

Letter Health Consultation

Genesee Landfill Site Preliminary Health Assessment Seattle, King County, Washington

June 22, 2016

Prepared by

**The Washington State Department of Health
Under a Cooperative Agreement with the
Agency for Toxic Substances and Disease Registry**



Foreword

The Washington State Department of Health (Health) prepared this health consultation in accordance with the Agency for Toxic Substances and Disease Registry (ATSDR) methodologies and guidelines. Health consultations are initiated in response to health concerns raised by community members or agencies about exposure to hazardous substances released into the environment. The health consultation summarizes our health findings and if needed, provides steps or actions to protect public health.

The findings in this report are relevant to conditions at the site during the time the report was written. It should not be relied upon if site conditions or land use changes in the future.

This report was supported by funds provided through a cooperative agreement with the ATSDR, U.S. Department of Health and Human Services. The findings and conclusions in these reports are those of the author(s) and do not necessarily represent the views of the ATSDR or the U.S. Department of Health and Human Services. This document has not been revised or edited to conform to agency standards.

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June 22, 2016

Romy Freier-Coppinger, Seattle Parks and Recreation
Jeff Neuner, Seattle Public Utilities

Re: Letter Health Consultation
Preliminary Health Assessment
Genesee Landfill Site
Seattle, King County, Washington

Dear Ms. Freier-Coppinger and Mr. Neuner:

Washington State Department of Health (Health) conducted a preliminary health consultation for the Genesee Landfill after reviewing the August 2015 Washington State Department of Ecology (Ecology) Site Hazard Assessment (SHA). Genesee Landfill received a Washington Ranking Method (“WARM”) score of 1 on a scale of 1 to 5. A score of 1 represents a site with the highest level of potential risk to human health and the environment.

To begin assessing the possible human health threat posed by the site, we reviewed reports related to landfill gas monitoring and other actions completed by the City of Seattle (City). While there is not enough recent data to conclude whether Genesee Landfill could harm the health of nearby residents, workers, or recreationalists, there is enough data to suggest that a potential health threat may exist. We recommend further investigation of the site to assess the potential threat (see the “Recommendations” section on page 7).

Background and Statement of Issues

Site History

Genesee Landfill (also known as the Rainier Valley Dump) is a former unlined landfill located in a residential area of the Rainier Valley neighborhood in Seattle, Washington. It is owned by the City. The property was a former slough, known as Wetmore Slough, which drained to Lake Washington. Between 1947 and 1963, both residential and commercial wastes were reportedly dumped into the landfill [1]. However, no records were kept indicating Genesee Landfill as a hazardous waste disposal site [2]. Genesee Landfill is adjacent to Rainier Playfield, which was likely filled with residential waste and/or road construction debris in 1913 [1].

Beginning in 1968, the landfill was covered and developed into the 57.7-acre Genesee Park and Playfield. The park hosts annual hydroplane races and air shows. The surrounding Rainier Valley neighborhood is diverse and densely populated (see demographics map in Attachment A). By city ordinance, new building structures within 1,000 feet of this site are required to have specific construction to prevent methane accumulation and combustible gas hazards [3].

Past Site Work

Public Health-Seattle & King County (PHSKC) sampled surface soil, landfill gas, and surface water for various vapor-forming chemicals at the site in 1986 as part of their Abandoned Landfill Toxicity/Hazard Assessment Project [1, 4, 5]. The project was limited to a toxicity/hazard assessment for park visitors and site workers. The report found combustible gas and physical hazards, including significant levels of combustible gas in an on-site sewer utility line and lower levels of combustible gas up to two blocks away. Additional monitoring and surfacing of the landfill/park cover were recommended in the 1986 report. The City followed up on some of PHSKC's recommendations and also conducted indoor air modeling of the proposed Rainier Community Center (an on-site building) [6, 7]. Additionally, the City addressed community concerns about fecal contamination in the off-leash dog park.

In 2006, the City, PHSKC, and Ecology met to discuss the site [8]. PHSKC indicated that Genesee Landfill may be out of compliance with Title 10, Board of Health Solid Waste Regulations (10.09.040 and 10.09.050) due to excess methane from bar-hole data, particularly near one residence (Parcel 4430 in Attachment B – Genesee Park & Playfield Utilities Map). To address PHSKC's concerns about landfill gas migration, the City installed nine soil gas probes in November 2006 [8]. These probes are further discussed in the following section.

The City installed a passive venting system in the southeastern portion of the landfill in 2000 and a landfill gas extraction system in a small portion of the southwestern area of the site in 2007, near GP9 (see Attachment B). Both systems are located south of Genesee Street. Methane is monitored near the gas extraction system. However, it doesn't appear that the passive vents are monitored for methane or vapor-forming chemicals [5, 8].

Groundwater at the site appears to flow north to northeast [8]. None of the documents reviewed by Health indicate that groundwater testing has been done at the former landfill.

Discussion

Closed, unlined municipal landfills, which often received a variety of wastes, have the potential to release contaminants to air, soil, groundwater, and surface water. When releases occur to these media, a potential human health threat may exist in the nearby community.

To begin evaluating the potential health threat posed by the Genesee Landfill, Health reviewed available site documents. Except for methane monitoring results, much of the data for the site is decades old and cannot be used in health risk assessment. However, there was enough information to develop a preliminary conceptual site model (CSM). As shown on the CSM in Figure 1, the landfill could be releasing contaminants to air and groundwater, which could result in potential residential, worker, and recreational exposures.

We cannot determine whether exposures to landfill-related contaminants are occurring, although the potential exists. Nearby residents could be exposed to site contaminants via vapor intrusion if landfill gas is migrating through native soils, along utility backfills, or if contaminated groundwater is entering utility pipes (e.g. sanitary sewer lines) and entering homes. The potential for vapor intrusion depends on many factors, such as building construction, presence of cracks/holes in foundation, ventilation and air flow, presence of heating and air conditioning systems, hydrogeology, moisture, time of year, and other factors.

Exposure to contaminants found in landfill gas may cause a variety of health and safety concerns, including explosions/fire, asphyxiation (in rare cases), non-cancer health effects (such as neurological and reproductive effects), as well as increased risk of cancer.

Workers, including utility workers, could potentially be exposed to vapor-forming contaminants within excavations or within subsurface utility vaults or lines. Workers in excavations might also have direct contact with contaminated soil and groundwater. Recreationalists could potentially be exposed if they encounter contaminated surface water along the north end of the park.

Site monitoring activity

Methane monitoring has been the primary focus of the City's work. Nine soil gas probes have been installed in the vicinity of the landfill to monitor methane, in addition to oxygen and carbon dioxide. Vapor-forming chemicals, like trichloroethylene (TCE), however, have not been monitored.

Only one soil gas probe (GP9) is currently installed in refuse. Methane levels in GP9 decreased to zero about a month after the gas extraction system startup in February 2007 [9]. However, elevated levels of methane were reported in GP9 in April and May 2009, January to April 2010, and February to May 2011. It is unknown why elevated levels occurred during these times.

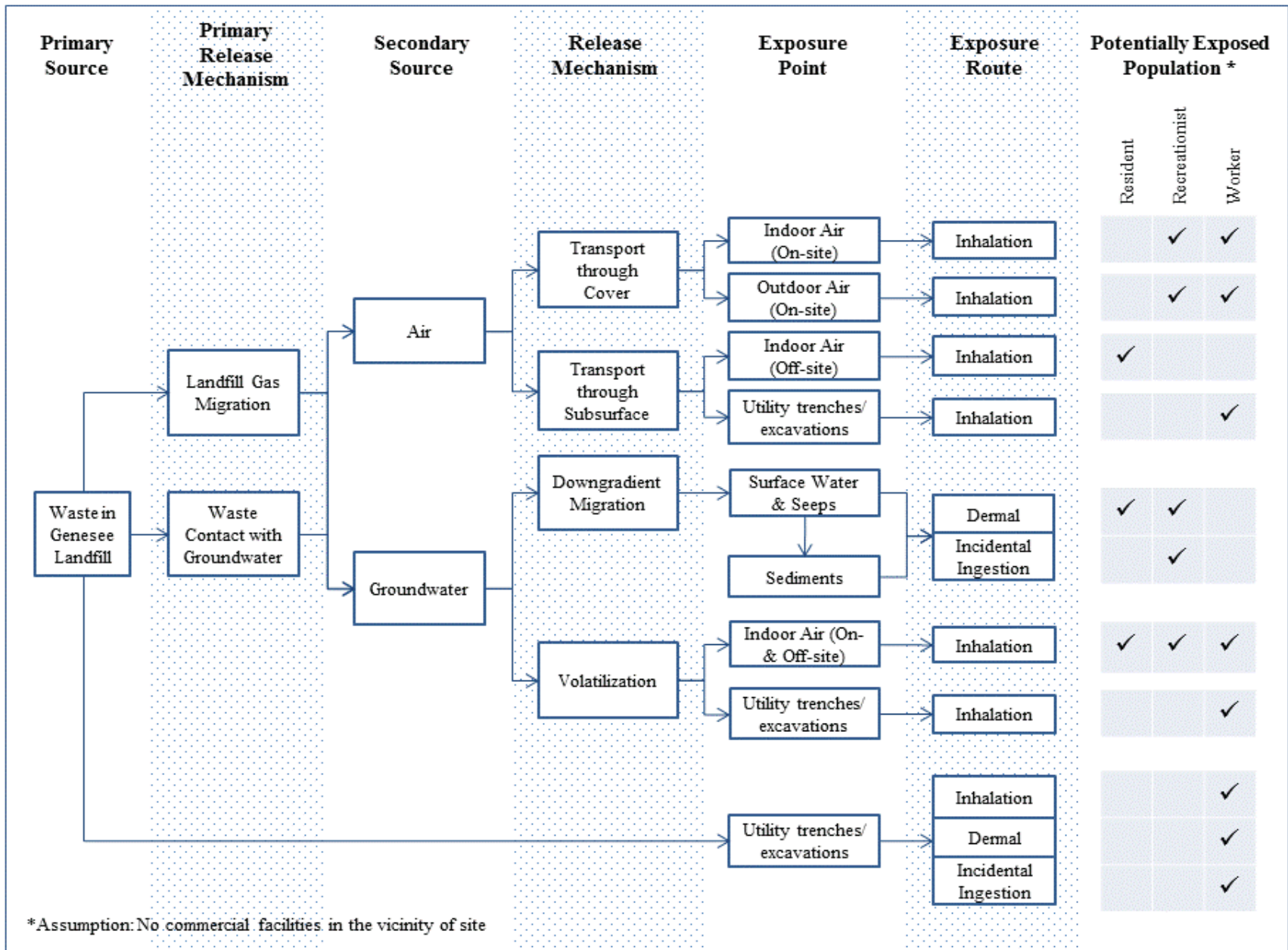


Figure 1: Preliminary Conceptual Site Model – Exposure Pathway Evaluation for Genesee Landfill, Seattle, King County, WA

The remaining eight probes are installed in native soils outside of the landfill boundaries. One probe, GP3, is screened in soft to medium stiff soils; the other seven probes are generally screened in stiff to hard sandy silt to silt. Methane was periodically detected in GP3 in 2007, '09, '10, '14, and '15.

Four probes (GP2, GP6, GP7, and GP8), located along the south and western portion of the site, have been generally blocked during landfill gas monitoring between 2006 and 2016.^a Another probe, GP4 (located along the east side of the site), was periodically blocked.^b Methane has been detected infrequently at GP1, GP4, and GP5. Water levels in gas probes were last measured in 2007, and ranged from 6.18 – 23.40 feet below ground surface (GP9 was dry at 10 feet).[9, 10] The City presumes that high water levels are causing probes to be blocked, although more recent measurements of groundwater depths may better inform us about probe blockages and the possible use of these probes for future soil gas testing.[11]

While the unblocked gas probes (GP1, GP3, and GP5) and GP9 may help us understand what might be happening with vapor migration in those areas, it does not help us understand what might be occurring throughout the landfill, in other areas outside of the landfill, or along utility lines where soil conditions may be very different.

No groundwater monitoring wells have been installed at the landfill. As a result, it is unknown whether contaminated groundwater exists. Given that the site was a former slough that drained to Lake Washington, it is expected that groundwater at the site is discharging there.

Conclusions

There is insufficient data to conclude whether contaminated groundwater and/or landfill gas could harm the health and safety of onsite workers, park recreationalists, or nearby residents over time.

^a Probes were considered blocked or unblocked using > 95% of all monthly readings.

^b About 40% of monthly readings for GP4 were blocked.

Recommendations

The Department of Health recommends the following actions be taken to address potential public health issues at Genesee Landfill:

- Determine whether landfill gas (including vapor-forming chemicals) may be migrating through native soils, along utility backfills, or if contaminated groundwater is entering utility pipes (e.g. sanitary sewer lines) and entering indoor air at nearby residences or on-site buildings.
- Ensure that leachate collection system is capturing the leachate before it discharges to the lake to prevent recreational exposures to landfill contaminants.
- Ensure that utility and excavation workers on and near the landfill are aware of the potential to encounter contaminated soils, groundwater, and soil gas so they can take steps to prevent exposures.

We are available to support the development and/or review of sampling plans when further site characterization occurs. We appreciate your cooperation in helping us address these potential public health issues and look forward to providing ongoing public health assessment support when more data is available. Please contact me at 360-236-3357 if you have any questions.

Sincerely,

Amy Leang, Toxicologist / Health Assessor
Site Assessments and Toxicology Section

Enclosures (2)

cc: Bob Warren, Department of Ecology
Darshan Dhillon, Public Health-Seattle & King County
Darcy Webber, Public Health-Seattle & King County
Barbara Trejo, Department of Health
Joanne Snarski, Department of Health

Attachment A – Demographics Map [12]

EPA FACILITY ID: NOT AVAILABLE

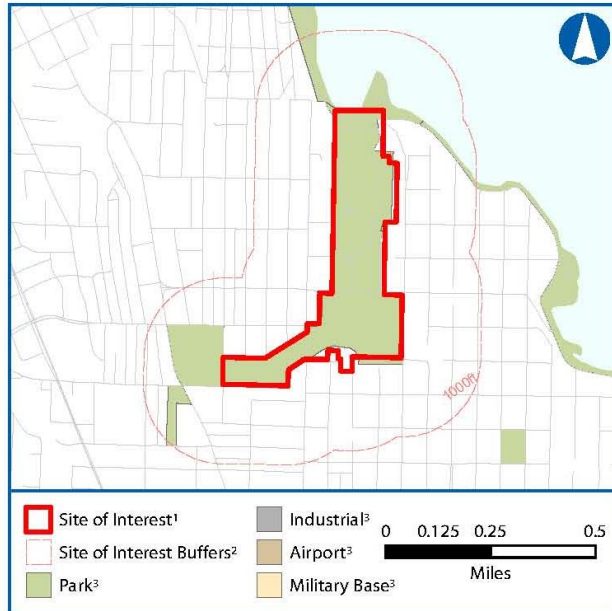
Genesee Landfill

Seattle, King County, WA

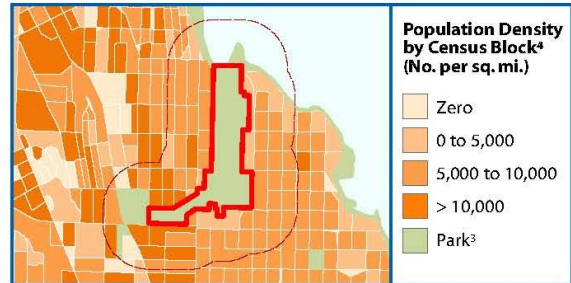
GENERAL SITE PROFILE

INTRODUCTORY MAP SERIES

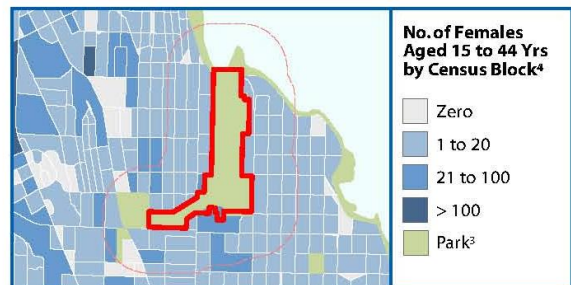
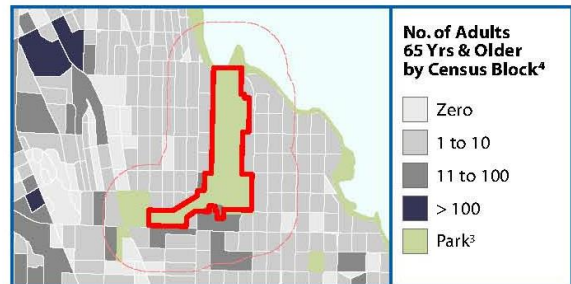
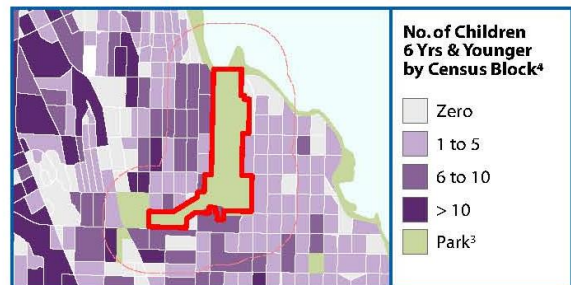
Site Vicinity Map



General Population Density



Sensitive Populations



The **General Site Profile Map** depicts the hazardous waste site of interest, along with any airport, industrial, military, or park land uses. It also provides community demographic and housing statistics.

Demographic Statistics^{4,5}

Within 1000ft buffer of site boundary

Measure	2000	2010	Change
Total Population	2,899	2,991	+3%
White Alone	1,369	1,727	+26%
Black Alone	751	563	-25%
Am. Indian & Alaska Native Alone	30	13	-57%
Asian Alone	450	405	-10%
Native Hawaiian & Other Pacific Islander Alone	9	5	-44%
Some Other Race Alone	119	108	-9%
Two or More Races	173	179	+3%
Hispanic or Latino ⁶	247	255	+3%
Children Aged 6 and Younger	225	272	+21%
Adults Aged 65 and Older	356	317	-11%
Females Aged 15 to 44	629	609	-3%
Housing Units	1,076	1,221	+13%

Data Sources: ¹ATSDR GRASP Hazardous Waste Site Boundary Database. ²ATSDR GRASP. ³TomTom International BV (2012). ⁴US Census 2010. **Notes:** ⁵Calculated using area-proportion spatial analysis method. ⁶Individuals identifying origin as Hispanic or Latino may be of any race. **Projection:** Projection used for all map panels is NAD 1983 StatePlane Washington North FIPS 4601 Feet.

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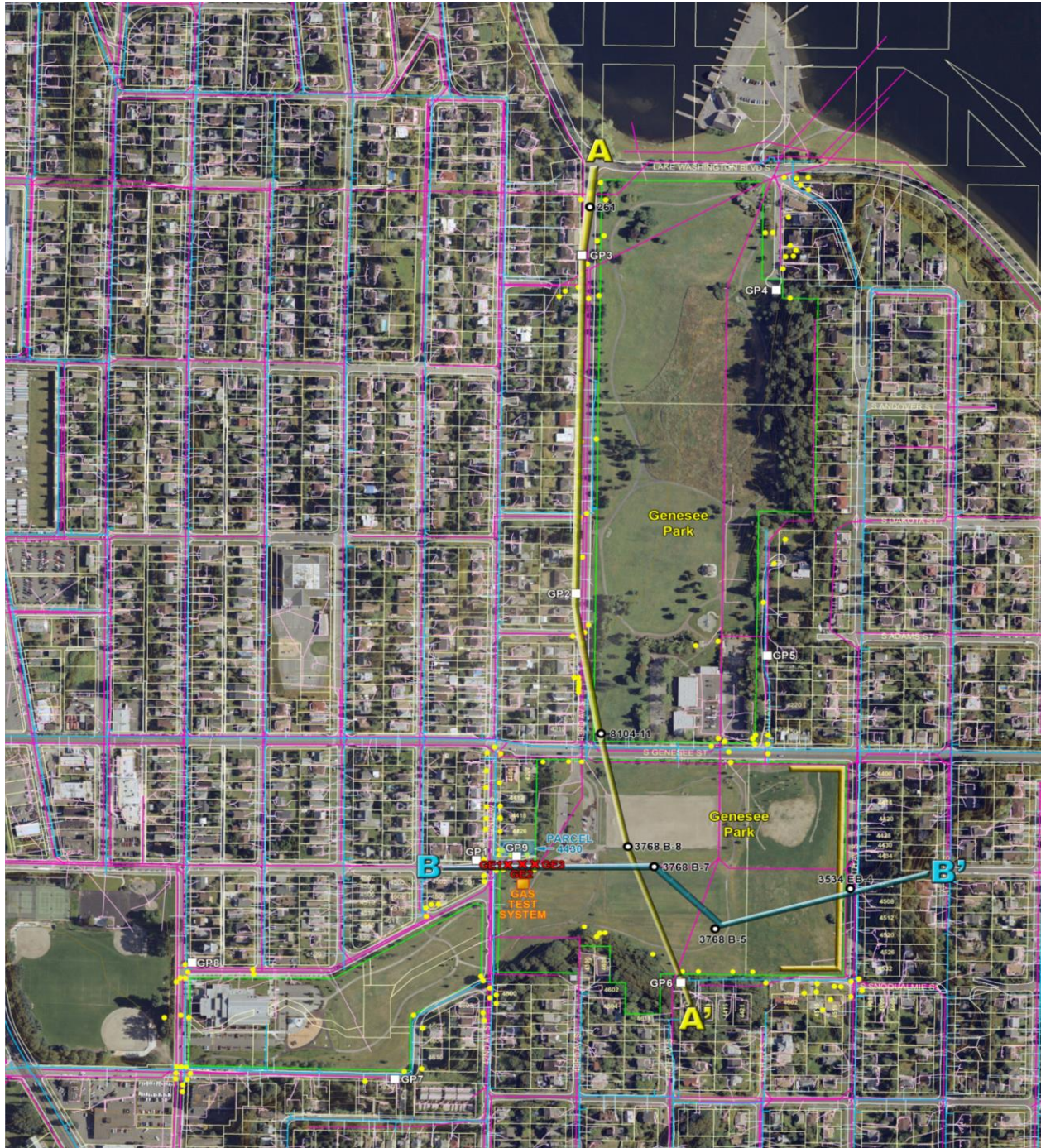
Agency for Toxic Substances and Disease Registry

Division of Toxicology and Human Health Sciences



FINAL - FOR PUBLIC RELEASE

Attachment B – Genesee Park & Playfield Utilities Map [8]



Parametrix Genesee Park 555-1550-052/02(072) 2/07 (B) PS

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Orthophoto source:
Trithon, July 1999
Map date: May 4, 2007

Legend		Probes	
	Parcel Boundary		Gas monitoring probe
	DWU Lateral		Gas extraction well
	DWU Mainline		Bar hole
	Water Mainline		Utility hole
	Water services		Vault ambient
	Pavement edge	Contours	
	Geologic cross-section line		10' contour
	Approximate Location of Passive Vent System		2' contour

Figure 5
Cross-Section Locations
Genesee Park Landfill
Seattle, Washington



References

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2. Hart Crowser & Associates, *Subsurface Exploration and Geotechnical Engineering Feasibility Study, Site B Proposed Hawthorne School Facilities, Seattle, WA - Prepared for Seattle School District No. 1*. 1985: Seattle, WA.
3. City of Seattle, *Development standards for abandoned landfills*, in 25.09.220. Seattle, WA.
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7. Parametrix, *Rainier Community Center Trace Gas Evaluation Report, Draft*. 1993: Kirkland, WA.
8. Parametrix, *Final - Genesee Park Landfill Gas Test System and Monitoring Network Installation Report, Genesee Park Landfill, Seattle, Washington*. 2007: Bellevue, WA.
9. Seattle Public Utilities, *Genesee Landfill Monthly Probe Data*. 2016: Seattle, WA.
10. Seattle Public Utilities, *Genesee Probes Water Level*. 2007: Seattle, WA.
11. Washington State Department of Health, *6/2/16 Meeting with Seattle Parks and Recreation, Seattle Public Utilities*. 2016: Seattle, WA.
12. Agency for Toxic Substances and Disease Registry - GRASP, *Genesee Landfill General Site Profile*. 2015, Agency for Toxic Substances and Disease Registry: Atlanta, GA.