

NORTHERLY ISLAND PARK



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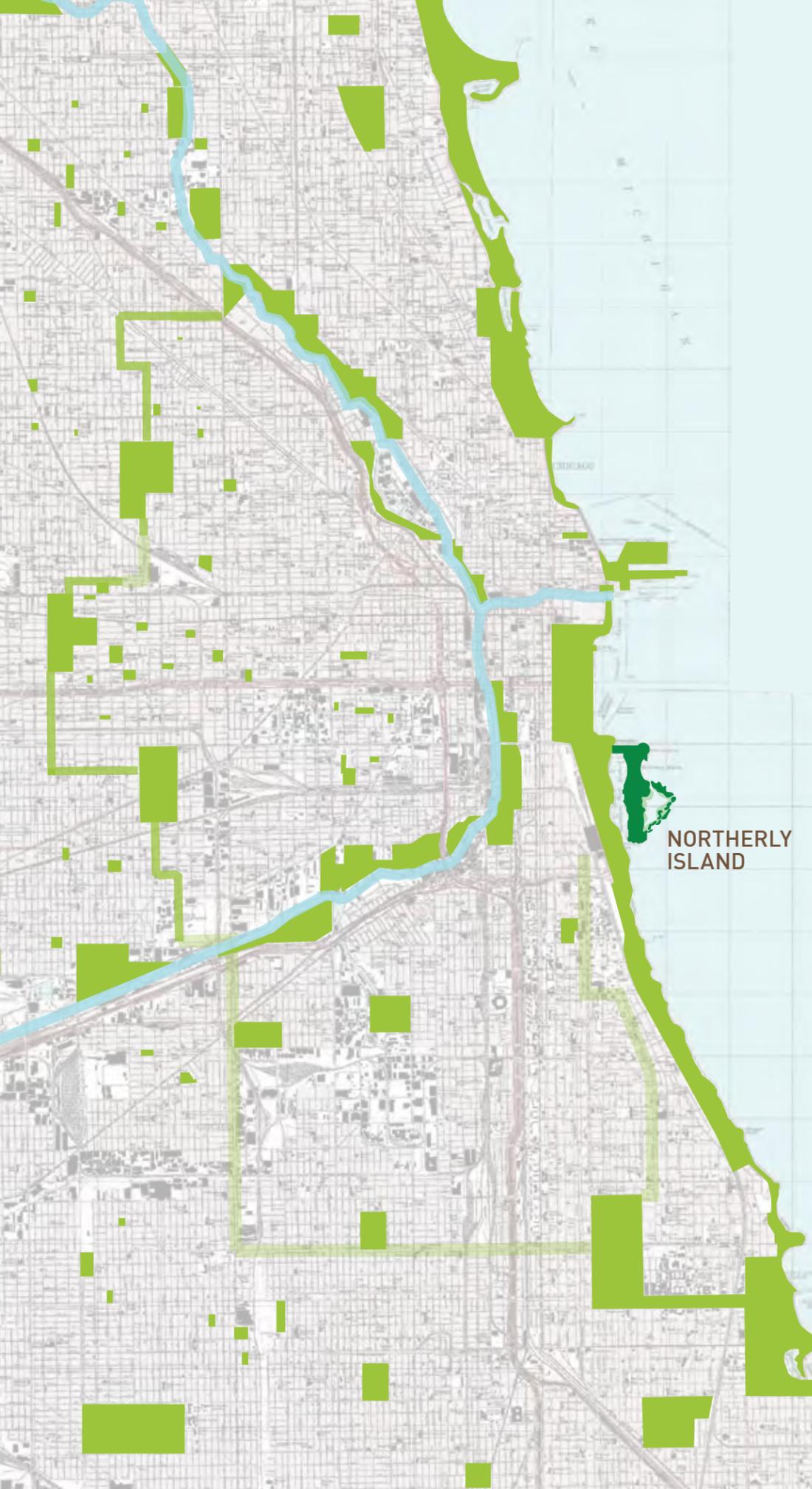
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NORTHERLY ISLAND

01

CHICAGO'S COASTAL PARK

Surrounded by Lake Michigan, Northerly Island, more than any other Chicago park, provides an intimate connection to the water and dramatic skyline views within walking distance of downtown. The design takes advantage of this important location by creating inspirational outdoor experiences and strengthening Chicago's leading position as a 21st century green city.

PUBLIC INPUT

For the past several years, the Chicago Park District and the City of Chicago have collected ideas and comments from the public on appropriate uses for this 91-acre site. The design team assembled to develop the design of the park began by studying this wealth of public thinking.

The overwhelming consensus was that Northerly Island should be an ecologically diverse park in which visitors could explore nature and experience peaceful solitude without leaving the city. Prominent among the responses were requests for ponds, meadows, forests, educational activities, integration with the Museum Campus, diverse water activities, links to the mainland, and environmentally-sustainable design.

YEAR-ROUND EDUCATIONAL USE

Northerly Island Park will strengthen connection to the nearby Museum Campus through the addition of instructive ecosystems (living classrooms) and supportive community spaces. Building upon the year-round schedules of the Field Museum, Shedd Aquarium, and Adler Planetarium, Northerly Island Park will expand educational opportunities unique to these cultural and scientific institutions through its accessible aquatic and terrestrial habitats. The island will become an outdoor classroom with activity oriented programming.

SUSTAINABILITY

Northerly Island Park will set an example for sustainability through its financial viability, maintenance considerations, reduced energy use, and energy production. The design organizes human activity and natural habitat to attract revenue sources (ensuring the island's future) and protect the habitat (easing the burden and increasing the efficiency of habitat maintenance). Northerly's location on/in Lake Michigan creates an opportunity for incorporating renewable energy. Emerging technology that harnesses the energy of waves will contribute to powering facilities on the island. Heating and cooling for Northerly Island buildings will be supplemented by geothermal exchange with the lake water. Collected and filtered rainwater will be used to replenish the island's landscape and wetland elements.

Burnham and Bennett's 1909 Plan for Chicago, Northerly appears in chain of islands designed to protect inner lagoons

Plate 50A from *The Plan of Chicago*

PARK

CONNECTING LAND AND WATER

As a centrally located piece of Chicago's extensive lakefront park system, Northerly Island Park has the potential to become a global model for an ecological urban habitat. Northerly is unique in its size, proximity to the Museum Campus, and expansive shoreline along one of the largest bodies of fresh water in the world. These features make it possible to strengthen Northerly's direct link to the lake and to diversify Chicago's lakefront environments with demonstrative wetlands, lagoons, seasonal pools, fishing coves and other water-scapes for learning and recreation.

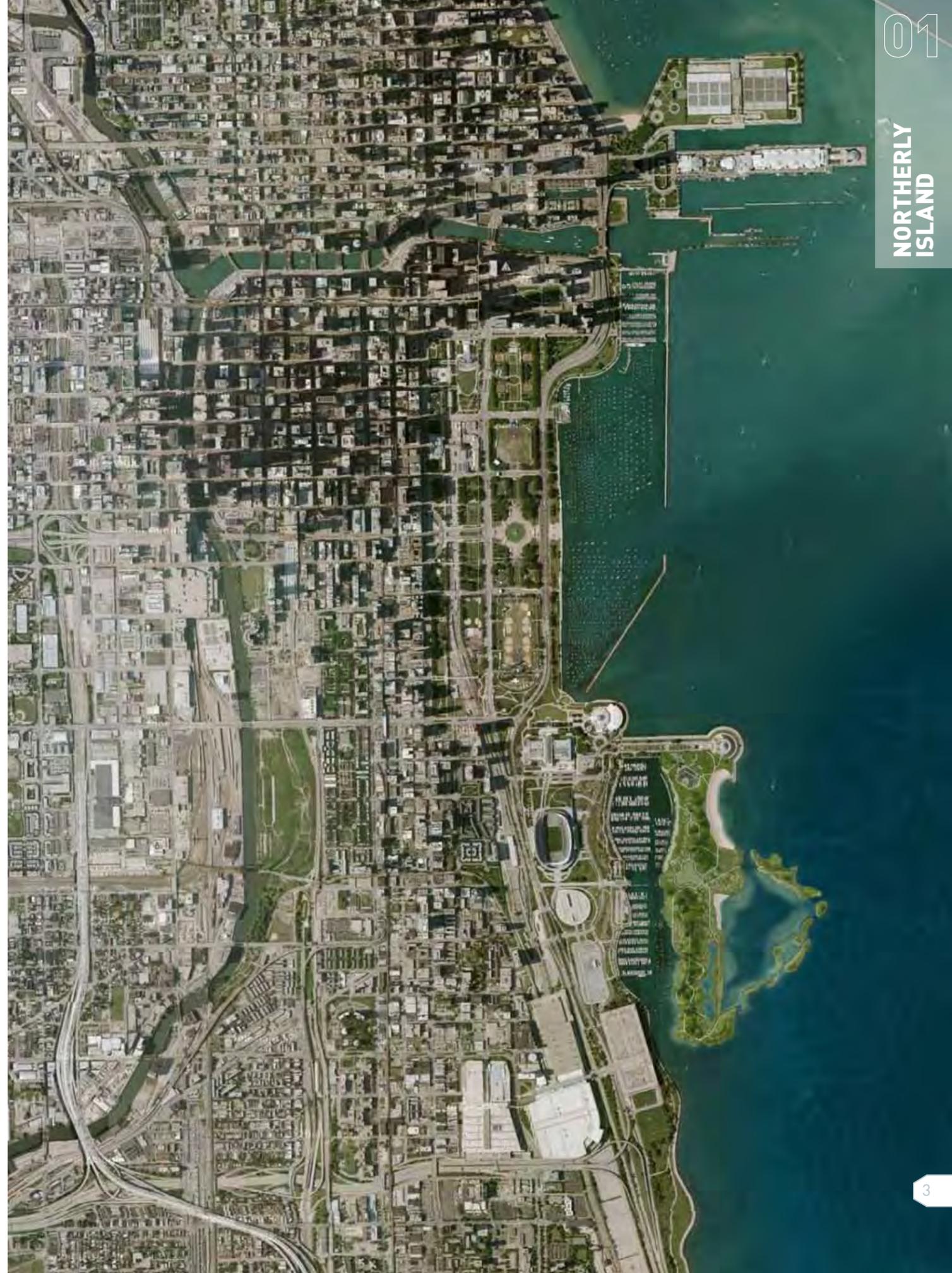
In addition to its extensive lake and harbor frontage, Northerly Island is comprised of 91 acres of land. This area is large enough to accommodate several diverse natural environments, such as dense forest, savannah, prairie, and wetland. These environments will be living examples of the region's fascinating ecology. In this way, Northerly Island

Park will play a pivotal role in educational, social, and cultural activities. It will invite visitors to enjoy music, beach activities, kayaking, group camping, bird-watching, art installations, and hiking on its miles of interior paths.

A LOCAL PARK WITH GLOBAL APPEAL

This park design framework aims to create an internationally recognized destination enhancing Chicago's worldwide leadership in urban environmentalism. The design builds upon a thorough understanding of today's Northerly Island to envision a new Northerly Island Park that will be unique to Chicago and the world.

The design of Northerly Island Park builds upon its unique geographic location on the lake and adjacency to the Museum Campus to intensify and interpret visitors' experiences of this unique place.



SITE STRATEGY

02

THE REEF

REEFS EXPAND LAKE RECREATION AND ECOLOGY

Imagine canoeing through calm lake water to quiet off-shore islands, hiking an island oasis under shade provided by a thriving woodland canopy, or discovering a remote rocky beach with breathtaking views. Imagine all of this within walking distance of Chicago's bustling urban center.

The ambitious plan to add barrier islands (spits of land formed by wind and water that protect inner aquatic ecosystems from turbulent water) to Chicago's lake-

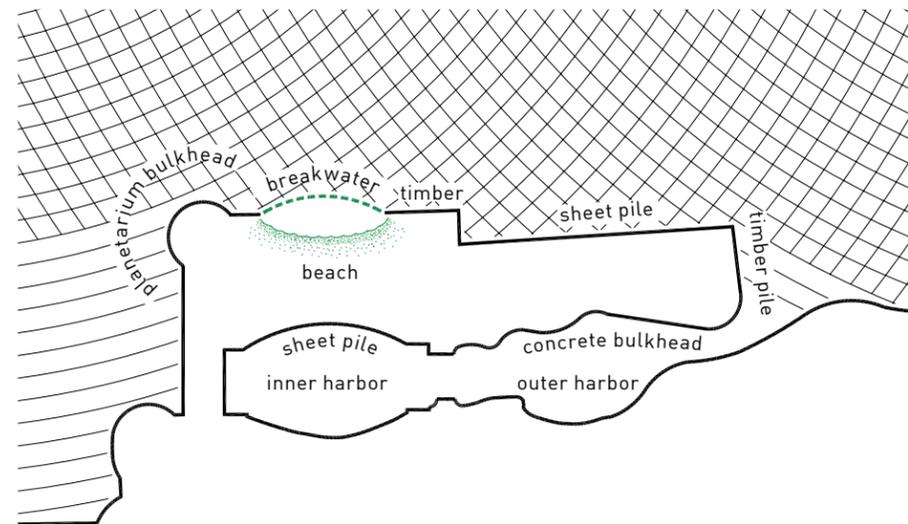
front parks is not new. Protective islands were first proposed in Chicago as part of Daniel Burnham and Edward Bennett's visionary Plan for Chicago in 1909. In the spirit of this plan, the need for bold manipulation of the lakefront is still necessary to expand the recreational and ecological functions of Chicago's greatest resource, Lake Michigan.

Northerly Island Park's barrier reef allows a soft, green lakefront edge to form; fostering scenic and educational habitat that is unique along the entire Chicago coastline. The reef will provide a protected

inner basin environment abundant with native fish, canoe and kayak launches, deep-lake swimming, and snorkeling and diving sites. The reef system will not only benefit Chicago's residents and visitors, but will be an investment in the health of Lake Michigan ecosystems. Adding 12 acres of fish spawning habitat, 40 acres of migratory bird habitat and 19 acres of wetland, the reef and park renovation significantly expands Lake Michigan's fragile coastal ecosystem. It is a proposal rooted in Chicago's history that ensures its future as a leader in ecological urban practices.

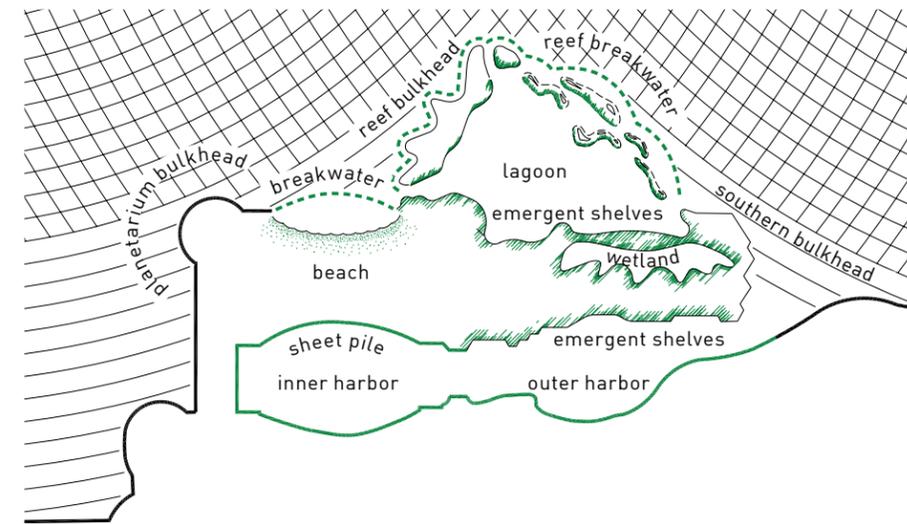
LATE 20TH CENTURY COASTAL ENGINEERING

Battles the forces of nature with hard armored edges.



21ST CENTURY COASTAL ENGINEERING

Encourages diverse habitat through the introduction of a constructed reef that also shields shoreline ecosystems.

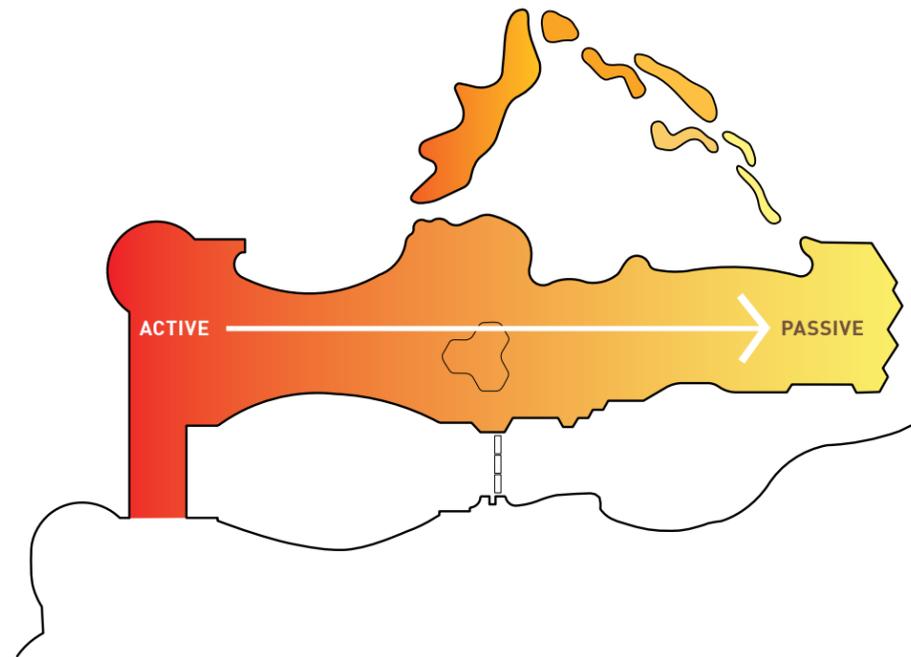


Barrier islands are staggered to break down the immense energy of waves. The calm water protected by the reef is the ideal environment for native fish and aquatic recreation.



02 SITE STRATEGY

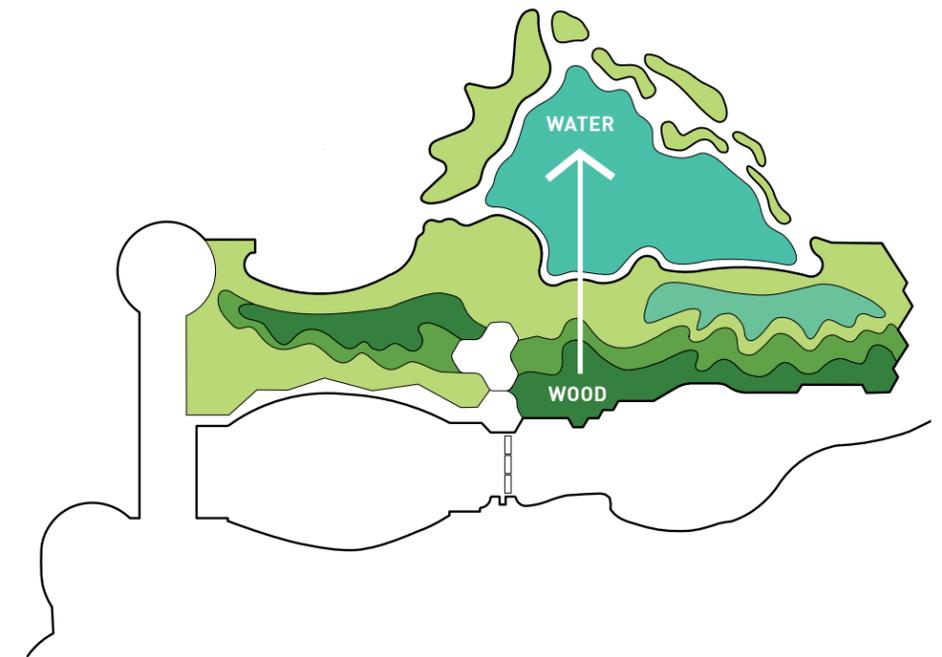
ORGANIZATIONAL PRINCIPLES



N EXPERIENCING THE ISLAND

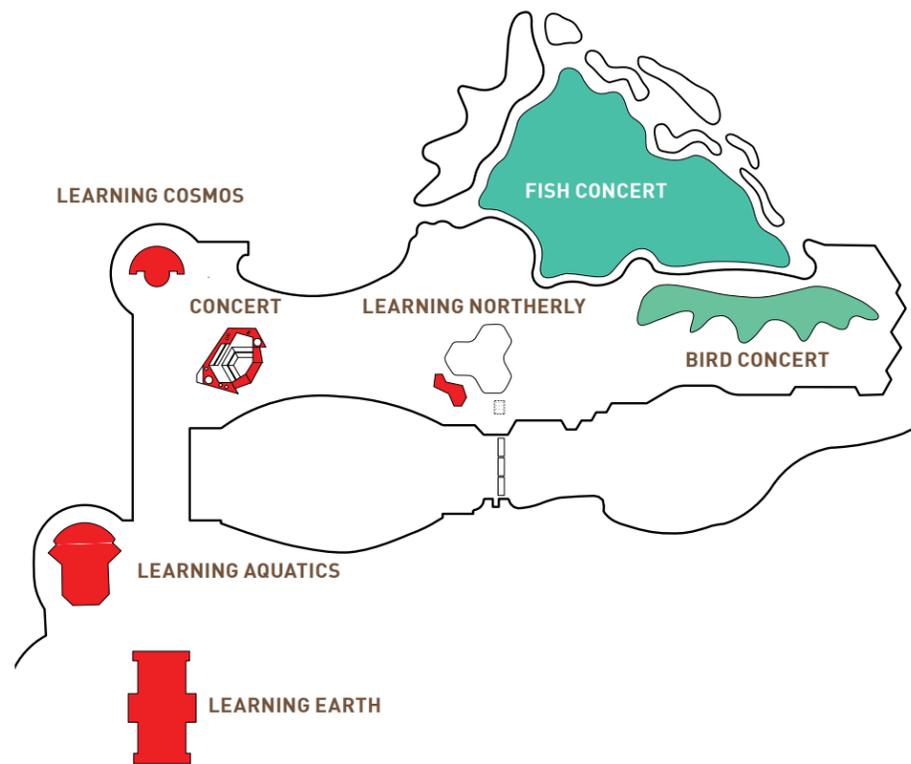
The existing connection to Northerly Island from Solidarity Drive will be maintained as the primary access to the park. The north end of the island will be programmed to take advantage of the high number of people arriving from this direction. As visitors move from north to south, they experience the island's gradual

transition from a place of lively entertainment on a larger-group scale, to the diverse ecology toward the island's tip that fosters quieter, more focused individual experiences.



HABITATS PARALLEL TO THE COASTLINE

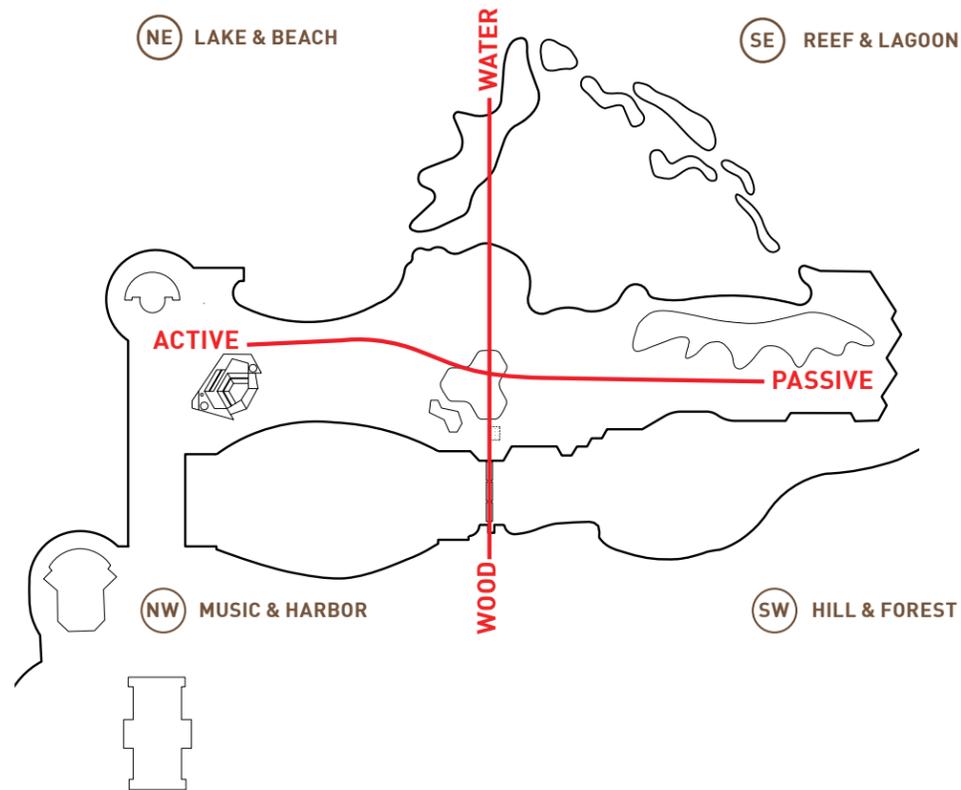
The ecological zones on the island are organized in linear bands parallel to the coastline. This is representative of natural organization along the coast of Lake Michigan. A dense woodland on the west transitions to an open savannah, grassland prairie, emergent marsh, to lagoon and open lake water to the east.



LEARNING AND EVENTS

Learning opportunities abound through the outdoor programming that builds upon the adjacent Museum Campus. Star gazing and astronomy connect with the Alder Planetarium. Ecological spaces align with Field Museum and the Shedd Aquarium programs. An Environmental Education Center will accommodate classes, meetings and excursions. At the same time, special events are supported through the design. A space for outdoor summer concerts on the north

end of the island is balanced by a prairie and wetland that will support migratory birds and give visitors an opportunity to hear their songs. The wetland and fish-spawning reef create space for this interesting aquatic event and will become an important research site for students and professionals studying the near-shore environments of the Great Lakes.



FOUR DISTINCT QUADRANTS

The park's diverse activities, experiences and habitats will attract diverse people, fish, and birds. In the northwest, closest to the city, a harbor walk with restaurants, people-watching and summer time music enliven the park. The northeast beach gives access for swimming. The southeast presents a unique relationship with the water, and the southwest buffers the visual connection to the Convention

Center across the harbor with a wooded landscape. As the seasons change and the natural habitats mature, visitors will discover a new island each time they arrive. For a bird watcher, this may be spotting a Great Blue Heron, a bird attracted to the wet marsh. For hikers, this may be discovering a challenging trail that rewards them with views of the city and lake.

- NE LAKE & BEACH**
recreation
connected
busy
buffered
diversity
lakefront
horizon
- NW MUSIC & HARBOR**
culture
highly accessible
fun and active
harbor
city skyline
- SE REEF & LAGOON**
nature aquatic
remote
dynamic
quiet
wonder
discovery
ecological diversity
protected reefscape
horizon
- SW HILL & FOREST**
nature terrestrial
hiker access
peaceful
echoing
floral diversity
soft water edge
woods

02 SITE STRATEGY THE PLAN

SCALE AND MEASURE

Earth, water, and animal habitats are the elements found at Northerly Island Park. Each of these elements share a common structure found in nature: the hexagon. Bee hives, for example, are formed from tightly packed hexagonal cells that serve different purposes (housing honey, pollen, or larvae).

The design team employed the structure and scalability of hexagons as a tool to organize the different features of the island's plan. By first establishing a "grid" of quarter acre, 1 acre, and 4 acre hexagons,

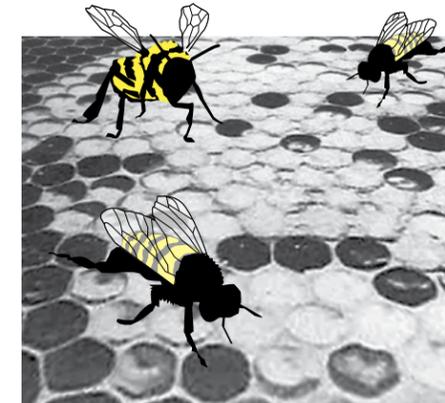
the geometry provides a scale to better understand the vast Northerly Island Park landscape. Next, the hexagons are filled with elements such as grasses, wetland, savannah, or woodland, and suddenly the island becomes a dynamic mosaic. This landscape, like a craftsman's mosaic surface, conveys an appropriate design message for a park that is as much a demonstration of man-made construction as it is of natural processes. The geometric yet heterogeneous order of the park will be seen and understood by an airline passenger flying into Chicago or by a visitor on foot.

1/4 acre, 1 acre, 4 acre hexagons overlaid on a map of Millennium Park. The area surrounding Cloud Gate, for example, is equal to 1/4 acre.



EARTH: FLOURITE

When viewed at close range, Illinois' state mineral has a hexagonal composition.



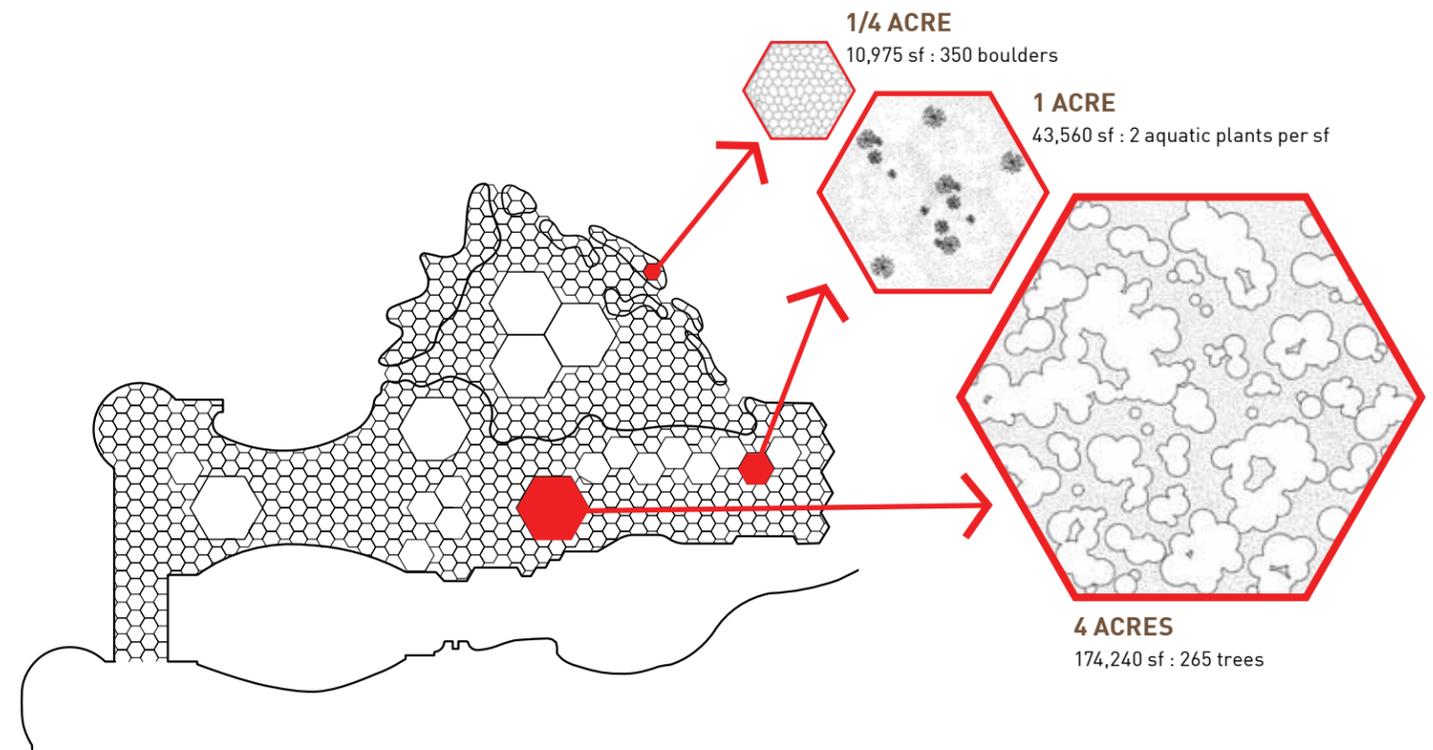
ANIMAL: BEEHIVE

Bees fill their hive with larvae, pollen, or honey using a compact hexagonal structure.



WATER: PETOSKEY STONE

Fossilized Lake Michigan coral is known for its enigmatic hexagonal shapes.





SITE PLAN
N 0 100 200 400 800 FT

URBAN CAMPING AT NORTHERLY ISLAND PARK

Many of us have memorable childhood experiences of camping and outdoor adventures: learning to pitch a tent, prepare food on a cook stove, and watch for shooting stars. As studies have shown, appreciation of the outdoors is a strong contributor to health, happiness and career success in later adult life. Northerly Island Park is the ideal location to offer urban youth the opportunity to experience fun and gain skills and respect for nature that come from camping and other immersive experiences.



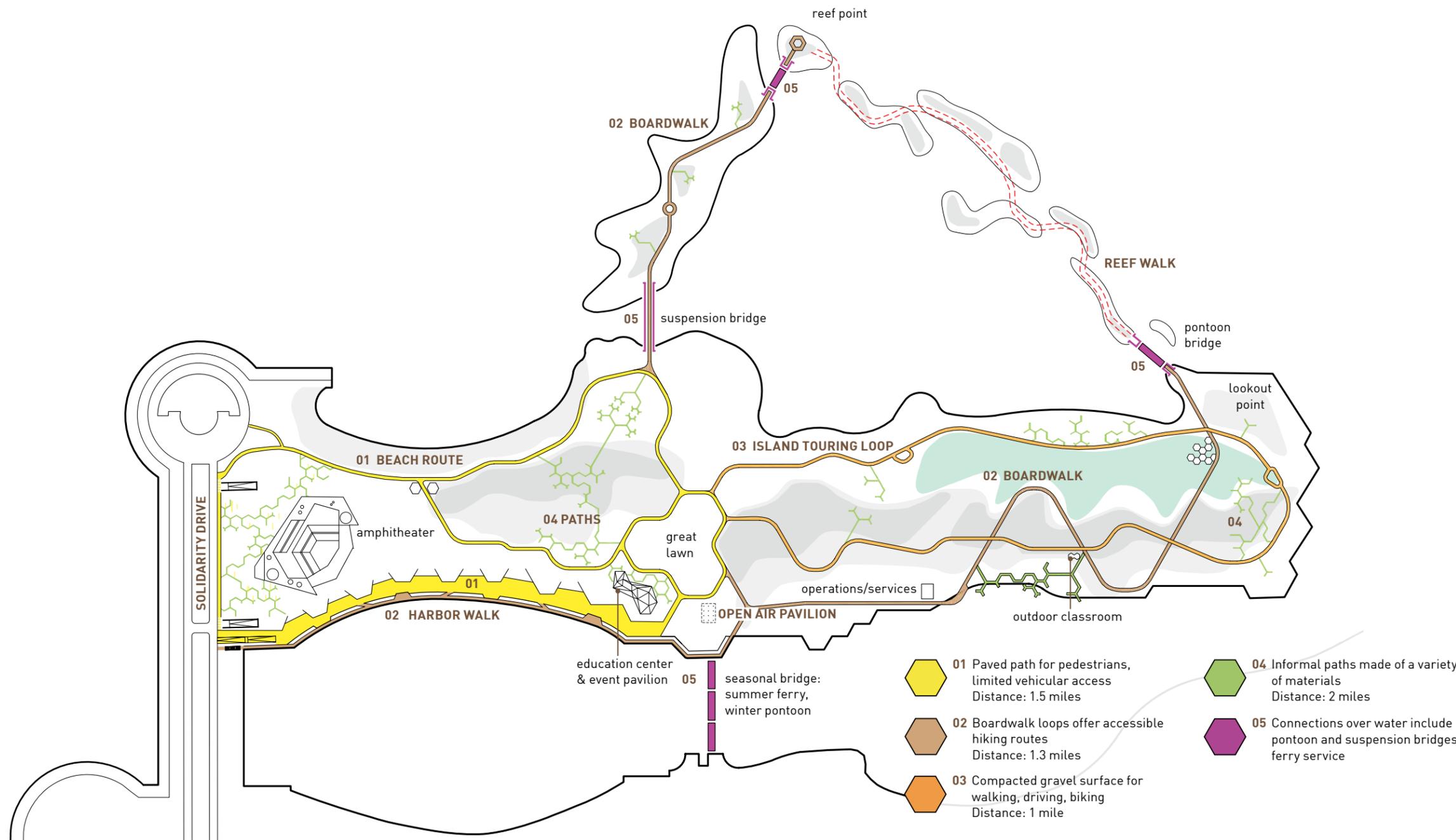
GETTING AROUND

Joggers, bikers, birders, and skiers will experience a connection to the city and find solitude as they traverse the trails at Northerly Island Park. The network of paths are designed to support activities that transition from active to passive as one moves north to south.

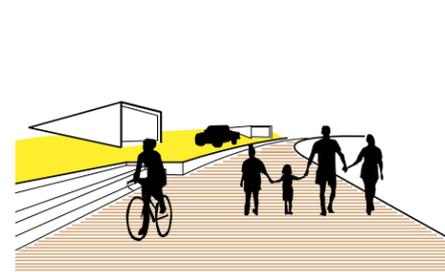
A primary trail linking Solidarity Drive and the Amphitheater plaza with the Great Lawn and Education Center is designed to serve the widest range of visitors of all ages and of all levels of physical ability. This paved route will serve walkers, rollers, strollers, bicyclists, and runners. It is structured to accommodate limited vehicular access and emergency vehicles.

South of the Great Lawn a network of accessible compacted gravel trails and boardwalk trails create a loop around the island and connect the various habitats and activities together. These footpaths, designed for strolling, bring visitors closer to the ecological zones and connect to bird blinds and observation points.

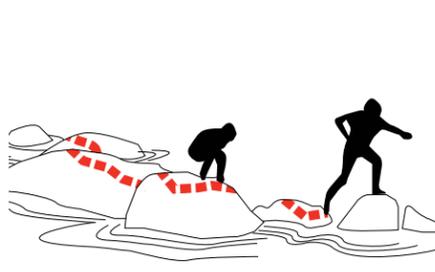
From these main trails, a set of informal paths break away, giving visitors a remote experience and an opportunity to discover the island in solitude. A trampled grass trail, stepping stones through the wetland, and winter paths for snow shoes will enhance the quiet experiences of the island. These paths will provide variety as they open and close in different seasons, or under different conditions. For example, when lake levels are down, the Reef Walk becomes traversable for a season. With snow, a woodland path is created. When birds are nesting, some of these paths will have limited access.



HARBOR WALK



REEF WALK



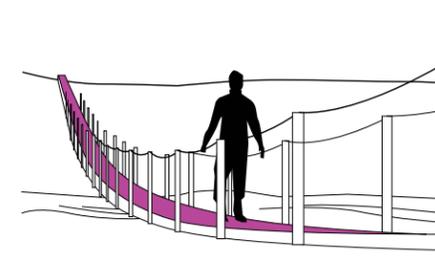
ISLAND TOURING LOOP



PATHS



BRIDGE CONNECTIONS



02 SITE STRATEGY ACTIVITIES

FOUR SEASONS AT NORTHERLY ISLAND PARK

Northerly Island Park will be a destination where Chicagoans and tourists alike experience nature, challenge their abilities, and expand their knowledge. The park is designed for year-round activity that gets people out into the snow in winter and keeps them out into the night during summer camping trips.

Day or night, remotely or with a group, winter, summer, and everything in between – Northerly Island Park will be a place for visitors to choose their own adventure. The activities featured on this page will be a starting point for others to fill in as the park evolves.

ACTIVE ← → **PASSIVE**

WINTER



SPRING

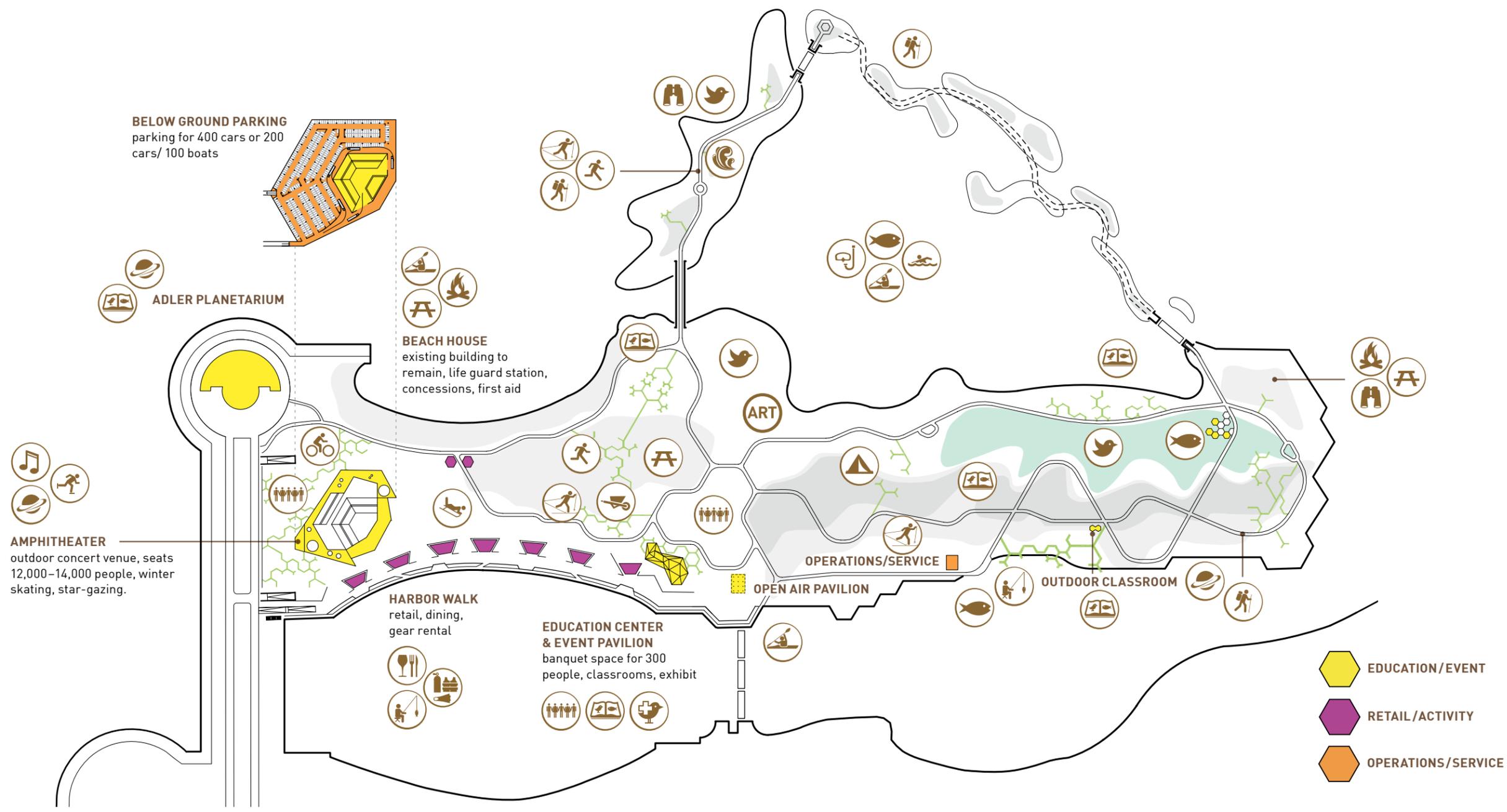


SUMMER



FALL





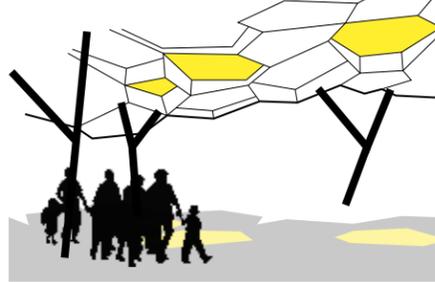
SUMMER MUSIC AMPHITHEATER



HARBOR WALK



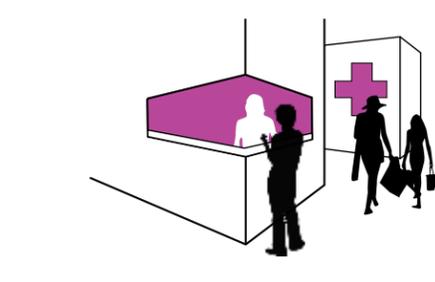
EDUCATION CENTER



OPEN AIR PAVILION



BEACH HOUSE



OUTDOOR CLASSROOM



PARK FEATURES: NORTH

NORTHERLY'S URBAN CONNECTION

03

To maintain and sustain an urban park the size of Northerly Island Park, revenue generation must be integrated into the plan. Venues that help to make the park economically viable serve the dual purpose of providing services that make the park-experience more enjoyable for visitors. These venues include the music Amphitheater, retail and concessions along the Harbor Walk (shown here), the Education Center and Event Pavilion on the Great Lawn.

Located in the northern section of the Island, these venues, easily accessible from Solidarity Drive, take advantage of the current Museum Campus, beach, and harbor foot traffic and reinforce other activities that already exist on this part of the site. These structures will be sustainably designed and will be integrated into the landscape, reducing the overall paved area in the park. Perhaps most importantly, the active northern section of Northerly Island preserves the southern section of the park for quieter activities.



NORTH ISLAND PLAN

BUILDINGS

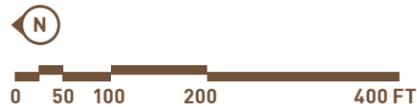
- 01 Adler Planetarium
- 02 Amphitheater
- 03 Education Center
- 04 Event Pavilion
- 05 Harbor Walk
- 06 Leasable Retail Space
- 07 Beach House

LANDSCAPE

- 08 Woodland
- 09 Savannah
- 10 Prairie
- 11 Great Lawn
- 12 12th Street Beach

INFRASTRUCTURE

- 13 Vehicular Entry/
Exit to Garage
- 14 Pedestrian Entry/
Exit to Garage
- 15 Cable Ferry/Pontoon Bridge
- 16 Suspension Bridge
- 17 Island Touring Loop:
Paved Beach Route
- 18 Reef Walk
- 19 Kayak Launch
- 20 Demonstration Gardens
- 21 Picnic Grove
- 22 Outdoor Exhibits



03 PARK FEATURES: NORTH AMPHITHEATER

A summer music amphitheater integrated into the landscape provides stunning views of the surroundings while focusing sound away from residential areas and natural habitats.





03 PARK FEATURES: NORTH AMPHITHEATER



The Amphitheater supports year-round activities such as public ice-skating in the winter.

MUSIC IN THE PARK

A multi-use amphitheater accommodates summer concerts and provides additional seasonal and educational features that extend its benefits to the public year-round. In concert mode, the venue seats 12,000 to 14,000 fans. Seating will be integrated into a landscape slope that provides functional areas below grade including limited parking and back-of-house areas for the touring bands.

ASTRONOMICAL STRUCTURES

Additionally the Amphitheater ties to the educational outreach of the Adler Planetarium by incorporating architectural-scale star gazing structures into its design. An elevated walk-about serves as a 'cosmic ribbon,' where visitors can experience stellar alignments such as the summer or winter solstice. These features lend a unique and site-specific educational aspect to the facility that will encourage visitor attendance in all seasons or for specific astronomical events.

YEAR-ROUND ACTIVITY

In winter the venue may be converted to an outdoor recreational skating rink. This activity will allow visitors to the Museum Campus to extend their stay on the island to include outdoor recreation in the dark months of winter. The skating function can also supplement neighborhood outdoor recreation by accommodating ice hockey leagues, speed skating training and figure skating.

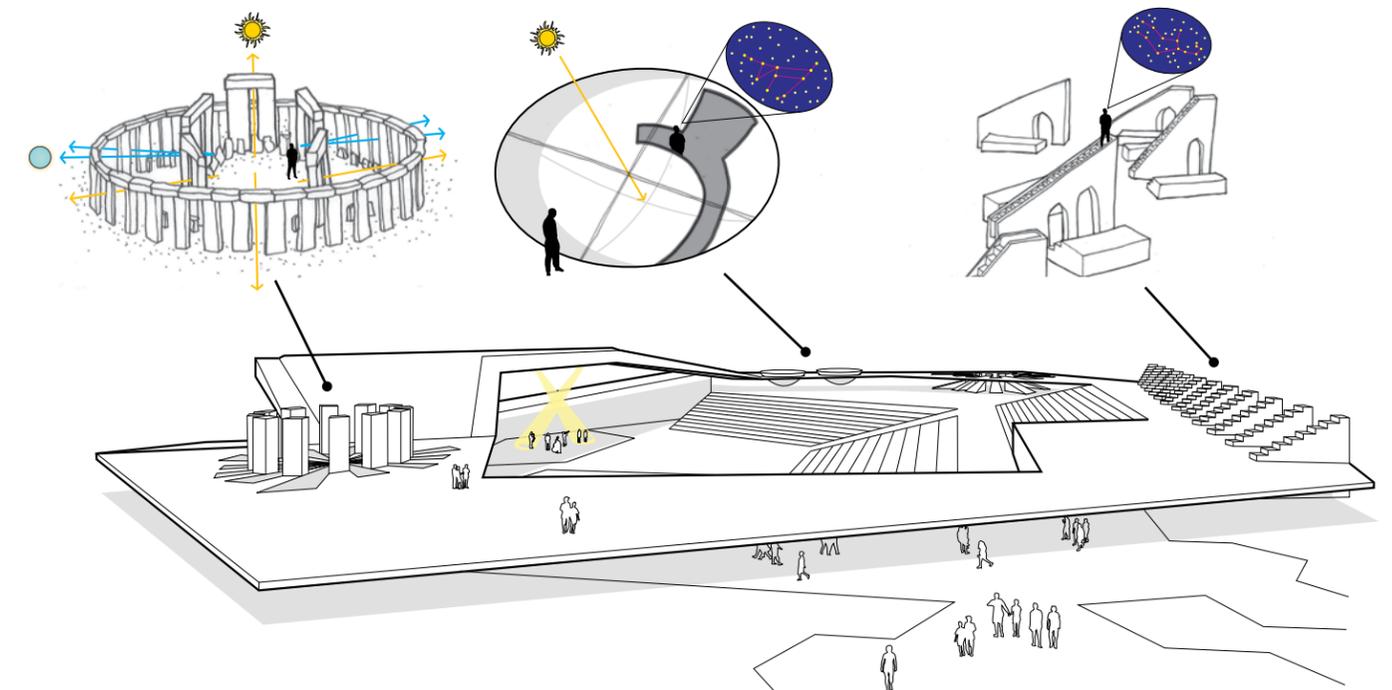
EXAMPLES OF ASTRONOMICAL ARCHITECTURE

A 'cosmic ribbon' wrapping the Amphitheater charts stars and constellation events in the cosmos. Astronomical elements at the Amphitheater celebrate cosmic phenomena as well as the everyday paths of the sun and moon.

monoliths align with axes of the rise and set of the solstice sun and moon.

shadow cast by cross hairs charts daily sun path, gaps in dome align viewers with stars and constellations.

instruments arranged at different angles to align with zodiac constellations.





Summer evenings bring concerts to Northerly Island Park's unique Amphitheater. The space is designed to host concerts without interfering with simultaneous activities on the island, such as swimming at 12th Street beach, hiking, dining or camping.

03 PARK FEATURES: NORTH EDUCATION CENTER & EVENT PAVILION

EDUCATION CENTER

With its intensified ecology there will be much to learn and appreciate at Northerly Island Park. The wonder of its coastal reef, its wetland, its prairie and savannah are to be experienced first hand – the Education Center and its exhibits will elucidate and contextualize these experiences by providing an indoor, year-round space for education and events of the island.

The building is sited at the mid-point of the island at the end of the Harbor Walk and adjacent to the mid-island pontoon bridge and cable ferry access. It is envisioned as an airy structure, with a bird-friendly façade that opens onto the Great Lawn. This location functions well in conjunction with educational field trips by school groups and also ensures that visitors have easy access to begin or end their visit at the Education Center.

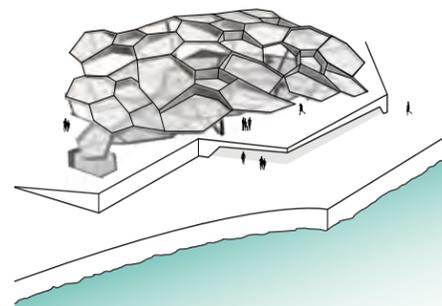
The design will enable multiple uses so that special events, conferences or ceremonies can also be held inside and spill out onto the Great Lawn. By accommodating events within the building, the need for the annual temporary erection of large tents on Northerly will be eliminated.

OPEN-AIR PAVILION

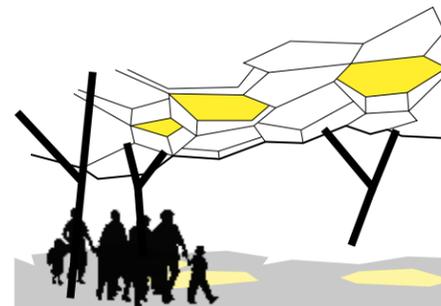
As a glass enclosed building, the former Terminal Building presents a hazard to migrating birds that are often critically injured by flying into it. To remedy this problem the existing Terminal Building has had to be fitted-out with opaque window decals, severely compromising its original aesthetic and historic character and not improving its energy consumption or its ability to be repurposed. The Framework Plan envisions preserving the column structure of the former Terminal Building main hall and converting into a stunning open-air pavilion. As a restored and prominently located historic artifact, the column structure gains a new life more in keeping with Northerly's new identity as an ecological destination. Newly illuminated and open-air, the structure will be transformed into an attractive shelter and backdrop for events rather than be a hazard for the wildlife the park is designed to protect.



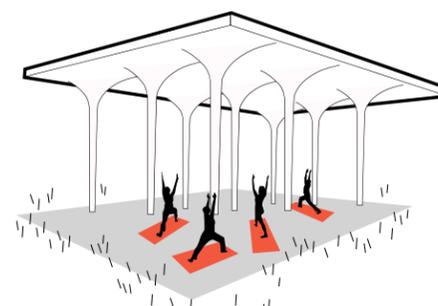
Winter crossing at the pontoon bridge with the open-air pavilion marking the entry to Northerly Island.



EDUCATION CENTER
accessible from the Great Lawn and Harbor Walk



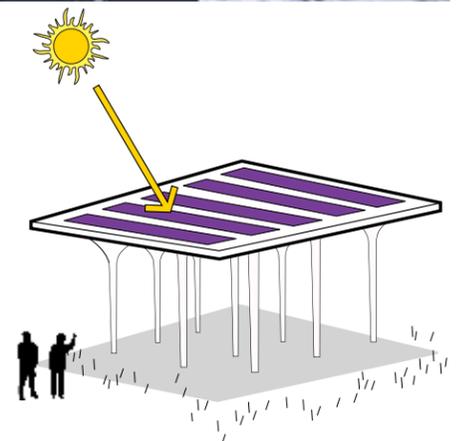
EDUCATION CENTER PORCH



YOGA AT THE PAVILION



RESERVED FOR FAMILY REUNION



ENERGY PRODUCTION
solar cells produce renewable energy



The shaded porch of the Education Center presents views to the Great Lawn, open-air pavilion, and forested ridge beyond.

PARK FEATURES: SOUTH

NORTHERLY'S NATURAL CONNECTION

04



A boardwalk loops the southern tip of the island, giving access to its varied ecologies.

SOUTH ISLAND PLAN

BUILDINGS

- 01** Outdoor Classroom
- 02** Operations/ Services Shed
- 03** Bird Blind Pier
- 04** McCormick Place Convention Center

LANDSCAPE

- 05** Woodland
- 06** Savannah
- 07** Prairie
- 08** Wetland
- 09** Emergent Marsh
- 10** Aquatic Emergent Environment

INFRASTRUCTURE

- 11** Summer Floating Bridge
- 12** Island Touring Loop: Compacted Gravel Route
- 13** Reef Walk
- 14** Informal Paths
- 15** Kayak Launch
- 16** Floating Platform
- 17** Sunken Ship
- 18** Fire Pit
- 19** Existing Roof Water Outfall Structure
- 20** Fishing Piers
- 21** Camping Bowl



04 PARK FEATURES: SOUTH EXPERIENCING WOODS AND WATER

REINTRODUCTION OF NATIVE HABITATS

Ecology and habitat on the island are based in an understanding of regional ecological communities in the context of an island that is entirely constructed. The landscape on the island references the native landscape of Illinois, such as the natural development of elongated habitat zones in ridges parallel to the lake. The natural evolution of this landscape and its native ecologies influenced the design. Although the constructed landscape at Northerly Island Park benefits from efficiencies learned from nature, it will require some maintenance during establishment and throughout its life

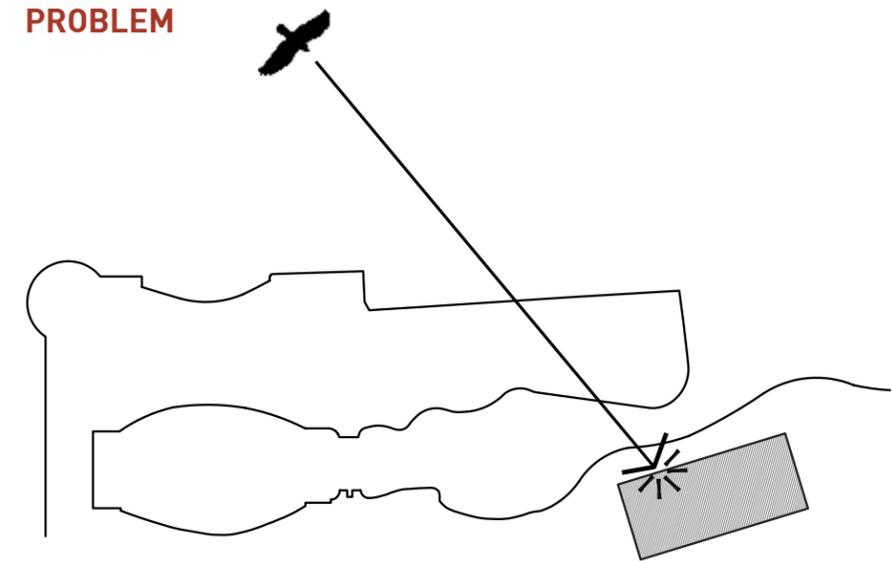
A WOODLAND-PRAIRIE CONTINUUM

At the time of settlement, Chicagoland was primarily prairie marsh. The mouth of the Chicago River, just north of today's Northerly Island, was a unique spot along the shore where tall grass prairie extended into Lake Michigan. Today prairie is the most scarce habitat along the lake. Birds following the Mississippi Flyway still look for grassland habitat along Chicago's shoreline. In recognition of this fact, prairie will occupy an area two times larger than any other habitat on Northerly Island. The population and diversity of birds attracted to Northerly Island will also be greatly enhanced by the addition of a wetland, woodland and savannah habitat.

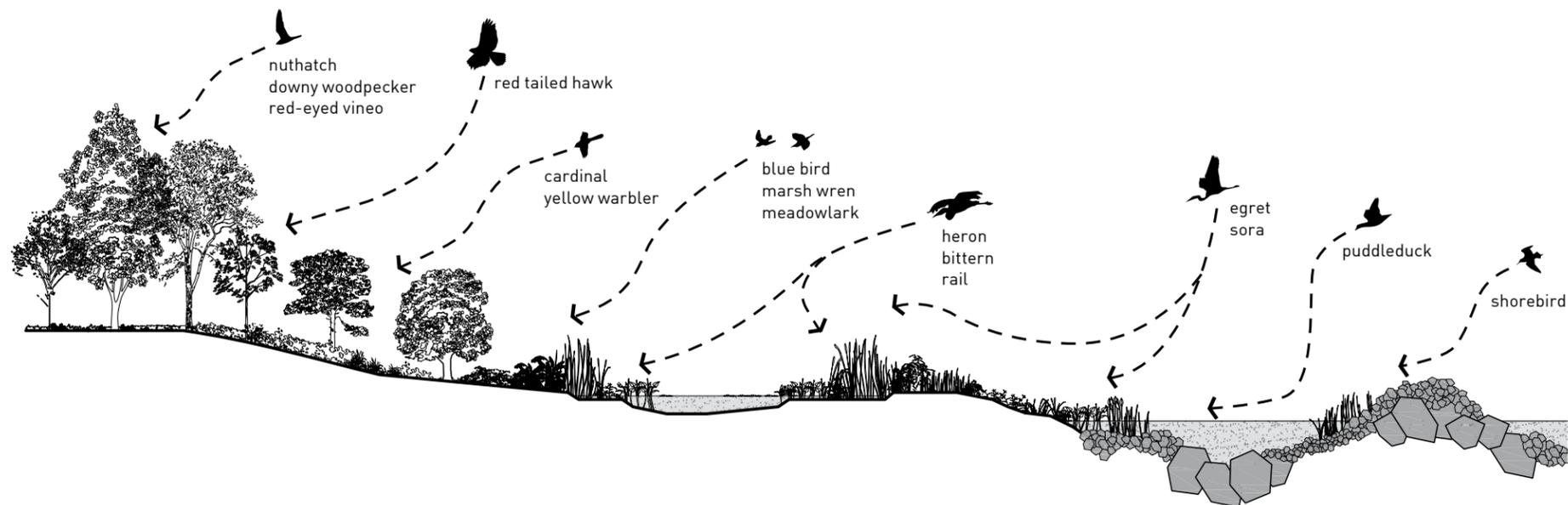
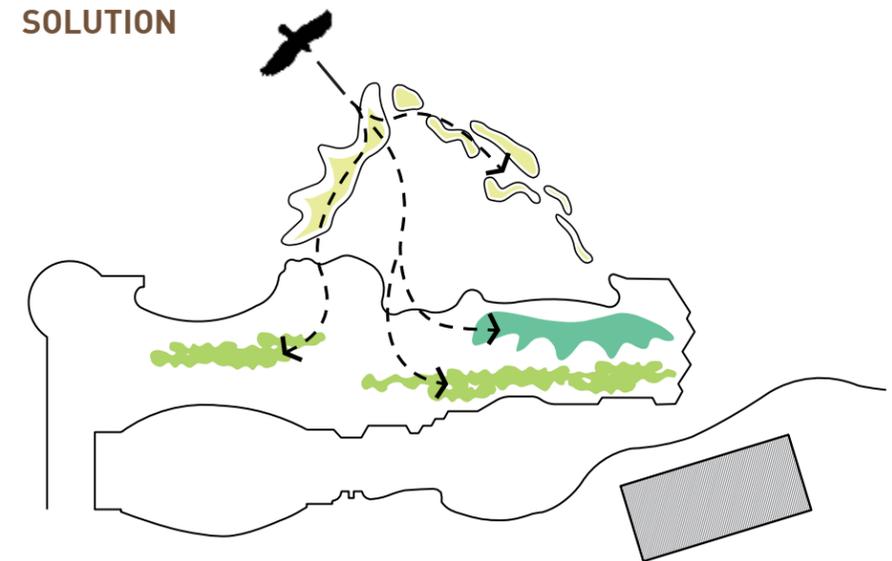
PREVENTING BIRD STRIKES

Cities along migratory bird routes can prevent fatal bird strikes with their glass buildings by providing attractive habitat along their waterways (in addition to other strategies). Several trees were planted east of McCormick Place in recent years resulting in a reduction of annual bird strikes with that building as birds were attracted to the trees instead of reflections in the glass and were able to reorient themselves to the potential dangers of the urban surroundings. A woodland planted at Northerly Island Park will decrease bird fatalities by providing migratory birds a source of food, water, nesting and resting habitat that is scarce along the Chicago coastline and vital east of McCormick Place.

PROBLEM

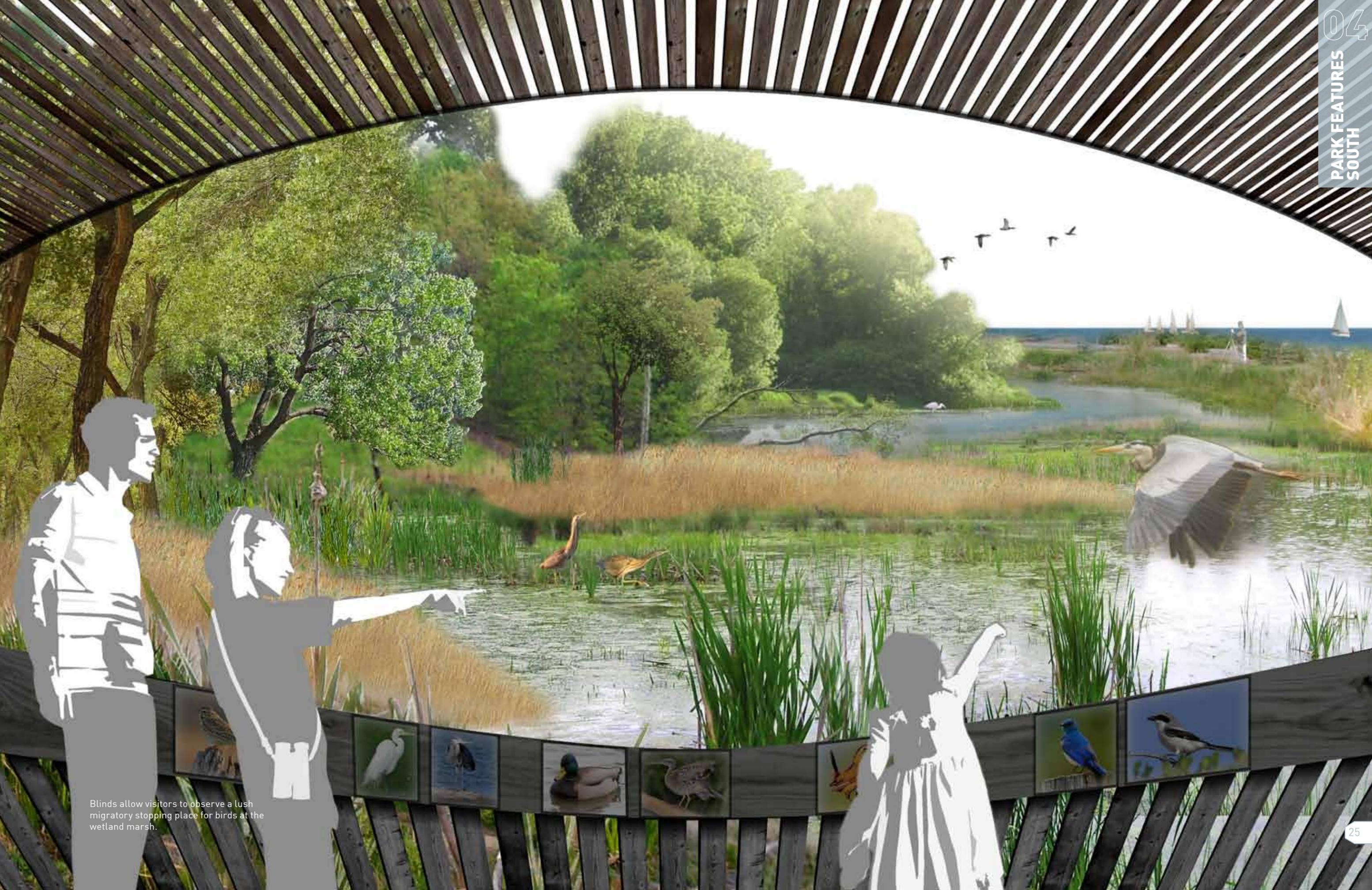


SOLUTION



WOODLAND SAVANNAH PRAIRIE WETLAND PRAIRIE REEF PRAIRIE

Despite close proximity and fluid boundaries between habitats, they are each characterized by distinct plant and animal species and topographic features.



Blinds allow visitors to observe a lush migratory stopping place for birds at the wetland marsh.

PARK FEATURES: REEF

NORTHERLY'S AQUATIC CONNECTION

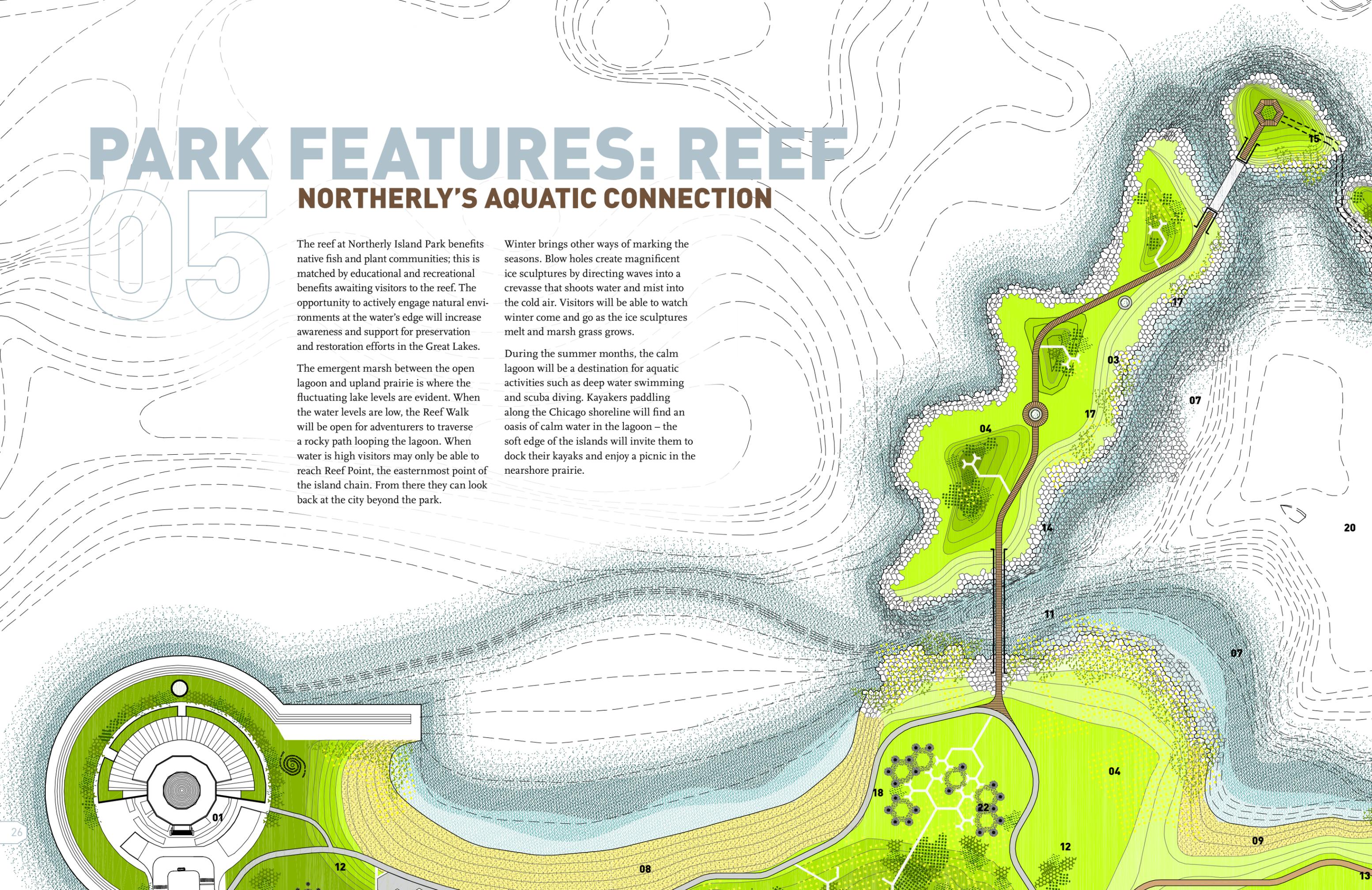
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The reef at Northerly Island Park benefits native fish and plant communities; this is matched by educational and recreational benefits awaiting visitors to the reef. The opportunity to actively engage natural environments at the water's edge will increase awareness and support for preservation and restoration efforts in the Great Lakes.

The emergent marsh between the open lagoon and upland prairie is where the fluctuating lake levels are evident. When the water levels are low, the Reef Walk will be open for adventurers to traverse a rocky path looping the lagoon. When water is high visitors may only be able to reach Reef Point, the easternmost point of the island chain. From there they can look back at the city beyond the park.

Winter brings other ways of marking the seasons. Blow holes create magnificent ice sculptures by directing waves into a crevasse that shoots water and mist into the cold air. Visitors will be able to watch winter come and go as the ice sculptures melt and marsh grass grows.

During the summer months, the calm lagoon will be a destination for aquatic activities such as deep water swimming and scuba diving. Kayakers paddling along the Chicago shoreline will find an oasis of calm water in the lagoon – the soft edge of the islands will invite them to dock their kayaks and enjoy a picnic in the nearshore prairie.



NORTHERLY REEF PLAN

BUILDINGS

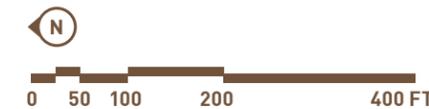
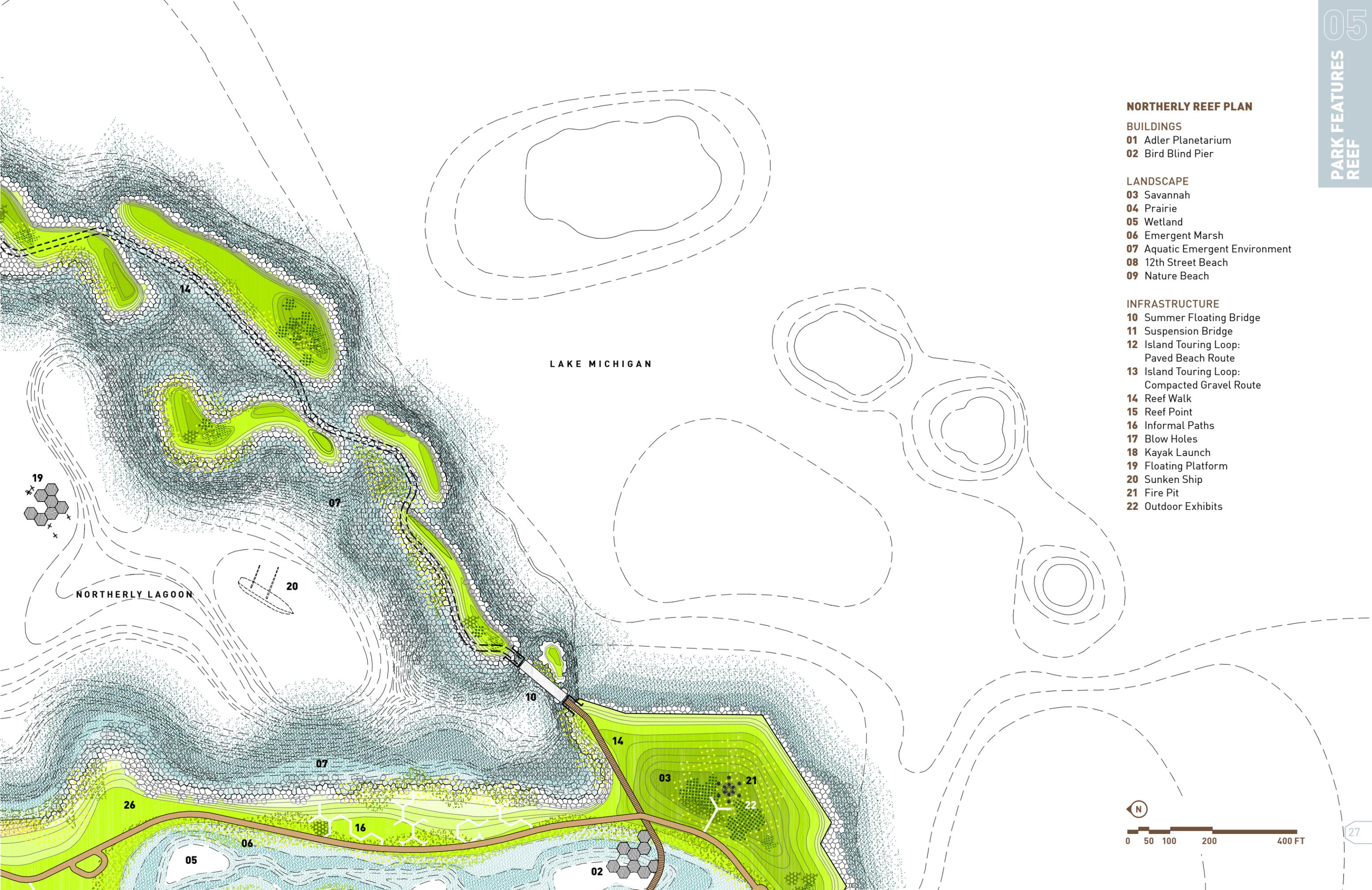
- 01** Adler Planetarium
- 02** Bird Blind Pier

LANDSCAPE

- 03** Savannah
- 04** Prairie
- 05** Wetland
- 06** Emergent Marsh
- 07** Aquatic Emergent Environment
- 08** 12th Street Beach
- 09** Nature Beach

INFRASTRUCTURE

- 10** Summer Floating Bridge
- 11** Suspension Bridge
- 12** Island Touring Loop:
Paved Beach Route
- 13** Island Touring Loop:
Compacted Gravel Route
- 14** Reef Walk
- 15** Reef Point
- 16** Informal Paths
- 17** Blow Holes
- 18** Kayak Launch
- 19** Floating Platform
- 20** Sunken Ship
- 21** Fire Pit
- 22** Outdoor Exhibits







The reef feature at Northerly's eastern edge will protect a deep water lagoon designed to support water activities and fish habitat.



Structures for divers to explore in Northerly's lagoon also help stabilize the shoreline and fish populations.

FORMING REEF AND LAGOON

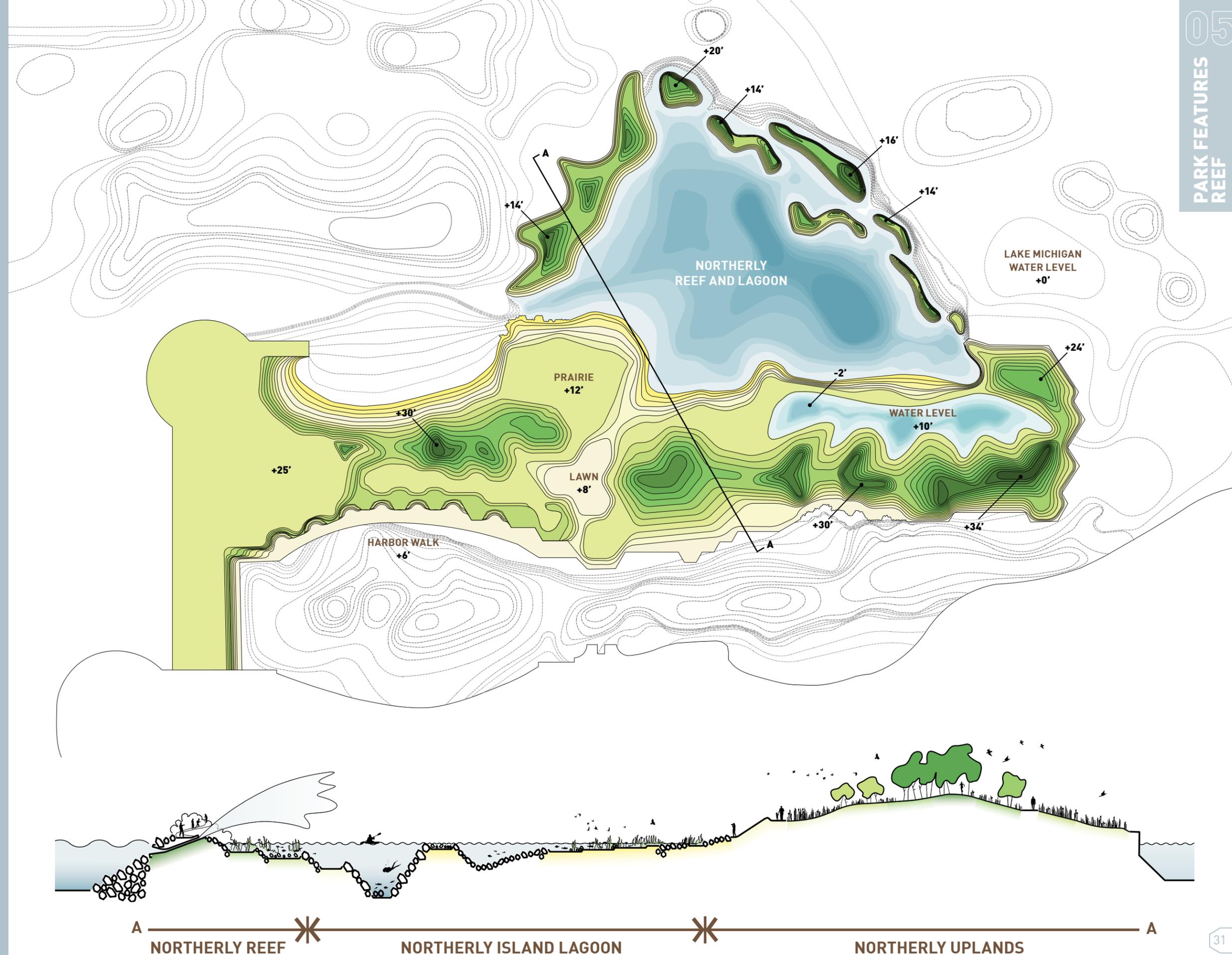
Topography has played a key role in shaping the identity of Northerly Island over the last hundred years. Historic underwater topographic maps reveal deep pits where land was dredged in the early 1920s to construct the island. Other sources of fill to build up the land were not quite as local—these include building demolition debris and materials diverted from landfills.

Topography will continue to play a key role in shaping visitors' experiences and creating healthy ecologies at Northerly Island Park.

A network of ridges dotted with peaks and valleys runs along the southwest edge of the island into Lake Michigan where they become the Northerly Reef, forming and protecting the Lagoon. This elevated loop connects land and water activities and ecologies, thereby defining a new way of engaging the lake.

Construction of these protective ridges will be composed of inexpensive shot rock, generally obtained for the 'first blast' at a quarry. This type of stone is available in suitable quantities and is less expensive than other types of fill material. The rock will be placed in several layers of different sized stone. Larger stones will be used on the outside of the reef where they will protect the reef against the Lake Michigan's powerful waves. Different sizes stones at the inner lagoon will be selected based on needs of spawning fish and surface vegetation.

A less identifiable, but not less important, benefit of the ridge network is the visual and acoustic buffer it provides. Visitors to Northerly will be able to stand on the edge of the wetland and lose all sense of the city beyond. A short hike up the forested ridge will reveal views of Chicago's skyline and a bustling harbor nearby.



ACTION PLAN

06 IMPLEMENTATION

RATIONALE

This Action Plan illustrates how to sequence the project through a logical progression of implementation. This approach maintains required existing operations to keep a significant portion of the park open at all times and considers factors such as access to the Alder Planetarium, 12th Street Beach and the music venue. The Action Plan will also depend on timing to acquire permits from various regulatory agencies, maintaining current revenue streams, budget and dovetailing with potential funding sources. These issues are discussed in greater detail on the following pages.

FUNDING OPPORTUNITIES

A project as complex and socially significant as Northerly Island will have the presence to become a textbook example of civic improvement and, as such, draw upon numerous public and private funding sources. To address this, the design of Northerly Island is structured to align with a number of known funding sources. These range from public-private partnerships that could provide needed revenue generation to a range of grant opportunities that align with the plan's recommendations for physical and programmatic improvements. The project includes flexible public facilities and revenue generating venues, open space, habitat, recreational spaces and a range of transportation enhancements that each align with funding opportunities. Northerly Island looks upon one of the greatest bodies of fresh water in the world in a world renowned city. It is the

neighbor of esteemed cultural institutions and is the vista for millions of visitors to a world class convention center, harbor and sports stadium. Donor opportunities will offer a significant opportunity to provide additional sources of revenue.

More important than the available funding will be how the funding is pursued, the timing of how it is pursued, and the construction procurement requirements associated with the funding. This Action Plan recommends an aggressive funding program based upon the plan rather than a finished project. A strategic, systematic approach to funding can be implemented by the Chicago Park District where real time, actual tracking occurs for secured funding, operator agreements and the donor program. The Chicago Park

District can rigorously pursue funding and secure the agreements during the multiple phases of the project, tracking real revenue during this process that can determine the extent of funded improvements. This approach is highly recommended over a traditional "design then chase the money" approach.

REGULATORY CONSIDERATIONS

The regulatory steps associated with Northerly Island Park implementation will depend on the selected improvements proposed in the plan. This document highlights the broad range of possible permits for the general work proposed. Each phase as described herein identifies the types of permits that may be required for the work. In general, improvements

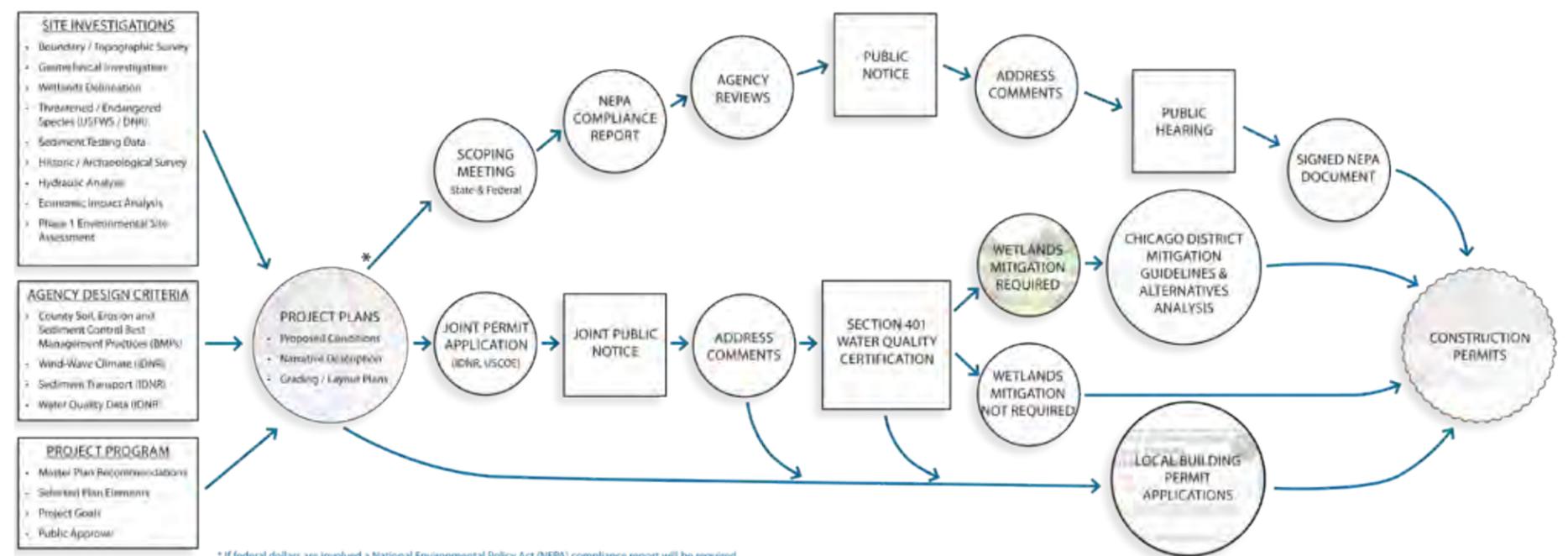
proposed at/near the land-water interface or within floodplain and wetland areas require both State and Federal authorization. The coordinated State permit process is also known as the "Joint Application Process" for the applicant seeking authorization from the United States Army Corps of Engineers (USACE), the Illinois Department of Natural Resources-Office of Water Resources (IDNR-OWR), and the Illinois Environmental Protection Agency (IEPA). This permit process will also identify additional regulatory steps associated with threatened/endangered and protected species or site historical significance.

Typically, local requirements and all regulatory steps are identified early in the project planning process and appropri-

ately factored in the regulatory permitting strategy for the Project. All permit applications and related processes must be sequenced as appropriate throughout the project so that permit issuance is timely with construction.

The coordination with all regulatory agencies is highly recommended as early as possible during the implementation phase. This allows time to collect the data necessary to meet the regulatory agencies' requirements. While the regulatory agencies do not have a detailed list of specific documents that are required for a project of Northerly Island's complexity, general authorities and requirements are presented below.

Should any new land be created, the Project would need to receive the approval



PERMITS

of several permitting agencies, including the Department of Natural Resources. Illinois Law 615 ILCS 5/18 states: “The building of any causeway, harbor, or mooring facilities for watercraft in Lake Michigan shall be confined to those areas recommended by the Department and authorized by the General Assembly and approved by the Governor and shall be in aid of and not an interference with public interest or navigation”.

Experience with similar projects along the Lake Michigan Illinois shoreline indicates the project will require authorization by the General Assembly and approval by the Governor and could be achieved by a Joint Resolution as an alternative to a Legislative Act.

USACE

The decision to issue a permit will be based on evaluation of the possible impacts on the public interests, protection and utilization of the natural resources. The project factors which may be relevant to the permit approvals are:

- Conservation
- Aesthetics
- Economics
- Environmental Concerns
- Wetlands
- Historic Properties
- Fish and Wildlife Values
- Flood Hazards
- Land Use
- Navigation
- Shoreline Erosion
- Energy Needs
- Safety
- Welfare of the people

During the permitting evaluation, the USACE will request comments from the public, Federal, State and local agencies, and other interested parties. Any comments received under the Joint Public Notice process will determine whether to issue, modify, or deny a permit. Based on similar projects, special attention will be given to proposed fill quantities below the Ordinary High Water Mark (OHWM), CSO and stormwater outfalls, Best Management Practices for water quality issues, stormwater runoff from impervious areas, minimizing the project impacts on sediment transport, and proposed area of bottom lands created.

IDNR-OWR

The project factors which may be relevant to the permit approval are similar with the ones listed under USACE, with additional specific lake encroachments and sediment transport/impacts. Based on similar projects, special attention will be given to any E. coli issues, basis of design (wind wave climate), project impacts to near-shore habitat, sediment transport and by-passing, and Environmental Analysis (EA) as a tool to assess the various possible project impacts.

IEPA

The Section 401 certification is mandatory for all projects requiring a joint permit application. The IEPA is responsible for water quality standards, and determining if additional permits are necessary, such as sanitary sewers, water mains, disposal of dredged material, and other miscellaneous activities. For projects in Lake Michigan, a joint permit from IEPA and IDNR-OWR is required in addition to the Sections 401 Certification and the 404 permit from USACE.

INTERAGENCY WETLANDS POLICY ACT OF 1989 ILCS

This act established the State of Illinois goal of no overall loss of wetlands due to proposed construction activities. This act is implemented through the State of Illinois Wetlands Mitigation Program. The Interagency Wetlands Committee includes provisions for conflict resolution, compensation plans and scientific monitoring.

LOCAL APPROVALS

The project will need to comply with the Chicago Lakefront Protection Ordinance and will need to go through a series of local permits and approvals including the Department of Zoning and Land Use Planning, Chicago Plan Commission, Chicago Harbor Permit and the City Council once all requirements of the permit have been met.

MWRD PERMITTING

The Metropolitan Water Reclamation District of Greater Chicago (MWRD) was originally organized as the Sanitary District of Chicago (1889), with the name changed in 1989. MWRD has jurisdiction over the Cook County sewerage systems, interceptors, sewage disposal and treatment plants and facilities by controlling the nature, volume and the manner of discharge into said systems.

For watershed areas under the jurisdiction of MWRD, the permittee must first obtain approval from the local permitting agency. In general, most local permitting agencies comply with the requirements of MWRD as to types of materials, methods of installation, maximum permissible rates of infiltration and other engineering parameters. The MWRD permit allows for by-pass of the storm sewer runoff from the local system to the MWRD storm interceptors.

The permit is awarded based on (1) the local government having jurisdiction over the project area shall have adopted a storm water detention or flood control ordinance

acceptable to the District, together with a drainage plan and time schedule for its implementation approved by the District, or (2) the run off rate from the area be restricted to be no greater than that from its natural or undeveloped state and that detention space for the excess storm water be provided in accordance with the current Manual of Procedures of the District. Provision shall be made for proper maintenance of any such detention facility.

DWM PERMITTING

The Chicago Department of Water Management (DWM) will need to issue a sewer permit for the project based on the City of Chicago Sewer Ordinance and will need to be coordinated with the IEPA and the Metropolitan Water Reclamation District of Greater Chicago (MWRD).

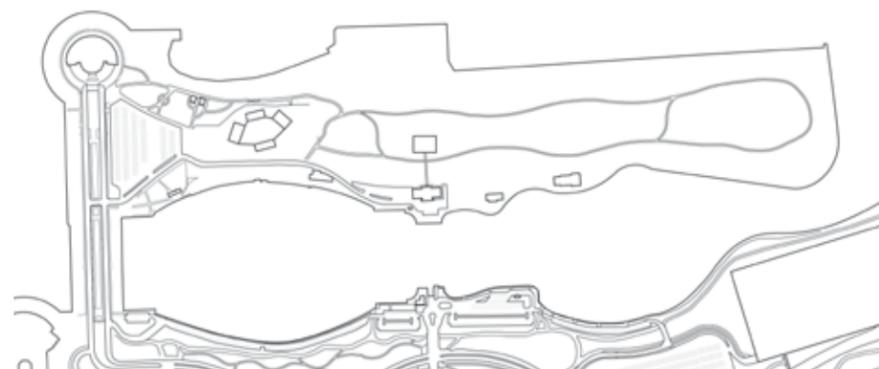
Phasing for the project has been structured to allow for construction of immediate needs that will provide a revenue stream for operations and funding for future phases. The first phase does not require regulatory agency approval so it can commence immediately. Local permitting will be required, but the complexity and timetable are much less significant than . Available funding or other factors could alter this approach. The general multi-phase approach will consist of the initial phase, then future phases can follow in any order depending on funding and identified needs. Future phases, especially the Coast Phase, will require an extensive regulatory process and it will likely be a requirement that they be permitted coincidentally. The general phasing and project areas are described as follows:

Current Phase – Music Venue, Parking Garage, North Burnham Harbor Promenade

Future Coastal Phase – East Shoreline, Kayak Beach and Beach House, Lake Features, Reef, Habitat Enhancement

Future Land Phase – East and South Park, South Burnham Harbor Promenade, Great Lawn, Education Center and Pavilion

The phases are depicted with the various improvements, general descriptions and access routes to maintain use of needed existing facilities. Each illustrates the likely regulatory steps.



NORTHERLY ISLAND TODAY



CURRENT PHASE

- Music Venue
- Parking Garage
- North Burnham Harbor Promenade

- 1 Public access to beach, existing music venue, and Northerly Island
- - - → 2 Private access by music venue service and VIP vehicles through construction zone

Work will be conducted to maintain use of the existing venue. Demolition of the existing parking lot and a portion of the harbor promenade will be required, but access will be maintained. Provisions for temporary parking and or / shuttle service maybe required. Various utility relocations will be required. Excavation for the underground structure and the venue superstructure will be conducted. The use of water cut-off walls may be required depending on design approach. The concrete foundation and superstructure system will be constructed. Site utility infrastructure will be installed

and will be stubbed for extension into future phases of the park. Build out of the garage, site amenities, the venue and landscaping will be completed.

REQUIRED PERMITS

- IEPA
- Lakefront Protection Ordinance
- MWRD
- DWM
- City Of Chicago Building Permit



FUTURE COASTAL PHASE

- East Shoreline
- Kayak Beach and Beach House
- Lake Features and Islands
- Reef Walk
- Lagoon
- Habitat Enhancement

- 1 Public access through completed work to beach, new Music Venue, and Northerly Island
- 2 Existing music venue is removed and its site restored

The former venue and surrounding support buildings can be demolished once the new venue and garage are operational. Upon approval from regulatory agencies, work on the outer breakwater islands and creation of the habitat and recreational lagoon can begin. Habitat improvement / creation will likely provide the mitigation needed for the regulatory permitting. Work can be conducted from both land and water if required. Placement of foundation stone and shoreline protection will be conducted. Reshaping of the east shoreline of the current island will be conducted. Spoils and construction staging will take place on portions of the southern end of the park. Use

of the park will be maximized by managed use of the construction zone. Completion of access paths and bridges will be done and the area will become available upon opening of the paths. Docks and diving/habitat, sunken ships and docks will be implemented.

REQUIRED PERMITS

- USACE
- IDNR-OWR
- IEPA
- Wetlands
- Lakefront Protection Ordinance
- MWRD
- DWM



FUTURE LAND PHASE

- East and South Park
- South Burnham Harbor Promenade
- Great Lawn
- Education Center and Pavilion

- 1 Public access to beach, new Music Venue, and Northerly Island
- 2 Pontoon bridge gives mid-island public access to Education Center and Reef Walk
- 3 Reef Walk

Work on the land phase can begin anytime after receiving regulatory approvals. The 12th Street Beach can be completed by final site element connection to the new venue and completed lagoon area. The south and central portions of the island can be re-contoured to create the land forms and wetland interpretive areas. Wetland areas will likely provide some or all of the mitigation needed for regulatory permitting. The site buildings and south end of the harbor promenade can be completed. Access to the harbor and docks will be maintained at all times. Pathways, landscaping and site amenities will be installed.

REQUIRED PERMITS

- USACE
- IDNR-OWR
- IEPA
- Wetlands
- Lakefront Protection Ordinance
- MWRD
- DWM
- City of Chicago Building Permit



NORTHERLY ISLAND PARK COMPLETE

07 TECHNICAL DESIGN AQUATIC ECOLOGY

BENEFITS TO HABITAT

Scientists have found that a lack of fish spawning habitat is limiting the reproductive success and population growth of native fish in the Great Lakes Areas of Concern. The Northerly Island Park project is expected to improve reproductive success and enhance the productivity of numerous fish stocks harvested by the Great Lakes fishery. It is anticipated that the construction of the bio-engineered breakwaters may enhance reproduction of several native fishes such as emerald shiner, white sucker, smallmouth bass, silver redhorse, largemouth bass, rock bass, bluegill, yellow perch, drum and walleye.

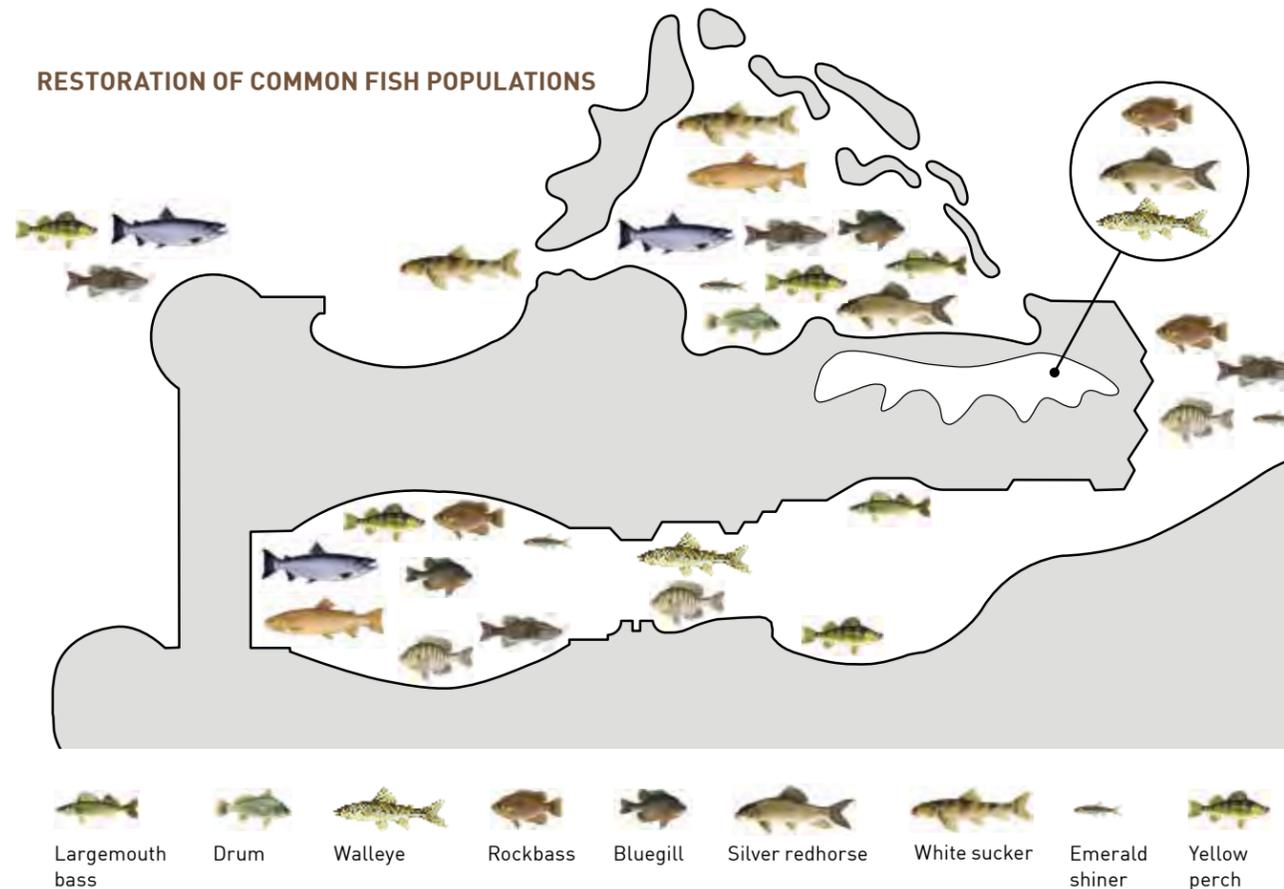
DESIGN STRATEGY

The approach to spawning/ nursery/ rearing habitat building reflects lessons learned while working in other Great Lakes and Detroit River habitats enhancement projects. These projects were successful in their use of different types of substrate materials and sizes. The first bed is comprised of 12-18 inch diameter broken limestone. The second bed is comprised of 6-8 inch diameter broken limestone. The third bed is comprised of 3-6 inch rounded rock. These materials are recommended because their use elsewhere

in the Great Lakes and connecting channels have attracted several fish species of interest, including bass, perch, lake whitefish and walleye. The team also found that use of large anchor-stone on the leading edge of constructed spawning habitats provides for adult resting and hiding.

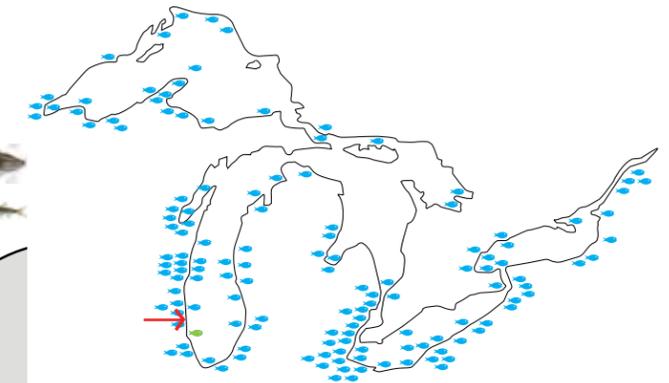
The survival of the fish larvae once hatched is greatly influenced by the proximity and quality of adjacent nursery habitat. Many newly constructed reefs have not considered the importance of this relationship. High numbers of spawn ready fish and egg deposits do not necessarily result in increased productivity. This project proposes to support the spawning habitat by creating both adult resting and nursery/ rearing habitats adjacent to and landward of the spawning reef. Naturalized and protected embayments along the Northerly Island eastern shoreline will provide for fish habitat structure, created wetland edges and deep holes in the vicinity of the spawning reef. Conceptual designs that mimic those areas known to attract and keep fish will include coastal wetlands, rock barriers, deep water habitat, substrate modification, flow diversion structures, increased plant and forage fish diversity.

RESTORATION OF COMMON FISH POPULATIONS



RESTORATION IN THE GREAT LAKES

Northerly Island Park is part of a larger effort to restore native fish population and habitat in the Great Lakes (fish in lake) and their watershed (fish on land)



PROJECT GOALS

- Create 12 acres of spawning habitat; 19 acres of coastal wetlands, 70 acres of shallow water and 10 acres deep water habitat. The relationship of fish spawning to nursery/ rearing habitat will enhance reproductive success and productivity of native fish.
- Increase our understanding of connectivity between spawning sites and nearshore habitat. Using information about fish preference, a variety of nearshore habitats could be constructed throughout the Lake Michigan to benefit multiple species. This would have a significant impact on native fish populations. The project team plans to coordinate with the other Great Lake scientists on restoration work in Lake Michigan with the long-term

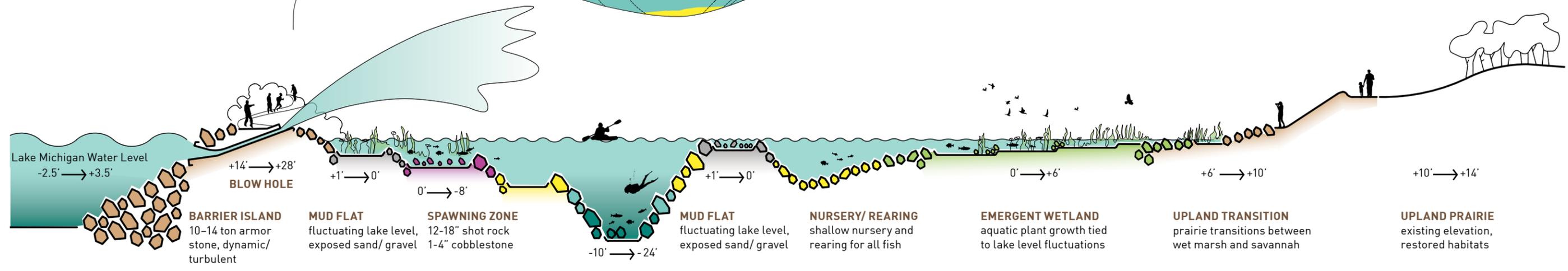
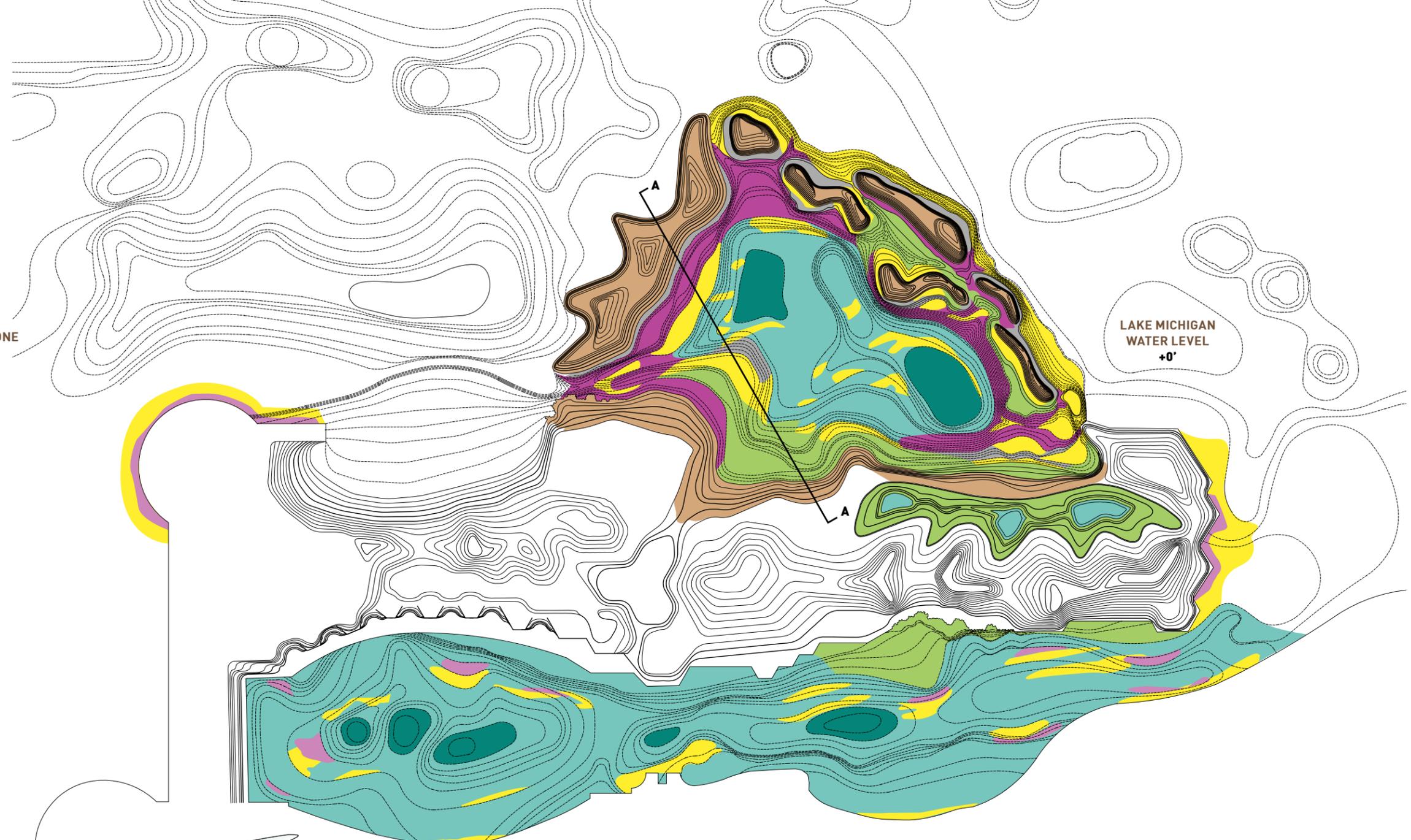
goal of enhancing native fish productivity. This will be facilitated by team members that include agencies with jurisdiction throughout the U.S. portion of the Great Lakes basin, e.g., USGS, USFWS, Illinois Sea Grant and Illinois DNR, and entities with strong relationships in the fishery management community.

- Establish a coordinated outreach and education effort for outdoor classroom-piloted, activity-oriented programming.
- Enhance sport fisheries - annually the Great Lakes fishery is a \$4 billion industry.
- Improve recreational activities, such as hiking, bird/wildlife watching, kayaking and canoeing, tourism to enhance the regional quality of life and appreciation of aquatic habitats.

- Enhance public understanding of the importance of fish and wildlife habitat to their quality of life and the economic health of the region.
- Understand fishery needs in terms of size, location, and proximity of associated spawning to nursery habitats, including connectivity of these habitats to increase survival of young fish produced on the spawning habitat.
- Provide resource managers with support tools and scientific information for fish and habitat restoration in Lake Michigan.
- Transfer and adapt findings and lessons learned from this project to other Great Lake locations i.e. AOCs, connecting channels such as the St. Mary's River, the Niagara River and the St. Lawrence River.

- Support techniques that will assist in the delisting of fish and wildlife Beneficial Use Impairments under the Great Lakes Water Quality Agreement.
- Inform local, regional, and national audiences (educators, legislators, general public) about the fish habitat restoration results of this project and the importance on the connection between fish life cycles and habitat restoration.

-  **UPLAND TRANSITION TO RIPARIAN ZONE**
more that 8' above MWL
-  **EMERGENT WETLAND**
0 to 6' above MWL
-  **MUD FLATS**
0 to 1' above MWL
-  **GRAVEL/ BOULDERS**
1' above to 6' below MWL
-  **SPAWNING ZONE**
0 to 8' below MWL
-  **WARM WATER FISH SPAWNING**
0 to 8' below MWL
-  **SHALLOW WATER**
6 to 10' below MWL
-  **DEEP WATER**
more than 10' below MWL



A **LAKE MICHIGAN** * **NORTHERLY REEF** * **NORTHERLY ISLAND LAGOON** * **NORTHERLY UPLANDS** A

07 TECHNICAL DESIGN TERRESTRIAL ECOLOGY

The ecologies on Northerly Island Park are designed to increase biodiversity, demonstrate sustainable restoration practices, and offer the people of Chicago a scenic escape. With a natural area nearly three times the size of Navy Pier, an entertainment destination just north of Northerly, the park is vast enough to support a functioning ecosystem and host the wide range of activities the public seeks.



At Northerly today, the city has a strong presence beyond the island's grassland prairie.

NORTHERLY ISLAND TODAY

An analysis of Northerly Island's current landscape provides important information about the success or failure of plantings and habitats.

The highest quality habitat on the island is a short grass prairie that was planted 2004. This grassland covers approximately 35% of Northerly Island today and provides nesting habitat, most notably, for savannah sparrows and dickcissels, and other common grassland and suburban species. Bird watchers can be seen at Northerly Island watching for marsh birds that stop at the park during migration. The trampled grass paths at the remote edge of the island are evidence of the popularity of Northerly as a birder's destination and need for accessible infrastructure.

A LOCAL ECOLOGICAL PALETTE

The habitats introduced to the park will reference the palette of pre-settlement plants common to the region. While Northerly Island Park is not a pure restoration project (the island itself is a man-made construction), it will give visitors a glimpse at what the region looked like centuries ago. A hike to the southern tip of Northerly will afford views of tall bulrush at the edge of a wetland marsh under the shade from the canopy of a Hickory grove. Looking north from this point will

transport hikers back to the present day—the Chicago skyline will be visible rising from the prairie.

The landscape design will evoke the flora of the Prairie State. The interconnected ecosystems on the island – wetland, prairie, savannah, and woodland – will be made up of native plants that are known for hardiness. They must be able to mature while battling harsh winds off the lake and a near constant stream of visitors passing through. The diverse mix of native plant species and habitat zones will transform the island into a living classroom that demonstrates the balance of natural and constructed landscapes.

RESTORATION PLAN

WETLAND

A wetland at the southern end of the island will not be disturbed by loud concerts and events in the more active north end. The contained wetland, disconnected from the extreme fluctuations of water level in Lake Michigan, will greatly expand the number and species of birds attracted to Northerly Island Park and provide continuous spawning and foraging habitat for cool water fish. The wetland hydrology is a system separate from the aquatic Reef. The contained wetland will be fed from an artificial water source and maintained continuously while the Reef is tied to the changing lake levels. The depth and turbulence of the lake does not

permit birds to rest, nest, or feed; their preferred stopping place is wetland.

The irregular shape of the wetland with “fingers” is designed to maximize the perimeter where the emergent marsh becomes sedge prairie. Heterogeneity is further supported by shelves at varying levels designed to support aquatic plants (3 to 1 foot below water level), emergent plants (1.5 to 0 feet below water level), and wet prairie (just above the water level).

PRAIRIE

The wetland marsh becomes a tallgrass prairie as the elevation rises to dry land. Additional areas of prairie at the northern and eastern edge of the park will welcome visitors to Northerly with panoramic vistas of the lake and woodland ridge beyond.

The prairie at Northerly today is a significant habitat for upland and grassland birds following the Mississippi Flyway. This habitat is nearly absent elsewhere along Chicago's coastline. The prairie will be expanded and improved by diversifying plant species. Improved prairie habitat will in turn bring an increase in nesting grassland birds. Birds houses will be installed to encourage nesting by swallow, bluebirds, and purple martins and to educate visitors about the birds in the region.

WOODLAND AND SAVANNAH

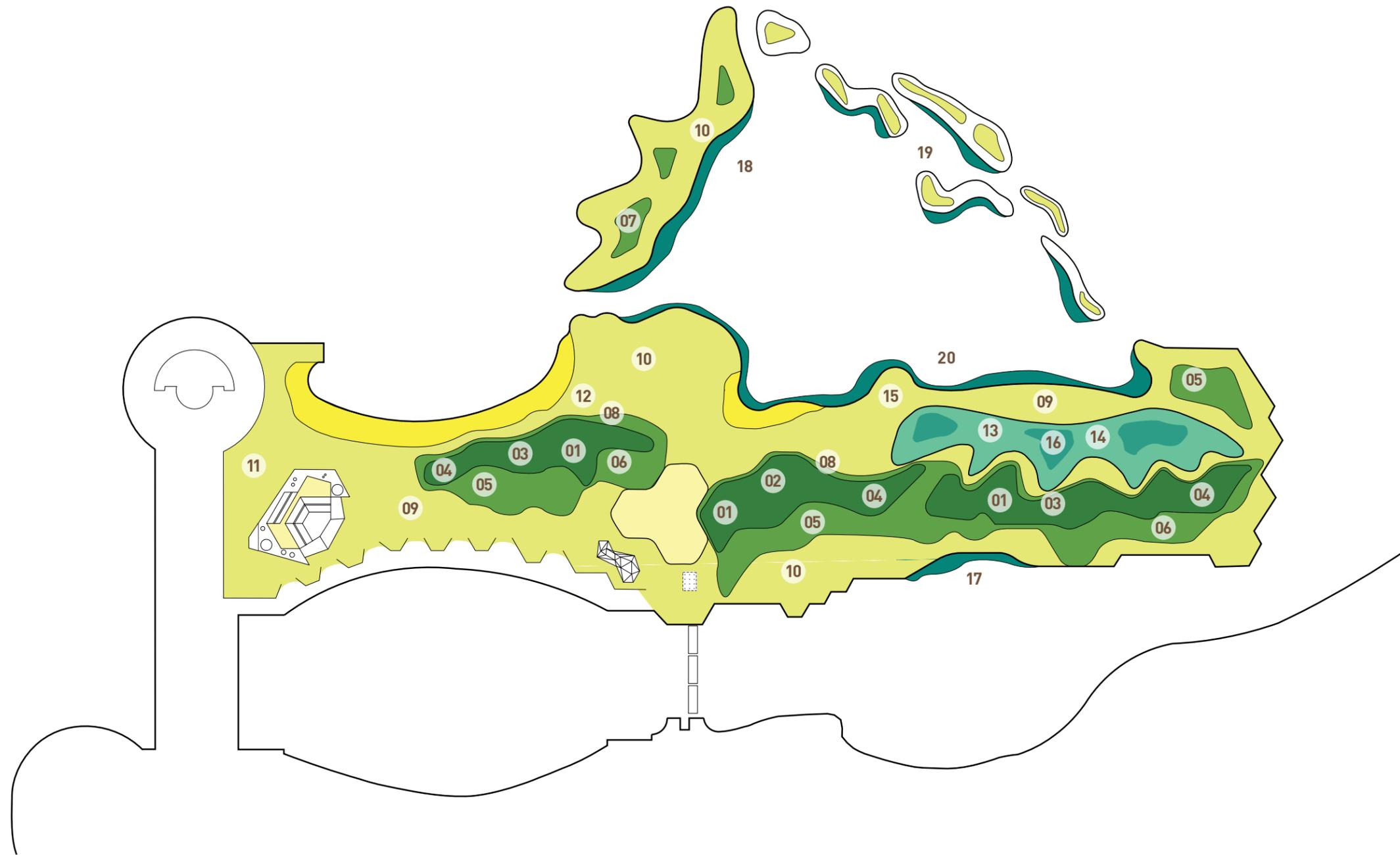
As much of Northerly today is planted with common prairie grass, the introduction of woodland habitat will greatly

increase the biodiversity on-site. At the southwest of the island the flat expanse of prairie becomes a chain of peaks and valleys. Here the prairie transitions to open savannah (30-50% canopy cover) that transitions to woodland (50-80% cover). The woodland ridge acts as a noise buffer keeping sounds of the city (especially Lake Shore Drive) out of the park.

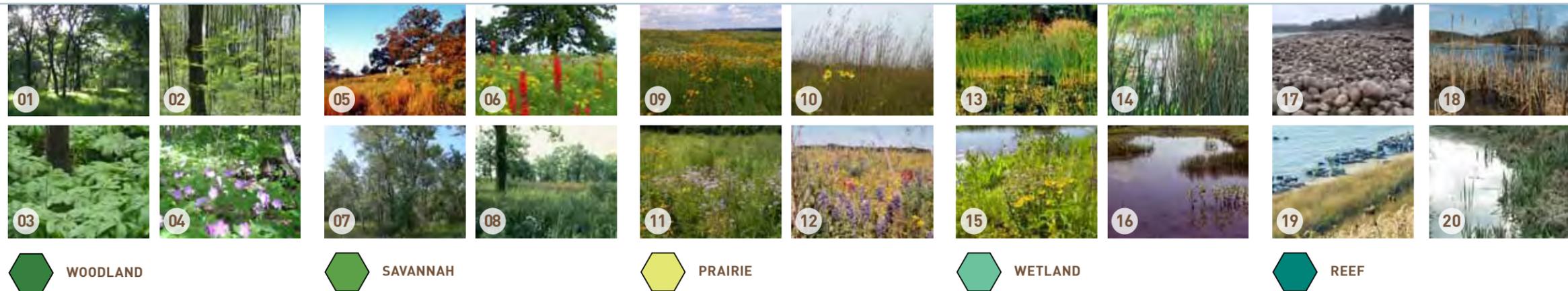
The ridge will be accessible by a network of paths designed for a range of activities: hiking, cross-country skiing, nighttime star-gazing walks. The addition of these upland communities will provide expanded habitat for warblers, red-tailed hawks, and cardinals - and create an enhanced educational and recreational experience for bird watchers, hikers, students, and eco-tourists.

PROJECT GOALS

- Restore indigenous natural communities to maximize sustainable ecological functions, including biodiversity and wildlife habitat.
- Demonstrate the value and importance of restored natural communities in urban corridors for wildlife.
- Provide researchers and students with opportunities to work in a natural, outdoor “living laboratory” where they can study such phenomena as:
 1. How the diversity and richness of flora and fauna changes over time as a restoration matures and evolves;
 2. How the restoration of native plant communities builds and stabilizes soils;
 3. How natural area restoration can sequester carbon and at what rate;
 4. The efficacy of varying natural area management techniques.
- Provide educators with an outdoor classroom where they can give students hands-on instruction in ecosystem processes, ecosystem restoration, wildlife biology, plant taxonomy, natural lands management, etc.
- Provide grassland birds with habitat for resting and re-fueling during migration, and habitat for nesting during the growing season.
- Provide opportunities for the City, local universities, NGOs, and public natural resource agencies and managers (e.g. the Park District, Forest Preserve District, DNR, US FWS, Corps of Engineers, EPA, GLRI, etc.) to collaborate and work together to define and meet joint goals.



CHARACTERISTIC PLANT SPECIES



07 TECHNICAL DESIGN OPERATIONS AND SUSTAINABILITY

Restored ecological communities will require consistent maintenance, monitoring, and management to maximize habitat benefits, all of which must be scheduled and budgeted as part of the restoration implementation plan.

WETLAND/ PRAIRIE MAINTENANCE

Inland wetland hydrology will be managed with a pump and a water control system. Water levels will be lowered during the first year to enhance the establishment of new plantings, and raised to a sustained pool elevation once marsh plants are established.

Mowing reduces the ability of annual weeds to set seed while promoting the root development of native species. As such, prairie and sedge meadow zones will be mowed to about 12 inches three times during the first year, and twice during the second year. Mowing during future years depends upon the success of the initial seeding and growth development.

Once wetland and prairie plantings have become fully established (usually after

three to five years), wetland marsh and prairie should be burned in the spring on a one to three year cycle. Annual wetland maintenance includes the physical removal of invasive weeds like reed canary grass, some cattail, phragmites, purple loosestrife, thistle, teasel, and burdock.

SAVANNAH / UPLAND WOODLAND MAINTENANCE

Trees and shrubs should be planted in copses, or clusters of mixed trees and shrubs, to facilitate the management of understory weeds using fire and mechanical means. Most of the savannah/woodland communities are on slopes that should be protected with appropriate erosion control fabric until understory vegetation is established.

PRESCRIBED FIRE

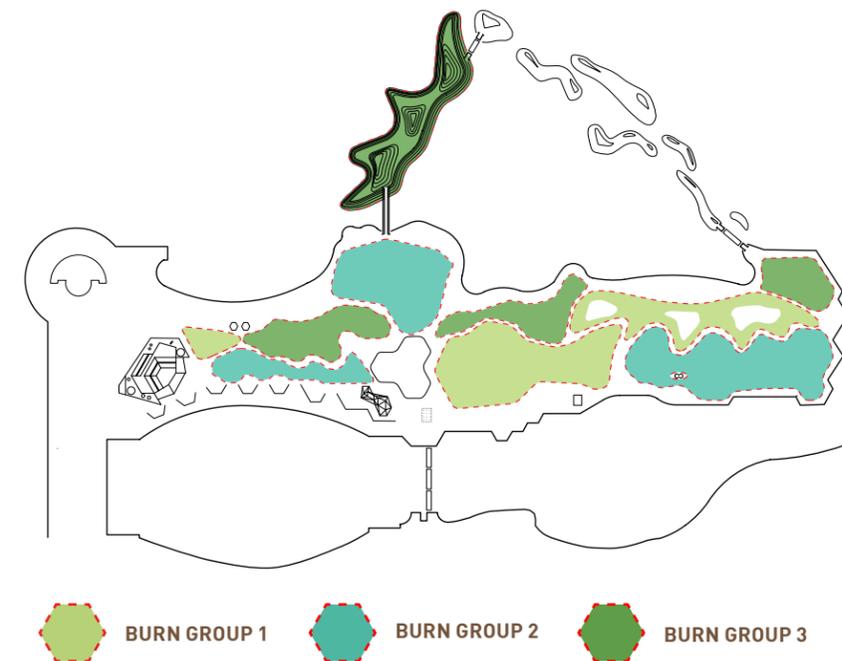
The use of prescribed fire is an important management tool for ecological restorations, and Northerly Island Park is no exception.

Native Illinois plant communities were shaped by fires set by Native Americans or, prior to that, those sparked by lightning. Fires reduce the encroachment of woody material into the prairie, while the scorched and blackened soil they leave behind absorbs heat from the sun that stimulates the growth of warm-season native plants. Some native plant seed cases even require scarification by fire before the seeds will germinate.

The extent and severity of fires is determined by humidity, wind, topography,

aspect, and moisture content in plants. In general, prairies naturally burn more regularly than savannahs, which burn more regularly than woodlands (as only relatively rare catastrophic fires are fierce enough to destroy mature trees with fire-adapted bark).

Once established, Northerly Island Park's wetland and herbaceous communities should be burned on a one to three year cycle, and its woodlands and savannahs on a three to five year cycle.



A primary goal of the project is to minimize energy usage on the island and generate its energy on-site, thereby minimizing its impact on the existing utility infrastructure and reducing its carbon footprint. The project also aims to use strategies and technologies new to the City of Chicago in order to set an example and precedents for future area projects.

RENEWABLE WATER SOURCE: MCCORMICK ROOF WATER FEED

The contained wetland at the south end of Northerly Island Park will demand a significant volume of fresh water in order to keep a constant water level at a depth that sustains plant and animal life. This water will be provided by diverting an existing rainwater collection pipe for reuse in the wetland.

A system commissioned in 2006 drains water collected on the roof of McCormick

Place into Lake Michigan. The difference in elevation between the roof level and the water outlet directs the storm-water through a tunnel below the harbor and out into Lake Michigan without the use of pumps. This system will be modified so that water is collected in a buried reservoir rather than draining into the lake. The reservoir will drain into the wetland to maintain a constant water level.

RENEWABLE HEATING AND COOLING: GEO-THERMAL EXCHANGE LOOP

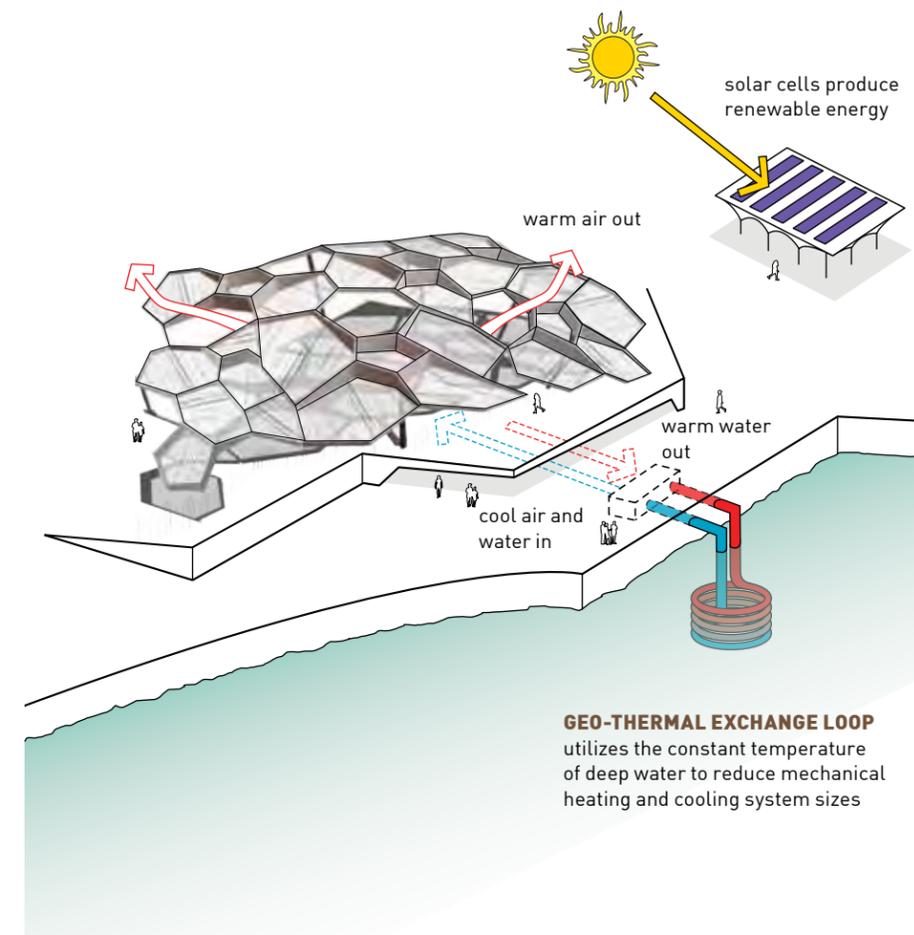
The cooling and heating required for the structures proposed in the Framework Plan will be supplied using a lake loop geo-exchange system. This system will utilize the near consistent temperatures of the deep lake water combined with heat exchangers to generate heating and cooling energy to be delivered to each structure.

This system will draw lake water below a depth of 10 feet into a heat exchanger and transfer lake water to a working fluid. The working fluid can be used directly in cooling coils or be used to temper cooling and heating of efficient refrigeration fluids during times of extreme heat or cold.

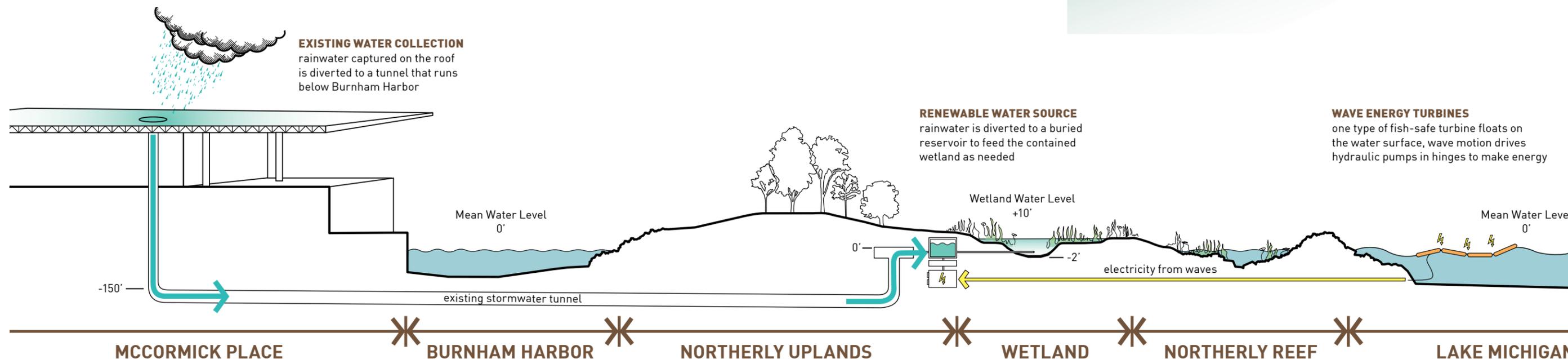
RENEWABLE ENERGY: WAVE ENERGY TURBINES

The immense energy of waves has guided the concept of the Northerly Island Park plan. A study of wave impact on deteriorating edges of Northerly today led to this proposal for naturalized edges to protect water and emergent environments from this power. The waves that break at the new barrier islands will be used to generate energy for the buildings and infrastructure at the park. Wave energy

captured through fish and bird safe wave energy turbines is a developing technology that has been used in Denmark, Portugal, Scotland, and the UK. Current studies find wave energy is an efficient system for energy production in the Great Lakes. Northerly Island Park will be a model for this technology.



GEO-THERMAL EXCHANGE LOOP utilizes the constant temperature of deep water to reduce mechanical heating and cooling system sizes



EXISTING WATER COLLECTION rainwater captured on the roof is diverted to a tunnel that runs below Burnham Harbor

RENEWABLE WATER SOURCE rainwater is diverted to a buried reservoir to feed the contained wetland as needed

WAVE ENERGY TURBINES one type of fish-safe turbine floats on the water surface, wave motion drives hydraulic pumps in hinges to make energy

07 TECHNICAL DESIGN COASTAL ENGINEERING

Creating the 21st century coastal engineering solution for Northerly Island Park will require a carefully orchestrated technical solution which will provide protection for the different coastal environs and create inviting, sustainable natural settings that look as if they have been there for decades.

EXISTING CHALLENGES

The coastal protection at Northerly Island Park consists largely of hardened edges. These edges include timber cribs, timber piles with stone protection, timber piles with concrete bulkheads, vertical and battered steel sheet piling and stone revetments. Many of these edges are in a deteriorated condition and susceptible to failure in the near future.

Public interaction with the water has historically been limited to walking to the edge of a vertical or near vertical structure and peering over at the water below. During moderate or severe storm events, even this limited use is severely restricted due to the wave climate and the propensity to

be showered with the cool Lake Michigan spray. With the exception of the beach area located on the north east side of the island, access to the water does not exist in most locations.

The island is impacted continuously by wind and wave forces and varying water levels. On the east side of the island, waves 11' to 13' high typically occur in the late fall and early spring while waves 4' to 5' high are fairly common during the summer months. Lake Michigan's water levels have a yearly cyclical variation of approximately one foot while the historic high and lows span a range of over 6.3'. These environmental and coastal conditions pose a significant challenge when designing the coastal protection.

NORTHERLY'S LIVING EDGE

The Northerly Island Park redevelopment concept includes a fresh look at the shore protection structures and significantly changes what exists today. Through a series of offshore islands, submerged reefs, coastal wetlands, coastal beaches and softened edges, the coastal engineering structures will provide lower impact protection to combat the harsh Lake Michigan coastal environment.

Offshore islands will provide the first line of defense from wave forces on the eastern side. The location of these islands will take advantage of the shallower water depths that exist at certain locations around the island. Locating the islands in shallower water will minimize the quantity of material required and result in lower construction costs. The lakeside perimeter of the islands will incorporate the largest of the shore protection stone in the system. Stones of approximately 10 to 14 tons will be used in the island

revetments and placed to protect the islands during severe storm events but also will be placed to give the impression the islands gradually disappear and blend into the lake bottom.

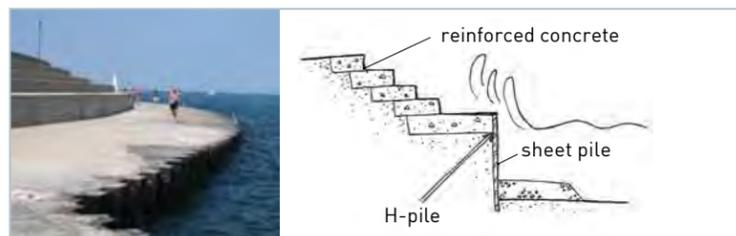
The protected lagoon side of the barrier islands will be comprised of many different gradations of smaller stone, varying water depths and changing slopes. It is in these areas where focused habitat creation will result in fish spawning shelves, fish nursery and emergent vegetation. Varying levels of above and below water trails will link the islands for the serious adventurer.

The protection afforded by the offshore islands permits a softer, environmentally diverse shore protection scheme to be developed along the eastern edge of Northerly Island Park. The offshore islands will drastically reduce the wave climate in the protected lagoon and will allow construction of sand beaches, coastal wetlands, emergent vegetation, and scenic natural areas. Public access to

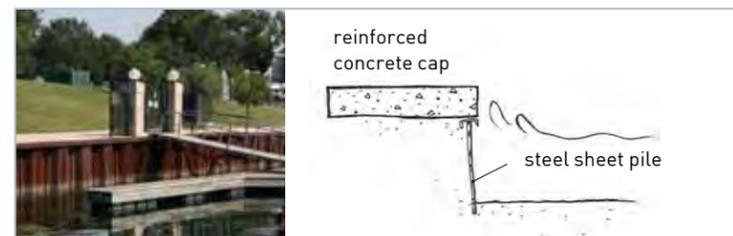
the water and islands will be provided on many levels and will accommodate users of all ages.

The western side of the island will take advantage of the excellent condition of the existing steel sheet piling located at the north end and will only include minor modifications as required for island programming. The southwest and south end of the island will include new steel sheet piling and stone revetments. The revetments used in this area will absorb much of the storm induced wave energy, creating a calmer environment for recreational watercraft entering and exiting Burnham Harbor.

The coastal environment envisioned in the redevelopment concept provides an opportunity to increase and diversify the ecological systems, increase and enhance public access and interaction, and provide an unprecedented level of habitat enhancement that will redefine Northerly Island.



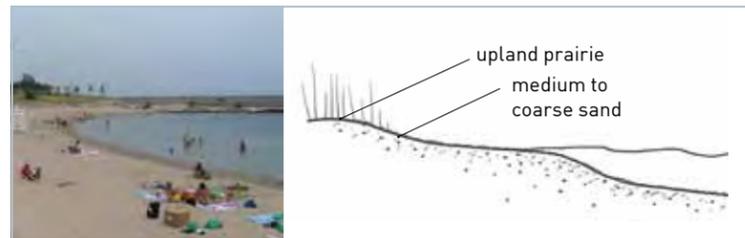
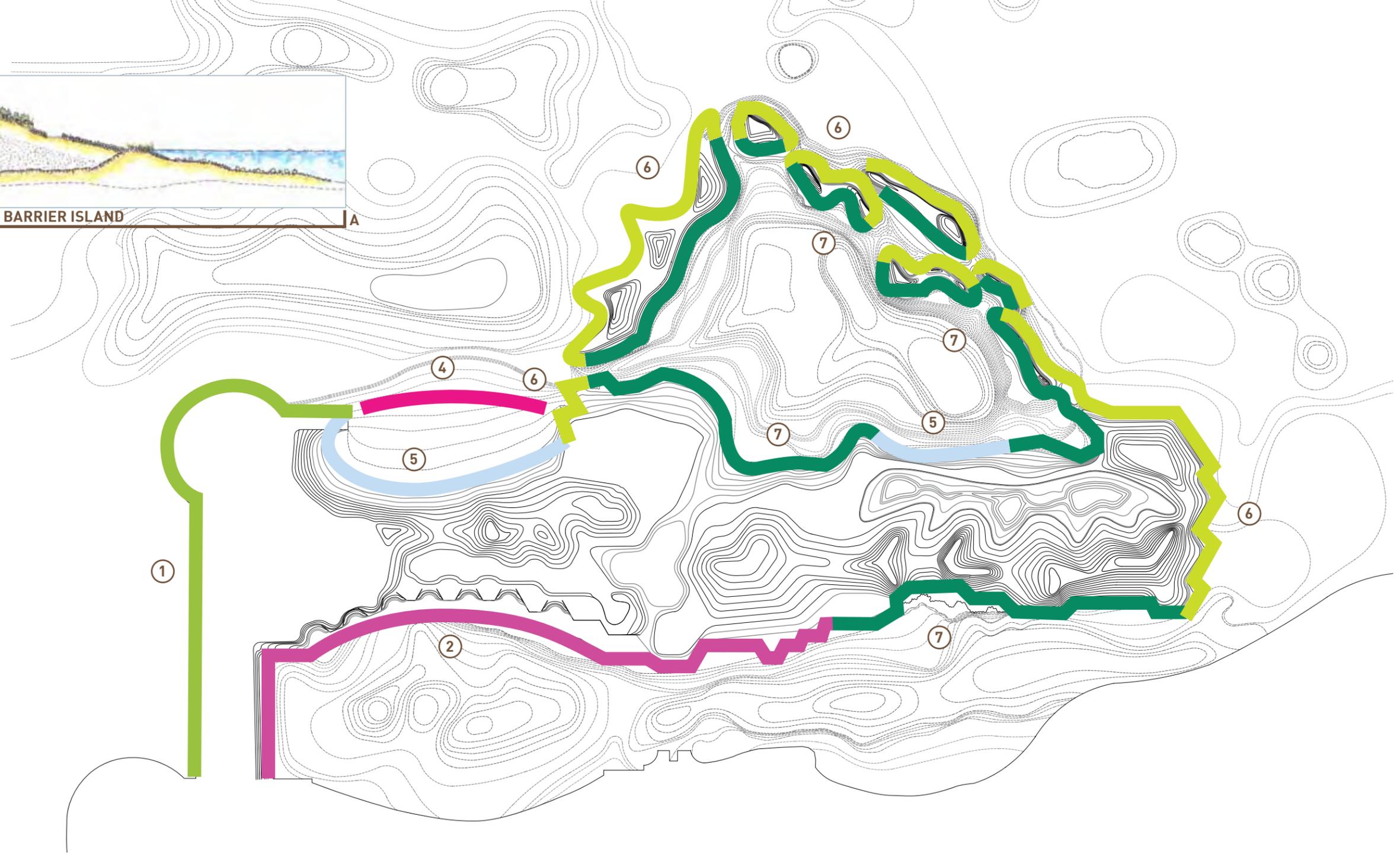
01 PLANETARIUM BULKHEAD



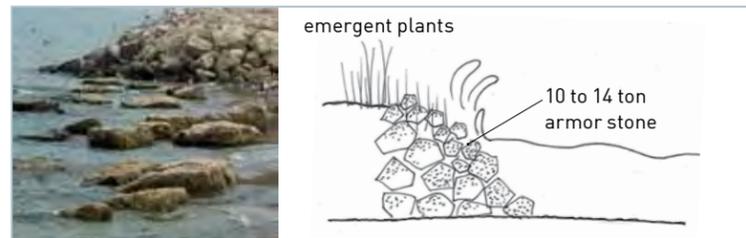
02 STEEL SHEET PILING



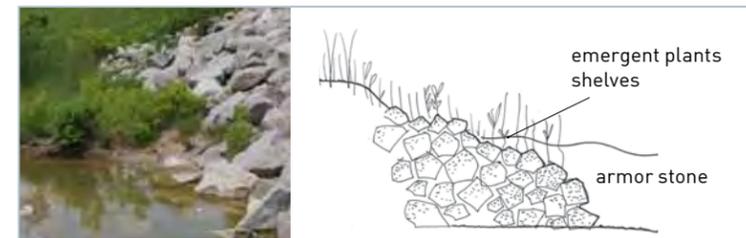
04 BEACH RETAINING STRUCTURE



05 12TH STREET BEACH, NATURE BEACH



06 ARMOR STONE REVETMENT



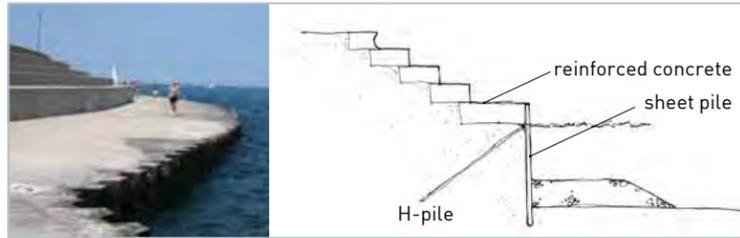
07 AQUATIC EMERGENT ENVIRONMENT

NATURALIZED EDGE TREATMENT

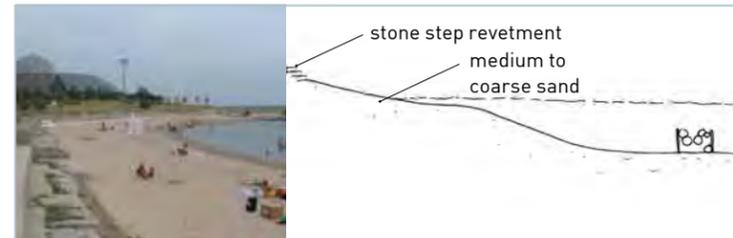
07 TECHNICAL DESIGN EXISTING EDGE CONDITIONS

TO REMAIN OR IMPROVE

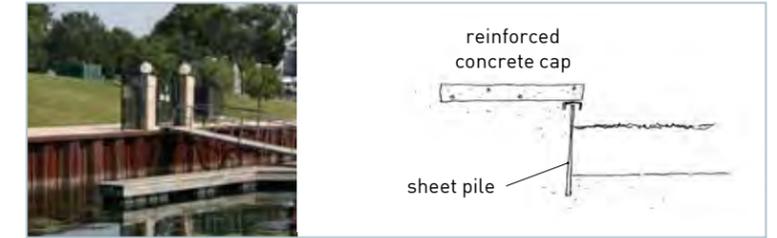
A study of existing edge conditions reveals edge constructions that can remain as-is or largely intact with required targeted improvements. The existing Planetarium Bulkhead, which is designed to absorb the impact of northeasterly waves, was rebuilt recently and will be incorporated into the new design. The McCormick Storm Outfall Structure, at the south end of the island, is the current outlet for rainwater collected on the roof of McCormick Place. This system will be modified: rather than draining rainwater into Lake Michigan, the collected water will be stored on Northerly to feed the wetland.



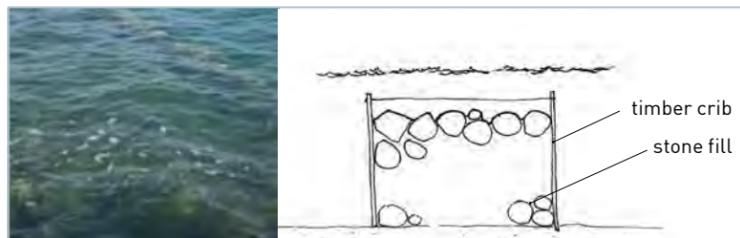
01 PLANETARIUM BULKHEAD



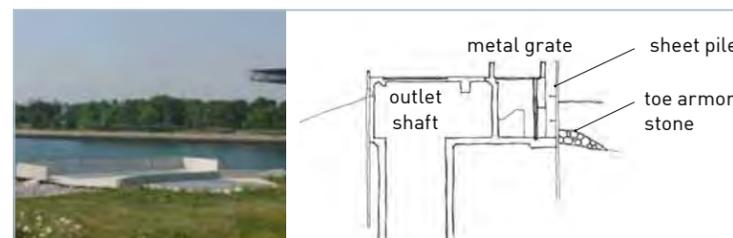
03 12TH STREET BEACH



11 STEEL SHEET PILING



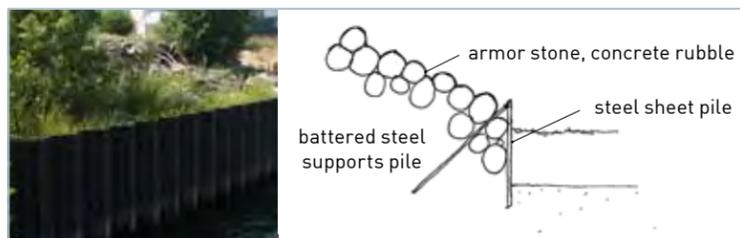
02 BEACH RETAINING STRUCTURE



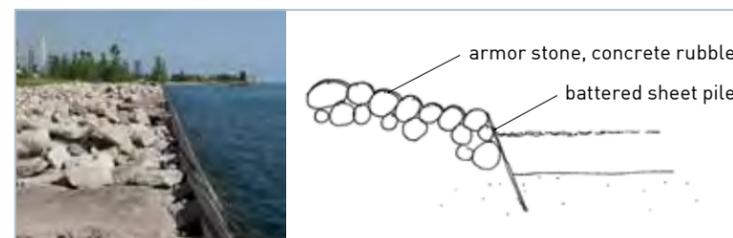
09 MCCORMICK RAINWATER OUTFALL STRUCTURE

TO BE REDESIGNED

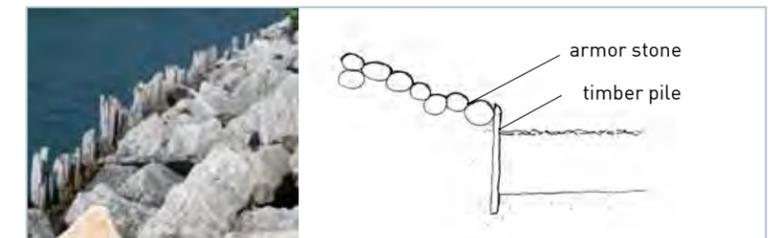
Other edges have deteriorated over the years and do not offer a safe or welcoming habitat for people, animals, or plants. They will be redesigned due to their poor condition and because the new Northerly Reef will provide wave protection.



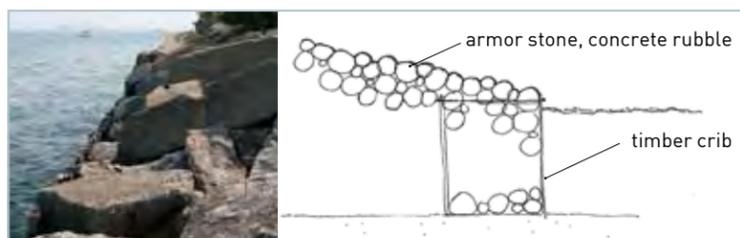
04 STEEL SHEET PILING



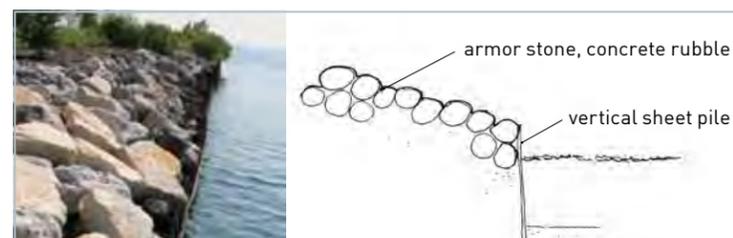
06 BATTERED STEEL SHEET PILING



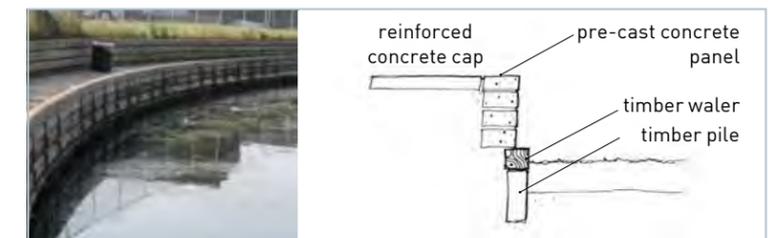
08 PILE TIMBER REVETMENT



05 TIMBER CRIB REVETMENT



07 STEEL SHEET PILING WITH ARMOR STONE



10 TIMBER PILES WITH CONCRETE BULKHEAD



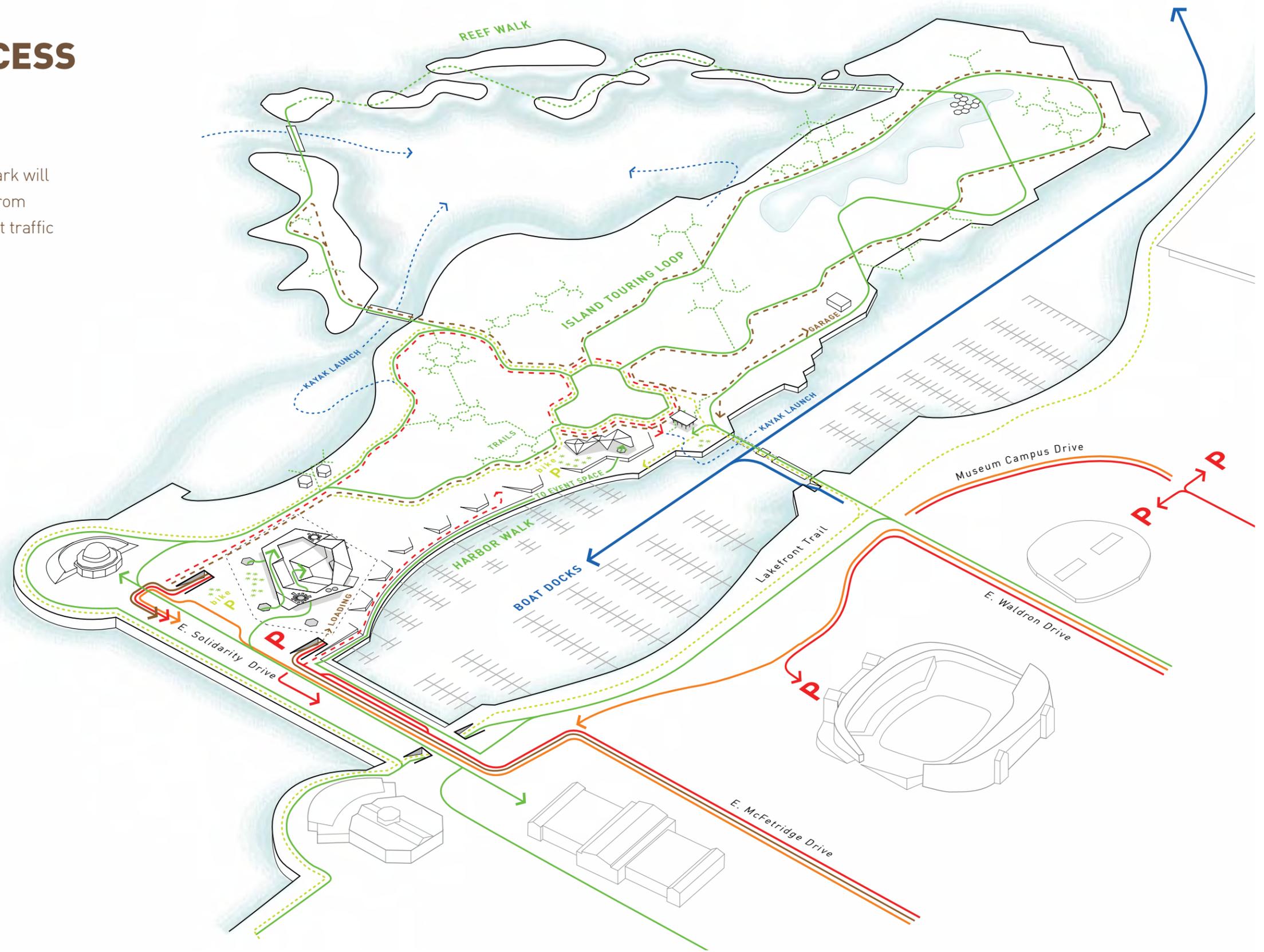
EXISTING EDGE CONDITIONS, 2008



07 TECHNICAL DESIGN MOVEMENT AND ACCESS

The circulation network at Northerly Island Park will support multiple travel modes. These range from recreation to maintenance networks; from foot traffic to motorized movement.

- **PEDESTRIAN PATHS**
Compacted gravel, paved, and boardwalk paths for walkers, joggers, hikers
- - - **INFORMAL PATHS**
Variety of materials, path access related to season, weather, lake levels
- · - · - **DESIGNATED BIKE LANE**
Links to Lakefront Trail
- **VEHICULAR TRAFFIC**
Access from Solidarity Drive to below grade parking lot
- - - **LIMITED VEHICULAR TRAFFIC**
Drop-off access to beach, event space
- **LOADING ACCESS**
Loading for music venue, retail
- - - **MAINTENANCE/ EMERGENCY ACCESS**
Controlled access route for services, maintenance, emergency vehicles
- **PUBLIC TRANSIT/ SHUTTLE ROUTE**
CTA bus routes and shuttle buses between Northerly Island Park and remote parking
- **MOTORIZED BOAT ROUTE**
Burnham Harbor boat docks and access to Lake Michigan at south are retained
- - - **NON-MOTORIZED BOATS WATER ACCESS**
Several kayak and small boat launches connect boaters to Northerly Reef and Burnham Harbor



ACCESS TO NORTHERLY

Northerly Island Park should be accessible to as many as possible via all travel modes: auto, bus, bike, foot, and water. ADA accessibility is extremely important and all connections will be accessible. While access to Northerly Island Park should be multi-modal, the primary mode of access to island destinations should be on foot or by bike. Linkages to off-site parking, transit stops, bike rentals, etc. should be made via clearly designated, safe, and continuous walking paths. Additional auto access points should be discouraged.

Travel modes should reflect the environmental context of the island. Vehicular access on the island itself should be discouraged and limited. On-site paths should be integrated into the island's landscape.

HARBOR CROSSING DESIGN

A new bridge to the island is an important component of the plan. As activities increase at venues on Northerly Island Park, the number of visitors will increase – not only during peak times but year-round. Providing a connection at the center of the island on axis with Waldron Drive offers a preferential treatment for pedestrians and bicyclists by providing a more direct access route to events on the island.

Adding a connection at Waldron Drive also reduces congestion in the area of McFetridge Drive, Solidarity Drive, and Museum Campus Drive near the Shedd Aquarium. Walkers and bikers travelling from the west and south will no longer need to travel through this area.

The design of the new harbor connection will change between the summer (boating) season and winter (non-boating) season. During the boating season, the harbor will need to remain open unimpeded for boat access.

One approach for the boating season is a ferry service that would transport people and bicycles back and forth from Northerly Island Park to the west side of the harbor. The service would require operation during daytime and evening hours until the conclusion of Amphitheater events. A ferry service would need to be coordinated by the Harbor Master. Operators such as those that operate the water ferries from rail terminals to downtown Chicago would be optimal providers. This option would be a lower cost alternative that could be implemented in the short term.

During the winter/non-boating season, a temporary structure could be put in place, such as a floating pontoon bridge or a temporary bridge designed to handle icy winter conditions. Floating bridges, which are essentially floating docks, can be used as temporary or seasonal solutions. These structures are supported by buoyancy of the construction materials, are connected at land at one or both ends, and require an anchoring system. A pontoon bridge has been used on the Red River along the North Dakota/Minnesota border. Like a ferry service, this option is a lower cost and short term alternative. A temporary bridge is a transportable bridge assembled in panels. The bridge would be removed and stored during the summer boating season.

HARBOR WALK

Destinations along the Harbor Walk will activate the north end of the park. This retail and recreation walk will be serviced by a 25' wide paved lane for limited vehicular use. Adjacent to the service lane will be a boardwalk for pedestrian access at the water's edge. Access to path will be via Solidarity Drive on the north and the new harbor crossing connection on the west. Vehicular access will be controlled by bollards and gates to limit vehicle use to emergency and service vehicles, occasional deliveries, and individual access to the Education Center by persons with disabilities (as needed). Bike rental stations will be located along the Harbor Walk. Vehicular drop-off locations will be available adjacent to the Amphitheater and at the new harbor crossing at Waldron Drive.



- ▭ VEHICLE PARKING
- ▭ BOAT STORAGE
- * * * BICYCLE PARKING

N BELOW GRADE PARKING PLAN
0 50 100 200 400 FT

PARKING

Visitors to Northerly Island Park should not be greeted by a large surface parking lot. However, the plan recognizes the need for some parking to support the activities on the island. Clearly designated, safe, and continuous walking paths will provide links to off-site parking.

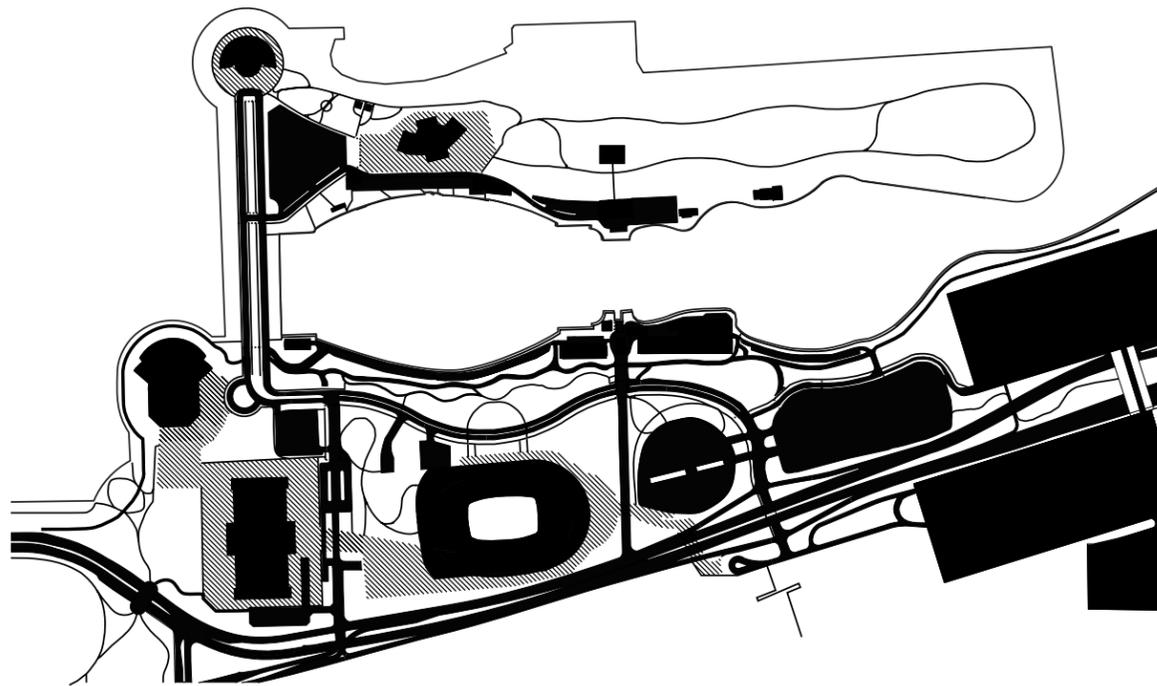
Along with improved linkages to off-site parking, limited parking will be available at Northerly Island Park. A below-grade,

400 space parking lot will serve Adler staff and patrons, park-goers, boats, and visitors to the Museum Campus. The parking structure will be designed to accommodate boat storage in the winter. Boaters who dock at Burnham Harbor or elsewhere can rent a space to store their boat indoors for the winter. During the winter, 200 car parking spaces and between 75-100 boat storage spaces will be available on site.

With limited parking on Northerly Island, connections to parking on the west side of the harbor are important. A pedestrian connection at Waldron Drive makes those spaces at Soldier Field and the west harbor front a more accessible and viable alternative.

07 TECHNICAL DESIGN

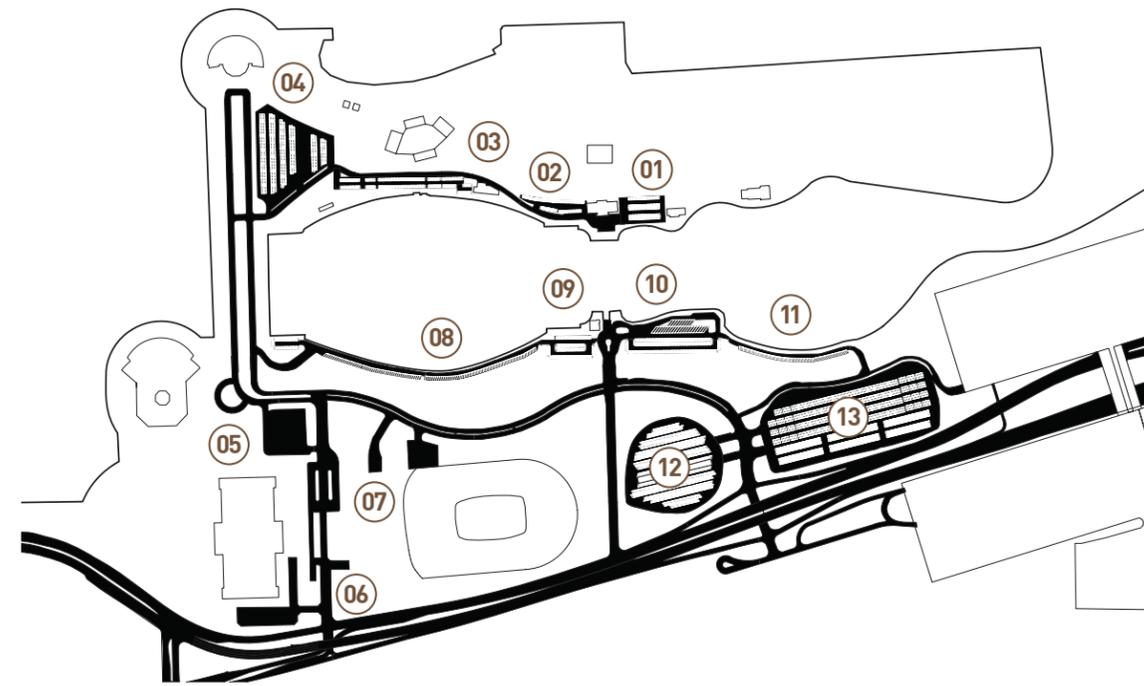
EXISTING TRANSPORTATION/ACCESS



SURFACES: PAVED VS. UNPAVED

While less than a quarter of Northerly Island is currently paved, it is located east of large paved plazas and a network of wide boulevards that are challenging for pedestrians to navigate.

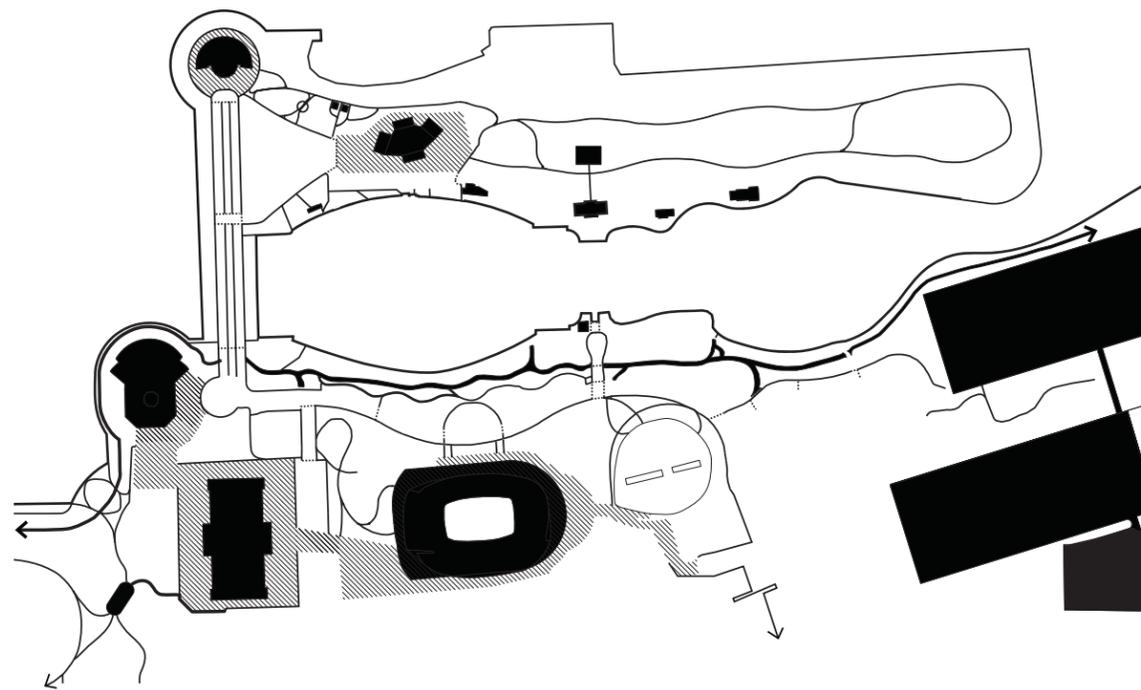
- Paved
- Partly Paved
- Unpaved



SURFACES: VEHICULAR ACCESS

Vehicles access Northerly Island from Solidarity Drive. Visitors have several parking options in the vicinity.

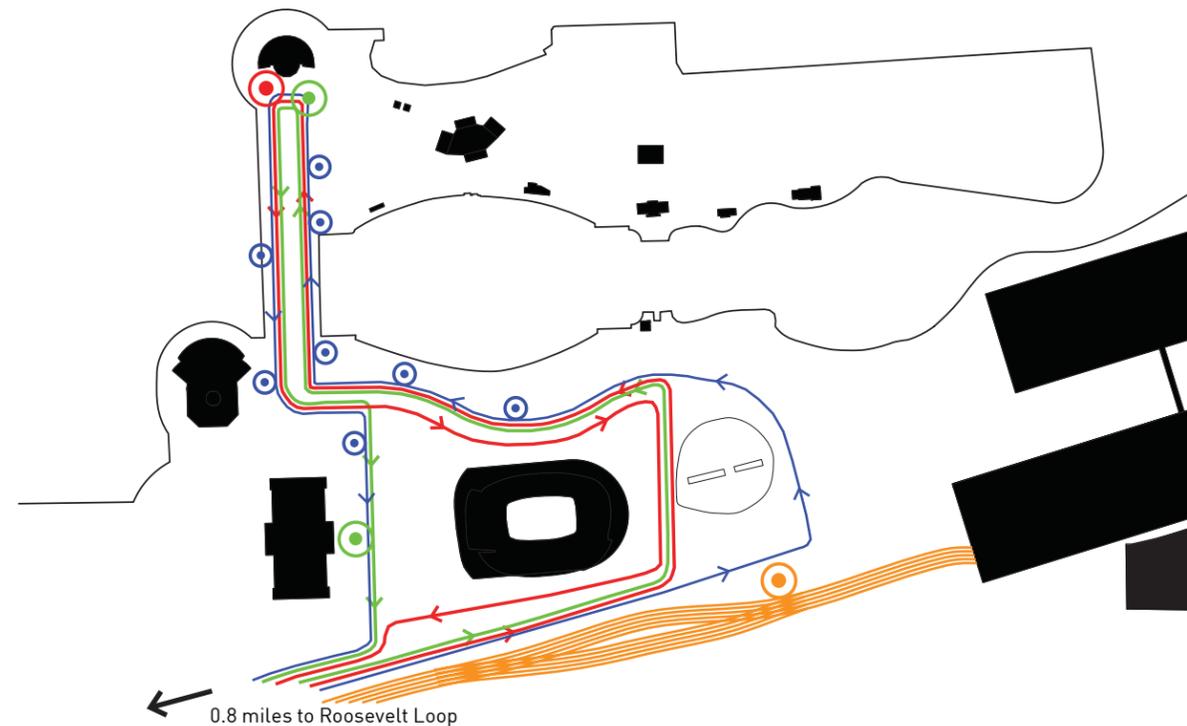
1 Terminal East:	100 spaces	8 Harbor North:	152 spaces
2 Terminal West:	70 spaces	9 Harbor West:	96 spaces
3 Northerly Harbor:	120 spaces	10 Harbor West Extended:	210 spaces
4 Northerly Island:	500 spaces	11 Harbor South:	56 spaces
5 Field Museum:	135 spaces	12 Soldier Field:	1,500 spaces
6 Field Museum South:	92 spaces	13 McCormick Place:	1,500 spaces
7 Soldier Field Parking:	2,500 spaces		



PEDESTRIAN ACCESS

Currently the only pedestrian access point to Northerly Island is from Solidarity Drive. Bicyclists access Solidarity Drive from the Lake Shore bike path that runs under the drive.

- Pedestrian and bike paths
- ▨ Pedestrian plazas
- Lake Shore bike path



PUBLIC TRANSPORTATION ACCESS

Public transportation bus and trolley routes connect the island to the Museum Campus and downtown Chicago. The nearest "L" Station is the Roosevelt Red Line

- CTA Route 130 (Seasonal)
- CTA Routes 12, 146
- CDOT Downtown Trolley
- METRA

07 TECHNICAL DESIGN MUSIC AMPHITHEATER

The state-of-the-art music amphitheater is a multi-use pop concert venue programmed to hold live music events in the summer and educational events year-round. It will be an open-air facility with a covered stage that holds 12,000-14,000 people. Rather than duplicate what is offered elsewhere in Chicago, the amphitheater will complement the local music scene and further diversify music in the city.

The technical design of the amphitheater is based on the premise that touring acts typically bring with them everything they need for an event. These acts essentially expect that the venue will provide hanging points, abundant power, and a large, flat floor area that they can plug into. The new music amphitheater at Northerly Island is designed to balance these technical theatrical requirements with the needs and desires of fans attending a show, visitors to the museum campus, and the health of natural habitats on the island.

Within the amphitheater, three raked seating sections surround a slightly-sloped area in front of the stage that can be used either as standing room or

flexible seating. Concessions, amenities, and support areas for visitors will be located beneath the elevated promenade that encircles the venue (also known as the “cosmic ribbon”). Services for touring groups such as loading, tour bus parking, and backstage green rooms are efficiently integrated below grade near the stage. Visitor parking and optional boat storage during the winter months are also located below grade.

STAGE DESIGN

The music amphitheater features a larger stage area than the current Charter One Pavilion at Northerly Island. The new

main stage dimension will be roughly 80' x 60' in plan, with additional side stages. This increased performance area will accommodate larger pop music events and performances requiring more extensive changes between acts, both of which are popular in today's touring concerts.

To further increase flexibility, the stage height will be manually adaptable with a range between four feet and seven feet above the first row of the audience. The floor panels will be easily removable, so they can be replaced with rostra for use with lighting, audio monitors, etc. Like the current stage, the new stage will be raised and lowered using a scaffold-based system.

LOADING AND CIRCULATION

The loading zone is located below grade near the building in order to assure good working conditions for the technical staff and to avoid inconveniencing the surrounding public park.

Of great importance to a streamlined and profitable event is an efficient area for show set up and break down. The design for the new venue calls for a covered loading dock that can be used simultaneously by four to six trucks. This assures easy redistribution of cases, trusses, and other materials.

The trucks will not have to perform any maneuvers aside from backing up to the dock. All other driving will be forward, in a one-way loop around the stage.

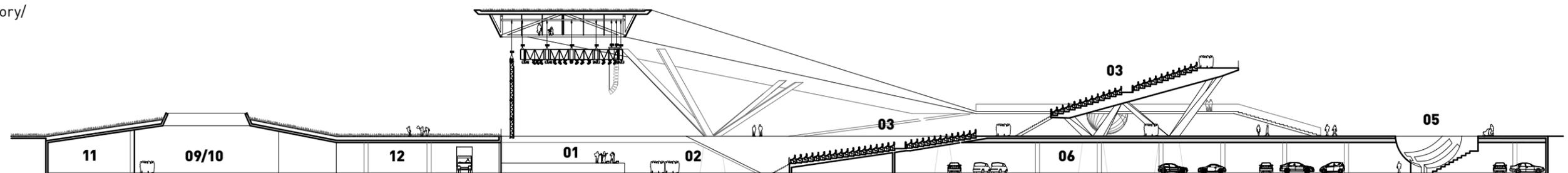
The loading dock design provides parking positions for trucks and buses, the latter having a close connection to the backstage artists' area. Since these parking spots are all partly underground, and thus protected from rain and direct sun exposure, there will be dedicated power connections for all bus and truck amenities located there. Any broadcasting of events will also take place from these positions, with the exception of trucks with specific (microwave) antenna or satellite dishes.

Visitors can park in the below-grade spaces directly beneath the seating bowl. Circulation between private loading vehicles and public vehicles is separated to maximize security and efficiency.

From the south, the proposed Harbor Bridge provides pedestrian access to the music amphitheater from abundant parking at Soldier Fields. The Harbor Walk connects the bridge and amphitheater and provides amenities to fans before and after the show. The current venue at Northerly Island does not take advantage of this promenade, which is currently used as a turnaround for trucks loading the shows. Bottlenecks are also a problem at the current venue, because all concertgoers enter the Charter One Pavilion from the north. This will be resolved by the new site strategy.

MUSIC VENUE SECTIONS

- 01 Stage
- 02 Standing room/ flexible seating
- 03 Fixed seating area
- 04 Cosmic Ribbon/ promenade
- 05 Astronomical observatory/
parking access
- 06 Parking
- 07 Retail/ Concession
- 08 Harbor Walk
- 09 Artists' Village
- 10 Dining, Courtyard
- 11 Artists Foyer
- 12 Loading Area



0 10 25 50 100 FT

SECTION AA

Modularity in the planning of the seating bowl, 'cosmic ribbon,' and tree-column bundles will take full advantage of the structural, economical, and environmental efficiencies of concrete construction.

The primary structure of the stage roof is a combination of steel trusses and standard steel framing. Structural steel offers the flexibility desired by touring acts, as it can attach to and support a variety of lighting grids, sound systems, and other staging requirements. Portions of the roof can easily be assembled on the ground and lifted into place, enhancing the speed of erection and overall safety during construction.

PARKING GARAGE AND FOUNDATION
The parking garage will be constructed of cast-in-place concrete for economy and durability.

The foundations for the primary support columns will be drilled caissons supported on the hard-pan soils below. Lighter loads will be supported by driven friction piles, which minimize construction costs while effectively addressing foundation settlement.

frees the concourse level from the typical repetition of closely-spaced columns, and provides a unique structural aesthetic which compliments the surrounding landscape.

The promenade will be constructed using a combination of cast-in-place and precast concrete in order to provide an economical yet durable structure which requires little maintenance.

ROOF STRUCTURE FOR STAGE
The tree-columns support the stage roof, providing efficient vertical support and lateral bracing while remaining completely clear of the primary stage area. The tree-columns will be constructed of cast-in-place concrete, which economically provides the desired strength, stiffness, and durability they require.

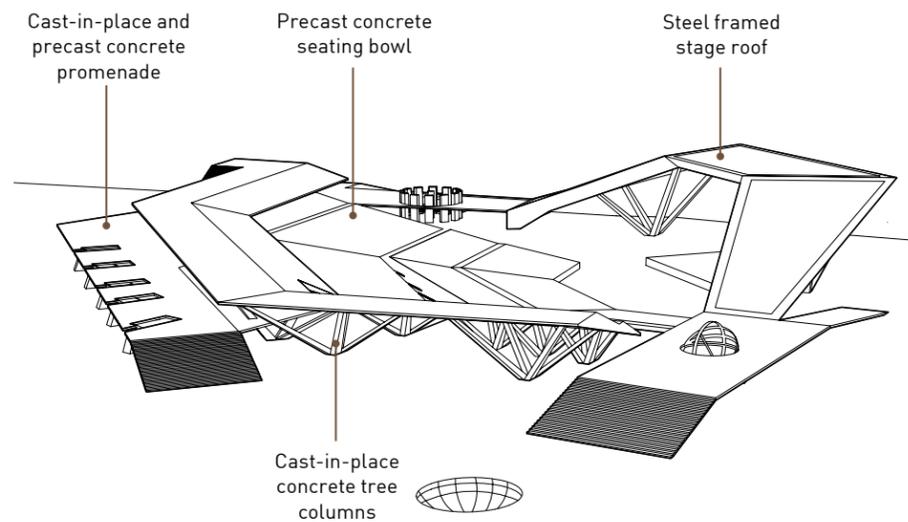
STRUCTURE

SEATING BOWL AND PROMENADE

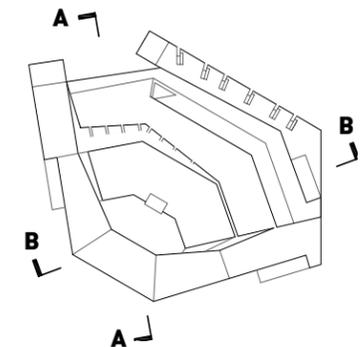
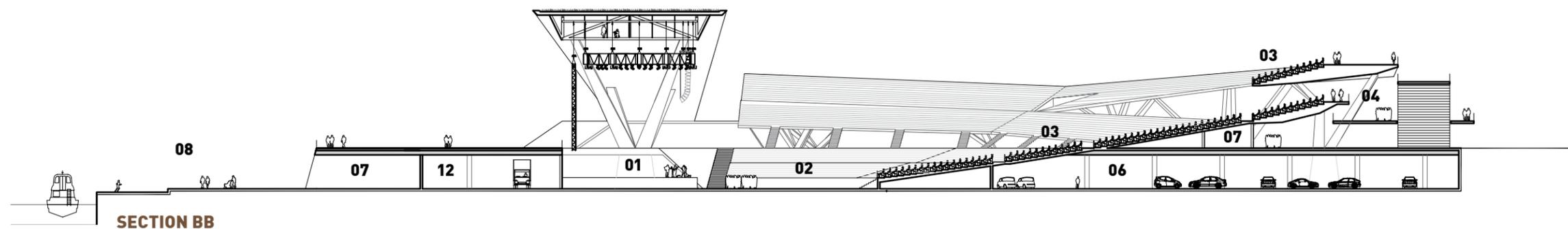
The risers for the elevated seating bowl will be constructed of precast concrete. Precast concrete provides a cost-effective and durable surface for structures exposed to the elements. The simple geometry and durability of the precast pieces will make cleaning and maintenance of the seating bowl easy.

Cast-in-place concrete raker beams will support the precast risers of the seating bowl. The concrete raker beams will carry loads efficiently to the tree-columns.

The sloping cast-in-place concrete tree-columns supporting the seating bowl provide both vertical support and lateral bracing for the bowl. Their sloping geometry



Primary structural concrete elements of the new music amphitheater.



07 TECHNICAL DESIGN

EXISTING STRUCTURES

TO REMAIN

The existing beach house will remain on site to provide amenities to 12th Street Beach – this includes bathrooms, concessions, and a lifeguard station.

The outfall structure at the southern end of the island will be converted into a water collection structure to feed the wetland.



01 BEACH HOUSE



02 MCCORMICK PLACE ROOF WATER OUTFALL STRUCTURE

TO BE REPLACED

Several structures currently on the island provide needed function and services. These will be rebuilt to be more integrated into the natural landscape and improved to better accommodate the dynamic activities and high attendance rate expected at Northerly Island Park.



03 TEMPORARY MUSIC VENUE



04 SAILING CLUB



05 YACHT CLUB



06 EVENT TENT

TO BE ALTERED AND REUSED

The Terminal Building will be transformed into a public pavilion. The iconic reinforced concrete columns will remain in place as a gateway to Northerly Island Park.



07 TERMINAL BUILDING

TO BE DISMANTLED AND MATERIALS RECYCLED

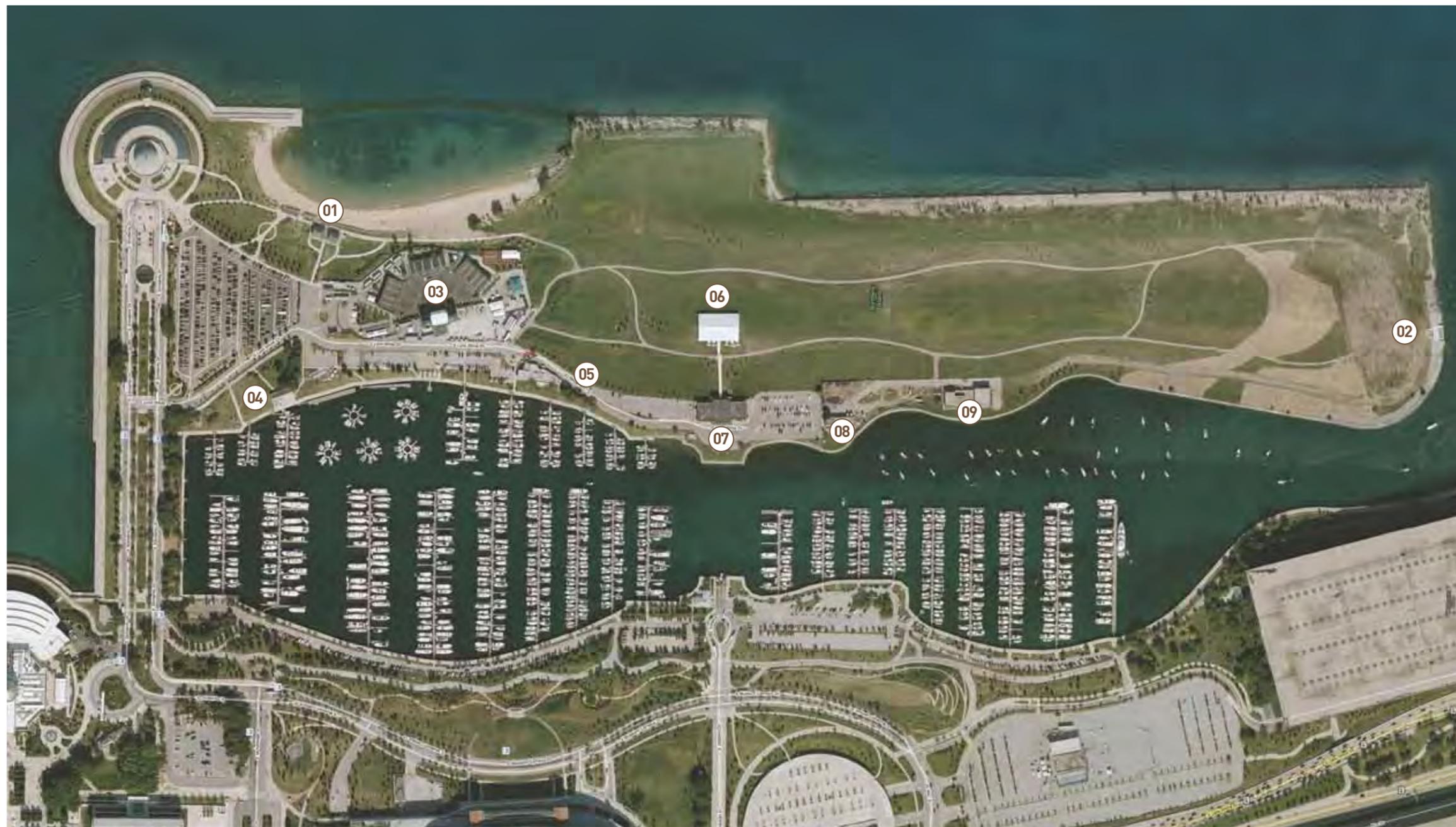
Buildings that cannot be adapted to the needs of the new Northerly Island Park will be removed. Materials salvaged from these structures will be reused on site where possible.



08 FIRE CRASH & RESCUE STATION



09 CONTROL TOWER



EXISTING STRUCTURES



