May 3, 2024

Mr. Wyatt Webster
Environmental and Land Manager
Holcim-WCR
1687 Cole Blvd., Suite 300
Golden, CO 80401

Re: Revised Pond 1 Reclamation Slope Stability Analyses, Xcel Transmission Towers, Wattenberg Lakes Mine Amendment, DRMS Permit NO. M-2004-051

Dear Mr. Webster:

This letter summarizes supplemental reclamation slope stability analyses performed near the Xcel utility towers located on the east side of Pond 1 at the Wattenberg Lakes Mine. Previous stability analyses at the site were performed by Tetra Tech (2023). Additional geotechnical design data, in the form of additional borings and laboratory testing, indicates the design slopes and strength parameters will differ than those originally analyzed. Currently two reclamation slope options are under consideration at the mine referred to herein as a shallower and deeper. We have analyzed both reclamation slope options and found both of the slope configurations to be stable as discussed herein.

The Pond 1 site is located north of intersection of Weld County Roads 23.5 and 2.75 in Weld County, Colorado. More specifically, the site is within part of Section 36, Township 1 North, Range 67 West of the 6th Principal Meridian. Land uses in the area include agricultural, oil and gas production, active gravel mines, gravel mines reclaimed as below grade reservoirs, and rural residential housing.

GEOLOGY

The Site is located approximately 25 miles east of the eastern flank of the Rocky Mountain Front Range. Younger sedimentary strata dip eastward off the Pre-Cambrian igneous and metamorphic rocks that form the core of the Front Range into the Denver Structural Basin. The Denver Basin is an asymmetrical down-warp of sedimentary strata with a steeply dipping west limb and a gently dipping east limb.

Bedrock does not crop out at the site, however regional geologic mapping of the area (Colton, 1978) indicates the near surface bedrock at the site is most likely the Denver and Arapahoe (Colton, 1978 maps the Denver and Arapahoe Formation as undifferentiated). Colton (1978) describes the Denver and Arapahoe Formations as olive gray claystone and siltstone interbedded with tuffaceous sandstone. Review of mapping at the State Division of Water Resources indicates the site is within the recharge area of the Lower Arapahoe Aquifer. The regional mapping indicates the bedrock is overlain by the Piney Creek and Post Piney Creek Alluviums. Colton (1978) describes these alluvial deposits as sandy and gravelly alluvium. The Post Piney Creek alluvium tends to underlie the active stream channels. The Piney Creek Alluvium is the adjacent terrace deposit that tends to lie 10 to 20 feet higher than the Post Piney Creek Alluvium.

GEOTECHNICAL EXPLORATIONS

Civil Resources, LLC personnel logged and observed two sets of exploratory investigations at the site:

1.) Exploratory test pits excavated by a track-hoe on the west side of the site on November 29, 2023, and
2.) Exploratory drilling along the slurry wall alignment and borrow areas from January 11 to 19, 2005 and from November 20 to 22, 2023.

Exploratory locations, drill and test pit logs are provided in Attachment A. Laboratory data is presented along-side the

logs.

Exploratory Test Pits
Nine (9) test pits were excavated at the approximate locations shown on Sheet 3 of the plans (Attachment A). The purpose of the test pit program was to explore mining spoils remaining on the west side of the site and obtain bulk samples of the materials for testing at a geotechnical laboratory. A representative of Civil Resources, LLC logged the test pits. Summary logs and notes pertaining to the exploratory test pits are presented on Sheet 13 of the plans (Attachment A). A discussion of the materials encountered is presented below.

Exploratory Drilling
A total of twenty-two (22) exploratory borings were drilled at the Pond 1 site. Eighteen (18) of these borings were drilled along and/or near the proposed slurry wall alignment at the locations shown on Sheet 3 of the plans (Attachment A). The purpose of the drilling was to investigate subsurface conditions of the overburden, alluvial sand and gravel, and the underlying bedrock. Summary logs and notes pertaining to the drilling are included on Sheets 10 through 12 of the plans (Attachment A). The remaining four (4) borings were drilled in the mine spoil area and along the previous permitted slurry wall alignment associated with the prior mine plan. These four (4) borings provide additional subsurface data related to the mine spoils and additional bedrock elevation data in the interior of the reservoir.

A representative of Civil Resources LLC logged the boreholes. During drilling, subsurface samples were obtained by driving a Standard Slit Spoon sampler at the intervals indicated on the Summary Logs. The samples were driven with a 140-pound hammer free falling 30-inches (standard penetration test, (spt)). The spt tests give an indication of the soil/bedrock density and consistency by recording the number of hammer blows (n value) necessary to drive the sampler the bottom foot of the drive. These values are recorded on the Summary Logs (Attachment A). In addition, the bedrock was cored at four (4) locations. Where cored, packer permeability testing was performed. The packer test consisted of placing an inflatable packer in the boring immediately above the interval to be tested. Water was then introduced at various pressures below the packer. Based on the pressure and flow into the formation, the hydraulic conductivity can be calculated.

SUBSURFACE CONDITIONS
Based on the site investigations, the site subsurface generally consists of four (4) main soil/bedrock units: 1) Fill Mine Spoils on the west half of the site generally consisting of clayey sand grading to sandy clay; 2) Overburden in unmined areas generally consisting of near surface clayey sand to sandy clay; 3) sand and gravel alluvial deposits that underlie the overburden and overlie the bedrock; and 4) bedrock usually consisting of claystone with lesser amounts of sandstone that is commonly weathered in the top 1 to 2 feet and is commonly interbedded and interlaminated.

Fill Mine Spoils
The fill mine spoils are stockpiled in the previously mined cell on the west part of the site. These fill mine spoils exist at the surface and extend to bedrock left over after mining the west part of the cell. Where encountered in the field explorations, this fill ranges from approximately 12 to 24 feet in thickness. Thinner areas should be anticipated at the edges of the fill and in areas of high bedrock. This unit is typically slightly moist to moist, very loose to dense when classified as a clayey sand, and stiff to very stiff when classified as a sandy clay. Field observations indicate discrete zones of sand, clayey sand, silty sand, and sandy clay appear to be present. Of the fill mine spoils samples tested, the range of percent passing the No. 200 sieve ranged from 26.4% to 75.9% with an average of 42.2%. Atterberg Limits testing resulted in Liquid Limits of 19 to 33 averaging 26.1 and Plasticity Indices of 2 to 14 averaging 8.1.

Overburden
The overburden is typically clayey sand commonly grading to sandy clay that is of low plasticity though one tested sample was of high plasticity. This unit overlies the site sand and gravel along the slurry wall alignment and is usually on the order of 1 to 2 feet thick or not present. Locally this unit can be as much as 6-feet thick. This unit is usually dry to moist, occasionally very moist; very loose where classified as a sand or, locally soft to stiff where classified as a clay;

containing significant organics in the upper 6-8 inches. Some blow counts (n values) in the uppermost samples are skewed to a higher value due to the frozen nature of the soils at the time of drilling. Of the overburden samples tested, the range of percent passing the No. 200 sieve ranged from 18.8% to 90.5% with an average of 43.8%. Atterberg Limits testing resulted in Liquid Limits of 21 to 56 averaging 33.4 and Plasticity Indices of 5 to 30 averaging 13.8.

Sand and Gravel

The sand and gravel unit lies in unmined intervals on the east half of the site and along the slurry wall alignment underlying the overburden and overlying the bedrock. This unit typically consists of gravelly, fine to coarse grained sand locally grading to sandy gravel. Where gravels were encountered, the size was typically ¼ to 1.5 inches. This unit is typically medium dense to dense, but is also locally very loose to loose. This deposit ranges in thickness from approximately 5 feet to 44 feet where encountered. The sands are clean with fines content (silt and clay) generally ranging from approximately 1.6% to 12%.

Bedrock

The bedrock encountered in the exploratory borings was generally weathered in the upper one to two feet typically became harder in unweathered zones and with depth. The bedrock consisted predominately of claystone and sandy claystone with local areas of clayey sandstone and silty sandstone that were commonly interbedded and interlaminated. Local lignite was also encountered. The percent passing No. 200 sieve ranges from approximately 16.3% to 97.1% averaging 80.8%.

Groundwater

The 2005 drilling focused on the east side of Pond 1 at a time when the site was not dewatered and groundwater levels ranged from approximately 2.5 to 7 feet below the surface. At the time of the 2023 drilling, on-going dewatering in the east part of Pond 1 was occurring. The 2023 borings focused on the west part of the slurry wall and the Fill Spoil Areas. Water levels along the west part of the slurry wall alignment remained relatively high (1 to 7 feet below grade) in-spite of the dewatering activities likely due to the presence of high bedrock. In the Fill Mine Spoil Areas, water levels were considerably lower, closer to the bedrock levels.

The groundwater levels will vary with dewatering and seasonality. Groundwater levels will typically rise during the irrigation season. Groundwater will be controlled with the proposed below grade slurry wall. After slurry wall construction, groundwater mounding (higher water table) is anticipated on the upgradient (west and south) side of the site and a groundwater shadow (deeper water table) is anticipated on the downgradient (north and east) side the site. This mounding and shadowing will be mitigated with an underdrain constructed around the Pond 1 cell.

RECLAMATION SLOPE DESIGNS

The reclamation slopes will be constructed with low plasticity clays, sandy clays, gravelly clays, clayey sands and silty sands (meeting project specifications) sourced predominately from the Fill Mine Spoils with local Overburden. Bedrock will not be used in the reclamation slope fill. If the decision is made to use bedrock in the reclamation slopes, CR should be informed in order that further evaluation and design can be performed. Use of bedrock will require flatter slopes than those currently utilized in the stability analyses. The reclamation slopes will be compacted to a minimum of 95-percent Standard Proctor Maximum Dry Density within two (2) percent of Optimum Moisture Content.

As mentioned above, two potential reclamation slopes are being considered in the area of each utility tower. Sections showing reclamation slopes are provided in Attachment B. A discussion of the shallower and deeper reclamation slopes is provided as follows:

1.) **Shallower Option**-The shallower reclamation slope will be thirty-one (31) feet or less in height, the mine limit will be 25-feet or greater from the center line of the slurry wall. The reclamation slope will be constructed from the mine limit with a 10-foot wide crest transitioning to a 3 horizontal to 1 vertical (3:1, H:V) slope extending to

mine bottom. The crest will slope one-percent (1%) away from the 3:1 slope in order to minimize runoff and winnowing on the 3:1 reclamation slope. A perimeter access road will be constructed exterior to the slurry wall.

At the northeast and southeast utility towers the shallow reclamation slope will be 28-feet deep and the local grading will result in a distance of 45-feet from the southeast utility tower and 52-feet the northeast utility tower. The slurry wall will be exterior to the utility towers. Two (2) feet of reservoir freeboard, from the low point on the north side of the reservoir was utilized in the analysis. Stability analyses (discussed below) indicate this slope configuration will be stable under future reservoir conditions near the utility towers.

2.) Deeper Option-The deeper reclamation slope will extend deeper than 31-feet. The upper part of the slope will have the same geometry as discussed in shallower option above extending to a depth of 31-feet. At the 31-foot depth, a 20-foot wide horizontal buttress will then transition to a 4:1 (h:v) slope extending to the bedrock. At the top of bedrock, another 20 foot bench will be graded and the bedrock slope will be cut/ripped at a slope of 6 horizontal to 1 vertical (6:1, h:v) until reaching the bottom of the reservoir. A perimeter access road will be constructed exterior to the slurry wall.

At the northeast and southeast utility towers the deeper reclamation slope (including the bedrock cut) will be 46 and 47-feet deep respectively. The local grading will result in a distance of 96-feet from the southeast utility tower and 82-feet the northeast utility tower. The slurry wall will be exterior to the utility towers. Two (2) feet of reservoir freeboard, from the low point on the north side of the reservoir was utilized in the analysis. Stability analyses (discussed below) indicate this slope configuration will be stable under future reservoir conditions near the utility towers.

STABILITY ANALYSES

The DRMS has standards for static and seismic stability (listed in the table below) but has not adapted a FOS for the rapid drawdown analysis for below grade reservoirs. The geotechnical practice in the area evolved from the State Engineers Office (SEO), Dam Safety Branch (DSB) requirements for jurisdictional dams. The required FOS used for the reclamation slope are summarized as follows:

Scenario	*DSB FOS*	*DRMS FOS*
Post Construction	1.3	NA
Full Reservoir Static	1.5	1.5
Rapid Drawdown	1.2	NA
Seismic	1.0	1.3

The stability analyses performed herein were performed on two (2) cross sections at each utility tower as described above and shown in Attachment B. The sections were analyzed under anticipated loading conditions listed in the above table and were performed with the GALENA computer program using the Mohr/Coulomb framework in order to evaluate the minimum FOS. Seismic analyses were modeled at 0.067 g horizontal acceleration obtained from U.S.G.S Seismic Design Map of the area (U.S.G. S., 2017) using Site Class D, Stiff Soil. The material properties assigned in the stability model and the analyses are described and summarized below.

Material Properties
The material index and engineering strengths modeled in the slope stability analyses are discussed below.

Overburden
The strength properties for the in-situ sandy clay to clayey sand overburden were based on field and laboratory testing data and on our engineering judgment; the following parameters have been used to model the overburden:

Unit Weight (pcf)	***Cohesion C' psf***	***Friction Angle Φ' °***
114	50	28

Alluvial Sand and Gravel
The sand and gravel is generally a fine to coarse-grained sand locally grading to sandy gravel that is typically medium dense to dense. The alluvial sand and gravel is modeled as follows:

Unit Weight (pcf)	***Cohesion C' psf***	***Friction Angle Φ' °***
130	0	35

Bedrock
Bedrock below the alluvium is typically sandy claystone which may locally grade to sandstone and interlaminated to interbedded claystone and sandstone bedrock. Sandstone is typically stronger than claystone. Sandy Claystone is generally a weak bedrock. To be conservative, we modeled the bedrock as sandy claystone. For the sandy claystone bedrock, two potential strength conditions were considered. These strength conditions are referred to as: 1) the unweathered bedrock (peak strength), and 2) weathered bedrock (residual strength). One (1) foot of weathered bedrock was modeled over the unweathered claystone.

Unit Weight (pcf)	***Cohesion C' psf***	***Friction Angle Φ' °***
Unweathered = 124 Weathered= 124	Unweathered= 150 Weathered= 0	Unweathered = 26 Weathered = 17

Compacted Reclamation Slope
The reclamation slopes will consist of compacted fill sourced from the fill mine spoils. The compacted mine spoils were modeled as follows:

Unit Weight (pcf)	***Cohesion C' psf***	***Friction Angle Φ' °***
119	150	28

Soil-Bentonite Slurry Wall
The slurry wall backfill consists of a mix of the fill mine spoils, overburden, sand and gravel, bentonite slurry, and imported bentonite. The resulting mix produces a non-Newtonian fluid with some shear strength characteristics based on a reduced friction angle of the fill mine spoils. Based on engineering judgment, we modeled the slurry wall as follows:

Unit Weight (pcf)	*Cohesion C' psf*	*Friction Angle Φ' °*
110	0	0

STABILITY ANALYSES RESULTS

The minimum factors of safety (FOS) for the reservoir loading conditions listed above are shown in the table below. All of the FOS are met:

Holcim, Wattenberg Lakes Gravel Mine, Pond 1
Summary of Stability Analysis Results Near Utility Towers

Section	*Scenario*	*Calculated Factor of Safety*	*DSB Factor of Safety*	*DRMS Factor of Safety*
1) **Northeast Tower-Shallower Pond**, 3h:1v slope extending to reservoir bottom.	Post Construction Full Reservoir Static Rapid Drawdown Seismic	2.41 2.63 1.83 1.80	1.3 1.5 1.2 1.0	NA 1.5 NA 1.3
2) **Northeast Tower-Deeper Pond**, Buttressed slope with bedrock cut	Post Construction Full Reservoir Static Rapid Drawdown Seismic	1.63 2.19 1.22 1.31	1.3 1.5 1.2 1.0	NA 1.5 NA 1.3
3) **Southeast Tower-Shallower Pond**, 3h:1v slope extending to reservoir bottom	Post Construction Full Reservoir Static Rapid Drawdown Seismic	2.47 2.60 1.64 1.79	1.3 1.5 1.2 1.0	NA 1.5 NA 1.3
4) **Southeast Tower-Deeper Pond**, Buttressed slope with bedrock cut	Post Construction Full Reservoir Static Rapid Drawdown Seismic	1.79 2.17 1.24 1.31	1.3 1.5 1.2 1.0	NA 1.5 NA 1.3

1. Factor of safety using the Modified Bishop limit equilibrium method.
2. Seismic Analyses were modeled with a horizontal acceleration of 0.067g (U.S.G.S., 2017, stiff soil).

As summarized in the table above, the reclamation slopes meet the design parameters. Output files of the stability analyses are included in Attachment B.

CONCLUSIONS

Based on the Factors of Safety listed in the table above, the shallower and deeper reclamation slopes constructed near the utility towers will be stable provided they are constructed to the project plans and specifications. The reclamation slope design is based on standard methods using collected field and laboratory data. The Site geology is variable and

requires close monitoring during construction to ensure proper foundation preparation. CR recommends that all areas of the foundation be observed and signed off on by the Engineer and Contractor prior to placing fill. In addition, construction QA/QC should be performed in conjunction with the specifications.

LIMITATIONS

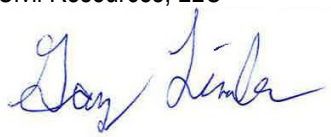
Our review is based on regional geologic mapping, present mining plans, and in part borehole data by others. Stability analyses were performed using typical strength parameters for the various strata in the critical sections. Should the mining plans change, or subsurface conditions vary from those portrayed in this letter, we should be contacted to re-evaluate the potential effects on utility towers.

The concept of risk is an important aspect of any geotechnical evaluation as analytical methods used to develop geotechnical recommendations do not comprise an exact science. The solutions or recommendations presented in any geotechnical evaluation should not be considered risk-free and, more importantly, are not a guarantee. The engineering recommendations presented in the preceding sections constitute Civil Resources best estimate of the on-site conditions and those measures that are necessary to help the slurry wall and reclamation slopes perform in a satisfactory manner, based on the information generated during this and previous evaluations, and our experience in working with these conditions. The site is within the flood way and flood plain of the South Platte River. Future flood events will likely damage the reclamation slopes.

Please call with any questions or comments.

Sincerely,

Civil Resources, LLC



Gary Linden, P.G.
Senior Engineering Geologist

Attachments: A-Geotechnical Exploration Locations and Logs
B-GALENA Model Output Files

Reference:

Colton, R.B. 1978.; “Geologic Map of the Boulder-Fort Collins-Greeley Area, Colorado”; U.S.G.S. Map I-855-G

Tetra Tech, 2023. Wattenberg Lakes Amendment, Pond 1 Reclamation Slope Stability, May 3, 2023

U.S. Geological Survey, 2017, U.S. Seismic Design Maps

Attachment A
Geotechnical Exploration Locations and Logs

LEGEND

- EXISTING BOREHOLE (DRILLED 2005)
- BOREHOLE DRILLED (DRILLED 2023)
- TEST PIT LOCATION (EXCAVATED 11/29/2023)
- EXISTING CONTOUR DECEMBER 2023

NOTES:

1. OVERHEAD ELECTRIC SAG MEASUREMENTS PERFORMED 12/21/23 AT A TEMPERATURE OF 59°F.
2. SAG ELEVATIONS WILL VARY BASED ON TEMPERATURE AND THE VOLTAGE BEING CARRIED THROUGH THE LINES.

Know what's below. Call before you dig.

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303.857.7830 (p)
CONTACT: RANDY STIPPICH

HOLCIM WATTENBERG LAKES GRAVEL MINE
POND 1 SLURRY WALL & RECLAMATION SLOPE
WELD COUNTY, COLORADO

REVISIONS

NO.	DESCRIPTION	DATE

DESIGNED BY: GL
DRAWN BY: KR
CHECKED BY: GL
JOB NO.: 359.002.01
DWG NAME: SLURRY WALL PLAN.DWG
DATE: 3/7/2024
SCALE: AS NOTED
AS NOTED

EXISTING CONDITIONS

SHEET: 3

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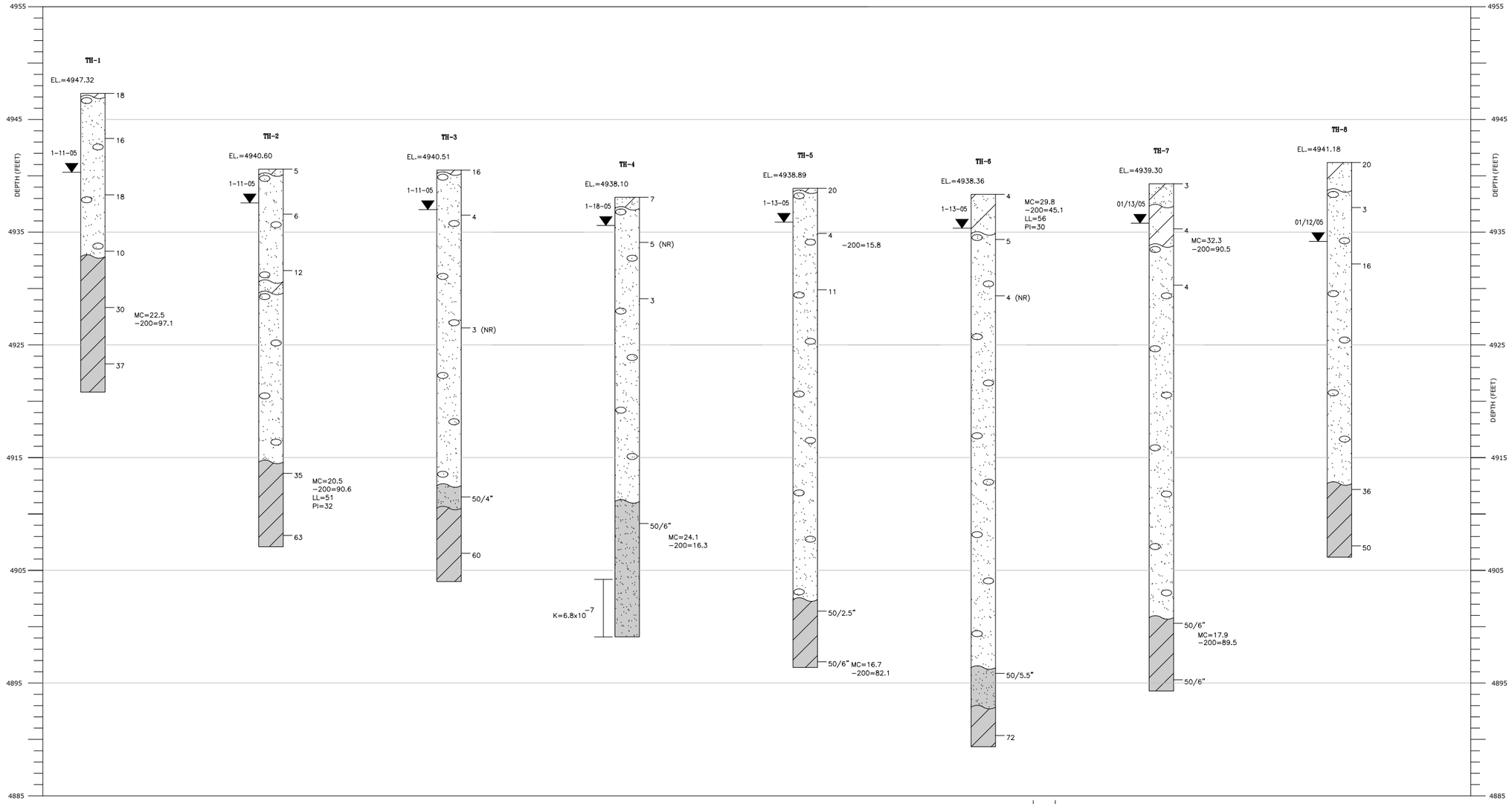


BORE LOG LEGEND:

FILL:

CLAY, MEDIUM STIFF TO STIFF, SANDY TO VERY SANDY, GRAVELLY, GRADING TO SILTY CLAYEY SANDS, DRY TO MOIST, LOCALLY VERY MOIST TAN, BROWN, (CL, CL-SC, SC, SM)

CLAY:

SOFT TO STIFF, SANDY TO VERY SANDY, LOCALLY GRADING TO CLAYEY SAND, PLASTIC TO HIGHLY PLASTIC, BROWN TO DARK BROWN, LOCALLY TAN-BUFF AND GREY TO DARK GREY (CL, CL-CH, CH, CL-SC, SC)

SAND:

VERY LOOSE; CLAYEY LOCALLY GRADING TO SANDY CLAY, ORGANICS NEAR SURFACE, LOCAL PEAT, FINE TO MEDIUM GRAINED, LOCALLY COARSE GRAINED, LOCAL TRACE GRAVEL, DRY TO MOIST, LIGHT BROWN TO DARK BROWN, LOCALLY TAN,(SC, CL-SC, CH-SC)

SAND:

VERY LOOSE TO MEDIUM DENSE, FINE TO MEDIUM GRAINED, LOCALLY COARSE GRAINED, SILTY NEAR SURFACE, LOCAL TRACE GRAVEL, MOIST TO WET, LIGHT BROWN TO BROWN, PINK, GREY, LOCALLY RED-BROWN (SW, SP, SW-SP, SM)

SAND:

VERY LOOSE TO DENSE, GRAVELLY TO VERY GRAVELLY, LOCALLY GRADING TO VERY SANDY GRAVEL, LOCAL THIN LENSES OF CLAYEY SAND, FINE TO COARSE GRAINED, DRY TO WET, LIGHT BROWN, PINK, LOCALLY RED-BROWN, ORANGE, GREY (SW, SW-SP, SW-GW, GW)

CLAYSTONE:

STIFF TO VERY HARD (SOILS), LOW STRENGTH ROCK, LOCALLY SANDY, MODERATE TO HIGHLY PLASTIC, GREY TO DARK GREY, LIGHT BROWN TO OLIVE NEAR WEATHERED ZONE, LOCAL LIGNITE NODULES, LOCAL INTERBEDDED SANDSTONE, LOCAL SLICKENSIDES PRESENT

SANDSTONE:

VERY DENSE TO HARD(SOILS), LOW TO MODERATE STRENGTH ROCK, LOCALLY CLAYEY, SILTY TO VERY SILTY, FINE GRAINED, SLIGHTLY MOIST TO WET, LIGHT GREY TO DARK GREY, OLIVE NEAR WEATHERED ZONE, LOCALLY SOME INTERBEDDED SANDSTONE

WATER LEVEL AND DATE MEASURED 4-6-20

NOTES:

1. EXPLORATORY BORINGS AND WERE DRILLED AT THE APPROXIMATE LOCATION SHOWN ON THE SITE PLAN.
2. EXPLORATORY BORINGS TH-1 THROUGH TH-14 WERE DRILLED JANUARY 11 THROUGH JANUARY 19, 2005 USING A TRUCK MOUNTED GME 75 DRILL RIG PUSHING 4.25 INCH HOLLOW STEM AUGERS.
3. EXPLORATORY BORINGS TH-15 THROUGH TH-22 WERE DRILLED NOVEMBER 20 THROUGH NOVEMBER 22, 2023 USING A TRUCKED MOUNTED DIEDRICH 120HT PUSHING 4.25 INCH HOLLOW STEM AUGERS.
4. LINES BETWEEN MATERIALS ARE APPROXIMATE AND TRANSITIONS MAY BE GRADUAL.
5. GROUNDWATER LEVELS WERE MEASURED AT THE TIME OF DRILLING AND WILL FLUCTUATE SEASONALLY AND WITH RIVER STAGE, LOCAL IRRIGATION, AND DEWATERING.
6. TEST PITS WERE EXCAVATED WITH A TRACK HOE ON NOVEMBER 29, 2023.

NQ CORE INTERVAL
REC = % RECOVERED
RQD = % ROCK QUALITY DESIGNATION

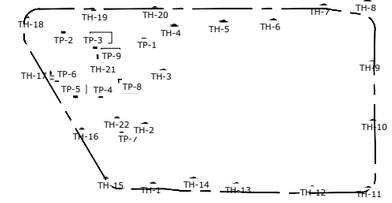
LABORATORY TESTING:

MC= % IN-SITU MOISTURE
-200 = % PASSING THE #200 SIEVE
LL = LIQUID LIMIT, %
PI = PLASTICITY INDEX, %

INTERVAL OF BULK DISTURBED SAMPLE

5 STANDARD SPLIT SPOON SAMPLE
NUMBER INDICATED THE NUMBER OF BLOWS OF A 140 LB HAMMER FREE FALLING 30 INCHES REQUIRED TO DRIVE THE SAMPLER 1-FT OR THE INDICATED INTERVAL
(NR) = NO RECOVERY

K=1x10^-5 PACKER TEST INTERVAL AND RESULTS OR "NO TAKE" IF INDICATED.



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POND 1 SLURRY WALL & RECLAMATION SLOPE
WELD COUNTY, CO

REVISIONS

NO	DESCRIPTION	DATE

DESIGNED BY: GL | DATE: 12/28/2023
DRAWN BY: KSR | SCALE: AS NOTED
CHECKED BY: GL | AS NOTED
JOB NO.: 359.002.01
DWG NAME: SLURRY WALL BORELOGS.DWG

BORE LOGS - 1

SHEET: 10

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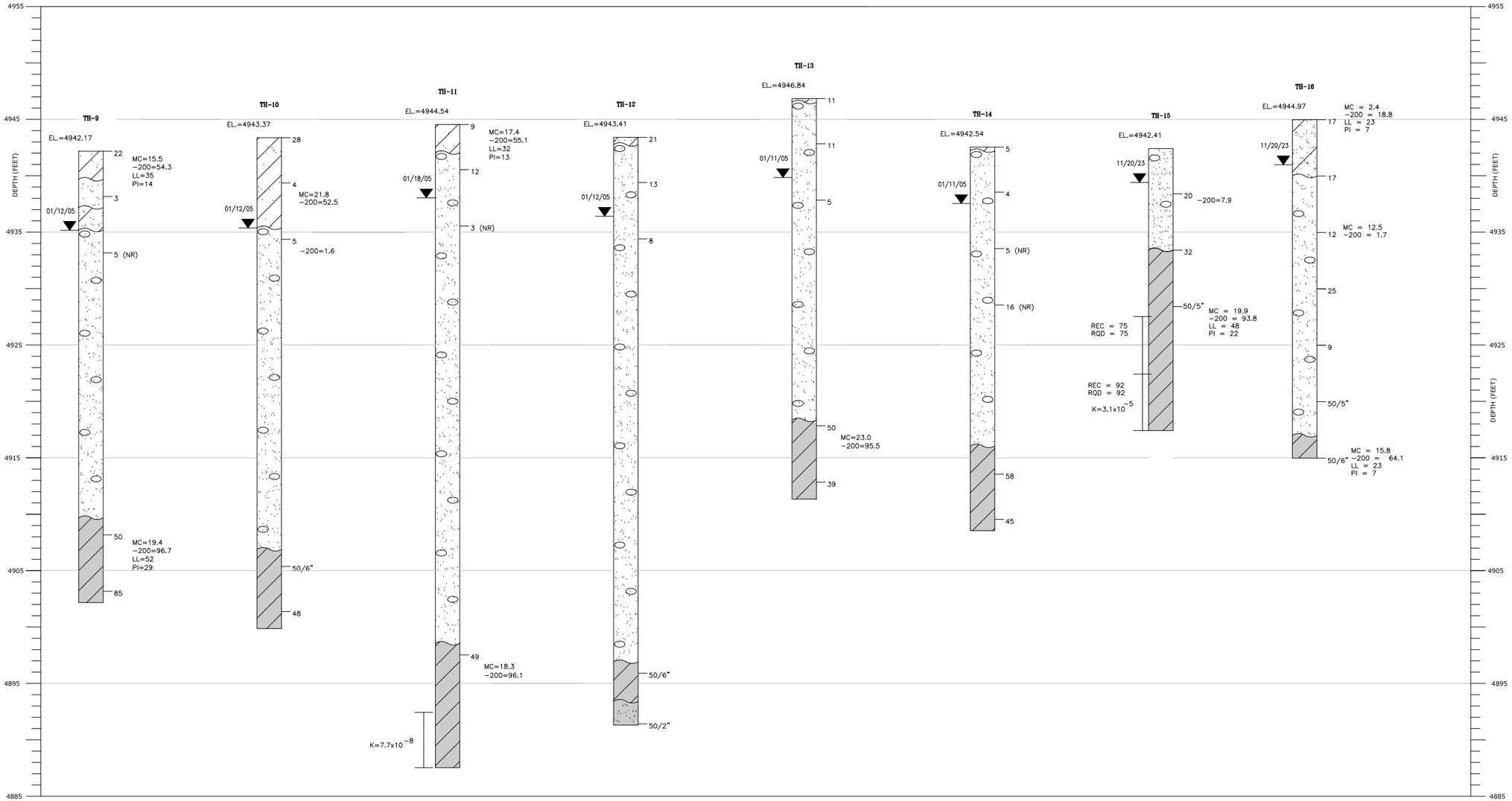
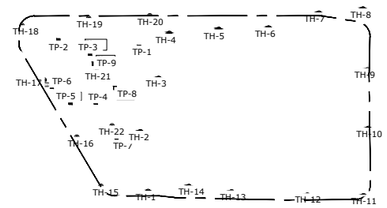


*SEE SHEET 10 FOR LEGEND AND NOTES



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BORE LOGS - 2

SHEET: 11

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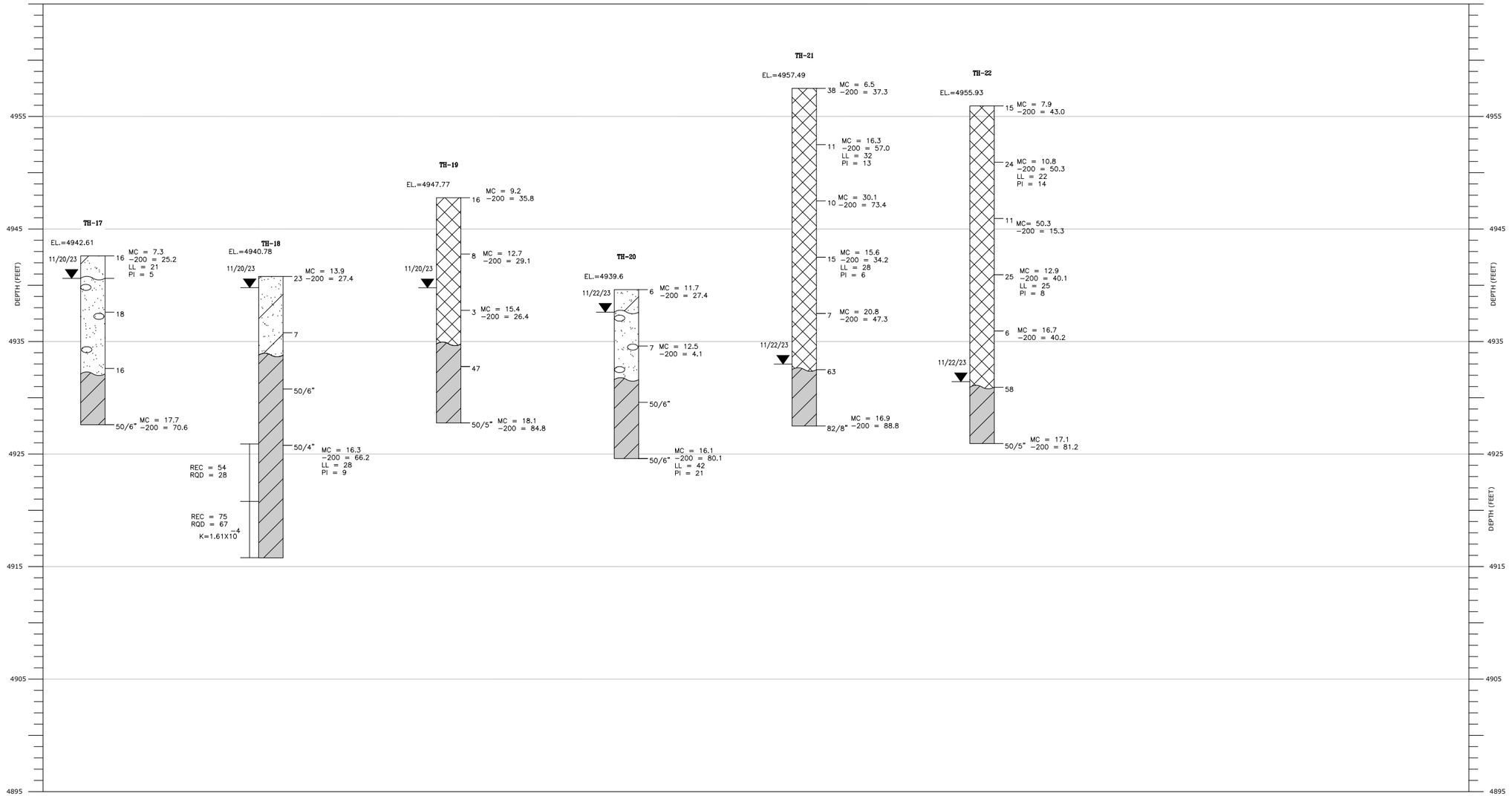
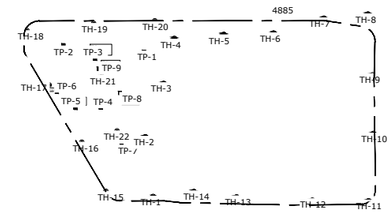


*SEE SHEET 10 FOR LEGEND AND NOTES



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FIRESTONE, CO 80504
303.833.1416
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CLAYSTONE CONSTRUCTION INC.

CLAYSTONE CONSTRUCTION INC.
11840 STATE HIGHWAY 52
FORT LUPTON, CO 80621
303.857.7830 (p)
CONTACT: RANDY STIPPICH

HOLCIM WATTENBERG LAKES GRAVEL MINE
POND 1 SLURRY WALL & RECLAMATION SLOPE
WELD COUNTY, CO

REVISIONS

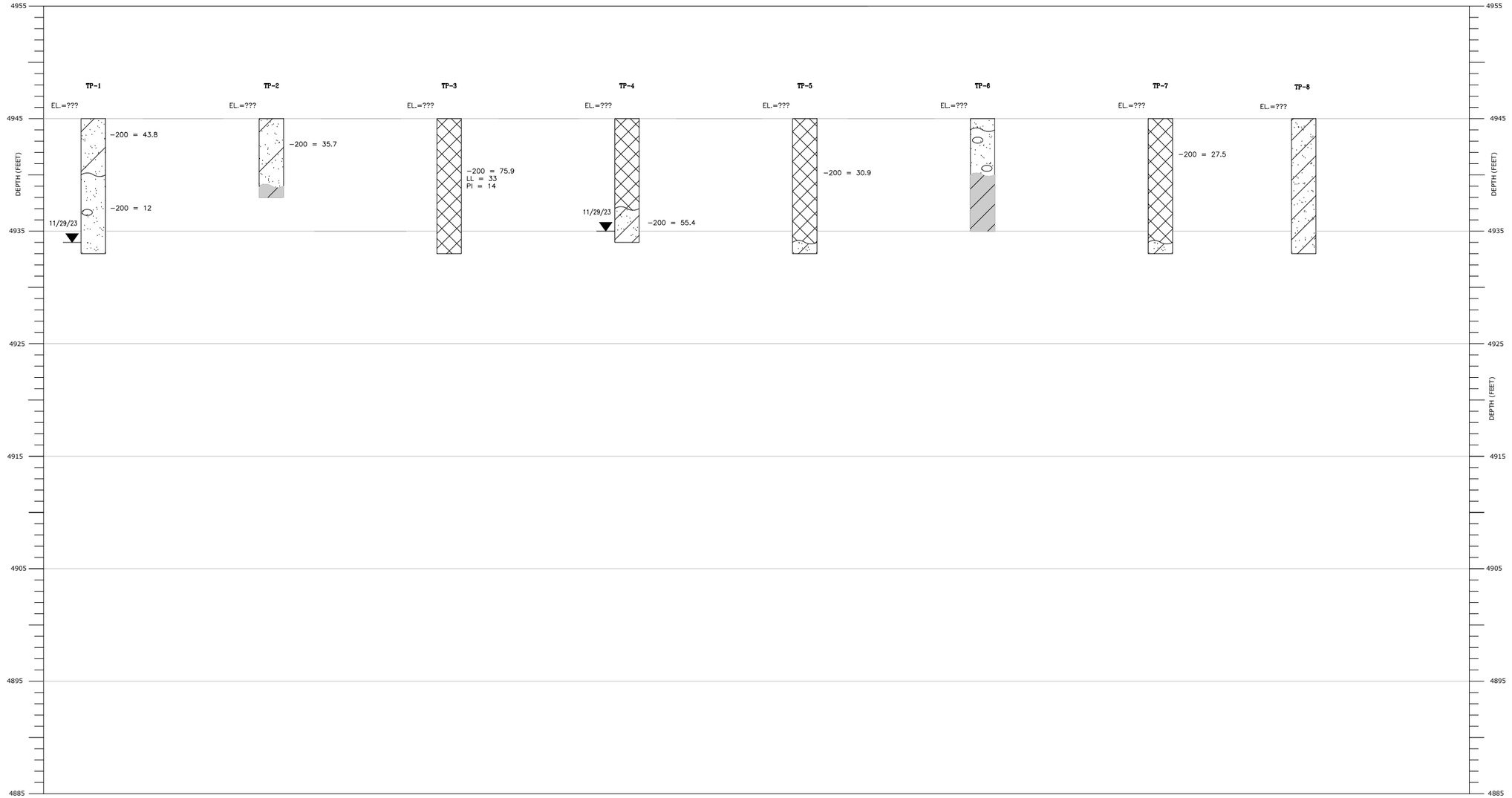
NO.	DESCRIPTION	DATE

DESIGNED BY: GL
DRAWN BY: KSR
CHECKED BY: GL
DATE: 12/28/2023
SCALE: AS NOTED
AS NOTED
JOB NO.: 359.002.01
DWG NAME: SLURRY WALL BORELOGS.DWG

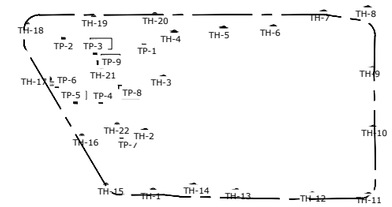
BORE LOGS - 3

SHEET: 12

J:\Claystone Construction\Wattenberg_Drawings_Sheets\Slurry Wall Borelogs.dwg, BORINGS 3, 1/15/2024 9:29:40 AM



*SEE SHEET 10 FOR LEGEND AND NOTES



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HOLCIM WATTENBERG LAKES GRAVEL MINE
POND 1 SLURRY WALL & RECLAMATION SLOPE
WELD COUNTY, CO

REVISIONS

NO.	DESCRIPTION	DATE

DESIGNED BY: ØLx | DATE: 12/28/2023
DRAWN BY: KBR | SCALE: AS NOTED
CHECKED BY: ØLx | AS NOTED
JOB NO.: 359.002.01
DWG NAME: SLURRY WALL BORELOGS.DWG

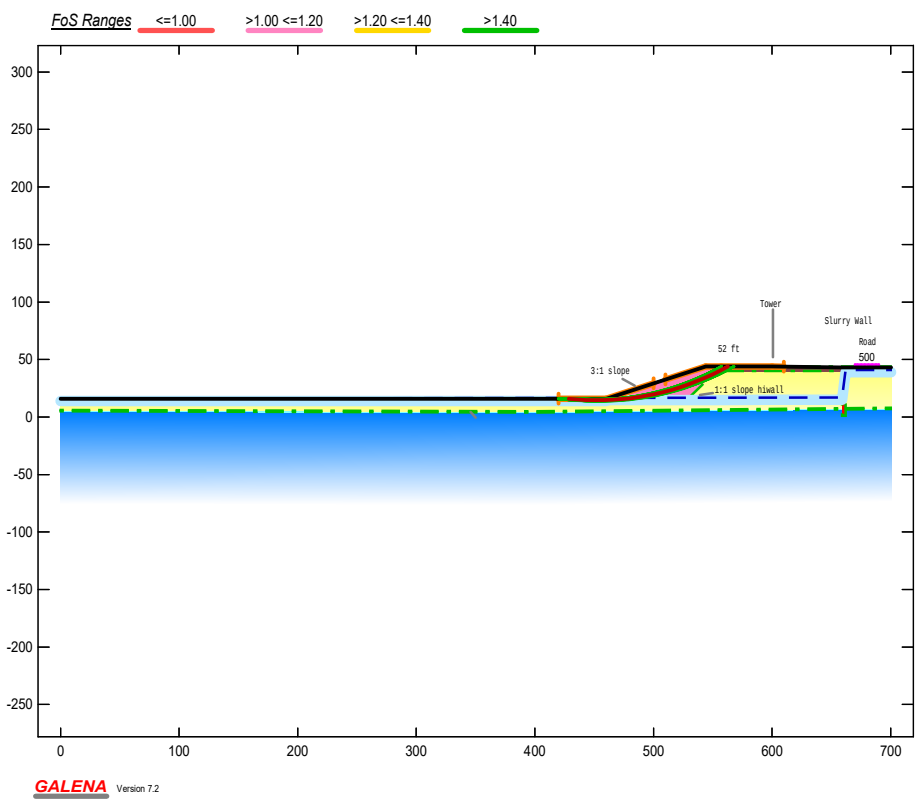
TEST PIT LOGS

SHEET: 13

J:\Claystone Construction\Wattenberg_Drawings_Sheets\Slurry Wall Borelogs.dwg, TEST PITS, 1/15/2024 9:30:00 AM

Attachment B
Stability Analyses

Northeast Tower Shallow



Material Keys

1: Overburden
2: Sand and Gravel
3: Weathered Bedrock
4: Unweathered Bedrock
5: Reclamation Slope
6: Slurry Wall

Analysis 1

Multiple Stability Analysis
Method: Bishop Simplified
Surface: Circular

Results

Critical Factor of Safety: 2.41

Project Wattenberg Lakes, Pond 1, NE Transmission Tower
Shallow Option Post Construction

File: J:\Aggregate Industries-297\Wattenberg\DRMS Stability\Stability NE\NE shallow post construction.gmf

Edited: 23 Apr 2024 *Processed:* 23 Apr 2024

Civil Resources

GALENA 7.2 Analysis Results Version: 7.2.1.05 Licensee: Civil Resources

Project: Wattenberg Lakes, Pond 1, NE Transmission Tower
File: J:\Aggregate Industries-297\Wattenberg\DRMS Stability\Stability NE\NE shallow post construction.gmf
Processed: 23 Apr 2024 10:51:46

DATA: Analysis 1 - Shallow Option Post Construction

Material Properties (6 materials)

Material: 1 (Mohr-Coulomb Isotropic) - Overburden

Cohesion	Phi	UnitWeight	Ru
50.00	28.0	114.00	Auto

Material: 2 (Mohr-Coulomb Isotropic) - Sand and Gravel

Cohesion	Phi	UnitWeight	Ru
0.00	35.0	130.00	Auto

Material: 3 (Mohr-Coulomb Isotropic) - Weathered Bedrock

Cohesion	Phi	UnitWeight	Ru
0.00	17.0	124.00	Auto

Material: 4 (Mohr-Coulomb Isotropic) - Unweathered Bedrock

Cohesion	Phi	UnitWeight	Ru
150.00	26.0	124.00	Auto

Material: 5 (Mohr-Coulomb Isotropic) - Reclamation Slope

Cohesion	Phi	UnitWeight	Ru
150.00	28.0	119.00	Auto

Material: 6 (Mohr-Coulomb Isotropic) - Slurry Wall

Cohesion	Phi	UnitWeight	Ru
0.00	0.0	110.00	Auto

Water Properties

Unit weight of water: 62.400 Unit weight of water/medium above ground: 62.400

Material Profiles (6 profiles)

Profile: 1 (2 points) Material beneath: 1 - Overburden

0.00	44.00	700.00	44.00

Profile: 2 (2 points) Material beneath: 2 - Sand and Gravel

0.00	40.00	700.00	40.00

Profile: 3 (3 points) Material beneath: 3 - Weathered Bedrock

0.00	6.00	399.00	5.00	700.00	8.00

Profile: 4 (3 points) Material beneath: 4 - Unweathered Bedrock

0.00	5.00	399.00	4.00	700.00	7.00

Profile: 5 (5 points) Material within: 6 - Slurry Wall

662.00	43.00	659.00	43.00	659.00	1.00	662.00	1.00	662.00	43.00

Profile: 6 (5 points) Material within: 5 - Reclamation Slope

557.00	44.00	544.00	44.00	460.00	16.00	529.00	16.00	557.00	44.00

Slope Surface (7 points)

0.00	16.00	460.00	16.00	544.00	44.00	557.00	44.00
600.00	44.00	659.00	43.00	700.00	43.00		

Phreatic Surface (4 points)

```
----------------
      0.00       16.00         659.00       17.00         662.00       41.00
700.00       41.00

Failure Surface
---------------
Initial circular surface for critical search defined by: XL,XR,R
  Intersects:  XL:     460.00      YL:      16.00      XR:     560.00      YR:
44.00
      Centre:  XC:     445.44      YC:     260.57                  Radius:  R:
245.00

Distributed Loads (1 load)
------------------
Load      X-Left    Pressure        X-Right   Pressure
  1       670.00      500.0         690.00      500.0

Variable Restraints
-------------------
Parameter descriptor:              XL         XR         R
Range of variation:              80.00     100.00      50.00
Trial positions within range:      20         20         50

-  --  --  --  --  --  --  --  --  --  --  --  --  --  --  --  --  --  --  --  --  --  --
--  --  --  --  --  --  --  --  --  --  --  -

RESULTS: Analysis  1 - Shallow Option Post Construction

Bishop Simplified Method of Analysis - Circular Failure Surface
---------------------------------------------------------------
Critical Failure Surface Search using Multiple Circle Generation Techniques

Initial failure surface approximation - Factor of Safety:   2.519

Analysis Summary
================
There were:  14603 successful analyses from a total of 20001 trial failure surfaces
             5398 analyses terminated due to unacceptable geometry

Critical (minimum) Factor of Safety:  2.41
==========================================

Results Summary - Lowest 99 Factor of Safety circles
----------------------------------------------------
Circle    X-Left      Y-Left     X-Right     Y-Right     X-Centre    Y-Centre
Radius      FoS
   1       428.42       16.00      562.63       44.00      452.83      234.64
220.00     2.412   <-- Critical Surface
   2       424.21       16.00      562.63       44.00      452.11      234.22
220.00     2.414
   3       428.42       16.00      562.63       44.00      452.61      235.69
221.02     2.415
   4       432.63       16.00      562.63       44.00      453.48      235.01
220.00     2.416
   5       424.21       16.00      562.63       44.00      451.90      235.28
221.02     2.416
   6       428.42       16.00      562.63       44.00      452.39      236.74
222.04     2.418
   7       424.21       16.00      562.63       44.00      451.68      236.33
222.04     2.419
   8       432.63       16.00      562.63       44.00      453.25      236.06
221.02     2.420
```

9	428.42	16.00	562.63	44.00	452.18	237.79	223.06	2.421
10	424.21	16.00	562.63	44.00	451.47	237.39	223.06	2.421
11	420.00	16.00	562.63	44.00	451.32	233.76	220.00	2.423
12	432.63	16.00	562.63	44.00	453.02	237.10	222.04	2.423
13	428.42	16.00	562.63	44.00	451.96	238.84	224.08	2.424
14	424.21	16.00	562.63	44.00	451.26	238.44	224.08	2.424
15	420.00	16.00	562.63	44.00	451.11	234.82	221.02	2.425
16	424.21	16.00	562.63	44.00	451.04	239.50	225.10	2.426
17	436.84	16.00	562.63	44.00	454.03	235.33	220.00	2.426
18	420.00	16.00	562.63	44.00	450.90	235.88	222.04	2.427
19	432.63	16.00	562.63	44.00	452.80	238.15	223.06	2.427
20	420.00	16.00	562.63	44.00	450.69	236.94	223.06	2.429
21	432.63	16.00	562.63	44.00	452.57	239.19	224.08	2.430
22	420.00	16.00	562.63	44.00	450.48	238.00	224.08	2.431
23	436.84	16.00	562.63	44.00	453.80	236.37	221.02	2.431
24	428.42	16.00	562.63	44.00	451.08	243.04	228.16	2.431
25	424.21	16.00	562.63	44.00	450.19	243.71	229.18	2.432
26	420.00	16.00	562.63	44.00	450.28	239.06	225.10	2.433
27	428.42	16.00	562.63	44.00	451.74	239.89	225.10	2.434
28	428.42	16.00	562.63	44.00	450.86	244.08	229.18	2.434
29	436.84	16.00	562.63	44.00	453.57	237.41	222.04	2.435
30	424.21	16.00	562.63	44.00	449.98	244.76	230.20	2.435
31	432.63	16.00	562.63	44.00	451.90	242.32	227.14	2.436
32	424.21	16.00	562.63	44.00	450.83	240.55	226.12	2.437
33	428.42	16.00	562.63	44.00	451.52	240.94	226.12	2.437
34	424.21	16.00	562.63	44.00	449.77	245.81	231.22	2.438
35	424.21	16.00	562.63	44.00	450.62	241.60	227.14	2.438
36	428.42	16.00	562.63	44.00	450.64	245.13	230.20	2.439
37	436.84	16.00	562.63	44.00	453.34	238.45	223.06	2.439
38	424.21	16.00	557.37	44.00	447.74	234.74	220.00	2.440
39	428.42	16.00	562.63	44.00	451.30	241.99	227.14	2.440

40	432.63	16.00	562.63	44.00	451.68	243.37	228.16	2.440
41	420.00	16.00	557.37	44.00	447.03	234.33	220.00	2.440
42	432.63	16.00	562.63	44.00	452.35	240.24	225.10	2.441
43	428.42	16.00	562.63	44.00	450.43	246.18	231.22	2.441
44	424.21	16.00	562.63	44.00	450.40	242.65	228.16	2.441
45	424.21	16.00	562.63	44.00	449.55	246.86	232.24	2.441
46	420.00	16.00	562.63	44.00	449.03	245.39	231.22	2.442
47	420.00	16.00	562.63	44.00	450.07	240.11	226.12	2.442
48	436.84	16.00	562.63	44.00	453.11	239.49	224.08	2.444
49	432.63	16.00	562.63	44.00	451.45	244.41	229.18	2.444
50	420.00	16.00	557.37	44.00	446.82	235.39	221.02	2.444
51	424.21	16.00	557.37	44.00	447.52	235.79	221.02	2.444
52	424.21	16.00	562.63	44.00	449.34	247.91	233.27	2.444
53	420.00	16.00	562.63	44.00	449.86	241.17	227.14	2.445
54	428.42	16.00	562.63	44.00	450.21	247.22	232.24	2.445
55	432.63	16.00	562.63	44.00	452.12	241.28	226.12	2.445
56	420.00	16.00	562.63	44.00	448.82	246.45	232.24	2.445
57	441.05	16.00	562.63	44.00	454.49	235.59	220.00	2.445
58	420.00	16.00	562.63	44.00	449.65	242.23	228.16	2.447
59	436.84	16.00	562.63	44.00	452.64	241.57	226.12	2.447
60	420.00	16.00	562.63	44.00	448.62	247.50	233.27	2.447
61	432.63	16.00	562.63	44.00	451.23	245.45	230.20	2.448
62	424.21	16.00	562.63	44.00	449.13	248.96	234.29	2.448
63	428.42	16.00	557.37	44.00	448.36	235.09	220.00	2.448
64	420.00	16.00	557.37	44.00	446.61	236.44	222.04	2.448
65	436.84	16.00	562.63	44.00	452.87	240.53	225.10	2.448
66	428.42	16.00	562.63	44.00	449.99	248.27	233.27	2.448
67	441.05	16.00	562.63	44.00	454.26	236.63	221.02	2.448
68	424.21	16.00	557.37	44.00	447.30	236.84	222.04	2.449
69	420.00	16.00	562.63	44.00	449.45	243.28	229.18	2.449
70	432.63	16.00	567.89	44.00	457.92	234.54	220.00	2.450

71	420.00	16.00	562.63	44.00	448.41	248.56	234.29	2.450
72	424.21	16.00	562.63	44.00	448.92	250.01	235.31	2.451
73	420.00	16.00	562.63	44.00	449.24	244.34	230.20	2.452
74	432.63	16.00	562.63	44.00	451.00	246.49	231.22	2.452
75	436.84	16.00	562.63	44.00	452.41	242.61	227.14	2.452
76	432.63	16.00	567.89	44.00	457.70	235.59	221.02	2.452
77	428.42	16.00	562.63	44.00	449.77	249.31	234.29	2.452
78	428.42	16.00	567.89	44.00	457.18	234.11	220.00	2.452
79	420.00	16.00	562.63	44.00	448.20	249.61	235.31	2.453
80	420.00	16.00	557.37	44.00	446.39	237.49	223.06	2.453
81	428.42	16.00	557.37	44.00	448.13	236.14	221.02	2.453
82	424.21	16.00	557.37	44.00	447.08	237.89	223.06	2.453
83	441.05	16.00	562.63	44.00	454.02	237.66	222.04	2.454
84	432.63	16.00	567.89	44.00	457.49	236.65	222.04	2.454
85	424.21	16.00	562.63	44.00	448.71	251.05	236.33	2.454
86	428.42	16.00	567.89	44.00	456.97	235.17	221.02	2.454
87	436.84	16.00	567.89	44.00	458.59	234.92	220.00	2.455
88	432.63	16.00	562.63	44.00	450.78	247.53	232.24	2.455
89	420.00	16.00	562.63	44.00	448.00	250.66	236.33	2.455
90	420.00	16.00	557.37	44.00	446.18	238.55	224.08	2.456
91	436.84	16.00	562.63	44.00	452.18	243.65	228.16	2.456
92	428.42	16.00	562.63	44.00	449.55	250.36	235.31	2.456
93	428.42	16.00	567.89	44.00	456.76	236.23	222.04	2.456
94	432.63	16.00	567.89	44.00	457.27	237.70	223.06	2.456
95	424.21	16.00	567.89	44.00	456.37	233.64	220.00	2.457
96	436.84	16.00	567.89	44.00	458.36	235.97	221.02	2.457
97	424.21	16.00	562.63	44.00	448.49	252.10	237.35	2.458
98	424.21	16.00	557.37	44.00	446.86	238.93	224.08	2.458
99	420.00	16.00	562.63	44.00	447.79	251.71	237.35	2.458

Critical Failure Surface (circle 1)

Intersects: XL: 428.42 YL: 16.00 XR: 562.63 YR: 44.00

Centre: XC: 452.83 YC: 234.64 Radius: R: 220.00

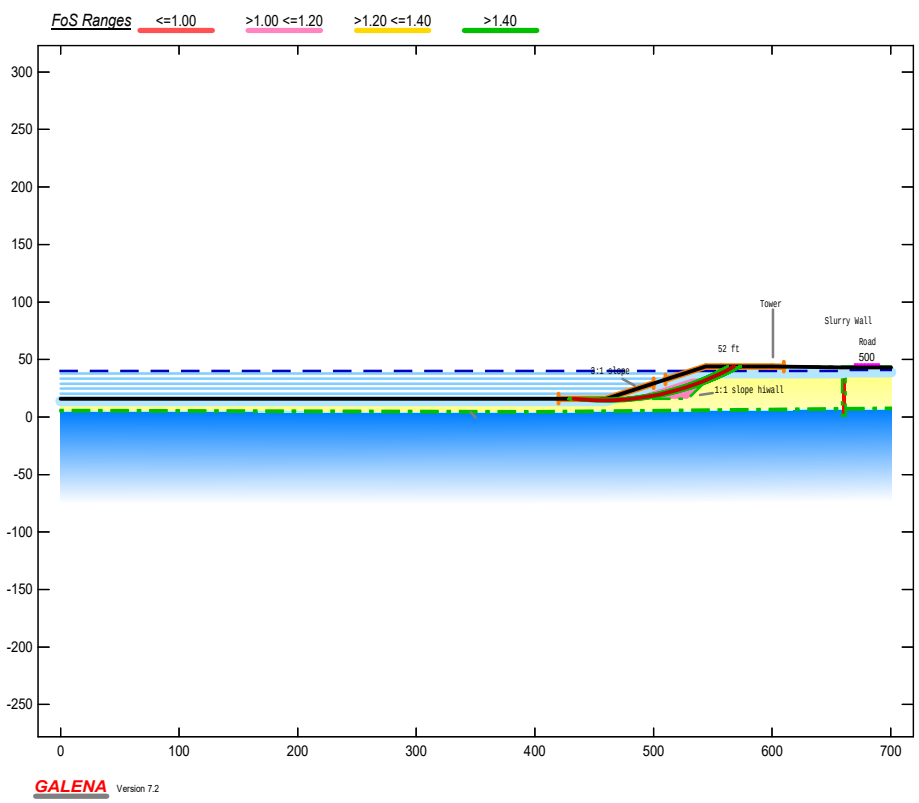
Generated failure surface: (20 points)

428.42	16.00	435.73	15.31	443.05	14.86	450.38	14.66	457.72	14.70
465.05	14.98	472.37	15.51	479.67	16.28	486.94	17.30	494.17	18.56
501.35	20.06	508.48	21.79	515.54	23.77	522.54	25.98	529.46	28.42
536.30	31.09	543.04	33.99	549.68	37.10	556.21	40.44	562.63	44.00

Slice Geometry and Properties - Critical Failure Surface (circle 1, 44 slices)

Slice	X-S	Base						PoreWater	Normal	Test
	X-Left	Area	Angle	Width	Length	Matl	Cohesion	Phi	Weight	Force	Stress	Factor
1	428.42	0.63	-5.4	3.65	3.67	2	0.00	35.0	82.20	189.10	63.58	1.03
2	432.07	1.90	-5.4	3.65	3.67	2	0.00	35.0	246.60	269.63	109.59	1.03
3	435.73	2.95	-3.5	3.66	3.67	2	0.00	35.0	383.03	336.21	147.01	1.02
4	439.39	3.77	-3.5	3.66	3.67	2	0.00	35.0	489.78	388.81	176.78	1.02
5	443.05	4.37	-1.6	3.67	3.67	2	0.00	35.0	568.27	427.42	197.73	1.01
6	446.72	4.75	-1.6	3.67	3.67	2	0.00	35.0	616.89	452.05	211.40	1.01
7	450.38	4.90	0.3	3.67	3.67	2	0.00	35.0	636.60	462.67	216.19	1.00
8	454.05	4.82	0.3	3.67	3.67	2	0.00	35.0	626.89	459.29	213.90	1.00
9	457.72	2.87	2.2	2.28	2.28	2	0.00	35.0	373.05	278.24	206.28	0.99
10	460.00	3.21	2.2	2.10	2.11	2	0.00	35.0	409.00	246.22	215.09	0.99
11	462.10	6.70	2.2	2.95	2.95	2	0.00	35.0	831.75	327.93	279.97	0.99
12	465.05	11.64	4.1	3.66	3.67	2	0.00	35.0	1420.89	365.12	382.35	0.98
13	468.71	15.13	4.1	3.66	3.67	2	0.00	35.0	1826.04	305.75	490.46	0.98
14	472.37	11.25	6.1	2.31	2.32	2	0.00	35.0	1347.58	157.09	568.80	0.98
15	474.68	12.46	6.1	2.31	2.32	2	0.00	35.0	1485.32	122.21	626.28	0.98
16	476.99	16.01	6.1	2.68	2.70	5	150.00	28.0	1905.47	98.27	688.26	0.98
17	479.67	21.09	8.0	3.20	3.24	5	150.00	28.0	2510.30	44.77	751.81	0.98
18	482.87	29.59	8.0	4.06	4.10	5	150.00	28.0	3521.41	0.00	832.55	0.98
19	486.94	28.79	9.9	3.61	3.67	5	150.00	28.0	3426.31	0.00	902.48	0.98
20	490.55	30.87	9.9	3.61	3.67	5	150.00	28.0	3673.97	0.00	968.46	0.98
21	494.17	32.51	11.8	3.59	3.67	5	150.00	28.0	3869.27	0.00	1017.58	0.98
22	497.76	34.12	11.8	3.59	3.67	5	150.00	28.0	4060.72	0.00	1068.53	0.98

```
 23      501.35     35.24    13.7     3.56     3.67     5     150.00    28.0
4192.97        0.00       1101.95    0.98
 24      504.91     36.37    13.7     3.56     3.67     5     150.00    28.0
4328.55        0.00       1138.04    0.98
 25      508.48     36.96    15.6     3.53     3.67     5     150.00    28.0
4398.20        0.00       1156.13    0.98
 26      512.01     37.63    15.6     3.53     3.67     5     150.00    28.0
4478.48        0.00       1177.52    0.98
 27      515.54     37.70    17.5     3.50     3.67     5     150.00    28.0
4486.84        0.00       1180.66    0.98
 28      519.04     37.92    17.5     3.50     3.67     5     150.00    28.0
4512.63        0.00       1187.55    0.98
 29      522.54     37.49    19.4     3.46     3.67     5     150.00    28.0
4461.56        0.00       1176.11    0.98
 30      526.00     37.26    19.4     3.46     3.67     5     150.00    28.0
4433.95        0.00       1168.71    0.98
 31      529.46     27.06    21.3     2.54     2.73     5     150.00    28.0
3220.66        0.00       1145.88    0.99
 32      532.00     44.97    21.3     4.30     4.61     2       0.00    35.0
5812.18        0.00       1215.00    0.96
 33      536.30     34.32    23.3     3.37     3.67     2       0.00    35.0
4387.60        0.00       1157.28    0.97
 34      539.67     33.23    23.3     3.37     3.67     2       0.00    35.0
4203.74        0.00       1108.76    0.97
 35      543.04      9.26    25.2     0.96     1.06     2       0.00    35.0
1163.35        0.00       1064.33    0.97
 36      544.00     25.26    25.2     2.84     3.14     2       0.00    35.0
3159.15        0.00        978.97    0.97
 37      546.84     21.47    25.2     2.84     3.14     2       0.00    35.0
2666.69        0.00        826.37    0.97
 38      549.68      5.81    27.1     0.87     0.98     2       0.00    35.0
716.69         0.00        717.04    0.98
 39      550.55     13.99    27.1     2.40     2.69     5     150.00    28.0
1698.05        0.00        608.14    1.01
 40      552.95     11.06    27.1     2.40     2.69     2       0.00    35.0
1318.04        0.00        478.85    0.98
 41      555.34      3.29    27.1     0.87     0.98     1      50.00    28.0
379.83         0.00        383.02    1.01
 42      556.21      2.63    29.0     0.79     0.90     1      50.00    28.0
300.93         0.00        330.59    1.02
 43      557.00      6.59    29.0     2.82     3.22     1      50.00    28.0
751.05         0.00        227.46    1.02
 44      559.82      2.20    29.0     2.82     3.22     1      50.00    28.0
250.35         0.00         69.00    1.02
                 --------                 -------                          -------
---
     X-S Area:     822.04    Path Length:    139.42              X-S Weight:
99632.83
```



Material Keys

1: Overburden
2: Sand and Gravel
3: Weathered Bedrock
4: Unweathered Bedrock
5: Reclamation Slope
6: Slurry Wall

Analysis 1

Multiple Stability Analysis
Method: Bishop Simplified
Surface: Circular

Results

Critical Factor of Safety: 2.63

Project Wattenberg Lakes, Pond 1, NE Transmission Tower
Shallow Option Full Reservoir

File: J:\Aggregate Industries-297\Wattenberg\DRMS Stability\Stability NE\NE shallow option full reservoir.gmf

Edited: 23 Apr 2024 *Processed:* 23 Apr 2024

Civil Resources

GALENA 7.2 Analysis Results Version: 7.2.1.05 Licensee: Civil Resources

Project: Wattenberg Lakes, Pond 1, NE Transmission Tower
File: J:\Aggregate Industries-297\Wattenberg\DRMS Stability\Stability NE\NE shallow option full reservoir.gmf
Processed: 23 Apr 2024 10:46:18

DATA: Analysis 1 - Shallow Option Full Reservoir

Material Properties (6 materials)

Material: 1 (Mohr-Coulomb Isotropic) - Overburden

Cohesion	Phi	UnitWeight	Ru
50.00	28.0	114.00	Auto

Material: 2 (Mohr-Coulomb Isotropic) - Sand and Gravel

Cohesion	Phi	UnitWeight	Ru
0.00	35.0	130.00	Auto

Material: 3 (Mohr-Coulomb Isotropic) - Weathered Bedrock

Cohesion	Phi	UnitWeight	Ru
0.00	17.0	124.00	Auto

Material: 4 (Mohr-Coulomb Isotropic) - Unweathered Bedrock

Cohesion	Phi	UnitWeight	Ru
150.00	26.0	124.00	Auto

Material: 5 (Mohr-Coulomb Isotropic) - Reclamation Slope

Cohesion	Phi	UnitWeight	Ru
150.00	28.0	119.00	Auto

Material: 6 (Mohr-Coulomb Isotropic) - Slurry Wall

Cohesion	Phi	UnitWeight	Ru
0.00	0.0	110.00	Auto

Water Properties

Unit weight of water: 62.400 Unit weight of water/medium above ground: 62.400

Material Profiles (6 profiles)

Profile: 1 (2 points) Material beneath: 1 - Overburden

0.00	44.00	700.00	44.00

Profile: 2 (2 points) Material beneath: 2 - Sand and Gravel

0.00	40.00	700.00	40.00

Profile: 3 (3 points) Material beneath: 3 - Weathered Bedrock

0.00	6.00	399.00	5.00	700.00	8.00

Profile: 4 (3 points) Material beneath: 4 - Unweathered Bedrock

0.00	5.00	399.00	4.00	700.00	7.00

Profile: 5 (5 points) Material within: 6 - Slurry Wall

662.00	43.00	659.00	43.00	659.00	1.00	662.00	1.00	662.00	43.00

Profile: 6 (5 points) Material within: 5 - Reclamation Slope

557.00	44.00	544.00	44.00	460.00	16.00	529.00	16.00	557.00	44.00

Slope Surface (7 points)

0.00	16.00	460.00	16.00	544.00	44.00	557.00	44.00
600.00	44.00	659.00	43.00	700.00	43.00		

Phreatic Surface (4 points)

```
----------------
      0.00       40.00         659.00       40.00         662.00       41.00
700.00       41.00

Failure Surface
---------------
Initial circular surface for critical search defined by: XL,XR,R
  Intersects:  XL:     460.00      YL:      16.00      XR:     560.00      YR:
44.00
      Centre:  XC:     445.44      YC:     260.57                  Radius:  R:
245.00

Distributed Loads (1 load)
-----------------
Load      X-Left    Pressure        X-Right   Pressure
  1       670.00      500.0         690.00      500.0

Variable Restraints
-------------------
Parameter descriptor:              XL         XR         R
Range of variation:              80.00     100.00      50.00
Trial positions within range:      20         20         50

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RESULTS: Analysis  1 - Shallow Option Full Reservoir

Bishop Simplified Method of Analysis - Circular Failure Surface
---------------------------------------------------------------
Critical Failure Surface Search using Multiple Circle Generation Techniques

Initial failure surface approximation - Factor of Safety:   2.875

Analysis Summary
================
There were:  14603 successful analyses from a total of 20001 trial failure surfaces
             5398 analyses terminated due to unacceptable geometry

Critical (minimum) Factor of Safety:  2.63
==========================================

Results Summary - Lowest 99 Factor of Safety circles
----------------------------------------------------
Circle    X-Left      Y-Left     X-Right     Y-Right     X-Centre    Y-Centre
Radius      FoS
   1       432.63       16.00      567.89       44.00      457.92      234.54
220.00     2.629   <-- Critical Surface
   2       436.84       16.00      567.89       44.00      458.59      234.92
220.00     2.630
   3       436.84       16.00      567.89       44.00      458.36      235.97
221.02     2.631
   4       432.63       16.00      567.89       44.00      457.70      235.59
221.02     2.633
   5       436.84       16.00      567.89       44.00      458.14      237.02
222.04     2.635
   6       432.63       16.00      567.89       44.00      457.49      236.65
222.04     2.636
   7       441.05       16.00      567.89       44.00      459.16      235.25
220.00     2.637
   8       432.63       16.00      567.89       44.00      457.27      237.70
223.06     2.639
```

9	436.84	16.00	567.89	44.00	457.91	238.06	223.06	2.640
10	441.05	16.00	573.16	44.00	463.69	234.83	220.00	2.641
11	441.05	16.00	567.89	44.00	458.93	236.30	221.02	2.641
12	436.84	16.00	573.16	44.00	463.01	234.44	220.00	2.642
13	432.63	16.00	567.89	44.00	457.05	238.75	224.08	2.643
14	436.84	16.00	573.16	44.00	462.79	235.49	221.02	2.644
15	441.05	16.00	573.16	44.00	463.47	235.88	221.02	2.644
16	436.84	16.00	567.89	44.00	457.69	239.11	224.08	2.644
17	441.05	16.00	567.89	44.00	458.70	237.34	222.04	2.646
18	436.84	16.00	573.16	44.00	462.57	236.54	222.04	2.646
19	432.63	16.00	567.89	44.00	456.83	239.80	225.10	2.646
20	441.05	16.00	573.16	44.00	463.25	236.93	222.04	2.647
21	436.84	16.00	567.89	44.00	457.47	240.16	225.10	2.649
22	436.84	16.00	573.16	44.00	462.36	237.60	223.06	2.649
23	445.26	16.00	573.16	44.00	464.29	235.18	220.00	2.649
24	441.05	16.00	573.16	44.00	463.02	237.98	223.06	2.650
25	432.63	16.00	567.89	44.00	456.62	240.85	226.12	2.650
26	441.05	16.00	567.89	44.00	458.47	238.38	223.06	2.651
27	436.84	16.00	573.16	44.00	462.14	238.65	224.08	2.652
28	432.63	16.00	573.16	44.00	462.25	234.00	220.00	2.653
29	445.26	16.00	573.16	44.00	464.06	236.22	221.02	2.653
30	436.84	16.00	567.89	44.00	457.24	241.20	226.12	2.653
31	441.05	16.00	573.16	44.00	462.80	239.02	224.08	2.653
32	432.63	16.00	567.89	44.00	456.40	241.90	227.14	2.654
33	436.84	16.00	573.16	44.00	461.93	239.70	225.10	2.654
34	432.63	16.00	573.16	44.00	462.04	235.06	221.02	2.655
35	441.05	16.00	567.89	44.00	458.24	239.42	224.08	2.655
36	428.42	16.00	567.89	44.00	457.18	234.11	220.00	2.656
37	441.05	16.00	573.16	44.00	462.58	240.07	225.10	2.656
38	432.63	16.00	573.16	44.00	461.83	236.11	222.04	2.656
39	449.47	16.00	573.16	44.00	464.80	235.47	220.00	2.656

40	445.26	16.00	573.16	44.00	463.83	237.26	222.04	2.656
41	445.26	16.00	567.89	44.00	459.65	235.53	220.00	2.657
42	436.84	16.00	573.16	44.00	461.71	240.75	226.12	2.657
43	432.63	16.00	567.89	44.00	456.18	242.94	228.16	2.657
44	436.84	16.00	567.89	44.00	457.02	242.24	227.14	2.658
45	428.42	16.00	567.89	44.00	456.97	235.17	221.02	2.658
46	432.63	16.00	573.16	44.00	461.62	237.17	223.06	2.658
47	441.05	16.00	573.16	44.00	462.36	241.12	226.12	2.659
48	436.84	16.00	573.16	44.00	461.49	241.80	227.14	2.660
49	445.26	16.00	573.16	44.00	463.61	238.31	223.06	2.660
50	432.63	16.00	573.16	44.00	461.41	238.23	224.08	2.660
51	449.47	16.00	573.16	44.00	464.57	236.50	221.02	2.660
52	428.42	16.00	567.89	44.00	456.76	236.23	222.04	2.661
53	432.63	16.00	567.89	44.00	455.97	243.99	229.18	2.661
54	441.05	16.00	567.89	44.00	458.01	240.46	225.10	2.661
55	432.63	16.00	562.63	44.00	453.48	235.01	220.00	2.661
56	445.26	16.00	567.89	44.00	459.41	236.57	221.02	2.662
57	436.84	16.00	567.89	44.00	456.80	243.29	228.16	2.662
58	432.63	16.00	573.16	44.00	461.20	239.28	225.10	2.662
59	436.84	16.00	573.16	44.00	461.28	242.85	228.16	2.663
60	441.05	16.00	573.16	44.00	462.14	242.16	227.14	2.663
61	428.42	16.00	567.89	44.00	456.55	237.28	223.06	2.663
62	445.26	16.00	573.16	44.00	463.38	239.35	224.08	2.664
63	432.63	16.00	573.16	44.00	460.98	240.34	226.12	2.664
64	432.63	16.00	567.89	44.00	455.75	245.04	230.20	2.664
65	449.47	16.00	573.16	44.00	464.33	237.54	222.04	2.664
66	428.42	16.00	562.63	44.00	452.83	234.64	220.00	2.665
67	436.84	16.00	573.16	44.00	461.06	243.90	229.18	2.666
68	428.42	16.00	567.89	44.00	456.33	238.34	224.08	2.666
69	432.63	16.00	573.16	44.00	460.77	241.39	227.14	2.666
70	441.05	16.00	567.89	44.00	457.79	241.50	226.12	2.666

71	441.05	16.00	573.16	44.00	461.92	243.21	228.16	2.667
72	445.26	16.00	567.89	44.00	459.18	237.60	222.04	2.667
73	436.84	16.00	567.89	44.00	456.58	244.33	229.18	2.667
74	432.63	16.00	562.63	44.00	453.25	236.06	221.02	2.667
75	445.26	16.00	573.16	44.00	463.15	240.39	225.10	2.667
76	428.42	16.00	567.89	44.00	456.12	239.39	225.10	2.668
77	432.63	16.00	567.89	44.00	455.53	246.09	231.22	2.668
78	449.47	16.00	573.16	44.00	464.10	238.58	223.06	2.669
79	432.63	16.00	573.16	44.00	460.56	242.45	228.16	2.669
80	436.84	16.00	573.16	44.00	460.85	244.95	230.20	2.669
81	428.42	16.00	562.63	44.00	452.61	235.69	221.02	2.669
82	441.05	16.00	573.16	44.00	461.69	244.25	229.18	2.670
83	432.63	16.00	573.16	44.00	460.35	243.50	229.18	2.671
84	428.42	16.00	567.89	44.00	455.91	240.45	226.12	2.671
85	436.84	16.00	562.63	44.00	454.03	235.33	220.00	2.671
86	436.84	16.00	567.89	44.00	456.35	245.38	230.20	2.672
87	436.84	16.00	573.16	44.00	460.63	246.00	231.22	2.672
88	432.63	16.00	567.89	44.00	455.32	247.13	232.24	2.672
89	441.05	16.00	567.89	44.00	457.56	242.54	227.14	2.672
90	445.26	16.00	573.16	44.00	462.92	241.43	226.12	2.672
91	449.47	16.00	573.16	44.00	463.86	239.62	224.08	2.673
92	432.63	16.00	573.16	44.00	460.14	244.55	230.20	2.673
93	432.63	16.00	562.63	44.00	453.02	237.10	222.04	2.673
94	428.42	16.00	567.89	44.00	455.70	241.50	227.14	2.674
95	428.42	16.00	562.63	44.00	452.39	236.74	222.04	2.674
96	441.05	16.00	573.16	44.00	461.47	245.30	230.20	2.674
97	428.42	16.00	573.16	44.00	461.42	233.51	220.00	2.674
98	445.26	16.00	573.16	44.00	462.69	242.47	227.14	2.675
99	436.84	16.00	573.16	44.00	460.42	247.05	232.24	2.675

Critical Failure Surface (circle 1)

Intersects: XL: 432.63 YL: 16.00 XR: 567.89 YR: 44.00

Centre: XC: 457.92 YC: 234.54 Radius: R: 220.00

Generated failure surface: (20 points)

432.63	16.00	439.99	15.27	447.37	14.79
454.76	14.56	462.16	14.58		
469.55	14.85	476.92	15.36	484.28	16.13
491.60	17.13	498.89	18.39		
506.13	19.89	513.32	21.63	520.44	23.61
527.50	25.83	534.47	28.29		
541.36	30.98	548.15	33.90	554.85	37.04
561.43	40.41	567.89	44.00		

Slice Geometry and Properties - Critical Failure Surface (circle 1, 42 slices)

Slice	X-S	Base						PoreWater	Normal	Test
	X-Left	Area	Angle	Width	Length	Matl	Cohesion	Phi	Weight	Force	Stress	Factor
1	432.63	0.67	-5.6	3.68	3.70	2	0.00	35.0	86.88	5579.12	1521.54	1.03
2	436.31	2.00	-5.6	3.68	3.70	2	0.00	35.0	260.63	5662.93	1569.43	1.03
3	439.99	3.12	-3.7	3.69	3.70	2	0.00	35.0	405.88	5732.41	1608.61	1.02
4	443.68	4.01	-3.7	3.69	3.70	2	0.00	35.0	520.71	5787.69	1640.02	1.02
5	447.37	4.67	-1.8	3.70	3.70	2	0.00	35.0	606.74	5828.53	1662.50	1.01
6	451.07	5.09	-1.8	3.70	3.70	2	0.00	35.0	662.10	5855.07	1677.54	1.01
7	454.76	3.75	0.1	2.62	2.62	2	0.00	35.0	487.86	4157.20	1683.78	1.00
8	457.38	3.74	0.1	2.62	2.62	2	0.00	35.0	485.69	4156.21	1682.95	1.00
9	460.00	3.84	0.1	2.16	2.16	2	0.00	35.0	490.21	3419.36	1702.51	1.00
10	462.16	9.92	2.1	3.69	3.70	2	0.00	35.0	1235.76	5848.93	1747.19	0.99
11	465.85	13.98	2.1	3.69	3.70	2	0.00	35.0	1713.30	5818.18	1799.00	0.99
12	469.55	17.78	4.0	3.69	3.70	2	0.00	35.0	2156.72	5773.12	1840.24	0.98
13	473.23	21.36	4.0	3.69	3.70	2	0.00	35.0	2572.96	5713.75	1875.42	0.98
14	476.92	20.36	5.9	3.07	3.09	2	0.00	35.0	2438.69	4715.06	1897.68	0.98
15	479.99	22.52	5.9	3.07	3.09	2	0.00	35.0	2685.64	4653.75	1913.26	0.98
16	483.06	9.50	5.9	1.21	1.22	5	150.00	28.0	1131.00	1823.38	1921.81	0.98
17	484.28	30.49	7.8	3.66	3.70	5	150.00	28.0	3628.56	5449.90	1924.78	0.98
18	487.94	33.12	7.8	3.66	3.70	5	150.00	28.0	3940.79	5333.49	1932.74	0.98
19	491.60	35.32	9.8	3.64	3.70	5	150.00	28.0	4202.99	5202.97	1927.88	0.98
20	495.25	37.46	9.8	3.64	3.70	5	150.00	28.0	4457.62	5058.23	1920.85	0.98
21	498.89	39.11	11.7	3.62	3.70	5	150.00	28.0	4654.31	4899.37	1900.62	0.98
22	502.51	40.77	11.7	3.62	3.70	5	150.00	28.0	4851.41	4726.49	1878.70	0.98

```
 23      506.13     41.87    13.6     3.59     3.70     5     150.00    28.0
4982.67     4539.59      1843.31    0.98
 24      509.73     43.05    13.6     3.59     3.70     5     150.00    28.0
5122.48     4338.66      1806.62    0.98
 25      513.32     43.60    15.5     3.56     3.70     5     150.00    28.0
5188.77     4123.88      1756.27    0.98
 26      516.88     44.30    15.5     3.56     3.70     5     150.00    28.0
5272.00     3895.23      1704.95    0.98
 27      520.44     44.32    17.5     3.53     3.70     5     150.00    28.0
5274.64     3652.82      1639.87    0.99
 28      523.97     44.56    17.5     3.53     3.70     5     150.00    28.0
5302.08     3396.70      1574.07    0.99
 29      527.50     56.85    19.4     4.50     4.77     5     150.00    28.0
6765.47     3984.75      1482.84    0.99
 30      532.00     31.04    19.4     2.47     2.62     2       0.00    35.0
4023.65     1985.95      1553.46    0.97
 31      534.47     42.84    21.3     3.44     3.70     2       0.00    35.0
5515.64     2546.88      1515.48    0.97
 32      537.92     42.16    21.3     3.44     3.70     2       0.00    35.0
5384.25     2236.70      1473.00    0.97
 33      541.36     31.72    23.3     2.64     2.87     2       0.00    35.0
4020.29     1516.01      1420.61    0.98
 34      544.00     22.36    23.3     1.95     2.12     2       0.00    35.0
2821.42      989.10      1346.26    0.98
 35      545.95     23.31    23.3     2.20     2.40     5     150.00    28.0
2918.48      984.52      1228.45    1.00
 36      548.15     31.17    25.2     3.35     3.70     5     150.00    28.0
3826.49     1226.61      1048.62    1.01
 37      551.50     25.91    25.2     3.35     3.70     2       0.00    35.0
3218.30      863.72       880.80    0.98
 38      554.85     13.80    27.1     2.15     2.42     2       0.00    35.0
1667.39      363.26       699.33    0.99
 39      557.00     17.86    27.1     3.62     4.07     2       0.00    35.0
2089.80      235.65       514.36    0.99
 40      560.62      3.05    27.1     0.80     0.90     1      50.00    28.0
347.98        0.00       383.15    1.02
 41      561.43      8.70    29.0     3.23     3.70     1      50.00    28.0
991.83        0.00       266.35    1.03
 42      564.66      2.90    29.0     3.23     3.70     1      50.00    28.0
330.60        0.00        82.46    1.03
                --------                  -------                          -------
---
     X-S Area:     977.96    Path Length:    140.50              X-S Weight:
118740.68
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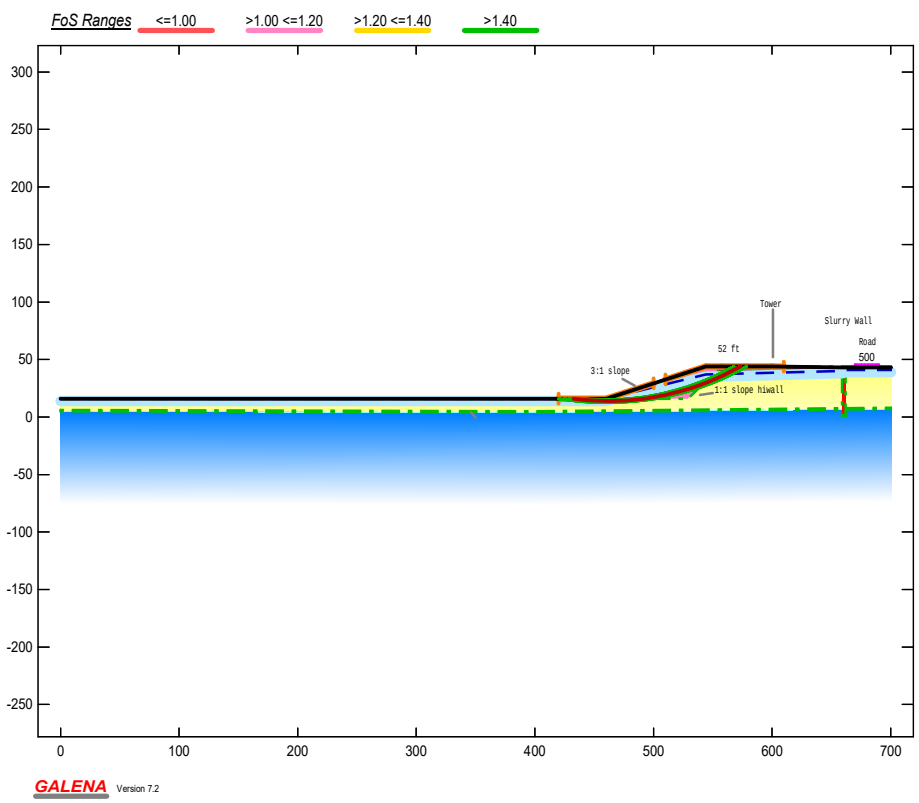

Material Keys

1: Overburden
2: Sand and Gravel
3: Weathered Bedrock
4: Unweathered Bedrock
5: Reclamation Slope
6: Slurry Wall

Analysis 1

Multiple Stability Analysis
Method: Bishop Simplified
Surface: Circular

Results

Critical Factor of Safety: 1.83

Project Wattenberg Lakes, Pond 1, NE Transmission Tower
Shallow Option Rapid Drawdown

File: J:\Aggregate Industries-297\Wattenberg\DRMS Stability\Stability NE\NE shallow option rapid drawdown.gmf

Edited: 23 Apr 2024 *Processed:* 23 Apr 2024

Civil Resources

GALENA 7.2 Analysis Results Version: 7.2.1.05 Licensee: Civil Resources

Project: Wattenberg Lakes, Pond 1, NE Transmission Tower
File: J:\Aggregate Industries-297\Wattenberg\DRMS Stability\Stability NE\NE shallow option rapid drawdown.gmf
Processed: 23 Apr 2024 10:25:33

DATA: Analysis 1 - Shallow Option Rapid Drawdown

Material Properties (6 materials)

Material: 1 (Mohr-Coulomb Isotropic) - Overburden

Cohesion	Phi	UnitWeight	Ru
50.00	28.0	114.00	Auto

Material: 2 (Mohr-Coulomb Isotropic) - Sand and Gravel

Cohesion	Phi	UnitWeight	Ru
0.00	35.0	130.00	Auto

Material: 3 (Mohr-Coulomb Isotropic) - Weathered Bedrock

Cohesion	Phi	UnitWeight	Ru
0.00	17.0	124.00	Auto

Material: 4 (Mohr-Coulomb Isotropic) - Unweathered Bedrock

Cohesion	Phi	UnitWeight	Ru
150.00	26.0	124.00	Auto

Material: 5 (Mohr-Coulomb Isotropic) - Reclamation Slope

Cohesion	Phi	UnitWeight	Ru
150.00	28.0	119.00	Auto

Material: 6 (Mohr-Coulomb Isotropic) - Slurry Wall

Cohesion	Phi	UnitWeight	Ru
0.00	0.0	110.00	Auto

Water Properties

Unit weight of water: 62.400 Unit weight of water/medium above ground: 62.400

Material Profiles (6 profiles)

Profile: 1 (2 points) Material beneath: 1 - Overburden

0.00	44.00	700.00	44.00

Profile: 2 (2 points) Material beneath: 2 - Sand and Gravel

0.00	40.00	700.00	40.00

Profile: 3 (3 points) Material beneath: 3 - Weathered Bedrock

0.00	6.00	399.00	5.00	700.00	8.00

Profile: 4 (3 points) Material beneath: 4 - Unweathered Bedrock

0.00	5.00	399.00	4.00	700.00	7.00

Profile: 5 (5 points) Material within: 6 - Slurry Wall

662.00	43.00	659.00	43.00	659.00	1.00	662.00	1.00	662.00	43.00

Profile: 6 (5 points) Material within: 5 - Reclamation Slope

557.00	44.00	544.00	44.00	460.00	16.00	529.00	16.00	557.00	44.00

Slope Surface (7 points)

0.00	16.00	460.00	16.00	544.00	44.00	557.00	44.00
600.00	44.00	659.00	43.00	700.00	43.00		

Phreatic Surface (6 points)

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----------------
      0.00       16.00         460.00       16.00         544.00       37.00
659.00       40.00         662.00       41.00
    700.00       41.00

Failure Surface
---------------
Initial circular surface for critical search defined by: XL,XR,R
  Intersects:  XL:     460.00      YL:      16.00      XR:     560.00      YR:
44.00
      Centre:  XC:     445.44      YC:     260.57                  Radius:  R:
245.00

Distributed Loads (1 load)
-----------------
Load      X-Left    Pressure        X-Right   Pressure
  1       670.00      500.0         690.00      500.0

Variable Restraints
-------------------
Parameter descriptor:              XL         XR         R
Range of variation:              80.00     100.00      50.00
Trial positions within range:      20         20         50

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RESULTS: Analysis  1 - Shallow Option Rapid Drawdown

Bishop Simplified Method of Analysis - Circular Failure Surface
---------------------------------------------------------------
Critical Failure Surface Search using Multiple Circle Generation Techniques

Initial failure surface approximation - Factor of Safety:   2.089

Analysis Summary
================
There were:  14607 successful analyses from a total of 20001 trial failure surfaces
             5394 analyses terminated due to unacceptable geometry

Critical (minimum) Factor of Safety:  1.83
==========================================

Results Summary - Lowest 99 Factor of Safety circles
----------------------------------------------------
Circle    X-Left      Y-Left     X-Right     Y-Right     X-Centre    Y-Centre
Radius      FoS
   1       432.63       16.00      573.16       44.00      462.25      234.00
220.00     1.827   <-- Critical Surface
   2       428.42       16.00      573.16       44.00      461.42      233.51
220.00     1.827
   3       432.63       16.00      573.16       44.00      462.04      235.06
221.02     1.829
   4       428.42       16.00      573.16       44.00      461.21      234.57
221.02     1.830
   5       436.84       16.00      573.16       44.00      463.01      234.44
220.00     1.832
   6       428.42       16.00      567.89       44.00      457.18      234.11
220.00     1.832
   7       432.63       16.00      573.16       44.00      461.83      236.11
222.04     1.832
   8       428.42       16.00      573.16       44.00      461.01      235.64
222.04     1.832
```

9	432.63	16.00	567.89	44.00	457.92	234.54
220.00	1.833					
10	424.21	16.00	567.89	44.00	456.37	233.64
220.00	1.833					
11	436.84	16.00	573.16	44.00	462.79	235.49
221.02	1.834					
12	428.42	16.00	573.16	44.00	460.80	236.70
223.06	1.835					
13	424.21	16.00	573.16	44.00	460.53	232.98
220.00	1.835					
14	432.63	16.00	573.16	44.00	461.62	237.17
223.06	1.835					
15	428.42	16.00	567.89	44.00	456.97	235.17
221.02	1.836					
16	424.21	16.00	567.89	44.00	456.16	234.70
221.02	1.836					
17	424.21	16.00	573.16	44.00	460.33	234.05
221.02	1.837					
18	432.63	16.00	567.89	44.00	457.70	235.59
221.02	1.837					
19	428.42	16.00	573.16	44.00	460.60	237.76
224.08	1.837					
20	436.84	16.00	573.16	44.00	462.57	236.54
222.04	1.837					
21	432.63	16.00	573.16	44.00	461.41	238.23
224.08	1.838					
22	424.21	16.00	573.16	44.00	460.13	235.12
222.04	1.839					
23	428.42	16.00	567.89	44.00	456.76	236.23
222.04	1.839					
24	424.21	16.00	567.89	44.00	455.96	235.76
222.04	1.839					
25	428.42	16.00	573.16	44.00	460.39	238.82
225.10	1.839					
26	436.84	16.00	573.16	44.00	462.36	237.60
223.06	1.840					
27	432.63	16.00	573.16	44.00	461.20	239.28
225.10	1.840					
28	432.63	16.00	567.89	44.00	457.49	236.65
222.04	1.841					
29	424.21	16.00	573.16	44.00	459.92	236.18
223.06	1.841					
30	420.00	16.00	567.89	44.00	455.49	233.12
220.00	1.841					
31	441.05	16.00	573.16	44.00	463.69	234.83
220.00	1.841					
32	428.42	16.00	573.16	44.00	460.19	239.88
226.12	1.842					
33	428.42	16.00	567.89	44.00	456.55	237.28
223.06	1.842					
34	424.21	16.00	567.89	44.00	455.75	236.82
223.06	1.843					
35	424.21	16.00	573.16	44.00	459.72	237.25
224.08	1.843					
36	432.63	16.00	573.16	44.00	460.98	240.34
226.12	1.843					
37	436.84	16.00	573.16	44.00	462.14	238.65
224.08	1.844					
38	420.00	16.00	567.89	44.00	455.29	234.18
221.02	1.844					
39	436.84	16.00	567.89	44.00	458.59	234.92
220.00	1.844					

40	428.42	16.00	573.16	44.00	459.98	240.94	227.14	1.844
41	441.05	16.00	573.16	44.00	463.47	235.88	221.02	1.845
42	432.63	16.00	567.89	44.00	457.27	237.70	223.06	1.845
43	424.21	16.00	573.16	44.00	459.52	238.31	225.10	1.845
44	424.21	16.00	567.89	44.00	455.54	237.88	224.08	1.845
45	428.42	16.00	567.89	44.00	456.33	238.34	224.08	1.846
46	420.00	16.00	573.16	44.00	459.57	232.41	220.00	1.846
47	432.63	16.00	573.16	44.00	460.77	241.39	227.14	1.846
48	420.00	16.00	567.89	44.00	455.09	235.25	222.04	1.846
49	436.84	16.00	573.16	44.00	461.93	239.70	225.10	1.847
50	432.63	16.00	578.42	44.00	466.47	233.38	220.00	1.847
51	428.42	16.00	573.16	44.00	459.78	242.00	228.16	1.847
52	424.21	16.00	573.16	44.00	459.32	239.38	226.12	1.847
53	436.84	16.00	567.89	44.00	458.36	235.97	221.02	1.847
54	420.00	16.00	573.16	44.00	459.38	233.48	221.02	1.848
55	441.05	16.00	573.16	44.00	463.25	236.93	222.04	1.848
56	436.84	16.00	578.42	44.00	467.31	233.88	220.00	1.848
57	424.21	16.00	567.89	44.00	455.34	238.94	225.10	1.848
58	432.63	16.00	567.89	44.00	457.05	238.75	224.08	1.849
59	432.63	16.00	578.42	44.00	466.26	234.45	221.02	1.849
60	420.00	16.00	567.89	44.00	454.89	236.32	223.06	1.849
61	432.63	16.00	573.16	44.00	460.56	242.45	228.16	1.849
62	420.00	16.00	573.16	44.00	459.18	234.56	222.04	1.849
63	428.42	16.00	567.89	44.00	456.12	239.39	225.10	1.849
64	424.21	16.00	573.16	44.00	459.12	240.44	227.14	1.849
65	428.42	16.00	573.16	44.00	459.57	243.06	229.18	1.850
66	436.84	16.00	573.16	44.00	461.71	240.75	226.12	1.850
67	436.84	16.00	578.42	44.00	467.10	234.94	221.02	1.850
68	432.63	16.00	578.42	44.00	466.06	235.51	222.04	1.851
69	428.42	16.00	578.42	44.00	465.56	232.84	220.00	1.851
70	441.05	16.00	573.16	44.00	463.02	237.98	223.06	1.851

71	420.00	16.00	573.16	44.00	458.99	235.63	223.06	1.851
72	436.84	16.00	567.89	44.00	458.14	237.02	222.04	1.851
73	424.21	16.00	567.89	44.00	455.13	240.00	226.12	1.851
74	420.00	16.00	567.89	44.00	454.69	237.38	224.08	1.852
75	424.21	16.00	573.16	44.00	458.92	241.51	228.16	1.852
76	436.84	16.00	578.42	44.00	466.89	236.00	222.04	1.852
77	432.63	16.00	573.16	44.00	460.35	243.50	229.18	1.852
78	428.42	16.00	578.42	44.00	465.36	233.91	221.02	1.852
79	428.42	16.00	573.16	44.00	459.37	244.11	230.20	1.852
80	432.63	16.00	578.42	44.00	465.85	236.57	223.06	1.852
81	432.63	16.00	567.89	44.00	456.83	239.80	225.10	1.853
82	420.00	16.00	573.16	44.00	458.79	236.70	224.08	1.853
83	428.42	16.00	567.89	44.00	455.91	240.45	226.12	1.853
84	436.84	16.00	573.16	44.00	461.49	241.80	227.14	1.853
85	441.05	16.00	578.42	44.00	468.09	234.33	220.00	1.853
86	428.42	16.00	578.42	44.00	465.16	234.98	222.04	1.854
87	424.21	16.00	573.16	44.00	458.72	242.57	229.18	1.854
88	420.00	16.00	567.89	44.00	454.48	238.45	225.10	1.854
89	436.84	16.00	578.42	44.00	466.68	237.06	223.06	1.854
90	432.63	16.00	578.42	44.00	465.65	237.64	224.08	1.854
91	441.05	16.00	573.16	44.00	462.80	239.02	224.08	1.855
92	424.21	16.00	567.89	44.00	454.92	241.06	227.14	1.855
93	420.00	16.00	573.16	44.00	458.60	237.77	225.10	1.855
94	432.63	16.00	573.16	44.00	460.14	244.55	230.20	1.855
95	428.42	16.00	573.16	44.00	459.16	245.17	231.22	1.855
96	428.42	16.00	578.42	44.00	464.96	236.05	223.06	1.855
97	445.26	16.00	573.16	44.00	464.29	235.18	220.00	1.856
98	441.05	16.00	578.42	44.00	467.87	235.39	221.02	1.856
99	436.84	16.00	567.89	44.00	457.91	238.06	223.06	1.856

Critical Failure Surface (circle 1)

Intersects: XL: 432.63 YL: 16.00 XR: 573.16 YR: 44.00

Centre: XC: 462.25 YC: 234.00 Radius: R: 220.00

Generated failure surface: (20 points)

432.63	16.00	440.26	15.10	447.91	14.46
455.59	14.10	463.27	14.00		
470.95	14.17	478.62	14.61	486.26	15.31
493.88	16.28	501.47	17.52		
509.00	19.02	516.47	20.79	523.88	22.81
531.22	25.09	538.47	27.62		
545.63	30.41	552.68	33.44	559.63	36.72
566.46	40.24	573.16	44.00		

Slice Geometry and Properties - Critical Failure Surface (circle 1, 42 slices)

Slice	X-S	Base						PoreWater	Normal	Test
	X-Left	Area	Angle	Width	Length	Matl	Cohesion	Phi	Weight	Force	Stress	Factor
1	432.63	0.86	-6.7	3.81	3.84	2	0.00	35.0	111.69	53.98	30.00	1.05
2	436.45	2.58	-6.7	3.81	3.84	2	0.00	35.0	335.06	161.95	90.01	1.05
3	440.26	4.06	-4.7	3.83	3.84	2	0.00	35.0	527.20	253.92	140.09	1.04
4	444.09	5.27	-4.7	3.83	3.84	2	0.00	35.0	684.98	329.92	182.02	1.04
5	447.91	6.24	-2.7	3.84	3.84	2	0.00	35.0	811.32	389.88	213.54	1.02
6	451.75	6.94	-2.7	3.84	3.84	2	0.00	35.0	902.71	433.80	237.60	1.02
7	455.59	8.52	-0.7	4.41	4.41	2	0.00	35.0	1107.18	531.49	251.55	1.01
8	460.00	8.25	-0.7	3.27	3.27	2	0.00	35.0	1052.63	486.94	322.97	1.01
9	463.27	14.16	1.3	3.84	3.84	2	0.00	35.0	1767.39	780.01	458.13	0.99
10	467.11	18.75	1.3	3.84	3.84	2	0.00	35.0	2309.83	989.72	598.68	0.99
11	470.95	23.04	3.3	3.83	3.84	2	0.00	35.0	2814.54	1183.22	724.92	0.98
12	474.78	27.10	3.3	3.83	3.84	2	0.00	35.0	3288.69	1360.52	846.91	0.98
13	478.62	30.82	5.3	3.82	3.84	2	0.00	35.0	3718.98	1521.47	952.77	0.97
14	482.44	34.35	5.3	3.82	3.84	2	0.00	35.0	4123.88	1666.12	1056.31	0.97
15	486.26	26.21	7.3	2.70	2.72	2	0.00	35.0	3134.38	1258.47	1129.78	0.96
16	488.96	27.71	7.3	2.70	2.72	2	0.00	35.0	3302.22	1314.47	1190.09	0.96
17	491.66	24.01	7.3	2.23	2.24	5	150.00	28.0	2856.61	1127.57	1244.98	0.97
18	493.88	42.96	9.3	3.79	3.84	5	150.00	28.0	5112.07	2001.51	1298.35	0.97
19	497.67	45.40	9.3	3.79	3.84	5	150.00	28.0	5403.01	2080.39	1372.55	0.97
20	501.47	47.28	11.3	3.77	3.84	5	150.00	28.0	5626.65	2142.71	1427.07	0.96
21	505.23	49.18	11.3	3.77	3.84	5	150.00	28.0	5852.94	2188.50	1484.52	0.96
22	509.00	50.44	13.3	3.74	3.84	5	150.00	28.0	6002.14	2217.79	1521.50	0.96

```
 23      512.74     51.80    13.3      3.74     3.84     5     150.00    28.0
6164.29     2230.49      1562.30    0.96
 24      516.47     52.43    15.3      3.71     3.84     5     150.00    28.0
6239.38     2226.61      1581.98    0.96
 25      520.18     53.26    15.3      3.71     3.84     5     150.00    28.0
6337.94     2206.19      1606.23    0.96
 26      523.88     53.28    17.3      3.67     3.84     5     150.00    28.0
6340.45     2169.23      1608.82    0.96
 27      527.55     53.58    17.3      3.67     3.84     5     150.00    28.0
6376.24     2115.67      1616.64    0.96
 28      531.22     11.43    19.3      0.78     0.83     5     150.00    28.0
1360.36      447.76      1605.74    0.96
 29      532.00     47.27    19.3      3.24     3.43     2       0.00    35.0
6126.22     1812.94      1732.39    0.93
 30      535.24     47.10    19.3      3.24     3.43     2       0.00    35.0
6065.68     1744.02      1713.51    0.93
 31      538.47     50.90    21.3      3.53     3.78     2       0.00    35.0
6510.06     1829.47      1669.34    0.93
 32      542.00     28.61    21.3      2.00     2.15     5     150.00    28.0
3625.48      987.98      1643.21    0.96
 33      544.00     22.64    21.3      1.63     1.75     5     150.00    28.0
2840.98      755.30      1582.63    0.96
 34      545.63     45.27    23.3      3.53     3.84     5     150.00    28.0
5604.77     1418.66      1421.55    0.97
 35      549.16     39.92    23.3      3.53     3.84     5     150.00    28.0
4830.78     1077.07      1216.69    0.97
 36      552.68     41.15    25.3      4.32     4.77     2       0.00    35.0
5120.51      839.53      1031.65    0.94
 37      557.00     20.77    25.3      2.63     2.91     2       0.00    35.0
2531.96      230.54       827.21    0.94
 38      559.63      9.66    27.3      1.40     1.57     2       0.00    35.0
1166.03       33.50       700.78    0.94
 39      561.03     14.67    27.3      2.48     2.79     2       0.00    35.0
1748.00        0.00       588.83    0.94
 40      563.51     11.50    27.3      2.48     2.79     2       0.00    35.0
1336.21        0.00       450.11    0.94
 41      565.98     10.82    29.0      3.59     4.10     1      50.00    28.0
1233.22        0.00       282.96    0.98
 42      569.57      3.61    29.3      3.59     4.11     1      50.00    28.0
411.07         0.00       85.34    0.99
                --------                    -------                          -------
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     X-S Area:    1173.79    Path Length:    145.94              X-S Weight:
142815.77
```

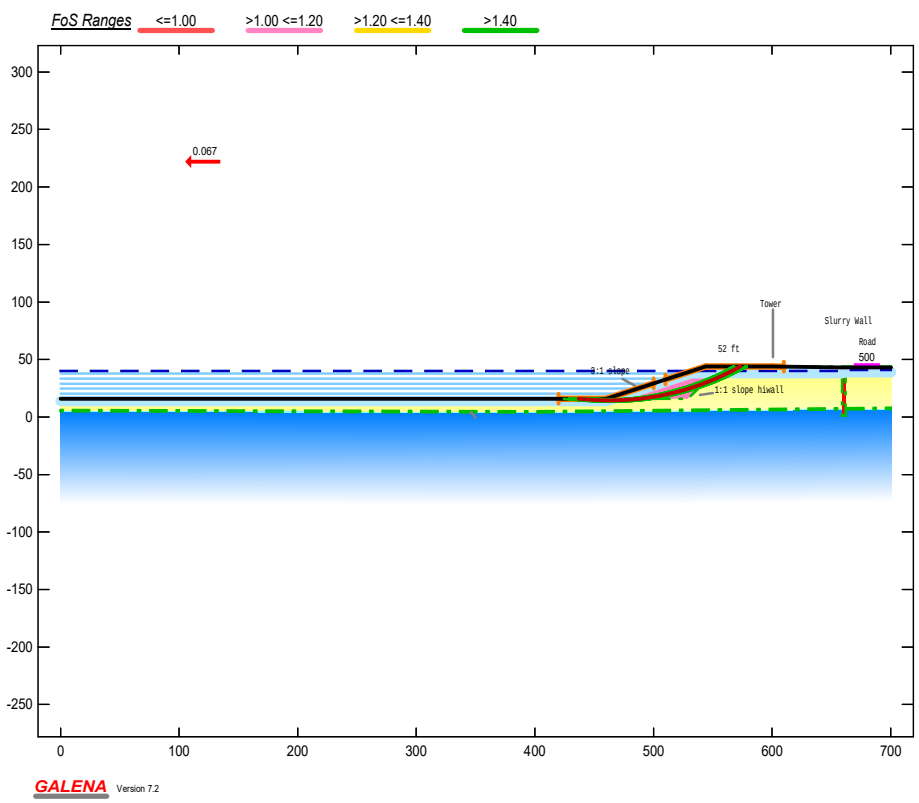

Material Keys

1: Overburden
2: Sand and Gravel
3: Weathered Bedrock
4: Unweathered Bedrock
5: Reclamation Slope
6: Slurry Wall

Analysis 1

Multiple Stability Analysis
Method: Bishop Simplified
Surface: Circular

Results

Critical Factor of Safety: 1.80

Project Wattenberg Lakes, Pond 1, NE Transmission Tower
Shallow Option Seismic

File: J:\Aggregate Industries-297\Wattenberg\DRMS Stability\Stability NE\NE shallow option seismic.gmf

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Civil Resources

GALENA 7.2 Analysis Results Version: 7.2.1.05 Licensee: Civil Resources

Project: Wattenberg Lakes, Pond 1, NE Transmission Tower
File: J:\Aggregate Industries-297\Wattenberg\DRMS Stability\Stability NE\NE shallow option seismic.gmf
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DATA: Analysis 1 - Shallow Option Seismic

Material Properties (6 materials)

Material: 1 (Mohr-Coulomb Isotropic) - Overburden

Cohesion	Phi	UnitWeight	Ru
50.00	28.0	114.00	Auto

Material: 2 (Mohr-Coulomb Isotropic) - Sand and Gravel

Cohesion	Phi	UnitWeight	Ru
0.00	35.0	130.00	Auto

Material: 3 (Mohr-Coulomb Isotropic) - Weathered Bedrock

Cohesion	Phi	UnitWeight	Ru
0.00	17.0	124.00	Auto

Material: 4 (Mohr-Coulomb Isotropic) - Unweathered Bedrock

Cohesion	Phi	UnitWeight	Ru
150.00	26.0	124.00	Auto

Material: 5 (Mohr-Coulomb Isotropic) - Reclamation Slope

Cohesion	Phi	UnitWeight	Ru
150.00	28.0	119.00	Auto

Material: 6 (Mohr-Coulomb Isotropic) - Slurry Wall

Cohesion	Phi	UnitWeight	Ru
0.00	0.0	110.00	Auto

Water Properties

Unit weight of water: 62.400 Unit weight of water/medium above ground: 62.400

Material Profiles (6 profiles)

Profile: 1 (2 points) Material beneath: 1 - Overburden

0.00	44.00	700.00	44.00

Profile: 2 (2 points) Material beneath: 2 - Sand and Gravel

0.00	40.00	700.00	40.00

Profile: 3 (3 points) Material beneath: 3 - Weathered Bedrock

0.00	6.00	399.00	5.00	700.00	8.00

Profile: 4 (3 points) Material beneath: 4 - Unweathered Bedrock

0.00	5.00	399.00	4.00	700.00	7.00

Profile: 5 (5 points) Material within: 6 - Slurry Wall

662.00	43.00	659.00	43.00	659.00	1.00	662.00	1.00	662.00	43.00

Profile: 6 (5 points) Material within: 5 - Reclamation Slope

557.00	44.00	544.00	44.00	460.00	16.00	529.00	16.00	557.00	44.00

Slope Surface (7 points)

0.00	16.00	460.00	16.00	544.00	44.00	557.00	44.00
600.00	44.00	659.00	43.00	700.00	43.00		

Phreatic Surface (4 points)

```
----------------
      0.00       40.00         659.00       40.00         662.00       41.00
700.00       41.00

Failure Surface
---------------
Initial circular surface for critical search defined by: XL,XR,R
  Intersects:  XL:     460.00      YL:      16.00      XR:     560.00      YR:
44.00
      Centre:  XC:     445.44      YC:     260.57                  Radius:  R:
245.00

Distributed Loads (1 load)
------------------
Load      X-Left    Pressure        X-Right   Pressure
  1       670.00      500.0         690.00      500.0

Earthquake Force
----------------
Pseudo-static earthquake (seismic) coefficient:  0.067

Variable Restraints
-------------------
Parameter descriptor:              XL         XR         R
Range of variation:             80.00     100.00      50.00
Trial positions within range:     20         20         50

-  --  --  --  --  --  --  --  --  --  --  --  --  --  --  --  --  --  --  --  --  --
--  --  --  --  --  --  --  --  --  --  --  -

RESULTS: Analysis  1 - Shallow Option Seismic

Bishop Simplified Method of Analysis - Circular Failure Surface
---------------------------------------------------------------
Critical Failure Surface Search using Multiple Circle Generation Techniques

Initial failure surface approximation - Factor of Safety:   2.026

Analysis Summary
================
There were:  14603 successful analyses from a total of 20001 trial failure surfaces
             5398 analyses terminated due to unacceptable geometry

Critical (minimum) Factor of Safety:  1.80
==========================================

Results Summary - Lowest 99 Factor of Safety circles
----------------------------------------------------
Circle    X-Left      Y-Left     X-Right     Y-Right     X-Centre    Y-Centre
Radius      FoS
   1       436.84       16.00      573.16       44.00      463.01      234.44
220.00     1.795   <-- Critical Surface
   2       432.63       16.00      573.16       44.00      462.25      234.00
220.00     1.796
   3       436.84       16.00      573.16       44.00      462.79      235.49
221.02     1.796
   4       432.63       16.00      573.16       44.00      462.04      235.06
221.02     1.798
   5       436.84       16.00      573.16       44.00      462.57      236.54
222.04     1.798
   6       432.63       16.00      573.16       44.00      461.83      236.11
222.04     1.799
```

7	441.05	16.00	573.16	44.00	463.69	234.83	
220.00	1.799						
8	436.84	16.00	573.16	44.00	462.36	237.60	
223.06	1.800						
9	432.63	16.00	573.16	44.00	461.62	237.17	
223.06	1.801						
10	432.63	16.00	567.89	44.00	457.92	234.54	
220.00	1.801						
11	441.05	16.00	573.16	44.00	463.47	235.88	
221.02	1.801						
12	432.63	16.00	573.16	44.00	461.41	238.23	
224.08	1.802						
13	436.84	16.00	573.16	44.00	462.14	238.65	
224.08	1.802						
14	428.42	16.00	573.16	44.00	461.42	233.51	
220.00	1.803						
15	441.05	16.00	573.16	44.00	463.25	236.93	
222.04	1.804						
16	432.63	16.00	567.89	44.00	457.70	235.59	
221.02	1.804						
17	432.63	16.00	573.16	44.00	461.20	239.28	
225.10	1.804						
18	428.42	16.00	573.16	44.00	461.21	234.57	
221.02	1.804						
19	436.84	16.00	573.16	44.00	461.93	239.70	
225.10	1.804						
20	428.42	16.00	573.16	44.00	461.01	235.64	
222.04	1.805						
21	432.63	16.00	573.16	44.00	460.98	240.34	
226.12	1.806						
22	441.05	16.00	573.16	44.00	463.02	237.98	
223.06	1.806						
23	441.05	16.00	578.42	44.00	468.09	234.33	
220.00	1.806						
24	445.26	16.00	578.42	44.00	468.79	234.74	
220.00	1.806						
25	428.42	16.00	573.16	44.00	460.80	236.70	
223.06	1.806						
26	432.63	16.00	567.89	44.00	457.49	236.65	
222.04	1.806						
27	436.84	16.00	573.16	44.00	461.71	240.75	
226.12	1.807						
28	441.05	16.00	578.42	44.00	467.87	235.39	
221.02	1.807						
29	432.63	16.00	573.16	44.00	460.77	241.39	
227.14	1.807						
30	428.42	16.00	573.16	44.00	460.60	237.76	
224.08	1.807						
31	436.84	16.00	578.42	44.00	467.31	233.88	
220.00	1.807						
32	445.26	16.00	578.42	44.00	468.57	235.79	
221.02	1.807						
33	441.05	16.00	578.42	44.00	467.66	236.44	
222.04	1.808						
34	436.84	16.00	578.42	44.00	467.10	234.94	
221.02	1.808						
35	436.84	16.00	567.89	44.00	458.59	234.92	
220.00	1.808						
36	428.42	16.00	573.16	44.00	460.39	238.82	
225.10	1.808						
37	441.05	16.00	573.16	44.00	462.80	239.02	
224.08	1.808						

38	436.84	16.00	573.16	44.00	461.49	241.80	227.14	1.809
39	432.63	16.00	573.16	44.00	460.56	242.45	228.16	1.809
40	445.26	16.00	573.16	44.00	464.29	235.18	220.00	1.809
41	445.26	16.00	578.42	44.00	468.35	236.84	222.04	1.809
42	432.63	16.00	567.89	44.00	457.27	237.70	223.06	1.809
43	436.84	16.00	578.42	44.00	466.89	236.00	222.04	1.809
44	436.84	16.00	567.89	44.00	458.36	235.97	221.02	1.810
45	441.05	16.00	578.42	44.00	467.44	237.49	223.06	1.810
46	441.05	16.00	573.16	44.00	462.58	240.07	225.10	1.810
47	436.84	16.00	578.42	44.00	466.68	237.06	223.06	1.810
48	428.42	16.00	573.16	44.00	460.19	239.88	226.12	1.810
49	428.42	16.00	567.89	44.00	457.18	234.11	220.00	1.810
50	432.63	16.00	573.16	44.00	460.35	243.50	229.18	1.810
51	445.26	16.00	578.42	44.00	468.13	237.89	223.06	1.811
52	441.05	16.00	578.42	44.00	467.23	238.55	224.08	1.811
53	436.84	16.00	573.16	44.00	461.28	242.85	228.16	1.811
54	428.42	16.00	573.16	44.00	459.98	240.94	227.14	1.811
55	445.26	16.00	573.16	44.00	464.06	236.22	221.02	1.811
56	436.84	16.00	578.42	44.00	466.47	238.11	224.08	1.811
57	432.63	16.00	567.89	44.00	457.05	238.75	224.08	1.812
58	428.42	16.00	573.16	44.00	459.78	242.00	228.16	1.812
59	441.05	16.00	578.42	44.00	467.01	239.60	225.10	1.812
60	445.26	16.00	578.42	44.00	467.91	238.93	224.08	1.812
61	432.63	16.00	573.16	44.00	460.14	244.55	230.20	1.812
62	436.84	16.00	567.89	44.00	458.14	237.02	222.04	1.812
63	436.84	16.00	578.42	44.00	466.26	239.17	225.10	1.813
64	428.42	16.00	567.89	44.00	456.97	235.17	221.02	1.813
65	441.05	16.00	573.16	44.00	462.36	241.12	226.12	1.813
66	436.84	16.00	573.16	44.00	461.06	243.90	229.18	1.813
67	449.47	16.00	578.42	44.00	469.41	235.09	220.00	1.813
68	428.42	16.00	573.16	44.00	459.57	243.06	229.18	1.813

69	441.05	16.00	578.42	44.00	466.80	240.65	226.12	1.814
70	436.84	16.00	578.42	44.00	466.06	240.23	226.12	1.814
71	445.26	16.00	578.42	44.00	467.69	239.98	225.10	1.814
72	432.63	16.00	578.42	44.00	466.47	233.38	220.00	1.814
73	445.26	16.00	573.16	44.00	463.83	237.26	222.04	1.814
74	432.63	16.00	573.16	44.00	459.93	245.61	231.22	1.814
75	432.63	16.00	578.42	44.00	466.26	234.45	221.02	1.814
76	432.63	16.00	567.89	44.00	456.83	239.80	225.10	1.815
77	428.42	16.00	567.89	44.00	456.76	236.23	222.04	1.815
78	428.42	16.00	573.16	44.00	459.37	244.11	230.20	1.815
79	436.84	16.00	578.42	44.00	465.85	241.28	227.14	1.815
80	432.63	16.00	578.42	44.00	466.06	235.51	222.04	1.815
81	449.47	16.00	578.42	44.00	469.19	236.14	221.02	1.815
82	436.84	16.00	573.16	44.00	460.85	244.95	230.20	1.815
83	441.05	16.00	578.42	44.00	466.59	241.70	227.14	1.815
84	445.26	16.00	578.42	44.00	467.47	241.03	226.12	1.815
85	441.05	16.00	573.16	44.00	462.14	242.16	227.14	1.815
86	432.63	16.00	578.42	44.00	465.85	236.57	223.06	1.816
87	432.63	16.00	573.16	44.00	459.73	246.66	232.24	1.816
88	436.84	16.00	567.89	44.00	457.91	238.06	223.06	1.816
89	436.84	16.00	578.42	44.00	465.64	242.34	228.16	1.816
90	428.42	16.00	573.16	44.00	459.16	245.17	231.22	1.816
91	432.63	16.00	578.42	44.00	465.65	237.64	224.08	1.816
92	445.26	16.00	573.16	44.00	463.61	238.31	223.06	1.816
93	424.21	16.00	567.89	44.00	456.37	233.64	220.00	1.817
94	428.42	16.00	567.89	44.00	456.55	237.28	223.06	1.817
95	441.05	16.00	578.42	44.00	466.37	242.75	228.16	1.817
96	449.47	16.00	573.16	44.00	464.80	235.47	220.00	1.817
97	449.47	16.00	578.42	44.00	468.96	237.18	222.04	1.817
98	432.63	16.00	578.42	44.00	465.44	238.70	225.10	1.817
99	432.63	16.00	567.89	44.00	456.62	240.85	226.12	1.817

Critical Failure Surface (circle 1)

Intersects: XL: 436.84 YL: 16.00 XR: 573.16 YR: 44.00
Centre: XC: 463.01 YC: 234.44 Radius: R: 220.00
Generated failure surface: (20 points)

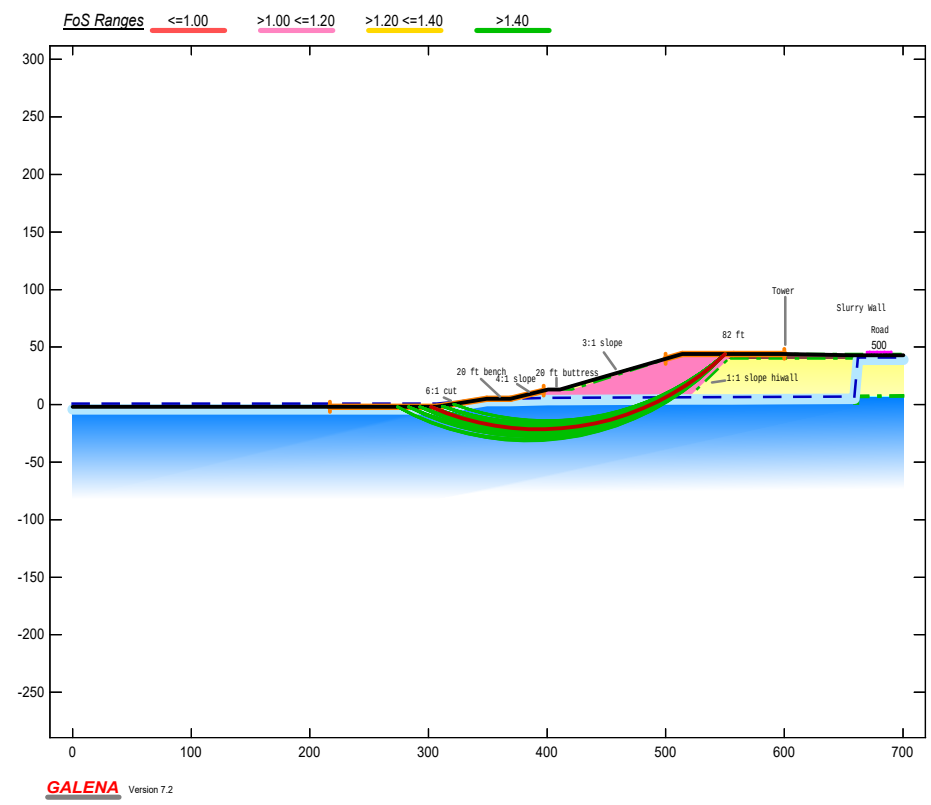
436.84	16.00	444.26	15.24	451.69	14.73	459.14	14.47	466.59	14.47
474.04	14.72	481.47	15.21	488.89	15.97	496.27	16.97	503.62	18.22
510.92	19.72	518.16	21.46	525.34	23.45	532.45	25.69	539.48	28.16
546.42	30.87	553.27	33.81	560.01	36.98	566.65	40.38	573.16	44.00

Slice Geometry and Properties - Critical Failure Surface (circle 1, 41 slices)

Slice	X-S	Base						PoreWater	Normal	Test
	X-Left	Area	Angle	Width	Length	Matl	Cohesion	Phi	Weight	Force	Stress	Factor
1	436.84	0.71	-5.9	3.71	3.73	2	0.00	35.0	91.65	5624.30	1522.86	1.05
2	440.55	2.12	-5.9	3.71	3.73	2	0.00	35.0	274.96	5712.80	1573.39	1.05
3	444.26	3.30	-3.9	3.72	3.73	2	0.00	35.0	429.19	5786.41	1614.71	1.03
4	447.97	4.25	-3.9	3.72	3.73	2	0.00	35.0	552.25	5845.62	1648.29	1.03
5	451.69	4.97	-2.0	3.72	3.73	2	0.00	35.0	646.00	5890.24	1672.31	1.01
6	455.41	5.45	-2.0	3.72	3.73	2	0.00	35.0	708.28	5920.20	1689.16	1.01
7	459.14	1.32	-0.0	0.86	0.86	2	0.00	35.0	171.38	1374.56	1696.23	1.00
8	460.00	6.85	-0.0	3.29	3.29	2	0.00	35.0	870.15	5248.18	1727.49	1.00
9	463.29	10.47	-0.0	3.29	3.29	2	0.00	35.0	1301.63	5248.67	1789.95	1.00
10	466.59	15.97	1.9	3.72	3.73	2	0.00	35.0	1960.19	5921.88	1844.89	0.99
11	470.31	20.13	1.9	3.72	3.73	2	0.00	35.0	2450.39	5893.16	1898.27	0.99
12	474.04	24.01	3.8	3.72	3.73	2	0.00	35.0	2904.57	5849.60	1938.63	0.98
13	477.75	27.69	3.8	3.72	3.73	2	0.00	35.0	3332.05	5791.53	1974.93	0.98
14	481.47	31.04	5.8	3.71	3.73	2	0.00	35.0	3717.77	5718.89	1997.08	0.97
15	485.18	34.23	5.8	3.71	3.73	2	0.00	35.0	4081.90	5631.62	2016.50	0.97
16	488.89	37.02	7.7	3.69	3.73	5	150.00	28.0	4405.80	5529.70	2018.85	0.97
17	492.58	39.72	7.7	3.69	3.73	5	150.00	28.0	4726.46	5413.25	2027.30	0.97
18	496.27	41.95	9.7	3.67	3.73	5	150.00	28.0	4992.40	5282.30	2019.58	0.97
19	499.94	44.15	9.7	3.67	3.73	5	150.00	28.0	5254.09	5136.84	2012.80	0.97
20	503.62	45.82	11.6	3.65	3.73	5	150.00	28.0	5452.10	4976.89	1989.34	0.96

```
 21      507.27     47.52    11.6     3.65     3.73     5     150.00    28.0
5654.88     4802.59      1967.47    0.96
 22      510.92     48.61    13.5     3.62     3.73     5     150.00    28.0
5785.11     4614.04      1928.58    0.96
 23      514.54     49.83    13.5     3.62     3.73     5     150.00    28.0
5929.27     4411.06      1891.79    0.96
 24      518.16     50.35    15.5     3.59     3.73     5     150.00    28.0
5992.23     4194.01      1837.74    0.96
 25      521.75     51.08    15.5     3.59     3.73     5     150.00    28.0
6078.38     3962.60      1786.21    0.96
 26      525.34     47.80    17.4     3.33     3.49     5     150.00    28.0
5688.51     3488.88      1719.42    0.96
 27      528.67     48.02    17.4     3.33     3.49     5     150.00    28.0
5714.16     3261.35      1657.54    0.96
 28      532.00     54.01    19.1     3.74     3.96     2       0.00    35.0
6995.49     3413.30      1749.94    0.93
 29      535.74     53.75    19.4     3.74     3.97     2       0.00    35.0
6910.99     3092.73      1718.80    0.93
 30      539.48     39.19    21.3     2.75     2.95     2       0.00    35.0
5005.90     2081.68      1673.73    0.93
 31      542.23     25.01    21.3     1.77     1.90     5     150.00    28.0
3168.17     1235.73      1642.90    0.96
 32      544.00     32.98    21.3     2.42     2.60     5     150.00    28.0
4132.06     1559.54      1561.14    0.96
 33      546.42     42.44    23.3     3.42     3.73     5     150.00    28.0
5234.01     1952.63      1383.63    0.97
 34      549.85     37.41    23.3     3.42     3.73     5     150.00    28.0
4505.76     1610.60      1184.57    0.97
 35      553.27     34.74    25.2     3.73     4.12     2       0.00    35.0
4312.38     1366.92      1028.40    0.93
 36      557.00     23.29    25.2     3.01     3.33     2       0.00    35.0
2834.69      774.80       830.95    0.93
 37      560.01     18.46    27.1     2.95     3.31     2       0.00    35.0
2211.10      467.91       648.97    0.94
 38      562.96     14.01    27.1     2.95     3.31     2       0.00    35.0
1632.71      155.97       469.69    0.94
 39      565.91      2.82    27.1     0.74     0.83     1      50.00    28.0
321.06       0.00       364.77    0.98
 40      566.65      8.84    29.1     3.26     3.73     1      50.00    28.0
1008.22       0.00       252.54    0.98
 41      569.90      2.95    29.1     3.26     3.73     1      50.00    28.0
336.09        0.00        75.32    0.98
                --------                  -------                          -------
---
     X-S Area:    1134.25    Path Length:    141.59              X-S Weight:
137774.41
```

Northeast Tower Deeper



Project Wattenberg Lakes, Pond 1, NE Transmission Tower
Deeper Option, Post Construction

File: J:\Aggregate Industries-297\Wattenberg\DRMS Stability\Stability NE\More fil NE deeper option post construction.gmf

Material Keys

1: Overburden
2: Sand and Gravel
3: Weathered Bedrock
4: Unweathered Bedrock
5: Reclamation Slope
6: Slurry Wall

Analysis 1

Multiple Stability Analysis
Method: Bishop Simplified
Surface: Circular

Results

Critical Factor of Safety: 1.63

Edited: 3 May 2024 *Processed:* 3 May 2024

Civil Resources

GALENA 7.2 Analysis Results Version: 7.2.1.05 Licensee: Civil Resources

Project: Wattenberg Lakes, Pond 1, NE Transmission Tower
File: J:\Aggregate Industries-297\Wattenberg\DRMS Stability\Stability NE\More fil NE deeper option post construction.gmf
Processed: 03 May 2024 11:38:25

DATA: Analysis 1 - Deeper Option, Post Construction

Material Properties (6 materials)

Material: 1 (Mohr-Coulomb Isotropic) - Overburden

Cohesion	Phi	UnitWeight	Ru
50.00	28.0	114.00	Auto

Material: 2 (Mohr-Coulomb Isotropic) - Sand and Gravel

Cohesion	Phi	UnitWeight	Ru
0.00	35.0	130.00	Auto

Material: 3 (Mohr-Coulomb Isotropic) - Weathered Bedrock

Cohesion	Phi	UnitWeight	Ru
0.00	17.0	124.00	Auto

Material: 4 (Mohr-Coulomb Isotropic) - Unweathered Bedrock

Cohesion	Phi	UnitWeight	Ru
150.00	26.0	124.00	Auto

Material: 5 (Mohr-Coulomb Isotropic) - Reclamation Slope

Cohesion	Phi	UnitWeight	Ru
150.00	28.0	119.00	Auto

Material: 6 (Mohr-Coulomb Isotropic) - Slurry Wall

Cohesion	Phi	UnitWeight	Ru
0.00	0.0	110.00	Auto

Water Properties

Unit weight of water: 62.400 Unit weight of water/medium above ground: 62.400

Material Profiles (6 profiles)

Profile: 1 (2 points)	Material beneath: 1 - Overburden					
0.00	44.00	700.00	44.00			
Profile: 2 (2 points)	Material beneath: 2 - Sand and Gravel					
0.00	40.00	700.00	40.00			
Profile: 3 (3 points)	Material beneath: 3 - Weathered Bedrock					
0.00	6.00	399.00	5.00	700.00	8.00	
Profile: 4 (3 points)	Material beneath: 4 - Unweathered Bedrock					
0.00	5.00	399.00	4.00	700.00	7.00	
Profile: 5 (5 points)	Material within: 6 - Slurry Wall					
662.00	43.00	659.00	43.00	659.00	1.00	
662.00	1.00	662.00	43.00			
Profile: 6 (8 points)	Material within: 5 - Reclamation Slope					
557.00	44.00	514.00	44.00	421.00	13.00	
401.00	13.00	369.00	5.00			
369.00	4.00	517.00	4.00	557.00	44.00	

Slope Surface (11 points)

0.00	-2.00	307.00	-2.00	349.00	5.00	
369.00	5.00	401.00	13.00			
411.00	13.00	514.00	44.00	557.00	44.00	
600.00	44.00	659.00	43.00			

```
    700.00       43.00

Phreatic Surface (8 points)
---------------
      0.00        1.00         307.00        1.00         349.00        5.00
369.00        5.00         401.00        6.00
    659.00        7.00         662.00       41.00         700.00       41.00

Failure Surface
---------------
Initial circular surface for critical search defined by: XL,XR,R
  Intersects:  XL:     307.00      YL:      -2.00      XR:     550.00      YR:
44.00
      Centre:  XC:     389.16      YC:     228.81                  Radius:  R:
245.00

Distributed Loads (1 load)
-----------------
Load      X-Left    Pressure        X-Right   Pressure
  1       670.00      500.0         690.00      500.0

Variable Restraints
-------------------
Parameter descriptor:              XL         XR         R
Range of variation:             180.00     100.00      50.00
Trial positions within range:      20          1         50

-  --  --  --  --  --  --  --  --  --  --  --  --  --  --  --  --  --  --  --  --  --
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RESULTS: Analysis  1 - Deeper Option, Post Construction

Bishop Simplified Method of Analysis - Circular Failure Surface
------------------------------------------------------------
Critical Failure Surface Search using Multiple Circle Generation Techniques

Initial failure surface approximation - Factor of Safety:   1.683

Analysis Summary
================
There were:  1001 successful analyses from a total of 1001 trial failure surfaces

Critical (minimum) Factor of Safety:  1.63
==========================================

Results Summary - Lowest 99 Factor of Safety circles
----------------------------------------------------
Circle    X-Left      Y-Left     X-Right     Y-Right     X-Centre    Y-Centre
Radius      FoS
   1       302.26       -2.00      550.00       44.00      392.98      199.55
221.02     1.630   <-- Critical Surface
   2       302.26       -2.00      550.00       44.00      393.21      198.32
220.00     1.631
   3       302.26       -2.00      550.00       44.00      392.75      200.77
222.04     1.632
   4       292.79       -2.00      550.00       44.00      390.23      195.24
220.00     1.632
   5       302.26       -2.00      550.00       44.00      392.53      201.98
223.06     1.634
   6       292.79       -2.00      550.00       44.00      390.01      196.49
221.02     1.634
   7       302.26       -2.00      550.00       44.00      392.30      203.20
224.08     1.635
```

8	292.79	-2.00	550.00	44.00	389.79	197.73	222.04	1.636
9	302.26	-2.00	550.00	44.00	392.08	204.41	225.10	1.637
10	311.74	-1.21	550.00	44.00	396.65	201.74	220.00	1.638
11	292.79	-2.00	550.00	44.00	388.68	203.91	227.14	1.639
12	302.26	-2.00	550.00	44.00	391.85	205.62	226.12	1.639
13	311.74	-1.21	550.00	44.00	396.42	202.94	221.02	1.640
14	292.79	-2.00	550.00	44.00	389.57	198.97	223.06	1.641
15	311.74	-1.21	550.00	44.00	396.19	204.14	222.04	1.642
16	292.79	-2.00	550.00	44.00	389.12	201.45	225.10	1.643
17	292.79	-2.00	550.00	44.00	389.34	200.21	224.08	1.643
18	311.74	-1.21	550.00	44.00	395.97	205.34	223.06	1.644
19	292.79	-2.00	550.00	44.00	388.90	202.68	226.12	1.645
20	302.26	-2.00	550.00	44.00	391.63	206.83	227.14	1.646
21	302.26	-2.00	550.00	44.00	391.40	208.03	228.16	1.646
22	302.26	-2.00	550.00	44.00	391.18	209.23	229.18	1.647
23	283.32	-2.00	550.00	44.00	387.17	191.94	220.00	1.647
24	302.26	-2.00	550.00	44.00	390.96	210.43	230.20	1.647
25	292.79	-2.00	550.00	44.00	388.46	205.14	228.16	1.647
26	283.32	-2.00	550.00	44.00	386.73	194.49	222.04	1.647
27	283.32	-2.00	550.00	44.00	386.95	193.22	221.02	1.648
28	302.26	-2.00	550.00	44.00	390.74	211.63	231.22	1.648
29	283.32	-2.00	550.00	44.00	386.51	195.75	223.06	1.648
30	292.79	-2.00	550.00	44.00	388.24	206.36	229.18	1.649
31	283.32	-2.00	550.00	44.00	386.30	197.02	224.08	1.650
32	292.79	-2.00	550.00	44.00	388.03	207.58	230.20	1.650
33	302.26	-2.00	550.00	44.00	390.07	215.21	234.29	1.650
34	302.26	-2.00	550.00	44.00	390.51	212.82	232.24	1.651
35	311.74	-1.21	550.00	44.00	395.74	206.53	224.08	1.651
36	311.74	-1.21	550.00	44.00	395.51	207.72	225.10	1.651
37	311.74	-1.21	550.00	44.00	395.29	208.91	226.12	1.652
38	292.79	-2.00	550.00	44.00	387.81	208.80	231.22	1.652

39	311.74	-1.21	550.00	44.00	395.06	210.10	227.14	1.653
40	302.26	-2.00	550.00	44.00	390.29	214.02	233.27	1.653
41	292.79	-2.00	550.00	44.00	387.59	210.02	232.24	1.653
42	283.32	-2.00	550.00	44.00	386.08	198.28	225.10	1.654
43	302.26	-2.00	550.00	44.00	389.85	216.40	235.31	1.654
44	311.74	-1.21	550.00	44.00	394.84	211.28	228.16	1.655
45	292.79	-2.00	550.00	44.00	387.37	211.23	233.27	1.655
46	283.32	-2.00	550.00	44.00	385.86	199.53	226.12	1.655
47	292.79	-2.00	550.00	44.00	386.51	216.06	237.35	1.656
48	283.32	-2.00	550.00	44.00	385.65	200.79	227.14	1.657
49	292.79	-2.00	550.00	44.00	387.16	212.44	234.29	1.657
50	311.74	-1.21	550.00	44.00	394.61	212.46	229.18	1.658
51	283.32	-2.00	550.00	44.00	385.43	202.04	228.16	1.658
52	302.26	-2.00	550.00	44.00	389.63	217.58	236.33	1.658
53	292.79	-2.00	550.00	44.00	386.29	217.26	238.37	1.658
54	292.79	-2.00	550.00	44.00	386.94	213.65	235.31	1.659
55	283.32	-2.00	550.00	44.00	385.22	203.28	229.18	1.660
56	311.74	-1.21	550.00	44.00	394.39	213.64	230.20	1.660
57	292.79	-2.00	550.00	44.00	386.08	218.46	239.39	1.660
58	292.79	-2.00	550.00	44.00	386.73	214.86	236.33	1.660
59	283.32	-2.00	550.00	44.00	385.00	204.53	230.20	1.662
60	302.26	-2.00	550.00	44.00	389.41	218.77	237.35	1.662
61	292.79	-2.00	550.00	44.00	385.87	219.66	240.41	1.662
62	321.21	0.37	550.00	44.00	400.64	205.53	220.00	1.662
63	311.74	-1.21	550.00	44.00	394.17	214.82	231.22	1.663
64	283.32	-2.00	550.00	44.00	384.57	207.01	232.24	1.663
65	302.26	-2.00	550.00	44.00	389.19	219.95	238.37	1.664
66	292.79	-2.00	550.00	44.00	385.65	220.85	241.43	1.664
67	283.32	-2.00	550.00	44.00	384.36	208.24	233.27	1.664
68	302.26	-2.00	550.00	44.00	388.53	223.49	241.43	1.665
69	283.32	-2.00	550.00	44.00	384.79	205.77	231.22	1.665

70	321.21	0.37	550.00	44.00	400.42	206.71
221.02	1.665					
71	311.74	-1.21	550.00	44.00	393.94	216.00
232.24	1.665					
72	273.84	-2.00	550.00	44.00	384.03	188.41
220.00	1.666					
73	283.32	-2.00	550.00	44.00	384.15	209.48
234.29	1.666					
74	302.26	-2.00	550.00	44.00	388.97	221.13
239.39	1.666					
75	292.79	-2.00	550.00	44.00	385.44	222.05
242.45	1.666					
76	273.84	-2.00	550.00	44.00	383.82	189.72
221.02	1.667					
77	283.32	-2.00	550.00	44.00	383.94	210.71
235.31	1.667					
78	311.74	-1.21	550.00	44.00	393.72	217.17
233.27	1.668					
79	321.21	0.37	550.00	44.00	400.19	207.89
222.04	1.668					
80	302.26	-2.00	550.00	44.00	388.75	222.31
240.41	1.668					
81	283.32	-2.00	550.00	44.00	383.72	211.94
236.33	1.669					
82	283.32	-2.00	550.00	44.00	383.51	213.16
237.35	1.670					
83	311.74	-1.21	550.00	44.00	393.50	218.35
234.29	1.670					
84	321.21	0.37	550.00	44.00	399.97	209.06
223.06	1.671					
85	273.84	-2.00	550.00	44.00	383.60	191.02
222.04	1.671					
86	273.84	-2.00	550.00	44.00	383.39	192.31
223.06	1.672					
87	283.32	-2.00	550.00	44.00	383.30	214.38
238.37	1.672					
88	273.84	-2.00	550.00	44.00	383.17	193.60
224.08	1.673					
89	311.74	-1.21	550.00	44.00	393.27	219.52
235.31	1.673					
90	273.84	-2.00	550.00	44.00	382.96	194.89
225.10	1.673					
91	292.79	-2.00	550.00	44.00	385.23	223.24
243.47	1.673					
92	321.21	0.37	550.00	44.00	399.74	210.24
224.08	1.674					
93	292.79	-2.00	550.00	44.00	385.01	224.43
244.49	1.674					
94	273.84	-2.00	550.00	44.00	382.74	196.17
226.12	1.674					
95	292.79	-2.00	550.00	44.00	384.80	225.62
245.51	1.675					
96	292.79	-2.00	550.00	44.00	384.59	226.80
246.53	1.675					
97	283.32	-2.00	550.00	44.00	383.09	215.60
239.39	1.676					
98	311.74	-1.21	550.00	44.00	393.05	220.69
236.33	1.676					
99	292.79	-2.00	550.00	44.00	384.38	227.99
247.55	1.677					

Critical Failure Surface (circle 1)

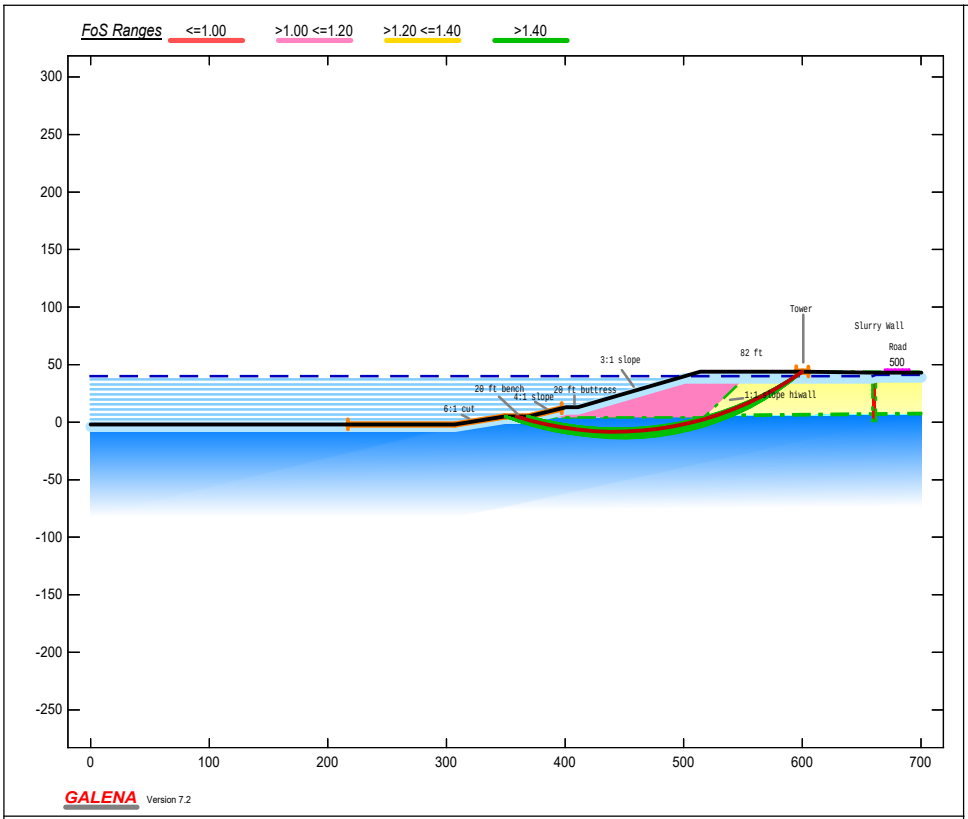
Intersects: XL: 302.26 YL: -2.00 XR: 550.00 YR: 44.00
Centre: XC: 392.98 YC: 199.55 Radius: R: 221.02
Generated failure surface: (20 points)

302.26 -2.00 315.31 -7.38 328.67 -11.91
342.29 -15.58 356.12 -18.38
370.10 -20.29 384.17 -21.30 398.28 -21.41
412.36 -20.62 426.37 -18.94
440.24 -16.36 453.92 -12.91 467.35 -8.59
480.48 -3.42 493.25 2.58
505.61 9.38 517.52 16.95 528.91 25.27
539.76 34.30 550.00 44.00

Slice Geometry and Properties - Critical Failure Surface (circle 1, 48 slices)

Slice	X-S	Base						PoreWater	Normal	Test
	X-Left	Area	Angle	Width	Length	Matl	Cohesion	Phi	Weight	Force	Stress	Factor
1	302.26	4.62	-22.4	4.74	5.12	4	150.00	26.0	573.48	1271.27	359.99	1.23
2	307.00	13.10	-22.4	4.15	4.49	4	150.00	26.0	1624.94	1683.90	639.77	1.23
3	311.15	23.09	-22.4	4.15	4.49	4	150.00	26.0	2863.35	2274.81	940.25	1.23
4	315.31	56.46	-18.7	6.68	7.05	4	150.00	26.0	7001.07	4674.83	1276.91	1.18
5	321.99	79.04	-18.7	6.68	7.05	4	150.00	26.0	9801.15	5952.79	1689.83	1.18
6	328.67	102.22	-15.1	6.81	7.05	4	150.00	26.0	12675.66	7138.67	2044.54	1.13
7	335.48	122.46	-15.1	6.81	7.05	4	150.00	26.0	15185.17	8232.44	2398.69	1.13
8	342.29	30.41	-11.4	1.54	1.57	4	150.00	26.0	3771.26	1977.79	2573.49	1.09
9	343.83	108.51	-11.4	5.17	5.27	4	150.00	26.0	13455.16	6968.75	2716.90	1.09
10	349.00	161.30	-11.4	7.12	7.26	4	150.00	26.0	20001.76	10269.04	2919.47	1.09
11	356.12	153.41	-7.8	6.44	6.50	4	150.00	26.0	19022.97	9661.58	3029.08	1.05
12	362.56	159.07	-7.8	6.44	6.50	4	150.00	26.0	19724.96	10018.12	3140.38	1.05
13	369.00	27.82	-7.8	1.10	1.11	3	0.00	17.0	3449.95	1744.07	3184.22	1.04
14	370.10	187.82	-4.1	7.04	7.05	3	0.00	17.0	23251.81	11306.02	3327.88	1.02
15	377.13	203.76	-4.1	7.04	7.05	3	0.00	17.0	25165.51	11625.54	3602.96	1.02
16	384.17	218.69	-0.5	7.05	7.05	3	0.00	17.0	26953.49	11846.20	3824.14	1.00
17	391.22	231.52	-0.5	7.05	7.05	3	0.00	17.0	28482.14	11967.85	4041.16	1.00
18	398.28	92.53	3.2	2.72	2.73	3	0.00	17.0	11369.08	4642.57	4151.40	0.99
19	401.00	170.60	3.2	5.00	5.01	3	0.00	17.0	20954.91	8477.39	4165.04	0.99
20	406.00	169.20	3.2	5.00	5.01	3	0.00	17.0	20782.68	8396.02	4130.78	0.99
21	411.00	46.22	3.2	1.36	1.37	3	0.00	17.0	5679.26	2277.60	4135.40	0.99

```
 22      412.36    148.63     6.9     4.32     4.35     3       0.00    17.0
18287.93     7168.17      4178.58    0.98
 23      416.68    152.00     6.9     4.32     4.35     3       0.00    17.0
18740.25     7031.79      4280.31    0.98
 24      421.00    193.83     6.9     5.37     5.41     3       0.00    17.0
23897.03     8559.18      4384.83    0.98
 25      426.37    256.37    10.5     6.94     7.05     3       0.00    17.0
31534.79    10743.03      4444.93    0.98
 26      433.31    261.92    10.5     6.94     7.05     3       0.00    17.0
32135.41    10187.97      4525.96    0.98
 27      440.24    262.15    14.2     6.84     7.05     3       0.00    17.0
32083.15     9535.98      4539.85    0.98
 28      447.08    264.41    14.2     6.84     7.05     3       0.00    17.0
32279.14     8787.16      4562.39    0.98
 29      453.92    260.25    17.8     6.72     7.05     3       0.00    17.0
31690.26     7942.90      4514.64    0.99
 30      460.64    259.32    17.8     6.72     7.05     3       0.00    17.0
31492.49     7003.29      4479.28    0.99
 31      467.35    251.01    21.5     6.56     7.05     3       0.00    17.0
30398.07     5970.17      4370.94    1.00
 32      473.92    247.01    21.5     6.56     7.05     3       0.00    17.0
29824.12     4843.63      4278.54    1.00
 33      480.48    234.92    25.2     6.39     7.05     3       0.00    17.0
28272.35     3626.00      4110.87    1.02
 34      486.87    228.05    25.2     6.39     7.05     3       0.00    17.0
27346.26     2317.13      3962.56    1.02
 35      493.25     89.97    28.8     2.58     2.95     3       0.00    17.0
10758.57      564.79      3796.11    1.03
 36      495.83     61.32    28.8     1.79     2.04     4     150.00    26.0
7321.42      239.23      3490.80    0.98
 37      497.62     62.70    28.8     1.85     2.11     3       0.00    17.0
7475.92      116.84      3664.71    1.03
 38      499.47     41.41    28.8     1.24     1.41     5     150.00    28.0
4933.46        3.74      3339.11    0.97
 39      500.71    160.43    28.8     4.90     5.60     2       0.00    35.0
20807.31        0.00      3431.57    0.92
 40      505.61    131.63    32.5     4.19     4.97     2       0.00    35.0
17009.88        0.00      3186.31    0.93
 41      509.81    125.73    32.5     4.19     4.97     2       0.00    35.0
16188.29        0.00      3032.41    0.93
 42      514.00     99.09    32.5     3.52     4.17     2       0.00    35.0
12726.96        0.00      2841.19    0.93
 43      517.52    142.26    36.1     5.70     7.05     2       0.00    35.0
18243.69        0.00      2437.63    0.94
 44      523.22    118.57    36.1     5.70     7.05     2       0.00    35.0
15163.02        0.00      2026.00    0.94
 45      528.91     89.30    39.8     5.42     7.05     2       0.00    35.0
11369.93        0.00      1544.89    0.96
 46      534.34     64.83    39.8     5.42     7.05     2       0.00    35.0
8188.79        0.00      1112.65    0.96
 47      539.76     41.24    43.4     6.02     8.29     2       0.00    35.0
5096.52        0.00       601.80    0.98
 48      545.78      8.45    43.4     4.22     5.82     5     150.00    28.0
1005.25        0.00       115.27    1.05
                --------                 -------                          -------
---
     X-S Area:    6618.66    Path Length:    268.06              X-S Weight:
816060.00
```



Project Wattenberg Lakes, Pond 1, NE Transmission Tower
Deeper Option Static, Full Reservoir

File: J:\Aggregate Industries-297\Wattenberg\DRMS Stability\Stability NE\More fil NE deeper option full reservoir.gmf

Material Keys

1: Overburden
2: Sand and Gravel
3: Weathered Bedrock
4: Unweathered Bedrock
5: Reclamation Slope
6: Slurry Wall

Analysis 1

Multiple Stability Analysis
Method: Bishop Simplified
Surface: Circular

Results

Critical Factor of Safety: 2.19

Edited: 3 May 2024 *Processed:* 3 May 2024

Civil Resources

GALENA 7.2 Analysis Results Version: 7.2.1.05 Licensee: Civil Resources

Project: Wattenberg Lakes, Pond 1, NE Transmission Tower
File: J:\Aggregate Industries-297\Wattenberg\DRMS Stability\Stability NE\More fil NE deeper option full reservoir.gmf
Processed: 03 May 2024 11:12:06

DATA: Analysis 1 - Deeper Option Static, Full Reservoir

Material Properties (6 materials)

Material: 1 (Mohr-Coulomb Isotropic) - Overburden

Cohesion	Phi	UnitWeight	Ru
50.00	28.0	114.00	Auto

Material: 2 (Mohr-Coulomb Isotropic) - Sand and Gravel

Cohesion	Phi	UnitWeight	Ru
0.00	35.0	130.00	Auto

Material: 3 (Mohr-Coulomb Isotropic) - Weathered Bedrock

Cohesion	Phi	UnitWeight	Ru
0.00	17.0	124.00	Auto

Material: 4 (Mohr-Coulomb Isotropic) - Unweathered Bedrock

Cohesion	Phi	UnitWeight	Ru
150.00	26.0	124.00	Auto

Material: 5 (Mohr-Coulomb Isotropic) - Reclamation Slope

Cohesion	Phi	UnitWeight	Ru
150.00	28.0	119.00	Auto

Material: 6 (Mohr-Coulomb Isotropic) - Slurry Wall

Cohesion	Phi	UnitWeight	Ru
0.00	0.0	110.00	Auto

Water Properties

Unit weight of water: 62.400 Unit weight of water/medium above ground: 62.400

Material Profiles (6 profiles)

Profile: 1 (2 points) Material beneath: 1 - Overburden

0.00	44.00	700.00	44.00

Profile: 2 (2 points) Material beneath: 2 - Sand and Gravel

0.00	40.00	700.00	40.00

Profile: 3 (3 points) Material beneath: 3 - Weathered Bedrock

0.00	6.00	399.00	5.00	700.00	8.00

Profile: 4 (3 points) Material beneath: 4 - Unweathered Bedrock

0.00	5.00	399.00	4.00	700.00	7.00

Profile: 5 (5 points) Material within: 6 - Slurry Wall

662.00	43.00	659.00	43.00	659.00	1.00	662.00	1.00	662.00	43.00

Profile: 6 (8 points) Material within: 5 - Reclamation Slope

557.00	44.00	514.00	44.00	421.00	13.00	401.00	13.00	369.00	5.00	369.00	4.00	517.00	4.00	557.00	44.00

Slope Surface (11 points)

0.00	-2.00	307.00	-2.00	349.00	5.00	369.00	5.00	401.00	13.00	411.00	13.00	514.00	44.00	557.00	44.00
600.00	44.00	659.00	43.00												

700.00 43.00

Phreatic Surface (4 points)

0.00 40.00 659.00 40.00 662.00 41.00
700.00 41.00

Failure Surface

Initial circular surface for critical search defined by: XL,XR,R
Intersects: XL: 307.00 YL: -2.00 XR: 600.00 YR:
44.00
Centre: XC: 423.25 YC: 213.66 Radius: R:
245.00

Distributed Loads (1 load)

Load	X-Left	Pressure	X-Right	Pressure
1	670.00	500.0	690.00	500.0

Variable Restraints

Parameter descriptor:	XL	XR	R
Range of variation:	180.00	10.00	50.00
Trial positions within range:	20	1	50

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RESULTS: Analysis 1 - Deeper Option Static, Full Reservoir

Bishop Simplified Method of Analysis - Circular Failure Surface
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Critical Failure Surface Search using Multiple Circle Generation Techniques

Initial failure surface approximation - Factor of Safety: 2.417

Analysis Summary
================
There were: 1001 successful analyses from a total of 1001 trial failure surfaces

Critical (minimum) Factor of Safety: 2.19
==

Results Summary - Lowest 99 Factor of Safety circles

Circle	X-Left	Y-Left	X-Right	Y-Right	X-Centre	Y-Centre	Radius	FoS	
1	359.11	5.00	600.00	44.00	441.98	256.60	264.90	2.189	<-- Critical Surface
2	359.11	5.00	600.00	44.00	441.06	262.26	270.00	2.189	
3	359.11	5.00	600.00	44.00	441.24	261.13	268.98	2.189	
4	359.11	5.00	600.00	44.00	442.16	255.47	263.88	2.189	
5	359.11	5.00	600.00	44.00	441.43	260.00	267.96	2.189	
6	359.11	5.00	600.00	44.00	441.61	258.87	266.94	2.189	
7	359.11	5.00	600.00	44.00	441.79	257.74	265.92	2.189	

8	359.11	5.00	600.00	44.00	442.34	254.33	262.86	2.189
9	359.11	5.00	600.00	44.00	442.53	253.19	261.84	2.191
10	359.11	5.00	600.00	44.00	443.08	249.77	258.78	2.192
11	359.11	5.00	600.00	44.00	444.57	240.59	250.61	2.193
12	359.11	5.00	600.00	44.00	443.27	248.63	257.76	2.193
13	359.11	5.00	600.00	44.00	443.45	247.48	256.73	2.194
14	359.11	5.00	600.00	44.00	442.71	252.05	260.82	2.194
15	359.11	5.00	600.00	44.00	444.38	241.74	251.63	2.195
16	359.11	5.00	600.00	44.00	443.64	246.34	255.71	2.195
17	349.63	5.00	600.00	44.00	438.30	258.95	268.98	2.196
18	359.11	5.00	600.00	44.00	443.82	245.19	254.69	2.196
19	368.58	5.00	600.00	44.00	444.63	259.81	265.92	2.196
20	368.58	5.00	600.00	44.00	444.82	258.69	264.90	2.197
21	359.11	5.00	600.00	44.00	444.20	242.89	252.65	2.197
22	368.58	5.00	600.00	44.00	445.01	257.57	263.88	2.197
23	368.58	5.00	600.00	44.00	444.26	262.05	267.96	2.197
24	359.11	5.00	600.00	44.00	444.01	244.04	253.67	2.197
25	349.63	5.00	600.00	44.00	438.12	260.09	270.00	2.198
26	359.11	5.00	600.00	44.00	442.90	250.91	259.80	2.198
27	368.58	5.00	600.00	44.00	444.45	260.93	266.94	2.200
28	359.11	5.00	600.00	44.00	444.76	239.44	249.59	2.200
29	359.11	5.00	600.00	44.00	444.94	238.28	248.57	2.201
30	359.11	5.00	600.00	44.00	445.13	237.12	247.55	2.202
31	368.58	5.00	600.00	44.00	445.20	256.44	262.86	2.202
32	368.58	5.00	600.00	44.00	445.39	255.32	261.84	2.203
33	359.11	5.00	600.00	44.00	445.32	235.97	246.53	2.203
34	368.58	5.00	600.00	44.00	445.58	254.19	260.82	2.203
35	368.58	5.00	600.00	44.00	445.77	253.06	259.80	2.203
36	349.63	5.00	600.00	44.00	438.47	257.80	267.96	2.203
37	368.58	5.00	600.00	44.00	445.96	251.93	258.78	2.204
38	359.11	5.00	600.00	44.00	445.50	234.81	245.51	2.204

39	349.63	5.00	600.00	44.00	438.65	256.66	266.94	2.204
40	368.58	5.00	600.00	44.00	446.15	250.81	257.76	2.204
41	368.58	5.00	600.00	44.00	444.07	263.17	268.98	2.204
42	368.58	5.00	600.00	44.00	446.34	249.67	256.73	2.204
43	349.63	5.00	600.00	44.00	438.83	255.51	265.92	2.205
44	359.11	5.00	600.00	44.00	445.69	233.64	244.49	2.205
45	368.58	5.00	600.00	44.00	446.53	248.54	255.71	2.205
46	349.63	5.00	600.00	44.00	439.01	254.36	264.90	2.205
47	368.58	5.00	600.00	44.00	446.72	247.41	254.69	2.205
48	349.63	5.00	600.00	44.00	439.19	253.22	263.88	2.206
49	368.58	5.00	600.00	44.00	446.92	246.28	253.67	2.206
50	359.11	5.00	600.00	44.00	445.88	232.48	243.47	2.206
51	368.58	5.00	600.00	44.00	447.11	245.14	252.65	2.206
52	349.63	5.00	600.00	44.00	439.37	252.07	262.86	2.206
53	368.58	5.00	600.00	44.00	447.30	244.00	251.63	2.207
54	359.11	5.00	600.00	44.00	446.07	231.32	242.45	2.207
55	349.63	5.00	600.00	44.00	439.55	250.91	261.84	2.207
56	368.58	5.00	600.00	44.00	447.49	242.86	250.61	2.207
57	349.63	5.00	600.00	44.00	439.73	249.76	260.82	2.207
58	368.58	5.00	600.00	44.00	447.68	241.73	249.59	2.208
59	359.11	5.00	600.00	44.00	446.26	230.15	241.43	2.208
60	349.63	5.00	600.00	44.00	439.91	248.61	259.80	2.208
61	368.58	5.00	600.00	44.00	447.87	240.58	248.57	2.208
62	359.11	5.00	600.00	44.00	446.45	228.98	240.41	2.209
63	368.58	5.00	600.00	44.00	448.07	239.44	247.55	2.209
64	349.63	5.00	600.00	44.00	440.09	247.45	258.78	2.209
65	368.58	5.00	600.00	44.00	448.26	238.30	246.53	2.209
66	349.63	5.00	600.00	44.00	440.27	246.29	257.76	2.210
67	368.58	5.00	600.00	44.00	448.45	237.15	245.51	2.210
68	359.11	5.00	600.00	44.00	446.64	227.81	239.39	2.210
69	349.63	5.00	600.00	44.00	440.45	245.14	256.73	2.210

70	368.58	5.00	600.00	44.00	448.65	236.01	244.49	2.210
71	359.11	5.00	600.00	44.00	446.83	226.64	238.37	2.211
72	349.63	5.00	600.00	44.00	440.63	243.98	255.71	2.211
73	368.58	5.00	600.00	44.00	443.88	264.29	270.00	2.211
74	359.11	5.00	600.00	44.00	448.16	218.39	231.22	2.211
75	368.58	5.00	600.00	44.00	448.84	234.86	243.47	2.211
76	349.63	5.00	600.00	44.00	440.81	242.81	254.69	2.212
77	359.11	5.00	600.00	44.00	447.02	225.47	237.35	2.212
78	359.11	5.00	600.00	44.00	448.36	217.20	230.20	2.212
79	349.63	5.00	600.00	44.00	440.99	241.65	253.67	2.213
80	359.11	5.00	600.00	44.00	447.21	224.29	236.33	2.213
81	359.11	5.00	600.00	44.00	448.55	216.01	229.18	2.214
82	349.63	5.00	600.00	44.00	441.17	240.49	252.65	2.214
83	359.11	5.00	600.00	44.00	447.40	223.11	235.31	2.214
84	349.63	5.00	600.00	44.00	441.35	239.32	251.63	2.214
85	359.11	5.00	600.00	44.00	448.74	214.82	228.16	2.215
86	349.63	5.00	600.00	44.00	441.53	238.15	250.61	2.215
87	368.58	5.00	600.00	44.00	449.03	233.71	242.45	2.216
88	359.11	5.00	600.00	44.00	447.59	221.93	234.29	2.216
89	359.11	5.00	600.00	44.00	448.93	213.63	227.14	2.216
90	349.63	5.00	600.00	44.00	441.72	236.98	249.59	2.216
91	368.58	5.00	600.00	44.00	449.61	230.25	239.39	2.217
92	359.11	5.00	600.00	44.00	447.78	220.75	233.27	2.217
93	359.11	5.00	600.00	44.00	449.13	212.43	226.12	2.217
94	349.63	5.00	600.00	44.00	441.90	235.81	248.57	2.217
95	359.11	5.00	600.00	44.00	449.32	211.23	225.10	2.218
96	368.58	5.00	600.00	44.00	449.81	229.10	238.37	2.218
97	349.63	5.00	600.00	44.00	442.08	234.64	247.55	2.218
98	359.11	5.00	600.00	44.00	447.97	219.57	232.24	2.218
99	368.58	5.00	600.00	44.00	450.00	227.94	237.35	2.219

Critical Failure Surface (circle 1)

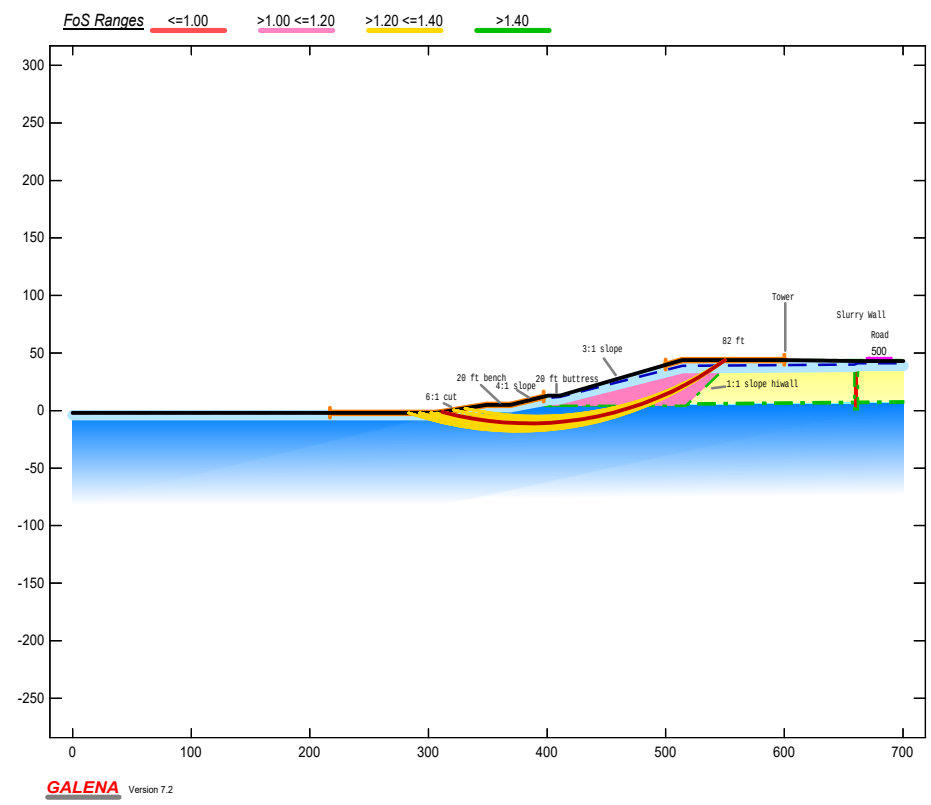
Intersects: XL: 359.11 YL: 5.00 XR: 600.00 YR: 44.00
Centre: XC: 441.98 YC: 256.60 Radius: R: 264.90
Generated failure surface: (20 points)

359.11	5.00	371.88	1.15	384.84	-2.06	397.94	-4.61	411.15	-6.50
424.44	-7.72	437.78	-8.26	451.12	-8.14	464.44	-7.34	477.71	-5.88
490.89	-3.74	503.94	-0.95	516.83	2.50	529.53	6.59	542.01	11.32
554.24	16.67	566.18	22.63	577.81	29.18	589.09	36.31	600.00	44.00

Slice Geometry and Properties - Critical Failure Surface (circle 1, 46 slices)

Slice	X-S	Base						PoreWater	Normal	Test
	X-Left	Area	Angle	Width	Length	Matl	Cohesion	Phi	Weight	Force	Stress	Factor
1	359.11	1.37	-16.8	3.01	3.14	3	0.00	17.0	169.28	6951.83	2241.50	1.09
2	362.11	13.40	-16.8	6.89	7.19	4	150.00	26.0	1661.90	16582.64	2456.14	1.12
3	369.00	10.90	-16.8	2.88	3.01	3	0.00	17.0	1347.13	7218.87	2638.99	1.09
4	371.88	40.08	-13.9	6.48	6.67	3	0.00	17.0	4921.73	16513.11	2861.67	1.07
5	378.36	60.95	-13.9	6.48	6.67	3	0.00	17.0	7457.18	17180.57	3158.84	1.07
6	384.84	81.72	-11.0	6.55	6.67	3	0.00	17.0	9978.19	17779.63	3429.98	1.05
7	391.39	100.80	-11.0	6.55	6.67	3	0.00	17.0	12289.48	18310.44	3685.43	1.05
8	397.94	18.10	-8.1	1.06	1.07	3	0.00	17.0	2204.93	2989.04	3822.70	1.03
9	399.00	35.31	-8.1	2.00	2.02	3	0.00	17.0	4300.94	5660.93	3872.21	1.03
10	401.00	92.02	-8.1	5.00	5.05	3	0.00	17.0	11211.81	14309.83	3949.42	1.03
11	406.00	95.59	-8.1	5.00	5.05	3	0.00	17.0	11655.69	14534.83	4039.10	1.03
12	411.00	102.32	-5.3	5.00	5.02	3	0.00	17.0	12514.25	14637.41	4156.87	1.02
13	416.00	112.14	-5.2	5.00	5.02	3	0.00	17.0	13777.87	14778.97	4317.11	1.02
14	421.00	82.89	-5.2	3.44	3.46	3	0.00	17.0	10196.16	10256.18	4446.22	1.02
15	424.44	172.70	-2.4	6.67	6.67	3	0.00	17.0	21193.84	19926.06	4557.41	1.01
16	431.11	187.90	-2.4	6.67	6.67	3	0.00	17.0	22998.71	20040.00	4703.64	1.01
17	437.78	202.15	0.5	6.67	6.67	3	0.00	17.0	24685.08	20083.98	4816.23	1.00
18	444.45	215.14	0.5	6.67	6.67	3	0.00	17.0	26214.45	20057.93	4919.98	1.00
19	451.12	226.60	3.4	6.66	6.67	3	0.00	17.0	27555.94	19962.24	4988.77	0.99
20	457.78	237.30	3.4	6.66	6.67	3	0.00	17.0	28802.45	19796.29	5050.10	0.99
21	464.44	245.80	6.3	6.63	6.67	3	0.00	17.0	29779.05	19560.54	5075.42	0.99

```
 22      471.08    254.17     6.3     6.63     6.67     3       0.00    17.0
30738.05    19255.17      5094.44    0.99
 23      477.71    259.62     9.2     6.59     6.67     3       0.00    17.0
31339.30    18880.64      5076.72    0.99
 24      484.30    265.65     9.2     6.59     6.67     3       0.00    17.0
32009.20    18436.63      5053.69    0.99
 25      490.89    201.40    12.1     4.91     5.02     3       0.00    17.0
24227.17    13547.04      5001.44    0.99
 26      495.80    203.49    12.1     4.91     5.02     3       0.00    17.0
24443.50    13217.40      4952.72    0.99
 27      500.71    134.78    12.1     3.23     3.30     3       0.00    17.0
17356.33     8500.89      5298.73    0.99
 28      503.94    211.37    15.0     5.03     5.21     3       0.00    17.0
27184.50    13091.06      5298.16    1.00
 29      508.97    212.22    15.0     5.03     5.21     3       0.00    17.0
27254.57    12653.78      5308.53    1.00
 30      514.00    118.48    15.0     2.83     2.93     3       0.00    17.0
15209.01     6921.79      5267.57    1.00
 31      516.83    174.85    17.9     4.28     4.50     4     150.00    26.0
22484.30    10339.21      5029.73    0.98
 32      521.11    168.93    17.9     4.28     4.50     4     150.00    26.0
21540.34     9951.38      4818.46    0.98
 33      525.40    122.43    17.9     3.20     3.37     3       0.00    17.0
15493.85     7186.67      4720.86    1.01
 34      528.60    244.72    20.3     6.71     7.15     5     150.00    28.0
30674.43    14501.79      4340.14    0.98
 35      535.31    227.69    20.7     6.71     7.17     5     150.00    28.0
28152.38    13402.55      3977.90    0.98
 36      542.01    191.62    23.6     6.11     6.67     5     150.00    28.0
23335.95    11385.88      3587.19    0.99
 37      548.13    175.27    23.6     6.11     6.67     5     150.00    28.0
20978.75    10272.03      3222.63    0.99
 38      554.24     73.52    26.5     2.76     3.08     2       0.00    35.0
9400.14     4357.35      3132.02    0.96
 39      557.00    113.90    26.5     4.59     5.13     2       0.00    35.0
14513.69     6662.58      2904.72    0.96
 40      561.59    103.39    26.5     4.59     5.13     2       0.00    35.0
13146.45     5929.13      2628.21    0.96
 41      566.18    114.72    29.4     5.81     6.67     2       0.00    35.0
14541.76     6551.67      2269.28    0.97
 42      572.00     95.67    29.4     5.81     6.67     2       0.00    35.0
12065.61     5187.35      1877.18    0.97
 43      577.81     73.54    32.3     5.64     6.67     2       0.00    35.0
9199.34     3762.98      1451.36    0.98
 44      583.45     53.43    32.3     5.64     6.67     2       0.00    35.0
6584.90     2278.44      1028.42    0.98
 45      589.09     30.59    35.2     5.23     6.40     2       0.00    35.0
3641.57      737.01       588.94    1.00
 46      594.33     11.35    35.2     5.67     6.94     1      50.00    28.0
1293.83       0.00       180.92    1.04
                --------                 -------                          -------
---
     X-S Area:    6171.98    Path Length:    253.58              X-S Weight:
761724.88
```



Project Wattenberg Lakes, Pond 1, NE Transmission Tower
Deeper Option, Rapid Drawdown

File: J:\Aggregate Industries-297\Wattenberg\DRMS Stability\Stability NE\More fil NE deeper option rapid drawdown.gmf

Material Keys

1: Overburden
2: Sand and Gravel
3: Weathered Bedrock
4: Unweathered Bedrock
5: Reclamation Slope
6: Slurry Wall

Analysis 1

Multiple Stability Analysis
Method: Bishop Simplified
Surface: Circular

Results

Critical Factor of Safety: 1.22

Edited: 3 May 2024 *Processed:* 3 May 2024

Civil Resources

GALENA 7.2 Analysis Results Version: 7.2.1.05 Licensee: Civil Resources

Project: Wattenberg Lakes, Pond 1, NE Transmission Tower
File: J:\Aggregate Industries-297\Wattenberg\DRMS Stability\Stability NE\More fil NE deeper option rapid drawdown.gmf
Processed: 03 May 2024 11:48:22

DATA: Analysis 1 - Deeper Option, Rapid Drawdown

Material Properties (6 materials)

Material: 1 (Mohr-Coulomb Isotropic) - Overburden

Cohesion	Phi	UnitWeight	Ru
50.00	28.0	114.00	Auto

Material: 2 (Mohr-Coulomb Isotropic) - Sand and Gravel

Cohesion	Phi	UnitWeight	Ru
0.00	35.0	130.00	Auto

Material: 3 (Mohr-Coulomb Isotropic) - Weathered Bedrock

Cohesion	Phi	UnitWeight	Ru
0.00	17.0	124.00	Auto

Material: 4 (Mohr-Coulomb Isotropic) - Unweathered Bedrock

Cohesion	Phi	UnitWeight	Ru
150.00	26.0	124.00	Auto

Material: 5 (Mohr-Coulomb Isotropic) - Reclamation Slope

Cohesion	Phi	UnitWeight	Ru
150.00	28.0	119.00	Auto

Material: 6 (Mohr-Coulomb Isotropic) - Slurry Wall

Cohesion	Phi	UnitWeight	Ru
0.00	0.0	110.00	Auto

Water Properties

Unit weight of water: 62.400 Unit weight of water/medium above ground: 62.400

Material Profiles (6 profiles)

Profile: 1 (2 points) Material beneath: 1 - Overburden

0.00	44.00	700.00	44.00

Profile: 2 (2 points) Material beneath: 2 - Sand and Gravel

0.00	40.00	700.00	40.00

Profile: 3 (3 points) Material beneath: 3 - Weathered Bedrock

0.00	6.00	399.00	5.00	700.00	8.00

Profile: 4 (3 points) Material beneath: 4 - Unweathered Bedrock

0.00	5.00	399.00	4.00	700.00	7.00

Profile: 5 (5 points) Material within: 6 - Slurry Wall

662.00	43.00	659.00	43.00	659.00	1.00
662.00	1.00	662.00	43.00		

Profile: 6 (8 points) Material within: 5 - Reclamation Slope

557.00	44.00	514.00	44.00	421.00	13.00
401.00	13.00	369.00	5.00		
369.00	4.00	517.00	4.00	557.00	44.00

Slope Surface (11 points)

0.00	-2.00	307.00	-2.00	349.00	5.00
369.00	5.00	401.00	13.00		
411.00	13.00	514.00	44.00	557.00	44.00
600.00	44.00	659.00	43.00		

```
    700.00       43.00

Phreatic Surface (10 points)
----------------
      0.00       -2.00         307.00       -2.00         349.00        5.00
369.00        5.00         401.00       11.00
    411.00       12.00         514.00       39.00         659.00       40.00
662.00       41.00         700.00       41.00

Failure Surface
---------------
Initial circular surface for critical search defined by: XL,XR,R
  Intersects:  XL:     307.00      YL:      -2.00      XR:     550.00      YR:
44.00
      Centre:  XC:     377.66      YC:     289.56                  Radius:  R:
300.00

Distributed Loads (1 load)
-----------------
Load      X-Left    Pressure        X-Right   Pressure
  1       670.00      500.0         690.00      500.0

Variable Restraints
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Parameter descriptor:              XL         XR         R
Range of variation:             180.00     100.00      50.00
Trial positions within range:      20          1         50

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RESULTS: Analysis  1 - Deeper Option, Rapid Drawdown

Bishop Simplified Method of Analysis - Circular Failure Surface
-----------------------------------------------------------------
Critical Failure Surface Search using Multiple Circle Generation Techniques

Initial failure surface approximation - Factor of Safety:   1.259

Analysis Summary
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There were:  1001 successful analyses from a total of 1001 trial failure surfaces

Critical (minimum) Factor of Safety:  1.22
==========================================

Results Summary - Lowest 99 Factor of Safety circles
----------------------------------------------------
Circle    X-Left      Y-Left     X-Right     Y-Right     X-Centre    Y-Centre
Radius      FoS
   1       311.74       -1.21      550.00       44.00      384.85      263.89
275.00     1.218   <-- Critical Surface
   2       311.74       -1.21      550.00       44.00      384.64      265.01
276.02     1.220
   3       311.74       -1.21      550.00       44.00      384.43      266.12
277.04     1.222
   4       302.26       -2.00      550.00       44.00      381.51      261.34
275.00     1.222
   5       302.26       -2.00      550.00       44.00      381.30      262.46
276.02     1.223
   6       302.26       -2.00      550.00       44.00      380.88      264.72
278.06     1.223
```

7	302.26	-2.00	550.00	44.00	381.09	263.59	
277.04	1.224						
8	311.74	-1.21	550.00	44.00	384.22	267.24	
278.06	1.224						
9	321.21	0.37	550.00	44.00	388.94	266.90	
275.00	1.224						
10	302.26	-2.00	550.00	44.00	380.67	265.84	
279.08	1.225						
11	302.26	-2.00	550.00	44.00	380.25	268.09	
281.12	1.225						
12	311.74	-1.21	550.00	44.00	384.01	268.35	
279.08	1.226						
13	302.26	-2.00	550.00	44.00	380.46	266.97	
280.10	1.226						
14	311.74	-1.21	550.00	44.00	383.80	269.46	
280.10	1.227						
15	302.26	-2.00	550.00	44.00	380.04	269.21	
282.14	1.228						
16	321.21	0.37	550.00	44.00	388.73	268.00	
276.02	1.228						
17	311.74	-1.21	550.00	44.00	383.59	270.58	
281.12	1.229						
18	302.26	-2.00	550.00	44.00	379.84	270.33	
283.16	1.230						
19	311.74	-1.21	550.00	44.00	383.38	271.69	
282.14	1.231						
20	321.21	0.37	550.00	44.00	388.52	269.11	
277.04	1.231						
21	302.26	-2.00	550.00	44.00	379.63	271.45	
284.18	1.233						
22	292.79	-2.00	550.00	44.00	378.79	259.21	
275.00	1.233						
23	311.74	-1.21	550.00	44.00	383.17	272.80	
283.16	1.233						
24	302.26	-2.00	550.00	44.00	379.42	272.57	
285.20	1.234						
25	321.21	0.37	550.00	44.00	388.30	270.21	
278.06	1.235						
26	311.74	-1.21	550.00	44.00	382.95	273.90	
284.18	1.235						
27	292.79	-2.00	550.00	44.00	378.59	260.35	
276.02	1.235						
28	302.26	-2.00	550.00	44.00	379.21	273.69	
286.22	1.236						
29	292.79	-2.00	550.00	44.00	378.39	261.49	
277.04	1.236						
30	311.74	-1.21	550.00	44.00	382.74	275.01	
285.20	1.237						
31	321.21	0.37	550.00	44.00	388.09	271.32	
279.08	1.237						
32	302.26	-2.00	550.00	44.00	379.01	274.80	
287.24	1.237						
33	292.79	-2.00	550.00	44.00	378.18	262.62	
278.06	1.237						
34	311.74	-1.21	550.00	44.00	382.53	276.12	
286.22	1.238						
35	321.21	0.37	550.00	44.00	387.88	272.42	
280.10	1.239						
36	292.79	-2.00	550.00	44.00	377.98	263.76	
279.08	1.239						
37	302.26	-2.00	550.00	44.00	378.80	275.92	
288.27	1.239						

38	292.79	-2.00	550.00	44.00	377.78	264.90	280.10
1.240							
39	311.74	-1.21	550.00	44.00	382.32	277.23	287.24
1.240							
40	302.26	-2.00	550.00	44.00	378.59	277.03	289.29
1.241							
41	321.21	0.37	550.00	44.00	387.67	273.52	281.12
1.241							
42	292.79	-2.00	550.00	44.00	377.57	266.03	281.12
1.241							
43	302.26	-2.00	550.00	44.00	378.38	278.15	290.31
1.242							
44	311.74	-1.21	550.00	44.00	382.11	278.33	288.27
1.242							
45	292.79	-2.00	550.00	44.00	377.37	267.17	282.14
1.243							
46	321.21	0.37	550.00	44.00	387.46	274.62	282.14
1.243							
47	311.74	-1.21	550.00	44.00	381.90	279.44	289.29
1.244							
48	292.79	-2.00	550.00	44.00	377.17	268.30	283.16
1.244							
49	321.21	0.37	550.00	44.00	387.25	275.72	283.16
1.245							
50	330.68	1.95	550.00	44.00	393.02	269.79	275.00
1.245							
51	292.79	-2.00	550.00	44.00	376.96	269.43	284.18
1.245							
52	311.74	-1.21	550.00	44.00	381.70	280.54	290.31
1.246							
53	292.79	-2.00	550.00	44.00	376.76	270.56	285.20
1.247							
54	321.21	0.37	550.00	44.00	387.04	276.82	284.18
1.247							
55	302.26	-2.00	550.00	44.00	378.18	279.26	291.33
1.248							
56	311.74	-1.21	550.00	44.00	381.49	281.64	291.33
1.248							
57	292.79	-2.00	550.00	44.00	376.56	271.69	286.22
1.248							
58	302.26	-2.00	550.00	44.00	377.97	280.37	292.35
1.248							
59	302.26	-2.00	550.00	44.00	377.76	281.49	293.37
1.249							
60	321.21	0.37	550.00	44.00	386.83	277.92	285.20
1.249							
61	302.26	-2.00	550.00	44.00	377.56	282.60	294.39
1.249							
62	292.79	-2.00	550.00	44.00	376.36	272.82	287.24
1.250							
63	311.74	-1.21	550.00	44.00	381.28	282.75	292.35
1.250							
64	302.26	-2.00	550.00	44.00	377.35	283.71	295.41
1.250							
65	292.79	-2.00	550.00	44.00	376.16	273.95	288.27
1.251							
66	330.68	1.95	550.00	44.00	392.81	270.89	276.02
1.251							
67	311.74	-1.21	550.00	44.00	381.07	283.85	293.37
1.252							
68	302.26	-2.00	550.00	44.00	377.15	284.81	296.43
1.252							

69	330.68	1.95	550.00	44.00	392.60	271.98	277.04
1.252							
70	292.79	-2.00	550.00	44.00	375.96	275.07	289.29
1.252							
71	330.68	1.95	550.00	44.00	392.39	273.08	278.06
1.253							
72	311.74	-1.21	550.00	44.00	380.86	284.95	294.39
1.253							
73	302.26	-2.00	550.00	44.00	376.94	285.92	297.45
1.253							
74	292.79	-2.00	550.00	44.00	375.75	276.20	290.31
1.254							
75	321.21	0.37	550.00	44.00	386.63	279.02	286.22
1.255							
76	292.79	-2.00	550.00	44.00	375.55	277.32	291.33
1.255							
77	302.26	-2.00	550.00	44.00	376.74	287.03	298.47
1.255							
78	283.32	-2.00	550.00	44.00	375.96	256.92	275.00
1.255							
79	321.21	0.37	550.00	44.00	386.42	280.11	287.24
1.256							
80	330.68	1.95	550.00	44.00	392.18	274.17	279.08
1.256							
81	283.32	-2.00	550.00	44.00	375.76	258.08	276.02
1.256							
82	321.21	0.37	550.00	44.00	386.21	281.21	288.27
1.256							
83	292.79	-2.00	550.00	44.00	375.35	278.45	292.35
1.257							
84	302.26	-2.00	550.00	44.00	376.53	288.14	299.49
1.257							
85	321.21	0.37	550.00	44.00	386.00	282.31	289.29
1.257							
86	307.00	-2.00	550.00	44.00	377.66	289.56	300.00
1.259							
87	330.68	1.95	550.00	44.00	391.97	275.26	280.10
1.259							
88	302.26	-2.00	550.00	44.00	376.32	289.24	300.51
1.259							
89	311.74	-1.21	550.00	44.00	380.65	286.05	295.41
1.259							
90	321.21	0.37	550.00	44.00	385.79	283.40	290.31
1.260							
91	311.74	-1.21	550.00	44.00	380.44	287.15	296.43
1.260							
92	311.74	-1.21	550.00	44.00	380.23	288.24	297.45
1.261							
93	302.26	-2.00	550.00	44.00	376.12	290.35	301.53
1.261							
94	283.32	-2.00	550.00	44.00	375.57	259.23	277.04
1.261							
95	292.79	-2.00	550.00	44.00	375.15	279.57	293.37
1.261							
96	283.32	-2.00	550.00	44.00	375.37	260.38	278.06
1.261							
97	283.32	-2.00	550.00	44.00	375.17	261.53	279.08
1.261							
98	283.32	-2.00	550.00	44.00	374.97	262.68	280.10
1.261							
99	311.74	-1.21	550.00	44.00	380.03	289.34	298.47
1.261							

Critical Failure Surface (circle 1)

Intersects: XL: 311.74 YL: -1.21 XR: 550.00 YR: 44.00
Centre: XC: 384.85 YC: 263.89 Radius: R: 275.00
Generated failure surface: (20 points)
311.74 -1.21 324.56 -4.42 337.52 -7.00 350.59 -8.97 363.74 -10.30
376.94 -11.00 390.16 -11.06 403.36 -10.49 416.52 -9.28 429.61 -7.44
442.60 -4.98 455.45 -1.89 468.14 1.81 480.64 6.11 492.91 11.01
504.94 16.49 516.69 22.55 528.13 29.16 539.24 36.32 550.00 44.00

Slice Geometry and Properties - Critical Failure Surface (circle 1, 45 slices)

Slice	X-S	Base						PoreWater	Normal	Test
	X-Left	Area	Angle	Width	Length	Matl	Cohesion	Phi	Weight	Force	Stress	Factor
1	311.74	8.57	-14.0	6.41	6.61	4	150.00	26.0	1062.13	550.96	209.04	1.15
2	318.15	25.70	-14.0	6.41	6.61	4	150.00	26.0	3186.43	1652.89	558.69	1.15
3	324.56	42.33	-11.3	6.48	6.61	4	150.00	26.0	5248.47	2693.27	871.49	1.11
4	331.04	57.71	-11.3	6.48	6.61	4	150.00	26.0	7156.05	3672.15	1178.53	1.11
5	337.52	69.97	-8.5	6.31	6.38	4	150.00	26.0	8676.01	4414.88	1438.56	1.08
6	343.83	66.74	-8.5	5.17	5.23	4	150.00	26.0	8276.04	4211.35	1671.13	1.08
7	349.00	22.04	-8.5	1.59	1.61	4	150.00	26.0	2733.07	1390.75	1791.17	1.08
8	350.59	94.02	-5.8	6.58	6.61	4	150.00	26.0	11658.08	5896.63	1823.27	1.05
9	357.17	98.39	-5.8	6.58	6.61	4	150.00	26.0	12200.78	6171.12	1907.53	1.05
10	363.74	81.17	-3.0	5.26	5.27	4	150.00	26.0	10064.62	5071.85	1941.32	1.02
11	369.00	133.23	-3.0	7.94	7.95	3	0.00	17.0	16483.57	8201.97	2089.86	1.01
12	376.94	124.39	-0.3	6.61	6.61	3	0.00	17.0	15332.65	7472.00	2321.54	1.00
13	383.55	135.51	-0.3	6.61	6.61	3	0.00	17.0	16657.16	7995.96	2522.10	1.00
14	390.16	96.40	2.5	4.42	4.43	3	0.00	17.0	11824.53	5617.55	2659.48	0.99
15	394.58	100.44	2.5	4.42	4.43	3	0.00	17.0	12300.73	5793.54	2766.46	0.99
16	399.00	46.76	2.5	2.00	2.00	3	0.00	17.0	5721.16	2678.70	2844.20	0.99
17	401.00	55.61	2.5	2.36	2.37	3	0.00	17.0	6801.90	3195.80	2862.28	0.99
18	403.36	176.69	5.2	7.64	7.67	3	0.00	17.0	21607.27	10410.39	2796.14	0.98
19	411.00	129.08	5.2	5.52	5.55	3	0.00	17.0	15816.77	7705.12	2829.71	0.98
20	416.52	108.75	8.0	4.48	4.52	3	0.00	17.0	13373.52	6485.73	2935.55	0.98

```
 21      421.00    107.70     8.0     4.31     4.35     3       0.00    17.0
13248.46     6387.01      3021.40    0.98
 22      425.31    110.68     8.0     4.31     4.35     3       0.00    17.0
13584.32     6529.34      3097.84    0.98
 23      429.61    171.44    10.7     6.49     6.61     3       0.00    17.0
20984.37    10126.59      3154.70    0.97
 24      436.11    176.13    10.7     6.49     6.61     3       0.00    17.0
21489.37    10320.39      3230.28    0.97
 25      442.60    177.90    13.5     6.43     6.61     3       0.00    17.0
21637.22    10446.59      3265.59    0.97
 26      449.03    180.42    13.5     6.43     6.61     3       0.00    17.0
21874.41    10505.13      3300.91    0.97
 27      455.45    179.56    16.3     6.34     6.61     3       0.00    17.0
21700.98    10495.92      3295.53    0.97
 28      461.80    179.94    16.3     6.34     6.61     3       0.00    17.0
21675.34    10419.09      3290.96    0.97
 29      468.14    179.94    19.0     6.37     6.74     3       0.00    17.0
21599.87    10470.88      3245.26    0.97
 30      474.51     63.15    19.0     2.25     2.38     4     150.00    26.0
7560.79     3646.40      3101.57    0.93
 31      476.76     83.57    19.0     2.99     3.16     3       0.00    17.0
9989.99     4802.60      3196.49    0.97
 32      479.75    181.74    21.4     6.58     7.07     5     150.00    28.0
21699.02    10504.44      2991.29    0.92
 33      486.33    177.48    21.8     6.58     7.09     5     150.00    28.0
21177.28    10132.10      2910.54    0.92
 34      492.91    203.02    24.5     7.80     8.57     5     150.00    28.0
24206.64    11606.61      2767.36    0.92
 35      500.71    106.17    24.5     4.23     4.65     2       0.00    35.0
13765.21     5957.27      2845.21    0.87
 36      504.94    110.06    27.3     4.53     5.10     2       0.00    35.0
14205.35     6220.00      2697.74    0.87
 37      509.47    105.66    27.3     4.53     5.10     2       0.00    35.0
13568.30     5854.94      2572.92    0.87
 38      514.00     59.50    27.3     2.69     3.02     2       0.00    35.0
7616.58     3235.44      2431.30    0.87
 39      516.69    113.27    30.0     5.72     6.61     2       0.00    35.0
14473.64     6117.39      2129.68    0.87
 40      522.41     94.35    30.0     5.72     6.61     2       0.00    35.0
12014.07     4770.12      1756.16    0.87
 41      528.13     72.50    32.8     5.56     6.61     2       0.00    35.0
9180.27     3366.73      1343.55    0.87
 42      533.69     52.62    32.8     5.56     6.61     2       0.00    35.0
6595.92     1907.14       944.41    0.87
 43      539.24     25.19    35.5     4.04     4.96     2       0.00    35.0
3097.01      441.89       569.84    0.87
 44      543.28      4.92    35.5     1.12     1.37     2       0.00    35.0
589.93       0.00       374.28    0.87
 45      544.40     11.20    35.5     5.60     6.88     5     150.00    28.0
1333.14       0.00       114.43    0.94
                --------                  -------                         -------
---
     X-S Area:    4601.60    Path Length:    251.13              X-S Weight:
565048.38
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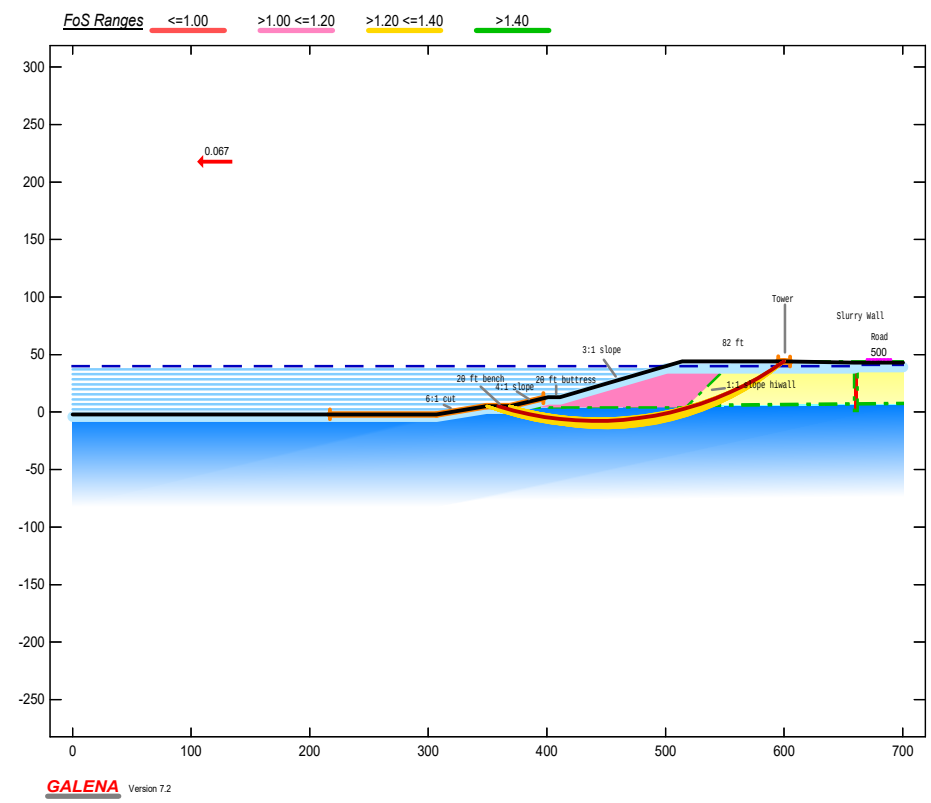

Material Keys

1: Overburden
2: Sand and Gravel
3: Weathered Bedrock
4: Unweathered Bedrock
5: Reclamation Slope
6: Slurry Wall

Analysis 1

Multiple Stability Analysis
Method: Bishop Simplified
Surface: Circular

Results

Critical Factor of Safety: 1.31

Project Wattenberg Lakes, Pond 1, NE Transmission Tower
Deeper Option Seismic

File: J:\Aggregate Industries-297\Wattenberg\DRMS Stability\Stability NE\More fil NE deeper option rapid seismic.gmf

Edited: 2 May 2024 *Processed:* 2 May 2024

Civil Resources

GALENA 7.2 Analysis Results Version: 7.2.1.05 Licensee: Civil Resources

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Project: Wattenberg Lakes, Pond 1, NE Transmission Tower
File: J:\Aggregate Industries-297\Wattenberg\DRMS Stability\Stability NE\More fil NE deeper option rapid seismic.gmf
Processed: 02 May 2024 10:29:11

DATA: Analysis 1 - Deeper Option Seismic

Material Properties (6 materials)

Material: 1 (Mohr-Coulomb Isotropic) - Overburden
Cohesion Phi UnitWeight Ru
50.00 28.0 114.00 Auto
Material: 2 (Mohr-Coulomb Isotropic) - Sand and Gravel
Cohesion Phi UnitWeight Ru
0.00 35.0 130.00 Auto
Material: 3 (Mohr-Coulomb Isotropic) - Weathered Bedrock
Cohesion Phi UnitWeight Ru
0.00 17.0 124.00 Auto
Material: 4 (Mohr-Coulomb Isotropic) - Unweathered Bedrock
Cohesion Phi UnitWeight Ru
150.00 26.0 124.00 Auto
Material: 5 (Mohr-Coulomb Isotropic) - Reclamation Slope
Cohesion Phi UnitWeight Ru
150.00 28.0 119.00 Auto
Material: 6 (Mohr-Coulomb Isotropic) - Slurry Wall
Cohesion Phi UnitWeight Ru
0.00 0.0 110.00 Auto

Water Properties

Unit weight of water: 62.400 Unit weight of water/medium above ground: 62.400

Material Profiles (6 profiles)

Profile: 1 (2 points) Material beneath: 1 - Overburden
0.00 44.00 700.00 44.00
Profile: 2 (2 points) Material beneath: 2 - Sand and Gravel
0.00 40.00 700.00 40.00
Profile: 3 (3 points) Material beneath: 3 - Weathered Bedrock
0.00 6.00 399.00 5.00 700.00 8.00
Profile: 4 (3 points) Material beneath: 4 - Unweathered Bedrock
0.00 5.00 399.00 4.00 700.00 7.00
Profile: 5 (5 points) Material within: 6 - Slurry Wall
662.00 43.00 659.00 43.00 659.00 1.00
662.00 1.00 662.00 43.00
Profile: 6 (8 points) Material within: 5 - Reclamation Slope
557.00 44.00 514.00 44.00 421.00 13.00
401.00 13.00 369.00 5.00
369.00 4.00 517.00 4.00 557.00 44.00

Slope Surface (11 points)

0.00 -2.00 307.00 -2.00 349.00 5.00
369.00 5.00 401.00 13.00
411.00 13.00 514.00 44.00 557.00 44.00
600.00 44.00 659.00 43.00

```
    700.00       43.00

Phreatic Surface (4 points)
---------------
      0.00       40.00         659.00       40.00         662.00       41.00
700.00       41.00

Failure Surface
---------------
Initial circular surface for critical search defined by: XL,XR,R
  Intersects:  XL:     307.00      YL:      -2.00      XR:     600.00      YR:
44.00
      Centre:  XC:     423.25      YC:     213.66                  Radius:  R:
245.00

Distributed Loads (1 load)
-----------------
Load      X-Left    Pressure        X-Right   Pressure
  1       670.00      500.0         690.00      500.0

Earthquake Force
----------------
Pseudo-static earthquake (seismic) coefficient:  0.067

Variable Restraints
-------------------
Parameter descriptor:             XL         XR         R
Range of variation:           180.00      10.00      50.00
Trial positions within range:     20          1         50

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RESULTS: Analysis  1 - Deeper Option Seismic

Bishop Simplified Method of Analysis - Circular Failure Surface
---------------------------------------------------------------
Critical Failure Surface Search using Multiple Circle Generation Techniques

Initial failure surface approximation - Factor of Safety:   1.441

Analysis Summary
================
There were:  1001 successful analyses from a total of 1001 trial failure surfaces

Critical (minimum) Factor of Safety:  1.31
==========================================

Results Summary - Lowest 99 Factor of Safety circles
----------------------------------------------------
Circle    X-Left      Y-Left     X-Right     Y-Right     X-Centre    Y-Centre
Radius      FoS
   1       359.11        5.00      600.00       44.00      441.06      262.26
270.00     1.308   <-- Critical Surface
   2       359.11        5.00      600.00       44.00      441.98      256.60
264.90     1.308
   3       359.11        5.00      600.00       44.00      441.24      261.13
268.98     1.308
   4       359.11        5.00      600.00       44.00      441.43      260.00
267.96     1.308
   5       359.11        5.00      600.00       44.00      441.61      258.87
266.94     1.308
```

6	359.11	5.00	600.00	44.00	441.79	257.74	265.92	1.308
7	359.11	5.00	600.00	44.00	442.16	255.47	263.88	1.308
8	359.11	5.00	600.00	44.00	442.34	254.33	262.86	1.308
9	359.11	5.00	600.00	44.00	442.53	253.19	261.84	1.309
10	368.58	5.00	600.00	44.00	444.63	259.81	265.92	1.309
11	359.11	5.00	600.00	44.00	443.08	249.77	258.78	1.310
12	368.58	5.00	600.00	44.00	444.82	258.69	264.90	1.310
13	368.58	5.00	600.00	44.00	445.01	257.57	263.88	1.310
14	368.58	5.00	600.00	44.00	444.26	262.05	267.96	1.310
15	359.11	5.00	600.00	44.00	443.27	248.63	257.76	1.310
16	359.11	5.00	600.00	44.00	444.57	240.59	250.61	1.310
17	359.11	5.00	600.00	44.00	442.71	252.05	260.82	1.311
18	359.11	5.00	600.00	44.00	443.45	247.48	256.73	1.311
19	359.11	5.00	600.00	44.00	444.38	241.74	251.63	1.311
20	359.11	5.00	600.00	44.00	443.64	246.34	255.71	1.311
21	368.58	5.00	600.00	44.00	444.45	260.93	266.94	1.311
22	359.11	5.00	600.00	44.00	443.82	245.19	254.69	1.312
23	359.11	5.00	600.00	44.00	444.20	242.89	252.65	1.313
24	359.11	5.00	600.00	44.00	444.01	244.04	253.67	1.313
25	359.11	5.00	600.00	44.00	442.90	250.91	259.80	1.313
26	349.63	5.00	600.00	44.00	438.30	258.95	268.98	1.313
27	368.58	5.00	600.00	44.00	444.07	263.17	268.98	1.314
28	349.63	5.00	600.00	44.00	438.12	260.09	270.00	1.314
29	359.11	5.00	600.00	44.00	444.76	239.44	249.59	1.315
30	368.58	5.00	600.00	44.00	445.20	256.44	262.86	1.315
31	368.58	5.00	600.00	44.00	445.39	255.32	261.84	1.315
32	359.11	5.00	600.00	44.00	444.94	238.28	248.57	1.315
33	368.58	5.00	600.00	44.00	445.58	254.19	260.82	1.316
34	368.58	5.00	600.00	44.00	445.77	253.06	259.80	1.316
35	359.11	5.00	600.00	44.00	445.13	237.12	247.55	1.316
36	368.58	5.00	600.00	44.00	445.96	251.93	258.78	1.316

37	368.58	5.00	600.00	44.00	446.15	250.81	257.76	1.316
38	368.58	5.00	600.00	44.00	446.34	249.67	256.73	1.316
39	359.11	5.00	600.00	44.00	445.32	235.97	246.53	1.316
40	368.58	5.00	600.00	44.00	446.53	248.54	255.71	1.317
41	368.58	5.00	600.00	44.00	446.72	247.41	254.69	1.317
42	359.11	5.00	600.00	44.00	445.50	234.81	245.51	1.317
43	368.58	5.00	600.00	44.00	446.92	246.28	253.67	1.317
44	368.58	5.00	600.00	44.00	447.11	245.14	252.65	1.317
45	359.11	5.00	600.00	44.00	445.69	233.64	244.49	1.318
46	368.58	5.00	600.00	44.00	447.30	244.00	251.63	1.318
47	349.63	5.00	600.00	44.00	438.47	257.80	267.96	1.318
48	368.58	5.00	600.00	44.00	447.49	242.86	250.61	1.318
49	359.11	5.00	600.00	44.00	445.88	232.48	243.47	1.318
50	349.63	5.00	600.00	44.00	438.65	256.66	266.94	1.318
51	368.58	5.00	600.00	44.00	447.68	241.73	249.59	1.318
52	368.58	5.00	600.00	44.00	443.88	264.29	270.00	1.318
53	349.63	5.00	600.00	44.00	438.83	255.51	265.92	1.319
54	368.58	5.00	600.00	44.00	447.87	240.58	248.57	1.319
55	359.11	5.00	600.00	44.00	446.07	231.32	242.45	1.319
56	349.63	5.00	600.00	44.00	439.01	254.36	264.90	1.319
57	368.58	5.00	600.00	44.00	448.07	239.44	247.55	1.319
58	349.63	5.00	600.00	44.00	439.19	253.22	263.88	1.319
59	359.11	5.00	600.00	44.00	446.26	230.15	241.43	1.319
60	368.58	5.00	600.00	44.00	448.26	238.30	246.53	1.320
61	349.63	5.00	600.00	44.00	439.37	252.07	262.86	1.320
62	368.58	5.00	600.00	44.00	448.45	237.15	245.51	1.320
63	349.63	5.00	600.00	44.00	439.55	250.91	261.84	1.320
64	359.11	5.00	600.00	44.00	446.45	228.98	240.41	1.320
65	368.58	5.00	600.00	44.00	448.65	236.01	244.49	1.320
66	349.63	5.00	600.00	44.00	439.73	249.76	260.82	1.320
67	359.11	5.00	600.00	44.00	446.64	227.81	239.39	1.321

68	349.63	5.00	600.00	44.00	439.91	248.61
259.80	1.321					
69	368.58	5.00	600.00	44.00	448.84	234.86
243.47	1.321					
70	349.63	5.00	600.00	44.00	440.09	247.45
258.78	1.321					
71	359.11	5.00	600.00	44.00	446.83	226.64
238.37	1.321					
72	349.63	5.00	600.00	44.00	440.27	246.29
257.76	1.322					
73	359.11	5.00	600.00	44.00	448.16	218.39
231.22	1.322					
74	349.63	5.00	600.00	44.00	440.45	245.14
256.73	1.322					
75	359.11	5.00	600.00	44.00	447.02	225.47
237.35	1.322					
76	359.11	5.00	600.00	44.00	448.36	217.20
230.20	1.323					
77	349.63	5.00	600.00	44.00	440.63	243.98
255.71	1.323					
78	359.11	5.00	600.00	44.00	447.21	224.29
236.33	1.323					
79	349.63	5.00	600.00	44.00	440.81	242.81
254.69	1.323					
80	359.11	5.00	600.00	44.00	448.55	216.01
229.18	1.323					
81	368.58	5.00	600.00	44.00	449.03	233.71
242.45	1.323					
82	349.63	5.00	600.00	44.00	440.99	241.65
253.67	1.324					
83	359.11	5.00	600.00	44.00	447.40	223.11
235.31	1.324					
84	359.11	5.00	600.00	44.00	448.74	214.82
228.16	1.324					
85	368.58	5.00	600.00	44.00	449.61	230.25
239.39	1.324					
86	349.63	5.00	600.00	44.00	441.17	240.49
252.65	1.324					
87	359.11	5.00	600.00	44.00	447.59	221.93
234.29	1.324					
88	349.63	5.00	600.00	44.00	441.35	239.32
251.63	1.325					
89	359.11	5.00	600.00	44.00	448.93	213.63
227.14	1.325					
90	368.58	5.00	600.00	44.00	449.81	229.10
238.37	1.325					
91	349.63	5.00	600.00	44.00	441.53	238.15
250.61	1.325					
92	359.11	5.00	600.00	44.00	447.78	220.75
233.27	1.325					
93	359.11	5.00	600.00	44.00	449.13	212.43
226.12	1.326					
94	368.58	5.00	600.00	44.00	450.00	227.94
237.35	1.326					
95	349.63	5.00	600.00	44.00	441.72	236.98
249.59	1.326					
96	368.58	5.00	600.00	44.00	449.23	232.56
241.43	1.326					
97	368.58	5.00	600.00	44.00	450.79	223.30
233.27	1.326					
98	359.11	5.00	600.00	44.00	449.32	211.23
225.10	1.326					

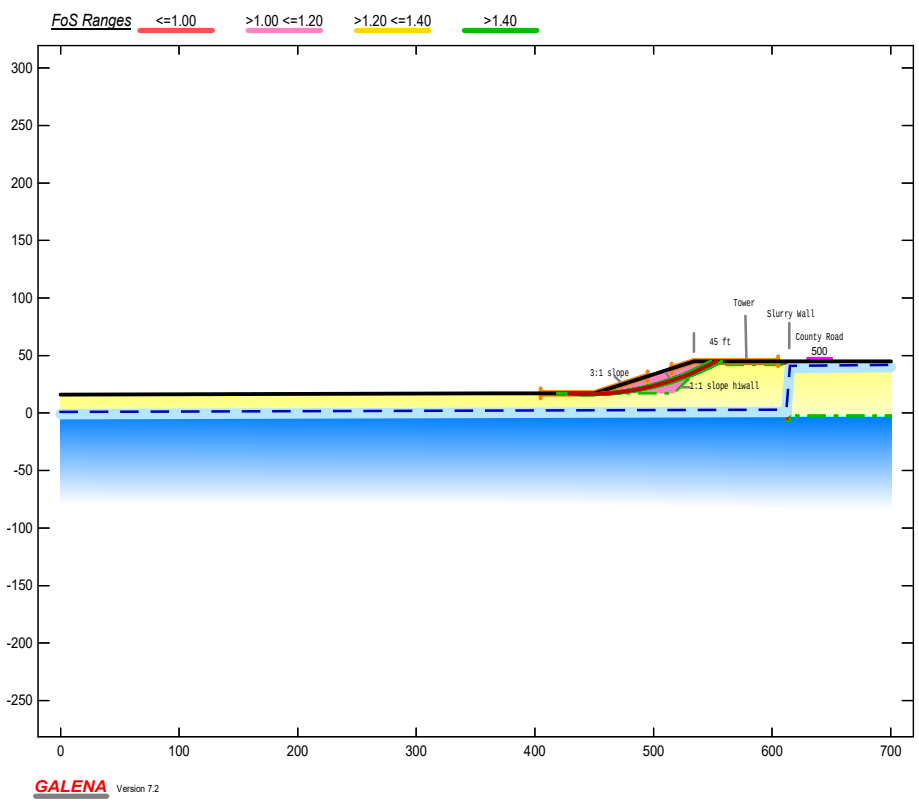
```
  99       359.11        5.00      600.00       44.00      447.97      219.57
232.24     1.326

Critical Failure Surface (circle 1)
-----------------------
Intersects:  XL:     359.11      YL:       5.00      XR:     600.00      YR:
44.00
    Centre:  XC:     441.06      YC:     262.26                  Radius:  R:
270.00
Generated failure surface: (20 points)
    359.11      5.00          371.90      1.27          384.86     -1.82
397.96     -4.28          411.16     -6.08
    424.44     -7.23          437.75     -7.72          451.08     -7.55
464.38     -6.73          477.62     -5.25
    490.77     -3.12          503.81     -0.35          516.69      3.07
529.38      7.12          541.86     11.78
    554.10     17.06          566.06     22.94          577.72     29.40
589.04     36.42          600.00     44.00

Slice Geometry and Properties - Critical Failure Surface (circle 1,  46 slices)
-----------------------------------------------------------
Slice                X-S     ------------------- Base ---------------------
PoreWater      Normal    Test
        X-Left      Area    Angle    Width    Length  Matl   Cohesion    Phi
Weight      Force        Stress   Factor
  1      359.11      1.41   -16.3     3.11     3.24     3       0.00    17.0
175.23     7174.56      2242.33    1.12
  2      362.22     12.86   -16.3     6.78     7.06     4     150.00    26.0
1594.75    16263.24      2470.96    1.17
  3      369.00     10.64   -16.3     2.90     3.02     3       0.00    17.0
1314.58     7215.74      2631.45    1.12
  4      371.90     39.13   -13.4     6.48     6.66     3       0.00    17.0
4804.62    16423.89      2851.19    1.09
  5      378.38     59.66   -13.4     6.48     6.66     3       0.00    17.0
7296.86    17067.09      3145.72    1.09
  6      384.86     80.04   -10.6     6.55     6.66     3       0.00    17.0
9768.63    17643.60      3410.49    1.06
  7      391.41     98.78   -10.6     6.55     6.66     3       0.00    17.0
12039.43    18153.25      3662.74    1.06
  8      397.96     17.43    -7.8     1.04     1.05     3       0.00    17.0
2123.15     2912.41      3792.90    1.04
  9      399.00     34.61    -7.8     2.00     2.02     3       0.00    17.0
4214.18     5611.98      3841.35    1.04
 10      401.00     90.16    -7.8     5.00     5.05     3       0.00    17.0
10981.23    14180.37      3916.35    1.04
 11      406.00     93.57    -7.8     5.00     5.05     3       0.00    17.0
11405.58    14395.26      4002.61    1.04
 12      411.00    100.16    -5.0     5.00     5.02     3       0.00    17.0
12246.50    14495.39      4112.37    1.02
 13      416.00    109.85    -4.9     5.00     5.02     3       0.00    17.0
13494.04    14628.83      4270.17    1.02
 14      421.00     81.11    -4.9     3.44     3.45     3       0.00    17.0
9974.88    10131.65      4397.24    1.02
 15      424.44    169.09    -2.1     6.66     6.66     3       0.00    17.0
20746.21    19685.64      4499.19    1.01
 16      431.09    184.06    -2.1     6.66     6.66     3       0.00    17.0
22523.40    19787.83      4642.18    1.01
 17      437.75    198.08     0.7     6.66     6.66     3       0.00    17.0
24180.25    19821.94      4744.12    1.00
 18      444.41    210.88     0.7     6.66     6.66     3       0.00    17.0
25688.05    19787.60      4845.00    1.00
 19      451.08    222.17     3.5     6.65     6.66     3       0.00    17.0
27008.71    19684.66      4902.97    0.99
```

```
 20      457.73    232.75     3.5     6.65     6.66     3       0.00    17.0
28239.75    19513.61      4961.97    0.99
 21      464.38    241.17     6.4     6.62     6.66     3       0.00    17.0
29207.23    19274.52      4976.69    0.98
 22      471.00    249.47     6.4     6.62     6.66     3       0.00    17.0
30157.24    18967.18      4994.16    0.98
 23      477.62    254.93     9.2     6.58     6.66     3       0.00    17.0
30760.11    18592.21      4966.39    0.98
 24      484.20    260.94     9.2     6.58     6.66     3       0.00    17.0
31427.80    18149.51      4942.77    0.98
 25      490.77    200.45    12.0     4.97     5.08     3       0.00    17.0
24102.40    13499.61      4880.98    0.97
 26      495.74    202.62    12.0     4.97     5.08     3       0.00    17.0
24326.77    13164.16      4832.02    0.97
 27      500.71    127.44    12.0     3.10     3.17     3       0.00    17.0
16420.75     8038.50      5170.15    0.97
 28      503.81    210.84    14.9     5.10     5.27     3       0.00    17.0
27131.67    13051.90      5157.39    0.97
 29      508.90    211.76    14.9     5.10     5.27     3       0.00    17.0
27210.31    12607.17      5167.03    0.97
 30      514.00    110.96    14.9     2.69     2.78     3       0.00    17.0
14250.45     6469.00      5128.86    0.97
 31      516.69    271.42    17.7     6.81     7.15     4     150.00    26.0
34835.08    15991.91      4775.36    0.94
 32      523.50    123.85    17.7     3.24     3.40     3       0.00    17.0
15738.99     7262.75      4671.21    0.98
 33      526.74     98.70    17.7     2.65     2.78     5     150.00    28.0
12470.85     5770.98      4378.87    0.93
 34      529.38    222.89    20.5     6.24     6.66     5     150.00    28.0
27930.27    13186.15      4108.85    0.93
 35      535.62    208.32    20.5     6.24     6.66     5     150.00    28.0
25768.52    12215.70      3788.94    0.93
 36      541.86    189.01    23.3     6.12     6.66     5     150.00    28.0
23035.49    11181.86      3411.79    0.93
 37      547.98    172.86    23.3     6.12     6.66     5     150.00    28.0
20702.37    10084.56      3062.76    0.93
 38      554.10     76.06    26.2     2.90     3.23     2       0.00    35.0
9722.78     4481.21      2942.96    0.88
 39      557.00    110.52    26.2     4.53     5.05     2       0.00    35.0
14078.10     6424.27      2725.65    0.88
 40      561.53    100.44    26.2     4.53     5.05     2       0.00    35.0
12767.54     5723.39      2467.67    0.88
 41      566.06    113.33    29.0     5.83     6.66     2       0.00    35.0
14359.58     6421.76      2120.68    0.88
 42      571.89     94.51    29.0     5.83     6.66     2       0.00    35.0
11912.95     5079.12      1750.82    0.88
 43      577.72     72.72    31.8     5.66     6.66     2       0.00    35.0
9091.47     3677.47      1343.02    0.88
 44      583.38     52.83    31.8     5.66     6.66     2       0.00    35.0
6506.04     2216.95       945.57    0.88
 45      589.04     29.95    34.6     5.17     6.29     2       0.00    35.0
3562.08      701.71       532.61    0.89
 46      594.21     11.58    34.6     5.79     7.04     1      50.00    28.0
1319.62       0.00       157.35    0.95
                --------                  -------                          -------
---
     X-S Area:    6066.01    Path Length:    253.18              X-S Weight:
748616.56
```

Southeast Tower Shallow



Material Keys

1: Overburden
2: Sand and Gravel
3: Weathered Bedrock
4: Unweathered Bedrock
5: Reclamation Slope
6: Slurry Wall

Analysis 1

Multiple Stability Analysis
Method: Bishop Simplified
Surface: Circular

Results

Critical Factor of Safety: 2.47

Project Wattenberg Lakes, Pond 1, SE Transmission Tower
Shallower Option Post Construction

File: J:\Aggregate Industries-297\Wattenberg\DRMS Stability\Stability SE\SE shallower option post construction.gmf

Edited: 23 Apr 2024 *Processed:* 23 Apr 2024

Civil Resources

GALENA 7.2 Analysis Results Version: 7.2.1.05 Licensee: Civil Resources

Project: Wattenberg Lakes, Pond 1, SE Transmission Tower
File: J:\Aggregate Industries-297\Wattenberg\DRMS Stability\Stability SE\SE shallower option post construction.gmf
Processed: 23 Apr 2024 15:55:32

DATA: Analysis 1 - Shallower Option Post Construction

Material Properties (6 materials)

Material: 1 (Mohr-Coulomb Isotropic) - Overburden

Cohesion	Phi	UnitWeight	Ru
50.00	28.0	114.00	Auto

Material: 2 (Mohr-Coulomb Isotropic) - Sand and Gravel

Cohesion	Phi	UnitWeight	Ru
0.00	35.0	130.00	Auto

Material: 3 (Mohr-Coulomb Isotropic) - Weathered Bedrock

Cohesion	Phi	UnitWeight	Ru
0.00	17.0	124.00	Auto

Material: 4 (Mohr-Coulomb Isotropic) - Unweathered Bedrock

Cohesion	Phi	UnitWeight	Ru
150.00	26.0	124.00	Auto

Material: 5 (Mohr-Coulomb Isotropic) - Reclamation Slope

Cohesion	Phi	UnitWeight	Ru
150.00	28.0	119.00	Auto

Material: 6 (Mohr-Coulomb Isotropic) - Slurry Wall

Cohesion	Phi	UnitWeight	Ru
0.00	0.0	110.00	Auto

Water Properties

Unit weight of water: 62.400 Unit weight of water/medium above ground: 62.400

Material Profiles (6 profiles)

Profile: 1 (2 points) Material beneath: 1 - Overburden

0.00	45.00	700.00	45.00

Profile: 2 (2 points) Material beneath: 2 - Sand and Gravel

0.00	42.00	700.00	42.00

Profile: 3 (6 points) Material beneath: 3 - Weathered Bedrock

0.00	2.00	360.00	2.00	558.00	-1.00
612.00	-2.00	615.00	-2.00		
700.00	-2.00				

Profile: 4 (6 points) Material beneath: 4 - Unweathered Bedrock

0.00	1.00	360.00	1.00	558.00	-2.00
612.00	-3.00	615.00	-3.00		
700.00	-3.00				

Profile: 5 (5 points) Material within: 6 - Slurry Wall

612.00	45.00	615.00	45.00	615.00	-7.00
612.00	-7.00	612.00	45.00		

Profile: 6 (6 points) Material within: 5 - Reclamation Slope

549.00	45.00	534.00	45.00	450.00	17.00
517.00	17.00	534.00	34.00		
549.00	45.00				

Slope Surface (5 points)

```
      0.00       16.00         360.00       17.00         450.00       17.00
534.00       45.00         700.00       45.00

Phreatic Surface (4 points)
---------------
      0.00        1.00         612.00        3.00         615.00       41.00
700.00       42.00

Failure Surface
---------------
Initial circular surface for critical search defined by: XL,XR,R
  Intersects:  XL:     450.00      YL:      17.00      XR:     560.00      YR:
45.00
      Centre:  XC:     446.21      YC:     261.97                  Radius:  R:
245.00

Distributed Loads (1 load)
-----------------
Load      X-Left    Pressure        X-Right   Pressure
  1       630.00      500.0         650.00      500.0

Variable Restraints
-------------------
Parameter descriptor:              XL         XR         R
Range of variation:             90.00      90.00      50.00
Trial positions within range:     20         20         50

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RESULTS: Analysis  1 - Shallower Option Post Construction

Bishop Simplified Method of Analysis - Circular Failure Surface
---------------------------------------------------------------
Critical Failure Surface Search using Multiple Circle Generation Techniques

Initial failure surface approximation - Factor of Safety:   2.604

Analysis Summary
================
There were:  15748 successful analyses from a total of 20001 trial failure surfaces
             4253 analyses terminated due to unacceptable geometry

Critical (minimum) Factor of Safety:  2.47
==========================================

Results Summary - Lowest 99 Factor of Safety circles
----------------------------------------------------
Circle    X-Left      Y-Left     X-Right     Y-Right     X-Centre    Y-Centre
Radius      FoS
   1       428.68       17.00      552.89       45.00      444.48      236.43
220.00     2.467   <-- Critical Surface
   2       428.68       17.00      552.89       45.00      444.25      237.47
221.02     2.470
   3       428.68       17.00      552.89       45.00      444.01      238.51
222.04     2.473
   4       423.95       17.00      552.89       45.00      443.89      236.09
220.00     2.474
   5       433.42       17.00      552.89       45.00      444.95      236.70
220.00     2.475
   6       428.68       17.00      552.89       45.00      443.78      239.55
223.06     2.476
```

7	423.95	17.00	552.89	45.00	443.66	237.14	221.02	2.476
8	423.95	17.00	552.89	45.00	443.43	238.18	222.04	2.478
9	428.68	17.00	552.89	45.00	443.54	240.59	224.08	2.479
10	433.42	17.00	552.89	45.00	444.71	237.73	221.02	2.479
11	423.95	17.00	552.89	45.00	443.21	239.23	223.06	2.480
12	428.68	17.00	552.89	45.00	443.31	241.63	225.10	2.482
13	423.95	17.00	552.89	45.00	442.98	240.27	224.08	2.482
14	433.42	17.00	552.89	45.00	444.47	238.77	222.04	2.483
15	423.95	17.00	552.89	45.00	442.75	241.32	225.10	2.484
16	428.68	17.00	552.89	45.00	443.08	242.66	226.12	2.485
17	423.95	17.00	552.89	45.00	442.53	242.36	226.12	2.486
18	433.42	17.00	552.89	45.00	444.22	239.80	223.06	2.486
19	428.68	17.00	552.89	45.00	442.84	243.70	227.14	2.488
20	423.95	17.00	552.89	45.00	442.30	243.40	227.14	2.488
21	423.95	17.00	552.89	45.00	442.07	244.44	228.16	2.489
22	433.42	17.00	552.89	45.00	443.98	240.83	224.08	2.490
23	428.68	17.00	552.89	45.00	442.61	244.74	228.16	2.491
24	423.95	17.00	552.89	45.00	441.85	245.48	229.18	2.491
25	423.95	17.00	548.16	45.00	439.74	236.43	220.00	2.492
26	433.42	17.00	557.63	45.00	449.22	236.43	220.00	2.493
27	433.42	17.00	552.89	45.00	443.74	241.87	225.10	2.494
28	423.95	17.00	552.89	45.00	441.62	246.52	230.20	2.494
29	428.68	17.00	552.89	45.00	442.37	245.77	229.18	2.495
30	433.42	17.00	557.63	45.00	448.98	237.47	221.02	2.495
31	423.95	17.00	548.16	45.00	439.51	237.47	221.02	2.496
32	438.16	17.00	552.89	45.00	445.28	236.88	220.00	2.496
33	423.95	17.00	552.89	45.00	441.40	247.57	231.22	2.497
34	433.42	17.00	557.63	45.00	448.75	238.51	222.04	2.497
35	428.68	17.00	552.89	45.00	442.14	246.81	230.20	2.498
36	419.21	17.00	548.16	45.00	439.15	236.09	220.00	2.498
37	428.68	17.00	557.63	45.00	448.62	236.09	220.00	2.498

38	433.42	17.00	557.63	45.00	448.51	239.55	223.06	2.500
39	428.68	17.00	557.63	45.00	448.40	237.14	221.02	2.500
40	433.42	17.00	552.89	45.00	443.50	242.90	226.12	2.500
41	423.95	17.00	552.89	45.00	441.17	248.61	232.24	2.500
42	438.16	17.00	557.63	45.00	449.69	236.70	220.00	2.500
43	438.16	17.00	552.89	45.00	445.03	237.91	221.02	2.501
44	423.95	17.00	548.16	45.00	439.27	238.51	222.04	2.501
45	428.68	17.00	557.63	45.00	448.17	238.18	222.04	2.501
46	419.21	17.00	548.16	45.00	438.92	237.14	221.02	2.501
47	428.68	17.00	548.16	45.00	440.21	236.70	220.00	2.501
48	433.42	17.00	552.89	45.00	443.26	243.93	227.14	2.501
49	433.42	17.00	557.63	45.00	448.28	240.59	224.08	2.502
50	428.68	17.00	552.89	45.00	441.91	247.85	231.22	2.502
51	428.68	17.00	557.63	45.00	447.94	239.23	223.06	2.502
52	438.16	17.00	557.63	45.00	449.44	237.73	221.02	2.503
53	423.95	17.00	552.89	45.00	440.94	249.65	233.27	2.503
54	433.42	17.00	557.63	45.00	448.05	241.63	225.10	2.504
55	428.68	17.00	557.63	45.00	447.72	240.27	224.08	2.504
56	419.21	17.00	548.16	45.00	438.70	238.18	222.04	2.504
57	423.95	17.00	548.16	45.00	439.04	239.55	223.06	2.505
58	428.68	17.00	557.63	45.00	447.49	241.32	225.10	2.505
59	428.68	17.00	552.89	45.00	441.67	248.88	232.24	2.505
60	433.42	17.00	557.63	45.00	447.81	242.66	226.12	2.506
61	438.16	17.00	557.63	45.00	449.20	238.77	222.04	2.506
62	423.95	17.00	552.89	45.00	440.72	250.68	234.29	2.507
63	433.42	17.00	552.89	45.00	443.01	244.96	228.16	2.507
64	428.68	17.00	557.63	45.00	447.26	242.36	226.12	2.507
65	428.68	17.00	548.16	45.00	439.97	237.73	221.02	2.507
66	438.16	17.00	552.89	45.00	444.78	238.94	222.04	2.507
67	419.21	17.00	548.16	45.00	438.47	239.23	223.06	2.507
68	433.42	17.00	557.63	45.00	447.58	243.70	227.14	2.508

69	428.68	17.00	557.63	45.00	447.04	243.40	227.14	2.508
70	419.21	17.00	552.89	45.00	443.18	235.69	220.00	2.509
71	438.16	17.00	557.63	45.00	448.96	239.80	223.06	2.509
72	438.16	17.00	552.89	45.00	444.53	239.97	223.06	2.509
73	419.21	17.00	552.89	45.00	442.96	236.74	221.02	2.509
74	423.95	17.00	548.16	45.00	438.81	240.59	224.08	2.510
75	428.68	17.00	552.89	45.00	441.44	249.92	233.27	2.510
76	423.95	17.00	552.89	45.00	440.49	251.72	235.31	2.510
77	428.68	17.00	557.63	45.00	446.81	244.44	228.16	2.510
78	419.21	17.00	552.89	45.00	442.74	237.79	222.04	2.510
79	433.42	17.00	557.63	45.00	447.34	244.74	228.16	2.510
80	419.21	17.00	548.16	45.00	438.24	240.27	224.08	2.511
81	419.21	17.00	552.89	45.00	442.52	238.84	223.06	2.511
82	438.16	17.00	557.63	45.00	448.72	240.83	224.08	2.512
83	428.68	17.00	557.63	45.00	446.58	245.48	229.18	2.512
84	442.89	17.00	557.63	45.00	450.02	236.88	220.00	2.512
85	419.21	17.00	552.89	45.00	442.30	239.89	224.08	2.512
86	433.42	17.00	552.89	45.00	442.77	245.99	229.18	2.512
87	419.21	17.00	552.89	45.00	442.08	240.94	225.10	2.513
88	433.42	17.00	557.63	45.00	447.11	245.77	229.18	2.513
89	423.95	17.00	552.89	45.00	440.27	252.76	236.33	2.513
90	428.68	17.00	557.63	45.00	446.36	246.52	230.20	2.514
91	419.21	17.00	548.16	45.00	438.02	241.32	225.10	2.514
92	419.21	17.00	552.89	45.00	441.86	241.99	226.12	2.514
93	423.95	17.00	548.16	45.00	438.57	241.63	225.10	2.514
94	428.68	17.00	552.89	45.00	441.21	250.95	234.29	2.514
95	438.16	17.00	557.63	45.00	448.48	241.87	225.10	2.514
96	442.89	17.00	557.63	45.00	449.77	237.91	221.02	2.515
97	428.68	17.00	548.16	45.00	439.73	238.77	222.04	2.515
98	419.21	17.00	552.89	45.00	441.64	243.03	227.14	2.515
99	438.16	17.00	552.89	45.00	444.28	241.00	224.08	2.516

Critical Failure Surface (circle 1)

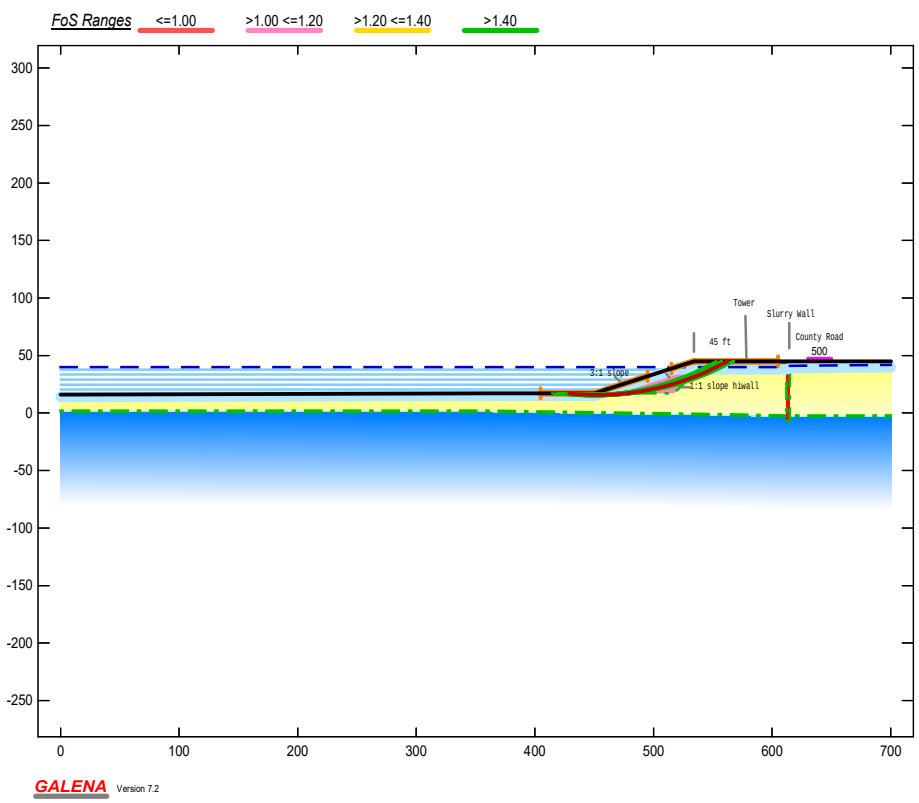
Intersects: XL: 428.68 YL: 17.00 XR: 552.89 YR: 45.00
Centre: XC: 444.48 YC: 236.43 Radius: R: 220.00
Generated failure surface: (20 points)

428.68	17.00	435.47	16.62	442.27	16.44
449.07	16.48	455.86	16.73		
462.64	17.18	469.41	17.85	476.15	18.72
482.86	19.81	489.54	21.10		
496.17	22.59	502.75	24.29	509.28	26.19
515.74	28.29	522.14	30.60		
528.46	33.09	534.71	35.79	540.86	38.67
546.93	41.74	552.89	45.00		

Slice Geometry and Properties - Critical Failure Surface (circle 1, 41 slices)

Slice	X-S	---------- Base ----------						PoreWater	Normal	Test
	X-Left	Area	Angle	Width	Length	Matl	Cohesion	Phi	Weight	Force	Stress	Factor
1	428.68	0.33	-3.2	3.39	3.40	2	0.00	35.0	42.28	0.00	12.66	1.02
2	432.08	0.98	-3.2	3.39	3.40	2	0.00	35.0	126.84	0.00	37.98	1.02
3	435.47	1.45	-1.5	3.40	3.40	2	0.00	35.0	188.47	0.00	55.87	1.01
4	438.87	1.74	-1.5	3.40	3.40	2	0.00	35.0	226.76	0.00	67.22	1.01
5	442.27	1.86	0.3	3.40	3.40	2	0.00	35.0	241.94	0.00	71.07	1.00
6	445.67	1.80	0.3	3.40	3.40	2	0.00	35.0	233.83	0.00	68.69	1.00
7	449.07	0.47	2.1	0.93	0.93	2	0.00	35.0	61.05	0.00	64.73	0.99
8	450.00	2.70	2.1	2.93	2.93	2	0.00	35.0	335.19	0.00	113.23	0.99
9	452.93	5.25	2.1	2.93	2.93	2	0.00	35.0	635.22	0.00	214.58	0.99
10	455.86	11.23	3.9	4.06	4.07	2	0.00	35.0	1342.94	0.00	324.55	0.98
11	459.92	9.99	3.9	2.72	2.73	5	150.00	28.0	1188.85	0.00	426.34	0.99
12	462.64	14.98	5.6	3.38	3.40	5	150.00	28.0	1782.77	0.00	510.20	0.98
13	466.03	17.67	5.6	3.38	3.40	5	150.00	28.0	2102.63	0.00	602.79	0.98
14	469.41	20.10	7.4	3.37	3.40	5	150.00	28.0	2392.32	0.00	682.71	0.98
15	472.78	22.42	7.4	3.37	3.40	5	150.00	28.0	2667.67	0.00	762.16	0.98
16	476.15	24.44	9.2	3.36	3.40	5	150.00	28.0	2907.97	0.00	827.96	0.98
17	479.51	26.37	9.2	3.36	3.40	5	150.00	28.0	3138.53	0.00	894.36	0.98
18	482.86	27.97	10.9	3.34	3.40	5	150.00	28.0	3329.03	0.00	946.31	0.98
19	486.20	29.54	10.9	3.34	3.40	5	150.00	28.0	3514.78	0.00	999.75	0.98
20	489.54	30.71	12.7	3.32	3.40	5	150.00	28.0	3654.99	0.00	1038.10	0.98

```
 21      492.85     31.90    12.7      3.32     3.40     5     150.00    28.0
3796.20        0.00       1078.71    0.98
 22      496.17     32.66    14.5      3.29     3.40     5     150.00    28.0
3886.52        0.00       1103.74    0.98
 23      499.46     33.47    14.5      3.29     3.40     5     150.00    28.0
3983.48        0.00       1131.63    0.98
 24      502.75     33.82    16.2      3.26     3.40     5     150.00    28.0
4024.37        0.00       1143.63    0.98
 25      506.02     34.27    16.2      3.26     3.40     5     150.00    28.0
4077.58        0.00       1158.96    0.98
 26      509.28     34.20    18.0      3.23     3.40     5     150.00    28.0
4070.38        0.00       1158.21    0.98
 27      512.51     34.29    18.0      3.23     3.40     5     150.00    28.0
4080.40        0.00       1161.13    0.98
 28      515.74     33.83    19.8      3.20     3.40     5     150.00    28.0
4026.32        0.00       1147.94    0.99
 29      518.94     33.56    19.8      3.20     3.40     5     150.00    28.0
3994.17        0.00       1138.61    0.99
 30      522.14     29.62    21.6      2.86     3.07     5     150.00    28.0
3525.25        0.00       1114.35    0.99
 31      525.00     35.23    21.6      3.46     3.73     2       0.00    35.0
4557.60        0.00       1182.89    0.97
 32      528.46     27.47    23.3      2.77     3.01     2       0.00    35.0
3522.21        0.00       1133.82    0.97
 33      531.23     26.72    23.3      2.77     3.01     2       0.00    35.0
3396.63        0.00       1093.39    0.97
 34      534.00      6.62    23.3      0.71     0.77     2       0.00    35.0
837.70         0.00       1055.52    0.97
 35      534.71     20.69    25.1      2.39     2.64     2       0.00    35.0
2611.12        0.00        963.95    0.97
 36      537.10     18.02    25.1      2.39     2.64     2       0.00    35.0
2263.09        0.00        835.45    0.97
 37      539.49      9.15    25.1      1.37     1.52     5     150.00    28.0
1140.80        0.00        727.90    1.00
 38      540.86     16.87    26.9      3.03     3.40     5     150.00    28.0
2069.12        0.00        587.42    1.01
 39      543.90     12.21    26.9      3.03     3.40     2       0.00    35.0
1481.52        0.00        427.17    0.98
 40      546.93      5.58    28.6      2.07     2.36     1      50.00    28.0
643.82         0.00        268.13    1.02
 41      549.00      4.14    28.6      3.89     4.44     1      50.00    28.0
472.16         0.00         98.56    1.02
                 --------                    -------                          -------
---
     X-S Area:     766.34    Path Length:    129.17              X-S Weight:
92574.50
```



Material Keys

1: Overburden
2: Sand and Gravel
3: Weathered Bedrock
4: Unweathered Bedrock
5: Reclamation Slope
6: Slurry Wall

Analysis 1

Multiple Stability Analysis
Method: Bishop Simplified
Surface: Circular

Results

Critical Factor of Safety: 2.60

Project Wattenberg Lakes, Pond 1, SE Transmission Tower
Shallower Option Full Reservoir

File: J:\Aggregate Industries-297\Wattenberg\DRMS Stability\Stability SE\SE shallower option full reservoir.gmf

Edited: 23 Apr 2024 *Processed:* 23 Apr 2024

Civil Resources

GALENA 7.2 Analysis Results Version: 7.2.1.05 Licensee: Civil Resources

Project: Wattenberg Lakes, Pond 1, SE Transmission Tower
File: J:\Aggregate Industries-297\Wattenberg\DRMS Stability\Stability SE\SE shallower option full reservoir.gmf
Processed: 23 Apr 2024 15:17:45

DATA: Analysis 1 - Shallower Option Full Reservoir

Material Properties (6 materials)

Material: 1 (Mohr-Coulomb Isotropic) - Overburden

Cohesion	Phi	UnitWeight	Ru
50.00	28.0	114.00	Auto

Material: 2 (Mohr-Coulomb Isotropic) - Sand and Gravel

Cohesion	Phi	UnitWeight	Ru
0.00	35.0	130.00	Auto

Material: 3 (Mohr-Coulomb Isotropic) - Weathered Bedrock

Cohesion	Phi	UnitWeight	Ru
0.00	17.0	124.00	Auto

Material: 4 (Mohr-Coulomb Isotropic) - Unweathered Bedrock

Cohesion	Phi	UnitWeight	Ru
150.00	26.0	124.00	Auto

Material: 5 (Mohr-Coulomb Isotropic) - Reclamation Slope

Cohesion	Phi	UnitWeight	Ru
150.00	28.0	119.00	Auto

Material: 6 (Mohr-Coulomb Isotropic) - Slurry Wall

Cohesion	Phi	UnitWeight	Ru
0.00	0.0	110.00	Auto

Water Properties

Unit weight of water: 62.400 Unit weight of water/medium above ground: 62.400

Material Profiles (6 profiles)

Profile: 1 (2 points) Material beneath: 1 - Overburden

0.00	45.00	700.00	45.00

Profile: 2 (2 points) Material beneath: 2 - Sand and Gravel

0.00	42.00	700.00	42.00

Profile: 3 (6 points) Material beneath: 3 - Weathered Bedrock

0.00	2.00	360.00	2.00	558.00	-1.00
612.00	-2.00	615.00	-2.00		
700.00	-2.00				

Profile: 4 (6 points) Material beneath: 4 - Unweathered Bedrock

0.00	1.00	360.00	1.00	558.00	-2.00
612.00	-3.00	615.00	-3.00		
700.00	-3.00				

Profile: 5 (5 points) Material within: 6 - Slurry Wall

612.00	45.00	615.00	45.00	615.00	-7.00
612.00	-7.00	612.00	45.00		

Profile: 6 (6 points) Material within: 5 - Reclamation Slope

549.00	45.00	534.00	45.00	450.00	17.00
517.00	17.00	534.00	34.00		
549.00	45.00				

Slope Surface (5 points)

```
      0.00       16.00         360.00       17.00         450.00       17.00
534.00       45.00         700.00       45.00

Phreatic Surface (4 points)
---------------
      0.00       40.00         612.00       40.00         615.00       41.00
700.00       42.00

Failure Surface
---------------
Initial circular surface for critical search defined by: XL,XR,R
  Intersects:  XL:     450.00      YL:      17.00      XR:     560.00      YR:
45.00
      Centre:  XC:     446.21      YC:     261.97                  Radius:  R:
245.00

Distributed Loads (1 load)
-----------------
Load      X-Left    Pressure        X-Right   Pressure
  1       630.00      500.0         650.00      500.0

Variable Restraints
-------------------
Parameter descriptor:              XL         XR         R
Range of variation:             90.00      90.00      50.00
Trial positions within range:      20         20         50

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RESULTS: Analysis  1 - Shallower Option Full Reservoir

Bishop Simplified Method of Analysis - Circular Failure Surface
---------------------------------------------------------------
Critical Failure Surface Search using Multiple Circle Generation Techniques

Initial failure surface approximation - Factor of Safety:   2.799

Analysis Summary
================
There were:  15748 successful analyses from a total of 20001 trial failure surfaces
             4253 analyses terminated due to unacceptable geometry

Critical (minimum) Factor of Safety:  2.60
==========================================

Results Summary - Lowest 99 Factor of Safety circles
----------------------------------------------------
Circle    X-Left      Y-Left     X-Right     Y-Right     X-Centre    Y-Centre
Radius      FoS
   1       428.68       17.00      562.37       45.00      452.65      235.69
220.00     2.597   <-- Critical Surface
   2       423.95       17.00      557.63       45.00      447.92      235.69
220.00     2.597
   3       428.68       17.00      562.37       45.00      452.43      236.74
221.02     2.599
   4       423.95       17.00      557.63       45.00      447.70      236.74
221.02     2.601
   5       433.42       17.00      562.37       45.00      453.36      236.09
220.00     2.602
   6       428.68       17.00      562.37       45.00      452.21      237.79
222.04     2.602
```

7	428.68	17.00	557.63	45.00	448.62	236.09	220.00	2.603
8	423.95	17.00	562.37	45.00	451.85	235.22	220.00	2.604
9	423.95	17.00	557.63	45.00	447.48	237.79	222.04	2.605
10	428.68	17.00	562.37	45.00	451.99	238.84	223.06	2.605
11	433.42	17.00	562.37	45.00	453.13	237.14	221.02	2.605
12	423.95	17.00	562.37	45.00	451.63	236.28	221.02	2.606
13	428.68	17.00	557.63	45.00	448.40	237.14	221.02	2.607
14	423.95	17.00	557.63	45.00	447.26	238.84	223.06	2.608
15	423.95	17.00	562.37	45.00	451.42	237.33	222.04	2.609
16	419.21	17.00	557.63	45.00	447.11	235.22	220.00	2.609
17	428.68	17.00	562.37	45.00	451.77	239.89	224.08	2.609
18	433.42	17.00	562.37	45.00	452.91	238.18	222.04	2.609
19	438.16	17.00	562.37	45.00	453.95	236.43	220.00	2.609
20	423.95	17.00	562.37	45.00	451.21	238.39	223.06	2.611
21	419.21	17.00	557.63	45.00	446.90	236.28	221.02	2.612
22	423.95	17.00	557.63	45.00	447.04	239.89	224.08	2.612
23	428.68	17.00	557.63	45.00	448.17	238.18	222.04	2.612
24	428.68	17.00	562.37	45.00	451.56	240.94	225.10	2.612
25	433.42	17.00	562.37	45.00	452.68	239.23	223.06	2.613
26	423.95	17.00	562.37	45.00	450.99	239.44	224.08	2.613
27	438.16	17.00	562.37	45.00	453.72	237.47	221.02	2.614
28	419.21	17.00	557.63	45.00	446.68	237.33	222.04	2.614
29	428.68	17.00	562.37	45.00	451.34	241.99	226.12	2.615
30	423.95	17.00	562.37	45.00	450.78	240.50	225.10	2.616
31	423.95	17.00	557.63	45.00	446.82	240.94	225.10	2.616
32	433.42	17.00	567.11	45.00	457.39	235.69	220.00	2.616
33	428.68	17.00	557.63	45.00	447.94	239.23	223.06	2.617
34	433.42	17.00	562.37	45.00	452.45	240.27	224.08	2.617
35	419.21	17.00	557.63	45.00	446.47	238.39	223.06	2.617
36	438.16	17.00	562.37	45.00	453.49	238.51	222.04	2.618
37	433.42	17.00	567.11	45.00	457.17	236.74	221.02	2.618

38	428.68	17.00	562.37	45.00	451.12	243.03	
227.14	2.619						
39	428.68	17.00	567.11	45.00	456.58	235.22	
220.00	2.619						
40	423.95	17.00	562.37	45.00	450.57	241.55	
226.12	2.619						
41	423.95	17.00	557.63	45.00	446.60	241.99	
226.12	2.619						
42	419.21	17.00	557.63	45.00	446.26	239.44	
224.08	2.620						
43	433.42	17.00	557.63	45.00	449.22	236.43	
220.00	2.620						
44	423.95	17.00	562.37	45.00	450.35	242.60	
227.14	2.620						
45	428.68	17.00	567.11	45.00	456.37	236.28	
221.02	2.621						
46	433.42	17.00	562.37	45.00	452.23	241.32	
225.10	2.621						
47	433.42	17.00	567.11	45.00	456.95	237.79	
222.04	2.621						
48	428.68	17.00	557.63	45.00	447.72	240.27	
224.08	2.621						
49	428.68	17.00	562.37	45.00	450.90	244.08	
228.16	2.622						
50	419.21	17.00	562.37	45.00	450.95	234.70	
220.00	2.622						
51	438.16	17.00	562.37	45.00	453.25	239.55	
223.06	2.622						
52	428.68	17.00	567.11	45.00	456.16	237.33	
222.04	2.622						
53	419.21	17.00	557.63	45.00	446.04	240.50	
225.10	2.623						
54	438.16	17.00	567.11	45.00	458.10	236.09	
220.00	2.623						
55	433.42	17.00	567.11	45.00	456.73	238.84	
223.06	2.623						
56	423.95	17.00	562.37	45.00	450.14	243.65	
228.16	2.623						
57	423.95	17.00	557.63	45.00	446.38	243.03	
227.14	2.623						
58	419.21	17.00	562.37	45.00	450.74	235.76	
221.02	2.624						
59	428.68	17.00	567.11	45.00	455.94	238.39	
223.06	2.624						
60	433.42	17.00	562.37	45.00	452.00	242.36	
226.12	2.624						
61	433.42	17.00	557.63	45.00	448.98	237.47	
221.02	2.625						
62	433.42	17.00	567.11	45.00	456.51	239.89	
224.08	2.626						
63	419.21	17.00	562.37	45.00	450.53	236.82	
222.04	2.626						
64	428.68	17.00	557.63	45.00	447.49	241.32	
225.10	2.626						
65	438.16	17.00	567.11	45.00	457.87	237.14	
221.02	2.626						
66	428.68	17.00	562.37	45.00	450.68	245.13	
229.18	2.626						
67	428.68	17.00	567.11	45.00	455.73	239.44	
224.08	2.626						
68	423.95	17.00	562.37	45.00	449.93	244.71	
229.18	2.626						

69	419.21	17.00	562.37	45.00	450.33	237.88	223.06	2.627
70	438.16	17.00	562.37	45.00	453.02	240.59	224.08	2.627
71	423.95	17.00	557.63	45.00	446.16	244.08	228.16	2.627
72	419.21	17.00	557.63	45.00	445.83	241.55	226.12	2.628
73	433.42	17.00	567.11	45.00	456.29	240.94	225.10	2.628
74	428.68	17.00	567.11	45.00	455.52	240.50	225.10	2.628
75	433.42	17.00	562.37	45.00	451.77	243.40	227.14	2.628
76	419.21	17.00	562.37	45.00	450.12	238.94	224.08	2.628
77	428.68	17.00	562.37	45.00	450.46	246.17	230.20	2.629
78	419.21	17.00	557.63	45.00	445.62	242.60	227.14	2.629
79	438.16	17.00	567.11	45.00	457.64	238.18	222.04	2.629
80	423.95	17.00	562.37	45.00	449.72	245.76	230.20	2.629
81	419.21	17.00	562.37	45.00	449.91	240.00	225.10	2.630
82	433.42	17.00	567.11	45.00	456.07	241.99	226.12	2.630
83	428.68	17.00	557.63	45.00	447.26	242.36	226.12	2.631
84	433.42	17.00	557.63	45.00	448.75	238.51	222.04	2.631
85	428.68	17.00	567.11	45.00	455.30	241.55	226.12	2.631
86	438.16	17.00	562.37	45.00	452.78	241.63	225.10	2.631
87	438.16	17.00	567.11	45.00	457.42	239.23	223.06	2.632
88	428.68	17.00	567.11	45.00	455.09	242.60	227.14	2.632
89	433.42	17.00	562.37	45.00	451.55	244.44	228.16	2.632
90	419.21	17.00	557.63	45.00	445.40	243.65	228.16	2.632
91	423.95	17.00	562.37	45.00	449.50	246.81	231.22	2.632
92	419.21	17.00	562.37	45.00	449.70	241.06	226.12	2.632
93	423.95	17.00	557.63	45.00	445.94	245.13	229.18	2.632
94	428.68	17.00	562.37	45.00	450.24	247.22	231.22	2.633
95	414.47	17.00	557.63	45.00	446.21	234.70	220.00	2.633
96	433.42	17.00	567.11	45.00	455.85	243.03	227.14	2.633
97	419.21	17.00	552.89	45.00	443.18	235.69	220.00	2.633
98	423.95	17.00	552.89	45.00	443.89	236.09	220.00	2.633
99	419.21	17.00	562.37	45.00	449.50	242.11	227.14	2.634

Critical Failure Surface (circle 1)

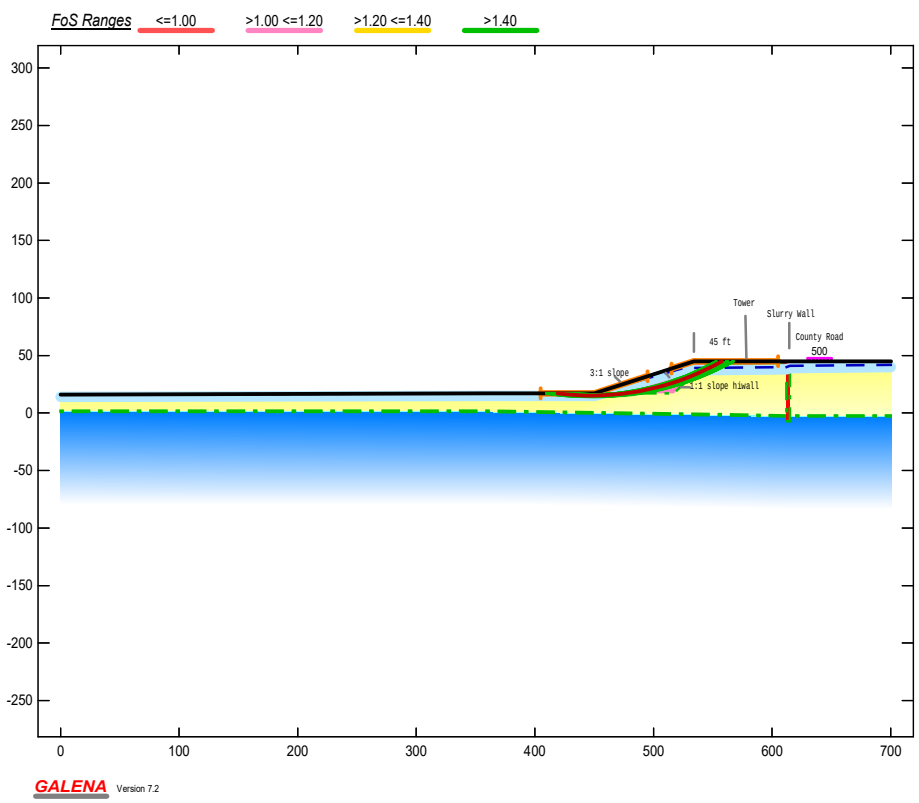
Intersects: XL: 428.68 YL: 17.00 XR: 562.37 YR: 45.00
Centre: XC: 452.65 YC: 235.69 Radius: R: 220.00
Generated failure surface: (20 points)

428.68	17.00	435.96	16.32	443.26	15.89
450.56	15.70	457.87	15.75		
465.18	16.05	472.47	16.58	479.73	17.36
486.97	18.38	494.17	19.64		
501.33	21.14	508.43	22.88	515.46	24.85
522.43	27.05	529.33	29.48		
536.13	32.14	542.85	35.03	549.46	38.14
555.97	41.46	562.37	45.00		

Slice Geometry and Properties - Critical Failure Surface (circle 1, 41 slices)

Slice	X-S	---------- Base ----------						PoreWater	Normal	Test
	X-Left	Area	Angle	Width	Length	Matl	Cohesion	Phi	Weight	Force	Stress	Factor
1	428.68	0.61	-5.3	3.64	3.65	2	0.00	35.0	79.89	5283.54	1457.45	1.03
2	432.32	1.84	-5.3	3.64	3.65	2	0.00	35.0	239.68	5360.57	1501.95	1.03
3	435.96	2.86	-3.4	3.65	3.65	2	0.00	35.0	371.78	5423.84	1537.97	1.02
4	439.61	3.65	-3.4	3.65	3.65	2	0.00	35.0	474.56	5473.26	1566.38	1.02
5	443.26	3.89	-1.5	3.37	3.37	2	0.00	35.0	505.25	5082.05	1585.64	1.01
6	446.63	4.18	-1.5	3.37	3.37	2	0.00	35.0	543.82	5100.57	1597.13	1.01
7	450.00	0.78	-1.5	0.56	0.57	2	0.00	35.0	101.25	856.66	1609.20	1.01
8	450.56	7.62	0.4	3.65	3.65	2	0.00	35.0	958.12	5538.49	1647.37	1.00
9	454.22	11.97	0.4	3.65	3.65	2	0.00	35.0	1475.52	5532.60	1712.80	1.00
10	457.87	16.09	2.3	3.65	3.65	2	0.00	35.0	1962.32	5512.76	1768.01	0.99
11	461.53	20.00	2.3	3.65	3.65	2	0.00	35.0	2421.26	5479.10	1817.11	0.99
12	465.18	23.64	4.2	3.64	3.65	2	0.00	35.0	2845.60	5431.78	1855.03	0.98
13	468.82	27.09	4.2	3.64	3.65	2	0.00	35.0	3245.23	5370.48	1887.89	0.98
14	472.47	32.36	6.1	3.88	3.90	2	0.00	35.0	3859.86	5649.29	1909.35	0.98
15	476.35	31.06	6.1	3.39	3.41	5	150.00	28.0	3695.76	4852.66	1925.40	0.98
16	479.73	35.81	8.0	3.62	3.65	5	150.00	28.0	4261.71	5104.08	1933.12	0.98
17	483.35	38.33	8.0	3.62	3.65	5	150.00	28.0	4561.53	4987.77	1939.59	0.98
18	486.97	40.41	9.9	3.60	3.65	5	150.00	28.0	4808.78	4857.69	1932.85	0.98
19	490.57	42.46	9.9	3.60	3.65	5	150.00	28.0	5052.95	4714.04	1924.69	0.98
20	494.17	44.00	11.8	3.58	3.65	5	150.00	28.0	5236.49	4556.86	1902.95	0.98

```
 21      497.75     45.59    11.8     3.58     3.65     5     150.00    28.0
5425.17     4386.04      1880.25    0.98
 22      501.33     46.59    13.7     3.55     3.65     5     150.00    28.0
5544.60     4201.59      1843.70    0.98
 23      504.88     47.71    13.7     3.55     3.65     5     150.00    28.0
5678.01     4003.74      1806.59    0.98
 24      508.43     48.19    15.6     3.52     3.65     5     150.00    28.0
5734.34     3792.56      1755.44    0.98
 25      511.94     48.85    15.6     3.52     3.65     5     150.00    28.0
5813.14     3567.95      1704.04    0.98
 26      515.46     49.52    17.5     3.54     3.71     5     150.00    28.0
5893.17     3377.27      1638.03    0.99
 27      519.00     48.29    17.5     3.43     3.60     5     150.00    28.0
5746.24     3031.53      1606.03    0.99
 28      522.43     36.11    19.4     2.57     2.72     5     150.00    28.0
4297.55     2122.76      1594.94    0.99
 29      525.00     60.56    19.4     4.33     4.59     2       0.00    35.0
7838.88     3228.89      1715.93    0.97
 30      529.33     32.47    21.3     2.34     2.51     5     150.00    28.0
4159.62     1575.36      1673.42    0.99
 31      531.66     32.15    21.3     2.34     2.51     5     150.00    28.0
4062.15     1432.32      1630.58    0.99
 32      534.00     28.31    21.3     2.13     2.29     5     150.00    28.0
3538.57     1182.32      1553.34    0.99
 33      536.13     40.75    23.3     3.36     3.65     5     150.00    28.0
5041.15     1627.14      1393.11    1.00
 34      539.49     35.90    23.3     3.36     3.65     5     150.00    28.0
4373.63     1298.12      1203.13    1.00
 35      542.85     28.45    25.2     3.08     3.40     5     150.00    28.0
3398.16      900.90      1006.41    1.01
 36      545.92     24.00    25.2     3.08     3.40     2       0.00    35.0
2990.25      594.64       882.61    0.98
 37      549.00     24.89    26.8     4.11     4.61     2       0.00    35.0
3038.50      302.31       657.76    0.99
 38      553.11     12.21    27.1     2.86     3.21     2       0.00    35.0
1450.00       0.00       445.66    0.99
 39      555.97      3.19    29.0     0.97     1.11     2       0.00    35.0
367.36        0.00       328.09    0.99
 40      556.95      6.10    29.0     2.71     3.10     1      50.00    28.0
695.19        0.00       220.82    1.03
 41      559.66      2.03    29.0     2.71     3.10     1      50.00    28.0
231.72        0.00        67.22    1.03
                --------                  -------                          -------
---
     X-S Area:    1090.54    Path Length:    138.87              X-S Weight:
132018.77
```



Material Keys

1: Overburden
2: Sand and Gravel
3: Weathered Bedrock
4: Unweathered Bedrock
5: Reclamation Slope
6: Slurry Wall

Analysis 1

Multiple Stability Analysis
Method: Bishop Simplified
Surface: Circular

Results

Critical Factor of Safety: 1.64

Project Wattenberg Lakes, Pond 1, SE Transmission Tower
Shallower Option Rapid Drawdown

File: J:\Aggregate Industries-297\Wattenberg\DRMS Stability\Stability SE\SE shallower option rapid drawdown.gmf

Edited: 23 Apr 2024 *Processed:* 23 Apr 2024

Civil Resources

GALENA 7.2 Analysis Results Version: 7.2.1.05 Licensee: Civil Resources

Project: Wattenberg Lakes, Pond 1, SE Transmission Tower
File: J:\Aggregate Industries-297\Wattenberg\DRMS Stability\Stability SE\SE shallower option rapid drawdown.gmf
Processed: 23 Apr 2024 15:06:17

DATA: Analysis 1 - Shallower Option Rapid Drawdown

Material Properties (6 materials)

Material: 1 (Mohr-Coulomb Isotropic) - Overburden

Cohesion	Phi	UnitWeight	Ru
50.00	28.0	114.00	Auto

Material: 2 (Mohr-Coulomb Isotropic) - Sand and Gravel

Cohesion	Phi	UnitWeight	Ru
0.00	35.0	130.00	Auto

Material: 3 (Mohr-Coulomb Isotropic) - Weathered Bedrock

Cohesion	Phi	UnitWeight	Ru
0.00	17.0	124.00	Auto

Material: 4 (Mohr-Coulomb Isotropic) - Unweathered Bedrock

Cohesion	Phi	UnitWeight	Ru
150.00	26.0	124.00	Auto

Material: 5 (Mohr-Coulomb Isotropic) - Reclamation Slope

Cohesion	Phi	UnitWeight	Ru
150.00	28.0	119.00	Auto

Material: 6 (Mohr-Coulomb Isotropic) - Slurry Wall

Cohesion	Phi	UnitWeight	Ru
0.00	0.0	110.00	Auto

Water Properties

Unit weight of water: 62.400 Unit weight of water/medium above ground: 62.400

Material Profiles (6 profiles)

Profile: 1 (2 points) Material beneath: 1 - Overburden

0.00	45.00	700.00	45.00

Profile: 2 (2 points) Material beneath: 2 - Sand and Gravel

0.00	42.00	700.00	42.00

Profile: 3 (6 points) Material beneath: 3 - Weathered Bedrock

0.00	2.00	360.00	2.00	558.00	-1.00
612.00	-2.00	615.00	-2.00		
700.00	-2.00				

Profile: 4 (6 points) Material beneath: 4 - Unweathered Bedrock

0.00	1.00	360.00	1.00	558.00	-2.00
612.00	-3.00	615.00	-3.00		
700.00	-3.00				

Profile: 5 (5 points) Material within: 6 - Slurry Wall

612.00	45.00	615.00	45.00	615.00	-7.00
612.00	-7.00	612.00	45.00		

Profile: 6 (6 points) Material within: 5 - Reclamation Slope

549.00	45.00	534.00	45.00	450.00	17.00
517.00	17.00	534.00	34.00		
549.00	45.00				

Slope Surface (5 points)

```
      0.00       16.00         360.00       17.00         450.00       17.00
534.00       45.00         700.00       45.00

Phreatic Surface (7 points)
---------------
      0.00       16.00         360.00       17.00         450.00       17.00
525.00       39.00         612.00       40.00
    615.00       41.00         700.00       42.00

Failure Surface
---------------
Initial circular surface for critical search defined by: XL,XR,R
  Intersects:  XL:     450.00      YL:      17.00      XR:     560.00      YR:
45.00
      Centre:  XC:     446.21      YC:     261.97                  Radius:  R:
245.00

Distributed Loads (1 load)
-----------------
Load      X-Left    Pressure        X-Right   Pressure
  1       630.00      500.0         650.00      500.0

Variable Restraints
-------------------
Parameter descriptor:              XL         XR         R
Range of variation:             90.00      90.00      50.00
Trial positions within range:      20         20         50

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RESULTS: Analysis  1 - Shallower Option Rapid Drawdown

Bishop Simplified Method of Analysis - Circular Failure Surface
---------------------------------------------------------------
Critical Failure Surface Search using Multiple Circle Generation Techniques

Initial failure surface approximation - Factor of Safety:   1.824

Analysis Summary
================
There were:  15748 successful analyses from a total of 20001 trial failure surfaces
             4253 analyses terminated due to unacceptable geometry

Critical (minimum) Factor of Safety:  1.64
=======================================

Results Summary - Lowest 99 Factor of Safety circles
----------------------------------------------------
Circle    X-Left      Y-Left     X-Right     Y-Right     X-Centre    Y-Centre
Radius      FoS
   1       419.21       17.00      557.63       45.00      447.11      235.22
220.00     1.645   <-- Critical Surface
   2       423.95       17.00      557.63       45.00      447.92      235.69
220.00     1.648
   3       419.21       17.00      557.63       45.00      446.90      236.28
221.02     1.648
   4       423.95       17.00      562.37       45.00      451.85      235.22
220.00     1.648
   5       414.47       17.00      557.63       45.00      446.21      234.70
220.00     1.650
   6       419.21       17.00      557.63       45.00      446.68      237.33
222.04     1.650
```

7	419.21	17.00	562.37	45.00	450.95	234.70
220.00	1.651					
8	423.95	17.00	562.37	45.00	451.63	236.28
221.02	1.651					
9	423.95	17.00	557.63	45.00	447.70	236.74
221.02	1.651					
10	414.47	17.00	557.63	45.00	446.00	235.76
221.02	1.652					
11	419.21	17.00	562.37	45.00	450.74	235.76
221.02	1.652					
12	428.68	17.00	562.37	45.00	452.65	235.69
220.00	1.653					
13	423.95	17.00	562.37	45.00	451.42	237.33
222.04	1.653					
14	419.21	17.00	557.63	45.00	446.47	238.39
223.06	1.653					
15	423.95	17.00	557.63	45.00	447.48	237.79
222.04	1.654					
16	419.21	17.00	562.37	45.00	450.53	236.82
222.04	1.655					
17	414.47	17.00	557.63	45.00	445.80	236.82
222.04	1.655					
18	428.68	17.00	562.37	45.00	452.43	236.74
221.02	1.655					
19	423.95	17.00	562.37	45.00	451.21	238.39
223.06	1.656					
20	419.21	17.00	557.63	45.00	446.26	239.44
224.08	1.656					
21	419.21	17.00	562.37	45.00	450.33	237.88
223.06	1.656					
22	414.47	17.00	557.63	45.00	445.59	237.88
223.06	1.657					
23	423.95	17.00	557.63	45.00	447.26	238.84
223.06	1.658					
24	423.95	17.00	562.37	45.00	450.99	239.44
224.08	1.658					
25	428.68	17.00	562.37	45.00	452.21	237.79
222.04	1.658					
26	419.21	17.00	562.37	45.00	450.12	238.94
224.08	1.658					
27	428.68	17.00	557.63	45.00	448.62	236.09
220.00	1.659					
28	414.47	17.00	557.63	45.00	445.38	238.94
224.08	1.659					
29	419.21	17.00	557.63	45.00	446.04	240.50
225.10	1.659					
30	414.47	17.00	562.37	45.00	449.97	234.12
220.00	1.660					
31	423.95	17.00	562.37	45.00	450.78	240.50
225.10	1.660					
32	419.21	17.00	562.37	45.00	449.91	240.00
225.10	1.661					
33	428.68	17.00	562.37	45.00	451.99	238.84
223.06	1.661					
34	423.95	17.00	557.63	45.00	447.04	239.89
224.08	1.661					
35	414.47	17.00	562.37	45.00	449.76	235.18
221.02	1.662					
36	414.47	17.00	557.63	45.00	445.17	240.00
225.10	1.662					
37	428.68	17.00	557.63	45.00	448.40	237.14
221.02	1.663					

38	419.21	17.00	562.37	45.00	449.70	241.06	226.12	1.663
39	409.74	17.00	557.63	45.00	445.23	234.12	220.00	1.663
40	414.47	17.00	562.37	45.00	449.56	236.25	222.04	1.663
41	419.21	17.00	557.63	45.00	445.83	241.55	226.12	1.663
42	423.95	17.00	562.37	45.00	450.57	241.55	226.12	1.664
43	433.42	17.00	562.37	45.00	453.36	236.09	220.00	1.664
44	428.68	17.00	562.37	45.00	451.77	239.89	224.08	1.664
45	414.47	17.00	557.63	45.00	444.97	241.06	226.12	1.665
46	423.95	17.00	557.63	45.00	446.82	240.94	225.10	1.665
47	414.47	17.00	562.37	45.00	449.36	237.32	223.06	1.665
48	409.74	17.00	557.63	45.00	445.03	235.18	221.02	1.665
49	419.21	17.00	562.37	45.00	449.50	242.11	227.14	1.665
50	419.21	17.00	557.63	45.00	445.62	242.60	227.14	1.665
51	423.95	17.00	562.37	45.00	450.35	242.60	227.14	1.665
52	414.47	17.00	562.37	45.00	449.16	238.38	224.08	1.667
53	428.68	17.00	557.63	45.00	448.17	238.18	222.04	1.667
54	409.74	17.00	557.63	45.00	444.83	236.25	222.04	1.667
55	428.68	17.00	562.37	45.00	451.56	240.94	225.10	1.667
56	433.42	17.00	562.37	45.00	453.13	237.14	221.02	1.667
57	414.47	17.00	557.63	45.00	444.76	242.11	227.14	1.667
58	419.21	17.00	562.37	45.00	449.29	243.17	228.16	1.667
59	423.95	17.00	557.63	45.00	446.60	241.99	226.12	1.668
60	428.68	17.00	567.11	45.00	456.58	235.22	220.00	1.668
61	423.95	17.00	562.37	45.00	450.14	243.65	228.16	1.668
62	414.47	17.00	562.37	45.00	448.96	239.45	225.10	1.668
63	419.21	17.00	557.63	45.00	445.40	243.65	228.16	1.669
64	423.95	17.00	567.11	45.00	455.69	234.70	220.00	1.669
65	409.74	17.00	557.63	45.00	444.62	237.32	223.06	1.669
66	419.21	17.00	552.89	45.00	442.96	236.74	221.02	1.669
67	419.21	17.00	562.37	45.00	449.08	244.23	229.18	1.670
68	428.68	17.00	562.37	45.00	451.34	241.99	226.12	1.670

69	414.47	17.00	562.37	45.00	448.76	240.51	226.12	1.670
70	414.47	17.00	557.63	45.00	444.55	243.17	228.16	1.670
71	433.42	17.00	562.37	45.00	452.91	238.18	222.04	1.670
72	428.68	17.00	567.11	45.00	456.37	236.28	221.02	1.670
73	423.95	17.00	567.11	45.00	455.48	235.76	221.02	1.670
74	428.68	17.00	557.63	45.00	447.94	239.23	223.06	1.671
75	414.47	17.00	552.89	45.00	442.37	235.22	220.00	1.671
76	409.74	17.00	557.63	45.00	444.42	238.38	224.08	1.671
77	423.95	17.00	562.37	45.00	449.93	244.71	229.18	1.671
78	423.95	17.00	557.63	45.00	446.38	243.03	227.14	1.672
79	414.47	17.00	562.37	45.00	448.55	241.57	227.14	1.672
80	419.21	17.00	557.63	45.00	445.19	244.71	229.18	1.672
81	419.21	17.00	562.37	45.00	448.88	245.28	230.20	1.672
82	428.68	17.00	567.11	45.00	456.16	237.33	222.04	1.672
83	423.95	17.00	567.11	45.00	455.27	236.82	222.04	1.672
84	428.68	17.00	562.37	45.00	451.12	243.03	227.14	1.673
85	419.21	17.00	552.89	45.00	443.18	235.69	220.00	1.673
86	414.47	17.00	557.63	45.00	444.35	244.23	229.18	1.673
87	409.74	17.00	557.63	45.00	444.22	239.45	225.10	1.673
88	433.42	17.00	562.37	45.00	452.68	239.23	223.06	1.673
89	419.21	17.00	552.89	45.00	442.74	237.79	222.04	1.673
90	423.95	17.00	567.11	45.00	455.06	237.88	223.06	1.674
91	414.47	17.00	562.37	45.00	448.35	242.63	228.16	1.674
92	423.95	17.00	562.37	45.00	449.72	245.76	230.20	1.674
93	414.47	17.00	552.89	45.00	442.16	236.28	221.02	1.674
94	428.68	17.00	567.11	45.00	455.94	238.39	223.06	1.674
95	419.21	17.00	562.37	45.00	448.67	246.34	231.22	1.674
96	428.68	17.00	557.63	45.00	447.72	240.27	224.08	1.674
97	433.42	17.00	567.11	45.00	457.39	235.69	220.00	1.675
98	419.21	17.00	567.11	45.00	454.70	234.12	220.00	1.675
99	409.74	17.00	557.63	45.00	444.02	240.51	226.12	1.675

Critical Failure Surface (circle 1)

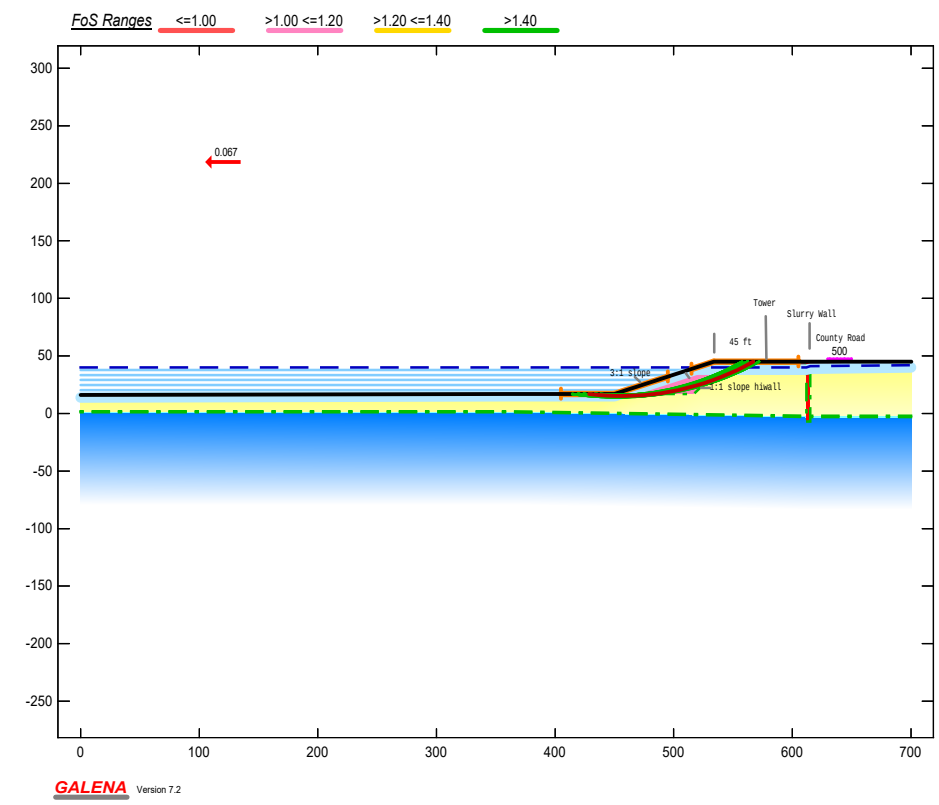
Intersects: XL: 419.21 YL: 17.00 XR: 557.63 YR: 45.00
Centre: XC: 447.11 YC: 235.22 Radius: R: 220.00
Generated failure surface: (20 points)

419.21	17.00	426.73	16.17	434.28	15.60
441.84	15.29	449.40	15.24		
456.97	15.44	464.52	15.91	472.05	16.64
479.55	17.63	487.01	18.87		
494.43	20.37	501.79	22.13	509.09	24.13
516.31	26.39	523.45	28.89		
530.50	31.64	537.45	34.63	544.30	37.85
551.02	41.31	557.63	45.00		

Slice Geometry and Properties - Critical Failure Surface (circle 1, 44 slices)

Slice	X-S	---------- Base ----------						
PoreWater	Normal	Test						
	X-Left	Area	Angle	Width	Length	Matl	Cohesion	Phi
Weight	Force	Stress	Factor					
1	419.21	0.78	-6.3	3.76	3.78	2	0.00	35.0
101.48	49.01	27.68	1.06					
2	422.97	2.34	-6.3	3.76	3.78	2	0.00	35.0
304.43	147.02	83.03	1.06					
3	426.73	3.67	-4.3	3.77	3.78	2	0.00	35.0
477.24	229.73	128.70	1.04					
4	430.50	4.75	-4.3	3.77	3.78	2	0.00	35.0
617.32	297.16	166.47	1.04					
5	434.28	5.59	-2.4	3.78	3.78	2	0.00	35.0
727.00	349.26	194.11	1.02					
6	438.06	6.18	-2.4	3.78	3.78	2	0.00	35.0
803.52	386.02	214.54	1.02					
7	441.84	6.53	-0.4	3.78	3.78	2	0.00	35.0
848.78	407.43	224.70	1.00					
8	445.62	6.63	-0.4	3.78	3.78	2	0.00	35.0
861.41	413.49	228.04	1.00					
9	449.40	1.05	1.6	0.60	0.60	2	0.00	35.0
136.42	65.51	226.91	0.99					
10	450.00	7.94	1.6	3.48	3.48	2	0.00	35.0
1010.23	480.62	288.28	0.99					
11	453.48	11.65	1.6	3.48	3.48	2	0.00	35.0
1447.85	681.83	413.14	0.99					
12	456.97	16.57	3.6	3.78	3.78	2	0.00	35.0
2032.12	952.64	530.80	0.98					
13	460.74	20.44	3.6	3.78	3.78	2	0.00	35.0
2482.56	1158.76	648.43	0.98					
14	464.52	23.99	5.5	3.77	3.78	2	0.00	35.0
2892.56	1349.24	751.86	0.96					
15	468.28	27.35	5.5	3.77	3.78	2	0.00	35.0
3276.75	1524.02	851.69	0.96					
16	472.05	21.74	7.5	2.72	2.75	2	0.00	35.0
2591.94	1207.53	924.74	0.96					
17	474.77	20.31	7.5	2.39	2.41	5	150.00	28.0
2416.50	1121.85	977.54	0.97					
18	477.16	21.46	7.5	2.39	2.41	5	150.00	28.0
2553.60	1179.99	1033.56	0.97					
19	479.55	35.57	9.5	3.73	3.78	5	150.00	28.0
4233.14	1953.69	1088.35	0.96					
20	483.28	37.89	9.5	3.73	3.78	5	150.00	28.0
4509.25	2065.24	1160.06	0.96					

```
 21      487.01     39.71    11.4      3.71     3.78     5     150.00    28.0
4725.18     2160.89      1213.80    0.96
 22      490.72     41.51    11.4      3.71     3.78     5     150.00    28.0
4939.62     2240.60      1269.38    0.96
 23      494.43     42.73    13.4      3.68     3.78     5     150.00    28.0
5085.28     2304.33      1306.35    0.95
 24      498.11     44.02    13.4      3.68     3.78     5     150.00    28.0
5238.38     2352.11      1345.88    0.95
 25      501.79     44.66    15.4      3.65     3.78     5     150.00    28.0
5314.28     2383.84      1366.34    0.95
 26      505.44     45.43    15.4      3.65     3.78     5     150.00    28.0
5406.67     2399.63      1389.93    0.95
 27      509.09     45.50    17.3      3.61     3.78     5     150.00    28.0
5414.37     2399.42      1394.12    0.95
 28      512.70     45.77    17.3      3.61     3.78     5     150.00    28.0
5446.88     2383.19      1401.91    0.95
 29      516.31     45.28    19.3      3.57     3.78     5     150.00    28.0
5388.12     2350.94      1390.11    0.95
 30      519.88     45.06    19.3      3.57     3.78     5     150.00    28.0
5362.10     2302.75      1382.25    0.95
 31      523.45     19.46    21.3      1.55     1.66     5     150.00    28.0
2315.45      994.71      1361.29    0.95
 32      525.00     34.17    21.3      2.75     2.95     2       0.00    35.0
4427.60     1654.13      1460.89    0.92
 33      527.75     33.74    21.3      2.75     2.95     2       0.00    35.0
4344.42     1462.62      1425.74    0.92
 34      530.50     24.20    23.3      2.00     2.18     2       0.00    35.0
3098.84      951.95      1376.76    0.92
 35      532.50     17.89    23.3      1.50     1.63     5     150.00    28.0
2273.26      638.98      1344.06    0.96
 36      534.00     38.35    23.3      3.45     3.76     5     150.00    28.0
4819.32     1227.39      1231.67    0.96
 37      537.45     32.74    25.2      3.42     3.78     5     150.00    28.0
4054.33      880.18      1021.53    0.96
 38      540.87     27.22    25.2      3.42     3.78     5     150.00    28.0
3303.08      508.76       818.06    0.96
 39      544.30     17.56    27.2      2.72     3.06     2       0.00    35.0
2185.24      130.75       665.97    0.92
 40      547.02     10.38    27.2      1.98     2.23     2       0.00    35.0
1261.05        0.00       522.28    0.92
 41      549.00      8.52    27.2      2.02     2.28     2       0.00    35.0
1010.64        0.00       409.49    0.92
 42      551.02      4.12    29.2      1.23     1.41     2       0.00    35.0
476.63         0.00       312.46    0.93
 43      552.26      6.05    29.2      2.69     3.08     1      50.00    28.0
689.24         0.00       202.91    0.97
 44      554.94      2.02    29.2      2.69     3.08     1      50.00    28.0
229.74         0.00        58.05    0.97
                --------                  -------                          -------
---
     X-S Area:     998.51    Path Length:    143.76              X-S Weight:
121133.83
```



Material Keys

1: Overburden
2: Sand and Gravel
3: Weathered Bedrock
4: Unweathered Bedrock
5: Reclamation Slope
6: Slurry Wall

Analysis 1

Multiple Stability Analysis

Method: Bishop Simplified

Surface: Circular

Results

Critical Factor of Safety: 1.79

Project Wattenberg Lakes, Pond 1, SE Transmission Tower
Shallower Option Seismic

File: J:\Aggregate Industries-297\Wattenberg\DRMS Stability\Stability SE\SE shallower option seismic.gmf

Edited: 25 Apr 2024 *Processed:*25 Apr 2024

Civil Resources

GALENA 7.2 Analysis Results Version: 7.2.1.05 Licensee: Civil Resources

Project: Wattenberg Lakes, Pond 1, SE Transmission Tower
File: J:\Aggregate Industries-297\Wattenberg\DRMS Stability\Stability SE\SE shallower option seismic.gmf
Processed: 25 Apr 2024 10:07:52

DATA: Analysis 1 - Shallower Option Seismic

Material Properties (6 materials)

Material: 1 (Mohr-Coulomb Isotropic) - Overburden

Cohesion	Phi	UnitWeight	Ru
50.00	28.0	114.00	Auto

Material: 2 (Mohr-Coulomb Isotropic) - Sand and Gravel

Cohesion	Phi	UnitWeight	Ru
0.00	35.0	130.00	Auto

Material: 3 (Mohr-Coulomb Isotropic) - Weathered Bedrock

Cohesion	Phi	UnitWeight	Ru
0.00	17.0	124.00	Auto

Material: 4 (Mohr-Coulomb Isotropic) - Unweathered Bedrock

Cohesion	Phi	UnitWeight	Ru
150.00	26.0	124.00	Auto

Material: 5 (Mohr-Coulomb Isotropic) - Reclamation Slope

Cohesion	Phi	UnitWeight	Ru
150.00	28.0	119.00	Auto

Material: 6 (Mohr-Coulomb Isotropic) - Slurry Wall

Cohesion	Phi	UnitWeight	Ru
0.00	0.0	110.00	Auto

Water Properties

Unit weight of water: 62.400 Unit weight of water/medium above ground: 62.400

Material Profiles (6 profiles)

Profile: 1 (2 points) Material beneath: 1 - Overburden

0.00	45.00	700.00	45.00

Profile: 2 (2 points) Material beneath: 2 - Sand and Gravel

0.00	42.00	700.00	42.00

Profile: 3 (6 points) Material beneath: 3 - Weathered Bedrock

0.00	2.00	360.00	2.00	558.00	-1.00
612.00	-2.00	615.00	-2.00		
700.00	-2.00				

Profile: 4 (6 points) Material beneath: 4 - Unweathered Bedrock

0.00	1.00	360.00	1.00	558.00	-2.00
612.00	-3.00	615.00	-3.00		
700.00	-3.00				

Profile: 5 (5 points) Material within: 6 - Slurry Wall

612.00	45.00	615.00	45.00	615.00	-7.00
612.00	-7.00	612.00	45.00		

Profile: 6 (6 points) Material within: 5 - Reclamation Slope

549.00	45.00	534.00	45.00	450.00	17.00
517.00	17.00	534.00	34.00		
549.00	45.00				

Slope Surface (5 points)

```
      0.00       16.00         360.00       17.00         450.00       17.00
534.00       45.00         700.00       45.00

Phreatic Surface (4 points)
---------------
      0.00       40.00         612.00       40.00         615.00       41.00
700.00       42.00

Failure Surface
--------------
Initial circular surface for critical search defined by: XL,XR,R
  Intersects:  XL:     450.00      YL:      17.00      XR:     560.00      YR:
45.00
      Centre:  XC:     446.21      YC:     261.97                  Radius:  R:
245.00

Distributed Loads (1 load)
-----------------
Load      X-Left    Pressure        X-Right   Pressure
  1       630.00      500.0         650.00      500.0

Earthquake Force
---------------
Pseudo-static earthquake (seismic) coefficient:  0.067

Variable Restraints
-------------------
Parameter descriptor:             XL         XR         R
Range of variation:             90.00      90.00      50.00
Trial positions within range:     20         20         50

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RESULTS: Analysis  1 - Shallower Option Seismic

Bishop Simplified Method of Analysis - Circular Failure Surface
-------------------------------------------------------------
Critical Failure Surface Search using Multiple Circle Generation Techniques

Initial failure surface approximation - Factor of Safety:   1.960

Analysis Summary
================
There were:  15748 successful analyses from a total of 20001 trial failure surfaces
             4253 analyses terminated due to unacceptable geometry

Critical (minimum) Factor of Safety:  1.79
========================================

Results Summary - Lowest 99 Factor of Safety circles
----------------------------------------------------
Circle    X-Left      Y-Left     X-Right     Y-Right     X-Centre    Y-Centre
Radius      FoS
   1       428.68       17.00      567.11       45.00      456.58      235.22
220.00     1.789   <-- Critical Surface
   2       423.95       17.00      562.37       45.00      451.85      235.22
220.00     1.791
   3       428.68       17.00      567.11       45.00      456.37      236.28
221.02     1.791
   4       428.68       17.00      567.11       45.00      456.16      237.33
222.04     1.792
```

5	433.42	17.00	567.11	45.00	457.39	235.69	220.00	1.792
6	428.68	17.00	562.37	45.00	452.65	235.69	220.00	1.792
7	423.95	17.00	562.37	45.00	451.63	236.28	221.02	1.792
8	428.68	17.00	567.11	45.00	455.94	238.39	223.06	1.794
9	433.42	17.00	567.11	45.00	457.17	236.74	221.02	1.794
10	423.95	17.00	562.37	45.00	451.42	237.33	222.04	1.794
11	419.21	17.00	562.37	45.00	450.95	234.70	220.00	1.795
12	428.68	17.00	562.37	45.00	452.43	236.74	221.02	1.795
13	428.68	17.00	567.11	45.00	455.73	239.44	224.08	1.795
14	423.95	17.00	567.11	45.00	455.69	234.70	220.00	1.795
15	433.42	17.00	567.11	45.00	456.95	237.79	222.04	1.796
16	419.21	17.00	562.37	45.00	450.74	235.76	221.02	1.796
17	423.95	17.00	562.37	45.00	451.21	238.39	223.06	1.796
18	423.95	17.00	567.11	45.00	455.48	235.76	221.02	1.796
19	428.68	17.00	567.11	45.00	455.52	240.50	225.10	1.797
20	428.68	17.00	562.37	45.00	452.21	237.79	222.04	1.797
21	433.42	17.00	567.11	45.00	456.73	238.84	223.06	1.798
22	419.21	17.00	562.37	45.00	450.53	236.82	222.04	1.798
23	423.95	17.00	567.11	45.00	455.27	236.82	222.04	1.798
24	423.95	17.00	562.37	45.00	450.99	239.44	224.08	1.798
25	423.95	17.00	567.11	45.00	455.06	237.88	223.06	1.799
26	419.21	17.00	562.37	45.00	450.33	237.88	223.06	1.799
27	428.68	17.00	567.11	45.00	455.30	241.55	226.12	1.799
28	428.68	17.00	562.37	45.00	451.99	238.84	223.06	1.799
29	433.42	17.00	567.11	45.00	456.51	239.89	224.08	1.799
30	428.68	17.00	567.11	45.00	455.09	242.60	227.14	1.800
31	423.95	17.00	567.11	45.00	454.86	238.94	224.08	1.800
32	423.95	17.00	562.37	45.00	450.78	240.50	225.10	1.800
33	419.21	17.00	562.37	45.00	450.12	238.94	224.08	1.800
34	438.16	17.00	567.11	45.00	458.10	236.09	220.00	1.800
35	423.95	17.00	567.11	45.00	454.65	240.00	225.10	1.801

36	433.42	17.00	562.37	45.00	453.36	236.09	220.00	1.801
37	433.42	17.00	567.11	45.00	456.29	240.94	225.10	1.801
38	428.68	17.00	567.11	45.00	454.88	243.65	228.16	1.801
39	419.21	17.00	562.37	45.00	449.91	240.00	225.10	1.802
40	428.68	17.00	562.37	45.00	451.77	239.89	224.08	1.802
41	423.95	17.00	567.11	45.00	454.44	241.06	226.12	1.802
42	438.16	17.00	567.11	45.00	457.87	237.14	221.02	1.802
43	423.95	17.00	562.37	45.00	450.57	241.55	226.12	1.803
44	433.42	17.00	567.11	45.00	456.07	241.99	226.12	1.803
45	428.68	17.00	567.11	45.00	454.67	244.71	229.18	1.803
46	419.21	17.00	562.37	45.00	449.70	241.06	226.12	1.803
47	423.95	17.00	567.11	45.00	454.23	242.11	227.14	1.804
48	423.95	17.00	562.37	45.00	450.35	242.60	227.14	1.804
49	433.42	17.00	562.37	45.00	453.13	237.14	221.02	1.804
50	419.21	17.00	557.63	45.00	447.11	235.22	220.00	1.804
51	428.68	17.00	562.37	45.00	451.56	240.94	225.10	1.804
52	419.21	17.00	567.11	45.00	454.70	234.12	220.00	1.804
53	438.16	17.00	567.11	45.00	457.64	238.18	222.04	1.805
54	433.42	17.00	567.11	45.00	455.85	243.03	227.14	1.805
55	423.95	17.00	567.11	45.00	454.03	243.17	228.16	1.805
56	428.68	17.00	567.11	45.00	454.45	245.76	230.20	1.805
57	419.21	17.00	562.37	45.00	449.50	242.11	227.14	1.805
58	419.21	17.00	567.11	45.00	454.50	235.18	221.02	1.805
59	423.95	17.00	557.63	45.00	447.92	235.69	220.00	1.805
60	414.47	17.00	562.37	45.00	449.97	234.12	220.00	1.806
61	419.21	17.00	567.11	45.00	454.30	236.25	222.04	1.806
62	423.95	17.00	562.37	45.00	450.14	243.65	228.16	1.806
63	419.21	17.00	557.63	45.00	446.90	236.28	221.02	1.806
64	433.42	17.00	571.84	45.00	461.32	235.22	220.00	1.806
65	423.95	17.00	567.11	45.00	453.82	244.23	229.18	1.806
66	414.47	17.00	562.37	45.00	449.76	235.18	221.02	1.806

67	433.42	17.00	562.37	45.00	452.91	238.18	222.04	1.807
68	419.21	17.00	567.11	45.00	454.10	237.32	223.06	1.807
69	433.42	17.00	567.11	45.00	455.63	244.08	228.16	1.807
70	428.68	17.00	562.37	45.00	451.34	241.99	226.12	1.807
71	419.21	17.00	562.37	45.00	449.29	243.17	228.16	1.807
72	428.68	17.00	567.11	45.00	454.24	246.81	231.22	1.807
73	438.16	17.00	567.11	45.00	457.42	239.23	223.06	1.807
74	433.42	17.00	571.84	45.00	461.11	236.28	221.02	1.807
75	419.21	17.00	567.11	45.00	453.90	238.38	224.08	1.807
76	414.47	17.00	562.37	45.00	449.56	236.25	222.04	1.807
77	423.95	17.00	567.11	45.00	453.61	245.28	230.20	1.808
78	419.21	17.00	567.11	45.00	453.69	239.45	225.10	1.808
79	423.95	17.00	557.63	45.00	447.70	236.74	221.02	1.808
80	423.95	17.00	562.37	45.00	449.93	244.71	229.18	1.808
81	433.42	17.00	571.84	45.00	460.89	237.33	222.04	1.808
82	414.47	17.00	562.37	45.00	449.36	237.32	223.06	1.808
83	419.21	17.00	557.63	45.00	446.68	237.33	222.04	1.808
84	419.21	17.00	562.37	45.00	449.08	244.23	229.18	1.809
85	428.68	17.00	567.11	45.00	454.03	247.86	232.24	1.809
86	419.21	17.00	567.11	45.00	453.49	240.51	226.12	1.809
87	428.68	17.00	562.37	45.00	451.12	243.03	227.14	1.809
88	438.16	17.00	567.11	45.00	457.19	240.27	224.08	1.809
89	438.16	17.00	571.84	45.00	462.13	235.69	220.00	1.809
90	423.95	17.00	567.11	45.00	453.41	246.34	231.22	1.809
91	414.47	17.00	557.63	45.00	446.21	234.70	220.00	1.809
92	428.68	17.00	571.84	45.00	460.42	234.70	220.00	1.809
93	433.42	17.00	562.37	45.00	452.68	239.23	223.06	1.809
94	433.42	17.00	571.84	45.00	460.68	238.39	223.06	1.809
95	433.42	17.00	567.11	45.00	455.41	245.13	229.18	1.809
96	414.47	17.00	562.37	45.00	449.16	238.38	224.08	1.810
97	428.68	17.00	571.84	45.00	460.21	235.76	221.02	1.810

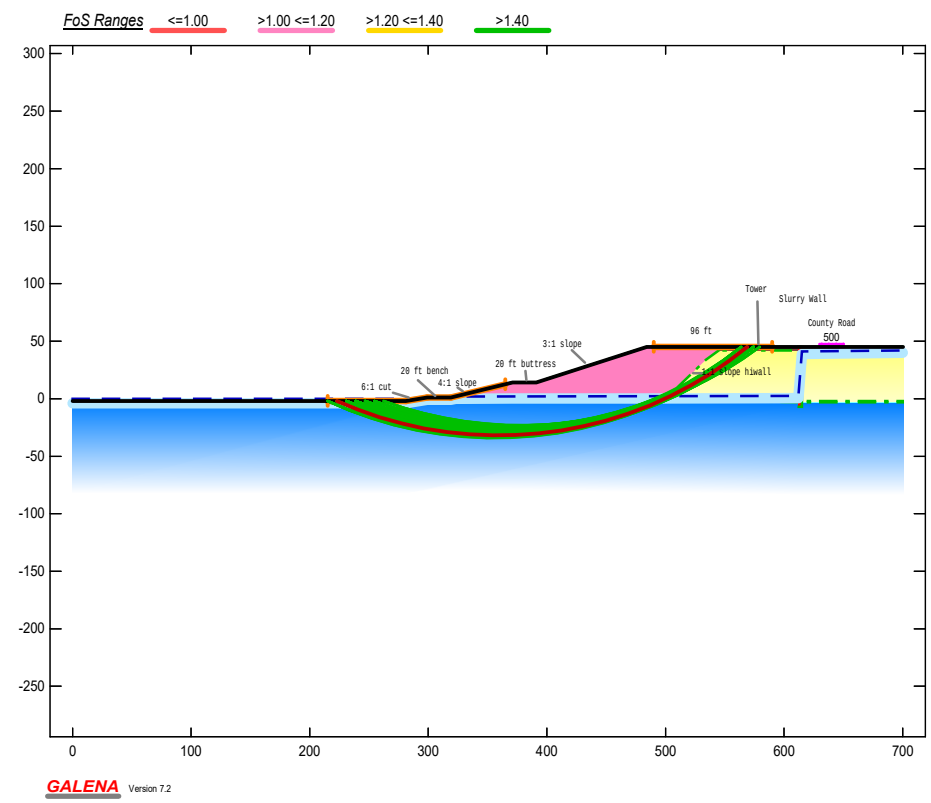
```
  98       419.21       17.00      567.11       45.00      453.29      241.57
227.14     1.810
  99       419.21       17.00      562.37       45.00      448.88      245.28
230.20     1.810

Critical Failure Surface (circle 1)
-----------------------
Intersects:  XL:     428.68      YL:      17.00      XR:     567.11      YR:
45.00
    Centre:  XC:     456.58      YC:     235.22                  Radius:  R:
220.00
Generated failure surface: (20 points)
    428.68     17.00          436.20     16.17          443.75     15.60
451.31     15.29          458.88     15.24
    466.44     15.44          473.99     15.91          481.52     16.64
489.02     17.63          496.49     18.87
    503.90     20.37          511.26     22.13          518.56     24.13
525.78     26.39          532.92     28.89
    539.97     31.64          546.92     34.63          553.77     37.85
560.50     41.31          567.11     45.00

Slice Geometry and Properties - Critical Failure Surface (circle 1,  45 slices)
-------------------------------------------------------
Slice                X-S     ------------------- Base ---------------------
PoreWater      Normal    Test
        X-Left      Area    Angle    Width    Length  Matl   Cohesion    Phi
Weight      Force        Stress   Factor
  1      428.68      0.78    -6.3     3.76     3.78     2       0.00    35.0
101.48     5478.69      1462.82    1.05
  2      432.44      2.34    -6.3     3.76     3.78     2       0.00    35.0
304.43     5576.74      1518.06    1.05
  3      436.20      3.67    -4.3     3.77     3.78     2       0.00    35.0
477.24     5659.33      1563.72    1.03
  4      439.98      4.75    -4.3     3.77     3.78     2       0.00    35.0
617.32     5726.80      1601.44    1.03
  5      443.75      4.58    -2.4     3.13     3.13     2       0.00    35.0
595.57     4775.09      1627.40    1.02
  6      446.87      4.98    -2.4     3.13     3.13     2       0.00    35.0
647.87     4800.22      1644.28    1.02
  7      450.00      2.49    -2.4     1.31     1.31     2       0.00    35.0
321.12     2019.36      1668.81    1.02
  8      451.31     10.57    -0.4     3.78     3.78     2       0.00    35.0
1329.20     5837.12      1720.43    1.00
  9      455.09     15.43    -0.4     3.78     3.78     2       0.00    35.0
1909.56     5843.22      1795.34    1.00
 10      458.88     20.05     1.6     3.78     3.78     2       0.00    35.0
2456.86     5833.80      1857.50    0.99
 11      462.66     24.42     1.6     3.78     3.78     2       0.00    35.0
2972.80     5809.14      1914.58    0.99
 12      466.44     28.50     3.6     3.78     3.78     2       0.00    35.0
3451.09     5769.23      1957.44    0.98
 13      470.22     32.37     3.6     3.78     3.78     2       0.00    35.0
3901.52     5713.83      1996.88    0.98
 14      473.99     35.88     5.5     3.77     3.78     2       0.00    35.0
4307.66     5643.24      2020.91    0.97
 15      477.76     39.24     5.5     3.77     3.78     2       0.00    35.0
4691.84     5557.22      2042.92    0.97
 16      481.52     30.33     7.5     2.72     2.75     2       0.00    35.0
3615.19     3972.27      2047.94    0.96
 17      484.25     27.85     7.5     2.39     2.41     5     150.00    28.0
3314.45     3435.27      2049.71    0.97
 18      486.64     29.00     7.5     2.39     2.41     5     150.00    28.0
3451.53     3388.00      2056.36    0.97
```

```
 19      489.02     47.36     9.5     3.73     3.78     5     150.00    28.0
5635.46     5207.79      2047.62    0.97
 20      492.76     49.68     9.5     3.73     3.78     5     150.00    28.0
5911.58     5060.93      2042.33    0.97
 21      496.49     51.42    11.4     3.71     3.78     5     150.00    28.0
6118.66     4899.02      2019.25    0.96
 22      500.20     53.22    11.4     3.71     3.78     5     150.00    28.0
6333.09     4721.94      1998.39    0.96
 23      503.90     54.35    13.4     3.68     3.78     5     150.00    28.0
6468.26     4529.86      1959.38    0.96
 24      507.58     55.64    13.4     3.68     3.78     5     150.00    28.0
6621.34     4322.79      1923.12    0.96
 25      511.26     56.18    15.4     3.65     3.78     5     150.00    28.0
6685.06     4100.77      1868.46    0.96
 26      514.91     56.95    15.4     3.65     3.78     5     150.00    28.0
6777.48     3863.98      1816.99    0.96
 27      518.56     50.72    17.3     3.22     3.37     5     150.00    28.0
6036.20     3233.94      1772.89    0.96
 28      521.78     50.94    17.3     3.22     3.37     5     150.00    28.0
6062.18     3022.27      1774.91    0.96
 29      525.00     12.41    17.3     0.78     0.82     2       0.00    35.0
1612.33      702.40      1929.60    0.93
 30      525.78     14.84    19.3     0.94     0.99     2       0.00    35.0
1924.47      831.58      1910.60    0.93
 31      526.72     49.11    19.3     3.10     3.29     5     150.00    28.0
6312.52     2613.34      1891.02    0.96
 32      529.82     48.94    19.3     3.10     3.29     5     150.00    28.0
6186.78     2390.17      1847.95    0.96
 33      532.92     16.93    21.3     1.08     1.16     5     150.00    28.0
2115.88      786.09      1801.78    0.96
 34      534.00     45.11    21.3     2.99     3.21     5     150.00    28.0
5595.14     2021.12      1715.25    0.96
 35      536.99     41.64    21.3     2.99     3.21     5     150.00    28.0
5109.63     1788.38      1562.02    0.96
 36      539.97     43.84    23.3     3.48     3.78     5     150.00    28.0
5306.58     1797.22      1375.67    0.97
 37      543.45     38.65    23.3     3.48     3.78     2       0.00    35.0
4905.88     1444.53      1263.20    0.93
 38      546.92     20.51    25.2     2.08     2.29     2       0.00    35.0
2574.92      699.11      1094.88    0.93
 39      549.00     21.06    25.2     2.38     2.64     2       0.00    35.0
2623.39      630.33       966.12    0.93
 40      551.38     18.38    25.2     2.38     2.64     2       0.00    35.0
2275.09      445.51       831.88    0.93
 41      553.77     25.37    27.2     4.18     4.70     2       0.00    35.0
3097.30      314.54       628.59    0.94
 42      557.95     11.09    27.2     2.55     2.87     2       0.00    35.0
1319.05        0.00       430.20    0.94
 43      560.50      4.12    29.2     1.23     1.41     2       0.00    35.0
476.63         0.00       317.39    0.94
 44      561.73      6.05    29.2     2.69     3.08     1      50.00    28.0
689.23         0.00       206.63    0.98
 45      564.42      2.02    29.2     2.69     3.08     1      50.00    28.0
229.75         0.00        59.96    0.98
                --------                  -------                          -------
---
     X-S Area:    1263.77    Path Length:    143.76              X-S Weight:
153470.61
```

Southeast Tower Deeper



Project Wattenberg Lakes, Pond 1, SE Transmission Tower
Deeper Option Post Construction

File: J:\Aggregate Industries-297\Wattenberg\DRMS Stability\Stability SE\more fill SE deeper option post construction.gmf

Material Keys

1: Overburden
2: Sand and Gravel
3: Weathered Bedrock
4: Unweathered Bedrock
5: Reclamation Slope
6: Slurry Wall

Analysis 1

Multiple Stability Analysis
Method: Bishop Simplified
Surface: Circular

Results

Critical Factor of Safety: 1.79

Edited: 3 May 2024 *Processed:* 3 May 2024

Civil Resources

GALENA 7.2 Analysis Results Version: 7.2.1.05 Licensee: Civil Resources

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Project: Wattenberg Lakes, Pond 1, SE Transmission Tower
File: J:\Aggregate Industries-297\Wattenberg\DRMS Stability\Stability SE\more fill SE deeper option post construction.gmf
Processed: 03 May 2024 09:13:12

DATA: Analysis 1 - Deeper Option Post Construction

Material Properties (6 materials)

Material: 1 (Mohr-Coulomb Isotropic) - Overburden

Cohesion	Phi	UnitWeight	Ru
50.00	28.0	114.00	Auto

Material: 2 (Mohr-Coulomb Isotropic) - Sand and Gravel

Cohesion	Phi	UnitWeight	Ru
0.00	35.0	130.00	Auto

Material: 3 (Mohr-Coulomb Isotropic) - Weathered Bedrock

Cohesion	Phi	UnitWeight	Ru
0.00	17.0	124.00	Auto

Material: 4 (Mohr-Coulomb Isotropic) - Unweathered Bedrock

Cohesion	Phi	UnitWeight	Ru
150.00	26.0	124.00	Auto

Material: 5 (Mohr-Coulomb Isotropic) - Reclamation Slope

Cohesion	Phi	UnitWeight	Ru
150.00	28.0	119.00	Auto

Material: 6 (Mohr-Coulomb Isotropic) - Slurry Wall

Cohesion	Phi	UnitWeight	Ru
0.00	0.0	110.00	Auto

Water Properties

Unit weight of water: 62.400 Unit weight of water/medium above ground: 62.400

Material Profiles (6 profiles)

Profile: 1 (2 points) Material beneath: 1 - Overburden

0.00	45.00	700.00	45.00

Profile: 2 (2 points) Material beneath: 2 - Sand and Gravel

0.00	42.00	700.00	42.00

Profile: 3 (6 points) Material beneath: 3 - Weathered Bedrock

0.00	2.00	360.00	2.00	558.00	-1.00
612.00	-2.00	615.00	-2.00		
700.00	-2.00				

Profile: 4 (6 points) Material beneath: 4 - Unweathered Bedrock

0.00	1.00	360.00	1.00	558.00	-2.00
612.00	-3.00	615.00	-3.00		
700.00	-3.00				

Profile: 5 (5 points) Material within: 6 - Slurry Wall

612.00	45.00	615.00	45.00	615.00	-7.00
612.00	-7.00	612.00	45.00		

Profile: 6 (10 points) Material within: 5 - Reclamation Slope

549.00	45.00	484.00	45.00	391.00	14.00
371.00	14.00	319.00	1.00		
319.00	-1.00	500.00	-1.00	500.00	0.00
534.00	34.00	549.00	45.00		

Slope Surface (8 points)

```
-------------
      0.00       -2.00         281.00       -2.00         299.00        1.00
319.00        1.00         371.00       14.00
    391.00       14.00         484.00       45.00         700.00       45.00

Phreatic Surface (7 points)
----------------
      0.00        0.00         281.00        0.00         299.00        1.00
319.00        2.00         612.00        2.50
    615.00       41.00         700.00       42.00

Failure Surface
---------------
Initial circular surface for critical search defined by: XL,XR,R
  Intersects:  XL:     290.00      YL:      -0.50      XR:     540.00      YR:
45.00
      Centre:  XC:     356.60      YC:     343.10                  Radius:  R:
350.00

Distributed Loads (1 load)
------------------
Load      X-Left    Pressure        X-Right   Pressure
  1       630.00      500.0         650.00      500.0

Variable Restraints
--------------------
Parameter descriptor:              XL         XR         R
Range of variation:             150.00     100.00      50.00
Trial positions within range:      20         20         50

-  --  --  --  --  --  --  --  --  --  --  --  --  --  --  --  --  --  --  --  --  --  --
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RESULTS: Analysis  1 - Deeper Option Post Construction

Bishop Simplified Method of Analysis - Circular Failure Surface
---------------------------------------------------------------
Critical Failure Surface Search using Multiple Circle Generation Techniques

Initial failure surface approximation - Factor of Safety:   2.198

Analysis Summary
================
There were:  19741 successful analyses from a total of 20001 trial failure surfaces
             260 analyses terminated due to unacceptable geometry

Critical (minimum) Factor of Safety:  1.79
==========================================

Results Summary - Lowest 99 Factor of Safety circles
----------------------------------------------------
Circle    X-Left      Y-Left     X-Right     Y-Right     X-Centre    Y-Centre
Radius      FoS
   1       222.89       -2.00      568.95       45.00      359.03      293.11
325.00     1.788   <-- Critical Surface
   2       230.79       -2.00      568.95       45.00      361.80      295.43
325.00     1.790
   3       222.89       -2.00      568.95       45.00      358.87      294.31
326.02     1.791
   4       230.79       -2.00      568.95       45.00      361.63      296.61
326.02     1.792
   5       222.89       -2.00      568.95       45.00      358.71      295.51
327.04     1.794
```

6	222.89	-2.00	568.95	45.00	358.54	296.70	328.06	1.797
7	230.79	-2.00	568.95	45.00	361.47	297.80	327.04	1.799
8	238.68	-2.00	568.95	45.00	364.52	297.65	325.00	1.801
9	222.89	-2.00	568.95	45.00	358.38	297.90	329.08	1.801
10	230.79	-2.00	568.95	45.00	361.30	298.98	328.06	1.802
11	254.47	-2.00	574.21	45.00	373.33	300.49	325.00	1.804
12	238.68	-2.00	574.21	45.00	367.97	296.18	325.00	1.804
13	222.89	-2.00	568.95	45.00	358.22	299.09	330.10	1.804
14	238.68	-2.00	568.95	45.00	364.35	298.83	326.02	1.804
15	238.68	-2.00	574.21	45.00	367.81	297.36	326.02	1.804
16	230.79	-2.00	568.95	45.00	361.14	300.17	329.08	1.806
17	238.68	-2.00	574.21	45.00	367.31	300.90	329.08	1.806
18	254.47	-2.00	574.21	45.00	373.16	301.65	326.02	1.807
19	238.68	-2.00	574.21	45.00	367.14	302.08	330.10	1.807
20	238.68	-2.00	574.21	45.00	367.47	299.72	328.06	1.807
21	222.89	-2.00	568.95	45.00	358.06	300.28	331.12	1.807
22	238.68	-2.00	574.21	45.00	366.98	303.26	331.12	1.808
23	238.68	-2.00	568.95	45.00	364.18	300.00	327.04	1.808
24	238.68	-2.00	574.21	45.00	367.64	298.54	327.04	1.808
25	230.79	-2.00	568.95	45.00	360.97	301.35	330.10	1.809
26	254.47	-2.00	574.21	45.00	372.99	302.81	327.04	1.809
27	230.79	-2.00	568.95	45.00	360.81	302.53	331.12	1.809
28	222.89	-2.00	568.95	45.00	357.90	301.47	332.14	1.810
29	246.58	-2.00	574.21	45.00	369.50	306.56	332.14	1.811
30	222.89	-2.00	568.95	45.00	357.74	302.66	333.16	1.811
31	238.68	-2.00	568.95	45.00	364.01	301.18	328.06	1.811
32	238.68	-2.00	574.21	45.00	366.81	304.43	332.14	1.813
33	230.79	-2.00	568.95	45.00	360.65	303.71	332.14	1.813
34	246.58	-2.00	574.21	45.00	369.33	307.72	333.16	1.814
35	238.68	-2.00	574.21	45.00	366.65	305.61	333.16	1.815
36	238.68	-2.00	568.95	45.00	363.85	302.35	329.08	1.815

37	230.79	-2.00	568.95	45.00	360.48	304.88	333.16	1.817
38	254.47	-2.00	574.21	45.00	372.82	303.97	328.06	1.817
39	246.58	-2.00	574.21	45.00	370.68	298.37	325.00	1.817
40	238.68	-2.00	574.21	45.00	366.49	306.78	334.18	1.817
41	222.89	-2.00	568.95	45.00	357.57	303.84	334.18	1.817
42	238.68	-2.00	568.95	45.00	363.68	303.52	330.10	1.818
43	230.79	-2.00	574.21	45.00	365.22	293.89	325.00	1.819
44	238.68	-2.00	574.21	45.00	366.32	307.95	335.20	1.819
45	230.79	-2.00	568.95	45.00	360.32	306.06	334.18	1.820
46	222.89	-2.00	568.95	45.00	357.41	305.03	335.20	1.821
47	246.58	-2.00	574.21	45.00	370.51	299.55	326.02	1.821
48	254.47	-2.00	574.21	45.00	372.65	305.13	329.08	1.821
49	230.79	-2.00	574.21	45.00	365.06	295.09	326.02	1.822
50	238.68	-2.00	574.21	45.00	366.16	309.12	336.22	1.822
51	262.37	-2.00	579.47	45.00	378.78	305.80	329.08	1.822
52	215.00	-2.00	563.68	45.00	352.84	292.32	325.00	1.822
53	246.58	-2.00	568.95	45.00	367.19	299.79	325.00	1.822
54	238.68	-2.00	568.95	45.00	363.51	304.69	331.12	1.822
55	222.89	-2.00	563.68	45.00	355.62	294.66	325.00	1.822
56	246.58	-2.00	568.95	45.00	367.02	300.96	326.02	1.823
57	230.79	-2.00	574.21	45.00	364.89	296.28	327.04	1.824
58	215.00	-2.00	568.95	45.00	354.47	303.93	336.22	1.824
59	230.79	-2.00	568.95	45.00	360.15	307.24	335.20	1.824
60	238.68	-2.00	574.21	45.00	365.99	310.29	337.24	1.824
61	222.89	-2.00	568.95	45.00	357.25	306.21	336.22	1.824
62	262.37	-2.00	579.47	45.00	378.61	306.96	330.10	1.824
63	246.58	-2.00	574.21	45.00	370.34	300.72	327.04	1.824
64	246.58	-2.00	568.95	45.00	366.85	302.12	327.04	1.825
65	246.58	-2.00	574.21	45.00	369.00	310.05	335.20	1.825
66	246.58	-2.00	574.21	45.00	369.17	308.89	334.18	1.825
67	215.00	-2.00	563.68	45.00	352.68	293.52	326.02	1.825

68	238.68	-2.00	574.21	45.00	365.50	313.79	340.31	1.825
69	254.47	-2.00	574.21	45.00	372.48	306.29	330.10	1.825
70	230.79	-2.00	574.21	45.00	364.73	297.47	328.06	1.826
71	222.89	-2.00	563.68	45.00	355.45	295.86	326.02	1.826
72	238.68	-2.00	568.95	45.00	363.35	305.86	332.14	1.826
73	246.58	-2.00	568.95	45.00	366.68	303.29	328.06	1.826
74	238.68	-2.00	574.21	45.00	365.83	311.46	338.27	1.826
75	215.00	-2.00	568.95	45.00	354.31	305.13	337.24	1.827
76	262.37	-2.00	579.47	45.00	378.44	308.11	331.12	1.827
77	230.79	-2.00	568.95	45.00	359.99	308.41	336.22	1.827
78	230.79	-2.00	574.21	45.00	364.57	298.66	329.08	1.827
79	238.68	-2.00	574.21	45.00	365.34	314.96	341.33	1.827
80	222.89	-2.00	568.95	45.00	357.09	307.40	337.24	1.828
81	230.79	-2.00	563.68	45.00	358.35	296.92	325.00	1.828
82	230.79	-2.00	574.21	45.00	364.41	299.85	330.10	1.828
83	246.58	-2.00	574.21	45.00	370.17	301.89	328.06	1.828
84	215.00	-2.00	563.68	45.00	352.51	294.73	327.04	1.828
85	230.79	-2.00	574.21	45.00	364.24	301.04	331.12	1.829
86	222.89	-2.00	563.68	45.00	355.29	297.04	327.04	1.829
87	246.58	-2.00	568.95	45.00	366.51	304.45	329.08	1.829
88	230.79	-2.00	574.21	45.00	364.08	302.22	332.14	1.829
89	238.68	-2.00	574.21	45.00	365.67	312.63	339.29	1.829
90	238.68	-2.00	568.95	45.00	363.18	307.03	333.16	1.829
91	238.68	-2.00	574.21	45.00	365.18	316.12	342.35	1.830
92	230.79	-2.00	574.21	45.00	363.92	303.41	333.16	1.830
93	254.47	-2.00	574.21	45.00	372.31	307.45	331.12	1.830
94	215.00	-2.00	568.95	45.00	356.23	290.71	325.00	1.830
95	215.00	-2.00	568.95	45.00	354.15	306.32	338.27	1.830
96	230.79	-2.00	568.95	45.00	359.83	309.58	337.24	1.830
97	246.58	-2.00	574.21	45.00	368.83	311.21	336.22	1.830
98	222.89	-2.00	568.95	45.00	356.93	308.58	338.27	1.831

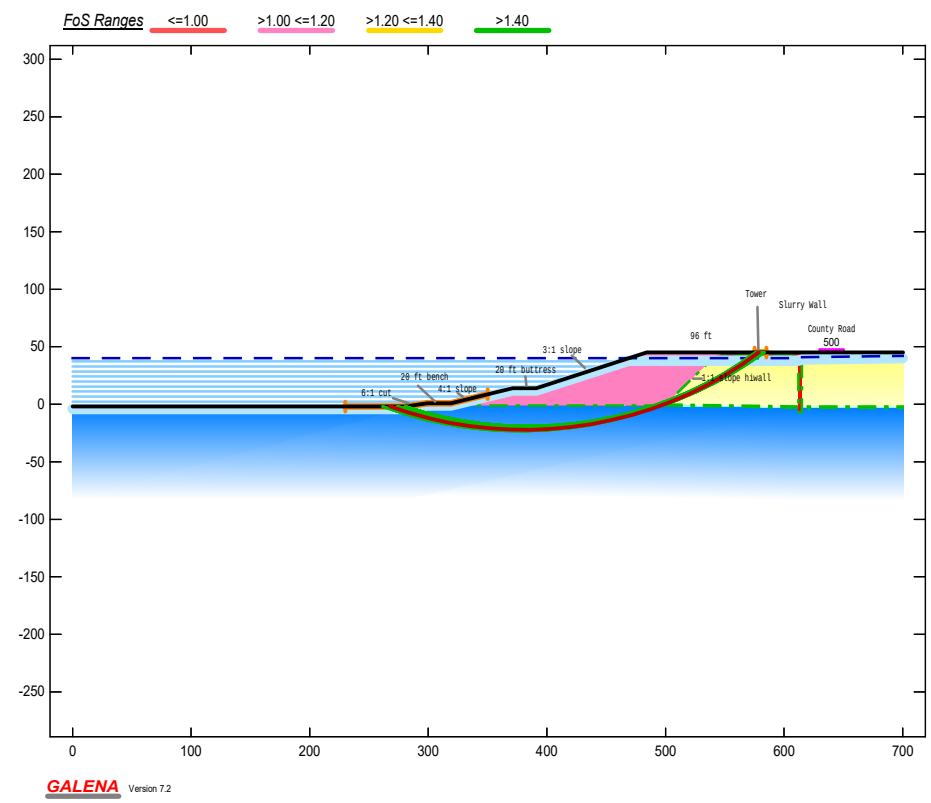
```
  99       215.00       -2.00      568.95       45.00      356.06      291.92
326.02     1.831

Critical Failure Surface (circle 1)
-----------------------
Intersects:  XL:     222.89      YL:      -2.00      XR:     568.95      YR:
45.00
    Centre:  XC:     359.03      YC:     293.11                  Radius:  R:
325.00
Generated failure surface: (20 points)
    222.89     -2.00          240.75     -9.60          259.02    -16.12
277.65    -21.53          296.57    -25.83
    315.71    -28.99          335.01    -31.00          354.39    -31.85
373.79    -31.55          393.14    -30.09
    412.36    -27.48          431.40    -23.73          450.18    -18.84
468.63    -12.85          486.69     -5.77
    504.30      2.38          521.39     11.57          537.90     21.76
553.77     32.92          568.95     45.00

Slice Geometry and Properties - Critical Failure Surface (circle 1,  48 slices)
-----------------------------------------------------------
Slice                X-S     ------------------- Base ---------------------
PoreWater      Normal    Test
        X-Left      Area    Angle    Width    Length  Matl   Cohesion    Phi
Weight      Force        Stress   Factor
  1      222.89     16.95   -23.1     8.93     9.70     4     150.00    26.0
2102.29     2360.40       416.09    1.23
  2      231.82     50.86   -23.1     8.93     9.70     4     150.00    26.0
6306.85     4659.89       917.87    1.23
  3      240.75     84.31   -19.6     9.14     9.70     4     150.00    26.0
10454.00     6796.07      1363.41    1.18
  4      249.88    114.09   -19.6     9.14     9.70     4     150.00    26.0
14146.71     8769.04      1789.21    1.18
  5      259.02    144.11   -16.2     9.32     9.70     4     150.00    26.0
17869.12    10575.23      2151.72    1.13
  6      268.34    169.33   -16.2     9.32     9.70     4     150.00    26.0
20997.42    12214.66      2501.93    1.13
  7      277.65     66.70   -12.8     3.35     3.43     4     150.00    26.0
8270.60     4696.54      2695.31    1.09
  8      281.00    169.92   -12.8     7.79     7.98     4     150.00    26.0
21070.01    11653.65      2913.28    1.09
  9      288.79    193.78   -12.8     7.79     7.98     4     150.00    26.0
24028.89    12749.60      3251.83    1.09
 10      296.57     65.17    -9.4     2.43     2.46     4     150.00    26.0
8081.40     4142.50      3427.26    1.06
 11      299.00    233.30    -9.4     8.36     8.47     4     150.00    26.0
28929.56    14865.38      3570.50    1.06
 12      307.36    244.83    -9.4     8.36     8.47     4     150.00    26.0
30358.54    15815.03      3771.57    1.06
 13      315.71     99.12    -5.9     3.29     3.30     4     150.00    26.0
12291.49     6408.15      3860.24    1.03
 14      319.00    124.15    -5.9     4.00     4.02     5     150.00    28.0
14814.00     7915.32      3800.44    1.04
 15      323.00    197.03    -5.9     6.01     6.04     3       0.00    17.0
24408.89    12082.79      4102.09    1.02
 16      329.01    209.80    -5.9     6.01     6.04     3       0.00    17.0
25947.71    12322.41      4362.27    1.02
 17      335.01    362.70    -2.5     9.69     9.70     3       0.00    17.0
44770.98    20125.43      4639.08    1.01
 18      344.70    390.33    -2.5     9.69     9.70     3       0.00    17.0
48079.51    20394.53      4982.84    1.01
 19      354.39    237.51     0.9     5.61     5.61     3       0.00    17.0
29211.64    11853.72      5201.54    1.00
```

20	360.00	487.36	0.9	11.00	11.00	3	0.00	17.0
59843.75	23175.57	5431.48	1.00					
21	371.00	127.24	0.9	2.79	2.79	3	0.00	17.0
15607.90	5865.82	5580.84	1.00					
22	373.79	389.13	4.3	8.60	8.63	3	0.00	17.0
47724.09	17944.03	5502.60	0.99					
23	382.40	383.55	4.3	8.60	8.63	3	0.00	17.0
47026.07	17602.52	5422.00	0.99					
24	391.00	95.23	4.3	2.14	2.14	3	0.00	17.0
11670.92	4322.18	5413.56	0.99					
25	393.14	439.81	7.7	9.61	9.70	3	0.00	17.0
53820.96	19112.54	5516.69	0.99					
26	402.75	458.06	7.7	9.61	9.70	3	0.00	17.0
55922.99	18332.19	5728.58	0.99					
27	412.36	468.73	11.2	9.52	9.70	3	0.00	17.0
57096.48	17378.88	5861.86	0.99					
28	421.88	481.07	11.2	9.52	9.70	3	0.00	17.0
58467.71	16252.64	5997.45	0.99					
29	431.40	483.86	14.6	9.39	9.70	3	0.00	17.0
58675.76	14955.48	6049.28	0.99					
30	440.79	490.32	14.6	9.39	9.70	3	0.00	17.0
59323.33	13487.35	6108.87	0.99					
31	450.18	485.37	18.0	9.23	9.70	3	0.00	17.0
58585.54	11850.85	6080.07	1.00					
32	459.40	486.10	18.0	9.23	9.70	3	0.00	17.0
58526.80	10046.11	6064.23	1.00					
33	468.63	334.79	21.4	6.37	6.85	3	0.00	17.0
40219.57	5920.50	5969.17	1.01					
34	475.00	468.77	21.4	9.00	9.67	3	0.00	17.0
60317.52	6550.94	6323.22	1.01					
35	484.00	137.94	21.4	2.69	2.89	3	0.00	17.0
17740.48	1546.02	6215.63	1.01					
36	486.69	490.81	24.8	10.14	11.17	3	0.00	17.0
63262.43	3982.69	5809.30	1.02					
37	496.83	95.37	24.8	2.09	2.31	3	0.00	17.0
12322.41	416.30	5471.71	1.02					
38	498.92	81.31	24.8	1.82	2.01	2	0.00	35.0
10509.85	249.27	4908.49	0.93					
39	500.74	148.25	24.8	3.41	3.76	5	150.00	28.0
19125.34	184.38	4901.55	0.97					
40	504.15	348.02	28.2	8.62	9.78	5	150.00	28.0
44593.97	0.00	4423.51	0.98					
41	512.77	308.08	28.3	8.62	9.79	5	150.00	28.0
39024.97	0.00	3864.89	0.98					
42	521.39	198.58	31.7	6.31	7.41	5	150.00	28.0
24842.08	0.00	3283.97	0.99					
43	527.69	174.02	31.7	6.31	7.41	5	150.00	28.0
21482.72	0.00	2833.97	0.99					
44	534.00	95.22	31.7	3.90	4.58	5	150.00	28.0
11612.23	0.00	2474.83	0.99					
45	537.90	214.73	35.1	11.10	13.57	5	150.00	28.0
25683.99	0.00	1864.26	1.01					
46	549.00	65.61	35.1	4.77	5.83	2	0.00	35.0
8300.63	0.00	1364.94	0.96					
47	553.77	86.05	38.5	11.41	14.58	2	0.00	35.0
10639.22	0.00	710.79	0.97					
48	565.18	5.65	38.5	3.77	4.82	1	50.00	28.0
644.42	0.00	120.26	1.03					

X-S Area: 11703.02 Path Length: 368.63 X-S Weight: 1444753.88



Project Wattenberg Lakes, Pond 1, SE Transmission Tower
Deeper Option Static, Full Reservoir

File: J:\Aggregate Industries-297\Wattenberg\DRMS Stability\Stability SE\more fill SE deeper option full reservoir.gmf

Material Keys

1: Overburden
2: Sand and Gravel
3: Weathered Bedrock
4: Unweathered Bedrock
5: Reclamation Slope
6: Slurry Wall

Analysis 1

Multiple Stability Analysis
Method: Bishop Simplified
Surface: Circular

Results

Critical Factor of Safety: 2.17

Edited: 3 May 2024 *Processed:* 3 May 2024

Civil Resources

GALENA 7.2 Analysis Results Version: 7.2.1.05 Licensee: Civil Resources

Project: Wattenberg Lakes, Pond 1, SE Transmission Tower
File: J:\Aggregate Industries-297\Wattenberg\DRMS Stability\Stability SE\more fill SE deeper option full reservoir.gmf
Processed: 03 May 2024 08:26:03

DATA: Analysis 1 - Deeper Option Static, Full Reservoir

Material Properties (6 materials)

Material: 1 (Mohr-Coulomb Isotropic) - Overburden

Cohesion	Phi	UnitWeight	Ru
50.00	28.0	114.00	Auto

Material: 2 (Mohr-Coulomb Isotropic) - Sand and Gravel

Cohesion	Phi	UnitWeight	Ru
0.00	35.0	130.00	Auto

Material: 3 (Mohr-Coulomb Isotropic) - Weathered Bedrock

Cohesion	Phi	UnitWeight	Ru
0.00	17.0	124.00	Auto

Material: 4 (Mohr-Coulomb Isotropic) - Unweathered Bedrock

Cohesion	Phi	UnitWeight	Ru
150.00	26.0	124.00	Auto

Material: 5 (Mohr-Coulomb Isotropic) - Reclamation Slope

Cohesion	Phi	UnitWeight	Ru
150.00	28.0	119.00	Auto

Material: 6 (Mohr-Coulomb Isotropic) - Slurry Wall

Cohesion	Phi	UnitWeight	Ru
0.00	0.0	110.00	Auto

Water Properties

Unit weight of water: 62.400 Unit weight of water/medium above ground: 62.400

Material Profiles (6 profiles)

Profile: 1 (2 points) Material beneath: 1 - Overburden

0.00	45.00	700.00	45.00

Profile: 2 (2 points) Material beneath: 2 - Sand and Gravel

0.00	42.00	700.00	42.00

Profile: 3 (6 points) Material beneath: 3 - Weathered Bedrock

0.00	2.00	360.00	2.00	558.00	-1.00
612.00	-2.00	615.00	-2.00		
700.00	-2.00				

Profile: 4 (6 points) Material beneath: 4 - Unweathered Bedrock

0.00	1.00	360.00	1.00	558.00	-2.00
612.00	-3.00	615.00	-3.00		
700.00	-3.00				

Profile: 5 (5 points) Material within: 6 - Slurry Wall

612.00	45.00	615.00	45.00	615.00	-7.00
612.00	-7.00	612.00	45.00		

Profile: 6 (10 points) Material within: 5 - Reclamation Slope

549.00	45.00	484.00	45.00	391.00	14.00
371.00	14.00	319.00	1.00		
319.00	-1.00	500.00	-1.00	500.00	0.00
534.00	34.00	549.00	45.00		

Slope Surface (8 points)

```
-------------
      0.00       -2.00         281.00       -2.00         299.00        1.00
319.00        1.00         371.00       14.00
    391.00       14.00         484.00       45.00         700.00       45.00

Phreatic Surface (4 points)
----------------
      0.00       40.00         612.00       40.00         615.00       41.00
700.00       42.00

Failure Surface
---------------
Initial circular surface for critical search defined by: XL,XR,R
  Intersects:  XL:     290.00      YL:      -0.50      XR:     580.00      YR:
45.00
      Centre:  XC:     385.75      YC:     336.15                  Radius:  R:
350.00

Distributed Loads (1 load)
------------------
Load      X-Left    Pressure        X-Right   Pressure
  1       630.00      500.0         650.00      500.0

Variable Restraints
--------------------
Parameter descriptor:              XL         XR         R
Range of variation:             120.00      10.00      50.00
Trial positions within range:      20         20         50

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RESULTS: Analysis  1 - Deeper Option Static, Full Reservoir

Bishop Simplified Method of Analysis - Circular Failure Surface
---------------------------------------------------------------
Critical Failure Surface Search using Multiple Circle Generation Techniques

Initial failure surface approximation - Factor of Safety:   2.319

Analysis Summary
================
There were:  20001 successful analyses from a total of 20001 trial failure surfaces

Critical (minimum) Factor of Safety:  2.17
==========================================

Results Summary - Lowest 99 Factor of Safety circles
----------------------------------------------------
Circle    X-Left      Y-Left     X-Right     Y-Right     X-Centre    Y-Centre
Radius      FoS
   1       267.89       -2.00      578.68       45.00      380.75      302.78
325.00     2.170   <-- Critical Surface
   2       274.21       -2.00      579.21       45.00      382.97      305.34
326.02     2.172
   3       267.89       -2.00      578.16       45.00      380.40      302.91
325.00     2.172
   4       274.21       -2.00      578.68       45.00      382.79      304.33
325.00     2.173
   5       267.89       -2.00      578.68       45.00      380.58      303.93
326.02     2.173
   6       280.53       -2.00      579.74       45.00      385.51      305.58
325.00     2.175
```

7	267.89	-2.00	579.21	45.00	380.76	304.95	
327.04	2.175						
8	274.21	-2.00	578.16	45.00	382.43	304.45	
325.00	2.175						
9	267.89	-2.00	577.63	45.00	380.04	303.04	
325.00	2.175						
10	274.21	-2.00	579.21	45.00	382.79	306.49	
327.04	2.175						
11	267.89	-2.00	578.16	45.00	380.22	304.06	
326.02	2.176						
12	280.53	-2.00	580.26	45.00	385.69	306.59	
326.02	2.176						
13	274.21	-2.00	578.68	45.00	382.61	305.47	
326.02	2.176						
14	267.89	-2.00	578.68	45.00	380.40	305.08	
327.04	2.176						
15	274.21	-2.00	577.63	45.00	382.07	304.58	
325.00	2.176						
16	280.53	-2.00	579.21	45.00	385.15	305.70	
325.00	2.177						
17	267.89	-2.00	577.11	45.00	379.69	303.17	
325.00	2.177						
18	280.53	-2.00	580.79	45.00	385.87	307.61	
327.04	2.177						
19	274.21	-2.00	578.16	45.00	382.25	305.60	
326.02	2.178						
20	267.89	-2.00	579.21	45.00	380.59	306.10	
328.06	2.178						
21	280.53	-2.00	579.74	45.00	385.33	306.72	
326.02	2.178						
22	267.89	-2.00	577.63	45.00	379.87	304.19	
326.02	2.178						
23	274.21	-2.00	577.11	45.00	381.71	304.71	
325.00	2.178						
24	274.21	-2.00	579.21	45.00	382.62	307.63	
328.06	2.179						
25	280.53	-2.00	578.68	45.00	384.79	305.82	
325.00	2.179						
26	267.89	-2.00	578.16	45.00	380.05	305.21	
327.04	2.179						
27	280.53	-2.00	581.32	45.00	386.06	308.62	
328.06	2.179						
28	274.21	-2.00	578.68	45.00	382.44	306.61	
327.04	2.179						
29	280.53	-2.00	580.26	45.00	385.51	307.73	
327.04	2.179						
30	267.89	-2.00	578.68	45.00	380.23	306.23	
328.06	2.180						
31	274.21	-2.00	577.63	45.00	381.89	305.72	
326.02	2.180						
32	267.89	-2.00	576.05	45.00	378.97	303.43	
325.00	2.180						
33	267.89	-2.00	576.58	45.00	379.33	303.30	
325.00	2.180						
34	280.53	-2.00	579.21	45.00	384.97	306.84	
326.02	2.180						
35	267.89	-2.00	577.11	45.00	379.51	304.32	
326.02	2.180						
36	280.53	-2.00	581.84	45.00	386.24	309.64	
329.08	2.181						
37	280.53	-2.00	580.79	45.00	385.70	308.75	
328.06	2.181						

38	261.58	-2.00	576.05	45.00	376.92	301.85
325.00	2.181					
39	274.21	-2.00	576.58	45.00	381.35	304.83
325.00	2.181					
40	267.89	-2.00	577.63	45.00	379.69	305.34
327.04	2.181					
41	280.53	-2.00	578.16	45.00	384.42	305.95
325.00	2.181					
42	280.53	-2.00	582.89	45.00	387.31	307.11
327.04	2.181					
43	267.89	-2.00	579.21	45.00	380.41	307.25
329.08	2.181					
44	274.21	-2.00	578.16	45.00	382.08	306.74
327.04	2.181					
45	280.53	-2.00	582.89	45.00	387.49	305.97
326.02	2.181					
46	280.53	-2.00	582.89	45.00	387.67	304.83
325.00	2.181					
47	280.53	-2.00	579.74	45.00	385.15	307.85
327.04	2.182					
48	274.21	-2.00	577.11	45.00	381.54	305.85
326.02	2.182					
49	274.21	-2.00	576.05	45.00	380.99	304.96
325.00	2.182					
50	280.53	-2.00	580.79	45.00	386.23	305.33
325.00	2.182					
51	274.21	-2.00	579.21	45.00	382.44	308.77
329.08	2.182					
52	280.53	-2.00	580.26	45.00	385.87	305.45
325.00	2.182					
53	280.53	-2.00	582.37	45.00	387.31	304.96
325.00	2.182					
54	267.89	-2.00	578.16	45.00	379.87	306.36
328.06	2.182					
55	267.89	-2.00	579.74	45.00	380.59	308.27
330.10	2.182					
56	280.53	-2.00	578.68	45.00	384.61	306.96
326.02	2.182					
57	280.53	-2.00	581.84	45.00	386.95	305.08
325.00	2.182					
58	280.53	-2.00	581.32	45.00	386.59	305.21
325.00	2.182					
59	267.89	-2.00	576.58	45.00	379.16	304.45
326.02	2.183					
60	280.53	-2.00	581.32	45.00	385.88	309.76
329.08	2.183					
61	274.21	-2.00	578.68	45.00	382.26	307.76
328.06	2.183					
62	261.58	-2.00	577.63	45.00	377.63	303.76
327.04	2.183					
63	267.89	-2.00	578.68	45.00	380.06	307.38
329.08	2.183					
64	261.58	-2.00	579.21	45.00	378.18	306.82
330.10	2.183					
65	280.53	-2.00	580.26	45.00	385.33	308.87
328.06	2.183					
66	280.53	-2.00	577.63	45.00	384.06	306.07
325.00	2.183					
67	274.21	-2.00	577.63	45.00	381.72	306.87
327.04	2.183					
68	280.53	-2.00	580.79	45.00	386.05	306.47
326.02	2.183					

69	280.53	-2.00	579.21	45.00	384.79	307.98
327.04	2.183					
70	280.53	-2.00	582.37	45.00	387.13	306.10
326.02	2.184					
71	274.21	-2.00	579.74	45.00	382.63	309.79
330.10	2.184					
72	280.53	-2.00	581.84	45.00	386.77	306.22
326.02	2.184					
73	267.89	-2.00	577.11	45.00	379.34	305.47
327.04	2.184					
74	280.53	-2.00	581.32	45.00	386.41	306.35
326.02	2.184					
75	280.53	-2.00	581.84	45.00	386.06	310.78
330.10	2.184					
76	261.58	-2.00	578.16	45.00	377.81	304.78
328.06	2.184					
77	274.21	-2.00	576.58	45.00	381.18	305.97
326.02	2.184					
78	280.53	-2.00	577.11	45.00	383.70	306.19
325.00	2.184					
79	280.53	-2.00	580.79	45.00	385.52	309.88
329.08	2.184					
80	280.53	-2.00	583.42	45.00	387.32	309.27
329.08	2.184					
81	267.89	-2.00	579.21	45.00	380.24	308.40
330.10	2.184					
82	267.89	-2.00	577.63	45.00	379.52	306.49
328.06	2.184					
83	280.53	-2.00	583.42	45.00	387.50	308.13
328.06	2.184					
84	261.58	-2.00	579.21	45.00	378.00	307.98
331.12	2.184					
85	280.53	-2.00	578.16	45.00	384.24	307.08
326.02	2.184					
86	261.58	-2.00	578.68	45.00	377.99	305.80
329.08	2.184					
87	280.53	-2.00	583.42	45.00	387.67	306.99
327.04	2.185					
88	274.21	-2.00	578.16	45.00	381.90	307.88
328.06	2.185					
89	274.21	-2.00	576.05	45.00	380.82	306.10
326.02	2.185					
90	280.53	-2.00	579.74	45.00	384.97	308.99
328.06	2.185					
91	280.53	-2.00	582.37	45.00	386.95	307.24
327.04	2.185					
92	280.53	-2.00	581.84	45.00	386.59	307.36
327.04	2.185					
93	267.89	-2.00	576.58	45.00	378.98	305.60
327.04	2.185					
94	280.53	-2.00	582.37	45.00	386.25	311.79
331.12	2.185					
95	280.53	-2.00	581.32	45.00	386.23	307.49
327.04	2.185					
96	274.21	-2.00	577.11	45.00	381.36	306.99
327.04	2.185					
97	267.89	-2.00	575.53	45.00	378.62	303.56
325.00	2.185					
98	267.89	-2.00	579.74	45.00	380.42	309.42
331.12	2.185					
99	267.89	-2.00	578.16	45.00	379.70	307.51
329.08	2.185					

Critical Failure Surface (circle 1)

Intersects: XL: 267.89 YL: -2.00 XR: 578.68 YR: 45.00
Centre: XC: 380.75 YC: 302.78 Radius: R: 325.00
Generated failure surface: (20 points)
267.89 -2.00 284.24 -7.56 300.86 -12.25
317.70 -16.05 334.72 -18.95
351.87 -20.94 369.10 -22.02 386.36 -22.18
403.61 -21.42 420.80 -19.75
437.87 -17.17 454.78 -13.68 471.48 -9.30
487.92 -4.05 504.07 2.08
519.86 9.05 535.26 16.85 550.23 25.46
564.72 34.85 578.68 45.00

Slice Geometry and Properties - Critical Failure Surface (circle 1, 50 slices)

Slice	X-S	Base						PoreWater	Normal	Test
	X-Left	Area	Angle	Width	Length	Matl	Cohesion	Phi	Weight	Force	Stress	Factor
1	267.89	7.31	-18.8	6.55	6.92	4	150.00	26.0	906.12	18622.39	2790.25	1.14
2	274.45	21.92	-18.8	6.55	6.92	4	150.00	26.0	2718.34	19585.64	3078.19	1.14
3	281.00	17.11	-18.8	3.24	3.42	4	150.00	26.0	2121.45	10037.33	3311.33	1.14
4	284.24	57.27	-15.8	7.38	7.67	4	150.00	26.0	7100.96	23257.81	3564.03	1.11
5	291.62	81.71	-15.8	7.38	7.67	4	150.00	26.0	10132.07	24254.06	3911.77	1.11
6	299.00	24.11	-15.8	1.86	1.93	4	150.00	26.0	2989.06	6255.49	4119.20	1.11
7	300.86	119.58	-12.7	8.42	8.63	4	150.00	26.0	14828.10	28657.49	4257.56	1.08
8	309.28	135.57	-12.7	8.42	8.63	4	150.00	26.0	16811.27	29680.54	4499.30	1.08
9	317.70	22.34	-9.7	1.30	1.32	4	150.00	26.0	2770.58	4628.63	4615.74	1.05
10	319.00	72.45	-9.7	4.00	4.06	5	150.00	28.0	8661.06	14333.68	4625.01	1.06
11	323.00	118.26	-9.7	5.86	5.94	3	0.00	17.0	14642.29	21306.86	4855.05	1.04
12	328.86	132.68	-9.7	5.86	5.94	3	0.00	17.0	16388.51	21676.93	5065.23	1.04
13	334.72	218.21	-6.6	8.57	8.63	3	0.00	17.0	26886.03	32021.55	5282.64	1.02
14	343.29	245.12	-6.6	8.57	8.63	3	0.00	17.0	30131.87	32557.70	5530.43	1.02
15	351.87	255.55	-3.6	8.13	8.15	3	0.00	17.0	31353.90	31111.59	5729.93	1.01
16	360.00	310.47	-3.6	9.10	9.12	3	0.00	17.0	38021.98	35120.23	5919.66	1.01
17	369.10	68.01	-0.5	1.90	1.90	3	0.00	17.0	8320.05	7355.56	6018.04	1.00
18	371.00	277.08	-0.5	7.68	7.68	3	0.00	17.0	33888.89	29754.73	6036.66	1.00
19	378.68	277.63	-0.5	7.68	7.68	3	0.00	17.0	33952.34	29788.86	6044.94	1.00
20	386.36	167.24	2.5	4.64	4.64	3	0.00	17.0	20449.20	17974.15	6020.19	0.99

21	391.00	232.61	2.5	6.31	6.31	3	0.00	17.0
28416.15	24356.22	6049.25	0.99					
22	397.31	244.12	2.5	6.31	6.31	3	0.00	17.0
29774.23	24247.15	6132.83	0.99					
23	403.61	349.16	5.6	8.59	8.63	3	0.00	17.0
42507.57	32860.15	6185.41	0.99					
24	412.20	366.59	5.6	8.59	8.63	3	0.00	17.0
44540.09	32410.08	6241.75	0.99					
25	420.80	379.47	8.6	8.54	8.63	3	0.00	17.0
46015.35	31837.04	6250.31	0.99					
26	429.33	392.73	8.6	8.54	8.63	3	0.00	17.0
47533.41	31141.61	6248.96	0.99					
27	437.87	400.15	11.6	8.45	8.63	3	0.00	17.0
48338.80	30325.00	6198.84	0.99					
28	446.32	409.25	11.6	8.45	8.63	3	0.00	17.0
49342.40	29386.49	6140.23	0.99					
29	454.78	349.83	14.7	7.11	7.35	3	0.00	17.0
42100.99	24197.70	6040.81	1.00					
30	461.89	353.43	14.7	7.11	7.35	3	0.00	17.0
42459.20	23342.56	5942.63	1.00					
31	469.00	124.04	14.7	2.48	2.56	3	0.00	17.0
14884.19	7935.52	5901.29	1.00					
32	471.48	176.61	17.7	3.52	3.70	3	0.00	17.0
21175.42	11244.11	5885.42	1.00					
33	475.00	452.16	17.7	9.00	9.45	3	0.00	17.0
58257.63	27558.18	6319.78	1.00					
34	484.00	194.90	17.7	3.92	4.12	3	0.00	17.0
25095.04	11482.99	6240.43	1.00					
35	487.92	374.57	20.8	7.88	8.42	3	0.00	17.0
48313.74	22370.27	5956.96	1.02					
36	495.80	115.52	20.8	2.53	2.71	3	0.00	17.0
14926.44	6864.01	5718.68	1.02					
37	498.34	112.77	20.8	2.53	2.70	2	0.00	35.0
14576.97	6682.94	5407.83	0.95					
38	500.86	139.43	20.8	3.20	3.43	5	150.00	28.0
17985.71	8236.90	5317.87	0.98					
39	504.07	325.20	23.8	7.90	8.63	5	150.00	28.0
41650.62	19488.40	4952.15	0.99					
40	511.96	297.66	23.8	7.90	8.63	5	150.00	28.0
37688.19	17610.37	4478.13	0.99					
41	519.86	241.49	26.9	7.07	7.92	5	150.00	28.0
30184.14	14419.36	3967.89	1.00					
42	526.93	216.17	26.9	7.07	7.92	5	150.00	28.0
26621.55	12648.43	3494.93	1.00					
43	534.00	35.94	26.9	1.26	1.42	5	150.00	28.0
4381.73	2072.50	3217.86	1.00					
44	535.26	179.77	29.9	6.87	7.92	5	150.00	28.0
21736.37	10468.51	2902.01	1.01					
45	542.13	152.63	29.9	6.87	7.92	2	0.00	35.0
19598.35	8514.88	2574.86	0.97					
46	549.00	139.78	32.5	7.86	9.32	2	0.00	35.0
17793.96	7433.94	2014.50	0.98					
47	556.86	99.75	33.0	7.86	9.36	2	0.00	35.0
12590.39	4496.05	1408.15	0.99					
48	564.72	53.66	36.0	7.09	8.76	2	0.00	35.0
6635.92	1406.39	789.23	1.00					
49	571.80	11.01	36.0	2.75	3.40	2	0.00	35.0
1299.47	0.00	382.38	1.00					
50	574.55	6.19	36.0	4.13	5.10	1	50.00	28.0
706.16	0.00	130.96	1.05					

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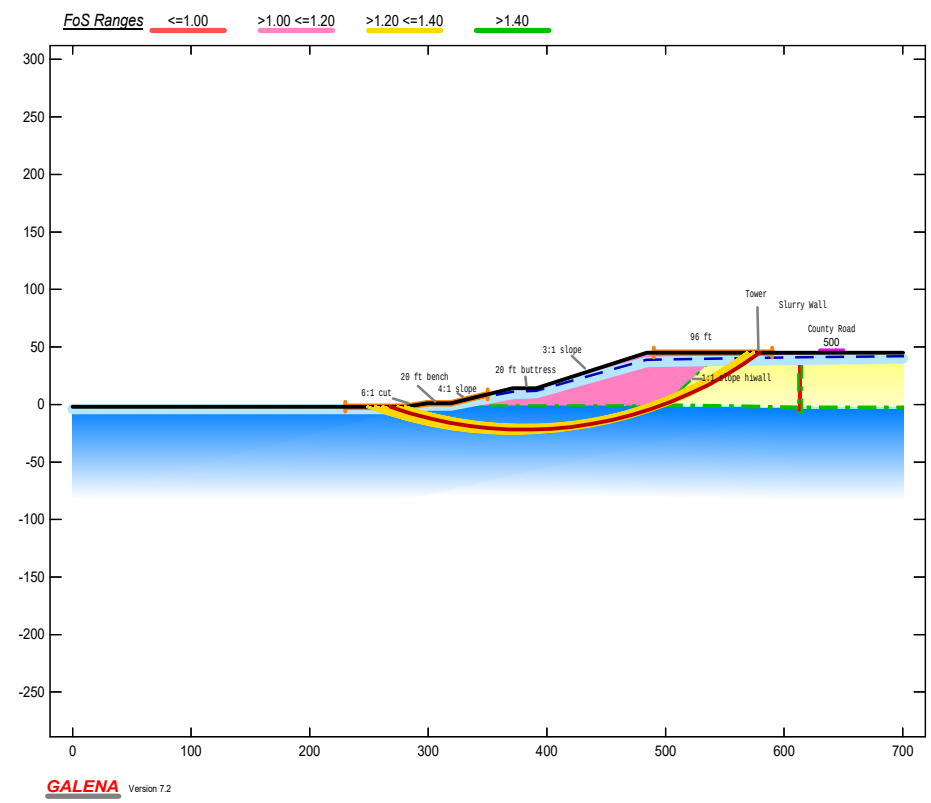
X-S Area: 9556.23 Path Length: 328.04 X-S Weight: 1180204.25



Project Wattenberg Lakes, Pond 1, SE Transmission Tower
Deeper Option Rapid Drawdown

File: J:\Aggregate Industries-297\Wattenberg\DRMS Stability\Stability SE\more fill SE deeper option rapid drawdown.gmf

Material Keys

1: Overburden
2: Sand and Gravel
3: Weathered Bedrock
4: Unweathered Bedrock
5: Reclamation Slope
6: Slurry Wall

Analysis 1

Multiple Stability Analysis
Method: Bishop Simplified
Surface: Circular

Results

Critical Factor of Safety: 1.24

Edited: 3 May 2024 *Processed:* 3 May 2024

Civil Resources

GALENA 7.2 Analysis Results Version: 7.2.1.05 Licensee: Civil Resources

Project: Wattenberg Lakes, Pond 1, SE Transmission Tower
File: J:\Aggregate Industries-297\Wattenberg\DRMS Stability\Stability SE\more fill SE deeper option rapid drawdown.gmf
Processed: 03 May 2024 08:56:19

DATA: Analysis 1 - Deeper Option Rapid Drawdown

Material Properties (6 materials)

Material: 1 (Mohr-Coulomb Isotropic) - Overburden

Cohesion	Phi	UnitWeight	Ru
50.00	28.0	114.00	Auto

Material: 2 (Mohr-Coulomb Isotropic) - Sand and Gravel

Cohesion	Phi	UnitWeight	Ru
0.00	35.0	130.00	Auto

Material: 3 (Mohr-Coulomb Isotropic) - Weathered Bedrock

Cohesion	Phi	UnitWeight	Ru
0.00	17.0	124.00	Auto

Material: 4 (Mohr-Coulomb Isotropic) - Unweathered Bedrock

Cohesion	Phi	UnitWeight	Ru
150.00	26.0	124.00	Auto

Material: 5 (Mohr-Coulomb Isotropic) - Reclamation Slope

Cohesion	Phi	UnitWeight	Ru
150.00	28.0	119.00	Auto

Material: 6 (Mohr-Coulomb Isotropic) - Slurry Wall

Cohesion	Phi	UnitWeight	Ru
0.00	0.0	110.00	Auto

Water Properties

Unit weight of water: 62.400 Unit weight of water/medium above ground: 62.400

Material Profiles (6 profiles)

Profile: 1 (2 points) Material beneath: 1 - Overburden

0.00	45.00	700.00	45.00

Profile: 2 (2 points) Material beneath: 2 - Sand and Gravel

0.00	42.00	700.00	42.00

Profile: 3 (6 points) Material beneath: 3 - Weathered Bedrock

0.00	2.00	360.00	2.00	558.00	-1.00
612.00	-2.00	615.00	-2.00		
700.00	-2.00				

Profile: 4 (6 points) Material beneath: 4 - Unweathered Bedrock

0.00	1.00	360.00	1.00	558.00	-2.00
612.00	-3.00	615.00	-3.00		
700.00	-3.00				

Profile: 5 (5 points) Material within: 6 - Slurry Wall

612.00	45.00	615.00	45.00	615.00	-7.00
612.00	-7.00	612.00	45.00		

Profile: 6 (10 points) Material within: 5 - Reclamation Slope

549.00	45.00	484.00	45.00	391.00	14.00
371.00	14.00	319.00	1.00		
319.00	-1.00	500.00	-1.00	500.00	0.00
534.00	34.00	549.00	45.00		

Slope Surface (8 points)

```
-------------
      0.00       -2.00         281.00       -2.00         299.00        1.00
319.00        1.00         371.00       14.00
    391.00       14.00         484.00       45.00         700.00       45.00

Phreatic Surface (10 points)
----------------
      0.00       -2.00         281.00       -2.00         299.00        1.00
319.00        1.00         371.00       11.00
    391.00       12.00         484.00       39.00         550.00       40.00
615.00       41.00         700.00       42.00

Failure Surface
---------------
Initial circular surface for critical search defined by: XL,XR,R
  Intersects:  XL:     290.00      YL:      -0.50      XR:     540.00      YR:
45.00
      Centre:  XC:     356.60      YC:     343.10                  Radius:  R:
350.00

Distributed Loads (1 load)
-----------------
Load      X-Left    Pressure        X-Right   Pressure
  1       630.00      500.0         650.00      500.0

Variable Restraints
-------------------
Parameter descriptor:             XL         XR         R
Range of variation:             120.00     100.00      50.00
Trial positions within range:      20         20         50

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RESULTS: Analysis  1 - Deeper Option Rapid Drawdown

Bishop Simplified Method of Analysis - Circular Failure Surface
---------------------------------------------------------------
Critical Failure Surface Search using Multiple Circle Generation Techniques

Initial failure surface approximation - Factor of Safety:   1.394

Analysis Summary
================
There were:  19987 successful analyses from a total of 20001 trial failure surfaces
             14 analyses terminated due to unacceptable geometry

Critical (minimum) Factor of Safety:  1.24
==========================================

Results Summary - Lowest 99 Factor of Safety circles
----------------------------------------------------
Circle    X-Left      Y-Left     X-Right     Y-Right     X-Centre    Y-Centre
Radius      FoS
   1       267.89       -2.00      579.47       45.00      380.59      307.18
329.08     1.242   <-- Critical Surface
   2       261.58       -2.00      579.47       45.00      378.18      307.91
331.12     1.243
   3       261.58       -2.00      574.21       45.00      375.68      302.31
325.00     1.243
   4       261.58       -2.00      579.47       45.00      378.01      309.07
332.14     1.244
```

5	267.89	-2.00	579.47	45.00	380.42	308.33	330.10	1.244
6	255.26	-2.00	574.21	45.00	373.60	300.69	325.00	1.244
7	274.21	-2.00	579.47	45.00	382.80	307.57	328.06	1.245
8	267.89	-2.00	574.21	45.00	377.73	303.88	325.00	1.245
9	261.58	-2.00	574.21	45.00	375.50	303.47	326.02	1.245
10	280.53	-2.00	579.47	45.00	385.33	305.64	325.00	1.246
11	267.89	-2.00	579.47	45.00	380.24	309.48	331.12	1.246
12	255.26	-2.00	574.21	45.00	373.42	301.85	326.02	1.246
13	274.21	-2.00	579.47	45.00	382.62	308.71	329.08	1.247
14	261.58	-2.00	574.21	45.00	375.33	304.62	327.04	1.247
15	267.89	-2.00	574.21	45.00	377.55	305.03	326.02	1.247
16	261.58	-2.00	579.47	45.00	377.84	310.22	333.16	1.248
17	280.53	-2.00	579.47	45.00	385.15	306.78	326.02	1.248
18	267.89	-2.00	579.47	45.00	380.07	310.63	332.14	1.248
19	255.26	-2.00	574.21	45.00	373.25	303.01	327.04	1.248
20	274.21	-2.00	579.47	45.00	382.45	309.85	330.10	1.249
21	274.21	-2.00	574.21	45.00	379.73	305.39	325.00	1.249
22	261.58	-2.00	574.21	45.00	375.16	305.77	328.06	1.249
23	267.89	-2.00	574.21	45.00	377.37	306.17	327.04	1.249
24	261.58	-2.00	579.47	45.00	377.67	311.37	334.18	1.250
25	255.26	-2.00	574.21	45.00	373.08	304.17	328.06	1.250
26	280.53	-2.00	579.47	45.00	384.97	307.91	327.04	1.250
27	267.89	-2.00	579.47	45.00	379.90	311.77	333.16	1.250
28	274.21	-2.00	579.47	45.00	382.27	310.99	331.12	1.251
29	274.21	-2.00	574.21	45.00	379.56	306.53	326.02	1.251
30	261.58	-2.00	574.21	45.00	374.99	306.92	329.08	1.251
31	267.89	-2.00	574.21	45.00	377.20	307.32	328.06	1.251
32	261.58	-2.00	579.47	45.00	377.50	312.52	335.20	1.251
33	255.26	-2.00	574.21	45.00	372.91	305.33	329.08	1.252
34	267.89	-2.00	579.47	45.00	379.73	312.92	334.18	1.252
35	280.53	-2.00	579.47	45.00	384.79	309.05	328.06	1.252

36	274.21	-2.00	579.47	45.00	382.09	312.13	332.14	1.253
37	274.21	-2.00	574.21	45.00	379.38	307.67	327.04	1.253
38	261.58	-2.00	574.21	45.00	374.81	308.07	330.10	1.253
39	261.58	-2.00	579.47	45.00	377.33	313.67	336.22	1.253
40	267.89	-2.00	574.21	45.00	377.02	308.46	329.08	1.253
41	255.26	-2.00	574.21	45.00	372.74	306.49	330.10	1.253
42	267.89	-2.00	579.47	45.00	379.55	314.06	335.20	1.254
43	280.53	-2.00	579.47	45.00	384.61	310.19	329.08	1.254
44	274.21	-2.00	579.47	45.00	381.92	313.27	333.16	1.255
45	261.58	-2.00	574.21	45.00	374.64	309.22	331.12	1.255
46	274.21	-2.00	574.21	45.00	379.20	308.81	328.06	1.255
47	261.58	-2.00	579.47	45.00	377.16	314.82	337.24	1.255
48	255.26	-2.00	574.21	45.00	372.57	307.65	331.12	1.255
49	267.89	-2.00	574.21	45.00	376.85	309.60	330.10	1.255
50	267.89	-2.00	579.47	45.00	379.38	315.20	336.22	1.256
51	274.21	-2.00	579.47	45.00	383.33	304.14	325.00	1.256
52	280.53	-2.00	579.47	45.00	384.43	311.32	330.10	1.256
53	274.21	-2.00	579.47	45.00	381.74	314.41	334.18	1.257
54	261.58	-2.00	574.21	45.00	374.47	310.37	332.14	1.257
55	274.21	-2.00	579.47	45.00	383.15	305.28	326.02	1.257
56	261.58	-2.00	579.47	45.00	376.99	315.97	338.27	1.257
57	255.26	-2.00	568.95	45.00	370.07	302.05	325.00	1.257
58	261.58	-2.00	568.95	45.00	372.12	303.62	325.00	1.257
59	274.21	-2.00	574.21	45.00	379.02	309.94	329.08	1.257
60	255.26	-2.00	574.21	45.00	372.40	308.80	332.14	1.257
61	267.89	-2.00	574.21	45.00	376.67	310.75	331.12	1.257
62	267.89	-2.00	579.47	45.00	379.21	316.34	337.24	1.258
63	274.21	-2.00	579.47	45.00	382.97	306.43	327.04	1.258
64	261.58	-2.00	579.47	45.00	379.21	300.97	325.00	1.258
65	280.53	-2.00	579.47	45.00	384.26	312.46	331.12	1.258
66	261.58	-2.00	579.47	45.00	376.82	317.11	339.29	1.258

67	274.21	-2.00	579.47	45.00	381.57	315.55
335.20	1.259					
68	261.58	-2.00	574.21	45.00	374.29	311.52
333.16	1.259					
69	255.26	-2.00	568.95	45.00	369.90	303.20
326.02	1.259					
70	267.89	-2.00	568.95	45.00	374.14	305.14
325.00	1.259					
71	255.26	-2.00	574.21	45.00	372.23	309.96
333.16	1.259					
72	261.58	-2.00	568.95	45.00	371.95	304.77
326.02	1.259					
73	274.21	-2.00	574.21	45.00	378.84	311.08
330.10	1.259					
74	267.89	-2.00	574.21	45.00	376.50	311.89
332.14	1.259					
75	267.89	-2.00	579.47	45.00	379.04	317.49
338.27	1.260					
76	280.53	-2.00	579.47	45.00	384.08	313.59
332.14	1.260					
77	261.58	-2.00	579.47	45.00	378.52	305.60
329.08	1.260					
78	261.58	-2.00	579.47	45.00	376.65	318.26
340.31	1.260					
79	248.95	-2.00	568.95	45.00	367.98	300.42
325.00	1.260					
80	255.26	-2.00	568.95	45.00	369.72	304.36
327.04	1.260					
81	261.58	-2.00	574.21	45.00	374.12	312.66
334.18	1.260					
82	261.58	-2.00	579.47	45.00	378.35	306.76
330.10	1.260					
83	255.26	-2.00	574.21	45.00	372.06	311.11
334.18	1.261					
84	267.89	-2.00	568.95	45.00	373.96	306.28
326.02	1.261					
85	261.58	-2.00	568.95	45.00	371.77	305.92
327.04	1.261					
86	248.95	-2.00	574.21	45.00	370.63	304.85
330.10	1.261					
87	274.21	-2.00	579.47	45.00	381.39	316.68
336.22	1.261					
88	248.95	-2.00	574.21	45.00	370.47	306.02
331.12	1.261					
89	261.58	-2.00	579.47	45.00	378.69	304.44
328.06	1.261					
90	274.21	-2.00	574.21	45.00	378.67	312.22
331.12	1.261					
91	267.89	-2.00	574.21	45.00	376.32	313.03
333.16	1.261					
92	280.53	-2.00	574.21	45.00	381.70	306.85
325.00	1.261					
93	248.95	-2.00	574.21	45.00	370.30	307.18
332.14	1.261					
94	248.95	-2.00	574.21	45.00	370.13	308.34
333.16	1.261					
95	267.89	-2.00	579.47	45.00	378.86	318.63
339.29	1.261					
96	280.53	-2.00	574.21	45.00	381.52	307.98
326.02	1.262					
97	261.58	-2.00	579.47	45.00	378.86	303.29
327.04	1.262					

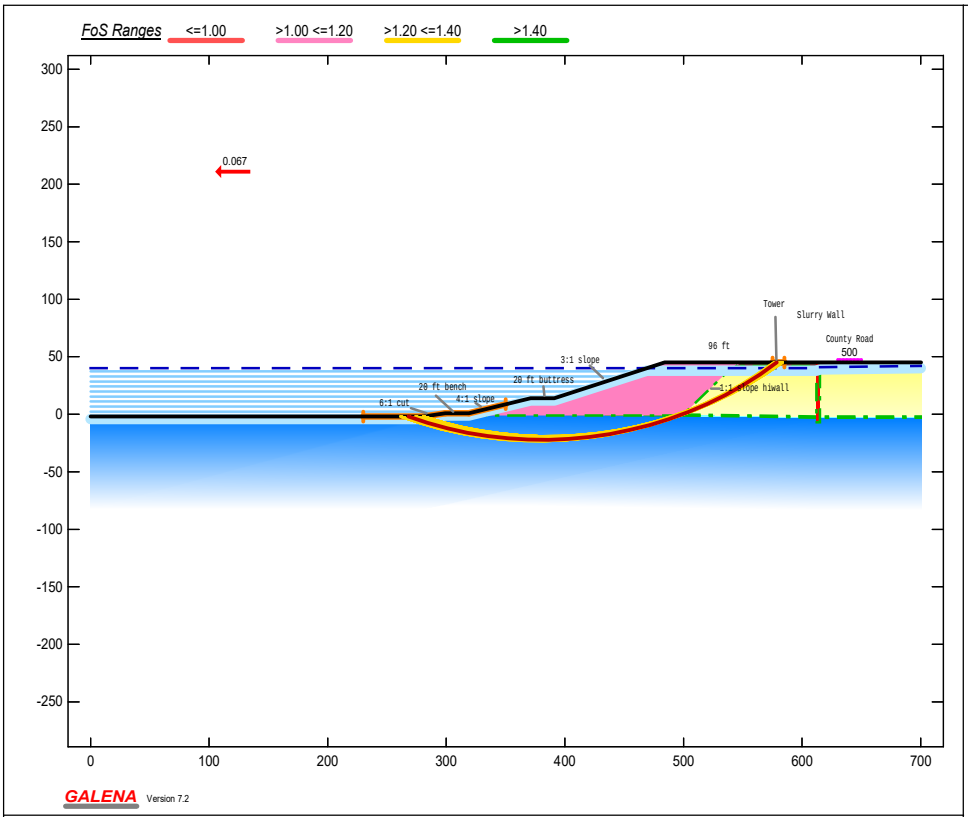
```
  98       280.53       -2.00      574.21       45.00      381.34      309.11
327.04     1.262
  99       248.95       -2.00      568.95       45.00      367.81      301.58
326.02     1.262

Critical Failure Surface (circle 1)
-----------------------
Intersects:  XL:     267.89      YL:      -2.00      XR:     579.47      YR:
45.00
    Centre:  XC:     380.59      YC:     307.18                  Radius:  R:
329.08
Generated failure surface: (20 points)
    267.89     -2.00          284.29     -7.49          300.95    -12.12
317.84    -15.86          334.89    -18.71
    352.07    -20.66          369.33    -21.71          386.62    -21.84
403.90    -21.07          421.11    -19.39
    438.21    -16.81          455.15    -13.34          471.88     -8.98
488.36     -3.75          504.55      2.34
    520.39      9.27          535.84     17.03          550.87     25.58
565.43     34.92          579.47     45.00

Slice Geometry and Properties - Critical Failure Surface (circle 1,  49 slices)
-------------------------------------------------------
Slice                X-S     ------------------- Base ---------------------
PoreWater      Normal    Test
        X-Left      Area    Angle    Width    Length  Matl   Cohesion    Phi
Weight      Force        Stress   Factor
  1      267.89      7.19   -18.5     6.55     6.91     4     150.00    26.0
891.81      473.30       192.92    1.21
  2      274.45     21.58   -18.5     6.55     6.91     4     150.00    26.0
2675.41     1419.88       485.59    1.21
  3      281.00     17.17   -18.5     3.29     3.47     4     150.00    26.0
2128.65     1129.70       742.00    1.21
  4      284.29     56.44   -15.5     7.35     7.63     4     150.00    26.0
6998.94     3655.15      1047.08    1.16
  5      291.65     80.47   -15.5     7.35     7.63     4     150.00    26.0
9977.91     5210.90      1476.75    1.16
  6      299.00     25.09   -15.5     1.95     2.03     4     150.00    26.0
3111.47     1624.95      1727.24    1.16
  7      300.95    118.62   -12.5     8.44     8.65     4     150.00    26.0
14708.52     7581.39      1854.34    1.12
  8      309.39    134.41   -12.5     8.44     8.65     4     150.00    26.0
16667.09     8590.92      2097.35    1.12
  9      317.84     91.13    -9.5     5.16     5.24     5     150.00    28.0
10895.92     5738.54      2209.62    1.09
 10      323.00    118.69    -9.5     5.95     6.03     3       0.00    17.0
14694.95     7357.39      2525.28    1.06
 11      328.95    133.43    -9.5     5.95     6.03     3       0.00    17.0
16479.03     8161.17      2832.51    1.06
 12      334.89    216.86    -6.5     8.59     8.65     3       0.00    17.0
26717.14    12990.84      3156.20    1.04
 13      343.48    243.69    -6.5     8.59     8.65     3       0.00    17.0
29951.64    14408.30      3538.82    1.04
 14      352.07    247.02    -3.5     7.93     7.94     3       0.00    17.0
30302.80    14383.21      3852.89    1.02
 15      360.00    315.82    -3.5     9.33     9.35     3       0.00    17.0
38671.80    18205.93      4176.90    1.02
 16      369.33     59.19    -0.5     1.67     1.67     3       0.00    17.0
7240.37     3386.66      4347.26    1.00
 17      371.00    279.28    -0.5     7.81     7.81     3       0.00    17.0
34153.30    16060.42      4376.38    1.00
 18      378.81    279.77    -0.5     7.81     7.81     3       0.00    17.0
34208.77    16281.08      4383.44    1.00
```

19	386.62	156.41	2.6	4.38	4.38	3	0.00	17.0
19123.16	9193.38	4345.53	0.99					
20	391.00	235.91	2.6	6.45	6.46	3	0.00	17.0
28814.76	13874.02	4442.56	0.99					
21	397.45	247.92	2.6	6.45	6.46	3	0.00	17.0
30231.35	14512.34	4660.89	0.99					
22	403.90	347.53	5.6	8.61	8.65	3	0.00	17.0
42299.02	20310.34	4855.43	0.98					
23	412.50	364.99	5.6	8.61	8.65	3	0.00	17.0
44335.70	21205.66	5089.00	0.98					
24	421.11	377.97	8.6	8.55	8.65	3	0.00	17.0
45822.81	21975.13	5258.98	0.98					
25	429.66	391.31	8.6	8.55	8.65	3	0.00	17.0
47349.57	22618.55	5433.82	0.98					
26	438.21	398.87	11.6	8.47	8.65	3	0.00	17.0
48172.55	23134.71	5542.97	0.97					
27	446.68	408.07	11.6	8.47	8.65	3	0.00	17.0
49188.62	23524.33	5659.32	0.97					
28	455.15	410.21	14.6	8.37	8.65	3	0.00	17.0
49348.11	23786.59	5708.50	0.97					
29	463.51	415.31	14.6	8.37	8.65	3	0.00	17.0
49858.49	23921.28	5766.77	0.97					
30	471.88	155.86	17.6	3.12	3.27	3	0.00	17.0
18684.61	9071.63	5756.77	0.97					
31	475.00	450.57	17.6	9.00	9.44	3	0.00	17.0
58061.38	26077.04	6183.91	0.97					
32	484.00	215.68	17.6	4.36	4.58	3	0.00	17.0
27775.92	12416.16	6102.58	0.97					
33	488.36	339.73	20.6	7.17	7.66	3	0.00	17.0
43825.22	19841.09	5816.14	0.98					
34	495.53	116.42	20.6	2.55	2.73	3	0.00	17.0
15042.12	6772.86	5599.67	0.98					
35	498.08	130.27	20.6	2.92	3.12	2	0.00	35.0
16838.87	7561.47	5173.35	0.88					
36	501.01	153.27	20.6	3.54	3.78	5	150.00	28.0
19766.07	8871.07	5098.58	0.92					
37	504.55	324.18	23.6	7.92	8.65	5	150.00	28.0
41495.25	19043.80	4715.32	0.92					
38	512.47	296.72	23.6	7.92	8.65	5	150.00	28.0
37538.11	17238.57	4261.62	0.92					
39	520.39	231.55	26.6	6.81	7.61	5	150.00	28.0
28917.64	13600.82	3763.55	0.92					
40	527.19	208.31	26.6	6.81	7.61	5	150.00	28.0
25642.56	12027.34	3330.86	0.92					
41	534.00	52.42	26.6	1.84	2.06	5	150.00	28.0
6386.77	2986.88	3058.14	0.92					
42	535.84	171.70	29.7	6.58	7.57	5	150.00	28.0
20738.71	9889.35	2735.59	0.93					
43	542.42	147.06	29.7	6.58	7.57	2	0.00	35.0
18881.54	8167.30	2435.08	0.87					
44	549.00	37.32	29.7	1.87	2.15	2	0.00	35.0
4761.59	2007.94	2153.75	0.87					
45	550.87	124.35	32.7	7.28	8.65	2	0.00	35.0
15815.99	6557.18	1797.49	0.87					
46	558.15	90.38	32.7	7.28	8.65	2	0.00	35.0
11400.56	4099.97	1276.44	0.87					
47	565.43	55.79	35.7	7.58	9.33	2	0.00	35.0
6889.73	1548.50	695.32	0.88					
48	573.00	8.77	35.7	2.29	2.82	2	0.00	35.0
1029.43	0.00	319.64	0.88					
49	575.30	6.27	35.7	4.18	5.14	1	50.00	28.0
714.52	0.00	108.70	0.94					

X-S Area:	9516.97	Path Length:	328.55	X-S Weight:	1175226.25



Material Keys

1: Overburden
2: Sand and Gravel
3: Weathered Bedrock
4: Unweathered Bedrock
5: Reclamation Slope
6: Slurry Wall

Analysis 1

Multiple Stability Analysis
Method: Bishop Simplified
Surface: Circular

Results

Critical Factor of Safety: 1.31

Project Wattenberg Lakes, Pond 1, SE Transmission Tower
Deeper Option Seismic

File: J:\Aggregate Industries-297\Wattenberg\DRMS Stability\Stability SE\more fill SE deeper option seismic.gmf

Edited: 3 May 2024 *Processed:* 3 May 2024

Civil Resources

GALENA 7.2 Analysis Results Version: 7.2.1.05 Licensee: Civil Resources

Project: Wattenberg Lakes, Pond 1, SE Transmission Tower
File: J:\Aggregate Industries-297\Wattenberg\DRMS Stability\Stability SE\more fill SE deeper option seismic.gmf
Processed: 03 May 2024 08:16:56

DATA: Analysis 1 - Deeper Option Seismic

Material Properties (6 materials)

Material: 1 (Mohr-Coulomb Isotropic) - Overburden

Cohesion	Phi	UnitWeight	Ru
50.00	28.0	114.00	Auto

Material: 2 (Mohr-Coulomb Isotropic) - Sand and Gravel

Cohesion	Phi	UnitWeight	Ru
0.00	35.0	130.00	Auto

Material: 3 (Mohr-Coulomb Isotropic) - Weathered Bedrock

Cohesion	Phi	UnitWeight	Ru
0.00	17.0	124.00	Auto

Material: 4 (Mohr-Coulomb Isotropic) - Unweathered Bedrock

Cohesion	Phi	UnitWeight	Ru
150.00	26.0	124.00	Auto

Material: 5 (Mohr-Coulomb Isotropic) - Reclamation Slope

Cohesion	Phi	UnitWeight	Ru
150.00	28.0	119.00	Auto

Material: 6 (Mohr-Coulomb Isotropic) - Slurry Wall

Cohesion	Phi	UnitWeight	Ru
0.00	0.0	110.00	Auto

Water Properties

Unit weight of water: 62.400 Unit weight of water/medium above ground: 62.400

Material Profiles (6 profiles)

Profile: 1 (2 points) Material beneath: 1 - Overburden

0.00	45.00	700.00	45.00

Profile: 2 (2 points) Material beneath: 2 - Sand and Gravel

0.00	42.00	700.00	42.00

Profile: 3 (6 points) Material beneath: 3 - Weathered Bedrock

0.00	2.00	360.00	2.00	558.00	-1.00
612.00	-2.00	615.00	-2.00		
700.00	-2.00				

Profile: 4 (6 points) Material beneath: 4 - Unweathered Bedrock

0.00	1.00	360.00	1.00	558.00	-2.00
612.00	-3.00	615.00	-3.00		
700.00	-3.00				

Profile: 5 (5 points) Material within: 6 - Slurry Wall

612.00	45.00	615.00	45.00	615.00	-7.00
612.00	-7.00	612.00	45.00		

Profile: 6 (10 points) Material within: 5 - Reclamation Slope

549.00	45.00	484.00	45.00	391.00	14.00
371.00	14.00	319.00	1.00		
319.00	-1.00	500.00	-1.00	500.00	0.00
534.00	34.00	549.00	45.00		

Slope Surface (8 points)

```
-------------
      0.00       -2.00         281.00       -2.00         299.00        1.00
319.00        1.00         371.00       14.00
    391.00       14.00         484.00       45.00         700.00       45.00

Phreatic Surface (4 points)
---------------
      0.00       40.00         612.00       40.00         615.00       41.00
700.00       42.00

Failure Surface
--------------
Initial circular surface for critical search defined by: XL,XR,R
  Intersects:  XL:     290.00      YL:      -0.50      XR:     580.00      YR:
45.00
      Centre:  XC:     385.75      YC:     336.15                  Radius:  R:
350.00

Distributed Loads (1 load)
-----------------
Load      X-Left    Pressure        X-Right   Pressure
  1       630.00      500.0         650.00      500.0

Earthquake Force
----------------
Pseudo-static earthquake (seismic) coefficient:  0.067

Variable Restraints
-------------------
Parameter descriptor:             XL         XR         R
Range of variation:             120.00      10.00      50.00
Trial positions within range:      20         20         50

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RESULTS: Analysis  1 - Deeper Option Seismic

Bishop Simplified Method of Analysis - Circular Failure Surface
---------------------------------------------------------------
Critical Failure Surface Search using Multiple Circle Generation Techniques

Initial failure surface approximation - Factor of Safety:   1.395

Analysis Summary
================
There were:  20001 successful analyses from a total of 20001 trial failure surfaces

Critical (minimum) Factor of Safety:  1.31
==========================================

Results Summary - Lowest 99 Factor of Safety circles
----------------------------------------------------
Circle    X-Left      Y-Left     X-Right     Y-Right     X-Centre    Y-Centre
Radius      FoS
   1       267.89       -2.00      578.68       45.00      380.75      302.78
325.00     1.306   <-- Critical Surface
   2       280.53       -2.00      582.89       45.00      387.31      307.11
327.04     1.307
   3       280.53       -2.00      582.89       45.00      387.49      305.97
326.02     1.307
   4       280.53       -2.00      582.89       45.00      387.67      304.83
325.00     1.307
```

5	280.53	-2.00	581.84	45.00	386.24	309.64	329.08	1.308
6	280.53	-2.00	581.32	45.00	386.06	308.62	328.06	1.308
7	267.89	-2.00	579.21	45.00	380.76	304.95	327.04	1.308
8	274.21	-2.00	579.21	45.00	382.97	305.34	326.02	1.308
9	267.89	-2.00	578.68	45.00	380.58	303.93	326.02	1.308
10	280.53	-2.00	582.37	45.00	387.31	304.96	325.00	1.308
11	267.89	-2.00	578.16	45.00	380.40	302.91	325.00	1.308
12	280.53	-2.00	580.79	45.00	385.87	307.61	327.04	1.309
13	280.53	-2.00	580.26	45.00	385.69	306.59	326.02	1.309
14	274.21	-2.00	578.68	45.00	382.79	304.33	325.00	1.309
15	280.53	-2.00	579.74	45.00	385.51	305.58	325.00	1.309
16	280.53	-2.00	582.37	45.00	387.13	306.10	326.02	1.309
17	280.53	-2.00	581.84	45.00	386.95	305.08	325.00	1.309
18	280.53	-2.00	583.42	45.00	386.61	313.82	333.16	1.309
19	280.53	-2.00	582.89	45.00	386.43	312.81	332.14	1.309
20	280.53	-2.00	582.37	45.00	386.25	311.79	331.12	1.310
21	280.53	-2.00	581.84	45.00	386.06	310.78	330.10	1.310
22	280.53	-2.00	581.32	45.00	385.88	309.76	329.08	1.310
23	280.53	-2.00	582.89	45.00	387.14	308.26	328.06	1.310
24	280.53	-2.00	582.37	45.00	386.95	307.24	327.04	1.310
25	280.53	-2.00	581.84	45.00	386.77	306.22	326.02	1.310
26	280.53	-2.00	583.42	45.00	387.32	309.27	329.08	1.310
27	267.89	-2.00	579.21	45.00	380.59	306.10	328.06	1.310
28	280.53	-2.00	581.32	45.00	386.59	305.21	325.00	1.310
29	267.89	-2.00	578.68	45.00	380.40	305.08	327.04	1.310
30	280.53	-2.00	583.42	45.00	387.50	308.13	328.06	1.310
31	274.21	-2.00	579.21	45.00	382.79	306.49	327.04	1.310
32	280.53	-2.00	583.42	45.00	387.67	306.99	327.04	1.310
33	267.89	-2.00	578.16	45.00	380.22	304.06	326.02	1.310
34	267.89	-2.00	577.63	45.00	380.04	303.04	325.00	1.310
35	280.53	-2.00	582.89	45.00	386.96	309.39	329.08	1.310

36	280.53	-2.00	582.37	45.00	386.78	308.38	328.06	1.310
37	280.53	-2.00	581.84	45.00	386.59	307.36	327.04	1.311
38	280.53	-2.00	580.79	45.00	385.70	308.75	328.06	1.311
39	280.53	-2.00	581.32	45.00	386.41	306.35	326.02	1.311
40	274.21	-2.00	578.68	45.00	382.61	305.47	326.02	1.311
41	280.53	-2.00	580.26	45.00	385.51	307.73	327.04	1.311
42	280.53	-2.00	579.74	45.00	385.33	306.72	326.02	1.311
43	280.53	-2.00	579.21	45.00	385.15	305.70	325.00	1.311
44	274.21	-2.00	578.16	45.00	382.43	304.45	325.00	1.311
45	280.53	-2.00	583.42	45.00	386.97	311.55	331.12	1.311
46	280.53	-2.00	582.89	45.00	386.78	310.53	330.10	1.311
47	261.58	-2.00	579.21	45.00	378.18	306.82	330.10	1.311
48	280.53	-2.00	582.37	45.00	386.60	309.52	329.08	1.311
49	280.53	-2.00	583.42	45.00	386.44	314.96	334.18	1.311
50	280.53	-2.00	581.84	45.00	386.42	308.50	328.06	1.311
51	280.53	-2.00	582.89	45.00	386.25	313.94	333.16	1.311
52	280.53	-2.00	581.32	45.00	386.23	307.49	327.04	1.311
53	267.89	-2.00	579.74	45.00	380.59	308.27	330.10	1.311
54	280.53	-2.00	582.37	45.00	386.07	312.93	332.14	1.311
55	280.53	-2.00	581.84	45.00	385.88	311.91	331.12	1.311
56	280.53	-2.00	580.79	45.00	386.23	305.33	325.00	1.311
57	280.53	-2.00	581.32	45.00	385.70	310.90	330.10	1.312
58	267.89	-2.00	579.21	45.00	380.41	307.25	329.08	1.312
59	267.89	-2.00	578.68	45.00	380.23	306.23	328.06	1.312
60	274.21	-2.00	579.21	45.00	382.62	307.63	328.06	1.312
61	267.89	-2.00	578.16	45.00	380.05	305.21	327.04	1.312
62	261.58	-2.00	579.74	45.00	378.36	307.85	331.12	1.312
63	261.58	-2.00	579.21	45.00	378.00	307.98	331.12	1.312
64	267.89	-2.00	577.63	45.00	379.87	304.19	326.02	1.312
65	280.53	-2.00	580.79	45.00	386.05	306.47	326.02	1.312
66	280.53	-2.00	580.26	45.00	385.87	305.45	325.00	1.312

67	267.89	-2.00	577.11	45.00	379.69	303.17
325.00	1.312					
68	274.21	-2.00	578.16	45.00	382.25	305.60
326.02	1.312					
69	280.53	-2.00	583.42	45.00	387.14	310.41
330.10	1.312					
70	274.21	-2.00	578.68	45.00	382.44	306.61
327.04	1.312					
71	280.53	-2.00	580.79	45.00	385.52	309.88
329.08	1.312					
72	274.21	-2.00	577.63	45.00	382.07	304.58
325.00	1.313					
73	280.53	-2.00	580.26	45.00	385.33	308.87
328.06	1.313					
74	280.53	-2.00	582.37	45.00	386.42	310.66
330.10	1.313					
75	280.53	-2.00	582.89	45.00	386.61	311.67
331.12	1.313					
76	280.53	-2.00	583.42	45.00	386.79	312.69
332.14	1.313					
77	280.53	-2.00	579.74	45.00	385.15	307.85
327.04	1.313					
78	280.53	-2.00	579.21	45.00	384.97	306.84
326.02	1.313					
79	280.53	-2.00	578.68	45.00	384.79	305.82
325.00	1.313					
80	261.58	-2.00	578.68	45.00	377.99	305.80
329.08	1.313					
81	261.58	-2.00	579.74	45.00	378.19	309.00
332.14	1.313					
82	261.58	-2.00	578.16	45.00	377.81	304.78
328.06	1.313					
83	261.58	-2.00	576.05	45.00	376.92	301.85
325.00	1.313					
84	280.53	-2.00	583.42	45.00	386.26	316.09
335.20	1.313					
85	267.89	-2.00	579.74	45.00	380.42	309.42
331.12	1.313					
86	261.58	-2.00	577.63	45.00	377.63	303.76
327.04	1.313					
87	280.53	-2.00	582.89	45.00	386.08	315.08
334.18	1.313					
88	267.89	-2.00	576.58	45.00	379.33	303.30
325.00	1.313					
89	280.53	-2.00	582.37	45.00	385.89	314.06
333.16	1.313					
90	267.89	-2.00	579.21	45.00	380.24	308.40
330.10	1.313					
91	280.53	-2.00	581.84	45.00	385.71	313.05
332.14	1.313					
92	267.89	-2.00	578.68	45.00	380.06	307.38
329.08	1.313					
93	274.21	-2.00	579.74	45.00	382.63	309.79
330.10	1.314					
94	274.21	-2.00	579.21	45.00	382.44	308.77
329.08	1.314					
95	267.89	-2.00	578.16	45.00	379.87	306.36
328.06	1.314					
96	267.89	-2.00	577.63	45.00	379.69	305.34
327.04	1.314					
97	261.58	-2.00	579.74	45.00	378.02	310.15
333.16	1.314					

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  98       261.58       -2.00      577.63       45.00      377.46      304.91
328.06     1.314
  99       267.89       -2.00      576.05       45.00      378.97      303.43
325.00     1.314

Critical Failure Surface (circle 1)
-----------------------
Intersects:  XL:     267.89      YL:      -2.00      XR:     578.68      YR:
45.00
    Centre:  XC:     380.75      YC:     302.78                  Radius:  R:
325.00
Generated failure surface: (20 points)
    267.89     -2.00          284.24     -7.56          300.86    -12.25
317.70    -16.05          334.72    -18.95
    351.87    -20.94          369.10    -22.02          386.36    -22.18
403.61    -21.42          420.80    -19.75
    437.87    -17.17          454.78    -13.68          471.48     -9.30
487.92     -4.05          504.07      2.08
    519.86      9.05          535.26     16.85          550.23     25.46
564.72     34.85          578.68     45.00

Slice Geometry and Properties - Critical Failure Surface (circle 1,  50 slices)
-------------------------------------------------------
Slice                X-S     ------------------- Base ---------------------
PoreWater      Normal    Test
        X-Left      Area    Angle    Width    Length  Matl   Cohesion    Phi
Weight      Force        Stress   Factor
  1      267.89      7.31   -18.8     6.55     6.92     4     150.00    26.0
906.12    18622.39      2813.86    1.21
  2      274.45     21.92   -18.8     6.55     6.92     4     150.00    26.0
2718.34    19585.64      3110.43    1.21
  3      281.00     17.11   -18.8     3.24     3.42     4     150.00    26.0
2121.45    10037.33      3351.06    1.21
  4      284.24     57.27   -15.8     7.38     7.67     4     150.00    26.0
7100.96    23257.81      3603.34    1.16
  5      291.62     81.71   -15.8     7.38     7.67     4     150.00    26.0
10132.07    24254.06      3961.29    1.16
  6      299.00     24.11   -15.8     1.86     1.93     4     150.00    26.0
2989.06     6255.49      4174.63    1.16
  7      300.86    119.58   -12.7     8.42     8.63     4     150.00    26.0
14828.10    28657.49      4303.15    1.12
  8      309.28    135.57   -12.7     8.42     8.63     4     150.00    26.0
16811.27    29680.54      4549.40    1.12
  9      317.70     22.34    -9.7     1.30     1.32     4     150.00    26.0
2770.58     4628.63      4654.10    1.08
 10      319.00     72.45    -9.7     4.00     4.06     5     150.00    28.0
8661.06    14333.68      4665.77    1.09
 11      323.00    118.26    -9.7     5.86     5.94     3       0.00    17.0
14642.29    21306.86      4876.04    1.06
 12      328.86    132.68    -9.7     5.86     5.94     3       0.00    17.0
16388.51    21676.93      5088.67    1.06
 13      334.72    218.21    -6.6     8.57     8.63     3       0.00    17.0
26886.03    32021.55      5300.13    1.03
 14      343.29    245.12    -6.6     8.57     8.63     3       0.00    17.0
30131.87    32557.70      5549.98    1.03
 15      351.87    255.55    -3.6     8.13     8.15     3       0.00    17.0
31353.90    31111.59      5741.23    1.02
 16      360.00    310.47    -3.6     9.10     9.12     3       0.00    17.0
38021.98    35120.23      5931.88    1.02
 17      369.10     68.01    -0.5     1.90     1.90     3       0.00    17.0
8320.05     7355.56      6019.91    1.00
 18      371.00    277.08    -0.5     7.68     7.68     3       0.00    17.0
33888.89    29754.73      6038.54    1.00
```

19	378.68	277.63	-0.5	7.68	7.68	3	0.00	17.0
33952.34	29788.86	6046.82	1.00					
20	386.36	167.24	2.5	4.64	4.64	3	0.00	17.0
20449.20	17974.15	6011.51	0.99					
21	391.00	232.61	2.5	6.31	6.31	3	0.00	17.0
28416.15	24356.22	6040.39	0.99					
22	397.31	244.12	2.5	6.31	6.31	3	0.00	17.0
29774.23	24247.15	6123.56	0.99					
23	403.61	349.16	5.6	8.59	8.63	3	0.00	17.0
42507.57	32860.15	6164.33	0.98					
24	412.20	366.59	5.6	8.59	8.63	3	0.00	17.0
44540.09	32410.08	6219.70	0.98					
25	420.80	379.47	8.6	8.54	8.63	3	0.00	17.0
46015.35	31837.04	6215.44	0.98					
26	429.33	392.73	8.6	8.54	8.63	3	0.00	17.0
47533.41	31141.61	6213.01	0.98					
27	437.87	400.15	11.6	8.45	8.63	3	0.00	17.0
48338.80	30325.00	6149.64	0.97					
28	446.32	409.25	11.6	8.45	8.63	3	0.00	17.0
49342.40	29386.49	6090.11	0.97					
29	454.78	349.83	14.7	7.11	7.35	3	0.00	17.0
42100.99	24197.70	5977.54	0.97					
30	461.89	353.43	14.7	7.11	7.35	3	0.00	17.0
42459.20	23342.56	5878.95	0.97					
31	469.00	124.04	14.7	2.48	2.56	3	0.00	17.0
14884.19	7935.52	5836.76	0.97					
32	471.48	176.61	17.7	3.52	3.70	3	0.00	17.0
21175.42	11244.11	5806.59	0.98					
33	475.00	452.16	17.7	9.00	9.45	3	0.00	17.0
58257.63	27558.18	6225.45	0.98					
34	484.00	194.90	17.7	3.92	4.12	3	0.00	17.0
25095.04	11482.99	6144.72	0.98					
35	487.92	374.57	20.8	7.88	8.42	3	0.00	17.0
48313.74	22370.27	5849.77	0.98					
36	495.80	115.52	20.8	2.53	2.71	3	0.00	17.0
14926.44	6864.01	5615.22	0.98					
37	498.34	112.77	20.8	2.53	2.70	2	0.00	35.0
14576.97	6682.94	5210.31	0.89					
38	500.86	139.43	20.8	3.20	3.43	5	150.00	28.0
17985.71	8236.90	5147.68	0.93					
39	504.07	325.20	23.8	7.90	8.63	5	150.00	28.0
41650.62	19488.40	4771.63	0.93					
40	511.96	297.66	23.8	7.90	8.63	5	150.00	28.0
37688.19	17610.37	4313.17	0.93					
41	519.86	241.49	26.9	7.07	7.92	5	150.00	28.0
30184.14	14419.36	3802.49	0.93					
42	526.93	216.17	26.9	7.07	7.92	5	150.00	28.0
26621.55	12648.43	3346.51	0.93					
43	534.00	35.94	26.9	1.26	1.42	5	150.00	28.0
4381.73	2072.50	3079.33	0.93					
44	535.26	179.77	29.9	6.87	7.92	5	150.00	28.0
21736.37	10468.51	2761.30	0.93					
45	542.13	152.63	29.9	6.87	7.92	2	0.00	35.0
19598.35	8514.88	2434.10	0.88					
46	549.00	139.78	32.5	7.86	9.32	2	0.00	35.0
17793.96	7433.94	1891.24	0.88					
47	556.86	99.75	33.0	7.86	9.36	2	0.00	35.0
12590.39	4496.05	1312.88	0.88					
48	564.72	53.66	36.0	7.09	8.76	2	0.00	35.0
6635.92	1406.39	719.09	0.89					
49	571.80	11.01	36.0	2.75	3.40	2	0.00	35.0
1299.47	0.00	339.72	0.89					

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 50      574.55      6.19    36.0     4.13     5.10     1      50.00    28.0
706.16        0.00       110.52    0.95
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     X-S Area:    9556.23    Path Length:    328.04              X-S Weight:
1180204.25
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EXHIBIT L – RECLAMATION COSTS

The entirety of operations covered under this permit amendment, including the small amount of mining required along with reclamation of all disturbed areas, are estimated for reclamation costs. The table below represents the estimated cost for DRMS to reclaim the Wattenberg Lakes mine.

WATTENBERG DRMS PERMIT AMENDMENT – RECLAMATION COSTS

ITEM	UNIT	UNIT COST	# OF UNITS	TOTAL COST
Earthmoving and Revegetation				
Excavation & hauling of remaining material (overburden and growth medium)	Cubic Yards	$3.25	900,000	$2,925,000
Earthwork to build up the south side of Pond 1 (to achieve offset from road)	Cubic Yards	$5.00	21,300	$106,500
Backfill placement/grading to achieve reclamation grades	Cubic Yards	$5.00	114,000	$570,000
Rip/grade access road to be reclaimed (after done hauling)	Acre	$2,445	1.1	$2,690
Growth medium placement/rough grading	Cubic Yards	$2.30	56,100	$129,030
Fine grading	Acre	$3,800	69.6	$264,480
Upland seeding	Acre	$3,115	22.9	$71,334
Wetland seeding	Acre	$6,500	36.7	$238,550
Mulching	Acre	$2,100	69.6	$146,160
Cottonwood plant material and planting operations	Acre	$20,900	10.0	$209,000
Weed control	Acre	$160	7.0	$1,114
Dewatering and Pond 1 Development				
Dewatering, northwest existing unnamed pond and Pond 1	Lump Sum	$30,000	1	$30,000
Design, construction, and related tasks for slurry wall/underdrain installation - Pond 1	Lump Sum[1]	$3,704,750	1	$3,704,750
Reclamation slope grading - Pond 1	Acre	$1,000	11.8	$11,800
Reservoir bottom grading - Pond 1	Lump Sum	$10,000	1	$10,000
TOTAL DIRECT RECLAMATION COSTS				***$8,420,413***
Overhead & Profit				
Public Liability Insurance			0.0155	$130,516
Contractor Performance Bond			0.0155	$130,516
Contractor Profit			0.1000	$842,041
DRMS Project Administration Expense			0.0500	$421,021
TOTAL INDIRECT RECLAMATION COST				***$1,524,095***
TOTAL PERFORMANCE BOND AMOUNT				**$9,944,508**

[1] A detailed breakdown is provided in the following table.

DETAILED BREAKDOWN OF SLURRY WALL/UNDERDRAIN COST

ITEM	UNIT	UNIT COST	# OF UNITS	TOTAL COST
Slurry Wall Estimated Cost				
Mobilization/Demobilization Slurry Wall Sub.	Lump Sum	$375,000	1	$375,000
Construct Slurry Wall Work Platform	Cubic Yards	$2.75	30,000	$82,500
Supplemental Fines Material	Cubic Yards	$2.75	27,000	$74,250
Slurry Wall Const. (6400'x40')	Square Ft	$8.95	230,000	$2,058,500
Keyway Construction (10'Wx5'D)	Cubic Yards	$4.50	18,000	$81,000
Mounding Underdrain Pipe	Feet	$75	6,000	$450,000
90-Day Leak Test	Lump Sum	$155,000	1	$155,000
Geotechnical Investigation	Lump Sum	$63,500	1	$63,500
Slurry Wall/Underdrain Engineering Design	Lump Sum	$365,000	1	$365,000
TOTAL				**$3,704,750**