INFORME DEL ANÁLISIS INTEGRAL DE LA ESTABILIDAD GLOBAL
Vertedero de Chiquita Canyon,
Castaic, California

SEPTIEMBRE DE 2026
PROYECTO No. RM22.1077.00

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Acrónimos

CCL	Vertedero de Chiquita Canyon
CCR	Código de Regulaciones de California
CGS	Instituto Geológico de California
DTSC	Departamento de Control de Sustancias Tóxicas
ETLF	Evento de Vertedero de Temperatura Elevada
GLA	Geo-Logic Associates
GMM	Modelo de Movimiento de Suelo
HDPE	Polietileno de Alta Densidad
LARWQCB	Junta Regional de Control de Calidad del Agua de Los Ángeles
LCRS	Sistema de Recolección y Remoción de Lixiviados
LEA	Agencia Local de Cumplimiento (Departamento de Salud Pública del Condado de Los Ángeles)
LFG	Gas de Vertedero
M	Magnitud de Momento
MPE	Terremoto Máximo Probable
MSE	Tierra Estabilizada Mecánicamente
MSW	Desechos Sólidos Municipales
PGA	Aceleración Pico del Suelo
RTFA	RT Frankian and Associates
SCAQMD	Distrito de Gestión de la Calidad del Aire de la Costa Sur de California
SCS	SCS Engineers
TT	Tetra Tech
USEPA	Agencia de Protección Ambiental de Estados Unidos
USGS	Servicio Geológico de Estados Unidos
WDRs	Requisitos de Descarga de Desechos

1.0 INTRODUCCIÓN

Este Informe sobre el Análisis Integral de la Estabilidad Global (el Informe) fue elaborado por Geo-Logic Associates, Inc. (GLA) para resumir los resultados de los Análisis Integrales de la Estabilidad Global que se completaron para tratar la directiva del Departamento de Control de Sustancias Tóxicas (DTSC) del 15 de octubre de 2025 que indica que Chiquita Canyon, LLC (Chiquita) debe completar un análisis de la *"estabilidad global de la pendiente modelando [sic] identificando qué pendientes tienen más probabilidades de ser vulnerables a la inestabilidad por el evento SET y los criterios utilizados para el análisis", que incluya "un análisis de la estabilidad global de la pendiente que incluya la reciente colocación del Parque de Tanques 13 en la base de la pendiente del cañón principal de CCL en la Celda 8B (sobre los desechos existentes que pueden ser consumidos por el evento SET) y cuando el Parque de Tanques 13 ya no esté ubicado en la Celda 8B, cómo esto afectará la estabilidad de la pendiente".* Los análisis descritos en este informe se basaron en esta directiva y en los Planes de Trabajo y en los acuerdos de análisis que se describen a continuación.

1.1 Resumen de los Hallazgos

GLA completó análisis integrales de estabilidad estática y sísmica de pendientes representativas oeste, norte, este y sur del Vertedero de Chiquita Canyon, utilizando las condiciones actualizadas del sitio, los datos de los monitoreos, las propiedades de los materiales y la información sobre peligros sísmicos. Los análisis también evaluaron el apuntalamiento propuesto de la pendiente oeste, la aplicación de sobrecarga asociada al parque de tanques de lixiviados sur y los efectos de una condición de presión interna calculada retroactivamente, solicitada por la agencia. Los hallazgos principales se resumen a continuación.

Deformación de la Pendiente Oeste. La revisión de los datos de los estudios topográficos y las observaciones del sitio indican que la deformación a lo largo de la pendiente oeste está asociada espacialmente a un área de asentamiento más amplia dentro de la zona centro-oeste del vertedero. El patrón observado es más consistente con una deformación de la masa de desechos generada por asentamiento y dependiente del tiempo que con el movimiento de una masa coherente a lo largo de una superficie de falla traslacional o rotacional. No se ha identificado ninguna escarpa principal definida u otro límite superior bien definido de una masa desplazada. Además, la parte superior del sistema de revestimientos de la base cerca del pie oeste ha estado expuesta durante tres actividades de construcción separadas sin desplazamiento, distorsión u otra evidencia de deformación observable a lo largo del sistema de contención inferior. Estas observaciones no descartan un cizallamiento localizado dentro de la masa de desechos o en el sistema de revestimiento, pero no proporcionan evidencia de un mecanismo de falla global coherente en la pendiente.

Condiciones de los Lixiviados, del Gas de Vertedero (LFG) y de la Temperatura. Las elevaciones de lixiviados medidas son localmente sustanciales dentro del vertedero al oeste; sin embargo, las superficies interpretadas representan interpolación entre puntos de monitoreo discretos dentro de los desechos heterogéneos y no deben ser interpretadas como superficies freáticas convencionales.

Los monitoreos del LFG indican que el vertedero se mantiene principalmente bajo presión negativa y que las recientes presiones positivas son aisladas y no son continuas lateralmente. Para los análisis de estabilidad, la superficie de lixiviados medida se aumentó de forma conservadora en 5 pies para tener en cuenta una posible presión positiva del LFG, y se asume que los desechos que están debajo de esta superficie de presión combinada están totalmente saturados con presión hidrostática que se extiende hasta el sistema de recolección y remoción de lixiviados (LCRS). Las temperaturas elevadas ocurren localmente dentro de los desechos, pero los monitoreos disponibles indican una sustancial variabilidad lateral y vertical y temperaturas en descenso hacia la base del vertedero. La información disponible no proporciona una base técnica para aplicar una reducción generalizada relacionada con la temperatura a las resistencias al corte de la interfaz del revestimiento en todo el vertedero.

Hipótesis del Análisis. Los análisis incorporan hipótesis conservadoras previstas para evitar exagerar la estabilidad. Se asignó el perfil de la resistencia al corte de los desechos sólidos municipales (MSW) degradados recomendado por el Dr. Stark en toda la masa de desechos, aunque las observaciones del campo indican que hay desechos degradados en zonas discretas y que partes sustanciales de los desechos retienen una mayor resistencia al corte. Se utilizó en los análisis la resistencia al corte crítica de la interfaz del revestimiento que aplica a cada parte del vertedero. Los análisis estáticos y pseudoestáticos (es decir, de aceleración de fluencia) consideraron superficies de fallas tanto circulares como no circulares, con las búsquedas de aceleración de fluencia restringidas para ajustarse sustancialmente a las superficies de fallas estáticas mínimas, al mismo tiempo permitiendo una variación limitada para identificar superficies de poca aceleración de fluencia físicamente razonables.

Estabilidad bajo las Condiciones Representativas. Los análisis indican una estabilidad estática aceptable y un desplazamiento sísmico estimado generalmente limitado para las pendientes evaluadas. Los factores de seguridad estática existentes en la pendiente oeste varían de aproximadamente 1.4 a 2.0; la construcción del apuntalamiento propuesto aumenta estos valores a aproximadamente 1.8 a 2.9, con desplazamientos sísmicos estimados de aproximadamente 1 a 4 pulgadas. Los factores de seguridad estática de la pendiente norte varían de aproximadamente 1.9 a 4.1 y los factores de seguridad de la pendiente del este son de aproximadamente 2.3 a 2.6. Las aceleraciones de fluencia de las dos secciones del norte y ambas secciones del este exceden la mitad de la aceleración pico del suelo (PGA) del lecho de roca correspondiente, de forma que no se justificaban los cálculos del desplazamiento sísmico. Los factores de seguridad estática de la pendiente sur varían de aproximadamente 1.5 a 1.8, con desplazamientos sísmicos estimados de aproximadamente 3 a 6 pulgadas. La sobrecarga asociada al parque de tanques de lixiviados básicamente no tiene ningún efecto en la estabilidad calculada en las pendientes del sur.

Retroanálisis y Evaluación de la Sensibilidad. Por indicación de la agencia, se realizó un retroanálisis para estimar el aumento en la superficie de presión interna medida requerida para reducir el factor de seguridad estática en un corte transversal representativo al oeste, a aproximadamente 1.0. Los resultados del análisis indicaron que la superficie de presión combinada debía aumentarse aproximadamente 32 pies por encima de la superficie de lixiviados medida bajo la condición seleccionada sin carga hidráulica sobre el revestimiento. Como no se ha identificado ninguna superficie de falla discreta y no se conocen de forma independiente la geometría de la falla, la resistencia al corte de los MSW ni las condiciones de presión interna, el retroanálisis es altamente no único y la superficie de presión resultante no debe ser interpretada como una condición de campo reconstruida. No obstante, aplicar el aumento de presión calculado retroactivamente a las otras secciones analizadas proporciona una evaluación conservadora de la sensibilidad del tipo "qué ocurriría si". Como se prevé, los factores de seguridad calculados y las aceleraciones de fluencia se reducen; sin embargo, ninguna de las pendientes evaluadas tiene un factor de seguridad estática calculado por debajo de 1.0 y los factores de seguridad calculados son de aproximadamente 1.2 o más. Por lo tanto, incluso bajo esta situación de presión impuesta, los análisis no indican una condición de pendiente inestable.

En general, los análisis no identifican una inestabilidad estática global para ninguna de las pendientes representativas del vertedero evaluadas. El apuntalamiento propuesto de la pendiente oeste proporciona una mejora sustancial en la estabilidad de la pendiente oeste, el parque de tanques de lixiviados del sur no afecta la estabilidad materialmente y los desplazamientos sísmicos calculados bajo condiciones representativas son limitados. Los resultados son consistentes con las observaciones disponibles en el sitio, que indican un amplio asentamiento y deformación de la masa de residuos, pero no proporcionan evidencia de movimiento a lo largo de una superficie de falla global discreta.

1.2 Antecedentes del Plan de Trabajo

1.2.1 Plan de Trabajo Original

GLA elaboró un Plan de Trabajo en diciembre de 2025 para describir los medios y los métodos para tratar los requerimientos de análisis de estabilidad del DTSC del 15 de octubre de 2025 resumidos arriba. Como se describe en el Plan de Trabajo de diciembre de 2025, los análisis se basarían en la comprensión de GLA de las condiciones del sitio previas y actuales, en las observaciones del sitio, en los datos disponibles del sitio y en los análisis de la estabilidad previos realizados para fases diferentes de la construcción en el Vertedero de Chiquita Canyon. Los análisis también tratarían la estabilidad de las alternativas existentes y alternativas que puedan proponerse en respuesta a la carta del DTSC del 15 de octubre de 2025.

1.2.2 Comentarios del DTSC sobre el Plan de Trabajo

El 23 de febrero de 2026, el DTSC proporcionó "*comentarios y recomendaciones a ser incorporados en un plan de trabajo del estudio de estabilidad global revisado para obtener la aprobación del DTSC".*

La correspondencia del DTSC adjuntaba una carta de CalRecycle que incluía otros comentarios y recomendaciones y el DTSC indicó que *"Todos estos comentarios deben tratarse para que el DTSC apruebe el plan de trabajo".* El 6 de marzo de 2026, Chiquita recibió otros comentarios sobre el Plan de Trabajo del Departamento de Salud Pública del Condado de Los Ángeles que actúa como Agencia de Cumplimiento Local (LEA) que fueron idénticos a los comentarios de CalRecycle.

1.2.3 Plan de Trabajo Revisado

El 13 de marzo de 2026, GLA elaboró un Plan de Trabajo Revisado sobre el Estudio Integral de la Estabilidad de la Pendiente (el Plan de Trabajo Revisado) que trataba los comentarios del DTSC, de CalRecycle y de la LEA. El propósito del Plan de Trabajo Revisado fue tratar el requerimiento del DTSC de completar análisis de la estabilidad estática y sísmica de la estabilidad global que incluye la zona del Parque de Tanques 13 y la recomendación de CalRecycle de tratar áreas donde se encuentra la infraestructura crítica. Según los comentarios de CalRecycle, el Plan de Trabajo Revisado agregaba una evaluación de las pendientes del este del vertedero además de las pendientes del norte, del oeste, del sur y del Parque de Tanques 13. El Plan de Trabajo Revisado se incluye en el Apéndice A-1.

1.2.4 Comentarios Regulatorios Adicionales y Respuesta de Chiquita

El 6 de mayo de 2026, la LEA aprobó condicionalmente el Plan de Trabajo Revisado, sujeto a la instalación de piezómetros, a la implementación de un sistema de detección de movimiento de las pendientes en tiempo real, a la remoción continua de lixiviados y gases y a la presentación de una respuesta escrita que trate los comentarios del Dr. Timothy Stark que estaban en una carta anexa a la correspondencia de la LEA. La respuesta a la carta de la LEA se incluye en el Apéndice A-2.

1.2.5 Reunión por Video del 1 de julio de 2026 y Posterior Transmisión de Datos

El 1 de julio de 2026, Chiquita y representantes del DTSC, de la LEA, de CalRecycle, de la Junta Regional de Control de Calidad del Agua de Los Ángeles (LARWQCB) y el Dr. Stark participaron en una reunión por video para analizar los datos disponibles y previstos para su incorporación en los análisis. Durante esta reunión, se acordó que GLA compilaría la información principal que sería incorporada al análisis y la enviaría a las agencias para su revisión. Esta información se compiló y se presentó el 17 de julio de 2026.

1.2.6 Reunión por Video del 14 de agosto de 2026 y Acuerdos

El 14 de agosto de 2026, Chiquita y representantes del DTSC, de la LEA, de CalRecycle, de la LARWQCB y el Dr. Stark participaron en otra reunión por video para conversar sobre técnicas analíticas específicas y sobre las ubicaciones de los cortes transversales que las agencias creían que eran importantes para el análisis. Estos análisis y secciones adicionales incluyeron:

Se realizará un análisis inverso o retroanálisis para estimar la magnitud de una superficie de presión combinada de lixiviados y LFG que dé como resultado un factor de seguridad estática levemente mayor a 1.0. La superficie de presión resultante después se aplicaría a las pendientes del este como parte de los análisis "qué ocurriría si". GLA destacó que como no se conocen la geometría de cualquier superficie de posible falla, la resistencia al corte de los residuos o la magnitud y distribución real de presiones internas de forma independiente, el retroanálisis es altamente no único.[1] El análisis, por lo tanto, no puede determinar cuál de estas combinaciones, si es que alguna, representa las condiciones reales del campo. Por consiguiente, la superficie de presión derivada de los análisis no puede considerarse una reconstrucción única, ni siquiera necesariamente una estimación razonable, de condiciones de presiones reales en la subsuperficie. La opinión de GLA es que la superficie de presión resultante por lo tanto proporcionará poca información significativa sobre las condiciones reales en la subsuperficie y tendrá una significancia incluso más limitada cuando se aplique a pendientes que tienen geometrías sustancialmente diferentes. De todas formas, GLA aceptó realizar el análisis en cumplimiento con la directiva de la agencia.

Las agencias recomendaron agregar un corte transversal de norte a sur que pase por el frente sur sin apuntalamiento o "abierto" del vertedero. GLA destacó que este corte transversal ya estaba previsto para análisis y sería incluido.

1.3 Propósito y Alcance de los Análisis

El propósito principal de los análisis descritos en este Informe fue realizar un análisis integral de la estabilidad estática y sísmica del vertedero, utilizando información actualizada específica del sitio e incorporando los procedimientos resumidos arriba y descritos en el Plan de Trabajo Revisado. El alcance del trabajo realizado para cumplir con estos objetivos incluyó:

Completar una evaluación de peligros sísmicos actualizada del sitio.

Revisar los datos de los estudios aéreos de Propeller recopilados entre 2022 y 2026 y desarrollar curvas de igual asentamiento y perfiles de asentamiento a lo largo de cortes transversales representativos, para evaluar la magnitud y la distribución espacial de la deformación observada en el vertedero.

Revisar la información del nivel de lixiviados medido desde puntos específicos de monitoreo de elevación y desarrollar perfiles de los niveles de lixiviados para usarlos para caracterizar condiciones representativas de presión de poros en el vertedero.

[1] En otras palabras, un rango indeterminado de combinaciones de presuntas geometrías de las superficies de las fallas, resistencia de los materiales y presiones internas podría producir básicamente el mismo factor de seguridad calculado.

Revisar los datos de las presiones del LFG y los gráficos para evaluar la magnitud y la distribución de las presiones positivas del LFG dentro del vertedero y su posible efecto en la estabilidad de la pendiente.

Revisar los datos de las sondas de temperatura para evaluar la magnitud y la distribución de las temperaturas internas en el vertedero,

Revisar los Planos del Proyecto de Mitigación de la Pendiente Oeste de julio de 2026 para caracterizar la geometría del apuntalamiento del suelo y otras características del diseño relevantes a la estabilidad e incorporar esta información a los análisis de estabilidad de la pendiente oeste.

Identificar cortes transversales representativos para los análisis de estabilidad de las pendientes oeste, norte, este y sur del vertedero.

Revisar la nivelación de la base del vertedero que está disponible y los materiales de los sistemas de contención y otros datos relevantes publicados y específicos del sitio, para seleccionar propiedades de los materiales representativas para los análisis.

Completar análisis de estabilidad de pendiente estática y de deformación sísmica para los cortes transversales representativos.

Excepto por la evaluación de peligros sísmicos actualizada, este informe no reproduce las condiciones geológicas o hidrogeológicas del sitio descritas en informes previos. La geología del sitio está muy bien caracterizada en esos informes y no han ocurrido cambios en las condiciones geológicas que justifiquen repetir esa información para la evaluación actual. De forma similar, hay aguas subterráneas en las profundidades debajo del vertedero que están hidráulicamente separadas de los residuos y del sistema de revestimientos; por lo tanto, las condiciones de las aguas subterráneas no afectan materialmente los análisis de estabilidad aquí presentados. La caracterización geológica e hidrogeológica documentada previamente sigue siendo aplicable y se incorpora como referencia, como corresponde.

2.0 CONDICIONES ACTUALIZADAS SOBRE EL SITIO RELEVANTES A LOS ANÁLISIS

2.1 Asentamiento de la Pendiente y Deformación

Análisis previos y observaciones del sitio indican que la deformación cerca del pie de la pendiente oeste está asociada principalmente a un asentamiento y deformación del vertedero. Para evaluar la magnitud y la distribución espacial de esta deformación, se compararon los estudios topográficos disponibles para períodos seleccionados entre 2022 y abril de 2026. La evaluación se enfocó principalmente en períodos durante los cuales ocurrió poco o nada de rellenado o construcción significativos a lo largo de la pendiente oeste y el pie, de esta manera minimizando la posibilidad de que los cambios operativos en la nivelación oculten la deformación del propio vertedero.

La evaluación incluye tres intervalos de tiempo, como se muestra en los gráficos del asentamiento y la deformación lateral presentados en el Apéndice B:

2022 al cuarto trimestre de 2023 (Apéndice B-1). Este intervalo se extiende desde que comenzaron las inspecciones de GLA del área sobre la pendiente oeste hasta inmediatamente antes de la construcción del primer proyecto de drenaje del pie de la pendiente oeste. Se revisaron los datos para proporcionar contexto histórico, pero no se utilizaron como base para evaluar la deformación porque ocurrió un rellenado importante durante este período, haciendo que resulte difícil distinguir una deformación del vertedero de los cambios operativos en la nivelación.

Fines de 2023 a 2024 (Apéndice B-2). Este intervalo se extiende desde que se completó el primer proyecto de drenaje del pie de la pendiente oeste hasta el inicio del segundo proyecto de drenaje del pie. Hubo un rellenado o construcción relativamente poco significativos a lo largo de la pendiente oeste durante este intervalo; por consiguiente, la comparación de los estudios topográficos disponibles proporciona una indicación más representativo del asentamiento y de la deformación lateral del vertedero.

Fines de 2024 a abril de 2026 (Apéndice B-3). Este intervalo se extiende desde que se completó el segundo proyecto de drenaje del pie de la pendiente oeste hasta abril de 2026 y se basa principalmente en datos topográficos de Propeller con fecha 27 de noviembre de 2024 y 15 de abril de 2026. Al igual que con el intervalo anterior, ocurrió un rellenado poco significativo en la pendiente oeste y no se realizaron actividades de construcción a lo largo del pie que afecten materialmente la comparación topográfica.

La comparación de los datos topográficos de los dos períodos considerados los más representativos de la deformación del vertedero (Apéndices B-2 y B-3) indica una relación consistente entre el asentamiento dentro del vertedero y la deformación a lo largo de la pendiente oeste. La deformación predominante ocurre en un área amplia del vertedero occidental-central y el asentamiento generalmente aumenta hacia adentro desde el perímetro oeste. Este patrón es evidente durante ambos

períodos de evaluación y se hace más pronunciado durante el período entre noviembre de 2024 y abril de 2026.

La deformación observada es más consistente con una deformación de la masa de desechos generada por asentamiento y dependiente del tiempo que con el movimiento de una masa coherente a lo largo de una superficie de falla traslacional o rotacional. Bajo esta interpretación, el asentamiento y la compresión vertical de los residuos están acompañados por una deformación lateral hacia la pendiente oeste que está comparativamente menos confinada. Esta interpretación es consistente con la amplia distribución del asentamiento, la ausencia de una escarpa principal definida u otro límite superior bien definido, abultamientos hacia afuera cerca del pie, inclinación pendiente abajo de los tubos verticales y la deformación variable de la geomembrana a lo largo de la pendiente oeste.[2]

La información disponible no descarta un cizallamiento localizado dentro de la masa de desechos o a lo largo de partes del sistema de revestimientos subyacente ni establece de forma independiente el mecanismo específico en la subsuperficie responsable de la deformación observada. Sin embargo, ni el patrón de la deformación ni las observaciones que se realizaron cuando la pendiente de residuos quedó expuesta durante los proyectos de drenaje del pie proporcionan evidencia de un mecanismo de falla traslacional o rotacional coherente ni definen una superficie de falla discreta. Por ejemplo, la parte superior del sistema de revestimiento de la base cerca de su zanja de anclaje en el pie de la pendiente oeste ha quedado expuesta en tres ocasiones separadas durante las actividades de construcción. Estas exposiciones dieron la oportunidad de observar el sistema de revestimientos directamente en un área donde se podría esperar razonablemente que se manifieste una deformación asociada a una falla que se extienda hasta la base del vertedero. No se identificó ningún desplazamiento, distorsión ni otra evidencia observable durante estas exposiciones que indique deformación a lo largo del sistema de contención del fondo. Aunque estas observaciones no descartan una deformación localizada en otro lugar debajo del vertedero, proporcionan más evidencia de campo de que la deformación observada en la pendiente oeste no está asociada a movimiento de una masa de desechos coherente a lo largo del sistema de contención inferior.

2.2 Superficie de Lixiviados

Se revisaron las elevaciones de lixiviados medidas en puntos de monitoreo específicos dentro de la parte oeste del vertedero para caracterizar las condiciones de los lixiviados para los análisis de la estabilidad. Las elevaciones de lixiviados medidas se resumen en la Tabla 1 y las ubicaciones de los monitoreos y las superficies de lixiviados interpretadas en base a las mediciones del 1 de junio de 2026 se muestran en

[2] La interpretación de las condiciones actuales de la superficie se complica por la cubierta de geomembrana instalada sobre la pendiente oeste a principios de 2025, que puede enmascarar o atenuar las expresiones superficiales de la deformación de los desechos subyacentes. Sin embargo, observaciones repetidas de la pendiente oeste entre 2022 y la instalación de la geomembrana no identificaron escarpa, agrietamiento relacionado con un deslizamiento ni otras características indicativas de movimiento a lo largo de una superficie de falla discreta.

el Apéndice C. Las ubicaciones de los lugares de monitoreo también se muestran en las Figuras 1 y 2 y en los cortes transversales que se muestran en las Figuras 3 a 5. Los datos medidos indican que hay lixiviados en elevaciones sustancialmente por encima de las nivelaciones de la base del vertedero sobre partes del vertedero al oeste y las elevaciones de lixiviados interpretadas generalmente ocurren muy por debajo de la superficie existente en el vertedero. El nivel de lixiviados resultante medido por encima de la nivelación de la base excede localmente los 100 pies y, en partes del interior del vertedero, se encuentra en el orden de los 200 pies o más. Las elevaciones interpretadas generalmente varían gradualmente en todo el vertedero, aunque hay variaciones localizadas aparentes entre diferentes lugares de monitoreo. Los datos también indican que los niveles de lixiviados relativamente más altos se miden en la parte del vertedero que tiene temperaturas elevadas.

Las elevaciones de lixiviados que se muestran en el Apéndice C y en las Figuras 3 a 5 fueron desarrolladas interpolando entre puntos de monitoreo discretos dentro de la masa de residuos heterogénea. Por lo tanto, las superficies resultantes no deben ser interpretadas como superficies de agua subterránea o freáticas convencionales y las elevaciones medidas no necesariamente indican que todo el espesor de los residuos por debajo de las superficies exhibidas está saturado. Más bien, las mediciones representan condiciones hidráulicas en lugares de monitoreo individuales y proporcionan una indicación específica del sitio de las elevaciones a las que ocurren lixiviados dentro del vertedero. La interpretación de estas mediciones requiere que se considere la forma en la que ocurren lixiviados y pasan por los desechos sólidos municipales (MSW), en particular bajo las condiciones atípicas que pueden desarrollarse en áreas afectadas por el evento de temperatura elevada.

2.3 Presión del Biogás

Los datos de la presión del gas de vertedero para el período que corre desde octubre de 2024 hasta junio de 2026 se muestran en el Apéndice D y fueron revisados para evaluar si las presiones positivas del LFG dentro de los residuos podrían afectar materialmente la estabilidad de la pendiente. Los datos de los monitoreos indican que el vertedero se mantuvo predominantemente bajo presión negativa durante todo el período evaluado. Aunque se registraron presiones positivas localizadas durante fines de 2024, principalmente en partes del vertedero al oeste y noroeste, la frecuencia de las mediciones de presión positiva se redujo sustancialmente con el tiempo. Las presiones positivas se registraron en 55 de 635 lugares de monitoreo durante el cuarto trimestre de 2024, comparado con solo 4 de 757 lugares durante el segundo trimestre de 2026. Los monitoreos más recientes, por lo tanto, indican que las presiones positivas del LFG son aisladas y no definen una condición de presión interna lateralmente continua o generalizada.[3]

[3] En base a estos datos, una presión positiva de LFG generalizada no se considera representativa de las condiciones actuales dentro del vertedero en general y de la pendiente oeste específicamente. Podrán ocurrir presiones positivas localizadas intermitentemente dentro de la masa de residuos heterogénea; sin embargo, la información disponible de los monitoreos no indica que estas presiones formen una zona de presión continua de suficiente extensión como para que se justifique su representación como superficie de presión de gas generalizada desestabilizante en los análisis de estabilidad. Como se describe en

2.4 Temperaturas Internas del Vertedero

Se consideraron las temperaturas elevadas asociadas a la zona reactiva al evaluar si se justificaban las reducciones en la resistencia al corte relacionadas con la temperatura en la interfaz del sistema de revestimientos. La Tabla 2 resume las temperaturas medidas en 40 sondas de monitoreo como promedios de las temperaturas máximas diarias registradas desde el 18 de mayo hasta el 17 de junio de 2026. Las temperaturas máximas excedieron los 180 °F en 15 sondas y excedieron los 200 °F en varias sondas y la temperatura máxima localizada más alta, de aproximadamente 260 °F, se registró en TP-23. Estos datos confirman que hay un calentamiento significativo dentro de partes de la masa de residuos. Sin embargo, no indican que haya temperaturas comparables en todo el vertedero o a lo largo de los sistemas de revestimientos subyacentes.

Los resultados de los monitoreos demuestran una sustancial variabilidad lateral y vertical. Como se muestra en las Figuras 1 y 2, las sondas con temperaturas máximas mayores a 180 °F se intercalan con sondas sustancialmente más frías en lugar de distribuirse de manera uniforme por todo el vertedero. Los perfiles de las temperaturas también varían notablemente con la profundidad y no definen una zona de alta temperatura lateralmente continua consistente cerca de la base del vertedero. Aunque hay excursiones localizadas hacia afuera dentro de varios perfiles, la mayoría no exhibe un perfil de temperatura “ensanchado” común bien desarrollado y las profundidades y las elevaciones de la temperatura máxima varían entre diferentes sondas. Colectivamente, estos datos son más consistentes con zonas de calor espacialmente heterogéneas que con condiciones de alta temperatura uniforme en toda la masa de residuos.

La distinción entre la temperatura máxima y promedio de la sonda también es importante. La máxima informada de cada sonda representa la temperatura más alta medida en cualquier profundidad monitoreada y no debe ser interpretada como la temperatura que hay en el fondo de la sonda o en el revestimiento. De las 40 sondas, solo seis (TP-3, TP-11, TP-15, TP-22, TP-23 y TP-33) tuvieron temperaturas promedio mayores a 180 °F. Como se muestra en la Tabla 3, cuatro de estas seis sondas terminan más de 100 pies por encima del revestimiento subyacente más cercano, mientras que TP-3 y TP-23 terminan aproximadamente 33 y 57 pies por encima del revestimiento, respectivamente. Por lo tanto, las ubicaciones que exhiben las temperaturas altas más sostenidas generalmente no proporcionan información directa relacionada con las temperaturas en las interfaces del revestimiento.

Las sondas más profundas proporcionan la información más relevante relacionada con posibles condiciones térmicas cerca del revestimiento inferior. Las instalaciones de las sondas TP-24, TP-27, TP-31, TP-32, TP-36, TP-

la Sección 4 a continuación, la superficie piezométrica utilizada para los análisis aumentó 5 pies en los modelos de estabilidad para los cortes transversales analizados. Este ajuste excede sustancialmente las presiones positivas del LFG observadas en los datos de monitoreo disponibles y proporciona un margen simple y conservador de la presión del gas, sin asumir que las mediciones positivas aisladas representan una condición de presión interna continua.

38 y TP-40 terminan aproximadamente entre 14 y 28 pies por encima del revestimiento más cercano; como el intervalo monitoreado más profundo no siempre coincide con la profundidad de la terminación de la sonda, las mediciones de temperatura reales más profundas son de aproximadamente 14 a 44 pies por encima del revestimiento. Estos perfiles indican consistentemente temperaturas reducidas dentro de los desechos inferiores a medida que se van acercando al revestimiento. En TP-24, la temperatura medida se redujo de aproximadamente 210 °F a los 250 pies por debajo de la superficie (bgs) a aproximadamente 153 °F a los 320 pies bgs. En TP-31, se redujo de aproximadamente 193 °F a los 165 pies bgs a aproximadamente 141 °F a los 280 pies bgs; y en TP-36 se redujo de aproximadamente 172 °F a los 165 pies bgs a aproximadamente 136 °F a los 230 pies bgs. Se midieron reducciones similares en TP-27, TP-32, TP-38 y TP-40. Estos resultados son consistentes con la conclusión del Informe de la Integridad del Revestimiento y de LCRS del Primer Trimestre de 2026 (SCS Engineers, 2026b) que indica que las temperaturas disminuyen dentro de las capas de desechos más bajas y en las proximidades del sistema del revestimiento inferior.

Las temperaturas elevadas pueden afectar potencialmente las propiedades físicas o mecánicas de los materiales geosintéticos, pero la magnitud de cualquier efecto depende del material y de la interfaz en particular, de la temperatura y la duración de la exposición y las condiciones de tensión normal correspondientes. La ocurrencia de temperaturas elevadas dentro de la masa de desechos por sí misma no establece que los geosintéticos subyacentes hayan experimentado temperaturas comparables o que se haya visto afectada negativamente la resistencia al corte de la interfaz del sistema de revestimientos. Las evaluaciones trimestrales que realiza SCS sobre la integridad del revestimiento (SCS Engineers, 2025, 2026a, 2026b) tampoco informan evidencia de que la reacción de temperaturas elevadas haya comprometido la integridad del revestimiento o el sistema de recolección y remoción de lixiviados.

Por consiguiente, los datos disponibles no proporcionan una base técnica para aplicar una reducción de resistencia generalizada, relacionada con la temperatura, por todo el sistema de revestimientos del vertedero. Este tipo de reducción requeriría evidencia de la magnitud y la duración de la exposición a la temperatura en la interfaz del revestimiento en particular a ser evaluada, además de evidencia que indique que la exposición redujo materialmente la resistencia al corte aplicable de la interfaz. Los datos disponibles de los monitoreos, en cambio, indican temperaturas altas localizadas dentro de la masa de residuos, heterogeneidad espacial y vertical sustancial y atenuación térmica hacia la base del vertedero.

3.0 RETROANÁLISIS

3.1 Requerimiento de Retroanálisis

Las agencias reguladoras han indicado que debe realizarse un retroanálisis para estimar una superficie de presión interna para aplicarla en los análisis de estabilidad en diferentes cortes y ubicaciones dentro del vertedero. Es importante reconocer que este análisis no se está realizando en respuesta a una falla de pendiente documentada. No hay evidencia de que haya ocurrido una falla de pendiente en el vertedero. En particular, las observaciones reiteradas en el sitio no han

identificado una escarpa definida, desplazamiento del pie, agrietamiento de la superficie ni otras características que establecerían la presencia o geometría de una superficie de falla de pendiente discreta.

Esta distinción impone limitaciones importantes en el análisis. Un retroanálisis convencional es más defendible donde ocurrió una falla real, donde la geometría de la superficie de la falla puede reconstruirse con razonable confianza y donde el análisis se utiliza para resolver uno o una cantidad limitada de parámetros desconocidos. En el caso actual, no hay una superficie de falla establecida de forma independiente en ningún lugar del vertedero. Además, la resistencia al corte de los MSW es inherentemente variable y no puede establecerse de forma única con la información disponible. Por consiguiente, la geometría de la posible falla, la resistencia al corte de los MSW y las condiciones de presión interna no pueden determinarse todas de forma independiente con un retroanálisis. Un análisis numérico puede identificar combinaciones de resistencias asumidas, la geometría de la falla y la presión que producen un factor de seguridad limitante seleccionado, pero la superficie de presión resultante no es una solución única y no demuestra que existan las condiciones de presión calculadas dentro del vertedero.

Aplican limitaciones similares para transferir una superficie de presión calculada retroactivamente a otras partes del vertedero. La relación entre la presión interna y la estabilidad depende de la geometría y de las condiciones del corte a ser analizado, e incluye el espesor de los desechos, la geometría de la pendiente, la configuración del revestimiento, las condiciones de la cimentación y otros factores específicos del sitio. Por lo tanto, una superficie de presión calculada para producir una condición de estabilidad limitante en un corte transversal no tiene la misma significancia en la estabilidad en otro corte transversal que tenga una geometría sustancialmente diferente. La aplicación directa de una superficie de este tipo en otro lugar asumiría implícitamente que la condición de presión derivada del modelo es lateralmente continua y físicamente aplicable en todo el vertedero, pero ninguno de estos se establece con el retroanálisis. La superficie resultante por lo tanto es considerada más apropiadamente una distribución de presión desestabilizante equivalente asociada a las hipótesis utilizadas en el análisis y no una superficie física reconstruida de presión de lixiviados o de gas de vertedero.

3.2 Procedimiento para el Retroanálisis

De todas formas, se realizó un retroanálisis en cumplimiento con la directiva de la agencia. Para reducir la cantidad de variables independientes lo máximo posible, se incorporaron las siguientes hipótesis en los análisis:

1. La resistencia al corte de los MSW utilizada en el análisis se basa en la resistencia al corte recomendada por el Dr. Stark y su acuerdo en utilizar este valor, en una reunión por video realizada con las agencias el 1 de julio de 2026.

2. Se asumió que la resistencia al corte del sistema de revestimientos de base es igual a 12 grados sin cohesión, que representa una resistencia típica a grandes desplazamientos de una interfaz de geomembrana texturada y geotextil (o geocompuesto).

3. La posible superficie de falla se estimó utilizando el gráfico de deformaciones de 2024–2026 para el Corte F que se presenta en el Apéndice B-3. Se seleccionó esta sección porque proporciona el patrón de deformación mejor definido y menos ambiguo en el sitio.

4. Se identificó una condición de presión interna de referencia utilizando las mediciones de los lixiviados actuales en el sitio, resumidas en la Tabla 1 y las superficies de lixiviados interpretadas, presentadas en el Apéndice C. Utilizando estas hipótesis, se utilizaron rutinas de búsqueda para evaluar posibles superficies de fallas dentro de los límites de búsqueda establecidos desde el patrón de deformación observado en el Corte F (ver el Apéndice E). Después se elevó incrementalmente la superficie de presión de referencia para determinar la condición de presión requerida para reducir el factor de seguridad calculado a aproximadamente 1.04.

3.3 Resultados del Retroanálisis

Los resultados de los análisis están incluidos en el Apéndice E y muestran que el factor de seguridad estática calculado para la condición de referencia era de aproximadamente 1.99 cuando no se había aplicado carga de presión en el sistema de revestimientos y de aproximadamente 1.83 cuando se aplicaba carga de presión al sistema de revestimientos. Los análisis de la sensibilidad indicaron que se necesitaba un aumento de aproximadamente 32 pies para reducir el factor de seguridad calculado a aproximadamente 1.04 para la condición sin carga hidráulica sobre el revestimiento, mientras que se requería un aumento de aproximadamente 24 pies cuando también se aplicaba carga de presión al sistema de revestimiento.[4] El retroanálisis, por lo tanto, indica que se requiere un aumento sustancial en la presión interna equivalente por encima de la condición de referencia para producir la condición de estabilidad limitante especificada en el Corte F. La superficie de presión resultante, calculada retroactivamente, representa la condición de presión requerida por el modelo para alcanzar el factor de seguridad objetivo bajo las hipótesis indicadas; no debe ser interpretada como una condición de presión de campo reconstruida o verificada de forma independiente y no determina de forma independiente las condiciones de presión dentro del vertedero.

[4] Estos resultados son ampliamente autocompensatorios: aplicar carga de presión al revestimiento reduce el factor de seguridad de referencia, pero, por consiguiente, requiere un menor aumento en la superficie de presión para llegar al mismo factor de seguridad objetivo. Por lo tanto, cualquiera de las hipótesis en definitiva produce una condición de presión equivalente calibrada con el mismo criterio de estabilidad limitante.

4.0 CONDICIONES Y MÉTODOS DE ANÁLISIS

4.1 Propiedades de los Materiales Asumidas para el Análisis

4.1.1 Lecho de Roca Subyacente

Se asumió que el lecho de roca que está debajo del vertedero existente y el apuntalamiento tiene una resistencia infinita (es decir, que las superficies de falla no podían pasar por este material). La validez de la hipótesis se verificó realizando análisis complementarios que consideraron la resistencia al corte del lecho de roca recomendada por R.T. Frankian & Associates (RTFA) y que permitieron que la superficie de falla se extendiera por debajo de la base del revestimiento y el apuntalamiento. Ambos conjuntos de análisis llegaron a las mismas superficies de falla críticas y factores de seguridad.

4.1.2 Sistemas de Revestimientos

Los sistemas de revestimiento de la base y de las pendientes varían en todo el vertedero como resultado de los diferentes períodos de desarrollo del vertedero e incluyen combinaciones de mezcla de suelo y bentonita o arcilla compactada, GCL, geomembrana de HDPE, materiales geocompuestos o de drenaje granular, geotextiles y suelo cobertor de protección. Las configuraciones de los revestimientos que aplican a las áreas individuales del vertedero se resumen en la Tabla 4. Se revisaron los datos disponibles de la resistencia al corte de la interfaz para cada configuración de revestimiento, para identificar la capa o interfaz crítica para el análisis de la estabilidad. Las interfaces críticas y los parámetros de la resistencia al corte correspondientes utilizados en los análisis se resumen en la Tabla 5. Los datos disponibles de las pruebas de laboratorio, las evaluaciones de las resistencias al corte históricas y las envolventes de resistencia de respaldo se indican en el Apéndice F. En los análisis de la estabilidad se utilizó la resistencia al corte de la interfaz crítica del revestimiento que aplica a cada parte del vertedero.

4.1.3 Resistencia de los MSW Degradados

Se asumió de forma conservadora que los MSW estaban degradados y que eran lateral y verticalmente continuos en toda la masa de desechos en todos los análisis de estabilidad. Las observaciones específicas del sitio indican que las condiciones reales son sustancialmente más heterogéneas. Por ejemplo, se han observado desechos degradados en zonas discretas, capas y lentes y no como material continuo en toda la pendiente oeste. Además, las excavaciones en los desechos a lo largo del pie oeste con frecuencia permanecieron sin soporte en alturas que exceden los 20 pies y en inclinaciones que se acercan a 0.5H:1V. Aunque estas observaciones no proporcionan una medición cuantitativa de la resistencia al corte de los desechos, proporcionan evidencia cualitativa de que partes sustanciales de los desechos retienen una mayor resistencia al corte de lo que se representaría asumiendo MSW degradados continuamente.

La Figura 6 en el Apéndice F compara el rango de resistencias al corte de los MSW degradados informado en varias publicaciones, el perfil de resistencia de los MSW degradados utilizado en algunas evaluaciones de la estabilidad previas realizadas por GLA y el perfil de resistencia de los MSW degradados recomendado por el Dr. Timothy

Stark en el memorándum del 21 de agosto de 2024 elaborado en nombre de Weston Solutions, Inc., contratista de la EPA. El Dr. Stark confirmó durante la reunión por video celebrada el 1 de julio de 2026 con las agencias que este perfil de resistencia era apropiado. Se asignó el perfil de la resistencia al corte recomendado por Stark, que yace hacia la parte inferior del rango informado de las resistencias al corte de los MSW degradados, en toda la masa de desechos, para los análisis de estabilidad actuales. Este supuesto por lo tanto es conservador porque no considera la mayor resistencia al corte que proporcionarían desechos menos degradados entre las zonas de degradación relativamente pequeñas y discretas que han sido observadas en los registros de perforación de los pozos de LFG y en excavaciones de desechos a lo largo de la pendiente oeste del vertedero.

4.1.4 Relleno de Tierra Compactada

La mayor parte del suelo utilizado para el parque de tanques de lixiviados y para la construcción del apuntalamiento de la pendiente oeste se obtuvo de fuentes de préstamo del propio sitio y es relativamente uniforme, ya que consiste predominantemente de arena relativamente fina y limo con poca arcilla. Para propósitos de los análisis de la estabilidad, se asumió que el peso unitario en el lugar del suelo del apuntalamiento era de 130 lb/pies^3 en base a las 68 pruebas de densidad realizadas en el campo, en suelo tomado del mismo sitio durante la construcción del parque de tanques de lixiviados de la Celda 8B. El relleno del parque de tanques de lixiviados y del apuntalamiento tienen las mismas especificaciones de compactación y la construcción se realizó/se está realizando bajo una observación continua de CQA, con confirmación regular de las relaciones de humedad-densidad y pruebas de densidad en el campo, para verificar que el suelo se coloque y se compacte en cumplimiento con los requerimientos del proyecto.

Para los propósitos del análisis, al relleno de suelo compactado se le asignó una envolvente de esfuerzos efectivos asumida, caracterizada por cero cohesión y un ángulo de fricción de 32 grados. Una representación de la resistencia sin cohesión es consistente con la naturaleza predominantemente friccional del material y evita de forma conservadora basarse en una aparente cohesión que podría resultar de una saturación parcial o estructura del suelo. La uniformidad relativa del material tomado, además de una colocación y compactación controlada bajo el programa del proyecto de CQA, respalda el uso de una sola resistencia al corte representativa para el relleno del apuntalamiento.

4.1.5 Geosintéticos Internos del Apuntalamiento de la Pendiente Oeste

El Detalle 1 del CEC en el Plano C500 del Apéndice G muestra que la pendiente interior del apuntalamiento inferior de la pendiente del oeste será revestida con una geomembrana de HDPE texturada de 80 milésimas de pulgada, colocada sobre relleno de suelo compactado y superpuesta por un geotextil de amortiguación o geocompuesto. Se prevé que la resistencia al corte de esta interfaz se regirá por el contacto del HDPE texturado con el geotextil o del HDPE con el geocompuesto. Para propósitos de los análisis de estabilidad, a esta interfaz se le asignó de forma conservadora una resistencia al corte de gran desplazamiento caracterizada por cero cohesión y un ángulo de fricción de 12 grados. Esta resistencia asumida es relativamente conservadora

pero también es bastante inconsecuente porque este componente tiene entre poco y nada de efecto en la estabilidad global del sistema del apuntalamiento.

4.2 Presión de los Lixiviados y del LFG

4.2.1 Superficie de Lixiviados

Las superficies de lixiviados que se muestran en las Figuras 2 a 5 y en los cortes del Apéndice C fueron desarrolladas interpolando entre puntos de monitoreo discretos para definir una superficie de lixiviados dentro de la masa de residuos heterogénea. Las superficies que se muestran en estas secciones no necesariamente indican que todo el espesor de los MSW debajo de las superficies esté saturado. Esto se debe a que la ocurrencia de lixiviados dentro de los MSW generalmente es discontinua lateral y verticalmente, reflejando un flujo de lixiviados preferencial por vías de acceso relativamente permeables y acumulaciones localizadas o condiciones colgadas sobre los materiales de menor permeabilidad.

Para propósitos de los análisis de estabilidad, se asumió de forma conservadora que los MSW debajo de la superficie de lixiviados interpretada estaban completamente saturados y se asumió de forma conservadora una presión hidrostática completa que se extendía desde el límite hidráulico superior hasta el límite hidráulico inferior en el sistema de recolección y remoción de lixiviados (LCRS). No hay evidencia de que el LCRS deba ser considerado no funcional y no se espera que se desarrolle una carga hidráulica sostenida significativa inmediatamente sobre el revestimiento.[5]

4.2.2 Presión del Gas de Vertedero

Como se indicó arriba, los datos de la presión del LFG para el período que corre desde octubre de 2024 hasta junio de 2026 se muestran en el Apéndice D y fueron revisados para evaluar si las presiones positivas del LFG dentro de los residuos podrían afectar materialmente la estabilidad de la pendiente. Los datos de los monitoreos indican que el vertedero se mantuvo predominantemente bajo presión negativa durante todo el período evaluado. Aunque se registraron presiones positivas localizadas durante fines de 2024, principalmente en partes del vertedero al oeste y noroeste, la frecuencia de las mediciones de presión positiva se redujo sustancialmente con el tiempo.[6] Los monitoreos disponibles indican que las presiones positivas de LFG son aisladas y no definen una condición de presión interna lateralmente continua o generalizada.

[5] Por ejemplo, los datos operativos y de monitoreo del sitio no proporcionan indicios de que el LCRS haya fallado o que las condiciones de temperatura elevada hayan perjudicado materialmente su capacidad de recoger y remover lixiviados. Durante el primer trimestre de 2026, se informa que se removieron aproximadamente entre 0.58 y 0.78 millones de galones de lixiviados por mes a través del colector del LCRS, demostrando una recolección y remoción de lixiviados activa y continua. Además, los monitoreos de las aguas subterráneas no identificaron nuevos impactos significativos a nivel medible en las aguas subterráneas atribuibles al vertedero, no proporcionando ningún indicio de pérdida de contención asociada a una falla del revestimiento o del LCRS.

[6] Por ejemplo, las presiones positivas se registraron en 55 de 635 lugares de monitoreo durante el cuarto trimestre de 2024, comparado con solo 4 de 757 lugares durante el segundo trimestre de 2026.

En base a estos datos, una presión positiva de LFG generalizada no se considera representativa de las condiciones actuales dentro de la pendiente oeste. Podrán ocurrir presiones positivas localizadas intermitentemente dentro de la masa de residuos heterogénea; sin embargo, la información disponible de los monitoreos no indica que estas presiones formen una zona de presión continua de suficiente extensión como para que se justifique su representación como superficie de presión de gas generalizada desestabilizante en los análisis de estabilidad. De todas maneras, para representar de forma conservadora la posible influencia de presiones positivas de LFG significativas en toda la masa de desechos, se aumentó 5 pies la superficie piezométrica que se muestra en el Apéndice C en los modelos de estabilidad, para proporcionar un margen conservador para la posible presión del LFG que pudiera no haber sido capturada en los datos del Apéndice D.

4.2.3 Superficie de Presión Asumida para el Análisis

Las presiones de los lixiviados y del LFG se aproximaron utilizando una superficie de presión combinada continua lateral y verticalmente que es 5 pies más alta que las superficies de lixiviados que se muestran en las Figuras 3 a 5 y en el Apéndice C. Como las superficies de lixiviados que se muestran en las Figuras 3 a 5 y en el Apéndice C solo se extienden hasta los puntos de monitoreo físicos más lejanos en los cortes correspondientes, la superficie de presión de lixiviados/LFG combinada se extendió horizontalmente desde el punto de datos más cercano hasta el frente de la pendiente, para los propósitos del análisis. El apuntalamiento incluye un drenaje de pie a lo largo de la alineación en la base de la pendiente y estará encapsulado por una geomembrana al completarse (ver el Detalle 1 en el Plano C500 en el Apéndice G). Por lo tanto, los análisis asumen que no se acumularán lixiviados en el suelo del apuntalamiento superior y que la precipitación no se infiltrará en el sistema.

4.3 Factores de Seguridad Estática y Aceleraciones de Fluencia

Los factores de seguridad estática y las aceleraciones de fluencia se calcularon utilizando el método de equilibrio de límite de Morgenstern y Price (1965) como se implementa en el programa informático SLIDE2. El método Morgenstern-Price cumple con el equilibrio de fuerza y momento y se utilizó la función entre dovelas de medio seno para los análisis. Los análisis de la sensibilidad indican que la diferencia entre factores de seguridad calculados utilizando las cuatro funciones entre dovelas diferentes de Morgenstern-Price tiene un diferencial máximo de 0.02, que es insignificante dentro del contexto de las evaluaciones que se realizaron. Se utilizaron las rutinas de búsqueda de SLIDE2 para identificar la posible superficie de la falla con el factor de seguridad (SF) más bajo asociado a cada sección. Se evaluaron superficies de fallas tanto circulares como no circulares para cada sección analizada y en todos los casos las superficies de fallas no circulares que interceptaban el revestimiento existente debajo de cada pendiente tuvieron los factores de seguridad más bajos.

Stark e Idries (2025) desaconsejan permitir que continúe una búsqueda automatizada de superficies de falla después de aplicar el coeficiente sísmico porque la búsqueda podría migrar hacia masas de deslizamiento progresivamente más grandes y potencialmente poco realistas, ya que la fuerza inercial aumenta

con la masa. Por lo tanto, ellos recomiendan identificar la superficie crítica de la falla bajo condiciones estáticas, manteniendo fija esa superficie y variando el coeficiente sísmico para determinar la aceleración de fluencia. Esto proporciona una medida de seguridad de utilidad contra superficies de falla pseudoestáticas generadas numéricamente y físicamente irrazonables.

Sin embargo, la superficie mínima del factor de seguridad estática no necesariamente es la superficie que tiene la aceleración de fluencia más baja o que produce el mayor desplazamiento sísmico. Por ejemplo, las pautas de la FHWA (Kavazanjian et al., 2011) reconocen esta distinción y Bray y Macedo (2023) destacan de forma similar que la posible masa deslizante que tiene el factor de seguridad estática más bajo podría no ser la más crítica para el análisis dinámico. Esto es particularmente relevante para el procedimiento Bray–Macedo porque la aceleración de fluencia, la respuesta dinámica y el desplazamiento calculado dependen en parte de la geometría y de las características dinámicas de la posible masa deslizante.

Para los análisis actuales, por lo tanto, se restringió la búsqueda de la aceleración de fluencia para que la superficie de falla resultante coincida sustancialmente con la superficie de falla estática mínima, al mismo tiempo permitiendo una variación limitada necesaria para identificar una superficie físicamente razonable con una baja aceleración de fluencia. Este enfoque aborda el problema numérico identificado por Stark e Idries y al mismo tiempo evita que se asuma que la superficie de falla estática mínima debe, por definición, también representar la masa deslizante dinámicamente crítica.

4.4 Desplazamiento Sísmico

4.4.1 Actualización de la Fuente Sísmica

Se actualizó la evaluación de la fuente sísmica de Chiquita utilizando el Modelo Nacional de Peligros Sísmicos de los Estados Unidos de 2023 (NSHM23) y la base de datos de fallas del oeste de los EE.UU. asociada (Hatem et al., 2024). NSHM23 representa una actualización de los modelos de rupturas por fallas y terremotos que estaban previamente disponibles para California e incorpora geometrías de fallas revisadas, información sobre los índices de los deslizamientos, modelos de deformaciones y estimaciones de la magnitud de los terremotos. La evaluación actualizada consideró fuentes de fallas activas dentro de aproximadamente 100 km del sitio y los resultados de esta evaluación se resumen en la Tabla 7. La información de la aceleración pico del suelo (PGA) de la Tabla 5 se calculó utilizando los cuatro modelos de movimiento de suelo de corteza activa (GMMs) NGA-West2: Abrahamson et al. (2014), Boore et al. (2014), Campbell y Bozorgnia (2014), y Chiou y Youngs (2014). Las evaluaciones previas y actualizadas de los peligros sísmicos deterministas indican que los movimientos de suelo en el sitio están controlados principalmente por las fallas cercanas de las Cordilleras Transversales y no por la falla de San Andrés más distante.

4.4.2 Método

La deformación sísmica se evaluó utilizando el procedimiento completamente acoplado y simplificado desarrollado por Bray y Macedo (2019, 2021a, 2021b, 2023). El procedimiento estima un desplazamiento de corte permanente

inducido por terremotos mientras que representa tanto la resistencia a la fluencia como la respuesta dinámica de la masa que posiblemente se está deformando. Los parámetros principales utilizados en el análisis incluyen el coeficiente de fluencia, el período fundamental inicial de la masa que posiblemente se está deformando, la magnitud del momento del terremoto y la aceleración espectral en un período de 1.3 veces el período fundamental inicial. El coeficiente de fluencia representa el coeficiente sísmico horizontal requerido para reducir el factor de seguridad calculado a 1.0 y se determina con análisis pseudoestáticos de estabilidad de pendientes.[7] El período fundamental inicial se estima en base a la altura representativa y a la velocidad de la onda de corte de la masa que posiblemente se está deformando, como se describe en Bray y Macedo (2021b). El perfil de aceleración espectral utilizado para análisis se incluye en las impresiones del análisis en el Apéndice H. Las mediciones de la velocidad pico del suelo utilizadas en los análisis se resumen en la Tabla 6. Debido a la proximidad de las fallas, los cálculos del desplazamiento se basaron en las ecuaciones combinadas ordinarias y de pulso de Bray-Macedo.

4.5 Cortes Transversales Seleccionados para el Análisis

Las ubicaciones de los cortes analizados para este Informe se muestran en la Figura 2 y las condiciones de la ubicación de cada corte se muestran en las Figuras 3, 4 y 5. Estas secciones incluyeron:

Pendiente Oeste. Se seleccionaron cinco cortes representativos a lo largo de la pendiente oeste del vertedero para evaluar las condiciones previas al apuntalamiento y la estabilidad de la pendiente al completar el proyecto de apuntalamiento. Los detalles del apuntalamiento se incluyen en el Apéndice G. Como se muestra en estos planos, el apuntalamiento se está construyendo a lo largo de una alineación de aproximadamente 2,950 pies en el pie de la pendiente oeste. Los planos de CEC incluyen cortes del apuntalamiento cada 50 pies en las Estaciones de alineación 2+00 a 29+50. Se va a construir un muro de retención de tierra estabilizado mecánicamente (MSE) cerca de la Estación 19+00 para acomodar las restricciones de las líneas de propiedad.[8] La construcción del apuntalamiento inferior incluirá la unión con el revestimiento existente de la pendiente en el pie de la pendiente y su extensión hacia arriba por la pendiente interior, como se muestra en el Detalle 1 (Plano C500) de los planos de CEC. Se construirá un drenaje de pie que correrá por toda la longitud del apuntalamiento

[7] Hynes-Griffin y Franklin (1984) desarrollaron una base racional para seleccionar un coeficiente sísmico pseudoestático utilizando análisis de bloques de deslizamiento de Newmark de un gran catálogo de registros de terremotos además de considerar la respuesta del terraplén. Llegaron a la conclusión de que para pendientes no sujetas a licuefacción o a pérdida de resistencia sustancial inducida por terremotos y para las que puede tolerarse una deformación limitada, el uso de un coeficiente sísmico horizontal equivalente a la mitad de la aceleración pico prevista del lecho de roca (PGA), junto a un factor de seguridad pseudoestático mayor a 1.0, proporciona un criterio de selección conservador contra una deformación inducida por un terremoto inaceptablemente grande. Por lo tanto, no se realizaron análisis de las deformaciones en casos en los que la aceleración de fluencia era igual o mayor a 0.5 veces la PGA.

[8] Se realizaron análisis estáticos y sísmicos durante el diseño del muro de MSE y no se repiten ni se incluyen en este Informe.

antes de que se coloque y se compacte el suelo del apuntalamiento superior. El drenaje del pie y la parte del apuntalamiento superior contigua al MSW existente serán encapsulados por una geomembrana al completar el proyecto. Los cortes de CEC del Apéndice G se extendieron pasando la parte superior de la pendiente oeste para los propósitos del análisis, como se muestra en las Figuras 2 y 3.

Pendiente Norte. Se seleccionaron tres cortes perpendiculares a las pendientes más empinadas y más altas, en los lugares que se muestran en la Figura 2. Como se muestra en la Figura 4, las pendientes asociadas a las Secciones NS-01 y NS-02 son relativamente cortas y tienen inclinaciones modestas si se las compara con las pendientes de las laderas oeste y sur del vertedero. La Sección NS-01 es representativa de la pendiente más empinada y más alta en el extremo norte del vertedero.

Pendiente Este. Se identificaron dos secciones perpendiculares a las pendientes más empinadas y más altas en la pendiente este del vertedero, en los lugares que se muestran en la Figura 2. Estas pendientes también son relativamente planas si se las compara con otras pendientes de las laderas oeste y sur del vertedero.

Pendiente Sur. Se identificaron cinco cortes representativos para evaluar las pendientes más empinadas y más altas del vertedero (Secciones SS-01, SS-02 y SS-03), los posibles efectos del Parque de Tanques de Lixiviados 8 en la estabilidad (Secciones SS-04 y SS-05) y el extremo sur no apuntalado del vertedero (SS-05). Los cortes SS-04 y SS-05 fueron evaluados con y sin la sobrecarga asociada al parque de tanques.

5.0 RESULTADOS DE LOS ANÁLISIS

5.1.1 Condiciones Representativas

Los resultados de los análisis se resumen en la Tabla 7 y la salida del análisis se incluye en el Apéndice H. En general, los análisis indican una estabilidad estática aceptable y un desplazamiento sísmico estimado generalmente limitado para las pendientes evaluadas:

Pendiente Oeste. Bajo las condiciones existentes, los factores de seguridad estática calculados varían de 1.4 a 2.0 para los cortes primarios. La construcción del apuntalamiento propuesto en la pendiente oeste aumenta sustancialmente los factores de seguridad calculados a valores de 1.8 a 2.9. Para la condición apuntalada, las aceleraciones de fluencia calculadas varían de 0.15g a 0.28g, con desplazamientos sísmicos estimados de aproximadamente 1 a 4 pulgadas. Por lo tanto, el apuntalamiento proporciona una mejora sustancial en la estabilidad estática y al mismo tiempo limita la deformación prevista inducida por terremotos.

Pendientes del Norte. Los factores de seguridad estática calculados varían de 1.86 a 4.1. En los Cortes NS-01 y NS-02 las aceleraciones de fluencia calculadas exceden la mitad de la PGA; por lo tanto, no se justificaban los cálculos de desplazamiento sísmico. La Sección NS-03 tiene una aceleración de fluencia calculada de 0.13g y un desplazamiento sísmico estimado de aproximadamente 3 pulgadas.

Pendientes del Este. Las pendientes del este tienen factores de seguridad estática calculados de 2.3 y 2.6. Las aceleraciones de fluencia calculadas exceden la mitad de la PGA en ambas secciones; por lo tanto, no se justificaban los cálculos de desplazamiento sísmico. Los resultados indican importantes márgenes en la estabilidad estática y sísmica para las pendientes del este evaluadas.

Pendientes del Sur. Los factores de seguridad estática calculados varían de aproximadamente 1.5 a 1.76, con aceleraciones de fluencia que varían de 0.09g a 0.13g. Los desplazamientos sísmicos estimados varían de aproximadamente 3 a 6 pulgadas y el desplazamiento más grande se calculó en la Sección SS-01. Se realizaron análisis en las Secciones SS-04 y SS-05 tanto con como sin sobrecargas que representan el Parque de Tanques de Lixiviados en la Celda 8B. La sobrecarga básicamente no tiene ningún efecto en los resultados calculados de la estabilidad: los factores de seguridad estática y los desplazamientos sísmicos calculados no presentan cambios o casi no tienen cambios entre los casos A y B correspondientes. Por lo tanto, la carga del parque de tanques no afecta materialmente la estabilidad de las pendientes evaluadas del sur.

5.1.2 Aplicación de la Superficie de Presión del Retroanálisis

Como se resume en la Tabla 8, la aplicación de la superficie de presión de lixiviados y LFG combinada, calculada retroactivamente, aproximadamente 32 pies sobre la superficie de lixiviados medida en junio de 2026, reduce los factores de seguridad estática calculados y las aceleraciones de fluencia en relación con los análisis de la condición representativa en todas las partes evaluadas del vertedero. A pesar de este sustancial aumento asumido en la presión interna, ninguna de las pendientes evaluadas se acerca al factor de seguridad estática calculado por debajo de 1.0; los factores de seguridad estática son de aproximadamente 1.2 o más y la mayoría son sustancialmente más altos. Las aceleraciones de fluencia correspondientes generalmente se reducen y los valores más bajos de aproximadamente 0.04g a 0.05g ocurren a lo largo de partes de la pendiente sur; varias secciones de las pendientes norte y este continúan teniendo aceleraciones de fluencia comparativamente altas. Estos resultados demuestran la sensibilidad prevista de la estabilidad calculada a las condiciones de presión interna asumida, pero no deben interpretarse como que establecen que la superficie de presión calculada retroactivamente representa condiciones reales en otras partes del vertedero. Como se dijo previamente, el retroanálisis es altamente no único y la aplicación de una superficie de presión derivada de la geometría de una pendiente a geometrías del vertedero sustancialmente diferentes introduce incertidumbre adicional. Por lo tanto, los resultados se consideran, de forma más apropiada, análisis de sensibilidad del tipo “qué ocurriría si”;

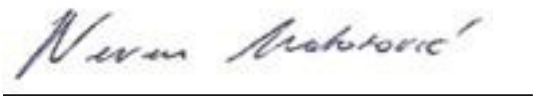
en particular, incluso bajo esta situación de presión impuesta, los análisis no indican una condición de pendiente inestable.

6.0 LIMITACIONES

Geo-Logic Associates preparó este informe bajo la dirección de Richard Mitchell, PG, CEG. Neven Matasovic, Ph.D., PE, GE realizó la revisión por pares del documento. Las conclusiones y recomendaciones de este informe se basan en gran medida en datos limitados recopilados por otros y en el juicio profesional. Por lo tanto, los hallazgos y conclusiones basados en los resultados de los análisis presentados en este informe deben revisarse y modificarse si se obtiene información adicional relevante para la evaluación. Hemos empleado procedimientos aceptados de ingeniería geotécnica y de geología de ingeniería, y nuestras opiniones y conclusiones profesionales se hacen de acuerdo con estos principios y prácticas. Esta norma sustituye a todas las garantías, ya sean expresas o implícitas.



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Table 1
SUMMARY OF LEACHATE ELEVATION DATA
Chiquita Canyon Landfill

POINT NO.	POINT ID	COORDINATES			PIEZOMETER COMPLETION DETAILS					FLUID ELEVATION			
		Northing	Easting	GS Elevation (ft MSL)	Boring Diameter (in)	Casing Diameter (in)	As-Built Casing Depth (ft bgs)	As-Built Solid Pipe (ft)	As-Built Perforated Pipe (ft)	5/1/2026 (ft MSL)	6/1/2026 (ft MSL)	7/1/2026 (ft MSL)	8/1/2026 (ft MSL)
1001	CV-24188	1980073	6365636	1,265	36	8	100	30	70	1,202	1,203	1,204	1,206
1002	CV-24133	1982183	6367883	1,284	36	8	110	30	80	1,189	1,189	1,189	1,188
1003	CV-2402	1981949	6365544	1,360	36	8	45	20	25	1,323	1,324	1,324	1,356
1005	CV-2009	1981768	6367114	1,382	36	8	148	UNK	UNK	1,293	1,313	1,316	1,262
1007	CV-113	1982022	6366674	1,343	36	8	60	34	26	1,312	1,313	1,370	1,369
1009	CV-24181	1980292	6366164	1,342	36	8	146	30	116	1,268	1,268	1,268	1,268
1011	CV-24123	1982149	6366820	1,308	36	8	60	30	30	1,259	1,260	1,260	ND
1012	CV-2207	1981660	6367430	1,388	36	8	231	32	199	1,169	1,169	1,169	1,168
1013	CV-24149	1981230	6366602	1,408	36	8	108	30	78	1,327	1,327	1,254	1,248
1014	CV-24169	1980660	6366374	1,399	36	8	135	30	105	1,309	1,308	1,184	1,180
1019	CV-2506	1979667	6366398	1,247	36	8	185	30	155	1,128	1,128	1,128	ND
1021	CV-2476	1981437	6366639	1,414	36	8	163	30	133	1,294	1,287	1,253	1,288
1022	CV-2002	1980561	6365357	1,275	36	8	91	22	69	1,216	1,215	1,215	1,214
1023	CV-24112	1981387	6367436	1,391	36	8	98	30	68	1,304	1,304	ND	ND
1024	CV-2008	1981754	6366820	1,392	36	8	124	32	92	1,280	1,281	1,279	1,274
1026	CV-2572	1979424	6366558	1,149	36	8	107	30	77	1,045	1,044	1,044	1,043
1027	CV-2513	1979065	6366026	1,161	36	8	109	30	79	1,056	1,056	1,056	1,055
1028	CV-24231	1979603	6365776	1,292	36	8	173	30	143	1,126	1,126	1,127	1,126
1029	CV-24106	1980270	6366664	1,329	36	8	115	30	85	1,241	1,241	1,243	1,242
1030	CV-2012	1981309	6367703	1,351	36	8	134	32	102	1,255	1,255	1,255	1,248
1031	CV-2523	1981543	6368198	1,284	36	8	122	30	92	1,167	1,168	1,168	1,166
1032	CV-24187	1980192	6365806	1,314	36	8	128	30	98	1,207	1,209	1,205	1,205
1033	CV-24117	1980346	6367212	1,305	36	8	103	30	73	1,228	1,228	1,229	1,228
1034	CV-2512	1979220	6365481	1,248	36	8	66	30	36	1,185	1,185	1,185	1,184
1035	CV-2480	1980643	6366035	1,390	36	8	171	30	141	1,222	1,221	ND	1,225
1036	CV-24132	1982119	6367487	1,286	36	8	90	30	60	1,201	1,201	ND	ND
1037	CV-24199	1980065	6366401	1,340	36	8	148	30	118	1,202	1,202	1,146	1,144
1038	CV-24141	1981508	6365298	1,295	36	8	30	20	10	1,289	1,287	1,287	1,286
1039	CV-2003	1980765	6365485	1,308	36	8	95	22	73	1,258	1,258	1,253	1,251

NOTES:

1. Fluid (leachate) elevations are static levels determined from in-well Lorentz Liquid Level Temperature Sensors (LLTS). The LLTS uses an absolute pressure sensor and operates with a plug-in barometer installed in the controller.
2. ND - No Data; Sensor Offline or Showing Error.
3. UNK - Length of solid and perforated pipe is unknown.
4. See Appendix C for locations of piezometers and 6/1/2026 elevations in cross section.

Table 2

AVERAGE OF MAXIMUM MAY 18 THROUGH JUNE 17 2026 DAILY TEMPERATURES (°F) AT PROBE DEPTH INTERVALS

Chiquita Canyon Landfill

PROBE ID	NORTHING	EASTING	GROUND SURFACE ELEVATION (ft MSL)	TOTAL DEPTH (ft bgs)	PROBE INTERVAL (FT BELOW GROUND SURFACE)																																				
					15	30	45	60	65	70	75	80	85	90	95	100	105	110	120	125	130	135	140	145	150	155	160	165	180	185	190	200	210	220	230	250	265	280	320
TP-1	1981755	6365540	1377	125	149	127	136	142				147				152				147																			
TP-2	1981507	6365461	1335	80	114	141	148	157																															
TP-3	1981182	6365428	1292	55	203	213	233																																
TP-4	1980301	6365506	1268	75	151	158	157	157																															
TP-5	1980603	6365551	1301	90	137	163	166	160			165																												
TP-6	1979988	6365828	1305	130	109	115	117	115				132				139			138				142																
TP-7	1980306	6365799	1320	123	127	130	136	139			143					154																							
TP-8	1980584	6365944	1353	180	140	146	142																																
TP-9	1980983	6365924	1352	141	111	122	130	137				141				172				208																			
TP-10	1980737	6366122	1364	130	122	127	131	141				141				143				155																			
TP-11	1980905	6366290	1373	158	171	184	187					198				208				208																			
TP-12	1980865	6366617	1398	192	101	121	126					135				139				150																			
TP-13	1981186	6366386	1374	166	149	166	165				168					171							173																
TP-14	1981083	6366653	1393	157	91	115	128				146					159				169					172														
TP-15	1981315	6366568	1376	170	183	198	200				201					203																							
TP-16	1981430	6366764	1394	131	138	177	147	142				141				143																							
TP-17	1981534	6366646	1398	135	141	146	143	144				147				148				161																			
TP-18	1981868	6366468	1365	90	138	171	208																																
TP-19	1981807	6366741	1374	155	144	146	146				148					159				164					232														
TP-20	1982028	6366793	1335	97	128	135	141																																
TP-21	1981238	6365804	1352	110	117	144	153	160		162			181		211			256																					
TP-22	1981377	6366018	1349	147	197																																		
TP-23	1981729	6366232	1365	107	191	221	229				260																												
TP-24	1980531	6366233	1380	320	111	117	126									143										165						189				210		153
TP-25	1981419	6366871	1401	138	111	124	127	128			132			148				201			210																	
TP-26	1981665	6366912	1392	159	119	138	143	149				150				169				171					178													
TP-27	1982001	6366919	1333	154	127	137	140	150				156				157				153					130													
TP-28	1980190	6366176	1352	173	79	93	114			125					132				131					140			144											
TP-29	1980687	6366649	1393	245	115	128	129					134							148								155					166			189				
TP-30	1980817	6366867	1396	200	105	113	115			146						170					168						168				175							
TP-31	1981476	6367157	1398	290	112	127	131					139									163							193							187			141	
TP-32	1981876	6367285	1339	196	127	140	144			154						163					170						167				150							
TP-33	1981456	6366284	1363	50	174	188	197																																
TP-34	1981132	6366434	1379	124	124	129	137	134			136			137				145	151																				
TP-35	1980719	6366444	1392	142	100	124	135		137				149				163			172			175															
TP-36	1981433	6367538	1369	250	103	125	133				136								155									172					161			136			
TP-37	1980945	6367236	1383	180	105	115	136				136					142					163					177			184									
TP-38	1980732	6367309	1339	250	115	136	143				150								162									172					162			136			
TP-39	1980386	6366790	1332	190	101	119	138				143						151					157					159											
TP-40	1979663	6365958	1273	220	99	121	128				129							125								144				149				134				

Table 3
PROBE TEMPERATURES AND DISTANCE TO CONTAINMENT SYSTEMS
Chiquita Canyon Landfill

PROBE ID	CLOSEST ADJACENT LINER	SURFACE ELEVATION (ft MSL)	TOTAL PROBE DEPTH (ft bgs)	BOTTOM PROBE ELEVATION (ft MSL)	ELEVATION OF LINER BELOW PROBE (ft MSL)	CLOSEST PROBE DISTANCE TO ADJACENT LINER (ft)	MAXIMUM PROBE TEMPERATURE (^{o}F)	AVERAGE PROBE TEMPERATURE (^{o}F)
TP-1	Module 2B/3/4	1,377	125	1,252	1,225	27	152	143
TP-2	Module 2B/3/4	1,335	80	1,255	1,192	63	157	140
TP-3	Module 4	1,292	55	1,237	1,204	33	233	216
TP-4	Module 4	1,268	75	1,193	1,152	41	158	156
TP-5	Module 4	1,301	90	1,211	1,073	137	166	158
TP-6	Module 5	1,305	130	1,175	1,085	89	142	126
TP-7	Module 4	1,320	123	1,197	1,069	128	154	138
TP-8	Module 2B/3/4	1,353	180	1,173	1,048	125	146	142
TP-9	Module 2B/3/4	1,352	141	1,211	1,055	156	208	146
TP-10	Module 2B/3/4	1,364	130	1,234	1,050	183	155	137
TP-11	Cell 1/2A	1,373	158	1,215	1,062	152	208	193
TP-12	Cell 1/2A	1,398	192	1,206	1,050	155	150	129
TP-13	Cell 1/2A	1,374	166	1,208	1,067	141	173	165
TP-14	Cell 1/2A	1,393	157	1,236	1,061	175	172	140
TP-15	Cell 1/2A	1,376	170	1,206	1,069	138	203	197
TP-16	Cell 1/2A	1,394	131	1,263	1,071	193	177	148
TP-17	Cell 1/2A	1,398	135	1,263	1,083	180	161	147
TP-18	Cell 1/2A	1,365	90	1,275	1,229	46	208	172
TP-19	Cell 2 Phase 2B	1,374	155	1,219	1,159	60	232	163
TP-20	Cell 2 Phase 2B	1,335	97	1,238	1,203	35	141	135
TP-21	Module 2B/3/4	1,352	110	1,242	1,083	158	256	173
TP-22	Module 2B/3/4	1,349	147	1,202	1,070	131	197	197
TP-23	Module 2B/3/4	1,365	107	1,258	1,202	57	260	225
TP-24	Module 2B/3/4	1,380	320	1,060	1,046	14	210	152
TP-25	Cell 2 Phase 1	1,401	138	1,263	1,073	190	210	148
TP-26	Cell 2 Phase 1	1,392	159	1,233	1,088	145	178	152
TP-27	Cell 2 Phase 2B	1,333	154	1,179	1,158	20	157	144
TP-28	Module 4	1,352	173	1,179	1,039	140	144	120
TP-29	Cell 1/2A	1,393	245	1,148	1,058	90	189	145
TP-30	Cell 1	1,396	200	1,196	1,066	130	175	145
TP-31	Cell 2 Phase 1	1,398	290	1,108	1,086	22	193	149
TP-32	Cell 2 Phase 2A	1,339	196	1,143	1,114	28	170	152
TP-33	Cell 1/2A	1,363	50	1,313	1,083	230	197	186
TP-34	Cell 1/2A	1,379	124	1,255	1,065	190	151	137
TP-35	Cell 1/2A	1,392	142	1,250	1,058	193	175	144
TP-36	Cell 1	1,369	250	1,119	1,100	18	172	140
TP-37	Cell 1	1,383	180	1,203	1,078	126	184	145
TP-38	Cell 1	1,339	250	1,089	1,070	18	172	147
TP-39	Module 2B/3/4	1,332	190	1,142	1,051	91	159	138
TP-40	Module 5	1,273	220	1,053	1,036	17	149	129

NOTES:

1. Temperatures based on average of May 18 Through June 17 maximum daily temperatures - see Table 2.
2. See Figures 1 and 2 for probe locations.

Table 4
BASE AND SLOPE LINER CONFIGURATIONS
Chiquita Canyon Landfill
Castaic, California

CANYONS A AND D	
Base Liner	**Slope Liner**
Subgrade	Subgrade
Soil-Bentonite Admixture	HDPE
Sand Layer (LCS)	Protective Cover Soil
Protective Cover Soil	
CANYON C CELL 1	
Base Liner	**Slope Liner**
Subgrade	Subgrade
Low Permeability Soil (<1E-7 cm/sec)	HDPE
Single-Side Textured HDPE (Down)	Protective Cover Soil
Sand or Granular layer (LCS)	
Protective Cover Soil	
CANYON C CELL 2 PHASES 1, 2A, 2B	
Base Liner	**Slope Liner**
Subgrade	Subgrade
Geosynthetic Clay Liner	Geosynthetic Clay Liner
Double-Side Textured HDPE	Single-Side Textured HDPE
Granular Layer (LCS)	Protective Cover Soil
Protective Cover Soil	
CANYON C CELL 1/2A AND MODULES 2B, 3, AND 4	
Base Liner	**Slope Liner**
Subgrade	Subgrade
Geosynthetic Clay Liner	Double-Side Textured HDPE
Double-Side Textured HDPE	Geocomposite (LCS)
Geocomposite (LCS)	Protective Cover Soil
Protective Cover Soil	
MODULE 5	
Base Liner	**Slope Liner**
Subgrade	Subgrade
Compacted Clay Liner	Double-Side Textured HDPE
Double-Side Textured HDPE	Geocomposite (LCS)
Geocomposite (LCS)	Protective Cover Soil
Protective Cover Soil	
CELL 6	
Base Liner	**Slope Liner**
Subgrade	Subgrade
Compacted Clay Liner	Geosynthetic Clay Liner
Double-Side Textured HDPE	Double-Side Textured HDPE
Cushion Geotextile	Cushion Geotextile
Granular Layer (LCS)	Protective Cover Soil
Filter Geotextile	
Protective Cover Soil	
CELLS 8A AND 8B	
Base Liner	**Slope Liner**
Subgrade	Subgrade
Compacted Clay Liner	Geosynthetic Clay Liner
Geosynthetic Clay Liner	Double-Side Textured HDPE
Double-Side Textured HDPE	Cushion Geotextile
Cushion Geotextile	Protective Cover Soil
Granular Layer (LCS)	
Filter Geotextile	
Protective Cover Soil	

Table 5
SUMMARY OF LINER SYSTEM STRENGTH DATA AND ASSUMPTIONS FOR ANALYSIS
Chiquita Canyon Landfill
Castaic, California

LINER SYSTEM	COMPONENT	CRITICAL LAYER OR INTERFACE	SHEAR STRENGTH DATA				
			REPORTED SHEAR STRENGTH		SHEAR STRENGTH USED FOR ANALYSIS		REFERENCE
			c' (psf)	Ø' (degrees)	c' (psf)	Ø' (degrees)	
Canyons A and D	Base Liner	Soil-Bentonite Admixture	0	18	0	17	See EMCON information and plots in Appendix F.
	Slope Liner	Subgrade-HDPE	0	22	0	17	See EMCON information and plots in Appendix F.
Canyon C Cell 1	Base Liner	Low Permeability Soil - Textured HDPE	0	18	0	17	See EMCON information and plots in Appendix F.
	Slope Liner	Subgrade-HDPE	0	22	0	17	See EMCON information and plots in Appendix F.
Cell 2 Phases 1, 2A, 2B	Base Liner	GCL-HDPE	Trilinear Strength		Trilinear Strength		See EMCON information and plots in Appendix F.
	Slope Liner	GCL-HDPE	Trilinear Strength		Trilinear Strength		See EMCON information and plots in Appendix F.
Cell 1/2A and Modules 2B, 3, 4	Base Liner	Textured HDPE-Geocomposite	100	14	0	14	See Appendix F.
	Slope Liner	Textured HDPE-Geocomposite	100	14	0	14	See Appendix F.
Module 5	Base Liner	Textured HDPE-Geocomposite	105	12.5	0	12	See Appendix F.
	Slope Liner	Textured HDPE-Geocomposite	105	12.5	0	12	See Appendix F.
Cells 6, 8A, 8B	Base Liner	Textured HDPE-Geotextile	0	14	0	14	See Appendix F.
	Slope Liner	Textured HDPE-Geotextile	0	14	0	14	See Appendix F.

Table 6
SUMMARY OF HOLOCENE-ACTIVE FAULTS WITHIN 100 KILOMETERS OF THE SITE
Chiquita Canyon Landfill
Castaic, California

FAULT	FAULT STYLE	RUPTURE DISTANCE Rrup (km)	DETERMINISTIC MAGNITUDE (Mw)	EQUALLY WEIGHTED PHGA (g)	EQUALLY WEIGHTED PGV (cm/s)	MEDIAN PHGA (g)			
						ASK14	BSSA14	CB14	CY14
Holser	Reverse	1.34	6.79	0.579		0.577	0.434	0.684	0.623
					50	53	38	59	51
San Gabriel	Right-lateral strike-slip	6.14	7.22	0.377		0.339	0.324	0.430	0.415
					40	40	34	44	41
Northridge	Thrust (reverse)	8.02	6.85	0.402		0.405	0.380	0.423	0.400
Oak Ridge (Onshore)	Thrust (reverse)	8.03	7.12	0.333		0.305	0.278	0.385	0.362
Santa Susana	Thrust (reverse)	8.14	7.10	0.532		0.477	0.450	0.657	0.545
					51	52	44	57	51
San Cayetano	Thrust (reverse)	10	7.11	0.310		0.373	0.237	0.315	0.312
Simi-Santa Rosa	Reverse	14	6.83	0.233		0.203	0.221	0.265	0.242
Sierra Madre (San Fernando)	Thrust (reverse)	19	6.63	0.165		0.171	0.152	0.186	0.153
Santa Ynez (East)	Left-lateral reverse	28	7.14	0.128		0.116	0.131	0.142	0.123
Verdugo	Reverse	28	6.85	0.108		0.098	0.103	0.124	0.108
San Andreas (Mojave, South)	Right-lateral strike-	32	7.28	0.118		0.112	0.116	0.129	0.114
Pitas Point	Left-lateral reverse	33	7.10	0.109		0.104	0.100	0.120	0.114
Anacapa-Dume	Thrust (reverse)	35	7.28	0.119		0.104	0.114	0.127	0.129
Sierra Madre	Reverse	37	7.14	0.097		0.090	0.092	0.106	0.102
Hollywood	Left-lateral reverse	42	6.62	0.063		0.054	0.067	0.072	0.057
Malibu Coast	Reverse	43	6.64	0.060		0.054	0.062	0.066	0.056
Santa Monica	Left-lateral reverse	44	6.51	0.054		0.046	0.060	0.063	0.048
Puente Hills (Los Angeles)	Thrust (reverse)	46	6.88	0.077		0.092	0.069	0.073	0.074
Elysian Park (Upper)	Thrust (reverse)	46	6.59	0.060		0.056	0.058	0.070	0.056
Mission Ridge-Arroyo Parida-Santa Ana	Left-lateral reverse	48	6.92	0.064		0.061	0.064	0.067	0.065
Garlock (West)	Left-lateral strike-slip	48	7.32	0.083		0.079	0.082	0.090	0.079
Pleito	Thrust (reverse)	49	7.03	0.070		0.063	0.068	0.078	0.071
Newport-Inglewood	Right-lateral strike-	50	7.14	0.072		0.068	0.072	0.080	0.067

Table 6
SUMMARY OF HOLOCENE-ACTIVE FAULTS WITHIN 100 KILOMETERS OF THE SITE
Chiquita Canyon Landfill
Castaic, California

FAULT	FAULT STYLE	RUPTURE DISTANCE Rrup (km)	DETERMINISTIC MAGNITUDE (Mw)	EQUALLY WEIGHTED PHGA (g)	EQUALLY WEIGHTED PGV (cm/s)	MEDIAN PHGA (g)			
						ASK14	BSSA14	CB14	CY14
Raymond	Left-lateral strike-slip	52	6.65	0.050		0.044	0.052	0.058	0.045
Palos Verdes	Right-lateral reverse	52	7.34	0.077		0.074	0.076	0.084	0.074
Puente Hills (Santa Fe Springs)	Thrust (reverse)	58	6.54	0.042		0.040	0.042	0.046	0.040
Clamshell-Sawpit	Reverse	59	6.55	0.039		0.034	0.041	0.046	0.035
Red Mountain	Thrust (reverse)	61	7.39	0.071		0.066	0.066	0.075	0.078
Oak Ridge (Offshore)	Thrust (reverse)	61	6.67	0.040		0.037	0.042	0.045	0.038
Channel Islands	Thrust (reverse)	65	7.23	0.066		0.071	0.056	0.063	0.075
Puente Hills (Coyote Hills)	Thrust (reverse)	67	6.75	0.042		0.041	0.040	0.045	0.042
North Channel	Reverse	71	6.76	0.038		0.036	0.037	0.041	0.037
White Wolf	Left-lateral reverse	71	7.13	0.050		0.045	0.047	0.056	0.052
Santa Cruz Island	Left-lateral reverse	75	7.12	0.046		0.042	0.043	0.052	0.048
Pitas Point (Lower, Montalvo)	Left-lateral reverse	77	7.21	0.055		0.073	0.045	0.049	0.052
San Jose	Left-lateral strike-slip	81	6.52	0.026		0.021	0.027	0.031	0.023
Cucamonga	Thrust (reverse)	85	6.83	0.032		0.028	0.031	0.038	0.031
Pitas Point (Upper)	Left-lateral reverse	85	6.78	0.031		0.029	0.029	0.034	0.031
Santa Ynez (West)	Left-lateral reverse	91	7.07	0.033		0.031	0.034	0.036	0.033
Chino	Right-lateral reverse	93	6.74	0.026		0.023	0.026	0.031	0.023

Table 6
SUMMARY OF HOLOCENE-ACTIVE FAULTS WITHIN 100 KILOMETERS OF THE SITE
Chiquita Canyon Landfill
Castaic, California

FAULT	FAULT STYLE	RUPTURE DISTANCE Rrup (km)	DETERMINISTIC MAGNITUDE (Mw)	EQUALLY WEIGHTED PHGA (g)	EQUALLY WEIGHTED PGV (cm/s)	MEDIAN PHGA (g)			
						ASK14	BSSA14	CB14	CY14

NOTES:

1. Fault-source information and finite rupture geometry are based on the published NSHM23 western U.S. fault-system solution (WUS Version 4/R1) and associated fault-section database.
2. Rrup is the closest distance to the selected finite rupture plane. Deterministic magnitudes correspond to the upper end of the nonzero-rate NSHM23 individual-parent-fault rupture range represented by the selected rupture.
3. Ground motions are median predictions for Vs30 = 760 m/s, California regional/default basin conditions, using the four NGA-West2 relationships listed below. The equally weighted PHGA is the arithmetic average of the four median predictions.
4. Potential near-source/directivity effects were evaluated separately using the Bayless-Abrahamson-Somerville method. No generic directivity adjustment is applied to the PHGA values shown in this table. Finite-rupture and hanging-wall effects applicable to reverse faults are represented through the NGA-West2 model inputs; potential strike-slip directivity effects for the San Andreas and San Gabriel faults were evaluated separately.
5. Median RotD50 PGVs were calculated using the OpenQuake Engine implementations of the ASK14, BSSA14, CB14, and CY14 NGA-West2 ground-motion models (Pagani et al., 2014; Abrahamson et al., 2014; Boore et al., 2014; Campbell and Bozorgnia, 2014; Chiou and Youngs, 2014).
6. Attenuation relationships :

ASK14 - Norman A. Abrahamson, Walter J. Silva, and Ronnie Kamai, Summary of the ASK14 Ground Motion Relation for Active Crustal Regions, Earthquake Spectra, Volume 30, No. 3, pages 1025-1055, August 2014.

BSSA14 - David M. Boore, Jonathan P. Stewart, Emel Seyhan, and Gail M. Atkinson, NGA-West2 Equations for Predicting PGA, PGV, and 5% Damped PSA for Shallow Crustal Earthquakes, Earthquake Spectra, Volume 30, No. 3, pages 1057-1085, August 2014; © 2014.

CB14 - Kenneth W. Campbell and Yousef Bozorgnia, NGA-West2 Ground Motion Model for the Average Horizontal Components of PGA, PGV, and 5% Damped Linear Acceleration Response Spectra, Earthquake Spectra, Volume 30, No. 3, pages 1087-1115, August 2014.

CY14 - Brian S.-J. Chiou and Robert R. Youngs, Update of the Chiou and Youngs NGA Model for the Average Horizontal Component of Peak Ground Motion and Response Spectra, Earthquake Spectra, Volume 30, No. 3, pages 1117-1153, August 2014.

Table 7
SUMMARY OF STABILITY ANALYSIS RESULTS
Chiquita Canyon Landfill
Castaic, California

CROSS SECTION	SLOPE	STATIC SAFETY FACTOR		SEISMIC DISPLACEMENT						
		Existing Conditions	After West Slope Buttress	Yield Acceleration (g)	Site Period (T_s, sec)	1.3 T_s	Spectral Acceleration @ 1.3T_s (g)	Earthquake Moment Magnitude	Estimated Displacment (cm)	Estimated Displacment (in)
9+00	Western	1.7	1.8	0.15	0.48	0.63	0.60	6.8	10.1	4
16+00	Western	1.7	2.7	0.21	0.61	0.79	0.48	6.8	4.1	2
19+00	Western	1.5	2.9	0.20	0.70	0.91	0.42	6.8	4.0	2
21+00	Western	1.4	2.9	0.23	0.61	0.80	0.48	6.8	3.3	1
24+00	Western	2.0	2.6	0.28	0.51	0.66	0.60	6.8	2.8	1
NS-01	Northern	2.8	NA	>0.5 x PGA (0.47)	NA	NA	NA	NA	NA	NA
NS-02	Northern	4.1	NA	>0.5 x PGA (0.33)	NA	NA	NA	NA	NA	NA
NS-03	Northern	1.8	NA	0.13	0.77	1.01	0.38	6.8	8.7	3
ES-01	Eastern	2.3	NA	>0.5 x PGA (0.33)	NA	NA	NA	NA	NA	NA
ES-02	Eastern	2.6	NA	>0.5 x PGA (0.37)	NA	NA	NA	NA	NA	NA
SS-01	Southern	1.5	NA	0.09	0.76	0.99	0.38	6.8	16.2	6
SS-02	Southern	1.5	NA	0.13	0.64	0.84	0.42	6.8	8.5	3
SS-03	Southern	1.6	NA	0.13	0.73	0.95	0.40	6.8	12.9	5
SS-04A	Southern	1.7	NA	0.12	0.77	1.00	0.38	6.8	16.2	6
SS-04B	Southern	1.7	NA	0.12	0.77	1.00	0.38	6.8	16.2	6
SS-05A	Southern	1.5	NA	0.10	0.85	1.11	0.34	6.8	12.5	5
SS-05B	Southern	1.5	NA	0.10	0.85	1.11	0.34	6.8	12.5	5

NOTES:

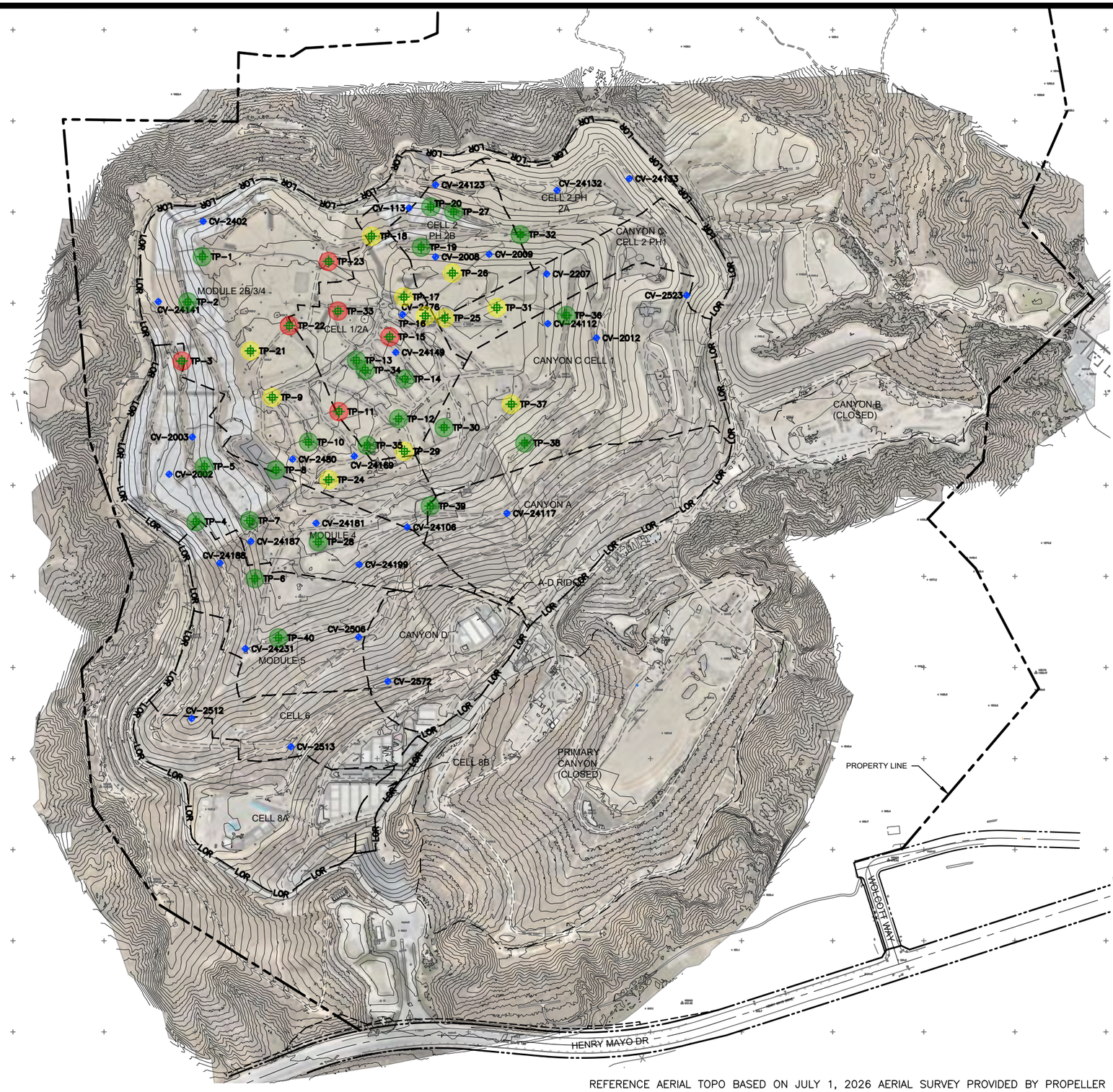
1. See Figure 2 for cross section locations.
2. See Appendix H for analysis output.
3. See Appendix H for bedrock spectral accelerations for Holser fault.
4. All safety factors are associated with non-cicular failure surfaces. Circular surface analyses were performed for all cross sections and returned higher safety factors in all cases.
5. Seismic displacement calculations are associated with the western slope buttressed condition and with existing conditions for the northern, eastern, and southern slopes.
6. Displacement calculations not warranted if yield acceleration is greater than 0.5 x PGA (Hynes-Griffin and Franklin, 1984).
7. SS-04A and SS-05A include surcharge loads representative of Leachate Tank Farm 8 loads. SS-04B and SS-05B do not include the surcharge loads.

Table 8
COMPARISON OF REPRESENTATIVE STABILITY ANALYSIS RESULTS WITH RESULTS USING BACK ANALYSIS PRESSURE SURFACE
Chiquita Canyon Landfill
Castaic, California

CROSS SECTION	SLOPE	STATIC SAFETY FACTOR		YIELD ACCLERATION	
		Representative Conditions	Back-Calculated Pressure Surface	Representative Conditions	Back-Calculated Pressure Surface
9+00	Western	1.8	1.3	0.15	0.06
16+00	Western	2.7	2.2	0.21	0.15
19+00	Western	2.9	2.2	0.20	0.14
21+00	Western	2.9	2.3	0.23	0.15
24+00	Western	2.6	2.2	0.28	0.22
NS-01	Northern	2.8	2.2	>0.5 x PGA (0.47)	>0.5 x PGA (0.31)
NS-02	Northern	4.1	1.8	>0.5 x PGA (0.33)	0.23
NS-03	Northern	1.8	1.5	0.13	0.09
ES-01	Eastern	2.3	2.2	>0.5 x PGA (0.33)	>0.5 x PGA (0.30)
ES-02	Eastern	2.6	2.3	>0.5 x PGA (0.37)	>0.5 x PGA (0.35)
SS-01	Southern	1.5	1.2	0.09	0.04
SS-02	Southern	1.5	1.2	0.13	0.05
SS-03	Southern	1.6	1.5	0.13	0.10
SS-04A	Southern	1.7	1.5	0.12	0.10
SS-04B	Southern	1.7	1.5	0.12	0.10
SS-05A	Southern	1.5	1.3	0.10	0.07
SS-05B	Southern	1.5	1.3	0.10	0.07

NOTES:

1. See Figure 2 for cross section locations.
2. See Appendix E for back analysis output.
3. Representative conditions pressure surface is 5 ft above baseline June 2026 measured surface.
4. Back analysis pressure surface is 32 ft above baseline June 2026 measured surface.
5. SS-04A and SS-05A include surcharge loads representative of Leachate Tank Farm 8 loads. SS-04B and SS-05B do not include the surcharge loads.
6. Western slope analyses assume buttress has been constructed.



LEGEND:

- PROPERTY LINE
- LOR LOR — APPROXIMATE LIMIT OF REFUSE
- CELL LIMIT
- CV-2523 — LEACHATE LEVEL MONITORING POINT LOCATION
- TP-23 — TEMPERATURE MONITORING POINT LOCATIONS
- MAX AND AVERAGE TEMPERATURE LESS THAN 180 DEGREES F
- MAX TEMPERATURE >180 DEGREES F AND AVERAGE TEMPERATURE <180 DEGREES F
- MAX AND AVERAGE TEMPERATURE GREATER THAN 180 DEGREES F

600' 0' 300' 600'

SCALE: 1" = 600'

REFERENCE AERIAL TOPO BASED ON JULY 1, 2026 AERIAL SURVEY PROVIDED BY PROPELLER

FIGURE 1

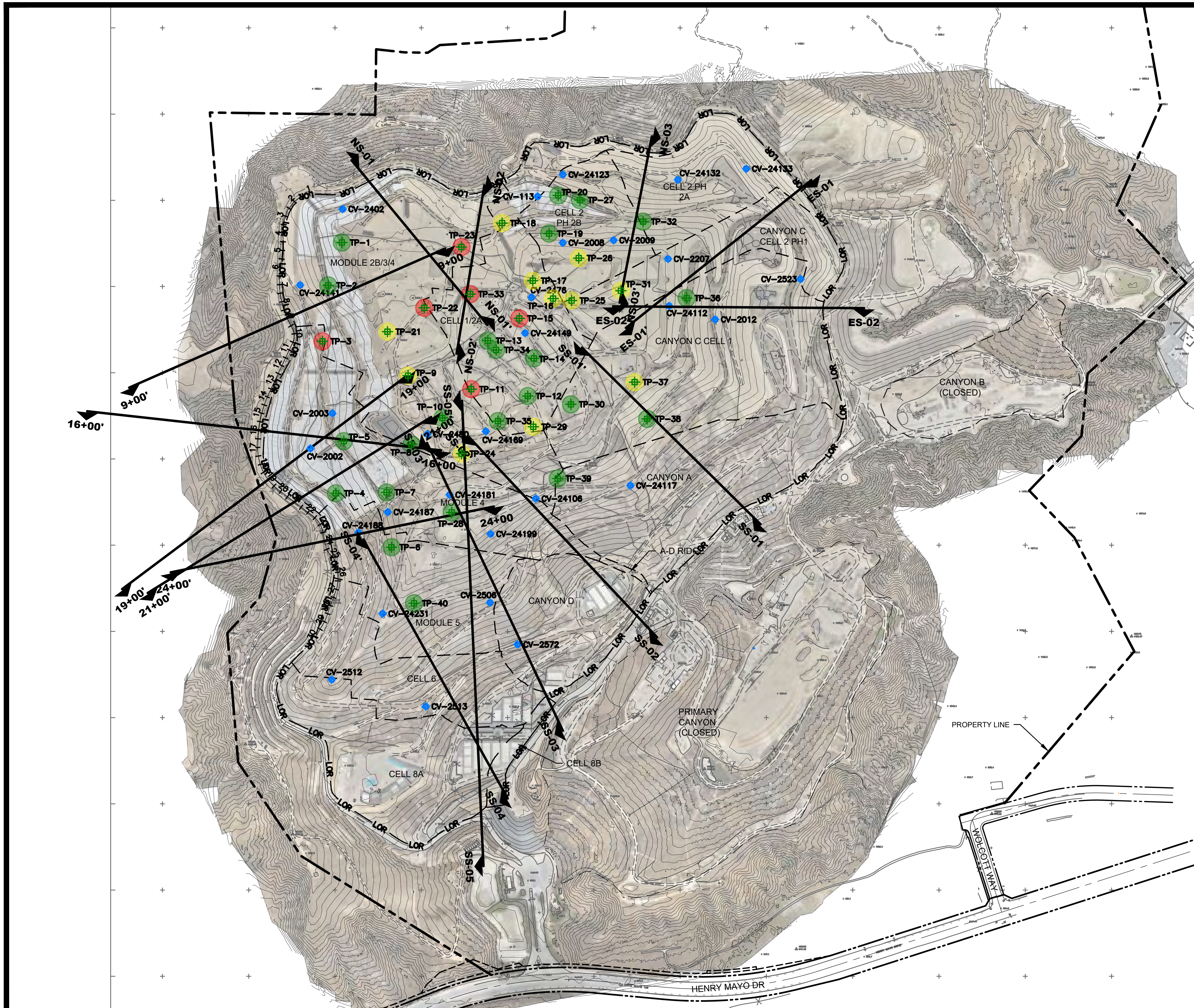
BASE MAP COMPREHENSIVE STABILITY ANALYSES

CHIQUITA CANYON LANDFILL CASTAIC, CA

Geo-Logic ASSOCIATES

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P:\SITES\CHIQUITA CYN LF\WEST SLOPE EXCAV\FIGURES\1026.1002-CCL-WEST SLOPE-FIG 1-(2026-09-01).DWG September 8, 2026 - 9:45 AM BY: GLA-USER



REFERENCE AERIAL TOPO BASED ON JULY 1, 2026 AERIAL SURVEY PROVIDED BY PROPELLER

LEGEND:

— - - —	PROPERTY LINE
—LOR —LOR —	APPROXIMATE LIMIT OF REFUSE
— — —	CELL LIMIT
CV-2523	LEACHATE LEVEL MONITORING POINT LOCATION
TP-23	TEMPERATURE MONITORING POINT LOCATIONS
(green circle)	MAX AND AVERAGE TEMPERATURE LESS THAN 180 DEGREES F
(yellow circle)	MAX TEMPERATURE >180 DEGREES F AND AVERAGE TEMPERATURE <180 DEGREES F
(red circle)	MAX AND AVERAGE TEMPERATURE GREATER THAN 180 DEGREES F

N

600' 0' 300' 600'

SCALE: 1" = 600'

FIGURE 2

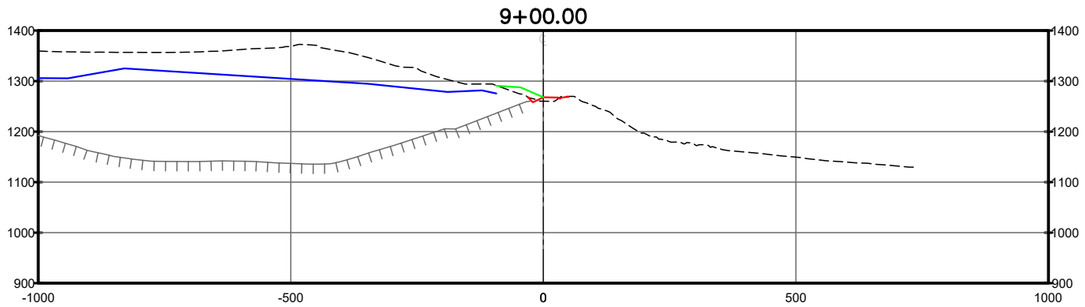
CROSS SECTION LOCATIONS
COMPREHENSIVE STABILITY ANALYSES

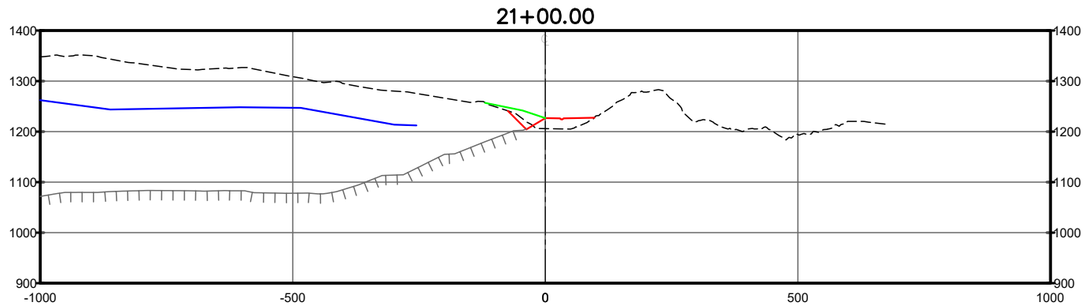
CHIQUITA CANYON LANDFILL
CASTAIC, CA

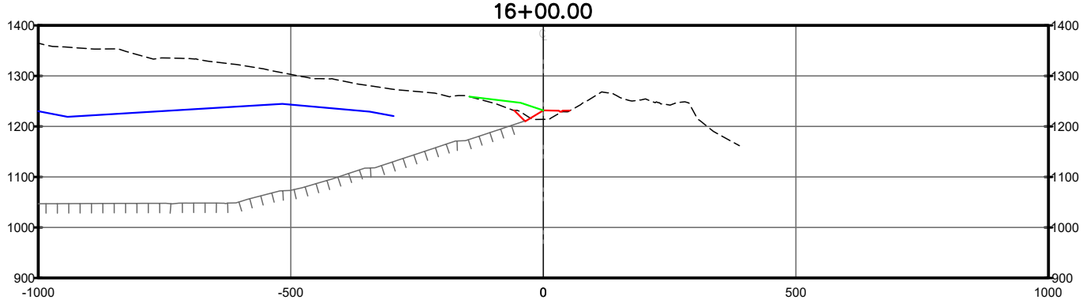
Geo-Logic ASSOCIATES

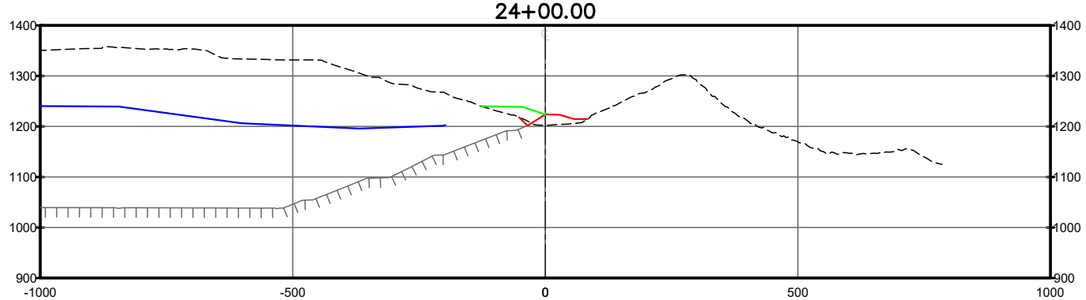
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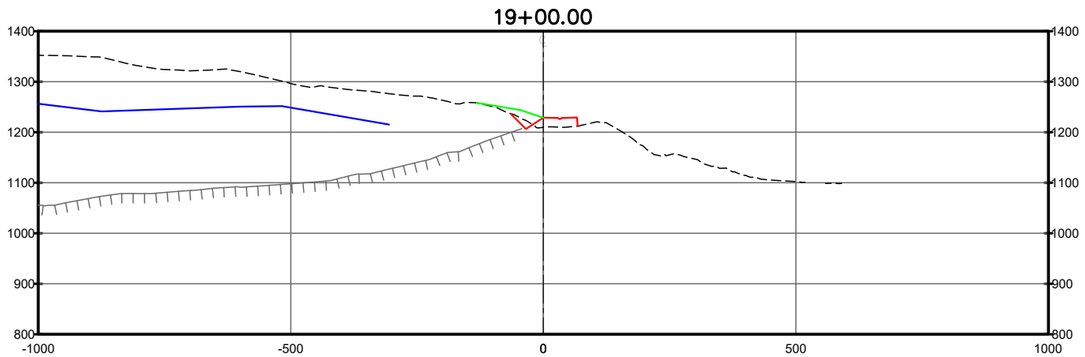
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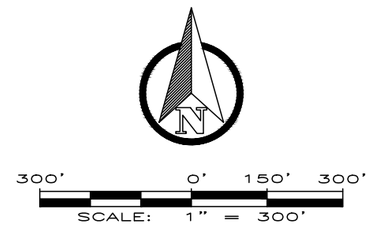






LEGEND:

- SUBGRADE
- TOPO 2026-07-01
- LEACHATE LIQUID LEVEL 2026-06-01
- LOWER BUTTRESS GRADE
- UPPER BUTTRESS GRADE



REFERENCE AERIAL TOPO BASED ON JULY 1, 2026 AERIAL SURVEY PROVIDED BY PROPELLER

FIGURE 3

CROSS SECTIONS COMPREHENSIVE STABILITY ANALYSES

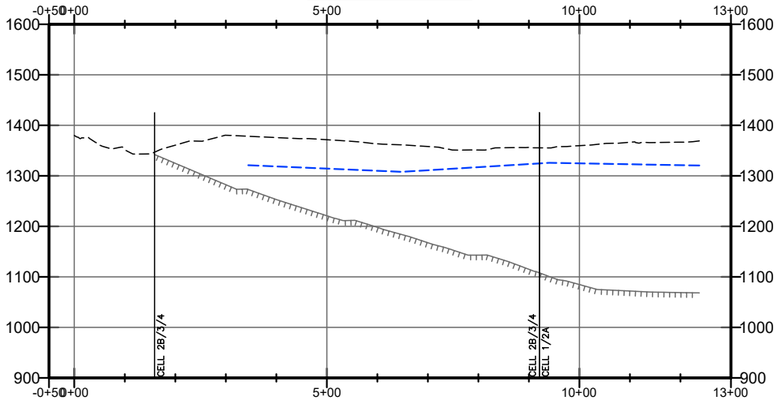
CHIQUITA CANYON LANDFILL CASTAIC, CA

Geo-Logic ASSOCIATES

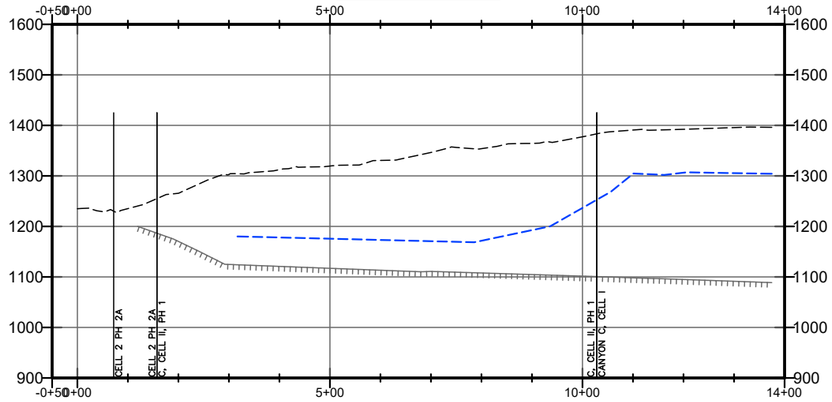
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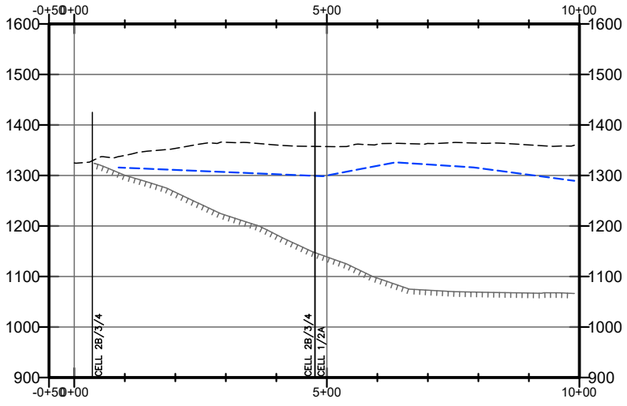
NS-01 SECTION



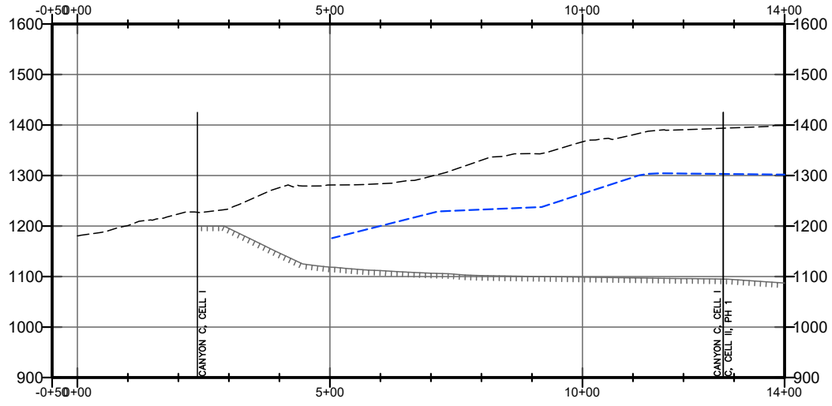
ES-01 SECTION



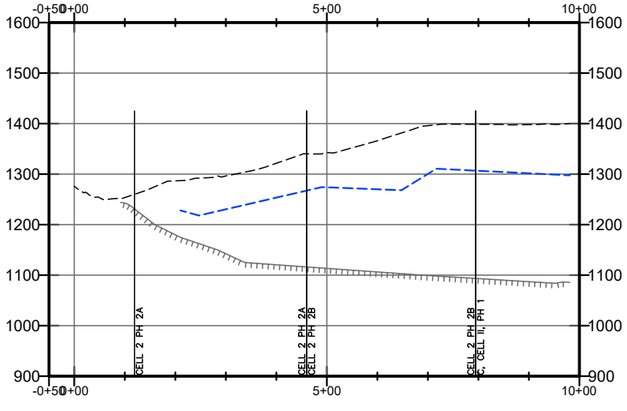
NS-02 SECTION



ES-02 SECTION

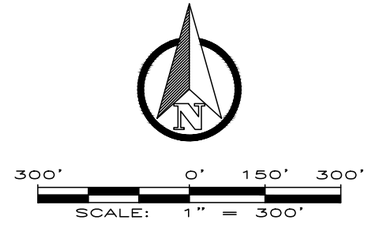


NS-03 SECTION



LEGEND:

- SUBGRADE
- TOPO 2026-07-01
- LEACHATE LIQUID LEVEL 2026-06-01



REFERENCE AERIAL TOPO BASED ON JULY 1, 2026 AERIAL SURVEY PROVIDED BY PROPELLER

FIGURE 4

CROSS SECTIONS
COMPREHENSIVE STABILITY ANALYSES

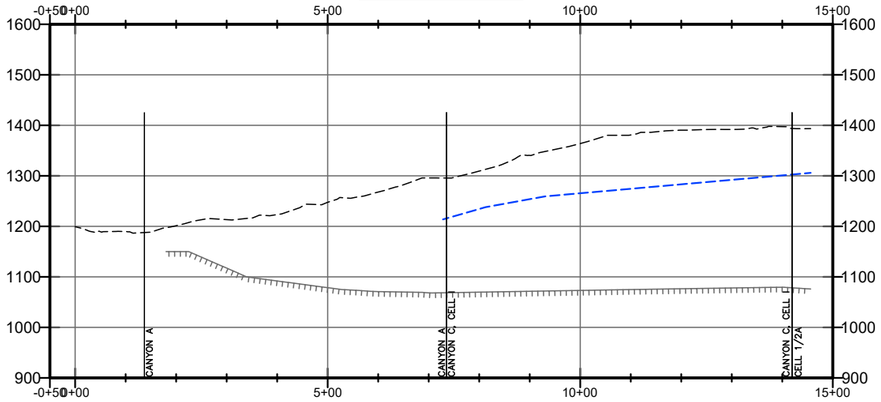
CHIQUITA CANYON LANDFILL
CASTAIC, CA

Geo-Logic ASSOCIATES

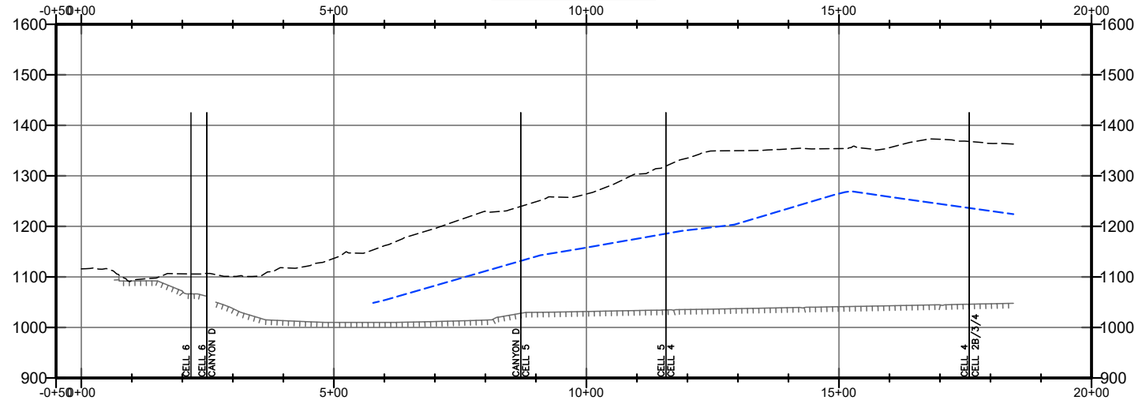
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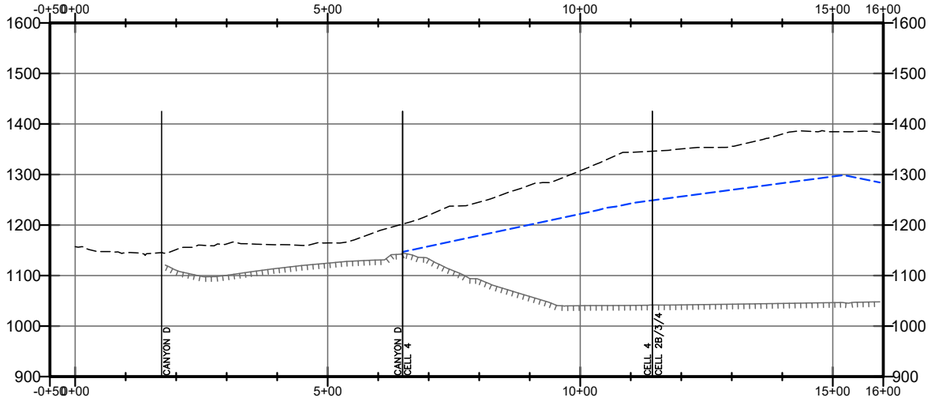
SS-01 SECTION



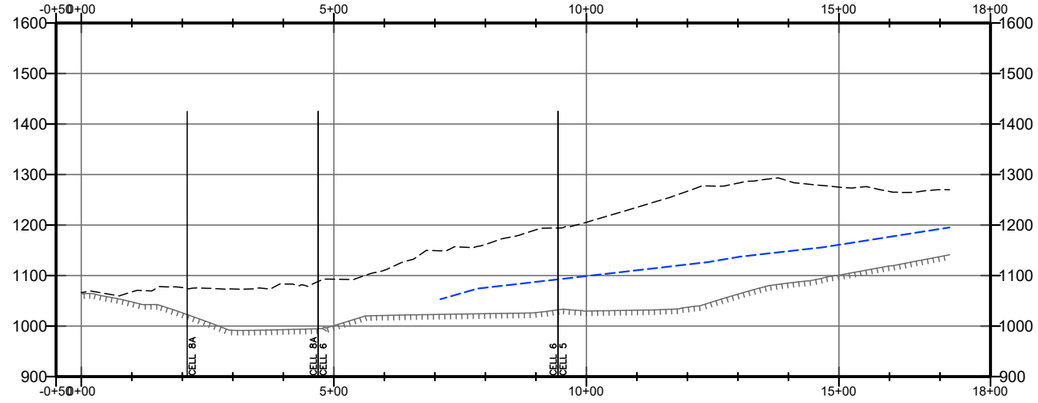
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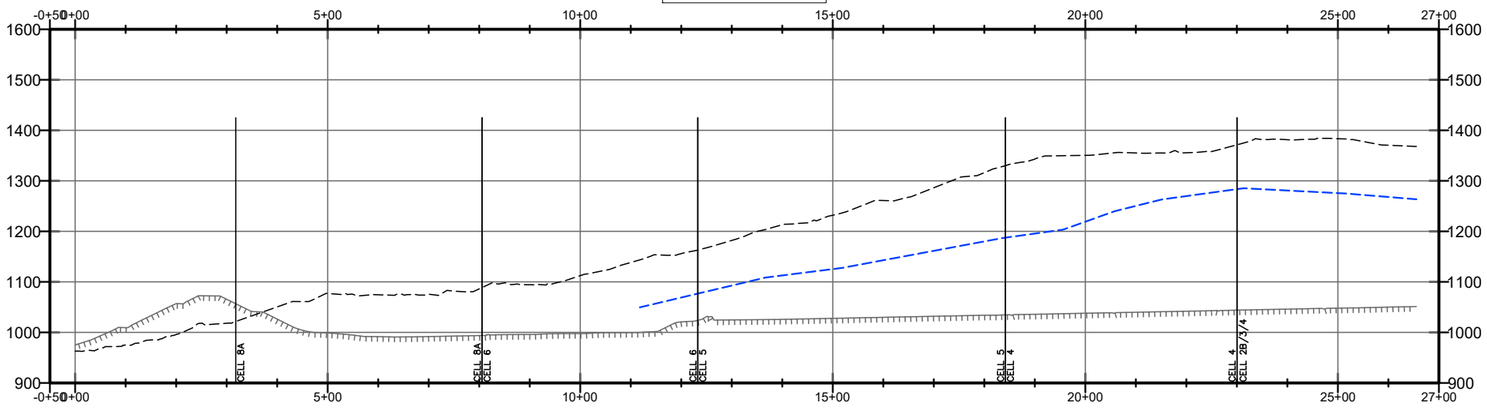
SS-02 SECTION



SS-04 SECTION



SS-05 SECTION



LEGEND:

- SUBGRADE
- TOPO 2026-07-01
- LEACHATE LIQUID LEVEL 2026-06-01

300' 0' 150' 300'

SCALE: 1" = 300'

REFERENCE AERIAL TOPO BASED ON JULY 1, 2026 AERIAL SURVEY PROVIDED BY PROPELLER

FIGURE 5

CROSS SECTIONS COMPREHENSIVE STABILITY ANALYSES

CHIQUITA CANYON LANDFILL CASTAIC, CA

Geo-Logic ASSOCIATES

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Appendix A
REVISED WORK PLAN AND CORRESPONDENCE

Appendix A-1
MARCH 13, 2025 REVISED COMPREHENSIVE GLOBAL STABILITY STUDY WORK PLAN

Geo-Logic ASSOCIATES

March 13, 2026

Mr. Dylan Smith
Chiquita Canyon Landfill
29201 Henry Mayo Drive
Castaic, California 91384

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

Dear Mr. Smith:

This Revised Comprehensive Global Stability Study Work Plan (Revised Work Plan) was prepared by Geo-Logic Associates, Inc. (GLA) to address the February 23, 2026 Department of Toxic Substances Control (DTSC) comments on the December 17, 2025 Comprehensive Global Stability Work Plan (Work Plan). The Revised Work Plan also addresses Work Plan comments from the California Department of Resources Recycling and Recovery (CalRecycle) and the County of Los Angeles Department of Public Health, acting as the Local Enforcement Agency (LEA).

ORIGINAL WORK PLAN

The December 2025 Work Plan was prepared by GLA to describe the means and methods to address the 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 CalRecycle's 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]

The purpose of the December 2025 Work Plan was 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 in the Work Plan, the analyses would 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 would also address stability of existing alternatives and alternatives that may be proposed in response to DTSC's October 15, 2025 letter.

DTSC REQUIREMENTS

On February 23, 2026, DTSC provided "*comments and recommendations to be incorporated into a revised comprehensive global stability study work plan for DTSC approval*." The DTSC correspondence attached a CalRecycle letter that included additional comments and recommendations and DTSC noted "*All these comments must be addressed in order for DTSC to approve the work plan*." On March 6, 2026, Chiquita received additional comments on the Work Plan from the LEA that are identical to the CalRecycle comments. The DTSC and CalRecycle/LEA comments are incorporated in this Revised Work Plan. To provide additional context, the DTSC and CalRecycle/LEA comments are identified verbatim in Attachment 1 in *italics*, with GLA's response immediately below.

PURPOSE OF REVISED WORK PLAN

The purpose of the Revised 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. In accordance with the CalRecycle comments (see Attachment 1), the Revised Work Plan adds an assessment of the eastern Landfill slopes in addition to the northern, western, southern, and Tank Farm 13 slopes. The analyses will also

[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.

address stability of existing alternatives and alternatives that may be proposed in response to DTSC's October 15, 2025 letter.

DATA SOURCES

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 landfill. This information includes site-specific landfill design, constructing, and testing information; published information regarding municipal solid waste (MSW) shear strength; published information regarding liner component shear strength; published relevant case histories, relevant geologic and seismologic information; and site-specific data that has included:

Site topographic maps.

The results of surface crack and fissure mapping performed at the site.

Leachate removal information.

Leachate level measurements.

LFG monitoring well boring logs.

LFG monitoring well pressure data.

Temperature probe data.

Relevant observations from regular site surveys, special site surveys by GLA staff, construction observations, and other similar sources site construction.

Landfill containment system information including material property data for the different materials.

These data sources are referenced, and relevant site-specific data are included in the following reports:

GLA (2024a) West and North Slope Stability Analyses; February 2024.

GLA (2024b) West and North Slope Stability Analysis (DRAFT); March 2024.

GLA (2024c) Evaluation of Los Angeles Regional Water Quality Control Board Denial of Cell 8B Final Construction Quality Assurance Report; June 2024.

GLA (2024d) Master Development Plan Stability Analyses; August 2024.

GLA (2024e) Information to Address Regulatory Agency Western and Southern Slope Stability Evaluation Comments; December 2024.

A consolidated reference list for these reports follows the detailed response to comments in Attachment 1. As a general practice, each successive analysis has incorporated newly available site data and any additional published information considered relevant to the analyses being performed. Potentially applicable published information identified by DTSC and/or CalRecycle/LEA will be reviewed and incorporated, as appropriate. This information will include, but not be limited to:

> Ghazizadeh, S., and Bareither, C A. (2020), "Temperature Effects of Internal Shear Behavior in Reinforced GCLs.", J. Geotech. Geoenvir. Engrg., ASCE, 146(1), 14 pp.
>
> Stark, T.D., N. Huvaj-Sarihan, and G. Li, "Shear Strength of Municipal Solid Waste for Stability Analyses," Environmental Geology J., Springer Pub., http://dx.doi.org/10.1007/s00254-008-1480-0, 57(8), 2009, 1911-1923.

Additional information not identified by DTSC or CalRecycle/LEA that will be reviewed includes, but is not limited to:

> Akpinar, M.V., and Benson, C.H. (2005). *Effect of temperature on shear strength of two geosynthetic clay liner interfaces*. Geotextiles and Geomembranes, 23(6), 443–463.
>
> Karademir, T. (2011). *Elevated temperature effects on interface shear strength of geosynthetics*. Ph.D. Dissertation, School of Civil and Environmental Engineering, Georgia Institute of Technology, Atlanta, Georgia.
>
> Karademir, T., and Stark, T.D. (2014). *Elevated temperature effects on geosynthetic interface shear strength*. Proceedings, 10th International Conference on Geosynthetics, Berlin, Germany.
>
> Rowe, R.K., and Rimal, S. (2012). *Time and temperature effects on geomembrane strain from gravel indentations*. Canadian Geotechnical Journal, 49(12), 1417–1430.
>
> Koerner, R.M. (2012). *Designing with Geosynthetics*, 6th Edition. Xlibris Publishing, Bloomington, Indiana.
>
> Hsuan, Y.G., Koerner, R.M., and Lord, A.E. (2008). *Temperature effects on the mechanical behavior of high-density polyethylene geomembranes*. Geosynthetics International, 15(6), 376–387.

In GLA's opinion, the available site-specific data, supplemented by relevant peer-reviewed studies and published technical literature, provide an adequate technical basis for comprehensive global stability evaluations. Should the analyses identify any data gaps that could materially influence the evaluation, those gaps will be identified

and discussed in the stability analysis report, along with any recommended additional data collection or evaluation.

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

[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.

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 based on a deterministic assessment of the magnitudes and bedrock spectral accelerations associated with maximum credible earthquakes (MCEs) on Holocene-active faults within 100 km of the landfill. Consistent with the December GLA report, the deformations will be calculated using the MCEs and bedrock accelerations on the Holser, San Gabriel, and San Andreas faults. Potential displacements associated with the Newport-Inglewood fault will also be considered to address the CalRecycle and LEA comments.

Previous displacement analyses used the Bray and Travasarou (2007) procedure because it is widely used in California and is generally considered a standard-of-practice approach for estimating earthquake-induced slope displacements in geotechnical engineering applications, including landfill stability evaluations. Although Bray and Macedo (2019) represents a more recent refinement of the Newmark-type displacement procedure, it has not yet been adopted as a universal standard of practice within the profession. Nevertheless, in the interest of addressing the DTSC comment and providing additional context for comparison, GLA will perform supplemental displacement estimates using the Bray and Macedo (2019) procedure and compare those results with the Bray and Travasarou (2007) analyses.

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:

> **Degraded Municipal Solid Waste (MSW) Shear Strength**. As described in Attachment 1, the December GLA (2024e) report incorporated degraded municipal solid waste (MSW) shear strength parameters explicitly recommended by Dr. Timothy Stark, who was retained by the regulatory agencies as their technical expert.[4] GLA therefore assumes that DTSC accepts these parameters for use in the Comprehensive Global Stability analyses. The Stark-recommended degraded shear strength profile is shown in Attachment 1.

[4] 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.

Displaced Unaffected (or Non-Degraded) MSW Shear Strength. The July 7, 2024 Stark Memo provided a recommended bilinear strength envelope for displaced, non-degraded MSW. This recommendation was adopted for the December GLA (2024e) report and will be carried forward for use as applicable in the Comprehensive Global Stability analyses.

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.[5] As described in more detail in Attachment 1, the shear strength envelope presented in Kavazanjian et al. (2013) was not developed solely from data obtained at the Operating Industries, Inc. (OII) Landfill. Although the OII investigation provided one of the most comprehensive datasets of large-scale MSW shear testing and is therefore frequently cited, the recommended strength relationships presented in the paper were developed through consideration of a broader body of information. Kavazanjian et al. (2013) synthesize results from multiple published MSW shear strength studies, including laboratory and field testing programs and back-analyses of landfill slope performance reported in the literature (e.g., Singh and Murphy, 1990; Landva and Clark, 1990; Kavazanjian et al., 1995; Stark et al., 2009; Zekkos et al., 2006–2010). Accordingly, the recommended shear strength envelope represents the collective behavior of MSW observed across numerous studies and landfill sites rather than conditions specific to the OII facility.

Liner Shear Strength. The December GLA (2024e) analyses incorporated the residual shear strength parameters for liner systems potentially affected by the reaction and elevated temperatures, as recommended in the July 7, 2024 Stark Memorandum. These recommendations will be implemented in the evaluations described in this Revised Work Plan. For liner systems not affected by the reaction and elevated temperatures, large-displacement shear strengths will be used. Where site-specific laboratory test data are not available, liner shear strength parameters will be assessed using information from the published literature referenced previously in this Revised Work Plan and in Attachment 1.

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,

[5] 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.

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.

Previous stability evaluations for the landfill have incorporated both leachate levels and LFG pressures in the stability analyses, and sensitivity analyses have been performed to evaluate the potential effects of variations in these pressures on calculated factors of safety and estimated displacements. The same analytical approach will be used in the current evaluation. Representative leachate elevations and LFG pressures will be developed based on available monitoring data and relevant field observations, and sensitivity analyses will be performed to evaluate conditions reflecting historically observed maximum leachate levels and LFG pressures, as appropriate. Stability analyses will be performed using the SLIDE2 software package, which includes the capability to explicitly incorporate gas pressures in the stability modeling. Accordingly, the methods used in the current analyses will be consistent with those applied in previous landfill stability evaluations and will address the potential influence of both leachate and LFG pressures on stability conditions.

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.

Any known or anticipated construction-related activities that alter site topography will be considered and incorporated in the analyses.

The results of surface crack and fissure mapping performed at the site.

Leachate removal information.

Leachate level measurements.

LFG monitoring well boring logs.

LFG monitoring well pressure data.

Temperature probe data.

Relevant design and construction information 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 slopes, one or more west-to-east cross sections will be identified to evaluate stability of the eastern slopes, one or more north-to-south cross sections will be identified to evaluate stability of the northern slopes, 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.[6]

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. In accordance with CalRecycle and LEA comments, the report will be provided to DTSC in draft form and will not be finalized until DTSC comments are addressed. 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

[6] 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.

period. The schedule also includes a four-week DTSC Draft Report review and comment period. Shorter or longer review, approval, and comment periods 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

ID	Task Name	Start	Finish	Duration
1	REVISED WORK PLAN SUBMITTAL	3/16/2026	3/16/2026	0d
2	AGENCY REVIEW AND APPROVAL	3/16/2026	4/24/2026	30d
3	DATA COLLECTION, REVIEW, EVALUATION, AND SUMMARIES	4/27/2026	5/15/2026	15d
4	IDENTIFY CROSS SECTIONS AND BUILD MODELS	5/18/2026	5/29/2026	10d
5	RUN ANALYSES AND SCENARIOS	6/1/2026	6/5/2026	5d
6	PREPARE DRAFT REPORT	6/8/2026	6/19/2026	10d
7	INTERNAL REVIEW & REVISE REPORT	6/22/2026	7/3/2026	10d
8	SUBMIT DRAFT REPORT FOR AGENCY REVIEW	7/6/2026	7/6/2026	0d
9	AGENCY REVIEW AND COMMENT	7/6/2026	8/14/2026	30d
10	REVISE AND SUBMIT FINAL REPORT	8/17/2026	8/28/2026	10d

Attachment 1
INFORMATION TO ADDRESS DTSC, CALRECYCLE, AND LEA
COMPREHENSIVE STABILITY WORK PLAN REVIEW COMMENTS
Chiquita Canyon Landfill

DTSC FEBRUARY 23, 2026 COMMENTS

General Comments

1. *Estimate Reduced Shear Strength of Municipal Solid Waste (MSW) due to SET Event: Include estimated Post-SET MSW shear strength properties for analysis profiles slices that intersect areas of documented SET effects at high temperature. Respondents shall provide MSW shear strength parameters that are representative of conditions near the end of/following an SET event from either (1) site-specific MSW sampling and shear strength testing from CCL; (2) technical references; or (3) other proposed parameters approved by DTSC.*

All GLA stability analyses performed in 2024 to assess the western and southern slopes of the landfill incorporated reduced shear strengths for degraded MSW potentially affected by the reaction. These reports include:

GLA (2024a) West and North Slope Stability Analyses; February 2024.

GLA (2024b) West and North Slope Stability Analysis (DRAFT); March 2024.

GLA (2024c) Evaluation of Los Angeles Regional Water Quality Control Board Denial of Cell 8B Final Construction Quality Assurance Report; June 2024.

GLA (2024d) Master Development Plan Stability Analyses; August 2024.

GLA (2024e) Information to Address Regulatory Agency Western and Southern Slope Stability Evaluation Comments; December 2024.

Prior to the December GLA (2024e) report, the shear strength of degraded municipal solid waste (MSW) was based on published literature values. The December GLA report incorporated degraded MSW shear strength parameters explicitly recommended by Dr. Timothy Stark. Dr. Stark was retained by the regulatory agencies as their technical expert, and his recommendations regarding degraded MSW shear strength parameters were therefore incorporated into the analyses. Figure 4 from the December GLA report is included with this attachment and illustrates both the degraded MSW profile assumed in the earlier GLA analyses (GLA 2024a, 2024b, 2024c, and 2024d) and the Stark-recommended degraded MSW profile used in the December analyses. Use of the Dr. Stark-recommended profile was identified in the original Work Plan and is retained in the Revised Work Plan. GLA therefore assumes that DTSC accepts these parameters for use in the analyses.

2. *SET Event Effects on Liner Geotextile, Geomembrane, and Geosynthetic Clay Liner (GCL) Interface Shear Strength: When considering analysis profiles slices that*

intersect areas of documented SET event effects with high temperatures, evaluate the potential adverse thermal effect on shear strength properties of geotextiles and geomembranes (e.g., degradation of peak strength of GCLs). DTSC notes that at some locations, the high or highest SET-event-induced MSW temperatures are at the greatest depths of the probe array and are at much higher temperatures. DTSC notes at select temperature monitoring probe (TP) locations (based on readings from CCL temperature probes in SCS RMC® on January 8, 2026), the deepest temperature readings are the highest, and exceed 200° Fahrenheit (F), including TP-03 at 232°F, TP-09 at 207°F, TP-21 at 253°F, and TP-25 at 202°F.

The Workplan should provide technical literature references, or information from product manufacturers that estimate the shear strength properties of side-slope bottom liner interfaces during or following an exposure to the estimated elevated MSW, leachate and landfill gas temperatures typical of the CCL SET event. And, based on technical literature and product vendor data, whether additional adverse, accelerated chemical effects on geotextiles/geomembranes/GCL may occur from contact with leachate or landfill gas at elevated SET temperatures. Also, evaluate whether higher SET-related temperatures warrant "de-rating" of the peak and residual interface shear strength estimated for floor and side slope bottom liners, respectively. If so, apply these "de-rated" shear strength liner interface properties to the stability analysis.

Available technical literature indicates that the GCL internal shear strength typically exceeds its interface strength. However, at higher temperatures (e.g., from a SET event), some GCLs exhibit reduced internal shear strength.[1] For those areas of CCL with side-slope GCL bottom liners, CCL should evaluate the likelihood of whether the estimated elevated MSW/leachate temperatures at depth - associated with the CCL SET event - might reduce the GCL bottom liner's internal shear strength such that the GCL internal shear strength becomes weaker than the GCL interface shear strength. If so, include a GCL residual internal shear strength ("de-rated" for SET-induced higher temperature of GCL) in the stability analysis.

Potential effects of elevated temperatures on the shear strengths of geosynthetic materials underlying the landfill have been considered in previous analyses (see, for example, the GLA December 2024e report addressing western and southern slope stability). These potential effects will continue to be evaluated based on information available in the published technical literature and data obtained from existing temperature monitoring probes. The evaluation will consider the magnitude of the heat source and the proximity of elevated

[1] *Ghazizadeh, S., and Bareither, C A. (2020), "Temperature Effects of Internal Shear Behavior in Reinforced GCLs.", J. Geotech. Geoenvir. Engrg., ASCE, 146(1), 14 pp.*

temperatures to the nearest side slope or base liner system to determine whether temperature-related reductions in geosynthetic shear strength are warranted. In addition to the GCL reference identified by DTSC, other technical resources that will be considered include, but are not limited to:

Akpinar, M.V., and Benson, C.H. (2005). *Effect of temperature on shear strength of two geosynthetic clay liner interfaces*. Geotextiles and Geomembranes, 23(6), 443–463.

Karademir, T. (2011). *Elevated temperature effects on interface shear strength of geosynthetics*. Ph.D. Dissertation, School of Civil and Environmental Engineering, Georgia Institute of Technology, Atlanta, Georgia.

Karademir, T., and Stark, T.D. (2014). *Elevated temperature effects on geosynthetic interface shear strength*. Proceedings, 10th International Conference on Geosynthetics, Berlin, Germany.

Rowe, R.K., and Rimal, S. (2012). *Time and temperature effects on geomembrane strain from gravel indentations*. Canadian Geotechnical Journal, 49(12), 1417–1430.

Koerner, R.M. (2012). *Designing with Geosynthetics*, 6th Edition. Xlibris Publishing, Bloomington, Indiana.

Hsuan, Y.G., Koerner, R.M., and Lord, A.E. (2008). *Temperature effects on the mechanical behavior of high-density polyethylene geomembranes*. Geosynthetics International, 15(6), 376–387.

3. *<u>Account for New Soil Surcharge Loads</u>: The Workplan must propose evaluating the degree of estimated settlement that typically occurs at an MSW and that which will occur as a result of the SET event in the study. Also, the Workplan must propose evaluating where new soil surcharge placement is estimated to be needed to reestablish grades for positive drainage, and that the study will account for these new estimated soil surcharge loads on the applicable stability profiles.*

The Revised Work Plan does not include evaluation of additional soil surcharge loads because no soil surcharge placement is currently planned or contemplated. The stability analyses will evaluate existing conditions and anticipated landfill configurations based on currently available grading information. While settlement of municipal solid waste is a well-recognized behavior, the magnitude and spatial distribution of settlement associated with future events cannot be reliably predicted at this stage and there are no design plans indicating that soil will be placed to reestablish grades for drainage. Accordingly, evaluating new soil surcharge loads would require purely hypothetical assumptions regarding both

settlement magnitude and the location and thickness of potential soil placement. Such assumptions would not meaningfully inform the stability evaluation. Nevertheless, as is common practice in landfill stability analyses, sensitivity evaluations may be performed to illustrate the potential effects of generalized surcharge loading where appropriate.

4. *Account for Displacement of Liner Systems vs. Final Cover: The Work Plan should include displacement analysis and should differentiate, and separately estimate magnitudes of displacement of liner systems, versus displacement of final cover.*

The requested differentiation between displacements of liner systems and final cover is not directly relevant to the evaluation of overall landfill stability addressed in this Revised Work Plan. Because final grading plans have not yet been developed and the final cover system has not yet been selected, a meaningful analysis of final cover stability cannot be performed at this time.

Engineering Comments – ESPO (Peter Gathungu)

1. *Methods of Analysis. Analytical Methods: It is stated in the first sentence in the second paragraph that the Bray and Travasarou (2007) procedure will be used to calculate seismic displacements consistent with previous analyses. DTSC notes that more recent/updated procedures/models, such as Bray & Macedo (2019), are available and may be more appropriate. While consistency with previous analyses may be informative, DTSC requires the use of updated procedures which are based on more robust data. However, Bray and Travasarou (2007) may be used in addition to the updated procedures.*

The Bray and Travasarou (2007) procedure is widely used in California and is generally considered a standard-of-practice approach for estimating earthquake-induced slope displacements in geotechnical engineering applications, including landfill stability evaluations. This method has therefore been the basis for displacement evaluations performed by our firm and many others on similar projects. While Bray and Macedo (2019) represents a more recent refinement of the Newmark-type displacement procedure, it has not yet been adopted as a universal standard of practice within the profession. Selection of appropriate analytical methods is typically an engineering judgment made by the engineer of record based on project conditions and accepted professional practice. Nevertheless, in the interest of addressing the DTSC comment and providing additional context for comparison, we will perform supplemental displacement estimates using the Bray and Macedo (2019) procedure and compare those results with the Bray and Travasarou (2007) analyses.

2. *Methods of Analysis. Analytical Methods: It is stated in the first sentence in the second paragraph that maximum credible earthquakes (MCEs) associated with Holocene-active faults with 50 kilometers of the landfill will be used in determination of seismic displacements. MCEs must account for Holocene-active faults within a 100-kilometer radius of the landfill as defined in 22 California Code of Regulations (CCR) Section 66260.10 and 27 CCR Section 20164. The Work Plan must be revised so that the MCE complies with above regulation citations.*

The deterministic seismic hazard evaluation focused on seismic sources within approximately 50 km of the site because ground motions at the site are controlled by nearby faults with the highest combinations of magnitude and site peak ground acceleration (PGA). As summarized in previous report tables, the Holser (1.8 km, M6.8, PGA ≈0.60g), Santa Susana (8.2 km, M6.9, PGA ≈0.51g), Northridge (7.8 km, M6.9, PGA ≈0.42g), San Gabriel (6.4 km, M6.4, PGA ≈0.37g), and Southern San Andreas (32 km, M8.2, PGA ≈0.19g) faults dominate the ground motion estimates because they produce the largest expected shaking at the site. Faults located at greater distances generally produce substantially lower spectral accelerations due to attenuation of seismic waves with distance and therefore do not meaningfully influence the controlling deterministic ground motions. Nevertheless, in response to the DTSC comment, additional regional faults within 100 km of the site will be identified and reviewed to confirm that they do not control the deterministic hazard for the site.

3. *Methods of Analysis. Material Properties for Analysis: It is stated in the third bullet - In-Place and Unaffected (or Non-Degraded) MSW Shear Strength - that "[t]he Kavazanjian et al. (2013) MSW shear strength will be assumed for MSW outside of the reaction area that has not been affected by movement". The Kavazanjian et al. (2013) MSW (municipal solid waste) shear strength is based on investigation at the Operating Industries, Inc. (OII) Superfund Site Landfill where landfill operations occurred from 1948 to 1984 and as such the nature of MSW at OII may not be representative of MSW at CCL as the types of waste placed in landfills are expected to vary over time. The Work Plan must be revised to discuss the representativeness of OII data for use at CCL.*

The shear strength envelope presented by Kavazanjian et al. (2013) in the Rankine Lecture/Peck Lecture paper was not developed solely from data obtained at the Operating Industries, Inc. (OII) Landfill. While the OII site investigation provided an extensive and well-documented dataset of large-scale direct shear tests and waste characterization that contributed meaningfully to the understanding of MSW shear strength behavior, the recommended shear strength relationships presented in Kavazanjian et al. (2013) were

developed through consideration of a much broader body of information. The paper synthesizes results from multiple published MSW testing programs, including laboratory and field shear tests reported in the technical literature, as well as back-analyses of landfill slope performance and failures documented in prior studies. These datasets include, among others, the MSW shear strength work reported by Singh and Murphy (1990), Landva and Clark (1990), Kavazanjian et al. (1995), Stark et al. (2009), and Zekkos et al. (2006–2010). The recommended envelope is therefore intended to represent the collective behavior of MSW observed across numerous landfills and studies rather than conditions unique to the OII facility. The OII testing program is frequently cited because it represents one of the most comprehensive field-based MSW shear strength datasets available; however, the strength relationships presented in Kavazanjian et al. (2013) reflect a synthesis of multiple independent datasets and case histories and have been widely adopted in the geotechnical literature and engineering practice as representative of typical MSW shear strength behavior. The Revised Work Plan includes this discussion.

4. *Methods of Analysis - Leachate and Landfill Gas [LFG] Pressures: It is stated in this section that the most recent leachate elevation data, and LFG pressures estimated based on relevant field observations will be used in the analyzed cross sections. DTSC requires that sensitivity analysis includes the use of past observed highest/maximum leachate levels and gas pressures, given the varying conditions, spatial and temporal, that are likely to be encountered at the landfill. In addition, the analysis methods, including software, used for stability evaluation must have the capability to accommodate gas pressures.*

Previous stability evaluations for the landfill have incorporated both leachate levels and LFG pressures in the stability analyses, and sensitivity analyses have been performed to evaluate the potential effects of variations in these pressures on calculated factors of safety and estimated displacements. The same analytical approach will be used in the current evaluation. Representative leachate elevations and LFG pressures will be developed based on monitoring data and relevant field observations, and sensitivity analyses will be performed to evaluate conditions reflecting historically observed maximum leachate levels and LFG pressures, as appropriate. Stability analyses will be performed using the SLIDE2 software package, which includes the capability to explicitly incorporate gas pressures in the stability modeling. Accordingly, the methods used in the current analyses will be consistent with those applied in previous landfill stability evaluations and will address the potential influence of both leachate and LFG pressures on stability conditions.

5. *Work Plan Components - Data Collection and Review: The objective of the data collection task is stated to be review of site data collected since the last stability evaluations were completed in the fourth quarter of 2024. We recommend the Work Plan be revised to include discussion of site data collected prior to the stability evaluations completed in the fourth quarter of 2024, including site data used in landfill design and the approved closure plan or site closure documents, if available, as well as the adequacy of that site data.*

This information has been included by reference in all previous stability reports, and a comprehensive list of previous references is included at the end of this attachment. The adequacy of the data is addressed in the Revised Work Plan.

6. *Work Plan Components - Data Collection and Review: The first bullet in this section states that current (2025) and earlier site topography will be reviewed and incorporated in the site data used for slope stability evaluations. DTSC requires that any known or anticipated construction-related activities, including known or anticipated construction-related activities that alter site topography, are also considered and incorporated into a revised work plan.*

Any known or anticipated construction-related activities that alter site topography will be considered and incorporated as described in the Revised Work Plan.

7. *Work Plan Components - Documentation and Recommendations: The text states that if warranted, recommendations for additional investigations for the assessment of subsurface MSW properties, fluid levels, internal pressures, and/or short-term stabilization measures will be included in the global slope stability report. The additional investigations to assess MSW properties, fluid levels, and internal pressures are likely to take an extended period. DTSC recommends the currently available data is reviewed and validated to determine if it is adequate to complete the global slope stability evaluation. If the available data is determined to be inadequate and therefore additional investigations are warranted, CCL must commence planning and implementation of the additional investigations.*

This recommendation is acknowledged.

CALRECYCLE JANUARY 9, 2026 AND LEA MARCH 6, 2026 COMMENTS

General Comments

1. *The purpose of this global stability study is to provide a detailed stability analysis of the current SET Event and to identify potential issues should it continue to expand. Because CCL has elected not to construct any containment barrier(s) to prevent additional expansion of the SET Event and has placed critical environmental infrastructure (i.e., the temporary leachate storage and treatment system) at the toe*

of the slope in Canyon D, Cell 6, and Cell 8, the CCL shall locate the critical cross-section for each slope and determine if the slope will be stable based on both static and seismic forces.

The preliminary cross sections identified in the Work Plan address this comment. As described in the Revised Work Plan, additional cross sections will be considered and/or the existing cross sections may be relocated based on information developed during the data review portion of the analysis.

2. *Stability analyses shall be based on accepted engineering practice, information gathered from academic and/or industry publications, and realistic past case studies, such as the Countywide and Bridgeton Landfills, that account for actual field conditions.*

All previous analyses have addressed this comment. The analyses performed for this investigation will continue to consider all relevant information.

3. *The CCL is using a containment strategy (i.e., removing heat via typical gas extraction wells) that has not been effective at other SET Events. Current data from CCL demonstrate that the SET Event is expanding outside CCL's Data-Driven Reaction Boundary identified in September and December of 2025, and there is no barrier to contain it within the currently identified boundary. Once the entire facility is covered with a geomembrane, field observations of cracks and fissures indicative of slope instability will no longer be possible. As a result, CCL must use slope stability analyses to identify locations where, if specific slope instability metrics are observed, CCL could implement countermeasures, such as an earthen slope buttress or pressure relief system, to stabilize the waste mass so a slope failure similar to one that occurred on the western slope does not occur.*

The statements regarding the effectiveness of containment strategies, the potential expansion of the SET event, and the need for potential future countermeasures represent regulatory observations and operational considerations rather than elements of the analytical methodology. Because this work plan is intended to describe the technical approach, data sources, and analytical methods that will be used to evaluate slope stability, inclusion of these broader operational or policy considerations is outside the scope of the work plan. The results of the stability analyses will, however, provide information that can be used to evaluate and support potential mitigation measures should such actions be required.

General Comments

1. *Page 3. Include the Newport-Inglewood Fault in the analysis.*

The Newport-Inglewood fault was identified and considered in all previous GLA analyses (see the seismic hazard table included with this attachment). This fault is 49 km from the landfill and has a moment magnitude of 7.50. However, due to its distance from the site, the resultant site ground motions associated with an earthquake on this fault are small (the site PGA associated with the MCE is only 0.094g). Therefore, this fault is less critical than the closer faults. However, if CalRecycle and the LEA believe it necessary, displacements associated with rupture of the Newport-Inglewood fault can be performed.

2. *Page 4 – In-Place and Unaffected Municipal Solid Waste (MSW) Shear Strength: Include non-degraded MSW strength parameters[2] in the PLAN. Based on field case histories, this MSW shear strength does not use a cohesion value, which impacts stability at low vertical stresses.*

See the above response to DTSC comments regarding MSW shear strength and the text in the Revised Work Plan.

3. *Page 4 - Liner Shear Strength: Apply residual interface strength to all side slope bottom liner interfaces.*

See the above response to DTSC comments regarding residual shear strength and the text in the Revised Work Plan.

4. *Page 4 and 5 - Leachate and Landfill Gas Pressures: Replicate localized and transient features that are likely to cause slope instability during a SET Event, similar to what occurred in the western slope area. These localized, transient, and high liquid and gas pressures should be used, and, where data are unavailable, gas pressure should be determined using the ideal gas law and measured temperatures.*

Leachate and LFG pressures will be evaluated as described in the responses to the DTSC comments and in the Revised Work Plan. Use of the ideal gas law to estimate landfill gas pressure solely from measured temperature is of limited applicability because pressure is not a function of temperature alone. Application of the ideal gas law requires additional assumptions regarding gas volume and gas mass, both of which are expected to vary within the landfill due to gas generation, migration, extraction, changing waste void space, and liquid/vapor phase interactions. Accordingly, measured field pressures and site observations provide a more reliable basis for evaluating landfill gas pressures.

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[2] *Stark, T.D., N. Huvaj-Sarihan, and G. Li, "Shear Strength of Municipal Solid Waste for Stability Analyses," Environmental Geology J., Springer Pub., http://dx.doi.org/10.1007/s00254-008-1480-0, 57(8), 2009, 1911-1923.*

5. *Page 5 - Data Collection and Review: Include liquid and gas pressures as data sources. Use an inverse analysis of the west slope failures to estimate gas and liquid pressures to use on the east and south slopes.*

Liquid and LFG pressures will be based on site-specific data to the extent practicable. Implementation of an inverse (back-analysis) approach is not practical under the current conditions because the key inputs required for a meaningful back-calculation are not well defined. Inverse analyses typically rely on identification of a reasonably well-constrained failure surface and reasonably representative pore pressure conditions at the time of failure. In the areas of concern at the site, no clearly defined or continuous failure surface has been identified. In addition, available information indicates that leachate levels and LFG pressures are localized and transient, varying spatially and temporally within the waste mass. Under these conditions, it is not possible to uniquely define the geometry of a potential failure mechanism or the pore pressure distribution required to perform a reliable back-calculation. As a result, an inverse analysis would require numerous assumptions regarding failure surface geometry and localized pressure conditions, which could lead to non-unique or non-representative results. For this reason, forward stability analyses that evaluate a range of plausible pressure conditions and potential failure geometries provide a more technically defensible approach for assessing stability.

6. *Page 5 - Cross Sections, Material Properties, and Pressures: GLA must determine the critical cross-section for both the east and south sides of the landfill. While a general representational cross-section is valuable for comparison purposes, multiple cross-sections should be selected to identify the critical cross-section (i.e., the cross-section that yields the lowest factor of safety and highest seismically induced permanent deformation).*

This comment is incorporated in the Revised Work Plan.

7. *Page 6 - Documentation and Recommendations: GLA should provide a draft report and afterwards present their findings to the DTSC before finalizing the report so comments and changes can be incorporated.*

This comment is incorporated in the Revised Work Plan.

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Table 1
SUMMARY OF HOLOCENE- ACTIVE FAULTS WITHIN 50 KILOMETERS OF THE SITE
Chiquita Canyon Landfill
Castaic, California

FAULT	DISTANCE (km)	MAXIMUM OR CHARACTERISTIC MAGNITUDE (M_w)	EQUALLY WEIGHTED MEDIAN PEAK ACCELERATION (g)	MEDIAN PEAK GROUND ACCELERATION (g)			
				1	2	3	4
Holser	1.8	6.80	0.60	0.630	0.437	0.697	0.626
Santa Susana	8.2	6.90	0.51	0.485	0.443	0.600	0.502
Northridge	7.8	6.90	0.42	0.457	0.399	0.395	0.415
San Gabriel	6.4	7.30	0.37	0.369	0.335	0.391	0.365
Oak Ridge (Connected)	7.8	7.40	0.36	0.355	0.305	0.365	0.405
Oak Ridge (Onshore)	7.8	7.20	0.35	0.346	0.290	0.383	0.380
San Cayetano	10	7.20	0.28	0.275	0.245	0.299	0.309
Simi-Santa Rosa	14	6.90	0.24	0.254	0.231	0.241	0.228
Garlock	49	7.72	0.19	0.216	0.188	0.175	0.184
Southern San Andreas	32	8.20	0.19	0.207	0.184	0.165	0.191
Sierra Madre (Connected)	21	7.30	0.18	0.191	0.159	0.171	0.194
Santa Ynez (Connected)	28	7.40	0.15	0.148	0.147	0.142	0.144
Sierra Madre (San Fernando)	21	6.70	0.13	0.141	0.124	0.143	0.128
Santa Ynez (East)	28	7.20	0.13	0.133	0.137	0.133	0.128
Santa Monica	36	7.40	0.12	0.123	0.115	0.178	0.135
Verdugo	28	6.90	0.11	0.114	0.106	0.117	0.112
Anacapa-Dune	36	7.20	0.11	0.115	0.102	0.104	0.118
Sierra Madre	37	7.20	0.10	0.103	0.095	0.099	0.106
Newport-Inglewood	49	7.50	0.09	0.095	0.090	0.087	0.088
Pitas Point	46	7.30	0.09	0.095	0.082	0.084	0.096
Malibu Creek	42	7.00	0.08	0.080	0.085	0.046	0.073
Ventura-Pitas Point	42	7.00	0.07	0.077	0.069	0.075	0.074
Puente Hills	50	7.00	0.07	0.075	0.066	0.072	0.074
Pleitas	51	7.10	0.07	0.070	0.069	0.071	0.073
Hollywood	42	6.70	0.07	0.065	0.073	0.075	0.058
Mission Ridge-Arroyo Parida-Santa Ana	47	6.90	0.07	0.067	0.066	0.069	0.065
Elysian Park	48	6.70	0.06	0.066	0.057	0.065	0.058

NOTES:

1. Fault distances and MCE magnitudes based on USGS 2008 Seismic Hazard Mapping Program (Field et al., 2008; Petersen et al., 2008). The maximum (or characteristic) magnitude along a fault is estimated by using the mapped surface geology and recorded earthquake location and depth distributions to obtain fault length or area. Using the fault dimensions and, in some cases, estimates of where earthquake ruptures may initiate and terminate (segmentation models), the maximum or characteristic magnitudes are calculated from relationships that are dependent on fault length or area (Ellsworth, 2003).
2. Where applicable, near source directivity average factor calculated using the Abrahamson (2000)-Somerville (1997) method.
3. Attenuation relationships :
   1. Norman A. Abrahamson, Walter J. Silva, and Ronnie Kamai, Summary of the ASK14 Ground Motion Relation for Active Crustal Regions, Earthquake Spectra, Volume 30, No. 3, pages 1025-1055, August 2014.
   2. David M. Boore, Jonathan P. Stewart, Emel Seyhan, and Gail M. Atkinson, NGA-West2 Equations for Predicting PGA, PGV, and 5% Damped PSA for Shallow Crustal Earthquakes, Earthquake Spectra, Volume 30, No. 3, pages 1057-1085, August 2014; © 2014.
   3. Kenneth W. Campbell and Yousef Bozorgnia, NGA-West2 Ground Motion Model for the Average Horizontal Components of PGA, PGV, and 5% Damped Linear Acceleration Response Spectra, Earthquake Spectra, Volume 30, No. 3, pages 1087-1115, August 2014.
   4. Brian S.-J. Chiou and Robert R. Youngs, Update of the Chiou and Youngs NGA Model for the Average Horizontal Component of Peak Ground Motion and Response Spectra, Earthquake Spectra, Volume 30, No. 3, pages 1117-1153, August 2014.

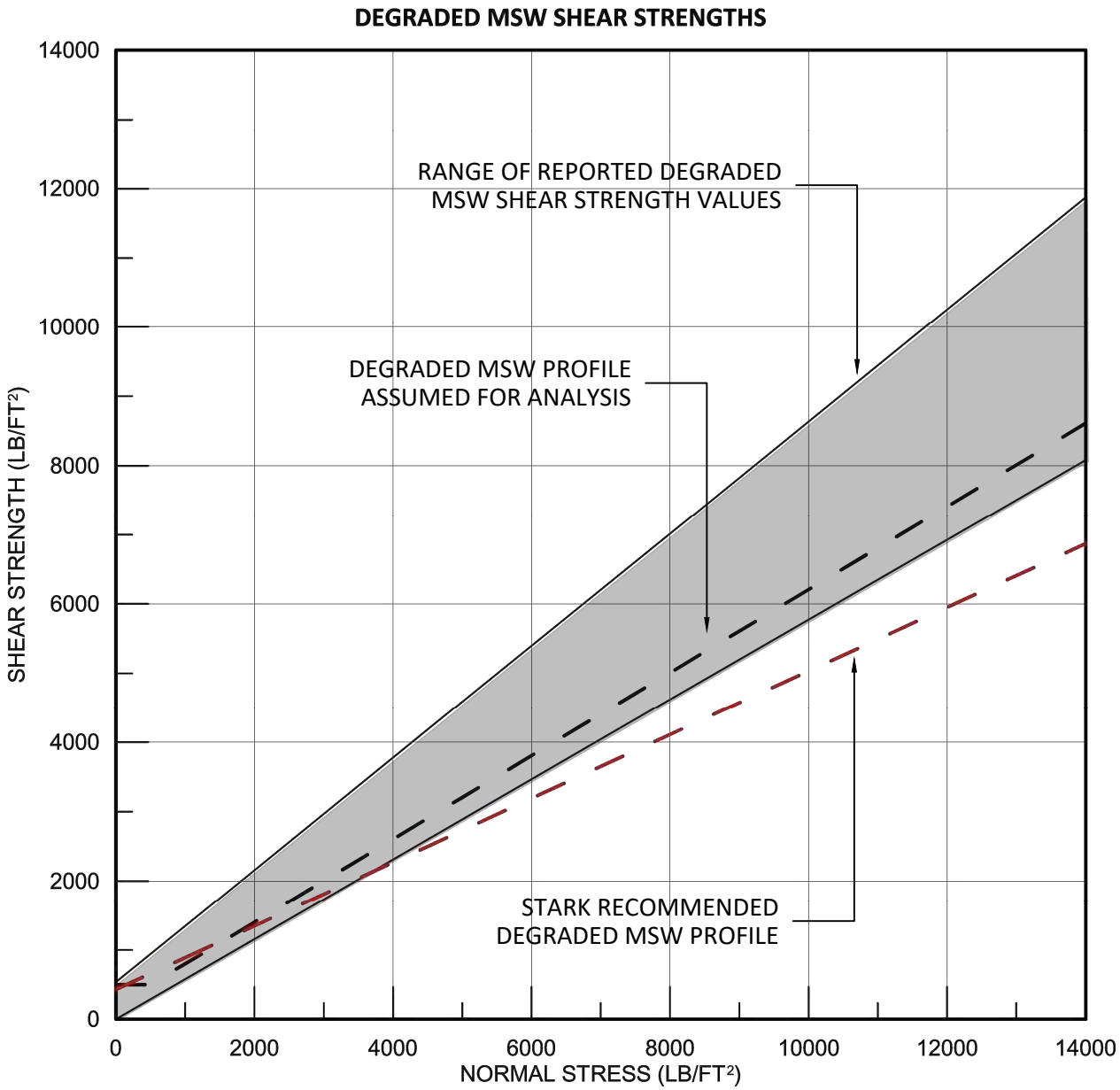


FIGURE 4

REPRESENTATIVE DEGRADED MSW STRENGTH

UPDATED STABILITY EVALUATION
CHIQUITA CANYON LANDFILL
LOS ANGELES COUNTY, CA

Geo-Logic ASSOCIATES

DRAWN BY: RM	DATE: SEPTEMBER 2024	JOB NO. RM22.1077

Appendix A-2
CHIQUITA RESPONSE TO LEA MAY 6, 2026 CORRESPONDENCE

May 20, 2026

Via E-Mail
Eric Morofuji, EHS III
Solid Waste Management Program
Local Enforcement Agency (LEA)
5050 Commerce Drive
Baldwin Park, California 91706
emorofuji@ph.lacounty.gov

Re: Chiquita Canyon, LLC – Response to LEA's May 6, 2026 Comments on the Revised Comprehensive Global Stability Study Work Plan

Dear Mr. Morofuji:

Chiquita Canyon, LLC (Chiquita) submits this response to the Los Angeles County Department of Public Health, Solid Waste Management Program, acting as the Local Enforcement Agency (LEA), regarding the LEA's May 6, 2026 letter commenting on Chiquita's Comprehensive Global Stability Study Work Plan (the Plan). This response also addresses LEA Comment No. 4, which requests that Chiquita review and submit written responses addressing the comments and technical issues raised in Dr. Timothy Stark's April 19, 2026 letter. Chiquita provides its responses below.

> ***LEA Comment No. 1:*** ***High-Temperature Piezometer Installation.*** *Consistent with CalRecycle's 2024 guidance, install high temperature piezometers, rated above 450° F, to obtain direct measurements of elevated liquid pressures along the western slope. In addition, install a series of piezometers along the southern and eastern slopes to monitor pore pressure and to assess SET Event progression and slope stability risk.*

Chiquita will assess the need for high-temperature piezometer installations following the collection and evaluation of the data for the global slope stability study. If during that data collection and evaluation it is determined there is insufficient liquid pressure data to properly evaluate global slope stability, Chiquita will begin the installation of high-temperature piezometers in discrete areas where additional data is needed to properly evaluate global slope stability.

> ***LEA Comment No. 2:*** ***Real-Time Slope Failure Detection System.*** *Implement a real-time slope movement detection system capable of identifying deformation during construction activities and during periods of high-temperature SET Event expansion. This system should ensure timely detection of slope movement due to instability and inform rapid response actions.*

Chiquita does not currently have concerns regarding slope movement or instability in the planned

excavation areas. However, as a precautionary measure, Chiquita has begun the procurement process for real time slope movement monitoring devices to be used in areas where slope excavation activities are planned. These devices will be deployed during excavation to monitor for slope movement, enable timely detection of potential deformation or instability, and support rapid response actions, if needed.

> ***LEA Comment No. 3:* Continued Leachate and Gas Removal.** *Continue the uninterrupted extraction of leachate and landfill gas to reduce pore pressures, limit gas pressure buildup, and lower the risk of additional flow-type failures. Continuous removal shall be maintained to support slope stability and prevent further deformation along the western slope and other areas.*

Elevated temperature landfill (ETLF) events are characterized by the accumulation of heat within the waste mass in excess of heat removal and dissipation capacities. As such, Chiquita's primary strategy to curtail its ETLF event has been to maximize the extraction of leachate and landfill gas to enhance heat removal from the waste mass. Chiquita has continued, and will continue, to remove leachate and landfill gas as expeditiously as practicable and to the best of its ability, despite ongoing constraints outside of Chiquita's control, including the ongoing lack of disposal capacity in Southern California and the rest of North America.[1]

Chiquita further maintains that no flow-type failure has occurred at the Landfill. Direct evidence collected from the Landfill continues to refute the occurrence of any type of flow-failure onsite.

> ***LEA Comment No. 4:* CCL shall review and submit written responses by May 20, 2026, addressing the comments and technical issues from Dr. Stark's letter dated April 19, 2026. See enclosed letter.**

As a preliminary matter, several of Dr. Stark's comments pertain to different reports,[2] different agency correspondence, and, in some instances, landfills other than the Chiquita Canyon Landfill

[1] In the past two years, Chiquita has contacted over 650 potential disposal facilities and is in constant discussions with disposal outlets about additional capacity and disposal volume. Chiquita continues to search for new potential disposal facilities.

[2] For example, Dr. Stark writes on page 1 of his letter, "The subject GLA Work Plan was prepared to respond to the March 22, 2024 letter to CCL from the Los Angeles County Department of Public Health in its role as the Local Enforcement Agency (LEA). The LEA letter appended a March 12, 2024 letter from Todd Thalhamer of CalRecycle that included a series of comments and requirements based on his review of the information in the February 2024 Stability Analysis Report (GLA, 2024) that was prepared to address the stability analysis requirements in LEA/CalRecycle November 2023 letters to CCL." Dr. Stark's history of the Plan is incorrect. The Plan identified as the "subject" Plan was initially dated December 17, 2025 and was prepared to address the Department of Toxic Substances Control's (DTSC) October 15, 2025 comments that referenced a Department of Resources Recycling and Recovery (CalRecycle) September 12, 2025 letter to DTSC which contained a recommendation that Chiquita complete a comprehensive global stability study. The Plan was revised on March 13, 2026 in response to DTSC's February 23, 2026 comments, which included comments from CalRecycle dated January 9, 2026. These same CalRecycle comments were later appended to a comment letter from the LEA, dated March 6, 2026. As Dr. Stark correctly states, Mr. Thalhamer's March 12, 2024 comments were associated with a Geo-Logic Associates February 2024 Stability Analysis Report. These comments were addressed in a subsequent work plan and report that itself was updated several times in 2024.

(the Landfill).[3] Portions of the review also appear to rely on outdated or unrelated information and do not consistently reflect an understanding of the current site conditions, updated monitoring results, recent topographic evaluations, or the actual scope and purpose of the March 13, 2026 revised Plan.[4] Nonetheless, Chiquita notes Dr. Stark's comments and will incorporate them, as applicable, into the stability analyses discussed in the Plan.

Chiquita provides the following overarching clarifications:

- Previous and future analyses distinguish, and will continue to distinguish, between areas affected by the reaction and areas interpreted to remain unaffected. Material properties and pressure assumptions have been, and will continue to be, selected based on site-specific conditions and available data.
- Yield acceleration evaluations have been performed, and will continue to be performed, in accordance with standard accepted practice by identifying the critical static failure surface and seismic acceleration that results in a pseudostatic safety factor of 1.0.
- Geo-Logic Associates (GLA) did not use the Kavazanjian et al. (1995) MSW strength model referenced in the review comments but instead used the more recent Kavazanjian et al. (2013) model for non-degraded waste, together with reduced-strength assumptions for degraded waste conditions where appropriate. Degraded waste strength has been, and will continue to be, consistent with Dr. Stark's recommendations.
- Leachate and landfill gas (LFG) pressures will continue to be evaluated using the best available site-specific information, including monitoring data, field observations, and evolving site conditions.
- Multiple cross sections are being evaluated for all landfill slopes, and prior analyses have incorporated conservative assumptions regarding the lateral and vertical continuity of degraded waste zones, elevated pressures, and heterogeneous waste conditions.
- Preliminary buttress stability analyses for the western slope have already been completed and will be refined and incorporated into the Comprehensive Global Stability Study Report as the design advances.

GLA will continue to evaluate its interpretations of the data regarding deformation mechanisms, settlement behavior, and potential instability against newly acquired field observations, survey data, monitoring information, and construction observations. As additional information becomes available, GLA will update its interpretations and analyses accordingly.

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[3] As another example, Dr. Stark writes on page 2 of his letter, "The landfill site is a former limestone quarry, which began in 1939 and ended in 1988. The quarrying resulted in two quarry pits, the North Quarry Pit and the South Quarry Pit, which were excavated to maximum depth of 240 feet below ground surface (bgs). The north and south quarry portions cover an area of approximately 52 acres. Landfilling began in the North Quarry Pit in 1974 and continued in this area until 1985. In 1985, the landfill underwent expansion to the southwest into the area known as the South Quarry Pit." Dr. Stark's description of the Chiquita Canyon Landfill is incorrect and instead describes a different landfill facility involving former limestone quarry operations and distinct North and South Quarry Pits.

[4] The inclusion of site history and operational details unrelated to the Chiquita Canyon Landfill raises concerns that portions of the review comments were derived from another document without adequate review of or reconciliation with the Plan. The incorrect regulatory and document history and the misidentification of the landfill facility raise additional concerns regarding the thoroughness and care applied in reviewing the Plan and preparing comments.

2.1 PURPOSE OF REVISED WORK PLAN

> ***Top of Page 3:*** *GLA states: "… address stability of existing alternatives and alternatives that may be proposed in response to DTSC's October 15, 2025 letter"*
>
> *GLA should address the alternatives for buttressing the west slope to stop the current slope movement/failure, which includes construction of a toe buttress. This analysis should include the factor of safety (FoS), i.e., the level of safety, used to design the buttress.*

Comment noted. As stated in the above response to LEA Comment No. 3, Chiquita maintains that no flow-type failure has occurred at the Landfill. Rather, the purpose of the west slope buttress is to re-route and/or relocate existing infrastructure, extend the "bottom" engineered liner system, construct a soil buttress with integral liquids drainage infrastructure, and cap the installation with EVOH geomembrane. The improvements will include: (i) a soil buttress which is designed and constructed with sufficient height, thickness, extent, compaction, and other criteria to provide adequate support to the west slope to prevent potential slope failure; and (ii) engineered liner, cover, gas control systems, and leachate and other liquids drainage sufficient to prevent the extrusion of leachate, other liquids, or saturated waste, and landfill gas emissions from the west slope.

The west slope buttress had not been identified as a mitigation measure when the Plan was prepared. Since that time, preliminary stability analyses have been completed for the proposed buttress, including evaluations of buttress geometry, material unit weight, and target factors of safety. These analyses were submitted to the U.S. Environmental Protection Agency (EPA) on May 12, 2026, and will be updated as necessary during final design and as part of the Comprehensive Global Stability Study Evaluation, and the results will be included in the Comprehensive Global Stability Study Report.

2.2 DATA SOURCES

> *Middle of Page 4: GLA cites the following reference, which I did not co-author.*
>
> *Karademir, T., and Stark, T.D. (2014). Elevated temperature effects on geosynthetic interface shear strength. Proceedings, 10th International Conference on Geosynthetics, Berlin, Germany*

Comment noted. Future documents will include the correct citation.

2.3 METHODS OF ANALYSIS - Basis of Analysis

> *Middle of Page 5: GLA states. "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."

Current temperature and landfill gas generation show the SET Event is expanding as fingers towards the south and east. In addition, SCS was tasked with analyzing if any internal break existed within the waste mass that could possibility contain the SET Event. In their Revised Reaction Break/Barrier Plan dated July 8, 2024 SCS found that:

- ***No Cell Separation Berms*** *– Section 4, Page 4 - historical photos b/t 2002 and 2008 do not indicate berms that could be used to isolate reaction.*
- ***No Legacy Roads*** *– Section 4, Page 4 - historical photos between 2002 and 2024 no legacy road segment that could be used to isolate reaction.*
- ***Uncertain Intermediate Soil Cover Break*** *– Section 4, Page 4 - historical photos in 2004 indicate soil cover on sideslopes of Cell 1/2A, 2-Phase 2B, and Canyon A but borings do not indicate thick enough soil cover layer.*

As a result, there is no barrier or break to prevent the SET Event from encompassing/consuming the entire waste management unit. Thus, global stability analyses should assume that the SET Event can/will encompass the entire waste management unit. This means elevated liquid and gas pressures and degraded waste strengths should be used for all stability analyses to predict future stability. In areas the SET Event has not reached yet, normal liquid and gas pressures and non-degraded waste strengths can be used to evaluate current stability.

Dr. Stark's comments regarding SCS's evaluation and interpretation of site conditions are noted. Dr. Stark's final sentence acknowledges that normal liquid and gas pressures and non-degraded waste strengths may be used in areas where the ETLF[5] has not reached. This distinction is inconsistent with his broader assertion earlier in the paragraph that the ETLF should be assumed capable of encompassing the entire waste management unit for all future stability evaluations. Importantly, that distinction is generally consistent with the methodology applied in previous GLA analyses, which differentiate between areas interpreted to be affected by the ETLF and areas interpreted to remain unaffected, based on available monitoring data, field observations, operational history, and other site-specific information. Consistent with prior practice, future analyses will continue to evaluate site conditions and apply material properties and pressure assumptions appropriate to the specific area and condition being analyzed.

2.4 METHODS OF ANALYSIS - Analytical Methods

Bottom of Page 5: *GLA states. "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……....."*

[5] Although Dr. Stark's letter refers to the reaction as a "SET event," "ETLF" is the accurate term that appropriately characterizes the nature of the reaction occurring at the Landfill.

> *Search routines should not be used with a seismic coefficient. GLA should locate the critical circular and non-circular failure surfaces without a seismic coefficient. After locating these two critical failure surfaces, GLA should vary the seismic coefficient for only these two failure surfaces to estimate the yield accelerations (see Stark and Idries, 2025).*

Dr. Stark's comment describes the standard procedure for estimating yield acceleration. Previous GLA analyses have followed this procedure by first identifying the critical circular and non-circular failure surfaces under static conditions, without applying a seismic coefficient, and then varying the seismic coefficient only along those identified surfaces to estimate the critical combination of yield acceleration and failure surface that results in a pseudostatic safety factor of 1.0, consistent with the referenced methodology. Future analyses will continue to follow this approach.

> ***Middle of Page 6:*** *GLA states. "GLA will perform supplemental displacement estimates Instead of a rigid block, Kramer and Smith (1997) use a compliant (deformable) block to estimate permanent, earthquake-induced displacements, which is better than the original rigid-block. However, given the current slope instability along the western slope and a significant SET Event, I think it is appropriate to consider a more sophisticated method such as the software package FLAC by Itasca in Minneapolis, Minnesota (Lin et al., 2025a and b) to estimate permanent, earthquake-induced displacement mechanisms and magnitudes. A FLAC analysis can simulate the complex response of degraded waste, elevated liquid pressures, and the shear behavior of geosynthetic interfaces in the bottom liner system (Lin et al., 2025a and b).*

Comment noted. Chiquita will consider a FLAC analysis for this purpose.

2.5 METHODS OF ANALYSIS - Material Properties for Analysis

> ***In-Place and Unaffected (or Non-Degraded) MSW Shear Strength***.
>
> ***Middle of Page 6:*** *GLA states. "GLA will perform supplemental displacement estimates using the Bray and Macedo (2019) procedure and compare those results with the Bray and Travasarou (2007) analyses."*
>
> *Kavazanjian et al. (1995) suggest the following effective stress shear strength parameters for MSW: cohesion (c') of 500 psf (24 kPa) and friction angle (□) of 0 degrees for normal stress range of 0 to 30 kPa and c' = 0 and □ = 33 degrees for normal stress range of 30 to 300 kPa as shown in Figure 2 below from Kavazanjian et al. (1995). The use of a c' of 500 psf (24 kPa) at low stress has a significant influence on the calculated factor of safety (FoS). If GLA continues to insist on using the strength parameters in Kavazanjian et al. (1995), it is recommended the FoS also be computed using the MSW shear strength parameters provided by Huvaj and Stark (2008) and Stark et al. (2009), which are based on failed landfill slopes.*

The stress-dependent MSW strength parameters recommended by Stark et al. (2009) are:

0 ≤ Normal stress ≤ 4,200 psf c' = 125 psf and φ' = 35⁰ Normal stress ≥ 4,200 psf c' = 625 psf and φ' = 30⁰

Huvaj and Stark (2008) and Stark et al. (2009) only allow a c' of 125 psf at low normal stresses instead of 500 psf as recommended by Kavazanjian et al. (1995).

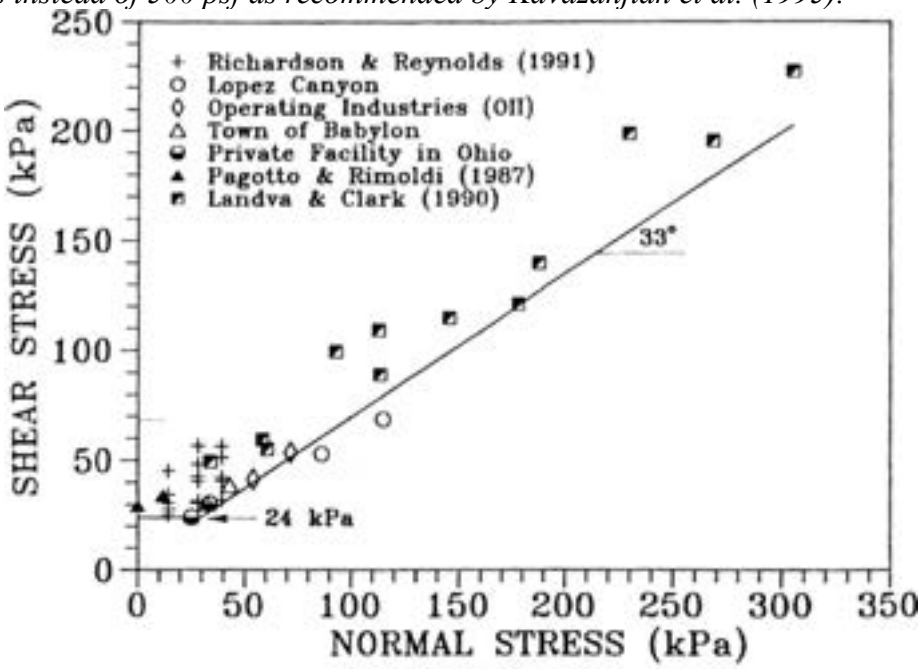


FIG. 2 Shear Strength of MSW

No analyses performed by GLA to date have used the Kavazanjian et al. (1995) strength model. Accordingly, the basis for Dr. Stark's statement that GLA "continues to insist" on using that strength model is unclear. GLA uses the Kavazanjian et al. (2013) strength model for non-degraded waste. That model was published after the Stark et al. (2009) model and is based on a larger dataset than was available when Stark et al. (2009) was published. In GLA's opinion, the Kavazanjian et al. (2013) model is more representative of intact MSW. Previous GLA analyses have explicitly included Dr. Stark's recommendation for degraded waste and will continue to do so in future analyses.

2.6 METHODS OF ANALYSIS - Leachate and Landfill Gas Pressures

Middle of Page 6: GLA states. "Stability analyses will be performed using the SLIDE2 software package, which includes the capability to explicitly incorporate gas pressures in the stability modeling."

GLA expresses concerns about using the Ideal Gas Law to estimate the liquid and gas pressures in their SLIDE2 stability analyses on Page 9 of 10 in Attachment 1. Then GLA states in Attachment 1:

> *"Accordingly, measured field pressures and site observations provide a more reliable basis for evaluating landfill gas pressures."*

I agree and recommend that CCL install some Geokon high temperature piezometers that have a working range up to 480^0F. This would provide a direct estimate of the elevated liquid pressures, rather than estimating them from downhole temperature measurements and the ideal gas law (discussed next). The increase in temperature causes an increase in liquid and gas pressures, which can cause slope instability.

Landfill gas is continuously generated during a SET Event. Thiel (1998) provides a procedure for incorporating gas pore pressure (ug) at the geomembrane-soil interface in an infinite-slope analysis for design of a gas pressure relief layer below a geomembrane final cover system to improve slope stability. The resulting infinite-slope analysis calculates the factor of safety (FoS) using the following expression:

$$FoS = \frac{a' + (h*\gamma*\cos(\beta - u_g)*tan(\emptyset')}{(h*\gamma*\sin(\beta)} \qquad (2)$$

where a' is the effective stress geosynthetic interface adhesion, β is the slope angle from the horizontal; h is the thickness of cover soil normal to the slope; γ is the average total unit weight of the cover soil placed above the geomembrane; and $\phi\phi$' is the effective stress interface friction angle. Inspection of this equation shows that gas pressure reduces the effective normal stress acting on the geomembrane interface, thereby reducing the interface friction and, ultimately the FoS.

Stark et al. (2010) use a similar approach that can be applied for modeling gas pressure in MSW landfills. For example, slope stability software allows a user to define pore-water or liquid pressure in a layer using a pore-water pressure ratio (see Equation (1) above, which relates the pore-water pressure to the static total vertical stress or a constant pore-water pressure, where the pore-water pressure is constant at all locations within a layer or material type. If a leachate level is also assigned to the same material unit (in this case, MSW) the pore-water pressures calculated by ru or constant pore pressure are added to the pore pressures calculated from the phreatic surface used to model the leachate level. Stark et al. (2010) present a hypothetical example in which pore-water pressures are modeled as a phreatic or piezometric surface, while gas pressures are incorporated using a constant pore pressure. If the gas pressure is measured as a pressure head, the pressure head can be converted to a pressure by multiplying it by the unit weight of landfill gas, e.g., γg = 81.5 pcf (12.8 N/m^3) as suggested by Thiel (1998).

As mentioned above, Chiquita will assess the need for high-temperature piezometer installations following the collection and evaluation of the data for the global slope stability study. Additionally, GLA will evaluate LFG pressures using the best available site-specific information at the time the analyses are performed. The analytical methods and pressure assumptions incorporated into the evaluations will be selected based on available monitoring data, site observations, and the specific conditions being analyzed. Consistent with previous analyses, LFG and leachate pressures may be represented using a combination of phreatic surfaces, pore-pressure ratios, equivalent pressure distributions, and/or the Thiel (1998) approach as appropriate for the available data and modeling approach.

2.7 WORK PLAN COMPONENTS - Data Collection and Review

Middle of Page 8: *GLA states. "Any known or anticipated construction-related activities that alter site topography will be considered and incorporated in the analyses."*

As a result, GLA should include the stability analyses used to size the west slope buttress that is proposed to stop the slope failure/movement that is currently occurring. This analysis should include the FoS to which the buttress is being designed, e.g., 1.5, and the size, width, and unit weight of the buttress material to stop the movement.

Stability analyses for the proposed western slope buttress have already been completed as part of the preliminary design evaluation. These analyses considered the conceptual and preliminary buttress geometry, material unit weight, and the target factors of safety for both static and seismic conditions. The analyses will be updated as appropriate during final design and the results will be incorporated into the Comprehensive Global Stability Study Report.

2.8 WORK PLAN COMPONENTS - Cross Sections, Material Properties, and Pressures

Top of Page 9: *GLA states. "Based on current site understanding, one or more east-to-west cross sections will be identified to evaluate stability of the western slopes, one or more west-to-east cross sections will be identified to evaluate stability of the eastern slopes, one or more north-to-south cross sections will be identified to evaluate stability of the northern slopes, and two or more cross sections will be identified to evaluate the southern slope of the landfill, including Tank Farm 13."*

I strongly disagree that only "one or more cross-sections" should be analyzed to evaluate the stability of the western, eastern, and northern slopes. Prior to this point in this Work Plan, GLA frequently describes the heterogeneous nature of MSW, gas and liquid pressures, MSW shear strength, and landfill geometry. As a result, analyzing only one cross-section is not sufficient to locate the critical cross-section, i.e., lowest static and seismic FoS. At a minimum, GLA should analyze two or more cross-sections for every slope as they proposed for the southern slope.

GLA's statement that "one or more" cross sections will be evaluated was not intended to suggest that only a single cross section would be analyzed for any slope. Rather, GLA will evaluate multiple cross sections for each landfill slope, as appropriate, to assess the range of site geometries,

waste conditions, and pressure conditions present across the facility. For example, the recent western slope buttress evaluation incorporated nine separate cross sections for the preliminary design assessment.

Previous GLA analyses have also accounted for the heterogeneous nature of the waste mass by incorporating multiple conservative assumptions regarding the lateral and vertical continuity of degraded waste zones, leachate conditions, and LFG pressures. For example, these analyses have assumed the zones of degraded waste and the leachate/LFG pressure surfaces are laterally and vertically continuous. GLA will continue this practice in future evaluations to ensure that the analyses reasonably bound the range of anticipated site conditions and identify critical stability conditions where present.

> ***Middle of Page 9:*** *GLA states. "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."*
>
> *Clearly GLA should use the fissures, tension cracking, leachate outbreaks, and other evidence of slope stability along the western slope to guide their inverse and forward slope stability analyses. For example, the current west slope movement should be used to estimate the liquid and gas pressures acting on the slope by assuming a FoS at or below unity (1.0), i.e., failure.*

This was exactly the procedure that was used for the buttress conceptual design analysis.

> *It is apparent that significant ongoing waste-mass movement/flow along the west slope is slope instability. For example, in its March 2026 Fissure and Tension Crack Monitoring Summary for CCL, GLA characterizes the observed cracking as "surface features" attributable to routine settlement rather than indicators of slope movement within the waste mass. This interpretation is inconsistent with field evidence, such as, the crack geometry, slope displacement patterns, and progressive widening of the movement area documented since late 2025, which indicate active slope movement not settlement due to thermal degradation of the waste. By dismissing these features as superficial, GLA's analysis fails to recognize the potential underlying instability mechanism and therefore cannot support credible conclusions about current or future slope stability. For example, GLA states in their March 2026 Fissure and Tension Crack Monitoring Summary for CCL:*
>
> > *"Observations on the western slope included bulging at the toe of the slope, vertical risers tilted in a downslope direction, "trampolining" of the geomembrane near the top of slope, and evidence of variable, multi-directional geomembrane stress between the crest and toe. The observed deformation is spatially coincident with, and likely associated with, the reaction area and corresponding zone of maximum settlement originally described and shown in Figure 3 of the GLA November 11, 2025 monthly summary report and reattached herein as Figure 3.*

> *Collectively, these features do not indicate a conventional slope instability involving movement along one or more discrete slip surfaces. Rather, the deformation pattern is more consistent with settlement-driven, time-dependent lateral squeezing of waste within the reaction area. In this interpretation, ongoing vertical compression and settlement of reaction area waste generate deviatoric stresses that are relieved through gradual outward deformation toward the slope face. This mechanism is expressed at the ground surface as bulging near the toe, rather than as a distinct translational or rotational instability. Chiquita intends to construct a soil buttress on the west side of the Landfill, adjacent to the prior "west slope toe drain project. Chiquita and its consultants are in the process of planning and designing this project."*

The reasoning above ignores the likely explanation that the observed phenomena are caused by slope instability/flow rather than settlement. For example, GLA concludes these observations "do not indicate a conventional slope instability involving movement along one or more discrete slip surfaces". As discussed below, one should not expect "conventional slope instability" during a SET Event. A SET Event is unique and results in more of a flow failure instead of a "conventional" slope failure. Consultants with prior SET-Event experience routinely identify these fissures, tension cracks, and displacement patterns as manifestations of active slope instability, not routine settlement. Without consideration of this possibility, CCL's monitoring and stability evaluations may fail to recognize the slope movement mechanism and resulting hazard.

In particular, the elevated gas and liquid pressures result in more of a flow failure than movement along a distinct failure surface, such as, a geosynthetic interface or weak layer of waste, in a non-SET Event facility. This is evident by the waste mass along the western slope moving/flowing outside of the limits of waste placement. A flow failure is more concerning than a non-SET Event slope failure because the waste mass can flow a greater distance than a no-flow failure mass due to the elevated gas and liquid pressures. A similar flow failure occurred during the SET Event in the Countywide MSW Landfill. If CCL does not continue to remove leachate from the landfill, more waste will likely become saturated, or near saturated, increasing the potential for additional slope movement/flow.

GLA's conclusion that bulging at the toe along the western slope is entirely "settlement-driven" may not be correct. Often, settlement induced movement causes the slope to flatten not bulge out at the toe. If the west slope does not undergo additional slope movements, it will eventually flatten, i.e., settle back into the landfill, due to a reduction in the gas and liquid pressures and thermal degradation of the waste. A good case study is presented in Jafari et al. (2017), which describes the progression of a SET Event through a MSW landfill and the manifestation of the souffle falling into the landfill at the end of a SET Event not during it, i.e., after slope instability occurs.

Dr. Stark's comments and interpretations are noted. However, much of the discussion appears to rely on older information and does not reflect more recent field observations, updated monitoring data, or current topographic evaluations completed for the Landfill. GLA's interpretations are routinely checked and refined against newly acquired field information, including updated survey and topographic datasets, observed deformation patterns, construction observations, and monitoring results as they become available.

As with any large and evolving waste mass, site understanding continues to develop as additional information is collected. Accordingly, interpretations are based on the totality of available site-specific data rather than generalized analogies or conceptual descriptions derived from unrelated facilities. The "soufflé" analogy is not a substitute for ongoing site characterization, deformation monitoring, and engineering evaluation grounded in current field conditions.

*****

If you have any questions, please do not hesitate to reach out to me at dylan.smith@wasteconnections.com.

Sincerely,



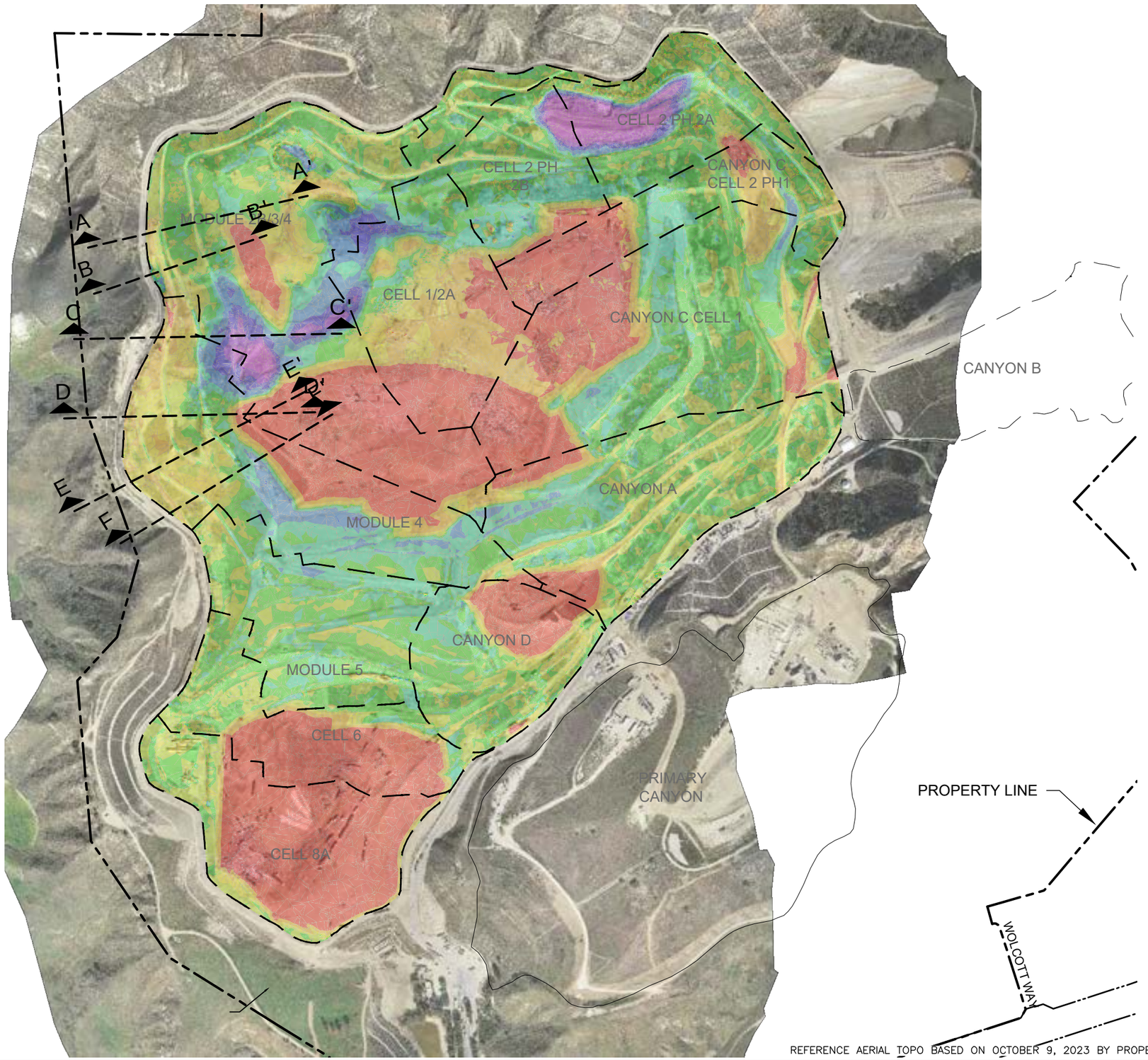
Dylan Smith
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Sarah Phillips, Chiquita Canyon
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Appendix B
SETTLEMENT-DEFORMATION PLOTS

Appendix B-1
2022-2023 SETTLEMENT



REFERENCE AERIAL TOPO BASED ON OCTOBER 9, 2023 BY PROPELLER

LEGEND

PROPERTY BOUNDARY

EXISTING LINER

FILL (FT)		CUT (FT)	
	>+10		>-20
	+10 TO +5		-20 TO -15
	+5 TO +2		-15 TO -10
	+2 TO 0		-10 TO -5
			-5 TO -2
			-2 TO 0

NOTE: MAP SHOWS FILL AND SETTLEMENT (CUT) BETWEEN 9/30/2022 AND 10/9/2023.

N

500' 0' 250' 500'

SCALE: 1" = 500'

FIGURE 1

SETTLEMENT MAP AND CROSS SECTIONS LOCATIONS

CHIQUITA CANYON LANDFILL
CASTAIC, CA

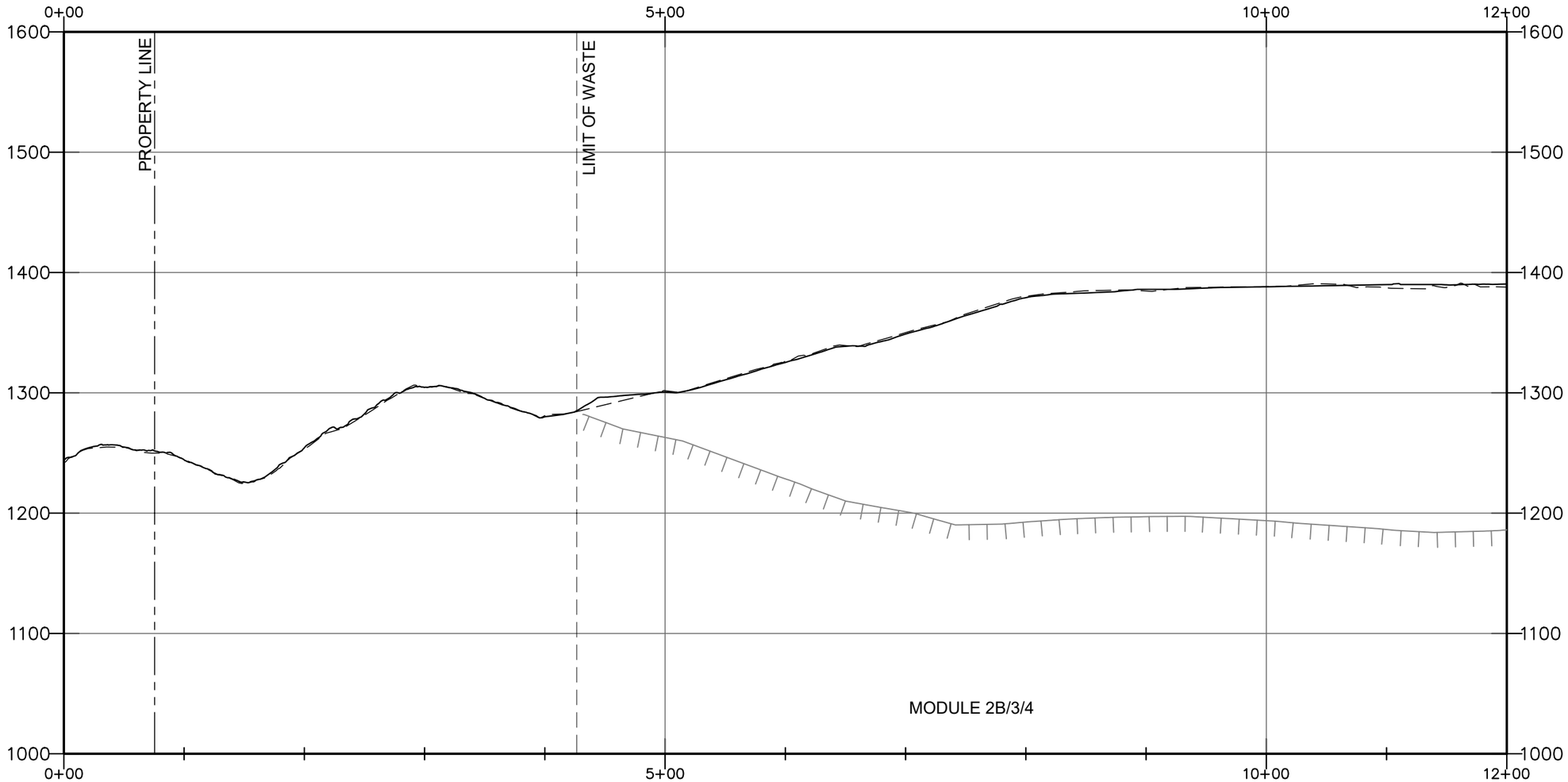
Geo-Logic ASSOCIATES

DRAWN BY: LP/RM	DATE: AUGUST 2026	JOB NO.: 1026.1002.100

P:\SITES\CHIQUITA CYN LF\COMPARATIVE STABILITY EVALUATION-2026\FIGURES\1026.1002-CCL-FIG 1-SETTLEMENT-2022VS2023-(2026-08-18).DWG August 20, 2026 - 11:02 AM BY: GLA-USER

P:\SITES\CHIQUITA CYN LF\COMPARATIVE STABILITY EVALUATION-2026\MODELS\PROFILES\ZCCL-XS-(2026-08-20)_22VS23.DWG August 20, 2026

SECTION A–A'



100' 0' 50' 100'

SCALE: 1" = 100'

LEGEND

- TOPOGRAPHY (OCTOBER 9, 2023)
- TOPOGRAPHY (SEPTEMBER 3, 2022)
- EXISTING LINER
- PROPERTY LINE
- LIMIT OF WASTE

FIGURE 2

CROSS SECTION A–A'

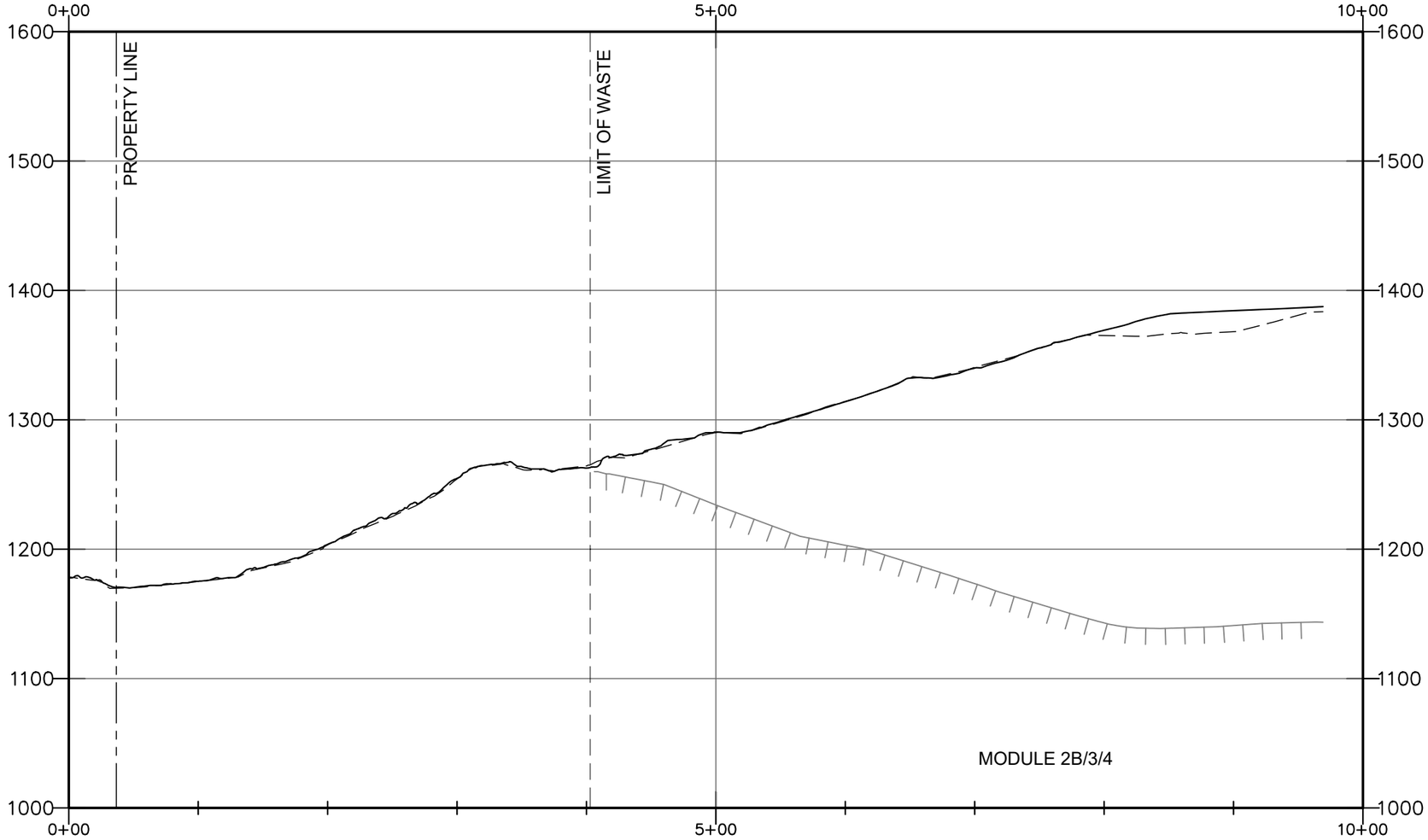
CHIQUITA CANYON LANDFILL
CASTAIC, CALIFORNIA

Geo-Logic ASSOCIATES

CAD DSGN BY: LP	DATE: AUGUST 2026	JOB NO. 1026.1002

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SECTION B–B'



100' 0' 50' 100'

SCALE: 1" = 100'

LEGEND

- TOPOGRAPHY (OCTOBER 9, 2023)
- TOPOGRAPHY (SEPTEMBER 3, 2022)
- EXISTING LINER
- PROPERTY LINE
- LIMIT OF WASTE

FIGURE 3

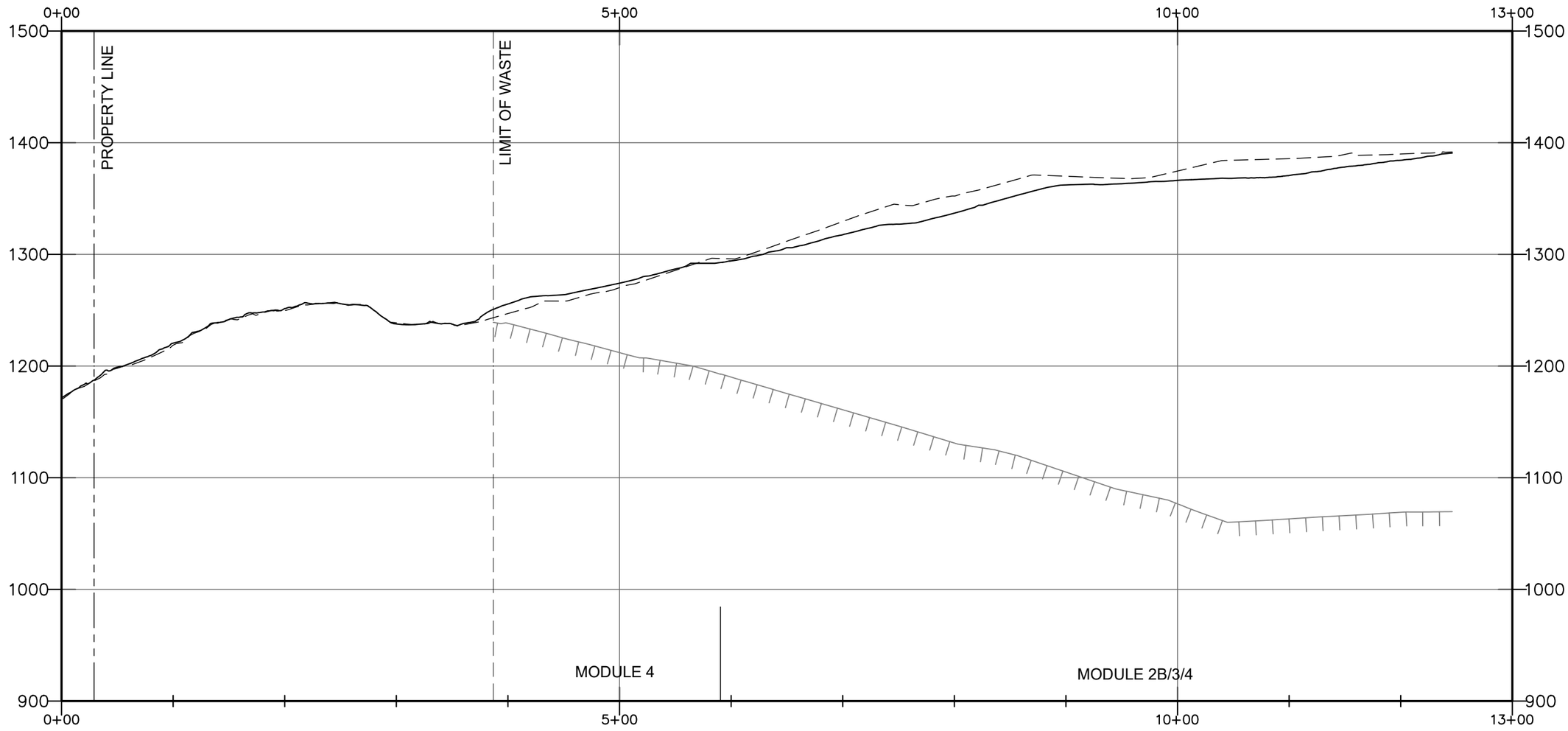
CROSS SECTION B–B'

CHIQUITA CANYON LANDFILL
CASTAIC, CALIFORNIA

Geo-Logic ASSOCIATES

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SECTION C–C'



100' 0' 50' 100'

SCALE: 1" = 100'

LEGEND

- TOPOGRAPHY (OCTOBER 9, 2023)
- TOPOGRAPHY (SEPTEMBER 3, 2022)
- EXISTING LINER
- PROPERTY LINE
- LIMIT OF WASTE

FIGURE 4

CROSS SECTION C–C'

CHIQUITA CANYON LANDFILL
CASTAIC, CALIFORNIA

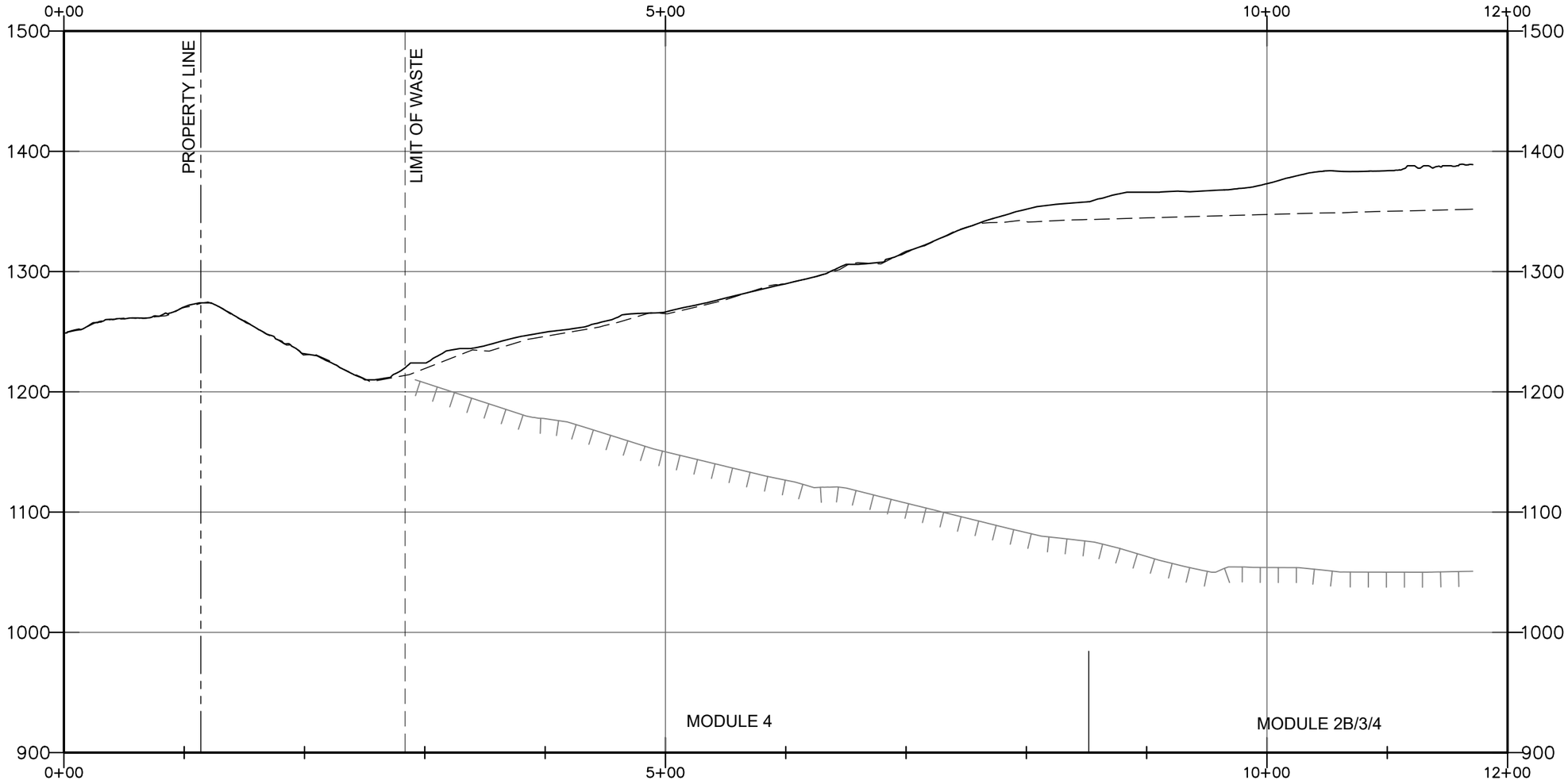
Geo-Logic ASSOCIATES

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SECTION D–D'



100' 0' 50' 100'

SCALE: 1" = 100'

LEGEND

- TOPOGRAPHY (OCTOBER 9, 2023)
- TOPOGRAPHY (SEPTEMBER 3, 2022)
- EXISTING LINER
- PROPERTY LINE
- LIMIT OF WASTE

FIGURE 5

CROSS SECTION D–D'

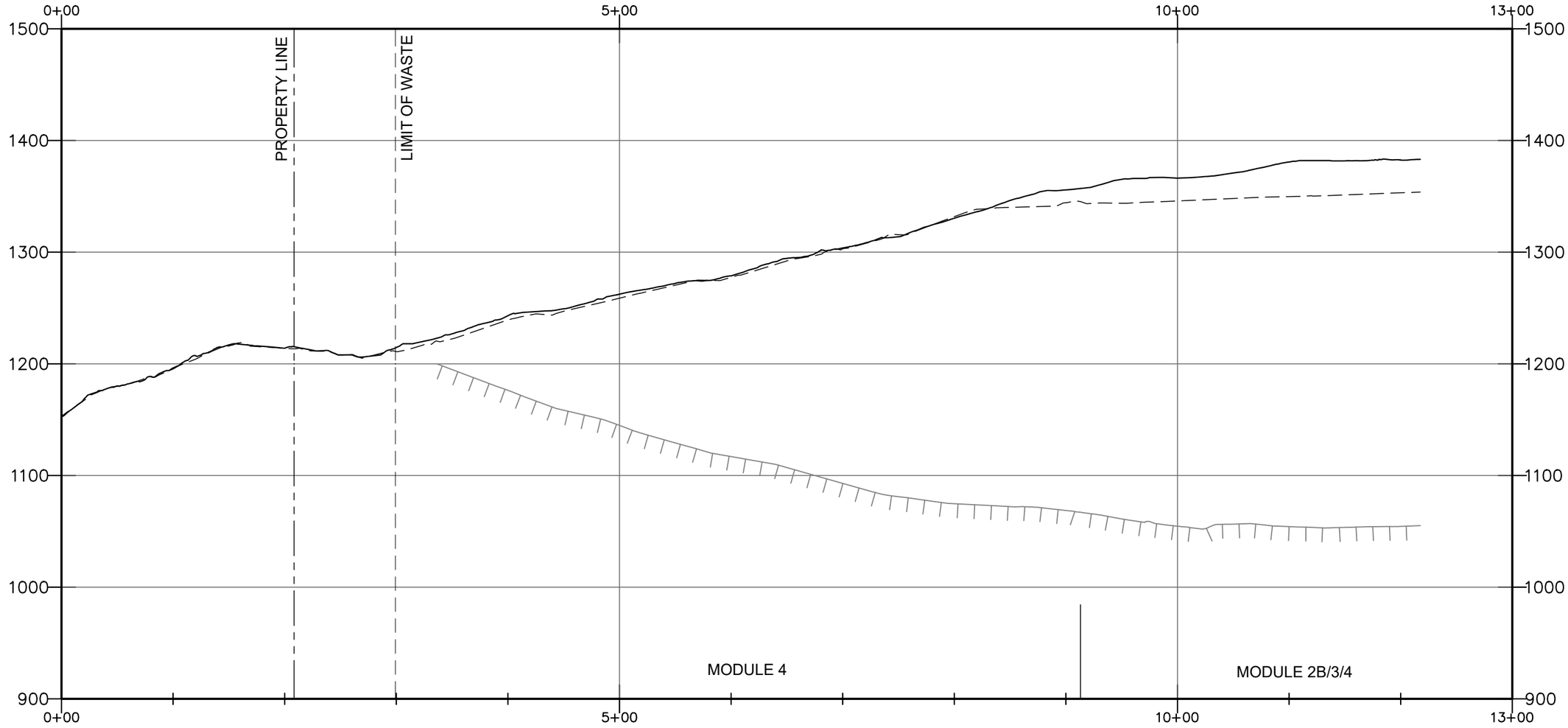
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SECTION E-E'



100' 0' 50' 100'

SCALE: 1" = 100'

LEGEND

- TOPOGRAPHY (OCTOBER 9, 2023)
- TOPOGRAPHY (SEPTEMBER 3, 2022)
- EXISTING LINER
- PROPERTY LINE
- LIMIT OF WASTE

FIGURE 6

CROSS SECTION E-E'

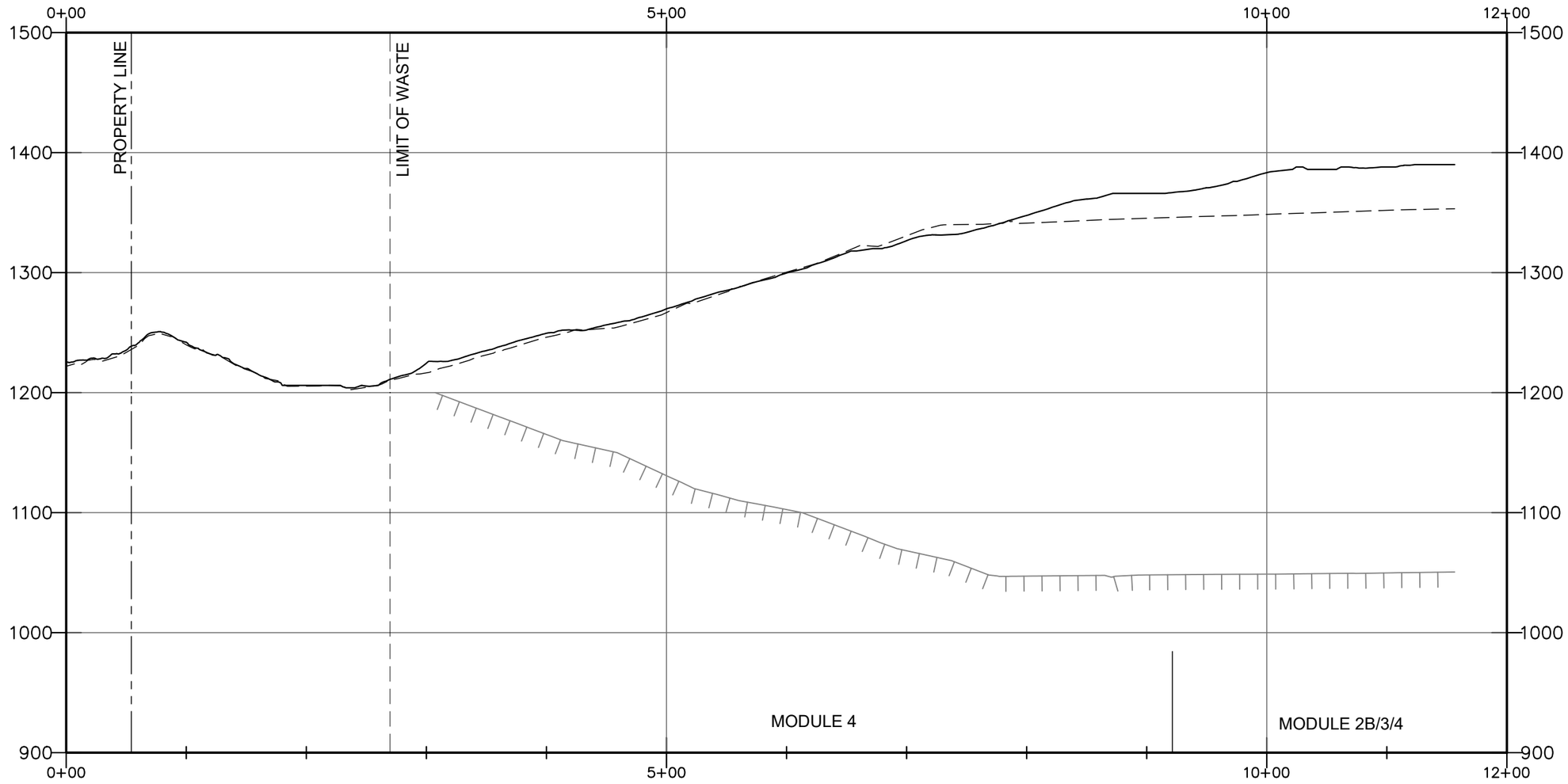
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SECTION F–F'



100' 0' 50' 100'

SCALE: 1" = 100'

LEGEND

- TOPOGRAPHY (OCTOBER 9, 2023)
- TOPOGRAPHY (SEPTEMBER 3, 2022)
- EXISTING LINER
- PROPERTY LINE
- LIMIT OF WASTE

FIGURE 7

CROSS SECTION F–F'

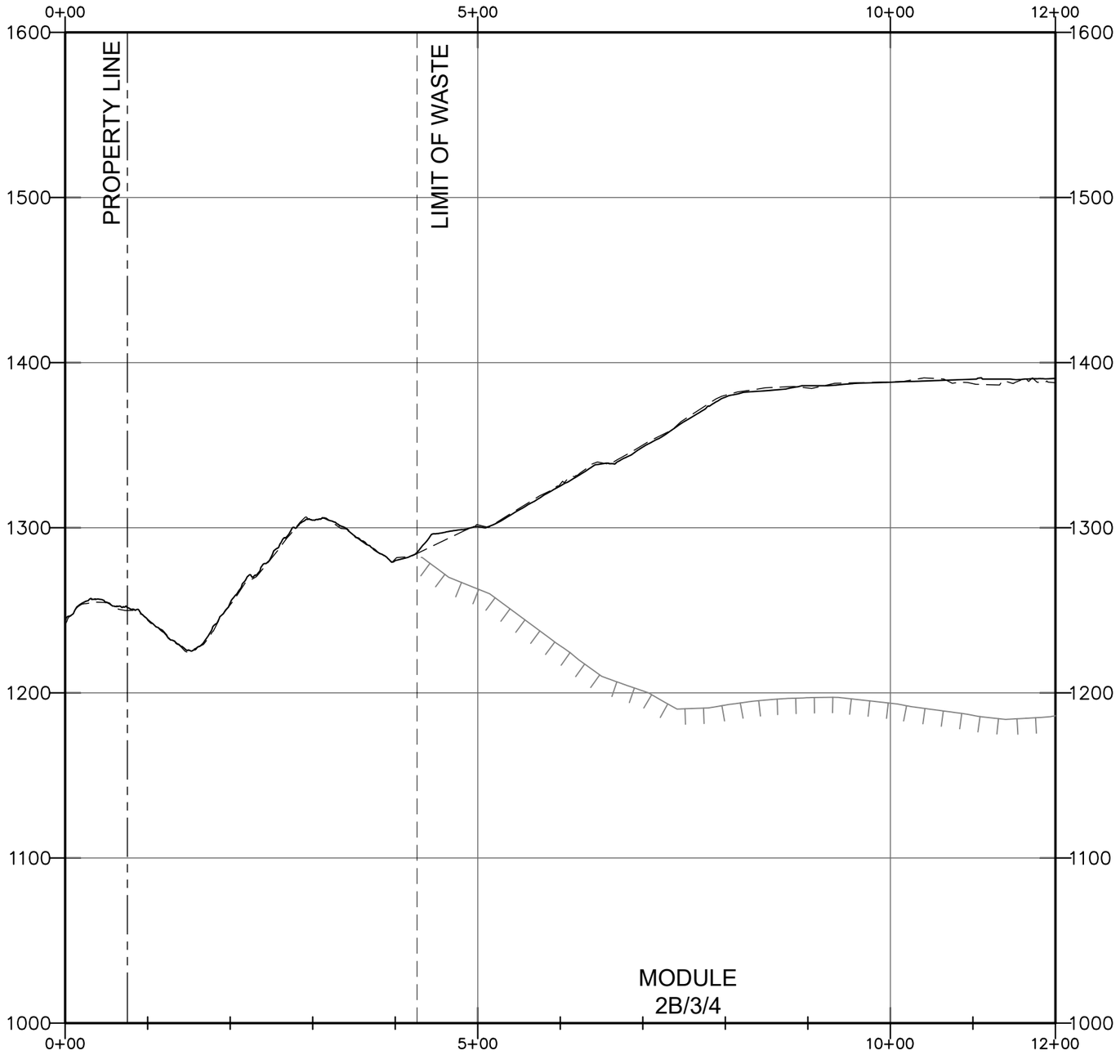
CHIQUITA CANYON LANDFILL
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SECTION A–A'



LEGEND

- TOPOGRAPHY (OCTOBER 9, 2023)
- TOPOGRAPHY (SEPTEMBER 3, 2022)
- EXISTING LINER
- PROPERTY LINE
- LIMIT OF WASTE

150' 0' 75' 150'

SCALE: 1" = 150'

FIGURE 2

CROSS SECTION A–A'

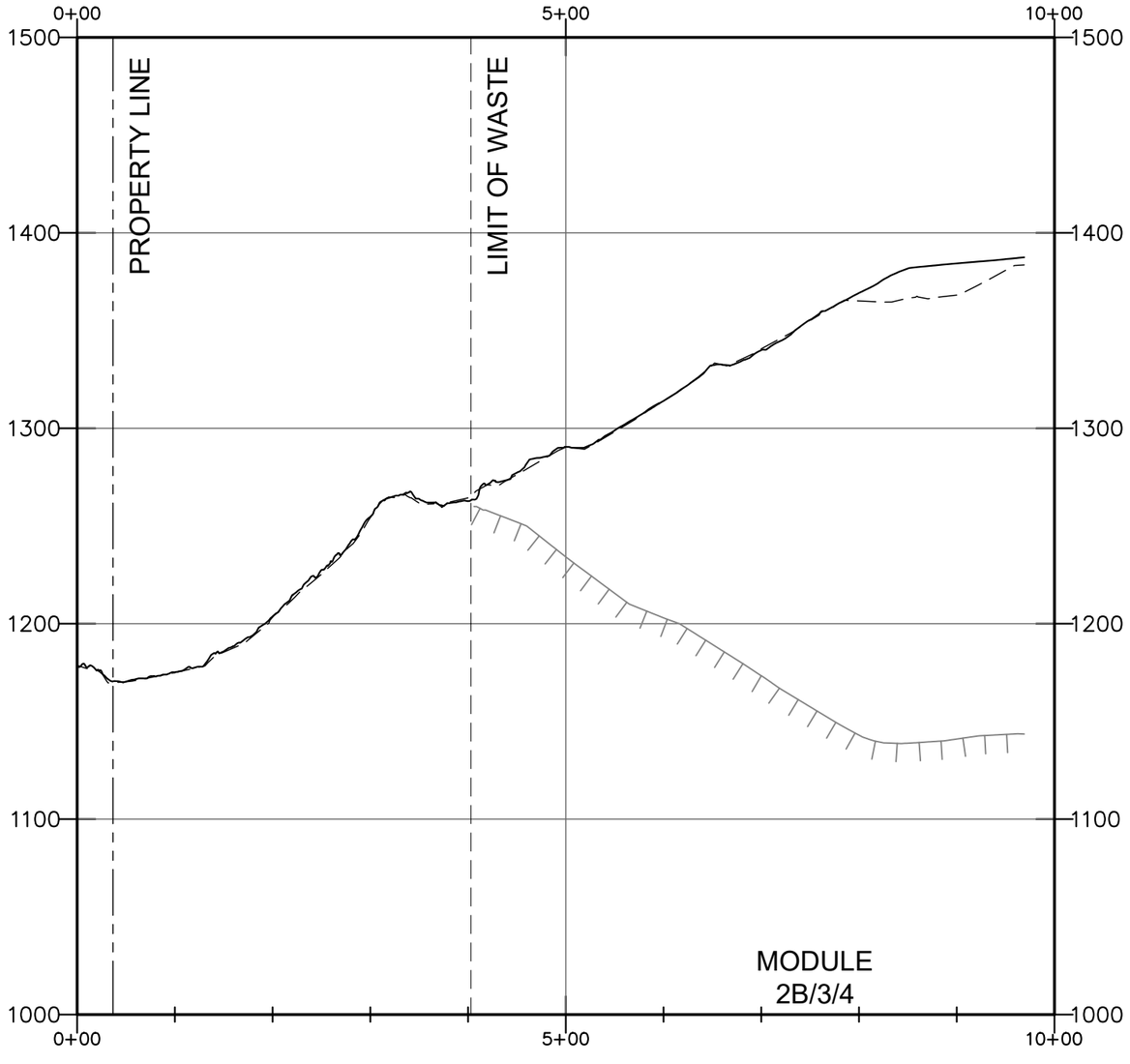
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SECTION B–B'



LEGEND

- TOPOGRAPHY (OCTOBER 9, 2023)
- TOPOGRAPHY (SEPTEMBER 3, 2022)
- EXISTING LINER
- PROPERTY LINE
- LIMIT OF WASTE

150' 0' 75' 150'

SCALE: 1" = 150'

FIGURE 3

CROSS SECTION B–B'

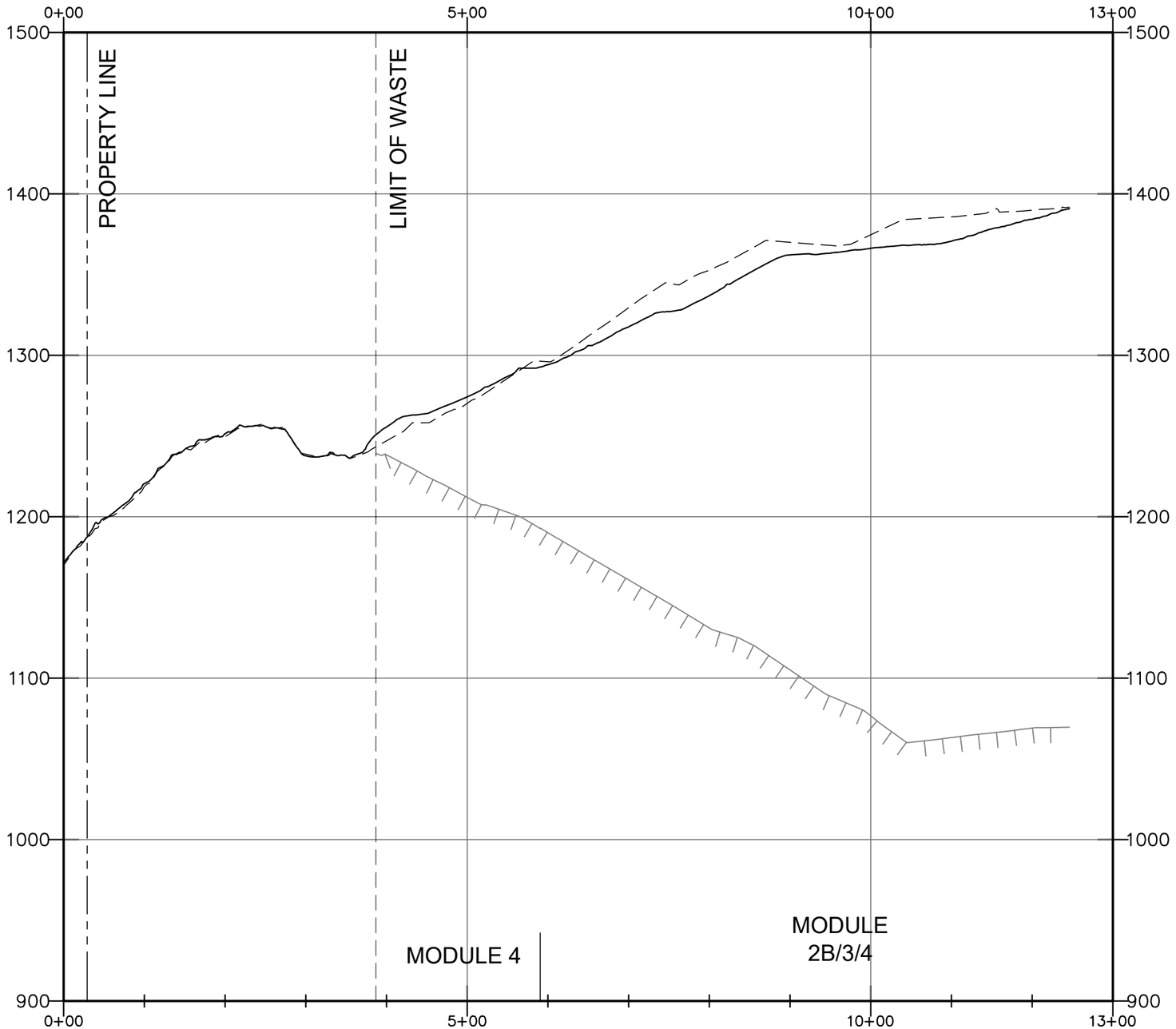
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SECTION C–C'



LEGEND

- TOPOGRAPHY (OCTOBER 9, 2023)
- TOPOGRAPHY (SEPTEMBER 3, 2022)
- EXISTING LINER
- PROPERTY LINE
- LIMIT OF WASTE

150' 0' 75' 150'

SCALE: 1" = 150'

FIGURE 4

CROSS SECTION C–C'

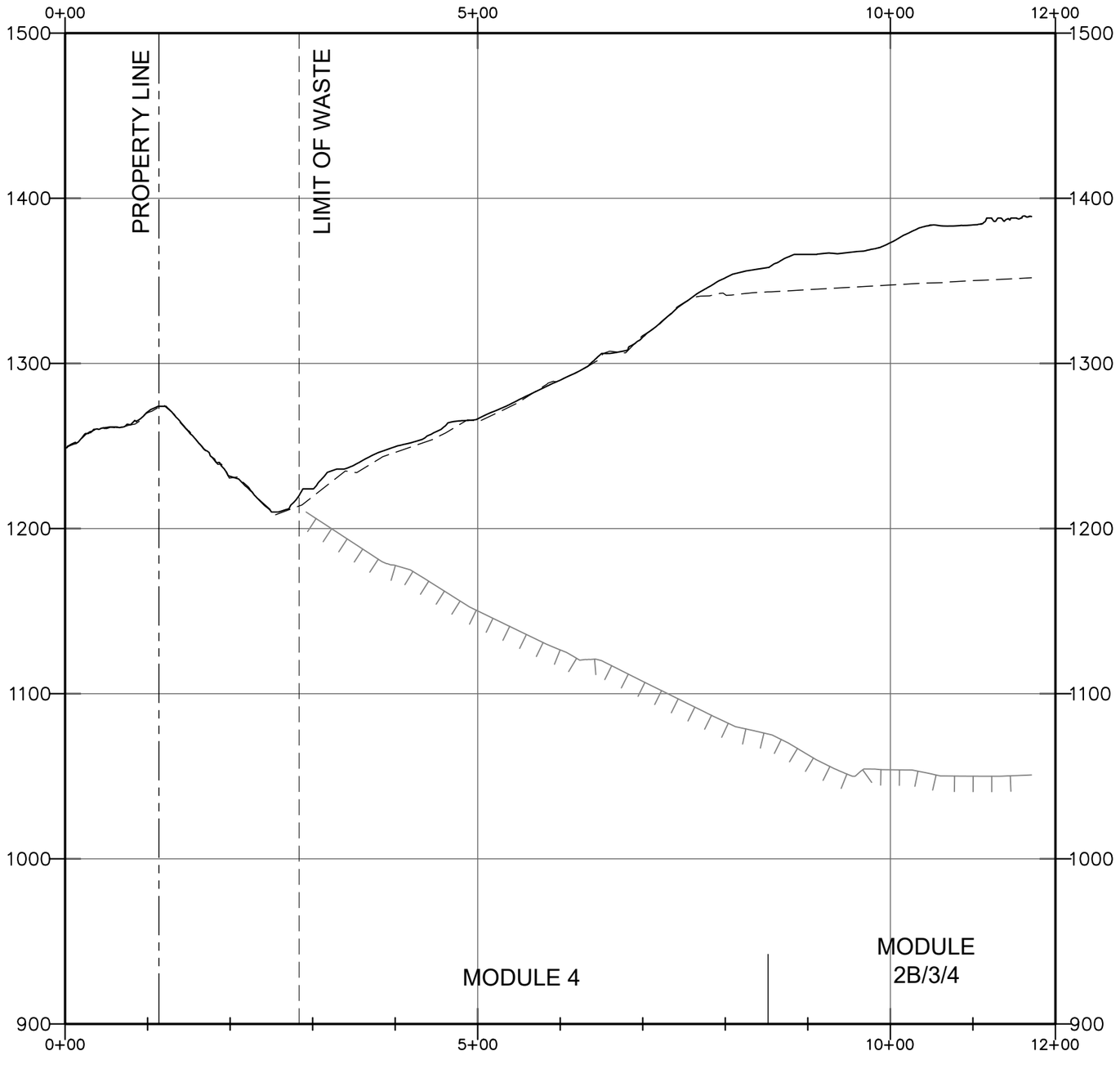
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CASTAIC, CALIFORNIA

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SECTION D–D'



LEGEND

- TOPOGRAPHY (OCTOBER 9, 2023)
- TOPOGRAPHY (SEPTEMBER 3, 2022)
- EXISTING LINER
- PROPERTY LINE
- LIMIT OF WASTE

150' 0' 75' 150'

SCALE: 1" = 150'

FIGURE 5

CROSS SECTION D–D'

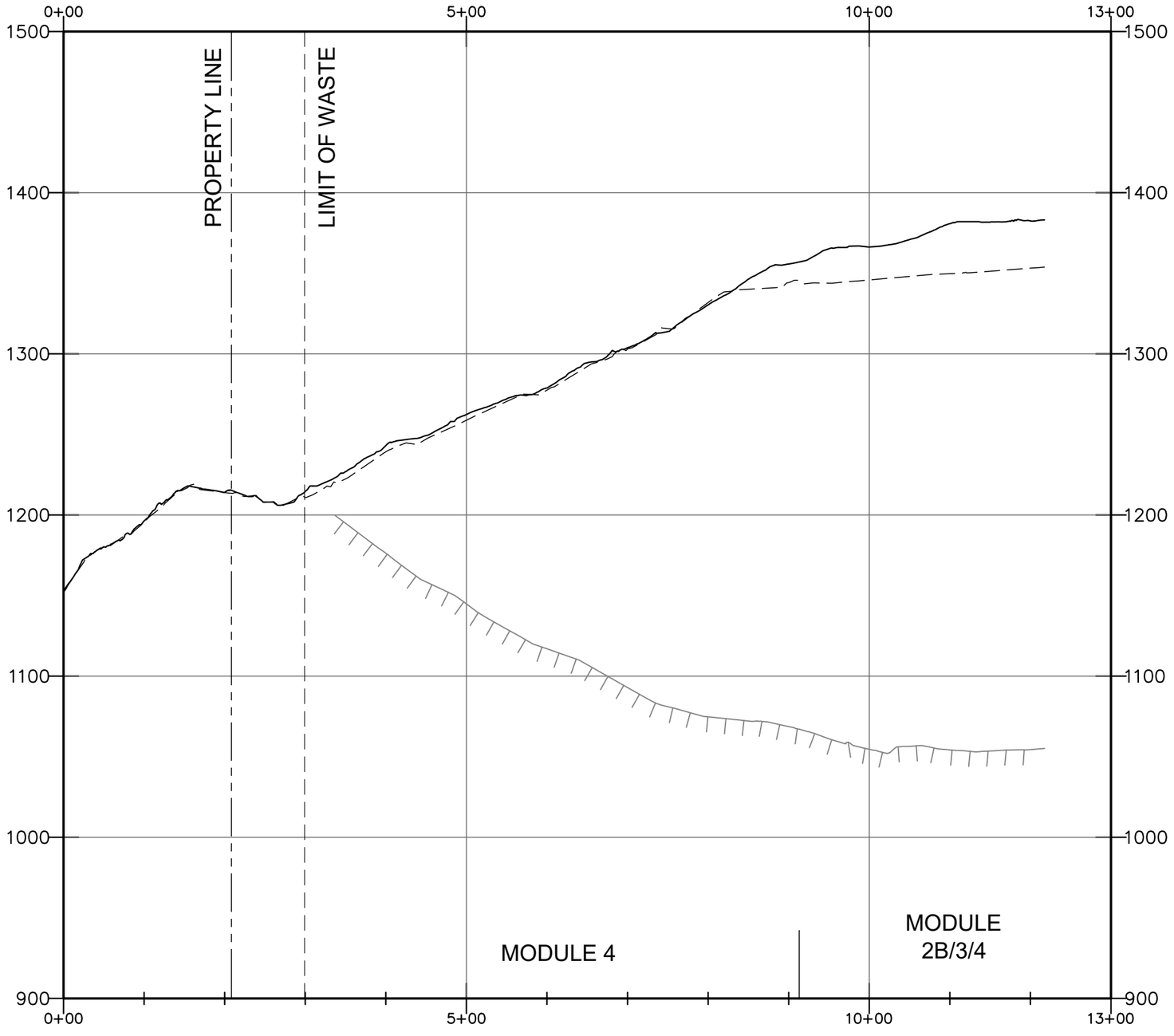
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CASTAIC, CALIFORNIA

Geo-Logic ASSOCIATES

CAD DSGN BY: LP	DATE: AUGUST 2026	JOB NO. 1026.1002

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SECTION E-E'



LEGEND

- TOPOGRAPHY (OCTOBER 9, 2023)
- TOPOGRAPHY (SEPTEMBER 3, 2022)
- EXISTING LINER
- PROPERTY LINE
- LIMIT OF WASTE

150' 0' 75' 150'

SCALE: 1" = 150'

FIGURE 6

CROSS SECTION E-E'

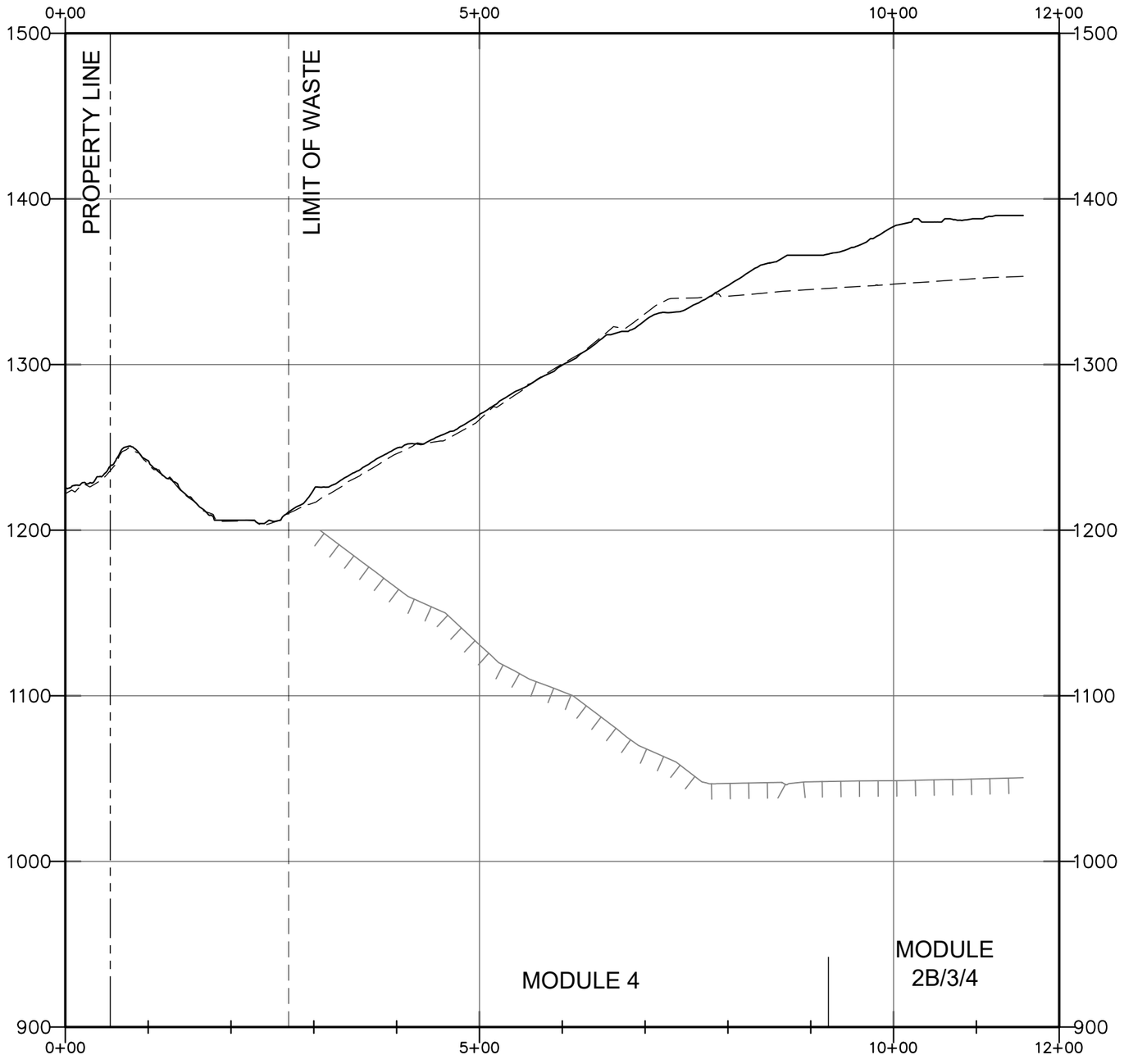
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SECTION F–F'



LEGEND

- TOPOGRAPHY (OCTOBER 9, 2023)
- TOPOGRAPHY (SEPTEMBER 3, 2022)
- EXISTING LINER
- PROPERTY LINE
- LIMIT OF WASTE

150' 0' 75' 150'

SCALE: 1" = 150'

FIGURE 7

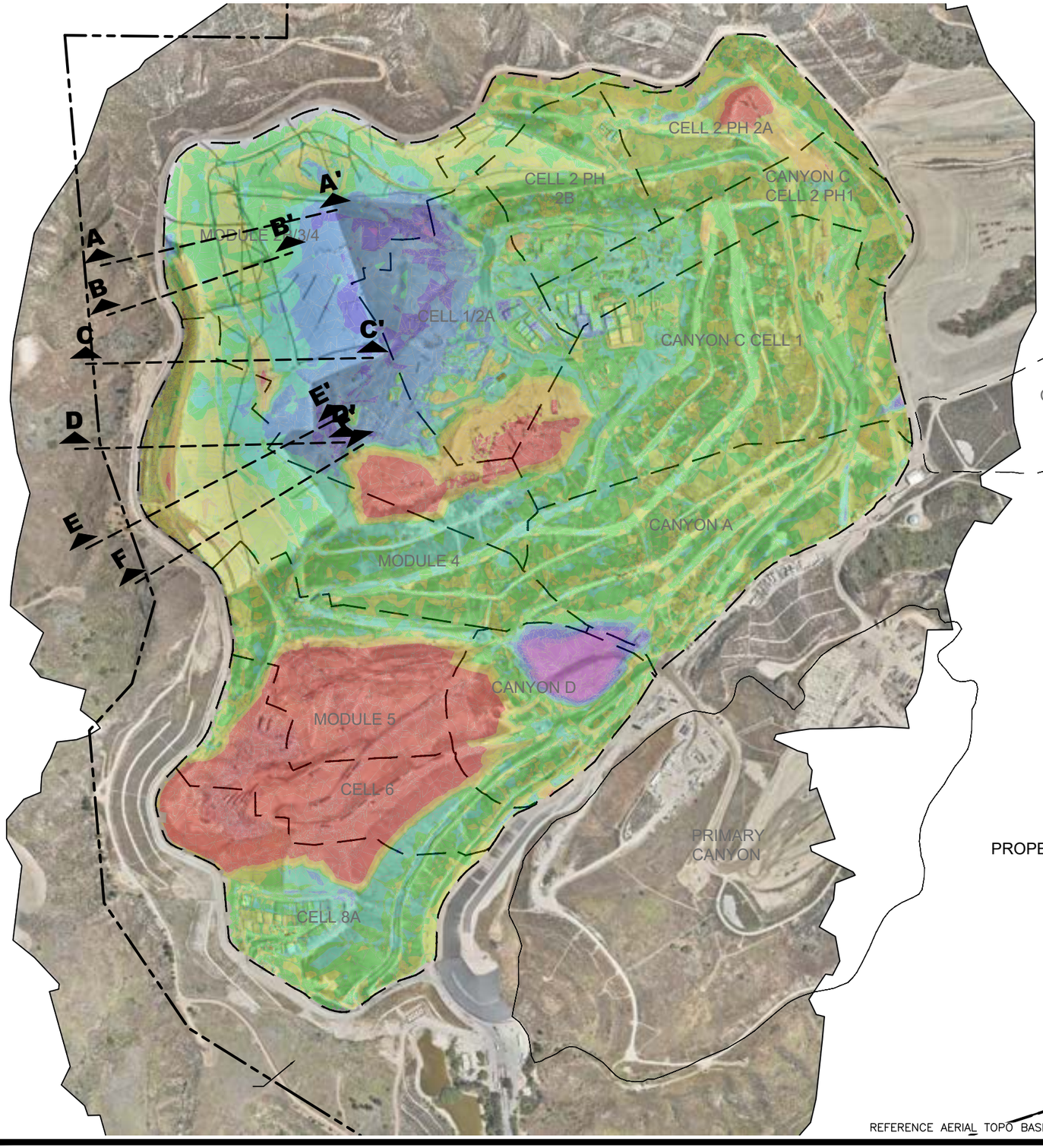
CROSS SECTION F–F'

CHIQUITA CANYON LANDFILL
CASTAIC, CALIFORNIA

Geo-Logic ASSOCIATES

CAD DSGN BY: LP	DATE: AUGUST 2026	JOB NO. 1026.1002

Appendix B-2
2023-2024 SETTLEMENT



REFERENCE AERIAL TOPO BASED ON JUNE 26, 2024 BY PROPELLER

LEGEND

PROPERTY BOUNDARY

EXISTING LINER

FILL (FT)		CUT (FT)	
	>+10		>-20
	+10 TO +5		-20 TO -15
	+5 TO +2		-15 TO -10
	+2 TO 0		-10 TO -5
			-5 TO -2
			-2 TO 0

NOTE: MAP SHOWS FILL AND SETTLEMENT (CUT) BETWEEN 12/4/2023 AND 6/26/2024.

N

500' 0' 250' 500'

SCALE: 1" = 500'

FIGURE 1

SETTLEMENT MAP AND CROSS SECTIONS LOCATIONS

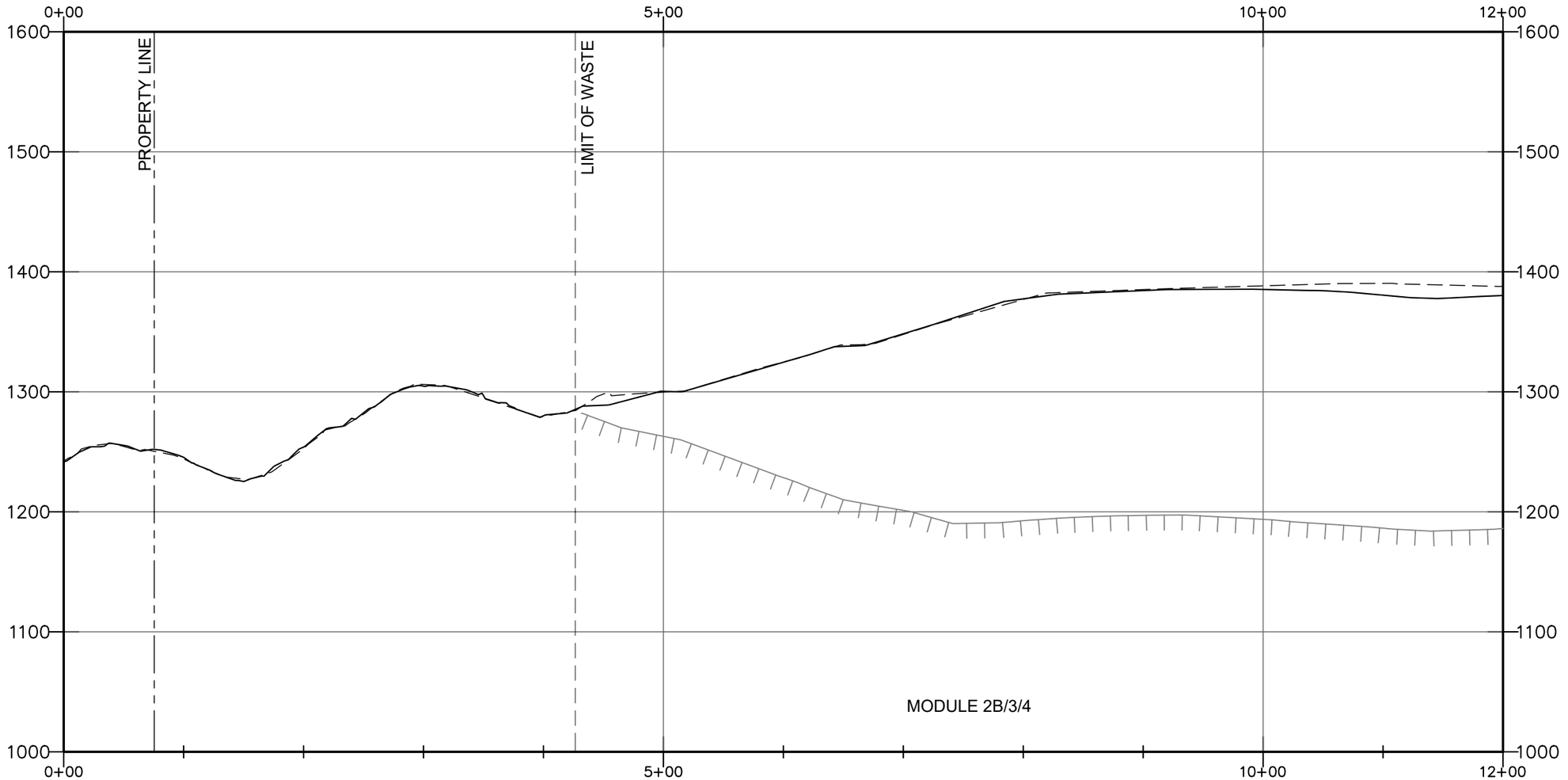
CHIQUITA CANYON LANDFILL CASTAIC, CA

Geo-Logic ASSOCIATES

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SECTION A–A'



100' 0' 50' 100'

SCALE: 1" = 100'

LEGEND

- TOPOGRAPHY (JUNE 26, 2024)
- TOPOGRAPHY (DECEMBER 4, 2023)
- EXISTING LINER
- PROPERTY LINE
- LIMIT OF WASTE

FIGURE 2

CROSS SECTION A–A'

CHIQUITA CANYON LANDFILL
CASTAIC, CALIFORNIA

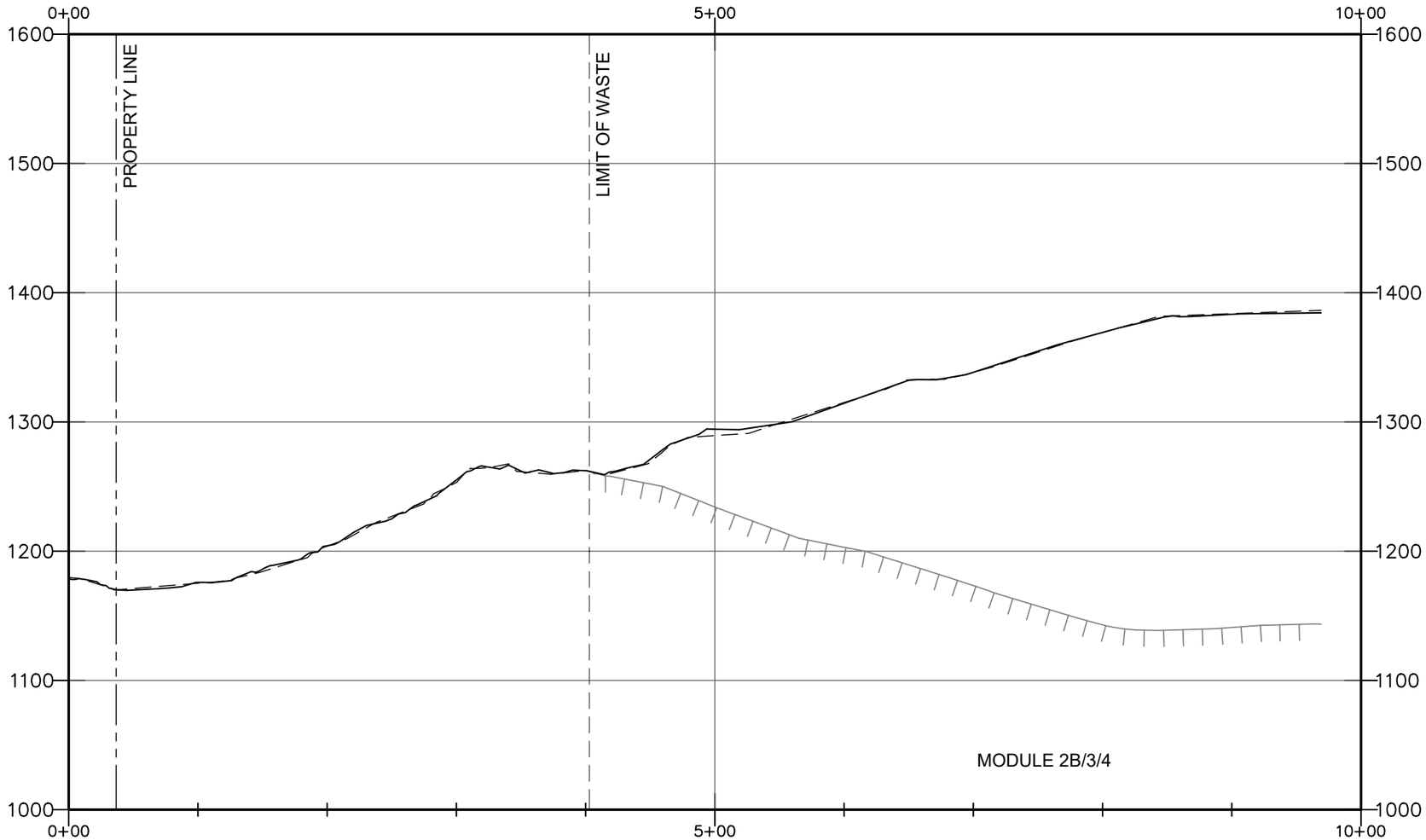
Geo-Logic ASSOCIATES

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SECTION B–B'



100' 0' 50' 100'

SCALE: 1" = 100'

LEGEND

- TOPOGRAPHY (JUNE 26, 2024)
- TOPOGRAPHY (DECEMBER 4, 2023)
- EXISTING LINER
- PROPERTY LINE
- LIMIT OF WASTE

FIGURE 3

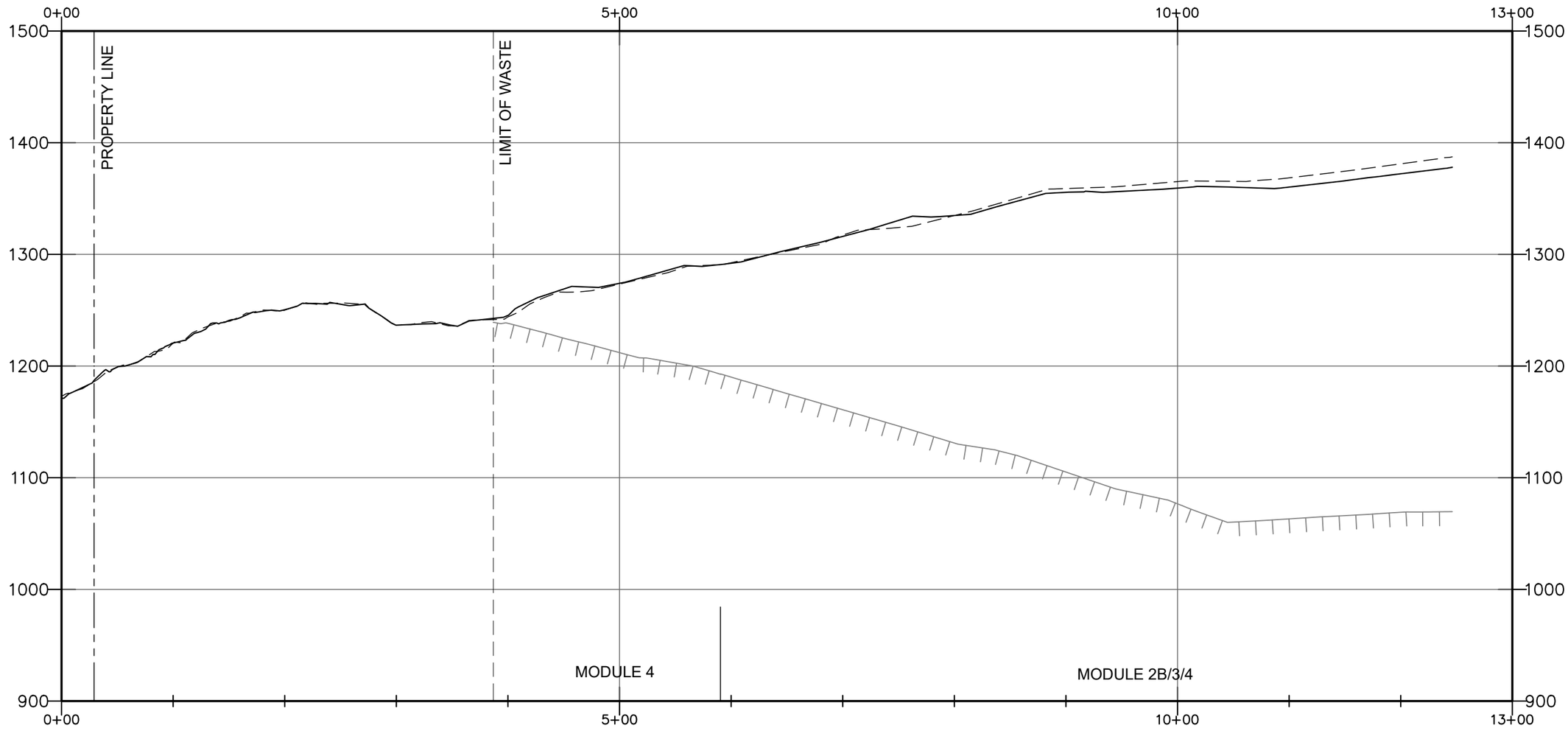
CROSS SECTION B–B'

CHIQUITA CANYON LANDFILL
CASTAIC, CALIFORNIA

Geo-Logic ASSOCIATES

CAD DSGN BY: LP	DATE: AUGUST 2026	JOB NO. 1026.1002

SECTION C–C'



100' 0' 50' 100'

SCALE: 1" = 100'

LEGEND

- TOPOGRAPHY (JUNE 26, 2024)
- TOPOGRAPHY (DECEMBER 4, 2023)
- EXISTING LINER
- PROPERTY LINE
- LIMIT OF WASTE

FIGURE 4

CROSS SECTION C–C'

CHIQUITA CANYON LANDFILL
CASTAIC, CALIFORNIA

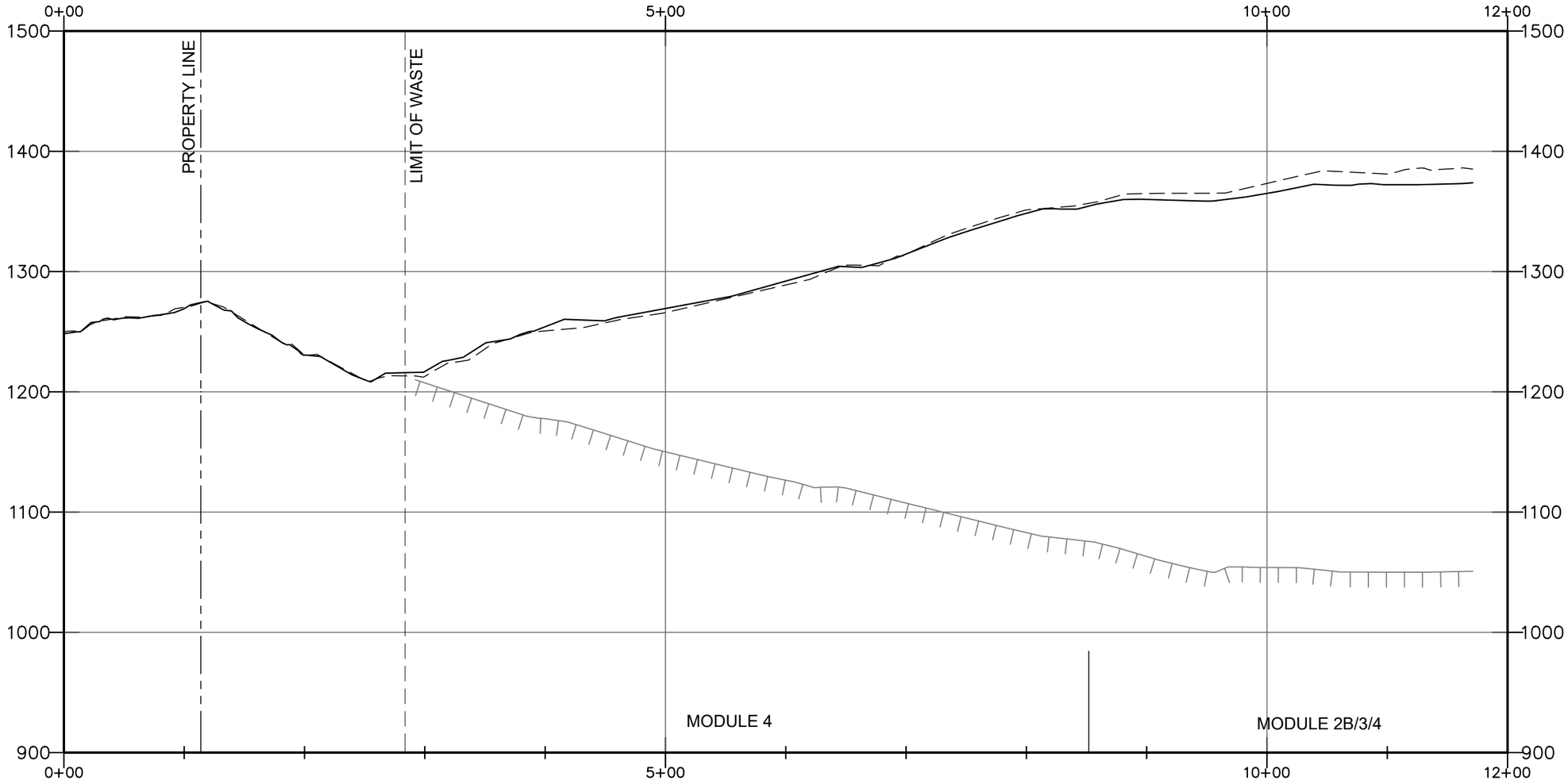
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SECTION D-D'



100' 0' 50' 100'

SCALE: 1" = 100'

LEGEND

- TOPOGRAPHY (JUNE 26, 2024)
- TOPOGRAPHY (DECEMBER 4, 2023)
- EXISTING LINER
- PROPERTY LINE
- LIMIT OF WASTE

FIGURE 5

CROSS SECTION D-D'

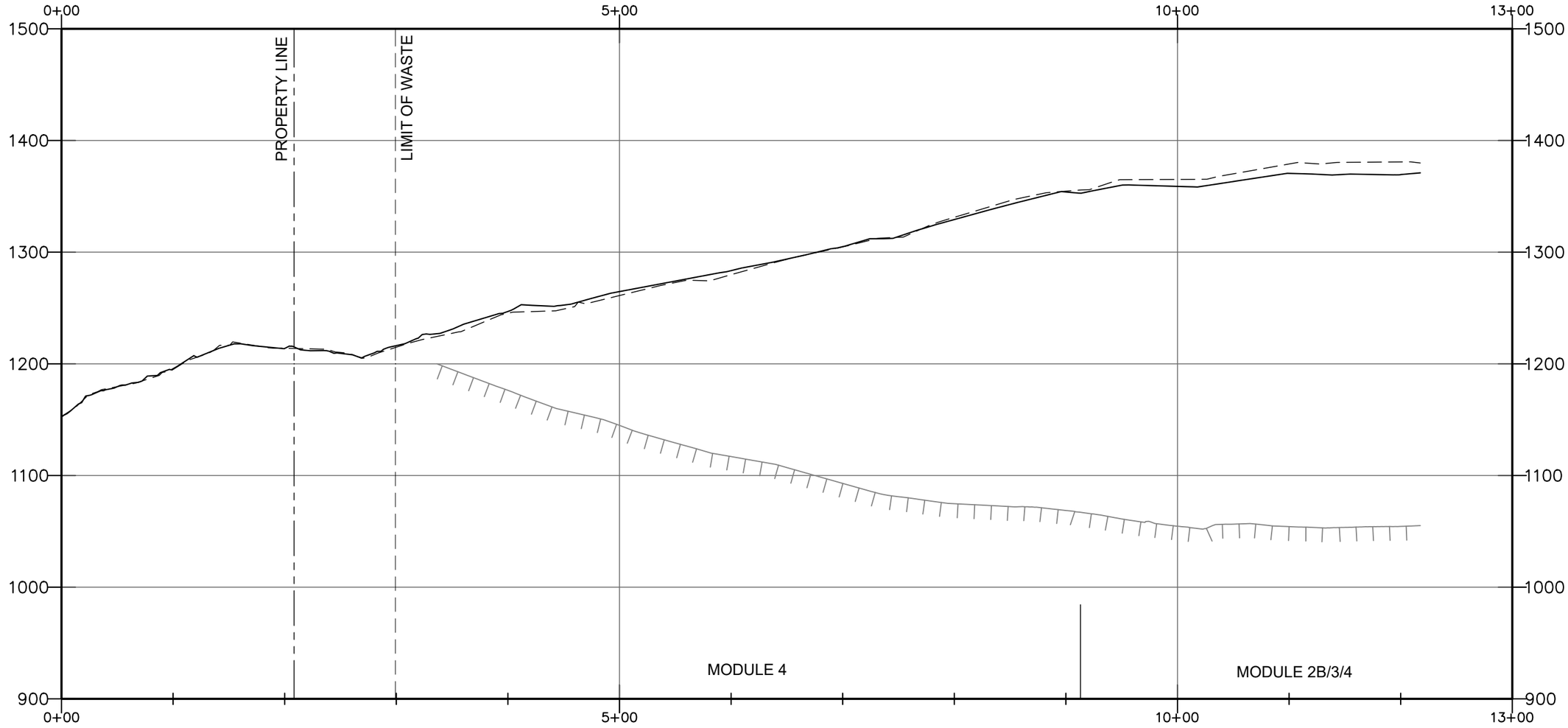
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SECTION E-E'



100' 0' 50' 100'

SCALE: 1" = 100'

LEGEND

- TOPOGRAPHY (JUNE 26, 2024)
- TOPOGRAPHY (DECEMBER 4, 2023)
- EXISTING LINER
- PROPERTY LINE
- LIMIT OF WASTE

FIGURE 6

CROSS SECTION E-E'

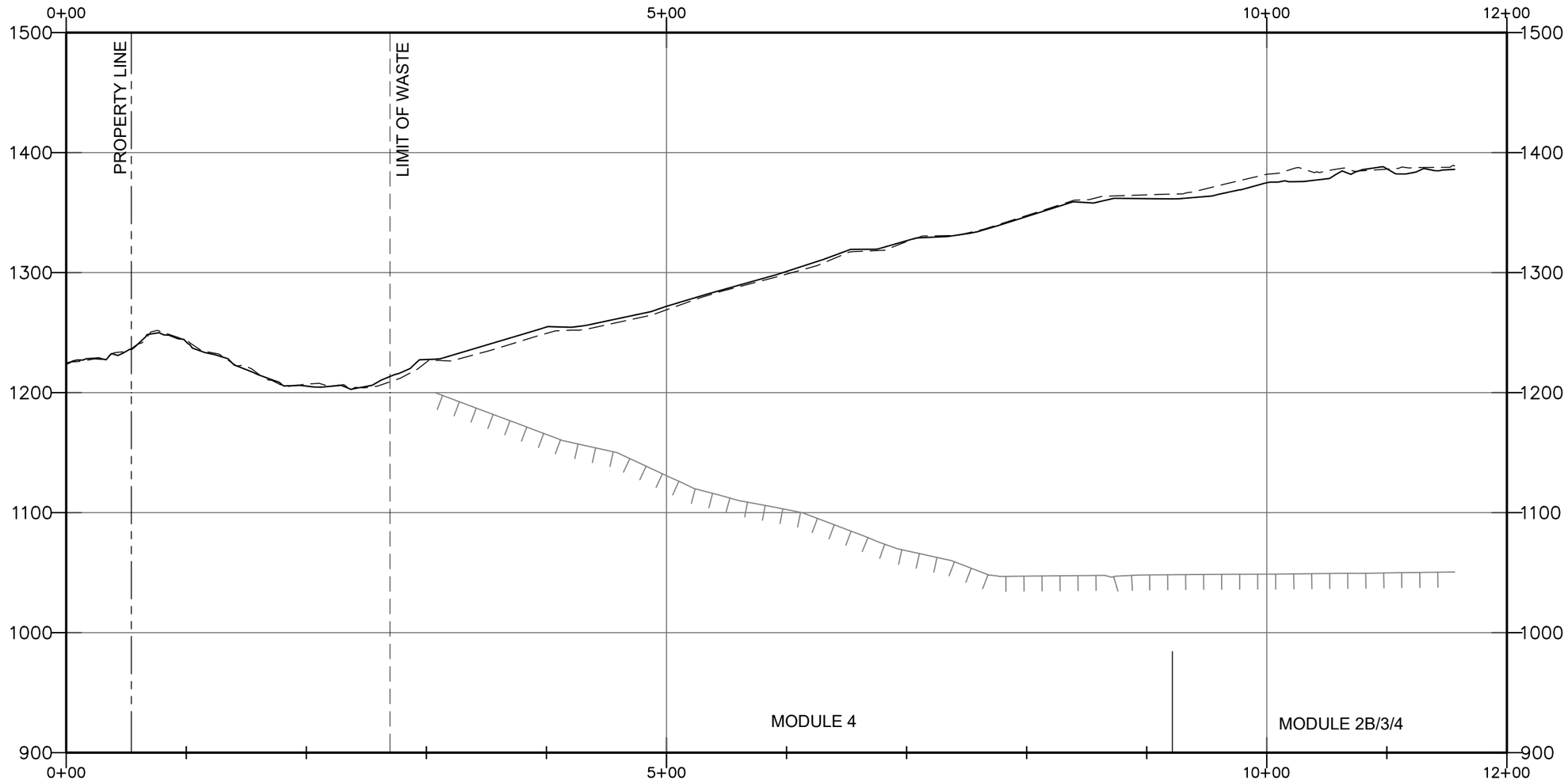
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SECTION F–F'



100' 0' 50' 100'

SCALE: 1" = 100'

LEGEND

- TOPOGRAPHY (JUNE 26, 2024)
- TOPOGRAPHY (DECEMBER 4, 2023)
- EXISTING LINER
- PROPERTY LINE
- LIMIT OF WASTE

FIGURE 7

CROSS SECTION F–F'

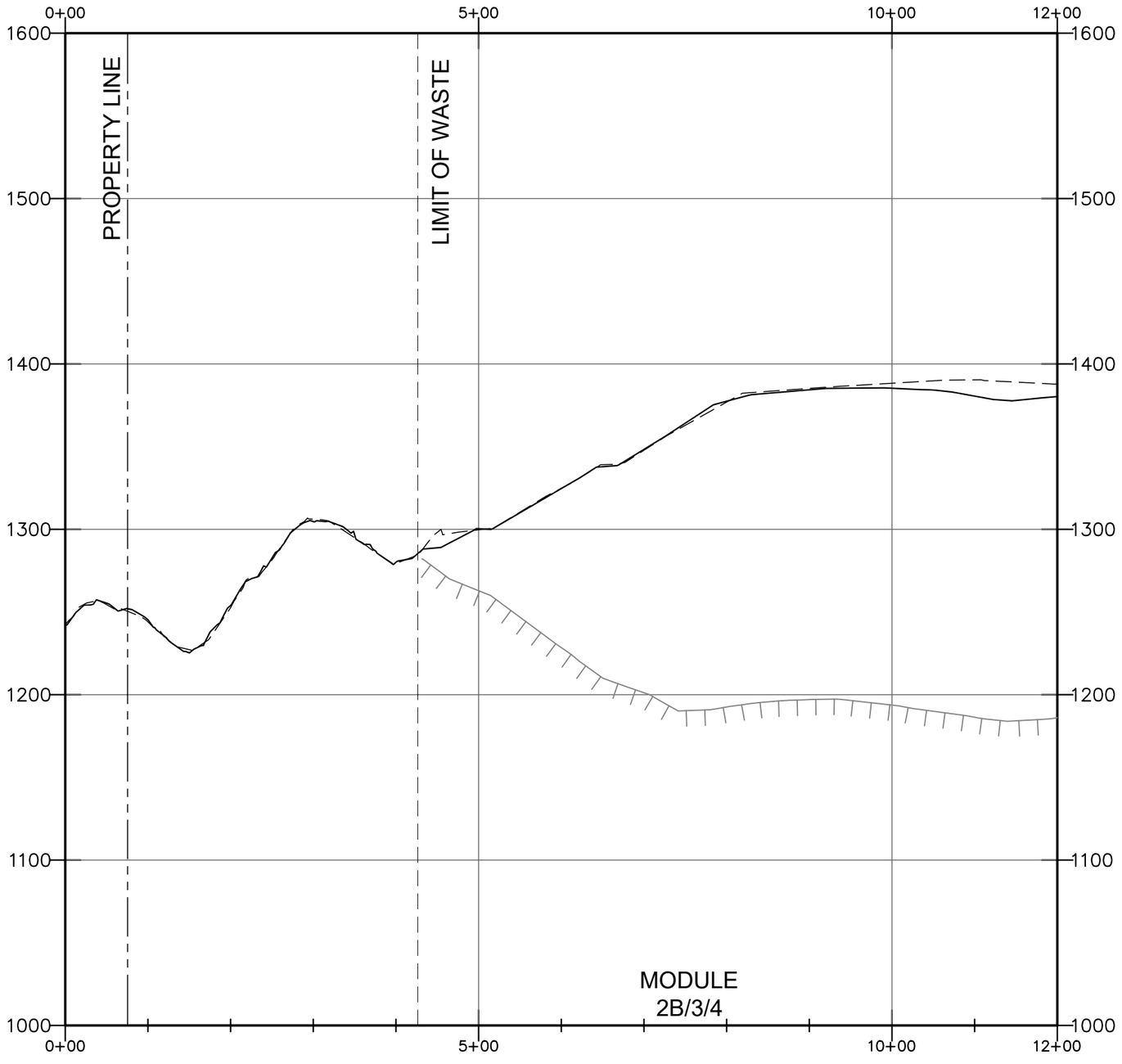
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Geo-Logic ASSOCIATES

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SECTION A–A'



LEGEND

- TOPOGRAPHY (JUNE 26, 2024)
- TOPOGRAPHY (DECEMBER 4, 2023)
- EXISTING LINER
- PROPERTY LINE
- LIMIT OF WASTE

150' 0' 75' 150'

SCALE: 1" = 150'

FIGURE 2

CROSS SECTION A–A'

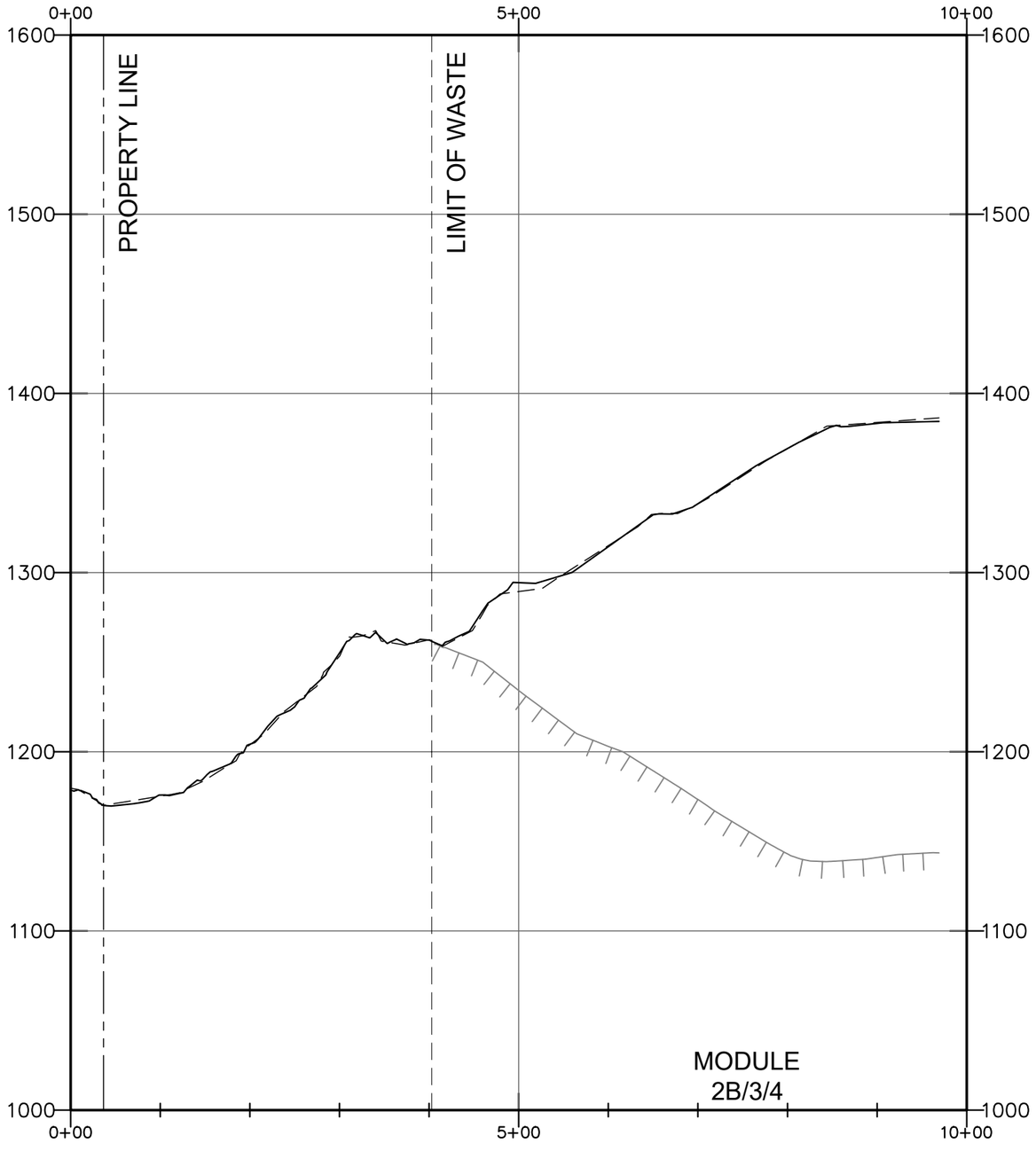
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CASTAIC, CALIFORNIA

Geo-Logic ASSOCIATES

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SECTION B–B'



LEGEND

- TOPOGRAPHY (JUNE 26, 2024)
- TOPOGRAPHY (DECEMBER 4, 2023)
- EXISTING LINER
- PROPERTY LINE
- LIMIT OF WASTE

150' 0' 75' 150'

SCALE: 1" = 150'

FIGURE 3

CROSS SECTION B–B'

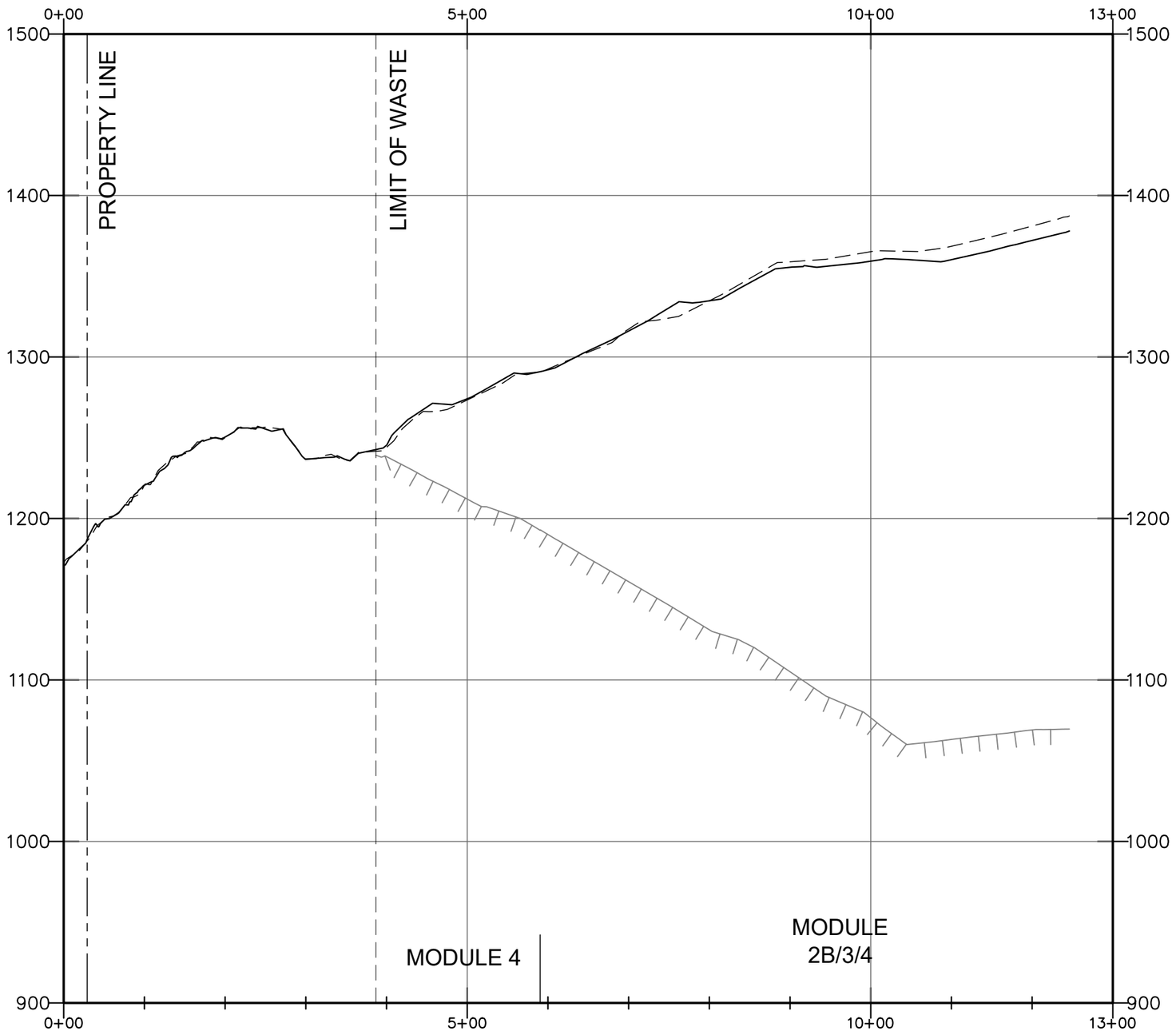
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SECTION C–C'



LEGEND

- TOPOGRAPHY (JUNE 26, 2024)
- TOPOGRAPHY (DECEMBER 4, 2023)
- EXISTING LINER
- PROPERTY LINE
- LIMIT OF WASTE

150' 0' 75' 150'

SCALE: 1" = 150'

FIGURE 4

CROSS SECTION C–C'

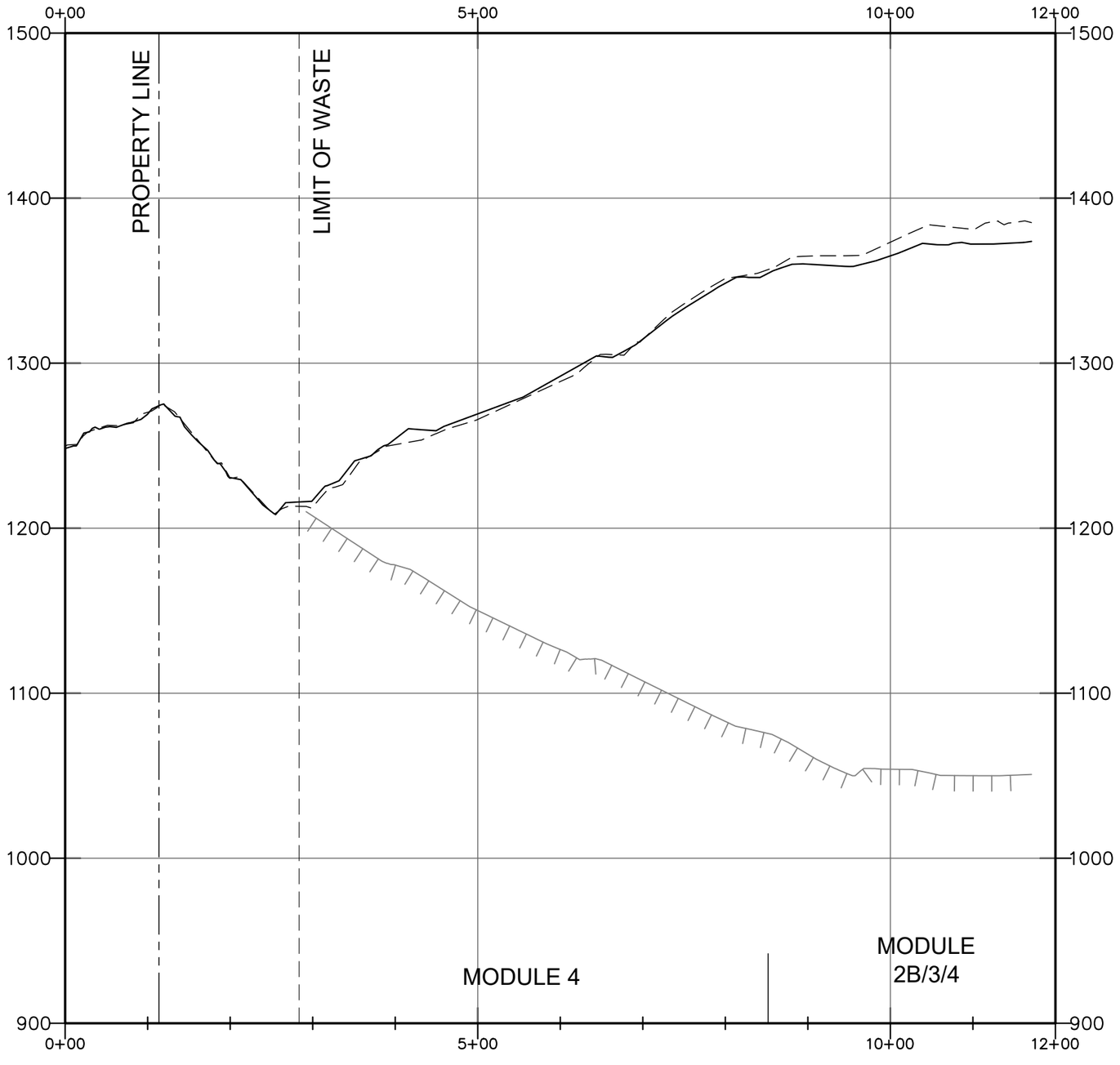
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SECTION D–D'



LEGEND

- TOPOGRAPHY (JUNE 26, 2024)
- TOPOGRAPHY (DECEMBER 4, 2023)
- EXISTING LINER
- PROPERTY LINE
- LIMIT OF WASTE

150' 0' 75' 150'

SCALE: 1" = 150'

FIGURE 5

CROSS SECTION D–D'

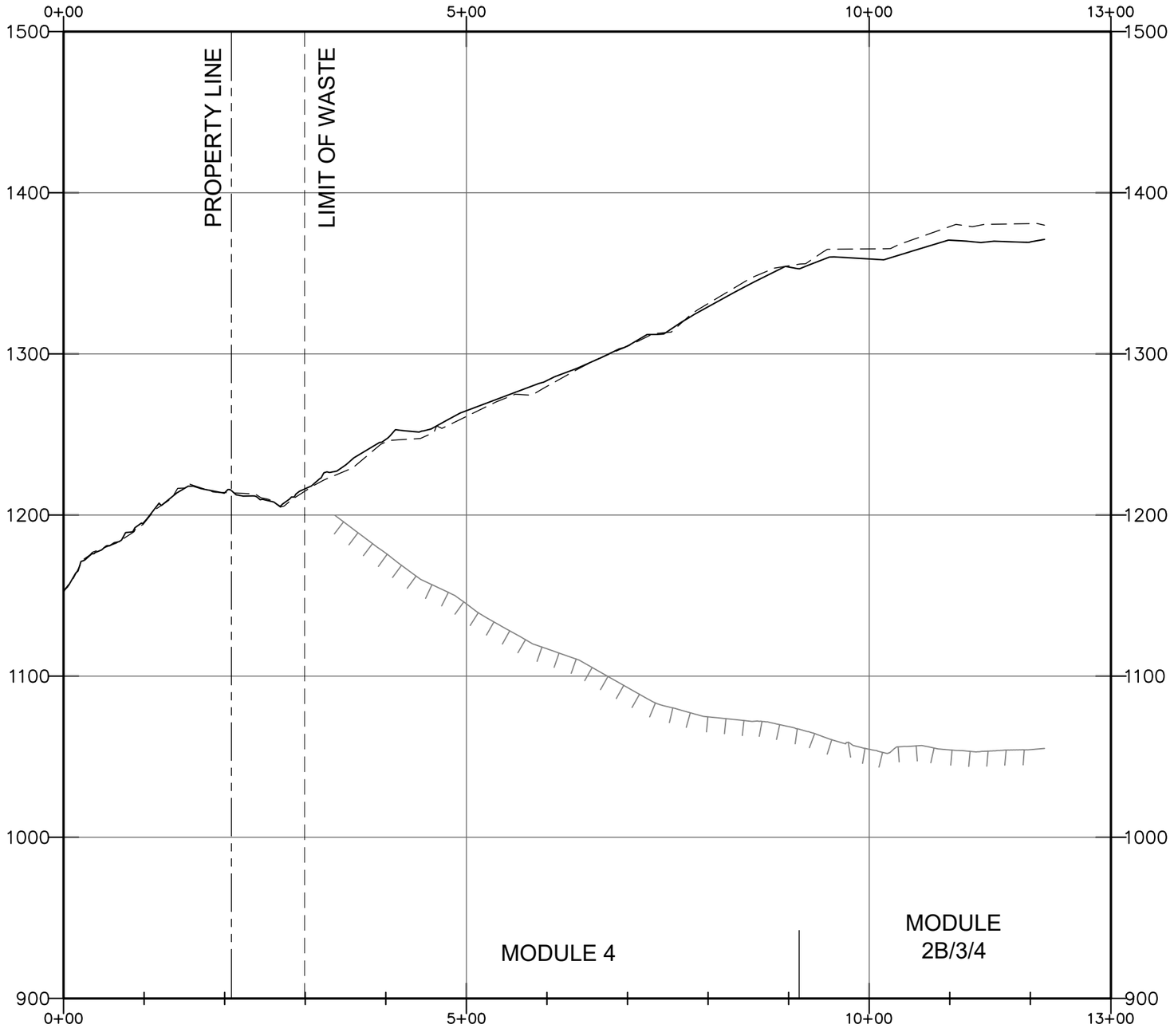
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CASTAIC, CALIFORNIA

Geo-Logic ASSOCIATES

CAD DSGN BY: LP	DATE: AUGUST 2026	JOB NO. 1026.1002

P:\SITES\CHIQUITA CYN LF\COMPARATIVE STABILITY EVALUATION-2026\MODELS\PROFILES\ZCCL-XS-(2026-08-20)_23VS24.DWG August 20, 2026

SECTION E–E'



LEGEND

- TOPOGRAPHY (JUNE 26, 2024)
- TOPOGRAPHY (DECEMBER 4, 2023)
- EXISTING LINER
- PROPERTY LINE
- LIMIT OF WASTE

150' 0' 75' 150'

SCALE: 1" = 150'

FIGURE 6

CROSS SECTION E–E'

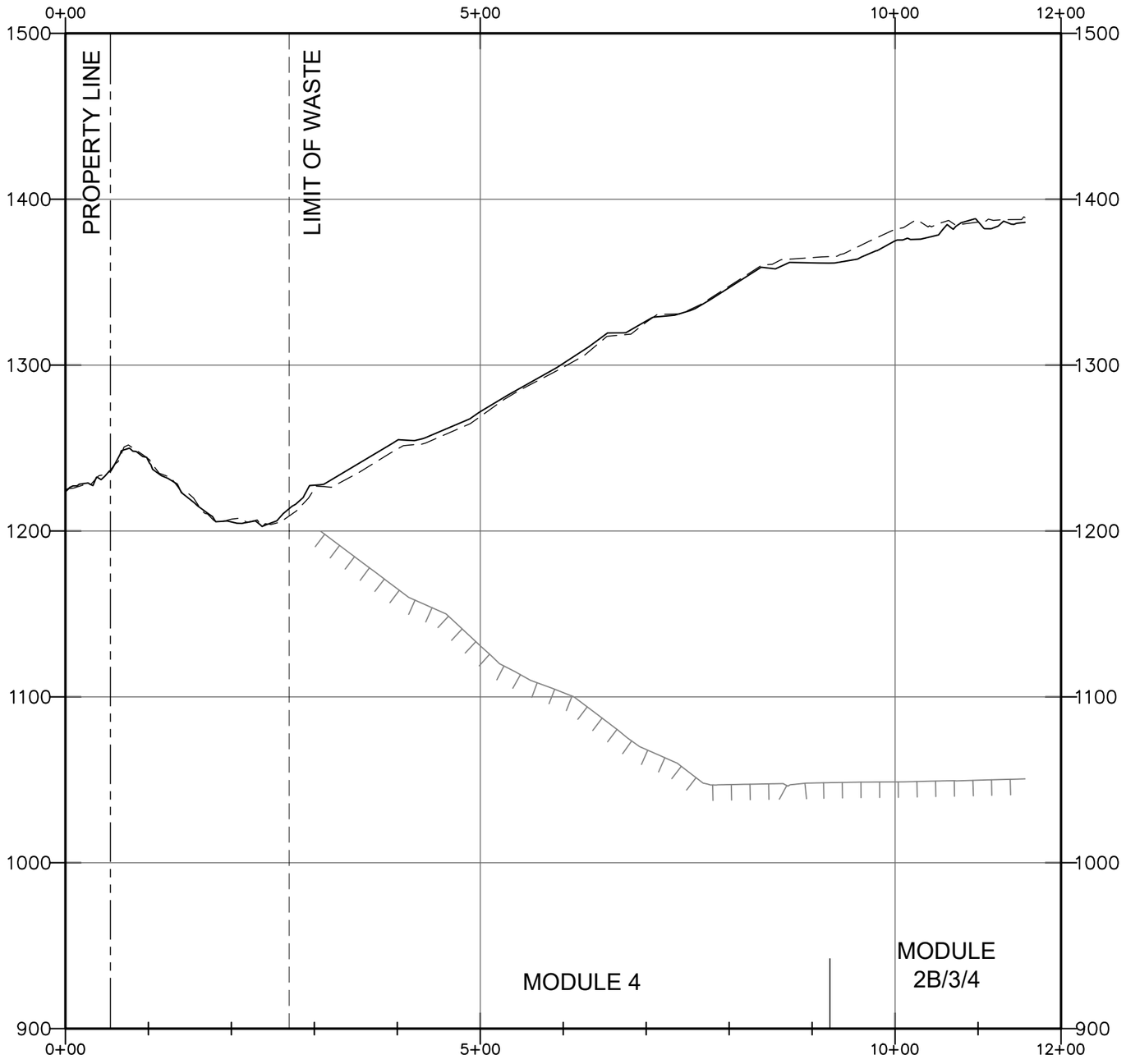
CHIQUITA CANYON LANDFILL
CASTAIC, CALIFORNIA

Geo-Logic ASSOCIATES

CAD DSGN BY: LP	DATE: AUGUST 2026	JOB NO. 1026.1002

P:\SITES\CHIQUITA CYN LF\COMPARATIVE STABILITY EVALUATION-2026\MODELS\PROFILES\ZCCL-XS-(2026-08-20)_23VS24.DWG August 20, 2026

SECTION F–F'



LEGEND

- TOPOGRAPHY (JUNE 26, 2024)
- TOPOGRAPHY (DECEMBER 4, 2023)
- EXISTING LINER
- PROPERTY LINE
- LIMIT OF WASTE

150' 0' 75' 150'

SCALE: 1" = 150'

FIGURE 7

CROSS SECTION F–F'

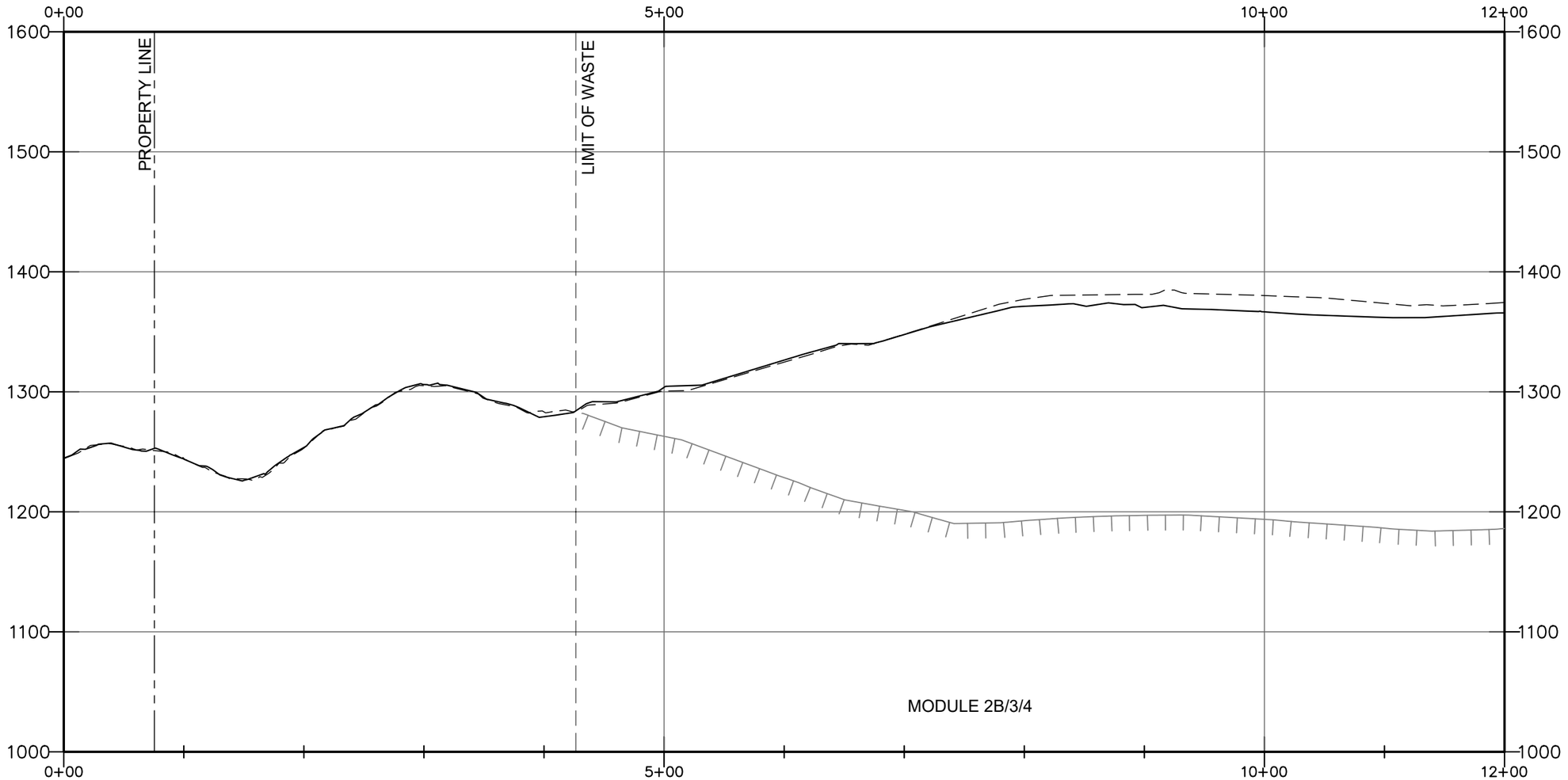
CHIQUITA CANYON LANDFILL
CASTAIC, CALIFORNIA

Geo-Logic ASSOCIATES

CAD DSGN BY: LP	DATE: AUGUST 2026	JOB NO. 1026.1002

Appendix B-3
2024-2026 SETTLEMENT

SECTION A–A'



LEGEND

- CURRENT TOPOGRAPHY (APRIL 15, 2026)
- TOPOGRAPHY (NOVEMBER 27, 2024)
- EXISTING LINER
- PROPERTY LINE
- LIMIT OF WASTE

100' 0' 50' 100'

SCALE: 1" = 100'

FIGURE 2

CROSS SECTION A–A'

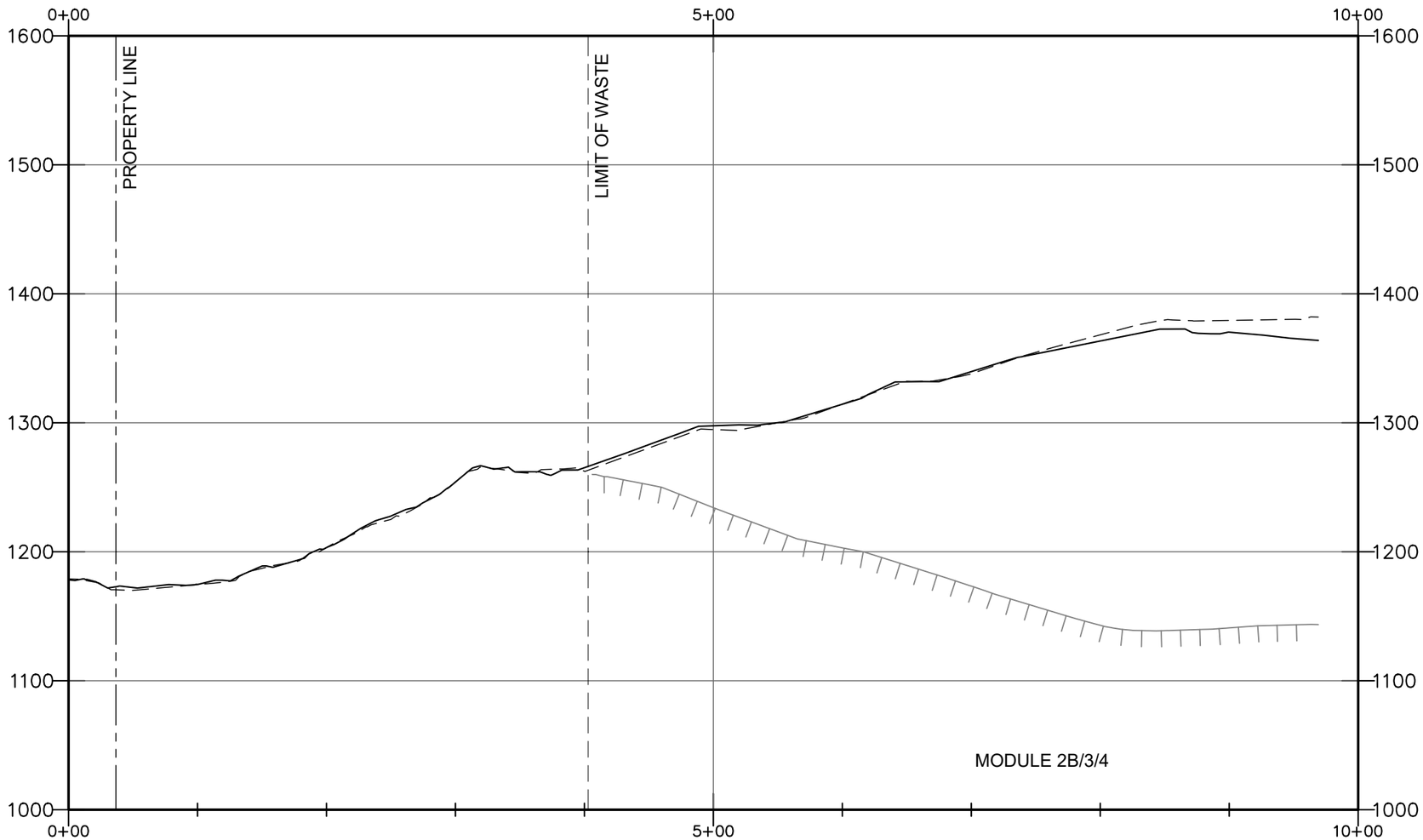
CHIQUITA CANYON LANDFILL
CASTAIC, CALIFORNIA

Geo-Logic ASSOCIATES

CAD DSGN BY: LP	DATE: AUGUST 2026	JOB NO. 1026.1002

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SECTION B–B'



100' 0' 50' 100'

SCALE: 1" = 100'

LEGEND

- CURRENT TOPOGRAPHY (APRIL 15, 2026)
- TOPOGRAPHY (NOVEMBER 27, 2024)
- EXISTING LINER
- PROPERTY LINE
- LIMIT OF WASTE

FIGURE 3

CROSS SECTION B–B'

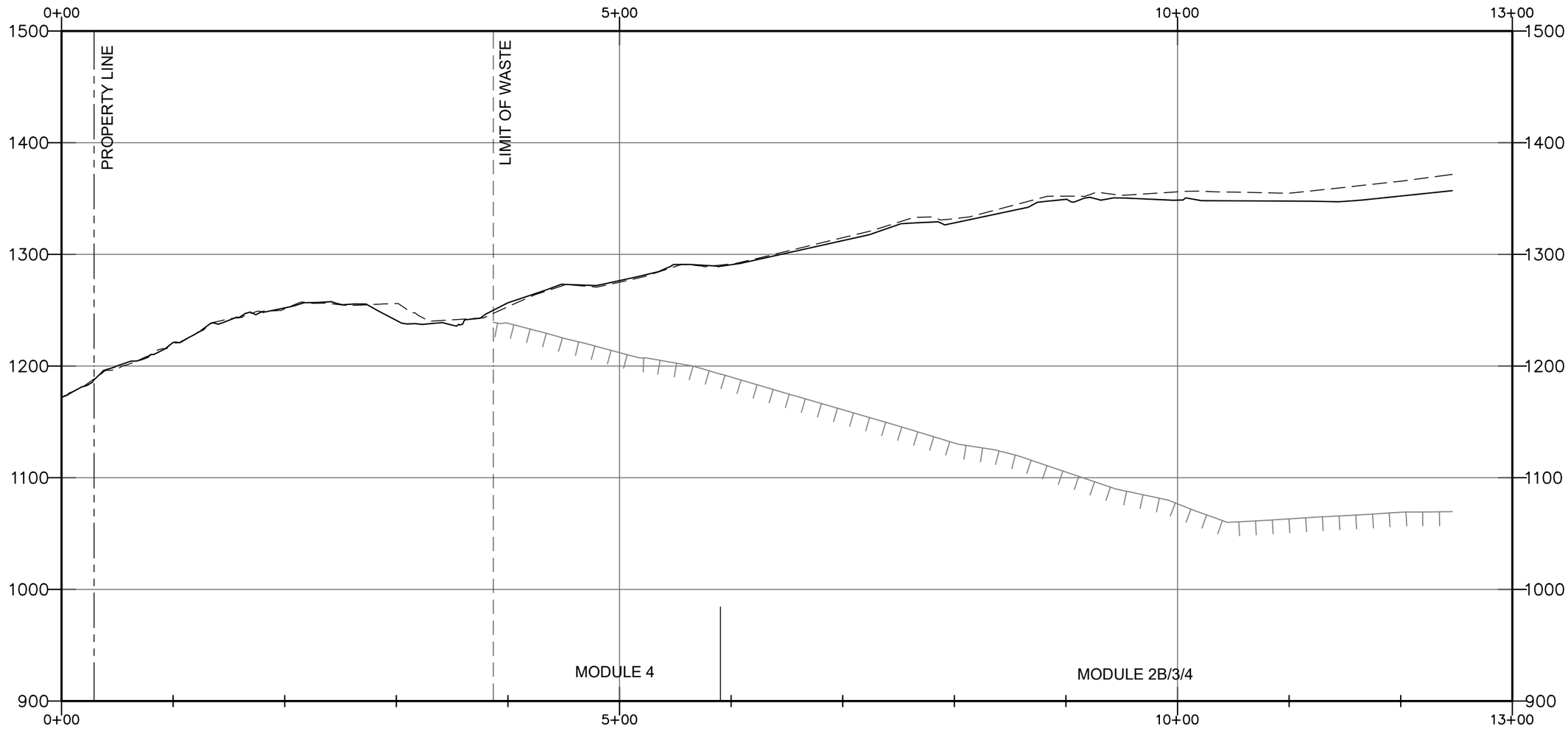
CHIQUITA CANYON LANDFILL
CASTAIC, CALIFORNIA

Geo-Logic ASSOCIATES

CAD DSGN BY: LP	DATE: AUGUST 2026	JOB NO. 1026.1002

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SECTION C–C'



100' 0' 50' 100'

SCALE: 1" = 100'

LEGEND

- CURRENT TOPOGRAPHY (APRIL 15, 2026)
- TOPOGRAPHY (NOVEMBER 27, 2024)
- EXISTING LINER
- PROPERTY LINE
- LIMIT OF WASTE

FIGURE 4

CROSS SECTION C–C'

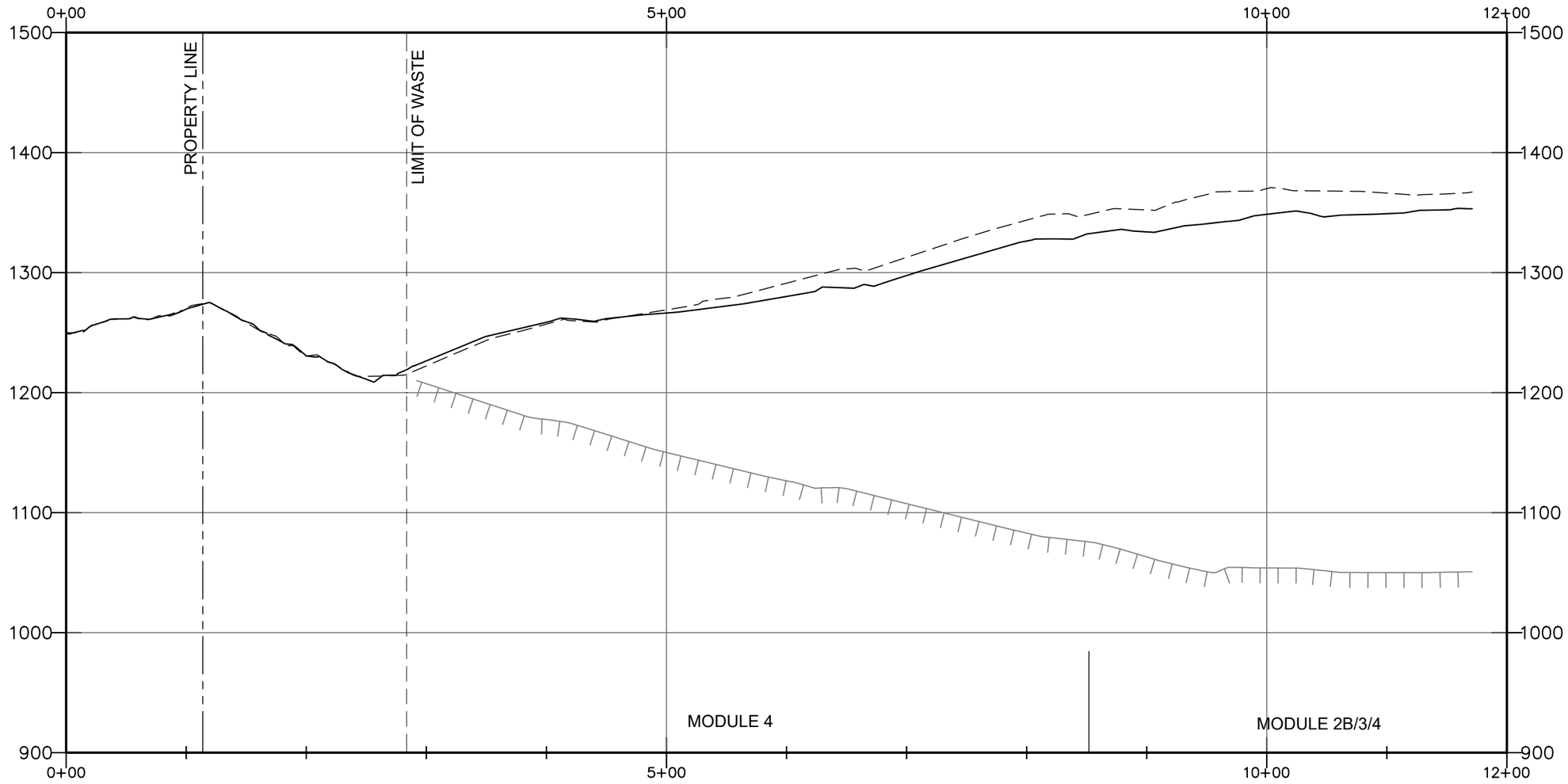
CHIQUITA CANYON LANDFILL
CASTAIC, CALIFORNIA

Geo-Logic ASSOCIATES

CAD DSGN BY:	LP	DATE:	AUGUST 2026	JOB NO.	1026.1002

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SECTION D–D'



LEGEND

- CURRENT TOPOGRAPHY (APRIL 15, 2026)
- TOPOGRAPHY (NOVEMBER 27, 2024)
- EXISTING LINER
- PROPERTY LINE
- LIMIT OF WASTE

100' 0' 50' 100'

SCALE: 1" = 100'

FIGURE 5

CROSS SECTION D–D'

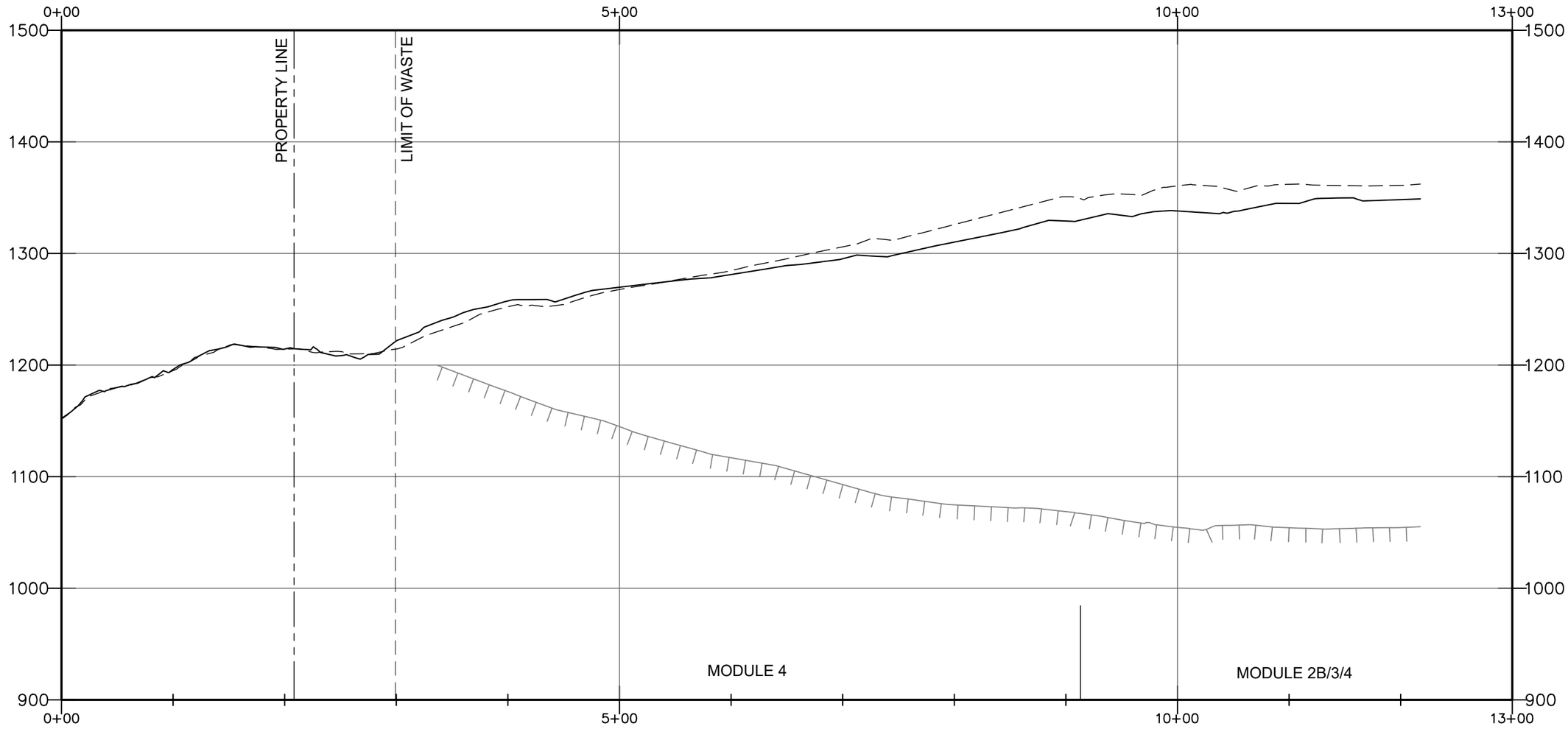
CHIQUITA CANYON LANDFILL
CASTAIC, CALIFORNIA

Geo-Logic ASSOCIATES

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SECTION E–E'



100' 0' 50' 100'

SCALE: 1" = 100'

LEGEND

- CURRENT TOPOGRAPHY (APRIL 15, 2026)
- TOPOGRAPHY (NOVEMBER 27, 2024)
- EXISTING LINER
- PROPERTY LINE
- LIMIT OF WASTE

FIGURE 6

CROSS SECTION E–E'

CHIQUITA CANYON LANDFILL
CASTAIC, CALIFORNIA

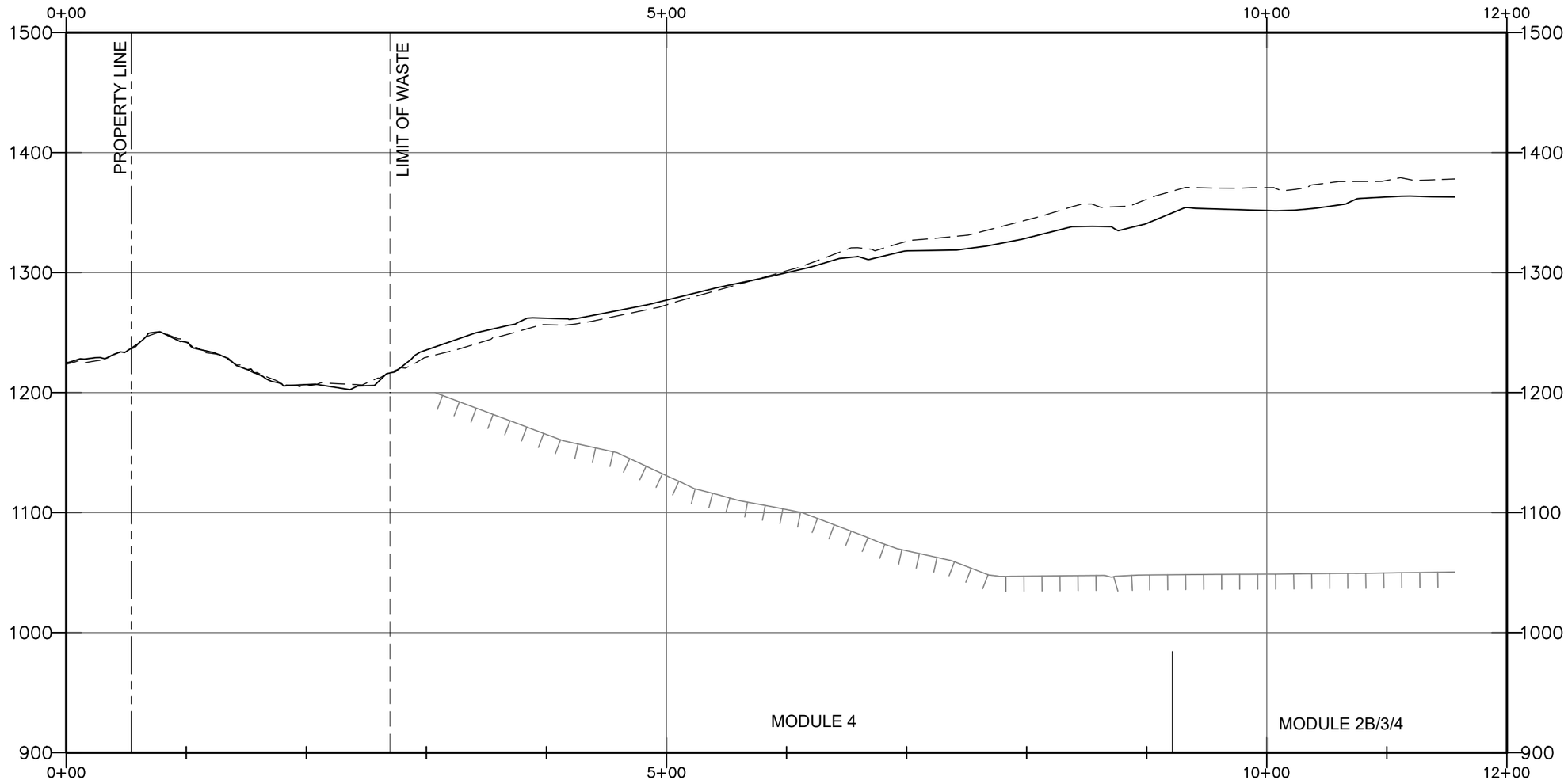
Geo-Logic ASSOCIATES

CAD DSGN BY:	LP	DATE:	AUGUST 2026	JOB NO.	1026.1002

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SECTION F–F'



100' 0' 50' 100'

SCALE: 1" = 100'

LEGEND

- CURRENT TOPOGRAPHY (APRIL 15, 2026)
- TOPOGRAPHY (NOVEMBER 27, 2024)
- EXISTING LINER
- PROPERTY LINE
- LIMIT OF WASTE

FIGURE 7

CROSS SECTION F–F'

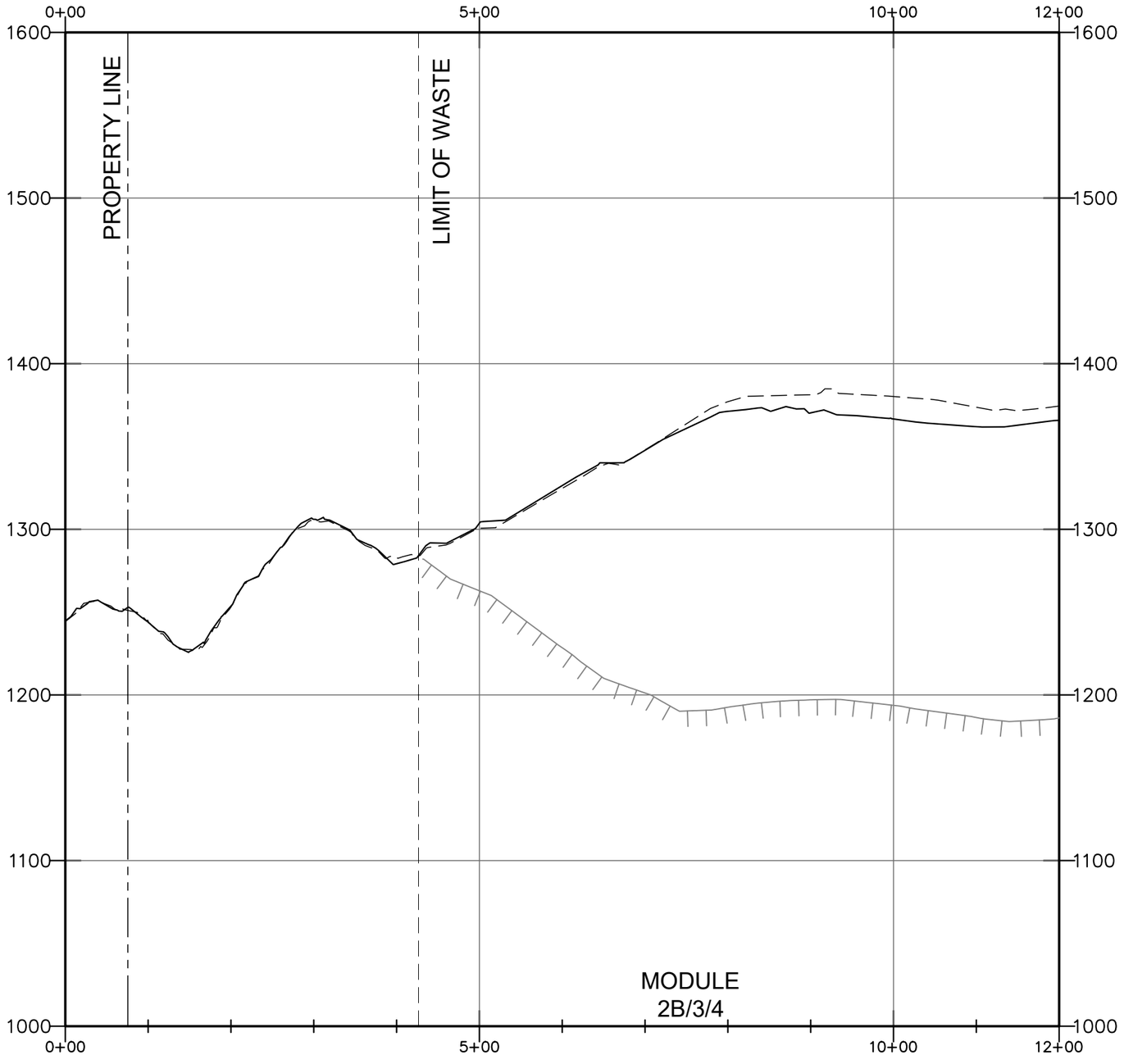
CHIQUITA CANYON LANDFILL
CASTAIC, CALIFORNIA

Geo-Logic ASSOCIATES

CAD DSGN BY: LP	DATE: AUGUST 2026	JOB NO. 1026.1002

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SECTION A–A'



LEGEND

- CURRENT TOPOGRAPHY (APRIL 15, 2026)
- TOPOGRAPHY (NOVEMBER 27, 2024)
- EXISTING LINER
- PROPERTY LINE
- LIMIT OF WASTE

150' 0' 75' 150'

SCALE: 1" = 150'

FIGURE 2

CROSS SECTION A–A'

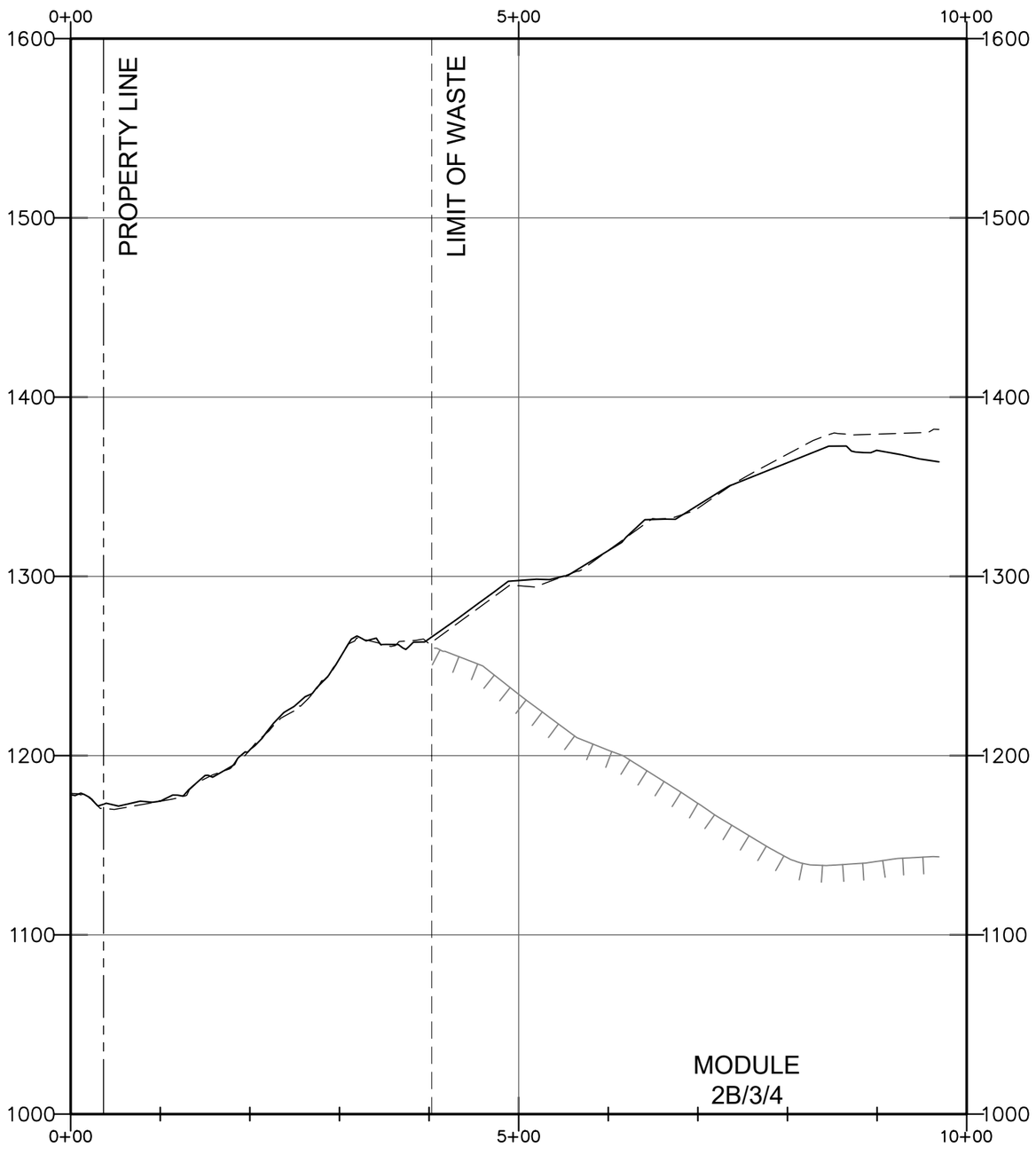
CHIQUITA CANYON LANDFILL
CASTAIC, CALIFORNIA

Geo-Logic ASSOCIATES

CAD DSGN BY: LP	DATE: AUGUST 2026	JOB NO. 1026.1002

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SECTION B–B'



LEGEND

- CURRENT TOPOGRAPHY (APRIL 15, 2026)
- TOPOGRAPHY (NOVEMBER 27, 2024)
- EXISTING LINER
- PROPERTY LINE
- LIMIT OF WASTE

150' 0' 75' 150'

SCALE: 1" = 150'

FIGURE 3

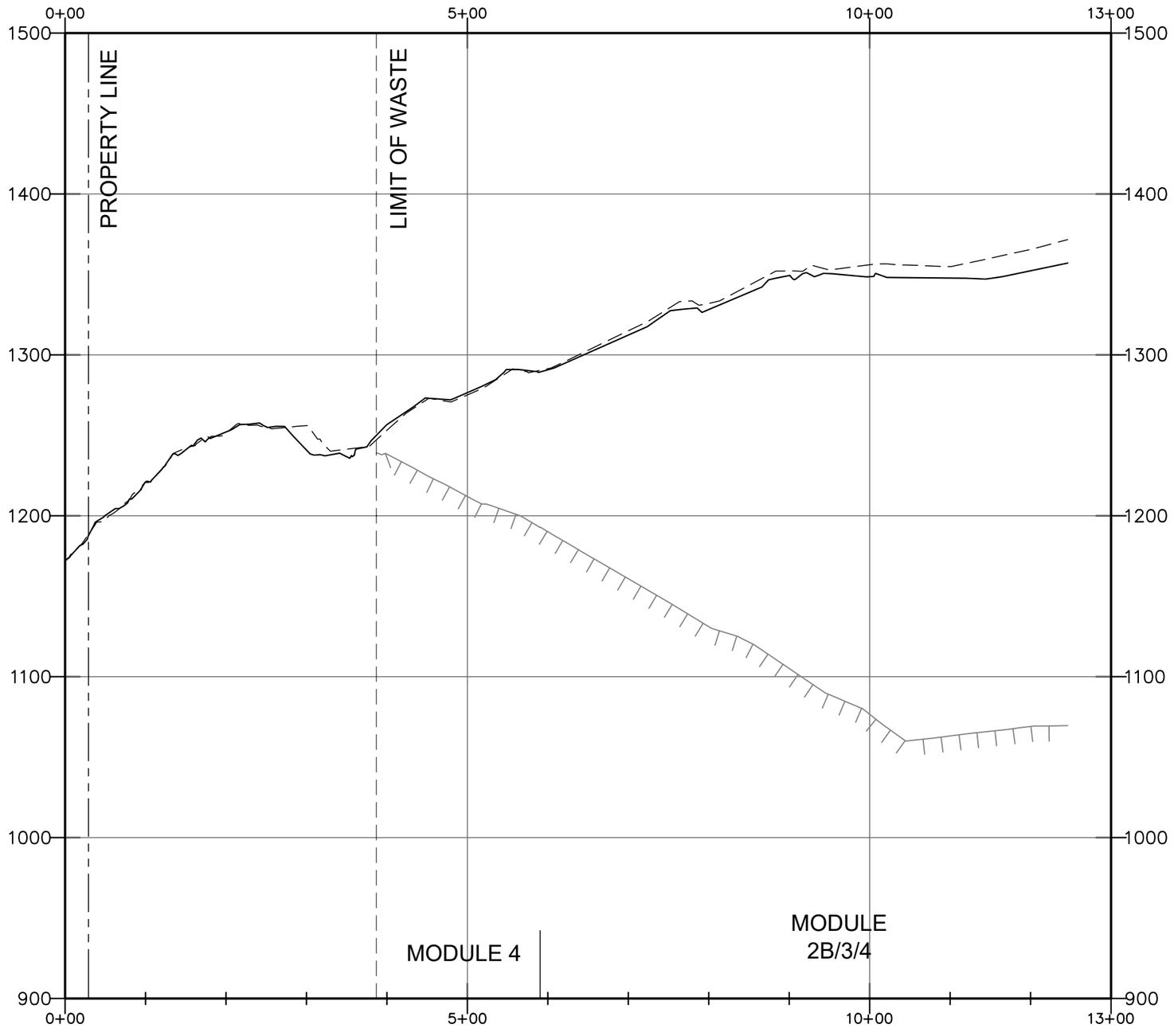
CROSS SECTION B–B'

CHIQUITA CANYON LANDFILL
CASTAIC, CALIFORNIA

Geo-Logic ASSOCIATES

CAD DSGN BY: LP	DATE: AUGUST 2026	JOB NO. 1026.1002

SECTION C–C'



LEGEND

- CURRENT TOPOGRAPHY (APRIL 15, 2026)
- TOPOGRAPHY (NOVEMBER 27, 2024)
- EXISTING LINER
- PROPERTY LINE
- LIMIT OF WASTE

150' 0' 75' 150'

SCALE: 1" = 150'

FIGURE 4

CROSS SECTION C–C'

CHIQUITA CANYON LANDFILL
CASTAIC, CALIFORNIA

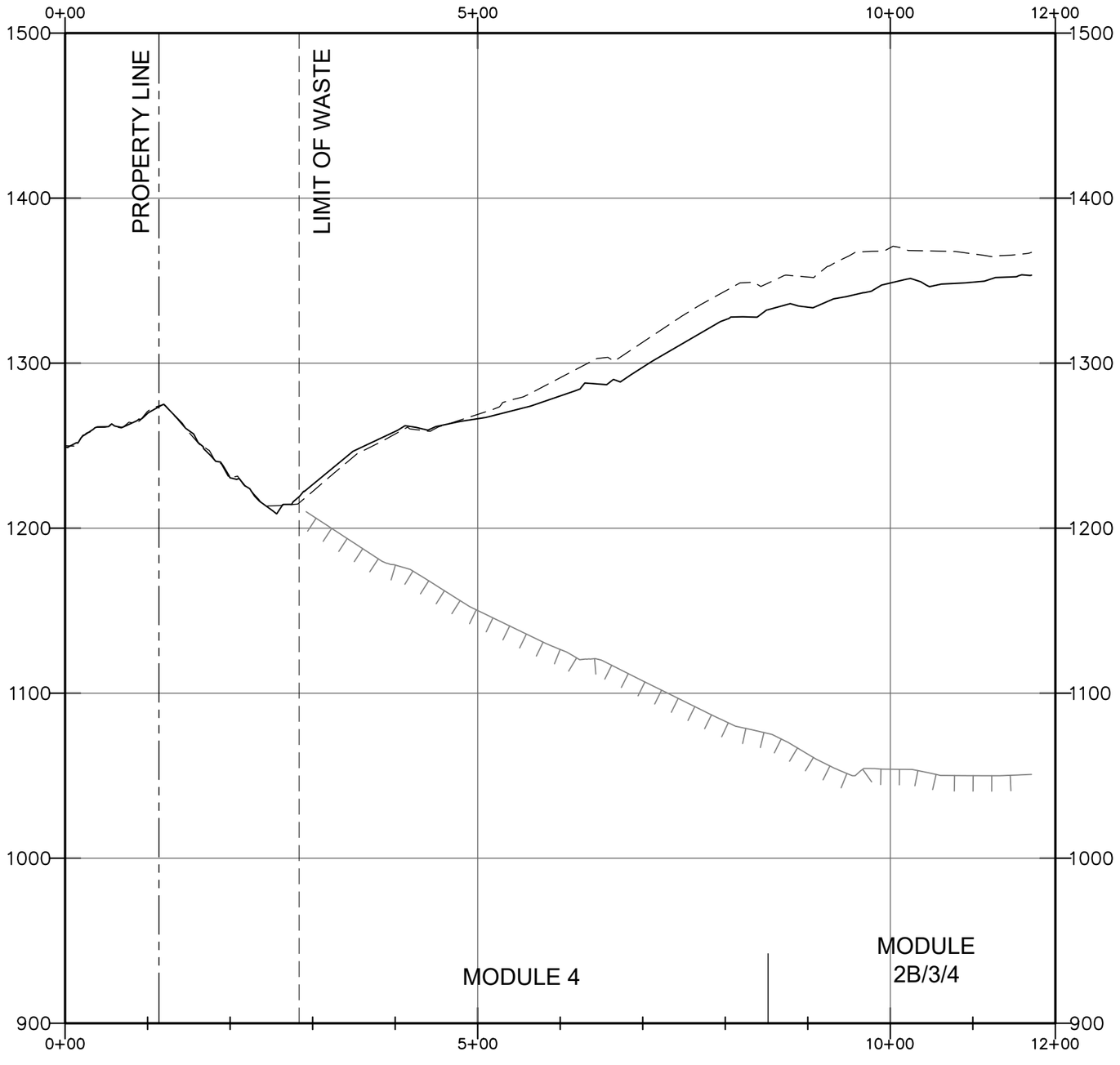
Geo-Logic ASSOCIATES

CAD DSGN BY: LP	DATE: AUGUST 2026	JOB NO. 1026.1002

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SECTION D–D'



LEGEND

- CURRENT TOPOGRAPHY (APRIL 15, 2026)
- TOPOGRAPHY (NOVEMBER 27, 2024)
- EXISTING LINER
- PROPERTY LINE
- LIMIT OF WASTE

150' 0' 75' 150'

SCALE: 1" = 150'

FIGURE 5

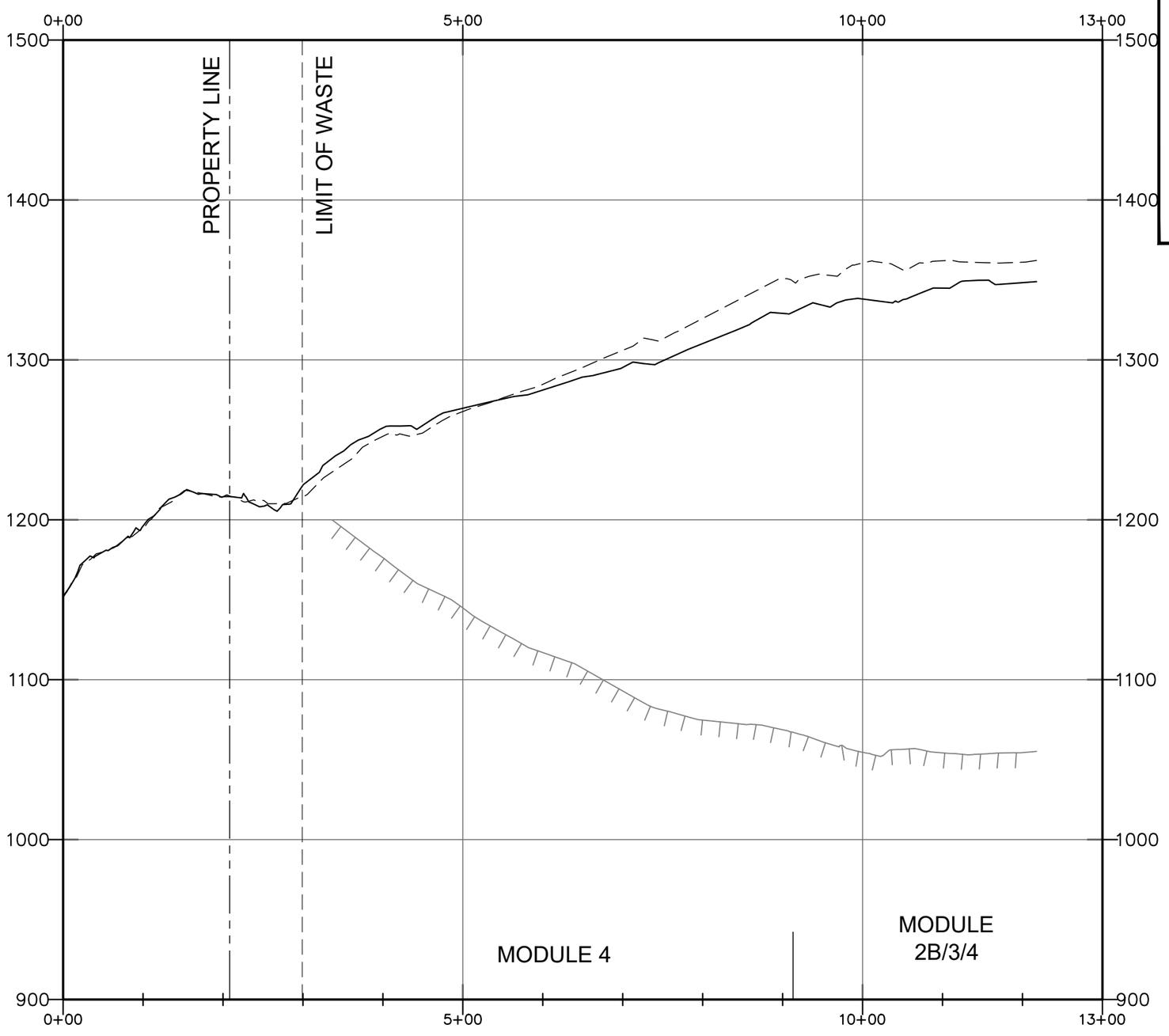
CROSS SECTION D–D'

CHIQUITA CANYON LANDFILL
CASTAIC, CALIFORNIA

Geo-Logic ASSOCIATES

CAD DSGN BY: LP	DATE: AUGUST 2026	JOB NO. 1026.1002

SECTION E–E'



LEGEND

- CURRENT TOPOGRAPHY (APRIL 15, 2026)
- TOPOGRAPHY (NOVEMBER 27, 2024)
- EXISTING LINER
- PROPERTY LINE
- LIMIT OF WASTE

150' 0' 75' 150'

SCALE: 1" = 150'

FIGURE 6

CROSS SECTION E–E'

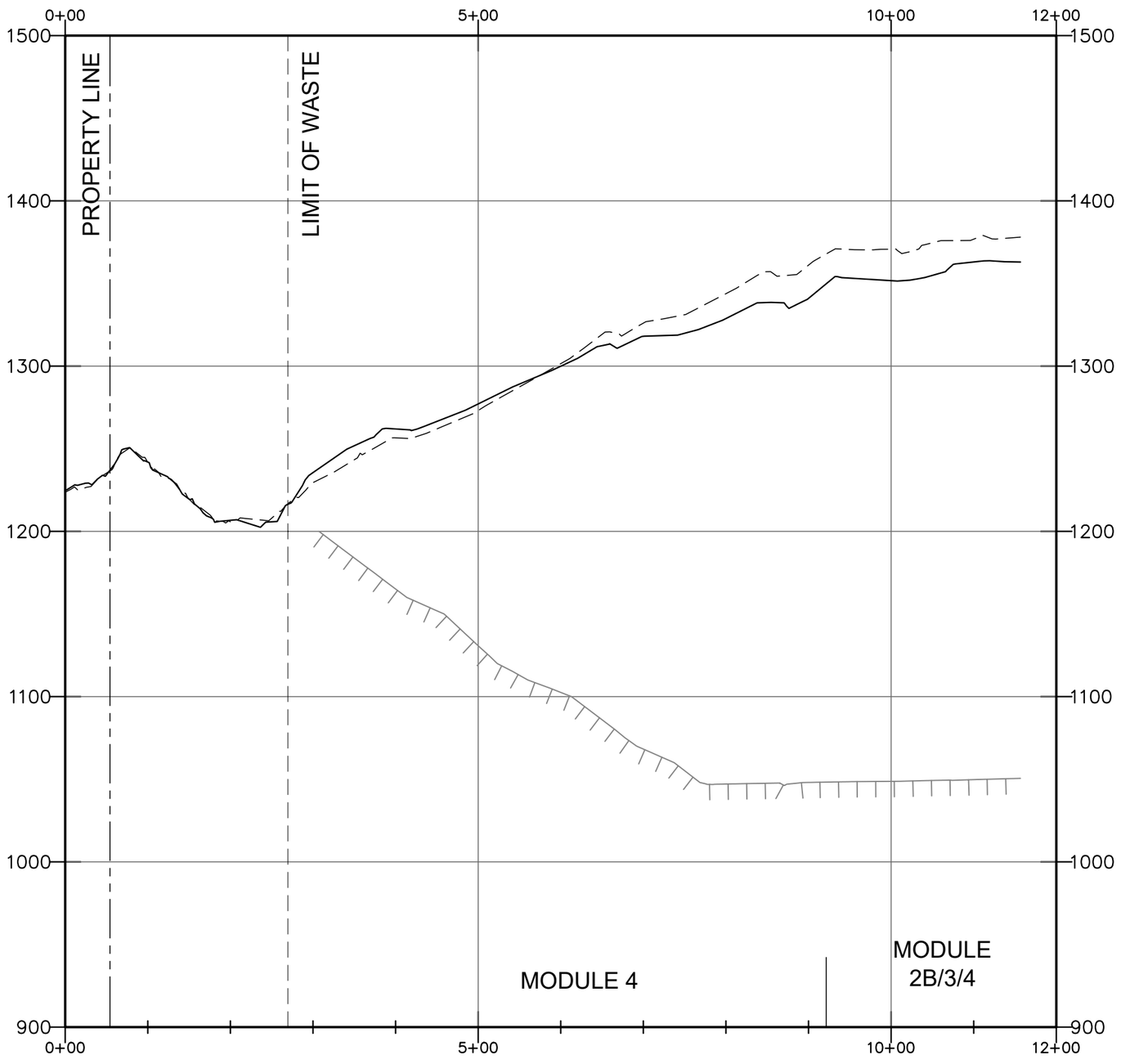
CHIQUITA CANYON LANDFILL
CASTAIC, CALIFORNIA

Geo-Logic ASSOCIATES

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SECTION F–F'



LEGEND

- CURRENT TOPOGRAPHY (APRIL 15, 2026)
- TOPOGRAPHY (NOVEMBER 27, 2024)
- EXISTING LINER
- PROPERTY LINE
- LIMIT OF WASTE

150' 0' 75' 150'

SCALE: 1" = 150'

FIGURE 7

CROSS SECTION F–F'

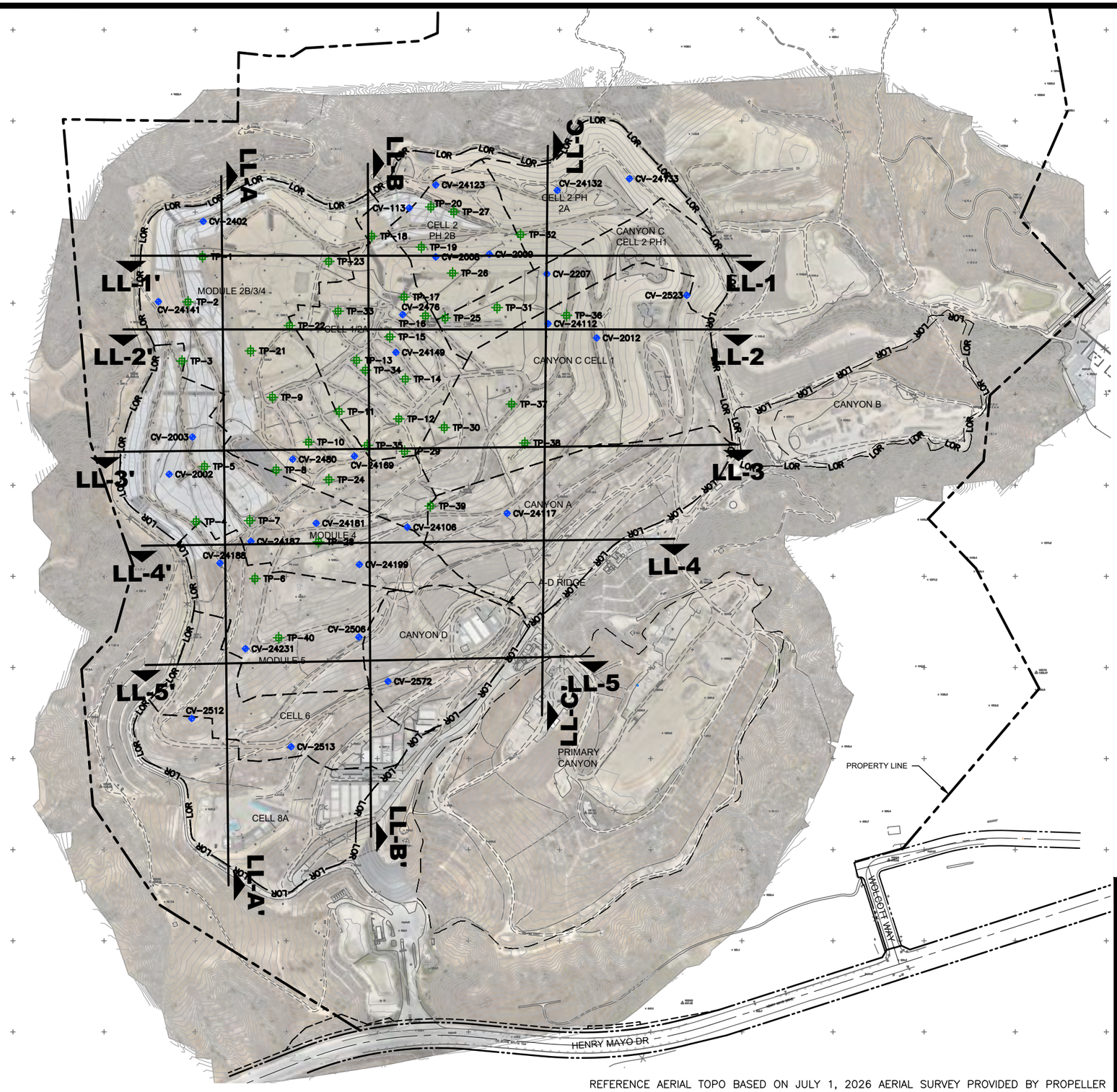
CHIQUITA CANYON LANDFILL
CASTAIC, CALIFORNIA

Geo-Logic ASSOCIATES

CAD DSGN BY: LP | DATE: AUGUST 2026 | JOB NO. 1026.1002

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Appendix C
FLUID LEVEL MEASUREMENTS AND SURFACES



LEGEND:

- PROPERTY LINE
- LOR LOR — APPROXIMATE LIMIT OF REFUSE
- CELL LIMIT
- CV-2523 — LEACHATE LEVEL MONITORING POINT LOCATION
- TP-23 — TEMPERATURE MONITORING POINT LOCATIONS

600' 0' 300' 600'

SCALE: 1" = 600'

REFERENCE AERIAL TOPO BASED ON JULY 1, 2026 AERIAL SURVEY PROVIDED BY PROPELLER

FIGURE 1

WEST SIDE PROJECT

CHIQUITA CANYON LANDFILL
CASTAIC, CA

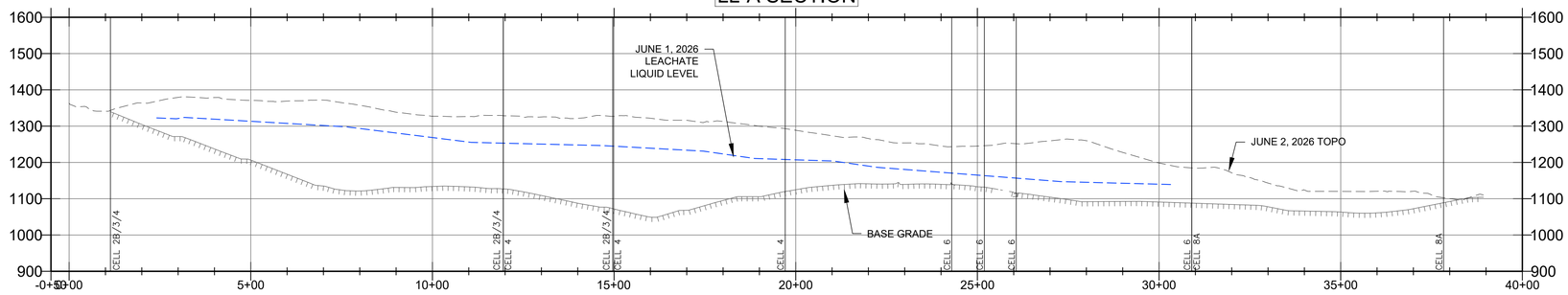
Geo-Logic ASSOCIATES

DRAWN BY: LP/RM	DATE: JULY 2026	JOB NO.: 1026.1002

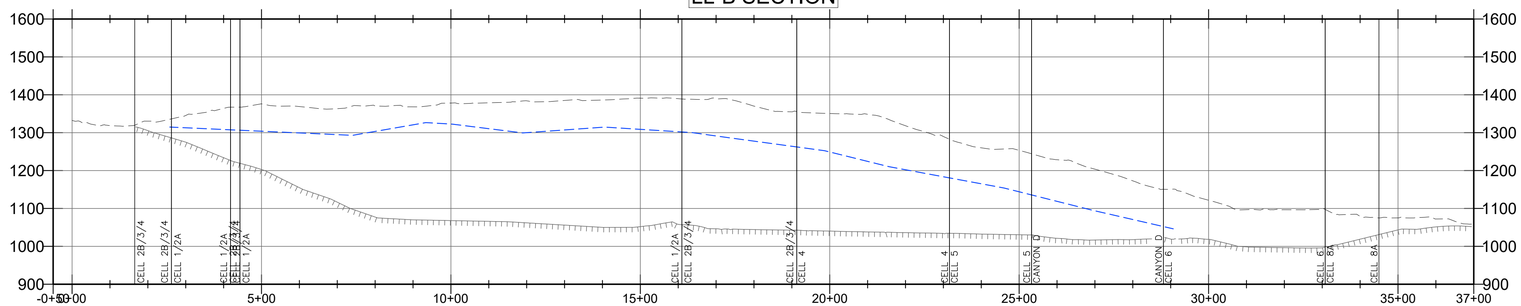
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SCALE
H: 1" = 200'
V: 1" = 200'

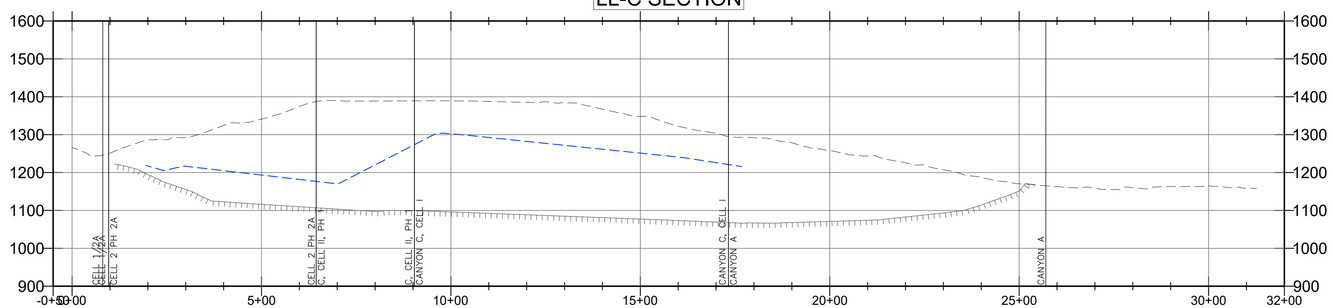
LL-A SECTION



LL-B SECTION



LL-C SECTION



200' 0' 100' 200' 400'
SCALE: 1" = 200'

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ISSUED FOR REVIEW
REFERENCE AERIAL TOPO BASED ON JUNE 2, 2026 AERIAL SURVEY BY PROPELLER

REV. NO.	DATE	DESCRIPTION	APPROVED BY

DATE OF ISSUE: JULY 2026
DESIGNED BY: R MITCHELL
CAD DESIGN BY: L PADILLA
CHECKED BY: R MITCHELL
APPROVED BY: R MITCHELL

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Geo-Logic ASSOCIATES
2777 EAST GUASTI ROAD
SUITE 1
ONTARIO, CA 91761
(909) 626-2282
www.geo-logic.com

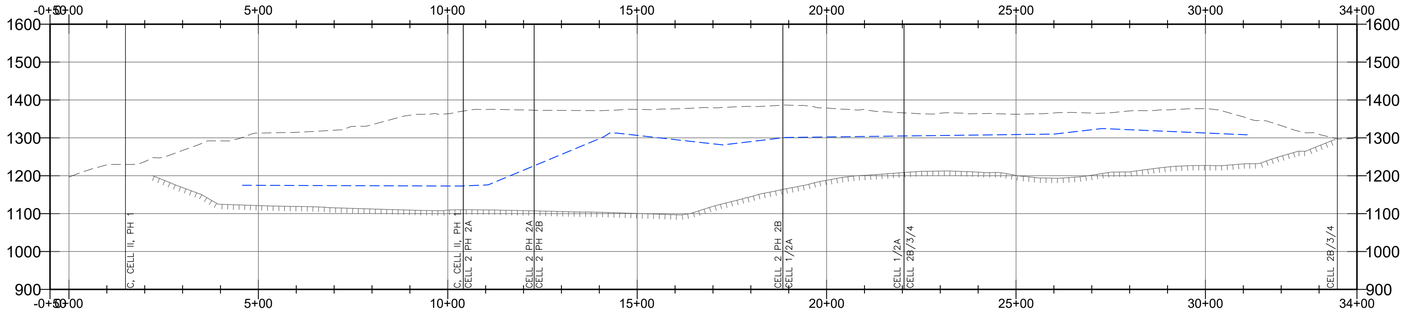
CHIQUITA CANYON
A Waste Connections Company
29201 HENRY MAYO DRIVE
CASTAIC, CA 91384

CHIQUITA CANYON LANDFILL
WEST SIDE SLOPE PROJECT
CROSS SECTIONS

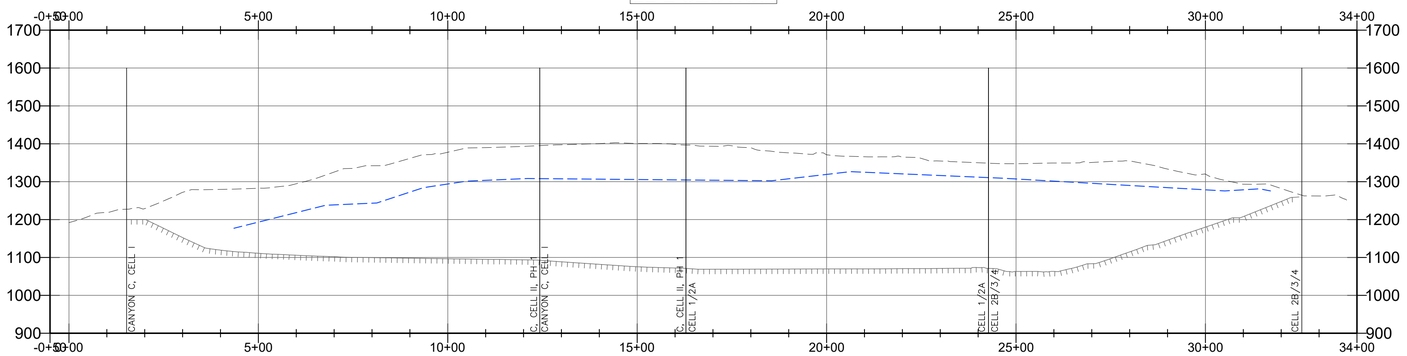
DWG NO.
PROJECT NO. RM22.1077

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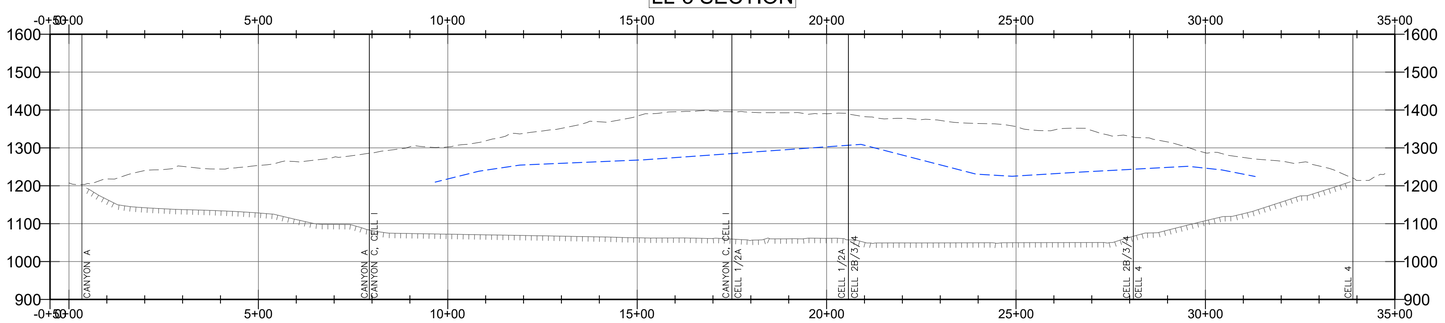
LL-1 SECTION



LL-2 SECTION



LL-3 SECTION



SCALE
H: 1" = 200'
V: 1" = 200'

200' 0' 100' 200' 400'
SCALE: 1" = 200'

ISSUED FOR REVIEW
REFERENCE AERIAL TOPO BASED ON JUNE 2, 2026 AERIAL SURVEY BY PROPELLER

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REV. NO.	DATE	DESCRIPTION	APPROVED BY

DATE OF ISSUE: JULY 2026
DESIGNED BY: R MITCHELL
CAD DESIGN BY: L PADILLA
CHECKED BY: R MITCHELL
APPROVED BY: R MITCHELL

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2777 EAST GUASTI ROAD
SUITE 1
ONTARIO, CA 91761
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A Waste Connections Company
29201 HENRY MAYO DRIVE
CASTAIC, CA 91384

CHIQUITA CANYON LANDFILL
WEST SIDE SLOPE PROJECT
CROSS SECTIONS

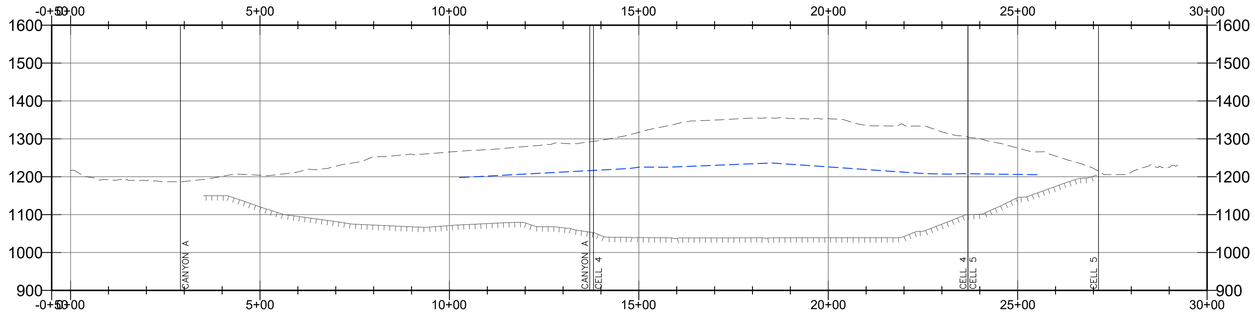
DWG NO.

PROJECT NO.
RM22.1077

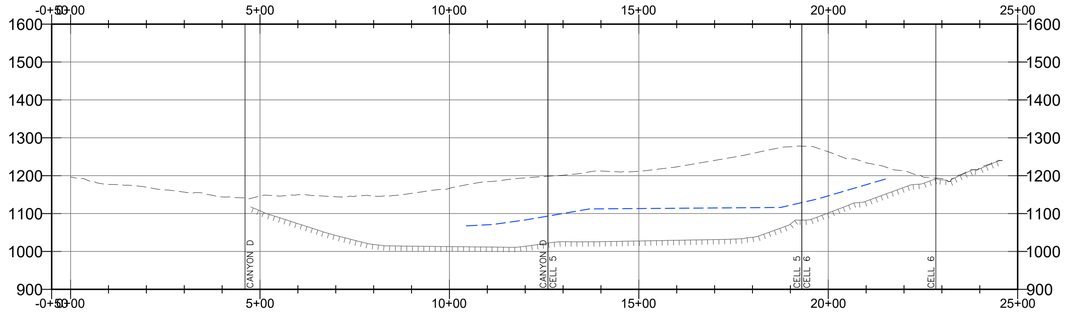
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SCALE
H: 1" = 200'
V: 1" = 200'

LL-4 SECTION



LL-5 SECTION



200' 0' 100' 200' 400'
SCALE: 1" = 200'

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REV. NO.	DATE	DESCRIPTION	APPROVED BY

DATE OF ISSUE: JULY 2026
DESIGNED BY: R MITCHELL
CAD DESIGN BY: L PADILLA
CHECKED BY: R MITCHELL
APPROVED BY: R MITCHELL

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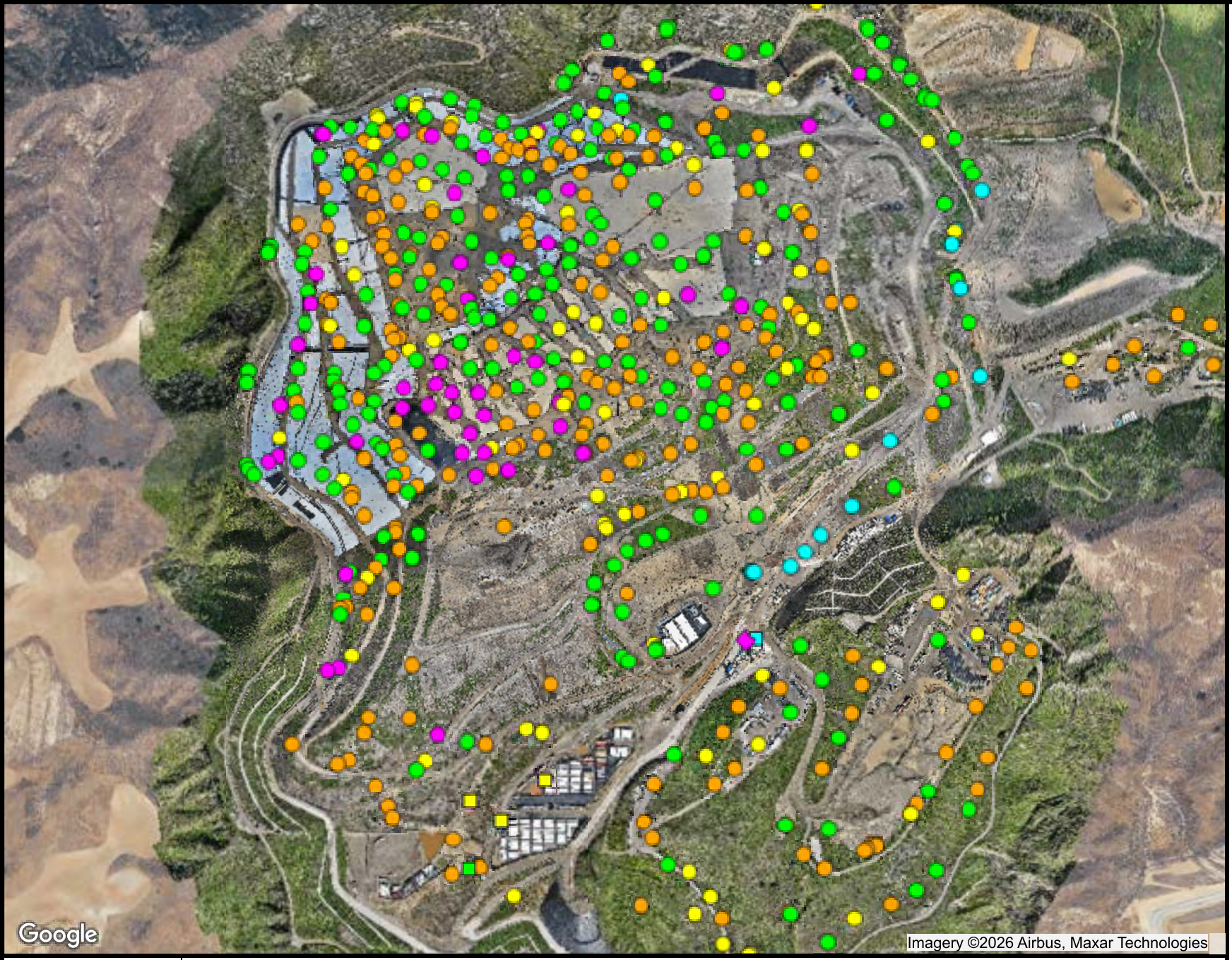
CHIQUITA CANYON LANDFILL
WEST SIDE SLOPE PROJECT
CROSS SECTIONS

DWG NO.

PROJECT NO.
RM22.1077

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Appendix D
LANDFILL GAS PRESSURE PLOTS



Ranges Mapped

						# Points
	>=	-101	and	<	-10	31
	>=	-10	and	<	-2	229
	>=	-2	and	<	-1	89
	>=	-1	and	<	0	231
	>=	0	and	<	101	55

Point Type Legend

- calibration record
- flare-engine-ghg
- monitoring probe
- sample port
- well

N

SCSeTools

Chiquita Canyon Landfill

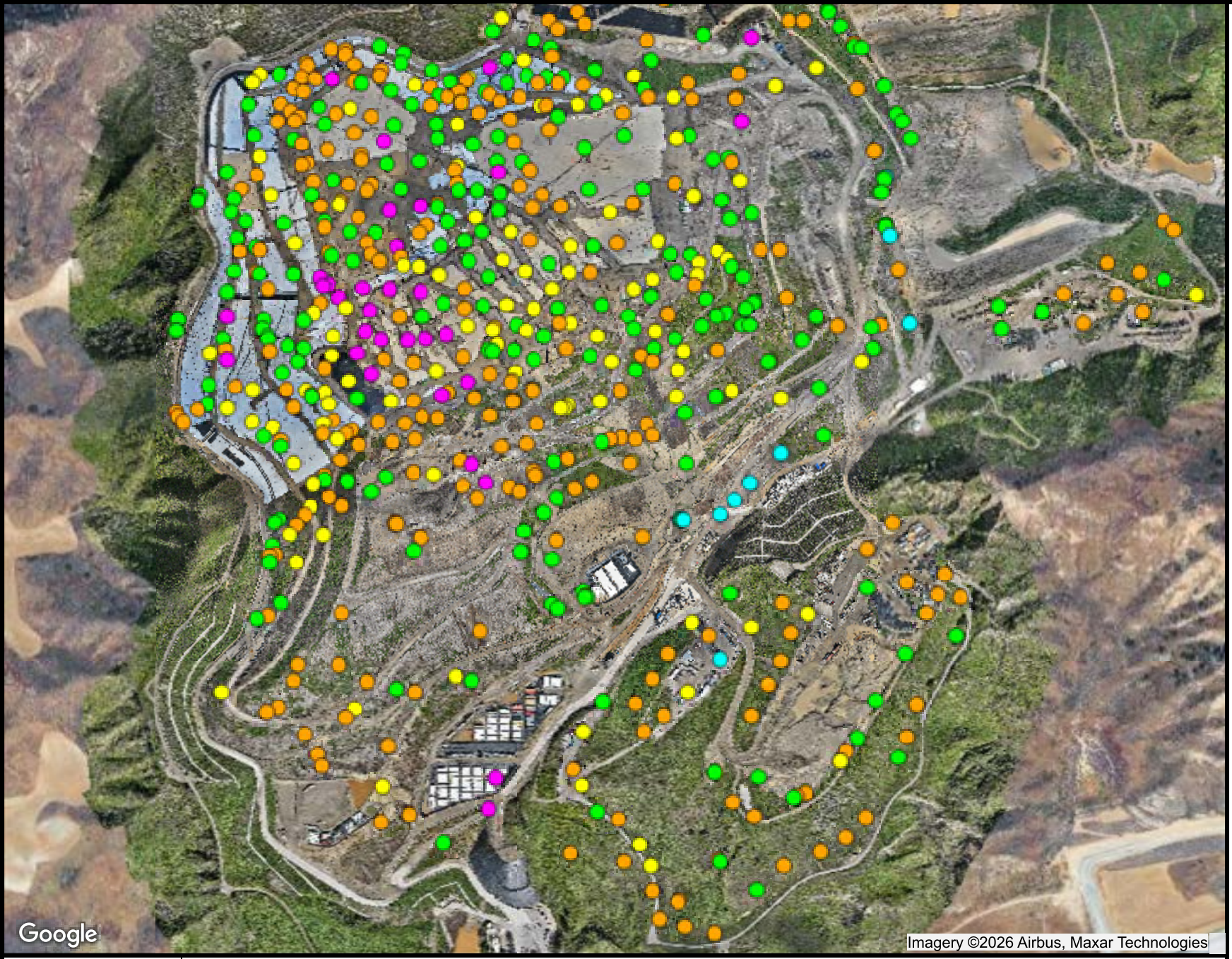
Range Map

Parameter: Adj Static Press (mid range)

Analysis Method: MostRecent

Date Range: 10/01/2024 - 12/31/2024

Map generation date : 06/23/2026



Ranges Mapped

						# Points
	>=	-101	and	<	-10	12
	>=	-10	and	<	-2	219
	>=	-2	and	<	-1	106
	>=	-1	and	<	0	259
	>=	0	and	<	101	32

Point Type Legend

well

N

SCSeTools

Chiquita Canyon Landfill

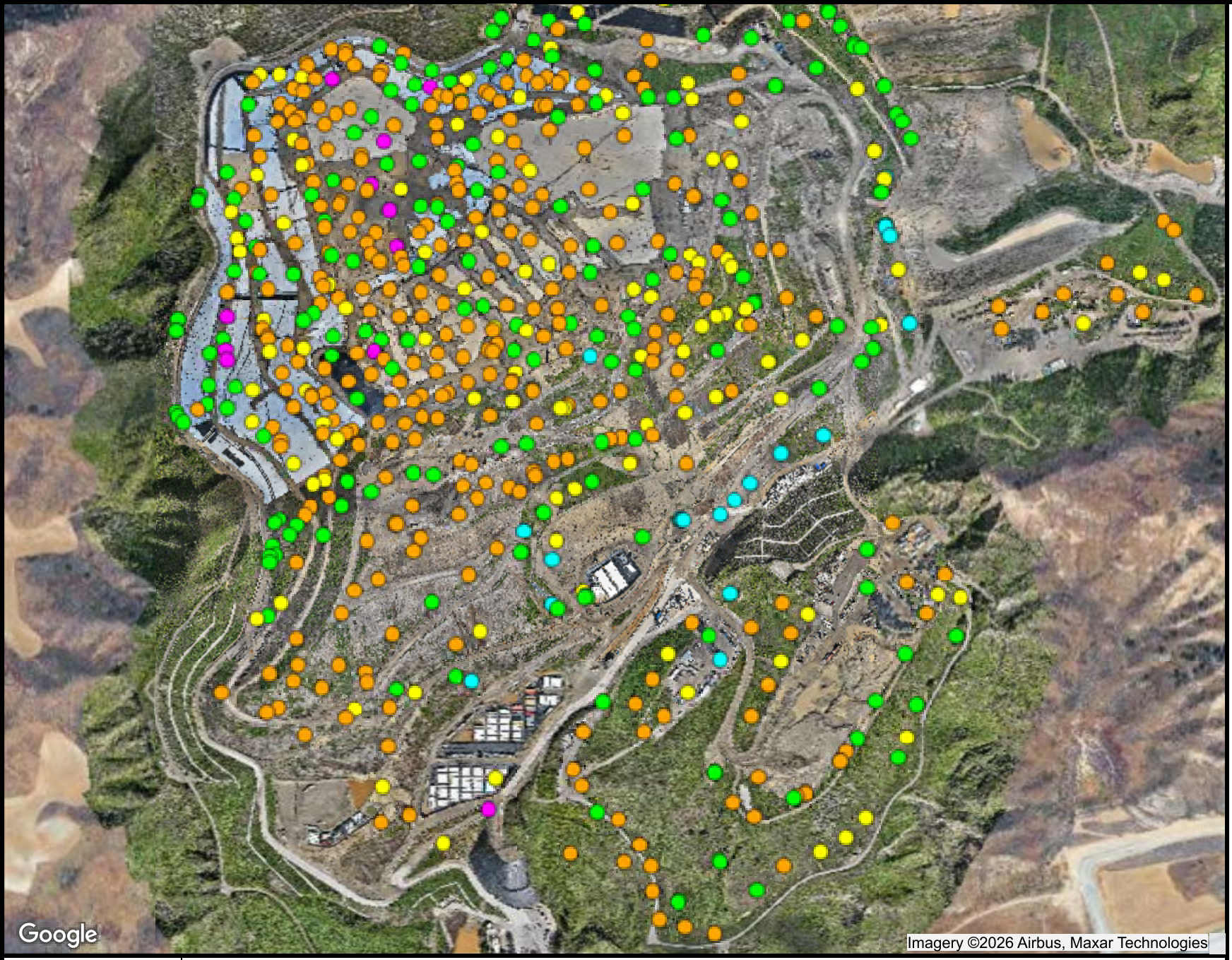
Range Map

Parameter: Adj Static Press (mid range)

Analysis Method: MostRecent

Date Range: 01/01/2025 - 03/31/2025

Map generation date : 06/24/2026



Ranges Mapped

						# Points
	>=	-101	and	<	-10	22
	>=	-10	and	<	-2	179
	>=	-2	and	<	-1	107
	>=	-1	and	<	0	325
	>=	0	and	<	101	11

Point Type Legend

well

N

SCSeTools

Chiquita Canyon Landfill

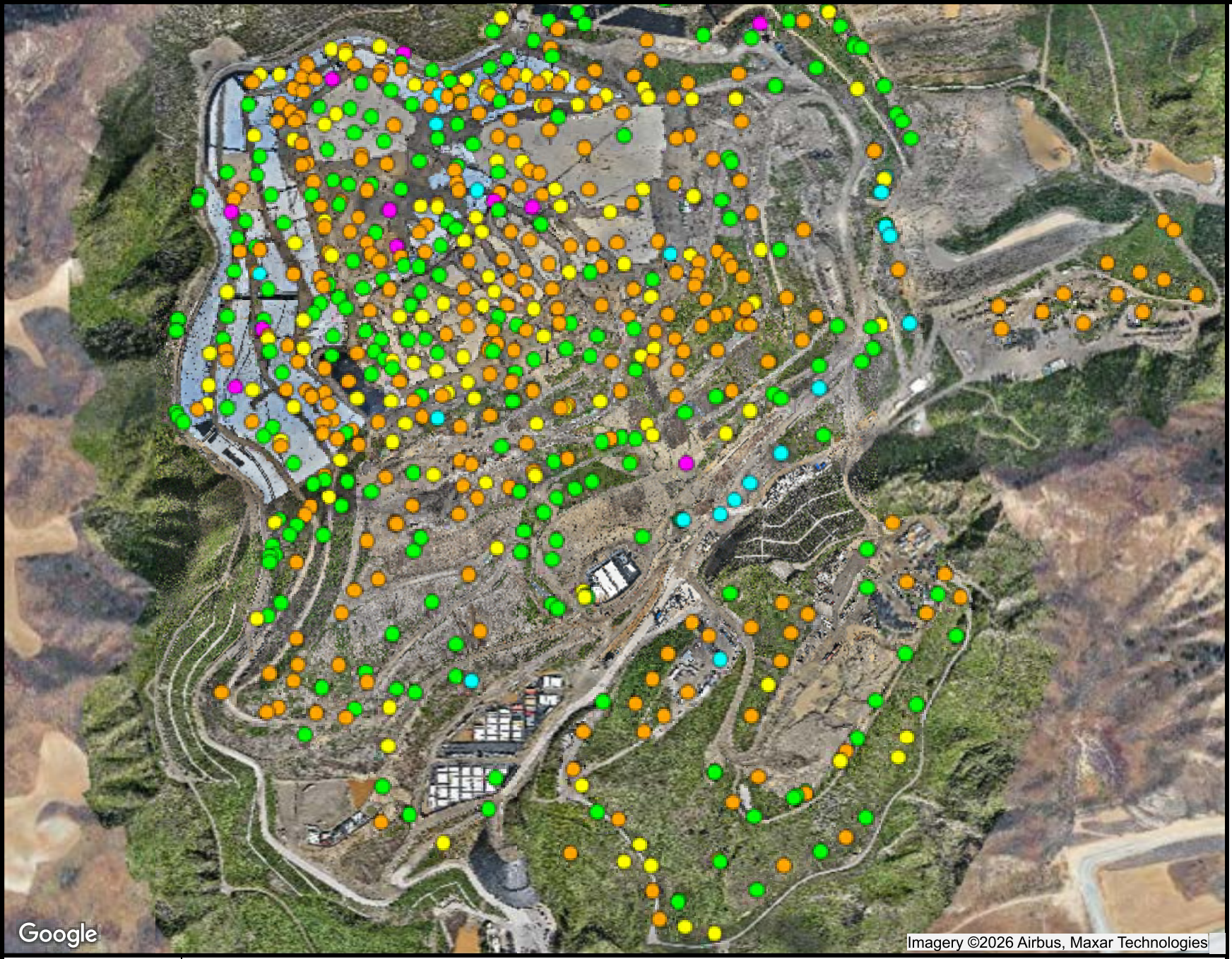
Range Map

Parameter: Adj Static Press (mid range)

Analysis Method: MostRecent

Date Range: 04/01/2025 - 06/30/2025

Map generation date : 06/24/2026



Ranges Mapped

						# Points
	>=	-101	and	<	-10	20
	>=	-10	and	<	-2	237
	>=	-2	and	<	-1	114
	>=	-1	and	<	0	288
	>=	0	and	<	101	11

Point Type Legend

well

N

SCSeTools

Chiquita Canyon Landfill

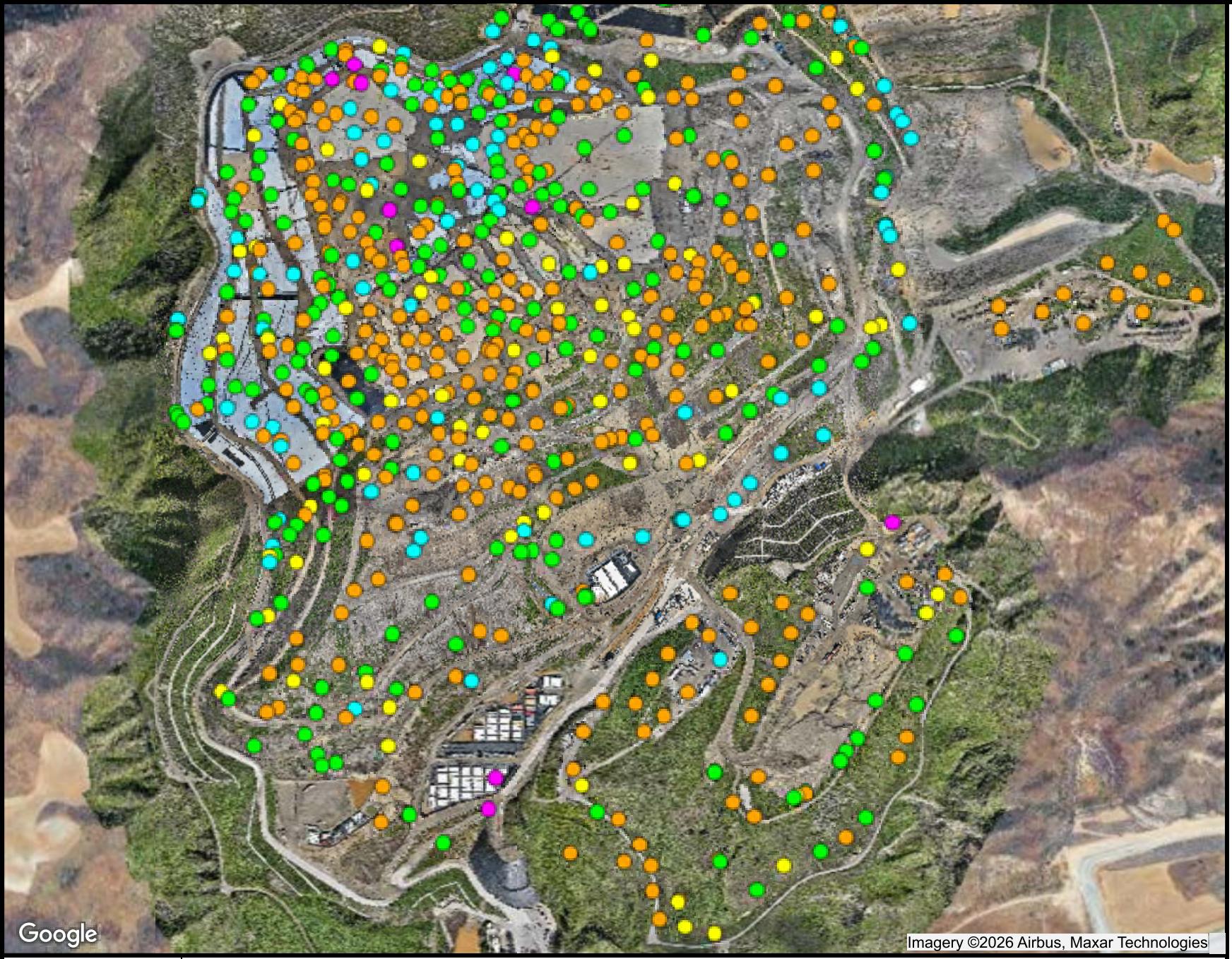
Range Map

Parameter: Adj Static Press (mid range)

Analysis Method: MostRecent

Date Range: 07/01/2025 - 09/30/2025

Map generation date : 06/24/2026



Ranges Mapped

						# Points
	>=	-101	and	<	-10	93
	>=	-10	and	<	-2	212
	>=	-2	and	<	-1	77
	>=	-1	and	<	0	321
	>=	0	and	<	101	10

Point Type Legend

well

N

SCSeTools

Chiquita Canyon Landfill

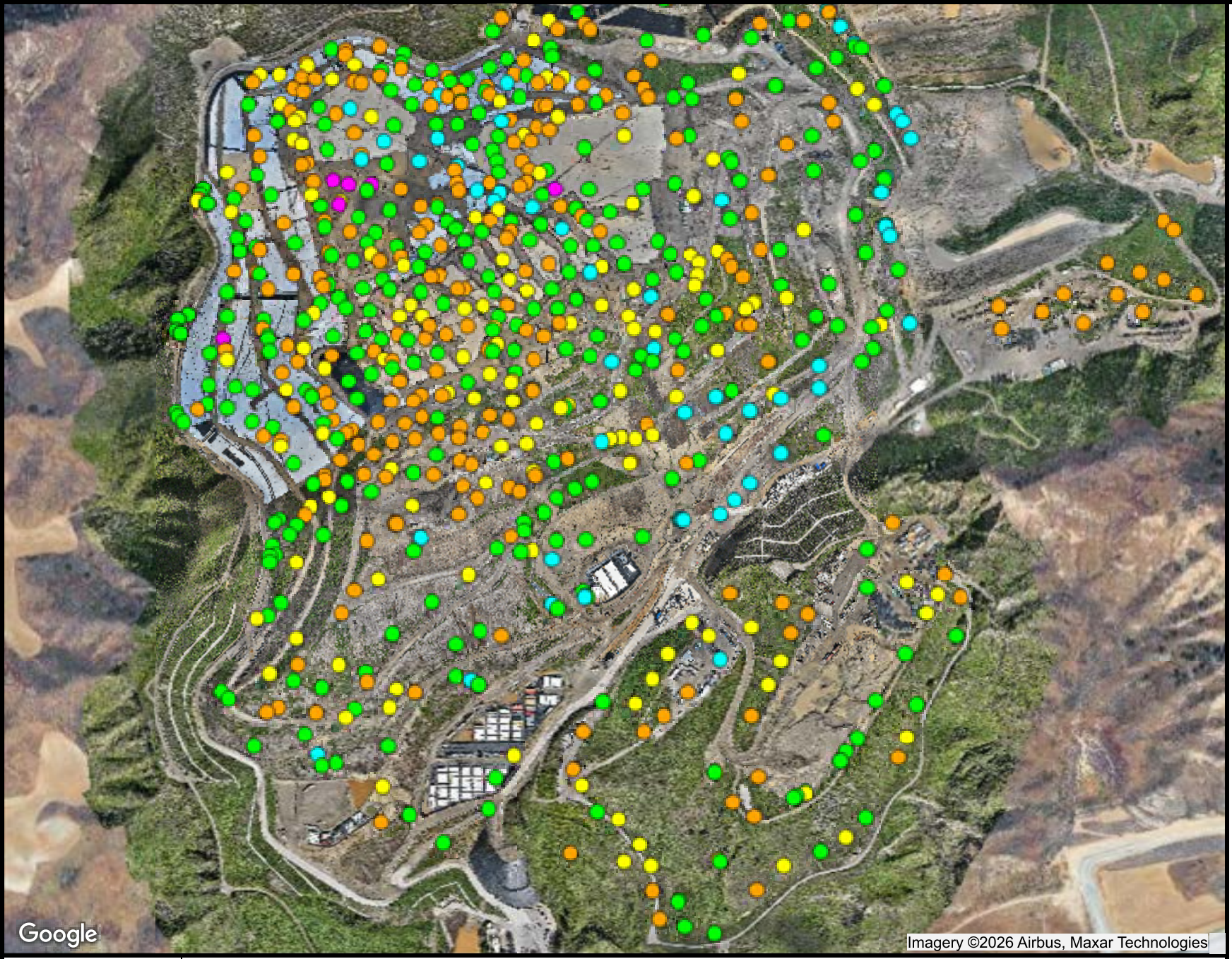
Range Map

Parameter: Adj Static Press (mid range)

Analysis Method: MostRecent

Date Range: 10/01/2025 - 12/31/2025

Map generation date : 06/24/2026



Ranges Mapped

						# Points
	>=	-101	and	<	-10	59
	>=	-10	and	<	-2	319
	>=	-2	and	<	-1	136
	>=	-1	and	<	0	237
	>=	0	and	<	101	6

Point Type Legend

well

N

SCSeTools

Chiquita Canyon Landfill

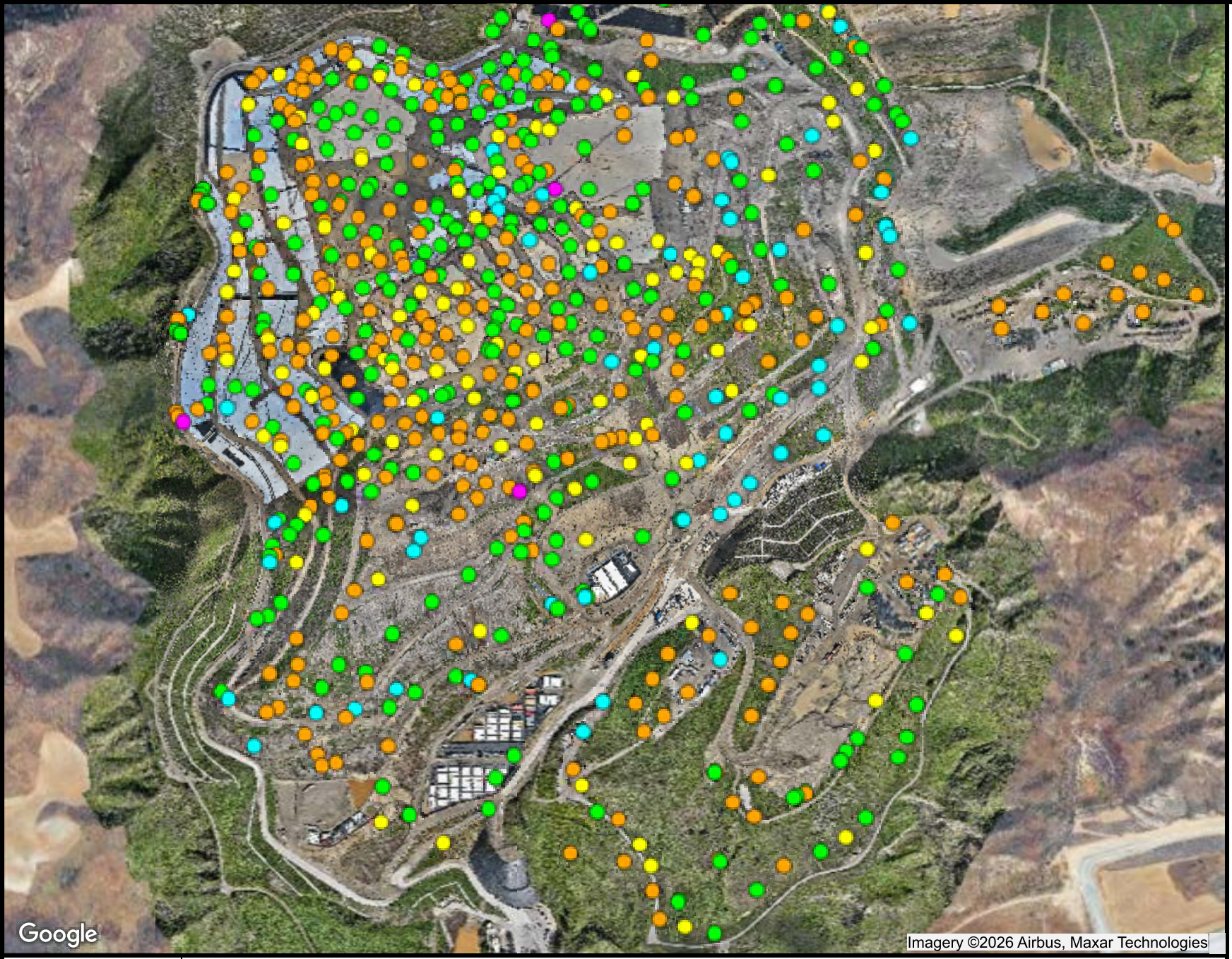
Range Map

Parameter: Adj Static Press (mid range)

Analysis Method: MostRecent

Date Range: 01/01/2026 - 03/31/2026

Map generation date : 06/24/2026



Ranges Mapped

						# Points
	>=	-101	and	<	-10	67
	>=	-10	and	<	-2	291
	>=	-2	and	<	-1	113
	>=	-1	and	<	0	282
	>=	0	and	<	101	4

Point Type Legend

well

N

SCSeTools

Chiquita Canyon Landfill

Range Map

Parameter: Adj Static Press (mid range)

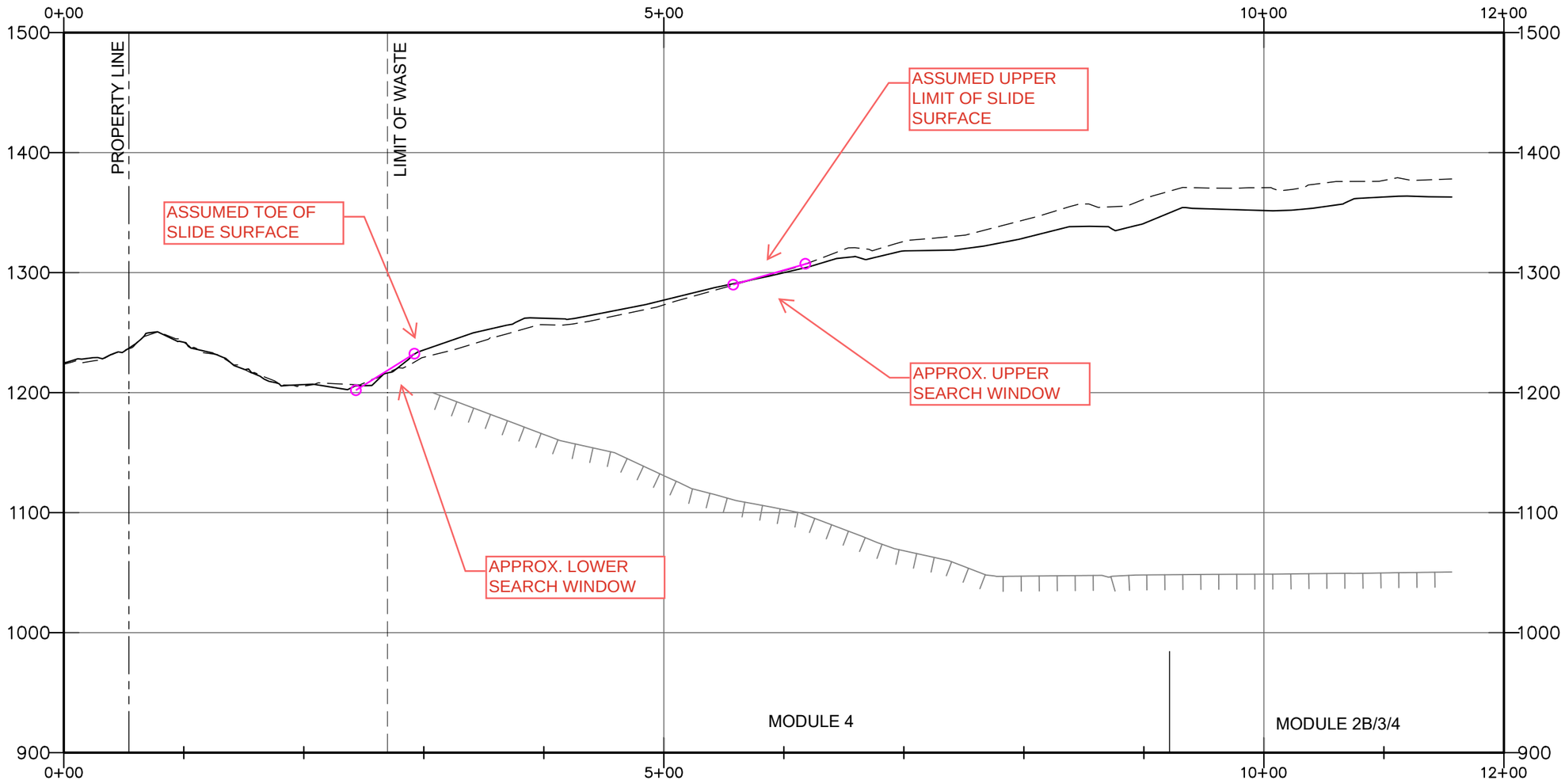
Analysis Method: MostRecent

Date Range: 04/01/2026 - 06/30/2026

Map generation date : 06/24/2026

Appendix E
BACK ANALYSIS OUTPUT

SECTION F–F'



LEGEND

- CURRENT TOPOGRAPHY (APRIL 15, 2026)
- TOPOGRAPHY (NOVEMBER 27, 2024)
- EXISTING LINER
- PROPERTY LINE
- LIMIT OF WASTE

100' 0' 50' 100'

SCALE: 1" = 100'

FIGURE 7

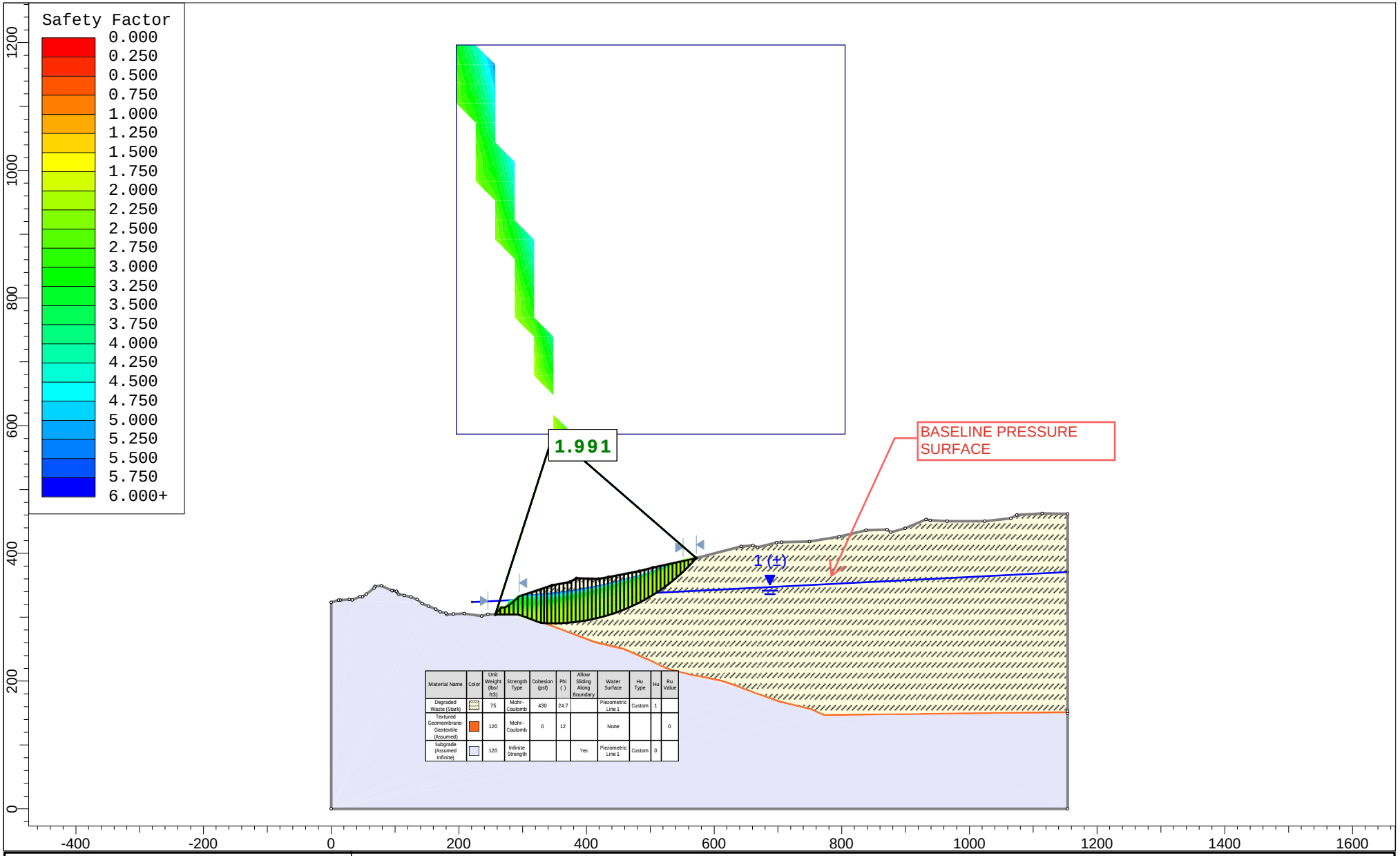
CROSS SECTION F–F'

CHIQUITA CANYON LANDFILL
CASTAIC, CALIFORNIA

Geo-Logic ASSOCIATES

CAD DSGN BY: LP | DATE: AUGUST 2026 | JOB NO. 1026.1002

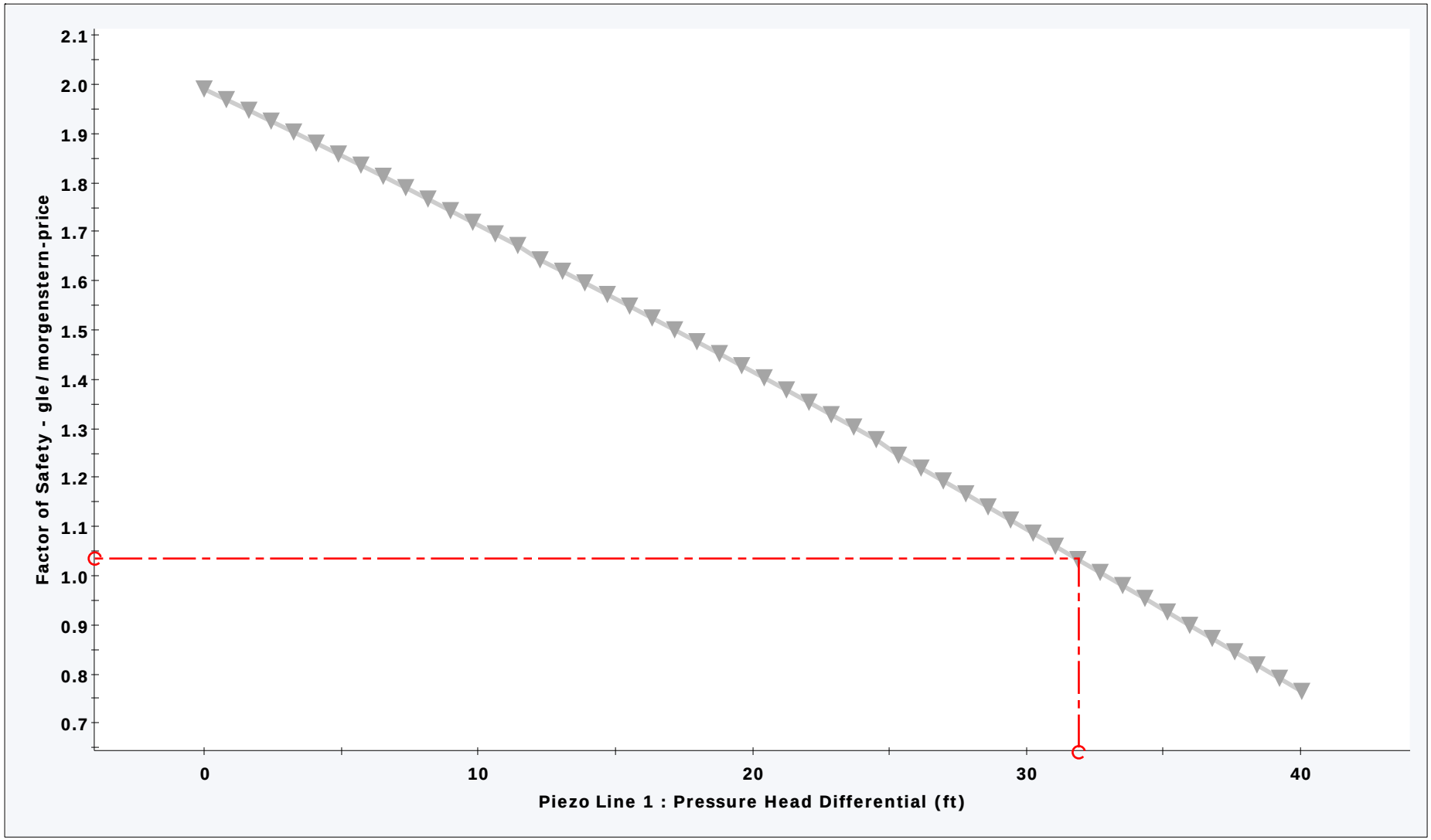
P:\SITES\CHIQUITA CYN LF\COMPARATIVE STABILITY EVALUATION–2026\MODELS\PROFILES\ZCCL–XS–(2026–08–20).DWG August 20, 2026



ROCSCIENCE

SLIDEINTERPRET 9.044

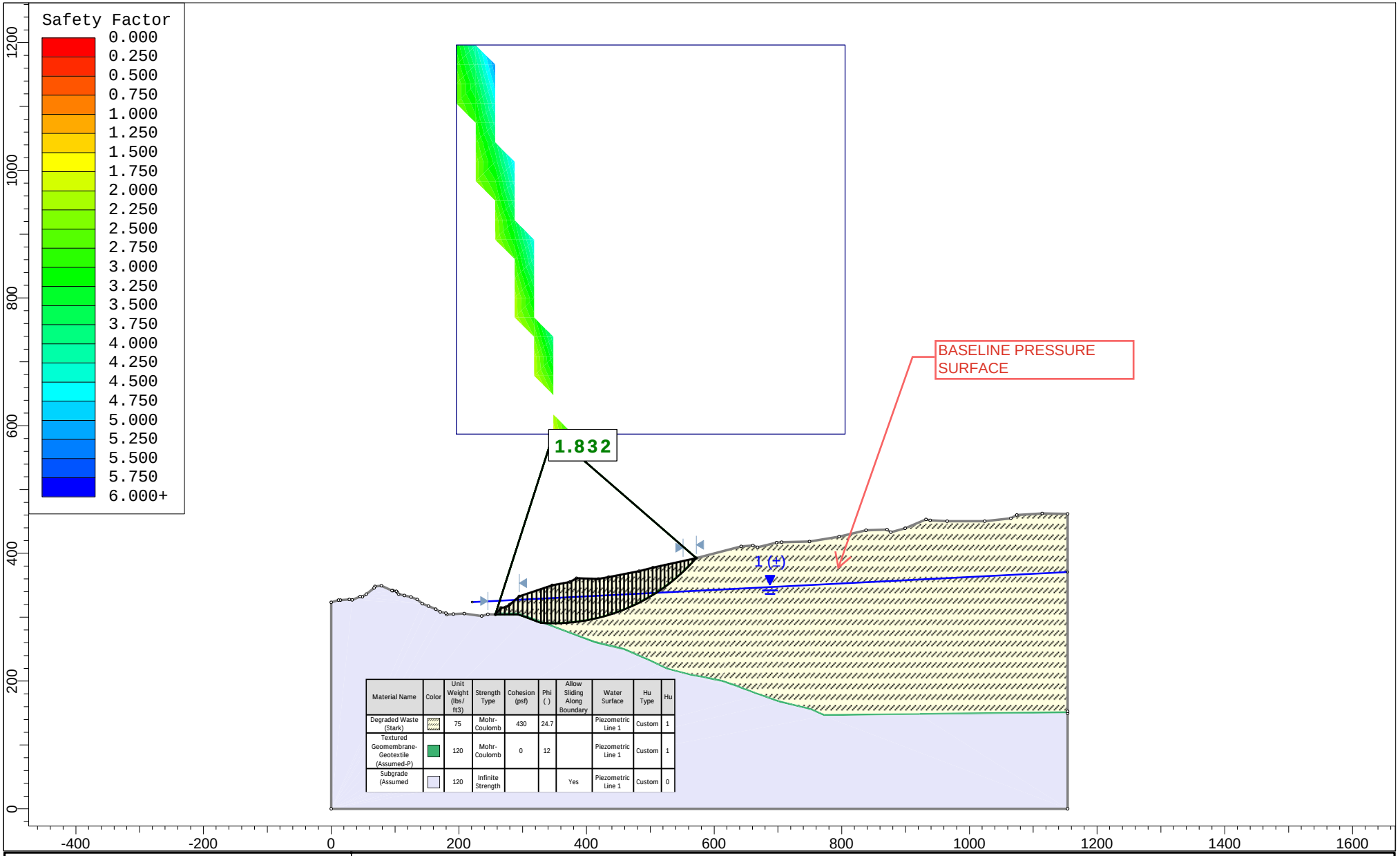
Project	COMPREHENSIVE STABILITY EVALUATION		
Group	Section F	*Scenario*	Static Safety Factor (No Head on Liner)
Drawn By	R. Mitchell	*Company*	GLA
Date	9/1/2026	*File Name*	Back Analysis Cross Sections +5.slmd



Piezo Line 1 : Pressure Head Differential (ft)

ROCSCIENCE	Project	COMPREHENSIVE STABILITY EVALUATION	
	Group	Section F	Scenario: Static Safety Factor (No Head on Liner)
	Drawn By	R. Mitchell	Company: GLA
	Date	9/1/2026	File Name: Back Analysis Cross Sections +5.slmd

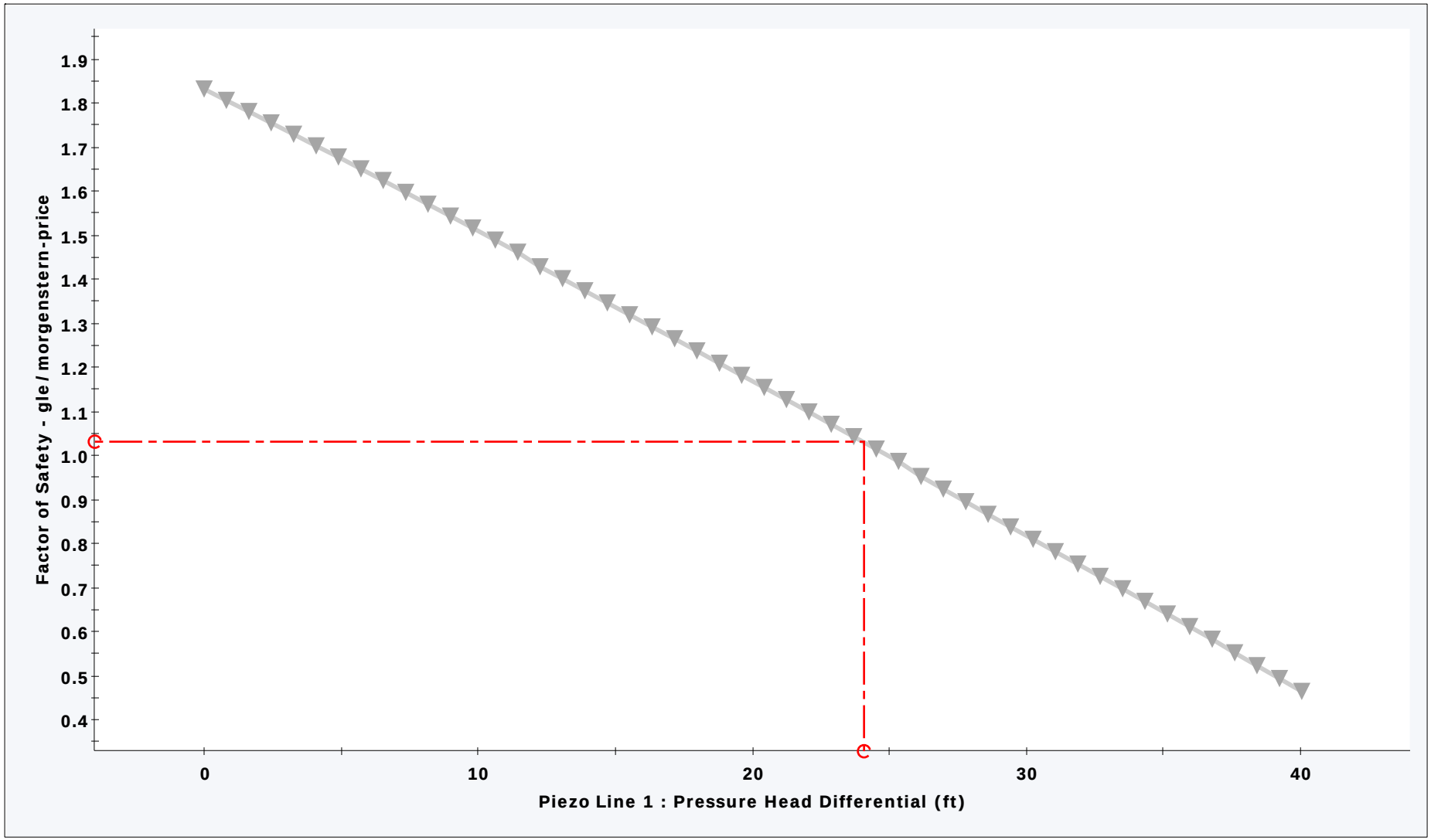
SLIDEINTERPRET 9.044



ROCSCIENCE

SLIDEINTERPRET 9.044

Project	COMPREHENSIVE STABILITY EVALUATION		
Group	Section F	*Scenario*	Static Safety Factor (Head on Liner)
Drawn By	R. Mitchell	*Company*	GLA
Date	9/1/2026	*File Name*	Back Analysis Cross Sections +5.slmd



Piezo Line 1 : Pressure Head Differential (ft)

ROCSCIENCE	Project	COMPREHENSIVE STABILITY EVALUATION	
	Group	Section F	Scenario: Static Safety Factor (Head on Liner)
	Drawn By	R. Mitchell	Company: GLA
	Date	9/1/2026	File Name: Back Analysis Cross Sections +5.slmd

SLIDEINTERPRET 9.044

Appendix F
LINER AND DEGRADED MSW SHEAR STRENGTH DATA

TABLE 1
SUMMARY OF LINER SYSTEMS ON E. ING LANDFILL AND STRENGTH VALUES

CANYON	BASE LINER	STRENGTH [1] Refuse Ht (ft)	c (psf)	ϕ (deg)		SIDESLOPE LINER	STRENGTH [1] Refuse Ht (ft)	c (psf)	ϕ (deg)	
A	Admixture (alluvium & 9% Smectite); 1 ft; 95% compaction @ 2% wet of the optimum moisture content	–	0	18	[2]	Smooth HDPE on subgrade	–	0	22	[3]
D	Similar to Canyon A		Same as Canyon A			Similar to Canyon A		Same as Canyon A		
C - Cell I (C/I)	Composite (2-ft bentonite admix underlying single-sided textured HDPE (textured side down)	–	0	18	[3], [4]	Smooth HDPE on subgrade	–	0	22	[3]
C - Cell II Phase 1 (C/II/1)	Double-sided textured HDPE on GCL[CLAYMAX]	<40 >40	0 835	20 3.4	[5]	Single-sided textured HDPE (textured side down) on GCL [CLAYMAX]	<40 >40	0 835	20 3.4	[5]
C - Cell II Phase 2A (C/II/2A) [7]	Double-sided textured HDPE on GCL[BENTOMAT]	<40 40-130 >130	0 700 1,600	24 9 3	[6]	Single-sided textured HDPE (textured side down) on GCL [BENTOMAT]	<40 40-130 >130	0 700 1,600	24 9 3	[6]
						Geotextile on top of HDPE for the upper 1/3 of the sideslope		0	8	[5]
C - Cell II Phase 2B (C/II/2B) [8]	Similar to Cell II, Phase 2A		Same as Cell II, Phase 2A			Similar to Cell II, Phase 2A		Same as Cell II, Phase 2A		

NOTES:

[1] Shear strength at the weakest interface of the liner

[2] Assumed value considering a ϕ of 18 deg between admixture and textured HPDE [See NOTE 3], and a ϕ of 19 deg between admixture and textured HPDE under normal loads ranging from 2,000 to 20,000 psf [See NOTE 4]

[3] EMCON (1994a)

[4] 12-inch by 12 inch direct shear box testing between admixture and textured HDPE under normal loads from 2,000 to 20,000 psf by Dr. J. D. Scott (EMCON 1995a)

[5] EMCON (1996)

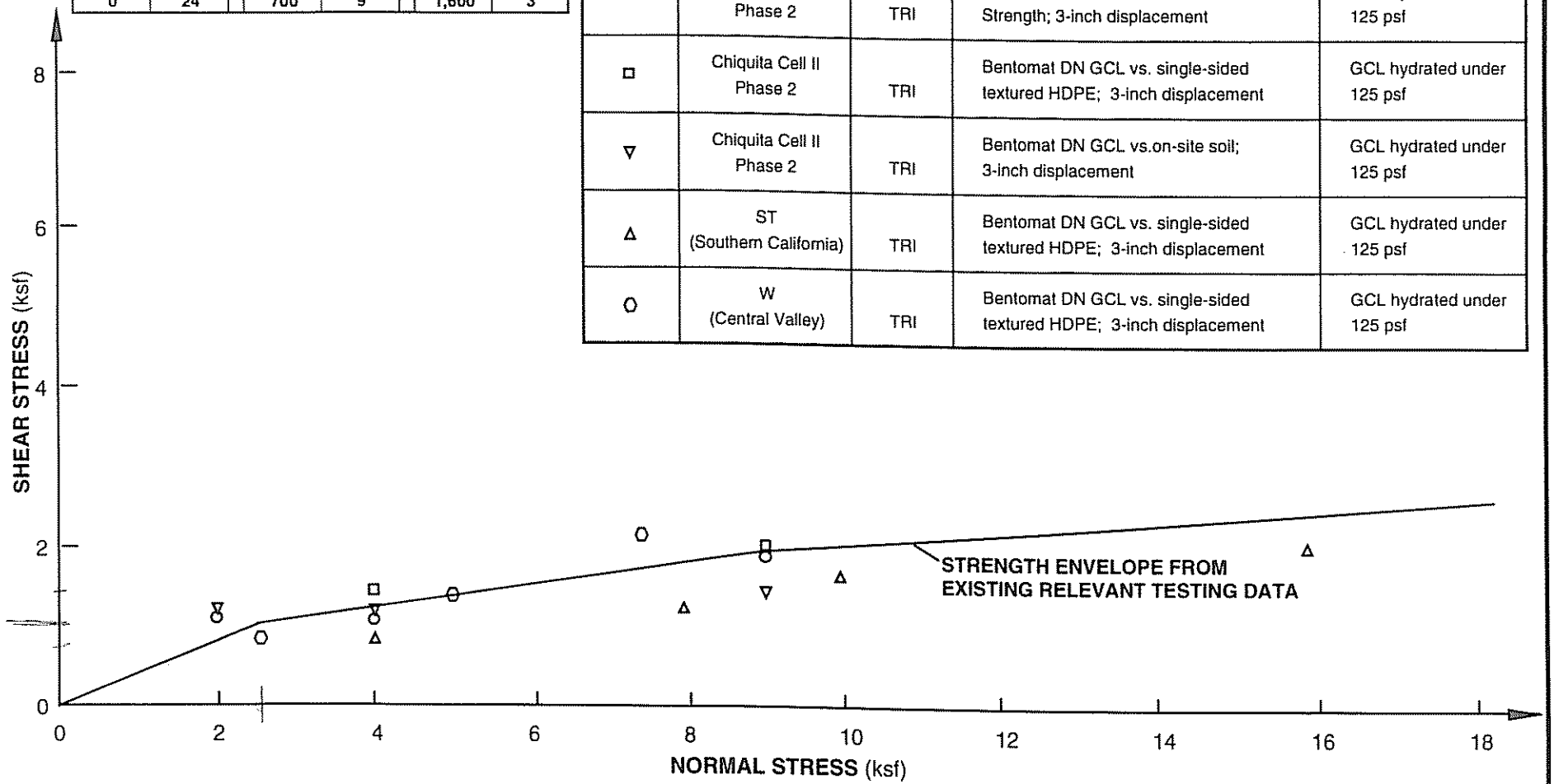
[6] Based on relevant testing data from Burns & McDonnell (May 1997) as discussed in Section 3.1.2

[7] Liner constructed in May 1997

[8] Liner currently under construction

Approx. Normal Stress Range					
0 - 2.7 ksf		2.7 - 9 ksf		> 9 ksf	
c (psf)	ϕ (deg)	c (psf)	ϕ (deg)	c (psf)	ϕ (deg)
0	24	700	9	1,600	3

SYMBOL	PROJECT SITE	SOURCE	TESTED INTERFACE	CONDITIONING
○	Chiquita Cell II Phase 2	TRI	Bentomat DN GCL Internal Shear Strength; 3-inch displacement	GCL hydrated under 125 psf
□	Chiquita Cell II Phase 2	TRI	Bentomat DN GCL vs. single-sided textured HDPE; 3-inch displacement	GCL hydrated under 125 psf
▽	Chiquita Cell II Phase 2	TRI	Bentomat DN GCL vs.on-site soil; 3-inch displacement	GCL hydrated under 125 psf
△	ST (Southern California)	TRI	Bentomat DN GCL vs. single-sided textured HDPE; 3-inch displacement	GCL hydrated under 125 psf
⬡	W (Central Valley)	TRI	Bentomat DN GCL vs. single-sided textured HDPE; 3-inch displacement	GCL hydrated under 125 psf



EMCON

DATE 9/97
DWN S.E.R.
APPR
REV
PROJECT NO.
20976-003.026

FIGURE 4
CHIQUITA CANYON LANDFILL,INC
CHIQUITA CANYON LANDFILL
LOS ANGELES COUNTY, CALIFORNIA
STRENGTH ENVELOPE FOR EXISTING GCL (BENTOMAT) / TEXTURED HDPE

Figure 1
CANYONS A & D AND CANYON 3 (CELL 1) SHEAR STRENGTH PROFILES

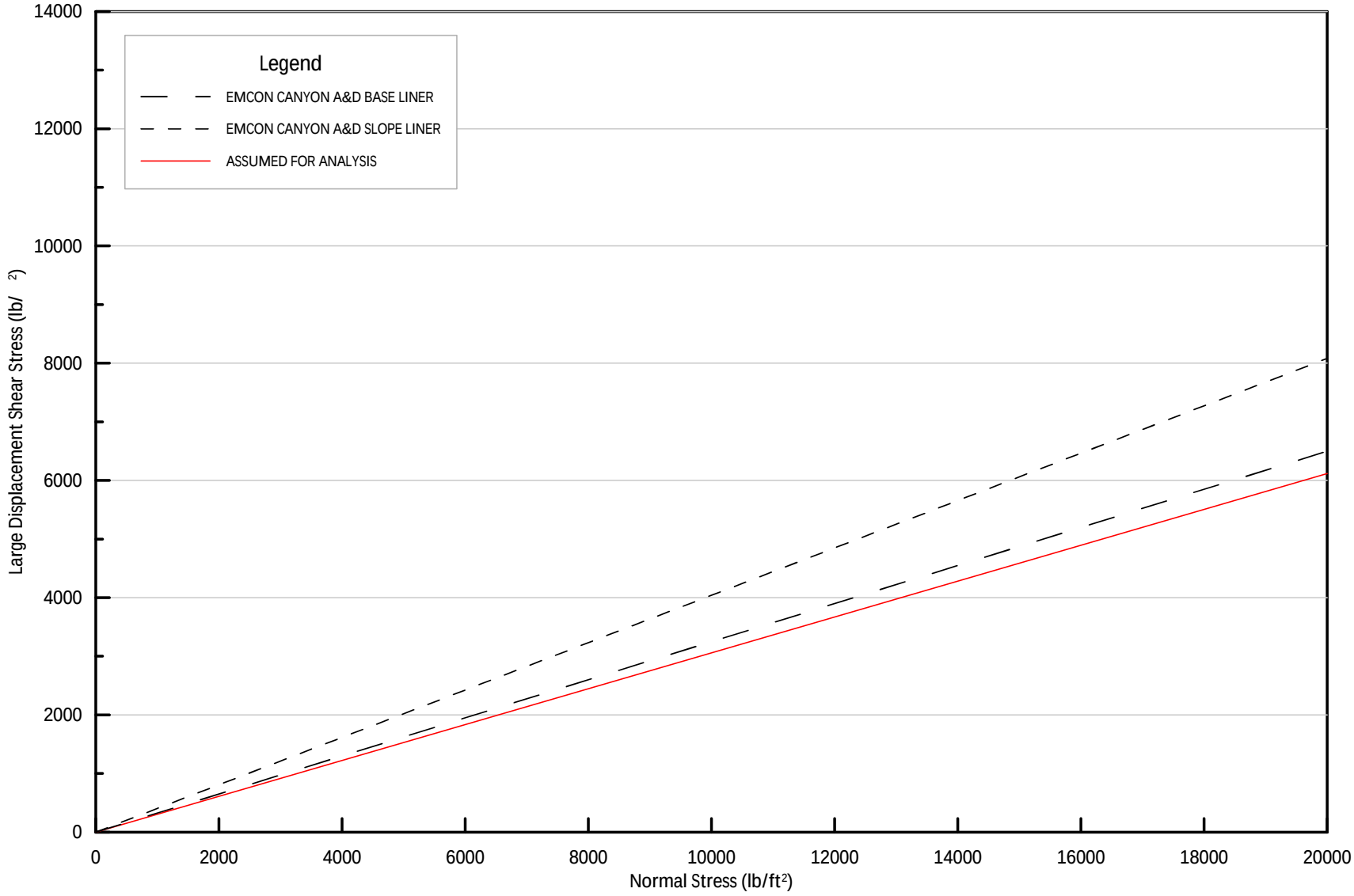


Figure 2
CANYON C (CELL 2) PHASES 1, 2A, 2B SHEAR STRENGTH PROFILE

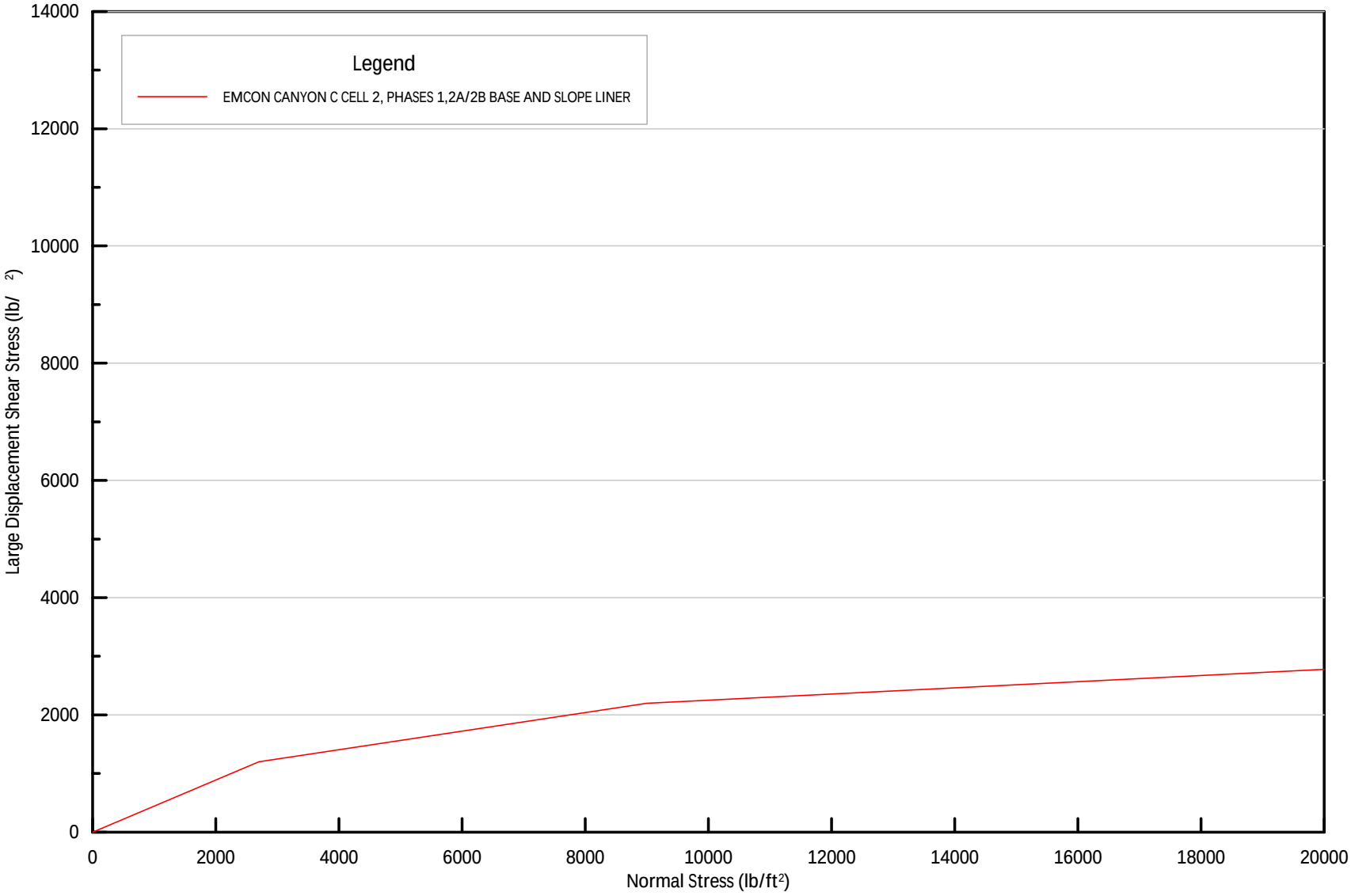


Figure 3
CELL 1/2A AND MODULES 2B, 3, AND 4

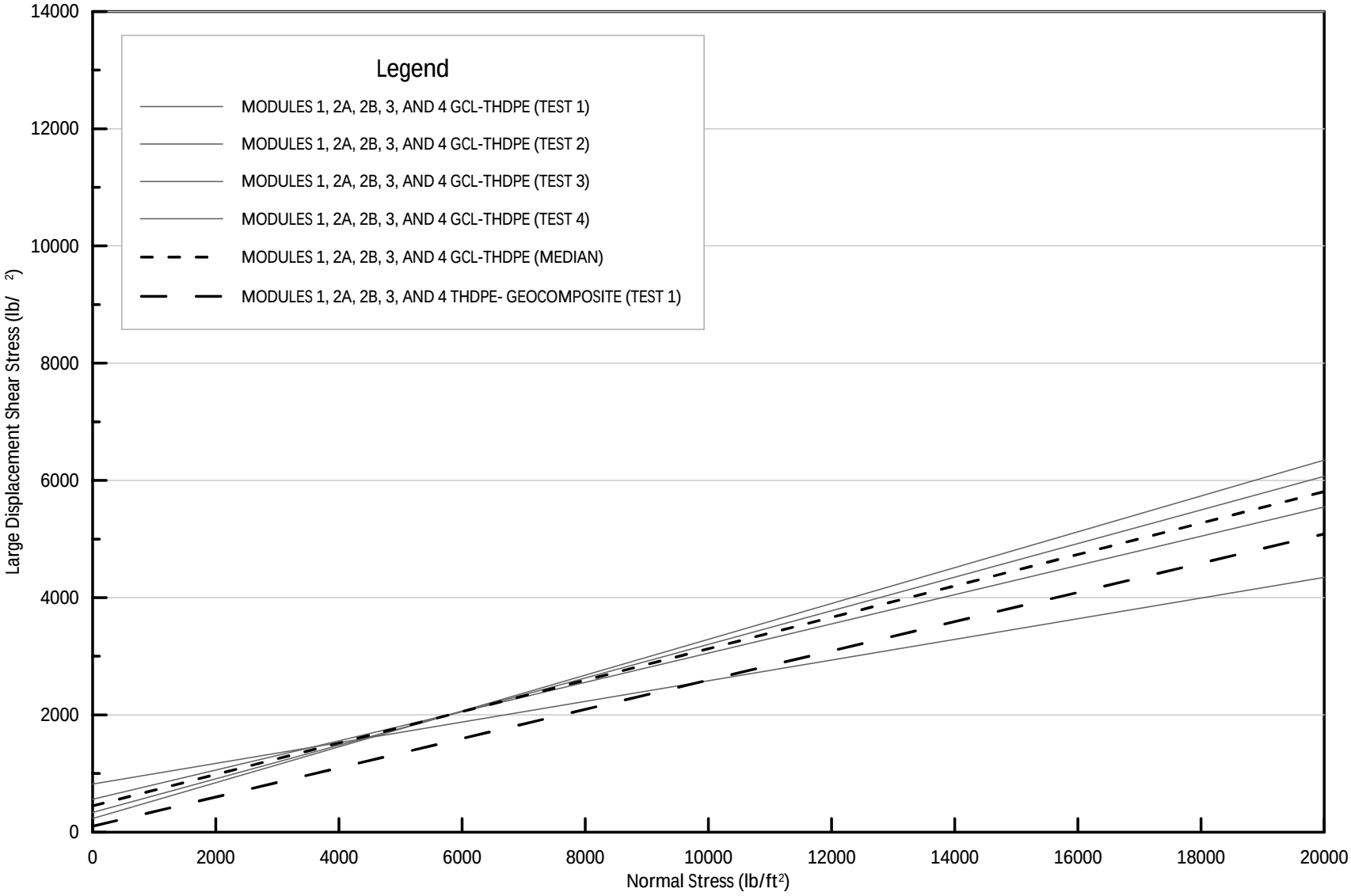


Figure 4
MODULE 5 SHEAR STRENGTH DATA

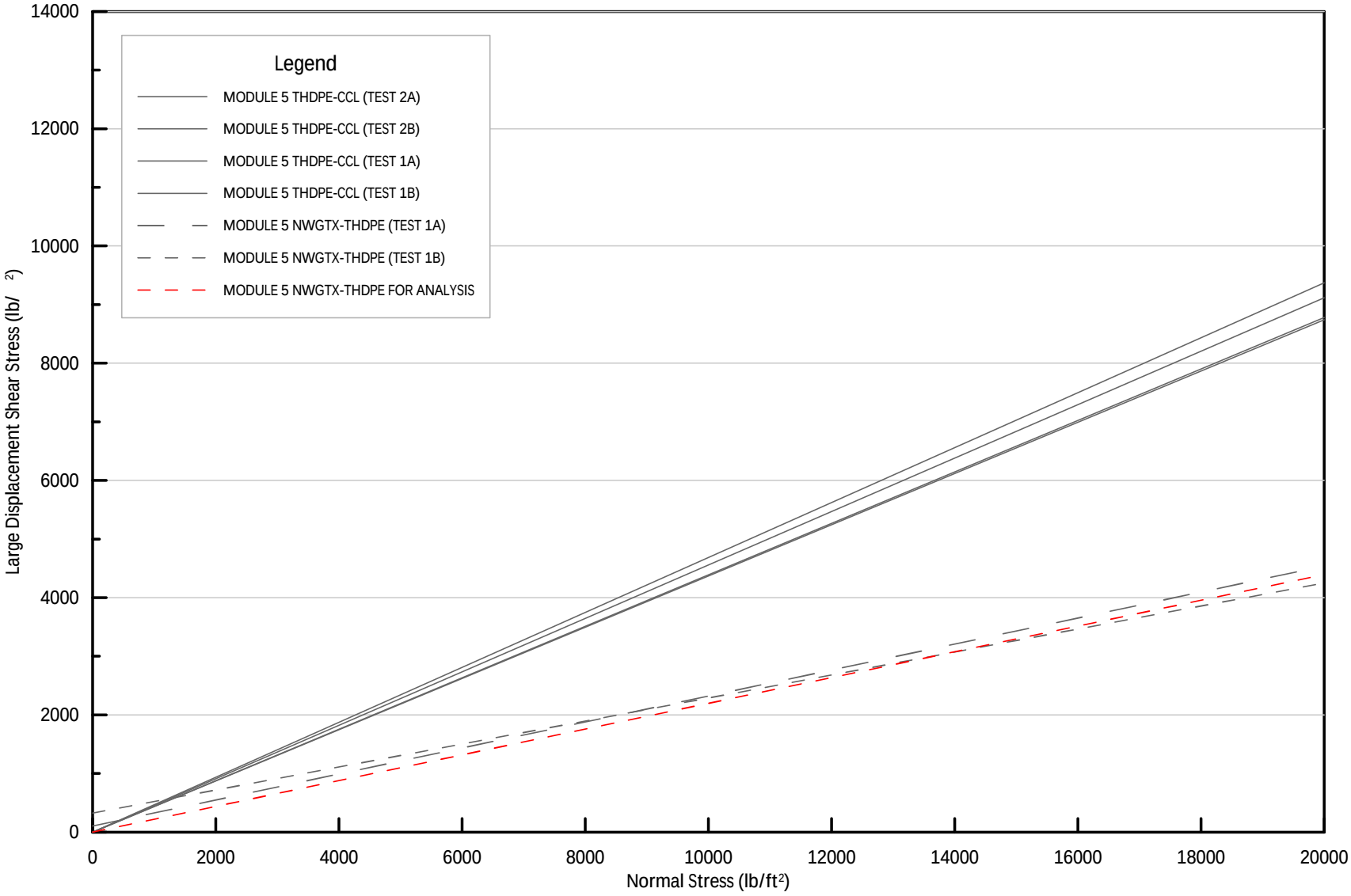
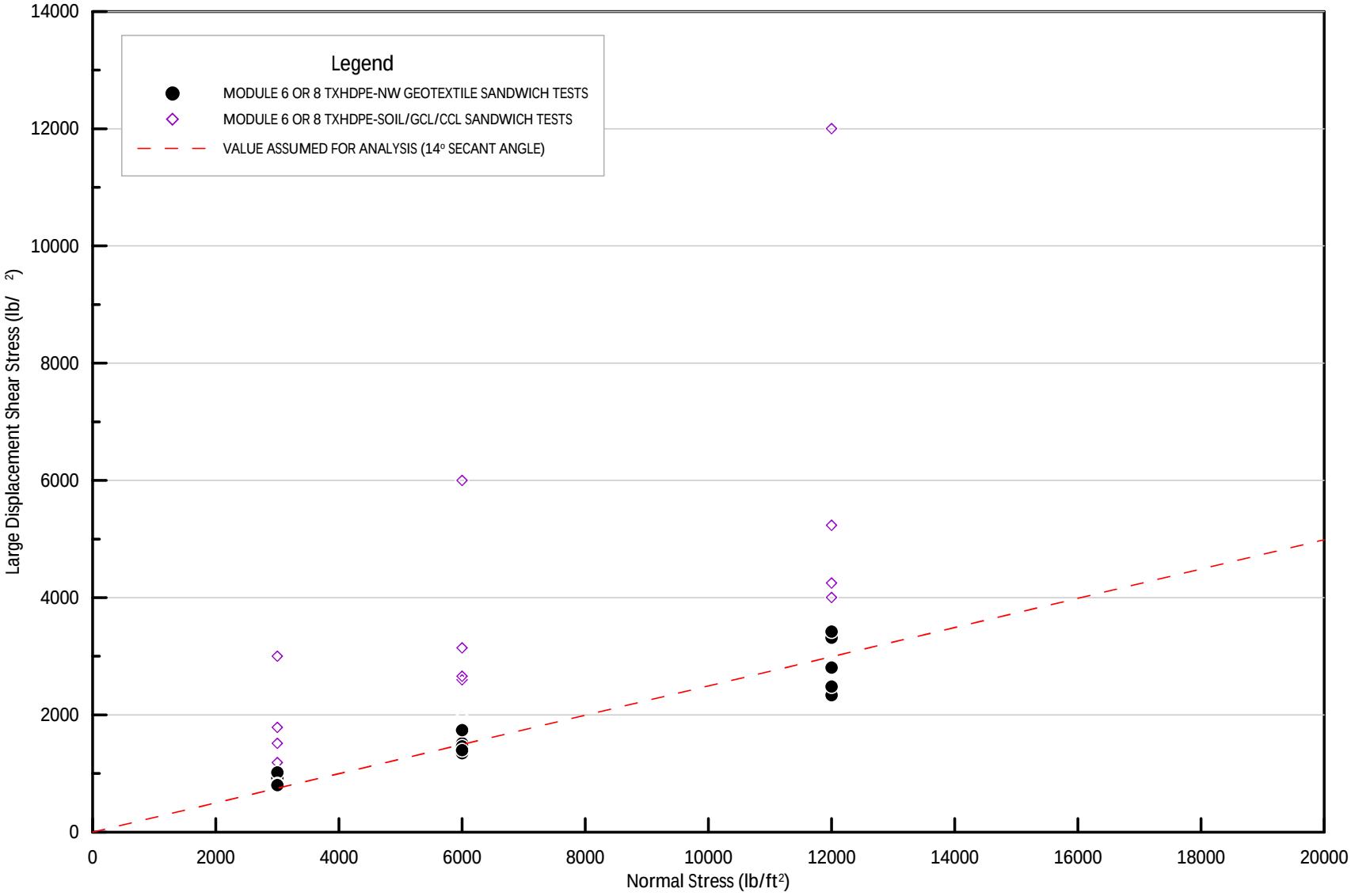


Figure 5
MODULES 6 AND 8 SHEAR STRENGTH DATA



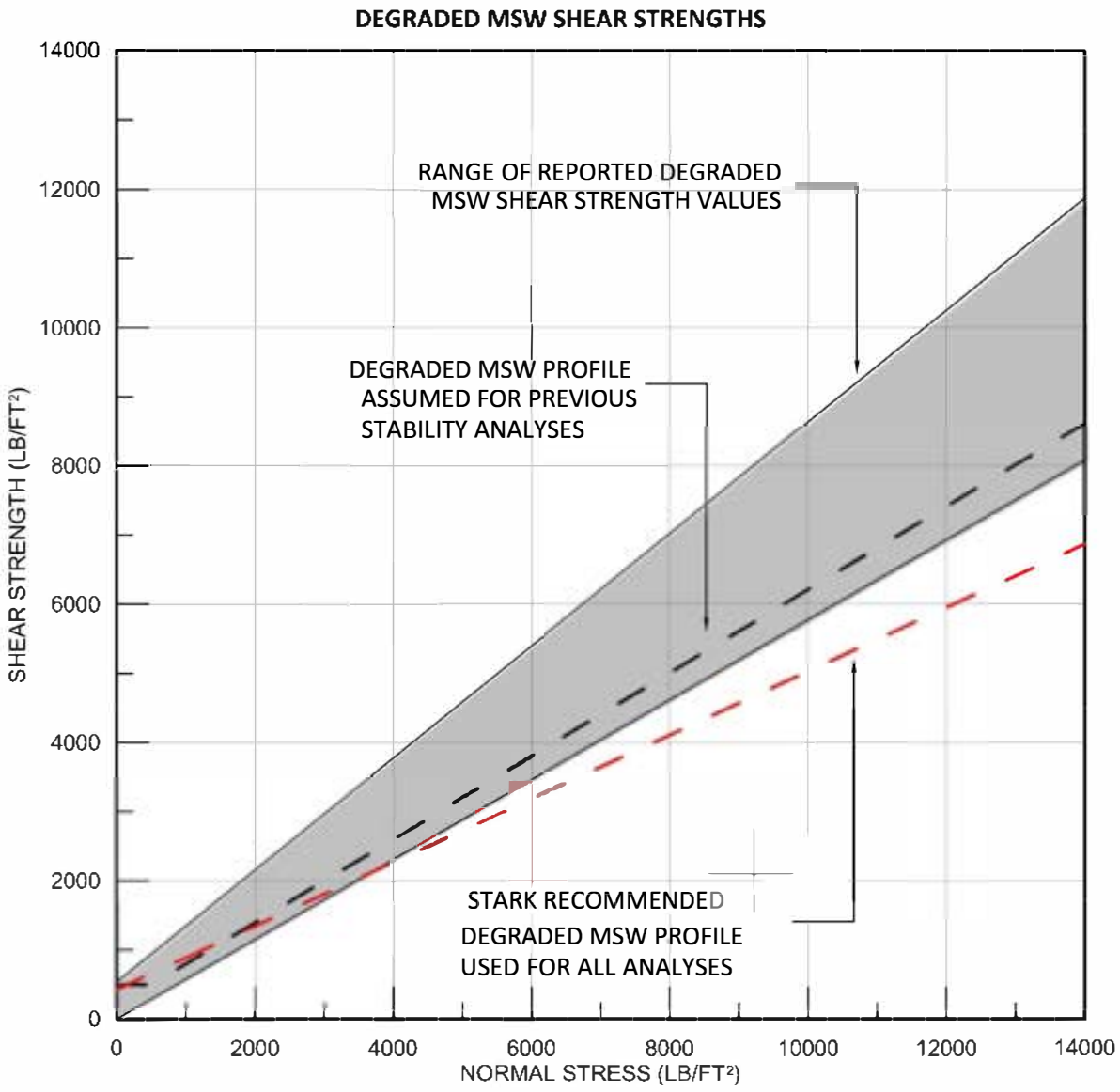


FIGURE 6

REPRESENTATIVE DEGRADED MSW STRENGTH

UPDATED STABILITY EVALUATION
CHIQUITA CANYON LANDFILL
LOS ANGELES COUNTY, CA

Geo-Logic ASSOCIATES

DRAWN BY: RM	DATE: SEPTEMBER 2024	JOB NO. RM22.1077

Appendix G
CEC JULY 2026 WEST SLOPE MITIGATION DRAWINGS

WASTE CONNECTIONS
CHIQUITA CANYON LANDFILL

29201 HENRY MAY DR.
CASTAIC, CALIFORNIA

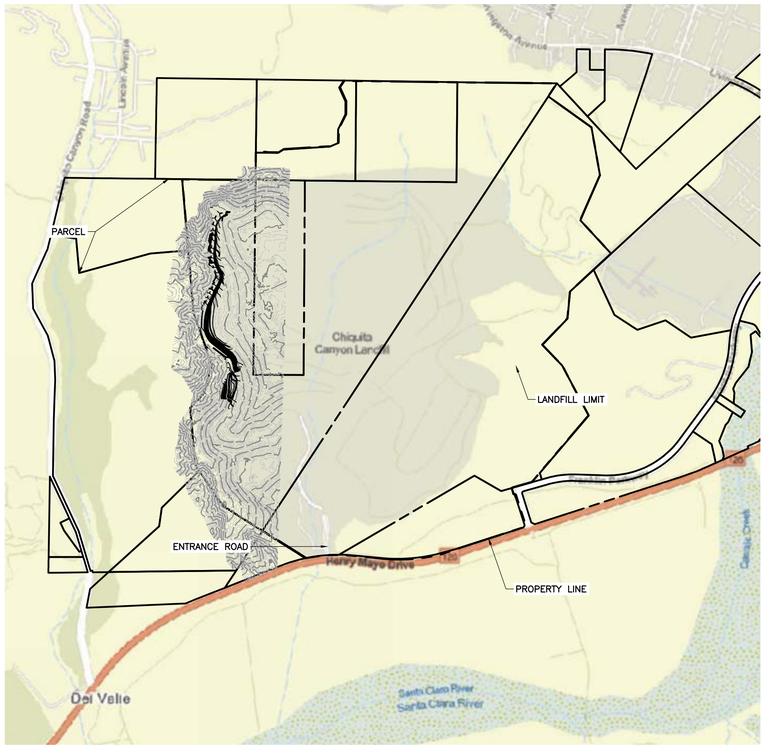
WEST SLOPE MITIGATION

JULY 2026

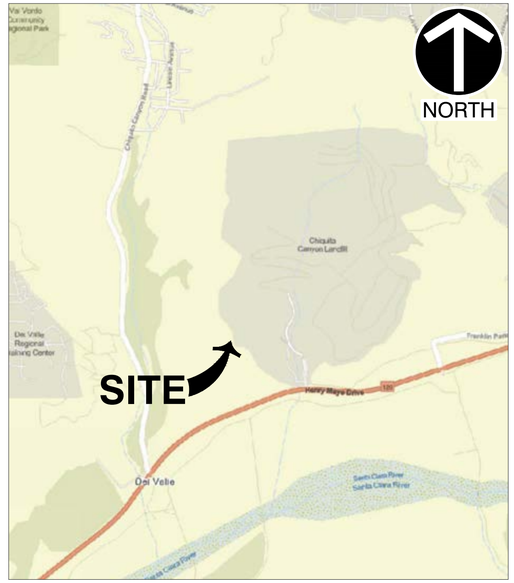


REGIONAL MAP
NTS

SHEET LIST TABLE		
Drawing Number	**Sheet Number**	**Sheet Title**
1	C000	COVER SHEET
2	C001	GENERAL NOTES
3	C010	GEOMETRIC LAYOUT
4	C100	OVERALL LOWER BUTTRESS PLAN AND PROFILE
5	C101	LOWER BUTTRESS AND BACKCUT PLAN AND PROFILE STA. 1+00 TO 5+50
6	C102	LOWER BUTTRESS AND BACKCUT PLAN AND PROFILE STA. 5+50 TO 10+00
7	C103	LOWER BUTTRESS AND BACKCUT PLAN AND PROFILE STA. 10+00 TO 15+00
8	C104	LOWER BUTTRESS AND BACKCUT PLAN AND PROFILE STA. 15+00 TO 20+00
9	C105	LOWER BUTTRESS AND BACKCUT PLAN AND PROFILE STA. 20+00 TO 25+00
10	C106	LOWER BUTTRESS AND BACKCUT PLAN AND PROFILE STA. 25+00 TO 30+00
11	C107	GP-14 MSE WALL PLAN AND PROFILE
12	C108	GP-14 MSE WALL SECTIONS 1 OF 2
13	C109	GP-14 MSE WALL SECTIONS 2 OF 2
14	C110	GP-14 MSE WALL DETAILS
15	C113	SOUTH BASIN PLAN
16	C115	OVERALL UPPER BUTTRESS PLAN
17	C116	UPPER BUTTRESS PLAN STA. 1+00 TO 5+50
18	C117	UPPER BUTTRESS PLAN STA. 5+50 TO 10+00
19	C118	UPPER BUTTRESS PLAN STA. 10+00 TO 15+00
20	C119	UPPER BUTTRESS PLAN STA. 15+00 TO 20+00
21	C120	UPPER BUTTRESS PLAN STA. 20+00 TO 25+00
22	C300	BUTTRESS CROSS SECTIONS STA. 1+00 TO STA. 3+50
23	C301	BUTTRESS CROSS SECTIONS STA. 4+00 TO STA. 6+50
24	C302	BUTTRESS CROSS SECTIONS STA. 7+00 TO STA. 9+50
25	C303	BUTTRESS CROSS SECTIONS STA. 10+00 TO STA. 12+50
26	C304	BUTTRESS CROSS SECTIONS STA. 13+00 TO STA. 15+50
27	C305	BUTTRESS CROSS SECTIONS STA. 16+00 TO STA. 28+50
28	C306	BUTTRESS CROSS SECTIONS STA. 19+00 TO STA. 21+50
29	C307	BUTTRESS CROSS SECTIONS STA. 22+00 TO STA. 24+50
30	C308	BUTTRESS CROSS SECTIONS STA. 25+00 TO STA. 27+50
31	C309	BUTTRESS CROSS SECTIONS STA. 28+00 TO STA. 30+00
32	C500	DETAILS 1 OF 2
33	C501	DETAILS 2 OF 2



SITE PLAN
SCALE IN FEET
0 1000 2000



VICINITY MAP
NTS

BASIS OF BEARING

XYZ

BASIS OF ELEVATION

XYZ

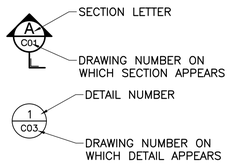
PROJECT QUANTITIES

XYZ

FACILITY AREA

XYZ

SYMBOLS



OWNER/TEAM INFORMATION

CIVIL ENGINEER

CIVIL & ENVIRONMENTAL CONSULTANTS, INC.
2356 GOLD MEADOW WAY, SUITE 120
GOLD RIVER, CA 95670
PH: (949) 396-8439
CONTACTS: ROBERT VAN HYNING, PE

OWNER

WASTE CONNECTIONS
CHIQUITA CANYON LANDFILL
29201 HENRY MAYO DR.
CASTAIC, CA 91384
PH: (661) 964-5821
CONTACT: BILL HALEY

PROJECT PURPOSE

1. XYZ
2. XYZ

DRAFT

SUBMITTAL RECORD

NO	DATE	DESCRIPTION
2	06/24/2026	FOR PRELIMINARY USE

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2356 Gold Meadow Way
Suite 120
Gold River, CA 95670
Ph: 916.503.0050
www.cecinc.com

WASTE CONNECTIONS
WEST SLOPE MITIGATION
CHIQUITA CANYON LANDFILL
29201 HENRY MAYO DR
CASTAIC, CALIFORNIA 91384

COVER SHEET

DRAWN BY:	JAT
CHECKED BY:	CJM
DATE:	JULY 2026
DWG SCALE:	AS NOTED
PROJECT NO:	350-750
APPROVED BY:	RVH

DRAWING NO.: C000
SHEET 1 OF ----

P:\350-0001\350-7501-0A01\Dwg\Civil\350750-CN01-COVER SHEET.dwg[C000] LS(1:1)2026 - cmathews - LP: 7/6/2026 1:20 PM

LEGEND

- EXISTING UNPAVED ROADS
- EXISTING LIGHT POLE
- 385 — EXISTING INDEX (MAJOR) CONTOUR
- EXISTING INTERMEDIATE (MINOR) CONTOUR
- W — EXISTING WATERLINE
- OH-E — EXISTING OVERHEAD WIRE
- EXISTING STORMWATER CULVERT
- EXISTING CURB
- EXISTING ELECTRIC POLE
- EXISTING GROUNDWATER WELL
- GEW-171 — EXISTING GAS EXTRACTION WELL
- PGC-45 — EXISTING PERIMETER GAS COLLECTION
- CS-3 — EXISTING CONDENSATE SUMP
- S-3.2 — EXISTING LEACHATE SUMP
- LEP-3 — EXISTING LEACHATE EXTRACTION PIPE
- GP-13 — EXISTING PERIMETER GAS PROBE
- 1050 — PROPOSED INDEX (MAJOR) CONTOUR
- 1048 — PROPOSED INTERMEDIATE (MINOR) CONTOUR
- EXISTING PROPERTY LINE
- EXISTING EASEMENT
- PROPOSED PARCEL LINE

ABBREVIATIONS

AC	ACRE
APPROX.	APPROXIMATE
CS	CONDENSATE SUMP
ø	DIAMETER
EL	ELEVATION
GEW	GAS EXTRACTION WELL
GCL	GEOSYNTHETIC CLAY LINER
HDPE	HIGH DENSITY POLYETHYLENE
I.D.	INNER DIAMETER
LEP	LEACHATE EXTRACTION PIPE
MAX	MAXIMUM
MIN	MINIMUM
MNPT	MALE NATIONAL PIPE THREAD
NAD 83	NORTH AMERICAN DATUM OF 1983
NAVD 88	NORTH AMERICAN VERTICAL DATUM OF 1988
O.C.	ON CENTER
PGC	PERIMETER GAS COLLECTION
TYP	TYPICAL

DRAFT

SUBMITTAL RECORD

NO	DATE	DESCRIPTION
2	06/24/2026	FOR PRELIMINARY USE

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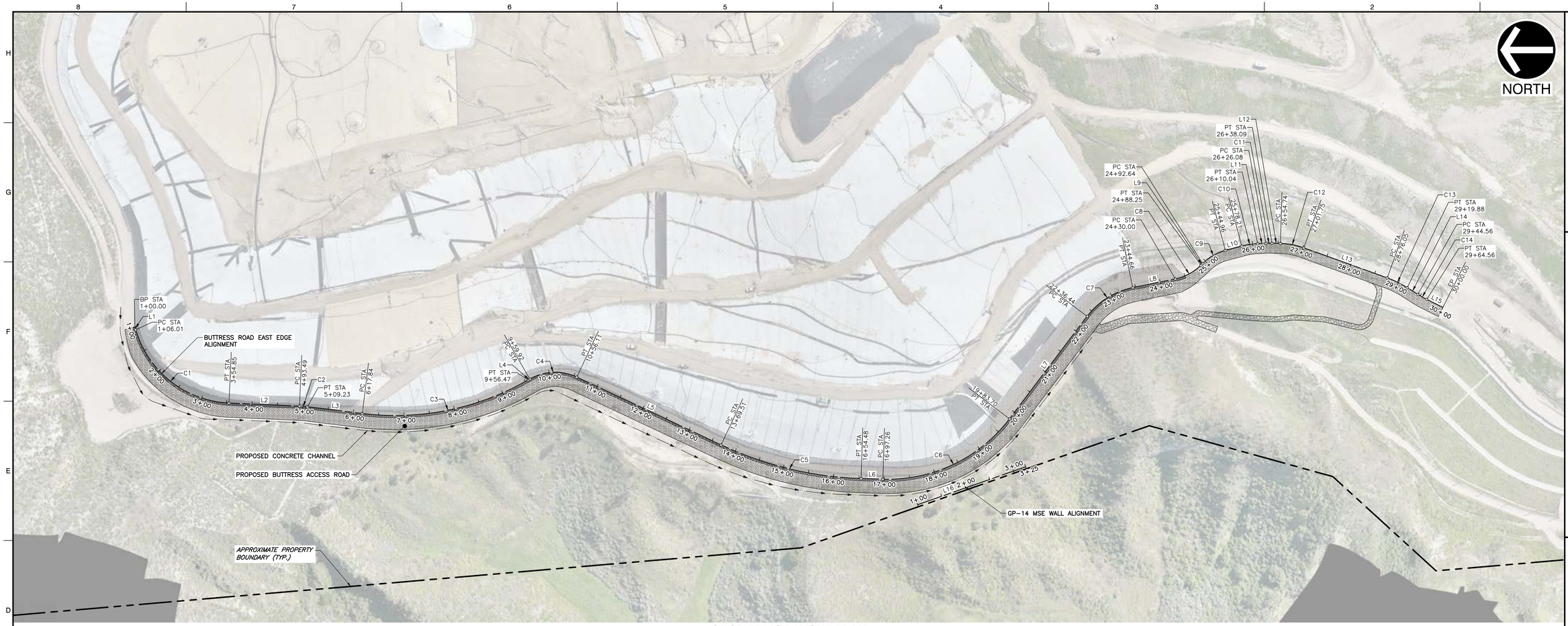
WASTE CONNECTIONS
WEST SLOPE MITIGATION
CHIQUITA CANYON LANDFILL
29201 HENRY MAYO DR
CASTAIC, CALIFORNIA 91384

GENERAL NOTES

DATE:	JUNE 2026
DRAWN BY:	JAT
DWG SCALE:	AS NOTED
CHECKED BY:	CJM
PROJECT NO:	350-750
APPROVED BY:	RVH

DRAWING NO.:
C001
SHEET 2 OF ----

P:\350-000\350-750\-CADD\dwg\CIVIL\350750-CIVIL-COVER SHEET.dwg[C001] LS(7/8/2026 - cmathews) - LP: 7/8/2026 1:20 PM



GEOMETRIC LAYOUT PLAN

SCALE: 1" = 100'

CHIQUITA CANYON – WEST SLOPE MITIGATION – BUTTRESS ROAD EAST EDGE ALIGNMENT – LINE TABLE				
LINE #	BEARING	LENGTH	START POINT	END POINT
L1	S 73° 47' 39.08" W	6.01'	STA: 1+00.00 N: 1,982,039.68; E: 6,365,352.31	STA: 1+06.01 N: 1,982,038.00; E: 6,365,346.54
L2	S 02° 30' 21.64" W	138.64'	STA: 3+54.85 N: 1,981,854.69; E: 6,365,202.55	STA: 4+93.49 N: 1,981,716.19; E: 6,365,196.49
L3	S 07° 00' 57.33" W	108.61'	STA: 5+09.23 N: 1,981,700.51; E: 6,365,195.18	STA: 6+17.84 N: 1,981,592.71; E: 6,365,181.92
L4	S 29° 56' 25.62" E	3.45'	STA: 9+56.47 N: 1,981,266.56; E: 6,365,248.05	STA: 9+59.92 N: 1,981,263.57; E: 6,365,249.77
L5	S 25° 10' 22.86" W	313.40'	STA: 10+56.11 N: 1,981,171.12; E: 6,365,253.62	STA: 13+69.51 N: 1,980,887.48; E: 6,365,120.31
L6	S 01° 50' 52.02" W	42.77'	STA: 16+54.48 N: 1,980,612.31; E: 6,365,054.20	STA: 16+97.26 N: 1,980,569.56; E: 6,365,052.82
L7	S 52° 51' 28.47" E	252.75'	STA: 19+83.70 N: 1,980,320.74; E: 6,365,171.52	STA: 22+36.44 N: 1,980,168.14; E: 6,365,373.00
L8	S 11° 31' 10.57" E	85.33'	STA: 23+44.66 N: 1,980,078.52; E: 6,365,429.41	STA: 24+30.00 N: 1,979,994.91; E: 6,365,446.45
L9	S 44° 53' 40.62" E	4.39'	STA: 24+88.25 N: 1,979,944.30; E: 6,365,473.59	STA: 24+92.64 N: 1,979,941.19; E: 6,365,476.69
L10	S 14° 55' 05.08" E	33.25'	STA: 25+44.96 N: 1,979,896.35; E: 6,365,502.48	STA: 25+78.21 N: 1,979,864.22; E: 6,365,511.04
L11	S 02° 45' 37.62" E	16.04'	STA: 26+10.04 N: 1,979,832.83; E: 6,365,515.92	STA: 26+26.08 N: 1,979,816.80; E: 6,365,516.70
L12	S 01° 49' 32.56" W	16.65'	STA: 26+38.09 N: 1,979,804.80; E: 6,365,516.79	STA: 26+54.74 N: 1,979,788.15; E: 6,365,516.26
L13	S 19° 46' 52.63" W	174.30'	STA: 27+01.75 N: 1,979,742.17; E: 6,365,507.49	STA: 28+76.05 N: 1,979,578.16; E: 6,365,448.50
L14	S 32° 20' 18.33" W	24.69'	STA: 29+19.88 N: 1,979,538.86; E: 6,365,429.28	STA: 29+44.56 N: 1,979,518.00; E: 6,365,416.08
L15	S 26° 36' 33.11" W	35.44'	STA: 29+64.56 N: 1,979,500.60; E: 6,365,406.24	STA: 30+00.00 N: 1,979,468.91; E: 6,365,390.37

CHIQUITA CANYON – WEST SLOPE MITIGATION – BUTTRESS ROAD EAST EDGE ALIGNMENT – CURVE TABLE										
CURVE #	RADIUS	LENGTH	CHORD BEARING	START POINT	END POINT	PI	DELTA	DEGREE OF CURVE	TANGENT	MID ORDINATE
C1	200.00	248.84	S 38° 09' 00.36" W	STA: 1+06.01 N: 1,982,038.00; E: 6,365,346.54	STA: 3+54.85 N: 1,981,854.69; E: 6,365,202.55	STA: 2+49.43 N: 1,981,997.98; E: 6,365,208.82	071° 17' 17"	028° 38' 52"	143.42	37.47
C2	200.00	15.74	S 04° 45' 39.49" W	STA: 4+93.49 N: 1,981,716.19; E: 6,365,196.49	STA: 5+09.23 N: 1,981,700.51; E: 6,365,195.18	STA: 5+01.36 N: 1,981,708.32; E: 6,365,196.15	004° 30' 36"	028° 38' 52"	7.88	0.15
C3	525.00	338.63	S 11° 27' 44.14" E	STA: 6+17.84 N: 1,981,592.71; E: 6,365,181.92	STA: 9+56.47 N: 1,981,266.56; E: 6,365,248.05	STA: 7+93.28 N: 1,981,418.58; E: 6,365,160.49	036° 57' 23"	010° 54' 49"	175.44	27.07
C4	100.00	96.19	S 02° 23' 01.38" E	STA: 9+59.92 N: 1,981,263.57; E: 6,365,249.77	STA: 10+56.11 N: 1,981,171.12; E: 6,365,253.62	STA: 10+12.10 N: 1,981,218.35; E: 6,365,275.82	055° 06' 48"	057° 17' 45"	52.18	11.34
C5	700.00	284.97	S 13° 30' 37.44" W	STA: 13+69.51 N: 1,980,887.48; E: 6,365,120.31	STA: 16+54.48 N: 1,980,612.31; E: 6,365,054.20	STA: 15+14.00 N: 1,980,756.72; E: 6,365,058.85	023° 19' 31"	008° 11' 06"	144.49	14.45
C6	300.00	286.44	S 25° 30' 18.23" E	STA: 16+97.26 N: 1,980,569.56; E: 6,365,052.82	STA: 19+83.70 N: 1,980,320.74; E: 6,365,171.52	STA: 18+52.45 N: 1,980,414.45; E: 6,365,047.81	054° 42' 20"	019° 05' 55"	155.19	33.54
C7	150.00	108.22	S 32° 11' 19.52" E	STA: 22+36.44 N: 1,980,168.14; E: 6,365,373.00	STA: 23+44.66 N: 1,980,078.52; E: 6,365,429.41	STA: 22+93.03 N: 1,980,133.97; E: 6,365,418.10	041° 20' 18"	038° 11' 50"	56.59	9.65
C8	100.00	58.25	S 28° 12' 25.59" E	STA: 24+30.00 N: 1,979,994.91; E: 6,365,446.45	STA: 24+88.25 N: 1,979,944.30; E: 6,365,473.59	STA: 24+59.97 N: 1,979,965.53; E: 6,365,452.43	033° 22' 30"	057° 17' 45"	29.98	4.21
C9	100.00	52.32	S 29° 54' 22.85" E	STA: 24+92.64 N: 1,979,941.19; E: 6,365,476.69	STA: 25+44.96 N: 1,979,896.35; E: 6,365,502.48	STA: 25+19.41 N: 1,979,922.22; E: 6,365,495.59	029° 58' 36"	057° 17' 45"	26.77	3.40
C10	150.00	31.83	S 08° 50' 21.35" E	STA: 25+78.21 N: 1,979,864.22; E: 6,365,511.04	STA: 26+10.04 N: 1,979,832.83; E: 6,365,515.92	STA: 25+94.18 N: 1,979,848.78; E: 6,365,515.15	012° 09' 27"	038° 11' 50"	15.97	0.84
C11	150.00	12.01	S 00° 28' 02.53" E	STA: 26+26.08 N: 1,979,816.80; E: 6,365,516.70	STA: 26+38.09 N: 1,979,804.80; E: 6,365,516.79	STA: 26+32.09 N: 1,979,810.80; E: 6,365,516.98	004° 35' 10"	038° 11' 50"	6.01	0.12
C12	150.00	47.01	S 10° 48' 12.60" W	STA: 26+54.74 N: 1,979,788.15; E: 6,365,516.26	STA: 27+01.75 N: 1,979,742.17; E: 6,365,507.49	STA: 26+78.44 N: 1,979,764.47; E: 6,365,515.51	017° 57' 20"	038° 11' 50"	23.70	1.84
C13	200.00	43.83	S 26° 03' 35.48" W	STA: 28+76.05 N: 1,979,578.16; E: 6,365,448.50	STA: 29+19.88 N: 1,979,538.86; E: 6,365,429.28	STA: 28+98.05 N: 1,979,557.45; E: 6,365,441.05	012° 33' 26"	028° 38' 52"	22.00	1.20
C14	200.00	20.00	S 29° 28' 25.72" W	STA: 29+44.56 N: 1,979,518.00; E: 6,365,416.08	STA: 29+64.56 N: 1,979,500.60; E: 6,365,406.24	STA: 29+54.57 N: 1,979,509.55; E: 6,365,410.72	005° 43' 45"	028° 38' 52"	10.01	0.25

CHIQUITA CANYON – WEST SLOPE MITIGATION – GP–14 MSE WALL ALIGNMENT – LINE TABLE				
LINE #	BEARING	LENGTH	START POINT	END POINT
L16	S 19° 19' 16.00" E	225.00'	STA: 1+00.00 N: 1,980,501.29; E: 6,365,002.81	STA: 3+25.00 N: 1,980,288.96; E: 6,365,077.25

REFERENCE

1. EXISTING PLANIMETRICS PREPARED BY TETRA TECH, DATED JANUARY 16, 2025.
2. EXISTING TOPOGRAPHY PROVIDED BY WASTE CONNECTIONS INC., DATED MARCH 11, 2026

SCALE IN FEET
0 100 200

DRAFT

SUBMITTAL RECORD

NO	DATE	DESCRIPTION
2	06/24/2026	FOR PRELIMINARY USE

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Suite 120
Gold River, CA 95670
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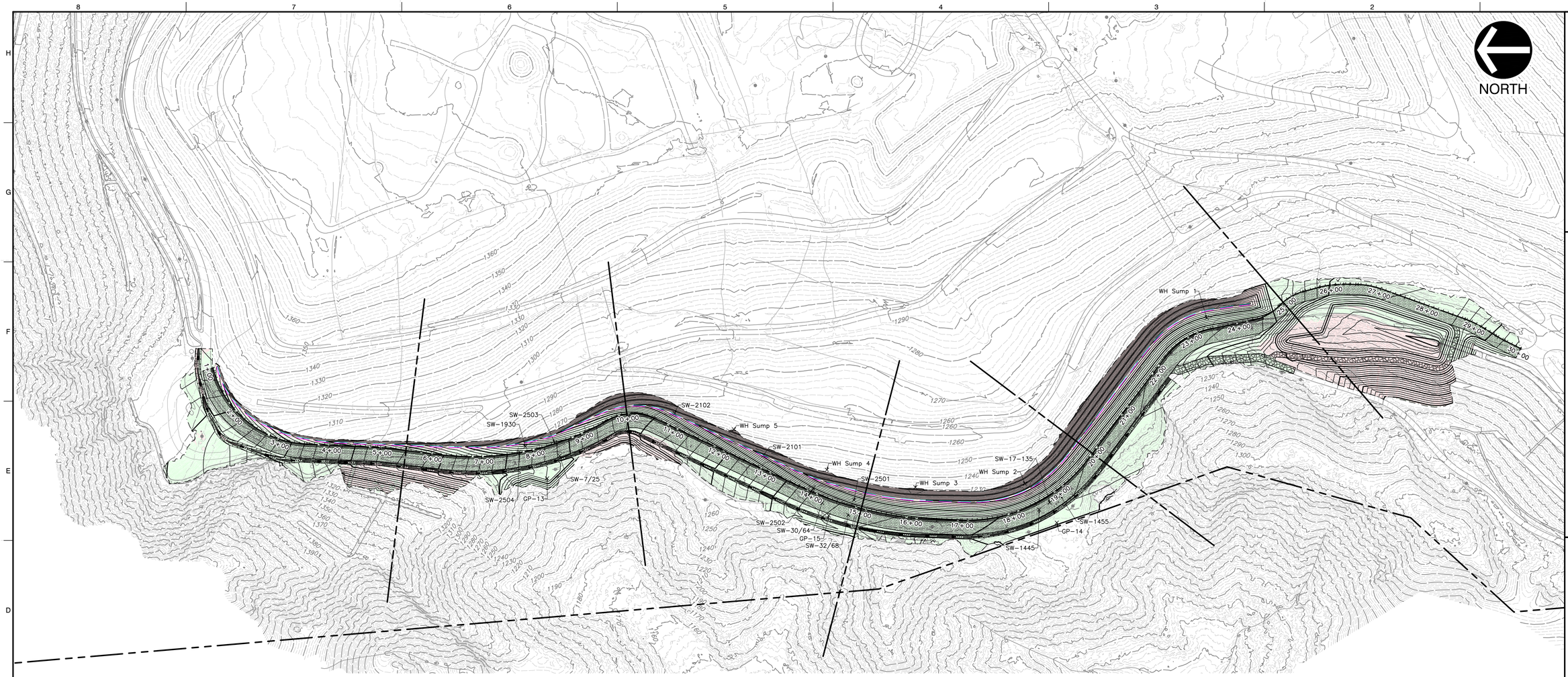
WASTE CONNECTIONS
WEST SLOPE MITIGATION
CHIQUITA CANYON LANDFILL
29201 HENRY MAYO DR
CASTAIC, CALIFORNIA 91384

GEOMETRIC LAYOUT

DRAWN BY:	JAT
CHECKED BY:	CJM
DATE:	JULY 2026
DWG SCALE:	1" = 100'
PROJECT NO:	350-750
APPROVED BY:	RVH

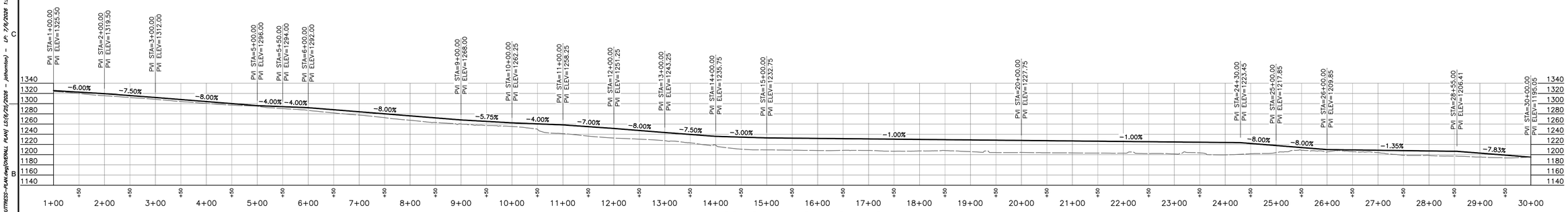
DRAWING NO.:
C010
SHEET 3 OF ----

P:\350-0001\350-750\--CADD\Dwg\C010\350750-C010-LINE AND CURVE TABLES.dwg[C010] LS(6/24/2026 - cmatthews) - LP: 7/6/2026 1:21 PM



LOWER BUTTRESS AND BACKCUT PLAN

SCALE: 1" = 100'



BUTTRESS ROAD - EAST EDGE PROFILE

SCALE H:1"=100'; V:1"=100'

REFERENCE

1. EXISTING PLANIMETRICS PREPARED BY TETRA TECH, DATED JANUARY 16, 2025.
2. EXISTING TOPOGRAPHY PROVIDED BY WASTE CONNECTIONS INC., DATED MARCH 11, 2026

NOTES:

1. LOWER BUTTRESS VOLUMES*
   CUT – 28,300 CU. YD.
   FILL – 76,780 CU. YD.
   NET – 48,480 CU. YD (FILL)
   *EXISTING SURFACE COMPARED TO LOWER BUTTRESS SURFACE TO TRENCH TIE–IN AND STORMWATER BASIN GRADING
2. BACKCUT VOLUMES**
   CUT – 10 CU. YD.
   FILL – 9,410 CU. YD.
   NET – 9,400 CU. YD. (CUT)
   **EXISTING SURFACE COMPARED TO TRENCH TIE–IN EAST
3. LINED SURFACE AREA
   2D LINED AREA – 60,370 SQ. FT.
   3D LINED AREA – 70,120 SQ. FT.

HORIZONTAL SCALE IN FEET
0 100 200

VERTICAL SCALE IN FEET
0 100 200

DRAFT

SUBMITTAL RECORD

NO	DATE	DESCRIPTION
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WASTE CONNECTIONS
WEST SLOPE MITIGATION
CHIQUITA CANYON LANDFILL
29201 HENRY MAYO DR
CASTAIC, CALIFORNIA 91384

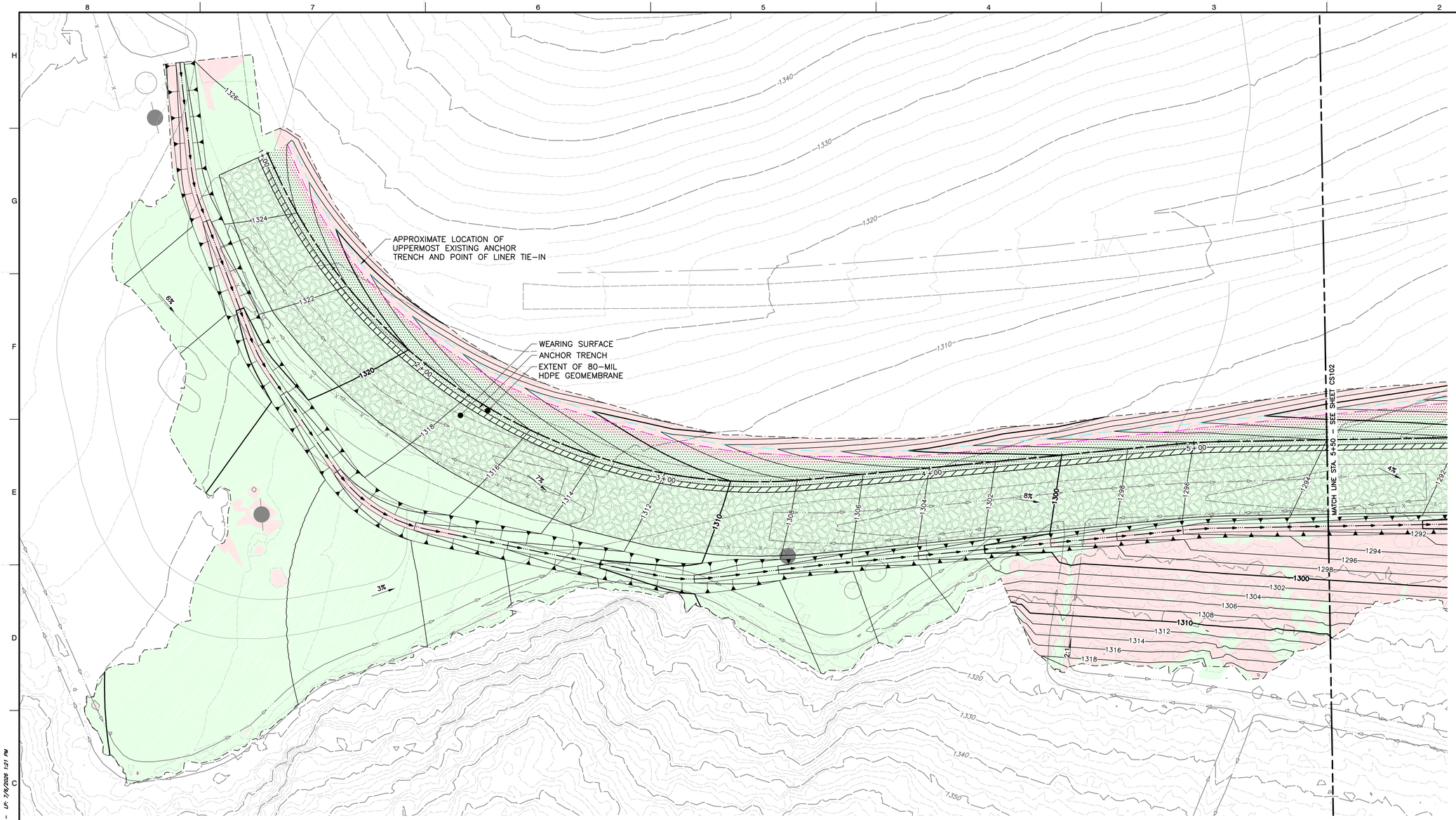
OVERALL LOWER BUTTRESS PLAN AND PROFILE

DATE:	JULY 2026
DWG SCALE: H: 1"= 100'; V: 1"= 100'	
PROJECT NO:	350-750
DRAWN BY:	JAT
CHECKED BY:	CJM
APPROVED BY:	RVH

DRAWING NO.: **C100**

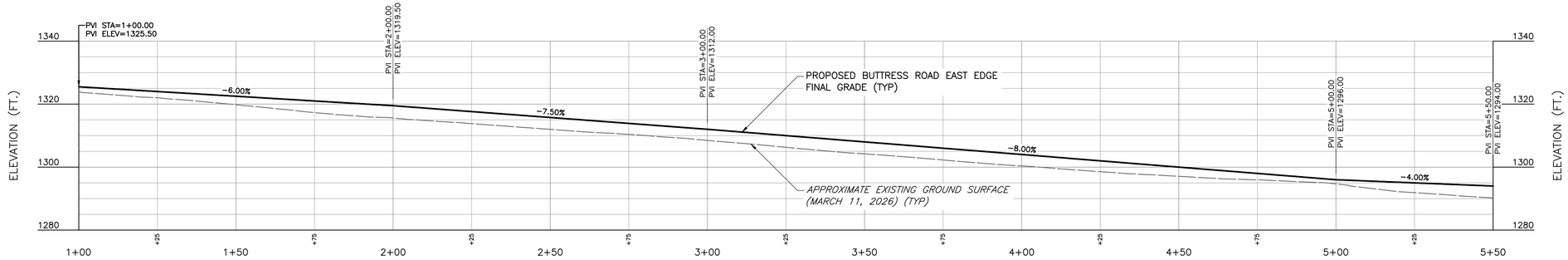
SHEET 4 OF ----

P:\350-000\350-750\1-CAD\Dwg\CV01\350750-CV01-BUTTRESS-PLAN.dwg(OVERALL PLAN) 1/6/26 - LP, 1/6/2026 1:21 PM



LOWER BUTTRESS AND BACKCUT - STA. 1+00 TO 5+50 PLAN

SCALE: 1" = 20'



BUTTRESS ROAD - EAST EDGE - STA. 1+00 TO 5+50 PROFILE

SCALE H:1"=20'; V:1"=20'

NORTH

NOTES:

1. xxx

REFERENCE

1. EXISTING PLANIMETRICS PREPARED BY TETRA TECH, DATED JANUARY 16, 2025.
2. EXISTING TOPOGRAPHY PROVIDED BY WASTE CONNECTIONS INC., DATED MARCH 11, 2026

HORIZONTAL SCALE IN FEET 0 20 40

VERTICAL SCALE IN FEET 0 20 40

DRAFT

SUBMITTAL RECORD

NO	DATE	DESCRIPTION
2	06/24/2026	FOR PRELIMINARY USE

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Gold River, CA 95670
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WASTE CONNECTIONS WEST SLOPE MITIGATION CHIQUITA CANYON LANDFILL 29201 HENRY MAYO DR CASTAIC, CALIFORNIA 91384

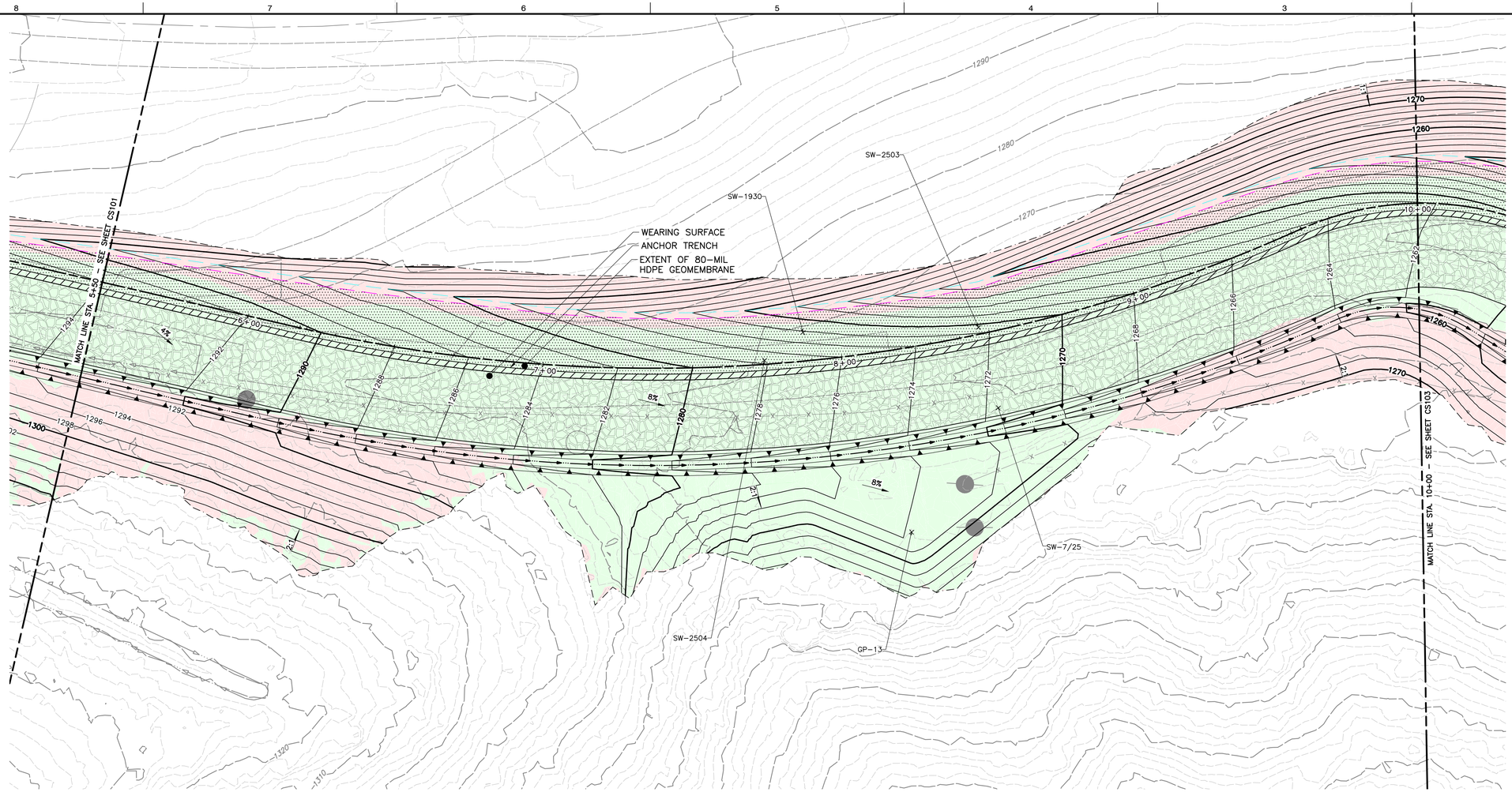
LOWER BUTTRESS AND BACKCUT PLAN AND PROFILE STA. 1+00 TO 5+50

DATE:	JULY 2026
DWG SCALE:	H: 1"=20'; V: 1"=20'
DRAWN BY:	JAT
CHECKED BY:	CJM
PROJECT NO:	350-750
APPROVED BY:	RVH

DRAWING NO.: C101

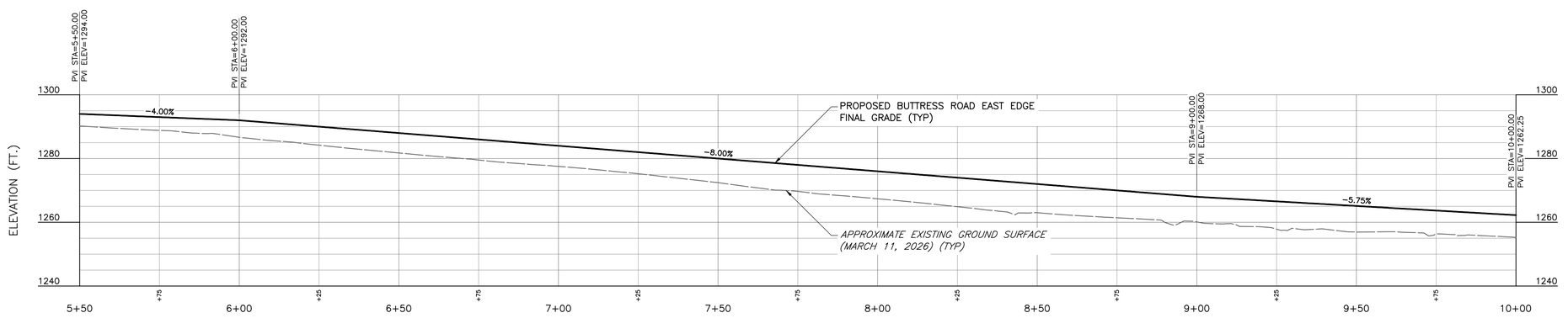
SHEET 5 OF ----

P:\350-000\350-750\~CADD\Dwg\C101\350750-C101-BUTTRESS-PLAN.dwg[PLAN 1] LS:(6/25/2026 - jjohnston) - LP: 7/6/2026 1:21 PM



LOWER BUTTRESS AND BACKCUT - STA. 5+50 TO 10+00 PLAN

SCALE: 1" = 20'



BUTTRESS ROAD - EAST EDGE - STA. 5+50 TO 10+00 PROFILE

SCALE H:1"=20'; V:1"=20'

REFERENCE

1. EXISTING PLANIMETRICS PREPARED BY TETRA TECH, DATED JANUARY 16, 2025.
2. EXISTING TOPOGRAPHY PROVIDED BY WASTE CONNECTIONS INC., DATED MARCH 11, 2026

NOTES:

1. XXX

HORIZONTAL SCALE IN FEET 0 20 40

VERTICAL SCALE IN FEET 0 20 40

DRAFT

SUBMITTAL RECORD

NO	DATE	DESCRIPTION
2	06/24/2026	FOR PRELIMINARY USE

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WASTE CONNECTIONS
WEST SLOPE MITIGATION
CHIQUITA CANYON LANDFILL
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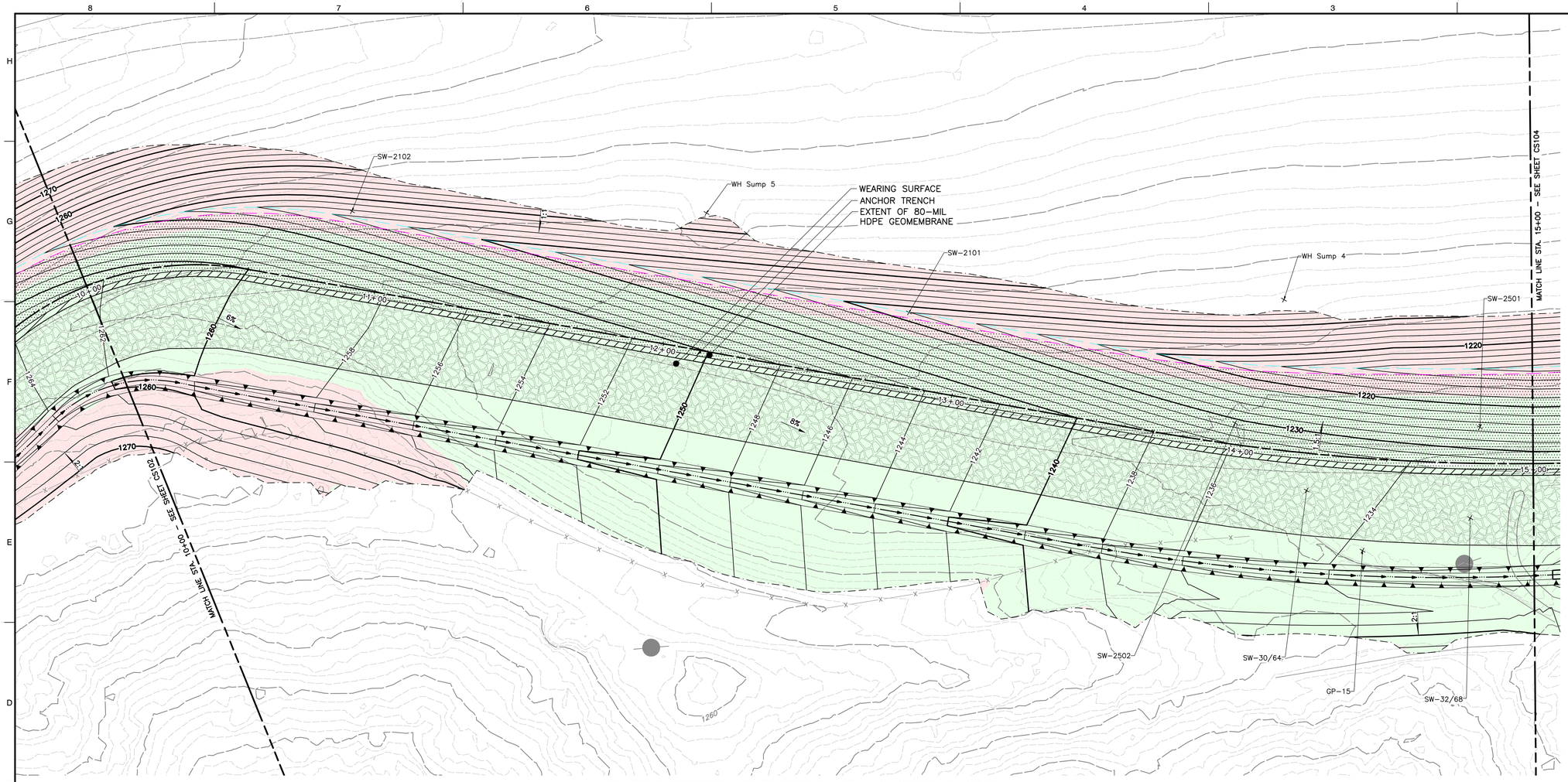
LOWER BUTTRESS AND BACKCUT PLAN AND PROFILE STA. 5+50 TO 10+00

DATE:	JULY 2026
DWG SCALE:	H: 1"=20'; V: 1"=20'
PROJECT NO:	350-750
DRAWN BY:	JAT
CHECKED BY:	CJM
APPROVED BY:	RVH

DRAWING NO.: **C102**

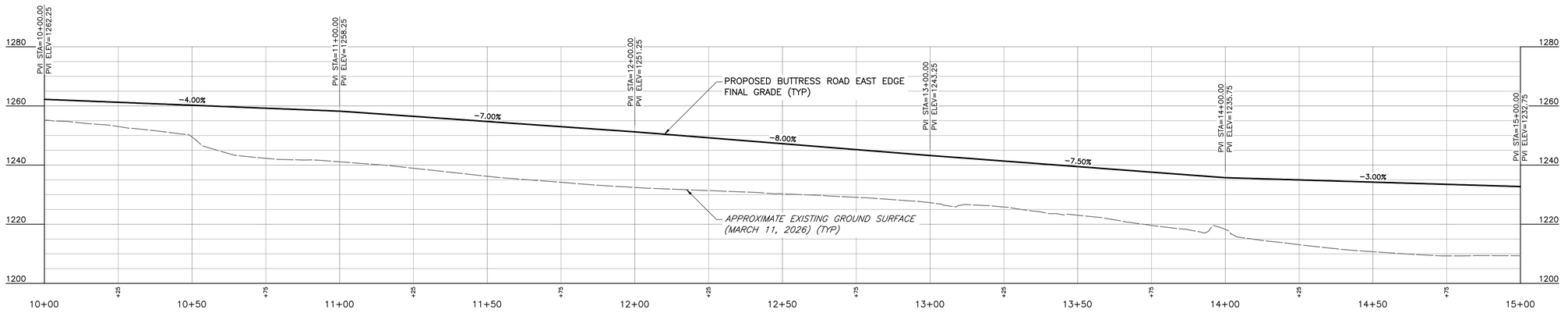
SHEET 6 OF ----

P:\350-000\350-750\-CADD\dwg\C101\350750-C101-BUTTRESS-PLAN.dwg[PLAN 3] LS:6/25/2026 - johnston] - LP: 7/6/2026 1:21 PM



LOWER BUTTRESS AND BACKCUT - STA. 10+00 TO 15+00 PLAN

SCALE: 1" = 20'



BUTTRESS ROAD - EAST EDGE - STA. 10+00 TO 15+00 PROFILE

SCALE H:1"=20'; V:1"=20'

HORIZONTAL SCALE IN FEET
0 20 40

VERTICAL SCALE IN FEET
0 20 40

DRAFT

REFERENCE

1. EXISTING PLANIMETRICS PREPARED BY TETRA TECH, DATED JANUARY 16, 2025.
2. EXISTING TOPOGRAPHY PROVIDED BY WASTE CONNECTIONS INC., DATED MARCH 11, 2026

NORTH

NOTES:

1. XXX

SUBMITTAL RECORD

NO	DATE	DESCRIPTION
2	06/24/2026	FOR PRELIMINARY USE

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WASTE CONNECTIONS
WEST SLOPE MITIGATION
CHIQUITA CANYON LANDFILL
29201 HENRY MAYO DR
CASTAIC, CALIFORNIA 91384

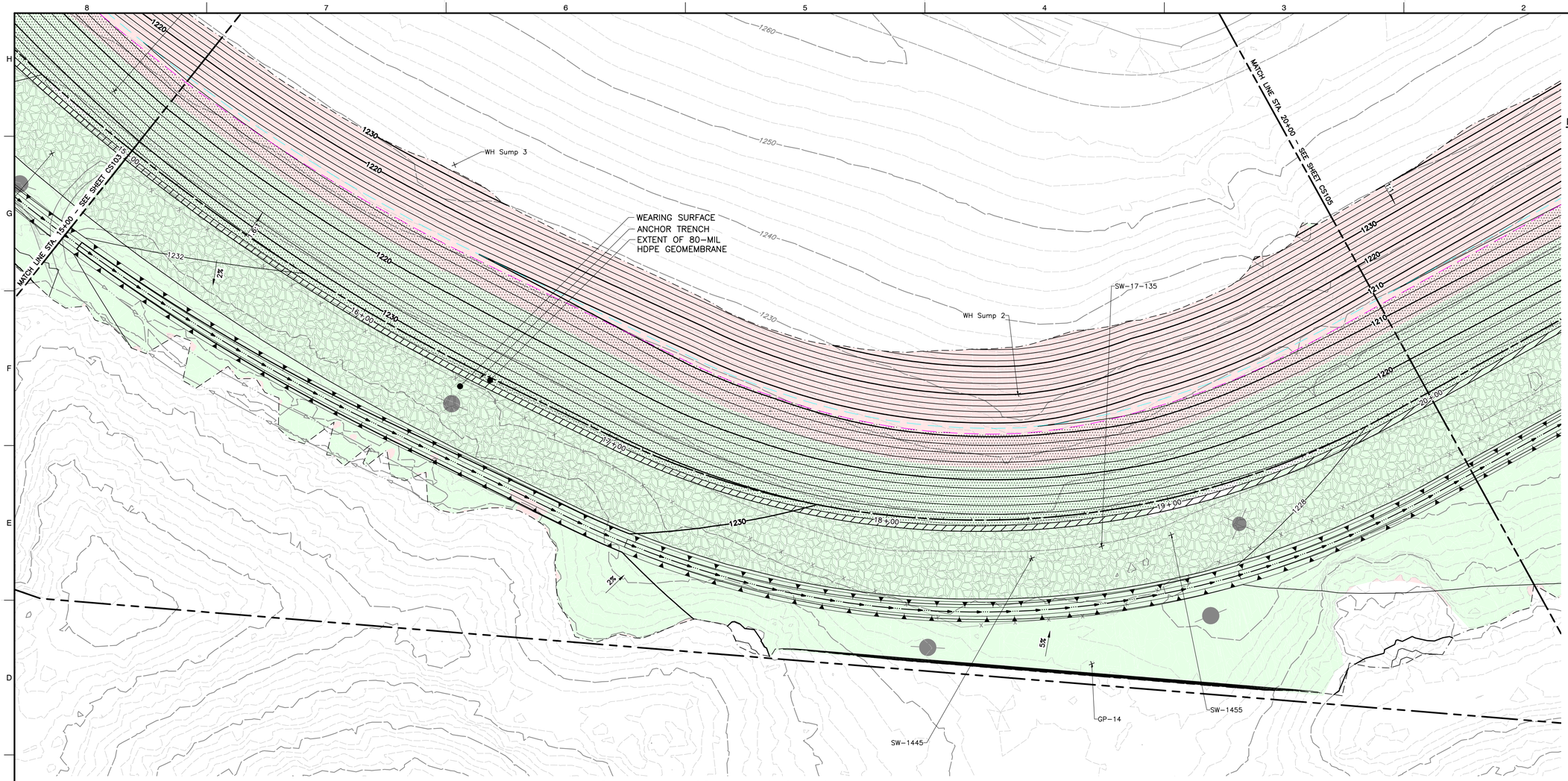
LOWER BUTTRESS AND BACKCUT PLAN AND PROFILE STA. 10+00 TO 15+00

DATE:	JULY 2026
DWG SCALE:	H: 1"=20'; V: 1"=20'
DRAWN BY:	JAT
CHECKED BY:	CJM
PROJECT NO:	350-750
APPROVED BY:	RVH

DRAWING NO.: **C103**

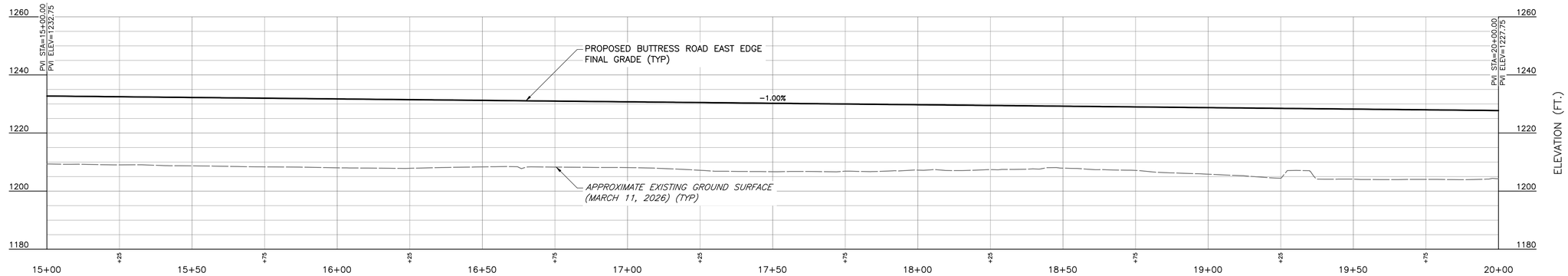
SHEET ---- OF ----

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LOWER BUTTRESS AND BACKCUT - STA. 15+00 TO 20+00 PLAN

SCALE: 1" = 20'



BUTTRESS ROAD - EAST EDGE - STA. 15+00 TO 20+00 PROFILE

SCALE H:1"=20'; V:1"=20'

HORIZONTAL SCALE IN FEET
0 20 40

VERTICAL SCALE IN FEET
0 20 40

DRAFT

REFERENCE

1. EXISTING PLANIMETRICS PREPARED BY TETRA TECH, DATED JANUARY 16, 2025.
2. EXISTING TOPOGRAPHY PROVIDED BY WASTE CONNECTIONS INC., DATED MARCH 11, 2026

SUBMITTAL RECORD

NO	DATE	DESCRIPTION
2	06/24/2026	FOR PRELIMINARY USE

DISCIPLINES, SURVEYING AND LANDSCAPE ARCHITECTURE IN THE STATE OF NORTH CAROLINA WILL BE PROVIDED BY CEC SURVEYING AND LANDSCAPE ARCHITECTS OF NC, PLLC. LANDSCAPE ARCHITECTURE SHALL BE PROVIDED BY CEC LANDSCAPE ARCHITECTS, PLLC. ARCHITECTURE SHALL BE PROVIDED BY CEC ENGINEERS & ARCHITECTS, PLLC. ENGINEERING SHALL BE PROVIDED BY CEC ENGINEERS & ARCHITECTS, PLLC. SURVEYING SHALL BE PROVIDED BY CEC SURVEYING AND LANDSCAPE ARCHITECTS, PLLC.

Civil & Environmental Consultants, Inc.
2356 Gold Meadow Way
Suite 120
Gold River, CA 95670
Ph: 916.503.0050
www.cecinc.com

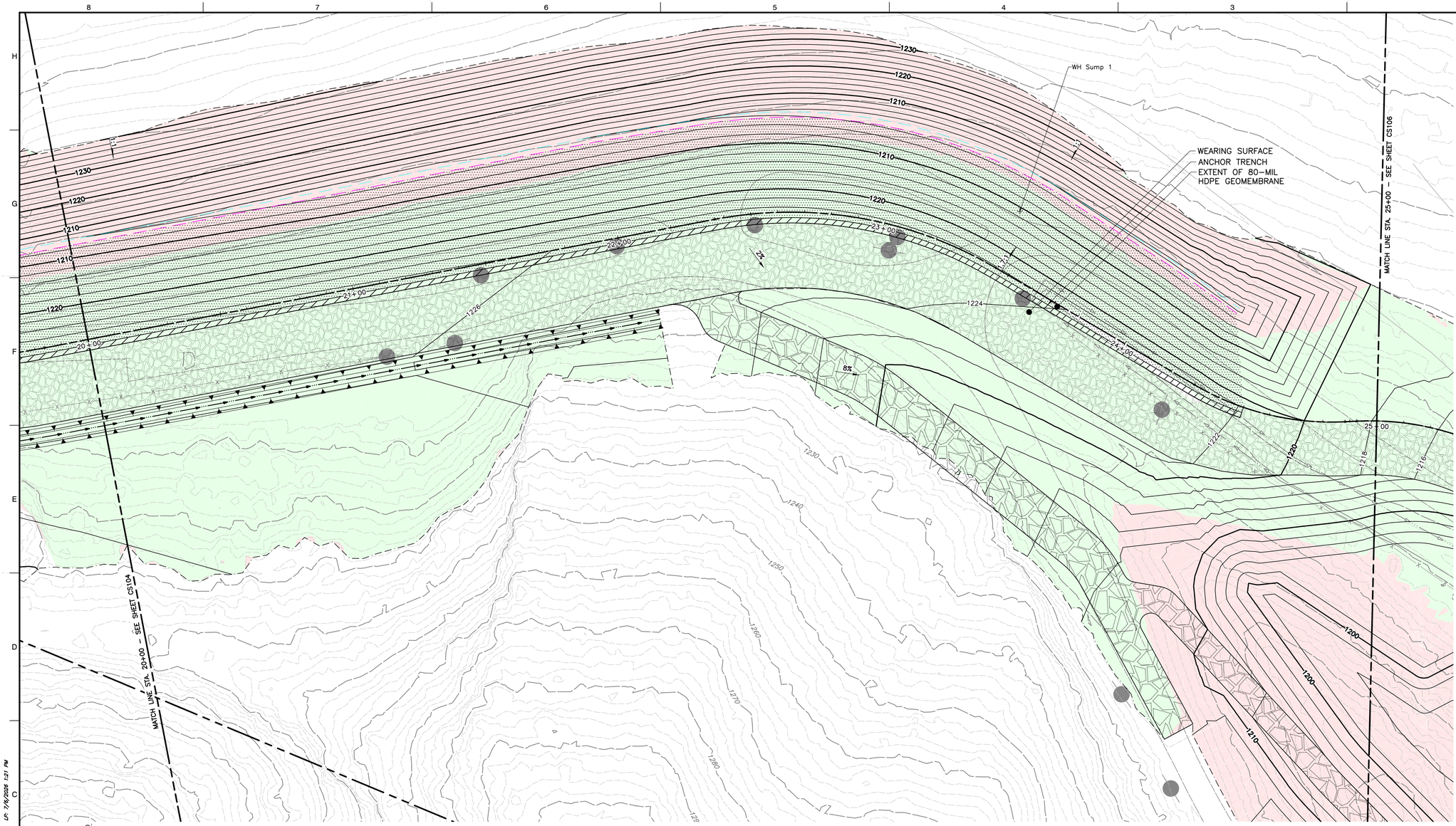
WASTE CONNECTIONS
WEST SLOPE MITIGATION
CHIQUITA CANYON LANDFILL
29201 HENRY MAYO DR
CASTAIC, CALIFORNIA 91384

LOWER BUTTRESS AND BACKCUT PLAN AND PROFILE STA. 15+00 TO 20+00

DATE:	JULY 2026
DWG SCALE:	H: 1"=20'; V: 1"=20'
PROJECT NO:	350-750
DRAWN BY:	JAT
CHECKED BY:	CJM
APPROVED BY:	RVH

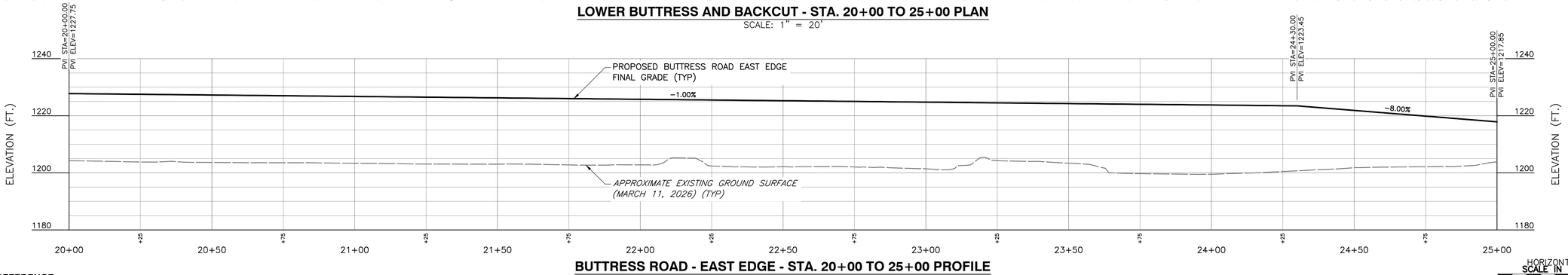
DRAWING NO.:
C104
SHEET ---- OF ----

P:\350-0001\350-750\1-CADD\dwg\CIVIL\350750-CIVIL-BUTTRESS-PLAN.dwg[PLAN 4] LS(15/25/2026 - pthornton) - LP: 7/9/2026 1:21 PM



LOWER BUTTRESS AND BACKCUT - STA. 20+00 TO 25+00 PLAN

SCALE: 1" = 20'



BUTTRESS ROAD - EAST EDGE - STA. 20+00 TO 25+00 PROFILE

SCALE H:1"=20'; V:1"=20'

HORIZONTAL SCALE IN FEET
0 20 40

VERTICAL SCALE IN FEET
0 20 40

REFERENCE

1. EXISTING PLANIMETRICS PREPARED BY TETRA TECH, DATED JANUARY 16, 2025.
2. EXISTING TOPOGRAPHY PROVIDED BY WASTE CONNECTIONS INC., DATED MARCH 11, 2026

NORTH

NOTES:

1. XXX

DRAFT

SUBMITTAL RECORD

NO	DATE	DESCRIPTION
2	06/24/2026	FOR PRELIMINARY USE

ENGINEERING, SURVEYING AND LANDSCAPE ARCHITECTURE IN THE STATE OF NORTH CAROLINA WILL BE PROVIDED BY CEC SURVEYING AND LANDSCAPE ARCHITECTS OF NC, PLLC. LANDSCAPE ARCHITECTURE IN THE STATE OF CALIFORNIA WILL BE PROVIDED BY CEC LANDSCAPE ARCHITECTS, LLC. ENGINEERING, SURVEYING AND LANDSCAPE ARCHITECTURE IN THE STATE OF NEVADA WILL BE PROVIDED BY CEC ENGINEERS & SURVEYORS, LTD. ALL WORK PERFORMED SHALL BE PERFORMED BY OR UNDER THE DIRECT SUPERVISION OF PERSONNEL HOLDING VALID LICENSES IN THE STATE OF WORK.

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Gold River, CA 95670
Ph: 916.503.0050
www.cecinc.com

Civil & Environmental Consultants, Inc.

WASTE CONNECTIONS
WEST SLOPE MITIGATION
CHIQUITA CANYON LANDFILL
29201 HENRY MAYO DR
CASTAIC, CALIFORNIA 91384

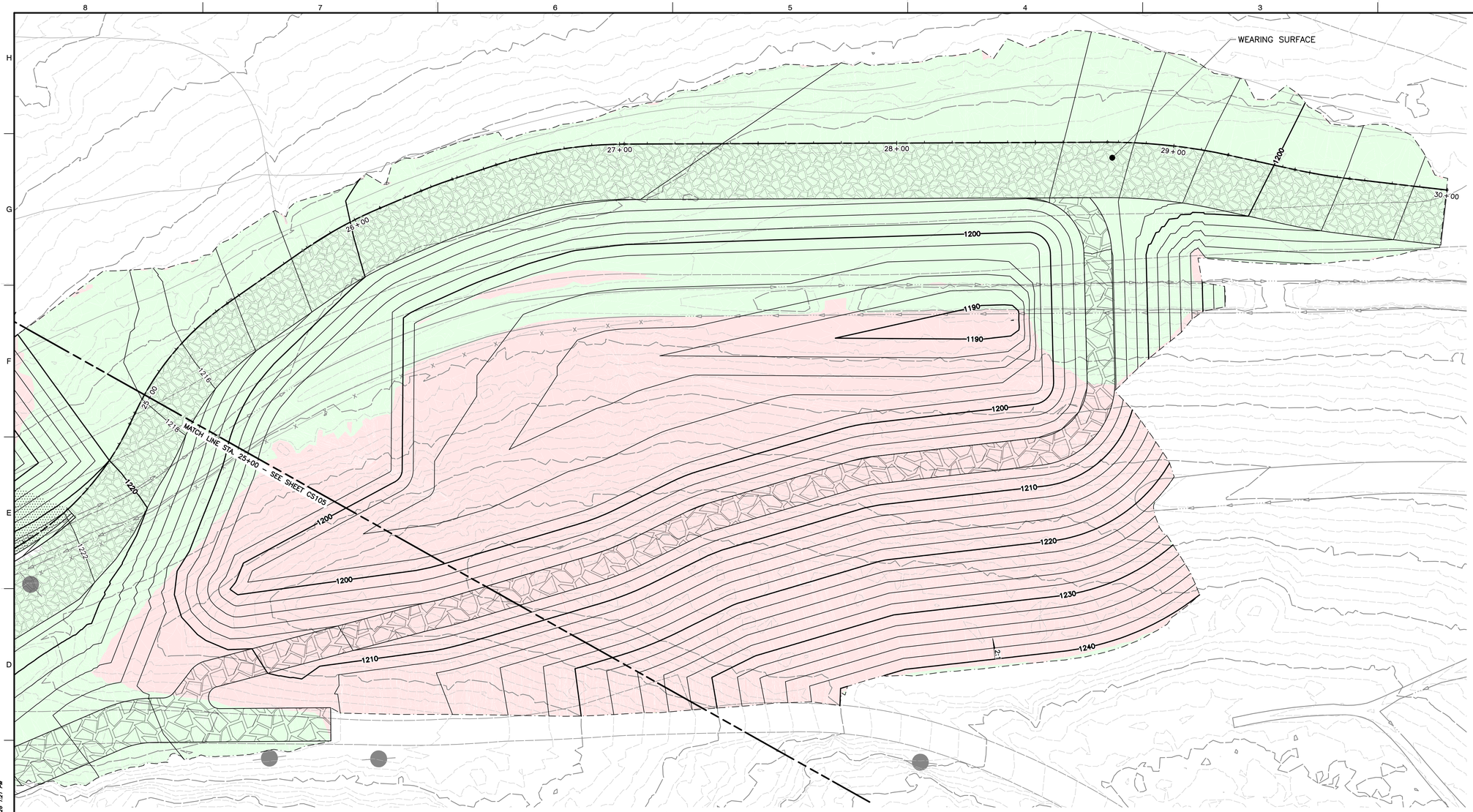
LOWER BUTTRESS AND BACKCUT PLAN AND PROFILE STA. 20+00 TO 25+00

DATE:	JULY 2026
DWG SCALE:	H: 1"=20'; V: 1"=20'
PROJECT NO:	350-750
DRAWN BY:	JAT
CHECKED BY:	CJM
APPROVED BY:	RVH

DRAWING NO.: **C105**

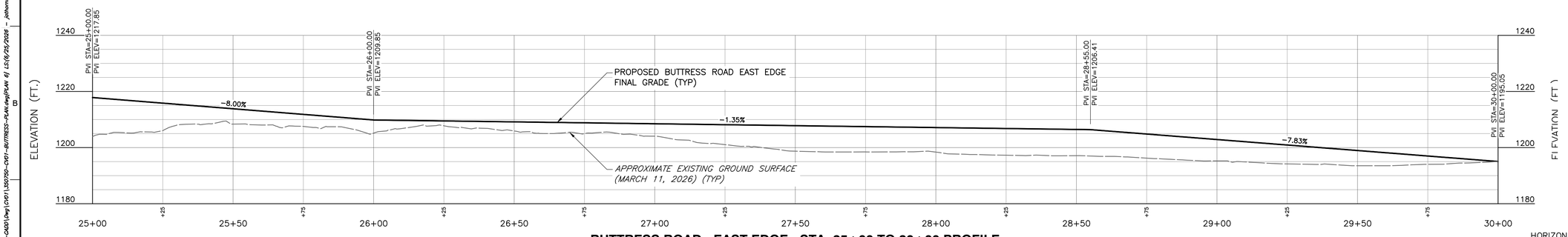
SHEET 5 OF ----

P:\350-001\350-750\-CADD\Dwg\C101\350750-C101-BUTTRESS-PLAN.dwg[PLAN 5] LS:(5/23/2026 - jjohnston) - LP: 7/6/2026 1:21 PM



LOWER BUTTRESS AND BACKCUT - STA. 25+00 TO 30+00 PLAN

SCALE: 1" = 20'



BUTTRESS ROAD - EAST EDGE - STA. 25+00 TO 30+00 PROFILE

SCALE H:1"=20'; V:1"=20'

REFERENCE

1. EXISTING PLANIMETRICS PREPARED BY TETRA TECH, DATED JANUARY 16, 2025.
2. EXISTING TOPOGRAPHY PROVIDED BY WASTE CONNECTIONS INC., DATED MARCH 11, 2026

HORIZONTAL SCALE IN FEET
0 20 40

VERTICAL SCALE IN FEET
0 20 40

DRAFT

NORTH

NOTES:

1. XXX

SUBMITTAL RECORD

NO	DATE	DESCRIPTION
2	06/24/2026	FOR PRELIMINARY USE

PREPARING, SURVEYING AND LANDSCAPE ARCHITECTURE IN THE STATE OF NORTH CAROLINA WILL BE PROVIDED BY CEC SURVEYING AND LANDSCAPE ARCHITECTS OF NC, PLLC. LANDSCAPE ARCHITECTURE IN THE STATE OF CALIFORNIA WILL BE PROVIDED BY CEC LANDSCAPE ARCHITECTS, PLLC. ALL PLANS, DESIGNS, AND DRAWINGS PREPARED BY CEC ENGINEERS & BOWDEN PFTS, LLC, ARCHITECTS, INCLUDED IN THIS SET OF WORK ARE AND SHALL REMAIN THE PROPERTY OF CEC LANDSCAPE ARCHITECTS, LLC.

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WASTE CONNECTIONS
WEST SLOPE MITIGATION
CHIQUITA CANYON LANDFILL
29201 HENRY MAYO DR
CASTAIC, CALIFORNIA 91384

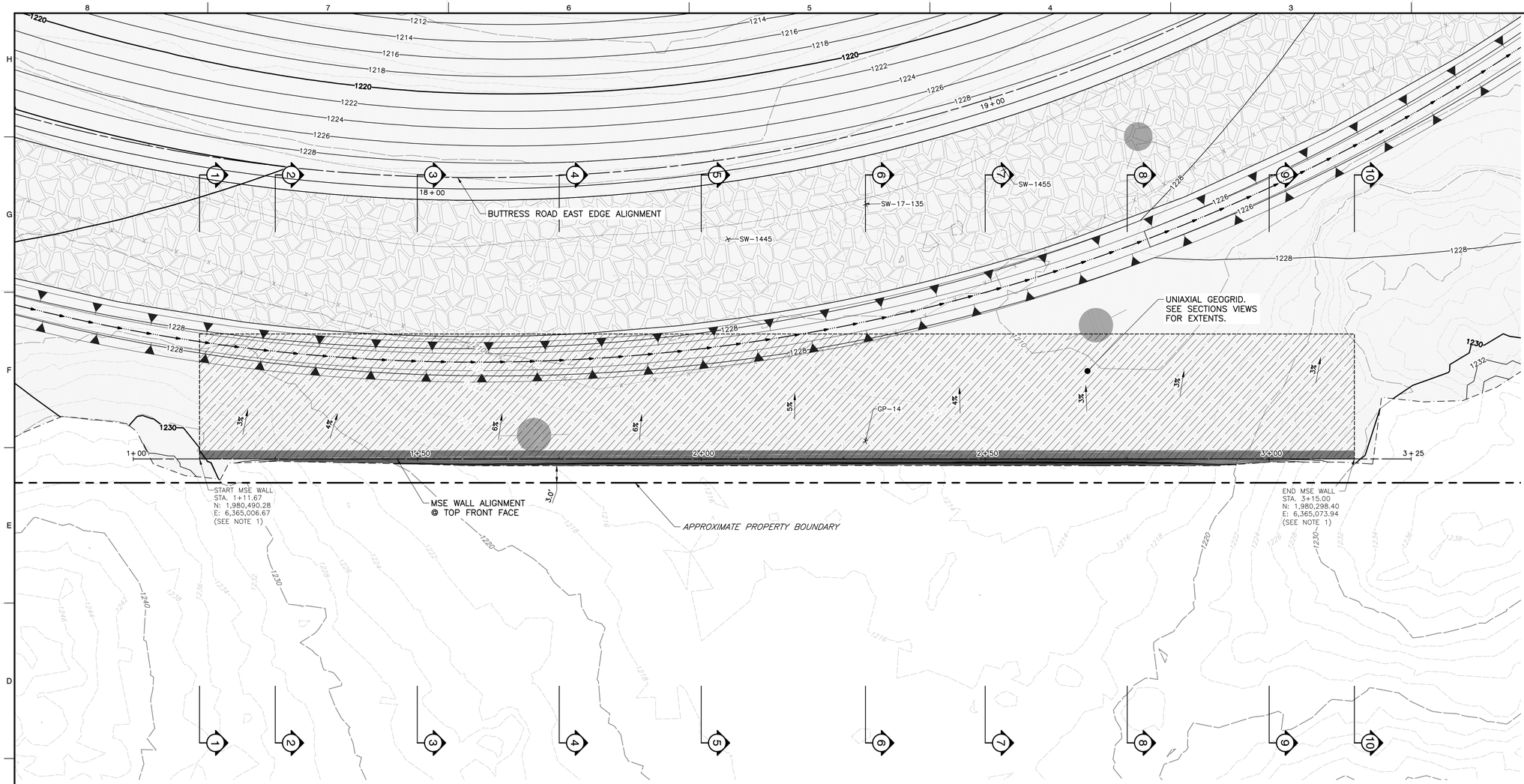
LOWER BUTTRESS AND BACKCUT PLAN AND PROFILE STA. 25+00 TO 30+00

DRAWN BY:	JAT
DATE:	JULY 2026
CHECKED BY:	CJM
DWG SCALE:	H: 1"=20'; V: 1"=20'
PROJECT NO:	350-750
APPROVED BY:	RVH

DRAWING NO.: **C106**

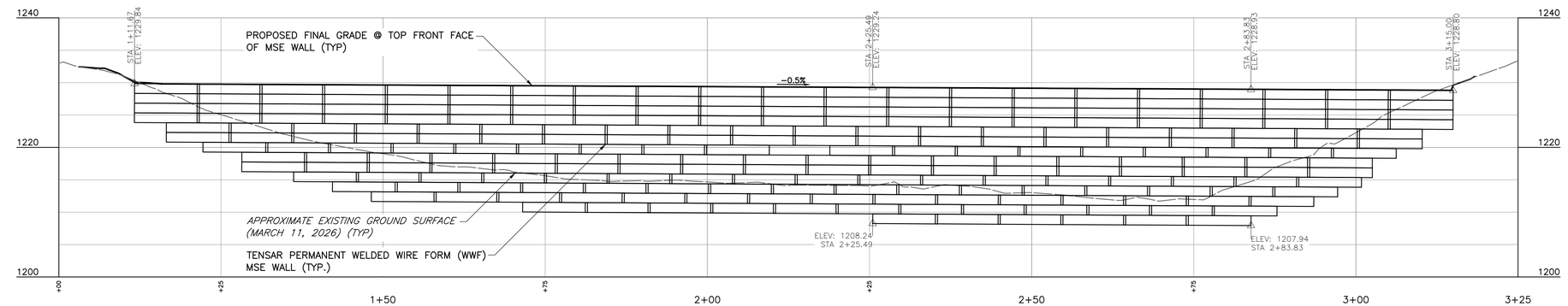
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GP-14 MSE WALL PLAN

SCALE: 1" = 10'



GP-14 MSE WALL PROFILE

SCALE H:1"=10'; V:1"=10'

HORIZONTAL SCALE IN FEET
0 10 20

VERTICAL SCALE IN FEET
0 10 20

DRAFT

REFERENCE

1. EXISTING PLANIMETRICS PREPARED BY TETRA TECH, DATED JANUARY 16, 2025.
2. EXISTING TOPOGRAPHY PROVIDED BY WASTE CONNECTIONS INC., DATED MARCH 11, 2026

NORTH

NOTES:

1. THE CONTROL LINE FOR THE RETAINING WALL IS THE FRONT FACE OF THE UPPERMOST CAGE. AS SUCH, THE CONTROL POINT SHOWN IN THE NORTHWESTERN CORNER OF THE NORTHERNMOST CAGE. CONTRACTOR SHALL CONFIRM TOE LOCATION OF BOTTOM-MOST CAGES RELATIVE TO PROPERTY BOUNDARY IN THE FIELD.

SUBMITTAL RECORD

NO	DATE	DESCRIPTION
2	06/24/2026	FOR PRELIMINARY USE

ENGINEERING, SURVEYING AND LANDSCAPE ARCHITECTURE IN THE STATE OF NORTH CAROLINA WILL BE PROVIDED BY CEC SURVEYING AND LANDSCAPE ARCHITECTS OF NC, PLLC. LANDSCAPE ARCHITECTURE IN THE STATE OF CALIFORNIA WILL BE PROVIDED BY CEC SURVEYING & PLANNING, INC. ENGINEERING SERVICES IN THE STATE OF NORTH CAROLINA WILL BE PROVIDED BY CEC LANDSCAPE ARCHITECTS, LLC.

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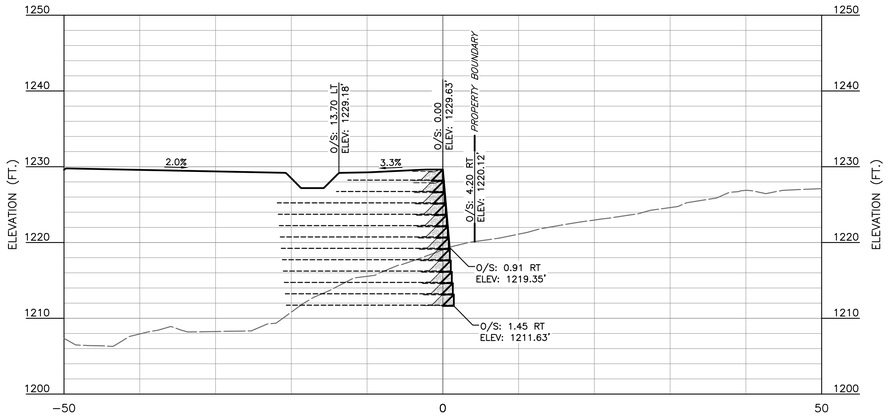
WASTE CONNECTIONS
WEST SLOPE MITIGATION
CHIQUITA CANYON LANDFILL
29201 HENRY MAYO DR
CASTAIC, CALIFORNIA 91384

GP-14 MSE WALL
PLAN AND PROFILE

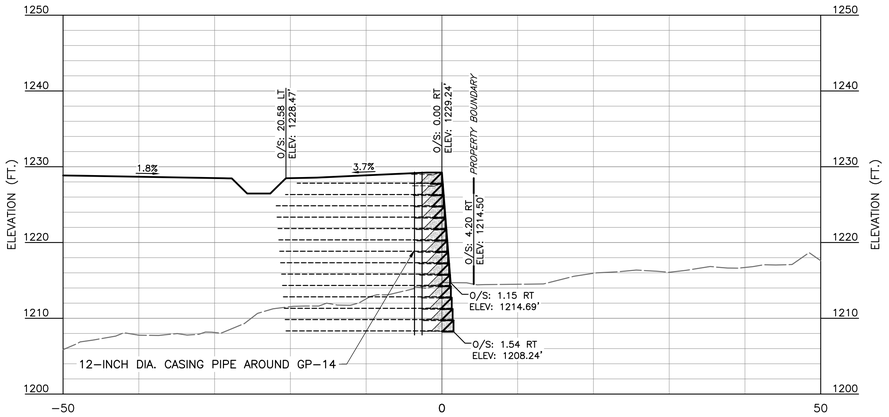
DATE:	JULY 2026
DWG SCALE:	H: 1"=10'; V: 1"=10'
PROJECT NO:	350-750
DRAWN BY:	JAT
CHECKED BY:	CJM
APPROVED BY:	RVH

DRAWING NO.:
C107
SHEET ---- OF ----

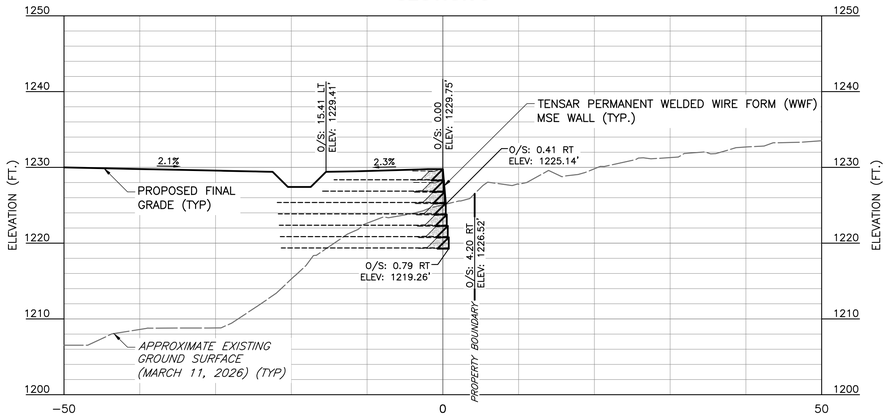
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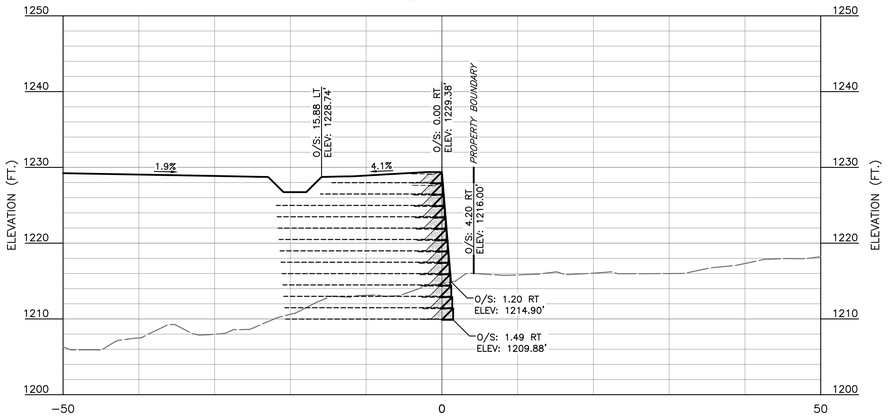
GP-14 MSE WALL STA 1+50
SECTION 3



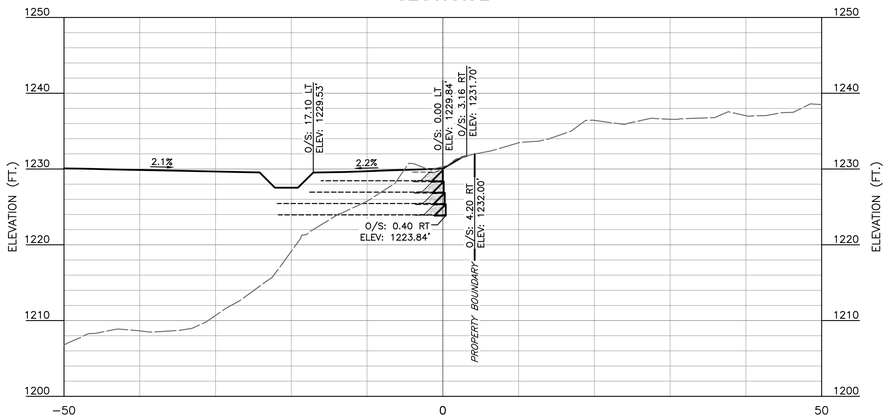
GP-14 MSE WALL STA 2+28.91
SECTION 6



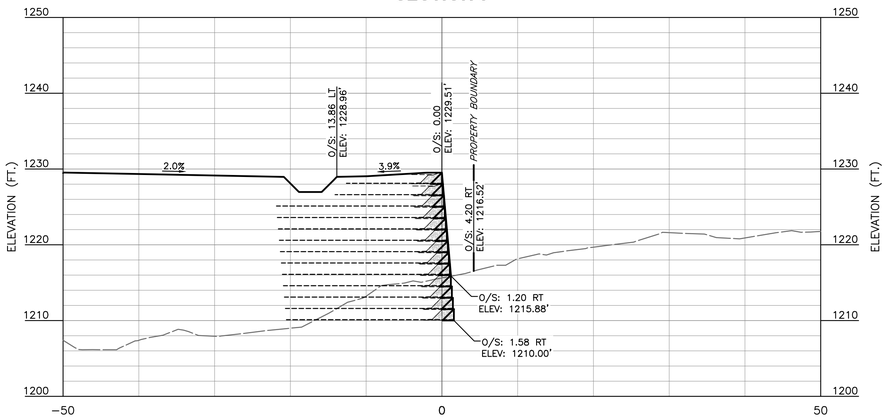
GP-14 MSE WALL STA 1+25
SECTION 2



GP-14 MSE WALL STA 2+00
SECTION 5



GP-14 MSE WALL STA 1+11.67
SECTION 1



GP-14 MSE WALL STA 1+75
SECTION 4

REFERENCE

1. EXISTING PLANIMETRICS PREPARED BY TETRA TECH, DATED JANUARY 16, 2025.
2. EXISTING TOPOGRAPHY PROVIDED BY WASTE CONNECTIONS INC., DATED MARCH 11, 2026

HORIZONTAL
SCALE IN FEET
0 10 20

VERTICAL
SCALE IN FEET
0 10 20

DRAFT

SUBMITTAL RECORD

NO	DATE	DESCRIPTION
2	06/24/2026	FOR PRELIMINARY USE

ENGINEERING, SURVEYING AND LANDSCAPE ARCHITECTURE IN THE STATE OF NORTH CAROLINA WILL BE PROVIDED BY CEC SURVEYING AND LANDSCAPE ARCHITECTS OF NC, PLLC. LANDSCAPE ARCHITECTURE IN THE STATE OF CALIFORNIA WILL BE PROVIDED BY CEC LANDSCAPE ARCHITECTS, LLC. ENGINEERING, SURVEYING AND LANDSCAPE ARCHITECTURE IN THE STATE OF NORTH CAROLINA WILL BE PROVIDED BY CEC SURVEYING AND LANDSCAPE ARCHITECTS OF NC, PLLC. LANDSCAPE ARCHITECTURE IN THE STATE OF CALIFORNIA WILL BE PROVIDED BY CEC LANDSCAPE ARCHITECTS, LLC.

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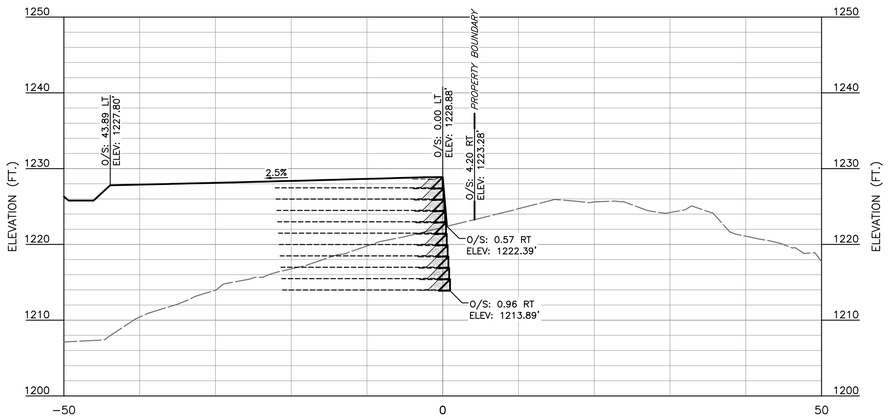
WASTE CONNECTIONS
WEST SLOPE MITIGATION
CHIQUITA CANYON LANDFILL
29201 HENRY MAYO DR
CASTAIC, CALIFORNIA 91384

GP-14 MSE WALL
SECTIONS 1 OF 2

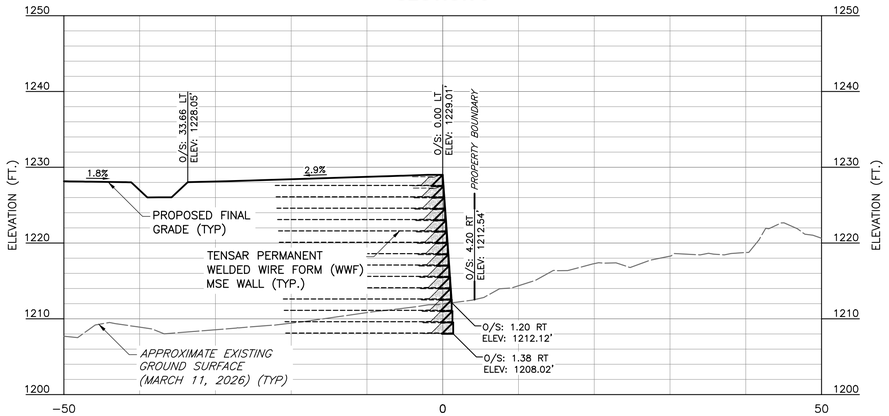
DATE:	JULY 2026
DWG SCALE:	H: 1"= 10', V: 1"= 10'
PROJECT NO:	350-750
DRAWN BY:	JAT
CHECKED BY:	CJM
APPROVED BY:	RVH

DRAWING NO.:
C108
SHEET ---- OF ----

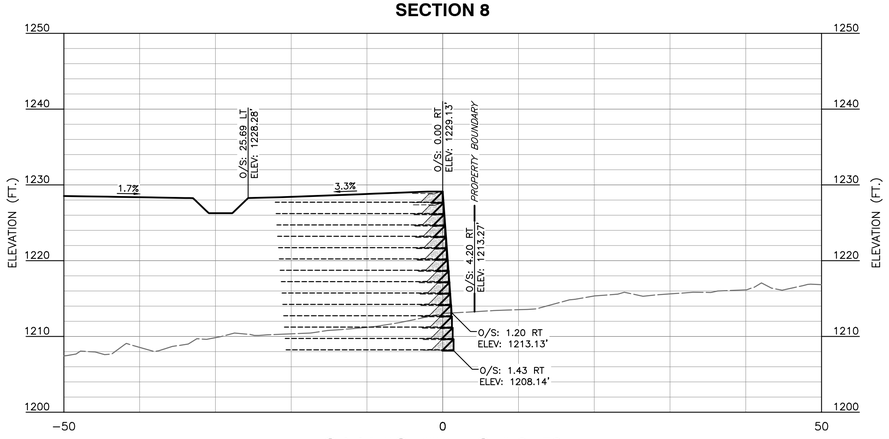
P:\350-000\350-750\--CAD\Dwg\CIVIL\350750-CV01-RETAINING WALL.dwg\WALL SECTIONS 1| LS(7/3/2026 - cmathews) - LP: 7/6/2026 1:21 PM



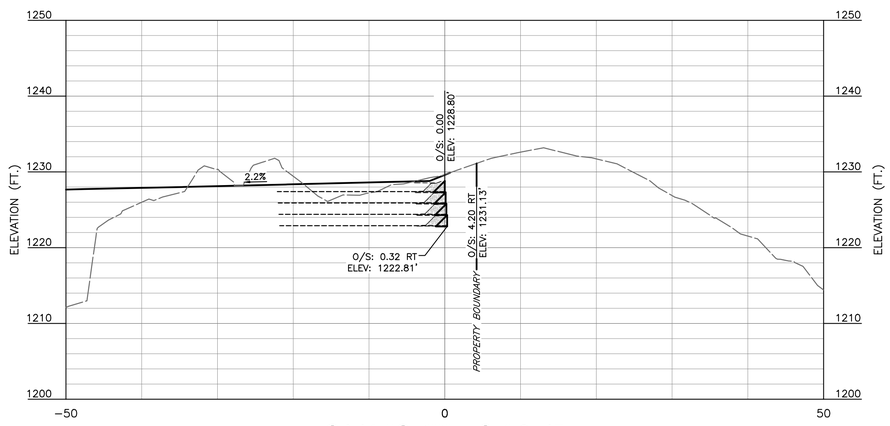
GP-14 MSE WALL STA 3+00
SECTION 9



GP-14 MSE WALL STA 2+75
SECTION 8



GP-14 MSE WALL STA 2+50
SECTION 7



GP-14 MSE WALL STA 3+15
SECTION 10

REFERENCE

1. EXISTING PLANIMETRICS PREPARED BY TETRA TECH, DATED JANUARY 16, 2025.
2. EXISTING TOPOGRAPHY PROVIDED BY WASTE CONNECTIONS INC., DATED MARCH 11, 2026

HORIZONTAL
SCALE IN FEET
0 10 20

VERTICAL
SCALE IN FEET
0 10 20

DRAFT

SUBMITTAL RECORD

NO	DATE	DESCRIPTION
2	06/24/2026	FOR PRELIMINARY USE

THIS DRAWING, SURVEYING AND LANDSCAPE ARCHITECTURE IN THE STATE OF NORTH CAROLINA WILL BE PROVIDED BY CEC SURVEYING AND LANDSCAPE ARCHITECTS OF NC, PLLC. LANDSCAPE ARCHITECTURE IN THE STATE OF CALIFORNIA WILL BE PROVIDED BY CEC LANDSCAPE ARCHITECTS, PLLC. THIS DRAWING IS PROTECTED BY CEC SURVEYING AND LANDSCAPE ARCHITECTS OF NC, PLLC & PROVIDED BY CEC LANDSCAPE ARCHITECTS, LLC. UNAUTHORIZED USE, REPRODUCTION OR MODIFICATION OF THIS DRAWING IN WHOLE OR IN PART IS PROHIBITED BY LAW.

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Civil & Environmental Consultants, Inc.

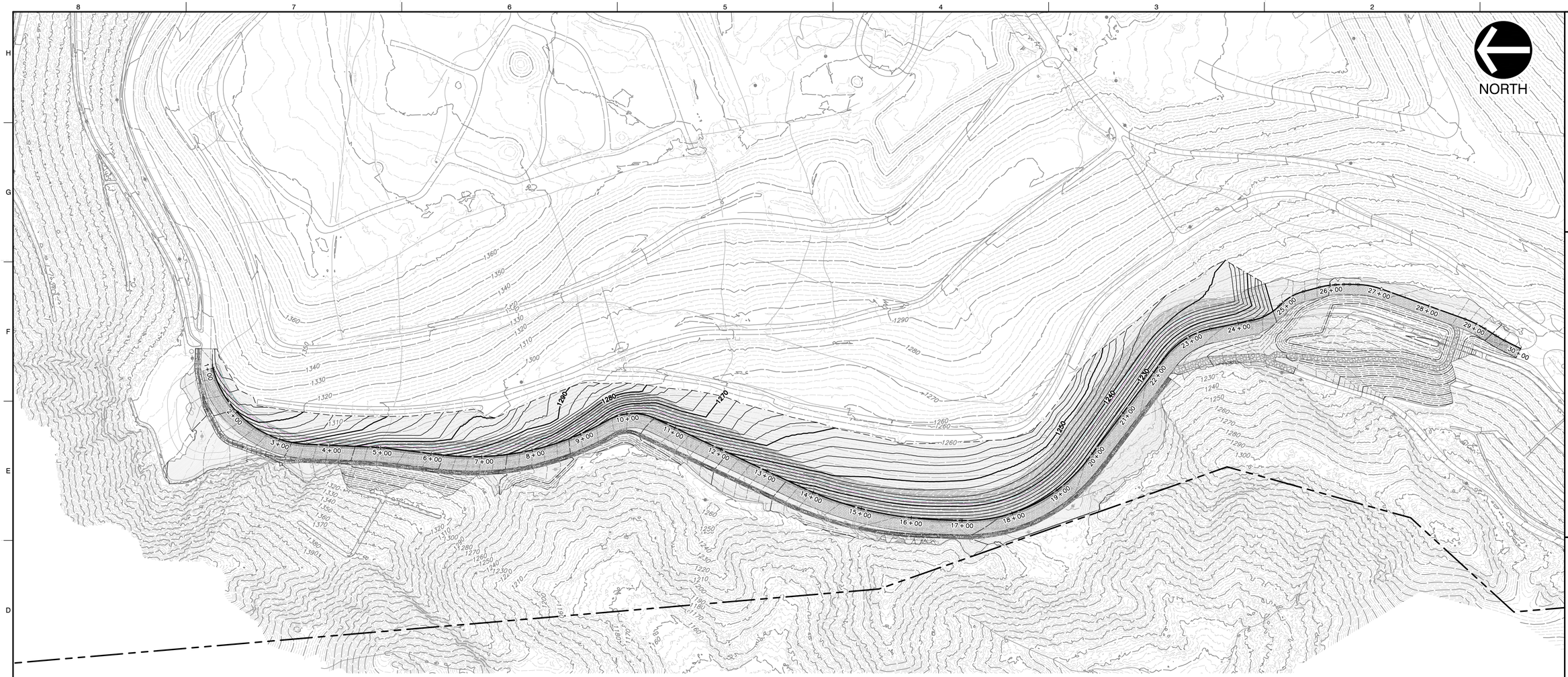
WASTE CONNECTIONS
WEST SLOPE MITIGATION
CHIQUITA CANYON LANDFILL
29201 HENRY MAYO DR
CASTAIC, CALIFORNIA 91384

GP-14 MSE WALL
SECTIONS 2 OF 2

DATE:	JULY 2026
DWG SCALE:	H: 1"= 10'; V: 1"= 10'
PROJECT NO:	350-750
DRAWN BY:	JAT
CHECKED BY:	CJM
APPROVED BY:	RVH

DRAWING NO.:
C109
SHEET ---- OF ----

P:\350-000\350-750\--CAD\Dwg\C101\350750-C101-RETAINING WALL.dwg[WALL SECTIONS 2] LS(T)(3/2026 - cmathews) - LP: 3/6/2026 1:21 PM



UPPER BUTTRESS PLAN
SCALE: 1" = 100'

SCALE IN FEET
0 100 200

DRAFT

REFERENCE

1. EXISTING PLANIMETRICS PREPARED BY TETRA TECH, DATED JANUARY 16, 2025.
2. EXISTING TOPOGRAPHY PROVIDED BY WASTE CONNECTIONS INC., DATED MARCH 11, 2026

NOTES:

1. UPPER BUTTRESS VOLUMES*
   CUT – 30 CU. YD.
   FILL – 86,600 CU. YD.
   NET – 86,570 CU. YD (FILL)
   *COMBINED EXISTING SURFACE WITH LOWER BUTTRESS AND BACKCUT SURFACE COMPARED TO UPPER BUTTRESS GRADING.
2. LINED SURFACE AREA
   2D LINED AREA – 223,310 SQ. FT.
   3D LINED AREA – 229,800 SQ. FT.

SUBMITTAL RECORD

NO	DATE	DESCRIPTION
2	06/24/2026	FOR PRELIMINARY USE

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Ph: 916.503.0050
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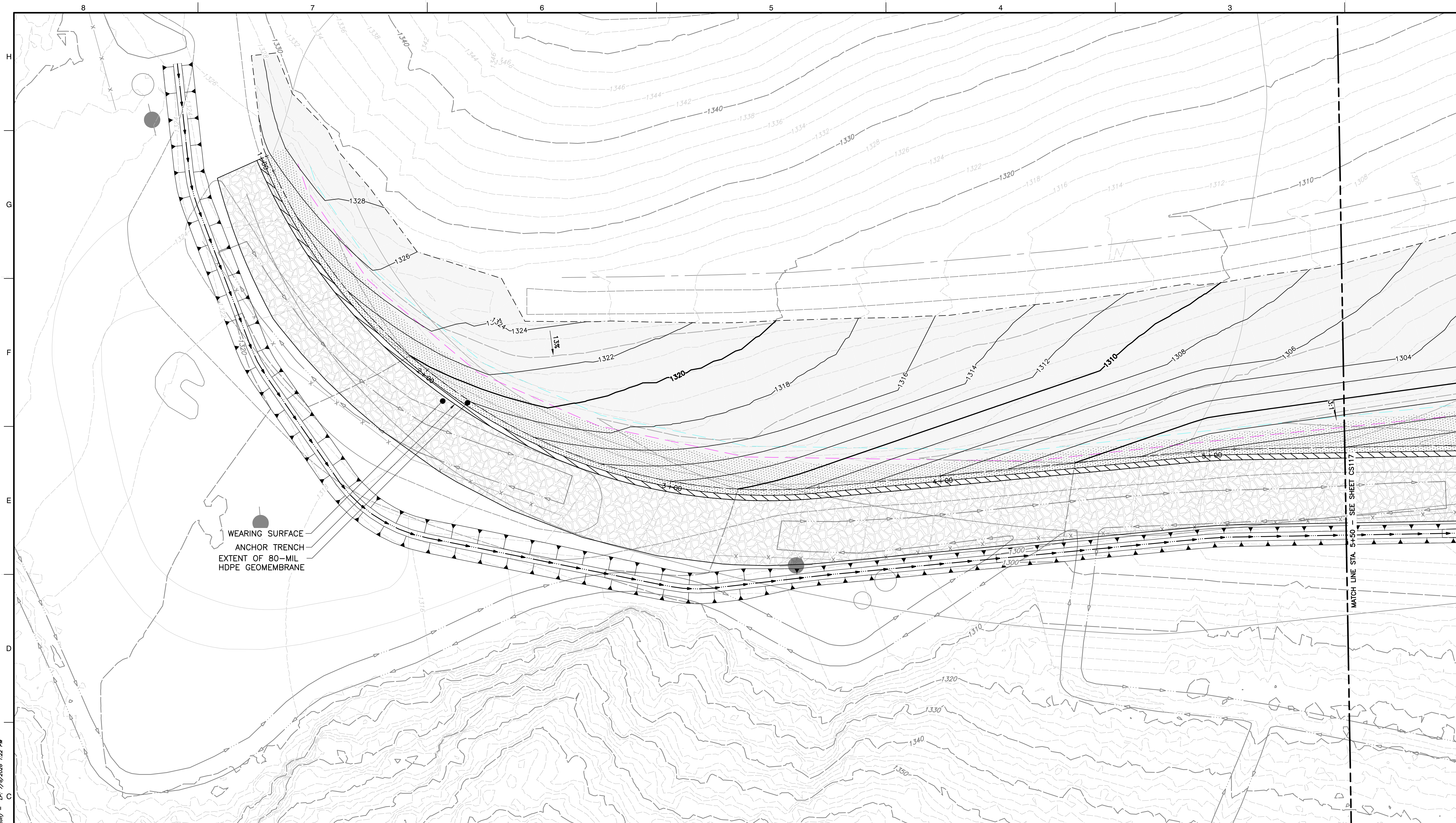
WASTE CONNECTIONS
WEST SLOPE MITIGATION
CHIQUITA CANYON LANDFILL
29201 HENRY MAYO DR
CASTAIC, CALIFORNIA 91384

OVERALL UPPER BUTTRESS PLAN

DATE:	JULY 2026
DRAWN BY:	JAT
DWG SCALE:	1" = 100'
CHECKED BY:	CJM
PROJECT NO:	350-750
APPROVED BY:	RVH

DRAWING NO.:
C115
SHEET ---- OF ----

P:\350-000\350-750\--DADD\Dwg\CVD\\350750-CVD1--UPPER BUTTRESS-PLAN.dwg(OVERALL PLAN) LS(6/24/2026 - xjohnston) - LP: 7/8/2026 1:22 PM



UPPER BUTTRESS - STA. 1+00 TO 5+50 PLAN

SCALE: 1" = 20'

NORTH

NOTES:

1. XXX

REFERENCE

1. EXISTING PLANIMETRICS PREPARED BY TETRA TECH, DATED JANUARY 16, 2025.
2. EXISTING TOPOGRAPHY PROVIDED BY WASTE CONNECTIONS INC., DATED MARCH 11, 2026

SCALE IN FEET: 0 20 40

SUBMITTAL RECORD

NO	DATE	DESCRIPTION
2	06/24 2026	FOR PRELIMINARY USE

ENGINEERING, SURVEYING AND LANDSCAPE ARCHITECTURE IN THE STATE OF NORTH CAROLINA WILL BE PROVIDED BY CEC SURVEYING AND LANDSCAPE ARCHITECTS OF NC, PLLC. SERVICES IN PUERTO RICO WILL BE PROVIDED BY CEC ENGINEERS & CONSULTANTS, LLC. LANDSCAPE ARCHITECTURE SERVICES IN THE STATE OF OHIO WILL BE PROVIDED BY CEC LANDSCAPE ARCHITECTS, LLC.

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WASTE CONNECTIONS
WEST SLOPE MITIGATION
CHIQUITA CANYON LANDFILL
29201 HENRY MAYO DR
CASTAIC, CALIFORNIA 91384

UPPER BUTTRESS PLAN
STA. 1+00 TO 5+50

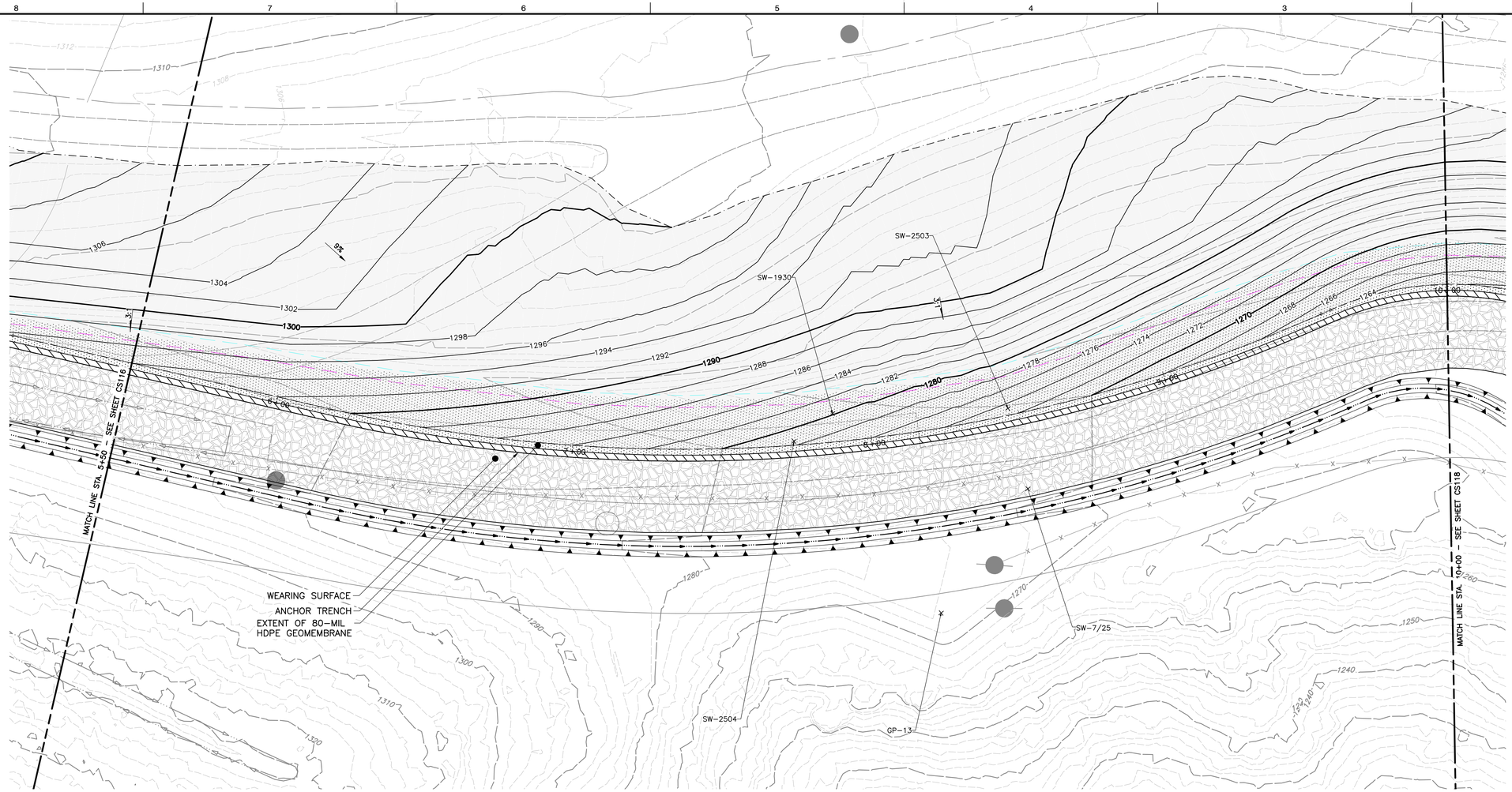
DATE:	JULY 2026	DRAWN BY:	JAT
DWG SCALE:	1"=20'	CHECKED BY:	CJM
PROJECT NO:	350-750		
APPROVED BY:	RVH		

DRAFT

DRAWING NO.: **C116**

SHEET ---- OF ----

P:\350-000\350-750\-CADD\Dwg\CV01\350750-CV01-UPPER BUTTRESS-PLANS.dwg{PLAN 1} LS:(6/24/2026 - jathornton) - LP: 7/6/2026 1:22 PM



NORTH

NOTES:

1. XXX

UPPER BUTTRESS - STA. 5+50 TO 10+00 PLAN
SCALE: 1" = 20'

REFERENCE

1. EXISTING PLANIMETRICS PREPARED BY TETRA TECH, DATED JANUARY 16, 2025.
2. EXISTING TOPOGRAPHY PROVIDED BY WASTE CONNECTIONS INC., DATED MARCH 11, 2026

SCALE IN FEET
0 20 40

DRAFT

SUBMITTAL RECORD

NO	DATE	DESCRIPTION
2	06/24/2026	FOR PRELIMINARY USE

ENGINEERING, SURVEYING AND LANDSCAPE ARCHITECTURE IN THE STATE OF NORTH CAROLINA WILL BE PROVIDED BY CEC SURVEYING AND LANDSCAPE ARCHITECTS OF NC, PLLC. LANDSCAPE ARCHITECTURE IN THE STATE OF CALIFORNIA WILL BE PROVIDED BY CEC LANDSCAPE ARCHITECTS, LLC.

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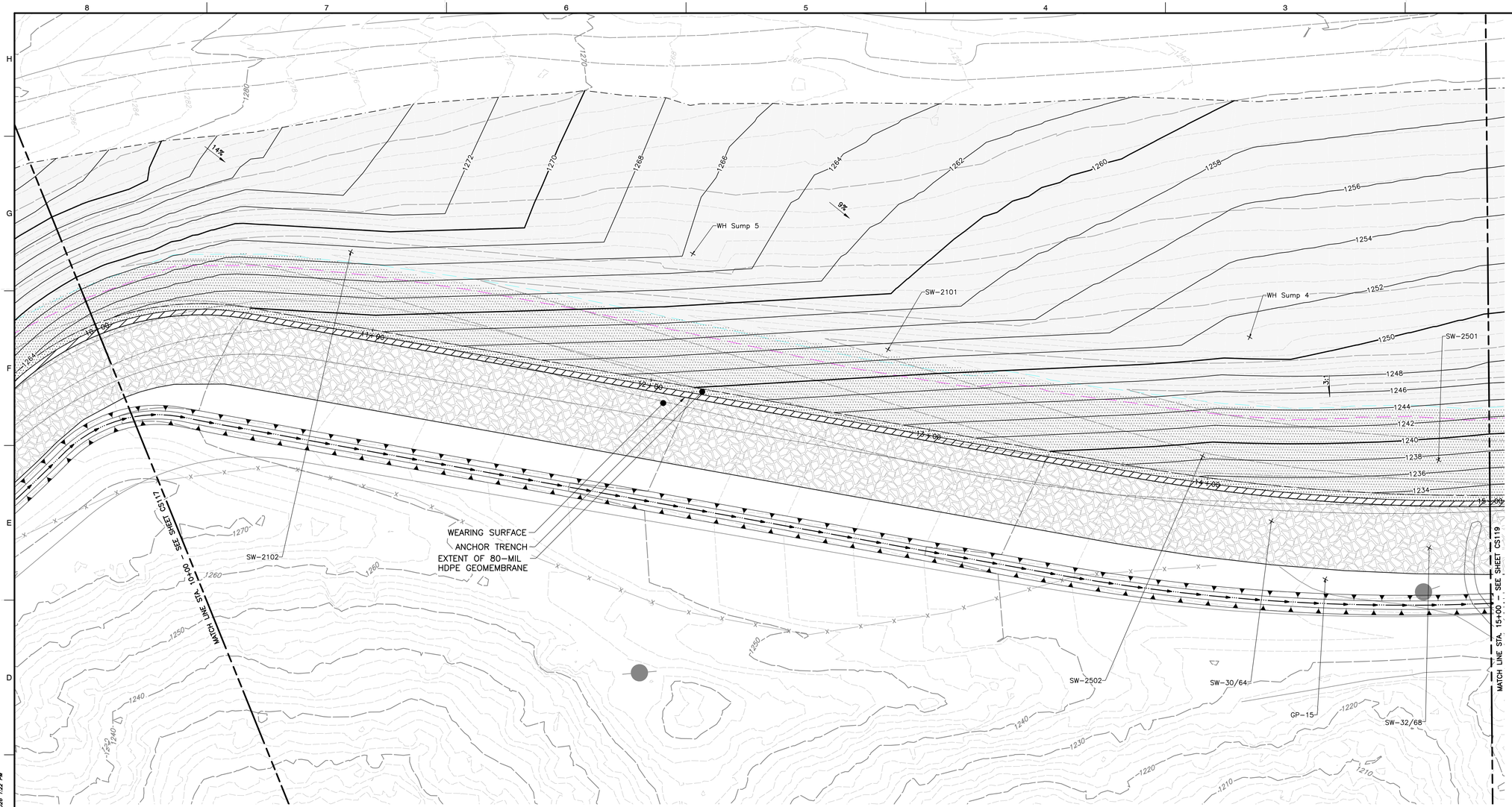
WASTE CONNECTIONS
WEST SLOPE MITIGATION
CHIQUITA CANYON LANDFILL
29201 HENRY MAYO DR
CASTAIC, CALIFORNIA 91384

UPPER BUTTRESS PLAN
STA. 5+50 TO 10+00

DATE:	JULY 2026
DWG SCALE:	1"=20'
PROJECT NO:	350-750
DRAWN BY:	JAT
CHECKED BY:	CJM
APPROVED BY:	RVH

DRAWING NO.:
C117
SHEET ---- OF ----

P:\350-0001\350-750\-CADD\Dwg\C101\350750-C101-UPPER BUTTRESS-PLANS.dwg[PLAN A] LS(6/24/2026 - jahamilton) - LP: 7/16/2026 1:23 PM



UPPER BUTTRESS - STA. 10+00 TO 15+00 PLAN

SCALE: 1" = 20'

NORTH

NOTES:

1. XXX

REFERENCE

1. EXISTING PLANIMETRICS PREPARED BY TETRA TECH, DATED JANUARY 16, 2025.
2. EXISTING TOPOGRAPHY PROVIDED BY WASTE CONNECTIONS INC., DATED MARCH 11, 2026

SCALE IN FEET

0 20 40

DRAFT

SUBMITTAL RECORD

NO	DATE	DESCRIPTION
2	06/24/2026	FOR PRELIMINARY USE

ENGINEERING, SURVEYING AND LANDSCAPE ARCHITECTURE IN THE STATE OF NORTH CAROLINA WILL BE PROVIDED BY CEC SURVEYING AND LANDSCAPE ARCHITECTS OF NC, PLLC. LANDSCAPE ARCHITECTURAL SERVICES IN THE STATE OF CALIFORNIA WILL BE PROVIDED BY CEC LANDSCAPE ARCHITECTS, LLC.

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Gold River, CA 95670
Ph: 916.503.0050
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Civil & Environmental Consultants, Inc.

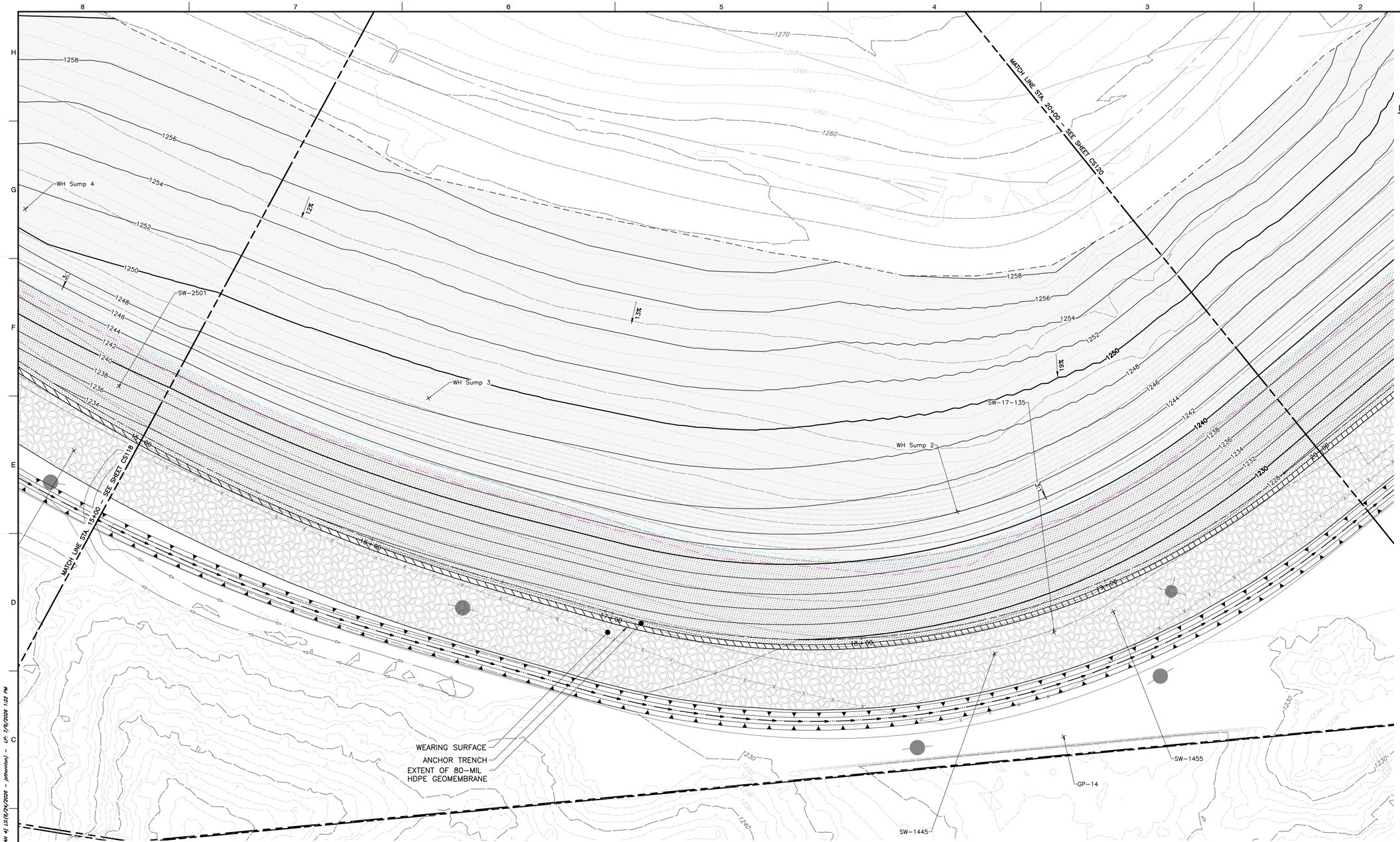
WASTE CONNECTIONS
WEST SLOPE MITIGATION
CHIQUITA CANYON LANDFILL
29201 HENRY MAYO DR
CASTAIC, CALIFORNIA 91384

UPPER BUTTRESS PLAN
STA. 10+00 TO 15+00

DATE:	JULY 2026
DWG SCALE:	1"=20'
PROJECT NO:	350-750
DRAWN BY:	JAT
CHECKED BY:	CJM
APPROVED BY:	RVH

DRAWING NO.:
C118
SHEET ---- OF ----

P:\350-000\350-750\1-CADD\Dwg\C101\350750-C101-UPPER BUTTRESS-PLANS.dwg[PLAN 3] LS(6/24/2026 - Johnston) - LP: 7/8/2026 1:22 PM



UPPER BUTTRESS - STA. 15+00 TO 20+00 PLAN

SCALE: 1" = 20'

NORTH

NOTES:

1. XXX

REFERENCE

1. EXISTING PLANIMETRICS PREPARED BY TETRA TECH, DATED JANUARY 16, 2025.
2. EXISTING TOPOGRAPHY PROVIDED BY WASTE CONNECTIONS INC., DATED MARCH 11, 2026

SCALE IN FEET

0 20 40

DRAFT

SUBMITTAL RECORD

NO	DATE	DESCRIPTION
2	06/24/2026	FOR PRELIMINARY USE

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Gold River, CA 95670
Ph: 916.503.0050
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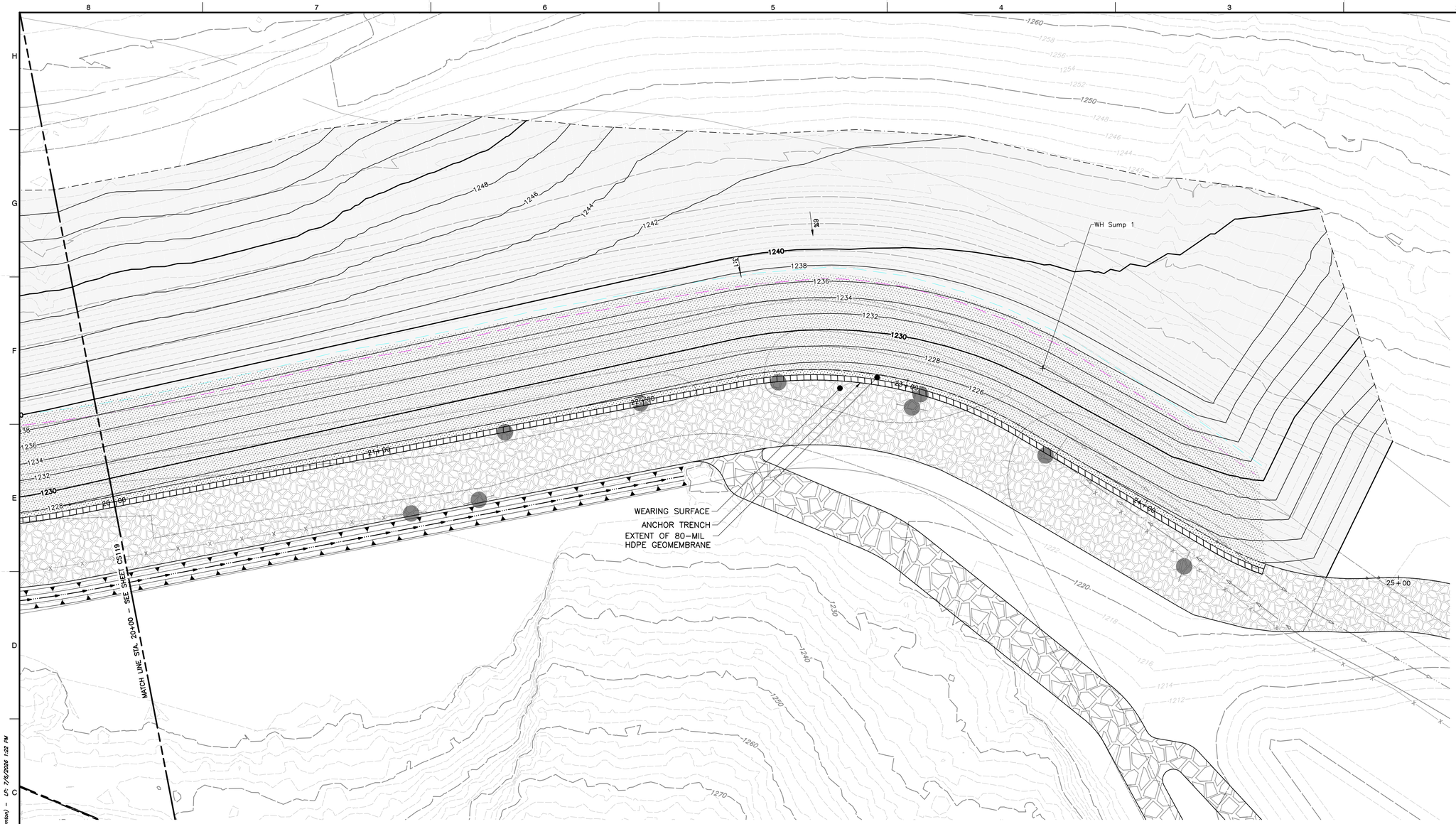
WASTE CONNECTIONS
WEST SLOPE MITIGATION
CHIQUITA CANYON LANDFILL
29201 HENRY MAYO DR
CASTAIC, CALIFORNIA 91384

UPPER BUTTRESS PLAN
STA. 15+00 TO 20+00

DATE:	JULY 2026
DWG SCALE:	1"=20'
PROJECT NO:	350-750
DRAWN BY:	JAT
CHECKED BY:	CJM
APPROVED BY:	RVH

DRAWING NO.:
C119
SHEET ---- OF ----

P:\350-2001\350-750\1-CAD\Dwg\CIVIL\350750-CIVIL-UPPER BUTTRESS-PLANS.dwg[PLAN 4] LS(6/24/2026 - Johnston) - LP 7/8/2026 1:22 PM



UPPER BUTTRESS - STA. 20+00 TO 25+00 PLAN

SCALE: 1" = 20'

NOTES:

1. XXX

REFERENCE

1. EXISTING PLANIMETRICS PREPARED BY TETRA TECH, DATED JANUARY 16, 2025.
2. EXISTING TOPOGRAPHY PROVIDED BY WASTE CONNECTIONS INC., DATED MARCH 11, 2026

SCALE IN FEET
0 20 40

DRAFT

SUBMITTAL RECORD

NO	DATE	DESCRIPTION
2	06/24/2026	FOR PRELIMINARY USE

ENGINEERING, SURVEYING AND LANDSCAPE ARCHITECTURE IN THE STATE OF NORTH CAROLINA WILL BE PROVIDED BY CEC SURVEYING AND LANDSCAPE ARCHITECTS OF NC, PLLC. LANDSCAPE ARCHITECTURE SHALL BE PERFORMED BY CEC LANDSCAPE ARCHITECTS, PLLC. ENGINEERING SERVICES INCLUDE PROJECTS BY CEC ENGINEERS & REVIEWED BY CEC LANDSCAPE ARCHITECTS, PLLC. SURVEYING IN THE STATE OF NORTH CAROLINA SHALL BE PERFORMED BY CEC LANDSCAPE ARCHITECTS, LLC.

2356 Gold Meadow Way
Suite 120
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Ph: 916.503.0050
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Civil & Environmental Consultants, Inc.

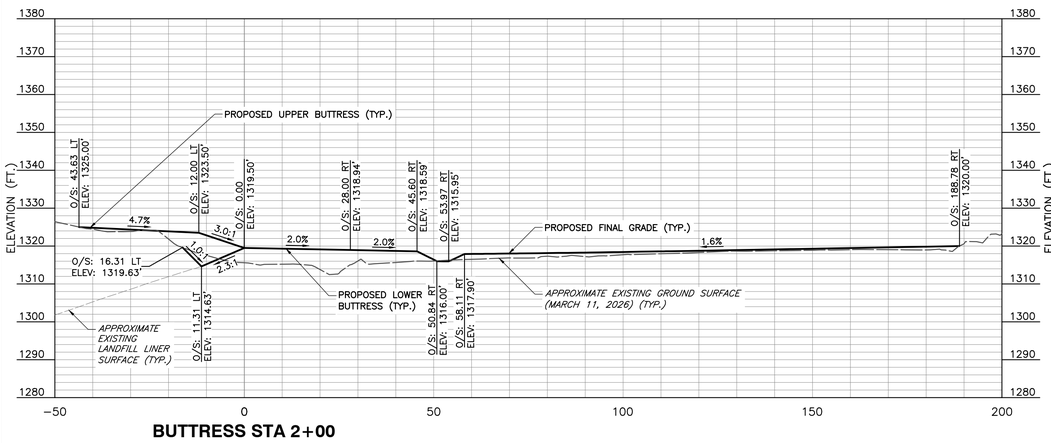
WASTE CONNECTIONS
WEST SLOPE MITIGATION
CHIQUITA CANYON LANDFILL
29201 HENRY MAYO DR
CASTAIC, CALIFORNIA 91384

UPPER BUTTRESS PLAN
STA. 20+00 TO 25+00

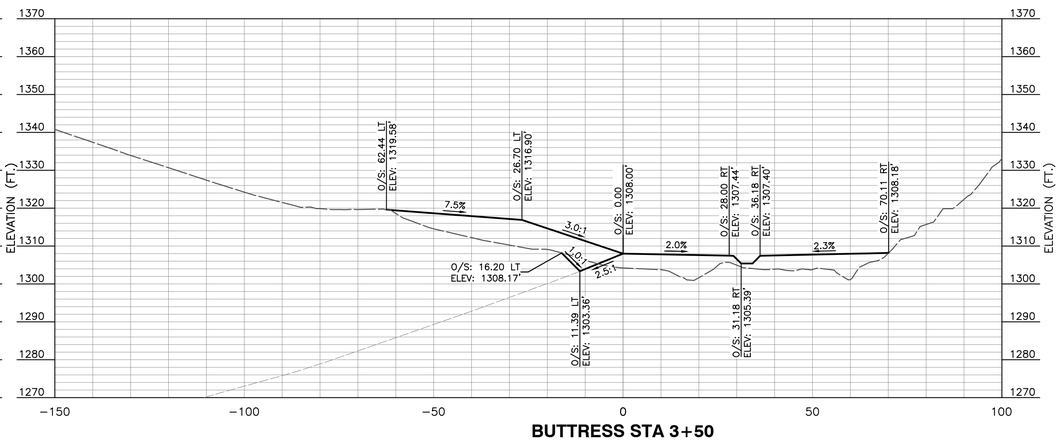
DATE:	JULY 2026
DWG SCALE:	1"=20'
PROJECT NO:	350-750
DRAWN BY:	JAT
CHECKED BY:	CJM
APPROVED BY:	RVH

DRAWING NO.:
C120
SHEET ---- OF ----

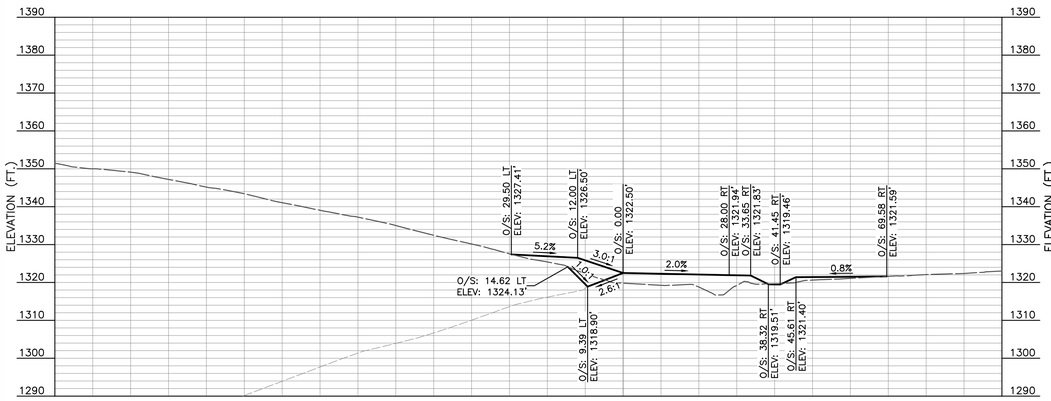
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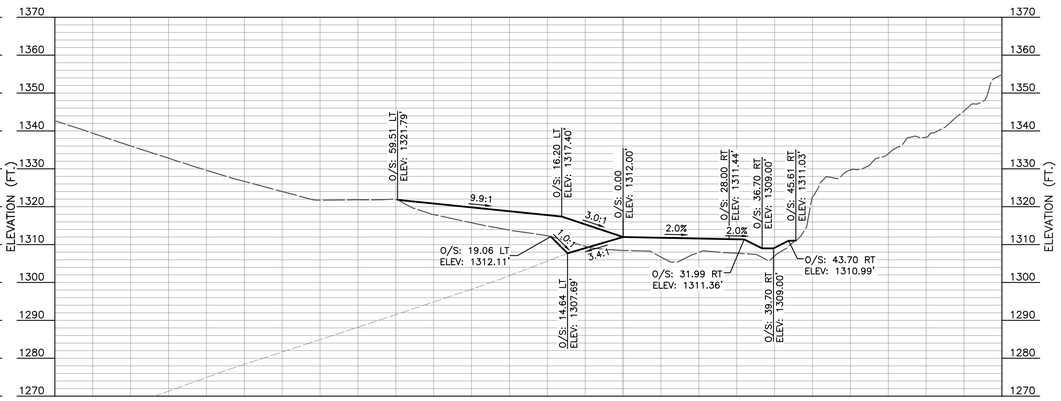
BUTTRESS STA 2+00



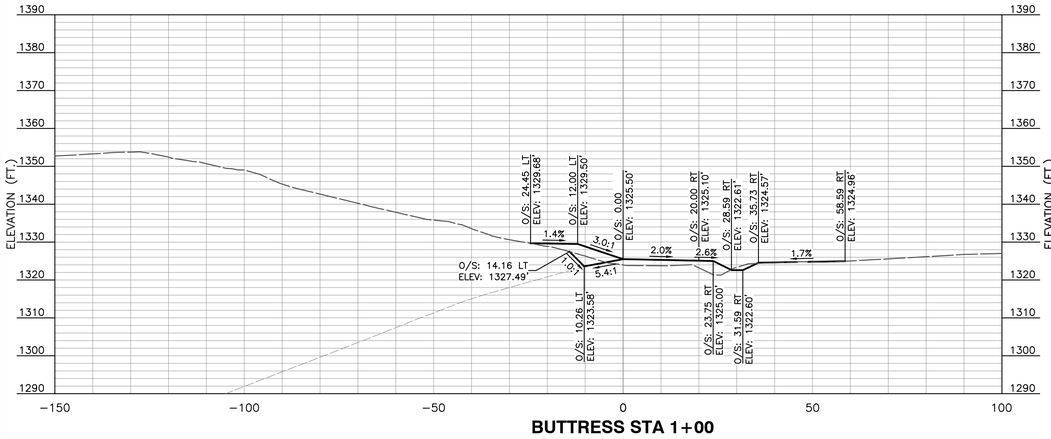
BUTTRESS STA 3+50



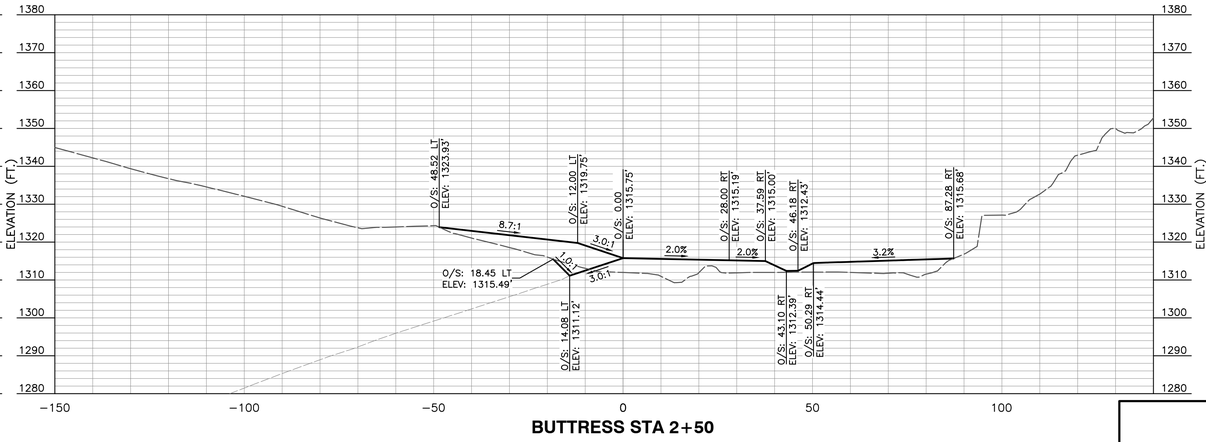
BUTTRESS STA 1+50



BUTTRESS STA 3+00



BUTTRESS STA 1+00



BUTTRESS STA 2+50

REFERENCE

1. EXISTING PLANIMETRICS PREPARED BY TETRA TECH, DATED JANUARY 16, 2025.
2. EXISTING TOPOGRAPHY PROVIDED BY WASTE CONNECTIONS INC., DATED MARCH 11, 2026

HORIZONTAL SCALE IN FEET
0 20 40

VERTICAL SCALE IN FEET
0 20 40

DRAFT

SUBMITTAL RECORD		
NO	DATE	DESCRIPTION
2	06/24/2026	FOR PRELIMINARY USE

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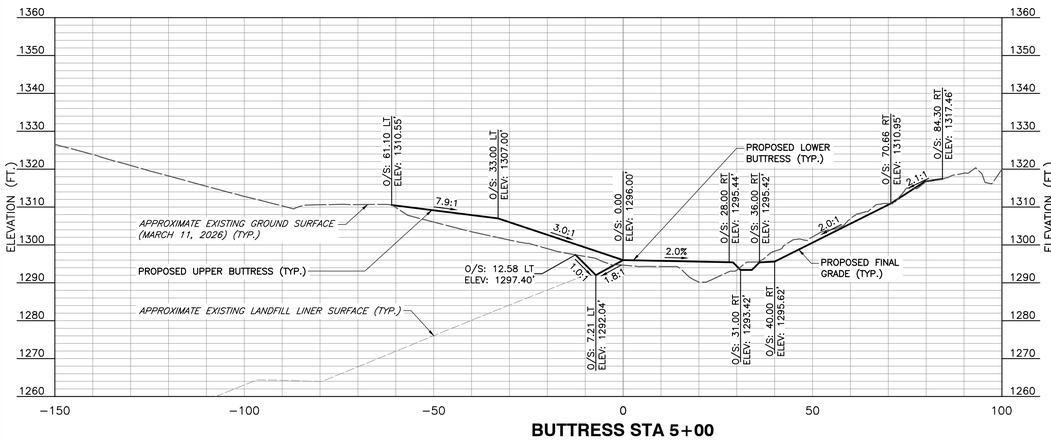
WASTE CONNECTIONS
WEST SLOPE MITIGATION
CHIQUITA CANYON LANDFILL
29201 HENRY MAYO DR
CASTAIC, CALIFORNIA 91384

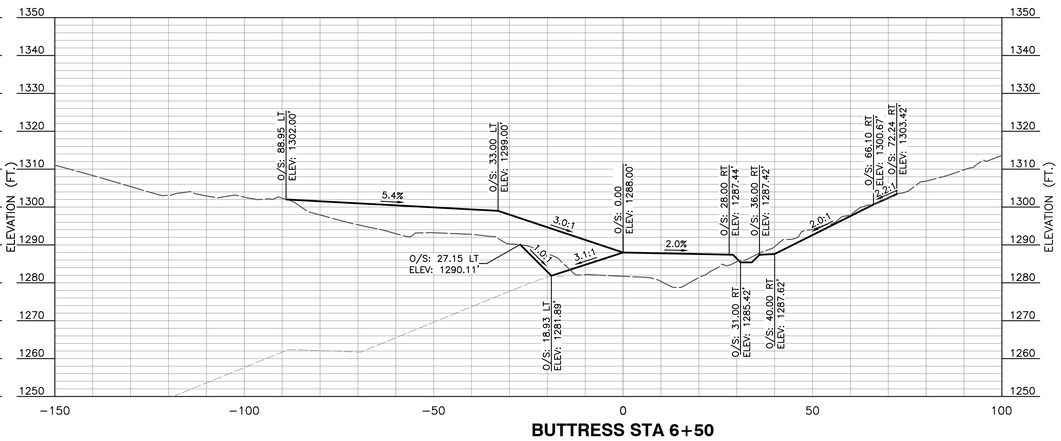
BUTTRESS CROSS SECTIONS
STA. 1+00 TO STA. 3+50

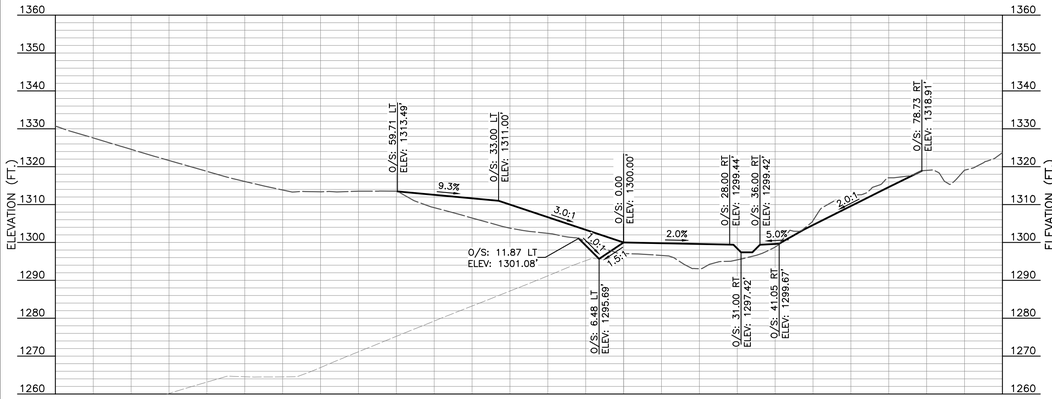
DRAWN BY:	JAT
CHECKED BY:	CJM
DATE:	JULY 2026
DWG SCALE:	H: 1"=20'; V: 1"=20'
PROJECT NO:	350-750
APPROVED BY:	RVH

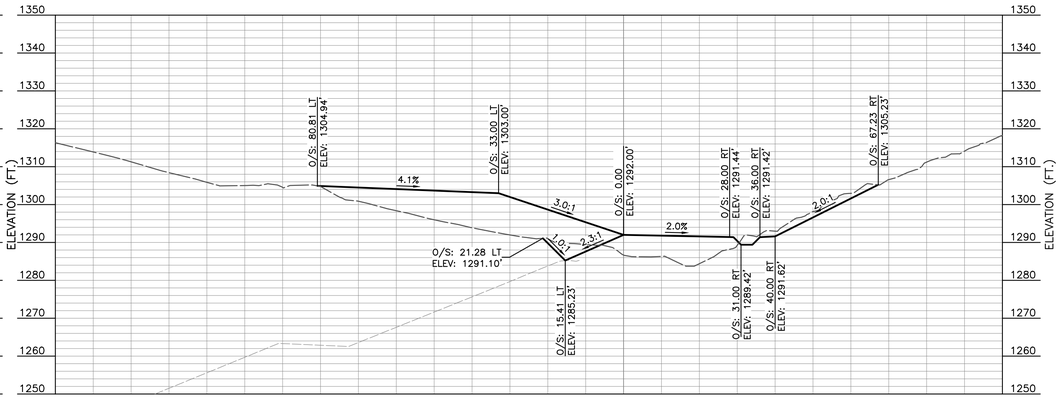
DRAWING NO.:
C300
SHEET ---- OF ----

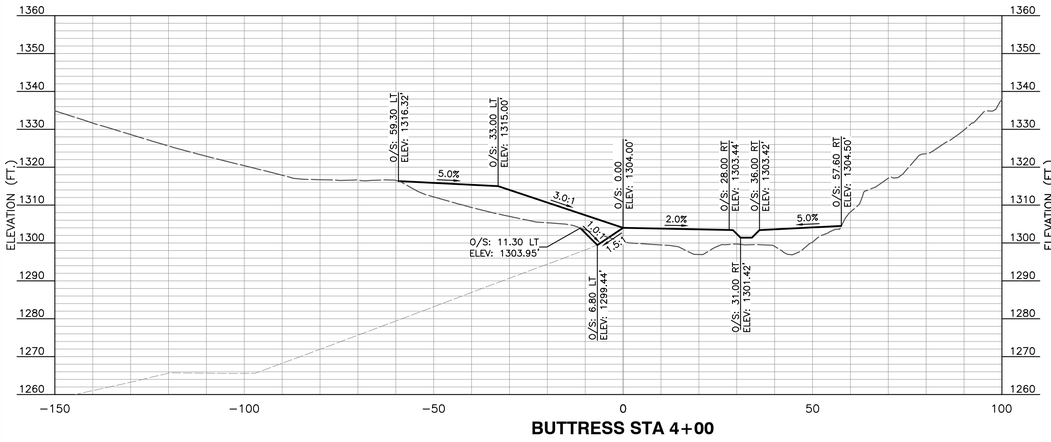
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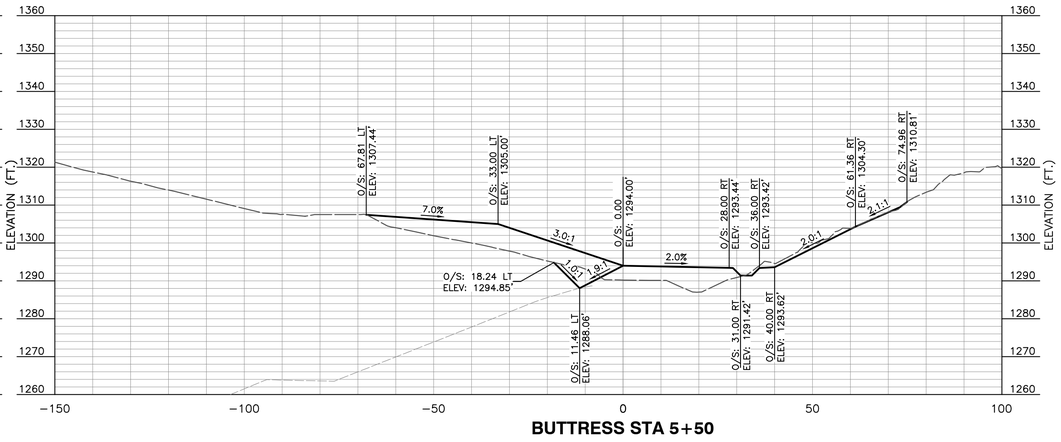












REFERENCE

1. EXISTING PLANIMETRICS PREPARED BY TETRA TECH, DATED JANUARY 16, 2025.
2. EXISTING TOPOGRAPHY PROVIDED BY WASTE CONNECTIONS INC., DATED MARCH 11, 2026

HORIZONTAL SCALE IN FEET
0 20 40

VERTICAL SCALE IN FEET
0 20 40

DRAFT

SUBMITTAL RECORD

NO	DATE	DESCRIPTION
2	06/24/2026	FOR PRELIMINARY USE

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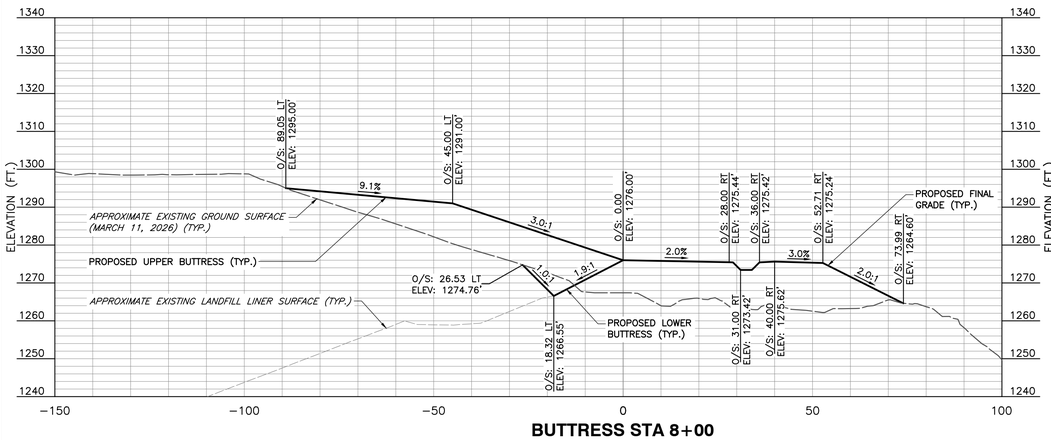
WASTE CONNECTIONS
WEST SLOPE MITIGATION
CHIQUITA CANYON LANDFILL
29201 HENRY MAYO DR
CASTAIC, CALIFORNIA 91384

BUTTRESS CROSS SECTIONS
STA. 4+00 TO STA. 6+50

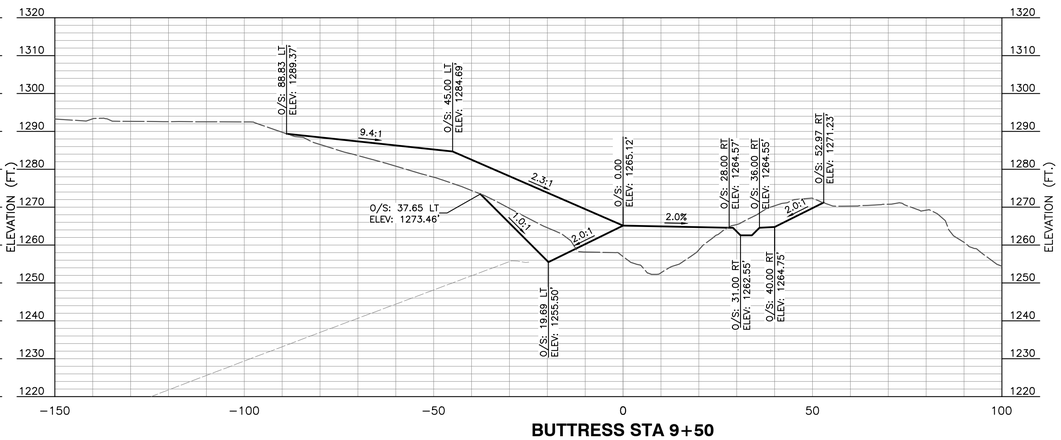
DRAWN BY:	JAT
CHECKED BY:	CJM
DATE:	JULY 2026
DWG SCALE:	H: 1"=20'; V: 1"=20'
PROJECT NO:	350-750
APPROVED BY:	RVH

DRAWING NO.:
C301
SHEET ---- OF ----

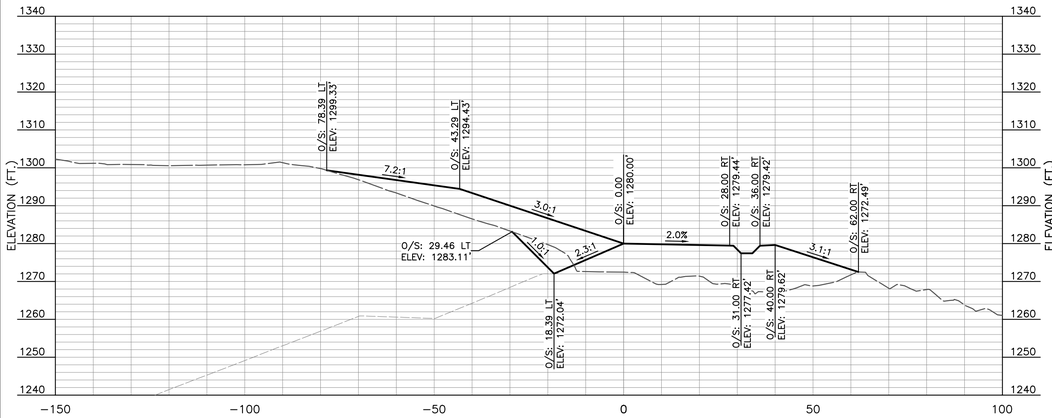
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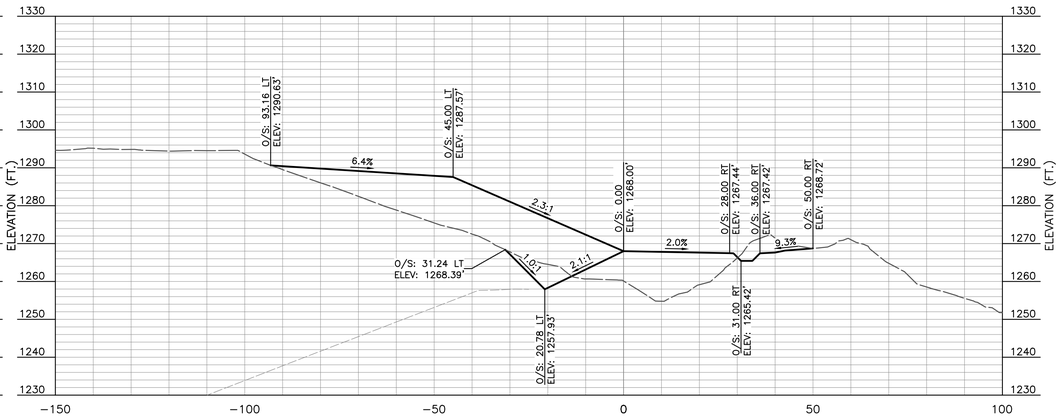
BUTTRESS STA 8+00



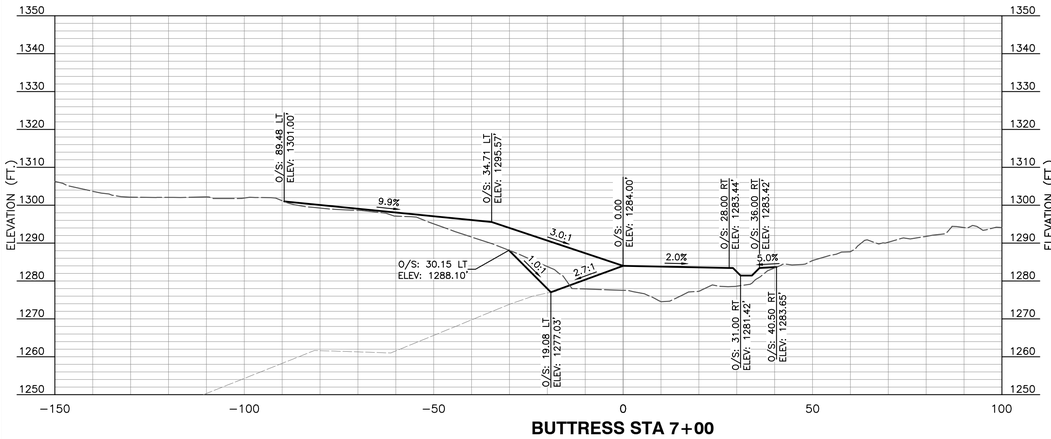
BUTTRESS STA 9+50



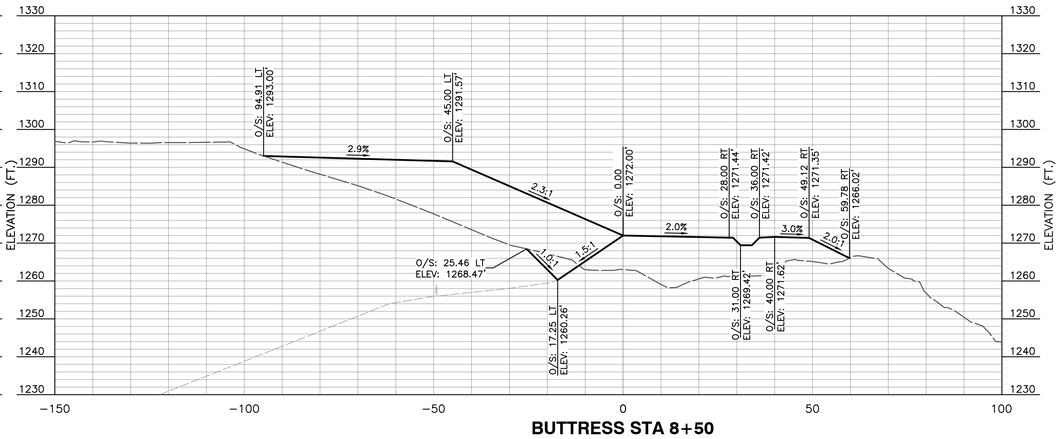
BUTTRESS STA 7+50



BUTTRESS STA 9+00



BUTTRESS STA 7+00



BUTTRESS STA 8+50

REFERENCE

1. EXISTING PLANIMETRICS PREPARED BY TETRA TECH, DATED JANUARY 16, 2025.
2. EXISTING TOPOGRAPHY PROVIDED BY WASTE CONNECTIONS INC., DATED MARCH 11, 2026

HORIZONTAL SCALE IN FEET
0 20 40

VERTICAL SCALE IN FEET
0 20 40

DRAFT

SUBMITTAL RECORD

NO	DATE	DESCRIPTION
2	06/24/2026	FOR PRELIMINARY USE

ENGINEERING, SURVEYING AND LANDSCAPE ARCHITECTURE IN THE STATE OF NORTH CAROLINA WILL BE PROVIDED BY CEC SURVEYING AND LANDSCAPE ARCHITECTS OF NC, PLLC. LANDSCAPE ARCHITECTURE SERVICES IN THE STATE OF CALIFORNIA WILL BE PROVIDED BY CEC LANDSCAPE ARCHITECTS, LLC.

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Ph: 916.503.0050
www.cecinc.com

Civil & Environmental Consultants, Inc.

WASTE CONNECTIONS
WEST SLOPE MITIGATION
CHIQUITA CANYON LANDFILL
29201 HENRY MAYO DR
CASTAIC, CALIFORNIA 91384

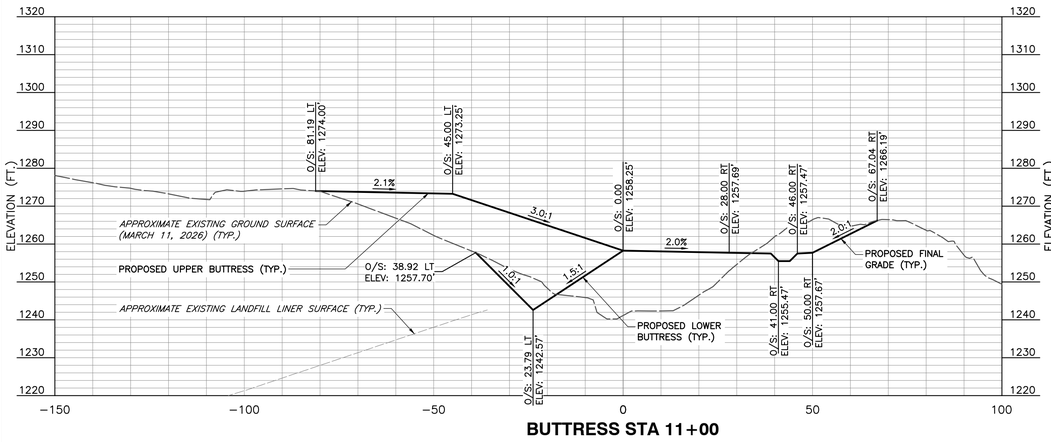
BUTTRESS CROSS SECTIONS
STA. 7+00 TO STA. 9+50

DATE:	JULY 2025	DRAWN BY:	JAT
DWG SCALE:	H: 1"=20', V: 1"=20'	CHECKED BY:	CJM
PROJECT NO:			350-750
APPROVED BY:			RVH

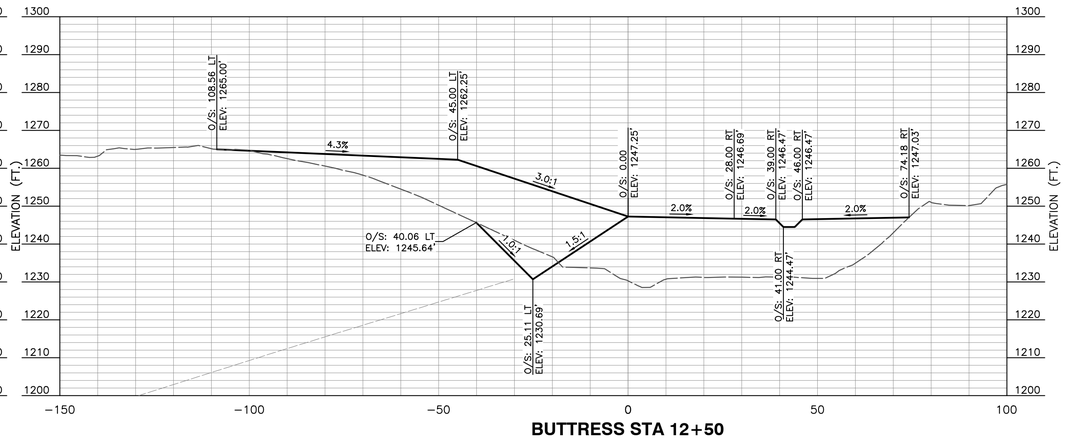
DRAWING NO.: **C302**

SHEET ---- OF ----

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BUTTRESS STA 11+00



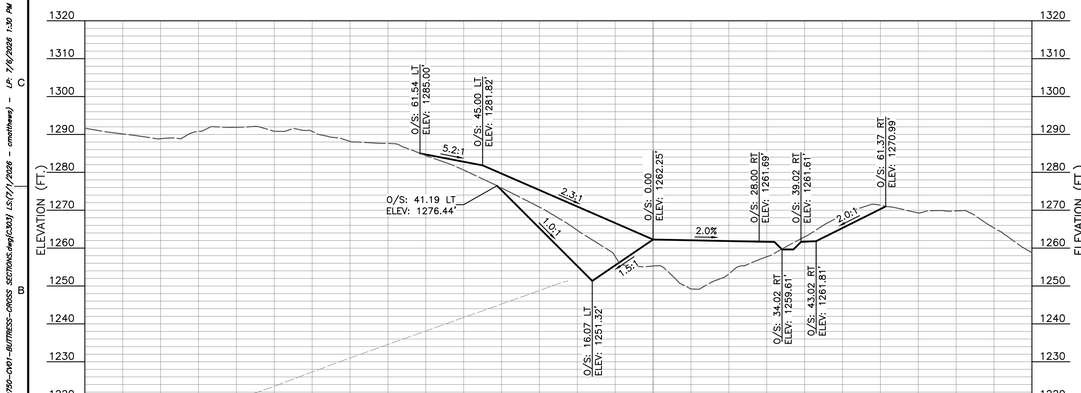
BUTTRESS STA 12+50



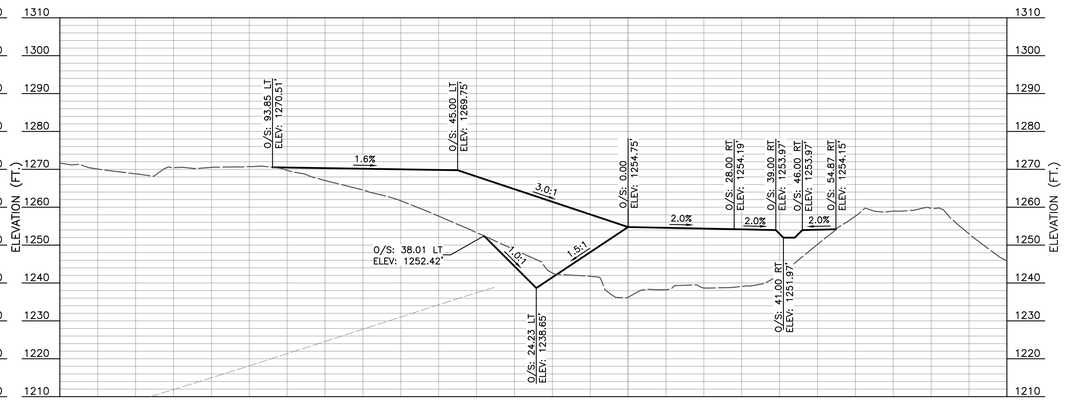
BUTTRESS STA 10+50



BUTTRESS STA 12+00



BUTTRESS STA 10+00



BUTTRESS STA 11+50

REFERENCE

1. EXISTING PLANIMETRICS PREPARED BY TETRA TECH, DATED JANUARY 16, 2025.
2. EXISTING TOPOGRAPHY PROVIDED BY WASTE CONNECTIONS INC., DATED MARCH 11, 2026

HORIZONTAL SCALE IN FEET
0 20 40

VERTICAL SCALE IN FEET
0 20 40

DRAFT

SUBMITTAL RECORD

NO	DATE	DESCRIPTION
2	06/24/2026	FOR PRELIMINARY USE

ENGINEERING, SURVEYING AND LANDSCAPE ARCHITECTURE IN THE STATE OF NORTH CAROLINA WILL BE PROVIDED BY CEC SURVEYING AND LANDSCAPE ARCHITECTS OF NC, PLLC. ENGINEERING, SURVEYING AND LANDSCAPE ARCHITECTURE SERVICES IN THE STATE OF CALIFORNIA WILL BE PROVIDED BY CEC LANDSCAPE ARCHITECTS, LLC.

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Suite 120
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Civil & Environmental Consultants, Inc.

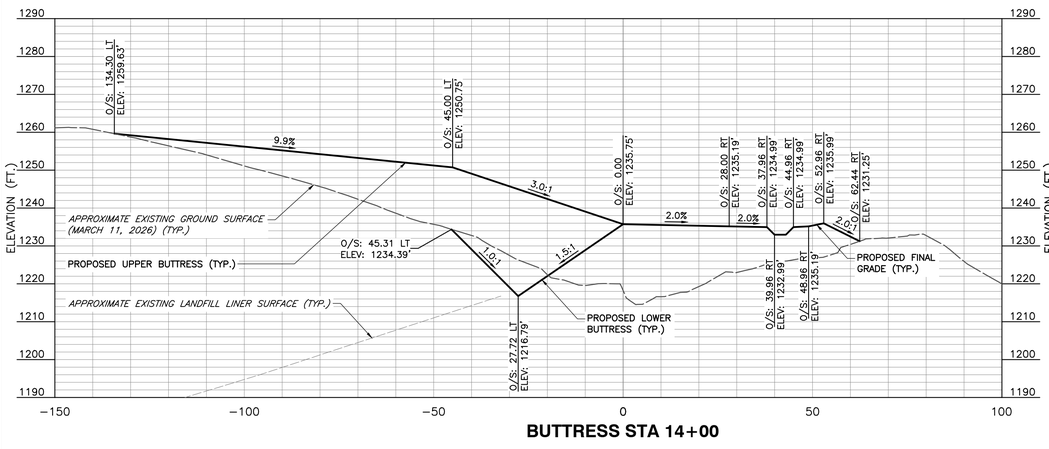
WASTE CONNECTIONS
WEST SLOPE MITIGATION
CHIQUITA CANYON LANDFILL
29201 HENRY MAYO DR
CASTAIC, CALIFORNIA 91384

BUTTRESS CROSS SECTIONS
STA. 10+00 TO STA. 12+50

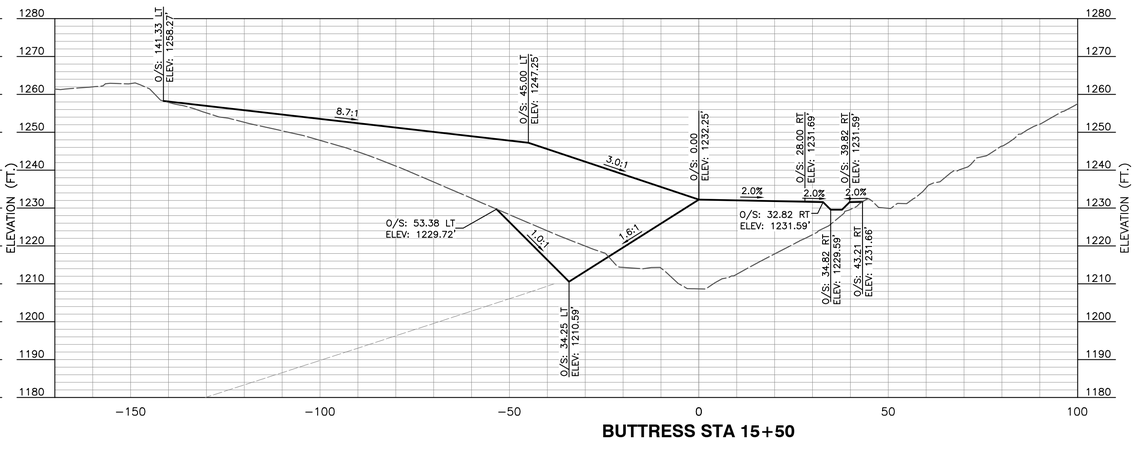
DATE:	JULY 2026
DWG SCALE:	H: 1"=20'; V: 1"=20'
PROJECT NO:	350-750
DRAWN BY:	JAT
CHECKED BY:	CJM
APPROVED BY:	RVH

DRAWING NO.: **C303**
SHEET ---- OF ----

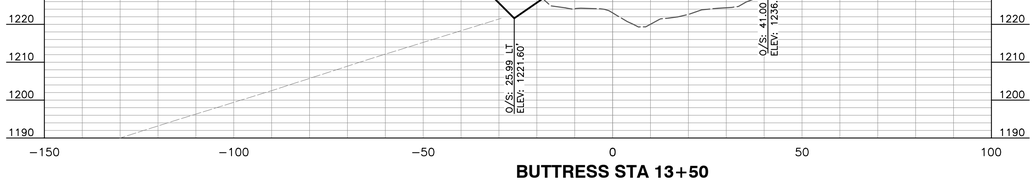
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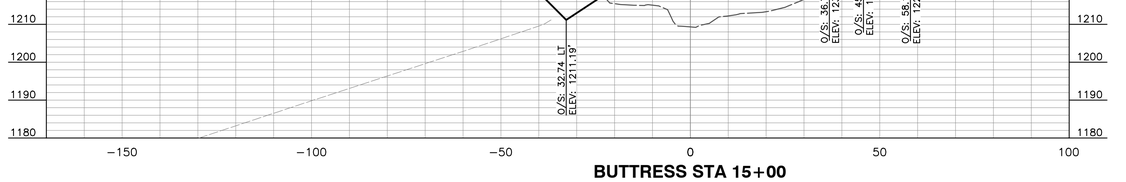
BUTTRESS STA 14+00



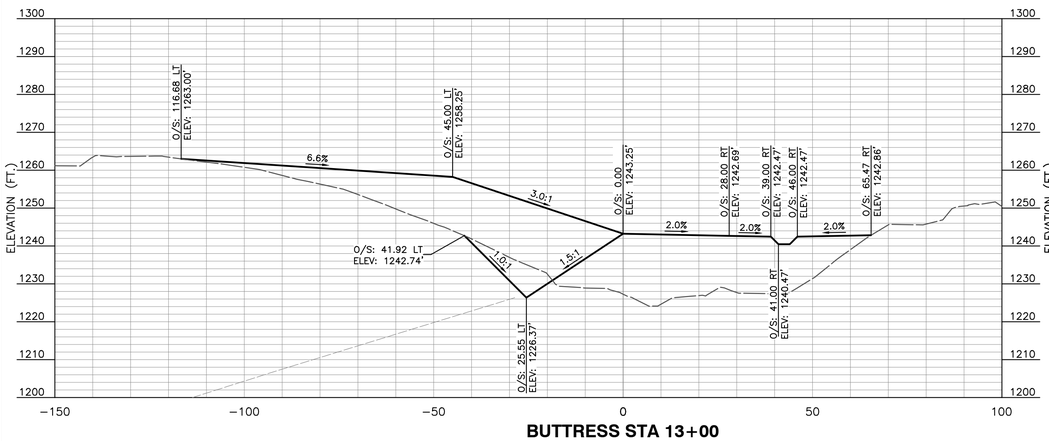
BUTTRESS STA 15+50



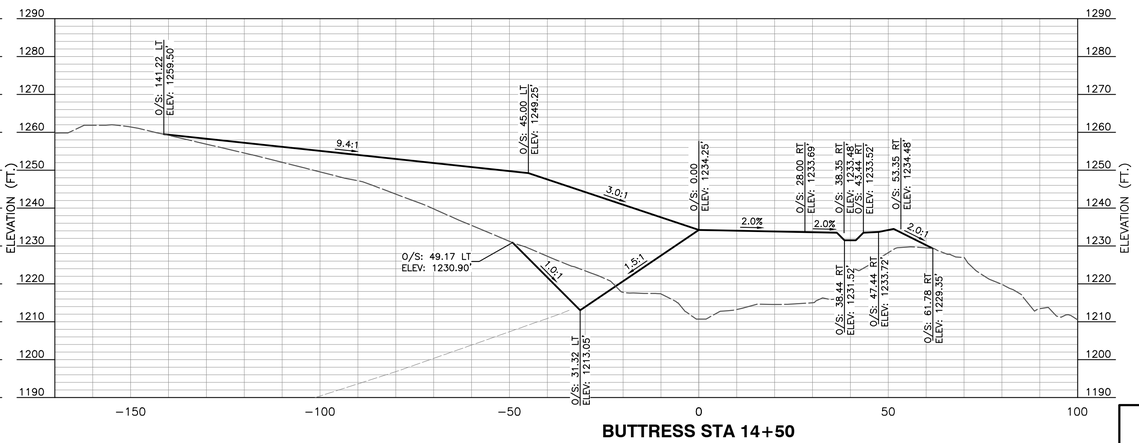
BUTTRESS STA 13+50



BUTTRESS STA 15+00



BUTTRESS STA 13+00



BUTTRESS STA 14+50

REFERENCE

1. EXISTING PLANIMETRICS PREPARED BY TETRA TECH, DATED JANUARY 16, 2025.
2. EXISTING TOPOGRAPHY PROVIDED BY WASTE CONNECTIONS INC., DATED MARCH 11, 2026

HORIZONTAL SCALE IN FEET
0 20 40

VERTICAL SCALE IN FEET
0 20 40

DRAFT

SUBMITTAL RECORD

NO	DATE	DESCRIPTION
2	06/24/2026	FOR PRELIMINARY USE

ENGINEERING, SURVEYING AND LANDSCAPE ARCHITECTURE IN THE STATE OF NORTH CAROLINA WILL BE PROVIDED BY CEC SURVEYING AND LANDSCAPE ARCHITECTS OF NC, PLLC. LANDSCAPE ARCHITECTURE SERVICES IN THE STATE OF CALIFORNIA WILL BE PROVIDED BY CEC LANDSCAPE ARCHITECTS, LLC.

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Civil & Environmental Consultants, Inc.

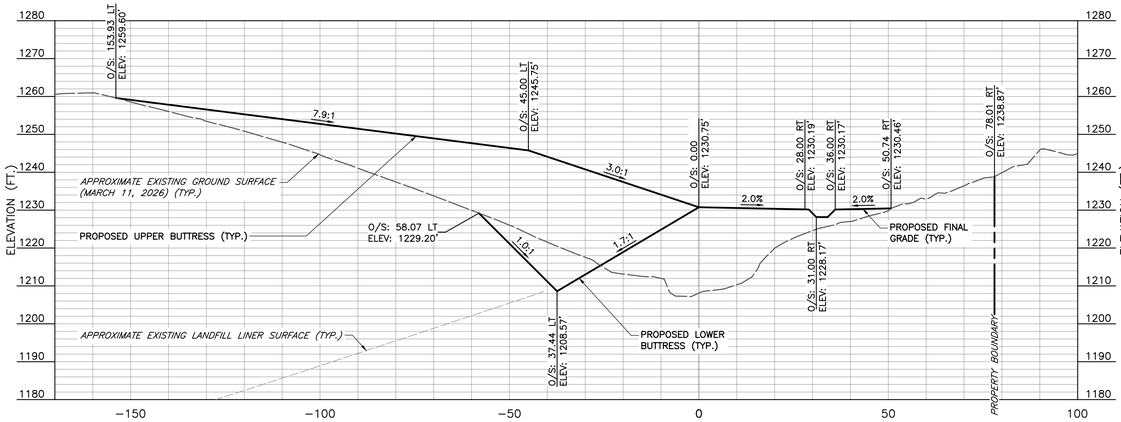
WASTE CONNECTIONS
WEST SLOPE MITIGATION
CHIQUITA CANYON LANDFILL
29201 HENRY MAYO DR
CASTAIC, CALIFORNIA 91384

BUTTRESS CROSS SECTIONS
STA. 13+00 TO STA. 15+50

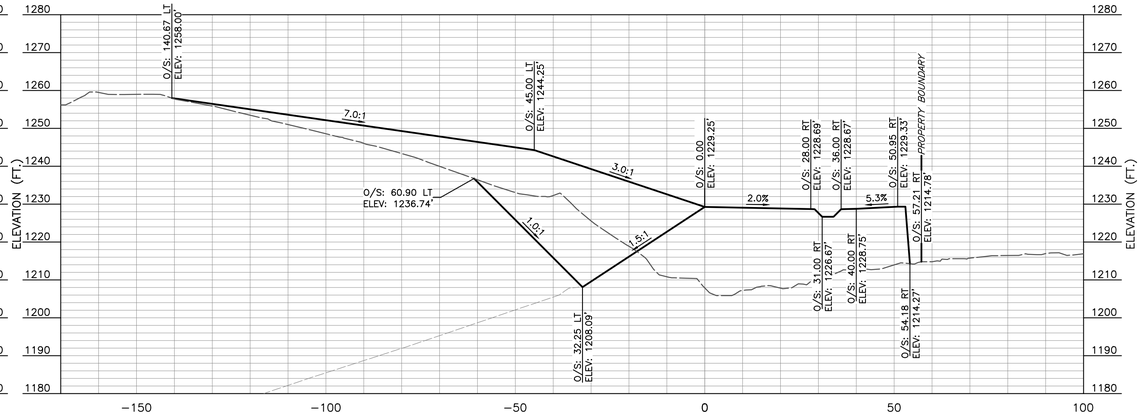
DATE:	JULY 2026	DRAWN BY:	JAT
DWG SCALE:	H: 1"=20', V: 1"=20'	CHECKED BY:	CJM
PROJECT NO:			350-750
APPROVED BY:			RVH

DRAWING NO.:
C304
SHEET ---- OF ----

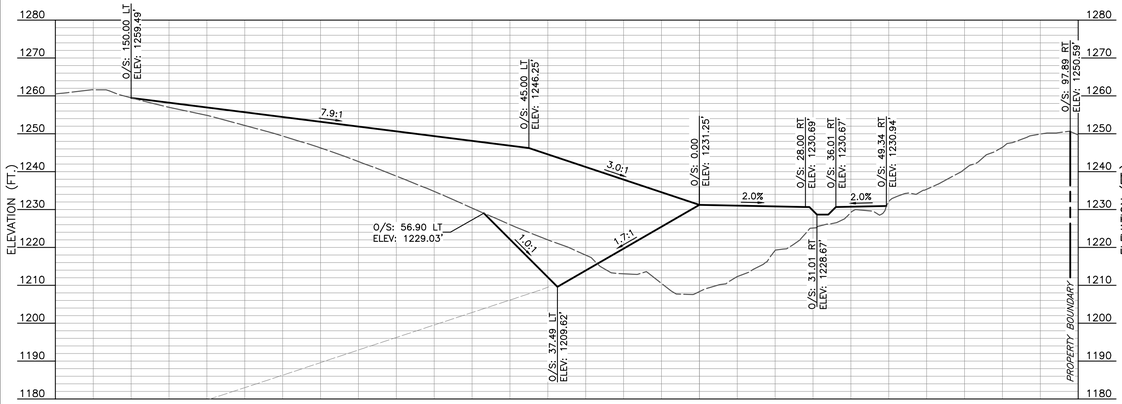
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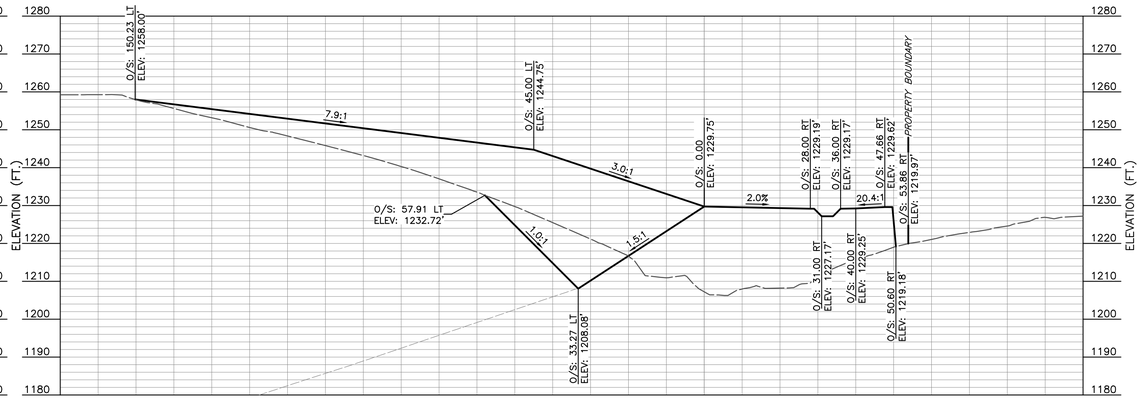
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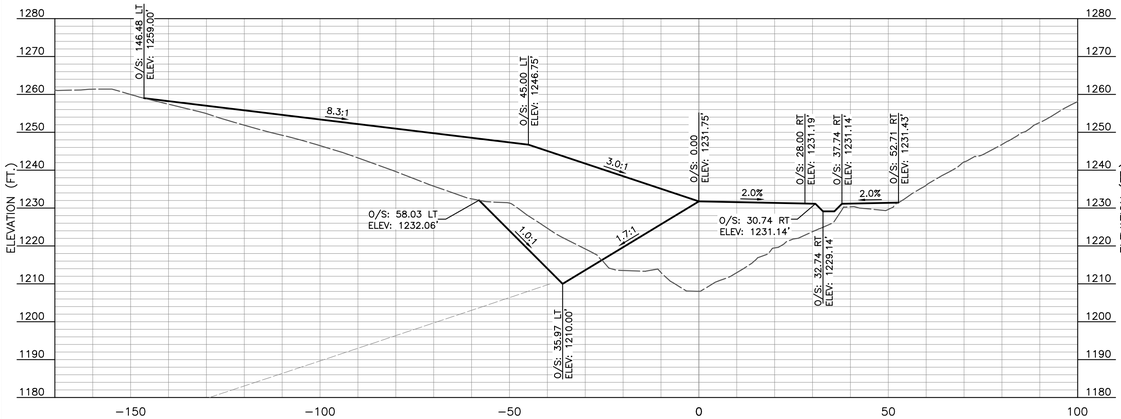
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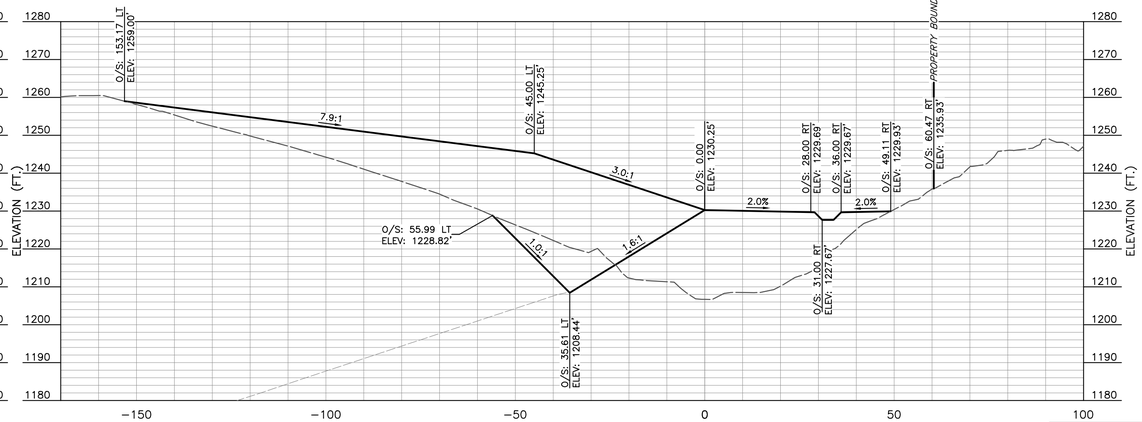
BUTTRESS STA 16+50



BUTTRESS STA 18+00



BUTTRESS STA 16+00



BUTTRESS STA 17+50

REFERENCE

1. EXISTING PLANIMETRICS PREPARED BY TETRA TECH, DATED JANUARY 16, 2025.
2. EXISTING TOPOGRAPHY PROVIDED BY WASTE CONNECTIONS INC., DATED MARCH 11, 2026

HORIZONTAL SCALE IN FEET
0 20 40

VERTICAL SCALE IN FEET
0 20 40

DRAFT

SUBMITTAL RECORD

NO	DATE	DESCRIPTION
2	06/24/2026	FOR PRELIMINARY USE

ENGINEERING, SURVEYING AND LANDSCAPE ARCHITECTURE IN THE STATE OF NORTH CAROLINA WILL BE PROVIDED BY CEC SURVEYING AND LANDSCAPE ARCHITECTS OF NC, PLLC. LANDSCAPE ARCHITECTURE SERVICES IN THE STATE OF CALIFORNIA WILL BE PROVIDED BY CEC LANDSCAPE ARCHITECTS, LLC.

2356 Gold Meadow Way
Suite 120
Gold River, CA 95670
Ph: 916.503.0050
www.cecinc.com

Civil & Environmental Consultants, Inc.

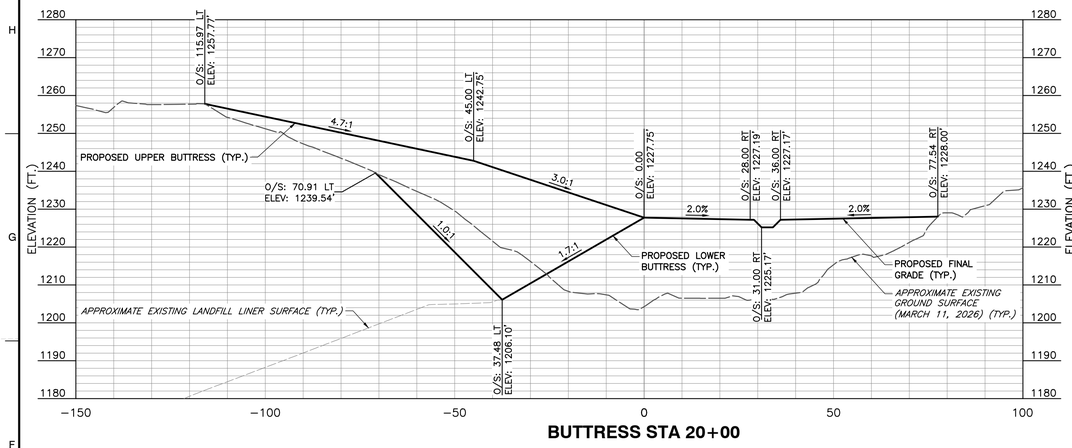
WASTE CONNECTIONS
WEST SLOPE MITIGATION
CHIQUITA CANYON LANDFILL
29201 HENRY MAYO DR
CASTAIC, CALIFORNIA 91384

BUTTRESS CROSS SECTIONS
STA. 16+00 TO STA. 28+50

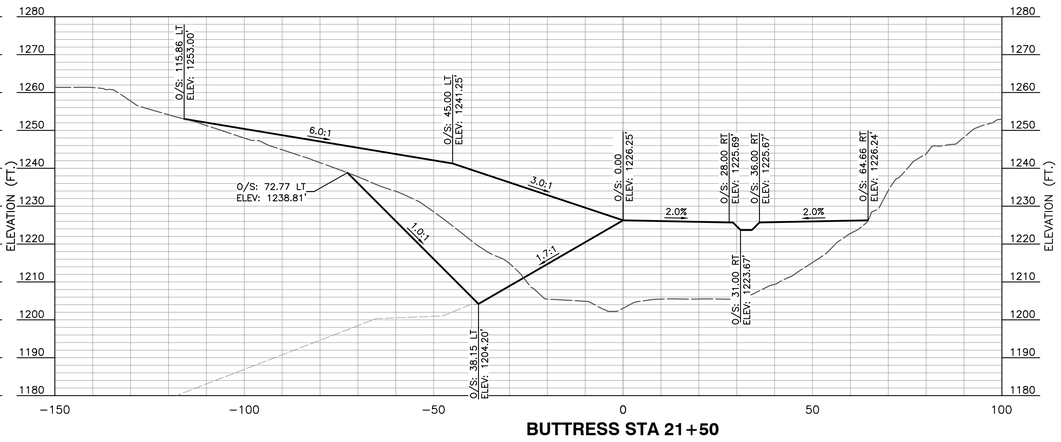
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CHECKED BY:	CJM
PROJECT NO:	350-750
APPROVED BY:	RVH
DATE:	JULY 2026
DWG SCALE:	H: 1"= 20', V: 1"= 20'

DRAWING NO.:
C305
SHEET ---- OF ----

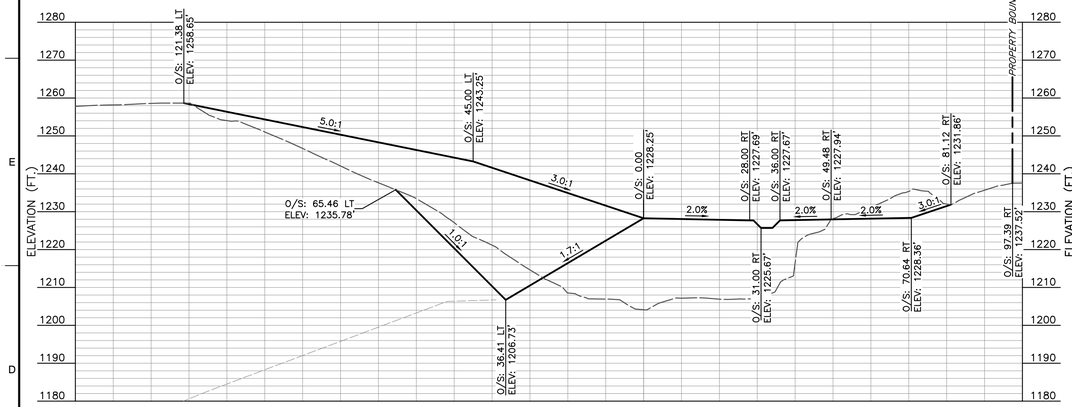
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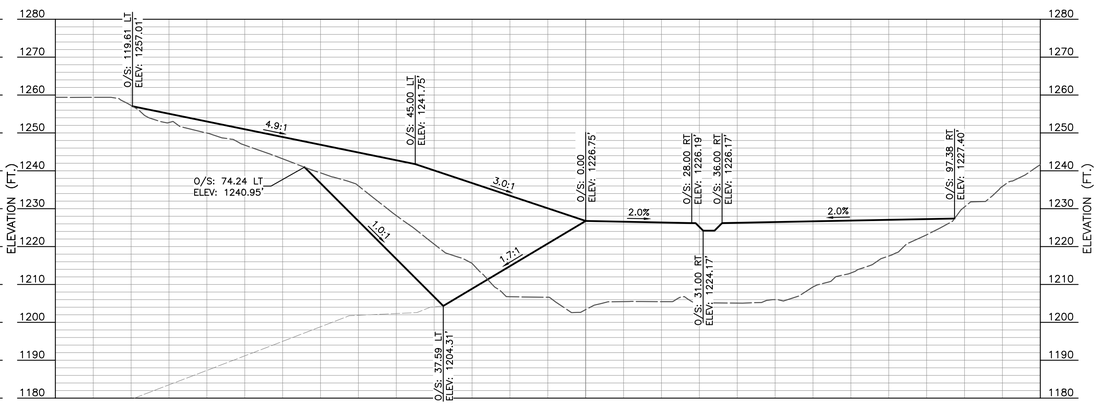
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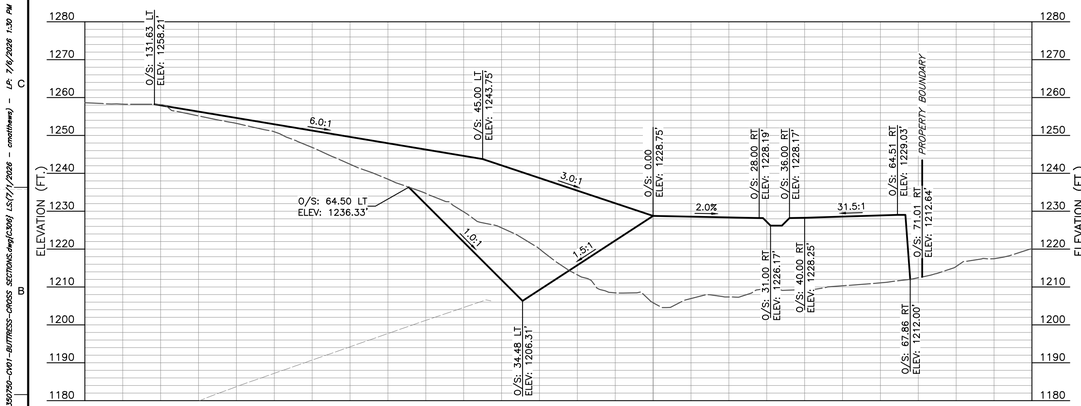
BUTTRESS STA 21+50



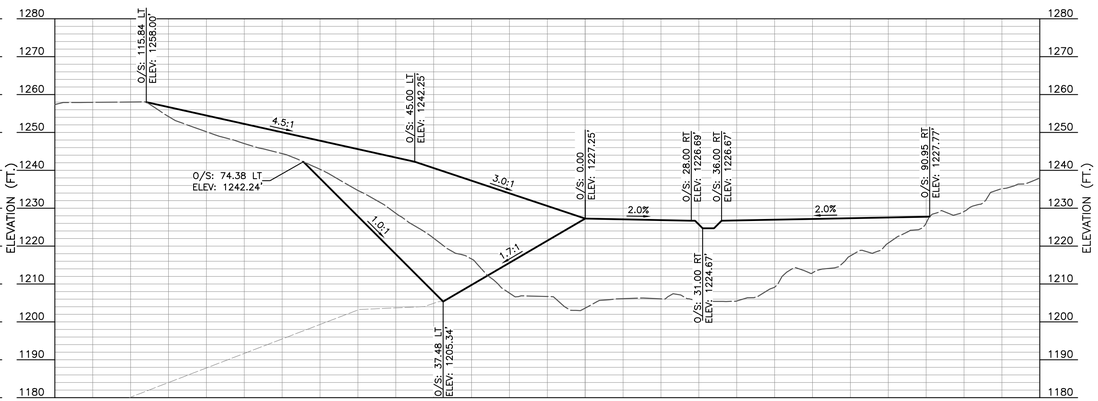
BUTTRESS STA 19+50



BUTTRESS STA 21+00



BUTTRESS STA 19+00



BUTTRESS STA 20+50

REFERENCE

1. EXISTING PLANIMETRICS PREPARED BY TETRA TECH, DATED JANUARY 16, 2025.
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HORIZONTAL SCALE IN FEET
0 20 40

VERTICAL SCALE IN FEET
0 20 40

DRAFT

SUBMITTAL RECORD		
NO	DATE	DESCRIPTION
2	06/24/2026	FOR PRELIMINARY USE

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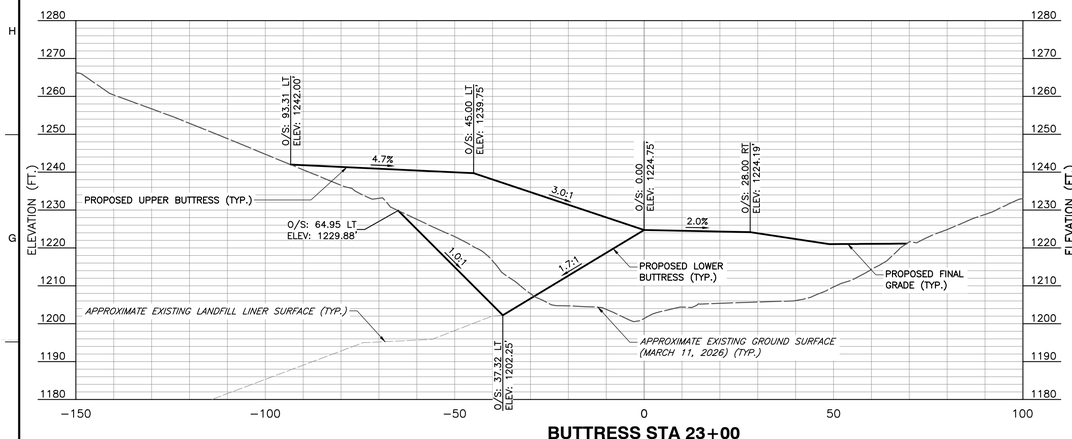
WASTE CONNECTIONS
WEST SLOPE MITIGATION
CHIQUITA CANYON LANDFILL
29201 HENRY MAYO DR
CASTAIC, CALIFORNIA 91384

BUTTRESS CROSS SECTIONS
STA. 19+00 TO STA. 21+50

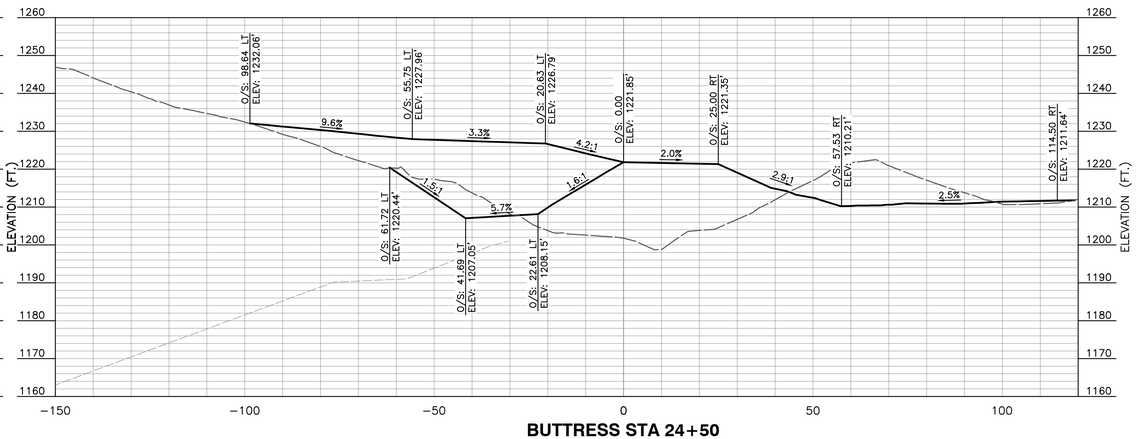
DATE:	JULY 2026	DRAWN BY:	JAT
DWG SCALE:	H: 1"=20'; V: 1"=20'	CHECKED BY:	CJM
PROJECT NO:			350-750
APPROVED BY:			RVH

DRAWING NO.: **C306**
SHEET ---- OF ----

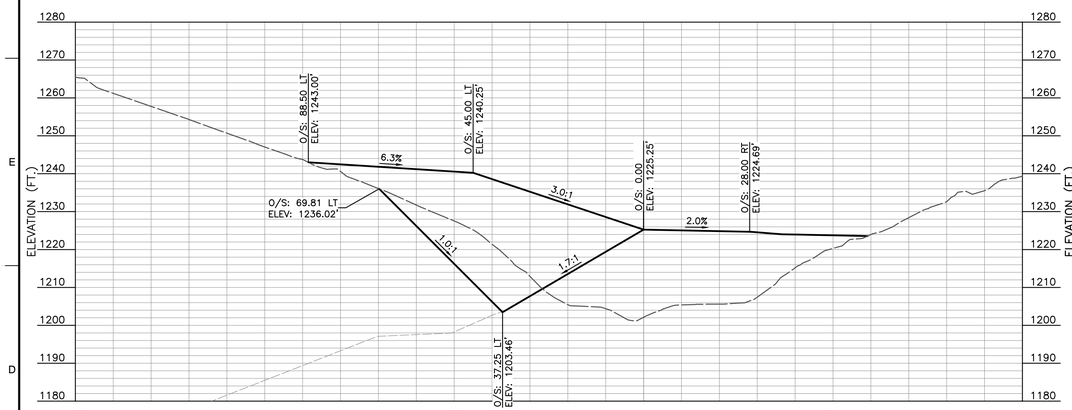
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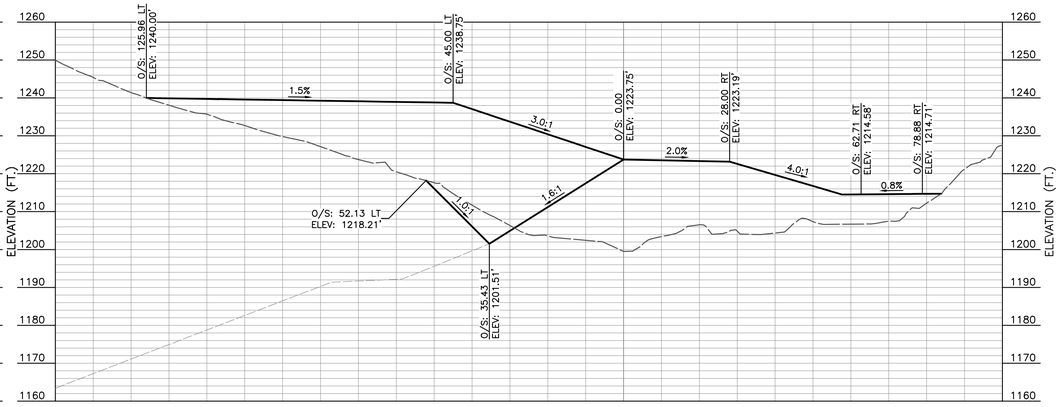
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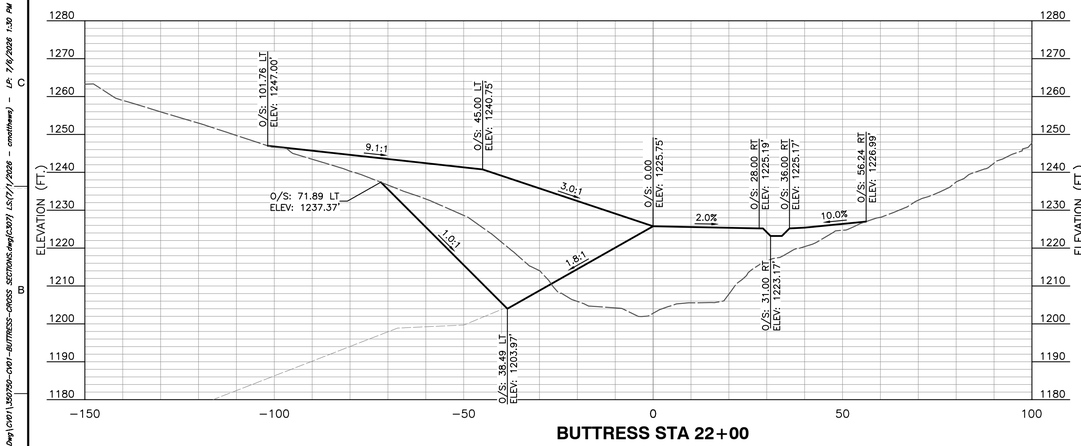
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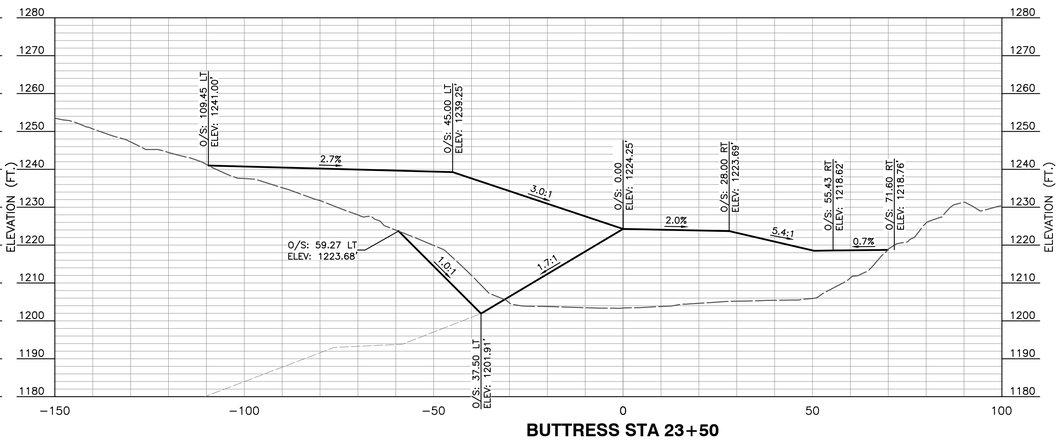
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BUTTRESS STA 24+00



BUTTRESS STA 22+00



BUTTRESS STA 23+50

REFERENCE

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HORIZONTAL SCALE IN FEET
0 20 40

VERTICAL SCALE IN FEET
0 20 40

DRAFT

SUBMITTAL RECORD

NO	DATE	DESCRIPTION
2	06/24/2026	FOR PRELIMINARY USE

ENGINEERING, SURVEYING AND LANDSCAPE ARCHITECTURE IN THE STATE OF NORTH CAROLINA WILL BE PROVIDED BY CEC SURVEYING AND LANDSCAPE ARCHITECTS OF NC, PLLC. LANDSCAPE ARCHITECTURE SERVICES IN THE STATE OF CALIFORNIA WILL BE PROVIDED BY CEC LANDSCAPE ARCHITECTS, LLC.

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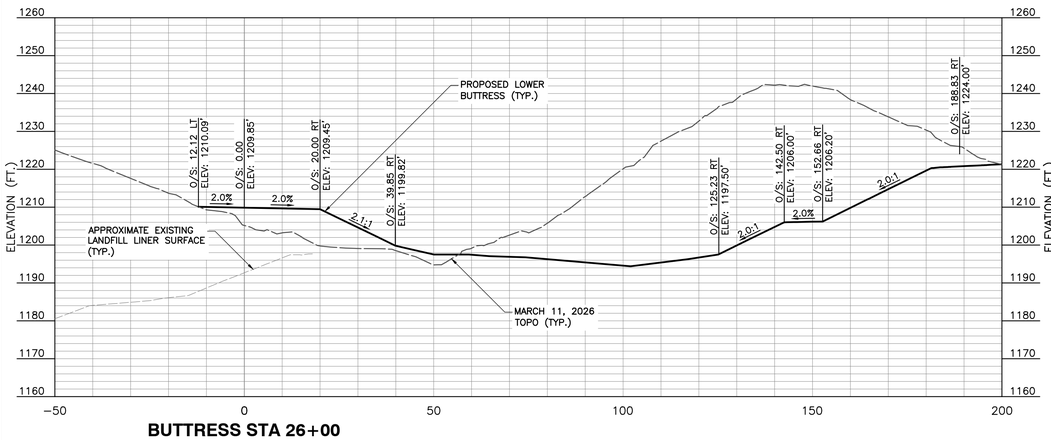
WASTE CONNECTIONS
WEST SLOPE MITIGATION
CHIQUITA CANYON LANDFILL
29201 HENRY MAYO DR
CASTAIC, CALIFORNIA 91384

BUTTRESS CROSS SECTIONS
STA. 22+00 TO STA. 24+50

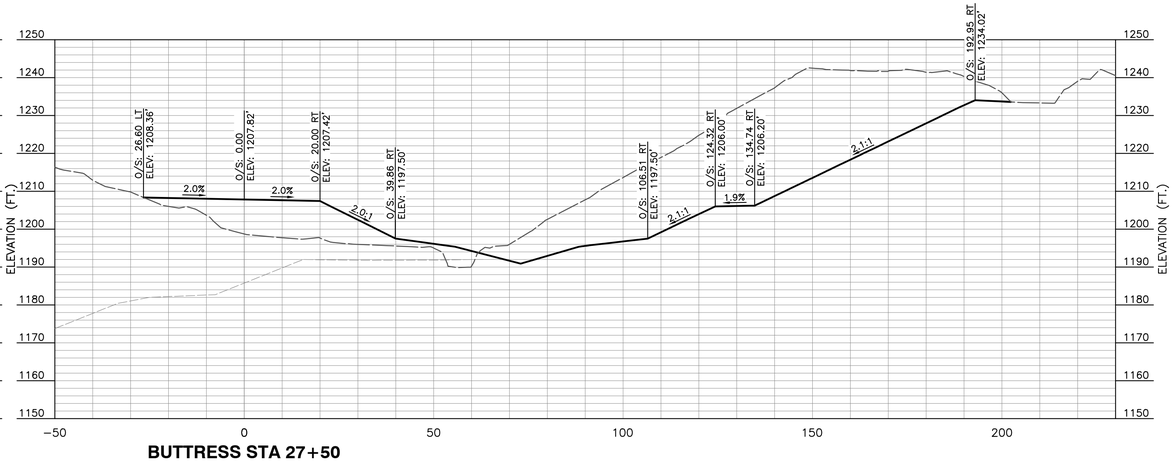
DRAWN BY:	JAT
CHECKED BY:	CJM
DATE:	JULY 2026
DWG SCALE:	H: 1"=20'; V: 1"=20'
PROJECT NO:	350-750
APPROVED BY:	RVH

DRAWING NO.:
C307
SHEET ---- OF ----

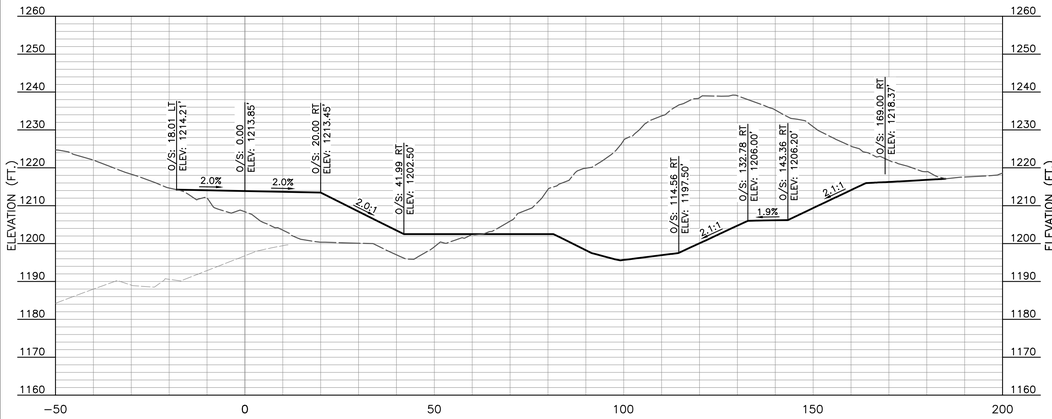
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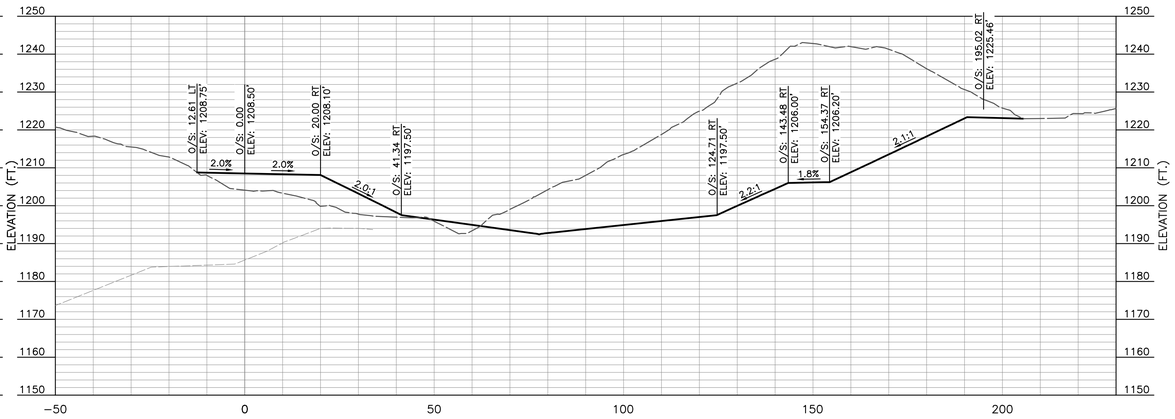
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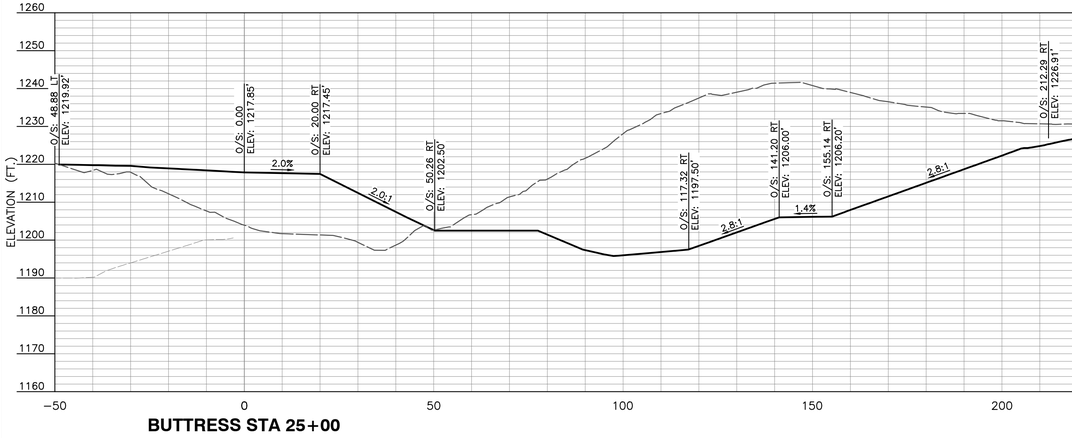
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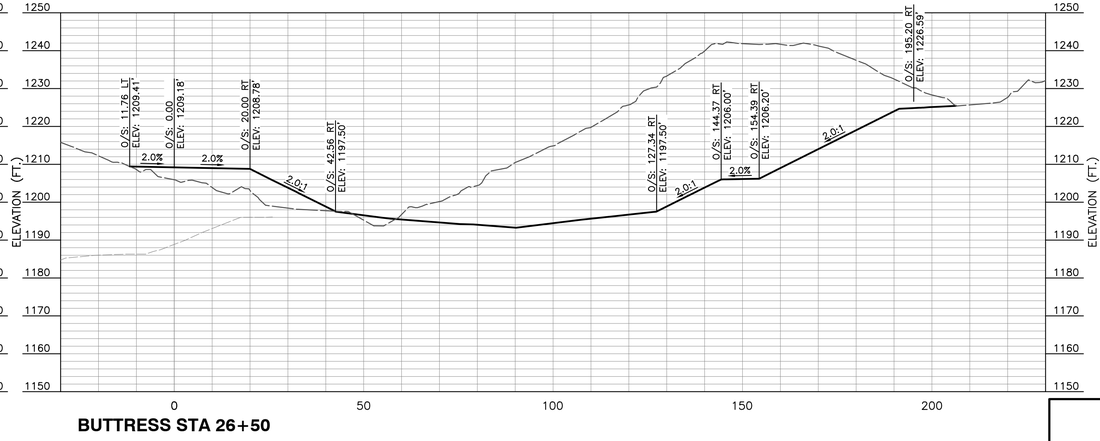
BUTTRESS STA 25+50



BUTTRESS STA 27+00



BUTTRESS STA 25+00



BUTTRESS STA 26+50

REFERENCE

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HORIZONTAL SCALE IN FEET
0 20 40

VERTICAL SCALE IN FEET
0 20 40

DRAFT

SUBMITTAL RECORD

NO	DATE	DESCRIPTION
2	06/24/2026	FOR PRELIMINARY USE

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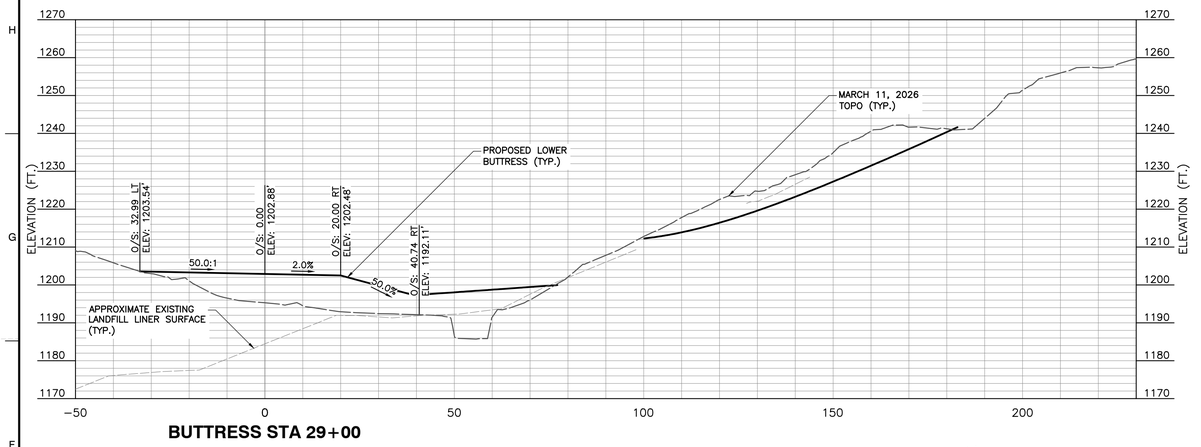
WASTE CONNECTIONS
WEST SLOPE MITIGATION
CHIQUITA CANYON LANDFILL
29201 HENRY MAYO DR
CASTAIC, CALIFORNIA 91384

BUTTRESS CROSS SECTIONS
STA. 25+00 TO STA. 27+50

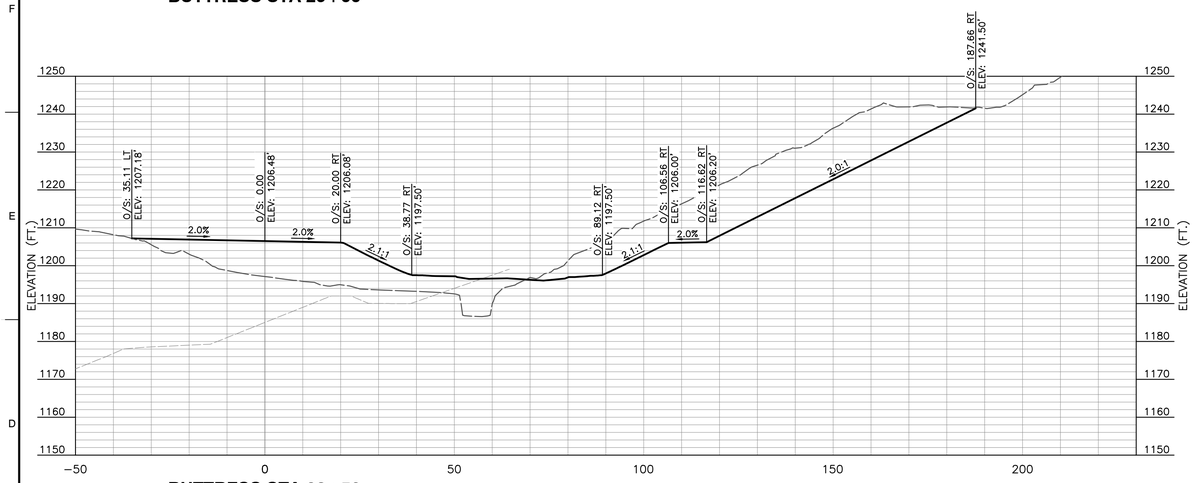
DRAWN BY:	JAT
CHECKED BY:	CJM
PROJECT NO:	350-750
APPROVED BY:	RVH
DATE:	JULY 2026
DWG SCALE:	H: 1"=20'; V: 1"=20'

DRAWING NO.:
C308
SHEET ---- OF ----

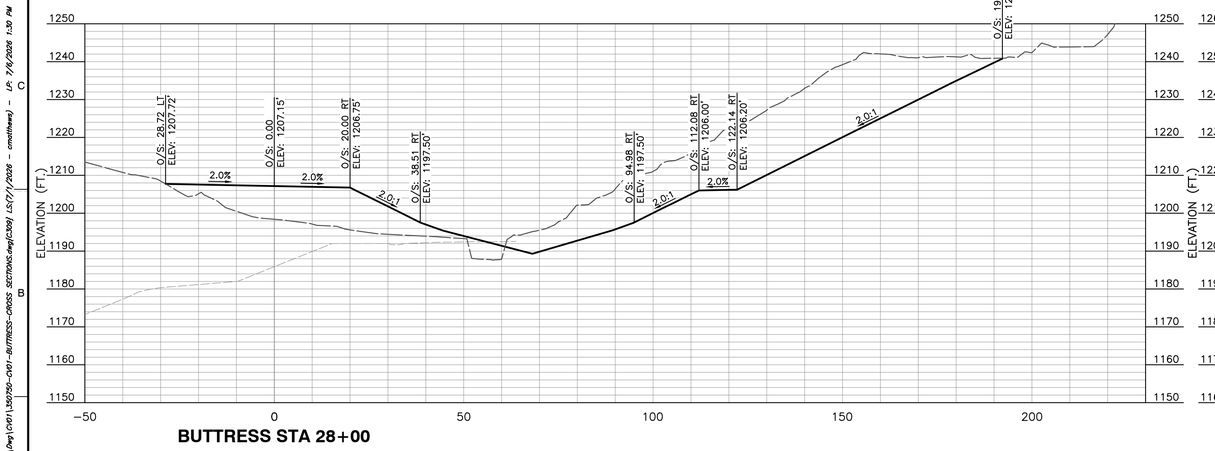
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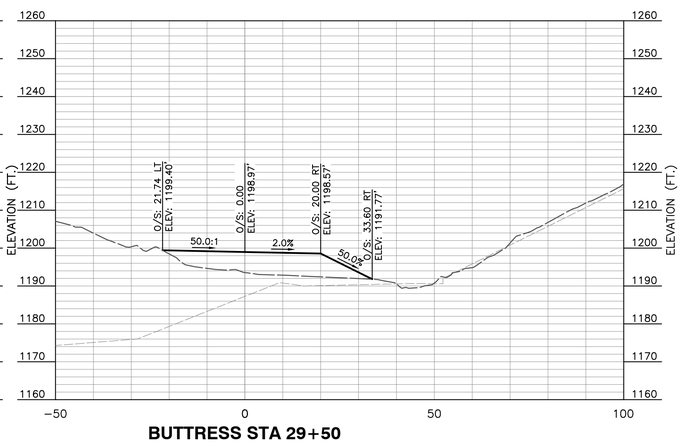
BUTTRESS STA 29+00



BUTTRESS STA 28+50



BUTTRESS STA 28+00



BUTTRESS STA 29+50

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HORIZONTAL SCALE IN FEET
0 20 40

VERTICAL SCALE IN FEET
0 20 40

DRAFT

SUBMITTAL RECORD

NO	DATE	DESCRIPTION
2	06/24/2026	FOR PRELIMINARY USE

ENGINEERING, SURVEYING AND LANDSCAPE ARCHITECTURE IN THE STATE OF NORTH CAROLINA WILL BE PROVIDED BY CEC SURVEYING AND LANDSCAPE ARCHITECTS OF NC, PLLC. LANDSCAPE ARCHITECTURE SERVICES IN THE STATE OF CALIFORNIA WILL BE PROVIDED BY CEC LANDSCAPE ARCHITECTS, LLC.

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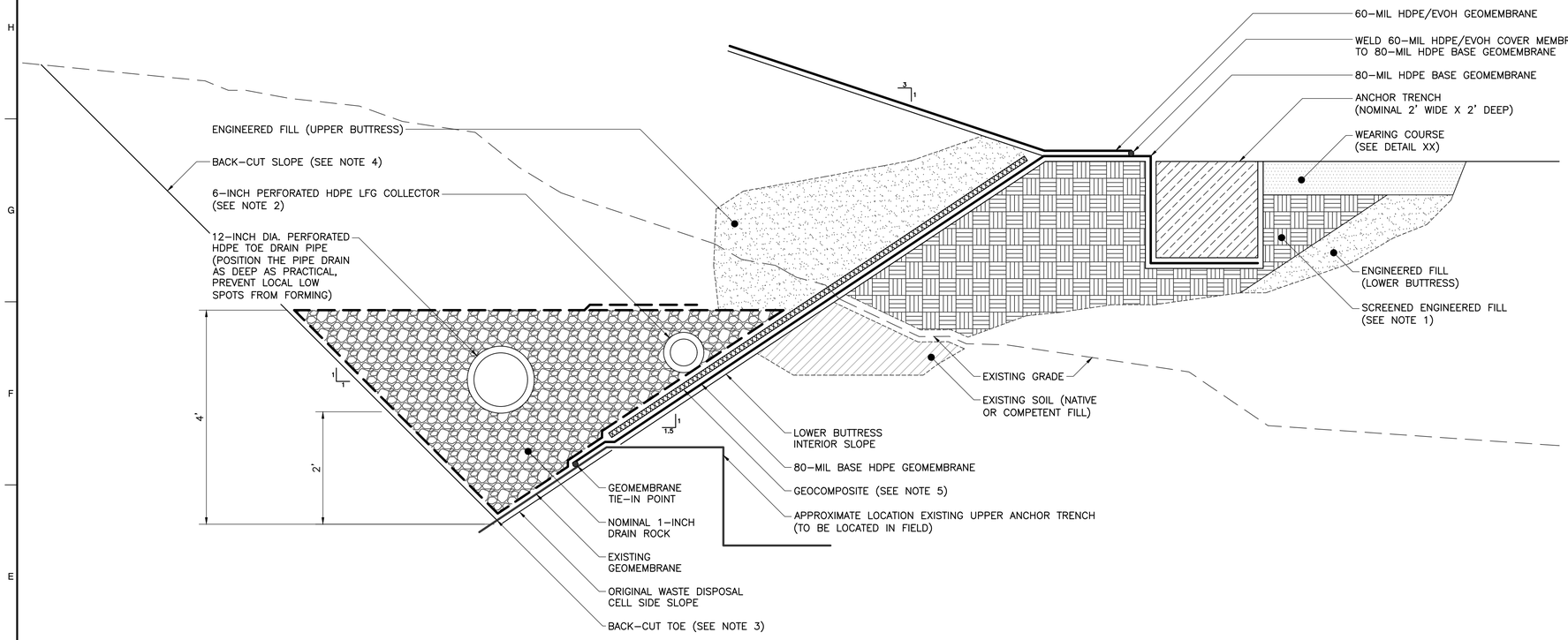
WASTE CONNECTIONS
WEST SLOPE MITIGATION
CHIQUITA CANYON LANDFILL
29201 HENRY MAYO DR
CASTAIC, CALIFORNIA 91384

BUTTRESS CROSS SECTIONS
STA. 28+00 TO STA. 30+00

DATE:	JULY 2026
DRAWN BY:	JAT
CHECKED BY:	CJM
DWG SCALE:	H: 1"=20'; V: 1"=20'
PROJECT NO:	350-750
APPROVED BY:	RVH

DRAWING NO.:
C309
SHEET ---- OF ----

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1 / C500 **TYPICAL TOE DRAIN SCHEMATIC DETAIL**
NOT TO SCALE

NOTES:

1. SCREENED FILL TO HAVE A MAXIMUM PARTICLE SIZE OF 1–INCH. THE INTENT OF MATERIAL IS TO ENSURE THAT THERE ARE NO LARGE SOIL PARTICLES PUSHING AGAINST THE GEOMEMBRANE. THE SCREENED MATERIAL THICKNESS CAN BE AS SMALL AS 6–INCHES (MEASURED NORMAL TO THE SLOPE). THE DETAIL SHOWS THE MATERIAL PLACED APPROXIMATELY 8–FEET WIDE (APPROXIMATELY THE WIDTH OF A PIECE OF EQUIPMENT.
2. LFG COLLECTOR MUST BE PLACED WITHIN TOE DRAIN GRAVEL PACK, BUT ITS POSITION WITHIN THE PACK CAN BE ADJUSTED TO FACILITATE CONSTRUCTION.
3. THE PURPOSE OF THE BACK–CUT IS TO EXPOSE THE HIGHEST PORTION OF THE EXISTING GEOMEMBRANE LINER AND TO CREATE THE SPACE WITHIN WHICH A NEW TOE DRAIN CAN BE CONSTRUCTED. THE DEPTH OF THE BACK–CUT IS THE MINIMUM NECESSARY TO EXPOSE THE EXISTING GEOMEMBRANE PLUS THE ADDITIONAL SPACE NECESSARY TO ALLOW THE NEW GEOMEMBRANE TO BE WELDED TO THAT EXISTING GEOMEMBRANE.
4. THE BACK–CUT SLOPE SHALL BE A STEEP AS PRACTICAL, LIMITED BY INSTRUCTION FROM THE GEOTECHNICAL ENGINEER, SAFE CONSTRUCTION PRACTICES, AND FIELD CONDITIONS OBSERVED DURING CONSTRUCTION BY SITE PERSONNEL AND MONITORING EQUIPMENT.
5. THE PRIMARY FUNCTION OF THE GEOCOMPOSITE IS TO PROTECT THE 80–MIL BASE GEOMEMBRANE DURING PLACEMENT AND COMPACTION OF THE UPPER BUTTRESS FILL. THE SECONDARY FUNCTION OF THE GEOCOMPOSITE IS TO PROVIDE A PREFERRED DRAINAGE PATHWAY DOWN THE INTERIOR FACE OF THE LOWER BUTTRESS. IT IS NOT EXPECTED ANY SIGNIFICANT QUANTITY OF LIQUID WILL REACH THIS LOCATION. THE GEOCOMPOSITE CAN BE REPLACED BY A 16–OUNCE NON–WOVEN GEOTEXTILE IF THAT MATERIAL IS MORE CONVENIENTLY AVAILABLE. CONTRACTOR SHALL SECURE GEOCOMPOSITE OR GEOTEXTILE IN PLACE DURING CONSTRUCTION, IT DOES NOT NEED TO BE SECURED IN THE ANCHOR TRENCH.

DRAFT

SUBMITTAL RECORD

NO	DATE	DESCRIPTION
2	06/24/2026	FOR PRELIMINARY USE

PROFESSIONAL SURVEYING AND LANDSCAPE ARCHITECTURE IN THE STATE OF NORTH CAROLINA WILL BE PROVIDED BY CEC SURVEYING AND LANDSCAPE ARCHITECTS OF NC, PLLC. LANDSCAPE ARCHITECTURE SHALL BE PERFORMED BY OR UNDER THE DIRECT SUPERVISION OF A LANDSCAPE ARCHITECT REGISTERED TO PRACTICE IN THE STATE OF NORTH CAROLINA AND EMPLOYED BY CEC LANDSCAPE ARCHITECTS, LLC.

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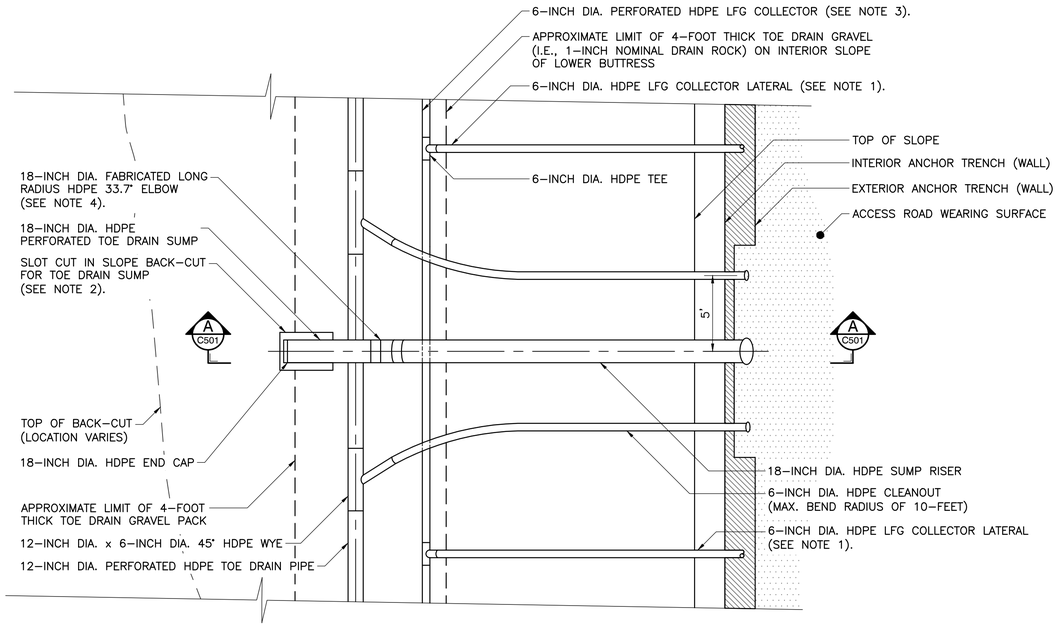
WASTE CONNECTIONS
WEST SLOPE MITIGATION
CHIQUITA CANYON LANDFILL
29201 HENRY MAYO DR
CASTAIC, CALIFORNIA 91384

DETAILS 1 OF 2

DATE:	JULY 2026
DWG SCALE:	NOT TO SCALE
PROJECT NO:	350-750
DRAWN BY:	JAT
CHECKED BY:	CJM
APPROVED BY:	RVH

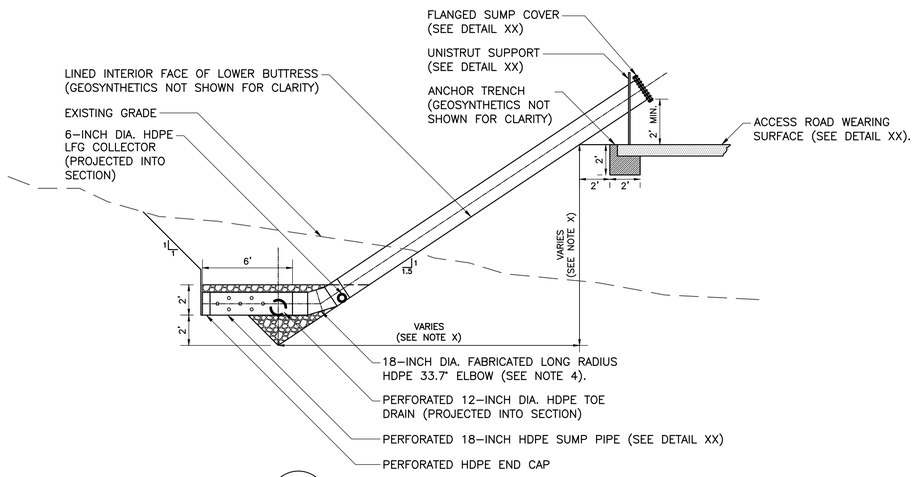
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C500
SHEET ---- OF ----

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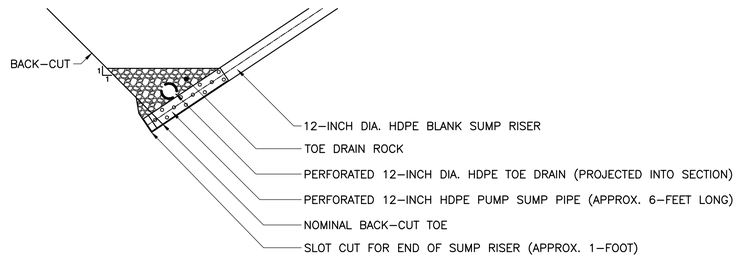
1 C501 **TOE DRAIN SUMP RISER PLAN**

SCALE: 1" = 5'



2 C501 **RISER PIPE SECTION A**

SCALE: 1" = 5'



3 C501 **ALTERNATE SUMP RISER PIPE SECTION A**

SCALE: 1" = 5'

NOTES:

1. LFG COLLECTORS TO BE CONNECTED TO PERIMETER HEADER SYSTEM AT SURFACE VIA LATERALS. LATERALS TO BE SPACED NO FURTHER THAN 200 FEET. SURFACE CONNECTION DETAILS TO BE PROVIDED BY OTHERS.
2. THE SLOT CUT IS INTENDED TO PROVIDE ROOM FOR THE HORIZONTAL SUMP PIPE AND END CAP. ALLOW 6–INCHES CLEARANCE ON SIDES AND ENDS. WALLS OF SLOT CUT SHOULD BE AS STEEP AS PRACTICAL CONSISTENT WITH FIELD CONDITIONS AND SAFE WORK PRACTICES. PLACE GEOTEXTILE, DRAIN ROCK, PIPE, AND OTHER APPURTENANCES IMMEDIATELY UPON MAKING SLOT CUT TO RESTORE THE SLOPE AS QUICKLY AS POSSIBLE.
3. THE LFG COLLECTOR IS SHOWN BROKEN INTO DISCRETE SECTIONS. AT THE OWNER'S DISCRETION, THE LFG COLLECTOR CAN BE INSTALLED CONTINUOUSLY WITHIN THE TOE DRAIN BY LAYING THE LFG COLLECTOR ACROSS THE SUMP RISERS AND CLEANOUTS WHERE NECESSARY. ENSURE THAT NO LOCAL LOW SPOTS ARE ALLOWED TO FORM THAT ARE NOT PROVIDED WITH THE MEANS TO DRAIN CONDENSATE.
4. THE FITTING IS INTENDED TO ALLOW INSERTION AND REMOVAL OF A PUMP FROM THE SURFACE. CONTRACTOR TO SUBMIT A SHOP DRAWING OF THE PROPOSED FITTING FOR APPROVAL BY CONSTRUCTION MANAGER. THE FITTING SHALL CONSIST OF AT LEAST 3 SECTIONS AND BE A LONG RADIUS ELBOW WITH A DEFLECTION ANGLE OF 33.7 DEGREES TO CREATE A TRANSITION FROM THE 1.5:1 SLOPE TO THE HORIZONTAL ORIENTATION SHOWN.

SUBMITTAL RECORD

NO	DATE	DESCRIPTION
2	06/24/2026	FOR PRELIMINARY USE

ENGINEERING, SURVEYING AND LANDSCAPE ARCHITECTURE IN THE STATE OF NORTH CAROLINA WILL BE PROVIDED BY CEC SURVEYING AND LANDSCAPE ARCHITECTS OF NC, PLLC. LANDSCAPE ARCHITECTURAL SERVICES IN THE STATE OF CALIFORNIA WILL BE PROVIDED BY CEC LANDSCAPE ARCHITECTS, LLC.

2356 Gold Meadow Way
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Gold River, CA 95670
Ph: 916.503.0050
www.cecinc.com

Civil & Environmental Consultants, Inc.

WASTE CONNECTIONS
WEST SLOPE MITIGATION
CHIQUITA CANYON LANDFILL
29201 HENRY MAYO DR
CASTAIC, CALIFORNIA 91384

DETAILS 2 OF 2

DRAWN BY:	JAT
CHECKED BY:	CJM
DATE:	JULY 2026
DWG SCALE:	NOT TO SCALE
PROJECT NO:	350-750
APPROVED BY:	RVH

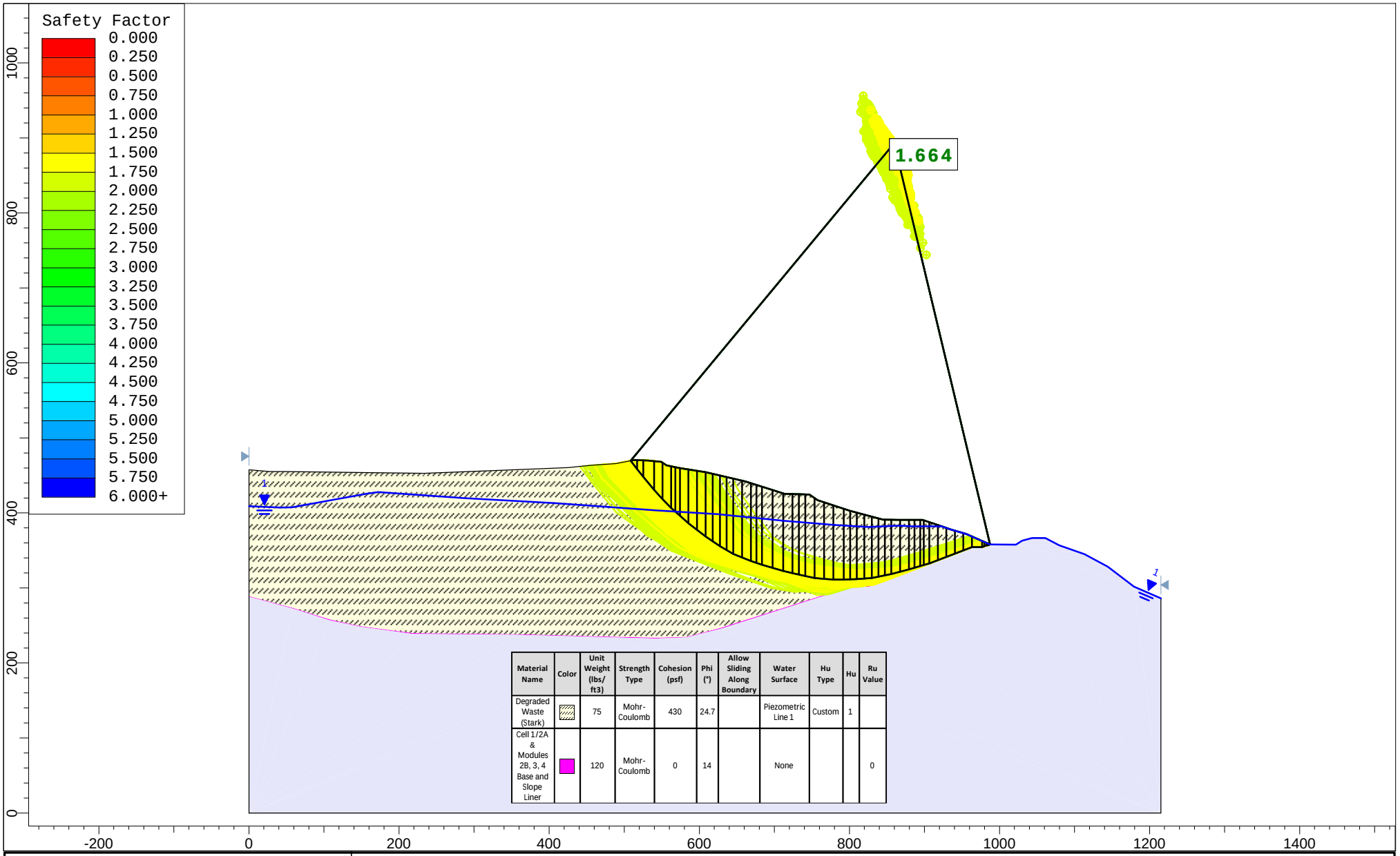
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Appendix H
STABILITY ANALYSIS OUTPUT

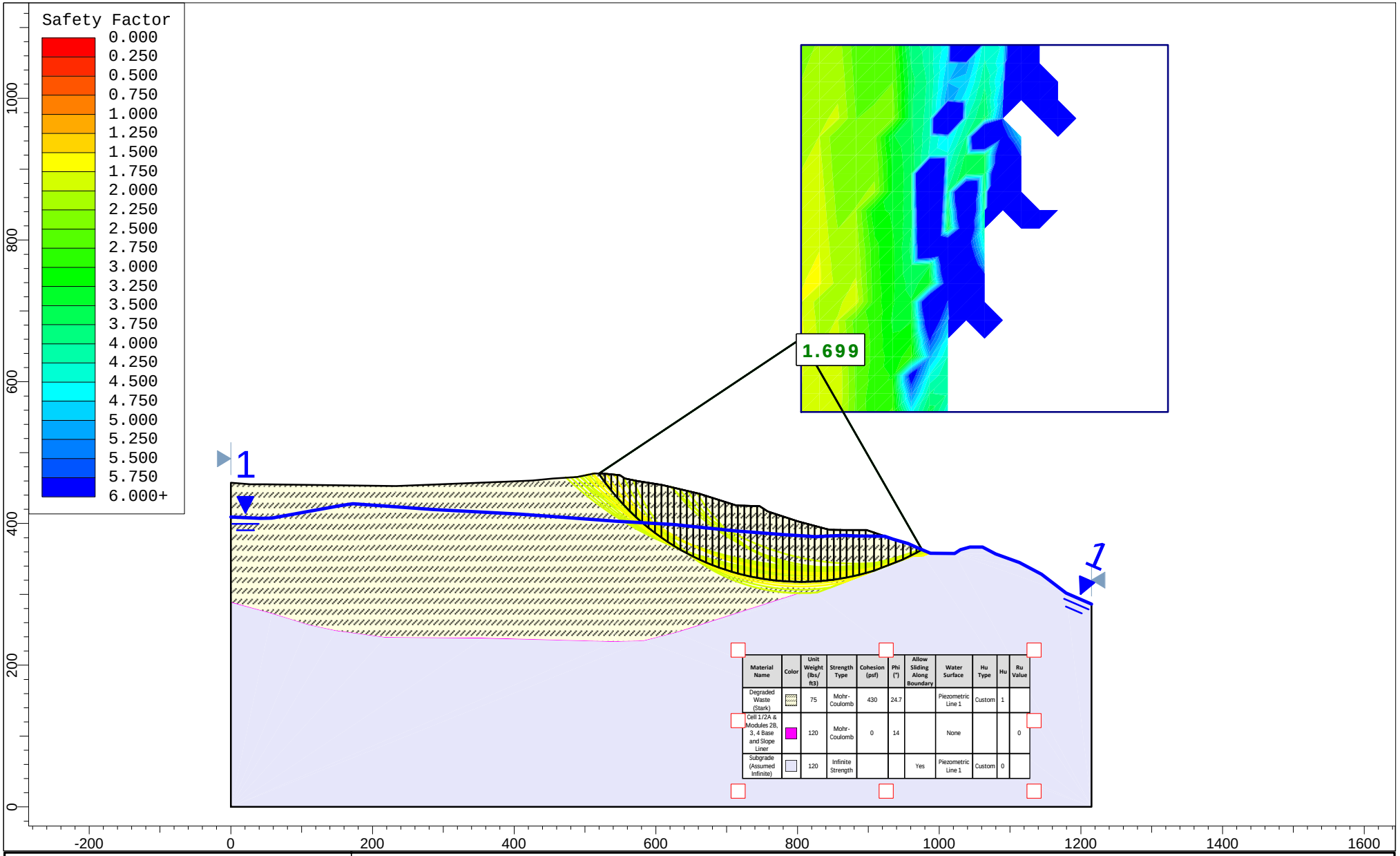


Material Name	Color	Unit Weight (lbs/ ft3)	Strength Type	Cohesion (psf)	Phi (°)	Allow Sliding Along Boundary	Water Surface	Hu Type	Hu	Ru Value
Degraded Waste (Stark)		75	Mohr-Coulomb	430	24.7		Piezometric Line 1	Custom	1	
Cell 1/2A & Modules 2B, 3, 4 Base and Slope Liner		120	Mohr-Coulomb	0	14		None			0

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Project	COMPREHENSIVE STABILITY EVALUATION		
Group	Section 9+00 (Pre-Buttress)	*Scenario*	Static Safety Factor (Non-Circular)
Drawn By	R. Mitchell	*Company*	GLA
Date	9/1/2026	*File Name*	West Slope Cross Sections +5.slmd

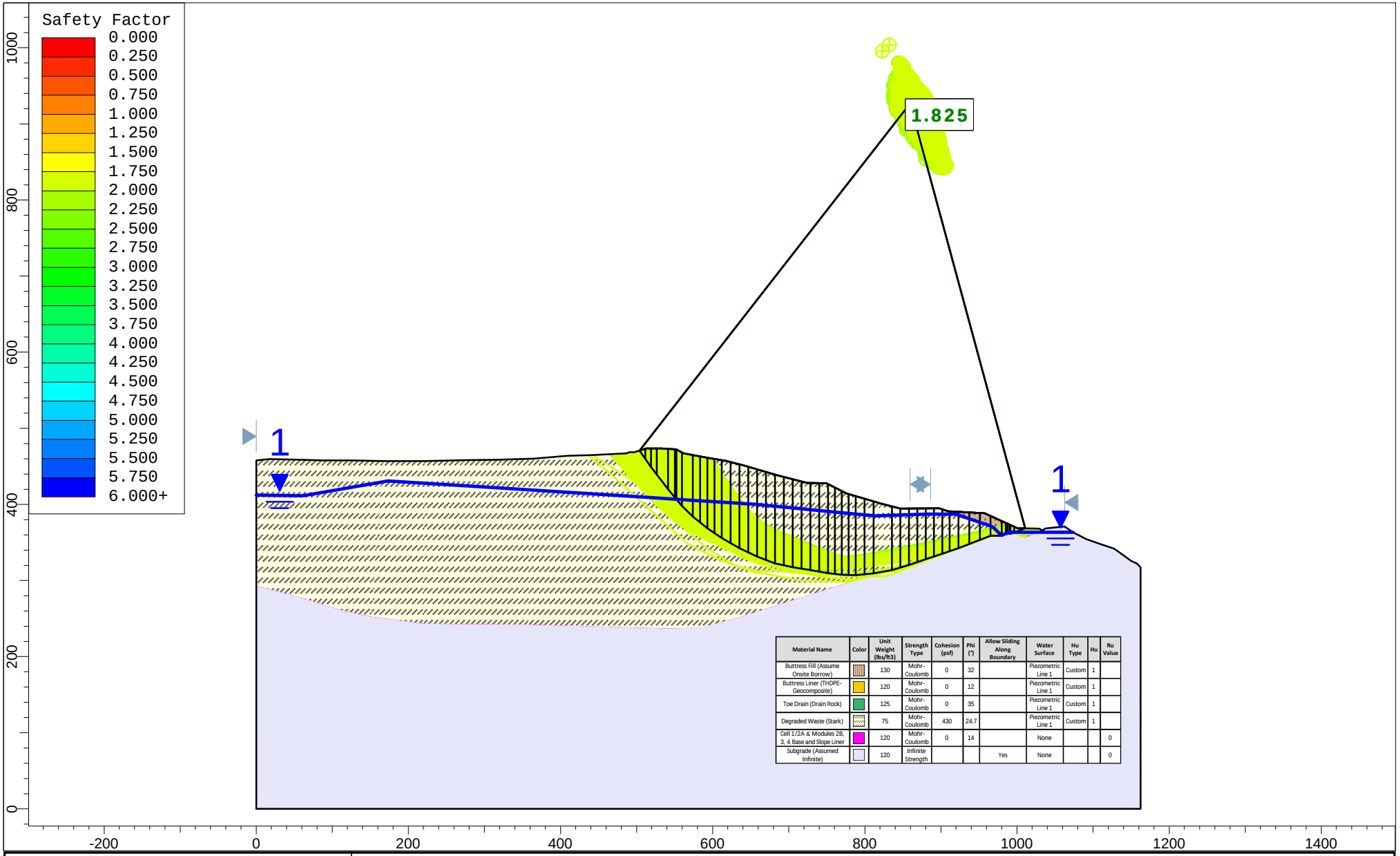


Material Name	Color	Unit Weight (lbs/ft3)	Strength Type	Cohesion (psf)	Phi (°)	Allow Sliding Along Boundary	Water Surface	Hu Type	Hu	Ru Value
Degraded Waste (Stark)		75	Mohr-Coulomb	430	24.7		Piezometric Line 1	Custom	1	
Cell 1/2A & Modules 2B, 3, 4 Base and Slope Liner		120	Mohr-Coulomb	0	14		None			0
Subgrade (Assumed Infinite)		120	Infinite Strength			Yes	Piezometric Line 1	Custom	0	

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SLIDEINTERPRET 9.044

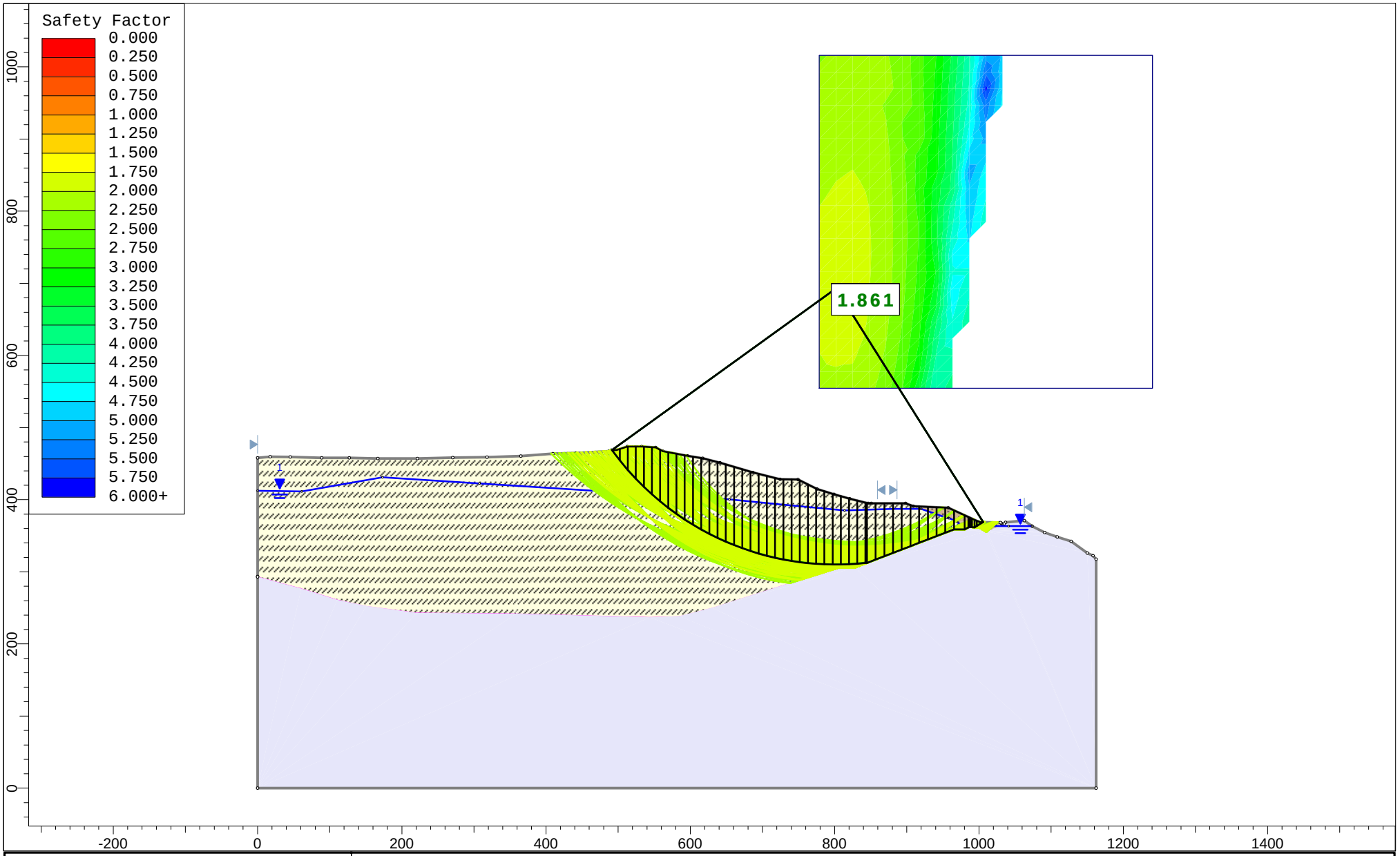
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Group	Section 9+00 (Pre-Buttress)	*Scenario*	Static Safety Factor (Circular)
Drawn By	R. Mitchell	*Company*	GLA
Date	9/1/2026	*File Name*	West Slope Cross Sections +5.slmd



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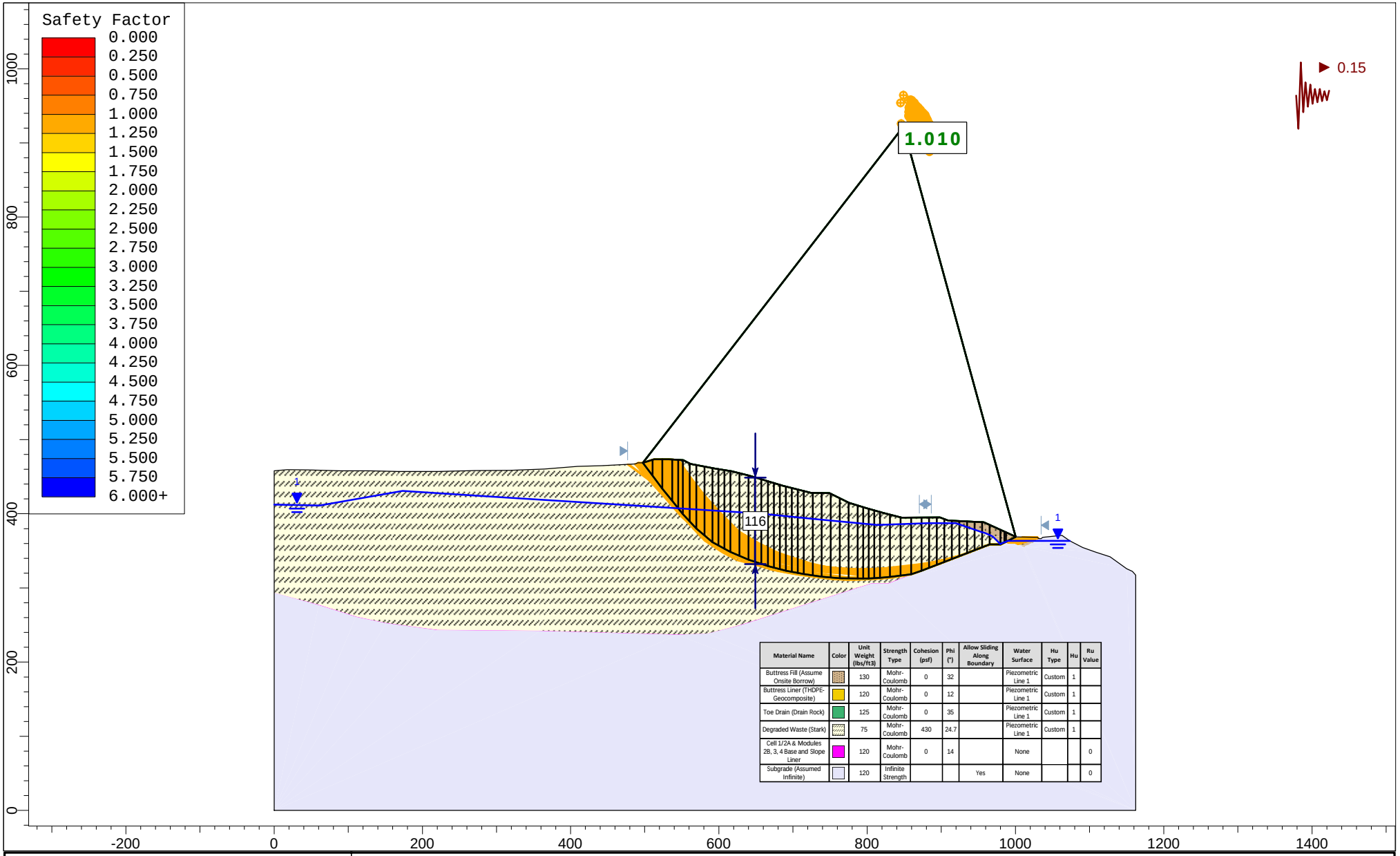
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Group	Section 9+00	*Scenario*	Static Safety Factor (Non-Circular)
Drawn By	R. Mitchell	*Company*	GLA
Date	9/1/2026	*File Name*	West Slope Cross Sections +5.slmd



ROCSCIENCE

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Project	COMPREHENSIVE STABILITY EVALUATION		
Group	Section 9+00	*Scenario*	Static Safety Factor (Circular)
Drawn By	R. Mitchell	*Company*	GLA
Date	9/1/2026	*File Name*	West Slope Cross Sections +5.slmd

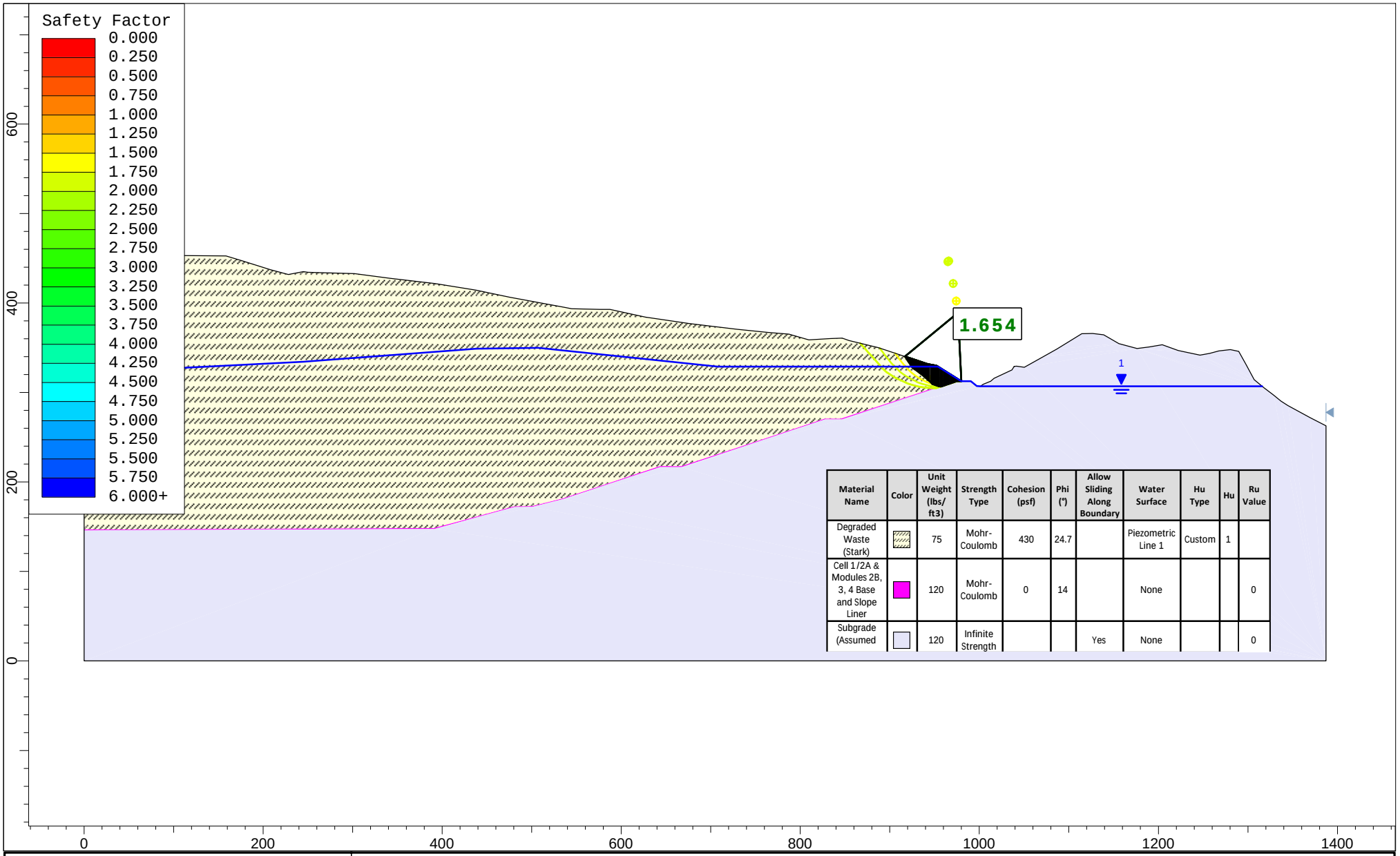


Material Name	Color	Unit Weight (lbs/ft3)	Strength Type	Cohesion (psf)	Phi (°)	Allow Sliding Along Boundary	Water Surface	Hu Type	Hu	Ru Value
Buttress Fill (Assume Onsite Borrow)		130	Mohr-Coulomb	0	32		Piezometric Line 1	Custom	1	
Buttress Liner (THDPE-Geocomposite)		120	Mohr-Coulomb	0	12		Piezometric Line 1	Custom	1	
Toe Drain (Drain Rock)		125	Mohr-Coulomb	0	35		Piezometric Line 1	Custom	1	
Degraded Waste (Stark)		75	Mohr-Coulomb	430	24.7		Piezometric Line 1	Custom	1	
Cell 1/2A & Modules 2B, 3, 4 Base and Slope Liner		120	Mohr-Coulomb	0	14		None			0
Subgrade (Assumed Infinite)		120	Infinite Strength			Yes	None			0

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Project	COMPREHENSIVE STABILITY EVALUATION		
Group	Section 9+00	Scenario	Yield Acceleration
Drawn By	R. Mitchell	Company	GLA
Date	9/1/2026	File Name	West Slope Cross Sections +5.slmd

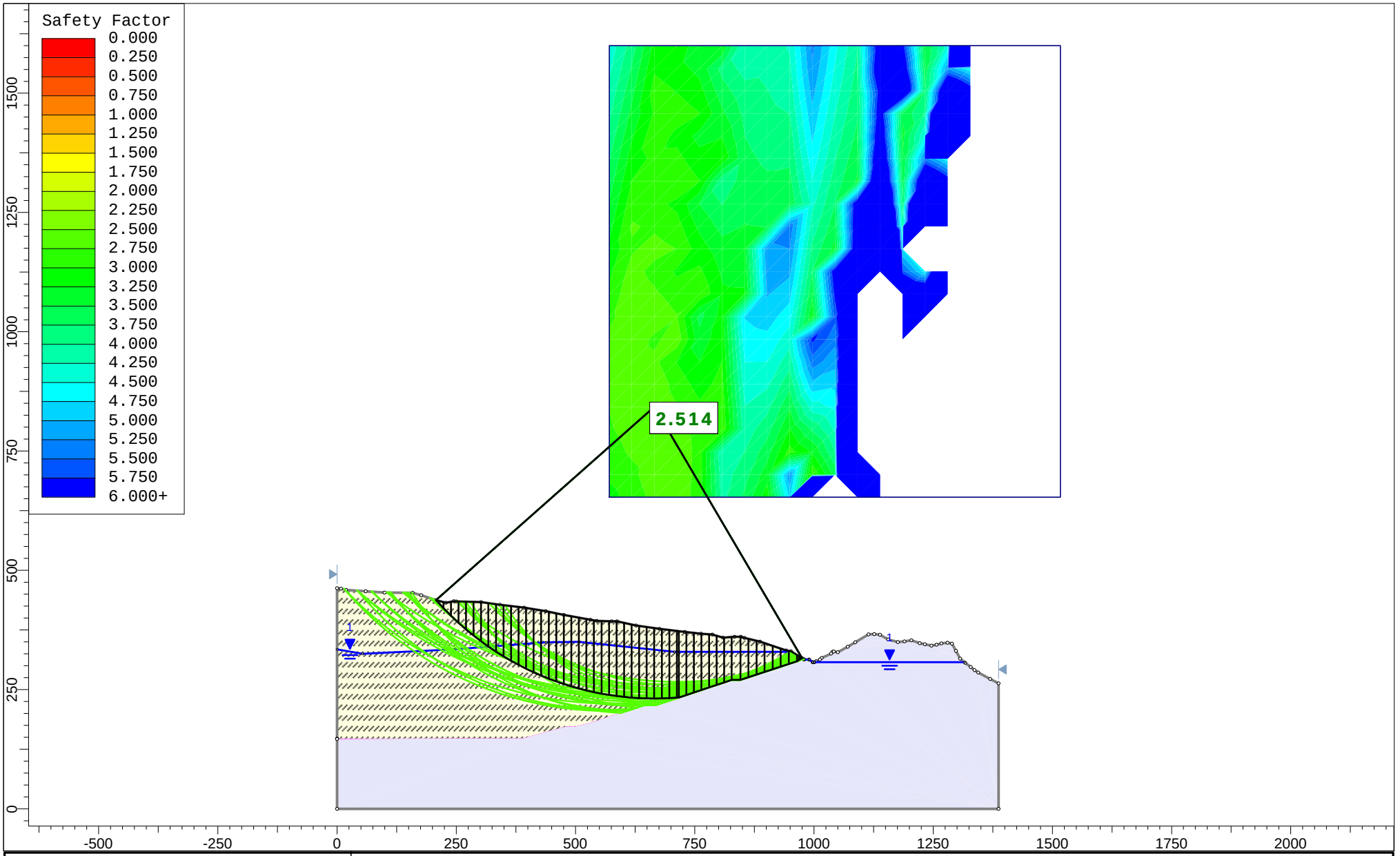


Material Name	Color	Unit Weight (lbs/ ft3)	Strength Type	Cohesion (psf)	Phi (°)	Allow Sliding Along Boundary	Water Surface	Hu Type	Hu	Ru Value
Degraded Waste (Stark)		75	Mohr-Coulomb	430	24.7		Piezometric Line 1	Custom	1	
Cell 1/2A & Modules 2B, 3, 4 Base and Slope Liner		120	Mohr-Coulomb	0	14		None			0
Subgrade (Assumed		120	Infinite Strength			Yes	None			0

ROCSCIENCE

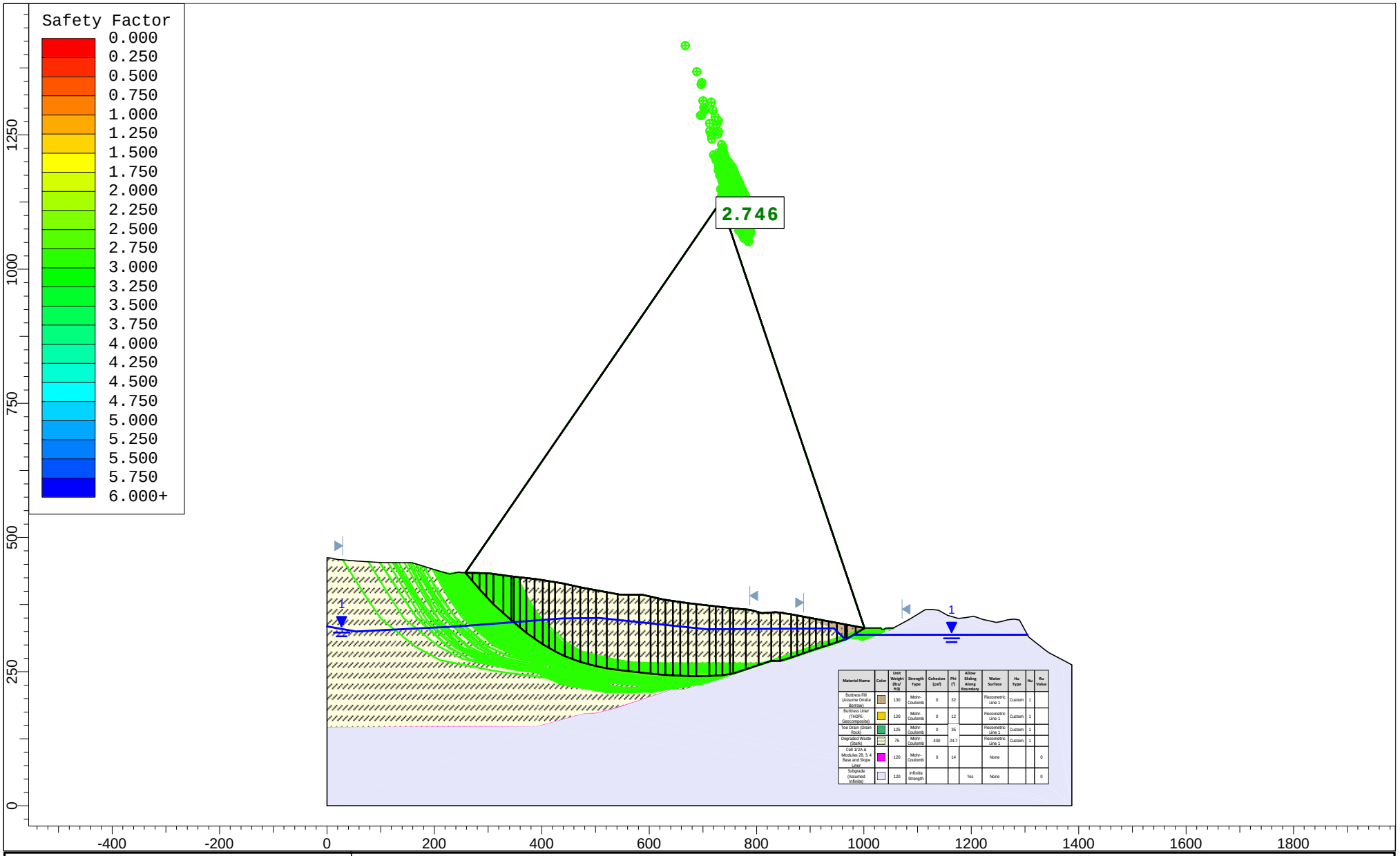
SLIDEINTERPRET 9.044

Project	COMPREHENSIVE STABILITY EVALUATION		
Group	Section 16+00 (Pre-Buttress)	*Scenario*	Static Safety Factor (Non-Circular)
Drawn By	R. Mitchell	*Company*	GLA
Date	9/1/2026	*File Name*	West Slope Cross Sections +5.slmd



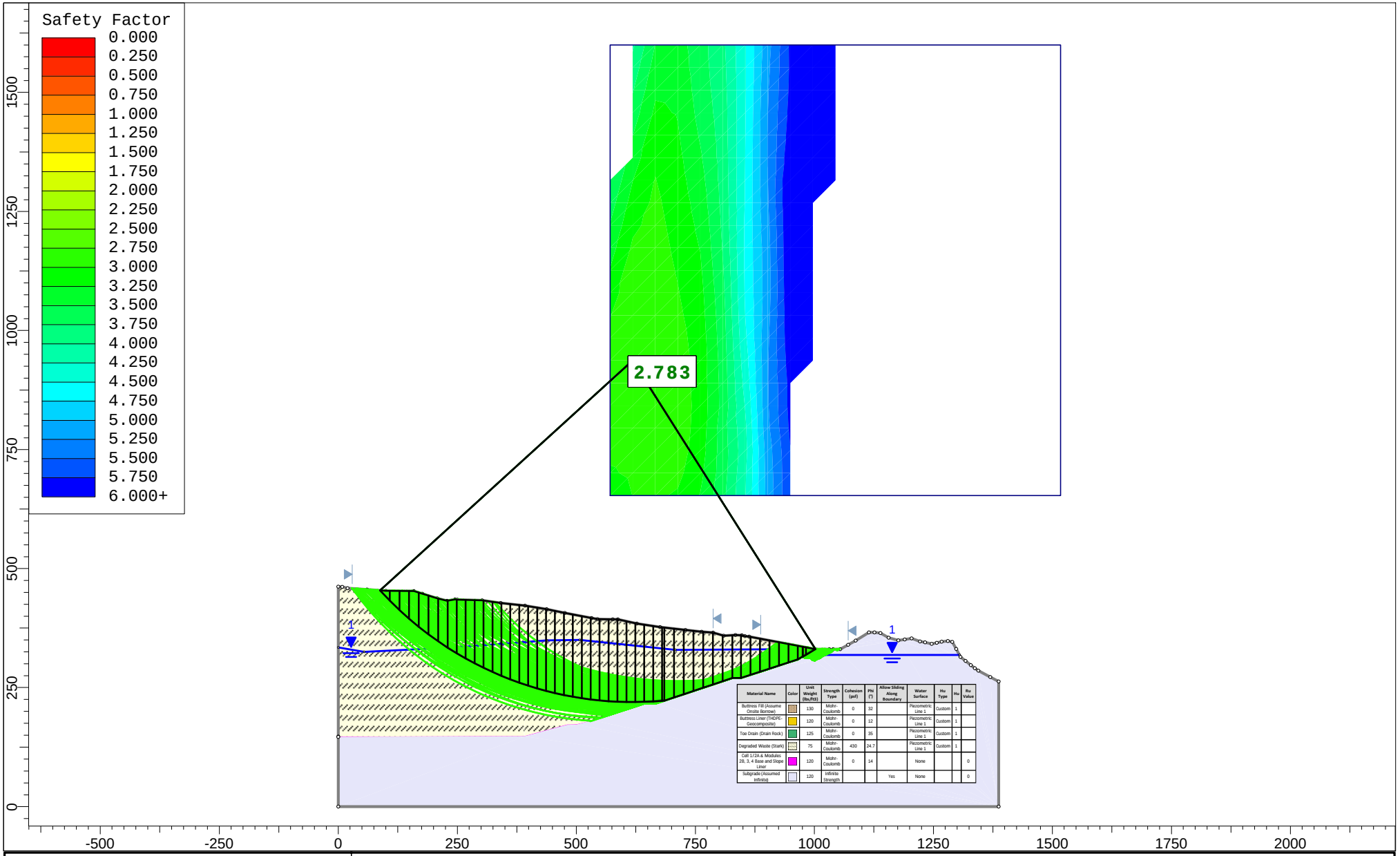
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	Drawn By	R. Mitchell	Company: GLA
	Date	9/1/2026	File Name: West Slope Cross Sections +5.slmd

SLIDEINTERPRET 9.044



ROCSCIENCE	*Project*	COMPREHENSIVE STABILITY EVALUATION	
	Group	Section 16+00	*Scenario* Static Safety Factor (Non-Circular)
	Drawn By	R. Mitchell	*Company* GLA
	Date	9/1/2026	*File Name* West Slope Cross Sections +5.slmd

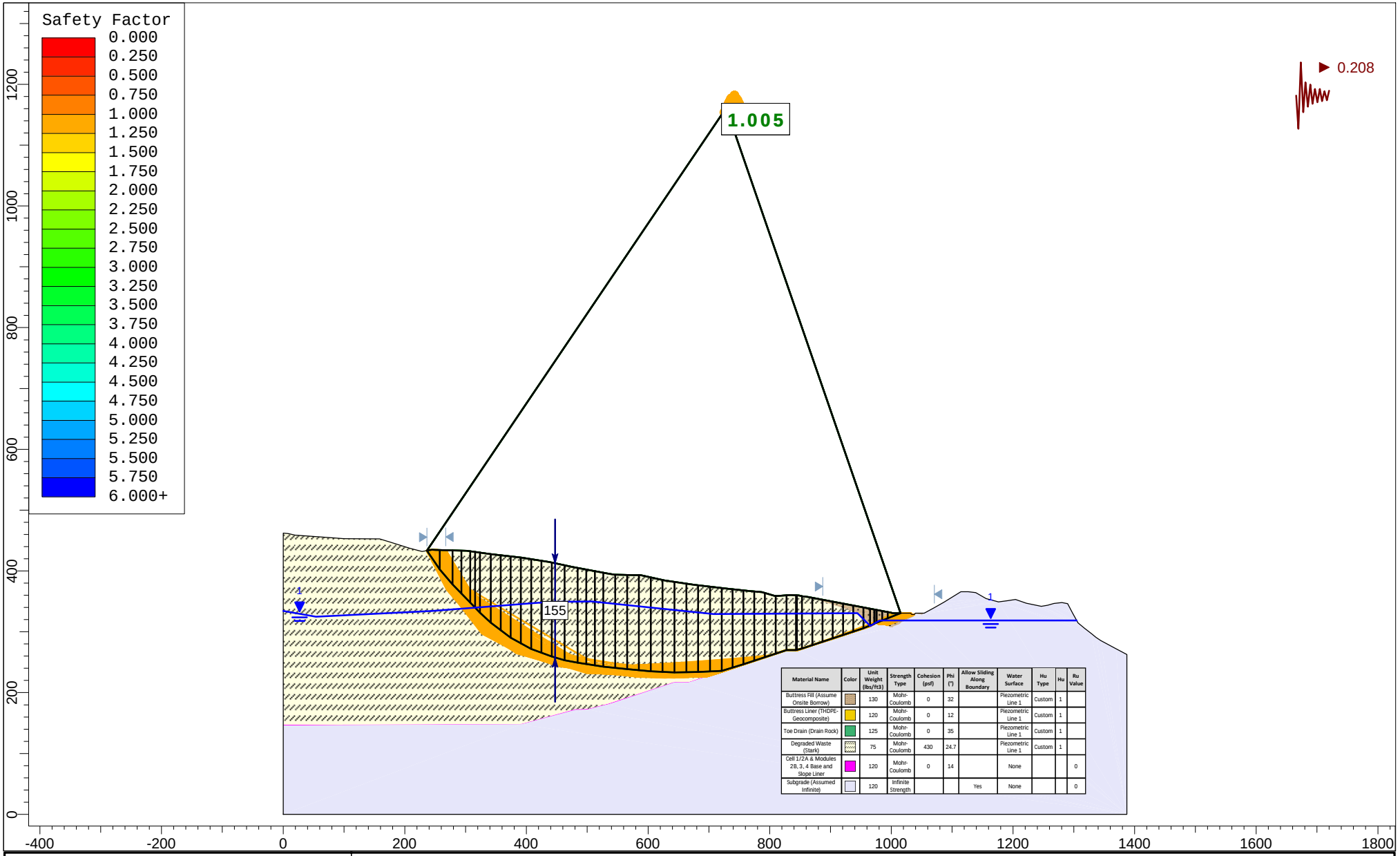
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SLIDEINTERPRET 9.044

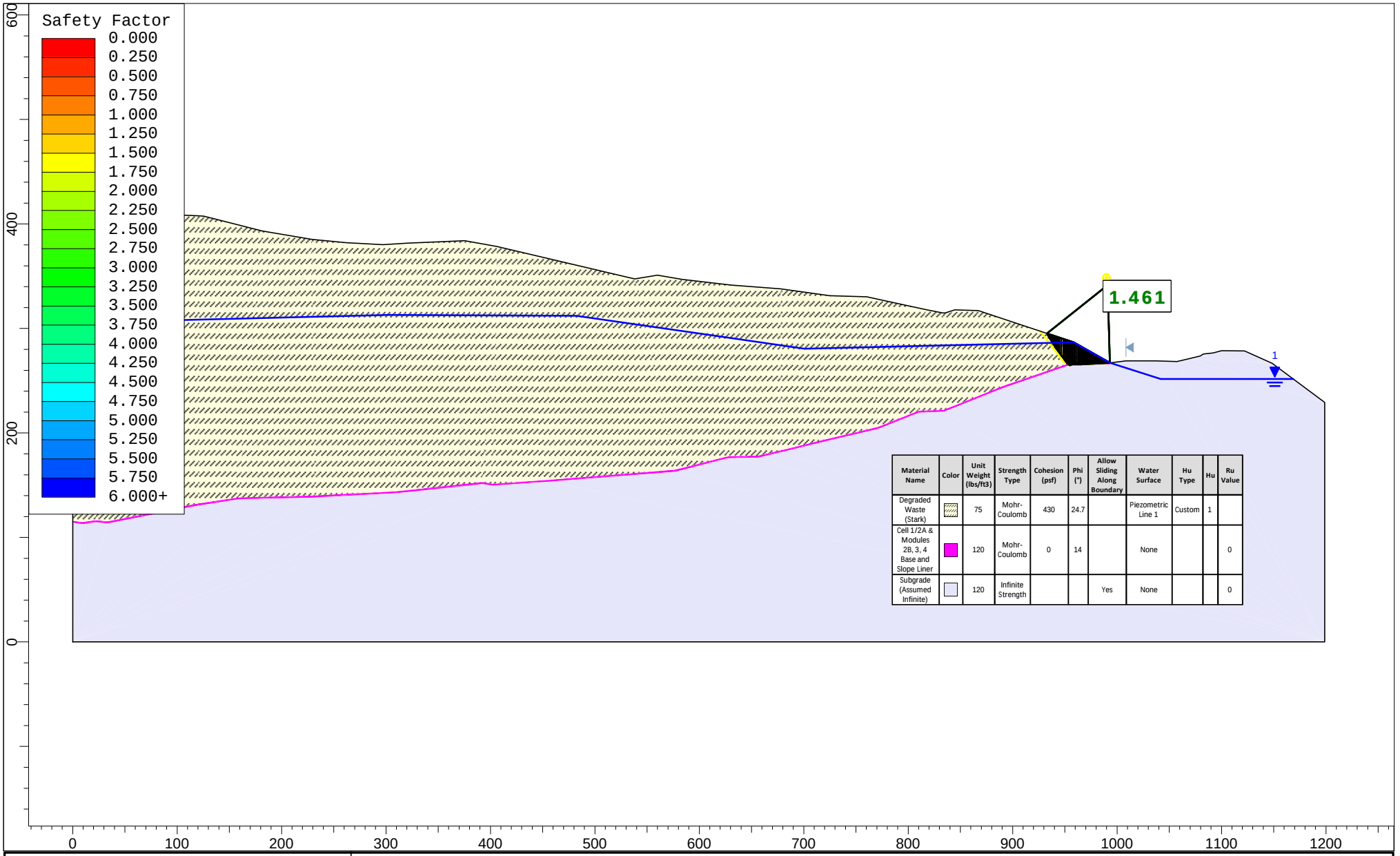
Project	COMPREHENSIVE STABILITY EVALUATION		
Group	Section 16+00	*Scenario*	Static Safety Factor (Circular)
Drawn By	R. Mitchell	*Company*	GLA
Date	9/1/2026	*File Name*	West Slope Cross Sections +5.slmd



ROCSCIENCE

SLIDEINTERPRET 9.044

Project	COMPREHENSIVE STABILITY EVALUATION		
Group	Section 16+00	*Scenario*	Yield Acceleration
Drawn By	R. Mitchell	*Company*	GLA
Date	9/1/2026	*File Name*	West Slope Cross Sections +5.slmd

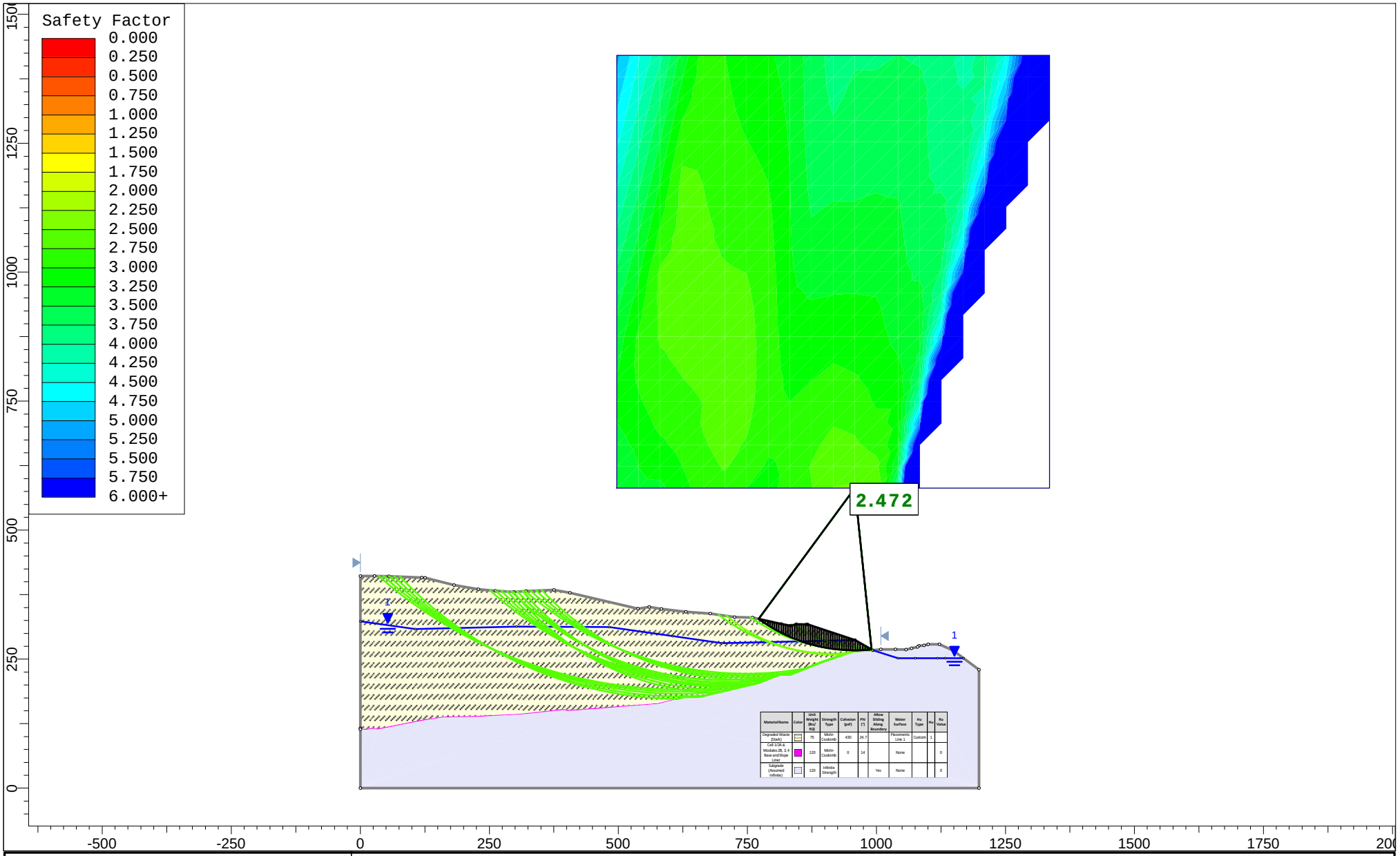


Material Name	Color	Unit Weight (lbs/ft3)	Strength Type	Cohesion (psf)	Phi (°)	Allow Sliding Along Boundary	Water Surface	Hu Type	Hu	Ru Value
Degraded Waste (Stark)		75	Mohr-Coulomb	430	24.7		Piezometric Line 1	Custom	1	
Cell 1/2A & Modules 2B, 3, 4 Base and Slope Liner		120	Mohr-Coulomb	0	14		None			0
Subgrade (Assumed Infinite)		120	Infinite Strength			Yes	None			0

ROCSCIENCE

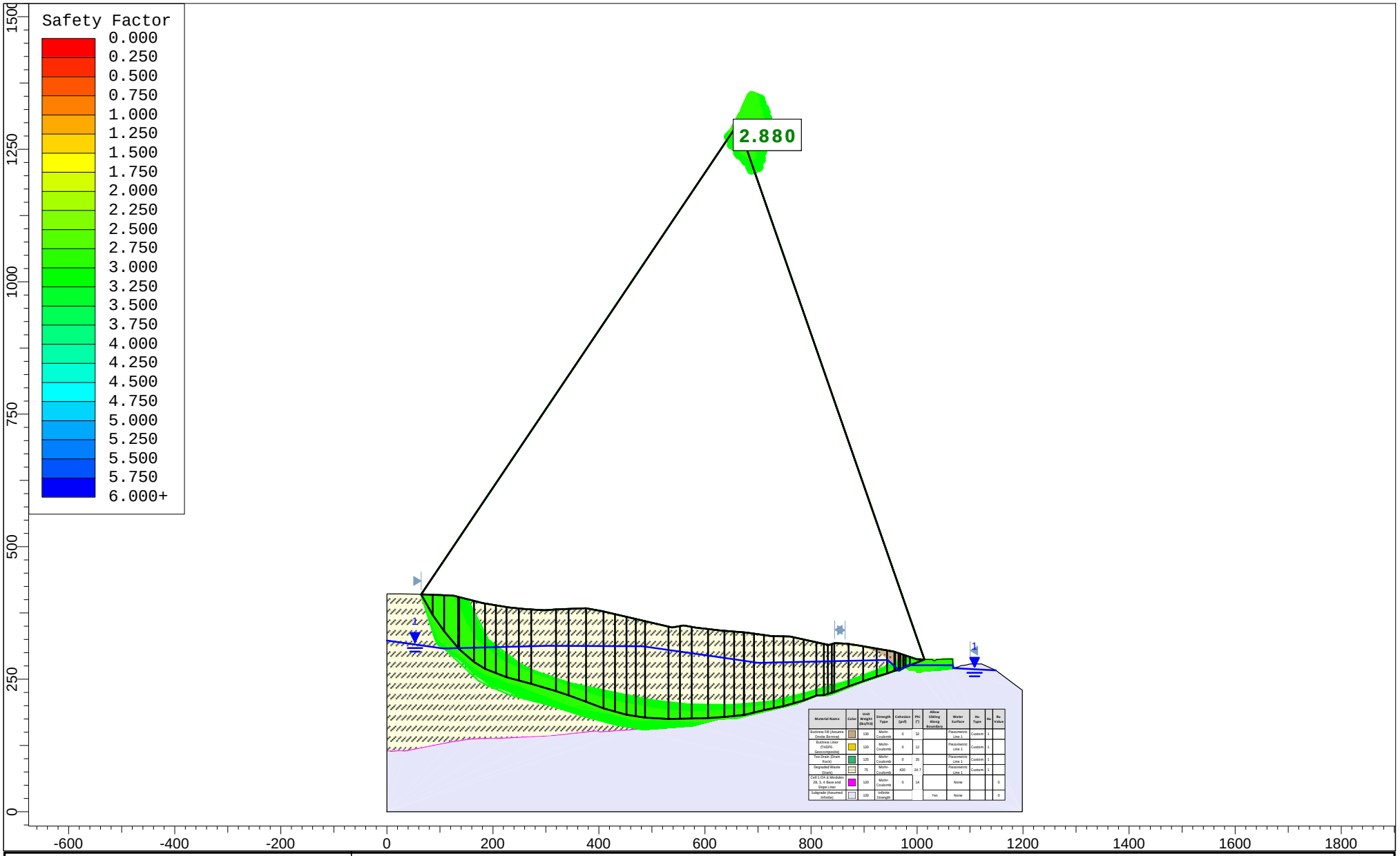
SLIDEINTERPRET 9.044

Project	COMPREHENSIVE STABILITY EVALUATION		
Group	Section 19+00 (Pre-Buttress)	*Scenario*	Static Safety Factor (Non-Circular)
Drawn By	R. Mitchell	*Company*	GLA
Date	9/1/2026	*File Name*	West Slope Cross Sections +5.slmd



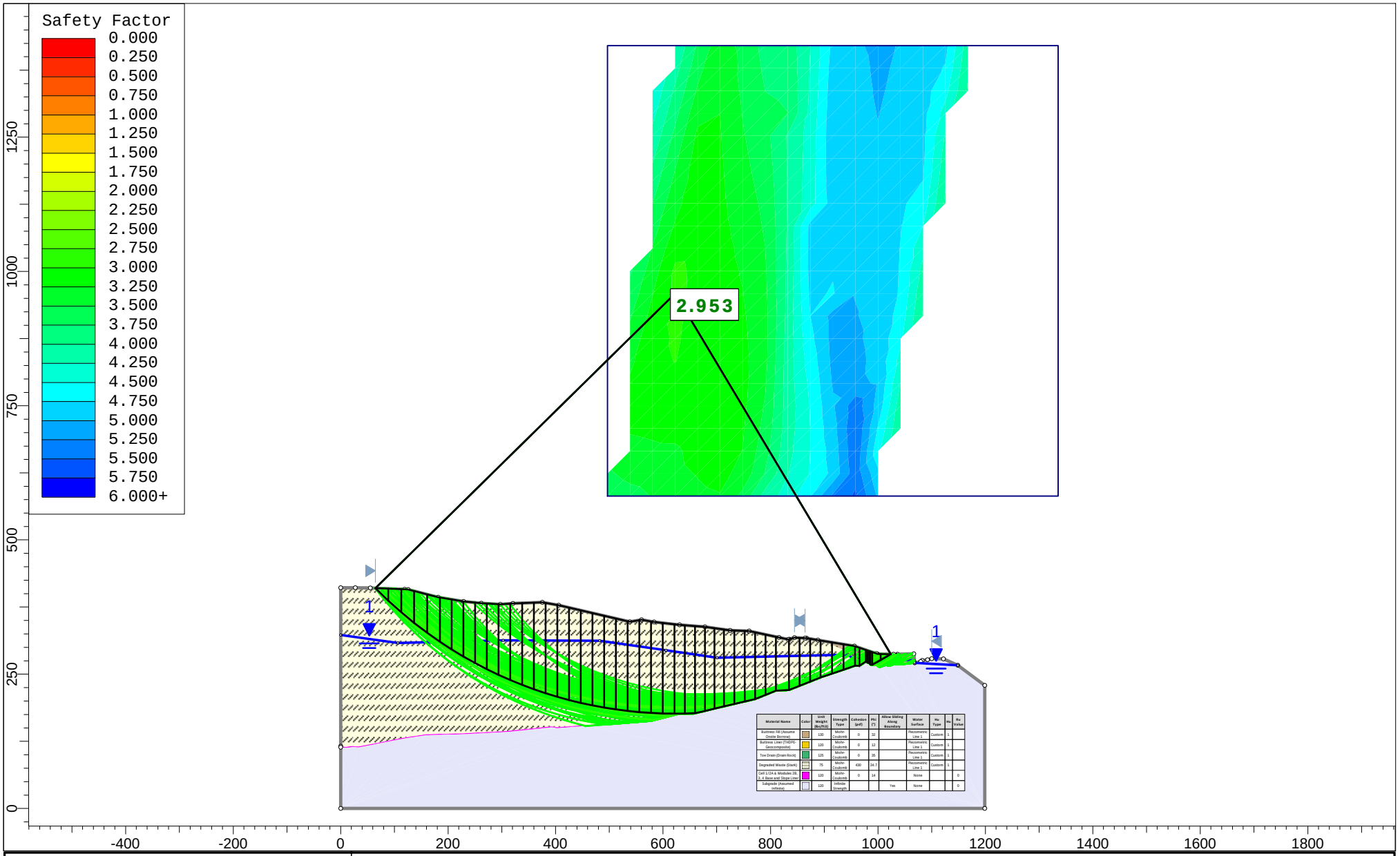
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	Group	Section 19+00 (Pre-Buttress)	*Scenario* Static Safety Factor (Circular)
	Drawn By	R. Mitchell	*Company* GLA
	Date	9/1/2026	*File Name* West Slope Cross Sections +5.slmd

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ROCSCIENCE	*Project*	COMPREHENSIVE STABILITY EVALUATION	
	Group	Section 19+00	*Scenario* Static Safety Factor (Non-Circular)
	Drawn By	R. Mitchell	*Company* GLA
	Date	9/1/2026	*File Name* West Slope Cross Sections +5.slmd

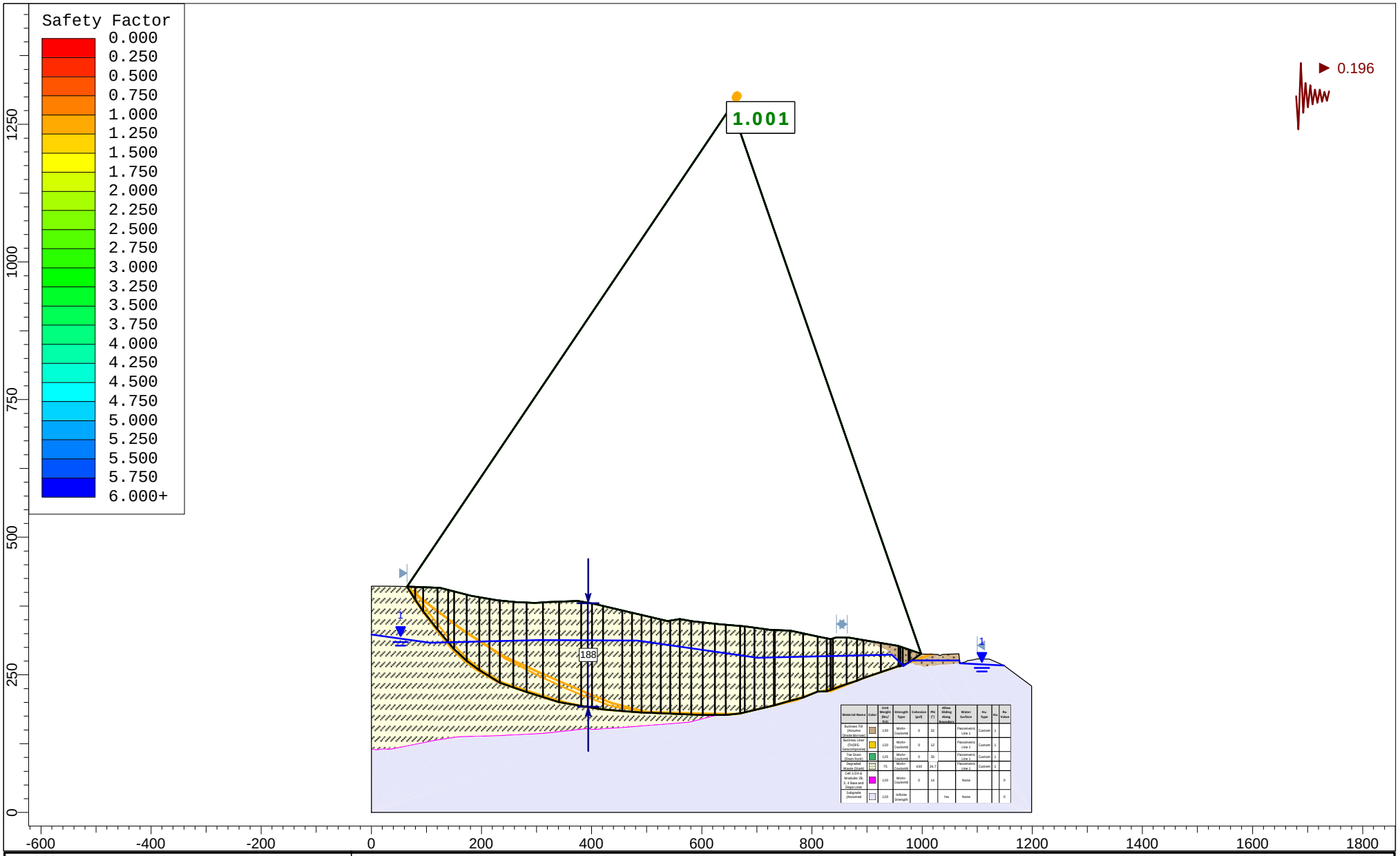
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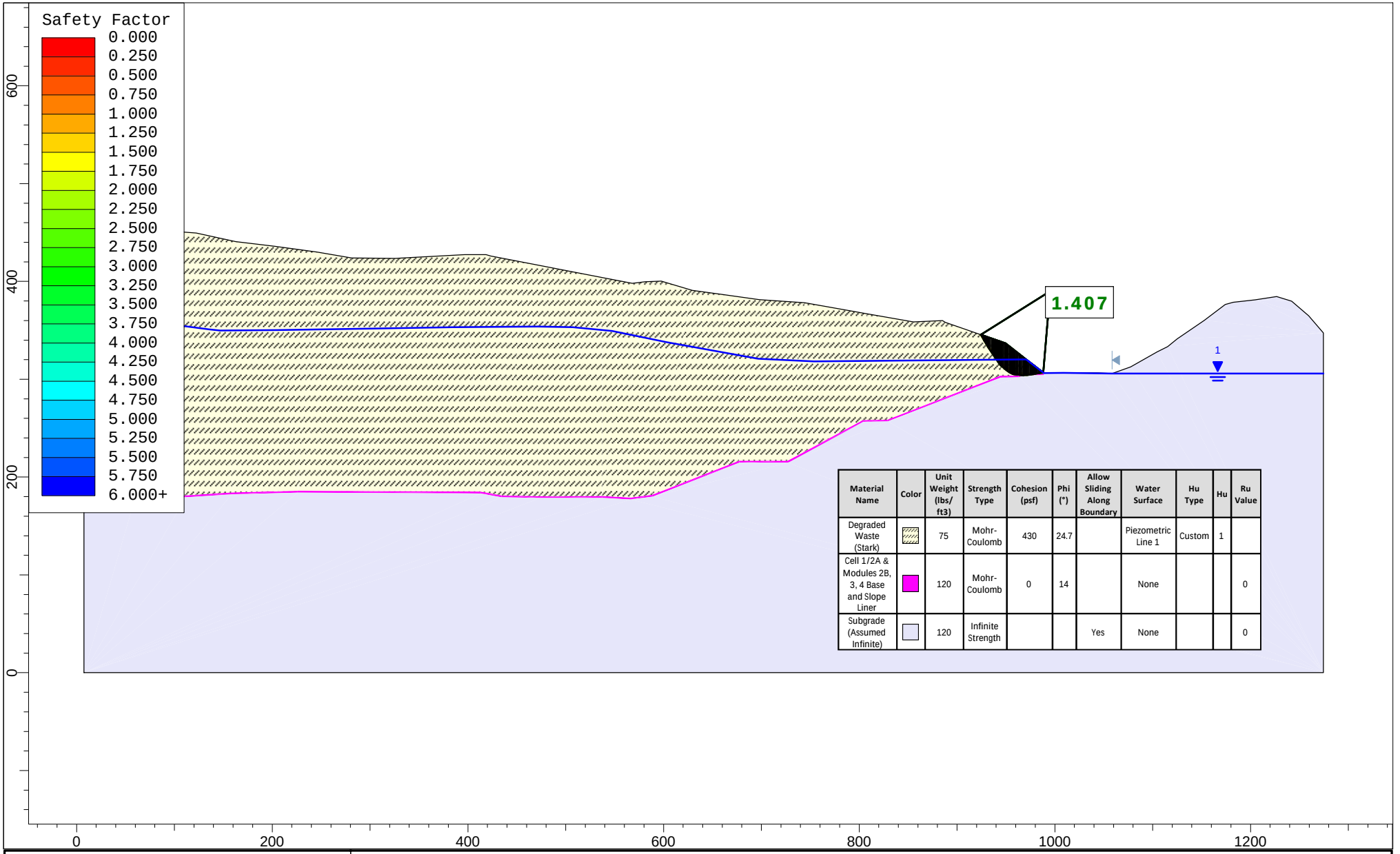
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Group	Section 19+00	*Scenario*	Static Safety Factor (Circular)
Drawn By	R. Mitchell	*Company*	GLA
Date	9/1/2026	*File Name*	West Slope Cross Sections +5.slmd



ROCSCIENCE

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Project	COMPREHENSIVE STABILITY EVALUATION		
Group	Section 19+00	*Scenario*	Yield Acceleration
Drawn By	R. Mitchell	*Company*	GLA
Date	9/1/2026	*File Name*	West Slope Cross Sections +5.slmd

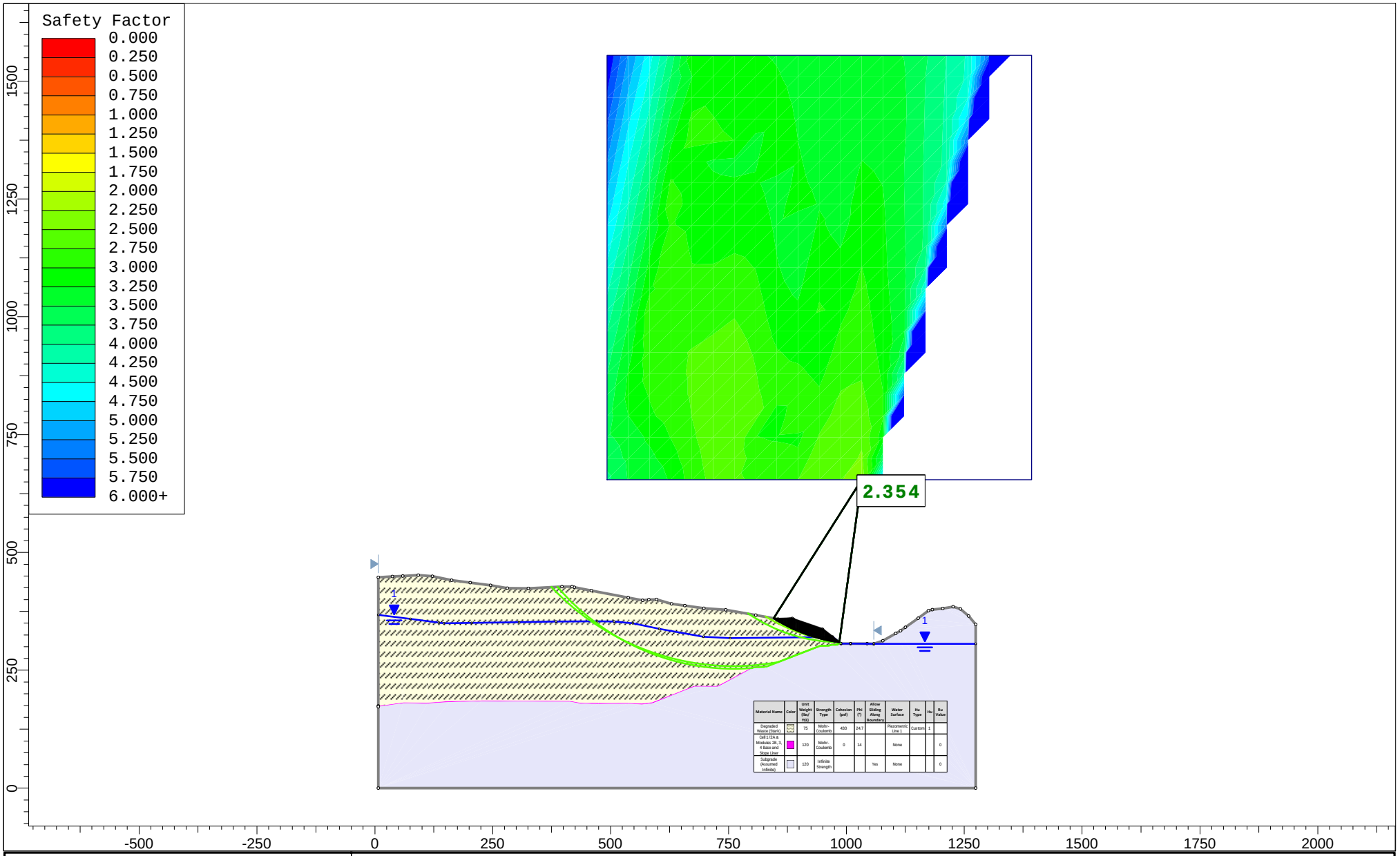


Material Name	Color	Unit Weight (lbs/ ft3)	Strength Type	Cohesion (psf)	Phi (°)	Allow Sliding Along Boundary	Water Surface	Hu Type	Hu	Ru Value
Degraded Waste (Stark)		75	Mohr-Coulomb	430	24.7		Piezometric Line 1	Custom	1	
Cell 1/2A & Modules 2B, 3, 4 Base and Slope Liner		120	Mohr-Coulomb	0	14		None			0
Subgrade (Assumed Infinite)		120	Infinite Strength			Yes	None			0

ROCSCIENCE

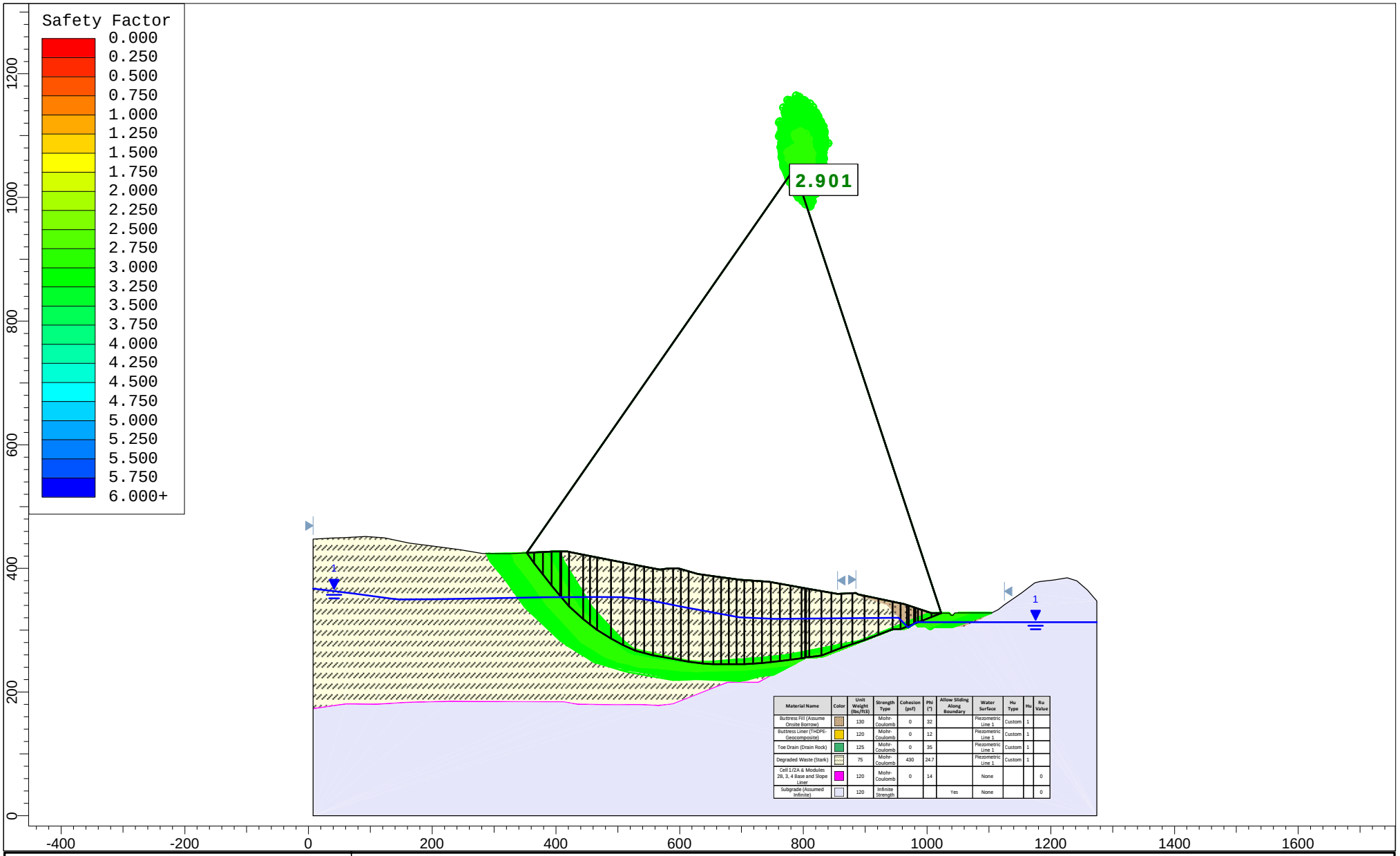
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Project	COMPREHENSIVE STABILITY EVALUATION		
Group	Section 21+00 (Pre-Buttress)	*Scenario*	Static Safety Factor (Non-Circular)
Drawn By	R. Mitchell	*Company*	GLA
Date	9/1/2026	*File Name*	West Slope Cross Sections +5.slmd



ROCSCIENCE	*Project*	COMPREHENSIVE STABILITY EVALUATION	
	Group	Section 21+00 (Pre-Buttress)	*Scenario* Static Safety Factor (Circular)
	Drawn By	R. Mitchell	*Company* GLA
	Date	9/1/2026	*File Name* West Slope Cross Sections +5.slmd

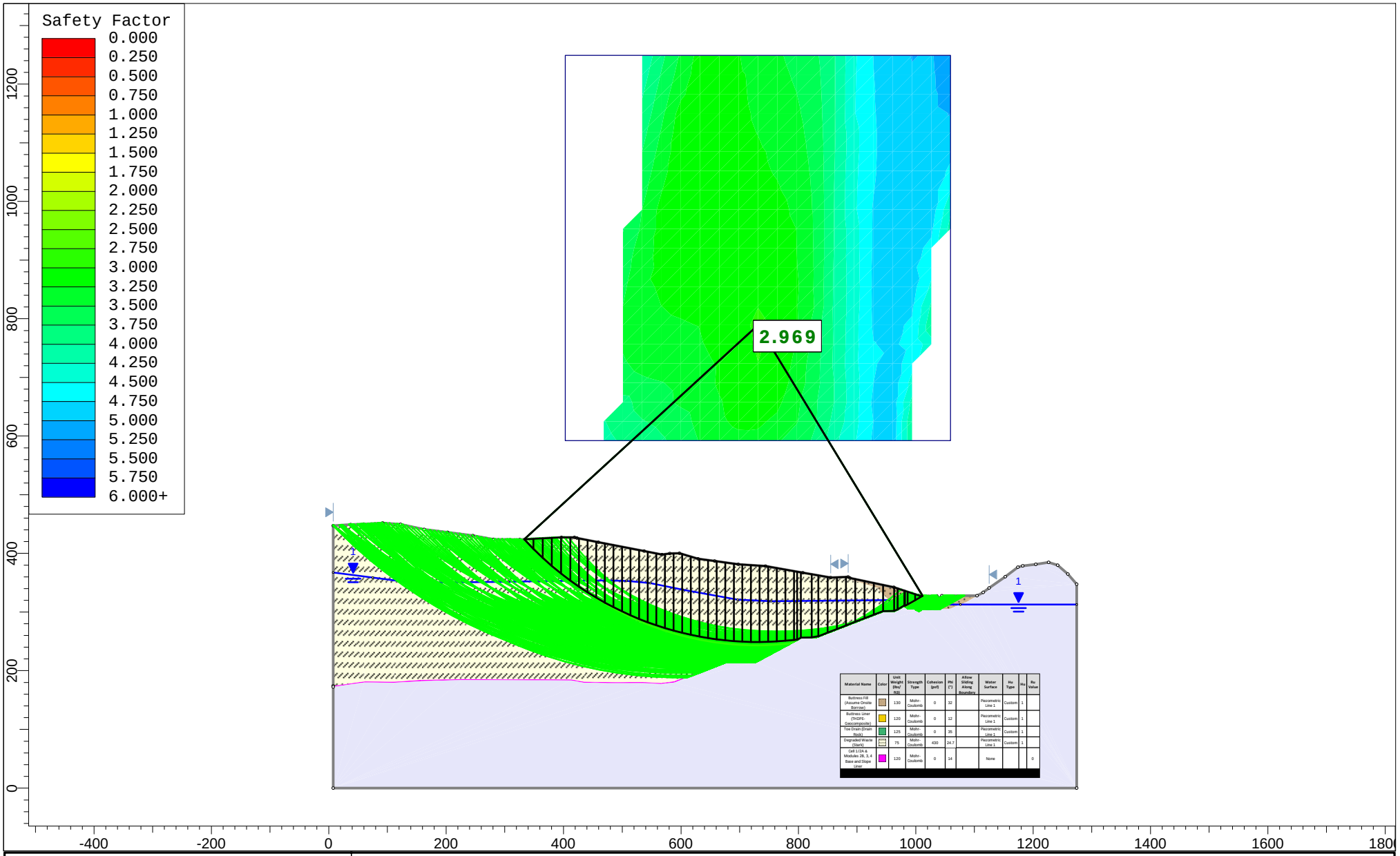
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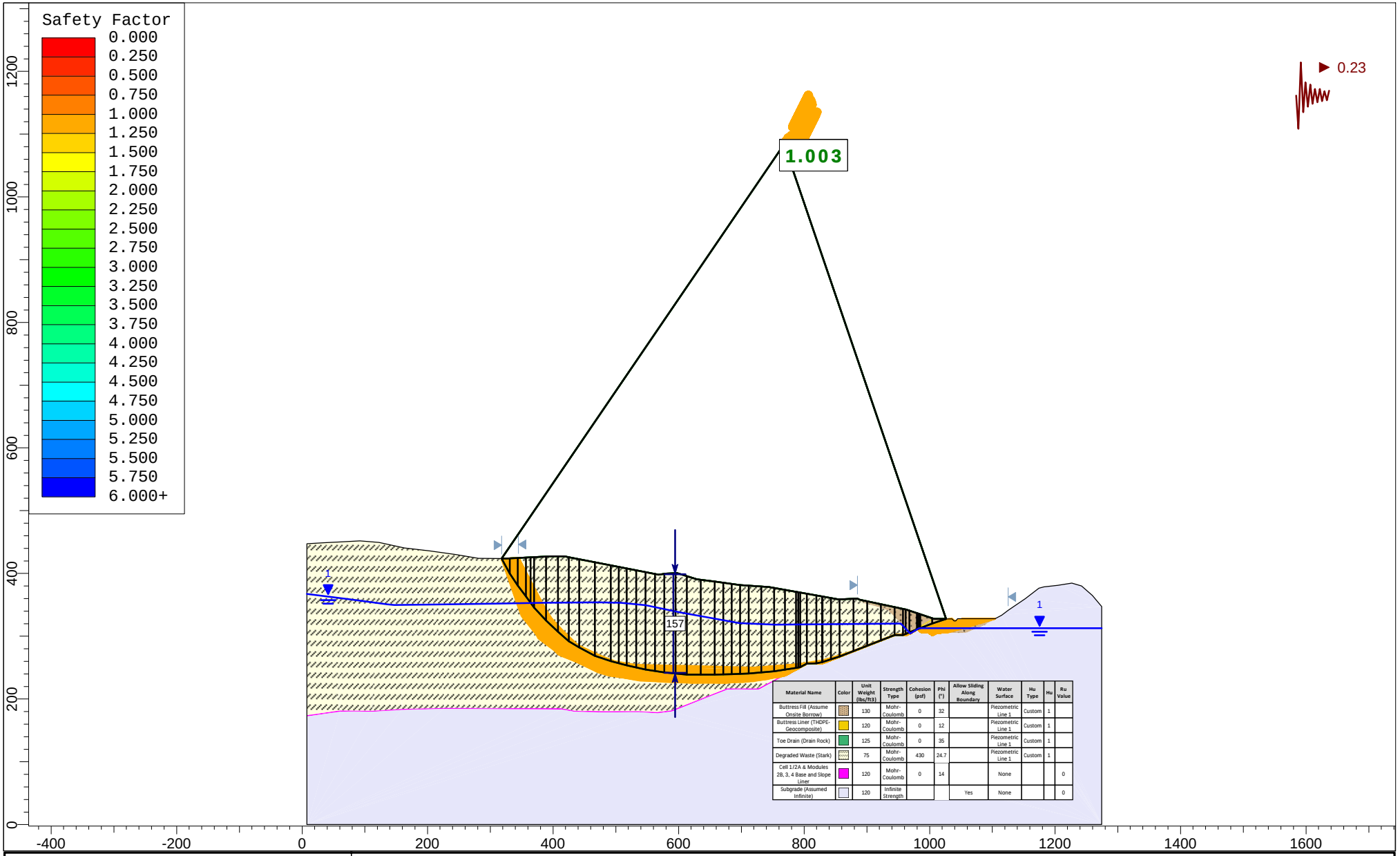
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Project	COMPREHENSIVE STABILITY EVALUATION		
Group	Section 21+00	*Scenario*	Static Safety Factor (Non-Circular)
Drawn By	R. Mitchell	*Company*	GLA
Date	9/1/2026	*File Name*	West Slope Cross Sections +5.slmd



ROCSCIENCE	Project	COMPREHENSIVE STABILITY EVALUATION	
	Group	Section 21+00	Scenario: Static Safety Factor (Circular)
	Drawn By	R. Mitchell	Company: GLA
	Date	9/1/2026	File Name: West Slope Cross Sections +5.slmd

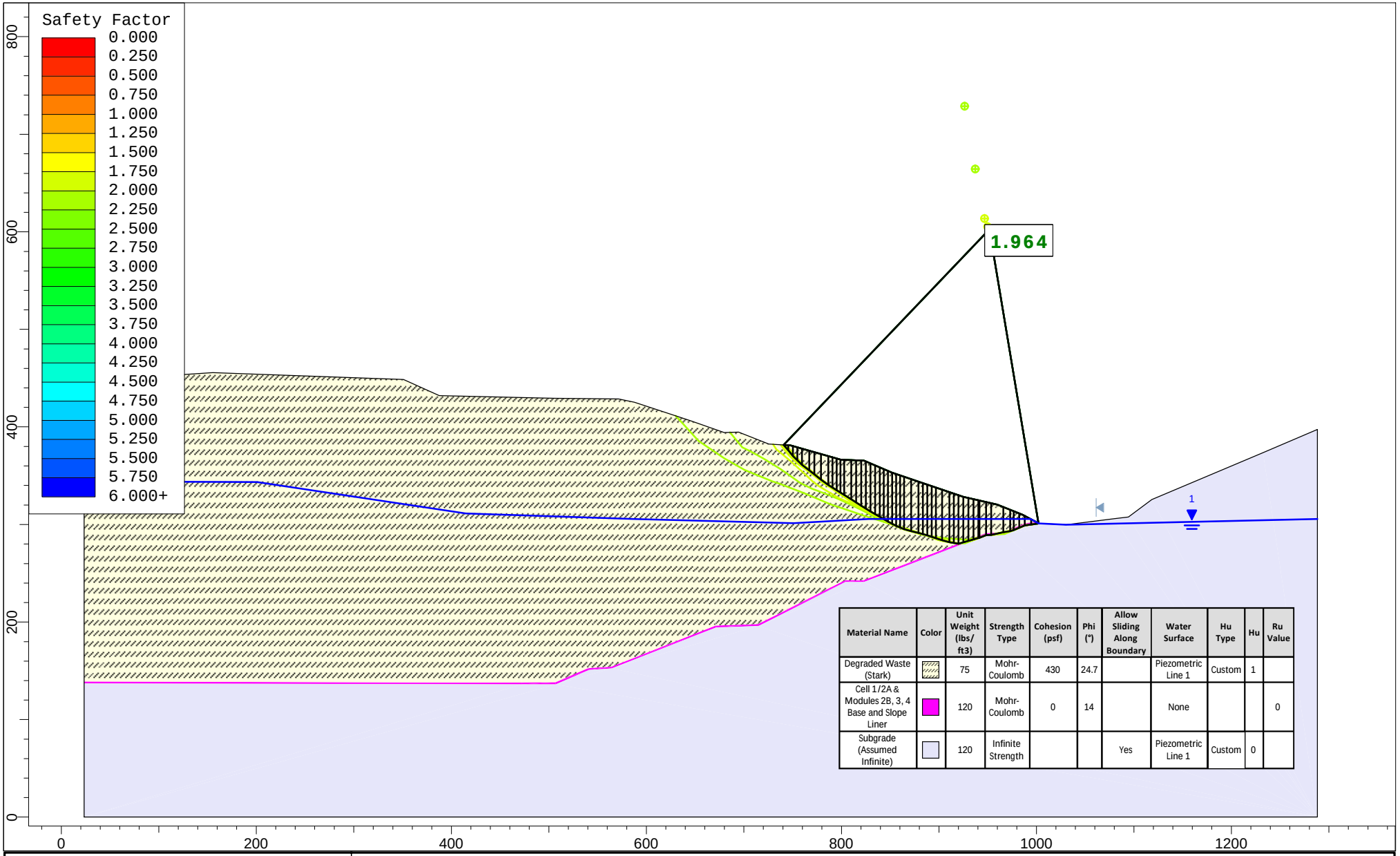
SLIDEINTERPRET 9.044



ROCSCIENCE

SLIDEINTERPRET 9.044

Project	COMPREHENSIVE STABILITY EVALUATION		
Group	Section 21+00	*Scenario*	Yield Acceleration
Drawn By	R. Mitchell	*Company*	GLA
Date	9/1/2026	*File Name*	West Slope Cross Sections +5.slmd

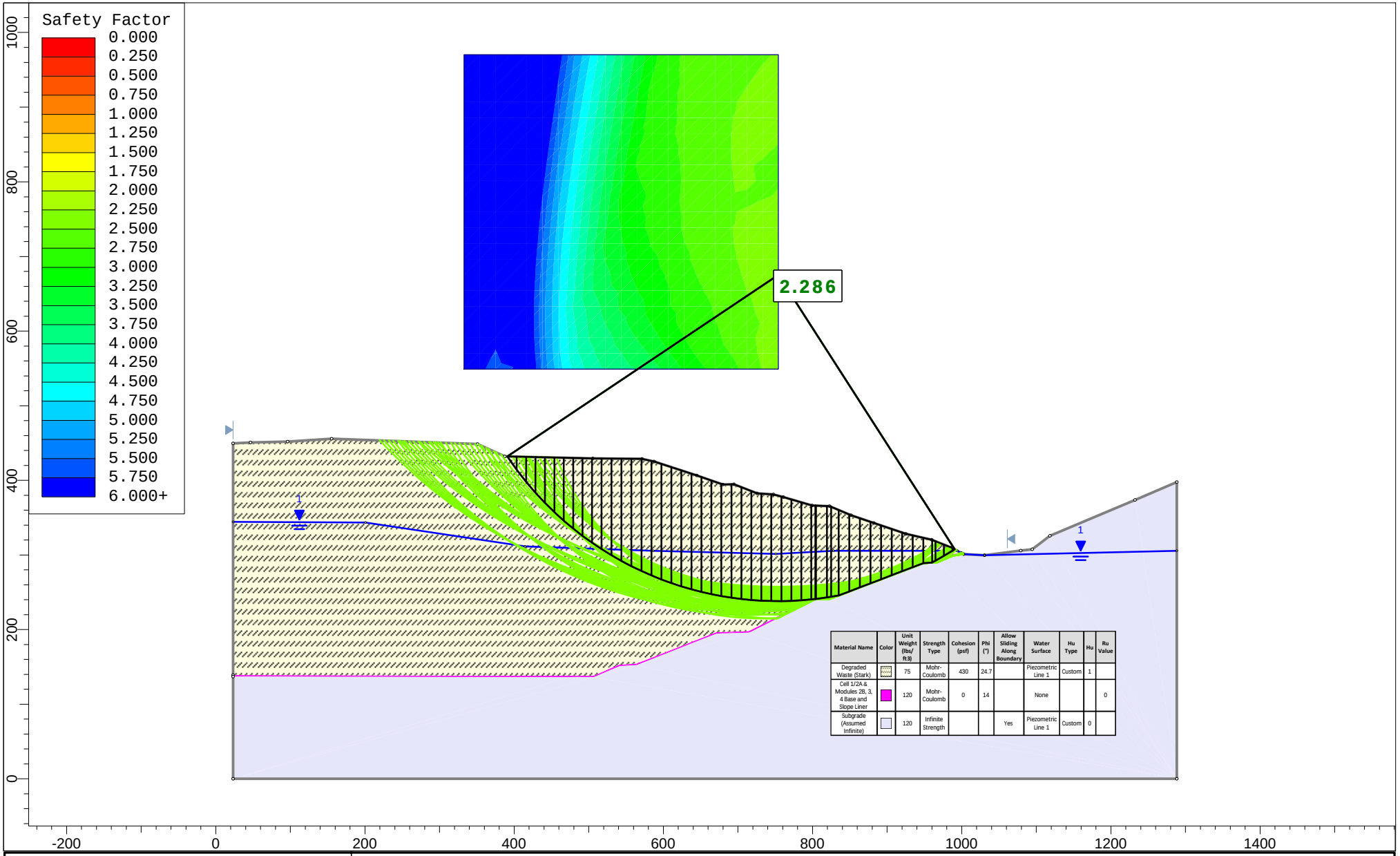


Material Name	Color	Unit Weight (lbs/ ft3)	Strength Type	Cohesion (psf)	Phi (°)	Allow Sliding Along Boundary	Water Surface	Hu Type	Hu	Ru Value
Degraded Waste (Stark)		75	Mohr-Coulomb	430	24.7		Piezometric Line 1	Custom	1	
Cell 1/2A & Modules 2B, 3, 4 Base and Slope Liner		120	Mohr-Coulomb	0	14		None			0
Subgrade (Assumed Infinite)		120	Infinite Strength			Yes	Piezometric Line 1	Custom	0	

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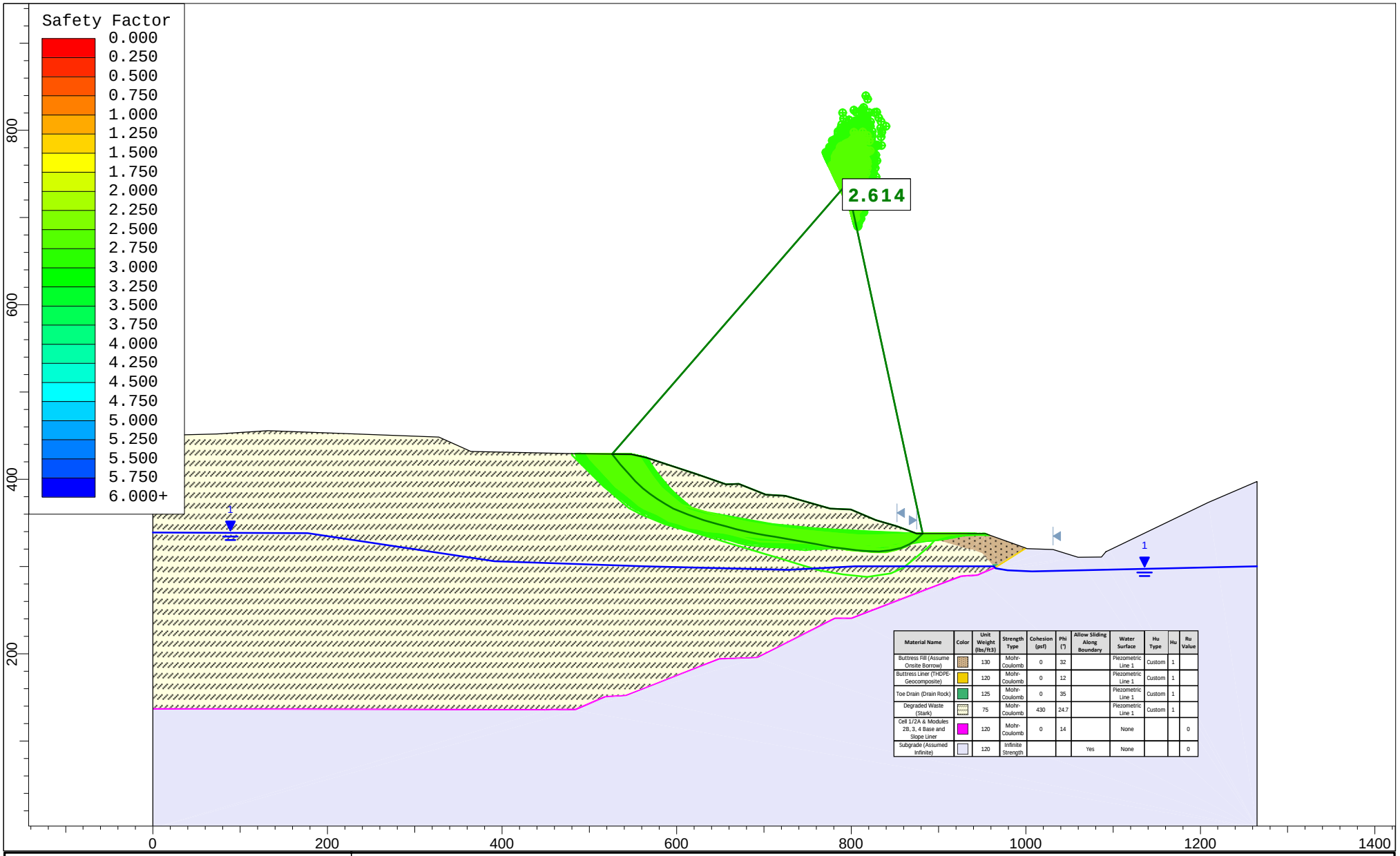
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Drawn By	R. Mitchell	*Company*	GLA
Date	9/1/2026	*File Name*	West Slope Cross Sections +5.slmd



ROCSCIENCE

SLIDEINTERPRET 9.044

Project	COMPREHENSIVE STABILITY EVALUATION		
Group	Section 24+00 (Pre-Buttress)	*Scenario*	Static Safety Factor (Circular)
Drawn By	R. Mitchell	*Company*	GLA
Date	9/1/2026	*File Name*	West Slope Cross Sections +5.slmd

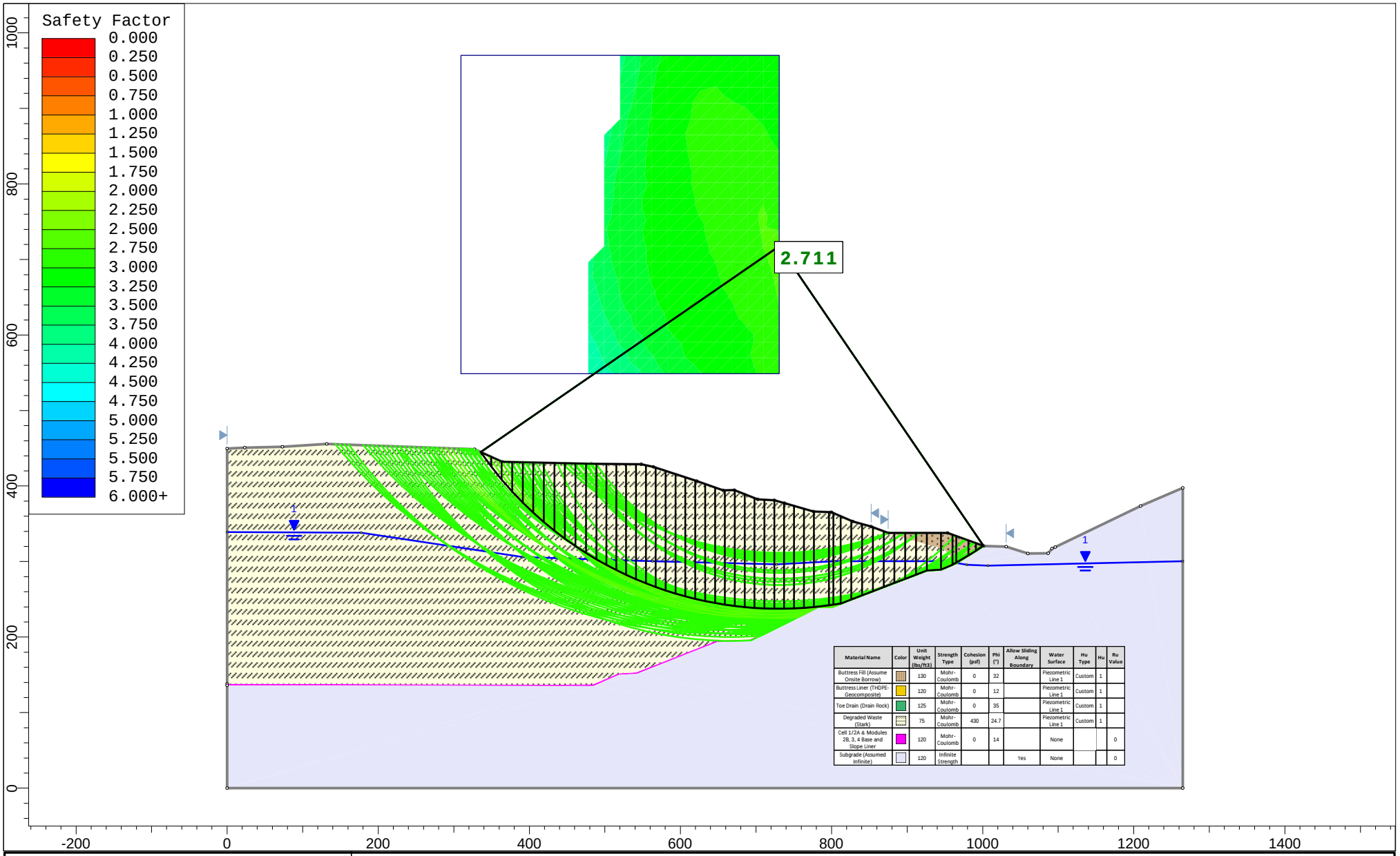


Material Name	Color	Unit Weight (lbs/ft3)	Strength Type	Cohesion (psf)	Phi (°)	Allow Sliding Along Boundary	Water Surface	Hu Type	Hu	Ru Value
Buttress Fill (Assume Onsite Borrow)		130	Mohr-Coulomb	0	32		Piezometric Line 1	Custom	1	
Buttress Liner (THDPE-Geocomposite)		120	Mohr-Coulomb	0	12		Piezometric Line 1	Custom	1	
Toe Drain (Drain Rock)		125	Mohr-Coulomb	0	35		Piezometric Line 1	Custom	1	
Degraded Waste (Stark)		75	Mohr-Coulomb	430	24.7		Piezometric Line 1	Custom	1	
Cell 1/2A & Modules 2B, 3, 4 Base and Slope Liner		120	Mohr-Coulomb	0	14		None			0
Subgrade (Assumed Infinite)		120	Infinite Strength			Yes	None			0

ROCSCIENCE

SLIDEINTERPRET 9.044

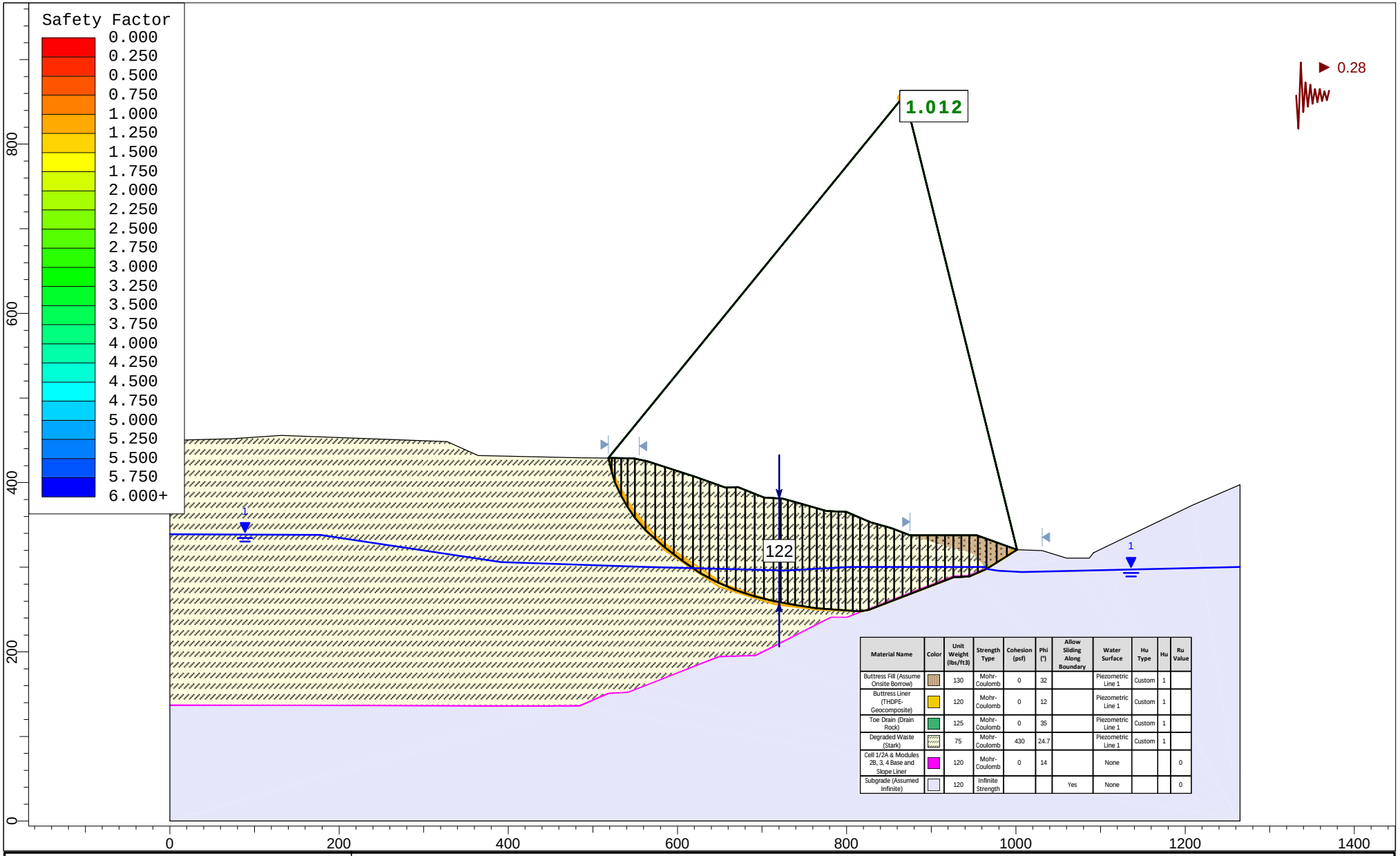
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Group	Section 24+00	Scenario	Static Safety Factor (Non-Circular)
Drawn By	R. Mitchell	Company	GLA
Date	9/1/2026	File Name	West Slope Cross Sections +5.slmd



ROCSCIENCE

SLIDEINTERPRET 9.044

Project	COMPREHENSIVE STABILITY EVALUATION		
Group	Section 24+00	Scenario	Static Safety Factor (Circular)
Drawn By	R. Mitchell	Company	GLA
Date	9/1/2026	File Name	West Slope Cross Sections +5.slmd

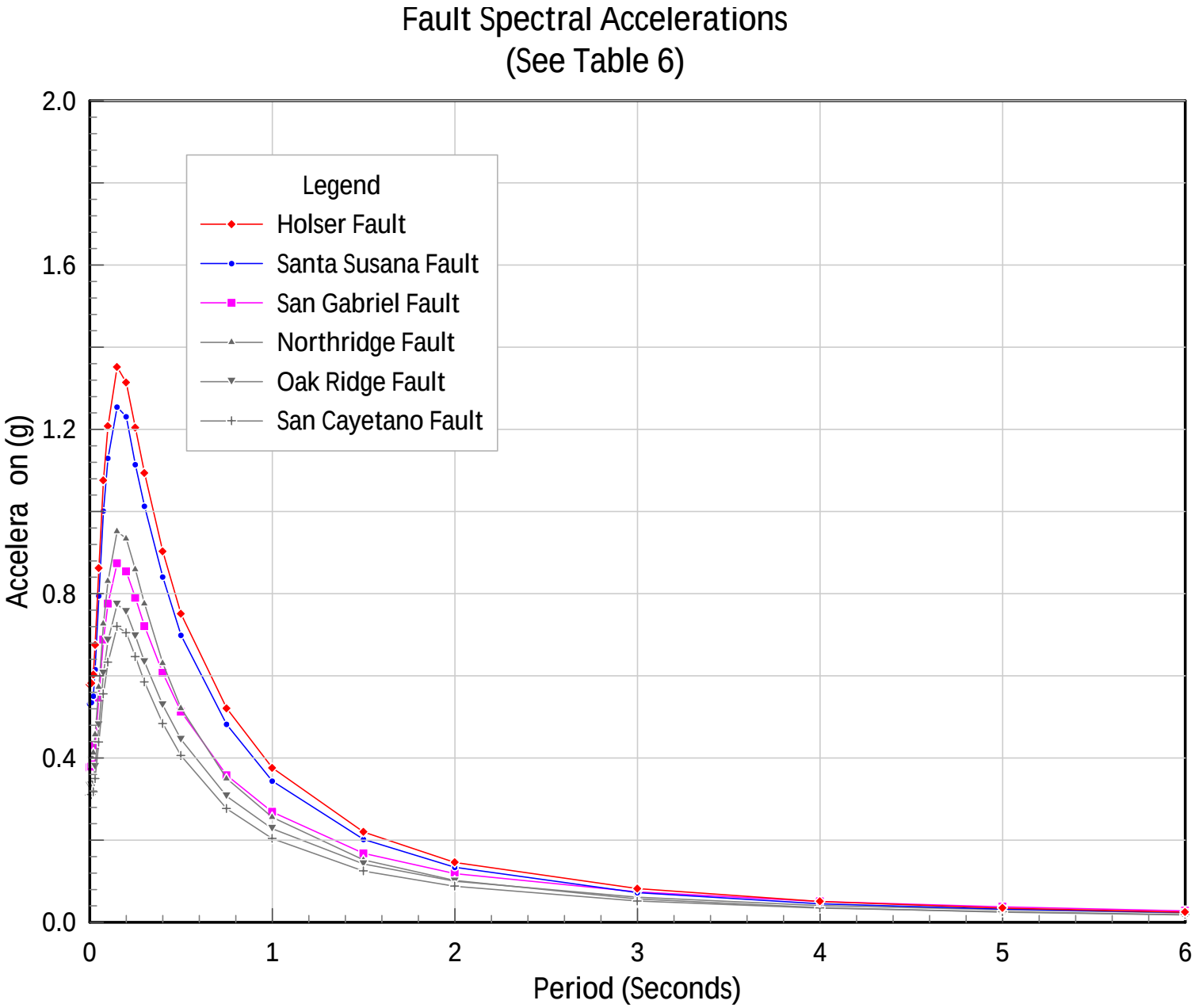


Material Name	Color	Unit Weight (lbs/ft3)	Strength Type	Cohesion (psf)	Phi (°)	Allow Sliding Along Boundary	Water Surface	Hu Type	Hu	Ru Value
Buttress Fill (Assume Onsite Borrow)		130	Mohr-Coulomb	0	32		Piezometric Line 1	Custom	1	
Buttress Liner (THDPE-Geocomposite)		120	Mohr-Coulomb	0	12		Piezometric Line 1	Custom	1	
Toe Drain (Drain Rock)		125	Mohr-Coulomb	0	35		Piezometric Line 1	Custom	1	
Degraded Waste (Stark)		75	Mohr-Coulomb	430	24.7		Piezometric Line 1	Custom	1	
Cell 1/2A & Modules 2B, 3, 4 Base and Slope Liner		120	Mohr-Coulomb	0	14		None			0
Subgrade (Assumed Infinite)		120	Infinite Strength			Yes	None			0

ROCSCIENCE

SLIDEINTERPRET 9.044

Project	COMPREHENSIVE STABILITY EVALUATION		
Group	Section 24+00	Scenario	Yield Acceleration
Drawn By	R. Mitchell	Company	GLA
Date	9/1/2026	File Name	West Slope Cross Sections +5.slmd


Fault Spectral Accelerations
(See Table 6)
Legend
Holser Fault
Santa Susana Fault
San Gabriel Fault
Northridge Fault
Oak Ridge Fault
San Cayetano Fault
Accelera on (g)
Period (Seconds)
0.0
0.4
0.8
1.2
1.6
2.0
0
1
2
3
4
5
6

Procedure for Estimating Shear-Induced Seismic Slope Displacement for Shallow Crustal Earthquakes

by Jonathan D. Bray and Jorge Macedo, UC Berkeley and Georgia Tech

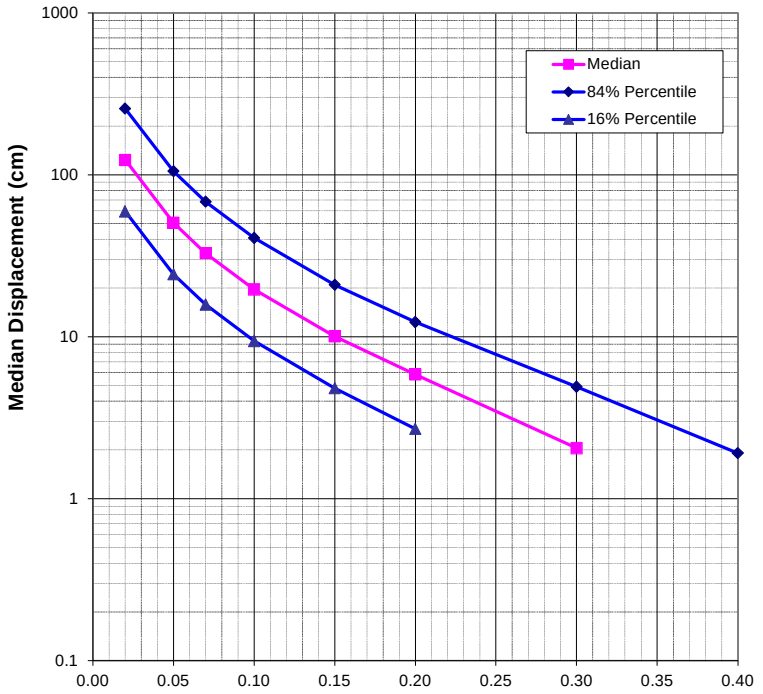
Procedure for Estimating Shear-Induced Seismic Slope Displacement for Shallow Crustal Earthquakes, ASCE JGGE, 2019, 145(12), doi: 10.1061/(ASCE)GT.1943-5606.0002143

SEE NOTES BELOW FOR GUIDANCE IN THE USE OF SPREADSHEET

Input Parameters			
Case	Deterministic-Pseudoprobabilistic (EQ8&9)		*** Select Ordinary or Pulse or Combined Equations**
Yield Coefficient (k_y) [(a)]	0.15		**(a) Based on pseudostatic analysis**
Initial Fundamental Period (T_s) [(b)]	0.48	seconds	**(b) 1D: T_s=4H/V_s 2D: T_s=2.6H/V_s**
Degraded Period (1.3T_s)	0.62	seconds	**(c) Input the Spectral Acceleration (g) at**
Moment Magnitude (M_w)	6.8		**the base of the sliding mass assuming**
Spectral Acceleration (S_a(1.3T_s)) [(c)]	0.60	g	**there is no material above it.**
PGV Information	Both Ordinary & Pulse Motions		**(d) PGV (cm/s) is required for near-fault pulse**
Peak Ground Velocity (PGV) [(d)]	40.0	cm/s	**motions & for EQ9 when PGV > 115 cm/s;**
Percentile (if Pulse ground Motion) [(e)]	Both Ordinary & Pulse Motions		**it is estimated at the base of sliding**
Additional Input Parameters			**mass assuming no material above it.**
Probability of Exceedance #1 (P1)	84	%	**(e) If Pulse motion the percentile is given**
Probability of Exceedance #2 (P2)	50	%	**as either D100 or D50. D100 should be**
Probability of Exceedance #3 (P3)	16	%	**used for fault-normal direction**
Displacement Threshold (d_threshold)	30	cm	
Intermediate Calculated Parameters			
Non-Zero Seismic Displacement Est (D)	10.1	cm	eq. (3) or (5) or (7) or (9)
Standard Deviation of Non-Zero Seismic D	0.736		
Results			
Probability of Negligible Displ. (P(D=0))	**0.00**		eq. (2) or (4) or (6) or (8)
D1	**4.8**	**cm**	calc. using eq. (11)
D2	**10.1**	**cm**	calc. using eq. (11)
D3	**20.9**	**cm**	calc. using eq. (11)
P(D>d_threshold)	**0.07**		eq. (11)

Dependence on k_y

k_y	P(D="0")	D (cm)	Dmedian (cm)	D-84% (cm)	D-16% (cm)
0.020	0.000	123.4	123.4	256.7	59.4
0.05	0.000	50.6	50.6	105.1	24.3
0.07	0.000	32.8	32.8	68.3	15.8
0.1	0.000	19.6	19.6	40.7	9.4
0.15	0.002	10.1	10.1	20.9	4.8
0.2	0.024	6.0	5.9	12.3	2.7
0.3	0.222	2.7	2.1	4.9	<0.5
0.4	0.546	1.4	<0.5	1.91	<0.5



Notes

1. Values highlighted in blue are input parameters, and results are presented in the table with the yellow heading.
2. Probability of Exceedance is the desired probability of exceeding a particular displacement value.
3. Displacements D1, D2, and D3 correspond to P1, P2, and P3, respectively.
   (e.g., the probability of exceeding displacement D1 is P1 and it is referred to as the (100% - P1) percentile value.
4. The 16%, 50%, and 84% percentile displacement values at selected k_y values are shown to the right.
5. Calculated seismic displacements are due to deviatoric deformation only (add in volumetrically induced movement).
6. k_y may range between 0.01 and 0.8, T_s between 0 and 2 s, S_a between 0.002 and 4.5 g, M_w between 5.5 and 8.2
7. Rigid slope is assumed for T_s < 0.05 s, i.e. T_s = 0.0. If Ts is just less than 0.05 s, set T_s = 0.050 s
8. When a value for D is not calculated, D is < 0.5 cm
9. k_y should be estimated with a slope stability program; the simplified equations shown below in Fig. 14.1 provide approximate values.
10. Examples of how T_s is estimated are shown below in Fig. 14.4 and Fig. 3.
11. V_s = weighted avg. shear wave velocity for the sliding mass, e.g., for 2 layers, V_s = [(h1)(V_s1) + (h2)(V_s2)]/(h1 + h2)

Procedure for Estimating Shear-Induced Seismic Slope Displacement for Shallow Crustal Earthquakes

by Jonathan D. Bray and Jorge Macedo, UC Berkeley and Georgia Tech

Procedure for Estimating Shear-Induced Seismic Slope Displacement for Shallow Crustal Earthquakes, ASCE JGGE, 2019, 145(12), doi: 10.1061/(ASCE)GT.1943-5606.0002143

SEE NOTES BELOW FOR GUIDANCE IN THE USE OF SPREADSHEET

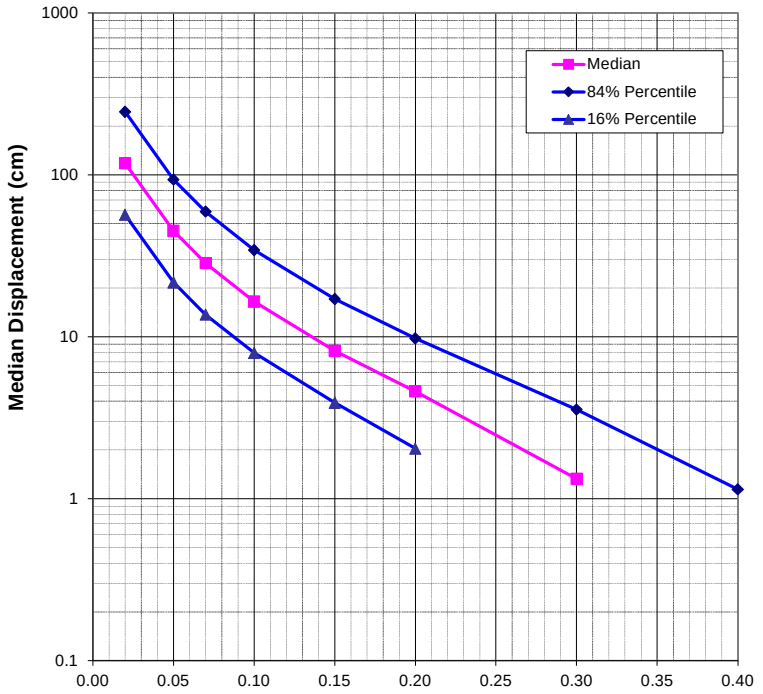
Input Parameters			
Case	Deterministic-Pseudoprobabilistic (EQ8&9)		*** Select Ordinary or Pulse or Combined Equations**
Yield Coefficient (k_y) [(a)]	0.21		**(a) Based on pseudostatic analysis**
Initial Fundamental Period (T_s) [(b)]	0.61	seconds	**(b) 1D: T_s=4H/V_s 2D: T_s=2.6H/V_s**
Degraded Period (1.3T_s)	0.79	seconds	**(c) Input the Spectral Acceleration (g) at**
Moment Magnitude (M_w)	6.8		**the base of the sliding mass assuming**
Spectral Acceleration (S_a(1.3T_s)) [(c)]	0.48	g	**there is no material above it.**
PGV Information	Both Ordinary & Pulse Motions		**(d) PGV (cm/s) is required for near-fault pulse**
Peak Ground Velocity (PGV) [(d)]	40.0	cm/s	**motions & for EQ9 when PGV > 115 cm/s;**
Percentile (if Pulse ground Motion) [(e)]	Both Ordinary & Pulse Motions		**it is estimated at the base of sliding**
Additional Input Parameters			**mass assuming no material above it.**
Probability of Exceedance #1 (P1)	84	%	**(e) If Pulse motion the percentile is given**
Probability of Exceedance #2 (P2)	50	%	**as either D100 or D50. D100 should be**
Probability of Exceedance #3 (P3)	16	%	**used for fault-normal direction**
Displacement Threshold (d_threshold)	30	cm	

Intermediate Calculated Parameters			
Non-Zero Seismic Displacement Est (D)	4.4	cm	eq. (3) or (5) or (7) or (9)
Standard Deviation of Non-Zero Seismic D	0.736		

Results			
Probability of Negligible Displ. (P(D=0))	**0.06**		eq. (2) or (4) or (6) or (8)
D1	**1.8**	**cm**	calc. using eq. (11)
D2	**4.1**	**cm**	calc. using eq. (11)
D3	**8.8**	**cm**	calc. using eq. (11)
P(D>d_threshold)	**0.00**		eq. (11)

Dependence on k_y

k_y	P(D="0")	D (cm)	Dmedian (cm)	D-84% (cm)	D-16% (cm)
0.020	0.000	117.8	117.8	244.9	56.7
0.05	0.000	45.0	45.0	93.5	21.6
0.07	0.000	28.5	28.5	59.2	13.7
0.1	0.000	16.5	16.5	34.3	7.9
0.15	0.005	8.2	8.2	17.1	3.9
0.2	0.042	4.8	4.6	9.8	2.0
0.3	0.315	2.1	1.3	3.6	<0.5
0.4	0.666	1.1	<0.5	1.14	<0.5



Notes

1. Values highlighted in blue are input parameters, and results are presented in the table with the yellow heading.
2. Probability of Exceedance is the desired probability of exceeding a particular displacement value.
3. Displacements D1, D2, and D3 correspond to P1, P2, and P3, respectively.
   (e.g., the probability of exceeding displacement D1 is P1 and it is referred to as the (100% - P1) percentile value.
4. The 16%, 50%, and 84% percentile displacement values at selected k_y values are shown to the right.
5. Calculated seismic displacements are due to deviatoric deformation only (add in volumetrically induced movement).
6. k_y may range between 0.01 and 0.8, T_s between 0 and 2 s, S_a between 0.002 and 4.5 g, M_w between 5.5 and 8.2
7. Rigid slope is assumed for T_s < 0.05 s, i.e. T_s = 0.0. If Ts is just less than 0.05 s, set T_s = 0.050 s
8. When a value for D is not calculated, D is < 0.5 cm
9. k_y should be estimated with a slope stability program; the simplified equations shown below in Fig. 14.1 provide approximate values.
10. Examples of how T_s is estimated are shown below in Fig. 14.4 and Fig. 3.
11. V_s = weighted avg. shear wave velocity for the sliding mass, e.g., for 2 layers, V_s = [(h1)(V_s1) + (h2)(V_s2)]/(h1 + h2)

SECTION 19+00

Procedure for Estimating Shear-Induced Seismic Slope Displacement for Shallow Crustal Earthquakes

by Jonathan D. Bray and Jorge Macedo, UC Berkeley and Georgia Tech

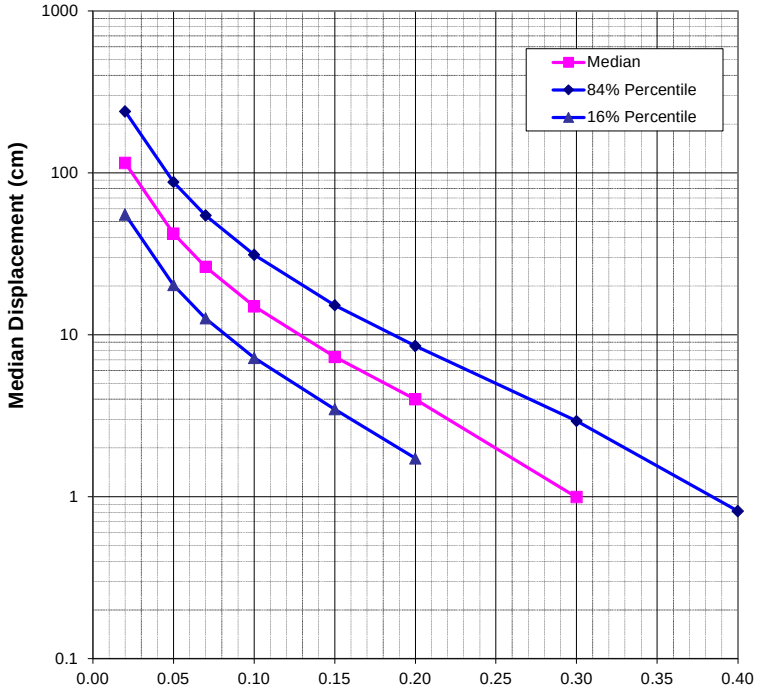
Procedure for Estimating Shear-Induced Seismic Slope Displacement for Shallow Crustal Earthquakes, ASCE JGGE, 2019, 145(12), doi: 10.1061/(ASCE)GT.1943-5606.0002143

SEE NOTES BELOW FOR GUIDANCE IN THE USE OF SPREADSHEET

Input Parameters			
Case	Deterministic-Pseudoprobabilistic (EQ8&9)		*** Select Ordinary or Pulse or Combined Equations**
Yield Coefficient (k_y) [(a)]	0.20		**(a) Based on pseudostatic analysis**
Initial Fundamental Period (T_s) [(b)]	0.70	seconds	**(b) 1D: T_s=4H/V_s 2D: T_s=2.6H/V_s**
Degraded Period (1.3T_s)	0.91	seconds	**(c) Input the Spectral Acceleration (g) at**
Moment Magnitude (M_w)	6.8		**the base of the sliding mass assuming**
Spectral Acceleration (S_a(1.3T_s)) [(c)]	0.42	g	**there is no material above it.**
PGV Information	Both Ordinary & Pulse Motions		**(d) PGV (cm/s) is required for near-fault pulse**
Peak Ground Velocity (PGV) [(d)]	40.0	cm/s	**motions & for EQ9 when PGV > 115 cm/s;**
Percentile (if Pulse ground Motion) [(e)]	Both Ordinary & Pulse Motions		**it is estimated at the base of sliding**
Additional Input Parameters			**mass assuming no material above it.**
Probability of Exceedance #1 (P1)	84	%	**(e) If Pulse motion the percentile is given**
Probability of Exceedance #2 (P2)	50	%	**as either D100 or D50. D100 should be**
Probability of Exceedance #3 (P3)	16	%	**used for fault-normal direction**
Displacement Threshold (d_threshold)	30	cm	
Intermediate Calculated Parameters			
Non-Zero Seismic Displacement Est (D)	4.2	cm	eq. (3) or (5) or (7) or (9)
Standard Deviation of Non-Zero Seismic D	0.736		
Results			
Probability of Negligible Displ. (P(D=0))	**0.05**		eq. (2) or (4) or (6) or (8)
D1	**1.7**	**cm**	calc. using eq. (11)
D2	**4.0**	**cm**	calc. using eq. (11)
D3	**8.5**	**cm**	calc. using eq. (11)
P(D>d_threshold)	**0.00**		eq. (11)

Dependence on k_y

k_y	P(D="0")	D (cm)	Dmedian (cm)	D-84% (cm)	D-16% (cm)
0.020	0.000	115.0	115.0	239.2	55.3
0.05	0.000	42.1	42.1	87.5	20.2
0.07	0.000	26.2	26.2	54.6	12.6
0.1	0.000	15.0	15.0	31.1	7.2
0.15	0.006	7.3	7.3	15.2	3.5
0.2	0.053	4.2	4.0	8.5	1.7
0.3	0.367	1.8	1.0	2.9	<0.5
0.4	0.721	0.9	<0.5	0.82	<0.5



Notes

1. Values highlighted in blue are input parameters, and results are presented in the table with the yellow heading.
2. Probability of Exceedance is the desired probability of exceeding a particular displacement value.
3. Displacements D1, D2, and D3 correspond to P1, P2, and P3, respectively.
   (e.g., the probability of exceeding displacement D1 is P1 and it is referred to as the (100% - P1) percentile value.
4. The 16%, 50%, and 84% percentile displacement values at selected k_y values are shown to the right.
5. Calculated seismic displacements are due to deviatoric deformation only (add in volumetrically induced movement).
6. k_y may range between 0.01 and 0.8, T_s between 0 and 2 s, S_a between 0.002 and 4.5 g, M_w between 5.5 and 8.2
7. Rigid slope is assumed for T_s < 0.05 s, i.e. T_s = 0.0. If Ts is just less than 0.05 s, set T_s = 0.050 s
8. When a value for D is not calculated, D is < 0.5 cm
9. k_y should be estimated with a slope stability program; the simplified equations shown below in Fig. 14.1 provide approximate values.
10. Examples of how T_s is estimated are shown below in Fig. 14.4 and Fig. 3.
11. V_s = weighted avg. shear wave velocity for the sliding mass, e.g., for 2 layers, V_s = [(h1)(V_s1) + (h2)(V_s2)]/(h1 + h2)

SECTION 21+00

Procedure for Estimating Shear-Induced Seismic Slope Displacement for Shallow Crustal Earthquakes

by Jonathan D. Bray and Jorge Macedo, UC Berkeley and Georgia Tech

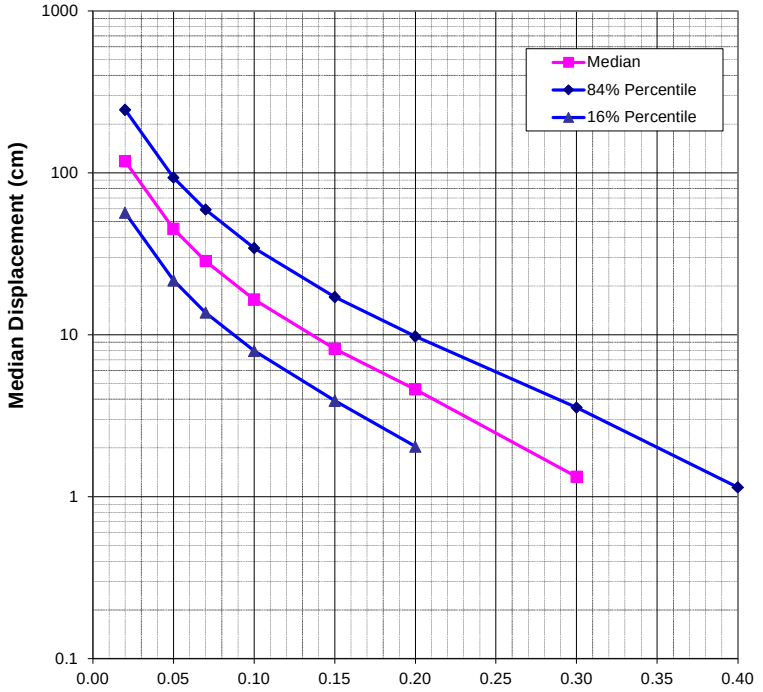
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SEE NOTES BELOW FOR GUIDANCE IN THE USE OF SPREADSHEET

Input Parameters			
Case	Deterministic-Pseudoprobabilistic (EQ8&9)		*** Select Ordinary or Pulse or Combined Equations**
Yield Coefficient (k_y) [(a)]	0.23		**(a) Based on pseudostatic analysis**
Initial Fundamental Period (T_s) [(b)]	0.61	seconds	**(b) 1D: T_s=4H/V_s 2D: T_s=2.6H/V_s**
Degraded Period (1.3T_s)	0.79	seconds	**(c) Input the Spectral Acceleration (g) at**
Moment Magnitude (M_w)	6.8		**the base of the sliding mass assuming**
Spectral Acceleration (S_a(1.3T_s)) [(c)]	0.48	g	**there is no material above it.**
PGV Information	Both Ordinary & Pulse Motions		**(d) PGV (cm/s) is required for near-fault pulse**
Peak Ground Velocity (PGV) [(d)]	40.0	cm/s	**motions & for EQ9 when PGV > 115 cm/s;**
Percentile (if Pulse ground Motion) [(e)]	Both Ordinary & Pulse Motions		**it is estimated at the base of sliding**
Additional Input Parameters			**mass assuming no material above it.**
Probability of Exceedance #1 (P1)	84	%	**(e) If Pulse motion the percentile is given**
Probability of Exceedance #2 (P2)	50	%	**as either D100 or D50. D100 should be**
Probability of Exceedance #3 (P3)	16	%	**used for fault-normal direction**
Displacement Threshold (d_threshold)	30	cm	
Intermediate Calculated Parameters			
Non-Zero Seismic Displacement Est (D)	3.6	cm	eq. (3) or (5) or (7) or (9)
Standard Deviation of Non-Zero Seismic D	0.736		
Results			
Probability of Negligible Displ. (P(D=0))	**0.10**		eq. (2) or (4) or (6) or (8)
D1	**1.2**	**cm**	calc. using eq. (11)
D2	**3.3**	**cm**	calc. using eq. (11)
D3	**7.2**	**cm**	calc. using eq. (11)
P(D>d_threshold)	**0.00**		eq. (11)

Dependence on k_y

k_y	P(D="0")	D (cm)	Dmedian (cm)	D-84% (cm)	D-16% (cm)
0.020	0.000	117.8	117.8	244.9	56.7
0.05	0.000	45.0	45.0	93.5	21.6
0.07	0.000	28.5	28.5	59.2	13.7
0.1	0.000	16.5	16.5	34.3	7.9
0.15	0.005	8.2	8.2	17.1	3.9
0.2	0.042	4.8	4.6	9.8	2.0
0.3	0.315	2.1	1.3	3.6	<0.5
0.4	0.666	1.1	<0.5	1.14	<0.5



Notes

1. Values highlighted in blue are input parameters, and results are presented in the table with the yellow heading.
2. Probability of Exceedance is the desired probability of exceeding a particular displacement value.
3. Displacements D1, D2, and D3 correspond to P1, P2, and P3, respectively.
   (e.g., the probability of exceeding displacement D1 is P1 and it is referred to as the (100% - P1) percentile value.
4. The 16%, 50%, and 84% percentile displacement values at selected k_y values are shown to the right.
5. Calculated seismic displacements are due to deviatoric deformation only (add in volumetrically induced movement).
6. k_y may range between 0.01 and 0.8, T_s between 0 and 2 s, S_a between 0.002 and 4.5 g, M_w between 5.5 and 8.2
7. Rigid slope is assumed for T_s < 0.05 s, i.e. T_s = 0.0. If Ts is just less than 0.05 s, set T_s = 0.050 s
8. When a value for D is not calculated, D is < 0.5 cm
9. k_y should be estimated with a slope stability program; the simplified equations shown below in Fig. 14.1 provide approximate values.
10. Examples of how T_s is estimated are shown below in Fig. 14.4 and Fig. 3.
11. V_s = weighted avg. shear wave velocity for the sliding mass, e.g., for 2 layers, V_s = [(h1)(V_s1) + (h2)(V_s2)]/(h1 + h2)

SECTION 24+00

Procedure for Estimating Shear-Induced Seismic Slope Displacement for Shallow Crustal Earthquakes

by Jonathan D. Bray and Jorge Macedo, UC Berkeley and Georgia Tech

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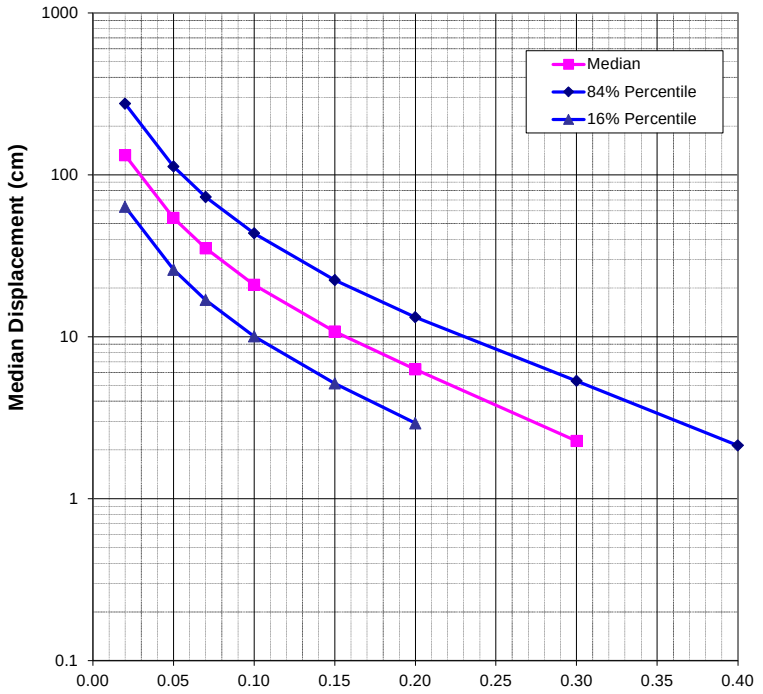
Input Parameters			
Case	Deterministic-Pseudoprobabilistic (EQ8&9)		*** Select Ordinary or Pulse or Combined Equations**
Yield Coefficient (k_y) [(a)]	0.28		**(a) Based on pseudostatic analysis**
Initial Fundamental Period (T_s) [(b)]	0.51	seconds	**(b) 1D: T_s=4H/V_s 2D: T_s=2.6H/V_s**
Degraded Period (1.3T_s)	0.66	seconds	**(c) Input the Spectral Acceleration (g) at**
Moment Magnitude (M_w)	6.8		**the base of the sliding mass assuming**
Spectral Acceleration (S_a(1.3T_s)) [(c)]	0.60	g	**there is no material above it.**
PGV Information	Both Ordinary & Pulse Motions		**(d) PGV (cm/s) is required for near-fault pulse**
Peak Ground Velocity (PGV) [(d)]	40.0	cm/s	**motions & for EQ9 when PGV > 115 cm/s;**
Percentile (if Pulse ground Motion) [(e)]	Both Ordinary & Pulse Motions		**it is estimated at the base of sliding**
Additional Input Parameters			**mass assuming no material above it.**
Probability of Exceedance #1 (P1)	84	%	**(e) If Pulse motion the percentile is given**
Probability of Exceedance #2 (P2)	50	%	**as either D100 or D50. D100 should be**
Probability of Exceedance #3 (P3)	16	%	**used for fault-normal direction**
Displacement Threshold (d_threshold)	30	cm	

Intermediate Calculated Parameters			
Non-Zero Seismic Displacement Est (D)	3.3	cm	eq. (3) or (5) or (7) or (9)
Standard Deviation of Non-Zero Seismic D	0.736		

Results			
Probability of Negligible Displ. (P(D=0))	**0.15**		eq. (2) or (4) or (6) or (8)
D1	**0.7**	**cm**	calc. using eq. (11)
D2	**2.8**	**cm**	calc. using eq. (11)
D3	**6.4**	**cm**	calc. using eq. (11)
P(D>d_threshold)	**0.00**		eq. (11)

Dependence on k_y

k_y	P(D="0")	D (cm)	Dmedian (cm)	D-84% (cm)	D-16% (cm)
0.020	0.000	132.1	132.1	274.6	63.5
0.05	0.000	54.1	54.1	112.4	26.0
0.07	0.000	35.1	35.1	73.1	16.9
0.1	0.000	20.9	20.9	43.5	10.1
0.15	0.002	10.8	10.8	22.4	5.2
0.2	0.020	6.4	6.3	13.2	2.9
0.3	0.200	2.9	2.3	5.3	<0.5
0.4	0.519	1.6	<0.5	2.13	<0.5



Notes

1. Values highlighted in blue are input parameters, and results are presented in the table with the yellow heading.
2. Probability of Exceedance is the desired probability of exceeding a particular displacement value.
3. Displacements D1, D2, and D3 correspond to P1, P2, and P3, respectively.
   (e.g., the probability of exceeding displacement D1 is P1 and it is referred to as the (100% - P1) percentile value.
4. The 16%, 50%, and 84% percentile displacement values at selected k_y values are shown to the right.
5. Calculated seismic displacements are due to deviatoric deformation only (add in volumetrically induced movement).
6. k_y may range between 0.01 and 0.8, T_s between 0 and 2 s, S_a between 0.002 and 4.5 g, M_w between 5.5 and 8.2
7. Rigid slope is assumed for T_s < 0.05 s, i.e. T_s = 0.0. If Ts is just less than 0.05 s, set T_s = 0.050 s
8. When a value for D is not calculated, D is < 0.5 cm
9. k_y should be estimated with a slope stability program; the simplified equations shown below in Fig. 14.1 provide approximate values.
10. Examples of how T_s is estimated are shown below in Fig. 14.4 and Fig. 3.
11. V_s = weighted avg. shear wave velocity for the sliding mass, e.g., for 2 layers, V_s = [(h1)(V_s1) + (h2)(V_s2)]/(h1 + h2)

SECTION NS-03

Procedure for Estimating Shear-Induced Seismic Slope Displacement for Shallow Crustal Earthquakes

by Jonathan D. Bray and Jorge Macedo, UC Berkeley and Georgia Tech

Procedure for Estimating Shear-Induced Seismic Slope Displacement for Shallow Crustal Earthquakes, ASCE JGGE, 2019, 145(12), doi: 10.1061/(ASCE)GT.1943-5606.0002143

SEE NOTES BELOW FOR GUIDANCE IN THE USE OF SPREADSHEET

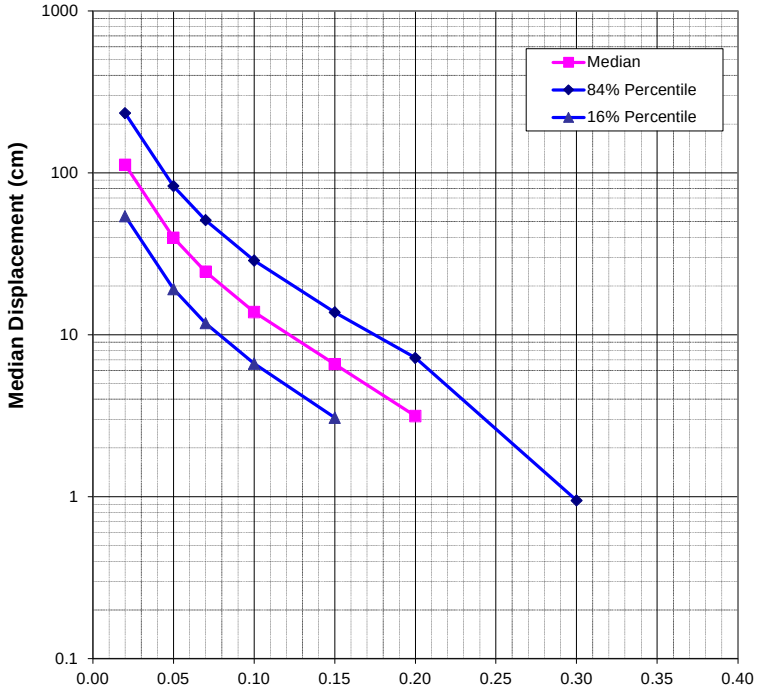
Input Parameters			
Case	Deterministic-Pseudoprobabilistic (EQ8&9)		*** Select Ordinary or Pulse or Combined Equations**
Yield Coefficient (k_y) [(a)]	0.13		**(a) Based on pseudostatic analysis**
Initial Fundamental Period (T_s) [(b)]	0.77	seconds	**(b) 1D: T_s=4H/V_s 2D: T_s=2.6H/V_s**
Degraded Period (1.3T_s)	1.00	seconds	**(c) Input the Spectral Acceleration (g) at**
Moment Magnitude (M_w)	6.8		**the base of the sliding mass assuming**
Spectral Acceleration (S_a(1.3T_s)) [(c)]	0.38	g	**there is no material above it.**
PGV Information	Both Ordinary & Pulse Motions		**(d) PGV (cm/s) is required for near-fault pulse**
Peak Ground Velocity (PGV) [(d)]	40.0	cm/s	**motions & for EQ9 when PGV > 115 cm/s;**
Percentile (if Pulse ground Motion) [(e)]	Both Ordinary & Pulse Motions		**it is estimated at the base of sliding**
Additional Input Parameters			**mass assuming no material above it.**
Probability of Exceedance #1 (P1)	84	%	**(e) If Pulse motion the percentile is given**
Probability of Exceedance #2 (P2)	50	%	**as either D100 or D50. D100 should be**
Probability of Exceedance #3 (P3)	16	%	**used for fault-normal direction**
Displacement Threshold (d_threshold)	30	cm	

Intermediate Calculated Parameters			
Non-Zero Seismic Displacement Est (D)	8.7	cm	eq. (3) or (5) or (7) or (9)
Standard Deviation of Non-Zero Seismic D	0.736		

Results			
Probability of Negligible Displ. (P(D=0))	**0.00**		eq. (2) or (4) or (6) or (8)
D1	**4.2**	**cm**	calc. using eq. (11)
D2	**8.7**	**cm**	calc. using eq. (11)
D3	**18.1**	**cm**	calc. using eq. (11)
P(D>d_threshold)	**0.05**		eq. (11)

Dependence on k_y

k_y	P(D="0")	D (cm)	Dmedian (cm)	D-84% (cm)	D-16% (cm)
0.020	0.000	112.2	112.2	233.2	54.0
0.05	0.000	39.8	39.8	82.7	19.1
0.07	0.000	24.5	24.5	51.0	11.8
0.1	0.000	13.8	13.8	28.7	6.6
0.15	0.015	6.7	6.6	13.8	3.1
0.2	0.168	3.8	3.1	7.2	<0.5
0.3	0.789	1.6	<0.5	0.9	<0.5
0.4	0.983	0.8	<0.5	<0.5	<0.5



Notes

1. Values highlighted in blue are input parameters, and results are presented in the table with the yellow heading.
2. Probability of Exceedance is the desired probability of exceeding a particular displacement value.
3. Displacements D1, D2, and D3 correspond to P1, P2, and P3, respectively.
   (e.g., the probability of exceeding displacement D1 is P1 and it is referred to as the (100% - P1) percentile value.
4. The 16%, 50%, and 84% percentile displacement values at selected k_y values are shown to the right.
5. Calculated seismic displacements are due to deviatoric deformation only (add in volumetrically induced movement).
6. k_y may range between 0.01 and 0.8, T_s between 0 and 2 s, S_a between 0.002 and 4.5 g, M_w between 5.5 and 8.2
7. Rigid slope is assumed for T_s < 0.05 s, i.e. T_s = 0.0. If Ts is just less than 0.05 s, set T_s = 0.050 s
8. When a value for D is not calculated, D is < 0.5 cm
9. k_y should be estimated with a slope stability program; the simplified equations shown below in Fig. 14.1 provide approximate values.
10. Examples of how T_s is estimated are shown below in Fig. 14.4 and Fig. 3.
11. V_s = weighted avg. shear wave velocity for the sliding mass, e.g., for 2 layers, V_s = [(h1)(V_s1) + (h2)(V_s2)]/(h1 + h2)

SECTION SS-01

Procedure for Estimating Shear-Induced Seismic Slope Displacement for Shallow Crustal Earthquakes

by Jonathan D. Bray and Jorge Macedo, UC Berkeley and Georgia Tech

Procedure for Estimating Shear-Induced Seismic Slope Displacement for Shallow Crustal Earthquakes, ASCE JGGE, 2019, 145(12), doi: 10.1061/(ASCE)GT.1943-5606.0002143

SEE NOTES BELOW FOR GUIDANCE IN THE USE OF SPREADSHEET

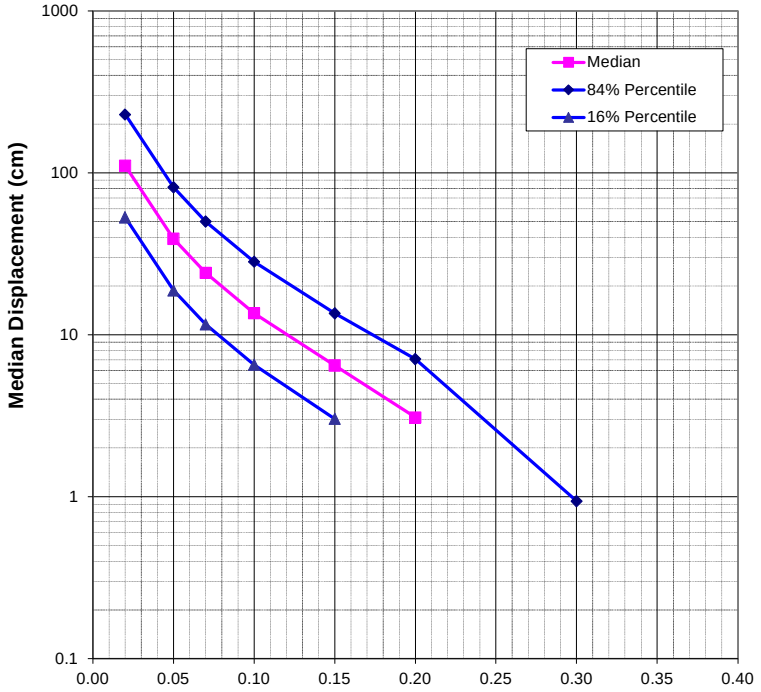
Input Parameters			
Case	Deterministic-Pseudoprobabilistic (EQ8&9)		*** Select Ordinary or Pulse or Combined Equations**
Yield Coefficient (k_y) [(a)]	0.09		**(a) Based on pseudostatic analysis**
Initial Fundamental Period (T_s) [(b)]	0.76	seconds	**(b) 1D: T_s=4H/V_s 2D: T_s=2.6H/V_s**
Degraded Period (1.3T_s)	0.99	seconds	**(c) Input the Spectral Acceleration (g) at**
Moment Magnitude (M_w)	6.8		**the base of the sliding mass assuming**
Spectral Acceleration (S_a(1.3T_s)) [(c)]	0.38	g	**there is no material above it.**
PGV Information	Both Ordinary & Pulse Motions		**(d) PGV (cm/s) is required for near-fault pulse**
Peak Ground Velocity (PGV) [(d)]	40.0	cm/s	**motions & for EQ9 when PGV > 115 cm/s;**
Percentile (if Pulse ground Motion) [(e)]	Both Ordinary & Pulse Motions		**it is estimated at the base of sliding**
Additional Input Parameters			**mass assuming no material above it.**
Probability of Exceedance #1 (P1)	84	%	**(e) If Pulse motion the percentile is given**
Probability of Exceedance #2 (P2)	50	%	**as either D100 or D50. D100 should be**
Probability of Exceedance #3 (P3)	16	%	**used for fault-normal direction**
Displacement Threshold (d_threshold)	30	cm	

Intermediate Calculated Parameters			
Non-Zero Seismic Displacement Est (D)	16.2	cm	eq. (3) or (5) or (7) or (9)
Standard Deviation of Non-Zero Seismic D	0.736		

Results			
Probability of Negligible Displ. (P(D=0))	**0.00**		eq. (2) or (4) or (6) or (8)
D1	**7.8**	**cm**	calc. using eq. (11)
D2	**16.2**	**cm**	calc. using eq. (11)
D3	**33.6**	**cm**	calc. using eq. (11)
P(D>d_threshold)	**0.20**		eq. (11)

Dependence on k_y

k_y	P(D="0")	D (cm)	Dmedian (cm)	D-84% (cm)	D-16% (cm)
0.020	0.000	110.2	110.2	229.2	53.0
0.05	0.000	39.1	39.1	81.3	18.8
0.07	0.000	24.1	24.1	50.1	11.6
0.1	0.000	13.6	13.6	28.2	6.5
0.15	0.015	6.6	6.5	13.5	3.0
0.2	0.167	3.7	3.1	7.1	<0.5
0.3	0.789	1.6	<0.5	0.9	<0.5
0.4	0.983	0.8	<0.5	<0.5	<0.5



Notes

1. Values highlighted in blue are input parameters, and results are presented in the table with the yellow heading.
2. Probability of Exceedance is the desired probability of exceeding a particular displacement value.
3. Displacements D1, D2, and D3 correspond to P1, P2, and P3, respectively.
   (e.g., the probability of exceeding displacement D1 is P1 and it is referred to as the (100% - P1) percentile value.
4. The 16%, 50%, and 84% percentile displacement values at selected k_y values are shown to the right.
5. Calculated seismic displacements are due to deviatoric deformation only (add in volumetrically induced movement).
6. k_y may range between 0.01 and 0.8, T_s between 0 and 2 s, S_a between 0.002 and 4.5 g, M_w between 5.5 and 8.2
7. Rigid slope is assumed for T_s < 0.05 s, i.e. T_s = 0.0. If Ts is just less than 0.05 s, set T_s = 0.050 s
8. When a value for D is not calculated, D is < 0.5 cm
9. k_y should be estimated with a slope stability program; the simplified equations shown below in Fig. 14.1 provide approximate values.
10. Examples of how T_s is estimated are shown below in Fig. 14.4 and Fig. 3.
11. V_s = weighted avg. shear wave velocity for the sliding mass, e.g., for 2 layers, V_s = [(h1)(V_s1) + (h2)(V_s2)]/(h1 + h2)

SECTION SS-02

Procedure for Estimating Shear-Induced Seismic Slope Displacement for Shallow Crustal Earthquakes

by Jonathan D. Bray and Jorge Macedo, UC Berkeley and Georgia Tech

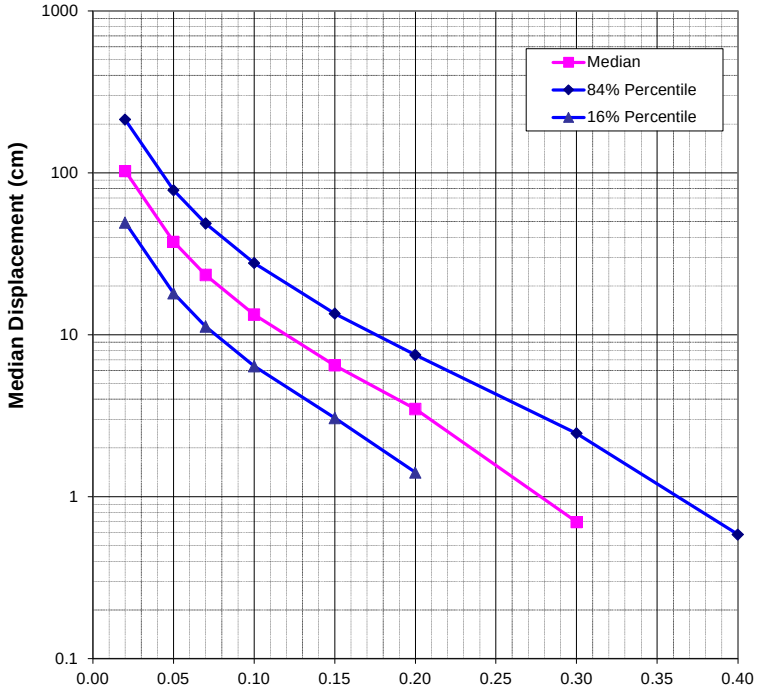
Procedure for Estimating Shear-Induced Seismic Slope Displacement for Shallow Crustal Earthquakes, ASCE JGGE, 2019, 145(12), doi: 10.1061/(ASCE)GT.1943-5606.0002143

SEE NOTES BELOW FOR GUIDANCE IN THE USE OF SPREADSHEET

Input Parameters			
Case	Deterministic-Pseudoprobabilistic (EQ8&9)		*** Select Ordinary or Pulse or Combined Equations**
Yield Coefficient (k_y) [(a)]	0.13		**(a) Based on pseudostatic analysis**
Initial Fundamental Period (T_s) [(b)]	0.64	seconds	**(b) 1D: T_s=4H/V_s 2D: T_s=2.6H/V_s**
Degraded Period (1.3T_s)	0.83	seconds	**(c) Input the Spectral Acceleration (g) at**
Moment Magnitude (M_w)	6.8		**the base of the sliding mass assuming**
Spectral Acceleration (S_a(1.3T_s)) [(c)]	0.42	g	**there is no material above it.**
PGV Information	Both Ordinary & Pulse Motions		**(d) PGV (cm/s) is required for near-fault pulse**
Peak Ground Velocity (PGV) [(d)]	40.0	cm/s	**motions & for EQ9 when PGV > 115 cm/s;**
Percentile (if Pulse ground Motion) [(e)]	Both Ordinary & Pulse Motions		**it is estimated at the base of sliding**
Additional Input Parameters			**mass assuming no material above it.**
Probability of Exceedance #1 (P1)	84	%	**(e) If Pulse motion the percentile is given**
Probability of Exceedance #2 (P2)	50	%	**as either D100 or D50. D100 should be**
Probability of Exceedance #3 (P3)	16	%	**used for fault-normal direction**
Displacement Threshold (d_threshold)	30	cm	
Intermediate Calculated Parameters			
Non-Zero Seismic Displacement Est (D)	8.5	cm	eq. (3) or (5) or (7) or (9)
Standard Deviation of Non-Zero Seismic D	0.736		
Results			
Probability of Negligible Displ. (P(D=0))	**0.00**		eq. (2) or (4) or (6) or (8)
D1	**4.0**	**cm**	calc. using eq. (11)
D2	**8.5**	**cm**	calc. using eq. (11)
D3	**17.6**	**cm**	calc. using eq. (11)
P(D>d_threshold)	**0.04**		eq. (11)

Dependence on k_y

k_y	P(D="0")	D (cm)	Dmedian (cm)	D-84% (cm)	D-16% (cm)
0.020	0.000	102.4	102.4	213.0	49.3
0.05	0.000	37.5	37.5	77.9	18.0
0.07	0.000	23.4	23.4	48.6	11.2
0.1	0.000	13.3	13.3	27.7	6.4
0.15	0.010	6.5	6.5	13.5	3.1
0.2	0.074	3.7	3.5	7.5	1.4
0.3	0.425	1.6	0.7	2.5	<0.5
0.4	0.766	0.8	<0.5	0.58	<0.5



Notes

1. Values highlighted in blue are input parameters, and results are presented in the table with the yellow heading.
2. Probability of Exceedance is the desired probability of exceeding a particular displacement value.
3. Displacements D1, D2, and D3 correspond to P1, P2, and P3, respectively.
   (e.g., the probability of exceeding displacement D1 is P1 and it is referred to as the (100% - P1) percentile value.
4. The 16%, 50%, and 84% percentile displacement values at selected k_y values are shown to the right.
5. Calculated seismic displacements are due to deviatoric deformation only (add in volumetrically induced movement).
6. k_y may range between 0.01 and 0.8, T_s between 0 and 2 s, S_a between 0.002 and 4.5 g, M_w between 5.5 and 8.2
7. Rigid slope is assumed for T_s < 0.05 s, i.e. T_s = 0.0. If Ts is just less than 0.05 s, set T_s = 0.050 s
8. When a value for D is not calculated, D is < 0.5 cm
9. k_y should be estimated with a slope stability program; the simplified equations shown below in Fig. 14.1 provide approximate values.
10. Examples of how T_s is estimated are shown below in Fig. 14.4 and Fig. 3.
11. V_s = weighted avg. shear wave velocity for the sliding mass, e.g., for 2 layers, V_s = [(h1)(V_s1) + (h2)(V_s2)]/(h1 + h2)

SECTION SS-03

Procedure for Estimating Shear-Induced Seismic Slope Displacement for Shallow Crustal Earthquakes

by Jonathan D. Bray and Jorge Macedo, UC Berkeley and Georgia Tech

Procedure for Estimating Shear-Induced Seismic Slope Displacement for Shallow Crustal Earthquakes, ASCE JGGE, 2019, 145(12), doi: 10.1061/(ASCE)GT.1943-5606.0002143

SEE NOTES BELOW FOR GUIDANCE IN THE USE OF SPREADSHEET

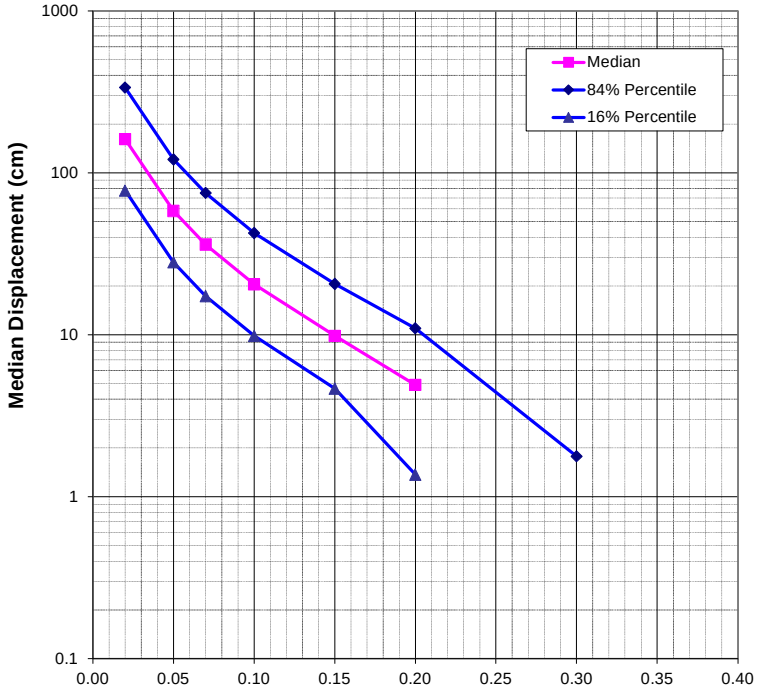
Input Parameters			
Case	Deterministic-Pseudoprobabilistic (EQ8&9)		*** Select Ordinary or Pulse or Combined Equations**
Yield Coefficient (k_y) [(a)]	0.13		**(a) Based on pseudostatic analysis**
Initial Fundamental Period (T_s) [(b)]	0.95	seconds	**(b) 1D: T_s=4H/V_s 2D: T_s=2.6H/V_s**
Degraded Period (1.3T_s)	1.24	seconds	**(c) Input the Spectral Acceleration (g) at**
Moment Magnitude (M_w)	6.8		**the base of the sliding mass assuming**
Spectral Acceleration (S_a(1.3T_s)) [(c)]	0.40	g	**there is no material above it.**
PGV Information	Both Ordinary & Pulse Motions		**(d) PGV (cm/s) is required for near-fault pulse**
Peak Ground Velocity (PGV) [(d)]	40.0	cm/s	**motions & for EQ9 when PGV > 115 cm/s;**
Percentile (if Pulse ground Motion) [(e)]	Both Ordinary & Pulse Motions		**it is estimated at the base of sliding**
Additional Input Parameters			**mass assuming no material above it.**
Probability of Exceedance #1 (P1)	84	%	**(e) If Pulse motion the percentile is given**
Probability of Exceedance #2 (P2)	50	%	**as either D100 or D50. D100 should be**
Probability of Exceedance #3 (P3)	16	%	**used for fault-normal direction**
Displacement Threshold (d_threshold)	30	cm	

Intermediate Calculated Parameters			
Non-Zero Seismic Displacement Est (D)	12.9	cm	eq. (3) or (5) or (7) or (9)
Standard Deviation of Non-Zero Seismic D	0.736		

Results			
Probability of Negligible Displ. (P(D=0))	**0.00**		eq. (2) or (4) or (6) or (8)
D1	**6.2**	**cm**	calc. using eq. (11)
D2	**12.9**	**cm**	calc. using eq. (11)
D3	**26.9**	**cm**	calc. using eq. (11)
P(D>d_threshold)	**0.13**		eq. (11)

Dependence on k_y

k_y	P(D="0")	D (cm)	Dmedian (cm)	D-84% (cm)	D-16% (cm)
0.020	0.000	161.4	161.4	335.6	77.6
0.05	0.000	58.2	58.2	120.9	28.0
0.07	0.000	36.1	36.1	75.0	17.3
0.1	0.000	20.5	20.5	42.5	9.8
0.15	0.011	9.9	9.9	20.6	4.7
0.2	0.137	5.7	4.9	11.0	1.4
0.3	0.757	2.4	<0.5	1.8	<0.5
0.4	0.979	1.2	<0.5	<0.5	<0.5



Notes

1. Values highlighted in blue are input parameters, and results are presented in the table with the yellow heading.
2. Probability of Exceedance is the desired probability of exceeding a particular displacement value.
3. Displacements D1, D2, and D3 correspond to P1, P2, and P3, respectively.
   (e.g., the probability of exceeding displacement D1 is P1 and it is referred to as the (100% - P1) percentile value.
4. The 16%, 50%, and 84% percentile displacement values at selected k_y values are shown to the right.
5. Calculated seismic displacements are due to deviatoric deformation only (add in volumetrically induced movement).
6. k_y may range between 0.01 and 0.8, T_s between 0 and 2 s, S_a between 0.002 and 4.5 g, M_w between 5.5 and 8.2
7. Rigid slope is assumed for T_s < 0.05 s, i.e. T_s = 0.0. If Ts is just less than 0.05 s, set T_s = 0.050 s
8. When a value for D is not calculated, D is < 0.5 cm
9. k_y should be estimated with a slope stability program; the simplified equations shown below in Fig. 14.1 provide approximate values.
10. Examples of how T_s is estimated are shown below in Fig. 14.4 and Fig. 3.
11. V_s = weighted avg. shear wave velocity for the sliding mass, e.g., for 2 layers, V_s = [(h1)(V_s1) + (h2)(V_s2)]/(h1 + h2)

SECTION SS-04

Procedure for Estimating Shear-Induced Seismic Slope Displacement for Shallow Crustal Earthquakes

by Jonathan D. Bray and Jorge Macedo, UC Berkeley and Georgia Tech

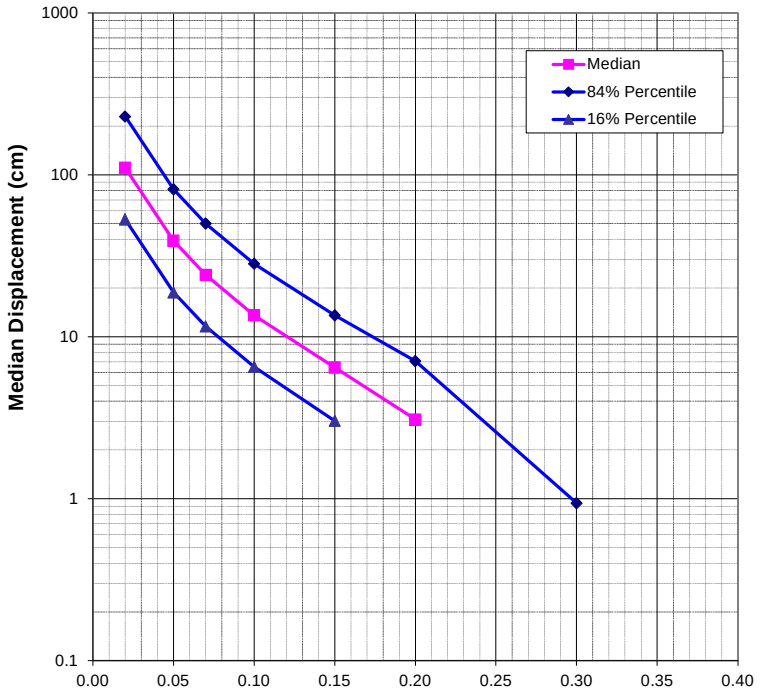
Procedure for Estimating Shear-Induced Seismic Slope Displacement for Shallow Crustal Earthquakes, ASCE JGGE, 2019, 145(12), doi: 10.1061/(ASCE)GT.1943-5606.0002143

SEE NOTES BELOW FOR GUIDANCE IN THE USE OF SPREADSHEET

Input Parameters			
Case	Deterministic-Pseudoprobabilistic (EQ8&9)		*** Select Ordinary or Pulse or Combined Equations**
Yield Coefficient (k_y) [(a)]	0.09		**(a) Based on pseudostatic analysis**
Initial Fundamental Period (T_s) [(b)]	0.76	seconds	**(b) 1D: T_s=4H/V_s 2D: T_s=2.6H/V_s**
Degraded Period (1.3T_s)	0.99	seconds	**(c) Input the Spectral Acceleration (g) at**
Moment Magnitude (M_w)	6.8		**the base of the sliding mass assuming**
Spectral Acceleration (S_a(1.3T_s)) [(c)]	0.38	g	**there is no material above it.**
PGV Information	Both Ordinary & Pulse Motions		**(d) PGV (cm/s) is required for near-fault pulse**
Peak Ground Velocity (PGV) [(d)]	40.0	cm/s	**motions & for EQ9 when PGV > 115 cm/s;**
Percentile (if Pulse ground Motion) [(e)]	Both Ordinary & Pulse Motions		**it is estimated at the base of sliding**
Additional Input Parameters			**mass assuming no material above it.**
Probability of Exceedance #1 (P1)	84	%	**(e) If Pulse motion the percentile is given**
Probability of Exceedance #2 (P2)	50	%	**as either D100 or D50. D100 should be**
Probability of Exceedance #3 (P3)	16	%	**used for fault-normal direction**
Displacement Threshold (d_threshold)	30	cm	
Intermediate Calculated Parameters			
Non-Zero Seismic Displacement Est (D)	16.2	cm	eq. (3) or (5) or (7) or (9)
Standard Deviation of Non-Zero Seismic D	0.736		
Results			
Probability of Negligible Displ. (P(D=0))	**0.00**		eq. (2) or (4) or (6) or (8)
D1	**7.8**	**cm**	calc. using eq. (11)
D2	**16.2**	**cm**	calc. using eq. (11)
D3	**33.6**	**cm**	calc. using eq. (11)
P(D>d_threshold)	**0.20**		eq. (11)

Dependence on k_y

k_y	P(D="0")	D (cm)	Dmedian (cm)	D-84% (cm)	D-16% (cm)
0.020	0.000	110.2	110.2	229.2	53.0
0.05	0.000	39.1	39.1	81.3	18.8
0.07	0.000	24.1	24.1	50.1	11.6
0.1	0.000	13.6	13.6	28.2	6.5
0.15	0.015	6.6	6.5	13.5	3.0
0.2	0.167	3.7	3.1	7.1	<0.5
0.3	0.789	1.6	<0.5	0.9	<0.5
0.4	0.983	0.8	<0.5	<0.5	<0.5



Notes

1. Values highlighted in blue are input parameters, and results are presented in the table with the yellow heading.
2. Probability of Exceedance is the desired probability of exceeding a particular displacement value.
3. Displacements D1, D2, and D3 correspond to P1, P2, and P3, respectively.
   (e.g., the probability of exceeding displacement D1 is P1 and it is referred to as the (100% - P1) percentile value.
4. The 16%, 50%, and 84% percentile displacement values at selected k_y values are shown to the right.
5. Calculated seismic displacements are due to deviatoric deformation only (add in volumetrically induced movement).
6. k_y may range between 0.01 and 0.8, T_s between 0 and 2 s, S_a between 0.002 and 4.5 g, M_w between 5.5 and 8.2
7. Rigid slope is assumed for T_s < 0.05 s, i.e. T_s = 0.0. If Ts is just less than 0.05 s, set T_s = 0.050 s
8. When a value for D is not calculated, D is < 0.5 cm
9. k_y should be estimated with a slope stability program; the simplified equations shown below in Fig. 14.1 provide approximate values.
10. Examples of how T_s is estimated are shown below in Fig. 14.4 and Fig. 3.
11. V_s = weighted avg. shear wave velocity for the sliding mass, e.g., for 2 layers, V_s = [(h1)(V_s1) + (h2)(V_s2)]/(h1 + h2)

SECTION SS-05

Procedure for Estimating Shear-Induced Seismic Slope Displacement for Shallow Crustal Earthquakes

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Procedure for Estimating Shear-Induced Seismic Slope Displacement for Shallow Crustal Earthquakes, ASCE JGGE, 2019, 145(12), doi: 10.1061/(ASCE)GT.1943-5606.0002143

SEE NOTES BELOW FOR GUIDANCE IN THE USE OF SPREADSHEET

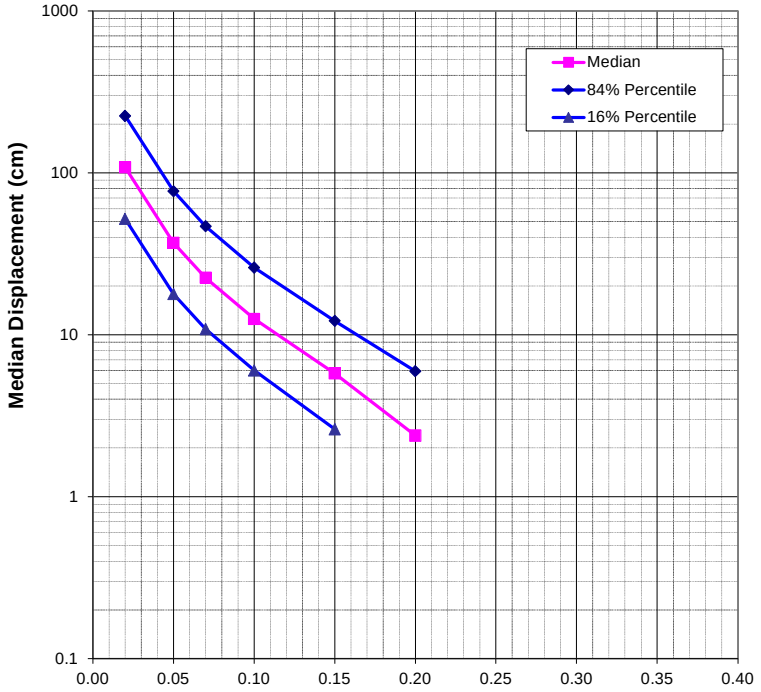
Input Parameters			
Case	Deterministic-Pseudoprobabilistic (EQ8&9)		*** Select Ordinary or Pulse or Combined Equations**
Yield Coefficient (k_y) [(a)]	0.10		**(a) Based on pseudostatic analysis**
Initial Fundamental Period (T_s) [(b)]	0.85	seconds	**(b) 1D: T_s=4H/V_s 2D: T_s=2.6H/V_s**
Degraded Period (1.3T_s)	1.11	seconds	**(c) Input the Spectral Acceleration (g) at**
Moment Magnitude (M_w)	6.8		**the base of the sliding mass assuming**
Spectral Acceleration (S_a(1.3T_s)) [(c)]	0.34	g	**there is no material above it.**
PGV Information	Both Ordinary & Pulse Motions		**(d) PGV (cm/s) is required for near-fault pulse**
Peak Ground Velocity (PGV) [(d)]	40.0	cm/s	**motions & for EQ9 when PGV > 115 cm/s;**
Percentile (if Pulse ground Motion) [(e)]	Both Ordinary & Pulse Motions		**it is estimated at the base of sliding**
Additional Input Parameters			**mass assuming no material above it.**
Probability of Exceedance #1 (P1)	84	%	**(e) If Pulse motion the percentile is given**
Probability of Exceedance #2 (P2)	50	%	**as either D100 or D50. D100 should be**
Probability of Exceedance #3 (P3)	16	%	**used for fault-normal direction**
Displacement Threshold (d_threshold)	30	cm	

Intermediate Calculated Parameters			
Non-Zero Seismic Displacement Est (D)	12.5	cm	eq. (3) or (5) or (7) or (9)
Standard Deviation of Non-Zero Seismic D	0.736		

Results			
Probability of Negligible Displ. (P(D=0))	**0.00**		eq. (2) or (4) or (6) or (8)
D1	**6.0**	**cm**	calc. using eq. (11)
D2	**12.5**	**cm**	calc. using eq. (11)
D3	**26.0**	**cm**	calc. using eq. (11)
P(D>d_threshold)	**0.12**		eq. (11)

Dependence on k_y

k_y	P(D="0")	D (cm)	Dmedian (cm)	D-84% (cm)	D-16% (cm)
0.020	0.000	108.1	108.1	224.8	52.0
0.05	0.000	37.0	37.0	77.0	17.8
0.07	0.000	22.5	22.5	46.8	10.8
0.1	0.000	12.5	12.5	26.0	6.0
0.15	0.033	6.0	5.8	12.2	2.6
0.2	0.261	3.3	2.4	6.0	<0.5
0.3	0.873	1.4	<0.5	<0.5	<0.5
0.4	0.993	0.7	<0.5	<0.5	<0.5



Notes

1. Values highlighted in blue are input parameters, and results are presented in the table with the yellow heading.
2. Probability of Exceedance is the desired probability of exceeding a particular displacement value.
3. Displacements D1, D2, and D3 correspond to P1, P2, and P3, respectively.
   (e.g., the probability of exceeding displacement D1 is P1 and it is referred to as the (100% - P1) percentile value.
4. The 16%, 50%, and 84% percentile displacement values at selected k_y values are shown to the right.
5. Calculated seismic displacements are due to deviatoric deformation only (add in volumetrically induced movement).
6. k_y may range between 0.01 and 0.8, T_s between 0 and 2 s, S_a between 0.002 and 4.5 g, M_w between 5.5 and 8.2
7. Rigid slope is assumed for T_s < 0.05 s, i.e. T_s = 0.0. If Ts is just less than 0.05 s, set T_s = 0.050 s
8. When a value for D is not calculated, D is < 0.5 cm
9. k_y should be estimated with a slope stability program; the simplified equations shown below in Fig. 14.1 provide approximate values.
10. Examples of how T_s is estimated are shown below in Fig. 14.4 and Fig. 3.
11. V_s = weighted avg. shear wave velocity for the sliding mass, e.g., for 2 layers, V_s = [(h1)(V_s1) + (h2)(V_s2)]/(h1 + h2)