

Rolling Knolls Landfill Superfund Site

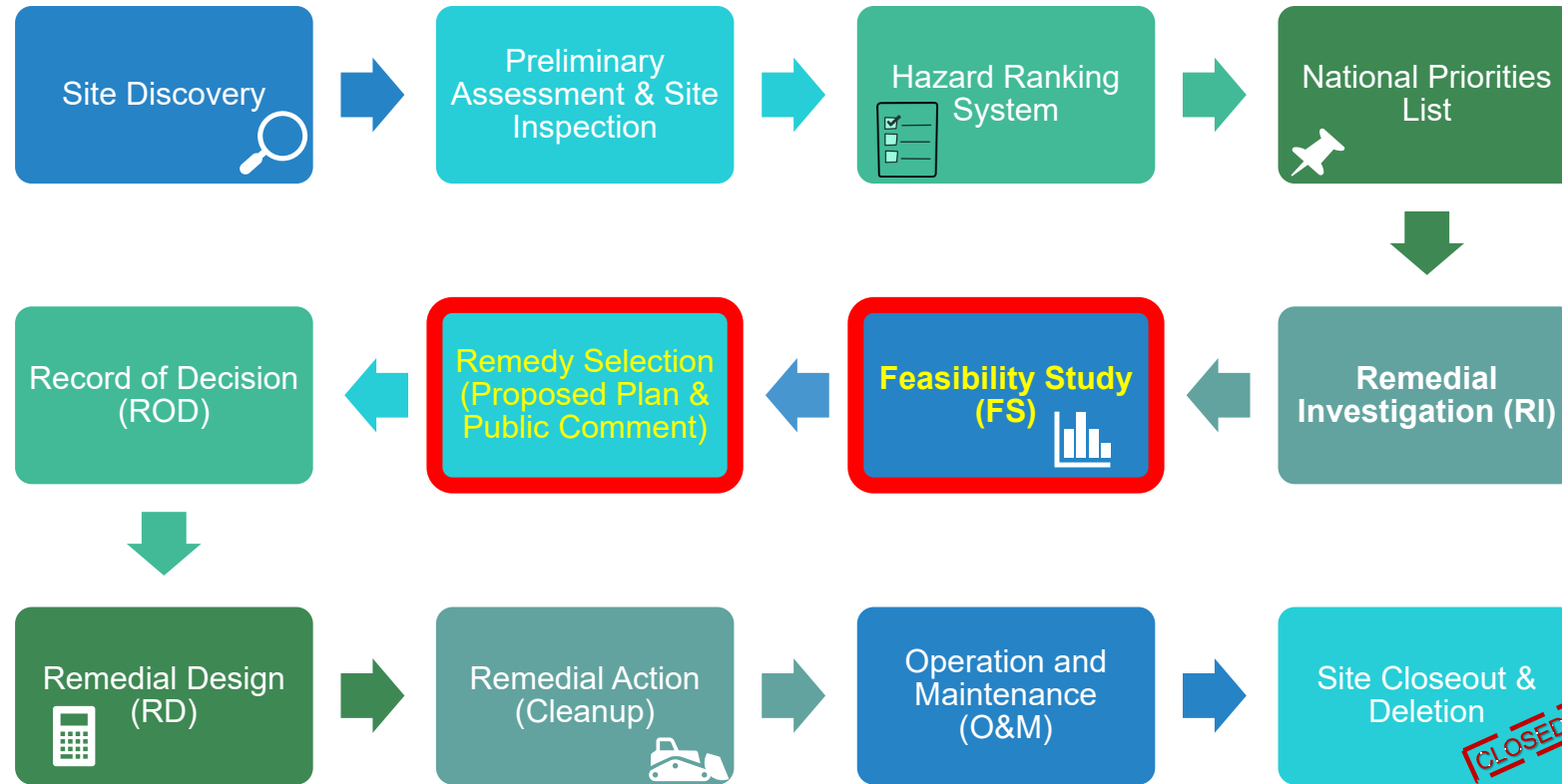
Remedial Investigation

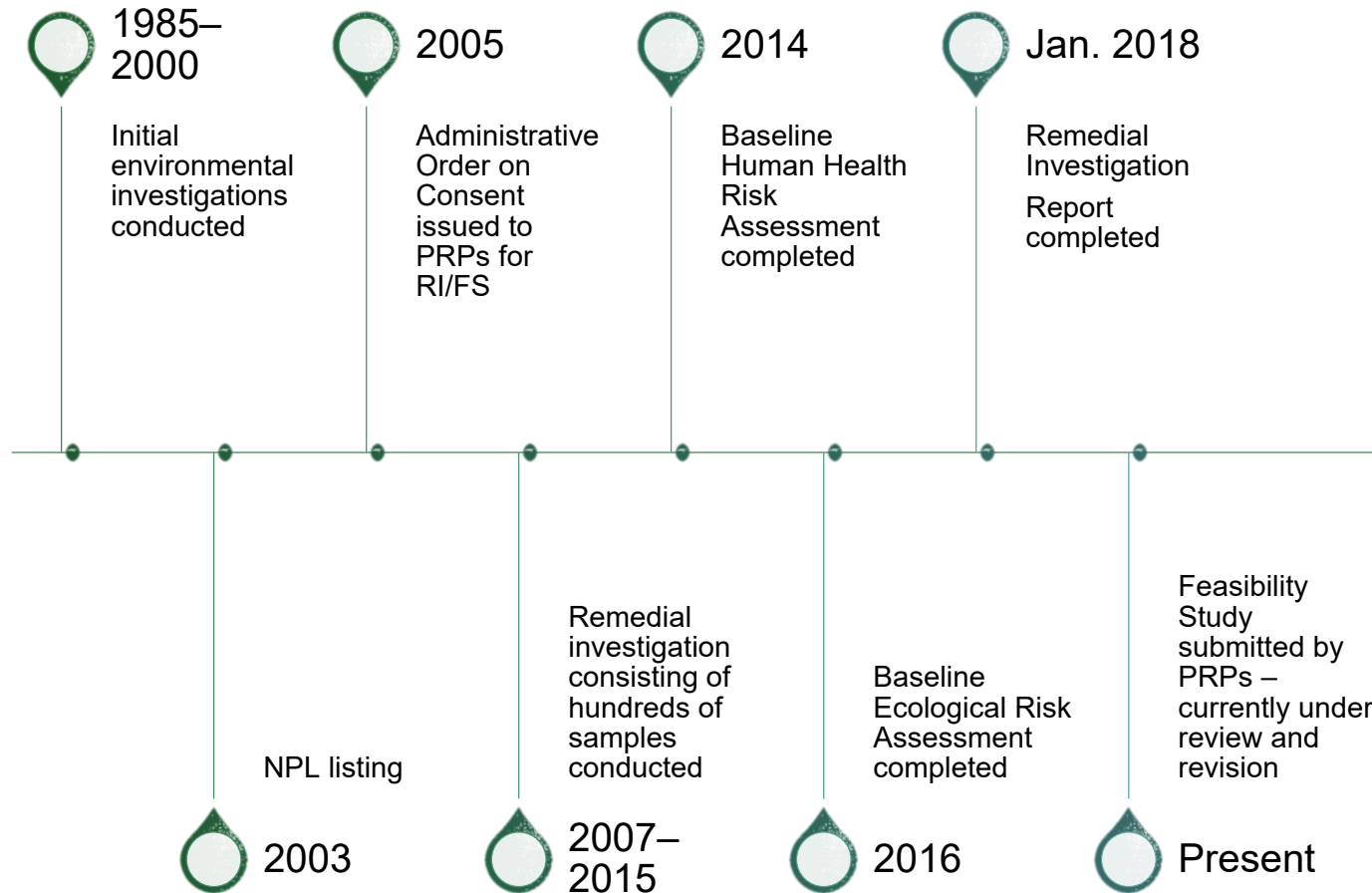
CAG Meeting

December 3, 2018



Superfund Process





Superfund Project History



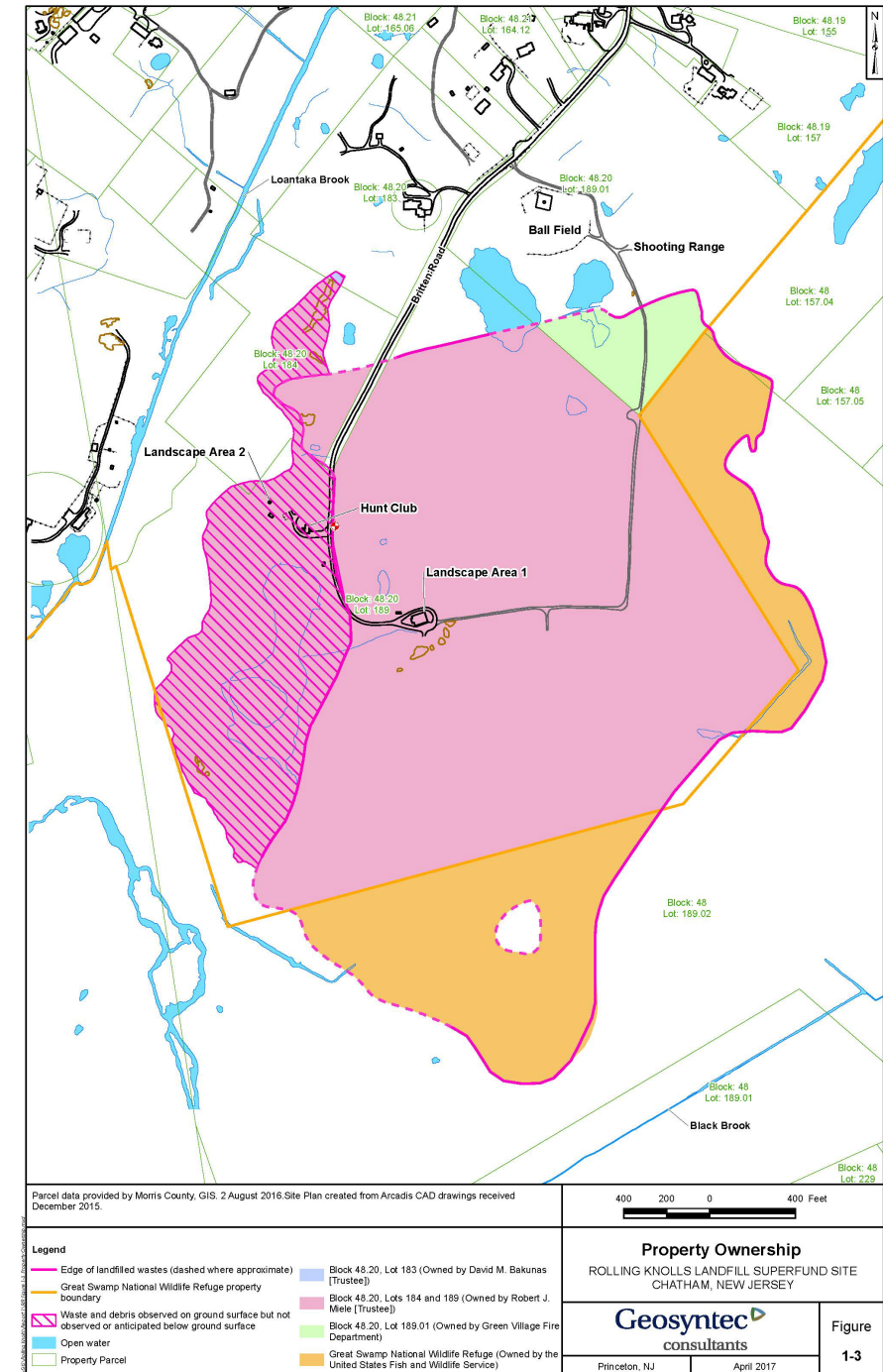
Remedial Investigation

- A Remedial Investigation (RI) was conducted to define the physical characteristics of the site, the nature and extent of contamination at the site, the sources of the contamination at the site and the fate and transport of the contamination present. The information collected during the RI was also used to evaluate the risks posed by the site to human health and the environment.
- The RI was conducted pursuant to the 2005 Settlement Agreement, with direct oversight by EPA, in compliance with requirements of the 2005 Settlement Agreement, EPA, and NJDEP guidance, and in consultation with FWS and NJDEP
- An RI/FS workplan was reviewed and approved by EPA in 2007



Site Description

- Approximately 200 acre site – used primarily as a municipal landfill from 1930's to 1968
- Waste at site includes household garbage, construction and demolition debris, industrial waste, septic waste and scrap metal up to 18 feet deep.
- Site has mixed ownership
 - More than 80% of the site is owned by private family trust (Miele Trust) – about 140 acres
 - Approximately 35 acres owned by the Department of Interior (DOI). This portion is a part of the Great Swamp National Wildlife Refuge (GSNWR) and is managed by Fish and Wildlife Service (FWS)
 - Northeastern portion of site owned by the Green Village Fire Department



Remedial Investigation Field Work

- Field work conducted from 2007 to 2015
- Determine physical characteristics of site
- Characterize nature and extent of contamination for all media
 - Soil
 - Groundwater
 - Sediment
 - Surface water
 - Indoor air
 - Biota/Ecological
- EPA Oversight
 - EPA oversees all work at the site, including field work and document preparation
 - all work conducted pursuant to site-specific EPA-approved quality assurance project plans



Physical Characteristics of the site

- Topography – Elevations range from 227 to 250 feet above sea level
- Geology - Soil, organic matter, sand, clay and silt are found to about 25 feet below the surface and above the thick clay layer (cross section Figure 6-1b)
- Groundwater is found at about 2.5 below the ground surface on average and flows radially away from the site.
- Surface Water
 - 3 ponds range in size from one to four acres and vernal pools
 - Loantaka and Black Brooks
- Wetlands & Flood Hazard Zones on the landfilled and adjacent areas



Physical Characteristics of the site, cont.

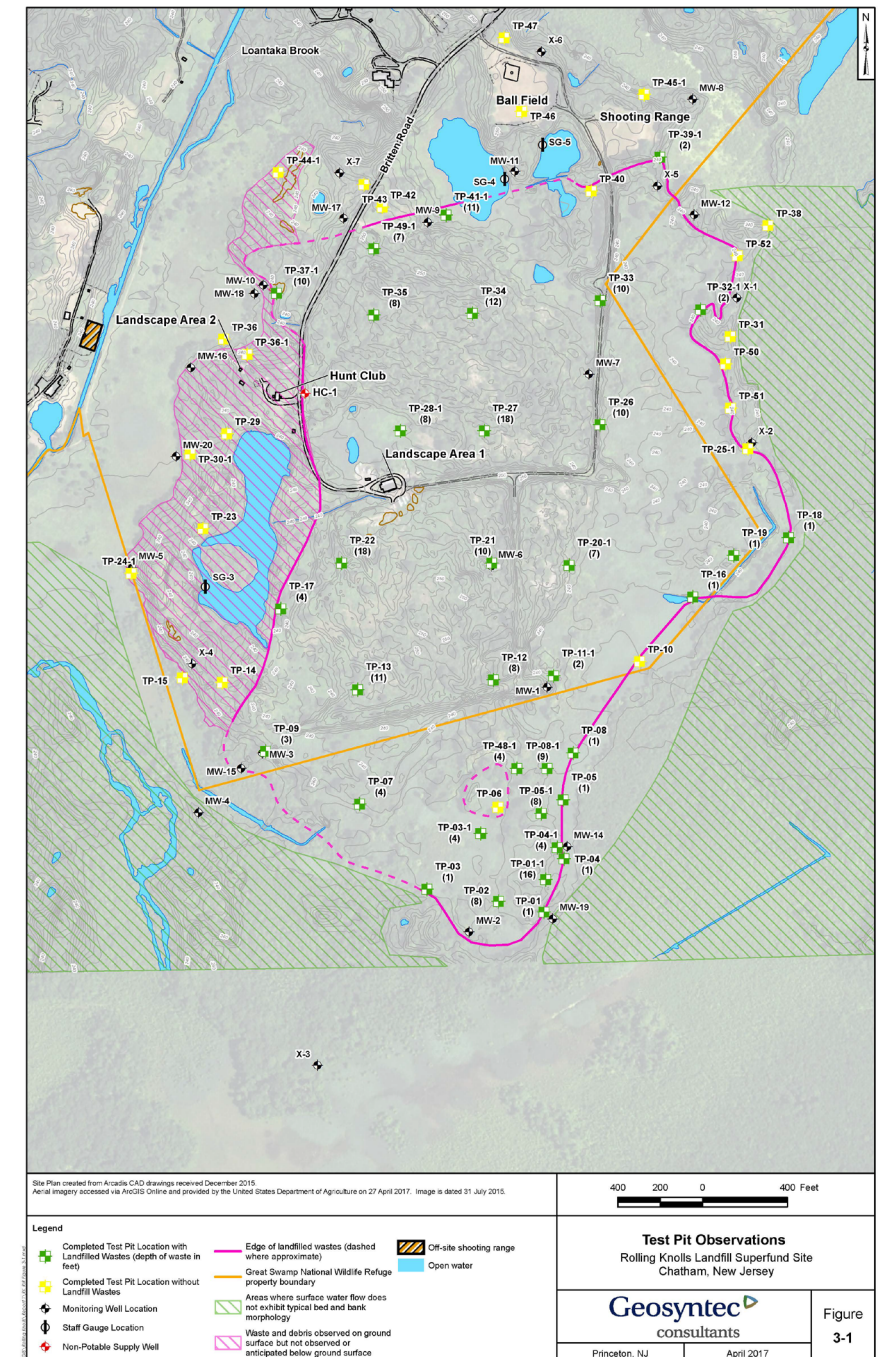
- Terrestrial (non-wetlands) on landfill area
 - Wooded areas
 - 15 acres with trees up to 80 feet tall, varied understory of blueberry, sedges, ferns, lizard tail, grasses
 - Open field – 1 acre
 - Scrub/shrub (disturbed) – 62 acres
 - Phragmites (disturbed) – 47 acres
- Threatened and Endangered Species
 - Six species found on state and federal species lists
 - Bog turtle survey conducted and identified 46 acres of potential habitat





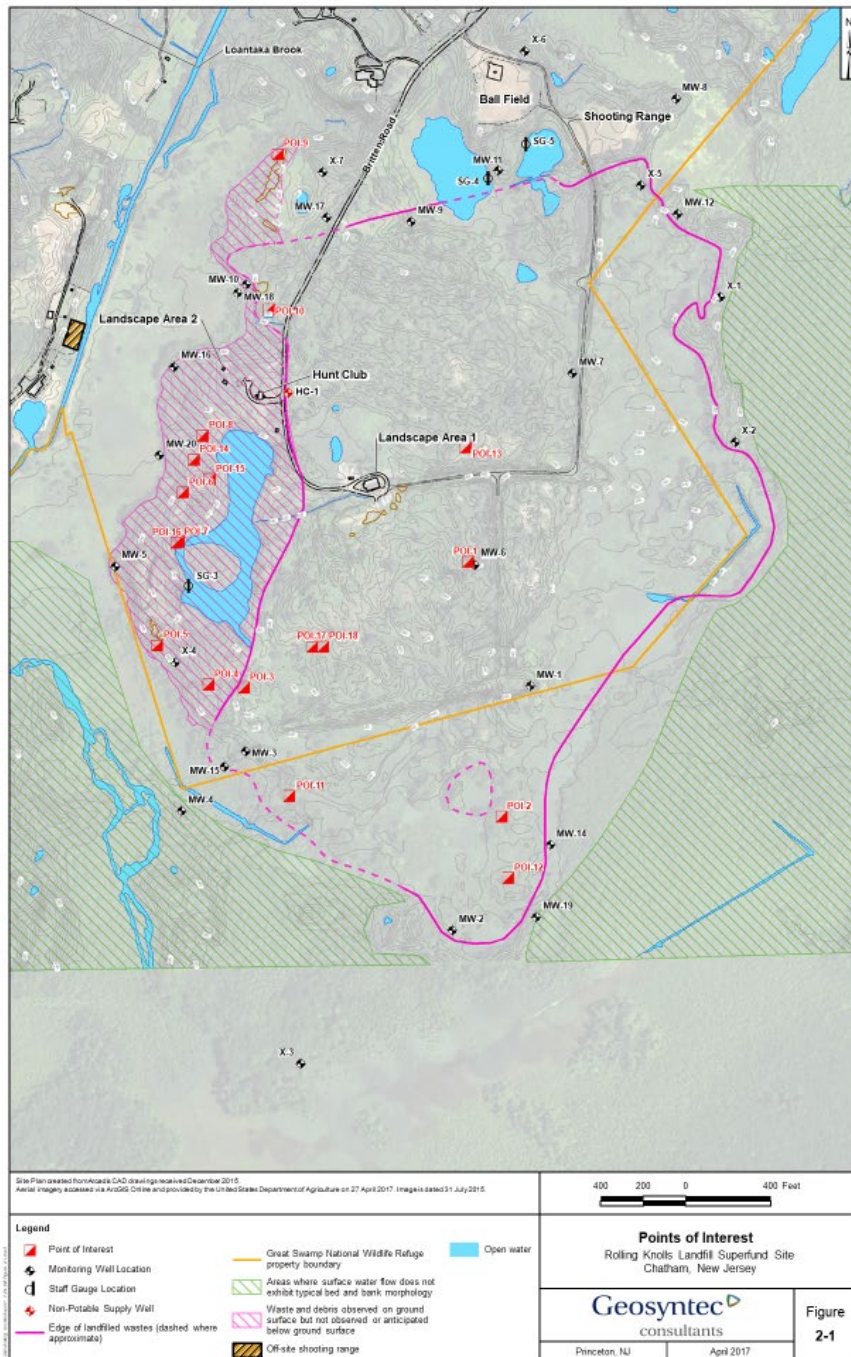
Test Pits

- 57 exploratory test pits were dug throughout the site's 200 acres during 2007 and 2008.
- 37 test pits had waste and debris. Depth of waste varied from zero to 18 feet below the surface. Observation logs are found in Table 3-1.
- Landfill area was refined about 170 acres. 140 acres has waste below the surface and 30 acres on the west has waste on the surface.
- Three test pits were sampled where potential industrial waste was observed.
- Test Pit 9 had evidence of industrial waste – oily sheen, rusted drums, oil boom. Sample results showed elevated VOCs, SVOCs and PCBs,



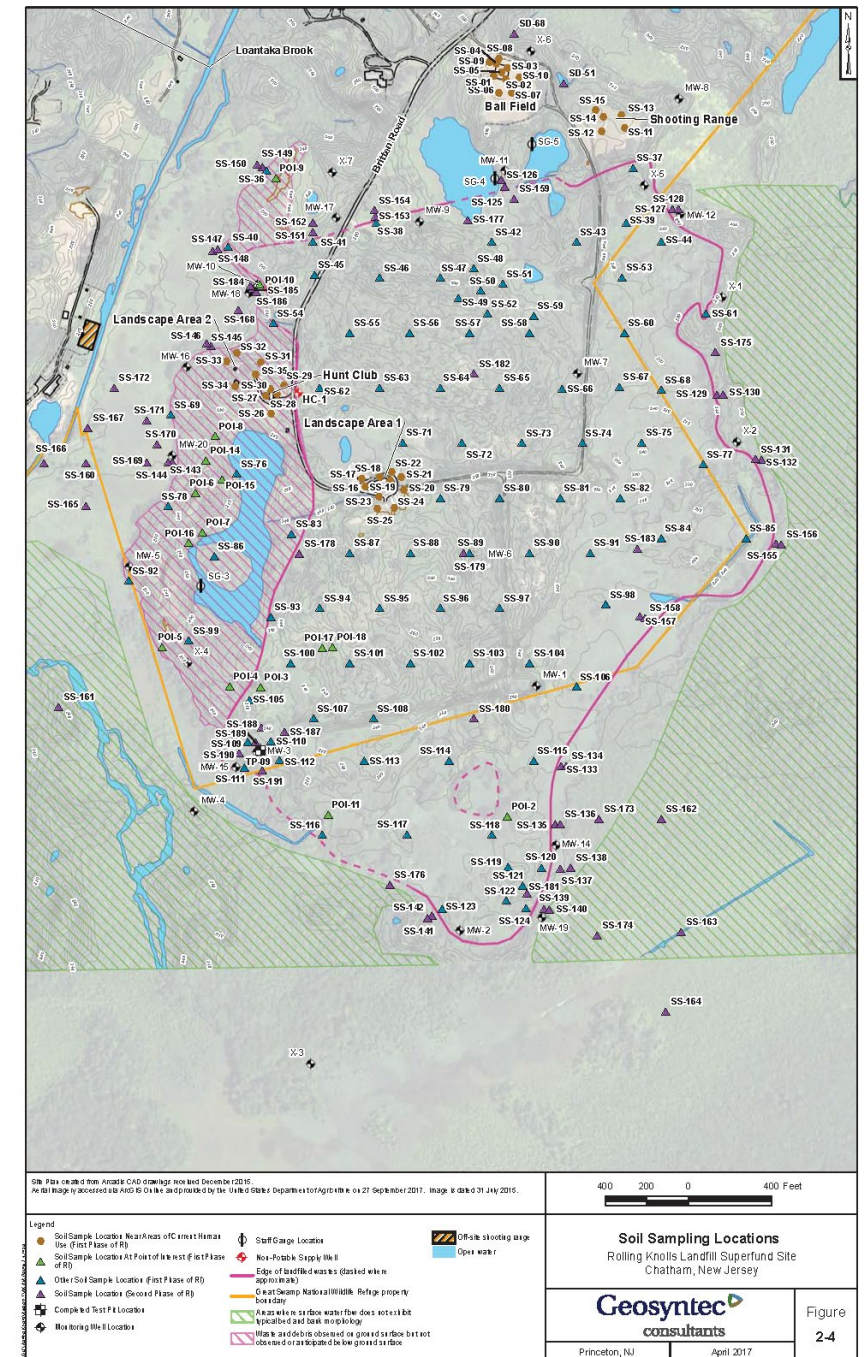
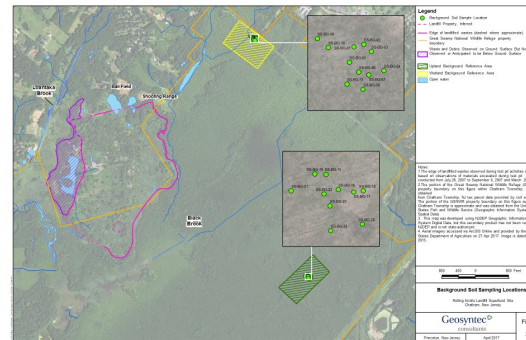
Points of Interest

- 18 “Points of Interest” were identified where materials observed on the surface appeared to differ from trash seen at most locations. Surface soil samples were collected at 13 locations. Figure 3-1, Table 3-1
- POI-1, near the center of the landfill, had 98 partially intact drums. Drums were excavated, categorized/sampled, overpacked and securely stored at two on-site drum storage areas which are inspected each month. VOCs, SVOCs, PCBs, Pesticides, Metals were found.



Soil Investigations

- 22 background samples collected from two areas on the Wildlife Refuge not on the landfill Figure 2-5
- 35 surface samples collected from Baseball field, Shooting range, Landscape Area 1 & 2 and Hunt Club where current users could come into contact with soil
- 121 surface samples collected from the landfill
- 29 subsurface samples
- Summary of Findings
 - Contaminant concentrations are higher on the landfill than outside
 - Predominant contaminants were identified based on frequency of detection above NJ soil standards. Table RI page 76 and Appendix C maps



Predominant Soil Contaminants

- PAHS - mainly on landfill and two locations in surface debris area above non-residential standards
- Pesticides – two locations on landfill and one in surface debris area above non-residential standards
- PCBs - one third of samples had PCB exceedances, maximum results found in north and central part of landfill and found at lower concentrations at two locations in surface debris
- Arsenic – exceedances found on landfill and two locations in surface debris area
- Lead – exceedances found on landfill and at several locations in surface debris area



Predominant Soil Contaminants

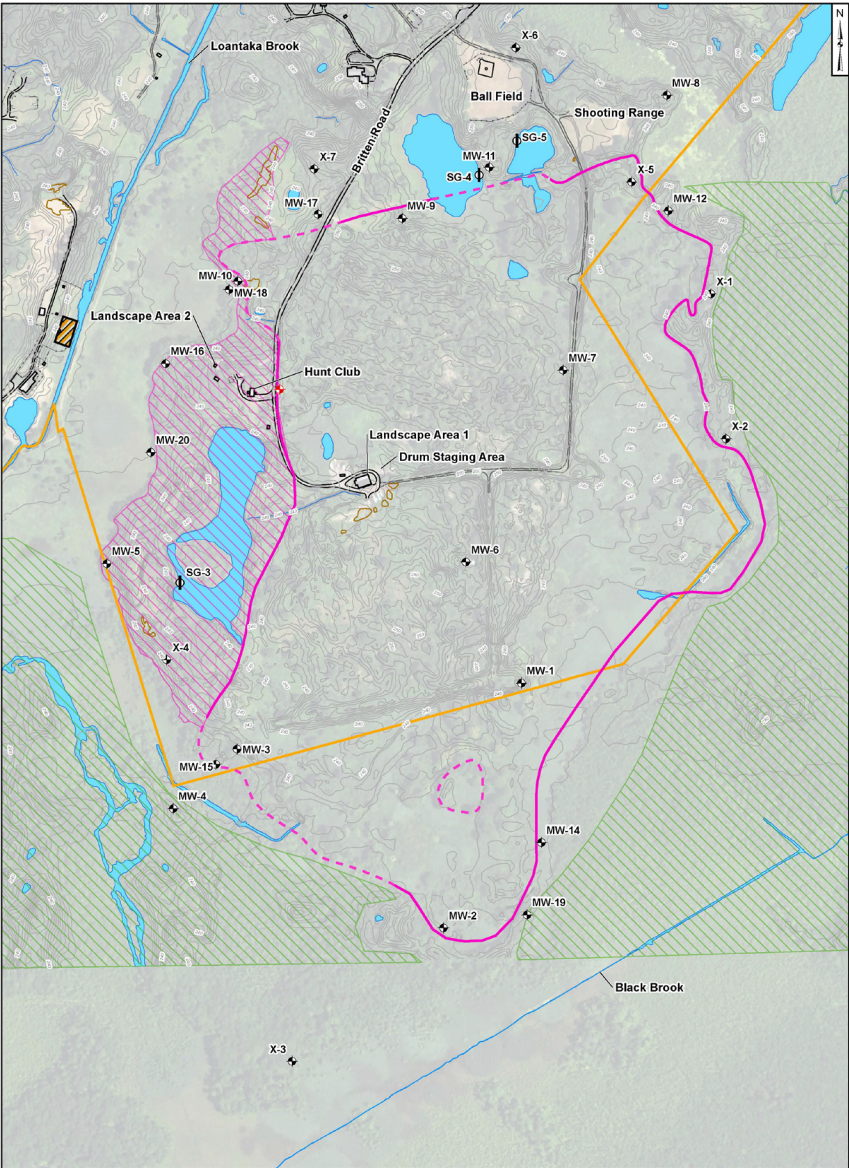
Constituent	Number of Surface Soil Samples Analyzed	Number of Results Above Residential SRS	Percentage of Results Above Residential SRS	Number of Results Above Non-Residential SRS	Percentage of Results Above Non-Residential SRS
Benzo(a)pyrene (PAH)	187	41	22	14	7
Benzo(b) Fluoranthene (PAH)	187	5	3	2	1
Dibenz(a,h) Anthracene (PAH)	187	8	4	2	1
Chlordane (cis) (pesticide)	187	13	7	1	1
Chlordane (trans) (pesticide)	184	11	6	1	1
Dieldrin (pesticide)	186	35	19	2	1
Total PCBs	188	91	48	67	36
Arsenic	188	25	13	25	13
Lead	188	82	44	67	36



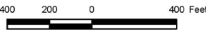
Groundwater

- Overall groundwater impacts at the site appear to be limited to a few isolated areas in the shallow water bearing zone within 25 feet of the surface. No plume identified.
- Monitoring of groundwater downgradient of the landfill indicates that contamination is not migrating away from the landfill
- MW-3, near TP-09, had four contaminants above NJ groundwater quality standards.
- MW-7 near the center of the landfill had detections of PCBs and 1,4 dioxane, but downgradient wells do not have detections of these compounds.
- MW-19 near the southeastern landfill boundary had a slightly elevated benzene exceedance.
- MW-10 & MW-18 – had detections of refrigerant compounds greater than the NJ groundwater quality standards. Recent samples showed no exceedances.
- The Hunt Club Well, which was installed around 1962 at 170 feet deep is located below the clay layer was sampled in 2007. Results indicated that only iron and manganese which are naturally occurring were above the state limits for aesthetic characteristics such as taste, odor or appearance.





Site Plan created from Arcadis CAD drawings received December 2015.
Aerial imagery accessed via ArcGIS Online and provided by the United States Department of Agriculture on 27 April 2017.
Image is dated 31 July 2015.



- Legend**
- Non-Potable Supply Well
 - Monitoring Well Location
 - Staff Gauge Location
 - Edge of landfilled wastes (dashed where approximate)
 - Great Swamp National Wildlife Refuge property boundary
 - Areas where surface water flow does not exhibit typical bed and bank morphology
 - Waste and debris observed on ground surface but not observed or anticipated below ground surface
 - Off-site shooting range
 - Open water

Site Plan ROLLING KNOLLS LANDFILL SUPERFUND SITE CHATHAM, NEW JERSEY	
Geosyntec consultants	Figure 1-2
Princeton, NJ	April 2017



Soil Impact to Groundwater

- Impact to groundwater screening levels were developed to protect against future contamination of groundwater.
- Benzene was found in soil samples exceeding the screening level and in groundwater samples exceeding the groundwater quality standard at three monitoring wells.
- PCBs were found in groundwater above the groundwater quality standard in one well near the center of the landfill.



Additional Groundwater Investigations

- Additional groundwater evaluation work was undertaken in 2016 to:
 - better delineate contamination;
 - determine if biological degradation is taking place; and
 - to get a better understanding of the local geochemistry effects on contaminant behavior.



Soil Gas Testing Beneath the Hunt Club Building

- One sample was collected from beneath the Hunt Club building to determine the potential for risk associated with any contaminants that might and enter the building.
- Results of the sample were compared to EPA and NJDEP screening levels and findings did not suggest that concentrations of contaminants were of concern.



Surface Water

- Surface water samples were collected from all surface water bodies located on or near the site – Loantaka Brook, Black Brook and several ponds. For the brooks, samples were collected both upstream of the site and downstream of the site.
 - Loantaka Brook – upstream and downstream results were similar, with some results exceeding state SW standards for inorganics
 - Black Brook – upstream and downstream results also similar, with slightly higher concentrations of some metals in downstream samples
- Investigations at the larger ponds found one PAH, one phthalate, three VOCs and inorganics. Sampling at the smaller ponds found several PAHs, pesticides and inorganics. The ponds are located on or adjacent to the waste materials



Sediment

- RI sampling results from 47 locations were compared to NJ risk-based screening levels for fresh water sediment. Samples from the Loantaka and Black Brooks were used to characterize the conditions upstream of the landfill.
- Only a few contaminants were found at concentrations above the screening levels. Loantaka Brook had similar upstream and downstream results. Black Brook also had consistent upstream and downstream results (except for one anomalous detection of acetone).
- Pond sediment results showed a number of exceedances, mostly in the large pond.



Risk Assessment

- EPA conducts baseline risk assessments to characterize the potential risks of cancer and non-cancer health effects to humans, and the potential hazards to ecology (plants/animals), posed by exposure to site-related contaminants.
 - Risk assessments provide a framework to understand the nature and magnitude of the risk, the adversity of the risk, the confidence or reliability of the estimates and the areas of uncertainty.
- To conduct a risk assessment, need a site-specific Conceptual Site Model:
 - Who/what is exposed?
 - What is the exposure media (such as soil, groundwater, surface water, etc.)?
 - What activities bring the receptors into contact with the media?
 - What is the frequency and duration of exposure (i.e., days per year, number of years)?
- This information is put together to determine the potential adverse effects from exposure to relevant media at the site.
- Goal is protection under reasonable maximum exposures



Baseline Human Health Risk Assessment

- Exposure scenarios evaluated:
 - Current and reasonably anticipated future use scenario
 - A landscaper in Landscape Area 1
 - A landscaper in Hunt Club Area and Landscape Area 2
 - A Hunt Club user at the Hunt Club and Landscape Area 2
 - An adolescent and/or adult shooting range user at the shooting range
 - A ball player on the baseball field
 - An adolescent and/or adult trespasser on the Landfill
 - Future On-Site Residential Development Scenario
 - A child and/or adult resident in the potentially developable area
 - A construction worker in the potentially developable area



Reasonably Anticipated Future Use

- A formal reuse evaluation was conducted in 2017 to help understand anticipated future uses for the site.
- Informal discussions have been being held with the community and local stakeholders throughout the RI process.
- Both the formal evaluation and feedback received from the community suggest that there is strong support for limited future use, consistent with a passive recreational user:
 - In July 2018, the approved 2014 human health risk assessment was updated to reflect this future use.
 - Assumes adults and adolescents access the site 84 days per year and have higher dermal contact with site soil than the default non-residential worker would.



Baseline Human Health Risk Assessment - Results

For the reasonably anticipated future use:

- Cancer Risks posed by the site contamination do not exceed the risk range
- Non-Cancer Health Hazards slightly exceed the target value of 1:
 - Adolescent trespasser/limited recreational user - HI = 3
 - Adult trespasser/limited recreational user - HI = 2
 - Primarily driven by PCBs



Baseline Ecological Risk Assessment

- Thirteen assessment endpoints evaluated:
 - Terrestrial vegetation;
 - Benthic invertebrates;
 - Amphibians and reptiles;
 - Herbivorous mammals;
 - Vermivorous mammals;
 - Vermivorous birds;
 - Carnivorous mammals;
 - Insectivorous mammals;
 - Insectivorous birds;
 - Carnivorous birds; and
 - Piscivorous mammals
- Only marginally elevated ecological risks were found to vermivorous birds (as represented by the American robin) and vermivorous mammals (as represented by the short-tailed shrew)



Questions?

- Various alternatives to address the elevated risks are being evaluated in the Feasibility Study
- Future presentations can provide more detail on the risk assessment process and on the Feasibility Study
- Hard copies of the Remedial Investigation Report and the risk assessments are available at the Library of the Chathams and the Chatham Township Municipal Building.
- Electronic copies of the documents are also available on the EPA Rolling Knolls website.

