

Between Land and Water

A non-degree-required thesis submitted to the
Master of Architecture Program
Department of Architecture

by

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Abstract

Coal power plants have been a significant part of the U.S. energy landscape since the late 19th century, but many have closed due to environmental concerns and the rise of cleaner energy sources. This thesis proposes the revitalization of a defunct coal power plant and a reclamation of the surrounding brownfield site as a hub for clean-food production to benefit the health of Alexandria City residents.

Located between historic Old Town and Reagan National Airport with a view across the Potomac to D.C. 's water-treatment plant, this unique 20-acre site offers a demonstrative prototype for the many post-coal facilities found throughout the U.S. This thesis addresses issues such as mal-nourishment, need for clean drinking water, and cognitive burnout through basic principles of health: growth, mindfulness, and connection.

Subtractive and additive moves will be made to the site, enhancing public accessibility and fostering contemplation on the historical urban relationships between land and water. By integrating diverse food production spaces, including urban farms, hydroponic systems, and community kitchens, current and future residents will gain a stronger connection to the land, water, and labor required to feed body and soul.

This revitalization will transform the once industrial area into a vibrant cultural and educational hub on the northern edge of the Old Town neighborhood, balancing between increased urbanization along the Potomac River and efforts to protect its ecosystem. This project aims to create a sustainable and inclusive site that promotes community engagement and environmental stewardship.

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Introduction

The intention behind this thesis was to explore how a conceptual understanding of site can lead to a new way of considering adaptive reuse of industrial buildings. My attempts at introducing the site as part of a broader informational and ecological network were explored through research of coal-infrastructure in the Eastern United States. The use of mapping as an exercise to pursue this narrative helped illustrate how the Potomac River, which borders my site in Alexandria, Virginia, is a connective artery for multiple territories, processes, and situations of time.

Does architecture play a role in the history and future of energy infrastructure?

As a continuation of my interests from an Undergraduate thesis titled *The Plant: Adaptive Reuse of Defunct Urban Industrial Sites* (shown right), questions arose about how to approach the situation of post-industrial sites and their toxic remains of water, land, and air. What use is there to maintain a site of toxification for previous generations of city residents? My undergraduate research dove into the historical relationship between critical-infrastructure-industries, such as electricity-generating power-plants, cities, residents, and ultimately rivers as places of necessity even after the “primary” use has passed.

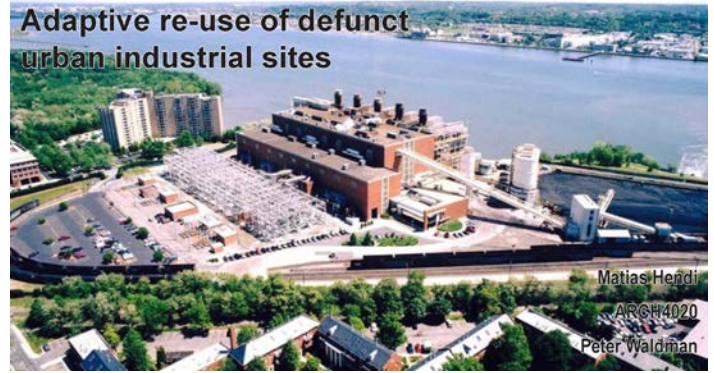
So then, how to transform a site that is



Presentation of 'Between Land and Water'. May 6th, 2025.
Elmaleh Gallery, Campbell Hall, UVA School of Architecture

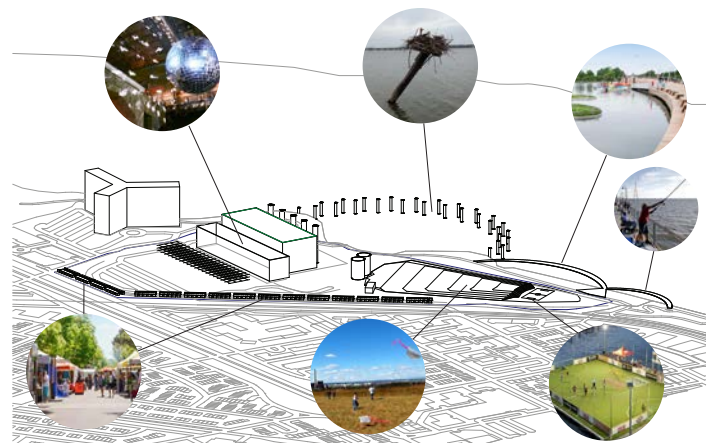
The Plant:

Adaptive re-use of defunct
urban industrial sites



both tangible in its toxic physical remains,
yet theoretical as a marker of a temporal
condition that is responsive to historical and
future relationships between industry, city,
and ecology?

The design-research I led and later
applied to the site was an exploration of
concepts as a way to re-think “existing-
conditions” not just as a snapshot in time,
but as a transformative-situation that implies
a much broader consideration of time and
space. The result was a very diagrammatic
series of schemes scattered throughout the
site representing design-intentions to re-
introduce the site back to the city as a place
of new connections to the Potomac River,
energy infrastructure, and community health.



Undergraduate thesis, by author.

UVA B.ARCH requirement. Advised by Peter Waldman

Water

Named after the Native American tribe of Patowomeck, the Potomac River is the reason Alexandria City exists today. In 1608, Captain John Smith visited the Patowomeck tribe, who were friendly to the English Colonists and supplied the Jamestown settlement with corn and other food when they were struggling to feed themselves. After six tumultuous decades of relations between the English and the Patowomeck, a tribe with nearly four centuries of habitation along the great river was virtually erased from history, although their name lives on. In 322 BC, Alexander the Great founded Alexandria in Egypt's Nile River Delta, an influential center for scholarship, politics, and maritime trade. 2,347 years later and a brother city, named not after a king, but a Scottish merchant who purchased the land for 6,000 pounds of tobacco called John Alexander, was founded. In its mere 275 years of existence (f. 1749) Alexandria's history has flowed continuously alongside that of her own great river, playing part in the founding of a nation, the capital of Washington D.C.

As a source of water, food and transportation, a river's importance to human settlement is second only to the land a city sits on. In many ways land and river are not two distinct conditions, but a constant mixing of nutrients and sediments that result in fertile habitat for many creatures. The various natural cycles of global ice-age and melting, flood and drought, harvest



Concept model by author exploring reciprocity in land transformation induced by humans. This model was a guiding exploration of 'double', or recurring dualities, found in human settlement and was on the desk of the author throughout his thesis development.

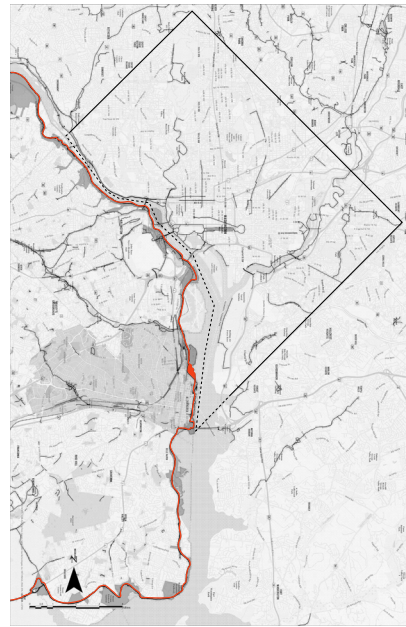
and hunger, have been and will continue to be defining situations of human life. When framed as relations of double, or doubleness, such cycles are explained not through separation, but of interconnectedness. There is no freeze without thaw, no rain without sunshine, nor a drive to cultivate without the burden of hunger. Natural cycles of doubleness have penetrated anthropocentric, that of human-driven development, cycles where in all actions we notice a Newtonian equal-and-opposite reaction. In WG Clark's essay Replacement he argues for an architecture that atones for the loss of natural land, where in losing some external part of us, designers must constantly search for the intensification of what remains. One can ponder over the humble brick seen in many buildings throughout the world. In the act of subtracting clay from the surface of the Earth, there is an additive process of brick-laying. The clay simply transforms; it plays a critical role in both conditions and ceases to be 'natural' when a human acts upon it. The inevitable balance of 'doubleness' plays out across scales of time and space, whether in collection and distribution, excavation and construction, or in life and in death.



Sculpture by author exploring conditions of polarity, found here in the junction between straight and curved lines.

Land

3,000 years ago the Chesapeake Bay was formed as a large tidal estuary at the end of the Susquehanna River valley. As a tributary to this bay, billions of gallons of freshwater flows down the Potomac River, which has a watershed of approximately 15,000 square miles (larger than Belgium) and traverses the Coastal Plain up to the Appalachian Plateau. The situation between land and water in the American Mid-East is similar to many other regions. Agriculture and pastures that were predominate a century ago have slowly and continuously been replaced by growing urban and suburban communities. Anchored by forest that is largely second- or third-growth, meaning old-growth trees have largely been harvested for timber by now, is crucial to maintaining aquatic and terrestrial ecosystems, preventing run-off and simultaneously recharging groundwater, while providing habitat and aiding the nutrient and water cycles. Land faces many threats as human settlements continue to densify and expand outwards. Deforestation is met with land-management practices that save some semblance of “untouched” for future generations. Toxification by industrial processes and/or dumping is solved by zoning boundaries, which place the toxic activities far-enough away (hopefully) from current settlements so that poisonous substances have time to gradually be contained by the Earth in artificial mounds or ponds. Eventually, as toxic industries become defunct and are encroached upon by settlements, when zoning has foregone



Map series meant to illustrate location of site in relation to Washington, D.C., the adjacency to the river, and an existing trail-network that bypasses the site. The bottom map suggests new circulation within and through the site.

safety for economy, toxicity is dealt with by sweeping it further away or pushing it farther down into the Earth as erasure is easier than dealing with the question of responsible toxic-waste management. Another challenge, which nonetheless creates equal opportunity, is the high-value placed on land in both economic and political terms. Land is a thing which can be traded, modeled, and idealized. It becomes an entity that takes on characteristics that are between humanistic and topographical (the sacred and profane): fertility, serenity, locality, longevity. These traits entertain a more meaningful, individual relationship to land that calls back to a transcendentalist, or homo religiosus, connection to Mother Earth as an undercurrent to development concepts central to capitalism. So the situation is one of toxicity and of spiritual connection, where the former involves decisions for the societal 'many' balancing the latter's demands of the individual 'few'. Fortunately, what is contained within land; flora and fauna, minerals, its history and a view of the sky offers immense serendipitous conditions to resolve both the situations at present and those of the future.



Photos taken by author of the current situation as an abandoned site awaiting remediation and renovation.

Air

Let's dispense with the coincidences first, as they are not what make the site what it is, but what it was. This site lies directly South of the White House, the United States seat of the executive branch, and directly West of the D.C. Municipal Water Treatment Plant, one of the largest public water suppliers in the country.

"The late 18th- and early 19th-century history of the area represents a period of transition from an agricultural area dominated by large plantations to a region characterized by smaller farms that supported the growing town of Alexandria."

Its location is matched by the coincidence of time; when the Coal Power Plant was built-out in the 1940s, it replaced other smaller industrial scenes such as chlorophyll production used in soaps and cosmetics, or fertilizer mixing, through the 1920s and 30s. The transformation of the site into a 500,000 kilowatt coal-power plant meant the introduction of three key remaining situations that remain on the site. An area containing a transformer, housed outside, where high-voltage electricity is downgraded to an end-user-friendly voltage. A coal-yard, where coal was piled up after a long train journey from Appalachian coal-mines, awaiting its turn to be sorted, pulverized, and fed into one of five furnaces. These five furnaces and accompanying electricity-generating equipment were housed in a 100,000 square foot brick and steel-structure building, divided into three primary sections of a turbine hall (approx. 400ft.x80ft.), the plant (approx. 350ft.x100ft.) and a steel exoskeleton that suspended the coal hoppers



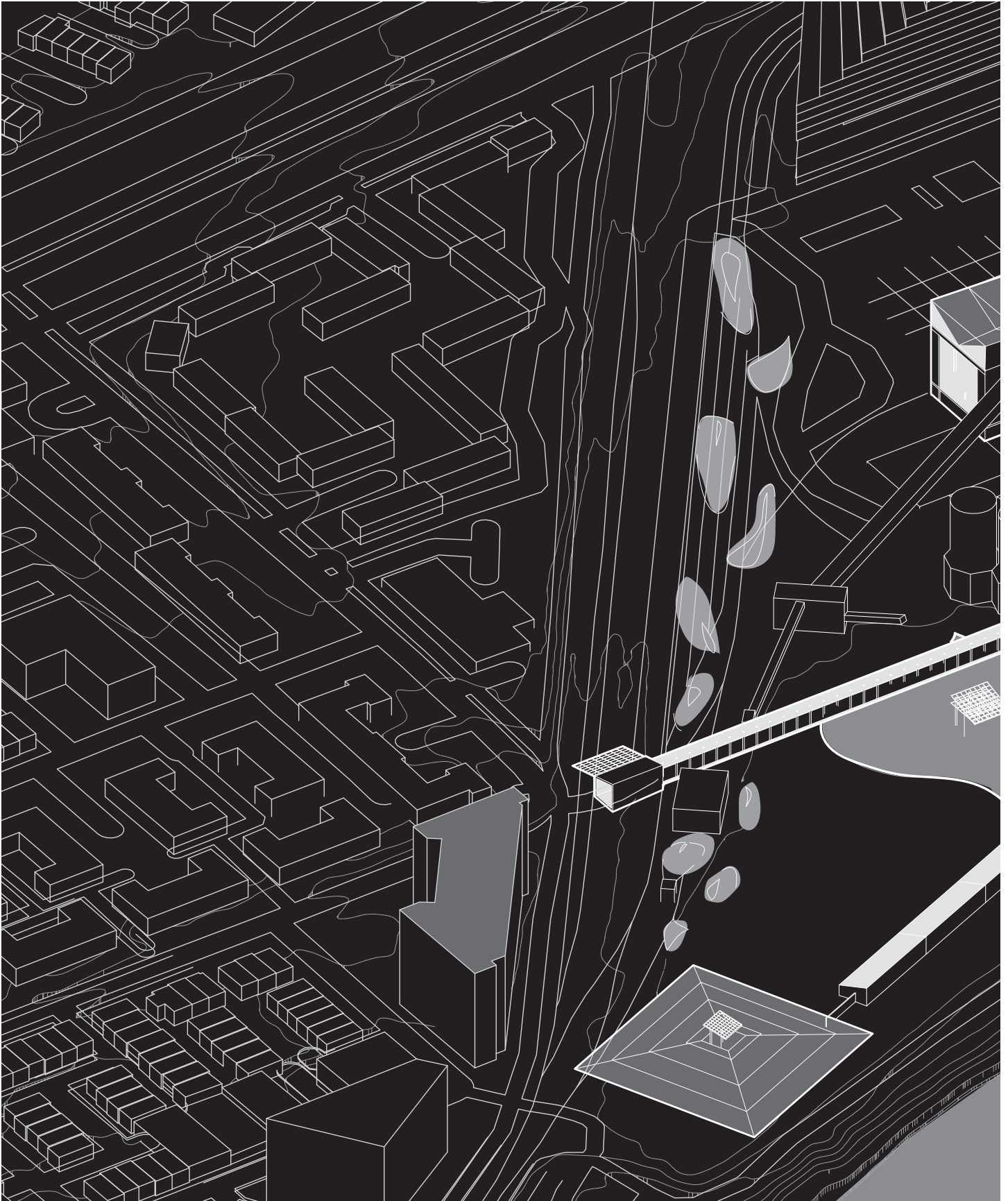
above the ground to be gravity-fed into the furnaces. There were also various secondary and tertiary structures critical to the functioning of the plant placed throughout the site, such as the water-pump station, ash collection towers, a gate-house, and coal-conveyor belts. It is not a coincidence that we find these situations on the site today. This was the result of many decades of growing reliance on coal, a carbon-laden mineral dug-out from mines deep below the surface of the Earth, as the fuel to keep houses warm, power locomotives, and produce steam used to generate electricity. For the roughly half-century this plant was functioning, the functions these spaces housed were critical to the security of the national capital's energy-security infrastructure, though were also releasing toxic pollutants into the air, ground, and water that lead to the deaths of local Alexandria neighbors to the site in North Old Town. The adjacency to busy Ronald Reagan National Airport less than a mile north of the site necessitated shorter smokestacks, which prevented those harmful toxins from being released higher into the air allowing them to disperse more effectively.

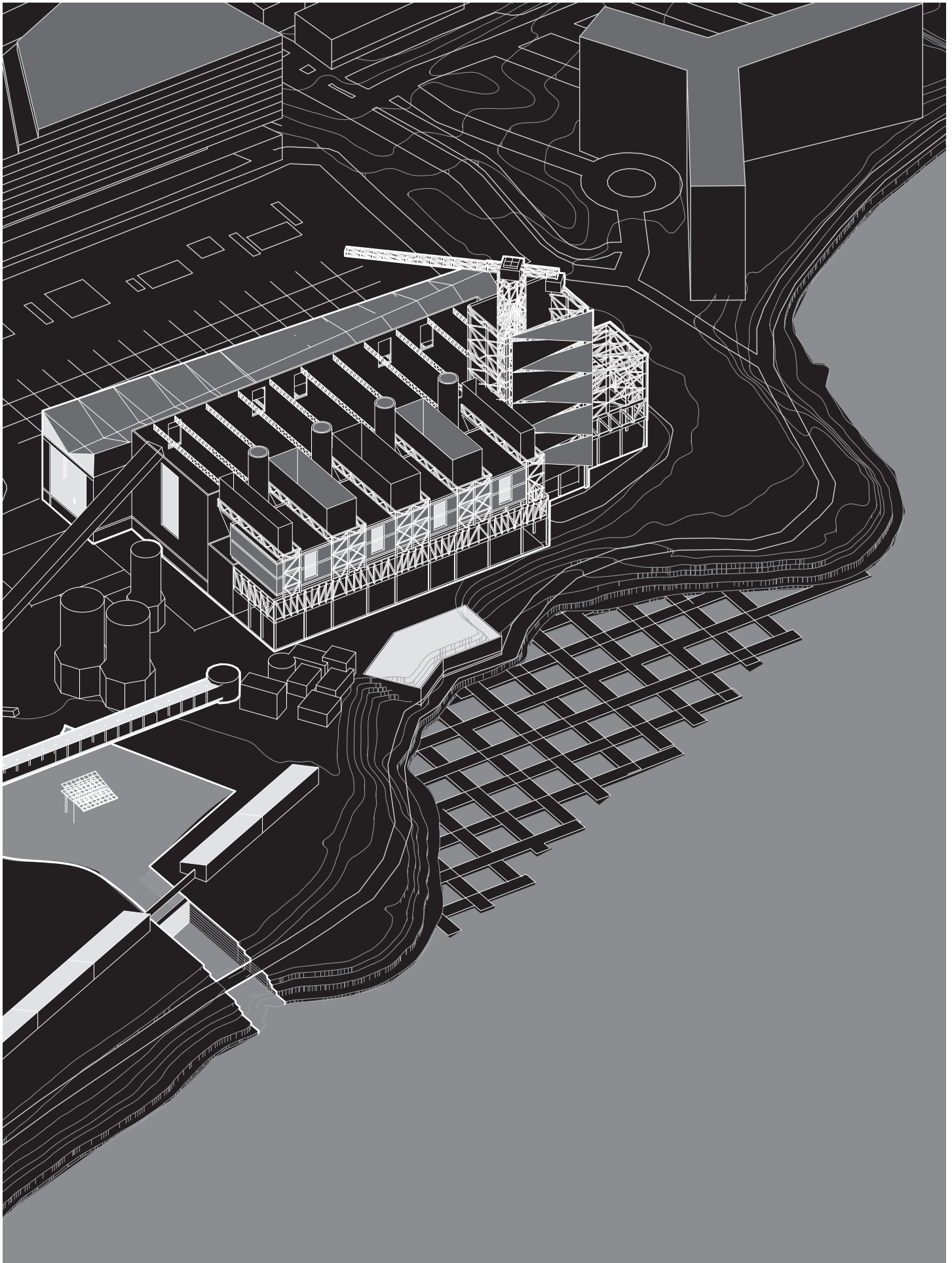
(Below and Left) Aerial image annotated by author showing Alexandria City waterfront. Location of site is towards the center of the mapping, between Ronald Reagan National Airport on the right and the Woodrow Wilson bridge on the left

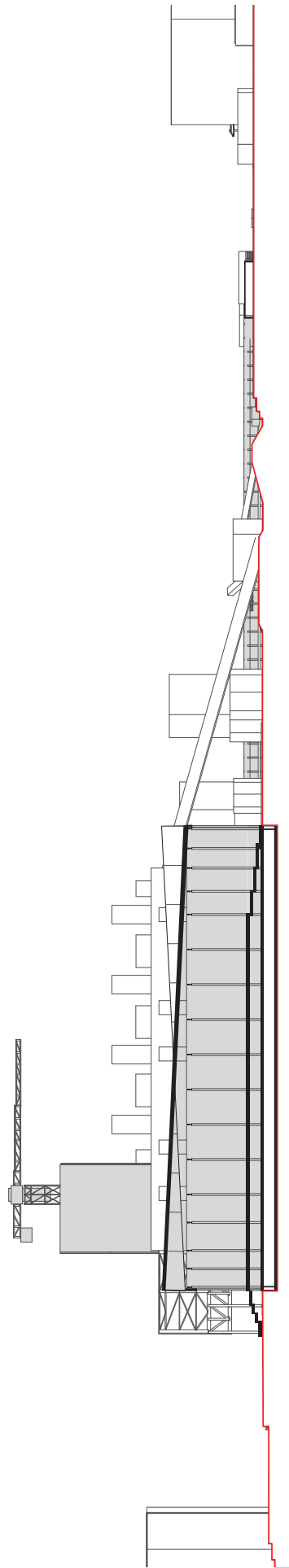
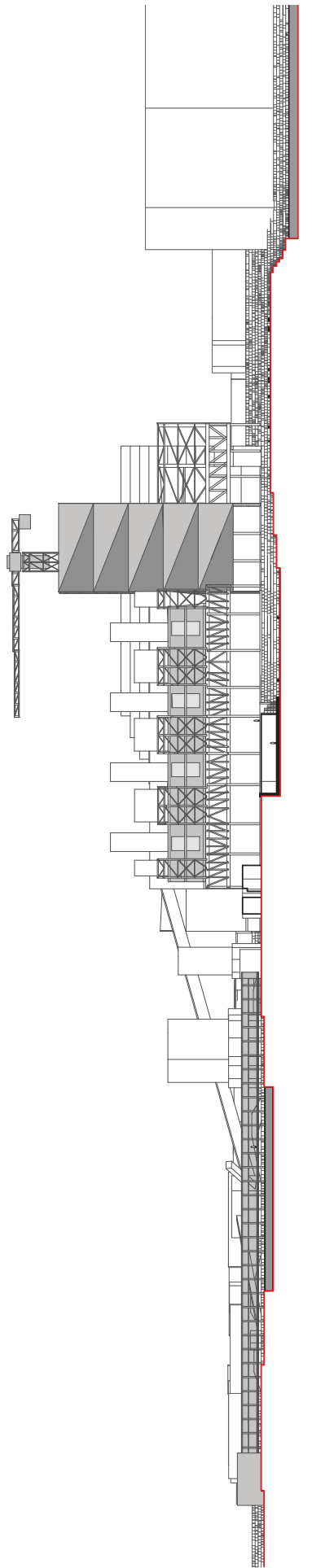


Design Response

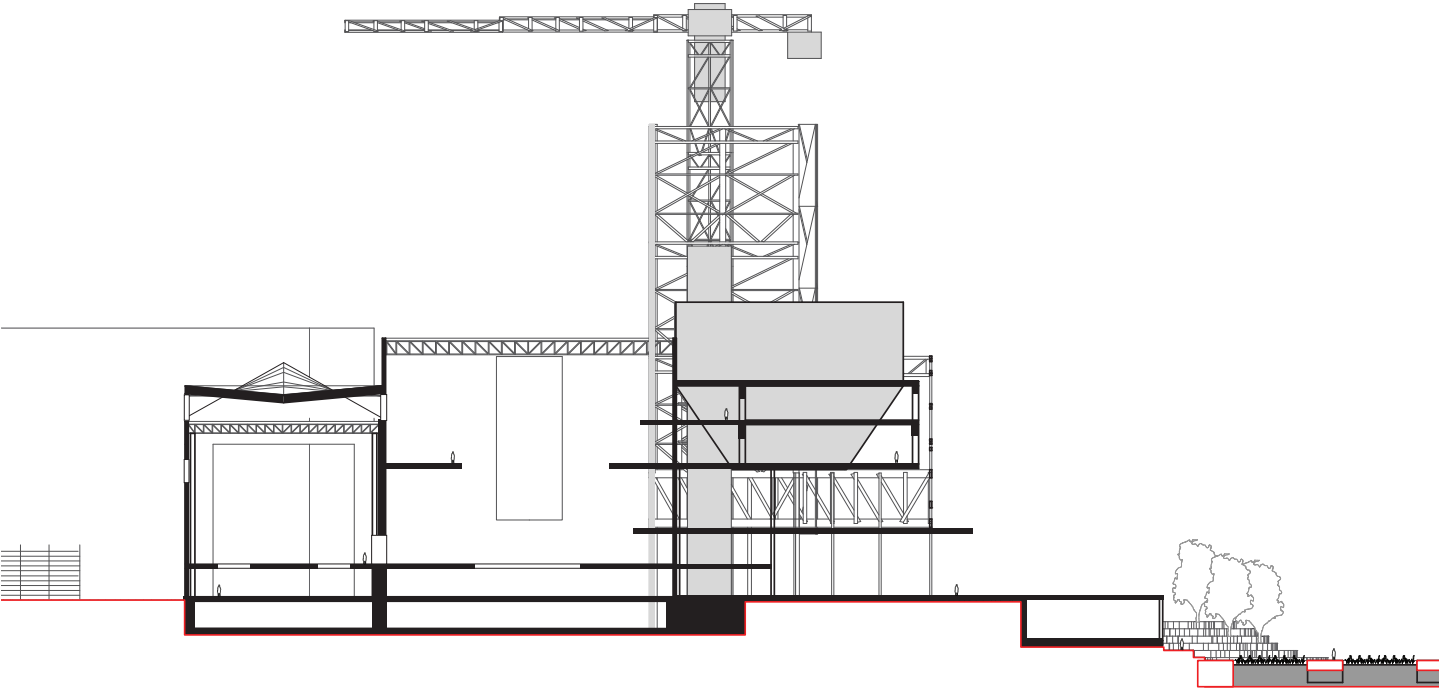
Axonometric drawing of site.











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