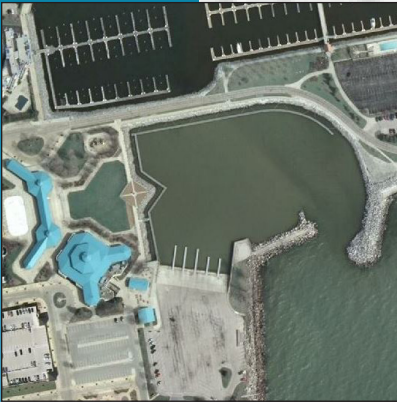




Award Submittal

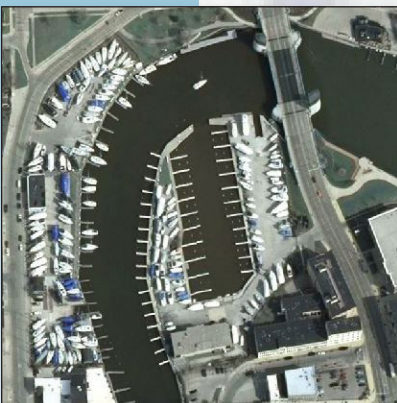
2016 WODA Environmental Excellence Award

Category: Environmental
Dredging



Pershing Park Boat Basin Dredging Racine County, Wisconsin

April 2016



Summary

The nominated project for the 2016 WODA Environmental Excellence Award is the Pershing Park Boat Basin dredging and disposal project in Racine County, Wisconsin. The Racine County Public Works and Development Services (County) is responsible for maintaining the depth of a regionally important boat basin (Pershing Park) on Lake Michigan in the City of Racine, Wisconsin. In 2013, the basin began to present shallow water hazards due to sedimentation that was compounded by historic low lake levels. The County began the process of planning for dredging and sediment disposal. Compounding this maintenance dredging activity were two factors related to (1) low level contamination of the sediments and (2) limited disposal options. The closest upland location for disposal of dredged material was a County park located eight miles north of Pershing Park. However, placement of sediment at this park presented several challenges including high disposal costs, interference with future plans for the park, and disturbance of a natural area. While considering the placement of dredged material in the County park, the County was also evaluating what to do with a defunct marina property, referred to as Belle Harbor Marina (Belle Harbor) which was located adjacent to the Root River within one-half mile of the boat basin. The entrance to Belle Harbor was un-sustainably located on an inside bend of the Root River and was filling-in with sediment. These sediments exhibited low level contamination as well which would add to the cost of dredging and disposal. However, because of excess local capacity, there was no longer a market for the boat slips in Belle Harbor. In 2014, the County put these two problems together (along with the help of state and private dollars) into one solution by mechanically dredging the Pershing Park boat basin and filling in the basin of Belle Harbor (Figure 1). The result was a harbor, dredged to navigable depths, and improved value and development-appeal of the reclaimed property of Belle Harbor. The County placed approximately 15,400 cubic yards of dredged material directly into the 1.5 acre basin followed by 2,000 cubic yards of clean fill to bring the elevation to grade. This solution had the added benefit of combining and containing low level contaminated sediments from both locations. The project was successfully completed on time and on budget. The Belle Harbor property, which has a prime location in downtown Racine, is now more attractive to prospective developers.



*Belle Harbor Marina
Before - 12/1/2014*



*Belle Harbor Marina
After - 7/17/2015*

Project Team Members

Affiliation		Team Member	Role
Owner	Racine County Public Works & Development Services	Julie Anderson Nathan Plunkett	Director County Engineer
Engineer	Foth Infrastructure & Environment, LLC ^{1,2}	Ken Potrykus Mike Raimonde Craig Harley Brian Stanul Brian Hinrichs	Project Director Project Manager Project Engineer Construction Manager Grant Coordinator
Contractor	Roen Salvage Company	Tom Drager Barry Kuzay	Dredge Project Director Dredge Project Manager
Stakeholders	City of Racine - Harbor Commission	--	--
Project Financial Supporters	<ul style="list-style-type: none"> ◆ Wisconsin Waterways Commission ◆ Wisconsin Department of Transportation Harbor Assistance Program ◆ Fund for Lake Michigan 	--	--

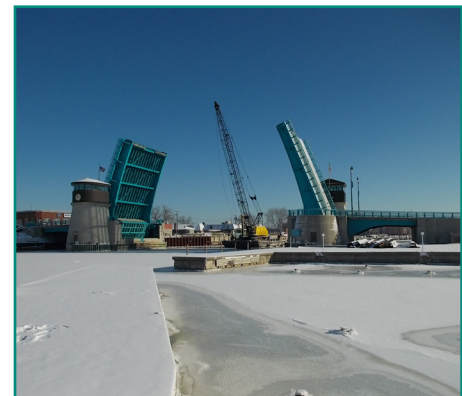
¹Active sustaining member of WEDA.

²Nominating entity.

Environmental Benefits

Beneficial reuse of the dredged material.

As part of the planning process, the County identified a beneficial reuse option that involved using the dredged material to fill in the basin of a nearby County-owned marina basin. This marina, known as Belle Harbor Marina (Figure 2), was a County-owned property that was defunct. The property was no longer used as a marina due to insufficient depth and market conditions. The property features, including the docks and sections of the bulkhead, were in disrepair. This basin was in close proximity to the dredge site which would reduce over-land hauling costs and also allow for barge hauling of material for disposal.



Total project costs for disposing sediment in Belle Harbor were estimated to be considerably less (>6% less) than other options. Disposing of dredged material in Belle Harbor had the added benefit of creating redevelopment value of the property. After careful evaluation, which included coordination with regulatory approval agencies and preliminary engineering, the County decided to close and fill the marina basin.



Contained and reduced exposure to sediments with low-level contamination from two separate aquatic systems.

Sediments to be dredged within the Pershing Park boat basin and sediments within the Belle Harbor marina basin both exhibited low level contamination. These contaminants included metals and polynuclear aromatic hydrocarbon (PAH) compounds. Some Polychlorinated Biphenyl (PCB) concentrations were observed in the

Belle Harbor sediments. Water quality protection regulations in the State of Wisconsin required materials dredged from either location to be removed, handled, and disposed as a low level hazardous substance which would require a capping material and would limit upland location and methods where the material could be placed. The design of the disposal cell at Belle Harbor allowed for the existing Belle Harbor sediments to remain in place and combined with sediments from Pershing Park. These sediment materials were then contained under a minimum 24” clay-containing cover material. The result of this disposal solution isolated contaminated sediment material in two separate aquatic systems (Root River & Lake Michigan).



Eliminated Poor Quality Water Habitat

Quality of the aquatic habitat in the Belle Harbor basin was evaluated in coordination with Lake Michigan fisheries staff from the Wisconsin Department of Natural Resources (WDNR). Several electrofishing events in the Belle Harbor marina revealed a limited rough fish population. Specifically related to game fish, there were no critical resources observed in the marina. The lack of quality aquatic resources in the basin were attributed to its sediment build up and shallow depths. Dissolved oxygen level in the summer were considered too low for sustaining game fish populations. The project had the benefit of eliminating this poor quality aquatic habitat.

Eliminated Upland Disposal of Dredge Sediments in Natural Park Area.

Use of the dredge material to fill in the Belle Harbor basin eliminated the need to dispose of the material at a County owned park facility. For this project, three disposal options were available for the project which included:

- ◆ Upland disposal at County park facility,
- ◆ Closure and Fill of defunct marina basin (Belle Harbor Marina); and
- ◆ Disposal at nearby landfill.

The County park disposal option included placement of dredged sediments at a park facility owned by Racine County (Cliffside Park), located approximately 8 miles north of the project site. This option involved trucking of the sediments to the park and land spreading over a 2.5 acre area to a height of 4 feet.



The County park disposal option was estimated to be over \$110,000 greater than the beneficial reuse alternative which represents an approximate 6% savings. Much of the greater costs of the upland alternative were attributable to hauling of the material over a greater distance and stabilization and containment requirements for the soil at the upland disposal site due to its low-level hazard characteristics. The landfill disposal option was determined economically unfeasible when compared to the other two options due primarily to the tipping fee.



With respect to resource quality in comparing the upland disposal option to the beneficial reuse option, the beneficial reuse disposal option impacted a natural resource intended for man-made commercial use (i.e. recreational boat access), whereas, the upland disposal option would have impacted a natural resource intended to be maintained as a natural resource (i.e. park space). Furthermore, in comparison of quality for these respective aquatic and terrestrial resources, the upland disposal location is more natural and less impacted by human activity than the marina basin which is silted in and exhibits indicators of poor quality such as sediment contamination, stagnation, and collects trash and debris from the river.

Finally, the Belle Harbor disposal option was the more sustainable solution since it had a lighter carbon footprint due to the reduced trucking, used supplemental fill material from a nearby road reconstruction project for cover, and resulted in less road wear. The Belle Harbor disposal option also increased public safety by reducing truck traffic.

Mitigation project: stream bank stabilization

A mitigation project was adopted to offset the limited impacts to aquatic resources in the Belle Harbor basin. The mitigation project sought to improve shoreland habitat of the Root River by stabilizing two streambank sections (324 linear feet total) of the West Branch Root River. Streambank stabilization measures include rip-rap toe protection and vegetation using native plant plugs, live stakes, and tree seedlings.

Innovation

A drainage system was constructed to remove water from the disposal cell. The water from this system was discharged directly to the adjacent Root River. A system of corrugated drain pipe and rock was constructed on the inside of the sheet pile wall to allow for filtering and drainage of the disposal cell during and after construction (Figures 3 and 4). The primary purpose of the drainage system was short term draining of the disposal cell and to equilibrate groundwater in the cell with the water level in the river.



Long term, the drainage system is intended to provide some relief if the groundwater-level rises and is trapped in the disposal cell. Permittivity or other drainage properties of the existing basin perimeter wall system were not characterized during the design. The design intent of the drainage system was to ensure water introduced to the cell would not be trapped within the disposal cell.

Future development considerations for use of the disposal cell drainage system include:

- ◆ If future development of the property leaves the disposal site as a pervious surface, the drainage system could help prevent a buildup of groundwater and assist in equilibrating pressure with the water level in the river. The drainage feature will not be needed if the disposal cell is ultimately paved over or built on.

- ◆ A developer may be able to utilize the manhole and outfall for site drainage.
- ◆ A build-out of the site will likely require some post-construction stormwater control. The drainage feature could be used as part of bioretention facility or infiltration basin to meet those needs.
- ◆ Any structural build-out on the disposal cell will likely require some cut and fill or deep foundations. The drainage feature may be utilized during construction as a stormwater or groundwater discharge control.
- ◆ There is no regulatory requirement for the system to remain long term. Consolidation of the disposal cell, dewatering, and groundwater is expected to stabilize within one or two years. Future developer has flexibility to remove to accommodate plans for the site.



Economic Benefits

The County's solution to use the Belle Harbor site for disposal of dredged sediments through filling of the marina basin had the added benefit of creating upland property with more development appeal. The property had not been used for several years due to insufficient depth and market conditions but has a desirable location in downtown Racine on the Root River with access to Lake Michigan. While subsurface conditions of this upland area created are not ideal as-is for multi-story building development, part of the challenging and costly work of permitting and filling the basin has been completed which may add to the development appeal of the property. Future development considerations will have many more options as a result of this project.

Transferability

While the project is not unique in its overall approach to placing dredged material within what is essentially a confined disposal facility (CDF). The specific approach to placement of the material over existing sediments in balancing costs of disposal with future property value and development needs (i.e. subsurface conditions and foundation requirements) is a transferable notion. Specifically, the use of public grant dollars in this case with their mission of improving the Pershing Park boat basin for the public made the primary project objective dredging of the boat basin. Dredged material disposal was a secondary objective. This presented



challenges relating to balancing efforts to use grant and local public dollars to provide sediment disposal and improving the Belle Harbor Marina property. In other words, minimizing costs for sediment disposal and maximizing benefit or value added to the marina property. The final solution to this challenge was to place the dredged materials directly into the basin for disposal without amendment to the soils or compaction standards. Some compaction was provided by equipment used to place and work the material. Since there was no immediate development plans, consolidation of the material would be allowed to occur over time. Additionally, the supplemental fill (or cover material) was obtained from a nearby road project that included removal of subgrade material. This material met the regulatory requirement of having >50% by weight passing a P200 sieve.



Outreach and Education

The project involved two separate 30-day public comment periods related to the USACE permitting action under Section 404 and the WDNR low hazard solid waste exemption under NR 500. Additionally, adjacent property owners to both project sites were notified of the project as part of the community outreach activities. Additionally, monthly meeting presentation were provided to the Racine Harbor Commission. Another community outreach event included a lakefront celebration with City and County public officials, state representatives, and regulatory representatives. Finally, the project is being presented at the WODCON XXI conference in order to share project experiences with peers in the dredging community.





Figure 1. Project Site Locations

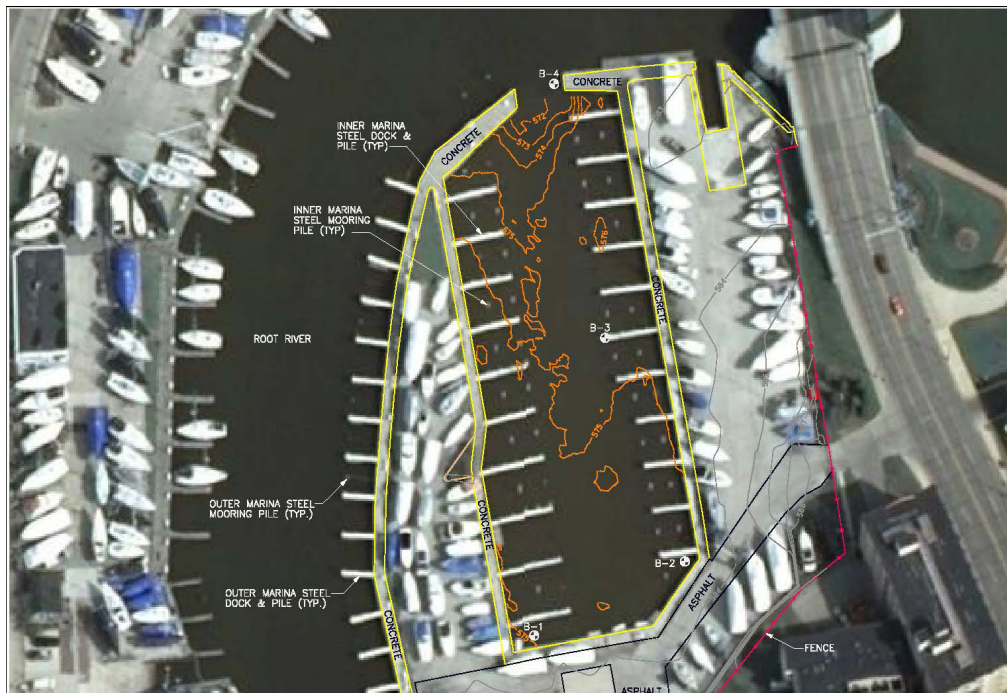


Figure 2. Belle Harbor Marina Disposal Site

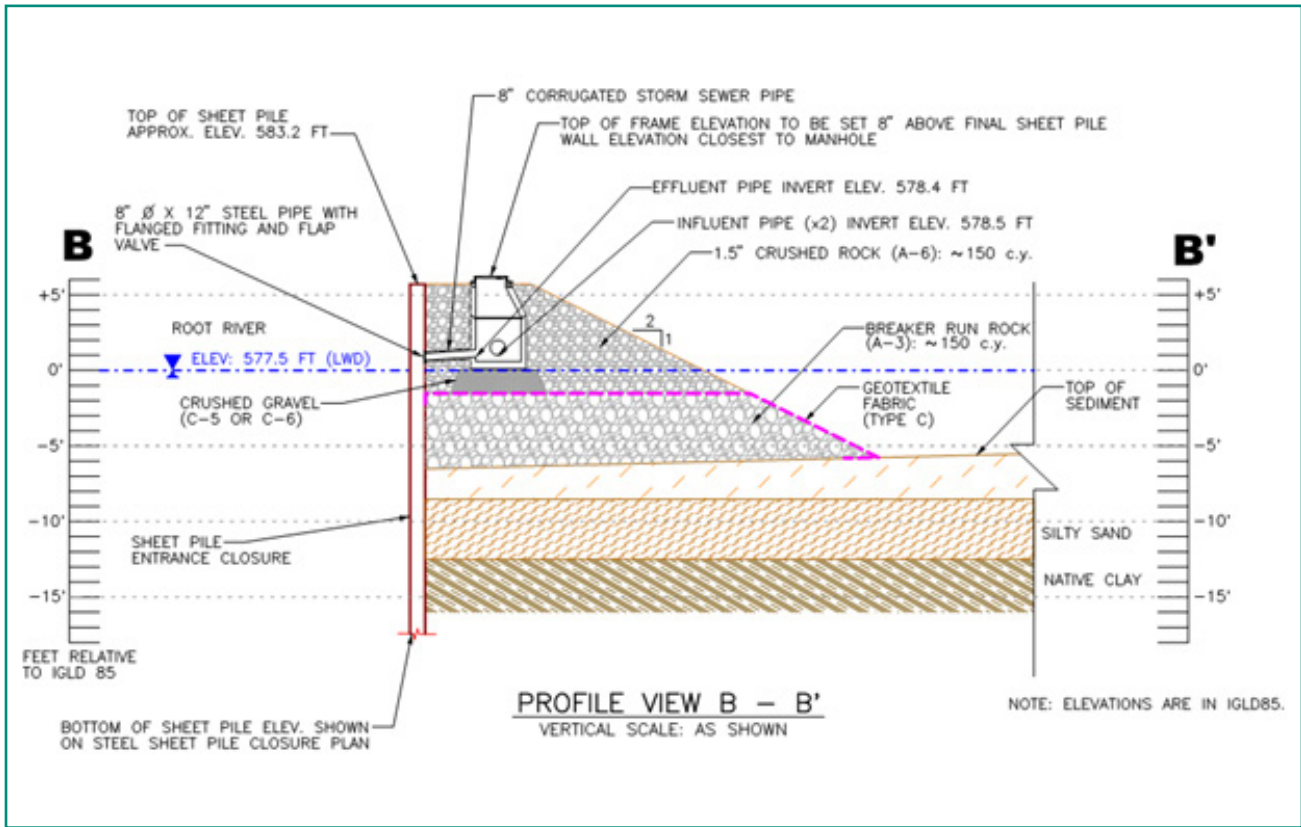


Figure 3. Disposal Cell Drainage System - Profile View

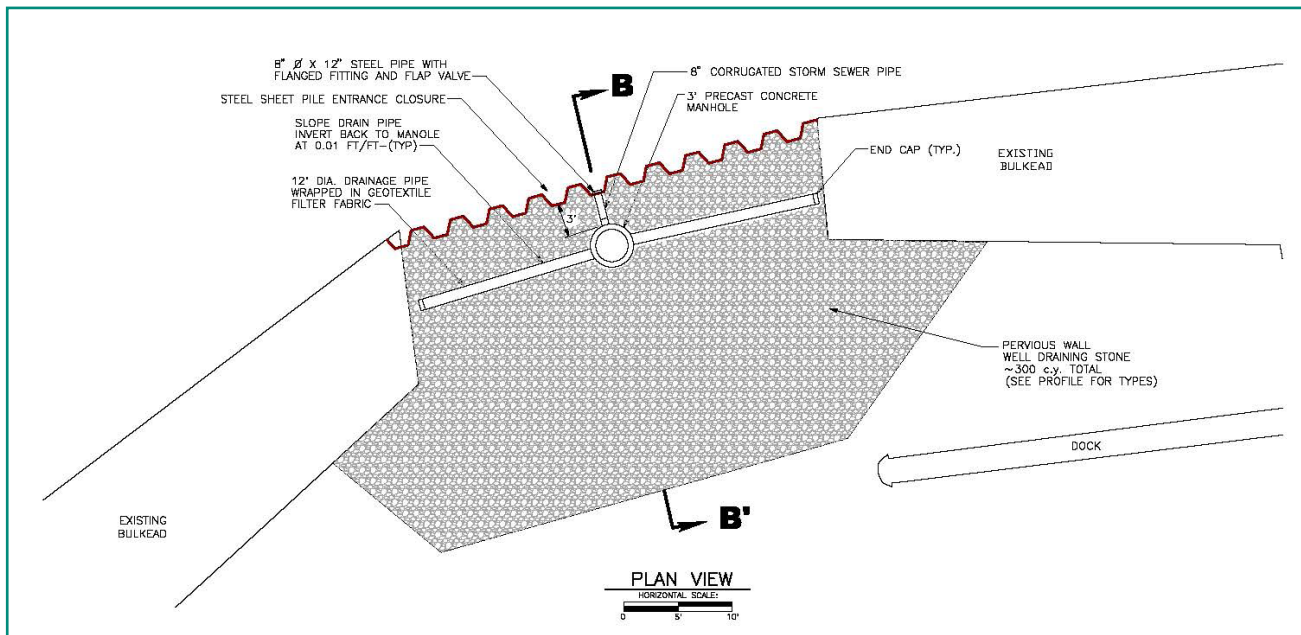


Figure 4. Disposal Cell Drainage System - Plan View

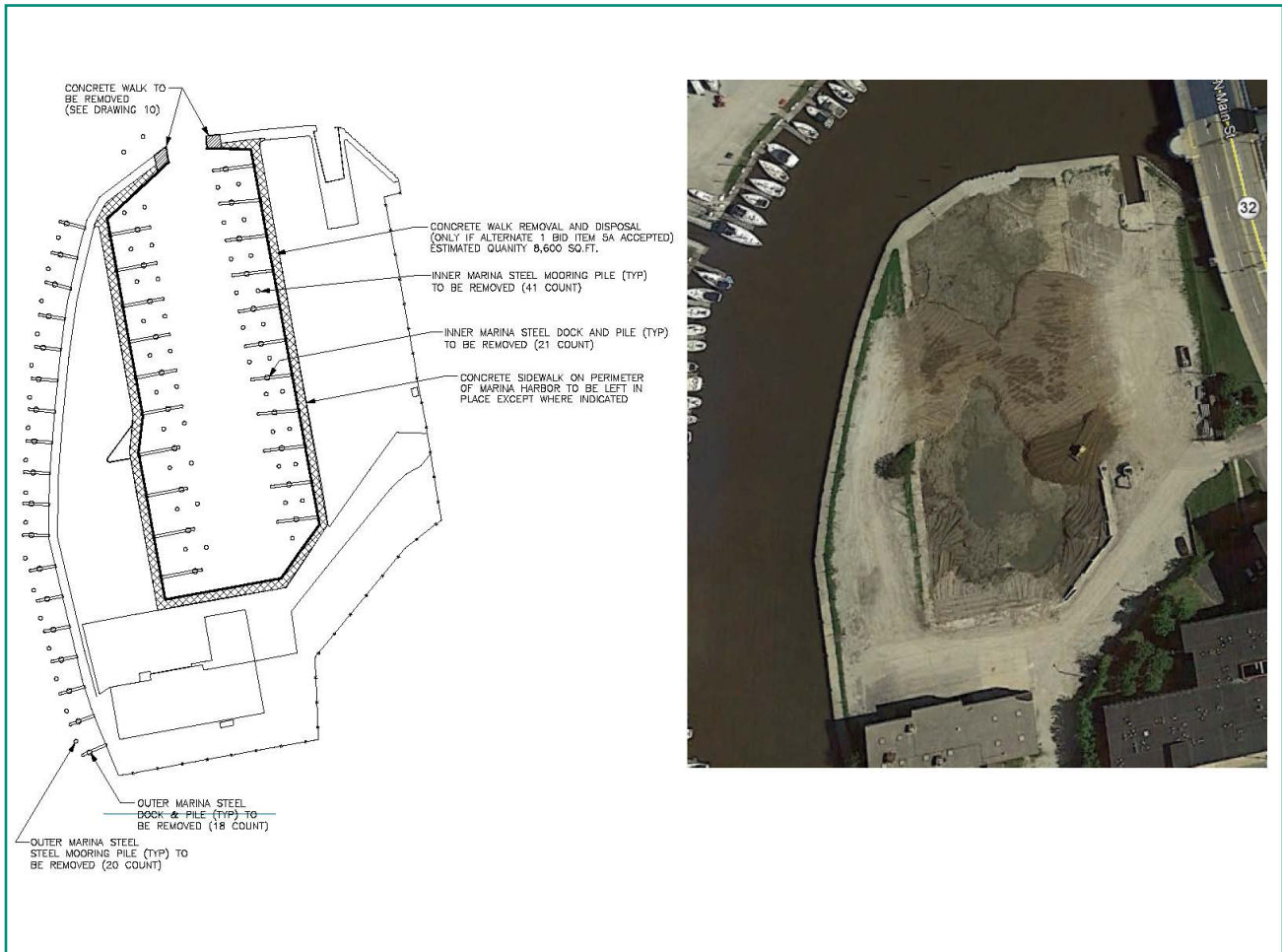


Figure 5. Belle Harbor disposal cell during fill activities