BYER GEOTECHNICAL, INC.

December 21, 2018
BG 18554

Dr. Ken and Annette York
210 South Grand Avenue, Suite 215
Glendora, California 91741

Subject

Transmittal of Geologic and Soils Engineering Exploration Update
Proposed Grading for Access Driveway and Pads for
Future Residence, Guest House, Pool, and Required Animal-Keeping Areas
Assessor's Parcel No. 5577-008-003
Portion of Lot 6, NE¼, SEC 23, T1N, R14W
6459 West Innsdale Drive
Los Angeles, California

Gentlepersons:

Byer Geotechnical has completed our update report dated December 21, 2018, which replaces the previously-transmitted report dated September 11, 2018. The revised report describes the geologic and soils engineering conditions with respect to the proposed project. All copies of the September 11, 2018, report should be discarded. The reviewing agency for this document is City of Los Angeles, Department of Building and Safety (LADBS). The reviewing agency requires two unbound copies, one with a wet signature, a CD (PDF format), an application form, and a filing fee. Four copies of the report are enclosed.

It is our understanding that you will file the report with the LADBS. Please review the report carefully prior to submittal to the governmental agency. Questions concerning the report should be directed to the undersigned. Byer Geotechnical appreciates the opportunity to offer our consultation and advice on this project.

Very truly yours,
BYER GEOTECHNICAL, INC.

Robert I. Zweigler
Vice Presiden

BYER GEOTECHNICAL, INC.

GEOLOGIC AND SOILS ENGINEERING EXPLORATION UPDATE
PROPOSED GRADING FOR ACCESS DRIVEWAY AND PADS FOR FUTURE RESIDENCE, GUEST HOUSE, POOL, AND REQUIRED ANIMAL-KEEPING AREAS
ASSESSOR'S PARCEL NO. 5577-008-003
PORTION OF LOT 6, NE¼, SEC 23, T1N, R14W
6459 WEST INNSDALE DRIVE
LOS ANGELES, CALIFORNIA
FOR DR. KEN AND ANNETTE YORK
BYER GEOTECHNICAL, INC., PROJECT NUMBER BG 18554
DECEMBER 21, 2018

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INTRODUCTION

This report summarizes findings of Byer Geotechnical, Inc., geologic and soils engineering exploration update performed on the site. The purpose of this study is to evaluate the nature, distribution, engineering properties, relative stability, and geologic structure of the earth materials underlying the site with respect to grading to create an access driveway and a level pad suitable for construction of a custom residence, guest house, and pool. Level required animal-keeping areas will also be created. This report is intended to assist in the design and completion of the proposed project and to reduce geotechnical risks that may affect the project. The professional opinions and advice presented in this report are based upon commonly accepted exploration standards and are subject to the AGREEMENT with TERMS AND CONDITIONS, and the GENERAL CONDITIONS AND NOTICE section of this report. No warranty is expressed or implied by the issuing of this report.

PROPOSED PROJECT

The scope of the current project was determined from consultation with the clients and review of the revised grading plans by Stephen Smith, civil engineer, dated December 17, 2018, which was utilized as the basis for the enclosed updated Geologic Map and Sections A - D. The project consists of cutting into the west end of a hill to create a level pad for the two-story residence over a basement (three levels), a guest house, and a pool. The excavated soil will be compacted in the canyon to the north to create level areas for required animal keeping. The cut-and-fill is to balance onsite. A small shed for animal keeping is planned on each pad. Three retaining walls are planned that will support excavations on both sides of the access driveway and at the toe of the rear-yard cut slope. Cut slopes are planned at a 1:1 gradient up to 55 feet high, east of the residence pad. A 10-foot-high, 1:1 cut is planned along the west side of the access driveway and a 1:1 cut up to 25 feet high is planned at the northeast side of the driveway. A 1¼:1 cut slope up to 40 feet high is planned east of the driveway. The fill slope for required animal-keeping areas will be 2:1 in gradient and up to 110 feet high.

EXPLORATION

Previous exploration was conducted with the aid of hand labor provided by the client. It included logging three test pits on February 1, 2012, and field geologic mapping.

Office tasks for this update included review of previous laboratory testing, review of published maps and photos for the area, review of our files, review of agency files, preparation of updated cross sections, preparation of the Geologic Map, slope stability calculations, engineering analysis, and preparation of this report. Earth materials exposed in the test pits are described on the enclosed Log of Test Pits.

The proposed project, surface geologic conditions, and the locations of the test pits are shown on the Geologic Map. Subsurface distribution of the earth materials, projected geologic structure, and the

proposed project are shown on Sections A, B, C, and D. Section D forms the basis for the slope stability calculations.

RESEARCH - PRIOR WORK

The J. Byer Group (JB 18554) prepared the following geotechnical reports for the subject property related to the development of the existing vineyard:

Engineering Geologic Site Observation, 6459 West Innsdale Drive, Los Angeles, California, dated August 31, 2000;

Addendum Report, Proposed Vineyard, 6459 West Innsdale Drive, Los Angeles, California, dated September 19, 2000; and

Addendum Report #2, Proposed Vineyard, 6459 West Innsdale Drive, Los Angeles, California, dated February 28, 2001.

The City of Los Angeles, Department of Building and Safety (LADBS), reviewed the reports and issued the conditional approval letter, Log # 31787-02, dated May 25, 2001.

In addition, The J. Byer Group (JB 18554) performed a study of 6443 West Innsdale Drive, adjacent to the southwest corner of the subject property. JBG prepared:

Geologic and Soils Engineering Exploration, Proposed Retaining Wall, Lot 20, Tract 24583, 6443 West Innsdale Drive, Los Angeles, California, dated October 11, 2000;

Plan Review and Update, Proposed Pool Equipment and Pump House, Lot 20, Tract 24583, 6443 West Innsdale Drive, Los Angeles, California, dated July 19, 2001;

Additional Information - Plan Review and Update, 6443 West Innsdale Drive, Los Angeles, California, dated July 20, 2001; and

Additional Information - Plan Review and Update #2, 6443 West Innsdale Drive, Los Angeles, California, dated July 26, 2001.

The October 11, 2000, report was reviewed and approved by LADBS in their conditional approval letter, Log # 33509, approved on May 30, 2001.

Byer Geotechnical prepared the following geotechnical report addressing a prior version of the project:

> *Geologic and Soils Engineering Exploration, Proposed Grading for Access Driveway and Two Pads for Future Residence, Pool, Pool House, Wine Caves, and Tennis Court, Assessor's Parcel No. 5577-008-003, Portion of Lot 6, NE¼, SEC 23, T1N, R14W, 6459 West Innsdale Drive, Los Angeles, California,* dated August 21, 2012; and

The LADBS reviewed the report and issued the Geology and Soils Report Correction Letter, Log # 78346, dated October 30, 2012. BG then prepared the:

> *Addendum Geologic and Soils Engineering Exploration, Response to City of Los Angeles Correction Letter, Proposed Grading for Access Driveway and Two Pads for Future Residence, Pool, Pool House, and Tennis Court, Assessor's Parcel No. 5577-008-003, Portion of Lot 6, NE¼, SEC 23, T1N, R14W, 6459 West Innsdale Drive, Los Angeles, California*, dated July 25, 2013.

The addendum, and a Request for Modification of the Building Ordinances to allow a cut slope in bedrock at a 1:1 gradient, were reviewed and approved by the LADBS in the Geology and Soils Report Approval Letter, Log # 78346-01, dated September 6, 2013, and in the Request for Modification File No. 21293, also dated September 6, 2013.

The main difference from the current project is the grading to create an access driveway to the canyon fill area above the western property boundary has been deleted.

The data contained in these reports was reviewed and considered as part of our work on this project.

SITE DESCRIPTION

The subject property consists of a 40-acre hillside parcel on the south flank of the eastern Santa Monica Mountains in the Lake Hollywood section of the city of Los Angeles, California (34.1315° N Latitude, 118.3308° W Longitude). It is located about one-half of a mile southwest of the "Hollywood Sign." The site is vacant, with several trails associated with operation of the vineyard and orchard on the south-facing slope.

The area to the south of the subject property has been developed with single-family residences on graded, level pads. Past grading on the site has included creating cut slopes as steep as 1:1 at the rear of the residences along the north side of Innsdale Drive.

Physical relief across the southern half of the property, which includes the proposed project, is about 360 feet, with slope gradients ranging from an elevation of 1,340 to the east, to 980 in the canyon in the central-west portion of the site.

Vegetation on the site consists of a moderately-thick assemblage of native chaparral. The southeastern portion of the site has been developed as a vineyard and orchard. Surface drainage is by sheetflow runoff down the contours of the land, generally to the west-draining canyon for most of the site. The southernmost portion drains to the south, where it is collected in swales on the slopes behind residences along Innsdale Drive.

GROUNDWATER

Groundwater was not encountered in the test pits. Seasonal fluctuations in groundwater levels occur due to variations in climate, irrigation, development, and other factors not evident at the time of the exploration. Groundwater levels may also differ across the site. Groundwater can saturate earth materials causing subsidence or instability of slopes.

METHANE ZONES

City of Los Angeles Ordinance No. 175790 established methane mitigation requirements and includes construction standards to control methane intrusion into buildings. The subject property is not mapped within a Methane Zone or Methane Buffer Zone.

EARTH MATERIALS

Fill

Minor fill, associated with previous site grading to access the vineyard, is present in scattered locations. The fill is less than two feet thick and consists of silty sand and gravel that is light brown, slightly moist, and medium dense.

Soil

A thin scattered layer of natural residual soil blankets portions of the site. The soil consists of silty sand that is light to medium brown, slightly moist, and medium dense. The soil layer observed in the test pits, which were excavated in drainage swales, is two or three feet thick.

Bedrock

Bedrock underlying the site and encountered in the test pits consists of conglomerate mapped as part of the Topanga Formation (Hoots, 1931, and Dibblee, Jr., 1991 and 1992). The bedrock is also exposed in cut slopes on the southwest corner of the site and in numerous outcrops throughout the site. The bedrock is generally massive and hard to very hard. The upper ½ to 1½ feet is generally friable.

GEOLOGIC STRUCTURE

The bedrock described above is common to this area of the eastern Santa Monica Mountains and the geologic structure is consistent with regional trends. The conglomerate bedrock is generally massive and lacks significant structural planes.

One bedding plane was mapped on the main hill and strikes northeast and dips 30 degrees to the northwest, which is consistent with the regional geologic structure. The geologic structure and massive nature of the bedrock are favorable for the gross stability of the site and proposed project.

GENERAL SEISMIC CONSIDERATIONS

The subject property is located in an active seismic region. Moderate to strong earthquakes can occur on numerous local faults. The United States Geological Survey, California Geological Survey (CGS), private consultants, and universities have been studying earthquakes in southern California for several decades. Early studies were directed toward earthquake prediction and estimation of the effects of strong ground shaking. Studies indicate that earthquake prediction is not practical and not sufficiently accurate to benefit the general public. Governmental agencies now require earthquake-resistant structures. The purpose of the code seismic-design parameters is to prevent collapse during strong ground shaking. Cosmetic damage should be expected.

Southern California faults are classified as "active" or "potentially active." Faults from past geologic periods of mountain building that do not display evidence of recent offset are considered "potentially active." Faults that have historically produced earthquakes or show evidence of movement within the past 11,000 years are known as "active faults." No known active faults cross the subject property.

The following table lists the current applicable City of Los Angeles Building Code seismic coefficients for the project:

SEISMIC COEFFICIENTS (2017 City of Los Angeles Building Code - Based on ASCE 7-10 Standard)		
Latitude = 34.1315° N Longitude = 118.3308° W	Short Period (0.2s)	One-Second Period
Earth Materials and Site Class from Table 20.3-1, ASCE Standard 7-10	Bedrock - C	
Mapped Spectral Accelerations from Figures 1613.3.1 (1) and 1613.3.1 (2) and USGS	S_s = 2.626 (g)	S_1 = 0.921 (g)
Site Coefficients from Tables 1613.3.3 (1) and 1613.3.3 (2) and USGS	F_A = 1.0	F_V = 1.3
Maximum Considered Spectral Response Accelerations from Equations 16-37 and 16-38, 2013 CBC	S_{MS} = 2.626 (g)	S_{M1} = 1.197 (g)
Design Spectral Response Accelerations from Equations 16-39 and 16-40, 2013 CBC	S_{DS} = 1.750 (g)	S_{D1} = 0.798 (g)
Maximum Considered Earthquake Geometric Mean (MCE_G) Peak Ground Acceleration, adjusted for Site Class effects	PGA_M = 0.992 (g)	

Reference: U.S. Geological Survey, **Geologic Hazards Science Center, U. S. Seismic Design Maps,** http://earthquake.usgs.gov/designmaps/us/application.php

The Occupancy Category for a residence is II. The mapped spectral response acceleration parameter for the site for a 1-second period (S_1) is greater than 0.75g. The design spectral response acceleration parameters for the site for a 1-second period (S_{D1}) is greater than or equal to 0.20g, and/or the short period (S_{DS}) is greater than or equal to 0.50g. Therefore, the current project is considered to be in Seismic Design Category E.

The principal seismic hazard to the proposed project is strong ground shaking from earthquakes produced by local faults. Modern, well-constructed buildings are designed to resist ground shaking through the use of shear panels, moment frames, and reinforcement. Additional precautions may be

taken, including strapping water heaters and securing furniture to walls and floors. It is likely that the subject property will be shaken by future earthquakes produced in southern California.

Ground Motion

Ground motion parameters that are used to determine the seismic-induced horizontal acceleration that acts on retaining walls, slopes, and potentially-liquefiable soils, include the Peak Ground Acceleration for a maximum considered earthquake (PGA_M, listed above), and the magnitude (M_w) and the distance to the seismic source, for a predominant earthquake with a given probability of exceedance in 50 years.

The magnitude and distance for a predominant earthquake are determined by a probabilistic seismic deaggregation analysis, as listed in the following table:

Probabilistic Seismic Deaggregation Analysis		
Latitude = 34.1315° N Longitude = 118.3308° W	Percent Probability of Exceedance in 50 Years	
Shear-Wave Velocity = 760 Meters-per-Second	10%	2%
Return Period	475 Years	2475 Years
Magnitude of the Predominant Earthquake (Mw)*	6.48	6.48
Distance to the Seismic Source (Km)*	3.6	3.4

* Modal Values (R,M,e0)

Reference: U.S. Geological Survey, 2008 Interactive Deaggregation, http://geohazards.usgs.gov/deaggint/2008/

Liquefaction

The CGS has not mapped the site within an area where historic occurrence of liquefaction or geological, geotechnical, and groundwater conditions indicate a potential for permanent ground

displacement such that mitigation as defined in Public Resources Code Section 2693 (c) would be required. The subject property is underlain by bedrock, which is not subject to liquefaction.

SLOPE STABILITY

Gross Stability

The CGS has designated the property within a state zone requiring seismic landslide investigation per Public Resources Code, Section 2693 (c). The data used to derive the horizontal pseudo-static seismic coefficient (k_h) used for the slope stability analysis under seismic loading are listed in the following table:

Pseudo-Static Seismic Coefficients (k_h) - Slope Stability Analyses		
Peak Ground Acceleration (PGA) = ⅔ PGA_M= 0.669g Percent Probability of Exceedance in 50 Years = 10% Magnitude of the Predominant Earthquake (Mw) = 6.48 Distance to the Seismic Source = 3.6 km		
Tolerable Slope Displacement (u)	5 cm (2 inches)	15 cm (6 inches)
Seismicity Factor (f_{eq})	0.45	0.33
Horizontal Pseudo-static Seismic Coefficient (k_h)	0.29	0.22

Reference: SP117A, pages 28 - 31

Slopes analyzed for stability include the proposed 50-foot-high, 1:1 cut slope shown on Section D. The gross stability of the slope was analyzed using a computerized version of Simplified Bishop's Method and the software program *Slide 7.022* by Rocscience, Inc. The seismic stability was also calculated based on 15 centimeter displacement.

The analysis shows that the proposed slopes will be grossly and seismically stable. The calculations use the shear tests of bedrock believed to be representative of the strength of the bedrock, which was adopted for this site in 2000. Cross Section D is the most critical for the slopes analyzed.

CONCLUSIONS AND RECOMMENDATIONS

General Findings

The conclusions and recommendations of this exploration are based upon review of the preliminary plans, review of published maps, three test pits, field geologic mapping, research of available records, laboratory testing, engineering analysis, and years of experience performing similar studies on similar sites. It is the finding of Byer Geotechnical, Inc., that development of the proposed project is feasible from a geologic and soils engineering standpoint provided the advice and recommendations contained in this report are included in the plans and are implemented during construction.

The recommended bearing materials are the future compacted fill and bedrock. Conventional foundations may be used to support the proposed two-story residence over a basement (three levels) and pool house. Soils to be exposed at finished grade will be in the very low expansion range.

SITE PREPARATION - REMOVALS

Surficial materials consisting of soil is present on the site. Remedial grading is recommended to improve site conditions. The soil should be removed to bedrock and replaced as certified compacted fill. The following general grading specifications may be used in preparation of the grading plan and job specifications. Byer Geotechnical would appreciate the opportunity of reviewing the plans to ensure that these recommendations are included. The grading contractor should be provided with a copy of this report.

A. The area to receive compacted fill should be prepared by removing all vegetation, debris, existing fill, and soil. The exposed excavated area should be observed by the geologist prior to placing compacted fill. Removal depths can be found in the "Site Preparation - Removals" section above. The exposed grade should be scarified to a depth of six inches, moistened to optimum moisture content, and recompacted to 95 percent of the maximum density.

B. Due to the very hard bedrock expected at the main residence pad, the building pad may be undercut five feet and replaced as compacted fill to provide a more uniform foundation condition. The undercut area shall include the entire cut portion of the pad. The excavated areas shall be observed by the soils engineer/geologist prior to placing compacted fill.

C. Fill, consisting of soil approved by the soils engineer, shall be placed in horizontal lifts, moistened as required, and compacted in six-inch layers with suitable compaction equipment. The excavated onsite materials are considered satisfactory for reuse in the controlled fills. Any imported fill shall be observed by the soils engineer prior to use in fill areas. Rocks larger than six inches in diameter shall not be used in the fill.

D. The moisture content of the fill should be near the optimum moisture content. When the moisture content of the fill is too wet or dry, the fill shall be moisture conditioned and mixed until the proper moisture is attained.

E. The fill shall be compacted to at least 95 percent of the maximum laboratory density for the material used. The maximum density shall be determined by ASTM D 1557-12 or equivalent.

F. Field observation and testing shall be performed by the soils engineer during grading to assist the contractor in obtaining the required degree of compaction and the proper moisture content. Where compaction is less than required, additional compactive effort shall be made with adjustment of the moisture content, as necessary, until 95 percent compaction is obtained. A minimum of one compaction test is required for each 500 cubic yards or two vertical feet of fill placed.

G. The bedrock is expected to bulk when excavated and reused as compacted fill. The required animal-keeping pads are designed to be able to be adjusted in elevation up or down to reflect the actual volume of fill placed, and therefore the project will be a balanced project, and no import or export of soil will be required.

Fill Slopes

Fill slopes may be constructed at a 2:1 gradient. Compacted fill should be keyed and benched into bedrock. Keyways should be a minimum of 15 feet wide and 3 feet into bedrock, as measured on

the downhill side. The base of all fills and the axis of drainage courses require subdrains. Fill slopes shall be overbuilt about two feet and trimmed to expose the compacted inner core. Trackwalking of slopes is not acceptable to Byer Geotechnical. Spoils from drain excavations should be removed from the site and not cast over the finished slope.

Cut Slopes

Steep cut slopes are necessary to create the proposed access road and the southern level pad, which is to be developed with the residence, guest house, pool, and pool house. Cut slopes are to be 1:1 in gradient and up to 50 feet high. For the residence pad, the steep cut-slope gradient of 1:1 is planned so as to reduce the amount of grading both in terms of yardage and area. This cut is shown on Section D. Flattening this cut to 1½:1 will result in the loss of a significant additional percentage of the existing well-established vineyard on the south-facing slope. This is also shown on Section A.

The enclosed calculations, based on Section D, indicate the proposed 1:1 cut slope will have a factor of safety of greater than 1.5. In addition, seismic stability calculations indicate that the proposed 1:1 cut slope will be seismically stable. Approval of a Request for Modification of Building Ordinances has been issued to permit the 1:1 cut-slope gradient (Request for Modification of Building Ordinances, File No. 21293, dated September 6, 2013).

Excavation Characteristics

Hard bedrock is present. Excavation difficulty is a function of the degree of weathering and amount of fracturing within the bedrock. The bedrock generally becomes harder and more difficult to excavate with increasing depth. Hard, cemented layers are also known to occur at random locations and depths and may be encountered during foundation excavation. Should a hard, cemented layer be encountered, coring or the use of jackhammers may be necessary.

FOUNDATION DESIGN

Spread Footings

Continuous and/or pad footings may be used to support the proposed residence, guest house, and animal keeping sheds, provided they are founded in bedrock or approved compacted fill. Continuous footings should be a minimum of 12 inches in width. Pad footings should be a minimum of 24-inches square. The following chart contains the recommended design parameters.

Bearing Material	Minimum Embedment Depth of Footing (Inches)	Vertical Bearing (psf)	Coefficient of Friction	Passive Earth Pressure (pcf)	Maximum Earth Pressure (psf)
Future Compacted Fill	12	2,000	0.4	300	4,000
Bedrock	12	6,000	0.6	600	6,000

Increases in the bearing value of the future compacted fill are allowable at a rate of 20 percent for each additional foot of footing width or depth to the maximum earth pressure. For bearing calculations, the weight of the concrete in the footing may be neglected.

The bearing values shown above are for the total of dead and frequently applied live loads and may be increased by one-third for short duration loading, which includes the effects of wind or seismic forces. When combining passive and friction for lateral resistance, the passive component should be reduced by one-third.

Footings adjacent to retaining walls should be deepened below a 1:1 plane from the bottom of the lower retaining wall, or the footings should be designed as grade beams to bridge from the wall to the 1:1 plane.

All continuous footings should be reinforced with a minimum of four #4 steel bars: two placed near the top, and two near the bottom of the footings. Footings should be cleaned of all loose soil, moistened, free of shrinkage cracks, and approved by the geologist prior to placing forms, steel, or concrete.

Foundation Settlement

Settlement of the foundation system is expected to occur on initial application of loading. A total settlement of one-fourth to one-half of an inch may be anticipated. Differential settlement should not exceed one-fourth of an inch.

Foundation Setback

The California Building Code requires that foundations be a sufficient depth to provide a horizontal setback from a descending slope steeper than 3:1. The required setback is one-third the height of the slope, with a maximum of 40 feet, measured horizontally, from the base of the foundation to the slope face. The required setback for a swimming pool is one-sixth the height of the slope, with a minimum of five feet and a maximum of 20 feet, measured horizontally, from the bottom of the pool to the slope face. On the subject property, the slope descends below the residence building area nearly 100 feet. The code-required clearance is 33 feet.

Geologic conditions on the site are favorable for stability. It is the opinion of Byer Geotechnical that the required setback can be reduced to 10 feet from the soil/bedrock contact. The recommended setback is an "alternate setback" per the California Building Code, Section 1803.5.10, based upon this site-specific geologic and geotechnical study and was approved in the September 6, 2013, LADBS letter.

Toe of Slope Clearance

The building code requires a level rear-yard setback, between the toe of an ascending slope steeper than 3:1 and the proposed residence and pool house, of one-half the slope height to a maximum 15-foot clearance. For retained slopes, the face of the retaining wall is considered the toe of the slope. For a swimming pool, the setback is one-fourth the slope height to a maximum 7.5.

SWIMMING POOL

The proposed swimming pool shall be constructed using a freestanding design. Pool walls should be designed for an inward pressure of 43 pounds-per-cubic-foot. The pool should derive support entirely from the bedrock. A hydrostatic relief valve is recommended.

TUNNEL WALLS

If desired, tunnel portals, walls, and a roof may be constructed into an ascending slope of variable steepness. The average slope is 1½:1 to 1:1. For general design, the portal can be assumed to support an equivalent fluid pressure of 55 pounds-per-cubic-foot when surcharged by a 1½:1 slope, and 80 pounds-per-cubic-foot for slopes steeper than 1½:1. The portal should be free draining to avoid any possible build up of hydrostatic pressures.

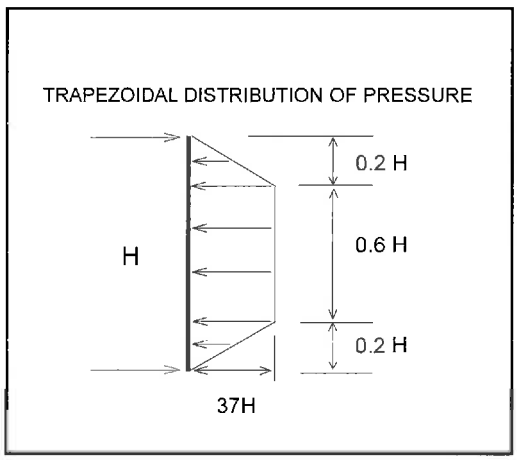
The tunnel roof should be designed to support a load of 2,700 pounds-per-square-foot (135 pounds-per-cubic-foot x 20 feet of rock load-Hp). Tunnel walls may be designed for a uniform load of 500 pounds-per-square-foot.

RETAINING WALLS

General Design

Retaining walls with a 2:1 backslope may be designed for an equivalent fluid pressure of 43 pounds-per-cubic-foot. Retaining walls with a 1½:1 backslope may be designed for an equivalent fluid pressure of 55 pounds-per-cubic-foot . Retaining walls supporting a slope steeper than 1½:1 may be designed for an equivalent fluid pressure of 80 pounds-per-cubic-foot. Retaining walls should be provided with a subdrain or weepholes covered with a minimum of 12 inches of ¾-inch crushed gravel.

Proposed basement walls, which will be restrained, should be designed for a lateral earth pressure of 37H, where H is the height of the wall. The diagram illustrates the trapezoidal distribution of earth pressure. The design earth pressures assume that the walls are free draining. Basement walls should be provided with a subdrain or weepholes covered with a minimum of 12 inches of ¾-inch crushed gravel. A sump pump may be required for basement subdrains.



Seismic Design

The seismic loading on the proposed retaining walls was calculated using a horizontal pseudo-static seismic coefficient (k_h) equal to one-third $PGA_M = 0.33g$. The calculations indicate the static design pressures are sufficient to support seismic loads.

Backfill

Retaining wall backfill should be compacted to a minimum of 95 percent of the maximum density as determined by ASTM D 1557-12, or equivalent. Where access between the retaining wall and the temporary excavation prevents the use of compaction equipment, retaining walls should be backfilled with ¾-inch crushed gravel to within two feet of the ground surface. Where the area between the wall and the excavation exceeds 18 inches, the gravel must be vibrated or wheel-rolled, and tested for compaction. The upper two feet of backfill above the gravel should consist of a compacted-fill blanket to the surface. Restrained walls should not be backfilled until the restraining system is in place.

Retaining Wall Deflection

It should be noted that non-restrained retaining walls can deflect up to one percent of their height in response to loading. This deflection is normal and results in lateral movement and settlement of the backfill toward the wall. The zone of influence is within a 1:1 plane from the bottom of the wall. Hard surfaces or footings placed on the retaining wall backfill should be designed to avoid the effects of differential settlement from this movement. Decking that caps a retaining wall should be provided with a flexible joint to allow for the normal deflection of the retaining wall. Decking that does not cap a retaining wall should not be tied to the wall. The space between the wall and the deck will require periodic caulking to prevent moisture intrusion into the retaining wall backfill.

Foundation Design

Retaining wall footings may be sized per the "Spread Footings" section of this report.

Deepened Foundations - Friction Piles

Cast-in-place, concrete friction piles are recommended to support a proposed retaining wall on the downhill side of the proposed driveway. Piles should be a minimum of 24 inches in diameter and a minimum of eight feet into bedrock. Piles may be assumed fixed at three feet into bedrock. The piles may be designed for a skin friction of 1,000 pounds-per-square-foot for that portion of pile in contact with the bedrock. Grade beams parallel to the slope should be designed to resist an equivalent fluid pressure of 43 pounds-per-cubic-foot. Grade beams supporting future compacted fill should be embedded a minimum of one foot into bedrock, as measured on the downhill side.

Lateral Design

The friction value is for the total of dead and frequently applied live loads and may be increased by one-third for short duration loading, which includes the effects of wind or seismic forces. Resistance to lateral loading may be provided by passive earth pressure within the bedrock.

Passive earth pressure may be computed as an equivalent fluid having a density of 800 pounds-per-cubic-foot. The maximum allowable earth pressure is 6,000 pounds-per-square-foot. For design of isolated piles, the allowable passive and maximum earth pressures may be increased by 100 percent. Piles spaced more than 2½-pile diameters on center may be considered isolated.

Freeboard

Retaining walls surcharged by a sloping condition should be provided with a minimum of 12 inches of freeboard for slough protection. An open "V" drain should be placed behind the wall so that all upslope flows are directed around the structure to the street.

Temporary Excavations

Temporary excavations will be required during grading to construct the proposed basement and retaining walls. The excavations will be up to 20 feet in height and will expose minor soil over bedrock. The soil should be trimmed to 1:1 for wall excavations. The bedrock is capable of maintaining vertical excavations up to 20 feet, per the enclosed calculations. It is recommended that the excavations be draped with chain-link fencing, anchored into the bedrock, to prevent large cobbles from raveling.

The geologist should be present during grading to see temporary slopes. All excavations should be stabilized within 30 days of initial excavation. Water should not be allowed to pond on top of the excavations nor to flow toward them. No vehicular surcharge should be allowed within three feet of the top of the cut.

FLOOR SLABS

Floor slabs should be cast over approved compacted fill or bedrock, and reinforced with a minimum of #4 bars on 16-inch centers, each way. Slabs that will be provided with a floor covering should be protected by a polyethylene plastic vapor barrier. The barrier should be sandwiched between the layers of sand, about two inches each, to prevent punctures and aid in the concrete cure. A low-slump concrete may be used to minimize possible curling of the slab. The concrete should be allowed to cure properly before placing vinyl or other moisture sensitive floor covering.

It should be noted that cracking of concrete slabs is common. The cracking occurs because concrete shrinks as it cures. Control joints, which are commonly used in exterior decking to control such cracking, are normally not used in interior slabs. The reinforcement recommended above is intended to reduce cracking and its proper placement is critical to the performance of the slab. The minor shrinkage cracks, which often form in interior slabs, generally do not present a problem when

carpeting, linoleum, or wood floor coverings are used. The slab cracks can, however, lead to surface cracks in brittle floor coverings such as ceramic tile.

EXTERIOR CONCRETE DECKS

Decking should be cast over approved compacted fill placed in accordance with the "Site Preparation" section of this report. Decking should be reinforced with a minimum of #3 bars placed 24 inches on center, each way. Decking that caps a retaining wall should be provided with a flexible joint to allow for the normal one to two percent deflection of the retaining wall. Decking that does not cap a retaining wall should not be tied to the wall. The space between the wall and the deck will require periodic caulking to prevent moisture intrusion into the retaining wall backfill. The subgrade should be moistened prior to placing concrete.

PAVING

Prior to placing paving, the subgrade should be scarified to a depth of 12 inches, moistened as required to obtain optimum moisture content, and recompacted to 95 percent of the maximum dry density, as determined by ASTM D 1557-12. Trench backfill below paving should be compacted to 95 percent of the maximum dry density. Irrigation water should be prevented from migrating under paving.

For rigid concrete pavement, four inches of concrete over six inches of aggregate base can be used. Concrete should be reinforced for heavy load application.

The Class II aggregate base and top one foot of subgrade should be compacted to a minimum of 95 percent of maximum dry density. Crushed aggregate base should meet the requirements of "Greenbook" (Standard Specification for Public Works Construction) Section 200-2.2.

The following table shows the recommended pavement sections:

Service	Pavement Thickness (Inches)	Base Course (Inches)
Light Passenger Cars or Moderate Trucks	3	0

DRAINAGE

Control of site drainage is important for the performance of the proposed project. Roof gutters are recommended. Pad and roof drainage should be collected and transferred to the street or approved location in non-erosive drainage devices. Drainage should not be allowed to pond on the pad or against any foundation or retaining wall. Drainage should not be allowed to flow uncontrolled over any descending slope. Planters located within retaining wall backfill should be sealed to prevent moisture intrusion into the backfill. Planters located next to raised-floor-type construction also should be sealed to the depth of the footings. Drainage control devices require periodic cleaning, testing, and maintenance to remain effective.

Low-Impact Development (LID) Requirements

Typically, infiltration systems are utilized in areas underlain by pervious granular earth materials that have high percolation characteristics. In addition, infiltration systems are normally planned at least 10 feet from adjacent property lines or public right-of-way, 15 feet from a 1:1 plane projected from the bottom of adjacent structural foundations, and below a 1:1 plane projected from the bottom of any structural fill or backfill supporting a subsurface utility. Since the site is to be located on hard impermeable bedrock and future compacted fill in a hillside area, water infiltration into the subsurface earth materials is not recommended.

As an alternative, a flow-through planter-box system is planned to capture and treat storm-water runoff from the residence pad through different soil layers before discharging water to the street.

The flow-through planter box should be an impermeable rigid structure that is equipped with an underdrain to prevent water infiltration to the underlying subsurface earth materials. Flow-through planter boxes may be situated above ground and placed adjacent to buildings. Flow-through planter boxes should be designed as freestanding and for an inward equivalent fluid pressure of 43 pounds-per-cubic-foot. This fluid pressure includes possible vehicular surcharge.

In the animal keeping area, it is planned to collect pad drainage into a storage tank for reuse.

Irrigation

Control of irrigation water is a necessary part of site maintenance. Soggy ground and perched water may result if irrigation water is excessively applied. Irrigation systems should be adjusted to provide the minimum water needed. Adjustments should be made for changes in climate and rainfall.

Rodent Control

Gophers and other burrowing rodents should be eliminated, as their burrows provide access for surface drainage to saturate the subsurface. A rodent control program is important to the future performance of graded slopes. It is recommended that a licensed pest control company be utilized to develop and maintain effective rodent control procedures.

WATERPROOFING

Interior and exterior retaining walls are subject to moisture intrusion, seepage, and leakage, and should be waterproofed. Waterproofing paints, compounds, or sheeting can be effective if properly installed. Equally important is the use of a subdrain that daylights to the atmosphere. The subdrain should be covered with ¾-inch crushed gravel to help the collection of water. Landscape areas above the wall should be sealed or properly drained to prevent moisture contact with the wall or saturation of wall backfill.

Construction of raised-floor buildings, where the grade under the floor has been lowered for joist clearance, can also lead to moisture problems. Surface moisture can seep through the footing and pond in the underfloor area. Positive drainage away from the footings, waterproofing the footings, compaction of trench backfill, and subdrains can help to reduce moisture intrusion.

PLAN REVIEW

Formal plans ready for submittal to the building department should be reviewed by Byer Geotechnical. Any change in scope of the project may require additional work.

SITE OBSERVATIONS DURING CONSTRUCTION

The building department requires that the geotechnical engineer provide site observations during grading and construction. Foundation excavations should be observed and approved by the geotechnical engineer or geologist prior to placing steel, forms, or concrete. The geologist should observe bottoms for fill, compaction of fill, pool excavations, temporary slopes, permanent cut slopes, and subdrains. All fill that is placed should be approved by the geotechnical engineer and the building department prior to use for support of structural footings and floor slabs.

Please advise Byer Geotechnical, Inc., at least 24 hours prior to any required site visit. The building department stamped plans, the permits, and the geotechnical reports should be at the job site and available to our representative. The project consultant will perform the observation and post a notice at the job site with the findings. This notice should be given to the agency inspector.

FINAL REPORTS

The geotechnical engineer will prepare interim and final compaction reports upon request. The geologist will prepare reports summarizing pile excavations.

CONSTRUCTION SITE MAINTENANCE

It is the responsibility of the contractor to maintain a safe construction site. The area should be fenced and warning signs posted. All excavations must be covered and secured. Soil generated by foundation excavations should be either removed from the site or placed as compacted fill. Soil should not be spilled over any descending slope. Workers should not be allowed to enter any unshored trench excavations over five feet deep. Water shall not be allowed to saturate open footing trenches.

GENERAL CONDITIONS AND NOTICE

This report and the exploration are subject to the following conditions. Please read this section carefully; it limits our liability.

In the event of any changes in the design or location of any structure, as outlined in this report, the conclusions and recommendations contained herein may not be considered valid unless the changes are reviewed by Byer Geotechnical, Inc., and the conclusions and recommendations are modified or reaffirmed after such review.

The subsurface conditions, excavation characteristics, and geologic structure described herein have been projected from test excavations on the site and may not reflect any variations that occur between these test excavations or that may result from changes in subsurface conditions.

Fluctuations in the level of groundwater may occur due to variations in rainfall, temperature, irrigation, and other factors not evident at the time of the measurements reported herein. Fluctuations also may occur across the site. High groundwater levels can be extremely hazardous. Saturation of earth materials can cause subsidence or slippage of the site.

If conditions encountered during construction appear to differ from those disclosed herein, notify us immediately so we may consider the need for modifications. Compliance with the design concepts, specifications, and recommendations requires the review of the engineering geologist and geotechnical engineer during the course of construction.

THE EXPLORATION WAS PERFORMED ONLY ON A PORTION OF THE SITE, AND CANNOT BE CONSIDERED AS INDICATIVE OF THE PORTIONS OF THE SITE NOT EXPLORED.

This report, issued and made for the sole use and benefit of the client, is not transferable. Any liability in connection herewith shall not exceed the Phase I fee for the exploration and report or a negotiated fee per the Agreement. No warranty is expressed, implied, or intended in connection with the exploration performed or by the furnishing of this report.

THIS REPORT WAS PREPARED ON THE BASIS OF THE PRELIMINARY DEVELOPMENT PLAN FURNISHED. FINAL PLANS SHOULD BE REVIEWED BY THIS OFFICE AS ADDITIONAL GEOTECHNICAL WORK MAY BE REQUIRED.

Byer Geotechnical appreciates the opportunity to continue to provide our service on this project. Any questions concerning the data or interpretation of this report should be directed to the undersigned.

Respectfully submitted,
BYER GEOTECHNICAL, INC.

Robert I. Zweigler
E. G. 1210/G. E. 2120

RIZ:mh
S:\FINAL\BG\18554_York\18554_York_Geo_and_Soils_Report_12.21.18.wpd

Enc: List of References
LADBS, conditional approval letters dated May 25 and May 30, 2001, and September 6, 2013 (11 Pages)
LADBS, Request for Modification of Building Ordinances, approved September 6, 2013
Appendix I - Byer Geotechnical, Inc., excerpts from report dated August 21, 2012
Laboratory Testing
Shear Test Diagrams (2 Pages)
Log of Test Pits
Calculation Sheets (7 Pages)
Appendix II - Calculations and Figures
Slope Stability Calculations (6 Pages)
PSH Deaggregation Charts (2 Pages)
Seismic Slope Stability Screening Analysis
USGS Design Maps Detailed Report (6 Pages)
Sections B, C, and D (3 Sheets)

In Pocket: Section A
Geologic Map

xc (4) Addressee (Email and Pick Up)

REFERENCES

2017 **City of Los Angeles Building Code**.

California Building Standards Commission (2016), **2016 California Building Code,** Based on the 2009 International Building Code (IBC), Title 24, Part 2, Vol. 1 and 2.

California Department of Conservation (1999), **State of California, Seismic Hazard Zones, Burbank Quadrangle**, Official Map, Division of Mines and Geology.

California Department of Conservation (2001, updated 2006), **Seismic Hazard Zone Report 016, Seismic Hazard Zone Report for the Burbank 7.5-Minute Quadrangle, Los Angeles County, California**.

California Department of Conservation (2008), **Special Publication 117A, Guidelines for Evaluating and Mitigating Seismic Hazards in California.**

City of Los Angeles (2011), **Development Best Management Practices Handbook, Working Draft of LID Manual, Part B**, Department of Public Works, Sanitation Division, Fourth Edition, June 2011.

City of Los Angeles, Department of Building and Safety (2014), **Geology and Soils Engineering Firms Practicing in the City of Los Angeles**, Correspondence Regarding 2014 Los Angeles Building Code (LABC) Requirements, dated July 16, 2014.

Dibblee, T. W. (1991), **Geologic Map of the Hollywood and Burbank (South ½) Quadrangle, Los Angeles County, California**, 1:24,000 scale, Dibblee Foundation, Santa Barbara, California, Map DF-30.

Hoots, H. W. (1931), **Geology of the Eastern Part of the Santa Monica Mountains, Los Angeles County, California**, U. S. Geological Survey Professional Paper 165-C.

ICBO (1998), **Maps of Known Active Fault Near-Source Zones in California and Adjacent Portions of Nevada.**

Southern California Earthquake Center (1999), **Recommended Procedures for Implementation of DMG Special Publication 117, Guidelines for Analyzing and Mitigating Liquefaction in California**.

U.S. Geological Survey, **Earthquake Hazards Program, Seismic Design Values for Buildings,** http://earthquake.usgs.gov/hazards/design/buildings.php

Software

Slide 7.0, Rocscience, Inc., 2016.

CITY OF LOS ANGELES
CALIFORNIA

May 25, 2001

Log # 31787-02
SOILS/GEOLOGY FILE - 2

Kenneth York
721 Dolo Way
Los Angeles, CA 90077

TRACT: SN34T1SR14W
LOT: Arb 6
LOCATION: 6459 W. Innsdale Dr

CURRENT REFERENCE REPORT/LETTER(S)	REPORT NO.	DATE(S) OF DOCUMENT	PREPARED BY
Geology/Soil Report	18554-B	02/28/01	J. Byer Group
Ovrszd Doc	"	"	"

PREVIOUS REFERENCE REPORT/LETTER(S)	REPORT NO.	DATE(S) OF DOCUMENT	PREPARED BY
Geology/Soil Report	18554-B	08/31/00	J. Byer Group
"	18554-B	09/19/20	"
Department letter	31787	10/06/00	LADBS
"	31787-01	12/02/00	"
Order To Comply	1003	08/23/00	LADBS

The referenced report concerning an excavation without permit has been reviewed by the Grading Section of the Department of Building and Safety. According to the current report, the excavations have been trimmed and the spill fill has been removed from the slope. It is the opinion of the consultants that the property is stable. The reports are acceptable, provided the following conditions are complied with during site development:

1. A grading permit shall be obtained for the grading that has occurred on the site.

2. All graded, brushed or bare slopes shall be planted to prevent future erosion.

DAVID HSU
Chief of Grading Section

DANA PREVOST
Engineering Geologist II

THEODORE GILMORE
Geotechnical Engineer I

DP/TG:dp/tg
31787-02

(213) 977-6329
cc: J. Byer Group
LA District Office

ADBS B 17 (R 2/01)

City of Los Angeles
DEPARTMENT OF BUILDING AND SAFETY
Grading Division

District LA | Log No. 33509
ADDRESS APPROVED | Signature/Date

APPLICATION FOR REVIEW OF TECHNICAL REPORTS AND IMPORT-EXPORT ROUTES

INSTRUCTIONS

1. Address all communications to the Grading Division, Department of Building and Safety, 201 N. Figueroa St., 3rd Fl., Los Ange California 90012-4869. Phone (Area Code 213) 977-6329.
2. Obtain address approval from the Department of Public Works prior to submittal.
3. Submit 2 copies (4 for fault study zone) of reports and 3 copies of application with items (1) through (10) completed.
4. Check should be made to the Department of Building and Safety. Note: Please F

(1) LEGAL DESCRIPTION Tract R583-1/5 RECORD OF SURVEY Blk ____ Lots 20

(2) PROJECT ADDRESS 6443 INNSDALE D

(3) OWNER KENNETH YORK
Address 6443 INNSDALE DRIVE
City LA Zip ____
Phone (Daytime) 626·335·0266

(4) APPLICANT Rose Lance NORTH STATE GENERAL CO
Address 7616-B LOUISE AVE
City VAN NUYS CA
Phone (Daytime) 818·609·9634 Zip 9145
Fax 818·996·9752

(5) Report(s) Prepared by The Byer Group, Inc.

(6) Report Date(s) OCT. 11, 2000

(7) Status of project: [X] Proposed [ ] Under Construction [ ] Storm Damage

(8) Previous site reports? NO If yes, give date(s) of report(s) and name of company(s) who prepared report(s).

(9) Previous Department actions? NO If yes, please give dates and attach a copy to expedite processing.
Dates ____

(10) Signature of applicant Rose Lance Position OFFICE ASSISTANT.

(DEPARTMENT USE ONLY)

REVIEW REQUESTED & PROCESSING	FEES	REVIEW REQUESTED & PROCESSING	FEES
[ ] Foundation Investigation		[ ] Seismology report per 91.2305(d)	
[ ] Soils Engineering		[ ] Environmental Assessment	
[ ] Geology		[ ] Import-Export Route	
[X] Combined Soils Engr. & Geol.	440.	[ ] Division of land	
[ ] Supplemental			Sub-total
[ ] Combined Supplement		11 0/0 + 5	One-Stop Surcharge

THE REPORT IS [■] APPROVED WITH CONDITIONS [ ] NOT APPROVED TOTAL FEE 460.1

DEPARTMENT ACTION BY: Regulate H. Gurney For Geology 5/30/01 Date T. GILMORE For Soils & Foundation D

[■] Conditions of Approval [ ] Reasons for Non-Approval [ ] See Attached letter [ ] Supplemental Sheet Attach

All circled conditions on the attached Standard Approval Condition for Soil and/or Geology Reports including Nos: 1, 4, 5, 9, 10, 13, 15, 18, 24, 27, 28, 31, 33, 36, 42, 44, 46-54, 57+58.

LA Department of Building and Safet
LA 02 08 034952 05/01/01 01:59PM

GRADING REPORT	$41
ONE STOP SURCH	$
SYSTEMS DEVT FEE	$2
PLAN CHECKING SURCH	$1
MISCELLANEOUS	$
Total Due:	$46
Check:	$46

(Cashier Use Only)

Attached Pgs. 2-6 (Continued)

DEPARTMENT USE ONLY
Fee Due 460.10
Fee Verified MZ

DISTRIBUTION: [■] Owner [■] Applicant [■] Soil Engineer [ ] Geologist [ ] Board files [ ] LA Plan Check [ ] VN [ ] WLA [■] LA Inspection [ ] VN [ ] BMI [ ] WLA [ ] BI

STANDARD APPROVAL CONDITIONS FOR SOIL AND/OR GEOLOGY REPORTS;

Project Address: 6443 W. Innsdale Drive Log # 33509
Description of work/Comments: Proposed construction of retaining walls in the northeast portion of the existing pad. A 120± ascending slopes of up to 80 feet in height exists behind the proposed tie back slope wall.
Is the site located within a liquefaction or landslide Seismic Hazard Zone: YES (NO)
Does construction qualify as a "project" per the Seismic Hazard Mapping Act: YES (NO)

ALL CIRCLED CONDITION NUMBERS SHALL APPLY:

Plans

(1.) The geologist and soils engineer shall review and approve the detailed plans prior to issuance of any permits. This approval shall be by signature on the plans which clearly indicates that the geologist and soils engineer have reviewed the plans prepared by the design engineer and that the plans include the recommendations contained in their reports.

2. The soils engineer shall review and approve the detailed plans prior to issuance of any permits. This approval shall be by signature on the plans which clearly indicates that the geologist and soils engineer have reviewed the plans prepared by the design engineer and that the plans include the recommendations contained in their reports.

3. The Soil Engineer shall review and approve the shoring and/or underpinning plans prior to issuance of the permit.

(4) A copy of the subject and appropriate referenced reports and this approval letter shall be attached to the District Office and field set of plans. Submit one copy of the above reports to the Building Department Plan Checker prior to issuance of the permit.

(5.) All recommendations of the report(s) which are in addition to or more restrictive than the conditions contained herein shall be incorporated into the plans.

6. Prior to the issuance of any permit which authorizes an excavation where the excavation is to be of a greater depth than are the walls or foundation of any adjoining building or structure and located closer to the property line than the depth of the excavation, the owner of the subject site shall provide the Department with evidence that the adjacent property owner has been given a 30-day written notice of such intent to make an excavation.

7. All conditions of the following Department letter(s) shall apply except as superseded herein: _____

General/Building

8. Buildings adjacent to ascending slopes shall be set back from the toe of the slope a level distance equal to one half the vertical height of the slope, but need not exceed 15 feet in accordance with Code Section 91.1806.5.2.

(9.) Whenever the principal building on a site is added to, altered or repaired in excess of 50 percent of its

replacement value, the entire site shall be brought up to the current Code standard per Code Section 91.7005.9.

10. The LABC Soil Type underlying the site is S B .

11. The dwelling shall be connected to the public sewer system.

Footings/Slabs

12. Compacted fill shall extend beyond the footings a minimum distance equal to the depth of the fill below the bottom of footings or a minimum of 5 feet whichever is greater.

13. All footings shall be founded in Competent bedrock, as recommended.

14. The structural engineer and the soil engineer shall verify the adequacy of the existing footings for underpinning.

15. Footings adjacent to a descending slope steeper than 3:1 in gradient shall be located a distance of one-third the vertical height of the slope but need not exceed 40 feet measured horizontally from the face of the slope; for in-ground pools the footing setback shall be one-sixth the slope height to a maximum of 20 feet.

16. Footings may be designed with a horizontal setback from the _____ of ____ feet, as recommended, in lieu of the standard setback prescribed by the Building Code.

17. Footings supported on approved compacted fill or expansive soil shall be reinforced with a minimum of four (4) ½-inch diameter (#4) deformed reinforcing bars. Two (2) bars shall be placed near the bottom and two (2) bars placed bear the top.

18. Pile caisson and/or isolated foundation ties are required by Code Section 91.1807.2. Exceptions and modification to this requirement are provided in Rule of General Application 662.

19. Pile and/or caisson shafts shall be designed for a lateral load of 1000 pounds per linear foot of shaft exposed to fill, soil and weathered bedrock.

20. If the actual foundation design loads do not conform to the foundation loads assumed in the report, the Soils Engineer shall submit a supplementary report containing specific design recommendations for the heavier loads to the Department for review and approval prior to issuance of a permit.

21. Slabs placed on approved compacted fill shall be at least 3½ inches thick and shall be reinforced with ½-inch diameter (#4) reinforcing bars spaced a maximum of 16 inches on center each way.

22. Concrete floor slabs placed on expansive soil shall be placed on a 4-inch-thick fill of coarse aggregate or on a moisture barrier membrane. The slabs shall be at least 3½ inches thick and shall be reinforced with ½-inch diameter (#4) reinforcing bars spaced a maximum of 16 inches on center each way.

23. Slab-on-uncertified fill shall be designed as a structural slab.

24. Existing uncertified fill shall not be used for support of footings, concrete slabs or new fill.

25. If import soils are used, no footings shall be poured until the Soils Engineer has submitted a compaction report containing in-place shear test data and settlement data to the Department, and obtained approval.

26. The building design shall incorporate provisions for anticipated differential settlements in excess of one-fourth inch.

27. All loose foundation excavation material shall be removed prior to commencement of framing. Slopes disturbed by construction activities shall be restored.

Grading/Slopes

28. All new fill slopes shall be no steeper than 2:1.

29. All new cut slopes in bedrock shall be no steeper than_____and/or no steeper than any unsupported bedding planes, foliation planes, continuous joints or faults.

30. All nonconforming street cut slopes shall be trim-graded back to a slope gradient no steeper than_____ or retained by a designed retaining wall.

31. A grading permit shall be obtained.

32. A grading bond shall be posted, prior to issuance of a permit for excavation or fill of 250 cubic yards or more of earth in a hillside area.

33. All man-made fill shall be compacted to a minimum 90 percent of the maximum dry density of the fill material per the latest version of ASTM D 1557; Where cohesionless soil having less than 15 percent finer than 0.005 millimeters is used for fill, it shall be compacted to a minimum of 95 percent relative compaction based on maximum dry density.

34. For grading involving import or export of more than 1000 cubic yards of earth materials within the *grading hillside area*, approval is required by the Board of Building and Safety. Application for approval of the haul route must be filed with the Grading Section. Processing time for application is approximately 8 weeks to hearing plus 10-day appeal period.

35. Grading shall be scheduled for completion prior to the start of the rainy season, or detailed temporary erosion control plans shall be filed in a manner satisfactory to the Department and the Department of Public Works, for any grading work in excess of 200 cu yd.

Drainage

36. All roof and pad drainage shall be conducted to the street in an acceptable manner; water shall not be dispersed on to descending slopes without specific approval from the Grading Section and the consulting geologist and soil engineer.

37. Pool deck drainage shall be collected and conducted to an approved location via a non-erosive device.

38. All deck drainage shall be collected and conducted to an approved location in a non-erosive device, or the deck shall be constructed with open-spaced flooring.

39. All deck drainage shall be collected and conducted to an approved location in a non-erosive device.

Pools

40. The proposed swimming pool shall be designed for a freestanding condition.

41. Pools adjacent to ascending slopes shall be set back from the toe of the slope a level distance equal to one-fourth the vertical height of the slope, but need not exceed 7.5 feet in accordance with Code Section 91.1806.5.4.

Temporary Excavations/Retaining Walls

42. The applicant is advised that the approval of this report does not waive the requirements for excavations contained in the State Construction Safety Orders enforced by the State Division of Industrial Safety.

43. A supplemental report shall be submitted to the Grading Section containing recommendations for shoring, underpinning, and sequence of construction in the event that any excavation would remove lateral support to the public way or adjacent structures.

44. Unsurcharged temporary excavations over 5 feet in height exposing bedrock shall be trimmed to a slope angle no steeper than 1:1, as recommended. Fill shall be trimmed to slope gradient of 1:1 or flatter.

45. Suitable arrangements shall be made with the Department of Public Works for the proposed removal of support and/or retaining of slopes adjoining the public way.

46. Retaining walls up to a maximum height of 8 feet shall be designed for a minimum equivalent fluid pressure of 55 pcf, as recommended, for ascending backslope and 43pcf for level.

47. All retaining walls shall be provided with a standard surface backdrain system and all drainage shall be conducted to the street in an acceptable manner and in a non-erosive device.

48. The rear yard retaining walls shall be provided with a minimum freeboard of 18 inches where ~~as recommended~~ supporting ascending slopes. The soils engineer shall review and approve the actual freeboard on the plans.

49. The recommended equivalent fluid pressure (EFP) for the proposed retaining wall shall apply from the top of the freeboard to the bottom of the wall footing.

50. All retaining walls shall be provided with a subdrain system to prevent possible hydrostatic pressure behind the wall. Installation of the subdrain system shall be inspected and approved by the soil engineer and the City grading/building inspector.

Construction Inspection and Reporting

51. Prior to the placing of compacted fill, a representative of the consulting Soils Engineer shall inspect and approve the bottom excavations. He shall post a notice on the job site for the City Grading Inspector and the Contractor stating that the soil inspected meets the conditions of the report, but that no fill shall be placed until the City Grading Inspector has also inspected and approved the bottom excavations. A written certification to this effect shall be filed with the Department upon completion of the work. The fill shall be placed under the inspection and approval of the Foundation Engineer. A compaction report shall be submitted to the Department upon completion of the compaction.

52. Prior to the pouring of concrete, a representative of the consulting Soil Engineer shall inspect and approve the footing excavations. He shall post a notice on the job site for the City Building Inspector and the Contractor stating that the work so inspected meets the conditions of the report, but that no concrete shall be poured until the City Building Inspector has also inspected and approved the footing excavations. A written certification to this effect shall be filed with the Department upon completion of the work.

53. The soil engineer and the geologist (where both are required to sign the plans) shall inspect the excavations for the footings to determine that they are founded in the recommended strata before calling the Department for footing inspection.

54. The soil engineer and the geologist (where both are required to sign the plans) shall inspect all excavations to determine that conditions anticipated in the report have been encountered and to provide recommendations for the correction of hazards found during grading.

55. Prior to excavation, an initial inspection shall be called at which time sequence of shoring, protection fences and dust and traffic control will be scheduled.

56. Installation of shoring, underpinning, and/or slot cutting excavations shall be performed under the inspection and approval of the soils engineer and deputy grading inspector.

Additional Conditions:

57 Proposed retaining wall with a level backfill shall be designed for a min. Efp of 430 pcf, as recommended

58 Retaining walls surcharged by 1½:1 slope shall be designed for a min. Efp of 95 pcf, as recommended

(revised 4/5/01; DVP)
G/:grdocs/grletters/SC(combined)

CITY OF LOS ANGELES
CALIFORNIA

DEPARTMENT OF
BUILDING AND SAFETY
201 NORTH FIGUEROA STREET
LOS ANGELES, CA 90012

RAYMOND S. CHAN, C.E., S.E.
SUPERINTENDENT OF BUILDING
INTERIM GENERAL MANAGER

GEOLOGY AND SOILS REPORT APPROVAL LETTER

September 6, 2013

Log # 78346-01
SOILS/GEOLOGY FILE - 2

Dr. Ken & Annette York
210 South Grand Avenue, Suite 215
Glendora, CA 91741

TRACT: NE 1/4 SEC 34T1N R14W
LOT: Arb 6 (PT)
LOCATION: 6459 W. Innsdale Dr

CURRENT REFERENCE REPORT/LETTER(S)	REPORT NO.	DATE(S) OF DOCUMENT	PREPARED BY
Geology/Soil Response Report	BG18554	07/25/2013	Byer Geotechnical
Ovrszd Doc	"	"	"

PREVIOUS REFERENCE REPORT/LETTER(S)	REPORT NO.	DATE(S) OF DOCUMENT	PREPARED BY
Request for Modification	File No. 21293	09/06/2013	LADBS
Correction Letter	Log # 78346	10/30/2012	"
Geology/Soil Report	18554-B	08/21/2012	Byer Geotechnical
Approval Letter	Log # 31787-02	05/25/2001	LADBS
Geology/Soil Report	18554-B	02/28/2001	J. Byer Group
Correction Letter	Log # 31787-01	12/02/2000	LADBS
Geology/Soil Report	18554-B	09/19/2000	J. Byer Group
Correction Letter	Log # 31787	10/06/2000	LADBS
Geology/Soil Report	18554-B	08/31/2000	J. Byer Group
Order To Comply	1003	08/23/2000	LADBS
Correction Letter	- - - - - -	07/26/1985	"
Geology/Soils Report	84-828	05/16/1985	2R Engineering

The referenced reports dated 08/21/2012 and 07/25/2013 concerning proposed grading and construction for an access driveway and two residential building pads for a future residence, guesthouse, and pool and a tennis court on the north portion of the property, have been reviewed by the Grading Division of the Department of Building and Safety.

The referenced request for modification was filed and approved to allow cut slopes in bedrock with horizontal to vertical slope gradients varying from 1.25:1 (h:v) to 1.5:1 (h:v) above portions of the access driveway and as steep as 1:1 (h:v), as shown on the geologic map in the 07/25/2013 report by Byer Geotechnical. The 07/25/2013 report by Byer Geotechnical is acceptable, provided the following conditions are complied with during site development:

1. This approval is for and specific to the proposed grading shown on the 1 inch = 40 feet scale geologic map, in the 07/25/2013 report by Byer Geotechnical. A supplemental report shall be submitted to the Grading Division, if the plans vary or deviate from the grading shown on the geologic map in the 07/25/2013 report.

2. The geologist and soils engineer shall review and approve the detailed plans prior to issuance of any permits. This approval shall be by signature on the plans which clearly indicates that the geologist and soils engineer have reviewed the plans prepared by the design engineer and that the plans include the recommendations contained in their reports.

3. All drainage shall be conducted in non-erosive devices to the street or other approved location in a manner that is acceptable to the Department. Water shall not be dispersed on to descending slopes without specific approval from the Grading Division and the consulting geologist and soils engineer.

4. All concentrated drainage shall be conducted in an approved device and disposed of in a manner approved by the LADBS.

5. Subdrains shall be installed in all drainage courses within which compacted fill is to be placed.

6. The surface drains for the proposed 2:1 cut slope below the proposed tennis court shall be provided and sustained on the plans as shown on section A in the 08/21/2012 report.

7. The applicant is advised that the approval of this report does not waive the requirements for excavations contained in the State Construction Safety Orders enforced by the State Division of Industrial Safety.

8. Prior to excavation, an initial inspection shall be called at which time the sequence of construction and grading, protection fences and dust and traffic control will be scheduled.

9. Temporary excavations shall be performed as recommended and specified on pgs. 18 & 19 in the 08/21/2012 report.

10. All grading shall be performed under the inspection and approval of the soils engineer and deputy grading inspector.

11. The geologist and soils engineer shall inspect all excavations to determine that conditions anticipated in the report have been encountered and to provide recommendations for the correction of hazards found during grading.

12. All new graded fill and cut slopes shall be no steeper than 2:1 (h:v) and 1:1 (h:v), respectively.

13. Existing uncertified fill shall not be used for support of foundations, concrete slabs or new fill.

14. All foundations shall be supported in competent bedrock, as recommended and approved by the geologist and soils engineer by inspection.

15. The LABC Soil Site Class Type underlying the site is C.

16. All recommendations of the reports which are in addition to or more restrictive than the conditions contained herein shall be incorporated into the plans.

17. A copy of the subject and appropriate referenced reports and this approval letter shall be attached to the District Office and field set of plans. Submit one copy of the above reports to the Building Department Plan Checker prior to issuance of the permit.

18. Foundations adjacent to a descending slope steeper than 3:1 in gradient shall be located a distance of one-third the vertical height of the slope but need not exceed 40 feet measured horizontally from the foundation bottom to the face of the slope; for in-ground pools the foundation setback shall be one-sixth the slope height to a maximum of 20 feet.

19. Foundations may be designed with a minimum of 10 feet horizontal setback from the "soil/bedrock contact" on the descending slope face, as recommended on pg. 16 in the 08/21/2012 report, in lieu of the standard setback prescribed by the Building Code (about 33 feet). This reduced setback for foundations shall be considered as an "alternate setback" per Chapter 70 of the LA City Building Code (see sections 1803.5.10 & 1808.7.5).

20. Buildings adjacent to ascending slopes shall be set back from the toe of the slope a level distance equal to one half the vertical height of the slope, but need not exceed 15 feet in accordance with Code Section 1808.7.1.

21. Retaining walls shall be designed for a minimum equivalent fluid pressure, as specified on page 16 - 18 in the report dated 08/21/2012.

22. All retaining walls shall be provided with a standard surface backdrain system and all drainage shall be conducted to the street in an acceptable manner and in a non-erosive device.

23. Retaining walls below slopes shall be provided with a minimum freeboard of 12 inches as recommended (see pg. 18 in the 08/21/2012 report).

24. The recommended equivalent fluid pressure (EFP) for the proposed retaining wall shall apply from the top of the freeboard to the bottom of the wall foundation.

25. All retaining walls shall be provided with a subdrain system to prevent possible hydrostatic pressure behind the wall. Prior to issuance of any permit, the retaining wall subdrain system recommended in the soil report shall be incorporated into the foundation plan which shall be reviewed and approved by the soils engineer of record.

26. Installation of the subdrain system shall be inspected and approved by the soils engineer of record and the City grading/building inspector.

27. A grading permit shall be obtained.

28. Grading shall be scheduled for completion prior to the start of the rainy season, or detailed temporary erosion control plans shall be filed in a manner satisfactory to the Grading Inspection Division of the Department and the Department of Public Works, Bureau of Engineering, B-Permit Section, for any grading work in excess of 200 cu yd.

201 N. Figueroa Street Room 770, LA	(213) 482-7474
6262 Van Nuys Blvd. Ste 351, V Nuys	(818) 374-4605
1828 Sawtelle Blvd., 3rd Floor, West LA	(310) 575-8625

29. All man-made fill shall be compacted to a minimum 90 percent of the maximum dry density of the fill material per the latest version of ASTM D 1557. Where cohesionless soil having less than 15 percent finer than 0.005 millimeters is used for fill, it shall be compacted to a minimum of 95 percent relative compaction based on maximum dry density (D1556). Placement of gravel in lieu of compacted fill is allowed only if complying with Section 91.7011.3 of the Code.

30. Prior to the placing of compacted fill, a representative of the consulting soils engineer shall inspect and approve the bottom excavations. He shall post a notice on the job site for the LADBS Grading Inspector and the Contractor stating that the soil inspected meets the conditions of the report, but that no fill shall be placed until the LADBS Grading Inspector has also inspected and approved the bottom excavations. A written certification to this effect shall be filed in the final compaction report filed with the Grading Division of the Department. All fill shall be placed under the inspection and approval of the soils engineer. A compaction report together with the approved soil report and Department approval letter shall be submitted to the Grading Division of the Department upon completion of the compaction. The engineer's certificate of compliance shall include the grading permit number and the legal description as described in the permit.

31. Prior to the pouring of concrete, a representative of the consulting soils engineer shall inspect and approve the foundation excavations. He shall post a notice on the job site for the LADBS Building Inspector and the Contractor stating that the work so inspected meets the conditions of the report, but that no concrete shall be poured until the LADBS Building Inspector has also inspected and approved the foundation excavations. A written certification to this effect shall be filed with the Department upon completion of the work. (108.9 & 7008.2)

STEPHEN DAWSON
Engineering Geologist II

PASCAL CHALLITA
Geotechnical Engineer II

Log # 78346-01
(213) 482-0480

cc: Byer Geotechnical
LA District Office

REQUEST FOR MODIFICATION OF BUILDING ORDINANCES

CITY LA DBS DEPARTMENT OF BUILDING AND SAFETY

UNDER AUTHORITY OF L.A.M.C. SECTION 98.0403

File #21293

PERMIT APP. #: None	DATE: 8/7/13
JOB ADDRESS: **6459 West Innsdale Drive**	
Tract: **NE¼, SEC 23, T1N, R14W**	Block: Lot: **Portion of Lot 6**
Owner: Dr. Ken and Annette York	Petitioner: Dr. Ken and Annette York
Address: 210 South Grand Avenue, Suite 215	Address: 210 South Grand Avenue, Suite 215
City: Glendora State: CA Zip: 91741 Phone: 626-335-0266	City: Glendora State: CA Zip: 91741 Phone: 626-335-0266
REQUEST (SUBMIT PLANS OR ADDITIONAL SHEETS AS NECESSARY)	CODE SECTIONS: ~~91.~~ 7010.2

Allow 1:1 cut slope in hard, massive conglomerate bedrock. Slopes will vary between 1½:1 and 1:1, as shown on the grading plan in the report dated 7/25/13 by Byer Geotechnical.

JUSTIFICATION (SUBMIT PLANS OR ADDITIONAL SHEETS AS NECESSARY)

See the Addendum Geologic and Soils Engineering Exploration and Response to City of Los Angeles Correction Letter, by Byer Geotechnical, Inc., dated July 26, 2013.

KENNETH YORK (Owner/Petitioner Name (Print)) — (Signature) — OWNER (Position)

FOR CITY DEPARTMENT'S USE ONLY BELOW THIS LINE

Concurrences required from the following Department(s)			Approved	Denied
☐ Los Angeles Fire Department	Print Name	Sign	☐	☐
☐ Public Works Bureau of Engineering	Print Name	Sign	☐	☐
☐ Department of City Planning	Print Name	Sign	☐	☐
☐ Other	Print Name	Sign	☐	☐

DEPARTMENT ACTION

Dana Prevost (Reviewed by: (Staff) (print)) — Dana Prevost (Sign) — 9/6/13 (Date)

☒ GRANTED ☐ DENIED

Dana Prevost (Action taken by: (Supervisor) (print)) — Dana Prevost (Sign) — 9/6/13 (Date)

NOTE: IN CASE OF DENIAL, SEE PAGE #2 OF THIS FORM FOR APPEAL PROCEDURES

CONDITIONS OF APPROVAL (Continued on Page 2):

Comply with the conditions in the Dept. approval letter dated 9-6-13, log # 78346-01.

FEES

Appeal Processing Fee.. (No. of Items) =	1		= 130
Inspection Fee ..... (No of Insp.) =	0	x	=
Research Fee ... (Total Hours Worked) =	6	x 104	= 624
Subtotal			= 754
Surcharge ..... (SUBTOTAL)		x	= 60.32
Total Fees			= 814.32

Fees verified by: Dana Prevost

Print and Sign Dana Prevost

For Cashiers Use Only

(PROCESS ONLY WHEN FEES ARE VERIFIED)

LA Department of Building and Safety
LA 0013 103035589 8/7/2013 10:57:07 AM

BOARD APPLIC FEE	$130.00
SYSTEMS DEV SURCH	$7.80
ONE STOP SURCH	$6.50
RESEARCH FEE	$624.00
SYSTEMS DEV SURCH	$37.44
ONE STOP SURCH	$32.50
Sub Total:	$838.24

Receipt #: 0100185952

December 21, 2018
BG 18554

APPENDIX I

Byer Geotechnical, Inc., excerpts from report dated August 21, 2012

Report Date: August 21, 2012
BG 18554

APPENDIX I

LABORATORY TESTING

Undisturbed and bulk samples of the soil and bedrock were obtained from the site and transported to the laboratory for testing and analysis. The samples were obtained by driving a ring-lined, barrel sampler conforming to ASTM D 3550-01 with successive drops of the sampler. Experience has shown that sampling causes some disturbance of the sample. However, the test results remain within a reasonable range. The samples were retained in brass rings of 2.50 inches outside diameter and 1.00 inches in height. The samples were stored in close fitting, waterproof containers for transportation to the laboratory.

Maximum Density

The maximum dry density and optimum moisture content of the future compacted fill were determined using the procedures outlined in ASTM D 1557-09, a five-layer standard. Remolded samples were prepared at 95 percent of the maximum density. The remolded samples were tested for shear strength.

Earth Material	Color and Soil Type	Maximum Density (pcf)	Optimum Moisture %	Expansion Index
Bedrock	Light Brown Silty Sand	123.0	13.0	Nil

Expansion Test

To find the expansiveness of the soil, a swell test was performed using the procedures outlined in ASTM D 4829-08A. Based upon the testing, the earth materials at the site are non-expansive.

Shear Tests

Shear tests were performed on samples of future compacted fill and bedrock using the procedures outlined in ASTM D 3080-11 and a strain controlled, direct-shear machine manufactured by Soil Test, Inc. The rate of deformation was 0.025 inches per minute. The samples were tested in an artificially saturated condition. Following the shear test, the moisture content of the samples was determined to verify saturation. The results are plotted on the Shear Test Diagrams.

BYER
GEOTECHNICAL
INC.

1461 E. CHEVY CHASE DRIVE, SUITE 200 GLENDALE, CA 91206
(818) 549-9959 Tel (818) 543-3747 FAX

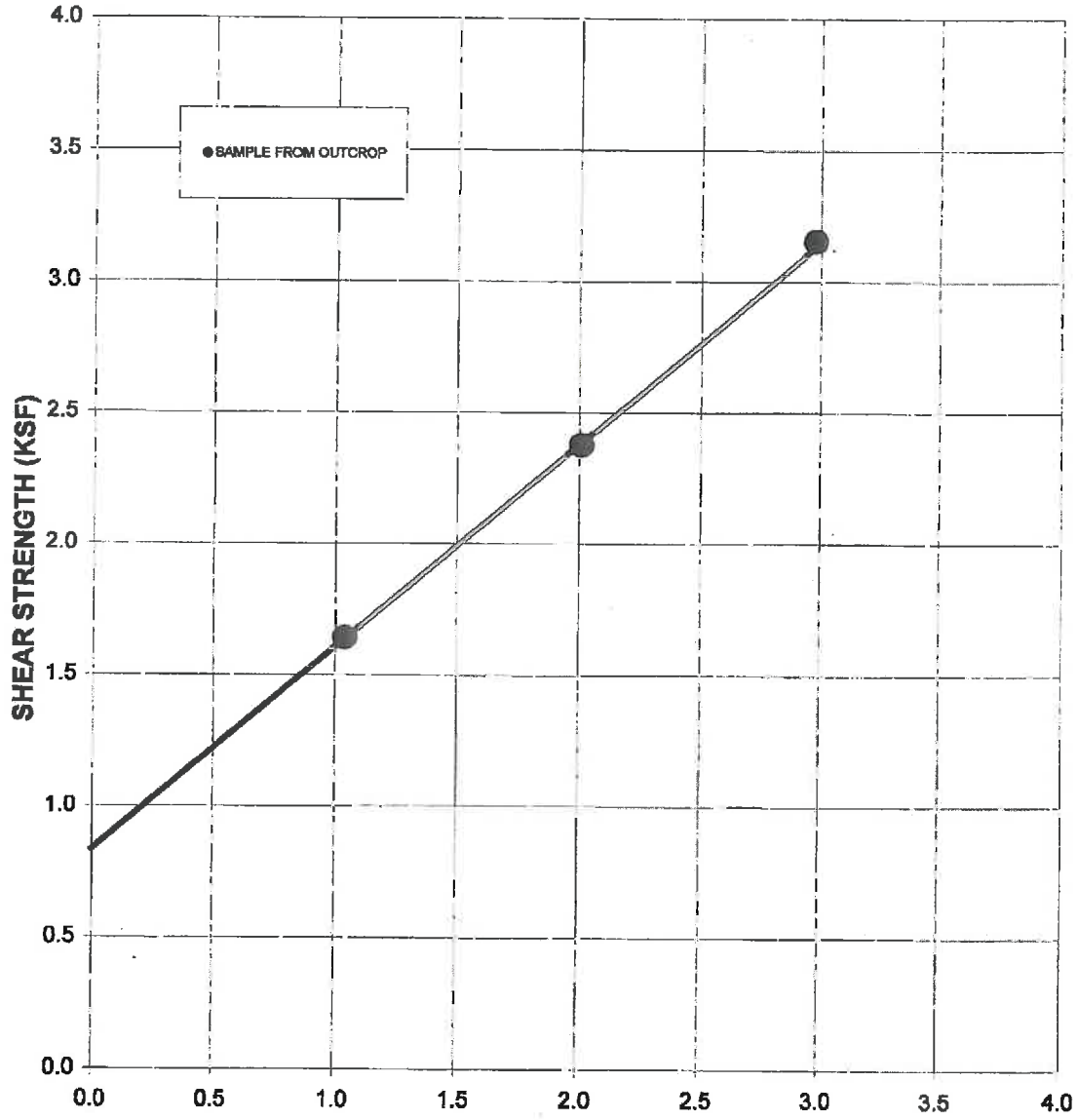
SHEAR DIAGRAM #1

BG: 18554 CONSULTANT: RIZ
CLIENT: YORK

EARTH MATERIAL: BEDROCK

Phi Angle =	37	degrees	Moisture Content	13.2%
Cohesion =	850	psf	Dry Density (pcf)	122.4
			Percent Saturation	99.7%

DIRECT SHEAR TEST - ASTM D-3080 - (ULTIMATE VALUES)



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INC.

1461 E. CHEVY CHASE DRIVE, SUITE 200 GLENDALE, CA 91206
(818) 549-9959 Tel (818) 543-3747 FAX

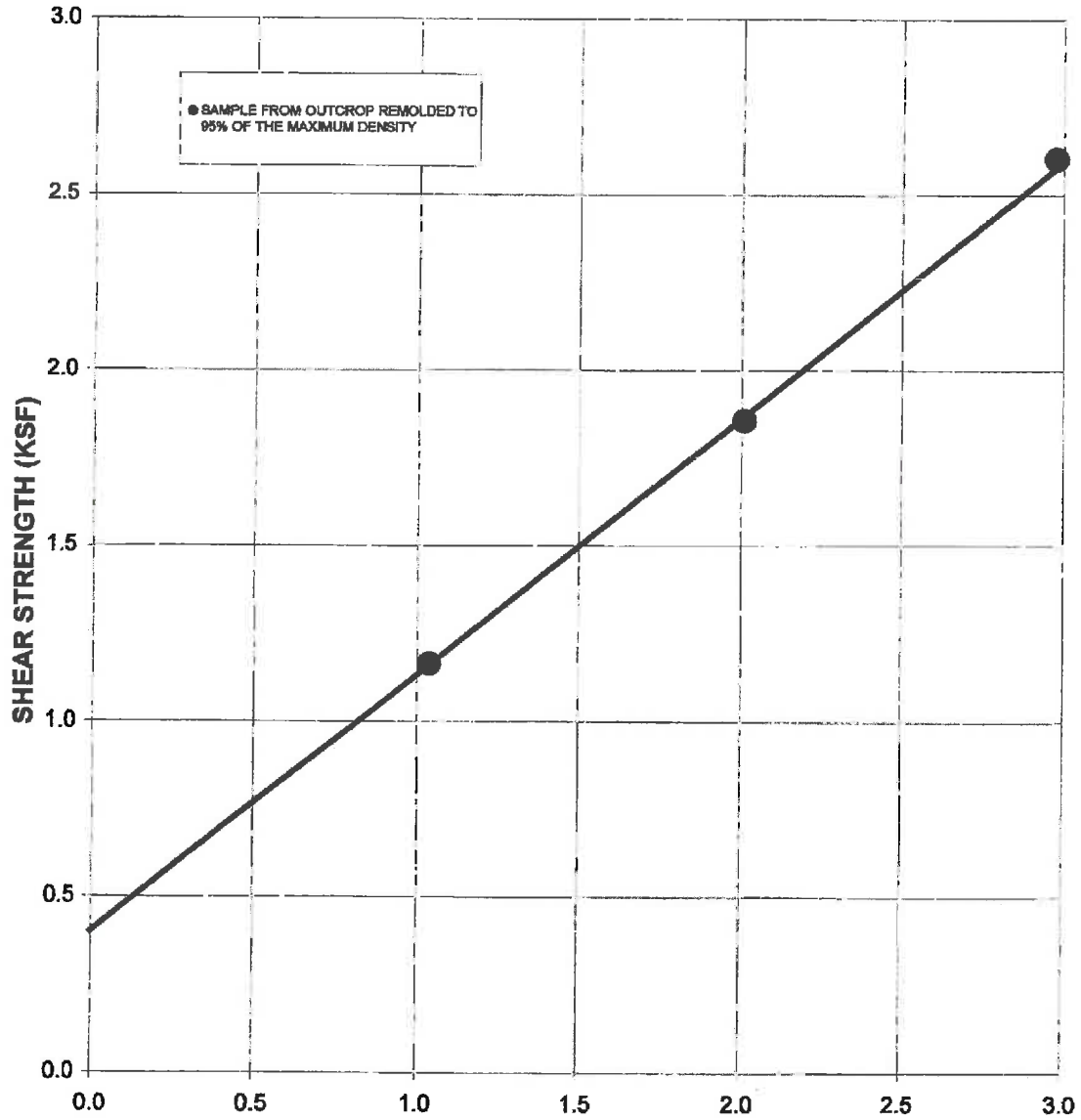
SHEAR DIAGRAM #2

BG: 18554 CONSULTANT: RIZ
CLIENT: YORK

EARTH MATERIAL: FUTURE COMPACTED FILL

			Moisture Content	15.3%
Phi Angle =	36	degrees	Dry Density (pcf)	116.9
Cohesion =	420	psf	Percent Saturation	97.8%

DIRECT SHEAR TEST - ASTM D-3080 - (ULTIMATE VALUES)



BYER GEOTECHNICAL INC.
1461 E. CHEVY CHASE DRIVE, SUITE 200, GLENDALE, CA 91206
tel 818.549.9959 fax 818.543.3747

LOG OF TEST PITS

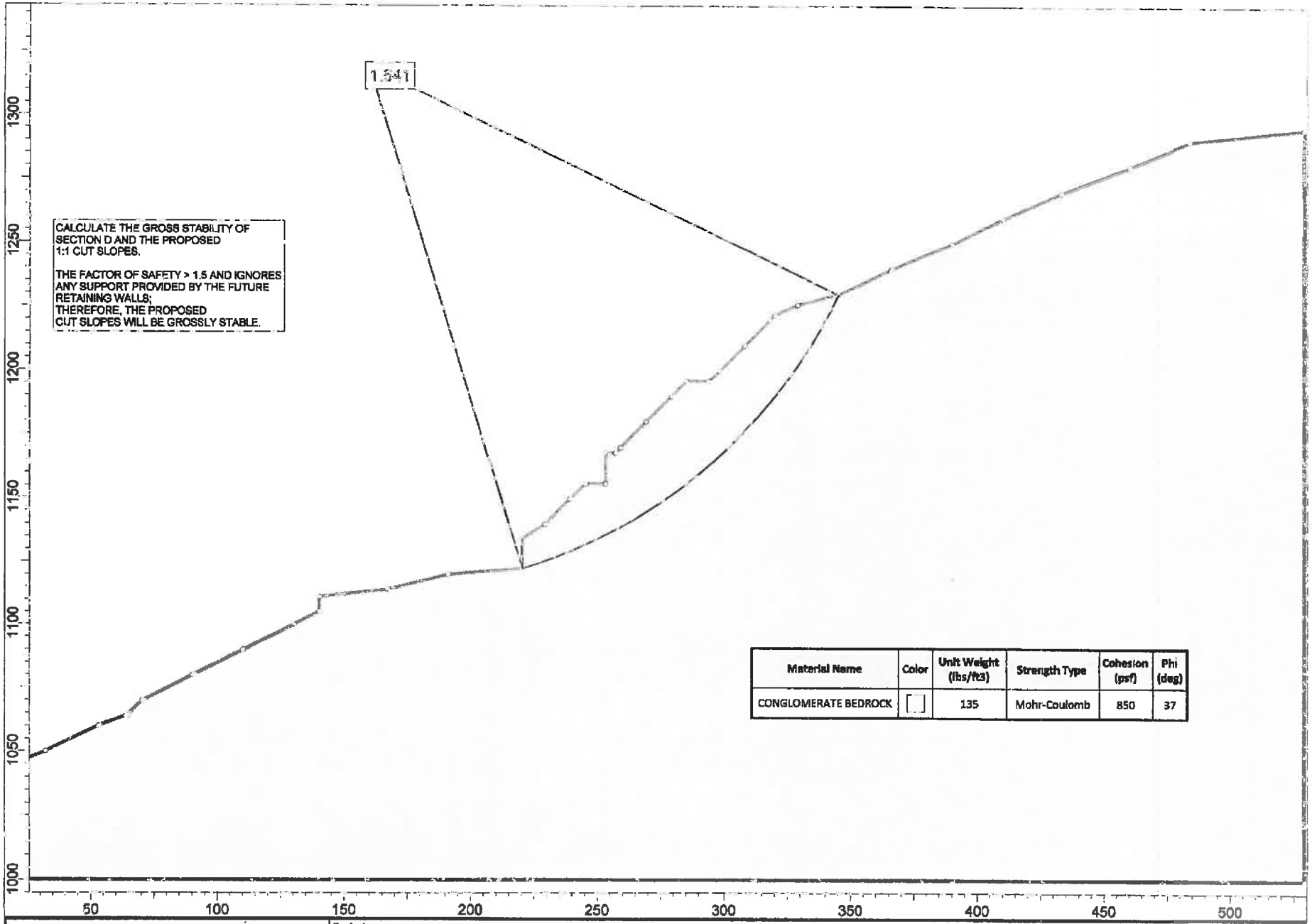
CLIENT: YORK

GEOLOGIST: RIZ BG: 18554

REPORT DATE: 8/21/12 DATE LOGGED: 2/1/12

DEPTH INTERVAL (feet)	EARTH MATERIAL	LITHOLOGIC DESCRIPTION
TEST PIT #1		Surface Conditions: Along Axis of West-Draining Swale
0 - 3	**SOIL:**	Gravelly Sand, light brown, slightly moist, slightly dense
		at 1.5 feet: Silty Sand, brown, slightly moist, medium dense, occasional cobbles to 6 inches
3 - 4.5	**BEDROCK:**	Conglomerate, tan, massive, friable, hard with depth
		End at 4.5 Feet; No Water; No Caving; No Fill.
TEST PIT #2		Surface Conditions: Within Drainage Swale at Toe of Proposed Fill Slope
0 - 2	**SOIL:**	Silty Sand, brown, slightly moist, medium dense
2 - 2.5	**BEDROCK:**	Conglomerate, tan, massive, friable at surface, hard with depth
		End at 2.5 Feet; No Water; No Caving; No Fill.
TEST PIT #3		Surface Conditions: Within Drainage Swale near Upper Portion of Future Fill
0 - 2.5	**SOIL:**	Silty and Clayey Sand with Gravel, light brown, cobbles to 6 inches, slightly moist, medium dense
2.5 - 3	**BEDROCK:**	Conglomerate, tan, massive, friable at surface, hard with depth
		End at 3 Feet; No Water; No Caving; No Fill.

NOTE: The stratification depths shown on the Log of Test Pits are approximate and are based upon visual classification of samples and cuttings. The actual depths may vary. Variations between test pits may also occur.



Material Name	Color	Unit Weight (lbs/ft3)	Strength Type	Cohesion (psf)	Phi (deg)
CONGLOMERATE BEDROCK		135	Mohr-Coulomb	850	37

BYER GEOTECHNICAL INC.

SLIDEINTERPRET 6.018

Project	BG 18554 - YORK - SECTION D		
Analysis Description	CALCULATE THE GROSS STABILITY OF THE PROPOSED 1:1 CUT SLOPES		
Drawn By	R. ZWEIGLER	Company	BYER GEOTECHNICAL, INC.
Date	8/13/2012, 11:15:11 AM	File Name	18554 section d.slim

Slide Analysis Information

BG 18554 - YORK - SECTION D

Project Summary

File Name: 18554 section d.slim
Slide Modeler Version: 6.018
Project Title: BG 18554 - YORK - SECTION D
Analysis: CALCULATE THE GROSS STABILITY OF THE PROPOSED 1:1 CUT SLOPES
Author: R. ZWEIGLER
Company: BYER GEOTECHNICAL, INC.
Date Created: 8/13/2012, 11:15:11 AM

General Settings

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

Analysis Options

Analysis Methods Used

Bishop simplified

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

Groundwater Analysis

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

Random Numbers

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

Surface Options

Surface Type: Circular
Search Method: Auto Refine Search
Divisions along slope: 10
Circles per division: 10
Number of iterations: 10
Divisions to use in next iteration: 50%
Composite Surfaces: Disabled
Minimum Elevation: Not Defined
Minimum Depth: Not Defined

Material Properties

Property	CONGLOMERATE BEDROCK
Color	
Strength Type	Mohr-Coulomb
Unit Weight [lbs/ft3]	135
Cohesion [psf]	850
Friction Angle [deg]	37
Water Surface	None
Ru Value	0

Global Minimums

Method: bishop simplified

FS: 1.541170
Center: 159.820, 1318.822
Radius: 205.321
Left Slip Surface Endpoint: 220.000, 1122.519
Right Slip Surface Endpoint: 344.925, 1229.981
Left Slope Intercept: 220.000 1134.000
Right Slope Intercept: 344.925 1229.981
Resisting Moment=8.62119e+007 lb-ft
Driving Moment=5.59393e+007 lb-ft
Total Slice Area=3352.38 ft2

Valid / Invalid Surfaces

Method: bishop simplified

Number of Valid Surfaces: 1606
Number of Invalid Surfaces: 0

Slice Data

Global Minimum Query (bishop simplified) - Safety Factor: 1.54117

Slice Number	Width [ft]	Weight [lbs]	Base Material	Base Cohesion [psf]	Base Friction Angle [degrees]	Shear Stress [psf]	Shear Strength [psf]	Base Normal Stress [psf]	Pore Pressure [psf]	Effective Normal Stress [psf]
1	4.99701	8328.56	CONGLOMERATE BEDROCK	850	37	1181.29	1820.57	1287.99	0	1287.99
2	4.99701	9469.24	CONGLOMERATE BEDROCK	850	37	1262.55	1945.8	1454.17	0	1454.17
3	4.99701	11253.2	CONGLOMERATE BEDROCK	850	37	1394.57	2149.27	1724.19	0	1724.19
4	4.99701	13297.4	CONGLOMERATE BEDROCK	850	37	1544.11	2379.74	2030.04	0	2030.04
5	4.99701	15238.1	CONGLOMERATE BEDROCK	850	37	1681	2590.71	2310.01	0	2310.01
6	4.99701	15396.3	CONGLOMERATE BEDROCK	850	37	1672	2576.84	2291.59	0	2291.59
7	4.99701	16954	CONGLOMERATE BEDROCK	850	37	1772.2	2731.26	2496.51	0	2496.51
8	4.99701	20677	CONGLOMERATE BEDROCK	850	37	2036.32	3138.32	3036.69	0	3036.69
9	4.99701	21887.6	CONGLOMERATE BEDROCK	850	37	2100.28	3236.89	3167.52	0	3167.52
10	4.99701	23247.5	CONGLOMERATE BEDROCK	850	37	2172.21	3347.75	3314.64	0	3314.64
11	4.99701	24474.3	CONGLOMERATE BEDROCK	850	37	2230.51	3437.6	3433.87	0	3433.87
12	4.99701	25560.4	CONGLOMERATE BEDROCK	850	37	2274.84	3505.91	3524.51	0	3524.51
13	4.99701	26497.3	CONGLOMERATE BEDROCK	850	37	2304.79	3552.08	3585.77	0	3585.77
14	4.99701	25615.4	CONGLOMERATE BEDROCK	850	37	2202.94	3395.1	3377.47	0	3377.47
15	4.99701	22912.4	CONGLOMERATE BEDROCK	850	37	1975.77	3044.99	2912.85	0	2912.85
16	4.99701	22231	CONGLOMERATE BEDROCK	850	37	1891.26	2914.76	2740.02	0	2740.02
17	4.99701	22450.8	CONGLOMERATE BEDROCK	850	37	1866.67	2876.85	2689.72	0	2689.72
18	4.99701	22449.4	CONGLOMERATE BEDROCK	850	37	1824.82	2812.36	2604.14	0	2604.14
19	4.99701	22202.3	CONGLOMERATE BEDROCK	850	37	1764.76	2719.79	2481.29	0	2481.29

20	4.99701	21679.5	CONGLOMERATE BEDROCK	850	37	1685.28	2597.31	2318.76	0	2318.76
21	4.99701	19928.5	CONGLOMERATE BEDROCK	850	37	1530.29	2358.43	2001.76	0	2001.76
22	4.99701	16843.5	CONGLOMERATE BEDROCK	850	37	1300.35	2004.06	1531.5	0	1531.5
23	4.99701	12899.9	CONGLOMERATE BEDROCK	850	37	1030.7	1588.48	980.002	0	980.002
24	4.99701	8214.17	CONGLOMERATE BEDROCK	850	37	734.964	1132.7	375.162	0	375.162
25	4.99701	2863.04	CONGLOMERATE BEDROCK	850	37	425.895	656.377	-256.946	0	-256.946

Interslice Data

Global Minimum Query (bishop simplified) - Safety Factor: 1.54117

Slice Number	X coordinate [ft]	Y coordinate - Bottom [ft]	Interslice Normal Force [lbs]	Interslice Shear Force [lbs]	Interslice Force Angle [degrees]
1	220	1122.52	0	0	0
2	224.997	1124.12	3839.33	0	0
3	229.994	1125.87	7610.99	0	0
4	234.991	1127.76	11318.6	0	0
5	239.988	1129.8	14888.5	0	0
6	244.985	1132	18210.5	0	0
7	249.982	1134.36	21157.9	0	0
8	254.979	1136.88	23703.6	0	0
9	259.976	1139.59	25672.8	0	0
10	264.973	1142.47	27028.8	0	0
11	269.97	1145.55	27683.2	0	0
12	274.967	1148.83	27566.7	0	0
13	279.964	1152.32	26618.7	0	0
14	284.961	1156.05	24787.8	0	0
15	289.958	1160.01	22398.2	0	0
16	294.955	1164.24	19950.2	0	0
17	299.952	1168.76	17029	0	0
18	304.949	1173.58	13373	0	0
19	309.946	1178.76	9024.66	0	0
20	314.943	1184.31	4058.89	0	0
21	319.94	1190.3	-1406.64	0	0
22	324.937	1196.79	-6744.08	0	0
23	329.934	1203.85	-11071	0	0
24	334.931	1211.62	-13530.1	0	0
25	339.928	1220.24	-13093.6	0	0
26	344.925	1229.98	0	0	0

List Of Coordinates

External Boundary

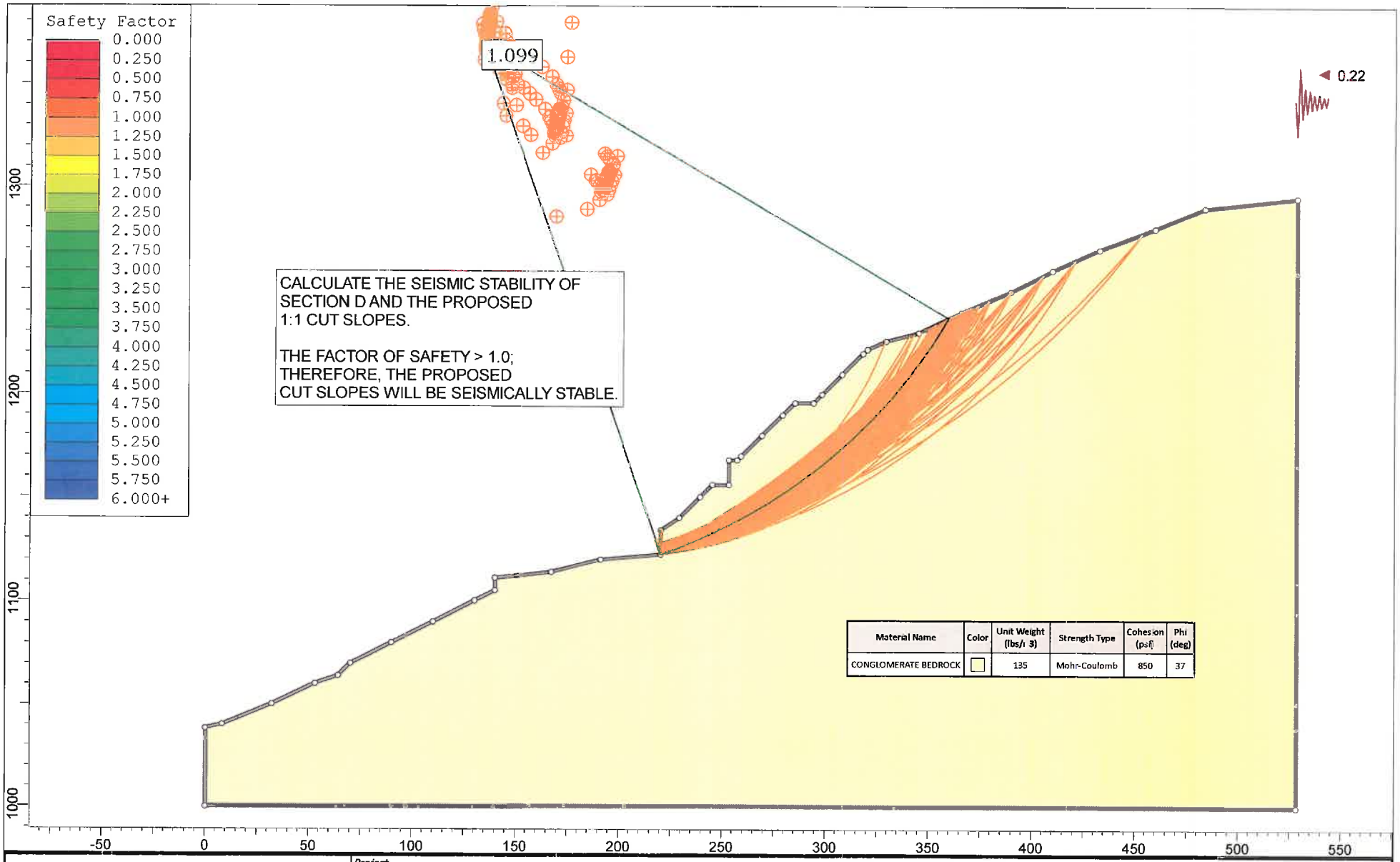
X	Y
0	1000
529	1000
529	1295
484	1290
460	1280
433	1270
410	1260
390	1250
366	1240
345	1230
329	1226
320	1222
318	1220
308	1210
298	1200
294	1196
285	1196
279	1190
269	1180
259	1170
257	1168
253	1168
253	1156
245	1156
239	1150
229	1140
220	1134
220	1122.5
191	1120
167	1114
140	1111
140	1105
130	1100
110	1090
90	1080
70	1070
64	1064
53	1060

32	1050
8	1040
0	1038

December 21, 2018
BG 18554

APPENDIX II

Calculations and Figures



BYER GEOTECHNICAL INC.

Project	BG 18554 - YORK - SECTION D				
Analysis Description	CALCULATE THE SEISMIC STABILITY OF THE PROPOSED 1:1 CUT SLOPES				
Drawn By	R. ZWEIGLER	Scale	1:769	Company	BYER GEOTECHNICAL, INC.
Date	2/23/17			File Name	18554 section d EQ updated.slim

SLIDEINTERPRET 7.022

Slide Analysis Information

BG 18554 - YORK - SECTION D

Project Summary

File Name:	18554 section d EQ updated
Slide Modeler Version:	7.022
Project Title:	BG 18554 - YORK - SECTION D
Analysis:	CALCULATE THE SEISMIC STABILITY OF THE PROPOSED 1:1 CUT SLOPES
Author:	R. ZWEIGLER
Company:	BYER GEOTECHNICAL, INC.
Date Created:	2/23/17

General Settings

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

Analysis Options

Slices Type:	Vertical

Analysis Methods Used

Bishop simplified

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

Groundwater Analysis

Groundwater Method:	Water Surfaces
Pore Fluid Unit Weight [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:	Circular
Search Method:	Auto Refine Search
Divisions along slope:	10
Circles per division:	10
Number of iterations:	10
Divisions to use in next iteration:	50%
Composite Surfaces:	Disabled
Minimum Elevation:	Not Defined
Minimum Depth:	Not Defined
Minimum Area:	Not Defined
Minimum Weight:	Not Defined

Seismic

Advanced seismic analysis:	No
Staged pseudostatic analysis:	No

Loading

Seismic Load Coefficient (Horizontal): 0.22

Material Properties

Property	CONGLOMERATE BEDROCK
Color	
Strength Type	Mohr-Coulomb
Unit Weight [lbs/ft3]	135
Cohesion [psf]	850
Friction Angle [deg]	37
Water Surface	None
Ru Value	0

Global Minimums

Method: bishop simplified

FS	1.098680
Center:	134.775, 1368.834
Radius:	260.654
Left Slip Surface Endpoint:	220.000, 1122.506
Right Slip Surface Endpoint:	359.605, 1236.955
Left Slope Intercept:	220.000 1134.000
Right Slope Intercept:	359.605 1236.955
Resisting Moment:	1.09208e+008 lb-ft
Driving Moment:	9.93988e+007 lb-ft
Total Slice Area:	3747.32 ft2
Surface Horizontal Width:	139.605 ft
Surface Average Height:	26.8423 ft

Valid / Invalid Surfaces

Method: bishop simplified

Number of Valid Surfaces:	1897
Number of Invalid Surfaces:	0

Slice Data

Global Minimum Query (bishop simplified) - Safety Factor: 1.09868

Slice Number	Width [ft]	Weight [lbs]	Angle of Slice Base [degrees]	Base Material	Base Cohesion [psf]	Base Friction Angle [degrees]	Shear Stress [psf]	Shear Strength [psf]	Base Normal Stress [psf]	Pore Pressure [psf]	Effective Normal Stress [psf]	Base Vertical Stress [psf]	Effective Vertical Stress [psf]
1	5.58421	9312.88	19.7367	CONGLOMERATE BEDROCK	850	37	1539.05	1690.92	1115.94	0	1115.94	1668.11	1668.11
2	5.58421	10660.1	21.0464	CONGLOMERATE BEDROCK	850	37	1648.27	1810.92	1275.18	0	1275.18	1909.42	1909.42
3	5.58421	12931.2	22.3677	CONGLOMERATE BEDROCK	850	37	1842.3	2024.1	1558.09	0	1558.09	2316.21	2316.21
4	5.58421	15350.7	23.7017	CONGLOMERATE BEDROCK	850	37	2044.06	2245.77	1852.24	0	1852.24	2749.59	2749.59
5	5.58421	17076.7	25.0495	CONGLOMERATE BEDROCK	850	37	2174.54	2389.12	2042.48	0	2042.48	3058.77	3058.77
6	5.58421	16344.8	26.4123	CONGLOMERATE BEDROCK	850	37	2074.88	2279.63	1897.18	0	1897.18	2927.71	2927.71
7	5.58421	22712.6	27.7914	CONGLOMERATE BEDROCK	850	37	2617.71	2876.03	2688.63	0	2688.63	4068.29	4068.29
8	5.58421	23812.8	29.1882	CONGLOMERATE BEDROCK	850	37	2674.48	2938.4	2771.4	0	2771.4	4265.39	4265.39
9	5.58421	25601.7	30.6043	CONGLOMERATE BEDROCK	850	37	2787.92	3063.03	2936.79	0	2936.79	4585.85	4585.85
10	5.58421	27249	32.0415	CONGLOMERATE BEDROCK	850	37	2883.55	3168.1	3076.22	0	3076.22	4880.97	4880.97
11	5.58421	28748.1	33.5016	CONGLOMERATE BEDROCK	850	37	2961.2	3253.41	3189.43	0	3189.43	5149.53	5149.53
12	5.58421	29818.6	34.9868	CONGLOMERATE BEDROCK	850	37	2998.02	3293.87	3243.12	0	3243.12	5341.33	5341.33
13	5.58421	27650.1	36.4995	CONGLOMERATE BEDROCK	850	37	2766.65	3039.66	2905.77	0	2905.77	4952.94	4952.94
14	5.58421	25624.3	38.0423	CONGLOMERATE BEDROCK	850	37	2552.2	2804.05	2593.12	0	2593.12	4590.16	4590.16
15	5.58421	26311.3	39.6184	CONGLOMERATE BEDROCK	850	37	2555.44	2807.61	2597.84	0	2597.84	4713.27	4713.27
16	5.58421	26933.9	41.2313	CONGLOMERATE BEDROCK	850	37	2550.05	2801.69	2589.98	0	2589.98	4824.84	4824.84
17	5.58421	27344	42.8851	CONGLOMERATE BEDROCK	850	37	2524.89	2774.05	2553.31	0	2553.31	4898.36	4898.36
18	5.58421	27514.3	44.5846	CONGLOMERATE BEDROCK	850	37	2478.68	2723.28	2485.93	0	2485.93	4928.92	4928.92
19	5.58421	26068.7	46.3353	CONGLOMERATE BEDROCK	850	37	2313.9	2542.24	2245.68	0	2245.68	4670.03	4670.03
20	5.58421	23290.2	48.1441	CONGLOMERATE BEDROCK	850	37	2059	2262.18	1874.03	0	1874.03	4172.37	4172.37
21	5.58421	19593.3	50.0192	CONGLOMERATE BEDROCK	850	37	1749.89	1922.57	1423.34	0	1423.34	3510.2	3510.2
22	5.58421	15444.2	51.9707	CONGLOMERATE BEDROCK	850	37	1423.3	1563.75	947.181	0	947.181	2767.01	2767.01
23	5.58421	11087.3	54.0115	CONGLOMERATE BEDROCK	850	37	1098.63	1207.04	473.805	0	473.805	1986.57	1986.57
24	5.58421	6983.97	56.1582	CONGLOMERATE BEDROCK	850	37	806.774	886.387	48.2872	0	48.2872	1251.53	1251.53
25	5.58421	2423.51	58.4328	CONGLOMERATE BEDROCK	850	37	506.415	556.388	-389.636	0	-389.636	434.588	434.588

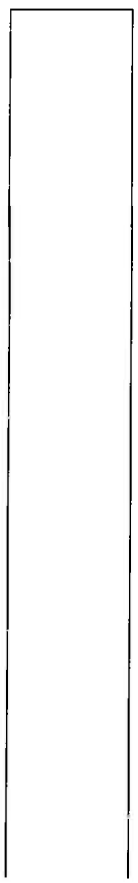
Interslice Data

Global Minimum Query (bishop simplified) - Safety Factor: 1.09868

Slice Number	X coordinate [ft]	Y coordinate - Bottom [ft]	Interslice Normal Force [lbs]	Interslice Shear Force [lbs]	Interslice Force Angle [degrees]
1	220	1122.51	0	0	0
2	225.584	1124.51	4303.57	0	0
3	231.168	1126.66	8415.91	0	0
4	236.753	1128.96	12271	0	0
5	242.337	1131.41	15759.3	0	0
6	247.921	1134.02	18806.1	0	0
7	253.505	1136.79	21526.6	0	0
8	259.089	1139.73	23224.1	0	0
9	264.674	1142.85	24264.2	0	0
10	270.258	1146.16	24488.5	0	0
11	275.842	1149.65	23833	0	0
12	281.426	1153.35	22243.2	0	0
13	287.011	1157.26	19737.8	0	0
14	292.595	1161.39	17086.5	0	0
15	298.179	1165.76	14360.2	0	0
16	303.763	1170.38	10822.5	0	0
17	309.347	1175.27	6451.43	0	0
18	314.932	1180.46	1282.48	0	0
19	320.516	1185.96	-4621.24	0	0
20	326.1	1191.82	-10583.3	0	0
21	331.684	1198.05	-15899	0	0
22	337.268	1204.71	-19923.7	0	0
23	342.853	1211.85	-22141.9	0	0
24	348.437	1219.54	-22093.9	0	0
25	354.021	1227.87	-19530.5	0	0
26	359.605	1236.95	0	0	0

List Of Coordinates

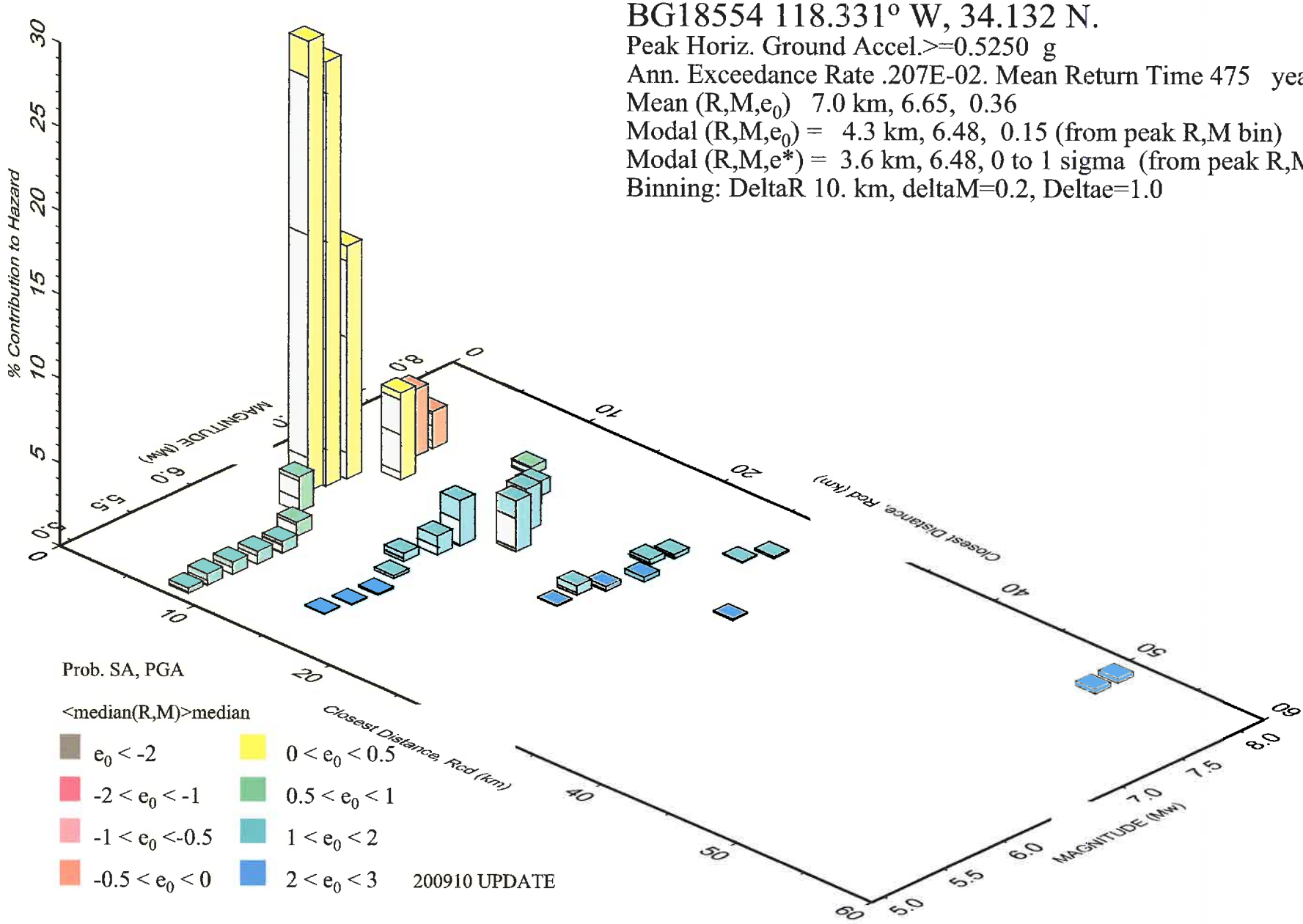
External Boundary



X	Y
0	1000
529	1000
529	1295
484	1290
460	1280
433	1270
410	1260
390	1250
366	1240
345	1230
329	1226
320	1222
318	1220
308	1210
298	1200
294	1196
285	1196
279	1190
269	1180
259	1170
257	1168
253	1168
253	1156
245	1156
239	1150
229	1140
220	1134
220	1122.5
191	1120
167	1114
140	1111
140	1105
130	1100
110	1090
90	1080
70	1070
64	1064
53	1060
32	1050
8	1040
0	1038

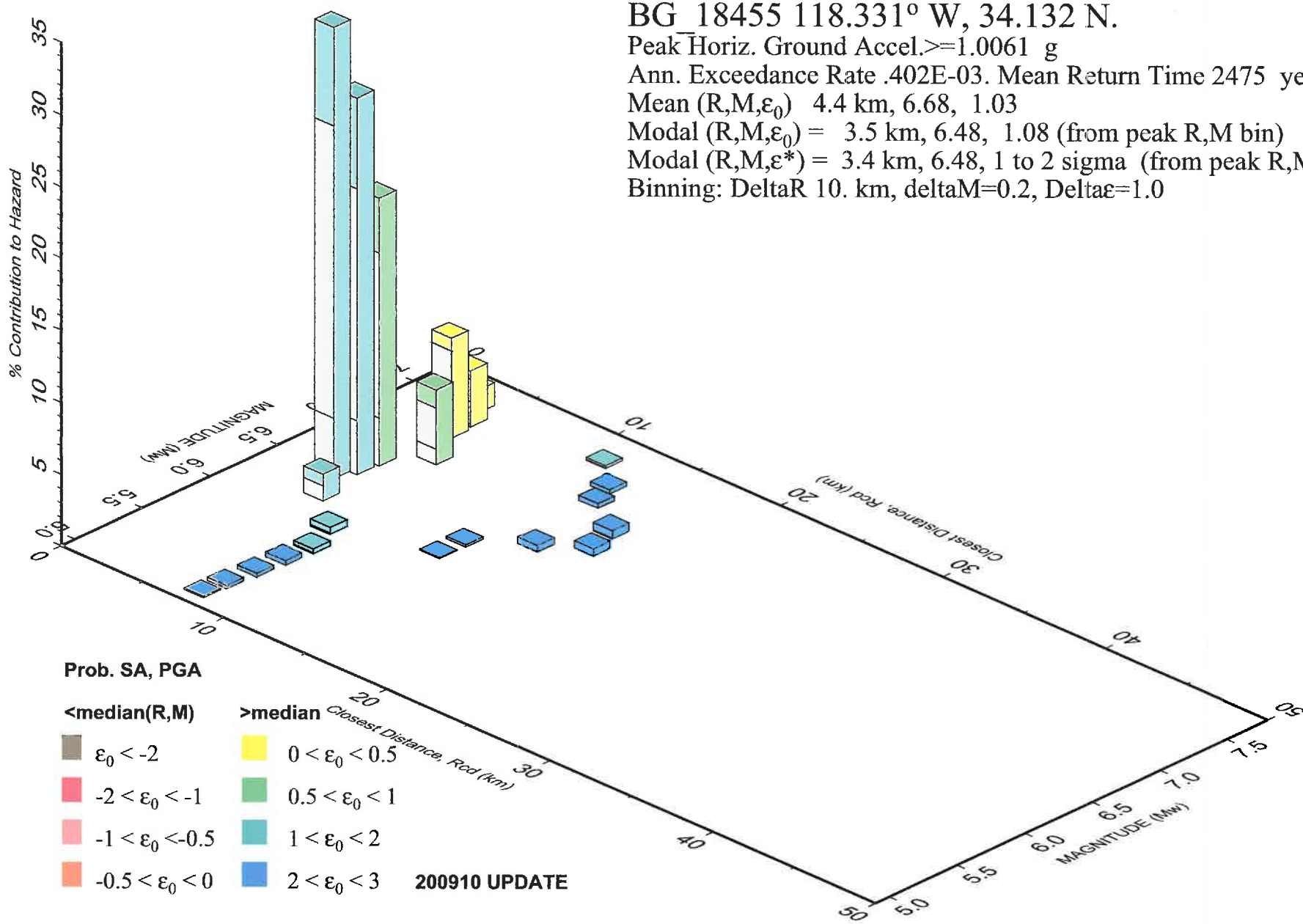
PSH Deaggregation on NEHRP BC rock
BG18554 118.331° W, 34.132 N.

Peak Horiz. Ground Accel.>=0.5250 g
Ann. Exceedance Rate .207E-02. Mean Return Time 475 years
Mean (R,M,e_0) 7.0 km, 6.65, 0.36
Modal (R,M,e_0) = 4.3 km, 6.48, 0.15 (from peak R,M bin)
Modal (R,M,e*) = 3.6 km, 6.48, 0 to 1 sigma (from peak R,M,e bin)
Binning: DeltaR 10. km, deltaM=0.2, Deltae=1.0



PSH Deaggregation on NEHRP BC rock
BG_18455 118.331° W, 34.132 N.

Peak Horiz. Ground Accel.>=1.0061 g
Ann. Exceedance Rate .402E-03. Mean Return Time 2475 years
Mean (R,M,ε_0) 4.4 km, 6.68, 1.03
Modal (R,M,ε_0) = 3.5 km, 6.48, 1.08 (from peak R,M bin)
Modal (R,M,ε^*) = 3.4 km, 6.48, 1 to 2 sigma (from peak R,M,ε bin)
Binning: DeltaR 10. km, deltaM=0.2, Deltaε=1.0



Seismic Slope Stability Screening Analysis

Reference: California Geological Survey (2008), Guidelines for Evaluating and Mitigating Seismic Hazards in California, Speciall Publication 117A.

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Input Parameters:

Maximum Horizontal Acceleration	MHAr (g) =	**0.66**
Moment Magnitude from Deaggregation	Mw =	**6.48**
Modal Distance from Deaggregation	r (km) =	**3.6**

Calculations:

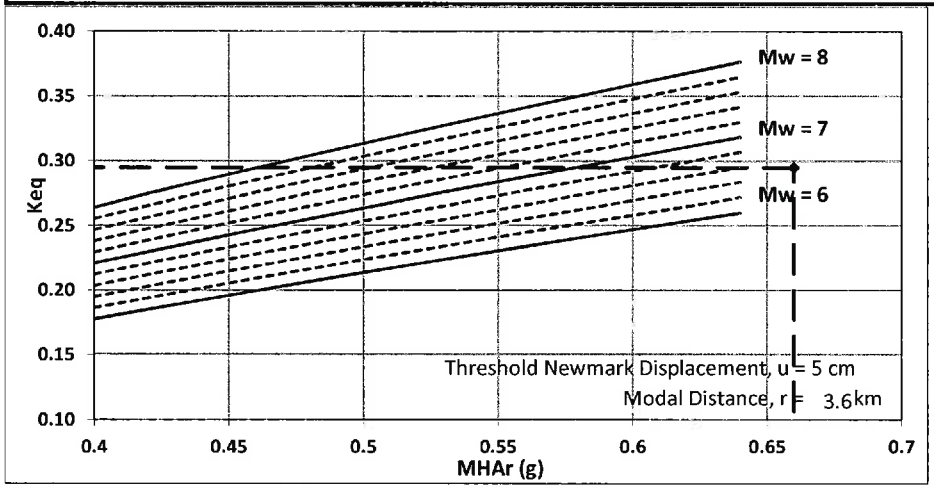
Non-Linear Response Factor	NRF =	0.8311	Eq. 11.3 (Valid for 0.1< MHAr < 0.8)
	$\ln(D_{5\text{-}95})$ =		Eq. 10.1a (for r > 10 km)
	$\ln(D_{5\text{-}95})$ =	2.2056	Eq. 10.1b (for r <= 10 km)
Median Duration of Shaking	$D_{5\text{-}95}$ (sec.) =	9.0758	

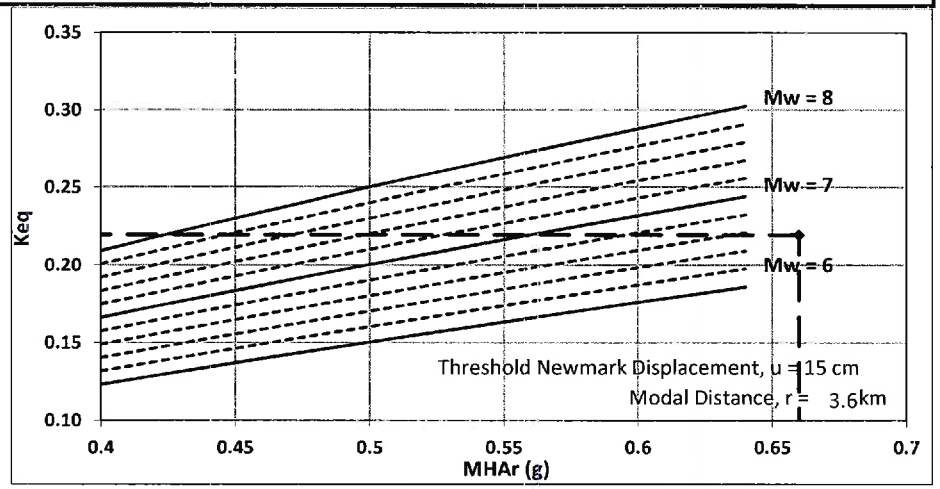
For Threshold Newmark Displacement, u, of 5 cm:

Median Seismicity Factor	f_{eq} =	0.4465	Eq. 11.2
Horizontal Seismic Coefficient	k_{eq} **(u = 5cm) =**	**0.2947**	Eq. 11.1. Use this in psuedostatic slope analysis. If FS>1, the site passes the screen.

For Threshold Newmark Displacement, u, of 15 cm:

Median Seismicity Factor	f_{eq} =	0.3325	Eq. 11.2
Horizontal Seismic Coefficient	k_{eq} **(u = 15 cm) =**	**0.2194**	Eq. 11.1. Use this in psuedostatic slope analysis. If FS>1, the site passes the screen.





Design Maps Detailed Report

ASCE 7-10 Standard (34.1315°N, 118.3308°W)

Site Class C – "Very Dense Soil and Soft Rock", Risk Category I/II/III

Section 11.4.1 — Mapped Acceleration Parameters

Note: Ground motion values provided below are for the direction of maximum horizontal spectral response acceleration. They have been converted from corresponding geometric mean ground motions computed by the USGS by applying factors of 1.1 (to obtain S_S) and 1.3 (to obtain S_1). Maps in the 2010 ASCE-7 Standard are provided for Site Class B. Adjustments for other Site Classes are made, as needed, in Section 11.4.3.

From Figure 22-1 [1] $S_S = 2.626$ g

From Figure 22-2 [2] $S_1 = 0.921$ g

Section 11.4.2 — Site Class

The authority having jurisdiction (not the USGS), site-specific geotechnical data, and/or the default has classified the site as Site Class C, based on the site soil properties in accordance with Chapter 20.

Table 20.3-1 Site Classification

Site Class	$\bar{v}_s$	$\bar{N}$ or $\bar{N}_{ch}$	$\bar{s}_u$
A. Hard Rock	>5,000 ft/s	N/A	N/A
B. Rock	2,500 to 5,000 ft/s	N/A	N/A
C. Very dense soil and soft rock	1,200 to 2,500 ft/s	>50	>2,000 psf
D. Stiff Soil	600 to 1,200 ft/s	15 to 50	1,000 to 2,000 psf
E. Soft clay soil	<600 ft/s	<15	<1,000 psf
	Any profile with more than 10 ft of soil having the characteristics: • Plasticity index PI > 20, • Moisture content $w \geq 40\%$, and • Undrained shear strength $\bar{s}_u$ < 500 psf		
F. Soils requiring site response analysis in accordance with Section 21.1	See Section 20.3.1		

For SI: 1ft/s = 0.3048 m/s 1lb/ft² = 0.0479 kN/m²

Section 11.4.3 — Site Coefficients and Risk-Targeted Maximum Considered Earthquake (MCE_R) Spectral Response Acceleration Parameters

Table 11.4-1: Site Coefficient F_a

Site Class	Mapped MCE_R Spectral Response Acceleration Parameter at Short Period				
	$S_S \leq 0.25$	$S_S = 0.50$	$S_S = 0.75$	$S_S = 1.00$	$S_S \geq 1.25$
A	0.8	0.8	0.8	0.8	0.8
B	1.0	1.0	1.0	1.0	1.0
C	1.2	1.2	1.1	1.0	1.0
D	1.6	1.4	1.2	1.1	1.0
E	2.5	1.7	1.2	0.9	0.9
F	See Section 11.4.7 of ASCE 7				

Note: Use straight-line interpolation for intermediate values of S_S

For Site Class = C and S_S = 2.626 g, F_a = 1.000

Table 11.4-2: Site Coefficient F_v

Site Class	Mapped MCE_R Spectral Response Acceleration Parameter at 1-s Period				
	$S_1 \leq 0.10$	$S_1 = 0.20$	$S_1 = 0.30$	$S_1 = 0.40$	$S_1 \geq 0.50$
A	0.8	0.8	0.8	0.8	0.8
B	1.0	1.0	1.0	1.0	1.0
C	1.7	1.6	1.5	1.4	1.3
D	2.4	2.0	1.8	1.6	1.5
E	3.5	3.2	2.8	2.4	2.4
F	See Section 11.4.7 of ASCE 7				

Note: Use straight-line interpolation for intermediate values of S_1

For Site Class = C and S_1 = 0.921 g, F_v = 1.300

Equation (11.4–1): $S_{MS} = F_a S_S = 1.000 \times 2.626 = 2.626$ g

Equation (11.4–2): $S_{M1} = F_v S_1 = 1.300 \times 0.921 = 1.197$ g

Section 11.4.4 — Design Spectral Acceleration Parameters

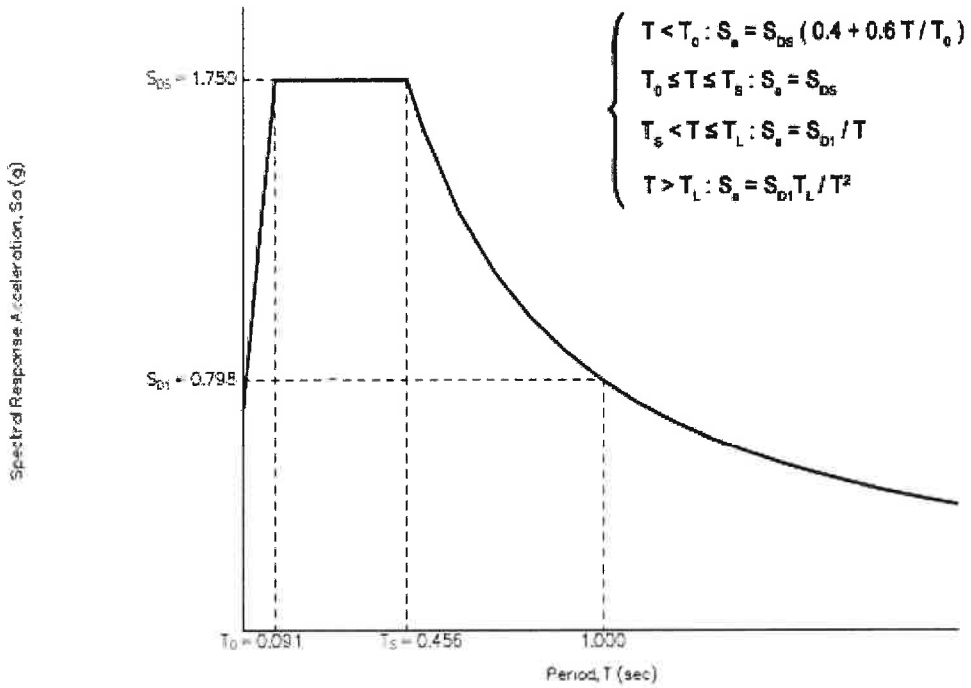
Equation (11.4–3): $S_{DS} = \frac{2}{3} S_{MS} = \frac{2}{3} \times 2.626 = 1.750$ g

Equation (11.4–4): $S_{D1} = \frac{2}{3} S_{M1} = \frac{2}{3} \times 1.197 = 0.798$ g

Section 11.4.5 — Design Response Spectrum

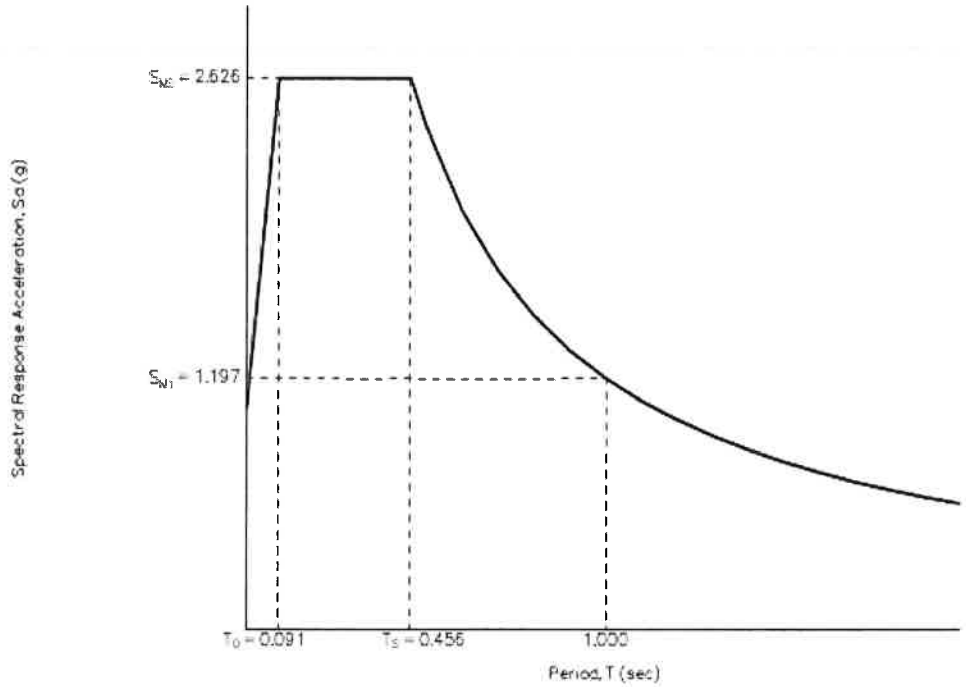
From Figure 22-12 [3] $T_L = 8$ seconds

Figure 11.4–1: Design Response Spectrum



Section 11.4.6 — Risk-Targeted Maximum Considered Earthquake (MCE_R) Response Spectrum

The MCE_R Response Spectrum is determined by multiplying the design response spectrum above by 1.5.



Section 11.8.3 — Additional Geotechnical Investigation Report Requirements for Seismic Design Categories D through F

From Figure 22-7 [4] PGA = 0.992

Equation (11.8-1): $PGA_M = F_{PGA}PGA = 1.000 \times 0.992 = 0.992$ g

Table 11.8-1: Site Coefficient F_{PGA}

Site Class	Mapped MCE Geometric Mean Peak Ground Acceleration, PGA				
	PGA ≤ 0.10	PGA = 0.20	PGA = 0.30	PGA = 0.40	PGA ≥ 0.50
A	0.8	0.8	0.8	0.8	0.8
B	1.0	1.0	1.0	1.0	1.0
C	1.2	1.2	1.1	1.0	1.0
D	1.6	1.4	1.2	1.1	1.0
E	2.5	1.7	1.2	0.9	0.9
F	See Section 11.4.7 of ASCE 7				

Note: Use straight-line interpolation for intermediate values of PGA

For Site Class = C and PGA = 0.992 g, F_{PGA} = 1.000

Section 21.2.1.1 — Method 1 (from Chapter 21 – Site-Specific Ground Motion Procedures for Seismic Design)

From Figure 22-17 [5] C_{RS} = 0.950

From Figure 22-18 [6] C_{R1} = 0.957

Section 11.6 — Seismic Design Category

Table 11.6-1 Seismic Design Category Based on Short Period Response Acceleration Parameter

VALUE OF S_{DS}	RISK CATEGORY		
	I or II	III	IV
$S_{DS} < 0.167g$	A	A	A
$0.167g \le S_{DS} < 0.33g$	B	B	C
$0.33g \le S_{DS} < 0.50g$	C	C	D
$0.50g \le S_{DS}$	D	D	D

For Risk Category = I and S_{DS} = 1.750 g, Seismic Design Category = D

Table 11.6-2 Seismic Design Category Based on 1-S Period Response Acceleration Parameter

VALUE OF S_{D1}	RISK CATEGORY		
	I or II	III	IV
$S_{D1} < 0.067g$	A	A	A
$0.067g \le S_{D1} < 0.133g$	B	B	C
$0.133g \le S_{D1} < 0.20g$	C	C	D
$0.20g \le S_{D1}$	D	D	D

For Risk Category = I and S_{D1} = 0.798 g, Seismic Design Category = D

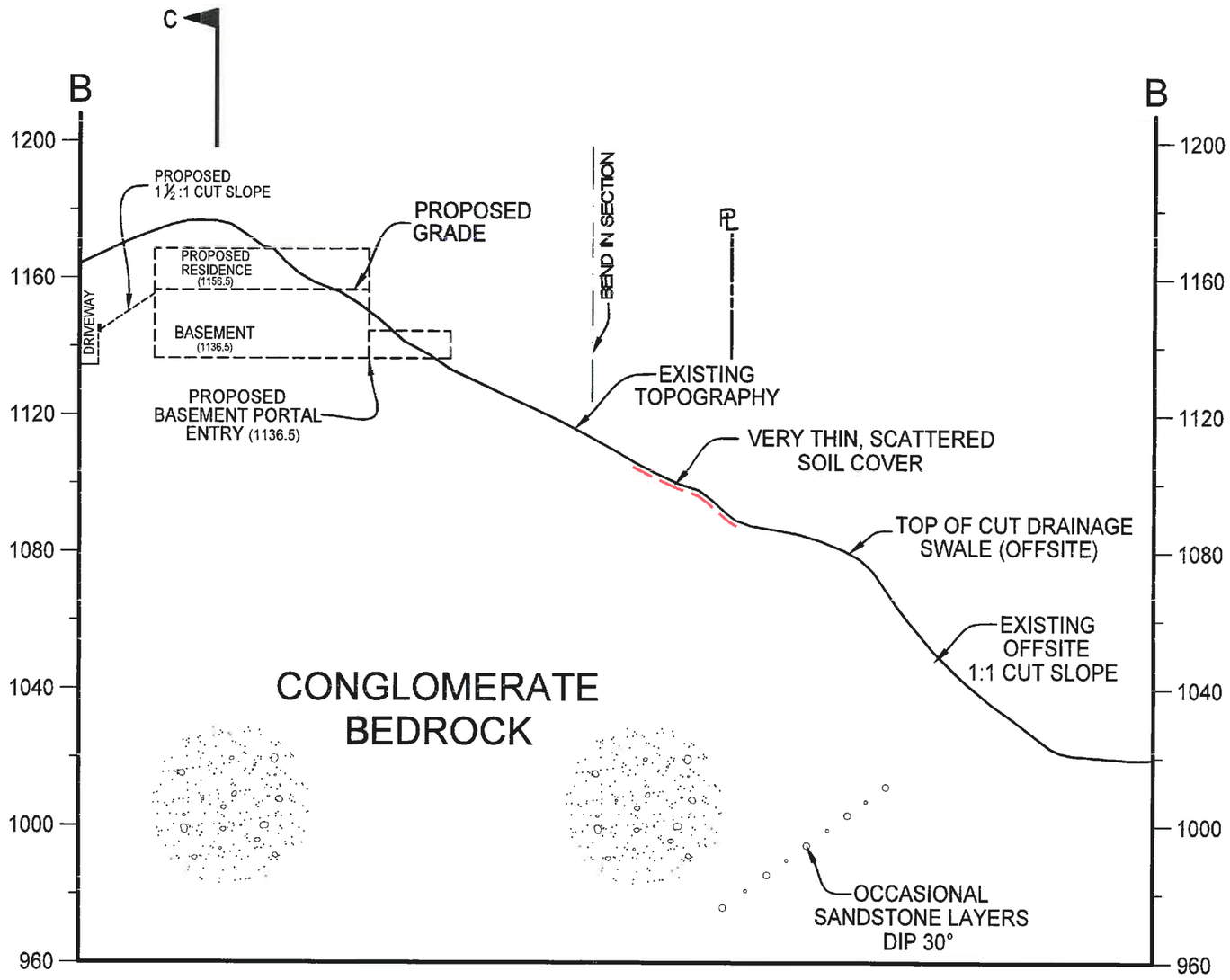
Note: When S_1 is greater than or equal to 0.75g, the Seismic Design Category is **E** for buildings in Risk Categories I, II, and III, and **F** for those in Risk Category IV, irrespective of the above.

Seismic Design Category ≡ "the more severe design category in accordance with Table 11.6-1 or 11.6-2" = E

Note: See Section 11.6 for alternative approaches to calculating Seismic Design Category.

References

1. *Figure 22-1*: https://earthquake.usgs.gov/hazards/designmaps/downloads/pdfs/2010_ASCE-7_Figure_22-1.pdf
2. *Figure 22-2*: https://earthquake.usgs.gov/hazards/designmaps/downloads/pdfs/2010_ASCE-7_Figure_22-2.pdf
3. *Figure 22-12*: https://earthquake.usgs.gov/hazards/designmaps/downloads/pdfs/2010_ASCE-7_Figure_22-12.pdf
4. *Figure 22-7*: https://earthquake.usgs.gov/hazards/designmaps/downloads/pdfs/2010_ASCE-7_Figure_22-7.pdf
5. *Figure 22-17*: https://earthquake.usgs.gov/hazards/designmaps/downloads/pdfs/2010_ASCE-7_Figure_22-17.pdf
6. *Figure 22-18*: https://earthquake.usgs.gov/hazards/designmaps/downloads/pdfs/2010_ASCE-7_Figure_22-18.pdf

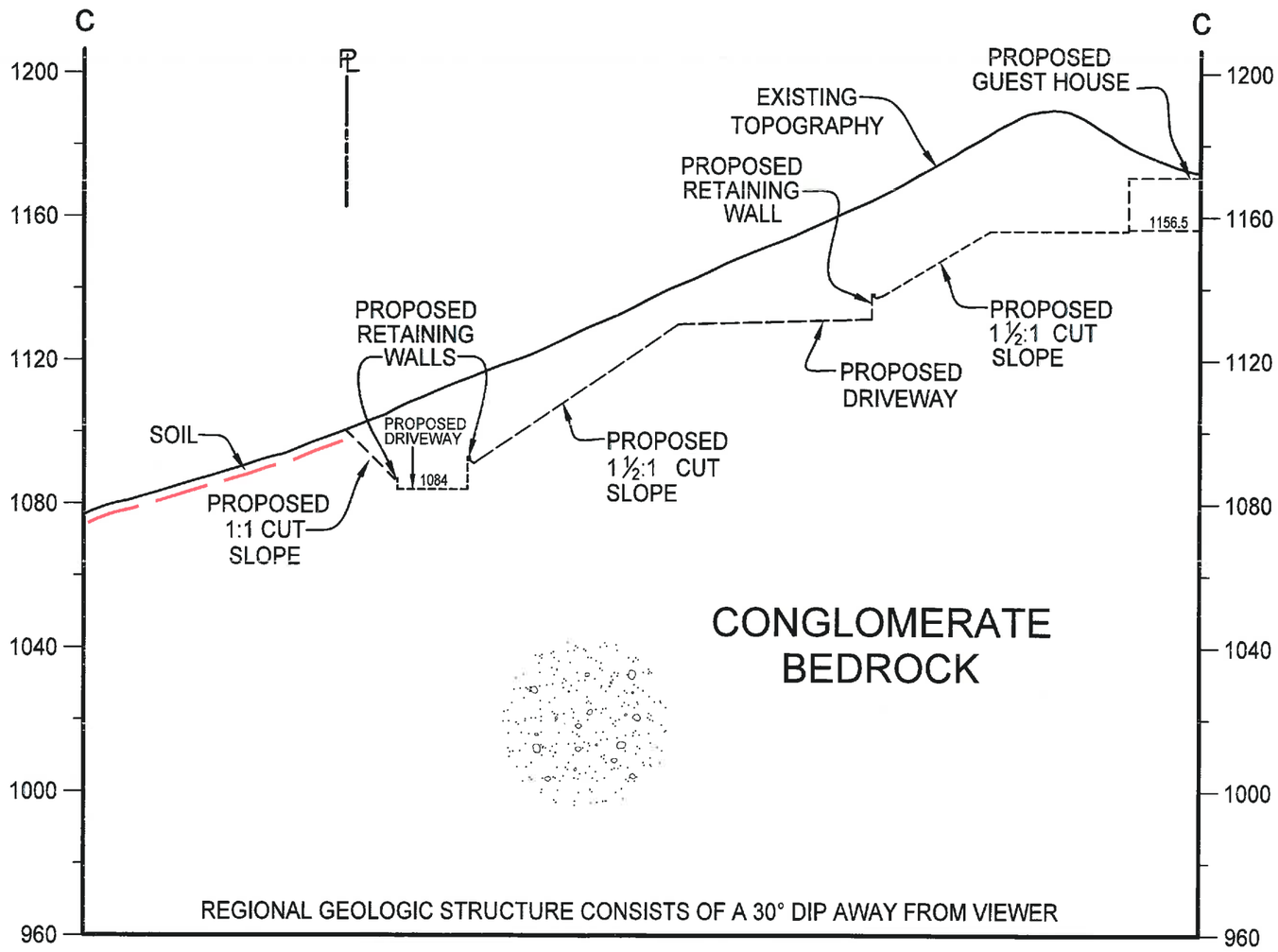


SECTION B

DECEMBER 21, 2018

BYER
GEOTECHNICAL
INC.
1461 E. CHEVY CHASE DR., SUITE 200
GLENDALE, CA 91206
818.549.9959 TEL
818.543.3747 FAX

SECTION B	
BG: 18554	YORK
CONSULTANT: RIZ	SCALE: 1" = 40'



SECTION C

DECEMBER 21, 2018

BYER GEOTECHNICAL INC.
1461 E. CHEVY CHASE DR., SUITE 200
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818.543.3747 FAX

SECTION C	
BG: 18554	YORK
CONSULTANT: RIZ	SCALE: 1" = 40'

BYER
GEOTECHNICAL
INC.
1461 E. CHEVY CHASE DR., SUITE 200
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818.549.9959 TEL
818.543.3747 FAX

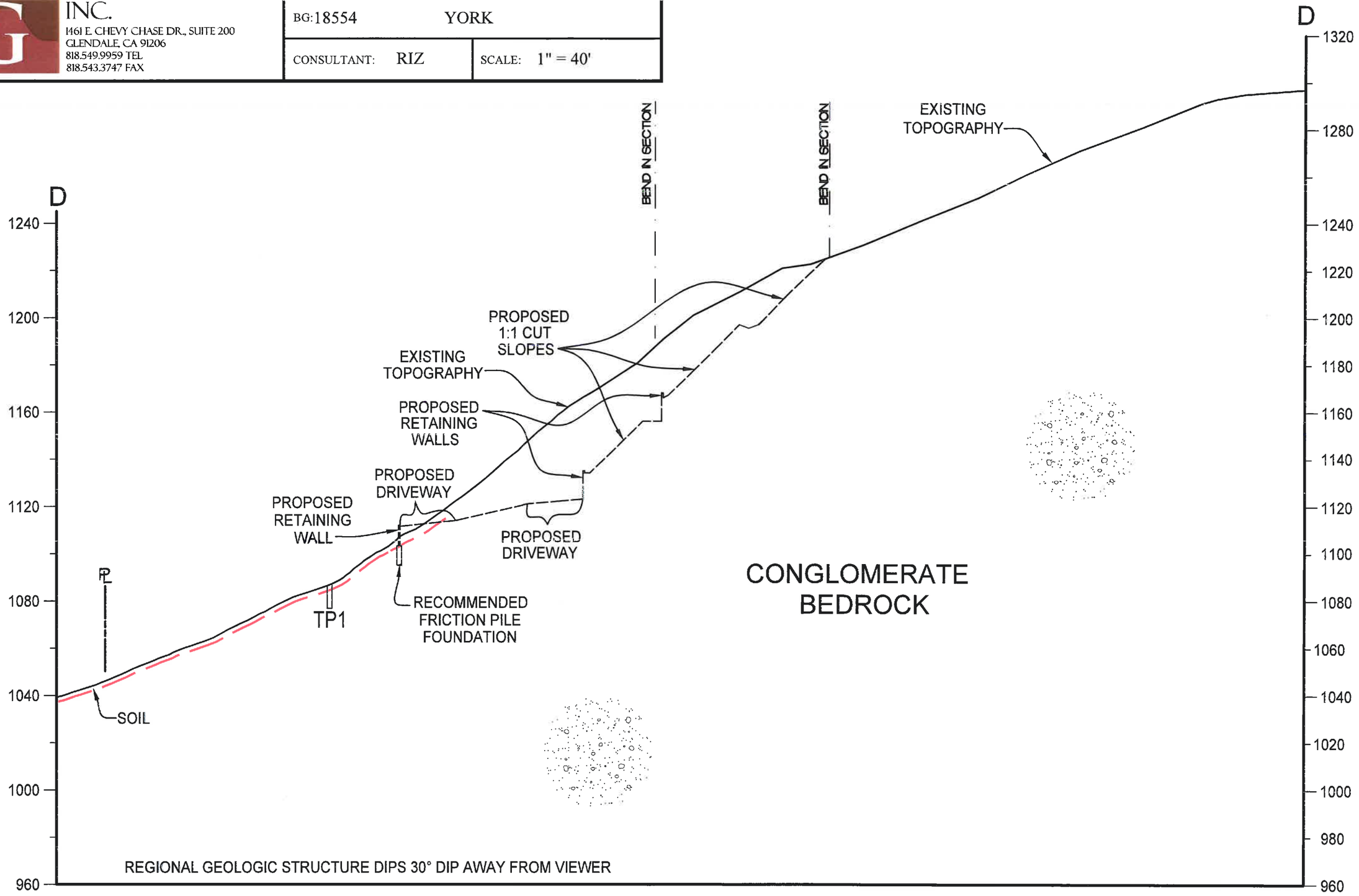
SECTION D

BG: 18554 YORK

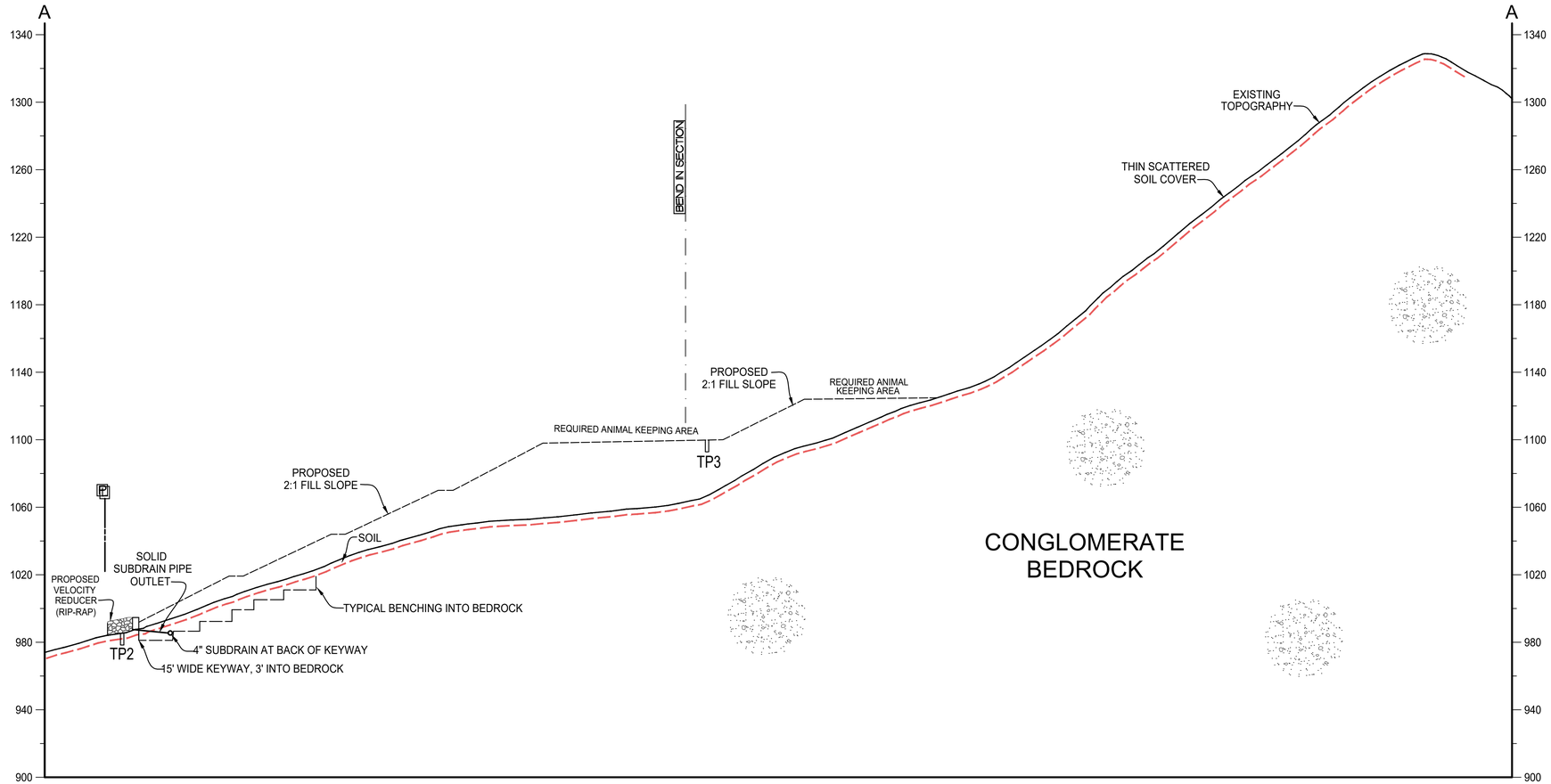
CONSULTANT: RIZ

SCALE: 1" = 40'

DECEMBER 21, 2018



SECTION D



SECTION A

DECEMBER 21, 2018

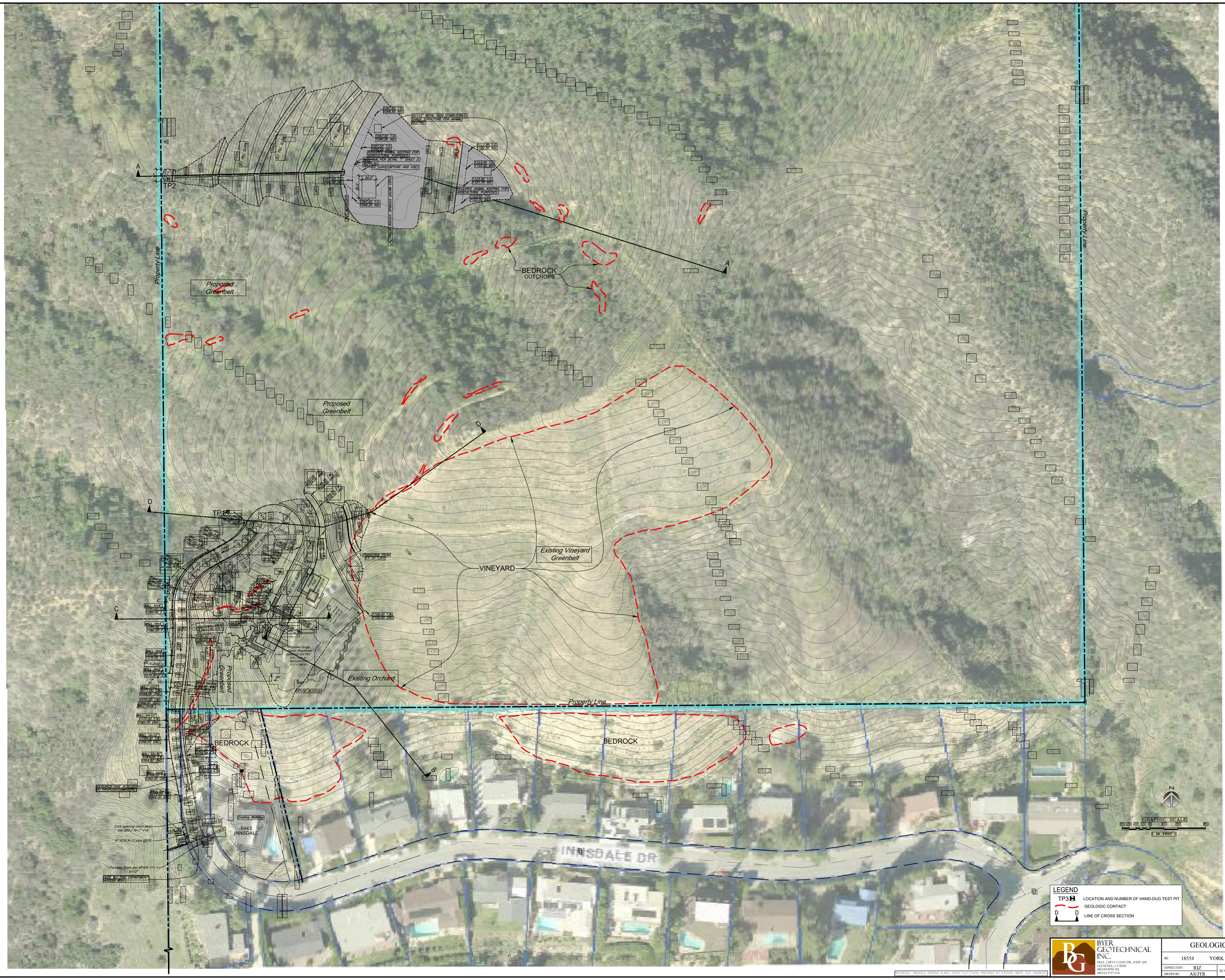
BYER GEOTECHNICAL INC.
1461 E. CHEVY CHASE DR., SUITE 200
GLENDALE, CA 91206
818.549.9959 TEL
888.543.3747 FAX

SECTION A

BG: 18554 YORK

CONSULTANT: RIZ

SCALE: 1" = 40'



LEGEND

TP3 LOCATION AND NUMBER OF HAND-DUG TEST PIT

GEOLOGIC CONTACT

D D LINE OF CROSS SECTION

REFERENCE: INNSDALE GRADING PLANS, DATED 12/11/2018, PREPARED BY STEPHEN SMITH, CIVIL ENGINEER

DECEMBER 21, 2018

BYER GEOTECHNICAL INC.
1900 E. CHEVY CHASE DR., SUITE 200
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818.549.0959 TEL
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GEOLOGIC MAP

BG:	18554	YORK	
CONSULTANT:	RIZ	SCALE:	1" = 40'
DRAWN BY:	AS/JTR		