

Overview

The purpose of this Basis of Estimate (BOE) is to describe the overall approach and the preliminary means and methods to remediate the environmental conditions posing potentially significant risks to human health or the environment at the Fireworks Site so that a Permanent Solution may be achieved under the Massachusetts Contingency Plan (MCP). This BOE was developed in primary consideration of Site-wide Remedial Alternatives 3 and 4 that were originally presented in the Phase III Draft Remedial Action Plan (RAP) (2007). These Site-wide Alternatives (SWAs) were further refined based on the supplemental site characterization data collected in autumn 2008 and the early winter 2009 and the recalculated removal volumes of sediment and soil. These volumes were required to achieve reductions in risk to human health and the environment. The SWAs being addressed in the RAP are:

Site-Wide Alternative	Description
1	No Action
2	1+ Removal of sediment source material in the Eastern Channel Corridor (ECC) 1+ Removal of potential risks to human health and public safety in the Cold Waste Area (CWA) 1+ Monitored Natural Attenuation / Recovery in other areas/media
3	2+ Removal of soil that exceeds upper concentration limits (UCLs) or Site-specific human health and ecological preliminary remediation goals (PRGs) at these same locations 2+ Removal of sediment in areas outside of the ECC to achieve the human health and ecological PRGs on a Site-wide average basis
4-1	3+ Removal of soil in the non-disposal upland areas (i.e., Potential Greenway Area (PGA) and Southern Conservation Commission Area (SCCA)) to achieve the human health PRGs for all chemicals of concern (COCs)
4-2	3+ Removal of soil in the non-disposal upland areas (i.e., PGA and SCCA) to achieve the human health and ecological PRGs for mercury and lead
4-3	3+ Removal of soil in the upland areas to achieve the human health and ecological PRGs for all COCs 3+ Removal of sediment in areas outside of the ECC to achieve the human health and ecological PRGs on a Risk Characterization Area-by-area basis
5	4-3+ Removal of additional sediment and soil to “Approach Background”

This BOE describes the overall approach to accomplish SWAs 3, 4-1, 4-2, or 4-3 although a similar approach could also be used to support the remaining removal alternatives.

Site History

The Fireworks Site is defined as approximately 240 acres of property generally located between King and Winter Streets in the town of Hanover, Massachusetts. The Site is bounded on the east by Winter Street, on the west by King Street and the Drinkwater River wetland, on the north by First Street, and on the south by Factory Pond. The Drinkwater River and Torrey Brook, which run through the Site, flow generally south/southwest toward Lily Pond and Factory Pond. Factory Pond discharges to the Indian

Head River which flows eastward to the North River. The land area encompassed by the Site is currently owned by over 20 different entities, including the town of Hanover.

Historical activities at the Site included the research, development and manufacture of munitions and pyrotechnics for the United States (US) government and the commercial manufacturing of civilian fireworks. Lead, mercury, and various organic solvents, among other chemicals, were used on-site during the facility's operational lifetime.

Following closure of the facility, US military personnel destroyed government-owned raw materials and explosives at the Site in the Waste Burn Pit Area. Several years later, the town of Hanover purchased approximately 130 acres of the Site in the general area of Factory Pond. The town continues to maintain the area for conservation purposes and has also built the Municipal Garage for the Department of Public Works (DPW) on a parcel along Ames Way. The remaining acreage was sold in May 1983 to Drinkwater Investment Corporation. It was subsequently subdivided and portions were sold to private and commercial entities, creating a multi-tenant commercial/industrial park.

After conducting surface water, sediment, and fish tissue sampling for mercury, lead, and other metals, the Massachusetts Department of Environmental Protection (MassDEP) issued Notices of Responsibility (NORs) for the Fireworks Site on October 20, 1995. These NORs were sent to the Kerr-McGee Chemical Corporation, Massachusetts Institute of Technology, National Coating Corporation, Susquehanna Corporation, and the US Department of Defense (DoD), based on their alleged status as former (or successors to former) owners, operators, generators, transporters. The first three entities, while not admitting liability, formed the Fireworks Site Joint Defense Group, and have been investigating environmental conditions at the Site. None of the Cooperating Parties currently owns any property at the Site. The Cooperating Parties subsequently reached an agreement with the DoD for reimbursement of a percentage of the site investigation costs.

Overall Work Approach/Sequence

The overall work approach at the Site will consist of the following general steps:

1. Mobilization and site preparation;
2. Improvement of existing roads to allow necessary access;
3. Establishing a material and equipment lay down and handling area for contaminated sediment and soil for the Northern site operations;
4. Implementation of erosion controls;
5. Removal of sediment associated with the ECC;
6. Removal of soil and munitions debris from the CWA;
7. Partial restoration of the CWA to create a material and equipment lay down and handling area for contaminated sediment and soil for the Southern site operations;
8. Construction of a shoreline bulkhead near the CWA to support mechanical dredging activities;
9. Removal of the existing footbridge over the narrow portion of Factory Pond (between Middle and Lower Factory Pond);
10. Removal of the earmarked impacted sediment that can be reached via a long-stick excavator working from a barge operating within Factory Pond, Lily Pond, the Lower Drinkwater River and the Marsh Upland Area (MUA). (For the purposes of this BOE, a minimum working open water depth of 6 feet is assumed to be required.);

11. Removal of the earmarked impacted sediment from the remaining portions of Lily Pond and upland soil from the Southern Disposal Area (SDA) and the MUA using a long-stick excavator working on crane mats or a track-mounted excavator;
12. Stabilization of the removed materials on temporary asphalt pads (as necessary to achieve maximum allowed water content for transport);
13. Confirmatory soil sampling (This BOE assumes that post-excavation samples will be collected on a 20 foot grid over the upland soil excavation footprints, no confirmatory soil or sediment sampling will be performed in the open water or wetland areas, and that these areas will be surveyed to confirm removal has occurred to the specified depth).
14. Backfilling and site-specific restoration;
15. Transportation and off-site disposal of excavated materials; and
16. Demobilization.

Remedial Approach by Area

The attached tables (Appendix B-2) present the activities proposed for each specific Risk Characterization Area (RCA) at the Site. Each table provides a short narrative of the proposed Site preparation, remedial approach, and restoration activities. The proposed site preparation locations, access routes, and material handling and lay down areas are shown on the figure included as Appendix B-3.