Geo-Logic ASSOCIATES

December 17, 2025

Ms. Kate Logan
Chiquita Canyon Landfill
29201 Henry Mayo Drive
Castaic, California 91384

COMPREHENSIVE GLOBAL STABILITY STUDY WORK PLAN
CHIQUITA CANYON LANDFILL
CASTAIC, CALIFORNIA

Dear Ms. Logan:

This Comprehensive Global Stability Study Work Plan (Work Plan) was prepared by Geo-Logic Associates, Inc. (GLA) to address the Department of Toxic Substances Control (DTSC) October 15, 2025 directive that Chiquita Canyon, LLC (Chiquita) complete an analysis of "*global slope stability modeling [sic] identifying which slopes are most likely to be vulnerable to instability from the SET event and the criteria used for the analysis*," including "*an analysis of global slope stability that is inclusive of the recent placement of Tank Farm 13 at the toe of the CCL main canyon slope in Cell 8B (on top of existing waste that can be consumed by the SET event), and when the Tank Farm 13 is no longer located in Cell 8B, how this will affect slope stability*." The DTSC directive was apparently informed by the California Department of Recycling and Recovery's (CalRecycle) slope stability work plan recommendation in its September 12, 2025 letter to DTSC that states:

> *The CCL should complete a comprehensive global stability study for areas where critical infrastructure is located (e.g., temporary Tank Farm 13 located in Cell 8B) assuming the reaction encompasses the entire waste management unit. The CCL's consultant GLA, in a presentation to USEPA in 2024, indicating that if the reaction expanded to the interface of Module 4/5, certain slope stability factors start dropping below the acceptable factor of safety.*[1]

[1] As described in Chiquita's November 21, 2025 response to DTSC's October 15, 2025 correspondence, CalRecycle's comment did not accurately represent the information presented in the October 2024 presentation to the USEPA. CalRecycle also apparently did not consider information in the December 9, 2024 GLA "Information to Address Regulatory Agency Western and Southern Slope Stability Evaluation Comments" report that presented analyses using considerably more information than the analyses that were discussed at the October 2024 meeting. These analyses extended the reaction area to the boundary of Module 4 and Module 5, and the results showed acceptable static safety factors and seismic displacements for all conditions that were analyzed.

PURPOSE OF WORK PLAN

The purpose of this Work Plan is to address the DTSC requirement to complete static and seismic stability analyses of global stability that is inclusive of the Tank Farm 13 area and the CalRecycle recommendation to address areas where critical infrastructure is located. As described in more detail below, the analyses will be based on GLA's understanding of previous and current site conditions, site observations, available site data, and previous stability analyses performed for different phases of construction at the Chiquita Canyon Landfill (the Landfill). The analyses will also address stability of existing alternatives and alternatives that may be proposed in response to DTSC's October 15, 2025 letter.

METHODS OF ANALYSIS

Basis of Analysis

Stability analyses will be based on parameter sets that are realistic, internally consistent, and supported by observed site conditions and accepted engineering principles. Parameters will not be selected in isolation or adjusted solely to satisfy prescriptive or outcome-driven expectations. Internal consistency is essential: if one assumption is adopted, the implications of that assumption must also be carried through the analysis. Selective or isolated conservatism that is not physically consistent with other adopted parameters does not provide meaningful insight into system behavior and will therefore be avoided.

In this context, GLA will evaluate the CalRecycle recommendation for GLA to assume that the reaction encompasses the entire waste management unit. Based on available site data, field observations, and operational history, there is no credible evidence indicating that this condition is present or reasonably likely to occur. Nonetheless, supplemental analyses will be performed that explicitly consider this specified condition. The significance of these results will be evaluated relative to observed site behavior, site history, and the internal consistency of the adopted assumptions. Where outcomes differ materially from analyses based on realistic, site-supported parameters, those differences will be clearly identified and attributed to the controlling assumptions rather than hypothetical conditions that are not reasonably foreseeable.

Analytical Methods

Static safety factors and yield accelerations will be calculated using the Morgenstern and Price (1965) limit equilibrium method as implemented by the computer program

SLIDE2.[2] The Morgenstern-Price method satisfies force and moment equilibrium and the interslice function that returns the lowest static safety factor will be used for the analyses.[3] The yield acceleration is the horizontal seismic load that results in a safety factor of 1 for the slope being analyzed. Search routines that span the entire potential sliding surface being analyzed will be used to identify the surface(s) with the lowest static safety factor. Both circular and non-circular sliding surfaces will be considered, although previous analyses have shown that non-circular surfaces have relatively lower safety factors.

Consistent with previous analyses, seismic displacements will be calculated using the Bray and Travasarou (2007) procedure based on the magnitudes and bedrock spectral accelerations associated with the applicable maximum credible earthquakes (MCEs) associated with Holocene-active faults within 50 km of the Landfill.[4] This procedure is based on a Newmark sliding block analogy to estimate permanent seismic displacements in waste structures resulting from earthquake-induced ground motions. The calculated seismic displacement depends primarily on the ground motion's spectral acceleration at the degraded period of the structure and the structure's yield coefficient and fundamental period. Consistent with the above-referenced GLA December 9, 2024 report, the deformations will be calculated for the MCEs and bedrock accelerations on the Holser, San Gabriel, and San Andreas faults.

Material Properties for Analysis

The following material properties that were previously used in the GLA December 9, 2024 "Information to Address Regulatory Agency Western and Southern Slope Stability Evaluation Comments" report will be used for the analyses:

[2] Morgenstern, N.R. and V.E. Price, 1965, The Analysis of the Stability of General Slip Surfaces; Geotechnique, Volume 15, Issue 1, March 1965, pp. 79-93.

[3] As discussed during the October 23, 2024 meeting referenced in footnote 1, sensitivity analyses show that the difference between safety factors calculated using the four different Morgenstern-Price interslice functions result in a maximum differential of 0.02, which is insignificant within the context of these evaluations.

[4] Bray, J.D., and Travasarou, Thalia, 2007, Simplified Procedure for Estimating Earthquake-Induced Deviatoric Slope Displacements: Journal of Geotechnical and Geoenvironmental Engineering, v. 133, p. 381-392. Dr. Stark concurred with this method of analysis during the October 23, 2024 meeting.

- **Degraded Municipal Solid Waste (MSW) Shear Strength**. The shear strength properties for degraded MSW that have been recommended by Dr. Timothy Stark will be used for analysis.[5]
- **Displaced Unaffected (or Non-Degraded) MSW Shear Strength**. The July 7, 2024 Stark Memo-recommended shear strength will be used for analysis.
- **In-Place and Unaffected (or Non-Degraded) MSW Shear Strength**. The Kavazanjian et al. (2013) MSW shear strength will be assumed for MSW outside of the reaction area that has not been affected by movement.[6]
- **Liner Shear Strength**. The July 7, 2024 Stark Memo-recommended residual shear strength will be assumed for slope liners. Large displacement shear strengths will be used for liners outside the limits of the reaction.

Leachate and Landfill Gas Pressures

Leachate and landfill gas (LFG) pressures within municipal solid waste landfills are inherently laterally and vertically discontinuous due to heterogeneous waste placement, intermittent low-permeability layers, preferential flow paths, and active gas extraction. Accordingly, stability analyses necessarily rely on simplified, representative pressure surfaces that are intended to reasonably bound site conditions rather than replicate localized, transient features.

The approximate leachate surface(s) used in the analyzed cross sections will be developed based on the most recent leachate elevation data, including observations made during drilling, liquid levels measured in LFG wells, and estimates derived from pressure transducers where available. These data will be interpreted in the context of known site stratigraphy and operational history to estimate representative leachate pressure conditions.

LFG pressures will be estimated based on relevant field observations, including measured pressure heads in LFG wells and wellhead pressure measurements, supplemented as appropriate by indirect indicators such as drilling observations, gas system performance, and observed pressure dissipation behavior. Where explicit

[5] Stark, Timothy D., 2024, Review Comments on May 7, 2024 GLA Report on West and North Slope Stability Analysis Update for Chiquita Canyon Landfill; memorandum to Weston Solutions, July 7, 2024. Although this memorandum is dated July 7, 2024, CalRecycle indicates it did not receive the report until August 21. CalRecycle transmitted the memorandum to the Los Angeles County Department of Public Health on September 4, 2024 and it was not provided to GLA for review until after this date.

[6] Kavazanjian, E., Matasovic, N. and R.C. Bachus, 2013, 11TH Peck Lecture: Predesign Geotechnical Investigation for the OII Superfund Site Landfill; Journal of Geotechnical and Geoenvironmental Engineering, ASCE, November 2013.

subsurface gas pressure measurements are limited, LFG pressure effects will be approximated by proportionally increasing the representative leachate surface(s) to reflect equivalent pressure heads acting along the potential failure surface.

WORK PLAN COMPONENTS

Data Collection and Review

The objective of this task will be to collect and review site data collected since the last stability evaluations were completed in the fourth quarter of 2024 and to use that information to identify representative cross sections and stability models. Data sources will include (but not be limited to):

- Current site topography based on the most recent (2025) Propeller aerial surveys. Earlier site topography will also be reviewed and incorporated if judged to be relevant to the analyses.
- The results of surface crack and fissure mapping performed in 2025.
- 2025 leachate removal information.
- 2025 leachate level measurements.
- 2025 LFG monitoring well data.
- 2025 temperature probe data.
- Relevant design and construction information available for Tank Farm 13.
- Landfill containment system information including material property data for the analyses.

Cross Sections, Material Properties, and Pressures

The information will be reviewed, compiled, and used to identify representative cross sections for analysis. Based on current site understanding, one or more east-to-west cross sections will be identified to evaluate stability of the western slope, one or more north-to-south cross sections will be identified to evaluate stability of the northern slope, and two or more cross sections will be identified to evaluate the southern slope of the landfill, including Tank Farm 13. The section locations will be selected to represent the most critical combinations of slope height, slope inclination, critical infrastructure, material property variation, and pressure conditions. The subsurface materials along each cross section will be evaluated based on the available data and fluid levels incorporated in the analyses will be estimated as summarized above. As part of this task, sequential topographic data, surface fissure and cracking mapping, and site

observations regarding leachate seepage will be used to identify zones of previous instability, if any.[7]

Documentation and Recommendations

The results of the analyses will be documented in a report that will summarize the data used for the analyses and the analysis results. Relevant data, site information, and analysis output will be appended to the report. Principal uncertainties associated with the analyses will be identified, and if warranted, the report will include recommendations for additional investigations to assess subsurface MSW properties, fluid levels, internal pressures, and/or short-term stabilization measures. The final report will be signed and stamped by two licensed GLA professionals.

TIMELINE

An approximate timeline for each of the associated tasks is shown in the attached schedule. This schedule assumes a four-week DTSC Work Plan review and approval period. Under this timeline, the analysis report would be submitted to DTSC by March 11, 2026, assuming DTSC provides approval within that four weeks. A shorter or longer DTSC Work Plan review and approval period will shift the report submittal date accordingly. This timeline is approximate and may change based on other factors or unanticipated circumstances.

Please contact the undersigned at (415) 699-8073 if you have questions or need additional information.

Very truly yours,

Geo-Logic Associates, Inc.

Richard A. Mitchell, PG, CEG
Principal Engineering Geologist

[7] If reasonably well-characterized, zones of instability or previous sliding, if any, can be used with other site information to assess subsurface stratigraphy and possible zones of degraded MSW, the distribution of subsurface fluids, and to back-calculate shear strengths.

ID	Task Name	Start	Finish	Duration
1	WORK PLAN SUBMITTAL	12/17/2025	12/17/2025	0d
2	AGENCY REVIEW AND APPROVAL	12/17/2025	1/13/2026	20d
3	DATA REVIEW AND EVALUATION	1/14/2026	2/3/2026	15d
4	IDENTIFY CROSS SECTIONS AND BUILD MODEL	2/4/2026	2/17/2026	10d
5	RUN ANALYSES AND SCENARIOS	2/18/2026	2/24/2026	5d
6	PREPARE DRAFT REPORT	2/25/2026	3/3/2026	5d
7	INTERNAL REVIEW	3/4/2026	3/10/2026	5d
8	SUBMIT REPORT	3/11/2026	3/11/2026	0d