

Mobile Pneumatic Flow Tube Mixing for Stabilization and Beneficial Use of Contaminated Sediments

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Background/Objectives. Over the last two decades, the states of New York and New Jersey have developed a comprehensive sediment management program seeking environmentally proactive solutions for the management and beneficial use of dredged materials in response to more stringent placement criteria for contaminated (unsuitable) dredged materials in the New York Bight. The move away from aquatic placement for unsuitable dredged materials is also currently playing out in Long Island Sound (LIS) which is a regulatory-management shared tidal estuary between the States of New York and Connecticut. Upland placement with beneficial use in Connecticut has not been developed because LIS has always been an available aquatic disposal option even though upland beneficial use of processed (stabilized) dredged material (PDM) for upland development and brownfield revitalization is well established elsewhere. The application of contaminated sediment ex-situ and in-situ stabilization for Superfund and industrial Municipal Gas Plants (MGPs) sites are also well established. The program presented herein, discusses the feasibility of using an innovative sediment solidification/stabilization technique, Pneumatic Flow Tube Mixing (PFTM), which has been successfully used internationally for the last decade in large scale reclamation projects utilizing stabilized soft sediments for options not realized with conventional upland stabilization processing.

Approach/Activities. PFTM is a closed loop process that provides several advantages over traditional in-barge and/or pug mill mixing stabilization techniques, highlighted by its extremely small footprint and the ease at which it can transport stabilized sediments relatively large distances. The PFTM process has been designed for barge implementation; has superior geotechnical mixing of sediments and amendments; produces a flowable fill for both structural and environmental beneficial use applications; can be pumped up to 1.6 km from the shoreline or barge to a disposal or transport site; takes the place of large-scale mechanical/geotube dewatering equipment/footprint and has no costly air or water discharges. These material handling capabilities provide a distinct role in aging-infrastructure Urban Sediment Management environments where staging areas are limited and/or located in densely populated residential communities. An example is that within these communities, environmental and cost-effective remediation disposal and/or beneficial use trans-disciplinary applications via Brownfield programs can be realized applying PFTM. In March 2018, the State of Connecticut has granted the first Solid Waste Permit for upland PFTM barge processing at New Haven Terminal, Connecticut (Regional Dredged Material Manufacturing Facility [RDMMF]).

Results/Lessons Learned. Contaminated sediment PFTM processing via a mobile barge system (MOBILE Sediment Engineering System [MOSES]) has advantages directly either at a fixed RDMMF or directly at dredging sites where flowable structural fill material is needed for upland placement when aquatic disposal or long-distance transport is not viable or cost effective. Superfund, brownfields and coastal resiliency beneficial use applications can also be considered. PFTM can be readily deployed to diverse maritime project-specific locations - hence innovative sediment strategies can now be a catalyst for regional economic growth utilizing stabilized sediments for beneficial use.