2026 PERIODIC SAFETY FACTOR ASSESSMENT OF UNITS 1&2 COAL COMBUSTION RESIDUAL (CCR) SURFACE IMPOUNDMENTS AT COLSTRIP STEAM ELECTRIC STATION

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2026 PERIODIC SAFETY FACTOR ASSESSMENT OF UNITS 1&2 COAL COMBUSTION RESIDUAL (CCR) SURFACE IMPOUNDMENTS AT COLSTRIP STEAM ELECTRIC STATION

1.0 INTRODUCTION

1.1 BACKGROUND

The United States Environmental Protection Agency (EPA) established regulations under Subtitle D of the Resource Conservation and Recovery Act (RCRA) to address the risks associated with disposal of Coal Combustion Residuals (CCRs) generated at electric utilities as well as independent power producers. These regulations became the Disposal of Coal Combustion Residuals from Electric Utilities final rule (CCR Rule), which was signed by the EPA Administrator on December 19, 2014 and was published to the Federal Register on April 17, 2015 as Title 40 CFR §257 Subpart D (EPA, 2015). Section 257.73 paragraph (e) requires a periodic safety factor assessment for each CCR surface impoundment. A CCR surface impoundment is defined by CCR Rule §257.53 as "*…a natural topographic depression, man-made excavation, or dike area, designed to hold an accumulation of CCR and liquids, and the unit treats, stores, or disposes of CCR.*" CCR Rule §257.73 paragraph (f) specifies that the initial safety factor assessment was to be performed by October 17, 2016, with a periodic update due every five years thereafter. The initial safety factor assessments for the CCR surface impoundments at Colstrip Steam Electric Station (CSES) were completed on October 17, 2016 (Jorgensen, 2016a and 2016b). The last periodic update to the initial safety factor assessments were completed on October 14, 2021 (Jorgensen, 2021a and 2021b).

Talen Montana, LLC is the operator of the CSES located near Colstrip, Montana. Historically, CSES operated two pairs of coal-fired generating units known as Units 1&2 and Units 3&4. Units 1&2, originally placed in service in 1975, had a generating capacity of 330-megawatts-gross each (Hydrometrics, 2012). Units 1&2 owners include Talen Montana, LLC and Puget Sound Energy Inc. Units 1&2 were retired from service on January 5, 2020. Units 3&4, placed in service in 1983 and 1985, respectively, have a generating capacity of 805-megawatts-gross each (Hydrometrics, 2012). Units 3&4 owners include Talen Montana, LLC, PacifiCorp, Portland General Electric Company, and NorthWestern Energy.

CCRs produced by the generating units at CSES are handled and disposed of in a closed-loop process aimed at minimizing impacts to water resources in the area. The closed-loop system

is comprised of several surface impoundments on and off the plant site that perform various functions to handle and permanently store CCRs. These surface impoundments and their associated CCR units are regulated under the CCR Rule. Units 1&2 and Units 3&4 have their own respective surface impoundments with cells dedicated for CCR handling and storage. It is also important to note that because Units 1&2 have been retired, surface impoundments associated with Units 1&2 continue to store existing CCRs but no longer accept new CCRs. The CCR units at CSES regulated by the CCR Rule include:

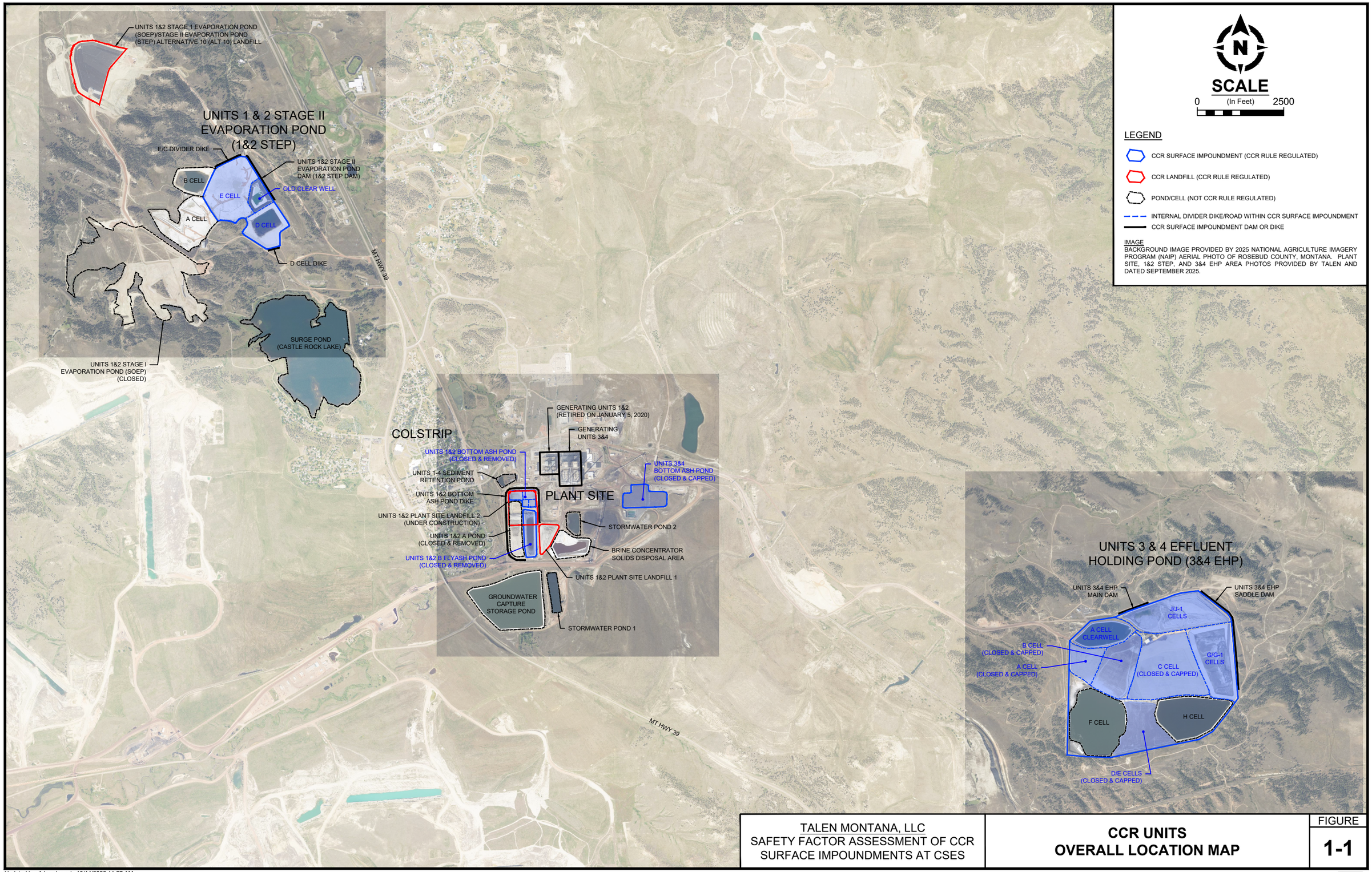
- Units 1&2 Stage II Evaporation Pond (STEP) D and E Cells and Old Clearwell;
- Units 1&2 Bottom Ash Pond (1&2 BAP), (Closed);
- Units 1&2 B Flyash Pond (B Pond), (Closure in Progress);
- Units 3&4 Effluent Holding Pond (3&4 EHP) A (Closed), B (Closed), C (Closed), D/E (Closed), G/G-1, and J/J-1 Cells; and
- Units 3&4 Bottom Ash Pond which is incised.

Incised CCR units are exempt from the requirements of §257.73 paragraph (e)(1). Therefore, a safety factor assessment will not be performed for 3&4 Bottom Ash Pond. The locations of CCR units and their respective CCR surface impoundments are displayed on Figure 1-1.

1.2 PURPOSE

The purpose of this document is to provide a periodic safety factor assessment for the CCR surface impoundments associated with Units 1&2 in accordance with the specific requirements of 40 CFR §257.73 paragraph (e)(1). The periodic safety factor assessment for CCR surface impoundments associated with Units 3&4 is provided by a separate document (Hydrometrics, 2026a). Section 257.73 paragraph (e)(1) states that the critical cross section(s) of each CCR surface impoundment embankment must meet minimum factors of safety against failure for a range of specified loading conditions. The loading conditions specified in §257.73 paragraph (e)(1) are as follows:

- Static factor of safety for the long-term, maximum storage pool must equal or exceed 1.50 [§257.73 paragraph (e)(1)(i)].
- Static factor of safety for the maximum surcharge pool must equal or exceed 1.40 [§257.73 paragraph (e)(1)(ii)].
- The seismic factor of safety must equal or exceed 1.00 [§257.73 paragraph (e)(1)(iii)].
- For dikes constructed of soils susceptible to liquefaction, the liquefaction factor of safety must equal or exceed 1.20 [§257.73 paragraph (e)(1)(iv)].



TALEN MONTANA, LLC
SAFETY FACTOR ASSESSMENT OF CCR SURFACE IMPOUNDMENTS AT CSES

CCR UNITS
OVERALL LOCATION MAP

FIGURE
1-1

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C:\Users\ajourdonnais\Dropbox\Talen - 2026 CCR Unit Assessments\7 - CAD\DWG\2600701h002.dwg [FIGURE 1-1 (SFA)]

Hydrometrics, Inc.

As shown on Figure 1-1 above, CCR units within the Units 1&2 STEP facility are impounded by the STEP Main Dam and E/C Divider Dike while the Units 1&2 Bottom Ash Pond (1&2 BAP), B Flyash Pond (B Pond), and A Pond were historically impounded by Units 1&2 BAP Dike (BAP Dike). A Pond was closed and drained in 2015 (Hydrometrics, 2015) and capped in 2019 (Geosyntec, 2025). In 2026 the 1&2 BAP and B Pond were drained and removed by excavation. The area within the BAP Dike; including the historic footprints of A Pond, B Pond, and 1&2 BAP; is currently being transitioned to Units 1&2 Plant Site Landfill 2 (Landfill 2), which is a CCR landfill as defined in §257.53 of the CCR Rule. The slope stability factors of safety for the critical sections of the STEP Main Dam, E/C Divider Dike, and the BAP Dike will be calculated for each applicable loading condition listed above.

1.3 REPORT ORGANIZATION

This report is organized as follows:

- Section 2.0 – Review of Existing Slope Stability Analyses;
- Section 3.0 – Slope Stability Analyses;
- Section 4.0 – Liquefaction Evaluation;
- Section 5.0 – Summary of Results;
- Section 6.0 – Conclusions;
- Section 7.0 – Safety Factor Assessment Certification; and
- Section 8.0 – References.

2.0 REVIEW OF EXISTING SLOPE STABILITY ANALYSES

Designs of the BAP Dike and 1&2 STEP facility were respectively completed in 1974 and 1979 (Bechtel, 1974 and 1979). There is no available construction data for the BAP Dike, although it is assumed that construction occurred around 1975 (Hydrometrics, 2026b). Construction of the STEP Main Dam and E/C Divider Dike was completed between 1987 and 1988 (Hydrometrics, 2026b). Throughout their design, construction, and operational service, several slope stability analyses have been performed for the STEP Main Dam and E/C Divider Dike as well as the BAP Dike. The following list presents existing slope stability analyses that were reviewed during preparation of this document:

- Second Stage Evaporation Pond Design Report (Bechtel, 1979);
- Geotechnical Investigation Report, EPA Recommended Corrective Measures at the Colstrip Power Plant, Units 1&2 Stage Two Evaporation Pond (STEP) Dam (WAI, 2010a);
- Geotechnical Investigation Report, EPA Recommended Corrective Measures at the Colstrip Power Plant, Units 1&2 Pond "A" Waste Impoundment Embankment (WAI, 2010b);
- Geotechnical Investigation Report, EPA Recommended Corrective Measures at the Colstrip Power Plant, Units 1&2 Bottom Ash Waste Impoundment Pond (WAI, 2010c);
- Geotechnical Investigation & Analysis Memo for the Units 1&2 STEP Dam Inspection Issue (WAI, 2010d);
- Initial Safety Factor Assessment Report, Colstrip Steam Electric Station Units 1&2, Colstrip Montana (Jorgensen, 2016a);
- 2021 Safety Factor Assessment, Units 1&2 Surface Impoundments, Colstrip Steam Electric Station, Colstrip, Montana (Jorgensen, 2021a); and
- Compliance Demonstration Report, Plant Site Landfill 2, Colstrip Power Plant, Colstrip, Montana (Geosyntec, 2026).

3.0 SLOPE STABILITY ANALYSES

Slope stability analyses conducted for this safety factor assessment were performed with Slide 6.0 software, manufactured by Rocscience. Slide 6.0 utilizes two-dimensional limit equilibrium methods to evaluate the safety and stability of slopes, embankments, and earth structures (Rocscience, 2010).

To be consistent with previous safety factor assessments, the Morgenstern-Price method was utilized to calculate factors of safety for the critical sections of the STEP Main Dam and E/C Divider Dike embankment slopes. The Morgenstern-Price method divides the potential soil mass into a series of vertical slices, satisfying both horizontal and vertical force and moment equilibrium, and accounts for both normal and shear interslice forces (Alok et al., 2024). A summary of slope stability model inputs, as well as how they were determined, are provided by the following sections.

3.1 EMBANKMENT MATERIALS

The Mohr-Coulomb strength parameters of soil and CCR materials used to construct the STEP Main Dam and E/C Divider Dike embankments, and used as slope stability model inputs, are provided in Table 3-1, while soil parameters used as model inputs for the BAP Dike are provided in Table 3-2. The values presented in Tables 3-1 and 3-2 were found in existing documentation including previous slope stability analyses and geotechnical investigations.

TABLE 3-1. STEP MAIN DAM AND E/C DIVIDER DIKE

SOIL MATERIAL STRENGTH PARAMETERS

Material	Moist Unit Weight (lb/ft^3)	Saturated Unit Weight (lb/ft^3)	Effective Cohesive Strength, c' (lb/ft^2)	Effective Friction Angle, ϕ' (degrees)	Source
Shell	125	130	50	33	Bechtel, 1979
Central Core	127	130	0	33.5	Bechtel, 1979
Drain	130	135	0	35	Bechtel, 1979
Paste	102	112	0	34.4	Golder, 2001
Fly Ash Slurry	100	103.4	700	28	Jorgensen, 2016b
Foundation	115	125	0	32	Bechtel, 1979

TABLE 3-2. BAP DIKE SOIL MATERIAL STRENGTH PARAMETERS

Material	Moist Unit Weight (lb/ft^3)	Saturated Unit Weight (lb/ft^3)	Effective Cohesive Strength, c' (lb/ft^2)	Effective Friction Angle, ϕ' (degrees)	Source
Embankment Fill Section A	120	126.8	204.2	31.5	WAI, 2010b
Embankment Fill Section B	127	146.4	372.9	30.9	WAI, 2010c
Central Core	127	140.4	0	33.5	Bechtel, 1982
Waste – Fly Ash	107	Dry Material	0	32	Geosyntec, 2026
Foundation	118.2	123.8	107.8	29.2	Bechtel, 1982
Bedrock	Modeled as Infinite Strength				

As shown in Tables 3-1 and 3-2, effective stress parameters were used for modeling. The loading conditions required by §257.73 paragraph (e)(1)(i) through (iv) are long-term; therefore, steady state seepage was modeled and excess pore pressures are not expected to occur.

Also shown in Table 3-1, a small effective cohesive strength value of 50 pounds per square foot was added to the Shell soil material for the STEP Main Dam and E/C Divider Dike. This was done to avoid slope stability models with infinitesimally shallow critical slip surfaces, which can occur when modeling cohesionless soils. Adding a small amount of cohesion to the select materials forces the critical slip surface deeper into the embankment, representing a failure surface that presents a greater, and more reasonable hazard to embankment stability. Given that embankment materials are largely composed of fine-grained clays and silts that typically exhibit larger cohesive strength values, the small amount of applied cohesion is very likely an underestimate of actual field conditions, which is a conservative approach.

The Bedrock material shown in Tables 3-1 and 3-2 represents claystone, siltstone, and sandstone layers identified in existing subsurface investigations of the STEP and BAP Dike areas. The Bedrock material was modeled as having "infinite strength," meaning that the circular critical slip surface is not permitted to penetrate this layer where it exists in the models.

Currently, all CCR units upstream of the STEP Main Dam, E/C Divider Dike, and BAP Dike are lined with geosynthetic liner systems. Further, monthly piezometer monitoring data has not

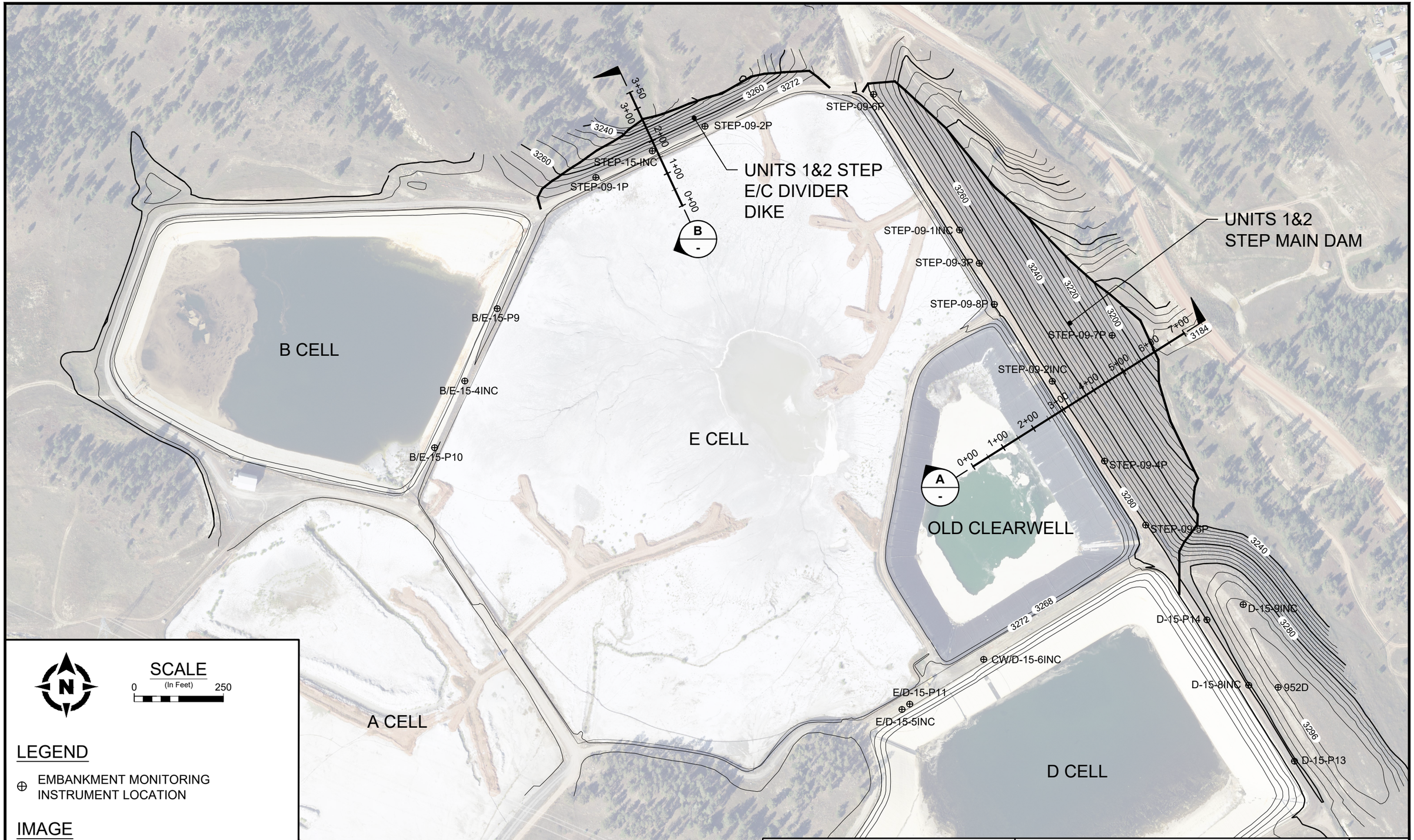
detected groundwater in these embankments since liner installation. There is one exception to this, piezometer PONDA-09-3P, located on the outboard crest of the northwest corner of the BAP Dike, has consistently recorded groundwater since its installation, and that level has remained at an elevation of 3220 feet above mean sea level (amsl) or below since 2016. Therefore, a piezometric line was added to the Section A model at 3220 feet amsl for the BAP Dike in order to account for this. For the effective stress conditions used in slope stability modeling, the moist unit weight of each material is applied above the piezometric line, and the saturated unit weight is applied below the piezometric line. Pore water pressures are calculated as the unit weight of water times the vertical distance to the center of each slice base in the model. However, none of the critical slip surfaces of the slope stability models, provided in Appendix A, encounter a piezometric line. Therefore, pore water pressures within the embankments are not a factor in the stability of the analyzed slopes.

3.2 EMBANKMENT GEOMETRY

The critical cross sections used in the slope stability models were located at the maximum embankment sections of the STEP Main Dam, E/C Divider Dike, and the BAP Dike. The location of each critical cross section at the STEP facility is displayed on Figure 3-1. BAP Dike critical cross sections are displayed on Figure 3-2.

Embankment geometry used in the slope stability models of the STEP Main Dam and E/C Divider Dike was determined from a variety of sources. External embankment and abutment geometry was determined by recent survey data provided by Talen and supplemented by design drawings provided in the Bechtel design report (Bechtel, 1979). The locations of the liner systems installed on the upstream slopes of the Old Clearwell and E Cell at the STEP facility were taken from existing as-built drawings. Internal geometry, including the central core, drainage layers, foundation, deposits of CCRs, and bedrock was modeled in accordance with geometry provided in the Bechtel design report (Bechtel, 1979) and boring logs presented in previous geotechnical investigations by Bechtel (Bechtel, 1979) and Womack and Associates (WAI, 2010a and 2010d).

Embankment geometry used in the slope stability models of the BAP Dike was also determined from a variety of sources. External embankment geometry was determined by recent survey data provided by Talen and supplemented by design drawings prepared by Bechtel (Bechtel, 1974). The location of the Landfill 2 bottom liner on the upstream face of the BAP Dike was determined from design drawings prepared by Geosyntec (Geosyntec, 2026). Internal geometry, including the central core, foundation, CCR deposits, and bedrock was modeled after geometry provided on the Bechtel design drawings (Bechtel, 1974) and



TALEN MONTANA, LLC
SAFETY FACTOR ASSESSMENT OF UNITS 1&2 CCR SURFACE MPOUNDMENTS

UNITS 1&2 STEP MAIN DAM & E/C DIVIDER DIKE LOCATION OF CRITICAL SECTIONS

FIGURE
3-1

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C:\Users\ajourdonnais\Dropbox\Talen - 2026 CCR Unit Assessments\7 - CAD\DWG\2600701h005.dwg [STAGE II DAM]

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C:\Users\ajourdonnais\Dropbox\Talen - 2026 CCR Unit Assessments\7 - CAD\DWG\260701h005.dwg [1&2 BAP & B POND]

SCALE
0 (In Feet) 250

LEGEND

⊕ EMBANKMENT MONITORING INSTRUMENT LOCATION

IMAGE
BACKGROUND IMAGE IS AN AERIAL PHOTO OF THE CSES PLANT SITE AREA PROVIDED BY TALEN AND DATED SEPTEMBER 2025.

UNITS 1&2
(RETIRED ON JANUARY 5, 2020)

UNITS 1-4
SEDIMENT
RETENTION POND

UNITS 1&2 BOTTOM
ASH POND DIKE

PONDA-09-2P
PONDA-09-4P
PONDA-09-3P
PONDA-09-1P
BOTASH-09-4P
BOTASH-09-3P

A
B

UNITS 1&2 BOTTOM ASH POND
(CLOSED & REMOVED)

UNITS 1&2 PLANT
SITE LANDFILL 2
(UNDER CONSTRUCTION)

UNITS 1&2
B FLYASH POND
(CLOSED & REMOVED)

UNITS 1&2 A POND
(CLOSED & REMOVED)

UNITS 1&2 PLANT
SITE LANDFILL 1

TALEN MONTANA, LLC SAFETY FACTOR ASSESSMENT OF UNITS 1&2 CCR SURFACE IMPOUNDMENTS	**UNITS 1&2 BOTTOM ASH POND DIKE LOCATION OF CRITICAL SECTIONS**	FIGURE **3-2**

Hydrometrics, Inc.

supplemented by boring logs found in previous geotechnical investigations by Womack and Associates (WAI, 2010b and 2010c). The existing level of fly ash waste placed in Landfill 2 was estimated from visual observation during a recent site visit (Hydrometrics, 2026c).

A circular or rotational slip surface, as opposed to a translational or block failure surface, was chosen for stability models of the STEP Main Dam, E/C Divider Dike, and BAP Dike. Circular slip surfaces are ideal for engineered earth embankments, such as earthen dams, where slope height and base dimensions are comparable. Circular slip surfaces are also preferable when analyzing slopes composed of homogeneous fine-grained or cohesive soils free of prominently weaker horizontal layers. Engineering judgement was used to select the entry and exit zones on the ground surface for the circular slip surface of each slope stability model. Entry and exit zones are located where the critical surface with the minimum factor of safety against failure was anticipated to occur.

Embankment geometry, specified circular slip surface entry and exit zones, and the critical slip surface locations can be found on the graphical display of each slope stability model provided in Appendix A. Additional details are provided in the model output reports presented in Appendix B.

3.3 PHREATIC SURFACE

Piezometer monitoring data for the Units 1&2 CCR surface impoundments, collected monthly since 2016, was reviewed during the preparation of this report. The locations of piezometers installed near each of the critical cross sections are provided on Figures 3-1 and 3-2 above. As discussed in Section 3.1 above, for the Units 1&2 CCR surface impoundments, groundwater has only been detected in one location near the northwest corner of the BAP Dike. This is anticipated as operational changes at the CSES STEP and Plant Site areas, including installation of geosynthetic liners in several pond cells and an overall decline in liquid storage volumes, have contributed to a general trend of decreasing groundwater levels observed in monitoring instruments for the Units 1&2 CCR surface impoundment embankments. The modeled phreatic surface, where it was included, has a minimal or no impact on the applicable slope stability models as the critical surface is located well above groundwater.

The location of the phreatic surface, where it was included in slope stability modeling, is provided by the model figures found in Appendix A.

3.4 DESCRIPTION OF ANALYSES

The following sections provide a description of the analysis of each required loading condition for the Units 1&2 CCR surface impoundment embankments.

3.4.1 Static Factor of Safety, Long-Term, Maximum Storage Pool

Calculation of the static factor of safety under the long-term, maximum storage pool loading condition is required by §257.73 paragraph (e)(1)(i) of the CCR Rule. The minimum factor of safety for this loading condition is 1.50. It is generally accepted practice to analyze the stability of the downstream slope of the embankment under steady-state seepage conditions with the reservoir at its maximum normal operating pool elevation for this loading condition (EPA, 2015). It is important to note that the upstream faces of all Units 1&2 CCR surface impoundments are currently lined with geosynthetic liner systems. Furthermore, the BAP Dike no longer impounds any appreciable volume of liquid as a result of its inclusion into Landfill 2 construction, which will store only dry CCR waste (Hydrometrics, 2026c). Therefore, the contribution of the upstream cells to steady-state seepage within the STEP Main Dam, E/C Divider Dike, and BAP Dike is minimal, if there is any contribution at all. The maximum operating pool for the Old Clearwell, adjacent to the STEP Main Dam, is an elevation of 3267 feet amsl. This elevation is three feet below the crest elevation of the divider dike between the Old Clearwell and adjacent cells. E Cell, adjacent to the E/C Divider Dike, is currently filled with dry CCRs to the maximum operating pool elevation of 3267 feet amsl. This elevation is three feet below the crest elevation of the E/C Divider Dike. The maximum storage pool for Section A of the BAP dike was elevation 3262 amsl, which is three feet below the dike crest. It is important to note that this is modeled as dry fly ash waste placed in Landfill 2 and not liquid. The existing conditions were modeled for Section B in lieu of the maximum storage pool elevation. This is conservative as fly ash waste has been placed up to the crest elevation of the BAP Dike (Hydrometrics, 2026c).

Only the upstream slope of STEP Main Dam was analyzed. The upstream slopes of the STEP E/C Divider Dike and BAP Dike have been backfilled with CCR material, which eliminates the need to analyze their stability. The current existing conditions at the STEP facility were modeled for the Main Dam critical cross section. This is the most conservative approach as placement of additional CCR material or liquid into the Old Clearwell effectively provides a buttress fill at the toe of the upstream slope of the Main Dam and will increase the factor of safety as the fill progresses upward.

The long-term, maximum storage pool slope stability models are presented in Appendix A. Calculated factors of safety for this loading condition are provided in Section 5.0 below.

3.4.2 Static Factor of Safety, Maximum Surcharge Pool

Calculation of the static factor of safety under the maximum surcharge pool loading condition is required by §257.73 paragraph (e)(1)(ii) of the CCR Rule. The minimum factor of safety for this loading condition is 1.40. The maximum surcharge pool loading condition is used to analyze the effects of a short-term raised water level in a CCR surface impoundment, resulting from a flood or other means, on the stability of the downstream slope (EPA, 2015). Maximum surcharge pool of the STEP Main Dam was modeled at an elevation of 3270 feet amsl. This elevation corresponds with the crest elevation of the divider dike between the Old Clearwell and adjacent cells. The STEP E/C Divider Dike was modeled with a maximum surcharge elevation of 3270 feet amsl, equal to its crest elevation. Section A of the BAP Dike was modeled with a maximum surcharge elevation of 3265 feet amsl, equal to its crest elevation. As mentioned above, only the existing conditions of BAP Dike Section B were modeled. Dry fly ash waste placed in Landfill 2 to the crest elevation of the BAP Dike, leaves no additional room for surcharge flows. Because the maximum surcharge pool is considered to be a temporary condition, no adjustments were made to modeled steady-state phreatic surfaces, if they were included.

The maximum surcharge pool slope stability models are presented in Appendix A. Calculated factors of safety for this loading condition are provided in Section 5.0 below.

3.4.3 Seismic Factor of Safety

Calculation of the seismic factor of safety under the maximum storage pool loading condition is required by §257.73 paragraph (e)(1)(ii) of the CCR Rule. The minimum factor of safety for the seismic loading condition is 1.00. All dam embankments surrounding CCR surface impoundments must be capable of withstanding a design earthquake without damage to the foundation or embankment that would cause discharge of its contents (EPA, 2015). The CCR Rule requires a design earthquake event with a 2 percent probability of exceedance in 50 years, or an overall return period 2,475 years (EPA, 2015). As further discussed in Section 3.5 below, a peak ground acceleration (PGA) value of 0.06g was determined for the STEP and BAP Dike facilities. Using guidance provided by Hynes-Griffin and Franklin, a horizontal seismic coefficient, k_h, equal to one half of the PGA, or 0.03g, was used for all slope stability modeling of seismic conditions (Hynes-Griffin and Franklin, 1984). The Hynes-Griffin and Franklin guidance also suggests a 20 percent reduction of soil material strength parameters, cohesion and effective friction angle, presented in Table 3-1 above. This accounts for the potential strength reduction of the embankment materials resulting from the cyclic stresses imparted during a seismic event. Model geometry from the maximum normal pool loading condition was used for seismic analysis of the STEP Main Dam and E/C Divider Dike downstream slopes,

as well as downstream slopes of the BAP Dike. The existing condition of the STEP Main Dam upstream slope was used for seismic analysis. The seismic force applied to the models is equal to the weight of the sliding mass multiplied by the horizontal seismic coefficient, k_h.

The seismic slope stability models are presented in Appendix A. Calculated factors of safety for this loading condition are provided in Section 5.0 below.

3.5 SEISMICITY

A peak ground acceleration (PGA) value of 0.06g was determined for the STEP and BAP facilities. This value was determined by utilization of U.S. Geological Survey's Unified Hazard Tool, available as an online web application. Unified Hazard Tool inputs included the locations of the STEP and BAP Dike facilities, assuming a soil site class of C, and a return period of 2,475 years which has a 2 percent probability of exceedance in 50 years. This value indicates that the STEP and BAP Dike facilities are located in areas of low seismic activity.

4.0 LIQUEFACTION EVALUATION

Determination of a factor of safety for dikes constructed of soils that are susceptible to liquefaction is required by §257.73 paragraph (e)(1)(iv) of the CCR Rule. To determine if the STEP Main Dam, E/C Divider Dike, and BAP Dike embankments and foundation soils are susceptible to liquefaction, an evaluation was provided in previous versions of this document prepared by Jorgensen Geotechnical, LLC (Jorgensen, 2016a and 2021a). As generally accepted in geotechnical engineering practice, and restated in the Jorgensen evaluation, three conditions are necessary for soil liquefaction to occur: loose, cohesionless soil; saturated conditions; and sufficient seismicity to create ground shaking and a corresponding increase in the pore water pressures of saturated soil materials (Jorgensen, 2021a). The Jorgensen evaluation assesses each of these requirements for liquefaction and draws the following conclusions:

- STEP Main Dam, E/C Divider Dike, and BAP Dike embankment and foundation materials are too stiff and fine-grained to be susceptible to liquefaction.
- Piezometers in the STEP Main Dam, E/C Divider Dike, and BAP Dike have not detected seepage within the embankments, with saturated conditions only expected deep in the foundations. This results in small differences between soil's total stress (σ_v) and effective stress (σ_v'), an important component of the soil's cyclic stress ratio (CSR) in liquefaction evaluation methods (Boulanger and Idriss, 2014; Idriss and Boulanger, 2008).
- The determined PGA of 0.06g represents a low level of seismicity, which would produce low values of CSR and would not be sufficient to induce liquefaction of embankment or foundation soils.

Hydrometrics reviewed the above evaluation as part of the preparation of this document and concurs with its findings. The Units 1&2 CCR surface impoundments are not constructed or founded on soils that are susceptible to liquefaction; therefore, factors of safety were not required to be determined for the liquefaction loading case.

5.0 SUMMARY OF RESULTS

The following sections present the results of slope stability analyses performed to satisfy the specific requirements of §257.73 paragraph (e)(1)(i) through (iv). As mentioned above, graphical displays of each slope stability model at the critical cross sections of the Units 1&2 CCR surface impoundments are provided in Appendix A. Detailed information for each model is provided by the analysis reports found in Appendix B.

5.1 RESULTS – STATIC FACTOR OF SAFETY, LONG-TERM, MAXIMUM STORAGE POOL

As stated in §257.73 paragraph (e)(1)(i), a minimum factor of safety of 1.50 is required for the long-term, maximum storage pool loading condition. As can be seen in Tables 5-1 and 5-2 below, the critical cross sections of the STEP Main Dam and E/C Divider Dike embankments exceed the minimum CCR rule requirements.

TABLE 5-1. RESULTS – STATIC FACTOR OF SAFETY, LONG-TERM, MAXIMUM STORAGE POOL

Embankment	Section	Direction	Calculated Factor of Safety
STEP Main Dam	A	Downstream (East)	2.12
STEP E/C Divider Dike	B	Downstream (North)	1.54
BAP Dike	A	Downstream (Northwest)	1.95

TABLE 5-2. RESULTS – STATIC FACTOR OF SAFETY, LONG-TERM, EXISTING CONDITIONS

Embankment	Section	Direction	Calculated Factor of Safety
STEP Main Dam	A	Upstream (West)	2.20
BAP Dike	B	Downstream (East)	2.24

5.2 STATIC FACTOR OF SAFETY, MAXIMUM SURCHARGE POOL

As stated in §257.73 paragraph (e)(1)(ii), a minimum factor of safety of 1.40 is required for the long-term, maximum storage pool loading condition. As can be seen in Table 5-3 below, the downstream slopes along the critical cross sections of the Units 1&2 CCR surface

impoundment embankments exceed the minimum CCR rule requirement. This analysis was not run on the downstream slope of BAP Dike Section B, as dry CCR waste has been placed up the crest elevation. Additionally, this analysis was not performed on upstream slopes of any Units 1&2 CCR surface impoundment embankments as the slopes would effectively be eliminated with the adjacent cells at the specified maximum surcharge pool elevation. Additionally, it is notable that the results seen in Table 5-1 above and Table 5-3 below are identical. Because the entry point of the critical slip surfaces for each of the maximum surcharge pool cross sections enter the respective embankments outside the adjacent cells, the surcharge load applied to these cells has no impact on the calculated minimum factor of safety for that loading condition.

TABLE 5-3. RESULTS – STATIC FACTOR OF SAFETY, MAXIMUM SURCHARGE POOL

Embankment	Section	Direction	Calculated Factor of Safety
STEP Main Dam	A	Downstream (East)	2.12
STEP E/C Divider Dike	B	Downstream (North)	1.54
BAP Dike	A	Downstream (Northwest)	1.95

5.3 SEISMIC FACTOR OF SAFETY

As stated in §257.73 paragraph (e)(1)(iii), a minimum factor of safety of 1.00 is required for the loading condition where a seismic load is applied to the long-term, maximum storage pool. As can be seen in Tables 5-4 and 5-5 below, the slopes along the critical cross sections of the Units 1&2 CCR surface impoundment embankments exceed the minimum CCR rule requirement.

TABLE 5-4. RESULTS – SEISMIC FACTOR OF SAFETY, MAXIMUM STORAGE POOL

Embankment	Section	Direction	Calculated Factor of Safety
STEP Main Dam	A	Downstream (East)	1.47
STEP E/C Divider Dike	B	Downstream (North)	1.10
BAP Dike	A	Downstream (Northwest)	1.40

TABLE 5-5. RESULTS – SEISMIC FACTOR OF SAFETY, EXISTING CONDITIONS

Embankment	Section	Direction	Calculated Factor of Safety
Main Dam	A	Upstream (West)	1.54
BAP Dike	B	Downstream (East)	1.62

5.4 LIQUEFACTION

As stated in Section 4.0 above, the embankment and foundation soils of the Units 1&2 CCR surface impoundments are not susceptible to liquefaction. Therefore, the liquefaction analysis described in §257.73 paragraph (e)(1)(iv) of the CCR Rules is not required for this assessment.

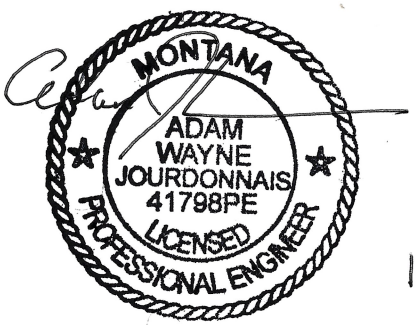
6.0 CONCLUSIONS

The STEP Main Dam, the highest of the Units 1&2 CCR surface impoundments, was constructed with zoned embankments that have 3H:1V upstream and downstream slopes (Hydrometrics, 2026b). The 3H:1V slopes are conservative regarding stability and the zoned embankment with a central clay core and downstream drainage layers historically maintained a low phreatic surface within the embankment. The STEP E/C Divider Dike and BAP Dike are relatively low in height (30 feet for the E/C Divider Dike, and 25 feet for the BAP Dike) and have good crest widths of at least 20 feet. Geosynthetic liner systems, installed on the upstream slopes of each embankment, effectively cut off recharge of seepage water through the respective embankments and foundations. This is evidenced by the results of monthly embankment piezometer readings since 2016. Given this information and using engineering judgement, it is expected that the Units 1&2 CCR surface impoundment embankments would have adequate factors of safety against failure. The results of slope stability modeling, presented in Section 5.0 above, confirm that the embankments exceed the minimum factors of safety required by 40 CFR §257.73 paragraph (e)(1).

7.0 SAFETY FACTOR ASSESSMENT CERTIFICATION

CERTIFICATION

I, Adam Jourdonnais, a registered Professional Engineer in the State of Montana, certify that this ***Safety Factor Assessment Report*** for the Units 1&2 CCR surface impoundments at Colstrip Steam Electric Station was conducted in accordance with the requirements of ***40 CFR 257.73(e)(1) Safety Factor Assessment.*** This certification is made in compliance with the specific requirements of §257.73(e)(2). This certification is based in part on review of reference documentation identified in Section 8.0 of this report.



10/15/2026

Adam W. Jourdonnais, P.E.

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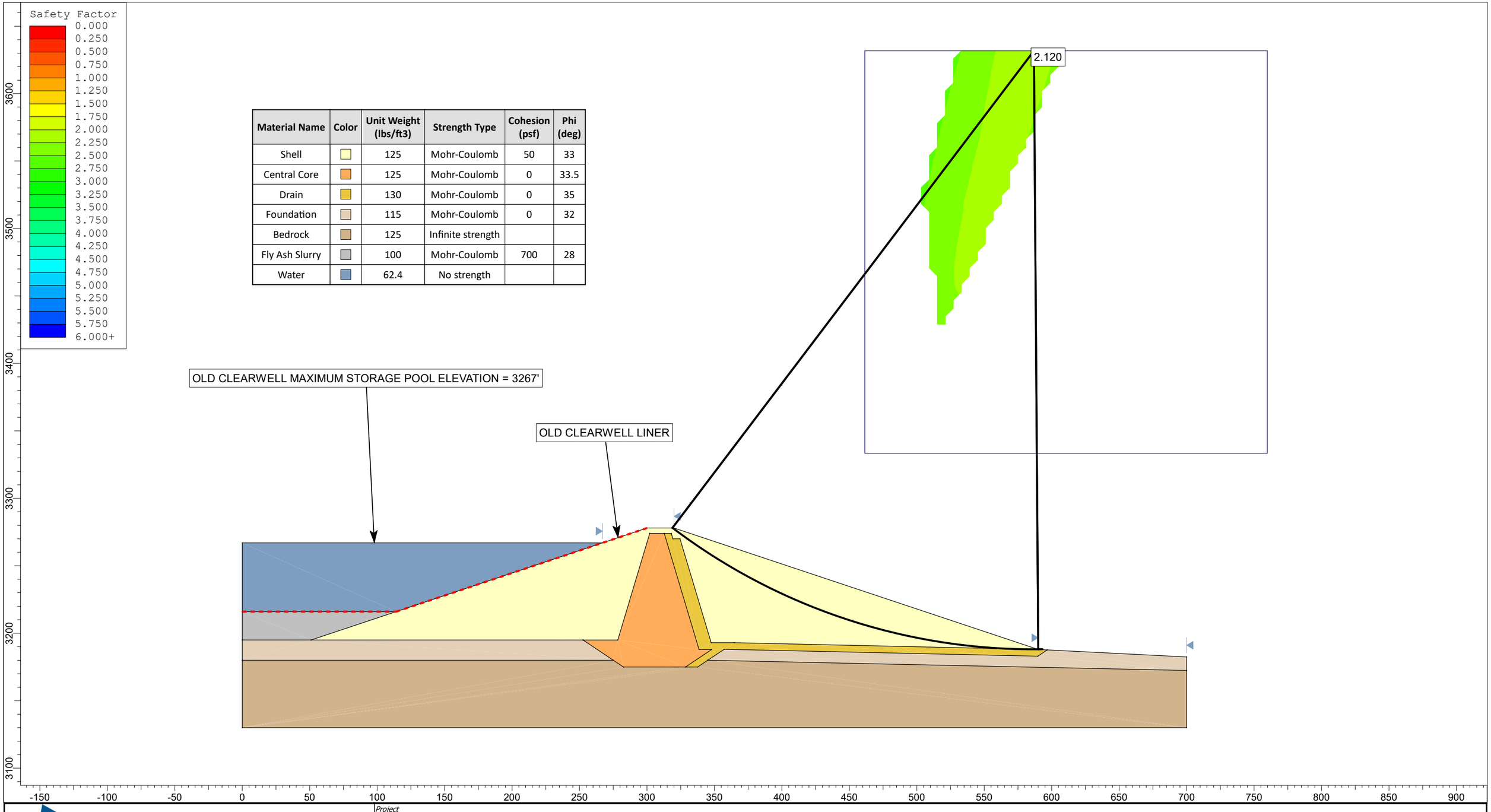
APPENDIX A

SLOPE STABILITY MODELS

Safety Factor
0.000
0.250
0.500
0.750
1.000
1.250
1.500
1.750
2.000
2.250
2.500
2.750
3.000
3.250
3.500
3.750
4.000
4.250
4.500
4.750
5.000
5.250
5.500
5.750
6.000+

Material Name	Color	Unit Weight (lbs/ft3)	Strength Type	Cohesion (psf)	Phi (deg)
Shell		125	Mohr-Coulomb	50	33
Central Core		125	Mohr-Coulomb	0	33.5
Drain		130	Mohr-Coulomb	0	35
Foundation		115	Mohr-Coulomb	0	32
Bedrock		125	Infinite strength		
Fly Ash Slurry		100	Mohr-Coulomb	700	28
Water		62.4	No strength		



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Project	2026 SAFETY FACTOR ASSESSMENT OF CCR SURFACE IMPOUNDMENTS AT CSES		
Analysis Description	UNITS 1&2 STEP - MAIN DAM - MAXIMUM STORAGE POOL - STATIC ANALYSIS		
Drawn By	AWJ	Scale 1:800	Company HYDROMETRICS, INC.
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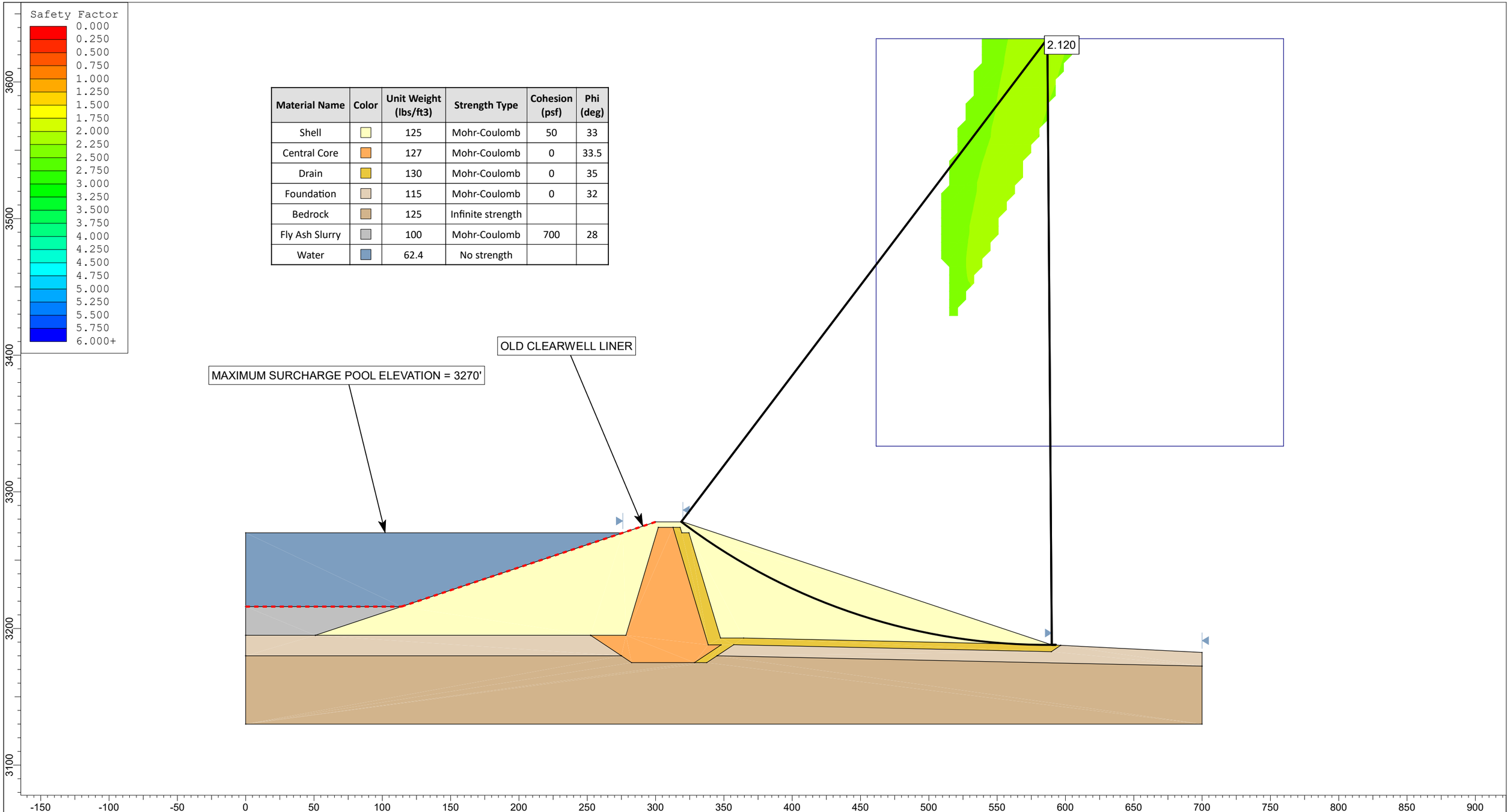

Material Name	Color	Unit Weight (lbs/ft3)	Strength Type	Cohesion (psf)	Phi (deg)
Shell		125	Mohr-Coulomb	50	33
Central Core		127	Mohr-Coulomb	0	33.5
Drain		130	Mohr-Coulomb	0	35
Foundation		115	Mohr-Coulomb	0	32
Bedrock		125	Infinite strength		
Fly Ash Slurry		100	Mohr-Coulomb	700	28
Water		62.4	No strength		

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Project	2026 SAFETY FACTOR ASSESSMENT OF CCR SURFACE IMPOUNDMENTS AT CSES		
Analysis Description	UNITS 1&2 STEP - MAIN DAM - MAXIMUM SURCHARGE POOL - STATIC ANALYSIS		
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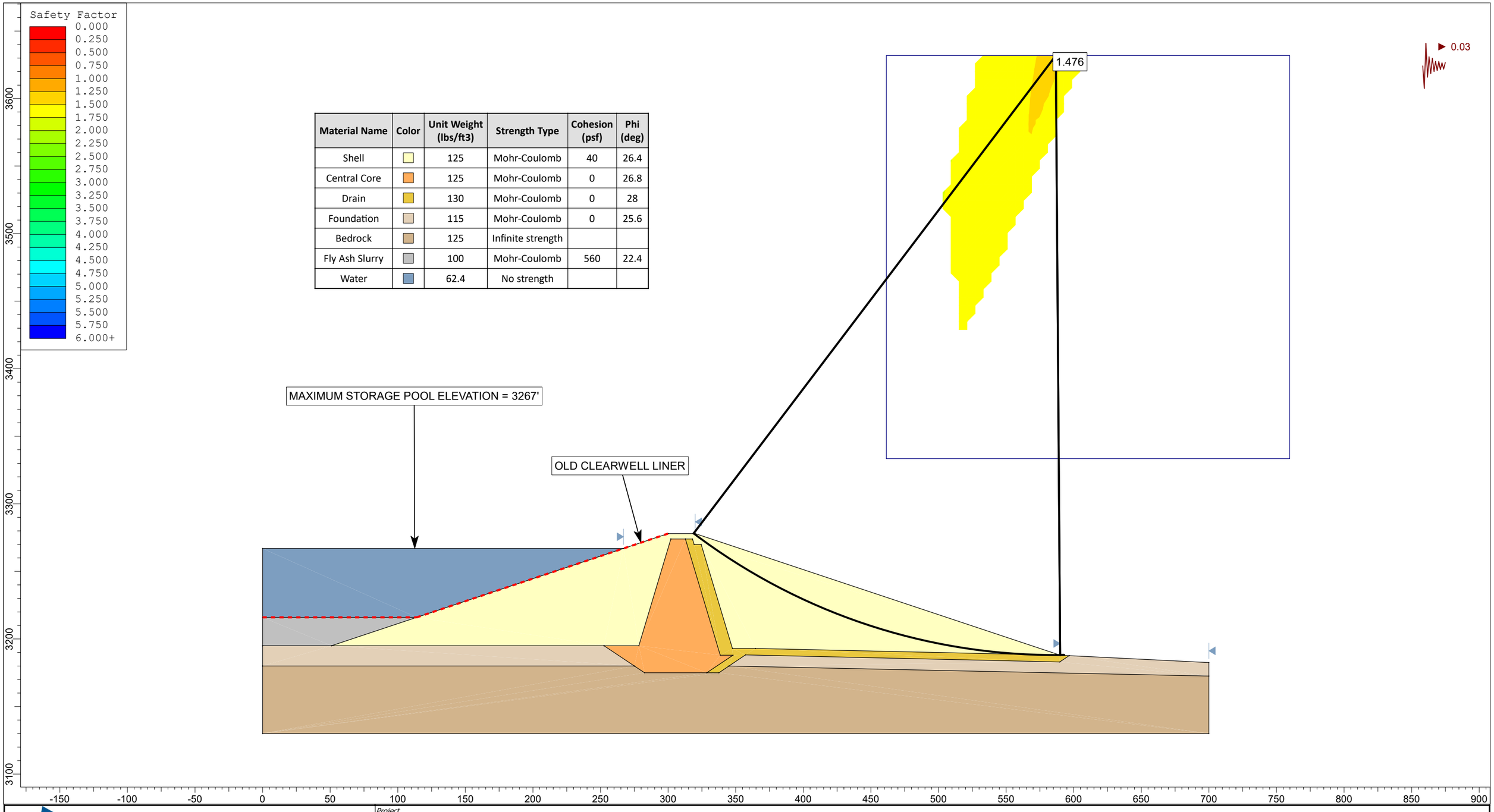

Material Name	Color	Unit Weight (lbs/ft3)	Strength Type	Cohesion (psf)	Phi (deg)
Shell		125	Mohr-Coulomb	40	26.4
Central Core		125	Mohr-Coulomb	0	26.8
Drain		130	Mohr-Coulomb	0	28
Foundation		115	Mohr-Coulomb	0	25.6
Bedrock		125	Infinite strength		
Fly Ash Slurry		100	Mohr-Coulomb	560	22.4
Water		62.4	No strength		

Project	2026 SAFETY FACTOR ASSESSMENT OF CCR SURFACE IMPOUNDMENTS AT CSES		
Analysis Description	UNITS 1&2 STEP - MAIN DAM - MAXIMUM STORAGE POOL - SEISMIC ANALYSIS		
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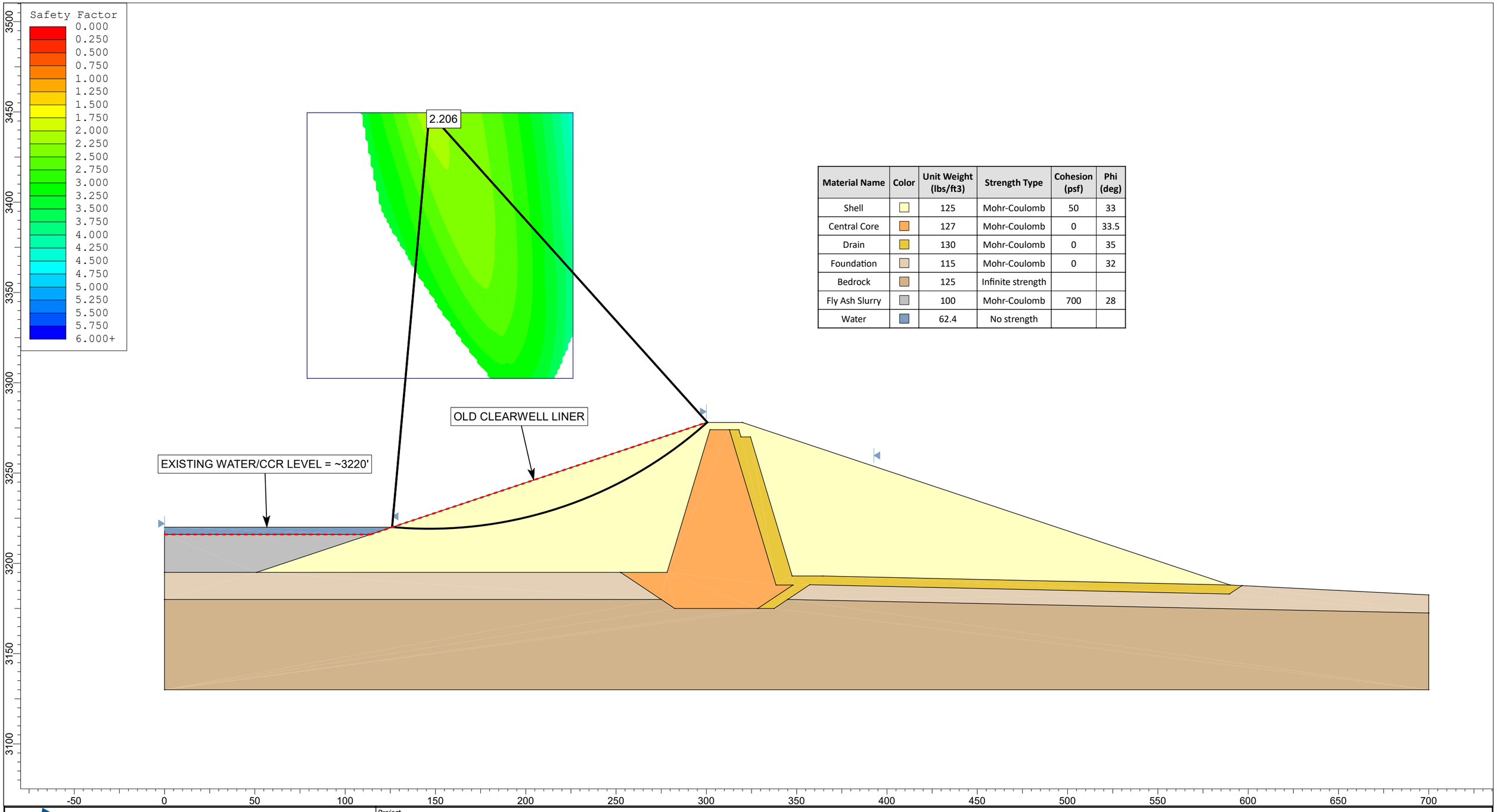

Material Name	Color	Unit Weight (lbs/ft3)	Strength Type	Cohesion (psf)	Phi (deg)
Shell		125	Mohr-Coulomb	50	33
Central Core		127	Mohr-Coulomb	0	33.5
Drain		130	Mohr-Coulomb	0	35
Foundation		115	Mohr-Coulomb	0	32
Bedrock		125	Infinite strength		
Fly Ash Slurry		100	Mohr-Coulomb	700	28
Water		62.4	No strength		

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Project	2026 SAFETY FACTOR ASSESSMENT OF CCR SURFACE IMPOUNDMENTS AT CSES		
Analysis Description	UNITS 1&2 STEP - MAIN DAM - UPSTREAM SLOPE - EXISTING CONDITIONS - STATIC ANALYSIS		
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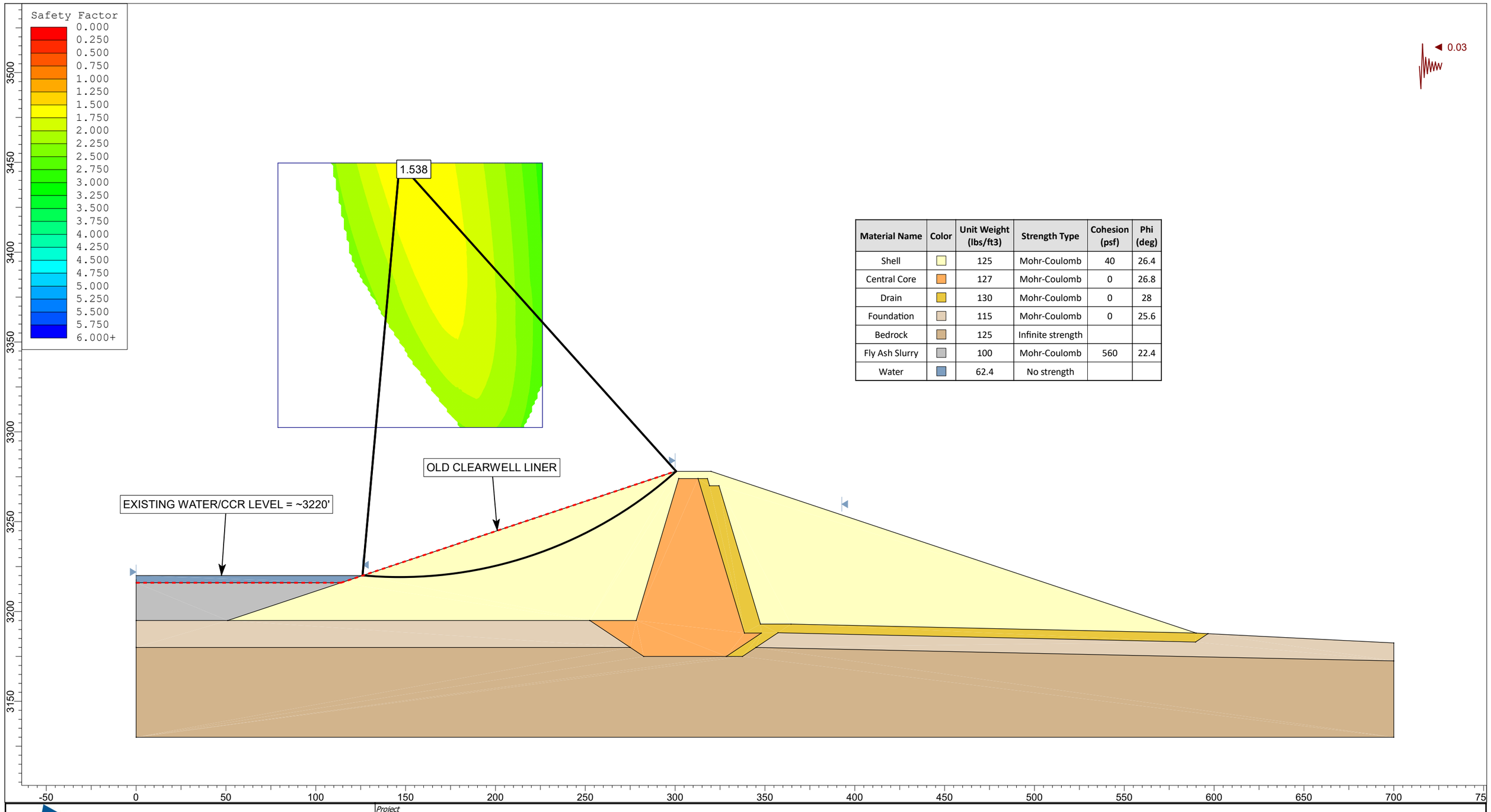

Material Name	Color	Unit Weight (lbs/ft3)	Strength Type	Cohesion (psf)	Phi (deg)
Shell		125	Mohr-Coulomb	40	26.4
Central Core		127	Mohr-Coulomb	0	26.8
Drain		130	Mohr-Coulomb	0	28
Foundation		115	Mohr-Coulomb	0	25.6
Bedrock		125	Infinite strength		
Fly Ash Slurry		100	Mohr-Coulomb	560	22.4
Water		62.4	No strength		

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Project	2026 SAFETY FACTOR ASSESSMENT OF CCR SURFACE IMPOUNDMENTS AT CSES		
Analysis Description	UNITS 1&2 STEP - MAIN DAM - UPSTREAM SLOPE - EXISTING CONDITIONS - SEISMIC ANALYSIS		
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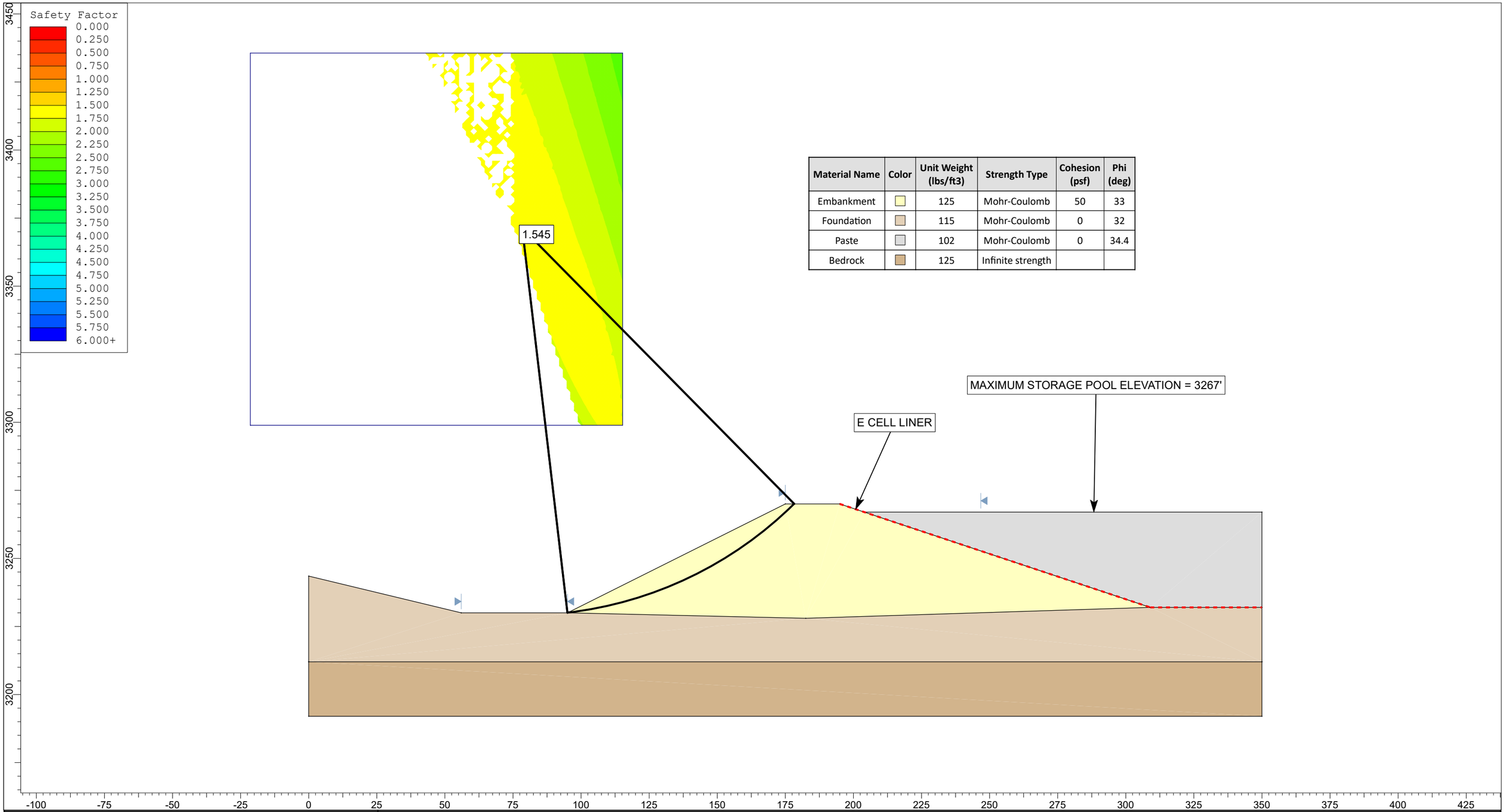

Material Name	Color	Unit Weight (lbs/ft3)	Strength Type	Cohesion (psf)	Phi (deg)
Embankment		125	Mohr-Coulomb	50	33
Foundation		115	Mohr-Coulomb	0	32
Paste		102	Mohr-Coulomb	0	34.4
Bedrock		125	Infinite strength		

Project	2026 SAFETY FACTOR ASSESSMENT OF CCR SURFACE IMPOUNDMENTS AT CSES			
Analysis Description	UNITS 1&2 STEP - E/C DIVIDER DIKE (SADDLE DAM) - MAXIMUM STORAGE POOL - STATIC ANALYSIS			
Drawn By	AWJ	Scale	1:400	Company HYDROMETRICS, INC.
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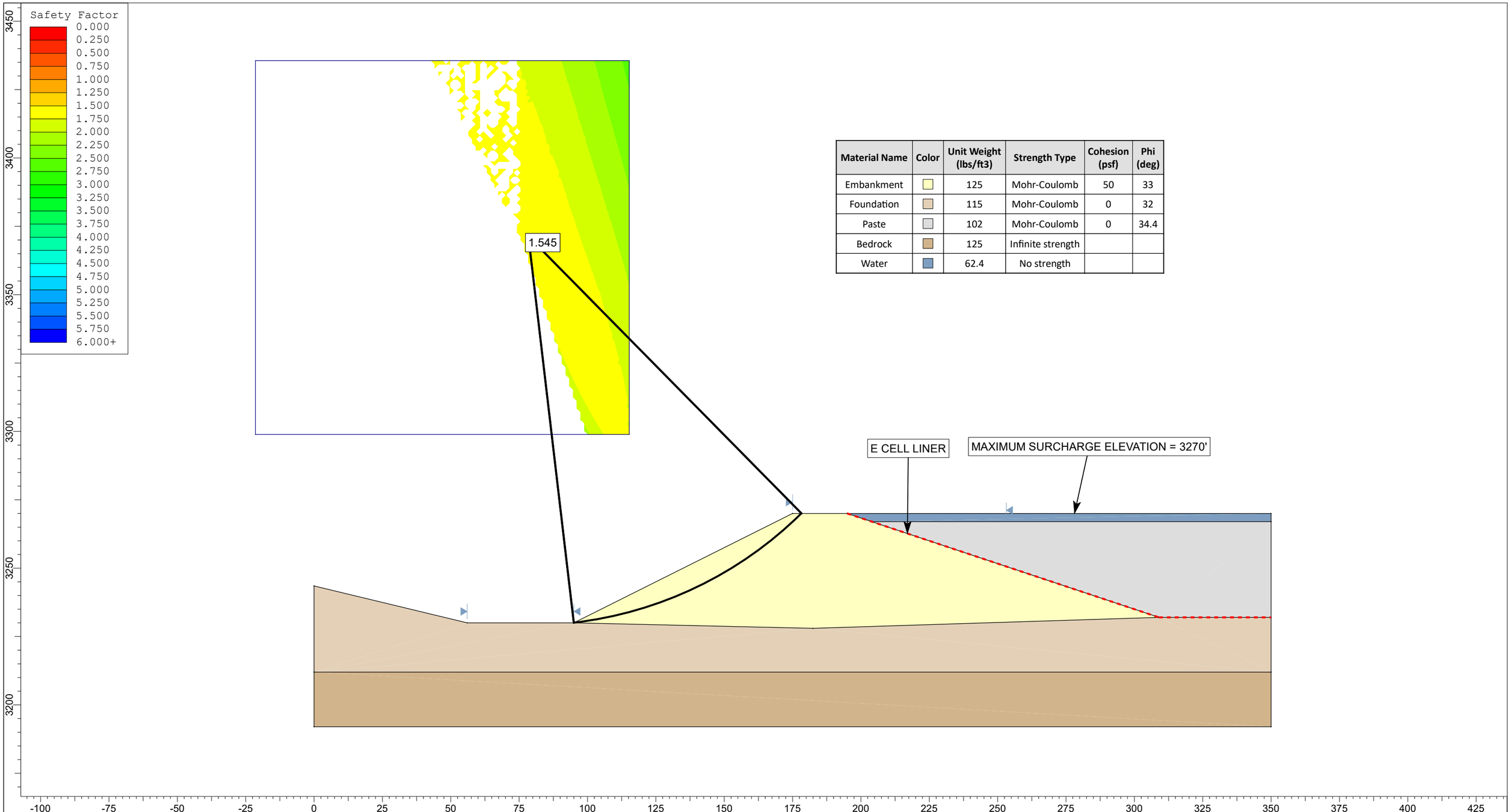

Material Name	Color	Unit Weight (lbs/ft3)	Strength Type	Cohesion (psf)	Phi (deg)
Embankment		125	Mohr-Coulomb	50	33
Foundation		115	Mohr-Coulomb	0	32
Paste		102	Mohr-Coulomb	0	34.4
Bedrock		125	Infinite strength		
Water		62.4	No strength		

	Project	2026 SAFETY FACTOR ASSESSMENT OF CCR SURFACE IMPOUNDMENTS AT CSES		
	Analysis Description	UNITS 1&2 STEP - E/C DIVIDER DIKE (SADDLE DAM) - MAXIMUM SURCHARGE POOL - STATIC ANALYSIS		
SLIDEINTERPRET 6.020	*Drawn By* AWJ	*Scale* 1:400	*Company* HYDROMETRICS, INC.	
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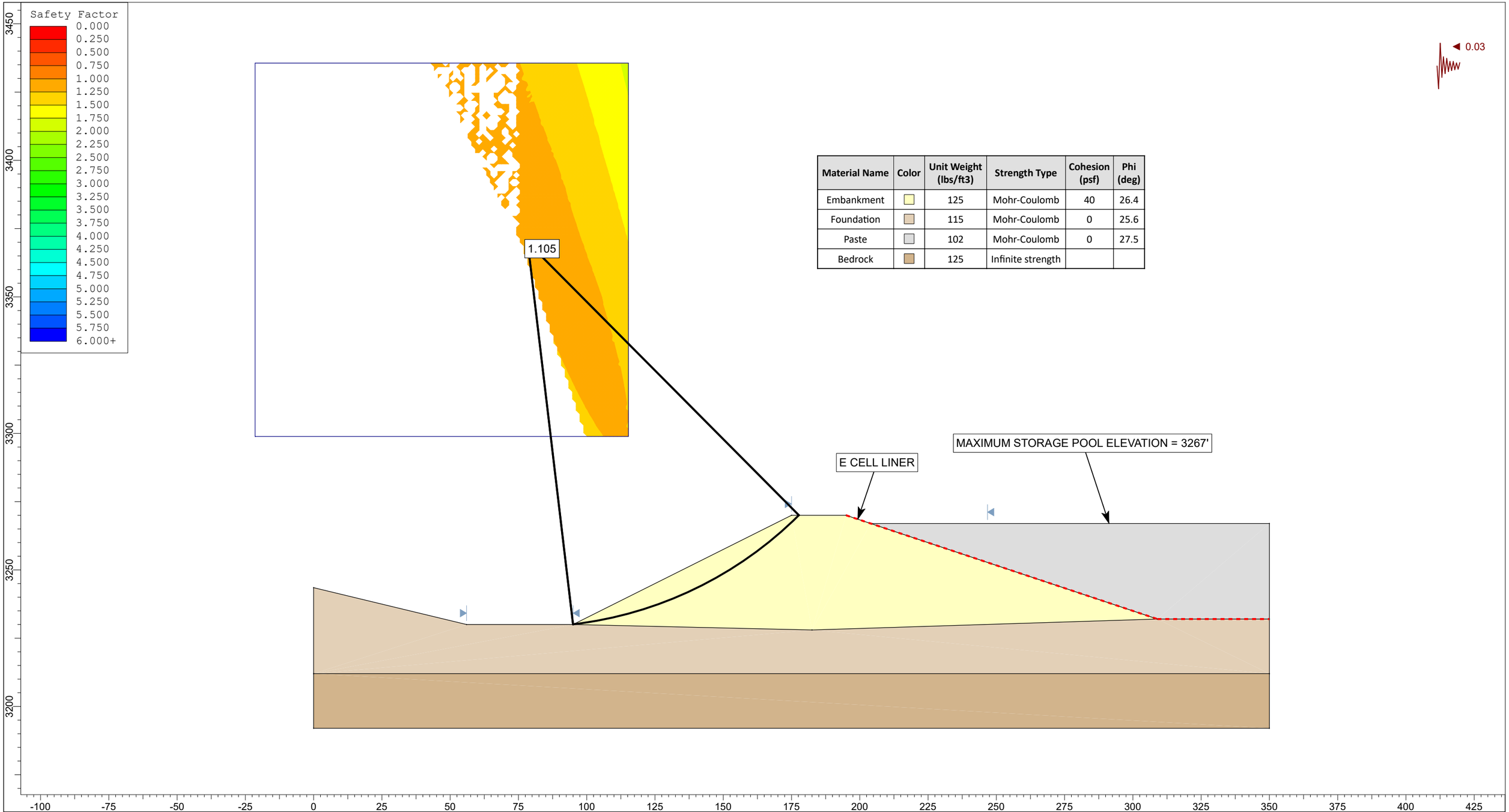

Material Name	Color	Unit Weight (lbs/ft3)	Strength Type	Cohesion (psf)	Phi (deg)
Embankment		125	Mohr-Coulomb	40	26.4
Foundation		115	Mohr-Coulomb	0	25.6
Paste		102	Mohr-Coulomb	0	27.5
Bedrock		125	Infinite strength		

Project	2026 SAFETY FACTOR ASSESSMENT OF CCR SURFACE IMPOUNDMENTS AT CSES		
Analysis Description	UNITS 1&2 STEP - E/C DIVIDER DIKE (SADDLE DAM) - MAXIMUM STORAGE POOL - SEISMIC ANALYSIS		
Drawn By AWJ	*Scale* 1:400	*Company* HYDROMETRICS, INC.	
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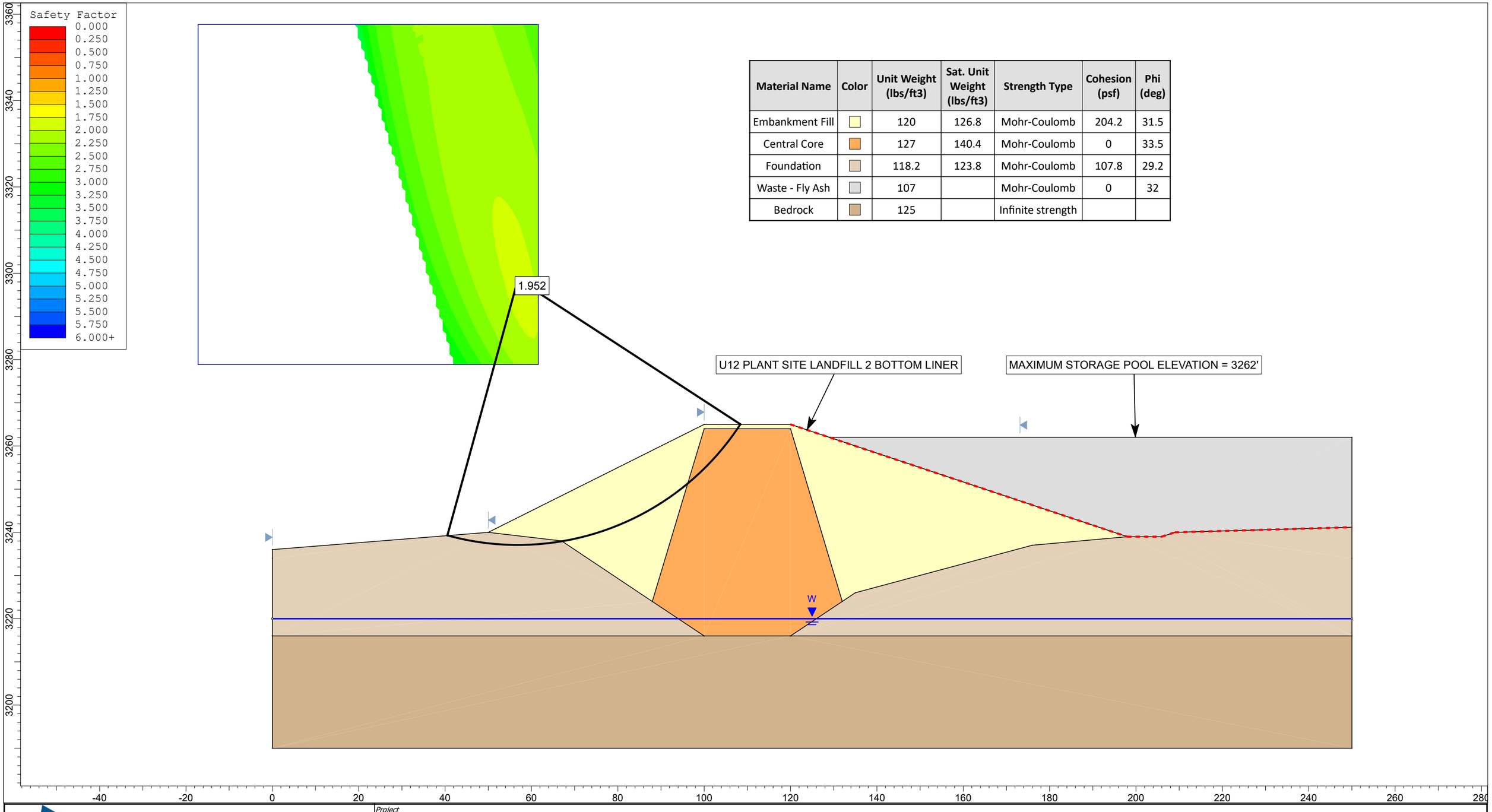

Material Name	Color	Unit Weight (lbs/ft3)	Sat. Unit Weight (lbs/ft3)	Strength Type	Cohesion (psf)	Phi (deg)
Embankment Fill		120	126.8	Mohr-Coulomb	204.2	31.5
Central Core		127	140.4	Mohr-Coulomb	0	33.5
Foundation		118.2	123.8	Mohr-Coulomb	107.8	29.2
Waste - Fly Ash		107		Mohr-Coulomb	0	32
Bedrock		125		Infinite strength		

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Project	2026 SAFETY FACTOR ASSESSMENT OF CCR SURFACE IMPOUNDMENTS AT CSES		
Analysis Description	UNITS 1&2 BOTTOM ASH POND (BAP) DIKE (SECTION A) - MAXIMUM STORAGE POOL - STATIC ANALYSIS		
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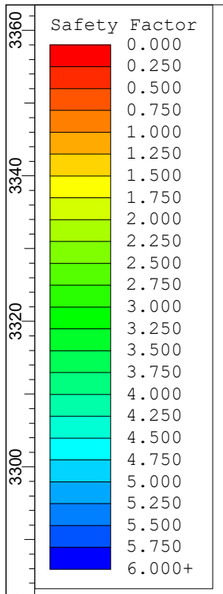
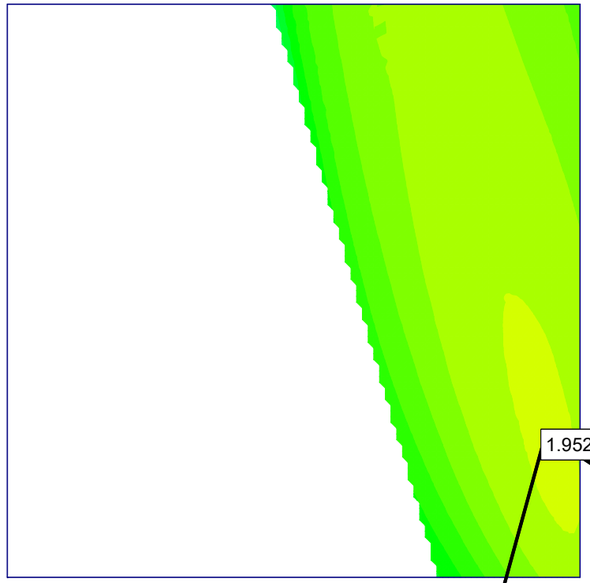
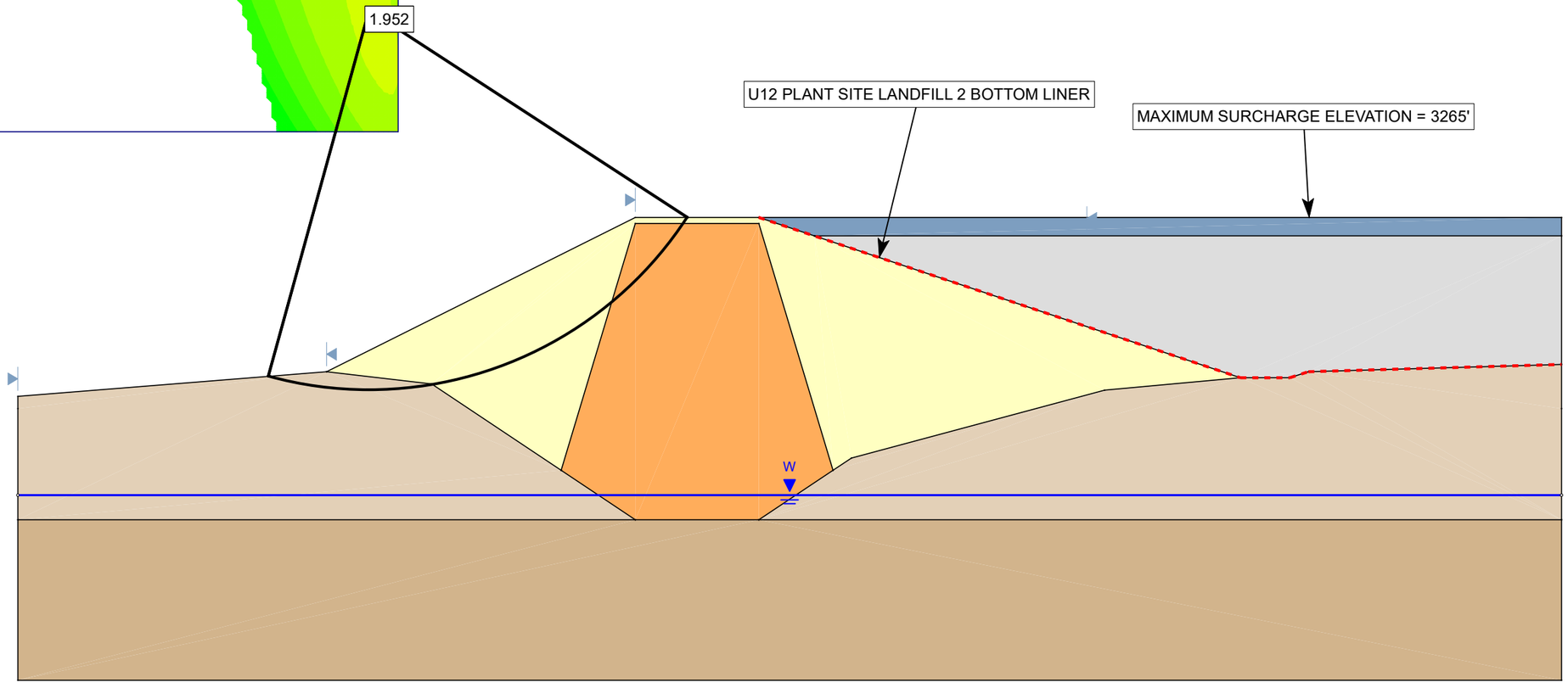




Material Name	Color	Unit Weight (lbs/ft3)	Sat. Unit Weight (lbs/ft3)	Strength Type	Cohesion (psf)	Phi (deg)
Embankment Fill		120	126.8	Mohr-Coulomb	204.2	31.5
Central Core		127	140.4	Mohr-Coulomb	0	33.5
Foundation		118.2	123.8	Mohr-Coulomb	107.8	29.2
Waste - Fly Ash		107		Mohr-Coulomb	0	32
Bedrock		125		Infinite strength		
Water		62.4		No strength		



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Project	2026 SAFETY FACTOR ASSESSMENT OF CCR SURFACE IMPOUNDMENTS AT CSES		
Analysis Description	UNITS 1&2 BOTTOM ASH POND (BAP) DIKE (SECTION A) - MAXIMUM SURCHARGE POOL - STATIC ANALYSIS		
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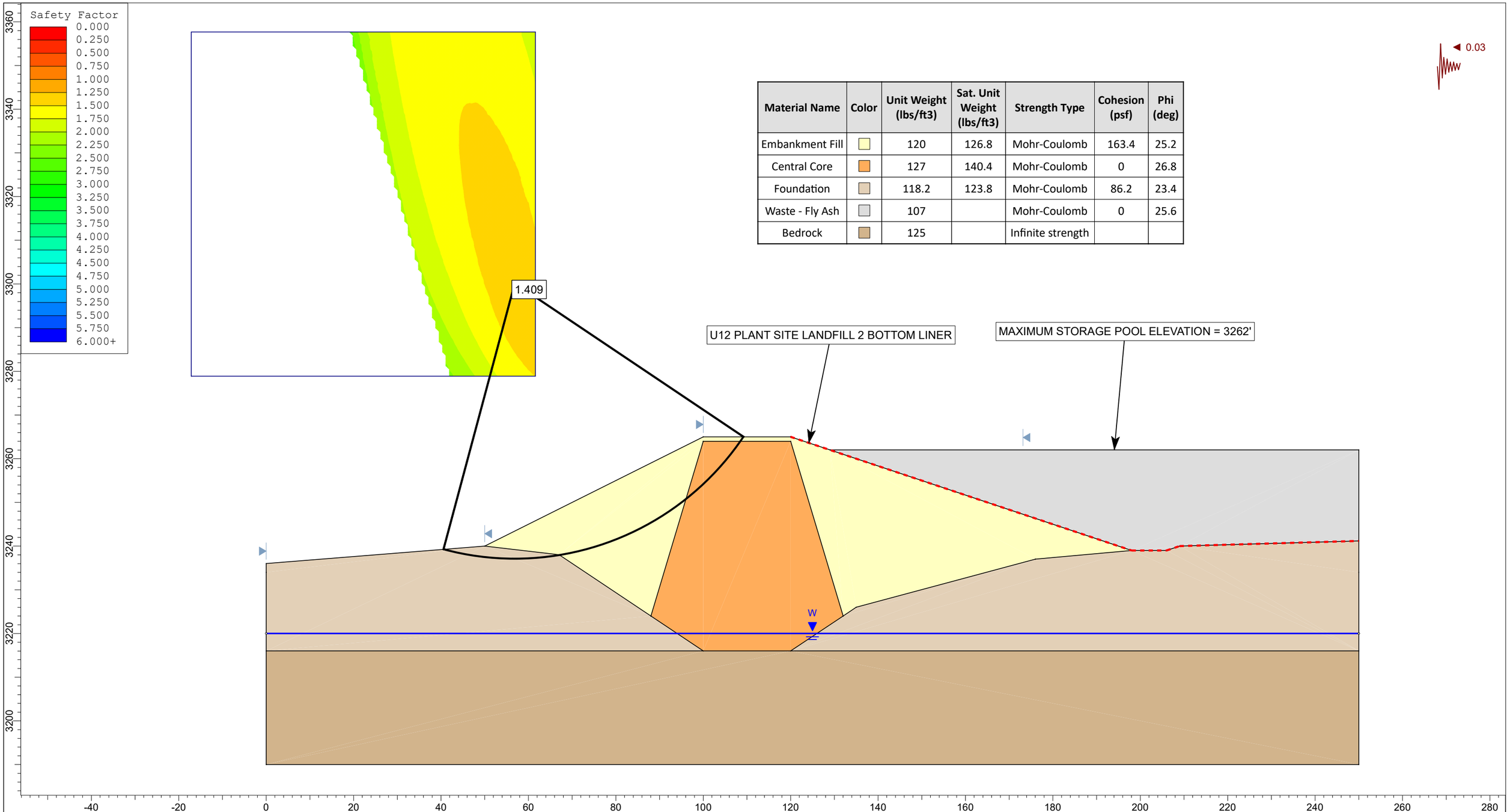

Material Name	Color	Unit Weight (lbs/ft3)	Sat. Unit Weight (lbs/ft3)	Strength Type	Cohesion (psf)	Phi (deg)
Embankment Fill		120	126.8	Mohr-Coulomb	163.4	25.2
Central Core		127	140.4	Mohr-Coulomb	0	26.8
Foundation		118.2	123.8	Mohr-Coulomb	86.2	23.4
Waste - Fly Ash		107		Mohr-Coulomb	0	25.6
Bedrock		125		Infinite strength		

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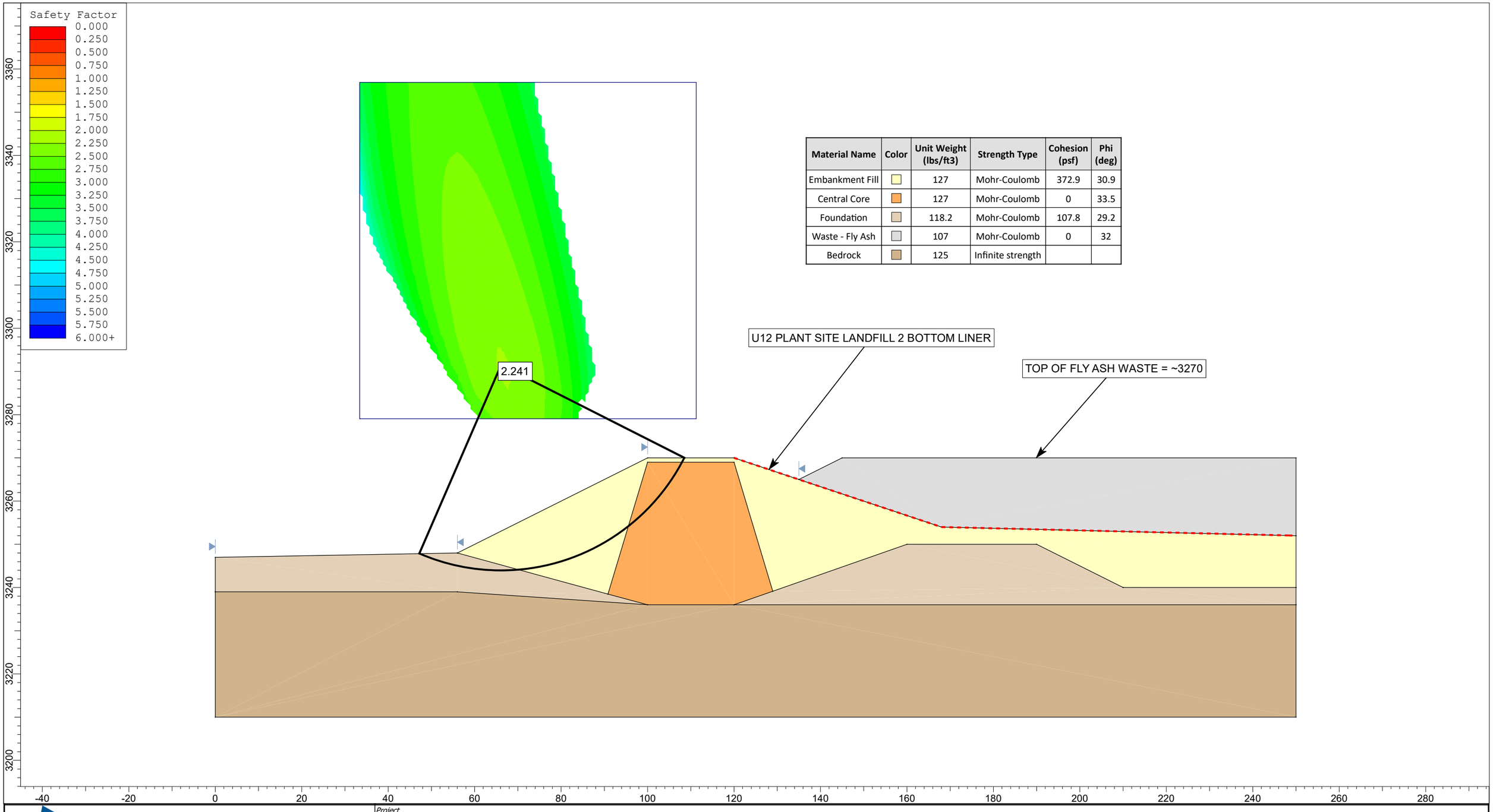
SLIDEINTERPRET 6.020

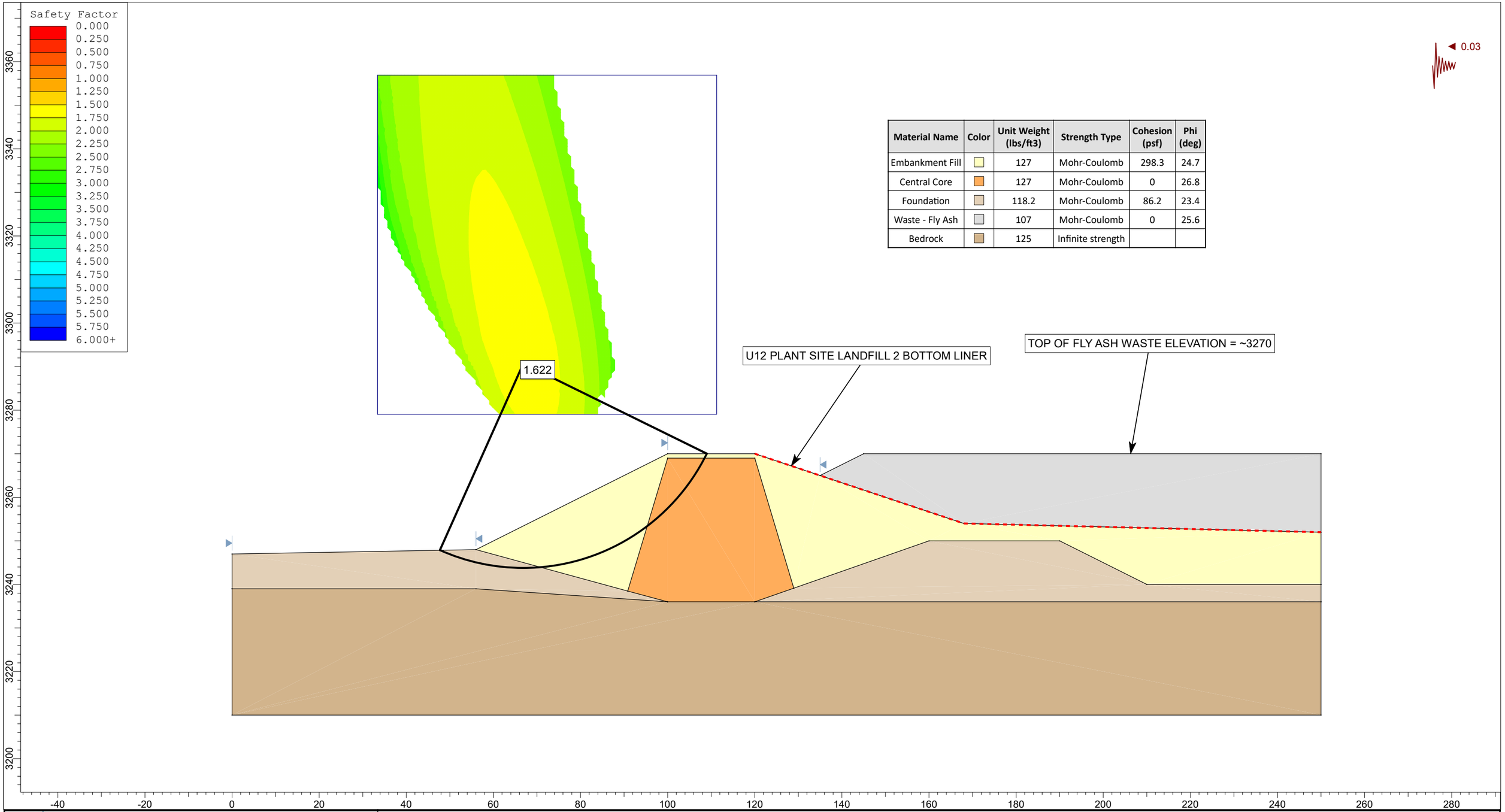
Project	2026 SAFETY FACTOR ASSESSMENT OF CCR SURFACE IMPOUNDMENTS AT CSES		
Analysis Description	UNITS 1&2 BOTTOM ASH POND (BAP) DIKE (SECTION A) - MAXIMUM STORAGE POOL - SEISMIC ANALYSIS		
Drawn By	AWJ	*Scale* 1:250	*Company* HYDROMETRICS, INC.
Date	9/25/2026, 4:07:52 PM		*File Name* 3.2 - 12 BAP DIKE A - Downstream - Max Normal Pool - Seismic.slim



Material Name	Color	Unit Weight (lbs/ft3)	Strength Type	Cohesion (psf)	Phi (deg)
Embankment Fill		127	Mohr-Coulomb	372.9	30.9
Central Core		127	Mohr-Coulomb	0	33.5
Foundation		118.2	Mohr-Coulomb	107.8	29.2
Waste - Fly Ash		107	Mohr-Coulomb	0	32
Bedrock		125	Infinite strength		

SLIDEINTERPRET 6.020

Project	2026 SAFETY FACTOR ASSESSMENT OF CCR SURFACE IMPOUNDMENTS AT CSES		
Analysis Description	UNITS 1&2 BOTTOM ASH POND (BAP) DIKE (SECTION B) - EXISTING CONDITIONS - STATIC ANALYSIS		
Drawn By AWJ	*Scale* 1:250	*Company*	HYDROMETRICS, INC.
Date 9/25/2026, 4:07:52 PM		*File Name*	4.0 - 12 BAP DIKE B - Downstream - Max Normal Pool - Static.slim



Material Name	Color	Unit Weight (lbs/ft3)	Strength Type	Cohesion (psf)	Phi (deg)
Embankment Fill		127	Mohr-Coulomb	298.3	24.7
Central Core		127	Mohr-Coulomb	0	26.8
Foundation		118.2	Mohr-Coulomb	86.2	23.4
Waste - Fly Ash		107	Mohr-Coulomb	0	25.6
Bedrock		125	Infinite strength		

SLIDEINTERPRET 6.020

Project	2026 SAFETY FACTOR ASSESSMENT OF CCR SURFACE IMPOUNDMENTS AT CSES		
Analysis Description	UNITS 1&2 BOTTOM ASH POND (BAP) DIKE (SECTION B) - EXISTING CONDITIONS - SEISMIC ANALYSIS		
Drawn By AWJ	*Scale* 1:250	*Company*	HYDROMETRICS, INC.
Date 9/25/2026, 4:07:52 PM		*File Name*	4.1 - 12 BAP DIKE B - Downstream - Existing Conditions - Seismic.slim

APPENDIX B

SLOPE STABILITY MODEL REPORTS

Slide Analysis Information

2026 SAFETY FACTOR ASSESSMENT OF CCR SURFACE IMPOUNDMENTS AT CSES

Project Summary

File Name: 1.0 - 12 STEP Main Dam - Downstream - Static.slim
Slide Modeler Version: 6.02
Project Title: 2026 SAFETY FACTOR ASSESSMENT OF CCR SURFACE IMPOUNDMENTS AT CSES
Analysis: UNITS 1&2 STEP - MAIN DAM - MAXIMUM STORAGE POOL - STATIC ANALYSIS
Author: AWJ
Company: HYDROMETRICS, INC.
Date Created: 9/25/2026, 4:07:52 PM

General Settings

Units of Measurement: Imperial Units
Time Units: days
Permeability Units: feet/second
Failure Direction: Left to Right
Data Output: Standard
Maximum Material Properties: 20
Maximum Support Properties: 20

Analysis Options

Analysis Methods Used

Bishop simplified
GLE/Morgenstern-Price with interslice force function: Half Sine
Janbu simplified

Number of slices: 25
Tolerance: 0.005
Maximum number of iterations: 50
Check malpha < 0.2: Yes
Initial trial value of FS: 1
Steffensen Iteration: Yes

Groundwater Analysis

Groundwater Method: Water Surfaces
Pore Fluid Unit Weight: 62.4 lbs/ft3
Advanced Groundwater Method: None

Random Numbers

Pseudo-random Seed: 10116
Random Number Generation Method: Park and Miller v.3

Surface Options

Surface Type: Circular
Search Method: Grid Search
Radius Increment: 10
Composite Surfaces: Disabled
Reverse Curvature: Invalid Surfaces
Minimum Elevation: Not Defined
Minimum Depth: Not Defined

Material Properties

Property	Shell	Central Core	Drain	Foundation	Bedrock	Fly Ash Slurry	Water
Color							
Strength Type	Mohr-Coulomb	Mohr-Coulomb	Mohr-Coulomb	Mohr-Coulomb	Infinite strength	Mohr-Coulomb	No strength
Unit Weight [lbs/ft3]	125	125	130	115	125	100	62.4
Cohesion [psf]	50	0	0	0		700	
Friction Angle [deg]	33	33.5	35	32		28	
Water Surface	None	None	None	None	None	None	None
Ru Value	0	0	0	0	0	0	0

Global Minimums

Method: bishop simplified

FS: 2.124170
Center: 586.742, 3631.732
Radius: 443.744
Left Slip Surface Endpoint: 318.820, 3278.000
Right Slip Surface Endpoint: 590.000, 3188.000
Resisting Moment=1.64779e+008 lb-ft
Driving Moment=7.75733e+007 lb-ft
Total Slice Area=4570.48 ft2

Method: janbu simplified

FS: 2.074630
Center: 586.742, 3631.732
Radius: 443.744
Left Slip Surface Endpoint: 318.820, 3278.000
Right Slip Surface Endpoint: 590.000, 3188.000
Resisting Horizontal Force=348435 lb
Driving Horizontal Force=167950 lb
Total Slice Area=4570.48 ft2

Method: gle/morgenstern-price

FS: 2.119870
Center: 586.742, 3631.732
Radius: 443.744
Left Slip Surface Endpoint: 318.820, 3278.000
Right Slip Surface Endpoint: 590.000, 3188.000
Resisting Moment=1.64445e+008 lb-ft
Driving Moment=7.75733e+007 lb-ft
Resisting Horizontal Force=349782 lb
Driving Horizontal Force=165002 lb
Total Slice Area=4570.48 ft2

Slice Data

Global Minimum Query (bishop simplified) - Safety Factor: 2.12417

Slice Number	Width [ft]	Weight [lbs]	Base Material	Base Cohesion [psf]	Base Friction Angle [degrees]	Shear Stress [psf]	Shear Strength [psf]	Base Normal Stress [psf]	Pore Pressure [psf]	Effective Normal Stress [psf]
1	10.6522	3337.94	Shell	50	33	97.4762	207.056	241.845	0	241.845
2	10.6522	8738.29	Shell	50	33	226.585	481.306	664.152	0	664.152
3	10.6522	13498.2	Shell	50	33	343.038	728.671	1045.06	0	1045.06
4	10.6522	17681.1	Shell	50	33	447.768	951.135	1387.63	0	1387.63
5	10.6522	21317.2	Shell	50	33	541.002	1149.18	1692.59	0	1692.59
6	10.6522	24432.9	Shell	50	33	622.949	1323.25	1960.64	0	1960.64
7	10.6522	27051.3	Shell	50	33	693.791	1473.73	2192.34	0	2192.34
8	10.6522	29192.9	Shell	50	33	753.678	1600.94	2388.23	0	2388.23
9	10.6522	30876	Shell	50	33	802.751	1705.18	2548.75	0	2548.75
10	10.6522	32116.7	Shell	50	33	841.124	1786.69	2674.26	0	2674.26
11	10.6522	32929.2	Shell	50	33	868.89	1845.67	2765.08	0	2765.08
12	10.6522	33326.3	Shell	50	33	886.12	1882.27	2821.45	0	2821.45
13	10.6522	33319.5	Shell	50	33	892.876	1896.62	2843.54	0	2843.54
14	10.6522	32918.7	Shell	50	33	889.185	1888.78	2831.47	0	2831.47
15	10.6522	32133	Shell	50	33	875.066	1858.79	2785.29	0	2785.29
16	10.6522	30970.3	Shell	50	33	850.516	1806.64	2705	0	2705
17	10.6522	29437.6	Shell	50	33	815.514	1732.29	2590.51	0	2590.51
18	10.6522	27540.9	Shell	50	33	770.018	1635.65	2441.69	0	2441.69
19	10.6522	25285.6	Shell	50	33	713.968	1516.59	2258.35	0	2258.35
20	10.6522	22676.2	Shell	50	33	647.279	1374.93	2040.21	0	2040.21
21	10.6522	19716.5	Shell	50	33	569.851	1210.46	1786.95	0	1786.95
22	10.6522	16409.8	Shell	50	33	481.563	1022.92	1498.17	0	1498.17
23	10.6522	12758.5	Shell	50	33	382.266	811.998	1173.38	0	1173.38
24	13.0903	10161.7	Drain	0	35	252.816	537.025	766.948	0	766.948
25	13.0903	3496.87	Drain	0	35	87.8437	186.595	266.485	0	266.485

Global Minimum Query (janbu simplified) - Safety Factor: 2.07463

Slice Number	Width [ft]	Weight [lbs]	Base Material	Base Cohesion [psf]	Base Friction Angle [degrees]	Shear Stress [psf]	Shear Strength [psf]	Base Normal Stress [psf]	Pore Pressure [psf]	Effective Normal Stress [psf]
1	10.6522	3337.94	Shell	50	33	99.3657	206.147	240.446	0	240.446
2	10.6522	8738.29	Shell	50	33	231.029	479.299	661.063	0	661.063
3	10.6522	13498.2	Shell	50	33	349.839	725.786	1040.62	0	1040.62
4	10.6522	17681.1	Shell	50	33	456.738	947.562	1382.12	0	1382.12
5	10.6522	21317.2	Shell	50	33	551.949	1145.09	1686.29	0	1686.29
6	10.6522	24432.9	Shell	50	33	635.68	1318.8	1953.77	0	1953.77
7	10.6522	27051.3	Shell	50	33	708.097	1469.04	2185.13	0	2185.13
8	10.6522	29192.9	Shell	50	33	769.361	1596.14	2380.84	0	2380.84
9	10.6522	30876	Shell	50	33	819.602	1700.37	2541.35	0	2541.35
10	10.6522	32116.7	Shell	50	33	858.929	1781.96	2666.99	0	2666.99

11	10.6522	32929.2	Shell	50	33	887.44	1841.11	2758.06	0	2758.06
12	10.6522	33326.3	Shell	50	33	905.193	1877.94	2814.78	0	2814.78
13	10.6522	33319.5	Shell	50	33	912.249	1892.58	2837.32	0	2837.32
14	10.6522	32918.7	Shell	50	33	908.629	1885.07	2825.77	0	2825.77
15	10.6522	32133	Shell	50	33	894.352	1855.45	2780.16	0	2780.16
16	10.6522	30970.3	Shell	50	33	869.408	1803.7	2700.47	0	2700.47
17	10.6522	29437.6	Shell	50	33	833.768	1729.76	2586.6	0	2586.6
18	10.6522	27540.9	Shell	50	33	787.384	1633.53	2438.42	0	2438.42
19	10.6522	25285.6	Shell	50	33	730.188	1514.87	2255.71	0	2255.71
20	10.6522	22676.2	Shell	50	33	662.094	1373.6	2038.17	0	2038.17
21	10.6522	19716.5	Shell	50	33	582.996	1209.5	1785.47	0	1785.47
22	10.6522	16409.8	Shell	50	33	492.752	1022.28	1497.18	0	1497.18
23	10.6522	12758.5	Shell	50	33	391.214	811.625	1172.8	0	1172.8
24	13.0903	10161.7	Drain	0	35	258.779	536.87	766.727	0	766.727
25	13.0903	3496.87	Drain	0	35	89.936	186.584	266.469	0	266.469

Global Minimum Query (gle/morgenstern-price) - Safety Factor: 2.11987

Slice Number	Width [ft]	Weight [lbs]	Base Material	Base Cohesion [psf]	Base Friction Angle [degrees]	Shear Stress [psf]	Shear Strength [psf]	Base Normal Stress [psf]	Pore Pressure [psf]	Effective Normal Stress [psf]
1	10.6522	3337.94	Shell	50	33	96.7592	205.117	238.859	0	238.859
2	10.6522	8738.29	Shell	50	33	221.137	468.781	644.866	0	644.866
3	10.6522	13498.2	Shell	50	33	329.835	699.208	999.693	0	999.693
4	10.6522	17681.1	Shell	50	33	425.793	902.626	1312.93	0	1312.93
5	10.6522	21317.2	Shell	50	33	510.824	1082.88	1590.5	0	1590.5
6	10.6522	24432.9	Shell	50	33	586.328	1242.94	1836.97	0	1836.97
7	10.6522	27051.3	Shell	50	33	653.328	1384.97	2055.68	0	2055.68
8	10.6522	29192.9	Shell	50	33	712.497	1510.4	2248.82	0	2248.82
9	10.6522	30876	Shell	50	33	764.165	1619.93	2417.49	0	2417.49
10	10.6522	32116.7	Shell	50	33	808.366	1713.63	2561.76	0	2561.76
11	10.6522	32929.2	Shell	50	33	844.816	1790.9	2680.75	0	2680.75
12	10.6522	33326.3	Shell	50	33	872.987	1850.62	2772.71	0	2772.71
13	10.6522	33319.5	Shell	50	33	892.097	1891.13	2835.09	0	2835.09
14	10.6522	32918.7	Shell	50	33	901.201	1910.43	2864.81	0	2864.81
15	10.6522	32133	Shell	50	33	899.253	1906.3	2858.45	0	2858.45
16	10.6522	30970.3	Shell	50	33	885.201	1876.51	2812.58	0	2812.58
17	10.6522	29437.6	Shell	50	33	858.081	1819.02	2724.05	0	2724.05
18	10.6522	27540.9	Shell	50	33	817.135	1732.22	2590.4	0	2590.4
19	10.6522	25285.6	Shell	50	33	761.896	1615.12	2410.07	0	2410.07
20	10.6522	22676.2	Shell	50	33	692.269	1467.52	2182.78	0	2182.78
21	10.6522	19716.5	Shell	50	33	608.575	1290.1	1909.58	0	1909.58
22	10.6522	16409.8	Shell	50	33	511.555	1084.43	1592.89	0	1592.89
23	10.6522	12758.5	Shell	50	33	402.343	852.915	1236.38	0	1236.38
24	13.0903	10161.7	Drain	0	35	263.075	557.684	796.454	0	796.454
25	13.0903	3496.87	Drain	0	35	89.7102	190.174	271.597	0	271.597

Interslice Data

Global Minimum Query (bishop simplified) - Safety Factor: 2.12417

Slice Number	X coordinate [ft]	Y coordinate - Bottom [ft]	Interslice Normal Force [lbs]	Interslice Shear Force [lbs]	Interslice Force Angle [degrees]
1	318.82	3278	0	0	0
2	329.472	3270.18	854.041	0	0
3	340.124	3262.83	3322.67	0	0
4	350.776	3255.93	6885.39	0	0
5	361.428	3249.45	11113.6	0	0
6	372.081	3243.36	15648.8	0	0
7	382.733	3237.66	20193.7	0	0
8	393.385	3232.33	24504.6	0	0
9	404.037	3227.35	28385.1	0	0
10	414.689	3222.7	31681.9	0	0
11	425.341	3218.38	34280	0	0
12	435.994	3214.38	36099.8	0	0
13	446.646	3210.68	37094.3	0	0
14	457.298	3207.29	37247.3	0	0
15	467.95	3204.18	36571	0	0
16	478.602	3201.37	35105.3	0	0
17	489.254	3198.83	32916.2	0	0
18	499.907	3196.57	30095.5	0	0
19	510.559	3194.58	26760.4	0	0
20	521.211	3192.85	23052.8	0	0
21	531.863	3191.39	19139.8	0	0
22	542.515	3190.2	15213.8	0	0
23	553.167	3189.26	11492.8	0	0

24	563.819	3188.58	8221.46	0	0
25	576.91	3188.1	5285.54	0	0
26	590	3188	0	0	0

Global Minimum Query (janbu simplified) - Safety Factor: 2.07463

Slice Number	X coordinate [ft]	Y coordinate - Bottom [ft]	Interslice Normal Force [lbs]	Interslice Shear Force [lbs]	Interslice Force Angle [degrees]
1	318.82	3278	0	0	0
2	329.472	3270.18	822.804	0	0
3	340.124	3262.83	3221.01	0	0
4	350.776	3255.93	6680.04	0	0
5	361.428	3249.45	10776.2	0	0
6	372.081	3243.36	15155.6	0	0
7	382.733	3237.66	19524.8	0	0
8	393.385	3232.33	23643.6	0	0
9	404.037	3227.35	27319	0	0
10	414.689	3222.7	30400.5	0	0
11	425.341	3218.38	32776	0	0
12	435.994	3214.38	34368.6	0	0
13	446.646	3210.68	35133.9	0	0
14	457.298	3207.29	35057.9	0	0
15	467.95	3204.18	34155.2	0	0
16	478.602	3201.37	32468.1	0	0
17	489.254	3198.83	30064.8	0	0
18	499.907	3196.57	27039.5	0	0
19	510.559	3194.58	23511.6	0	0
20	521.211	3192.85	19625.5	0	0
21	531.863	3191.39	15550.6	0	0
22	542.515	3190.2	11481.8	0	0
23	553.167	3189.26	7639.91	0	0
24	563.819	3188.58	4272.25	0	0
25	576.91	3188.1	1257.65	0	0
26	590	3188	0	0	0

Global Minimum Query (gle/morgenstern-price) - Safety Factor: 2.11987

Slice Number	X coordinate [ft]	Y coordinate - Bottom [ft]	Interslice Normal Force [lbs]	Interslice Shear Force [lbs]	Interslice Force Angle [degrees]
1	318.82	3278	0	0	0
2	329.472	3270.18	837.541	36.797	2.51565
3	340.124	3262.83	3220.67	280.845	4.98363
4	350.776	3255.93	6608.09	853.375	7.3585
5	361.428	3249.45	10582.6	1789.69	9.59883
6	372.081	3243.36	14814	3059.4	11.6687
7	382.733	3237.66	19039.1	4584.31	13.5382
8	393.385	3232.33	23046.3	6254.4	15.1835
9	404.037	3227.35	26664.6	7942.25	16.5866
10	414.689	3222.7	29756.1	9516.01	17.7343
11	425.341	3218.38	32210.4	10851	18.6176
12	435.994	3214.38	33942.1	11840.2	19.2306
13	446.646	3210.68	34889.3	12402.6	19.5695
14	457.298	3207.29	35014.7	12490.7	19.6327
15	467.95	3204.18	34306.8	12094.7	19.4199
16	478.602	3201.37	32782.5	11244.4	18.932
17	489.254	3198.83	30490.1	10008.1	18.172
18	499.907	3196.57	27511.6	8486.94	17.1443
19	510.559	3194.58	23964.4	6806.88	15.8567
20	521.211	3192.85	20002.1	5106.04	14.3204
21	531.863	3191.39	15812.6	3520.33	12.551
22	542.515	3190.2	11616.4	2167.54	10.5694
23	553.167	3189.26	7660.81	1131.67	8.40307
24	563.819	3188.58	4215.4	449.376	6.08494
25	576.91	3188.1	1156.97	62.3845	3.08643
26	590	3188	0	0	0

List Of Coordinates

External Boundary

X	Y
0	3195
0	3180
0	3130
700	3130

700	3172.5
700	3182.5
596.6	3187.67
590	3188
320	3278
300	3278
267	3267
0	3267
0	3216

Material Boundary

X	Y
0	3195
51	3195
114	3216
267	3267

Material Boundary

X	Y
302	3274
312.78	3274
318	3274
319.2	3270
324.42	3270
347.52	3193
364.5	3193
590	3188

Material Boundary

X	Y
252.5	3195
275	3180
282.5	3175
328.49	3175
337.5	3175
344.998	3180
357.25	3188.17
589.64	3183
596.6	3187.67

Material Boundary

X	Y
51	3195
252.5	3195

Material Boundary

X	Y
0	3180
275	3180

Material Boundary

X	Y
252.5	3195
278.3	3195
302	3274

Material Boundary

X	Y
312.78	3274
338.58	3188
348	3188
328.49	3175

Material Boundary

X	Y
344.998	3180
700	3172.5

Material Boundary

X	Y
0	3216
114	3216

Slide Analysis Information

2026 SAFETY FACTOR ASSESSMENT OF CCR SURFACE IMPOUNDMENTS AT CSES

Project Summary

File Name: 1.1 - 12 STEP Main Dam - Max Surcharge - Downstream - Static.slim
Slide Modeler Version: 6.02
Project Title: 2026 SAFETY FACTOR ASSESSMENT OF CCR SURFACE IMPOUNDMENTS AT CSES
Analysis: UNITS 1&2 STEP - MAIN DAM - MAXIMUM SURCHARGE POOL - STATIC ANALYSIS
Author: AWJ
Company: HYDROMETRICS, INC.
Date Created: 9/25/2026, 4:07:52 PM

General Settings

Units of Measurement: Imperial Units
Time Units: days
Permeability Units: feet/second
Failure Direction: Left to Right
Data Output: Standard
Maximum Material Properties: 20
Maximum Support Properties: 20

Analysis Options

Analysis Methods Used

Bishop simplified
GLE/Morgenstern-Price with interslice force function: Half Sine
Janbu simplified

Number of slices: 25
Tolerance: 0.005
Maximum number of iterations: 50
Check malpha < 0.2: Yes
Initial trial value of FS: 1
Steffensen Iteration: Yes

Groundwater Analysis

Groundwater Method: Water Surfaces
Pore Fluid Unit Weight: 62.4 lbs/ft3
Advanced Groundwater Method: None

Random Numbers

Pseudo-random Seed: 10116
Random Number Generation Method: Park and Miller v.3

Surface Options

Surface Type: Circular
Search Method: Grid Search
Radius Increment: 10
Composite Surfaces: Disabled
Reverse Curvature: Invalid Surfaces
Minimum Elevation: Not Defined
Minimum Depth: Not Defined

Material Properties

Property	Shell	Central Core	Drain	Foundation	Bedrock	Fly Ash Slurry	Water
Color							
Strength Type	Mohr-Coulomb	Mohr-Coulomb	Mohr-Coulomb	Mohr-Coulomb	Infinite strength	Mohr-Coulomb	No strength
Unit Weight [lbs/ft3]	125	127	130	115	125	100	62.4
Cohesion [psf]	50	0	0	0		700	
Friction Angle [deg]	33	33.5	35	32		28	
Water Surface	None	None	None	None	None	None	None
Ru Value	0	0	0	0	0	0	0

Global Minimums

Method: bishop simplified

FS: 2.124170
Center: 586.742, 3631.732
Radius: 443.744
Left Slip Surface Endpoint: 318.820, 3278.000
Right Slip Surface Endpoint: 590.000, 3188.000
Resisting Moment=1.64779e+008 lb-ft
Driving Moment=7.75733e+007 lb-ft
Total Slice Area=4570.48 ft2

Method: janbu simplified

FS: 2.074630
Center: 586.742, 3631.732
Radius: 443.744
Left Slip Surface Endpoint: 318.820, 3278.000
Right Slip Surface Endpoint: 590.000, 3188.000
Resisting Horizontal Force=348435 lb
Driving Horizontal Force=167950 lb
Total Slice Area=4570.48 ft2

Method: gle/morgenstern-price

FS: 2.119790
Center: 586.742, 3631.732
Radius: 443.744
Left Slip Surface Endpoint: 318.820, 3278.000
Right Slip Surface Endpoint: 590.000, 3188.000
Resisting Moment=1.64439e+008 lb-ft
Driving Moment=7.75733e+007 lb-ft
Resisting Horizontal Force=349780 lb
Driving Horizontal Force=165007 lb
Total Slice Area=4570.48 ft2

Slice Data

Global Minimum Query (bishop simplified) - Safety Factor: 2.12417

Slice Number	Width [ft]	Weight [lbs]	Base Material	Base Cohesion [psf]	Base Friction Angle [degrees]	Shear Stress [psf]	Shear Strength [psf]	Base Normal Stress [psf]	Pore Pressure [psf]	Effective Normal Stress [psf]
1	10.6522	3337.94	Shell	50	33	97.4762	207.056	241.845	0	241.845
2	10.6522	8738.29	Shell	50	33	226.585	481.306	664.152	0	664.152
3	10.6522	13498.2	Shell	50	33	343.038	728.671	1045.06	0	1045.06
4	10.6522	17681.1	Shell	50	33	447.768	951.135	1387.63	0	1387.63
5	10.6522	21317.2	Shell	50	33	541.002	1149.18	1692.59	0	1692.59
6	10.6522	24432.9	Shell	50	33	622.949	1323.25	1960.64	0	1960.64
7	10.6522	27051.3	Shell	50	33	693.791	1473.73	2192.34	0	2192.34
8	10.6522	29192.9	Shell	50	33	753.678	1600.94	2388.23	0	2388.23
9	10.6522	30876	Shell	50	33	802.751	1705.18	2548.75	0	2548.75
10	10.6522	32116.7	Shell	50	33	841.124	1786.69	2674.26	0	2674.26
11	10.6522	32929.2	Shell	50	33	868.89	1845.67	2765.08	0	2765.08
12	10.6522	33326.3	Shell	50	33	886.12	1882.27	2821.45	0	2821.45
13	10.6522	33319.5	Shell	50	33	892.876	1896.62	2843.54	0	2843.54
14	10.6522	32918.7	Shell	50	33	889.185	1888.78	2831.47	0	2831.47
15	10.6522	32133	Shell	50	33	875.066	1858.79	2785.29	0	2785.29
16	10.6522	30970.3	Shell	50	33	850.516	1806.64	2705	0	2705
17	10.6522	29437.6	Shell	50	33	815.514	1732.29	2590.51	0	2590.51
18	10.6522	27540.9	Shell	50	33	770.018	1635.65	2441.69	0	2441.69
19	10.6522	25285.6	Shell	50	33	713.968	1516.59	2258.35	0	2258.35
20	10.6522	22676.2	Shell	50	33	647.279	1374.93	2040.21	0	2040.21
21	10.6522	19716.5	Shell	50	33	569.851	1210.46	1786.95	0	1786.95
22	10.6522	16409.8	Shell	50	33	481.563	1022.92	1498.17	0	1498.17
23	10.6522	12758.5	Shell	50	33	382.266	811.998	1173.38	0	1173.38
24	13.0903	10161.7	Drain	0	35	252.816	537.025	766.948	0	766.948
25	13.0903	3496.87	Drain	0	35	87.8437	186.595	266.485	0	266.485

Global Minimum Query (janbu simplified) - Safety Factor: 2.07463

Slice Number	Width [ft]	Weight [lbs]	Base Material	Base Cohesion [psf]	Base Friction Angle [degrees]	Shear Stress [psf]	Shear Strength [psf]	Base Normal Stress [psf]	Pore Pressure [psf]	Effective Normal Stress [psf]
1	10.6522	3337.94	Shell	50	33	99.3657	206.147	240.446	0	240.446
2	10.6522	8738.29	Shell	50	33	231.029	479.299	661.063	0	661.063
3	10.6522	13498.2	Shell	50	33	349.839	725.786	1040.62	0	1040.62
4	10.6522	17681.1	Shell	50	33	456.738	947.562	1382.12	0	1382.12
5	10.6522	21317.2	Shell	50	33	551.949	1145.09	1686.29	0	1686.29
6	10.6522	24432.9	Shell	50	33	635.68	1318.8	1953.77	0	1953.77
7	10.6522	27051.3	Shell	50	33	708.097	1469.04	2185.13	0	2185.13
8	10.6522	29192.9	Shell	50	33	769.361	1596.14	2380.84	0	2380.84
9	10.6522	30876	Shell	50	33	819.602	1700.37	2541.35	0	2541.35
10	10.6522	32116.7	Shell	50	33	858.929	1781.96	2666.99	0	2666.99

11	10.6522	32929.2	Shell	50	33	887.44	1841.11	2758.06	0	2758.06
12	10.6522	33326.3	Shell	50	33	905.193	1877.94	2814.78	0	2814.78
13	10.6522	33319.5	Shell	50	33	912.249	1892.58	2837.32	0	2837.32
14	10.6522	32918.7	Shell	50	33	908.629	1885.07	2825.77	0	2825.77
15	10.6522	32133	Shell	50	33	894.352	1855.45	2780.16	0	2780.16
16	10.6522	30970.3	Shell	50	33	869.408	1803.7	2700.47	0	2700.47
17	10.6522	29437.6	Shell	50	33	833.768	1729.76	2586.6	0	2586.6
18	10.6522	27540.9	Shell	50	33	787.384	1633.53	2438.42	0	2438.42
19	10.6522	25285.6	Shell	50	33	730.188	1514.87	2255.71	0	2255.71
20	10.6522	22676.2	Shell	50	33	662.094	1373.6	2038.17	0	2038.17
21	10.6522	19716.5	Shell	50	33	582.996	1209.5	1785.47	0	1785.47
22	10.6522	16409.8	Shell	50	33	492.752	1022.28	1497.18	0	1497.18
23	10.6522	12758.5	Shell	50	33	391.214	811.625	1172.8	0	1172.8
24	13.0903	10161.7	Drain	0	35	258.779	536.87	766.727	0	766.727
25	13.0903	3496.87	Drain	0	35	89.936	186.584	266.469	0	266.469

Global Minimum Query (gle/morgenstern-price) - Safety Factor: 2.11979

Slice Number	Width [ft]	Weight [lbs]	Base Material	Base Cohesion [psf]	Base Friction Angle [degrees]	Shear Stress [psf]	Shear Strength [psf]	Base Normal Stress [psf]	Pore Pressure [psf]	Effective Normal Stress [psf]
1	10.6522	3337.94	Shell	50	33	96.7638	205.119	238.862	0	238.862
2	10.6522	8738.29	Shell	50	33	221.154	468.8	644.894	0	644.894
3	10.6522	13498.2	Shell	50	33	329.87	699.255	999.764	0	999.764
4	10.6522	17681.1	Shell	50	33	425.846	902.705	1313.05	0	1313.05
5	10.6522	21317.2	Shell	50	33	510.895	1082.99	1590.66	0	1590.66
6	10.6522	24432.9	Shell	50	33	586.412	1243.07	1837.17	0	1837.17
7	10.6522	27051.3	Shell	50	33	653.423	1385.12	2055.9	0	2055.9
8	10.6522	29192.9	Shell	50	33	712.594	1510.55	2249.05	0	2249.05
9	10.6522	30876	Shell	50	33	764.264	1620.08	2417.71	0	2417.71
10	10.6522	32116.7	Shell	50	33	808.453	1713.75	2561.95	0	2561.95
11	10.6522	32929.2	Shell	50	33	844.895	1791	2680.9	0	2680.9
12	10.6522	33326.3	Shell	50	33	873.044	1850.67	2772.79	0	2772.79
13	10.6522	33319.5	Shell	50	33	892.136	1891.14	2835.11	0	2835.11
14	10.6522	32918.7	Shell	50	33	901.217	1910.39	2864.75	0	2864.75
15	10.6522	32133	Shell	50	33	899.249	1906.22	2858.32	0	2858.32
16	10.6522	30970.3	Shell	50	33	885.173	1876.38	2812.38	0	2812.38
17	10.6522	29437.6	Shell	50	33	858.038	1818.86	2723.82	0	2723.82
18	10.6522	27540.9	Shell	50	33	817.081	1732.04	2590.12	0	2590.12
19	10.6522	25285.6	Shell	50	33	761.84	1614.94	2409.79	0	2409.79
20	10.6522	22676.2	Shell	50	33	692.215	1467.35	2182.52	0	2182.52
21	10.6522	19716.5	Shell	50	33	608.527	1289.95	1909.36	0	1909.36
22	10.6522	16409.8	Shell	50	33	511.522	1084.32	1592.71	0	1592.71
23	10.6522	12758.5	Shell	50	33	402.322	852.839	1236.26	0	1236.26
24	13.0903	10161.7	Drain	0	35	263.067	557.646	796.4	0	796.4
25	13.0903	3496.87	Drain	0	35	89.7103	190.167	271.587	0	271.587

Interslice Data

Global Minimum Query (bishop simplified) - Safety Factor: 2.12417

Slice Number	X coordinate [ft]	Y coordinate - Bottom [ft]	Interslice Normal Force [lbs]	Interslice Shear Force [lbs]	Interslice Force Angle [degrees]
1	318.82	3278	0	0	0
2	329.472	3270.18	854.041	0	0
3	340.124	3262.83	3322.67	0	0
4	350.776	3255.93	6885.39	0	0
5	361.428	3249.45	11113.6	0	0
6	372.081	3243.36	15648.8	0	0
7	382.733	3237.66	20193.7	0	0
8	393.385	3232.33	24504.6	0	0
9	404.037	3227.35	28385.1	0	0
10	414.689	3222.7	31681.9	0	0
11	425.341	3218.38	34280	0	0
12	435.994	3214.38	36099.8	0	0
13	446.646	3210.68	37094.3	0	0
14	457.298	3207.29	37247.3	0	0
15	467.95	3204.18	36571	0	0
16	478.602	3201.37	35105.3	0	0
17	489.254	3198.83	32916.2	0	0
18	499.907	3196.57	30095.5	0	0
19	510.559	3194.58	26760.4	0	0
20	521.211	3192.85	23052.8	0	0
21	531.863	3191.39	19139.8	0	0
22	542.515	3190.2	15213.8	0	0
23	553.167	3189.26	11492.8	0	0

24	563.819	3188.58	8221.46	0	0
25	576.91	3188.1	5285.54	0	0
26	590	3188	0	0	0

Global Minimum Query (janbu simplified) - Safety Factor: 2.07463

Slice Number	X coordinate [ft]	Y coordinate - Bottom [ft]	Interslice Normal Force [lbs]	Interslice Shear Force [lbs]	Interslice Force Angle [degrees]
1	318.82	3278	0	0	0
2	329.472	3270.18	822.804	0	0
3	340.124	3262.83	3221.01	0	0
4	350.776	3255.93	6680.04	0	0
5	361.428	3249.45	10776.2	0	0
6	372.081	3243.36	15155.6	0	0
7	382.733	3237.66	19524.8	0	0
8	393.385	3232.33	23643.6	0	0
9	404.037	3227.35	27319	0	0
10	414.689	3222.7	30400.5	0	0
11	425.341	3218.38	32776	0	0
12	435.994	3214.38	34368.6	0	0
13	446.646	3210.68	35133.9	0	0
14	457.298	3207.29	35057.9	0	0
15	467.95	3204.18	34155.2	0	0
16	478.602	3201.37	32468.1	0	0
17	489.254	3198.83	30064.8	0	0
18	499.907	3196.57	27039.5	0	0
19	510.559	3194.58	23511.6	0	0
20	521.211	3192.85	19625.5	0	0
21	531.863	3191.39	15550.6	0	0
22	542.515	3190.2	11481.8	0	0
23	553.167	3189.26	7639.91	0	0
24	563.819	3188.58	4272.25	0	0
25	576.91	3188.1	1257.65	0	0
26	590	3188	0	0	0

Global Minimum Query (gle/morgenstern-price) - Safety Factor: 2.11979

Slice Number	X coordinate [ft]	Y coordinate - Bottom [ft]	Interslice Normal Force [lbs]	Interslice Shear Force [lbs]	Interslice Force Angle [degrees]
1	318.82	3278	0	0	0
2	329.472	3270.18	837.514	36.7299	2.51115
3	340.124	3262.83	3220.67	280.342	4.97475
4	350.776	3255.93	6608.21	851.863	7.34548
5	361.428	3249.45	10582.9	1786.55	9.58203
6	372.081	3243.36	14814.6	3054.05	11.6484
7	382.733	3237.66	19040	4576.3	13.5148
8	393.385	3232.33	23047.3	6243.48	15.1575
9	404.037	3227.35	26665.8	7928.37	16.5585
10	414.689	3222.7	29757.2	9499.33	17.7045
11	425.341	3218.38	32211.4	10831.9	18.5865
12	435.994	3214.38	33942.8	11819.2	19.1986
13	446.646	3210.68	34889.8	12380.6	19.5372
14	457.298	3207.29	35014.8	12468.4	19.6003
15	467.95	3204.18	34306.5	12072.9	19.3876
16	478.602	3201.37	32781.9	11224.1	18.9005
17	489.254	3198.83	30489.2	9989.86	18.1415
18	499.907	3196.57	27510.6	8471.45	17.1154
19	510.559	3194.58	23963.5	6794.42	15.8297
20	521.211	3192.85	20001.2	5096.68	14.2958
21	531.863	3191.39	15812	3513.88	12.5292
22	542.515	3190.2	11615.9	2163.58	10.551
23	553.167	3189.26	7660.57	1129.61	8.38825
24	563.819	3188.58	4215.3	448.56	6.07412
25	576.91	3188.1	1156.94	62.2712	3.08092
26	590	3188	0	0	0

List Of Coordinates

External Boundary

X	Y
0	3195
0	3180
0	3130
700	3130

700	3172.5
700	3182.5
596.6	3187.67
590	3188
320	3278
300	3278
276	3270
0	3270
0	3216

Material Boundary

X	Y
0	3195
51	3195
114	3216
276	3270

Material Boundary

X	Y
302	3274
312.78	3274
318	3274
319.2	3270
324.42	3270
347.52	3193
364.5	3193
590	3188

Material Boundary

X	Y
252.5	3195
275	3180
282.5	3175
328.49	3175
337.5	3175
344.998	3180
357.25	3188.17
589.64	3183
596.6	3187.67

Material Boundary

X	Y
51	3195
252.5	3195

Material Boundary

X	Y
0	3180
275	3180

Material Boundary

X	Y
252.5	3195
278.3	3195
302	3274

Material Boundary

X	Y
312.78	3274
338.58	3188
348	3188
328.49	3175

Material Boundary

X	Y
344.998	3180
700	3172.5

Material Boundary

X	Y
0	3216
114	3216

Slide Analysis Information

2026 SAFETY FACTOR ASSESSMENT OF CCR SURFACE IMPOUNDMENTS AT CSES

Project Summary

File Name: 1.2 - 12 STEP Main Dam - Downstream - Seismic.slim
Slide Modeler Version: 6.02
Project Title: 2026 SAFETY FACTOR ASSESSMENT OF CCR SURFACE IMPOUNDMENTS AT CSES
Analysis: UNITS 1&2 STEP - MAIN DAM - MAXIMUM STORAGE POOL - SEISMIC ANALYSIS
Author: AWJ
Company: HYDROMETRICS, INC.
Date Created: 9/25/2026, 4:07:52 PM

General Settings

Units of Measurement: Imperial Units
Time Units: days
Permeability Units: feet/second
Failure Direction: Left to Right
Data Output: Standard
Maximum Material Properties: 20
Maximum Support Properties: 20

Analysis Options

Analysis Methods Used

Bishop simplified
GLE/Morgenstern-Price with interslice force function: Half Sine
Janbu simplified

Number of slices: 25
Tolerance: 0.005
Maximum number of iterations: 50
Check malpha < 0.2: Yes
Initial trial value of FS: 1
Steffensen Iteration: Yes

Groundwater Analysis

Groundwater Method: Water Surfaces
Pore Fluid Unit Weight: 62.4 lbs/ft3
Advanced Groundwater Method: None

Random Numbers

Pseudo-random Seed: 10116
Random Number Generation Method: Park and Miller v.3

Surface Options

Surface Type: Circular
Search Method: Grid Search
Radius Increment: 10
Composite Surfaces: Disabled
Reverse Curvature: Invalid Surfaces
Minimum Elevation: Not Defined
Minimum Depth: Not Defined

Loading

Seismic Load Coefficient (Horizontal): 0.03

Material Properties

Property	Shell	Central Core	Drain	Foundation	Bedrock	Fly Ash Slurry	Water
Color							
Strength Type	Mohr-Coulomb	Mohr-Coulomb	Mohr-Coulomb	Mohr-Coulomb	Infinite strength	Mohr-Coulomb	No strength
Unit Weight [lbs/ft3]	125	125	130	115	125	100	62.4
Cohesion [psf]	40	0	0	0		560	
Friction Angle [deg]	26.4	26.8	28	25.6		22.4	
Water Surface	None	None	None	None	None	None	None
Ru Value	0	0	0	0	0	0	0

Global Minimums

Method: bishop simplified

FS: 1.478600
Center: 586.742, 3631.732
Radius: 443.744
Left Slip Surface Endpoint: 318.820, 3278.000
Right Slip Surface Endpoint: 590.000, 3188.000
Resisting Moment=1.25026e+008 lb-ft
Driving Moment=8.45566e+007 lb-ft
Total Slice Area=4570.48 ft2

Method: janbu simplified

FS: 1.443390
Center: 586.742, 3631.732
Radius: 443.744
Left Slip Surface Endpoint: 318.820, 3278.000
Right Slip Surface Endpoint: 590.000, 3188.000
Resisting Horizontal Force=264314 lb
Driving Horizontal Force=183121 lb
Total Slice Area=4570.48 ft2

Method: gle/morgenstern-price

FS: 1.476140
Center: 586.742, 3631.732
Radius: 443.744
Left Slip Surface Endpoint: 318.820, 3278.000
Right Slip Surface Endpoint: 590.000, 3188.000
Resisting Moment=1.24817e+008 lb-ft
Driving Moment=8.45566e+007 lb-ft
Resisting Horizontal Force=265523 lb
Driving Horizontal Force=179877 lb
Total Slice Area=4570.48 ft2

Slice Data

Global Minimum Query (bishop simplified) - Safety Factor: 1.4786

Slice Number	Width [ft]	Weight [lbs]	Base Material	Base Cohesion [psf]	Base Friction Angle [degrees]	Shear Stress [psf]	Shear Strength [psf]	Base Normal Stress [psf]	Pore Pressure [psf]	Effective Normal Stress [psf]
1	10.6522	3337.94	Shell	40	26.4	106.141	156.94	235.574	0	235.574
2	10.6522	8738.29	Shell	40	26.4	245.672	363.251	651.185	0	651.185
3	10.6522	13498.2	Shell	40	26.4	371.754	549.675	1026.73	0	1026.73
4	10.6522	17681.1	Shell	40	26.4	485.352	717.642	1365.1	0	1365.1
5	10.6522	21317.2	Shell	40	26.4	586.678	867.462	1666.91	0	1666.91
6	10.6522	24432.9	Shell	40	26.4	675.916	999.41	1932.72	0	1932.72
7	10.6522	27051.3	Shell	40	26.4	753.233	1113.73	2163.02	0	2163.02
8	10.6522	29192.9	Shell	40	26.4	818.768	1210.63	2358.23	0	2358.23
9	10.6522	30876	Shell	40	26.4	872.65	1290.3	2518.71	0	2518.71
10	10.6522	32116.7	Shell	40	26.4	914.967	1352.87	2644.76	0	2644.76
11	10.6522	32929.2	Shell	40	26.4	945.8	1398.46	2736.6	0	2736.6
12	10.6522	33326.3	Shell	40	26.4	965.21	1427.16	2794.41	0	2794.41
13	10.6522	33319.5	Shell	40	26.4	973.225	1439.01	2818.29	0	2818.29
14	10.6522	32918.7	Shell	40	26.4	969.87	1434.05	2808.3	0	2808.3
15	10.6522	32133	Shell	40	26.4	955.14	1412.27	2764.41	0	2764.41
16	10.6522	30970.3	Shell	40	26.4	929	1373.62	2686.56	0	2686.56
17	10.6522	29437.6	Shell	40	26.4	891.418	1318.05	2574.61	0	2574.61
18	10.6522	27540.9	Shell	40	26.4	842.317	1245.45	2428.36	0	2428.36
19	10.6522	25285.6	Shell	40	26.4	781.611	1155.69	2247.55	0	2247.55
20	10.6522	22676.2	Shell	40	26.4	709.198	1048.62	2031.85	0	2031.85
21	10.6522	19716.5	Shell	40	26.4	624.929	924.02	1780.85	0	1780.85
22	10.6522	16409.8	Shell	40	26.4	528.653	781.667	1494.08	0	1494.08
23	10.6522	12758.5	Shell	40	26.4	420.183	621.283	1170.99	0	1170.99
24	13.0903	10161.7	Drain	0	28	275.501	407.356	766.124	0	766.124
25	13.0903	3496.87	Drain	0	28	95.8082	141.662	266.427	0	266.427

Global Minimum Query (janbu simplified) - Safety Factor: 1.44339

Slice Number	Width [ft]	Weight [lbs]	Base Material	Base Cohesion [psf]	Base Friction Angle [degrees]	Shear Stress [psf]	Shear Strength [psf]	Base Normal Stress [psf]	Pore Pressure [psf]	Effective Normal Stress [psf]
1	10.6522	3337.94	Shell	40	26.4	108.168	156.129	233.94	0	233.94
2	10.6522	8738.29	Shell	40	26.4	250.428	361.465	647.586	0	647.586
3	10.6522	13498.2	Shell	40	26.4	379.043	547.107	1021.56	0	1021.56
4	10.6522	17681.1	Shell	40	26.4	494.986	714.458	1358.68	0	1358.68
5	10.6522	21317.2	Shell	40	26.4	598.46	863.811	1659.56	0	1659.56
6	10.6522	24432.9	Shell	40	26.4	689.645	995.427	1924.69	0	1924.69

7	10.6522	27051.3	Shell	40	26.4	768.697	1109.53	2154.56	0	2154.56
8	10.6522	29192.9	Shell	40	26.4	835.762	1206.33	2349.56	0	2349.56
9	10.6522	30876	Shell	40	26.4	890.944	1285.98	2510.01	0	2510.01
10	10.6522	32116.7	Shell	40	26.4	934.342	1348.62	2636.2	0	2636.2
11	10.6522	32929.2	Shell	40	26.4	966.031	1394.36	2728.33	0	2728.33
12	10.6522	33326.3	Shell	40	26.4	986.054	1423.26	2786.55	0	2786.55
13	10.6522	33319.5	Shell	40	26.4	994.444	1435.37	2810.95	0	2810.95
14	10.6522	32918.7	Shell	40	26.4	991.208	1430.7	2801.55	0	2801.55
15	10.6522	32133	Shell	40	26.4	976.347	1409.25	2758.33	0	2758.33
16	10.6522	30970.3	Shell	40	26.4	949.813	1370.95	2681.19	0	2681.19
17	10.6522	29437.6	Shell	40	26.4	911.569	1315.75	2569.98	0	2569.98
18	10.6522	27540.9	Shell	40	26.4	861.527	1243.52	2424.48	0	2424.48
19	10.6522	25285.6	Shell	40	26.4	799.597	1154.13	2244.41	0	2244.41
20	10.6522	22676.2	Shell	40	26.4	725.66	1047.41	2029.41	0	2029.41
21	10.6522	19716.5	Shell	40	26.4	639.562	923.138	1779.07	0	1779.07
22	10.6522	16409.8	Shell	40	26.4	541.141	781.078	1492.89	0	1492.89
23	10.6522	12758.5	Shell	40	26.4	430.196	620.941	1170.29	0	1170.29
24	13.0903	10161.7	Drain	0	28	282.125	407.216	765.864	0	765.864
25	13.0903	3496.87	Drain	0	28	98.1384	141.652	266.408	0	266.408

Global Minimum Query (gle/morgenstern-price) - Safety Factor: 1.47614

Slice Number	Width [ft]	Weight [lbs]	Base Material	Base Cohesion [psf]	Base Friction Angle [degrees]	Shear Stress [psf]	Shear Strength [psf]	Base Normal Stress [psf]	Pore Pressure [psf]	Effective Normal Stress [psf]
1	10.6522	3337.94	Shell	40	26.4	105.249	155.362	232.395	0	232.395
2	10.6522	8738.29	Shell	40	26.4	239.064	352.892	630.317	0	630.317
3	10.6522	13498.2	Shell	40	26.4	355.75	525.137	977.303	0	977.303
4	10.6522	17681.1	Shell	40	26.4	458.658	677.044	1283.32	0	1283.32
5	10.6522	21317.2	Shell	40	26.4	549.899	811.728	1554.63	0	1554.63
6	10.6522	24432.9	Shell	40	26.4	631.112	931.609	1796.13	0	1796.13
7	10.6522	27051.3	Shell	40	26.4	703.501	1038.47	2011.4	0	2011.4
8	10.6522	29192.9	Shell	40	26.4	767.868	1133.48	2202.81	0	2202.81
9	10.6522	30876	Shell	40	26.4	824.624	1217.26	2371.57	0	2371.57
10	10.6522	32116.7	Shell	40	26.4	873.799	1289.85	2517.81	0	2517.81
11	10.6522	32929.2	Shell	40	26.4	915.076	1350.78	2640.55	0	2640.55
12	10.6522	33326.3	Shell	40	26.4	947.783	1399.06	2737.81	0	2737.81
13	10.6522	33319.5	Shell	40	26.4	970.958	1433.27	2806.73	0	2806.73
14	10.6522	32918.7	Shell	40	26.4	983.416	1451.66	2843.76	0	2843.76
15	10.6522	32133	Shell	40	26.4	983.823	1452.26	2844.97	0	2844.97
16	10.6522	30970.3	Shell	40	26.4	970.829	1433.08	2806.34	0	2806.34
17	10.6522	29437.6	Shell	40	26.4	943.196	1392.29	2724.17	0	2724.17
18	10.6522	27540.9	Shell	40	26.4	899.928	1328.42	2595.51	0	2595.51
19	10.6522	25285.6	Shell	40	26.4	840.408	1240.56	2418.52	0	2418.52
20	10.6522	22676.2	Shell	40	26.4	764.494	1128.5	2192.76	0	2192.76
21	10.6522	19716.5	Shell	40	26.4	672.555	992.785	1919.38	0	1919.38
22	10.6522	16409.8	Shell	40	26.4	565.521	834.788	1601.09	0	1601.09
23	10.6522	12758.5	Shell	40	26.4	444.798	656.584	1242.1	0	1242.1
24	13.0903	10161.7	Drain	0	28	287.822	424.866	799.057	0	799.057
25	13.0903	3496.87	Drain	0	28	97.9812	144.634	272.016	0	272.016

Interslice Data

Global Minimum Query (bishop simplified) - Safety Factor: 1.4786

Slice Number	X coordinate [ft]	Y coordinate - Bottom [ft]	Interslice Normal Force [lbs]	Interslice Shear Force [lbs]	Interslice Force Angle [degrees]
1	318.82	3278	0	0	0
2	329.472	3270.18	814.165	0	0
3	340.124	3262.83	3249.4	0	0
4	350.776	3255.93	6789.31	0	0
5	361.428	3249.45	11007.6	0	0
6	372.081	3243.36	15547	0	0
7	382.733	3237.66	20110	0	0
8	393.385	3232.33	24452.1	0	0
9	404.037	3227.35	28375.8	0	0
10	414.689	3222.7	31725.6	0	0
11	425.341	3218.38	34384.6	0	0
12	435.994	3214.38	36270.8	0	0
13	446.646	3210.68	37334.9	0	0
14	457.298	3207.29	37558	0	0
15	467.95	3204.18	36950	0	0
16	478.602	3201.37	35548.4	0	0
17	489.254	3198.83	33417.3	0	0
18	499.907	3196.57	30646.5	0	0
19	510.559	3194.58	27351.6	0	0

20	521.211	3192.85	23673.2	0	0
21	531.863	3191.39	19777.6	0	0
22	542.515	3190.2	15856.9	0	0
23	553.167	3189.26	12129.4	0	0
24	563.819	3188.58	8840.6	0	0
25	576.91	3188.1	5916.42	0	0
26	590	3188	0	0	0

Global Minimum Query (janbu simplified) - Safety Factor: 1.44339

Slice Number	X coordinate [ft]	Y coordinate - Bottom [ft]	Interslice Normal Force [lbs]	Interslice Shear Force [lbs]	Interslice Force Angle [degrees]
1	318.82	3278	0	0	0
2	329.472	3270.18	777.667	0	0
3	340.124	3262.83	3130.9	0	0
4	350.776	3255.93	6550.02	0	0
5	361.428	3249.45	10614.4	0	0
6	372.081	3243.36	14971.8	0	0
7	382.733	3237.66	19329.4	0	0
8	393.385	3232.33	23446.6	0	0
9	404.037	3227.35	27129.7	0	0
10	414.689	3222.7	30226.8	0	0
11	425.341	3218.38	32624.1	0	0
12	435.994	3214.38	34242.9	0	0
13	446.646	3210.68	35036.6	0	0
14	457.298	3207.29	34989.3	0	0
15	467.95	3204.18	34113.7	0	0
16	478.602	3201.37	32450	0	0
17	489.254	3198.83	30065	0	0
18	499.907	3196.57	27051.3	0	0
19	510.559	3194.58	23527.1	0	0
20	521.211	3192.85	19636.1	0	0
21	531.863	3191.39	15547.4	0	0
22	542.515	3190.2	11456.2	0	0
23	553.167	3189.26	7584.01	0	0
24	563.819	3188.58	4179.71	0	0
25	576.91	3188.1	1161.93	0	0
26	590	3188	0	0	0

Global Minimum Query (gle/morgenstern-price) - Safety Factor: 1.47614

Slice Number	X coordinate [ft]	Y coordinate - Bottom [ft]	Interslice Normal Force [lbs]	Interslice Shear Force [lbs]	Interslice Force Angle [degrees]
1	318.82	3278	0	0	0
2	329.472	3270.18	796.432	39.0566	2.80751
3	340.124	3262.83	3143.24	305.941	5.55926
4	350.776	3255.93	6504.11	937.545	8.20249
5	361.428	3249.45	10465.9	1975.62	10.6898
6	372.081	3243.36	14701.2	3388.87	12.9809
7	382.733	3237.66	18947.9	5092.46	15.0434
8	393.385	3232.33	22994.2	6965.34	16.8525
9	404.037	3227.35	26667.3	8865.97	18.3902
10	414.689	3222.7	29825.7	10646.6	19.6446
11	425.341	3218.38	32354.5	12166	20.6074
12	435.994	3214.38	34162.4	13301.7	21.2743
13	446.646	3210.68	35181.4	13959.6	21.6426
14	457.298	3207.29	35367.6	14082.6	21.7114
15	467.95	3204.18	34703.7	13656.2	21.4801
16	478.602	3201.37	33202.1	12711.6	20.9496
17	489.254	3198.83	30908.5	11324.2	20.1217
18	499.907	3196.57	27904.4	9608.34	19.0002
19	510.559	3194.58	24309.5	7707.2	17.5909
20	521.211	3192.85	20281.8	5779.04	15.9042
21	531.863	3191.39	16016	3979.91	13.9551
22	542.515	3190.2	11739.7	2445.09	11.7651
23	553.167	3189.26	7707.93	1270.93	9.36303
24	563.819	3188.58	4195.83	499.262	6.78572
25	576.91	3188.1	1118.68	67.3287	3.44424
26	590	3188	0	0	0

List Of Coordinates

External Boundary

X	Y

0	3195
0	3180
0	3130
700	3130
700	3172.5
700	3182.5
596.6	3187.67
590	3188
320	3278
300	3278
267	3267
0	3267
0	3216

Material Boundary

X	Y
0	3195
51	3195
114	3216
267	3267

Material Boundary

X	Y
302	3274
312.78	3274
318	3274
319.2	3270
324.42	3270
347.52	3193
364.5	3193
590	3188

Material Boundary

X	Y
252.5	3195
275	3180
282.5	3175
328.49	3175
337.5	3175
344.998	3180
357.25	3188.17
589.64	3183
596.6	3187.67

Material Boundary

X	Y
51	3195
252.5	3195

Material Boundary

X	Y
0	3180
275	3180

Material Boundary

X	Y
252.5	3195
278.3	3195
302	3274

Material Boundary

X	Y
312.78	3274
338.58	3188
348	3188
328.49	3175

Material Boundary

X	Y
344.998	3180
700	3172.5

Material Boundary

X	Y
0	3216
114	3216

Slide Analysis Information

2026 SAFETY FACTOR ASSESSMENT OF CCR SURFACE IMPOUNDMENTS AT CSES

Project Summary

File Name: 1.3 - 12 STEP Main Dam - EC - Upstream - Static.slim
Slide Modeler Version: 6.02
Project Title: 2026 SAFETY FACTOR ASSESSMENT OF CCR SURFACE IMPOUNDMENTS AT CSES
Analysis: UNITS 1&2 STEP - MAIN DAM - UPSTREAM SLOPE - EXISTING CONDITIONS - STATIC ANALYSIS
Author: AWJ
Company: HYDROMETRICS, INC.
Date Created: 9/25/2026, 4:07:52 PM

General Settings

Units of Measurement: Imperial Units
Time Units: days
Permeability Units: feet/second
Failure Direction: Right to Left
Data Output: Standard
Maximum Material Properties: 20
Maximum Support Properties: 20

Analysis Options

Analysis Methods Used

Bishop simplified
GLE/Morgenstern-Price with interslice force function: Half Sine
Janbu simplified

Number of slices: 25
Tolerance: 0.005
Maximum number of iterations: 50
Check malpha < 0.2: Yes
Initial trial value of FS: 1
Steffensen Iteration: Yes

Groundwater Analysis

Groundwater Method: Water Surfaces
Pore Fluid Unit Weight: 62.4 lbs/ft3
Advanced Groundwater Method: None

Random Numbers

Pseudo-random Seed: 10116
Random Number Generation Method: Park and Miller v.3

Surface Options

Surface Type: Circular
Search Method: Grid Search
Radius Increment: 10
Composite Surfaces: Disabled
Reverse Curvature: Invalid Surfaces
Minimum Elevation: Not Defined
Minimum Depth: Not Defined

Material Properties

Property	Shell	Central Core	Drain	Foundation	Bedrock	Fly Ash Slurry	Water
Color							
Strength Type	Mohr-Coulomb	Mohr-Coulomb	Mohr-Coulomb	Mohr-Coulomb	Infinite strength	Mohr-Coulomb	No strength
Unit Weight [lbs/ft3]	125	127	130	115	125	100	62.4
Cohesion [psf]	50	0	0	0		700	
Friction Angle [deg]	33	33.5	35	32		28	
Water Surface	None	None	None	None	None	None	None
Ru Value	0	0	0	0	0	0	0

Global Minimums

Method: bishop simplified

FS: 2.206750
Center: 146.672, 3449.612
Radius: 230.541
Left Slip Surface Endpoint: 126.000, 3220.000
Right Slip Surface Endpoint: 300.615, 3278.000
Resisting Moment=4.55178e+007 lb-ft
Driving Moment=2.06266e+007 lb-ft
Total Slice Area=2383.21 ft2

Method: janbu simplified

FS: 2.127090
Center: 146.672, 3449.612
Radius: 230.541
Left Slip Surface Endpoint: 126.000, 3220.000
Right Slip Surface Endpoint: 300.615, 3278.000
Resisting Horizontal Force=184169 lb
Driving Horizontal Force=86582.7 lb
Total Slice Area=2383.21 ft2

Method: gle/morgenstern-price

FS: 2.206410
Center: 146.672, 3449.612
Radius: 230.541
Left Slip Surface Endpoint: 126.000, 3220.000
Right Slip Surface Endpoint: 300.615, 3278.000
Resisting Moment=4.55106e+007 lb-ft
Driving Moment=2.06266e+007 lb-ft
Resisting Horizontal Force=185288 lb
Driving Horizontal Force=83977 lb
Total Slice Area=2383.21 ft2

Slice Data

Global Minimum Query (bishop simplified) - Safety Factor: 2.20675

Slice Number	Width [ft]	Weight [lbs]	Base Material	Base Cohesion [psf]	Base Friction Angle [degrees]	Shear Stress [psf]	Shear Strength [psf]	Base Normal Stress [psf]	Pore Pressure [psf]	Effective Normal Stress [psf]
1	6.98458	1244.21	Shell	50	33	76.7672	169.406	183.869	0	183.869
2	6.98458	3639.74	Shell	50	33	178.333	393.537	529	0	529
3	6.98458	5849.88	Shell	50	33	270.238	596.348	841.303	0	841.303
4	6.98458	7875.1	Shell	50	33	352.762	778.457	1121.73	0	1121.73
5	6.98458	9715.39	Shell	50	33	426.143	940.391	1371.08	0	1371.08
6	6.98458	11370.2	Shell	50	33	490.586	1082.6	1590.05	0	1590.05
7	6.98458	12838.5	Shell	50	33	546.256	1205.45	1779.23	0	1779.23
8	6.98458	14118.8	Shell	50	33	593.293	1309.25	1939.08	0	1939.08
9	6.98458	15208.7	Shell	50	33	631.811	1394.25	2069.97	0	2069.97
10	6.98458	16105.7	Shell	50	33	661.892	1460.63	2172.19	0	2172.19
11	6.98458	16806.4	Shell	50	33	683.589	1508.51	2245.92	0	2245.92
12	6.98458	17306.7	Shell	50	33	696.939	1537.97	2291.28	0	2291.28
13	6.98458	17601.8	Shell	50	33	701.951	1549.03	2308.3	0	2308.3
14	6.98458	17686.2	Shell	50	33	698.602	1541.64	2296.91	0	2296.91
15	6.98458	17553.3	Shell	50	33	686.847	1515.7	2256.99	0	2256.99
16	6.98458	17195.4	Shell	50	33	666.632	1471.09	2188.28	0	2188.28
17	6.98458	16603.9	Shell	50	33	637.848	1407.57	2090.48	0	2090.48
18	6.98458	15768.4	Shell	50	33	600.385	1324.9	1963.17	0	1963.17
19	6.98458	14677.2	Shell	50	33	554.086	1222.73	1805.84	0	1805.84
20	6.98458	13316.4	Shell	50	33	498.774	1100.67	1617.89	0	1617.89
21	6.98458	11670	Shell	50	33	434.234	958.245	1398.58	0	1398.58
22	6.98458	9718.96	Shell	50	33	360.216	794.907	1147.06	0	1147.06
23	6.98458	7440.76	Shell	50	33	276.435	610.022	862.359	0	862.359
24	6.98458	4808.47	Shell	50	33	182.563	402.871	543.373	0	543.373
25	6.98458	1781.61	Shell	50	33	77.969	172.058	187.954	0	187.954

Global Minimum Query (janbu simplified) - Safety Factor: 2.12709

Slice Number	Width [ft]	Weight [lbs]	Base Material	Base Cohesion [psf]	Base Friction Angle [degrees]	Shear Stress [psf]	Shear Strength [psf]	Base Normal Stress [psf]	Pore Pressure [psf]	Effective Normal Stress [psf]
1	6.98458	1244.21	Shell	50	33	79.7075	169.545	184.083	0	184.083
2	6.98458	3639.74	Shell	50	33	185.101	393.726	529.292	0	529.292
3	6.98458	5849.88	Shell	50	33	280.401	596.438	841.441	0	841.441
4	6.98458	7875.1	Shell	50	33	365.909	778.321	1121.52	0	1121.52
5	6.98458	9715.39	Shell	50	33	441.884	939.926	1370.37	0	1370.37
6	6.98458	11370.2	Shell	50	33	508.545	1081.72	1588.71	0	1588.71
7	6.98458	12838.5	Shell	50	33	566.079	1204.1	1777.15	0	1777.15
8	6.98458	14118.8	Shell	50	33	614.633	1307.38	1936.19	0	1936.19
9	6.98458	15208.7	Shell	50	33	654.335	1391.83	2066.23	0	2066.23
10	6.98458	16105.7	Shell	50	33	685.274	1457.64	2167.58	0	2167.58

11	6.98458	16806.4	Shell	50	33	707.525	1504.97	2240.46	0	2240.46
12	6.98458	17306.7	Shell	50	33	721.117	1533.88	2284.98	0	2284.98
13	6.98458	17601.8	Shell	50	33	726.076	1544.43	2301.21	0	2301.21
14	6.98458	17686.2	Shell	50	33	722.381	1536.57	2289.12	0	2289.12
15	6.98458	17553.3	Shell	50	33	710.008	1510.25	2248.58	0	2248.58
16	6.98458	17195.4	Shell	50	33	688.885	1465.32	2179.4	0	2179.4
17	6.98458	16603.9	Shell	50	33	658.924	1401.59	2081.27	0	2081.27
18	6.98458	15768.4	Shell	50	33	620.011	1318.82	1953.81	0	1953.81
19	6.98458	14677.2	Shell	50	33	572.002	1216.7	1796.56	0	1796.56
20	6.98458	13316.4	Shell	50	33	514.717	1094.85	1608.93	0	1608.93
21	6.98458	11670	Shell	50	33	447.947	952.824	1390.22	0	1390.22
22	6.98458	9718.96	Shell	50	33	371.448	790.103	1139.66	0	1139.66
23	6.98458	7440.76	Shell	50	33	284.938	606.089	856.302	0	856.302
24	6.98458	4808.47	Shell	50	33	188.098	400.101	539.108	0	539.108
25	6.98458	1781.61	Shell	50	33	80.2961	170.797	186.011	0	186.011

Global Minimum Query (gle/morgenstern-price) - Safety Factor: 2.20641

Slice Number	Width [ft]	Weight [lbs]	Base Material	Base Cohesion [psf]	Base Friction Angle [degrees]	Shear Stress [psf]	Shear Strength [psf]	Base Normal Stress [psf]	Pore Pressure [psf]	Effective Normal Stress [psf]
1	6.98458	1244.21	Shell	50	33	78.1233	172.372	188.436	0	188.436
2	6.98458	3639.74	Shell	50	33	185.688	409.703	553.895	0	553.895
3	6.98458	5849.88	Shell	50	33	286.96	633.152	897.975	0	897.975
4	6.98458	7875.1	Shell	50	33	380.117	838.694	1214.48	0	1214.48
5	6.98458	9715.39	Shell	50	33	463.46	1022.58	1497.64	0	1497.64
6	6.98458	11370.2	Shell	50	33	535.585	1181.72	1742.69	0	1742.69
7	6.98458	12838.5	Shell	50	33	595.515	1313.95	1946.32	0	1946.32
8	6.98458	14118.8	Shell	50	33	642.755	1418.18	2106.82	0	2106.82
9	6.98458	15208.7	Shell	50	33	677.313	1494.43	2224.22	0	2224.22
10	6.98458	16105.7	Shell	50	33	699.634	1543.68	2300.06	0	2300.06
11	6.98458	16806.4	Shell	50	33	710.534	1567.73	2337.09	0	2337.09
12	6.98458	17306.7	Shell	50	33	711.065	1568.9	2338.9	0	2338.9
13	6.98458	17601.8	Shell	50	33	702.403	1549.79	2309.47	0	2309.47
14	6.98458	17686.2	Shell	50	33	685.711	1512.96	2252.76	0	2252.76
15	6.98458	17553.3	Shell	50	33	662.035	1460.72	2172.31	0	2172.31
16	6.98458	17195.4	Shell	50	33	632.222	1394.94	2071.03	0	2071.03
17	6.98458	16603.9	Shell	50	33	596.861	1316.92	1950.9	0	1950.9
18	6.98458	15768.4	Shell	50	33	556.247	1227.31	1812.89	0	1812.89
19	6.98458	14677.2	Shell	50	33	510.349	1126.04	1656.96	0	1656.96
20	6.98458	13316.4	Shell	50	33	458.824	1012.35	1481.89	0	1481.89
21	6.98458	11670	Shell	50	33	400.97	884.704	1285.33	0	1285.33
22	6.98458	9718.96	Shell	50	33	335.709	740.711	1063.6	0	1063.6
23	6.98458	7440.76	Shell	50	33	261.518	577.017	811.535	0	811.535
24	6.98458	4808.47	Shell	50	33	176.349	389.098	522.165	0	522.165
25	6.98458	1781.61	Shell	50	33	77.2409	170.425	185.437	0	185.437

Interslice Data

Global Minimum Query (bishop simplified) - Safety Factor: 2.20675

Slice Number	X coordinate [ft]	Y coordinate - Bottom [ft]	Interslice Normal Force [lbs]	Interslice Shear Force [lbs]	Interslice Force Angle [degrees]
1	126	3220	0	0	0
2	132.985	3219.48	631.747	0	0
3	139.969	3219.17	2039.93	0	0
4	146.954	3219.07	4007.8	0	0
5	153.938	3219.19	6341.48	0	0
6	160.923	3219.51	8868.14	0	0
7	167.907	3220.05	11434.6	0	0
8	174.892	3220.81	13906.1	0	0
9	181.877	3221.78	16165.7	0	0
10	188.861	3222.96	18113.2	0	0
11	195.846	3224.38	19665.1	0	0
12	202.83	3226.02	20754.6	0	0
13	209.815	3227.89	21331.2	0	0
14	216.8	3230	21361.8	0	0
15	223.784	3232.35	20830.4	0	0
16	230.769	3234.96	19740.2	0	0
17	237.753	3237.83	18114.1	0	0
18	244.738	3240.97	15996.8	0	0
19	251.722	3244.4	13457.4	0	0
20	258.707	3248.12	10591.9	0	0
21	265.692	3252.17	7527.94	0	0
22	272.676	3256.55	4429.19	0	0
23	279.661	3261.3	1502.42	0	0

24	286.645	3266.43	-993.904	0	0
25	293.63	3271.98	-2737.87	0	0
26	300.615	3278	0	0	0

Global Minimum Query (janbu simplified) - Safety Factor: 2.12709

Slice Number	X coordinate [ft]	Y coordinate - Bottom [ft]	Interslice Normal Force [lbs]	Interslice Shear Force [lbs]	Interslice Force Angle [degrees]
1	126	3220	0	0	0
2	132.985	3219.48	651.887	0	0
3	139.969	3219.17	2106.25	0	0
4	146.954	3219.07	4143.32	0	0
5	153.938	3219.19	6566.51	0	0
6	160.923	3219.51	9200.52	0	0
7	167.907	3220.05	11889.9	0	0
8	174.892	3220.81	14497.8	0	0
9	181.877	3221.78	16905.3	0	0
10	188.861	3222.96	19010.4	0	0
11	195.846	3224.38	20727.7	0	0
12	202.83	3226.02	21988.8	0	0
13	209.815	3227.89	22741.5	0	0
14	216.8	3230	22950.9	0	0
15	223.784	3232.35	22599.4	0	0
16	230.769	3234.96	21688.3	0	0
17	237.753	3237.83	20238.7	0	0
18	244.738	3240.97	18293.4	0	0
19	251.722	3244.4	15919.2	0	0
20	258.707	3248.12	13209.8	0	0
21	265.692	3252.17	10290.2	0	0
22	272.676	3256.55	7320.97	0	0
23	279.661	3261.3	4505.37	0	0
24	286.645	3266.43	2097.72	0	0
25	293.63	3271.98	414.903	0	0
26	300.615	3278	0	0	0

Global Minimum Query (gle/morgenstern-price) - Safety Factor: 2.20641

Slice Number	X coordinate [ft]	Y coordinate - Bottom [ft]	Interslice Normal Force [lbs]	Interslice Shear Force [lbs]	Interslice Force Angle [degrees]
1	126	3220	0	0	0
2	132.985	3219.48	643.96	31.1963	2.7735
3	139.969	3219.17	2112.04	203.02	5.49069
4	146.954	3219.07	4203.48	598.111	8.09823
5	153.938	3219.19	6719.24	1251.19	10.5482
6	160.923	3219.51	9467.21	2150.89	12.8
7	167.907	3220.05	12267.9	3246.03	14.8206
8	174.892	3220.81	14960.2	4455.48	16.5847
9	181.877	3221.78	17405.2	5680.26	18.0743
10	188.861	3222.96	19489.9	6816.38	19.2767
11	195.846	3224.38	21127.9	7766.79	20.1838
12	202.83	3226.02	22259.3	8451.4	20.7907
13	209.815	3227.89	22848.8	8814.21	21.0947
14	216.8	3230	22883.3	8827.52	21.0947
15	223.784	3232.35	22369.2	8493.11	20.7907
16	230.769	3234.96	21329.6	7840.93	20.1838
17	237.753	3237.83	19802.7	6925.78	19.2767
18	244.738	3240.97	17840.8	5822.43	18.0743
19	251.722	3244.4	15511.1	4619.55	16.5847
20	258.707	3248.12	12897.8	3412.7	14.8206
21	265.692	3252.17	10107.4	2296.33	12.7999
22	272.676	3256.55	7274.63	1354.61	10.5482
23	279.661	3261.3	4574.23	650.865	8.09823
24	286.645	3266.43	2235.85	214.921	5.49068
25	293.63	3271.98	567.143	27.4749	2.77349
26	300.615	3278	0	0	0

List Of Coordinates

External Boundary

X	Y
0	3195
0	3180
0	3130
700	3130

700	3172.5
700	3182.5
596.6	3187.67
590	3188
320	3278
300	3278
126	3220
0	3220
0	3216

Material Boundary

X	Y
0	3195
51	3195
114	3216
126	3220

Material Boundary

X	Y
302	3274
312.78	3274
318	3274
319.2	3270
324.42	3270
347.52	3193
364.5	3193
590	3188

Material Boundary

X	Y
252.5	3195
275	3180
282.5	3175
328.49	3175
337.5	3175
344.998	3180
357.25	3188.17
589.64	3183
596.6	3187.67

Material Boundary

X	Y
51	3195
252.5	3195

Material Boundary

X	Y
0	3180
275	3180

Material Boundary

X	Y
252.5	3195
278.3	3195
302	3274

Material Boundary

X	Y
312.78	3274
338.58	3188
348	3188
328.49	3175

Material Boundary

X	Y
344.998	3180
700	3172.5

Material Boundary

X	Y
0	3216
114	3216

Slide Analysis Information

2026 SAFETY FACTOR ASSESSMENT OF CCR SURFACE IMPOUNDMENTS AT CSES

Project Summary

File Name: 1.4 - 12 STEP Main Dam - EC - Upstream - Seismic.slim
Slide Modeler Version: 6.02
Project Title: 2026 SAFETY FACTOR ASSESSMENT OF CCR SURFACE IMPOUNDMENTS AT CSES
Analysis: UNITS 1&2 STEP - MAIN DAM - UPSTREAM SLOPE - EXISTING CONDITIONS - SEISMIC ANALYSIS
Author: AWJ
Company: HYDROMETRICS, INC.
Date Created: 9/25/2026, 4:07:52 PM

General Settings

Units of Measurement: Imperial Units
Time Units: days
Permeability Units: feet/second
Failure Direction: Right to Left
Data Output: Standard
Maximum Material Properties: 20
Maximum Support Properties: 20

Analysis Options

Analysis Methods Used

Bishop simplified
GLE/Morgenstern-Price with interslice force function: Half Sine
Janbu simplified

Number of slices: 25
Tolerance: 0.005
Maximum number of iterations: 50
Check malpha < 0.2: Yes
Initial trial value of FS: 1
Steffensen Iteration: Yes

Groundwater Analysis

Groundwater Method: Water Surfaces
Pore Fluid Unit Weight: 62.4 lbs/ft3
Advanced Groundwater Method: None

Random Numbers

Pseudo-random Seed: 10116
Random Number Generation Method: Park and Miller v.3

Surface Options

Surface Type: Circular
Search Method: Grid Search
Radius Increment: 10
Composite Surfaces: Disabled
Reverse Curvature: Invalid Surfaces
Minimum Elevation: Not Defined
Minimum Depth: Not Defined

Loading

Seismic Load Coefficient (Horizontal): 0.03

Material Properties

Property	Shell	Central Core	Drain	Foundation	Bedrock	Fly Ash Slurry	Water
Color							
Strength Type	Mohr-Coulomb	Mohr-Coulomb	Mohr-Coulomb	Mohr-Coulomb	Infinite strength	Mohr-Coulomb	No strength
Unit Weight [lbs/ft3]	125	127	130	115	125	100	62.4
Cohesion [psf]	40	0	0	0		560	
Friction Angle [deg]	26.4	26.8	28	25.6		22.4	
Water Surface	None	None	None	None	None	None	None
Ru Value	0	0	0	0	0	0	0

Global Minimums

Method: bishop simplified

FS: 1.538000
Center: 146.672, 3449.612
Radius: 230.541
Left Slip Surface Endpoint: 126.000, 3220.000
Right Slip Surface Endpoint: 300.615, 3278.000
Resisting Moment=3.45797e+007 lb-ft
Driving Moment=2.24835e+007 lb-ft
Total Slice Area=2383.21 ft2

Method: janbu simplified

FS: 1.481440
Center: 146.672, 3449.612
Radius: 230.541
Left Slip Surface Endpoint: 126.000, 3220.000
Right Slip Surface Endpoint: 300.615, 3278.000
Resisting Horizontal Force=139872 lb
Driving Horizontal Force=94415.9 lb
Total Slice Area=2383.21 ft2

Method: gle/morgenstern-price

FS: 1.538290
Center: 146.672, 3449.612
Radius: 230.541
Left Slip Surface Endpoint: 126.000, 3220.000
Right Slip Surface Endpoint: 300.615, 3278.000
Resisting Moment=3.45862e+007 lb-ft
Driving Moment=2.24835e+007 lb-ft
Resisting Horizontal Force=140876 lb
Driving Horizontal Force=91579.4 lb
Total Slice Area=2383.21 ft2

Slice Data

Global Minimum Query (bishop simplified) - Safety Factor: 1.538

Slice Number	Width [ft]	Weight [lbs]	Base Material	Base Cohesion [psf]	Base Friction Angle [degrees]	Shear Stress [psf]	Shear Strength [psf]	Base Normal Stress [psf]	Pore Pressure [psf]	Effective Normal Stress [psf]
1	6.98458	1244.21	Shell	40	26.4	85.5626	131.595	184.517	0	184.517
2	6.98458	3639.74	Shell	40	26.4	197.01	303.002	529.815	0	529.815
3	6.98458	5849.88	Shell	40	26.4	297.668	457.813	841.678	0	841.678
4	6.98458	7875.1	Shell	40	26.4	387.873	596.549	1121.16	0	1121.16
5	6.98458	9715.39	Shell	40	26.4	467.918	719.658	1369.16	0	1369.16
6	6.98458	11370.2	Shell	40	26.4	538.051	827.523	1586.46	0	1586.46
7	6.98458	12838.5	Shell	40	26.4	598.484	920.468	1773.69	0	1773.69
8	6.98458	14118.8	Shell	40	26.4	649.391	998.763	1931.41	0	1931.41
9	6.98458	15208.7	Shell	40	26.4	690.917	1062.63	2060.06	0	2060.06
10	6.98458	16105.7	Shell	40	26.4	723.166	1112.23	2160.01	0	2160.01
11	6.98458	16806.4	Shell	40	26.4	746.235	1147.71	2231.47	0	2231.47
12	6.98458	17306.7	Shell	40	26.4	760.169	1169.14	2274.63	0	2274.63
13	6.98458	17601.8	Shell	40	26.4	764.993	1176.56	2289.59	0	2289.59
14	6.98458	17686.2	Shell	40	26.4	760.722	1169.99	2276.34	0	2276.34
15	6.98458	17553.3	Shell	40	26.4	747.315	1149.37	2234.82	0	2234.82
16	6.98458	17195.4	Shell	40	26.4	724.727	1114.63	2164.84	0	2164.84
17	6.98458	16603.9	Shell	40	26.4	692.88	1065.65	2066.16	0	2066.16
18	6.98458	15768.4	Shell	40	26.4	651.664	1002.26	1938.45	0	1938.45
19	6.98458	14677.2	Shell	40	26.4	600.938	924.242	1781.29	0	1781.29
20	6.98458	13316.4	Shell	40	26.4	540.534	831.342	1594.15	0	1594.15
21	6.98458	11670	Shell	40	26.4	470.252	723.248	1376.4	0	1376.4
22	6.98458	9718.96	Shell	40	26.4	389.856	599.598	1127.3	0	1127.3
23	6.98458	7440.76	Shell	40	26.4	299.074	459.976	846.037	0	846.037
24	6.98458	4808.47	Shell	40	26.4	197.599	303.908	531.639	0	531.639
25	6.98458	1781.61	Shell	40	26.4	84.8044	130.429	182.168	0	182.168

Global Minimum Query (janbu simplified) - Safety Factor: 1.48144

Slice Number	Width [ft]	Weight [lbs]	Base Material	Base Cohesion [psf]	Base Friction Angle [degrees]	Shear Stress [psf]	Shear Strength [psf]	Base Normal Stress [psf]	Pore Pressure [psf]	Effective Normal Stress [psf]
1	6.98458	1244.21	Shell	40	26.4	88.9175	131.726	184.781	0	184.781
2	6.98458	3639.74	Shell	40	26.4	204.651	303.178	530.17	0	530.17
3	6.98458	5849.88	Shell	40	26.4	309.088	457.896	841.846	0	841.846
4	6.98458	7875.1	Shell	40	26.4	402.597	596.423	1120.91	0	1120.91
5	6.98458	9715.39	Shell	40	26.4	485.493	719.229	1368.3	0	1368.3
6	6.98458	11370.2	Shell	40	26.4	558.049	826.716	1584.83	0	1584.83

7	6.98458	12838.5	Shell	40	26.4	620.495	919.226	1771.19	0	1771.19
8	6.98458	14118.8	Shell	40	26.4	673.025	997.046	1927.95	0	1927.95
9	6.98458	15208.7	Shell	40	26.4	715.797	1060.41	2055.6	0	2055.6
10	6.98458	16105.7	Shell	40	26.4	748.94	1109.51	2154.5	0	2154.5
11	6.98458	16806.4	Shell	40	26.4	772.539	1144.47	2224.94	0	2224.94
12	6.98458	17306.7	Shell	40	26.4	786.674	1165.41	2267.14	0	2267.14
13	6.98458	17601.8	Shell	40	26.4	791.379	1172.38	2281.17	0	2281.17
14	6.98458	17686.2	Shell	40	26.4	786.667	1165.4	2267.1	0	2267.1
15	6.98458	17553.3	Shell	40	26.4	772.512	1144.43	2224.87	0	2224.87
16	6.98458	17195.4	Shell	40	26.4	748.879	1109.42	2154.34	0	2154.34
17	6.98458	16603.9	Shell	40	26.4	715.696	1060.26	2055.29	0	2055.29
18	6.98458	15768.4	Shell	40	26.4	672.851	996.788	1927.44	0	1927.44
19	6.98458	14677.2	Shell	40	26.4	620.222	918.822	1770.38	0	1770.38
20	6.98458	13316.4	Shell	40	26.4	557.646	826.119	1583.63	0	1583.63
21	6.98458	11670	Shell	40	26.4	484.928	718.392	1366.61	0	1366.61
22	6.98458	9718.96	Shell	40	26.4	401.84	595.302	1118.65	0	1118.65
23	6.98458	7440.76	Shell	40	26.4	308.122	456.464	838.96	0	838.96
24	6.98458	4808.47	Shell	40	26.4	203.475	301.436	526.661	0	526.661
25	6.98458	1781.61	Shell	40	26.4	87.2798	129.3	179.894	0	179.894

Global Minimum Query (gle/morgenstern-price) - Safety Factor: 1.53829

Slice Number	Width [ft]	Weight [lbs]	Base Material	Base Cohesion [psf]	Base Friction Angle [degrees]	Shear Stress [psf]	Shear Strength [psf]	Base Normal Stress [psf]	Pore Pressure [psf]	Effective Normal Stress [psf]
1	6.98458	1244.21	Shell	40	26.4	87.2465	134.21	189.786	0	189.786
2	6.98458	3639.74	Shell	40	26.4	206.085	317.019	558.051	0	558.051
3	6.98458	5849.88	Shell	40	26.4	318.245	489.553	905.619	0	905.619
4	6.98458	7875.1	Shell	40	26.4	421.484	648.364	1225.54	0	1225.54
5	6.98458	9715.39	Shell	40	26.4	513.698	790.217	1511.3	0	1511.3
6	6.98458	11370.2	Shell	40	26.4	593.153	912.442	1757.52	0	1757.52
7	6.98458	12838.5	Shell	40	26.4	658.643	1013.18	1960.47	0	1960.47
8	6.98458	14118.8	Shell	40	26.4	709.58	1091.54	2118.3	0	2118.3
9	6.98458	15208.7	Shell	40	26.4	745.997	1147.56	2231.17	0	2231.17
10	6.98458	16105.7	Shell	40	26.4	768.496	1182.17	2300.89	0	2300.89
11	6.98458	16806.4	Shell	40	26.4	778.137	1197	2330.76	0	2330.76
12	6.98458	17306.7	Shell	40	26.4	776.265	1194.12	2324.96	0	2324.96
13	6.98458	17601.8	Shell	40	26.4	764.362	1175.81	2288.08	0	2288.08
14	6.98458	17686.2	Shell	40	26.4	743.891	1144.32	2224.65	0	2224.65
15	6.98458	17553.3	Shell	40	26.4	716.159	1101.66	2138.7	0	2138.7
16	6.98458	17195.4	Shell	40	26.4	682.193	1049.41	2033.44	0	2033.44
17	6.98458	16603.9	Shell	40	26.4	642.699	988.658	1911.06	0	1911.06
18	6.98458	15768.4	Shell	40	26.4	598.019	919.926	1772.6	0	1772.6
19	6.98458	14677.2	Shell	40	26.4	548.107	843.147	1617.93	0	1617.93
20	6.98458	13316.4	Shell	40	26.4	492.535	757.662	1445.72	0	1445.72
21	6.98458	11670	Shell	40	26.4	430.477	662.198	1253.41	0	1253.41
22	6.98458	9718.96	Shell	40	26.4	360.675	554.822	1037.1	0	1037.1
23	6.98458	7440.76	Shell	40	26.4	281.377	432.84	791.371	0	791.371
24	6.98458	4808.47	Shell	40	26.4	190.242	292.647	508.953	0	508.953
25	6.98458	1781.61	Shell	40	26.4	83.9138	129.084	179.458	0	179.458

Interslice Data

Global Minimum Query (bishop simplified) - Safety Factor: 1.538

Slice Number	X coordinate [ft]	Y coordinate - Bottom [ft]	Interslice Normal Force [lbs]	Interslice Shear Force [lbs]	Interslice Force Angle [degrees]
1	126	3220	0	0	0
2	132.985	3219.48	655.33	0	0
3	139.969	3219.17	2083.05	0	0
4	146.954	3219.07	4064.07	0	0
5	153.938	3219.19	6402.92	0	0
6	160.923	3219.51	8925.85	0	0
7	167.907	3220.05	11479.3	0	0
8	174.892	3220.81	13928.7	0	0
9	181.877	3221.78	16157.5	0	0
10	188.861	3222.96	18066.4	0	0
11	195.846	3224.38	19573.1	0	0
12	202.83	3226.02	20612.2	0	0
13	209.815	3227.89	21134.9	0	0
14	216.8	3230	21109.5	0	0
15	223.784	3232.35	20522.4	0	0
16	230.769	3234.96	19378.3	0	0
17	237.753	3237.83	17702.1	0	0
18	244.738	3240.97	15540.7	0	0
19	251.722	3244.4	12964.5	0	0

20	258.707	3248.12	10071.6	0	0
21	265.692	3252.17	6990.49	0	0
22	272.676	3256.55	3885.76	0	0
23	279.661	3261.3	964.266	0	0
24	286.645	3266.43	-1516.35	0	0
25	293.63	3271.98	-3236.33	0	0
26	300.615	3278	0	0	0

Global Minimum Query (janbu simplified) - Safety Factor: 1.48144

Slice Number	X coordinate [ft]	Y coordinate - Bottom [ft]	Interslice Normal Force [lbs]	Interslice Shear Force [lbs]	Interslice Force Angle [degrees]
1	126	3220	0	0	0
2	132.985	3219.48	680.062	0	0
3	139.969	3219.17	2163.94	0	0
4	146.954	3219.07	4228.79	0	0
5	153.938	3219.19	6675.77	0	0
6	160.923	3219.51	9328.1	0	0
7	167.907	3220.05	12029.4	0	0
8	174.892	3220.81	14642.6	0	0
9	181.877	3221.78	17048.6	0	0
10	188.861	3222.96	19146	0	0
11	195.846	3224.38	20850.3	0	0
12	202.83	3226.02	22093.9	0	0
13	209.815	3227.89	22826.1	0	0
14	216.8	3230	23013.2	0	0
15	223.784	3232.35	22639.4	0	0
16	230.769	3234.96	21707.4	0	0
17	237.753	3237.83	20239.9	0	0
18	244.738	3240.97	18281.3	0	0
19	251.722	3244.4	15899.8	0	0
20	258.707	3248.12	13190.5	0	0
21	265.692	3252.17	10278.8	0	0
22	272.676	3256.55	7325.83	0	0
23	279.661	3261.3	4534.39	0	0
24	286.645	3266.43	2157.34	0	0
25	293.63	3271.98	508.74	0	0
26	300.615	3278	0	0	0

Global Minimum Query (gle/morgenstern-price) - Safety Factor: 1.53829

Slice Number	X coordinate [ft]	Y coordinate - Bottom [ft]	Interslice Normal Force [lbs]	Interslice Shear Force [lbs]	Interslice Force Angle [degrees]
1	126	3220	0	0	0
2	132.985	3219.48	671.181	35.8461	3.05712
3	139.969	3219.17	2174.11	230.396	6.0492
4	146.954	3219.07	4309.74	676.055	8.91515
5	153.938	3219.19	6877.5	1411.86	11.6009
6	160.923	3219.51	9681.15	2424.83	14.0615
7	167.907	3220.05	12535.7	3656.68	16.262
8	174.892	3220.81	15273.9	5014.95	18.1768
9	181.877	3221.78	17752	6386.95	19.7881
10	188.861	3222.96	19852.9	7654.66	21.0851
11	195.846	3224.38	21488.7	8708.67	22.0611
12	202.83	3226.02	22599.5	9459.61	22.713
13	209.815	3227.89	23152.3	9846.29	23.0392
14	216.8	3230	23137.7	9840.09	23.0393
15	223.784	3232.35	22566.6	9445.85	22.713
16	230.769	3234.96	21467.2	8699.95	22.0611
17	237.753	3237.83	19882.2	7665.96	21.0851
18	244.738	3240.97	17868.4	6428.85	19.7882
19	251.722	3244.4	15496.3	5087.97	18.1768
20	258.707	3248.12	12852.8	3749.18	16.262
21	265.692	3252.17	10045.3	2516.04	14.0616
22	272.676	3256.55	7209.07	1479.93	11.6009
23	279.661	3261.3	4517.69	708.674	8.91513
24	286.645	3266.43	2198.67	232.999	6.04921
25	293.63	3271.98	556.39	29.7154	3.05712
26	300.615	3278	0	0	0

List Of Coordinates

External Boundary

X	Y

0	3195
0	3180
0	3130
700	3130
700	3172.5
700	3182.5
596.6	3187.67
590	3188
320	3278
300	3278
126	3220
0	3220
0	3216

Material Boundary

X	Y
0	3195
51	3195
114	3216
126	3220

Material Boundary

X	Y
302	3274
312.78	3274
318	3274
319.2	3270
324.42	3270
347.52	3193
364.5	3193
590	3188

Material Boundary

X	Y
252.5	3195
275	3180
282.5	3175
328.49	3175
337.5	3175
344.998	3180
357.25	3188.17
589.64	3183
596.6	3187.67

Material Boundary

X	Y
51	3195
252.5	3195

Material Boundary

X	Y
0	3180
275	3180

Material Boundary

X	Y
252.5	3195
278.3	3195
302	3274

Material Boundary

X	Y
312.78	3274
338.58	3188
348	3188
328.49	3175

Material Boundary

X	Y
344.998	3180
700	3172.5

Material Boundary

X	Y
0	3216
114	3216

Slide Analysis Information

2026 SAFETY FACTOR ASSESSMENT OF CCR SURFACE IMPOUNDMENTS AT CSES

Project Summary

File Name: 2.0 - 12 STEP EC DIKE - Downstream - Max Normal Pool - Static.slim
Slide Modeler Version: 6.02
Project Title: 2026 SAFETY FACTOR ASSESSMENT OF CCR SURFACE IMPOUNDMENTS AT CSES
Analysis: UNITS 1&2 STEP - E/C DIVIDER DIKE (SADDLE DAM) - MAXIMUM STORAGE POOL - STATIC ANALYSIS
Author: AWJ
Company: HYDROMETRICS, INC.
Date Created: 9/25/2026, 4:07:52 PM

General Settings

Units of Measurement: Imperial Units
Time Units: days
Permeability Units: feet/second
Failure Direction: Right to Left
Data Output: Standard
Maximum Material Properties: 20
Maximum Support Properties: 20

Analysis Options

Analysis Methods Used

Bishop simplified
GLE/Morgenstern-Price with interslice force function: Half Sine
Janbu simplified

Number of slices: 25
Tolerance: 0.005
Maximum number of iterations: 50
Check malpha < 0.2: Yes
Initial trial value of FS: 1
Steffensen Iteration: Yes

Groundwater Analysis

Groundwater Method: Water Surfaces
Pore Fluid Unit Weight: 62.4 lbs/ft3
Advanced Groundwater Method: None

Random Numbers

Pseudo-random Seed: 10116
Random Number Generation Method: Park and Miller v.3

Surface Options

Surface Type: Circular
Search Method: Grid Search
Radius Increment: 10
Composite Surfaces: Disabled
Reverse Curvature: Invalid Surfaces
Minimum Elevation: Not Defined
Minimum Depth: Not Defined

Material Properties

Property	Embankment	Foundation	Paste	Bedrock
Color				
Strength Type	Mohr-Coulomb	Mohr-Coulomb	Mohr-Coulomb	Infinite strength
Unit Weight [lbs/ft3]	125	115	102	125
Cohesion [psf]	50	0	0	
Friction Angle [deg]	33	32	34.4	
Water Surface	None	None	None	None
Ru Value	0	0	0	0

Global Minimums

Method: bishop simplified

FS: 1.550290
Center: 75.626, 3375.445
Radius: 146.730
Left Slip Surface Endpoint: 95.000, 3230.000
Right Slip Surface Endpoint: 177.660, 3270.000
Resisting Moment=6.19592e+006 lb-ft
Driving Moment=3.99663e+006 lb-ft
Total Slice Area=505.875 ft2

Method: janbu simplified

FS: 1.491330
Center: 100.236, 3320.756
Radius: 91.913
Left Slip Surface Endpoint: 85.701, 3230.000
Right Slip Surface Endpoint: 176.863, 3270.000
Resisting Horizontal Force=58849.7 lb
Driving Horizontal Force=39461.1 lb
Total Slice Area=838.026 ft2

Method: gle/morgenstern-price

FS: 1.545450
Center: 78.360, 3371.343
Radius: 142.319
Left Slip Surface Endpoint: 95.000, 3230.000
Right Slip Surface Endpoint: 178.282, 3270.000
Resisting Moment=6.38763e+006 lb-ft
Driving Moment=4.1332e+006 lb-ft
Resisting Horizontal Force=40227.5 lb
Driving Horizontal Force=26029.7 lb
Total Slice Area=542.09 ft2

Slice Data

Global Minimum Query (bishop simplified) - Safety Factor: 1.55029

Slice Number	Width [ft]	Weight [lbs]	Base Material	Base Cohesion [psf]	Base Friction Angle [degrees]	Shear Stress [psf]	Shear Strength [psf]	Base Normal Stress [psf]	Pore Pressure [psf]	Effective Normal Stress [psf]
1	3.3064	242.689	Embankment	50	33	59.3998	92.0869	64.8079	0	64.8079
2	3.3064	712.099	Embankment	50	33	114.418	177.381	196.15	0	196.15
3	3.3064	1149.39	Embankment	50	33	164.655	255.263	316.077	0	316.077
4	3.3064	1554.16	Embankment	50	33	210.176	325.834	424.746	0	424.746
5	3.3064	1925.94	Embankment	50	33	251.036	389.178	522.289	0	522.289
6	3.3064	2264.22	Embankment	50	33	287.28	445.367	608.811	0	608.811
7	3.3064	2568.4	Embankment	50	33	318.946	494.459	684.407	0	684.407
8	3.3064	2837.8	Embankment	50	33	346.064	536.5	749.143	0	749.143
9	3.3064	3071.67	Embankment	50	33	368.654	571.521	803.072	0	803.072
10	3.3064	3269.17	Embankment	50	33	386.73	599.544	846.224	0	846.224
11	3.3064	3429.36	Embankment	50	33	400.297	620.576	878.611	0	878.611
12	3.3064	3551.18	Embankment	50	33	409.351	634.613	900.226	0	900.226
13	3.3064	3633.48	Embankment	50	33	413.883	641.639	911.046	0	911.046
14	3.3064	3674.93	Embankment	50	33	413.874	641.625	911.023	0	911.023
15	3.3064	3674.09	Embankment	50	33	409.298	634.53	900.096	0	900.096
16	3.3064	3629.3	Embankment	50	33	400.119	620.3	878.185	0	878.185
17	3.3064	3538.75	Embankment	50	33	386.294	598.868	845.182	0	845.182
18	3.3064	3400.36	Embankment	50	33	367.773	570.155	800.968	0	800.968
19	3.3064	3211.81	Embankment	50	33	344.495	534.067	745.396	0	745.396
20	3.3064	2970.46	Embankment	50	33	316.39	490.496	678.304	0	678.304
21	3.3064	2673.3	Embankment	50	33	283.379	439.32	599.5	0	599.5
22	3.3064	2316.89	Embankment	50	33	245.377	380.405	508.779	0	508.779
23	3.3064	1897.25	Embankment	50	33	202.285	313.6	405.909	0	405.909
24	3.3064	1409.78	Embankment	50	33	153.999	238.743	290.639	0	290.639
25	3.3064	627.965	Embankment	50	33	80.2922	124.476	114.683	0	114.683

Global Minimum Query (janbu simplified) - Safety Factor: 1.49133

Slice Number	Width [ft]	Weight [lbs]	Base Material	Base Cohesion [psf]	Base Friction Angle [degrees]	Shear Stress [psf]	Shear Strength [psf]	Base Normal Stress [psf]	Pore Pressure [psf]	Effective Normal Stress [psf]
1	3.76815	113.476	Foundation	0	32	13.3974	19.9799	31.9745	0	31.9745
2	3.76815	306.24	Foundation	0	32	35.4953	52.9352	84.714	0	84.714
3	3.76815	557.219	Foundation	0	32	63.4402	94.6103	151.408	0	151.408
4	3.76815	1407.95	Foundation	0	32	157.524	234.92	375.95	0	375.95
5	3.76815	2289.07	Foundation	0	32	251.755	375.45	600.847	0	600.847
6	3.76815	3103.1	Foundation	0	32	335.568	500.442	800.875	0	800.875
7	3.76815	3849.65	Foundation	0	32	409.385	610.528	977.048	0	977.048
8	3.59915	4300.63	Embankment	50	33	519.904	775.348	1116.94	0	1116.94
9	3.59915	4834.06	Embankment	50	33	570.953	851.48	1234.17	0	1234.17
10	3.59915	5300.51	Embankment	50	33	612.762	913.83	1330.18	0	1330.18

11	3.59915	5698.24	Embankment	50	33	645.484	962.63	1405.33	0	1405.33
12	3.59915	6025.09	Embankment	50	33	669.223	998.033	1459.84	0	1459.84
13	3.59915	6278.41	Embankment	50	33	684.03	1020.11	1493.84	0	1493.84
14	3.59915	6454.98	Embankment	50	33	689.904	1028.88	1507.33	0	1507.33
15	3.59915	6550.89	Embankment	50	33	686.796	1024.24	1500.2	0	1500.2
16	3.59915	6561.44	Embankment	50	33	674.606	1006.06	1472.2	0	1472.2
17	3.59915	6480.88	Embankment	50	33	653.173	974.097	1422.98	0	1422.98
18	3.59915	6302.19	Embankment	50	33	622.283	928.029	1352.05	0	1352.05
19	3.59915	6016.71	Embankment	50	33	581.651	867.434	1258.74	0	1258.74
20	3.59915	5613.59	Embankment	50	33	530.922	791.78	1142.24	0	1142.24
21	3.59915	5079.02	Embankment	50	33	469.657	700.413	1001.55	0	1001.55
22	3.59915	4394.99	Embankment	50	33	397.325	592.542	835.441	0	835.441
23	3.59915	3537.38	Embankment	50	33	313.301	467.235	642.484	0	642.484
24	3.59915	2472.58	Embankment	50	33	216.87	323.425	421.036	0	421.036
25	3.59915	1042.8	Embankment	50	33	99.1359	147.844	150.667	0	150.667

Global Minimum Query (gle/morgenstern-price) - Safety Factor: 1.54545

Slice Number	Width [ft]	Weight [lbs]	Base Material	Base Cohesion [psf]	Base Friction Angle [degrees]	Shear Stress [psf]	Shear Strength [psf]	Base Normal Stress [psf]	Pore Pressure [psf]	Effective Normal Stress [psf]
1	3.33128	256.831	Embankment	50	33	62.7593	96.9913	72.3601	0	72.3601
2	3.33128	753.763	Embankment	50	33	125.58	194.078	221.861	0	221.861
3	3.33128	1217.05	Embankment	50	33	185.155	286.148	363.636	0	363.636
4	3.33128	1646.3	Embankment	50	33	240.325	371.411	494.93	0	494.93
5	3.33128	2041.04	Embankment	50	33	290.002	448.183	613.148	0	613.148
6	3.33128	2400.73	Embankment	50	33	333.272	515.055	716.123	0	716.123
7	3.33128	2724.75	Embankment	50	33	369.483	571.018	802.298	0	802.298
8	3.33128	3012.41	Embankment	50	33	398.29	615.538	870.854	0	870.854
9	3.33128	3262.92	Embankment	50	33	419.663	648.568	921.715	0	921.715
10	3.33128	3475.39	Embankment	50	33	433.859	670.508	955.499	0	955.499
11	3.33128	3648.83	Embankment	50	33	441.371	682.117	973.375	0	973.375
12	3.33128	3782.12	Embankment	50	33	442.853	684.407	976.9	0	976.9
13	3.33128	3874.02	Embankment	50	33	439.036	678.508	967.819	0	967.819
14	3.33128	3923.12	Embankment	50	33	430.653	665.552	947.868	0	947.868
15	3.33128	3927.85	Embankment	50	33	418.366	646.563	918.626	0	918.626
16	3.33128	3886.44	Embankment	50	33	402.716	622.378	881.384	0	881.384
17	3.33128	3796.92	Embankment	50	33	384.09	593.592	837.057	0	837.057
18	3.33128	3657.02	Embankment	50	33	362.698	560.531	786.149	0	786.149
19	3.33128	3464.21	Embankment	50	33	338.569	523.241	728.727	0	728.727
20	3.33128	3215.58	Embankment	50	33	311.546	481.478	664.417	0	664.417
21	3.33128	2907.81	Embankment	50	33	281.279	434.703	592.391	0	592.391
22	3.33128	2537.06	Embankment	50	33	247.208	382.048	511.309	0	511.309
23	3.33128	2098.9	Embankment	50	33	208.526	322.267	419.254	0	419.254
24	3.33128	1588.13	Embankment	50	33	164.134	253.661	313.609	0	313.609
25	3.33128	661.997	Embankment	50	33	82.2702	127.144	118.792	0	118.792

Interslice Data

Global Minimum Query (bishop simplified) - Safety Factor: 1.55029

Slice Number	X coordinate [ft]	Y coordinate - Bottom [ft]	Interslice Normal Force [lbs]	Interslice Shear Force [lbs]	Interslice Force Angle [degrees]
1	95	3230	0	0	0
2	98.3064	3230.48	165.141	0	0
3	101.613	3231.03	433.941	0	0
4	104.919	3231.67	777.257	0	0
5	108.226	3232.38	1168.34	0	0
6	111.532	3233.18	1582.79	0	0
7	114.838	3234.05	1998.48	0	0
8	118.145	3235.01	2395.56	0	0
9	121.451	3236.05	2756.45	0	0
10	124.758	3237.19	3065.84	0	0
11	128.064	3238.41	3310.76	0	0
12	131.37	3239.72	3480.59	0	0
13	134.677	3241.12	3567.23	0	0
14	137.983	3242.62	3565.12	0	0
15	141.29	3244.23	3471.47	0	0
16	144.596	3245.94	3286.41	0	0
17	147.902	3247.75	3013.26	0	0
18	151.209	3249.68	2658.8	0	0
19	154.515	3251.73	2233.63	0	0
20	157.822	3253.9	1752.66	0	0
21	161.128	3256.2	1235.6	0	0
22	164.434	3258.64	707.703	0	0
23	167.741	3261.23	200.606	0	0

24	171.047	3263.98	-246.608	0	0
25	174.354	3266.9	-586.022	0	0
26	177.66	3270	0	0	0

Global Minimum Query (janbu simplified) - Safety Factor: 1.49133

Slice Number	X coordinate [ft]	Y coordinate - Bottom [ft]	Interslice Normal Force [lbs]	Interslice Shear Force [lbs]	Interslice Force Angle [degrees]
1	85.7013	3230	0	0	0
2	89.4695	3229.48	67.1744	0	0
3	93.2376	3229.11	231.78	0	0
4	97.0058	3228.9	502.373	0	0
5	100.774	3228.85	1116.05	0	0
6	104.542	3228.94	2003.97	0	0
7	108.31	3229.2	3063.3	0	0
8	112.078	3229.61	4202.89	0	0
9	115.678	3230.15	5468.59	0	0
10	119.277	3230.84	6672.82	0	0
11	122.876	3231.68	7761.03	0	0
12	126.475	3232.67	8686.24	0	0
13	130.074	3233.82	9408.79	0	0
14	133.673	3235.14	9896.37	0	0
15	137.272	3236.64	10124.2	0	0
16	140.872	3238.31	10075.5	0	0
17	144.471	3240.19	9742.1	0	0
18	148.07	3242.27	9125.75	0	0
19	151.669	3244.58	8239.63	0	0
20	155.268	3247.14	7110.76	0	0
21	158.867	3249.97	5783.5	0	0
22	162.467	3253.12	4324.62	0	0
23	166.066	3256.61	2831.17	0	0
24	169.665	3260.53	1442.74	0	0
25	173.264	3264.95	362.068	0	0
26	176.863	3270	0	0	0

Global Minimum Query (gle/morgenstern-price) - Safety Factor: 1.54545

Slice Number	X coordinate [ft]	Y coordinate - Bottom [ft]	Interslice Normal Force [lbs]	Interslice Shear Force [lbs]	Interslice Force Angle [degrees]
1	95	3230	0	0	0
2	98.3313	3230.43	177.742	11.3442	3.65189
3	101.663	3230.94	482.273	61.0759	7.21762
4	104.994	3231.54	883.016	165.532	10.6176
5	108.325	3232.21	1348.83	330.903	13.7839
6	111.656	3232.97	1848.99	553.441	16.6635
7	114.988	3233.82	2354.27	820.69	19.2184
8	118.319	3234.75	2838.06	1113.58	21.4237
9	121.65	3235.77	3277.15	1409.05	23.2659
10	124.982	3236.88	3652.43	1682.93	24.7388
11	128.313	3238.08	3949.16	1912.63	25.8415
12	131.644	3239.37	4156.96	2079.38	26.575
13	134.975	3240.77	4269.56	2169.92	26.9411
14	138.307	3242.26	4284.36	2177.44	26.941
15	141.638	3243.86	4201.97	2101.89	26.5749
16	144.969	3245.57	4025.74	1949.71	25.8414
17	148.3	3247.4	3761.39	1733.14	24.7389
18	151.632	3249.33	3416.91	1469.14	23.2658
19	154.963	3251.4	3002.58	1178.13	21.4237
20	158.294	3253.59	2531.41	882.44	19.2184
21	161.626	3255.92	2019.8	604.568	16.6635
22	164.957	3258.4	1488.66	365.207	13.7839
23	168.288	3261.04	965.123	180.924	10.6176
24	171.619	3263.84	484.959	61.4161	7.21762
25	174.951	3266.82	96.1398	6.13604	3.6519
26	178.282	3270	0	0	0

List Of Coordinates

External Boundary

X	Y
0	3212
0	3192
350	3192
350	3212

350	3232
350	3267
204	3267
195	3270
175	3270
95	3230
56	3230
0	3243.5

Material Boundary

X	Y
95	3230
182.5	3228
309	3232
350	3232

Material Boundary

X	Y
204	3267
309	3232

Material Boundary

X	Y
0	3212
350	3212

Slide Analysis Information

2026 SAFETY FACTOR ASSESSMENT OF CCR SURFACE IMPOUNDMENTS AT CSES

Project Summary

File Name: 2.1 - 12 STEP EC DIKE - Downstream - Max Surcharge Pool - Static.slim
Slide Modeler Version: 6.02
Project Title: 2026 SAFETY FACTOR ASSESSMENT OF CCR SURFACE IMPOUNDMENTS AT CSES
Analysis: UNITS 1&2 STEP - E/C DIVIDER DIKE (SADDLE DAM) - MAXIMUM SURCHARGE POOL - STATIC ANALYSIS
Author: AWJ
Company: HYDROMETRICS, INC.
Date Created: 9/25/2026, 4:07:52 PM

General Settings

Units of Measurement: Imperial Units
Time Units: days
Permeability Units: feet/second
Failure Direction: Right to Left
Data Output: Standard
Maximum Material Properties: 20
Maximum Support Properties: 20

Analysis Options

Analysis Methods Used

Bishop simplified
GLE/Morgenstern-Price with interslice force function: Half Sine
Janbu simplified

Number of slices: 25
Tolerance: 0.005
Maximum number of iterations: 50
Check malpha < 0.2: Yes
Initial trial value of FS: 1
Steffensen Iteration: Yes

Groundwater Analysis

Groundwater Method: Water Surfaces
Pore Fluid Unit Weight: 62.4 lbs/ft3
Advanced Groundwater Method: None

Random Numbers

Pseudo-random Seed: 10116
Random Number Generation Method: Park and Miller v.3

Surface Options

Surface Type: Circular
Search Method: Grid Search
Radius Increment: 10
Composite Surfaces: Disabled
Reverse Curvature: Invalid Surfaces
Minimum Elevation: Not Defined
Minimum Depth: Not Defined

Material Properties

Property	Embankment	Foundation	Paste	Bedrock	Water
Color					
Strength Type	Mohr-Coulomb	Mohr-Coulomb	Mohr-Coulomb	Infinite strength	No strength
Unit Weight [lbs/ft3]	125	115	102	125	62.4
Cohesion [psf]	50	0	0		
Friction Angle [deg]	33	32	34.4		
Water Surface	None	None	None	None	None
Ru Value	0	0	0	0	0

Global Minimums

Method: bishop simplified

FS: 1.550290
Center: 75.626, 3375.445
Radius: 146.730
Left Slip Surface Endpoint: 95.000, 3230.000
Right Slip Surface Endpoint: 177.660, 3270.000
Resisting Moment=6.19592e+006 lb-ft
Driving Moment=3.99663e+006 lb-ft
Total Slice Area=505.875 ft2

Method: janbu simplified

FS: 1.491330
Center: 100.236, 3320.756
Radius: 91.913
Left Slip Surface Endpoint: 85.701, 3230.000
Right Slip Surface Endpoint: 176.863, 3270.000
Resisting Horizontal Force=58849.7 lb
Driving Horizontal Force=39461.1 lb
Total Slice Area=838.026 ft2

Method: gle/morgenstern-price

FS: 1.545450
Center: 78.360, 3371.343
Radius: 142.319
Left Slip Surface Endpoint: 95.000, 3230.000
Right Slip Surface Endpoint: 178.282, 3270.000
Resisting Moment=6.38763e+006 lb-ft
Driving Moment=4.1332e+006 lb-ft
Resisting Horizontal Force=40227.5 lb
Driving Horizontal Force=26029.7 lb
Total Slice Area=542.09 ft2

Slice Data

Global Minimum Query (bishop simplified) - Safety Factor: 1.55029

Slice Number	Width [ft]	Weight [lbs]	Base Material	Base Cohesion [psf]	Base Friction Angle [degrees]	Shear Stress [psf]	Shear Strength [psf]	Base Normal Stress [psf]	Pore Pressure [psf]	Effective Normal Stress [psf]
1	3.3064	242.689	Embankment	50	33	59.3998	92.0869	64.8079	0	64.8079
2	3.3064	712.099	Embankment	50	33	114.418	177.381	196.15	0	196.15
3	3.3064	1149.39	Embankment	50	33	164.655	255.263	316.077	0	316.077
4	3.3064	1554.16	Embankment	50	33	210.176	325.834	424.746	0	424.746
5	3.3064	1925.94	Embankment	50	33	251.036	389.178	522.289	0	522.289
6	3.3064	2264.22	Embankment	50	33	287.28	445.367	608.811	0	608.811
7	3.3064	2568.4	Embankment	50	33	318.946	494.459	684.407	0	684.407
8	3.3064	2837.8	Embankment	50	33	346.064	536.5	749.143	0	749.143
9	3.3064	3071.67	Embankment	50	33	368.654	571.521	803.072	0	803.072
10	3.3064	3269.17	Embankment	50	33	386.73	599.544	846.224	0	846.224
11	3.3064	3429.36	Embankment	50	33	400.297	620.576	878.611	0	878.611
12	3.3064	3551.18	Embankment	50	33	409.351	634.613	900.226	0	900.226
13	3.3064	3633.48	Embankment	50	33	413.883	641.639	911.046	0	911.046
14	3.3064	3674.93	Embankment	50	33	413.874	641.625	911.023	0	911.023
15	3.3064	3674.09	Embankment	50	33	409.298	634.53	900.096	0	900.096
16	3.3064	3629.3	Embankment	50	33	400.119	620.3	878.185	0	878.185
17	3.3064	3538.75	Embankment	50	33	386.294	598.868	845.182	0	845.182
18	3.3064	3400.36	Embankment	50	33	367.773	570.155	800.968	0	800.968
19	3.3064	3211.81	Embankment	50	33	344.495	534.067	745.396	0	745.396
20	3.3064	2970.46	Embankment	50	33	316.39	490.496	678.304	0	678.304
21	3.3064	2673.3	Embankment	50	33	283.379	439.32	599.5	0	599.5
22	3.3064	2316.89	Embankment	50	33	245.377	380.405	508.779	0	508.779
23	3.3064	1897.25	Embankment	50	33	202.285	313.6	405.909	0	405.909
24	3.3064	1409.78	Embankment	50	33	153.999	238.743	290.639	0	290.639
25	3.3064	627.965	Embankment	50	33	80.2922	124.476	114.683	0	114.683

Global Minimum Query (janbu simplified) - Safety Factor: 1.49133

Slice Number	Width [ft]	Weight [lbs]	Base Material	Base Cohesion [psf]	Base Friction Angle [degrees]	Shear Stress [psf]	Shear Strength [psf]	Base Normal Stress [psf]	Pore Pressure [psf]	Effective Normal Stress [psf]
1	3.76815	113.476	Foundation	0	32	13.3974	19.9799	31.9745	0	31.9745
2	3.76815	306.24	Foundation	0	32	35.4953	52.9352	84.714	0	84.714
3	3.76815	557.219	Foundation	0	32	63.4402	94.6103	151.408	0	151.408
4	3.76815	1407.95	Foundation	0	32	157.524	234.92	375.95	0	375.95
5	3.76815	2289.07	Foundation	0	32	251.755	375.45	600.847	0	600.847
6	3.76815	3103.1	Foundation	0	32	335.568	500.442	800.875	0	800.875
7	3.76815	3849.65	Foundation	0	32	409.385	610.528	977.048	0	977.048
8	3.59915	4300.63	Embankment	50	33	519.904	775.348	1116.94	0	1116.94
9	3.59915	4834.06	Embankment	50	33	570.953	851.48	1234.17	0	1234.17
10	3.59915	5300.51	Embankment	50	33	612.762	913.83	1330.18	0	1330.18

11	3.59915	5698.24	Embankment	50	33	645.484	962.63	1405.33	0	1405.33
12	3.59915	6025.09	Embankment	50	33	669.223	998.033	1459.84	0	1459.84
13	3.59915	6278.41	Embankment	50	33	684.03	1020.11	1493.84	0	1493.84
14	3.59915	6454.98	Embankment	50	33	689.904	1028.88	1507.33	0	1507.33
15	3.59915	6550.89	Embankment	50	33	686.796	1024.24	1500.2	0	1500.2
16	3.59915	6561.44	Embankment	50	33	674.606	1006.06	1472.2	0	1472.2
17	3.59915	6480.88	Embankment	50	33	653.173	974.097	1422.98	0	1422.98
18	3.59915	6302.19	Embankment	50	33	622.283	928.029	1352.05	0	1352.05
19	3.59915	6016.71	Embankment	50	33	581.651	867.434	1258.74	0	1258.74
20	3.59915	5613.59	Embankment	50	33	530.922	791.78	1142.24	0	1142.24
21	3.59915	5079.02	Embankment	50	33	469.657	700.413	1001.55	0	1001.55
22	3.59915	4394.99	Embankment	50	33	397.325	592.542	835.441	0	835.441
23	3.59915	3537.38	Embankment	50	33	313.301	467.235	642.484	0	642.484
24	3.59915	2472.58	Embankment	50	33	216.87	323.425	421.036	0	421.036
25	3.59915	1042.8	Embankment	50	33	99.1359	147.844	150.667	0	150.667

Global Minimum Query (gle/morgenstern-price) - Safety Factor: 1.54545

Slice Number	Width [ft]	Weight [lbs]	Base Material	Base Cohesion [psf]	Base Friction Angle [degrees]	Shear Stress [psf]	Shear Strength [psf]	Base Normal Stress [psf]	Pore Pressure [psf]	Effective Normal Stress [psf]
1	3.33128	256.831	Embankment	50	33	62.7593	96.9913	72.3601	0	72.3601
2	3.33128	753.763	Embankment	50	33	125.58	194.078	221.861	0	221.861
3	3.33128	1217.05	Embankment	50	33	185.155	286.148	363.636	0	363.636
4	3.33128	1646.3	Embankment	50	33	240.325	371.411	494.93	0	494.93
5	3.33128	2041.04	Embankment	50	33	290.002	448.183	613.148	0	613.148
6	3.33128	2400.73	Embankment	50	33	333.272	515.055	716.123	0	716.123
7	3.33128	2724.75	Embankment	50	33	369.483	571.018	802.298	0	802.298
8	3.33128	3012.41	Embankment	50	33	398.29	615.538	870.854	0	870.854
9	3.33128	3262.92	Embankment	50	33	419.663	648.568	921.715	0	921.715
10	3.33128	3475.39	Embankment	50	33	433.859	670.508	955.499	0	955.499
11	3.33128	3648.83	Embankment	50	33	441.371	682.117	973.375	0	973.375
12	3.33128	3782.12	Embankment	50	33	442.853	684.407	976.9	0	976.9
13	3.33128	3874.02	Embankment	50	33	439.036	678.508	967.819	0	967.819
14	3.33128	3923.12	Embankment	50	33	430.653	665.552	947.868	0	947.868
15	3.33128	3927.85	Embankment	50	33	418.366	646.563	918.626	0	918.626
16	3.33128	3886.44	Embankment	50	33	402.716	622.378	881.384	0	881.384
17	3.33128	3796.92	Embankment	50	33	384.09	593.592	837.057	0	837.057
18	3.33128	3657.02	Embankment	50	33	362.698	560.531	786.149	0	786.149
19	3.33128	3464.21	Embankment	50	33	338.569	523.241	728.727	0	728.727
20	3.33128	3215.58	Embankment	50	33	311.546	481.478	664.417	0	664.417
21	3.33128	2907.81	Embankment	50	33	281.279	434.703	592.391	0	592.391
22	3.33128	2537.06	Embankment	50	33	247.208	382.048	511.309	0	511.309
23	3.33128	2098.9	Embankment	50	33	208.526	322.267	419.254	0	419.254
24	3.33128	1588.13	Embankment	50	33	164.134	253.661	313.609	0	313.609
25	3.33128	661.997	Embankment	50	33	82.2702	127.144	118.792	0	118.792

Interslice Data

Global Minimum Query (bishop simplified) - Safety Factor: 1.55029

Slice Number	X coordinate [ft]	Y coordinate - Bottom [ft]	Interslice Normal Force [lbs]	Interslice Shear Force [lbs]	Interslice Force Angle [degrees]
1	95	3230	0	0	0
2	98.3064	3230.48	165.141	0	0
3	101.613	3231.03	433.941	0	0
4	104.919	3231.67	777.257	0	0
5	108.226	3232.38	1168.34	0	0
6	111.532	3233.18	1582.79	0	0
7	114.838	3234.05	1998.48	0	0
8	118.145	3235.01	2395.56	0	0
9	121.451	3236.05	2756.45	0	0
10	124.758	3237.19	3065.84	0	0
11	128.064	3238.41	3310.76	0	0
12	131.37	3239.72	3480.59	0	0
13	134.677	3241.12	3567.23	0	0
14	137.983	3242.62	3565.12	0	0
15	141.29	3244.23	3471.47	0	0
16	144.596	3245.94	3286.41	0	0
17	147.902	3247.75	3013.26	0	0
18	151.209	3249.68	2658.8	0	0
19	154.515	3251.73	2233.63	0	0
20	157.822	3253.9	1752.66	0	0
21	161.128	3256.2	1235.6	0	0
22	164.434	3258.64	707.703	0	0
23	167.741	3261.23	200.606	0	0

24	171.047	3263.98	-246.608	0	0
25	174.354	3266.9	-586.022	0	0
26	177.66	3270	0	0	0

Global Minimum Query (janbu simplified) - Safety Factor: 1.49133

Slice Number	X coordinate [ft]	Y coordinate - Bottom [ft]	Interslice Normal Force [lbs]	Interslice Shear Force [lbs]	Interslice Force Angle [degrees]
1	85.7013	3230	0	0	0
2	89.4695	3229.48	67.1744	0	0
3	93.2376	3229.11	231.78	0	0
4	97.0058	3228.9	502.373	0	0
5	100.774	3228.85	1116.05	0	0
6	104.542	3228.94	2003.97	0	0
7	108.31	3229.2	3063.3	0	0
8	112.078	3229.61	4202.89	0	0
9	115.678	3230.15	5468.59	0	0
10	119.277	3230.84	6672.82	0	0
11	122.876	3231.68	7761.03	0	0
12	126.475	3232.67	8686.24	0	0
13	130.074	3233.82	9408.79	0	0
14	133.673	3235.14	9896.37	0	0
15	137.272	3236.64	10124.2	0	0
16	140.872	3238.31	10075.5	0	0
17	144.471	3240.19	9742.1	0	0
18	148.07	3242.27	9125.75	0	0
19	151.669	3244.58	8239.63	0	0
20	155.268	3247.14	7110.76	0	0
21	158.867	3249.97	5783.5	0	0
22	162.467	3253.12	4324.62	0	0
23	166.066	3256.61	2831.17	0	0
24	169.665	3260.53	1442.74	0	0
25	173.264	3264.95	362.068	0	0
26	176.863	3270	0	0	0

Global Minimum Query (gle/morgenstern-price) - Safety Factor: 1.54545

Slice Number	X coordinate [ft]	Y coordinate - Bottom [ft]	Interslice Normal Force [lbs]	Interslice Shear Force [lbs]	Interslice Force Angle [degrees]
1	95	3230	0	0	0
2	98.3313	3230.43	177.742	11.3442	3.65189
3	101.663	3230.94	482.273	61.0759	7.21762
4	104.994	3231.54	883.016	165.532	10.6176
5	108.325	3232.21	1348.83	330.903	13.7839
6	111.656	3232.97	1848.99	553.441	16.6635
7	114.988	3233.82	2354.27	820.69	19.2184
8	118.319	3234.75	2838.06	1113.58	21.4237
9	121.65	3235.77	3277.15	1409.05	23.2659
10	124.982	3236.88	3652.43	1682.93	24.7388
11	128.313	3238.08	3949.16	1912.63	25.8415
12	131.644	3239.37	4156.96	2079.38	26.575
13	134.975	3240.77	4269.56	2169.92	26.9411
14	138.307	3242.26	4284.36	2177.44	26.941
15	141.638	3243.86	4201.97	2101.89	26.5749
16	144.969	3245.57	4025.74	1949.71	25.8414
17	148.3	3247.4	3761.39	1733.14	24.7389
18	151.632	3249.33	3416.91	1469.14	23.2658
19	154.963	3251.4	3002.58	1178.13	21.4237
20	158.294	3253.59	2531.41	882.44	19.2184
21	161.626	3255.92	2019.8	604.568	16.6635
22	164.957	3258.4	1488.66	365.207	13.7839
23	168.288	3261.04	965.123	180.924	10.6176
24	171.619	3263.84	484.959	61.4161	7.21762
25	174.951	3266.82	96.1398	6.13604	3.6519
26	178.282	3270	0	0	0

List Of Coordinates

External Boundary

X	Y
0	3212
0	3192
350	3192
350	3212

350	3232
350	3267
350	3270
195	3270
175	3270
95	3230
56	3230
0	3243.5

Material Boundary

X	Y
95	3230
182.5	3228
309	3232
350	3232

Material Boundary

X	Y
204	3267
309	3232

Material Boundary

X	Y
0	3212
350	3212

Material Boundary

X	Y
204	3267
350	3267

Material Boundary

X	Y
195	3270
204	3267

Slide Analysis Information

2026 SAFETY FACTOR ASSESSMENT OF CCR SURFACE IMPOUNDMENTS AT CSES

Project Summary

File Name: 2.2 - 12 STEP EC DIKE - Downstream - Max Storage Pool - Seismic.slim
Slide Modeler Version: 6.02
Project Title: 2026 SAFETY FACTOR ASSESSMENT OF CCR SURFACE IMPOUNDMENTS AT CSES
Analysis: UNITS 1&2 STEP - E/C DIVIDER DIKE (SADDLE DAM) - MAXIMUM STORAGE POOL - SEISMIC ANALYSIS
Author: AWJ
Company: HYDROMETRICS, INC.
Date Created: 9/25/2026, 4:07:52 PM

General Settings

Units of Measurement: Imperial Units
Time Units: days
Permeability Units: feet/second
Failure Direction: Right to Left
Data Output: Standard
Maximum Material Properties: 20
Maximum Support Properties: 20

Analysis Options

Analysis Methods Used

Bishop simplified
GLE/Morgenstern-Price with interslice force function: Half Sine
Janbu simplified

Number of slices: 25
Tolerance: 0.005
Maximum number of iterations: 50
Check malpha < 0.2: Yes
Initial trial value of FS: 1
Steffensen Iteration: Yes

Groundwater Analysis

Groundwater Method: Water Surfaces
Pore Fluid Unit Weight: 62.4 lbs/ft3
Advanced Groundwater Method: None

Random Numbers

Pseudo-random Seed: 10116
Random Number Generation Method: Park and Miller v.3

Surface Options

Surface Type: Circular
Search Method: Grid Search
Radius Increment: 10
Composite Surfaces: Disabled
Reverse Curvature: Invalid Surfaces
Minimum Elevation: Not Defined
Minimum Depth: Not Defined

Loading

Seismic Load Coefficient (Horizontal): 0.03

Material Properties

Property	Embankment	Foundation	Paste	Bedrock
Color				
Strength Type	Mohr-Coulomb	Mohr-Coulomb	Mohr-Coulomb	Infinite strength
Unit Weight [lbs/ft3]	125	115	102	125
Cohesion [psf]	40	0	0	
Friction Angle [deg]	26.4	25.6	27.5	
Water Surface	None	None	None	None
Ru Value	0	0	0	0

Global Minimums

Method: bishop simplified

FS: 1.109310
Center: 75.626, 3376.812
Radius: 148.085
Left Slip Surface Endpoint: 95.000, 3230.000
Right Slip Surface Endpoint: 178.195, 3270.000
Resisting Moment=4.86238e+006 lb-ft
Driving Moment=4.38324e+006 lb-ft
Total Slice Area=519.403 ft2

Method: janbu simplified

FS: 1.063710
Center: 100.236, 3320.756
Radius: 91.913
Left Slip Surface Endpoint: 85.701, 3230.000
Right Slip Surface Endpoint: 176.863, 3270.000
Resisting Horizontal Force=44607.3 lb
Driving Horizontal Force=41935.4 lb
Total Slice Area=838.026 ft2

Method: gle/morgenstern-price

FS: 1.105110
Center: 78.360, 3369.976
Radius: 140.962
Left Slip Surface Endpoint: 95.000, 3230.000
Right Slip Surface Endpoint: 177.733, 3270.000
Resisting Moment=4.68318e+006 lb-ft
Driving Moment=4.23774e+006 lb-ft
Resisting Horizontal Force=29792 lb
Driving Horizontal Force=26958.3 lb
Total Slice Area=528.158 ft2

Slice Data

Global Minimum Query (bishop simplified) - Safety Factor: 1.10931

Slice Number	Width [ft]	Weight [lbs]	Base Material	Base Cohesion [psf]	Base Friction Angle [degrees]	Shear Stress [psf]	Shear Strength [psf]	Base Normal Stress [psf]	Pore Pressure [psf]	Effective Normal Stress [psf]
1	3.32778	246.723	Embankment	40	26.4	65.0581	72.1696	64.8053	0	64.8053
2	3.32778	724.048	Embankment	40	26.4	124.156	137.728	196.871	0	196.871
3	3.32778	1168.95	Embankment	40	26.4	178.081	197.547	317.376	0	317.376
4	3.32778	1581.02	Embankment	40	26.4	226.91	251.714	426.494	0	426.494
5	3.32778	1959.8	Embankment	40	26.4	270.714	300.306	524.384	0	524.384
6	3.32778	2304.78	Embankment	40	26.4	309.549	343.386	611.168	0	611.168
7	3.32778	2615.34	Embankment	40	26.4	343.465	381.009	686.96	0	686.96
8	3.32778	2890.83	Embankment	40	26.4	372.501	413.219	751.845	0	751.845
9	3.32778	3130.48	Embankment	40	26.4	396.688	440.05	805.895	0	805.895
10	3.32778	3333.47	Embankment	40	26.4	416.049	461.527	849.16	0	849.16
11	3.32778	3498.84	Embankment	40	26.4	430.596	477.665	881.671	0	881.671
12	3.32778	3625.55	Embankment	40	26.4	440.337	488.47	903.436	0	903.436
13	3.32778	3712.43	Embankment	40	26.4	445.267	493.939	914.456	0	914.456
14	3.32778	3758.18	Embankment	40	26.4	445.377	494.061	914.7	0	914.7
15	3.32778	3761.33	Embankment	40	26.4	440.647	488.814	904.13	0	904.13
16	3.32778	3720.26	Embankment	40	26.4	431.048	478.166	882.681	0	882.681
17	3.32778	3633.15	Embankment	40	26.4	416.546	462.079	850.274	0	850.274
18	3.32778	3497.93	Embankment	40	26.4	397.096	440.503	806.809	0	806.809
19	3.32778	3312.29	Embankment	40	26.4	372.645	413.379	752.168	0	752.168
20	3.32778	3073.6	Embankment	40	26.4	343.131	380.639	686.212	0	686.212
21	3.32778	2778.88	Embankment	40	26.4	308.483	342.203	608.783	0	608.783
22	3.32778	2424.71	Embankment	40	26.4	268.621	297.984	519.706	0	519.706
23	3.32778	2007.16	Embankment	40	26.4	223.461	247.887	418.786	0	418.786
24	3.32778	1521.65	Embankment	40	26.4	172.905	191.805	305.811	0	305.811
25	3.32778	643.95	Embankment	40	26.4	86.583	96.0474	112.907	0	112.907

Global Minimum Query (janbu simplified) - Safety Factor: 1.06371

Slice Number	Width [ft]	Weight [lbs]	Base Material	Base Cohesion [psf]	Base Friction Angle [degrees]	Shear Stress [psf]	Shear Strength [psf]	Base Normal Stress [psf]	Pore Pressure [psf]	Effective Normal Stress [psf]
1	3.76815	113.476	Foundation	0	25.6	14.4662	15.3878	32.117	0	32.117
2	3.76815	306.24	Foundation	0	25.6	38.2735	40.7119	84.9723	0	84.9723
3	3.76815	557.219	Foundation	0	25.6	68.3148	72.6671	151.668	0	151.668
4	3.76815	1407.95	Foundation	0	25.6	169.412	180.205	376.117	0	376.117
5	3.76815	2289.07	Foundation	0	25.6	270.423	287.652	600.377	0	600.377
6	3.76815	3103.1	Foundation	0	25.6	360.023	382.96	799.299	0	799.299

7	3.76815	3849.65	Foundation	0	25.6	438.713	466.663	974.001	0	974.001
8	3.59915	4300.63	Embankment	40	26.4	556.413	591.862	1111.72	0	1111.72
9	3.59915	4834.06	Embankment	40	26.4	610.226	649.104	1227.03	0	1227.03
10	3.59915	5300.51	Embankment	40	26.4	654.094	695.766	1321.03	0	1321.03
11	3.59915	5698.24	Embankment	40	26.4	688.207	732.053	1394.13	0	1394.13
12	3.59915	6025.09	Embankment	40	26.4	712.704	758.11	1446.62	0	1446.62
13	3.59915	6278.41	Embankment	40	26.4	727.662	774.021	1478.68	0	1478.68
14	3.59915	6454.98	Embankment	40	26.4	733.107	779.813	1490.34	0	1490.34
15	3.59915	6550.89	Embankment	40	26.4	729.013	775.458	1481.57	0	1481.57
16	3.59915	6561.44	Embankment	40	26.4	715.295	760.866	1452.17	0	1452.17
17	3.59915	6480.88	Embankment	40	26.4	691.814	735.89	1401.86	0	1401.86
18	3.59915	6302.19	Embankment	40	26.4	658.371	700.316	1330.2	0	1330.2
19	3.59915	6016.71	Embankment	40	26.4	614.696	653.858	1236.61	0	1236.61
20	3.59915	5613.59	Embankment	40	26.4	560.45	596.156	1120.37	0	1120.37
21	3.59915	5079.02	Embankment	40	26.4	495.212	526.762	980.577	0	980.577
22	3.59915	4394.99	Embankment	40	26.4	418.478	445.139	816.147	0	816.147
23	3.59915	3537.38	Embankment	40	26.4	329.654	350.656	625.813	0	625.813
24	3.59915	2472.58	Embankment	40	26.4	228.076	242.607	408.148	0	408.148
25	3.59915	1042.8	Embankment	40	26.4	104.569	111.231	143.493	0	143.493

Global Minimum Query (gle/morgenstern-price) - Safety Factor: 1.10511

Slice Number	Width [ft]	Weight [lbs]	Base Material	Base Cohesion [psf]	Base Friction Angle [degrees]	Shear Stress [psf]	Shear Strength [psf]	Base Normal Stress [psf]	Pore Pressure [psf]	Effective Normal Stress [psf]
1	3.30933	252.642	Embankment	40	26.4	68.1709	75.3363	71.1844	0	71.1844
2	3.30933	741.358	Embankment	40	26.4	134.677	148.833	219.244	0	219.244
3	3.30933	1196.76	Embankment	40	26.4	197.699	218.479	359.544	0	359.544
4	3.30933	1618.43	Embankment	40	26.4	255.956	282.86	489.237	0	489.237
5	3.30933	2005.93	Embankment	40	26.4	308.244	340.643	605.641	0	605.641
6	3.30933	2358.69	Embankment	40	26.4	353.559	390.722	706.524	0	706.524
7	3.30933	2676.11	Embankment	40	26.4	391.194	432.312	790.307	0	790.307
8	3.30933	2957.49	Embankment	40	26.4	420.786	465.015	856.187	0	856.187
9	3.30933	3202.04	Embankment	40	26.4	442.334	488.828	904.156	0	904.156
10	3.30933	3408.87	Embankment	40	26.4	456.158	504.105	934.932	0	934.932
11	3.30933	3576.98	Embankment	40	26.4	462.842	511.491	949.812	0	949.812
12	3.30933	3705.26	Embankment	40	26.4	463.143	511.824	950.482	0	950.482
13	3.30933	3792.47	Embankment	40	26.4	457.903	506.033	938.818	0	938.818
14	3.30933	3837.18	Embankment	40	26.4	447.953	495.037	916.666	0	916.666
15	3.30933	3837.83	Embankment	40	26.4	434.036	479.657	885.683	0	885.683
16	3.30933	3792.65	Embankment	40	26.4	416.749	460.554	847.201	0	847.201
17	3.30933	3699.64	Embankment	40	26.4	396.508	438.185	802.14	0	802.14
18	3.30933	3556.54	Embankment	40	26.4	373.525	412.786	750.973	0	750.973
19	3.30933	3360.79	Embankment	40	26.4	347.802	384.36	693.708	0	693.708
20	3.30933	3109.47	Embankment	40	26.4	319.14	352.685	629.9	0	629.9
21	3.30933	2799.24	Embankment	40	26.4	287.122	317.301	558.619	0	558.619
22	3.30933	2426.22	Embankment	40	26.4	251.104	277.497	478.436	0	478.436
23	3.30933	1985.94	Embankment	40	26.4	210.183	232.275	387.335	0	387.335
24	3.30933	1473.14	Embankment	40	26.4	163.141	180.289	282.609	0	282.609
25	3.30933	648.16	Embankment	40	26.4	86.2658	95.3332	111.468	0	111.468

Interslice Data

Global Minimum Query (bishop simplified) - Safety Factor: 1.10931

Slice Number	X coordinate [ft]	Y coordinate - Bottom [ft]	Interslice Normal Force [lbs]	Interslice Shear Force [lbs]	Interslice Force Angle [degrees]
1	95	3230	0	0	0
2	98.3278	3230.48	178.078	0	0
3	101.656	3231.03	460.103	0	0
4	104.983	3231.67	816.395	0	0
5	108.311	3232.38	1219.76	0	0
6	111.639	3233.17	1645.42	0	0
7	114.967	3234.05	2070.97	0	0
8	118.294	3235.01	2476.33	0	0
9	121.622	3236.05	2843.75	0	0
10	124.95	3237.18	3157.81	0	0
11	128.278	3238.4	3405.48	0	0
12	131.606	3239.72	3576.14	0	0
13	134.933	3241.12	3661.67	0	0
14	138.261	3242.63	3656.58	0	0
15	141.589	3244.23	3558.15	0	0
16	144.917	3245.94	3366.61	0	0
17	148.245	3247.76	3085.34	0	0
18	151.572	3249.69	2721.22	0	0
19	154.9	3251.73	2284.92	0	0

20	158.228	3253.91	1791.36	0	0
21	161.556	3256.21	1260.24	0	0
22	164.883	3258.65	716.68	0	0
23	168.211	3261.24	192.077	0	0
24	171.539	3263.99	-274.895	0	0
25	174.867	3266.9	-636.97	0	0
26	178.195	3270	0	0	0

Global Minimum Query (janbu simplified) - Safety Factor: 1.06371

Slice Number	X coordinate [ft]	Y coordinate - Bottom [ft]	Interslice Normal Force [lbs]	Interslice Shear Force [lbs]	Interslice Force Angle [degrees]
1	85.7013	3230	0	0	0
2	89.4695	3229.48	67.7014	0	0
3	93.2376	3229.11	233.232	0	0
4	97.0058	3228.9	504.726	0	0
5	100.774	3228.85	1118.97	0	0
6	104.542	3228.94	2005.43	0	0
7	108.31	3229.2	3059.98	0	0
8	112.078	3229.61	4190.69	0	0
9	115.678	3230.15	5455.34	0	0
10	119.277	3230.84	6653.96	0	0
11	122.876	3231.68	7732.25	0	0
12	126.475	3232.67	8643.67	0	0
13	130.074	3233.82	9349.22	0	0
14	133.673	3235.14	9817.35	0	0
15	137.272	3236.64	10024.2	0	0
16	140.872	3238.31	9954.01	0	0
17	144.471	3240.19	9599.74	0	0
18	148.07	3242.27	8964.31	0	0
19	151.669	3244.58	8062.12	0	0
20	155.268	3247.14	6921.42	0	0
21	158.867	3249.97	5587.72	0	0
22	162.467	3253.12	4128.83	0	0
23	166.066	3256.61	2642.46	0	0
24	169.665	3260.53	1268.35	0	0
25	173.264	3264.95	208.235	0	0
26	176.863	3270	0	0	0

Global Minimum Query (gle/morgenstern-price) - Safety Factor: 1.10511

Slice Number	X coordinate [ft]	Y coordinate - Bottom [ft]	Interslice Normal Force [lbs]	Interslice Shear Force [lbs]	Interslice Force Angle [degrees]
1	95	3230	0	0	0
2	98.3093	3230.43	187.241	12.4799	3.81321
3	101.619	3230.95	498.27	65.8972	7.53376
4	104.928	3231.54	903.115	176.8	11.0765
5	108.237	3232.22	1370.94	351.227	14.3698
6	111.547	3232.98	1871.08	584.863	17.3582
7	114.856	3233.82	2374.2	864.299	20.0034
8	118.165	3234.75	2853.49	1169.23	22.2816
9	121.475	3235.77	3285.64	1475.28	24.1805
10	124.784	3236.88	3651.51	1757.04	25.696
11	128.093	3238.08	3936.5	1990.95	26.8288
12	131.403	3239.37	4130.61	2157.73	27.5815
13	134.712	3240.77	4228.12	2244.05	27.9569
14	138.021	3242.26	4227.18	2243.56	27.957
15	141.331	3243.86	4129.28	2157.03	27.5814
16	144.64	3245.57	3938.69	1992.06	26.8288
17	147.949	3247.39	3662.16	1762.17	25.6961
18	151.259	3249.33	3308.65	1485.62	24.1806
19	154.568	3251.39	2889.44	1183.96	22.2816
20	157.877	3253.58	2418.49	880.425	20.0035
21	161.187	3255.91	1913.16	598.018	17.3583
22	164.496	3258.39	1395.34	357.478	14.3698
23	167.805	3261.03	893.177	174.854	11.0765
24	171.115	3263.83	443.55	58.6604	7.53376
25	174.424	3266.82	95.6766	6.37699	3.81321
26	177.733	3270	0	0	0

List Of Coordinates

External Boundary

X	Y

0	3212
0	3192
350	3192
350	3212
350	3232
350	3267
204	3267
195	3270
175	3270
95	3230
56	3230
0	3243.5

Material Boundary

X	Y
95	3230
182.5	3228
309	3232
350	3232

Material Boundary

X	Y
204	3267
309	3232

Material Boundary

X	Y
0	3212
350	3212

Slide Analysis Information

2026 SAFETY FACTOR ASSESSMENT OF CCR SURFACE IMPOUNDMENTS AT CSES

Project Summary

File Name: 3.0 - 12 BAP DIKE A - Downstream - Max Normal Pool - Static.slim
Slide Modeler Version: 6.02
Project Title: 2026 SAFETY FACTOR ASSESSMENT OF CCR SURFACE IMPOUNDMENTS AT CSES
Analysis: UNITS 1&2 BOTTOM ASH POND (BAP) DIKE (SECTION A) - MAXIMUM STORAGE POOL - STATIC ANALYSIS
Author: AWJ
Company: HYDROMETRICS, INC.
Date Created: 9/25/2026, 4:07:52 PM

General Settings

Units of Measurement: Imperial Units
Time Units: days
Permeability Units: feet/second
Failure Direction: Right to Left
Data Output: Standard
Maximum Material Properties: 20
Maximum Support Properties: 20

Analysis Options

Analysis Methods Used

Bishop simplified
GLE/Morgenstern-Price with interslice force function: Half Sine
Janbu simplified

Number of slices: 25
Tolerance: 0.005
Maximum number of iterations: 50
Check malpha < 0.2: Yes
Initial trial value of FS: 1
Steffensen Iteration: Yes

Groundwater Analysis

Groundwater Method: Water Surfaces
Pore Fluid Unit Weight: 62.4 lbs/ft3
Advanced Groundwater Method: None

Random Numbers

Pseudo-random Seed: 10116
Random Number Generation Method: Park and Miller v.3

Surface Options

Surface Type: Circular
Search Method: Grid Search
Radius Increment: 10
Composite Surfaces: Disabled
Reverse Curvature: Invalid Surfaces
Minimum Elevation: Not Defined
Minimum Depth: Not Defined

Material Properties

Property	Embankment Fill	Central Core	Foundation	Waste - Fly Ash	Bedrock
Color					
Strength Type	Mohr-Coulomb	Mohr-Coulomb	Mohr-Coulomb	Mohr-Coulomb	Infinite strength
Unsaturated Unit Weight [lbs/ft3]	120	127	118.2		
Saturated Unit Weight [lbs/ft3]	126.8	140.4	123.8		
Cohesion [psf]	204.2	0	107.8	0	
Friction Angle [deg]	31.5	33.5	29.2	32	
Water Surface	Water Table	Water Table	Water Table	Water Table	None
Hu Value	1	1	1	0	
Ru Value					0

Global Minimums

Method: bishop simplified

FS: 1.964480
Center: 56.873, 3298.580
Radius: 61.540
Left Slip Surface Endpoint: 40.551, 3239.244
Right Slip Surface Endpoint: 108.444, 3265.000
Resisting Moment=3.20975e+006 lb-ft
Driving Moment=1.63389e+006 lb-ft
Total Slice Area=594.107 ft2

Method: janbu simplified

FS: 1.781470
Center: 60.811, 3285.191
Radius: 49.641
Left Slip Surface Endpoint: 41.781, 3239.342
Right Slip Surface Endpoint: 106.161, 3265.000
Resisting Horizontal Force=49535.2 lb
Driving Horizontal Force=27805.9 lb
Total Slice Area=663.639 ft2

Method: gle/morgenstern-price

FS: 1.952300
Center: 56.873, 3298.580
Radius: 61.540
Left Slip Surface Endpoint: 40.551, 3239.244
Right Slip Surface Endpoint: 108.444, 3265.000
Resisting Moment=3.18984e+006 lb-ft
Driving Moment=1.63389e+006 lb-ft
Resisting Horizontal Force=46594 lb
Driving Horizontal Force=23866.2 lb
Total Slice Area=594.107 ft2

Slice Data

Global Minimum Query (bishop simplified) - Safety Factor: 1.96448

Slice Number	Width [ft]	Weight [lbs]	Base Material	Base Cohesion [psf]	Base Friction Angle [degrees]	Shear Stress [psf]	Shear Strength [psf]	Base Normal Stress [psf]	Pore Pressure [psf]	Effective Normal Stress [psf]
1	2.65938	138.454	Foundation	107.8	29.2	75.0443	147.423	70.8971	0	70.8971
2	2.65938	395.865	Foundation	107.8	29.2	103.225	202.784	169.954	0	169.954
3	2.65938	614.804	Foundation	107.8	29.2	126.362	248.235	251.28	0	251.28
4	2.65938	832.04	Foundation	107.8	29.2	148.735	292.186	329.919	0	329.919
5	2.65938	1280.6	Foundation	107.8	29.2	195.818	384.681	495.42	0	495.42
6	2.65938	1747.61	Foundation	107.8	29.2	243.739	478.821	663.862	0	663.862
7	2.65938	2178.42	Foundation	107.8	29.2	286.64	563.098	814.659	0	814.659
8	2.65938	2573.05	Foundation	107.8	29.2	324.689	637.845	948.405	0	948.405
9	2.65938	2931.32	Foundation	107.8	29.2	358.015	703.314	1065.55	0	1065.55
10	2.65938	3252.86	Foundation	107.8	29.2	386.713	759.69	1166.42	0	1166.42
11	2.902	3869.95	Embankment Fill	204.2	31.5	490.279	963.143	1238.48	0	1238.48
12	2.902	4153.5	Embankment Fill	204.2	31.5	511.412	1004.66	1306.23	0	1306.23
13	2.902	4384.96	Embankment Fill	204.2	31.5	526.53	1034.36	1354.69	0	1354.69
14	2.902	4562.2	Embankment Fill	204.2	31.5	535.592	1052.16	1383.74	0	1383.74
15	2.902	4682.52	Embankment Fill	204.2	31.5	538.503	1057.88	1393.08	0	1393.08
16	2.902	4742.51	Embankment Fill	204.2	31.5	535.118	1051.23	1382.22	0	1382.22
17	2.902	4737.88	Embankment Fill	204.2	31.5	525.223	1031.79	1350.51	0	1350.51
18	2.902	4663.22	Embankment Fill	204.2	31.5	508.536	999.008	1297.01	0	1297.01
19	2.902	4511.57	Embankment Fill	204.2	31.5	484.68	952.144	1220.53	0	1220.53
20	2.902	4273.9	Embankment Fill	204.2	31.5	453.171	890.245	1119.52	0	1119.52
21	2.9035	4012.34	Central Core	0	33.5	358.82	704.895	1064.98	0	1064.98
22	2.9035	3540.35	Central Core	0	33.5	306.82	602.741	910.642	0	910.642
23	2.9035	2417.3	Central Core	0	33.5	201.83	396.491	599.033	0	599.033
24	2.9035	1072.84	Central Core	0	33.5	85.5366	168.035	253.874	0	253.874
25	0.665135	39.9081	Embankment Fill	204.2	31.5	83.5303	164.094	-65.4477	0	-65.4477

Global Minimum Query (janbu simplified) - Safety Factor: 1.78147

Slice Number	Width [ft]	Weight [lbs]	Base Material	Base Cohesion [psf]	Base Friction Angle [degrees]	Shear Stress [psf]	Shear Strength [psf]	Base Normal Stress [psf]	Pore Pressure [psf]	Effective Normal Stress [psf]
1	2.77396	209.393	Foundation	107.8	29.2	95.6262	170.355	111.929	0	111.929
2	2.77396	598.011	Foundation	107.8	29.2	142.178	253.286	260.317	0	260.317
3	2.77396	928.185	Foundation	107.8	29.2	179.677	320.089	379.846	0	379.846
4	2.77396	1411.68	Foundation	107.8	29.2	234.245	417.3	553.784	0	553.784
5	2.77396	2022.52	Foundation	107.8	29.2	301.875	537.782	769.363	0	769.363
6	2.77396	2581.06	Foundation	107.8	29.2	361.069	643.234	958.045	0	958.045
7	2.77396	3088.23	Foundation	107.8	29.2	412.384	734.65	1121.62	0	1121.62
8	2.77396	3544.44	Foundation	107.8	29.2	456.238	812.774	1261.4	0	1261.4
9	2.77396	3949.63	Foundation	107.8	29.2	492.933	878.146	1378.37	0	1378.37

10	2.77396	4306.39	Foundation	107.8	29.2	523.016	931.738	1474.26	0	1474.26
11	2.62699	4358.56	Embankment Fill	204.2	31.5	639.876	1139.92	1526.96	0	1526.96
12	2.62699	4578.07	Embankment Fill	204.2	31.5	654.624	1166.19	1569.83	0	1569.83
13	2.62699	4749	Embankment Fill	204.2	31.5	662.593	1180.39	1593	0	1593
14	2.62699	4868.89	Embankment Fill	204.2	31.5	663.696	1182.35	1596.2	0	1596.2
15	2.62699	4934.59	Embankment Fill	204.2	31.5	657.762	1171.78	1578.96	0	1578.96
16	2.62699	4941.96	Embankment Fill	204.2	31.5	644.537	1148.22	1540.51	0	1540.51
17	2.62699	4885.67	Embankment Fill	204.2	31.5	623.653	1111.02	1479.8	0	1479.8
18	2.62699	4758.65	Embankment Fill	204.2	31.5	594.616	1059.29	1395.38	0	1395.38
19	2.62699	4551.44	Embankment Fill	204.2	31.5	556.751	991.836	1285.31	0	1285.31
20	2.62699	4250.89	Embankment Fill	204.2	31.5	509.148	907.032	1146.92	0	1146.92
21	2.47796	3683.44	Central Core	0	33.5	395.156	703.958	1063.57	0	1063.57
22	2.47796	3269.15	Central Core	0	33.5	334.788	596.414	901.082	0	901.082
23	2.47796	2327.11	Central Core	0	33.5	224.47	399.887	604.165	0	604.165
24	2.47796	1021.83	Central Core	0	33.5	90.5735	161.354	243.779	0	243.779
25	0.458577	27.5146	Embankment Fill	204.2	31.5	77.2302	137.583	-108.709	0	-108.709

Global Minimum Query (gle/morgenstern-price) - Safety Factor: 1.9523

Slice Number	Width [ft]	Weight [lbs]	Base Material	Base Cohesion [psf]	Base Friction Angle [degrees]	Shear Stress [psf]	Shear Strength [psf]	Base Normal Stress [psf]	Pore Pressure [psf]	Effective Normal Stress [psf]
1	2.65938	138.454	Foundation	107.8	29.2	77.3159	150.944	77.1968	0	77.1968
2	2.65938	395.865	Foundation	107.8	29.2	111.015	216.735	194.917	0	194.917
3	2.65938	614.804	Foundation	107.8	29.2	141.215	275.695	300.413	0	300.413
4	2.65938	832.04	Foundation	107.8	29.2	171.226	334.285	405.248	0	405.248
5	2.65938	1280.6	Foundation	107.8	29.2	228.563	446.223	605.537	0	605.537
6	2.65938	1747.61	Foundation	107.8	29.2	286.18	558.709	806.808	0	806.808
7	2.65938	2178.42	Foundation	107.8	29.2	336.035	656.041	980.963	0	980.963
8	2.65938	2573.05	Foundation	107.8	29.2	377.192	736.391	1124.73	0	1124.73
9	2.65938	2931.32	Foundation	107.8	29.2	409.28	799.038	1236.83	0	1236.83
10	2.65938	3252.86	Foundation	107.8	29.2	432.475	844.32	1317.85	0	1317.85
11	2.902	3869.95	Embankment Fill	204.2	31.5	542.422	1058.97	1394.86	0	1394.86
12	2.902	4153.5	Embankment Fill	204.2	31.5	549.246	1072.29	1416.6	0	1416.6
13	2.902	4384.96	Embankment Fill	204.2	31.5	547.436	1068.76	1410.83	0	1410.83
14	2.902	4562.2	Embankment Fill	204.2	31.5	538.773	1051.85	1383.24	0	1383.24
15	2.902	4682.52	Embankment Fill	204.2	31.5	524.877	1024.72	1338.96	0	1338.96
16	2.902	4742.51	Embankment Fill	204.2	31.5	507.038	989.891	1282.13	0	1282.13
17	2.902	4737.88	Embankment Fill	204.2	31.5	486.124	949.06	1215.5	0	1215.5
18	2.902	4663.22	Embankment Fill	204.2	31.5	462.544	903.024	1140.38	0	1140.38
19	2.902	4511.57	Embankment Fill	204.2	31.5	436.257	851.705	1056.63	0	1056.63
20	2.902	4273.9	Embankment Fill	204.2	31.5	406.796	794.187	962.772	0	962.772
21	2.9035	4012.34	Central Core	0	33.5	309.753	604.73	913.647	0	913.647
22	2.9035	3540.35	Central Core	0	33.5	271.158	529.382	799.809	0	799.809
23	2.9035	2417.3	Central Core	0	33.5	184.225	359.662	543.389	0	543.389
24	2.9035	1072.84	Central Core	0	33.5	82.0089	160.106	241.894	0	241.894
25	0.665135	39.9081	Embankment Fill	204.2	31.5	84.471	164.913	-64.1108	0	-64.1108

Interslice Data

Global Minimum Query (bishop simplified) - Safety Factor: 1.96448

Slice Number	X coordinate [ft]	Y coordinate - Bottom [ft]	Interslice Normal Force [lbs]	Interslice Shear Force [lbs]	Interslice Force Angle [degrees]
1	40.5511	3239.24	0	0	0
2	43.2105	3238.58	246.726	0	0
3	45.8698	3238.03	613.419	0	0
4	48.5292	3237.61	1055.49	0	0
5	51.1886	3237.3	1551.28	0	0
6	53.848	3237.11	2164.96	0	0
7	56.5074	3237.04	2861.12	0	0
8	59.1667	3237.08	3588.62	0	0
9	61.8261	3237.24	4302.37	0	0
10	64.4855	3237.51	4962.55	0	0
11	67.1449	3237.9	5534.17	0	0
12	70.0469	3238.47	6257.81	0	0
13	72.9489	3239.18	6812.62	0	0
14	75.8509	3240.04	7170.55	0	0
15	78.7529	3241.06	7309.5	0	0
16	81.6549	3242.25	7213.62	0	0
17	84.5569	3243.62	6873.87	0	0
18	87.4589	3245.18	6288.98	0	0
19	90.3609	3246.95	5467.03	0	0
20	93.2629	3248.95	4427.77	0	0
21	96.1649	3251.22	3206.42	0	0
22	99.0684	3253.78	1513.09	0	0

23	101.972	3256.71	-260.138	0	0
24	104.875	3260.07	-1689.26	0	0
25	107.779	3264	-2438.68	0	0
26	108.444	3265	0	0	0

Global Minimum Query (janbu simplified) - Safety Factor: 1.78147

Slice Number	X coordinate [ft]	Y coordinate - Bottom [ft]	Interslice Normal Force [lbs]	Interslice Shear Force [lbs]	Interslice Force Angle [degrees]
1	41.7807	3239.34	0	0	0
2	44.5547	3238.29	383.852	0	0
3	47.3286	3237.42	1005.76	0	0
4	50.1026	3236.72	1769.88	0	0
5	52.8765	3236.19	2714.62	0	0
6	55.6505	3235.82	3837.58	0	0
7	58.4245	3235.61	5043.62	0	0
8	61.1984	3235.55	6252.26	0	0
9	63.9724	3235.65	7394.88	0	0
10	66.7464	3235.91	8412.72	0	0
11	69.5203	3236.32	9255.96	0	0
12	72.1473	3236.86	10112.6	0	0
13	74.7743	3237.55	10748.2	0	0
14	77.4013	3238.4	11137.7	0	0
15	80.0283	3239.42	11262.1	0	0
16	82.6552	3240.61	11108	0	0
17	85.2822	3242	10668.6	0	0
18	87.9092	3243.6	9945.27	0	0
19	90.5362	3245.43	8949.61	0	0
20	93.1632	3247.54	7707.02	0	0
21	95.7902	3249.97	6263.17	0	0
22	98.2681	3252.61	4428.4	0	0
23	100.746	3255.7	2475.11	0	0
24	103.224	3259.4	802.242	0	0
25	105.702	3264	-95.3374	0	0
26	106.161	3265	0	0	0

Global Minimum Query (gle/morgenstern-price) - Safety Factor: 1.9523

Slice Number	X coordinate [ft]	Y coordinate - Bottom [ft]	Interslice Normal Force [lbs]	Interslice Shear Force [lbs]	Interslice Force Angle [degrees]
1	40.5511	3239.24	0	0	0
2	43.2105	3238.58	256.932	15.2278	3.39183
3	45.8698	3238.03	657.847	77.3885	6.70938
4	48.5292	3237.61	1160.11	202.127	9.88348
5	51.1886	3237.3	1738.55	396.718	12.8542
6	53.848	3237.11	2459.88	685.556	15.5729
7	56.5074	3237.04	3279.12	1065.67	18.0035
8	59.1667	3237.08	4130.75	1513.35	20.1209
9	61.8261	3237.24	4956.11	1993.33	21.9098
10	64.4855	3237.51	5705.52	2464.5	23.3619
11	67.1449	3237.9	6339.34	2885.47	24.4735
12	70.0469	3238.47	7125.75	3367.94	25.2975
13	72.9489	3239.18	7711.56	3713.95	25.7158
14	75.8509	3240.04	8081.37	3894.42	25.7295
15	78.7529	3241.06	8229.78	3896.94	25.3383
16	81.6549	3242.25	8158.48	3725.22	24.5418
17	84.5569	3243.62	7873.99	3397.45	23.3391
18	87.4589	3245.18	7386.17	2943.96	21.7311
19	90.3609	3246.95	6707.93	2404.8	19.7228
20	93.2629	3248.95	5856.3	1827	17.3264
21	96.1649	3251.22	4855.24	1261.51	14.5648
22	99.0684	3253.78	3407.93	691.698	11.4733
23	101.972	3256.71	1855.25	264.286	8.10741
24	104.875	3260.07	562.089	44.6135	4.5381
25	107.779	3264	-150.532	-2.23669	0.851271
26	108.444	3265	0	0	0

List Of Coordinates

Water Table

X	Y
0	3220
250	3220

External Boundary

X	Y
0	3190
250	3190
250	3216
250	3234
250	3241.17
250	3262
129	3262
120	3265
100	3265
50	3240
0	3236
0	3234
-6.93889e-018	3216

Material Boundary

X	Y
50	3240
67	3238
88	3224
100	3216
120	3216
132	3224
135	3226
176	3237
198	3239
206	3239
209	3240
250	3241.17

Material Boundary

X	Y
88	3224
100	3264
120	3264
132	3224

Material Boundary

X	Y
129	3262
198	3239

Material Boundary

X	Y
-6.93889e-018	3216
100	3216

Material Boundary

X	Y
120	3216
250	3216

Slide Analysis Information

2026 SAFETY FACTOR ASSESSMENT OF CCR SURFACE IMPOUNDMENTS AT CSES

Project Summary

File Name: 3.1 - 12 BAP DIKE A - Downstream - Max Surcharge Pool - Static.slim
Slide Modeler Version: 6.02
Project Title: 2026 SAFETY FACTOR ASSESSMENT OF CCR SURFACE IMPOUNDMENTS AT CSES
Analysis: UNITS 1&2 BOTTOM ASH POND (BAP) DIKE (SECTION A) - MAXIMUM SURCHARGE POOL - STATIC ANALYSIS
Author: AWJ
Company: HYDROMETRICS, INC.
Date Created: 9/25/2026, 4:07:52 PM

General Settings

Units of Measurement: Imperial Units
Time Units: days
Permeability Units: feet/second
Failure Direction: Right to Left
Data Output: Standard
Maximum Material Properties: 20
Maximum Support Properties: 20

Analysis Options

Analysis Methods Used

Bishop simplified
GLE/Morgenstern-Price with interslice force function: Half Sine
Janbu simplified

Number of slices: 25
Tolerance: 0.005
Maximum number of iterations: 50
Check malpha < 0.2: Yes
Initial trial value of FS: 1
Steffensen Iteration: Yes

Groundwater Analysis

Groundwater Method: Water Surfaces
Pore Fluid Unit Weight: 62.4 lbs/ft3
Advanced Groundwater Method: None

Random Numbers

Pseudo-random Seed: 10116
Random Number Generation Method: Park and Miller v.3

Surface Options

Surface Type: Circular
Search Method: Grid Search
Radius Increment: 10
Composite Surfaces: Disabled
Reverse Curvature: Invalid Surfaces
Minimum Elevation: Not Defined
Minimum Depth: Not Defined

Material Properties

Property	Embankment Fill	Central Core	Foundation	Waste - Fly Ash	Bedrock	Water
Color						
Strength Type	Mohr-Coulomb	Mohr-Coulomb	Mohr-Coulomb	Mohr-Coulomb	Infinite strength	No strength
Unsaturated Unit Weight [lbs/ft3]	120	127	118.2			
Saturated Unit Weight [lbs/ft3]	126.8	140.4	123.8			
Cohesion [psf]	204.2	0	107.8	0		
Friction Angle [deg]	31.5	33.5	29.2	32		
Water Surface	Water Table	Water Table	Water Table	Water Table	None	None
Hu Value	1	1	1	0		
Ru Value					0	0

Global Minimums

Method: bishop simplified

FS: 1.964480
Center: 56.873, 3298.580
Radius: 61.540
Left Slip Surface Endpoint: 40.551, 3239.244
Right Slip Surface Endpoint: 108.444, 3265.000
Resisting Moment=3.20975e+006 lb-ft
Driving Moment=1.63389e+006 lb-ft
Total Slice Area=594.107 ft2

Method: janbu simplified

FS: 1.781470
Center: 60.811, 3285.191
Radius: 49.641
Left Slip Surface Endpoint: 41.781, 3239.342
Right Slip Surface Endpoint: 106.161, 3265.000
Resisting Horizontal Force=49535.2 lb
Driving Horizontal Force=27805.9 lb
Total Slice Area=663.639 ft2

Method: gle/morgenstern-price

FS: 1.952300
Center: 56.873, 3298.580
Radius: 61.540
Left Slip Surface Endpoint: 40.551, 3239.244
Right Slip Surface Endpoint: 108.444, 3265.000
Resisting Moment=3.18984e+006 lb-ft
Driving Moment=1.63389e+006 lb-ft
Resisting Horizontal Force=46594 lb
Driving Horizontal Force=23866.2 lb
Total Slice Area=594.107 ft2

Slice Data

Global Minimum Query (bishop simplified) - Safety Factor: 1.96448

Slice Number	Width [ft]	Weight [lbs]	Base Material	Base Cohesion [psf]	Base Friction Angle [degrees]	Shear Stress [psf]	Shear Strength [psf]	Base Normal Stress [psf]	Pore Pressure [psf]	Effective Normal Stress [psf]
1	2.65938	138.454	Foundation	107.8	29.2	75.0443	147.423	70.8971	0	70.8971
2	2.65938	395.865	Foundation	107.8	29.2	103.225	202.784	169.954	0	169.954
3	2.65938	614.804	Foundation	107.8	29.2	126.362	248.235	251.28	0	251.28
4	2.65938	832.04	Foundation	107.8	29.2	148.735	292.186	329.919	0	329.919
5	2.65938	1280.6	Foundation	107.8	29.2	195.818	384.681	495.42	0	495.42
6	2.65938	1747.61	Foundation	107.8	29.2	243.739	478.821	663.862	0	663.862
7	2.65938	2178.42	Foundation	107.8	29.2	286.64	563.098	814.659	0	814.659
8	2.65938	2573.05	Foundation	107.8	29.2	324.689	637.845	948.405	0	948.405
9	2.65938	2931.32	Foundation	107.8	29.2	358.015	703.314	1065.55	0	1065.55
10	2.65938	3252.86	Foundation	107.8	29.2	386.713	759.69	1166.42	0	1166.42
11	2.902	3869.95	Embankment Fill	204.2	31.5	490.279	963.143	1238.48	0	1238.48
12	2.902	4153.5	Embankment Fill	204.2	31.5	511.412	1004.66	1306.23	0	1306.23
13	2.902	4384.96	Embankment Fill	204.2	31.5	526.53	1034.36	1354.69	0	1354.69
14	2.902	4562.2	Embankment Fill	204.2	31.5	535.592	1052.16	1383.74	0	1383.74
15	2.902	4682.52	Embankment Fill	204.2	31.5	538.503	1057.88	1393.08	0	1393.08
16	2.902	4742.51	Embankment Fill	204.2	31.5	535.118	1051.23	1382.22	0	1382.22
17	2.902	4737.88	Embankment Fill	204.2	31.5	525.223	1031.79	1350.51	0	1350.51
18	2.902	4663.22	Embankment Fill	204.2	31.5	508.536	999.008	1297.01	0	1297.01
19	2.902	4511.57	Embankment Fill	204.2	31.5	484.68	952.144	1220.53	0	1220.53
20	2.902	4273.9	Embankment Fill	204.2	31.5	453.171	890.245	1119.52	0	1119.52
21	2.9035	4012.34	Central Core	0	33.5	358.82	704.895	1064.98	0	1064.98
22	2.9035	3540.35	Central Core	0	33.5	306.82	602.741	910.642	0	910.642
23	2.9035	2417.3	Central Core	0	33.5	201.83	396.491	599.033	0	599.033
24	2.9035	1072.84	Central Core	0	33.5	85.5366	168.035	253.874	0	253.874
25	0.665135	39.9081	Embankment Fill	204.2	31.5	83.5303	164.094	-65.4477	0	-65.4477

Global Minimum Query (janbu simplified) - Safety Factor: 1.78147

Slice Number	Width [ft]	Weight [lbs]	Base Material	Base Cohesion [psf]	Base Friction Angle [degrees]	Shear Stress [psf]	Shear Strength [psf]	Base Normal Stress [psf]	Pore Pressure [psf]	Effective Normal Stress [psf]
1	2.77396	209.393	Foundation	107.8	29.2	95.6262	170.355	111.929	0	111.929
2	2.77396	598.011	Foundation	107.8	29.2	142.178	253.286	260.317	0	260.317
3	2.77396	928.185	Foundation	107.8	29.2	179.677	320.089	379.846	0	379.846
4	2.77396	1411.68	Foundation	107.8	29.2	234.245	417.3	553.784	0	553.784
5	2.77396	2022.52	Foundation	107.8	29.2	301.875	537.782	769.363	0	769.363
6	2.77396	2581.06	Foundation	107.8	29.2	361.069	643.234	958.045	0	958.045
7	2.77396	3088.23	Foundation	107.8	29.2	412.384	734.65	1121.62	0	1121.62
8	2.77396	3544.44	Foundation	107.8	29.2	456.238	812.774	1261.4	0	1261.4
9	2.77396	3949.63	Foundation	107.8	29.2	492.933	878.146	1378.37	0	1378.37

10	2.77396	4306.39	Foundation	107.8	29.2	523.016	931.738	1474.26	0	1474.26
11	2.62699	4358.56	Embankment Fill	204.2	31.5	639.876	1139.92	1526.96	0	1526.96
12	2.62699	4578.07	Embankment Fill	204.2	31.5	654.624	1166.19	1569.83	0	1569.83
13	2.62699	4749	Embankment Fill	204.2	31.5	662.593	1180.39	1593	0	1593
14	2.62699	4868.89	Embankment Fill	204.2	31.5	663.696	1182.35	1596.2	0	1596.2
15	2.62699	4934.59	Embankment Fill	204.2	31.5	657.762	1171.78	1578.96	0	1578.96
16	2.62699	4941.96	Embankment Fill	204.2	31.5	644.537	1148.22	1540.51	0	1540.51
17	2.62699	4885.67	Embankment Fill	204.2	31.5	623.653	1111.02	1479.8	0	1479.8
18	2.62699	4758.65	Embankment Fill	204.2	31.5	594.616	1059.29	1395.38	0	1395.38
19	2.62699	4551.44	Embankment Fill	204.2	31.5	556.751	991.836	1285.31	0	1285.31
20	2.62699	4250.89	Embankment Fill	204.2	31.5	509.148	907.032	1146.92	0	1146.92
21	2.47796	3683.44	Central Core	0	33.5	395.156	703.958	1063.57	0	1063.57
22	2.47796	3269.15	Central Core	0	33.5	334.788	596.414	901.082	0	901.082
23	2.47796	2327.11	Central Core	0	33.5	224.47	399.887	604.165	0	604.165
24	2.47796	1021.83	Central Core	0	33.5	90.5735	161.354	243.779	0	243.779
25	0.458577	27.5146	Embankment Fill	204.2	31.5	77.2302	137.583	-108.709	0	-108.709

Global Minimum Query (gle/morgenstern-price) - Safety Factor: 1.9523

Slice Number	Width [ft]	Weight [lbs]	Base Material	Base Cohesion [psf]	Base Friction Angle [degrees]	Shear Stress [psf]	Shear Strength [psf]	Base Normal Stress [psf]	Pore Pressure [psf]	Effective Normal Stress [psf]
1	2.65938	138.454	Foundation	107.8	29.2	77.3159	150.944	77.1968	0	77.1968
2	2.65938	395.865	Foundation	107.8	29.2	111.015	216.735	194.917	0	194.917
3	2.65938	614.804	Foundation	107.8	29.2	141.215	275.695	300.413	0	300.413
4	2.65938	832.04	Foundation	107.8	29.2	171.226	334.285	405.248	0	405.248
5	2.65938	1280.6	Foundation	107.8	29.2	228.562	446.222	605.537	0	605.537
6	2.65938	1747.61	Foundation	107.8	29.2	286.18	558.709	806.808	0	806.808
7	2.65938	2178.42	Foundation	107.8	29.2	336.035	656.041	980.963	0	980.963
8	2.65938	2573.05	Foundation	107.8	29.2	377.191	736.39	1124.73	0	1124.73
9	2.65938	2931.32	Foundation	107.8	29.2	409.28	799.038	1236.83	0	1236.83
10	2.65938	3252.86	Foundation	107.8	29.2	432.475	844.32	1317.85	0	1317.85
11	2.902	3869.95	Embankment Fill	204.2	31.5	542.422	1058.97	1394.86	0	1394.86
12	2.902	4153.5	Embankment Fill	204.2	31.5	549.245	1072.29	1416.6	0	1416.6
13	2.902	4384.96	Embankment Fill	204.2	31.5	547.436	1068.76	1410.83	0	1410.83
14	2.902	4562.2	Embankment Fill	204.2	31.5	538.773	1051.85	1383.24	0	1383.24
15	2.902	4682.52	Embankment Fill	204.2	31.5	524.877	1024.72	1338.96	0	1338.96
16	2.902	4742.51	Embankment Fill	204.2	31.5	507.038	989.891	1282.13	0	1282.13
17	2.902	4737.88	Embankment Fill	204.2	31.5	486.124	949.06	1215.5	0	1215.5
18	2.902	4663.22	Embankment Fill	204.2	31.5	462.544	903.024	1140.38	0	1140.38
19	2.902	4511.57	Embankment Fill	204.2	31.5	436.257	851.705	1056.63	0	1056.63
20	2.902	4273.9	Embankment Fill	204.2	31.5	406.796	794.187	962.772	0	962.772
21	2.9035	4012.34	Central Core	0	33.5	309.753	604.731	913.647	0	913.647
22	2.9035	3540.35	Central Core	0	33.5	271.158	529.382	799.809	0	799.809
23	2.9035	2417.3	Central Core	0	33.5	184.225	359.662	543.389	0	543.389
24	2.9035	1072.84	Central Core	0	33.5	82.0089	160.106	241.894	0	241.894
25	0.665135	39.9081	Embankment Fill	204.2	31.5	84.471	164.913	-64.1109	0	-64.1109

Interslice Data

Global Minimum Query (bishop simplified) - Safety Factor: 1.96448

Slice Number	X coordinate [ft]	Y coordinate - Bottom [ft]	Interslice Normal Force [lbs]	Interslice Shear Force [lbs]	Interslice Force Angle [degrees]
1	40.5511	3239.24	0	0	0
2	43.2105	3238.58	246.726	0	0
3	45.8698	3238.03	613.419	0	0
4	48.5292	3237.61	1055.49	0	0
5	51.1886	3237.3	1551.28	0	0
6	53.848	3237.11	2164.96	0	0
7	56.5074	3237.04	2861.12	0	0
8	59.1667	3237.08	3588.62	0	0
9	61.8261	3237.24	4302.37	0	0
10	64.4855	3237.51	4962.55	0	0
11	67.1449	3237.9	5534.17	0	0
12	70.0469	3238.47	6257.81	0	0
13	72.9489	3239.18	6812.62	0	0
14	75.8509	3240.04	7170.55	0	0
15	78.7529	3241.06	7309.5	0	0
16	81.6549	3242.25	7213.62	0	0
17	84.5569	3243.62	6873.87	0	0
18	87.4589	3245.18	6288.98	0	0
19	90.3609	3246.95	5467.03	0	0
20	93.2629	3248.95	4427.77	0	0
21	96.1649	3251.22	3206.42	0	0
22	99.0684	3253.78	1513.09	0	0

23	101.972	3256.71	-260.138	0	0
24	104.875	3260.07	-1689.26	0	0
25	107.779	3264	-2438.68	0	0
26	108.444	3265	0	0	0

Global Minimum Query (janbu simplified) - Safety Factor: 1.78147

Slice Number	X coordinate [ft]	Y coordinate - Bottom [ft]	Interslice Normal Force [lbs]	Interslice Shear Force [lbs]	Interslice Force Angle [degrees]
1	41.7807	3239.34	0	0	0
2	44.5547	3238.29	383.852	0	0
3	47.3286	3237.42	1005.76	0	0
4	50.1026	3236.72	1769.88	0	0
5	52.8765	3236.19	2714.62	0	0
6	55.6505	3235.82	3837.58	0	0
7	58.4245	3235.61	5043.62	0	0
8	61.1984	3235.55	6252.26	0	0
9	63.9724	3235.65	7394.88	0	0
10	66.7464	3235.91	8412.72	0	0
11	69.5203	3236.32	9255.96	0	0
12	72.1473	3236.86	10112.6	0	0
13	74.7743	3237.55	10748.2	0	0
14	77.4013	3238.4	11137.7	0	0
15	80.0283	3239.42	11262.1	0	0
16	82.6552	3240.61	11108	0	0
17	85.2822	3242	10668.6	0	0
18	87.9092	3243.6	9945.27	0	0
19	90.5362	3245.43	8949.61	0	0
20	93.1632	3247.54	7707.02	0	0
21	95.7902	3249.97	6263.17	0	0
22	98.2681	3252.61	4428.4	0	0
23	100.746	3255.7	2475.11	0	0
24	103.224	3259.4	802.242	0	0
25	105.702	3264	-95.3374	0	0
26	106.161	3265	0	0	0

Global Minimum Query (gle/morgenstern-price) - Safety Factor: 1.9523

Slice Number	X coordinate [ft]	Y coordinate - Bottom [ft]	Interslice Normal Force [lbs]	Interslice Shear Force [lbs]	Interslice Force Angle [degrees]
1	40.5511	3239.24	0	0	0
2	43.2105	3238.58	256.932	15.2277	3.39181
3	45.8698	3238.03	657.847	77.3884	6.70938
4	48.5292	3237.61	1160.11	202.127	9.88348
5	51.1886	3237.3	1738.55	396.717	12.8541
6	53.848	3237.11	2459.88	685.554	15.5728
7	56.5074	3237.04	3279.12	1065.67	18.0035
8	59.1667	3237.08	4130.75	1513.35	20.1209
9	61.8261	3237.24	4956.11	1993.33	21.9098
10	64.4855	3237.51	5705.52	2464.49	23.3619
11	67.1449	3237.9	6339.34	2885.47	24.4735
12	70.0469	3238.47	7125.75	3367.94	25.2975
13	72.9489	3239.18	7711.56	3713.94	25.7158
14	75.8509	3240.04	8081.37	3894.41	25.7294
15	78.7529	3241.06	8229.78	3896.93	25.3383
16	81.6549	3242.25	8158.48	3725.22	24.5418
17	84.5569	3243.62	7873.99	3397.44	23.3391
18	87.4589	3245.18	7386.17	2943.96	21.7311
19	90.3609	3246.95	6707.93	2404.8	19.7228
20	93.2629	3248.95	5856.3	1826.99	17.3264
21	96.1649	3251.22	4855.24	1261.5	14.5647
22	99.0684	3253.78	3407.93	691.697	11.4733
23	101.972	3256.71	1855.25	264.286	8.10741
24	104.875	3260.07	562.089	44.6135	4.5381
25	107.779	3264	-150.532	-2.23669	0.851271
26	108.444	3265	0	0	0

List Of Coordinates

Water Table

X	Y
0	3220
250	3220

External Boundary

X	Y
0	3190
250	3190
250	3216
250	3234
250	3241.17
250	3262
250	3265
120	3265
100	3265
50	3240
0	3236
0	3234
-6.93889e-018	3216

Material Boundary

X	Y
50	3240
67	3238
88	3224
100	3216
120	3216
132	3224
135	3226
176	3237
198	3239
206	3239
209	3240
250	3241.17

Material Boundary

X	Y
88	3224
100	3264
120	3264
132	3224

Material Boundary

X	Y
120	3265
129	3262
198	3239

Material Boundary

X	Y
-6.93889e-018	3216
100	3216

Material Boundary

X	Y
120	3216
250	3216

Material Boundary

X	Y
129	3262
250	3262

Slide Analysis Information

2026 SAFETY FACTOR ASSESSMENT OF CCR SURFACE IMPOUNDMENTS AT CSES

Project Summary

File Name: 3.2 - 12 BAP DIKE A - Downstream - Max Normal Pool - Seismic.slim
Slide Modeler Version: 6.02
Project Title: 2026 SAFETY FACTOR ASSESSMENT OF CCR SURFACE IMPOUNDMENTS AT CSES
Analysis: UNITS 1&2 BOTTOM ASH POND (BAP) DIKE (SECTION A) - MAXIMUM STORAGE POOL - SEISMIC ANALYSIS
Author: AWJ
Company: HYDROMETRICS, INC.
Date Created: 9/25/2026, 4:07:52 PM

General Settings

Units of Measurement: Imperial Units
Time Units: days
Permeability Units: feet/second
Failure Direction: Right to Left
Data Output: Standard
Maximum Material Properties: 20
Maximum Support Properties: 20

Analysis Options

Analysis Methods Used

Bishop simplified
GLE/Morgenstern-Price with interslice force function: Half Sine
Janbu simplified

Number of slices: 25
Tolerance: 0.005
Maximum number of iterations: 50
Check malpha < 0.2: Yes
Initial trial value of FS: 1
Steffensen Iteration: Yes

Groundwater Analysis

Groundwater Method: Water Surfaces
Pore Fluid Unit Weight: 62.4 lbs/ft3
Advanced Groundwater Method: None

Random Numbers

Pseudo-random Seed: 10116
Random Number Generation Method: Park and Miller v.3

Surface Options

Surface Type: Circular
Search Method: Grid Search
Radius Increment: 10
Composite Surfaces: Disabled
Reverse Curvature: Invalid Surfaces
Minimum Elevation: Not Defined
Minimum Depth: Not Defined

Loading

Seismic Load Coefficient (Horizontal): 0.03

Material Properties

Property	Embankment Fill	Central Core	Foundation	Waste - Fly Ash	Bedrock
Color					
Strength Type	Mohr-Coulomb	Mohr-Coulomb	Mohr-Coulomb	Mohr-Coulomb	Infinite strength
Unsaturated Unit Weight [lbs/ft3]	120	127	118.2		
Saturated Unit Weight [lbs/ft3]	126.8	140.4	123.8		
Cohesion [psf]	163.4	0	86.2	0	
Friction Angle [deg]	25.2	26.8	23.4	25.6	
Water Surface	Water Table	Water Table	Water Table	Water Table	None

Hu Value	1	1	1	0	
Ru Value					0

Global Minimums

Method: bishop simplified

FS: 1.416690
Center: 56.873, 3300.943
Radius: 63.829
Left Slip Surface Endpoint: 40.528, 3239.242
Right Slip Surface Endpoint: 109.620, 3265.000
Resisting Moment=2.6175e+006 lb-ft
Driving Moment=1.84761e+006 lb-ft
Total Slice Area=611.209 ft2

Method: janbu simplified

FS: 1.281530
Center: 60.811, 3285.979
Radius: 50.381
Left Slip Surface Endpoint: 41.756, 3239.340
Right Slip Surface Endpoint: 106.616, 3265.000
Resisting Horizontal Force=38429 lb
Driving Horizontal Force=29986.9 lb
Total Slice Area=669.567 ft2

Method: gle/morgenstern-price

FS: 1.408690
Center: 56.873, 3300.156
Radius: 63.066
Left Slip Surface Endpoint: 40.535, 3239.243
Right Slip Surface Endpoint: 109.231, 3265.000
Resisting Moment=2.55157e+006 lb-ft
Driving Moment=1.81131e+006 lb-ft
Resisting Horizontal Force=36524.2 lb
Driving Horizontal Force=25927.7 lb
Total Slice Area=605.456 ft2

Slice Data

Global Minimum Query (bishop simplified) - Safety Factor: 1.41669

Slice Number	Width [ft]	Weight [lbs]	Base Material	Base Cohesion [psf]	Base Friction Angle [degrees]	Shear Stress [psf]	Shear Strength [psf]	Base Normal Stress [psf]	Pore Pressure [psf]	Effective Normal Stress [psf]
1	2.95172	164.574	Foundation	86.2	23.4	84.0141	119.022	75.8469	0	75.8469
2	2.95172	468.229	Foundation	86.2	23.4	116.025	164.371	180.643	0	180.643
3	2.95172	721.574	Foundation	86.2	23.4	141.646	200.668	264.521	0	264.521
4	2.95172	1064.14	Foundation	86.2	23.4	176.049	249.407	377.151	0	377.151
5	2.95172	1652.58	Foundation	86.2	23.4	235.309	333.36	571.154	0	571.154
6	2.95172	2202.81	Foundation	86.2	23.4	288.956	409.361	746.781	0	746.781
7	2.95172	2705.36	Foundation	86.2	23.4	336.24	476.348	901.579	0	901.579
8	2.95172	3160.07	Foundation	86.2	23.4	377.378	534.627	1036.25	0	1036.25
9	2.95172	3566.51	Foundation	86.2	23.4	412.526	584.421	1151.32	0	1151.32
10	2.88462	3829.23	Embankment Fill	163.4	25.2	523.976	742.311	1230.25	0	1230.25
11	2.88462	4118.79	Embankment Fill	163.4	25.2	547.139	775.127	1299.99	0	1299.99
12	2.88462	4359.37	Embankment Fill	163.4	25.2	564.196	799.291	1351.34	0	1351.34
13	2.88462	4549.16	Embankment Fill	163.4	25.2	575.129	814.779	1384.25	0	1384.25
14	2.88462	4685.87	Embankment Fill	163.4	25.2	579.876	821.504	1398.54	0	1398.54
15	2.88462	4766.62	Embankment Fill	163.4	25.2	578.324	819.306	1393.87	0	1393.87
16	2.88462	4787.83	Embankment Fill	163.4	25.2	570.307	807.948	1369.73	0	1369.73
17	2.88462	4745.02	Embankment Fill	163.4	25.2	555.594	787.105	1325.44	0	1325.44
18	2.88462	4632.55	Embankment Fill	163.4	25.2	533.883	756.347	1260.08	0	1260.08
19	2.88462	4443.21	Embankment Fill	163.4	25.2	504.782	715.12	1172.46	0	1172.46
20	2.59698	3827.9	Central Core	0	26.8	407.198	576.874	1142.02	0	1142.02
21	2.59698	3596.52	Central Core	0	26.8	372.931	528.327	1045.91	0	1045.91
22	2.59698	2858.89	Central Core	0	26.8	287.987	407.988	807.681	0	807.681
23	2.59698	1929.25	Central Core	0	26.8	187.925	266.231	527.048	0	527.048
24	2.59698	874.031	Central Core	0	26.8	81.7836	115.862	229.368	0	229.368
25	0.695491	41.7295	Embankment Fill	163.4	25.2	91.6046	129.775	-71.4562	0	-71.4562

Global Minimum Query (janbu simplified) - Safety Factor: 1.28153

Slice Number	Width [ft]	Weight [lbs]	Base Material	Base Cohesion [psf]	Base Friction Angle [degrees]	Shear Stress [psf]	Shear Strength [psf]	Base Normal Stress [psf]	Pore Pressure [psf]	Effective Normal Stress [psf]
1	2.77207	206.492	Foundation	86.2	23.4	105.783	135.564	114.073	0	114.073
2	2.77207	589.952	Foundation	86.2	23.4	155.35	199.086	260.863	0	260.863
3	2.77207	916.039	Foundation	86.2	23.4	195.175	250.123	378.805	0	378.805
4	2.77207	1392.24	Foundation	86.2	23.4	252.98	324.201	549.988	0	549.988

5	2.77207	2000.62	Foundation	86.2	23.4	325.429	417.047	764.543	0	764.543
6	2.77207	2557.62	Foundation	86.2	23.4	388.756	498.203	952.081	0	952.081
7	2.77207	3064.1	Foundation	86.2	23.4	443.589	568.473	1114.47	0	1114.47
8	2.77207	3520.48	Foundation	86.2	23.4	490.4	628.462	1253.1	0	1253.1
9	2.77207	3926.7	Foundation	86.2	23.4	529.537	678.618	1369	0	1369
10	2.77207	4285.27	Foundation	86.2	23.4	561.597	719.704	1463.94	0	1463.94
11	2.62092	4333.94	Embankment Fill	163.4	25.2	683.998	876.564	1515.55	0	1515.55
12	2.62092	4556.33	Embankment Fill	163.4	25.2	699.57	896.52	1557.96	0	1557.96
13	2.62092	4731.36	Embankment Fill	163.4	25.2	708.059	907.399	1581.08	0	1581.08
14	2.62092	4856.75	Embankment Fill	163.4	25.2	709.397	909.114	1584.72	0	1584.72
15	2.62092	4929.54	Embankment Fill	163.4	25.2	703.44	901.479	1568.5	0	1568.5
16	2.62092	4945.91	Embankment Fill	163.4	25.2	689.953	884.196	1531.77	0	1531.77
17	2.62092	4900.91	Embankment Fill	163.4	25.2	668.604	856.836	1473.63	0	1473.63
18	2.62092	4788.08	Embankment Fill	163.4	25.2	638.932	818.81	1392.82	0	1392.82
19	2.62092	4598.82	Embankment Fill	163.4	25.2	600.315	769.322	1287.65	0	1287.65
20	2.62092	4321.32	Embankment Fill	163.4	25.2	551.918	707.299	1155.85	0	1155.85
21	2.61474	3985.17	Central Core	0	26.8	427.02	547.239	1083.35	0	1083.35
22	2.61474	3546.15	Central Core	0	26.8	362.143	464.097	918.755	0	918.755
23	2.61474	2512.73	Central Core	0	26.8	241.271	309.196	612.106	0	612.106
24	2.61474	1098.95	Central Core	0	26.8	96.7695	124.013	245.504	0	245.504
25	0.47134	28.2804	Embankment Fill	163.4	25.2	84.1029	107.78	-118.198	0	-118.198

Global Minimum Query (gle/morgenstern-price) - Safety Factor: 1.40869

Slice Number	Width [ft]	Weight [lbs]	Base Material	Base Cohesion [psf]	Base Friction Angle [degrees]	Shear Stress [psf]	Shear Strength [psf]	Base Normal Stress [psf]	Pore Pressure [psf]	Effective Normal Stress [psf]
1	2.65753	135.691	Foundation	86.2	23.4	85.2946	120.154	78.4622	0	78.4622
2	2.65753	388.154	Foundation	86.2	23.4	121.488	171.139	196.282	0	196.282
3	2.65753	603.262	Foundation	86.2	23.4	154.103	217.083	302.454	0	302.454
4	2.65753	816.328	Foundation	86.2	23.4	186.468	262.675	407.81	0	407.81
5	2.65753	1261	Foundation	86.2	23.4	248.343	349.838	609.232	0	609.232
6	2.65753	1726.7	Foundation	86.2	23.4	310.75	437.75	812.384	0	812.384
7	2.65753	2157.14	Foundation	86.2	23.4	364.697	513.745	987.997	0	987.997
8	2.65753	2552.36	Foundation	86.2	23.4	409.099	576.294	1132.54	0	1132.54
9	2.65753	2912.19	Foundation	86.2	23.4	443.52	624.782	1244.59	0	1244.59
10	2.65753	3236.28	Foundation	86.2	23.4	468.142	659.467	1324.74	0	1324.74
11	2.89005	3842.27	Embankment Fill	163.4	25.2	585.442	824.706	1405.35	0	1405.35
12	2.89005	4129.86	Embankment Fill	163.4	25.2	592.013	833.963	1425.02	0	1425.02
13	2.89005	4367.49	Embankment Fill	163.4	25.2	589.299	830.139	1416.89	0	1416.89
14	2.89005	4553.26	Embankment Fill	163.4	25.2	579.329	816.095	1387.05	0	1387.05
15	2.89005	4684.72	Embankment Fill	163.4	25.2	563.97	794.459	1341.07	0	1341.07
16	2.89005	4758.86	Embankment Fill	163.4	25.2	544.732	767.358	1283.48	0	1283.48
17	2.89005	4771.86	Embankment Fill	163.4	25.2	522.654	736.257	1217.38	0	1217.38
18	2.89005	4718.98	Embankment Fill	163.4	25.2	498.271	701.909	1144.39	0	1144.39
19	2.89005	4594.17	Embankment Fill	163.4	25.2	471.629	664.379	1064.64	0	1064.64
20	2.89005	4389.68	Embankment Fill	163.4	25.2	442.327	623.102	976.918	0	976.918
21	3.13368	4507.84	Central Core	0	26.8	334.934	471.818	934.04	0	934.04
22	3.13368	3978.82	Central Core	0	26.8	293.286	413.149	817.896	0	817.896
23	3.13368	2708.54	Central Core	0	26.8	198.927	280.227	554.755	0	554.755
24	3.13368	1193.73	Central Core	0	26.8	88.2558	124.325	246.122	0	246.122
25	0.685482	41.1289	Embankment Fill	163.4	25.2	92.189	129.866	-71.2641	0	-71.2641

Interslice Data

Global Minimum Query (bishop simplified) - Safety Factor: 1.41669

Slice Number	X coordinate [ft]	Y coordinate - Bottom [ft]	Interslice Normal Force [lbs]	Interslice Shear Force [lbs]	Interslice Force Angle [degrees]
1	40.5281	3239.24	0	0	0
2	43.4798	3238.53	296.211	0	0
3	46.4316	3237.97	725.336	0	0
4	49.3833	3237.55	1231.78	0	0
5	52.335	3237.28	1823.88	0	0
6	55.2867	3237.13	2548.51	0	0
7	58.2384	3237.13	3337.5	0	0
8	61.1902	3237.26	4128.29	0	0
9	64.1419	3237.53	4866.41	0	0
10	67.0936	3237.94	5504.57	0	0
11	69.9782	3238.47	6238.5	0	0
12	72.8628	3239.15	6812.15	0	0
13	75.7474	3239.97	7198.71	0	0
14	78.6321	3240.94	7376.91	0	0
15	81.5167	3242.06	7331.19	0	0
16	84.4013	3243.36	7052.08	0	0
17	87.2859	3244.83	6536.98	0	0

18	90.1705	3246.49	5791.24	0	0
19	93.0551	3248.36	4829.94	0	0
20	95.9398	3250.47	3680.5	0	0
21	98.5367	3252.59	2198.54	0	0
22	101.134	3254.95	583.538	0	0
23	103.731	3257.6	-895.229	0	0
24	106.328	3260.59	-2041.08	0	0
25	108.925	3264	-2637.54	0	0
26	109.62	3265	0	0	0

Global Minimum Query (janbu simplified) - Safety Factor: 1.28153

Slice Number	X coordinate [ft]	Y coordinate - Bottom [ft]	Interslice Normal Force [lbs]	Interslice Shear Force [lbs]	Interslice Force Angle [degrees]
1	41.756	3239.34	0	0	0
2	44.5281	3238.3	405.135	0	0
3	47.3002	3237.44	1041.44	0	0
4	50.0723	3236.76	1814.76	0	0
5	52.8443	3236.23	2761.5	0	0
6	55.6164	3235.87	3881.74	0	0
7	58.3885	3235.66	5081.42	0	0
8	61.1606	3235.6	6281.13	0	0
9	63.9326	3235.69	7413.37	0	0
10	66.7047	3235.94	8420.51	0	0
11	69.4768	3236.35	9253.86	0	0
12	72.0977	3236.88	10111.4	0	0
13	74.7186	3237.56	10751	0	0
14	77.3395	3238.39	11148.8	0	0
15	79.9605	3239.38	11286.7	0	0
16	82.5814	3240.54	11152.2	0	0
17	85.2023	3241.9	10739.5	0	0
18	87.8232	3243.45	10050.3	0	0
19	90.4441	3245.23	9095.81	0	0
20	93.065	3247.28	7900.25	0	0
21	95.686	3249.62	6506.01	0	0
22	98.3007	3252.32	4573.8	0	0
23	100.915	3255.49	2507.31	0	0
24	103.53	3259.27	744.549	0	0
25	106.145	3264	-196.709	0	0
26	106.616	3265	0	0	0

Global Minimum Query (gle/morgenstern-price) - Safety Factor: 1.40869

Slice Number	X coordinate [ft]	Y coordinate - Bottom [ft]	Interslice Normal Force [lbs]	Interslice Shear Force [lbs]	Interslice Force Angle [degrees]
1	40.5352	3239.24	0	0	0
2	43.1928	3238.59	273.655	17.2592	3.60882
3	45.8503	3238.06	688.998	86.2676	7.13671
4	48.5078	3237.65	1205.4	223.601	10.5089
5	51.1654	3237.35	1798.05	437.023	13.6611
6	53.8229	3237.16	2532.76	752.289	16.5427
7	56.4804	3237.09	3365.56	1166.54	19.1169
8	59.138	3237.13	4230.83	1654.61	21.3597
9	61.7955	3237.28	5069.38	2178.77	23.2576
10	64.453	3237.55	5830.86	2694.76	24.8042
11	67.1105	3237.93	6475.12	3157.92	25.9985
12	70.0006	3238.47	7285.59	3696.03	26.899
13	72.8906	3239.16	7893.86	4089.52	27.387
14	75.7807	3239.99	8285.19	4306.51	27.4647
15	78.6707	3240.98	8455.25	4332.79	27.1323
16	81.5608	3242.12	8407.13	4171.22	26.3884
17	84.4508	3243.44	8148.81	3839.83	25.2305
18	87.3409	3244.94	7691.32	3369.23	23.6561
19	90.2309	3246.63	7048.17	2799.94	21.6658
20	93.121	3248.55	6235.89	2179.63	19.266
21	96.011	3250.7	5276.18	1560.19	16.4732
22	99.1447	3253.35	3714.7	860.122	13.0368
23	102.278	3256.39	2033.03	330.651	9.23767
24	105.412	3259.89	631.544	57.091	5.16545
25	108.546	3264	-139.141	-2.26876	0.934152
26	109.231	3265	0	0	0

List Of Coordinates

Water Table

X	Y
0	3220
250	3220

External Boundary

X	Y
0	3190
250	3190
250	3216
250	3234
250	3241.17
250	3262
129	3262
120	3265
100	3265
50	3240
0	3236
0	3234
-6.93889e-018	3216

Material Boundary

X	Y
50	3240
67	3238
88	3224
100	3216
120	3216
132	3224
135	3226
176	3237
198	3239
206	3239
209	3240
250	3241.17

Material Boundary

X	Y
88	3224
100	3264
120	3264
132	3224

Material Boundary

X	Y
129	3262
198	3239

Material Boundary

X	Y
-6.93889e-018	3216
100	3216

Material Boundary

X	Y
120	3216
250	3216

Slide Analysis Information

2026 SAFETY FACTOR ASSESSMENT OF CCR SURFACE IMPOUNDMENTS AT CSES

Project Summary

File Name: 4.0 - 12 BAP DIKE B - Downstream - Max Normal Pool - Static.slim
Slide Modeler Version: 6.02
Project Title: 2026 SAFETY FACTOR ASSESSMENT OF CCR SURFACE IMPOUNDMENTS AT CSES
Analysis: UNITS 1&2 BOTTOM ASH POND (BAP) DIKE (SECTION B) - EXISTING CONDITIONS - STATIC ANALYSIS
Author: AWJ
Company: HYDROMETRICS, INC.
Date Created: 9/25/2026, 4:07:52 PM

General Settings

Units of Measurement: Imperial Units
Time Units: days
Permeability Units: feet/second
Failure Direction: Right to Left
Data Output: Standard
Maximum Material Properties: 20
Maximum Support Properties: 20

Analysis Options

Analysis Methods Used

Bishop simplified
GLE/Morgenstern-Price with interslice force function: Half Sine
Janbu simplified

Number of slices: 25
Tolerance: 0.005
Maximum number of iterations: 50
Check malpha < 0.2: Yes
Initial trial value of FS: 1
Steffensen Iteration: Yes

Groundwater Analysis

Groundwater Method: Water Surfaces
Pore Fluid Unit Weight: 62.4 lbs/ft3
Advanced Groundwater Method: None

Random Numbers

Pseudo-random Seed: 10116
Random Number Generation Method: Park and Miller v.3

Surface Options

Surface Type: Circular
Search Method: Grid Search
Radius Increment: 10
Composite Surfaces: Disabled
Reverse Curvature: Invalid Surfaces
Minimum Elevation: Not Defined
Minimum Depth: Not Defined

Material Properties

Property	Embankment Fill	Central Core	Foundation	Waste - Fly Ash	Bedrock
Color					
Strength Type	Mohr-Coulomb	Mohr-Coulomb	Mohr-Coulomb	Mohr-Coulomb	Infinite strength
Unit Weight [lbs/ft3]	127	127	118.2	107	125
Cohesion [psf]	372.9	0	107.8	0	
Friction Angle [deg]	30.9	33.5	29.2	32	
Water Surface	None	None	None	None	None
Ru Value	0	0	0	0	0

Global Minimums

Method: bishop simplified

FS: 2.261790
Center: 66.877, 3289.960
Radius: 46.267
Left Slip Surface Endpoint: 47.705, 3247.852
Right Slip Surface Endpoint: 108.617, 3270.000
Resisting Moment=2.70891e+006 lb-ft
Driving Moment=1.19768e+006 lb-ft
Total Slice Area=597.173 ft2

Method: janbu simplified

FS: 1.958050
Center: 69.991, 3279.061
Radius: 37.311
Left Slip Surface Endpoint: 49.494, 3247.884
Right Slip Surface Endpoint: 106.185, 3270.000
Resisting Horizontal Force=53405.6 lb
Driving Horizontal Force=27274.8 lb
Total Slice Area=667.92 ft2

Method: gle/morgenstern-price

FS: 2.241140
Center: 66.099, 3291.517
Radius: 47.588
Left Slip Surface Endpoint: 47.197, 3247.843
Right Slip Surface Endpoint: 108.545, 3270.000
Resisting Moment=2.70726e+006 lb-ft
Driving Moment=1.20798e+006 lb-ft
Resisting Horizontal Force=51032.6 lb
Driving Horizontal Force=22770.8 lb
Total Slice Area=579.747 ft2

Slice Data

Global Minimum Query (bishop simplified) - Safety Factor: 2.26179

Slice Number	Width [ft]	Weight [lbs]	Base Material	Base Cohesion [psf]	Base Friction Angle [degrees]	Shear Stress [psf]	Shear Strength [psf]	Base Normal Stress [psf]	Pore Pressure [psf]	Effective Normal Stress [psf]
1	2.59754	174.223	Foundation	107.8	29.2	71.6457	162.048	97.0645	0	97.0645
2	2.59754	495.115	Foundation	107.8	29.2	103.72	234.593	226.869	0	226.869
3	2.59754	762.578	Foundation	107.8	29.2	129.302	292.453	330.398	0	330.398
4	2.59754	1119.55	Foundation	107.8	29.2	163.156	369.024	467.406	0	467.406
5	2.59754	1710.59	Foundation	107.8	29.2	219.26	495.919	694.457	0	694.457
6	2.59754	2262.99	Foundation	107.8	29.2	270.014	610.714	899.86	0	899.86
7	2.59754	2769.76	Foundation	107.8	29.2	314.992	712.446	1081.89	0	1081.89
8	2.59754	3231.5	Foundation	107.8	29.2	354.479	801.757	1241.69	0	1241.69
9	2.59754	3648.37	Foundation	107.8	29.2	388.678	879.107	1380.09	0	1380.09
10	2.42659	3735.32	Embankment Fill	372.9	30.9	554.885	1255.03	1473.94	0	1473.94
11	2.42659	4000.76	Embankment Fill	372.9	30.9	574.973	1300.47	1549.85	0	1549.85
12	2.42659	4225.14	Embankment Fill	372.9	30.9	590.072	1334.62	1606.92	0	1606.92
13	2.42659	4407.11	Embankment Fill	372.9	30.9	600.146	1357.4	1644.99	0	1644.99
14	2.42659	4544.85	Embankment Fill	372.9	30.9	605.11	1368.63	1663.75	0	1663.75
15	2.42659	4635.98	Embankment Fill	372.9	30.9	604.821	1367.98	1662.65	0	1662.65
16	2.42659	4677.42	Embankment Fill	372.9	30.9	599.069	1354.97	1640.92	0	1640.92
17	2.42659	4665.15	Embankment Fill	372.9	30.9	587.569	1328.96	1597.45	0	1597.45
18	2.42659	4593.99	Embankment Fill	372.9	30.9	569.931	1289.07	1530.8	0	1530.8
19	2.42659	4457.06	Embankment Fill	372.9	30.9	545.643	1234.13	1439.01	0	1439.01
20	2.55514	4461.6	Central Core	0	33.5	410.196	927.778	1401.72	0	1401.72
21	2.55514	4116.12	Central Core	0	33.5	366.708	829.416	1253.11	0	1253.11
22	2.55514	3374.68	Central Core	0	33.5	289.367	654.487	988.824	0	988.824
23	2.55514	2326.93	Central Core	0	33.5	189.93	429.582	649.027	0	649.027
24	2.55514	1039.85	Central Core	0	33.5	79.1621	179.048	270.511	0	270.511
25	0.493079	31.3105	Embankment Fill	372.9	30.9	118.269	267.499	-176.112	0	-176.112

Global Minimum Query (janbu simplified) - Safety Factor: 1.95805

Slice Number	Width [ft]	Weight [lbs]	Base Material	Base Cohesion [psf]	Base Friction Angle [degrees]	Shear Stress [psf]	Shear Strength [psf]	Base Normal Stress [psf]	Pore Pressure [psf]	Effective Normal Stress [psf]
1	2.47189	224.323	Foundation	107.8	29.2	97.7981	191.494	149.752	0	149.752
2	2.47189	637.199	Foundation	107.8	29.2	150.258	294.213	333.547	0	333.547
3	2.47189	1008.78	Foundation	107.8	29.2	194.638	381.111	489.032	0	489.032
4	2.47189	1604.79	Foundation	107.8	29.2	265.771	520.392	738.246	0	738.246
5	2.47189	2222.22	Foundation	107.8	29.2	336.602	659.083	986.404	0	986.404
6	2.47189	2786.67	Foundation	107.8	29.2	398.234	779.763	1202.34	0	1202.34
7	2.47189	3300.55	Foundation	107.8	29.2	451.585	884.226	1389.25	0	1389.25
8	2.47189	3765.4	Foundation	107.8	29.2	497.303	973.745	1549.42	0	1549.42
9	2.47189	4182.07	Foundation	107.8	29.2	535.845	1049.21	1684.46	0	1684.46
10	2.47189	4550.74	Foundation	107.8	29.2	567.514	1111.22	1795.4	0	1795.4

11	2.47189	4870.97	Foundation	107.8	29.2	592.482	1160.11	1882.88	0	1882.88
12	2.24047	4640.07	Embankment Fill	372.9	30.9	772.845	1513.27	1905.42	0	1905.42
13	2.24047	4801.27	Embankment Fill	372.9	30.9	778.811	1524.95	1924.93	0	1924.93
14	2.24047	4919.46	Embankment Fill	372.9	30.9	778.484	1524.31	1923.87	0	1923.87
15	2.24047	4991.98	Embankment Fill	372.9	30.9	771.645	1510.92	1901.5	0	1901.5
16	2.24047	5015.24	Embankment Fill	372.9	30.9	757.948	1484.1	1856.69	0	1856.69
17	2.24047	4984.44	Embankment Fill	372.9	30.9	736.912	1442.91	1787.85	0	1787.85
18	2.24047	4893.02	Embankment Fill	372.9	30.9	707.847	1386	1692.76	0	1692.76
19	2.24047	4731.83	Embankment Fill	372.9	30.9	669.802	1311.51	1568.3	0	1568.3
20	2.26225	4529.56	Central Core	0	33.5	511.631	1001.8	1513.56	0	1513.56
21	2.26225	4173.9	Central Core	0	33.5	450.283	881.677	1332.07	0	1332.07
22	2.26225	3613.9	Central Core	0	33.5	367.082	718.764	1085.93	0	1085.93
23	2.26225	2601.16	Central Core	0	33.5	241.848	473.55	715.456	0	715.456
24	2.26225	1152.39	Central Core	0	33.5	90.6386	177.475	268.134	0	268.134
25	0.265138	16.8362	Embankment Fill	372.9	30.9	97.4817	190.874	-304.144	0	-304.144

Global Minimum Query (gle/morgenstern-price) - Safety Factor: 2.24114

Slice Number	Width [ft]	Weight [lbs]	Base Material	Base Cohesion [psf]	Base Friction Angle [degrees]	Shear Stress [psf]	Shear Strength [psf]	Base Normal Stress [psf]	Pore Pressure [psf]	Effective Normal Stress [psf]
1	2.56199	161.626	Foundation	107.8	29.2	72.7045	162.941	98.6634	0	98.6634
2	2.56199	459.635	Foundation	107.8	29.2	109.107	244.525	244.64	0	244.64
3	2.56199	708.559	Foundation	107.8	29.2	141.344	316.771	373.91	0	373.91
4	2.56199	977.484	Foundation	107.8	29.2	175.748	393.875	511.873	0	511.873
5	2.56199	1513.96	Foundation	107.8	29.2	239.425	536.585	767.221	0	767.221
6	2.56199	2046.8	Foundation	107.8	29.2	299.816	671.93	1009.39	0	1009.39
7	2.56199	2537.15	Foundation	107.8	29.2	350.794	786.179	1213.82	0	1213.82
8	2.56199	2985.51	Foundation	107.8	29.2	391.473	877.345	1376.94	0	1376.94
9	2.56199	3392.03	Foundation	107.8	29.2	421.747	945.195	1498.34	0	1498.34
10	2.52849	3694.36	Embankment Fill	372.9	30.9	600.215	1345.17	1624.54	0	1624.54
11	2.52849	3984.96	Embankment Fill	372.9	30.9	608.698	1364.18	1656.31	0	1656.31
12	2.52849	4230.46	Embankment Fill	372.9	30.9	608.51	1363.76	1655.6	0	1655.6
13	2.52849	4429.37	Embankment Fill	372.9	30.9	601.362	1347.74	1628.84	0	1628.84
14	2.52849	4579.68	Embankment Fill	372.9	30.9	588.881	1319.76	1582.1	0	1582.1
15	2.52849	4678.74	Embankment Fill	372.9	30.9	572.429	1282.89	1520.49	0	1520.49
16	2.52849	4723.12	Embankment Fill	372.9	30.9	552.996	1239.34	1447.72	0	1447.72
17	2.52849	4708.34	Embankment Fill	372.9	30.9	531.141	1190.36	1365.88	0	1365.88
18	2.52849	4628.58	Embankment Fill	372.9	30.9	506.981	1136.22	1275.41	0	1275.41
19	2.52849	4476.07	Embankment Fill	372.9	30.9	480.202	1076.2	1175.13	0	1175.13
20	2.49663	4188.91	Central Core	0	33.5	331.949	743.945	1123.98	0	1123.98
21	2.49663	3855.75	Central Core	0	33.5	300.316	673.051	1016.87	0	1016.87
22	2.49663	3143.15	Central Core	0	33.5	241.413	541.041	817.423	0	817.423
23	2.49663	2160.37	Central Core	0	33.5	164.382	368.404	556.598	0	556.598
24	2.49663	972.013	Central Core	0	33.5	73.6558	165.073	249.398	0	249.398
25	0.5219	33.1407	Embankment Fill	372.9	30.9	122.332	274.162	-164.979	0	-164.979

Interslice Data

Global Minimum Query (bishop simplified) - Safety Factor: 2.26179

Slice Number	X coordinate [ft]	Y coordinate - Bottom [ft]	Interslice Normal Force [lbs]	Interslice Shear Force [lbs]	Interslice Force Angle [degrees]
1	47.7049	3247.85	0	0	0
2	50.3024	3246.76	291.567	0	0
3	52.9	3245.85	766.938	0	0
4	55.4975	3245.11	1347.11	0	0
5	58.095	3244.53	2041.64	0	0
6	60.6926	3244.11	2906.37	0	0
7	63.2901	3243.83	3855.34	0	0
8	65.8877	3243.7	4811.91	0	0
9	68.4852	3243.72	5710.16	0	0
10	71.0828	3243.88	6492.97	0	0
11	73.5094	3244.17	7416.1	0	0
12	75.9359	3244.59	8162.55	0	0
13	78.3625	3245.14	8704.72	0	0
14	80.7891	3245.83	9019.73	0	0
15	83.2157	3246.67	9089.42	0	0
16	85.6423	3247.67	8900.57	0	0
17	88.0689	3248.83	8445.52	0	0
18	90.4954	3250.18	7723.09	0	0
19	92.922	3251.72	6740.28	0	0
20	95.3486	3253.49	5514.9	0	0
21	97.9038	3255.64	3551.7	0	0
22	100.459	3258.13	1360.37	0	0
23	103.014	3261.07	-802.116	0	0

24	105.569	3264.59	-2604.29	0	0
25	108.124	3269	-3594.89	0	0
26	108.617	3270	0	0	0

Global Minimum Query (janbu simplified) - Safety Factor: 1.95805

Slice Number	X coordinate [ft]	Y coordinate - Bottom [ft]	Interslice Normal Force [lbs]	Interslice Shear Force [lbs]	Interslice Force Angle [degrees]
1	49.4944	3247.88	0	0	0
2	51.9663	3246.39	465.072	0	0
3	54.4382	3245.15	1252.25	0	0
4	56.9101	3244.12	2236.02	0	0
5	59.382	3243.29	3504.27	0	0
6	61.8539	3242.65	4969.48	0	0
7	64.3258	3242.18	6513.51	0	0
8	66.7976	3241.89	8040.5	0	0
9	69.2695	3241.76	9471.02	0	0
10	71.7414	3241.79	10738	0	0
11	74.2133	3241.99	11784.2	0	0
12	76.6852	3242.36	12560	0	0
13	78.9257	3242.84	13376.6	0	0
14	81.1661	3243.46	13913.9	0	0
15	83.4066	3244.25	14152.7	0	0
16	85.6471	3245.19	14078.2	0	0
17	87.8875	3246.32	13680.8	0	0
18	90.128	3247.65	12956.8	0	0
19	92.3685	3249.21	11910.9	0	0
20	94.6089	3251.02	10559.2	0	0
21	96.8712	3253.18	8445.95	0	0
22	99.1334	3255.76	6031.5	0	0
23	101.396	3258.91	3438.22	0	0
24	103.658	3262.98	1078.29	0	0
25	105.92	3269	-331.392	0	0
26	106.185	3270	0	0	0

Global Minimum Query (gle/morgenstern-price) - Safety Factor: 2.24114

Slice Number	X coordinate [ft]	Y coordinate - Bottom [ft]	Interslice Normal Force [lbs]	Interslice Shear Force [lbs]	Interslice Force Angle [degrees]
1	47.1973	3247.84	0	0	0
2	49.7592	3246.82	286.684	16.9906	3.39172
3	52.3212	3245.97	774.796	91.0489	6.70228
4	54.8832	3245.27	1396.97	242.711	9.85624
5	57.4452	3244.72	2126.34	482.641	12.7884
6	60.0072	3244.32	3046.82	841.902	15.4466
7	62.5692	3244.06	4076.2	1308.1	17.792
8	65.1312	3243.94	5120.2	1843.2	19.7982
9	67.6932	3243.95	6097.81	2395.66	21.4485
10	70.2552	3244.11	6943.6	2909.42	22.734
11	72.7836	3244.4	7986.94	3496.2	23.6409
12	75.3121	3244.83	8813.03	3958.31	24.1869
13	77.8406	3245.4	9403.19	4259.9	24.3718
14	80.3691	3246.12	9749.92	4380.89	24.1956
15	82.8976	3246.99	9853.64	4316.91	23.6584
16	85.4261	3248.03	9719.93	4077.94	22.7602
17	87.9546	3249.24	9357.41	3686.46	21.5025
18	90.483	3250.65	8776.76	3175.28	19.8892
19	93.0115	3252.27	7991.1	2585.5	17.9289
20	95.54	3254.13	7017.79	1964.24	15.6366
21	98.0366	3256.24	5474.56	1271.15	13.072
22	100.533	3258.67	3749.38	677.503	10.2427
23	103.03	3261.5	2033.86	256.783	7.19575
24	105.527	3264.87	570.662	39.8033	3.98988
25	108.023	3269	-276.139	-3.34302	0.693606
26	108.545	3270	0	0	0

List Of Coordinates

External Boundary

X	Y
0	3239
0	3210
250	3210
250	3236

250	3240
250	3252
250	3270
145	3270
135	3265
120	3270
100	3270
56	3248
0	3247

Material Boundary

X	Y
56	3248
90.85	3238.49
100	3236
120	3236
128.96	3239.13
160	3250
190	3250
210	3240
250	3240

Material Boundary

X	Y
90.85	3238.49
100	3269
120	3269
128.96	3239.13

Material Boundary

X	Y
135	3265
168	3254
250	3252

Material Boundary

X	Y
120	3236
250	3236

Material Boundary

X	Y
0	3239
56	3239
100	3236

Slide Analysis Information

2026 SAFETY FACTOR ASSESSMENT OF CCR SURFACE IMPOUNDMENTS AT CSES

Project Summary

File Name: 4.1 - 12 BAP DIKE B - Downstream - Existing Conditions - Seismic.slim
Slide Modeler Version: 6.02
Project Title: 2026 SAFETY FACTOR ASSESSMENT OF CCR SURFACE IMPOUNDMENTS AT CSES
Analysis: UNITS 1&2 BOTTOM ASH POND (BAP) DIKE (SECTION B) - EXISTING CONDITIONS - SEISMIC ANALYSIS
Author: AWJ
Company: HYDROMETRICS, INC.
Date Created: 9/25/2026, 4:07:52 PM

General Settings

Units of Measurement: Imperial Units
Time Units: days
Permeability Units: feet/second
Failure Direction: Right to Left
Data Output: Standard
Maximum Material Properties: 20
Maximum Support Properties: 20

Analysis Options

Analysis Methods Used

Bishop simplified
GLE/Morgenstern-Price with interslice force function: Half Sine
Janbu simplified

Number of slices: 25
Tolerance: 0.005
Maximum number of iterations: 50
Check malpha < 0.2: Yes
Initial trial value of FS: 1
Steffensen Iteration: Yes

Groundwater Analysis

Groundwater Method: Water Surfaces
Pore Fluid Unit Weight: 62.4 lbs/ft3
Advanced Groundwater Method: None

Random Numbers

Pseudo-random Seed: 10116
Random Number Generation Method: Park and Miller v.3

Surface Options

Surface Type: Circular
Search Method: Grid Search
Radius Increment: 10
Composite Surfaces: Disabled
Reverse Curvature: Invalid Surfaces
Minimum Elevation: Not Defined
Minimum Depth: Not Defined

Loading

Seismic Load Coefficient (Horizontal): 0.03

Material Properties

Property	Embankment Fill	Central Core	Foundation	Waste - Fly Ash	Bedrock
Color					
Strength Type	Mohr-Coulomb	Mohr-Coulomb	Mohr-Coulomb	Mohr-Coulomb	Infinite strength
Unit Weight [lbs/ft3]	127	127	118.2	107	125
Cohesion [psf]	298.3	0	86.2	0	
Friction Angle [deg]	24.7	26.8	23.4	25.6	
Water Surface	None	None	None	None	None
Ru Value	0	0	0	0	0

Global Minimums

Method: bishop simplified

FS: 1.633860
Center: 66.877, 3291.517
Radius: 47.680
Left Slip Surface Endpoint: 47.725, 3247.852
Right Slip Surface Endpoint: 109.426, 3270.000
Resisting Moment=2.16933e+006 lb-ft
Driving Moment=1.32773e+006 lb-ft
Total Slice Area=603.494 ft2

Method: janbu simplified

FS: 1.408880
Center: 69.991, 3279.061
Radius: 37.311
Left Slip Surface Endpoint: 49.494, 3247.884
Right Slip Surface Endpoint: 106.185, 3270.000
Resisting Horizontal Force=41142.9 lb
Driving Horizontal Force=29202.6 lb
Total Slice Area=667.92 ft2

Method: gle/morgenstern-price

FS: 1.622030
Center: 66.877, 3290.738
Radius: 46.973
Left Slip Surface Endpoint: 47.714, 3247.852
Right Slip Surface Endpoint: 109.024, 3270.000
Resisting Moment=2.1122e+006 lb-ft
Driving Moment=1.30219e+006 lb-ft
Resisting Horizontal Force=40371.5 lb
Driving Horizontal Force=24889.5 lb
Total Slice Area=600.35 ft2

Slice Data

Global Minimum Query (bishop simplified) - Safety Factor: 1.63386

Slice Number	Width [ft]	Weight [lbs]	Base Material	Base Cohesion [psf]	Base Friction Angle [degrees]	Shear Stress [psf]	Shear Strength [psf]	Base Normal Stress [psf]	Pore Pressure [psf]	Effective Normal Stress [psf]
1	2.55233	162.65	Foundation	86.2	23.4	77.9669	127.387	95.1774	0	95.1774
2	2.55233	462.899	Foundation	86.2	23.4	110.721	180.903	218.845	0	218.845
3	2.55233	714.453	Foundation	86.2	23.4	136.956	223.767	317.899	0	317.899
4	2.55233	1039.12	Foundation	86.2	23.4	170.469	278.523	444.435	0	444.435
5	2.55233	1603.49	Foundation	86.2	23.4	229.01	374.17	665.46	0	665.46
6	2.55233	2137.1	Foundation	86.2	23.4	282.58	461.696	867.722	0	867.722
7	2.55233	2628.68	Foundation	86.2	23.4	330.233	539.554	1047.64	0	1047.64
8	2.55233	3078.79	Foundation	86.2	23.4	372.267	608.232	1206.34	0	1206.34
9	2.55233	3487.61	Foundation	86.2	23.4	408.902	668.089	1344.67	0	1344.67
10	2.4568	3694.73	Embankment Fill	298.3	24.7	588.347	961.276	1441.41	0	1441.41
11	2.4568	3976.09	Embankment Fill	298.3	24.7	610.839	998.025	1521.31	0	1521.31
12	2.4568	4216.36	Embankment Fill	298.3	24.7	628.034	1026.12	1582.39	0	1582.39
13	2.4568	4414.3	Embankment Fill	298.3	24.7	639.918	1045.54	1624.61	0	1624.61
14	2.4568	4568.26	Embankment Fill	298.3	24.7	646.427	1056.17	1647.73	0	1647.73
15	2.4568	4676.02	Embankment Fill	298.3	24.7	647.44	1057.83	1651.33	0	1651.33
16	2.4568	4734.77	Embankment Fill	298.3	24.7	642.772	1050.2	1634.75	0	1634.75
17	2.4568	4740.85	Embankment Fill	298.3	24.7	632.164	1032.87	1597.06	0	1597.06
18	2.4568	4689.57	Embankment Fill	298.3	24.7	615.267	1005.26	1537.04	0	1537.04
19	2.4568	4574.75	Embankment Fill	298.3	24.7	591.614	966.615	1453.02	0	1453.02
20	2.72833	4856.49	Central Core	0	26.8	441.535	721.406	1428.14	0	1428.14
21	2.72833	4494.41	Central Core	0	26.8	395.658	646.449	1279.75	0	1279.75
22	2.72833	3663.35	Central Core	0	26.8	310.211	506.841	1003.37	0	1003.37
23	2.72833	2522	Central Core	0	26.8	203.25	332.082	657.411	0	657.411
24	2.72833	1122.89	Central Core	0	26.8	84.4742	138.019	273.232	0	273.232
25	0.520626	33.0598	Embankment Fill	298.3	24.7	130.239	212.793	-185.906	0	-185.906

Global Minimum Query (janbu simplified) - Safety Factor: 1.40888

Slice Number	Width [ft]	Weight [lbs]	Base Material	Base Cohesion [psf]	Base Friction Angle [degrees]	Shear Stress [psf]	Shear Strength [psf]	Base Normal Stress [psf]	Pore Pressure [psf]	Effective Normal Stress [psf]
1	2.47189	224.323	Foundation	86.2	23.4	109.35	154.061	156.817	0	156.817
2	2.47189	637.199	Foundation	86.2	23.4	166.128	234.054	341.67	0	341.67
3	2.47189	1008.78	Foundation	86.2	23.4	213.888	301.343	497.168	0	497.168
4	2.47189	1604.79	Foundation	86.2	23.4	290.527	409.317	746.681	0	746.681
5	2.47189	2222.22	Foundation	86.2	23.4	366.593	516.485	994.33	0	994.33
6	2.47189	2786.67	Foundation	86.2	23.4	432.5	609.341	1208.91	0	1208.91

7	2.47189	3300.55	Foundation	86.2	23.4	489.304	689.371	1393.85	0	1393.85
8	2.47189	3765.4	Foundation	86.2	23.4	537.756	757.634	1551.59	0	1551.59
9	2.47189	4182.07	Foundation	86.2	23.4	578.382	814.871	1683.86	0	1683.86
10	2.47189	4550.74	Foundation	86.2	23.4	611.535	861.58	1791.8	0	1791.8
11	2.47189	4870.97	Foundation	86.2	23.4	637.428	898.06	1876.1	0	1876.1
12	2.24047	4640.07	Embankment Fill	298.3	24.7	829.717	1168.97	1892.97	0	1892.97
13	2.24047	4801.27	Embankment Fill	298.3	24.7	834.911	1176.29	1908.88	0	1908.88
14	2.24047	4919.46	Embankment Fill	298.3	24.7	833.405	1174.17	1904.27	0	1904.27
15	2.24047	4991.98	Embankment Fill	298.3	24.7	824.966	1162.28	1878.42	0	1878.42
16	2.24047	5015.24	Embankment Fill	298.3	24.7	809.242	1140.13	1830.26	0	1830.26
17	2.24047	4984.44	Embankment Fill	298.3	24.7	785.728	1107	1758.23	0	1758.23
18	2.24047	4893.02	Embankment Fill	298.3	24.7	753.716	1061.9	1660.17	0	1660.17
19	2.24047	4731.83	Embankment Fill	298.3	24.7	712.209	1003.42	1533.03	0	1533.03
20	2.26225	4529.56	Central Core	0	26.8	534.552	753.12	1490.93	0	1490.93
21	2.26225	4173.9	Central Core	0	26.8	469.479	661.439	1309.43	0	1309.43
22	2.26225	3613.9	Central Core	0	26.8	381.745	537.833	1064.73	0	1064.73
23	2.26225	2601.16	Central Core	0	26.8	250.629	353.106	699.032	0	699.032
24	2.26225	1152.39	Central Core	0	26.8	93.3855	131.569	260.463	0	260.463
25	0.265138	16.8362	Embankment Fill	298.3	24.7	104.1	146.665	-329.677	0	-329.677

Global Minimum Query (gle/morgenstern-price) - Safety Factor: 1.62203

Slice Number	Width [ft]	Weight [lbs]	Base Material	Base Cohesion [psf]	Base Friction Angle [degrees]	Shear Stress [psf]	Shear Strength [psf]	Base Normal Stress [psf]	Pore Pressure [psf]	Effective Normal Stress [psf]
1	2.57502	168.344	Foundation	86.2	23.4	81.7362	132.579	107.174	0	107.174
2	2.57502	478.76	Foundation	86.2	23.4	123.484	200.294	263.657	0	263.657
3	2.57502	738.168	Foundation	86.2	23.4	160.761	260.759	403.384	0	403.384
4	2.57502	1078.65	Foundation	86.2	23.4	207.98	337.35	580.374	0	580.374
5	2.57502	1656.42	Foundation	86.2	23.4	282.902	458.875	861.201	0	861.201
6	2.57502	2199.43	Foundation	86.2	23.4	349.566	567.007	1111.08	0	1111.08
7	2.57502	2698.64	Foundation	86.2	23.4	404.702	656.439	1317.75	0	1317.75
8	2.57502	3154.64	Foundation	86.2	23.4	447.309	725.548	1477.45	0	1477.45
9	2.57502	3567.59	Foundation	86.2	23.4	477.425	774.398	1590.33	0	1590.33
10	2.44156	3715.08	Embankment Fill	298.3	24.7	670.682	1087.87	1716.64	0	1716.64
11	2.44156	3988.45	Embankment Fill	298.3	24.7	675.455	1095.61	1733.47	0	1733.47
12	2.44156	4220.77	Embankment Fill	298.3	24.7	671.199	1088.7	1718.46	0	1718.46
13	2.44156	4410.74	Embankment Fill	298.3	24.7	659.931	1070.43	1678.73	0	1678.73
14	2.44156	4556.61	Embankment Fill	298.3	24.7	643.53	1043.83	1620.89	0	1620.89
15	2.44156	4656.11	Embankment Fill	298.3	24.7	623.559	1011.43	1550.46	0	1550.46
16	2.44156	4706.27	Embankment Fill	298.3	24.7	601.146	975.077	1471.42	0	1471.42
17	2.44156	4703.3	Embankment Fill	298.3	24.7	576.933	935.803	1386.03	0	1386.03
18	2.44156	4642.23	Embankment Fill	298.3	24.7	551.077	893.863	1294.85	0	1294.85
19	2.44156	4516.58	Embankment Fill	298.3	24.7	523.282	848.779	1196.83	0	1196.83
20	2.64249	4660.22	Central Core	0	26.8	356.757	578.671	1145.57	0	1145.57
21	2.64249	4306.51	Central Core	0	26.8	323.322	524.438	1038.21	0	1038.21
22	2.64249	3520.03	Central Core	0	26.8	260.31	422.23	835.874	0	835.874
23	2.64249	2425.18	Central Core	0	26.8	177.716	288.261	570.66	0	570.66
24	2.64249	1081.69	Central Core	0	26.8	79.038	128.202	253.797	0	253.797
25	0.506955	32.1916	Embankment Fill	298.3	24.7	130.711	212.017	-187.593	0	-187.593

Interslice Data

Global Minimum Query (bishop simplified) - Safety Factor: 1.63386

Slice Number	X coordinate [ft]	Y coordinate - Bottom [ft]	Interslice Normal Force [lbs]	Interslice Shear Force [lbs]	Interslice Force Angle [degrees]
1	47.7249	3247.85	0	0	0
2	50.2772	3246.82	291.808	0	0
3	52.8295	3245.95	749.322	0	0
4	55.3819	3245.24	1302.06	0	0
5	57.9342	3244.68	1953.67	0	0
6	60.4865	3244.27	2765.13	0	0
7	63.0388	3243.99	3659.1	0	0
8	65.5912	3243.85	4564.51	0	0
9	68.1435	3243.85	5420.06	0	0
10	70.6958	3243.99	6172.6	0	0
11	73.1526	3244.25	7125.75	0	0
12	75.6094	3244.64	7906.81	0	0
13	78.0662	3245.17	8487.84	0	0
14	80.523	3245.83	8845.78	0	0
15	82.9798	3246.64	8962.35	0	0
16	85.4366	3247.6	8824.27	0	0
17	87.8934	3248.72	8423.72	0	0
18	90.3502	3250.01	7759.19	0	0
19	92.807	3251.5	6836.92	0	0

20	95.2638	3253.21	5673.11	0	0
21	97.9922	3255.39	3613.78	0	0
22	100.721	3257.93	1301.77	0	0
23	103.449	3260.92	-967.903	0	0
24	106.177	3264.52	-2853.71	0	0
25	108.906	3269	-3882.06	0	0
26	109.426	3270	0	0	0

Global Minimum Query (janbu simplified) - Safety Factor: 1.40888

Slice Number	X coordinate [ft]	Y coordinate - Bottom [ft]	Interslice Normal Force [lbs]	Interslice Shear Force [lbs]	Interslice Force Angle [degrees]
1	49.4944	3247.88	0	0	0
2	51.9663	3246.39	497.823	0	0
3	54.4382	3245.15	1315.83	0	0
4	56.9101	3244.12	2326.04	0	0
5	59.382	3243.29	3615.37	0	0
6	61.8539	3242.65	5094.44	0	0
7	64.3258	3242.18	6644.17	0	0
8	66.7976	3241.89	8168.5	0	0
9	69.2695	3241.76	9588.26	0	0
10	71.7414	3241.79	10837	0	0
11	74.2133	3241.99	11858.4	0	0
12	76.6852	3242.36	12604	0	0
13	78.9257	3242.84	13417.4	0	0
14	81.1661	3243.46	13949.2	0	0
15	83.4066	3244.25	14181.4	0	0
16	85.6471	3245.19	14101.2	0	0
17	87.8875	3246.32	13700.7	0	0
18	90.128	3247.65	12978.5	0	0
19	92.3685	3249.21	11941.6	0	0
20	94.6089	3251.02	10609.4	0	0
21	96.8712	3253.18	8462.77	0	0
22	99.1334	3255.76	6026.42	0	0
23	101.396	3258.91	3426	0	0
24	103.658	3262.98	1075.46	0	0
25	105.92	3269	-316.073	0	0
26	106.185	3270	0	0	0

Global Minimum Query (gle/morgenstern-price) - Safety Factor: 1.62203

Slice Number	X coordinate [ft]	Y coordinate - Bottom [ft]	Interslice Normal Force [lbs]	Interslice Shear Force [lbs]	Interslice Force Angle [degrees]
1	47.714	3247.85	0	0	0
2	50.289	3246.79	318.933	20.9768	3.76303
3	52.864	3245.9	856.382	111.672	7.42943
4	55.439	3245.18	1540.44	296.937	10.9106
5	58.014	3244.61	2374.23	597.766	14.1318
6	60.5891	3244.19	3415.15	1046.42	17.0353
7	63.1641	3243.91	4555.24	1620.36	19.5812
8	65.7391	3243.78	5691.34	2269.9	21.7438
9	68.3141	3243.79	6735.78	2930.22	23.5102
10	70.8892	3243.94	7619.43	3532.75	24.8748
11	73.3307	3244.21	8674.58	4192.9	25.797
12	75.7723	3244.62	9502.03	4708.29	26.3586
13	78.2138	3245.15	10087.6	5042.88	26.5609
14	80.6554	3245.83	10428.1	5177.52	26.4043
15	83.097	3246.65	10527.7	5109.35	25.8884
16	85.5385	3247.63	10395.2	4850.04	25.0121
17	87.9801	3248.77	10041.7	4423.51	23.7742
18	90.4217	3250.09	9479.52	3863.63	22.1747
19	92.8632	3251.61	8722.14	3212.08	20.2171
20	95.3048	3253.34	7785.73	2516.37	17.911
21	97.9473	3255.51	6108.07	1641.6	15.0433
22	100.59	3258.03	4216.75	882.973	11.8267
23	103.232	3260.99	2320.58	339.27	8.31774
24	105.875	3264.55	685.527	55.067	4.59259
25	108.517	3269	-266.67	-3.4627	0.743942
26	109.024	3270	0	0	0

List Of Coordinates

External Boundary

X	Y

0	3239
0	3210
250	3210
250	3236
250	3240
250	3252
250	3270
145	3270
135	3265
120	3270
100	3270
56	3248
0	3247

Material Boundary

X	Y
56	3248
90.85	3238.49
100	3236
120	3236
128.96	3239.13
160	3250
190	3250
210	3240
250	3240

Material Boundary

X	Y
90.85	3238.49
100	3269
120	3269
128.96	3239.13

Material Boundary

X	Y
135	3265
168	3254
250	3252

Material Boundary

X	Y
120	3236
250	3236

Material Boundary

X	Y
0	3239
56	3239
100	3236