December 16, 2021

Mr. Patrick Lennberg
Division of Reclamation, Mines, and Safety
1313 Sherman Street, Room 215
Denver, Colorado 80203

RE: Adequacy Review No. 2 Response; M-2004-044

Dear Mr. Lennberg:

This letter serves as the Adequacy Review No. 2 Response for the 112c Construction Materials Amendment Application (AM-2), Permit No. M-2004-044. The Adequacy Review No. 2 was summarized in your letter of December 10, 2021. The italicized items are the current comment and the bold text are the responses:

EXHIBIT D – Mining Plan (Rule 6.4.4):

1. *Please clarify what would the total area of the Affect Area be with the approval of this amendment.*

   The total affected area will be 238.6 acres. This area is summarized in the mining acreage table on Sheet C-1 of Exhibit C.

2. *The table, D-8, depicting the point in time when mining disturbance would be at its maximum, please insert the sub-total acreage values that sum to 88.2 acres.*

   The table has been revised please see attached Exhibit D.

EXHIBIT L – Reclamation Costs (Rule 6.4.12):

3. *The Division is currently reviewing the Reclamation Cost estimate for the site and will inform the applicant of any additional items.*

   Acknowledged.

EXHIBIT S – Permanent Man-made Structures (Rule 6.4.19):

4. *On December 8, 2021 the applicant supplied the completed Challenger Reservoir Stability Analysis which included all attachments. Please provide a justification for using a surcharge value of 3,000 psf and if needed please redo the analysis using an updated surcharge value.*

   The intent of the original analysis was to conservatively model surcharge loads from maintenance traffic and parked equipment. Research indicates traffic loads should be modeled with a surcharge load of 250 psf and that parked equipment should be modeled with a surcharge load of 100 psf. We have run the analysis again with a surcharge load of 500 psf. Please see the attached stability analysis.

5. *The applicant has attempted to get structure agreements from all structure owners within 200 feet of the affected land boundary along the conveyor belt corridor north of 168th Ave. However, ten agreements were not signed and returned. Please perform an engineering evaluation for the conveyor corridor pursuant to Rule 6.4.19(b).*

   The evaluation has been performed. Please see the attached stability analysis.

6. *The applicant attempted to get a signed structure agreement from Cristofer Muhler (Map C-2 structure B-51). Please perform an engineering evaluation for the structure pursuant to Rule 6.4.19(b).*

   The evaluation has been performed. Please see the attached stability analysis.

7. *The Division acknowledges the operator will have to perform a saturated stability analysis for the Tucson Street embankment as part of a commitment to Adams County. However, the stability of Tucson Street is jurisdictional as it is a structure within 200 feet of the affected land boundary. Please complete a stability analysis along Tucson Street embankment for at least one cross-section under a saturated slope (high pore water pressure)/rapid reservoir drawdown conditions to verify that the proposed slopes below Tucson Street will be stable under all conditions. Please provide the stability analysis data to allow the Division to duplicate the analysis with Clover Technology's Galena software for verification purposes if needed.*

   This evaluation has been performed. Please see the attached stability analysis. The stability analysis data is provided in hard copy in the attached stability analysis and will be provided in an Xcel spread sheet so the Division can duplicate the analysis.

Other:

8. *Pursuant to Rule 1.6.2(2), please demonstrate that the applicant's response to these adequacy issues and the Preliminary Adequacy issues have been placed with the application materials previously placed with the County Clerk or Recorders Office, and made available for public review*

   The documents have been placed at the Weld and Adams County Clerk and Recorders office. Please see the attached proofs of receipt.

Included in this response is:

- Revised Exhibit D.
- Stability Analysis.
- Proofs of receipt from the Weld and Adams County Clerk and Recorders.

If there are any questions, please do not hesitate to call or email me.

CIVIL RESOURCES, LLC

Gary Linden, P.G.

Encl:

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EXHIBIT D – MINING PLAN

This information provided in this Exhibit is intended to satisfy the requirements outlined in Section 6.4.4 of the Colorado Mined Land Reclamation Board Construction Material Rules and Regulations:

Mining Plan

The proposed mining plan does not differ from that previously approved by the DRMS.

The proposed amended Mined Land Reclamation Board (MLRB) Tucson South Resource mine area is approximately 1.5 miles south of the Aggregate Industries Wattenberg Lakes Mine (M-2004-051), which supplies aggregate construction materials to much of southern Weld and western Adams counties. The amended area will be a conveyer easement that will allow for export of mined material from the Tucson South Resource to the Wattenberg Lakes Mine. The amended Tucson South Resource Permit Boundary contains substantiated aggregate resources to continue the supply in this region of Colorado. Supplementing resources at the Wattenberg operation, new supplies from the amended Tucson South Resource will continue to provide construction materials to meet the Front Range Colorado demand.

Introduction and Overview

The amended Tucson South Resource permit area is currently owned by Aggregate Industries-WCR Inc., the City of Aurora, Adams County, Yoshi and Suzu, LLLP, Dorothy and James Struck, and Toby Struck. The permit area consists of dryland and irrigated agriculture, a reclaimed gravel resource, a partially reclaimed gravel resource, and a former greenhouse growing operation. Above ground structures at the greenhouse have been demolished and removed from the site. Below grade features will soon be demolished and hauled from the site. The previously permitted property is located north of Colorado Highway 7, bisected by Tucson Street. The amended area, providing an area for the conveyor easement, is along the west side of Tucson Street, the south side of 168th Ave. (aka Weld County Road 2), and the west side of Weld County Road 23.5 before crossing over Weld County Road 23.75 entering the Wattenberg Lakes facility. Aggregate Industries has entered into agreements with the City of Aurora, Yoshi and Suzu LLLP, Dorothy and James Struck, and Toby Struck to allow for the conveyor easement crossing.

Mining of the Tucson South Resource is proposed to happen in two phases. The West Area (Phase 1) is located north of Colorado Highway 7 and west of Tucson Street, and the East Area (Phase 2) is located north of Colorado Highway 7 and east of Tucson Street.

In general, drainage on the site flows toward the South Platte River to the north and east of the property. The drainage pattern in the West Area either flows to local low spots on the property, is conveyed off-site to the north, or is conveyed via an irrigation return ditch to the East Area. The East cell generally drains north and east to the river via overland flow or through existing channels and ditches left by historic disturbance. Drainage at the amended area flows to local low spots before being conveyed to existing gravel mines locate north of the site.

With this project the Permit Boundary and the Affected Lands are different areas, as explained below.

Permit Boundary Area

The proposed Permit Boundary contains the following areas as shown on Exhibit C-1 and Exhibit F-1:

- Tracts of land owned by Aggregate Industries-WCR, Inc. referred to on our mapping as Tracts A, B, D, E, F, H, and M.
- Tracts of land owned by the City of Aurora referred to on our mapping as Tracts C, G, K, and N.
- Tucson Street right-of-way referred to on our maps as Tract L.
- East 168th Avenue right-of-way referred to as Tract O.
- Land owned by Yoshi and Suzu, LLLP referred to on our maps as Tracts P and Q.
- Land owned by Dorothy and James Struck is referred to as Tract R.
- Land owned by Toby Struck is referred to as Tract S.

Affected Land

The Affected Land includes all Tracts described in the Permit Boundary except Tract K, which is owned by the City of Aurora. This area is located east and west of the Brighton Ditch and will not be disturbed by the mining activities and reclamation operations. Therefore, it was excluded from the Affected Land. Aggregate Industries had previously planned to mine a South Cell which was removed from the permit with the approval of Acreage Reduction Request 2 (AR-02). Technical Revision 2 (TR-02) updated the Mining and Reclamation maps to reflect the removal of the South Cell.

Existing Land Uses

The proposed Tucson South Resource mine currently consists of dryland and irrigated agriculture, one house (with outbuilding) and the former greenhouse growing operation described above. A Todd Creek water well and associated United Power overhead electric line on the west side of the West area will also be removed. Aggregate Industries purchased the Todd Creek water well parcel and entered into an agreement to relocate the well to an area adjacent to the river. The relocated well is shown on Exhibit C-3. The applicant has contacted United Power regarding removal

of the existing electric service and will forward the documentation regarding removal of the service line upon receipt. There is one rural residential property located adjacent to the mine on Tucson Street, several more rural residential properties located south of Tracts A and H and Highway 7, and several more rural residential properties located along Baseline and Weld County Road 23.5 along the conveyor alignment. In addition, there is a developing residential subdivision located west of Tract K. The South Platte River corridor receives recreational use and the City of Brighton operates a parks and wildlife recreational area north of Highway 7 and east of Tract H along the west side of the South Platte River.

Improvements owned by the applicant or property owners that are located within the Permit Boundary Area such as un-improved roads, fences, alluvial water wells and associated pumps, houses and outbuildings, irrigation ditches and laterals, may be removed or relocated during mining and reclamation. There were two oil and gas wells and associated facilities located on the property. The wells were plugged and abandoned per Colorado Oil and Gas Conservation Commission standards and the associated facilities have been hauled from the site. Structures, easements, or rights-of-ways not owned by the applicant or property owner will not be disturbed without prior permission (see Exhibit C Pre-Mining Maps). None of the easements, rights-of-ways, or associated structures are expected to be negatively affected by mining or reclamation operations.

Nature of Deposit to be Mined

Test borings indicate a layer of topsoil and overburden ranging from 1 to 11 feet in depth with a typical overburden depth of 5 feet. The typical depth of topsoil to be removed is 6". In the western part of the site, the topsoil has been tilled until recently and likely contains a significant amount of organics. The overburden is underlain by an aggregate layer with a thickness ranging from 0 to 46 feet with a typical thickness of 25 feet. In some parts of the sites, the aggregate layer contains a 2- to 9-foot thick mud lens. The total depth to bedrock from the surface grade ranges from 5 feet in the west to approximately 50 feet in a paleochannel in the eastern part of the site. The typical depth to bedrock is approximately 27 feet over most of the mine area. The aggregate layer overlies sedimentary bedrock of the Denver Basin.

A soils report is attached in Exhibit I herein for reference.

Mine Phasing

Aggregate Industries anticipates mining and reclaiming the proposed Tucson South Resource site in approximately 5 to 8 years. The rate of mining and overall life of the mine is dependent on several factors including product demand and operational needs. Test borings have verified that commercial deposits of sand and gravel exist up to 50 feet below the surface of the ground. In addition to the commercial sand

and gravel materials, clay, silt, and other non-marketable materials excavated from the proposed permit area will be used on-site for reclamation.

The mining plan currently includes mining in two phases. Mining may occur simultaneously in more than one phase. The actual sequence may change depending on market conditions, operational needs, or site conditions:

- West Area (Phase 1), is located north of Highway 7 and west of Tucson Street and included Tracts A, B and C
- East Area (Phase 2) is north of Highway 7 and east of Tucson Street and includes Tracts D, E, F, G and H

Tracts N, O, P, Q, R, and S will contain the conveyor to export product off-site to the Wattenberg Lakes Site and will be used during all mining phases.

Mining will begin in the West Area (Phase 1). Once mining is complete in the West Area, mining will commence in the East Area (Phase 2). All necessary permits will be obtained. A summary of mining phases is presented in the table below.

Processing and sale of the material will occur on the Platte Valley site (M-1989-120). Overburden from the West and East Areas will be used to reclaim the cells. If there is excess overburden material, the material will be conveyed to the Platte Valley site and Wattenberg Lakes site for reclamation.

A slurry wall will be constructed around the East and West Areas prior to exposure of the water table. The slurry wall has been designed and is attached to this exhibit.

Mine Phasing Summary

Mine Phase	Total Acreage To be	Duration (years)
West	72.0	4
East	83.8	4
Tot	**155.8**	**8**

Mining Methods

The method of mining used within the permit boundary:

- The slurry wall liner for the West and East Areas will be installed prior to exposure of ground water at the site. Once the slurry wall is installed the West and East Areas will be dewatered. The deposit will be dry mined using dewatering trenches and pumps within the slurry lined area. Prior to excavation of each mining phase, trenches will be cut along the perimeter of the excavation to begin dewatering the sand and gravel material. The trenches will extend through the overburden and alluvium to bedrock. Pumps will be used to remove the groundwater that drains from the deposit within the lined excavation. If necessary, water from the trenches will be circulated through a settling pond prior to being discharged to adjacent drainage ditches and/or the

South Platte River (see Exhibit C Mining Maps). As excavation begins, the mining cell and dewatering trenches on the floor will continue to collect any water entering the lined Areas, keeping the deposit material relatively dry. The collected water will be directed to settling ponds within the Areas or near the final discharge point to South Platte River. It is anticipated that dewatering will be completed within the slurry wall lined mining area within 12 months and dewatering throughout the life of the mine will be limited to precipitation, stormwater runoff that drains into the mining area, and minor amounts of groundwater.

Earth Moving

Setbacks from the top of slope of each area to the proposed permit boundary or man-made structures not owned by the applicant or by agreement with the structure owner will generally be 30 feet or greater. Specific setbacks from Highway 7 and Tucson Street also account for future expansion of the roadways. The perimeter setbacks from the structures are shown on Exhibit C - Mining Maps.

These setbacks were determined in combination with Adams County regulations and the Slope Stability Analysis prepared by Tetra Tech provided herein in the Geotechnical Stability Exhibit. The setbacks reflect the Factors of Safety in the Proposed Slope Stability/Geotechnical Analysis Policy in the DRMS memorandum dated May 16, 2018.

Areas to be mined will be prepared by removal of topsoil and overburden. Each preparation area may be as much as 100 feet wide along the anticipated mining face. Usually, only enough area is stripped and prepared to provide the estimated needs for the next 10 to 14 months of mining. Surface topsoil material will be stripped separate from the underlying, deeper subsoil or overburden material. This topsoil layer contains most of the soils organic matter and will be stockpiled separately for use in reclamation. Once the topsoil has been removed, the rest of the overburden will be stripped and stockpiled separate from the topsoil.

When the alluvial material is exposed and sufficiently dewatered, the aggregate material will be recovered using equipment typical for sand and gravel mining operations. In the West and East Areas, the aggregates will be mined using conventional dry mining methods. Earth moving equipment may include, but is not limited to, dozers, loaders, scrapers, and excavators as mining progresses to a depth of 20 to 50 feet below the surface. The alluvial material is an unconsolidated deposit and, therefore, no blasting is required. The aggregate material from the Areas will be temporarily stockpiled within the various Areas, conveyed to the staging area, or immediately transported off-site for processing. During mining and reclamation activities, watering trucks for dust control will be used as needed.

The active mining face will extend no more than 2,300 feet in length. During mining and prior to reclamation in the West and East Areas, the mine walls will be a nearly vertical to ½H:1V slope (see Exhibit C, Mining Maps). Mining will progress down to the depth of quality aggregate material. Backfilling and/or grading of side slopes may follow behind the mining activities before mining in the Area is complete. Concurrent reclamation will be practiced when the highwall reaches the mine limit. During the flood season April 1 through September 30 and when the highwall is within 400 feet or less of the river the highwall will be no steeper then 3H:1V.

As mining progresses, topsoil, overburden, and non-marketable materials will be removed and stockpiled for use in reclamation activities. Overburden from the West Area and East Areas will be used in reclamation. Should there be excess overburden on these cells, the material will be conveyed to the Platte Valley site for reclamation or to be sold. During mining in the West and East Areas, topsoil will be segregated and stockpiled in the locations shown on Exhibit C Mining Maps, i.e. outside of the Floodway. As mining progresses, overburden will be taken directly to mined out slopes for use in reclamation. Topsoil and overburden stockpiles will be configured to have side-slopes no steeper than 3H:1V. If the stockpiles are inactive for more than one growing season, such as the stockpiles used for screening, they will be seeded with the fast-growing grass seed mixture below.

Stockpile Grass Seed Mixture

Grass Species	**Rate (#PLS/ac**
Luna Pubescent Wheatgrass	15.0
Amur Intermediate Wheatgrass	15.0
Rates are for broadcast seeding.	

Other than those used for screening, long-term stockpiles are not anticipated. Temporary stockpile materials will continually be used for reclamation and the stockpiles will likely be disturbed on a frequent basis and seeding the stockpiles may not be practical during the operation. If stockpile seeding is not used, surface roughening will be maintained to limit wind and water erosion.

Most of the proposed Tucson South Resource Permit Boundary Area is within the regulatory floodplain of South Platte River. Because of floodplain regulatory restrictions, stockpiling will occur within a mining Area whenever possible with the top of stockpile elevation lower than the pre-project grade. Stockpiles within the modeled floodplain above the existing ground surface will generally be created parallel to potential South Platte River flood flows. The stockpiles will be no longer than 300 feet, with minimum spacing of 100 feet between stockpiles for flood flows to pass (see Exhibit C, Mining Maps). The screening stockpiles along Highway 7 as

indicated by modeling, are located in areas where placement is not expected to impact floodplain water surface elevations. Consequently, there is no restriction on length or orientation. The impacts of stockpiles on floodplain water surface elevations is presented in the *Floodplain Use Permit* application approved by Adams County.

Additional mining and reclamation procedures will be used within the regulatory floodplain to mitigate impacts from potential flood flows. Flood season is considered to be April 1 through September 30. The southern and eastern slopes of each area will either be maintained at 3H:1V during the flood season during mining or concurrently reclaimed at 3H:1V with reclamation backfill. This restriction only applies for areas within 400 feet of the South Platte River in accordance with DRMS policy. If flood waters reach the mining Areas prior to complete reclamation, the 3H:1V slopes will allow more controlled flow into the Areas while reducing the potential for head cutting and capture of the South Platte River.

A Floodplain Use Applications have been approved by Adams and Weld Counties for this project. Adams County may request review and comment from Mile High Flood District (MHFD). Comments and revisions from the County or the MHFD will be incorporated into the final Floodplain Use Permit.

The table below illustrates a point in time when the mining disturbance could be at its maximum. At the proposed Tucson South Resource site, it is assumed that the mining disturbance will be at its greatest when the East Area mining is nearly complete. That will be a time when the slurry walls are installed and, topsoil replacement and initial seeding will be completed for the West Area.

Aspect	Mining Operation	Disturbed Area (acres)
A	***Active Mining Area***: 1. Backfill remaining East Cell mining face and side slopes (2,300 feet in length averaging 27 feet deep requiring backfill and rough grading to 3H:1V slopes.) 2. Rough Grade remaining disturbed areas of the east cell 3. Replace topsoil on backfilled area of East cell above the HWL of the reservoir (61.5 acres) 4. Final Grade East Cell	65.8
B	***Miscellaneous Disturbed Areas (Stockpiles, Haul Roads, Conveyor route)*** 1. Replace topsoil on internal haul roads and main site entrance (3 acres x 0.5') 2. Replace topsoil on conveyor route (7.7 acres X 0.5') 3. Replace topsoil on stockpile area (5 acres x 0.5') 4. Scarify internal haul roads and conveyor route areas 5. Final grade all miscellaneous areas (8.3 acres x 0.5') *6.* Reseed 20% of all areas in the area of disturbance above	24
C	***Final Reclamation***: 1. Seeding – entire East Area above the highwater line of the reservoir plus internal haul route and the conveyor route. 2. Weed management and re-seeding (20% of the Affected Lands located above the highwater line of the reservoirs)	73 15
Total Disturbed Area (Sum A and B)		**89.8**

Diversions and Impoundments

Roads and irrigation ditches will effectively minimize stormwater surface run-on to the mining site, so run-on diversion structures are not anticipated. During the initial mining activities, stockpiling of topsoil and overburden on the surface is anticipated. Diversionary channels, as shown on Exhibit C, will be used divert surface runoff from leaving each of the Areas or entering the wetlands areas. Surface diversion channels will convey runoff to settling ponds, prior to discharging to the South Platte River. As mining progresses and the excavation increases in size, diversionary channels will convey less runoff because more runoff will enter the mine excavations. Runoff that collects in the excavations will be conveyed by the dewatering trenches to a common point, where it will be pumped to the river after sediment settling has occurred, if necessary.

Material Processing and Associated Facilities

Pit run material will be conveyed off-site to the Wattenberg Lakes site (M-2004-051) to be conveyed for processing at the Platte Valley site (M-1989-120).

Commodities to be Mined and Intended Use

Sand and gravel for use as construction materials will be the primary products produced from the proposed Tucson South Resource. Test pits have verified that commercial deposits of sand and gravel exist up to 50 feet below the surface of the ground. In addition to the commercial sand and gravel materials, topsoil and overburden materials will be used on-site for reclamation.

Use of Explosives

The material is unconsolidated deposits, no explosives are required.

Wetlands

The Department of the Army published an Approved Jurisdictional Determination on July 23, 2019 attached to Exhibit J. No jurisdictional wetlands are present at the site.

December 14, 2021

Mr. Paul Conrad
Aggregate Industries-WCR
1687 Cole Blvd., Suite 300
Golden, CO 80401

Re: Stability Analyses, Tucson South Amendment 2, DRMS Permit NO. M-2004-044

Dear Mr. Conrad:

This letter has been prepared to address the Mined Land Reclamation Board (MLRB) Construction Materials Rule 6, Section 4, Subsection 19, Exhibit S - Permanent Man-Made Structures (6.4.19, Exhibit S) for the proposed Tucson South Amendment 2 of the Tucson South Mine located in Weld and Adams Counties, Colorado. Previous analyses regarding structure offsets at the mine cells were performed by Tetra Tech (2019, Amendment 1). The analyses performed herein address stability along the Amendment 2 conveyor alignment. Additionally, we have performed rapid drawdown analyses on the west and east cells located along Tucson Street.

The site is located both north and south of the intersection of 168th Street and Tucson Street in Adams and Weld Counties, Colorado. More specifically, the site is within part of Section 1, Township 1 South, and within part of Section 36 Township 1 North. Both sections are in 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 residential housing.

The south part of the site will be mined in two cells referred to as West and East cells. A conveyor will transfer mine products from the mine to the Wattenberg Lakes Mine located approximately 1.5 miles north of the Tucson South Mine. The majority of the conveyor route passes along unmined, nearly flat land that will not be subject to stability failure. However, part of the conveyor will be located near the top of the clay liner which was constructed at the below grade, City of Aurora, Challenger Reservoir. Review of the final grades of the reservoir, indicates the liner slopes approximately 3 horizontal to 1 vertical (3h:1v) and is approximately 30 feet in height.

Based on the original Tetra Tech (2019) analyses and the stability analyses discussed herein, the mine and conveyor route will be stable.

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 downwarp 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 (Trimble and Machette, 1979) indicates the near surface bedrock at the site is most likely the Denver Formation. Trimble and Machette (1979) describes the Denver Formation as claystone, siltstone, and sandstone. The regional mapping indicates the bedrock is overlain by the Post Piney Creek and Piney Creek Alluviums. Trimble and Machette (1979) describes these alluvial deposits as sandy to gravelly alluvium.

GEOTECHNICAL CONDITIONS

Based on the site investigations, the natural site stratigraphy generally consists of four main units: 1) Overburden generally consisting of sandy clay and clayey and silty sands; 2) sand and gravel alluvial deposits that underlie the

overburden and overlie the bedrock; 3) a mud lens locally interbedded within the sand and gravel; and 4) bedrock usually consisting of claystone, sandy claystone with local areas of sandstone. These units are described in more detail below.

Overburden Unit
The overburden at the site typically ranges from sandy clay to clayey sand locally grading to silty sand. This unit ranges from approximately 0.5 to 6 feet in thickness. This unit is usually slightly moist to moist, very stiff to hard or medium dense to dense with the top 6 inches containing significant organics. Of the samples tested, the percent passing the No. 200 sieve ranged from 29.0% to 88.2%. Atterberg Limits testing resulted in Liquid Limits of 22 to 68 and Plasticity Indices of 4 to 47.

Sand & Gravel Unit
The sand and gravel is present throughout the site usually underlying the overburden and overlying the bedrock. Locally, this unit is present at the ground surface on the west part of the west cell. 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 3 inches. This unit is typically medium dense to dense but is also locally loose. This deposit ranges in thickness from approximately 8 feet to 50 feet. The sands are clean with fines content (silt and clay) generally considered to be on the order of approximately 2 to 6 percent. Local clay to clayey lenses were also logged within the deposit.

Mud Lens Unit
The mud lens typically ranges from fine silty sand to sandy clayey silt, to silty clay. This unit is most common west of Tucson Street but also is found on the east side of the street. It is commonly interbedded within the sand and gravel unit.

Bedrock
The bedrock encountered in the exploratory borings was generally weathered in the upper one to two feet typically becoming harder in unweathered zones. The bedrock consisted of claystone or sandy claystone locally grading to silty, fine to medium grained, sandstone with local claystone seams. For the claystone samples, the percent passing the 200-sieve ranged from 51.7 to 95 percent. For the sandstone samples, the percent passing the minus No. 200 sieve ranges from approximately 11.4% to 29.2%.

Groundwater
Groundwater was encountered in all the borings at approximately 5 to 13 feet below ground surface at the time of drilling. The groundwater levels will vary seasonally and will typically rise during the irrigation season. Groundwater will be controlled with the proposed below grade slurry wall. After slurry wall construction, groundwater mounding 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. An underdrain has been designed around the west slurry wall to mitigate mounding and shadowing effects.

STRUCTURES WITHIN 200 FEET OF MINED AEAS
Structures within 200 feet of the mine limits are listed in Exhibit S of the DRMS Amendment. As mentioned above, stability analyses addressing off set from the mining were performed by Tetra Tech (2019) in the previous amendment. The purpose of this stability analysis is to evaluate the stability along the conveyor route and rapid drawdown at the reclaimed Tucson South Reservoirs.

STABILITY ANALYSES
Division of Reclamation and Mining Safety (DRMS) staff drafted a policy regarding stability analyses of neighboring structures. The draft summarizes adequate factors of safety (FOS) for non-critical and critical structures. All the structures considered in this analysis are considered critical structures. The FOS are for both static and seismic (from an

earthquake) stability analyses. For generalized strength assumptions and critical structures, a FOS of 1.5 is considered sufficient for static conditions and a FOS of 1.3 is considered suitable for seismic conditions.

The DRMS has not adapted a FOS for the rapid drawdown analysis. The geotechnical practice in the area is to require a FOS of 1.2 for rapid drawdown. This FOS evolved from the State Engineers Office (SEO), Dam Safety Branch (DSB) which required a 1.2 FOS for a rapid drawdown event at a jurisdictional dam.

The stability analyses performed herein were performed on cross sections described below and shown on Figures 1, 2, and 3. The sections were analyzed under anticipated loading conditions. The computer program XSTABL was used for the analysis. The method for selecting the critical failure surface for each analyzed loading condition is the following. The Modified Bishop's Method of Analysis is used to find the critical failure surface by randomly searching with 20 termination points and 20 initiation points (400 failure circles) with 7-foot line segments over the slope surface and at the structure in question to determine the lowest factor of safety. Both static stability under anticipated conditions and seismic stability under peak ground acceleration loads were performed for the three (3) sections along the conveyor. A maximum horizontal acceleration of 0.067g was used at the site. For the two (2) sections analyzed for rapid drawdown, the section was modeled high water levels (high pore pressure) within the reclamation slope to mimic a rapid drawdown event.

The cross-section locations were selected and analyzed as described below. The sections met adequate FOS as summarized below in Table 1. The section locations are shown on Figure 1, 2 and 3.

- West Cell Rapid Drawdown

  This section evaluated the proposed setback from the Tucson Street easement from the West Cell boundary with a compacted reclamation slope. A 500 psf load was applied to the road to mimic live traffic loads. A mud lens was modeled based on actual findings in the area. Outside of the slurry wall, the area was modeled with a high-water table assuming the wet season. Inside the slurry wall the area was modeled with a high-water table within the reclamation slope to mimic rapid draw down conditions. Potential failure surfaces were drawn from the edge of the Tucson Street easement. The location of this section is shown on Figure 1.

- East Cell Rapid Drawdown

  This section evaluated the proposed setback from the Tucson Street easement from the East Cell boundary with a compacted reclamation slope. A 500 psf load was applied to the road to mimic live traffic loads. No mud lens was modeled based on actual findings in the area. Outside of the slurry wall, the area was modeled with a high-water table assuming the wet season. Inside the slurry wall the area was modeled with a high-water table within the reclamation slope to mimic rapid draw down conditions. Potential failure surfaces were drawn from the edge of the Tucson Street easement. The location of this section is shown on Figure 2.

- Challenger Clay Liner:

  This section is on the east side of the Challenger Reservoir considers the tallest section adjacent to the conveyor. The stability analysis for this section assumes a mine highwall sloped at 0.5 horizontal to 1 vertical (0.5h:1v). The clay liner slopes 3h:1v. The overburden was modeled at 4 feet thick. The underlying sand and gravel was modeled at 26 feet thick with a 4 feet thick interlensed mud lens. One foot of residual strength bedrock was modeled over unweathered bedrock. A 500 psf surcharge was modeled at the top of the liner near the conveyor to mimic the conveyor and traffic loading of maintenance vehicles. Potential failure circles covered the clay liner slope. The location of this section is shown on Figure 1.

- C Muhler

  This section is on the northeast side of the Challenger Reservoir considers the tallest section adjacent to the conveyor and near the Muhler property. The stability analysis for this section assumes a mine highwall sloped at 0.5 horizontal to 1 vertical (0.5h:1v). The clay liner slopes 3h:1v. The overburden was modeled at 4 feet thick. The underlying sand and gravel was modeled at 26 feet thick with a 4 feet thick interlensed mud lens. One foot of residual strength bedrock was modeled over unweathered bedrock. A 500 psf surcharge was modeled at the top of the liner near the conveyor to mimic the conveyor and traffic loads. Potential failure surfaces were drawn from the edge of the Muhler property. The location of this section is shown on Figure 1.

- North Conveyor

  This section is on the west side of Weld County Road (WCR) 23.5. The area of this section is nearly flat with no mine highwall present in the area. The overburden was modeled at 4 feet thick. The underlying sand and gravel was modeled at 26 feet thick with a 4 feet thick interlensed mud lens. One foot of residual strength bedrock was modeled over unweathered bedrock. A 500 psf surcharge was modeled at the road and near the conveyor. Potential failure circles were drawn from the utility corridor along the west side WCR 23.5. The location of this section is shown on Figure 3.

MATERIAL PROPERTIES

The material index and engineering strengths assumed in this slope stability report match those used in the Tetra Tech (2019) analyses and are discussed below.

Overburden

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

Moist Unit Weight (pcf)	*Saturated Unit Weight (pcf)*	*Cohesion C' psf*	*Friction Angle Φ'*
114	126	50	28

Alluvial Sand and Gravel

The sand and gravel is generally a medium to coarse-grained sand that is medium dense to dense and locally gravelly. The alluvial sand and gravel was modeled as follows:

Moist Unit Weight (pcf)	*Saturated Unit Weight (pcf)*	*Cohesion C' psf*	*Friction Angle Φ'*
130	137	0	35

Mud Lens

The strength properties for the mud lens was based on field testing data and on our engineering judgment; the following parameters have been used to model the overburden.

Moist Unit Weight (pcf)	*Saturated Unit Weight (pcf)*	*Cohesion C' psf*	*Friction Angle Φ'*
114	126	50	28

Bedrock

Bedrock below the alluvium is predominately sandy claystone with local claystone and sandstone. Sandstone is typically stronger than claystone. Claystone is generally a weak bedrock. To be conservative, we modeled the bedrock as claystone. For the claystone bedrock, two potential strength conditions were considered. These strength conditions are referred to as: 1) peak strength, and 2) residual strength.

Peak strength is the maximum shear strength the claystone bedrock exhibits. The shear strength is made up of both cohesion (diagenetic bonding) and internal friction. Under short-term conditions for unsheared claystone, peak strength governs behavior. If a sheared surface or sheared zone is present within claystone as a result of faulting, slippage between beds due to folding, past shrink-swell behavior, stress relief, weathering, or from a landslide, the cohesion along the sheared surface is reduced to zero, and the angle of internal friction is decreased, due to alignment of clay minerals parallel to the shear plane. Under these conditions a claystone exhibits its lowest strength known as residual strength. Residual strength bedrock occurs in discrete zones, parallel with the sheared surface or zone, whereas fully softened strength occurs over a broader area (not used in this modeling). Based on data from other recent projects and engineering judgment, the residual strength claystone was modeled in a one-foot-thick layer overlying the peak strength bedrock as follows:

Moist Unit Weight (pcf)	***Saturated Unit Weight (pcf)***	***Cohesion C' psf***	***Friction Angle Φ'***
Peak = 124 Residual = 124	Peak = 134 Residual = 134	Peak = 100 Residual = 0	Peak = 28 Residual = 14

STABILITY ANALYSES RESULTS

The factor of safety shown below in Table 1 is the minimum factor of safety of the conditions listed above.

TABLE 1 - SLOPE STABILITY RESULTS AND SETBACKS

Section	Critical Structure	Static Factor of Safety at Structure	Seismic Factor of Safety at Structure (0.067g horizontal)	Rapid Drawdown Factor of Safety at Structure	DRMS FOS Requirement Static/Seismic	DSB FOS Requirement
West Cell	Tucson St Easement	NA	NA	1.4	NA	1.2
East Cell	Tucson St Easement	NA	NA	1.4	NA	1.2
Challenger Liner	Clay Liner	1.6	1.3	NA	1.5/1.3	NA
C Muhler	Property Line	3.9	2.5	NA	1.5/1.3	NA
North Conveyor	Utilities on WCR 23.5	3.3	2.9	NA	1.5/1.3	NA

CONCLUSIONS

Based on the Factors of Safety listed in the table above and the previous analyses performed by Tetra Tech (2019), neither the mine nor the conveyor will be a hazard to nearby structures provided the mine plan is followed and loading and subsurface conditions are as modeled.

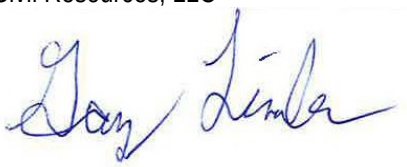
LIMITATIONS

Our review is based on regional geologic mapping, present mining and conveyor 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 or conveyor plans change, or subsurface conditions vary from those portrayed in this letter, we should be contacted to re-evaluate the potential affects on permanent man-made structures. The rapid drawdown analyses addressed herein are for structures as described herein. Further rapid drawdown analyses will be required when designing the final reservoir slopes.

Please call with any questions or comments.

Sincerely,

Civil Resources, LLC



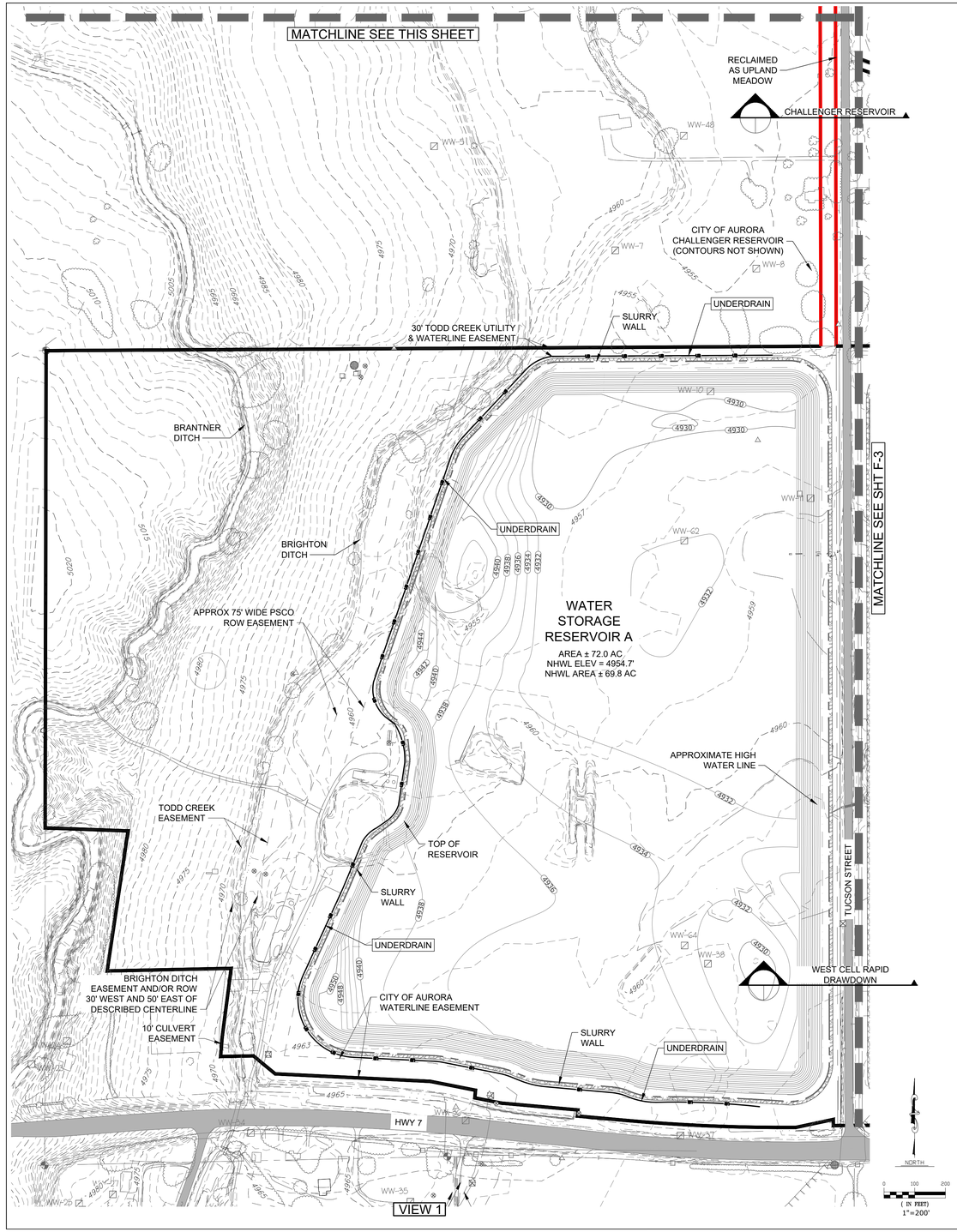
Gary Linden, P.G.
Senior Engineering Geologist

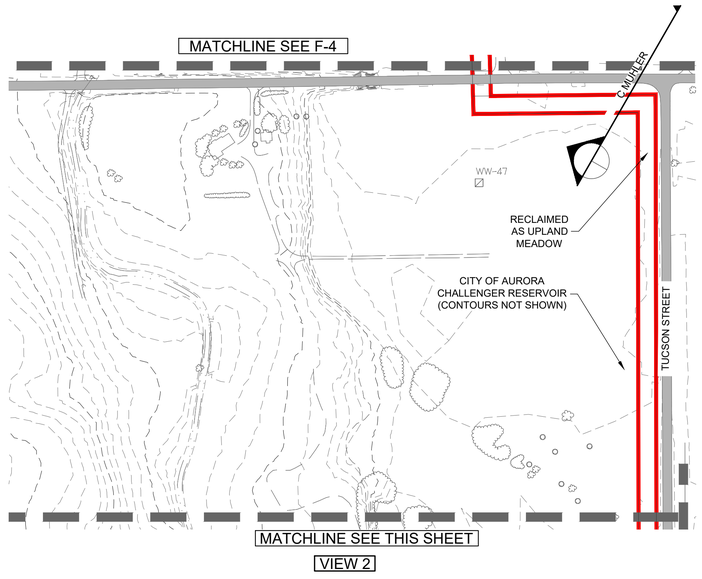
Attachments: Figures 1,2, and 3 – Site Drawings showing locations of sections.
XSTABL Model Input and Output Files

Reference:

Tetra Tech, 2019. Slope Stability and Setback Updates, July 3, 2019: Tetra Tech Job No. 200-23514-18004

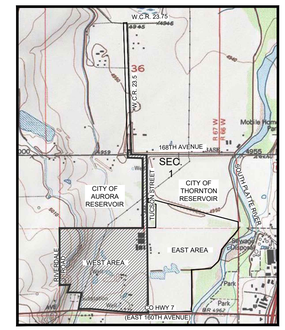
Trimble, D.E. and Machette, M.N.; "Geologic Map of the Greater Denver Area, Front Range Urban Corridor, Colorado"; U.S.G.S. Map I-856-H.





LEGEND:

- MINE PERMIT BOUNDARY
- TRACT BOUNDARY
- EFFECTIVE FLOODWAY
- EFFECTIVE ZONE AE
- EFFECTIVE ZONE X
- PRE-PROJECT/MINING CONDITIONS 100-YR FLOODPLAIN
- EXISTING EDGE OF WATER
- 4900 EXISTING 2' CONTOURS
- x x x x EXISTING FENCE
- EXISTING EDGE OF ROAD
- UE EXISTING ELECTRIC LINE
- OE EXISTING OVERHEAD ELECTRIC LINE
- G EXISTING GAS LINE
- W EXISTING WATER LINE
- OT EXISTING TELEPHONE LINE
- UD UD PROPOSED UNDERDRAIN
- PROPOSED SLURRY WALL
- 4900 PROPOSED 2' CONTOURS
- RESERVOIR ACCESS ROAD
- EXISTING ASPHALT ROAD
- EXISTING SOUTH PLATTE RIVER
- RESERVOIR ACCESS ROAD
- NHWL NORMAL HIGH WATER LINE
- NAME STABILITY ANALYSIS SECTION



PERMIT KEY MAP NORTH

NTS

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WWW.CIVILRESOURCES.COM

AGGREGATE INDUSTRIES
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GOLDEN, COLORADO 80401
303-648-1175(P)

TUCSON SOUTH RESOURCE
EXHIBIT F WEST AREA
RECLAMATION PLAN

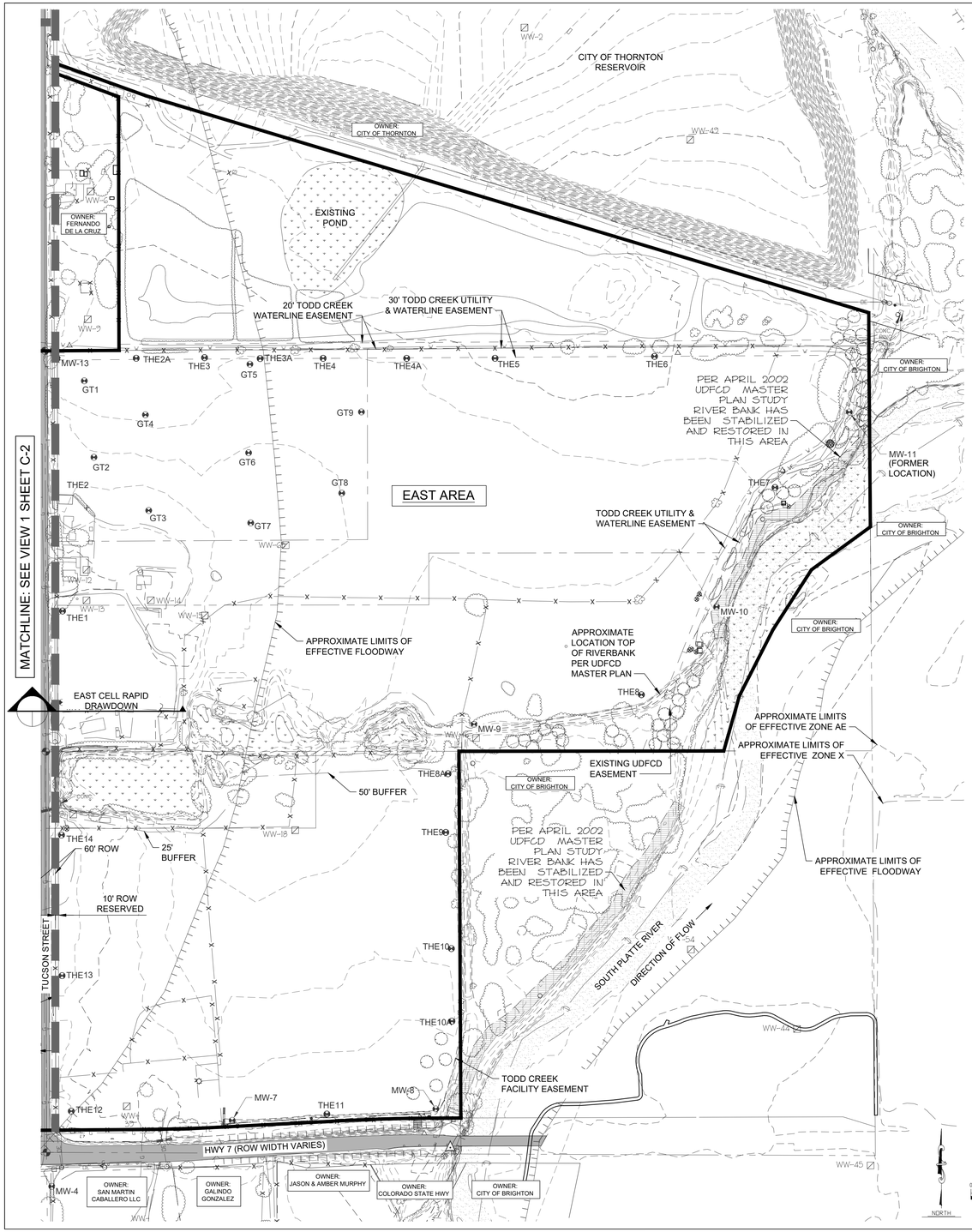
REVISIONS		
NO.	DESCRIPTION	DATE
1	ADEQUACY 2	12/15/21

DRAWN BY: CAI DATE: AUGUST 21
CHECKED BY: GL SCALE: AS NOTED
AS NOTED
JOB NO.: 297.001.09
DWG NAME: I:\ EXHIBIT F EAST AREA SECT.dwg

STABILITY ANALYSIS SECTIONS

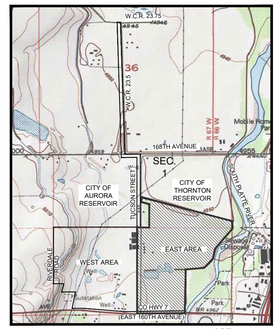
SHEET: 1

Know what's below. Call before you dig.



LEGEND:

- MINE PERMIT BOUNDARY
- TRACT BOUNDARY
- EFFECTIVE FLOODWAY
- EFFECTIVE ZONE AE
- EFFECTIVE ZONE X
- PRE-PROJECT/MINING CONDITIONS 100-YR FLOODPLAIN
- EXISTING EDGE OF WATER
- 4900 — EXISTING 2' CONTOURS
- EXISTING FENCE
- EXISTING EDGE OF ROAD
- UE — EXISTING ELECTRIC LINE
- OE — EXISTING OVERHEAD ELECTRIC LINE
- G — EXISTING GAS LINE
- W — EXISTING WATER LINE
- OT — EXISTING TELEPHONE LINE
- PROPOSED SLURRY WALL
- 4900 — PROPOSED 2' CONTOURS
- RESERVOIR ACCESS ROAD
- EXISTING ASPHALT ROAD
- EXISTING SOUTH PLATTE RIVER
- RESERVOIR ACCESS ROAD
- NHWL — NORMAL HIGH WATER LINE
- PROPOSED COTTONWOOD TREE (LOCATIONS SUBJECT TO CHANGE)
- PROPOSED SHRUB BEDS (LOCATIONS SUBJECT TO CHANGE)
- NAME — STABILITY ANALYSIS SECTION



PERMIT KEY MAP

NTS

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TUCSON SOUTH RESOURCE
EXHIBIT C
PRE-MINING EAST AREA

REVISIONS		
NO.	DESCRIPTION	DATE
1	PRELIM ADEQUACY	12/01/21
2	ADEQUACY 2	12/15/21

DRAWN BY:	CI	DATE:	AUGUST 21
CHECKED BY:	GL	SCALE:	AS NOTED
			AS NOTED

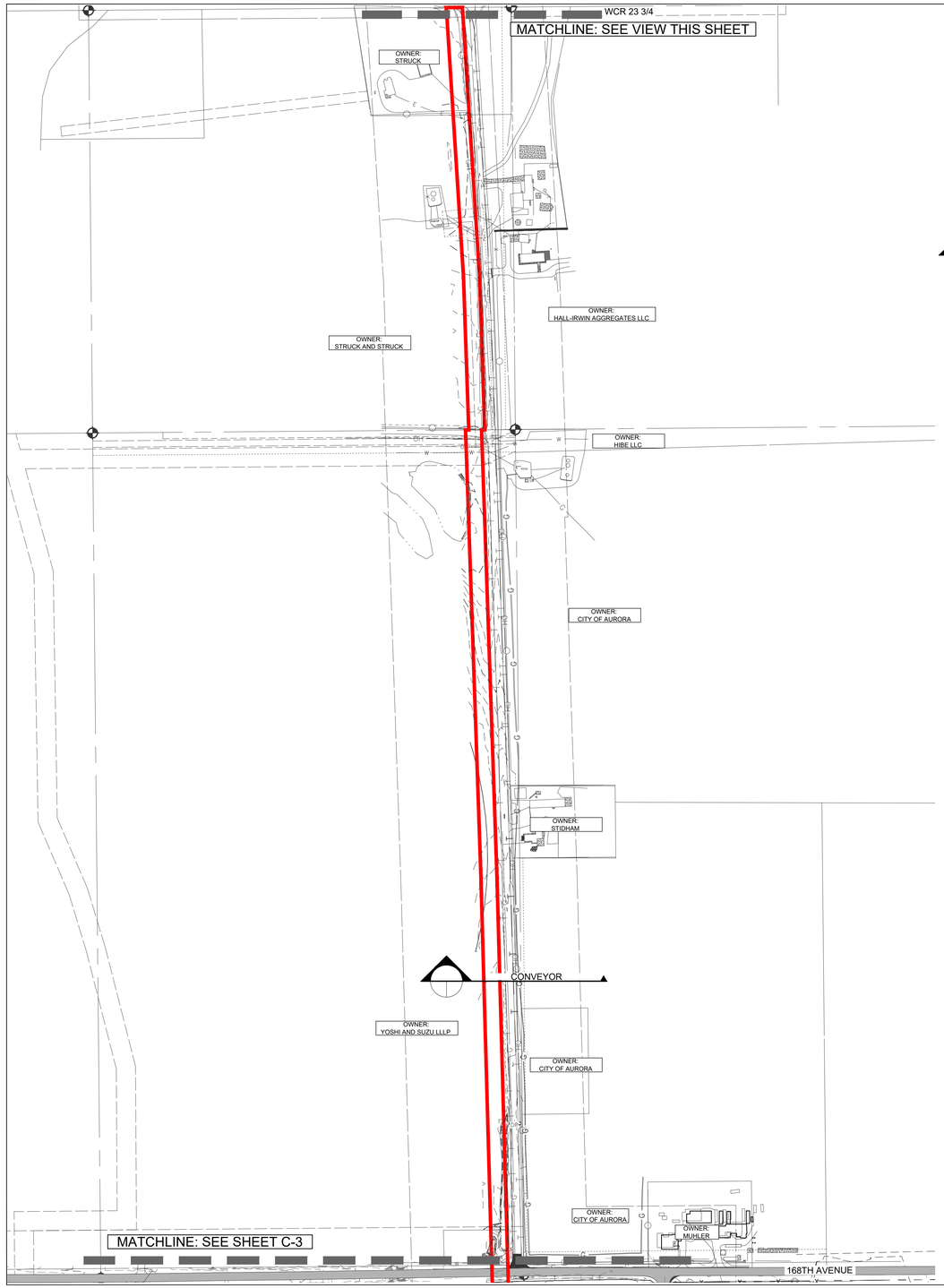
JOB NO.: 297.001.09

DWG NAME: SECTION STABILITY ANALYSIS 2.dwg

STABILITY ANALYSIS SECTION

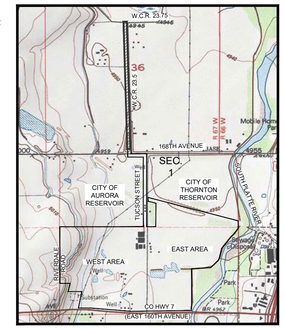
SHEET: 2

Know what's below. Call before you dig.



LEGEND:

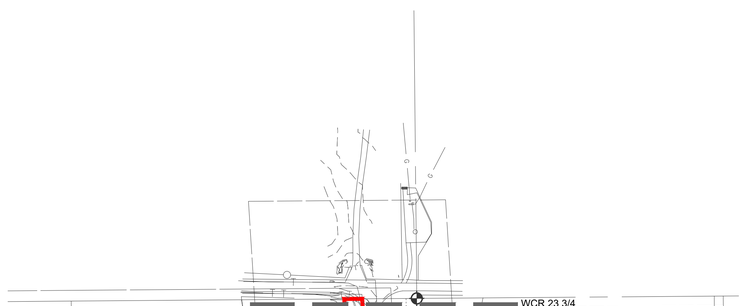
- MINE PERMIT BOUNDARY
- TRACT BOUNDARY
- EFFECTIVE FLOODWAY
- EFFECTIVE ZONE AE
- EFFECTIVE ZONE X
- PRE-PROJECT/MINING CONDITIONS 100-YR FLOODPLAIN
- EXISTING EDGE OF WATER
- 4900 EXISTING 2' CONTOURS
- EXISTING FENCE
- EXISTING EDGE OF ROAD
- UE EXISTING ELECTRIC LINE
- NAME STABILITY ANALYSIS SECTION
- OE EXISTING OVERHEAD ELECTRIC LINE
- G EXISTING GAS LINE
- W EXISTING WATER LINE
- OT EXISTING TELEPHONE LINE
- EXISTING ASPHALT ROAD
- EXISTING SOUTH PLATTE RIVER
- MW-I MONITORING WELL LOCATION WITH WELL ID #
- WW-IO WATER WELL LOCATION WITH WELL ID #
- EXISTING TREES
- UTILITY POLE
- SECTION CORNER MONUMENT



PERMIT KEY MAP

NORTH

NTS



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TUCSON SOUTH RESOURCE
EXHIBIT C
PRE-MINING WELD COUNTY CONVEYOR

REVISIONS

NO.	DESCRIPTION	DATE
1	PRELIM ADEQUACY	12/01/21
2	ADEQUACY 2	12/15/21

DRAWN BY: CI
CHECKED BY: GL
DATE: AUGUST 21
SCALE: AS NOTED
AS NOTED
JOB NO.: 297.001.09
DWG NAME: SECTION STABILITY ANALYSIS 3.dwg

STABILITY ANALYSIS SECTION

SHEET: 3

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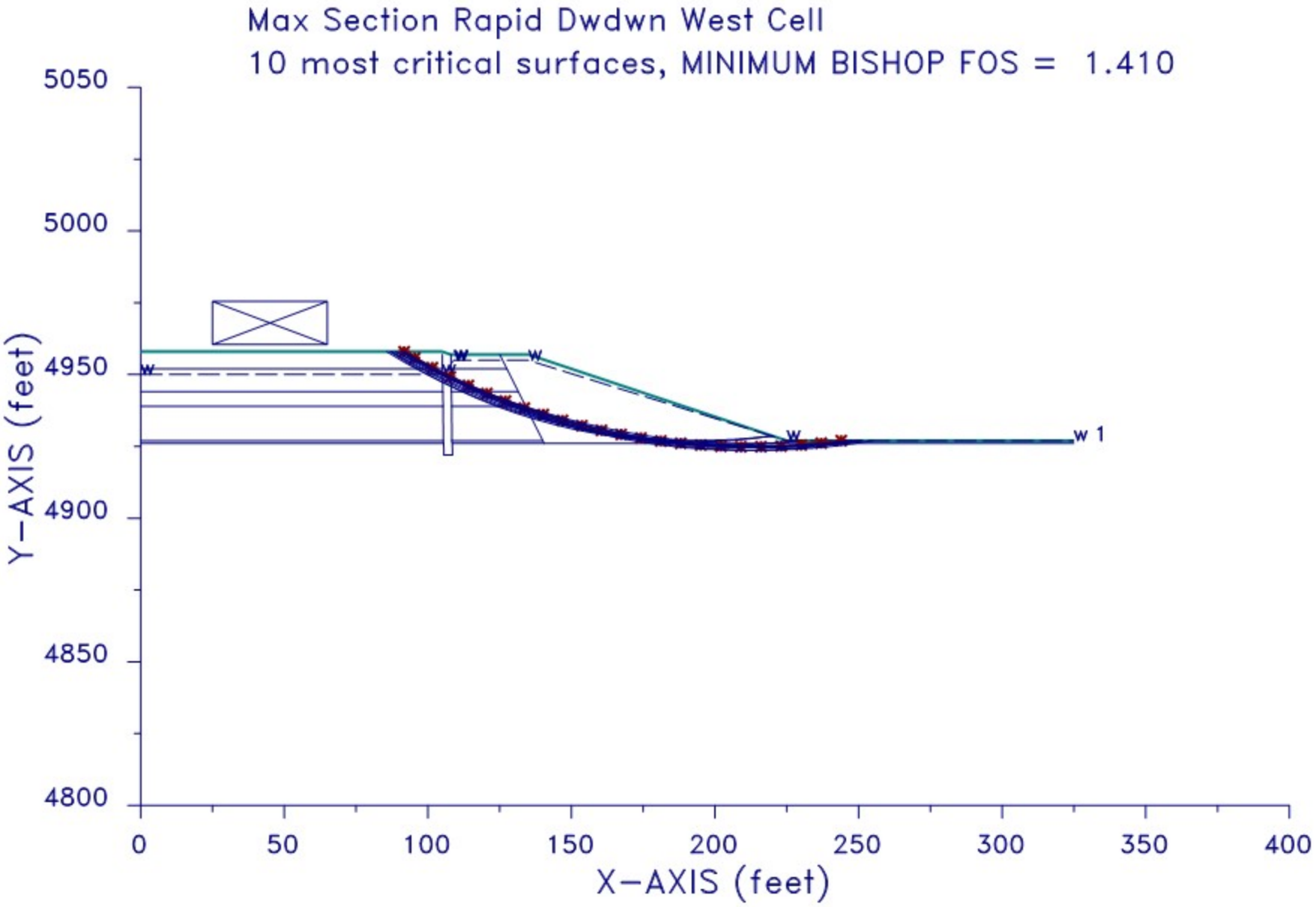

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    105.0     4958.0      108.0     4957.0   7
    108.0     4957.0      125.0     4957.0   1
    125.0     4957.0      135.0     4957.0   6
    135.0     4957.0      225.0     4927.0   6
    225.0     4927.0      325.0     4927.0   4
    105.0     4957.0      105.1     4952.0   1
    108.0     4957.0      108.1     4952.0   7
    125.0     4957.0      127.5     4952.0   1
       .0     4952.0      105.1     4952.0   2
    108.1     4952.0      127.5     4952.0   2
    105.1     4952.0      105.2     4944.0   3
    108.1     4952.0      108.2     4944.0   7
    127.5     4952.0      131.5     4944.0   3
       .0     4944.0      105.2     4944.0   3
    108.2     4944.0      131.5     4944.0   3
    105.2     4944.0      105.3     4939.0   3
    108.2     4944.0      108.3     4939.0   7
    131.5     4944.0      134.0     4939.0   3
       .0     4939.0      105.3     4939.0   2
    108.3     4939.0      134.0     4939.0   2
    105.3     4939.0      105.4     4927.0   2
    108.3     4939.0      108.4     4927.0   7
    134.0     4939.0      140.0     4927.0   2
       .0     4927.0      105.4     4927.0   4
    108.4     4927.0      140.0     4927.0   4
    105.4     4927.0      105.5     4926.0   4
    108.4     4927.0      108.5     4926.0   7
    140.0     4927.0      140.5     4926.0   4
    225.0     4927.0      225.5     4926.0   4
       .0     4926.0      105.5     4926.0   5
    108.5     4926.0      140.5     4926.0   5
    140.5     4926.0      225.0     4926.0   5
    225.0     4926.0      325.0     4926.0   5
    105.5     4926.0      105.6     4922.0   5
    108.5     4926.0      108.6     4922.0   7
    105.6     4922.0      108.6     4922.0   5
SOIL
  7
  114.0    126.0      50.0    28.00     .000        .0    1
  130.0    137.0        .0    35.00     .000        .0    1
  114.0    126.0      50.0    28.00     .000        .0    1
  124.0    134.0        .0    14.00     .000        .0    1
  124.0    134.0     100.0    28.00     .000        .0    1
  119.0    126.0      25.0    26.00     .000        .0    1
  118.0    124.0        .0      .00     .000        .0    1
WATER
```

```
  1       62.40
     7
          .0      4950.0
       105.0      4950.0
       109.0      4955.0
       109.4      4955.0
       135.0      4955.0
       225.0      4927.0
       325.0      4927.0
LOADS
  1
        25.0        65.0       500.0          .0
CIRCL2
    20      20
    220.0      255.0       80.0       92.0
   4900.0        7.0       -5.0      -45.0
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XSTABL File: WTSRDD 12-08-21 39:30

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*        Slope Stability Analysis       *
*                using the              *
*            Method of Slices           *
*                                       *
*        Copyright (C) 1992 - 2002      *
*   Interactive Software Designs, Inc.  *
*        Moscow, ID 83843, U.S.A.       *
*                                       *
*          All Rights Reserved          *
*                                       *
*  Ver. 5.206                 96 - 1952 *
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Problem Description : Max Section Rapid Dwdwn West Cell

SEGMENT BOUNDARY COORDINATES

---

6 SURFACE boundary segments

Segment No.	x-left (ft)	y-left (ft)	x-right (ft)	y-right (ft)	Soil Unit Below Segment
1	.0	4958.0	105.0	4958.0	1
2	105.0	4958.0	108.0	4957.0	7
3	108.0	4957.0	125.0	4957.0	1
4	125.0	4957.0	135.0	4957.0	6
5	135.0	4957.0	225.0	4927.0	6
6	225.0	4927.0	325.0	4927.0	4

31 SUBSURFACE boundary segments

Segment	x-left	y-left	x-right	y-right

Soil Unit Below Segment	No.	(ft)	(ft)	(ft)	(ft)
1	1	105.0	4957.0	105.1	4952.0
7	2	108.0	4957.0	108.1	4952.0
1	3	125.0	4957.0	127.5	4952.0
2	4	.0	4952.0	105.1	4952.0
2	5	108.1	4952.0	127.5	4952.0
3	6	105.1	4952.0	105.2	4944.0
7	7	108.1	4952.0	108.2	4944.0
3	8	127.5	4952.0	131.5	4944.0
3	9	.0	4944.0	105.2	4944.0
3	10	108.2	4944.0	131.5	4944.0
3	11	105.2	4944.0	105.3	4939.0
7	12	108.2	4944.0	108.3	4939.0
3	13	131.5	4944.0	134.0	4939.0
2	14	.0	4939.0	105.3	4939.0
2	15	108.3	4939.0	134.0	4939.0
2	16	105.3	4939.0	105.4	4927.0
7	17	108.3	4939.0	108.4	4927.0
2	18	134.0	4939.0	140.0	4927.0
4	19	.0	4927.0	105.4	4927.0
4	20	108.4	4927.0	140.0	4927.0
4	21	105.4	4927.0	105.5	4926.0
7	22	108.4	4927.0	108.5	4926.0
4	23	140.0	4927.0	140.5	4926.0
4	24	225.0	4927.0	225.5	4926.0

```
              25          .0    4926.0      105.5    4926.0
5
              26       108.5    4926.0      140.5    4926.0
5
              27       140.5    4926.0      225.0    4926.0
5
              28       225.0    4926.0      325.0    4926.0
5
              29       105.5    4926.0      105.6    4922.0
5
              30       108.5    4926.0      108.6    4922.0
7
              31       105.6    4922.0      108.6    4922.0
5
```

ISOTROPIC Soil Parameters

---

7 Soil unit(s) specified

Soil No.	Unit Weight Moist (pcf)	Unit Weight Sat. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Parameter Ru	Water Unit Constant (psf)	Surface No.
1	114.0	126.0	50.0			28.00	.000
2	130.0	137.0	.0			35.00	.000
3	114.0	126.0	50.0			28.00	.000
4	124.0	134.0	.0			14.00	.000
5	124.0	134.0	100.0			28.00	.000
6	119.0	126.0	25.0			26.00	.000
7	118.0					124.0	.0
	.0	.00	.000	.0	1		

1 Water surface(s) have been specified

Unit weight of water = 62.40 (pcf)

Water Surface No. 1 specified by 7 coordinate points

****
PHREATIC SURFACE,
****

Point No.	x-water (ft)	y-water (ft)
1	.00	4950.00
2	105.00	4950.00
3	109.00	4955.00
4	109.40	4955.00
5	135.00	4955.00
6	225.00	4927.00
7	325.00	4927.00

BOUNDARY LOADS
---

1 load(s) specified

Load No.	x-left (ft)	x-right (ft)	Intensity (psf)	Direction (deg)
1	25.0	65.0	500.0	.0

NOTE - Intensity is specified as a uniformly distributed force acting on a HORIZONTALLY projected surface.

A critical failure surface searching method, using a random technique for generating CIRCULAR surfaces has been specified.

400 trial surfaces will be generated and analyzed.

20 Surfaces initiate from each of 20 points equally spaced along the ground surface between x = 220.0 ft

and x = 255.0 ft

Each surface terminates between x = 80.0 ft
and x = 92.0 ft

Unless further limitations were imposed, the minimum elevation
at which a surface extends is y = 4900.0 ft

7.0 ft line segments define each trial failure surface.

ANGULAR RESTRICTIONS

The first segment of each failure surface will be inclined
within the angular range defined by :

Lower angular limit := -45.0 degrees
Upper angular limit := -5.0 degrees

Factors of safety have been calculated by the :

* * * * * SIMPLIFIED BISHOP METHOD * * * * *

The most critical circular failure surface
is specified by 24 coordinate points

Point No.	x-surf (ft)	y-surf (ft)
1	243.95	4927.00
2	237.00	4926.16
3	230.03	4925.53
4	223.04	4925.10
5	216.04	4924.88
6	209.04	4924.87
7	202.05	4925.07
8	195.06	4925.48

9	188.08	4926.09
10	181.13	4926.91
11	174.21	4927.93
12	167.32	4929.17
13	160.47	4930.60
14	153.66	4932.24
15	146.91	4934.08
16	140.21	4936.12
17	133.58	4938.36
18	127.02	4940.79
19	120.53	4943.42
20	114.12	4946.24
21	107.80	4949.25
22	101.57	4952.44
23	95.44	4955.82
24	91.76	4958.00

**** Simplified BISHOP FOS = 1.410 ****

The following is a summary of the TEN most critical surfaces

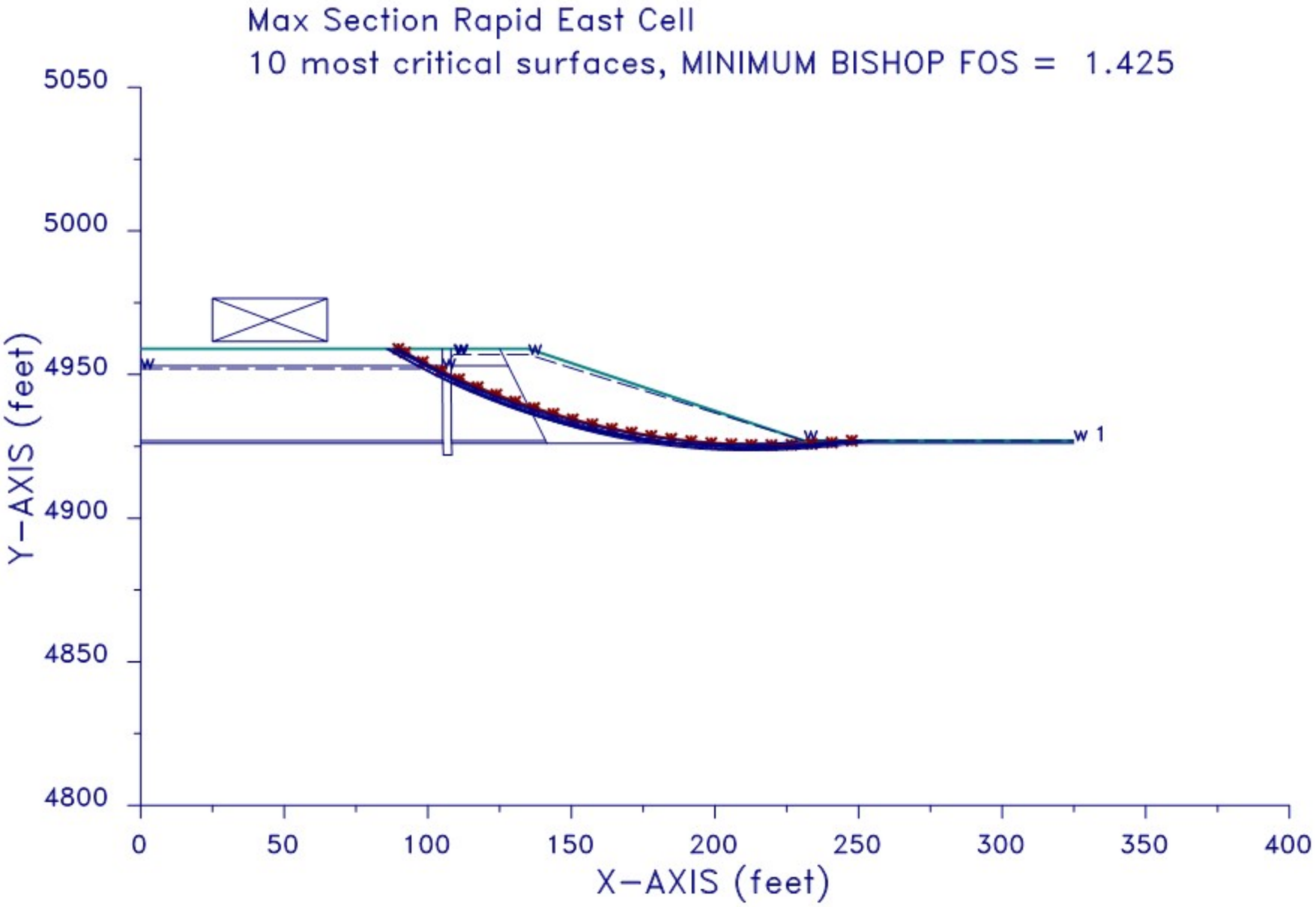
Problem Description : Max Section Rapid Dwdwn West Cell

	FOS (BISHOP)	Circle Center x-coord (ft)	Circle Center y-coord (ft)	Radius (ft)	Initial x-coord (ft)	Terminal x-coord (ft)	Resisting Moment (ft-lb)
1.	1.410	212.22	5160.22	235.37	243.95	91.76	1.618E+07
2.	1.429	216.46	5173.85	249.30	251.32	91.88	1.725E+07
3.	1.443	219.87	5202.10	276.90	251.32	89.03	1.849E+07
4.	1.456	215.35	5185.07	260.09	247.63	88.63	1.832E+07
5.	1.463	203.23	5149.17	223.69	229.21	87.22	1.639E+07
6.	1.468	210.59	5148.34	224.73	249.47	91.21	1.755E+07
7.	1.470	191.79	5117.61	191.04	220.00	86.85	1.360E+07
8.	1.482	215.00	5166.76	243.07	255.00	90.68	1.869E+07

```
           9.   1.483    194.36  5133.13   206.06   220.00
85.69  1.434E+07
          10.   1.485    211.82  5172.81   248.14   245.79
87.61  1.867E+07


                                * * *  END OF FILE  * * *
```

ETSRDD 12-08-21 40:31



```
PROFIL                                  FILE: ETSRDD    12-08-21   40:31    ft
Max Section Rapid East Cell
    25       6
       .0     4959.0      105.0     4959.0   1
    105.0     4959.0      108.0     4959.0   7
    108.0     4959.0      125.0     4959.0   1
    125.0     4959.0      135.0     4959.0   6
    135.0     4959.0      231.0     4927.0   6
    231.0     4927.0      325.0     4927.0   4
    105.0     4959.0      105.1     4953.0   1
    108.0     4959.0      108.1     4953.0   7
    125.0     4959.0      128.0     4953.0   1
       .0     4953.0      105.1     4953.0   2
    108.1     4953.0      128.0     4953.0   2
    105.1     4953.0      105.2     4927.0   2
    108.1     4953.0      108.2     4927.0   7
    128.0     4953.0      141.0     4927.0   2
       .0     4927.0      105.2     4927.0   4
    108.2     4927.0      141.0     4927.0   4
    105.2     4927.0      105.3     4926.0   4
    108.2     4927.0      108.3     4926.0   7
    141.0     4927.0      141.5     4926.0   4
       .0     4926.0      105.3     4926.0   5
    108.3     4926.0      141.5     4926.0   5
    141.5     4926.0      325.0     4926.0   5
    105.3     4926.0      105.4     4922.0   5
    108.3     4926.0      108.4     4922.0   7
    105.4     4922.0      108.4     4922.0   5
SOIL
  7
  114.0    126.0      50.0    28.00     .000        .0    1
  130.0    137.0        .0    35.00     .000        .0    1
  114.0    126.0      50.0    28.00     .000        .0    1
  124.0    134.0        .0    14.00     .000        .0    1
  124.0    134.0     100.0    28.00     .000        .0    1
  119.0    126.0      25.0    26.00     .000        .0    1
  118.0    124.0        .0      .00     .000        .0    1
WATER
  1       62.40
     7
          .0      4952.0
       105.0      4952.0
       109.0      4957.0
       109.4      4957.0
       135.0      4957.0
       231.0      4927.0
       325.0      4927.0
LOADS
  1
        25.0        65.0       500.0          .0
```

```
CIRCL2
    20      20
    220.0      255.0       80.0       90.0
   4900.0        7.0       -5.0      -45.0
```

XSTABL File: ETSRDD 12-08-21 40:31

```
*****************************************
*              X S T A B L              *
*                                       *
*        Slope Stability Analysis       *
*                using the              *
*            Method of Slices           *
*                                       *
*        Copyright (C) 1992 - 2002      *
*   Interactive Software Designs, Inc.  *
*        Moscow, ID 83843, U.S.A.       *
*                                       *
*          All Rights Reserved          *
*                                       *
*  Ver. 5.206                 96 - 1952 *
*****************************************
```

Problem Description : Max Section Rapid East Cell

SEGMENT BOUNDARY COORDINATES

---

6 SURFACE boundary segments

Segment No.	x-left (ft)	y-left (ft)	x-right (ft)	y-right (ft)	Soil Unit Below Segment
1	.0	4959.0	105.0	4959.0	1
2	105.0	4959.0	108.0	4959.0	7
3	108.0	4959.0	125.0	4959.0	1
4	125.0	4959.0	135.0	4959.0	6
5	135.0	4959.0	231.0	4927.0	6
6	231.0	4927.0	325.0	4927.0	4

19 SUBSURFACE boundary segments

Segment	x-left	y-left	x-right	y-right

Soil Unit Below Segment	No.	(ft)	(ft)	(ft)	(ft)
1	1	105.0	4959.0	105.1	4953.0
7	2	108.0	4959.0	108.1	4953.0
1	3	125.0	4959.0	128.0	4953.0
2	4	.0	4953.0	105.1	4953.0
2	5	108.1	4953.0	128.0	4953.0
2	6	105.1	4953.0	105.2	4927.0
7	7	108.1	4953.0	108.2	4927.0
2	8	128.0	4953.0	141.0	4927.0
4	9	.0	4927.0	105.2	4927.0
4	10	108.2	4927.0	141.0	4927.0
4	11	105.2	4927.0	105.3	4926.0
7	12	108.2	4927.0	108.3	4926.0
4	13	141.0	4927.0	141.5	4926.0
5	14	.0	4926.0	105.3	4926.0
5	15	108.3	4926.0	141.5	4926.0
5	16	141.5	4926.0	325.0	4926.0
5	17	105.3	4926.0	105.4	4922.0
7	18	108.3	4926.0	108.4	4922.0
5	19	105.4	4922.0	108.4	4922.0

ISOTROPIC Soil Parameters

---

7 Soil unit(s) specified

Soil	Unit Weight	Cohesion	Friction	Pore Pressure	Water

Unit No.	Moist (pcf)	Sat. (pcf)	Intercept (psf)	Angle (deg)	Parameter Ru	Constant (psf)	Surface No.
1	114.0	126.0	50.0				
						28.00	.000
		.0	1				
2	130.0	137.0	.0				
						35.00	.000
		.0	1				
3	114.0	126.0	50.0				
						28.00	.000
		.0	1				
4	124.0	134.0	.0				
						14.00	.000
		.0	1				
5	124.0	134.0	100.0				
						28.00	.000
		.0	1				
6	119.0	126.0	25.0				
						26.00	.000
		.0	1				
7	118.0						
						124.0	.0
		.00	.000	.0	1		

1 Water surface(s) have been specified

Unit weight of water = 62.40 (pcf)

Water Surface No. 1 specified by 7 coordinate points

****
PHREATIC SURFACE,
****

Point No.	x-water (ft)	y-water (ft)
1	.00	4952.00
2	105.00	4952.00
3	109.00	4957.00
4	109.40	4957.00
5	135.00	4957.00
6	231.00	4927.00
7	325.00	4927.00

BOUNDARY LOADS
---

1 load(s) specified

Load No.	x-left (ft)	x-right (ft)	Intensity (psf)	Direction (deg)
1	25.0	65.0	500.0	.0

NOTE - Intensity is specified as a uniformly distributed force acting on a HORIZONTALLY projected surface.

A critical failure surface searching method, using a random technique for generating CIRCULAR surfaces has been specified.

400 trial surfaces will be generated and analyzed.

20 Surfaces initiate from each of 20 points equally spaced along the ground surface between x = 220.0 ft
and x = 255.0 ft

Each surface terminates between x = 80.0 ft
and x = 90.0 ft

Unless further limitations were imposed, the minimum elevation at which a surface extends is y = 4900.0 ft

7.0 ft line segments define each trial failure surface.

ANGULAR RESTRICTIONS

The first segment of each failure surface will be inclined within the angular range defined by :

Lower angular limit := -45.0 degrees
Upper angular limit := -5.0 degrees

Factors of safety have been calculated by the :

* * * * * SIMPLIFIED BISHOP METHOD * * * * *

The most critical circular failure surface
is specified by 25 coordinate points

Point No.	x-surf (ft)	y-surf (ft)
1	247.63	4927.00
2	240.66	4926.34
3	233.68	4925.86
4	226.69	4925.57
5	219.69	4925.46
6	212.69	4925.54
7	205.69	4925.80
8	198.71	4926.24
9	191.73	4926.87
10	184.78	4927.68
11	177.85	4928.67
12	170.95	4929.84
13	164.08	4931.20
14	157.25	4932.73
15	150.47	4934.45
16	143.73	4936.34
17	137.04	4938.41
18	130.41	4940.65
19	123.84	4943.06
20	117.33	4945.65
21	110.90	4948.41
22	104.54	4951.34
23	98.26	4954.43
24	92.06	4957.69
25	89.72	4959.00

**** Simplified BISHOP FOS = 1.425 ****

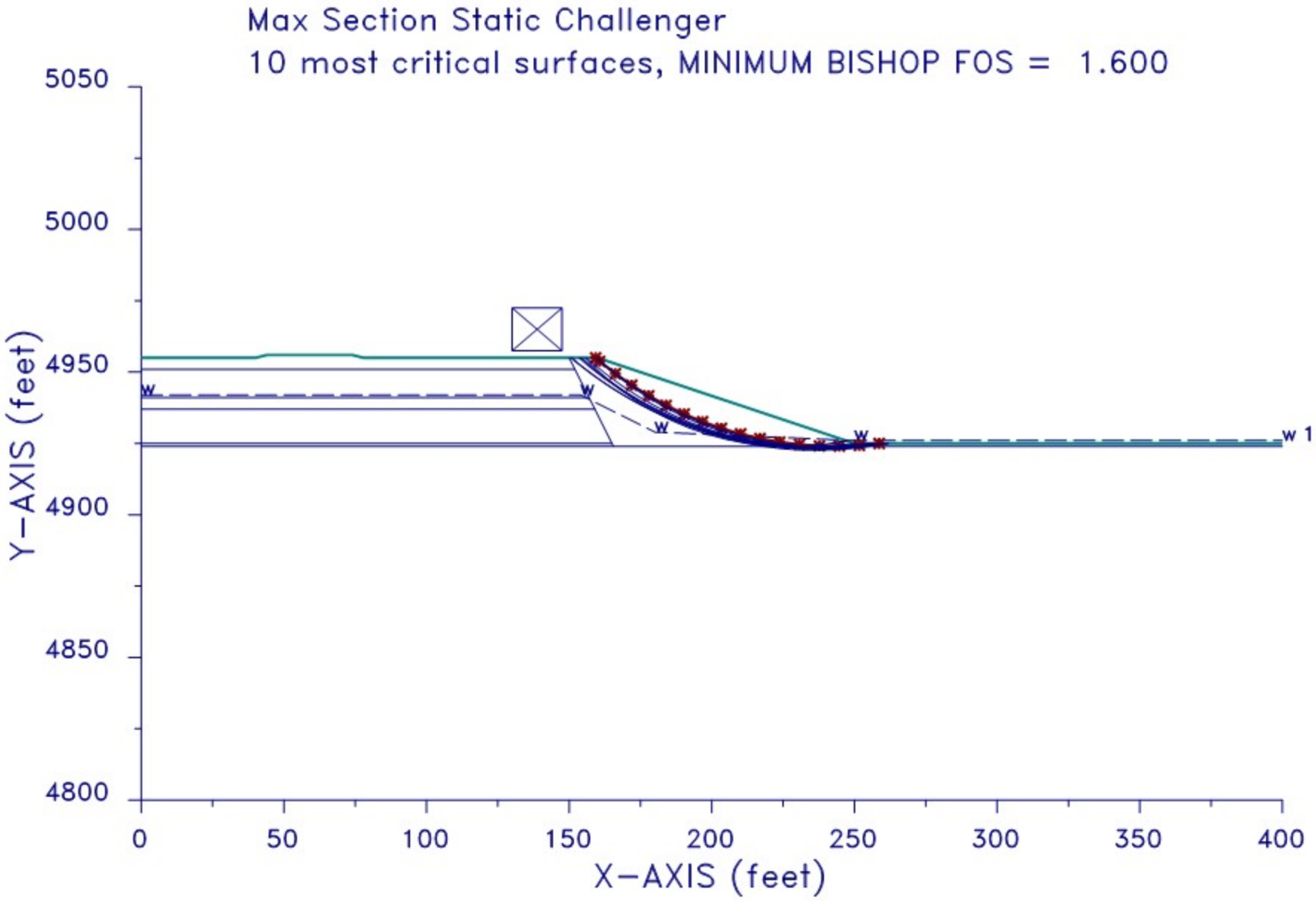
The following is a summary of the TEN most critical surfaces

Problem Description : Max Section Rapid East Cell

	FOS (BISHOP)	Circle Center x-coord (ft)	Circle Center y-coord (ft)	Radius (ft)	Initial x-coord (ft)	Terminal x-coord (ft)	Resisting Moment (ft-lb)
1.	1.425	219.03	5192.18	266.72	247.63	89.72	1.979E+07
2.	1.452	212.09	5161.32	236.48	243.95	89.76	1.922E+07
3.	1.463	216.38	5174.47	249.92	251.32	89.87	2.041E+07
4.	1.476	219.95	5201.34	276.13	251.32	87.52	2.170E+07
5.	1.498	210.43	5149.34	225.74	249.47	89.30	2.050E+07
6.	1.506	215.00	5166.76	243.08	255.00	88.89	2.172E+07
7.	1.508	204.72	5152.71	227.24	231.05	85.99	1.932E+07
8.	1.515	211.90	5172.19	247.52	245.79	86.29	2.156E+07
9.	1.529	214.66	5185.17	260.51	249.47	85.42	2.274E+07
10.	1.532	211.62	5166.18	242.16	249.47	86.42	2.216E+07

* * * END OF FILE * * *

STATIC2 12-08-21 34:43



```
PROFIL                                  FILE: STATIC2   12-08-21   34:43    ft
Max Section Static Challenger
    18       8
       .0     4955.0       40.0     4955.0   1
     40.0     4955.0       44.0     4956.0   1
     44.0     4956.0       74.0     4956.0   1
     74.0     4956.0       78.0     4955.0   1
     78.0     4955.0      150.0     4955.0   1
    150.0     4955.0      160.0     4955.0   6
    160.0     4955.0      250.0     4925.0   6
    250.0     4925.0      400.0     4925.0   4
    150.0     4955.0      152.0     4951.0   1
       .0     4951.0      152.0     4951.0   2
    152.0     4951.0      157.0     4941.0   2
       .0     4941.0      157.0     4941.0   3
    157.0     4941.0      159.0     4937.0   3
       .0     4937.0      159.0     4937.0   2
    159.0     4937.0      165.0     4925.0   2
       .0     4925.0      165.0     4925.0   4
    165.0     4925.0      165.5     4924.0   4
       .0     4924.0      400.0     4924.0   5
SOIL
  6
  114.0    126.0      50.0    28.00     .000        .0    1
  130.0    137.0        .0    35.00     .000        .0    1
  114.0    126.0      50.0    28.00     .000        .0    1
  124.0    134.0        .0    14.00     .000        .0    1
  124.0    134.0     100.0    28.00     .000        .0    1
  119.0    126.0      25.0    26.00     .000        .0    1
WATER
  1       62.40
     5
          .0      4942.0
       154.0      4942.0
       180.0      4929.0
       250.0      4926.0
       400.0      4926.0
LOADS
  1
       130.0       147.5       500.0          .0
CIRCL2
    20      20
    245.0      265.0      130.0      160.0
   4900.0        7.0       -5.0      -45.0
```

XSTABL File: STATIC2 12-08-21 34:43

```
*****************************************
*              X S T A B L              *
*                                       *
*        Slope Stability Analysis       *
*               using the               *
*            Method of Slices           *
*                                       *
*        Copyright (C) 1992 - 2002      *
*   Interactive Software Designs, Inc.  *
*        Moscow, ID 83843, U.S.A.       *
*                                       *
*          All Rights Reserved          *
*                                       *
*  Ver. 5.206                 96 - 1952 *
*****************************************
```

Problem Description : Max Section Static Challenger

SEGMENT BOUNDARY COORDINATES

---

8 SURFACE boundary segments

Segment No.	x-left (ft)	y-left (ft)	x-right (ft)	y-right (ft)	Soil Unit Below Segment
1	.0	4955.0	40.0	4955.0	1
2	40.0	4955.0	44.0	4956.0	1
3	44.0	4956.0	74.0	4956.0	1
4	74.0	4956.0	78.0	4955.0	1
5	78.0	4955.0	150.0	4955.0	1
6	150.0	4955.0	160.0	4955.0	6
7	160.0	4955.0	250.0	4925.0	6
8	250.0	4925.0	400.0	4925.0	4

10 SUBSURFACE boundary segments

Segment No.	x-left (ft)	y-left (ft)	x-right (ft)	y-right (ft)	Soil Unit Below Segment
1	150.0	4955.0	152.0	4951.0	1
2	.0	4951.0	152.0	4951.0	2
3	152.0	4951.0	157.0	4941.0	2
4	.0	4941.0	157.0	4941.0	3
5	157.0	4941.0	159.0	4937.0	3
6	.0	4937.0	159.0	4937.0	2
7	159.0	4937.0	165.0	4925.0	2
8	.0	4925.0	165.0	4925.0	4
9	165.0	4925.0	165.5	4924.0	4
10	.0	4924.0	400.0	4924.0	5

ISOTROPIC Soil Parameters
---

6 Soil unit(s) specified

Soil Unit No.	Unit Weight Moist (pcf)	Unit Weight Sat. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Parameter Ru	Water Constant (psf)	Surface No.
1	114.0	126.0	50.0	28.00	.000	.0	1
2	130.0	137.0	.0	35.00	.000	.0	1
3	114.0	126.0	50.0	28.00	.000	.0	1
4	124.0	134.0	.0	14.00	.000	.0	1
5	124.0	134.0	100.0				

```
28.00      .000          .0      1
            6   119.0   126.0       25.0
26.00      .000          .0      1


           1 Water surface(s) have been specified

          Unit weight of water =    62.40  (pcf)


          Water Surface No.  1 specified by  5 coordinate points

          **********************************
                   PHREATIC SURFACE,
          **********************************

            Point      x-water     y-water
             No.         (ft)        (ft)

               1           .00     4942.00
               2         154.00     4942.00
               3         180.00     4929.00
               4         250.00     4926.00
               5         400.00     4926.00


          ---------------
          BOUNDARY LOADS
          ---------------

              1 load(s) specified

          Load        x-left      x-right     Intensity
Direction
           No.         (ft)         (ft)        (psf)
(deg)

            1          130.0        147.5
500.0           .0


          NOTE - Intensity is specified as a uniformly
distributed
                 force acting on a HORIZONTALLY projected
surface.


          A critical failure surface searching method, using a
random
```

technique for generating CIRCULAR surfaces has been specified.

400 trial surfaces will be generated and analyzed.

20 Surfaces initiate from each of 20 points equally spaced
along the ground surface between x = 245.0 ft
and x = 265.0 ft

Each surface terminates between x = 130.0 ft
and x = 160.0 ft

Unless further limitations were imposed, the minimum elevation
at which a surface extends is y = 4900.0 ft

7.0 ft line segments define each trial failure surface.

ANGULAR RESTRICTIONS

The first segment of each failure surface will be inclined
within the angular range defined by :

Lower angular limit := -45.0 degrees
Upper angular limit := -5.0 degrees

Factors of safety have been calculated by the :

* * * * * SIMPLIFIED BISHOP METHOD * * * * *

The most critical circular failure surface
is specified by 17 coordinate points

Point	x-surf	y-surf

No.	(ft)	(ft)
1	258.68	4925.00
2	251.72	4924.34
3	244.72	4924.06
4	237.72	4924.16
5	230.74	4924.64
6	223.79	4925.50
7	216.90	4926.73
8	210.09	4928.34
9	203.37	4930.31
10	196.77	4932.64
11	190.31	4935.33
12	184.00	4938.37
13	177.87	4941.74
14	171.93	4945.44
15	166.19	4949.46
16	160.69	4953.78
17	159.30	4955.00

**** Simplified BISHOP FOS = 1.600 ****

The following is a summary of the TEN most critical surfaces

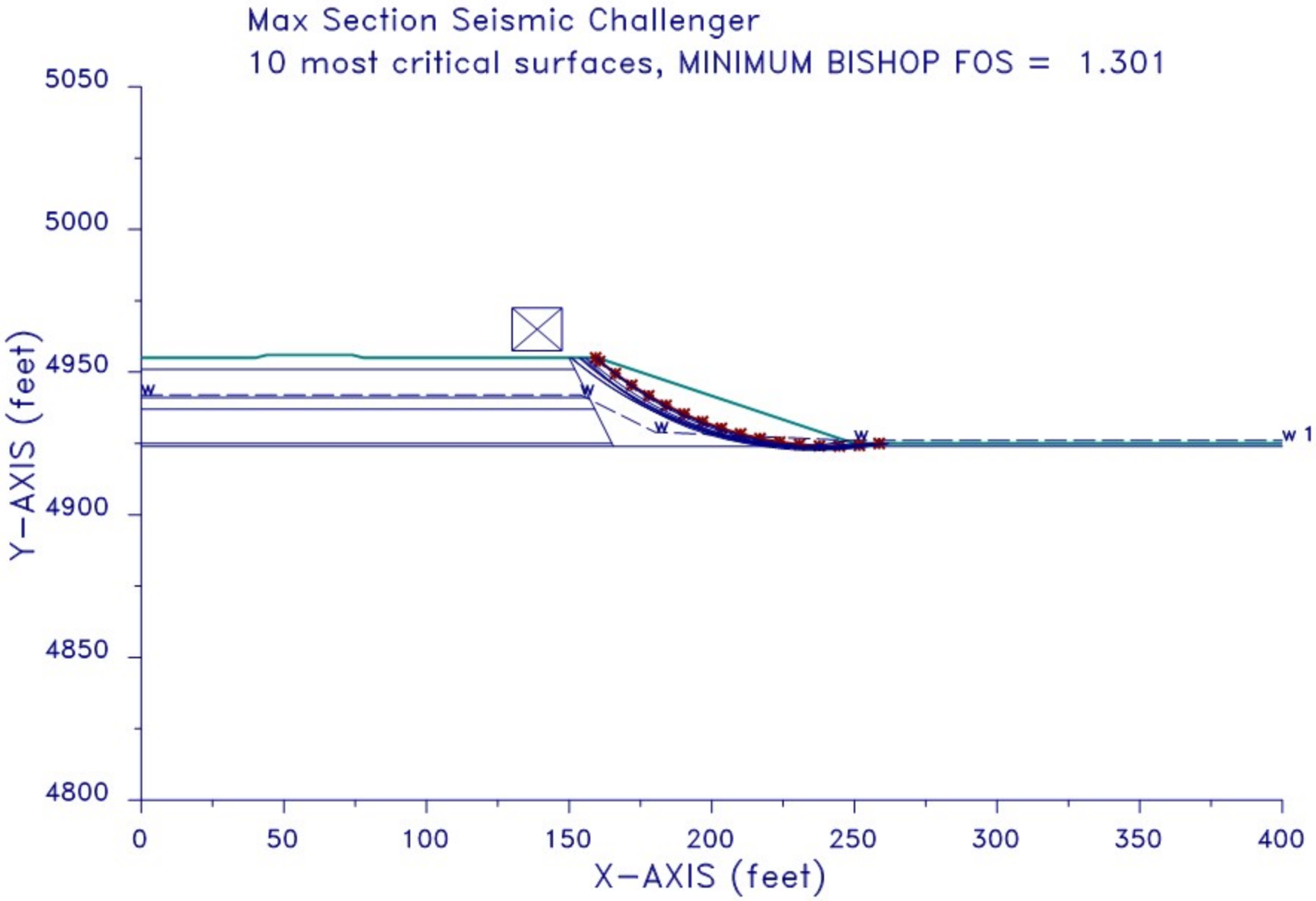
Problem Description : Max Section Static Challenger

	FOS (BISHOP)	Circle Center x-coord (ft)	Circle Center y-coord (ft)	Radius (ft)	Initial x-coord (ft)	Terminal x-coord (ft)	Resisting Moment (ft-lb)
1.	1.600	243.05	5053.08	129.03	258.68	159.30	4.711E+06
2.	1.622	235.28	5046.65	122.56	250.26	153.98	5.711E+06
3.	1.659	239.08	5040.58	116.89	256.58	159.43	4.817E+06
4.	1.668	227.21	5021.92	98.00	247.11	155.72	4.904E+06
5.	1.682	242.64	5048.51	124.99	261.84	159.74	5.013E+06
6.	1.682	236.01	5047.90	124.28	254.47	153.52	6.249E+06
7.	1.704	236.70	5057.04	133.53	256.58		

```
150.62  7.194E+06
           8.   1.707    239.76  5048.50   125.46   261.84
156.13  6.085E+06
           9.   1.722    236.18  5041.94   119.29   259.74
154.60  6.451E+06
          10.   1.724    237.35  5056.36   133.25   259.74
150.95  7.399E+06

                              * * *  END OF FILE  * * *
```

SEISMIC2 12-08-21 34:46



```
PROFIL                                  FILE: SEISMIC2  12-08-21   34:46    ft
Max Section Seismic Challenger
    18       8
       .0     4955.0       40.0     4955.0   1
     40.0     4955.0       44.0     4956.0   1
     44.0     4956.0       74.0     4956.0   1
     74.0     4956.0       78.0     4955.0   1
     78.0     4955.0      150.0     4955.0   1
    150.0     4955.0      160.0     4955.0   6
    160.0     4955.0      250.0     4925.0   6
    250.0     4925.0      400.0     4925.0   4
    150.0     4955.0      152.0     4951.0   1
       .0     4951.0      152.0     4951.0   2
    152.0     4951.0      157.0     4941.0   2
       .0     4941.0      157.0     4941.0   3
    157.0     4941.0      159.0     4937.0   3
       .0     4937.0      159.0     4937.0   2
    159.0     4937.0      165.0     4925.0   2
       .0     4925.0      165.0     4925.0   4
    165.0     4925.0      165.5     4924.0   4
       .0     4924.0      400.0     4924.0   5
SOIL
  6
  114.0    126.0      50.0    28.00     .000        .0    1
  130.0    137.0        .0    35.00     .000        .0    1
  114.0    126.0      50.0    28.00     .000        .0    1
  124.0    134.0        .0    14.00     .000        .0    1
  124.0    134.0     100.0    28.00     .000        .0    1
  119.0    126.0      25.0    26.00     .000        .0    1
WATER
  1       62.40
     5
          .0      4942.0
       154.0      4942.0
       180.0      4929.0
       250.0      4926.0
       400.0      4926.0
EQUAKE
   .067     .000
LOADS
  1
       130.0       147.5       500.0          .0
CIRCL2
    20      20
    245.0      265.0      130.0      160.0
   4900.0        7.0       -5.0      -45.0
```

XSTABL File: SEISMIC2 12-08-21   34:46

```
*****************************************
*              X S T A B L              *
*                                       *
*        Slope Stability Analysis       *
*                using the              *
*            Method of Slices           *
*                                       *
*        Copyright (C) 1992 - 2002      *
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*                                       *
*  Ver. 5.206                 96 - 1952 *
*****************************************
```

Problem Description : Max Section Seismic Challenger

SEGMENT BOUNDARY COORDINATES

---

8 SURFACE boundary segments

Segment No.	x-left (ft)	y-left (ft)	x-right (ft)	y-right (ft)	Soil Unit Below Segment
1	.0	4955.0	40.0	4955.0	1
2	40.0	4955.0	44.0	4956.0	1
3	44.0	4956.0	74.0	4956.0	1
4	74.0	4956.0	78.0	4955.0	1
5	78.0	4955.0	150.0	4955.0	1
6	150.0	4955.0	160.0	4955.0	6
7	160.0	4955.0	250.0	4925.0	6
8	250.0	4925.0	400.0	4925.0	4

10 SUBSURFACE boundary segments

Segment No.	x-left (ft)	y-left (ft)	x-right (ft)	y-right (ft)	Soil Unit Below Segment
1	150.0	4955.0	152.0	4951.0	1
2	.0	4951.0	152.0	4951.0	2
3	152.0	4951.0	157.0	4941.0	2
4	.0	4941.0	157.0	4941.0	3
5	157.0	4941.0	159.0	4937.0	3
6	.0	4937.0	159.0	4937.0	2
7	159.0	4937.0	165.0	4925.0	2
8	.0	4925.0	165.0	4925.0	4
9	165.0	4925.0	165.5	4924.0	4
10	.0	4924.0	400.0	4924.0	5

ISOTROPIC Soil Parameters
---

6 Soil unit(s) specified

Soil Unit No.	Unit Weight Moist (pcf)	Unit Weight Sat. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Parameter Ru	Water Constant (psf)	Surface No.
1	114.0	126.0	50.0	28.00	.000	.0	1
2	130.0	137.0	.0	35.00	.000	.0	1
3	114.0	126.0	50.0	28.00	.000	.0	1
4	124.0	134.0	.0	14.00	.000	.0	1
5	124.0	134.0	100.0				

```
28.00      .000          .0      1
            6   119.0   126.0       25.0
26.00      .000          .0      1


           1 Water surface(s) have been specified

          Unit weight of water =    62.40  (pcf)


          Water Surface No.  1 specified by  5 coordinate points

          **********************************
                   PHREATIC SURFACE,
          **********************************

            Point      x-water     y-water
             No.         (ft)        (ft)

              1            .00     4942.00
              2         154.00     4942.00
              3         180.00     4929.00
              4         250.00     4926.00
              5         400.00     4926.00


          A horizontal earthquake loading coefficient
          of   .067 has been assigned

          A vertical earthquake loading coefficient
          of   .000 has been assigned


          ---------------
          BOUNDARY LOADS
          ---------------

              1 load(s) specified


          Load        x-left      x-right     Intensity
Direction
           No.         (ft)         (ft)        (psf)
(deg)

            1          130.0        147.5
500.0           .0


          NOTE - Intensity is specified as a uniformly
```

distributed
force acting on a HORIZONTALLY projected
surface.

A critical failure surface searching method, using a
random
technique for generating CIRCULAR surfaces has been
specified.

400 trial surfaces will be generated and analyzed.

20 Surfaces initiate from each of 20 points equally
spaced
along the ground surface between x = 245.0 ft
and x = 265.0 ft

Each surface terminates between x = 130.0 ft
and x = 160.0 ft

Unless further limitations were imposed, the minimum
elevation
at which a surface extends is y = 4900.0 ft

7.0 ft line segments define each trial failure
surface.

ANGULAR RESTRICTIONS

The first segment of each failure surface will be
inclined
within the angular range defined by :

Lower angular limit := -45.0 degrees
Upper angular limit := -5.0 degrees

Factors of safety have been calculated by the :

* * * * * SIMPLIFIED BISHOP METHOD * * * * *

The most critical circular failure surface
is specified by 17 coordinate points

Point No.	x-surf (ft)	y-surf (ft)
1	258.68	4925.00
2	251.72	4924.34
3	244.72	4924.06
4	237.72	4924.16
5	230.74	4924.64
6	223.79	4925.50
7	216.90	4926.73
8	210.09	4928.34
9	203.37	4930.31
10	196.77	4932.64
11	190.31	4935.33
12	184.00	4938.37
13	177.87	4941.74
14	171.93	4945.44
15	166.19	4949.46
16	160.69	4953.78
17	159.30	4955.00

**** Simplified BISHOP FOS = 1.301 ****

The following is a summary of the TEN most critical surfaces

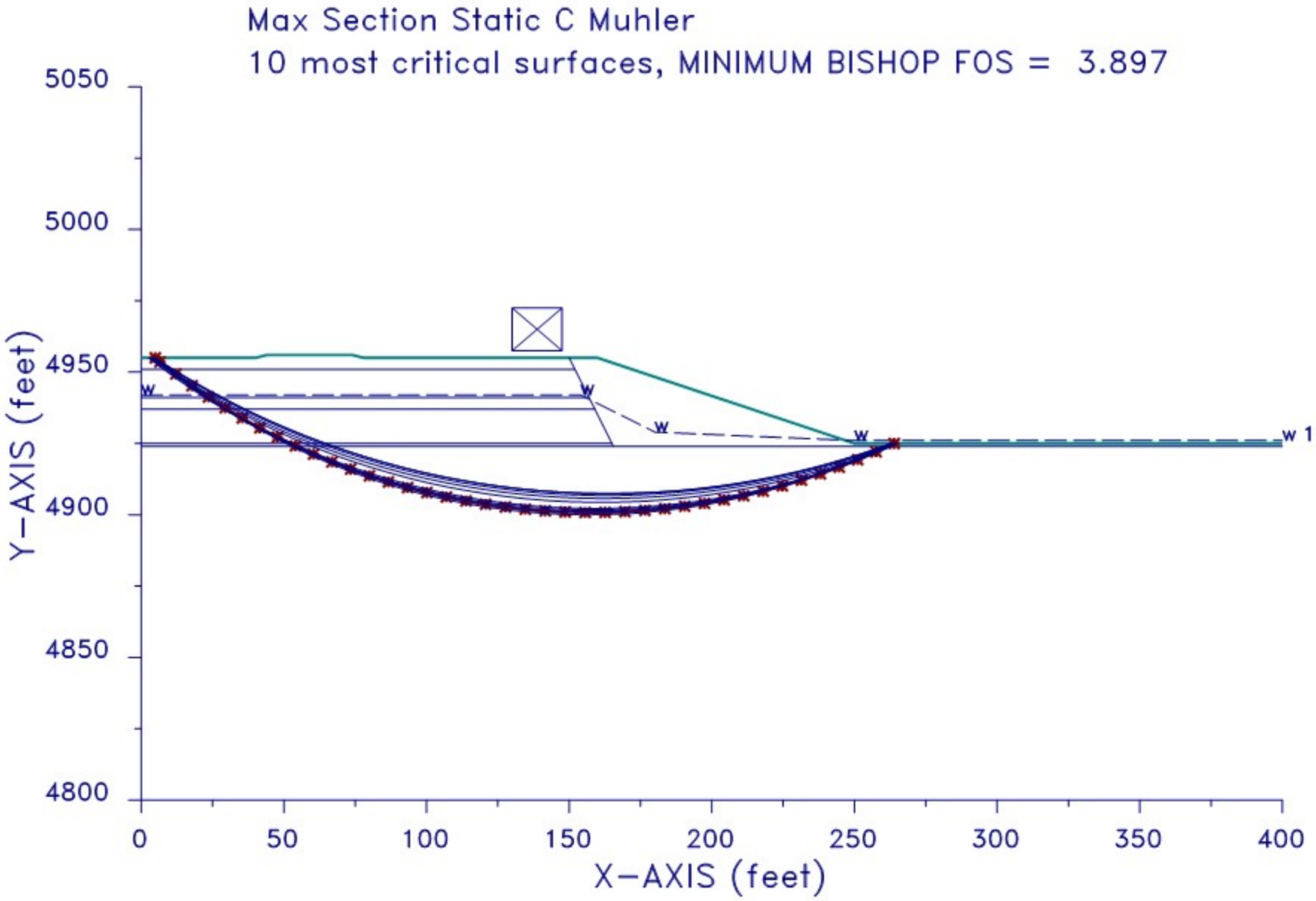
Problem Description : Max Section Seismic Challenger

	FOS (BISHOP)	Circle Center x-coord (ft)	Circle Center y-coord (ft)	Radius (ft)	Initial x-coord (ft)	Terminal x-coord (ft)	Resisting Moment (ft-lb)
1.	1.301	243.05	5053.08	129.03	258.68	159.30	4.614E+06
2.	1.318	235.28	5046.65	122.56	250.26	153.98	5.596E+06
3.	1.351	239.08	5040.58	116.89	256.58		

```
159.43  4.723E+06
           4.   1.359    227.21  5021.92    98.00   247.11
155.72  4.810E+06
           5.   1.368    236.01  5047.90   124.28   254.47
153.52  6.131E+06
           6.   1.368    242.64  5048.51   124.99   261.84
159.74  4.917E+06
           7.   1.381    236.70  5057.04   133.53   256.58
150.62  7.060E+06
           8.   1.387    239.76  5048.50   125.46   261.84
156.13  5.972E+06
           9.   1.397    237.35  5056.36   133.25   259.74
150.95  7.264E+06
          10.   1.398    236.18  5041.94   119.29   259.74
154.60  6.333E+06

                                * * *  END OF FILE  * * *
```

CMSTATIC 12-08-21 60:33



```
PROFIL                                  FILE: CMSTATIC  12-08-21   60:32    ft
Max Section Static C Muhler
    18       8
       .0     4955.0       40.0     4955.0   1
     40.0     4955.0       44.0     4956.0   1
     44.0     4956.0       74.0     4956.0   1
     74.0     4956.0       78.0     4955.0   1
     78.0     4955.0      150.0     4955.0   1
    150.0     4955.0      160.0     4955.0   6
    160.0     4955.0      250.0     4925.0   6
    250.0     4925.0      400.0     4925.0   4
    150.0     4955.0      152.0     4951.0   1
       .0     4951.0      152.0     4951.0   2
    152.0     4951.0      157.0     4941.0   2
       .0     4941.0      157.0     4941.0   3
    157.0     4941.0      159.0     4937.0   3
       .0     4937.0      159.0     4937.0   2
    159.0     4937.0      165.0     4925.0   2
       .0     4925.0      165.0     4925.0   4
    165.0     4925.0      165.5     4924.0   4
       .0     4924.0      400.0     4924.0   5
SOIL
  6
  114.0    126.0      50.0    28.00     .000        .0    1
  130.0    137.0        .0    35.00     .000        .0    1
  114.0    126.0      50.0    28.00     .000        .0    1
  124.0    134.0        .0    14.00     .000        .0    1
  124.0    134.0     100.0    28.00     .000        .0    1
  119.0    126.0      25.0    26.00     .000        .0    1
WATER
  1       62.40
     5
          .0      4942.0
       154.0      4942.0
       180.0      4929.0
       250.0      4926.0
       400.0      4926.0
LOADS
  1
       130.0       147.5       500.0          .0
CIRCL2
    20      20
    245.0      265.0         .0        5.0
   4900.0        7.0       -5.0      -45.0
```

XSTABL File: CMSTATIC 12-08-21 60:33

```
*****************************************
*              X S T A B L              *
*                                       *
*        Slope Stability Analysis       *
*                using the              *
*            Method of Slices           *
*                                       *
*        Copyright (C) 1992 - 2002      *
*   Interactive Software Designs, Inc.  *
*        Moscow, ID 83843, U.S.A.       *
*                                       *
*          All Rights Reserved          *
*                                       *
*  Ver. 5.206                 96 - 1952 *
*****************************************
```

Problem Description : Max Section Static C Muhler

SEGMENT BOUNDARY COORDINATES
---

8 SURFACE boundary segments

Segment No.	x-left (ft)	y-left (ft)	x-right (ft)	y-right (ft)	Soil Unit Below Segment
1	.0	4955.0	40.0	4955.0	1
2	40.0	4955.0	44.0	4956.0	1
3	44.0	4956.0	74.0	4956.0	1
4	74.0	4956.0	78.0	4955.0	1
5	78.0	4955.0	150.0	4955.0	1
6	150.0	4955.0	160.0	4955.0	6
7	160.0	4955.0	250.0	4925.0	6
8	250.0	4925.0	400.0	4925.0	4

10 SUBSURFACE boundary segments

Segment No.	x-left (ft)	y-left (ft)	x-right (ft)	y-right (ft)	Soil Unit Below Segment
1	150.0	4955.0	152.0	4951.0	1
2	.0	4951.0	152.0	4951.0	2
3	152.0	4951.0	157.0	4941.0	2
4	.0	4941.0	157.0	4941.0	3
5	157.0	4941.0	159.0	4937.0	3
6	.0	4937.0	159.0	4937.0	2
7	159.0	4937.0	165.0	4925.0	2
8	.0	4925.0	165.0	4925.0	4
9	165.0	4925.0	165.5	4924.0	4
10	.0	4924.0	400.0	4924.0	5

ISOTROPIC Soil Parameters
---

6 Soil unit(s) specified

Soil Unit No.	Unit Weight Moist (pcf)	Unit Weight Sat. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Parameter Ru	Water Constant (psf)	Surface No.
1	114.0	126.0	50.0	28.00	.000	.0	1
2	130.0	137.0	.0	35.00	.000	.0	1
3	114.0	126.0	50.0	28.00	.000	.0	1
4	124.0	134.0	.0	14.00	.000	.0	1
5	124.0	134.0	100.0				

```
28.00      .000          .0      1
            6   119.0   126.0       25.0
26.00      .000          .0      1


           1 Water surface(s) have been specified

          Unit weight of water =    62.40  (pcf)


          Water Surface No.  1 specified by  5 coordinate points

          **********************************
                   PHREATIC SURFACE,
          **********************************

            Point      x-water     y-water
             No.         (ft)        (ft)

               1           .00     4942.00
               2         154.00     4942.00
               3         180.00     4929.00
               4         250.00     4926.00
               5         400.00     4926.00


          ---------------
          BOUNDARY LOADS
          ---------------

              1 load(s) specified

          Load        x-left      x-right     Intensity
Direction
           No.         (ft)         (ft)        (psf)
(deg)

            1          130.0        147.5
500.0           .0


          NOTE - Intensity is specified as a uniformly
distributed
                 force acting on a HORIZONTALLY projected
surface.


          A critical failure surface searching method, using a
random
```

technique for generating CIRCULAR surfaces has been specified.

400 trial surfaces will be generated and analyzed.

20 Surfaces initiate from each of 20 points equally spaced
along the ground surface between x = 245.0 ft
and x = 265.0 ft

Each surface terminates between x = .0 ft
and x = 5.0 ft

Unless further limitations were imposed, the minimum elevation
at which a surface extends is y = 4900.0 ft

7.0 ft line segments define each trial failure surface.

ANGULAR RESTRICTIONS

The first segment of each failure surface will be inclined
within the angular range defined by :

Lower angular limit := -45.0 degrees
Upper angular limit := -5.0 degrees

Factors of safety have been calculated by the :

* * * * * SIMPLIFIED BISHOP METHOD * * * * *

The most critical circular failure surface
is specified by 41 coordinate points

Point	x-surf	y-surf

No.	(ft)	(ft)
1	263.95	4925.00
2	257.60	4922.05
3	251.17	4919.29
4	244.66	4916.71
5	238.08	4914.31
6	231.44	4912.11
7	224.73	4910.10
8	217.97	4908.28
9	211.16	4906.66
10	204.31	4905.24
11	197.42	4904.01
12	190.49	4902.98
13	183.54	4902.15
14	176.57	4901.52
15	169.59	4901.09
16	162.59	4900.86
17	155.59	4900.83
18	148.59	4901.00
19	141.60	4901.37
20	134.63	4901.95
21	127.67	4902.72
22	120.74	4903.70
23	113.84	4904.87
24	106.97	4906.24
25	100.15	4907.80
26	93.37	4909.57
27	86.65	4911.52
28	79.99	4913.67
29	73.39	4916.01
30	66.86	4918.54
31	60.41	4921.25
32	54.04	4924.15
33	47.75	4927.23
34	41.56	4930.48
35	35.46	4933.92
36	29.46	4937.53
37	23.57	4941.31
38	17.79	4945.25
39	12.12	4949.37
40	6.58	4953.64
41	4.91	4955.00

**** Simplified BISHOP FOS = 3.897 ****

The following is a summary of the TEN most critical

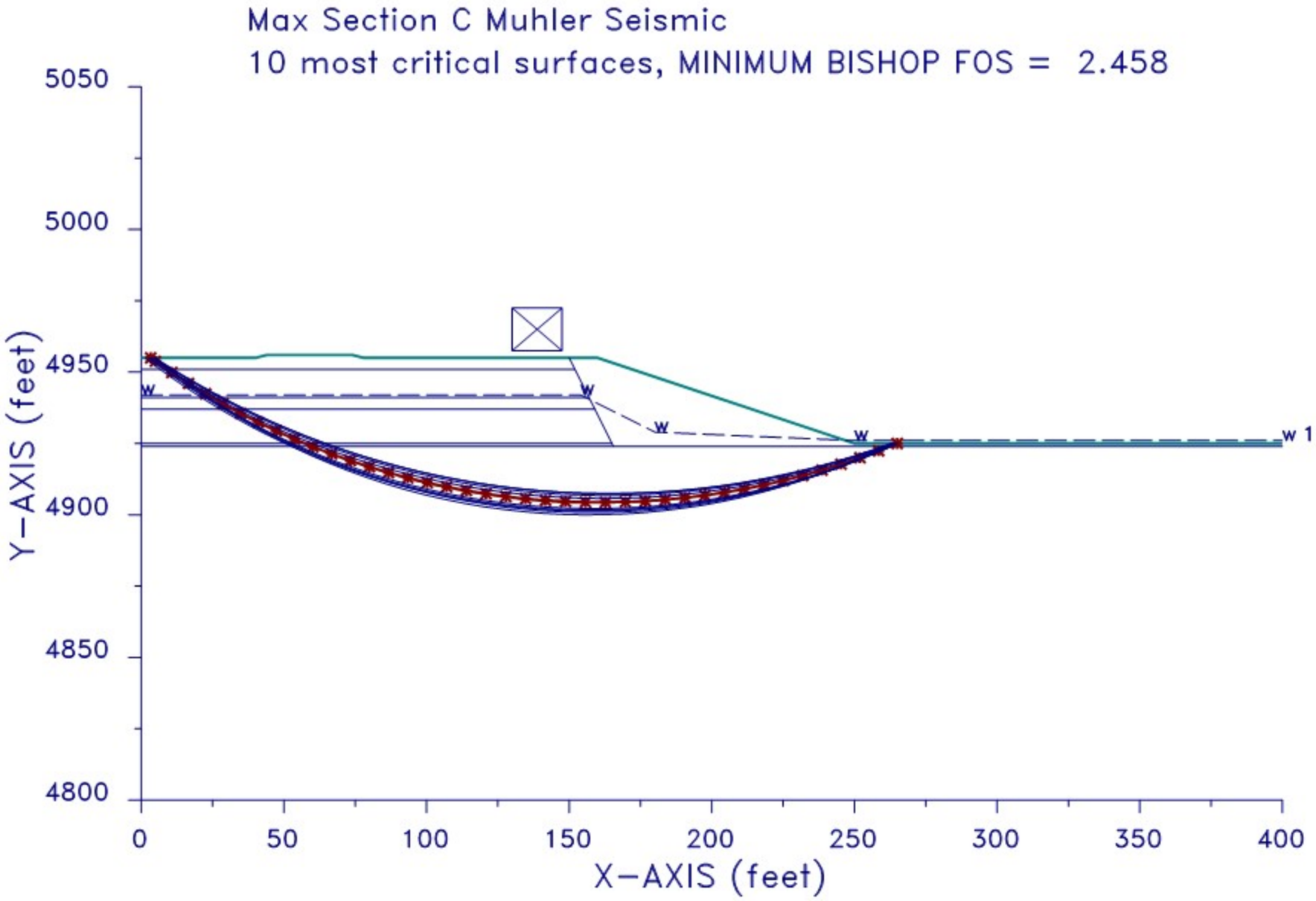
surfaces

Problem Description : Max Section Static C Muhler

	FOS (BISHOP)	Circle Center x-coord (ft)	Circle Center y-coord (ft)	Radius (ft)	Initial x-coord (ft)	Terminal x-coord (ft)	Resisting Moment (ft-lb)
1.	3.897	158.13	5144.47	243.65	263.95	4.91	1.136E+08
2.	3.899	161.15	5175.88	271.53	265.00	3.33	1.195E+08
3.	3.902	164.21	5199.17	291.75	263.95	4.53	1.204E+08
4.	3.910	158.86	5159.80	257.68	265.00	2.88	1.183E+08
5.	3.910	163.70	5196.39	288.95	262.89	4.98	1.189E+08
6.	3.913	162.12	5184.89	279.12	263.95	3.56	1.195E+08
7.	3.917	162.91	5190.54	283.75	262.89	4.49	1.186E+08
8.	3.918	158.24	5156.23	254.69	265.00	2.55	1.183E+08
9.	3.922	156.75	5137.74	237.75	262.89	4.85	1.124E+08
10.	3.929	157.24	5144.66	243.75	262.89	4.13	1.137E+08

* * * END OF FILE * * *

CMSEIS 12-08-21 60:56



```
PROFIL                                  FILE: CMSEIS    12-08-21   60:56    ft
Max Section C Muhler Seismic
    18       8
       .0     4955.0       40.0     4955.0   1
     40.0     4955.0       44.0     4956.0   1
     44.0     4956.0       74.0     4956.0   1
     74.0     4956.0       78.0     4955.0   1
     78.0     4955.0      150.0     4955.0   1
    150.0     4955.0      160.0     4955.0   6
    160.0     4955.0      250.0     4925.0   6
    250.0     4925.0      400.0     4925.0   4
    150.0     4955.0      152.0     4951.0   1
       .0     4951.0      152.0     4951.0   2
    152.0     4951.0      157.0     4941.0   2
       .0     4941.0      157.0     4941.0   3
    157.0     4941.0      159.0     4937.0   3
       .0     4937.0      159.0     4937.0   2
    159.0     4937.0      165.0     4925.0   2
       .0     4925.0      165.0     4925.0   4
    165.0     4925.0      165.5     4924.0   4
       .0     4924.0      400.0     4924.0   5
SOIL
  6
  114.0    126.0      50.0    28.00     .000        .0    1
  130.0    137.0        .0    35.00     .000        .0    1
  114.0    126.0      50.0    28.00     .000        .0    1
  124.0    134.0        .0    14.00     .000        .0    1
  124.0    134.0     100.0    28.00     .000        .0    1
  119.0    126.0      25.0    26.00     .000        .0    1
WATER
  1       62.40
     5
          .0      4942.0
       154.0      4942.0
       180.0      4929.0
       250.0      4926.0
       400.0      4926.0
EQUAKE
   .067     .000
LOADS
  1
       130.0       147.5       500.0          .0
CIRCL2
    20      20
    245.0      265.0         .0        5.0
   4900.0        7.0       -5.0      -45.0
```

XSTABL File: CMSEIS 12-08-21 60:56

```
*****************************************
*              X S T A B L              *
*                                       *
*        Slope Stability Analysis       *
*                using the              *
*            Method of Slices           *
*                                       *
*        Copyright (C) 1992 - 2002      *
*   Interactive Software Designs, Inc.  *
*        Moscow, ID 83843, U.S.A.       *
*                                       *
*          All Rights Reserved          *
*                                       *
*  Ver. 5.206                 96 - 1952 *
*****************************************
```

Problem Description : Max Section C Muhler Seismic

SEGMENT BOUNDARY COORDINATES

---

8 SURFACE boundary segments

Segment No.	x-left (ft)	y-left (ft)	x-right (ft)	y-right (ft)	Soil Unit Below Segment
1	.0	4955.0	40.0	4955.0	1
2	40.0	4955.0	44.0	4956.0	1
3	44.0	4956.0	74.0	4956.0	1
4	74.0	4956.0	78.0	4955.0	1
5	78.0	4955.0	150.0	4955.0	1
6	150.0	4955.0	160.0	4955.0	6
7	160.0	4955.0	250.0	4925.0	6
8	250.0	4925.0	400.0	4925.0	4

10 SUBSURFACE boundary segments

Segment No.	x-left (ft)	y-left (ft)	x-right (ft)	y-right (ft)	Soil Unit Below Segment
1	150.0	4955.0	152.0	4951.0	1
2	.0	4951.0	152.0	4951.0	2
3	152.0	4951.0	157.0	4941.0	2
4	.0	4941.0	157.0	4941.0	3
5	157.0	4941.0	159.0	4937.0	3
6	.0	4937.0	159.0	4937.0	2
7	159.0	4937.0	165.0	4925.0	2
8	.0	4925.0	165.0	4925.0	4
9	165.0	4925.0	165.5	4924.0	4
10	.0	4924.0	400.0	4924.0	5

ISOTROPIC Soil Parameters
---

6 Soil unit(s) specified

Soil Unit No.	Unit Weight Moist (pcf)	Unit Weight Sat. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Parameter Ru	Water Constant (psf)	Surface No.
1	114.0	126.0	50.0	28.00	.000	.0	1
2	130.0	137.0	.0	35.00	.000	.0	1
3	114.0	126.0	50.0	28.00	.000	.0	1
4	124.0	134.0	.0	14.00	.000	.0	1
5	124.0	134.0	100.0				

```
28.00      .000          .0      1
            6   119.0   126.0       25.0
26.00      .000          .0      1


           1 Water surface(s) have been specified

          Unit weight of water =    62.40  (pcf)


          Water Surface No.  1 specified by  5 coordinate points

          **********************************
                   PHREATIC SURFACE,
          **********************************

            Point      x-water     y-water
             No.         (ft)        (ft)

              1            .00     4942.00
              2         154.00     4942.00
              3         180.00     4929.00
              4         250.00     4926.00
              5         400.00     4926.00


          A horizontal earthquake loading coefficient
          of   .067 has been assigned

          A vertical earthquake loading coefficient
          of   .000 has been assigned


          ---------------
          BOUNDARY LOADS
          ---------------

              1 load(s) specified


          Load        x-left      x-right     Intensity
Direction
           No.         (ft)         (ft)        (psf)
(deg)

            1          130.0        147.5
500.0           .0


          NOTE - Intensity is specified as a uniformly
```

distributed
force acting on a HORIZONTALLY projected
surface.

A critical failure surface searching method, using a
random
technique for generating CIRCULAR surfaces has been
specified.

400 trial surfaces will be generated and analyzed.

20 Surfaces initiate from each of 20 points equally
spaced
along the ground surface between x = 245.0 ft
and x = 265.0 ft

Each surface terminates between x = .0 ft
and x = 5.0 ft

Unless further limitations were imposed, the minimum
elevation
at which a surface extends is y = 4900.0 ft

7.0 ft line segments define each trial failure
surface.

ANGULAR RESTRICTIONS

The first segment of each failure surface will be
inclined
within the angular range defined by :

Lower angular limit := -45.0 degrees
Upper angular limit := -5.0 degrees

Factors of safety have been calculated by the :

* * * * * SIMPLIFIED BISHOP METHOD * * * * *

The most critical circular failure surface
is specified by 41 coordinate points

Point No.	x-surf (ft)	y-surf (ft)
1	265.00	4925.00
2	258.50	4922.41
3	251.93	4919.98
4	245.30	4917.73
5	238.62	4915.64
6	231.89	4913.73
7	225.11	4912.00
8	218.28	4910.44
9	211.42	4909.05
10	204.53	4907.85
11	197.60	4906.82
12	190.65	4905.97
13	183.69	4905.30
14	176.70	4904.81
15	169.71	4904.50
16	162.71	4904.37
17	155.71	4904.42
18	148.71	4904.65
19	141.73	4905.06
20	134.75	4905.65
21	127.79	4906.42
22	120.86	4907.37
23	113.95	4908.50
24	107.07	4909.81
25	100.23	4911.29
26	93.43	4912.95
27	86.68	4914.79
28	79.97	4916.80
29	73.32	4918.98
30	66.73	4921.33
31	60.20	4923.85
32	53.73	4926.54
33	47.34	4929.39
34	41.02	4932.41
35	34.79	4935.59
36	28.64	4938.92
37	22.57	4942.42
38	16.60	4946.07
39	10.72	4949.88
40	4.95	4953.83
41	3.33	4955.00

**** Simplified BISHOP FOS = 2.458 ****

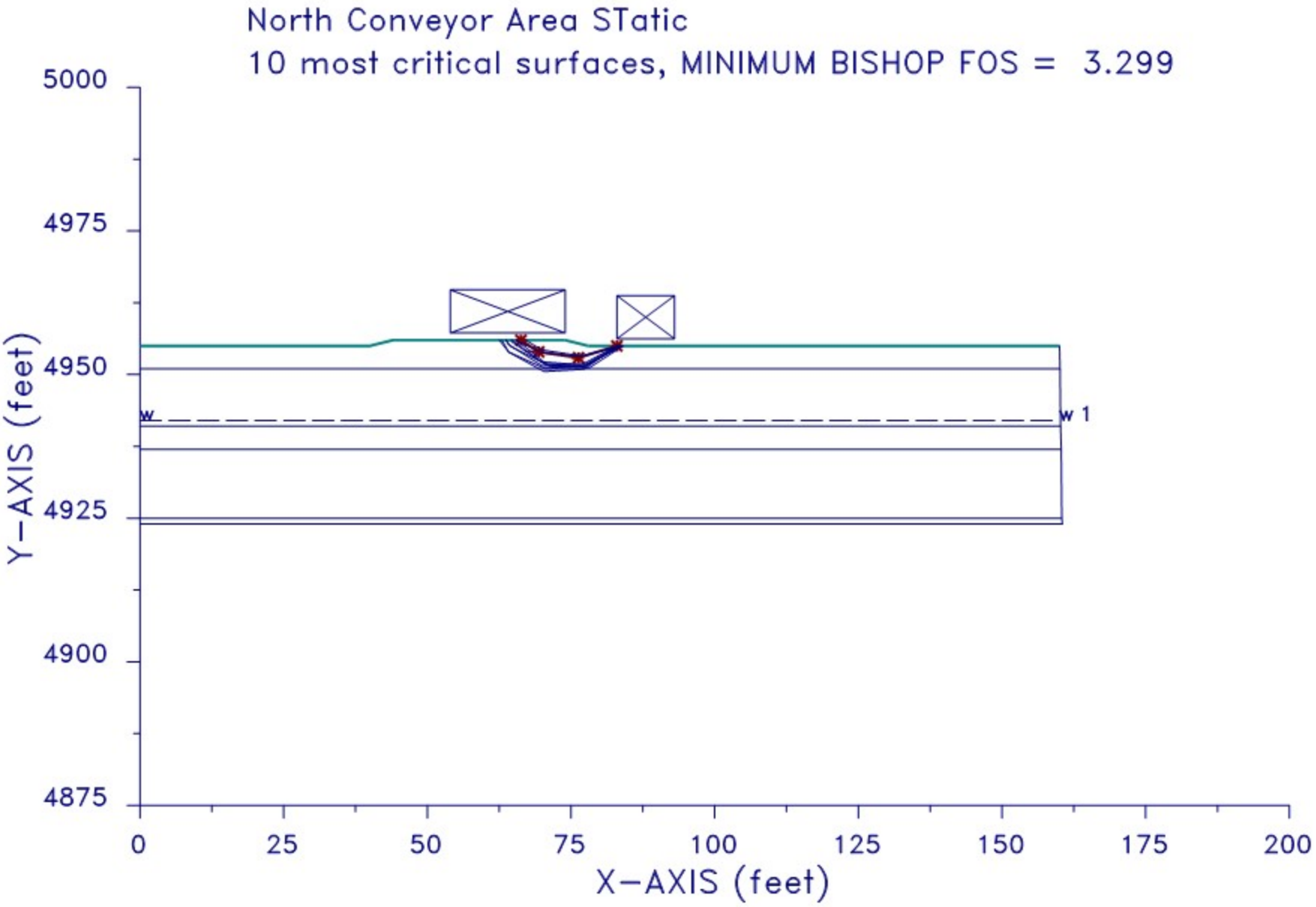
The following is a summary of the TEN most critical surfaces

Problem Description : Max Section C Muhler Seismic

	FOS (BISHOP)	Circle Center x-coord (ft)	y-coord (ft)	Radius (ft)	Initial x-coord (ft)	Terminal x-coord (ft)	Resisting Moment (ft-lb)
1.	2.458	161.15	5175.88	271.53	265.00	3.33	1.183E+08
2.	2.462	158.13	5144.47	243.65	263.95	4.91	1.124E+08
3.	2.463	158.86	5159.80	257.68	265.00	2.88	1.171E+08
4.	2.464	164.21	5199.17	291.75	263.95	4.53	1.192E+08
5.	2.465	162.12	5184.89	279.12	263.95	3.56	1.183E+08
6.	2.466	158.24	5156.23	254.69	265.00	2.55	1.171E+08
7.	2.468	163.70	5196.39	288.95	262.89	4.98	1.177E+08
8.	2.470	162.91	5190.54	283.75	262.89	4.49	1.173E+08
9.	2.475	157.67	5156.60	255.27	265.00	1.34	1.185E+08
10.	2.475	156.75	5137.74	237.75	262.89	4.85	1.112E+08

* * * END OF FILE * * *

CONVSTAT 12-08-21 63:27



```
PROFIL                                  FILE: CONVSTAT  12-08-21   63:27    ft
North Conveyor Area STatic
    16       6
       .0     4955.0       40.0     4955.0   1
     40.0     4955.0       44.0     4956.0   1
     44.0     4956.0       74.0     4956.0   1
     74.0     4956.0       78.0     4955.0   1
     78.0     4955.0      150.0     4955.0   1
    150.0     4955.0      160.0     4955.0   1
    160.0     4955.0      160.1     4951.0   1
       .0     4951.0      160.1     4951.0   2
    160.1     4951.0      160.2     4941.0   2
       .0     4941.0      160.2     4941.0   3
    160.2     4941.0      160.3     4937.0   3
       .0     4937.0      160.3     4937.0   2
    160.3     4937.0      160.4     4925.0   2
       .0     4925.0      160.4     4925.0   4
    160.4     4925.0      160.5     4924.0   4
       .0     4924.0      160.5     4924.0   5
SOIL
  6
  114.0    126.0      50.0    28.00     .000        .0    1
  130.0    137.0        .0    35.00     .000        .0    1
  114.0    126.0      50.0    28.00     .000        .0    1
  124.0    134.0        .0    14.00     .000        .0    1
  124.0    134.0     100.0    28.00     .000        .0    1
  119.0    126.0      25.0    26.00     .000        .0    1
WATER
  1       62.40
     2
          .0      4942.0
       160.0      4942.0
LOADS
  2
        54.0        74.0       500.0          .0
        83.0        93.0       500.0          .0
CIRCL2
    20      20
     83.0       93.0       54.0       74.0
   4930.0        7.0       -5.0      -45.0
```

XSTABL File: CONVSTAT 12-08-21   63:27

```
*****************************************
*              X S T A B L              *
*                                       *
*        Slope Stability Analysis       *
*                using the              *
*            Method of Slices           *
*                                       *
*        Copyright (C) 1992 - 2002      *
*   Interactive Software Designs, Inc.  *
*        Moscow, ID 83843, U.S.A.       *
*                                       *
*          All Rights Reserved          *
*                                       *
*  Ver. 5.206                 96 - 1952 *
*****************************************
```

Problem Description : North Conveyor Area STatic

SEGMENT BOUNDARY COORDINATES
---

6 SURFACE boundary segments

Segment No.	x-left (ft)	y-left (ft)	x-right (ft)	y-right (ft)	Soil Unit Below Segment
1	.0	4955.0	40.0	4955.0	1
2	40.0	4955.0	44.0	4956.0	1
3	44.0	4956.0	74.0	4956.0	1
4	74.0	4956.0	78.0	4955.0	1
5	78.0	4955.0	150.0	4955.0	1
6	150.0	4955.0	160.0	4955.0	1

10 SUBSURFACE boundary segments

Segment	x-left	y-left	x-right	y-right

Soil Unit Below Segment	No.	(ft)	(ft)	(ft)	(ft)
1	1	160.0	4955.0	160.1	4951.0
1	2	.0	4951.0	160.1	4951.0
2	3	160.1	4951.0	160.2	4941.0
2	4	.0	4941.0	160.2	4941.0
3	5	160.2	4941.0	160.3	4937.0
3	6	.0	4937.0	160.3	4937.0
2	7	160.3	4937.0	160.4	4925.0
2	8	.0	4925.0	160.4	4925.0
4	9	160.4	4925.0	160.5	4924.0
4	10	.0	4924.0	160.5	4924.0
5					

ISOTROPIC Soil Parameters

---

6 Soil unit(s) specified

Soil Unit No.	Unit Weight Moist (pcf)	Sat. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Parameter Ru	Water Constant (psf)	Surface No.
1	114.0	126.0	50.0			28.00	
.000		.0	1				
2	130.0	137.0	.0			35.00	
.000		.0	1				
3	114.0	126.0	50.0			28.00	
.000		.0	1				
4	124.0	134.0	.0			14.00	
.000		.0	1				
5	124.0	134.0	100.0			28.00	
.000		.0	1				
6	119.0	126.0	25.0			26.00	
.000		.0	1				

1 Water surface(s) have been specified

Unit weight of water = 62.40 (pcf)

Water Surface No. 1 specified by 2 coordinate points

****
PHREATIC SURFACE,
****

Point No.	x-water (ft)	y-water (ft)
1	.00	4942.00
2	160.00	4942.00

BOUNDARY LOADS
---

2 load(s) specified

Load No.	x-left (ft)	x-right (ft)	Intensity (psf)	Direction (deg)
1	54.0	74.0	500.0	.0
2	83.0	93.0	500.0	.0

NOTE - Intensity is specified as a uniformly distributed
force acting on a HORIZONTALLY projected surface.

A critical failure surface searching method, using a random
technique for generating CIRCULAR surfaces has been specified.

400 trial surfaces will be generated and analyzed.

20 Surfaces initiate from each of 20 points equally spaced
along the ground surface between x = 83.0 ft
and x = 93.0 ft

Each surface terminates between x = 54.0 ft
and x = 74.0 ft

Unless further limitations were imposed, the minimum elevation
at which a surface extends is y = 4930.0 ft

7.0 ft line segments define each trial failure surface.

ANGULAR RESTRICTIONS

The first segment of each failure surface will be inclined
within the angular range defined by :

Lower angular limit := -45.0 degrees
Upper angular limit := -5.0 degrees

****
** Factor of safety calculation for surface # 2 **
** failed to converge within FIFTY iterations **
**
** The last calculated value of the FOS was-491.3621 **
** This will be ignored for final summary of results **
****

```
      Circular surface (FOS=********) is defined by: xcenter =
81.73
      ycenter =   4972.10   Init. Pt. =     93.00   Seg. Length =
7.00
      ------------------------------------------------------------
--------


************************************************************
          **     Factor of safety calculation for surface #     3
**
          **     failed to converge within FIFTY iterations
**
          **
**
          **    The last calculated value of the FOS was -32.2896
**
          **    This will be ignored for final summary of results
**
************************************************************

      Circular surface (FOS=-32.2896) is defined by: xcenter =
84.00
      ycenter =   4988.14   Init. Pt. =     93.00   Seg. Length =
7.00
      ------------------------------------------------------------
--------


************************************************************
          **     Factor of safety calculation for surface #     6
**
          **     failed to converge within FIFTY iterations
**
          **
**
          **    The last calculated value of the FOS was -35.7350
**
          **    This will be ignored for final summary of results
**
************************************************************

      Circular surface (FOS=-35.7350) is defined by: xcenter =
82.80
      ycenter =   4976.72   Init. Pt. =     93.00   Seg. Length =
7.00
```

```
      ------------------------------------------------------------
--------


************************************************************
          **     Factor of safety calculation for surface #     8
**
          **     failed to converge within FIFTY iterations
**
          **
**
          **    The last calculated value of the FOS was -32.7246
**
          **    This will be ignored for final summary of results
**
************************************************************

      Circular surface (FOS=-32.7246) is defined by: xcenter =
83.15
      ycenter =   4979.69   Init. Pt. =     93.00   Seg. Length =
7.00
      ------------------------------------------------------------
--------


************************************************************
          **     Factor of safety calculation for surface #    11
**
          **     failed to converge within FIFTY iterations
**
          **
**
          **    The last calculated value of the FOS was  52.8740
**
          **    This will be ignored for final summary of results
**
************************************************************

      Circular surface (FOS= 52.8740) is defined by: xcenter =
80.82
      ycenter =   4967.11   Init. Pt. =     93.00   Seg. Length =
7.00
      ------------------------------------------------------------
--------
```

```
************************************************************
          **     Factor of safety calculation for surface #    16
**
          **     failed to converge within FIFTY iterations
**
          **
**
          **    The last calculated value of the FOS was -15.5318
**
          **    This will be ignored for final summary of results
**
************************************************************

      Circular surface (FOS=-15.5318) is defined by: xcenter =
84.58
      ycenter =   4987.12   Init. Pt. =     93.00   Seg. Length =
7.00
      ------------------------------------------------------------
--------


************************************************************
          **     Factor of safety calculation for surface #    19
**
          **     failed to converge within FIFTY iterations
**
          **
**
          **    The last calculated value of the FOS was  -8.0779
**
          **    This will be ignored for final summary of results
**
************************************************************

      Circular surface (FOS= -8.0779) is defined by: xcenter =
82.97
      ycenter =   4960.19   Init. Pt. =     93.00   Seg. Length =
7.00
      ------------------------------------------------------------
--------


************************************************************
          **     Factor of safety calculation for surface #    20
**
```

```
          **     failed to converge within FIFTY iterations
**
          **
**
          **    The last calculated value of the FOS was  39.6022
**
          **    This will be ignored for final summary of results
**
************************************************************

      Circular surface (FOS= 39.6022) is defined by: xcenter =
81.78
      ycenter =   4983.78   Init. Pt. =     93.00   Seg. Length =
7.00
      ------------------------------------------------------------
--------


************************************************************
          **     Factor of safety calculation for surface #    21
**
          **     failed to converge within FIFTY iterations
**
          **
**
          **    The last calculated value of the FOS was -11.0770
**
          **    This will be ignored for final summary of results
**
************************************************************

      Circular surface (FOS=-11.0770) is defined by: xcenter =
82.38
      ycenter =   4960.57   Init. Pt. =     92.47   Seg. Length =
7.00
      ------------------------------------------------------------
--------


************************************************************
          **     Factor of safety calculation for surface #    22
**
          **     failed to converge within FIFTY iterations
**
          **
**
```

```
          **    The last calculated value of the FOS was  21.5112
**
          **    This will be ignored for final summary of results
**

************************************************************

      Circular surface (FOS= 21.5112) is defined by: xcenter =
78.45
      ycenter =   4965.72   Init. Pt. =     92.47   Seg. Length =
7.00
      ------------------------------------------------------------
--------


************************************************************
          **     Factor of safety calculation for surface #    23
**
          **     failed to converge within FIFTY iterations
**
          **
**
          **    The last calculated value of the FOS was -32.0946
**
          **    This will be ignored for final summary of results
**

************************************************************

      Circular surface (FOS=-32.0946) is defined by: xcenter =
82.14
      ycenter =   4971.45   Init. Pt. =     92.47   Seg. Length =
7.00
      ------------------------------------------------------------
--------


************************************************************
          **     Factor of safety calculation for surface #    25
**
          **     failed to converge within FIFTY iterations
**
          **
**
          **    The last calculated value of the FOS was  53.5767
**
          **    This will be ignored for final summary of results
**
```

```
************************************************************

      Circular surface (FOS= 53.5767) is defined by: xcenter =
80.65
      ycenter =   4967.47   Init. Pt. =     92.47   Seg. Length =
7.00
      ------------------------------------------------------------
--------


************************************************************
          **     Factor of safety calculation for surface #    29
**
          **     failed to converge within FIFTY iterations
**
          **
**
          **    The last calculated value of the FOS was  56.7196
**
          **    This will be ignored for final summary of results
**
************************************************************

      Circular surface (FOS= 56.7196) is defined by: xcenter =
80.99
      ycenter =   4972.20   Init. Pt. =     92.47   Seg. Length =
7.00
      ------------------------------------------------------------
--------


************************************************************
          **     Factor of safety calculation for surface #    31
**
          **     failed to converge within FIFTY iterations
**
          **
**
          **    The last calculated value of the FOS was  47.7356
**
          **    This will be ignored for final summary of results
**
************************************************************
```

```
      Circular surface (FOS= 47.7356) is defined by: xcenter =
79.95
      ycenter =   4963.75   Init. Pt. =     92.47   Seg. Length =
7.00
      ------------------------------------------------------------
--------


*************************************************************
          **     Factor of safety calculation for surface #    35
**
          **     failed to converge within FIFTY iterations
**
          **
**
          **    The last calculated value of the FOS was -39.4037
**
          **    This will be ignored for final summary of results
**
*************************************************************

      Circular surface (FOS=-39.4037) is defined by: xcenter =
83.24
      ycenter =   4983.77   Init. Pt. =     92.47   Seg. Length =
7.00
      ------------------------------------------------------------
--------


*************************************************************
          **     Factor of safety calculation for surface #    37
**
          **     failed to converge within FIFTY iterations
**
          **
**
          **    The last calculated value of the FOS was -14.4923
**
          **    This will be ignored for final summary of results
**
*************************************************************

      Circular surface (FOS=-14.4923) is defined by: xcenter =
82.12
      ycenter =   4960.96   Init. Pt. =     92.47   Seg. Length =
7.00
```

```
      ------------------------------------------------------------
--------


************************************************************
          **     Factor of safety calculation for surface #    38
**
          **     failed to converge within FIFTY iterations
**
          **
**
          **    The last calculated value of the FOS was  76.3719
**
          **    This will be ignored for final summary of results
**
************************************************************

      Circular surface (FOS= 76.3719) is defined by: xcenter =
80.19
      ycenter =   4962.49   Init. Pt. =     92.47   Seg. Length =
7.00
      ------------------------------------------------------------
--------


************************************************************
          **     Factor of safety calculation for surface #    40
**
          **     failed to converge within FIFTY iterations
**
          **
**
          **    The last calculated value of the FOS was -20.8987
**
          **    This will be ignored for final summary of results
**
************************************************************

      Circular surface (FOS=-20.8987) is defined by: xcenter =
82.49
      ycenter =   4971.54   Init. Pt. =     92.47   Seg. Length =
7.00
      ------------------------------------------------------------
--------
```

```
************************************************************
          **     Factor of safety calculation for surface #    42
**
          **     failed to converge within FIFTY iterations
**
          **
**
          **    The last calculated value of the FOS was  51.4481
**
          **    This will be ignored for final summary of results
**
************************************************************

      Circular surface (FOS= 51.4481) is defined by: xcenter =
79.79
      ycenter =   4962.50   Init. Pt. =     91.95   Seg. Length =
7.00
      ------------------------------------------------------------
--------


************************************************************
          **     Factor of safety calculation for surface #    45
**
          **     failed to converge within FIFTY iterations
**
          **
**
          **    The last calculated value of the FOS was  -7.3123
**
          **    This will be ignored for final summary of results
**
************************************************************

      Circular surface (FOS= -7.3123) is defined by: xcenter =
83.18
      ycenter =   4969.46   Init. Pt. =     91.95   Seg. Length =
7.00
      ------------------------------------------------------------
--------


************************************************************
          **     Factor of safety calculation for surface #    47
**
```

```
          **     failed to converge within FIFTY iterations
**
          **
**
          **    The last calculated value of the FOS was  96.3648
**
          **    This will be ignored for final summary of results
**

************************************************************

      Circular surface (FOS= 96.3648) is defined by: xcenter =
80.23
      ycenter =   4961.77   Init. Pt. =     91.95   Seg. Length =
7.00
      ------------------------------------------------------------
--------


************************************************************
          **     Factor of safety calculation for surface #    48
**
          **     failed to converge within FIFTY iterations
**
          **
**
          **    The last calculated value of the FOS was  48.4674
**
          **    This will be ignored for final summary of results
**

************************************************************

      Circular surface (FOS= 48.4674) is defined by: xcenter =
80.28
      ycenter =   4965.85   Init. Pt. =     91.95   Seg. Length =
7.00
      ------------------------------------------------------------
--------


************************************************************
          **     Factor of safety calculation for surface #    50
**
          **     failed to converge within FIFTY iterations
**
          **
**
```

```
          **    The last calculated value of the FOS was  -9.0601
**
          **    This will be ignored for final summary of results
**
************************************************************

      Circular surface (FOS= -9.0601) is defined by: xcenter =
82.39
      ycenter =   4961.68   Init. Pt. =     91.95   Seg. Length =
7.00
      ------------------------------------------------------------
--------


************************************************************
          **     Factor of safety calculation for surface #    53
**
          **     failed to converge within FIFTY iterations
**
          **
**
          **    The last calculated value of the FOS was  21.4756
**
          **    This will be ignored for final summary of results
**
************************************************************

      Circular surface (FOS= 21.4756) is defined by: xcenter =
80.94
      ycenter =   4989.61   Init. Pt. =     91.95   Seg. Length =
7.00
      ------------------------------------------------------------
--------


************************************************************
          **     Factor of safety calculation for surface #    54
**
          **     failed to converge within FIFTY iterations
**
          **
**
          **    The last calculated value of the FOS was -23.2765
**
          **    This will be ignored for final summary of results
**
```

```
************************************************************

      Circular surface (FOS=-23.2765) is defined by: xcenter =
81.47
      ycenter =   4960.68   Init. Pt. =     91.95   Seg. Length =
7.00
      ------------------------------------------------------------
--------


************************************************************
          **     Factor of safety calculation for surface #    55
**
          **     failed to converge within FIFTY iterations
**
          **
**
          **    The last calculated value of the FOS was  -9.8217
**
          **    This will be ignored for final summary of results
**
************************************************************

      Circular surface (FOS= -9.8217) is defined by: xcenter =
82.29
      ycenter =   4961.95   Init. Pt. =     91.95   Seg. Length =
7.00
      ------------------------------------------------------------
--------


************************************************************
          **     Factor of safety calculation for surface #    56
**
          **     failed to converge within FIFTY iterations
**
          **
**
          **    The last calculated value of the FOS was -13.3030
**
          **    This will be ignored for final summary of results
**
************************************************************
```

```
      Circular surface (FOS=-13.3030) is defined by: xcenter =
81.94
      ycenter =   4962.40   Init. Pt. =     91.95   Seg. Length =
7.00
      ---------------------------------------------------------
--------


************************************************************
          **     Factor of safety calculation for surface #    59
**
          **     failed to converge within FIFTY iterations
**
          **
**
          **    The last calculated value of the FOS was  33.5809
**
          **    This will be ignored for final summary of results
**
************************************************************

      Circular surface (FOS= 33.5809) is defined by: xcenter =
79.14
      ycenter =   4962.88   Init. Pt. =     91.95   Seg. Length =
7.00
      ---------------------------------------------------------
--------


************************************************************
          **     Factor of safety calculation for surface #    63
**
          **     failed to converge within FIFTY iterations
**
          **
**
          **    The last calculated value of the FOS was -14.7837
**
          **    This will be ignored for final summary of results
**
************************************************************

      Circular surface (FOS=-14.7837) is defined by: xcenter =
83.55
      ycenter =   4983.84   Init. Pt. =     91.42   Seg. Length =
7.00
```

```
      ------------------------------------------------------------
--------


************************************************************
          **     Factor of safety calculation for surface #    65
**
          **     failed to converge within FIFTY iterations
**
          **
**
          **    The last calculated value of the FOS was  -6.5802
**
          **    This will be ignored for final summary of results
**
************************************************************

      Circular surface (FOS= -6.5802) is defined by: xcenter =
82.55
      ycenter =   4960.48   Init. Pt. =     91.42   Seg. Length =
7.00
      ------------------------------------------------------------
--------


************************************************************
          **     Factor of safety calculation for surface #    69
**
          **     failed to converge within FIFTY iterations
**
          **
**
          **    The last calculated value of the FOS was  28.8818
**
          **    This will be ignored for final summary of results
**
************************************************************

      Circular surface (FOS= 28.8818) is defined by: xcenter =
78.80
      ycenter =   4962.94   Init. Pt. =     91.42   Seg. Length =
7.00
      ------------------------------------------------------------
--------
```

```
************************************************************
          **     Factor of safety calculation for surface #    70
**
          **     failed to converge within FIFTY iterations
**
          **
**
          **    The last calculated value of the FOS was  -6.8699
**
          **    This will be ignored for final summary of results
**
************************************************************

      Circular surface (FOS= -6.8699) is defined by: xcenter =
82.53
      ycenter =   4962.50   Init. Pt. =     91.42   Seg. Length =
7.00
      ------------------------------------------------------------
--------


************************************************************
          **     Factor of safety calculation for surface #    72
**
          **     failed to converge within FIFTY iterations
**
          **
**
          **    The last calculated value of the FOS was -10.7286
**
          **    This will be ignored for final summary of results
**
************************************************************

      Circular surface (FOS=-10.7286) is defined by: xcenter =
81.85
      ycenter =   4960.69   Init. Pt. =     91.42   Seg. Length =
7.00
      ------------------------------------------------------------
--------


************************************************************
          **     Factor of safety calculation for surface #    75
**
```

```
          **     failed to converge within FIFTY iterations
**
          **
**
          **    The last calculated value of the FOS was  60.0299
**
          **    This will be ignored for final summary of results
**

************************************************************

      Circular surface (FOS= 60.0299) is defined by: xcenter =
80.17
      ycenter =   4966.11   Init. Pt. =     91.42   Seg. Length =
7.00
      ------------------------------------------------------------
--------


************************************************************
          **     Factor of safety calculation for surface #    76
**
          **     failed to converge within FIFTY iterations
**
          **
**
          **    The last calculated value of the FOS was  27.5180
**
          **    This will be ignored for final summary of results
**

************************************************************

      Circular surface (FOS= 27.5180) is defined by: xcenter =
78.63
      ycenter =   4962.84   Init. Pt. =     91.42   Seg. Length =
7.00
      ------------------------------------------------------------
--------


************************************************************
          **     Factor of safety calculation for surface #    79
**
          **     failed to converge within FIFTY iterations
**
          **
**
```

```
          **    The last calculated value of the FOS was -12.9345
**
          **    This will be ignored for final summary of results
**

************************************************************


      Circular surface (FOS=-12.9345) is defined by: xcenter =
81.65
      ycenter =   4961.06   Init. Pt. =     91.42   Seg. Length =
7.00
      ------------------------------------------------------------
--------


************************************************************
          **     Factor of safety calculation for surface #    81
**
          **     failed to converge within FIFTY iterations
**
          **
**
          **    The last calculated value of the FOS was -15.1571
**
          **    This will be ignored for final summary of results
**

************************************************************


      Circular surface (FOS=-15.1571) is defined by: xcenter =
81.19
      ycenter =   4960.20   Init. Pt. =     90.89   Seg. Length =
7.00
      ------------------------------------------------------------
--------


************************************************************
          **     Factor of safety calculation for surface #    82
**
          **     failed to converge within FIFTY iterations
**
          **
**
          **    The last calculated value of the FOS was  24.3380
**
          **    This will be ignored for final summary of results
**
```

```
************************************************************

      Circular surface (FOS= 24.3380) is defined by: xcenter =
79.67
      ycenter =   4970.89   Init. Pt. =     90.89   Seg. Length =
7.00
      ------------------------------------------------------------
--------


************************************************************
          **     Factor of safety calculation for surface #    85
**
          **     failed to converge within FIFTY iterations
**
          **
**
          **    The last calculated value of the FOS was -18.8957
**
          **    This will be ignored for final summary of results
**
************************************************************

      Circular surface (FOS=-18.8957) is defined by: xcenter =
81.00
      ycenter =   4960.16   Init. Pt. =     90.89   Seg. Length =
7.00
      ------------------------------------------------------------
--------


************************************************************
          **     Factor of safety calculation for surface #    88
**
          **     failed to converge within FIFTY iterations
**
          **
**
          **    The last calculated value of the FOS was -17.7468
**
          **    This will be ignored for final summary of results
**
************************************************************
```

```
      Circular surface (FOS=-17.7468) is defined by: xcenter =
81.37
      ycenter =   4964.97   Init. Pt. =     90.89   Seg. Length =
7.00
      ------------------------------------------------------------
--------


************************************************************
          **     Factor of safety calculation for surface #    95
**
          **     failed to converge within FIFTY iterations
**
          **
**
          **    The last calculated value of the FOS was  -4.6070
**
          **    This will be ignored for final summary of results
**
************************************************************

      Circular surface (FOS= -4.6070) is defined by: xcenter =
82.65
      ycenter =   4964.44   Init. Pt. =     90.89   Seg. Length =
7.00
      ------------------------------------------------------------
--------


************************************************************
          **     Factor of safety calculation for surface #    96
**
          **     failed to converge within FIFTY iterations
**
          **
**
          **    The last calculated value of the FOS was -12.6784
**
          **    This will be ignored for final summary of results
**
************************************************************

      Circular surface (FOS=-12.6784) is defined by: xcenter =
82.32
      ycenter =   4972.60   Init. Pt. =     90.89   Seg. Length =
7.00
```

```
      ------------------------------------------------------------
--------


************************************************************
          **     Factor of safety calculation for surface #    97
**
          **     failed to converge within FIFTY iterations
**
          **
**
          **    The last calculated value of the FOS was -26.6447
**
          **    This will be ignored for final summary of results
**
************************************************************

      Circular surface (FOS=-26.6447) is defined by: xcenter =
80.84
      ycenter =   4962.63   Init. Pt. =     90.89   Seg. Length =
7.00
      ------------------------------------------------------------
--------


************************************************************
          **     Factor of safety calculation for surface #   100
**
          **     failed to converge within FIFTY iterations
**
          **
**
          **    The last calculated value of the FOS was -26.0670
**
          **    This will be ignored for final summary of results
**
************************************************************

      Circular surface (FOS=-26.0670) is defined by: xcenter =
80.77
      ycenter =   4960.52   Init. Pt. =     90.89   Seg. Length =
7.00
      ------------------------------------------------------------
--------
```

```
************************************************************
          **     Factor of safety calculation for surface #   101
**
          **     failed to converge within FIFTY iterations
**
          **
**
          **    The last calculated value of the FOS was  29.6304
**
          **    This will be ignored for final summary of results
**
************************************************************

      Circular surface (FOS= 29.6304) is defined by: xcenter =
79.19
      ycenter =   4964.38   Init. Pt. =     90.37   Seg. Length =
7.00
      ------------------------------------------------------------
--------


************************************************************
          **     Factor of safety calculation for surface #   102
**
          **     failed to converge within FIFTY iterations
**
          **
**
          **    The last calculated value of the FOS was -14.3478
**
          **    This will be ignored for final summary of results
**
************************************************************

      Circular surface (FOS=-14.3478) is defined by: xcenter =
81.01
      ycenter =   4960.49   Init. Pt. =     90.37   Seg. Length =
7.00
      ------------------------------------------------------------
--------


************************************************************
          **     Factor of safety calculation for surface #   104
**
```

```
          **     failed to converge within FIFTY iterations
**
          **
**
          **    The last calculated value of the FOS was -15.4626
**
          **    This will be ignored for final summary of results
**
************************************************************

      Circular surface (FOS=-15.4626) is defined by: xcenter =
82.60
      ycenter =   4979.68   Init. Pt. =     90.37   Seg. Length =
7.00
      ------------------------------------------------------------
--------


************************************************************
          **     Factor of safety calculation for surface #   106
**
          **     failed to converge within FIFTY iterations
**
          **
**
          **    The last calculated value of the FOS was -22.7825
**
          **    This will be ignored for final summary of results
**
************************************************************

      Circular surface (FOS=-22.7825) is defined by: xcenter =
81.44
      ycenter =   4969.98   Init. Pt. =     90.37   Seg. Length =
7.00
      ------------------------------------------------------------
--------


************************************************************
          **     Factor of safety calculation for surface #   110
**
          **     failed to converge within FIFTY iterations
**
          **
**
```

```
          **    The last calculated value of the FOS was-543.7020
**
          **    This will be ignored for final summary of results
**

************************************************************

      Circular surface (FOS=********) is defined by: xcenter =
79.87
      ycenter =   4960.58   Init. Pt. =     90.37   Seg. Length =
7.00
      ------------------------------------------------------------
--------


************************************************************
          **     Factor of safety calculation for surface #   111
**
          **     failed to converge within FIFTY iterations
**
          **
**
          **    The last calculated value of the FOS was  45.2305
**
          **    This will be ignored for final summary of results
**

************************************************************

      Circular surface (FOS= 45.2305) is defined by: xcenter =
81.90
      ycenter =   4990.61   Init. Pt. =     90.37   Seg. Length =
7.00
      ------------------------------------------------------------
--------


************************************************************
          **     Factor of safety calculation for surface #   112
**
          **     failed to converge within FIFTY iterations
**
          **
**
          **    The last calculated value of the FOS was  -5.8798
**
          **    This will be ignored for final summary of results
**
```

```
************************************************************

      Circular surface (FOS= -5.8798) is defined by: xcenter =
82.00
      ycenter =   4963.45   Init. Pt. =     90.37   Seg. Length =
7.00
      ------------------------------------------------------------
--------


************************************************************
          **     Factor of safety calculation for surface #   113
**
          **     failed to converge within FIFTY iterations
**
          **
**
          **    The last calculated value of the FOS was -65.5261
**
          **    This will be ignored for final summary of results
**
************************************************************

      Circular surface (FOS=-65.5261) is defined by: xcenter =
80.69
      ycenter =   4967.06   Init. Pt. =     90.37   Seg. Length =
7.00
      ------------------------------------------------------------
--------


************************************************************
          **     Factor of safety calculation for surface #   114
**
          **     failed to converge within FIFTY iterations
**
          **
**
          **    The last calculated value of the FOS was*********
**
          **    This will be ignored for final summary of results
**
************************************************************
```

```
      Circular surface (FOS=********) is defined by: xcenter =
82.22
      ycenter =   4987.15   Init. Pt. =     90.37   Seg. Length =
7.00
      ------------------------------------------------------------
--------


************************************************************
          **     Factor of safety calculation for surface #   115
**
          **     failed to converge within FIFTY iterations
**
          **
**
          **    The last calculated value of the FOS was -18.0873
**
          **    This will be ignored for final summary of results
**
************************************************************

      Circular surface (FOS=-18.0873) is defined by: xcenter =
81.25
      ycenter =   4965.30   Init. Pt. =     90.37   Seg. Length =
7.00
      ------------------------------------------------------------
--------


************************************************************
          **     Factor of safety calculation for surface #   122
**
          **     failed to converge within FIFTY iterations
**
          **
**
          **    The last calculated value of the FOS was  30.2146
**
          **    This will be ignored for final summary of results
**
************************************************************

      Circular surface (FOS= 30.2146) is defined by: xcenter =
81.68
      ycenter =   4993.21   Init. Pt. =     89.84   Seg. Length =
7.00
```

```
      ------------------------------------------------------------
--------


************************************************************
          **     Factor of safety calculation for surface #   124
**
          **     failed to converge within FIFTY iterations
**
          **
**
          **    The last calculated value of the FOS was  60.2213
**
          **    This will be ignored for final summary of results
**
************************************************************

      Circular surface (FOS= 60.2213) is defined by: xcenter =
79.24
      ycenter =   4960.72   Init. Pt. =     89.84   Seg. Length =
7.00
      ------------------------------------------------------------
--------


************************************************************
          **     Factor of safety calculation for surface #   125
**
          **     failed to converge within FIFTY iterations
**
          **
**
          **    The last calculated value of the FOS was -25.2789
**
          **    This will be ignored for final summary of results
**
************************************************************

      Circular surface (FOS=-25.2789) is defined by: xcenter =
81.30
      ycenter =   4972.19   Init. Pt. =     89.84   Seg. Length =
7.00
      ------------------------------------------------------------
--------
```

```
************************************************************
          **     Factor of safety calculation for surface #   130
**
          **     failed to converge within FIFTY iterations
**
          **
**
          **    The last calculated value of the FOS was  73.5744
**
          **    This will be ignored for final summary of results
**
************************************************************

      Circular surface (FOS= 73.5744) is defined by: xcenter =
79.75
      ycenter =   4965.90   Init. Pt. =     89.84   Seg. Length =
7.00
      ------------------------------------------------------------
--------


************************************************************
          **     Factor of safety calculation for surface #   131
**
          **     failed to converge within FIFTY iterations
**
          **
**
          **    The last calculated value of the FOS was  26.8843
**
          **    This will be ignored for final summary of results
**
************************************************************

      Circular surface (FOS= 26.8843) is defined by: xcenter =
79.74
      ycenter =   4971.98   Init. Pt. =     89.84   Seg. Length =
7.00
      ------------------------------------------------------------
--------


************************************************************
          **     Factor of safety calculation for surface #   132
**
```

```
          **     failed to converge within FIFTY iterations
**
          **
**
          **    The last calculated value of the FOS was  21.4034
**
          **    This will be ignored for final summary of results
**

************************************************************

      Circular surface (FOS= 21.4034) is defined by: xcenter =
78.47
      ycenter =   4961.76   Init. Pt. =     89.84   Seg. Length =
7.00
      ------------------------------------------------------------
--------


************************************************************
          **     Factor of safety calculation for surface #   133
**
          **     failed to converge within FIFTY iterations
**
          **
**
          **    The last calculated value of the FOS was-211.8828
**
          **    This will be ignored for final summary of results
**

************************************************************

      Circular surface (FOS=********) is defined by: xcenter =
82.74
      ycenter =   4992.92   Init. Pt. =     89.84   Seg. Length =
7.00
      ------------------------------------------------------------
--------


************************************************************
          **     Factor of safety calculation for surface #   136
**
          **     failed to converge within FIFTY iterations
**
          **
**
```

```
          **    The last calculated value of the FOS was  -5.2738
**
          **    This will be ignored for final summary of results
**

************************************************************

      Circular surface (FOS= -5.2738) is defined by: xcenter =
81.99
      ycenter =   4966.40   Init. Pt. =     89.84   Seg. Length =
7.00
      ------------------------------------------------------------
--------


************************************************************
          **     Factor of safety calculation for surface #   138
**
          **     failed to converge within FIFTY iterations
**
          **
**
          **    The last calculated value of the FOS was -79.1132
**
          **    This will be ignored for final summary of results
**

************************************************************

      Circular surface (FOS=-79.1132) is defined by: xcenter =
79.82
      ycenter =   4960.88   Init. Pt. =     89.84   Seg. Length =
7.00
      ------------------------------------------------------------
--------


************************************************************
          **     Factor of safety calculation for surface #   148
**
          **     failed to converge within FIFTY iterations
**
          **
**
          **    The last calculated value of the FOS was  -4.6713
**
          **    This will be ignored for final summary of results
**
```

```
************************************************************

      Circular surface (FOS= -4.6713) is defined by: xcenter =
81.43
      ycenter =   4961.62   Init. Pt. =     89.32   Seg. Length =
7.00
      ------------------------------------------------------------
--------


************************************************************
          **     Factor of safety calculation for surface #   154
**
          **     failed to converge within FIFTY iterations
**
          **
**
          **    The last calculated value of the FOS was 106.3962
**
          **    This will be ignored for final summary of results
**
************************************************************

      Circular surface (FOS=106.3962) is defined by: xcenter =
79.22
      ycenter =   4961.74   Init. Pt. =     89.32   Seg. Length =
7.00
      ------------------------------------------------------------
--------


************************************************************
          **     Factor of safety calculation for surface #   158
**
          **     failed to converge within FIFTY iterations
**
          **
**
          **    The last calculated value of the FOS was  -7.1744
**
          **    This will be ignored for final summary of results
**
************************************************************
```

```
      Circular surface (FOS= -7.1744) is defined by: xcenter =
81.20
      ycenter =   4964.20   Init. Pt. =     89.32   Seg. Length =
7.00
      ------------------------------------------------------------
--------


************************************************************
          **     Factor of safety calculation for surface #   159
**
          **     failed to converge within FIFTY iterations
**
          **
**
          **    The last calculated value of the FOS was -10.5140
**
          **    This will be ignored for final summary of results
**
************************************************************

      Circular surface (FOS=-10.5140) is defined by: xcenter =
80.84
      ycenter =   4961.06   Init. Pt. =     89.32   Seg. Length =
7.00
      ------------------------------------------------------------
--------


************************************************************
          **     Factor of safety calculation for surface #   160
**
          **     failed to converge within FIFTY iterations
**
          **
**
          **    The last calculated value of the FOS was -31.0110
**
          **    This will be ignored for final summary of results
**
************************************************************

      Circular surface (FOS=-31.0110) is defined by: xcenter =
80.01
      ycenter =   4960.72   Init. Pt. =     89.32   Seg. Length =
7.00
```

```
      ------------------------------------------------------------
--------


************************************************************
          **     Factor of safety calculation for surface #   161
**
          **     failed to converge within FIFTY iterations
**
          **
**
          **    The last calculated value of the FOS was -74.5634
**
          **    This will be ignored for final summary of results
**
************************************************************

      Circular surface (FOS=-74.5634) is defined by: xcenter =
79.68
      ycenter =   4961.96   Init. Pt. =     88.79   Seg. Length =
7.00
      ------------------------------------------------------------
--------


************************************************************
          **     Factor of safety calculation for surface #   162
**
          **     failed to converge within FIFTY iterations
**
          **
**
          **    The last calculated value of the FOS was -50.0083
**
          **    This will be ignored for final summary of results
**
************************************************************

      Circular surface (FOS=-50.0083) is defined by: xcenter =
79.78
      ycenter =   4961.60   Init. Pt. =     88.79   Seg. Length =
7.00
      ------------------------------------------------------------
--------
```

```
************************************************************
          **     Factor of safety calculation for surface #   164
**
          **     failed to converge within FIFTY iterations
**
          **
**
          **    The last calculated value of the FOS was -47.1210
**
          **    This will be ignored for final summary of results
**
************************************************************

      Circular surface (FOS=-47.1210) is defined by: xcenter =
80.87
      ycenter =   4970.37   Init. Pt. =     88.79   Seg. Length =
7.00
      ------------------------------------------------------------
--------


************************************************************
          **     Factor of safety calculation for surface #   167
**
          **     failed to converge within FIFTY iterations
**
          **
**
          **    The last calculated value of the FOS was -12.8982
**
          **    This will be ignored for final summary of results
**
************************************************************

      Circular surface (FOS=-12.8982) is defined by: xcenter =
80.84
      ycenter =   4965.74   Init. Pt. =     88.79   Seg. Length =
7.00
      ------------------------------------------------------------
--------


************************************************************
          **     Factor of safety calculation for surface #   168
**
```

```
          **     failed to converge within FIFTY iterations
**
          **
**
          **    The last calculated value of the FOS was  38.3386
**
          **    This will be ignored for final summary of results
**

************************************************************

      Circular surface (FOS= 38.3386) is defined by: xcenter =
78.54
      ycenter =   4960.47   Init. Pt. =     88.79   Seg. Length =
7.00
      ------------------------------------------------------------
--------


************************************************************
          **     Factor of safety calculation for surface #   170
**
          **     failed to converge within FIFTY iterations
**
          **
**
          **    The last calculated value of the FOS was-172.6040
**
          **    This will be ignored for final summary of results
**

************************************************************

      Circular surface (FOS=********) is defined by: xcenter =
79.24
      ycenter =   4960.19   Init. Pt. =     88.79   Seg. Length =
7.00
      ------------------------------------------------------------
--------


************************************************************
          **     Factor of safety calculation for surface #   182
**
          **     failed to converge within FIFTY iterations
**
          **
**
```

```
          **    The last calculated value of the FOS was  -4.6110
**
          **    This will be ignored for final summary of results
**
************************************************************

      Circular surface (FOS= -4.6110) is defined by: xcenter =
81.08
      ycenter =   4962.03   Init. Pt. =     88.26   Seg. Length =
7.00
      ------------------------------------------------------------
--------


************************************************************
          **     Factor of safety calculation for surface #   188
**
          **     failed to converge within FIFTY iterations
**
          **
**
          **    The last calculated value of the FOS was -87.8898
**
          **    This will be ignored for final summary of results
**
************************************************************

      Circular surface (FOS=-87.8898) is defined by: xcenter =
80.32
      ycenter =   4966.33   Init. Pt. =     88.26   Seg. Length =
7.00
      ------------------------------------------------------------
--------


************************************************************
          **     Factor of safety calculation for surface #   190
**
          **     failed to converge within FIFTY iterations
**
          **
**
          **    The last calculated value of the FOS was -10.8499
**
          **    This will be ignored for final summary of results
**
```

```
************************************************************

      Circular surface (FOS=-10.8499) is defined by: xcenter =
81.00
      ycenter =   4966.25   Init. Pt. =     88.26   Seg. Length =
7.00
      ------------------------------------------------------------
--------


************************************************************
          **     Factor of safety calculation for surface #   198
**
          **     failed to converge within FIFTY iterations
**
          **
**
          **    The last calculated value of the FOS was  73.6869
**
          **    This will be ignored for final summary of results
**
************************************************************

      Circular surface (FOS= 73.6869) is defined by: xcenter =
80.22
      ycenter =   4967.75   Init. Pt. =     88.26   Seg. Length =
7.00
      ------------------------------------------------------------
--------


************************************************************
          **     Factor of safety calculation for surface #   203
**
          **     failed to converge within FIFTY iterations
**
          **
**
          **    The last calculated value of the FOS was  28.0646
**
          **    This will be ignored for final summary of results
**
************************************************************
```

```
      Circular surface (FOS= 28.0646) is defined by: xcenter =
78.29
      ycenter =   4960.17   Init. Pt. =     87.74   Seg. Length =
7.00
      ------------------------------------------------------------
--------


************************************************************
          **     Factor of safety calculation for surface #   210
**
          **     failed to converge within FIFTY iterations
**
          **
**
          **    The last calculated value of the FOS was  22.7284
**
          **    This will be ignored for final summary of results
**
************************************************************

      Circular surface (FOS= 22.7284) is defined by: xcenter =
77.85
      ycenter =   4960.08   Init. Pt. =     87.74   Seg. Length =
7.00
      ------------------------------------------------------------
--------


************************************************************
          **     Factor of safety calculation for surface #   213
**
          **     failed to converge within FIFTY iterations
**
          **
**
          **    The last calculated value of the FOS was -26.5968
**
          **    This will be ignored for final summary of results
**
************************************************************

      Circular surface (FOS=-26.5968) is defined by: xcenter =
79.85
      ycenter =   4961.31   Init. Pt. =     87.74   Seg. Length =
7.00
```

```
      ------------------------------------------------------------
--------


************************************************************
          **     Factor of safety calculation for surface #   216
**
          **     failed to converge within FIFTY iterations
**
          **
**
          **    The last calculated value of the FOS was -18.5190
**
          **    This will be ignored for final summary of results
**
************************************************************

      Circular surface (FOS=-18.5190) is defined by: xcenter =
80.00
      ycenter =   4961.54   Init. Pt. =     87.74   Seg. Length =
7.00
      ------------------------------------------------------------
--------


************************************************************
          **     Factor of safety calculation for surface #   217
**
          **     failed to converge within FIFTY iterations
**
          **
**
          **    The last calculated value of the FOS was  -5.8326
**
          **    This will be ignored for final summary of results
**
************************************************************

      Circular surface (FOS= -5.8326) is defined by: xcenter =
80.66
      ycenter =   4961.36   Init. Pt. =     87.74   Seg. Length =
7.00
      ------------------------------------------------------------
--------
```

```
************************************************************
          **     Factor of safety calculation for surface #   219
**
          **     failed to converge within FIFTY iterations
**
          **
**
          **    The last calculated value of the FOS was  25.9148
**
          **    This will be ignored for final summary of results
**
************************************************************

      Circular surface (FOS= 25.9148) is defined by: xcenter =
78.11
      ycenter =   4960.13   Init. Pt. =     87.74   Seg. Length =
7.00
      ------------------------------------------------------------
--------


************************************************************
          **     Factor of safety calculation for surface #   251
**
          **     failed to converge within FIFTY iterations
**
          **
**
          **    The last calculated value of the FOS was  43.2226
**
          **    This will be ignored for final summary of results
**
************************************************************

      Circular surface (FOS= 43.2226) is defined by: xcenter =
80.86
      ycenter =   4974.63   Init. Pt. =     86.68   Seg. Length =
7.00
      ------------------------------------------------------------
--------


          Factors of safety have been calculated by the :

          * * * * *   SIMPLIFIED BISHOP METHOD   * * * * *
```

The most critical circular failure surface
is specified by 4 coordinate points

Point No.	x-surf (ft)	y-surf (ft)
1	83.00	4955.00
2	76.31	4952.95
3	69.38	4953.95
4	66.30	4956.00

**** Simplified BISHOP FOS = 3.299 ****

****
***
**
** Out of the 400 surfaces generated and analyzed by XSTABL, **
** 85 surfaces were found to have MISLEADING FOS values. **
**
**
****
***

The following is a summary of the TEN most critical surfaces

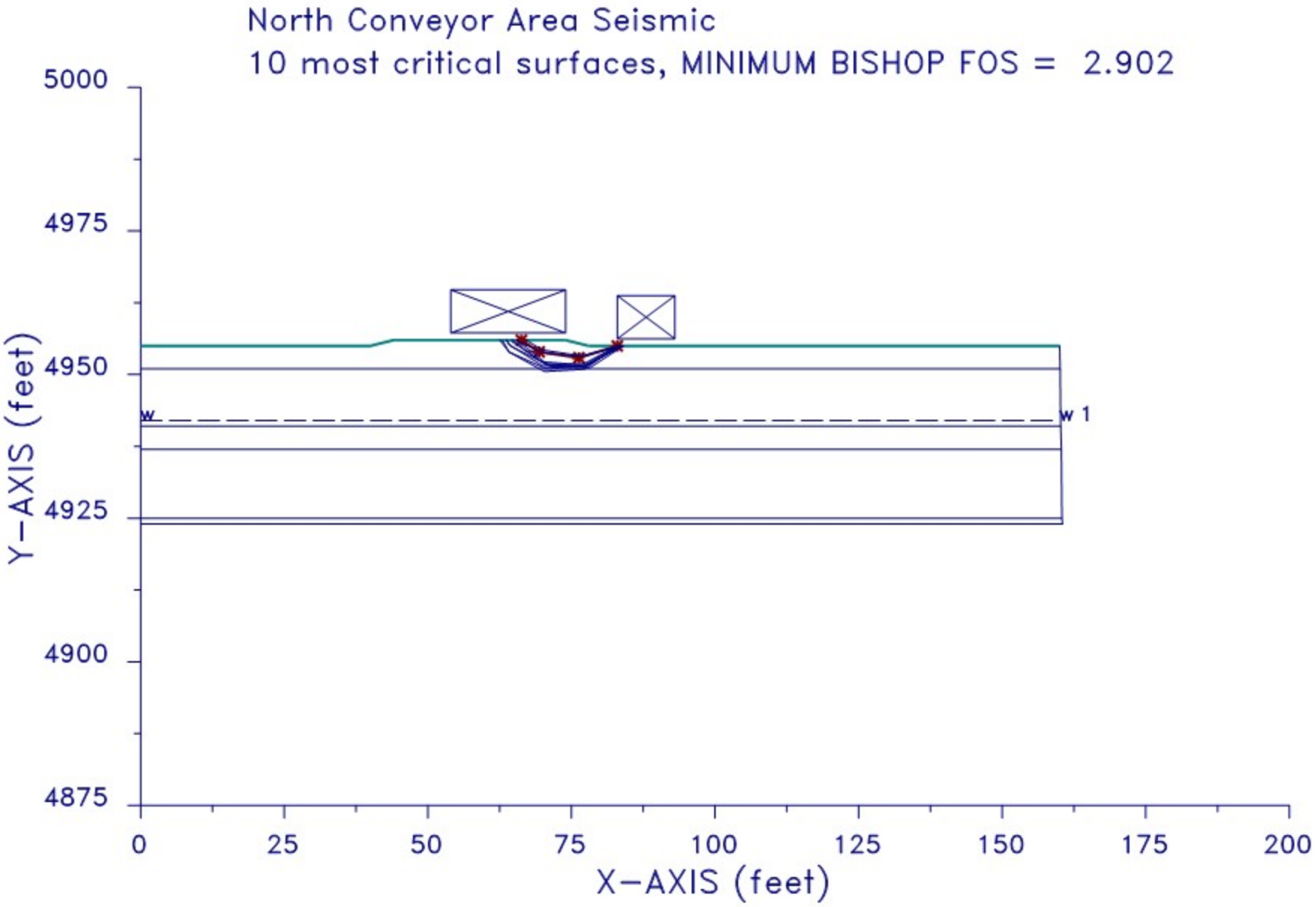
Problem Description : North Conveyor Area STatic

	FOS (BISHOP)	Circle Center x-coord (ft)	Circle Center y-coord (ft)	Radius (ft)	Initial x-coord (ft)	Terminal x-coord (ft)	Resisting Moment (ft-lb)
1.	3.299	75.08	4968.88	15.98	83.00	66.30	7.487E+04

```
           2.   3.340     74.23  4964.01    12.58    83.00
64.75  8.391E+04
           3.   3.612     73.66  4963.84    12.86    83.00
63.72  9.941E+04
           4.   3.627     75.89  4970.45    17.23    83.53
67.17  7.371E+04
           5.   3.715     74.44  4963.66    12.56    83.53
64.59  9.270E+04
           6.   3.817     75.14  4972.15    19.09    83.53
65.49  9.763E+04
           7.   4.000     75.19  4962.27    11.47    84.05
65.64  8.558E+04
           8.   4.262     73.23  4965.51    14.71    83.53
62.53  1.316E+05
           9.   4.287     74.23  4966.51    15.13    84.05
63.71  1.192E+05
          10.   4.379     73.09  4962.95    12.71    83.00
62.98  1.263E+05

                              * * *  END OF FILE  * * *
```

CONVSEI 12-08-21 62:54



```
PROFIL                                  FILE: CONVSEI   12-08-21   62:54    ft
North Conveyor Area Seismic
    16       6
       .0     4955.0       40.0     4955.0   1
     40.0     4955.0       44.0     4956.0   1
     44.0     4956.0       74.0     4956.0   1
     74.0     4956.0       78.0     4955.0   1
     78.0     4955.0      150.0     4955.0   1
    150.0     4955.0      160.0     4955.0   1
    160.0     4955.0      160.1     4951.0   1
       .0     4951.0      160.1     4951.0   2
    160.1     4951.0      160.2     4941.0   2
       .0     4941.0      160.2     4941.0   3
    160.2     4941.0      160.3     4937.0   3
       .0     4937.0      160.3     4937.0   2
    160.3     4937.0      160.4     4925.0   2
       .0     4925.0      160.4     4925.0   4
    160.4     4925.0      160.5     4924.0   4
       .0     4924.0      160.5     4924.0   5
SOIL
  6
  114.0    126.0      50.0    28.00     .000        .0    1
  130.0    137.0        .0    35.00     .000        .0    1
  114.0    126.0      50.0    28.00     .000        .0    1
  124.0    134.0        .0    14.00     .000        .0    1
  124.0    134.0     100.0    28.00     .000        .0    1
  119.0    126.0      25.0    26.00     .000        .0    1
WATER
  1       62.40
     2
          .0      4942.0
       160.0      4942.0
EQUAKE
   .067     .000
LOADS
  2
        54.0        74.0       500.0          .0
        83.0        93.0       500.0          .0
CIRCL2
    20      20
     83.0       93.0       54.0       74.0
   4930.0        7.0       -5.0      -45.0
```

XSTABL File: CONVSEI 12-08-21 62:54

```
*****************************************
*              X S T A B L              *
*                                       *
*        Slope Stability Analysis       *
*               using the               *
*            Method of Slices           *
*                                       *
*        Copyright (C) 1992 - 2002      *
*   Interactive Software Designs, Inc.  *
*        Moscow, ID 83843, U.S.A.       *
*                                       *
*          All Rights Reserved          *
*                                       *
*  Ver. 5.206                 96 - 1952 *
*****************************************
```

Problem Description : North Conveyor Area Seismic

SEGMENT BOUNDARY COORDINATES

---

6 SURFACE boundary segments

Segment No.	x-left (ft)	y-left (ft)	x-right (ft)	y-right (ft)	Soil Unit Below Segment
1	.0	4955.0	40.0	4955.0	1
2	40.0	4955.0	44.0	4956.0	1
3	44.0	4956.0	74.0	4956.0	1
4	74.0	4956.0	78.0	4955.0	1
5	78.0	4955.0	150.0	4955.0	1
6	150.0	4955.0	160.0	4955.0	1

10 SUBSURFACE boundary segments

Segment	x-left	y-left	x-right	y-right

Soil Unit Below Segment	No.	(ft)	(ft)	(ft)	(ft)
1	1	160.0	4955.0	160.1	4951.0
1	2	.0	4951.0	160.1	4951.0
2	3	160.1	4951.0	160.2	4941.0
2	4	.0	4941.0	160.2	4941.0
3	5	160.2	4941.0	160.3	4937.0
3	6	.0	4937.0	160.3	4937.0
2	7	160.3	4937.0	160.4	4925.0
2	8	.0	4925.0	160.4	4925.0
4	9	160.4	4925.0	160.5	4924.0
4	10	.0	4924.0	160.5	4924.0
5					

ISOTROPIC Soil Parameters

---

6 Soil unit(s) specified

Soil Unit No.	Unit Weight Moist (pcf)	Sat. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Parameter Ru	Water Constant (psf)	Surface No.
1	114.0	126.0	50.0			28.00	
.000		.0	1				
2	130.0	137.0	.0			35.00	
.000		.0	1				
3	114.0	126.0	50.0			28.00	
.000		.0	1				
4	124.0	134.0	.0			14.00	
.000		.0	1				
5	124.0	134.0	100.0			28.00	
.000		.0	1				
6	119.0	126.0	25.0			26.00	
.000		.0	1				

1 Water surface(s) have been specified

Unit weight of water = 62.40 (pcf)

Water Surface No. 1 specified by 2 coordinate points

****
PHREATIC SURFACE,
****

Point No.	x-water (ft)	y-water (ft)
1	.00	4942.00
2	160.00	4942.00

A horizontal earthquake loading coefficient
of .067 has been assigned

A vertical earthquake loading coefficient
of .000 has been assigned

BOUNDARY LOADS
---

2 load(s) specified

Load No.	x-left (ft)	x-right (ft)	Intensity (psf)	Direction (deg)
1	54.0	74.0	500.0	.0
2	83.0	93.0	500.0	.0

NOTE - Intensity is specified as a uniformly distributed
force acting on a HORIZONTALLY projected surface.

A critical failure surface searching method, using a random technique for generating CIRCULAR surfaces has been specified.

400 trial surfaces will be generated and analyzed.

20 Surfaces initiate from each of 20 points equally spaced along the ground surface between x = 83.0 ft
and x = 93.0 ft

Each surface terminates between x = 54.0 ft
and x = 74.0 ft

Unless further limitations were imposed, the minimum elevation at which a surface extends is y = 4930.0 ft

7.0 ft line segments define each trial failure surface.

ANGULAR RESTRICTIONS

The first segment of each failure surface will be inclined within the angular range defined by :

Lower angular limit := -45.0 degrees
Upper angular limit := -5.0 degrees

****
** Factor of safety calculation for surface # 2 **
** failed to converge within FIFTY iterations **
**

```
          **    The last calculated value of the FOS was  25.6625
**
          **    This will be ignored for final summary of results
**

************************************************************

      Circular surface (FOS= 25.6625) is defined by: xcenter =
81.73
      ycenter =   4972.10   Init. Pt. =     93.00   Seg. Length =
7.00
      ------------------------------------------------------------
--------


************************************************************
          **     Factor of safety calculation for surface #     3
**
          **     failed to converge within FIFTY iterations
**
          **
**
          **    The last calculated value of the FOS was -99.6076
**
          **    This will be ignored for final summary of results
**

************************************************************

      Circular surface (FOS=-99.6076) is defined by: xcenter =
84.00
      ycenter =   4988.14   Init. Pt. =     93.00   Seg. Length =
7.00
      ------------------------------------------------------------
--------


************************************************************
          **     Factor of safety calculation for surface #     6
**
          **     failed to converge within FIFTY iterations
**
          **
**
          **    The last calculated value of the FOS was 168.9250
**
          **    This will be ignored for final summary of results
**
```

```
************************************************************

      Circular surface (FOS=168.9250) is defined by: xcenter =
82.80
      ycenter =   4976.72   Init. Pt. =     93.00   Seg. Length =
7.00
      ------------------------------------------------------------
--------


************************************************************
          **     Factor of safety calculation for surface #     8
**
          **     failed to converge within FIFTY iterations
**
          **
**
          **    The last calculated value of the FOS was*********
**
          **    This will be ignored for final summary of results
**
************************************************************

      Circular surface (FOS=********) is defined by: xcenter =
83.15
      ycenter =   4979.69   Init. Pt. =     93.00   Seg. Length =
7.00
      ------------------------------------------------------------
--------


************************************************************
          **     Factor of safety calculation for surface #    16
**
          **     failed to converge within FIFTY iterations
**
          **
**
          **    The last calculated value of the FOS was -21.7026
**
          **    This will be ignored for final summary of results
**
************************************************************
```

```
      Circular surface (FOS=-21.7026) is defined by: xcenter =
84.58
      ycenter =   4987.12   Init. Pt. =     93.00   Seg. Length =
7.00
      ------------------------------------------------------------
--------


************************************************************
          **     Factor of safety calculation for surface #    19
**
          **     failed to converge within FIFTY iterations
**
          **
**
          **    The last calculated value of the FOS was -11.4507
**
          **    This will be ignored for final summary of results
**
************************************************************

      Circular surface (FOS=-11.4507) is defined by: xcenter =
82.97
      ycenter =   4960.19   Init. Pt. =     93.00   Seg. Length =
7.00
      ------------------------------------------------------------
--------


************************************************************
          **     Factor of safety calculation for surface #    21
**
          **     failed to converge within FIFTY iterations
**
          **
**
          **    The last calculated value of the FOS was -18.5791
**
          **    This will be ignored for final summary of results
**
************************************************************

      Circular surface (FOS=-18.5791) is defined by: xcenter =
82.38
      ycenter =   4960.57   Init. Pt. =     92.47   Seg. Length =
7.00
```

```
      ------------------------------------------------------------
--------


************************************************************
          **     Factor of safety calculation for surface #    23
**
          **     failed to converge within FIFTY iterations
**
          **
**
          **    The last calculated value of the FOS was 132.2947
**
          **    This will be ignored for final summary of results
**
************************************************************

      Circular surface (FOS=132.2947) is defined by: xcenter =
82.14
      ycenter =   4971.45   Init. Pt. =     92.47   Seg. Length =
7.00
      ------------------------------------------------------------
--------


************************************************************
          **     Factor of safety calculation for surface #    35
**
          **     failed to converge within FIFTY iterations
**
          **
**
          **    The last calculated value of the FOS was*********
**
          **    This will be ignored for final summary of results
**
************************************************************

      Circular surface (FOS=********) is defined by: xcenter =
83.24
      ycenter =   4983.77   Init. Pt. =     92.47   Seg. Length =
7.00
      ------------------------------------------------------------
--------
```

```
************************************************************
          **     Factor of safety calculation for surface #    37
**
          **     failed to converge within FIFTY iterations
**
          **
**
          **    The last calculated value of the FOS was -31.1527
**
          **    This will be ignored for final summary of results
**
************************************************************

      Circular surface (FOS=-31.1527) is defined by: xcenter =
82.12
      ycenter =   4960.96   Init. Pt. =     92.47   Seg. Length =
7.00
      ------------------------------------------------------------
--------


************************************************************
          **     Factor of safety calculation for surface #    40
**
          **     failed to converge within FIFTY iterations
**
          **
**
          **    The last calculated value of the FOS was -94.9390
**
          **    This will be ignored for final summary of results
**
************************************************************

      Circular surface (FOS=-94.9390) is defined by: xcenter =
82.49
      ycenter =   4971.54   Init. Pt. =     92.47   Seg. Length =
7.00
      ------------------------------------------------------------
--------


************************************************************
          **     Factor of safety calculation for surface #    45
**
```

```
          **     failed to converge within FIFTY iterations
**
          **
**
          **    The last calculated value of the FOS was  -9.7822
**
          **    This will be ignored for final summary of results
**

************************************************************

      Circular surface (FOS= -9.7822) is defined by: xcenter =
83.18
      ycenter =   4969.46   Init. Pt. =     91.95   Seg. Length =
7.00
      ------------------------------------------------------------
--------


************************************************************
          **     Factor of safety calculation for surface #    50
**
          **     failed to converge within FIFTY iterations
**
          **
**
          **    The last calculated value of the FOS was -13.8099
**
          **    This will be ignored for final summary of results
**

************************************************************

      Circular surface (FOS=-13.8099) is defined by: xcenter =
82.39
      ycenter =   4961.68   Init. Pt. =     91.95   Seg. Length =
7.00
      ------------------------------------------------------------
--------


************************************************************
          **     Factor of safety calculation for surface #    54
**
          **     failed to converge within FIFTY iterations
**
          **
**
```

```
          **    The last calculated value of the FOS was-154.8900
**
          **    This will be ignored for final summary of results
**

************************************************************

      Circular surface (FOS=********) is defined by: xcenter =
81.47
      ycenter =   4960.68   Init. Pt. =     91.95   Seg. Length =
7.00
      ------------------------------------------------------------
--------


************************************************************
          **     Factor of safety calculation for surface #    55
**
          **     failed to converge within FIFTY iterations
**
          **
**
          **    The last calculated value of the FOS was -15.7191
**
          **    This will be ignored for final summary of results
**

************************************************************

      Circular surface (FOS=-15.7191) is defined by: xcenter =
82.29
      ycenter =   4961.95   Init. Pt. =     91.95   Seg. Length =
7.00
      ------------------------------------------------------------
--------


************************************************************
          **     Factor of safety calculation for surface #    56
**
          **     failed to converge within FIFTY iterations
**
          **
**
          **    The last calculated value of the FOS was -27.4385
**
          **    This will be ignored for final summary of results
**
```

```
************************************************************

      Circular surface (FOS=-27.4385) is defined by: xcenter =
81.94
      ycenter =   4962.40   Init. Pt. =     91.95   Seg. Length =
7.00
      ------------------------------------------------------------
--------


************************************************************
          **     Factor of safety calculation for surface #    63
**
          **     failed to converge within FIFTY iterations
**
          **
**
          **    The last calculated value of the FOS was -20.5845
**
          **    This will be ignored for final summary of results
**
************************************************************

      Circular surface (FOS=-20.5845) is defined by: xcenter =
83.55
      ycenter =   4983.84   Init. Pt. =     91.42   Seg. Length =
7.00
      ------------------------------------------------------------
--------


************************************************************
          **     Factor of safety calculation for surface #    65
**
          **     failed to converge within FIFTY iterations
**
          **
**
          **    The last calculated value of the FOS was  -8.6785
**
          **    This will be ignored for final summary of results
**
************************************************************
```

```
      Circular surface (FOS= -8.6785) is defined by: xcenter =
82.55
      ycenter =   4960.48   Init. Pt. =     91.42   Seg. Length =
7.00
      ------------------------------------------------------------
--------


************************************************************
          **     Factor of safety calculation for surface #    70
**
          **     failed to converge within FIFTY iterations
**
          **
**
          **    The last calculated value of the FOS was  -9.4549
**
          **    This will be ignored for final summary of results
**
************************************************************


      Circular surface (FOS= -9.4549) is defined by: xcenter =
82.53
      ycenter =   4962.50   Init. Pt. =     91.42   Seg. Length =
7.00
      ------------------------------------------------------------
--------


************************************************************
          **     Factor of safety calculation for surface #    72
**
          **     failed to converge within FIFTY iterations
**
          **
**
          **    The last calculated value of the FOS was -17.7511
**
          **    This will be ignored for final summary of results
**
************************************************************


      Circular surface (FOS=-17.7511) is defined by: xcenter =
81.85
      ycenter =   4960.69   Init. Pt. =     91.42   Seg. Length =
7.00
```

```
      ------------------------------------------------------------
--------


************************************************************
          **     Factor of safety calculation for surface #    79
**
          **     failed to converge within FIFTY iterations
**
          **
**
          **    The last calculated value of the FOS was -25.0479
**
          **    This will be ignored for final summary of results
**
************************************************************

      Circular surface (FOS=-25.0479) is defined by: xcenter =
81.65
      ycenter =   4961.06   Init. Pt. =     91.42   Seg. Length =
7.00
      ------------------------------------------------------------
--------


************************************************************
          **     Factor of safety calculation for surface #    81
**
          **     failed to converge within FIFTY iterations
**
          **
**
          **    The last calculated value of the FOS was -33.5991
**
          **    This will be ignored for final summary of results
**
************************************************************

      Circular surface (FOS=-33.5991) is defined by: xcenter =
81.19
      ycenter =   4960.20   Init. Pt. =     90.89   Seg. Length =
7.00
      ------------------------------------------------------------
--------
```

```
************************************************************
          **     Factor of safety calculation for surface #    85
**
          **     failed to converge within FIFTY iterations
**
          **
**
          **    The last calculated value of the FOS was -59.3029
**
          **    This will be ignored for final summary of results
**
************************************************************

      Circular surface (FOS=-59.3029) is defined by: xcenter =
81.00
      ycenter =   4960.16   Init. Pt. =     90.89   Seg. Length =
7.00
      ------------------------------------------------------------
--------


************************************************************
          **     Factor of safety calculation for surface #    88
**
          **     failed to converge within FIFTY iterations
**
          **
**
          **    The last calculated value of the FOS was -63.4378
**
          **    This will be ignored for final summary of results
**
************************************************************

      Circular surface (FOS=-63.4378) is defined by: xcenter =
81.37
      ycenter =   4964.97   Init. Pt. =     90.89   Seg. Length =
7.00
      ------------------------------------------------------------
--------


************************************************************
          **     Factor of safety calculation for surface #    95
**
```

```
          **     failed to converge within FIFTY iterations
**
          **
**
          **    The last calculated value of the FOS was  -5.6079
**
          **    This will be ignored for final summary of results
**

************************************************************

      Circular surface (FOS= -5.6079) is defined by: xcenter =
82.65
      ycenter =   4964.44   Init. Pt. =     90.89   Seg. Length =
7.00
      ------------------------------------------------------------
--------


************************************************************
          **     Factor of safety calculation for surface #    96
**
          **     failed to converge within FIFTY iterations
**
          **
**
          **    The last calculated value of the FOS was -20.9915
**
          **    This will be ignored for final summary of results
**

************************************************************

      Circular surface (FOS=-20.9915) is defined by: xcenter =
82.32
      ycenter =   4972.60   Init. Pt. =     90.89   Seg. Length =
7.00
      ------------------------------------------------------------
--------


************************************************************
          **     Factor of safety calculation for surface #    97
**
          **     failed to converge within FIFTY iterations
**
          **
**
```

```
          **    The last calculated value of the FOS was 545.1580
**
          **    This will be ignored for final summary of results
**

************************************************************

      Circular surface (FOS=545.1580) is defined by: xcenter =
80.84
      ycenter =   4962.63   Init. Pt. =     90.89   Seg. Length =
7.00
      ------------------------------------------------------------
--------


************************************************************
          **     Factor of safety calculation for surface #   100
**
          **     failed to converge within FIFTY iterations
**
          **
**
          **    The last calculated value of the FOS was-569.9694
**
          **    This will be ignored for final summary of results
**

************************************************************

      Circular surface (FOS=********) is defined by: xcenter =
80.77
      ycenter =   4960.52   Init. Pt. =     90.89   Seg. Length =
7.00
      ------------------------------------------------------------
--------


************************************************************
          **     Factor of safety calculation for surface #   102
**
          **     failed to converge within FIFTY iterations
**
          **
**
          **    The last calculated value of the FOS was -30.4013
**
          **    This will be ignored for final summary of results
**
```

```
************************************************************

      Circular surface (FOS=-30.4013) is defined by: xcenter =
81.01
      ycenter =   4960.49   Init. Pt. =     90.37   Seg. Length =
7.00
      ------------------------------------------------------------
--------


************************************************************
          **     Factor of safety calculation for surface #   104
**
          **     failed to converge within FIFTY iterations
**
          **
**
          **    The last calculated value of the FOS was -23.6176
**
          **    This will be ignored for final summary of results
**
************************************************************

      Circular surface (FOS=-23.6176) is defined by: xcenter =
82.60
      ycenter =   4979.68   Init. Pt. =     90.37   Seg. Length =
7.00
      ------------------------------------------------------------
--------


************************************************************
          **     Factor of safety calculation for surface #   106
**
          **     failed to converge within FIFTY iterations
**
          **
**
          **    The last calculated value of the FOS was-115.0629
**
          **    This will be ignored for final summary of results
**
************************************************************
```

```
      Circular surface (FOS=********) is defined by: xcenter =
81.44
      ycenter =   4969.98   Init. Pt. =     90.37   Seg. Length =
7.00
      ------------------------------------------------------------
--------


************************************************************
          **     Factor of safety calculation for surface #   110
**
          **     failed to converge within FIFTY iterations
**
          **
**
          **    The last calculated value of the FOS was  28.8068
**
          **    This will be ignored for final summary of results
**
************************************************************

      Circular surface (FOS= 28.8068) is defined by: xcenter =
79.87
      ycenter =   4960.58   Init. Pt. =     90.37   Seg. Length =
7.00
      ------------------------------------------------------------
--------


************************************************************
          **     Factor of safety calculation for surface #   111
**
          **     failed to converge within FIFTY iterations
**
          **
**
          **    The last calculated value of the FOS was  23.5574
**
          **    This will be ignored for final summary of results
**
************************************************************

      Circular surface (FOS= 23.5574) is defined by: xcenter =
81.90
      ycenter =   4990.61   Init. Pt. =     90.37   Seg. Length =
7.00
```

```
      ------------------------------------------------------------
--------


************************************************************
          **     Factor of safety calculation for surface #   112
**
          **     failed to converge within FIFTY iterations
**
          **
**
          **    The last calculated value of the FOS was  -7.6263
**
          **    This will be ignored for final summary of results
**
************************************************************

      Circular surface (FOS= -7.6263) is defined by: xcenter =
82.00
      ycenter =   4963.45   Init. Pt. =     90.37   Seg. Length =
7.00
      ------------------------------------------------------------
--------


************************************************************
          **     Factor of safety calculation for surface #   113
**
          **     failed to converge within FIFTY iterations
**
          **
**
          **    The last calculated value of the FOS was  40.1552
**
          **    This will be ignored for final summary of results
**
************************************************************

      Circular surface (FOS= 40.1552) is defined by: xcenter =
80.69
      ycenter =   4967.06   Init. Pt. =     90.37   Seg. Length =
7.00
      ------------------------------------------------------------
--------
```

```
**********************************************************
          **     Factor of safety calculation for surface #   114
**
          **     failed to converge within FIFTY iterations
**
          **
**
          **    The last calculated value of the FOS was  49.8032
**
          **    This will be ignored for final summary of results
**
**********************************************************

      Circular surface (FOS= 49.8032) is defined by: xcenter =
82.22
      ycenter =   4987.15   Init. Pt. =     90.37   Seg. Length =
7.00
      ---------------------------------------------------------
--------


**********************************************************
          **     Factor of safety calculation for surface #   115
**
          **     failed to converge within FIFTY iterations
**
          **
**
          **    The last calculated value of the FOS was -61.9946
**
          **    This will be ignored for final summary of results
**
**********************************************************

      Circular surface (FOS=-61.9946) is defined by: xcenter =
81.25
      ycenter =   4965.30   Init. Pt. =     90.37   Seg. Length =
7.00
      ---------------------------------------------------------
--------


**********************************************************
          **     Factor of safety calculation for surface #   125
**
```

```
          **     failed to converge within FIFTY iterations
**
          **
**
          **    The last calculated value of the FOS was-136.8815
**
          **    This will be ignored for final summary of results
**

************************************************************

      Circular surface (FOS=********) is defined by: xcenter =
81.30
      ycenter =   4972.19   Init. Pt. =     89.84   Seg. Length =
7.00
      ------------------------------------------------------------
--------


************************************************************
          **     Factor of safety calculation for surface #   133
**
          **     failed to converge within FIFTY iterations
**
          **
**
          **    The last calculated value of the FOS was 107.2427
**
          **    This will be ignored for final summary of results
**

************************************************************

      Circular surface (FOS=107.2427) is defined by: xcenter =
82.74
      ycenter =   4992.92   Init. Pt. =     89.84   Seg. Length =
7.00
      ------------------------------------------------------------
--------


************************************************************
          **     Factor of safety calculation for surface #   136
**
          **     failed to converge within FIFTY iterations
**
          **
**
```

```
          **    The last calculated value of the FOS was  -6.4988
**
          **    This will be ignored for final summary of results
**
************************************************************

      Circular surface (FOS= -6.4988) is defined by: xcenter =
81.99
      ycenter =   4966.40   Init. Pt. =     89.84   Seg. Length =
7.00
      ------------------------------------------------------------
--------


************************************************************
          **     Factor of safety calculation for surface #   138
**
          **     failed to converge within FIFTY iterations
**
          **
**
          **    The last calculated value of the FOS was  40.2756
**
          **    This will be ignored for final summary of results
**
************************************************************

      Circular surface (FOS= 40.2756) is defined by: xcenter =
79.82
      ycenter =   4960.88   Init. Pt. =     89.84   Seg. Length =
7.00
      ------------------------------------------------------------
--------


************************************************************
          **     Factor of safety calculation for surface #   148
**
          **     failed to converge within FIFTY iterations
**
          **
**
          **    The last calculated value of the FOS was  -5.7276
**
          **    This will be ignored for final summary of results
**
```

```
************************************************************

      Circular surface (FOS= -5.7276) is defined by: xcenter =
81.43
      ycenter =   4961.62   Init. Pt. =     89.32   Seg. Length =
7.00
      ------------------------------------------------------------
--------


************************************************************
          **     Factor of safety calculation for surface #   158
**
          **     failed to converge within FIFTY iterations
**
          **
**
          **    The last calculated value of the FOS was  -9.8860
**
          **    This will be ignored for final summary of results
**
************************************************************

      Circular surface (FOS= -9.8860) is defined by: xcenter =
81.20
      ycenter =   4964.20   Init. Pt. =     89.32   Seg. Length =
7.00
      ------------------------------------------------------------
--------


************************************************************
          **     Factor of safety calculation for surface #   159
**
          **     failed to converge within FIFTY iterations
**
          **
**
          **    The last calculated value of the FOS was -17.6853
**
          **    This will be ignored for final summary of results
**
************************************************************
```

```
      Circular surface (FOS=-17.6853) is defined by: xcenter =
80.84
      ycenter =   4961.06   Init. Pt. =     89.32   Seg. Length =
7.00
      ------------------------------------------------------------
--------


************************************************************
          **     Factor of safety calculation for surface #   160
**
          **     failed to converge within FIFTY iterations
**
          **
**
          **    The last calculated value of the FOS was 194.5803
**
          **    This will be ignored for final summary of results
**
************************************************************

      Circular surface (FOS=194.5803) is defined by: xcenter =
80.01
      ycenter =   4960.72   Init. Pt. =     89.32   Seg. Length =
7.00
      ------------------------------------------------------------
--------


************************************************************
          **     Factor of safety calculation for surface #   161
**
          **     failed to converge within FIFTY iterations
**
          **
**
          **    The last calculated value of the FOS was  37.9370
**
          **    This will be ignored for final summary of results
**
************************************************************

      Circular surface (FOS= 37.9370) is defined by: xcenter =
79.68
      ycenter =   4961.96   Init. Pt. =     88.79   Seg. Length =
7.00
```

```
      ------------------------------------------------------------
--------


************************************************************
          **     Factor of safety calculation for surface #   162
**
          **     failed to converge within FIFTY iterations
**
          **
**
          **    The last calculated value of the FOS was  53.2161
**
          **    This will be ignored for final summary of results
**
************************************************************

      Circular surface (FOS= 53.2161) is defined by: xcenter =
79.78
      ycenter =   4961.60   Init. Pt. =     88.79   Seg. Length =
7.00
      ------------------------------------------------------------
--------


************************************************************
          **     Factor of safety calculation for surface #   164
**
          **     failed to converge within FIFTY iterations
**
          **
**
          **    The last calculated value of the FOS was  91.1507
**
          **    This will be ignored for final summary of results
**
************************************************************

      Circular surface (FOS= 91.1507) is defined by: xcenter =
80.87
      ycenter =   4970.37   Init. Pt. =     88.79   Seg. Length =
7.00
      ------------------------------------------------------------
--------
```

```
************************************************************
          **     Factor of safety calculation for surface #   167
**
          **     failed to converge within FIFTY iterations
**
          **
**
          **    The last calculated value of the FOS was -24.4608
**
          **    This will be ignored for final summary of results
**
************************************************************

      Circular surface (FOS=-24.4608) is defined by: xcenter =
80.84
      ycenter =   4965.74   Init. Pt. =     88.79   Seg. Length =
7.00
      ------------------------------------------------------------
--------


************************************************************
          **     Factor of safety calculation for surface #   170
**
          **     failed to converge within FIFTY iterations
**
          **
**
          **    The last calculated value of the FOS was  32.4792
**
          **    This will be ignored for final summary of results
**
************************************************************

      Circular surface (FOS= 32.4792) is defined by: xcenter =
79.24
      ycenter =   4960.19   Init. Pt. =     88.79   Seg. Length =
7.00
      ------------------------------------------------------------
--------


************************************************************
          **     Factor of safety calculation for surface #   182
**
```

```
          **     failed to converge within FIFTY iterations
**
          **
**
          **    The last calculated value of the FOS was  -5.6056
**
          **    This will be ignored for final summary of results
**

************************************************************

      Circular surface (FOS= -5.6056) is defined by: xcenter =
81.08
      ycenter =   4962.03   Init. Pt. =     88.26   Seg. Length =
7.00
      ------------------------------------------------------------
--------


************************************************************
          **     Factor of safety calculation for surface #   188
**
          **     failed to converge within FIFTY iterations
**
          **
**
          **    The last calculated value of the FOS was  40.0811
**
          **    This will be ignored for final summary of results
**

************************************************************

      Circular surface (FOS= 40.0811) is defined by: xcenter =
80.32
      ycenter =   4966.33   Init. Pt. =     88.26   Seg. Length =
7.00
      ------------------------------------------------------------
--------


************************************************************
          **     Factor of safety calculation for surface #   190
**
          **     failed to converge within FIFTY iterations
**
          **
**
```

```
          **    The last calculated value of the FOS was -17.1558
**
          **    This will be ignored for final summary of results
**

************************************************************

      Circular surface (FOS=-17.1558) is defined by: xcenter =
81.00
      ycenter =   4966.25   Init. Pt. =     88.26   Seg. Length =
7.00
      ------------------------------------------------------------
--------


************************************************************
          **     Factor of safety calculation for surface #   213
**
          **     failed to converge within FIFTY iterations
**
          **
**
          **    The last calculated value of the FOS was1458.1360
**
          **    This will be ignored for final summary of results
**

************************************************************

      Circular surface (FOS********) is defined by: xcenter =
79.85
      ycenter =   4961.31   Init. Pt. =     87.74   Seg. Length =
7.00
      ------------------------------------------------------------
--------


************************************************************
          **     Factor of safety calculation for surface #   216
**
          **     failed to converge within FIFTY iterations
**
          **
**
          **    The last calculated value of the FOS was -63.5938
**
          **    This will be ignored for final summary of results
**
```

```
************************************************************

      Circular surface (FOS=-63.5938) is defined by: xcenter =
80.00
      ycenter =   4961.54   Init. Pt. =     87.74   Seg. Length =
7.00
      ------------------------------------------------------------
--------


************************************************************
          **     Factor of safety calculation for surface #   217
**
          **     failed to converge within FIFTY iterations
**
          **
**
          **    The last calculated value of the FOS was  -7.5062
**
          **    This will be ignored for final summary of results
**
************************************************************

      Circular surface (FOS= -7.5062) is defined by: xcenter =
80.66
      ycenter =   4961.36   Init. Pt. =     87.74   Seg. Length =
7.00
      ------------------------------------------------------------
--------


************************************************************
          **     Factor of safety calculation for surface #   251
**
          **     failed to converge within FIFTY iterations
**
          **
**
          **    The last calculated value of the FOS was  24.1885
**
          **    This will be ignored for final summary of results
**
************************************************************
```

Circular surface (FOS= 24.1885) is defined by: xcenter = 80.86
ycenter = 4974.63 Init. Pt. = 86.68 Seg. Length = 7.00

Factors of safety have been calculated by the :

* * * * * SIMPLIFIED BISHOP METHOD * * * * *

The most critical circular failure surface
is specified by 4 coordinate points

Point No.	x-surf (ft)	y-surf (ft)
1	83.00	4955.00
2	76.31	4952.95
3	69.38	4953.95
4	66.30	4956.00

**** Simplified BISHOP FOS = 2.902 ****

****
**
** Out of the 400 surfaces generated and analyzed by XSTABL, **
** 57 surfaces were found to have MISLEADING FOS values. **
**
****

The following is a summary of the TEN most critical surfaces

Problem Description : North Conveyor Area Seismic

	FOS (BISHOP)	Circle Center x-coord (ft)	y-coord (ft)	Radius (ft)	Initial x-coord (ft)	Terminal x-coord (ft)	Resisting Moment (ft-lb)
1.	2.902	75.08	4968.88	15.98	83.00	66.30	7.458E+04
2.	2.903	74.23	4964.01	12.58	83.00	64.75	8.357E+04
3.	3.097	73.66	4963.84	12.86	83.00	63.72	9.901E+04
4.	3.182	75.89	4970.45	17.23	83.53	67.17	7.347E+04
5.	3.184	74.44	4963.66	12.56	83.53	64.59	9.236E+04
6.	3.320	75.14	4972.15	19.09	83.53	65.49	9.732E+04
7.	3.408	75.19	4962.27	11.47	84.05	65.64	8.529E+04
8.	3.550	73.23	4965.51	14.71	83.53	62.53	1.311E+05
9.	3.585	74.23	4966.51	15.13	84.05	63.71	1.188E+05
10.	3.689	73.09	4962.95	12.71	83.00	62.98	1.258E+05

* * * END OF FILE * * *

December 16, 2021

Adams County Clerk & Recorder
4430 S. Adams County Pkwy
1st Fl. E2400
Brighton, CO 80601

RE: Tucson South Gravel Mine

Dear Clerk to the Board:

As a requirement of the Division of Reclamation Mining and Safety (DRMS), the complete Tucson South Gravel Mine application must be on file at the County Clerk's Office and be available for public viewing. A copy of the complete application on behalf of Aggregate Industries is attached. Please sign below to indicate that you have received the above-mentioned information and return this page to us by email at gary@civilresources.com.

As always, thank you for your assistance.

Sincerely,

Civil Resources, LLC

Gary Linden, P.G.
Senior Engineering Geologist

Confirmation of Receipt:
I have received the above reference documents, and will put it on file for public viewing.

County Clerk to the Board Date

J:\Aggregate Industries-297/Tucson South Permit Support/2021 amendment\DRMS\notices\letter to clerk_signature reqted_Adams-.doc

December 16, 2021

Clerk to the Board of Weld County Commissioners
1150 O Street
P.O. Box 758
Greeley, CO 80631

RE: Tucson South Gravel Mine

Dear Clerk to the Board:

As a requirement of the Division of Reclamation Mining and Safety (DRMS), the complete Tucson South Gravel Mine application must be on file at the County Clerk's Office and be available for public viewing. A copy of the complete application on behalf of Aggregate Industries is attached. Please sign below to indicate that you have received the above-mentioned information and return this page to us by email at gary@civilresources.com.

As always, thank you for your assistance.

Sincerely,

Civil Resources, LLC

Gary Linden, P.G.
Senior Engineering Geologist

RECEIVED
DEC 16 2021
WELD COUNTY
COMMISSIONERS

Confirmation of Receipt:
I have received the above reference documents, and will put it on file for public viewing.

County Clerk to the Board Date

J:\Aggregate Industries-297/Tucson South Permit Support/2021 amendment\DRMS\notices\letter to clerk_signature reqted_Weld.doc