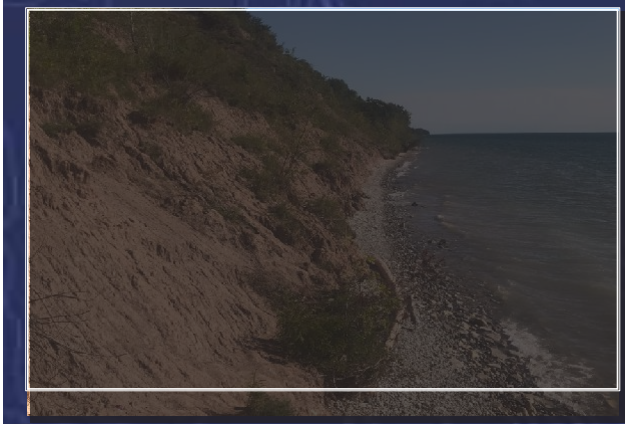
Project Understanding and Approach

Although the City of Port Washington is blessed with an excellent waterfront and harbor, its natural geologic setting provides for very little beach. What little beach it has along the tow of the bluff north of the WWTP hasn't been useable for several years due to the present high lake water level. Concurrently, storm waves have eroded the toe of the bluff, precipitating landslides that pose hazard to any useable beach. In addition, the eroding bluff crest has advanced quite close to the southern portion of the eastern (northbound) lane of the drive through Upper Lake Park.



Slope failures causing safety concerns

Bluff crest recessing close to park road

Present assets include the stairway near the southern end of Upper Lake Park, which has and continues to provide pedestrian access down to the south end of the presently unusable beach. Additionally, the paved promenade around the east side of the WWTP provides emergency vehicle and maintenance equipment access to the beach. The upper park area is rich with recreation activites and a beautiful all-accessible playground for the community to enjoy.

Making the beach useful, stabilizing the bluff so that both the beach below and the east drive in the park above are safe, and improving pedestrian connectivity between Upper Lake Park and the beach can be accomplished by:

a) **Cutting back and revegetating the present bare and unstable bluff** face along the southern two thirds of the park and relocating approximately 700 lineal feet of the east (northbound) drive that's closest to the bluff crest westward. This will accommodate construction of a traversing pedestrian paved pathway from the Upper Park to the beach. The northern remainder of the existing east drive is safely distant from the bluff crest.

b) **Installing a relatively small cross section revetment at the toe of the bluff**, trenched in along approximately 1,100 lineal feet, in order to prevent storm wave erosion along the stabilized bluff area during high water levels. We don't recommend armoring the northern 700 lineal feet of the park's shoreline because the east (northbound) drive lane in that area is sufficiently distant (75' to 125') from the bluff crest to accommodate the natural rate of shore recession (estimated at about 50' per century) for many decades to come. Additionally, there are disadvantages on a regional scale in unnecessarily or prematurely armoring the shoreline.

c) **Utilizing "beach nourishment"** to augment the natural materials along approximately 600 feet of the beach with compatible locally mined native sand and gravel can make it useful even during present and future high-water levels. The natural migration of sand along this region of shoreline is from north to south, so the lakeward projection of the WWTP in relation the shoreline to the north forms a convenient pocket that will aid in "nourishment" retention.

T**hese features are depicted in the attached Concept Plan** which, based on our experience, is more suitable for all purposes than an alternate plan that had been provided to the city by others in 2001. Instead of beach nourishment, the 2001 plan had proposed an off-shore breakwater to protect a pocket beach. We recommend against a breakwater enclosed beach because the degree of water stagnation inherent to that type of configuration substantially increases the incidence of necessary beach closures for public safety due to high bacteria counts.

Our approach is consistent with the environmentally compatible designs we have developed for more than 30 municipal beach restorations along the Lake Michigan shoreline over the last 20 years and approximately 100 bluff and shoreline stabilizations over the last 35 years. Our Concept Plan has the following advantages over the 2001 plan:

1) Is a fraction of the construction cost.

2) Maintains natural circulation of water that's vital to minimize beach closures due to high bacteria counts.

3) Avoids unnecessary or premature "hardening" of the shoreline.

If requested, we're available to provide a more thorough description of advantages 2 and 3, as well as our firm's capabilities, in a presentation to the Common Council.