

Utilizing Adaptive Management Techniques during an Environmental Dredging Remediation Project

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Background/Objectives: Sevenson successfully completed a multi-year remediation within 39 acres of a public lake using an adjacent 1.67-acre processing site in the midst of a residential community. The site was adjacent to a middle school and residential lake houses with boat docks. The final approved remedy included three (3) general areas – sediments in the lake portion adjacent to the source; sediments at two downstream areas; and soils in the uplands and wetlands. The contaminants of concern included mercury in the sediment, as well as copper, lead, and zinc. Several restrictions impacted the operations schedule including a regulatory mandated fish window which could have limited access to the work area, restricted trucking hours and routes due to the adjacent school and residential community, changed conditions in the lake sediment characteristics, and the addition of water treatment needed to meet required standards contained in the state issued discharge permit. To maintain the tight project schedule and meet the project objectives while accommodating the changes, Sevenson combined standard construction practices and innovative approaches. This project had more than 4,000 trucks transport over 100,000 tons of contaminated waste to licensed off site facilities as part of the project scope.

Approach/Activities: The project utilized both mechanical and hydraulic techniques to remove soil and sediment within predefined dredge prisms. Bathymetric and physical surveys were conducted before and after removal activities to ensure the removal elevation was achieved. It was determined during the mechanical stabilization phase of the project that additional water treatment would be necessary during the hydraulic dredging phase to meet the requirements contained in the state issued discharge permit. Sevenson designed and installed a dewatering plant with filter presses to maintain the schedule and reduce the processing equipment footprint. The remaining space was used to construct water treatment processes which included: physical filtration, carbon (GAC) filtration, metals precipitation, and TOC removal elements. The process was balanced to operate efficiently between the hydraulic dredge, the processing facility, and the water treatment operation. During dredging operations, unexpected rocky material was discovered within the pre-determined dredge prism. The material was not conducive to hydraulic dredging and the material was not the target sediment of the remedy. Sevenson developed an innovative approach to remove the coarse material from the sediment using a material sifting bucket attached to an excavator, which allowed the target sediment to be conventionally removed. The coarse material was placed in a collection area to be replaced in the lake post sediment removal. The remaining sediment was later hydraulically dredged. The process was contained within turbidity curtain and continuously monitored. Early installation of the containment system ahead of the fish window restriction allowed work to progress in accordance with the project schedule. Dredging was completed within the same construction season as originally scheduled despite the large volume and area increases due to the effective operations changes. Modifications to the approved work plan to incorporate the changes required approval by the regulators prior to implementation which could have caused delays in the project schedule.

Results/Lessons Learned: The project required frequent interaction with local city, state and federal agencies. Involving the agencies early on, and communicating with them throughout the project was instrumental to completing the project on schedule. The project benefitted from a good working relationship between the owner, engineer, and contractor. Everyone working together, open communications, and a “team” approach to problem solving allowed changes to be openly discussed, analyzed, and solutions implemented quickly and efficiently. As changes were discovered, all team members weighed in on their respective areas of expertise to develop safe approaches to maintain the overall schedule and project objectives.