Proposed sheet pile wall and breakwater construction in Lake Michigan at 607 Longwood Avenue, Glencoe, IL 60022.

607 Longwood LLC, 30 North LaSalle Street, Suite 3100, Chicago, IL 60602 has applied for an Illinois Department of Natural Resources, Office of Water Resources permit for the construction of a steel sheet pile wall and a breakwater in Lake Michigan at 607 Longwood Avenue, Glencoe, IL 60022.

The applicant’s current shore protection consists of a stone revetment. The applicant proposes to install a steel sheet pile wall and construct a new breakwater. A 70 ft long steel sheet pile wall will be installed extending lakeward from the existing revetment. The sheet pile wall will have a crest elevation of 587 ft tapering down to 585 ft at the lakeward end. An 80 ft long breakwater will be constructed extending north from the shore perpendicular end of the steel sheet pile wall. The breakwater will have a crest elevation of approximately 585 ft. Approximately 506 tons of premitigational sand will be placed. All elevations are in International Great Lakes Datum – 1985 adjusted. The proposed project will be reviewed using the Department’s Part 3704 Rules. A location map and plans are attached to this notice.

No work is to start on this project unless and until such a time that the permit is issued.

Plans for the work may be seen at the Office of Water Resources, Chicago Office, 100 W. Randolph Street 15th floor, Chicago, Illinois 60601. Inquiries and requests to review the plans may be directed to James Kessen of the Chicago Office at (312) 793-0990 or james.kessen@illinois.gov. An expanded version of the public notice can be viewed at http://www.dnr.illinois.gov/WaterResources/Pages/PublicNotices.aspx. You are invited to send comments regarding the work to the Chicago Office by August 8, 2022.

July 8, 2022
Dear Ms. McLaurin:

Please find enclosed a permit application for shore protection for the property located at 607 Longwood, Glencoe, IL, owned by 607 Longwood LLC. The shoreline stabilization will be comprised of a quarrystone breakwater with a steel groin and stone connection to land. The breakwater will be installed extending to 125’ offshore from the bluff toe. The quarrystone breakwater is designed to help reduce incident wave energy from eroding the sand and clay lakebed, to create a sustainable sand cover over the clay lakebed which helps reduces lakebed downcutting (deepening of the water), to help improve water quality caused by colloidal fines from the eroding clay being suspended in the water during storms, and to help reduce wave energy at the revetment for increased bluff stability. A letter of authorization from the south neighbor for stone and sand to be placed south of the property line in attached.

A Design of Shoreline Erosion Protection report has been attached to this cover letter as the coastal design specifications component of this permit. All references and figures referred to in the cover letter and the following report can be found in the Appendix.

The proposed activity complies with the approved Illinois Coastal Management Program and will be conducted in a manner consistent with such policies.

Project Purpose Statement
607 Longwood LLC has retained Shabica & Associates (SA) to help protect the bluff and beach at the Lake Michigan coastline at 607 Longwood, Glencoe, IL. The purpose of this project is to help provide a higher level of shore protection for the bluff and lakebed. The property currently has a small revetment at the bluff toe with a small beach where the property has been cut back to form a bay.

Project Description
Install 70’ of steel sheet pile wall extending east from the bluff toe/revetment with an elevation of 587’ west tapering down to 585’ east. Armorstone will be placed on the south side of the steel with a crest to match the steel (tolerance +1’, -5’) and a slope of 1:1. This armorstone will be placed with the lower section crossing the property line extension up to 4’. An 80’ long quarrystone breakwater will be constructed extending north from the shore perpendicular end of the steel [north 65’ and 15’ to the south (toe to toe)]. The breakwater will be constructed to 125’ offshore from the existing bluff toe (in the center of the bay). The crest will be at 585’, 11’ feet wide with structure slopes of 1v:1.5h. Approximately 550 cubic yards of quarrystone will placed below the visual OHWM. New fill will cover 0.07 acres below the visual OHWM.
The proposed system is designed to help retain a sandy beach, move the locus of wave energy further offshore, help reduce lakebed downcutting, reduce erosion of the bluff toe landward of the seawall, and help provide safe access for pedestrians and swimmers to and from Lake Michigan. At most Lake Michigan water levels, there is no access for shore walking south of the project site.

**Coastal Geology**

This section of coastline has historically lost sand due to lakebed downcutting especially during prolonged periods of low lake levels. Nearshore sand deposits are thin and less than one foot in some locations at this site (Figure 1, Appendix) and scientists estimate that the rate of lakebed erosion up to 6 inches per year (Nairn, 1997). The net result is similar to the effects of global warming and rising sea level on marine coasts. This includes deeper water nearshore, larger stormwaves and progressively narrower beaches as the nearshore lakebed continues to erode.

The Illinois Lake Michigan shoreline is considered “sediment starved” by coastal scientists. This is in contrast to East Coast and Gulf Coast open ocean shores where tens of thousands of tons of sand are found in the nearshore system that provide a primary line of defense against stormwaves. On most Great Lakes shores including southern Lake Michigan, natural sand beaches are not able to protect the lakeshore (exceptions may be during very low lake levels like 1964 or 2013). Large quantities of sand have been trapped or diverted offshore by municipal structures that extend 900 feet or more into the lake. Today, the main sand supply is wave erosion of the nearshore glacial clay lakebed that contains only about 10% sand (Shabica and Pranschke, 1994). The result is that groins are losing their effectiveness at holding a sandy beach during average to high lake levels. To retain a sand covering over the shallow lakebed (where downcutting is most active) as well as to protect the bluff toe, SA has designed this pocket beach system to better hold sand as necessary and protect the lakebed and bluff during variable lake levels.

If beach and nearshore sand is lost, degradation of the nearshore ecosystem will result. Meadows et al., (2005) reports an increase in zebra mussels *Dreissena polymorpha*, and a decrease in native zooplankton in waters where the lakebed is eroding clay and rocks. In comparison, a nearshore area with 100% sand cover supports a species-rich community. The report concludes, “it [is] nonetheless clear that sand-based areas were characterized by sufficient shallow water fish CPUE and species richness to suggest that these are important habitats within the context of the Great Lakes Basin and not simply ‘wet deserts’ as they are often considered.”

**Coastal Climate**

One of the largest factors in determining the scope of a project is analyzing current lake levels and climatic conditions. Over the past several years, larger-than-normal stormwaves have impacted the shoreline of Lake Michigan due to climate change. The shoreline at 607 Longwood has been impacted by the recent extreme increase in water level evidenced by waves overtopping the existing revetment and the deflation of the beach. These stormwaves, in combination with a severe rebound in Lake Michigan water levels, have exacerbated the nearshore erosion along the lakefront. Changes in weather patterns and lake levels affect the intensity of storms. Unfortunately, it is not possible to predict future Lake Michigan lake levels and how the changing lake levels will impact the shoreline.

The **Illinois State Water Survey, Prairie Research Institute** report on **Potential Impacts of Climate Change on Water Availability** ([http://www.isws.illinois.edu/iswsdocs/wsp/climate_impacts_012808.pdf](http://www.isws.illinois.edu/iswsdocs/wsp/climate_impacts_012808.pdf)) states that:

> “Scientists cannot predict future Illinois climatic conditions with confidence. The historical climate and hydrological records since the nineteenth century show that climate has changed significantly in the past and, even without human interference, could change significantly in the future.”

550 Frontage Road ● Suite 3735 ● Northfield, Illinois 60093 ● Tel 847.446.1436 ● info@shabica.com
www.shabica.com
The Illinois State Water Survey goes on to graph future precipitation models, illustrating conditions that are wetter or drier than previous historic extremes. Either scenario is likely to cause loss of property due to stormwave erosion from either lakebed downcutting and/or larger stormwaves. Currently, Lake Michigan water level is hovering around 580’ (IGLD 1985).

Benefits of Sandy Beaches
The Great Lakes represent the most important natural resource in the United States. Sandy beaches play an important role in maintaining water quality and safe access. Furthermore, a sandy beach makes a better ecotone (transitional environment) for flora and fauna than seawalls and revetments. Summary arguments supporting a sandy beach system include:

1) Beaches are filters for non-point source runoff.
2) Beaches help reduce lakebed downcutting, a source of fine clay pollutants.
3) Beaches make better wildlife habitat than actively eroding bluffs or seawalls.
4) Stone headlands make better fish habitat than eroding lakebed clay.
5) Beaches protect the lakebed from erosion that causes larger stormwaves to impact the shore.
6) Beaches are far safer for swimmers and boaters than a coast lined with seawalls or revetments, especially in an emergency.

On urban coasts, more than 35 years of system monitoring (Shabica et al, 2011) has shown that engineered pocket beaches (aka bay-beaches or attached-breakwater beaches), pre-nourished with sand, have shown a great resilience to changing lake-levels and decreased sediment-supply. After an intense storm such as the storm on Halloween, 2014, pocket beach recovery can be fast. Further, net sand loss and renourishment costs are lower than for unprotected beaches on open Great Lakes coasts. And finally, a diverse coastal ecosystem dominated by American Beach Grass and native species like Sea-Rocket has been surprising resilient after severe shore erosion events. Planting of native species on the new beaches further improves the decreasing terrestrial habitat regionally. And with each beach, thousands of tons of new sand is brought in, not only to initially nourish the pocket beach but also to add 20% overfill sand to the lakeshore and littoral drift system. Periodic sand renourishment has proven to be a successful management tool and provides additional sand for the entire Illinois coastal ecosystem.

Impact to Littoral Drift System
The proposed plan for this site includes construction of a breakwater-protected beach system and placement of mitigational sandfill, as required for permit. The design of the proposed system, including the mitigational sandfill, will help assure no negative impact to the littoral drift system. This region of the Lake Michigan shoreline around 607 Longwood, Glencoe is completely engineered. This section of the coastline consists of breakwater-held beaches, groins, seawalls and revetments. Sand mitigation (as required by the IDNR) will be placed in and around the new structures with a 20% overfill as required.

The proposed quarrystone breakwater will extend to 125’ offshore. The proposed structures that have been designed fall under the IDNR guidelines regarding distance offshore. Sandbars easily move around structures built in shallow water (less than 10’) allowing the littoral stream to continue past the project. The property to the north (40 Hazel) has a broken concrete revetment and is immediately south of the Glencoe public beach that has a 300’ long steel and concrete pier at its south property line that drastically reduces wave energy impacting 40 Hazel. The property to the south (605 Longwood) has a newly constructed revetment. The littoral drift system should remain at a dynamic equilibrium once the mitigational sand is placed (anticipated quantity plus 20% overfill).
IDNR regulations for structures that will retain sand require pre- and post-construction surveys, as well as surveys at the one and five-year intervals. This requirement will help assure that a sand equilibrium is met and that the new project is gaining and losing sand at a similar rate to neighboring properties or mitigation may be required at the owner’s expense.

**Impact on Public Uses**
A beach can provide a safe place for boaters and swimmers in distress. Fishing will not be impacted negatively, as the underwater area of the quarrystone protection will create an improved fish habitat. Additionally, navigation of water craft will not be impacted, as the proposed construction will not extend further east than the existing nearby structures.

**Impact on Natural Resources**
Quarrystone structures in the nearshore waters of Lake Michigan and sandy beaches improve native species habitat. The LandOwner Resource Centre with support from the Canadian Wildlife Service and the Ontario Ministry of Natural Resources states that, “unstable shorelines can release silt that can choke nearby aquatic habitats.” Additionally, underwater structures such as artificial reefs constructed of large boulders and clean riprap material “in large water bodies, such as the Great Lakes . . . are often the best method of creating habitat.” As stated above, according to Meadows, et al., 2005, “a nearshore area with 100% sand cover support[s] a species rich community.” As the design does not impact the bluff and vegetation, the local terrestrial wildlife will continue to inhabit this property.

**Type of Permit**
The scope of this project requires an LMRGP.

**Description and Schedule of Proposed Activity**
This project will be completed via marine construction with a barge and tugboat delivering all materials and equipment to the site. The proposed work will be completed using a backhoe that will work from the beach to place the materials unless the lake level prohibits this method of construction. Work will not begin until all necessary permits have been received. This work will require approximately 8 weeks to complete.

**Type and Quantity of Fill/Measures Taken to Avoid Impact/Erosion and Sediment Control Plan**
All material will be clean and from inland quarries. Approximately 1,385 tons of clean quarried stone will be placed to construct the breakwater system. Approximately 506 tons of clean sand will be placed as sandfill in and around the system. The area of fill to be placed below the Visual Ordinary High Water Mark (583 feet, IGLD 1985) is 0.07 acres.
Summary
All of the described activities and plans will follow LMRGP terms and conditions. All of the proposed work adheres to the guidelines prescribed by the Illinois Environmental Protection Agency and its Anti-Degradation Assessment. U.S. Fish & Wildlife Service will be updated on all relevant correspondence.

If you have any questions, please feel free to call me at the phone number below.

Sincerely,

Jon Shabica
Vice President

C: IDNR/OWR (Kessen)
   Illinois EPA, Bureau of Water, Permit Section
   U.S. Fish & Wildlife Service
   607 Longwood LLC
APPENDIX
607 Longwood, Glencoe – May 9, 2022

DESIGN OF SHORELINE EROSION PROTECTION

Introduction
The following report summarizes assumptions and design criteria for a quarrystone breakwater system including sandfill to help retain a beach, provide lake access, and better protect the property located at 607 Longwood, Glencoe. The design is based on the drawings included in this submission.

The site lies within a fully engineered section of urban lakeshore that is typically protected with revetments, seawalls, impermeable piers and steel sheetpile groins that may hold narrow beaches. There are no naturally eroding bluffs in the area.

This section of coast is sand-starved due to municipal structures (littoral barriers) constructed over the past 100 years that extend lakeward beyond the littoral zone and reduce sand bypass. Although there is currently an exposed sandy beach, the beach width varies greatly due to the vulnerability of this location. According to the Illinois State Geological Survey, there is almost no sand moving along this section of coast. All structures in the area have been steadily losing their effectiveness at holding beach sand. This problem is exacerbated by lakebed erosion. In many cases where all the sand has been lost, the adjacent bluffs have begun to erode. To provide adequate protection for the upland property, solutions have typically been of two types: breakwater- or groin-anchored beaches to protect the bluffs, or large quarrystone revetments placed against the toe of the bluff that prevent stormwave erosion but at the expense of the beach.

Project Description
The proposed design includes a pocket beach breakwater system. The project will include sandfill mitigation that fulfills the design requirements of 20-year stormwave erosion protection. With the higher lake level, stormwaves cause deeper water in the nearshore. The breakwater-protected pocket beach is designed to help maintain the bluff as well as retain and enhance a beach on this property during normal lake conditions.

Summary Specifications
Using the Army Corps of Engineers Shore Protection Manual (1984), performance of nearby prototypes and other sources, the following specifications were developed for this site (elevations are based on IGLD 1985):

<table>
<thead>
<tr>
<th>Breakwater Specifications</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Lakeward Crest Elevation:</td>
<td>585 ft</td>
</tr>
<tr>
<td>Toe of Breakwater:</td>
<td>575 ft</td>
</tr>
<tr>
<td>Crest Width:</td>
<td>11 ft</td>
</tr>
<tr>
<td>Average Armor Size:</td>
<td>4.5 tons (3-6)</td>
</tr>
<tr>
<td>“B” Stone</td>
<td>600 - 1000 lbs</td>
</tr>
<tr>
<td>Slope:</td>
<td>1:1.5</td>
</tr>
<tr>
<td>Tons/linear ft:</td>
<td>19.5 tons</td>
</tr>
</tbody>
</table>
APPENDIX
607 Longwood, Glencoe – May 9, 2022

Assumptions
- Design High Water (DHW): 582 ft *
- Design Water Level: 580 ft
- Design Low Water (DLW): 577.5 ft *
- Existing clay till elevation at breakwater toe: 574 ft
- 20-yr lakebed erosion at breakwater toe: 3 ft
- Design wave height: Hs = 6.7' ft
- Nearshore Slope: 1:50
- Design Wave Period (T): 9.9 s **
- Depth at Structure Toe DHW (Ds): 7'
- Design Deepwater Wave (Ho): 18.0'
- Design Wave Length (Lo): 501.8'
- Stone Porosity: 37%

* DHW includes 2 ft storm setup, DLW is equivalent to Low Water Datum
** Resio & Vincent, 1976

Shoreline/Bathymetry
Bathymetric surveying was performed on August 25, 2021. Survey notes: Lake conditions at the time of survey were waves of 1 foot or less. Bathymetric survey was performed using a Trimble R10 GPS Receiver along with a Hydrolite-TM Single Beam Echosounder. Survey was performed tied to Trimble’s VRS Now Network, data points were collected in NAV88 datum and converted to IGLD1985.

Water Levels
The following table summarizes water level data representing daily highest extremes measured at Calumet Harbor, Illinois, approximately 28 miles to the south of Glencoe. Note: Low water datum LWD = 577.5 ft (IGLD 1985).

<table>
<thead>
<tr>
<th>Lake Level</th>
<th>LWD</th>
<th>IGLD 1985</th>
</tr>
</thead>
<tbody>
<tr>
<td>Record High</td>
<td>+5.5</td>
<td>583.0</td>
</tr>
<tr>
<td>Record Low</td>
<td>-1.4</td>
<td>576.1</td>
</tr>
</tbody>
</table>

Project Supporting Data
To help facilitate project review, Shabica & Associates offers the following supporting data based on standard coastal engineering practices:

1. Sediment transport around structure
   The structure is designed to lie within the surf zone (zone of breaking waves), therefore allowing sediment transport around the structure. The range of breaking wave heights is from 8.3 ft based on a 6-second wave with a wave length of 184 ft (using 1/25 Lo) to 18 ft based on a 9.9-second wave with a wave length of 501.8 ft (Resio and Vincent, 1976). The commonly accepted zone of sediment transport is to 18 ft (depth of closure) in this section of Lake Michigan, which is a function of the design wave parameters. Based on this data, once the structure has been filled with sand, it will continue to bypass littoral drift sand. Survey monitoring will be conducted, as required by the IDNR, to help assure that the system performs as designed.
The IDNR requires sandfill in areas where sediment will be trapped by the new system. Sand volume quantities have been calculated as shown in the permit drawings. As required by the IDNR, a 20% overfill will be added to the calculated volume. Additionally, the new pre- and post-construction monitoring will be performed and submitted to the IDNR to verify the impacts to the system.

2. **Effect on Adjacent Shorelines**
   A wave diffraction diagram (Figure 2, Appendix) has been overlain on the proposed shore protection system. Using a refracted incident wave angle of 90 degrees (USACE, Shore Protection Manual), with average and design waves, there will be a decrease in wave energy on adjacent properties. The wave diffraction pattern shows that the coefficient of diffraction (K) reduces the wave energy to a distance of about ½ the wave length downdrift and does not have an impact further downdrift. For the average 6-second wave, that distance of reduced wave energy is about 90 ft and for the design wave, the protected distance is about 250 ft. This protected area close to the structure has diminished wave energy that will in turn reduce erosion in the area.

3. **Wave Reduction in Rubble-Mound Structures**
   The Iribarren number (\(\xi\)), or surf similarity number, is used to determine the wave reflection coefficient. For rubble-mound structures, wave reflection (and wave energy) is reduced by one half or more (0.2 to 0.53) (Figure 3, Appendix). For example, a wave reflection of 0.25 means that the wave energy is reduced by 75%. The range of wave reflection for beaches peaks at about 0.44. The range for plane slopes, however, quickly rises to 0.5 and peaks at .91. This illustrates that rubble-mound structures reduce wave energy almost as well as beaches.

**Lakebed Erosion**
Lakebed erosion, active in water depths of 10 ft or less, is a design component of this plan. This section of Glencoe lakeshore is considered sediment-starved. Sand deposits were measured near this site (Harbor Street, Glencoe) from the backshore to a depth of 6.3 m (21 ft). Sand deposits were thin to non-existent to a distance of 150 ft from shore (Shabica & Pranschke, 1994). Also, the site is underlain by highly-erodible, cohesive glacial clay-till. This condition increases the rate of irreversible lakebed erosion that causes deepening of the water and larger waves to impact the shoreline. According to Robert Nairn, approximately 200 m³ of sand cover per meter of lakeshore (out to a depth of 4 m) is necessary to protect the underlying cohesive profile from lakebed erosion under most conditions. Sand and coarser sediments represent typically less than 15% of the material eroding from the lakebed and bluffs.

Using the historic rate of lakebed downcutting of 0.15 ft/yr (Nairn, 1997), an irreversible lowering of the nearshore lakebed clay of approximately 3.0 ft over a 20-year period is predicted in unprotected areas. With the stone breakwater, revetment and sandfill installed, the lakebed erosion will be reduced.
Stone Stability, Armorstone
The proposed quarrystone breakwater has two layers of 3 – 6 ton armorstone built on a 1:1.5. Overtopping of the structure is expected during storms and higher water levels. Design conditions include:

* Lakeward breakwater crest elevation 3 ft above DHW, 7.5 ft above DLW
* Depth-limited breaking waves will break on the stone breakwater and sand beach
* Depth at the toe of the structure is 7 ft (576.0) at design high water
* Incident wave directions: NE, E and SE
* Wave period for DHW $T = 9.9$ seconds
* Wave period for average conditions $T = 6$ seconds

Quartzite armorstone is recommended as it is highly durable and is locally available in most gradations under 6 tons. Hudson’s formula was used to estimate armorstone size. An armorstone of 2 tons is predicted for 2-layer random placement armorstone based on the design conditions. The armorstone gradation selected for this project is 3 – 6 tons.

Project Monitoring
As the performance of shore protection structures cannot be predicted with absolute certainty, the shore protection system for 607 Longwood, Glencoe will be inspected as required by IDNR guidelines. This includes topographic and hydrographic surveys beginning at an elevation of 581.5 feet (IGLD 1985) and progressing to 300 feet lakeward of the lakeward end of the project within the north and south property lines. Additionally, all structures should be inspected to assure that they continue to meet design specifications.
2021 Google Earth – Approximate property lines in yellow

2021 Photo looking south at the site cut back bay and revetment
2021 Photo looking north at the existing fences on Glencoe’s public beach (no access)

2021 Photo looking south at the adjacent stone revetment
References


FIGURE 1a

LAKEFRONT SURVEY 1991  
FIELD WORK SHEET  
DATE: 08/29/91  
TRANSECT DESIGNATION: HARBOR STREET - GLENCOE  
NUMBER: 17  
DESCRIPTION OF OBSERVATION SITE: EASEMENT TO LAKE AT END OF STREET.

REFERENCE POINT: BRUNTON COMPASS  
AZIMUTH ANGLE:  
SETTING-OUT HORIZONTAL DISTANCE: 26 ft  
TRANSECT AZIMUTH ANGLE: 60.0°  
THE INTERNATIONAL GREAT LAKES DATUM MEASURED AT CALUMET HARBOR:  

<table>
<thead>
<tr>
<th>POINT ON TRANSECT</th>
<th>NOMINAL DISTANCE</th>
<th>ACTUAL DISTANCE</th>
<th>WATER DEPTH</th>
<th>SAND DEPTH</th>
<th>SPECIAL NOTES &amp; COMMENTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>01</td>
<td>BEACH</td>
<td>-25 ft</td>
<td>- ft</td>
<td>- ft</td>
<td></td>
</tr>
<tr>
<td>02</td>
<td>SHORE</td>
<td>0 ft</td>
<td>0 ft</td>
<td>0 ft</td>
<td></td>
</tr>
<tr>
<td>03</td>
<td>25 ft</td>
<td>25 ft</td>
<td>4 ft</td>
<td>0 ft</td>
<td></td>
</tr>
<tr>
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<tr>
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<td>100 ft</td>
<td>5 ft</td>
<td>0 ft</td>
<td></td>
</tr>
<tr>
<td>06</td>
<td>150 ft</td>
<td>150 ft</td>
<td>6 ft</td>
<td>0 ft</td>
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</tr>
<tr>
<td>07</td>
<td>250 ft</td>
<td>253 ft</td>
<td>6 ft</td>
<td>3 ft</td>
<td></td>
</tr>
<tr>
<td>08</td>
<td>500 ft</td>
<td>561 ft</td>
<td>8 ft</td>
<td>5 ft</td>
<td></td>
</tr>
<tr>
<td>09</td>
<td>750 ft</td>
<td>744 ft</td>
<td>11 ft</td>
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<td></td>
</tr>
<tr>
<td>10</td>
<td>1000 ft</td>
<td>1000 ft</td>
<td>13 ft</td>
<td>6 ft</td>
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<tr>
<td>11</td>
<td>1250 ft</td>
<td>1249 ft</td>
<td>14 ft</td>
<td>7 ft</td>
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<tr>
<td>12</td>
<td>1500 ft</td>
<td>1497 ft</td>
<td>16 ft</td>
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<td>13</td>
<td>1750 ft</td>
<td>1760 ft</td>
<td>18 ft</td>
<td>4 ft</td>
<td></td>
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<tr>
<td>14</td>
<td>2000 ft</td>
<td>2003 ft</td>
<td>21 ft</td>
<td>0 ft</td>
<td>ROCKS AND CLAY</td>
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<tr>
<td>15</td>
<td>2500 ft</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>16</td>
<td>3000 ft</td>
<td></td>
<td></td>
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</tr>
</tbody>
</table>

NOTES & COMMENTS:

Field Worksheet from 1991 USGS Lakefront Sand Thickness Survey at Harbor Street in Glencoe, note: exposed clay lakebed from shore to 150 feet east, then exposed clay lakebed again at 2000 feet east (From Shabica et al., 1991)
Wave reflection coefficients for slopes, beaches, and rubble-mound breakwaters as a function of the surf similarity parameter $\xi$.

Shore Protection Manual
USACE
LAKE MICHIGAN REGIONAL GENERAL PERMIT (LMRGP)
Property Address: 607 Longwood, Glencoe
Project: Breakwater Construction

<table>
<thead>
<tr>
<th>AUTHORIZED ACTIVITY: The following activities are covered under this permit:</th>
<th>N/A</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Installation, repair, and modification of permanent and seasonal piers/docks, boat ramps, boat hoists, and lifts</td>
<td>N/A</td>
</tr>
<tr>
<td>2. Navigational and mooring aids</td>
<td>N/A</td>
</tr>
<tr>
<td>3. Temporary recreational structures</td>
<td>N/A</td>
</tr>
<tr>
<td>4. Installation, repair, and modification of shore protection</td>
<td>Breakwater Protected Beach System</td>
</tr>
<tr>
<td>5. Beach nourishment</td>
<td>Yes</td>
</tr>
<tr>
<td>6. Maintenance of existing public harbors, public access facilities, and navigational features required for maintaining existing function</td>
<td>N/A</td>
</tr>
<tr>
<td>7. In-water discharge of dredged material, including beneficial use of dredged material for beach nourishment, shore protection or ecosystem restoration</td>
<td>N/A</td>
</tr>
<tr>
<td>8. Temporary structures and minor discharges of dredged or fill material necessary for the removal of vessels (wrecked, abandoned, or disabled) or for the removal of constructed obstructions to navigation.</td>
<td>N/A</td>
</tr>
</tbody>
</table>

1. A completed application form signed by the applicant or agent. The application form is available at [https://www.lrc.usace.army.mil/Missions/Regulatory/Illinois/](https://www.lrc.usace.army.mil/Missions/Regulatory/Illinois/). If the applicant does not sign the application form, notification must include a signed, written statement from the applicant designating the agent as their representative. Completed application is attached

2. Location map identifying the project site. Location map is attached

3. A detailed project description. Include the amount of fill in cubic yards and acres to be placed below the OHWM.

Install 70' of steel sheet pile wall extending east from the bluff toe/revetment with an elevation of 587' west tapering down to 585' east. Armorstone will be placed on the south side of the steel with a crest to match the steel (tolerance +1', -5') and a slope of 1:1. This armorstone will be placed with the lower section crossing the property line extension up to 4'. An 80' long quarrystone breakwater will be constructed extending north from the shore perpendicular end of the steel [north 65' and 15' to the south (toe to toe)]. The breakwater will be constructed to 125' offshore from the existing bluff toe (in the center of the bay). The crest will be at 585', 11' feet wide with structure slopes of 1v:1.5h. Approximately 550 cubic yards of quarrystone will placed below the visual OHWM. New fill will cover 0.07 acres below the visual OHWM.

4. Project plans and any construction drawings depicting all proposed work. The plans must include the following: a. A plan view identifying the dimensions of all existing structures and prior fills, as well as dimensions of all proposed structures and fill; b. A cross-sectional plan that identifies the water level measured at the OHWM as it relates to the proposed activity(ies) and/or structures; and c. The OHWM clearly depicted on the plans. Plans as described are included in the permit submittal.
5. Description of existing site conditions: a. On-site constructed structures such as piers, revetments, breakwaters, etc.; b. Proximate structures potentially influencing site conditions or project design both on- and off-site; c. Assessment of shoreline morphology including shoreline orientation, condition and description of shoreline (e.g. beach, bluff, maintained turf lawn, recent erosion, existing vegetation), and any other relevant features; d. Applicable project history such as past permits, recent changes in site conditions or water levels, etc. Describe any significant recent storm events that may have influenced site conditions and the date that the qualitative assessment (item 6 below) was completed; and e. Recent photographs of the shoreline and project area.

6. Quantitative assessment of the habitat near the project area (excluding authorized activities 2 and 3 defined above): a. Describe substrate composition, basic description of aquatic and terrestrial vegetation, and any other habitat features observed or known/documented; b. Distance from, and location of, nearest tributary, ravine, or other aquatic resource; c. Distance from, and location of, nearest known reef/shoal or other habitat feature; and d. Bathymetric survey conducted within the last 12 months.

**STATEMENT ON MITIGATION:** Mitigation includes actions which may avoid, minimize, rectify, reduce, or compensate for adverse environmental effects or activities which may otherwise be contrary to the public interest. The notification request must include a statement describing how compensatory mitigation requirements will be satisfied, or an explanation why compensatory mitigation should not be required for proposed losses to WOUU. Project proponents may propose the use of mitigation banks, in-lieu fee programs, or permittee-responsible mitigation. When developing a compensatory mitigation proposal, the project proponent must consider appropriate and practicable options consistent with the framework at 33 CFR 332.3(b). Compensatory mitigation projects provided to offset losses of aquatic resources must comply with the applicable provisions of the current Corps policies, guidelines, and 33 CFR 332 (the Mitigation Rule).

Special Conditions:

1. Installation, repair, and modification of permanent and seasonal piers/docks.
2. Navigational and mooring aids.
3. Temporary recreational structures.
4. Installation, repair, and modification of shoreline protection: Includes seawalls, revetments, bulkheads, groins, breakwaters, or other similar structures.
   a. Acceptable materials to be used include poured (formed) concrete, clean quarried stone, fabric-formed concrete, gabions, steel (piling), and clean recycled concrete chunks with the reinforcement steel removed. Rubble, asphalt, pavement, debris, and other waste products may not be used for shore protection.
   b. Shoreline structures must be designed to withstand the expected wave forces of the lake. Steepening of stone structure faces that include a stone toe design may be allowed by this office on a case-by-case basis.
   c. For shoreline protection structures consisting of steel, the addition of stone may be required to reduce erosion of adjacent shorelines from reflected waves or induced eddies at the end of structures.

| A. The property has a small quarrystone revetment at the back of a cut back bay with a narrow beach. B. The Glencoe public beach’s 300’ long steel pier is approximately 225’ north of the subject property. The south property has a new revetment that protects the bluff. C. The shoreline is relatively straight and oriented to the northeast. Sand has eroded due to the higher lake level and the sand starved nature of this stretch of shoreline. No vegetation is present on the beach. The bluff is vegetated. There is an exposed stormwater outfall on the bluff that leads to the beach. D. The change in lake level from 2013 (all time low under 576’) to record high lake level in 2020 caused a loss of sand to Lake Michigan that has not yet fully recoved on this property. E. Photos are attached in the cover letter. |
|———|
| A. The substrate composition of the lakebed is a thin veneer of native lake sand over cohesive glacial clay till. There is no visible aquatic vegetation. Any terrestrial vegetation that previously existed has been lost due to erosion. B. The nearest ravine outlet is located approximately 1200 feet to the south. C. The nearest known reef or aquatic feature is a small limestone outcropping very close to shore just north of the Glencoe Public Beach approximately 1400’ to the north. D. Recent bathymetric survey is included. |

Special Conditions:

| The project is for a new breakwater protected beach system. |
|———|
| Construction material is clean quarried stone and sand |
| The breakwaters are designed with a 1:1.5 slope. The toe of the structure will be dug into lakebed clay to address future lakebed erosion and scour. |

<p>| N/A |</p>
<table>
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<tr>
<td><strong>d.</strong> A construction sequence describing how access to the site will be accomplished. Water-based access is limited to the use of barges for the transport of heavy equipment and construction materials;</td>
<td>This project will likely be constructed via marine access to deliver machinery and materials to the site. A backhoe will work from the beach to place the stone and sand in accordance with the drawings.</td>
</tr>
<tr>
<td><strong>e.</strong> A contingency plan for temporary “dig-in” and sidecasting of lake substrate for access to the work area by barge. If temporary “dig-in” is needed, you must provide notification to this office of the change prior to sidecasting and relocating the substrate;</td>
<td>In the unlikely event that the water is too shallow due to sandbars, sand will be sidecast downdrift. The bucket will remain under the water surface. No clay will be excavated for access.</td>
</tr>
<tr>
<td><strong>f.</strong> Revetments must be the minimum width below the OHWM necessary for completing the work and for structural integrity of the proposed design;</td>
<td>N/A</td>
</tr>
<tr>
<td><strong>g.</strong> Groins and breakwaters must be situated within 125 feet of the toe of the bluff, as determined by this office. A variance in the maximum offshore distance of a structure may be granted for public facilities. All variances must be approved by this office on a case-by-case basis;</td>
<td>This project is a residential project and does not extend more than 125’ offshore.</td>
</tr>
<tr>
<td><strong>h.</strong> Pre-fill sand at a volume of 120% of the calculated capture volume of the proposed structure(s) must be provided in conjunction with the construction of the structure. A pre-construction bathymetric survey must be completed within one (1) month of the start of construction to recalculate the pre-fill sand volume to account for changes in site conditions since the original survey. Surveys more than one (1) month old will be considered if the start of construction is delayed due to weather conditions. A copy of the survey and final pre-fill sand volume must be provided to this office prior to the start of construction activities;</td>
<td>This project will abide by the state and federal requirements for sand quantities and monitoring.</td>
</tr>
<tr>
<td><strong>i.</strong> Structures must provide reasonable accommodations, as determined by this office, to maintain public access to the shoreline.</td>
<td>Access to the shoreline will be maintained.</td>
</tr>
<tr>
<td><strong>j.</strong></td>
<td></td>
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<tr>
<td><strong>5.</strong> Beach nourishment: a. Clean sand material from an upland source or suitable dredged material that complies with the 401 WQC in Appendix 1 may be used; b. Placement may not occur within or be associated with activities occurring in wetlands as defined in Title 33 CFR Part 320.</td>
<td>Sand nourishment will be clean sand from inland quarries.</td>
</tr>
<tr>
<td><strong>6.</strong> Maintenance of existing public harbor, public access facilities, and navigational features required for maintaining existing function:</td>
<td>N/A</td>
</tr>
<tr>
<td><strong>7.</strong> In-water discharge of dredged material, including beneficial use of dredged material for beach nourishment, shore protection, or ecosystem restoration: a. In-water discharge of dredged material includes placement of clean dredged sediment in less than 18 feet of water depth and on beaches below the OHWM; b. Materials may be placed for any purpose including disposal of excess materials, shoreline/beach nourishment, habitat creation, or other approved purpose; c. Placement may not occur within, or be associated with, activities occurring in wetlands as defined in Title 33 CFR Part 320 unless specifically approved by this office.</td>
<td>N/A</td>
</tr>
<tr>
<td><strong>8.</strong> Temporary structures and minor discharges of dredged or fill material necessary for the removal of vessels (wrecked, abandoned, or disabled) or for the removal of constructed obstructions to navigation:</td>
<td>N/A</td>
</tr>
</tbody>
</table>
May 3, 2022

Dear Sir or Madam,

I hereby request that Shabica & Associates, Inc. be authorized to act in my behalf in placing stone along the proposed steel groin and sand on my property located 605 Longwood in Glencoe related to the proposed beach project 607 Longwood in Glencoe, Illinois. The stone would cross up to 4' south of the property line. I convey permission for representatives of Shabica & Associates, Inc. to enter my property for consulting purposes related to the beach work, which includes sand and stone placement as shown on the breakwater permit plans.

If additional information is required, please contact me at the above address.

Sincerely,

Hillary Weinstein

cc: Illinois Department of Natural Resources
    Illinois Environmental Protection Agency
    Shabica & Associates, Inc.
# JOINT APPLICATION FORM FOR ILLINOIS

**ITEMS 1 AND 2 FOR AGENCY USE**

<table>
<thead>
<tr>
<th>1. Application Number</th>
<th>2. Date Received</th>
</tr>
</thead>
<tbody>
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</tbody>
</table>

**3. and 4. (SEE SPECIAL INSTRUCTIONS) NAME, MAILING ADDRESS AND TELEPHONE NUMBERS**

<table>
<thead>
<tr>
<th>3a. Applicant’s Name:</th>
<th>3b. Co-Applicant/Property Owner Name (If needed or if different from applicant):</th>
<th>4. Authorized Agent (an agent is not required):</th>
</tr>
</thead>
<tbody>
<tr>
<td>Company Name (if any):</td>
<td>Address:</td>
<td>Company Name (if any):</td>
</tr>
<tr>
<td>607 Longwood LLC</td>
<td>Address:</td>
<td>Shabica &amp; Associates, Inc.</td>
</tr>
<tr>
<td>30 N. LaSalle Street, Suite 3000</td>
<td>Address:</td>
<td>Address:</td>
</tr>
<tr>
<td>Chicago, IL 60602</td>
<td>Email Address:</td>
<td>550 Frontage Road</td>
</tr>
<tr>
<td></td>
<td>Email Address:</td>
<td>Suite 3735</td>
</tr>
<tr>
<td></td>
<td>Applicant’s Phone Nos. w/area code:</td>
<td>Northfield, IL 60093</td>
</tr>
<tr>
<td></td>
<td>Business:</td>
<td>Email Address:</td>
</tr>
<tr>
<td></td>
<td>Residence:</td>
<td>Business:</td>
</tr>
<tr>
<td></td>
<td>Cell:</td>
<td>Residence:</td>
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<tr>
<td></td>
<td>Fax:</td>
<td>Cell:</td>
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<tr>
<td></td>
<td>Fax:</td>
<td>Fax:</td>
</tr>
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**STATEMENT OF AUTHORIZATION**

I hereby authorize, [Company Name], to act in my behalf as my agent in the processing of this application and to furnish, upon request, supplementary information in support of this permit application.

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</table>

**5. ADJOINING PROPERTY OWNERS (Upstream and Downstream of the water body and within Visual Reach of Project)**

<table>
<thead>
<tr>
<th>Name</th>
<th>Mailing Address</th>
<th>Phone No. w/area code</th>
</tr>
</thead>
<tbody>
<tr>
<td>a.</td>
<td></td>
<td></td>
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<tr>
<td>b.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>c.</td>
<td></td>
<td></td>
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<tr>
<td>d.</td>
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</table>

**6. PROJECT TITLE:**

Breakwater-Protected Beach System

**7. PROJECT LOCATION:**

Lakefront at 607 Longwood Avenue, Glencoe, IL

<table>
<thead>
<tr>
<th>LATITUDE</th>
<th>LONGITUDE</th>
<th>UTMs</th>
<th>WATERWAY</th>
</tr>
</thead>
<tbody>
<tr>
<td>42.13672</td>
<td>-87.74822</td>
<td>4665231.24 m</td>
<td>WATERWAY</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>STREET, ROAD, OR OTHER DESCRIPTIVE LOCATION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lakefront at 607 Longwood Avenue</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>COUNTY</th>
<th>STATE</th>
<th>ZIP CODE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Glencoe</td>
<td>Cook</td>
<td>IL</td>
</tr>
<tr>
<td></td>
<td></td>
<td>60022</td>
</tr>
</tbody>
</table>

Revised 2010

[Checkboxes for:]  
- Corps of Engineers  
- IL Dept’t of Natural Resources  
- IL Environmental Protection Agency  
- Applicant’s Copy
8. PROJECT DESCRIPTION (Include all features):
Install 70' of steel sheet pile wall extending east from the bluff toe/revetment with an elevation of 587' west tapering down to 585' east. Armorstone will be placed on the south side of the steel with a crest to match the steel (tolerance +1', -5') and a slope of 1:1. This armorstone will be placed with the lower section crossing the property line extension up to 4'. An 80' long quarrystone breakwater will be constructed extending north from the shore perpendicular end of the steel [north 65' and 15' to the south (toe to toe)]. The breakwater will be constructed to 125' offshore from the existing bluff toe (in the center of the bay). The crest will be at 585', 11' feet wide with structure slopes of 1v:1.5h. Approximately 550 cubic yards of quarrystone will placed below the visual OHWM. New fill will cover 0.07 acres below the visual OHWM.

9. PURPOSE AND NEED OF PROJECT:
To help maintain a stable beach and protect the clay lakebed and toe of the bluff

COMPLETE THE FOLLOWING FOUR BLOCKS IF DREDGED AND/OR FILL MATERIAL IS TO BE DISCHARGED

10. REASON(S) FOR DISCHARGE:
Lakebed and shore protection

11. TYPE(S) OF MATERIAL BEING DISCHARGED AND THE AMOUNT OF EACH TYPE IN CUBIC YARDS FOR WATERWAYS:
TYPE: Stone and sand
AMOUNT IN CUBIC YARDS:
Stone: 550 cu. yds; Sand: 405 cu. yds.

12. SURFACE AREA IN ACRES OF WETLANDS OR OTHER WATERS FILLED (See Instructions)
Stone will cover +/- 0.07 acres

13. DESCRIPTION OF AVOIDANCE, MINIMIZATION AND COMPENSATION (See instructions)
This project will not negatively impact aquatic and terrestrial flora and fauna. This project will not measurably impact sediment added to the system for erosion or negatively impact the littoral drift system.

14. Date activity is proposed to commence
May 1, 2023
Date activity is expected to be completed
8 weeks

15. Is any portion of the activity for which authorization is sought now complete?
Yes [ ] No [x] NOTE: If answer is "YES" give reasons in the Project Description and Remarks section, Indicate the existing work on drawings.
Month and Year the activity was completed

16. List all approvals or certification and denials received from other Federal, interstate, state, or local agencies for structures, construction, discharges or other activities described in this application.

<table>
<thead>
<tr>
<th>Issuing Agency</th>
<th>Type of Approval</th>
<th>Identification No.</th>
<th>Date of Application</th>
<th>Date of Approval</th>
<th>Date of Denial</th>
</tr>
</thead>
</table>

17. CONSENT TO ENTER PROPERTY LISTED IN PART 7 ABOVE IS HEREBY GRANTED.
Yes [x] No [ ]

18. APPLICATION-VERIFICATION (SEE SPECIAL INSTRUCTIONS)

I affirm with the information contained in the application, and that to the
I further certify that I possess the authority to undertake the proposed

5-10-2022
Date

Signature of Applicant or Authorized Agent

☐ Corps of Engineers ☐ IL Dept of Natural Resources ☐ IL Environmental Protection Agency ☐ Applicant’s Copy
Revised 2010

SEE INSTRUCTIONS FOR ADDRESS
Breakwater-Protected Beach System

607 Longwood Avenue
Glencoe, IL 60022
Location of Project: 607 Longwood Avenue, Glencoe, Illinois 60022

List of property owners (from North to South):

1. Glencoe Park District
2. Village of Glencoe
3. Eileen and Harold Sirkin
4. Subject Property: 607 Longwood LLC, 607 Longwood Avenue, Glencoe, IL 60022
   (mailing: 30 N. LaSalle Street, Suite 3000, Chicago, IL 60602)
5. Hilary Weinstein
6. David Kalt
7. Leo Birov
8. Caroline Grossinger
9. Adrienne Glazov
10. Irmgard Rueggsegger
11. Ross Pearlstein
12. James and Tracy Sprayregen
13. James and Tracy Sprayregen
14. A. Youkhana
Title: Breakwater-Protected Beach System
607 Longwood Avenue
Glencoe, Illinois 60022

Submittal Date: May 9, 2022

Modified Date: June 7, 2022

Plan Sheets:
- 2022.3.29, modified 6.7.2022 607 Longwood Avenue, Glencoe_Plan View – Sheet 1 of 4
- 2022.2.21, modified 6.7.2022 607 Longwood Avenue, Glencoe_Cross Sections – Sheet 2 of 4
- 2022.3.29, modified 6.7.2022 607 Longwood Avenue, Glencoe_Sand Plan View – Sheet 3 of 4
- 2022.5.5 607 Longwood Avenue, Glencoe_Sand Calculations – Sheet 4 of 4
LAKE MICHIGAN
LAKE LEVEL = 580.8 IGLD85
(8-25-2021)

PLAN VIEW

605 LONGWOOD
GLENCOE

607 LONGWOOD AVE.
GLENCOE, ILLINOIS

Shabica & Associates, Inc.
550 Frontage Rd, Suite 3735
Northfield, Illinois 60093
MARCH 29, 2022
MOD. JUNE 7, 2022
SAND CALCULATIONS

\[
\frac{25 \text{ yd} \times 25 \text{ yd} \times 1 \text{ yd}}{2} = 312.5 \text{ yds}
\]

\[
\frac{10 \text{ yds} \times 15 \text{ yds} \times 1 \text{ yd}}{6} = 25 \text{ yds}
\]

312.5 yds + 25 yds = 337.5 yds

337.5 yds \times 1.25 \text{ yds/ton} = 422 \text{ TONS}

422 \text{ TONS} \times 20\% \text{ OVERFILL} = 84 \text{ TONS}

422 \text{ TONS} + 84 \text{ TONS} = 506 \text{ TONS}

PLACE 506 TONS CLEAN SAND

SAND CALCULATIONS

607 NOLANWOOD, GLENCOE
Shabica & Associates, Inc.
550 Frontage Rd, Suite 3735
Northfield, Illinois 60093

MAY 5, 2022