

EXECUTIVE SUMMARY

This Feasibility Study Report (FS Report) has been prepared for the Rolling Knolls Landfill Superfund Site (the Site) in Chatham Township, New Jersey. The purpose of this FS Report is to screen and develop potential remedial alternatives to address the risks posed by the Site, and to conduct a detailed evaluation of each remedial alternative identified for the Site.

This FS Report, which is focused on soil contamination, is part of the remedial investigation/feasibility study (RI/FS) process being conducted for the Site. The RI report was approved on January 31, 2018. The baseline human health risk assessment (BHHRA) was completed on June 13, 2014, and updated on July 5, 2018, and the baseline ecological risk assessment (BERA) was completed on December 29, 2016.

The nearly 200-acre Site consists of a former landfill that operated from the mid-1930s through 1968 as well as other adjacent properties. The RI report indicates that waste disposal occurred over approximately 170 acres with approximately 140 of those acres consisting of waste material of varying thickness (from no waste to 18 feet of waste) overlying native soil and approximately 30 acres consisting of areas of debris scattered on the ground surface, but with no buried waste (the Surface Debris Area). The RI found no landfill-related impacts on the remaining approximately 30 acres of the Site.

Waste at the Site includes household garbage, construction and demolition debris, septic waste, scrap metal and industrial waste. Landfilled materials identified at the Site are generally consistent with typical municipal solid waste expected within a landfill that operated during this period. Evidence of potential industrial waste (based on visual observations and analytical results), was found at three isolated areas. The industrial waste found comprises a small portion of the total volume of waste disposed of at the landfill. The landfill is covered in some areas by a thin layer of soil and/or vegetation, and in others the waste is visible at the surface. Historical operations of the landfill included the application of pesticides for mosquito and rodent control on the landfill and the surrounding area.

One hundred acres of the landfill, as well as the 30-acre Surface Debris Area, are held in the Trust created by the Last Will and Testament of Angelo J. Miele (Miele Trust). Approximately 35 acres of the landfill are on land federally designated as a Wilderness Area and managed by the United States Fish and Wildlife Service (USFWS) and part of the Great Swamp National Wildlife Refuge (GSNWR). Approximately five acres of the landfill (northeastern part of the landfill) are on property owned by the Green Village Fire Department (GVFD). A Baseball Field and Shooting Range are also on property owned by GVFD, but are not part of the landfill (i.e., were found to not to have been impacted by the landfill-related activities). A small portion of the Surface Debris Area, approximately 4,000 square feet, extends from the Trust property to an adjacent residential property.

The Site is located at the southern end of Britten Road in the Green Village portion of Chatham Township. Green Village is a scenic, rural village oriented along Green Village Road. Green Village Road is a 2-lane county road with residential and limited commercial development on each side. Britten Road intersects Green Village Road and is primarily residential. Britten Road is approximately 1.5 lanes wide and is the only road that provides access to the Site. The Site is approximately 5.5 miles from the nearest major road, State Route 24, and is accessible only by driving through residential and commercial areas of Chatham.

Wetlands and flood hazard areas (FHAs) occupy the adjacent areas to the east, south, and west of the Site, with parts of the landfill itself in wetlands and flood hazard areas. The majority of these adjacent areas are located in the GSNWR and are in a federally designated Wilderness Area. The portions of the Wilderness Area on and adjacent to the landfill provide habitat for native mammals, fish, amphibians, and reptiles, including the endangered bog turtle, Indiana bat, and blue-spotted salamander.

Site conditions and contaminant concentrations in soil, sediment, surface water, and groundwater have been characterized through several phases of investigation since 2007. For soil, analytical results indicate that volatile organic compounds (VOCs), metals, semi-volatile organic compounds (SVOCs), polycyclic aromatic hydrocarbons (PAHs), pesticides, and polychlorinated biphenyls (PCBs) are present in surface and subsurface soil at concentrations greater than the New Jersey Non-Residential Direct Contact Soil Remediation Standards (NRDCSRS) and/or the New Jersey Residential Direct Contact Soil Remediation Standards (RDCSRS). For groundwater, certain VOCs, SVOCs, PCBs, pesticides, and metals are present at concentrations above their respective Class IIA New Jersey Ground Water Quality Standards (GWQS). Except for the metals, these elevated concentrations in the groundwater were found in limited areas of the Site and are generally co-located with contaminated soil. Groundwater impacts are limited to shallow groundwater above a confining clay layer. Elevated concentrations of metals found in the groundwater under the landfill are more widespread and can be attributed to changes in aquifer geochemistry under the landfill. For surface water and sediment, only slightly elevated concentrations of PAHs, VOCs and metals were found, and these concentrations were generally consistent with or below concentrations upgradient of the Site.

Human health and ecological risk assessments were completed to assess the risks associated with the Site contaminants found in soil, groundwater, surface water and sediment. The Baseline Human Health Risk Assessment (BHHRA) identified non-dioxin like PCBs in soil as presenting an unacceptable human health risk for current and reasonably anticipated future users of the Site. Subsequent to completing the BHHRA, a Site Reuse Assessment was conducted. Based on the Site Reuse Assessment, residential development is not reasonably anticipated to occur on the Site. The evaluated risks found in the BHHRA are to potential receptors if the Site were to be developed residentially. Further, it is unlikely that the Site will be used for commercial, industrial or active recreational purposes. The Trust property is subject to restrictive covenants that state that the Trust property shall be preserved as open space and that no development shall take place on the Trust property.

Passive recreation (such as bird watching, light hiking) is allowed on the USFWS portion of the Site. As such, the only reasonably anticipated human exposures at the Site are to trespassers or passive recreators. The remedial alternatives described herein address human health risks to trespassers and passive recreators as well as risks to the environment.

For these reasonably anticipated current and future exposures, the BHHRA indicates that all estimated cancer risks and the majority of non-cancer health hazard to human receptors are within or less than USEPA target levels. For passive recreators and trespassers, the BHHRA found that the estimated non-cancer health hazard to adolescent and adult trespassers is greater than the USEPA target level of 1 (total Hazard Index of 3 for adolescents and 2 for adults). Lead concentrations are also at levels that require remedial action. Note that while the Human Health Risk Assessment evaluated risks to a current or reasonably anticipated future trespasser at the site, the exposure assumptions used for trespassers are similar to/consistent with those that would be used to assess risks to a passive recreator who may use the site for activities such as light hiking or bird watching.

The results of the Baseline Ecological Risk Assessment (BERA) indicate that exposures to contaminants in the environmental media sampled at the Site do not pose an unacceptable ecological concern for most of the evaluated receptors. However, slightly elevated risks were found for vermivorous birds (as represented by American robins) and vermivorous mammals (as represented by the short-tailed shrew) mainly through exposure to PCBs and certain metals in soil. The human health and ecological risk assessments do not show the need for any remedial action for surface water. Limited areas of sediment adjacent to impacted soil may need to be addressed.

Based on Site conditions, the results of the risk assessments, the reuse assessment and a review of Applicable or Relevant and Appropriate Requirements (ARARs), the following Remedial Action Objectives (RAOs) have been developed for the Site:

1. Prevent or minimize unacceptable risks to current and potential future human and ecological receptors from direct contact with or ingestion of contaminated soil/sediment.
2. Control or remove source areas to prevent or minimize impacts to groundwater.

In addition, based on the results of the risk assessments, and consistent with NJDEP guidance (N.J.A.C. 7:26D-7.3(b)(3)), site-specific Preliminary Remediation Goals (PRGs) were developed, as shown in Table 4-3 of the FS report.

Note that an approximately 25-acre area contains the majority of the soil locations that present unacceptable risks at the Site. This 25-acre area was determined based on statistical analysis using the concentrations of the primary human health risk driver in soil (non-dioxin-like PCBs) and is referred to herein as the "Selected Area." The remaining soil/sediment locations that present unacceptable human health risks or impact to groundwater at the Site will also be addressed by the alternatives described below.

Five remedial alternatives for soil/sediment were evaluated in this FS. These alternatives include:

- 1) No Action;
- 2) Engineering and Institutional Controls (such as fencing, signage and land use restrictions);
- 3) Capping of Selected Area to reduce the overall risk posed by the Site; capping and/or excavation of additional areas that exceed the PRGs in soil to further reduce risk and/or to prevent impacts to groundwater; and Engineering and Institutional Controls;
- 4) Excavation and Off-Site Disposal of Selected Area to Reduce Overall Risk; capping and/or excavation of additional areas that exceed the PRGs in soil to further reduce risk and/or to prevent impacts to groundwater; and Engineering and Institutional Controls; and,
- 5) Capping of the approximately 140-acre landfilled area; capping and/or excavation of additional areas that exceed the PRGs to further reduce risk and/or to prevent impacts to groundwater; and Engineering and Institutional Controls.

For remedial alternatives 3 and 4, the Selected Area would be either capped (Alternative 3) or excavated (Alternative 4) to mitigate the overall risk to human health (trespassers/passive recreators). To fully comply with the RAOs, Alternatives 3 and 4 also address additional areas of contamination located outside the boundary of the Selected Area that exceed PRGs. These areas will either be capped in place to prevent direct contact with contaminants of concern or excavated to prevent or minimize impacts to groundwater. If excavated, material from these areas will either be consolidated on-site under the Selected Area cap, if appropriate, or disposed of off-site. Full details of the remedial alternatives are discussed in Section 6 of the FS report.

A residual ecological risk assessment analysis was conducted to determine whether remedial alternatives would also reduce unacceptable risks to the environment (vermivorous birds and mammals) from the primary ecological risk drivers (Total PCBs and metals). This analysis showed that Alternatives 3, 4 and 5 would address both the human health and ecological risks posed by the Site.

The following table summarizes each remedial alternative when compared to the evaluation criteria in the National Contingency Plan (NCP).

Evaluation Criteria	Soil Remedial Alternatives				
	1	2	3	4	5
Threshold Criteria					
Overall Protection of Human Health and the Environment	NA	Does Not Meet NCP Criterion	Meets NCP Criterion	Meets NCP Criterion	Meets NCP Criterion
Compliance with ARARs	NA	Does Not Meet NCP Criterion	Meets NCP Criterion	Meets NCP Criterion	Meets NCP Criterion

Primary Balancing Criteria					
Long-Term Effectiveness and Permanence	NA	Ecological risk remains	Adequate and reliable control of risk through capping of Selected Area, remediation of additional areas, engineering and institutional controls	Removal of impacted soil permanently addresses risk posed by Selected Area; adequate and reliable control of remaining risks through remediation of additional areas, engineering and institutional controls	Adequate and reliable control of risk through capping, engineering and institutional controls; Cap maintenance will require significant effort due to its large size
Reduction of Toxicity, Mobility, and Volume Through Treatment*	NA	Does not reduce toxicity, mobility or volume through treatment or otherwise	Does not reduce toxicity, mobility or volume through treatment, though the mobility and, possibly, volume of contamination would be reduced.	Does not reduce toxicity, mobility or volume through treatment, though the mobility and volume of contamination would be reduced	Does not reduce toxicity, mobility or volume through treatment, though the mobility and, possibly, volume of contamination would be reduced.
Short-Term Effectiveness	NA	Does not meet RAOs	As compared to Alternatives 4 and 5, this would have the lowest impact on the community and would take the least amount of time to meet RAOs.	As compared to Alternatives 3 and 5, this would have the largest impact on the community due to off-site disposal of Selected Area material.	This alternative would have greater impact on the community than Alternative 3 and would lead to greater loss of quality habitat and wetlands than

					Alternative 3 or 4.
Implementability	NA	Easily implementable	Alternative 3 is readily implementable	Alternative 4 is implementable, though would be more difficult to implement than Alternative 3 due to the large volume of off-site disposal.	Alternative 5 would be more difficult to implement than Alternative 3 and possibly Alternative 4 due to larger size of the capped area.
Costs	NA	\$761,000	\$16,525,000 to \$21,099,000	\$32,831,000 to \$57,792,000	\$55,430,000

NA - Not Applicable

NCP – National Contingency Plan

For Alternatives 3 and 4, the range of costs reflects differing remedial approaches included within the alternative. The higher number includes excavation of all material in areas located outside the boundary of the Selected Area and the lower number includes capping of these areas.

The Superfund program requires that the “no action” alternative be evaluated at every site to establish a baseline for comparison. The No Action Alternative has no remedial components and provides no protection, and therefore it was not compared to the evaluation criteria. Alternative 2, Engineering and Institutional Controls, provides some protection to potential trespassers and prevents future use of the Site through institutional controls. However, Alternate 2 does not meet the NCP requirements for protection of the environment, or for compliance with ARARs.

Both Alternatives 3 and 4 meet the threshold criteria for overall protection and compliance with ARARs. The primary difference between Alternatives 3 and 4 is that Alternative 3 includes capping of the Selected Area in place while Alternative 4 includes full excavation and off-site disposal of the Selected Area. Both alternatives include capping and/or excavation of additional areas to further reduce risks and/or prevent migration of contamination to groundwater, as well as engineering and institutional controls. Alternative 3 has better short-term effectiveness because it has fewer impacts to the community, is more easily implementable and is more cost effective than

Alternative 4. Alternative 4 would provide better effectiveness in the long term since contaminated soil in the Selected Area would be removed from the site.

Alternative 5 includes full capping of the entire landfilled area. It is similar to Alternatives 3 and 4 in terms of overall protection, compliance with ARARs, and long-term effectiveness. However, this alternative has a lower short-term effectiveness in that it would eliminate the existing habitat at the Site, which includes well-established mature trees and woody habitat and may require significant truck traffic to implement. It would also cost more than Alternative 3 or 4 to implement.

None of the alternatives reduce toxicity, mobility or volume of contamination through treatment, although Alternatives 3, 4 and 5 would all reduce the mobility of contamination and, to varying degrees, the volume of contamination.

The RI data indicates that groundwater contamination is limited to the shallow water-bearing zone, which is underlain by a thick (greater than 50 feet) impermeable clay layer. Groundwater impacts do not extend much beyond the landfilled area, and elevated concentrations of organic contaminants in groundwater are localized and generally co-located with the presence of soil contamination. It is anticipated that implementation of the soil remedy will address the marginally elevated concentrations of COCs in groundwater. Groundwater monitoring during and after implementation of the soil remedy will take place to ensure that the selected remedy addresses risks posed by COCs in the groundwater. Therefore, this FS does not consider alternatives to address groundwater contamination. A future decision document will address groundwater.

There are no unacceptable site-related risks for surface water, and a decision document for surface water is not anticipated to be required. However, sampling during and after implementation of the soil/sediment remedy will be conducted to confirm this finding and, if necessary, surface water will also be addressed in a future decision document.