

TECHNICAL MEMORANDUM

DATE March 10, 2025

TO Alexis Mena
Alen Estrada-Rodas

FROM Cathy Fitzgerald, P.E., Senior Engineer

SUBJECT Evaluation of Roberts Avenue Landfill and Need for Additional Investigation

The purpose of this memorandum is to review the available groundwater and methane monitoring data at the former Roberts Avenue Landfill and determine if a Phase II Environmental Site Assessment (ESA), including soil and soil vapor testing, is warranted for the proposed residential development project at 1170 & 1190 Roberts Avenue. The project applicant (Pan-Cal Corporation) is seeking approval from the City of San José to construct a total of 16 detached single-family residential units on two 1.09-acre parcels. Two previous Phase I ESAs were prepared for the proposed project by Almar Environmental, but failed to identify the former Roberts Avenue Landfill, which is across the street from the proposed project, as a potential Recognized Environmental Condition (REC) and did not evaluate its potential impact on future residents occupying the project site.

BACKGROUND

The Roberts Avenue Landfill site was formerly owned and operated by Remillard-Dandini Brick Company, who excavated clay pits for brick production from approximately 1957 to 1961. It was then purchased by the City and converted into a public municipal landfill. Although the City closed the landfill in 1969, the City continued to accept organic waste until 1979, at which time the landfill was closed. The landfill was subsequently capped with one to three feet of soil, followed by two to three feet of compacted fill. An additional three to 14 feet of soil was placed on top of the landfill in the mid-to-late 1990s by the City. The former landfill is unlined and has no leachate collection or extraction system.¹

In the mid-2000s, the City submitted a Post-Closure Development Plan for an 11-acre portion of the site to include construction of a parking lot to serve Happy Hollow Park and

¹ San Francisco Bay Regional Water Quality Control Board, 2010. Waste Discharge Requirements (WDRs), City of San Jose, Roberts Avenue Landfill, Former Municipal Solid Waste Site, San Jose, Santa Clara County.

Zoo across Coyote Creek to the west. The San Francisco RWQCB issued WDRs in January 2010 to incorporate provisions for the proposed development and post-closure monitoring.

Construction of the parking lot included a restroom/information kiosk building with a methane barrier and venting system beneath the slab and methane sensors inside the building and a passive landfill gas venting system under the paved areas. The Post Closure Development Plan was approved by the RWQCB in 2009 and the parking lot and associated facilities were subsequently constructed. The WDRs issued by the RWQCB require regular groundwater monitoring, leachate monitoring, and landfill gas monitoring.

METHANE AND LANDFILL GASES

The WDRs require quarterly methane monitoring at nine locations in and around the methane venting system. The highest concentration of methane was 3.1% in December 1998, which is below the level of concern (lower explosive limit – LEL) of 5%. No methane has been detected during the quarterly monitoring since 2010, when a maximum concentration of 0.9% was detected in one of the probes. The latest methane monitoring results (August 2024) show no detectable concentrations of methane in the nine locations at and around the parking kiosk. Therefore, the possible migration of methane across Roberts Avenue and onto the project site at a concentration that would impact residents is highly unlikely. In addition, the active and passive venting systems within the parking lot would limit the potential migration of methane offsite.

Landfill gas (LFG) is a byproduct of decomposing organic waste. Although the primary constituents in LFG are methane and carbon dioxide, LFG can contain trace concentrations of volatile organic compounds (VOCs) and other contaminants that dissolve into the groundwater. Concentrations of these constituents in groundwater and LFG typically decrease over time, after closure of the landfill. The Roberts Avenue Landfill was closed 46 years ago and only accepted municipal and organic waste for a relatively short period of time (from 1961 to 1979).

However, VOCs can be present in soil vapor and have the potential to migrate offsite, depending on site conditions. As discussed in detail in the following section, no VOCs have been detected in groundwater since 2006 in the two monitoring wells closest to the site and the primary constituents in groundwater are total petroleum hydrocarbons (TPH) as diesel and TPH as motor oil, which are not typically volatile. Because there are no VOCs in groundwater, it is unlikely that there will be concentrations of VOCs in the soil vapor that would create a vapor intrusion risk to the proposed project occupants. Also, the soils

present beneath the project site and in the surrounding area are clay loam to silty clay loam (Elpaloalto Complex),² which are not conducive to vapor migration due to low porosity.

Although PlaceWorks only had access to information on the GeoTracker website to assess site conditions and soil vapor data from the former landfill were not available, the current and historical results from the quarterly monitoring conducted at this site do not indicate that the project site would be subject to a vapor intrusion risk. In addition, a review of available data for the Story Road/Martin Park Landfill, which is about 900 feet northwest of the Roberts Avenue Landfill, showed similar concentrations of TPH as diesel in groundwater and no VOCs other than acetone in soil matrix samples.³ The lack of VOCs in groundwater and soil samples at this site indicates that soil vapor migration would not be an issue at this landfill with similar site conditions.

GROUNDWATER MONITORING

There are two monitoring wells at the former Roberts Avenue Landfill that are near the project site: MW-5 and MW-7. Well MW-5 is located on the west side of Roberts Avenue and is approximately 309 feet southwest of the project site. Well MW-7 is located within the former landfill footprint about 74 feet from Roberts Avenue and about 408 feet northwest of the project site. The depth to groundwater in these wells is 21.32 feet below ground surface (bgs) and 24.45 feet bgs, respectively, as measured during the December 2024 monitoring period.⁴ The groundwater flow direction is to the west-southwest toward Coyote Creek. Therefore, the project site is upgradient from the former landfill and it is highly unlikely that groundwater from the landfill could impact the site.

Well MW-5 is no longer in the monitoring network. However, the last time that this well was sampled in November 2023, there was a concentration of 100 ug/l of total petroleum hydrocarbons as motor oil (TPH-mo). No fuel oxygenates or volatile organic compounds (VOCs) were detected. Well MW-7 was sampled in December 2024 and had a TPH as diesel

² Natural Resources Conservation Service, 2025. Web Soil Survey.

³ RRM, 2009. Revised Site Investigation Results, Story Road Landfill, San José, California.

⁴ Kleinfelder, 2025. Roberts Avenue Landfill, Former Municipal Solid Waste Site, Annual Groundwater and Methane Monitoring Report, Second Semester 2024. Dated January 31, 2025.

concentration of 37 ug/l and a TPH-mo concentration of 110 ug/l. No fuel oxygenates or VOCs were detected in this well.⁵

Residual fuels, such as motor oil, are high molecular weight hydrocarbons that lack a significant amount of volatile compounds and are generally assumed to pose a minimal vapor intrusion risk. Therefore, this analysis focuses on the concentrations of TPH as diesel detected in the groundwater monitoring wells. Diesel consists of heavy, relatively low-volatility, C-9-C18 aliphatic compounds. Diesel can also include aromatic compounds, such as benzene, toluene, ethylbenzene, and xylene (BTEX). However, volatile organic compounds and fuel oxygenates, including BTEX, have not been detected in Well MW-5 and no VOCs or fuel oxygenates have been detected in Well MW-7 since 2020. Previous detections at Well MW-7 were low concentrations of MTBE at 15 ug/l or less. Therefore, this analysis focuses on the diesel aliphatic compounds and the potential for vapor intrusion.

The Department of Toxic Substances Control (DTSC) issued recent guidance for the evaluation of vapor intrusion risk.⁶ The guidance document provides an evaluation of potential vapor intrusion risk based on groundwater concentrations. DTSC also has issued guidance for evaluating human health risk at sites contaminated by petroleum hydrocarbons.⁷ The toxicity value for inhalation for C9-C16 TPH fractions of 50 ug/m³ was used in this evaluation. The toxicity value for inhalation for TPH as motor oil (C17+) fractions has not been developed by DTSC due to the low volatility of these compounds. The Interstate Technology & Regulatory Council (ITRC) has also developed guidance for evaluating petroleum vapor intrusion, which was also used in this evaluation.⁸

The ITRC uses a lateral inclusion zone to determine whether a building is close enough to the lateral edge of a petroleum vapor source to be considered a potential vapor intrusion issue. A conservative 30-foot lateral inclusion distance is considered appropriate. The

⁵ Kleinfelder, 2025. Roberts Avenue Landfill, Former Municipal Solid Waste Site, Annual Groundwater and Methane Monitoring Report, Second Semester 2024. Dated January 31, 2025.

⁶ Department of Toxic Substances Control (DTSC), 2023. Final Draft Supplemental Guidance: Screening and Evaluating Vapor Intrusion.

⁷ DTSC, 2021. Human Health risk Assessment (HHRA) Note 12. Guidance for evaluating Human Health Risk at Sites Contaminated by Petroleum Hydrocarbons and Related chemicals of Potential Concern (COPC).

⁸ Interstate Technology & Regulatory Council (ITRC), 2014. Petroleum Vapor Intrusion, Fundamentals of Screening, Investigation, and Management.

parcel boundary of the project site is more than 30 feet from the parcel containing the former landfill and therefore is screened out as having a vapor intrusion risk. In addition, the nearest proposed buildings would be set back at least 72 feet from the former landfill site.

The ITRC also has a vertical separation distance between impacted groundwater and the building foundation. For dissolved phase plumes, the vertical separation distance is 5 feet bgs. This is also the same vertical separation distance used by the State Water Resources Control Board (SWRCB) in their Low-Threat Underground Storage Tank Case Closure Policy.⁹ It is not likely that the groundwater plume beneath the landfill could migrate onto the upgradient project site. Nevertheless, the separation distance between groundwater and the ground surface would be 20 feet bgs or more.

Finally, a calculation was conducted to determine the potential vapor intrusion risk at the project site, if groundwater containing TPH as diesel had migrated upgradient and beneath the project site. Given the groundwater flow direction and gradient at the former landfill site, this is highly unlikely that groundwater would flow upgradient. The calculations are provided in the attached spreadsheet. The predicted indoor air concentrations for residents based on TPH as diesel in groundwater are calculated to be 5.6 to 5.1 ug/m³. The Environmental Screening Levels for aliphatic hydrocarbons for residential use range from 100 to 420 ug/m³, and the exposure is non-carcinogenic.¹⁰ Therefore, in the highly unlikely event that groundwater migrated beneath the project site, it would not result in any potential health risk to residential occupants.

CONCLUSIONS

Based on the available data and evaluation provided above, it is PlaceWorks opinion that the potential for vapor intrusion from the former Roberts Avenue Landfill onto the project site is not likely and a Phase II investigation is not necessary.

- Methane concentrations have not been detected at the former landfill since 2010. Also, the former landfill has an active and passive methane barrier and venting

⁹ State Water Resources Control Board (SWRCB), 2012. Low-Threat Underground Storage Tank Case Closure Policy.

¹⁰ San Francisco Regional Water Quality Control Board, 2024. Regional Screening Level (RSL), Resident Ambient Air Table.

system beneath the parking lot and buildings on the site which would collect any methane vapors and prevent off-site migration.

- The groundwater flow direction and gradient at the landfill is to the west-southwest toward Coyote Creek and the project site is upgradient from this landfill. Therefore, the potential for groundwater migration onto the project site is negligible. Also, no VOCs have been detected in groundwater and therefore it can be assumed that VOCs are not present at the landfill in concentrations that would result in a vapor intrusion risk to surrounding properties.
- Lateral and vertical separation zones for petroleum vapors are 30 feet and 5 feet, respectively. Since the nearest proposed building at the project site is more than 70 feet from the landfill and the depth to groundwater is 20 feet bgs, the vapor intrusion risk is negligible.
- The primary contaminant found in groundwater at the landfill is TPH as diesel, which has very low volatility. An evaluation was performed that shows that potential indoor concentrations if a building were constructed above the impacted groundwater would be much less than the concentrations that would result in a vapor intrusion issue or health risk to occupants.
- The Story Road Landfill/Martin Park Landfill, approximately 900 feet northwest of the Roberts Avenue Landfill, has a similar site history. This landfill also reported high concentrations of TPH as diesel in groundwater but no significant levels of VOCs in soil matrix samples. Therefore, it is unlikely that vapor migration is an issue at this site or the Roberts Avenue Landfill site.

Based on a review of available information presented herein, it is PlaceWorks opinion that vapor intrusion would not be an issue at the proposed project site and a Phase II ESA is not warranted at this time.

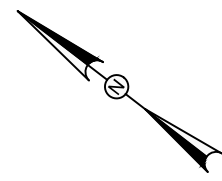
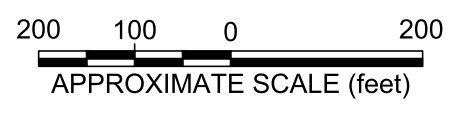
Cathleen Fitzgerald, D.Env., P.E.
Senior Engineer





LEGEND

- MW-7 GROUNDWATER MONITORING WELL
- PZ-1 PIEZOMETER
- MW-1 DESTROYED GROUNDWATER MONITORING WELL
- PARCEL LINE
- APPROXIMATE PROPERTY BOUNDARY



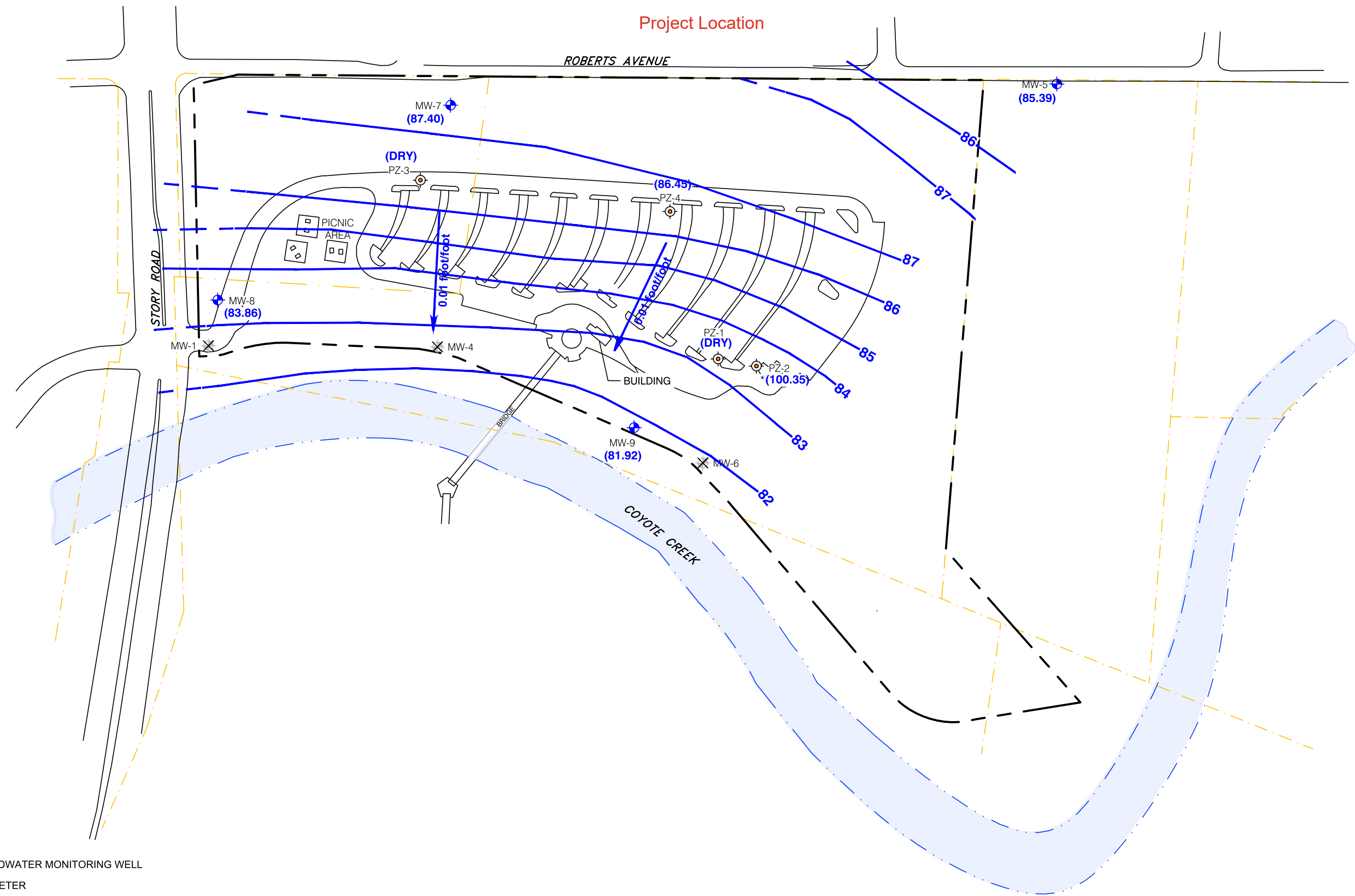
REFERENCE:
 BASE MAP PROVIDED BY AEI CONSULTANTS, DATED 05/2019

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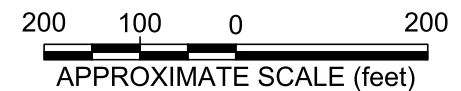
PROJECT:	24003491	GENERALIZED SITE PLAN	FIGURE
DRAWN BY:	JDS		
CHECKED BY:	HP	FORMER ROBERTS AVENUE LANDFILL SAN JOSE, CALIFORNIA	2
DATE:	01/2025		
REVISED:	-		

Project Location



LEGEND

- MW-7 GROUNDWATER MONITORING WELL
- PZ-1 PIEZOMETER
- MW-1 DESTROYED GROUNDWATER MONITORING WELL
- PARCEL LINE
- APPROXIMATE PROPERTY BOUNDARY
- (88.86) GROUNDWATER ELEVATION
- 87 INFERRED GROUNDWATER CONTOUR (FEET)
CONTOUR INTERVAL = 1 FOOT
- 0.03 foot/foot APPARENT GROUNDWATER FLOW DIRECTION



NOTE:
GROUNDWATER LEVELS MEASURED ON DECEMBER 3, 2024
*PZ-2 GROUNDWATER ELEVATION IS AN OUTLIER, AND THEREFORE IS EXCLUDED FROM GROUNDWATER CONTOUR MAP

REFERENCE:
BASE MAP PROVIDED BY AEI CONSULTANTS, DATED 05/2019



PROJECT:	24003491
DRAWN BY:	JDS
CHECKED BY:	HP
DATE:	01/2025
REVISED:	-

GROUNDWATER POTENTIOMETRIC SURFACE MAP - DECEMBER 3, 2024	
FORMER ROBERTS AVENUE LANDFILL SAN JOSE, CALIFORNIA	

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VAPOR INTRUSION CALCULATIONS

Groundwater as Line of Evidence to Evaluate Vapor Intrusion Risk
 DTSC, 2023. Final Draft Supplemental Guidance: Screening and Evaluating Vapor Intrusion

1. Equilibrium Vapor Concentration in Groundwater

Equation: $C_{\text{vapor-GW}} = C_{\text{GW}} \times H \times (1,000\text{L/m}^3)$

where $C_{\text{vapor-GW}}$ = Vapor concentration in equilibrium with groundwater in ug/m^3
 C_{GW} = Groundwater concentration in ug/l
 H = Henry's constant (unitless) = 0.14 for aliphatic hydrocarbons (C9-C16)

2. Indoor Air Concentration

Equation: $C_{\text{IA}} = C_{\text{vapor-GW}} \times \text{AF}_{\text{GW}}$
 C_{IA} = Indoor air concentration in ug/m^3
 $C_{\text{vapor-GW}}$ = Vapor concentration in equilibrium with groundwater in ug/m^3
 AF_{GW} = attenuation factor = 0.001 or 0.0005 if laterally continuous, fine-grained vadose zone is present

Latest concentration of groundwater at wells nearest to project site

MW-5	40 ug/l	TPH as diesel	11/16/2023
MW-7	44 ug/l	TPH as diesel	12/3/2024

$C_{\text{vapor-GW}}$ = Vapor concentration in equilibrium with groundwater in ug/m^3

MW-5	5600 ug/m^3
MW-7	6160 ug/m^3

C_{IA} = Indoor air concentration in ug/m^3	Environmental Screening Level (ESL) - TPH	Indoor Air Concentration Exceeds ESL?
MW-5	Aliphatic - Low 420 ug/m^3	No
MW-7	Aliphatic - Medium 100 ug/m^3	No

