APPENDIX D.1

Geotechnical Report

GEOLOGIC AND GEOTECHNICAL ENGINEERING REPORT,
PROPOSED RESIDENCE WITH BASEMENT, SWIMMING POOL,
AND ADU,

Lots 1 and 2, Tract 8002, APN 5208-015-001
2830 Prewett Street,
Los Angeles, California

for

Mr. Duc Truong

April 6, 2021 W.O. 7578

MDN 22030

GeoSoils Consultants Inc.
GEOTECHNICAL GEOLOGIC ENVIRONMENTAL

April 6, 2021
W.O. 7578

MR. DUC TRUONG
4532 College View Avenue
Los Angeles, California 90041

Subject: **Geologic and Geotechnical Engineering Report, Proposed Residence with Basement, Swimming Pool, and ADU, Lots 1 and 2, Tract 8002, APN 5208-015-001 and -002, 2830 Prewett Street, Los Angeles, California**

Dear Mr. Truong:

As requested, GeoSoils Consultants, Inc. (GSC) has prepared this geologic and geotechnical engineering report for the subject project. The property is located at 2830 Prewett Street in the community of Lincoln Heights in the City of Los Angeles.

The existing site conditions are shown in the Geologic Map, Plate 1. The proposed residence, swimming pool and ADU are shown on the Site Plan, Plate 2. Three geologic cross sections were prepared and are included on the Geologic Cross Sections, Plates 3A and 3B.

SCOPE OF SERVICES

This geologic and geotechnical engineering study included:

a. Excavating, sampling, and logging of six test pits. The test pit locations are shown on the enclosed Plate 1, Geologic Map. The test pit logs (Plates TP-1 to TP-6) are provided in Appendix A along with a general description of the field operations.

MDN 22033

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b. Laboratory testing of selected samples to determine the engineering properties of the on-site soils. The results of laboratory testing are presented in Appendix B and on the test pit logs.

c. Engineering analyses of the data and information obtained from our field study and laboratory testing and the preparation of this report summarizing our findings, conclusions and recommendations.

SITE DESCRIPTION AND CITY RESEARCH

The site consists of vacant land at the south end of Thomas Street. The end of Prewett Street is to the east of the site. Future access to the property will be from Thomas Street. The property directly west of these two lots is 2831 Thomas Street and is currently under construction. The geologic reports were researched for this site and are referenced herein. The geologic conditions in the reports correspond to the geologic conditions observed in our test pits and GSC has reviewed the reports and accepts responsibility for the shear data in the TK Engineering report. The along bedding shear data was utilized in our stability analyses.

PROPOSED DEVELOPMENT

The two lots, Lots 1 and 2 of Tract 8002, will be combined for construction of a proposed two story single family residence with an ADU and swimming pool. The proposed site improvements are shown on the Site Plan, Plate 2.

WATER

Surface Water

Surface water consists of sheetflow from precipitation falling directly on the site and landscape watering.

Groundwater

No groundwater was encountered in our test pits excavated on the site to a maximum depth of 5.5 feet. However, perched groundwater levels typically fluctuate and may vary in response to season, precipitation patterns, on or off-site construction activities, site utilization, and other factors. Groundwater is not anticipated to pose an issue during development of this site.

SUBSURFACE CONDITIONS

The following sections present our findings concerning subsurface soil conditions and expansion potential of surficial site soils.

We offer the following general description of materials encountered during our subsurface exploration of the test pits (Plates TP-1 through TP-6).

> Artificial fill (af): Artificial fill was encountered in test pit TP-5 to a maximum depth of 4 feet. This fill appears to be dumped material and may have been used to fill in a hole. This material is not suitable for structural support.
>
> Slopewash (Qsw): Slopewash was observed in the test pits with a thickness of up to 3 feet 9 inches. This material is not suitable for structural support.
>
> Bedrock: Puente Formation (Tp): Bedrock of the Puente Formation was encountered in all of the test pits. The bedrock consists of siltstone and sandstone that was very consistently striking between N15W to N33E with dips of between 25 to 27 degrees to the northeast and southeast. The bedrock is suitable for structural support.

The enclosed test pits, which are included in Appendix A, provide a detailed description of the soil strata encountered in our subsurface exploration.

Expansion Potential and Sulfate Content of Surficial Site Soils

For preliminary foundation design purposes, the surficial site soils should be considered to have a medium expansion potential.

No sulfate testing was performed; however, based on other projects in the area, the bedrock material has a negligible sulfate content. Type II cement may be used in construction.

FAULTING AND SEISMICITY

The project site is not located within an Alquist-Priolo Earthquake Fault Zone. Although there are no faults on or adjacent to the property, there are other faults in close proximity to the site that can cause moderate to intense ground shaking during the lifetime of the proposed development. Therefore, earthquake resistant design is recommended.

Seismic Design Criteria

The 2019 CBC (California Building Code) seismic coefficient criteria are provided here for structural design consideration.

Under the Earthquake Design Regulations of Chapter 16, Section 1613 of the CBC 2019, and based on the mapped values, the following coefficients and factors apply to the lateral-force design for the proposed structures at the site.

2019 CBC Section 1613, Earthquake Loads	
Site Class Definition	C
Mapped Spectral Response Acceleration Parameter, S_s (Table 1613.3.1 for 0.2 second)	2.041
Mapped Spectral Response Acceleration Parameter, S_1 (Table 1613.3.1 for 1.0 second)	0.731
Site Coefficient, F_a (Table 1613.3.3(1) short period)	1.2
Site Coefficient, F_v (Table 1613.3.3(2) 1-second period)	1.4
Adjusted Maximum Considered Earthquake Spectral Response Acceleration Parameter S_{MS} (Eq. 16-37)	2.449
Adjusted Maximum Considered Earthquake Spectral Response Acceleration Parameter S_{M1} (Eq. 16-38)	1.023
Design Spectral Response Acceleration Parameter, S_{DS} (Eq. 16-39)	1.663
Design Spectral Response Acceleration Parameter, S_{D1} (Eq. 16-40)	0.682
Notes: Location: Longitude: -118.2066, Latitude: 34.0791 1. Site Class Designation: Class C is recommended based on subsurface condition. 2. Ss, SMs, and SDs are spectral response accelerations for the period of 0.2 second. 3. S1, SM1, and SD1 are spectral response accelerations for the period of 1.0 second.	

Conformance to the above criteria for seismic excitation does not constitute any kind of guarantee or assurance that significant structural damage or ground failure will not occur if a maximum level earthquake occurs. The primary goal of seismic design is to protect life and not to avoid all damage, since such design may be economically prohibitive. Following a major earthquake, a building may be damaged beyond repair, yet not collapse.

Secondary Earthquake Effects

Ground shaking produced during an earthquake can result in a number of potentially damaging phenomena classified as secondary earthquake effects. These secondary effects include ground rupture, landslides, lurching, seiches and tsunamis, seismically-induced settlement, and liquefaction. Descriptions of each of these phenomenon and how it could potentially affect the proposed site are described below:

Ground Rupture

Ground surface rupture results when the movement along a fault is sufficient to cause a surface gap or rupture along the upper edge of the fault zone. No known faults cross the property. Therefore, the potential for ground rupture is considered remote.

Landsliding

Landslides are slope failures that occur where the horizontal seismic forces act to induce soil and/or bedrock failures. The most common failure occurs by the reactivation or movement of a pre-existing landslide. Typically, existing slides that are stable under static conditions (i.e., factor-of-safety at or greater than one) become unstable and move during strong ground shaking. The subject site is not located in an earthquake induced landslide area as per the parcel profile report of the City of Los Angeles.

Ground Lurching

Ground lurching is defined as earthquake motion at right angles to a cliff, stream bank, or embankment that results in yielding of material in the direction in which it is unsupported. The initial effect is to produce a series of parallel cracks with the top of the slope or embankment that separating the ground into rough blocks. Lurching is also used to describe undulating surface waves in the soil that have some similarities to the seismic oscillation. This phenomenon generally occurs in soft, saturated, fine-grained soils. Due to the absence of embankments or cliffs, lurching does not represent a hazard to the site.

Seiches and Tsunamis

Seiches are generally caused by seismic excitation of a body of water, which causes surface oscillations that vary in period from a few minutes to several hours. Tsunamis are large sea waves produced by submarine earthquakes or volcanic eruptions. Due to the proximity of the site relative to the ocean, seiches and tsunamis are not considered a hazard to the site.

Liquefaction – General

Liquefaction describes a phenomenon where cyclic stresses, which are produced by earthquake-induced ground motion creates excess pore pressures in cohesionless soils. These soils may thereby acquire a high degree of mobility, which can lead to lateral sliding, consolidation and settlement of loose sediments, sand boils, and other damaging deformation. This phenomenon occurs only below the water table, but after liquefaction has developed, it can propagate upward into overlying, non-saturated soils as excess pore water escapes.

Liquefaction susceptibility is related to numerous factors and the following conditions must exist for liquefaction to occur: 1) sediments must be relatively young in age and must not have developed large amounts of cementation, 2) sediments must consist mainly of cohesionless sands and silts, 3) the sediments must not have a high relative density, 4) free groundwater must exist in the sediment, and 5) the site must be exposed to seismic events of a magnitude large enough to induce straining of soil particles.

This site is not located in an area subject to potential liquefaction as noted on the State of California Seismic Hazard Zone map and is underlain by shallow bedrock. Therefore, liquefaction is not considered a hazard to the site.

Seismic Settlement Analysis

Seismically-induced settlement in unsaturated (dry) and saturated soils generally occur due to the dissipation of pore pressure.

The potential for seismically-induced settlement is greatest in loose granular soils (i.e., sands, silty sands, sandy silts), whereas cohesive soils (i.e., clays and silts) are generally not prone to settlement. It should be realized that granular soils are susceptible to settlement during a seismic event whether the soils liquefy or not. The site is underlain by bedrock material. Therefore, seismic settlement is not considered to be a hazard to the site.

CONCLUSIONS AND RECOMMENDATIONS

The proposed development is feasible from a geotechnical engineering perspective, provided the recommendations contained herein are incorporated into the final design and construction phase of the proposed development.

GSC anticipates that the proposed improvements will be founded into bedrock. If unsuitable soils, such as old fill or slopewash/topsoil, are encountered at the proposed grade, the proposed footings may be deepened into bedrock with conventional or deepened foundations. Foundation recommendations provided herein are for bedrock.

The proposed basement and retaining wall excavations may remove lateral support from the adjoining properties. In addition, as shown on Cross-Section C-C', a daylighted bedding condition may be exposed. Therefore, temporary shoring recommendations consisting of soldier piles are provided.

The recommendations provided in this report are applicable for improvements on the lot provided the structure is constructed with roof gutters and downspouts and the yard areas have positive drainage that is maintained away from the structure. Therefore, it is important that information regarding drainage and site maintenance be passed on to future homeowners.

As in most of Southern California, the site lies within a seismically-active area; therefore earthquake resistant structural design is recommended.

The following geologic and geotechnical recommendations for utility trench backfill, foundation design, and drainage should be incorporated into final design and construction. All such work and design shall be in conformance with local governmental regulations or the recommendations contained herein, whichever is more restrictive.

Utility Trenching and Backfill

Utility Trenching

Open excavations and excavations that are shored shall conform to all applicable Federal, State and local regulations.

Backfill Placement

Approved on-site or imported fill material shall be evenly placed, watered, processed, and compacted in controlled horizontal layers not exceeding eight inches in loose thickness, and each layer should be thoroughly compacted with approved equipment. All fill material should be moisture conditioned, as required to obtain at least optimum moisture, but not greater than 120 percent of optimum moisture content. The fill should be placed and compacted on a horizontal plane, unless otherwise recommended by the Geotechnical Engineer.

Backfill Compaction Criteria

Each layer of utility trench backfill shall be compacted to at least 90 percent of the maximum laboratory density determined by ASTM D-1557-12. The field density shall be determined by the ASTM D-1556-07 method or equivalent. Where moisture content of the fill or density testing yields compaction results less than 90 percent, additional compaction effort and/or moisture conditioning, as necessary, shall be performed until the compaction criteria is reached.

Exterior Trenches Adjacent to Footings

Exterior trenches, paralleling a footing and extending below a 1H: 1V plane projected from the outside bottom edge of the footing should be compacted to 90 percent of the laboratory standard. Sand backfill, unless it is similar to the in-place fill, should not be allowed in these trench backfill areas. Density testing, along with probing, should be accomplished to verify the desired results.

Pipe Bedding

We recommend that a minimum of six inches of bedding material should be placed in the bottom of the utility trench. All bedding materials shall extend at least four inches above the top of utilities which require protection during subsequent trench backfilling. All trenches shall be wide enough to allow for compaction around the haunches of the pipe or materials, such as pea gravel, or controlled density fill (CDF) shall be used below the spring line of the pipes to eliminate the need for mechanical compaction in this portion of the trenches.

Construction Considerations

Erosion Control

Erosion control measures, when necessary, should be provided by the Contractor during grading and prior to the completion and construction of permanent drainage controls.

Compaction Equipment

It is also the Contractor's responsibility to have suitable and sufficient compaction equipment on the project site to handle the amount of fill being placed and the type of fill material to be compacted. If necessary, excavation equipment should be shut down to permit completion of compaction in accordance with the recommendations contained herein. Sufficient watering devices/equipment should also be provided by the Contractor to achieve optimum moisture content in the fill material.

Final Grading Considerations

Care should be taken by the Contractor during final grading to preserve any berms, drainage terraces, interceptor swales, or other devices of a permanent nature on or adjacent to the property.

FOUNDATION DESIGN RECOMMENDATIONS

In our opinion, spread footings can be used to support the proposed improvements. We offer the following site-specific recommendations and comments for purposes of footing design and construction. All footings should be founded at the recommended depth into competent bedrock. All foundations should be founded into bedrock.

Bearing Subgrades: The proposed improvements should be founded into competent bedrock material.

Subgrade Verification: All footing subgrades should consist of bedrock. Under no circumstances should footings be cast atop loose, soft, or slough, debris, existing artificial fill, or surfaces covered by standing water. We recommend that a representative of GSC verify the condition of all subgrades before any concrete is placed.

Footing Depth and Width: Footings should be continuous and be founded at a minimum depth of 24 inches into bedrock and have a minimum width of 12 inches. Footings should be reinforced according to structural design. All footings should be founded entirely in bedrock.

Bearing Pressures: The allowable bearing capacity values shown in the following table include dead and live loads and may be used for design of footings and foundations. All foundations should be founded in bedrock and should be reinforced according to structural design. The allowable bearing capacity values may be increased by one-third when considering short duration loading conditions such as seismic or wind loads.

Bearing Subgrade	Embedment Depth (inches)	Allowable Bearing Capacity (psf)	Bearing Capacity Increase per Foot Deeper (%)	Bearing Capacity Increase per Foot Wider (%)	Maximum Allowable Bearing Capacity (psf)
Bedrock	24	2000	20	10	4000

Lateral Capacity: To resist lateral loads, the allowable passive earth pressures shown in the following table, expressed as an equivalent fluid pressure, may be used on that portion of shallow foundations which have a minimum embedment depth as previously recommended. When combining passive pressure and frictional resistance, the passive pressure component should be reduced by one-third.

Soil Type	Allowable Lateral Bearing Pressure (pcf/foot)	Maximum Allowable Lateral Bearing Pressure (pcf/foot)	Coefficient of Friction
Bedrock	350	3500	0.4

Slab-On-Grade Floor

We offer the following recommendations and comments for purposes of slab-on-grade floor design and construction. Prior to the placement of any steel or concrete, any remaining fill/slopewash material should be removed and replaced as compacted fill beneath the proposed slab.

Reinforcement: Concrete slabs should be reinforced with at least No. 4 rebar at 16 inches on-center in both directions. All slab reinforcement should be properly positioned at mid-height in the slab during placement of concrete.

Thickness: The design engineer should determine the actual thickness of the slabs based on proposed loadings and use. However, minimum slab thickness of four inches is recommended.

Moisture Protection: Concrete slabs should be underlain with a vapor barrier consisting of a minimum of 10-mil polyvinyl chloride membrane with all laps overlain 12 inches in each direction. Two, two-inch layers of sand should underlie and overlie this membrane.

Slab Sectioning: To minimize transgression of shrinkage cracks, slabs must not exceed 20-foot sections. Expansion joints, plastic joints, saw cutting, or proper tooling may be used to create sectioning during concrete placement. It is suggested that slabs not be tied structurally to heavily loaded walls or columns, until most of the dead loads are in place to permit minor differential settlement.

Subgrade Preparation: All areas to receive concrete should be pre-moistened to a depth of 18 inches. GSC should verify all subgrades that are pre-soaked within 48 hours of concrete placement.

Swimming Pool Recommendations

1. The surface and near-surface materials in the area of the proposed swimming pool have medium expansion potential. Design the pool for medium expansive soil conditions. The pool should also satisfy current code setback requirements.

2. Pool decking should be cast free of the swimming pool/spa and water stops should be provided between the bond beam and the deck.

3. The entire pool bottom and spa (where support is relied upon) will be supported in bedrock material.

4. The pool/spa should be designed for any possible surcharge loadings from nearby structures. Surcharge loads may be determined from Figures 11 and 12 of the Navfac manuals.

5. In the case of a spa being planned structurally continuous with the pool shell, the spa should either be designed to be entirely supported by the pool shell (i.e., cantilevered) or the spa support be derived at a depth comparable to that of the pool (i.e. deep). The Structural Engineer should exercise extreme care in this area. The transition area between the pool and spa is a common area for cracks to develop.

6. In many cases, we have found pool contractors who commonly use standard pool detail sheets instead of having a Structural Engineer design a pool for the specific criteria recommended. These detail sheets usually incorporate details for several site conditions and can be confusing as to exactly which detail is appropriate. Typical "standard detail" may not conform to the criteria recommended. As such, we strongly discourage the use of standard detail sheets. Instead, the Structural Engineer should prepare a specific design and details to conform to the criteria presented in this report, as well as other structural criteria. The detail should also consider provisions for deck construction. We further recommend that the Structural Engineer review steel once in-place and leave a memo at the job site indicating for the benefit of the concerned parties (e.g., owner and City) that it is appropriate to proceed further. Deputy inspection of gunite placement is advised.

7. Prior to placement of steel, the pool plans should be reviewed by this office, and the pool excavation must be observed by a Geologist or Geotechnical Engineer.

8. Surface drainage around the pool should be provided to keep water from ponding and seeping into the ground. Surface water shall be collected and conducted through non-erosive devices to the street, storm drain, or other approved watercourse or disposal area.

9. Leakage from the swimming pool or any of the appurtenant plumbing could create an artificial groundwater condition which could have a deleterious effect on the underlying soil. Therefore, it is imperative that all plumbing and pool features be absolutely leak-

free. A pool subdrain should be installed to relieve water pressure under the pool shell installed. The pool subdrain detail is provided as Figure 1.

10. Should any subdrain pipes, (i.e., such as a yard drain system) be broken or impacted during construction of the pool system, or any structure, these pipes should be repaired and/or rerouted where necessary to restore their intended function (i.e., to provide proper drainage).

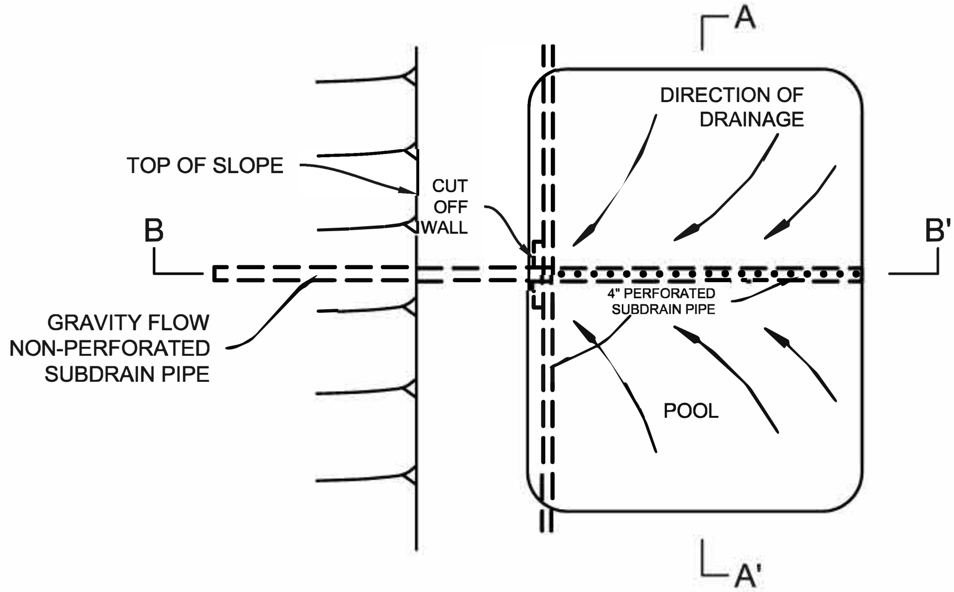
Retaining Wall Recommendations

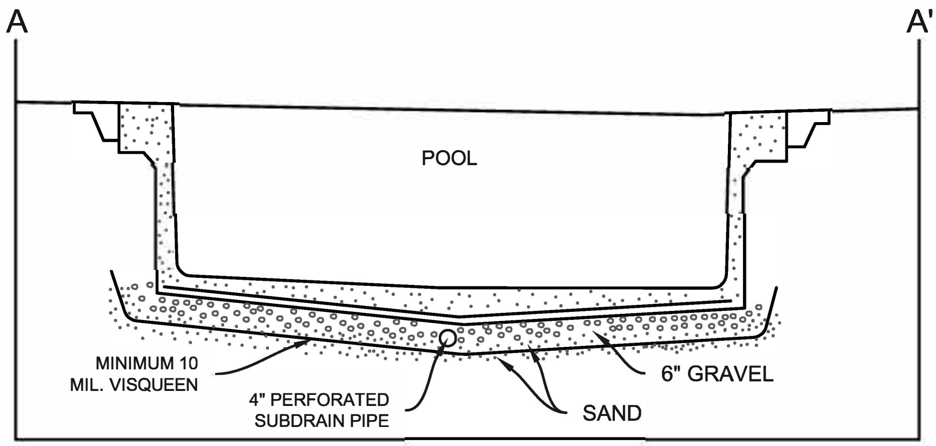
The following recommendations should be followed for retaining wall design and construction: Wall footings should be founded into bedrock. As shown on Cross-Section C-C', a daylighted bedding condition will be exposed during excavation of the proposed residence. Analyses for this condition have been performed and are presented in Appendix D.

The equivalent fluid pressures recommended are based on the assumption of a uniform backfill and no build-up of hydrostatic pressure behind the wall. To prevent the build-up of lateral soil pressures in excess of the recommended design pressures, overcompaction of the fill behind the wall should be avoided. This can be accomplished by placement of the backfill above a 45-degree plane projected upward from the base of the wall, in horizontal lifts not exceeding 8 inches in loose depth, and compacted with hand-operated or small self propelled vibrating plates. (Note: Placement of free-draining material in this zone could also prevent the build-up of lateral soils pressures). All walls must conform to International Building Code setback requirements.

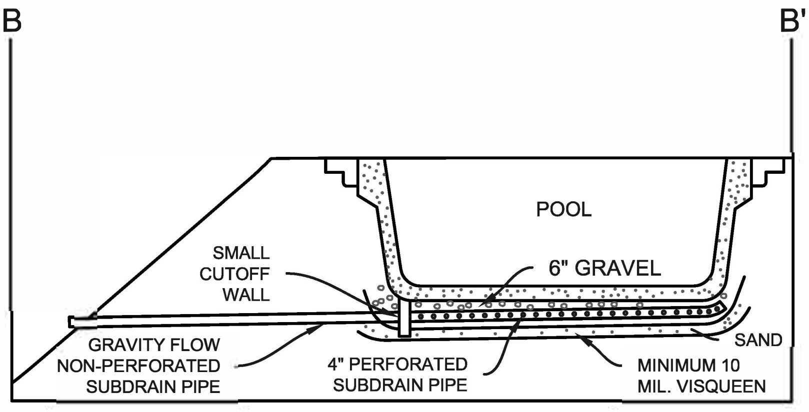
1. **Conventional (Yielding) Retaining Walls**

   All recommendations for active lateral earth pressures contained herein assume that the anticipated retaining structures are in tight contact with the fill or soil that they are supposed to support.





MINIMUM 10 MIL
VISQUEEN SANDWICHED IN 2"+ OF SAND (i.e. TO PREVENT DRAINAGE TO VISQUEEN FROM ROCKS IN GRAVEL OR UNDERLYING FILL BEDROCK MATERIAL)



6" GRAVEL SUB-BASE, OVER VISQUEEN, WITH 4" DIA. PERFORATED PIPE LONGITUDINAL CONNECTED TO 4" DIA. PERFORATED PIPE TRANSVERSE. CONNECT TRANSVERSE PIPE TO 4" NON-PERFORATED PIPE AT LOW POINT & OUTLET OR TO SLUMP PUMP AREA

NOTE:
NOT TO SCALE

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TYPICAL POOL SUBDRAIN SYSTEM

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The earth support system must be sufficient stiff to hold horizontal movements in the soil to less than one percent of the height of the vertical face, but should be free-standing to the point that they yield at the top at least 0.1 percent of the height of the wall.

2. **Earth Pressures on Conventional (Yielding) Walls**

The earth pressures on walls retaining self-draining, granular materials, compacted fill or undisturbed native soil shall be assumed equal to that exerted by an equivalent fluid having a density not less than that shown in the following table:

Backfill Slope (Horizontal: Vertical)	Equivalent Fluid Density
Level	45 pcf
2:1	50 pcf

3. **Restrained (Non-Yielding) Walls**

Earth pressures will be greater on walls where yielding at the top of the wall is limited to less than one-thousandth the height of the wall either by stiffness (i.e., return walls, etc.) or structural floor network prior to backfilling. Utilizing the recommended backfill compaction of 90 percent Modified Proctor Density per ASTM D-1557-12, we recommend the following equivalent fluid density for non-yielding walls:

Backfill Slope (Horizontal: Vertical)	Equivalent Fluid Density
Level	65 pcf
2:1	70 pcf

4. **Seismic Criteria**

The following seismic design criteria must be incorporated into the design of the retaining walls, where applicable:

From NavFac: $Pae = 3/8\gamma H^2 k_h$

H = Height of wall

$Kh = 1/3PGA_m = 1/3(1.059) = 0.349$

γ = 120 pcf

$$P_e = 3/8(120 \text{ pcf})(0.349)H^2 = 15.7H^2$$

P_e acts at 0.6H above the wall base

5. **General**

a. If water is allowed to saturate the backfill, the lateral pressure would exceed the active pressure provided. Clayey or expansive soils should not be used for backfilling behind retaining walls.

b. Any anticipated, superimposed loading (i.e., upper retaining walls, other structures, etc.) within a 45-degree (1:1) projection upward from the wall bottom, except retained earth, shall be considered as surcharge and provided for in the design.

c. A vertical component equal to one-third of the horizontal force so obtained may be assumed at the plane of application of force.

d. Walls higher than three feet should be constructed with weepholes near the bottom on five-foot centers or with perforated drainpipe in a gravel envelope at the bottom and behind the wall. A one-foot thick zone of clean, granular, free-draining material should be placed behind the wall to within three feet of the surface. On-site soil should be used for the remainder of the backfill and should be compacted to 90 percent relative compaction as determined by ASTM Test Designation D-1557-12. All proposed subterranean walls should be waterproofed and backdrained.

e. A concrete-lined swale is recommended to be placed behind retaining walls that can intercept surface runoff from upslope areas. This surface runoff shall be transferred to an approved drainage channel via non-erosive drainage devices.

Deepened Foundation

The following parameters may be used for preliminary pile design. All foundations must satisfy current setback requirements

A. Foundation support may be derived by drilled cast-in-place, reinforced concrete piles designed for frictional resistance.

B. Piles should be designed by a Structural Engineer. Piles should have a minimum embedment depth of five (5) feet into bedrock. However, pile depths may not be less than the depth required to resist the lateral load by passive resistance. All foundations must satisfy current setback requirements.

C. Piles should be tied together with grade and/or tie beams.

D. The existing fill and topsoil/slopewash are subject to downhill creep in areas of existing slopes. Pile shafts should be designed for a lateral load of 1000 pounds per linear foot for each foot of shaft exposed to these materials.

E. Piles may be assumed to be fixed five feet below pile cap or grade beam or existing or proposed grade, whichever is deeper.

F. Passive earth pressures may be computed as an equivalent fluid having a density of 350 pounds per cubic foot for bedrock material, with a maximum earth pressure of 3,500 pounds per square foot. The existing fill and slopewash materials may not be utilized for structural support.

G. The allowable frictional resistance to be used for pile design is 750 pounds per square foot, per foot of depth, into bedrock. The existing fill and slopewash may not be utilized for structural support.

H. All surface water should be collected and conducted to the street or approved water course via non-erosive devices.

I. All drilling should be observed and approved by the Geotechnical Engineer or Engineering Geologist before placing steel or pouring concrete. The City Inspector should also observe the foundation excavations.

J. Should groundwater be encountered during pile excavations, all groundwater should be pumped from the excavations prior to pouring concrete, or the concrete should be tremied into the excavation.

K. All piles should comply with section 1810A. 2.5 of the 2016 CBC.

Settlement

We anticipate that total settlement will not exceed ½-inch and that differential settlement should be less than ¼-inch. The majority of the settlement will probably occur during the initial loading of the foundation; however, if any undisturbed or soft soils are left within the footing area prior to concrete placement, settlements may be increased substantially.

Leakage from any of the appurtenant plumbing will create an artificial groundwater condition, which could likely render settlement problems; therefore, it is imperative that all underground plumbing fixtures be *absolutely* leak-free.

Once foundation plans are available, which include loading details of total dead and real live loads, they should be reviewed by the Geotechnical Engineer to ensure that total and/or differential settlements are within tolerable limits.

Temporary Excavations

Any unsurcharged excavations may have vertical cuts to a maximum height of five feet in bedrock, with any portion above five feet trimmed back at a gradient of 1:1.

In areas where soils with little or no binder are encountered, shoring or flatter excavation slopes shall be made.

These recommended temporary excavation slopes do not preclude local ravelling or sloughing.

All applicable requirements of the California Construction and General Industry Safety Orders, the Occupational Safety and Health Act, and the Construction Safety Act should be met.

Where sloped embankments are used, the top of the slope should be barricaded to prevent equipment and heavy storage loads within five feet of the top of the slope. If the temporary construction embankments are to be maintained for long periods, berms should be constructed along the top of the slope to prevent runoff water from eroding the slope faces. The soils exposed in the temporary backcut slopes during excavation should be observed by our personnel so that modifications of the slopes can be made if variations in the soil conditions occur.

If there are excavations that exceed five feet with no room for the 1:1 slope trimback or excavations will remove lateral support of existing improvements, it is recommended soldier piles be utilized.

This is discussed in the following.

Soldier Pile Recommendations

Excavations will be made directly adjacent to the property line and may expose daylighted bedding (see Section C-C'); therefore, it is anticipated soldier piles may be utilized for some of the proposed excavations.

General

The Contractor should be solely responsible for safety during construction. A surveying program, or other types of instrumentation, should be implemented to check for movement of the shoring system. It is anticipated that minor yielding of adjacent soils may occur during construction. Care should be taken to ensure that any movements associated with yielding are not excessive.

GeoSoils Consultants, Inc. requests that we be notified 24 hours prior to and allowed to regularly inspect the excavation as work progresses in order to monitor earth strain and verify the conditions assumed for design remain unchanged.

Soldier Piles

It is anticipated the soldier piles will become part of the permanent structure. Therefore, the equivalent fluid pressure provided under the *Retaining Wall* section should be utilized in the design of the soldier piles.

Resistance to lateral loads can be assumed to be provided by passive earth pressures. An allowable passive earth pressure of 350 pounds per square foot, per foot of depth into competent bedrock, may be used. The maximum allowable passive pressure should be limited to 3,500 pounds per square foot. The passive pressure may be increased by 100 percent for isolated poles.

Piles should be a minimum of 18 inches in diameter. Maximum width of pile spacing should be no more than 8 feet on-center. Materials exposed in the face of any cut should be kept moist, but not saturated, to retard raveling and sloughing during construction. If soldier piles with timber lagging are used, the lagging should be pressure treated. Care should be taken to fill all void spaces between the excavation face and lagging. All lagging should be placed as soon as possible after the excavation is made.

Any anticipated surcharge loads should be considered in the design of the soldier pile system and determined by the Structural Engineer.

On-Site Drainage

Seasonal precipitation and/or landscape water should not be allowed to pond within the site, especially next to foundations of any structures. Surface runoff should be collected and disposed of in such a manner as to prevent concentrated erosion. Roof gutters, downspouts, and yard drains should be provided in accordance with the City of Los Angeles requirements. All pad drainage should be directed toward the street or an approved water course area swale via non-erosive channel, pipe and/or dispersions devices. We recommend that all planters proposed adjacent to structures be self-contained, provided with a subdrain system, and/or allowed to have positive drainage away from structure to drain excess landscape water.

We recommend that lot drainage be verified after construction and that notices be posted cautioning homeowners not to modify drainage in any way without approval by the City of Los Angeles. At no time should drainage be directed toward any descending slope or allowed to pond. All slope or fill backdrains should continue to remain unobstructed and be allowed to drain freely.

Leakage from any of the appurtenant plumbing will create an artificial groundwater condition which could likely render settlement problems; therefore, it is imperative that all underground plumbing fixtures be *absolutely* leak-free.

LIMITATIONS

The findings and recommendations of this report were prepared in accordance with generally accepted professional geotechnical engineering principles and practice for the City of Los Angeles at this time. We make no other warranty, either express or implied. The conclusions and recommendations contained in this report are based on site conditions disclosed in our subsurface investigation. However, soil conditions can vary significantly between test pits; therefore, further refinements of our recommendations contained herein may be necessary due to changes in the building plans or what is encountered during site grading.

The recommendations provided in this report are applicable for preliminary development planning for the referenced lot provided that surface water will be kept from infiltrating into the subgrade adjacent to the house foundation system. This may include, but not be limited to rain water, roof water, landscape water and/or leaky plumbing. The lot is to be fine graded at the completion of construction to include positive drainage away from the structure and roof water will be collected via gutters, downspouts, and transported to the street in buried drain pipes. We caution against constructing open draining planters adjacent to the houses, or obstructing the yard drainage in any way.

Since our investigation was based on the site conditions observed, selective laboratory testing, and engineering analysis, the conclusions and recommendations contained herein are professional opinions. Further, these opinions have been derived in accordance with standard engineering practices, and no warranty is expressed or implied.

If the conditions encountered during grading are not consistent with the findings presented in this report, or if proposed construction is moved from the location investigated, this office shall be notified immediately so that the condition or change can be evaluated and appropriate action taken.

We appreciate this opportunity to be of continued service to you. If you have any questions regarding the content of this report or any other aspects of the project, please do not hesitate to contact us.

REGISTERED PROFESSIONAL ENGINEER
KAREN L. MILLER
No. 2257
Exp. 3/31/22
GEOTECHNICAL
STATE OF CALIFORNIA

CERTIFIED ENGINEERING GEOLOGIST
JAMES L. VAN METER
No. 2031
Exp. 2/28/23
STATE OF CALIFORNIA

Very truly yours,

GEOSOILS CONSULTANTS, INC.

KAREN L. MILLER
GE 2257

JAMES L. VAN METER
CEG 2031

Encl: References
Plate 1, Geologic Map
Plate 2, Site Plan
Plates 3A and 3B, Geologic Cross Sections
Appendix A, Field Exploration Procedures
Plates TP-1 to TP-6, Test Pit Logs
Appendix B, Laboratory Testing Procedures and Results
Plates SH-1 to SH-3, Shear Test Diagrams
Appendix C, Grading Guidelines
Appendix D, Slope Stability Analyses

cc: (3) Addressee

REFERENCES

1. City of Los Angeles Review Letter dated November 7, 1990, Log No. 19781

2. T.K. Engineering Corp. dated July 31, 1990, "Geotechnical Investigation Report, Proposed Three Residential Lots, 2823 Two Tree Avenue, 2831 Thomas Street, and 2830 Prewett Street, Lincoln Heights, California"

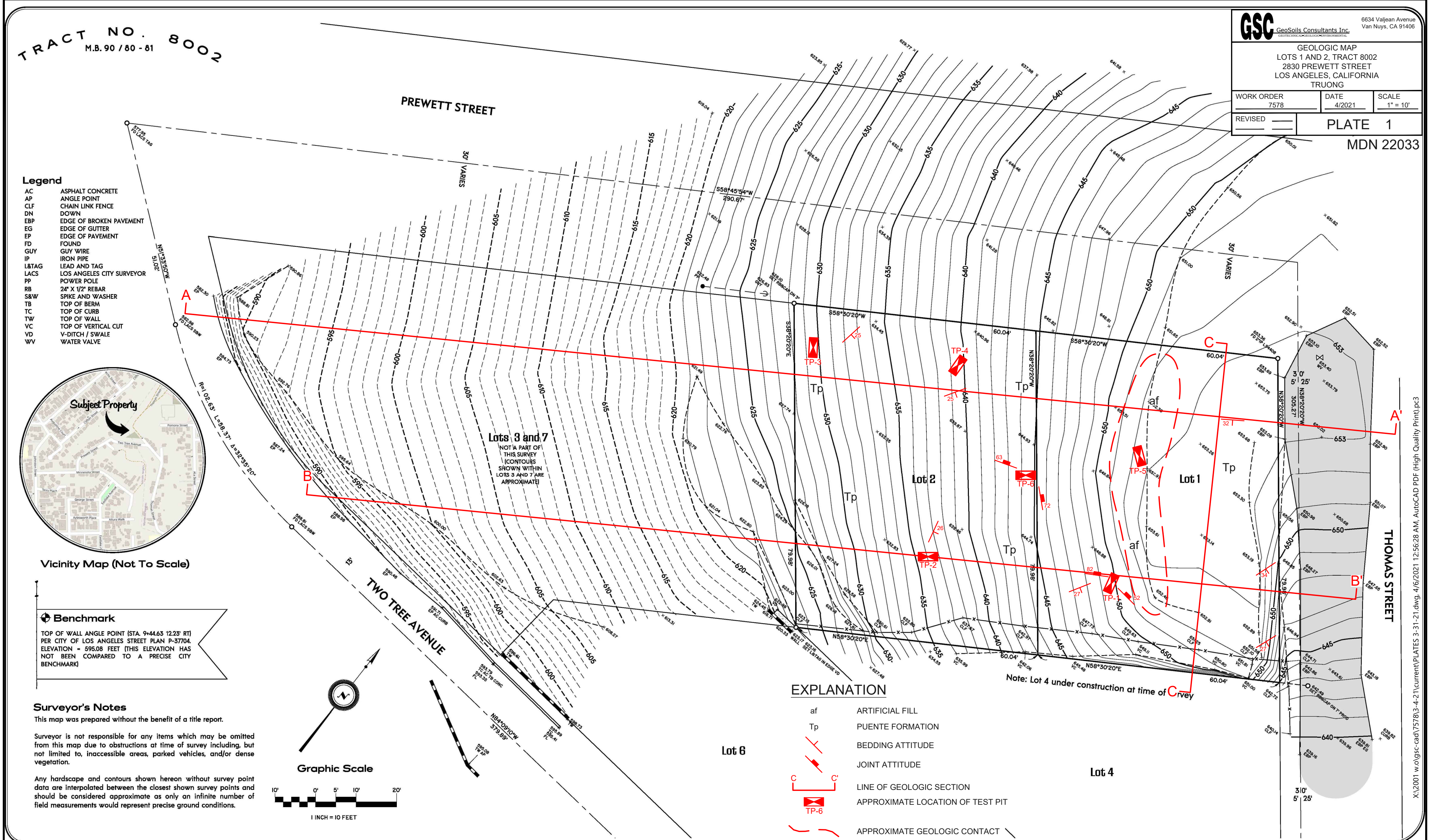
3. The Geologic Outfit dated July 31, 1990, "Engineering Geologic Investigation, Proposed Residential Development, Lots 1, 4, and 5, Tract 8002, Vicinity of Thomas Street, and Prewett Street, Lincoln Heights, California"

4. City of Los Angeles Geology and Soils Report Correction Letter dated March 24, 2014, Log No. 83412

5. Sassan Geosciences, Inc. dated February 17, 2014, "Preliminary Geotechnical Engineering and Engineering Geology Investigation, 2831 Thomas Street, Los Angeles, California"

6. City of Los Angeles Geology and Soils Report Approval Letter dated May 6, 2014, Log No. 83412-01

7. Sassan Geosciences, Inc. dated March 30, 2014, "Addendum No. 1 to Preliminary Geotechnical Engineering and Engineering Geology Investigation, 2831 Thomas Street, Los Angeles, California"



Topographic Survey

2824-2830 PREWETT STREET
LOS ANGELES, CALIFORNIA 90031

Prepared For

DUC TRUONG

Legal Description

Lot 1 and 2 of Tract No. 8002 in the City of Los Angeles, County of Los Angeles, State of California as per map filed in book 90 pages 80 and 81 of maps, in the office of the County Recorder of Los Angeles County.

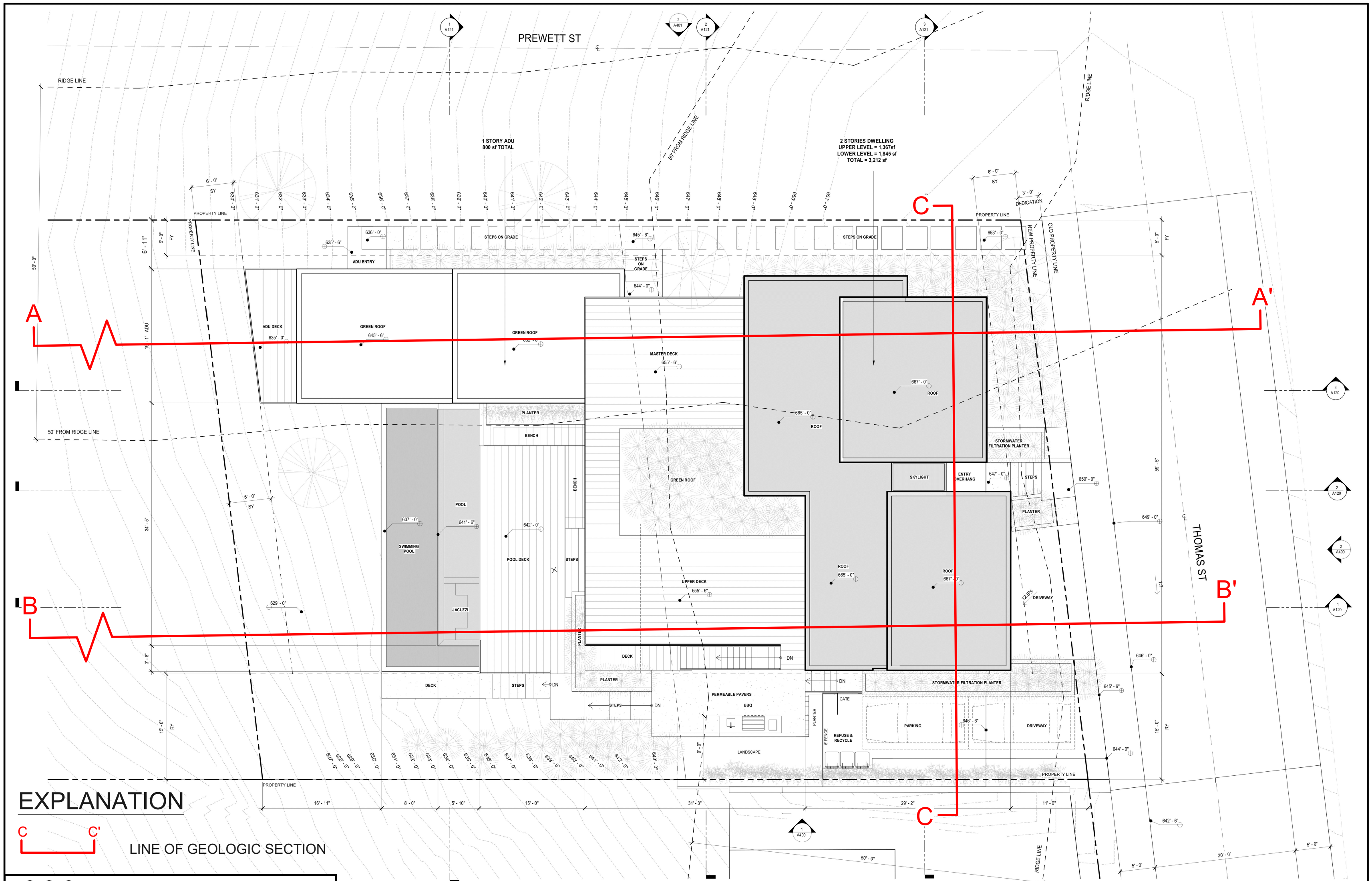
APN: 5208-015-001 and 5208-015-002

Basis of Bearings

The bearings shown hereon are based on the bearing S 84°09'10" E in the centerline of Two Tree Avenue as shown on the map of Tract No. 8002 in the City of Los Angeles, County of Los Angeles, State of California as per map filed in book 90 pages 80 and 81 of maps, in the office of the County Recorder of Los Angeles County.

Prepared by

N.C. HANSEN, INC.
SURVEYING & MAPPING
1545 Victory Boulevard, 2nd Floor
Glendale, California 91201
Tel. (747) 215-6667 www.NCHansen.com
Date of Survey: February 4, 2021 // JN 21-035DT



EXPLANATION

C — C' LINE OF GEOLOGIC SECTION

MOURA DESIGN

5236 YARMOUTH AVE SUITE 113
ENCINO, CA. 91316
TEL: 310.309.0102

HILLCREST

2830 PREWETT
LOS ANGELES, CA 90031

NO.	DATE	DESCRIPTION
1	02.28.21	50% SCHEMATIC DESIGN
2	03.28.21	100% SCHEMATIC DESIGN

SITE PLAN — SCALE 1" = 10' — 1

FINISHES LEGEND | KEYNOTES | LEGEND | APPROVAL STAMP

DRAWING SCALE: As indicated

DRAWING TITLE: SITE PLAN

SHEET NO: A110

GSC GeoSoils Consultants Inc.
GEOTECHNICAL•GEOLOGIC•ENVIRONMENTAL

6634 Valjean Avenue
Van Nuys, CA 91406

SITE PLAN
LOTS 1 AND 2, TRACT 8002
2830 PREWETT STREET
LOS ANGELES, CALIFORNIA
TRUONG

WORK ORDER	DATE	SCALE
7578	4/2021	1" = 10'

REVISED

PLATE 2

MDN 22033

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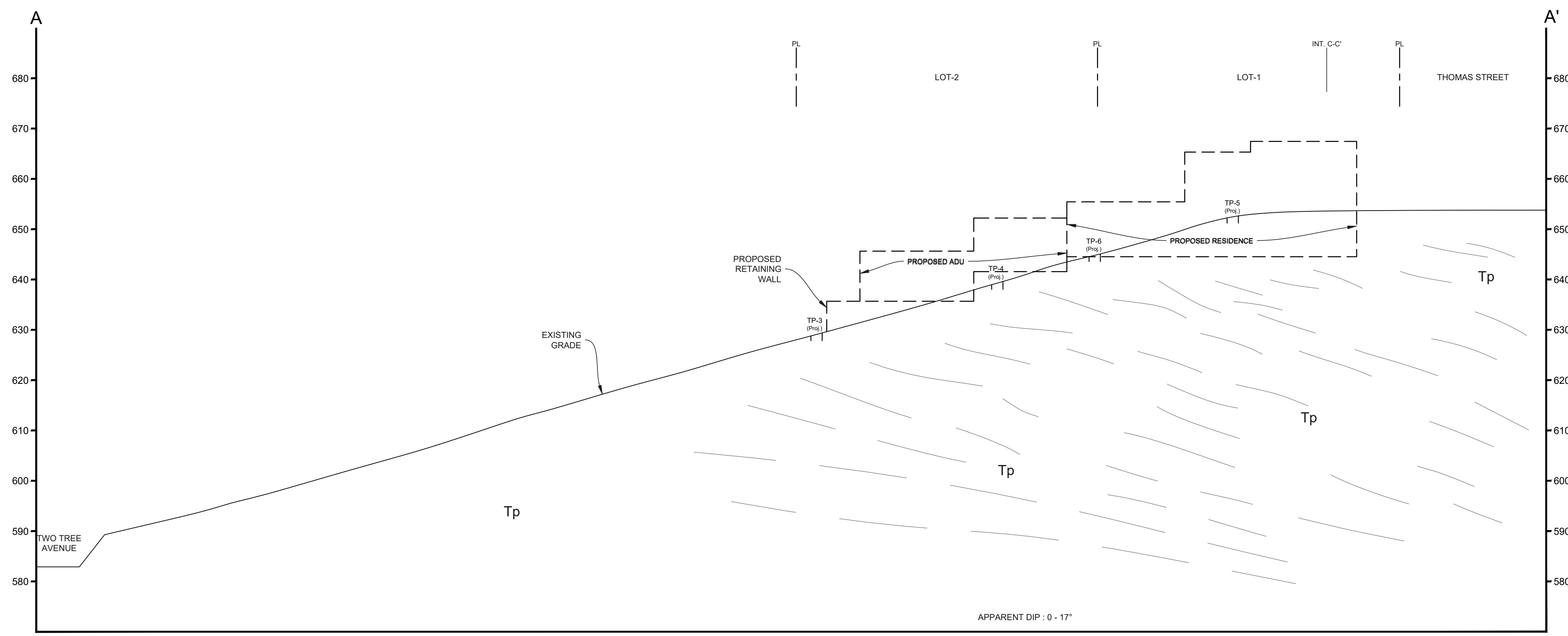

GSC GeoSoils Consultants Inc.

GEOTECHNICAL • GEOLOGIC • ENVIRONMENTAL

6634 Valjean Avenue
Van Nuys, CA 91406

GEOLOGIC CROSS-SECTION
LOTS 1 AND 2, TRACT 8002
2830 PREWETT STREET
LOS ANGELES, CALIFORNIA
TRUONG

WORK ORDER	DATE	SCALE
7578	4/2021	1" = 10'

REVISED

PLATE 3A

MDN 22033

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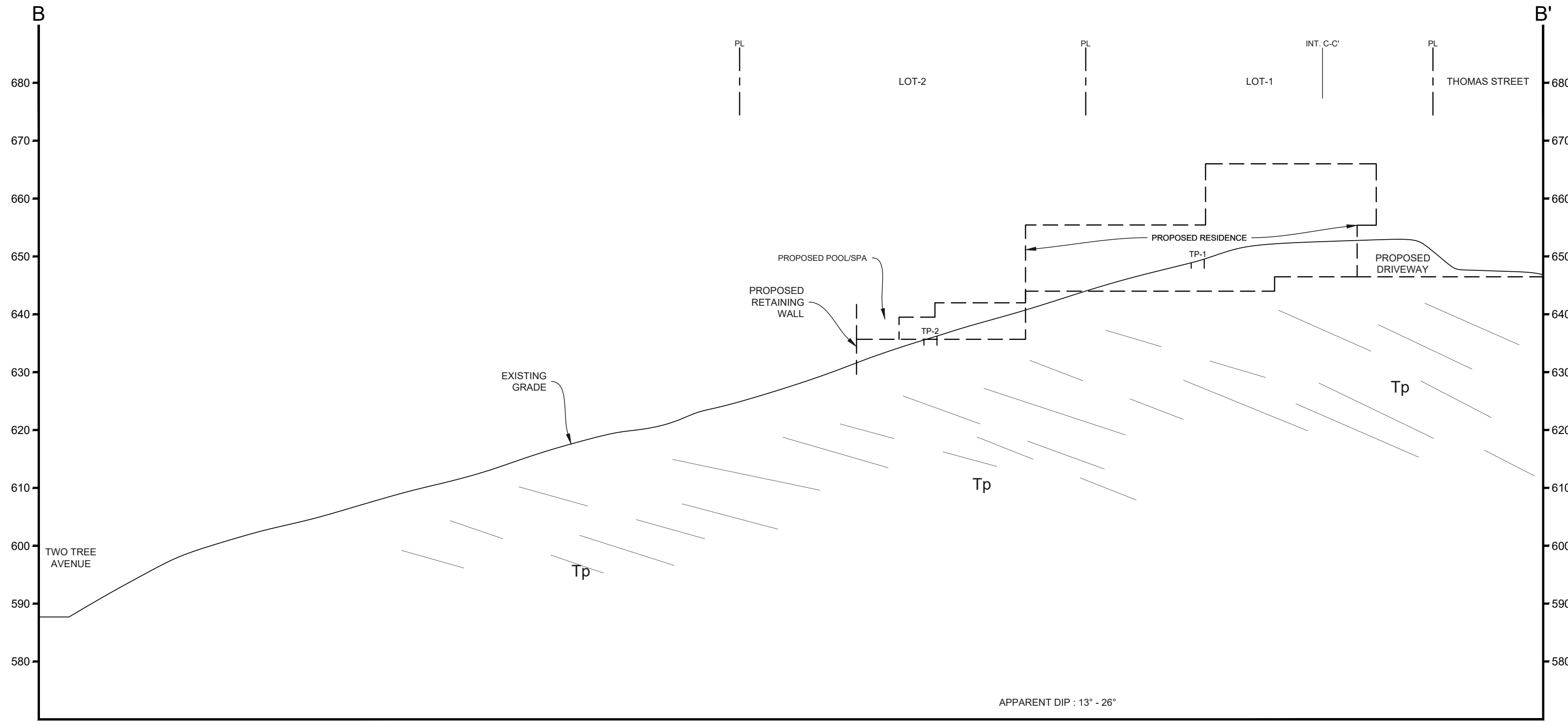

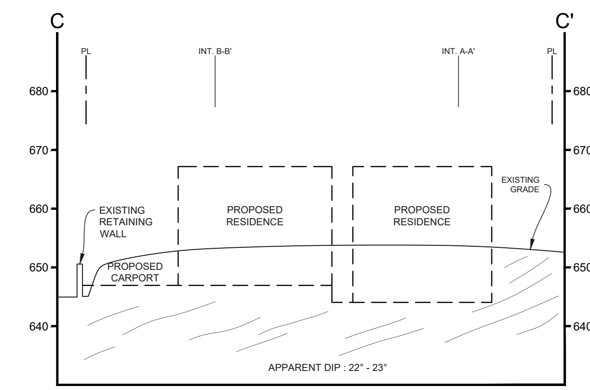

GSC GeoSoils Consultants Inc.
GEOTECHNICAL • GEOLOGIC • ENVIRONMENTAL

6634 Valjean Avenue
Van Nuys, CA 91406

GEOLOGIC CROSS-SECTIONS
LOTS 1 AND 2, TRACT 8002
2830 PREWETT STREET
LOS ANGELES, CALIFORNIA
TRUONG

WORK ORDER	DATE	SCALE
7578	4/2021	1" = 10'

REVISED

PLATE 3B

MDN 22033

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APPENDIX A

FIELD EXPLORATION PROCEDURES

APPENDIX A

FIELD EXPLORATION PROCEDURES

Six (6) hand dug test pits were excavated on site. Soil samples were obtained by a hand sampler.

A representative from our firm continuously observed the test pits, logged the subsurface conditions, and collected representative soil samples. All samples were stored in watertight containers and later transported to our laboratory for further visual examination and testing, as deemed necessary. After the test pits were completed, the test pits were backfilled with soil cuttings.

The enclosed Test Pit Logs (Plates TP-1 through TP-6) describes the vertical sequence of soils and materials encountered in the test pits, based primarily on our field classifications and supported by our subsequent laboratory examination and testing.

TEST PIT LOG 1

GeoSoils Consultants, Inc.

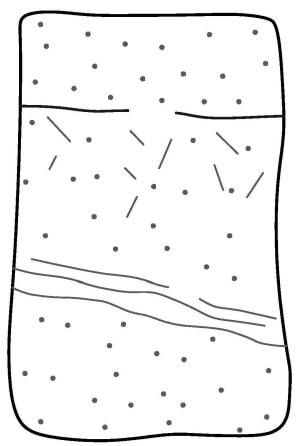
CLIENT: Truong

ELEVATION:
LOGGED BY: JLV

W.O. 7578
DATE: 3/5/2021

DEPTH	MATERIAL	DESCRIPTION	COMMENTS
0-1'	Slopewash (Qsw)	Medium brown, silty, fine to medium sand, slighlty moist, loose	Bedding: N30E, 27SE Joints: N60E, 82NW; N80W, 52NE
1'-4.5'	Bedrock, Puente Formation (Tp)	Light yellowish tan, fine to medium sandstone and light brown siltstone, slighty moist, dense	2', 5.7% moisture, 101.5 pcf dry density 4.5', 7.5% moisture, 109.0 pcf dry density

SCALE **H:** 1"=2' **V:** 1"=2' **PIT ORIENT:** **NATURAL SLOPE ANGLE** **TD** 4.5'



TEST PIT LOG 2

GeoSoils Consultants, Inc.

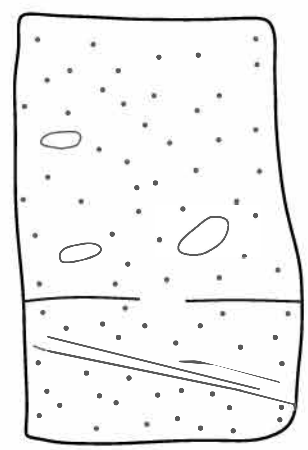
CLIENT: Truong

ELEVATION:
LOGGED BY: JLV

W.O. 7578
DATE: 3/5/2021

DEPTH	MATERIAL	DESCRIPTION	COMMENTS
0-3'	Slopewash (Qsw)	Medium brown, silty, fine to medium sand with sandstone fragments, slightly to moderately moist, slighlty to moderately dense	Bedding: N15W, 26NE 1', 8.6% moisture, 83.8 pcf dry density
3'-4.5'	Bedrock, Puente Formation (Tp)	Light yellowish tan sandstone and medium orange brown siltstone, moderately moist, dense	4.5', 14.3% moisture, 93.6 pcf dry density

SCALE H: 1"=2' **V:** 1"=2' **PIT ORIENT:** **NATURAL SLOPE ANGLE** **TD** 4.5'



TEST PIT LOG 3

GeoSoils Consultants, Inc.

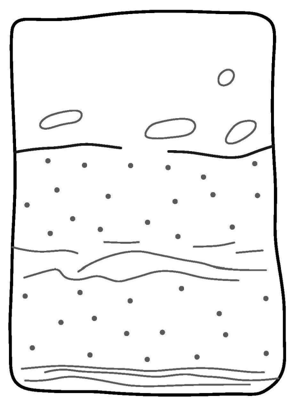
CLIENT: Truong

ELEVATION:
LOGGED BY: JLV

W.O. 7578
DATE: 3/5/2021

DEPTH	MATERIAL	DESCRIPTION	COMMENTS
0-1.5'	Slopewash (Qsw)	Medium brown, silty, fine to medium sand with sandstone fragments, slighlty moist, loose to slighlty dense	Bedding: N10E, 25SE
1.5'-4'	Bedrock, Puente Formation (Tp)	Light yellowish tan, fine to medium sandstone and light orange brown siltstone, moderately moist, dense	2', 28.9% moisture, 85.3 pcf dry density 4', 29.5% moisture, 78.8 pcf dry density

SCALE H: 1"=2' V: 1"=2' PIT ORIENT: NATURAL SLOPE ANGLE TD 4'



TEST PIT LOG 4

GeoSoils Consultants, Inc.

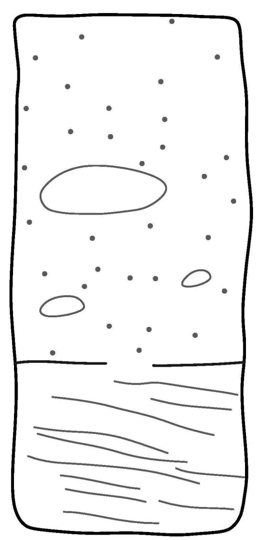
CLIENT: Truong

ELEVATION:
LOGGED BY: JLV

W.O. 7578
DATE: 3/5/2021

DEPTH	MATERIAL	DESCRIPTION	COMMENTS
0-3'9"	Slopewash (Qsw)	Medium brown, silty, fine to medium sand with sandstone fragments, slighlty to moderately moist, slightly to moderately dense	Bedding: N33E, 25SE 2', 18.8% moisture, 81.6 pcf dry density
3'9"-5'6"	Bedrock, Puente Formation (Tp)	Light brown to orange brown siltstone, moderately moist, moderately dense	5.5, 27.7% moisture, 80.9 pcf dry density

SCALE H: 1"=2' **V:** 1"=2' **PIT ORIENT:** **NATURAL SLOPE ANGLE** **TD** 5'6"



TP-4

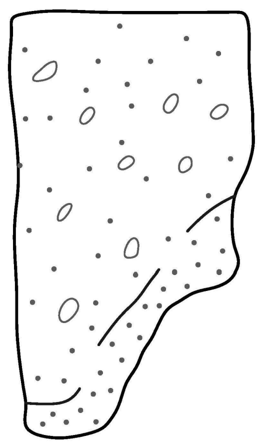
TEST PIT LOG 5

GeoSoils Consultants, Inc.

CLIENT:	Truong	**ELEVATION:**		**W.O.**	7578
		LOGGED BY:	JLV	**DATE:**	3/5/2021

DEPTH	MATERIAL	DESCRIPTION	COMMENTS
0-4'	Fill (af)	Light to medium brown, silty, fine to medium sand with rock fragments, moderately moist, moderately firm, no discernable bedding	2', 7.2% moisture, 87.4 pcf dry density
2'-4.5'	Bedrock, Puente Formation (Tp)	Light yellowish brown, fine to medium sandstone, moderately moist, dense	

SCALE H: 1"=2' **V:** 1"=2' **PIT ORIENT:** **NATURAL SLOPE ANGLE** **TD** 4.5'



TP-5

TEST PIT LOG 6

GeoSoils Consultants, Inc.

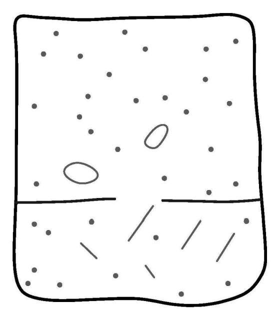
CLIENT: Truong

ELEVATION:
LOGGED BY: JLV

W.O. 7578
DATE: 3/5/2021

DEPTH	MATERIAL	DESCRIPTION	COMMENTS
0-2'	Slopewash (Qsw)	Medium brown, silty, fine to medium sand with sandstone fragments, moderately moist, slightly dense	Joints: N70E, 63NW; N47W, 72NE 2', 7.2% moisture, 107.3 pcf dry density
2'-3'	Bedrock, Puente Formation (Tp)	Light yellowish tan, fine to medium sandstone, slightly moist, dense, no discernable bedding	3', 11.2% moisture, 81.3 pcf dry density

SCALE H: 1"=2' **V:** 1"=2' **PIT ORIENT:** **NATURAL SLOPE ANGLE** **TD** 3'



APPENDIX B

LABORATORY TESTING PROCEDURES AND RESULTS

APPENDIX B

LABORATORY TESTING PROCEDURES AND RESULTS

Moisture-Density

The field moisture content and dry unit weights were determined for each undisturbed ring sample obtained from our subsurface exploration. Once the dry unit weights had been determined, in-place densities of underlying soil profile were estimated. In those cases where ring samples were obtained, the moisture content and dry unit weights are presented on Test Pit Logs (Plates TP-1 through TP-6).

Shear Tests

Three shear tests were performed in a strain-control type Direct Shear Machine. The samples were sheared under varying continued loads in order to determine the Coulomb shear strength parameters: Cohesion and angle of internal friction. All samples were tested in an artificially-saturated condition. The results are plotted on the Shear Test Diagrams included with this report as Plates SH-1 to SH-3.

Compaction Tests

A compaction test was performed to determine the moisture density relationships of the typical surficial soils encountered on the site. The laboratory standard used was in accordance with ASTM Test Designation D-1557-12. The compaction test results are shown in Table A-1.

TABLE A-1
COMPACTION TEST RESULTS

Test Pit No. and Sample Depth	Description	Maximum Dry Density (pcf)	Optimum Moisture (%)
TP-1 @ 1.5’	Dark brown, clayey, silty fine sand with sandstone fragment	119.0	12.5

Expansion Index Test

To determine the expansion potential of the on-site native soils, an expansion index test was conducted in accordance with the ASTD D-4829-07. The test results indicate a medium expansion potential.

Truong
W.O.: 7578

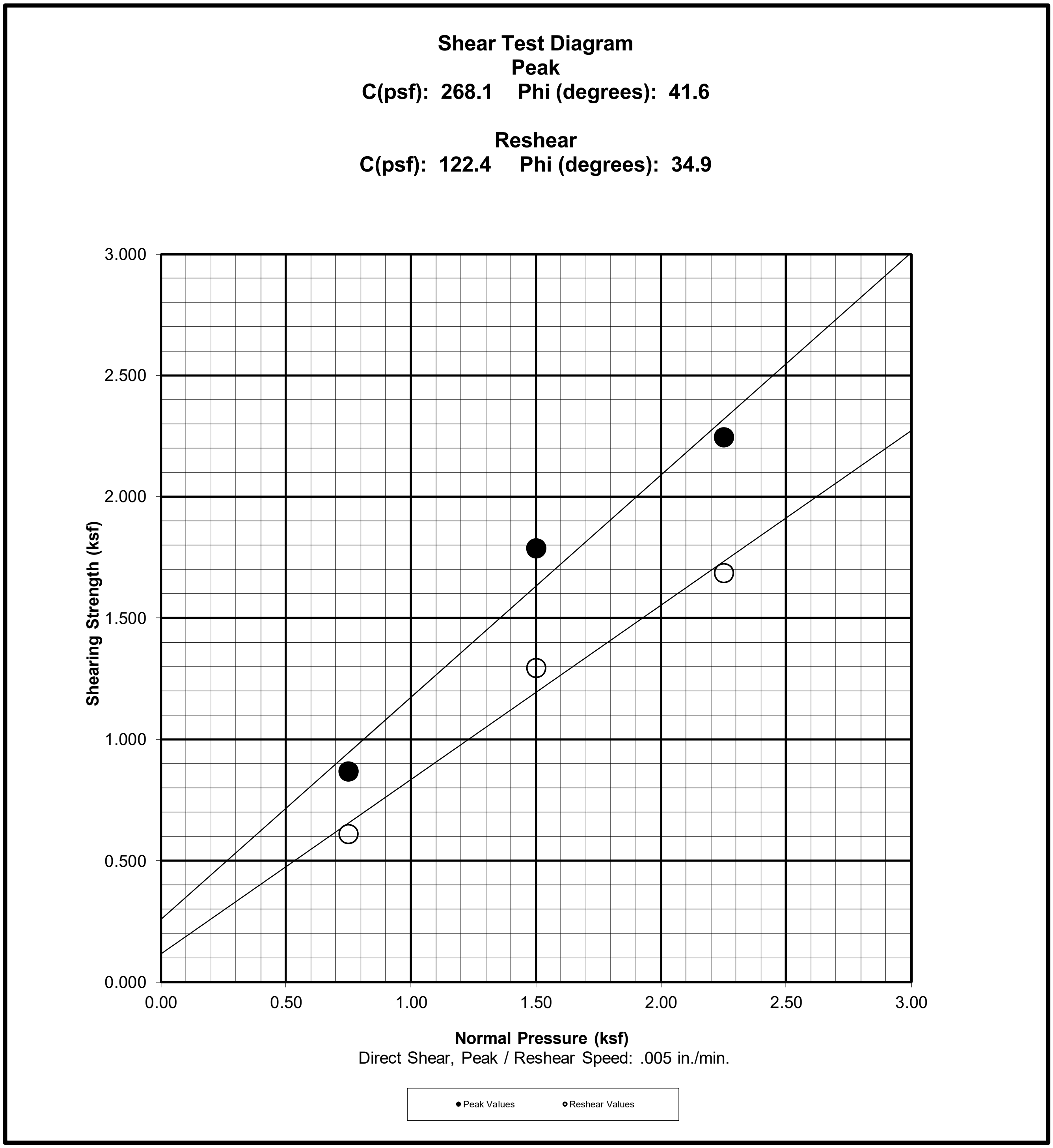
Date of Test: 3/21

Sample: **TP-1 @ 4.5'**

GeoSoils Consultants, Inc.

Geotechnical Engineering * Engineering Geology

PLATE SH-1



Undisturbed **Natural** Shear-Saturated

Orange brown silty very fine to fine SAND.

25.7% Saturated Moisture Content

7578TP-1@4.5'.xls

Truong
W.O.: 7578

Date of Test: 3/21

Sample: **TP-2 @ 1.0'**

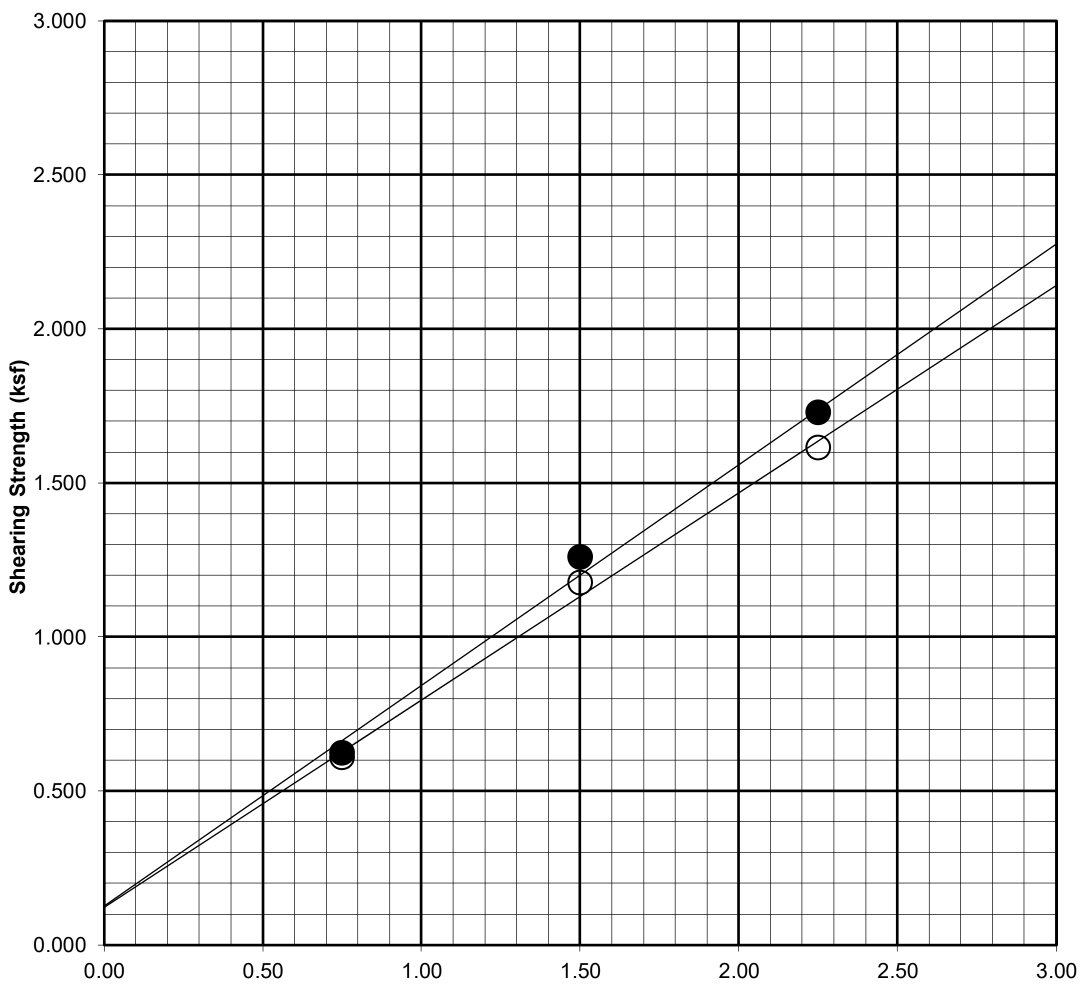
GeoSoils Consultants, Inc.

Geotechnical Engineering * Engineering Geology

PLATE SH-2

Shear Test Diagram
Peak
C(psf): 133.3 Phi (degrees): 34.8

Reshear
C(psf): 129.6 Phi (degrees): 33.1



Direct Shear, Peak / Reshear Speed: .005 in./min.

Peak Values Reshear Values

Undisturbed **Natural** Shear-Saturated

Brown slightly clayey sandy SILT.

27.0% Saturated Moisture Content

Truong
W.O.: 7578

Date of Test: 3/21

Sample: **TP-4 @ 5.5'**

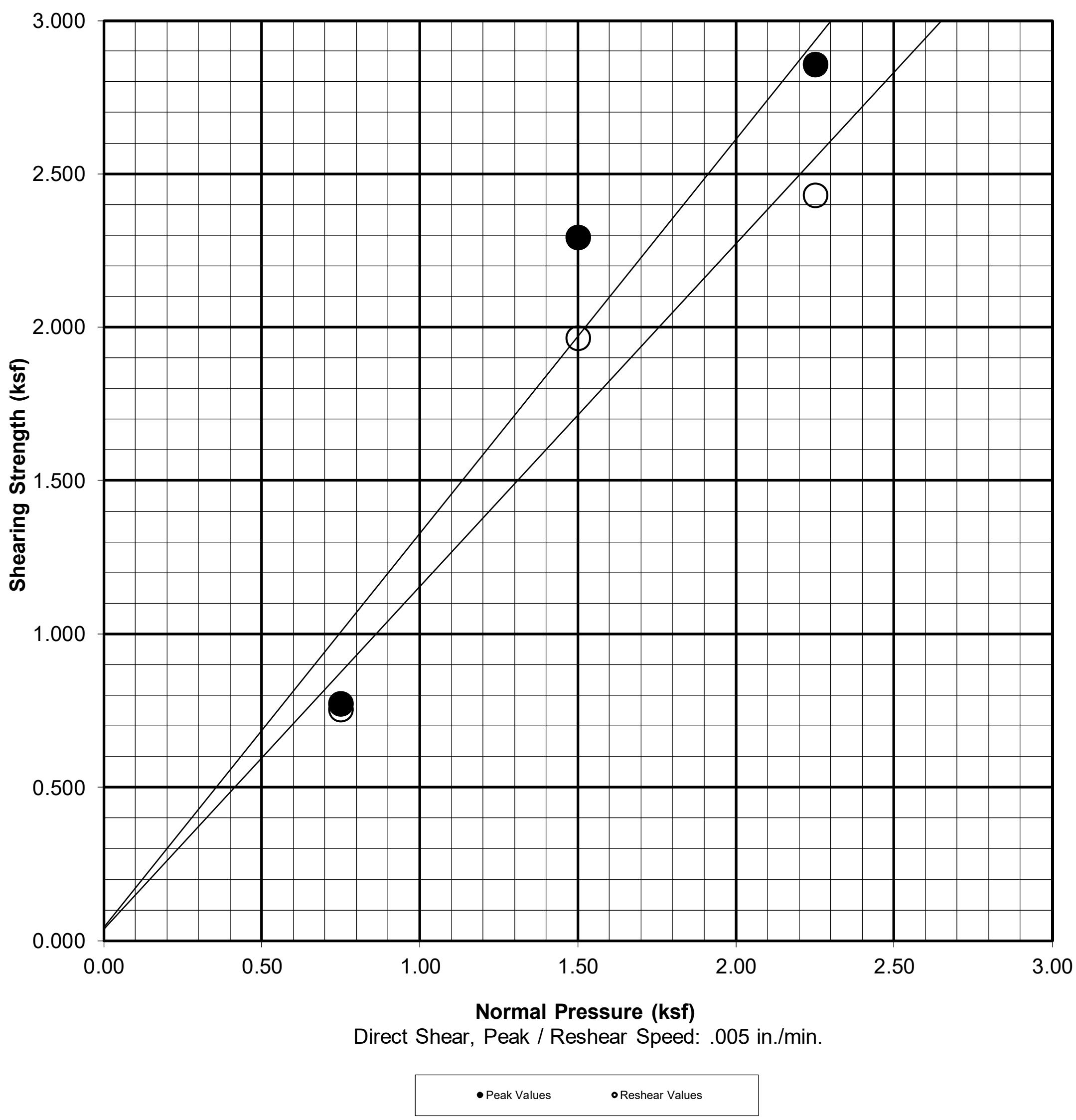
PLATE SH-3

GeoSoils Consultants, Inc.

Geotechnical Engineering * Engineering Geology

Shear Test Diagram
Peak
C(psf): 52.5 Phi (degrees): 51.2

Reshear
C(psf): 47.0 Phi (degrees): 47.3



Direct Shear, Peak / Reshear Speed: .005 in./min.

Undisturbed **Natural** Shear-Saturated

Orange/gray/brown slightly sandy CLAY with rock fragments.

41.9% Saturated Moisture Content

7578TP-4@5.5'.xls

APPENDIX C

GRADING GUIDELINES

APPENDIX C

GRADING GUIDELINES

These specifications present the minimum requirements for grading operations performed under the control of GeoSoils Consultants, Inc.

No deviation from these specifications would be allowed, except where specifically superseded in the preliminary geology and geotechnical report, or in other written communication signed by the Geotechnical Engineer or Engineering Geologist.

1. **General**

   A. The Geotechnical Engineer and Engineering Geologist are the Owner's or Builder's representative on the project. For the purpose of these specifications, supervision by the Geotechnical Engineer or Engineering Geologist includes that inspection performed by any person or persons employed by, and responsible to, the licensed Geotechnical Engineer or Engineering Geologist signing the Geotechnical report.

   B. All clearing, site preparation or earthwork performed on the project should be conducted by the Contractor under the observation of the Geotechnical Engineer or Engineering Geologist.

   C. It is the Contractor's responsibility to prepare the ground surface to receive the fills to the satisfaction of the Geotechnical Engineer or Engineering Geologist and to place, spread, mix, water, and compact the fill in accordance with the specifications of the Geotechnical Engineer or Engineering Geologist. The Contractor should also remove all material considered unsatisfactory by the Geotechnical Engineer or Engineering Geologist.

Appendix C

D. It is also the Contractor's responsibility to have suitable and sufficient compaction equipment on the jobsite to handle the amount of fill being placed. If necessary, excavation equipment would be shut down to permit completion of compaction. Sufficient watering apparatus would also be provided by the Contractor, with due consideration for the fill material, rate of placement and time of year.

E. A final report should be issued by the Geotechnical Engineer and Engineering Geologist attesting to the Contractor's conformance with these specifications.

F. At all times, safety would have precedence over production work. If an unsafe job condition is noted by a GeoSoils Consultants, Inc. representative, it would be brought to the attention of the Grading Contractor's foreman, the on-site developer's representative or both. Once this condition is noted, it should be corrected as soon as possible, or work related to the unsafe condition may be terminated.

2. Site Preparation

A. All vegetation and deleterious material, such as rubbish, should be disposed of off-site. This removal must be concluded prior to placing fill.

B. The Contractor should locate all houses, sheds, sewage disposal systems, large trees or structures on the site, or on the grading plan, to the best of his knowledge prior to preparing the ground surface.

Appendix C

C. Soils, alluvium or rock materials determined by the Geotechnical Engineer as being unsuitable for placement in compacted fills should be removed and wasted from the site. Any material incorporated as a part of a compacted fill must be approved by the Geotechnical Engineer.

D. After the ground surface to receive fill has been cleared, it should be scarified, disced or bladed by the Contractor until it is uniform and free from ruts, hollows, hummocks or other uneven features, which may prevent uniform compaction.

The scarified ground surface should then be brought to approximately 120 percent of optimum moisture, mixed as required, and compacted as specified. If the scarified zone is greater than 12 inches in depth, the excess should be removed and placed in lifts restricted to 6 inches.

Prior to placing fill, the ground surface to receive fill should be inspected, tested and approved by the Geotechnical Engineer.

E. Any underground structures such as cesspools, cisterns, mining shafts, tunnels, septic tanks, wells, pipelines or other not located prior to grading are to be removed or treated in a manner prescribed by the Geotechnical Engineer.

3. **Compacted Fills**

A. Material imported or excavated on the property may be utilized in the fill, provided such material has been determined to be suitable by the Geotechnical Engineer. Roots, tree branches and other deleterious matter missed during clearing should be removed from the fill as directed by the Geotechnical Engineer.

B. Rock fragments less than six inches in diameter may be utilized in the fill, provided:

Appendix C

1. they are not placed in concentrated pockets;
2. there is a sufficient percentage of fine-grained material to surround the rocks.
3. the distribution of the rocks is supervised by the Geotechnical Engineer.

C. Rocks greater than six inches in diameter should be taken off-site, or placed in accordance with the recommendations of the Geotechnical Engineer in fill areas designated as suitable for rock disposal.

D. Material that is spongy, subject to decay, or otherwise considered unsuitable should not be used in the compacted fill.

E. Representative samples of materials to be utilized as compacted fill should be analyzed in the laboratory by the Geotechnical Engineer to determine their physical properties. If any material other than that previously tested is encountered during grading, the appropriate analysis of this material should be conducted by the Geotechnical Engineer as soon as possible.

F. Material used in the compacting process should be evenly spread in thin lifts not to exceed six inches in thickness, watered, processed and compacted to obtain a uniformly dense layer. The fill should be placed and compacted on a <u>horizontal</u> plane, unless otherwise approved by the Geotechnical Engineer. This includes material placed for slope repairs, and utility trench backfills on slope areas.

G. Each layer should be compacted to at least a minimum of 90 percent of the maximum density in compliance with the testing method specified by the controlling governmental agency (in general, ASTM D-1557-12 would be used).

Appendix C

If compaction to a lesser percentage is authorized by the controlling governmental agency because of a specific land use or expansive geotechnical conditions, the area to receive fill compacted to less than 90 percent should either be delineated on the grading plan or appropriate reference made to the area in the geotechnical report.

H. All fills must be placed at approximately 120 percent of optimum moisture. If excessive moisture in the fill results in failing tests or an unacceptable "pumping" condition, then the fill should be allowed to dry until the moisture content is within the necessary range to meet above compaction requirements, or should be removed or reworked until acceptable conditions are obtained.

I. If the moisture content or relative density varies from that required by the Geotechnical Engineer, the Contractor should rework the fill until it is in accordance with the requirements of the Geotechnical Engineer. If a compaction test indicates that the fill meets or exceeds the minimum required relative compaction but is below 120 percent of optimum, then the fill should be reworked until it meets the moisture content requirements.

4. **Grading Control**

A. Inspection of the fill placement should be provided by the Geotechnical Engineer during the progress of grading.

B. In general, density tests should be made at intervals not exceeding two feet of fill height or every 500 cubic yards of fill placed. These criteria would vary depending on soil conditions and the size of the job. In any event, an adequate number of field density tests should be made to verify that the required compaction is being achieved.

Appendix C

C. Density tests should also be made on the surface material to receive fill as required by the Geotechnical Engineer.

D. All cleanout, processed ground to receive fill, key excavations, subdrains and rock disposal should be inspected and approved by the Geotechnical Engineer prior to placing any fill. It should be the Contractor's responsibility to notify the Geotechnical Engineer when such areas are ready for inspection. In most jurisdictions, these items must also be inspected by a representative of the controlling governmental agency prior to fill placement.

5. Construction Considerations

A. Erosion control measures, when necessary, should be provided by the Contractor during grading and prior to the completion and construction of permanent drainage controls.

B. Upon completion of grading and termination of inspections by the Geotechnical Engineer, no further filling or excavating, including that necessary for footings, foundations, large tree wells, retaining walls, or other features should be performed without the approval and observation of the Geotechnical Engineer or Engineering Geologist.

C. Care should be taken by the Contractor during final grading to preserve any berms, drainage terraces, interceptor swales, or other devices of a permanent nature on or adjacent to the property.

APPENDIX D

SLOPE STABILITY ANALYSES

APPENDIX D

SLOPE STABILITY ANALYSES

Slide 9.0 is a fully integrated and comprehensive slope stability analysis program. Slide is a 2D slope stability program for evaluating the safety factor or probability of failure, of circular or non-circular failure surfaces in soil or rock slopes and can create complex models to be analyzed. The software analyzes the stability of slip surfaces using vertical slice limit equilibrium methods (e.g. Bishop, Janbu, Spencer, etc). Individual slip surfaces can be analyzed, or search methods can be applied to locate the critical slip surface for a given slope or surfaces that meet the code required minimum factor of safety.

Slope stability analysis was performed on Section C-C' using non-circular surface path searches. An initial Factor of Safety (FS) check was performed to determine the critical surface and corresponding 1.5 FS surface. The depth to the 1.5 surface was considered in subsequent stability models to determine the equivalent fluid pressure (EFP) necessary to obtain the code-required minimum FS. A seismic coefficient of 0.330 was used for seismic (pseudo-static) analysis.

Soil Parameters

The parameters used in the slope stability analyses are given in Table D-1 and are based on a shear strengths provided and referenced in this report. Only reshear strengths were used.

TABLE D-1
STRENGTH PARAMETERS

Soil Description	Reshear		Unit Weight (pcf)
	c (psf)	ϕ (degrees)	
Puente Formation (Tp) Along-Bedding	150.0	20.0	120
Puente Formation (Tp) Cross-Bedding	122.4	34.9	120

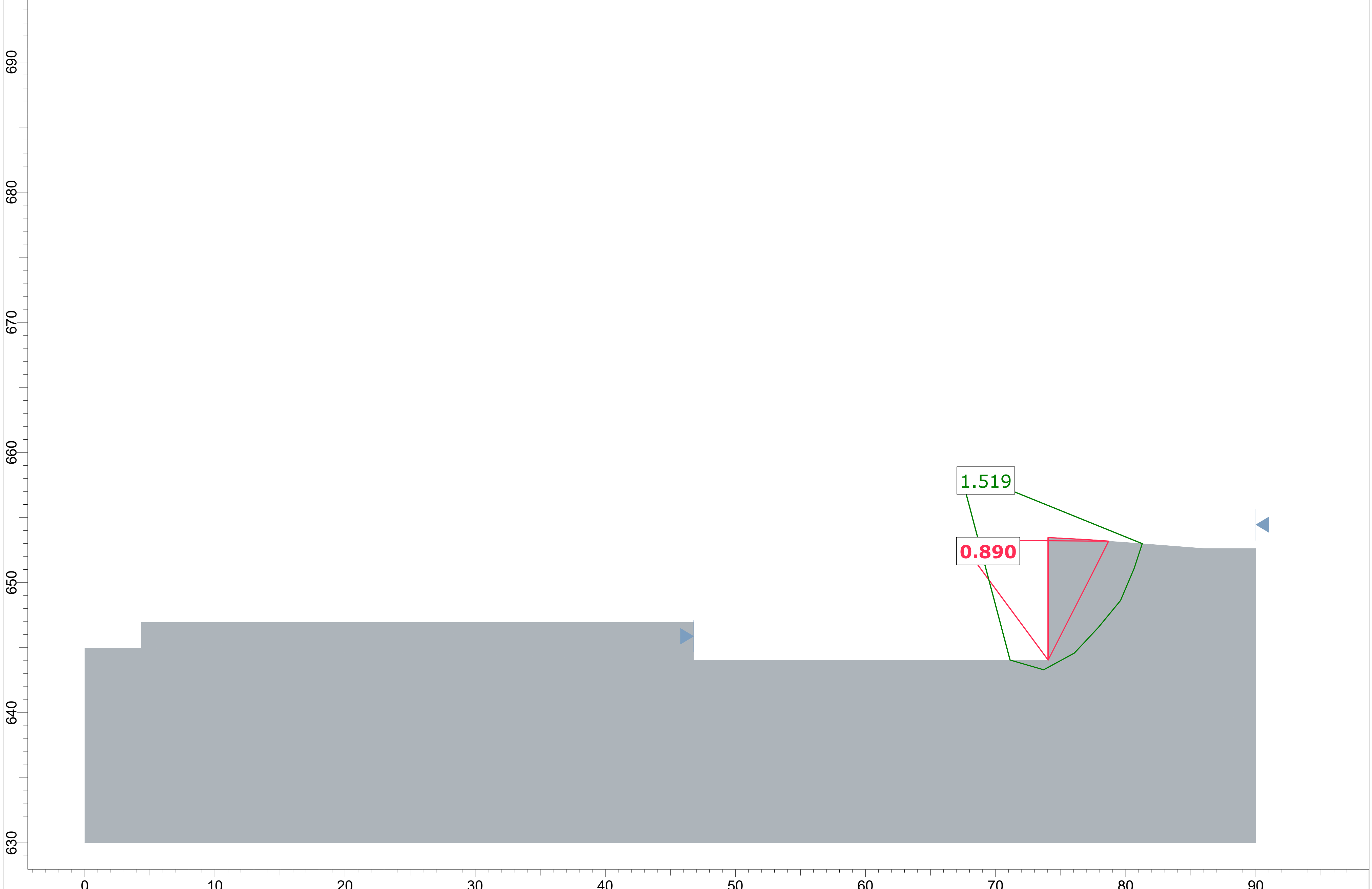
Appendix D

Results

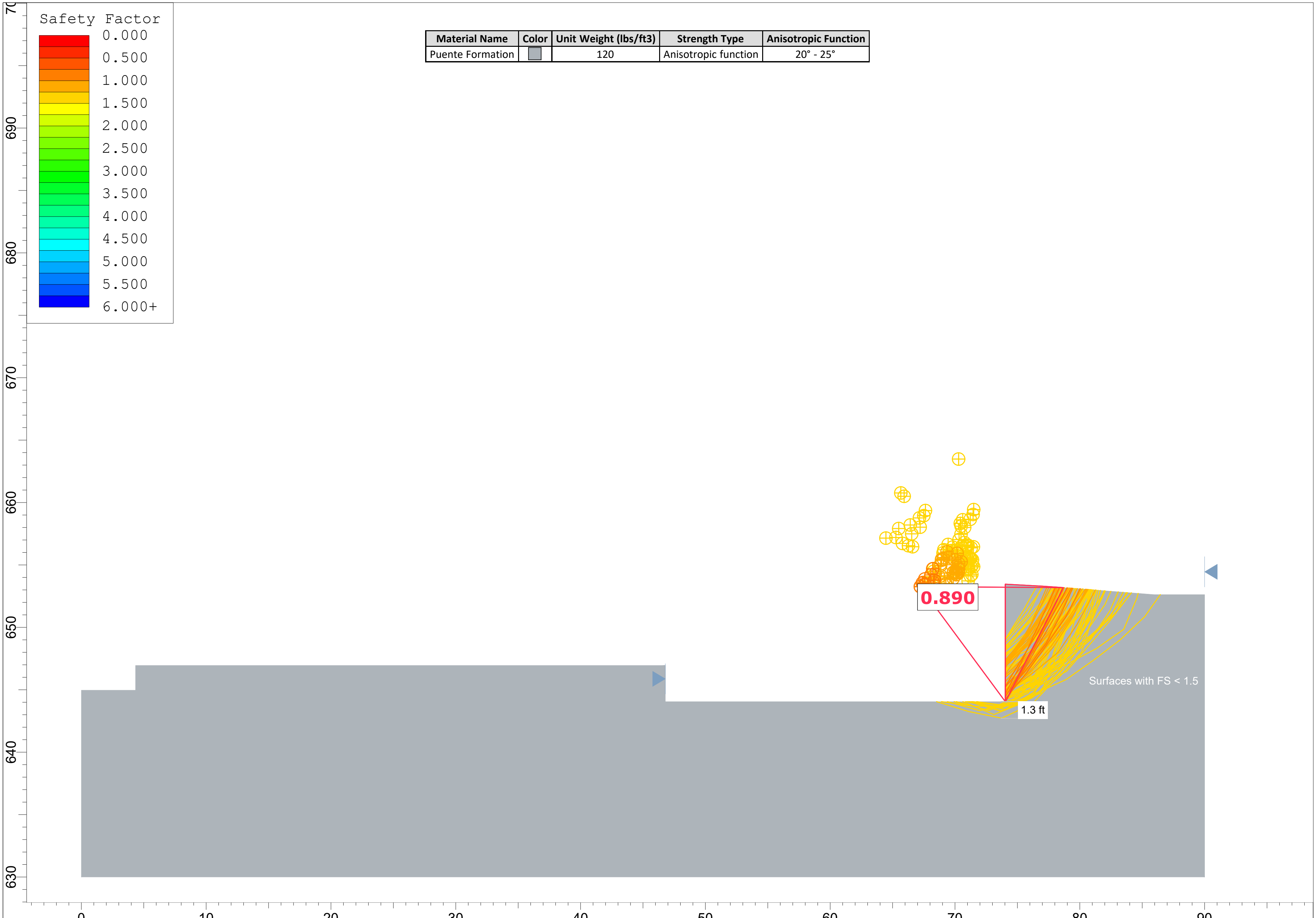
The results of the analyses are summarized in Table D-2. Stability analysis diagrams and raw output are included in the appendix.

TABLE D-2 STABILITY ANALYSIS RESULTS				
Section	**Lowest Factor of Safety**		**Minimum EFP**	**Description**
	Static	Seismic		
C-C'	0.890 (1.519)	-	-	Factor of safety check, non-circular surface search
	1.573	1.073	35 pcf Static 45 pcf Seismic	Support EFP, non-circular surface search

Material Name	Color	Unit Weight (lbs/ft3)	Strength Type	Anisotropic Function
Puente Formation		120	Anisotropic function	20° - 25°

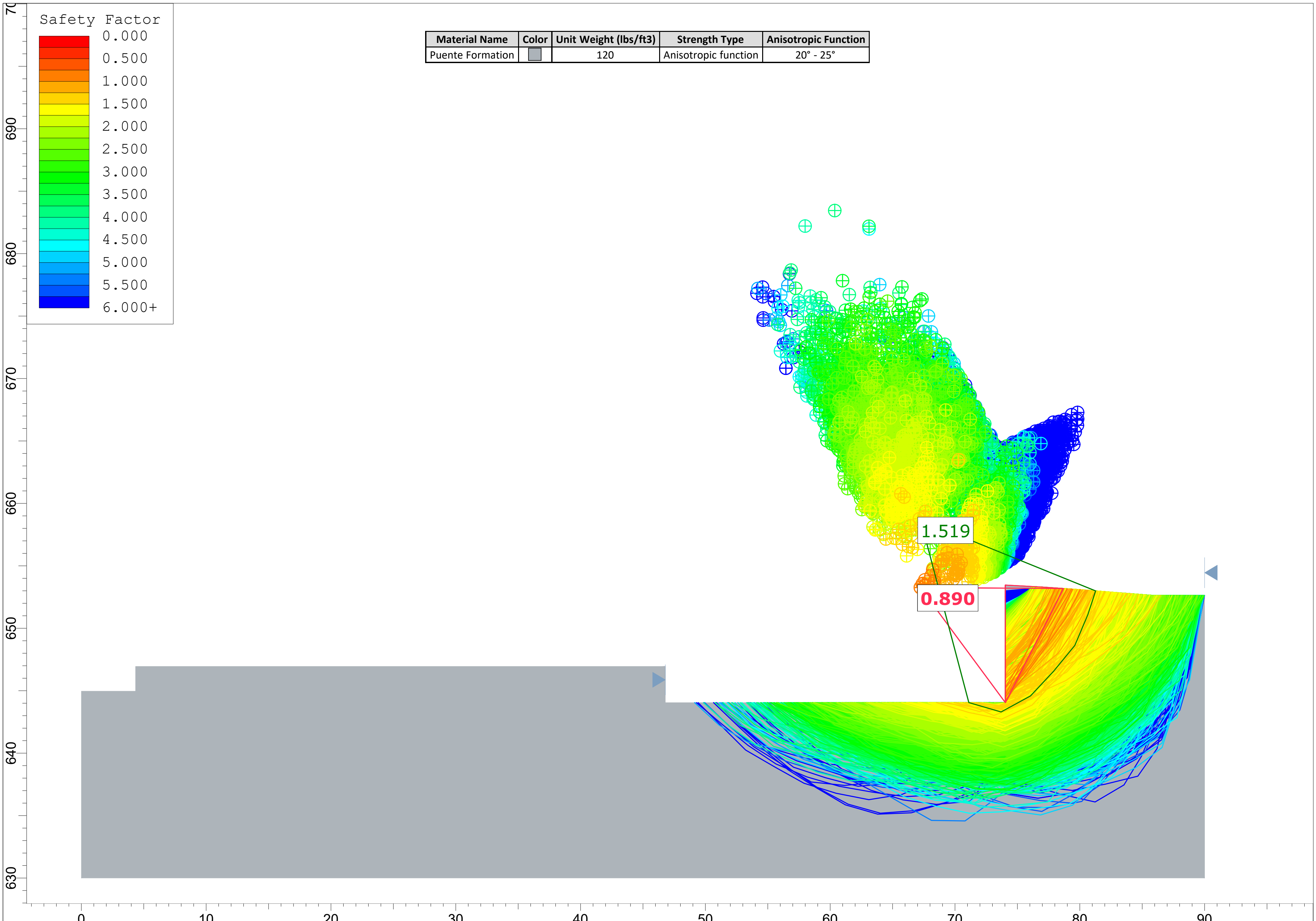


GSC	*Project* 2830 Prewett St		*Analysis* Section C FS Check (Non-Circular, Static)
	Drawn By JG	*Scale* 1:120	*Company* GeoSoils Consultants, Inc.
SLIDEINTERPRET 9.012	*Date* 4/7/2021		*File Name* 7578 Section C Static.slim



Material Name	Color	Unit Weight (lbs/ft3)	Strength Type	Anisotropic Function
Puente Formation		120	Anisotropic function	20° - 25°

GSC	*Project* 2830 Prewett St		*Analysis* Section C FS Check (Non-Circular, Static)
	Drawn By JG	*Scale* 1:120	*Company* GeoSoils Consultants, Inc.
SLIDEINTERPRET 9.012	*Date* 4/7/2021		*File Name* 7578 Section C Static.slim



GSC	Project: 2830 Prewett St		Analysis: Section C FS Check (Non-Circular, Static)
	Drawn By: JG	Scale: 1:120	Company: GeoSoils Consultants, Inc.
SLIDEINTERPRET 9.012	Date: 4/7/2021		File Name: 7578 Section C Static.slim

Slide Analysis Information

2830 Prewett St

Project Summary

Slide Modeler Version:	9.012
Compute Time:	00h:00m:19.979s
Author:	JG
Company:	GeoSoils Consultants, Inc.
Date Created:	4/7/2021

General Settings

Units of Measurement:	Imperial Units
Time Units:	days
Permeability Units:	feet/second
Data Output:	Standard
Failure Direction:	Right to Left

Analysis Options

Slices Type:	Vertical
Analysis Methods Used	
	Spencer
Number of slices:	50
Tolerance:	0.005
Maximum number of iterations:	75
Check malpha < 0.2:	Yes
Create Interslice boundaries at intersections with water tables and piezos:	Yes
Initial trial value of FS:	1
Steffensen Iteration:	Yes

Groundwater Analysis

Groundwater Method:	Water Surfaces
Pore Fluid Unit Weight [lbs/ft3]:	62.4
Use negative pore pressure cutoff:	Yes
Maximum negative pore pressure [psf]:	0
Advanced Groundwater Method:	None

Random Numbers

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

Surface Options

Surface Type:	Non-Circular Path Search
Number of Surfaces:	25000
Pseudo-Random Surfaces:	Enabled
Convex Surfaces Only:	Enabled
Segment Length:	Auto Defined
Minimum Elevation:	Not Defined
Minimum Depth:	Not Defined
Minimum Area:	Not Defined
Minimum Weight:	Not Defined
Upper Angle [deg]:	Auto Defined
Lower Angle [deg]:	Auto Defined

Seismic Loading

Advanced seismic analysis:	No
Staged pseudostatic analysis:	No

Materials

Puente Formation	
Color	
Strength Type	Anisotropic function
Unit Weight [lbs/ft3]	120
Water Surface	None
Ru Value	0

Anisotropic Functions

Name: 20° - 25°

Angle From	Angle To	c	phi
-90	20	122.4	34.9
20	25	150	20
25	90	122.4	34.9

Global Minimums

Method: spencer

FS	0.890153
Axis Location:	67.224, 653.261
Left Slip Surface Endpoint:	74.036, 644.046
Right Slip Surface Endpoint:	78.683, 653.181
Left Slope Intercept:	74.036 653.455
Right Slope Intercept:	78.683 653.181
Resisting Moment:	21410.9 lb-ft
Driving Moment:	24053.1 lb-ft
Resisting Horizontal Force:	947.23 lb
Driving Horizontal Force:	1064.12 lb
Total Slice Area:	21.9382 ft2
Surface Horizontal Width:	4.64689 ft
Surface Average Height:	4.72106 ft

Global Minimum Coordinates

Method: spencer

X	Y
74.036	644.046
74.1682	644.305
74.3004	644.564
74.4332	644.824
74.5661	645.083
74.699	645.343
74.8318	645.602
74.9647	645.865
75.0976	646.128
75.2304	646.387
75.3633	646.647
75.5743	647.07
75.7801	647.476
75.9859	647.886
76.1673	648.242
76.3026	648.509
76.438	648.772
76.5747	649.036
76.7114	649.299
76.8374	649.542
76.9634	649.785
77.0882	650.029
77.2131	650.273
77.3756	650.59
77.538	650.907
77.7544	651.329
77.9879	651.786
78.1623	652.133
78.3367	652.48
78.5098	652.83
78.6829	653.181

Global Minimum Support Data

No Supports Present

Valid and Invalid Surfaces

Method: spencer

Number of Valid Surfaces:	6919
Number of Invalid Surfaces:	18088

Error Codes
Error Code -106 reported for 5 surfaces
Error Code -108 reported for 120 surfaces
Error Code -111 reported for 17728 surfaces
Error Code -112 reported for 52 surfaces
Error Code -121 reported for 183 surfaces

Error Code Descriptions

The following errors were encountered during the computation:

-106 = Average slice width is less than 0.0001 * (maximum horizontal extent of soil region). This limitation is imposed to avoid numerical errors which may result from too many slices, or too small a slip region.

-108 = Total driving moment or total driving force < 0.1. This is to limit the calculation of extremely high safety factors if the driving force is very small (0.1 is an arbitrary number).

-111 = Safety factor equation did not converge

-112 = The coefficient M-Alpha = cos(alpha)(1+tan(alpha)tan(phi)/F) < 0.2 for the final iteration of the safety factor calculation. This screens out some slip surfaces which may not be valid in the context of the analysis, in particular, deep seated slip surfaces with many high negative base angle slices in the passive zone.

-121 = Concave failure surface, only convex surfaces have been defined as being allowed.

Slice Data

Global Minimum Query (spencer) - Safety Factor: 0.890153

Slice Number	Width [ft]	Weight [lbs]	Angle of Slice Base [deg]	Base Material	Base Cohesion [psf]	Base Friction Angle [deg]	Shear Stress [psf]	Shear Strength [psf]	Base Normal Stress [psf]	Pore Pressure [psf]	Effective Normal Stress [psf]	Base Vertical Stress [psf]	Effective Vertical Stress [psf]
1	0.13218	147.13	62.9833	Puente Formation	122.4	34.9	317.846	282.932	230.118	0	230.118	853.478	853.478
2	0.13218	142.905	62.9833	Puente Formation	122.4	34.9	312.661	278.316	223.5	0	223.5	836.69	836.69
3	0.132865	139.397	62.8812	Puente Formation	122.4	34.9	308.475	274.59	218.159	0	218.159	820.485	820.485
4	0.0664326	68.1045	62.8812	Puente Formation	122.4	34.9	304.563	271.108	213.168	0	213.168	807.856	807.856
5	0.0664326	67.0419	62.8812	Puente Formation	122.4	34.9	301.956	268.787	209.841	0	209.841	799.437	799.437
6	0.132865	130.896	62.8812	Puente Formation	122.4	34.9	298.045	265.306	204.851	0	204.851	786.811	786.811
7	0.0664326	63.8541	62.8812	Puente Formation	122.4	34.9	294.134	261.824	199.86	0	199.86	774.182	774.182
8	0.0664326	62.7915	62.8812	Puente Formation	122.4	34.9	291.526	259.503	196.533	0	196.533	765.764	765.764
9	0.0664326	61.7222	63.176	Puente Formation	122.4	34.9	286.296	254.847	189.857	0	189.857	756.036	756.036
10	0.0664326	60.6464	63.176	Puente Formation	122.4	34.9	283.689	252.527	186.533	0	186.533	747.558	747.558
11	0.132865	118.065	63.176	Puente Formation	122.4	34.9	279.782	249.049	181.547	0	181.547	734.844	734.844
12	0.132865	113.785	62.912	Puente Formation	122.4	34.9	276.793	246.388	177.732	0	177.732	718.912	718.912
13	0.0664326	55.2968	62.912	Puente Formation	122.4	34.9	272.882	242.907	172.742	0	172.742	706.276	706.276
14	0.0664326	54.2328	62.912	Puente Formation	122.4	34.9	270.275	240.586	169.415	0	169.415	697.851	697.851
15	0.105507	83.9128	63.4698	Puente Formation	122.4	34.9	262.54	233.701	159.547	0	159.547	685.427	685.427
16	0.105507	81.1652	63.4698	Puente Formation	122.4	34.9	258.401	230.016	154.264	0	154.264	671.852	671.852
17	0.10291	76.5407	63.1033	Puente Formation	122.4	34.9	257.02	228.787	152.501	0	152.501	659.187	659.187
18	0.10291	73.9669	63.1033	Puente Formation	122.4	34.9	252.983	225.194	147.351	0	147.351	646.08	646.08
19	0.10291	71.38	63.3426	Puente Formation	122.4	34.9	247.244	220.085	140.028	0	140.028	632.531	632.531
20	0.10291	68.78	63.3426	Puente Formation	122.4	34.9	243.208	216.492	134.878	0	134.878	619.341	619.341
21	0.0906896	58.471	63.0116	Puente Formation	122.4	34.9	241.659	215.114	132.902	0	132.902	607.422	607.422

22	0.0906896	56.4799	63.0116	Puente Formation	122.4	34.9	238.101	211.947	128.362	0	128.362	595.896	595.896
23	0.0676647	40.8403	63.1424	Puente Formation	122.4	34.9	234.141	208.422	123.309	0	123.309	585.675	585.675
24	0.0676647	39.7257	63.1424	Puente Formation	122.4	34.9	231.488	206.059	119.923	0	119.923	577.048	577.048
25	0.0676647	38.6208	62.7282	Puente Formation	122.4	34.9	231.453	206.028	119.878	0	119.878	568.852	568.852
26	0.0676647	37.5254	62.7282	Puente Formation	122.4	34.9	228.795	203.663	116.487	0	116.487	560.306	560.306
27	0.136722	72.4911	62.6153	Puente Formation	122.4	34.9	225.473	200.706	112.248	0	112.248	547.515	547.515
28	0.0683612	34.5769	62.5925	Puente Formation	122.4	34.9	221.578	197.238	107.278	0	107.278	534.608	534.608
29	0.0683612	33.4652	62.5925	Puente Formation	122.4	34.9	218.891	194.847	103.85	0	103.85	525.999	525.999
30	0.125982	58.7618	62.5725	Puente Formation	122.4	34.9	215.185	191.547	99.1203	0	99.1203	513.767	513.767
31	0.125982	54.9907	62.5534	Puente Formation	122.4	34.9	210.336	187.231	92.9336	0	92.9336	497.907	497.907
32	0.124847	50.7372	62.9078	Puente Formation	122.4	34.9	203.56	181.199	84.2863	0	84.2863	482.21	482.21
33	0.124847	46.9547	62.9079	Puente Formation	122.4	34.9	198.626	176.808	77.9918	0	77.9918	466.273	466.273
34	0.0812389	28.5233	62.8793	Puente Formation	122.4	34.9	194.689	173.303	72.9683	0	72.9683	453.086	453.086
35	0.0812389	26.9235	62.8793	Puente Formation	122.4	34.9	191.479	170.446	68.8714	0	68.8714	442.721	442.721
36	0.0812389	25.3238	62.8793	Puente Formation	122.4	34.9	188.269	167.588	64.7751	0	64.7751	432.356	432.356
37	0.0812389	23.7241	62.8793	Puente Formation	122.4	34.9	185.058	164.73	60.6787	0	60.6787	421.992	421.992
38	0.108169	29.1053	62.8812	Puente Formation	122.4	34.9	181.308	161.392	55.8934	0	55.8934	409.914	409.914
39	0.108169	26.269	62.8812	Puente Formation	122.4	34.9	177.033	157.587	50.4391	0	50.4391	396.113	396.113
40	0.0778334	17.1471	62.8862	Puente Formation	122.4	34.9	173.34	154.299	45.7261	0	45.7261	384.26	384.26
41	0.0778334	15.6782	62.8862	Puente Formation	122.4	34.9	170.264	151.561	41.8015	0	41.8015	374.329	374.329
42	0.0778334	14.2094	62.8862	Puente Formation	122.4	34.9	167.188	148.823	37.8769	0	37.8769	364.398	364.398
43	0.0872086	14.1592	63.318	Puente Formation	122.4	34.9	162.459	144.613	31.8416	0	31.8416	355.108	355.108
44	0.0872086	12.2816	63.318	Puente Formation	122.4	34.9	159.015	141.548	27.4482	0	27.4482	343.863	343.863
45	0.0872086	10.404	63.3181	Puente Formation	122.4	34.9	155.572	138.483	23.0545	0	23.0545	332.619	332.619
46	0.0872086	8.52641	63.3181	Puente Formation	122.4	34.9	152.129	135.418	18.6612	0	18.6612	321.374	321.374
47	0.0865467	6.58877	63.7397	Puente Formation	122.4	34.9	147.186	131.018	12.3533	0	12.3533	310.681	310.681
48	0.0865467	4.70626	63.7397	Puente Formation	122.4	34.9	143.755	127.964	7.97534	0	7.97534	299.349	299.349
49	0.0865467	2.82375	63.7396	Puente Formation	122.4	34.9	140.324	124.91	3.598	0	3.598	288.017	288.017
50	0.0865467	0.94125	63.7396	Puente Formation	122.4	34.9	136.893	121.856	-0.77987	0	-0.77987	276.685	276.685

Query 1 (spencer) - Safety Factor: 1.51905

Slice Number	Width [ft]	Weight [lbs]	Angle of Slice Base [deg]	Base Material	Base Cohesion [psf]	Base Friction Angle [deg]	Shear Stress [psf]	Shear Strength [psf]	Base Normal Stress [psf]	Pore Pressure [psf]	Effective Normal Stress [psf]	Base Vertical Stress [psf]	Effective Vertical Stress [psf]
1	N/A	N/A	N/A	Puente Formation	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
2	N/A	N/A	N/A	Puente Formation	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
3	N/A	N/A	N/A	Puente Formation	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
4	N/A	N/A	N/A	Puente Formation	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
5	N/A	N/A	N/A	Puente Formation	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
6	N/A	N/A	N/A	Puente Formation	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Interslice Data

Global Minimum Query (spencer) - Safety Factor: 0.890153

Slice Number	X coordinate [ft]	Y coordinate - Bottom [ft]	Interslice Normal Force [lbs]	Interslice Shear Force [lbs]	Interslice Force Angle [deg]
1	74.036	644.046	0	0	0
2	74.1682	644.305	-17.6408	-34.4168	62.862
3	74.3004	644.564	-34.2515	-66.8241	62.862
4	74.4332	644.824	-49.8633	-97.2823	62.862
5	74.4997	644.954	-57.2816	-111.755	62.862
6	74.5661	645.083	-64.4415	-125.724	62.862
7	74.699	645.343	-77.9863	-152.15	62.862
8	74.7654	645.472	-84.3712	-164.607	62.8621
9	74.8318	645.602	-90.4977	-176.559	62.862
10	74.8983	645.734	-96.4213	-188.116	62.862
11	74.9647	645.865	-102.081	-199.159	62.8621
12	75.0976	646.128	-112.61	-219.7	62.862
13	75.2304	646.387	-122.005	-238.029	62.862
14	75.2968	646.517	-126.313	-246.435	62.8621
15	75.3633	646.647	-130.363	-254.336	62.862
16	75.4688	646.859	-136.381	-266.077	62.862
17	75.5743	647.07	-141.72	-276.492	62.8619
18	75.6772	647.273	-146.209	-285.25	62.8619
19	75.7801	647.476	-150.068	-292.78	62.862
20	75.883	647.681	-153.329	-299.142	62.862
21	75.9859	647.886	-155.95	-304.255	62.862
22	76.0766	648.064	-157.701	-307.671	62.862
23	76.1673	648.242	-158.966	-310.139	62.862
24	76.235	648.375	-159.599	-311.375	62.862
25	76.3026	648.509	-159.96	-312.078	62.8619
26	76.3703	648.64	-160.033	-312.222	62.8621
27	76.438	648.772	-159.842	-311.848	62.862
28	76.5747	649.036	-158.641	-309.506	62.862
29	76.6431	649.167	-157.637	-307.547	62.862
30	76.7114	649.299	-156.365	-305.065	62.862
31	76.8374	649.542	-153.318	-299.121	62.8621
32	76.9634	649.785	-149.362	-291.402	62.862
33	77.0882	650.029	-144.518	-281.953	62.8621
34	77.2131	650.273	-138.755	-270.708	62.862
35	77.2943	650.431	-134.512	-262.431	62.8621
36	77.3756	650.59	-129.881	-253.395	62.862
37	77.4568	650.748	-124.86	-243.6	62.8621
38	77.538	650.907	-119.451	-233.046	62.862
39	77.6462	651.118	-111.644	-217.815	62.862
40	77.7544	651.329	-103.148	-201.239	62.8619
41	77.8322	651.481	-96.6069	-188.478	62.862
42	77.91	651.634	-89.7089	-175.02	62.862
43	77.9879	651.786	-82.4537	-160.866	62.8621
44	78.0751	651.959	-73.8114	-144.005	62.8621
45	78.1623	652.133	-64.707	-126.242	62.862
46	78.2495	652.306	-55.1404	-107.578	62.862
47	78.3367	652.48	-45.1118	-88.0122	62.862
48	78.4233	652.655	-34.5404	-67.3876	62.862
49	78.5098	652.83	-23.4979	-45.8439	62.862
50	78.5963	653.006	-11.9845	-23.3815	62.862
51	78.6829	653.181	0	0	0

Query 1 (spencer) - Safety Factor: 1.51905

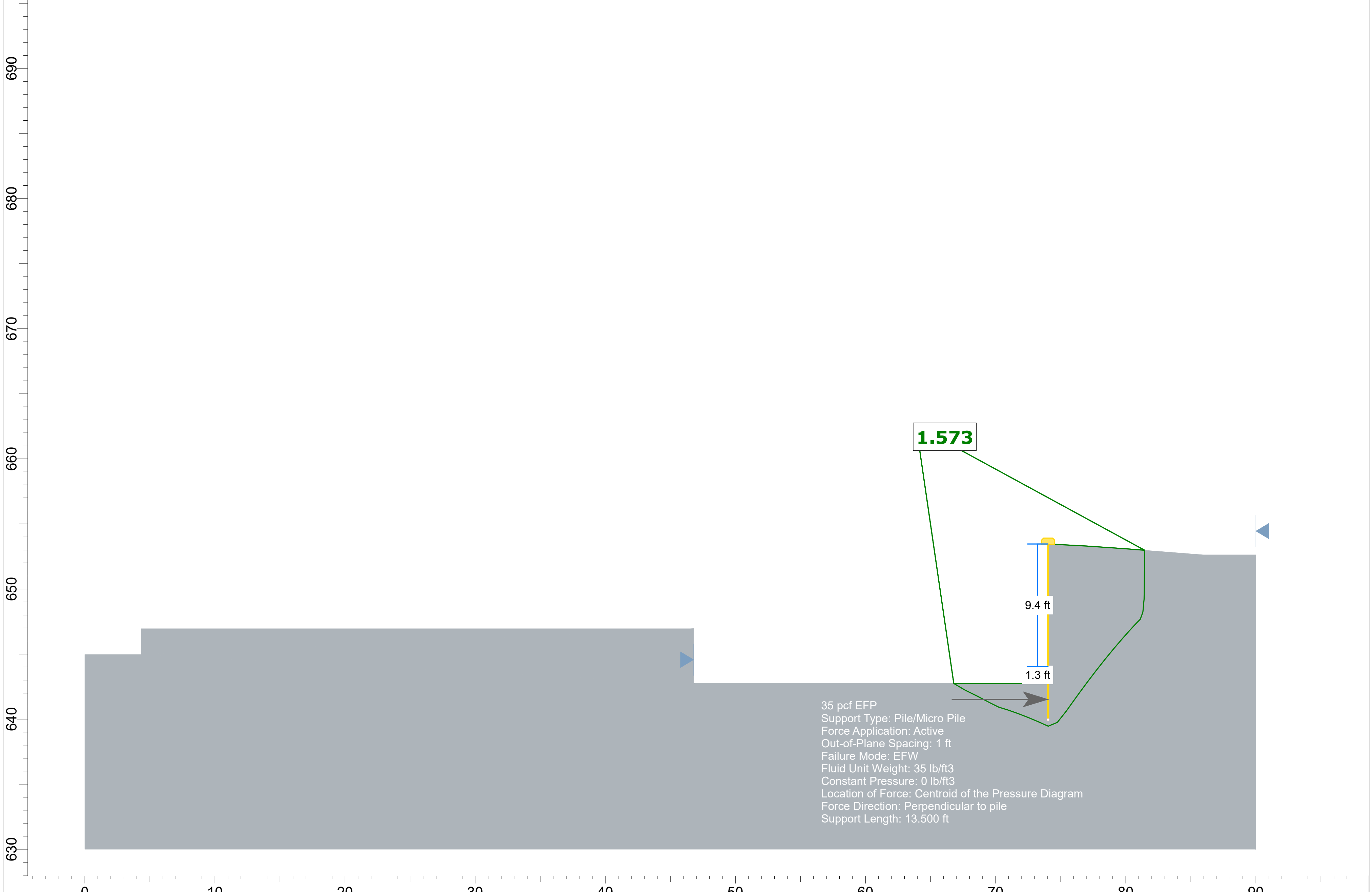
Slice Number	X coordinate [ft]	Y coordinate - Bottom [ft]	Interslice Normal Force [lbs]	Interslice Shear Force [lbs]	Interslice Force Angle [deg]
1	N/A	N/A	N/A	N/A	N/A
2	N/A	N/A	N/A	N/A	N/A
3	N/A	N/A	N/A	N/A	N/A
4	N/A	N/A	N/A	N/A	N/A
5	N/A	N/A	N/A	N/A	N/A
6	N/A	N/A	N/A	N/A	N/A
7	N/A	N/A	N/A	N/A	N/A

Entity Information

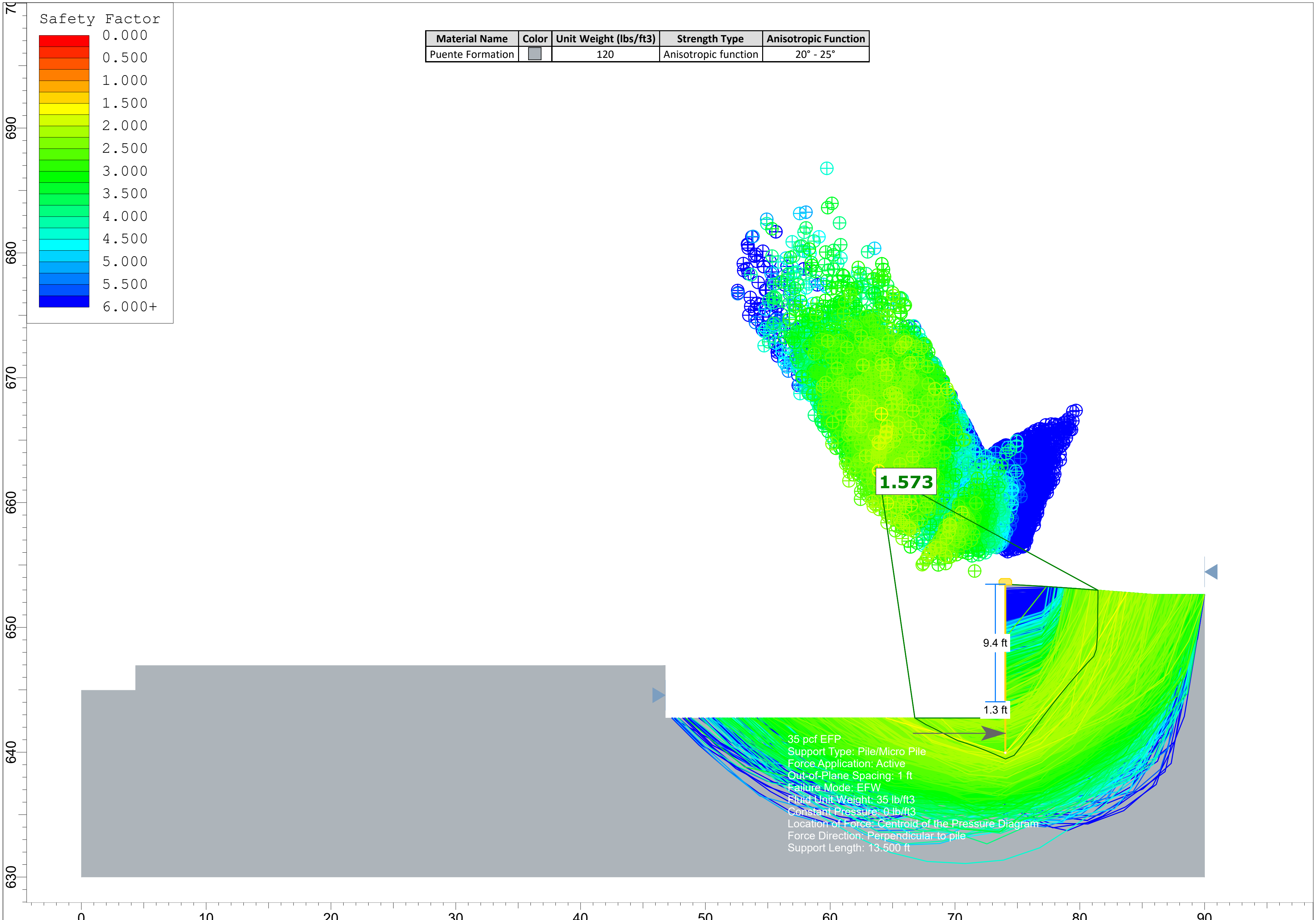
External Boundary

X	Y
90	630
90	652.623
85.953	652.623
83.496	652.811
79.858	653.102
76.969	653.297
74.036	653.455
74.036	644.046
46.794	644.046
46.794	646.95
4.345	646.95
4.345	644.969
0	644.969
0	630

Material Name	Color	Unit Weight (lbs/ft3)	Strength Type	Anisotropic Function
Puente Formation		120	Anisotropic function	20° - 25°



GSC	*Project* 2830 Prewett St		*Analysis* Section C Support (Non-Circular, Static)
	Drawn By JG	*Scale* 1:120	*Company* GeoSoils Consultants, Inc.
SLIDEINTERPRET 9.012	*Date* 4/7/2021		*File Name* 7578 Section C Support.slim



Material Name	Color	Unit Weight (lbs/ft3)	Strength Type	Anisotropic Function
Puente Formation		120	Anisotropic function	20° - 25°

GSC	Project: 2830 Prewett St		Analysis: Section C Support (Non-Circular, Static)
	Drawn By: JG	Scale: 1:120	Company: GeoSoils Consultants, Inc.
SLIDEINTERPRET 9.012	Date: 4/7/2021		File Name: 7578 Section C Support.slim

Slide Analysis Information

2830 Prewett St

Project Summary

Slide Modeler Version:	9.012
Compute Time:	00h:00m:03.490s
Author:	JG
Company:	GeoSoils Consultants, Inc.
Date Created:	4/7/2021

General Settings

Units of Measurement:	Imperial Units
Time Units:	days
Permeability Units:	feet/second
Data Output:	Standard
Failure Direction:	Right to Left

Analysis Options

Slices Type:	Vertical
Analysis Methods Used	
	Spencer
Number of slices:	50
Tolerance:	0.005
Maximum number of iterations:	75
Check malpha < 0.2:	Yes
Create Interslice boundaries at intersections with water tables and piezos:	Yes
Initial trial value of FS:	1
Steffensen Iteration:	Yes

Groundwater Analysis

Groundwater Method:	Water Surfaces
Pore Fluid Unit Weight [lbs/ft3]:	62.4
Use negative pore pressure cutoff:	Yes
Maximum negative pore pressure [psf]:	0
Advanced Groundwater Method:	None

Random Numbers

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

Surface Options

Surface Type:	Non-Circular Path Search
Number of Surfaces:	25000
Pseudo-Random Surfaces:	Enabled
Convex Surfaces Only:	Enabled
Segment Length:	Auto Defined
Minimum Elevation:	Not Defined
Minimum Depth:	Not Defined
Minimum Area:	Not Defined
Minimum Weight:	Not Defined
Upper Angle [deg]:	Auto Defined
Lower Angle [deg]:	Auto Defined

Seismic Loading

Advanced seismic analysis:	No
Staged pseudostatic analysis:	No

Materials

Puente Formation	
Color	
Strength Type	Anisotropic function
Unit Weight [lbs/ft3]	120
Water Surface	None
Ru Value	0

Anisotropic Functions

Name: 20° - 25°

Angle From	Angle To	c	phi
-90	20	122.4	34.9
20	25	150	20
25	90	122.4	34.9

Support

35 pcf EFP	
Color	
Support Type	Pile/Micro Pile
Force Application	Active
Out-of-Plane Spacing [ft]	1
Failure Mode	EFW
Fluid Unit Weight [lb/ft3]	35
Constant Pressure [lb/ft3]	0
Location of Force	Centroid of the Pressure Diagram
Force Direction	Perpendicular to pile

Global Minimums

Method: spencer

FS	1.572970
Axis Location:	63.890, 662.534
Left Slip Surface Endpoint:	66.785, 642.740
Right Slip Surface Endpoint:	81.462, 652.974
Resisting Moment:	197679 lb-ft
Driving Moment:	125672 lb-ft
Resisting Horizontal Force:	6655.89 lb
Driving Horizontal Force:	4231.41 lb
Total Slice Area:	83.5279 ft2
Surface Horizontal Width:	14.6771 ft
Surface Average Height:	5.69103 ft

Global Minimum Coordinates

Method: spencer

X	Y
66.7854	642.74
67.6709	642.218
68.5564	641.784
69.5775	641.248
70.2523	640.916
70.927	640.704
71.7049	640.433
72.4828	640.135
73.2607	639.81
74.0386	639.458
74.7444	639.752
75.4502	640.641
76.156	641.629
76.8617	642.592
77.3788	643.28
77.8959	643.95
78.4129	644.601
78.93	645.235
79.3808	645.771
79.8317	646.292
80.2189	646.726
80.6062	647.146
80.8607	647.414
81.1152	647.672
81.3158	648.221
81.4078	649.206
81.4213	650.14
81.4349	651.073
81.4487	652.019
81.4625	652.974

Global Minimum Support Data

Method: spencer

Number of Supports: 1						
35 pcf EFP						
Support Type: Pile/Micro Pile						
Start (x, y)	**Length (ft)**	**L Inside SS (ft)**	**L Outside SS (ft)**	**Li (ft)**	**Lo (ft)**	**Force (lb)**
74.036, 653.455	13.5	Not Effective	Not Effective	Not Effective	Not Effective	0

Valid and Invalid Surfaces

Method: spencer

Number of Valid Surfaces:	7378
Number of Invalid Surfaces:	17631

Error Codes

Error Code -108 reported for 149 surfaces
Error Code -111 reported for 17181 surfaces
Error Code -112 reported for 102 surfaces
Error Code -121 reported for 199 surfaces

Error Code Descriptions

The following errors were encountered during the computation:

-108 = Total driving moment or total driving force < 0.1. This is to limit the calculation of extremely high safety factors if the driving force is very small (0.1 is an arbitrary number).

-111 = Safety factor equation did not converge

-112 = The coefficient M-Alpha = cos(alpha)(1+tan(alpha)tan(phi)/F) < 0.2 for the final iteration of the safety factor calculation. This screens out some slip surfaces which may not be valid in the context of the analysis, in particular, deep seated slip surfaces with many high negative base angle slices in the passive zone.

-121 = Concave failure surface, only convex surfaces have been defined as being allowed.

Slice Data

Global Minimum Query (spencer) - Safety Factor: 1.57297

Slice Number	Width [ft]	Weight [lbs]	Angle of Slice Base [deg]	Base Material	Base Cohesion [psf]	Base Friction Angle [deg]	Shear Stress [psf]	Shear Strength [psf]	Base Normal Stress [psf]	Pore Pressure [psf]	Effective Normal Stress [psf]	Base Vertical Stress [psf]	Effective Vertical Stress [psf]
1	0.295174	3.08015	-30.5066	Puente Formation	122.4	34.9	110.314	173.52	73.279	0	73.279	8.28214	8.28214
2	0.295174	9.24044	-30.5066	Puente Formation	122.4	34.9	122.603	192.851	100.988	0	100.988	28.7507	28.7507
3	0.295174	15.4007	-30.5066	Puente Formation	122.4	34.9	134.892	212.181	128.698	0	128.698	49.2195	49.2195
4	0.295176	21.0441	-26.1185	Puente Formation	122.4	34.9	138.211	217.402	136.183	0	136.183	68.4182	68.4182
5	0.295176	26.1704	-26.1185	Puente Formation	122.4	34.9	147.892	232.629	158.01	0	158.01	85.4993	85.4993
6	0.295176	31.2967	-26.1185	Puente Formation	122.4	34.9	157.572	247.856	179.837	0	179.837	102.58	102.58
7	0.340362	42.6938	-27.7092	Puente Formation	122.4	34.9	171.675	270.039	211.636	0	211.636	121.469	121.469
8	0.340362	49.9951	-27.7092	Puente Formation	122.4	34.9	183.862	289.209	239.115	0	239.115	142.548	142.548
9	0.340362	57.2964	-27.7092	Puente Formation	122.4	34.9	196.048	308.378	266.593	0	266.593	163.625	163.625
10	0.337387	63.7773	-26.2158	Puente Formation	122.4	34.9	204.075	321.004	284.691	0	284.691	184.204	184.204
11	0.337387	70.5033	-26.2158	Puente Formation	122.4	34.9	215.2	338.503	309.777	0	309.777	203.812	203.812
12	0.337387	76.0054	-17.3902	Puente Formation	122.4	34.9	204.272	321.313	285.136	0	285.136	221.16	221.16
13	0.337387	80.2835	-17.3902	Puente Formation	122.4	34.9	210.723	331.461	299.68	0	299.68	233.683	233.683
14	0.259294	64.749	-19.1937	Puente Formation	122.4	34.9	220.542	346.906	321.821	0	321.821	245.048	245.048
15	0.259294	67.5576	-19.1937	Puente Formation	122.4	34.9	226.149	355.726	334.465	0	334.465	255.739	255.739
16	0.259294	70.3662	-19.1937	Puente Formation	122.4	34.9	231.756	364.546	347.108	0	347.108	266.43	266.43
17	0.388941	111.132	-20.9586	Puente Formation	122.4	34.9	243.494	383.009	373.575	0	373.575	280.309	280.309
18	0.388941	118.086	-20.9586	Puente Formation	122.4	34.9	252.914	397.826	394.815	0	394.815	297.94	297.94

19	0.388941	125.356	-22.6827	Puente Formation	122.4	34.9	267.576	420.889	427.873	0	427.873	316.038	316.038
20	0.388941	132.943	-22.6827	Puente Formation	122.4	34.9	278.04	437.349	451.47	0	451.47	335.261	335.261
21	0.388941	140.847	-24.3646	Puente Formation	122.4	34.9	294.328	462.969	488.194	0	488.194	354.9	354.9
22	0.388941	152.378	-24.3646	Puente Formation	122.4	34.9	310.526	488.448	524.717	0	524.717	384.087	384.087
23	0.352896	589.218	22.5988	Puente Formation	150	20	439.919	691.98	1489.08	0	1489.08	1672.19	1672.19
24	0.352896	582.193	22.5988	Puente Formation	150	20	435.708	685.355	1470.88	0	1470.88	1652.23	1652.23
25	0.352896	568.863	51.5612	Puente Formation	122.4	34.9	511.431	804.466	977.719	0	977.719	1622.09	1622.09
26	0.352896	549.229	51.5612	Puente Formation	122.4	34.9	495.485	779.383	941.762	0	941.762	1566.04	1566.04
27	0.352896	528.55	54.4583	Puente Formation	122.4	34.9	460.706	724.677	863.344	0	863.344	1508.24	1508.24
28	0.352896	506.826	54.4583	Puente Formation	122.4	34.9	443.722	697.961	825.048	0	825.048	1446.17	1446.17
29	0.352896	485.363	53.7709	Puente Formation	122.4	34.9	430.986	677.928	796.33	0	796.33	1384.57	1384.57
30	0.352896	464.161	53.7709	Puente Formation	122.4	34.9	414.253	651.607	758.601	0	758.601	1324	1324
31	0.258531	326.709	53.0602	Puente Formation	122.4	34.9	403.714	635.03	734.839	0	734.839	1271.76	1271.76
32	0.258531	315.51	53.0602	Puente Formation	122.4	34.9	391.535	615.873	707.376	0	707.376	1228.1	1228.1
33	0.258531	304.442	52.3253	Puente Formation	122.4	34.9	383.165	602.707	688.503	0	688.503	1184.71	1184.71
34	0.258531	293.513	52.3253	Puente Formation	122.4	34.9	371.166	583.833	661.449	0	661.449	1142.12	1142.12
35	0.258531	282.725	51.5651	Puente Formation	122.4	34.9	362.828	570.718	642.65	0	642.65	1099.85	1099.85
36	0.258531	272.077	51.5651	Puente Formation	122.4	34.9	351.024	552.15	616.033	0	616.033	1058.36	1058.36
37	0.258531	261.569	50.7787	Puente Formation	122.4	34.9	342.72	539.089	597.309	0	597.309	1017.21	1017.21
38	0.258531	251.201	50.7787	Puente Formation	122.4	34.9	331.114	520.833	571.139	0	571.139	976.817	976.817
39	0.450839	413.678	49.9648	Puente Formation	122.4	34.9	318.607	501.159	542.939	0	542.939	922.167	922.167
40	0.450839	383.426	49.1225	Puente Formation	122.4	34.9	302.005	475.045	505.505	0	505.505	854.426	854.426
41	0.387279	305.771	48.2505	Puente Formation	122.4	34.9	286.908	451.297	471.462	0	471.462	792.921	792.921
42	0.387279	284.481	47.3478	Puente Formation	122.4	34.9	273.297	429.888	440.773	0	440.773	737.439	737.439
43	0.254487	175.651	46.4131	Puente Formation	122.4	34.9	262.641	413.126	416.747	0	416.747	692.673	692.673
44	0.254487	167	45.4453	Puente Formation	122.4	34.9	254.946	401.023	399.398	0	399.398	658.338	658.338
45	0.200616	121.494	69.918	Puente Formation	122.4	34.9	157.461	247.681	179.586	0	179.586	610.288	610.288
46	0.0919476	47.0934	84.6671	Puente Formation	122.4	34.9	52.3037	82.2721	-57.522	0	-57.522	502.799	502.799
47	0.0135764	5.38381	89.1668	Puente Formation	122.4	34.9	5.84944	9.201	-162.267	0	-162.267	239.966	239.966
48	0.0135764	3.86147	89.1664	Puente Formation	122.4	34.9	4.22449	6.645	-165.931	0	-165.931	124.415	124.415
49	0.0137805	2.36347	89.166	Puente Formation	122.4	34.9	2.58619	4.068	-169.625	0	-169.625	8.03159	8.03159
50	0.0137805	0.789923	89.1727	Puente Formation	122.4	34.9	0.899572	1.415	-173.428	0	-173.428	-111.134	-111.134

Interslice Data

Global Minimum Query (spencer) - Safety Factor: 1.57297

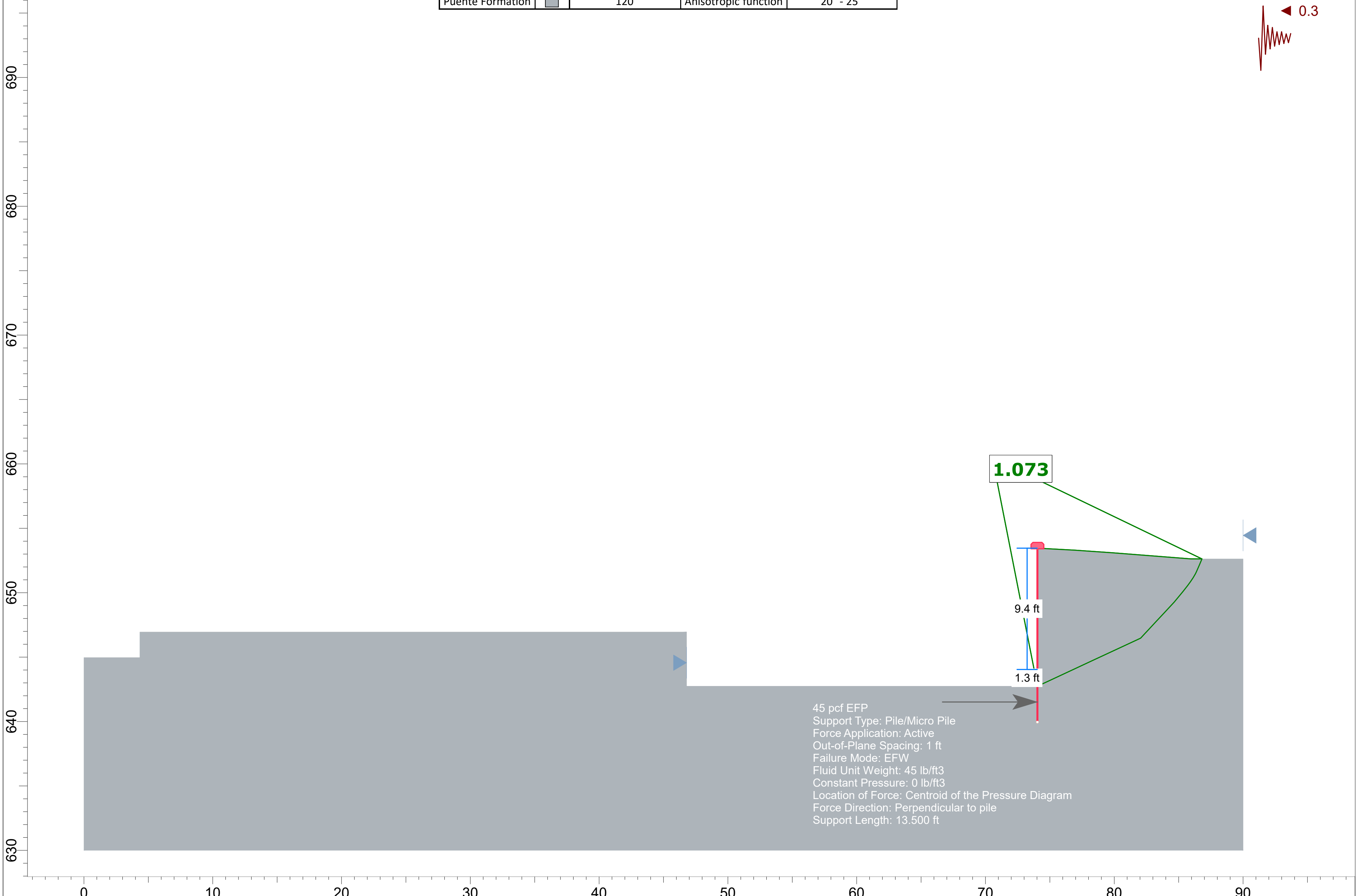
Slice Number	X coordinate [ft]	Y coordinate - Bottom [ft]	Interslice Normal Force [lbs]	Interslice Shear Force [lbs]	Interslice Force Angle [deg]
1	66.7854	642.74	0	0	0
2	67.0805	642.566	45.3063	-0.635497	-0.803617
3	67.3757	642.392	99.0592	-1.38947	-0.803616
4	67.6709	642.218	161.259	-2.26192	-0.803614
5	67.9661	642.074	221.764	-3.11062	-0.803619
6	68.2612	641.929	288.286	-4.0437	-0.803618
7	68.5564	641.784	360.825	-5.06117	-0.803616
8	68.8968	641.605	457.089	-6.41144	-0.803617
9	69.2371	641.427	562.414	-7.8888	-0.803617
10	69.5775	641.248	676.798	-9.49324	-0.803618
11	69.9149	641.082	792.947	-11.1224	-0.803616
12	70.2523	640.916	917.016	-12.8627	-0.803617
13	70.5897	640.81	1016.06	-14.252	-0.80362
14	70.927	640.704	1118.83	-15.6934	-0.803613
15	71.1863	640.614	1205.06	-16.903	-0.803617
16	71.4456	640.524	1293.89	-18.149	-0.803618
17	71.7049	640.433	1385.31	-19.4314	-0.803621
18	72.0939	640.284	1535.67	-21.5404	-0.803619
19	72.4828	640.135	1692.86	-23.7452	-0.803617
20	72.8718	639.973	1866.49	-26.1806	-0.803615
21	73.2607	639.81	2048.02	-28.7269	-0.803616
22	73.6496	639.634	2248.49	-31.5388	-0.803616
23	74.0386	639.458	2461.69	-34.5293	-0.803616
24	74.3915	639.605	2398.21	-33.6389	-0.803616
25	74.7444	639.752	2335.91	-32.7651	-0.803618
26	75.0973	640.196	2081.68	-29.199	-0.803615
27	75.4502	640.641	1837.8	-25.7783	-0.803619
28	75.8031	641.135	1573.91	-22.0767	-0.803616
29	76.156	641.629	1322.94	-18.5564	-0.803614
30	76.5088	642.111	1091.47	-15.3097	-0.803617
31	76.8617	642.592	872.274	-12.2351	-0.803616
32	77.1203	642.936	723.985	-10.1551	-0.803616
33	77.3788	643.28	581.989	-8.16337	-0.803617
34	77.6373	643.615	450.534	-6.3195	-0.803617
35	77.8959	643.95	325.036	-4.55917	-0.803616
36	78.1544	644.275	209.478	-2.93828	-0.803617
37	78.4129	644.601	99.5394	-1.39621	-0.803618
38	78.6715	644.918	-1.05402	0.0147844	-0.803617
39	78.93	645.235	-96.3586	1.35159	-0.803616
40	79.3808	645.771	-244.069	3.42348	-0.803617
41	79.8317	646.292	-371.219	5.20697	-0.803617
42	80.2189	646.726	-464.681	6.51794	-0.803618
43	80.6062	647.146	-544.137	7.63244	-0.803617
44	80.8607	647.414	-588.72	8.25779	-0.803617
45	81.1152	647.672	-627.073	8.79575	-0.803617
46	81.3158	648.221	-694.03	9.73494	-0.803617
47	81.4078	649.206	-632.561	8.87273	-0.803617
48	81.4213	650.14	-480.993	6.74673	-0.803616
49	81.4349	651.073	-326.105	4.57417	-0.803617
50	81.4487	652.019	-165.496	2.32136	-0.803617
51	81.4625	652.974	0	0	0

Entity Information

External Boundary

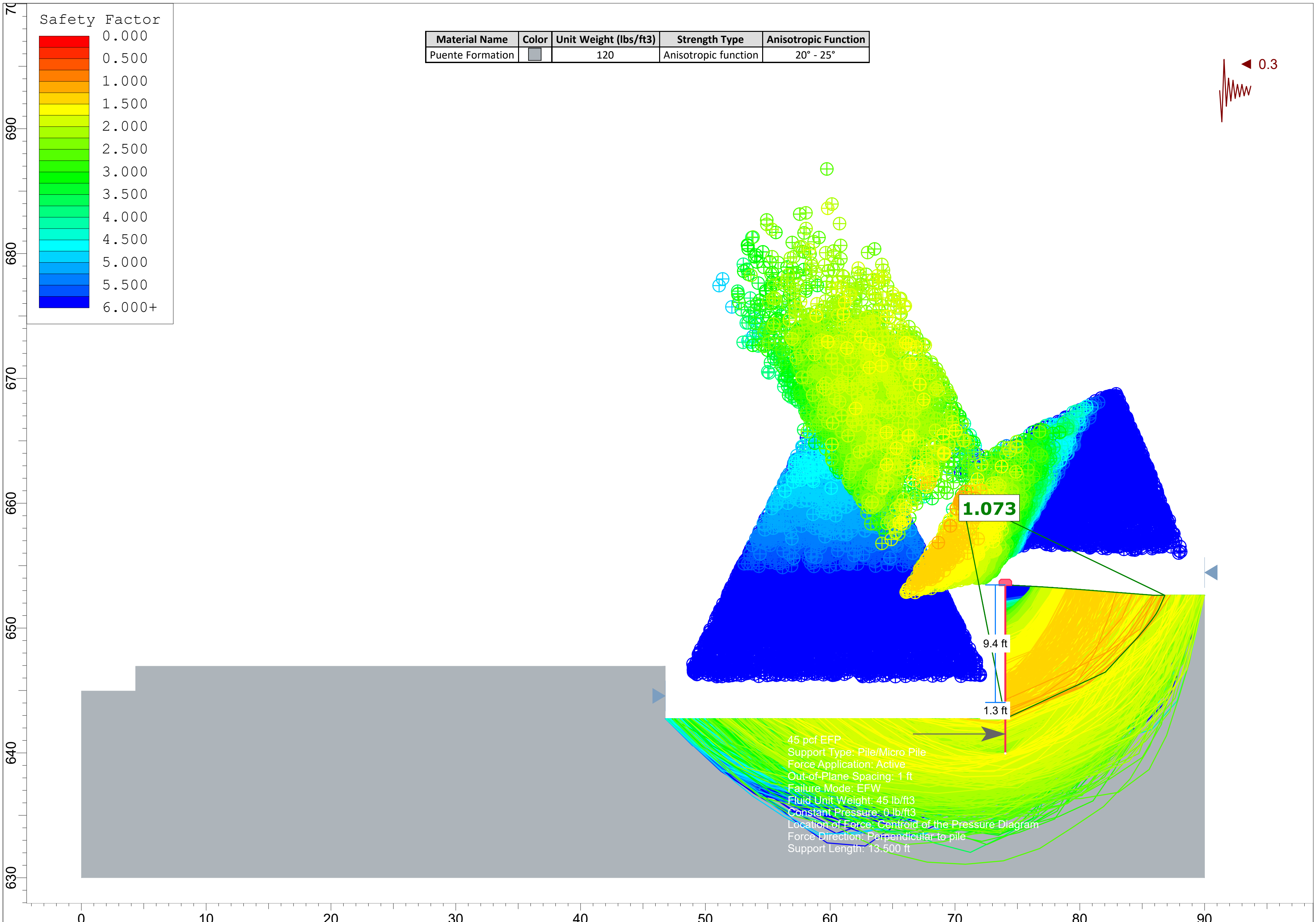
X	Y
90	630
90	652.623
85.953	652.623
83.496	652.811
79.858	653.102
76.969	653.297
74.036	653.455
74.036	642.74
46.794	642.74
46.794	646.95
4.345	646.95
4.345	644.969
0	644.969
0	630

Material Name	Color	Unit Weight (lbs/ft3)	Strength Type	Anisotropic Function
Puente Formation		120	Anisotropic function	20° - 25°



GSC	*Project* 2830 Prewett St		*Analysis* Section C Support (Non-Circular, Seismic)
	Drawn By JG	*Scale* 1:120	*Company* GeoSoils Consultants, Inc.
SLIDEINTERPRET 9.012	*Date* 4/7/2021		*File Name* 7578 Section C Support Seismic.slim

Material Name	Color	Unit Weight (lbs/ft3)	Strength Type	Anisotropic Function
Puente Formation		120	Anisotropic function	20° - 25°



GSC	Project	2830 Prewett St	Analysis	Section C Support (Non-Circular, Seismic)
	Drawn By: JG	Scale: 1:120	Company	GeoSoils Consultants, Inc.
SLIDEINTERPRET 9.012	Date	4/7/2021	File Name	7578 Section C Support Seismic.slim

Slide Analysis Information

2830 Prewett St

Project Summary

Slide Modeler Version:	9.012
Compute Time:	00h:00m:05.71s
Author:	JG
Company:	GeoSoils Consultants, Inc.
Date Created:	4/7/2021

General Settings

Units of Measurement:	Imperial Units
Time Units:	days
Permeability Units:	feet/second
Data Output:	Standard
Failure Direction:	Right to Left

Analysis Options

Slices Type:	Vertical
Analysis Methods Used	
	Spencer
Number of slices:	50
Tolerance:	0.005
Maximum number of iterations:	75
Check malpha < 0.2:	Yes
Create Interslice boundaries at intersections with water tables and piezos:	Yes
Initial trial value of FS:	1
Steffensen Iteration:	Yes

Groundwater Analysis

Groundwater Method:	Water Surfaces
Pore Fluid Unit Weight [lbs/ft3]:	62.4
Use negative pore pressure cutoff:	Yes
Maximum negative pore pressure [psf]:	0
Advanced Groundwater Method:	None

Random Numbers

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

Surface Options

Surface Type:	Non-Circular Path Search
Number of Surfaces:	25000
Pseudo-Random Surfaces:	Enabled
Convex Surfaces Only:	Enabled
Segment Length:	Auto Defined
Minimum Elevation:	Not Defined
Minimum Depth:	Not Defined
Minimum Area:	Not Defined
Minimum Weight:	Not Defined
Upper Angle [deg]:	Auto Defined
Lower Angle [deg]:	Auto Defined

Seismic Loading

Advanced seismic analysis:	No
Staged pseudostatic analysis:	No
Seismic Load Coefficient (Horizontal):	0.3

Materials

Puente Formation	
Color	
Strength Type	Anisotropic function
Unit Weight [lbs/ft3]	120
Water Surface	None
Ru Value	0

Anisotropic Functions

Name: 20° - 25°

Angle From	Angle To	c	phi
-90	20	122.4	34.9
20	25	150	20
25	90	122.4	34.9

Support

45 pcf EFP	
Color	
Support Type	Pile/Micro Pile
Force Application	Active
Out-of-Plane Spacing [ft]	1
Failure Mode	EFW
Fluid Unit Weight [lb/ft3]	45
Constant Pressure [lb/ft3]	0
Location of Force	Centroid of the Pressure Diagram
Force Direction	Perpendicular to pile

Global Minimums

Method: spencer

FS	1.072890
Axis Location:	70.539, 660.454
Left Slip Surface Endpoint:	74.036, 642.740
Right Slip Surface Endpoint:	86.809, 652.623
Left Slope Intercept:	74.036 653.455
Right Slope Intercept:	86.809 652.623
Resisting Moment:	100947 lb-ft
Driving Moment:	94088.2 lb-ft
Resisting Horizontal Force:	4749.16 lb
Driving Horizontal Force:	4426.5 lb
Active Support Moment:	-36533.4 lb-ft
Active Horizontal Support Force:	-2583.25 lb
Maximum Single Support Force:	2583.25 lb
Total Support Force:	2583.25 lb
Total Slice Area:	86.0464 ft2
Surface Horizontal Width:	12.7726 ft
Surface Average Height:	6.73681 ft

Global Minimum Coordinates

Method: spencer

X	Y
74.036	642.74
74.4425	642.93
74.8548	643.122
75.2737	643.317
75.6926	643.512
76.1115	643.708
76.5296	643.903
76.9303	644.09
77.331	644.276
77.7104	644.453
78.0897	644.63
78.5464	644.843
79.0031	645.056
79.4574	645.268
79.9117	645.48
80.3706	645.694
80.8295	645.908
81.2883	646.122
81.7472	646.336
82.0504	646.477
82.3536	646.801
82.6139	647.08
82.8742	647.36
83.1255	647.629
83.3769	647.899
83.6302	648.17
83.8842	648.443
84.3146	648.904
84.6502	649.264
85.001	649.671
85.354	650.117
85.5772	650.41
85.8552	650.776
86.1332	651.164
86.3692	651.595
86.6051	652.145
86.8086	652.623

Global Minimum Support Data

Method: spencer

Number of Supports: 1						
45 pcf EFP						
Support Type: Pile/Micro Pile						
Start (x, y)	**Length (ft)**	**L Inside SS (ft)**	**L Outside SS (ft)**	**Li (ft)**	**Lo (ft)**	**Force (lb)**
74.036, 653.455	13.5	10.715	2.785	10.715	2.785	2583.25

Valid and Invalid Surfaces

Method: spencer

Number of Valid Surfaces:	18644
Number of Invalid Surfaces:	6365

Error Codes

Error Code -108 reported for 310 surfaces
Error Code -111 reported for 5835 surfaces
Error Code -112 reported for 21 surfaces
Error Code -121 reported for 199 surfaces

Error Code Descriptions

The following errors were encountered during the computation:

-108 = Total driving moment or total driving force < 0.1. This is to limit the calculation of extremely high safety factors if the driving force is very small (0.1 is an arbitrary number).

-111 = Safety factor equation did not converge

-112 = The coefficient M-Alpha = cos(alpha)(1+tan(alpha)tan(phi)/F) < 0.2 for the final iteration of the safety factor calculation. This screens out some slip surfaces which may not be valid in the context of the analysis, in particular, deep seated slip surfaces with many high negative base angle slices in the passive zone.

-121 = Concave failure surface, only convex surfaces have been defined as being allowed.

Slice Data

Global Minimum Query (spencer) - Safety Factor: 1.07289

Slice Number	Width [ft]	Weight [lbs]	Angle of Slice Base [deg]	Base Material	Base Cohesion [psf]	Base Friction Angle [deg]	Shear Stress [psf]	Shear Strength [psf]	Base Normal Stress [psf]	Pore Pressure [psf]	Effective Normal Stress [psf]	Base Vertical Stress [psf]	Effective Vertical Stress [psf]
1	0.203271	260.076	24.9991	Puente Formation	150	20	3128.44	3356.47	8809.71	0	8809.71	10268.5	10268.5
2	0.203271	257.497	24.9991	Puente Formation	150	20	412.326	442.38	803.306	0	803.306	995.568	995.568
3	0.206111	258.461	24.9991	Puente Formation	150	20	409.701	439.564	795.571	0	795.571	986.61	986.61
4	0.206111	255.81	24.9991	Puente Formation	150	20	407.059	436.729	787.779	0	787.779	977.586	977.586
5	0.209457	257.246	24.9991	Puente Formation	150	20	404.394	433.87	779.927	0	779.927	968.492	968.492
6	0.209457	254.508	24.9991	Puente Formation	150	20	401.708	430.988	772.009	0	772.009	959.321	959.321
7	0.418915	500.801	24.9991	Puente Formation	150	20	397.679	426.666	760.134	0	760.134	945.567	945.567
8	0.418913	489.845	24.9991	Puente Formation	150	20	392.308	420.903	744.299	0	744.299	927.228	927.228
9	0.209049	240.349	24.9991	Puente Formation	150	20	388.281	416.583	732.432	0	732.432	913.483	913.483
10	0.209049	237.621	24.9991	Puente Formation	150	20	385.601	413.707	724.529	0	724.529	904.33	904.33
11	0.20036	225.184	24.9991	Puente Formation	150	20	382.976	410.891	716.793	0	716.793	895.371	895.371
12	0.20036	222.678	24.9991	Puente Formation	150	20	380.407	408.135	709.221	0	709.221	886.601	886.601
13	0.20036	220.151	24.9991	Puente Formation	150	20	377.816	405.355	701.581	0	701.581	877.752	877.752
14	0.20036	217.581	24.9991	Puente Formation	150	20	375.18	402.527	693.814	0	693.814	868.756	868.756

15	0.189655	203.587	24.9991	Puente Formation	150	20	372.614	399.774	686.248	0	686.248	859.994	859.994
16	0.189655	201.283	24.9991	Puente Formation	150	20	370.119	397.097	678.894	0	678.894	851.476	851.476
17	0.189655	198.979	24.9991	Puente Formation	150	20	367.623	394.419	671.535	0	671.535	842.953	842.953
18	0.189655	196.675	24.9991	Puente Formation	150	20	365.128	391.742	664.18	0	664.18	834.435	834.435
19	0.45673	464.181	24.9991	Puente Formation	150	20	360.875	387.179	651.644	0	651.644	819.916	819.916
20	0.228366	227.08	24.9991	Puente Formation	150	20	356.367	382.343	638.357	0	638.357	804.527	804.527
21	0.228366	223.74	24.9991	Puente Formation	150	20	353.362	379.119	629.499	0	629.499	794.268	794.268
22	0.22715	219.235	24.9991	Puente Formation	150	20	350.365	375.903	620.664	0	620.664	784.035	784.035
23	0.22715	215.93	24.9991	Puente Formation	150	20	347.377	372.697	611.854	0	611.854	773.832	773.832
24	0.227151	212.626	24.9991	Puente Formation	150	20	344.388	369.49	603.044	0	603.044	763.628	763.628
25	0.227151	209.319	24.9991	Puente Formation	150	20	341.397	366.281	594.226	0	594.226	753.415	753.415
26	0.458865	412.57	24.9991	Puente Formation	150	20	336.798	361.347	580.67	0	580.67	737.715	737.715
27	0.229432	201.109	24.9991	Puente Formation	150	20	332.163	356.374	567.01	0	567.01	721.894	721.894
28	0.229432	197.658	24.9991	Puente Formation	150	20	329.073	353.059	557.901	0	557.901	711.344	711.344
29	0.229432	194.208	24.9991	Puente Formation	150	20	325.984	349.745	548.792	0	548.792	700.794	700.794
30	0.229432	190.757	24.9991	Puente Formation	150	20	322.894	346.43	539.686	0	539.686	690.248	690.248
31	0.458865	371.162	24.9991	Puente Formation	150	20	318.259	341.457	526.024	0	526.024	674.425	674.425
32	0.303191	237.669	24.9991	Puente Formation	150	20	313.128	335.952	510.899	0	510.899	656.907	656.907
33	0.303191	228.319	46.908	Puente Formation	122.4	34.9	288.125	309.126	267.664	0	267.664	575.647	575.647
34	0.260328	185.914	47.0036	Puente Formation	122.4	34.9	278.062	298.33	252.19	0	252.19	550.412	550.412
35	0.260328	176.541	47.0036	Puente Formation	122.4	34.9	269.279	288.907	238.683	0	238.683	527.485	527.485
36	0.251322	161.542	47.0036	Puente Formation	122.4	34.9	260.649	279.648	225.409	0	225.409	504.956	504.956
37	0.251322	152.806	47.0036	Puente Formation	122.4	34.9	252.17	270.551	212.37	0	212.37	482.823	482.823
38	0.253318	145.184	47.0036	Puente Formation	122.4	34.9	243.662	261.422	199.284	0	199.284	460.611	460.611
39	0.254058	136.719	47.0036	Puente Formation	122.4	34.9	235.127	252.265	186.157	0	186.157	438.331	438.331
40	0.215167	108.83	47.0036	Puente Formation	122.4	34.9	227.236	243.799	174.021	0	174.021	417.732	417.732
41	0.215167	102.446	47.0036	Puente Formation	122.4	34.9	219.998	236.034	162.891	0	162.891	398.839	398.839
42	0.3356	147.044	47.0036	Puente Formation	122.4	34.9	210.736	226.097	148.646	0	148.646	374.661	374.661
43	0.35078	136.445	49.2541	Puente Formation	122.4	34.9	190.72	204.621	117.862	0	117.862	339.235	339.235
44	0.353012	118.113	51.6059	Puente Formation	122.4	34.9	170.913	183.371	87.4	0	87.4	303.084	303.084
45	0.22322	64.1997	52.7358	Puente Formation	122.4	34.9	157.694	169.188	67.069	0	67.069	274.34	274.34
46	0.27802	68.3309	52.7358	Puente Formation	122.4	34.9	148.985	159.845	53.676	0	53.676	249.501	249.501
47	0.278028	55.1984	54.3986	Puente Formation	122.4	34.9	135.517	145.394	32.9617	0	32.9617	222.239	222.239
48	0.235928	35.2101	61.2826	Puente Formation	122.4	34.9	113.235	121.489	-1.30611	0	-1.30611	205.373	205.373
49	0.235927	21.3185	66.8094	Puente Formation	122.4	34.9	96.0244	103.024	-27.7755	0	-27.7755	196.368	196.368
50	0.203477	5.83149	66.9262	Puente Formation	122.4	34.9	87.9837	94.3968	-40.1416	0	-40.1416	166.395	166.395

Interslice Data

Global Minimum Query (spencer) - Safety Factor: 1.07289

Slice Number	X coordinate [ft]	Y coordinate - Bottom [ft]	Interslice Normal Force [lbs]	Interslice Shear Force [lbs]	Interslice Force Angle [deg]
1	74.036	642.74	0	0	0
2	74.2393	642.835	2306.13	1827.2	38.3906
3	74.4425	642.93	2236.56	1772.08	38.3906
4	74.6487	643.026	2167	1716.97	38.3907
5	74.8548	643.122	2098.45	1662.65	38.3906
6	75.0642	643.219	2029.8	1608.26	38.3906
7	75.2737	643.317	1962.19	1554.69	38.3906
8	75.6926	643.512	1830.06	1450	38.3906
9	76.1115	643.708	1702.06	1348.58	38.3906
10	76.3206	643.805	1639.73	1299.19	38.3905
11	76.5296	643.903	1578.42	1250.62	38.3906
12	76.73	643.996	1520.63	1204.83	38.3906
13	76.9303	644.09	1463.79	1159.79	38.3905
14	77.1307	644.183	1407.9	1115.51	38.3906
15	77.331	644.276	1352.97	1071.99	38.3906
16	77.5207	644.365	1301.88	1031.51	38.3906
17	77.7104	644.453	1251.65	991.71	38.3906
18	77.9	644.542	1202.29	952.602	38.3906
19	78.0897	644.63	1153.8	914.181	38.3906
20	78.5464	644.843	1040.58	824.48	38.3907
21	78.7748	644.95	985.867	781.125	38.3906
22	79.0031	645.056	932.408	738.769	38.3906
23	79.2303	645.162	880.483	697.627	38.3906
24	79.4574	645.268	829.804	657.473	38.3906
25	79.6846	645.374	780.37	618.305	38.3906
26	79.9117	645.48	732.183	580.125	38.3906
27	80.3706	645.694	638.712	506.067	38.3906
28	80.6	645.801	593.928	470.583	38.3906
29	80.8295	645.908	550.445	436.13	38.3906
30	81.0589	646.015	508.262	402.708	38.3906
31	81.2883	646.122	467.38	370.316	38.3906
32	81.7472	646.336	389.518	308.624	38.3906
33	82.0504	646.477	340.926	270.123	38.3905
34	82.3536	646.801	273.039	216.335	38.3906
35	82.6139	647.08	219.239	173.708	38.3906
36	82.8742	647.36	169.736	134.486	38.3906
37	83.1255	647.629	126.022	99.8504	38.3907
38	83.3769	647.899	86.3128	68.3876	38.3906
39	83.6302	648.17	50.3385	39.8844	38.3906
40	83.8842	648.443	18.3344	14.5268	38.3907
41	84.0994	648.674	-5.57969	-4.42092	38.3906
42	84.3146	648.904	-26.5674	-21.05	38.3906
43	84.6502	649.264	-53.4606	-42.3581	38.3906
44	85.001	649.671	-75.4825	-59.8065	38.3906
45	85.354	650.117	-89.5179	-70.9271	38.3906
46	85.5772	650.41	-93.2557	-73.8887	38.3906
47	85.8552	650.776	-91.9491	-72.8535	38.3906
48	86.1332	651.164	-83.6315	-66.2632	38.3906
49	86.3692	651.595	-66.917	-53.0199	38.3906
50	86.6051	652.145	-35.3619	-28.018	38.3905
51	86.8086	652.623	0	0	0

Entity Information

External Boundary

X	Y
90	630
90	652.623
85.953	652.623
83.496	652.811
79.858	653.102
76.969	653.297
74.036	653.455
74.036	642.74
46.794	642.74
46.794	646.95
4.345	646.95
4.345	644.969
0	644.969
0	630