# 06.

**IN THIS CHAPTER:**

+ PHASING PLAN
+ CONSTRUCTION METHODS
+ COST ESTIMATES
+ POTENTIAL FUNDING SOURCES
+ IMPLEMENTATION & DESIGN CONSIDERATIONS

# How We Build It



The CHEERS plan is a bold vision for the eastern lakefront, inspired by the vibrant and engaged communities that surround the lake and the transformative potential these spaces hold. Implementation will require continued coordination, new partnerships, a creative phasing plan, and a diverse mix of public and private funds.

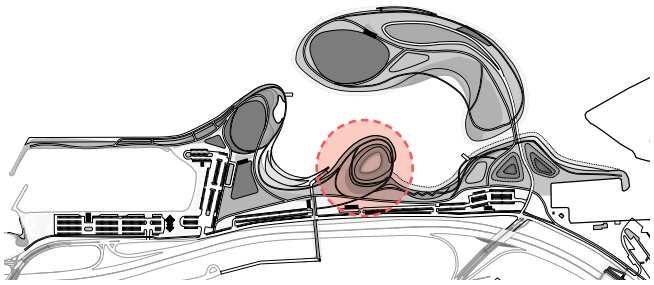
# Phasing Approach

Due to the scope and anticipated costs of creating 150 acres of park and habitat amenities, 80 acres of which will be new land, a phased approach will be crucial to a successful implementation. CHEERS was developed for the current communities and residents that reside on the east side of Cleveland. A key goal of the phasing approach will be to not displace any existing program element without first replacing it elsewhere. The approach will also work to mitigate any negative impacts to enjoying the lakefront during construction phases. The project elements are grouped in two phases – the Isle and the Lakeshore improvements.

There are several advantages to constructing the Isle as the first phase of the project. The primary one is that the Isle would provide protection from open-lake wave energy for several of the other project elements, enabling improvements in other areas to be constructed in a more efficient manner with less shore protection. This would allow naturalized or softened portions of the shore to be created in protected areas. The Isle also provides the maximum benefit in terms of dredge material capacity and would provide protection to the existing shore while funding is secured for future phases and park improvements.

However, constructing the Isle as the first phase of the project presents obstacles in relation to funding and development schedules. The Isle would also have a longer development schedule for design, permitting, construction, and filling with dredge material given its location in deeper lake water and need for larger protection measures. If full funding is not available for the construction of the Isle, starting with a combination of the outer breakwall structure of the Isle (Phase B1) and the lakeshore improvements (Phase A2) addresses immediate infrastructure protection needs, creates quality habitat, and is the most efficient construction sequence for achieving future full build out of the plan. Rather than construct hardened edges along the shoreline that will eventually be protected by the land mass of the Isle, a hybrid approach invests in the overall protective structure of the Isle, which will dissipate energy and wave action to protect the habitat created as part of the Shoreline. Phase A2 Lakeshore improvement offers a combination of infrastructure protection, particularly of I-90, and the ecological features essential to a vibrant living shoreline.


PHASE B: THE ISLE
36 ACRES
VIEWING PAVILION
PICNIC GROVE
LAWN
MULTI-USE TRAIL
NATURE PLAY
OVERLOOK
NATURE TRAIL
THE EASTERN FISHING COVE
THE ISLE
BOARDWALK TRAIL
THE COVE
THE GORDON HILLS
CLEVELAND LAKEFRONT NATURE PRESERVE
THE SHORE
THE LAUNCH
NATURE PLAY
THE HABITAT LOOP
MARSH WALK
THE LAKESHORE
INTERCITY YACHT CLUB
DOAN HABITAT SHORE
LAKESHORE BOULEVARD
I-90
E. 72ND GATEWAY
NORTH GORDON PARK
PICNIC GROVE
NEW PEDESTRIAN BRIDGE & GATEWAY
PHASE A: THE LAKESHORE
64 ACRES (43 acres new land)
E. 72ND GREENWAY
SOUTH GORDON PARK
ENHANCED PEDESTRIAN BRIDGE
E. 72N
MLK JR. DRIVE



## Phase A1 – The Habitat Loop

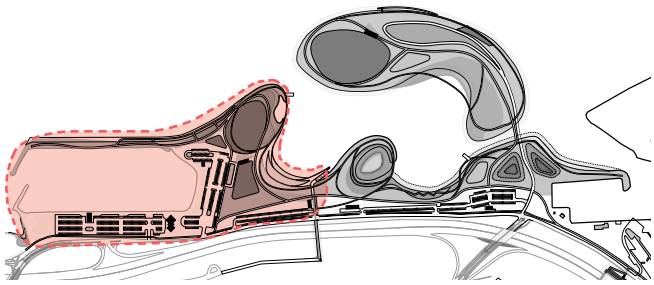
***366,400 cubic yards of dredge material storage***

Phase A1 involves the construction of new coastal wetland habitat through the beneficial use of dredge material. It would require the partial removal of the existing stone breakwaters from the former First Energy power plant and the construction of a new perimeter breakwater to protect the constructed wetland habitat. It is expected that much of the stone generated by removing the former power plant breakwaters could be recycled for the construction of the new perimeter breakwaters.

Constructing the Habitat Loop as a Phase A1 pilot project has several advantages and meets several of the overall goals of the CHEERS project: the beneficial use of dredge material, improved coastal habitat, increased waterfront amenities for communities in the project area, and protection of critical upland infrastructure (such as I-90).

A more detailed metocean analysis was performed once a final concept, the Habitat Loop area, was selected as a Phase A1 pilot project for advancement to the preliminary technical design stage. The detailed metocean analysis focused on the development of conditions, including water levels, waves and ice forces to be considered in the design of a perimeter breakwater to protect the Habitat Loop. The study assumed that the Habitat Loop would be constructed prior to other improvements, such as the Isle, that would provide wave attenuation lakeward of the structure.

A design wave height of 15.7 feet with a period of 8.7 seconds for a 50-year return period at the location of the Phase A1 perimeter breakwater was calculated. In this case, fetch-limited waves control design for this location (based on the assumption that no other improvements are constructed lakeward of the perimeter breakwater). Based on the design water levels and wave heights, up to 18-ton stone will be needed for the construction of the perimeter breakwater. This is consistent with the 12 to 24-ton stone required for the construction of the Cleveland Lakefront Nature Preserve in similar water depths and wave conditions.



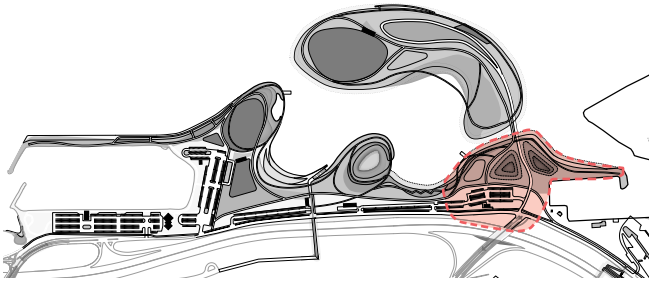
## Phase A2 – East 55th Street Area

***715,000 cubic yards of dredge material storage***

Phase A2 – the Eastern Fishing Cove, the Shore, and the Launch – will extend the Shoreline improvement project to the area lakeward of East 55th Street Marina. Construction of Phase A2 would also involve construction of a stone breakwater for shore protection prior to filling with dredge material. The breakwater would extend along the north end of East 55th Street Marina, lakeward toward the Isle, and back to connect to the Phase A1 Habitat Loop.

The concept includes a small embayment between the Eastern Fishing Cove and the Habitat Loop. This area, call the Shore, is intended to allow for a natural shore feature similar to a beach. Constructing a natural shore in this area is complicated by the water depths and wave energy, if constructed prior to the Isle. Constructing a submerged sill structure to support the fill along the shore may allow this area to be developed with a more natural shoreline prior to construction of the Isle. Constructing the fill area at the east end of East 55th Street Marina and the Habitat Loop will also provide headlands to help prevent loss of fill from this area.

A secondary benefit to constructing the Phase A2 improvements is the ability to alleviate loading on the existing shore structures adjacent to East 55th Street Marina. The existing steel sheet pile cells surrounding the marina basin were constructed in the 1950s and are reaching the end of the expected service life for sheet piling in the Great Lakes. Extending the shore to the north lakeward of the existing sheet piling provides an opportunity for beneficial use of dredge material and wave dissipation in the Harbor, as compared to replacing or rehabilitating the structures, at a similar cost.

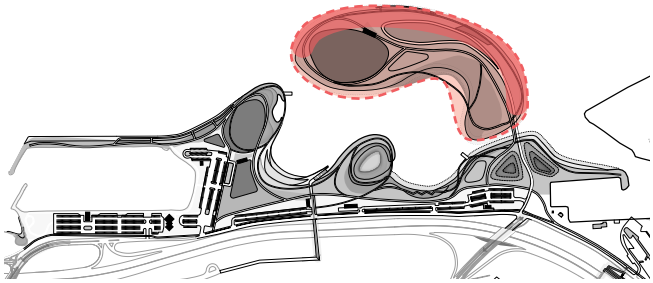


## Phase A3 – The Gordon Hills

***208,750 cubic yards of dredge material storage***

Phase A3 would extend the Shoreline improvement project to the area north of Gordon Park and the Intercity Yacht Club. The construction process for the Gordon Park area will be similar to Phases A1 and A2, with the construction of a perimeter breakwater prior to the placement of dredge material. The east end of proposed improvements will extend east of the Isle and will be exposed to open-lake wave energy, whether constructed before or after the Isle.

Constructing Phase A3, or a portion of Phase A3, prior to constructing the Isle may allow for more flexibility in construction methods for the Isle. Constructing a temporary causeway could allow the perimeter of the Isle to be reached with land-based equipment in addition to marine equipment.



## Phase B – The Isle

***1,884,250 cubic yards of dredge material.***

Phase B includes the construction of a new nearshore Isle. The lakeward facing edges of the Isle will require significant shore protection due to exposure to open-lake wave energy. Waves in the Cove on the landside of the Isle will be limited by the fetch distance for wave generation between the shore and the Cove. Most of the landside of the Isle can be constructed with limited protection, although a stone breakwater may still be required to contain dredge material until it is consolidated.

Due to the size of the Isle, the deep water along the lakeward edge, and the exposure to open-lake wave energy, construction of the Isle will be the most expensive phase of the project. However, the Isle also provides the largest benefits in terms of dredge material capacity, wave energy dissipation and infrastructure protection. The presence of the Isle will also allow softer, more naturalized shores along the Shoreline improvement areas. This would result in significant cost savings for constructing Phases A1-A3.

## Phase B1 – Outer Breakwall

Constructing just the outer breakwall of the Isle (B1) as one of the first phases of the project creates an efficient construction sequence for achieving future full build out of the plan. Rather than construct hardened edges along the shoreline that will eventually be protected by the land mass of the Isle, a hybrid approach invests in the overall protective structure of the Isle, which will dissipate energy and wave action to protect the habitat created as part of the Shoreline.

# Construction Methods

Construction methods will be similar for the perimeter structures and dredge material placement in each area. The construction will require placement of bedding stone to surcharge the lakebed and prevent settlement of the final structures. Once the lakebed has been compacted additional stone can be placed and shaped to construct the core of the perimeter breakwaters. Additional layers of stone, increasing in size, are placed over the core to create the breakwater cross section. The largest armor stone would be placed along the lakeward face of the structure. The cross section may also require the placement of small stone and gravel on the inside of the breakwater to prevent migration of dredge material through the breakwater. Once the breakwater is constructed, dredge material can be placed as fill. The fill can be generated from current dredge operations or material may be relocated to generate capacity at other disposal sites around the Harbor.

## Dredging and Materials Transport and Placement

A variety of technologies exist for excavating and placing dredged material for beneficial use applications (USACE 2015). For open water placement of dredged material, a floating or submerged discharge pipeline may be used. Additional sections of pipe can be added for upland or shore zone placement. Dredged material can also be placed in hopper barges for subsequent placement in open water or near shore areas that are remote from the dredging area. For open water placement (i.e., creation of subaqueous mounds for fish habitat) split-hull hopper dredges are unloaded by splitting the hull open to allow the dredged material to fall to the open-water placement site. Most dredges are also equipped with pump-out systems to pump the dredged material to upland placement sites (for example, beach or wetland creation projects). The side-casting dredge is a shallow-draft vessel, specially designed to remove material from channels or small inlets. Instead of collecting the material onboard the vessel, the side-casting dredge pumps the dredged material directly overboard through an elevated discharge boom.

Two basic types of mechanical bucket dredges may also be used to collect and place dredged material - the clamshell bucket dredge, and the backhoe dredge. The bucket dredging process usually requires that excavated material be hauled to a placement site by barge (often called a scow). Barges may be purposely built as dump scows with split hulls, or they may be flat-deck barges modified to carry dredged material, which is a hydraulically unloaded and pumped up on to the placement site. This operation usually involves adding additional water to the dredged material in the barge to form a slurry. The best use of the backhoe dredge is for excavating hard, compacted materials, rock, or other solid materials after blasting, and placing such materials to form submerged structure, or reefs to enhance fish habitat.

Environmental Dredging Windows: timeframes to complete dredging operations, including channel dredging or dredged material placement operations, are restricted to protect biological resources or their habitats from potentially detrimental effects. The primary concerns for aquatic and near-shore habitats typically involve impacts stemming from elevated turbidity, suspended sediments, sedimentation, and hydraulic entrainment of fish, turtles, and other aquatic biota. Additional impacts that must be avoided or minimized when dredging or placing dredged material include disruption of bird nesting activities, disruption of fish migrations, burial and physical removal of submerged vegetation, and potentially, disruption of recreational activities such as angling or boating.

Dredged Material Properties: Standard physical and chemical properties and engineering criteria should be evaluated to determine the characteristics of dredged material, and its suitability for wetland and upland habitat development applications. Soil parameters typically measured to determine suitability for beneficial use applications include grain-size, bulk density, permeability, specific gravity, plasticity, and organic content. Chemical properties should include cation exchange capacity (the capacity for soil particles to adsorb nutrients, including nitrogen and phosphorus, contaminants, and other chemical constituents). Engineering properties to be evaluated to determine the ability of dredged material to be used for various habitat and/or site development applications include consolidation, load-bearing capacity and shear strength.

## Upland Habitat Development on Dredged Material

Targeted upland habitats and recreational land features in the project area, including lawns, forest, shrub, and grassland communities, can be developed on dredged material substrate through natural colonization or by planting selected species. Plant material in the form of seed, bare root plugs, containers, and ball and burlap should be introduced early on along with a nurse crop of herbaceous grasses and forbs to promote rapid development of proposed vegetation communities. Even with careful planting, it is often very difficult to get climax species to survive under initial conditions due to lack of soil mycorrhizae (soil fungi that extend plant roots) to assist root growth and nutrient uptake, lack of shade, and extended spring flooding or fall drought conditions. Prior to planting, seedbed preparation should include plowing or disking to aerate the soil, destroy unwanted vegetation that may have invaded early on, and distribute soil amendments. Ideally, seedbed preparation should occur several months prior to planting and again just before planting (USACE 2015).

The advantages of natural colonization are low costs, and a greater degree of self-maintenance. The disadvantages include proliferation of non-native species, and slow growth and maturity (up to several decades). Initially, fencing off newly planted upland vegetation communities may be required to keep out the herbivores such as deer that eat developing tree bark, leaves, and shoots. The advantages associated with planting upland sites are the initial presence of desired tree/shrub species, rapid substrate stabilization, and more rapid progression towards the desired site aesthetics, which can be an important consideration if the habitat being developed is a component of a public space or park. The main disadvantage of establishing vegetation by planting is the cost involved with site/seed bed preparation and plant propagation and establishment. A hybrid approach may also be considered in certain situations, whereby natural colonization/species invasion is allowed to occur to stabilize the new substrate and promote soil and organic matter development, followed by planting of desired native tree/shrub species when conditions are deemed suitable (USACE 2015).

## Emergent Marsh Wetland Development on Dredged Material

Engineering design for marsh habitat development using dredged material consists of defining elevation, slope, shape and orientation, and size (area and volume). The final elevation of the marsh substrate is determined largely by settlement and consolidation of newly placed dredged material and sub-grade soils. This is often the most critical design consideration as it determines both the amount of material placed as well as the plant community structure and functional capacity of the habitat established (USACE 2015). Determination of final elevation and biological benchmarks for vegetation is critical and should be based on precise knowledge of the elevational requirements of the plant community (often based on data collected at nearby, natural reference sites). Should a greater amount of settlement/consolidation occur, such that the final marsh elevation is below design specifications, the difference can be made up in supplemental materials placement (prior to final grading and vegetation establishment).

The spacing/density of planting units for establishment of native marsh plant communities can vary and is largely determined by substrate type/quality, propagule type, growing season duration, and project/design performance standards. A common goal for marsh development projects is to achieve relatively uniform cover by the end of the second growing season (USACE 2015). Planting at an interval of approximately 1 m (3.2 ft) on center is usually a good compromise between material costs and acceptable coalescence of marsh vegetation. In some cases, especially were heavy grazing by waterfowl or aquatic mammals may be anticipated, a denser planting interval of 30 cm (12 in.) on center may be desirable. In addition, where sandy, low nutrient soils are present, a positive short-term plant growth response can usually be elicited via fertilization and/or organic matter amendments.

# Cost Estimates

Preliminary cost estimates to implement CHEERS primarily pivot around two construction scenarios. The first scenario includes construction of the Shoreline improvements prior to the construction of the Isle. The second scenario would be to construct an offshore Isle first to provide protection for the Shoreline improvements, limiting the size of stone required for shore protection. The second scenario represents significant cost savings by reducing the need for higher levels of shoreline protection.

In either case, structures exposed to open-lake wave energy in the relatively deep water at the east end of Cleveland Harbor will require significant protection. It is estimated that each of the armor stones necessary to construct the breakwaters will weigh approximately 18 tons each, based on the preliminary metocean analysis. This is similar in size to the 12- to 24-ton stone used to construct the perimeter of the Cleveland Lakefront Nature Preserve (Dike 14). The stone will need to be durable and of sound quality to provide for the longevity required for the structures. Stone of this size and quality is difficult to attain and typically requires specialized quarrying techniques. The stone will also need to be sourced from quarries with geology capable of producing the large stone. The cost of quarrying, transporting, and placing armor stone of this size is substantial.

Constructing the Isle first would prevent the need to armor portions of the Shoreline improvement areas with such large stone, resulting in significant cost savings. Conceptual-level cost opinions were prepared for both scenarios and are summarized in the adjacent chart.

“Construction Costs” (shown in the table to the right) are a rough order of magnitude. They include the estimated cost of building the project as conceptually shown in 2021. There may be uncertainties such as environmental mitigation or unanticipated challenge requirements from regulators. Likewise, there may be unanticipated savings that arise as the project scope is more carefully defined. The construction costs represent an order of magnitude that will continue to be shaped as funding and project scopes evolve. Each year, these costs are expected to escalate with inflation.

“Total Project Cost” captures the additional costs of developing a project outside of construction. This includes design, engineering and permitting fees. It captures project management costs and legal costs as the governance of the project and its contracts are negotiated. It also includes an estimate of the costs to fundraise money from corporate and philanthropic sources.

+ HIGHLIGHT

**How CHEERS Compares**

## Regional Project Investment

*The CHEERS project represents a significant investment in community and environmental infrastructure that will transform the eastern lakefront into a local and regional destination. The project encompasses 150 acres of shoreline and includes the creation of over 18 acres of new parkland and habitat space, miles of new trails, play spaces, and community gathering areas. This multi-million dollar investment will also protect the shoreline and critical infrastructure, helping to improve the long-term resilience of the lakefront and adjacent communities. The chart (right) puts this potential investment into the context of other regional planning and design projects.*

| PROJECT | CONSTRUCTION COST |
|---|---|
| VOINOVICH BRIDGES (I-90 INNERBELT) | $560M |
| OPPORTUNITY CORRIDOR | $306M |
| EDGEWATER PARKWAY / WEST SHOREWAY RECONSTRUCTION | $100M |
| I-480 BRIDGE | $228M |
| DOWNTOWN CLEVELAND LAND BRIDGE (2021 APPLICATION) | $229M |
| NEORSD PROJECT CLEAN LAKE (2017 ACTIVE & COMPLETE) | $829M |
| NEORSD PROJECT CLEAN LAKE (REMAINING) | $1.61B |

## SCENARIO 1:

### Construction of the Isle prior to the Lakeshore phases.

| | ESTIMATED CONSTRUCTION COST | TOTAL PROJECT COST |
|---|---|---|
| PHASE B: THE ISLE | $135.6M | $161.5M |
| PHASE A1: THE HABITAT LOOP | $29.2M | $35.1M |
| PHASE A2: E. 55TH STREET MARINA EXTENSION | $57.2M | $68.7M |
| PHASE A3: THE GORDON HILLS | $30.9M | $37.2M |
| TOTAL: | $252.9M | $302.5M |

## SCENARIO 2:

### Construction of the Lakeshore prior to the Isle.

| | ESTIMATED CONSTRUCTION COST | TOTAL PROJECT COST |
|---|---|---|
| PHASE A1: THE HABITAT LOOP | $36.5M | $43.8M |
| PHASE A2: E. 55TH STREET MARINA EXTENSION | $71.2M | $85.1M |
| PHASE A3: THE GORDON HILLS | $38.6M | $46.3M |
| PHASE B: THE ISLE | $135.6M | $161.5M |
| TOTAL: | $281.9M | $336.7M |

# Implementation & Design Considerations

## Develop design standards for the lakefront

Translating the goals and aspirations included in this plan will be critical on the path to implementing the plan. A series of lakefront design standards will help create a clear identity for the lakefront, uniting the park spaces along the lakefront. These standards should align with existing park development, operations and maintenance, and land management standards from Cleveland Metroparks and other partners. These design standards should include:

**Visitor Amenities**

Including seating, waste and recycling bins, bike amenities, bollards, planters, and other elements that help structure the visitor experience within park spaces. Furnishings should include elements that are standard to other Lakefront Reservation parks as well as ones that might be unique to the experience at the eastern lakefront or help achieve a specific aspiration within a project.

**Lighting**

Lighting standards should improve the sense of security for visitors while reducing negative impact to neighboring areas, including natural habitats. Proposed lighting should adhere to existing standards and strive to meet Dark Sky Compliant regulations.

**Materials (Architecture & Landscape Design)**

Materials used in park landscapes and on proposed structures will inform the visual identity of the lakefront park spaces. Material standards should include hardscapes (plazas, paving, etc.), softscapes (planting, trees, etc.), and architecture (cladding, etc.). These materials should contribute to the sustainability and adaptability of the site and be selected to reduce overall cost of operations and maintenance.

**Wayfinding**

Signage and wayfinding are essential to the visitor experience – providing visual interest and orienting visitors to key lakefront amenities and elements. Standards should identify standards that are consistent with other Lakefront Reservation parks as well as those that are unique to the eastern lakefront spaces. Types of signage should include, but is not limited to: monument signs, directional signage for vehicles, pedestrian wayfinding markers and kiosks, trail markers, interpretive and education signage, and building identification markers.

**Ecological Design Considerations**

In the preliminary planning and design phase of the study, the team reviewed planning principles and guidelines for habitat restoration highly disturbed and/or isolated settings, including those where the beneficial use of dredged material is an integral component of the habitat development process, as it will be in CHEERS (Thom 1997, Pastorok et al. 1997, USACE 2000). Notably, these recommendations address the challenges of conducting restoration where ecological connectivity may be lacking, and include:

1) An ecosystem perspective, where restoration actions are formulated in a watershed or regional context and project attributes are defined at appropriate spatial scales;

2) A key species function perspective where it is recognized that the presence of certain organisms (plants and animals) can drive the outcome of restoration projects;

3) Maintaining ecosystem connectivity by creating suitable habitat corridors, removing barriers, and addressing fragmentation;

4) Recognition that a natural population with a limited range or abundance may be considered locally valuable or significant - habitat that is essential for important species or critical to a species' recovery and survival may be considered limiting and warrant protection.

5) A "bet-hedging" design perspective where restoration practitioners recognize that ecosystems are a mosaic of habitats, and that natural disturbances may not always result in adverse effects - this strategy incorporates diversity in design elements, and implies that restoration projects be flexible, resilient and able to recover rapidly following a disturbance event.

Finding a balance between the ecological needs of the habitat and human needs and behaviors will be a challenge to implementing certain components of CHEERS. In an urban or industrial setting, such as the eastern lakefront, larger habitat development parcels will provide a protective buffer from deleterious effects of adjacent land uses. The general absence of natural ecosystems in the vicinity to the CHEERS project may affect colonization of shorelines by emergent wetland plants and the recruitment of insects and other terrestrial invertebrates. In contrast, highly mobile aquatic birds and songbirds, including many migratory species, are expected to readily colonize created wetlands and upland habitats, exploiting newly available areas for foraging and breeding (Simenstad and Thom 1996). Smaller restoration projects are also useful for educational and outreach purposes because they are often easily

+ SPOTLIGHT!

**Creating an Enhanced Visitor Experience & Defining the Lakefront Character**

## Site Furnishings & Amenities

**Benches & Seating**
*set the tone for a welcoming atmosphere.*

**Planting & Paving**
*creates a base for flexible programming and visual interest.*

**Lighting**
*provides a sense of security and allows for extended hours of use.*

**Supporting Communities**

# Creating Open Space Without Gentrification

*The benefits of new open spaces and parks are clear. However, new park spaces can often have unintended consequences, exacerbating gentrification in neighborhoods and often displacing the very residents they are meant to serve. This is often coined "green gentrification." To mitigate potential displacement and maintain affordability, new park amenity projects like CHEERS, must work to include equitable community development and strategies in coordination with CDCs and the City. These strategies will work to ensure that the residents who currently live in east Cleveland will benefit from these investments in their community.*

*(right: WRT)*

accessible and located within areas communities would like to reclaim, thereby increasing stakeholder support for the overall program (USACE 2009). The proposed design for CHEERS includes both large and small habitat development concepts; therefore, the overall design is both functional (from an ecosystem perspective) and accessible (to humans and biota).

## Manage Land Use Conflicts

Cleveland's eastern lakefront contains many locations where permitted land uses, such as wastewater/stormwater infrastructure, port terminal facilities, and hardened shorelines are necessary to society and the economy and cannot be removed. Many of these concerns can be addressed in the final design and planning phases. Sensitive habitats should not be planned for areas prone to disturbance. Densely populated or active recreational use areas may not be appropriate for restoring sensitive habitats because of the costs associated with restricting access and safeguarding against vandalism and disturbance from feral or domesticated animals. Furthermore, restricting access to popular recreation areas can lead to community resentment of future restoration activities. Instead, restoration projects sited in populous areas should be designed to incorporate recreational uses, providing natural settings and enabling residents to gain a greater appreciation for the ecosystem goods and services habitats provided through habitat development projects.

## Beneficial Use of Dredged Material in Ohio's Coastal Waters

In 2016, The Ohio Lake Erie Commission outlined several Priority areas, goals and strategic objectives for the conservation and restoration of Lake Erie's coastal ecosystems in its Lake Erie Protection and Restoration Plan. Many of these objectives directly address components of the CHEERS initiative, including "Dredged Material Beneficial Use and Management." The Plan promotes and prioritizes "research and demonstration projects on potential upland and in- water beneficial uses including habitat restoration, beach nourishment, and upland beneficial use of dredge material projects." An outstanding regional example and precedent for the habitat development component of CHEERS is the Cleveland Lakefront Nature Preserve (CLNP), located just east of Burke Lakefront Airport. Prior to being designated a nature preserve in 2012, the 88-acre site was used for three decades as a confined disposal facility (CDF), storing approximately 5.7 million cubic yards of dredged material removed from the Cuyahoga River. The CNLP is managed by the Cleveland-Cuyahoga County Port Authority and is publicly accessible through a trail system. After active fill operations at the CDF ceased in 1999, tree and shrub cover naturally established on the site, forming open fields, successional woodlands, and shrub thickets, representing a mix of native and non-native species (Davey Resource Group 2015).

## FUNDING

The funding strategy for the project will include a mix of private and public sources. Potential funding sources may include, but are not limited to:

- Continued grant funding through ecological foundations and organizations including:
  - the National Fish and Wildlife Foundation (NFWF) through the coastal resilience program
  - NOAA
  - Great Lakes Restoration Initiative
  - Ohio Healthy Lake Erie Fund
- Local, state, and federal infrastructure allocations.
- Partner organization funding (matching funds or allocations).
- Private foundations and donors.
- USACE Local Dredge Operations.

*The National Fish and Wildlife Foundation (NFWF) awarded a $2.5 million coastal resiliency grant with $2.5 million in local match to the Superior Watershed Partnership (SWP) in 2019. The project, located in Marquette Michigan, will restore almost a mile of severely eroding Lake Superior shoreline. It includes approximately 4,200 feet of shoreline and will create approximately 28 acres of public green space.*

**Exploring Funding Partnerships**

## USACE's Engineering with Nature

*Engineering with Nature is an initiative by the U.S. Army Corps of Engineers (USACE) to explore nature-based engineering solutions that area sustainable and deliver economic, environmental, and social benefits through collaboration with stakeholders and the community. The initiative focuses uses science and engineering to improve efficiency, natural processes to maximize benefits and the value provided by projects, and collaborative process to organize and engage. CHEERS aligns with the goals of the Design with Nature initiative by using a nature-based approach to protecting infrastructure, creating habitat, and providing recreational amenities to underserved communities.*

*(left: USACE)*

+ SPOTLIGHT!

**Building Momentum**

# Early Action Projects!

*Building momentum early on in long-term projects is a major key to implementation and keeping stakeholders engaged. There are multiple partner-sponsored projects that are in various stages of development and completion.*

## Neighborhood Connections

***Harrison Dillard Bikeway Intersection:*** *The Harrison Dillard Bikeway runs parallel to Martin Luther King, Jr. Drive and Doan Brook for 3.74 miles through Rockefeller Park and Cleveland Cultural Gardens. Harrison Dillard links the Cleveland Lakefront Bikeway along the coast of Lake Erie to the north with the Lake-to-Lakes Trail to the south, connecting Cleveland's Glenville, St. Clair-Superior, Hough, and University Circle neighborhoods, providing an opportunity to create a trailhead with amenities.*

***ODOT Active Transportation Underpass Improvements:*** *To reach the Lakefront, the Harrison Dillard Trail passes beneath I-90 through what used to be a dark and debris-laden segment of the path. Thanks to an Active Transportation grant from the Ohio Department of Transportation, the bicycle and pedestrian path was recently expanded to increase the separation between path users and motor vehicle traffic. A mural along the underside of the bridge depicts the transition from land to water as riders go north toward the lake.*

***Gordon Park Pedestrian Bridge:*** *I-90 is a significant physical barrier between neighborhood residents and the recreational amenities of Lake Erie. A pedestrian bridge between E. 72nd Street and Martin Luther King Jr., Drive allows bicyclists and pedestrians to pass over the interstate, connecting the neighborhoods and South Gordon Park to lakefront amenities and North Gordon Park. Future wayfinding signage and ADA accessibility improvements could lead to heavier utilization.*

***E. 72nd Street Bike Lanes:*** *In 2014, the City of Cleveland installed buffered bike lanes along E. 72nd Street, connecting the St. Clair commercial corridor and adjacent residential areas to the Lakefront.*

***Cleveland Lakefront Bikeway Extension:*** *There is an opportunity to leverage the momentum behind CHEERS to extend the current lakefront trail from E. 55th to Downtown.*

*Moveable or semi-movable furniture like picnic tables (top image – MOOS furniture) and loungers (bottom image) can provide nodes of gathering along the lakefront. (Streetlife & WRT)*

*The new E. 72nd Comfort Station was recently opened along the eastern lakefront. It includes water fountains, restrooms, bike parking, and shaded seating areas. (Cleveland Metroparks)*

## Additional Planning

***Safe Routes to Parks:*** *Through a competitive grant award, Bike Cleveland, St. Clair Superior Development Corporation, Cleveland Metroparks, and the Kent State Cleveland Urban Design Collaborative are receiving technical assistance from the Safe Routes National Partnership to develop an action plan for improving active travel to Cleveland's East Lakefront Park, including North and South Gordon Parks, and implement early actions from the plan. The action planning process will engage the community through surveys focused on bike and pedestrian programming, leading to recommendations and strategies to remove barriers to park access and proactively work toward ensuring that routes to the East Lakefront Park are safe and secure for all.*

***Lakefront East Connects!*** *In partnership with the Northeast Ohio Areawide Coordinating Agency, the City Planning Commission is sponsoring a Transportation for Livable Communities Initiative (TLCI) planning study to catalyze transportation and development opportunities to connect the adjacent neighborhoods to the eastern lakefront. The existing street and trail network currently supports motor vehicles at the expense of other users. Making multimodal connections stronger, safer, and more viable will help to better link people to the waterfront, Gordon Park, Rockefeller Park, and the regionally connected Harrison Dillard Trail, resulting in public health improvements for residents. Planning and implementation will focus on neighborhood scale connections such as E. 72nd St. corridor, bicycle and pedestrian enhancements along Martin Luther King, Jr. Drive, improvements to E. 82nd Ave., and Broad Ave. In addition, the study will explore opportunities for transit-oriented development and an extended waterfront rail line or BRT. Finally, consideration will be given to improvements to freeway interchange entrances/exits that will increase accessibility to the lakefront amenities.*

***Cleveland State University Eastside Parks Capstone Study:*** *The 2020 Planning Studio course offered by the Levin College of Urban Affairs partnered with the City of Cleveland, Famicos Foundation, and University Circle Inc., to research and design practical, actionable strategies to connect eastside neighborhoods with Rockefeller Park and the lakefront. The study made recommendations on physical development, bike and pedestrian access, wayfinding and identity, parks programming and activation, and an organizational structure for implementation.*

***Gordon Park Planning:*** *Gordon Park is 122 acres of underutilized park space owned and managed by the City of Cleveland. Recognizing that this park is lacking amenities, quality connections and access, and consistent investment the City's Administration is contemplating a holistic development strategy centered on the community's needs and most active users.*

## Visitor Amenities

***Wayfinding:*** *Installing additional wayfinding and directional signage can help orient visitors to current amenities and programs along the lakefront.*

***Kayak access at E. 55th:*** *Creating another access point for kayaking and watersports on the eastern lakefront will open up opportunities for new programming and activities along the lakefront.*

***Picnic Tables & Seating:*** *More places to sit and picnic were a key community request throughout the process. Installing new picnic tables, benches, and other seating at areas of activity will increase visitor comfort and create a more welcoming atmosphere.*

# PERMITTING

## General Considerations for Habitat Development in Ohio

Habitat development projects in the Lake Erie coastal zone are subject to regulation by Ohio laws, statutes, and permitting authorities. In many cases, projects are jointly regulated with federal permitting authorities (e.g., USACE). All activities occurring within the designated coastal zone of Lake Erie must be consistent with Ohio's approved coastal zone management policies.

## Regulatory Authority for Beneficial Use of Dredged Material

Use of dredged material for creation of wetlands, islands and other coastal habitats in Lake Erie may be authorized under Section 404 (b)(1) of CWA 1972, Section 1135 of WRDA 1986, Section 206 of WRDA 1996 and Section 1122 of WRDA 2016. In addition, Section 204 of WRDA 1992 provides funding and authority for the beneficial use of dredged material for creation and restoration of aquatic or related habitats in association with construction, operation or maintenance of authorized navigation projects. Section 216 of RHA 1970 authorizes the USACE to review navigation projects and recommend modifications that would involve habitat creation/restoration using dredged material. Habitat development projects are also subject to regulation by Ohio laws, statutes, and permitting authorities. The Ohio Department of Natural Resources (ODNR) shares regulatory jurisdiction with the Ohio Environmental Protection Agency (OH EPA) over dredging and/or the discharge of dredged material into Lake Erie and its ports and harbors. Additionally, any proposed discharge or placement of dredged material into waters of the state, including wetlands, must receive a Water Quality Certification from OH EPA.

Additional permits may include: OEPA 401 water quality, USACE 404 discharge of dredge, NEPA, ODNR Shore Structure Permit and Submerged Lands Leases, and any additional permits as needed based on coordination with the Burke Lakefront Airport (BLK) and the Federal Aviation Administration (FAA).

# CONSTRUCTION PHASE

## Contaminated Lake Erie and Cuyahoga River Sediments

A recurring concern voiced by project stakeholders is how potentially contaminated Lake Erie sediments would affect the proposed beneficial use of dredged materials for the development of various CHEERS ecosystem components. Before the 1970s, virtually all dredged material from the Great Lakes was placed in established open-lake placement areas. In 1970, Section 123 of the Rivers and Harbors Act (RHA) authorized construction of CDFs in the Great Lakes. Initially, the CDFs were built with a 10-yr design capacity, assuming that contaminated waterways would clean up sufficiently, as a result of passage and implementation of the Clean Water Act (CWA) in 1972, to re-allow open-water placement of all dredged material. In successive years, Great Lakes sediments failed to meet established testing criteria for open-lake disposal, requiring expansion of existing CDFs as well as the construction of new CDFs. Although many of Lake Erie's CDFs are at or near capacity, an increasing proportion of dredged material removed annually from Ports and Federal channels is now considered suitable for open-lake placement, in accordance with federal and state regulations (GLDT 2016).

The USACE sampled and analyzed sediment in 2013 and 2016 and concluded that sediments from the upper portion of the Cuyahoga River federal navigation channel were suitable for open-lake placement, including most beneficial use aquatic habitat development alternatives (USACE 2014). Currently, sediment dredged from the lower navigation channel is deemed suitable only for CDF placement. The USACE Engineer Research and Development Center (ERDC) evaluated the suitability of dredged sediment from the Port for placement in Lake Erie waters and determined that dredged material from all areas of the Port and Federal Channel was suitable for most upland placement scenarios (except possibly for residential use) (USACE 2011).

*Year one monitoring of Hunter's Point South restoration – New York (Great Ecology)*

## MONITORING PHASE

### Post-Construction Monitoring and Functional Equivalency:

The habitat development components of CHEERS should be, to the maximum extent possible, naturally functioning, self-sustaining aquatic, wetland and upland habitats that should require relatively little maintenance or human intervention over time. However, ecosystems are inherently unpredictable, and even engineered habitats or habitat complexes require some degree of initial and periodic maintenance and adjustment to achieve functional equivalency with natural habitats. The duration of post-construction monitoring should be determined through consultations with stakeholders and resource agencies (e.g., USACE, OH EPA). Ideally, the CHEERS habitat monitoring phase should extend long enough to provide a reasonable assurance that the developed habitats have met pre-specified performance criteria (i.e., observable physical, chemical, or biological attributes used to determine if a habitat restoration project meets its stated objectives). Typically, state and/or federal regulatory program permit conditions for habitat development projects specify monitoring programs of up to five years, to encompass and document the point of most rapid change and the period of stabilization. Specific components of the monitoring program, including measured parameters/ performance indicators, success criteria, number and location of monitoring stations, and data management and analysis protocols will be developed collaboratively with natural resource agencies and other stakeholders.

### Adaptive Management

CHEERS project proponents should work with regulatory agencies and other project partners to assist in the development and implementation of an Adaptive Management Plan for the Project. Adaptive management differs from traditional ecosystem management in that it recognizes and prepares for uncertainty and stochastic natural events or disturbance. If implemented at the outset of post-construction monitoring, problems and deviations from the expected restoration trajectory can be detected early and adjustments made to correct problems or deficiencies. If post- construction monitoring indicates that habitat elements of the project are failing to achieve pre-established performance standards, reasons for failure would be evaluated and corrective actions would be proposed to correct shortcomings. If it is determined that pre-established performance standards may not be attainable, new standards may be developed. Adaptive management requires a long-term commitment to monitoring and adjustments to restoration projects long after initial construction, to maximize success and functional gains.

# *Embracing* the community, the environment, and *the Lake.*

The time to act is now. The eastern lakefront and its communities are in urgent need of protection from the impact of a changing climate, natural habitat that supports biodiversity and creates natural filtration and dissipation areas, and equitable and accessible lakefront park spaces that meet the needs of current residents. The availability of dredge material, urgency of tackling community resiliency, and the community, partner, and stakeholder momentum all point to opportunities for transformative change. Change that will open up new experiences along the lakefront, enhance the existing natural beauty of the lake, and help protect and preserve infrastructure and communities.

Residents and stakeholders have made their ideas and aspirations for the lakefront clear – those projects, goals, and priorities shaped the community-driven plan for a resilient eastern lakefront. A lakefront that provides for community and user needs while providing the much needed space for nearshore and aquatic habitat that supports migrating birds and local fish species to thrive. A lakefront that provides for moments of joy, reflection, and respite and leverages the healing qualities of water to create spaces for communities to escape from the hustle and bustle of urban life.

CHEERS envisions returning the hardened edge of Cleveland's east side lakefront to a natural shoreline with places for people and nature. The beneficial use of 3.1 million cubic yards of dredge material will expand parks and habitat north of I-90, mitigate the impacts of the highway on existing parkland, protect infrastructure, and create a sheltered embayment where visitors can safely access the lake.

Proposed projects along the Lakeshore, The Cove, and The Isle include projects that use nature-based solutions to create benefits for the environment, the local economy, and communities. These projects connect people and communities to the lake, program spaces that meet the needs of the community, protect critical infrastructure and expand natural habitat areas, and celebrate the legacy, history, and significance of the lake. All together these projects will create a resilient lakefront and signature open space that honors and celebrates the lake, uplifts surrounding communities, and creates a contiguous and impactful lakefront for the City of Cleveland.