family-wage jobs will become less accessible to the workforce that needs them.

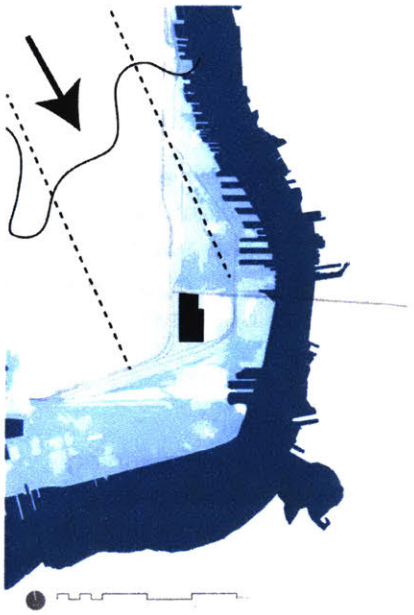
CENTRAL DELAWARE WALKABLE MIXED-USE VISION (DRWC)

The 2011 Central Delaware Master Plan, spearheaded by the Delaware River Waterfront Corporation, is a development vision that capitalizes on the Delaware's potential as a civic waterfront by recreating a walkable street grid, making strategic links across existing infrastructural barriers, and bringing a more varied land use mix to the water's edge. However, where this vision comes up against active port uses, the fine-grain street grid and the introduction of residential is seen as a direct threat to continued industrial use which generally requires larger blocks and fears residential complaints.



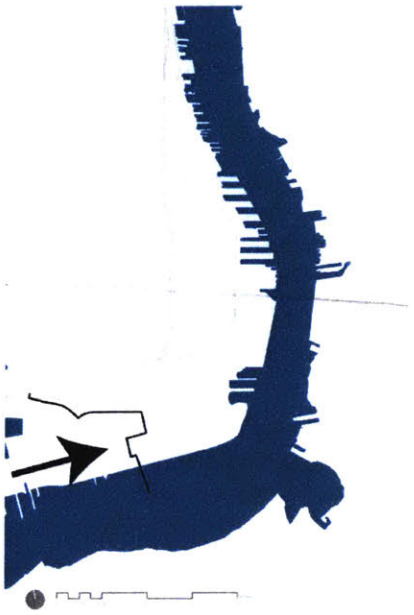
STADIUM DISTRICT LAND VALUE + CAR VOLUMES

The stadium district shows up in the land value map as a high-value spike amidst otherwise mid to low value land. As other entertainment venues such as casinos join the already thriving stadium district, its land values may begin to threaten the nearby industrial land uses that support the port. Furthermore, the already high-volume personal car traffic generated by game events in this district pose a challenge for the reliability, efficiency and flexibility of port-related freight movement that shares roadways with the stadium traffic. This is especially true for Columbus + Pattison Ave.



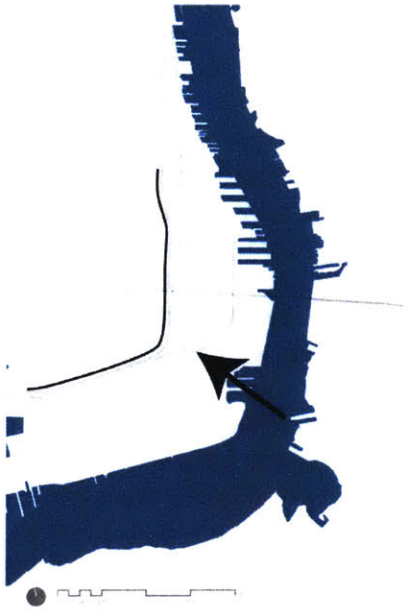
DEVELOPMENT PRESSURE ON SOUTHEAST WATER TREATMENT PLANT

As residential land values climb and presumably development intensity increases following those land values, the Southeast Water Pollution Control Plant (shown in black) runs the risk of having insufficient capacity to treat the combined sewershed it is responsible for. This, combined with the potential for waterfront flooding and the already "wet basements" that are common in some parts of South Philadelphia, means that all development in this district needs to strategically increase the plant's capacity or reduce the burden on the existing water management system.



INWARDLY-FOCUSED CAMPUS-STYLE FLEX SPACE BUSINESS PARK VISION (PIDC)

The vision plan put forward in 2013 for the Navy Yard, which is now owned by the Philadelphia Industrial Development Corporation, calls for an inwardly-focused flex space business park whose street grid and development pattern is entirely independent of the street grid and development pattern that radiates out from the port. This lack of continuity in the street grid and lack of alignment in the vision for the long-term land use transition between the Port and Navy Yard limits the transit system's ability to serve either in an efficient and integrated way.



PORT EXPANSION PLANS

The port owns its waterfront terminals and a few inland parcels but overall, it does not have control of much of the surrounding land which currently hosts a suite of privately-run supporting warehousing and distribution industries. The challenge of coordinating with the railroads, PIDC, PennDOT and the City of Philadelphia will therefore have a strong influence on the ability of PhilaPort to effectively shape its surroundings to best support the port's operations. The most pressing needs relate to roadway design, railroad re-alignment, and industrial land use protection.

SITE ANALYSIS SUMMARY: DESIGN NEGOTIATION NEEDS

Flooding is a major concern as is coordination with the operations of the Southeast Pollution Control Plant. Intelligent investments now could protect both the port and the inland neighborhoods from financial losses, persistent pollution and service interruptions in a flood event.

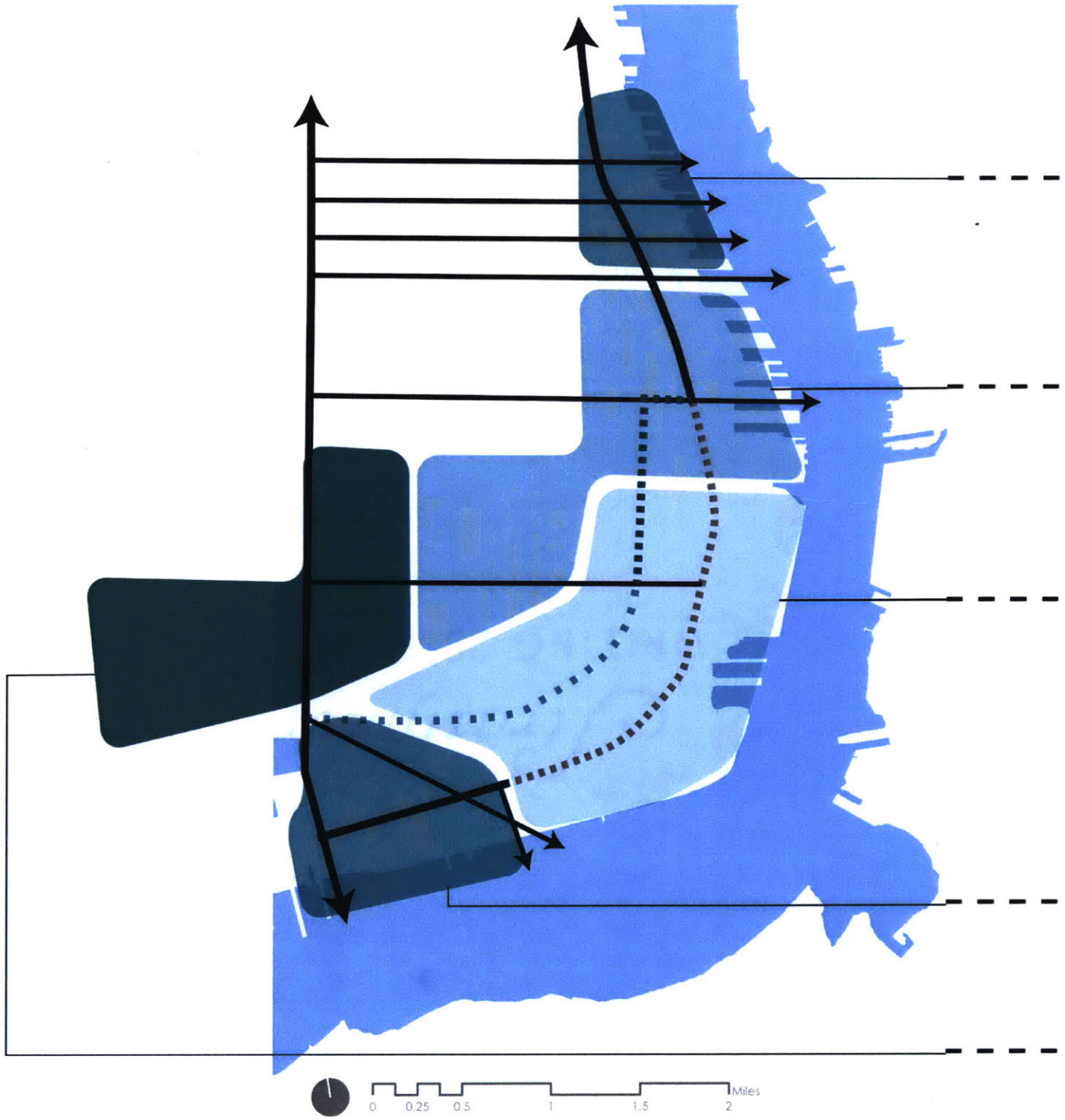
Separation and clarification of freight circulation in and around Columbus Blvd especially near Walt Whitman bridge is a priority for the port's operational efficiency. Efficient truck turn around times and high performance standards for truck impact mitigation is also a natural neighborhood concern. Finding a way of providing higher capacity public transit or private shuttle service along Columbus connecting to the Navy Yard should be a priority to maximize development potential of this key mixed use industrial area.

Strengthening the workforce relationship between South Philadelphia residential neighborhoods and adjacent port-related industrial uses can and should be a city planning priority. The port offers family-wage jobs that are within reach for a individuals with a broad range of professional training backgrounds and skill levels. Making it possible for workers to live nearby and/or get to the port via modes other than personal automobile will not only increase the land the port can make use of (by reducing the need for employee parking), it will also increase the range of individuals that can consider working at or near PhilaPort's southern terminals by making those jobs more transit-accessible. As PhilaPort prepares to enter a growth phase, enhancing workforce accessiblily and employee retention will position them to flexibly and rapidly scale to match their workforce with the cargo volumes they are able to attract. At the same time, if the port seeks to retain and grow of worker communities nearby, the port must continue to commit resources to improved environmental performance so that these environmental justice communities are healthy places to live that offer a high quality of life.

Unresolved land use transitions at the northern and southern borders of PhilaPort's terminals reveal unresolved institutional relationships and at times imply diverging visions for the future. Targeted discussions and thoughtful solutions will be needed to lay the groundwork for long-term growth in coordination with these neighbors - primarily the big box stores, stadiums and the Navy Yard. Key institutional players in this district are the Delaware River Waterfront Corporation, the Philadelphia Industrial Development Corporation, the Philadelphia Water Department, the stadium venue owners, and the railroads.

Finally, the port has an unsatisfactory relationship to the existing arterial streets and desire lines radiating out from the nearby residential and commercial districts. Selective responsiveness to these desire lines would go a long way towards cultivating a positive relationship with non-industrial users. On the same note, the uncerimonial ending of waterfront multi-use paths constrains access not only to the port, but perhaps more importantly, constrains access to the Navy Yard, Stadiums and FDR park. Proactively directing bike and pedestrian traffic through the district is important for the coordination of development efforts and transportation demand management. Proactively proposing these types of targeted improvements to the built and natural environment around the port will help build good will and buy-in among key stakeholders as the port initiates a series of controvertial requests to rationalize and prepare the land and infrastructure around them for the changes that are coming to the port.


Land Use Conflict
Circulation Conflict
0
0.25
0.5
1
1.5
2
Miles



Graphic Created By Zoë Taft Mueller.

DISTRICT IDENTITY CONSIDERATIONS + PUBLIC ACCESS APPROACH

Retail/Wholesale Marketplace

(1) fine-grain blocks
(2) emphasis on neighborhood to water cross streets
(3) open market quality to cross streets
(4) waterfront anchor open spaces, flood management focus

Logistics + Warehousing

(1) "superblock" arterial bike/ped routes
(2) internal free-form freight-priority streets
(3) introduce steps and towers to provide iconic views
(4) allow for selective public access to warehouse roofs for events
(5) consider second-story artists' spaces + music rehearsal spaces

Active Port Spectacle + Mitigation Landscape

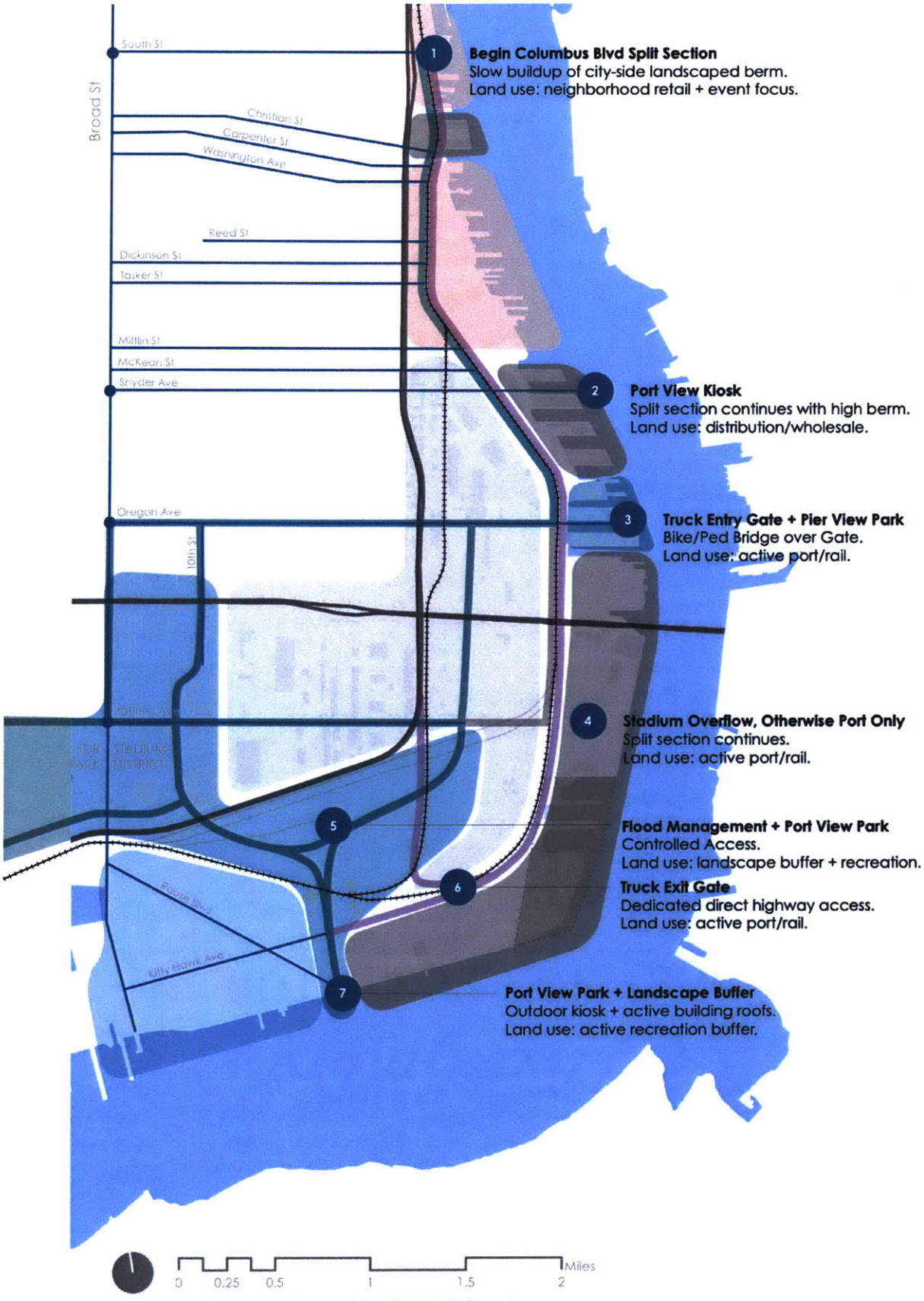
(1) elevated bike/ped path with lookout towers
(2) increased mitigation landscape
(3) public transit circulation via Columbus Ave alignment

Flex Space Office District

(1) fine-grain street grid
(2) focus development along arterials
(3) strengthen circulation system integration of Navy Yard with remainder of waterfront

Stadium + Active Recreation District

(1) at next rebuild, pull stadiums to hug Pattison Ave to create a bike-pedestrian focus, with auto-oriented parking and service functions circulate at rear near highway
(2) increase parking lot stormwater performance, consider time sharing for events in parking lots or port-related ro-ro cargo

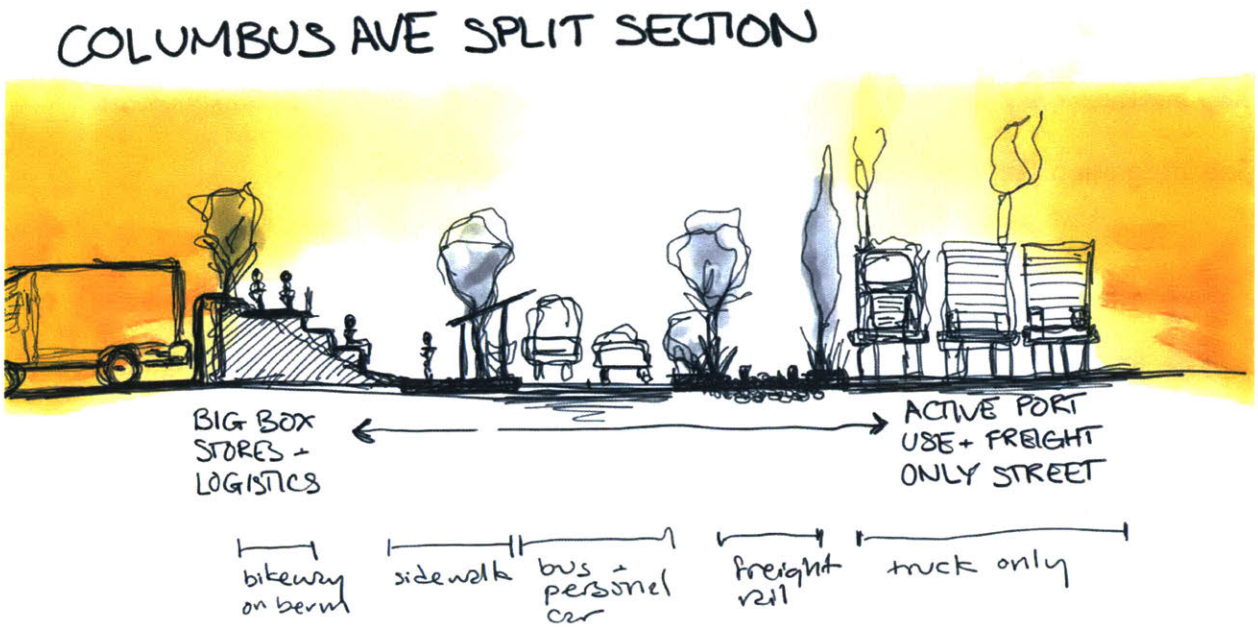


Graphic Created By Zoë Taft Mueller.

PROPOSED PORT IMPROVEMENT STRATEGIES

Key sites for port impact investment: FDR stormwater capacity, CSO holding tanks to support southeast PWD pollution control plant, Columbus Ave + Oregon Ave streetscapes.
Key institutional partners: PIDC, PWD, Parks Dept., OTIS, PennDOT, Rail Stakeholders

See Integration Tactic chapter and following pages for more detail.

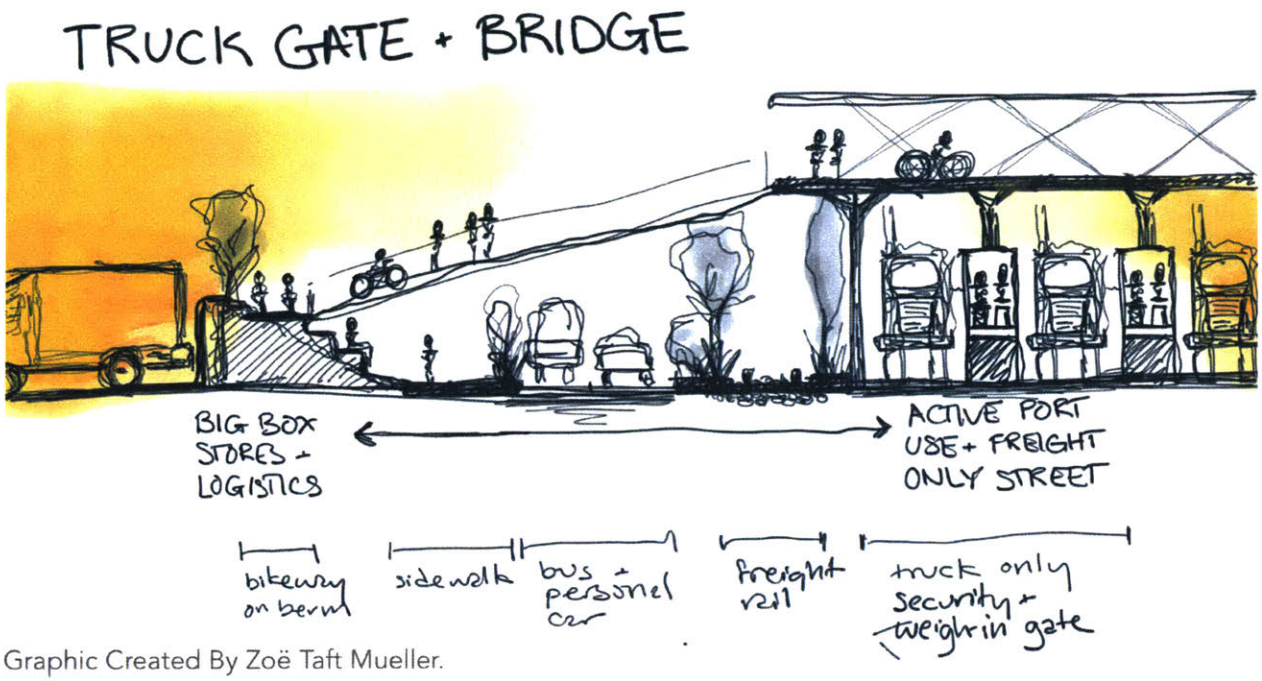


Graphic Created By Zoë Taft Mueller.

This split section leverages the low-speed infrequent rail that goes down the middle of Columbus Blvd to reinforce a division that creates dedicated freight space on the port side of the street and a more focused and high-quality bike and pedestrian oriented streetscape on the inland side of the street. A landscaped berm on the inland side helps negotiate the elevation change between the ground plane and elevated crossings while providing stormwater management, air pollution filtration and space protected from vehicular access. In a major flood event this berm could potentially be used to manage and direct flood waters.

1 PHILADELPHIA COLUMBUS AVE SPLIT SECTION

ALONG COLUMBUS BUILDING UP FROM SOUTH ST TO OREGON AVE



Graphic Created By Zoë Taft Mueller.

This builds on the split-section described on the previous page by leveraging the elevated plane of the landscaped berm in combination with the need for a new and improved truck entry gate (for weighing and security). The elevated walkway would slope up gradually from the inland side of the street to reach the required 22 foot clearance by the truck gate. The pedestrian and bike users of this bridge would add trivial load to the structure already required for the truck gate. This bridge would provide access to a waterfront park sited on the current inactive piers 96, 98 and 100.

3 PHILADELPHIA PORT GATEWAY + PIER PARK

AT OREGON AVE STREET END, CONTAINER TERMINAL ENTRANCE

05. CATALOG OF INTEGRATION TACTICS

Industrial Urbanism Tactics that Mediate + Integrate

Guiding Question(s)

Given the very real threats and conflicts associated with urban ports, how can the built environment be manipulated to increase environmental performance, economic efficiency and workforce accessibility of urban ports?

A REPLICABLE PROCESS

The most tangible outcome of this research up until this point has been the gradual discovery of a process or research method that can be treated as a replicable process (distilled on the facing page) for identifying urban design opportunities associated with working waterfront districts. Beyond this process mapping, some of the more intangible products of this research is an emerging understanding of how some of the complex spatial and political aspects of port development interact with one another to generate the unsatisfactory urban relationships that persist today between ports and their cities. This emerging understanding of the interaction of decision making bodies and political objectives with the working waterfront landscape reveals just how much interpersonal and institutional work will be required to shift the norms of investment in working waterfront sites such that they not only meaningfully address this physical legacy of their original purpose it must also address past wrongdoings through more equitable and sensitive redevelopment.

DEVELOPING AN INTEGRATION TOOLKIT

What follows in this chapter is a series of translatable intervention typologies that can be deployed in port districts to help develop a district and network scale urban design approach to increase environmental performance, clarify freight circulation and enhance workforce accessibility. They need not be used in isolation, but for the purposes of analytical clarity they are kept separate in this intervention toolkit.

1. EXISTING CONDITIONS ANALYSIS

PUBLIC PORT OPERATIONS PROFILE

GEOLOGY, ECOLOGY + RISK PROFILE

HISTORIC WORKING WATERFRONT STRUCTURE

ECONOMIC GEOGRAPHY PROFILE

INDUSTRIAL DEVELOPMENT POLICY PROFILE

PORT-ADJACENT DEVELOPMENT PLANS

PUBLIC ACCESS PATH ANALYSIS

INFRASTRUCTURAL BARRIER ANALYSIS

MASS TRANSIT CAPACITY/DEMAND ANALYSIS

2. WATERFRONT DESIGN ZONE STRATEGY GROUP

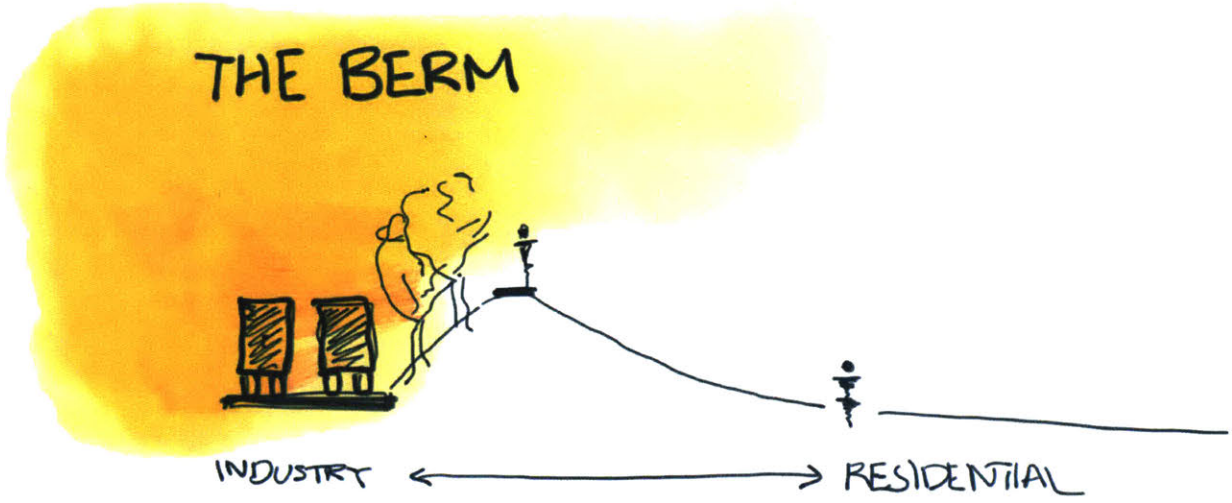
A **Civic Waterfront**
continuous public access with strong sightlines from core commercial/residential neighborhoods.

B **Dynamic Integration :** low, fluctuating risk profile
at grade linear paths punctuated by point access public spaces, path winds to water and back depending on shore-side land use. Space changes based on operations and time of day.

C **Phased Crossfade :** medium risk profile
Managed development of buffer light industrial and mixed use to restructure transitioning industrial district. Particularly relevant for petroleum "tank farms" and other out-moded industrial processes on sub-optimal land near the CBD.

D **Remote Spectacle :** high, steady risk profile
above grade linear public access removed from shoreline and elevated to allow only visual and not physical access.

3. INTEGRATION TACTICS BY DISTRICT



Graphic Created By Zoë Taft Mueller.

Mounding soil to form a landscaped and programmed berm is a widely used strategy to create a gentle transition to a dramatic vantage point. In the context of industrial areas it also provides the opportunity to trap and filter air pollution and to buffer human-centric uses from heavy noise pollution. By creating a separate ground plane, it makes cyclists and pedestrians feel physically safe and protected from trucks and other heavy machinery that easily jump the trivial curbs typically used to protect cyclists and pedestrians from motorists. Beyond the protection and pollution mitigation this strategy offers, it is also a versatile and adaptive way of helping build up to a generous cycling and pedestrian bridge connecting across infrastructural barriers like highways and rail corridors. In some cases it can double as a flood wall or a way of directing the movement of water throughout a site.

PRECEDENT PROJECTS

- Wilmington Waterfront Park
- Seattle Art Museum: Olympic Sculpture Park
- Queens Plaza Park
- The Haven Project
- Ariel Foundation Park

D

REMOTE SPECTACLE

CONTAINER, REFRIGERATED CONTAINER + LIQUID BULK TERMINALS

1

PHILADELPHIA COLUMBUS AVE SPLIT SECTION

ALONG COLUMBUS BUILDING UP FROM SOUTH ST TO OREGON AVE

3

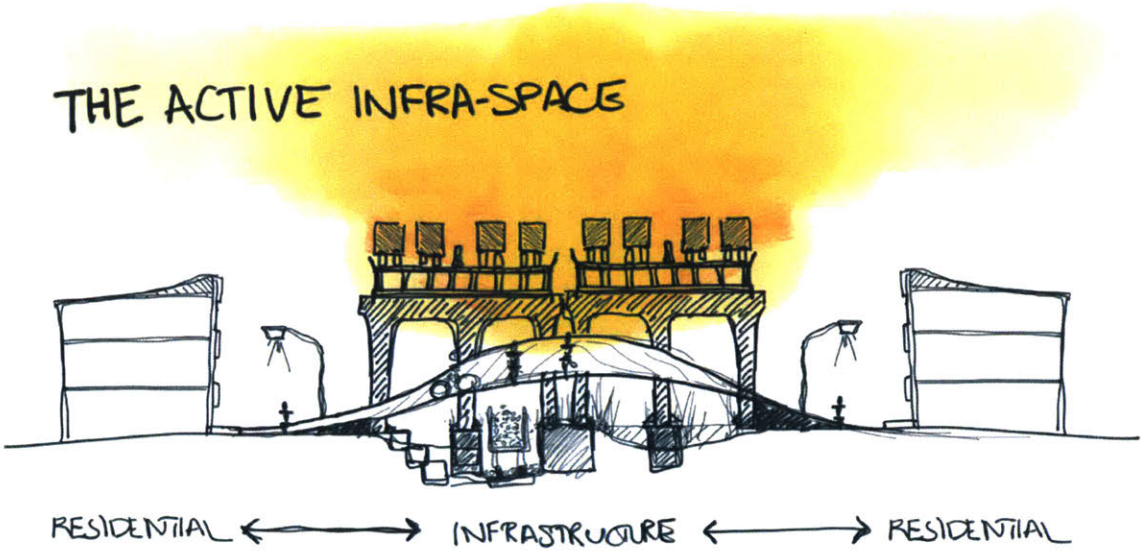
PHILADELPHIA PORT GATEWAY + PIER PARK

AT OREGON AVE STREET END, CONTAINER TERMINAL ENTRANCE

5

PHILADELPHIA WATER MANAGEMENT PARK

ECOLOGICAL RESTORATION + CONTROLLED ACCESS RECREATION



Graphic Created By Zoë Taft Mueller.

Active Infra-Space is a shorthand to refer to the suite of strategies used to connect cycling and pedestrian networks successfully under elevated infrastructure. Elevated infrastructure, without contextually sensitive intervention, results in dark spaces with poor sightlines and confusing circulation patterns on the ground plane. In places where multiple types of infrastructure converge - for instance at-grade rail lines and elevated highway on- and off-ramps - this condition is worsened. Contextually sensitive interventions will strategically connect cycling and pedestrian anchors along engaging desire-lines that are direct, comfortable and well-lit. These investments in stitching back together fragmented cycling and pedestrian networks can and should be paired with much-needed stormwater infrastructure improvements to handle the infrastructure's runoff. In many cases, these complex infrastructure knots were built to have water drain directly without treatment and are situated on top of former marshland that was filled in response to some pressing industrial or civic need. For sites that have this history, stormwater management is particularly critical in order to restore the function of these low-lying areas as stormwater infiltration and storm surge absorption zones. Inteligent investments in these leftover infrastructural spaces can therefore have strategic regional impact beyond the local cyclists and pedestrians that use the space.

PRECEDENT PROJECTS

- North Bank Bridge Park
- Infra-Space InkBlock Underground

B

DYNAMIC INTEGRATION

BREAKBULK, FISHING, SHIP REPAIR + AUTO (RO-RO) TERMINALS

C

PHASED CROSSFADE

INACTIVE/DEGRADED FINGER PIERS + LIQUID BULK TERMINALS

5

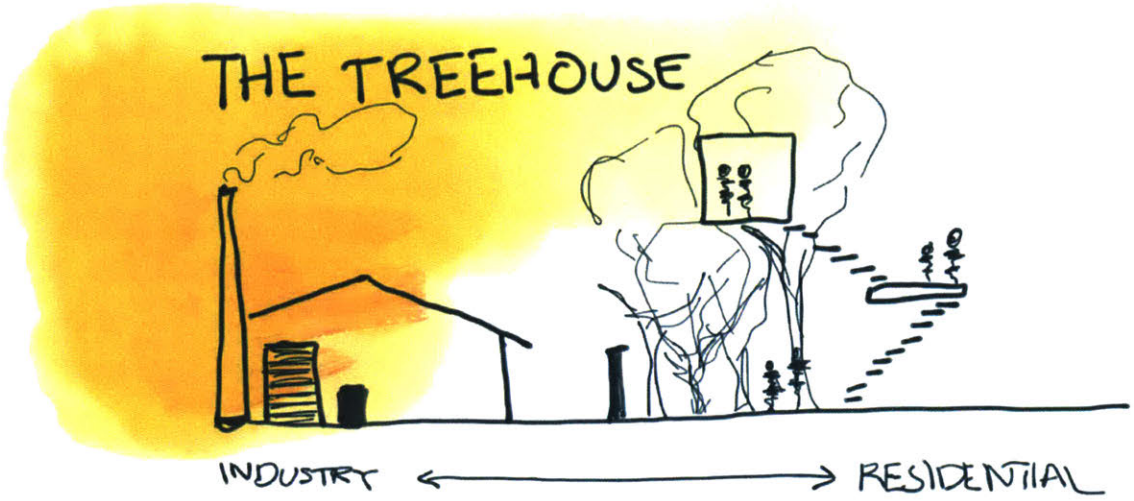
PHILADELPHIA WATER MANAGEMENT PARK

ECOLOGICAL RESTORATION + CONTROLLED ACCESS RECREATION

6

PHILADELPHIA PORT-ONLY HIGHWAY RAMPS

DIRECT HIGHWAY ACCESS REDUCES TRUCK AIR QUALITY IMPACT



Graphic Created By Zoë Taft Mueller.

The Treehouse is a playful proxy for any elevated structure built with the express intention of providing views and tempting visitors to climb to their summit. The superblock scale, infrastructural barriers and fragmented street grids of industrial areas are often confusing to those who don't work there every day. The large scale of structures also disrupts sightlines that would normally help someone quickly orient themselves and efficiently get to where they are trying to go. In this context, tall structures such as bridges, billboards, smokestacks, cell phone towers, and cranes become the defacto way of orienting oneself. The treehouse leverages this way of orienting oneself and uses it to quickly attract the attention of visitors, redirect them away from truck-only spaces that are dangerous, and draw them to a space that is for them. Once there, these structures provide the opportunity to see, understand and appreciate the way complex 21st century industrial systems work. Beyond the public relations aspect of this, it also can offer a preview of what it would be like to work in one of these places, which is an important and challenging aspect of long-range workforce recruitment in an era where many young people have no contact with a relative or frient who can explain to them what it is like working in an industrial business. By cultivating the curiosity of residents and visitors, industrial businesses can build a workforce pipeline and political support for the value they offer the city.

PRECEDENT PROJECTS

- Seattle Waterfront Kiosks
- HafenCity ViewPoint
- Ariel Foundation Park
- Keast Park

D

REMOTE SPECTACLE

CONTAINER, REFRIGERATED CONTAINER + LIQUID BULK TERMINALS

C

PHASED CROSSFADE

INACTIVE/DEGRADED FINGER PIERS + LIQUID BULK TERMINALS

2

PHILADELPHIA PORT VIEW KIOSK

AT STREET END NEAR DISTRIBUTION, WHOLESALE AND BREAKBULK

3

PHILADELPHIA PORT GATEWAY + PIER PARK

AT OREGON AVE STREET END, CONTAINER TERMINAL ENTRANCE

5

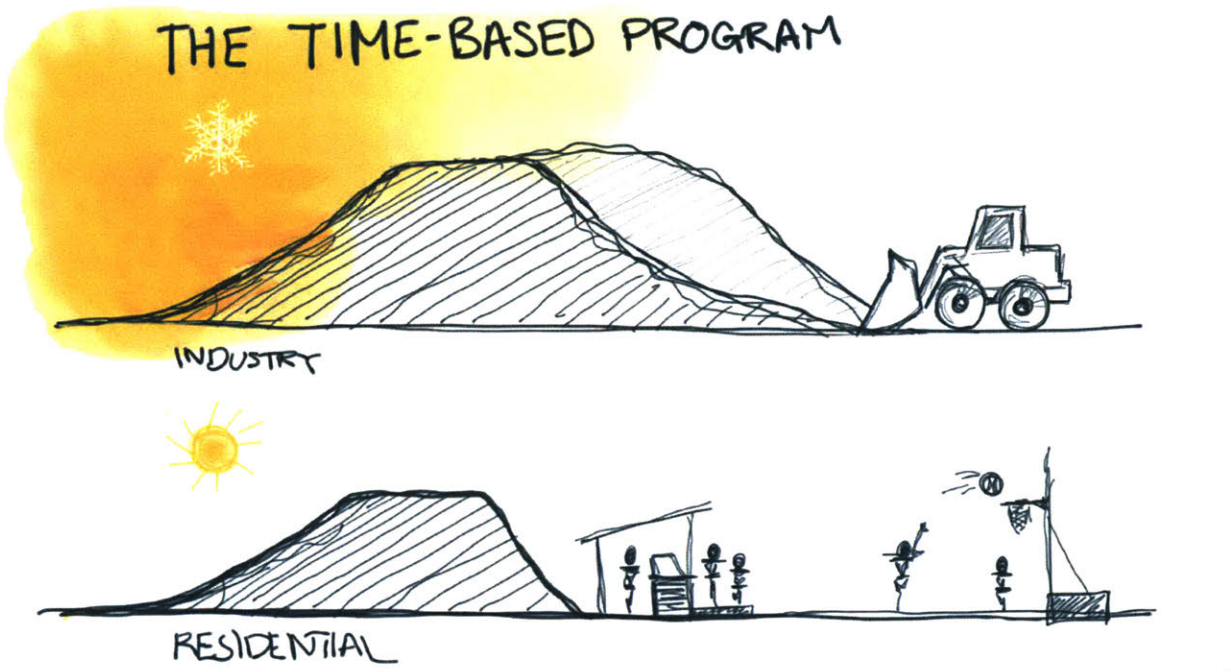
PHILADELPHIA WATER MANAGEMENT PARK

ECOLOGICAL RESTORATION + CONTROLLED ACCESS RECREATION

7

PHILADELPHIA PORT VIEW PARK

LANDSCAPE BUFFER AT WATERFRONT TERMINATION OF ROUSE BLVD



Graphic Created By Zoë Taft Mueller.

The Time-Based Program is a thoughtful time-share of industrial spaces that takes advantage of natural cycles of industrial work and allows public use in slow or reduced-volume periods. Many industrial businesses must be able to handle large swings in the use of their space meaning that they must retain access to an area that may exceed their standard volume. By anticipating these swings in work, industrial businesses can offer their space for contractually controlled temporary use in lieu of offering permanent space. This strategy only works for businesses that work with non-toxic materials and have significant, predictable cycles of work - such as importers and distributors of road salt, steel and forest products.

PRECEDENT PROJECTS

- Hafengeburtstag (Port's Birthday)
- The P.O.R.T.

B

DYNAMIC INTEGRATION

BREAKBULK, FISHING, SHIP REPAIR + AUTO (RO-RO) TERMINALS

C

PHASED CROSSFADE

INACTIVE/DEGRADED FINGER PIERS + LIQUID BULK TERMINALS

4

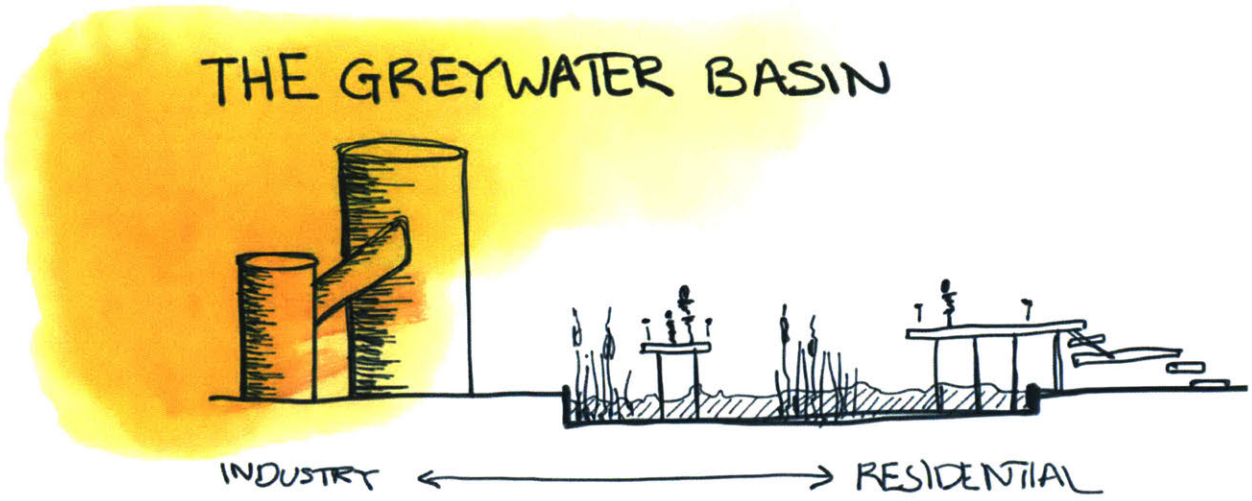
PHILADELPHIA STADIUM OVERFLOW

AT PATTISON AVE STREET END IN LOGISTICS + CONTAINER DISTRICT

5

PHILADELPHIA WATER MANAGEMENT PARK

ECOLOGICAL RESTORATION + CONTROLLED ACCESS RECREATION



Graphic Created By Zoë Taft Mueller.

The Greywater Basin can take many forms, but at its core it is a stormwater management strategy that prioritizes storage and infiltration at ground level and simultaneously offers controlled public access via elevated walkways and platforms. Typically used in the context of ecological restoration and nature preserves to keep human impact controlled, in industrial contexts it serves to keep people safe and to keep industrial operation areas secure. Beyond the issue of controlling public access, this intervention serves to protect industrial areas from the business lossess associated with flooding and protect residential areas from the public health risks associated with flood waters carrying hazardous industrial by-products. Many industrial areas are in low-lying flood planes, so there is a real need to build infrastructure that can control and direct flooding. Beyond flood-level stormwater risk, there is also a need to improve treatment of water running off polluted sites before it reaches the rivers and oceans our sewers drain to. Coastal industrial areas have a multi-faceted relationship to this problem. First, they are often on filled land in former marsh areas with very little permeable surface meaning that they flood easily and often. Second, they often were developed without a sewer system or with a sewer system that drained directly to the nearest waterway without treatment. Third, they are often adjacent to municipal wastewater treatment plants that are strained beyond capacity. Fourth, their large parcels and engineered soils make them better suited to the construction of undeground retention basins than most urban land. All of four of these factors make coastal industrial areas key sites for large-capacity green and grey stormwater infrastructure investments that not only contain their impacts but also support regional water management system needs.

PRECEDENT PROJECTS

- Red Ribbon Park
- Jellicoe Harbour and Silo Park
- Infra-Space InkBlock Underground

D

REMOTE SPECTACLE

CONTAINER, REFRIGERATED CONTAINER + LIQUID BULK TERMINALS

C

PHASED CROSSFADE

INACTIVE/DEGRADED FINGER PIERS + LIQUID BULK TERMINALS

2

PHILADELPHIA PORT VIEW KIOSK

AT STREET END NEAR DISTRIBUTION, WHOLESALE AND BREAKBULK

3

PHILADELPHIA PORT GATEWAY + PIER PARK

AT OREGON AVE STREET END, CONTAINER TERMINAL ENTRANCE

5

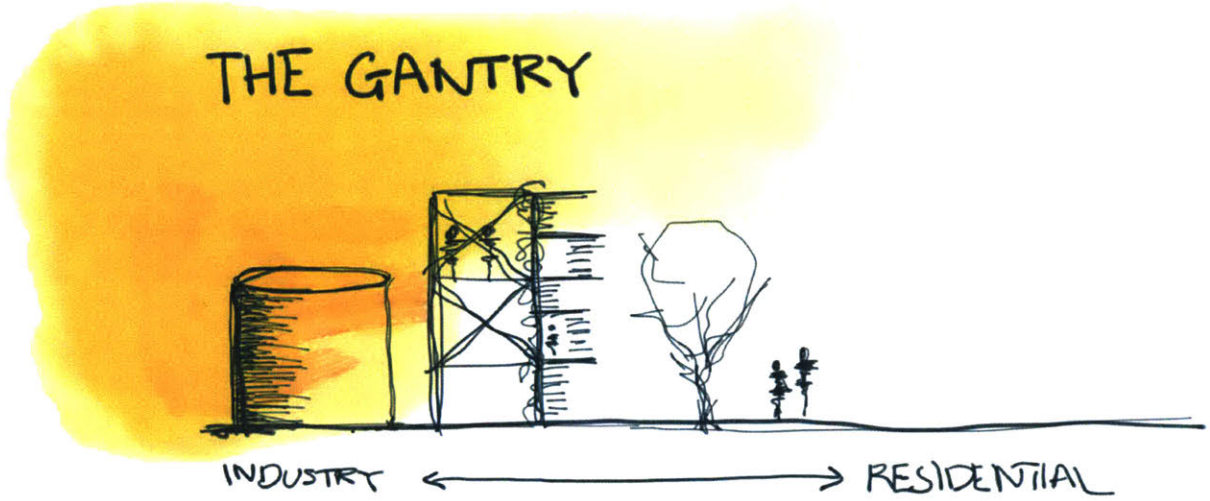
PHILADELPHIA WATER MANAGEMENT PARK

ECOLOGICAL RESTORATION + CONTROLLED ACCESS RECREATION

7

PHILADELPHIA PORT VIEW PARK

LANDSCAPE BUFFER AT WATERFRONT TERMINATION OF ROUSE BLVD



Graphic Created By Zoë Taft Mueller.

The Gantry is a way of providing visual access while reinforcing a spatial division or border between uses. In some cases the framing of the gantry itself can serve an industrial function such as providing access to elevated levels for ship repair or serving as a tie-down anchor. The open frame of the structure can also accomodate vining plants which can serve as air filtration and noise dampening to mitigate industrial impacts on nearby non-industrial uses. The open frame also allows for trucks, trains and other vehicles to pass freely beneath the structure without disrupting use of the structure itself.

PRECEDENT PROJECTS

- Jellicoe Harbour and Silo Park
- Hoover Mason Trestle / SteelStacks Park

B

DYNAMIC INTEGRATION

BREAKBULK, FISHING, SHIP REPAIR + AUTO (RO-RO) TERMINALS

C

PHASED CROSSFADE

INACTIVE/DEGRADED FINGER PIERS + LIQUID BULK TERMINALS

D

REMOTE SPECTACLE

CONTAINER, REFRIGERATED CONTAINER + LIQUID BULK TERMINALS

3

PHILADELPHIA PORT GATEWAY + PIER PARK

AT OREGON AVE STREET END, CONTAINER TERMINAL ENTRANCE

5

PHILADELPHIA WATER MANAGEMENT PARK

ECOLOGICAL RESTORATION + CONTROLLED ACCESS RECREATION

7

PHILADELPHIA PORT VIEW PARK

LANDSCAPE BUFFER AT WATERFRONT TERMINATION OF ROUSE BLVD

WILMINGTON WATERFRONT PARK

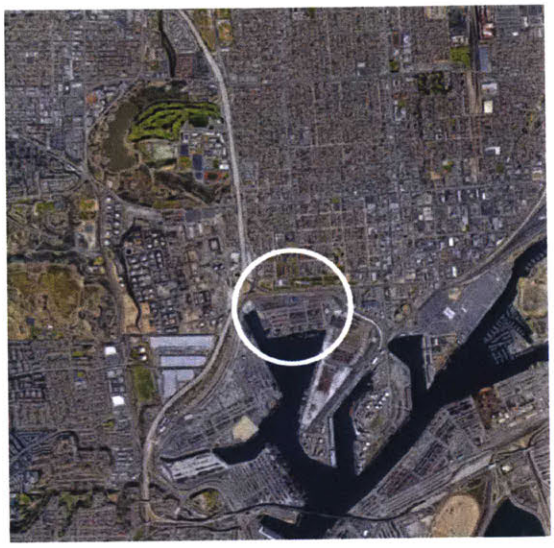
CLIENT
Port of LA

CARGO TYPE
Container

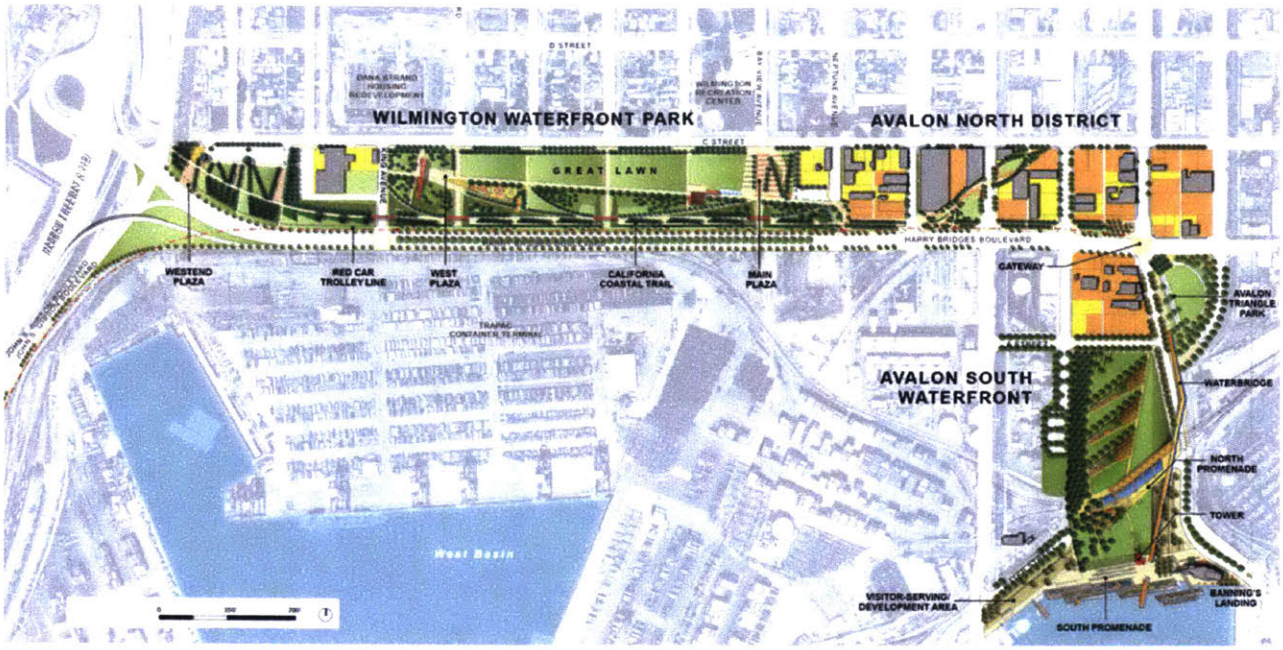
LOCATION
Los Angeles, CA

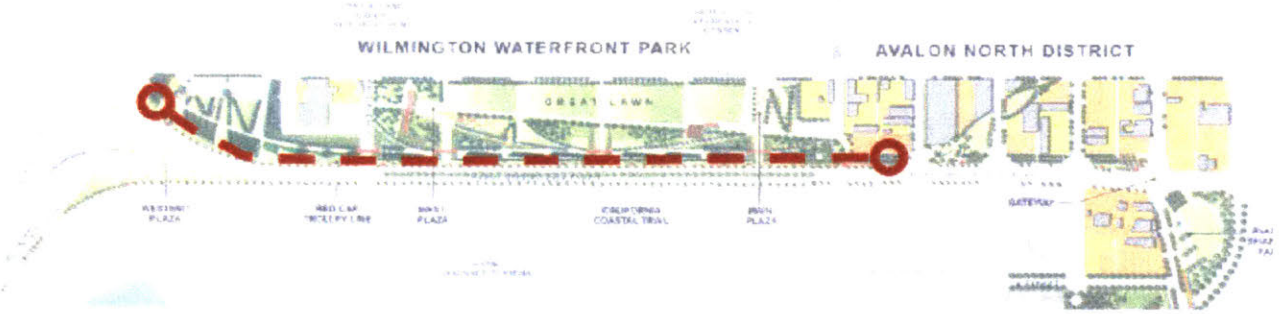
DESIGN FIRM
Sasaki

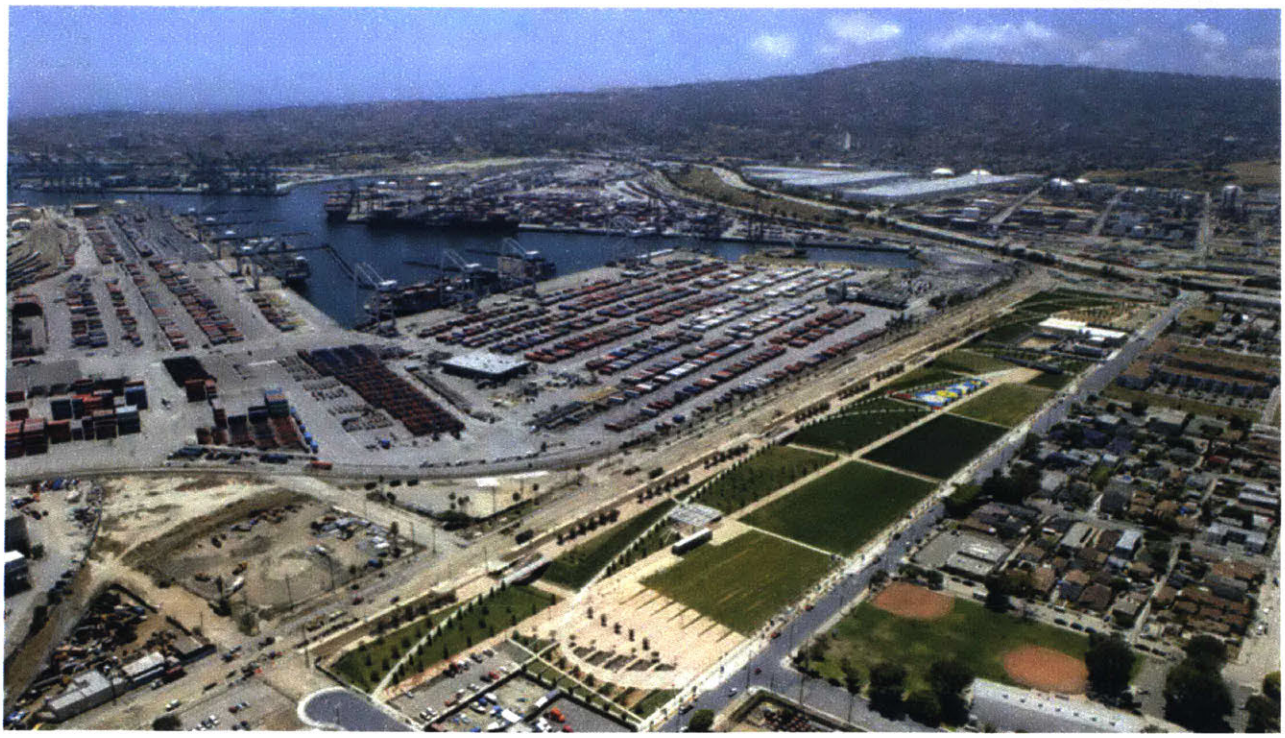
DATE COMPLETED
2011



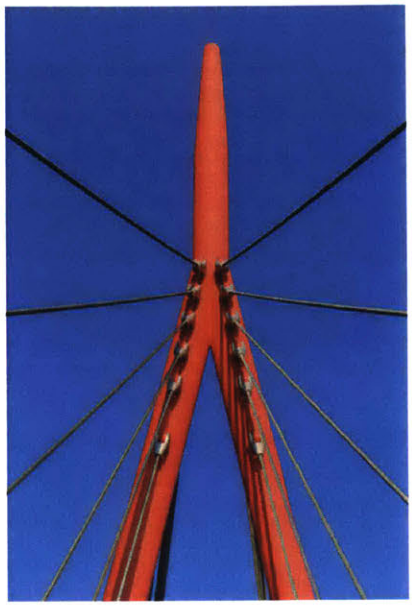
Planning for this project was initiated in 2004 as part of the environmental impact mitigation process for the Port of LA's planned expansion of their container terminal and deepening of the channels for Berths 136-147 in the West Basin of the San Pedro Bay. The redevelopment of this back-of-port brownfield site doubled the existing community open space and is defined by a strong 16 foot sculptural landform with a crest path named "el paseo." This berm uses engineered materials and strategic plantings to block and absorb the noise and air pollution impacts of nearby port operations. The berm and park pavilion roofs provide uninterrupted views of active port operations. The park offers a great variety of attractions from athletic fields to fountains to small seating areas and grand steps. This park is the first of a three-phase project that will ultimately include a mixed-use real estate development and a point-access waterfront park.

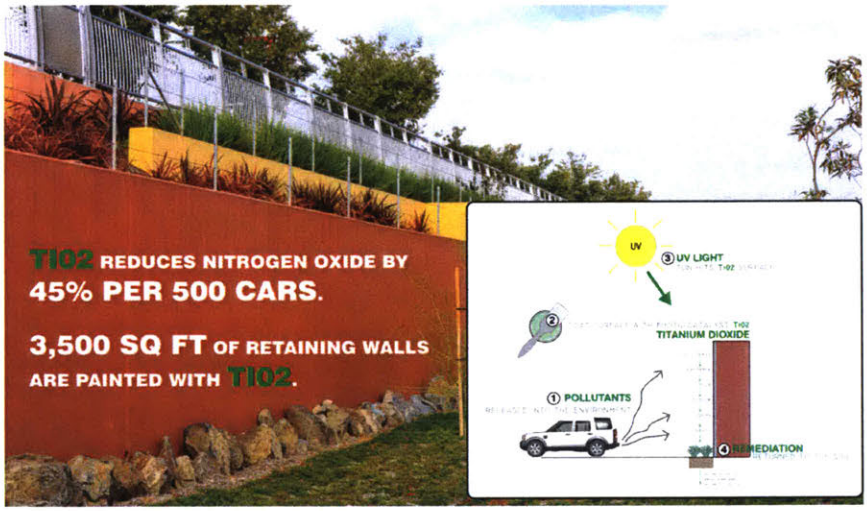

WILMINGTON WATERFRONT PARK
AVALON NORTH DISTRICT
GREAT LAWN
WESTEND PLAZA
RED CAR TROLLEY LINE
WEST PLAZA
CALIFORNIA COASTAL TRAIL
MAIN PLAZA
HARRY BRIDGES BOULEVARD
GATEWAY
AVALON TRIANGLE PARK
AVALON SOUTH WATERFRONT
WATERBRIDGE
NORTH PROMENADE
TOWER
West Basin
VISITOR-SERVING/ DEVELOPMENT AREA
BANNING'S LANDING
SOUTH PROMENADE


WILMINGTON WATERFRONT PARK
AVALON NORTH DISTRICT
GREAT LAWN




WORKING PORT THIS WAY
LANDSCAPE BERM MITIGATES NOISE FROM INDUSTRIAL TRAFFIC
HOW IT WORKS:
WALL
EARTH BERM
23 dBA




TI02 REDUCES NITROGEN OXIDE BY 45% PER 500 CARS.
3,500 SQ FT OF RETAINING WALLS ARE PAINTED WITH TI02.
UV
3 UV LIGHT
TITANIUM DIOXIDE
1 POLLUTANTS
4 REMEDIATION


653 NEW TREES / 14.5 ACRES OF TREE GROVES
HOW IT WORKS:

SEATTLE ART MUSEUM: OLYMPIC SCULPTURE PARK

CLIENT
Seattle Art Museum

CARGO TYPE
N/A

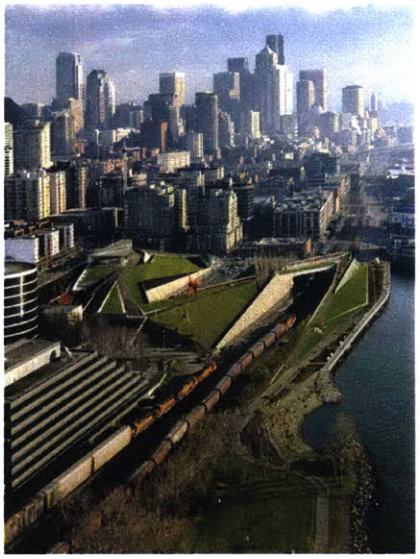
LOCATION
Seattle, WA, USA

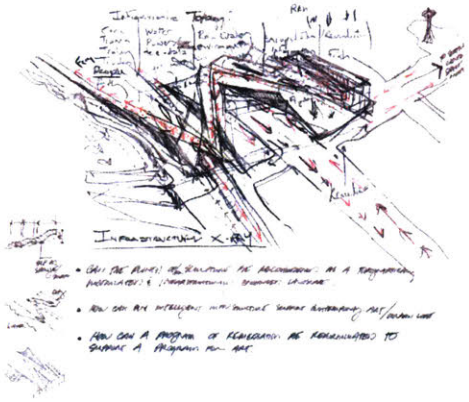
DESIGN FIRM
WeissManfredi

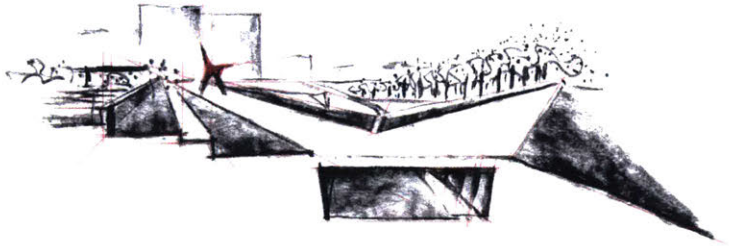
DATE COMPLETED
2007

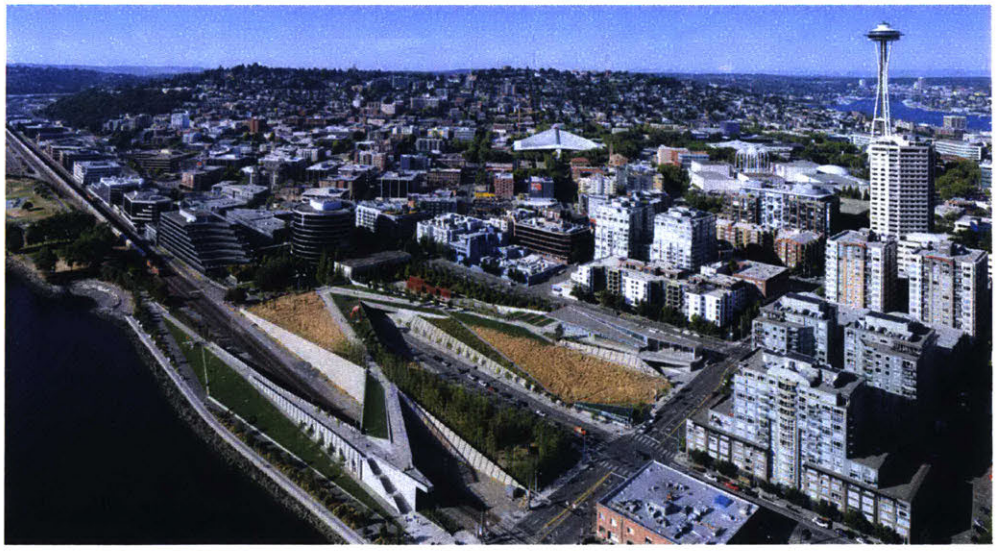
This urban sculpture park expertly soars over two infrastructural barriers to arrive at and activate an industrial site at the water's edge. The designers describe the project as "a continuous constructed landscape for art, forms an uninterrupted Z-shaped "green" platform, and descends 40 feet from the city to the water, capitalizing on views of the skyline and Elliot Bay and rising over the existing infrastructure to reconnect the urban core to the revitalized waterfront. An exhibition pavilion provides space for art, performances and educational programming. From this pavilion, the pedestrian route descends to the water, linking three new archetypal landscapes of the northwest: a dense temperate evergreen forest, a deciduous forest and a shoreline garden. The design not only brings sculpture outside of the museum walls but brings the park itself into the landscape of the city."

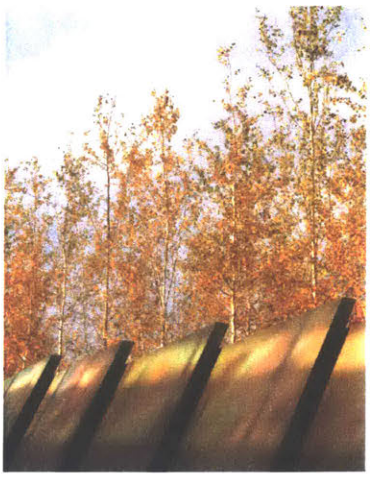
This project is particularly notable for its graceful landscape approach to bridging arterial road and rail corridors and its attention to the variety and intensity required to maintain user engagement throughout.

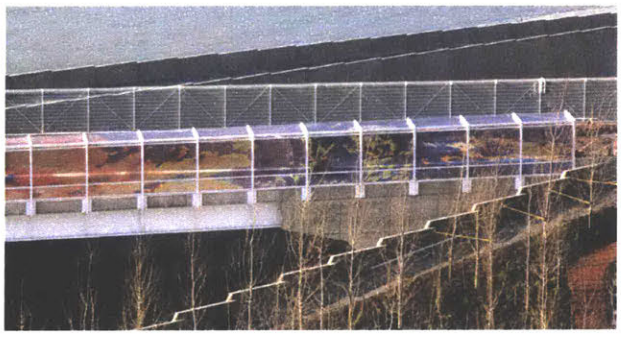


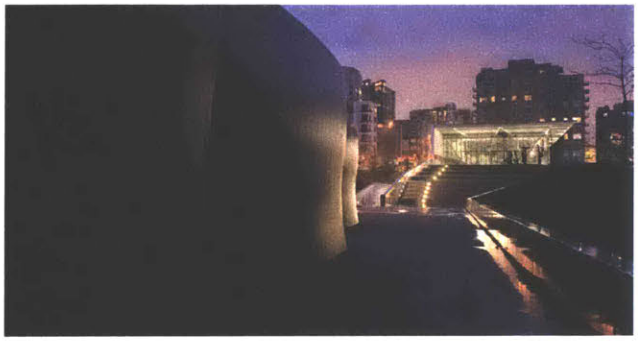


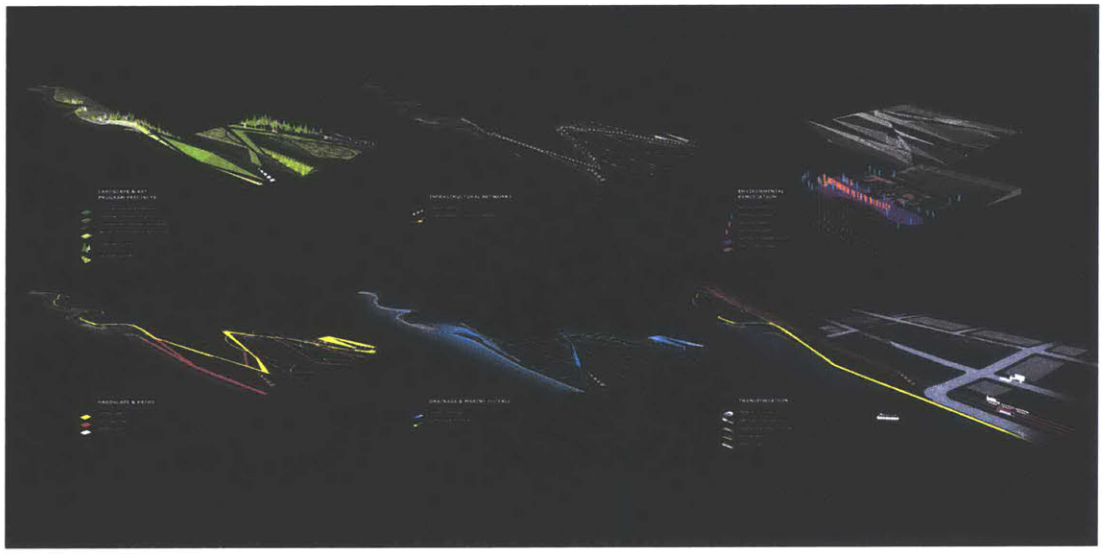












QUEENS PLAZA PARK

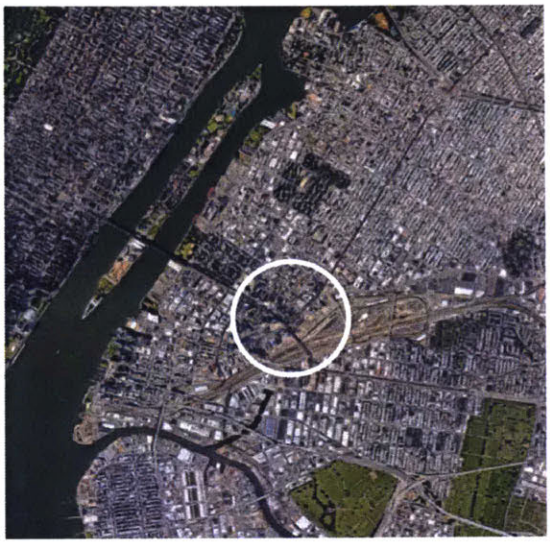
CLIENT
NYCDCP + NYCEDC

CARGO TYPE
N/A

LOCATION
New York City, NY

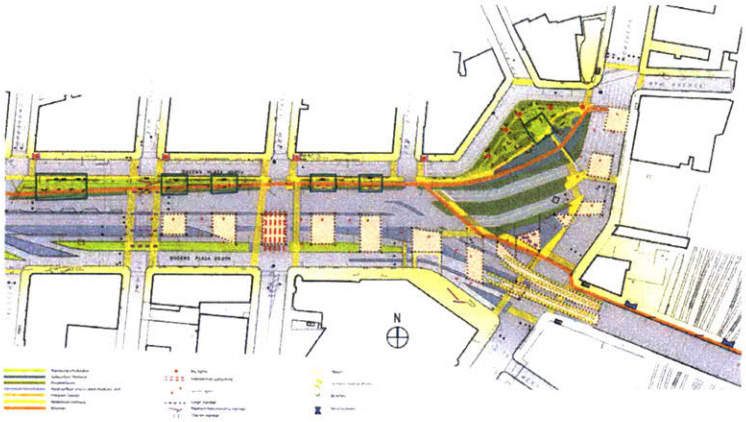
DESIGN FIRM
WRT Design, Marpillero Pollak Architects, Michael Singer

DATE COMPLETED
2012

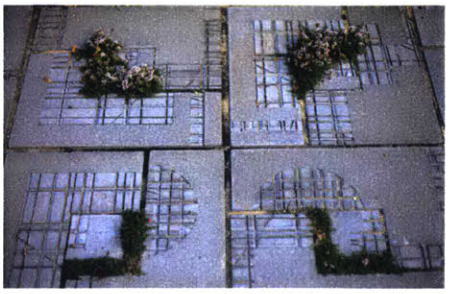


This project came out of New York City Department of Design and Construction's 2005 "High Performance Infrastructure Guidelines." These guidelines emphasize the need for infrastructure systems to be multi-functional and redundant in order to increase longevity, enhance resilience and improve quality of life. The guidelines are organized around seven themes - site assessment, streetscape, pavement, utility, stormwater management, landscape, and construction. The guidelines seek to improve environmental, social, and economic outcomes for the city's infrastructure investments by
(1) promoting sustainable urban ecology
(2) enhancing public health, safety and quality of life
(3) optimizing lifecycle and performance.

Queens Plaza Park is located at the convergence of 2 elevated, 3 underground, and 8 bus lines plus vehicular traffic coming across the Queensboro bridge from Manhattan. Previously an odd-shaped and inefficient paved parking lot, the park elevates the ground plane to protect and buffer pedestrians and cyclists from the heavy vehicular traffic that must also move through this area. Permeable pavers and dense plantings increase stormwater infiltration and increase noise absorption.




New unbeatable price.
Unlimited 40
metro



THE HAVEN PROJECT

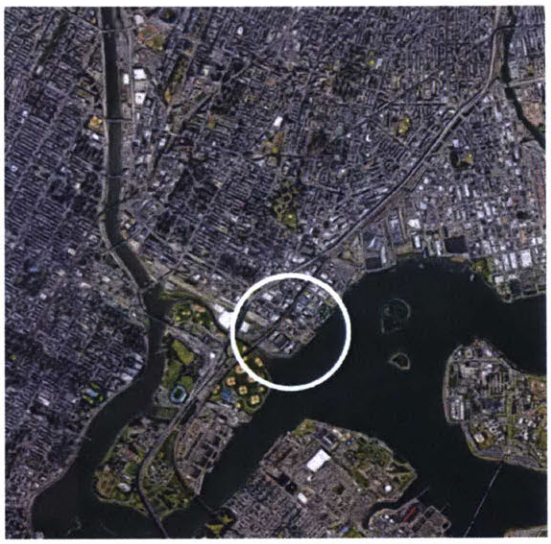
CLIENT
New York Restoration Project

CARGO TYPE
N/A - Logistics + Distribution

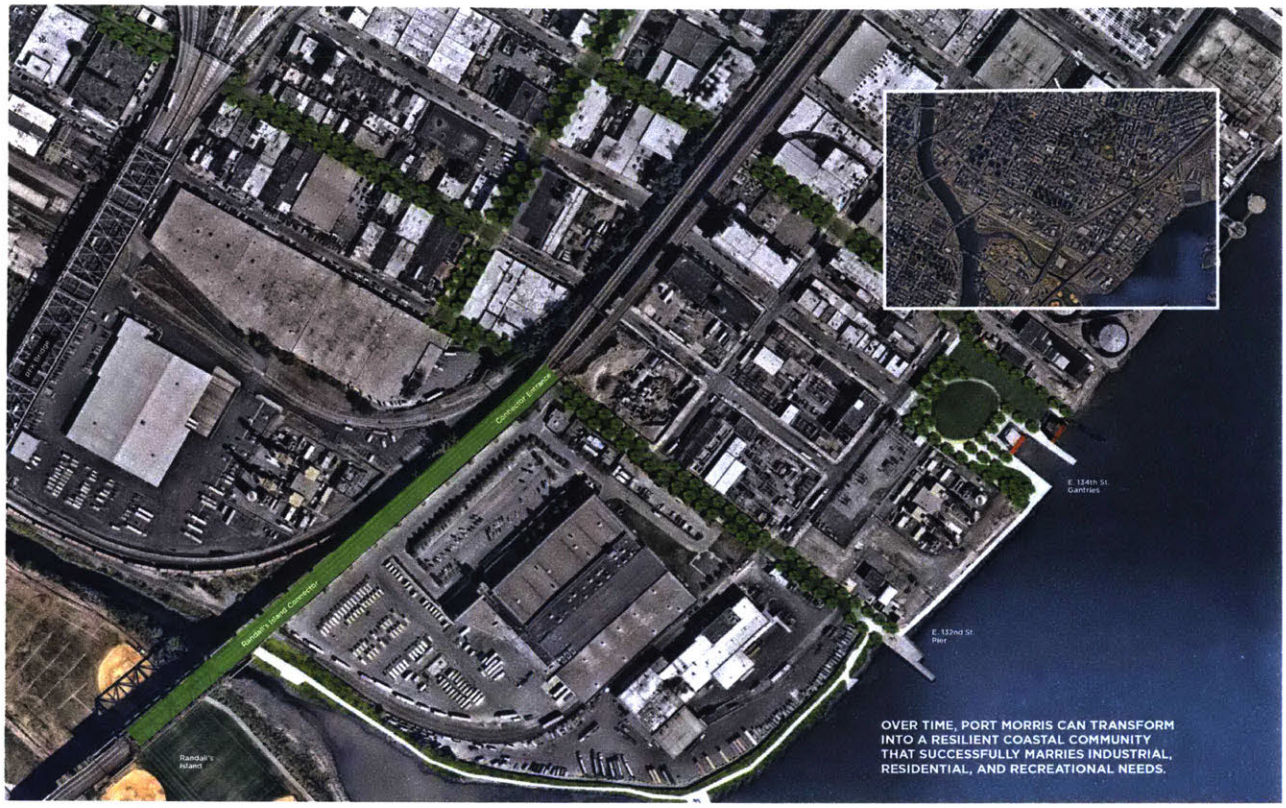
LOCATION
New York City, NY, USA

DESIGNERS
Mark Johnson and Jason Newsome, Civitas

DATE COMPLETED
unbuilt



This 2015 plan spearheaded by non-profit advocates and community-based organizations, is focused on public health improvements through ecological improvements and active recreation amenities. The New York Restoration Project describes the area's needs and challenges, explaining that "Mott Haven and Port Morris bear the brunt of housing some of the city's largest industries and highway infrastructure, resulting in poor environmental health outcomes such as asthma and obesity. As part of the poorest congressional district in the country, Mott Haven and Port Morris contain under-resourced parks and open spaces and a high concentration of public housing facilities, leaving a lot of room for improvement and growth." The centerpiece of this network approach is a trail hugging the inactive waterfront perimiter of active industrial businesses. If built, this linear perimiter park will be the first waterfront park in the Port Morris neighborhood.



DESIGN GOALS: WHAT DOES THE HAVEN PROJECT PROPOSE?

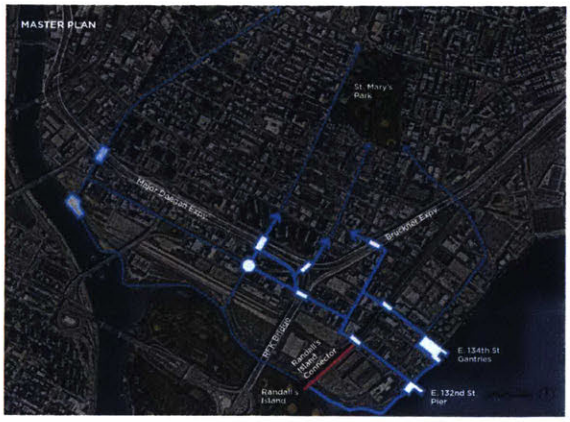
Over the next several years, NYRP will transform open spaces in Mott Haven and Port Morris in multiple phases, with each phase contributing to the overarching goal of improving quality of life for residents by addressing community priorities and persistent place-based inequity. Our work and the work we catalyze through partnerships with city agencies and other stakeholders will allow residents of NYCHA's Mill Brook or Betances Houses to enjoy a walk to a waterfront park in their community — a seemingly simple accomplishment, but one that has been unrealized for generations.

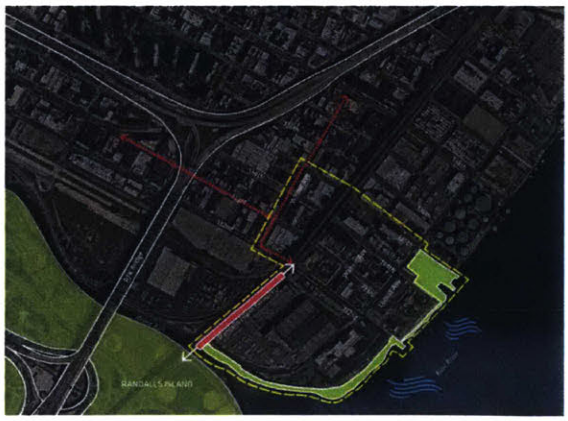
As a first phase of work, the Haven Project will focus on enhancing connectivity to the southeast corner of Port Morris and establishing waterfront parks at 132nd and 134th Streets. The planning strategies to achieve these goals are backed by research and community support. The next several pages explain why the project will focus first on the southeastern district and how the long-term vision as a whole will maximize impact for residents of Mott Haven and Port Morris.

Mott Haven's residents lack sufficient open space acres for active and passive recreation — our Mott Haven Open Space Index found that there is less than half the amount of open space acres in the neighborhood than needed. The Haven Project has the potential to change that by providing new open spaces and by strengthening connections to places like Randall's Island, where all New Yorkers can relax and recreate.

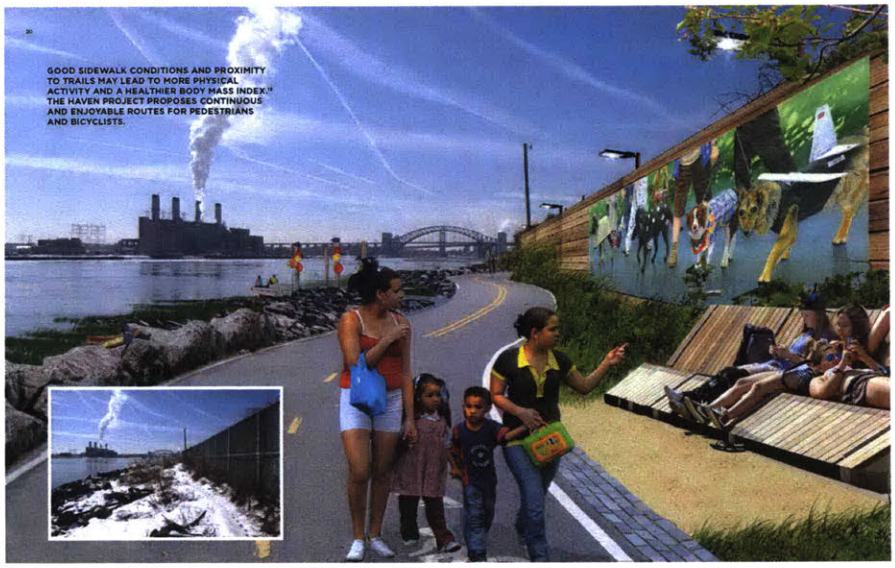
Tupper Thomas, Executive Director, New Yorkers for Parks

As a first phase of work, we are investing in the southeast corner of Port Morris and strengthening connections into Mott Haven (above). The plan builds off the momentum of the Randall's Island Connector and proposes additional waterfront access points (below).





THE HAVEN PROJECT PROPOSES DESIGN DECISIONS BASED ON RESEARCH. FOR EXAMPLE, AIR QUALITY IN THE SOUTH BRONX IS BETTER ALONG THE WATERFRONT, WHERE WIND DISPERSES POLLUTANTS HARMFUL TO HUMAN HEALTH.[1] THEREFORE, THE PLAN PROPOSES A SERIES OF WATERFRONT PARKS.



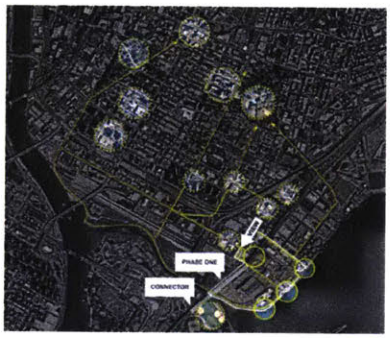
GOOD SIDEWALK CONDITIONS AND PROXIMITY TO TRAILS MAY LEAD TO MORE PHYSICAL ACTIVITY AND A HEALTHIER BODY MASS INDEX.[9] THE HAVEN PROJECT PROPOSES CONTINUOUS AND ENJOYABLE ROUTES FOR PEDESTRIANS AND BICYCLISTS.

FEELING VULNERABLE TO TRAFFIC INJURY DISCOURAGES WALKING, RUNNING, BIKING, AND OUTSIDE PLAY FOR CHILDREN.[9,10] STREET AND INFRASTRUCTURE DESIGN THAT REDUCES TRAFFIC AND IDLING DECREASES POLLUTANT LEVELS IN THE AIR.[9] MAKING STREETS SAFER AND MORE EFFICIENT CAN HAVE A DRAMATIC IMPACT ON COMMUNITY HEALTH.

1: Link neighborhood nodes

Creating safe and welcoming corridors to connect residents across physical and perceived barriers is paramount for the Haven Project. Right now, the streets of Mott Haven and Port Morris aren't optimized for anyone. Residents expressed concern over the lack of connectivity within their neighborhood for pedestrians and cyclists, especially below highway infrastructure. Not surprisingly, these perceptions by the community are backed up by research which suggests that safe street conditions are associated with increased walking, running, biking, and outside play for children. [23, 24, 27] Street improvements that facilitate smoother traffic flow also reduce idling and pollution, improving air quality.[28]

Perception of safety can be just as important as actual physical safety in terms of getting people to walk in their own neighborhood. Importantly, perception of safety is a greater predictor than actual safety for social connection and stress. [27, 28, 29, 30, 31, 32] Disorder of the streetscape, including derelict and vacant lots, increases stress and anxiety and affects social connection, especially related to trust. [33, 34, 35, 36]



4: Integrate creative, interactive placemaking

One of the strongest correlations found in our research is between community engagement and park use. In one particular study, regular physical activity increased from 14% to 59% in a group of individuals heavily engaged in the creation of a new park.[26] By aligning our efforts with current community interests and articulating the history and identity of the community, we will ensure active use of new open spaces.

2: Provide access to large open spaces

Large parks offer opportunities for recreation, exercise, and fresh air that are not achievable elsewhere in the city. Large parks in New York City (defined as six acres or more) are linked to lower body mass index (BMI) at a population level, whereas the relationship is not consistent for small parks.[37] Randall's Island Park offers more than 250 acres of parkland and recreation facilities, and now that the NYCEDC is completing the Randall's Island Connector, a pedestrian and bicycle bridge linking Port Morris and Randall's Island, a focus of the Haven Project will be to get people safely to this newly accessible large open space.

5: Support a resilient shoreline

Superstorm Sandy, despite its horrors, presented a case study in resilient design: Brooklyn Bridge Park, designed to withstand storm surges, suffered minimal damage and provides a model for other waterfront parks citywide. Many waterfront neighborhoods in the greater metropolitan area — lower Manhattan, Hoboken, and Staten Island, to name a few — are now developing mitigation plans and planning large capital projects for the shoreline. No such plan with financial backing exists for Mott Haven and Port Morris, yet some of the region's most toxic and vulnerable industries sit in the floodplain, and residents and businesses alike are concerned. By investing in the shoreline, NYRP can make Mott Haven and Port Morris resilient in the face of climate change.

3: Create a waterfront trail

NYRP will focus on creating new open spaces along the waterfront, leveraging their proximity to the Randall's Island Connector, and vice versa, to create a real destination for the neighborhood. Mott Haven and Port Morris residents' desire to recreate on their own waterfront is among the highest in the city. With not one public waterfront access point in the neighborhood, the creation of a waterfront park is a guaranteed success in the community.

Locating open spaces away from highway infrastructure and on the waterfront, where wind dispersion is highest, will also enable visitors to experience better air quality. Since physical activity requires deeper breathing, good air quality is especially pertinent for recreation.[38]

ARIEL FOUNDATION PARK

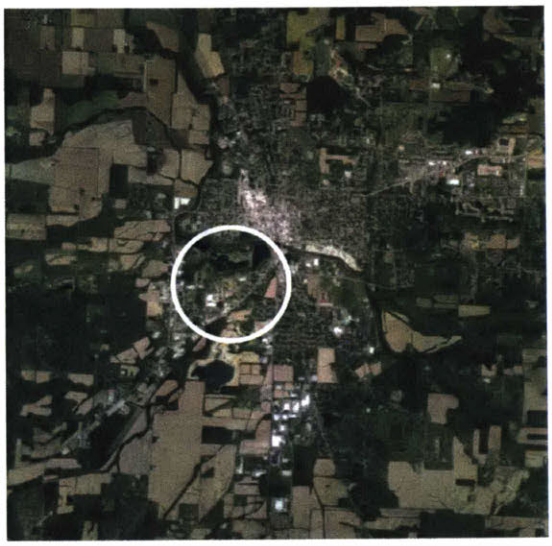
CLIENT
Ariel Foundation

CARGO TYPE
N/A

LOCATION
Mount Vernon, OH, USA

DESIGNER
Ted Schnormeier

DATE COMPLETED
2015



Located at a former Pittsburg Plate Glass (PPG) factory site, this park uses terraced landforms to shape visitor experience and define iconic views and destinations. Open pavilions help enable large-scale revenue-generating events to be hosted at the park. The grassy terraces provide an elevated perspective in what is otherwise a flat agricultural landscape and serve as event seating, sledding hills, and picnic sites.

The rastin tower, a remnant from the park's days as an active factory, has been repurposed as a destination for enterprising urban hikers. The tower is a visible icon for the park and is lit up in coordination with important local events and to honor local people.

NORTH BANK BRIDGE PARK

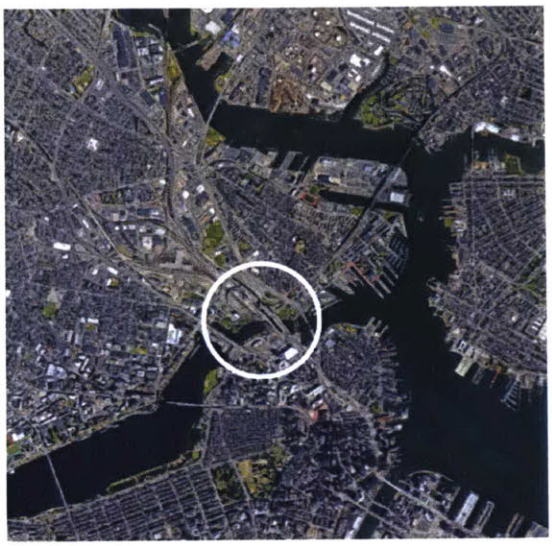
CLIENT
MassDOT

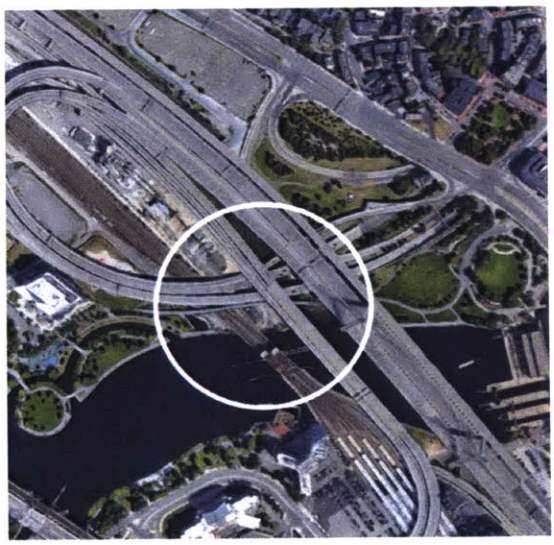
CARGO TYPE
N/A

LOCATION
Boston, MA

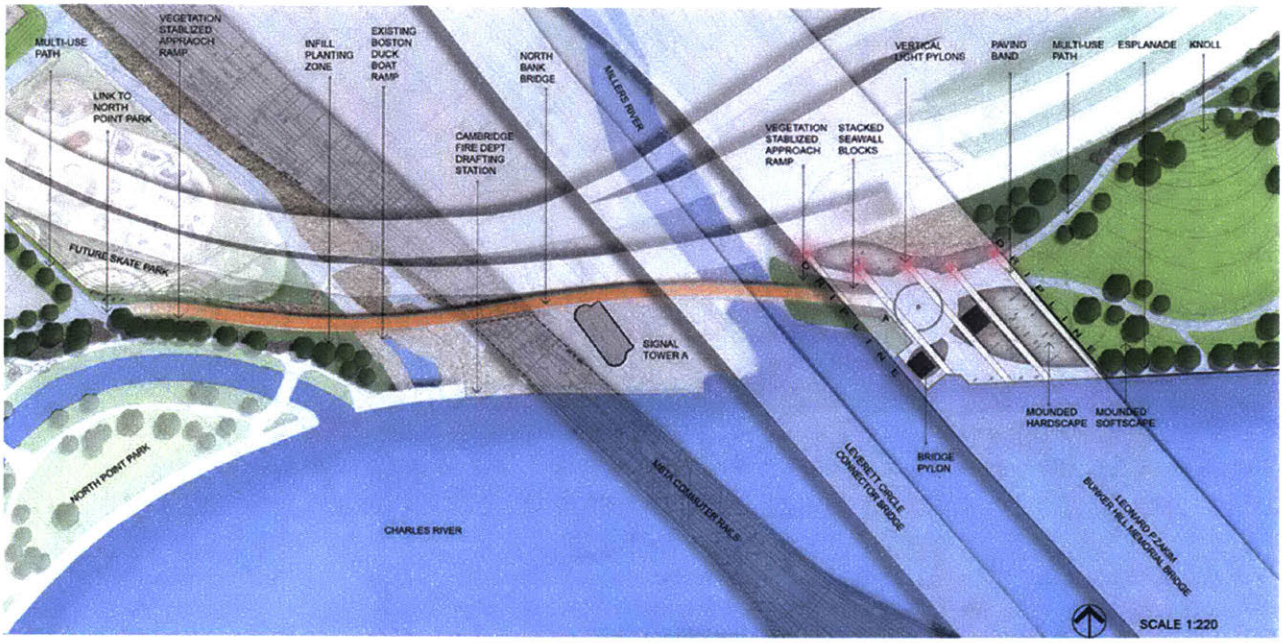
DESIGN FIRM
CRJA

DATE COMPLETED
2012

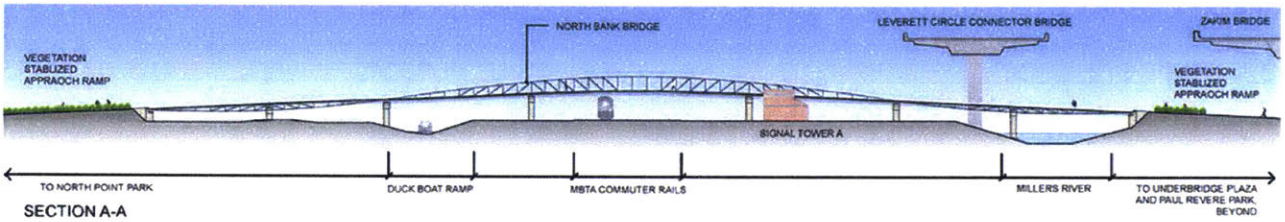




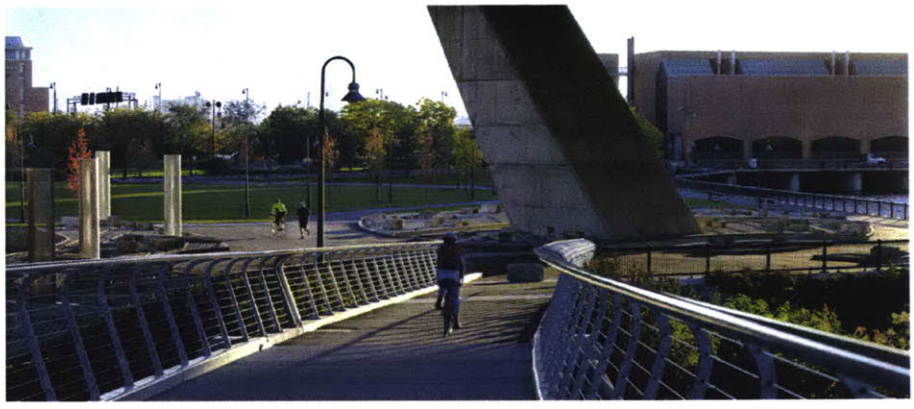
Designed as the final piece of the waterfront park system located beneath Boston's new Zakim bridge. The program for the site included a maintenance facility, multi-use trails, soccer fields, tennis courts and a skateboard park. The multi-use bridge itself provides bike and pedestrian access across passenger rail tracks and competes the missing link between the parks along the Charles River and those of the Boston Harbor. Thoughtful sightlines, textured hardscaping, dynamic lighting and diverse user group programs help to make this space inviting, easy to navigate and safe.

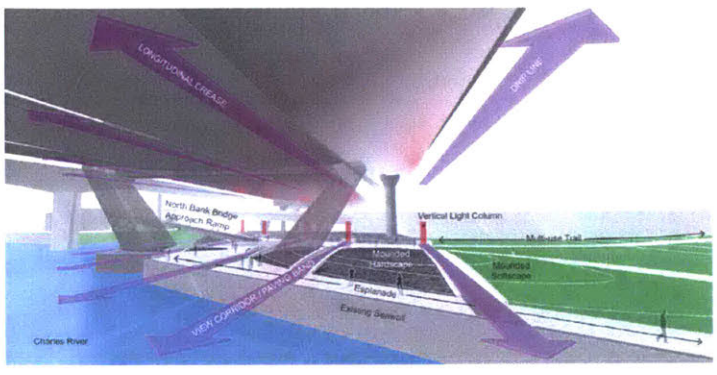


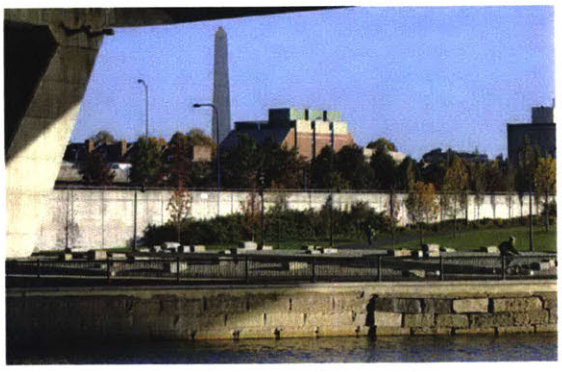
ENLARGEMENT PLAN



SECTION A-A

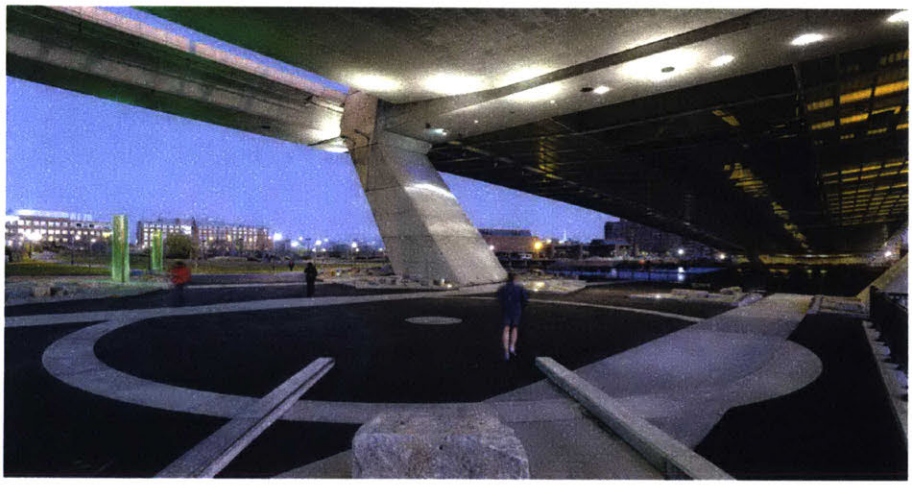



LONGITUDINAL BREAK
DAYLINE
North Bank Bridge
Approach Ramp
Vertical Light Column
Multi-use Trail
Mounded
Landscape
Mounded
Landscape
Esplanade
Existing Seawall
VIEW CORRIDOR/PARKING BEYOND
Charles River



CONNECTIONS

OVERALL SITE PLAN



INFRA-SPACE
INKBLOCK UNDERGROUD

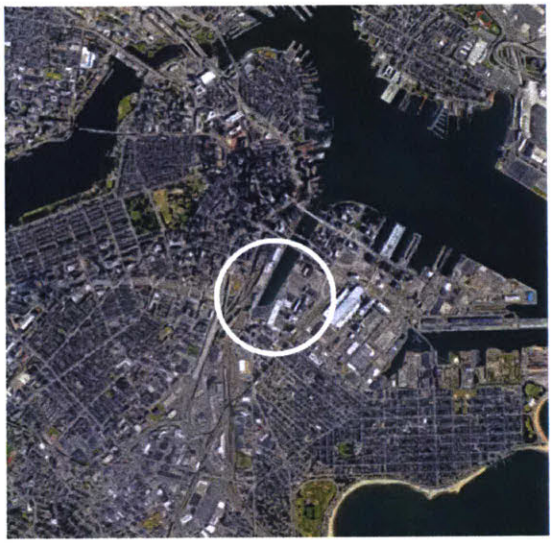
CLIENT
MassDOT

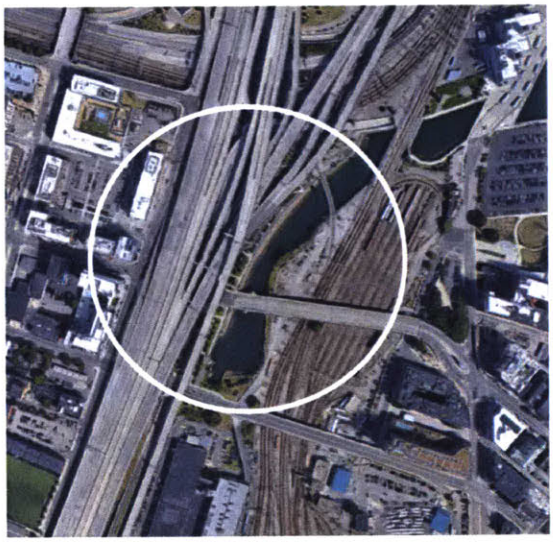
CARGO TYPE
N/A

LOCATION
Boston, MA

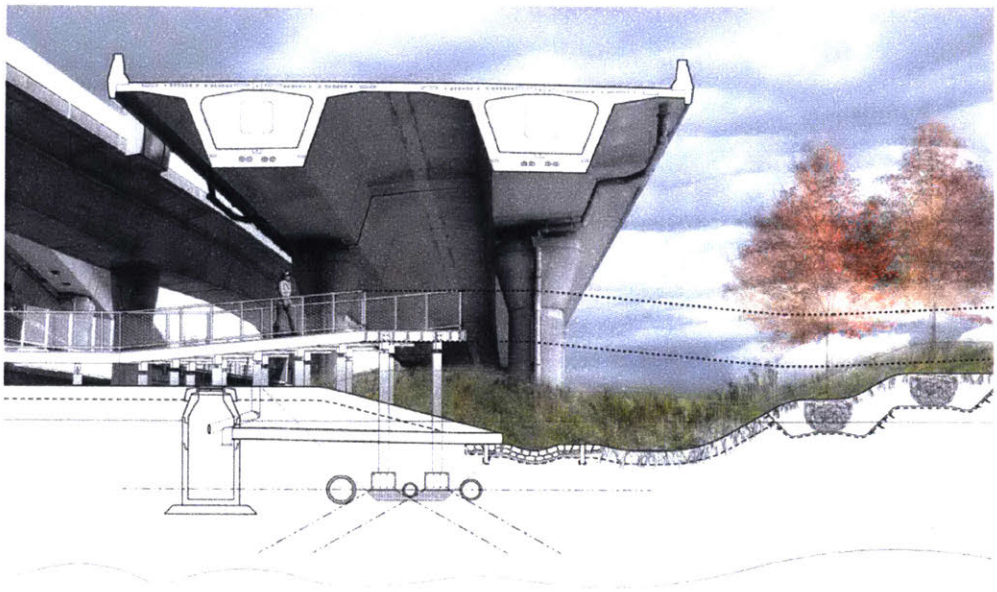
DESIGN FIRM
Landing Studio

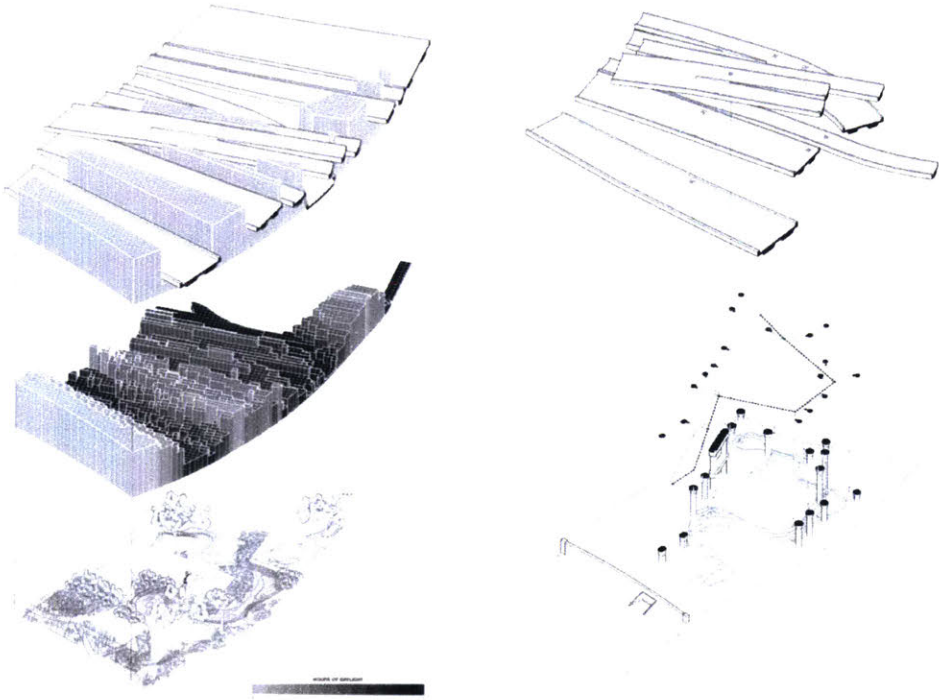
DATE COMPLETED
2017

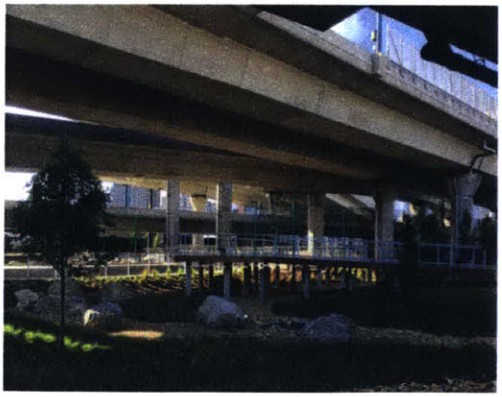


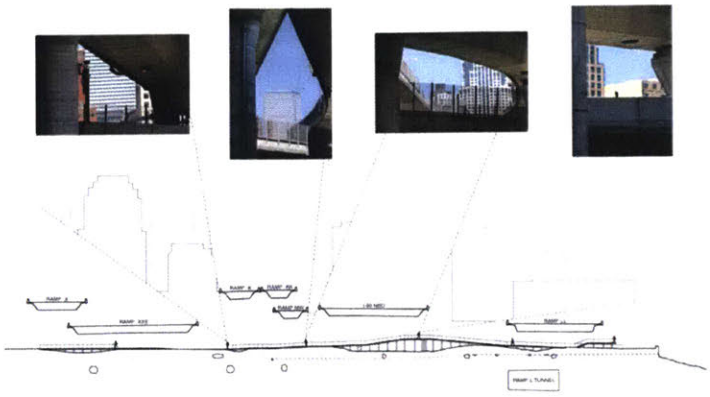


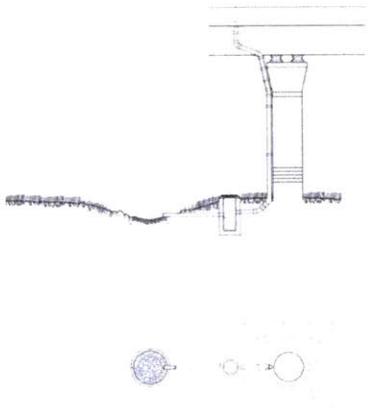
This project transcends an infrastructural knot to provide a much-needed safe and comfortable connection between two dense districts with growing residential populations and worsening flood risk and stormwater management issues. As described on the Landing Studio website, "The Infra-Space program is a statewide initiative with the Massachusetts Department of Transportation to re-evaluate spaces under viaducts for better urban and ecological performance. Infra-Space 1 is the pilot project, spanning nearly a half-mile in length through the middle of downtown Boston. The project includes a stormwater management landscape that diverts the runoff from the viaduct, improved maintenance access, public recreation, and a series of scaffold structures that support operable lighting and art installations."

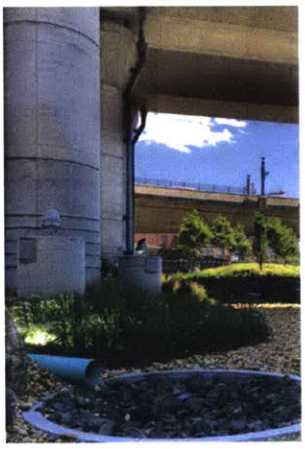


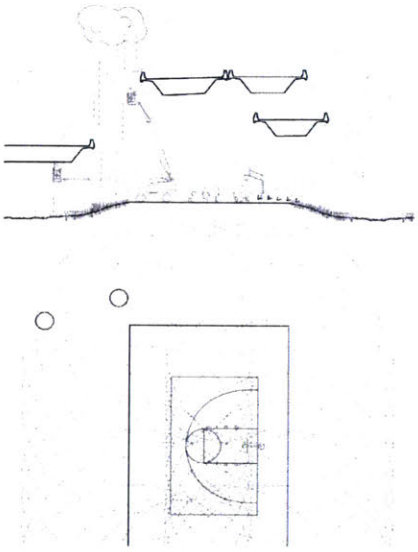


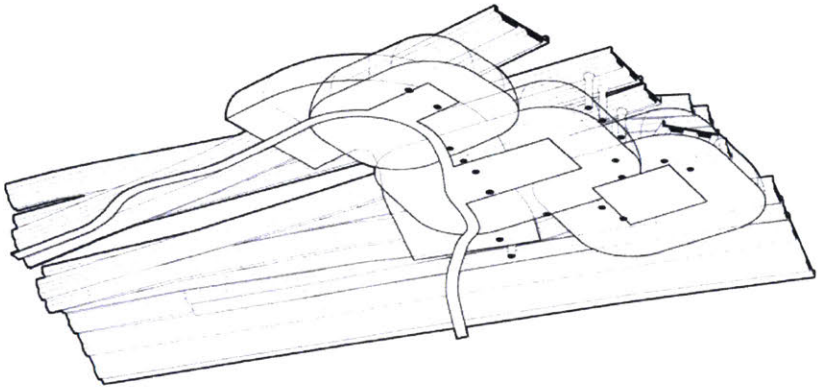


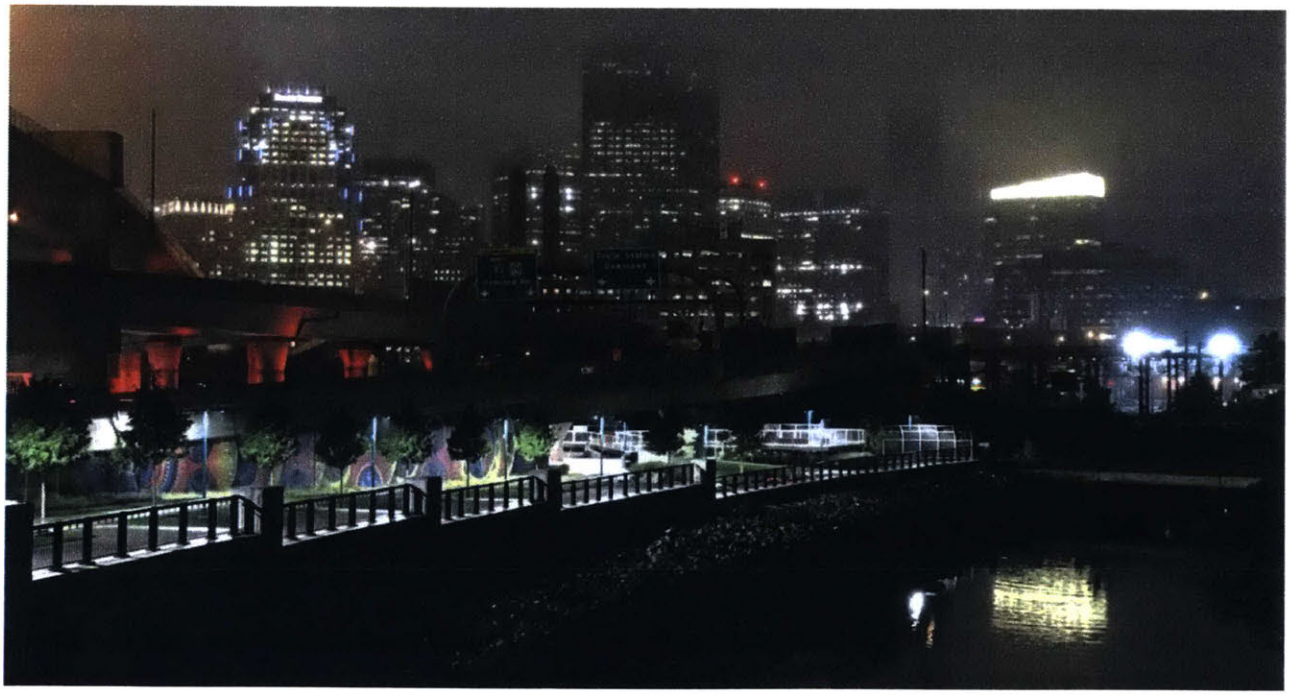












SEATTLE WATERFRONT KIOSKS

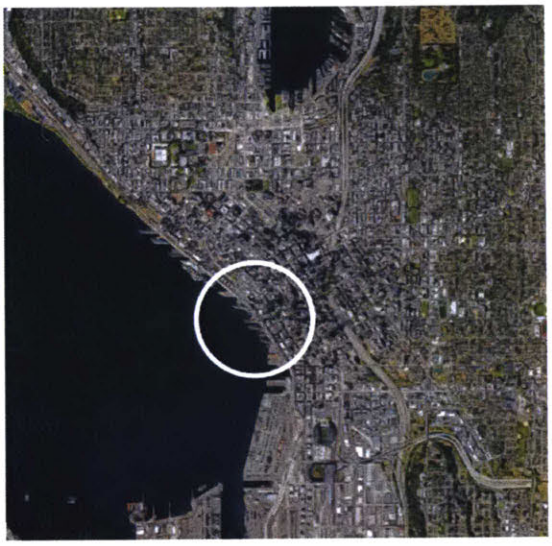
CLIENT
City of Seattle

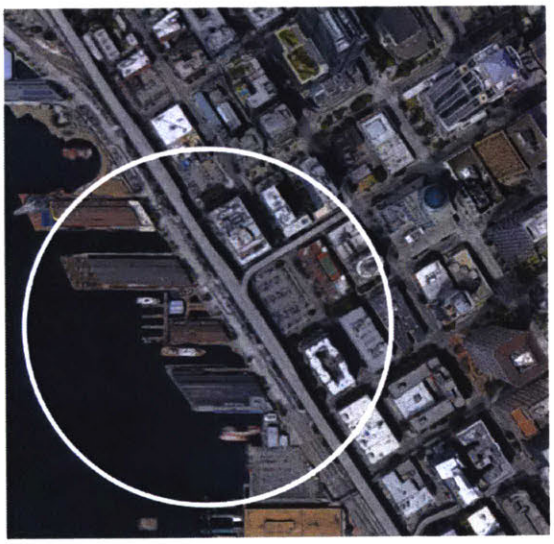
CARGO TYPE
N/A

LOCATION
Seattle, WA, USA

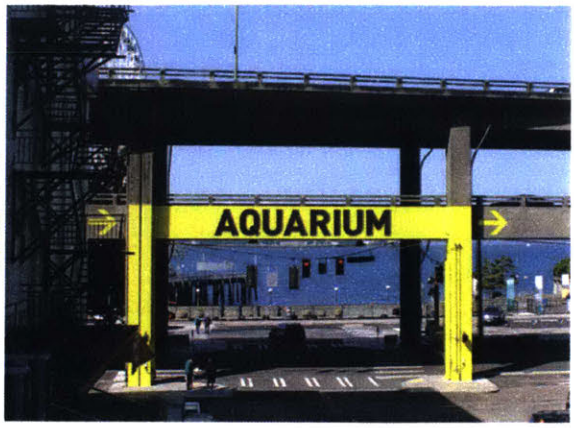
DESIGN FIRM
nArchitects + James Corner Field Operations

DATE COMPLETED
unbuilt





Four tall kiosks along Seattle's new waterfront will provide a variety of amenities at the ground level, while functioning as urban landmarks that will make the waterfront visible from afar. Designed to emphasize some of Seattle's most beautiful features, the kiosks will use reflective materials to capture a variety of views of the waterfront, Puget Sound, city, the Olympic mountains beyond, and Seattle's changing weather conditions. Sited along the axis of key cross-streets these kiosks will help direct the visitor experience along with other bold wayfinding interventions like the "aquarium" painting on the viaduct walls.


AQUARIUM


INERS LANDING
Public Storage

HAFENCITY VIEWPOINT

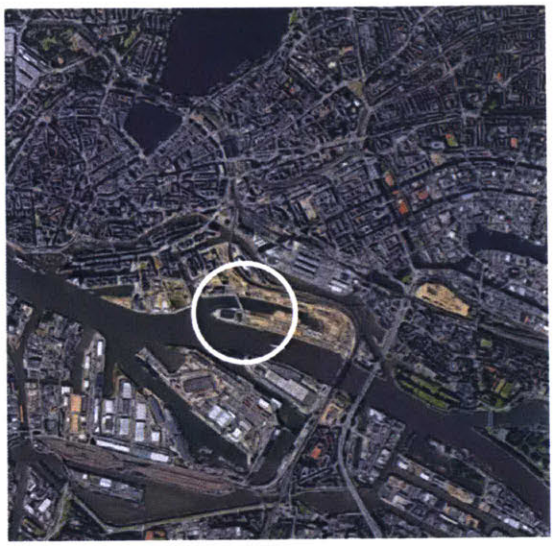
CLIENT
EU Waterfront Communitites Program

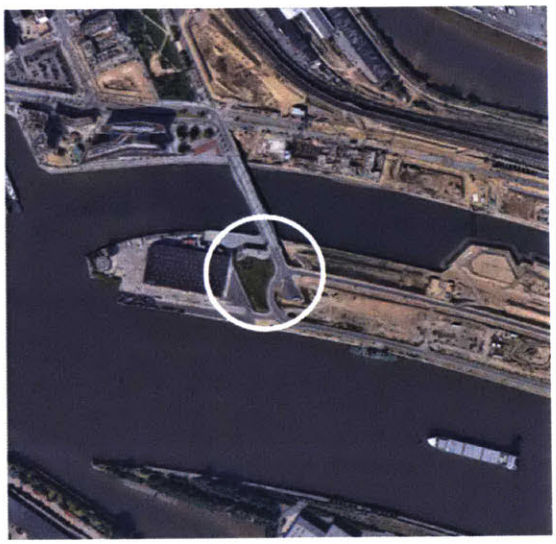
CARGO TYPE
N/A

LOCATION
Hamburg, Germany

DESIGN FIRM
Renner Hainke Wirth

DATE COMPLETED
2004





At over 42 feet high, the HafenCity ViewPoint tower has become an attraction for visitors and locals alike to get an elevated vantage point that puts the port and the growing city into a new perspective. Located nearby a temporary cruise terminal and inspired by the "animal-like dock cranes in the port" the tower is playfully designed to be like a "periscope emerging from the depths and scanning the horizon." The steel tower is also designed in such a way that it can be relocated to new vantage points as development evolves and key views shift. This adaptability ensures it can retain the attention of locals after their first visit and enables it to remain responsive to emerging paths and nodes.

Importantly, the ViewPoint is located along an improved bike and pedestrian path and at a visually prominent open point with clear multi-directional views to the port and the central city. It's bright color and large text labeling it as "View Point" further ensures visitors will quickly be able to find it and look up information on it.


VIEW POINT


SOUTH

KEAST PARK

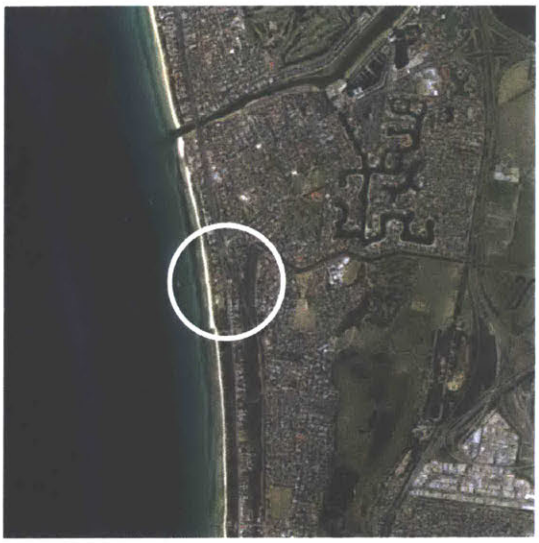
CLIENT
City of Frankston

CARGO TYPE
N/A

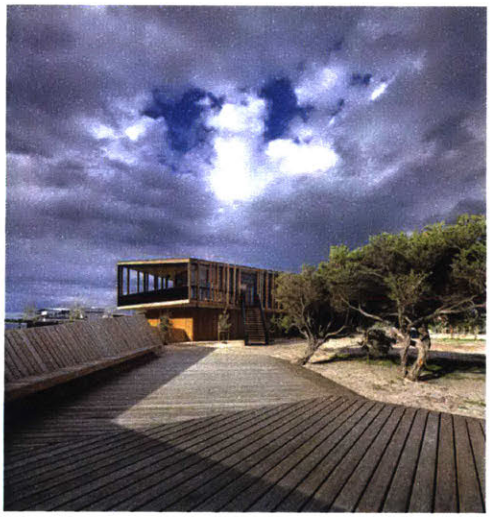
LOCATION
Frankston, Australia

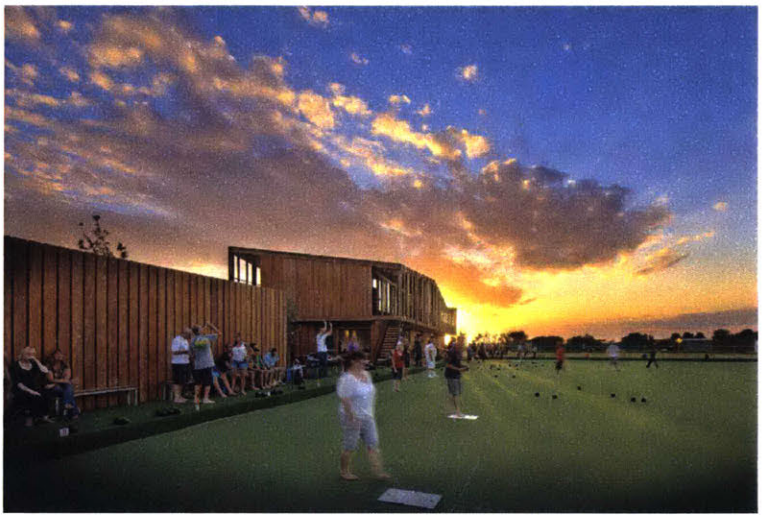
DESIGN FIRM
Site Office

DATE COMPLETED
2011



Designed to negotiate the transition from coastal dune to the inland urban environment. A boardwalk both protects the reinstated dune landscape, and shelters the grassy local park. The winding boardwalk deck and raised building work together to direct views and guide movement of visitors.





HAFENGEBURTSTAG (PORT'S BIRTHDAY)

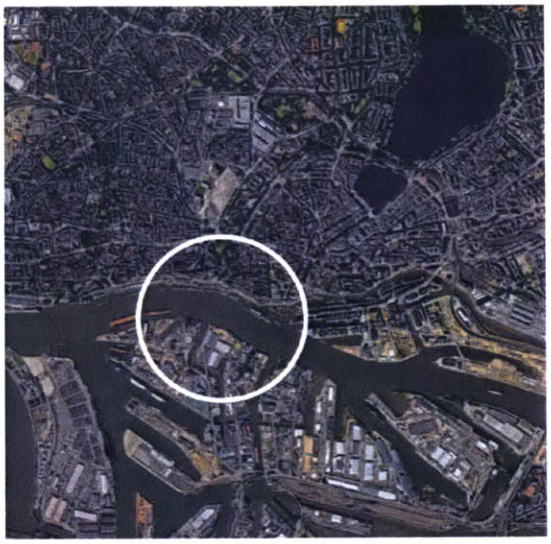
CLIENT
Port of Hamburg

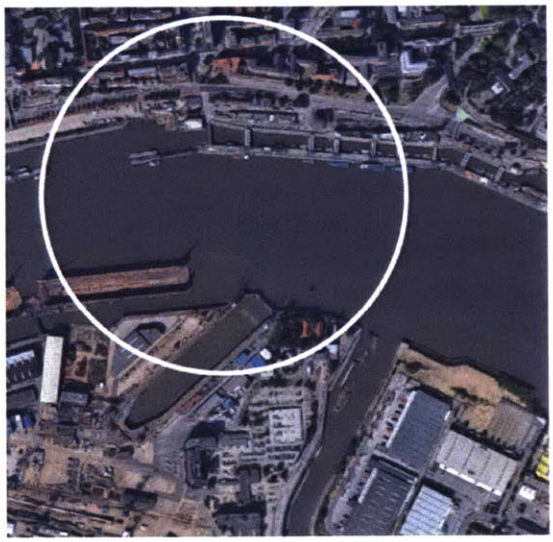
CARGO TYPE
Container + Breakbulk

LOCATION
Hamburg, Germany

DESIGN FIRM
N/A

DATE COMPLETED
1977





The port of Hamburg celebrates its May 7th anniversary annually and ivites the whole city. This ritual weekend-long public festival has taken place every year since 1977 and serves as a public relations promotion of the port's role in shaping and supporting the city. It features food stalls, live music and ship parades.

The festival activities primarily take place in parts of the urban waterfront that have strong views of the most active parts of the port and have active docks that can recieve ships of varying sizes.


100 METER

THE P.O.R.T.

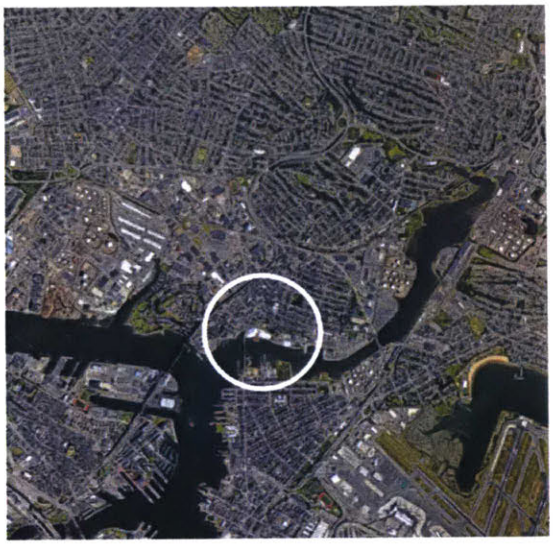
CLIENT
Rock Chapel Marine (Salt Importers)

CARGO TYPE
Breakbulk - Salt

LOCATION
Chelsea, MA

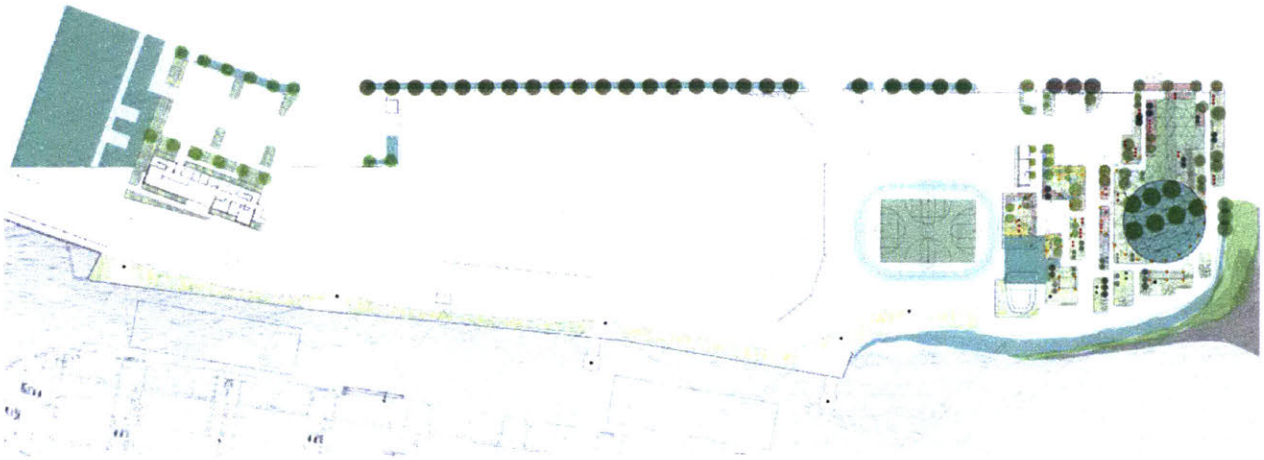
DESIGN FIRM
Landing Studio

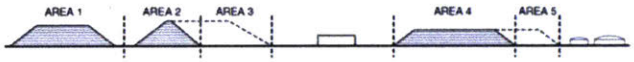
DATE COMPLETED
2006, ongoing

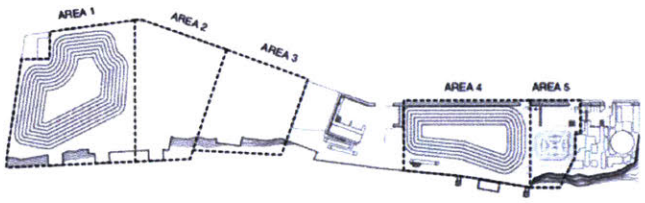


As described on the Landing Studio website, "The P.O.R.T. (Publicly Organized Recreation Territory) is the conversion of a 13 million gallon oil tank farm into a shared-use waterfront road-salt terminal, public recreation area, and wildlife habitat landscape... The PORT provides both year-round public recreation space and a seasonal expansion area when the salt operations are dormant in the summer. The seasonally shared zone is used for stockpiling and distributing 100,000 tons of salt in the winter, and is converted to public waterfront active recreation and event space in the summer... The industrial operations were designed to improve the everyday relationship between the city and the working waterfront. For example, different salt stockpiling scenarios based on varying quantities of salt are designed to preserve views from the neighborhood to the waterfront."

Key translatable ideas for other port public access projects include material reuse, sightline preservation, time sharing and habitat restoration.




AREA 1
AREA 2
AREA 3
AREA 4
AREA 5


AREA 1
AREA 2
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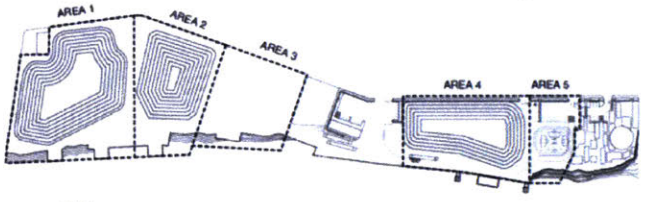
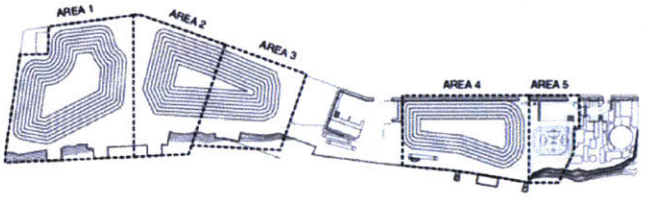
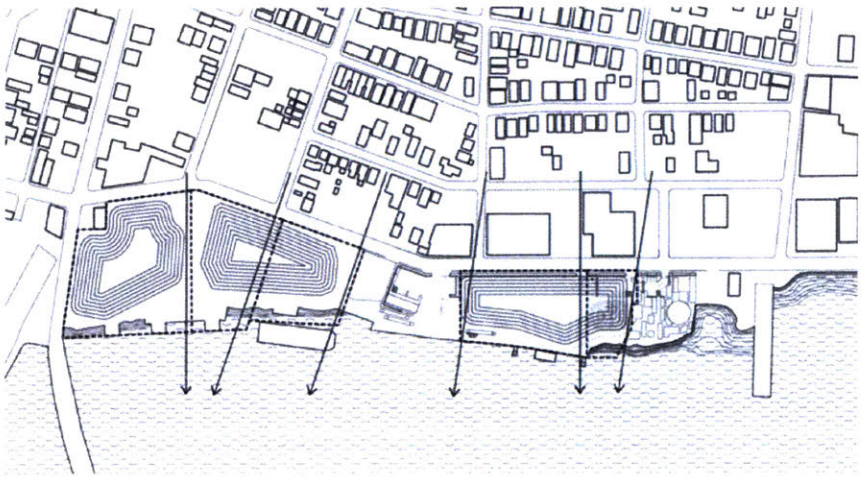
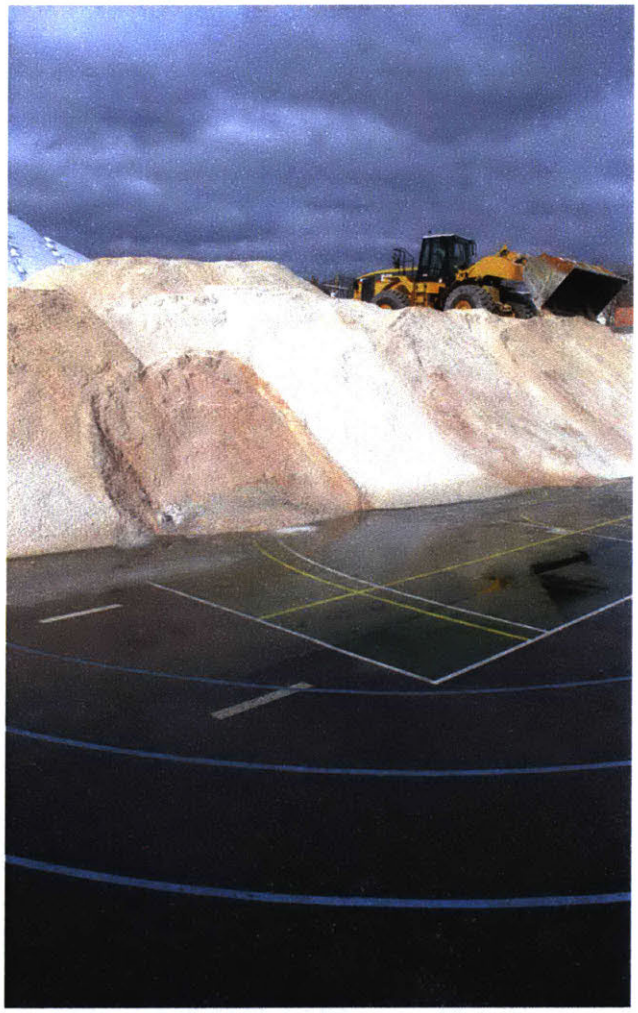
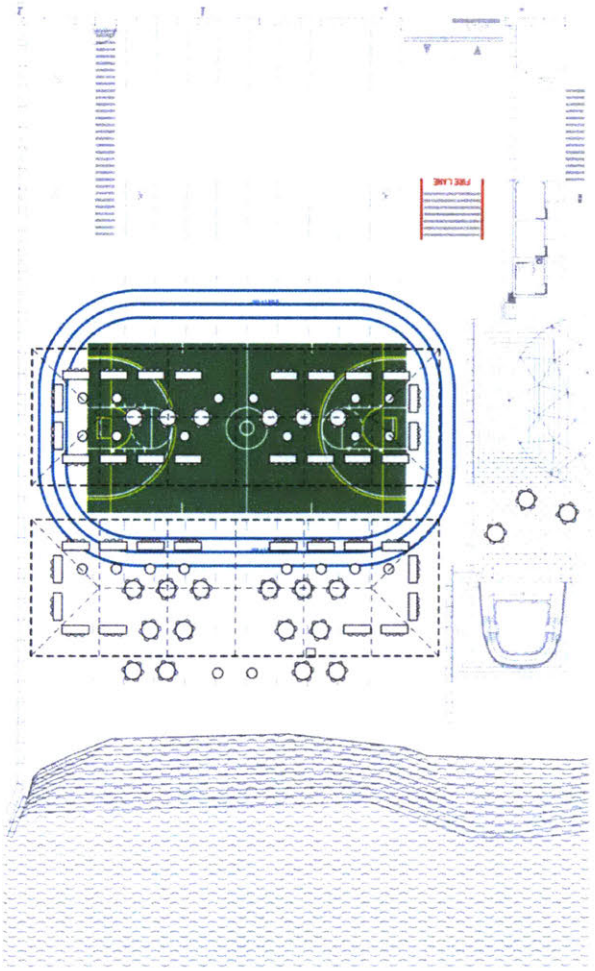
AREA 5


AREA 1
AREA 2
AREA 3
AREA 4
AREA 5


AREA 1
AREA 2
AREA 3
AREA 4
AREA 5







RED RIBBON PARK

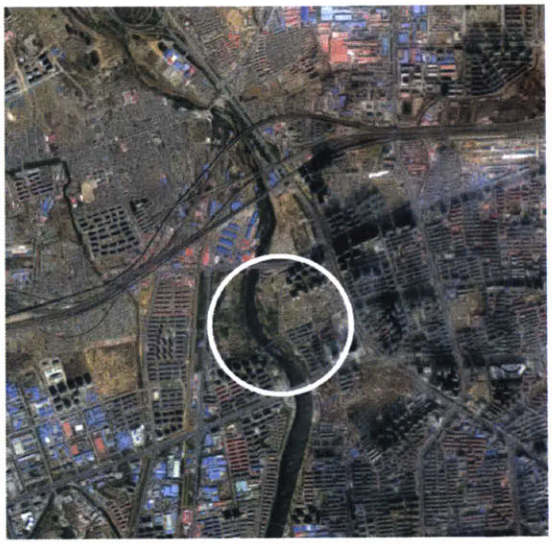
CLIENT
The Landscape Bureau of Qinhuangdao

CARGO TYPE
N/A

LOCATION
Qinhuangdao, Hebei, China

DESIGN FIRM
Turenscape

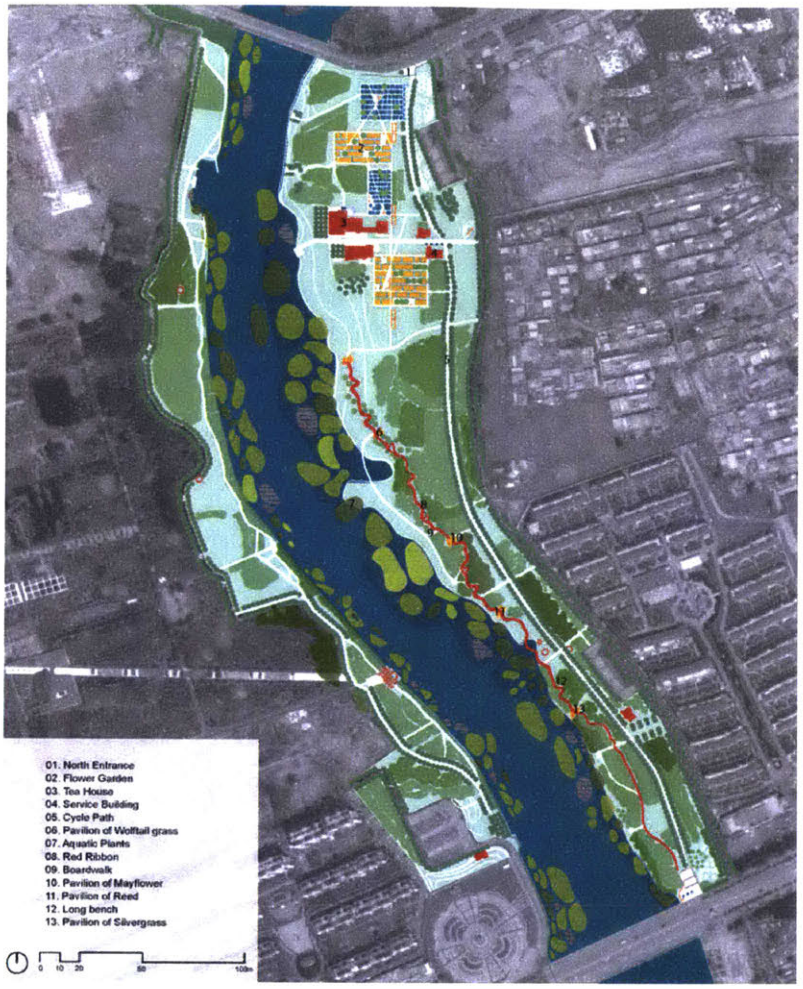
DATE COMPLETED
2007

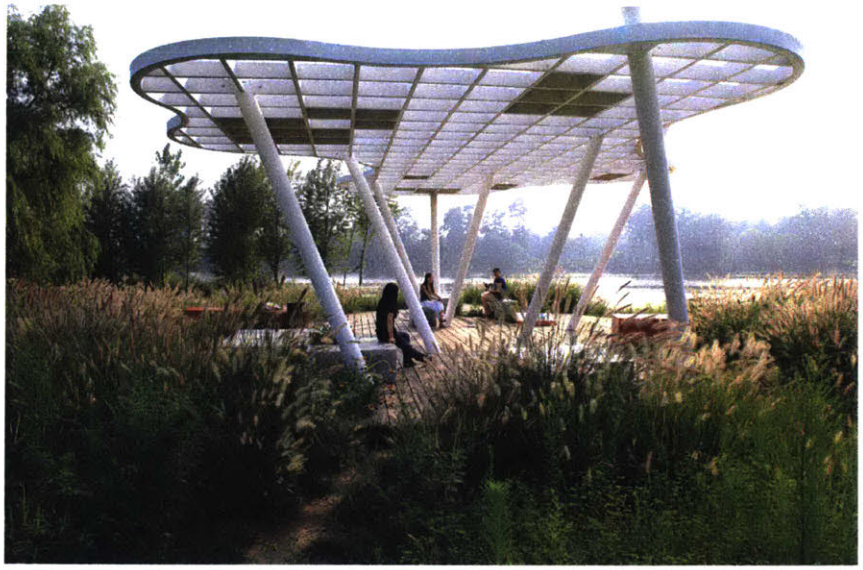


This riverbank site was overgrown and uncared for with ruins of former infrastructure and significant garbage dumping. The site's inaccessibility and poor internal visibility made it feel unsafe. This site was redesigned to serve as a naturalized stretch to compensate for channelized lower reaches of the same river and as a site to support diverse wildlife and vegetation.

The "red ribbon" itself is incredibly multifunctional. It integrates a boardwalk, lighting, and seating and is designed to facilitate fishing, swimming, and jogging. The fiberglass the red ribbon is made of glows red at night when lit from the inside. Crossings for small animals and perforations were made on the ribbon's top surface which allows grasses to grow up through the fiberglass ribbon from the ground below.

This project provides a great example of how to integrate flood risk planning, habitat cultivation, urban safety and recreation in a single unified site.


01. North Entrance
02. Flower Garden
03. Tea House
04. Service Building
05. Cycle Path
06. Pavilion of Wolftail grass
07. Aquatic Plants
08. Red Ribbon
09. Boardwalk
10. Pavilion of Mayflower
11. Pavilion of Reed
12. Long bench
13. Pavilion of Silvergrass



JELLICOE HARBOUR + SILO PARK

CLIENT
SEA + CITY Partnership (Auckland City Council, Auckland Regional Holdings, and Ports of Auckland Limited)

CARGO TYPE
Petroleum, Fishing, Yacht/Cruise Ship Repair

LOCATION
Auckland, NZ

DESIGN FIRM
Taylor Cullity Lethlean

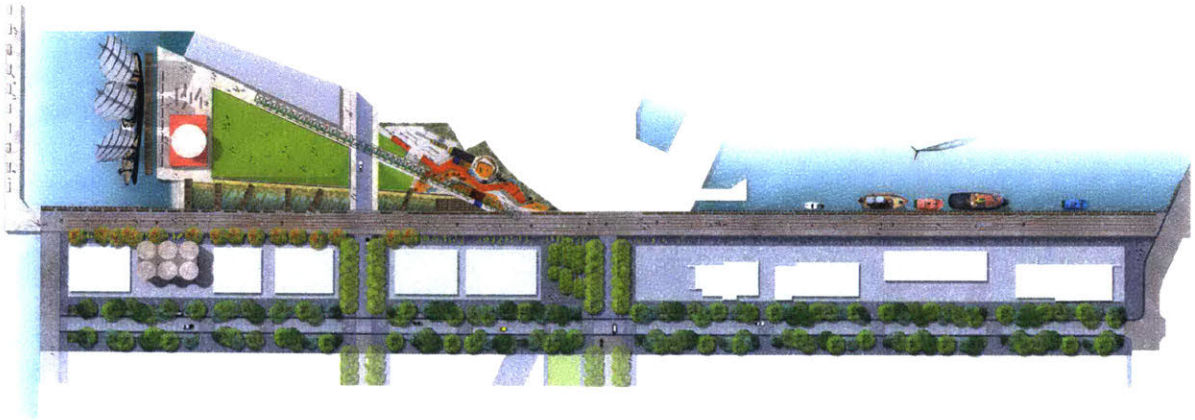
DATE COMPLETED
2015

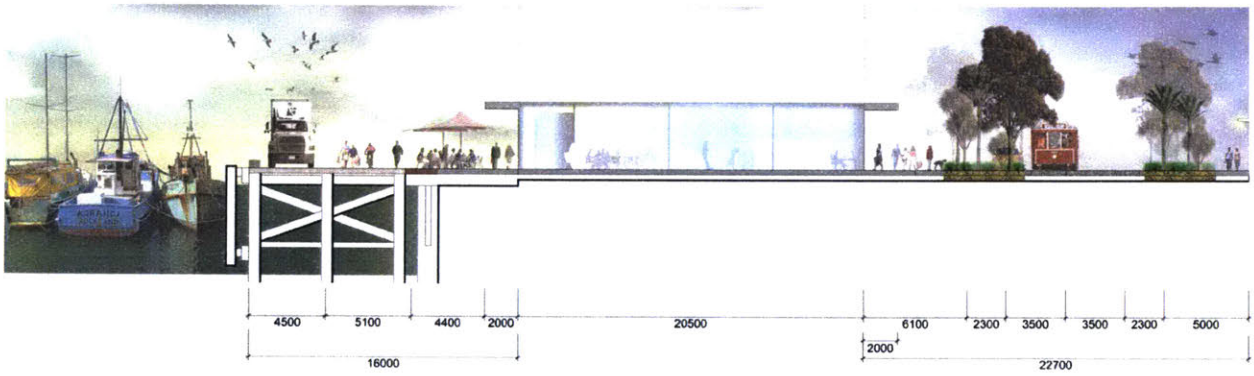
This park was designed as the catalyst around which a new development pattern would emerge in an area cycling out of heavy industrial use. Following a container terminal expansion and the completion of a fuel pipeline, port operations consolidated to the eastern harbour. Fishing, petroleum and superyacht repair remain as on-site industrial uses. The project took place on an abandoned concrete plant and oil tank farm and had the following goals:

Civic Agenda
- Foster real engagement with authentic maritime experiences
- Enable this place to communicate its history
- Create a public landscape to attract, order and inform desired redevelopment of adjacent land

Environmental Agenda
- Remediate contaminated site
- Treat all stormwater on-site
- Introduce rich, lush palette of native planting that recalls Auckland's gully ecologies

Redevelopment of the area was paid for based on the expected returns from residential and commercial developments on land leased from the partnership.

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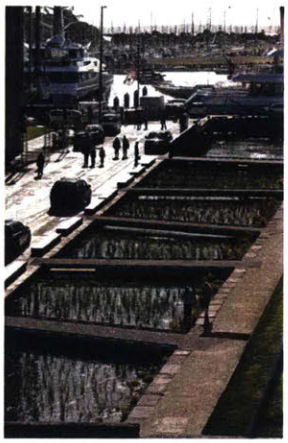


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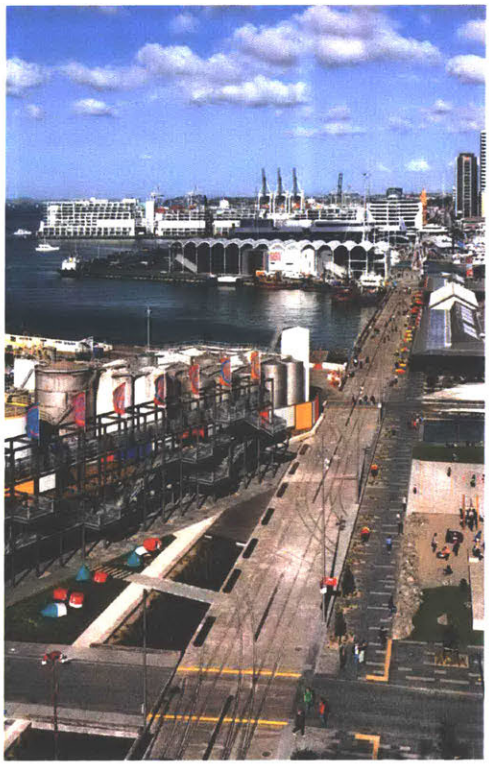
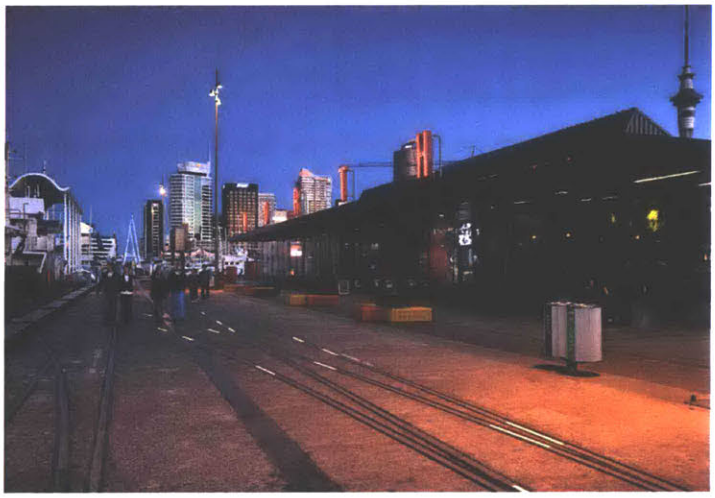
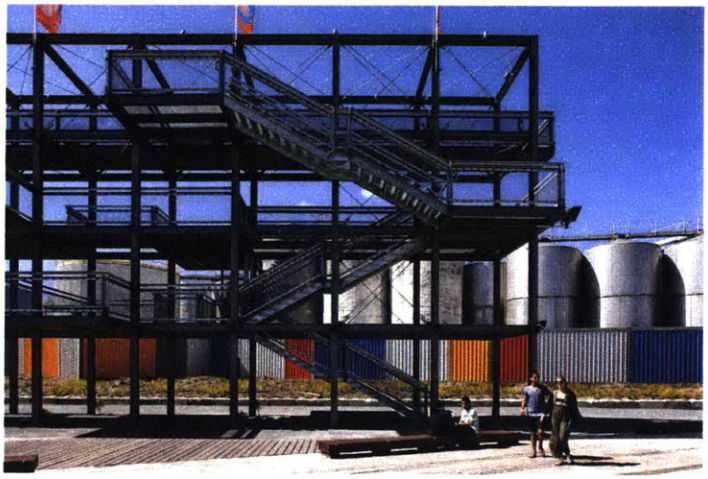
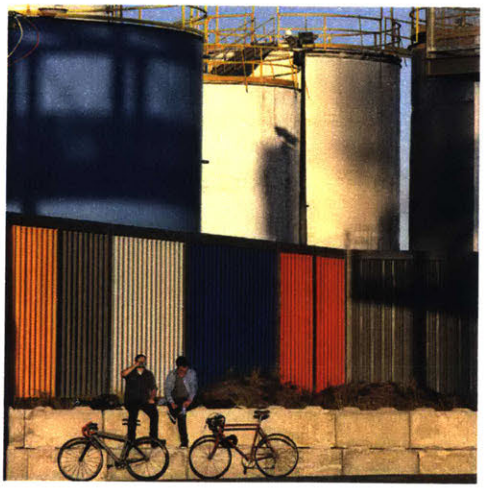








HOOVER MASON TRESTLE / STEELSTACKS PARK

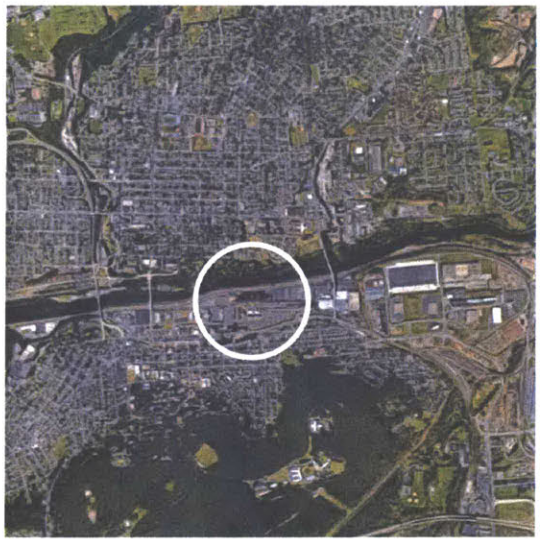
CLIENT
SteelStacks Arts and Cultural Campus Partnership

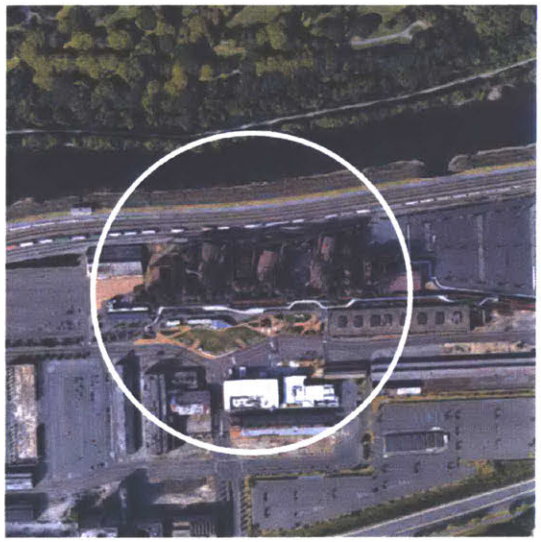
CARGO TYPE
N/A

LOCATION
Bethlehem, PA, USA

DESIGN FIRM
WRT Design

DATE COMPLETED
2015

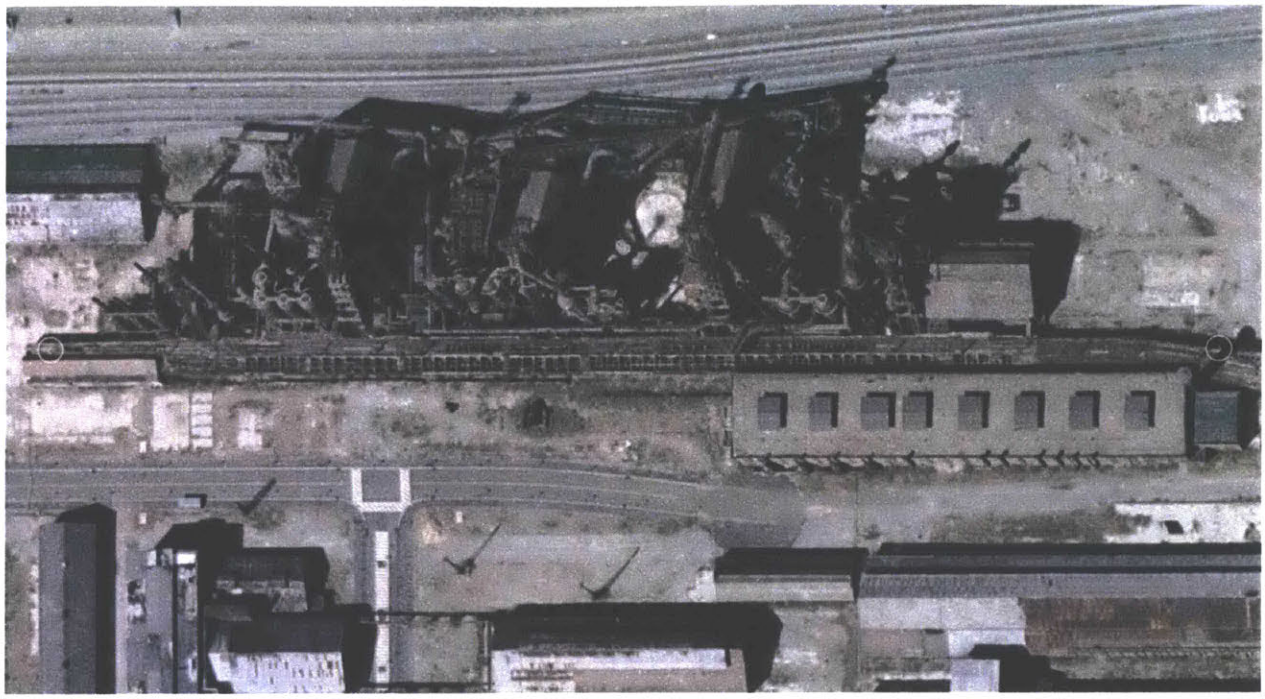


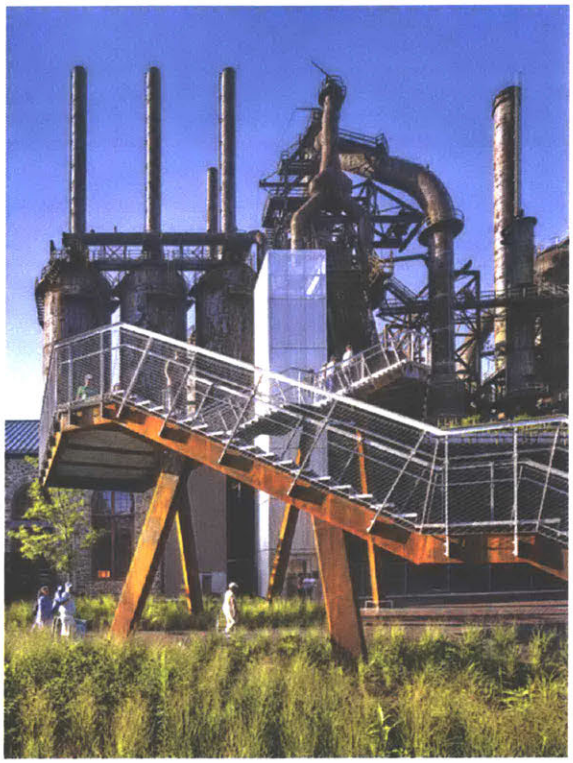


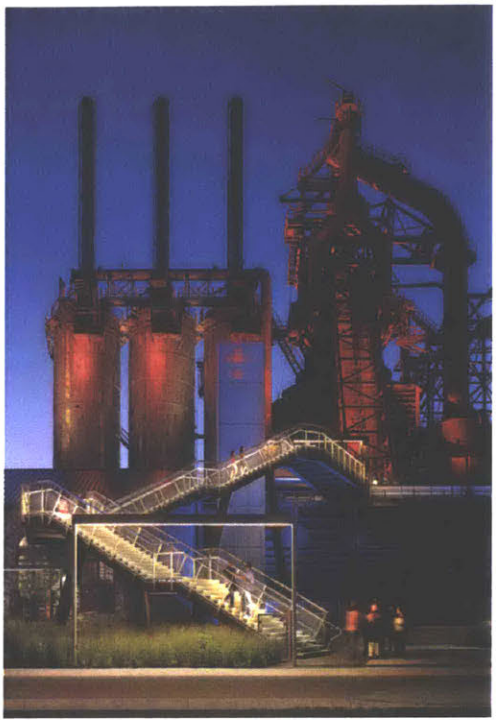
Built at the former Bethlehem Steel headquarters, SteelStacks park was initiated by a partnership involving the nonprofit ArtsQuest, the City of Bethlehem, the Bethlehem Redevelopment Authority, local public television station PBS 39 and Sands BethWorks Retail LLC. Funded as a Tax Incremental Financing district, on which a adjacent casino was built, the park centers around an elevated walkway allows visitors to stroll among the blast furnaces and learn about the history of the site. The physical design is paired with an interactive digital media archive that relates to specific parts of the site.

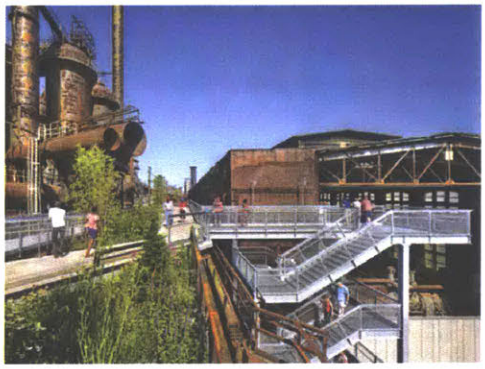
This project offers three key strategies for a port public access project --

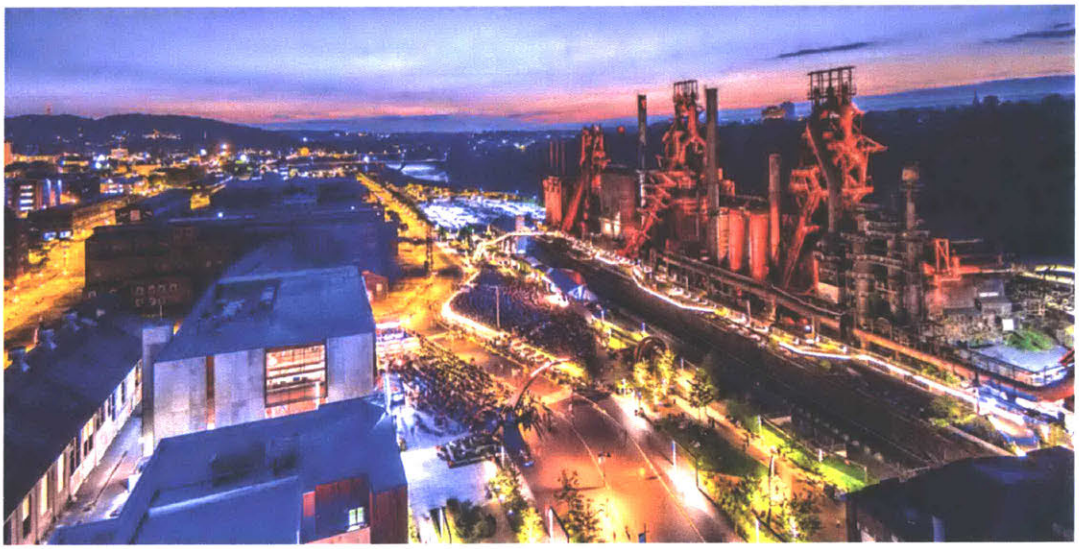
1. the street bending intervention to calm traffic in preparation for a major pedestrian crossing.
2. the elevated walkway to provide visual access without disturbing or altering the state of the industrial area itself
3. the pairing of an interactive media archive with a physical site to curate a more compelling narrative

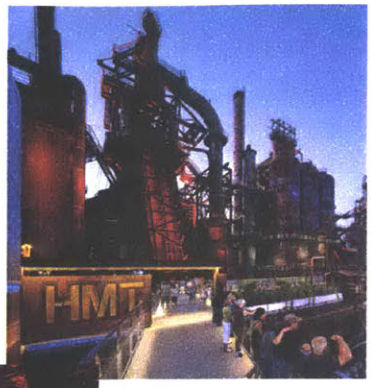








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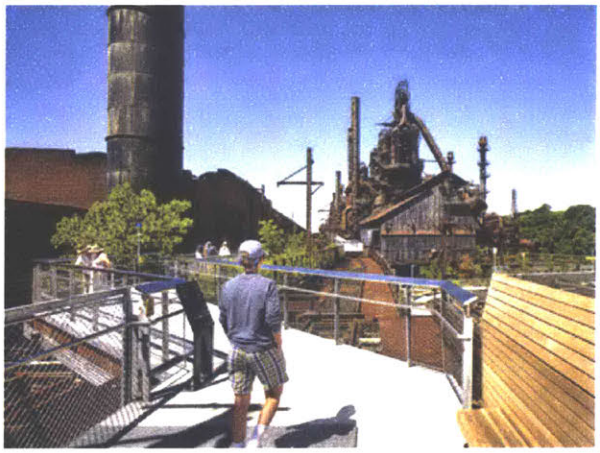


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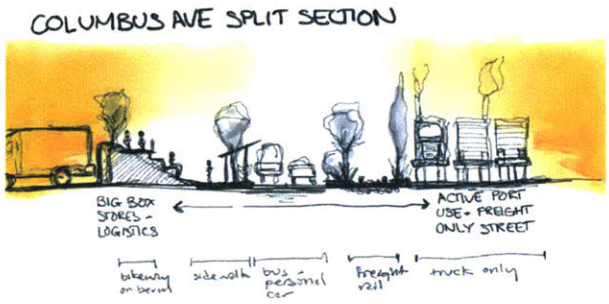
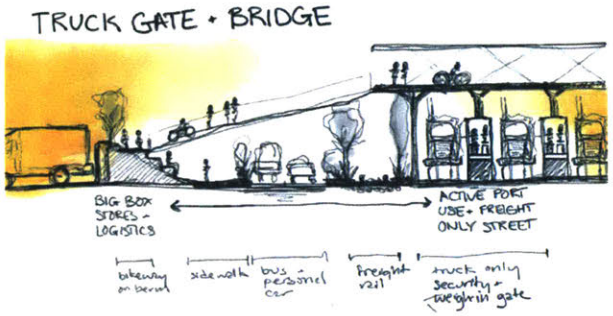
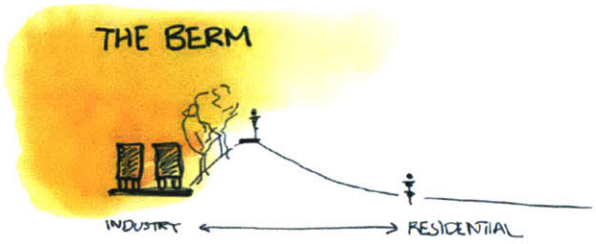
INTEGRATION TOOLKIT

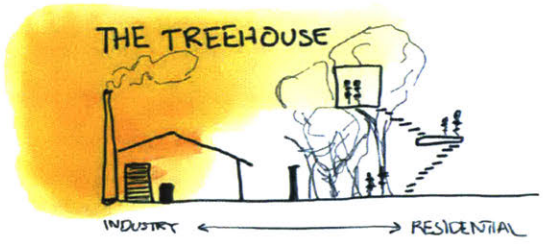
The series of precedent projects featured in this section can be distilled to the following suite of integration tactics that are keyed not only to the proposed PhilaPort interventions but also to the working waterfront design typologies more generally. Together this can be treated as a toolkit for any working waterfront planning and design project that seeks to increase a port's environmental performance, economic efficiency and workforce accessibility while positioning that port for a future of sustained growth.

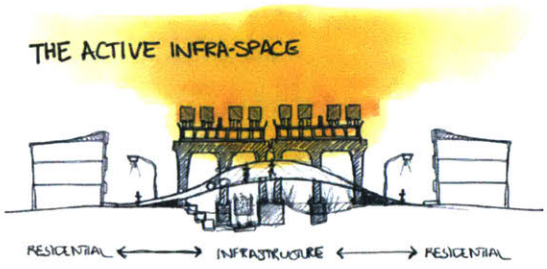
Graphics Created By Zoë Taft Mueller.

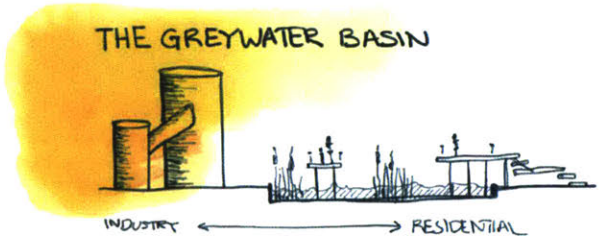


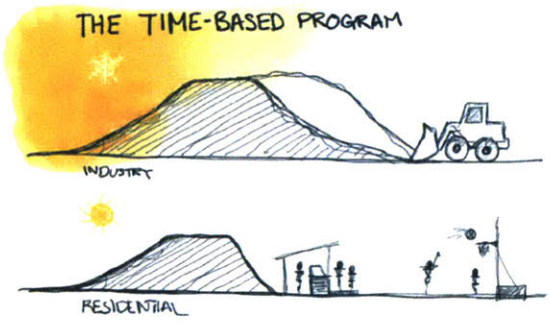


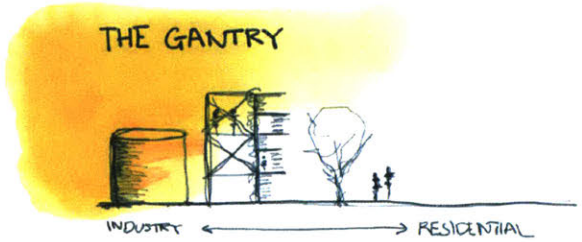












GENERALIZABLE WORKING WATERFRONT DESIGN TYPOLOGIES

B DYNAMIC INTEGRATION
BREAKBULK, FISHING, SHIP REPAIR + AUTO (RO-RO) TERMINALS

C PHASED CROSSFADE
INACTIVE/DEGRADED FINGER PIERS + LIQUID BULK TERMINALS

D REMOTE SPECTACLE
CONTAINER, REFRIGERATED CONTAINER + LIQUID BULK TERMINALS

PHILAPORT INTERVENTIONS

1 PHILADELPHIA COLUMBUS AVE SPLIT SECTION
ALONG COLUMBUS BUILDING UP FROM SOUTH ST TO OREGON AVE

2 PHILADELPHIA PORT VIEW KIOSK
AT STREET END NEAR DISTRIBUTION, WHOLESALE AND BREAKBULK

3 PHILADELPHIA PORT GATEWAY + PIER PARK
AT OREGON AVE STREET END, CONTAINER TERMINAL ENTRANCE

4 PHILADELPHIA STADIUM OVERFLOW
AT PATTISON AVE STREET END IN LOGISTICS + CONTAINER DISTRICT

5 PHILADELPHIA WATER MANAGEMENT PARK
ECOLOGICAL RESTORATION + CONTROLLED ACCESS RECREATION

6 PHILADELPHIA PORT-ONLY HIGHWAY RAMPS
DIRECT HIGHWAY ACCESS REDUCES TRUCK AIR QUALITY IMPACT

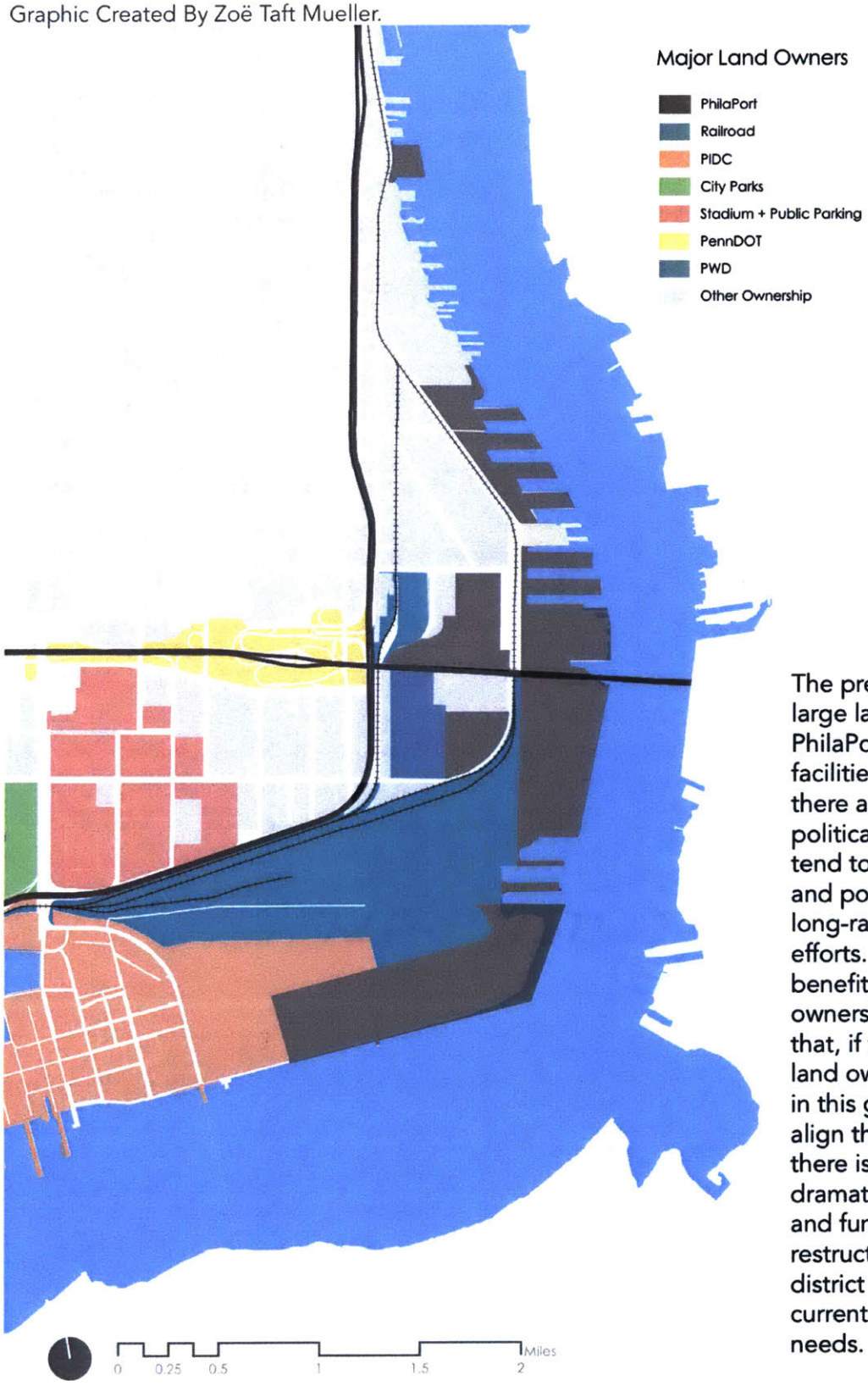
7 PHILADELPHIA PORT VIEW PARK
LANDSCAPE BUFFER AT WATERFRONT TERMINATION OF ROUSE BLVD

06. CONCLUSION

Generalization and Implications for 21st Century Working Waterfronts on the Atlantic Coast

LAND OWNERSHIP CONSIDERATIONS

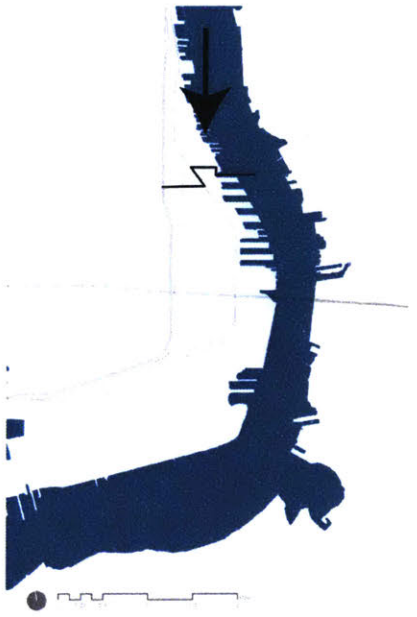
Graphic Created By Zoë Taft Mueller.



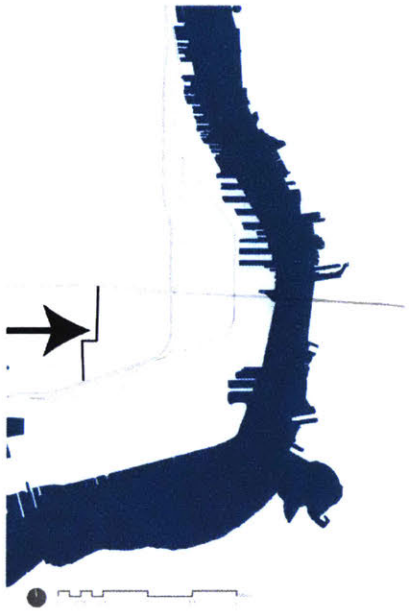
The presence of many large land owners near PhilaPort's southeast facilities means that there are diverse political motives that tend to result in conflict and poor alignment of long-range planning efforts. However, the benefit of this land ownership pattern is that, if the seven major land owners highlighted in this graphic can align their strategies, there is a potential for dramatic transformation and fundamental restructuring of the district to best serve current and future needs.

PORT DISTRICT PRESSURE MAPPING

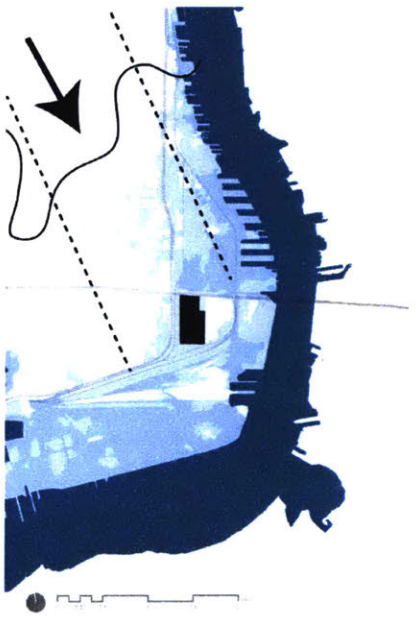
RESIDENTIAL GENTRIFICATION + DISPLACEMENT RISK



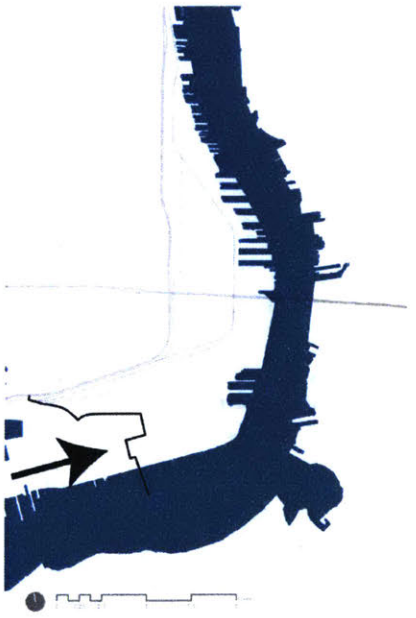
CENTRAL DELAWARE WALKABLE MIXED-USE VISION (DRWC)



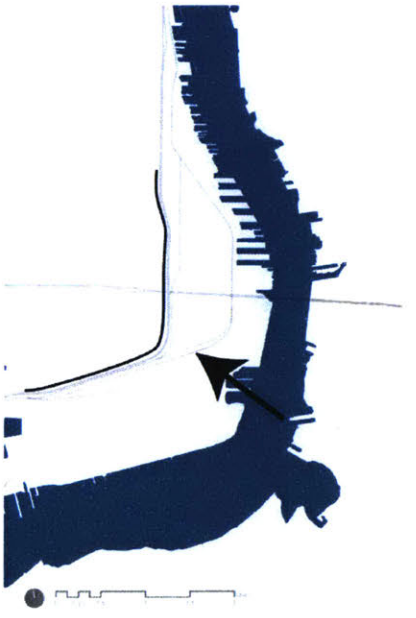
STADIUM DISTRICT LAND VALUE + CAR VOLUMES



DEVELOPMENT PRESSURE ON SOUTHEAST WATER TREATMENT PLANT



INWARDLY-FOCUSED CAMPUS-STYLE FLEX SPACE BUSINESS PARK VISION (PIDC)



PORT EXPANSION PLANS

CONCLUDING NOTES

This thesis began with an observation that Maritime industrial lands in American cities are contending with a dizzying array of pressures exerting contradicting forces that, in aggregate, mean that substantial investment and transformation of these spaces - in multiple directions - is beginning to unfold in many coastal cities. However, despite the massive scale and complex impacts of the ongoing transformations of our ports, port planning remains a topic that is relatively peripheral to the planning profession's internal literature and core practice areas. It seems that the profession has developed a sort of "don't ask don't tell" gentleman's agreement with the port authorities of our country that results in a mutual disregard and misunderstanding. Tracing the origins of and reasons for this disconnect between planning and port development in the US was beyond the scope of this project, but as the project went on it became a more conspicuous and persistent challenge blocking the more effective and collaborative problem solving needed to guide mutually beneficial transformation of port districts in the US.

My interaction with the major stakeholders involved in PhilaPort's transformation surprised me because where I expected to find frictions between the port and the neighboring residential districts, I instead found frictions between the port and other quasi-governmental agencies and corporate or institutional actors. In other words, for Philadelphia, the most pressing political challenges that urban design had a role in were not about residents, they were about competing political and economic motives within large organizations with a stake in the long-term development of the land near the port. Even more surprisingly, I found that the discussions I was having with staff at these organizations tended to gravitate towards advocacy for very specific physical planning outcomes more so than discussion of economic development policy. Upon reflection, it seemed that what I was witnessing was a desire to inscribe in the physical landscape a sort of division of institutional territories that would proactively avoid the need for more intimate coordination between institutional actors. The disconnects and diverging motives of these agencies and organizations were so powerful that they generally resented the need to coordinate with one another preferring instead to demarcate who had full rein in what area and where the line was where the power dynamic shifted to favor a different actor. In such a large area with so few residents, the urban landscape was becoming a political game board with a minimal presence of planners as mediators who could hole all these powerful actors accountable.

This absence of or disengagement of local planners remains a bit of a mystery to me, but my suspicion is that it starts from the political structuring of port authorities in the US. A basic scan of the port authorities of the US reveals that most are structured as quasi-governmental agencies with a stronger connection to the state and federal level than to the local municipal level. Especially in a city like Philadelphia where the city has struggled economically in recent years, the state's political capacity to bypass local political process and push forward initiatives that negatively impact the city may have conditioned the city to disengage from local planning in districts where the state has a strong political presence. Furthermore, the lack of residents within the port district may make it more difficult to justify the use of staff time on issues that are seen as more peripheral to or distant from daily life in the neighborhoods.

As I began to internalize the peculiar political structuring of the Philadelphia port landscape, my focus shifted to focus more explicitly on finding tactics that could bring these actors to the table by illustrating that it need not be a zero sum game where each organization drew a line in

the sand. This, oddly enough, elevated the role of urban design as a starting point for building a more collaborative approach to managing growth and change in districts that are dealing with this particular type of planning condition where residents are largely absent from the planning process and marginalized from decision-making. I see urban design in this context as a way of forcing organizational actors to reveal their motives in a setting that invites residents to engage and see their stake and agency in pushing for advancement beyond this political gridlock and in-fighting.

The particular attention of this thesis on the urban design process as a vehicle to engage institutional actors in meaningful negotiation is, of course, a byproduct of the particular conditions found in Philadelphia's southern port district and is by no means the universal political condition in which port-related urban design interventions are needed. For instance, in Oakland and Los Angeles there is a very intimate and unfiltered relationship between port uses and residential uses – this sort of adjacency creates a very different political condition and in some ways shifts the negotiation a bit more into the realm of policy and the traditional domain of urban planners.

That being said, chapters two and three of this thesis revealed that the conditions found in Philadelphia – where large agency interactions dominate the planning environment in industrial districts – is by no means an outlier. Chapters two and three revealed that while Atlantic Coast cities display integrated industrial urbanism, they display a wealth of isolation tactics and land use buffers at the district scale. The borders of industrial districts are often demarcated by various landscape and infrastructural barriers that tend to be owned and managed by large complex agencies at the regional, state or national level. Additionally, the land uses – such as government offices, schools, hospitals, stadiums and entertainment venues, social service agencies, punitive facilities – are themselves often large institutional actors. Zoning districts that exclude residential and commercial uses tend to unintentionally (or intentionally) create this kind of hyper-political institutional battleground. Hence, any tactic that has the capacity to break through the political gridlock this context cultivates has tremendous transformative potential.

This brings me to one of the most substantive insights that emerged from the development of this port-related urban design intervention toolkit. Each urban design intervention profiled in the precedent projects could be reframed to describe what types of urban tensions it best negotiates between and what types of political relationships would trigger and animate implementation of that intervention. More research would be required to solidify this reframing, but I believe it is the most productive direction to move with this work in order to make the tactics more translatable and relevant beyond the Philadelphia context. It is also apparent to me that at least one other in-depth case study of a port with a more intimate proximity to residential uses would be necessary to round out the development of intervention tactics that address urban tensions that did not show up in the Philadelphia analysis.

My interaction with Greg Iannarelli, PhilaPort's lawyer by training and planner by experience, has led me to believe that port authorities themselves are most likely to see the value in, and therefore proactively lead, the conversation on urban design interventions that negotiate tensions arising in the industrial public realm. Most other major actors in this space have a clearly defined role and operational space and do not have an incentive to work at a larger more coordinated scale to address tensions, frictions and weaknesses in the functioning of the districts of which they are a part. Ports, however, as mentioned at the outset of this thesis,

are impacted by the inefficiencies and political conflicts present in their urban context – those inefficiencies and conflicts affect their bottom line and their ability to effectively compete with their peers. I am therefore hopeful that insightful and proactive leaders at port authorities, like Greg, will begin to bring these tactics to their neighbors as offerings to loosen the gridlock and advance interventions that can ease tensions and achieve the goals set out in this thesis – improved environmental performance, clarified freight circulation and enhanced workforce accessibility. Because many leaders and industry professionals in planning roles at ports are, like Greg, trained in law or engineering or industrial operations, providing a clearly presented manual of integration tactics could equip these leaders with what they need to recruit their neighbors into collective action.

Based on this initial study, I would call attention to a few port-related urban design implementation triggers that seem relevant for the Philadelphia context and may be translatable more broadly. These triggers can be thought of as ways of thinking about who leads project implementation and what sort of political action is needed to animate and diversify the objective of a given urban design intervention

- **Highway Reconstruction Projects**
  Typically triggered by structural obsolescence, a need to expand or restore capacity, the presence of a new stormwater treatment policy and/or the desire to find revenue-generating uses for underperforming urban land. These projects are usually led by a state Department of Transportation and are guided by stormwater management guidelines inscribed in local policy and urban planning guidelines inscribed in the national "contextually sensitive highway design" initiative. These projects often address stormwater management and multi-modal circulation but do not engage in land use planning to complement or animate the physical intervention. Additionally, I have not yet seen a case where port-related warehousing use was considered as a viable and productive use of space under elevated highway infrastructure. As last-mile logistics continues to expand its influence and role in the economy, siting urban warehouses and distribution facilities to support this emerging economic sector is becoming a challenge. Finding low value, large parcels of land near highways and major arterial roads that are truck-ready is difficult. Under highway spaces could offer a solution to this challenge.

- **Combined Sewer Overflow (CSO) Reduction Projects**
  Typically led by or required by a local water management authority, these projects are designed to leverage interventions on private property to reduce the volume of stormwater entering the water treatment system. Programs like this have tended to struggle to productively engage industrial land users for a wide variety of reasons. A more targeted consideration of what kind of stormwater infrastructure is best suited to the operational demands, in-house capacity and budgetary constraints of industrial land uses could help unlock the stormwater management potential of these large low-lying areas with large parcelization. Additionally, bringing unsewered industrial areas into compliance with broader citywide CSO and water treatment standards will continue to be a struggle.

- **Coastal Flooding Resiliency Projects**
  Often tied to FEMA flood zones and federal-level funding streams, interventions to reduce the negative impacts of projected flooding have typically bypassed industrial areas but as coastal flooding increases I expect there will be an interest in leveraging large publicly owned coastal land to increase resiliency. If and when this issue comes to the forefront,

ports will be a focus of this work because their uncommonly large public land holdings at the coast make them one of the most politically feasible sites for large-scale coastal grey infrastructure to protect their cities from the worst flooding.

- **Environmental Impact Mitigation Projects from Port Investments**
  As ports continue to invest in scaling up and tailoring their facilities to match the rapidly evolving cargo demand they are seeing, those investments will likely continue to trigger the Environmental Impact Statement process and will likely continue to yield many small and a few large projects that are aimed specifically at flood mitigation and wetland preservation, air quality improvement, water quality improvement, habitat creation, and transportation congestion mitigation. These environmental impact mitigation projects have, in the past, been site-agnostic and have often resulted in investments that are physically distant from the port's facilities. I see a major role for urban design advocacy and innovation in this realm. By demonstrating that it is possible to conceive of and implement substantive environmental impact mitigation projects in the areas immediate surrounding ports, cities can proactively redirect these investments to have a more direct relationship to the environmental justice communities that are most negatively impacted by the presence of the port.

- **Dredging, Brownfield Remediation and Superfund Site Projects**
  As ports acquire new land and decommission land from active port use, some acquisitions and dispositions will likely trigger brownfield remediation projects. This can be seen as a sub-category or parallel project type to the Environmental Impact Project, but these projects are worth breaking out because they have a specific and intimate relationship to landscape architecture, earthwork, water management and public access constraints. Brownfield remediation sites can be re-conceived as stormwater management priority sites that are part of a system that supports high-intensity active industrial uses in nearby flood-prone sites.

- **Industrial Job Retention and Growth Programs**
  As cities contend with rising land values, urban real estate speculation, gentrification and displacement of working and middle class households there has been a renewed focus on the value of an industrial job base as a means of slowing market-based displacement and increasing the share of living-wage jobs that can sustain a family. These programs typically focus on workforce training, land use policy and financial incentives to retain industrial businesses however, they certainly could expand their scope to include a focus on expanding and improving public transit, bike and pedestrian access to these centers of industrial employment. Likewise, increasing public awareness of, exposure to and experience with industrial jobs can be seen as a long-range workforce development initiative to get individuals interested and motivated to get the training required to achieve industrial employment. Finally, these policy efforts have an embedded potential to form a more holistic approach to the relationship of residential development and industrial development. By approaching the challenge of industrial planning through the lens of workforce accessibility and worker quality of life, it becomes clear that residential displacement and industrial streetscapes are related, that social networks span home and work and are grounded in both, that expanding the port means repairing damaged relationships with former workers and connecting the port to new communities of workers that may have settled in more diverse locations within the metropolitan area.

- **Public Health Initiatives**
  As our healthcare system shifts to consider the role of healthcare beyond the hospital walls and as advocacy groups gain a more complete understanding of the role of air quality, water pollution, bike and pedestrian activity levels, and underemployment stress in expensive and harmful chronic illnesses, there is a potential for public health investments to specifically target investment in projects that improve air and water quality and increase bike and pedestrian activity in environmental justice communities.

In summary, there are a diverse array of social and political conditions that can trigger the types of urban design negotiation projects I've profiled in this thesis. Each "trigger" carries with it an embedded bias or objective that prioritizes some aspects of the investment over other aspects. In most cases, to achieve the full range of positive impacts, multiple actors and funding streams will need to be engaged in a collaborative process. However, even without ideal collaboration and partnership, each of these triggers has the potential to make a partial contribution towards a more multi-dimensional system of interventions that collectively improve environmental performance, clarify freight circulation and enhance workforce accessibility.

07. APPENDIX

SOURCES OF DATA + INSIGHT

DATA USED FOR CHAPTERS 1, 2 AND 4 MAPPING

- 2016 TIGER National Rail
- 2016 TIGER National Primary Roads
- 2010 Regional Plan Association Mega Regions
- 2015 US DOT Port Total Tonnage, MARAD
- Bureau of Transportation Statistics Navigable Waterways
- 2016 US Census State Boundaries
- 2010 Census Major Urban Areas, Bureau of Land Management.
  2010 census year update of the following: U.S. Census Urbanized Areas represents the Census 2000 Urbanized Areas (UA) and Urban Clusters (UC). A UA consists of contiguous, densely settled census block groups (BGs) and census blocks that meet minimum population density requirements (1000ppsm /500ppsm), along with adjacent densely settled census blocks that together encompass a population of at least 50,000 people. A UC consists of contiguous, densely settled census BGs and census blocks that meet minimum population density requirements, along with adjacent densely settled census blocks that together encompass a population of at least 2,500 people, but fewer than 50,000 people. The dataset covers the 50 States plus the District of Columbia within United States.
- DVRPC Employment Forecast 2010-2040
- Philly Open Data:
  2ft and 10ft Contours
  FEMA Flood 100yr, 500yr
  Historic Waterways
  2016 Land Use
  2017 Tax Assessed Value

IMAGES AND PLANS CONSULTED

Philadelphia Free Library Archival Photos
2010 Industrial Land Market Strategy, PIDC
2011 Central Delaware Master Plan, DRWC
2013 Navy Yard Master Plan, PIDC

TEXTURE OF THE PLACE

To animate the proposals and insights shared throughout the thesis, I want to offer some images that convey the texture and quality of the spaces that exist currently at PhilaPort. Additionally, I want to offer some images documenting both the unrealized potential of some relationships and sitelines as well as some projects and urban relationships in Philadelphia that can serve as starting points for design interventions near PhilaPort.

GLIMPSES OF PHILAPORT

SOUTHERN TERMINALS

Photos Taken By Zoë Taft Mueller.








GLIMPSES OF PHILAPORT

EXISTING TIOGA TERMINAL PUBLIC ACCESS IMPROVEMENTS

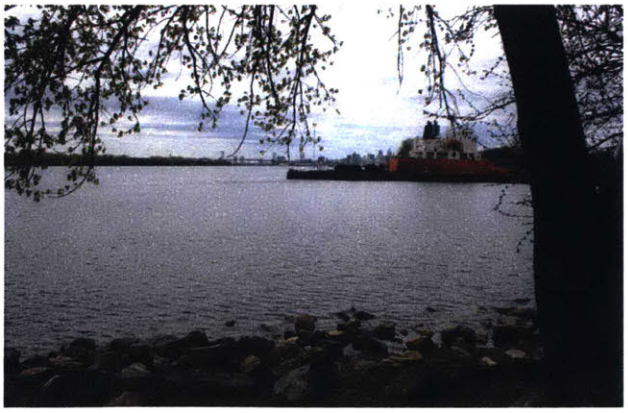
Photos Taken By Zoë Taft Mueller.


TIOGA

GLIMPSES OF PHILAPORT

EXISTING TIOGA TERMINAL GENERAL PULASKI PARK

Photos Taken By Zoë Taft Mueller.



GLIMPSES OF PHILAPORT

NAVY YARD APPROACH TO SOUTHPORT AUTO TERMINAL

This area was attractive to a small group of weekend fish-seekers who appreciated the calm and seclusion of the space as it is now.

Photos Taken By Zoë Taft Mueller.

OTHER LOCAL INDUSTRIAL + INFRASTRCTURAL EDGES

FDR PARK SKATEPARK UNDER I-95

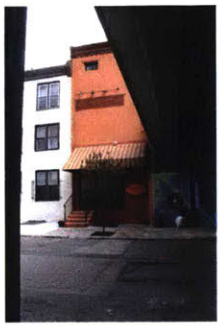
FDR Park nearby the port was bustling on an April weekend with family barbeques, solo fishing enthusiasts, baseball teams and skaters dominating the scene.

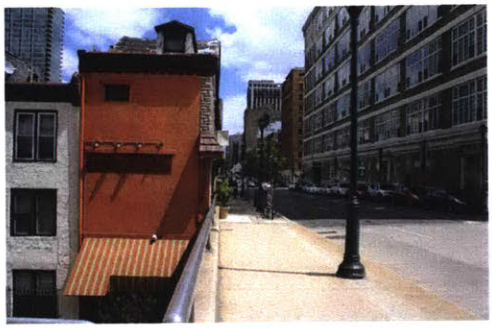
Photos Taken By Zoë Taft Mueller.

OTHER LOCAL INDUSTRIAL + INFRASTRCTURAL EDGES

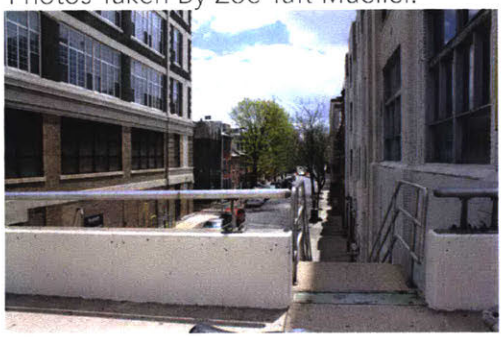
SCHUYLKILL BRIDGE APPROACHES FROM CENTER CITY

These bridge approaches create a double ground plane where both are active and safe.





Photos Taken By Zoë Taft Mueller.





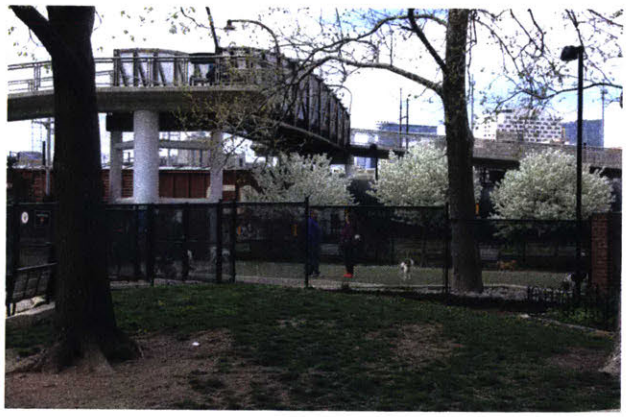


OTHER LOCAL INDUSTRIAL + INFRASTRCTURAL EDGES

SCHUYLKILL BANKS TRAIL DOG PARK + BRIDGE

People gathered on the bridge over the train tracks to watch dogs play below as a freight train went by beneath. A community garden also hugs the tracks.

Photos Taken By Zoë Taft Mueller.



OTHER LOCAL INDUSTRIAL + INFRASTRCTURAL EDGES

SCHUYLKILL BANKS GRAYS FERRY SEGMENT

This segment of the schuylkill banks trail has a clearly marked and branded gateway and uses a landscaped berm to buffer trail visitors from the FedEx distribution center behind the trail.

Photos Taken By Zoë Taft Mueller.

OTHER LOCAL INDUSTRIAL + INFRASTRCTURAL EDGES

UNIVERSITY OF PENNSYLVANIA SCHUYLKILL WEST BANK ATHLETIC COMPLEX

The Penn Athletic complex offers a wealth of examples of how to effectively negotiate multiple ground planes in an engaging and comfortable way.

Photos Taken By Zoë Taft Mueller.