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Appendix H – 404(b)(1) Analysis

Draft Supplemental Environmental Assessment Morgan Shoal Revetment Reconstruction (45th - 51st)

SECTION 404(B)(1) EVALUATION:

Chicago Shoreline Protection Project

45th Street to 51st Street (Morgan Shoal) Revetment Reconstruction

Chicago, Cook County, Illinois

I. Proposed Project Description

a. Location

The 45th Street to 51st Street Revetment Reconstruction Proposed project (Morgan Shoal Proposed project), which is one segment of the Chicago Shoreline Protection Project, is located approximately 5 miles south of downtown City of Chicago along the Lake Michigan Shoreline. The project limits begin at the southern edge of the completed 43rd Street to 45th Street Revetment Reconstruction Project (approximately 100 feet south of E. 45th Street extended to the lake) and extends to the northern end of the completed 51st Street to 54th Street Revetment Reconstruction Project (approximately 100 feet north of E. Hyde Park Blvd. extended to the lake). The project area (Figure 1) is adjacent to the west shore of Lake Michigan, in Sections 1, 2, and 12, T38N, R14E of the 3rd principal meridian, and is shown on the Jackson Park (Illinois) USGS 7.5' topographic quadrangle map. The center of the site is located at approximately 41.807508 N and 87.585725 W. The site is surrounded by Lake Michigan, DuSable Lake Shore Drive, parkland, and highly urbanized developed land. The project site currently includes parkland, Lake Michigan, pedestrian and bicycle trails, and a washroom building.

b. Background

Under resolutions adopted by the Committee on Public Works of the U.S. House (dated December 2, 1971 and April 11, 1974), the U.S. Army Corps of Engineers (USACE) was directed to study shore erosion problems and erosion control measures for the Illinois shore of Lake Michigan. In 1993, USACE completed the Final Feasibility Report and Environmental Assessment (EA) for the Illinois Shoreline Erosion Interim III Storm Damage Reduction study, which included an analysis under Section 404(b)(1) of the Clean Water Act of the recommended plan.

Section 101(a)(12) of the Water Resources Development Act of 1996, as amended, authorized construction of a "project for storm damage reduction and shoreline erosion protection" as set forth in the Interim III Study and EA. A Project Cooperation Agreement (PCA) was executed on 17 May 1999, and it provided for the non-Federal sponsor (the City of Chicago and the Chicago Park District) to build specific segments of the project. The proposed project is focused on replacing the existing failing shoreline structures to address park degradation from erosion and to provide flood protection for DuSable Lake Shore Drive.

Chicago's existing shoreline protection structures were originally built between 1910 and 1931 and generally consisted of wood pile cribs filled with riprap and topped with cap stones in the shape of steps. Some short segments of grouted cap stones that formed a "paved beach" were also part of the original design. In the 1950s, the wood

piles began collapsing, leaving the structures and parkland to erode and wash away. In 1964, the all-time lowest water levels on Lake Michigan, the wood piles became exposed and started rotting, further increasing the erosion process.

A unique characteristic of the site is the close proximity to the offshore geologic formation known as Morgan Shoal. This bedrock formation of dolomite limestone formed 425 million years ago during the Silurian Period and protrudes almost to the surface of Lake Michigan. Morgan Shoal provides unique aquatic habitat, is beloved by the local community, and contains the remnants of the 1914 Silver Spray shipwreck.

The project authorized in 1996 included vertical steel sheet pile walls at the water's edge tied back to H-piles with a concrete cap, and stepped limestone blocks set back from the walkway to act as a splash apron. The revetment would be constructed over and lakeward of the existing, failed revetment. However, the shallow bedrock near the shoal makes sheet-pile-based shoreline protection systems difficult to construct To address the issues with the original design, alternative approaches were considered. The preferred alternative for shoreline protection includes a replacement of the existing failed revetment with new revetments designed to manage wave attack. The proposed shoreline protection would consist primarily of rubble mound, in addition to sections of dynamic cobble revetment and steel sheet pile and stepped concrete revetment. The upland areas would be reshaped and refined to provide flood control and management of overtopping wave flows. Figure 1 illustrates the project location. Figure 2 provides examples of the failing condition of the existing revetment structures. Figure 3 shows an aerial view of Morgan Shoal.

Figure 1. Site Location Map

Figure 2-1. View of northern portion of project site, looking south. This area has been repeatedly repaired, and in 2020 emergency riprap and sand-filled TrapBags were placed to protect pedestrian trail from failure.

Figure 2-2. View of central portion of project site, looking north. Much of this area is no longer recognizable as having an engineered shore protection system. Nearly all of the capstones are displaced, and the area is undergoing active erosion.

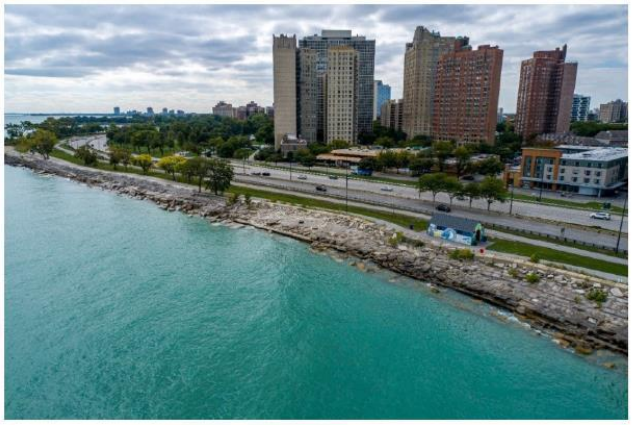


Figure 2-3. View of central portion of project site, looking south. The existing washroom building and the paved beach are visible, as is the nearby DuSable Lake Shore Drive. This area is the narrowest portion of Burnham Park and has been repeatedly damaged by storms.

Figure 2-4. View of southern portion of project site near 51st Street, looking north. The additional stone placed by the Chicago Park District several decades ago to protect an already damaged stepped revetment is clearly visible.

Figure 2-5.Flooding of the pedestrian Lakefront Trail just north of 47th Street on January 11, 2020. The entire trail is inundated, and the wrack line can be clearly seen to extend several feet up slope.

Figure 2-6. Inundation of the washroom building and pedestrian Lakefront Trail at 49th Street during the January 11, 2020 storm event.

Figure 3. Morgan Shoal Aerial and Bathymetry.

c. Proposed Project

1) Existing Revetment Conditions and Repair History

Documents retrieved from the Chicago Park District archive indicate that the area between 45th and 51st Street has been subject to several partial rehabilitation efforts and enhancements over the course of its life. Drawings from 1938 indicate that the stone blocks placed on top of the bulkheads required resetting. New stone was also placed at the site, resulting in a "promenade" at EL. +4 ft. Low Water Datum (LWD), with a series of steps up to a crest elevation of +13 ft. LWD. At the south end of the project site, close to 51st Street, short segments of rubble mound revetment have been added on top of the deteriorated revetment, to stabilize the structure and to reduce overtopping damage. In the 1960s, the Park District added stone north of 47th Street to buttress the revetment and drove steel H-Piles to help hold the stone in place.

Currently the structures are again in disrepair, having suffered deterioration from wave and ice impact, freeze-thaw processes, and lake-level change. The revetment deterioration includes damage to the timber bulkheads, tie-rods and wales, shifting of the structure, and subsided capstones. In some locations the timber bulkheads are no longer intact, the rockfill has been washed out, the capstones have settled or been displaced completely, and the concrete walk has disintegrated. A 1993 US Army Corps of Engineers report describing the area between 39th Street and 49th Street, stated that the "structural condition of shore protection within this area is in complete disarray and hard to distinguish from randomly placed rubble." The current elevation at the crest of the deteriorated revetment is generally at approximately EL. +10 ft. LWD, but in several areas it has been eroded and reduced to elevations closer to EL. + 5 ft. LWD. The concrete walkway has been undermined and damaged, and in many places is almost unrecognizable.

This portion of Burnham Park is particularly narrow, and the shoreline comes very close to DuSable Lake Shore Drive. The 2003 reconstruction of the roadway resulted in an increase in green space, but the highway is still within 150 feet of the water's edge for approximately half of the project site. Additional features of the site concentrated around 49th Street include the washroom building, the "paved beach", and an area of sand and cobble, which is exposed during lower water periods. In 2018, the Chicago Park District completed a Lakefront Trail separation project, which resulted in continuous dual trails through the project area, one for bicycle traffic, and a second for pedestrian traffic.

During the recent record high Lake Michigan water levels experienced in 2019-2021, the City of Chicago and Chicago Park District deployed a number of emergency and temporary measures to reduce the rate of erosion and to protect DuSable Lake Shore Drive and other infrastructure from flood damage. These measures have included placement of temporary concrete jersey barriers, TrapBags filled with birds-eye sand, large concrete blocks, and riprap.

2) Proposed Project Description

The shoreline protection works to be constructed at the Morgan Shoal Project site

include a complete replacement of existing failing revetment structures. The new revetment would consist of approximately 3,700 linear feet of rubble mound revetment, 1,000 linear feet of dynamic cobble revetment, and 800 linear feet of steel sheet pile and stepped concrete revetment. The steel sheet pile and stepped concrete revetment, which is the revetment treatment most frequently implemented for the Chicago Shoreline Protection Project, would only be used at the south limit of the proposed project, around the peninsula at 51st Street.

The intent of the preferred alternative is to meet or exceed the minimum requirements set forth by the USACE for shoreline protection, to incorporate public input into the design process, and to provide enhanced public shoreline recreational opportunities. The new revetments are designed to manage wave attack and flooding potential. The proposed action would add approximately 7 acres of new usable parkland by providing more width to the narrowest parts of the park. In addition, the proposed action incorporates new elevated viewpoints at 47th Street, 49th Street, and 51st Street, and a new comfort station with integrated shade structure and plaza area. While the majority of the new parkland would be lawn, some areas would be planted with native species to increase biodiversity and upland habitat. The new and modified lands would provide a buffer from Lake Michigan wave action, raise the elevation of parkland, and prevent the commonly occurring erosion and flooding. Figure 4 is an aerial view of existing conditions and Figure 5 is a rendering of the proposed project.

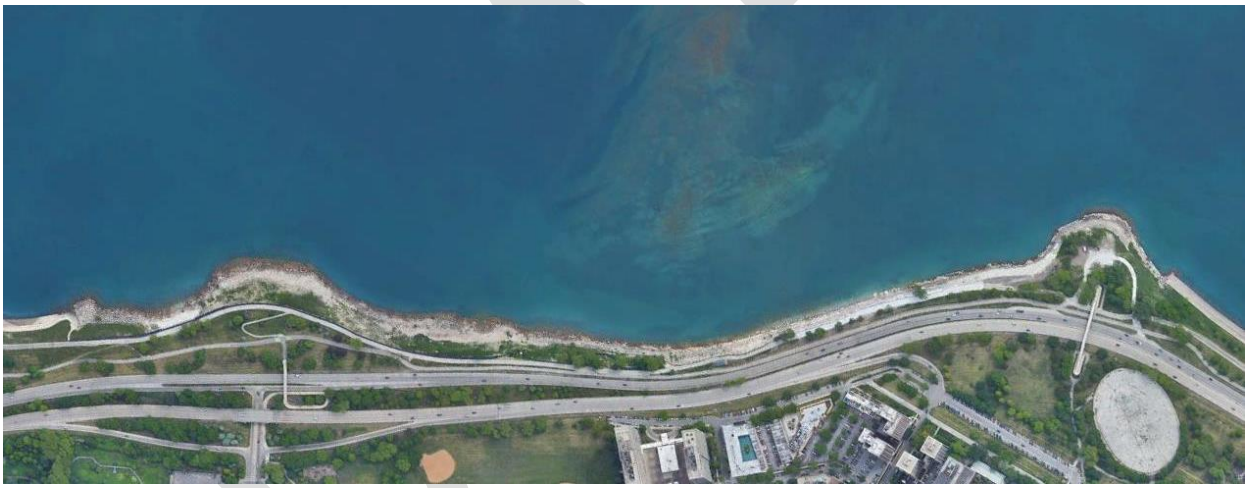


Figure 4. Existing Conditions.

Figure 5. Proposed Project Rendering.

The proposed project would include the following features, from north to south:

- Starting at the northern end of the proposed project, approximately 2,800 linear feet of new rubble mound revetment would be constructed lakeside of the existing deteriorated revetment. The new revetment would consist of IDOT RR3 core stone, 0.5-1.0 ton filter stone, and 6-10 ton armor stone would be placed in Lake Michigan up to crest elevation of +15.0 LWD. Due to lakebed conditions in this segment, a toe trench approximately 15 feet wide and 5 feet deep would be excavated and filled with clean core stone to provide a solid foundation for the armor stone. Suitable existing materials on site, including repurposed armor stone, and salvaged on-site limestone blocks, would be processed and reused within the project site. Parkland behind the new revetment would be graded to meet the new revetment and control stormwater and overtopping runoff.

- Approximately 1,000 linear feet of new dynamic revetment, comprising various sizes of cobble material, would be constructed to provide protection in the area most sheltered from wave action by the shoal. A small, naturally occurring pebble beach is currently located in this area – it is dynamic, receding and reforming based on lake levels and wave action. The new dynamic revetment design was studied in a physical model, which informed the shape, orientation, and material sizing. The site design celebrates the shoal and takes advantage of the natural protection offered by its presence. The dynamic revetment would be a cobble shore protection structure with a crest at EL. +10.0 ft LWD (the lower elevation and smaller material made possible due to the more sheltered wave conditions) and a minimum crest width of 60 feet. Clean core stone of IDOT RR3 and larger diameter 9-inch cobble would be topped with three feet of 3-inch diameter rounded cobble. The dynamic revetment would be backed by salvaged on-site materials to prevent migration of cobble into the park and onto the Lakefront Trails. Two rows of salvaged limestone blocks from the original construction would offer seating opportunities along the 1,000-foot-long feature, which would be an additional 100 feet further away from DuSable Lake Shore Drive than the current shoreline. Concrete blocks and birds eye sand from recent temporary protection measures would be salvaged and incorporated into the dynamic revetment. A new comfort station and plaza, in addition to a natively planted dune area, would also be incorporated into this segment.

- The dynamic revetment design includes a detached offshore rubble mound breakwater to assist with stabilizing the dynamic revetment form. The breakwater structure would have a 32-foot-wide crest at EL. +4.0 LWD. Clean core stone of IDOT RR3 would be topped with 450-650 lb. filter stone and 2-4 ton armor stone. The breakwater would be located between the two small headlands that border the dynamic revetment. The size, shape, and orientation of the breakwater was optimized through numerical and physical modeling to reduce wave forces at the dynamic revetment under various lake level conditions.

- South of the dynamic revetment would be approximately 900 linear feet of new rubble mound revetment. The new revetment would consist of IDOT RR3 core stone, 0.5-1.0 ton filter stone, and 4-6.5 ton armor stone with a crest elevation of

+13.0 LWD. This segment of rubble mound revetment uses a smaller armor stone and a lower crest height due to the protection provided by the shoal from waves coming from the NNE. Due to lakebed conditions in this segment, a toe trench would not be required. Suitable existing materials on site would be processed and reused within the project site. Parkland behind the new revetment would be graded to meet the new revetment and control stormwater and overtopping runoff.

- The southern 800 linear feet of project shoreline around the 51st Street Peninsula would be protected with a new steel sheet pile and stepped concrete revetment, similar to what has been installed in many other sections of the Chicago Shoreline Protection Project. The proposed revetment would provide a smooth universal access transition out of the completed 51st – 54th Street shoreline segment that currently dead-ends near 51st Street. The new concrete revetment profile (concrete step elevations, widths, and pitch) would match those of the 51st to 54th Street segment. Crushed stone or processed clean fill would be used as fill within the revetment structure. The toe of the sheet pile would be protected from scour with a layer of filter stone topped with core stone.

- The proposed project would include the filling of approximately 7 acres of the lake. The proposed project would include approximately 320,000 cubic yards of clean fill below the Ordinary High Water Mark (OHWM) of 581.5 (ILGD 85), which is +4.0 LWD. The fill below the OHWM would consist of approximately:

    - 54,000 CY of armor stone (2-10 ton)
    - 32,000 CY of filter stone (450 – 2,000 lb.)
    - 132,000 CY of core stone (IDOT RR3)
    - 10,000 CY of cobble (1-12”)
    - 2,000 CY of coarse aggregate (CA-1 and CA-6)
    - 75,000 CY of lakefill (processed clean material from existing deteriorated revetment, or other onsite sources, consisting of repurposed armor stone, concrete blocks (without protruding rebar), riprap, and birds-eye sand from temporary protection measures). Lake fill will not contain asphalt, mortar, earth, or other contaminated material that would leach out or violate any condition in the Illinois 401 water quality certification.
    - 15,000 CY of rubble fill (processed clean material from existing deteriorated revetment consisting of repurposed armor stone or concrete, or new aggregate). Rubble Fill will not contain any contaminated material that would leach out or violate any condition in the Illinois 401 water quality certification.

3) Public Participation Process and Activities

The work described in this report is the culmination of several decades of prior planning, including substantial public engagement. Past public participation efforts are discussed in the Draft Supplement Environmental Assessment Section 2.2.

The current proposed project considered various elements of the 2015 Morgan Shoal Framework Plan, including the unique “dynamic revetment”, which replicates, expands, and stabilizes an area of cobble which has collected in the lee of the shoal. The City of Chicago and the Chicago Park district held a series of public engagement opportunities regarding the Morgan Shoal project in 2024. Public input from the non-federal sponsor’s engagements are included in Appendix E of the main report.

4) Size, Type, and Habitat in Proposed project Area

The proposed project includes the filling of approximately 7 acres of the lake. The proposed project would include approximately 320,000 cubic yards of clean fill, as described above in Section I. C. 2., below the OHWM (581.5 IGLD 85 or +4.0 LWD). Normal lake level fluctuation, depth and shoreline development have all contributed to a lack of native submergent and emergent vegetation in the lake, leading to a largely open water habitat throughout the reach for lake fishes. The degraded shoreline of compromised timber cribs, failing limestone revetement blocks and rubble mound stone offers the most diverse aquatic habitat along the approximately one-mile reach due to the crevices and interstitial spaces between the rocks, stones, and cobbles being available for habitat usage. The rocky shoreline habitat is most notably used by the state listed Mudpuppy salamander (*Necturus maculosus*) during the cold season as well as used by fishes for foraging (i.e. Round Goby, Rock Bass, Smallmouth Bass) and nursery habitat (i.e. Smallmouth Bass) during the warm season.

While not directly in the project area, the approximately 32-acre Morgan Shoal rocky outcrop is immediately adjacent to the project area and offers an important diverse habitat area for a variety of fishes, macroinvertebrates, algae, and other organisms. It is worth noting Morgan Shoal due to its ecological importance as a diverse habitat hotspot in the vicinity.

5) Timing and Duration of Construction

Construction of the proposed project is anticipated to begin during the fall of 2026, with in-lake work commencing spring of 2027. Proposed project completion is anticipated by the end of 2030. The proposed project sequencing would be as follows:

PHASE 1 - SEQUENCE OF SITE PREPARATION

1. Install tree protection.
2. Remove trees (trees suitable for bat roosting may not be cut from April 1 through September 30).
3. Place temporary chain link fence at Phase I limits.
4. Construct temporary trail connections.
5. Install temporary trail barricades and detour signs.
6. Install maintenance of traffic signage.

7. Construct access to/from DuSable Lake Shore Drive (curb cuts, asphalt, barricade, light pole removal, traffic control signage, etc.).
8. Establish the field office and parking facilities at 51st Street peninsula, including appurtenant facilities.
9. Establish storage yards and laydown areas.

PHASE 2 - SEQUENCE OF WORK

1. Shared pedestrian and bike path to remain open to the public west of the chain link fence through the duration of Phase 2. Traffic control required for trail user safety.
2. Phase 2 includes the far majority of the proposed project work. Contractor would submit a sequenced execution plan for review and approval. General assumption is that the Contractor would work from north to south.
   a. Establish temporary mooring facility for barge delivery of materials near the 51st Street peninsula.
   b. Demolish existing revetment in a sequenced fashion ahead of new revetment construction such that unprotected shoreline exposure is minimized. Process clean demolished material for reuse. Remove unsuitable demolished material and dispose offsite in accordance with local, state, and federal regulations.
   c. North Rubble Mound. Excavate lakebed key and fill with clean stone. Place core stone, armor stone, and lake fill. Place geotextile and earthfill.
   d. Dynamic Revetment. Build temporary aggregate platform to reach offshore breakwater site. Place breakwater core stone and armor stone. Place repurposed large concrete blocks. Place core stone and lake fill for dynamic revetment. Place cobble stone and repurposed birds-eye sand. Place repurposed limestone block wall. Place geotextile and earthfill.
   e. South Rubble Mound. Place core stone, armor stone, and lake fill. Place geotextile and earthfill.
   f. Universal access structure. Clear lines for pile driving. Drive sheet and H piles. Place clean rubble fill. Install tie rods and whalers. Place aggregate. Cast-in-place concrete. Place earthfill.
   g. Landscape and Hardscape. Install trails, sod, trees, plants, comfort station, utilities, and appurtenant items.
   h. Remove temporary mooring facility.

PHASE 3 SEQUENCE OF WORK

1. Phase 3 includes the restoration of the portion of work that was open to the public during Phase 2. The new parkland and trails construction during Phase 2 are now open to the public. Remove old trail and temporary trail connections. Restore area. Remove construction fencing, temporary access off DuSable Lake Shore Drive, and temporary signage. Restore landscaping and finalize site. Phase 3 does not include any activities that impact Lake Michigan or the shoreline.

II. Factual Determinations

a. <u>Physical Substrate Determinations</u>

1) Substrate Conditions and Sediment Type

The construction of manmade fills and bulkheads in this region over the last hundred or more years has dramatically altered this portion of the shoreline. Harbors, jetties, and breakwaters have diverted and trapped the littoral sand to form the current shoreline position that is in a relative state of equilibrium.

Onshore and offshore subsurface investigations were undertaken in 1998 and 2004 to map the soil and rock stratigraphy within the project limits. Some of those soil borings were taken at offshore locations that aligned with 2004 proposed project design features that are no longer relevant. Five of the land side borings are in locations that are still useful for the current proposed project (Figure 6):

- B-6: Located near shoreline between 45th and 47th Street.
- LS-01 and CB-4-28-97: Located near the shoreline at the 47th Street peninsula.
- LS-02: Located near the shoreline south of 47th Street.
- LS-03: Located near the shoreline at the 51st Street peninsula.

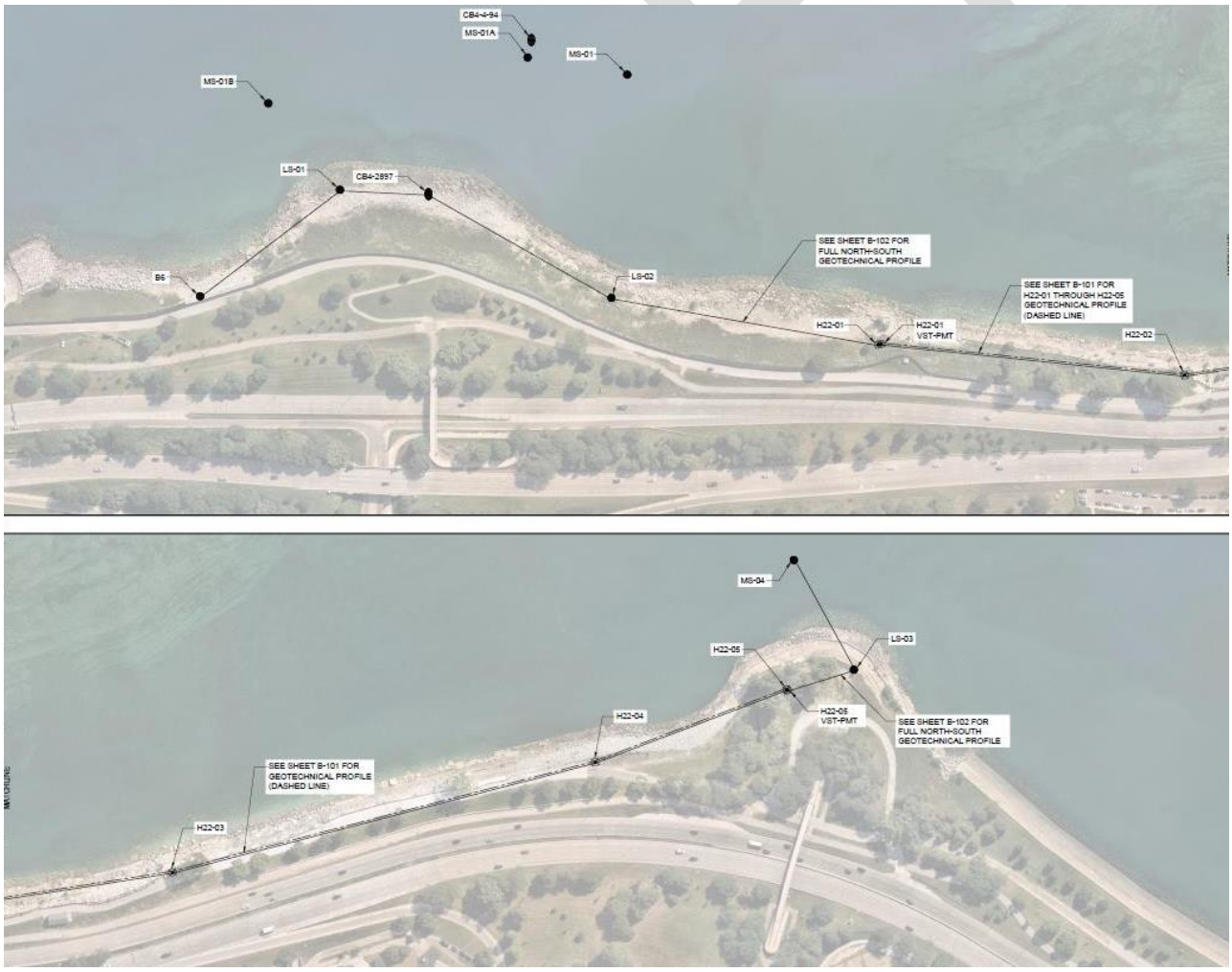


Figure 6. Geotechnical Borehole Locations.

In November 2022 an additional subsurface investigation was undertaken to fill the gap in subsurface information. An additional 5 borings were obtained (H22-01 through H22-05, Figure 6) to the depths of 32 to 40 feet below ground surface.

Based on the *in-situ* site investigation field logs, a laboratory test program was prepared which included tests for moisture content, Atterberg limits, particle size, specific gravity, and density unit weight and consolidation tests. The corrosion potential of the site was also analyzed for depths of 1 to 13.5-feet below ground surface. *In-situ* testing included field vane shear tests performed for softer silty clay and pressure meter tests for hard silty clay to determine the undisturbed strength properties of the *in-situ* soil.

Field investigation and field logs show that the proposed project's soil profile varied from non- cohesive fill and sand underlaid by soft to very hard silty clay as the depth increased from the ground surface.

The revetment reconstruction would consist of the various armor, filter, core stones, cobbles, coarse aggregate, lakefill and rubble fill materials. These materials would make up the new substrates and sediment types within the project area that were reconstructed. Areas of the lakebed that were not disturbed or filled upon would retain their original substrate composition.

2) Material Movement

All clean fill would be placed for this proposed project in a manner that minimizes new material movement during construction and maximizes protection of the shoreline from erosion. Parkland grading (geotextile fabric, earthfill, topsoil) would only be performed after a section of shoreline has been protected by new revetment.

The rubble mound revetment and underwater breakwater materials were appropriately sized to meet coastal standards as well as to prevent material movement after placement outside of the bounds of the revetment. The dynamic revetment features include the headlands, underwater breakwater and prefilled cobbles. The design features underwent physical and computation modeling to ensure the placement configuration and material sizes were appropriate for the dynamic revetment to remain stable. The underwater breakwater truncates the depth of closure minimizing material migration offshore and reduces wave energy. The north headland would deflect incoming wave-induced currents and reduce wave energy within the dynamic revetment. The placement location of the southern headland would prevent downdrift movement of prefilled cobbles along the shoreline. Prefilled cobbles within the dynamic revetment are expected to be dynamic and respond to the local hydraulics with reshaping the beach profile. However, the material is expected to remain stable within the closed system.

3) Physical Effects on Benthos

Benthic macroinvertebrates serve as both a food source for fish and other organisms higher on the food chain and as primary consumers of organic matter on the lake bottom. The diversity, abundance and composition of the macroinvertebrate population can be affected by environmental factors, including overall water quality, substrate type, and the physical parameters of temperature and current.

Taxonomic composition of invertebrates on rock substrates in Lake Michigan can be very diverse, but typically is dominated by amphipods, isopods, oligochaetes, and chironomids; accounting for 83% of organisms collected (Janssen et al. 2005). Additional invertebrate groups commonly collected on rock substrates, but not necessarily locally abundant, include mayflies, caddisflies, crayfish, and snails. The benthic fauna on rocks located at depths of 16-22 feet along the Illinois shoreline in southwestern Lake Michigan is represented by a diverse assemblage of aquatic insects including *Hydropsyche*, *Agraylea*, *Polycentropus*, *Setodes*, *Ceraclea*, and *Oecetis* (Trichopetera), *Epeorus*, *Stenonema* and *Stenacron* (Ephemeroptera), *Optioservus* (Coleoptera), and *Krenopelopia, Chaetocladius, Cricotopus/Orthocladius*, *Thienemanniella*, *Stilocladius*, *Paratanytarsus*, and *Rheotanytarsus* (Diptera) (Janssen et al. 2005). The invasive dreissenid mussels (quagga and zebra mussels) are known to be present along the rocky shoreline, however they do not completely encrust the rocks due to wave action and predation from Round Gobies.

The Illinois DNR has identified records of the state listed mudpuppy (*Necturus maculosus*) within 0.25 miles of the project location along the rocky shoreline habitat. An additional survey conducted in March 2023 resulted in the capture of three mudpuppy individuals within the project area. These captures were in water depths of ~2.0 to 3.0 m along the shoreline that is composed of failing limestone revetment with large crevices. Mudpuppies are known to reside in the deeper waters of Lake Michigan during the summer months and migrate inland to overwinter along the rocky shoreline.

The proposed revetment is not expected to have any long-term significant impacts to the benthos. Short-term impacts would occur in areas of proposed construction; however, the environment is expected to gain in terms of the diversity of lake bottom conditions that would occur with the placement of armor stone structures adjacent to the new revetment, underwater breakwater, and dynamic revetment. Lake bottom disturbance would not be allowed from November 1st through April 30th to avoid impacts to overwintering mudpuppies. The new installed rubble mound revetments in the proposed project reach would provide desirable mudpuppy habitat.

4) Other Effects

There would be no other significant substrate impacts. The changes in the substrate elevation and bottom contours from the placement of the dynamic revetment, breakwater, and headlands would be a localized minor impact that would not be significant on the regional scale.

5) Actions Taken to Minimize Impacts

The proposed plan, including the shape of the land surface and amount of lake fill is the result of an optimization analysis, including physical modelling of the dynamic revetment segment. A goal of the optimization analysis includes avoidance and minimization of proposed project impacts to the extent possible while meeting the flood control requirements of the proposed project.

This process required a balancing between the shape, geometry, and elevation of the revetment structure at the edge of the park; the extent and scope of filling; and controlling the amount of wave overtopping flows that need to be managed to accomplish the flood control project objectives.

The proposed upland ground contours also cause an overall reduction in the overtopping wave flows that are conveyed on the new park land. This overtopping water ultimately discharges in a controlled fashion back to Lake Michigan through porous revetment structures.

Several other revetment shapes and concepts have been considered over the last two decades for the 45th Street to 51st Street segment of shoreline. Many of those alternatives included a significantly greater amount of fill in Lake Michigan.

b. Water Quality, Circulation, and Fluctuation Determinations

1) Water Quality

Every two years, Section 303(d) of the Clean Water Act requires states to publish a list of all waters that are not meeting water quality standards. The 49th Street sampling site, which is located within the proposed project limits, is listed on the Illinois Environmental Protection Agency 2022 impaired waters (Assessment ID IL_QR-01) (IEPA 2022). The sampling site is considered impaired for fish and shellfish consumption, and swimming and boating, due to the presence of mercury, polychlorinated biphenyls, and bacteria (or other microbes) in the waterway. Nearshore areas of Lake Michigan (Assessment ID IL_QLM-01) fully support aquatic life, primary contact, and public and food processing water supply uses, but do not support fish consumption due to the presence of aldrin, dieldrin, endrin, heptachlor, mercury, mirex, polychlorinated biphenyls, and toxaphene. Nearshore areas of Lake Michigan also have impaired aesthetic quality due to the presence of total phosphorous (IEPA 2022).

IEPA conducts routine water quality monitoring in Lake Michigan. A near shore survey, consisting of a probabilistically based survey of 50 sites, results in sampling 25 sites per year in May, July, and September at a sample depth of 1.5 foot in Lake Michigan. In-situ surface measurements are collected (temperature, dissolved oxygen, pH, conductivity, and Secchi depth) and chemical parameters (chloride, fluoride, metals (total), nutrients (total), solids (total, dissolved, and volatile), and sulfate) are analyzed at the sampling sites. Additional analysis is collected for a subset of samples. Results of detected water quality parameters found in samples collected during routine sampling in the vicinity of the proposed project in the last five years are summarized in Tables 1 and 2 (USEPA 2023).

Table 1: Lake Michigan Water Quality – General Chemistry

Parameter, general water quality	Minimum	Maximum	Units
Ammonia-nitrogen	ND	0.1	mg/L
Nitrate + Nitrite, total	0.227	0.305	mg/L
Kjeldahl nitrogen, total	ND	0.44	mg/L
Phosphorus, total	ND	0.008	mg/L
Organic carbon, total	1.71	1.96	mg/L
pH	7.6	8.44	std. units
Hardness, Ca, Mg	118,000	138,000	ug/L
Chlorophyll a, corrected for pheophytin	ND	0.84	ug/L
Chlorophyll a, uncorrected for pheophytin	ND	0.96	ug/L
Depth, Secchi disk depth	78	332	inches
Dissolved oxygen (DO)	8.75	11.6	mg/L

Parameter, general water quality	Minimum	Maximum	Units
Dissolved oxygen saturation	96	115	%
Fluoride, total	ND	0.14	mg/L
Chloride, total	11.6	17	mg/L
Sulfate, total	20.7	23.6	mg/L
Total dissolved solids	154	216	mg/L
Total suspended solids	ND	5	mg/L
Specific conductance	286.5	306.5	umho/cm
Hexachlorobenzene, total	ND	0.0016	ug/L

Table 2: Lake Michigan Water Quality – Metals

Parameter, metals	Minimum	Maximum	Units
Aluminum, dissolved	ND	21.9	ug/L
Aluminum, total	ND	388	ug/L
Arsenic, dissolved	0.64	0.8	ug/L
Arsenic, total	0.68	1.19	ug/L
Barium, dissolved	17.8	20.7	ug/L
Barium, total	18.9	21.7	ug/L
Boron, dissolved	21.1	26.7	ug/L
Boron, total	21.5	27.8	ug/L
Calcium, dissolved	31,300	32,700	ug/L
Calcium, total	30,000	35,000	ug/L
Chromium, dissolved	ND	0.2	ug/L
Chromium, total	ND	12.5	ug/L
Cobalt, dissolved	ND	0.45	ug/L
Cobalt, total	ND	0.07	ug/L
Copper, dissolved	ND	0.5	ug/L
Copper, total	ND	1.9	ug/L
Iron, dissolved	ND	5.18	ug/L
Iron, total	ND	107	ug/L
Lead, total	ND	1.5	ug/L
Magnesium, dissolved	11,000	11,200	ug/L
Magnesium, total	10,500	12,300	ug/L
Manganese, dissolved	ND	0.84	ug/L
Manganese, total	ND	7.49	ug/L
Nickel, dissolved	ND	2.03	ug/L
Nickel, total	ND	0.64	ug/L
Potassium, dissolved	1,400	1.76	ug/L
Potassium, total	1,310	1,520	ug/L
Silver, total	ND	0.14	ug/L
Sodium, dissolved	7,400	9,410	ug/L
Sodium, total	7,380	9,020	ug/L
Strontium, dissolved	111	117	ug/L
Strontium, total	108	120	ug/L

Parameter, metals	Minimum	Maximum	Units
Vanadium, dissolved	ND	0.56	ug/L
Vanadium, total	ND	2.35	ug/L
Zinc, total	ND	5.85	ug/L

Turbidity levels fluctuate significantly during Lake Michigan storm conditions. This phenomenon is readily observed during storm events.

The proposed project is not expected to have any significant impacts to water quality. Placement of materials below the OHWM of Lake Michigan is limited to clean aggregate, clean riprap, armor stone, or processed repurposed onsite materials, such as existing revetment stone and concrete. Fill material that is proposed for placement below OHWM will contain less than 20% fines, or less than 20% passing a #230 sieve, which is the regulatory threshold set forth by the IEPA for conducting water quality testing and analysis to identify water quality impacts associated with placement of fill materials into waters of the U.S. Fill materials will not contain any contaminants that would leach out or violate any condition in the Illinois 401 water quality certification.

Mitigation is not proposed and is not anticipated based on initial Clean Water Act Section 401-coordination. The project will comply with mitigation and/or best management practices imposed by IEPA in 401-water quality certification. The Contractor will be required to implement and monitor a soil erosion and sediment control plan that conforms with the requirements of NPDES General Construction Stormwater Permit ILR10 and follows the guidelines of the Illinois Urban Manual. The Contractor will implement construction methods and sequence the revetment demolition and construction activities to minimize the exposure of shoreline to erosive wave action. While there may be short-term local impacts on water quality by suspension of sediment during construction activities, such as toe trench excavation, these impacts will be temporary and minor in nature. There will be no significant long-term impacts to aquatic resources or water quality.

2) Current Patterns and Circulation

The new proposed project revetment has been designed to protect the shoreline from erosion and to provide flood protection for DuSable Lake Shore Drive. The implementation of the proposed project would have a negligible impact on Lake Michigan current patterns, circulation, and wave action at a regional scale due to the small scale. However, the features would have a minor impact on the local wave and circulation environment to promote long- term stability of the shoreline to reduce coastal risk from erosion and wave attack.

The dynamic revetment, including small headlands and offshore breakwater, has been modeled and designed to promote the long-term stability of the dynamic revetment segment and minimize the need for maintenance following storm events. The offshore breakwater, for example, is designed to reduce wave energy at the dynamic revetment during high lake levels, thereby reducing the movement of dynamic revetment cobble. Therefore, the offshore breakwater would have a purposeful and beneficial local impact on wave conditions at the dynamic revetment to promote the long-term stability of the shoreline.

The Lake Michigan shoreline between Evanston, Illinois and Gary, Indiana is sediment-starved, with essentially no longshore transport, due to extensive anthropogenic coastal structures that have created littoral barriers. Sand is now transported and trapped at different points, creating sediment cells that are relatively self-contained systems with negligible sediment inputs from hardened shorelines. The sediment cell that the proposed project resides in experiences sediment inputs from the actively eroding sections of the project reach that feeds into the salient on the lee of Morgan Shoal, locally known as pebble beach.

A sediment transport analysis was performed under low, average, and high lake level conditions to optimize the stability of the dynamic revetment and minimize impacts on sediment transport (Appendix G). The dynamic revetment would remain stable, essentially creating a closed system, that would not erode and maintain the prefilled cobble salient. The increased stability of the sediment transport at the accretion zone is an intentional beneficial impact of the recommended plan to promote the long-term stability of the shoreline. However, the proposed headlands and offshore breakwater in the dynamic revetment segment may attenuate some sand on the updrift side. This impact would be negligible due to the area being sediment-starved, the intentional decrease in sediment inputs into the localized sediment cell from revetment reconstruction, and the wave induced current patterns that would periodically flush out any accumulation. There are no sediment resources downdrift of the dynamic revetment that would require sand mitigation from the alteration of the sediment transport.

The proposed project would have minor adverse and beneficial long-term impacts to nearshore wave conditions, current patterns, or circulation at the local scale, and negligible adverse impacts at the regional scale.

3) Normal Water Level Fluctuations

The water levels at the proposed project site are subject to the natural variation in Lake Michigan. Mean monthly lake levels have been recorded since 1903 in the Great Lakes. In the past 30 years, daily maximum, hourly mean water levels, and 6-minute mean water levels have been recorded at several gauging stations around the lake. The closest water level gauging station to the project site is at Calumet Harbor, NOAA Station 9087044, which is approximately 6 miles south of the project area. This station's available historical data were analyzed to determine the statistics of the return water periods. The reported statistical water levels are shown below, and the total monthly mean water level range recorded in Lake Michigan is approximately 6.4 feet.

Recorded monthly average water levels of the Lakes date back to 1860 at Milwaukee and 1903 at Calumet Harbor. The highest monthly mean lake level occurred in October 1986, when it reached an elevation of LWD +4.9 feet. The monthly mean water level of Lake Michigan recorded its second highest monthly mean, LWD +4.7 feet, in July of 2020. In general, the highest water levels typically occur during the summer months, and the average range between the summer and winter water levels is approximately 1 foot.

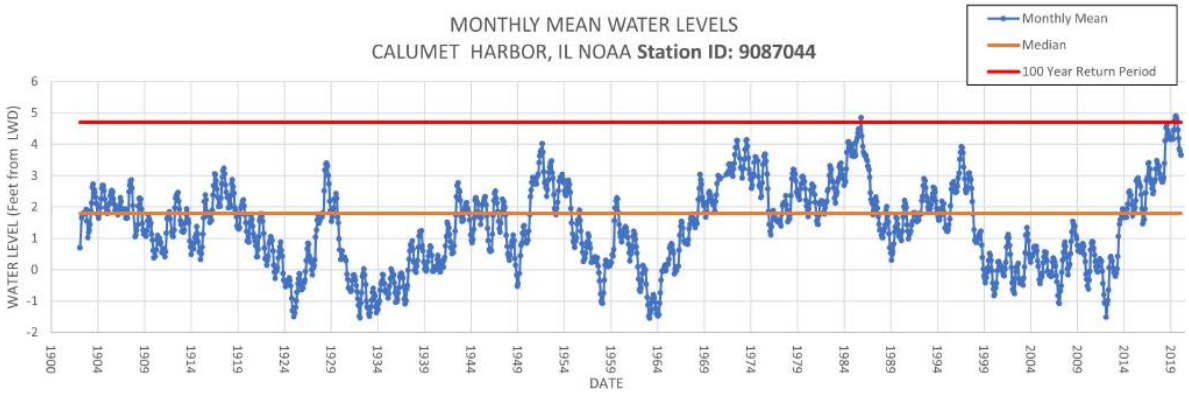
At the project site, incident conditions may vary dramatically from the prevailing long-term average. During wind events and changes in air pressure, the surface of the lake

can go up or down at a particular location. Storm surge is defined as the short-term, temporary increase in the mean water level due to wind setup and seiche events during storm activity. Short-term water level fluctuations of several feet are common in Lake Michigan. Storm surge is a key element in the design process, in addition to the monthly mean water levels. Additionally, storm surge increases the wave runup and overtopping discharges along the shoreline, which are also key design considerations.

To assess the local storm surge component of nearshore water levels, the maximum hourly recorded water levels were analyzed and compared to the corresponding monthly mean water levels for the Calumet station. The largest 40 storm surge events in the 40-year record period of hourly water levels were analyzed using the Weibull and Gumbel extreme event probability distributions. For example, the largest measured surge occurred at 9:00pm on September 22, 1989, when the peak hourly water level exceeded the monthly average for September 1989 by 2.7 feet.

The total water level scenarios for design must consider the combination of the monthly mean water levels and storm surge conditions. The total water levels for design include the possible water level scenarios that would likely be experienced during storm events occurring during periods of different average levels. These water levels range from +1.3 feet LWD for a 1-year storm during low lake levels that are exceeded 90% of the time and rising up to +7.7 feet LWD for a 100-year storm surge occurring during a monthly mean water level exceeded 1% of the time.

The numerical wave modeling process uses the water level scenarios shown below to develop design conditions for the various proposed project structures. These total water levels are considered static hourly water levels, and other important coastal processes such as wave setup and run-up elevations are computed during the numerical modeling process.



The proposed project would have no impact on water levels.

4) Actions Taken to Minimize Impacts

The proposed project would include the filling of approximately 7 acres of Lake Michigan with approximately 320,000 cubic yards of clean fill below the OHWM of EL. +4.0 LWD. The amount of proposed fill is miniscule compared to volume of Lake Michigan. T he proposed project would have no adverse impacts on Lake Michigan water levels.

c. Suspended Particulate/Turbidity Determinations

1) Expected Changes in Suspended Particulates and Turbidity

There would be temporary, limited increases in suspended particulates and turbidity levels in the immediate area of the proposed shoreline revetment during construction. Placement of materials below the OHWM of Lake Michigan is limited to clean aggregate, clean riprap, armor stone, or processed repurposed onsite materials, such as existing revetment stone and concrete. Fill material that is proposed for placement below OHWM will contain less than 20% fines, or less than 20% passing a #230 sieve, which is the regulatory threshold set forth by the IEPA for conducting turbidity testing and analysis to identify water quality impacts associated with placement of fill materials into waters of the U.S.

The Contractor will be required to implement and monitor a soil erosion and sediment control plan that conforms with the requirements of NPDES General Construction Stormwater Permit ILR10 and follows the guidelines of the Illinois Urban Manual. The Contractor will implement construction methods and sequence the revetment demolition and construction activities to minimize the exposure of shoreline to erosive wave action.

Temporary turbidity would occur during the north rubble mound revetment toe excavation operation.. The placement of clean fill would l have a minor temporary impact on turbidity levels in the areas where the lakebed is disturbed. The adoption of appropriate BMPs for the coastal environment would minimize impacts. Mitigation is not proposed and is not anticipated resulting from Clean Water Act Section 401-coordination. The project will comply with mitigation and/or best management practices imposed by IEPA in 401-water quality certification.

The proposed project will have no long-term adverse impact on suspended particulates and turbidity. This proposed project is being performed to protect the shoreline and reduce shoreline erosion. Overall, the proposed project would have a long-term beneficial impact on suspended particulates and turbidity, because it would improve water quality by reducing coastal erosion.

2) Effects on Chemical and Physical Properties of Water Column

a. Light penetration – Temporary localized turbidity increases during construction would cause decrease on light penetration.

b. Dissolved oxygen – Lake Michigan generally exhibits high levels of dissolved oxygen. The small area of potential minor turbidity increases would not have a significant impact on dissolved oxygen.

3) Effects on Biota

No significant impact on aquatic biota is expected to result from turbidity or suspended particulates associated with revetment construction. Temporary impacts to biota behavior (i.e., fish vacating area) may occur during construction.

4) Actions Taken to Minimize Impacts

Applicable permits would be secured, and the work would be performed in coordination

with the regulatory agency requirements, including the IEPA and IDNR.

d. Contaminant Determination

Lake bottom sediment sampling was not performed, since there are not anticipated borrow sources within the lake. Placement of materials below the OHWM of Lake Michigan is limited to clean aggregate, clean riprap, armor stone, or processed repurposed onsite materials, such as existing revetment stone and concrete. Fill material that is proposed for placement below OHWM will contain less than 20% fines, or less than 20% passing a #230 sieve, which is the regulatory threshold set forth by the IEPA for conducting water quality testing and analysis to identify water quality impacts associated with placement of fill materials into waters of the U.S. Fill materials will not contain any contaminants that would leach out or violate any condition in the Illinois 401 water quality certification.

e. Aquatic Ecosystem and Organism Determinations

1) Effects on Plankton

Plankton populations in Lake Michigan have decreased from historic populations due to the presence of the invasive quagga and zebra mussels filtering them out of the water column. The current plankton populations are more reflective of oligotrophic lakes with low populations and clearer water. Any phytoplankton populations present may experience temporary reduction of light penetration causing lower photosynthesis and other related metabolic functions in phytoplankton during construction; this would not be a significant impact.

2) Effects on Benthos

The proposed revetment is not expected to have any long-term significant impacts to the benthos. Short-term impacts would occur in areas of proposed construction; however, the environment is expected to gain in terms of the diversity of lake bottom conditions that would occur with the placement of armor stone structures adjacent to the new revetment. Lake bottom disturbance would not be allowed from November 1st through April 30th to avoid impacts to overwintering mudpuppies. The new installed rubble mound revetments and underwater breakwater in the project reach would provide desirable mudpuppy habitat.

3) Effects on Nekton

Fish eggs and larvae may be smothered by the proposed fill activity; however, this would be a minor, temporary impact. Fish and other free-swimming organisms would tend to avoid the construction area; the construction area would be used again by those organisms soon after construction ends. Species requiring rocky substrate for foraging and reproduction would be favored over those requiring sandy bottom habitats. The newly installed rubble mound revetments and underwater breakwater in the project reach would provide habitat opportunities.

4) Effects on Aquatic Food Web

No significant long-term impacts on the food web are expected.

5) Effects on Aquatic Sites

a) Sanctuaries and Refuges – none present; no significant impact

b) Wetlands – none present; no significant impact

c) Mud Flats – none present; no significant impact

d) Vegetated Shallows – none present; no significant impact

e) Coral Reefs – not applicable to freshwater environments

f) Riffle and Pool Complexes – none present; no significant impact

g) Other – Morgan Shoal is an ecologically important rocky outcrop in the immediate vicinity of the project area that provides diverse aquatic habitat. Construction work would not be conducted on the shoal with the placement of the offshore breakwater outside of the shoal's footprint. In-water construction of the breakwater may temporarily impact fish behavior on the shoal; this would not be a significant impact. The installation of the headland may attenuate some sand on the updrift side, which may migrate onto the shoal overtime or through high water level wave induced currents flushing out attenuated headland sands onto the shoal. It would be expected that any migrated sands onto the shoal would be temporary in nature as the hydraulics and wave environment around Morgan Shoal are dynamic and promote the flushing of smaller sediment material. This would be a negligible impact due to the area being relatively sand starved with low littoral drift sand volumes and the small area of the shoal potentially impacted. Overall, there would be no significant impact to the shoal and its ecological function.

6) Threatened and Endangered Species

No federally listed threatened and endangered species are known to be present within the project area. The project area is within the range of the endangered piping plover (*Charadrius melodus*), the endangered Hine's emerald dragonfly (*Somatochlora hineana*), the endangered leafy prairie-clover (*Dalea foliosa*), the threatened rufa red knot (*Calidris canutus rufa*), the threatened eastern massasauga (*Sistrurus catenatus*), the threatened eastern prairie fringed orchid (*Platanthera leucophaea*), and the proposed threatened monarch butterfly (*Danaus plexippus*). However, the project area contains no habitat likely to be used by threatened or endangered species, with the possible exception of migratory avian species.

While the northern long-eared bat and the tricolored bat were not listed by the USFWS as having the potential to occur in the project area, these species have a historical range within the project area. Out of an abundance of caution for impacts to bats due to tree cutting within the scope of work, a tree cutting window and best management practice would be in place. No cutting of any trees suitable for bat roosting (i.e., greater

than 5 inches diameter at breast height (DBH), living or dead, with loose hanging bark, or with cracks, crevices, or cavities) from April 1 through September 30. Tree removal would be mitigated by planting five trees, at least 2 inches DBH each, for each tree which is removed that is ten inches or greater DBH. Due to the nature of the project area as a disturbed urban lacustrine environment, no federally listed species would be affected by the proposed project. Table 3 provides a summary of federally-list species with potential to be in the project area.

Table 3: Federally Listed Species with the Potential of Occurring within the Project Area

Species Name	Federal Status	Habitat	Potential to Occur
Piping Plover (*Charadrius melodus*)	Endangered	Sandy beaches, tidal flats, and shores of large lakes and rivers	**Not expected to occur**; lack of suitable habitat due to small pebble beach. Known presence at Montrose Beach 7.6 miles north of Morgan Shoal
Red knot (*Calidris canutus rufa*)	Threatened	Found in coastal areas or large wetland complexes. Migratory window is May 1 through September 30	**Not expected to occur**; Lack of suitable habitat
Eastern Massasauga (*Sistrurus catenatus)*	Threatened	Graminoid dominated plant communities (e.g., fens, sedge meadows, peatlands, wet prairies, open woodlands, and shrublands	**Not expected to occur**; Lack of suitable habitat
Hine's Emerald Dragonfly (*Somatochlora hineana*)	Endangered	Spring-fed wetlands, wet meadows and marshes. Critical habitat has been designated for this species within Cook County; however, it is not within the vicinity of the project area.	**Not expected to occur**; Lack of suitable habitat
Monarch butterfly (*Danaus plexippus)*	Candidate	Prefer grassland ecosystems with native milkweed and nectar plants.	**Not expected to occur**; Lack of suitable habitat.
Eastern Prairie Fringed Orchid (*Platanthera leucophaea*)	Threatened	Mesic to wet prairies	**Not expected to occur;** Lack of suitable habitat
Leafy Prairie-clover (*Dalea foliosa*)	Endangered	Prairie remnants along the Des Plaines River in Illinois, in thin soils over limestone substrate	**Not expected to occur;** Lack of suitable habitat

The Illinois Department of Natural Resources identified the following listed species that may be in the vicinity of the project area: the state-endangered Black-crowned Night Heron (*Nycticorax nycticorax*), the state threatened Longnose sucker (*Catostomus*

catostomus) and Mudpuppy (*Necturus maculosus*) (Table 4). The Black-crowned Night Heron is a known summer resident along the Chicago shoreline, with observations of foraging herons along the project reach. There are no known observations or records of breeding Black-crowned Night Herons within the project area. The existing sparse trees in the project area do not provide suitable breeding habitat with adequate cover, therefore breeding pairs are not expected to occur and would not be significantly impacted.

There are records of the state listed Longnose sucker (*Catostomus catostomus*) caught over Morgan Shoal during their breeding season in the spring. These fish were caught within 0.25 miles of the shoreline likely utilizing the rocky outcropping for spawning habitat. It is unlikely that Longnose suckers would be utilizing the rocky shoreline for spawning due to the wave energy. The in-water placement of the breakwater near Morgan Shoal may cause temporary adverse impacts to sucker behavior causing fish to vacate the area due to general construction noise and potential turbidity. However, this would be a short-term, minor impact. As the placement of the breakwater is outside of Morgan Shoal's footprint, there would be no impact to Longnose sucker spawning habitat being smothered or covered by placed material. Overall, there would be no long-term significant adverse impacts to Longnose suckers.

The IL DNR has identified records of the state listed mudpuppy (Necturus maculosus) within 0.25 miles of the project location along the rocky shoreline habitat. An additional survey conducted in March 2023 resulted in the capture of three mudpuppy individuals within the project area along the rocky shoreline. Mudpuppies are known to reside in the deeper waters of Lake Michigan during the summer months and migrate inland to overwinter along the rocky shoreline. The IL DNR recommends that near-shore work be conducted between May 1st and October 31st to avoid impacts to Mudpuppies. This environmental window would be followed to avoid impacts, therefore there would be no significant impacts to Mudpuppies. Additionally, the installation of rubble mound revetment throughout the reach may provide beneficial impacts, as the crevices between the stones would provide suitable overwintering habitat for mudpuppies.

Table 4: State-listed Species with the Potential of Occurring within the Project Area

Species Name	List Status	Habitat	Potential to Occur
Black-crowned Night Heron (*Nycticorax nycticorax*)	Endangered	Foraging habitat of wetlands, streams, rivers, lakes, ponds, lagoons, mudflats, and wet agricultural fields. Breeding habitat of marsh reeds or trees with adequate cover	**Foraging – Occurs;** birds have been observed foraging along shoreline in project area **Breeding – Not expected to occur**; Lack of suitable breeding habitat
Longnose Sucker (*Catostomus catostomus*)	Threatened	Open water, lakes. Breeding in spring over rock and gravel.	**Occurs in vicinity;** species collected during breeding season over Morgan Shoal

Species Name	List Status	Habitat	Potential to Occur
Mudpuppy (*Necturus maculosus)*	Threatened	Clear lakes. Overwinters along rocky shorelines and substrates	**Occurs in project area**; species collected in project area during overwintering along rocky shoreline

7) Other Wildlife

Wildlife use of the project area is limited and consists primarily of birds and mammals common to developed lakeshore and urban areas. Species include common songbirds, pigeons, ducks, geese, gulls and other waterbirds, and small mammals such as mice and rats, bats, possum, squirrels and raccoons. The Lake Michigan shoreline is part of a known migratory flyway; seasonally, many migratory birds can be identified passing through the project area. There are potential temporary construction-related impacts to behavior with wildlife vacating the area due to noise and disturbances. These impacts would not be significant or long-term.

8) Actions Taken to Minimize Impacts

Environmental windows would be in place to minimize impacts to the state listed Mudpuppy and minimize potential impacts to the Federally listed Northern long-eared Bat as described in Section II e 6).

f. Proposed Discharge Site Determinations

1) Mixing Zone Determination

A mixing zone is not applicable to this proposed project as no violation of applicable water quality standards is expected during construction.

2) Determination of Compliance with Applicable Water Quality Standards

3) The proposed activity would not cause significant or long-term degradation of water quality within Lake Michigan and would comply would all applicable water quality standards. Placement of materials below the OHWM of Lake Michigan is limited to clean aggregate, clean riprap, armor stone, or processed repurposed onsite materials, such as existing revetment stone and concrete. Fill material that is proposed for placement below OHWM will contain less than 20% fines, or less than 20% passing a #230 sieve, which is the regulatory threshold set forth by the IEPA for conducting water quality testing and analysis to identify water quality impacts associated with placement of fill materials into waters of the U.S. Fill materials will not contain any contaminants that would leach out or violate any condition in the Illinois 401 water quality certification.Potential Effects on Human use Characteristics

No significant long-term negative impacts to municipal and private water supplies, water-related recreation, aesthetics, recreational, or commercial fisheries are expected. During implementation, recreational uses of the Lake would be limited within the construction work limits and potentially over Morgan Shoal due to its immediate vicinity. The proposed project would result in the creation of new parkland that would provide opportunities for recreation. No known National Parks, National and Historic Monuments, National Seashores, Wilderness Areas, Research Sites, and Similar Preserves are present.

g. Cumulative Effects on the Aquatic Ecosystem

There would be minor, temporary adverse impacts, but long term beneficial impacts due to increased habitat. There are no significant cumulative adverse effects expected as a result of implementation of the Morgan Shoal Revetment Reconstruction proposed project.

h. Secondary Effects on the Aquatic Ecosystem

No secondary effects on the Lake Michigan ecosystem are expected as a result of the proposed activity.

III. Findings of Compliance with the Restrictions on Discharge

a. No adaptation of the Section 404(b) (1) guidelines was made for this evaluation.

b. No practical alternatives are available that produce fewer adverse aquatic impacts than the proposed plan.

c. The proposed project would comply with applicable water quality standards.

d. The proposed project is in compliance with applicable Toxic Effluent Standards under Section 307 of the Clean Water Act; with the Endangered Species Act of 1973; and with the Marine Protection, Research, and Sanctuaries Act of 1972. We anticipate compliance with the National Historic Preservation Act of 1966 pending coordination with the Illinois State Historic Preservation Office.

e. The proposed activities would have no significant adverse impact on human health or welfare, including municipal and private water supplies, recreational and commercial fisheries, plankton, fish, shellfish, or wildlife communities (including community diversity, productivity, and stability), special aquatic sites, or recreational, aesthetic, and economic values.

f. No special measures were taken to minimize construction impacts other than selection of the least environmentally damaging construction alternative.

On the basis of the Guidelines, the proposed discharge of clean fill material is specified as complying with the requirements of these guidelines with the inclusion of appropriate and practical conditions to minimize pollution or adverse impacts to the aquatic ecosystem. There is no practicable alternative to the proposed discharge which would have less adverse impact on the aquatic ecosystem that would not have other significant adverse environmental consequences. In addition, the proposed action is in the public interest as set forth in this analysis and the associated Environmental Assessment.

Date _____

_____

Kenneth P. Rockwell
Colonel, U.S. Army
District Commander