GEOTECHNICAL INVESTIGATION REPORT

for

HIGHLAND ESTATES
San Mateo, California

Submitted to: THE CHAMBERLAIN GROUP
San Carlos, California

Prepared by: SOIL FOUNDATION SYSTEMS, INC.
Fremont, California

July, 1993

SOIL FOUNDATION SYSTEMS, INC.

Geotechnical Engineers • Engineering Geologists
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File No. S22-634-2
June 20, 1993

The Chamberlain Group
P. O. Box 970
San Carlos, California 94070

Attention: Mr. Jack Chamberlain

Subject: HIGHLAND ESTATES
San Mateo County, California
GEOTECHNICAL INVESTIGATION

Gentlemen:

Transmitted herewith is our geotechnical investigation report for the proposed residential development on the subject site.

This investigation was performed to explore subsurface conditions of the site, evaluate the geotechnical, geologic and seismic factors that could significantly affect the proposed development, and provide recommendations to mitigate any adverse effects of these factors. It is our conclusion that the proposed development is essentially feasible from the geotechnical engineering standpoint, when the various mitigation measures are implemented as recommended in the accompanying report.

The accompanying report presents the scope of the investigation, our findings and conclusions, and our recommendations pertaining to geotechnical engineering aspects of the proposed development.

Very truly yours,

SOIL FOUNDATION SYSTEMS, INC.

R. Patrick Fain

Darwin Myers
C.E.G. 946

K. C. Sohn
G.E. 795

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GEOTECHNICAL INVESTIGATION

for

HIGHLAND ESTATES
San Mateo County, California

1. INTRODUCTION

The subject property is located in San Mateo County just north of State Highway 92 and east of U.S. Highway 280, and comprises approximately 97 acres of natural terrain on the east-facing flank of the northwest-trending Pulgas Ridge. The site is bounded on the north by Bunker Hill Drive, on the east by Polhemus Road, on the south by Ticonderoga Drive, and on the west by residential communities and Yorktown Road.

A residential development called Highland Estates is proposed on approximately 20 acres of the site, with the remaining 77(±) acres preserved as permanent open space. The residential development includes 18 single-family lots at four separate locations along parts of the northerly and westerly boundaries of the site and 74 townhome units over a 12-acre portion in the southeast section, as shown on Plate 1.

The purpose of the investigation was to explore the subsurface conditions, evaluate any significant geotechnical, geologic and seismic factors that could adversely affect the proposed development, and to provide recommendations designed to mitigate these affects. The recommendations cover geotechnical aspects associated with the site development, foundations, retaining walls and other facilities.

2. SITE DESCRIPTION

The site is essentially surrounded by existing residential areas and other improvements. The Pulgas Ridge, on which the site is located, is a dominant northwest-trending landform. Several spur ridges of this main landform dominate the topography of the site. The highest peak occurs in the northwestern section within the proposed open space and reaches Elevation 750 feet. Maximum elevation relief within the site is approximately 350 feet. Outcrops of massive hard bedrock exist at several locations on the steep slopes. Thick vegetation covers most of the area.

Generally the northward facing slopes and ravines are covered by mature coast-range type oak woodland. Dense chaparral mantles much of the remainder of the site.

Drainage of the site is generally northeastward to the drainage facilities located along Polhemus Road. The existing drainage facilities along Polhemus Road in the area include an approximately 250 foot long open ditch that extends northward from the Polhemus Road-Ticonderoga Drive intersection and culverts, with several inlets, in the remaining portion. The site contains three prominent natural drainage areas. One is located through the central portion and is completely contained within the proposed open space. Another lies in the northwestern section, extending parallel to Bunker Hill Drive below the area of the proposed single-family lots 1 through 4, and terminates at a culvert in the Yorktown Road right-of-way. The southernmost watercourse bisects the area proposed for townhome development.

In addition to these main drainages, numerous ancillary drainages exist. Erosion gullies, carved by water released from the reservoir located atop the high peak in the northwestern section of the site, are present downslope from the water tank. These gullies are locally 15 to 20 feet deep. The discharge from the storm drain pipe at the terminus of Cobble Hill Place has caused gully erosion. These erosion gullies are as deep as 8 feet locally and generally direct runoff toward the existing Ticonderoga Townhomes, located at the corner of Ticonderoga Drive and Polhemus Road.

There are several existing landslides of various sizes within the proposed open space portion of the site. These features are shown on Plate 1.

3. SCOPE AND METHOD OF INVESTIGATION

3.1. Review of Published Geologic Maps, Literature and Reports

A variety of published sources were reviewed to obtain an overview of the geologic and seismic setting of the site. These sources consisted chiefly of reports and maps published by the U.S. Geological Survey. The most significant of these sources include a general purpose geologic map (Brabb and Pampeyan, 1983); a hillside materials map which comments on engineering properties of bedrock formations (Wentworth, Elen, Frizzel and Schlocker, 1985); a liquefaction susceptibility map (Youd and Perkins, 1987); a ground shaking intensity map (Thomas and Everden, 1986), and a relative slope stability map (Nilsen, et al, 1979).

We reviewed the relevant consultant-prepared reports for projects proposed previously on the southernmost 12 acres of the site. The most significant geologic investigations for this portion were those performed by United Soil Engineering (1977) and Berlogar, Long and Associates (1980). Other sources of the relevant literature included in our review are presented, along with

those mentioned above, in the List of References.

3.2. Examination of Aerial Photographs

Vertical angle, black and white aerial photographs were examined with a mirror stereoscope equipped with 3x binoculars. Aerial photographs furnish a means of observing large-scale, subtle features that may appear isolated and inconsequential. With the overview that aerial photographs provide, a systematic pattern of features may be observed which collectively provide insight into the potential for the occurrence of geologically unstable conditions on the property. Older photographs provide an opportunity to observe delicate slide-related features that may have been subsequently obscured by human activities. The aerial photographs examined were taken in 1955, 1961, 1983 and 1985.

3.3. Reconnaissance Mapping

The project geologist and geotechnical engineer performed a field reconnaissance of the area planned for development and the adjacent area. Rock outcrops, existing fills, and seepage areas were mapped, and geomorphic features observed on the aerial photographs were field checked. Some of these features were established solely by using terrain features and/or cultural features. Many of the boreholes were located by field survey. These boreholes were utilized as local control points to aid mapping of the location of geologic contacts, outcrops and certain terrain features, e.g. creek channels.

3.4. Subsurface Exploration

The subsurface exploration program consisted of test borings and test pits. The field work was performed on April 3 and April 6, 1990, and during the period of July 16 - 30, 1992. The test pits were excavated on the 21st and 24th of July, 1992, with a rubber-tired backhoe equipped with a 24-inch bucket. The wall of each test pit was cleaned in a grid pattern, exposing continuous horizontal swaths every five (5) feet. Where soils were exposed and in all areas where geologic contacts and weathering related profiles were exposed, the trench wall was cleaned for continuous tracing of contacts. An accurate profile was prepared utilizing a hand level and tape, geologic contacts and structural features were observed, geologic units were described, and a log was prepared that showed the details of observed features and conditions.

Altogether 32 test borings were logged, including the six borings which were logged on April 3 and 6, 1990. The borings drilled and logged during 1992 are designated as B-1 through B-26, and the borings logged in 1990 are designated as P-1 through P-6 on Plate 2. Borings B-1 through B-24 and test pits T-1 through T-3 were located through a field survey performed by

the project civil engineer, Brian Kangas Foulk. Locations of the test pits and borings are shown on Plate 2.

Types of equipment used for drilling included a truck-mounted rig using 6-inch diameter continuous flight augers, a portable rig (Minuteman) using 3-inch diameter continuous flight augers, a portable rig (Remote & Track) using an 8-inch diameter auger with extensions, and a backhoe rig using an 8-inch diameter auger with extensions. The borings were drilled to depths ranging up to 37 feet. Holes drilled with each type of the equipment mentioned above are listed below:

Truck-mounted rig :	Holes B-1 through B-7, B-9, B-12, B-17 through B-24 and P-4 through P-6.
Minuteman rig :	Holes B-14, B-16, and P-1 through P-3.
Remote & Track rig :	Holes B-8 and B-15.
Backhoe rig :	Holes B-10, B-11, B-13, B-25 and B-26.

Core samples of the subsurface materials were obtained during the drilling operation at various depths. Core samples from holes drilled with a truck-mounted rig were obtained by driving a 2-1/2-inch I.D. split-tube sampler into the undrilled mass of the material with a hammer weighing 140 pounds and dropping a distance of 30 inches for each blow, operated by an automated driver. With the Minuteman rig, samples were obtained with a 70-pound hammer, operated manually by using both the 2-1/2-inch I.D. sampler and also the standard penetration sampler. Blow counts for each six inches of driving were recorded. The sampler housed three brass liners, each measuring 2.375 inches in inside diameter and 6 inches in length, for retention of the core samples. The liners containing the sample were capped with plastic caps at both ends and sealed with adhesive tape. Spoils from drilling were also collected for laboratory analysis.

Each boring hole was logged by the project geotechnical engineer and project geologist during the drilling operation. Material descriptions in field logging included color, texture, gradation, moisture condition, stiffness, condition of weathering and other features which were determined based on examination of the materials recovered from core sampling and the spoils from drilling. The field logging also included the resistance to sampler driving and drilling resistance. These descriptions were modified as necessary based on the results of the laboratory tests and visual examination of the samples during and after the laboratory testing. Final descriptions of the materials were used to construct the logs of test borings presented on Plates 4 through 26. The boring logs also show the location of the core samples taken and penetration resistance of the sampler (blow counts for 12-inch penetration).

3.5. Hydrogeological Study

All the streams, drainage gullies and the slopes within and in the vicinity of the areas proposed for development were examined for evidence of water seepage. The confirmed seepage areas are shown on the geologic map, Plate 2. Groundwater was encountered during drilling in three test borings, B-14, B-16 and B-17, all located within the area of the proposed Concord Place extension. These three holes were provided with piezometer casings. No other holes encountered groundwater during drilling. However, two other holes, B-9 and B-22, located in the townhome area, were also provided with piezometer casings to study the water activity during and subsequent to the winter season. Hole B-9 is located in the proposed deep fill area in the main drainage swale, and B-22 is located in an area of a gentle topographic swale. The casing consisted of 3/4-inch and 1-1/4-inch diameter, perforated PVC pipes. The space outside the casing was filled with drain rock and the drain rock was capped with concrete. Upon installation of the casing, the water in the hole was pumped out and allowed to attain a stabilized surface level prior to taking the initial water level. This procedure was done to eliminate the effect of the drain rock backfill on the initial water level. These holes were examined for changes in the water level 24 hours after the drilling and on March 20 and April 15, 1993.

3.6. Laboratory Soil Tests

The laboratory soil testing program included determination of dry density of the core samples and Plasticity Index, a UBC swell index test, unconfined compression tests, direct shear tests, compaction tests, triaxial compression tests and consolidation tests.

Compaction tests were performed in accordance with the ASTM test procedure D1557-90 on representative materials from the anticipated deep cut areas, and the results established the basis for fabrication of test specimens for other types of tests.

Direct shear tests samples were placed in water under surcharge for one day prior to testing in order to increase the degree of saturation, and the tests were performed at a constant strain rate of 1/100 inch per minute. Residual shear strength was also measured by repetitive testing after reversing the displacement that had occurred during the previous run. Direct shear tests were performed on selected core samples as well as on fabricated samples.

Unconfined compression tests and triaxial tests were performed under a stress-controlled loading. Triaxial compression tests included unconsolidated-undrained type and consolidated-undrained type with pore pressure measurements, and used a multi-phase testing technique.

Consolidation tests were performed on core samples from the deep fill areas as well as on fabricated samples of materials from the deep cut areas in order to evaluate the settlement characteristics of the proposed deep fills.

Results of these tests are presented on Plates 6 through 40 and in Table IV of Appendix A.

3.7. Geotechnical Analysis

Geotechnical analysis included the following:

a) in-depth and detailed review of the grading scheme proposed in the vesting tentative maps of the project;

b) programming for test boring layout and soil sampling;

c) careful examination and selection of soil samples for pertinent soil mechanics testing;

d) review and reduction of the test data;

e) evaluation of the groundwater seepage effects on the stability of slopes;

f) determination of geotechnical criteria for selection and design of suitable retaining wall systems and foundations;

g) evaluation of settlement characteristics of deep fills,

h) determination of critical slope cross-sections and performance of stability analysis, and

i) determination of methods and geotechnical design parameters for slope stabilization, where required, based on the results of the slope stability analysis.

The geotechnical analysis focused in detail on the assessment of slope stability. Altogether ten critical slope locations were selected based on the subsurface information, topographic conditions and heights of the new slopes and retaining walls proposed in the grading plan, and cross-sections were constructed through the slopes for the purpose of performing stability analyses. The proposed constructed slope lines were taken from the cross-sections as shown on sheet 5 of 5 of the vesting tentative map for the 74-unit townhouse development. The anticipated loadings on the slope were established by the project geotechnical engineer, based on the proposed grading plan. Geologic cross-sections were then prepared by the project geologist for use in the subsequent slope stability analysis. Locations of these cross-sections are shown on Plate 2. All ten geologic cross-sections are shown on Plate 3.

4. DISCUSSIONS AND CONCLUSIONS

4.1. Geologic Setting

4.1.1. Regional Geology

Highland Estates is located in the Coastal Ranges geomorphic province, an area which is characterized by steep sided northwest-trending ridges and valleys. The bedrock in this province has been tightly folded and is cut by both active and inactive faults. Geologically speaking, the ridges and valleys of the Coast Ranges are quite young, and there is evidence that uplift is on-going. Landslides and other slope stability problems vary with climate, topography, bedrock geology and other local factors.

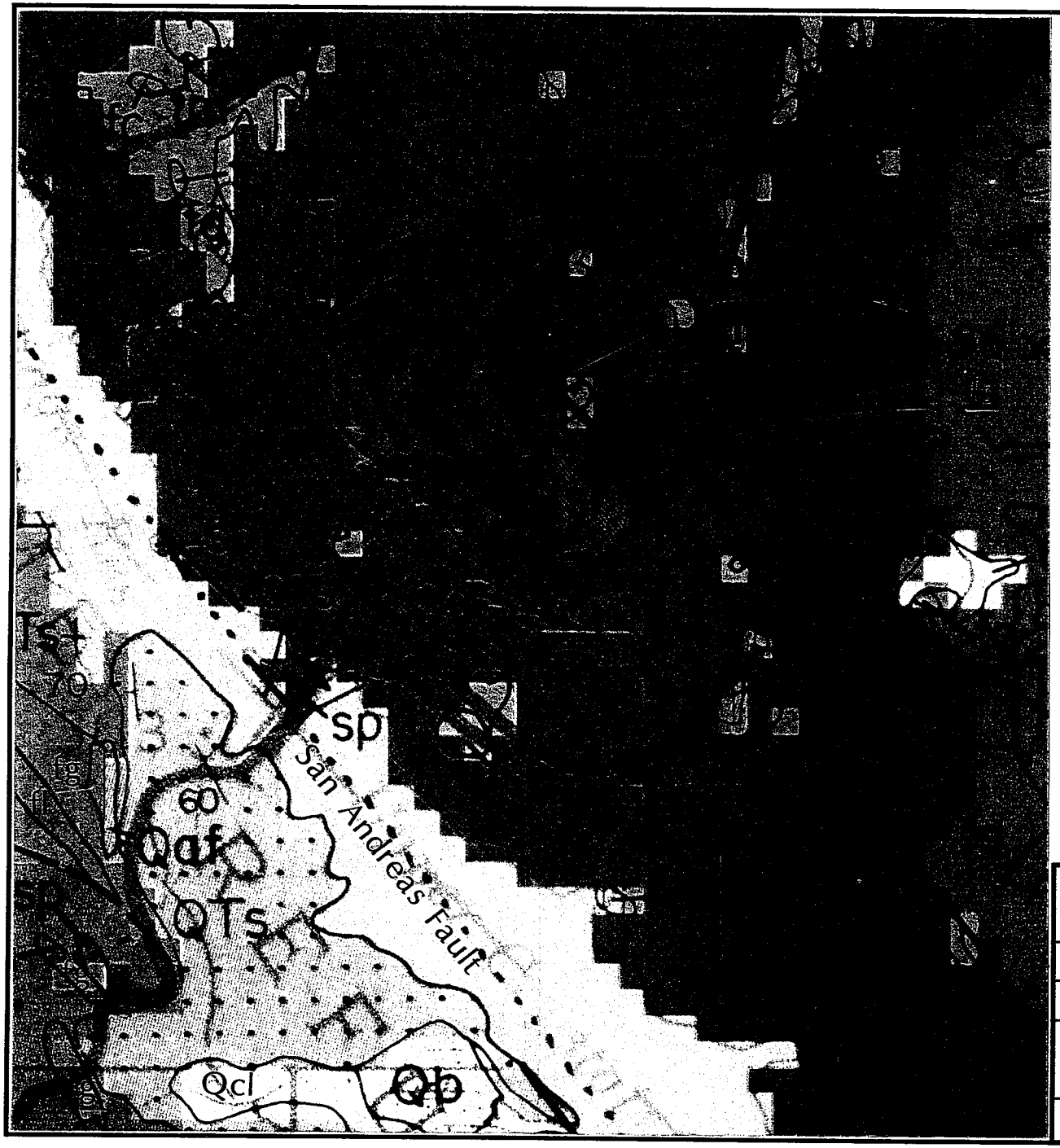
Highland Estates is chiefly on the northeast-facing flank of Pulgas Ridge. The San Andreas fault is approximately 4,000 feet southwest of the site.

4.1.2. Bedrock Geology

As mapped by the U.S. Geological Survey (Brabb and Pampeyan, 1983) the subject property is located within an outcrop belt of Franciscan melange (fsr). Franciscan melange is a disrupted assemblage of large and small masses of various hard rock types embedded in a fine-grained matrix of intensely sheared and crushed graywacke sandstone and shale. Figure 1, which has been photographically enlarged from the original USGS geologic map of San Mateo County, shows the distribution of bedrock units identified in the vicinity of the property to include chert (fc), serpentinite (sp), and greenstone (fg).

The terrain of the site is characterized by the presence of scattered prominent outcrops of monument-like masses of hard rock projecting out of otherwise smooth, brush-covered slopes. These hard or resistant masses on the property consist chiefly of graywacke sandstone and serpentinite. Elsewhere in the San Mateo area these hard masses also include chert, greenstone and glaucophane schist. The hard "knockers" rarely show evidence of continuity between outcrops. They represent isolated tectonic fragments delivered from a disrupted source or sources.

Figure 2 is a map prepared by the USGS (Wentworth et al, 1985) that describes the engineering character of bedrock formations. To enhance readability, it has been photographically enlarged from its published scale (approx. 1 in. = 1 mi.) to 1" =2,000'. It indicates that the site and adjacent properties are within Category I (gouge and sheared shale with hard blocks of sandstone).



Quaternary Deposits

Qaf	Artificial Fill
Qcl	Colluvium (slope wash deposits)
QTs	Santa Clara Formation (non-marine poorly sorted alluvial deposits of Plio-Pleistocene age)
QTm	Merced Formation (sandstone, siltstone and claystone of Plio-Pleistocene age)

Franciscan Assemblage

fsr	Sheared rock (predominantly graywacke, siltstone and shale)
fc	Chert
fs	Graywacke Sandstone
fg	Greenstone
fm	Metamorphic Rocks
fl	Limestone
sp	Serpentenite

Geologic Contact

Fault (dashed where location approximate; dotted where concealed)

60 Strike and dip of bedding

Source: Brabb & Pampeyan (1983)

USGS GEOLOGIC MAP

SCALE:	1"=2000'	FIGURE: 1	N
DATE:	7-20-93		

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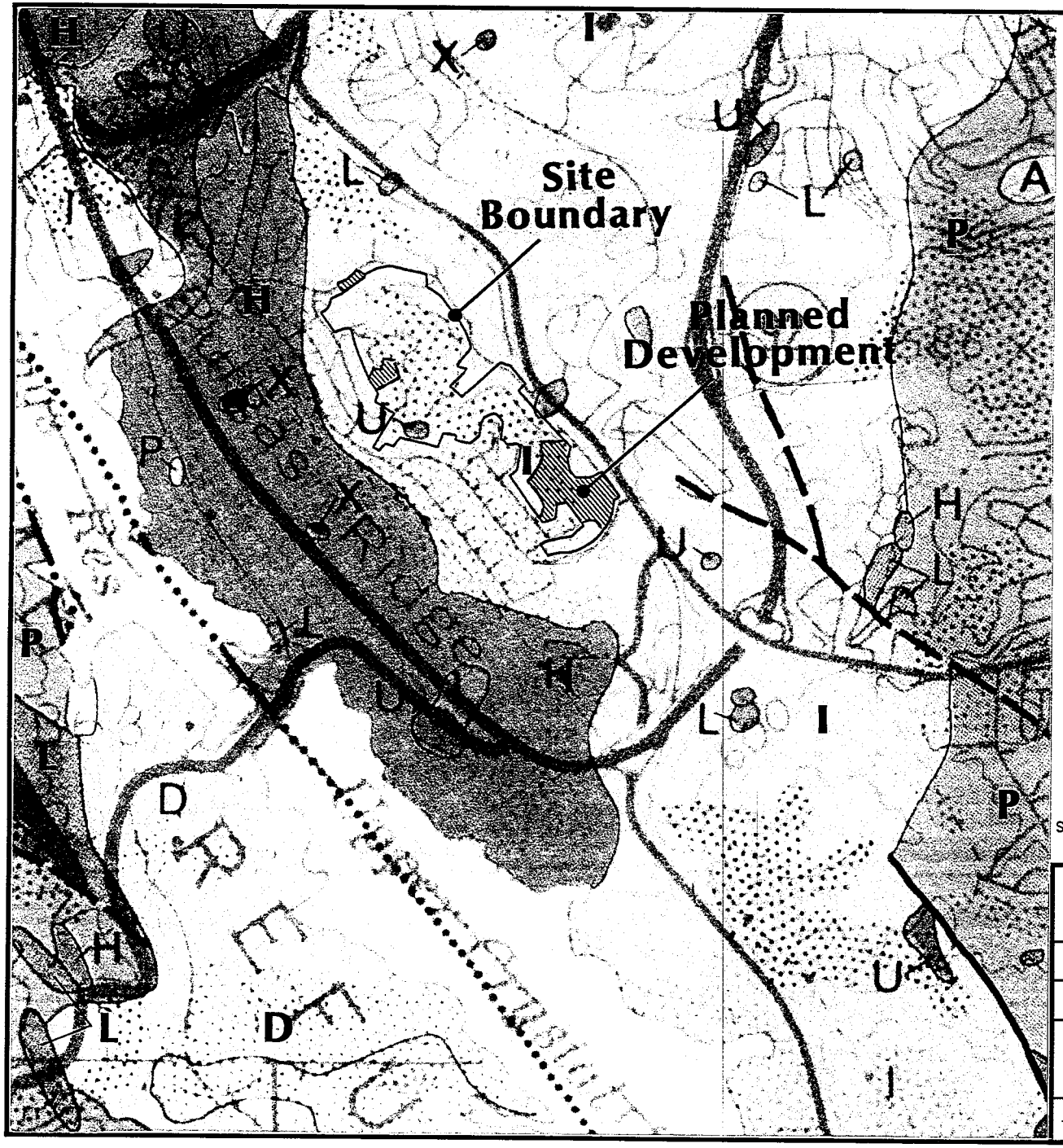

A SANDSTONE AND SILTSTONE (Merced Formation) firm to soft, permeability low to moderate, some rock expansive.

D CONGLOMERATE AND SANDSTONE (Santa Clara Formation) firm to soft, permeability low, some rock expansive).

H SERPENTINE WITH GROUGE AND HARD BLOCKS (Serpentine) soft to hard, shears close and fracture spacing moderate to wide, permeability very low to low, some rock expansive.

I GOUGE AND SHEARED SHALE WITH HARD BLOCKS AND SANDSTONE (sheared rock of Franciscan assemblage) soft to hard, fracture spacing very close to close, permeability very low to low, much rock and mantle expansive.

L BASALTIC VOLCANIC ROCK (Greenstone of Franciscan assemblage) firm to hard, fracture spacing close to wide, permeability very low to low much mantle expansive.

P SANDSTONE AND SOME SHEARED SHALE AND GOUGE WITH HARD BLOCKS (sandstone and conglomerate of Franciscan assemblage and undivided Franciscan assemblage) hard to firm, fracture spacing close to moderate permeability, very low to low, some rock and mantle expansive.

U CHERT AND FERRUGINOUS SHALE (chert of Franciscan assemblage) hard to soft, fracture spacing close, permeability very low to moderate, largely unexpansive.

X METAMORPHIC BLOCKS (metamorphic rocks of Franciscan assemblage) hard, fracture spacing moderate to very wide, permeability very low to low, unexpansive.

Source: Wentworth, Ellen, Frizzell, Jr., Schlocker (1985)

USGS HILLSIDE MATERIALS MAP			
SCALE: 1"=2000'		FIGURE: 2	n
DATE: 7-20-93			
SOIL FOUNDATION SYSTEMS INC.			
JOB NUMBER: S22-634-2			

Within the San Francisco Bay region, the blocks of hard rock that are embedded in the sheared sandstone/shale matrix range from an inch to miles in dimension. Many of these hard masses, such as the outcrops on the site, are composed of a single rock type and range in size from boulders to blocks covering several acres. Locally, the intensely-sheared melange matrix that encloses the hard blocks becomes relatively weak and easily eroded when exposed to weathering.

The differences in strength characteristics of the various components of the melange result in irregular topographic features and slope stability characteristics. The blocks of competent rock within the melange matrix tend to have very high strength characteristics, while the matrix is generally weaker. This factor was considered in the assessment of slope stability, which is discussed in detail in later sections of this report.

A relative slope stability map of the area, prepared by the USGS (Nilsen, Wright et al, 1979), and presented as Figure 3, indicates extensive instability in the project vicinity. The site is primarily within slope stability Category 4 (moderately unstable). According to the map explanation, lands in this category possess slopes of greater than 15% and are underlain by bedrock units susceptible to landsliding, but are not underlain by landslide deposits. This designation does not indicate that any particular site is unsuited or poorly suited to development. This map has been prepared to provide a regional context for interpreting detailed site investigations. It is not a substitute for a detailed site investigation by engineering geologists and geotechnical engineers. For local government and home builders, it assists in identifying areas that require an in-depth engineering geology investigation to evaluate site specific conditions.

4.1.3. Site Geology

a) Introduction

Plates 1 and 2, placed in the envelope at the end of this report, summarize our interpretation of geologic conditions on the project site. Plate 1 is presented at a scale of 1"=200′ and shows the entire 97 acres of Highland Estates. Of this total, 77 acres are proposed as permanent open space. The proposed open space areas were investigated by reconnaissance methods only (i.e., geologic interpretation of aerial photographs and field geologic mapping). The project engineering geologist devoted one full day to photointerpretation and two days to reconnaissance mapping as a part of our recent efforts in the investigation. Reconnaissance mapping of the entire Highland Estates was also carried out by the geotechnical engineer to gather field data for assessment of slope stability at specific locations.

Plate 2 shows the geology of the portions of the site which are planned for grading and development at a scale of 1"=100′. Data include the location of geologic points of observation

SYMBOL	DESCRIPTION
1A	Unstable. (areas of 0-5% slope that include tidelands, marshlands, and swamplands that are underlain by moist, unconsolidated muds)
1	Stable. (0-5% slopes; not underlain by landslides)
2	Generally Stable. (5-15% slopes; not underlain by landslides)
3	Generally Stable to Marginally Stable. (>15% slopes; bedrock not susceptible to landsliding)
4	Moderately Unstable. (>15% slopes underlain by bedrock units susceptible to landsliding)
5	Unstable. (Areas underlain by or immediately adjacent to landslide deposits)

Source: Nilsen, et al (1979)

USGS RELATIVE SLOPE STABILITY MAP

SCALE:	1"=1 mi.	FIGURE: 3	n
DATE:	7-20-93		

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JOB NUMBER: S22-634-2

(existing outcrops, exploratory borings and test pits), areas of the site disturbed by previous grading, and the location of lines of section for each of the ten cross-sections which were the subject of the slope stability analysis.

The following discussion provides an overview of the geology of the entire Highland Estates site, as shown on Plate 1. Subsequently, geologic conditions for each of the areas planned for grading and development are described. Finally, we present a discussion of the significant geologic features shown on each of the ten cross-sections.

b) Geologic Conditions of Overall Site (Plate No. 1)

The sloping hillside areas of the site are characterized by isolated, monument-like blocks of competent rock (mainly graywacke sandstone) projecting out of the brushy slope. These rock exposures are biased in the sense that they provide views of only the hardest, most erosion-resistant rock on the site. These blocks, which have an areal extent of up to two acres on site, are embedded in a sheared melange matrix.

Bedrock units that are mapped on the site consist of Franciscan melange (Fm), and embedded within the melange are blocks of graywacke sandstone (Ss) large enough to be mapped separately.

Near the ridgecrest is a serpentinite body which appears to be a steeply dipping dike. The sandstone is competent rock that presents good foundation conditions. The serpentinite is variable in character, ranging from hard, blocky-jointed rock to highly sheared. Locally, the serpentinite is altered to a silica carbonate rock by replacement of serpentine minerals with opal, chalcedony, quartz and carbonates of magnesium and iron.

Plate 1 shows the bedrock to be mantled locally by colluvium, alluvium, artificial fill and landslides. These units are described in the explanation to Plate 2. With regard to the landslides, it should be noted that they are present in the proposed open space area and range from small soil slips on oversteepened slopes to coalescing slide complexes up to 4 acres in size. Because of the height of scarp areas and midslope benches and other geometric characteristics, we infer that most slides are of shallow (shallower than 5 feet) or intermediate depth (5 feet to 15 feet) and involve soils and very severely weathered bedrock. Most appear to be soil slips, earthflows and earthflow complexes.

It should be noted that the interpretation of geology shown in Plates 1 and 2 also takes into account the previous investigations of Berlogar, Long and Associates (1980). Specifically, the test pit logs of Berlogar were considered, along with other pertinent information, in mapping geologic contacts in the southeastern portion of the site.

c) Geologic Conditions of Development Areas (Plate 2)

Plate 2 shows the details of the areas planned for development. As discussed in the regional geology section, the strength and stability of the bedrock slopes vary significantly depending on the bedrock geology and other local factors.

The following discussion deals with the specific geologic conditions and grading concept for each development area.

c-i) Lots 1 through 4

These lots are located on the east-facing bank which descends to the ravine floor at approximately 1-1/2:1 (horizontal : vertical). Graywacke sandstone is exposed on proposed Lot 1 and locally at the top of cuts made during the construction of Bunker Hill Drive. Outcrops of bedrock are present on the floor of the stream channel below these lots. A boring on proposed Lot 2 encountered 2 feet of clayey soil overlying graywacke sandstone. The lower elevations of Lots 2 and 3 contain a small topographic swale underlain by colluvium. The colluvium is potentially susceptible to creeping.

Immediately south of Lot 4, on the contiguous ravine bank, our 1990 investigation confirmed the existence of a one-acre slide. This slide is separated from Lot 4 by a bedrock nose, and coincides with a geologic contact of serpentine with sheared Franciscan sandstones and shales. The geologic contact is inferred to be sheared and may also be an area of seasonal groundwater seepage. The movement of the landslide mass occurred in a direction approximately perpendicular to the alignment of the ravine floor. The slide is blocked by the slope on the opposite side of the ravine. Therefore, the proposed development area is outside the direct influence of this landslide, and the intervening sandstone is massive rock.

c-ii) Lots 5 and 6 and Access Road

An existing service road for the water tank provides direct access to these lots. The potential building sites are located near the crest of Hill 750.0. Along the road are outcrops of Franciscan sandstone up to 20 feet high that are standing in cut slopes with gradients of 0.5:1 with only minor raveling. The thickness of soil overlying this competent rock ranges from 6 inches to 24 inches within the existing cut slope areas.

Borings B-25 and B-26 were logged on Lots 6 and 5, respectively, to supplement the geologic conditions indicated in the roadway cuts. Graywacke sandstone was penetrated at depths of one (Lot 6) to three feet (Lot 5). The upper 6 feet of sandstone is severely weathered, but below that depth the sandstone is moderately weathered and presents good foundation conditions.

c-iii) Lots 7 through 14 and Concord Place Extension

Development plans show an extension of Concord Place to serve eight proposed lots, all of which are to be situated on the downslope side of the future roadway. The oak woodland area between the existing neighborhood and the future roadway is to be preserved as ungraded open space. Topographically, this area is located in the upper reaches of a drainage swale which slopes steeply to the northeast. Within the swale are two natural drainage channels. One coincides with the boundary between Lots 8 and 9, and the other crosses Lots 11 through 14. The only grading work proposed in this area is that required for the improvement of the Concord Place extension. The grading concept for Concord Place includes cut slopes into the natural slope above the cul-de-sac portion and retaining walls along the upper side of the road extension. The building sites on Lots 7 and 8 will be accessed by a private driveway. The grading concept for the driveway also involves cut slopes and retaining walls. There are numerous isolated boulders on the ground in the oak woodland area, which appear to have been transported to the site during the mass grading of the adjoining Eichler subdivision.

Borings P-1, P-2, and B-14 through B-19 are relevant to the evaluation of geologic conditions in this portion of the property. Borings B-14 through B-17 are clustered in the future right of way of Concord Place. Each encountered sheared serpentine with associated clay gouge zones; massive, blocky serpentine was penetrated in Boring B-14. Typically, the depth to rock was 3 feet or less.

With the exception of Boring B-15, each boring encountered perched water within the upper five feet of the borehole; however, below the saturated zone the moisture content dropped to 13% or less and the soil sampler penetration resistance (blow count) increased.

Borings P-1 and P-2 were located upslope from the planned extension of Concord Place. Boring P-1, which was situated in the axis of a swale, penetrated 12 feet of fill and colluvium overlying a hard, high density rock which was classified as "sandstone/serpentine". Boring P-2 penetrated 2 feet of sandy clay soil overlying very hard sandstone. No groundwater was observed in either boring.

Boring B-18 penetrated massive serpentine at 4 feet and drilling refusal at 7 feet. To ensure the material being encountered was representative of geologic conditions, Boring B-18A was offset 10 feet from Boring B-18. This boring penetrated very stiff serpentine from 4 feet to the final depth of 16 feet. Boring B-19 penetrated serpentine with sandstone inclusions near the surface, underlain by graywacke sandstone. The sandstone ranged from severely weathered at 6 feet to very hard and only slightly weathered at 16 feet.

In the area of Lots 7 through 14 a strong correlation exists between vegetation and geology. Specifically, the oak woodland is underlain by graywacke sandstone. Locally, the sandstone is mantled by a fill placed on the site when the adjacent Eichler subdivision was constructed.

Downslope from the sandstone is a northwest-trending belt of serpentine characterized by a very dense growth of pampas grass. We interpret the serpentine as a near vertical dike with sheared margins. Projecting out of the slope in the area of Lot 12 and at the cul-de-sac are tectonic lenses of massive graywacke sandstone consisting of mainly fine to medium-grained sandstone. These erosion-resistant bodies occur near the sandstone/serpentine contact. The contact of blocky and jointed sandstone with nearly impervious serpentine is considered to be responsible for the seepage observed in the field.

c-iv) Lots 15 through 18

These lots are proposed at the terminus of Cobble Hill Place, on the crest of the ridge which defines the southeast flank of the main drainage swale on the property. A fill slope is proposed to extend up from the townhome area below and terminate at the rear of Lots 16 through 18. A cut slope is proposed in the north corner of Lot 16 in an area underlain by massive sandstone. Proposed Lot 15 possesses gentle slopes and will require only minor grading.

In 1980, Berlogar, Long and Associates excavated nine test pits in this area. This data indicates bedrock is near the surface, except for the rear of proposed Lot 16 (and adjacent portions of Lot 17), where the depth to rock is greater than 6 feet. The subsurface data gathered by Berlogar is summarized in Table I.

TABLE I

Summary of Subsurface Data
in Vicinity of Cobble Hill Place

(from Berlogar, Long & Associates)

Proposed Lot No.	Test Pit No.	Dominant Rock Type	Depth to Rock (ft.)	Comments
15	30, 33	Melange matrix	3.5, 9	Colluvium/Fill in TP-33
16	3, 4, 31, 32, 39	Melange matrix	1.5 to 6	TP-31 into SS; No rock in TP-3 & TP-4
17	20 27	Melange matrix	1.5 5	Rock in TP-27 is moist to very moist

Our firm logged Boring B-6 just beyond the existing terminus of Cobble Hill Place to validate and refine information on geologic conditions provided by the Berlogar report. This boring reached a total depth of 17 feet. It penetrated 8 feet of fill/colluvium overlying hard melange matrix. The boring penetrated dense serpentine below these surfacial deposits.

c-v) Townhome Area

Development of the proposed townhome area requires placement of engineered fill within a large drainage swale located behind the Hillsborough West Apartments, along with relatively high cut and fill slopes extending into the hillside areas which define the flanks of this drainage swale. The engineered fill in the axis of the drainage swale locally reaches a maximum of 50 feet in thickness. Cut slopes on the perimeter of the fill are typically 15 feet to 20 feet high.

As Plate 2 indicates, our firm logged five borings on the floor of the drainage swale. Additionally, five borings and two test pits were logged on the north flank of the swale. Previously, Berlogar, Long and Associates logged 49 test pits on the ridge south of the main drainage swale. To supplement this existing data base, our firm logged eight borings and two test pits in this area. The geologic map presented in Plate 2 is based on evaluation of this subsurface data, supplemented by geologic reconnaissance mapping and photointerpretation. The geology of the area may be summarized as follows:

Previous Earthwork: Two areas display evidence of previous earthwork. Immediately south of the Hillsborough West Apartments, on-site features include a rough-graded road, abandoned irrigation system and ornamental plants. To the west of the apartment property is a rough-graded road extending along the property line from near Boring B-9 to the area of Boring B-24. A concrete V-ditch runs parallel to this roadway in its lower elevations, and protruding, broken 1-1/2 inch PVC pipe gives evidence of a previous irrigation or subsurface drainage system. In addition, Boring B-24 penetrated drain rock from 2 feet to 8 feet below the surface. The drain rock was perfectly dry and dusty when exposed with a backhoe, indicating no evidence of recent seepage activities or collection of subsurface water.

Colluvium: As the explanation for Plate 2 indicates, colluvium is mapped where the depth to rock is known or inferred to be greater than 5 feet. For the purpose of Plate 2, all swale areas were inferred to contain colluvium, as well as the flanks of the main drainage swale. Our borings indicated that colluvium occurs to a greater depth on the ridge flank south of the main swale than at any other parts of the site, but rarely exceeds 10 feet in depth. The colluvium is generally unstable, especially when exposed on cut slopes.

Tectonic Lenses: Within the melange matrix, three blocks of sandstone are mapped south of the main drainage swale. Additionally, our borehole data indicates a band of sandstone in the hillside area north of the main drainage swale. Also, a predominantly sandstone material was penetrated in boring holes B-22 and B-24, beneath the melange matrix, which is interpreted as a

sheet-like body of sandstone within the melange matrix.

Talus: Berlogar mapped loose talus ranging from 3 feet to 10 feet thick on the lower portion of the north-facing flank of the main drainage swale. Their mapping was based on 7 test pits. Six of the test pits show the talus to be overlain by 2 feet to 3 feet of colluvium overburden, and only one test pit shows more than 8 feet of overburden. Boring B-8 was logged to ascertain thickness of the talus on the lower portion of the slope. This boring penetrated 2 feet of colluvium overlying a severely weathered melange/sandstone bedrock. This suggests that although there may be some bedrock hollows filled with colluvium to a substantial depth on the slope, the thickness is on the order of 5 feet to 10 feet (or less) in most areas. Berlogar mapped talus also over a small area on the central portion of the south ridge, where our Borings B-5 and B-7 were located. The talus is exposed to the surface in this area, and is limited to several feet in thickness.

Alluvium: The floor of the main drainage swale behind the Hillsborough West Apartments is underlain by alluvial deposits. The five borings drilled on the floor of the swale showed a systematic increase in the thickness of alluvium from less than 10 feet in Boring B-13 to 22 feet in Boring B-9. The alluvium is underlain by a yellowish-brown, severely weathered graywacke sandstone.

c-vi) Geologic Cross-sections

A series of ten cross-sections were prepared to evaluate the stability of natural and proposed slopes on the property. The lines of section are shown in Plate 2, and the geologic cross-sections are presented in Plate 3. The interpretation of geology shown on the sections utilized all available borehole and test pit data, and represents the interpretation of the project geologist.

Plate 3 shows the individual borings which directly and indirectly affected the geometry and strength parameters utilized in the stability analysis. The following discussion is intended to highlight significant geologic features for each cross-section.

Section GS-1 is oriented generally east-west and passes through the northern end of the proposed townhome area. It crosses the slope behind the Hillsborough West Apartments and the proposed reinforced earth slopes and retaining walls at the lower end of the townhouse units. The spacing of borings for this section was 100 feet or less, and the depth to the sandstone bedrock formed a systematic pattern along this section. The field data is interpreted as an east-dipping slab of sandstone within melange matrix. No slide debris was identified in this portion of the site.

Section GS-2 trends parallel to and approximately 200 feet south of Section GS-1. The geologic conditions for this section are similar to Section GS-1, but a near vertical dike of

serpentine with sheared contacts occurs near the west end. West of the serpentine, sandstone is mapped. Borings P-1 and P-2 penetrated sandstone southwest of the serpentine dike.

Section GS-3 is located through Lot 8 and crosses the proposed private driveway extension to Lots 7 and 8. The section shows the grading required for this area as well as proposed slopes above and below the roadway. The primary geologic features include a near vertical dike of serpentine, with sandstone upslope from the serpentine and Franciscan melange downslope. The sandstone is mantled by artificial fill at the upper elevations, and the melange is concealed beneath Quaternary alluvium in the drainage swale area.

Section GS-4 is oriented to pass through the proposed deep fill in the main drainage swale, while the upper slope is covered by a dense growth of pampas grass. The section indicates that the pampas grass is underlain by a near vertical dike of serpentine which possesses sheared contacts. Five boreholes on the valley floor confirm the thickness of the alluvium and establish that the valley floor is underlain chiefly by sandstone.

Section GS-5 is oriented generally north-south. It provides an interpretation of geology on the north-facing flank of the main drainage swale, a slope that is nearly 150 feet high and possesses a more or less consistent slope gradient of 50%. Near the top of the slope, Berlogar excavated two test pits, and our investigation included a borehole at the lower portion of the slope. Boring B-8 penetrated approximately 2 feet of colluvium overlying severely weathered melange. At a depth of 5 feet, severely weathered sandstone was encountered. Conversely, Berlogar reported a 10-foot thick layer of loose, blocky talus extending to an approximate depth of 18 feet below the ground surface in one test pit in the upper portion of the slope.

The resulting section shows a bedrock hollow along the upper portion of the slope, which thins to 5 feet in the midslope area. In the lower slope area, active downcutting of the stream channel is inferred to have removed nearly all vestiges of colluvium from the lower elevations of the slope.

Section GS-6 extends from the residential neighborhood (Woodcreek Court) to Polhemus Road. The central portion of this section is interpreted as an erosion-resistant slab of siliceous graywacke sandstone, inferred to possess a westerly component of dip on the basis of available borehole and test pit data. The lower slope area, below elevation 425, consists of colluvium underlain by sheared melange matrix.

Section GS-7 extends from the existing terminus of Cobble Hill Place to Ticonderoga Drive, and is centered in the axis of a minor drainage swale. Geologic interpretation takes into account Berlogar test pit data as well as our borehole logs. The section shows a slope mantled by colluvium, underlain by melange matrix. Sandstone was encountered in Boring B-4, and there are outcrops of sandstone along adjacent Ticonderoga Drive. Boring B-6, located at the

terminus of Cobble Hill Place, penetrated bedrock that consists of melange intruded by serpentine.

Section GS-8 extends from Cobble Hill Place, along a "nose" of sandstone, to Ticonderoga Drive. As the section indicates, the lower elevations consist of a block of sandstone with a near vertical contact at its west boundary. The upper portion of the section shows colluvium overlying melange.

Section GS-9 is located to the south of Section GS-8 and crosses the proposed high cut slope. As in Section GS-8, the contact between the melange in the upper elevations and the sandstone unit in the lower elevations occurs near the mid-height of the slope.

Section GS-10 crosses an existing cut slope located south of the Hillsborough West Apartments. This slope is approximately 20 feet high with a gradient of 1.5:1. This section also crosses the proposed curved retaining wall which will support fills and buildings. By extrapolation from nearby boreholes, the bedrock is mapped as melange below an elevation of 425 feet.

4.1.4 Summary of Site Geology

The site is underlain by bedrock units consisting of Franciscan melange (Fm). Embedded within the melange matrix are blocks of graywacke sandstone and the melange is intruded by a serpentine body. The sandstone is competent rock and ranges in size from small pebbles to large blocks. Serpentine, which is a near-vertical northwest-trending slab of rock, occurs near the ridgecrest, and varies from hard, blocky-jointed to highly sheared. The bedrock on the 97-acre site is mantled locally by colluvium, alluvium, artificial fill and landslide deposits.

Landslides are restricted to the proposed open space area. Based on their geometry, landslides are of shallow (5 feet or less) or intermediate depth (5 feet to 15 feet). They vary from small soil slumps to slides 4 acres in size. No slides were confirmed within the areas proposed for development.

Lots 1 through 6 are within the outcrop belt of competent sandstone. However, the lower elevations of the slope on Lots 2, 3 and 5 are mantled by colluvium (i.e. slope wash deposits), which is potentially susceptible to soil creep.

The proposed Concord Place extension is within an area underlain by a belt of serpentine. This serpentine belt is located between blocky, jointed sandstone in the higher elevations and the siltstone melange of the lower elevations. The sandstone/serpentine contact is characterized by a year-around seepage.

The higher elevations of Lots 15 through 18, as well as the townhome site are chiefly underlain by blocky sandstone/siltstone and minor associated melange matrix. The lower to mid-slope areas are predominantly underlain by the melange matrix. Colluvium/talus is mainly distributed below the mid-elevations of the townhome site. It is potentially unstable when exposed on new cut slopes. During grading operations, cut slopes exposing colluvium/talus will be overexcavated, and the collvium will be removed.

4.2. Seismic Setting

4.2.1. Background

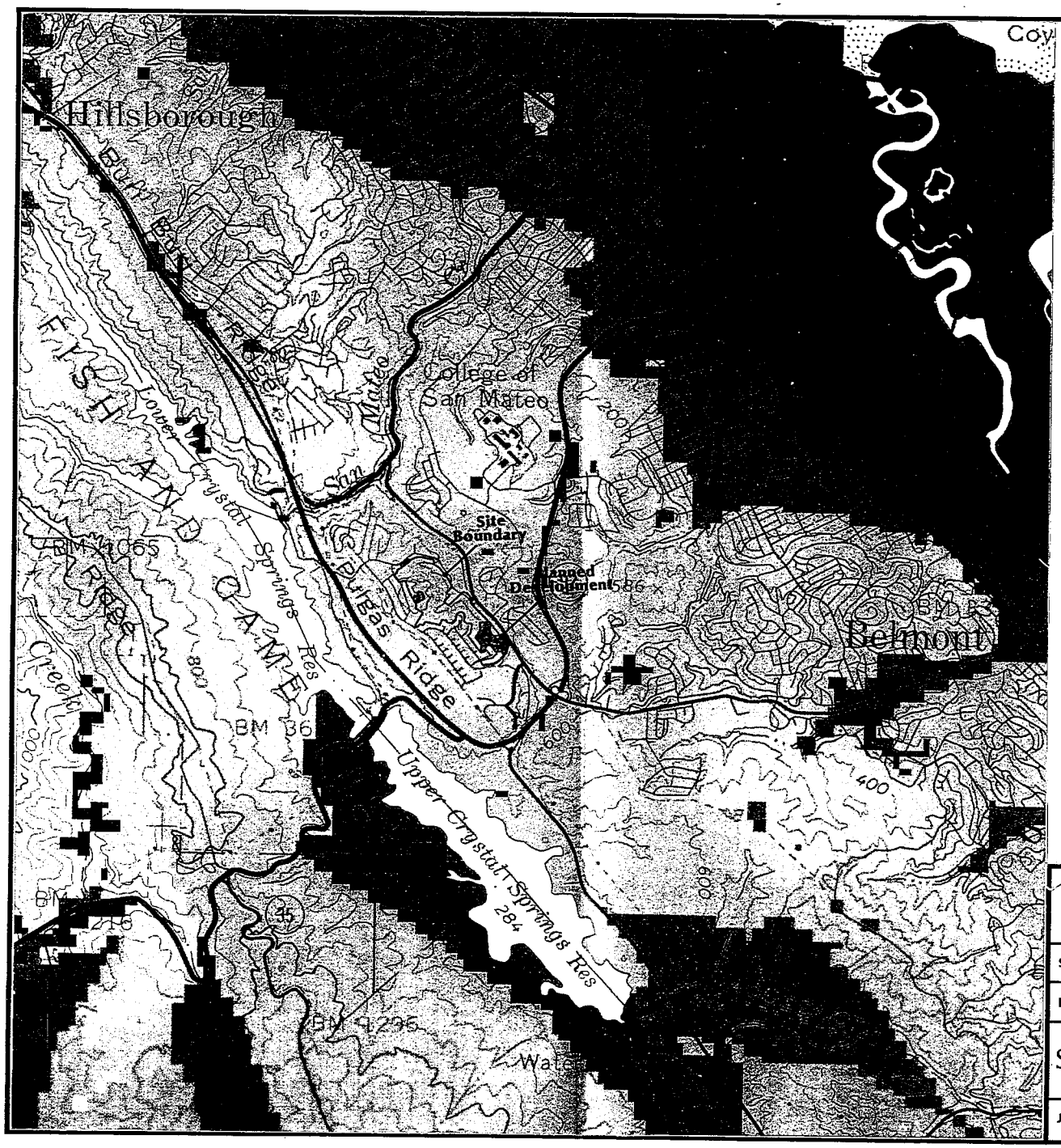
All of the contacts between major geologic units within the outcrop belt of Franciscan melange - serpentine, metamorphic rock, sedimentary rock - are sheared contacts. These shears are related to the "welding" of the Franciscan melange to the North American Continent during Late Mesozoic and Early Cenozoic time. They developed in a different stress field than those that are acting on the earth's crest today. The most recent geologic map of the site is the Geologic Map of San Mateo County, prepared by the U.S. Geological Survey (Brabb and Pampeyan, 1983). According to this map, no active or inactive faults cross the site (see Figure 1).

The active San Andreas fault passes approximately 4,000 feet southwest of the site. The Hayward-Rogers Creek and Calaveras fault systems pass approximately 18 and 25 miles northeast of the site, respectively. Due to the location of the site within a region of high seismicity, it can be anticipated that the planned development will be subjected to the effects of at least one high magnitude earthquake during the useful life of the proposed residences. With regard to the possibility of an earthquake on the San Andreas fault (San Francisco Peninsular segment), a circular issued by the USGS estimates a 23% probability of a magnitude 7 earthquake during the next 30 years. The maximum credible earthquake on the San Andreas fault is a magnitude 8.3 event.

According to a report issued by the USGS (Thompson and Everden, 1986), the property would undergo ground shaking rated as Modified Mercalli intensity 6.5 in the event of an earthquake on the San Andreas fault of comparable magnitude to the 1906 San Francisco earthquake (see Figure 4).

4.2.2. Ground Shaking

Ground shaking by earthquakes is a common regional problem affecting stability of structures and earth slopes. Seismic motions imparted to structures at a site are influenced by the stiffness or density of the material and the soil profile underlying the site. The Uniform Building Code provides methods for considering such site effects in the design of structures so as to minimize the damage potential. One such method is the use of a "site coefficient S". The Uniform



EXPLANATION

Modified Mercalli intensities
(See table 1 for description)

9.0
8.0
7.5
7.0
6.5
6.0

USGS SEISMIC-SHAKING PREDICTION MAP			
SCALE: 1"=1 mi.		FIGURE: 4	N
DATE: 7-20-93			
SOIL FOUNDATION SYSTEMS INC.			
JOB NUMBER: S22-634-2			

Building Code assigns an "S" value of 1.0 to a soil profile consisting of a rock-like material, or stiff or dense soils, not exceeding 200 feet in thickness and 1.2 to a profile consisting of stiff or dense soils exceeding 200 feet in thickness. An "S" value of 2.0 is assigned to a profile containing more than 40 feet of soft clay. The lower the "S" value, the more favorable the site is in site response characteristics when subjected to earthquake motions. It is reasonable to assign an "S" value of 1.2 to the subject site.

The intensity of ground shaking due to earthquakes in engineering applications is commonly expressed in terms of horizontal accelerations at the ground level. The anticipated level of the ground acceleration at a site is determined by the earthquake magnitude, the source distance and the thickness and stiffness of the material overlying the basement rock. A peak ground acceleration of 0.5g is estimated at the site from a magnitude 7 earthquake on the San Andreas fault (Seed and Idriss, 1982). The average equivalent uniform horizontal ground acceleration is a more meaningful basis than the peak acceleration and is commonly adopted as 65% of the peak acceleration (Seed and Idriss, 1972, 1982).

4.2.3. Ground Failure

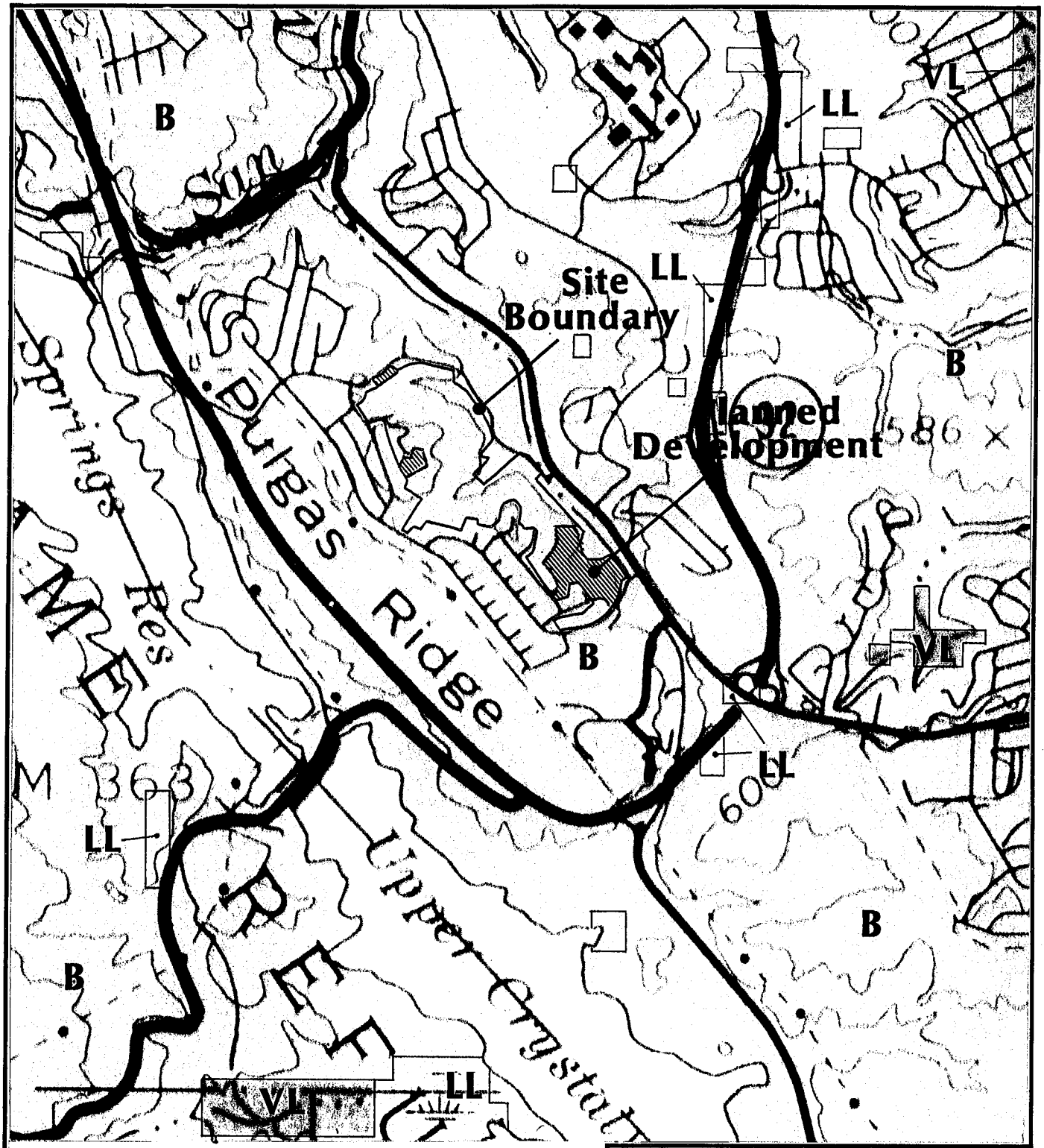
With regard to the potential for earthquake-induced ground failure, review of historic data indicates that the 1906 San Francisco earthquake produced ground cracks and differential settlements in areas of soft, water-saturated ground, and landslides were created on marginally stable or unstable slopes (Youd and Hoose, 1978). No earthquake-triggered landslides were reported on Pulgas Ridge.

Another form of earthquake-induced ground failure is a lateral spreading of liquefied ground. A preliminary liquefaction susceptibility map has been made for San Mateo County by the USGS (see Figure 5). According to this map, the site is within a non-liquefiable bedrock zone. This mapping agrees with our conclusion in this report regarding the liquefaction susceptibility of the proposed development areas of Highland Estates.

4.2.4 Summary

Liquefaction and seismically-induced ground settlement problems are not significant within the site. Further, the potential of ground displacements associated with direct faulting is not significant, as the site is not crossed by known active faults.

It is concluded that a site coefficient (S) of 1.2 is reasonable for the subject site for use in determination of the lateral seismic force for structural design. Further, an equivalent uniform ground acceleration of 0.3g is estimated for the site from a magnitude 7 earthquake on the nearby San Andreas fault.



LL LOCALLY LOW -- Liquefiable sediment not found in borehole drilled within 1 hectare grid cell

VL VERY LOW -- Less than 0.01 percent probability of liquefiable sediment based on average for map unit

B BEDROCK --

Source: Youd, Perkins (1987)

USGS LIQUEFACTION SUSCEPTIBILITY MAP			
SCALE: 1"=2000'		FIGURE: 5	n
DATE: 7-20-93			
SOIL FOUNDATION SYSTEMS INC.			
JOB NUMBER: S22-634-2			

It is concluded that the most critical seismic factor is the effect of the ground acceleration on stability of the proposed slopes. This seismic effect is considered in our slope stability analysis, and will be discussed further in later sections of this report.

4.3. Soil Conditions

4.3.1 Engineering Characteristics

Well-developed soils are generally limited to less than 3 feet in thickness over much of the ridge flanks. These soils range from colluvial sandy silt to residual sandy to silty clay. In the main drainage swale in the proposed townhome site, the soil cover attains a maximum thickness of close to 22 feet, and consists of stiff sandy to silty clay. Colluvium and weathered bedrock are expected to be the main source of fill material.

Engineering characteristics of the materials underlying the site are discussed below:

Expansion Potential: Index properties, such as Plasticity Index (P.I.), are often used to qualitatively evaluate the expansion potential of soils. Plasticity Index was determined on 13 samples which were obtained from various parts of the site and at varying depths. Of these, the highest Liquid Limit (L.L.) of 42% and, correspondingly, the highest Plasticity Index (P.I.) of 12% were determined on sample No. B21-A. The lowest L.L. (20%) and P.I. (4%) were determined on sample No. B17-3, which is described as serpentine in the boring log. The average value from all thirteen tests was 31% for L.L. and 8% for P.I. Clayey soils derived from serpentinite are generally recognized as having high expansion potential. However, the index values presented above are in the range indicating low to moderately low expansion potential. This may be attributed to the silty and quite sandy nature of the material.

Erodibility: Soil erosion can occur on slopes as a result of scouring by concentrated runoff or by a process of deflocculation when the soil is dispersive. The erosion channel formed in the slope above Ticonderoga Drive, directly below the terminus of Cobble Hill Place, was caused by the uncontrolled release of concentrated flow from an existing storm drain outlet. This feature is not an indication that the slope is highly erodible under natural conditions.

Natural slopes on site are relatively free from this type of erosion, even on the steep cut banks along Ticonderoga Drive, which possesses a gradient of 1:1. These slopes exhibit only minor raveling. The lack of erosion damage over the natural slopes may be attributed to a combination of the well-established protective vegetation cover and the favorable soil characteristics. Erosion control measures are, however, required for newly-constructed slopes, including the establishment of protective vegetation cover.

Compactability: The native soils and rocks are suitable for compacting with sheepsfoot rollers. Rocks found on the site should be crushable and reducible in size with regular compaction equipment, with the exception of some of the isolated boulders present on the upper slopes. These large size boulders can be incorporated in deep fills, with careful compaction of the fills around them.

Compressibility: When properly compacted, the engineered fills, consisting of the native materials, are low in compressibility. The alluvium deposits in the main swale area are also low in compressibility. Consolidation of the fill and alluvium is expected to take place rapidly, and, consequently, much of the fill settlement will occur within several months after completion of the fill.

Strength: The geology section of this report identified several geologic units on the hillside area below the terminus of Cobble Hill Place and Concord Place. The geologic units which will be involved in the proposed mass grading include alluvium (Qa), colluvium (Qc), serpentine (Sp), Franciscan melange (Fm), and sandstone (Ss). As discussed in detail in the previous section, these units generally lack developed structures that would tend to influence stability of the slope. It was our view that these units should be treated as if they were soils for purposes of the slope stability analysis. Strength parameters for these units were determined by various test methods, as discussed earlier. Altogether 16 sets of direct shear tests, 10 unconfined compression tests and 7 sets of triaxial compression tests were performed on samples representing these units.

The strength data for all the identified geologic units on the site show a trend indicating an increase of strength with depth. This trend was also supported by the penetration resistance, moisture content and dry density data.

Colluvium occurs chiefly on the slope surfaces, and is generally very loose. The colluvium will be removed from the natural slopes by excavations required for the construction of cut slopes and base keys for fills. Therefore, strength of the loose colluvium on the natural slopes will have no effect on stability of the slopes. It is noted that the colluvium will form very strong fills when mixed with other on-site materials and compacted.

Alluvium is present to a significant depth only in the main drainage swale of the proposed townhome site. This alluvium unit has been overconsolidated and is therefore stiff. It is predominantly clayey in the upper 10 feet, and becomes increasingly sandy at depth. Strength parameters, as determined from the results of direct shear tests on saturated samples, are 700 p.s.f. for cohesion and 10 degrees to 21 degrees for the angle of shearing resistance (friction angle). Since the alluvium deposits in this area will be covered by more than 30 feet of compacted fill, the strength of the alluvium upon completion of the filling is expected to increase substantially. For the purpose of our stability analysis, a cohesion of 700 p.s.f. was chosen for the entire depth, while the friction angle was chosen as 10 degrees for the upper 10 feet and 20

degrees below the upper 10 feet. The strength chosen for analysis is conservative, as evident from the above discussion.

The sandstone unit occurs as the most stable and the most favorable in terms of strength among all the geologic units of the site. The uniaxial compressive strength (unconfined compressive strength) of the sandstone unit is much higher than 10 k.s.f. This indicates the high cementation effect present in the rock mass. Due to hardness of the rock, core sampling for strength tests was limited to the more extensively-weathered upper strata. Therefore, the laboratory strength of the sandstone unit is expected to be much lower than the actual strength. Selected strength parameters for slope stability analyses are 1,000 p.s.f. for cohesion and 30 degrees for friction angle for the upper 10 feet, and 2,000 p.s.f. for cohesion and 35 degrees for friction angle for depths below the upper 10 feet.

The most significant geologic units for stability evaluation are the serpentine and the melange units, and accordingly, more extensive strength testing was devoted to these units. The significance of the serpentine unit is in the general recognition that its strength is inherently low when extensively weathered and also in that it occurs in an area of active seepage on the site. Two sets of direct shear tests and three sets of triaxial tests were performed on samples obtained from the serpentine unit. Due to the active seepage condition, both total and effective strengths were determined from the results of triaxial tests. Total strength parameters for the serpentine unit are in the range of 400 p.s.f. to 500 p.s.f. for cohesion and 19 degrees to 35 degrees for friction angle. Effective strength parameters are zero for cohesion and 29 degrees to 38 degrees for friction angle. The high friction angle determined by the laboratory testing is attributed to the sandy nature of the material. This material characteristic is also supported by a L.L. of 20% and P.I. of 4% for the serpentine unit. A cohesion of 400 p.s.f. was chosen for the entire depth for the purposes of stability analyses. The friction angle was chosen to vary from 20 degrees for the upper 10 feet to 30 degrees below the upper 10 feet. These values are deemed conservative.

The melange is the most commonly occurring geologic unit on the site. Figure 6 is a plot of variations in penetration resistance, moisture content, dry density, cohesion and friction angle with depth for the melange. This unit exhibits a marked increase in strength with depth. The average uniaxial compressive strength from six tests is approximately 6 k.s.f. For stability analysis, the cohesion was increased from 1,000 p.s.f. for the top 10 feet to 2,000 p.s.f. below the top 50 feet, while the friction angle was increased from 15 degrees for the upper 10 feet to 35 degrees below the top 50 feet, in five increments as shown in Table II.

Several sets of direct shear tests were performed on fabricated samples consisting of the weathered sandstone and melange materials. Cohesion varies from 1,000 to 4,000 p.s.f. and the friction angle varies from 8 to 31 degrees, depending on the mixture of the materials. Since fills will be constructed with a mixture of various types of the on-site materials, it is not the characteristics of one particular type of the material, but that of the mixture of the materials that determines the strength of engineered fills. On this basis, a cohesion of 1,500 p.s.f.

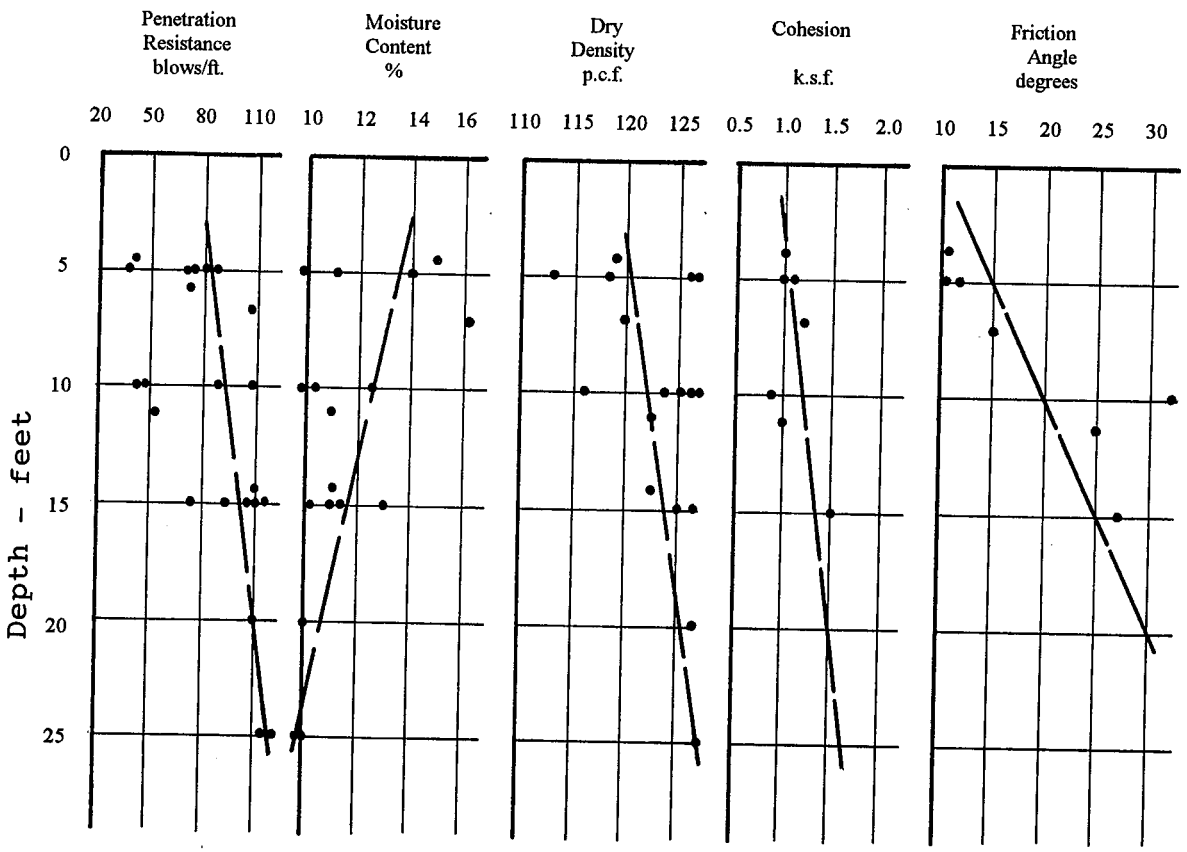


Figure 6 - Field and Laboratory Test Data for Fm Unit.

and a friction angle of 20 degrees were chosen for compacted fills. The strength parameters for the various geologic units discussed above are summarized in Table II. These strength parameters were used in our analysis for slope stability and determination of geotechnical criteria for design of retaining walls and foundations.

Liquefaction Potential: Loose, saturated sand and silt deposits are potentially vulnerable to liquefaction under strong ground shaking. However, this type of material was not present in borings on the site.

TABLE II

SUMMARY OF STRENGTH DATA FOR STABILITY ANALYSIS

Geologic Units	Depth ft.	Cohesion C p.s.f.	Cohesion C′ p.s.f.	Friction Angle ϕ deg.	Friction Angle ϕ′ deg.
Alluvium, Qa-1	top 10′	700	—	10	—
Qa-2	below top 10′	700	—	20	—
Melange, Fm-1	top 10′	1,000	—	15	—
Fm-2	top 10′-20′	1,000	—	25	—
Fm-3	top 20′-30′	1,250	—	30	—
Fm-4	top 30′-50′	1,500	—	35	—
Fm-5	below top 50′	2,000	—	35	—
Sandstone, Ss-1	top 10′	1,000	—	30	—
Ss-2	below top 10′	1,000	—	35	—
Serpentine, Sp-1	top 10′	400	0	20	30
Sp-2	below top 10′	400	0	30	35
Compacted Fill, Qaf		1,500	—	20	—

Note: C, ϕ : total strength parameters
C′, ϕ′ : effective strength parameters

4.3.2 Summary

The expansion potential of the native materials is low and not a critical factor determining the foundation and retaining wall design.

Compressibility of the native soils, in their natural or compacted state, is low. Settlement of the proposed major fills is expected to occur through the first several months from completion of the rough grading. However, differential settlement of fills placed on sloping ground is an important factor to consider in foundation construction. In this regard, it would be prudent to allow the fill to settle through at least one winter cycle prior to foundation construction in areas where the natural ground under the fill is steeper than 6:1 or the fill is more than 10 feet in thickness.

Native soils are subject to active mass wasting when the vegetation cover is removed. Consequently, all newly-constructed slopes should be provided with adequate erosion control measures. Cut slopes exposing the melange unit will require special attention for erosion control.

Strength characteristics of the native materials are variable, depending on the geologic units and depth. Bedrock exists at shallow depths on the site, and shows a trend of significant increase in hardness and strength with increase in depth. Because the core samples tested for strength determination were obtained in the upper weathered zone of the bedrock, the actual in-place strength of the bedrock units at greater depths is expected to be higher than the laboratory strength data summarized in Table II. This conservative approach to estimating strength characteristics of unweathered rock was used in all geotechnical analysis.

4.4. Hydrogeologic Conditions of Development Areas

4.4.1. Lots 1 through 4 and Lots 5 and 6

No tributary watershed is present to generate runoff to these lots. None of the lots contain evidence of active groundwater seepage.

4.4.2. Lots 7 through 14 and Concord Place Extension

This area is located immediately below the existing residential area. Development of this older subdivision involved extensive grading. The grade and surface conditions are such that the backyards of the homes along the project boundary constitute a significant watershed to the proposed development area.

Lots 9 through 11 and the segment of the Concord Place extension fronting these lots experiences year-round seepage. The seepage area is clearly delineated by a dense growth of pampas grass. The geologic condition of this area consists of sheared serpentine bounded on the southwest by massive, blocky jointed sandstone. The seepage discharges to the surface a short distance below the upper boundary of the pampas grass area and feeds the existing main drainage swale located in the proposed townhome site.

Boring B-15 was drilled approximately 25 feet above the upper boundary of the pampas grass area to a depth of 7 feet, and encountered no seepage or groundwater. This boring was drilled with portable equipment and took more than one-half hour to reach the first 7 feet into hard serpentine. Boring B-16 was drilled approximately 50 feet below the upper boundary of the pampas grass area, and seepage was encountered at a depth of 3 feet below the ground surface,

which is the boundary between the overburden soil layer and the serpentine. No standing water was present on the ground surface at this location at the time of our drilling. Boring B-14 was located approximately 200 feet below the upper boundary of the pampas grass area. The grass-covered ground surface was fully saturated at this location, and standing-water was present in ground depressions. Boring B-17 was drilled at the present terminus of Concord Place, and encountered groundwater at an approximate depth of 10 feet, including 5 feet of existing fills. The waterlevel in these three holes was monitored at various times, and the findings are summarized below:

Results of Water Level Survey

Hole No.	Water Level Initial	24 Hours	3/20/93	4/15/93
B-14	0"	+ 4"	+ 5"	+ 8"
B-16	–36"	–22"	+ 3"	–2"
B-17	–120"	–42"	0"	0"

Note + : above the ground surface, and
– : below the ground surface.

The in-place moisture content of the serpentine unit varied from 9.5% to 11.8% below the initial water level, while it was as high as 28.6% at or near the location of the initial water level. Moisture content of the serpentine unit described above suggests that a condition of complete saturation does not exist several feet below the initial water level. In addition, our visual examination of these samples obtained below the initial water level showed no evidence of saturation.

Based on the evidence presented above, it is our conclusion that the seepage occurs in a rather thin zone, 2 feet to less than 5 feet in thickness, at or immediately below the base of the overburden soil layer. The groundwater and seepage in this area are not related to the regional hydrogeological frame, as the Pulgas Ridge on which the site is located is an elevated localized landform. It is not an aquifer that feeds the seepage on the site. The seepage is occurring in severely weathered serpentine bedrock, just below the surface. The original ridgetop above the site was lowered and flattened during grading of the area for residential development many years ago. Fractured, permeable rock is exposed over much of the graded ridgetop area. Rain and irrigation water infiltrate and are conveyed by the rock fractures, feeding the hillside below and seeping out of the slope when the water reaches the impervious serpentine body. The water level rise of 42 inches in Hole B-17, through the winter of 1992-1993, also supports the

conclusion that the groundwater in this area originates from infiltration of the surface water.

Landsliding is common on slopes subject to seepage. However, the natural slopes within the seepage area of the subject site show no evidence of landsliding. This is attributed to the favorable strength characteristics of the serpentine unit discussed earlier. Moreover, the seepage zone is shallow (approximately 5 feet deep), and the seepage is quickly released to the surface. Therefore, seepage forces cannot develop in the natural slope to a magnitude that would significantly affect the slope.

4.4.3. Lots 15 through 18 and Townhome Area

As with the area discussed above, the existing residential area on Cobble Hill Place is a significant tributary watershed affecting the site. Storm drainage from the residential area discharges onto proposed Lots 17 and 18 through a pipeline extending out from the terminus of Cobble Hill Place. Flow from the system has developed deep erosion gullies, some 8 feet deep locally, located over the slope above the existing Ticonderoga Court townhome complex on the south side of Ticonderoga Drive. No hydrophilic vegetation or other indications of shallow groundwater were found in the proposed single-family lot areas or the planned townhome areas on this portion of the site.

The main erosion gully conveys concentrated runoff to Ticonderoga Drive and ultimately discharges the runoff into existing drainage facilities in the Polhemus Road right-of-way. The erosion gully has been carved into the relatively pervious sandstone and more erodible melange, resulting in local areas of ponding. The ponding of water in the erosion gully will increase infiltration into the slope along the edge of Ticonderoga Drive. In addition, the flow that occurs during heavy rains along the edge of Ticonderoga Drive feeds runoff into the aggregate base and subgrade of the roadway. When a natural drainage area has been filled, the water migration through the ground tends to take the natural drainage path that existed prior to grading. Therefore, the infiltration of water from the informal drainage system that links Cobble Hill Place to the drainage facilities in the Polhemus Road right-of-way may have contributed to the existing seepage at the Ticonderoga Court townhouse complex, located in the west quadrant of the Polhemus/Ticonderoga intersection.

Elsewhere in the proposed townhome portion, no seepage areas were detected, other than the runoff carried by ravines. Underdrains will be designed to collect the subsurface seepage where the natural watercourses are filled. According to the proposed site improvement plan, the surface runoff within the development areas will be collected into the project storm drainage facilities.

4.4.4. Summary

The most significant hydrogeological factor is the seepage in the vicinity of Lots 9 and 10 and in the right-of-way of the proposed Concord Place extension. Control of the seepage in this area is necessary to minimize its adverse affect on stability of the proposed road, the mass fills proposed below in the townhome area and the slope itself on Lots 9 and 10.

Another area currently impacted by hydrological conditions is the gully below the terminus of Cobble Hill Place that descends toward Ticonderoga Drive. The gully serves as a reservoir feeding water into the slope below. According to the site improvement plan, the gully and the adverse terrain features in this area will be eliminated. Slope benching and runoff interceptor ditches are proposed, along with other storm drainage facilities. Consequently, the proposed development will significantly reduce infiltration of the runoff and should alleviate the hydrological conditions presently impacting the lower area.

4.5. Reinforced Earth Construction

4.5.1. Background

Reinforced earth construction is proposed for several slopes and retaining walls in the subject project.

Reinforced earth is composed of compacted fill strengthened by the inclusion of reinforcing elements. Reinforcing elements commonly used include metal or polymer strips, geotextile sheets and polymer geogrid. Similar to reinforced concrete, the beneficial effects depend on a combination of the tensile strength of the reinforcing elements and the resistance between the compacted soil and the reinforcing elements. Earth reinforcing reduces lateral earth pressure behind retaining walls and increases strength of the compacted soil mass. Therefore, it is possible to apply nonstructural face blocks or elements to a near vertical face of reinforced earth to form a retaining wall or construct a fill slope with much steeper gradient than an unreinforced fill slope. Reinforced earth slopes are commonly constructed at 1:1 to facilitate installation of erosion control measures on the surface, although it is possible to construct the slope at much steeper gradients. The main components of a reinforced earth slope using geogrid as the reinforcing elements are shown on Figure 7.

The primary geogrid is designed to attain the mass stability of the slope (global stability). Secondary geogrids are placed at the surface, typically at a vertical spacing of 12 inches, and are used primarily for alignment control and to minimize sloughing during compaction. Another important benefit of secondary geogrids includes a reinforcing effect in the face of the slope, and, thus, it provides added protection against erosion and shallow slumping of the slope face.

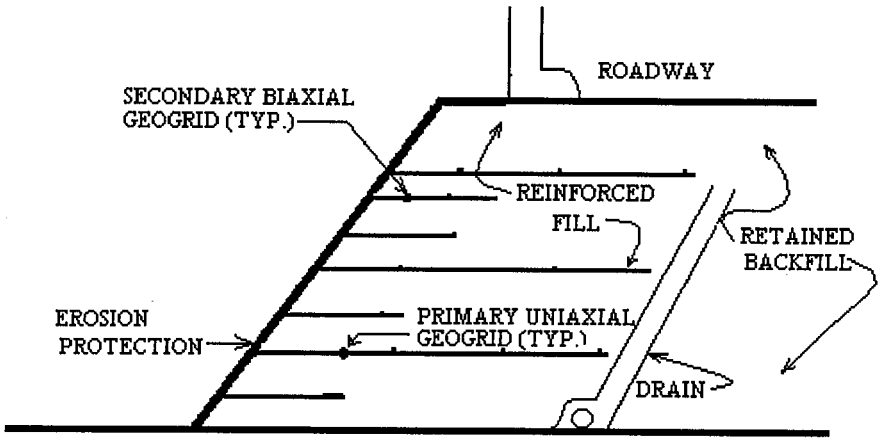


Figure 7 - Components of a Reinforced Earth Slope

For further erosion protection and aesthetic appearance, a polymer turf mat is placed on the slope surface. The turf mat facilitates vegetation growth.

The first application of earth reinforcing to major projects dates back to 1967. Since this time, its application has spread rapidly to many parts of the world, and a series of national and international conferences and symposia have been held for exchange and promotion of the technology among the material manufacturing, regulatory, academic, construction and technical communities of the world. Reinforced earth construction is a widely-accepted technology today throughout the world. Regulatory guidelines are now in place to ensure the longevity and quality requirements of the reinforcing elements by national authorities, such as AASHTO (American Association of State Highway and Transportation Officials) and ASTM (American Society for Testing of Materials).

4.5.2. Case Histories of Reinforced Earth Construction

Several case histories of reinforced earth constructions are presented below. Geographically, these case histories include projects in San Mateo County and other parts of California.

Project:	Highway 84 at Mile Post 9.8, constructed in 1986; San Mateo County; a CALTRANS project
Slope:	Height = 50 feet; H:V = 1:1
Facing:	HDPE (high density polyethylene) geogrid with straw

Project:	Highway 84 at Mile Post 10.15, constructed in 1986 San Mateo County; a CALTRANS project
Slope:	Height = 35 feet; H:V = 1:1
Facing:	HDPE geogrid with straw
Project:	Highway 9 at Mile Post 18.84, constructed in 1987; Santa Cruz County, a CALTRANS project
Slope:	Height = 48 feet; H:V = 1:1
Facing:	Barren soil with biodegradable mat; hydroseeded
Project:	Strawberry Canyon, constructed in 1986; University of California
Owner:	University of California
Slope:	Height = 90 feet; H:V = 0.75:1
Facing:	HDPE geogrid, planted with native plants and trees
Project:	Cummings Skyway, constructed in 1988; Contra Costa County
Owner:	Contra Costa County
Slope:	Height = 50 feet; H:V = 1:1
Facing:	Polypropylene biaxial geogrid
Project:	Spanish Hills Golf and Country Club, constructed 1990-1992; Ventura County
Owner:	Spanish Hills Development Company
Slope:	Height = 25 - 120 feet; H:V = 1:1
Facing:	Polypropylene biaxial geogrid
Project:	Highway 4-1, Van Duzen, California
Designer:	U.S. Dept. of Transportation
Slope:	Height = 20 - 60 feet; H:V = 1:1
Facing:	Turf reinforced with a polymer mat
Project:	Private residence, 27,000 sq. ft. residence; Los Gatos
Retaining Wall:	Height = 44 feet
Facing:	Keystone modular block

4.5.3. Reinforced Earth Construction for Subject Project

The previous conceptual plan for site grading included 2:1 graded slopes in combination with retaining walls ranging up to a maximum of 35 feet in height. These high retaining walls were proposed largely along Ticonderoga Drive. Primarily to enhance the aesthetic appearance, the grading plan now proposes to use reinforced earth slopes and eliminate retaining walls along Ticonderoga Drive. The maximum height of the proposed reinforced earth slope is approximately 60 feet. The high retaining walls proposed in the earlier plan behind the Hillsborough West Apartments will also be replaced with a combination of reinforced earth slopes and smaller retaining walls. At this location, the revised grading plan reduces the height of the retaining walls from 25 feet to less than 10 feet. The proposed reinforced earth slopes require less extensive stabilization measures to the natural slope for support than that required for retaining walls.

Reinforced earth construction is also proposed for retaining walls which will support fills or structures.

4.5.4. Summary

It is our conclusion that reinforced earth construction is feasible for both slopes and retaining walls for the subject project. In addition to enhancing the aesthetics, reinforced earth slopes require less extensive stabilization measures to support the natural slope in comparison to retaining walls.

The on-site weathered sandstone material is favorable for use in the reinforced earth construction, due to the high friction angle of the material.

The anticipated maximum heights for both the proposed reinforced earth slopes and retaining walls for the subject project are well within the limits established by case histories.

4.6. Slope Stability

4.6.1. Slope Profile and Strength Parameters

Several constructed slopes are proposed in the southeast section of the site, below Cobble Hill Place and Concord Place. Based on our detailed review of the proposed grading plan, ten critical slope sections were selected for analysis to assess the global stability. These sections, designated as GS-1 through GS-10 on Plate 2, were chosen to cross the proposed retaining walls, constructed slopes, various split-level pads and natural slopes showing irregular topography. Many cross-sections were analyzed in subsections to evaluate local stability

conditions. The geologic profiles used in our analysis were determined and characterized by the project geologist. These profiles are shown on Plate 3.

Basically, the geologic units controlling the slope stability are Franciscan melange (Fm) and sandstone (Ss) on the south ridge, as well as on the north ridge, and serpentine (Sp), alluvium (Qa) and sandstone (Ss) over the central portion. Strength parameters assigned to these geologic units are presented in Table II. Colluvium (Qc) is present on certain portions of the steep slopes as a surface layer, and is generally limited to less than 10 feet in thickness. Colluvium is the least stable unit in the natural slopes. The colluvium will be removed during the grading operation and used in engineered fill. Therefore, the colluvium is treated as engineered fills (Qaf) in the slope stability analyses.

Cyclic shear strength of the geologic units was assumed to be the same as the static undrained strength summarized in Table II. This assumption is reasonable in view of the fact that the site is underlain by stiff soils and bedrock and the materials are not vulnerable to liquefaction (Makdisi and Seed, 1978).

4.6.2. Method of Stability Analysis

The slope stability analysis was done by using a computer program, "BISTAT", developed by G. Y. Felio. This program is based on the simplified Bishop's method and utilizes a grid of centers to define the potential circular sliding planes. The analysis was cross checked by using our in-house program, "SLOPESFS1", which has an auto-search capability for locating critical circles. Several selected slopes were also analyzed with the computer program "TENSLO1" developed by TENSAR Earth Technologies, Inc. "TENSLO1" incorporates earth reinforcement design in the slope stability analysis. In the above computer solutions, the seismic force is introduced as the product of a seismic coefficient and the weight of the sliding mass, and acting at the center of gravity of the mass.

4.6.3. Determination of Seismic Coefficient

In presenting the seismic force in the manner described above, it is important that the seismic coefficient acting on the potential sliding mass characterizes the dynamic motions to be generated throughout the slope. In this regard, solutions have been obtained (Seed and Martin, 1966) for a homogeneous embankment of triangular cross-section based on the concept of average seismic coefficients and by adopting solutions based on elastic response analyses. According to the solutions of Seed and Martin, the average seismic coefficient depends on the input base motion, fundamental period and shear wave velocity of the embankment, and damping ratio of the embankment material. Based on the above solutions, Seed and Martin obtained a relationship between average seismic coefficients and fundamental period for

homogeneous embankments subjected to the El Centro (California) earthquake of 1940, for a damping ratio of 20%. This relationship is used to determine the average seismic coefficient for the subject site.

For the subject site, Pulgas Ridge may be considered as a long embankment, and the various slopes included in the stability analysis are parts of this main body. The average elevation relief of Pulgas Ridge is approximately 300 feet on the eastern flank and close to 500 feet on the western flank. A shear wave velocity of 1,000 feet/second is estimated for the Franciscan melange and the surfacial deposits on the site. Our estimated natural period for Pulgas Ridge for the bases presented above is approximately 1.2 seconds. The El Centro earthquake records, as used in the Seed-Martin analysis, indicate that the average uniform ground acceleration equivalent to 65% of the peak ground acceleration is approximately 0.2g. It was previously indicated that an equivalent uniform horizontal ground acceleration at the site from a magnitude 7.0 earthquake on the nearby San Andreas fault is estimated as 0.3g. By using a direct scaling of the base ground acceleration at the site to the El Central base, we have determined an average seismic coefficient of 0.15g for the subject site.

4.6.4. Assessment of Slope Stability

Results of our slope stability analyses are presented in Table III. As mentioned earlier, many sections were analyzed in subsections. These subsections are designated as, for example, GS-1a and GS-1b for cross section GS-1, and "a" refers to the upper portion and "b" refers to the lower portion of the cross section.

Complete sets of computer printouts for the slope stability analyses of all ten slopes are included in Appendix B.

Results of the slope stability analyses are presented in terms of a factor of safety for the condition to attain a limit equilibrium in the slope under the imposed loading condition. Thus, the factor of safety presented in Table III may be considered as the degree of safety against an ultimate failure of the slope. When the factor of safety is close to, or less than 1.0, the slope may be considered as being potentially unsafe. Slope stability assessment also needs to consider tolerable limits of the slope deformation. Slopes can generally tolerate a considerable amount of deformation before being brought to ultimate failure. However, the deformation needs to be limited when buildings or other type of structures, which cannot tolerate large deformations, are directly supported by the slope. It is possible to limit the slope deformation by requiring a higher factor of safety for stability. In this regard, we established a minimum factor of safety of 1.75 for slopes supporting structures and 1.50 for slopes free from structures, under static loading, and 1.15 when the seismic force is added for both cases.

TABLE III

RESULTS OF SLOPE STABILITY ANALYSES

Section	Factor of Safety Static	Seismic	Remarks
GS-1a	2.63	1.54	2:1 cut slope/Fm
GS-1b	1.78	1.11	wall/1:1 RE slope
GS-2a	2.12	1.30	2:1 cut slope/Fm
GS-2b	2.59	1.81	wall/natural slope
GS-3	2.07	1.36	2:1 cut slope/Sp
GS-4a	1.68	1.10	natural slope
GS-4b	2.03	1.15	2:1 fill slope
GS-5	1.99	1.10	2:1 cut slope/walls
GS-6a	2.52	1.62	2:1 cut slope/wall
GS-6b	2.10	1.05	25' high wall
GS-6b alt.	3.14	1.27	2:1 fill slope
GS-7a	2.35	1.18	2:1 cut slope/Fm
GS-7b	2.07	0.92	1:1 RE slope/Fm
GS-8a	2.66	1.64	2:1 cut slope/Fm
GS-8b	3.15	2.05	1:1 RE slope/Ss
GS-9	2.42	1.60	2:1 cut slope/Ss
GS-10	1.73	1.02	wall/1.5:1 N.G./Fm

Based on the results of the slope stability analyses, as well as our examination of the site conditions for each slope, we have determined six areas where the natural slopes will require reinforcing. These slopes are discussed below:

Cross Section GS-1: Slope stabilization is required for the natural slope immediately above the Hillsborough West Apartments. Reinforced earth slopes and retaining walls are proposed on this slope. The seismic force governs the stability, and stability is controlled by the melange unit which is approximately 10 feet in thickness and underlain by massive sandstone.

Cross Section GS-4: The natural slope on and immediately below the proposed Concord Place extension on Lots 9, 10 and 11 requires stabilization. Stabilization of this slope is necessary to alleviate the effects of slope creeping and nonuniform ground condition created by the cut-fill combination for grading on the proposed road extension and to control the existing seepage condition. This area is underlain by serpentine, and the conditions mentioned above are affected by the upper 10 feet of serpentine.

Cross Section GS-5: This slope supports the proposed roadway and retaining walls along both edges of the roadway. A proposed cut slope consisting of the melange unit will support the lower retaining wall. The melange unit requires reinforcing.

Cross Section GS-6: The natural slope along the existing open drainage ditch next to Polhemus Road requires stabilization when the alternate scheme using high retaining walls is chosen for support of the proposed road. The proposed retaining walls in this scheme are 20-foot to 25-foot high. The natural slope along the drainage ditch is underlain by alluvium and the melange unit. No stabilization is required when the proposed road is supported by 2:1 fill slope constructed over the drainage ditch.

Cross Section GS-7: The natural slope along part of Ticonderoga Drive, that will support the proposed 1:1 reinforced earth slopes, requires reinforcing. Stability of this slope is governed by the seismic force. The slope is located in an area of a topographic swale and is underlain by the melange unit.

Cross Section GS-10: The natural slope supporting the proposed 20-foot high, curved retaining wall requires stabilization. Factors critically affecting the stability of this slope include the heavy loads from the retaining wall and the existing steep cut slope located immediately below the retaining wall. The slope is also underlain by the melange.

4.6.5. Slope Stabilization Scheme

The slope shown by Cross Section GS-4 requires stabilization over an extended area, because the stabilization is intended to control seepage, correct the nonuniform ground condition created by the cut-fill combination for grading in the street area and eliminate the top 10 feet in the serpentine unit that is susceptible to creeping. The most practical method for stabilization of this slope will involve overexcavation of the top 10 feet of the serpentine unit, installation of underdrains and filling with compacted fill.

The main factor requiring stabilization of the other five slopes discussed in the previous section is the heavy loads from the proposed reinforced earth slope and retaining wall construction. For these five slopes, stabilization is required for reinforcement of the natural slope in limited areas. It is more advantageous and effective to provide the slope reinforcing directly beneath the

retaining walls or the toe section of the reinforced earth slope. Practical methods for reinforcing these slopes can include replacing the weak upper portion of the natural slope with reinforced earth or installation of drilled piers through the weak zone.

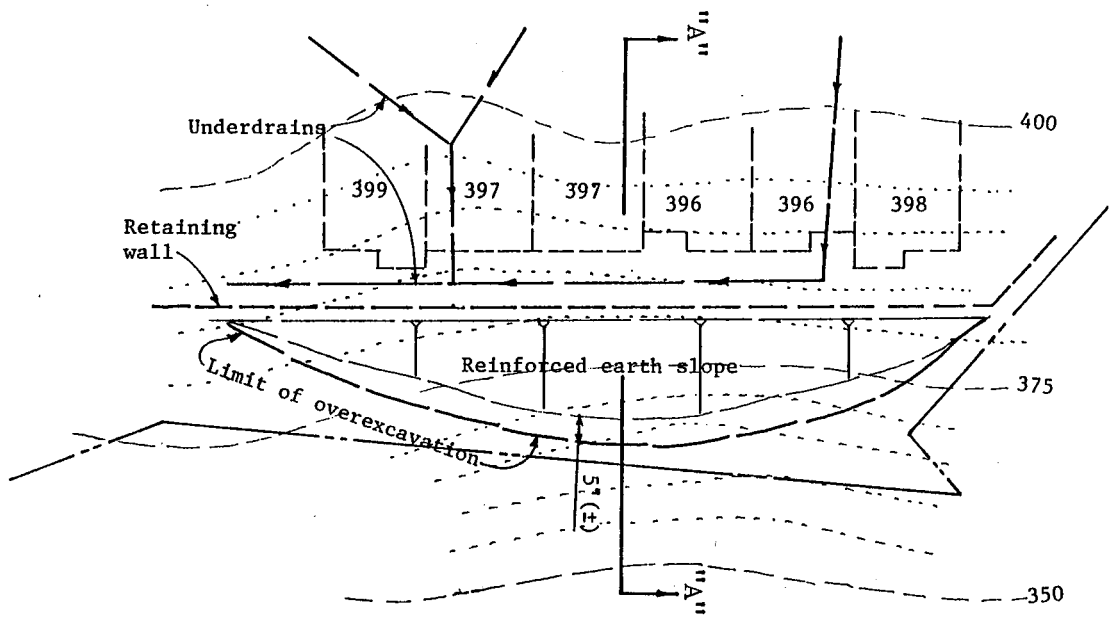
Reinforced earth construction for stabilization of the five slopes requires overexcavation to considerable depths. For the slopes shown by Cross Sections GS-7 and GS-10 (Figures 8-e and 8-f), our analyses indicate that the overexcavation scheme alone would not be practical due to the large depth of excavation that would be required. In such instances, drilled piers, or a combination of reinforced earth and piers, will be more practical.

Drilled piers are utilized in either a single-row or multi-row arrangement across the slope. The mechanism generating the stabilizing force is different between a single-row system and multi-row system. In a single-row system, the individual piers need to be treated as a passive pier, whose stability is determined by anchorage into the firm ground below the weak zone and the flexural stiffness of the pier. In a multi-row system, it is reasonable to treat the soil mass contained within the pier system as reinforced earth whose strength is increased by the shear resisting capacity of the piers. For stabilization of the natural slopes on the site, our analysis indicates that a multi-row system is more advantageous than a single-row system. In order for the pier system to work as a unit with the contained soil mass, the pier spacing should not be too large. The pier spacing is controlled by the strength characteristics of the soil and the overburden. It is our conclusion that an edge-to-edge spacing of no more than 10 feet or five diameters should be adequate for a multi-row system.

We have performed analyses for determination of a stabilization design for each of the six slopes. These stabilization designs are presented on Figures 8-a through 8-f. The purpose of Figures 8-a through 8-f is to indicate the feasibility of stabilizing the slopes to achieve the stability requirements outlined in this report and to show the specific slopes requiring stabilization. In the case of using drilled piers, no structural details were determined. However, we have determined the forces that must be generated by the piers. Distribution of the stabilizing pier forces for each of the five slopes is presented in the recommendations section of this report. Computations are included in Appendix B that pertain to determination of the stabilizing pier forces.

Slope stabilization is expected to be a major cost item for site development. It is noted that the designs presented on Figures 8-a through 8-f are not intended as representations of the most cost-effective design possibilities. It is possible to meet the stability requirements of these five slopes by utilizing various combinations of both reinforced earth construction and drilled piers.

In addition to the six slopes discussed above, the natural slopes underlain by colluvium in drainage swales on Lots 2 and 3 and Lot 5 require stabilization against creeping. Drilled piers in a single row would be practical for these slopes.



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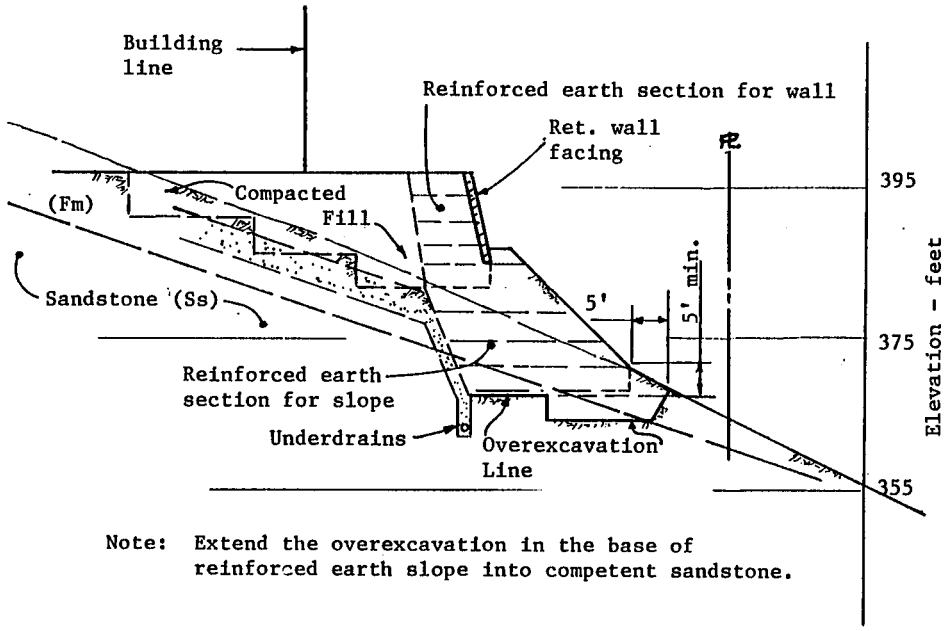
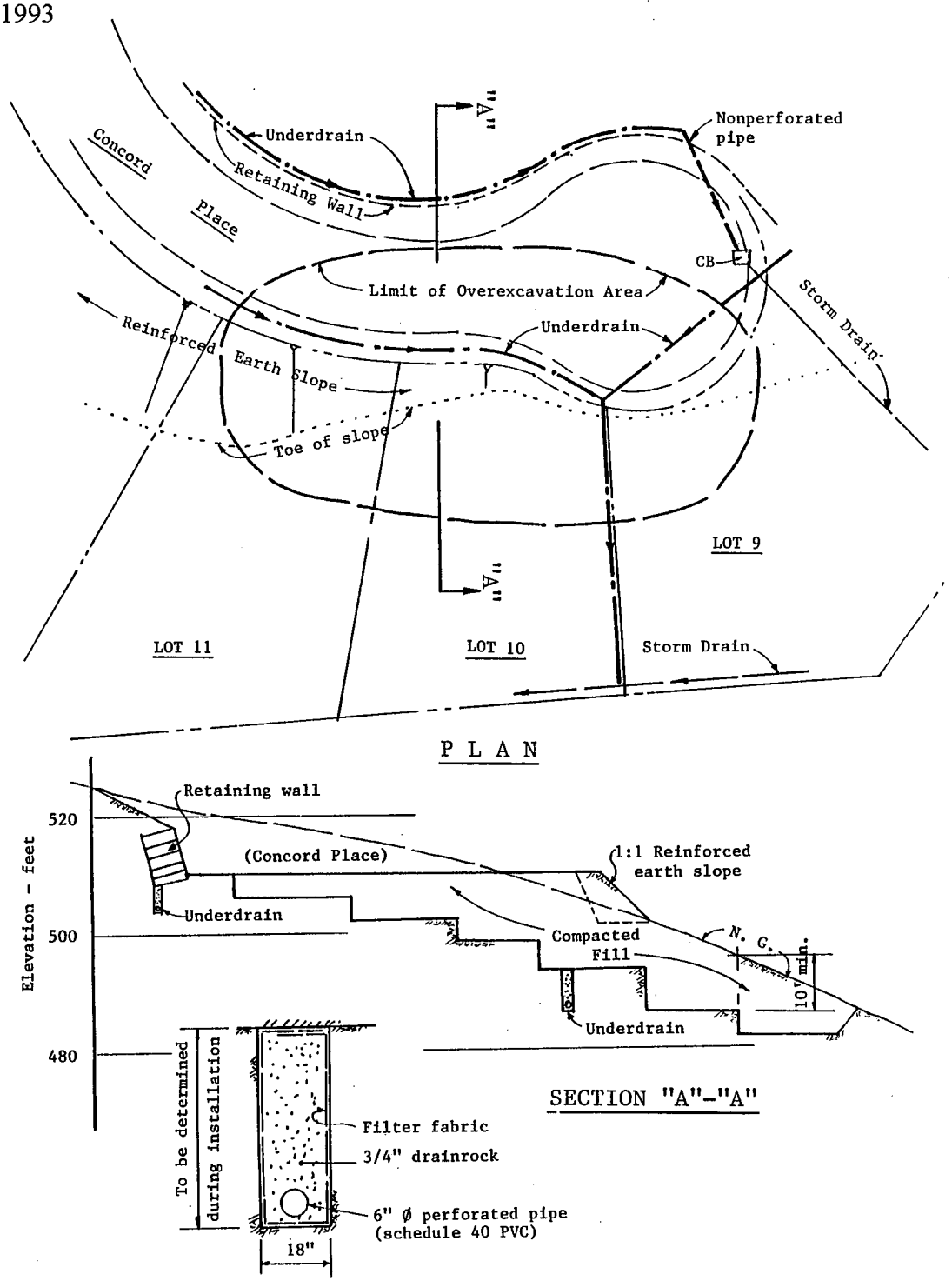


Note: Extend the overexcavation in the base of reinforced earth slope into competent sandstone.

SECTION "A"-"A"

Figure 8-a: Stabilization Design for Slope GS-1b



Typ. Underdrain Details

Figure 8-b: Stabilization Design for Slope GS-4a

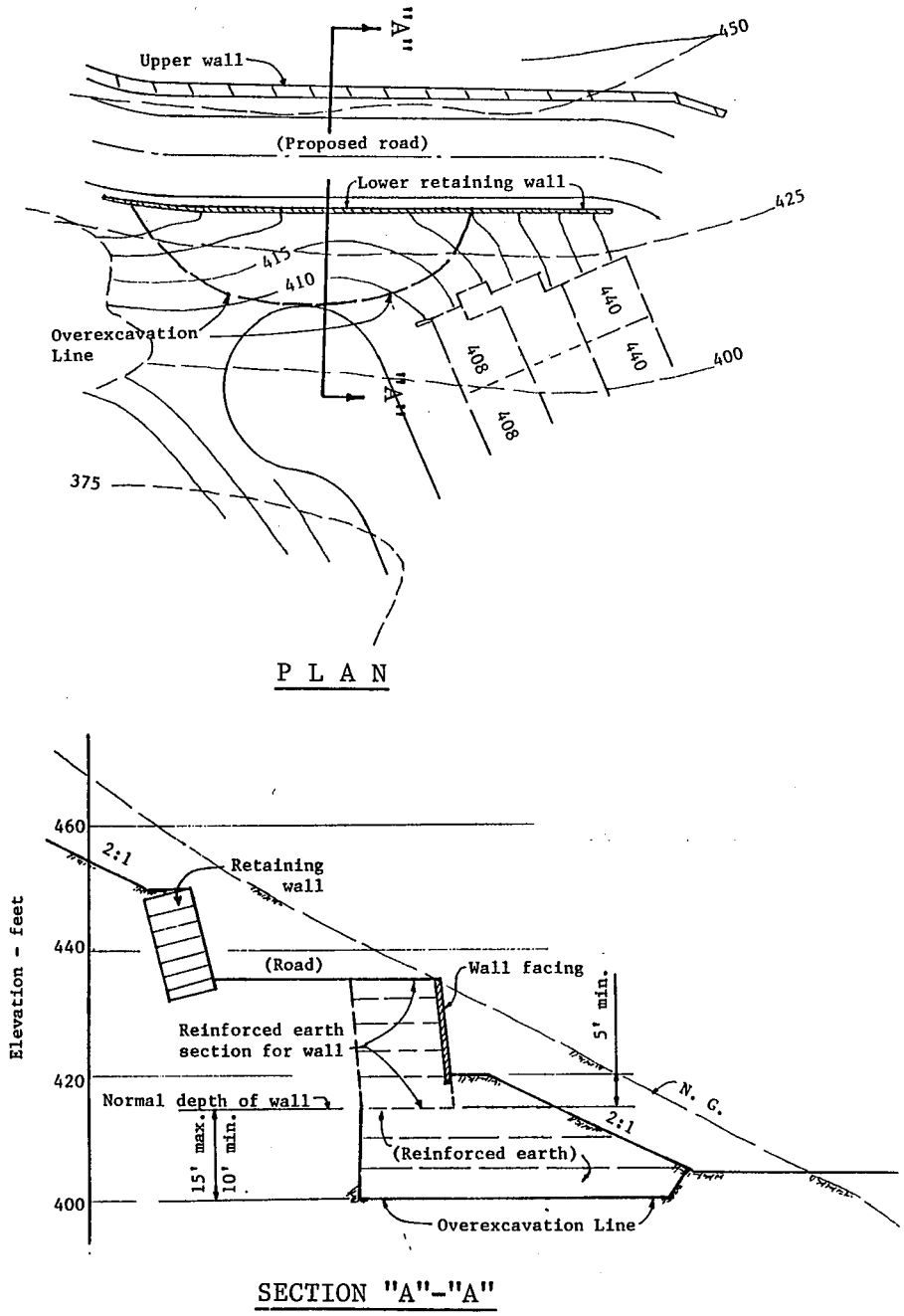
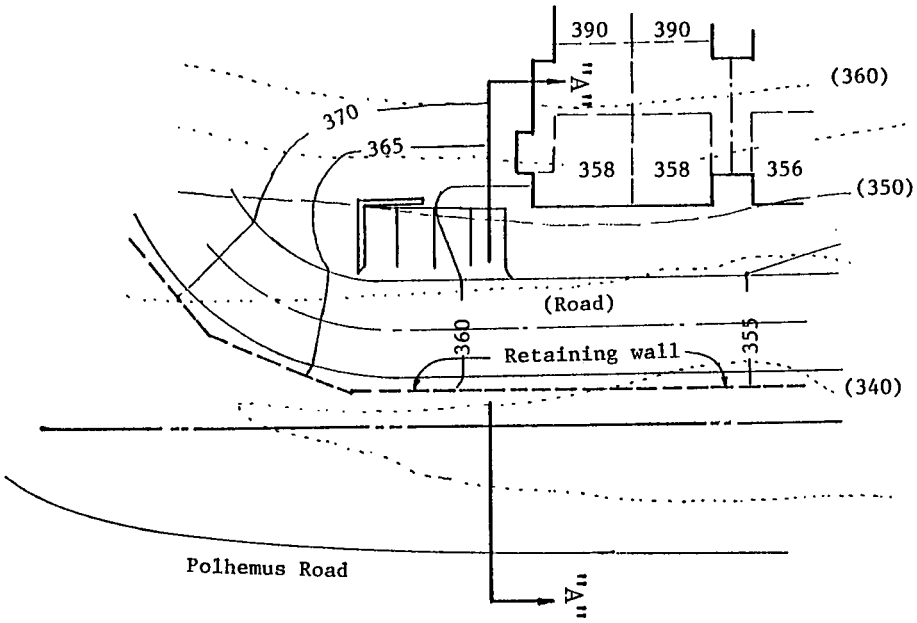


Figure 8-c: Stabilization Design for Slope GS-5



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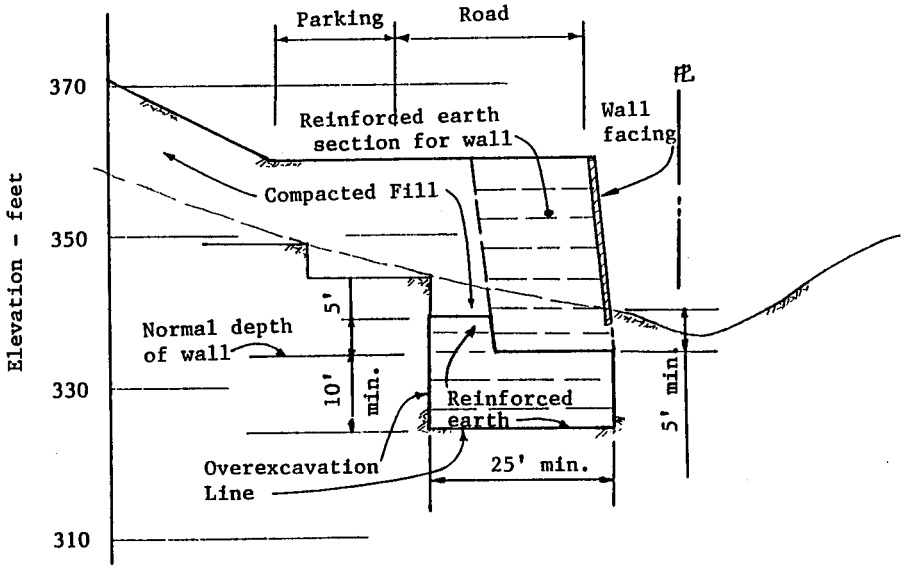
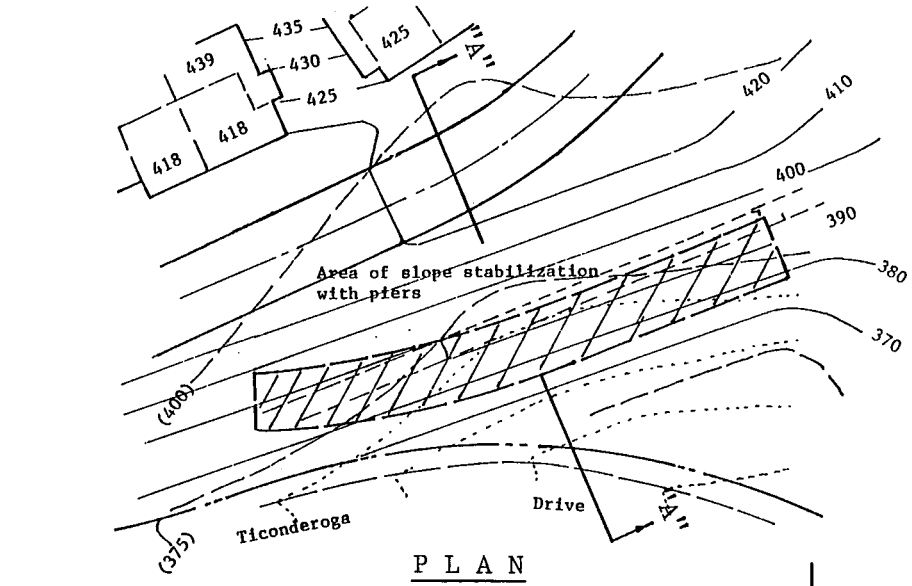


SECTION "A"-"A"

Figure 8-d: Stabilization Design for Slope GS-6b



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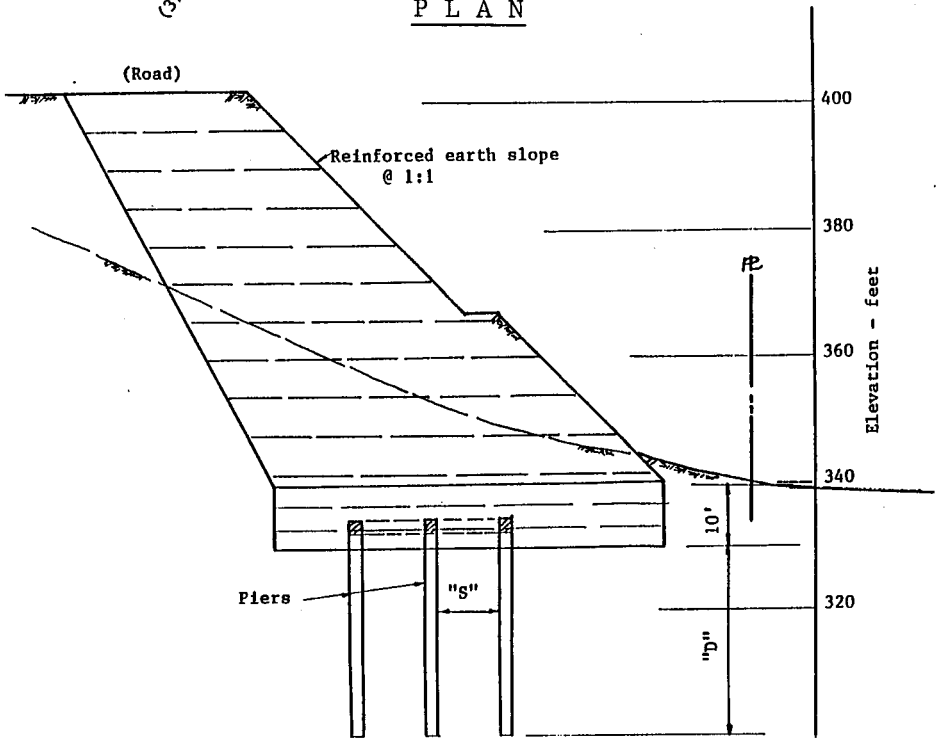
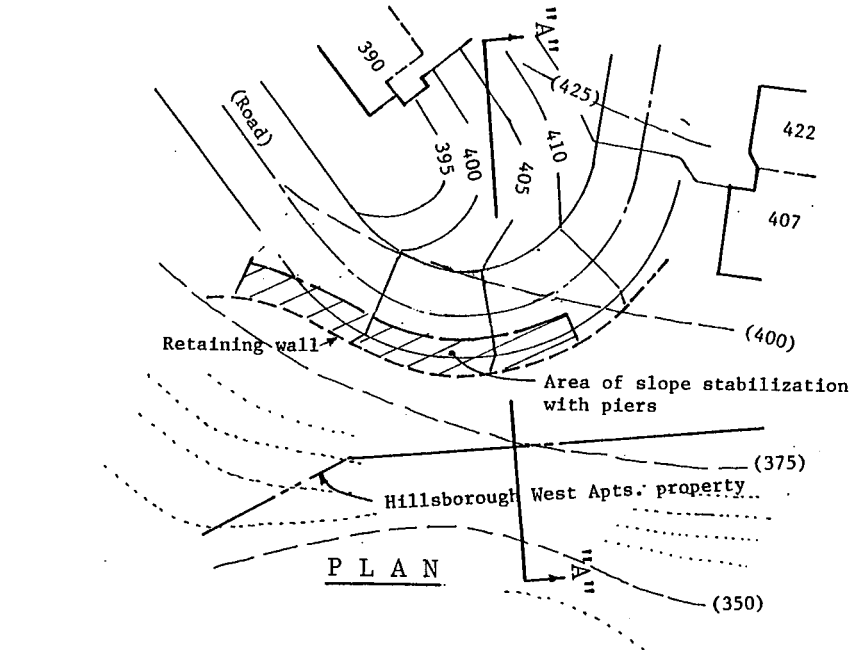


Notes: 1) "S" = 10' max. or 5 times pier diameter in both directions.
2) "D" to be determined per Section 5.3.4. of this report.
3) Actual pier design to be based on the criteria of this report.

SECTION "A"-"A"

Figure 8-e: Stabilization Design for Slope GS-7b



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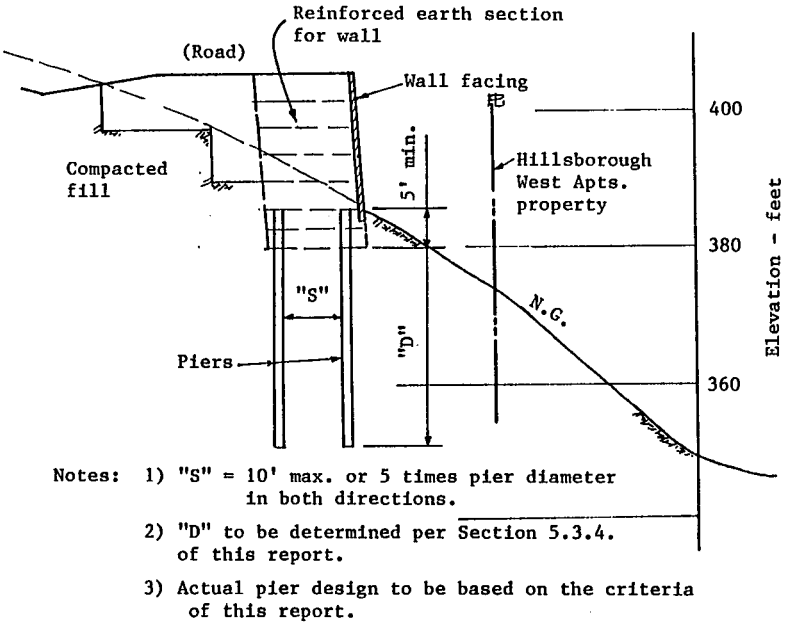

Notes: 1) "S" = 10' max. or 5 times pier diameter in both directions.

2) "D" to be determined per Section 5.3.4. of this report.

3) Actual pier design to be based on the criteria of this report.

SECTION "A"-"A"

Figure 8-f: Stabilization Design for Slope GS-10

4.6.6. Summary

Six slopes have been determined to require stabilization and these slopes are shown on Figures 8-a through 8-f. One slope is underlain by serpentine and the other five slopes are underlain by the melange unit. Stability of these slopes is generally governed by the seismic force. It is feasible to meet the slope stability requirements with either a reinforced earth construction or drilled piers installed in multi-rows. The designs presented on Figures 8-a through 8-f represent one out of many possible designs that can meet the stability requirements.

Slope stabilization is also required at two other locations, one on Lots 2 and 3 and the other on Lot 5, to alleviate the creep potential of the natural slope underlain by colluvium. These natural slopes can be stabilized with spaced, drilled piers.

4.7. Retaining Walls

4.7.1 Types of Construction

Retaining walls are proposed for the support of cuts along the proposed Concord Place extension. These walls are less than 10 feet in height, except for a short segment in the cul-de-sac section, where the height reaches a maximum of 21 feet. Proposed cuts in the townhome portion will also be supported by retaining walls along parts of the upper boundary and along portions of the roadway. These walls will be less than 15' feet in height. Retaining walls are also proposed for support of engineered fills at several locations in the townhome portion.

A variety of retaining wall constructions are available today that utilize prefabricated wall elements. Two types of wall construction that we deem most applicable to the subject project are discussed herein. One type is a reinforced earth wall. This construction consists of prefabricated face elements anchored to a reinforced earth section which acts as a gravity wall. Commonly known walls of this type are "Reinforced Earth" retaining walls and "TENSAR" geogrid reinforced soil walls with "Keystone" segmental concrete units. The other wall type is a crib wall, which consists of assemblages of prefabricated reinforced concrete elements in a crib form that are backfilled with granular material or soil. Commonly known walls of this type are "Criblock" walls and "Concrib" walls.

The walls described above are generally more cost-effective and practical to construct than conventional concrete walls. Another advantage of construction using prefabricated elements is in the selection of the variety of wall-facing elements and treatments that can enhance the landscape design. Both reinforced earth walls and crib walls have been used for heights in excess of 40 feet in a single wall arrangement.

The most important engineering consideration in selecting one type of the wall construction over another is the deformability and ability of the wall to resist lateral displacement. These factors become especially important when structures are located immediately above the wall. It is our opinion that crib walls are inherently inferior to reinforced earth walls in this respect. From a practical standpoint, reinforced earth walls are more easily adaptable to the field conditions, especially when the walls are used as a part of fill slope construction.

Retaining walls would also be used to provide grade breaks under the buildings. These walls are approximately 10 feet in height, and will be of reinforced concrete or masonry walls.

4.7.2 Summary

It is our conclusion that reinforced earth construction should be used for retaining walls to support engineered fills or structures, and the use of crib walls should be limited to the support of cut slopes on, or above, where no structures will be located.

The proposed retaining walls are well within the heights that have been successfully constructed with either reinforced earth walls or crib walls.

4.8. Foundations

4.8.1 Geotechnical Factors Affecting the Selection and Design of Foundations

Important geotechnical factors to consider in the selection and determination of the foundation design for the subject site include the following:

a) Differential settlement effect,
b) Creep potential of the slope supporting the foundation, and
d) Effect of the foundation loading on the stability of the slope and retaining walls.

In the San Francisco Bay Region, expansion potential of the foundation soil is often an important factor affecting the foundation design. However, data gathered from our extensive laboratory testing on the native soils indicate that the soils are low in expansion potential. Therefore, expansion potential of the foundation soil is not a critical factor in determining the foundation design.

Areas underlain by fills of varying thickness over steeply sloping ground can undergo differential settlements. The effects of the differential fill settlement on structures can be controlled in two ways: one is delaying the foundation construction until the residual differential settlement

is no longer a critical factor, and the other is designing the foundation to account for the effect of the differential settlement. The latter scheme may result in excessively high foundation costs.

Soil creeping can occur in steep natural slopes underlain by loose colluvium. We have identified two areas where this potential exists. These areas are the lower elevations of Lots 2, 3 and 5. Measures will be recommended in a later section of this report to mitigate the slope creeping in these areas. Although the houses will be located outside the soil creep areas, it would be prudent to use deep piers for foundations directly above these areas. Another area of potential soil creep on the natural slope is the seepage area on Lots 9, 10 and 11. The proposed seepage control measures on this slope will alleviate the soil creep. However, deep piers will be required in this area for the reason discussed below.

Buildings located immediately behind retaining walls and on or near the top edge of slopes need to be supported on deep piers to avoid overstressing the walls or slopes. This will apply to the retaining walls and slopes behind the Hillsborough West Apartments and the natural slope on Lots 9, 10 and 11

4.8.2 Summary

It is our conclusion that the effect of residual differential settlement of fills can most practically be controlled through a delay in foundation construction. In areas where the natural slope is steeper than 6:1 or the fill thickness is more than 10 feet, a delay period extending through the first winter after completion of rough grading will be sufficient to alleviate the differential settlement concern.

Natural slopes on portions of Lots 2, 3 and 5 and the upper slopes on Lots 9 and 10 are susceptible to creeping. Special slope stabilization measures are proposed for these slopes to alleviate the effect of the soil creeping on foundations. Buildings will require deep piers on Lots 2, 3, 9 and 10.

Deep piers are required to avoid overstressing retaining walls and slopes when buildings are located on or close to them.

Expansion potential of the native soil is not a critical factor determining the foundation design for the subject project.

5. SUMMARY OF CONCLUSIONS AND RECOMMENDATIONS

5.1. Summary of Conclusions

We have determined that several geologic and geotechnical factors will require special consideration in the design and construction of the proposed project. It is our conclusion that the proposed development is feasible provided these factors are properly considered in accordance with the recommendations of this report.

The recommendations provided in this report represent the specific details and requirements that must be met, individually and as a whole, in the design, construction and maintenance of the project, to ensure the intended level of the project's performance.

5.2. Constructed Slopes

5.2.1. Fill slopes constructed with reinforced earth meeting the geotechnical criteria of this report shall be 1:1 (horizontal : vertical) or flatter.

5.2.2. Nonreinforced fill slopes and cut slopes shall be constructed at a gradient of 2:1 (horizontal : vertical) or flatter.

5.2.3. All constructed slopes shall be provided with horizontal benches, having an approximate width of 6 feet, at a vertical interval of 25 feet to 30 feet. These benches shall be provided with a longitudinal gradient satisfactory for hydraulic design of any storm drainage facilities to be installed.

5.2.4. It is recommended that the material from cuts made into the sandstone unit and other sandy or gravelly native material approved by our office be used for construction of the reinforced earth section. The following geotechnical criteria shall be used for determination of stability of reinforced earth sections:

Unit weight of fill :	130 p.c.f.
Friction angle of backfill :	30 degrees

In addition to the above, strength parameters for the foundation soils at each location of the reinforced earth construction may be selected from Table II with the use of Plates 2 and 3.

5.2.5. Reinforced earth slopes shall be provided with adequate secondary reinforcing and suitable matting on the slope surface to protect the slope from surface slumping and erosion. The reinforced earth slope section shall extend a minimum of 5 feet into the natural slope.

5.2.6. Reinforced earth construction plans shall be reviewed by our office and shall be made a part of the final grading plan.

5.2.7. All excavations, placement of fills, installation of the reinforcing elements and other field work related to construction of reinforced earth sections shall be performed under the observation of a representative from our office, and the related earthwork shall conform to the applicable portions of the recommendations relating to site grading.

5.3. Slope Stabilization Measures

5.3.1. It is recommended that the slopes shown on Figures 8-a through 8-f, which are portions of the cross sections GS-1, GS-4, GS-5, GS-6, GS-7 and GS-10, be provided with adequate stabilization measures in the natural slope.

5.3.2. It is recommended that stabilization of the upper slope of Cross Section GS-4 follow the design as shown on Figure 8-b. However, it is noted that the actual limit of the overexcavation, and layout of the underdrains, may change depending on the subsurface conditions disclosed in the excavation.

5.3.3. Stabilization of the slopes as shown on Figures 8-a and 8-c through 8-f may use either a reinforced earth construction or multi-row drilled piers, or a combination of both. When reinforced earth construction is chosen, all applicable portions of the recommendations for earthwork operations relating to site grading shall be followed.

5.3.4. Multi-row drilled piers shall be provided with a maximum edge-to-edge spacing of 10 feet or five (5) times the diameter in directions perpendicular and parallel to the slope, and extend a minimum distance of 5 feet into the reinforced earth section. Piers in the multi-row system may be treated as developing the resistance through shearing capacity of the individual piers, and the total pier resistance may be uniformly distributed over the area contained within the pier system. The design of the pier system for each slope shall be determined based on the distribution of the required resisting forces as presented in Figure 9.

5.3.5. The scheme and geotechnical criteria recommended for stabilization of slopes on Lots 2, 3 and 5 are presented in Figure 10.

5.3.6. The actual limits of the areas requiring stabilization, as well as the extent of the overexcavation, at each location shall be determined by the project geotechnical engineer and engineering geologist during the grading operation, based on the subsurface conditions disclosed in the excavation at each location.

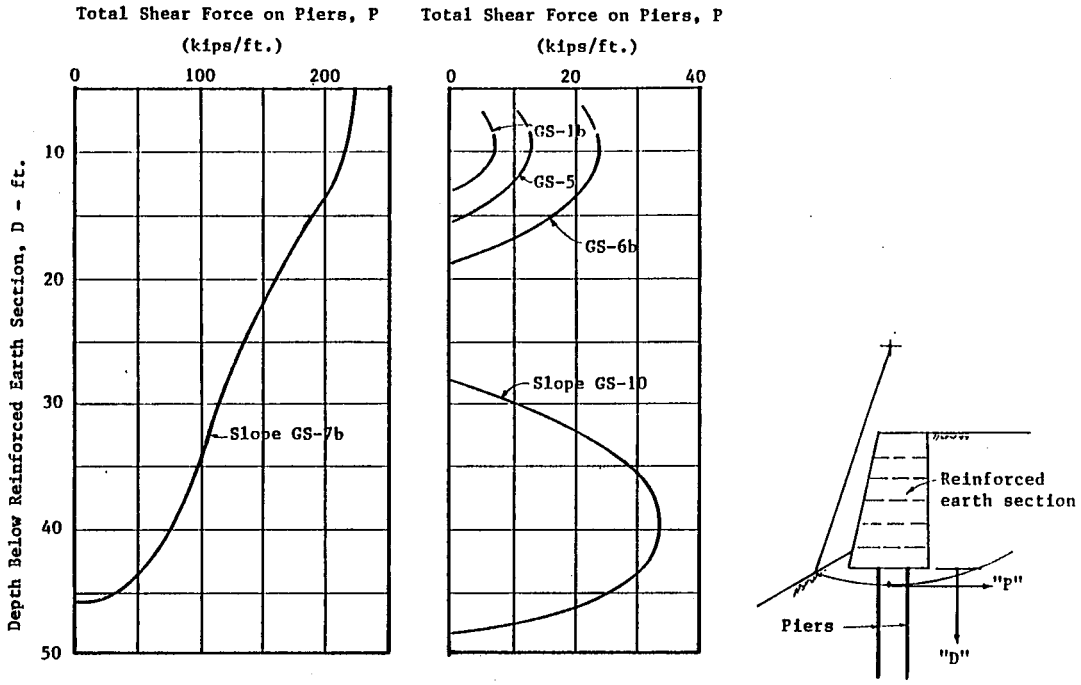

Figure 9 - Stabilizing Forces of Piers

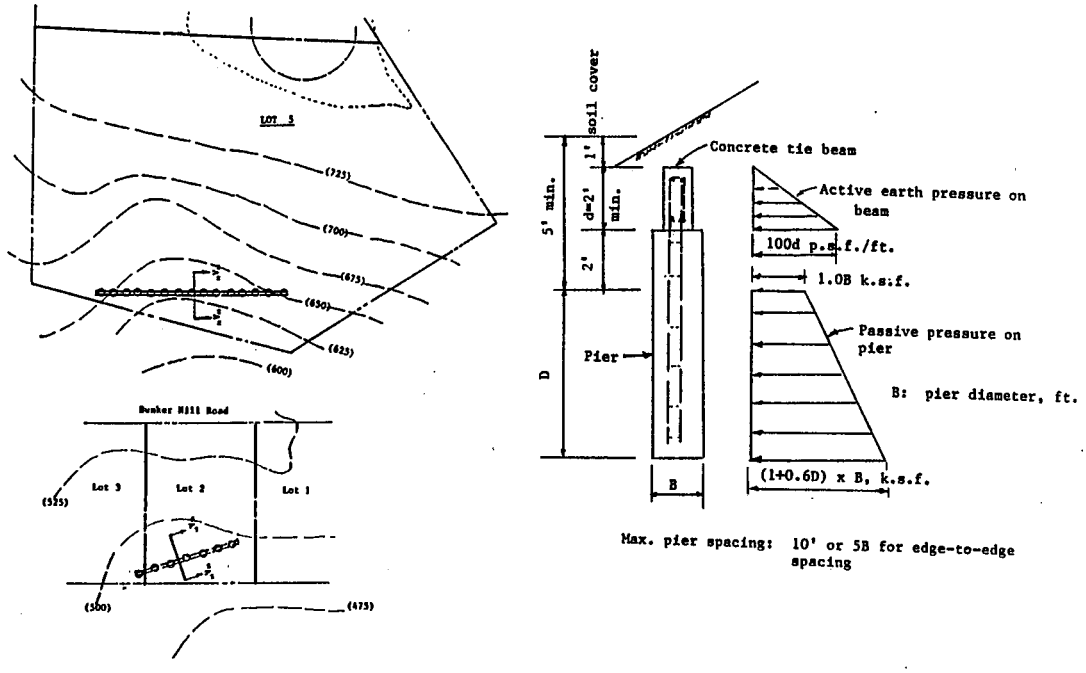

Figure 10 - Slope Stabilization for Lots 2, 3 and 5

5.3.7. All slope stabilization plans shall be reviewed by the project geotechnical engineer and made a part of the final grading plan.

5.3.8. Some of the proposed cut slopes are expected to expose colluvium and isolated rocks or boulders. These cut slopes shall be overexcavated for removal of colluvium and boulders, and the slope shall be restored with compacted fills. These slopes and the required extent of the overexcavation will be determined by the project geotechnical engineer during grading operations.

5.4. Seepage Control Measures

5.4.1. Our recommended seepage control scheme and design are presented on Figures 8-a and 8-b for two areas. In addition to these areas, all ravines to be filled shall be provided with underdrains. All areas showing evidence of high moisture accumulation or seepage, when disclosed in the excavation for site grading, shall be provided with interceptor drains acceptable to the project geotechnical engineer.

5.4.2. A typical detail for underdrain installation is shown on Figure 8-b. The actual layout and depth of the underdrains will depend on the subsurface conditions encountered during the site grading operations, and will be determined by the project geotechnical engineer during the grading operations.

5.4.3. Seepage on the site is caused by infiltration of surface water. Therefore, it is important that the surface drainage control measures ensure no areas accumulate standing water.

5.5. Earthwork Operations Relating to Site Grading

5.5.1. All areas to be graded shall be cleared of all materials and objects unsuitable for use in fills before excavation or filling may commence. The site clearing shall include removal of existing trash, brush, designated trees and their root systems, loose silts in streams, wet or saturated materials, surface organic material and any other objects that are determined by the project geotechnical engineer as unsuitable for fills during the site clearing operation.

5.5.2. Native materials are suitable for compacted fills, with the exception of the materials defined above for removal in the site clearing. Organic materials may be selectively used in the upper one foot of fills in landscape areas, where the final grade is not steeper than 6:1. Large rocks shall be reduced to less than 6 inches in size and mixed with a sufficient amount of soils so as to form a tight bond when compacted. Large size rocks or boulders that cannot be reduced in size with the grading equipment may be incorporated in the base portion of deep fills. When large rocks are incorporated in deep fills they should be distributed with a sufficient distance

between them to allow for passage of the mechanical compactor being used. Further, the voids under and around the individual rocks shall be filled with regular fill materials. Fill sections where large size rocks are permissible will be defined by the project geotechnical engineer during the grading operations. The placement moisture content of fills shall be kept close to the optimum moisture content, as determined by the ASTM test method D1557-90.

5.5.3. The natural slopes receiving compacted fills shall be consecutively benched commencing from the lower boundary of the fill. The actual extent of the overexcavation along the base of the compacted fills will be determined by the project engineering geologist or geotechnical engineer during grading operations, based on the ground conditions disclosed in the excavation at each location. However, the minimum excavation shall extend a depth of 3 feet and a width of 15 feet for the base bench along the lower boundary of the fill and to a depth of 3 feet and a width of 10 feet for the consecutive benches.

5.5.4. Fills shall be compacted with sheepsfoot rollers to a minimum relative compaction of 90% as determined by the ASTM test method D1557-90. The fill shall be placed in layers, and each layer shall be spread evenly and compacted adequately before the subsequent layer is placed.

5.5.5. It shall be the responsibility of the grading contractor to ensure that every section of the fill meets the minimum requirements of this report. The degree of compaction being attained during the fill placement will be ascertained by random field density tests which will be performed by a representative of the project geotechnical engineer. The contractor is responsible for cutting smooth pads suitable for performing the field density tests at any location designated by the person performing the test. When these tests indicate that the density of any layer of fill, or portion thereof, is below the required compaction, that particular layer, or portion, shall be reworked until the required density has been obtained. Favorable results of these tests shall not be construed as certification that the contractor has performed his responsibility to compact every section of the fill, and has satisfied the requirements of this report.

5.5.6. All fill slopes shall be overfilled and then trimmed back neatly to the design line to ensure that loose or uncompacted material will not be present on the surface. Slope finishing for cut slopes involved in overexcavation for stabilization shall be done in the same manner as recommended for fill slopes. Slope finishing for other cut slopes shall leave no loose material or disturbed pockets on the surface.

5.5.7. Fill placement shall not take place during unfavorable weather conditions. When the work is interrupted by heavy rains, the fill placement shall not resume until the moisture condition of the previously compacted fill is suitable for compaction. All previously compacted fills that are disturbed by rains shall be adequately recompacted before placing additional fills.

The contractor shall pay special attention to avoid the ponding of water from heavy rains as well as groundwater seepage discharging into the fill area during grading operations.

5.5.8. It is recommended that an average shrinkage factor of 5% be used in dirt quantity computations. It is noted that a precise determination of the shrinkage factor is not possible due to the cobbly nature of the materials that cover much of the slopes in the areas proposed for grading. Therefore, the recommended value should be used as a general guide, and an allowance should be provided for possible adjustment of the final grade to attain a dirt balance.

5.5.9. Underdrains shall be provided in the base of compacted fills in all ravine areas and in any other areas defined by the project geotechnical engineer during the grading operations. Underdrain installation shall conform to the detail shown on Figure 8-b, and the actual layout and depth of the underdrains will be determined by the geotechnical engineer during construction. The pipe lines shall be provided with cleanouts at the upper terminus and at each branch or bend point, and risers shall be provided with screwed caps.

5.5.10. Earthwork operations for the site grading shall be done under the observation of the project geotechnical engineer and engineering geologist. The project geotechnical engineer shall be notified of the commencement of earthwork operations, including site clearing, at least two days in advance.

5.6. Retaining Walls

5.6.1. Reinforced earth construction is recommended for those retaining walls that are not a part of buildings and required for support of compacted fills. Either crib walls or reinforced earth walls may be used for support of cut slopes that are free from structures.

5.6.2. It is recommended that the material from cuts made into the sandstone unit, and other sandy or gravelly native materials approved by our office, be used for construction of the reinforced earth section for walls. The native materials recommended for use in reinforced earth construction are also suitable for crib wall backfills. Wall backfills consisting of the native materials defined above shall be compacted to a minimum relative compaction of 90% as determined by the ASTM test method D1557-90. Reinforced earth wall sections shall extend a minimum depth of 5 feet into the natural slope. Crib walls shall be founded at a minimum depth of 2 feet below the lowest adjacent grade when the ground is level, or 5 feet below the lowest adjacent grade when the ground slopes away at 2:1 from the wall. If the contractor elects to use crushed rock or other types of pervious granular materials for crib wall backfill, so as to eliminate the need for compaction, he shall provide adequate measures for ensuring that surface water does not enter the granular backfill.

5.6.3. For the wall backfills defined above, we recommend the following geotechnical criteria for design of both reinforced earth walls and crib walls:

Unit weight of fill:	130 p.c.f.
Friction angle of backfill:	30 degrees
Active earth pressure in equivalent fluid weight:	
Level ground behind wall:	50 p.c.f.
2:1 slope behind wall:	75 p.c.f.
Passive earth pressure in equivalent weight:	
Level ground in front of wall:	400 p.c.f.
Negative slope in front of wall:	0 p.c.f. to a depth at which the distance to the slope face on the horizontal plane is less than 5 feet; 400 p.c.f. below this depth.
Base friction:	400 p.s.f. or 0.25 in coefficient
Allowable bearing capacity:	3,000 p.s.f.

5.6.4. Retaining walls which are part of the buildings will be of rigid masonry or concrete construction. These walls are expected to be restrained from rotation at the top due to the anchorage of the floor frame-subfloor system. The wall design shall satisfy both the restrained and unrestrained conditions, and shall be based on the following geotechnical criteria:

Active earth pressure in equivalent fluid weight:	
Unrestrained:	50 p.c.f.
Restrained:	75 p.c.f.
Passive pressure in equivalent fluid weight:	400 p.c.f.
Coefficient of basal friction on footing:	0.25
Allowable bearing capacity for DL + LL:	3,000 p.s.f.

5.6.5. It is recommended that a "site coefficient" of 1.2 be used for determination of the seismic coefficient acting on the retaining walls. Stability of the retaining walls against overturning under the seismic loading shall be determined based on the condition that the seismic force acts at one-third of the wall height, measured from the top of the wall.

5.6.6. The geotechnical parameters presented above for the wall design are applicable to drained backfill conditions. Therefore, the wall backfill shall be provided with an adequate drainage system to prevent hydrostatic pressures from acting on the backfill or saturating the wall subgrade.

5.6.7. All retaining wall plans shall be reviewed by the project geotechnical engineer.

5.6.8. Wall installations shall be done by a contractor with expertise in the particular wall installation procedures, and shall strictly adhere to the specifications and recommendations of the manufacturer of the wall elements and materials.

5.6.9. Excavations for the wall installations shall be examined by the project geotechnical engineer, and the actual extent of the excavation will be determined based on the subsurface conditions revealed by his examination.

5.6.10. Some of the retaining walls utilizing a reinforced earth construction will be located adjacent to proposed townhome buildings. These townhomes will be supported on drilled piers penetrating through the reinforced earth section. It is critical that piers which would penetrate the reinforcing elements be ascertained, and the loss of these reinforcing elements be accounted for in the design.

5.7. Foundations

5.7.1. Piers, as used in the foundation recommendations, refer to drilled, cast-in-place concrete piers in construction and end bearing piers in design. The bearing capacity of footings and piers and the passive resistance of piers, as presented in the recommendations, are provided for dead plus live loads, and the values may be increased by 1/3 to include the code wind or seismic loading. The passive resistance may be assumed to be mobilized over a cross-section equivalent to 1.5 times the diameter of the individual pier.

5.7.2. Lots 1 through 4: A mixed ground condition exists on these lots, varying from hard sandstone in the upper elevations to colluvium in the lower elevations. A pier and grade beam system is recommended. Piers shall be drilled to a minimum depth of 5 feet into the sandstone or a minimum of 10 feet below the ground level outside the sandstone area. If drilling to the minimum depth into the sandstone is not feasible, continuous footings may be used in the sandstone, with a pier and grade beam construction outside the sandstone area. The continuous footings and grade beams should maintain structural continuity. These continuous footings should be founded at a minimum depth of 12 inches in the sandstone.

The allowable bearing capacity is 7 k.s.f. for the piers and 3.0 k.s.f. for the continuous footings described above. For the combination of piers and continuous footings, the piers should be designed to resist all lateral loads from inclined loading and wind or seismic loading. A passive pressure of 500 p.c.f. in equivalent fluid weight may be used for determination of lateral stability of the piers when the foundation system is subjected to an inclined loading condition from dead plus live loads.

5.7.3. Lots 5 and 6: Continuous footings and isolated spread footings may be used on these lots. All footings should be founded at a minimum depth of 3 feet below the existing grade or

18 inches below the prepared pad grade. The allowable bearing capacity for the footings described above is 3.0 k.s.f.

On Lot 5, a portion of the lower elevations is underlain by approximately 5 feet of colluvium which is susceptible to creeping. In the event that the building will be partially located within the colluvium area, this portion of the building should require deepened footings or piers founded below the colluvium.

5.7.4. Lots 7 and 8: Pier and grade beam foundations are recommended for these lots. Minimum depth of the piers shall be 15 feet below the existing grade. The allowable bearing capacity is 10 k.s.f. The allowable passive resistance for the individual pier is 400 p.c.f. in equivalent fluid weight.

5.7.5. Lots 9, 10 and 11: Pier and grade beam foundations are recommended for these lots. Minimum depth of the piers shall be 20 feet below the existing grade. The allowable bearing capacity is 10 k.s.f. The piers shall also be designed for the condition that an active pressure of 90 p.c.f. in equivalent fluid weight acts on the upper 10 feet of the pier embedment, to account for the effect of soil creeping in the natural slope. The allowable passive resistance of the individual pier is 400 p.c.f. in equivalent fluid weight. The above foundation recommendations for these lots presuppose that the individual lots will have adequate seepage control measures in place prior to foundation construction.

5.7.6. Lots 12, 13 and 14: When level building pads are created with engineered fills on these lots, continuous strip footings and isolated spread footings could be used. When pier and grade beam foundations are utilized, piers should extend a minimum depth of 10 feet into the natural ground. Our recommended allowable bearing capacity is 3.0 k.s.f. for strip footings and 7.0 k.s.f. for piers. The allowable passive resistance of the pier is 400 p.c.f. in equivalent fluid weight.

5.7.7. Lots 15, 16, 17 and 18: A 2:1 fill slope will be constructed over the entire portion of Lot 17, and will extend partially onto Lots 16 and 18. Pier and grade beam foundations are recommended for these lots. All piers shall extend a minimum depth of 15 feet below the natural slope line. The allowable bearing capacity of the pier is 10.0 k.s.f. The allowable passive resistance of the pier is 400 p.c.f. in equivalent fluid weight.

5.7.8. Townhomes: The townhome plans typically involve split levels created by grading. Garages on the upper level and lower level open to opposite directions and a combination of retaining walls and slopes provide the elevation difference between the upper and lower levels. Nonuniform ground conditions will exist under the buildings that arise from cut-fill combinations and variations in thickness of the fills. In order to minimize the effect of the nonuniform ground conditions, the buildings should be supported by pier and grade beam foundations. Piers should be founded at a minimum depth of 5 feet in cut areas and 10 feet in fill areas. The allowable

bearing capacity for the pier is 7.0 k.s.f. The allowable passive resistance of the pier is 400 p.c.f. in equivalent fluid weight.

Several townhome units will be located adjacent to reinforced earth slopes or retaining walls supporting fills. Piers for these units shall extend at least 5 feet below the reinforced earth section.

5.7.9. Foundation plans and design computations shall be provided to the project geotechnical engineer for review, prior to submitting a building permit application.

5.7.10. All foundation excavations shall be examined by the project geotechnical engineer, and the foundation pier drilling shall be performed under the observation of a representative of the project geotechnical engineer. Depending on the subsurface conditions disclosed in the excavation and drilling, the actual foundation depth may deviate from the minimum recommended in this report. When unusual subsurface conditions are encountered that require a change to the foundation depth, this determination will be made by the project geotechnical engineer.

5.7.11. Pier holes should be cleared of loose soil spoils. Each pier hole should be thoroughly wetted immediately prior to placing concrete. If seepage or standing water is encountered in the pier holes, no more than 3 inches of standing water shall be allowed at commencement of concrete placement.

5.7.12. The project geotechnical engineer shall be notified at least two days in advance of the commencement of the foundation excavation or drilling.

5.7.13. In areas where the thickness of compacted fill is in excess of 10 feet, the foundation construction shall be delayed at least through the first winter after completion of the rough grading.

5.8. Concrete Slabs-on-Grade

5.8.1. Non-structural concrete slabs-on-grade shall not be used in living areas, unless approved by the project geotechnical engineer. Building plans should be provided to the project geotechnical engineer for his review to determine whether or not it would be feasible to use such slab construction in living areas for the particular plans.

5.8.2. Garage and driveway slabs may be constructed directly over the subgrade consisting of the compacted native material. Non-structural slabs of this kind can experience cracking due to shrinkage of the concrete itself, even when the subgrade conditions are favorable for the slab construction. Unless these slabs are provided with reinforcing against concrete shrinkage, it is

recommended that they be physically separated from the surrounding foundation walls by the use of expansion joint materials and that both the garage and driveway slabs be provided with deep surface scoring at 10 feet to 12 feet intervals to control and contain the slab cracking.

5.8.3. The subgrade shall be uniformly compacted at least for the upper 10 inches to a minimum relative compaction of 90% as determined by the ASTM test method D1557-90. The subgrade shall be thoroughly wetted immediately prior to concrete placement.

5.9. Street Pavement Construction

5.9.1. No analysis was performed at this time for determination of alternate pavement sections for streets, because the actual subgrade construction could involve several types of materials and their distribution cannot be anticipated at this time. For use in the grading plan design, it is recommended that a pavement section having a total thickness of 12 inches be assumed. The final construction pavement sections shall be determined based on the results of R-value tests performed on samples obtained from the subgrade established by rough grading.

5.9.2. At least the upper 10 inches of street subgrade and entire aggregate base section shall be compacted to a minimum relative compaction of 95% as determined by the California test method 216-E.

5.10. Surface Drainage and Erosion Control Measures

5.10.1. All newly-constructed slopes shall be provided with a suitable vegetation cover for protection of the slope against erosion. All horizontal benches on constructed slopes shall be provided with concrete-lined ditches adequately designed to contain the runoff to the benches. These concrete-lined ditches should be installed as soon as the slope construction is complete, and the benches should not be left though the winter months without the ditches installed.

5.10.2. The surface runoff shall be controlled so as to prevent concentrated flows from occurring over constructed slopes.

5.10.3. The final site grading and maintenance of the project shall ensure that no ground features exist that could create the accumulation of standing water any place within the project. Properly designed area drains and other storm drainage facilities shall be installed and maintained for positive control of surface drainage so that infiltration of the surface water is minimized at all locations within the project.

5.10.4. All roof drains shall be connected into a pipe system and conveyed to controlled storm drainage facilities. The exterior grade around the buildings shall be provided with a sufficient gradient away from the buildings to attain positive drainage control.

5.11. Utility Trench Backfill

5.11.1. Utility trench backfills shall consist of materials approved by our office. The native materials that have been defined previously for use in compacted fills are suitable for trench backfills. Other than for the bedding section, no granular materials that are significantly more pervious than the ground into which the trench extends, shall be permitted for the backfill.

5.11.2. Trench backfills above the bedding section shall be compacted to a minimum relative compaction of 90% as determined by ASTM test method D1557-90. No jetting shall be permitted for compaction of the trench backfills. All trench backfills above the bedding section shall be compacted by mechanical means or with a suitable manual tamper.

5.11.3. All trenches that are located on slopes and traverse in directions crossing the slope shall be consecutively benched into the ground on either side of the trench during placement of the backfill to minimize the effect of any discontinuity between the trench backfill section and the adjoining ground. It is recommended that both the bench interval and width be approximately 2 feet.

5.11.4. In seepage areas, the bedding section is expected to collect the seepage. Therefore, it is recommended that a seepage collection system be provided in the bedding section, consisting of perforated pipe. The seepage collection pipe should be periodically connected into other storm drainage facilities, or other seepage control systems.

5.12. Supplemental Geotechnical Investigation

5.12.1. A supplemental geotechnical investigation is recommended to be performed during the grading operations. The main objective of such an investigation will be to gather strength data for the geologic units at greater depths than reached by the investigation covered in this report. The laboratory test data reported herein pertain to core samples generally representing the more severely-weathered upper zone of the bedrock, whereas stability of some slopes on the project is dictated by the strength characteristics of the bedrock at greater depths. Deduction of the strength data, for use in stability analyses, for the bedrock at such depths was necessarily based on a conservative approach. Therefore, the supplemental geotechnical investigation may provide results requiring less extensive slope stabilization measures than those outlined in this report. The recommended timing for this supplemental investigation will also provide us with an opportunity to examine the geologic features more completely in open excavations.

6. LIMITATIONS AND UNIFORMITY OF CONDITIONS

6.1. The professional opinions and recommendations presented herein have been made in accordance with generally accepted principles and practices in the fields of engineering geology and geotechnical engineering. This acknowledgement is in lieu of all warranties, expressed or implied.

6.2. The conclusions and recommendations presented herein are based on the results of our investigation and the current development proposal. It is possible that actual subsurface conditions may vary locally from those determined by our investigation. If any changes are proposed to the current plan, or if any unusual subsurface conditions are encountered during construction, our conclusions and recommendations, as presented in this report, may become invalid, partially or wholly. In such event, our office should be immediately notified for supplemental recommendations.

6.3. The findings of this report are valid as of the present date. However, changes in the site conditions can occur on the site itself as well as on the adjacent properties with the passage of time, whether due to natural processes or to the work of man. In addition, changes in applicable or appropriate standards can occur, whether they result from legislation or the broadening of knowledge. These changes, which are outside of our control, may invalidate wholly or partially the recommendations of this report. Therefore, this report is subject to review and should not be relied upon after a period of three years.

7. ACKNOWLEDGEMENT

The case histories cited in the report, concerning reinforced earth construction for slopes and retaining walls, were provided by Mr. Steve Miller of Earth Technologies, Inc.

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APPENDIX A

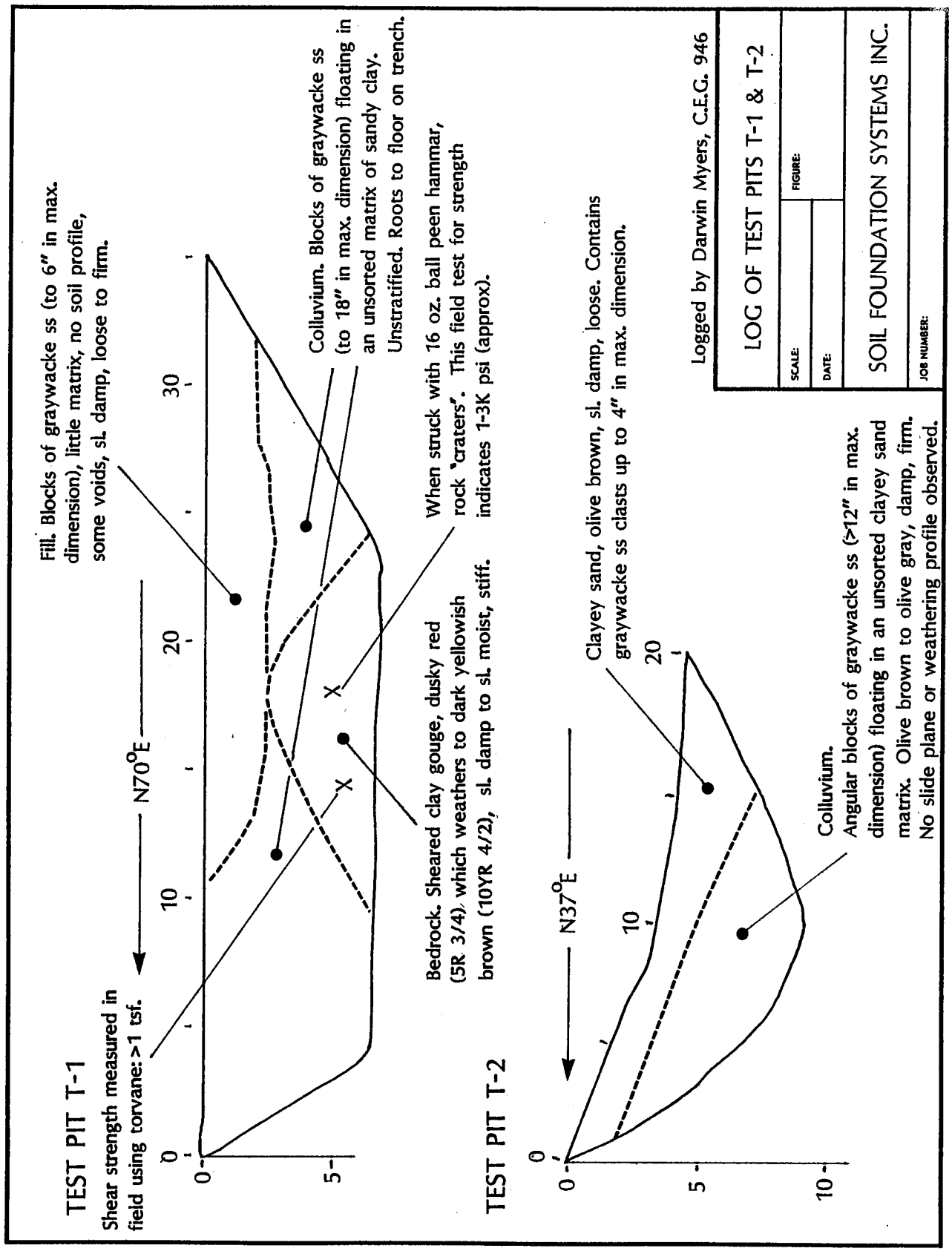

Plate 4 - Logs of Test Pits: T-1 & T-2

SOIL FOUNDATION SYSTEMS, INC.

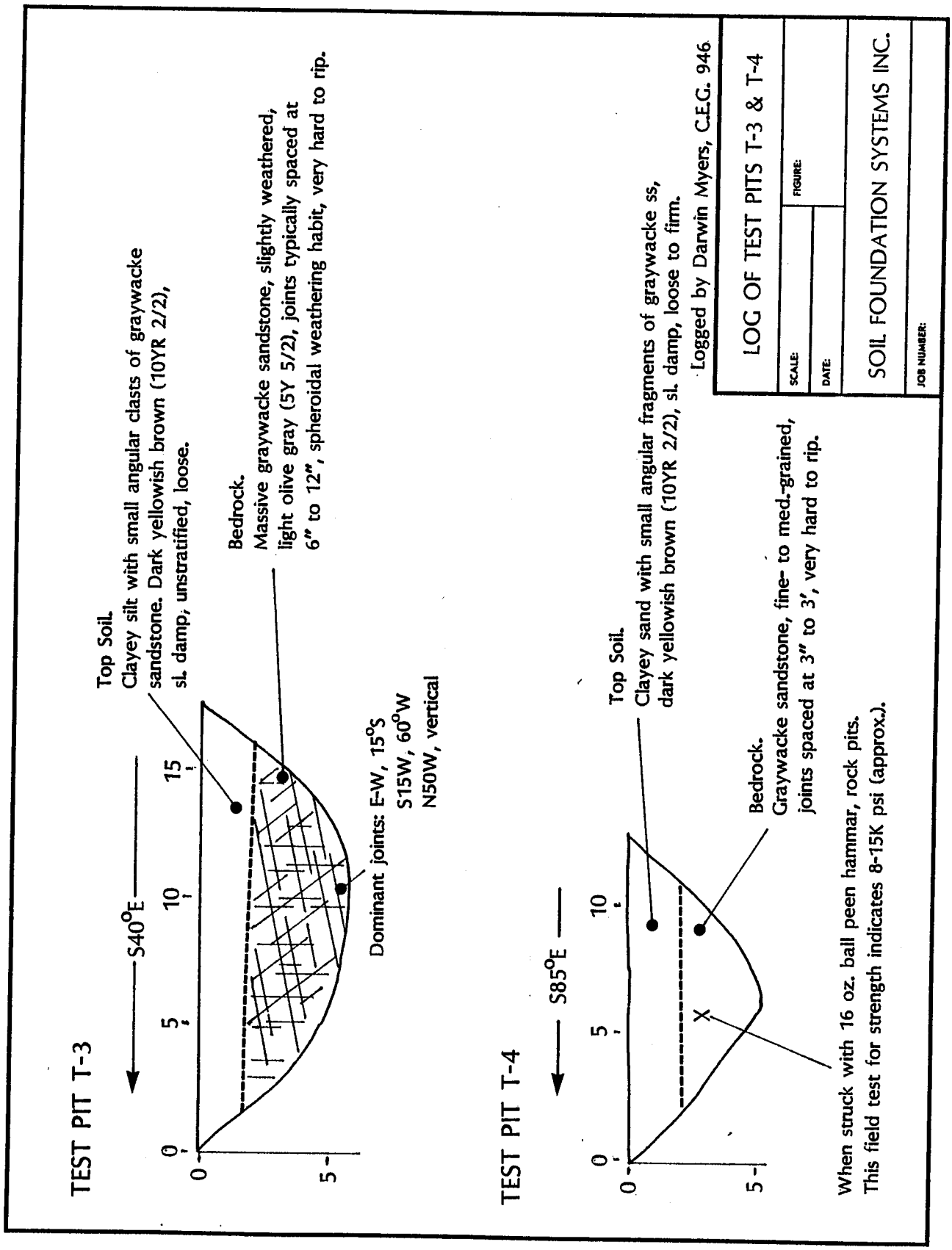

Plate 5 - Logs of Test Pits: T-3 & T-4

SOIL FOUNDATION SYSTEMS, INC.

File S22-634-2
July 20, 1993

EXPLORATORY BORING LOG						LABORATORY TESTS							
Sample Number	Depth, feet	Boring Log	Unified Soil Classification System Symbols	Description	Standard Penetration Test, blows/foot	Moisture Content, %	Dry Density, p.c.f.	Unconfined Compressive Strength, k.s.f.	Direct Shear Test "C", k.s.f.	Direct Shear Test "φ", degrees	Liquid Limit, %	Plasticity Index, %	Triaxial Compression
Boring No. B-1						Date of Drilling: 7/16/92							
	2			Colluvium, clayey Silt, rust-brown, with angular sandstone fragments to 6" (Q_c)									
1-1	4 6			sandy, stiff, poorly sorted, unstratified	* 77	11.0	116.3	10.0 @ 2% strain					
	8 10												
1-2	12			Siltstone breccia, sev. weathered, lt. to med. gray-brown, soft (stiff clayey Silt) - F_m	* 46	12.5 13.0	113.7 123.9	9.0 @ 4% strain					x
	14												
1-3				mottled with gray caliche mod. weathered	* 100	11.4	124.6	10.0 @ 3% strain					
				Bottom at 16 feet									
Notes: 1) * denotes penetration resistance of 2½-inch I.D. sampler. 2) Direct shear test data in ( ) are for residual strength.													
Boring No. B-2						Date of Drilling: 7/16/92							
	2			Colluvium, clayey Silt, rust-brown, with sandstone fragments - Q_c									
	4			varved with olive brown sandy clay & maroon mudstone									
2-1	6			Clay/Siltstone breccia, severely weathered, olive gray, fragments showing preferred orientation, fractures "healed" with caliche	* 73	10.8	113.0		1.0 (0.2)	7 (21)			
	8												
2-2	10												
	12			(F_m)	* 100+	8.0	126.0	8.0 @ 2% strain					
				Bottom at 13 feet									

Plate 6 - Logs of Test Borings: B-1 & B-2

SOIL FOUNDATION SYSTEMS, INC.

EXPLORATORY BORING LOG

Sample Number	Depth, feet	Boring Log	Unified Soil Classification System Symbols	Description	Standard Penetration Test, blows/foot	Moisture Content, %	Dry Density, p.c.f.	Unconfined Compressive Strength, k.s.f.	Direct Shear Test "C", k.s.f.	Direct Shear Test "φ", degrees	Liquid Limit, %	Plasticity Index, %
				Boring No. B-3								
				clayey Silt, lt. gray-brown, loose								
	2											
	4			Colluvium, clayey sandy Silt with SS fragments to 6"								
3-1	6			(poor sample)	*50/1"	13.2	-					
	8			(Q_c)								
	10			sheared Siltstone breccia, med. gray to olive gray, sl. damp, hard								
	12											
	14			(F_m)								
3-2				moderately weathered	*50/2"	7.7	-					
				Bottom at 16'								

Plate 7 - Log of Test Boring: B-3

SOIL FOUNDATION SYSTEMS, INC.

EXPLORATORY BORING LOG						LABORATORY TESTS									
Sample Number	Depth, feet	Boring Log	Unified Soil Classification System Symbols	Description	Standard Penetration Test, blows/foot	Moisture Content, %	Dry Density, p.c.f.	Unconfined Compressive Strength, k.s.f.	Direct Shear Test "C", k.s.f.	Direct Shear Test "φ", degrees	Liquid Limit, %	Plasticity Index, %	Triaxial Compression	Swell/Compaction
Boring No. B-4						Date of Drilling: 7/20/92									
4-A	2			sandy clayey Silt, tan-brown, sl. damp		13.5	107.0		2.0	8	33	6		x (UBC Swell Index: 9)
	4													
4-1	6			sheared Siltstone, yellowish lt. green, sl. damp (F_m)	*85	(sample not recovered)								
	8													
4-2	10			Greywacke Sandstone, moderately weathered, med. brown, fine to med. grained (S_s)	*100+	11.2	118.2						x	
	12													
	14													
4-3	16			massive, very hard	* 50/3"									
	18													
				Bottom at 20 feet										
				Note: * denotes penetration resistance of 2½-inch I.D. sampler. Data underlined are for recompacted samples.										
Boring No. B-5						Date of Drilling: 7/20/92									
	2			Colluvium, clayey Silt with angular 2" to 10" Sandstone talus (Q_c) very rocky										
	4													
				Bottom at 5 feet										

Plate 8 - Logs of Test Borings: B-4 & B-5

SOIL FOUNDATION SYSTEMS, INC.

File No. S22-634-2
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Sample Number	Depth, feet	Boring Log	Unified Soil Classification System Symbols	Description	Standard Penetration Test, blows/foot	Moisture Content, %	Dry Density, p.c.f.	Unconfined Compressive Strength, k.s.f.	Direct Shear Test "C", k.s.f.	Direct Shear Test "φ", degrees	Liquid Limit, %	Plasticity Index, %	Triaxial Compression
				EXPLORATORY BORING LOG									
				Boring No. B-6		Date of Drilling: 7/20/92							
	2			Fill, clayey Silt, dark brown-gray (Q_{af})									
	4												
	6												
6-1	8			mottled with med. gray clay & SS inclusions	* 43	16.5	119.4		1.2	15			
	10			Shale/Siltstone clay gouge, purple tinted gray-brown cuttings, damp, hard									
6-2	12			Claystone, sandy, purple blue, becoming blue-gray (F_m)	* 51	11.1	123.2					x	
	14												
	16			becoming blocky, slightly weathered									
				Bottom at 17 feet									
				Boring No. B-7		Date of Drilling: 7/20/92							
	2			Colluvium, sandy clayey Silt, tan-brown, sl. damp, loose									
	4			Siltstone, moderately weathered, pale yellowish brown, sheared, damp, soft (stiff clayey Silt) (F_m)	* 50/5"	11.5	106.3						
7-1	6												
	8												
	10												
	12			Graywacke Sandstone, sl. weathered, sl. damp, hard (S_s)									
	14												
				Bottom at 15 feet									

Plate 9 - Logs of Test Borings: B-6 & B-7

SOIL FOUNDATION SYSTEMS, INC.

File No. S22-634-2
July 20, 1993

EXPLORATORY BORING LOG						LABORATORY TESTS								
Sample Number	Depth, feet	Boring Log	Unified Soil Classification System Symbols	Description	Standard Penetration Test, blows/foot	Moisture Content, %	Dry Density, p.c.f.	Unconfined Compressive Strength, k.s.f.	Direct Shear Test "C", k.s.f.	Direct Shear Test "φ", degrees	Liquid Limit, %	Plasticity Index, %		
Boring No. B-8						Date of Drilling: 7/24/92								
	2			Colluvium, clayey Silt, med. brown-gray										
	4			silty Clay, purple-brown, with angular sandstone fragments (Q_c)										
	6			Sandstone, severely weathered, sandy Silt, orange brown (S_s)										
	8													
	10			becoming hard at 10'										
				Bottom at 12 feet Note: This hole was drilled with a portable rig										

Plate 10- Log of Test Boring: B-8

SOIL FOUNDATION SYSTEMS, INC.

EXPLORATORY BORING LOG						LABORATORY TESTS							
Sample Number	Depth, feet	Boring Log	Unified Soil Classification System Symbols	Description	Standard Penetration Test, blows/foot	Moisture Content, %	Dry Density, p.c.f.	Unconfined Compressive Strength, k.s.f.	Direct Shear Test "C", k.s.f.	Direct Shear Test "φ", degrees	Liquid Limit, %	Plasticity Index, %	Consolidation Test
Boring No. B-9						Date of Drilling: 7/16/92							
	2		ML	clayey Silt, lt. to med. brown, sl. damp, soft to firm									
9-1	6		ML	(poor sample) Alluvium, clayey Silt with rock fragments, dark brown, moderately moist, firm (Qa)	* 17	14.7							
9-2	12				* 30	22.0	106.9		0.65	5			x
	14			Alluvium, sandy Silt with Sandstone fragments, lt. to med. brown, moist									
9-3	18		SM	(Qa)	* 43	16.9	112.9		0.7 (0.7	21 5)			x
	20												
9-4	22			with fine sand laminae	* 85	11.0	127.2	6.0	@ 4% strain				
				Sandstone, weathered, hard									
				Bottom at 24 feet									

Notes:

1) * denotes penetration resisitance of 2½-inch I.D. sampler.
2) Direct shear test data ( ) are for residual strength.

Plate 11 - Log of Test Boring: B-9

SOIL FOUNDATION SYSTEMS, INC.

File No. S22-634-2
July 20, 1993

EXPLORATORY BORING LOG						LABORATORY TESTS								
Sample Number	Depth, feet	Boring Log	Unified Soil Classification System Symbols	Description	Standard Penetration Test, blows/foot	Moisture Content, %	Dry Density, p.c.f.	Unconfined Compressive Strength, k.s.f.	Direct Shear Test "C", k.s.f.	Direct Shear Test "φ", degrees	Liquid Limit, %	Plasticity Index, %		
Boring No. B-10						Date of Drilling: 7/21/92								
	2 4 6 8 10		ML	Alluvium, clayey Silt, dark to med. brown becoming stiff, moist (Qa)										
	12 14			Sandstone, sev. weathered, sandy Clay, tan-brown (Ss) moderately weathered		Note: this hole was drilled using a backhoe-mounted rig								
				Bottom at 16 feet										
Boring No. B-11						Date of Drilling: 7/21/92								
	2 4 6		ML	Alluvium, clayey Silt, med. brown, with angular rock fragments (Qa)										
	8			clayey Sand, tan to rust-brown, sl. damp										
	10 12 14			Graywacke Sandstone, severely weathered, tan to olive brown, poorly sorted (Ss) becoming hard, fractured		Note: this hole was drilled using a backhoe-mounted rig								
				Bottom at 15 feet										

Plate 12 - Log of Test Borings: B-10 & B-11

SOIL FOUNDATION SYSTEMS, INC.

EXPLORATORY BORING LOG						LABORATORY TESTS								
Sample Number	Depth, feet	Boring Log	Unified Soil Classification System Symbols	Description	Standard Penetration Test, blows/foot	Moisture Content, %	Dry Density, p.c.f.	Unconfined Compressive Strength, k.s.f.	Direct Shear Test "C", k.s.f.	Direct Shear Test "φ", degrees	Liquid Limit, %	Plasticity Index, %		
Boring No. B-12						Date of Drilling: 7/17/92								
	2		ML	Alluvium, clayey Silt, lt. brown, with fine angular rock fragments, damp, firm (Qa)										
	4			cobble at 4'										
12-1	6			Alluvium, sandy Clay, red-brown, stiff (Qa)	* 34	15.0	111.4		0.7	10				
	8			Graywacke Sandstone, sev. weathered, yellowish orange-brown (Ss)										
				Bottom at 10'										
				Boring No. B-13		Date of Drilling: 7/21/92								
	2			clayey Silt, med. brown, damp, firm										
	4		ML	Alluvium, sandy Clay, rust-brown, sl. moist, stiff (Qa)										
	6			Sandstone, severely weathered, fine to med. grained, light brown										
	8													
	10			(Ss)										
	12			mod. weathered, tan-brown										
				Bottom at 14'										
				Note: this hole drilled using backhoe-mounted rig										

Plate 13 - Logs of Test Borings: B-12 & B-13 **SOIL FOUNDATION SYSTEMS, INC.**

File No. S22-634-2
July 20, 1993

EXPLORATORY BORING LOG						LABORATORY TESTS								
Sample Number	Depth, feet	Boring Log	Unified Soil Classification System Symbols	Description	Standard Penetration Test, blows/foot	Moisture Content, %	Dry Density, p.c.f.	Unconfined Compressive Strength, k.s.f.	Direct Shear Test "C", k.s.f.	Direct Shear Test "φ", degrees	Liquid Limit, %	Plasticity Index, %		
Boring No. B-14						Date of Drilling: 7/30/92								
				(W/L: 17:30, 7/30/92)										
	2			Silty Clay, black sheared Serpentine, sev. weathered, blue-gray,										
14-1	4			moist (poor sample)	**18	13.4	-				34	12		
	6			(Sp)										
	8			Clay gouge zone										
14-2	10			sheared Serpentine, sl. damp	**27	11.8								
	12			(Sp)										
	14			massive, blocky										
	16													
	18													
				Note: ** denotes penetration resistance of Standard penentrometer driven with a 70-pound hammer dropping a distance of 30 inches.										
				Note: this hole drilled with portable rig										
				Bottom at 19 feet										
Boring No. B-15						Date of Drilling: 7/24/92								
	2			clayey Silt, dark brown to black, damp, sl. organic										
	4			Serpentine, very severely to severely weathered, silty Clay, pale green-gray, with angular fragments (Sp)										
	6			very hard at 7'										
				Bottom at 8 feet										
				Note: this hole drilled with portable rig										

Plate 14 - Logs of Test Borings: B-14 & B-15

SOIL FOUNDATION SYSTEMS, INC.

File No. S22-634-2
July 20, 1993

EXPLORATORY BORING LOG						LABORATORY TESTS							
Sample Number	Depth, feet	Boring Log	Unified Soil Classification System Symbols	Description	Standard Penetration Test, blows/foot	Moisture Content, %	Dry Density, p.c.f.	Unconfined Compressive Strength, k.s.f.	Direct Shear Test "C", k.s.f.	Direct Shear Test "φ", degrees	Liquid Limit, %	Plasticity Index, %	
Boring No. B-16						Date of Drilling: 7/30/92							
	2			silty Clay, dark brown									
	4			sl. organic ▼ (W/L: 11:00; 7/30/92)									
16-1	6			sheared Serpentine, very severely weathered, silty Clay with serpentine fragments, pale green-gray	*** 10	28.6	95.9		0.4	25			
	8												
	10			(Sp)									
16-2	12				*** 22	11.8	107.3		0.5	38			
	14												
	16			becoming hard									
16-3	18			(Sample not recovered)	*** 18								
				Bottom at 20 feet									

Note: *** denotes penetration resistance of 2-½ I.D. sampler driven with a 70-pound hammer dropping a distance of 30 inches.

Note: This hole drilled with a portable rig

Plate 15 - Log of Test Boring: B-16

SOIL FOUNDATION SYSTEMS, INC.

File No. S22-634-2
July 20, 1993

EXPLORATORY BORING LOG						LABORATORY TESTS								
Sample Number	Depth, feet	Boring Log	Unified Soil Classification System Symbols	Description	Standard Penetration Test, blows/foot	Moisture Content, %	Dry Density, p.c.f.	Unconfined Compressive Strength, k.s.f.	Direct Shear Test "C", k.s.f.	Direct Shear Test "φ", degrees	Liquid Limit, %	Plasticity Index, %	Triaxial Compression	
Boring No. B-17						Date of Drilling: 7/20/92								
	4			Fill, silty Clay, dark brown to green-black										
				(W/L: 16:00; 7/20/92)										
17-1	8			Serpentine, very severely weathered	*83	11.6	126.1						x	
				(W/L: 10:00; 7/20/92)										
	12													
17-2				sheared Serpentine, mod. weathered, blue-gray, moist	*25	11.8	132.5						x	
	16													
17-3				(Sp)	*48	9.5	129.9				20	4	x	
	20													
	24													
17-4	28			Clay gouge zone	*40	11.4	120.5							
	32			sheared Serpentine, sl. weathered, dark gray, sl. damp										
	36			(stiff silty Clay with										
17-5				serpentine fragments)	*100+	10.4	122.3							
				Bottom at 42 feet										

Note: * denotes penertation resistance of 2½-inch I.D. sampler driven with a 140-pound hammoer dropping a distance of 30 inches.

Plate 16 - Log of Test Boring: B-17

SOIL FOUNDATION SYSTEMS, INC.

File No. S22-634-2
July 20, 1993

EXPLORATORY BORING LOG						LABORATORY TESTS								
Sample Number	Depth, feet	Boring Log	Unified Soil Classification System Symbols	Description	Standard Penetration Test, blows/foot	Moisture Content, %	Dry Density, p.c.f.	Unconfined Compressive Strength, k.s.f.	Direct Shear Test "C", k.s.f.	Direct Shear Test "φ", degrees	Liquid Limit, %	Plasticity Index, %		
Boring No. B-18						Date of Drilling: 7/17/92								
	2			clayey Silt, dark gray, soft to firm, damp (Qc)										
18-1	4 6			Serpentine, severely weathered, greenish lt. gray, sl. damp hard at 7' (Sp)	* 23	3.0	127.9							
				Bottom at 7½ feet										
Boring No. B-18A						Date of Drilling: 7/17/92								
	2			clayey Silt, dark gray, soft to firm, damp										
	4													
	6			Serpentine, severely weathered, lt. olive gray, damp, (stiff silty Clay) (Sp)										
	8													
	10													
	12			moderately weathered, sl. damp										
18-2	14				* 38/2"									
				Bottom at 16 feet										

Plate 17 - Logs of Test Borings: B18 & B-18A

SOIL FOUNDATION SYSTEMS, INC.

File No. S22-634-2
July 20, 1993

EXPLORATORY BORING LOG						LABORATORY TESTS								
Sample Number	Depth, feet	Boring Log	Unified Soil Classification System Symbols	Description	Standard Penetration Test, blows/foot	Moisture Content, %	Dry Density, p.c.f.	Unconfined Compressive Strength, k.s.f.	Direct Shear Test "C", k.s.f.	Direct Shear Test "φ", degrees	Liquid Limit, %	Plasticity Index, %		
Boring No. B-19						Date of Drilling: 7/17/92								
				clayey Silt, lt. brown, damp, moderately stiff										
	2			Serpentine, very severely weathered, lt. gray-green, with yellow-brown sandstone										
	4													
19-1	6			inclusions (Sp)	* 70/9"	12.7	115.0	5.0	@ 3 % strain					
	8			Graywacke Sandstone, lt. gray-brown, moderately to severely weathered										
	10			(Ss)										
	12													
	14													
19-2				poorly sorted, highly indurated	* 15/2"									
				Bottom at 16 feet										

Note: * denotes penetration resistance of 2½-inch I.D. sampler driven with a 140-pound hammer dripping a distance of 30".

Plate 18 - Log of Test Boring: B-19

SOIL FOUNDATION SYSTEMS, INC.

File No. S22-634-2
July 20, 1993

EXPLORATORY BORING LOG						LABORATORY TESTS							
Sample Number	Depth, feet	Boring Log	Unified Soil Classification System Symbols	Description	Standard Penetration Test, blows/foot	Moisture Content, %	Dry Density, p.c.f.	Unconfined Compressive Strength, k.s.f.	Direct Shear Test "C", k.s.f.	Direct Shear Test "φ", degrees	Liquid Limit, %	Plasticity Index, %	
Boring No. B-20						Date of Drilling: 7/17/92							
	4			clayey Silt & angular Sandstone cobbles & fragments									
	8			Clay/Siltstone breccia, very severely weathered, stiff silty Clay, med.									
20-1	12			gray, with olive brown sandstone fragments to 2" (Fm)	*47	8.2 10.9	126.3 114.4	3.0	@ 4% strain				
20-2	16			Clay/Siltstone breccia, moderately weathered,	*100+	11.2 11.0	115.6 122.7		0.4 (0.4	10-disturbed 0) sample			
20-3	20			grayish purple, contains olive brown sandstone fragments (Fm)	*100+	6.4	128.2						
	24												
	28												
	32			Graywacke Sandstone, moderately weathered,									
	36			olive brown, hard, massive (Ss)									
				Bottom at 38 feet									

Notes:

1) * denotes penetration resistance of 2½-inch I. D. sampler driven with a 140-pound hammer dropping a distance of 30".
2) Direct shear test data in ( ) are for residual strength.

SOIL FOUNDATION SYSTEMS, INC.

Plate 19 - Log of Test Boring: B-20

File No. S22-634-2
July 20, 1993

EXPLORATORY BORING LOG						LABORATORY TESTS								
Sample Number	Depth, feet	Boring Log	Unified Soil Classification System Symbols	Description	Standard Penetration Test, blows/foot	Moisture Content, %	Dry Density, p. c. f.	Unconfined Compressive Strength, k. s. f.	Direct Shear Test "C", k. s. f.	Direct Shear Test "φ", degrees	Liquid Limit, %	Plasticity Index, %	Compaction Test	Consolidation Test
Boring No. B-21						Date of Drilling: 7/17/92								
21-A				clayey Silt, dk. brown, moderately firm, sl. damp		17.0	105.0		0.5	25	42	12	x	x
21-1	4			Clay/Siltstone breccia, v. sev. weathered, with sandstone inclusions	* 33	14.0	117.5		1.0 (0.9	10 4)				
21-2	8			sheared Siltstone breccia, blue-gray, mottled with purple Clay, sl. damp	* 56	14.1	119.1	4.0	@ 4% strain					
21-3	12			sheared Siltstone & Claystone breccia, grayish purple, with angular sandstone fragments (Fm)	* 78	8.7	127.2							
	16													
	20													
	24													
	28													
	32													
21-4				Graywacke Sandstone, mod. weathered, v. hard	* 75/10"	8.0	128.9	10.0	@ 3% strain					
				Bottom at 36'										

Note: Data underlined are for recompacted samples.

Plate 20 - Log of Test Boring: B-21

SOIL FOUNDATION SYSTEMS, INC.

File No. S22-634-2
July 20, 1993

EXPLORATORY BORING LOG						LABORATORY TESTS								
Sample Number	Depth, feet	Boring Log	Unified Soil Classification System · Symbols	Description	Standard Penetration Test, blows/foot	Moisture Content, %	Dry Density, p.c.f.	Unconfined Compressive Strength, k.s.f.	Direct Shear Test "C", k.s.f.	Direct Shear Test "φ", degrees	Liquid Limit, %	Plasticity Index, %	Triaxial Compression	
				Boring No. B-22		Date of Drilling: 7/16/92								
				Colluvium, clayey Silt, gray-brown (Qc)										
22-1	4				* 68/9"	9.0	107.7							
	8			Claystone breccia, grayish red-purple, with orange-brown sandstone inclusions		8.1	129.0							
22-2	12				* 89	8.6	132.7	8.0	@ 2% strain					
22-3	16			(Fm)	* 61/9"	13.2	125.5				29	8	x	
	20													
	24													
	28			Graywacke Sandstone, moderately weathered, fractured										
	32													
				(Ss)		8.9	-							
22-4	36			very hard	* 50/3"									
				Bottom at 38 feet										

Plate 21 - Log of Test Boring: B-22

SOIL FOUNDATION SYSTEMS, INC.

File No. S22-634-2
July 20, 1993

EXPLORATORY BORING LOG						LABORATORY TESTS								
Sample Number	Depth, feet	Boring Log	Unified Soil Classification System Symbols	Description	Standard Penetration Test, blows/foot	Moisture Content, %	Dry Density, p.c.f.	Unconfined Compressive Strength, k.s.f.	Direct Shear Test "C", k.s.f.	Direct Shear Test "φ", degrees	Liquid Limit, %	Plasticity Index, %		
Boring No. B-23						Date of Drilling: 7/16/92								
	2			Colluvium, clayey Silt, lt. brown/grayish, with angular sandstone and siltstone fragments (Qc)										
	4													
23-1	6			Siltstone breccia, very sev. weathered, gray-green, with stiff brown clayey Silt	* 70	8.7	135.5							
	8													
	10			Sandstone/Siltstone breccia, severely to moderately weathered, lt. yellow-brown to orange-brown (Fm)										
23-2	12				* 86/10"	7.6	125.7							
	14													
23-3	16			Graywacke Sandstone, severely weathered, olive brown, hard, fractured (Ss)	* 50/3"	6.2					29	8		
	18													
				Bottom at 20 feet										

Plate 22 - Log of Test Boring: B-23

SOIL FOUNDATION SYSTEMS, INC.

File No. S22-634-2
July 20, 1993

EXPLORATORY BORING LOG						LABORATORY TESTS								
Sample Number	Depth, feet	Boring Log	Unified Soil Classification System Symbols	Description	Standard Penetration Test, blows/foot	Moisture Content, %	Dry Density, p.c.f.	Unconfined Compressive Strength, k.s.f.	Direct Shear Test "C", k.s.f.	Direct Shear Test "φ", degrees	Liquid Limit, %	Plasticity Index, %		
Boring No. B-24						Date of Drilling: 7/16/92								
				clayey Silt with Talus										
	2			Fill, drain rock, subrounded gravel from 2" to 3", metamorphic clasts, little or no matrix										
24-1	4													
	6													
	8													
	10			Claystone/Siltstone breccia, very severely weathered, clayey Silt, olive brown (Fm)										
	12													
	14													
	16													
	18			Claystone & Siltstone breccia, severely weathered, clayey Silt, med. brown, sl. damp (Fm)										
	20													
	22													
24-2	24			moderately weathered, lt. olive gray										
	26			sl. weathered, med. gray, with highly indurated meta graywacke clasts										
24-3														
				Bottom at 28'										

Plate 23 - Log of Test Boring: B-24

SOIL FOUNDATION SYSTEMS, INC.

File No. S22-634-2
July 20, 1993

EXPLORATORY BORING LOG						LABORATORY TESTS								
Sample Number	Depth, feet	Boring Log	Unified Soil Classification System Symbols	Description	Standard Penetration Test, blows/foot	Moisture Content, %	Dry Density, p.c.f.	Unconfined Compressive Strength, k.s.f.	Direct Shear Test "C", k.s.f.	Direct Shear Test "φ", degrees	Liquid Limit, %	Plasticity Index, %		
				Boring No. B-25										
	2			clayey Silt, med. brown										
	4			Sandstone, severely weathered, silty Sand, tan to orange-brown										
	6			(Ss)										
	8			moderately weathered										
				Bottom at 10"										
				Note: Boring Nos. 25 & 26 were drilled using a backhoe-mounted rig										
				Boring No. B-26										
	2			clayey Silt, med. brown										
	4			Sandstone, severely weathered, tan brown, silty Sand										
	6			(Ss)										
	8			moderately weathered, oxide stained fractures										
	10													
	12													
	14													
				Bottom at 16'										

Date of Drilling: 7/21/92

Date of Drilling: 7/21/92

Plate 24 - Logs of Test Borings: B-25 & B-26

SOIL FOUNDATION SYSTEMS, INC.

File No. S22-634-2
July 20, 1993

EXPLORATORY BORING LOG						LABORATORY TESTS							
Sample Number	Depth, feet	Boring Log	Unified Soil Classification System Symbols	Description	Standard Penetration Test, blows/foot	Moisture Content, %	Dry Density, p.c.f.	Unconfined Compressive Strength, k.s.f.	Direct Shear Test "C", k.s.f.	Direct Shear Test "φ", degrees	Liquid Limit, %	Plasticity Index, %	
Hole P-1						Date of Drilling: 4/3/90							
1-1	2–4		CL – ML	FILL: Mixture of silty to sandy Clay and rock fragments, failry stiff (moist and soft at base)	24*	39.8	73.8						
1-2	6–8–10			Colluvium - mixture of clayey sand and rock fragments and boulders, fairly dense (Qc)	40*/5"	11.4	103.8		0.3	15			
1-3	12			(sandstone/serpentine) Medium to dark gray rock	30*/4"	9.9	121.8	7.2 @ 6.2% strain					
				Bottom at 13 feet									
Hole P-2						Date of Drilling: 4/3/90							
	2		CL	Sandy Clay w/Rock fragments									
	4			Sandstone, very hard refusal to drilling (Ss)									
				Bottom at 5 feet									

Plate 25 - Logs of Test Borings: P-1 & P-2

SOIL FOUNDATION SYSTEMS, INC.

EXPLORATORY BORING LOG — LABORATORY TESTS

Hole P-3 — Date of Drilling: 4/3/90

Sample Number	Depth, feet	Boring Log	Unified Soil Classification System Symbols	Description	Standard Penetration Test, blows/foot	Moisture Content, %	Dry Density, p.c.f.	Unconfined Compressive Strength, k.s.f.	Direct Shear Test "C", k.s.f.	Direct Shear Test "φ", degrees	Liquid Limit, %	Plasticity Index, %	Compaction Test
3-A	2		ML	Dark brown clayey Silt, fairly stiff					(2.0	8)	32	10	x
3-1	4			Light gray Shale, highly sheared, silty, interbedded w/sandstone (Fm)	35*	14.0	113.1		0.8	14			
	6												
	8												
3-2	10			Medium brown Sandsonte, highly fractures, hard (Ss)									
3-B	12												X
3-3	14												
				Bottom at 15 feet									

Notes: . * penetration resistance for 2½-I.D. split-tube sampler.
. Numbers in ( ) are for recompacted samples.

Plate 26 - Log of Test Boring: P-3

SOIL FOUNDATION SYSTEMS, INC.

File No. S22-634-2
July 20, 1993

EXPLORATORY BORING LOG						LABORATORY TESTS								
Sample Number	Depth, feet	Boring Log	Unified Soil Classification System Symbols	Description	Standard Penetration Test, blows/foot	Moisture Content, %	Dry Density, p. c. f.	Unconfined Compressive Strength, k. s. f.	Direct Shear Test "C", k. s. f.	Direct Shear Test "φ", degrees	Liquid Limit, %	Plasticity Index, %		
Hole P-4						Date of Drilling: 4/6/90								
	2			FILL: Mixture of sandy Clay and rock fragments (serpentine), stiff										
	4		CL											
4-1	6		–	(Qaf)	29*	13.5	117.3	2.4	@ 3.2% strain					
	8													
	10		ML											
4-2	12				84*	9.8	126.7							
	14													
						18.3	112.0							
4-3	16			Black to dark brown silty Clay with fine rock frgments, scattered tree roots	21*	14.5	114.3		0.5	20				
	18		CH											
	20					22.9	103.6							
4-4				becoming sandy and rocky	44*	19.9	109.9		0.5	14				
	22			(Qc)										
	24													
	26			Dark gray Serpentine, hard										
	28			(Sp)										
				Bottom at 30 feet										
				Note: * penetration resistnace of 2½-inch I.D. split-tube sampler										

Plate 27 - Log of Test Boring: P-4

SOIL FOUNDATION SYSTEMS, INC.

File No. S22-634-2
July 20, 1993

EXPLORATORY BORING LOG						LABORATORY TESTS							
Sample Number	Depth, feet	Boring Log	Unified Soil Classification System Symbols	Description	Standard Penetration Test, blows/foot	Moisture Content, %	Dry Density, p.c.f.	Unconfined Compressive Strength, k.s.f.	Direct Shear Test "C", k.s.f.	Direct Shear Test "φ", degrees	Liquid Limit, %	Plasticity Index, %	
Hole P-5						Date of Drilling : 4/6/90							
	2		CL	FILL: Mixture of light to dark brown silty clay, sandy Clay and Serpentine rock fragments, stiff									
5-1	4												
	6		–	(Qaf)	20*	16.5	102.5						
	8		ML										
5-2	10												
	12				51*	16.6	115.0		1.4	0			
	14		CL	Black to dark brown silty Clay with rock fragments, stiff, moist									
	16			(Qc)									
	18			Medium to dark gray Serpentine rock, hard (highly expansive)- Sp		11.2	120.2						
5-3	20				45*	10.1	131.8		0.5	14			
				Bottom at 21 feet									
				Hole P-6		Date of Drilling : 4/6/90							
	2		CL	Brown sandy Clay									
				Massive Sandstone, very hard (Ss) (refusal to drilling)									
	4												
				Bottom at 5 feet									

Plate 28 - Log of Test Borings: P-5 & P-7

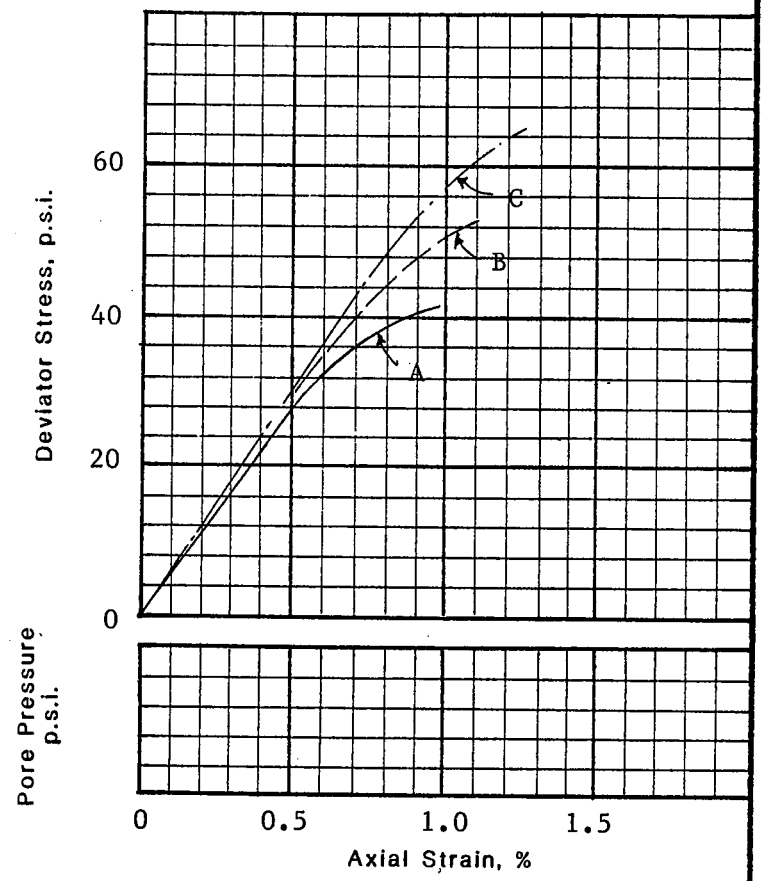
SOIL FOUNDATION SYSTEMS, INC.

TRIAXIAL COMPRESSION TEST

(TEST TYPE: U-U)

Sample No.	1-2	1-2	1-2
Depth feet	10	10	10
Moisture Content, %	13.0	13.0	13.0
Dry Density p.c.f.	124.0	124.0	124.0
Confining Pressure p.s.i.	10	15	20
Symbal	A	B	C

Remarks:
1) Multi-phase loading
2) Siltstone, med. gray-brown, weathered



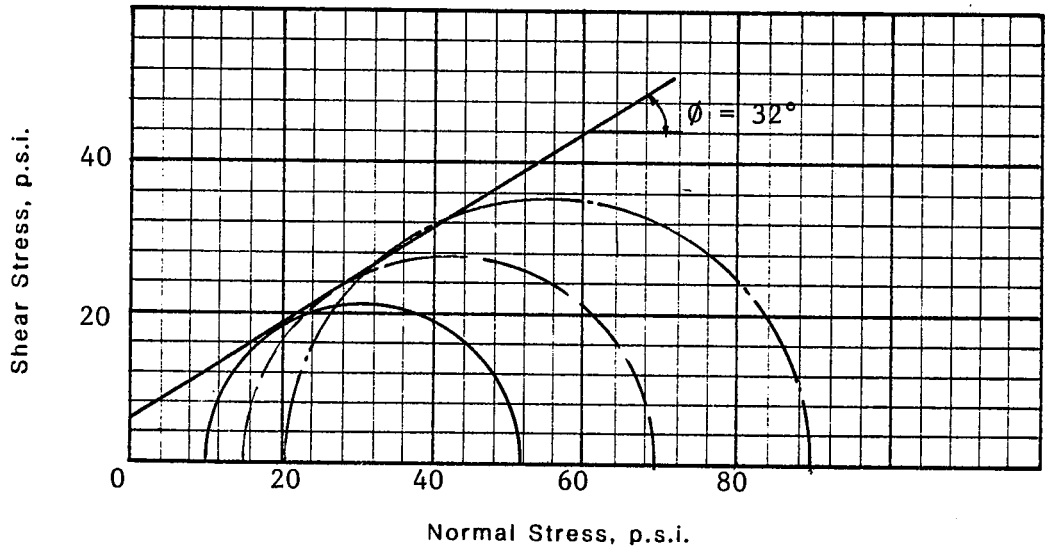


Plate 29

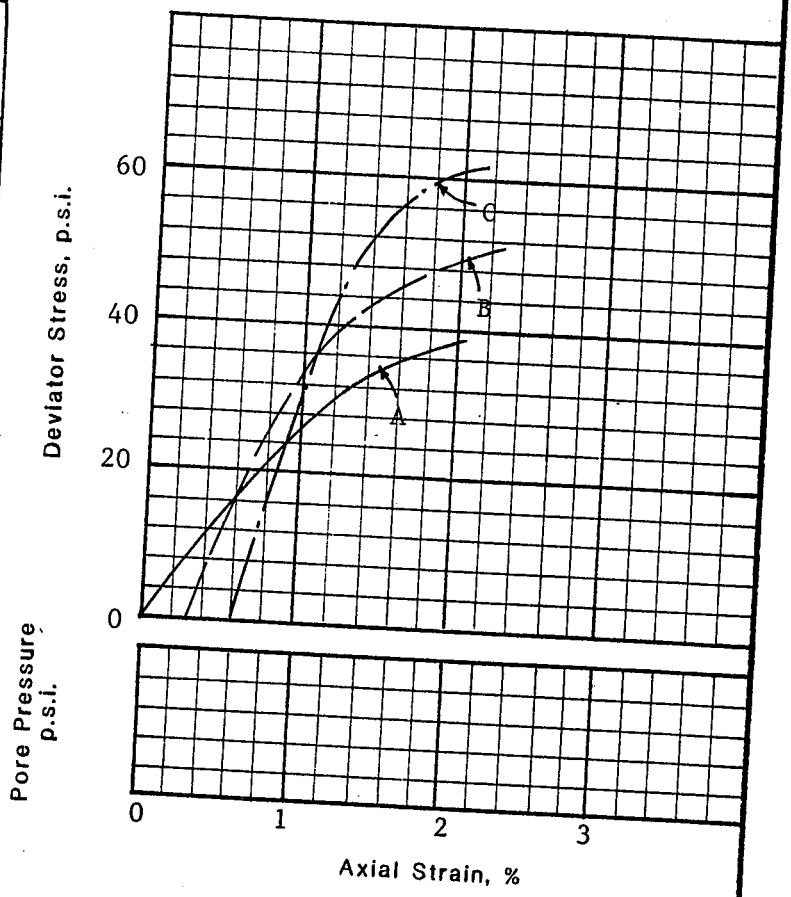
SOIL FOUNDATION SYSTEMS, INC.

TRIAXIAL COMPRESSION TEST

(TEST TYPE: U-U)

Sample No.	4-2	4-2	4-2
Depth feet	10	10	10
Moisture Content, %	11.2	11.2	11.2
Dry Density p.c.f.	118.2	118.2	118.2
Confining Pressure p.s.i.	10	15	20
Symbal	A	B	C

Remarks:
1) Multi-phase loading
2) Weathered silty Sandstone



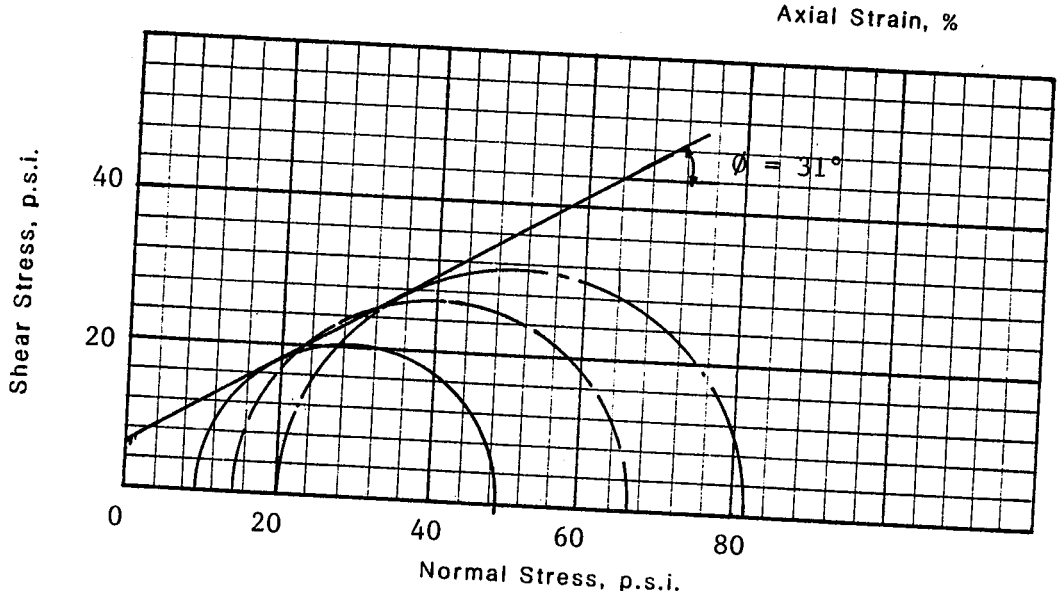


Plate 30

SOIL FOUNDATION SYSTEMS, INC.

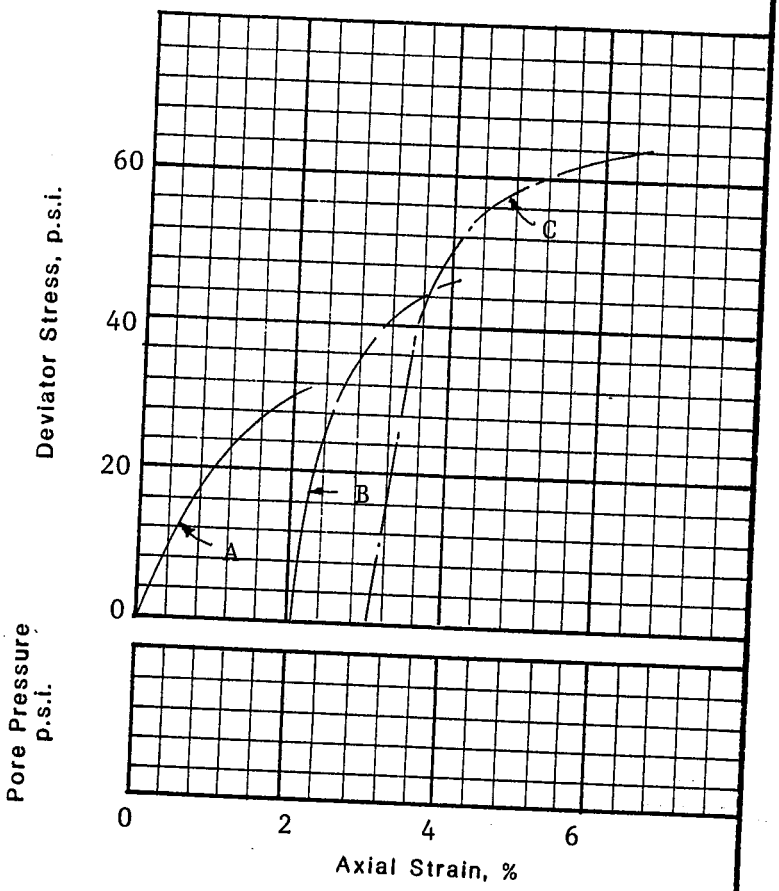
File No. S22-634-2
July 20, 1993

TRIAXIAL COMPRESSION TEST

(TEST TYPE: U-U)

Sample No.	6-2	6-2	6-2
Depth feet	12	12	12
Moisture Content, %	11.1	11.1	11.1
Dry Density p.c.f.	123.2	123.2	123.2
Confining Pressure p.s.i.	10	15	20
Symbal	A	B	C

Remarks:
1) Multi-phase loading
2) Claystone, purple-blue



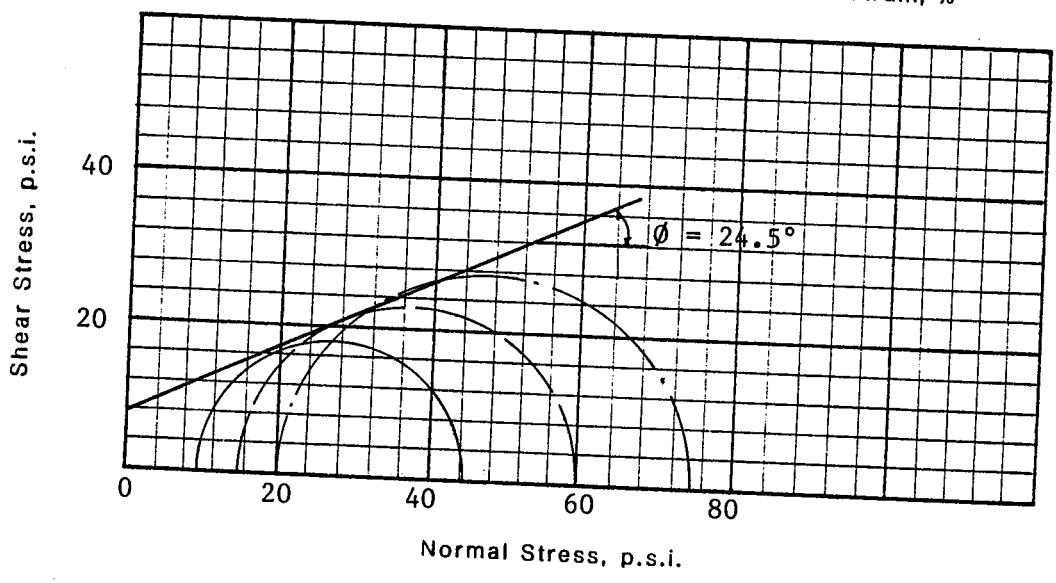


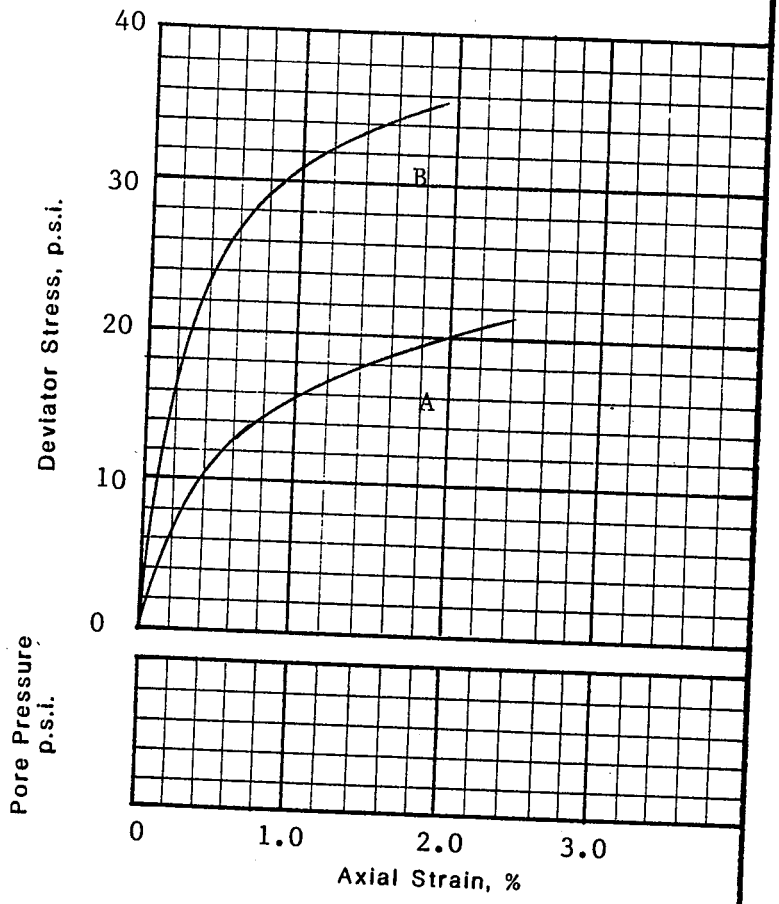
Plate 31

SOIL FOUNDATION SYSTEMS, INC.

TRIAXIAL COMPRESSION TEST

(TEST TYPE: U-U)

Sample No.	17-1	17-1	
Depth feet	8	8	
Moisture Content, %	11.6	11.6	
Dry Density p.c.f.	126.1	126.1	
Confining Pressure p.s.i.	10	15	
Symbal	A	B	
Remarks: Weathered Serpentine, green-gray			



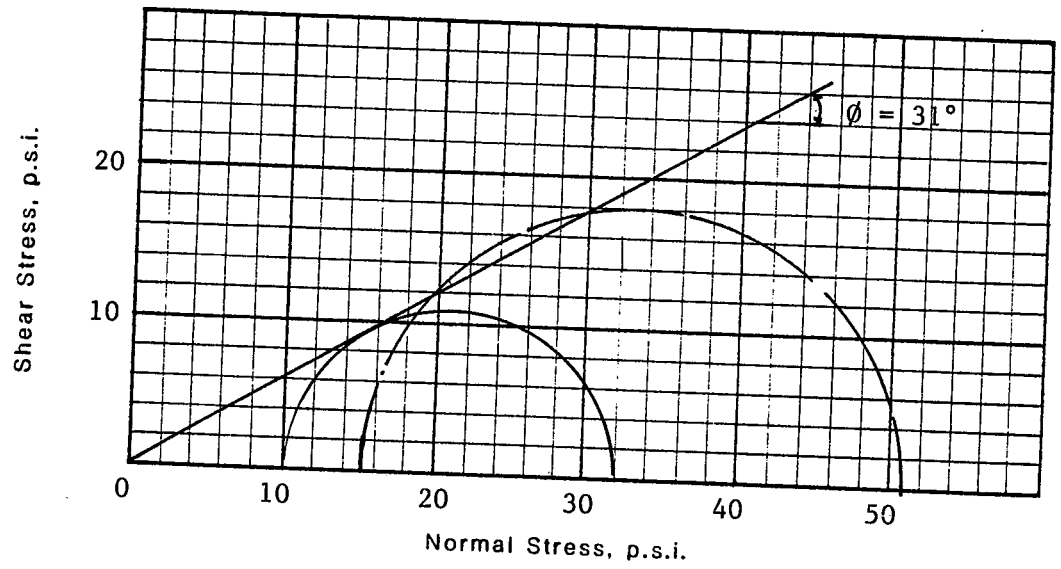


Plate 32

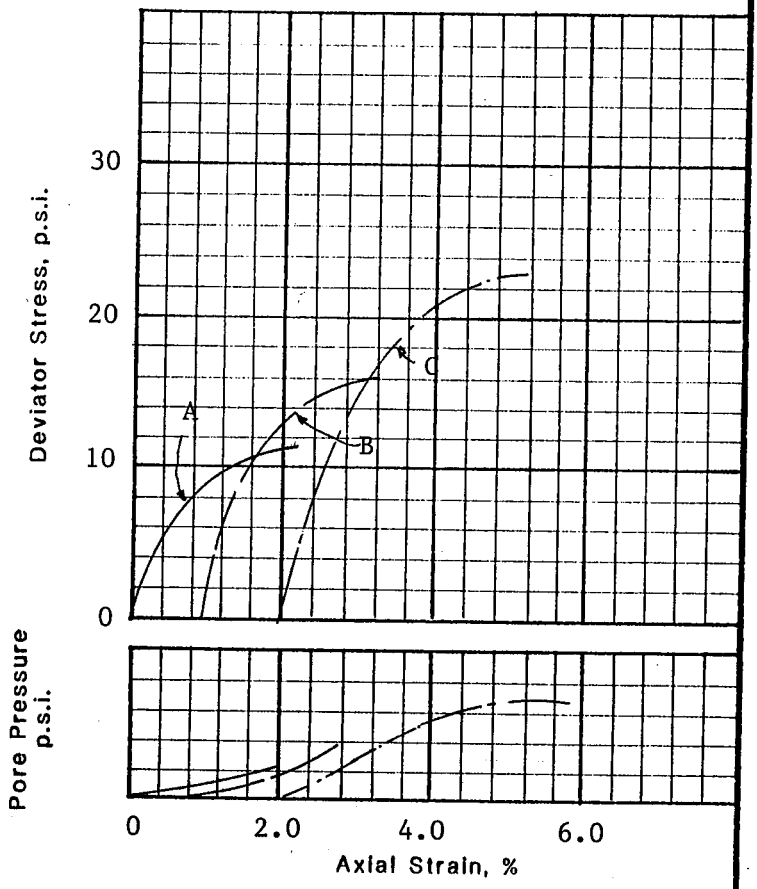
SOIL FOUNDATION SYSTEMS, INC.

TRIAXIAL COMPRESSION TEST

(TEST TYPE: C-U)

Sample No.	17-2	17-2	17-2
Depth feet	13	13	13
Moisture Content, %	11.8	11.8	11.8
Dry Density p.c.f.	132.5	132.5	132.5
Confining Pressure p.s.i.	5	10	15
Symbal	A	B	C

Remarks:
1) Multi-phase loading.
2) Friable weathered serpentine



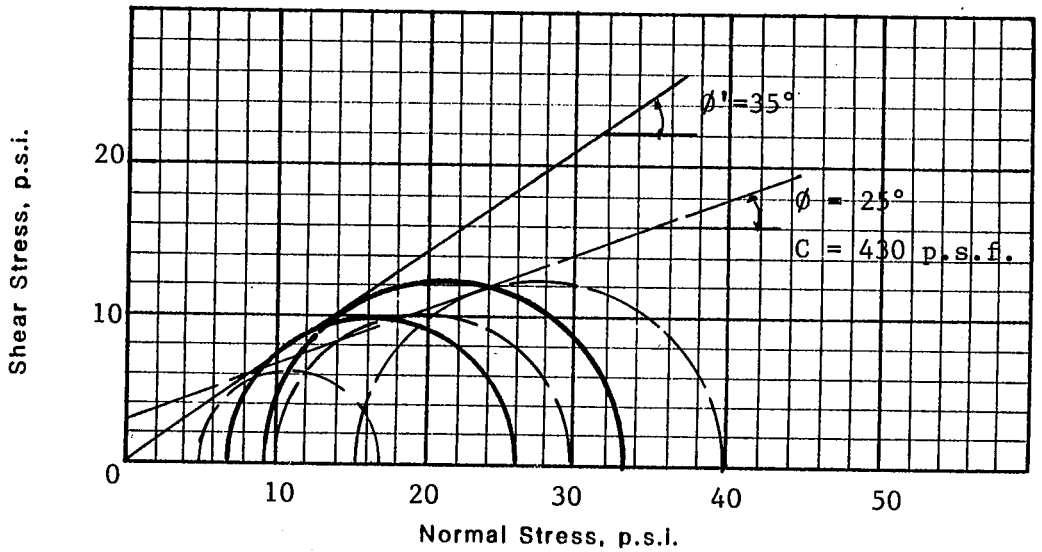


Plate 33

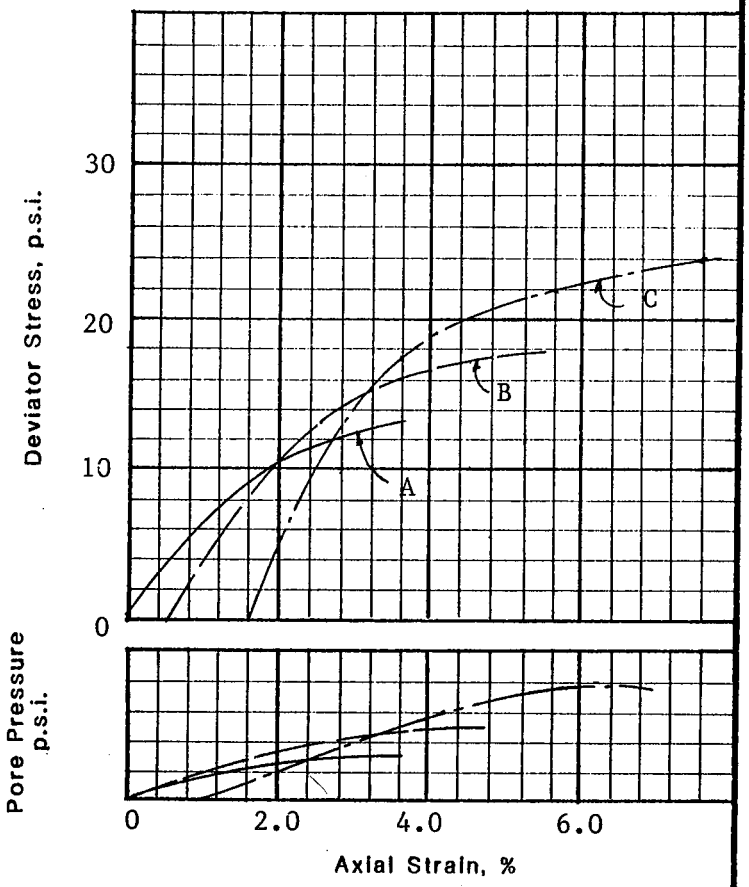
SOIL FOUNDATION SYSTEMS, INC.

TRIAXIAL COMPRESSION TEST

(TEST TYPE: C-U)

Sample No.	17-3	17-3	17-3
Depth feet	18	18	18
Moisture Content, %	9.5	9.5	9.5
Dry Density p.c.f.	130	130	130
Confining Pressure p.s.i.	10	15	20
Symbal	A	B	C

Remarks:
1) Multi-phase loading.
2) Blue serpentine



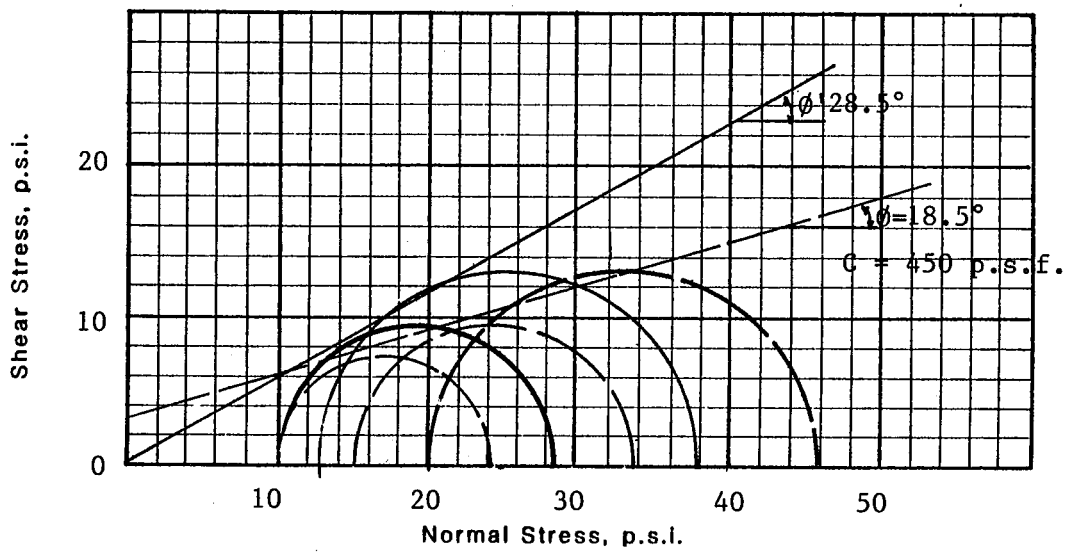


Plate 34

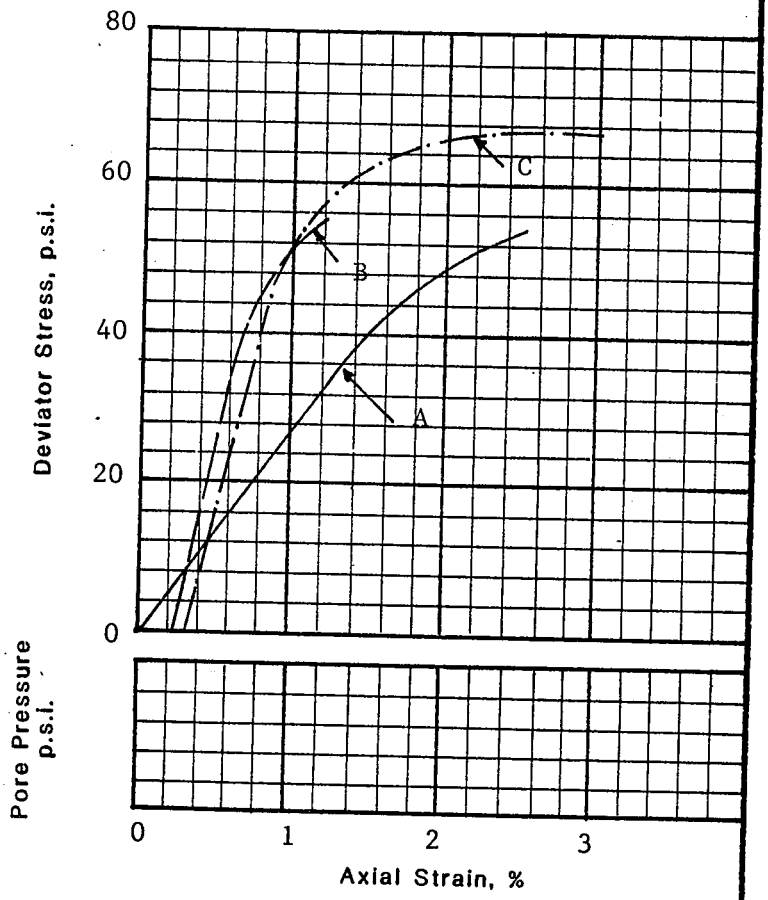
SOIL FOUNDATION SYSTEMS, INC.

TRIAXIAL COMPRESSION TEST

(TEST TYPE: U-U)

Sample No.	22-3	22-3	22-3
Depth feet	15	15	15
Moisture Content, %	8.1	8.1	8.1
Dry Density p.c.f.	129.0	129.0	129.0
Confining Pressure p.s.i.	10	15	20
Symbal	A	B	C

Remarks:
1) Multi-phase testing.
2) weathered Claystone.



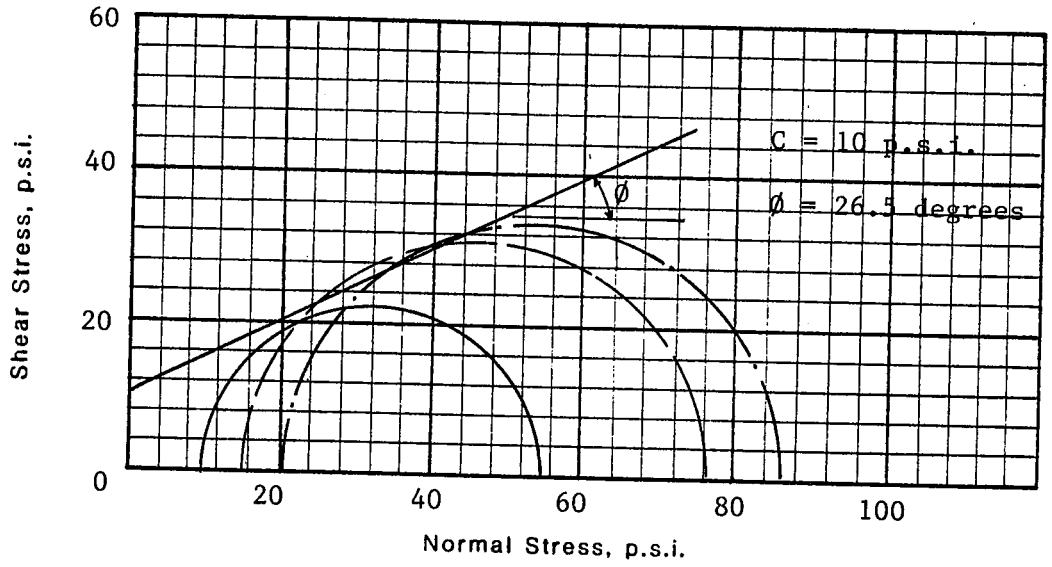


Plate 35

SOIL FOUNDATION SYSTEMS, INC.

CONSOLIDATION TEST

SAMPLE No.	9-3
HOLE No.	9
DEPTH, ft.	17
SOIL SYMBOL	ML

DRY DENSITY, p.c.f.	112.9
MOISTURE CONTENT, %	16.9

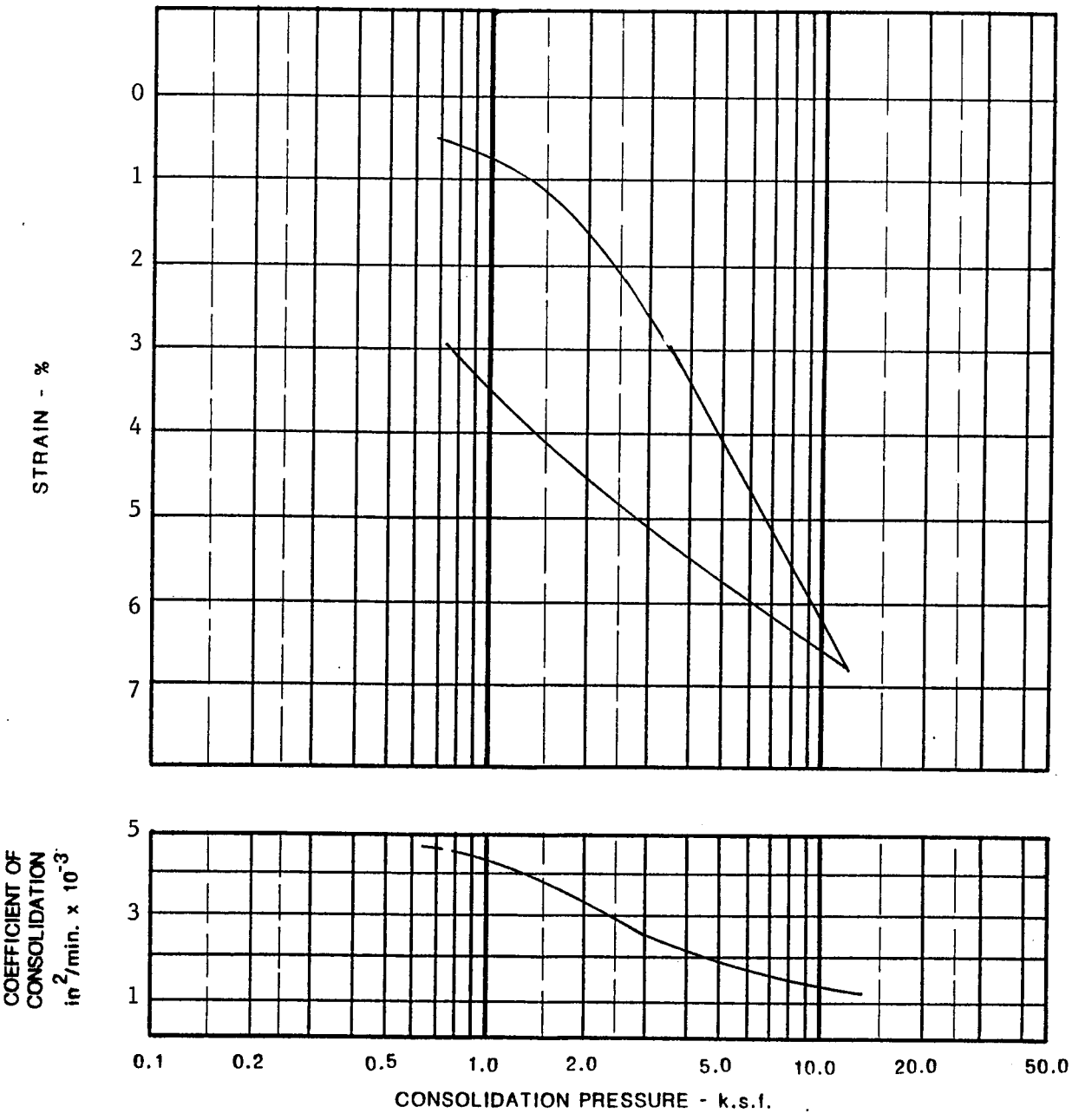


Plate 36

SOIL FOUNDATION SYSTEMS, INC.

CONSOLIDATION TEST

SAMPLE No.	9-2
HOLE No.	9
DEPTH, ft.	12
SOIL SYMBOL	ML - CL

DRY DENSITY, p.c.f.	106.9
MOISTURE CONTENT, %	22.0

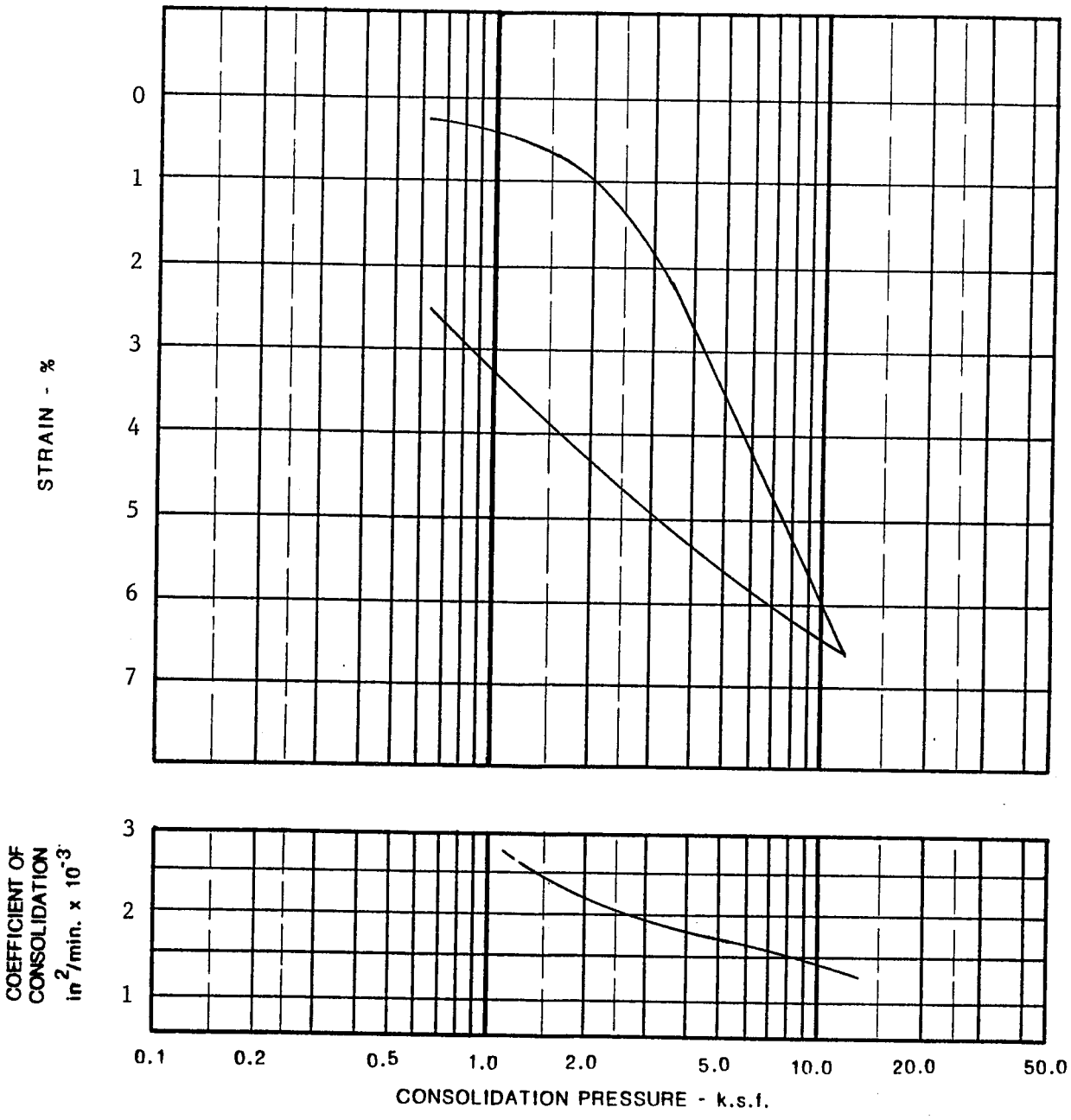


Plate 37

SOIL FOUNDATION SYSTEMS, INC.

CONSOLIDATION TEST

SAMPLE No.	21-A
HOLE No.	21
DEPTH, ft.	top 1 - 2'
SOIL SYMBOL	

DRY DENSITY, p.c.f.	106.3
MOISTURE CONTENT, %	14.7

Note: Recompacted sample

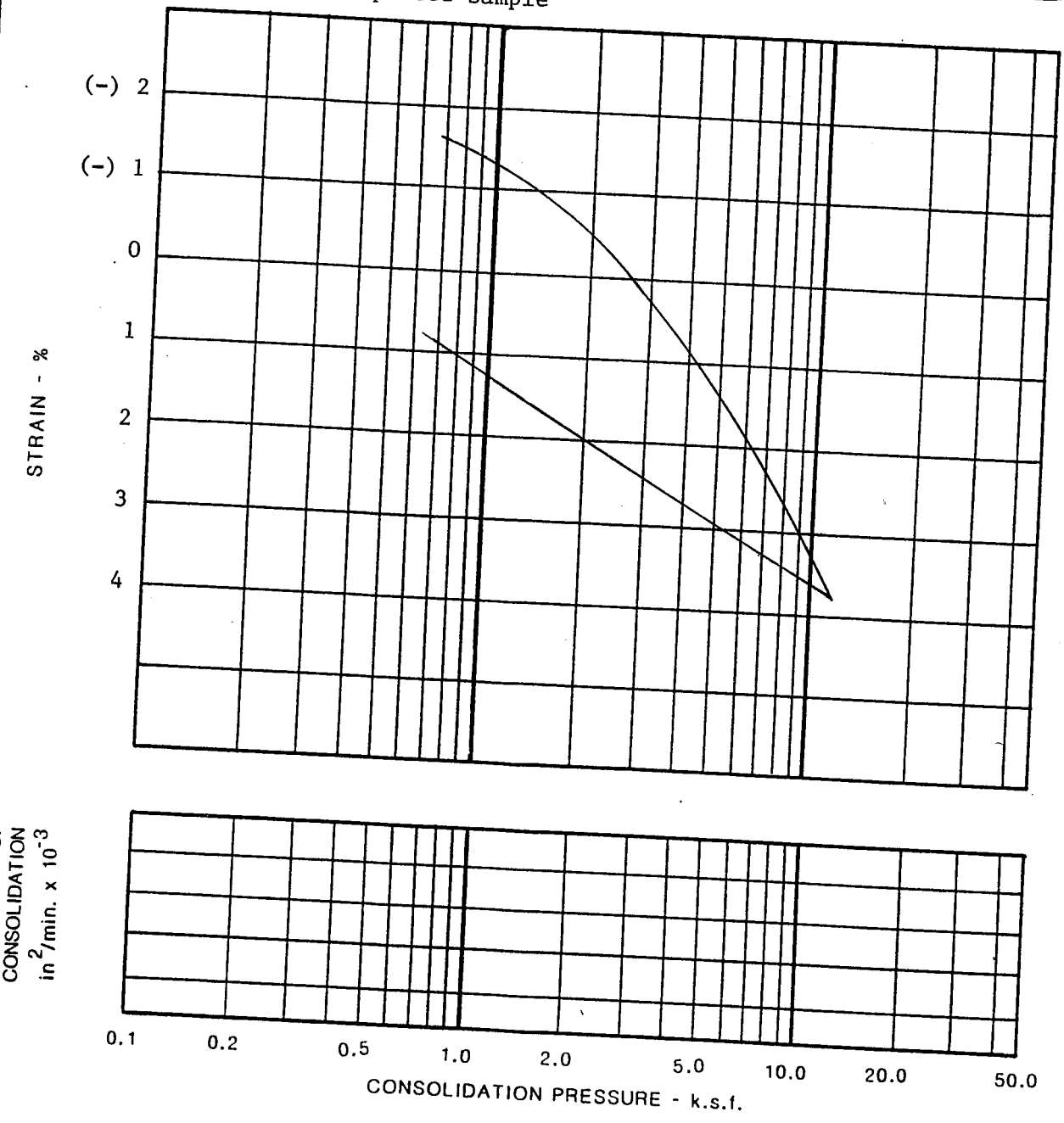


Plate 38

SOIL FOUNDATION SYSTEMS, INC.

CONSOLIDATION TEST

SAMPLE No.	X1-A
HOLE No.	
DEPTH, ft.	
SOIL SYMBOL	

DRY DENSITY, p.c.f.	122.4
MOISTURE CONTENT, %	8.2

Note: Recompacted sample from Tocondegora Drive cut bank

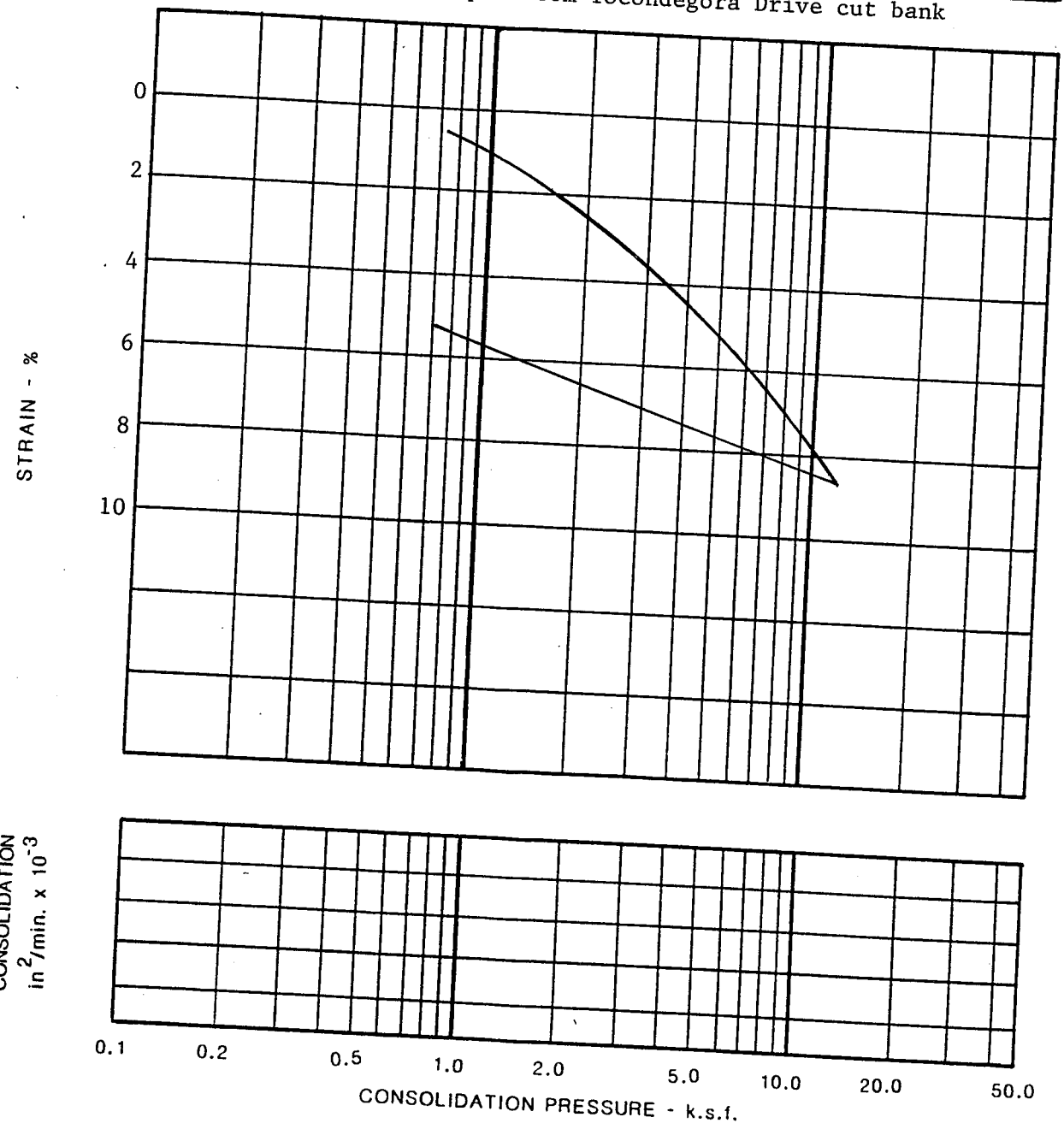
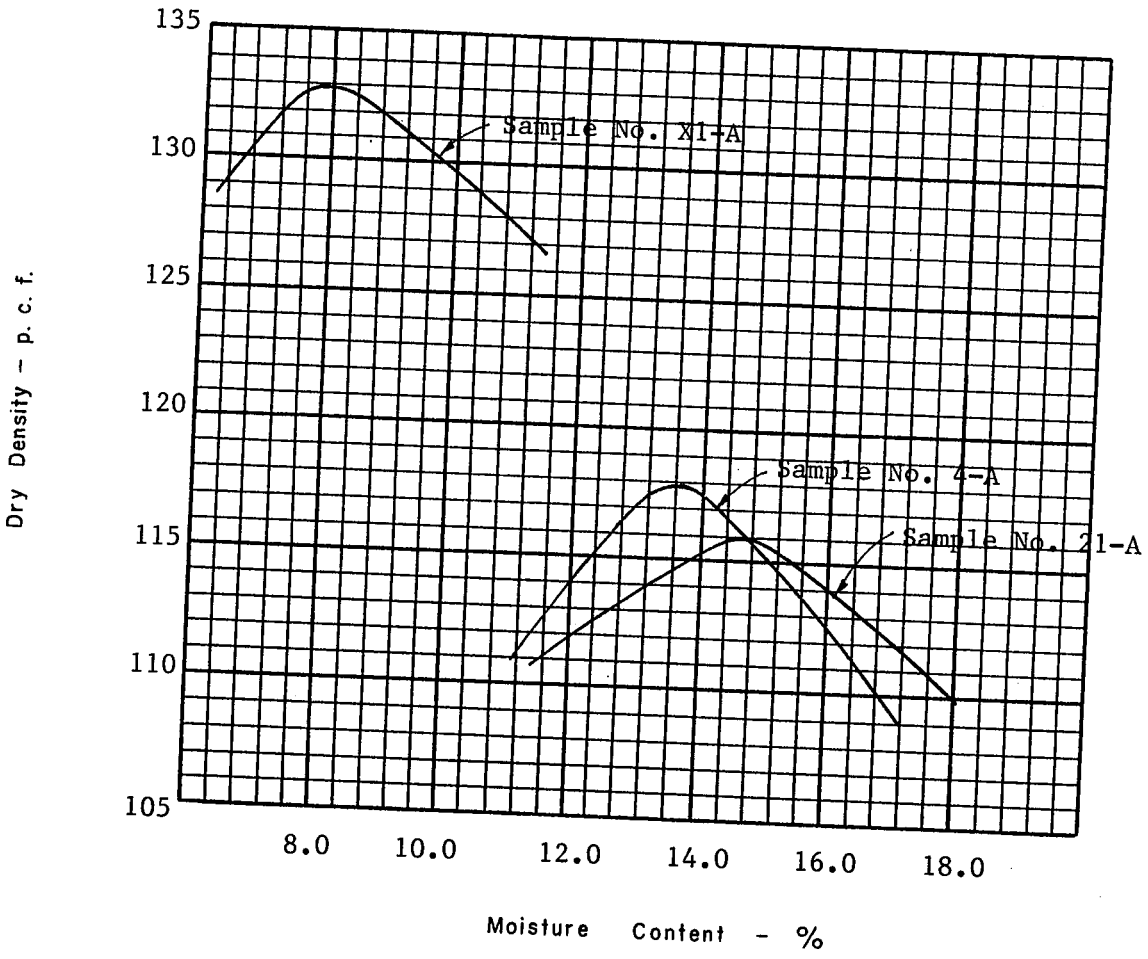


Plate 39

SOIL FOUNDATION SYSTEMS, INC.

LABORATORY COMPACTION TESTS



Sample Number	4-A	21-A	X1-A
Description	Dark brown clayey Silt, sandy	Dark brown clayey Silt	Light brown-gray silty Sandstone (clayey silt)
Test Procedure	ASTM D1557-90	ASTM D1557-90	ASTM D1557-90
Max. Dry Density, p. c. f.	118.0	116.0	133.0
Opt. Moisture Content, %	13.5	15.0	8.0

Plate 40

SOIL FOUNDATION SYSTEMS, INC.

TABLE IV

RESULTS OF LABORATORY SOIL TESTS
(not reported on Plates 6 through 40)

Sample No.	Location	Description	Compaction Test Max. Dry Density p.c.f.	Compaction Test Opt. M/C %	Atterberg Limits L.L. %	Atterberg Limits P.I. %
1	Ridge below Woodcreek Ct.	Sandy Silt and rock fragments	120.0	13.5	28	—
2	Ridge above Apartments	Sandy to clayey Silt	119.0	4.0	31	7
3	Ticonderoga	Mix of sandstone and siltstone	135.0	9.0	30	10
4	Ticonderoga	Siltstone/siltstone mixture	125.0	11.0	29	9

Sample No.	Direct Shear Test Cohesion p.s.f.	Direct Shear Test Friction Angle degrees	Notes
1	750	31.0	recompacted sample saturated
2	3,500	34.5	recompacted sample tested at molding water content
3	1,600	31.0	recompacted sample saturated
4	450	30.0	recompacted sample saturated

APPENDIX B

Slope Stability Analysis Computation Sheets

Computation of Pier Resisting Forces in Slope Stabilization

File No. S22-634-2
July 20, 1993

Problem Title:

User's Name:P. F.
Date: 06-07-1993

Project: HIGHLAND ESTATES
Slope : GS-1a
Loading: Static

GENERAL DATA

UNITS

Unit Weight of Water: 62.43

GEOMETRY

Number of Sections : 11

Section	X	Y-crk.	Y-grd.
1	-300.0	-50.0	-50.0
2	-175.0	-5.0	-5.0
3	-130.0	15.0	15.0
4	-40.0	55.0	55.0
5	-40.0	55.0	55.0
6	-30.0	60.0	60.0
7	-28.0	70.0	70.0
8	-28.0	70.0	70.0
9	-15.0	70.0	70.0
10	30.0	85.0	85.0
11	200.0	90.0	90.0

CIRCLE DATA

Coordinates of first circle (X,Y): -60 -120
Intervals of circle coordinates
X-direction: 15
Y-direction: 20
Number of intervals
X-direction: 5
Y-direction: 5

Elevation of upper-most tangent: 50
Tangent interval: 15
Number of tangents: 4

CONTROL DATA/ANALYSIS OPTIONS

No seismic analysis
Number of slices: 10

Total stress analysis

Soil parameters defined in SOIL PROPERTIES

SOIL PROPERTIES

File No. S22-634-2
July 20, 1993

Layer Number	Cohesion	Friction Angle	Unit Weight
1	9000.0	0.0	130.0
2	1000.0	15.0	125.0
3	1000.0	25.0	125.0
4	1000.0	30.0	130.0
5	2000.0	37.0	130.0

HIGHLAND ESATES

Slope: GS-1a
Loading: Static

SOIL PROFILE

Section Number	X	elevation to bottom of layer, layer number 1	2	3	4	5
1	-300.0	-50.0	-40.0	-20.0	-10.0	300.0
2	-175.0	-5.0	5.0	30.0	40.0	300.0
3	-130.0	15.0	25.0	45.0	55.0	300.0
4	-40.0	55.0	55.0	70.0	80.0	300.0
5	-40.0	75.0	75.0	75.0	75.0	300.0
6	-30.0	75.0	75.0	75.0	80.0	300.0
7	-28.0	75.0	75.0	75.0	80.0	300.0
8	-28.0	70.0	70.0	70.0	80.0	300.0
9	-15.0	70.0	70.0	70.0	85.0	300.0
10	30.0	85.0	85.0	85.0	95.0	300.0
11	200.0	90.0	90.0	90.0	130.0	300.0

RESULTS

circle	radius	X-center	Y-center	F.S.	ROVER	RESIST	ARCL
1	170.0	-60.0	-120.0	2.909	0.15105D+08	0.43943D+08	156.1
2	185.0	-60.0	-120.0	3.160	0.39141D+08	0.12369D+09	214.6
3	200.0	-60.0	-120.0	3.160	0.73413D+08	0.23197D+09	270.9
4	215.0	-60.0	-120.0	3.254	0.11738D+09	0.38198D+09	326.9
5	150.0	-60.0	-100.0	3.100	0.10882D+08	0.33733D+08	141.6
6	165.0	-60.0	-100.0	3.255	0.30703D+08	0.99935D+08	199.3
7	180.0	-60.0	-100.0	3.210	0.59494D+08	0.19100D+09	253.7
8	195.0	-60.0	-100.0	3.311	0.97052D+08	0.32138D+09	308.4
9	130.0	-60.0	-80.0	3.299	0.74185D+07	0.24473D+08	125.0
10	145.0	-60.0	-80.0	3.389	0.23245D+08	0.78778D+08	183.8
11	160.0	-60.0	-80.0	3.361	0.47046D+08	0.15811D+09	236.1
12	175.0	-60.0	-80.0	3.386	0.78463D+08	0.26569D+09	289.2
13	110.0	-60.0	-60.0	3.604	0.47742D+07	0.17205D+08	108.1
14	125.0	-60.0	-60.0	3.580	0.16810D+08	0.60173D+08	167.6
15	140.0	-60.0	-60.0	3.455	0.35972D+08	0.12428D+09	217.7
16	155.0	-60.0	-60.0	3.479	0.61819D+08	0.21510D+09	269.1
17	90.0	-60.0	-40.0	4.008	0.28401D+07	0.11382D+08	91.1
18	105.0	-60.0	-40.0	3.821	0.11511D+08	0.43986D+08	149.7
19	120.0	-60.0	-40.0	3.628	0.26288D+08	0.95376D+08	198.5
20	135.0	-60.0	-40.0	3.612	0.46869D+08	0.16928D+09	247.7
21	170.0	-45.0	-120.0	3.644	0.85226D+07	0.31059D+08	129.1
22	185.0	-45.0	-120.0	3.307	0.30281D+08	0.10015D+09	191.4
23	200.0	-45.0	-120.0	3.169	0.62280D+08	0.19734D+09	254.7
24	215.0	-45.0	-120.0	3.177	0.10424D+09	0.33111D+09	312.7

HIGHLAND ESTATES

Slope: GS-1a
Loading: Static

25	150.0	-45.0	-100.0	4.006	0.56195D+07	0.22511D+08	112.3
26	165.0	-45.0	-100.0	3.442	0.23239D+08	0.79989D+08	176.4
27	180.0	-45.0	-100.0	3.226	0.50146D+08	0.16177D+09	238.1
28	195.0	-45.0	-100.0	3.237	0.85760D+08	0.27760D+09	294.7
29	130.0	-45.0	-80.0	4.580	0.34606D+07	0.15850D+08	95.4
30	145.0	-45.0	-80.0	3.625	0.17109D+08	0.62021D+08	160.2
31	160.0	-45.0	-80.0	3.186	0.39237D+08	0.12502D+09	221.1
32	175.0	-45.0	-80.0	3.305	0.69173D+08	0.22861D+09	276.2
33	110.0	-45.0	-60.0	circle does not intercept slope			
34	125.0	-45.0	-60.0	3.760	0.12111D+08	0.45536D+08	143.0
35	140.0	-45.0	-60.0	3.257	0.29738D+08	0.96850D+08	203.5
36	155.0	-45.0	-60.0	3.402	0.54143D+08	0.18419D+09	256.9
37	90.0	-45.0	-40.0	circle does not intercept slope			
38	105.0	-45.0	-40.0	4.016	0.81403D+07	0.32687D+08	125.7
39	120.0	-45.0	-40.0	3.324	0.21679D+08	0.72056D+08	183.7
40	135.0	-45.0	-40.0	3.539	0.40795D+08	0.14436D+09	236.6
41	170.0	-30.0	-120.0	5.860	0.30690D+07	0.17986D+08	90.7
42	185.0	-30.0	-120.0	3.578	0.21418D+08	0.76628D+08	167.3
43	200.0	-30.0	-120.0	2.940	0.51300D+08	0.15083D+09	237.4
44	215.0	-30.0	-120.0	3.211	0.91095D+08	0.29254D+09	299.8
45	150.0	-30.0	-100.0	circle does not intercept slope			
46	165.0	-30.0	-100.0	3.784	0.15830D+08	0.59895D+08	150.5
47	180.0	-30.0	-100.0	3.012	0.40819D+08	0.12295D+09	221.4
48	195.0	-30.0	-100.0	3.217	0.74710D+08	0.24033D+09	281.0
49	130.0	-30.0	-80.0	circle does not intercept slope			
50	145.0	-30.0	-80.0	4.027	0.11299D+08	0.45502D+08	133.6
51	160.0	-30.0	-80.0	3.120	0.31425D+08	0.98031D+08	204.5
52	175.0	-30.0	-80.0	3.293	0.59875D+08	0.19718D+09	262.4
53	110.0	-30.0	-60.0	circle does not intercept slope			
54	125.0	-30.0	-60.0	4.319	0.77165D+07	0.33326D+08	116.8
55	140.0	-30.0	-60.0	3.213	0.23435D+08	0.75292D+08	186.1
56	155.0	-30.0	-60.0	3.407	0.46533D+08	0.15855D+09	243.9
57	90.0	-30.0	-40.0	circle does not intercept slope			
58	105.0	-30.0	-40.0	4.675	0.49727D+07	0.23246D+08	99.9
59	120.0	-30.0	-40.0	3.348	0.16799D+08	0.56251D+08	167.2
60	135.0	-30.0	-40.0	3.552	0.34878D+08	0.12387D+09	223.2
61	170.0	-15.0	-120.0	circle does not intercept slope			
62	185.0	-15.0	-120.0	4.379	0.13101D+08	0.57374D+08	138.0
63	200.0	-15.0	-120.0	2.922	0.40019D+08	0.11694D+09	218.7
64	215.0	-15.0	-120.0	3.331	0.77737D+08	0.25896D+09	291.1
65	150.0	-15.0	-100.0	circle does not intercept slope			
66	165.0	-15.0	-100.0	4.770	0.91722D+07	0.43751D+08	121.3
67	180.0	-15.0	-100.0	2.696	0.31110D+08	0.83878D+08	202.0
68	195.0	-15.0	-100.0	3.394	0.63284D+08	0.21476D+09	272.6
69	130.0	-15.0	-80.0	circle does not intercept slope			
70	145.0	-15.0	-80.0	5.267	0.61167D+07	0.32214D+08	104.5
71	160.0	-15.0	-80.0	2.634	0.23569D+08	0.62083D+08	184.4
72	175.0	-15.0	-80.0	3.486	0.50098D+08	0.17464D+09	253.4
73	110.0	-15.0	-60.0	circle does not intercept slope			
74	125.0	-15.0	-60.0	5.920	0.38248D+07	0.22644D+08	87.8
75	140.0	-15.0	-60.0	2.694	0.17108D+08	0.46081D+08	166.7
76	155.0	-15.0	-60.0	3.578	0.38508D+08	0.13779D+09	232.4
77	90.0	-15.0	-40.0	circle does not intercept slope			
78	105.0	-15.0	-40.0	9.172	0.21903D+07	0.20090D+08	71.0
79	120.0	-15.0	-40.0	3.016	0.12104D+08	0.36504D+08	148.8
80	135.0	-15.0	-40.0	3.683	0.28567D+08	0.10521D+09	210.8
81	170.0	0.0	-120.0	circle does not intercept slope			
82	185.0	0.0	-120.0	6.555	0.60788D+07	0.39848D+08	105.2
83	200.0	0.0	-120.0	2.676	0.28761D+08	0.76975D+08	195.7
84	215.0	0.0	-120.0	3.216	0.63508D+08	0.20425D+09	282.0

File No. S22-634-2
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HIGHLAND ESTATES

Slope: GS-1a
Loading: Static

85	150.0	0.0	-100.0	circle does not intercept slope			
86	165.0	0.0	-100.0	7.814	0.36938D+07	0.28865D+08	87.9
87	180.0	0.0	-100.0	2.772	0.21615D+08	0.59920D+08	178.7
88	195.0	0.0	-100.0	3.317	0.50939D+08	0.16894D+09	263.1
89	130.0	0.0	-80.0	circle does not intercept slope			
90	145.0	0.0	-80.0	F.S. greater than 10			
90	145.0	0.0	-80.0	%13.555	0.20035D+07	0.27157D+08	70.5
91	160.0	0.0	-80.0	2.907	0.16056D+08	0.46674D+08	161.7
92	175.0	0.0	-80.0	3.425	0.40050D+08	0.13716D+09	242.8
93	110.0	0.0	-60.0	circle does not intercept slope			
94	125.0	0.0	-60.0	F.S. greater than 10			
94	125.0	0.0	-60.0	%19.347	0.88823D+06	0.17185D+08	52.6
95	140.0	0.0	-60.0	3.029	0.11486D+08	0.34794D+08	144.7
96	155.0	0.0	-60.0	3.727	0.30606D+08	0.11407D+09	222.1
97	90.0	0.0	-40.0	circle does not intercept slope			
98	105.0	0.0	-40.0	F.S. greater than 10			
98	105.0	0.0	-40.0	%46.903	0.25282D+06	0.11858D+08	33.9
99	120.0	0.0	-40.0	4.555	0.75785D+07	0.34523D+08	127.5
100	135.0	0.0	-40.0	3.918	0.22089D+08	0.86554D+08	201.1

CRITICAL CIRCLES

circle	radius	X-center	Y-center	F.S.
1	160.0	-15.0	-80.0	2.634
2	200.0	0.0	-120.0	2.676
3	140.0	-15.0	-60.0	2.694
4	180.0	-15.0	-100.0	2.696
5	180.0	0.0	-100.0	2.772
6	160.0	0.0	-80.0	2.907
7	170.0	-60.0	-120.0	2.909
8	200.0	-15.0	-120.0	2.922
9	200.0	-30.0	-120.0	2.940
10	180.0	-30.0	-100.0	3.012

Problem Title:

User's Name:P. F.
Date: 06-07-1993

Project: HIGHLAND ESTATES
Slope : GS-1a
Loading: Seismic

GENERAL DATA

UNITS

Unit Weight of Water: 62.43

GEOMETRY

Number of Sections : 11

Section	X	Y-crk.	Y-grd.
1	-300.0	-50.0	-50.0
2	-175.0	-5.0	-5.0
3	-130.0	15.0	15.0
4	-40.0	55.0	55.0
5	-40.0	55.0	55.0
6	-30.0	60.0	60.0
7	-28.0	70.0	70.0
8	-28.0	70.0	70.0
9	-15.0	70.0	70.0
10	30.0	85.0	85.0
11	200.0	90.0	90.0

CIRCLE DATA

Coordinates of first circle (X,Y): -60 -120
Intervals of circle coordinates
X-direction: 15
Y-direction: 20
Number of intervals
X-direction: 5
Y-direction: 5

Elevation of upper-most tangent: 50
Tangent interval: 15
Number of tangents: 4

CONTROL DATA/ANALYSIS OPTIONS

Seismic coefficient: .15
Number of slices: 10

Total stress analysis

Soil parameters defined in SOIL PROPERTIES

SOIL PROPERTIES

File No. S22-634-2
July 20, 1993

HIGHLAND ESTATES

Slope: GS-1a
Loading: Seismic

Layer Number	Cohesion	Friction Angle	Unit Weight
1	9000.0	0.0	130.0
2	1000.0	15.0	125.0
3	1000.0	25.0	125.0
4	1000.0	30.0	130.0
5	2000.0	37.0	130.0

SOIL PROFILE

Section Number	X	elevation to bottom of layer layer number 1	2	3	4	5
1	-300.0	-50.0	-40.0	-20.0	-10.0	300.0
2	-175.0	-5.0	5.0	30.0	40.0	300.0
3	-130.0	15.0	25.0	45.0	55.0	300.0
4	-40.0	55.0	55.0	70.0	80.0	300.0
5	-40.0	75.0	75.0	75.0	75.0	300.0
6	-30.0	75.0	75.0	75.0	80.0	300.0
7	-28.0	75.0	75.0	75.0	80.0	300.0
8	-28.0	70.0	70.0	70.0	80.0	300.0
9	-15.0	70.0	70.0	70.0	85.0	300.0
10	30.0	85.0	85.0	85.0	95.0	300.0
11	200.0	90.0	90.0	90.0	130.0	300.0

RESULTS

circle	radius	X-center	Y-center	F.S.	ROVER	RESIST	ARCL
1	170.0	-60.0	-120.0	1.868	0.22749D+08	0.42505D+08	156.1
2	185.0	-60.0	-120.0	1.877	0.63798D+08	0.11972D+09	214.6
3	200.0	-60.0	-120.0	1.586	0.13572D+09	0.21530D+09	270.9
4	215.0	-60.0	-120.0	1.754	0.20450D+09	0.35866D+09	326.9
5	150.0	-60.0	-100.0	1.984	0.16465D+08	0.32665D+08	141.6
6	165.0	-60.0	-100.0	1.937	0.49983D+08	0.96824D+08	199.3
7	180.0	-60.0	-100.0	1.617	0.10980D+09	0.17751D+09	253.7
8	195.0	-60.0	-100.0	1.792	0.16866D+09	0.30224D+09	308.4
9	130.0	-60.0	-80.0	2.149	0.11090D+08	0.23832D+08	125.0
10	145.0	-60.0	-80.0	2.017	0.37879D+08	0.76416D+08	183.8
11	160.0	-60.0	-80.0	1.660	0.89086D+08	0.14789D+09	236.1
12	175.0	-60.0	-80.0	1.843	0.13584D+09	0.25040D+09	289.2
13	110.0	-60.0	-60.0	2.346	0.71554D+07	0.16789D+08	108.1
14	125.0	-60.0	-60.0	2.128	0.27468D+08	0.58457D+08	167.6
15	140.0	-60.0	-60.0	1.713	0.68033D+08	0.11653D+09	217.7
16	155.0	-60.0	-60.0	1.908	0.10653D+09	0.20325D+09	269.1
17	90.0	-60.0	-40.0	2.610	0.42656D+07	0.11134D+08	91.1
18	105.0	-60.0	-40.0	2.269	0.18869D+08	0.42820D+08	149.7
19	120.0	-60.0	-40.0	1.769	0.50494D+08	0.89342D+08	198.5
20	135.0	-60.0	-40.0	2.000	0.80268D+08	0.16054D+09	247.7
21	170.0	-45.0	-120.0	2.315	0.13065D+08	0.30247D+08	129.1
22	185.0	-45.0	-120.0	2.007	0.48468D+08	0.97280D+08	191.4
23	200.0	-45.0	-120.0	1.575	0.11721D+09	0.18459D+09	254.7
24	215.0	-45.0	-120.0	1.721	0.18135D+09	0.31216D+09	312.7

25	150.0	-45.0	-100.0	2.606	0.84579D+07	0.22042D+08	112.3
26	165.0	-45.0	-100.0	2.089	0.37229D+08	0.77769D+08	176.4
27	180.0	-45.0	-100.0	1.609	0.94211D+08	0.15155D+09	238.1
28	195.0	-45.0	-100.0	1.720	0.15202D+09	0.26147D+09	294.7
29	130.0	-45.0	-80.0	2.987	0.52108D+07	0.15562D+08	95.4
30	145.0	-45.0	-80.0	2.196	0.27487D+08	0.60372D+08	160.2
31	160.0	-45.0	-80.0	1.612	0.72523D+08	0.11690D+09	221.1
32	175.0	-45.0	-80.0	1.770	0.12197D+09	0.21584D+09	276.2
33	110.0	-45.0	-60.0	circle does not intercept slope			
34	125.0	-45.0	-60.0	2.433	0.18326D+08	0.44582D+08	143.0
35	140.0	-45.0	-60.0	1.674	0.54246D+08	0.90822D+08	203.5
36	155.0	-45.0	-60.0	1.837	0.94934D+08	0.17442D+09	256.9
37	90.0	-45.0	-40.0	circle does not intercept slope			
38	105.0	-45.0	-40.0	2.608	0.12290D+08	0.32050D+08	125.7
39	120.0	-45.0	-40.0	1.753	0.38712D+08	0.67865D+08	183.7
40	135.0	-45.0	-40.0	1.927	0.71203D+08	0.13720D+09	236.6
41	170.0	-30.0	-120.0	3.908	0.45470D+07	0.17770D+08	90.7
42	185.0	-30.0	-120.0	2.451	0.30707D+08	0.75271D+08	167.3
43	200.0	-30.0	-120.0	1.569	0.90157D+08	0.14148D+09	237.4
44	215.0	-30.0	-120.0	1.696	0.16201D+09	0.27479D+09	299.8
45	150.0	-30.0	-100.0	circle does not intercept slope			
46	165.0	-30.0	-100.0	2.600	0.22655D+08	0.58899D+08	150.5
47	180.0	-30.0	-100.0	1.611	0.71696D+08	0.11549D+09	221.4
48	195.0	-30.0	-100.0	1.769	0.12812D+09	0.22669D+09	281.0
49	130.0	-30.0	-80.0	circle does not intercept slope			
50	145.0	-30.0	-80.0	2.782	0.16104D+08	0.44799D+08	133.6
51	160.0	-30.0	-80.0	1.598	0.57449D+08	0.91787D+08	204.5
52	175.0	-30.0	-80.0	1.821	0.10233D+09	0.18637D+09	262.4
53	110.0	-30.0	-60.0	circle does not intercept slope			
54	125.0	-30.0	-60.0	3.009	0.10920D+08	0.32856D+08	116.8
55	140.0	-30.0	-60.0	1.669	0.42578D+08	0.71047D+08	186.1
56	155.0	-30.0	-60.0	1.893	0.79378D+08	0.15026D+09	243.9
57	90.0	-30.0	-40.0	circle does not intercept slope			
58	105.0	-30.0	-40.0	3.291	0.69740D+07	0.22950D+08	99.9
59	120.0	-30.0	-40.0	1.749	0.30467D+08	0.53282D+08	167.2
60	135.0	-30.0	-40.0	1.926	0.60986D+08	0.11746D+09	223.2
61	170.0	-15.0	-120.0	circle does not intercept slope			
62	185.0	-15.0	-120.0	3.034	0.18673D+08	0.56655D+08	138.0
63	200.0	-15.0	-120.0	1.562	0.70671D+08	0.11037D+09	218.7
64	215.0	-15.0	-120.0	1.723	0.14115D+09	0.24322D+09	291.1
65	150.0	-15.0	-100.0	circle does not intercept slope			
66	165.0	-15.0	-100.0	3.325	0.13010D+08	0.43257D+08	121.3
67	180.0	-15.0	-100.0	1.542	0.51681D+08	0.79692D+08	202.0
68	195.0	-15.0	-100.0	1.768	0.11427D+09	0.20206D+09	272.6
69	130.0	-15.0	-80.0	circle does not intercept slope			
70	145.0	-15.0	-80.0	3.699	0.86218D+07	0.31892D+08	104.5
71	160.0	-15.0	-80.0	1.554	0.38030D+08	0.59086D+08	184.4
72	175.0	-15.0	-80.0	1.829	0.90044D+08	0.16468D+09	253.4
73	110.0	-15.0	-60.0	circle does not intercept slope			
74	125.0	-15.0	-60.0	4.199	0.53458D+07	0.22449D+08	87.8
75	140.0	-15.0	-60.0	1.724	0.25678D+08	0.44265D+08	166.7
76	155.0	-15.0	-60.0	1.914	0.68151D+08	0.13041D+09	232.4
77	90.0	-15.0	-40.0	circle does not intercept slope			
78	105.0	-15.0	-40.0	6.610	0.30277D+07	0.20013D+08	71.0
79	120.0	-15.0	-40.0	1.759	0.19835D+08	0.34884D+08	148.8
80	135.0	-15.0	-40.0	2.062	0.48596D+08	0.10021D+09	210.8
81	170.0	0.0	-120.0	circle does not intercept slope			
82	185.0	0.0	-120.0	4.494	0.87947D+07	0.39521D+08	105.2
83	200.0	0.0	-120.0	1.562	0.46798D+08	0.73099D+08	195.7
84	215.0	0.0	-120.0	1.833	0.10611D+09	0.19453D+09	282.0

File No. S22-634-2
July 20, 1993

HIGHLAND ESTATES
Slope: GS-1a
Loading: Seismic

85	150.0	0.0	-100.0	circle does not intercept slope			
86	165.0	0.0	-100.0	5.387	0.53227D+07	0.28672D+08	37.9
87	180.0	0.0	-100.0	1.727	0.33239D+08	0.57390D+08	178.7
88	195.0	0.0	-100.0	1.892	0.85191D+08	0.16117D+09	263.1
89	130.0	0.0	-80.0	circle does not intercept slope			
90	145.0	0.0	-80.0	9.432	0.28718D+07	0.27087D+08	70.5
91	160.0	0.0	-80.0	1.686	0.26360D+08	0.44446D+08	161.7
92	175.0	0.0	-80.0	1.882	0.69395D+08	0.13060D+09	242.8
93	110.0	0.0	-60.0	circle does not intercept slope			
94	125.0	0.0	-60.0	F.S. greater than 10			
94	125.0	0.0	-60.0	%13.588	0.12626D+07	0.17156D+08	52.6
95	140.0	0.0	-60.0	1.845	0.18109D+08	0.33418D+08	144.7
96	155.0	0.0	-60.0	1.996	0.54247D+08	0.10829D+09	222.1
97	90.0	0.0	-40.0	circle does not intercept slope			
98	105.0	0.0	-40.0	F.S. greater than 10			
98	105.0	0.0	-40.0	%33.547	0.35332D+06	0.11853D+08	33.9
99	120.0	0.0	-40.0	3.256	0.10483D+08	0.34130D+08	127.5
100	135.0	0.0	-40.0	2.194	0.37640D+08	0.82576D+08	201.1

CRITICAL CIRCLES

circle	radius	X-center	Y-center	F.S.
1	180.0	-15.0	-100.0	1.542
2	160.0	-15.0	-80.0	1.554
3	200.0	-15.0	-120.0	1.562
4	200.0	0.0	-120.0	1.562
5	200.0	-30.0	-120.0	1.569
6	200.0	-45.0	-120.0	1.575
7	200.0	-60.0	-120.0	1.586
8	160.0	-30.0	-80.0	1.598
9	180.0	-45.0	-100.0	1.609
10	180.0	-30.0	-100.0	1.611

Problem Title: Highland Estates: Slope No. GS-1b
Loading: Static

User's Name:P. F.
Date: 06-07-1993

GENERAL DATA

UNITS

Unit Weight of Water: 62.43

GEOMETRY

Number of Sections : 11

Section	X	Y-crk.	Y-grd.
1	-170.0	35.0	35.0
2	-75.0	40.0	40.0
3	-25.0	40.0	40.0
4	-5.0	55.0	55.0
5	-5.0	55.0	55.0
6	9.0	55.0	55.0
7	10.0	65.0	65.0
8	20.0	80.0	80.0
9	55.0	95.0	95.0
10	90.0	110.0	110.0
11	200.0	120.0	120.0

CIRCLE DATA

Coordinates of first circle (X,Y): 10 -70
Intervals of circle coordinates
X-direction: 10
Y-direction: 10
Number of intervals
X-direction: 5
Y-direction: 9

Elevation of upper-most tangent: 80
Tangent interval: 5
Number of tangents: 3

CONTROL DATA/ANALYSIS OPTIONS

No seismic analysis
Number of slices: 10

Total stress analysis

Soil parameters defined in SOIL PROPERTIES

SOIL PROPERTIES

File No. S22-634-2
July 20, 1993

Layer Number	Cohesion	Friction Angle	Unit Weight
1	4000.0	30.0	130.0
2	1500.0	20.0	130.0
3	1000.0	15.0	125.0
4	1000.0	30.0	130.0
5	2000.0	35.0	130.0

HIGHLAND ESTATES
Slope: GS-1b
Loading: Static

SOIL PROFILE

Section Number	X	elevation to bottom of layer layer number 1	2	3	4	5
1	-170.0	35.0	35.0	35.0	45.0	300.0
2	-75.0	40.0	40.0	60.0	70.0	300.0
3	-25.0	40.0	60.0	75.0	85.0	300.0
4	-5.0	55.0	70.0	80.0	90.0	300.0
5	-5.0	80.0	80.0	80.0	90.0	300.0
6	9.0	80.0	80.0	82.0	92.0	300.0
7	10.0	80.0	80.0	83.0	93.0	300.0
8	20.0	80.0	80.0	85.0	95.0	300.0
9	55.0	95.0	95.0	95.0	105.0	300.0
10	90.0	110.0	110.0	110.0	110.0	300.0
11	200.0	120.0	120.0	120.0	140.0	300.0

RESULTS

circle	radius	X-center	Y-center	F.S.	ROVER	RESIST	ARCL
1	150.0	10.0	-70.0	3.750	0.13340D+08	0.50026D+08	123.3
2	155.0	10.0	-70.0	3.174	0.17542D+08	0.55686D+08	142.0
3	160.0	10.0	-70.0	3.679	0.22375D+08	0.82323D+08	160.1
4	140.0	10.0	-60.0	3.652	0.12299D+08	0.44915D+08	119.3
5	145.0	10.0	-60.0	3.065	0.16205D+08	0.49667D+08	137.7
6	150.0	10.0	-60.0	3.602	0.20717D+08	0.74626D+08	155.6
7	130.0	10.0	-50.0	3.405	0.11276D+08	0.38402D+08	115.2
8	135.0	10.0	-50.0	2.987	0.14898D+08	0.44499D+08	133.3
9	140.0	10.0	-50.0	3.290	0.19020D+08	0.62568D+08	150.9
10	120.0	10.0	-40.0	3.013	0.10267D+08	0.30936D+08	110.9
11	125.0	10.0	-40.0	2.807	0.13558D+08	0.38050D+08	128.7
12	130.0	10.0	-40.0	3.053	0.17325D+08	0.52894D+08	146.0
13	110.0	10.0	-30.0	3.376	0.92485D+07	0.31219D+08	106.5
14	115.0	10.0	-30.0	2.727	0.12225D+08	0.33335D+08	124.0
15	120.0	10.0	-30.0	2.818	0.15684D+08	0.44190D+08	141.0
16	100.0	10.0	-20.0	3.279	0.82394D+07	0.27015D+08	102.3
17	105.0	10.0	-20.0	2.639	0.10943D+08	0.28883D+08	119.1
18	110.0	10.0	-20.0	2.747	0.14064D+08	0.38628D+08	135.8
19	90.0	10.0	-10.0	3.179	0.72432D+07	0.23026D+08	97.9
20	95.0	10.0	-10.0	2.552	0.96851D+07	0.24719D+08	114.2
21	100.0	10.0	-10.0	2.673	0.12525D+08	0.33479D+08	130.3
22	80.0	10.0	0.0	3.173	0.62247D+07	0.19754D+08	93.2
23	85.0	10.0	0.0	2.472	0.84018D+07	0.20773D+08	109.1
24	90.0	10.0	0.0	2.607	0.10939D+08	0.28522D+08	124.8

File No. S22-634-2
July 20, 1993

HIGHLAND ESTATES
Slope: GS-1b
Loading: Static

25	70.0	10.0	10.0	3.107	0.51876D+07	0.16116D+08	88.2
26	75.0	10.0	10.0	2.400	0.71183D+07	0.17085D+08	103.7
27	80.0	10.0	10.0	2.480	0.93399D+07	0.23159D+08	119.0
28	150.0	20.0	-70.0	3.039	0.12702D+08	0.38599D+08	112.7
29	155.0	20.0	-70.0	2.803	0.16854D+08	0.47250D+08	133.0
30	160.0	20.0	-70.0	2.853	0.21701D+08	0.61908D+08	151.9
31	140.0	20.0	-60.0	3.417	0.11700D+08	0.39976D+08	103.7
32	145.0	20.0	-60.0	2.729	0.15513D+08	0.42330D+08	128.8
33	150.0	20.0	-60.0	2.788	0.20032D+08	0.55858D+08	147.5
34	130.0	20.0	-50.0	3.322	0.10687D+08	0.35504D+08	104.7
35	135.0	20.0	-50.0	2.652	0.14195D+08	0.37641D+08	124.6
36	140.0	20.0	-50.0	2.724	0.18428D+08	0.50196D+08	142.9
37	120.0	20.0	-40.0	3.229	0.96876D+07	0.31281D+08	100.9
38	125.0	20.0	-40.0	2.448	0.12936D+08	0.31669D+08	120.1
39	130.0	20.0	-40.0	2.652	0.16838D+08	0.44654D+08	138.3
40	110.0	20.0	-30.0	3.209	0.86991D+07	0.27918D+08	96.8
41	115.0	20.0	-30.0	2.366	0.11696D+08	0.27677D+08	115.8
42	120.0	20.0	-30.0	2.540	0.15181D+08	0.38563D+08	133.4
43	100.0	20.0	-20.0	3.121	0.76892D+07	0.23997D+08	92.6
44	105.0	20.0	-20.0	2.293	0.10426D+08	0.23909D+08	111.4
45	110.0	20.0	-20.0	2.470	0.13558D+08	0.33484D+08	128.5
46	90.0	20.0	-10.0	3.048	0.66494D+07	0.20269D+08	88.2
47	95.0	20.0	-10.0	2.178	0.91532D+07	0.19934D+08	106.7
48	100.0	20.0	-10.0	2.299	0.11976D+08	0.27533D+08	123.6
49	80.0	20.0	0.0	3.429	0.56060D+07	0.19223D+08	83.6
50	85.0	20.0	0.0	2.116	0.79099D+07	0.16735D+08	101.8
51	90.0	20.0	0.0	2.227	0.10433D+08	0.23237D+08	118.4
52	70.0	20.0	10.0	3.381	0.45405D+07	0.15353D+08	78.7
53	75.0	20.0	10.0	2.043	0.64757D+07	0.13228D+08	96.6
54	80.0	20.0	10.0	2.232	0.88534D+07	0.19761D+08	112.8
55	150.0	30.0	-70.0	3.353	0.11622D+08	0.38965D+08	101.9
56	155.0	30.0	-70.0	2.362	0.15647D+08	0.36956D+08	123.1
57	160.0	30.0	-70.0	2.550	0.20377D+08	0.51964D+08	143.0
58	140.0	30.0	-60.0	3.346	0.10631D+08	0.35572D+08	98.2
59	145.0	30.0	-60.0	2.287	0.14410D+08	0.32952D+08	119.0
60	150.0	30.0	-60.0	2.481	0.18828D+08	0.46705D+08	138.7
61	130.0	30.0	-50.0	3.260	0.96514D+07	0.31461D+08	94.5
62	135.0	30.0	-50.0	2.101	0.13214D+08	0.27768D+08	115.1
63	140.0	30.0	-50.0	2.410	0.17255D+08	0.41593D+08	134.3
64	120.0	30.0	-40.0	3.185	0.86385D+07	0.27516D+08	90.6
65	125.0	30.0	-40.0	2.087	0.11933D+08	0.24902D+08	111.1
66	130.0	30.0	-40.0	2.344	0.15652D+08	0.36681D+08	129.9
67	110.0	30.0	-30.0	3.209	0.76001D+07	0.24391D+08	86.5
68	115.0	30.0	-30.0	2.042	0.10676D+08	0.21802D+08	106.9
69	120.0	30.0	-30.0	2.277	0.14088D+08	0.32070D+08	125.5
70	100.0	30.0	-20.0	3.561	0.65690D+07	0.23391D+08	82.3
71	105.0	30.0	-20.0	1.980	0.92910D+07	0.18395D+08	102.6
72	110.0	30.0	-20.0	2.207	0.12581D+08	0.27765D+08	121.0
73	90.0	30.0	-10.0	3.641	0.54266D+07	0.19760D+08	77.8
74	95.0	30.0	-10.0	1.784	0.78972D+07	0.14089D+08	98.0
75	100.0	30.0	-10.0	2.097	0.11023D+08	0.23120D+08	116.2
76	80.0	30.0	0.0	3.644	0.44181D+07	0.16098D+08	73.2
77	85.0	30.0	0.0	2.244	0.66847D+07	0.15000D+08	93.3
78	90.0	30.0	0.0	2.051	0.94072D+07	0.19292D+08	111.2
79	70.0	30.0	10.0	4.276	0.33997D+07	0.14537D+08	68.2
80	75.0	30.0	10.0	2.269	0.54094D+07	0.12271D+08	88.2
81	80.0	30.0	10.0	2.018	0.76649D+07	0.15466D+08	105.8
82	150.0	40.0	-70.0	3.384	0.10099D+08	0.34179D+08	91.1
83	155.0	40.0	-70.0	2.311	0.14116D+08	0.32621D+08	112.2
84	160.0	40.0	-70.0	2.285	0.18728D+08	0.42803D+08	133.3

HIGHLAND ESTATES
Slope: GS-1b
Loading: Static

85	140.0	40.0	-60.0	3.423	0.90638D+07	0.31022D+08	87.4
86	145.0	40.0	-60.0	2.342	0.12845D+08	0.30082D+08	108.4
87	150.0	40.0	-60.0	2.215	0.17147D+08	0.37989D+08	129.3
88	130.0	40.0	-50.0	3.477	0.80320D+07	0.27927D+08	83.5
89	135.0	40.0	-50.0	2.300	0.11602D+08	0.26686D+08	104.4
90	140.0	40.0	-50.0	2.156	0.15605D+08	0.33636D+08	125.3
91	120.0	40.0	-40.0	3.441	0.70297D+07	0.24186D+08	79.5
92	125.0	40.0	-40.0	2.264	0.10335D+08	0.23398D+08	100.3
93	130.0	40.0	-40.0	2.163	0.14150D+08	0.30602D+08	121.1
94	110.0	40.0	-30.0	3.992	0.59875D+07	0.23905D+08	75.3
95	115.0	40.0	-30.0	2.374	0.87531D+07	0.20780D+08	96.1
96	120.0	40.0	-30.0	2.018	0.12596D+08	0.25416D+08	116.8
97	100.0	40.0	-20.0	4.269	0.48583D+07	0.20740D+08	70.9
98	105.0	40.0	-20.0	2.805	0.75008D+07	0.21037D+08	91.7
99	110.0	40.0	-20.0	1.985	0.10762D+08	0.21364D+08	112.4
100	90.0	40.0	-10.0	4.497	0.37496D+07	0.16861D+08	66.3
101	95.0	40.0	-10.0	2.835	0.62507D+07	0.17723D+08	87.0
102	100.0	40.0	-10.0	1.964	0.91654D+07	0.18004D+08	107.7
103	80.0	40.0	0.0	5.331	0.27461D+07	0.14640D+08	61.3
104	85.0	40.0	0.0	3.017	0.50174D+07	0.15137D+08	82.1
105	90.0	40.0	0.0	2.385	0.76472D+07	0.18241D+08	102.8
106	70.0	40.0	10.0	6.708	0.17600D+07	0.11806D+08	53.7
107	75.0	40.0	10.0	3.888	0.36649D+07	0.14248D+08	76.8
108	80.0	40.0	10.0	2.535	0.61516D+07	0.15592D+08	97.6
109	150.0	50.0	-70.0	3.957	0.79713D+07	0.31545D+08	79.5
110	155.0	50.0	-70.0	2.843	0.11850D+08	0.33687D+08	99.1
111	160.0	50.0	-70.0	2.144	0.16484D+08	0.35349D+08	122.9
112	140.0	50.0	-60.0	4.165	0.69727D+07	0.29038D+08	75.6
113	145.0	50.0	-60.0	2.891	0.10624D+08	0.30717D+08	94.9
114	150.0	50.0	-60.0	2.427	0.15061D+08	0.36556D+08	119.0
115	130.0	50.0	-50.0	4.641	0.59251D+07	0.27498D+08	71.6
116	135.0	50.0	-50.0	2.878	0.93352D+07	0.26866D+08	90.5
117	140.0	50.0	-50.0	2.401	0.13505D+08	0.32428D+08	115.0
118	120.0	50.0	-40.0	4.742	0.49391D+07	0.23419D+08	67.4
119	125.0	50.0	-40.0	2.983	0.80261D+07	0.23942D+08	85.8
120	130.0	50.0	-40.0	2.390	0.11742D+08	0.28066D+08	110.8
121	110.0	50.0	-30.0	5.017	0.38970D+07	0.19552D+08	62.9
122	115.0	50.0	-30.0	3.949	0.67574D+07	0.26682D+08	80.7
123	120.0	50.0	-30.0	2.029	0.10008D+08	0.20305D+08	106.5
124	100.0	50.0	-20.0	6.120	0.28381D+07	0.17369D+08	58.0
125	105.0	50.0	-20.0	4.166	0.54147D+07	0.22555D+08	74.8
126	110.0	50.0	-20.0	2.451	0.84346D+07	0.20677D+08	102.0
127	90.0	50.0	-10.0	7.647	0.17817D+07	0.13625D+08	52.5
128	95.0	50.0	-10.0	4.805	0.40465D+07	0.19444D+08	67.4
129	100.0	50.0	-10.0	2.504	0.70215D+07	0.17581D+08	97.3
130	80.0	50.0	0.0	F.S. greater than 10			
130	80.0	50.0	0.0	%10.637	0.93141D+06	0.99074D+07	36.6
131	85.0	50.0	0.0	6.027	0.27208D+07	0.16397D+08	60.7
132	90.0	50.0	0.0	3.419	0.52289D+07	0.17878D+08	92.3
133	70.0	50.0	10.0	F.S. greater than 10			
133	70.0	50.0	10.0	%12.171	0.53556D+06	0.65186D+07	22.0
134	75.0	50.0	10.0	7.616	0.15448D+07	0.11765D+08	46.3
135	80.0	50.0	10.0	3.953	0.36268D+07	0.14337D+08	86.1

CRITICAL CIRCLES

circle	radius	X-center	Y-center	F.S.
1	95.0	30.0	-10.0	1.784
2	100.0	40.0	-10.0	1.964
3	105.0	30.0	-20.0	1.980
4	110.0	40.0	-20.0	1.985
5	120.0	40.0	-30.0	2.018
6	80.0	30.0	10.0	2.018
7	120.0	50.0	-30.0	2.029
8	115.0	30.0	-30.0	2.042
9	75.0	20.0	10.0	2.043
10	90.0	30.0	0.0	2.051

Problem Title: Highland Estates: Slope No. GS-1b

User's Name:P. F. Loading: Seismic
Date: 06-07-1993

GENERAL DATA

UNITS

Unit Weight of Water: 62.43

GEOMETRY

Number of Sections : 11

Section	X	Y-crk.	Y-grd.
1	-170.0	35.0	35.0
2	-75.0	40.0	40.0
3	-25.0	40.0	40.0
4	-5.0	55.0	55.0
5	-5.0	55.0	55.0
6	9.0	55.0	55.0
7	10.0	65.0	65.0
8	20.0	80.0	80.0
9	55.0	95.0	95.0
10	90.0	110.0	110.0
11	200.0	120.0	120.0

CIRCLE DATA

Coordinates of first circle (X,Y): 10 -70
Intervals of circle coordinates
X-direction: 10
Y-direction: 10
Number of intervals
X-direction: 5
Y-direction: 9

Elevation of upper-most tangent: 80
Tangent interval: 5
Number of tangents: 3

CONTROL DATA/ANALYSIS OPTIONS

Seismic coefficient: .15
Number of slices: 10

Total stress analysis

Soil parameters defined in SOIL PROPERTIES

SOIL PROPERTIES

Layer Number	Cohesion	Friction Angle	Unit Weight
1	4000.0	30.0	130.0
2	1500.0	20.0	130.0
3	1000.0	15.0	125.0
4	1000.0	30.0	130.0
5	2000.0	35.0	130.0

File No. S22-634-2
July 20, 1993

HIGHLAND ESTATES
Slope: GS-1b
Loading: Seismic

SOIL PROFILE

Section Number	X	elevation to bottom of layer				
		layer number				
		1	2	3	4	5
1	-170.0	35.0	35.0	35.0	45.0	300.0
2	-75.0	40.0	40.0	60.0	70.0	300.0
3	-25.0	40.0	60.0	75.0	85.0	300.0
4	-5.0	55.0	70.0	80.0	90.0	300.0
5	-5.0	80.0	80.0	80.0	90.0	300.0
6	9.0	80.0	80.0	82.0	92.0	300.0
7	10.0	80.0	80.0	83.0	93.0	300.0
8	20.0	80.0	80.0	85.0	95.0	300.0
9	55.0	95.0	95.0	95.0	105.0	300.0
10	90.0	110.0	110.0	110.0	110.0	300.0
11	200.0	120.0	120.0	120.0	140.0	300.0

RESULTS

circle	radius	X-center	Y-center	F.S.	ROVER	RESIST	ARCL
1	150.0	10.0	-70.0	1.976	0.24751D+08	0.48905D+08	123.3
2	155.0	10.0	-70.0	1.393	0.37781D+08	0.52622D+08	142.0
3	160.0	10.0	-70.0	1.530	0.50576D+08	0.77390D+08	160.1
4	140.0	10.0	-60.0	1.943	0.22580D+08	0.43878D+08	119.3
5	145.0	10.0	-60.0	1.382	0.33923D+08	0.46876D+08	137.7
6	150.0	10.0	-60.0	1.514	0.46281D+08	0.70050D+08	155.6
7	130.0	10.0	-50.0	1.909	0.19717D+08	0.37639D+08	115.2
8	135.0	10.0	-50.0	1.363	0.30753D+08	0.41927D+08	133.3
9	140.0	10.0	-50.0	1.476	0.40009D+08	0.59062D+08	150.9
10	120.0	10.0	-40.0	1.872	0.16286D+08	0.30486D+08	110.9
11	125.0	10.0	-40.0	1.337	0.26972D+08	0.36071D+08	128.7
12	130.0	10.0	-40.0	1.448	0.34609D+08	0.50106D+08	146.0
13	110.0	10.0	-30.0	2.167	0.14221D+08	0.30820D+08	106.5
14	115.0	10.0	-30.0	1.321	0.23888D+08	0.31560D+08	124.0
15	120.0	10.0	-30.0	1.416	0.29627D+08	0.41955D+08	141.0
16	100.0	10.0	-20.0	2.130	0.12514D+08	0.26658D+08	102.3
17	105.0	10.0	-20.0	1.302	0.20968D+08	0.27304D+08	119.1
18	110.0	10.0	-20.0	1.403	0.26121D+08	0.36638D+08	135.8
19	90.0	10.0	-10.0	2.094	0.10847D+08	0.22710D+08	97.9
20	95.0	10.0	-10.0	1.284	0.18166D+08	0.23329D+08	114.2
21	100.0	10.0	-10.0	1.341	0.23564D+08	0.31609D+08	130.3
22	80.0	10.0	0.0	2.132	0.91171D+07	0.19442D+08	93.2
23	85.0	10.0	0.0	1.224	0.15917D+08	0.19489D+08	109.1
24	90.0	10.0	0.0	1.334	0.20166D+08	0.26907D+08	124.8

25	70.0	10.0	10.0	2.127	0.74509D+07	0.15851D+08	88.2
26	75.0	10.0	10.0	1.218	0.13141D+08	0.16007D+08	103.7
27	80.0	10.0	10.0	1.330	0.16392D+08	0.21799D+08	119.0
28	150.0	20.0	-70.0	1.871	0.20276D+08	0.37938D+08	112.7
29	155.0	20.0	-70.0	1.315	0.33944D+08	0.44629D+08	133.0
30	160.0	20.0	-70.0	1.400	0.41874D+08	0.58634D+08	151.9
31	140.0	20.0	-60.0	2.172	0.18123D+08	0.39358D+08	108.7
32	145.0	20.0	-60.0	1.297	0.30777D+08	0.39920D+08	128.8
33	150.0	20.0	-60.0	1.383	0.38188D+08	0.52832D+08	147.5
34	130.0	20.0	-50.0	2.130	0.16401D+08	0.34932D+08	104.7
35	135.0	20.0	-50.0	1.279	0.27710D+08	0.35439D+08	124.6
36	140.0	20.0	-50.0	1.315	0.35906D+08	0.47214D+08	142.9
37	120.0	20.0	-40.0	2.090	0.14712D+08	0.30753D+08	100.9
38	125.0	20.0	-40.0	1.244	0.24121D+08	0.30002D+08	120.1
39	130.0	20.0	-40.0	1.299	0.32278D+08	0.41938D+08	138.3
40	110.0	20.0	-30.0	2.110	0.12986D+08	0.27400D+08	96.8
41	115.0	20.0	-30.0	1.223	0.21400D+08	0.26173D+08	115.8
42	120.0	20.0	-30.0	1.294	0.27984D+08	0.36198D+08	133.4
43	100.0	20.0	-20.0	2.080	0.11313D+08	0.23531D+08	92.6
44	105.0	20.0	-20.0	1.159	0.19378D+08	0.22468D+08	111.4
45	110.0	20.0	-20.0	1.281	0.24504D+08	0.31389D+08	128.5
46	90.0	20.0	-10.0	2.063	0.96266D+07	0.19858D+08	88.2
47	95.0	20.0	-10.0	1.169	0.16072D+08	0.18788D+08	106.7
48	100.0	20.0	-10.0	1.258	0.20690D+08	0.26022D+08	123.6
49	80.0	20.0	0.0	2.452	0.76928D+07	0.18864D+08	83.6
50	85.0	20.0	0.0	1.160	0.13559D+08	0.15735D+08	101.8
51	90.0	20.0	0.0	1.248	0.17585D+08	0.21943D+08	118.4
52	70.0	20.0	10.0	2.472	0.60906D+07	0.15056D+08	78.7
53	75.0	20.0	10.0	1.185	0.10500D+08	0.12440D+08	96.6
54	80.0	20.0	10.0	1.241	0.14877D+08	0.18469D+08	112.8
55	150.0	30.0	-70.0	2.137	0.17893D+08	0.38239D+08	101.9
56	155.0	30.0	-70.0	1.220	0.28827D+08	0.35157D+08	123.1
57	160.0	30.0	-70.0	1.284	0.38213D+08	0.49071D+08	143.0
58	140.0	30.0	-60.0	2.159	0.16143D+08	0.34859D+08	98.2
59	145.0	30.0	-60.0	1.198	0.26120D+08	0.31301D+08	119.0
60	150.0	30.0	-60.0	1.268	0.34747D+08	0.44045D+08	138.7
61	130.0	30.0	-50.0	2.126	0.14491D+08	0.30801D+08	94.5
62	135.0	30.0	-50.0	1.110	0.23751D+08	0.26369D+08	115.1
63	140.0	30.0	-50.0	1.251	0.31314D+08	0.39173D+08	134.3
64	120.0	30.0	-40.0	2.101	0.12813D+08	0.26913D+08	90.6
65	125.0	30.0	-40.0	1.131	0.20835D+08	0.23563D+08	111.1
66	130.0	30.0	-40.0	1.237	0.27899D+08	0.34501D+08	129.9
67	110.0	30.0	-30.0	2.173	0.10974D+08	0.23841D+08	86.5
68	115.0	30.0	-30.0	1.122	0.18340D+08	0.20586D+08	106.9
69	120.0	30.0	-30.0	1.223	0.24633D+08	0.30122D+08	125.5
70	100.0	30.0	-20.0	2.506	0.91429D+07	0.22911D+08	82.3
71	105.0	30.0	-20.0	1.131	0.15352D+08	0.17364D+08	102.6
72	110.0	30.0	-20.0	1.163	0.22272D+08	0.25901D+08	121.0
73	90.0	30.0	-10.0	2.672	0.72504D+07	0.19375D+08	77.8
74	95.0	30.0	-10.0	1.116	0.12008D+08	0.13396D+08	98.0
75	100.0	30.0	-10.0	1.179	0.18393D+08	0.21684D+08	116.2
76	80.0	30.0	0.0	2.727	0.57865D+07	0.15780D+08	73.2
77	85.0	30.0	0.0	1.493	0.96072D+07	0.14343D+08	93.3
78	90.0	30.0	0.0	1.189	0.15213D+08	0.18087D+08	111.2
79	70.0	30.0	10.0	3.422	0.41839D+07	0.14316D+08	68.2
80	75.0	30.0	10.0	1.543	0.76015D+07	0.11728D+08	88.2
81	80.0	30.0	10.0	1.230	0.11813D+08	0.14529D+08	105.8
82	150.0	40.0	-70.0	2.182	0.15310D+08	0.33405D+08	91.1
83	155.0	40.0	-70.0	1.398	0.22514D+08	0.31471D+08	112.2
84	160.0	40.0	-70.0	1.214	0.33321D+08	0.40463D+08	133.3

85	140.0	40.0	-60.0	2.260	0.13413D+08	0.30310D+08	87.4
86	145.0	40.0	-60.0	1.438	0.20145D+08	0.28961D+08	108.4
87	150.0	40.0	-60.0	1.199	0.29928D+08	0.35869D+08	129.3
88	130.0	40.0	-50.0	2.373	0.11505D+08	0.27301D+08	83.5
89	135.0	40.0	-50.0	1.429	0.17955D+08	0.25662D+08	104.4
90	140.0	40.0	-50.0	1.185	0.26763D+08	0.31719D+08	125.3
91	120.0	40.0	-40.0	2.381	0.99235D+07	0.23629D+08	79.5
92	125.0	40.0	-40.0	1.432	0.15706D+08	0.22483D+08	100.3
93	130.0	40.0	-40.0	1.164	0.24579D+08	0.28614D+08	121.1
94	110.0	40.0	-30.0	2.964	0.79193D+07	0.23472D+08	75.3
95	115.0	40.0	-30.0	1.587	0.12618D+08	0.20027D+08	96.1
96	120.0	40.0	-30.0	1.145	0.20879D+08	0.23913D+08	116.8
97	100.0	40.0	-20.0	3.415	0.59904D+07	0.20459D+08	70.9
98	105.0	40.0	-20.0	1.966	0.10367D+08	0.20380D+08	91.7
99	110.0	40.0	-20.0	1.175	0.17129D+08	0.20131D+08	112.4
100	90.0	40.0	-10.0	3.658	0.45500D+07	0.16642D+08	66.3
101	95.0	40.0	-10.0	2.036	0.84383D+07	0.17180D+08	87.0
102	100.0	40.0	-10.0	1.197	0.14175D+08	0.16966D+08	107.7
103	80.0	40.0	0.0	4.398	0.32892D+07	0.14467D+08	61.3
104	85.0	40.0	0.0	2.272	0.64805D+07	0.14724D+08	82.1
105	90.0	40.0	0.0	1.518	0.11387D+08	0.17287D+08	102.8
106	70.0	40.0	10.0	5.588	0.20908D+07	0.11683D+08	53.7
107	75.0	40.0	10.0	3.143	0.44475D+07	0.13979D+08	76.8
108	80.0	40.0	10.0	1.681	0.88090D+07	0.14810D+08	97.6
109	150.0	50.0	-70.0	2.830	0.10943D+08	0.30967D+08	79.5
110	155.0	50.0	-70.0	1.871	0.17475D+08	0.32703D+08	99.1
111	160.0	50.0	-70.0	1.206	0.27727D+08	0.33427D+08	122.9
112	140.0	50.0	-60.0	3.222	0.88867D+07	0.28634D+08	75.6
113	145.0	50.0	-60.0	1.954	0.15262D+08	0.29823D+08	94.9
114	150.0	50.0	-60.0	1.468	0.23807D+08	0.34938D+08	119.0
115	130.0	50.0	-50.0	3.637	0.74606D+07	0.27137D+08	71.6
116	135.0	50.0	-50.0	1.969	0.13242D+08	0.26067D+08	90.5
117	140.0	50.0	-50.0	1.473	0.21028D+08	0.30970D+08	115.0
118	120.0	50.0	-40.0	3.765	0.61394D+07	0.23116D+08	67.4
119	125.0	50.0	-40.0	2.120	0.10978D+08	0.23273D+08	85.8
120	130.0	50.0	-40.0	1.517	0.17703D+08	0.26849D+08	110.8
121	110.0	50.0	-30.0	4.035	0.47852D+07	0.19309D+08	62.9
122	115.0	50.0	-30.0	3.085	0.85001D+07	0.26222D+08	80.7
123	120.0	50.0	-30.0	1.263	0.15220D+08	0.19223D+08	106.5
124	100.0	50.0	-20.0	4.990	0.34426D+07	0.17178D+08	58.0
125	105.0	50.0	-20.0	3.391	0.65535D+07	0.22223D+08	74.8
126	110.0	50.0	-20.0	1.632	0.12107D+08	0.19764D+08	102.0
127	90.0	50.0	-10.0	6.301	0.21422D+07	0.13498D+08	52.5
128	95.0	50.0	-10.0	3.973	0.48306D+07	0.19191D+08	67.4
129	100.0	50.0	-10.0	1.702	0.98787D+07	0.16814D+08	97.3
130	80.0	50.0	0.0	8.865	0.11094D+07	0.98348D+07	36.6
131	85.0	50.0	0.0	5.041	0.32147D+07	0.16206D+08	60.7
132	90.0	50.0	0.0	2.551	0.67982D+07	0.17340D+08	92.3
133	70.0	50.0	10.0	F.S. greater than 10			
133	70.0	50.0	10.0	%10.363	0.62468D+06	0.64735D+07	22.0
134	75.0	50.0	10.0	6.457	0.18045D+07	0.11652D+08	46.3
135	80.0	50.0	10.0	3.122	0.44897D+07	0.14018D+08	86.1

CRITICAL CIRCLES

HIGHLAND ESTATES
Slope: GS-1b
Loading: Seismic

circle	radius	X-center	Y-center	F.S.
1	135.0	30.0	-50.0	1.110
2	95.0	30.0	-10.0	1.116
3	115.0	30.0	-30.0	1.122
4	125.0	30.0	-40.0	1.131
5	105.0	30.0	-20.0	1.131
6	120.0	40.0	-30.0	1.145
7	105.0	20.0	-20.0	1.159
8	85.0	20.0	0.0	1.160
9	110.0	30.0	-20.0	1.163
10	130.0	40.0	-40.0	1.164

gs2a.r

Problem Title: Highland Estates: Profile No. 2-A
Loading: Static

User's Name:P. F.
Date: 06-07-1993

GENERAL DATA

UNITS

Unit Weight of Water: 62.43

GEOMETRY

Number of Sections : 17

Section	X	Y-crk.	Y-grd.
1	-250.0	10.0	10.0
2	-110.0	10.0	10.0
3	-55.0	28.0	28.0
4	5.0	48.0	48.0
5	50.0	71.0	71.0
6	72.0	84.0	84.0
7	80.0	84.0	84.0
8	120.0	103.0	103.0
9	120.5	103.0	103.0
10	130.0	107.0	107.0
11	132.0	115.0	115.0
12	145.0	115.0	115.0
13	145.5	115.0	115.0
14	155.0	115.0	115.0
15	155.5	130.0	130.0
16	195.0	132.0	132.0
17	270.0	135.0	135.0

CIRCLE DATA

Coordinates of first circle (X,Y): 120 -210
Intervals of circle coordinates
X-direction: 10
Y-direction: 10
Number of intervals
X-direction: 5
Y-direction: 5

Elevation of upper-most tangent: 130
Tangent interval: 5
Number of tangents: 3

CONTROL DATA/ANALYSIS OPTIONS

No seismic analysis
Number of slices: 10

Total stress analysis

File No. S22-634-2
July 20, 1993

HIGHLAND ESTATES
Slope: GS-2a
Loading: Static

Soil parameters defined in SOIL PROPERTIES

SOIL PROPERTIES

Layer Number	Cohesion	Friction Angle	Unit Weight
1	9000.0	0.0	130.0
2	1500.0	20.0	130.0
3	1000.0	15.0	125.0
4	1000.0	25.0	125.0
5	1000.0	30.0	130.0

SOIL PROFILE

Section Number	X	elevation to bottom of layer, layer number 1	2	3	4	5
1	-250.0	10.0	20.0	30.0	30.0	200.0
2	-110.0	10.0	20.0	30.0	30.0	200.0
3	-55.0	28.0	28.0	38.0	48.0	200.0
4	5.0	48.0	48.0	57.0	68.0	200.0
5	50.0	71.0	71.0	71.0	85.0	200.0
6	72.0	84.0	84.0	84.0	92.0	200.0
7	80.0	84.0	84.0	84.0	95.0	200.0
8	120.0	103.0	103.0	103.0	108.0	200.0
9	120.5	115.0	115.0	115.0	115.0	200.0
10	130.0	115.0	115.0	115.0	115.0	200.0
11	132.0	115.0	115.0	115.0	115.0	200.0
12	145.0	115.0	115.0	115.0	115.0	200.0
13	145.5	132.0	132.0	132.0	132.0	200.0
14	155.0	132.0	132.0	132.0	132.0	200.0
15	155.5	130.0	130.0	130.0	130.0	200.0
16	195.0	132.0	132.0	132.0	132.0	200.0
17	270.0	135.0	135.0	135.0	155.0	200.0

RESULTS

circle	radius	X-center	Y-center	F.S.	ROVER	RESIST	ARCL
1	340.0	120.0	-210.0	2.203	0.18586D+09	0.40947D+09	330.0
2	345.0	120.0	-210.0	2.176	0.21306D+09	0.46352D+09	356.3
3	350.0	120.0	-210.0	2.224	0.24001D+09	0.53381D+09	386.5
4	330.0	120.0	-200.0	2.194	0.17661D+09	0.38756D+09	325.9
5	335.0	120.0	-200.0	2.164	0.20291D+09	0.43910D+09	351.6
6	340.0	120.0	-200.0	2.250	0.22900D+09	0.51529D+09	381.4
7	320.0	120.0	-190.0	2.186	0.16756D+09	0.36626D+09	321.8
8	325.0	120.0	-190.0	2.152	0.19295D+09	0.41533D+09	346.8
9	330.0	120.0	-190.0	2.241	0.21808D+09	0.48870D+09	376.3
10	310.0	120.0	-180.0	2.177	0.15871D+09	0.34557D+09	317.6
11	315.0	120.0	-180.0	2.141	0.18319D+09	0.39221D+09	341.9
12	320.0	120.0	-180.0	2.232	0.20736D+09	0.46279D+09	371.1

13	300.0	120.0	-170.0	2.181	0.14907D+09	0.32518D+09	313.3
14	305.0	120.0	-170.0	2.130	0.17345D+09	0.36947D+09	337.0
15	310.0	120.0	-170.0	2.223	0.19686D+09	0.43755D+09	365.8
16	340.0	130.0	-210.0	2.169	0.17340D+09	0.37605D+09	320.0
17	345.0	130.0	-210.0	2.141	0.20000D+09	0.42812D+09	353.8
18	350.0	130.0	-210.0	2.242	0.22691D+09	0.50867D+09	384.9
19	330.0	130.0	-200.0	2.160	0.16457D+09	0.35548D+09	315.9
20	335.0	130.0	-200.0	2.131	0.19012D+09	0.40506D+09	349.1
21	340.0	130.0	-200.0	2.232	0.21615D+09	0.48235D+09	379.8
22	320.0	130.0	-190.0	2.165	0.15485D+09	0.33518D+09	311.8
23	325.0	130.0	-190.0	2.121	0.18050D+09	0.38284D+09	344.3
24	330.0	130.0	-190.0	2.260	0.20558D+09	0.46459D+09	374.7
25	310.0	130.0	-180.0	2.173	0.14511D+09	0.31527D+09	307.6
26	315.0	130.0	-180.0	2.124	0.17008D+09	0.36125D+09	339.5
27	320.0	130.0	-180.0	2.250	0.19520D+09	0.43924D+09	369.4
28	300.0	130.0	-170.0	2.183	0.13557D+09	0.29590D+09	303.3
29	305.0	130.0	-170.0	2.131	0.15966D+09	0.34020D+09	334.6
30	310.0	130.0	-170.0	2.238	0.18384D+09	0.41144D+09	364.1
31	340.0	140.0	-210.0	2.156	0.15909D+09	0.34307D+09	310.0
32	345.0	140.0	-210.0	2.162	0.18687D+09	0.40401D+09	351.1
33	350.0	140.0	-210.0	2.173	0.21418D+09	0.46545D+09	383.3
34	330.0	140.0	-200.0	2.164	0.14935D+09	0.32326D+09	306.0
35	335.0	140.0	-200.0	2.169	0.17623D+09	0.38218D+09	346.5
36	340.0	140.0	-200.0	2.163	0.20385D+09	0.44096D+09	378.2
37	320.0	140.0	-190.0	2.174	0.13982D+09	0.30393D+09	301.7
38	325.0	140.0	-190.0	2.176	0.16572D+09	0.36064D+09	341.8
39	330.0	140.0	-190.0	2.167	0.19232D+09	0.41667D+09	373.1
40	310.0	140.0	-180.0	2.177	0.13053D+09	0.28412D+09	294.8
41	315.0	140.0	-180.0	2.184	0.15541D+09	0.33949D+09	337.0
42	320.0	140.0	-180.0	2.173	0.18090D+09	0.39302D+09	367.9
43	300.0	140.0	-170.0	2.180	0.12162D+09	0.26511D+09	287.9
44	305.0	140.0	-170.0	2.189	0.14534D+09	0.31818D+09	330.1
45	310.0	140.0	-170.0	2.179	0.16980D+09	0.37006D+09	362.6
46	340.0	150.0	-210.0	2.174	0.14252D+09	0.30987D+09	299.6
47	345.0	150.0	-210.0	2.222	0.16989D+09	0.37747D+09	348.4
48	350.0	150.0	-210.0	2.179	0.19767D+09	0.43074D+09	381.6
49	330.0	150.0	-200.0	2.177	0.13326D+09	0.29014D+09	292.8
50	335.0	150.0	-200.0	2.232	0.15962D+09	0.35625D+09	343.8
51	340.0	150.0	-200.0	2.187	0.18634D+09	0.40747D+09	376.6
52	320.0	150.0	-190.0	2.180	0.12439D+09	0.27120D+09	286.0
53	325.0	150.0	-190.0	2.238	0.14960D+09	0.33474D+09	337.0
54	330.0	150.0	-190.0	2.195	0.17530D+09	0.38487D+09	371.5
55	310.0	150.0	-180.0	2.183	0.11590D+09	0.25303D+09	279.2
56	315.0	150.0	-180.0	2.243	0.14000D+09	0.31408D+09	329.6
57	320.0	150.0	-180.0	2.204	0.16437D+09	0.36219D+09	365.0
58	300.0	150.0	-170.0	2.186	0.10778D+09	0.23562D+09	272.3
59	305.0	150.0	-170.0	2.250	0.13047D+09	0.29361D+09	322.1
60	310.0	150.0	-170.0	2.211	0.15392D+09	0.34027D+09	357.0
61	340.0	160.0	-210.0	2.190	0.12567D+09	0.27526D+09	283.6
62	345.0	160.0	-210.0	2.212	0.15242D+09	0.33710D+09	343.6
63	350.0	160.0	-210.0	2.249	0.18036D+09	0.40557D+09	379.9
64	330.0	160.0	-200.0	2.194	0.11724D+09	0.25721D+09	276.9
65	335.0	160.0	-200.0	2.218	0.14264D+09	0.31633D+09	336.3
66	340.0	160.0	-200.0	2.259	0.16966D+09	0.38334D+09	373.5
67	320.0	160.0	-190.0	2.197	0.10922D+09	0.23999D+09	270.1
68	325.0	160.0	-190.0	2.225	0.13311D+09	0.29618D+09	329.0
69	330.0	160.0	-190.0	2.268	0.15934D+09	0.36139D+09	365.7
70	310.0	160.0	-180.0	2.202	0.10184D+09	0.22425D+09	263.3
71	315.0	160.0	-180.0	2.233	0.12410D+09	0.27707D+09	321.6
72	320.0	160.0	-180.0	2.277	0.14911D+09	0.33948D+09	357.9

HIGHLAND ESTATES
Slope: GS-2a
Loading: Static

73	300.0	160.0	-170.0	2.209	0.94393D+08	0.20856D+09	256.5
74	305.0	160.0	-170.0	2.241	0.11540D+09	0.25865D+09	314.2
75	310.0	160.0	-170.0	2.306	0.13912D+09	0.32088D+09	350.1

CRITICAL CIRCLES

circle	radius	X-center	Y-center	F.S.
1	325.0	130.0	-190.0	2.121
2	315.0	130.0	-180.0	2.124
3	305.0	120.0	-170.0	2.130
4	335.0	130.0	-200.0	2.131
5	305.0	130.0	-170.0	2.131
6	345.0	130.0	-210.0	2.141
7	315.0	120.0	-180.0	2.141
8	325.0	120.0	-190.0	2.152
9	340.0	140.0	-210.0	2.156
10	330.0	130.0	-200.0	2.160

HIGHLAND ESTATES
Slope: GS-2a
Loading: Static

Problem Title: Highland Estates: Profile No. 2-A
Loading: Seismic

User's Name:P. F.
Date: 06-07-1993

GENERAL DATA

UNITS

Unit Weight of Water: 62.43

GEOMETRY

Number of Sections : 17

Section	X	Y-crk.	Y-grd.
1	-250.0	10.0	10.0
2	-110.0	10.0	10.0
3	-55.0	28.0	28.0
4	5.0	48.0	48.0
5	50.0	71.0	71.0
6	72.0	84.0	84.0
7	80.0	84.0	84.0
8	120.0	103.0	103.0
9	120.5	103.0	103.0
10	130.0	107.0	107.0
11	132.0	115.0	115.0
12	145.0	115.0	115.0
13	145.5	115.0	115.0
14	155.0	115.0	115.0
15	155.5	130.0	130.0
16	195.0	132.0	132.0
17	270.0	135.0	135.0

CIRCLE DATA

Coordinates of first circle (X,Y): 120 -210
Intervals of circle coordinates
X-direction: 10
Y-direction: 10
Number of intervals
X-direction: 5
Y-direction: 5

Elevation of upper-most tangent: 130
Tangent interval: 5
Number of tangents: 3

CONTROL DATA/ANALYSIS OPTIONS

Seismic coefficient: .15
Number of slices: 10

Total stress analysis

File No. S22-634-2
July 20, 1993

HIGHLAND ESTATES
Slope: GS-2a
Loading: Seismic

Soil parameters defined in SOIL PROPERTIES

SOIL PROPERTIES

Layer Number	Cohesion	Friction Angle	Unit Weight
1	9000.0	0.0	130.0
2	1500.0	20.0	130.0
3	1000.0	15.0	125.0
4	1000.0	25.0	125.0
5	1000.0	30.0	130.0

SOIL PROFILE

Section Number	X	elevation to bottom of layer, layer number 1	2	3	4	5
1	-250.0	10.0	20.0	30.0	30.0	200.0
2	-110.0	10.0	20.0	30.0	30.0	200.0
3	-55.0	28.0	28.0	38.0	48.0	200.0
4	5.0	48.0	48.0	57.0	68.0	200.0
5	50.0	71.0	71.0	71.0	85.0	200.0
6	72.0	84.0	84.0	84.0	92.0	200.0
7	80.0	84.0	84.0	84.0	95.0	200.0
8	120.0	103.0	103.0	103.0	108.0	200.0
9	120.5	115.0	115.0	115.0	115.0	200.0
10	130.0	115.0	115.0	115.0	115.0	200.0
11	132.0	115.0	115.0	115.0	115.0	200.0
12	145.0	115.0	115.0	115.0	115.0	200.0
13	145.5	132.0	132.0	132.0	132.0	200.0
14	155.0	132.0	132.0	132.0	132.0	200.0
15	155.5	130.0	130.0	130.0	130.0	200.0
16	195.0	132.0	132.0	132.0	132.0	200.0
17	270.0	135.0	135.0	135.0	155.0	200.0

RESULTS

circle	radius	X-center	Y-center	F.S.	ROVER	RESIST	ARCL
1	340.0	120.0	-210.0	1.364	0.28540D+09	0.38937D+09	330.0
2	345.0	120.0	-210.0	1.332	0.33056D+09	0.44029D+09	356.3
3	350.0	120.0	-210.0	1.406	0.36328D+09	0.51064D+09	386.5
4	330.0	120.0	-200.0	1.366	0.26985D+09	0.36856D+09	325.9
5	335.0	120.0	-200.0	1.332	0.31314D+09	0.41707D+09	351.6
6	340.0	120.0	-200.0	1.396	0.35096D+09	0.49000D+09	381.4
7	320.0	120.0	-190.0	1.367	0.25470D+09	0.34830D+09	321.8
8	325.0	120.0	-190.0	1.332	0.29615D+09	0.39447D+09	346.8
9	330.0	120.0	-190.0	1.397	0.33252D+09	0.46468D+09	376.3
10	310.0	120.0	-180.0	1.369	0.23998D+09	0.32863D+09	317.6
11	315.0	120.0	-180.0	1.332	0.27960D+09	0.37248D+09	341.9
12	320.0	120.0	-180.0	1.399	0.31452D+09	0.44000D+09	371.1

13	300.0	120.0	-170.0	1.377	0.22464D+09	0.30925D+09	313.3
14	305.0	120.0	-170.0	1.333	0.26328D+09	0.35087D+09	337.0
15	310.0	120.0	-170.0	1.400	0.29713D+09	0.41598D+09	365.8
16	340.0	130.0	-210.0	1.351	0.26426D+09	0.35699D+09	320.0
17	345.0	130.0	-210.0	1.361	0.29963D+09	0.40775D+09	353.8
18	350.0	130.0	-210.0	1.349	0.35881D+09	0.48392D+09	384.9
19	330.0	130.0	-200.0	1.352	0.24954D+09	0.33741D+09	315.9
20	335.0	130.0	-200.0	1.362	0.28334D+09	0.38578D+09	349.1
21	340.0	130.0	-200.0	1.349	0.34022D+09	0.45884D+09	379.8
22	320.0	130.0	-190.0	1.359	0.23407D+09	0.31814D+09	311.8
23	325.0	130.0	-190.0	1.362	0.26772D+09	0.36459D+09	344.3
24	330.0	130.0	-190.0	1.339	0.32772D+09	0.43889D+09	374.7
25	310.0	130.0	-180.0	1.369	0.21866D+09	0.29925D+09	307.6
26	315.0	130.0	-180.0	1.368	0.25145D+09	0.34405D+09	339.5
27	320.0	130.0	-180.0	1.340	0.30968D+09	0.41484D+09	369.4
28	300.0	130.0	-170.0	1.379	0.20364D+09	0.28089D+09	303.3
29	305.0	130.0	-170.0	1.377	0.23535D+09	0.32402D+09	334.6
30	310.0	130.0	-170.0	1.352	0.28815D+09	0.38971D+09	364.1
31	340.0	140.0	-210.0	1.347	0.24135D+09	0.32512D+09	310.0
32	345.0	140.0	-210.0	1.374	0.27999D+09	0.38482D+09	351.1
33	350.0	140.0	-210.0	1.356	0.32685D+09	0.44336D+09	383.3
34	330.0	140.0	-200.0	1.356	0.22590D+09	0.30634D+09	306.0
35	335.0	140.0	-200.0	1.382	0.26334D+09	0.36404D+09	346.5
36	340.0	140.0	-200.0	1.357	0.30945D+09	0.42001D+09	378.2
37	320.0	140.0	-190.0	1.366	0.21083D+09	0.28805D+09	301.7
38	325.0	140.0	-190.0	1.391	0.24691D+09	0.34354D+09	341.8
39	330.0	140.0	-190.0	1.365	0.29082D+09	0.39692D+09	373.1
40	310.0	140.0	-180.0	1.375	0.19594D+09	0.26940D+09	294.8
41	315.0	140.0	-180.0	1.401	0.23081D+09	0.32343D+09	337.0
42	320.0	140.0	-180.0	1.374	0.27254D+09	0.37443D+09	367.9
43	300.0	140.0	-170.0	1.384	0.18173D+09	0.25150D+09	287.9
44	305.0	140.0	-170.0	1.410	0.21501D+09	0.30324D+09	330.1
45	310.0	140.0	-170.0	1.384	0.25484D+09	0.35261D+09	362.6
46	340.0	150.0	-210.0	1.359	0.21583D+09	0.29326D+09	299.6
47	345.0	150.0	-210.0	1.325	0.26931D+09	0.35690D+09	348.4
48	350.0	150.0	-210.0	1.407	0.29255D+09	0.41167D+09	381.6
49	330.0	150.0	-200.0	1.367	0.20092D+09	0.27472D+09	292.8
50	335.0	150.0	-200.0	1.334	0.25255D+09	0.33681D+09	343.8
51	340.0	150.0	-200.0	1.417	0.27489D+09	0.38950D+09	376.6
52	320.0	150.0	-190.0	1.376	0.18669D+09	0.25691D+09	286.0
53	325.0	150.0	-190.0	1.341	0.23598D+09	0.31656D+09	337.0
54	330.0	150.0	-190.0	1.427	0.25777D+09	0.36795D+09	371.5
55	310.0	150.0	-180.0	1.385	0.17320D+09	0.23979D+09	279.2
56	315.0	150.0	-180.0	1.300	0.22741D+09	0.29564D+09	329.6
57	320.0	150.0	-180.0	1.439	0.24076D+09	0.34641D+09	365.0
58	300.0	150.0	-170.0	1.392	0.16046D+09	0.22337D+09	272.3
59	305.0	150.0	-170.0	1.309	0.21119D+09	0.27651D+09	322.1
60	310.0	150.0	-170.0	1.449	0.22475D+09	0.32560D+09	357.0
61	340.0	160.0	-210.0	1.374	0.18955D+09	0.26043D+09	283.6
62	345.0	160.0	-210.0	1.371	0.23318D+09	0.31970D+09	343.6
63	350.0	160.0	-210.0	1.450	0.26753D+09	0.38790D+09	379.9
64	330.0	160.0	-200.0	1.382	0.17612D+09	0.24343D+09	276.9
65	335.0	160.0	-200.0	1.383	0.21707D+09	0.30019D+09	336.3
66	340.0	160.0	-200.0	1.461	0.25099D+09	0.36677D+09	373.5
67	320.0	160.0	-190.0	1.390	0.16351D+09	0.22719D+09	270.1
68	325.0	160.0	-190.0	1.395	0.20157D+09	0.28127D+09	329.0
69	330.0	160.0	-190.0	1.471	0.23521D+09	0.34588D+09	365.7
70	310.0	160.0	-180.0	1.337	0.15783D+09	0.21100D+09	263.3
71	315.0	160.0	-180.0	1.408	0.18703D+09	0.26332D+09	321.6
72	320.0	160.0	-180.0	1.386	0.23271D+09	0.32246D+09	357.9
73	300.0	160.0	-170.0	1.347	0.14577D+09	0.19632D+09	256.5
74	305.0	160.0	-170.0	1.431	0.17154D+09	0.24552D+09	314.2
75	310.0	160.0	-170.0	1.392	0.21825D+09	0.30375D+09	350.1

CRITICAL CIRCLES

HIGHLAND ESTATES
Slope: GS-2a
Loading: Seismic

circle	radius	X-center	Y-center	F.S.
1	315.0	150.0	-180.0	1.300
2	305.0	150.0	-170.0	1.309
3	345.0	150.0	-210.0	1.325
4	335.0	120.0	-200.0	1.332
5	345.0	120.0	-210.0	1.332
6	325.0	120.0	-190.0	1.332
7	315.0	120.0	-180.0	1.332
8	305.0	120.0	-170.0	1.333
9	335.0	150.0	-200.0	1.334
10	310.0	160.0	-180.0	1.337

File No. S22-634-2
July 20, 1993

GS2B.R

Problem Title: Highland Estates: Profile No. 2-b
Loading: Static

User's Name:P. F.
Date: 06-07-1993

GENERAL DATA

UNITS

Unit Weight of Water: 62.43

GEOMETRY

Number of Sections : 12

Section	X	Y-crk.	Y-grd.
1	155.0	130.0	130.0
2	195.0	132.0	132.0
3	255.0	135.0	135.0
4	255.5	135.0	135.0
5	270.0	135.0	135.0
6	270.5	155.0	155.0
7	310.0	155.0	155.0
8	310.5	155.0	155.0
9	320.0	155.0	155.0
10	324.0	167.0	167.0
11	370.0	190.0	190.0
12	420.0	215.0	215.0

CIRCLE DATA

Coordinates of first circle (X,Y): 335 110
Intervals of circle coordinates
X-direction: 10
Y-direction: 10
Number of intervals
X-direction: 6
Y-direction: 5

Elevation of upper-most tangent: 180
Tangent interval: 5
Number of tangents: 4

CONTROL DATA/ANALYSIS OPTIONS

No seismic analysis
Number of slices: 10

Total stress analysis

Soil parameters defined in SOIL PROPERTIES

SOIL PROPERTIES

Layer Number	Cohesion	Friction Angle	Unit Weight
1	9000.0	0.0	130.0
2	1000.0	15.0	125.0
3	1000.0	30.0	130.0

File No. S22-634-2
July 20, 1993

HIGHLAND ESTATES
Slope: GS-2b
Loading: Static

SOIL PROFILE

Section Number	X	elevation to bottom of layer layer number 1	2	3
1	155.0	130.0	130.0	250.0
2	195.0	132.0	132.0	250.0
3	255.0	135.0	155.0	250.0
4	255.5	155.0	155.0	250.0
5	270.0	155.0	160.0	250.0
6	270.5	155.0	160.0	250.0
7	310.0	155.0	175.0	250.0
8	310.5	167.0	175.0	250.0
9	320.0	167.0	180.0	250.0
10	324.0	167.0	183.0	250.0
11	370.0	190.0	190.0	250.0
12	420.0	215.0	215.0	250.0

RESULTS

circle	radius	X-center	Y-center	F.S.	ROVER	RESIST	ARCL
1	70.0	335.0	110.0	F.S. greater than 10			
1	70.0	335.0	110.0	%404.568	0.17495D+04	0.70777D+06	1.
1							
2	75.0	335.0	110.0	F.S. greater than 10			
2	75.0	335.0	110.0	%26.584	0.36378D+06	0.96710D+07	14.3
3	80.0	335.0	110.0	5.656	0.60371D+07	0.34149D+08	125.7
4	85.0	335.0	110.0	5.308	0.81725D+07	0.43377D+08	139.7
5	60.0	335.0	120.0	2.945	0.18955D+07	0.55814D+07	69.3
6	65.0	335.0	120.0	3.577	0.29072D+07	0.10398D+08	84.4
7	70.0	335.0	120.0	F.S. greater than 10			
7	70.0	335.0	120.0	%40.791	0.18952D+06	0.77308D+07	12.3
8	75.0	335.0	120.0	5.251	0.71025D+07	0.37296D+08	132.0
9	50.0	335.0	130.0	2.861	0.14830D+07	0.42432D+07	64.4
10	55.0	335.0	130.0	3.383	0.23072D+07	0.78055D+07	79.1
11	60.0	335.0	130.0	3.472	0.33471D+07	0.11619D+08	93.2
12	65.0	335.0	130.0	3.532	0.46168D+07	0.16305D+08	107.1
13	40.0	335.0	140.0	2.769	0.11006D+07	0.30471D+07	58.8
14	45.0	335.0	140.0	3.177	0.17834D+07	0.56665D+07	73.0
15	50.0	335.0	140.0	3.378	0.26463D+07	0.89392D+07	86.6
16	55.0	335.0	140.0	3.439	0.36949D+07	0.12708D+08	100.0
17	30.0	335.0	150.0	2.771	0.70858D+06	0.19638D+07	51.8
18	35.0	335.0	150.0	3.143	0.12043D+07	0.37852D+07	65.1
19	40.0	335.0	150.0	3.374	0.18636D+07	0.62881D+07	78.0
20	45.0	335.0	150.0	3.468	0.26788D+07	0.92889D+07	90.8
21	70.0	345.0	110.0	3.021	0.19253D+07	0.58166D+07	65.7
22	75.0	345.0	110.0	2.956	0.31680D+07	0.93640D+07	82.3
23	80.0	345.0	110.0	F.S. greater than 10			
23	80.0	345.0	110.0	%151.522	0.15327D+05	0.23224D+07	3.
2							
24	85.0	345.0	110.0	F.S. greater than 10			
24	85.0	345.0	110.0	%23.558	0.55506D+06	0.13076D+08	17.1
25	60.0	345.0	120.0	2.929	0.15694D+07	0.45973D+07	61.4
26	65.0	345.0	120.0	2.707	0.26438D+07	0.71564D+07	77.6
27	70.0	345.0	120.0	3.179	0.39920D+07	0.12691D+08	92.8
28	75.0	345.0	120.0	3.152	0.56167D+07	0.17706D+08	107.4
29	50.0	345.0	130.0	2.995	0.11505D+07	0.34455D+07	56.8

30	55.0	345.0	130.0	2.588	0.20254D+07	0.52416D+07	72.5
31	60.0	345.0	130.0	3.069	0.31172D+07	0.95661D+07	87.3
32	65.0	345.0	130.0	3.137	0.44677D+07	0.14016D+08	101.5
33	40.0	345.0	140.0	5.911	0.76251D+06	0.45069D+07	51.7
34	45.0	345.0	140.0	2.593	0.14926D+07	0.38696D+07	66.8
35	50.0	345.0	140.0	2.975	0.24338D+07	0.72402D+07	81.0
36	55.0	345.0	140.0	3.066	0.35588D+07	0.10913D+08	94.7
37	30.0	345.0	150.0	F.S. greater than 10			
37	30.0	345.0	150.0	%10.349	0.36241D+06	0.37506D+07	45.3
38	35.0	345.0	150.0	6.515	0.92063D+06	0.59978D+07	59.5
39	40.0	345.0	150.0	3.015	0.16510D+07	0.49771D+07	72.8
40	45.0	345.0	150.0	3.145	0.24926D+07	0.78398D+07	85.9
41	70.0	355.0	110.0	6.008	0.13031D+07	0.78296D+07	55.6
42	75.0	355.0	110.0	2.780	0.25286D+07	0.70302D+07	74.2
43	80.0	355.0	110.0	3.096	0.40670D+07	0.12590D+08	90.7
44	85.0	355.0	110.0	3.047	0.59424D+07	0.18105D+08	106.2
45	60.0	355.0	120.0	9.752	0.92052D+06	0.89766D+07	51.3
46	65.0	355.0	120.0	2.781	0.20213D+07	0.56217D+07	69.7
47	70.0	355.0	120.0	2.850	0.34551D+07	0.98474D+07	85.8
48	75.0	355.0	120.0	2.949	0.50837D+07	0.14993D+08	101.0
49	50.0	355.0	130.0	F.S. greater than 10			
49	50.0	355.0	130.0	%18.322	0.51701D+06	0.94726D+07	46.6
50	55.0	355.0	130.0	5.378	0.14484D+07	0.77888D+07	64.9
51	60.0	355.0	130.0	2.835	0.25530D+07	0.72386D+07	80.6
52	65.0	355.0	130.0	2.877	0.39786D+07	0.11446D+08	95.4
53	40.0	355.0	140.0	F.S. greater than 10			
53	40.0	355.0	140.0	%70.745	0.52722D+05	0.37298D+07	10.4
54	45.0	355.0	140.0	7.885	0.87024D+06	0.68617D+07	59.5
55	50.0	355.0	140.0	2.958	0.18260D+07	0.54019D+07	74.7
56	55.0	355.0	140.0	2.829	0.30970D+07	0.87624D+07	89.0
57	30.0	355.0	150.0	circle does not intercept slope			
58	35.0	355.0	150.0	circle does not intercept slope			
59	40.0	355.0	150.0	7.772	0.10403D+07	0.80855D+07	67.1
60	45.0	355.0	150.0	2.984	0.20589D+07	0.61446D+07	80.5
61	70.0	365.0	110.0	F.S. greater than 10			
61	70.0	365.0	110.0	%31.625	0.34129D+06	0.10793D+08	17.1
62	75.0	365.0	110.0	6.432	0.15614D+07	0.10042D+08	64.1
63	80.0	365.0	110.0	2.932	0.30989D+07	0.90871D+07	82.5
64	85.0	365.0	110.0	2.894	0.50768D+07	0.14694D+08	98.9
65	60.0	365.0	120.0	F.S. greater than 10			
65	60.0	365.0	120.0	%58.918	0.87482D+05	0.51542D+07	9.5
66	65.0	365.0	120.0	F.S. greater than 10			
66	65.0	365.0	120.0	%12.200	0.10097D+07	0.12318D+08	59.6
67	70.0	365.0	120.0	2.964	0.24642D+07	0.73029D+07	77.8
68	75.0	365.0	120.0	2.727	0.41617D+07	0.11347D+08	94.0
69	50.0	365.0	130.0	circle does not intercept slope			
70	55.0	365.0	130.0	F.S. greater than 10			
70	55.0	365.0	130.0	%43.565	0.15793D+06	0.68801D+07	13.9
71	60.0	365.0	130.0	6.699	0.16620D+07	0.11133D+08	72.8
72	65.0	365.0	130.0	2.922	0.30492D+07	0.89088D+07	88.6
73	40.0	365.0	140.0	circle does not intercept slope			
74	45.0	365.0	140.0	circle does not intercept slope			
75	50.0	365.0	140.0	9.933	0.89254D+06	0.88659D+07	67.3
76	55.0	365.0	140.0	6.415	0.21012D+07	0.13480D+08	82.5
77	30.0	365.0	150.0	circle does not intercept slope			
78	35.0	365.0	150.0	circle does not intercept slope			
79	40.0	365.0	150.0	circle does not intercept slope			
80	45.0	365.0	150.0	9.758	0.10445D+07	0.10192D+08	73.9
81	70.0	375.0	110.0	circle does not intercept slope			
82	75.0	375.0	110.0	F.S. greater than 10			
82	75.0	375.0	110.0	%45.735	0.17888D+06	0.81811D+07	12.1

83	80.0	375.0	110.0	F.S. greater than 10	
83	80.0	375.0	110.0	%10.699 0.17234D+07 0.18438D+08	72.4
84	85.0	375.0	110.0	2.933 0.37484D+07 0.10995D+08	90.7
85	60.0	375.0	120.0	circle does not intercept slope	
86	65.0	375.0	120.0	circle does not intercept slope	
87	70.0	375.0	120.0	F.S. greater than 10	
87	70.0	375.0	120.0	%15.600 0.98421D+06 0.15354D+08	67.8
88	75.0	375.0	120.0	5.946 0.28242D+07 0.16792D+08	85.9
89	50.0	375.0	130.0	circle does not intercept slope	
90	55.0	375.0	130.0	circle does not intercept slope	
91	60.0	375.0	130.0	circle does not intercept slope	
92	65.0	375.0	130.0	8.157 0.16921D+07 0.13801D+08	80.7
93	40.0	375.0	140.0	circle does not intercept slope	
94	45.0	375.0	140.0	circle does not intercept slope	
95	50.0	375.0	140.0	circle does not intercept slope	
96	55.0	375.0	140.0	4.884 0.88816D+06 0.43378D+07	60.1
97	30.0	375.0	150.0	circle does not intercept slope	
98	35.0	375.0	150.0	circle does not intercept slope	
99	40.0	375.0	150.0	circle does not intercept slope	
100	45.0	375.0	150.0	5.482 0.52936D+06 0.29018D+07	50.7
101	70.0	385.0	110.0	circle does not intercept slope	
102	75.0	385.0	110.0	circle does not intercept slope	
103	80.0	385.0	110.0	F.S. greater than 10	
103	80.0	385.0	110.0	%176.794 0.15018D+05 0.26550D+07	3.7
104	85.0	385.0	110.0	8.832 0.18208D+07 0.16081D+08	80.6
105	60.0	385.0	120.0	circle does not intercept slope	
106	65.0	385.0	120.0	circle does not intercept slope	
107	70.0	385.0	120.0	circle does not intercept slope	
108	75.0	385.0	120.0	F.S. greater than 10	
108	75.0	385.0	120.0	%129.053 0.32465D+05 0.41897D+07	6.2
109	50.0	385.0	130.0	circle does not intercept slope	
110	55.0	385.0	130.0	circle does not intercept slope	
111	60.0	385.0	130.0	circle does not intercept slope	
112	65.0	385.0	130.0	7.069 0.52764D+06 0.37298D+07	49.3
113	40.0	385.0	140.0	circle does not intercept slope	
114	45.0	385.0	140.0	circle does not intercept slope	
115	50.0	385.0	140.0	circle does not intercept slope	
116	55.0	385.0	140.0	8.802 0.28046D+06 0.24686D+07	39.8
117	30.0	385.0	150.0	circle does not intercept slope	
118	35.0	385.0	150.0	circle does not intercept slope	
119	40.0	385.0	150.0	circle does not intercept slope	
120	45.0	385.0	150.0	F.S. greater than 10	
120	45.0	385.0	150.0	%11.951 0.12400D+06 0.14820D+07	30.2

CRITICAL CIRCLES

circle	radius	X-center	Y-center	F.S.
1	55.0	345.0	130.0	2.588
2	45.0	345.0	140.0	2.593
3	65.0	345.0	120.0	2.707
4	75.0	365.0	120.0	2.727
5	40.0	335.0	140.0	2.769
6	30.0	335.0	150.0	2.771
7	75.0	355.0	110.0	2.780
8	65.0	355.0	120.0	2.781
9	55.0	355.0	140.0	2.829
10	60.0	355.0	130.0	2.835

File No. S22-634-2
July 20, 1993

GS2B.S

Problem Title: Highland Estates: Profile No. 2-b

Loading: Seismic

User's Name:P. F.
Date: 06-07-1993

GENERAL DATA

UNITS

Unit Weight of Water: 62.43

GEOMETRY

Number of Sections : 12

Section	X	Y-crk.	Y-grd.
1	155.0	130.0	130.0
2	195.0	132.0	132.0
3	255.0	135.0	135.0
4	255.5	135.0	135.0
5	270.0	135.0	135.0
6	270.5	155.0	155.0
7	310.0	155.0	155.0
8	310.5	155.0	155.0
9	320.0	155.0	155.0
10	324.0	167.0	167.0
11	370.0	190.0	190.0
12	420.0	215.0	215.0

CIRCLE DATA

Coordinates of first circle (X,Y): 335 110
Intervals of circle coordinates
X-direction: 10
Y-direction: 10
Number of intervals
X-direction: 6
Y-direction: 5

Elevation of upper-most tangent: 180
Tangent interval: 5
Number of tangents: 4

CONTROL DATA/ANALYSIS OPTIONS

Seismic coefficient: .15
Number of slices: 10

Total stress analysis

Soil parameters defined in SOIL PROPERTIES

SOIL PROPERTIES

Layer Number	Cohesion	Friction Angle	Unit Weight
1	9000.0	0.0	130.0
2	1000.0	15.0	125.0
3	1000.0	30.0	130.0

File No. S22-634-2
July 20, 1993

HIGHLAND ESTATES
Slope: GS-2b
Loading: Seismic

SOIL PROFILE

Section Number	X	elevation to bottom of layer layer number 1	2	3
1	155.0	130.0	130.0	250.0
2	195.0	132.0	132.0	250.0
3	255.0	135.0	155.0	250.0
4	255.5	155.0	155.0	250.0
5	270.0	155.0	160.0	250.0
6	270.5	155.0	160.0	250.0
7	310.0	155.0	175.0	250.0
8	310.5	167.0	175.0	250.0
9	320.0	167.0	180.0	250.0
10	324.0	167.0	183.0	250.0
11	370.0	190.0	190.0	250.0
12	420.0	215.0	215.0	250.0

RESULTS

circle	radius	X-center	Y-center	F.S.	ROVER	RESIST	ARCL
1	70.0	335.0	110.0	F.S. greater than 10			
1	70.0	335.0	110.0	%382.238	0.18517D+04	0.70777D+06	1.
1							
2	75.0	335.0	110.0	F.S. greater than 10			
2	75.0	335.0	110.0	%24.931	0.38791D+06	0.96710D+07	14.3
3	80.0	335.0	110.0	3.482	0.96942D+07	0.33758D+08	125.7
4	85.0	335.0	110.0	3.337	0.12859D+08	0.42909D+08	139.7
5	60.0	335.0	120.0	2.044	0.26884D+07	0.54945D+07	69.3
6	65.0	335.0	120.0	1.963	0.50795D+07	0.99717D+07	84.4
7	70.0	335.0	120.0	F.S. greater than 10			
7	70.0	335.0	120.0	%39.087	0.19779D+06	0.77308D+07	12.3
8	75.0	335.0	120.0	3.376	0.10937D+08	0.36920D+08	132.0
9	50.0	335.0	130.0	2.026	0.20595D+07	0.41723D+07	64.4
10	55.0	335.0	130.0	1.986	0.37947D+07	0.75348D+07	79.1
11	60.0	335.0	130.0	2.044	0.54862D+07	0.11212D+08	93.2
12	65.0	335.0	130.0	2.106	0.74744D+07	0.15738D+08	107.1
13	40.0	335.0	140.0	2.060	0.14546D+07	0.29963D+07	58.8
14	45.0	335.0	140.0	1.946	0.28054D+07	0.54587D+07	73.0
15	50.0	335.0	140.0	2.022	0.42594D+07	0.86130D+07	86.6
16	55.0	335.0	140.0	2.112	0.58443D+07	0.12340D+08	100.0
17	30.0	335.0	150.0	2.117	0.91052D+06	0.19280D+07	51.8
18	35.0	335.0	150.0	2.007	0.18185D+07	0.36493D+07	65.1

19	40.0	335.0	150.0	2.096	0.28954D+07	0.60682D+07	78.0
20	45.0	335.0	150.0	2.219	0.40778D+07	0.90486D+07	90.8
21	70.0	345.0	110.0	2.132	0.26852D+07	0.57250D+07	65.7
22	75.0	345.0	110.0	1.888	0.48233D+07	0.91061D+07	82.3
23	80.0	345.0	110.0	F.S. greater than 10			
23	80.0	345.0	110.0	%144.045	0.16123D+05	0.23224D+07	3.
2							
24	85.0	345.0	110.0	F.S. greater than 10			
24	85.0	345.0	110.0	%22.233	0.58814D+06	0.13076D+08	17.1
25	60.0	345.0	120.0	2.140	0.21147D+07	0.45245D+07	61.4
26	65.0	345.0	120.0	1.867	0.37445D+07	0.69918D+07	77.6
27	70.0	345.0	120.0	1.856	0.65469D+07	0.12153D+08	92.8
28	75.0	345.0	120.0	1.901	0.89800D+07	0.17071D+08	107.4
29	50.0	345.0	130.0	2.232	0.15185D+07	0.33893D+07	56.8
30	55.0	345.0	130.0	1.914	0.26907D+07	0.51498D+07	72.5
31	60.0	345.0	130.0	1.910	0.48338D+07	0.92348D+07	87.3
32	65.0	345.0	130.0	1.958	0.69109D+07	0.13529D+08	101.5
33	40.0	345.0	140.0	4.697	0.95623D+06	0.44915D+07	51.7
34	45.0	345.0	140.0	1.955	0.19424D+07	0.37977D+07	66.8
35	50.0	345.0	140.0	1.892	0.36889D+07	0.69806D+07	81.0
36	55.0	345.0	140.0	1.954	0.53883D+07	0.10527D+08	94.7
37	30.0	345.0	150.0	8.485	0.44151D+06	0.37464D+07	45.3
38	35.0	345.0	150.0	5.228	0.11454D+07	0.59874D+07	59.5
39	40.0	345.0	150.0	1.991	0.24156D+07	0.48102D+07	72.8
40	45.0	345.0	150.0	2.071	0.36615D+07	0.75842D+07	85.9
41	70.0	355.0	110.0	4.580	0.17031D+07	0.78009D+07	55.6
42	75.0	355.0	110.0	2.029	0.34079D+07	0.69138D+07	74.2
43	80.0	355.0	110.0	1.881	0.64432D+07	0.12120D+08	90.7
44	85.0	355.0	110.0	1.876	0.92774D+07	0.17405D+08	106.2
45	60.0	355.0	120.0	7.797	0.11500D+07	0.89669D+07	51.3
46	65.0	355.0	120.0	2.088	0.26489D+07	0.55300D+07	69.7
47	70.0	355.0	120.0	1.813	0.52519D+07	0.95219D+07	85.8
48	75.0	355.0	120.0	1.846	0.77962D+07	0.14390D+08	101.0
49	50.0	355.0	130.0	F.S. greater than 10			
49	50.0	355.0	130.0	%15.432	0.61372D+06	0.94707D+07	46.6
50	55.0	355.0	130.0	4.255	0.18242D+07	0.77611D+07	64.9
51	60.0	355.0	130.0	1.923	0.36669D+07	0.70506D+07	80.6
52	65.0	355.0	130.0	1.889	0.58600D+07	0.11071D+08	95.4
53	40.0	355.0	140.0	F.S. greater than 10			
53	40.0	355.0	140.0	%65.551	0.56898D+05	0.37298D+07	10.4
54	45.0	355.0	140.0	6.317	0.10842D+07	0.68493D+07	59.5
55	50.0	355.0	140.0	2.054	0.25624D+07	0.52638D+07	74.7
56	55.0	355.0	140.0	1.904	0.44528D+07	0.84761D+07	89.0
57	30.0	355.0	150.0	circle does not intercept slope			
58	35.0	355.0	150.0	circle does not intercept slope			
59	40.0	355.0	150.0	5.656	0.14257D+07	0.80632D+07	67.1
60	45.0	355.0	150.0	2.078	0.28724D+07	0.59697D+07	80.5
61	70.0	365.0	110.0	F.S. greater than 10			
61	70.0	365.0	110.0	%27.313	0.39517D+06	0.10793D+08	17.1
62	75.0	365.0	110.0	5.008	0.19990D+07	0.10011D+08	64.1
63	80.0	365.0	110.0	2.044	0.43464D+07	0.88824D+07	82.5
64	85.0	365.0	110.0	1.855	0.76305D+07	0.14157D+08	98.9
65	60.0	365.0	120.0	F.S. greater than 10			
65	60.0	365.0	120.0	%52.423	0.98320D+05	0.51542D+07	9.5
66	65.0	365.0	120.0	9.862	0.12483D+07	0.12310D+08	59.6

67	70.0	365.0	120.0	2.076	0.34350D+07	0.71296D+07	77.8
68	75.0	365.0	120.0	1.852	0.59465D+07	0.11012D+08	94.0
69	50.0	365.0	130.0	circle does not intercept slope			
70	55.0	365.0	130.0	F.S. greater than 10			
70	55.0	365.0	130.0	%39.715	0.17324D+06	0.68801D+07	13.9
71	60.0	365.0	130.0	5.027	0.22075D+07	0.11097D+08	72.8
72	65.0	365.0	130.0	2.034	0.42592D+07	0.86641D+07	88.6
73	40.0	365.0	140.0	circle does not intercept slope			
74	45.0	365.0	140.0	circle does not intercept slope			
75	50.0	365.0	140.0	7.476	0.11835D+07	0.88482D+07	67.3
76	55.0	365.0	140.0	4.666	0.28758D+07	0.13418D+08	82.5
77	30.0	365.0	150.0	circle does not intercept slope			
78	35.0	365.0	150.0	circle does not intercept slope			
79	40.0	365.0	150.0	circle does not intercept slope			
80	45.0	365.0	150.0	6.823	0.14891D+07	0.10161D+08	73.9
81	70.0	375.0	110.0	circle does not intercept slope			
82	75.0	375.0	110.0	F.S. greater than 10			
82	75.0	375.0	110.0	%40.484	0.20208D+06	0.81811D+07	12.1
83	80.0	375.0	110.0	8.481	0.21721D+07	0.18423D+08	72.4
84	85.0	375.0	110.0	2.057	0.52092D+07	0.10718D+08	90.7
85	60.0	375.0	120.0	circle does not intercept slope			
86	65.0	375.0	120.0	circle does not intercept slope			
87	70.0	375.0	120.0	F.S. greater than 10			
87	70.0	375.0	120.0	%12.472	0.12304D+07	0.15346D+08	67.8
88	75.0	375.0	120.0	4.357	0.38345D+07	0.16705D+08	85.9
89	50.0	375.0	130.0	circle does not intercept slope			
90	55.0	375.0	130.0	circle does not intercept slope			
91	60.0	375.0	130.0	circle does not intercept slope			
92	65.0	375.0	130.0	6.001	0.22915D+07	0.13752D+08	80.7
93	40.0	375.0	140.0	circle does not intercept slope			
94	45.0	375.0	140.0	circle does not intercept slope			
95	50.0	375.0	140.0	circle does not intercept slope			
96	55.0	375.0	140.0	3.368	0.12654D+07	0.42618D+07	60.1
97	30.0	375.0	150.0	circle does not intercept slope			
98	35.0	375.0	150.0	circle does not intercept slope			
99	40.0	375.0	150.0	circle does not intercept slope			
100	45.0	375.0	150.0	3.845	0.74360D+06	0.28588D+07	50.7
101	70.0	385.0	110.0	circle does not intercept slope			
102	75.0	385.0	110.0	circle does not intercept slope			
103	80.0	385.0	110.0	F.S. greater than 10			
103	80.0	385.0	110.0	%159.834	0.16611D+05	0.26550D+07	3.7
104	85.0	385.0	110.0	6.537	0.24519D+07	0.16027D+08	80.6
105	60.0	385.0	120.0	circle does not intercept slope			
106	65.0	385.0	120.0	circle does not intercept slope			
107	70.0	385.0	120.0	circle does not intercept slope			
108	75.0	385.0	120.0	F.S. greater than 10			
108	75.0	385.0	120.0	%118.915	0.35233D+05	0.41897D+07	6.2
109	50.0	385.0	130.0	circle does not intercept slope			
110	55.0	385.0	130.0	circle does not intercept slope			
111	60.0	385.0	130.0	circle does not intercept slope			
112	65.0	385.0	130.0	5.001	0.73767D+06	0.36889D+07	49.3
113	40.0	385.0	140.0	circle does not intercept slope			
114	45.0	385.0	140.0	circle does not intercept slope			
115	50.0	385.0	140.0	circle does not intercept slope			
116	55.0	385.0	140.0	6.339	0.38615D+06	0.24479D+07	39.8
117	30.0	385.0	150.0	circle does not intercept slope			
118	35.0	385.0	150.0	circle does not intercept slope			
119	40.0	385.0	150.0	circle does not intercept slope			
120	45.0	385.0	150.0	8.826	0.16695D+06	0.14735D+07	30.2

CRITICAL CIRCLES

circle	radius	X-center	Y-center	F.S.
1	70.0	355.0	120.0	1.813
2	75.0	355.0	120.0	1.846
3	75.0	365.0	120.0	1.852
4	85.0	365.0	110.0	1.855
5	70.0	345.0	120.0	1.856
6	65.0	345.0	120.0	1.867
7	85.0	355.0	110.0	1.876
8	80.0	355.0	110.0	1.881
9	75.0	345.0	110.0	1.888
10	65.0	355.0	130.0	1.889

File No. S22-634-2
July 20, 1993

gs3.r

Problem Title: Highland Estates: Profile No. 3

User's Name:P. F.
Date: 06-07-1993

Loading: Static

GENERAL DATA

UNITS

Unit Weight of Water: 62.43

GEOMETRY

Number of Sections : 11

Section	X	Y-crk.	Y-grd.
1	-200.0	-27.0	-27.0
2	-100.0	-27.0	-27.0
3	-40.0	-6.0	-6.0
4	-35.0	-5.0	-5.0
5	35.0	30.0	30.0
6	55.0	40.0	40.0
7	80.0	40.0	40.0
8	165.0	75.0	75.0
9	190.0	80.0	80.0
10	195.0	80.0	80.0
11	300.0	95.0	95.0

CIRCLE DATA

Coordinates of first circle (X,Y): 20 -80
Intervals of circle coordinates
X-direction: 10
Y-direction: 10
Number of intervals
X-direction: 5
Y-direction: 5

Elevation of upper-most tangent: 35
Tangent interval: 5
Number of tangents: 3

CONTROL DATA/ANALYSIS OPTIONS

No seismic analysis
Number of slices: 10

Total stress analysis

Soil parameters defined in SOIL PROPERTIES

SOIL PROPERTIES

Layer Number	Cohesion	Friction Angle	Unit Weight
1	1000.0	15.0	125.0
2	1000.0	25.0	125.0
3	1000.0	30.0	125.0
4	400.0	20.0	130.0
5	400.0	30.0	130.0
6	1000.0	30.0	130.0

File No. S22-634-2
July 20, 1993

HIGHLAND ESTATES
Slope: GS-3
Loading: Static

SOIL PROFILE

Section Number	X	elevation to bottom of layer, layer number 1	2	3	4	5	6
1	-200.0	-27.0	-27.0	-27.0	-27.0	-27.0	200.0
2	-100.0	-27.0	-27.0	-27.0	-27.0	-27.0	200.0
3	-40.0	-6.0	-6.0	-6.0	-6.0	-6.0	200.0
4	-35.0	-5.0	-5.0	-5.0	3.0	200.0	200.0
5	35.0	30.0	30.0	30.0	35.0	200.0	200.0
6	55.0	40.0	40.0	40.0	45.0	200.0	200.0
7	80.0	40.0	40.0	40.0	50.0	200.0	200.0
8	165.0	75.0	75.0	75.0	87.0	200.0	200.0
9	190.0	80.0	80.0	80.0	90.0	200.0	200.0
10	195.0	90.0	100.0	200.0	200.0	200.0	200.0
11	300.0	105.0	115.0	200.0	200.0	200.0	200.0

RESULTS

circle	radius	X-center	Y-center	F.S.	ROVER	RESIST	ARCL
1	115.0	20.0	-80.0	2.379	0.11024D+08	0.26224D+08	137.5
2	120.0	20.0	-80.0	2.311	0.15265D+08	0.35279D+08	155.7
3	125.0	20.0	-80.0	2.355	0.20173D+08	0.47510D+08	173.2
4	105.0	20.0	-70.0	2.403	0.91707D+07	0.22038D+08	129.6
5	110.0	20.0	-70.0	2.329	0.12911D+08	0.30072D+08	147.6
6	115.0	20.0	-70.0	2.312	0.17245D+08	0.39871D+08	164.8
7	95.0	20.0	-60.0	2.334	0.75225D+07	0.17561D+08	121.7
8	100.0	20.0	-60.0	2.360	0.10692D+08	0.25232D+08	139.2
9	105.0	20.0	-60.0	2.343	0.14451D+08	0.33859D+08	156.1
10	85.0	20.0	-50.0	2.369	0.60195D+07	0.14261D+08	113.5
11	90.0	20.0	-50.0	2.306	0.87579D+07	0.20192D+08	130.7
12	95.0	20.0	-50.0	2.310	0.11923D+08	0.27537D+08	147.2
13	75.0	20.0	-40.0	2.296	0.47122D+07	0.10820D+08	105.2
14	80.0	20.0	-40.0	2.265	0.69268D+07	0.15687D+08	121.9
15	85.0	20.0	-40.0	2.334	0.96288D+07	0.22477D+08	138.0
16	115.0	30.0	-80.0	2.306	0.86894D+07	0.20040D+08	124.4
17	120.0	30.0	-80.0	2.297	0.12688D+08	0.29148D+08	143.6
18	125.0	30.0	-80.0	2.284	0.17396D+08	0.39724D+08	168.5
19	105.0	30.0	-70.0	2.330	0.71566D+07	0.16673D+08	116.8
20	110.0	30.0	-70.0	2.227	0.10678D+08	0.23776D+08	135.7
21	115.0	30.0	-70.0	2.220	0.14783D+08	0.32814D+08	159.3
22	95.0	30.0	-60.0	2.241	0.57876D+07	0.12973D+08	109.2
23	100.0	30.0	-60.0	2.255	0.87728D+07	0.19782D+08	127.8

24	105.0	30.0	-60.0	2.231	0.12394D+08	0.27648D+08	149.9
25	85.0	30.0	-50.0	2.148	0.45338D+07	0.97400D+07	101.5
26	90.0	30.0	-50.0	2.181	0.71162D+07	0.15519D+08	119.6
27	95.0	30.0	-50.0	2.173	0.10144D+08	0.22040D+08	140.3
28	75.0	30.0	-40.0	2.185	0.34422D+07	0.75209D+07	94.3
29	80.0	30.0	-40.0	2.109	0.55620D+07	0.11730D+08	111.3
30	85.0	30.0	-40.0	2.203	0.81519D+07	0.17958D+08	130.4
31	115.0	40.0	-80.0	2.267	0.63360D+07	0.14365D+08	110.0
32	120.0	40.0	-80.0	2.229	0.10052D+08	0.22410D+08	130.5
33	125.0	40.0	-80.0	2.241	0.14448D+08	0.32377D+08	163.6
34	105.0	40.0	-70.0	2.316	0.50598D+07	0.11720D+08	102.7
35	110.0	40.0	-70.0	2.145	0.83373D+07	0.17884D+08	122.9
36	115.0	40.0	-70.0	2.263	0.12124D+08	0.27442D+08	154.5
37	95.0	40.0	-60.0	2.199	0.39663D+07	0.87217D+07	95.9
38	100.0	40.0	-60.0	2.182	0.67272D+07	0.14677D+08	115.3
39	105.0	40.0	-60.0	2.181	0.10100D+08	0.22024D+08	145.3
40	85.0	40.0	-50.0	2.306	0.29314D+07	0.67599D+07	88.2
41	90.0	40.0	-50.0	2.072	0.53379D+07	0.11058D+08	107.9
42	95.0	40.0	-50.0	2.125	0.81458D+07	0.17306D+08	135.9
43	75.0	40.0	-40.0	2.384	0.20889D+07	0.49798D+07	78.8
44	80.0	40.0	-40.0	2.150	0.40195D+07	0.86438D+07	99.8
45	85.0	40.0	-40.0	2.160	0.64502D+07	0.13935D+08	126.7
46	115.0	50.0	-80.0	2.249	0.39621D+07	0.89123D+07	94.3
47	120.0	50.0	-80.0	2.204	0.73329D+07	0.16160D+08	116.1
48	125.0	50.0	-80.0	2.258	0.11403D+08	0.25745D+08	155.3
49	105.0	50.0	-70.0	2.399	0.29288D+07	0.70256D+07	86.8
50	110.0	50.0	-70.0	2.084	0.59376D+07	0.12374D+08	109.0
51	115.0	50.0	-70.0	2.310	0.93767D+07	0.21663D+08	147.3
52	95.0	50.0	-60.0	2.563	0.20868D+07	0.53479D+07	77.4
53	100.0	50.0	-60.0	2.172	0.45748D+07	0.99360D+07	102.1
54	105.0	50.0	-60.0	2.186	0.76726D+07	0.16770D+08	139.2
55	85.0	50.0	-50.0	2.671	0.14227D+07	0.38000D+07	68.1
56	90.0	50.0	-50.0	2.257	0.34260D+07	0.77330D+07	92.8
57	95.0	50.0	-50.0	2.276	0.59940D+07	0.13644D+08	131.6
58	75.0	50.0	-40.0	2.965	0.91563D+06	0.27149D+07	58.7
59	80.0	50.0	-40.0	2.360	0.24866D+07	0.58684D+07	83.5
60	85.0	50.0	-40.0	2.362	0.45573D+07	0.10766D+08	120.7
61	115.0	60.0	-80.0	2.724	0.16609D+07	0.45245D+07	71.0
62	120.0	60.0	-80.0	2.249	0.45713D+07	0.10279D+08	100.7
63	125.0	60.0	-80.0	2.263	0.83343D+07	0.18863D+08	143.2
64	105.0	60.0	-70.0	3.183	0.10523D+07	0.33493D+07	60.8
65	110.0	60.0	-70.0	2.331	0.34231D+07	0.79779D+07	91.4
66	115.0	60.0	-70.0	2.347	0.66065D+07	0.15504D+08	136.7
67	95.0	60.0	-60.0	3.932	0.60162D+06	0.23656D+07	50.4
68	100.0	60.0	-60.0	2.476	0.24842D+07	0.61503D+07	82.1
69	105.0	60.0	-60.0	2.470	0.51130D+07	0.12629D+08	127.0
70	85.0	60.0	-50.0	5.377	0.28864D+06	0.15521D+07	39.3
71	90.0	60.0	-50.0	2.663	0.17338D+07	0.46163D+07	72.8
72	95.0	60.0	-50.0	2.620	0.38584D+07	0.10108D+08	117.3
73	75.0	60.0	-40.0	9.339	0.94087D+05	0.87867D+06	27.0
74	80.0	60.0	-40.0	2.806	0.11508D+07	0.32289D+07	63.4
75	85.0	60.0	-40.0	2.805	0.28230D+07	0.79199D+07	107.5

CRITICAL CIRCLES

circle	radius	X-center	Y-center	F.S.
1	90.0	40.0	-50.0	2.072
2	110.0	50.0	-70.0	2.084
3	80.0	30.0	-40.0	2.109
4	95.0	40.0	-50.0	2.125
5	110.0	40.0	-70.0	2.145
6	85.0	30.0	-50.0	2.148
7	80.0	40.0	-40.0	2.150
8	85.0	40.0	-40.0	2.160
9	100.0	50.0	-60.0	2.172
10	95.0	30.0	-50.0	2.173

File No. S22-634-2
July 20, 1993

gs3.s

Problem Title: Highland Estates: Profile No. 3
Loading: Seismic

User's Name:P. F.
Date: 06-07-1993

GENERAL DATA

UNITS

Unit Weight of Water: 62.43

GEOMETRY

Number of Sections : 11

Section	X	Y-crk.	Y-grd.
1	-200.0	-27.0	-27.0
2	-100.0	-27.0	-27.0
3	-40.0	-6.0	-6.0
4	-35.0	-5.0	-5.0
5	35.0	30.0	30.0
6	55.0	40.0	40.0
7	80.0	40.0	40.0
8	165.0	75.0	75.0
9	190.0	80.0	80.0
10	195.0	80.0	80.0
11	300.0	95.0	95.0

CIRCLE DATA

Coordinates of first circle (X,Y): 20 -80
Intervals of circle coordinates
X-direction: 10
Y-direction: 10
Number of intervals
X-direction: 5
Y-direction: 5

Elevation of upper-most tangent: 35
Tangent interval: 5
Number of tangents: 3

CONTROL DATA/ANALYSIS OPTIONS

Seismic coefficient: .15
Number of slices: 10

Total stress analysis

Soil parameters defined in SOIL PROPERTIES

SOIL PROPERTIES

Layer Number	Cohesion	Friction Angle	Unit Weight
1	1000.0	15.0	125.0
2	1000.0	25.0	125.0
3	1000.0	30.0	125.0
4	400.0	20.0	130.0
5	400.0	30.0	130.0
6	1000.0	30.0	130.0

File No. S22-634-2
July 20, 1993

HIGHLAND ESTATES
Slope: GS-3
Loading: Seismic

SOIL PROFILE

Section Number	X	elevation to bottom of layer, layer number 1	2	3	4	5	6
1	-200.0	-27.0	-27.0	-27.0	-27.0	-27.0	200.0
2	-100.0	-27.0	-27.0	-27.0	-27.0	-27.0	200.0
3	-40.0	-6.0	-6.0	-6.0	-6.0	-6.0	200.0
4	-35.0	-5.0	-5.0	-5.0	3.0	200.0	200.0
5	35.0	30.0	30.0	30.0	35.0	200.0	200.0
6	55.0	40.0	40.0	40.0	45.0	200.0	200.0
7	80.0	40.0	40.0	40.0	50.0	200.0	200.0
8	165.0	75.0	75.0	75.0	87.0	200.0	200.0
9	190.0	80.0	80.0	80.0	90.0	200.0	200.0
10	195.0	90.0	100.0	200.0	200.0	200.0	200.0
11	300.0	105.0	115.0	200.0	200.0	200.0	200.0

RESULTS

circle	radius	X-center	Y-center	F.S.	ROVER	RESIST	ARCL
1	115.0	20.0	-80.0	1.596	0.15630D+08	0.24948D+08	137.5
2	120.0	20.0	-80.0	1.574	0.21357D+08	0.33623D+08	155.7
3	125.0	20.0	-80.0	1.612	0.28157D+08	0.45398D+08	173.2
4	105.0	20.0	-70.0	1.613	0.12991D+08	0.20955D+08	129.6
5	110.0	20.0	-70.0	1.582	0.18102D+08	0.28635D+08	147.6
6	115.0	20.0	-70.0	1.576	0.24135D+08	0.38043D+08	164.8
7	95.0	20.0	-60.0	1.562	0.10671D+08	0.16669D+08	121.7
8	100.0	20.0	-60.0	1.608	0.14940D+08	0.24027D+08	139.2
9	105.0	20.0	-60.0	1.601	0.20179D+08	0.32312D+08	156.1
10	85.0	20.0	-50.0	1.582	0.85486D+07	0.13525D+08	113.5
11	90.0	20.0	-50.0	1.564	0.12276D+08	0.19195D+08	130.7
12	95.0	20.0	-50.0	1.581	0.16620D+08	0.26269D+08	147.2
13	75.0	20.0	-40.0	1.524	0.67208D+07	0.10244D+08	105.2
14	80.0	20.0	-40.0	1.540	0.96843D+07	0.14919D+08	121.9
15	85.0	20.0	-40.0	1.606	0.13337D+08	0.21425D+08	138.0
16	115.0	30.0	-80.0	1.530	0.12411D+08	0.18989D+08	124.4
17	120.0	30.0	-80.0	1.555	0.17809D+08	0.27701D+08	143.6
18	125.0	30.0	-80.0	1.559	0.24279D+08	0.37860D+08	168.5
19	105.0	30.0	-70.0	1.538	0.10256D+08	0.15778D+08	116.8
20	110.0	30.0	-70.0	1.500	0.15036D+08	0.22550D+08	135.7
21	115.0	30.0	-70.0	1.516	0.20600D+08	0.31239D+08	159.3
22	95.0	30.0	-60.0	1.470	0.83317D+07	0.12251D+08	109.2
23	100.0	30.0	-60.0	1.519	0.12343D+08	0.18752D+08	127.8

24	105.0	30.0	-60.0	1.522	0.17281D+08	0.26294D+08	149.9
25	85.0	30.0	-50.0	1.404	0.65537D+07	0.91995D+07	101.5
26	90.0	30.0	-50.0	1.461	0.10050D+08	0.14687D+08	119.6
27	95.0	30.0	-50.0	1.487	0.14100D+08	0.20961D+08	140.3
28	75.0	30.0	-40.0	1.436	0.49663D+07	0.71301D+07	94.3
29	80.0	30.0	-40.0	1.414	0.78630D+07	0.11120D+08	111.3
30	85.0	30.0	-40.0	1.502	0.11356D+08	0.17061D+08	130.4
31	115.0	40.0	-80.0	1.465	0.92440D+07	0.13540D+08	110.0
32	120.0	40.0	-80.0	1.487	0.14253D+08	0.21201D+08	130.5
33	125.0	40.0	-80.0	1.519	0.20273D+08	0.30791D+08	163.6
34	105.0	40.0	-70.0	1.479	0.74531D+07	0.11026D+08	102.7
35	110.0	40.0	-70.0	1.423	0.11868D+08	0.16886D+08	122.9
36	115.0	40.0	-70.0	1.524	0.17099D+08	0.26061D+08	154.5
37	95.0	40.0	-60.0	1.414	0.58248D+07	0.82353D+07	95.9
38	100.0	40.0	-60.0	1.442	0.95988D+07	0.13845D+08	115.3
39	105.0	40.0	-60.0	1.472	0.14202D+08	0.20904D+08	145.3
40	85.0	40.0	-50.0	1.470	0.43430D+07	0.63856D+07	88.2
41	90.0	40.0	-50.0	1.378	0.76022D+07	0.10478D+08	107.9
42	95.0	40.0	-50.0	1.425	0.11550D+08	0.16458D+08	135.9
43	75.0	40.0	-40.0	1.533	0.30755D+07	0.47158D+07	78.8
44	80.0	40.0	-40.0	1.426	0.57495D+07	0.81960D+07	99.8
45	85.0	40.0	-40.0	1.441	0.91857D+07	0.13239D+08	126.7
46	115.0	50.0	-80.0	1.466	0.57732D+07	0.84633D+07	94.3
47	120.0	50.0	-80.0	1.435	0.10602D+08	0.15216D+08	116.1
48	125.0	50.0	-80.0	1.492	0.16378D+08	0.24442D+08	155.3
49	105.0	50.0	-70.0	1.547	0.43152D+07	0.66765D+07	86.8
50	110.0	50.0	-70.0	1.363	0.85773D+07	0.11687D+08	109.0
51	115.0	50.0	-70.0	1.526	0.13482D+08	0.20572D+08	147.3
52	95.0	50.0	-60.0	1.635	0.31135D+07	0.50896D+07	77.4
53	100.0	50.0	-60.0	1.411	0.66526D+07	0.93856D+07	102.1
54	105.0	50.0	-60.0	1.453	0.11016D+08	0.16010D+08	139.2
55	85.0	50.0	-50.0	1.777	0.20559D+07	0.36536D+07	68.1
56	90.0	50.0	-50.0	1.458	0.50162D+07	0.73117D+07	92.8
57	95.0	50.0	-50.0	1.507	0.86522D+07	0.13036D+08	131.6
58	75.0	50.0	-40.0	1.946	0.13439D+07	0.26159D+07	58.7
59	80.0	50.0	-40.0	1.513	0.36715D+07	0.55543D+07	83.5
60	85.0	50.0	-40.0	1.557	0.66140D+07	0.10301D+08	120.7
61	115.0	60.0	-80.0	2.053	0.21589D+07	0.44329D+07	71.0
62	120.0	60.0	-80.0	1.456	0.66931D+07	0.97455D+07	100.7
63	125.0	60.0	-80.0	1.469	0.12239D+08	0.17981D+08	143.2
64	105.0	60.0	-70.0	2.406	0.13678D+07	0.32911D+07	60.8
65	110.0	60.0	-70.0	1.524	0.49769D+07	0.75872D+07	91.4
66	115.0	60.0	-70.0	1.532	0.96589D+07	0.14802D+08	136.7
67	95.0	60.0	-60.0	2.982	0.78202D+06	0.23323D+07	50.4
68	100.0	60.0	-60.0	1.605	0.36500D+07	0.58570D+07	82.1
69	105.0	60.0	-60.0	1.598	0.75571D+07	0.12080D+08	127.0
70	85.0	60.0	-50.0	4.094	0.37520D+06	0.15362D+07	39.3
71	90.0	60.0	-50.0	1.705	0.25820D+07	0.44029D+07	72.8
72	95.0	60.0	-50.0	1.676	0.57793D+07	0.96848D+07	117.3
73	75.0	60.0	-40.0	7.142	0.12231D+06	0.87348D+06	27.0
74	80.0	60.0	-40.0	1.873	0.16613D+07	0.31110D+07	63.4
75	85.0	60.0	-40.0	1.769	0.42976D+07	0.76034D+07	107.5

CRITICAL CIRCLES

circle	radius	X-center	Y-center	F.S.
1	110.0	50.0	-70.0	1.363
2	90.0	40.0	-50.0	1.378
3	85.0	30.0	-50.0	1.404
4	100.0	50.0	-60.0	1.411
5	95.0	40.0	-60.0	1.414
6	80.0	30.0	-40.0	1.414
7	110.0	40.0	-70.0	1.423
8	95.0	40.0	-50.0	1.425
9	80.0	40.0	-40.0	1.426
10	120.0	50.0	-80.0	1.435

Problem Title: Highland Estates: GS-4a
Loading: Static

User's Name:P.F.
Date: 06-07-1993

GENERAL DATA

UNITS

Unit Weight of Water: 62.43

GEOMETRY

Number of Sections : 8

Section	X	Y-crk.	Y-grd.
1	-200.0	0.0	0.0
2	-100.0	0.0	0.0
3	-40.0	15.0	15.0
4	-40.0	15.0	15.0
5	20.0	40.0	40.0
6	50.0	40.0	40.0
7	190.0	110.0	110.0
8	350.0	115.0	115.0

CIRCLE DATA

Coordinates of first circle (X,Y): 165 -110
Intervals of circle coordinates
X-direction: 10
Y-direction: 10
Number of intervals
X-direction: 5
Y-direction: 6

Elevation of upper-most tangent: 90
Tangent interval: 5
Number of tangents: 5

CONTROL DATA/ANALYSIS OPTIONS

No seismic analysis
Number of slices: 10

Total stress analysis

Soil parameters defined in SOIL PROPERTIES

SOIL PROPERTIES

Layer Number	Cohesion	Friction Angle	Unit Weight
1	1500.0	20.0	130.0
2	400.0	20.0	130.0
3	400.0	30.0	130.0
4	1000.0	30.0	130.0

File No. S22-634-2
July 20, 1993

HIGHLAND ESTATES
Slope: GS-4a
Loading: Static

SOIL PROFILE

Section Number	X	elevation to bottom of layer layer number 1	2	3	4
1	-200.0	0.0	0.0	0.0	300.0
2	-100.0	0.0	0.0	0.0	300.0
3	-40.0	15.0	15.0	15.0	300.0
4	-40.0	15.0	15.0	300.0	300.0
5	20.0	40.0	40.0	300.0	300.0
6	50.0	40.0	55.0	300.0	300.0
7	190.0	110.0	120.0	300.0	300.0
8	350.0	175.0	185.0	300.0	300.0

RESULTS

circle	radius	X-center	Y-center	F.S.	ROVER	RESIST	ARCL
1	200.0	165.0	-110.0	1.873	0.13526D+08	0.25334D+08	128.2
2	205.0	165.0	-110.0	1.949	0.20322D+08	0.39609D+08	148.6
3	210.0	165.0	-110.0	1.934	0.28102D+08	0.54352D+08	169.6
4	215.0	165.0	-110.0	1.951	0.37492D+08	0.73143D+08	194.1
5	220.0	165.0	-110.0	1.943	0.47913D+08	0.93111D+08	216.9
6	190.0	165.0	-100.0	1.826	0.11795D+08	0.21539D+08	124.6
7	195.0	165.0	-100.0	1.926	0.18443D+08	0.35515D+08	144.9
8	200.0	165.0	-100.0	1.904	0.25756D+08	0.49050D+08	163.9
9	205.0	165.0	-100.0	1.939	0.33974D+08	0.65876D+08	186.1
10	210.0	165.0	-100.0	1.922	0.44155D+08	0.84870D+08	208.8
11	180.0	165.0	-90.0	1.727	0.10158D+08	0.17541D+08	120.9
12	185.0	165.0	-90.0	1.868	0.16421D+08	0.30669D+08	141.2
13	190.0	165.0	-90.0	1.879	0.23501D+08	0.44151D+08	160.1
14	195.0	165.0	-90.0	1.904	0.31235D+08	0.59478D+08	178.2
15	200.0	165.0	-90.0	1.913	0.40041D+08	0.76590D+08	200.7
16	170.0	165.0	-80.0	1.708	0.86160D+07	0.14716D+08	117.1
17	175.0	165.0	-80.0	1.818	0.14394D+08	0.26163D+08	137.4
18	180.0	165.0	-80.0	1.842	0.21157D+08	0.38980D+08	156.1
19	185.0	165.0	-80.0	1.877	0.28578D+08	0.53641D+08	173.8
20	190.0	165.0	-80.0	1.887	0.36633D+08	0.69141D+08	192.6
21	160.0	165.0	-70.0	1.823	0.69015D+07	0.12582D+08	113.2
22	165.0	165.0	-70.0	1.829	0.12481D+08	0.22832D+08	133.5
23	170.0	165.0	-70.0	1.837	0.18717D+08	0.34375D+08	152.1
24	175.0	165.0	-70.0	1.857	0.25861D+08	0.48014D+08	169.7
25	180.0	165.0	-70.0	1.858	0.33561D+08	0.62365D+08	186.5
26	150.0	165.0	-60.0	circle does not intercept slope			
27	155.0	165.0	-60.0	1.816	0.10499D+08	0.19068D+08	129.5
28	160.0	165.0	-60.0	1.834	0.16407D+08	0.30088D+08	148.0
29	165.0	165.0	-60.0	1.828	0.22984D+08	0.42026D+08	165.4
30	170.0	165.0	-60.0	1.838	0.30413D+08	0.55906D+08	182.1
31	200.0	175.0	-110.0	1.815	0.89203D+07	0.16192D+08	115.1

HIHGLAND ESTATES
Slope: GS-4a
Loading: Static

32	205.0	175.0	-110.0	1.865	0.15669D+08	0.29225D+08	137.4
33	210.0	175.0	-110.0	1.869	0.23561D+08	0.44043D+08	157.6
34	215.0	175.0	-110.0	1.859	0.32095D+08	0.59661D+08	176.5
35	220.0	175.0	-110.0	1.898	0.41647D+08	0.79026D+08	199.9
36	190.0	175.0	-100.0	1.923	0.73057D+07	0.14049D+08	111.2
37	195.0	175.0	-100.0	1.821	0.13685D+08	0.24924D+08	133.7
38	200.0	175.0	-100.0	1.862	0.21114D+08	0.39308D+08	153.9
39	205.0	175.0	-100.0	1.835	0.29468D+08	0.54066D+08	172.7
40	210.0	175.0	-100.0	1.867	0.38441D+08	0.71772D+08	191.9
41	180.0	175.0	-90.0	circle does not intercept slope			
42	185.0	175.0	-90.0	1.793	0.11808D+08	0.21172D+08	129.9
43	190.0	175.0	-90.0	1.861	0.18707D+08	0.34804D+08	150.1
44	195.0	175.0	-90.0	1.801	0.26672D+08	0.48035D+08	168.8
45	200.0	175.0	-90.0	1.839	0.35396D+08	0.65107D+08	186.5
46	170.0	175.0	-80.0	circle does not intercept slope			
47	175.0	175.0	-80.0	1.681	0.97623D+07	0.16412D+08	126.0
48	180.0	175.0	-80.0	1.816	0.16422D+08	0.29817D+08	146.1
49	185.0	175.0	-80.0	1.794	0.23814D+08	0.42730D+08	164.8
50	190.0	175.0	-80.0	1.822	0.32197D+08	0.58661D+08	182.4
51	160.0	175.0	-70.0	circle does not intercept slope			
52	165.0	175.0	-70.0	circle does not intercept slope			
53	170.0	175.0	-70.0	1.795	0.14105D+08	0.25322D+08	142.1
54	175.0	175.0	-70.0	1.790	0.21098D+08	0.37768D+08	160.7
55	180.0	175.0	-70.0	1.793	0.28868D+08	0.51767D+08	178.1
56	150.0	175.0	-60.0	circle does not intercept slope			
57	155.0	175.0	-60.0	circle does not intercept slope			
58	160.0	175.0	-60.0	circle does not intercept slope			
59	165.0	175.0	-60.0	1.793	0.18467D+08	0.33115D+08	156.4
60	170.0	175.0	-60.0	1.786	0.25699D+08	0.45910D+08	173.8
61	200.0	185.0	-110.0	circle does not intercept slope			
62	205.0	185.0	-110.0	1.751	0.10406D+08	0.18223D+08	124.4
63	210.0	185.0	-110.0	1.809	0.17930D+08	0.32440D+08	146.5
64	215.0	185.0	-110.0	1.815	0.26625D+08	0.48327D+08	166.5
65	220.0	185.0	-110.0	1.831	0.36367D+08	0.66597D+08	185.3
66	190.0	185.0	-100.0	circle does not intercept slope			
67	195.0	185.0	-100.0	1.888	0.83445D+07	0.15754D+08	120.5
68	200.0	185.0	-100.0	1.827	0.15684D+08	0.28654D+08	142.7
69	205.0	185.0	-100.0	1.812	0.23802D+08	0.43137D+08	162.7
70	210.0	185.0	-100.0	1.819	0.33068D+08	0.60147D+08	181.4
71	180.0	185.0	-90.0	circle does not intercept slope			
72	185.0	185.0	-90.0	circle does not intercept slope			
73	190.0	185.0	-90.0	1.825	0.13291D+08	0.24255D+08	138.8
74	195.0	185.0	-90.0	1.812	0.21114D+08	0.38269D+08	158.8
75	200.0	185.0	-90.0	1.792	0.29761D+08	0.53337D+08	177.4
76	170.0	185.0	-80.0	circle does not intercept slope			
77	175.0	185.0	-80.0	circle does not intercept slope			
78	180.0	185.0	-80.0	circle does not intercept slope			
79	185.0	185.0	-80.0	1.781	0.18448D+08	0.32855D+08	154.8
80	190.0	185.0	-80.0	1.752	0.26606D+08	0.46625D+08	173.3
81	160.0	185.0	-70.0	circle does not intercept slope			
82	165.0	185.0	-70.0	circle does not intercept slope			
83	170.0	185.0	-70.0	circle does not intercept slope			
84	175.0	185.0	-70.0	1.839	0.15556D+08	0.28604D+08	150.7
85	180.0	185.0	-70.0	1.749	0.23608D+08	0.41299D+08	169.1
86	150.0	185.0	-60.0	circle does not intercept slope			
87	155.0	185.0	-60.0	circle does not intercept slope			
88	160.0	185.0	-60.0	circle does not intercept slope			
89	165.0	185.0	-60.0	circle does not intercept slope			
90	170.0	185.0	-60.0	1.786	0.20212D+08	0.36098D+08	164.8
91	200.0	195.0	-110.0	circle does not intercept slope			

HIGHLAND ESTATES
Slope: GS-4a
Loading: Static

92	205.0	195.0	-110.0	circle does not intercept slope			
93	210.0	195.0	-110.0	1.724	0.11722D+08	0.20205D+08	133.6
94	215.0	195.0	-110.0	1.809	0.20312D+08	0.36744D+08	155.4
95	220.0	195.0	-110.0	1.771	0.29747D+08	0.52689D+08	175.3
96	190.0	195.0	-100.0	circle does not intercept slope			
97	195.0	195.0	-100.0	circle does not intercept slope			
98	200.0	195.0	-100.0	circle does not intercept slope			
99	205.0	195.0	-100.0	1.798	0.17557D+08	0.31560D+08	151.5
100	210.0	195.0	-100.0	1.769	0.26623D+08	0.47105D+08	171.4
101	180.0	195.0	-90.0	circle does not intercept slope			
102	185.0	195.0	-90.0	circle does not intercept slope			
103	190.0	195.0	-90.0	circle does not intercept slope			
104	195.0	195.0	-90.0	1.816	0.14704D+08	0.26706D+08	147.5
105	200.0	195.0	-90.0	1.773	0.23597D+08	0.41847D+08	167.4
106	170.0	195.0	-80.0	circle does not intercept slope			
107	175.0	195.0	-80.0	circle does not intercept slope			
108	180.0	195.0	-80.0	circle does not intercept slope			
109	185.0	195.0	-80.0	circle does not intercept slope			
110	190.0	195.0	-80.0	1.775	0.20201D+08	0.35863D+08	163.3
111	160.0	195.0	-70.0	circle does not intercept slope			
112	165.0	195.0	-70.0	circle does not intercept slope			
113	170.0	195.0	-70.0	circle does not intercept slope			
114	175.0	195.0	-70.0	circle does not intercept slope			
115	180.0	195.0	-70.0	circle does not intercept slope			
116	150.0	195.0	-60.0	circle does not intercept slope			
117	155.0	195.0	-60.0	circle does not intercept slope			
118	160.0	195.0	-60.0	circle does not intercept slope			
119	165.0	195.0	-60.0	circle does not intercept slope			
120	170.0	195.0	-60.0	circle does not intercept slope			
121	200.0	205.0	-110.0	circle does not intercept slope			
122	205.0	205.0	-110.0	circle does not intercept slope			
123	210.0	205.0	-110.0	circle does not intercept slope			
124	215.0	205.0	-110.0	circle does not intercept slope			
125	220.0	205.0	-110.0	1.779	0.22628D+08	0.40253D+08	164.2
126	190.0	205.0	-100.0	circle does not intercept slope			
127	195.0	205.0	-100.0	circle does not intercept slope			
128	200.0	205.0	-100.0	circle does not intercept slope			
129	205.0	205.0	-100.0	circle does not intercept slope			
130	210.0	205.0	-100.0	1.839	0.19273D+08	0.35438D+08	160.3
131	180.0	205.0	-90.0	circle does not intercept slope			
132	185.0	205.0	-90.0	circle does not intercept slope			
133	190.0	205.0	-90.0	circle does not intercept slope			
134	195.0	205.0	-90.0	circle does not intercept slope			
135	200.0	205.0	-90.0	circle does not intercept slope			
136	170.0	205.0	-80.0	circle does not intercept slope			
137	175.0	205.0	-80.0	circle does not intercept slope			
138	180.0	205.0	-80.0	circle does not intercept slope			
139	185.0	205.0	-80.0	circle does not intercept slope			
140	190.0	205.0	-80.0	circle does not intercept slope			
141	160.0	205.0	-70.0	circle does not intercept slope			
142	165.0	205.0	-70.0	circle does not intercept slope			
143	170.0	205.0	-70.0	circle does not intercept slope			
144	175.0	205.0	-70.0	circle does not intercept slope			
145	180.0	205.0	-70.0	circle does not intercept slope			
146	150.0	205.0	-60.0	circle does not intercept slope			
147	155.0	205.0	-60.0	circle does not intercept slope			
148	160.0	205.0	-60.0	circle does not intercept slope			
149	165.0	205.0	-60.0	circle does not intercept slope			
150	170.0	205.0	-60.0	circle does not intercept slope			

CRITICAL CIRCLES

circle	radius	X-center	Y-center	F.S.
1	175.0	175.0	-80.0	1.681
2	170.0	165.0	-80.0	1.708
3	210.0	195.0	-110.0	1.724
4	180.0	165.0	-90.0	1.727
5	180.0	185.0	-70.0	1.749
6	205.0	185.0	-110.0	1.751
7	190.0	185.0	-80.0	1.752
8	210.0	195.0	-100.0	1.769
9	220.0	195.0	-110.0	1.771
10	200.0	195.0	-90.0	1.773

File No. S22-634-2
July 20, 1993

GS4A.S

Problem Title: Highland Estates: GS-4a
Loading: Seismic

User's Name:P.F.
Date: 06-07-1993

GENERAL DATA

UNITS

Unit Weight of Water: 62.43

GEOMETRY

Number of Sections : 8

Section	X	Y-crk.	Y-grd.
1	-200.0	0.0	0.0
2	-100.0	0.0	0.0
3	-40.0	15.0	15.0
4	-40.0	15.0	15.0
5	20.0	40.0	40.0
6	50.0	40.0	40.0
7	190.0	110.0	110.0
8	350.0	115.0	115.0

CIRCLE DATA

Coordinates of first circle (X,Y): 165 -110
Intervals of circle coordinates
X-direction: 10
Y-direction: 10
Number of intervals
X-direction: 5
Y-direction: 6

Elevation of upper-most tangent: 90
Tangent interval: 5
Number of tangents: 5

CONTROL DATA/ANALYSIS OPTIONS

Seismic coefficient: .15
Number of slices: 10

Total stress analysis

Soil parameters defined in SOIL PROPERTIES

SOIL PROPERTIES

Layer Number	Cohesion	Friction Angle	Unit Weight
1	1500.0	20.0	130.0
2	400.0	20.0	130.0
3	400.0	30.0	130.0
4	1000.0	30.0	130.0

File No. S22-634-2
July 20, 1993

HIGHLAND ESTATES
Slope: GS-4a
Loading: Seismic

SOIL PROFILE

Section Number	X	elevation to bottom of layer layer number 1	2	3	4
1	-200.0	0.0	0.0	0.0	300.0
2	-100.0	0.0	0.0	0.0	300.0
3	-40.0	15.0	15.0	15.0	300.0
4	-40.0	15.0	15.0	300.0	300.0
5	20.0	40.0	40.0	300.0	300.0
6	50.0	40.0	55.0	300.0	300.0
7	190.0	110.0	120.0	300.0	300.0
8	350.0	175.0	185.0	300.0	300.0

RESULTS

circle	radius	X-center	Y-center	F.S.	ROVER	RESIST	ARCL
1	200.0	165.0	-110.0	1.183	0.20202D+08	0.23900D+08	128.2
2	205.0	165.0	-110.0	1.166	0.31719D+08	0.36980D+08	148.6
3	210.0	165.0	-110.0	1.181	0.43043D+08	0.50851D+08	169.6
4	215.0	165.0	-110.0	1.203	0.57067D+08	0.68659D+08	194.1
5	220.0	165.0	-110.0	1.224	0.71682D+08	0.87724D+08	216.9
6	190.0	165.0	-100.0	1.197	0.17097D+08	0.20461D+08	124.6
7	195.0	165.0	-100.0	1.152	0.28709D+08	0.33079D+08	144.9
8	200.0	165.0	-100.0	1.162	0.39401D+08	0.45779D+08	163.9
9	205.0	165.0	-100.0	1.193	0.51755D+08	0.61762D+08	186.1
10	210.0	165.0	-100.0	1.209	0.66040D+08	0.79856D+08	208.8
11	180.0	165.0	-90.0	1.225	0.13778D+08	0.16876D+08	120.9
12	185.0	165.0	-90.0	1.144	0.24986D+08	0.28593D+08	141.2
13	190.0	165.0	-90.0	1.145	0.35889D+08	0.41094D+08	160.1
14	195.0	165.0	-90.0	1.172	0.47483D+08	0.55643D+08	178.2
15	200.0	165.0	-90.0	1.202	0.59905D+08	0.72003D+08	200.7
16	170.0	165.0	-80.0	1.271	0.11220D+08	0.14258D+08	117.1
17	175.0	165.0	-80.0	1.147	0.21403D+08	0.24552D+08	137.4
18	180.0	165.0	-80.0	1.137	0.31974D+08	0.36368D+08	156.1
19	185.0	165.0	-80.0	1.155	0.43334D+08	0.50067D+08	173.8
20	190.0	165.0	-80.0	1.186	0.54699D+08	0.64894D+08	192.6
21	160.0	165.0	-70.0	1.361	0.89714D+07	0.12208D+08	113.2
22	165.0	165.0	-70.0	1.154	0.18546D+08	0.21399D+08	133.5
23	170.0	165.0	-70.0	1.135	0.28230D+08	0.32027D+08	152.1
24	175.0	165.0	-70.0	1.143	0.39136D+08	0.44713D+08	169.7
25	180.0	165.0	-70.0	1.169	0.49954D+08	0.58420D+08	186.5
26	150.0	165.0	-60.0	circle does not intercept slope			
27	155.0	165.0	-60.0	1.178	0.15276D+08	0.17990D+08	129.5
28	160.0	165.0	-60.0	1.133	0.24706D+08	0.27987D+08	148.0
29	165.0	165.0	-60.0	1.140	0.34436D+08	0.39252D+08	165.4
30	170.0	165.0	-60.0	1.158	0.45138D+08	0.52270D+08	182.1
31	200.0	175.0	-110.0	1.348	0.11659D+08	0.15719D+08	115.1

32	205.0	175.0	-110.0	1.159	0.23661D+08	0.27416D+08	137.4
33	210.0	175.0	-110.0	1.136	0.36124D+08	0.41048D+08	157.6
34	215.0	175.0	-110.0	1.148	0.48502D+08	0.55697D+08	176.5
35	220.0	175.0	-110.0	1.181	0.62738D+08	0.74095D+08	199.9
36	190.0	175.0	-100.0	1.437	0.95055D+07	0.13657D+08	111.2
37	195.0	175.0	-100.0	1.169	0.20135D+08	0.23533D+08	133.7
38	200.0	175.0	-100.0	1.131	0.32331D+08	0.36576D+08	153.9
39	205.0	175.0	-100.0	1.132	0.44458D+08	0.50349D+08	172.7
40	210.0	175.0	-100.0	1.162	0.57809D+08	0.67160D+08	191.9
41	180.0	175.0	-90.0	circle does not intercept slope			
42	185.0	175.0	-90.0	1.189	0.16888D+08	0.20072D+08	129.9
43	190.0	175.0	-90.0	1.129	0.28630D+08	0.32330D+08	150.1
44	195.0	175.0	-90.0	1.125	0.39862D+08	0.44838D+08	168.8
45	200.0	175.0	-90.0	1.145	0.53107D+08	0.60792D+08	186.5
46	170.0	175.0	-80.0	circle does not intercept slope			
47	175.0	175.0	-80.0	1.252	0.12693D+08	0.15887D+08	126.0
48	180.0	175.0	-80.0	1.132	0.24626D+08	0.27868D+08	146.1
49	185.0	175.0	-80.0	1.122	0.35516D+08	0.39833D+08	164.8
50	190.0	175.0	-80.0	1.133	0.48224D+08	0.54662D+08	182.4
51	160.0	175.0	-70.0	circle does not intercept slope			
52	165.0	175.0	-70.0	circle does not intercept slope			
53	170.0	175.0	-70.0	1.143	0.20741D+08	0.23710D+08	142.1
54	175.0	175.0	-70.0	1.119	0.31408D+08	0.35161D+08	160.7
55	180.0	175.0	-70.0	1.129	0.42837D+08	0.48379D+08	178.1
56	150.0	175.0	-60.0	circle does not intercept slope			
57	155.0	175.0	-60.0	circle does not intercept slope			
58	160.0	175.0	-60.0	circle does not intercept slope			
59	165.0	175.0	-60.0	1.121	0.27471D+08	0.30784D+08	156.4
60	170.0	175.0	-60.0	1.126	0.38036D+08	0.42845D+08	173.8
61	200.0	185.0	-110.0	circle does not intercept slope			
62	205.0	185.0	-110.0	1.304	0.13544D+08	0.17667D+08	124.4
63	210.0	185.0	-110.0	1.139	0.26695D+08	0.30404D+08	146.5
64	215.0	185.0	-110.0	1.118	0.40240D+08	0.44999D+08	166.5
65	220.0	185.0	-110.0	1.126	0.55060D+08	0.61983D+08	185.3
66	190.0	185.0	-100.0	circle does not intercept slope			
67	195.0	185.0	-100.0	1.411	0.10847D+08	0.15300D+08	120.5
68	200.0	185.0	-100.0	1.148	0.23369D+08	0.26823D+08	142.7
69	205.0	185.0	-100.0	1.116	0.35942D+08	0.40109D+08	162.7
70	210.0	185.0	-100.0	1.116	0.50047D+08	0.55864D+08	181.4
71	180.0	185.0	-90.0	circle does not intercept slope			
72	185.0	185.0	-90.0	circle does not intercept slope			
73	190.0	185.0	-90.0	1.178	0.19407D+08	0.22866D+08	138.8
74	195.0	185.0	-90.0	1.115	0.31869D+08	0.35525D+08	158.8
75	200.0	185.0	-90.0	1.114	0.44615D+08	0.49692D+08	177.4
76	170.0	185.0	-80.0	circle does not intercept slope			
77	175.0	185.0	-80.0	circle does not intercept slope			
78	180.0	185.0	-80.0	circle does not intercept slope			
79	185.0	185.0	-80.0	1.122	0.27353D+08	0.30686D+08	154.8
80	190.0	185.0	-80.0	1.108	0.39216D+08	0.43436D+08	173.3
81	160.0	185.0	-70.0	circle does not intercept slope			
82	165.0	185.0	-70.0	circle does not intercept slope			
83	170.0	185.0	-70.0	circle does not intercept slope			
84	175.0	185.0	-70.0	1.148	0.23252D+08	0.26687D+08	150.7
85	180.0	185.0	-70.0	1.106	0.34735D+08	0.38423D+08	169.1
86	150.0	185.0	-60.0	circle does not intercept slope			
87	155.0	185.0	-60.0	circle does not intercept slope			
88	160.0	185.0	-60.0	circle does not intercept slope			
89	165.0	185.0	-60.0	circle does not intercept slope			
90	170.0	185.0	-60.0	1.122	0.29893D+08	0.33546D+08	164.8
91	200.0	195.0	-110.0	circle does not intercept slope			

92	205.0	195.0	-110.0	circle does not intercept slope			
93	210.0	195.0	-110.0	1.284	0.15239D+08	0.19572D+08	133.6
94	215.0	195.0	-110.0	1.123	0.30522D+08	0.34290D+08	155.4
95	220.0	195.0	-110.0	1.104	0.44404D+08	0.49025D+08	175.3
96	190.0	195.0	-100.0	circle does not intercept slope			
97	195.0	195.0	-100.0	circle does not intercept slope			
98	200.0	195.0	-100.0	circle does not intercept slope			
99	205.0	195.0	-100.0	1.139	0.25913D+08	0.29519D+08	151.5
100	210.0	195.0	-100.0	1.102	0.39706D+08	0.43767D+08	171.4
101	180.0	195.0	-90.0	circle does not intercept slope			
102	185.0	195.0	-90.0	circle does not intercept slope			
103	190.0	195.0	-90.0	circle does not intercept slope			
104	195.0	195.0	-90.0	1.179	0.21354D+08	0.25166D+08	147.5
105	200.0	195.0	-90.0	1.103	0.35197D+08	0.38828D+08	167.4
106	170.0	195.0	-80.0	circle does not intercept slope			
107	175.0	195.0	-80.0	circle does not intercept slope			
108	180.0	195.0	-80.0	circle does not intercept slope			
109	185.0	195.0	-80.0	circle does not intercept slope			
110	190.0	195.0	-80.0	1.125	0.29778D+08	0.33487D+08	163.3
111	160.0	195.0	-70.0	circle does not intercept slope			
112	165.0	195.0	-70.0	circle does not intercept slope			
113	170.0	195.0	-70.0	circle does not intercept slope			
114	175.0	195.0	-70.0	circle does not intercept slope			
115	180.0	195.0	-70.0	circle does not intercept slope			
116	150.0	195.0	-60.0	circle does not intercept slope			
117	155.0	195.0	-60.0	circle does not intercept slope			
118	160.0	195.0	-60.0	circle does not intercept slope			
119	165.0	195.0	-60.0	circle does not intercept slope			
120	170.0	195.0	-60.0	circle does not intercept slope			
121	200.0	205.0	-110.0	circle does not intercept slope			
122	205.0	205.0	-110.0	circle does not intercept slope			
123	210.0	205.0	-110.0	circle does not intercept slope			
124	215.0	205.0	-110.0	circle does not intercept slope			
125	220.0	205.0	-110.0	1.116	0.33651D+08	0.37548D+08	164.2
126	190.0	205.0	-100.0	circle does not intercept slope			
127	195.0	205.0	-100.0	circle does not intercept slope			
128	200.0	205.0	-100.0	circle does not intercept slope			
129	205.0	205.0	-100.0	circle does not intercept slope			
130	210.0	205.0	-100.0	1.142	0.28913D+08	0.33020D+08	160.3
131	180.0	205.0	-90.0	circle does not intercept slope			
132	185.0	205.0	-90.0	circle does not intercept slope			
133	190.0	205.0	-90.0	circle does not intercept slope			
134	195.0	205.0	-90.0	circle does not intercept slope			
135	200.0	205.0	-90.0	circle does not intercept slope			
136	170.0	205.0	-80.0	circle does not intercept slope			
137	175.0	205.0	-80.0	circle does not intercept slope			
138	180.0	205.0	-80.0	circle does not intercept slope			
139	185.0	205.0	-80.0	circle does not intercept slope			
140	190.0	205.0	-80.0	circle does not intercept slope			
141	160.0	205.0	-70.0	circle does not intercept slope			
142	165.0	205.0	-70.0	circle does not intercept slope			
143	170.0	205.0	-70.0	circle does not intercept slope			
144	175.0	205.0	-70.0	circle does not intercept slope			
145	180.0	205.0	-70.0	circle does not intercept slope			
146	150.0	205.0	-60.0	circle does not intercept slope			
147	155.0	205.0	-60.0	circle does not intercept slope			
148	160.0	205.0	-60.0	circle does not intercept slope			
149	165.0	205.0	-60.0	circle does not intercept slope			
150	170.0	205.0	-60.0	circle does not intercept slope			

CRITICAL CIRCLES

circle	radius	X-center	Y-center	F.S.
1	210.0	195.0	-100.0	1.102
2	200.0	195.0	-90.0	1.103
3	220.0	195.0	-110.0	1.104
4	180.0	185.0	-70.0	1.106
5	190.0	185.0	-80.0	1.108
6	200.0	185.0	-90.0	1.114
7	195.0	185.0	-90.0	1.115
8	220.0	205.0	-110.0	1.116
9	205.0	185.0	-100.0	1.116
10	210.0	185.0	-100.0	1.116

GS4B.R

Problem Title: Highland Estates: Profile No. 4-b
Loading: Static

User's Name:P.F.
Date: 06-07-1993

GENERAL DATA

UNITS

Unit Weight of Water: 62.43

GEOMETRY

Number of Sections : 8

Section	X	Y-crk.	Y-grd.
1	-180.0	0.0	0.0
2	-80.0	15.0	15.0
3	-80.0	15.0	15.0
4	-10.0	15.0	15.0
5	30.0	45.0	45.0
6	85.0	45.0	45.0
7	185.0	100.0	100.0
8	300.0	100.0	100.0

CIRCLE DATA

Coordinates of first circle (X,Y): 130 -190
Intervals of circle coordinates
X-direction: 10
Y-direction: 10
Number of intervals
X-direction: 5
Y-direction: 8

Elevation of upper-most tangent: 100
Tangent interval: 5
Number of tangents: 3

CONTROL DATA/ANALYSIS OPTIONS

No seismic analysis
Number of slices: 10

Total stress analysis

Soil parameters defined in SOIL PROPERTIES

SOIL PROPERTIES

Layer Number	Cohesion	Friction Angle	Unit Weight
1	1500.0	20.0	130.0
2	700.0	20.0	130.0
3	1000.0	30.0	130.0
4	1000.0	15.0	125.0
5	1000.0	25.0	125.0
6	1000.0	30.0	125.0

File No. S22-634-2
July 20, 1993

HIGHLAND ESTATES
Slope: GS-4b
Loading: Static

SOIL PROFILE

Section Number	X	elevation to bottom of layer					
		layer number					
		1	2	3	4	5	6
1	-180.0	0.0	0.0	0.0	10.0	20.0	200.0
2	-80.0	50.0	50.0	50.0	60.0	70.0	200.0
3	-80.0	50.0	50.0	200.0	200.0	200.0	200.0
4	-10.0	65.0	70.0	200.0	200.0	200.0	200.0
5	30.0	70.0	82.0	200.0	200.0	200.0	200.0
6	85.0	80.0	96.0	200.0	200.0	200.0	200.0
7	185.0	100.0	120.0	200.0	200.0	200.0	200.0
8	300.0	100.0	130.0	200.0	200.0	200.0	200.0

RESULTS

circle	radius	X-center	Y-center	F.S.	ROVER	RESIST	ARCL
1	290.0	130.0	-190.0	2.448	0.93105D+08	0.22792D+09	275.7
2	295.0	130.0	-190.0	2.570	0.10849D+09	0.27886D+09	292.1
3	300.0	130.0	-190.0	2.735	0.12542D+09	0.34305D+09	325.0
4	280.0	130.0	-180.0	2.303	0.88473D+08	0.20375D+09	271.7
5	285.0	130.0	-180.0	2.543	0.10368D+09	0.26368D+09	287.5
6	290.0	130.0	-180.0	2.702	0.12007D+09	0.32438D+09	318.8
7	270.0	130.0	-170.0	2.304	0.83294D+08	0.19191D+09	267.7
8	275.0	130.0	-170.0	2.524	0.98573D+08	0.24884D+09	283.4
9	280.0	130.0	-170.0	2.672	0.11443D+09	0.30579D+09	312.5
10	260.0	130.0	-160.0	2.194	0.78233D+08	0.17167D+09	263.6
11	265.0	130.0	-160.0	2.521	0.92769D+08	0.23388D+09	279.2
12	270.0	130.0	-160.0	2.659	0.10800D+09	0.28714D+09	307.1
13	250.0	130.0	-150.0	2.196	0.73293D+08	0.16093D+09	259.4
14	255.0	130.0	-150.0	2.518	0.87094D+08	0.21933D+09	274.9
15	260.0	130.0	-150.0	2.646	0.10169D+09	0.26905D+09	301.6
16	240.0	130.0	-140.0	2.198	0.68475D+08	0.15051D+09	255.2
17	245.0	130.0	-140.0	2.409	0.81553D+08	0.19650D+09	270.5
18	250.0	130.0	-140.0	2.633	0.95523D+08	0.25149D+09	296.0
19	230.0	130.0	-130.0	2.069	0.63826D+08	0.13204D+09	250.8
20	235.0	130.0	-130.0	2.409	0.76148D+08	0.18341D+09	266.0
21	240.0	130.0	-130.0	2.504	0.89489D+08	0.22412D+09	290.4
22	220.0	130.0	-120.0	2.058	0.59892D+08	0.12324D+09	246.4
23	225.0	130.0	-120.0	2.307	0.71206D+08	0.16427D+09	261.5
24	230.0	130.0	-120.0	2.491	0.84126D+08	0.20952D+09	284.6
25	290.0	140.0	-190.0	2.053	0.87362D+08	0.17933D+09	267.8
26	295.0	140.0	-190.0	2.419	0.10380D+09	0.25107D+09	290.9
27	300.0	140.0	-190.0	2.700	0.12034D+09	0.32489D+09	322.9
28	280.0	140.0	-180.0	2.052	0.82332D+08	0.16891D+09	263.9
29	285.0	140.0	-180.0	2.412	0.98055D+08	0.23653D+09	286.1

30	290.0	140.0	-180.0	2.687	0.11395D+09	0.30623D+09	317.7
31	270.0	140.0	-170.0	2.051	0.77418D+08	0.15878D+09	259.9
32	275.0	140.0	-170.0	2.304	0.92433D+08	0.21301D+09	281.3
33	280.0	140.0	-170.0	2.550	0.10756D+09	0.27431D+09	312.4
34	260.0	140.0	-160.0	2.051	0.72622D+08	0.14895D+09	255.9
35	265.0	140.0	-160.0	2.302	0.86934D+08	0.20011D+09	276.4
36	270.0	140.0	-160.0	2.535	0.10183D+09	0.25819D+09	307.1
37	250.0	140.0	-150.0	2.044	0.68353D+08	0.13973D+09	251.8
38	255.0	140.0	-150.0	2.294	0.81876D+08	0.18781D+09	271.4
39	260.0	140.0	-150.0	2.423	0.96401D+08	0.23357D+09	301.6
40	240.0	140.0	-140.0	2.033	0.64408D+08	0.13096D+09	247.6
41	245.0	140.0	-140.0	2.279	0.77284D+08	0.17612D+09	266.3
42	250.0	140.0	-140.0	2.406	0.91060D+08	0.21908D+09	296.0
43	230.0	140.0	-130.0	2.052	0.59355D+08	0.12179D+09	243.3
44	235.0	140.0	-130.0	2.264	0.72760D+08	0.16473D+09	261.1
45	240.0	140.0	-130.0	2.389	0.85814D+08	0.20498D+09	290.4
46	220.0	140.0	-120.0	2.073	0.54472D+08	0.11293D+09	238.9
47	225.0	140.0	-120.0	2.353	0.67032D+08	0.15773D+09	255.8
48	230.0	140.0	-120.0	2.386	0.80013D+08	0.19093D+09	284.6
49	290.0	150.0	-190.0	2.046	0.80555D+08	0.16484D+09	259.6
50	295.0	150.0	-190.0	2.410	0.96869D+08	0.23346D+09	290.9
51	300.0	150.0	-190.0	2.468	0.11347D+09	0.28008D+09	322.9
52	280.0	150.0	-180.0	2.044	0.75930D+08	0.15521D+09	255.7
53	285.0	150.0	-180.0	2.271	0.92105D+08	0.20921D+09	286.1
54	290.0	150.0	-180.0	2.452	0.10799D+09	0.26484D+09	317.7
55	270.0	150.0	-170.0	2.032	0.71995D+08	0.14631D+09	251.8
56	275.0	150.0	-170.0	2.256	0.87334D+08	0.19701D+09	281.3
57	280.0	150.0	-170.0	2.436	0.10260D+09	0.24997D+09	312.4
58	260.0	150.0	-160.0	2.030	0.67688D+08	0.13738D+09	247.8
59	265.0	150.0	-160.0	2.118	0.82649D+08	0.17501D+09	276.4
60	270.0	150.0	-160.0	2.420	0.97288D+08	0.23546D+09	307.1
61	250.0	150.0	-150.0	2.047	0.62666D+08	0.12827D+09	243.8
62	255.0	150.0	-150.0	2.119	0.77193D+08	0.16357D+09	271.4
63	260.0	150.0	-150.0	2.404	0.92072D+08	0.22133D+09	301.6
64	240.0	150.0	-140.0	2.067	0.57804D+08	0.11945D+09	239.6
65	245.0	150.0	-140.0	2.133	0.71349D+08	0.15219D+09	266.3
66	250.0	150.0	-140.0	2.420	0.85418D+08	0.20673D+09	296.0
67	230.0	150.0	-130.0	2.092	0.52939D+08	0.11073D+09	235.4
68	235.0	150.0	-130.0	2.149	0.65699D+08	0.14121D+09	261.1
69	240.0	150.0	-130.0	2.440	0.78938D+08	0.19258D+09	290.4
70	220.0	150.0	-120.0	2.121	0.48235D+08	0.10231D+09	231.1
71	225.0	150.0	-120.0	2.032	0.60247D+08	0.12241D+09	255.8
72	230.0	150.0	-120.0	2.462	0.72672D+08	0.17889D+09	284.6
73	290.0	160.0	-190.0	2.031	0.74707D+08	0.15173D+09	251.0
74	295.0	160.0	-190.0	2.029	0.91217D+08	0.18509D+09	290.9
75	300.0	160.0	-190.0	2.475	0.10777D+09	0.26670D+09	322.9
76	280.0	160.0	-180.0	2.040	0.69909D+08	0.14259D+09	247.2
77	285.0	160.0	-180.0	2.026	0.86039D+08	0.17431D+09	286.1
78	290.0	160.0	-180.0	2.458	0.10255D+09	0.25204D+09	317.7
79	270.0	160.0	-170.0	2.057	0.64935D+08	0.13356D+09	243.3
80	275.0	160.0	-170.0	2.040	0.80055D+08	0.16330D+09	281.3
81	280.0	160.0	-170.0	2.463	0.96268D+08	0.23710D+09	312.4
82	260.0	160.0	-160.0	2.161	0.59981D+08	0.12961D+09	239.4
83	265.0	160.0	-160.0	2.056	0.74251D+08	0.15264D+09	276.4
84	270.0	160.0	-160.0	2.358	0.89633D+08	0.21139D+09	307.1
85	250.0	160.0	-150.0	2.189	0.55111D+08	0.12065D+09	235.4
86	255.0	160.0	-150.0	2.074	0.68631D+08	0.14234D+09	271.4
87	260.0	160.0	-150.0	2.375	0.83196D+08	0.19760D+09	301.6
88	240.0	160.0	-140.0	2.221	0.50420D+08	0.11200D+09	231.3
89	245.0	160.0	-140.0	2.095	0.63203D+08	0.13239D+09	266.3

90	250.0	160.0	-140.0	2.391	0.77091D+08	0.18435D+09	296.0
91	230.0	160.0	-130.0	2.261	0.45862D+08	0.10370D+09	227.1
92	235.0	160.0	-130.0	2.094	0.58928D+08	0.12339D+09	261.1
93	240.0	160.0	-130.0	2.387	0.72026D+08	0.17196D+09	290.4
94	220.0	160.0	-120.0	2.331	0.40963D+08	0.95491D+08	222.9
95	225.0	160.0	-120.0	2.109	0.54269D+08	0.11443D+09	255.8
96	230.0	160.0	-120.0	2.386	0.66912D+08	0.15964D+09	284.6
97	290.0	170.0	-190.0	2.167	0.66056D+08	0.14315D+09	242.1
98	295.0	170.0	-190.0	2.099	0.81989D+08	0.17207D+09	290.9
99	300.0	170.0	-190.0	2.308	0.99192D+08	0.22890D+09	322.9
100	280.0	170.0	-180.0	2.194	0.61059D+08	0.13396D+09	238.3
101	285.0	170.0	-180.0	2.117	0.76241D+08	0.16143D+09	286.1
102	290.0	170.0	-180.0	2.325	0.92452D+08	0.21495D+09	317.7
103	270.0	170.0	-170.0	2.224	0.56230D+08	0.12508D+09	234.5
104	275.0	170.0	-170.0	2.135	0.70825D+08	0.15123D+09	281.3
105	280.0	170.0	-170.0	2.339	0.86106D+08	0.20138D+09	312.4
106	260.0	170.0	-160.0	2.259	0.51570D+08	0.11651D+09	230.6
107	265.0	170.0	-160.0	2.136	0.66462D+08	0.14193D+09	276.4
108	270.0	170.0	-160.0	2.338	0.80749D+08	0.18877D+09	307.1
109	250.0	170.0	-150.0	2.303	0.47015D+08	0.10829D+09	226.6
110	255.0	170.0	-150.0	2.138	0.62114D+08	0.13281D+09	271.4
111	260.0	170.0	-150.0	2.337	0.75533D+08	0.17656D+09	301.6
112	240.0	170.0	-140.0	2.376	0.42142D+08	0.10014D+09	222.5
113	245.0	170.0	-140.0	2.172	0.56772D+08	0.12330D+09	266.3
114	250.0	170.0	-140.0	2.186	0.70463D+08	0.15401D+09	296.0
115	230.0	170.0	-130.0	2.439	0.37494D+08	0.91437D+08	214.7
116	235.0	170.0	-130.0	2.240	0.50756D+08	0.11369D+09	261.1
117	240.0	170.0	-130.0	2.209	0.64753D+08	0.14301D+09	290.4
118	220.0	170.0	-120.0	2.427	0.33484D+08	0.81279D+08	197.6
119	225.0	170.0	-120.0	2.320	0.45026D+08	0.10447D+09	255.8
120	230.0	170.0	-120.0	2.272	0.58006D+08	0.13177D+09	284.6

CRITICAL CIRCLES

circle	radius	X-center	Y-center	F.S.
1	285.0	160.0	-180.0	2.026
2	295.0	160.0	-190.0	2.029
3	260.0	150.0	-160.0	2.030
4	290.0	160.0	-190.0	2.031
5	225.0	150.0	-120.0	2.032
6	270.0	150.0	-170.0	2.032
7	240.0	140.0	-140.0	2.033
8	280.0	160.0	-180.0	2.040
9	275.0	160.0	-170.0	2.040
10	280.0	150.0	-180.0	2.044

File No. S22-634-2
July 20, 1993

GS4B.S

Problem Title: Highland Estates: Profile No. 4-b
Loading: Seismic

User's Name:P.F.
Date: 06-07-1993

GENERAL DATA

UNITS

Unit Weight of Water: 62.43

GEOMETRY

Number of Sections : 8

Section	X	Y-crk.	Y-grd.
1	-180.0	0.0	0.0
2	-80.0	15.0	15.0
3	-80.0	15.0	15.0
4	-10.0	15.0	15.0
5	30.0	45.0	45.0
6	85.0	45.0	45.0
7	185.0	100.0	100.0
8	300.0	100.0	100.0

CIRCLE DATA

Coordinates of first circle (X,Y): 130 -190
Intervals of circle coordinates
X-direction: 10
Y-direction: 10
Number of intervals
X-direction: 5
Y-direction: 8

Elevation of upper-most tangent: 100
Tangent interval: 5
Number of tangents: 3

CONTROL DATA/ANALYSIS OPTIONS

Seismic coefficient: .15
Number of slices: 10

Total stress analysis

Soil parameters defined in SOIL PROPERTIES

SOIL PROPERTIES

Layer Number	Cohesion	Friction Angle	Unit Weight
1	1500.0	20.0	130.0
2	700.0	20.0	130.0
3	1000.0	30.0	130.0
4	1000.0	15.0	125.0
5	1000.0	25.0	125.0
6	1000.0	30.0	125.0

File No. S22-634-2
July 20, 1993

HIGHLAND ESTATES
Slope: GS-4b
Loading: Seismic

SOIL PROFILE

Section Number	X	elevation to bottom of layer layer number 1	2	3	4	5	6
1	-180.0	0.0	0.0	0.0	10.0	20.0	200.0
2	-80.0	50.0	50.0	50.0	60.0	70.0	200.0
3	-80.0	50.0	50.0	200.0	200.0	200.0	200.0
4	-10.0	65.0	70.0	200.0	200.0	200.0	200.0
5	30.0	70.0	82.0	200.0	200.0	200.0	200.0
6	85.0	80.0	96.0	200.0	200.0	200.0	200.0
7	185.0	100.0	120.0	200.0	200.0	200.0	200.0
8	300.0	100.0	130.0	200.0	200.0	200.0	200.0

RESULTS

circle	radius	X-center	Y-center	F.S.	ROVER	RESIST	ARCL
1	290.0	130.0	-190.0	1.214	0.17789D+09	0.21593D+09	275.7
2	295.0	130.0	-190.0	1.184	0.22157D+09	0.26236D+09	292.1
3	300.0	130.0	-190.0	1.248	0.25837D+09	0.32248D+09	325.0
4	280.0	130.0	-180.0	1.196	0.16157D+09	0.19327D+09	271.7
5	285.0	130.0	-180.0	1.180	0.21014D+09	0.24798D+09	287.5
6	290.0	130.0	-180.0	1.242	0.24537D+09	0.30477D+09	318.8
7	270.0	130.0	-170.0	1.199	0.15173D+09	0.18193D+09	267.7
8	275.0	130.0	-170.0	1.179	0.19849D+09	0.23392D+09	283.4
9	280.0	130.0	-170.0	1.238	0.23200D+09	0.28718D+09	312.5
10	260.0	130.0	-160.0	1.189	0.13745D+09	0.16345D+09	263.6
11	265.0	130.0	-160.0	1.182	0.18595D+09	0.21979D+09	279.2
12	270.0	130.0	-160.0	1.239	0.21760D+09	0.26958D+09	307.1
13	250.0	130.0	-150.0	1.193	0.12833D+09	0.15315D+09	259.4
14	255.0	130.0	-150.0	1.186	0.17377D+09	0.20606D+09	274.9
15	260.0	130.0	-150.0	1.240	0.20360D+09	0.25250D+09	301.6
16	240.0	130.0	-140.0	1.198	0.11948D+09	0.14315D+09	255.2
17	245.0	130.0	-140.0	1.171	0.15737D+09	0.18431D+09	270.5
18	250.0	130.0	-140.0	1.242	0.18998D+09	0.23593D+09	296.0
19	230.0	130.0	-130.0	1.187	0.10621D+09	0.12608D+09	250.8
20	235.0	130.0	-130.0	1.176	0.14619D+09	0.17197D+09	266.0
21	240.0	130.0	-130.0	1.234	0.17171D+09	0.21182D+09	290.4
22	220.0	130.0	-120.0	1.186	0.99143D+08	0.11759D+09	246.4
23	225.0	130.0	-120.0	1.168	0.13255D+09	0.15481D+09	261.5
24	230.0	130.0	-120.0	1.233	0.16048D+09	0.19787D+09	284.6
25	290.0	140.0	-190.0	1.161	0.14767D+09	0.17138D+09	267.8
26	295.0	140.0	-190.0	1.158	0.20359D+09	0.23568D+09	290.9
27	300.0	140.0	-190.0	1.241	0.24596D+09	0.30530D+09	322.9
28	280.0	140.0	-180.0	1.164	0.13861D+09	0.16137D+09	263.9
29	285.0	140.0	-180.0	1.159	0.19146D+09	0.22192D+09	286.1

30	290.0	140.0	-180.0	1.242	0.23160D+09	0.28767D+09	317.7
31	270.0	140.0	-170.0	1.168	0.12980D+09	0.15164D+09	259.9
32	275.0	140.0	-170.0	1.149	0.17481D+09	0.20089D+09	281.3
33	280.0	140.0	-170.0	1.234	0.21044D+09	0.25963D+09	312.4
34	260.0	140.0	-160.0	1.173	0.12124D+09	0.14219D+09	255.9
35	265.0	140.0	-160.0	1.152	0.16374D+09	0.18860D+09	276.4
36	270.0	140.0	-160.0	1.233	0.19804D+09	0.24422D+09	307.1
37	250.0	140.0	-150.0	1.174	0.11359D+09	0.13331D+09	251.8
38	255.0	140.0	-150.0	1.152	0.15347D+09	0.17687D+09	271.4
39	260.0	140.0	-150.0	1.213	0.18176D+09	0.22040D+09	301.6
40	240.0	140.0	-140.0	1.172	0.10653D+09	0.12485D+09	247.6
41	245.0	140.0	-140.0	1.150	0.14405D+09	0.16572D+09	266.3
42	250.0	140.0	-140.0	1.211	0.17057D+09	0.20656D+09	296.0
43	230.0	140.0	-130.0	1.181	0.98273D+08	0.11605D+09	243.3
44	235.0	140.0	-130.0	1.149	0.13482D+09	0.15486D+09	261.1
45	240.0	140.0	-130.0	1.210	0.15965D+09	0.19310D+09	290.4
46	220.0	140.0	-120.0	1.191	0.90304D+08	0.10754D+09	238.9
47	225.0	140.0	-120.0	1.223	0.12157D+09	0.14872D+09	255.8
48	230.0	140.0	-120.0	1.212	0.14826D+09	0.17973D+09	284.6
49	290.0	150.0	-190.0	1.165	0.13504D+09	0.15733D+09	259.6
50	295.0	150.0	-190.0	1.237	0.17890D+09	0.22127D+09	290.9
51	300.0	150.0	-190.0	1.220	0.21704D+09	0.26480D+09	322.9
52	280.0	150.0	-180.0	1.168	0.12676D+09	0.14808D+09	255.7
53	285.0	150.0	-180.0	1.216	0.16323D+09	0.19843D+09	286.1
54	290.0	150.0	-180.0	1.218	0.20543D+09	0.25021D+09	317.7
55	270.0	150.0	-170.0	1.166	0.11966D+09	0.13949D+09	251.8
56	275.0	150.0	-170.0	1.212	0.15402D+09	0.18671D+09	281.3
57	280.0	150.0	-170.0	1.216	0.19405D+09	0.23598D+09	312.4
58	260.0	150.0	-160.0	1.167	0.11219D+09	0.13090D+09	247.8
59	265.0	150.0	-160.0	1.195	0.13945D+09	0.16665D+09	276.4
60	270.0	150.0	-160.0	1.214	0.18293D+09	0.22212D+09	307.1
61	250.0	150.0	-150.0	1.175	0.10397D+09	0.12214D+09	243.8
62	255.0	150.0	-150.0	1.198	0.12994D+09	0.15565D+09	271.4
63	260.0	150.0	-150.0	1.213	0.17206D+09	0.20862D+09	301.6
64	240.0	150.0	-140.0	1.184	0.96033D+08	0.11368D+09	239.6
65	245.0	150.0	-140.0	1.205	0.12009D+09	0.14474D+09	266.3
66	250.0	150.0	-140.0	1.219	0.15968D+09	0.19472D+09	296.0
67	230.0	150.0	-130.0	1.196	0.88047D+08	0.10533D+09	235.4
68	235.0	150.0	-130.0	1.214	0.11059D+09	0.13422D+09	261.1
69	240.0	150.0	-130.0	1.227	0.14767D+09	0.18126D+09	290.4
70	220.0	150.0	-120.0	1.211	0.80333D+08	0.97263D+08	231.1
71	225.0	150.0	-120.0	1.207	0.96805D+08	0.11684D+09	255.8
72	230.0	150.0	-120.0	1.236	0.13606D+09	0.16824D+09	284.6
73	290.0	160.0	-190.0	1.163	0.12435D+09	0.14457D+09	251.0
74	295.0	160.0	-190.0	1.202	0.14759D+09	0.17740D+09	290.9
75	300.0	160.0	-190.0	1.226	0.20547D+09	0.25195D+09	322.9
76	280.0	160.0	-180.0	1.167	0.11633D+09	0.13578D+09	247.2
77	285.0	160.0	-180.0	1.203	0.13879D+09	0.16698D+09	286.1
78	290.0	160.0	-180.0	1.224	0.19438D+09	0.23793D+09	317.7
79	270.0	160.0	-170.0	1.175	0.10818D+09	0.12711D+09	243.3
80	275.0	160.0	-170.0	1.211	0.12913D+09	0.15637D+09	281.3
81	280.0	160.0	-170.0	1.228	0.18220D+09	0.22367D+09	312.4
82	260.0	160.0	-160.0	1.272	0.97371D+08	0.12386D+09	239.4
83	265.0	160.0	-160.0	1.220	0.11979D+09	0.14611D+09	276.4
84	270.0	160.0	-160.0	1.222	0.16404D+09	0.20053D+09	307.1
85	250.0	160.0	-150.0	1.288	0.89482D+08	0.11525D+09	235.4
86	255.0	160.0	-150.0	1.230	0.11076D+09	0.13618D+09	271.4
87	260.0	160.0	-150.0	1.231	0.15224D+09	0.18736D+09	301.6
88	240.0	160.0	-140.0	1.306	0.81903D+08	0.10696D+09	231.3
89	245.0	160.0	-140.0	1.241	0.10205D+09	0.12661D+09	266.3

HIGHLAND ESTATES
Slope: GS-4b
Loading: Seismic

90	250.0	160.0	-140.0	1.239	0.14103D+09	0.17470D+09	296.0
91	230.0	160.0	-130.0	1.327	0.74617D+08	0.99009D+08	227.1
92	235.0	160.0	-130.0	1.244	0.94829D+08	0.11793D+09	261.1
93	240.0	160.0	-130.0	1.240	0.13137D+09	0.16283D+09	290.4
94	220.0	160.0	-120.0	1.359	0.67081D+08	0.91171D+08	222.9
95	225.0	160.0	-120.0	1.252	0.87265D+08	0.10929D+09	255.8
96	230.0	160.0	-120.0	1.243	0.12158D+09	0.15106D+09	284.6
97	290.0	170.0	-190.0	1.271	0.10768D+09	0.13682D+09	242.1
98	295.0	170.0	-190.0	1.247	0.13231D+09	0.16504D+09	290.9
99	300.0	170.0	-190.0	1.221	0.17822D+09	0.21763D+09	322.9
100	280.0	170.0	-180.0	1.286	0.99561D+08	0.12800D+09	238.3
101	285.0	170.0	-180.0	1.257	0.12310D+09	0.15478D+09	286.1
102	290.0	170.0	-180.0	1.231	0.16603D+09	0.20430D+09	317.7
103	270.0	170.0	-170.0	1.302	0.91734D+08	0.11948D+09	234.5
104	275.0	170.0	-170.0	1.267	0.11439D+09	0.14495D+09	281.3
105	280.0	170.0	-170.0	1.239	0.15440D+09	0.19134D+09	312.4
106	260.0	170.0	-160.0	1.321	0.84203D+08	0.11126D+09	230.6
107	265.0	170.0	-160.0	1.270	0.10705D+09	0.13597D+09	276.4
108	270.0	170.0	-160.0	1.242	0.14436D+09	0.17927D+09	307.1
109	250.0	170.0	-150.0	1.344	0.76949D+08	0.10340D+09	226.6
110	255.0	170.0	-150.0	1.275	0.99739D+08	0.12717D+09	271.4
111	260.0	170.0	-150.0	1.245	0.13462D+09	0.16757D+09	301.6
112	240.0	170.0	-140.0	1.377	0.69443D+08	0.95616D+08	222.5
113	245.0	170.0	-140.0	1.293	0.91278D+08	0.11804D+09	266.3
114	250.0	170.0	-140.0	1.233	0.11921D+09	0.14701D+09	296.0
115	230.0	170.0	-130.0	1.406	0.62119D+08	0.87369D+08	214.7
116	235.0	170.0	-130.0	1.325	0.82169D+08	0.10884D+09	261.1
117	240.0	170.0	-130.0	1.244	0.10964D+09	0.13645D+09	290.4
118	220.0	170.0	-120.0	1.411	0.55167D+08	0.77854D+08	197.6
119	225.0	170.0	-120.0	1.361	0.73499D+08	0.10002D+09	255.8
120	230.0	170.0	-120.0	1.269	0.99046D+08	0.12571D+09	284.6

CRITICAL CIRCLES

circle	radius	X-center	Y-center	F.S.
1	235.0	140.0	-130.0	1.149
2	275.0	140.0	-170.0	1.149
3	245.0	140.0	-140.0	1.150
4	265.0	140.0	-160.0	1.152
5	255.0	140.0	-150.0	1.152
6	295.0	140.0	-190.0	1.158
7	285.0	140.0	-180.0	1.159
8	290.0	140.0	-190.0	1.161
9	290.0	160.0	-190.0	1.163
10	280.0	140.0	-180.0	1.164

File No. S22-634-2
July 20, 1993

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Problem Title: he-kcs

User's Name:kcs
Date: 06-07-1993

Project: HIGHLAND ESTATES
Slope : GS-5
Loading: Static

GENERAL DATA

UNITS

Unit Weight of Water: 62.4

GEOMETRY

Number of Sections : 13

Section	X	Y-crk.	Y-grd.
1	-200.0	-5.0	-5.0
2	-80.0	-5.0	-5.0
3	25.0	45.0	45.0
4	25.0	45.0	45.0
5	35.0	50.0	50.0
6	40.0	65.0	65.0
7	60.0	65.0	65.0
8	60.0	65.0	65.0
9	70.0	65.0	65.0
10	71.0	85.0	85.0
11	71.0	85.0	85.0
12	95.0	95.0	95.0
13	250.0	100.0	100.0

CIRCLE DATA

Coordinates of first circle (X,Y): 40 -50
Intervals of circle coordinates
X-direction: 15
Y-direction: 20
Number of intervals
X-direction: 5
Y-direction: 5

Elevation of upper-most tangent: 95
Tangent interval: 10
Number of tangents: 4

CONTROL DATA/ANALYSIS OPTIONS

No seismic analysis
Number of slices: 10

Total stress analysis

Soil parameters defined in SOIL PROPERTIES

File No. S22-634-2
July 20, 1993

HIGHLAND ESTATES
Slope: GS-5
Loading: Static

SOIL PROPERTIES

Layer Number	Cohesion	Friction Angle	Unit Weight
1	4000.0	30.0	130.0
2	1500.0	20.0	130.0
3	1000.0	15.0	125.0
4	1000.0	25.0	125.0
5	1250.0	30.0	125.0
6	1500.0	35.0	125.0
7	2000.0	35.0	125.0

SOIL PROFILE

Section Number	X	elevation to bottom of layer layer number 1	2	3	4	5	6	7
1	-200.0	-5.0	-5.0	-5.0	-5.0	-5.0	-5.0	300.0
2	-80.0	-5.0	0.0	10.0	20.0	30.0	50.0	300.0
3	25.0	45.0	55.0	65.0	75.0	85.0	105.0	300.0
4	25.0	65.0	65.0	65.0	75.0	85.0	105.0	300.0
5	35.0	65.0	65.0	70.0	80.0	90.0	110.0	300.0
6	40.0	65.0	65.0	73.0	83.0	93.0	113.0	300.0
7	60.0	65.0	65.0	85.0	95.0	105.0	125.0	300.0
8	60.0	90.0	90.0	90.0	95.0	105.0	125.0	300.0
9	70.0	90.0	90.0	90.0	98.0	108.0	128.0	300.0
10	71.0	90.0	90.0	90.0	100.0	110.0	130.0	300.0
11	71.0	85.0	85.0	90.0	100.0	110.0	130.0	300.0
12	95.0	95.0	95.0	100.0	110.0	120.0	140.0	300.0
13	250.0	100.0	175.0	185.0	195.0	105.0	225.0	300.0

RESULTS

circle	radius	X-center	Y-center	F.S.	ROVER	RESIST	ARCL
1	145.0	40.0	-50.0	2.627	0.52109D+08	0.13691D+09	221.3
2	155.0	40.0	-50.0	2.773	0.69999D+08	0.19411D+09	251.0
3	165.0	40.0	-50.0	2.949	0.90866D+08	0.26796D+09	290.1
4	175.0	40.0	-50.0	3.160	0.11130D+09	0.35165D+09	325.8
5	125.0	40.0	-30.0	2.589	0.39607D+08	0.10253D+09	207.0
6	135.0	40.0	-30.0	2.824	0.54920D+08	0.15510D+09	235.5
7	145.0	40.0	-30.0	2.942	0.73047D+08	0.21493D+09	271.0
8	155.0	40.0	-30.0	3.165	0.91530D+08	0.28967D+09	305.2
9	105.0	40.0	-10.0	2.727	0.27611D+08	0.75306D+08	184.0
10	115.0	40.0	-10.0	2.963	0.39795D+08	0.11791D+09	213.4
11	125.0	40.0	-10.0	2.975	0.55551D+08	0.16524D+09	245.9
12	135.0	40.0	-10.0	3.237	0.71293D+08	0.23077D+09	278.6
13	85.0	40.0	10.0	3.346	0.17062D+08	0.57095D+08	156.8
14	95.0	40.0	10.0	3.122	0.26421D+08	0.82479D+08	183.4
15	105.0	40.0	10.0	3.165	0.38298D+08	0.12122D+09	211.4
16	115.0	40.0	10.0	3.394	0.50431D+08	0.17115D+09	241.8
17	65.0	40.0	30.0	3.706	0.93754D+07	0.34744D+08	123.8

File No. S22-634-2
July 20, 1993

HIGHLAND ESTATES
Slope: GS-5
Loading: Static

18	75.0	40.0	30.0	3.536	0.15426D+08	0.54540D+08	147.9
19	85.0	40.0	30.0	3.480	0.23422D+08	0.81507D+08	171.6
20	95.0	40.0	30.0	3.794	0.31778D+08	0.12056D+09	200.1
21	145.0	55.0	-50.0	2.390	0.45377D+08	0.10845D+09	211.9
22	155.0	55.0	-50.0	2.628	0.64444D+08	0.16934D+09	249.7
23	165.0	55.0	-50.0	2.761	0.85151D+08	0.23506D+09	289.2
24	175.0	55.0	-50.0	3.009	0.10705D+09	0.32208D+09	325.0
25	125.0	55.0	-30.0	2.461	0.33461D+08	0.82345D+08	192.7
26	135.0	55.0	-30.0	2.601	0.49142D+08	0.12783D+09	231.7
27	145.0	55.0	-30.0	2.785	0.67820D+08	0.18891D+09	270.2
28	155.0	55.0	-30.0	3.036	0.86759D+08	0.26338D+09	304.4
29	105.0	55.0	-10.0	2.540	0.23213D+08	0.58970D+08	170.8
30	115.0	55.0	-10.0	2.583	0.35544D+08	0.91816D+08	205.9
31	125.0	55.0	-10.0	2.884	0.50120D+08	0.14454D+09	243.8
32	135.0	55.0	-10.0	3.087	0.65741D+08	0.20293D+09	277.9
33	85.0	55.0	10.0	2.617	0.15080D+08	0.39459D+08	147.0
34	95.0	55.0	10.0	2.758	0.24030D+08	0.66271D+08	177.2
35	105.0	55.0	10.0	3.052	0.34613D+08	0.10565D+09	211.8
36	115.0	55.0	10.0	3.292	0.46845D+08	0.15422D+09	243.2
37	65.0	55.0	30.0	2.819	0.84798D+07	0.23905D+08	118.9
38	75.0	55.0	30.0	2.921	0.14429D+08	0.42147D+08	144.6
39	85.0	55.0	30.0	3.209	0.22005D+08	0.70612D+08	174.8
40	95.0	55.0	30.0	3.568	0.30501D+08	0.10883D+09	203.9
41	145.0	70.0	-50.0	2.401	0.37110D+08	0.89112D+08	194.7
42	155.0	70.0	-50.0	2.492	0.55755D+08	0.13893D+09	247.5
43	165.0	70.0	-50.0	2.746	0.75820D+08	0.20818D+09	288.2
44	175.0	70.0	-50.0	2.915	0.98004D+08	0.28573D+09	324.1
45	125.0	70.0	-30.0	2.364	0.26840D+08	0.63440D+08	175.1
46	135.0	70.0	-30.0	2.547	0.41466D+08	0.10559D+09	224.3
47	145.0	70.0	-30.0	2.835	0.58452D+08	0.16572D+09	266.7
48	155.0	70.0	-30.0	2.967	0.78012D+08	0.23146D+09	303.7
49	105.0	70.0	-10.0	2.077	0.18815D+08	0.39079D+08	154.8
50	115.0	70.0	-10.0	2.561	0.29923D+08	0.76639D+08	199.9
51	125.0	70.0	-10.0	2.941	0.43284D+08	0.12728D+09	239.7
52	135.0	70.0	-10.0	3.132	0.58765D+08	0.18406D+09	275.2
53	85.0	70.0	10.0	2.169	0.12058D+08	0.26150D+08	133.5
54	95.0	70.0	10.0	2.606	0.20241D+08	0.52744D+08	173.7
55	105.0	70.0	10.0	2.864	0.29704D+08	0.85078D+08	210.2
56	115.0	70.0	10.0	3.271	0.41226D+08	0.13485D+09	243.0
57	65.0	70.0	30.0	2.261	0.68736D+07	0.15540D+08	109.8
58	75.0	70.0	30.0	2.692	0.12430D+08	0.33465D+08	143.8
59	85.0	70.0	30.0	3.021	0.19344D+08	0.58446D+08	176.5
60	95.0	70.0	30.0	3.492	0.27550D+08	0.96218D+08	206.4
61	145.0	85.0	-50.0	2.043	0.28331D+08	0.57885D+08	173.6
62	155.0	85.0	-50.0	2.511	0.45717D+08	0.11480D+09	238.1
63	165.0	85.0	-50.0	2.724	0.65154D+08	0.17748D+09	284.2
64	175.0	85.0	-50.0	3.016	0.87649D+08	0.26433D+09	323.3
65	125.0	85.0	-30.0	2.112	0.20163D+08	0.42586D+08	154.7
66	135.0	85.0	-30.0	2.497	0.33484D+08	0.83623D+08	215.6
67	145.0	85.0	-30.0	2.738	0.48622D+08	0.13314D+09	259.6
68	155.0	85.0	-30.0	3.142	0.66501D+08	0.20896D+09	298.8
69	105.0	85.0	-10.0	2.072	0.13941D+08	0.28880D+08	135.6
70	115.0	85.0	-10.0	2.521	0.23586D+08	0.59465D+08	192.3
71	125.0	85.0	-10.0	2.784	0.36102D+08	0.10052D+09	233.9
72	135.0	85.0	-10.0	3.210	0.50310D+08	0.16151D+09	271.0
73	85.0	85.0	10.0	1.995	0.83973D+07	0.16754D+08	116.1
74	95.0	85.0	10.0	2.519	0.15632D+08	0.39382D+08	167.8
75	105.0	85.0	10.0	2.899	0.24227D+08	0.70232D+08	206.5
76	115.0	85.0	10.0	3.291	0.35126D+08	0.11559D+09	240.9
77	65.0	85.0	30.0	2.349	0.43493D+07	0.10216D+08	95.5

HIGHLAND ESTATES
Slope: GS-5
Loading: Static

78	75.0	85.0	30.0	2.613	0.90783D+07	0.23719D+08	141.1
79	85.0	85.0	30.0	3.030	0.15803D+08	0.47884D+08	175.9
80	95.0	85.0	30.0	3.483	0.23269D+08	0.81054D+08	207.3
81	145.0	100.0	-50.0	1.993	0.19405D+08	0.38679D+08	148.8
82	155.0	100.0	-50.0	2.525	0.35116D+08	0.88672D+08	227.8
83	165.0	100.0	-50.0	2.857	0.52031D+08	0.14867D+09	275.3
84	175.0	100.0	-50.0	3.051	0.72490D+08	0.22117D+09	317.3
85	125.0	100.0	-30.0	2.058	0.13714D+08	0.28220D+08	130.5
86	135.0	100.0	-30.0	2.469	0.26436D+08	0.65262D+08	205.9
87	145.0	100.0	-30.0	2.879	0.39744D+08	0.11444D+09	251.4
88	155.0	100.0	-30.0	3.122	0.56376D+08	0.17601D+09	291.8
89	105.0	100.0	-10.0	2.606	0.81637D+07	0.21273D+08	112.0
90	115.0	100.0	-10.0	2.604	0.17128D+08	0.44594D+08	183.4
91	125.0	100.0	-10.0	3.007	0.28083D+08	0.84446D+08	226.7
92	135.0	100.0	-10.0	3.292	0.40618D+08	0.13373D+09	265.2
93	85.0	100.0	10.0	4.975	0.43919D+07	0.21848D+08	93.3
94	95.0	100.0	10.0	2.797	0.10837D+08	0.30314D+08	160.1
95	105.0	100.0	10.0	3.211	0.19206D+08	0.61664D+08	200.8
96	115.0	100.0	10.0	3.470	0.28270D+08	0.98095D+08	237.0
97	65.0	100.0	30.0	4.084	0.17919D+07	0.73173D+07	59.5
98	75.0	100.0	30.0	3.908	0.57142D+07	0.22333D+08	135.5
99	85.0	100.0	30.0	3.324	0.11450D+08	0.38056D+08	172.8
100	95.0	100.0	30.0	3.819	0.18072D+08	0.69021D+08	206.0

CRITICAL CIRCLES

circle	radius	X-center	Y-center	F.S.
1	145.0	100.0	-50.0	1.993
2	85.0	85.0	10.0	1.995
3	145.0	85.0	-50.0	2.043
4	125.0	100.0	-30.0	2.058
5	105.0	85.0	-10.0	2.072
6	105.0	70.0	-10.0	2.077
7	125.0	85.0	-30.0	2.112
8	85.0	70.0	10.0	2.169
9	65.0	70.0	30.0	2.261
10	65.0	85.0	30.0	2.349

File No. S22-634-2
July 20, 1993

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Problem Title: he-kcs

User's Name:kcs
Date: 06-07-1993

GENERAL DATA

Project: HIGHLAND ESTATES

Slope : GS-5

Loading: Seismic

UNITS

Unit Weight of Water: 62.4

GEOMETRY

Number of Sections : 13

Section	X	Y-crk.	Y-grd.
1	-200.0	-5.0	-5.0
2	-80.0	-5.0	-5.0
3	25.0	45.0	45.0
4	25.0	45.0	45.0
5	35.0	50.0	50.0
6	40.0	65.0	65.0
7	60.0	65.0	65.0
8	60.0	65.0	65.0
9	70.0	65.0	65.0
10	71.0	85.0	85.0
11	71.0	85.0	85.0
12	95.0	95.0	95.0
13	250.0	100.0	100.0

CIRCLE DATA

Coordinates of first circle (X,Y): 40 -50
Intervals of circle coordinates
X-direction: 15
Y-direction: 20
Number of intervals
X-direction: 5
Y-direction: 5

Elevation of upper-most tangent: 95
Tangent interval: 10
Number of tangents: 4

CONTROL DATA/ANALYSIS OPTIONS

Seismic coefficient: .15
Number of slices: 10

Total stress analysis

Soil parameters defined in SOIL PROPERTIES

File No. S22-634-2
July 20, 1993

HIGHLAND ESTATES
Slope: GS-5
Loading: Seismic

SOIL PROPERTIES

Layer Number	Cohesion	Friction Angle	Unit Weight
1	4000.0	30.0	130.0
2	1500.0	20.0	130.0
3	1000.0	15.0	125.0
4	1000.0	25.0	125.0
5	1250.0	30.0	125.0
6	1500.0	35.0	125.0
7	2000.0	35.0	125.0

SOIL PROFILE

Section Number	X	elevation to bottom of layer, layer number 1	2	3	4	5	6	7
1	-200.0	-5.0	-5.0	-5.0	-5.0	-5.0	-5.0	300.0
2	-80.0	-5.0	0.0	10.0	20.0	30.0	50.0	300.0
3	25.0	45.0	55.0	65.0	75.0	85.0	105.0	300.0
4	25.0	65.0	65.0	65.0	75.0	85.0	105.0	300.0
5	35.0	65.0	65.0	70.0	80.0	90.0	110.0	300.0
6	40.0	65.0	65.0	73.0	83.0	93.0	113.0	300.0
7	60.0	65.0	65.0	85.0	95.0	105.0	125.0	300.0
8	60.0	90.0	90.0	90.0	95.0	105.0	125.0	300.0
9	70.0	90.0	90.0	90.0	98.0	108.0	128.0	300.0
10	71.0	90.0	90.0	90.0	100.0	110.0	130.0	300.0
11	71.0	85.0	85.0	90.0	100.0	110.0	130.0	300.0
12	95.0	95.0	95.0	100.0	110.0	120.0	140.0	300.0
13	250.0	100.0	175.0	185.0	195.0	105.0	225.0	300.0

RESULTS

circle	radius	X-center	Y-center	F.S.	ROVER	RESIST	ARCL
1	145.0	40.0	-50.0	1.250	0.98197D+08	0.12272D+09	221.3
2	155.0	40.0	-50.0	1.297	0.13466D+09	0.17466D+09	251.0
3	165.0	40.0	-50.0	1.382	0.17574D+09	0.24287D+09	290.1
4	175.0	40.0	-50.0	1.529	0.21232D+09	0.32459D+09	325.8
5	125.0	40.0	-30.0	1.336	0.69494D+08	0.92837D+08	207.0
6	135.0	40.0	-30.0	1.306	0.10647D+09	0.13903D+09	235.5
7	145.0	40.0	-30.0	1.415	0.13752D+09	0.19459D+09	271.0
8	155.0	40.0	-30.0	1.557	0.17157D+09	0.26706D+09	305.2
9	105.0	40.0	-10.0	1.356	0.50198D+08	0.68085D+08	184.0
10	115.0	40.0	-10.0	1.357	0.78063D+08	0.10593D+09	213.4
11	125.0	40.0	-10.0	1.472	0.10185D+09	0.14990D+09	245.9
12	135.0	40.0	-10.0	1.599	0.13307D+09	0.21272D+09	278.6
13	85.0	40.0	10.0	1.706	0.31047D+08	0.52980D+08	156.8
14	95.0	40.0	10.0	1.480	0.50750D+08	0.75121D+08	183.4
15	105.0	40.0	10.0	1.545	0.71740D+08	0.11084D+09	211.4
16	115.0	40.0	10.0	1.674	0.94672D+08	0.15847D+09	241.8
17	65.0	40.0	30.0	1.891	0.17281D+08	0.32687D+08	123.8

HIGHLAND ESTATES
Slope: GS-5
Loading: Seismic

18	75.0	40.0	30.0	1.621	0.30887D+08	0.50064D+08	147.9
19	85.0	40.0	30.0	1.691	0.44734D+08	0.75631D+08	171.6
20	95.0	40.0	30.0	1.850	0.61051D+08	0.11297D+09	200.1
21	145.0	55.0	-50.0	1.168	0.82532D+08	0.96389D+08	211.9
22	155.0	55.0	-50.0	1.253	0.12058D+09	0.15106D+09	249.7
23	165.0	55.0	-50.0	1.335	0.15942D+09	0.21278D+09	289.2
24	175.0	55.0	-50.0	1.431	0.20537D+09	0.29384D+09	325.0
25	125.0	55.0	-30.0	1.187	0.61544D+08	0.73051D+08	192.7
26	135.0	55.0	-30.0	1.295	0.88898D+08	0.11508D+09	231.7
27	145.0	55.0	-30.0	1.355	0.12595D+09	0.17071D+09	270.2
28	155.0	55.0	-30.0	1.461	0.16424D+09	0.23996D+09	304.4
29	105.0	55.0	-10.0	1.234	0.42521D+08	0.52490D+08	170.8
30	115.0	55.0	-10.0	1.329	0.62477D+08	0.83046D+08	205.9
31	125.0	55.0	-10.0	1.423	0.92537D+08	0.13171D+09	243.8
32	135.0	55.0	-10.0	1.540	0.12058D+09	0.18564D+09	277.9
33	85.0	55.0	10.0	1.273	0.27673D+08	0.35224D+08	147.0
34	95.0	55.0	10.0	1.402	0.42742D+08	0.59936D+08	177.2
35	105.0	55.0	10.0	1.516	0.63521D+08	0.96321D+08	211.8
36	115.0	55.0	10.0	1.613	0.88134D+08	0.14213D+09	243.2
37	65.0	55.0	30.0	1.373	0.15699D+08	0.21556D+08	118.9
38	75.0	55.0	30.0	1.508	0.25527D+08	0.38488D+08	144.6
39	85.0	55.0	30.0	1.565	0.41335D+08	0.64673D+08	174.8
40	95.0	55.0	30.0	1.749	0.58067D+08	0.10154D+09	203.9
41	145.0	70.0	-50.0	1.119	0.70203D+08	0.78531D+08	194.7
42	155.0	70.0	-50.0	1.284	0.97642D+08	0.12539D+09	247.5
43	165.0	70.0	-50.0	1.305	0.14362D+09	0.18736D+09	288.2
44	175.0	70.0	-50.0	1.412	0.18346D+09	0.25901D+09	324.1
45	125.0	70.0	-30.0	1.138	0.49575D+08	0.56410D+08	175.1
46	135.0	70.0	-30.0	1.325	0.72100D+08	0.95559D+08	224.3
47	145.0	70.0	-30.0	1.328	0.11222D+09	0.14902D+09	266.7
48	155.0	70.0	-30.0	1.424	0.14816D+09	0.21102D+09	303.7
49	105.0	70.0	-10.0	1.222	0.29481D+08	0.36027D+08	154.8
50	115.0	70.0	-10.0	1.291	0.53378D+08	0.68885D+08	199.9
51	125.0	70.0	-10.0	1.347	0.84990D+08	0.11446D+09	239.7
52	135.0	70.0	-10.0	1.473	0.11342D+09	0.16702D+09	275.2
53	85.0	70.0	10.0	1.207	0.19809D+08	0.23909D+08	133.5
54	95.0	70.0	10.0	1.348	0.35584D+08	0.47968D+08	173.7
55	105.0	70.0	10.0	1.586	0.49593D+08	0.78642D+08	210.2
56	115.0	70.0	10.0	1.616	0.76568D+08	0.12376D+09	243.0
57	65.0	70.0	30.0	1.269	0.11247D+08	0.14275D+08	109.8
58	75.0	70.0	30.0	1.379	0.22078D+08	0.30434D+08	143.8
59	85.0	70.0	30.0	1.603	0.33726D+08	0.54069D+08	176.5
60	95.0	70.0	30.0	1.662	0.53394D+08	0.88726D+08	206.4
61	145.0	85.0	-50.0	1.152	0.45844D+08	0.52798D+08	173.6
62	155.0	85.0	-50.0	1.211	0.84976D+08	0.10292D+09	238.1
63	165.0	85.0	-50.0	1.407	0.11573D+09	0.16283D+09	284.2
64	175.0	85.0	-50.0	1.388	0.17343D+09	0.24065D+09	323.3
65	125.0	85.0	-30.0	1.103	0.34731D+08	0.38297D+08	154.7
66	135.0	85.0	-30.0	1.300	0.58652D+08	0.76254D+08	215.6
67	145.0	85.0	-30.0	1.371	0.88330D+08	0.12113D+09	259.6
68	155.0	85.0	-30.0	1.467	0.13029D+09	0.19113D+09	298.8
69	105.0	85.0	-10.0	1.140	0.23046D+08	0.26280D+08	135.6
70	115.0	85.0	-10.0	1.344	0.40554D+08	0.54500D+08	192.3
71	125.0	85.0	-10.0	1.383	0.66089D+08	0.91387D+08	233.9
72	135.0	85.0	-10.0	1.434	0.10237D+09	0.14681D+09	271.0
73	85.0	85.0	10.0	1.186	0.13032D+08	0.15450D+08	116.1
74	95.0	85.0	10.0	1.353	0.26889D+08	0.36392D+08	167.8
75	105.0	85.0	10.0	1.524	0.42360D+08	0.64571D+08	206.5
76	115.0	85.0	10.0	1.601	0.66522D+08	0.10651D+09	240.9
77	65.0	85.0	30.0	1.335	0.70483D+07	0.94116D+07	95.5

HIGHLAND ESTATES
Slope: GS-5
Loading: Seismic

78	75.0	85.0	30.0	1.477	0.15019D+08	0.22187D+08	141.1
79	85.0	85.0	30.0	1.543	0.28538D+08	0.44028D+08	175.9
80	95.0	85.0	30.0	1.696	0.44386D+08	0.75261D+08	207.3
81	145.0	100.0	-50.0	1.173	0.30526D+08	0.35795D+08	148.8
82	155.0	100.0	-50.0	1.288	0.63387D+08	0.81670D+08	227.8
83	165.0	100.0	-50.0	1.412	0.96217D+08	0.13590D+09	275.3
84	175.0	100.0	-50.0	1.468	0.13848D+09	0.20327D+09	317.3
85	125.0	100.0	-30.0	1.184	0.21987D+08	0.26024D+08	130.5
86	135.0	100.0	-30.0	1.327	0.45992D+08	0.61016D+08	205.9
87	145.0	100.0	-30.0	1.454	0.72632D+08	0.10561D+09	251.4
88	155.0	100.0	-30.0	1.506	0.10780D+09	0.16236D+09	291.8
89	105.0	100.0	-10.0	1.780	0.11456D+08	0.20396D+08	112.0
90	115.0	100.0	-10.0	1.431	0.29277D+08	0.41883D+08	183.4
91	125.0	100.0	-10.0	1.456	0.53415D+08	0.77757D+08	226.7
92	135.0	100.0	-10.0	1.600	0.77552D+08	0.12409D+09	265.2
93	85.0	100.0	10.0	3.894	0.54772D+07	0.21328D+08	93.3
94	95.0	100.0	10.0	1.543	0.18555D+08	0.28633D+08	160.1
95	105.0	100.0	10.0	1.536	0.37131D+08	0.57026D+08	200.8
96	115.0	100.0	10.0	1.720	0.53233D+08	0.91585D+08	237.0
97	65.0	100.0	30.0	3.391	0.21304D+07	0.72233D+07	59.5
98	75.0	100.0	30.0	2.387	0.88115D+07	0.21030D+08	135.5
99	85.0	100.0	30.0	1.714	0.20849D+08	0.35741D+08	172.8
100	95.0	100.0	30.0	1.811	0.35700D+08	0.64655D+08	206.0

CRITICAL CIRCLES

circle	radius	X-center	Y-center	F.S.
1	125.0	85.0	-30.0	1.103
2	145.0	70.0	-50.0	1.119
3	125.0	70.0	-30.0	1.138
4	105.0	85.0	-10.0	1.140
5	145.0	85.0	-50.0	1.152
6	145.0	55.0	-50.0	1.168
7	145.0	100.0	-50.0	1.173
8	125.0	100.0	-30.0	1.184
9	85.0	85.0	10.0	1.186
10	125.0	55.0	-30.0	1.187

GS6A.R

Problem Title: Highland Estates: Profile No. 6a
Loading: Static

User's Name:P.F.
Date: 06-07-1993

GENERAL DATA

UNITS

Unit Weight of Water: 62.43

GEOMETRY

Number of Sections : 19

Section	X	Y-crk.	Y-grd.
1	-150.0	-10.0	-10.0
2	-25.0	-10.0	-10.0
3	0.0	-5.0	-5.0
4	5.0	-3.0	-3.0
5	65.0	10.0	10.0
6	107.0	30.0	30.0
7	120.0	30.0	30.0
8	170.0	55.0	55.0
9	171.0	55.5	55.5
10	180.0	60.0	60.0
11	185.0	75.0	75.0
12	300.0	79.0	79.0
13	301.0	79.0	79.0
14	315.0	80.0	80.0
15	330.0	110.0	110.0
16	345.0	110.0	110.0
17	350.0	110.0	110.0
18	390.0	115.0	115.0
19	450.0	118.0	118.0

CIRCLE DATA

Coordinates of first circle (X,Y): 150 -100
Intervals of circle coordinates
X-direction: 10
Y-direction: 10
Number of intervals
X-direction: 5
Y-direction: 7

Elevation of upper-most tangent: 75
Tangent interval: 5
Number of tangents: 3

CONTROL DATA/ANALYSIS OPTIONS

No seismic analysis
Number of slices: 10

File No. S22-634-2
July 20, 1993

HIGHLAND ESTATES
Slope: GS-6a
Loading:Static

Total stress analysis

Soil parameters defined in SOIL PROPERTIES

SOIL PROPERTIES

Layer Number	Cohesion	Friction Angle	Unit Weight
1	9000.0	0.0	130.0
2	1500.0	20.0	130.0
3	1000.0	15.0	125.0
4	1000.0	25.0	125.0
5	1000.0	30.0	125.0
6	1000.0	30.0	130.0

SOIL PROFILE

Section Number	X	elevation to bottom of layer, layer number 1	2	3	4	5	6
1	-150.0	-10.0	-10.0	0.0	10.0	200.0	200.0
2	-25.0	-10.0	-10.0	0.0	10.0	60.0	200.0
3	0.0	-5.0	-5.0	0.0	10.0	10.0	200.0
4	5.0	-3.0	-3.0	-3.0	-3.0	-3.0	200.0
5	65.0	10.0	10.0	10.0	10.0	10.0	200.0
6	107.0	30.0	30.0	30.0	30.0	30.0	200.0
7	120.0	30.0	30.0	30.0	30.0	30.0	200.0
8	170.0	55.0	55.0	55.0	55.0	55.0	200.0
9	171.0	75.0	75.0	75.0	75.0	75.0	200.0
10	180.0	75.0	75.0	75.0	75.0	75.0	200.0
11	185.0	75.0	75.0	75.0	75.0	75.0	200.0
12	300.0	79.0	79.0	79.0	79.0	79.0	200.0
13	301.0	110.0	110.0	110.0	110.0	110.0	200.0
14	315.0	110.0	110.0	110.0	110.0	110.0	200.0
15	330.0	110.0	110.0	110.0	110.0	110.0	200.0
16	345.0	110.0	110.0	110.0	115.0	200.0	200.0
17	350.0	110.0	110.0	110.0	120.0	200.0	200.0
18	390.0	115.0	115.0	130.0	140.0	200.0	200.0
19	450.0	118.0	145.0	155.0	165.0	200.0	200.0

RESULTS

circle	radius	X-center	Y-center	F.S.	ROVER	RESIST	ARCL
1	175.0	150.0	-100.0	3.260	0.40774D+08	0.13294D+09	206.2
2	180.0	150.0	-100.0	2.634	0.49753D+08	0.13107D+09	224.5
3	185.0	150.0	-100.0	2.637	0.59545D+08	0.15702D+09	251.0
4	165.0	150.0	-90.0	3.272	0.36728D+08	0.12017D+09	199.8
5	170.0	150.0	-90.0	2.645	0.44927D+08	0.11883D+09	216.4
6	175.0	150.0	-90.0	2.636	0.54148D+08	0.14272D+09	243.3
7	155.0	150.0	-80.0	3.284	0.32964D+08	0.10824D+09	193.4

HIGHLAND ESTATES
Slope: GS-6a
Loading: Static

8	160.0	150.0	-80.0	2.658	0.40404D+08	0.10740D+09	208.6
9	165.0	150.0	-80.0	2.629	0.49069D+08	0.12902D+09	234.5
10	145.0	150.0	-70.0	3.296	0.29431D+08	0.97003D+08	187.0
11	150.0	150.0	-70.0	2.659	0.36215D+08	0.96301D+08	201.0
12	155.0	150.0	-70.0	2.624	0.44210D+08	0.11603D+09	226.0
13	135.0	150.0	-60.0	3.326	0.25921D+08	0.86206D+08	180.4
14	140.0	150.0	-60.0	2.656	0.32253D+08	0.85651D+08	193.2
15	145.0	150.0	-60.0	2.621	0.39565D+08	0.10370D+09	217.6
16	125.0	150.0	-50.0	3.367	0.22562D+08	0.75968D+08	173.7
17	130.0	150.0	-50.0	2.666	0.28286D+08	0.75401D+08	185.1
18	135.0	150.0	-50.0	2.628	0.34911D+08	0.91735D+08	208.9
19	115.0	150.0	-40.0	3.420	0.19385D+08	0.66290D+08	166.8
20	120.0	150.0	-40.0	2.690	0.24515D+08	0.65936D+08	177.5
21	125.0	150.0	-40.0	2.640	0.30428D+08	0.80324D+08	200.0
22	175.0	160.0	-100.0	3.185	0.37229D+08	0.11857D+09	193.4
23	180.0	160.0	-100.0	2.545	0.46362D+08	0.11797D+09	219.1
24	185.0	160.0	-100.0	2.540	0.56107D+08	0.14252D+09	247.0
25	165.0	160.0	-90.0	3.185	0.33663D+08	0.10720D+09	187.3
26	170.0	160.0	-90.0	2.533	0.42126D+08	0.10671D+09	211.9
27	175.0	160.0	-90.0	2.535	0.51004D+08	0.12927D+09	238.5
28	155.0	160.0	-80.0	3.194	0.30145D+08	0.96279D+08	181.0
29	160.0	160.0	-80.0	2.524	0.38027D+08	0.95962D+08	204.5
30	165.0	160.0	-80.0	2.533	0.46121D+08	0.11682D+09	230.5
31	145.0	160.0	-70.0	3.213	0.26712D+08	0.85838D+08	174.7
32	150.0	160.0	-70.0	2.524	0.33876D+08	0.85488D+08	197.0
33	155.0	160.0	-70.0	2.542	0.41228D+08	0.10480D+09	222.4
34	135.0	160.0	-60.0	3.236	0.23479D+08	0.75980D+08	168.2
35	140.0	160.0	-60.0	2.524	0.29929D+08	0.75540D+08	189.4
36	145.0	160.0	-60.0	2.550	0.36721D+08	0.93638D+08	214.2
37	125.0	160.0	-50.0	3.278	0.20301D+08	0.66544D+08	161.6
38	130.0	160.0	-50.0	2.520	0.26346D+08	0.66388D+08	181.5
39	135.0	160.0	-50.0	2.560	0.32444D+08	0.83067D+08	205.6
40	115.0	160.0	-40.0	3.332	0.17323D+08	0.57725D+08	154.8
41	120.0	160.0	-40.0	2.536	0.22719D+08	0.57608D+08	173.4
42	125.0	160.0	-40.0	2.584	0.28240D+08	0.72963D+08	196.9
43	175.0	170.0	-100.0	3.135	0.33540D+08	0.10513D+09	180.7
44	180.0	170.0	-100.0	2.570	0.42037D+08	0.10802D+09	214.7
45	185.0	170.0	-100.0	2.565	0.51379D+08	0.13177D+09	242.3
46	165.0	170.0	-90.0	3.144	0.30074D+08	0.94566D+08	174.6
47	170.0	170.0	-90.0	2.565	0.37886D+08	0.97195D+08	207.6
48	175.0	170.0	-90.0	2.561	0.46643D+08	0.11945D+09	234.6
49	155.0	170.0	-80.0	3.155	0.26804D+08	0.84566D+08	168.5
50	160.0	170.0	-80.0	2.558	0.34069D+08	0.87138D+08	200.4
51	165.0	170.0	-80.0	2.557	0.42125D+08	0.10773D+09	226.8
52	145.0	170.0	-70.0	3.177	0.23601D+08	0.74974D+08	162.2
53	150.0	170.0	-70.0	2.550	0.30448D+08	0.77643D+08	193.0
54	155.0	170.0	-70.0	2.554	0.37822D+08	0.96588D+08	218.8
55	135.0	170.0	-60.0	3.210	0.20545D+08	0.65942D+08	155.9
56	140.0	170.0	-60.0	2.561	0.26743D+08	0.68483D+08	185.5
57	145.0	170.0	-60.0	2.559	0.33545D+08	0.85846D+08	210.7
58	125.0	170.0	-50.0	3.252	0.17668D+08	0.57460D+08	149.4
59	130.0	170.0	-50.0	2.577	0.23224D+08	0.59844D+08	177.7
60	135.0	170.0	-50.0	2.581	0.29212D+08	0.75399D+08	202.3
61	115.0	170.0	-40.0	3.323	0.14850D+08	0.49352D+08	142.2
62	120.0	170.0	-40.0	2.601	0.19892D+08	0.51730D+08	169.8
63	125.0	170.0	-40.0	2.592	0.25427D+08	0.65913D+08	193.6
64	175.0	180.0	-100.0	3.142	0.29273D+08	0.91970D+08	167.7
65	180.0	180.0	-100.0	2.532	0.37762D+08	0.95617D+08	210.3
66	185.0	180.0	-100.0	2.581	0.46684D+08	0.12049D+09	238.3
67	165.0	180.0	-90.0	3.157	0.26062D+08	0.82281D+08	161.7

68	170.0	180.0	-90.0	2.527	0.34104D+08	0.86184D+08	203.3
69	175.0	180.0	-90.0	2.570	0.42192D+08	0.10845D+09	230.7
70	155.0	180.0	-80.0	3.183	0.22969D+08	0.73115D+08	155.7
71	160.0	180.0	-80.0	2.543	0.30215D+08	0.76847D+08	196.2
72	165.0	180.0	-80.0	2.568	0.37743D+08	0.96924D+08	223.0
73	145.0	180.0	-70.0	3.211	0.20089D+08	0.64513D+08	149.5
74	150.0	180.0	-70.0	2.560	0.26590D+08	0.68058D+08	188.9
75	155.0	180.0	-70.0	2.568	0.33559D+08	0.86180D+08	215.2
76	135.0	180.0	-60.0	3.276	0.17174D+08	0.56265D+08	143.3
77	140.0	180.0	-60.0	2.570	0.23340D+08	0.59982D+08	181.5
78	145.0	180.0	-60.0	2.565	0.29713D+08	0.76210D+08	207.1
79	125.0	180.0	-50.0	3.311	0.14582D+08	0.48286D+08	134.5
80	130.0	180.0	-50.0	2.609	0.20005D+08	0.52192D+08	173.9
81	135.0	180.0	-50.0	2.570	0.25989D+08	0.66797D+08	198.8
82	115.0	180.0	-40.0	3.351	0.12203D+08	0.40898D+08	125.4
83	120.0	180.0	-40.0	2.646	0.16898D+08	0.44713D+08	163.7
84	125.0	180.0	-40.0	2.618	0.22133D+08	0.57945D+08	190.2
85	175.0	190.0	-100.0	3.226	0.24528D+08	0.79138D+08	154.5
86	180.0	190.0	-100.0	2.653	0.32544D+08	0.86353D+08	205.7
87	185.0	190.0	-100.0	2.639	0.41269D+08	0.10892D+09	234.2
88	165.0	190.0	-90.0	3.256	0.21638D+08	0.70451D+08	148.6
89	170.0	190.0	-90.0	2.650	0.29068D+08	0.77032D+08	198.8
90	175.0	190.0	-90.0	2.650	0.37140D+08	0.98409D+08	226.8
91	155.0	190.0	-80.0	3.318	0.18720D+08	0.62112D+08	142.6
92	160.0	190.0	-80.0	2.646	0.25811D+08	0.68309D+08	191.8
93	165.0	190.0	-80.0	2.661	0.33239D+08	0.88441D+08	219.2
94	145.0	190.0	-70.0	3.355	0.16086D+08	0.53966D+08	134.4
95	150.0	190.0	-70.0	2.674	0.22395D+08	0.59885D+08	184.7
96	155.0	190.0	-70.0	2.675	0.29522D+08	0.78971D+08	211.4
97	135.0	190.0	-60.0	3.390	0.13659D+08	0.46296D+08	125.4
98	140.0	190.0	-60.0	2.703	0.19106D+08	0.51640D+08	175.6
99	145.0	190.0	-60.0	2.738	0.25354D+08	0.69416D+08	203.5
100	125.0	190.0	-50.0	3.390	0.11627D+08	0.39413D+08	116.5
101	130.0	190.0	-50.0	2.707	0.16366D+08	0.44307D+08	165.5
102	135.0	190.0	-50.0	2.772	0.21889D+08	0.60682D+08	193.6
103	115.0	190.0	-40.0	4.167	0.97332D+07	0.40557D+08	107.5
104	120.0	190.0	-40.0	2.733	0.13894D+08	0.37970D+08	155.4
105	125.0	190.0	-40.0	2.802	0.18740D+08	0.52515D+08	182.8

CRITICAL CIRCLES

circle	radius	X-center	Y-center	F.S.
1	130.0	160.0	-50.0	2.520
2	160.0	160.0	-80.0	2.524
3	150.0	160.0	-70.0	2.524
4	140.0	160.0	-60.0	2.524
5	170.0	180.0	-90.0	2.527
6	180.0	180.0	-100.0	2.532
7	165.0	160.0	-80.0	2.533
8	170.0	160.0	-90.0	2.533
9	175.0	160.0	-90.0	2.535
10	120.0	160.0	-40.0	2.536

GS6A.S

Problem Title: Highland Estates: Profile No. 6a
Loading: Seismic

User's Name:P.F.
Date: 06-07-1993

GENERAL DATA

UNITS

Unit Weight of Water: 62.43

GEOMETRY

Number of Sections : 19

Section	X	Y-crk.	Y-grd.
1	-150.0	-10.0	-10.0
2	-25.0	-10.0	-10.0
3	0.0	-5.0	-5.0
4	5.0	-3.0	-3.0
5	65.0	10.0	10.0
6	107.0	30.0	30.0
7	120.0	30.0	30.0
8	170.0	55.0	55.0
9	171.0	55.5	55.5
10	180.0	60.0	60.0
11	185.0	75.0	75.0
12	300.0	79.0	79.0
13	301.0	79.0	79.0
14	315.0	80.0	80.0
15	330.0	110.0	110.0
16	345.0	110.0	110.0
17	350.0	110.0	110.0
18	390.0	115.0	115.0
19	450.0	118.0	118.0

CIRCLE DATA

Coordinates of first circle (X,Y): 150 -100
Intervals of circle coordinates
X-direction: 10
Y-direction: 10
Number of intervals
X-direction: 5
Y-direction: 7

Elevation of upper-most tangent: 75
Tangent interval: 5
Number of tangents: 3

CONTROL DATA/ANALYSIS OPTIONS

Seismic coefficient: .15
Number of slices: 10

File No. S22-634-2
July 20, 1993

HIGHLAND ESTATES
Slope: GS-6a
Loading: Seismic

Total stress analysis

Soil parameters defined in SOIL PROPERTIES

SOIL PROPERTIES

Layer Number	Cohesion	Friction Angle	Unit Weight
1	9000.0	0.0	130.0
2	1500.0	20.0	130.0
3	1000.0	15.0	125.0
4	1000.0	25.0	125.0
5	1000.0	30.0	125.0
6	1000.0	30.0	130.0

SOIL PROFILE

Section Number	X	elevation to bottom of layer, layer number 1	2	3	4	5	6
1	-150.0	-10.0	-10.0	0.0	10.0	200.0	200.0
2	-25.0	-10.0	-10.0	0.0	10.0	60.0	200.0
3	0.0	-5.0	-5.0	0.0	10.0	10.0	200.0
4	5.0	-3.0	-3.0	-3.0	-3.0	-3.0	200.0
5	65.0	10.0	10.0	10.0	10.0	10.0	200.0
6	107.0	30.0	30.0	30.0	30.0	30.0	200.0
7	120.0	30.0	30.0	30.0	30.0	30.0	200.0
8	170.0	55.0	55.0	55.0	55.0	55.0	200.0
9	171.0	75.0	75.0	75.0	75.0	75.0	200.0
10	180.0	75.0	75.0	75.0	75.0	75.0	200.0
11	185.0	75.0	75.0	75.0	75.0	75.0	200.0
12	300.0	79.0	79.0	79.0	79.0	79.0	200.0
13	301.0	110.0	110.0	110.0	110.0	110.0	200.0
14	315.0	110.0	110.0	110.0	110.0	110.0	200.0
15	330.0	110.0	110.0	110.0	110.0	110.0	200.0
16	345.0	110.0	110.0	110.0	115.0	200.0	200.0
17	350.0	110.0	110.0	110.0	120.0	200.0	200.0
18	390.0	115.0	115.0	130.0	140.0	200.0	200.0
19	450.0	118.0	145.0	155.0	165.0	200.0	200.0

RESULTS

circle	radius	X-center	Y-center	F.S.	ROVER	RESIST	ARCL
1	175.0	150.0	-100.0	2.297	0.56597D+08	0.12998D+09	206.2
2	180.0	150.0	-100.0	1.746	0.72308D+08	0.12628D+09	224.5
3	185.0	150.0	-100.0	1.675	0.90066D+08	0.15083D+09	251.0
4	165.0	150.0	-90.0	2.315	0.50765D+08	0.11750D+09	199.8
5	170.0	150.0	-90.0	1.741	0.65708D+08	0.11438D+09	216.4
6	175.0	150.0	-90.0	1.706	0.80485D+08	0.13728D+09	243.3
7	155.0	150.0	-80.0	2.333	0.45358D+08	0.10584D+09	193.4

8	160.0	150.0	-80.0	1.736	0.59494D+08	0.10327D+09	208.6
9	165.0	150.0	-80.0	1.709	0.72595D+08	0.12408D+09	234.5
10	145.0	150.0	-70.0	2.354	0.40304D+08	0.94855D+08	187.0
11	150.0	150.0	-70.0	1.737	0.53277D+08	0.92537D+08	201.0
12	155.0	150.0	-70.0	1.714	0.65081D+08	0.11157D+09	226.0
13	135.0	150.0	-60.0	2.385	0.35350D+08	0.84304D+08	180.4
14	140.0	150.0	-60.0	1.741	0.47255D+08	0.82266D+08	193.2
15	145.0	150.0	-60.0	1.721	0.57929D+08	0.99693D+08	217.6
16	125.0	150.0	-50.0	2.425	0.30643D+08	0.74300D+08	173.7
17	130.0	150.0	-50.0	1.752	0.41320D+08	0.72390D+08	185.1
18	135.0	150.0	-50.0	1.733	0.50876D+08	0.88173D+08	208.9
19	115.0	150.0	-40.0	2.474	0.26213D+08	0.64843D+08	166.8
20	120.0	150.0	-40.0	1.774	0.35685D+08	0.63295D+08	177.5
21	125.0	150.0	-40.0	1.749	0.44129D+08	0.77187D+08	200.0
22	175.0	160.0	-100.0	2.271	0.51035D+08	0.11589D+09	193.4
23	180.0	160.0	-100.0	1.626	0.69453D+08	0.11290D+09	219.1
24	185.0	160.0	-100.0	1.794	0.76959D+08	0.13807D+09	247.0
25	165.0	160.0	-90.0	2.281	0.45931D+08	0.10478D+09	187.3
26	170.0	160.0	-90.0	1.626	0.62781D+08	0.10210D+09	211.9
27	175.0	160.0	-90.0	1.793	0.69834D+08	0.12520D+09	238.5
28	155.0	160.0	-80.0	2.298	0.40952D+08	0.94103D+08	181.0
29	160.0	160.0	-80.0	1.628	0.56373D+08	0.91779D+08	204.5
30	165.0	160.0	-80.0	1.792	0.63110D+08	0.11308D+09	230.5
31	145.0	160.0	-70.0	2.322	0.36140D+08	0.83901D+08	174.7
32	150.0	160.0	-70.0	1.635	0.50003D+08	0.81734D+08	197.0
33	155.0	160.0	-70.0	1.796	0.56444D+08	0.10140D+09	222.4
34	135.0	160.0	-60.0	2.348	0.31626D+08	0.74268D+08	168.2
35	140.0	160.0	-60.0	1.642	0.43967D+08	0.72194D+08	189.4
36	145.0	160.0	-60.0	1.800	0.50298D+08	0.90549D+08	214.2
37	125.0	160.0	-50.0	2.388	0.27242D+08	0.65050D+08	161.6
38	130.0	160.0	-50.0	1.648	0.38474D+08	0.63422D+08	181.5
39	135.0	160.0	-50.0	1.806	0.44462D+08	0.80278D+08	205.6
40	115.0	160.0	-40.0	2.436	0.23164D+08	0.56435D+08	154.8
41	120.0	160.0	-40.0	1.665	0.33048D+08	0.55017D+08	173.4
42	125.0	160.0	-40.0	1.818	0.38767D+08	0.70470D+08	196.9
43	175.0	170.0	-100.0	2.262	0.45424D+08	0.10275D+09	180.7
44	180.0	170.0	-100.0	1.685	0.61516D+08	0.10368D+09	214.7
45	185.0	170.0	-100.0	1.651	0.76557D+08	0.12643D+09	242.3
46	165.0	170.0	-90.0	2.278	0.40565D+08	0.92426D+08	174.6
47	170.0	170.0	-90.0	1.693	0.55102D+08	0.93283D+08	207.6
48	175.0	170.0	-90.0	1.658	0.69134D+08	0.11461D+09	234.6
49	155.0	170.0	-80.0	2.296	0.35996D+08	0.82652D+08	168.5
50	160.0	170.0	-80.0	1.699	0.49223D+08	0.83624D+08	200.4
51	165.0	170.0	-80.0	1.665	0.62084D+08	0.10335D+09	226.8
52	145.0	170.0	-70.0	2.322	0.31563D+08	0.73280D+08	162.2
53	150.0	170.0	-70.0	1.705	0.43692D+08	0.74502D+08	193.0
54	155.0	170.0	-70.0	1.672	0.55404D+08	0.92660D+08	218.8
55	135.0	170.0	-60.0	2.355	0.27375D+08	0.64457D+08	155.9
56	140.0	170.0	-60.0	1.720	0.38193D+08	0.65710D+08	185.5
57	145.0	170.0	-60.0	1.685	0.48874D+08	0.82351D+08	210.7
58	125.0	170.0	-50.0	2.394	0.23458D+08	0.56170D+08	149.4
59	130.0	170.0	-50.0	1.739	0.33019D+08	0.57414D+08	177.7
60	135.0	170.0	-50.0	1.706	0.42397D+08	0.72331D+08	202.3
61	115.0	170.0	-40.0	2.451	0.19686D+08	0.48258D+08	142.2
62	120.0	170.0	-40.0	1.761	0.28175D+08	0.49627D+08	169.8
63	125.0	170.0	-40.0	1.724	0.36682D+08	0.63229D+08	193.6
64	175.0	180.0	-100.0	2.292	0.39226D+08	0.89922D+08	167.7
65	180.0	180.0	-100.0	1.620	0.56362D+08	0.91318D+08	210.3
66	185.0	180.0	-100.0	1.765	0.65919D+08	0.11633D+09	238.3
67	165.0	180.0	-90.0	2.314	0.34775D+08	0.80452D+08	161.7

68	170.0	180.0	-90.0	1.619	0.50818D+08	0.82251D+08	203.3
69	175.0	180.0	-90.0	1.785	0.58711D+08	0.10480D+09	230.7
70	155.0	180.0	-80.0	2.342	0.30534D+08	0.71496D+08	155.7
71	160.0	180.0	-80.0	1.635	0.44863D+08	0.73342D+08	196.2
72	165.0	180.0	-80.0	1.811	0.51773D+08	0.93756D+08	223.0
73	145.0	180.0	-70.0	2.372	0.26600D+08	0.63089D+08	149.5
74	150.0	180.0	-70.0	1.652	0.39320D+08	0.64953D+08	188.9
75	155.0	180.0	-70.0	1.839	0.45373D+08	0.83455D+08	215.2
76	135.0	180.0	-60.0	2.425	0.22695D+08	0.55037D+08	143.3
77	140.0	180.0	-60.0	1.667	0.34333D+08	0.57244D+08	181.5
78	145.0	180.0	-60.0	1.867	0.39563D+08	0.73880D+08	207.1
79	125.0	180.0	-50.0	2.458	0.19219D+08	0.47246D+08	134.5
80	130.0	180.0	-50.0	1.696	0.29372D+08	0.49823D+08	173.9
81	135.0	180.0	-50.0	1.902	0.34093D+08	0.64833D+08	198.8
82	115.0	180.0	-40.0	2.496	0.16038D+08	0.40031D+08	125.4
83	120.0	180.0	-40.0	1.727	0.24738D+08	0.42722D+08	163.7
84	125.0	180.0	-40.0	1.941	0.28985D+08	0.56264D+08	190.2
85	175.0	190.0	-100.0	2.378	0.32563D+08	0.77451D+08	154.5
86	180.0	190.0	-100.0	1.729	0.47876D+08	0.82801D+08	205.7
87	185.0	190.0	-100.0	1.674	0.62348D+08	0.10436D+09	234.2
88	165.0	190.0	-90.0	2.410	0.28614D+08	0.68956D+08	148.6
89	170.0	190.0	-90.0	1.769	0.41844D+08	0.74001D+08	198.8
90	175.0	190.0	-90.0	1.690	0.55797D+08	0.94314D+08	226.8
91	155.0	190.0	-80.0	2.462	0.24698D+08	0.60812D+08	142.6
92	160.0	190.0	-80.0	1.811	0.36305D+08	0.65756D+08	191.8
93	165.0	190.0	-80.0	1.708	0.49640D+08	0.84783D+08	219.2
94	145.0	190.0	-70.0	2.497	0.21166D+08	0.52852D+08	134.4
95	150.0	190.0	-70.0	1.875	0.30829D+08	0.57791D+08	184.7
96	155.0	190.0	-70.0	1.728	0.43820D+08	0.75731D+08	211.4
97	135.0	190.0	-60.0	2.531	0.17919D+08	0.45356D+08	125.4
98	140.0	190.0	-60.0	1.958	0.25549D+08	0.50016D+08	175.6
99	145.0	190.0	-60.0	1.771	0.37617D+08	0.66612D+08	203.5
100	125.0	190.0	-50.0	2.465	0.15626D+08	0.38523D+08	116.5
101	130.0	190.0	-50.0	1.711	0.24680D+08	0.42220D+08	165.5
102	135.0	190.0	-50.0	1.804	0.32314D+08	0.58288D+08	193.6
103	115.0	190.0	-40.0	3.173	0.12617D+08	0.40031D+08	107.5
104	120.0	190.0	-40.0	1.742	0.20797D+08	0.36231D+08	155.4
105	125.0	190.0	-40.0	1.838	0.27481D+08	0.50508D+08	182.8

CRITICAL CIRCLES

circle	radius	X-center	Y-center	F.S.
1	170.0	180.0	-90.0	1.619
2	180.0	180.0	-100.0	1.620
3	180.0	160.0	-100.0	1.626
4	170.0	160.0	-90.0	1.626
5	160.0	160.0	-80.0	1.628
6	150.0	160.0	-70.0	1.635
7	160.0	180.0	-80.0	1.635
8	140.0	160.0	-60.0	1.642
9	130.0	160.0	-50.0	1.648
10	185.0	170.0	-100.0	1.651

File No. S22-634-2
July 20, 1993

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Problem Title: hestates

User's Name:kcs
Date: 06-07-1993

Project: HIGHLAND ESTATES
Slope : GS-6b
Loading: Static

GENERAL DATA

UNITS

Unit Weight of Water: 62.4

GEOMETRY

Number of Sections : 13

Section	X	Y-crk.	Y-grd.
1	-150.0	10.0	10.0
2	-100.0	10.0	10.0
3	-60.0	15.0	15.0
4	-20.0	15.0	15.0
5	40.0	40.0	40.0
6	70.0	40.0	40.0
7	70.0	40.0	40.0
8	85.0	40.0	40.0
9	87.0	60.0	60.0
10	87.0	60.0	60.0
11	100.0	67.0	67.0
12	130.0	55.0	55.0
13	400.0	55.0	55.0

CIRCLE DATA

Coordinates of first circle (X,Y): 50 -100
Intervals of circle coordinates
X-direction: 15
Y-direction: 20
Number of intervals
X-direction: 4
Y-direction: 5

Elevation of upper-most tangent: 70
Tangent interval: 10
Number of tangents: 4

CONTROL DATA/ANALYSIS OPTIONS

No seismic analysis
Number of slices: 10

Total stress analysis

Soil parameters defined in SOIL PROPERTIES

File No. S22-634-2
July 20, 1993

HIGHLAND ESTATES
Slope: GS-6b
Loading: Static

SOIL PROPERTIES

Layer Number	Cohesion	Friction Angle	Unit Weight
1	700.0	10.0	125.0
2	4000.0	30.0	130.0
3	1500.0	20.0	130.0
4	1000.0	15.0	125.0
5	1000.0	25.0	125.0
6	1000.0	30.0	125.0
7	1250.0	35.0	125.0

SOIL PROFILE

Section Number	X	elevation to bottom of layer layer number 1	2	3	4	5	6	7
1	-150.0	10.0	10.0	10.0	10.0	10.0	15.0	300.0
2	-100.0	10.0	10.0	10.0	10.0	20.0	30.0	300.0
3	-60.0	15.0	15.0	15.0	25.0	35.0	45.0	300.0
4	-20.0	33.0	15.0	33.0	43.0	53.0	63.0	300.0
5	40.0	60.0	40.0	60.0	70.0	80.0	90.0	300.0
6	70.0	75.0	40.0	75.0	85.0	95.0	105.0	300.0
7	70.0	75.0	65.0	40.0	85.0	95.0	105.0	300.0
8	85.0	80.0	65.0	40.0	90.0	100.0	110.0	300.0
9	87.0	80.0	65.0	60.0	90.0	100.0	110.0	300.0
10	87.0	80.0	60.0	60.0	90.0	100.0	110.0	300.0
11	100.0	85.0	65.0	65.0	95.0	105.0	115.0	300.0
12	130.0	85.0	55.0	55.0	95.0	105.0	115.0	300.0
13	400.0	85.0	55.0	55.0	95.0	105.0	115.0	300.0

RESULTS

circle	radius	X-center	Y-center	F.S.	ROVER	RESIST	ARCL
1	170.0	50.0	-100.0	3.206	0.23580D+08	0.75605D+08	188.5
2	180.0	50.0	-100.0	3.917	0.32954D+08	0.12908D+09	258.6
3	190.0	50.0	-100.0	4.368	0.45205D+08	0.19744D+09	297.5
4	200.0	50.0	-100.0	4.985	0.56245D+08	0.28038D+09	333.4
5	150.0	50.0	-80.0	3.034	0.19300D+08	0.58549D+08	177.8
6	160.0	50.0	-80.0	3.732	0.28538D+08	0.10650D+09	242.8
7	170.0	50.0	-80.0	4.279	0.38671D+08	0.16549D+09	281.4
8	180.0	50.0	-80.0	4.811	0.48574D+08	0.23371D+09	317.2
9	130.0	50.0	-60.0	2.989	0.15384D+08	0.45991D+08	167.1
10	140.0	50.0	-60.0	3.249	0.24204D+08	0.78647D+08	226.0
11	150.0	50.0	-60.0	4.147	0.32579D+08	0.13511D+09	263.5
12	160.0	50.0	-60.0	4.728	0.41066D+08	0.19415D+09	299.2
13	110.0	50.0	-40.0	2.953	0.11775D+08	0.34774D+08	156.6
14	120.0	50.0	-40.0	3.146	0.19961D+08	0.62800D+08	198.5
15	130.0	50.0	-40.0	4.039	0.26644D+08	0.10760D+09	244.6
16	140.0	50.0	-40.0	4.640	0.33962D+08	0.15760D+09	279.1
17	90.0	50.0	-20.0	3.012	0.82668D+07	0.24900D+08	144.9
18	100.0	50.0	-20.0	3.068	0.14556D+08	0.44662D+08	171.8
19	110.0	50.0	-20.0	4.100	0.19973D+08	0.81895D+08	224.7
20	120.0	50.0	-20.0	4.689	0.26807D+08	0.12569D+09	257.2
21	170.0	65.0	-100.0	2.597	0.22869D+08	0.59389D+08	175.0
22	180.0	65.0	-100.0	3.498	0.31730D+08	0.11099D+09	255.9
23	190.0	65.0	-100.0	4.559	0.41088D+08	0.18730D+09	295.9
24	200.0	65.0	-100.0	4.857	0.52983D+08	0.25733D+09	333.4
25	150.0	65.0	-80.0	2.432	0.18962D+08	0.46114D+08	166.4
26	160.0	65.0	-80.0	3.316	0.26830D+08	0.88975D+08	240.3
27	170.0	65.0	-80.0	4.383	0.34847D+08	0.15273D+09	279.0
28	180.0	65.0	-80.0	4.632	0.45777D+08	0.21204D+09	315.9
29	130.0	65.0	-60.0	2.192	0.15267D+08	0.33472D+08	157.1

HIGHLAND ESTATES
Slope: GS-6b
Loading: Static

30	140.0	65.0	-60.0	3:147	0.22313D+08	0.70218D+08	225.0
31	150.0	65.0	-60.0	4.159	0.29108D+08	0.12106D+09	261.3
32	160.0	65.0	-60.0	4.596	0.38188D+08	0.17549D+09	297.1
33	110.0	65.0	-40.0	2.098	0.11388D+08	0.23887D+08	147.1
34	120.0	65.0	-40.0	3.032	0.17647D+08	0.53509D+08	209.2
35	130.0	65.0	-40.0	3.931	0.23975D+08	0.94244D+08	243.5
36	140.0	65.0	-40.0	4.551	0.31061D+08	0.14135D+09	277.1
37	90.0	65.0	-20.0	2.201	0.76387D+07	0.16815D+08	134.8
38	100.0	65.0	-20.0	2.808	0.13415D+08	0.37670D+08	191.8
39	110.0	65.0	-20.0	3.613	0.18444D+08	0.66645D+08	224.7
40	120.0	65.0	-20.0	4.625	0.24327D+08	0.11252D+09	256.7
41	170.0	80.0	-100.0	2.446	0.19292D+08	0.47197D+08	212.4
42	180.0	80.0	-100.0	3.115	0.28233D+08	0.87953D+08	253.5
43	190.0	80.0	-100.0	4.036	0.37549D+08	0.15154D+09	293.3
44	200.0	80.0	-100.0	4.987	0.48436D+08	0.24155D+09	331.4
45	150.0	80.0	-80.0	2.444	0.15746D+08	0.38477D+08	200.1
46	160.0	80.0	-80.0	3.073	0.23681D+08	0.72762D+08	239.7
47	170.0	80.0	-80.0	3.814	0.32233D+08	0.12294D+09	276.6
48	180.0	80.0	-80.0	4.943	0.41010D+08	0.20271D+09	313.6
49	130.0	80.0	-60.0	2.491	0.12251D+08	0.30521D+08	186.9
50	140.0	80.0	-60.0	2.986	0.18962D+08	0.56618D+08	225.0
51	150.0	80.0	-60.0	3.719	0.26648D+08	0.99096D+08	260.6
52	160.0	80.0	-60.0	4.849	0.34702D+08	0.16827D+09	294.9
53	110.0	80.0	-40.0	2.543	0.86456D+07	0.21984D+08	169.7
54	120.0	80.0	-40.0	2.901	0.14615D+08	0.42394D+08	209.2
55	130.0	80.0	-40.0	3.679	0.20953D+08	0.77089D+08	243.5
56	140.0	80.0	-40.0	4.716	0.28042D+08	0.13223D+09	276.7
57	90.0	80.0	-20.0	2.385	0.58969D+07	0.14065D+08	147.1
58	100.0	80.0	-20.0	2.929	0.10138D+08	0.29698D+08	188.7
59	110.0	80.0	-20.0	3.743	0.15338D+08	0.57408D+08	224.7
60	120.0	80.0	-20.0	4.561	0.21496D+08	0.98043D+08	256.7
61	170.0	95.0	-100.0	2.644	0.15213D+08	0.40224D+08	212.4
62	180.0	95.0	-100.0	3.160	0.23799D+08	0.75211D+08	253.5
63	190.0	95.0	-100.0	3.794	0.33073D+08	0.12547D+09	291.4
64	200.0	95.0	-100.0	4.865	0.43268D+08	0.21052D+09	328.9
65	150.0	95.0	-80.0	2.593	0.11476D+08	0.29755D+08	200.1
66	160.0	95.0	-80.0	3.048	0.19545D+08	0.59577D+08	239.7
67	170.0	95.0	-80.0	3.834	0.27223D+08	0.10438D+09	276.5
68	180.0	95.0	-80.0	4.829	0.36767D+08	0.17755D+09	311.6
69	130.0	95.0	-60.0	2.770	0.83404D+07	0.23102D+08	180.3
70	140.0	95.0	-60.0	2.941	0.14826D+08	0.43599D+08	225.0
71	150.0	95.0	-60.0	3.700	0.22080D+08	0.81699D+08	260.6
72	160.0	95.0	-60.0	4.668	0.29984D+08	0.13996D+09	294.7
73	110.0	95.0	-40.0	2.949	0.57212D+07	0.16872D+08	159.3
74	120.0	95.0	-40.0	3.203	0.10269D+08	0.32886D+08	204.3
75	130.0	95.0	-40.0	3.816	0.16422D+08	0.62667D+08	243.5
76	140.0	95.0	-40.0	4.595	0.23806D+08	0.10939D+09	276.7
77	90.0	95.0	-20.0	3.011	0.38862D+07	0.11701D+08	137.8
78	100.0	95.0	-20.0	3.430	0.70436D+07	0.24159D+08	180.7
79	110.0	95.0	-20.0	4.061	0.11250D+08	0.45683D+08	219.8
80	120.0	95.0	-20.0	4.898	0.17072D+08	0.83619D+08	256.6

CRITICAL CIRCLES

circle	radius	X-center	Y-center	F.S.
1	110.0	65.0	-40.0	2.098
2	130.0	65.0	-60.0	2.192
3	90.0	65.0	-20.0	2.201
4	90.0	80.0	-20.0	2.385
5	150.0	65.0	-80.0	2.432
6	150.0	80.0	-80.0	2.444
7	170.0	80.0	-100.0	2.446
8	130.0	80.0	-60.0	2.491
9	110.0	80.0	-40.0	2.543
10	150.0	95.0	-80.0	2.593

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Problem Title: hestates

User's Name:kcs
Date: 06-07-1993

Project: HIGHLAND ESTATES
Slope : GS-6b
Loading: Seismic

GENERAL DATA

UNITS

Unit Weight of Water: 62.4

GEOMETRY

Number of Sections : 13

Section	X	Y-crk.	Y-grd.
1	-150.0	10.0	10.0
2	-100.0	10.0	10.0
3	-60.0	15.0	15.0
4	-20.0	15.0	15.0
5	40.0	40.0	40.0
6	70.0	40.0	40.0
7	70.0	40.0	40.0
8	85.0	40.0	40.0
9	87.0	60.0	60.0
10	87.0	60.0	60.0
11	100.0	67.0	67.0
12	130.0	55.0	55.0
13	400.0	55.0	55.0

CIRCLE DATA

Coordinates of first circle (X,Y): 50 -100
Intervals of circle coordinates
X-direction: 15
Y-direction: 20
Number of intervals
X-direction: 4
Y-direction: 5

Elevation of upper-most tangent: 70
Tangent interval: 10
Number of tangents: 4

CONTROL DATA/ANALYSIS OPTIONS

Seismic coefficient: .15
Number of slices: 10

Total stress analysis

Soil parameters defined in SOIL PROPERTIES

File No. S22-634-2
July 20, 1993

HIGHLAND ESTATES
Slope: GS-6b
Loading: Seismic

SOIL PROPERTIES

Layer Number	Cohesion	Friction Angle	Unit Weight
1	700.0	10.0	125.0
2	4000.0	30.0	130.0
3	1500.0	20.0	130.0
4	1000.0	15.0	125.0
5	1000.0	25.0	125.0
6	1000.0	30.0	125.0
7	1250.0	35.0	125.0

SOIL PROFILE

Section Number	X	elevation to bottom of layer, layer number 1	2	3	4	5	6	7
1	-150.0	10.0	10.0	10.0	10.0	10.0	15.0	300.0
2	-100.0	10.0	10.0	10.0	10.0	20.0	30.0	300.0
3	-60.0	15.0	15.0	15.0	25.0	35.0	45.0	300.0
4	-20.0	33.0	15.0	33.0	43.0	53.0	63.0	300.0
5	40.0	60.0	40.0	60.0	70.0	80.0	90.0	300.0
6	70.0	75.0	40.0	75.0	85.0	95.0	105.0	300.0
7	70.0	75.0	65.0	40.0	85.0	95.0	105.0	300.0
8	85.0	80.0	65.0	40.0	90.0	100.0	110.0	300.0
9	87.0	80.0	65.0	60.0	90.0	100.0	110.0	300.0
10	87.0	80.0	60.0	60.0	90.0	100.0	110.0	300.0
11	100.0	85.0	65.0	65.0	95.0	105.0	115.0	300.0
12	130.0	85.0	55.0	55.0	95.0	105.0	115.0	300.0
13	400.0	85.0	55.0	55.0	95.0	105.0	115.0	300.0

RESULTS

circle	radius	X-center	Y-center	F.S.	ROVER	RESIST	ARCL
1	170.0	50.0	-100.0	1.141	0.60749D+08	0.69292D+08	188.5
2	180.0	50.0	-100.0	1.260	0.93477D+08	0.11782D+09	258.6
3	190.0	50.0	-100.0	1.380	0.13097D+09	0.18074D+09	297.5
4	200.0	50.0	-100.0	1.514	0.17051D+09	0.25814D+09	333.4
5	150.0	50.0	-80.0	1.194	0.45857D+08	0.54765D+08	177.8
6	160.0	50.0	-80.0	1.218	0.79309D+08	0.96607D+08	242.8
7	170.0	50.0	-80.0	1.357	0.11107D+09	0.15078D+09	281.4
8	180.0	50.0	-80.0	1.503	0.14340D+09	0.21557D+09	317.2
9	130.0	50.0	-60.0	1.183	0.36220D+08	0.42847D+08	167.1
10	140.0	50.0	-60.0	1.229	0.58804D+08	0.72242D+08	226.0
11	150.0	50.0	-60.0	1.340	0.91796D+08	0.12300D+09	263.5
12	160.0	50.0	-60.0	1.495	0.11935D+09	0.17845D+09	299.2
13	110.0	50.0	-40.0	1.187	0.27446D+08	0.32568D+08	156.6
14	120.0	50.0	-40.0	1.156	0.49846D+08	0.57608D+08	198.5
15	130.0	50.0	-40.0	1.321	0.73797D+08	0.97477D+08	244.6
16	140.0	50.0	-40.0	1.492	0.96766D+08	0.14434D+09	279.1
17	90.0	50.0	-20.0	1.215	0.19268D+08	0.23405D+08	144.9
18	100.0	50.0	-20.0	1.177	0.34685D+08	0.40830D+08	171.8
19	110.0	50.0	-20.0	1.341	0.55559D+08	0.74510D+08	224.7
20	120.0	50.0	-20.0	1.522	0.75783D+08	0.11532D+09	257.2
21	170.0	65.0	-100.0	1.057	0.52071D+08	0.55065D+08	175.0
22	180.0	65.0	-100.0	1.183	0.86237D+08	0.10201D+09	255.9
23	190.0	65.0	-100.0	1.275	0.13330D+09	0.16996D+09	295.9
24	200.0	65.0	-100.0	1.445	0.16339D+09	0.23609D+09	333.4
25	150.0	65.0	-80.0	1.068	0.40299D+08	0.43051D+08	166.4
26	160.0	65.0	-80.0	1.175	0.70294D+08	0.82628D+08	240.3
27	170.0	65.0	-80.0	1.263	0.11019D+09	0.13913D+09	279.0
28	180.0	65.0	-80.0	1.442	0.13442D+09	0.19381D+09	315.9
29	130.0	65.0	-60.0	1.047	0.30247D+08	0.31676D+08	157.1
30	140.0	65.0	-60.0	1.175	0.55487D+08	0.65209D+08	225.0
31	150.0	65.0	-60.0	1.259	0.87493D+08	0.11018D+09	261.3
32	160.0	65.0	-60.0	1.436	0.11126D+09	0.15979D+09	297.1
33	110.0	65.0	-40.0	1.074	0.21306D+08	0.22878D+08	147.1
34	120.0	65.0	-40.0	1.191	0.41882D+08	0.49877D+08	209.2

35	130.0	65.0	-40.0	1.266	0.67538D+08	0.85474D+08	243.5
36	140.0	65.0	-40.0	1.439	0.89512D+08	0.12881D+09	277.1
37	90.0	65.0	-20.0	1.134	0.14269D+08	0.16182D+08	134.8
38	100.0	65.0	-20.0	1.205	0.29423D+08	0.35466D+08	191.8
39	110.0	65.0	-20.0	1.311	0.47163D+08	0.61822D+08	224.7
40	120.0	65.0	-20.0	1.450	0.70461D+08	0.10214D+09	256.7
41	170.0	80.0	-100.0	1.233	0.37275D+08	0.45968D+08	212.4
42	180.0	80.0	-100.0	1.227	0.67629D+08	0.82970D+08	253.5
43	190.0	80.0	-100.0	1.274	0.10899D+09	0.13885D+09	293.3
44	200.0	80.0	-100.0	1.365	0.16105D+09	0.21986D+09	331.4
45	150.0	80.0	-80.0	1.239	0.30208D+08	0.37432D+08	200.1
46	160.0	80.0	-80.0	1.207	0.56655D+08	0.68381D+08	239.7
47	170.0	80.0	-80.0	1.260	0.89750D+08	0.11309D+09	276.6
48	180.0	80.0	-80.0	1.362	0.13557D+09	0.18462D+09	313.6
49	130.0	80.0	-60.0	1.260	0.23531D+08	0.29653D+08	186.9
50	140.0	80.0	-60.0	1.215	0.43966D+08	0.53402D+08	225.0
51	150.0	80.0	-60.0	1.251	0.73173D+08	0.91566D+08	260.6
52	160.0	80.0	-60.0	1.344	0.11350D+09	0.15255D+09	294.9
53	110.0	80.0	-40.0	1.328	0.16176D+08	0.21475D+08	169.7
54	120.0	80.0	-40.0	1.229	0.32829D+08	0.40362D+08	209.2
55	130.0	80.0	-40.0	1.279	0.56011D+08	0.71626D+08	243.5
56	140.0	80.0	-40.0	1.358	0.88737D+08	0.12053D+09	276.7
57	90.0	80.0	-20.0	1.468	0.94453D+07	0.13867D+08	147.1
58	100.0	80.0	-20.0	1.276	0.22239D+08	0.28383D+08	188.7
59	110.0	80.0	-20.0	1.350	0.39612D+08	0.53459D+08	224.7
60	120.0	80.0	-20.0	1.408	0.64252D+08	0.90471D+08	256.7
61	170.0	95.0	-100.0	1.432	0.27621D+08	0.39544D+08	212.4
62	180.0	95.0	-100.0	1.216	0.59286D+08	0.72098D+08	253.5
63	190.0	95.0	-100.0	1.304	0.90210D+08	0.11766D+09	291.4
64	200.0	95.0	-100.0	1.373	0.14130D+09	0.19398D+09	328.9
65	150.0	95.0	-80.0	1.659	0.17772D+08	0.29484D+08	200.1
66	160.0	95.0	-80.0	1.266	0.45149D+08	0.57174D+08	239.7
67	170.0	95.0	-80.0	1.305	0.74830D+08	0.97624D+08	276.5
68	180.0	95.0	-80.0	1.358	0.12002D+09	0.16300D+09	311.6
69	130.0	95.0	-60.0	1.750	0.13087D+08	0.22905D+08	180.3
70	140.0	95.0	-60.0	1.318	0.32189D+08	0.42419D+08	225.0
71	150.0	95.0	-60.0	1.366	0.56500D+08	0.77170D+08	260.6
72	160.0	95.0	-60.0	1.382	0.94064D+08	0.12998D+09	294.7
73	110.0	95.0	-40.0	1.876	0.89273D+07	0.16744D+08	159.3
74	120.0	95.0	-40.0	1.405	0.22788D+08	0.32022D+08	204.3
75	130.0	95.0	-40.0	1.424	0.41788D+08	0.59510D+08	243.5
76	140.0	95.0	-40.0	1.428	0.71623D+08	0.10229D+09	276.7
77	90.0	95.0	-20.0	1.966	0.59126D+07	0.11624D+08	137.8
78	100.0	95.0	-20.0	1.448	0.16254D+08	0.23543D+08	180.7
79	110.0	95.0	-20.0	1.497	0.29326D+08	0.43896D+08	219.8
80	120.0	95.0	-20.0	1.512	0.52035D+08	0.78700D+08	256.6

CRITICAL CIRCLES

circle	radius	X-center	Y-center	F.S.
1	130.0	65.0	-60.0	1.047
2	170.0	65.0	-100.0	1.057
3	150.0	65.0	-80.0	1.068
4	110.0	65.0	-40.0	1.074
5	90.0	65.0	-20.0	1.134
6	170.0	50.0	-100.0	1.141
7	120.0	50.0	-40.0	1.156
8	140.0	65.0	-60.0	1.175
9	160.0	65.0	-80.0	1.175
10	100.0	50.0	-20.0	1.177

GS7A.R

Problem Title: Highland Estates: Profile No. 7-a
Loading: Static

User's Name:P. F.
Date: 06-07-1993

GENERAL DATA

UNITS

Unit Weight of Water: 62.43

GEOMETRY

Number of Sections : 8

Section	X	Y-crk.	Y-grd.
1	-200.0	0.0	0.0
2	-55.0	10.0	10.0
3	-15.0	33.0	33.0
4	-5.0	33.0	33.0
5	40.0	55.0	55.0
6	75.0	55.0	55.0
7	100.0	75.0	75.0
8	155.0	80.0	80.0

CIRCLE DATA

Coordinates of first circle (X,Y): 40 -180
Intervals of circle coordinates
X-direction: 10
Y-direction: 10
Number of intervals
X-direction: 5
Y-direction: 6

Elevation of upper-most tangent: 75
Tangent interval: 5
Number of tangents: 4

CONTROL DATA/ANALYSIS OPTIONS

No seismic analysis
Number of slices: 10

Total stress analysis

Soil parameters defined in SOIL PROPERTIES

SOIL PROPERTIES

Layer Number	Cohesion	Friction Angle	Unit Weight
1	1500.0	20.0	130.0
2	1000.0	15.0	125.0
3	1000.0	25.0	125.0
4	1250.0	30.0	125.0
5	1500.0	35.0	125.0
6	2000.0	35.0	125.0

File No. S22-634-2
July 20, 1993

HIGHLAND ESTATES
Slope: GS-7a
Loading: Static

SOIL PROFILE

Section Number	X	elevation to bottom of layer, layer number 1	2	3	4	5	6
1	-200.0	0.0	10.0	20.0	30.0	50.0	300.0
2	-55.0	45.0	55.0	65.0	75.0	95.0	300.0
3	-15.0	60.0	70.0	80.0	90.0	110.0	300.0
4	-5.0	65.0	75.0	85.0	95.0	115.0	300.0
5	40.0	80.0	90.0	100.0	110.0	130.0	300.0
6	75.0	95.0	105.0	115.0	125.0	145.0	300.0
7	100.0	105.0	115.0	125.0	135.0	155.0	300.0
8	155.0	125.0	135.0	145.0	155.0	175.0	300.0

RESULTS

circle	radius	X-center	Y-center	F.S.	ROVER	RESIST	ARCL
1	255.0	40.0	-180.0	2.658	0.56301D+08	0.14964D+09	247.7
2	260.0	40.0	-180.0	2.670	0.67167D+08	0.17935D+09	262.5
3	265.0	40.0	-180.0	2.884	0.79331D+08	0.22880D+09	283.4
4	270.0	40.0	-180.0	3.129	0.91760D+08	0.28708D+09	306.9
5	245.0	40.0	-170.0	2.642	0.53142D+08	0.14039D+09	243.4
6	250.0	40.0	-170.0	2.651	0.63747D+08	0.16897D+09	258.1
7	255.0	40.0	-170.0	2.862	0.75309D+08	0.21550D+09	278.2
8	260.0	40.0	-170.0	3.102	0.87151D+08	0.27036D+09	301.3
9	235.0	40.0	-160.0	2.527	0.49926D+08	0.12617D+09	239.0
10	240.0	40.0	-160.0	2.636	0.60157D+08	0.15859D+09	253.6
11	245.0	40.0	-160.0	2.839	0.71314D+08	0.20247D+09	272.8
12	250.0	40.0	-160.0	3.076	0.82589D+08	0.25402D+09	295.6
13	225.0	40.0	-150.0	2.501	0.46745D+08	0.11689D+09	234.6
14	230.0	40.0	-150.0	2.706	0.56450D+08	0.15275D+09	249.0
15	235.0	40.0	-150.0	2.745	0.66893D+08	0.18362D+09	267.4
16	240.0	40.0	-150.0	2.978	0.77677D+08	0.23128D+09	289.9
17	215.0	40.0	-140.0	2.498	0.43562D+08	0.10882D+09	230.0
18	220.0	40.0	-140.0	2.699	0.52709D+08	0.14226D+09	244.3
19	225.0	40.0	-140.0	2.649	0.62572D+08	0.16573D+09	261.8
20	230.0	40.0	-140.0	2.960	0.72869D+08	0.21571D+09	284.0
21	205.0	40.0	-130.0	2.497	0.40471D+08	0.10104D+09	225.4
22	210.0	40.0	-130.0	2.497	0.49062D+08	0.12252D+09	239.6
23	215.0	40.0	-130.0	2.638	0.58355D+08	0.15391D+09	256.1
24	220.0	40.0	-130.0	2.864	0.68167D+08	0.19525D+09	278.0
25	255.0	50.0	-180.0	2.496	0.53023D+08	0.13232D+09	238.4
26	260.0	50.0	-180.0	2.492	0.64439D+08	0.16058D+09	253.8
27	265.0	50.0	-180.0	2.669	0.76268D+08	0.20359D+09	279.8
28	270.0	50.0	-180.0	2.909	0.88505D+08	0.25748D+09	303.5
29	245.0	50.0	-170.0	2.586	0.49781D+08	0.12874D+09	234.2

File No. S22-634-2
July 20, 1993

HIGHLAND ESTATES
Slope: GS-7a
Loading: Static

30	250.0	50.0	-170.0	2.482	0.60625D+08	0.15046D+09	249.0
31	255.0	50.0	-170.0	2.654	0.71953D+08	0.19095D+09	274.6
32	260.0	50.0	-170.0	2.891	0.83622D+08	0.24178D+09	298.0
33	235.0	50.0	-160.0	2.585	0.46623D+08	0.12050D+09	229.9
34	240.0	50.0	-160.0	2.474	0.56893D+08	0.14076D+09	244.6
35	245.0	50.0	-160.0	2.638	0.67731D+08	0.17868D+09	269.3
36	250.0	50.0	-160.0	2.798	0.78839D+08	0.22060D+09	292.4
37	225.0	50.0	-150.0	2.583	0.43551D+08	0.11250D+09	225.5
38	230.0	50.0	-150.0	2.554	0.53252D+08	0.13602D+09	240.1
39	235.0	50.0	-150.0	2.622	0.63604D+08	0.16677D+09	263.9
40	240.0	50.0	-150.0	2.779	0.74157D+08	0.20610D+09	286.7
41	215.0	50.0	-140.0	2.582	0.40565D+08	0.10473D+09	221.1
42	220.0	50.0	-140.0	2.548	0.49698D+08	0.12663D+09	235.5
43	225.0	50.0	-140.0	2.606	0.59572D+08	0.15522D+09	258.4
44	230.0	50.0	-140.0	2.759	0.69660D+08	0.19222D+09	280.9
45	205.0	50.0	-130.0	2.588	0.37550D+08	0.97168D+08	216.5
46	210.0	50.0	-130.0	2.359	0.46240D+08	0.10909D+09	230.8
47	215.0	50.0	-130.0	2.587	0.55739D+08	0.14420D+09	252.8
48	220.0	50.0	-130.0	2.661	0.65431D+08	0.17411D+09	274.9
49	255.0	60.0	-180.0	2.597	0.48985D+08	0.12723D+09	228.9
50	260.0	60.0	-180.0	2.390	0.60237D+08	0.14397D+09	249.4
51	265.0	60.0	-180.0	2.660	0.71841D+08	0.19108D+09	276.0
52	270.0	60.0	-180.0	2.723	0.84480D+08	0.23005D+09	300.1
53	245.0	60.0	-170.0	2.596	0.45948D+08	0.11928D+09	224.8
54	250.0	60.0	-170.0	2.386	0.56639D+08	0.13513D+09	244.7
55	255.0	60.0	-170.0	2.548	0.67957D+08	0.17313D+09	270.9
56	260.0	60.0	-170.0	2.620	0.80144D+08	0.20999D+09	294.7
57	235.0	60.0	-160.0	2.703	0.43013D+08	0.11627D+09	220.6
58	240.0	60.0	-160.0	2.380	0.53175D+08	0.12657D+09	239.8
59	245.0	60.0	-160.0	2.529	0.64238D+08	0.16245D+09	265.7
60	250.0	60.0	-160.0	2.602	0.75876D+08	0.19740D+09	289.1
61	225.0	60.0	-150.0	2.812	0.39947D+08	0.11232D+09	216.2
62	230.0	60.0	-150.0	2.368	0.50014D+08	0.11841D+09	234.9
63	235.0	60.0	-150.0	2.408	0.60586D+08	0.14588D+09	260.3
64	240.0	60.0	-150.0	2.583	0.71676D+08	0.18512D+09	283.5
65	215.0	60.0	-140.0	2.825	0.36941D+08	0.10434D+09	211.9
66	220.0	60.0	-140.0	2.374	0.46439D+08	0.11024D+09	229.8
67	225.0	60.0	-140.0	2.398	0.56708D+08	0.13599D+09	254.9
68	230.0	60.0	-140.0	2.564	0.67539D+08	0.17316D+09	277.7
69	205.0	60.0	-130.0	2.942	0.34038D+08	0.10013D+09	207.4
70	210.0	60.0	-130.0	2.382	0.42942D+08	0.10230D+09	224.7
71	215.0	60.0	-130.0	2.393	0.52634D+08	0.12593D+09	249.4
72	220.0	60.0	-130.0	2.563	0.62672D+08	0.16066D+09	271.8
73	255.0	70.0	-180.0	2.840	0.44643D+08	0.12677D+09	219.2
74	260.0	70.0	-180.0	2.484	0.56485D+08	0.14031D+09	245.0
75	265.0	70.0	-180.0	2.349	0.68680D+08	0.16131D+09	272.2
76	270.0	70.0	-180.0	2.625	0.81261D+08	0.21333D+09	296.7
77	245.0	70.0	-170.0	3.060	0.41572D+08	0.12723D+09	215.1
78	250.0	70.0	-170.0	2.487	0.52870D+08	0.13148D+09	240.3
79	255.0	70.0	-170.0	2.432	0.64708D+08	0.15734D+09	267.1
80	260.0	70.0	-170.0	2.607	0.76872D+08	0.20039D+09	291.3
81	235.0	70.0	-160.0	3.075	0.38600D+08	0.11871D+09	210.9
82	240.0	70.0	-160.0	2.491	0.49325D+08	0.12289D+09	235.5
83	245.0	70.0	-160.0	2.346	0.60343D+08	0.14155D+09	262.0
84	250.0	70.0	-160.0	2.602	0.71950D+08	0.18723D+09	285.8
85	225.0	70.0	-150.0	3.092	0.35729D+08	0.11047D+09	206.7
86	230.0	70.0	-150.0	2.502	0.45735D+08	0.11443D+09	230.6
87	235.0	70.0	-150.0	2.356	0.56112D+08	0.13220D+09	256.7
88	240.0	70.0	-150.0	2.600	0.67107D+08	0.17445D+09	280.2
89	215.0	70.0	-140.0	3.119	0.32818D+08	0.10235D+09	202.4

90	220.0	70.0	-140.0	2.619	0.42193D+08	0.11051D+09	225.7
91	225.0	70.0	-140.0	2.367	0.52016D+08	0.12313D+09	251.4
92	230.0	70.0	-140.0	2.512	0.62411D+08	0.15677D+09	274.5
93	205.0	70.0	-130.0	3.159	0.29894D+08	0.94424D+08	198.0
94	210.0	70.0	-130.0	2.635	0.38818D+08	0.10228D+09	220.6
95	215.0	70.0	-130.0	2.379	0.48057D+08	0.11434D+09	245.9
96	220.0	70.0	-130.0	2.414	0.57861D+08	0.13969D+09	268.7
97	255.0	80.0	-180.0	3.148	0.39475D+08	0.12428D+09	209.1
98	260.0	80.0	-180.0	2.790	0.50877D+08	0.14192D+09	240.3
99	265.0	80.0	-180.0	2.502	0.62961D+08	0.15755D+09	268.3
100	270.0	80.0	-180.0	2.572	0.75285D+08	0.19360D+09	293.2
101	245.0	80.0	-170.0	3.172	0.36580D+08	0.11603D+09	205.0
102	250.0	80.0	-170.0	2.806	0.47316D+08	0.13278D+09	235.7
103	255.0	80.0	-170.0	2.513	0.58780D+08	0.14771D+09	263.3
104	260.0	80.0	-170.0	2.468	0.70498D+08	0.17398D+09	287.9
105	235.0	80.0	-160.0	3.208	0.33641D+08	0.10791D+09	200.9
106	240.0	80.0	-160.0	2.929	0.43872D+08	0.12850D+09	231.0
107	245.0	80.0	-160.0	2.524	0.54731D+08	0.13816D+09	258.2
108	250.0	80.0	-160.0	2.470	0.65852D+08	0.16268D+09	282.4
109	225.0	80.0	-150.0	3.273	0.30519D+08	0.99899D+08	196.8
110	230.0	80.0	-150.0	3.051	0.40542D+08	0.12370D+09	226.2
111	235.0	80.0	-150.0	2.530	0.50986D+08	0.12900D+09	253.0
112	240.0	80.0	-150.0	2.565	0.61592D+08	0.15797D+09	276.9
113	215.0	80.0	-140.0	3.368	0.27342D+08	0.92090D+08	192.5
114	220.0	80.0	-140.0	3.079	0.37269D+08	0.11476D+09	221.3
115	225.0	80.0	-140.0	2.526	0.47626D+08	0.12029D+09	247.7
116	230.0	80.0	-140.0	2.468	0.57670D+08	0.14231D+09	271.3
117	205.0	80.0	-130.0	3.447	0.24602D+08	0.84807D+08	188.2
118	210.0	80.0	-130.0	3.126	0.33910D+08	0.10601D+09	216.4
119	215.0	80.0	-130.0	2.545	0.43803D+08	0.11150D+09	242.3
120	220.0	80.0	-130.0	2.463	0.53851D+08	0.13261D+09	265.5

CRITICAL CIRCLES

circle	radius	X-center	Y-center	F.S.
1	245.0	70.0	-160.0	2.346
2	265.0	70.0	-180.0	2.349
3	235.0	70.0	-150.0	2.356
4	210.0	50.0	-130.0	2.359
5	225.0	70.0	-140.0	2.367
6	230.0	60.0	-150.0	2.368
7	220.0	60.0	-140.0	2.374
8	215.0	70.0	-130.0	2.379
9	240.0	60.0	-160.0	2.380
10	210.0	60.0	-130.0	2.382

File No. S22-634-2
July 20, 1993

GS7A.S

Problem Title: Highland Estates: Profile No. 7-a
Loading: Seismic

User's Name:P. F.
Date: 06-07-1993

GENERAL DATA

UNITS

Unit Weight of Water: 62.43

GEOMETRY

Number of Sections : 8

Section	X	Y-crk.	Y-grd.
1	-200.0	0.0	0.0
2	-55.0	10.0	10.0
3	-15.0	33.0	33.0
4	-5.0	33.0	33.0
5	40.0	55.0	55.0
6	75.0	55.0	55.0
7	100.0	75.0	75.0
8	155.0	80.0	80.0

CIRCLE DATA

Coordinates of first circle (X,Y): 40 -180
Intervals of circle coordinates
X-direction: 10
Y-direction: 10
Number of intervals
X-direction: 5
Y-direction: 6

Elevation of upper-most tangent: 75
Tangent interval: 5
Number of tangents: 4

CONTROL DATA/ANALYSIS OPTIONS

Seismic coefficient: .15
Number of slices: 10

Total stress analysis

Soil parameters defined in SOIL PROPERTIES

SOIL PROPERTIES

Layer Number	Cohesion	Friction Angle	Unit Weight
1	1500.0	20.0	130.0
2	1000.0	15.0	125.0
3	1000.0	25.0	125.0
4	1250.0	30.0	125.0
5	1500.0	35.0	125.0
6	2000.0	35.0	125.0

File No. S22-634-2
July 20, 1993

HIGHLAND ESTATES
Slope: GS-7a
Loading: Seismic

SOIL PROFILE

Section Number	X	elevation to bottom of layer, layer number 1	2	3	4	5	6
1	-200.0	0.0	10.0	20.0	30.0	50.0	300.0
2	-55.0	45.0	55.0	65.0	75.0	95.0	300.0
3	-15.0	60.0	70.0	80.0	90.0	110.0	300.0
4	-5.0	65.0	75.0	85.0	95.0	115.0	300.0
5	40.0	80.0	90.0	100.0	110.0	130.0	300.0
6	75.0	95.0	105.0	115.0	125.0	145.0	300.0
7	100.0	105.0	115.0	125.0	135.0	155.0	300.0
8	155.0	125.0	135.0	145.0	155.0	175.0	300.0

RESULTS

circle	radius	X-center	Y-center	F.S.	ROVER	RESIST	ARCL
1	255.0	40.0	-180.0	1.292	0.11172D+09	0.14436D+09	247.7
2	260.0	40.0	-180.0	1.210	0.14125D+09	0.17086D+09	262.5
3	265.0	40.0	-180.0	1.191	0.18130D+09	0.21599D+09	283.4
4	270.0	40.0	-180.0	1.199	0.22360D+09	0.26806D+09	306.9
5	245.0	40.0	-170.0	1.288	0.10508D+09	0.13539D+09	243.4
6	250.0	40.0	-170.0	1.203	0.13370D+09	0.16086D+09	258.1
7	255.0	40.0	-170.0	1.185	0.17153D+09	0.20327D+09	278.2
8	260.0	40.0	-170.0	1.193	0.21137D+09	0.25219D+09	301.3
9	235.0	40.0	-160.0	1.292	0.94564D+08	0.12217D+09	239.0
10	240.0	40.0	-160.0	1.199	0.12587D+09	0.15088D+09	253.6
11	245.0	40.0	-160.0	1.179	0.16185D+09	0.19082D+09	272.8
12	250.0	40.0	-160.0	1.188	0.19932D+09	0.23671D+09	295.6
13	225.0	40.0	-150.0	1.380	0.82410D+08	0.11370D+09	234.6
14	230.0	40.0	-150.0	1.266	0.11532D+09	0.14594D+09	249.0
15	235.0	40.0	-150.0	1.191	0.14592D+09	0.17375D+09	267.4
16	240.0	40.0	-150.0	1.196	0.18047D+09	0.21593D+09	289.9
17	215.0	40.0	-140.0	1.385	0.76386D+08	0.10583D+09	230.0
18	220.0	40.0	-140.0	1.267	0.10728D+09	0.13588D+09	244.3
19	225.0	40.0	-140.0	1.206	0.13077D+09	0.15772D+09	261.8
20	230.0	40.0	-140.0	1.194	0.16847D+09	0.20123D+09	284.0
21	205.0	40.0	-130.0	1.392	0.70579D+08	0.98250D+08	225.4
22	210.0	40.0	-130.0	1.275	0.92668D+08	0.11815D+09	239.6
23	215.0	40.0	-130.0	1.206	0.12139D+09	0.14640D+09	256.1
24	220.0	40.0	-130.0	1.204	0.15213D+09	0.18322D+09	278.0
25	255.0	50.0	-180.0	1.369	0.93927D+08	0.12862D+09	238.4
26	260.0	50.0	-180.0	1.251	0.12361D+09	0.15467D+09	253.8
27	265.0	50.0	-180.0	1.265	0.15404D+09	0.19488D+09	279.8
28	270.0	50.0	-180.0	1.186	0.20381D+09	0.24174D+09	303.5
29	245.0	50.0	-170.0	1.478	0.84904D+08	0.12550D+09	234.2

30	250.0	50.0	-170.0	1.252	0.11577D+09	0.14489D+09	249.0
31	255.0	50.0	-170.0	1.263	0.14463D+09	0.18270D+09	274.6
32	260.0	50.0	-170.0	1.183	0.19169D+09	0.22685D+09	298.0
33	235.0	50.0	-160.0	1.484	0.79153D+08	0.11745D+09	229.9
34	240.0	50.0	-160.0	1.253	0.10818D+09	0.13553D+09	244.6
35	245.0	50.0	-160.0	1.261	0.13546D+09	0.17088D+09	269.3
36	250.0	50.0	-160.0	1.182	0.17629D+09	0.20830D+09	292.4
37	225.0	50.0	-150.0	1.490	0.73581D+08	0.10963D+09	225.5
38	230.0	50.0	-150.0	1.327	0.98642D+08	0.13085D+09	240.1
39	235.0	50.0	-150.0	1.260	0.12654D+09	0.15943D+09	263.9
40	240.0	50.0	-150.0	1.180	0.16490D+09	0.19452D+09	286.7
41	215.0	50.0	-140.0	1.496	0.68190D+08	0.10204D+09	221.1
42	220.0	50.0	-140.0	1.330	0.91563D+08	0.12180D+09	235.5
43	225.0	50.0	-140.0	1.258	0.11787D+09	0.14832D+09	258.4
44	230.0	50.0	-140.0	1.177	0.15408D+09	0.18131D+09	280.9
45	205.0	50.0	-130.0	1.506	0.62853D+08	0.94657D+08	216.5
46	210.0	50.0	-130.0	1.349	0.78522D+08	0.10593D+09	230.8
47	215.0	50.0	-130.0	1.255	0.10970D+09	0.13770D+09	252.8
48	220.0	50.0	-130.0	1.184	0.13923D+09	0.16480D+09	274.9
49	255.0	60.0	-180.0	1.488	0.83296D+08	0.12391D+09	228.9
50	260.0	60.0	-180.0	1.342	0.10423D+09	0.13987D+09	249.4
51	265.0	60.0	-180.0	1.256	0.14542D+09	0.18266D+09	276.0
52	270.0	60.0	-180.0	1.253	0.17508D+09	0.21931D+09	300.1
53	245.0	60.0	-170.0	1.493	0.77781D+08	0.11614D+09	224.8
54	250.0	60.0	-170.0	1.346	0.97542D+08	0.13125D+09	244.7
55	255.0	60.0	-170.0	1.254	0.13229D+09	0.16586D+09	270.9
56	260.0	60.0	-170.0	1.265	0.15908D+09	0.20119D+09	294.7
57	235.0	60.0	-160.0	1.627	0.69655D+08	0.11335D+09	220.6
58	240.0	60.0	-160.0	1.349	0.91134D+08	0.12290D+09	239.8
59	245.0	60.0	-160.0	1.248	0.12463D+09	0.15552D+09	265.7
60	250.0	60.0	-160.0	1.259	0.15015D+09	0.18902D+09	289.1
61	225.0	60.0	-150.0	1.771	0.62020D+08	0.10982D+09	216.2
62	230.0	60.0	-150.0	1.347	0.85332D+08	0.11493D+09	234.9
63	235.0	60.0	-150.0	1.245	0.11294D+09	0.14060D+09	260.3
64	240.0	60.0	-150.0	1.253	0.14136D+09	0.17716D+09	283.5
65	215.0	60.0	-140.0	1.782	0.57246D+08	0.10200D+09	211.9
66	220.0	60.0	-140.0	1.354	0.78990D+08	0.10696D+09	229.8
67	225.0	60.0	-140.0	1.243	0.10537D+09	0.13101D+09	254.9
68	230.0	60.0	-140.0	1.248	0.13272D+09	0.16561D+09	277.7
69	205.0	60.0	-130.0	1.945	0.50459D+08	0.98138D+08	207.4
70	210.0	60.0	-130.0	1.363	0.72817D+08	0.99223D+08	224.7
71	215.0	60.0	-130.0	1.329	0.91557D+08	0.12170D+09	249.4
72	220.0	60.0	-130.0	1.252	0.12272D+09	0.15363D+09	271.8
73	255.0	70.0	-180.0	1.781	0.69594D+08	0.12394D+09	219.2
74	260.0	70.0	-180.0	1.449	0.94320D+08	0.13663D+09	245.0
75	265.0	70.0	-180.0	1.244	0.12554D+09	0.15612D+09	272.2
76	270.0	70.0	-180.0	1.244	0.16411D+09	0.20410D+09	296.7
77	245.0	70.0	-170.0	2.101	0.59506D+08	0.12500D+09	215.1
78	250.0	70.0	-170.0	1.455	0.87999D+08	0.12800D+09	240.3
79	255.0	70.0	-170.0	1.323	0.11500D+09	0.15212D+09	267.1
80	260.0	70.0	-170.0	1.240	0.15453D+09	0.19163D+09	291.3
81	235.0	70.0	-160.0	2.118	0.55056D+08	0.11663D+09	210.9
82	240.0	70.0	-160.0	1.462	0.81832D+08	0.11960D+09	235.5
83	245.0	70.0	-160.0	1.338	0.10279D+09	0.13755D+09	262.0
84	250.0	70.0	-160.0	1.242	0.14414D+09	0.17901D+09	285.8
85	225.0	70.0	-150.0	2.138	0.50773D+08	0.10853D+09	206.7
86	230.0	70.0	-150.0	1.474	0.75569D+08	0.11135D+09	230.6
87	235.0	70.0	-150.0	1.348	0.95272D+08	0.12844D+09	256.7
88	240.0	70.0	-150.0	1.245	0.13398D+09	0.16674D+09	280.2
89	215.0	70.0	-140.0	2.164	0.46469D+08	0.10056D+09	202.4

90	220.0	70.0	-140.0	1.608	0.66951D+08	0.10766D+09	225.7
91	225.0	70.0	-140.0	1.359	0.88016D+08	0.11960D+09	251.4
92	230.0	70.0	-140.0	1.250	0.12017D+09	0.15017D+09	274.5
93	205.0	70.0	-130.0	2.199	0.42188D+08	0.92774D+08	198.0
94	210.0	70.0	-130.0	1.624	0.61345D+08	0.99626D+08	220.6
95	215.0	70.0	-130.0	1.370	0.81027D+08	0.11104D+09	245.9
96	220.0	70.0	-130.0	1.257	0.10721D+09	0.13476D+09	268.7
97	255.0	80.0	-180.0	2.174	0.56175D+08	0.12213D+09	209.1
98	260.0	80.0	-180.0	1.759	0.78921D+08	0.13880D+09	240.3
99	265.0	80.0	-180.0	1.467	0.10476D+09	0.15365D+09	268.3
100	270.0	80.0	-180.0	1.245	0.14897D+09	0.18549D+09	293.2
101	245.0	80.0	-170.0	2.198	0.51874D+08	0.11403D+09	205.0
102	250.0	80.0	-170.0	1.775	0.73138D+08	0.12985D+09	235.7
103	255.0	80.0	-170.0	1.479	0.97385D+08	0.14404D+09	263.3
104	260.0	80.0	-170.0	1.252	0.13408D+09	0.16789D+09	287.9
105	235.0	80.0	-160.0	2.231	0.47543D+08	0.10606D+09	200.9
106	240.0	80.0	-160.0	1.948	0.64688D+08	0.12602D+09	231.0
107	245.0	80.0	-160.0	1.492	0.90276D+08	0.13470D+09	258.2
108	250.0	80.0	-160.0	1.257	0.12489D+09	0.15695D+09	282.4
109	225.0	80.0	-150.0	2.281	0.43049D+08	0.98198D+08	196.8
110	230.0	80.0	-150.0	2.123	0.57267D+08	0.12158D+09	226.2
111	235.0	80.0	-150.0	1.502	0.83724D+08	0.12575D+09	253.0
112	240.0	80.0	-150.0	1.462	0.10499D+09	0.15349D+09	276.9
113	215.0	80.0	-140.0	2.349	0.38552D+08	0.90540D+08	192.5
114	220.0	80.0	-140.0	2.148	0.52500D+08	0.11280D+09	221.3
115	225.0	80.0	-140.0	1.506	0.77860D+08	0.11722D+09	247.7
116	230.0	80.0	-140.0	1.476	0.94091D+08	0.13887D+09	271.3
117	205.0	80.0	-130.0	2.407	0.34649D+08	0.83389D+08	188.2
118	210.0	80.0	-130.0	2.185	0.47689D+08	0.10420D+09	216.4
119	215.0	80.0	-130.0	1.519	0.71536D+08	0.10863D+09	242.3
120	220.0	80.0	-130.0	1.479	0.87444D+08	0.12937D+09	265.5

CRITICAL CIRCLES

circle	radius	X-center	Y-center	F.S.
1	230.0	50.0	-140.0	1.177
2	245.0	40.0	-160.0	1.179
3	240.0	50.0	-150.0	1.180
4	250.0	50.0	-160.0	1.182
5	260.0	50.0	-170.0	1.183
6	220.0	50.0	-130.0	1.184
7	255.0	40.0	-170.0	1.185
8	270.0	50.0	-180.0	1.186
9	250.0	40.0	-160.0	1.188
10	235.0	40.0	-150.0	1.191

File No. S22-634-2
July 20, 1993

re

Problem Title: he-kcs

User's Name:kcs
Date: 06-07-1993

GENERAL DATA

UNITS

Unit Weight of Water: 62.4

Project: Highland Estates
Slope : GS-7b
Loading: Static

GEOMETRY

Number of Sections : 14

Section	X	Y-crk.	Y-grd.
1	-175.0	0.0	0.0
2	-55.0	10.0	10.0
3	40.0	55.0	55.0
4	62.0	55.0	55.0
5	100.0	75.0	75.0
6	120.0	77.0	77.0
7	145.0	80.0	80.0
8	152.0	80.0	80.0
9	155.0	80.0	80.0
10	160.0	85.0	85.0
11	185.0	108.0	108.0
12	220.0	140.0	140.0
13	220.0	140.0	140.0
14	500.0	140.0	140.0

CIRCLE DATA

Coordinates of first circle (X,Y): 140 -60
Intervals of circle coordinates
X-direction: 20
Y-direction: 20
Number of intervals
X-direction: 5
Y-direction: 5

Elevation of upper-most tangent: 155
Tangent interval: 10
Number of tangents: 5

CONTROL DATA/ANALYSIS OPTIONS

No seismic analysis
Number of slices: 10

Total stress analysis

Soil parameters defined in SOIL PROPERTIES

File No. S22-634-2
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HIGHLAND ESTATES
Slope: GS-7b
Loading: Static

SOIL PROPERTIES

Layer Number	Cohesion	Friction Angle	Unit Weight
1	4000.0	30.0	130.0
2	1500.0	20.0	130.0
3	1000.0	15.0	125.0
4	1000.0	25.0	125.0
5	1250.0	30.0	125.0
6	1500.0	35.0	125.0
7	2000.0	37.0	125.0

SOIL PROFILE

Section Number	X	elevation to bottom of layer, layer number 1	2	3	4	5	6	7
1	-175.0	0.0	0.0	0.0	10.0	20.0	40.0	300.0
2	-55.0	10.0	42.0	52.0	62.0	72.0	92.0	300.0
3	40.0	55.0	80.0	90.0	100.0	110.0	130.0	300.0
4	62.0	55.0	90.0	100.0	110.0	120.0	140.0	300.0
5	100.0	75.0	105.0	115.0	125.0	135.0	155.0	300.0
6	120.0	80.0	115.0	125.0	135.0	145.0	165.0	300.0
7	145.0	125.0	125.0	135.0	145.0	155.0	175.0	300.0
8	152.0	135.0	135.0	135.0	145.0	155.0	175.0	300.0
9	155.0	140.0	140.0	140.0	148.0	158.0	178.0	300.0
10	160.0	150.0	150.0	150.0	150.0	160.0	180.0	300.0
11	185.0	150.0	150.0	150.0	160.0	170.0	190.0	300.0
12	220.0	150.0	150.0	160.0	170.0	180.0	200.0	300.0
13	220.0	140.0	150.0	160.0	170.0	180.0	200.0	300.0
14	500.0	140.0	230.0	240.0	250.0	260.0	280.0	400.0

RESULTS

circle	radius	X-center	Y-center	F.S.	ROVER	RESIST	ARCL
1	215.0	140.0	-60.0	3.058	0.14296D+09	0.43722D+09	345.5
2	225.0	140.0	-60.0	3.093	0.18000D+09	0.55673D+09	386.7
3	235.0	140.0	-60.0	3.251	0.21805D+09	0.70898D+09	425.1
4	245.0	140.0	-60.0	3.417	0.25924D+09	0.88576D+09	461.5
5	255.0	140.0	-60.0	3.577	0.30104D+09	0.10768D+10	496.6
6	195.0	140.0	-40.0	3.151	0.11589D+09	0.36522D+09	328.4
7	205.0	140.0	-40.0	3.171	0.14970D+09	0.47472D+09	367.8
8	215.0	140.0	-40.0	3.303	0.18527D+09	0.61205D+09	405.0
9	225.0	140.0	-40.0	3.405	0.22284D+09	0.75878D+09	440.4
10	235.0	140.0	-40.0	3.621	0.25967D+09	0.94035D+09	474.5
11	175.0	140.0	-20.0	3.307	0.92344D+08	0.30540D+09	307.0
12	185.0	140.0	-20.0	3.428	0.12118D+09	0.41547D+09	343.1
13	195.0	140.0	-20.0	3.375	0.15148D+09	0.51130D+09	381.9
14	205.0	140.0	-20.0	3.493	0.18605D+09	0.64991D+09	416.7
15	215.0	140.0	-20.0	3.668	0.22159D+09	0.81284D+09	449.8

16	155.0	140.0	0.0	3.625	0.71386D+08	0.25879D+09	284.6
17	165.0	140.0	0.0	3.619	0.94354D+08	0.34149D+09	315.9
18	175.0	140.0	0.0	3.527	0.12022D+09	0.42398D+09	352.8
19	185.0	140.0	0.0	3.753	0.14913D+09	0.55971D+09	387.6
20	195.0	140.0	0.0	3.867	0.18045D+09	0.69776D+09	420.8
21	135.0	140.0	20.0	3.875	0.53194D+08	0.20613D+09	261.0
22	145.0	140.0	20.0	3.809	0.71415D+08	0.27201D+09	286.8
23	155.0	140.0	20.0	3.713	0.92516D+08	0.34347D+09	321.7
24	165.0	140.0	20.0	3.980	0.11523D+09	0.45863D+09	354.6
25	175.0	140.0	20.0	4.072	0.14133D+09	0.57551D+09	386.1
26	215.0	160.0	-60.0	2.785	0.12800D+09	0.35645D+09	337.6
27	225.0	160.0	-60.0	2.976	0.16420D+09	0.48860D+09	384 6
28	235.0	160.0	-60.0	3.079	0.20266D+09	0.62392D+09	423.6
29	245.0	160.0	-60.0	3.334	0.24376D+09	0.81271D+09	460.0
30	255.0	160.0	-60.0	3.468	0.28557D+09	0.99036D+09	495.2
31	195.0	160.0	-40.0	2.778	0.10457D+09	0.29052D+09	314.5
32	205.0	160.0	-40.0	3.063	0.13492D+09	0.41330D+09	360.1
33	215.0	160.0	-40.0	3.157	0.16861D+09	0.53224D+09	401.6
34	225.0	160.0	-40.0	3.417	0.20516D+09	0.70109D+09	439.1
35	235.0	160.0	-40.0	3.518	0.24584D+09	0.86498D+09	473.3
36	175.0	160.0	-20.0	3.005	0.84532D+08	0.25403D+09	291.0
37	185.0	160.0	-20.0	2.969	0.10979D+09	0.32599D+09	334.9
38	195.0	160.0	-20.0	3.236	0.13806D+09	0.44681D+09	375.0
39	205.0	160.0	-20.0	3.480	0.16845D+09	0.58624D+09	412.6
40	215.0	160.0	-20.0	3.644	0.20342D+09	0.74124D+09	448.4
41	155.0	160.0	0.0	3.041	0.66803D+08	0.20317D+09	266.9
42	165.0	160.0	0.0	3.081	0.87842D+08	0.27067D+09	308.9
43	175.0	160.0	0.0	3.310	0.11185D+09	0.37025D+09	347.3
44	185.0	160.0	0.0	3.575	0.13745D+09	0.49141D+09	383.4
45	195.0	160.0	0.0	3.769	0.16626D+09	0.62660D+09	417.8
46	135.0	160.0	20.0	3.087	0.51267D+08	0.15825D+09	241.8
47	145.0	160.0	20.0	3.175	0.68198D+08	0.21654D+09	281.7
48	155.0	160.0	20.0	3.428	0.87636D+08	0.30038D+09	318.2
49	165.0	160.0	20.0	3.713	0.10861D+09	0.40325D+09	352.4
50	175.0	160.0	20.0	3.916	0.13305D+09	0.52102D+09	385.2
51	215.0	180.0	-60.0	2.526	0.11174D+09	0.28230D+09	325.6
52	225.0	180.0	-60.0	2.770	0.14370D+09	0.39806D+09	373.7
53	235.0	180.0	-60.0	3.015	0.17963D+09	0.54161D+09	417.4
54	245.0	180.0	-60.0	3.196	0.21836D+09	0.69797D+09	458.5
55	255.0	180.0	-60.0	3.478	0.26062D+09	0.90643D+09	493.8
56	195.0	180.0	-40.0	2.558	0.92346D+08	0.23625D+09	303.1
57	205.0	180.0	-40.0	2.806	0.12042D+09	0.33787D+09	349.7
58	215.0	180.0	-40.0	3.060	0.15150D+09	0.46364D+09	392.2
59	225.0	180.0	-40.0	3.251	0.18479D+09	0.60081D+09	432.2
60	235.0	180.0	-40.0	3.556	0.22049D+09	0.78402D+09	470.3
61	175.0	180.0	-20.0	2.504	0.75522D+08	0.18908D+09	280.1
62	185.0	180.0	-20.0	2.862	0.98251D+08	0.28117D+09	325.3
63	195.0	180.0	-20.0	3.078	0.12423D+09	0.38242D+09	366.5
64	205.0	180.0	-20.0	3.309	0.15370D+09	0.50852D+09	405.2
65	215.0	180.0	-20.0	3.631	0.18463D+09	0.67042D+09	442.2
66	155.0	180.0	0.0	2.375	0.61398D+08	0.14579D+09	256.7
67	165.0	180.0	0.0	2.875	0.80313D+08	0.23093D+09	300.2
68	175.0	180.0	0.0	3.120	0.10134D+09	0.31615D+09	339.9
69	185.0	180.0	0.0	3.460	0.12436D+09	0.43024D+09	377.3
70	195.0	180.0	0.0	3.746	0.15022D+09	0.56269D+09	412.9
71	135.0	180.0	20.0	2.379	0.48808D+08	0.11611D+09	237.3
72	145.0	180.0	20.0	2.808	0.63882D+08	0.17936D+09	274.3
73	155.0	180.0	20.0	3.121	0.80726D+08	0.25196D+09	312.3
74	165.0	180.0	20.0	3.508	0.10080D+09	0.35359D+09	348.0
75	175.0	180.0	20.0	3.893	0.12187D+09	0.47442D+09	382.1

76	215.0	200.0	-60.0	2.333	0.95805D+08	0.22353D+09	312.4
77	225.0	200.0	-60.0	2.861	0.12372D+09	0.35393D+09	361.6
78	235.0	200.0	-60.0	2.989	0.15640D+09	0.46741D+09	406.3
79	245.0	200.0	-60.0	3.255	0.19328D+09	0.62920D+09	448.3
80	255.0	200.0	-60.0	3.385	0.23219D+09	0.78607D+09	488.4
81	195.0	200.0	-40.0	2.258	0.80286D+08	0.18130D+09	290.3
82	205.0	200.0	-40.0	2.771	0.10506D+09	0.29108D+09	338.1
83	215.0	200.0	-40.0	3.023	0.13162D+09	0.39795D+09	381.7
84	225.0	200.0	-40.0	3.334	0.16128D+09	0.53780D+09	422.7
85	235.0	200.0	-40.0	3.456	0.19630D+09	0.67841D+09	461.8
86	175.0	200.0	-20.0	2.171	0.66684D+08	0.14478D+09	269.1
87	185.0	200.0	-20.0	2.723	0.86751D+08	0.23624D+09	314.3
88	195.0	200.0	-20.0	2.961	0.11086D+09	0.32821D+09	356.6
89	205.0	200.0	-20.0	3.361	0.13620D+09	0.45783D+09	396.5
90	215.0	200.0	-20.0	3.600	0.16401D+09	0.59037D+09	434.5
91	155.0	200.0	0.0	2.104	0.54786D+08	0.11528D+09	254.0
92	165.0	200.0	0.0	2.689	0.72440D+08	0.19477D+09	292.3
93	175.0	200.0	0.0	2.937	0.90543D+08	0.26594D+09	330.9
94	185.0	200.0	0.0	3.359	0.11213D+09	0.37670D+09	369.5
95	195.0	200.0	0.0	3.650	0.13705D+09	0.50018D+09	406.3
96	135.0	200.0	20.0	2.074	0.42099D+08	0.87316D+08	233.2
97	145.0	200.0	20.0	2.518	0.57415D+08	0.14456D+09	274.0
98	155.0	200.0	20.0	2.979	0.74428D+08	0.22169D+09	308.2
99	165.0	200.0	20.0	3.304	0.91229D+08	0.30143D+09	341.6
100	175.0	200.0	20.0	3.759	0.10960D+09	0.41205D+09	377.0
101	215.0	220.0	-60.0	2.076	0.81532D+08	0.16927D+09	297.7
102	225.0	220.0	-60.0	2.563	0.10639D+09	0.27267D+09	348.4
103	235.0	220.0	-60.0	3.106	0.13661D+09	0.42430D+09	394.2
104	245.0	220.0	-60.0	3.285	0.16773D+09	0.55100D+09	437.2
105	255.0	220.0	-60.0	3.700	0.20128D+09	0.74470D+09	478.1
106	195.0	220.0	-40.0	2.329	0.69549D+08	0.16197D+09	283.1
107	205.0	220.0	-40.0	2.533	0.90358D+08	0.22891D+09	325.3
108	215.0	220.0	-40.0	3.172	0.11299D+09	0.35837D+09	370.1
109	225.0	220.0	-40.0	3.316	0.14255D+09	0.47267D+09	412.0
110	235.0	220.0	-40.0	3.689	0.17199D+09	0.63443D+09	452.0
111	175.0	220.0	-20.0	2.309	0.55764D+08	0.12878D+09	269.1
112	185.0	220.0	-20.0	2.522	0.76184D+08	0.19214D+09	308.8
113	195.0	220.0	-20.0	3.058	0.96530D+08	0.29514D+09	345.5
114	205.0	220.0	-20.0	3.252	0.11769D+09	0.38274D+09	386.4
115	215.0	220.0	-20.0	3.764	0.14359D+09	0.54044D+09	425.4
116	155.0	220.0	0.0	2.372	0.44590D+08	0.10577D+09	245.1
117	165.0	220.0	0.0	2.386	0.60780D+08	0.14503D+09	290.8
118	175.0	220.0	0.0	2.943	0.79811D+08	0.23488D+09	327.8
119	185.0	220.0	0.0	3.208	0.99866D+08	0.32039D+09	361.9
120	195.0	220.0	0.0	3.799	0.11964D+09	0.45448D+09	398.2
121	135.0	220.0	20.0	2.621	0.34777D+08	0.91147D+08	220.7
122	145.0	220.0	20.0	2.391	0.47870D+08	0.11446D+09	264.7
123	155.0	220.0	20.0	3.006	0.63212D+08	0.19001D+09	304.9
124	165.0	220.0	20.0	3.375	0.80313D+08	0.27102D+09	341.1
125	175.0	220.0	20.0	3.662	0.99942D+08	0.36598D+09	373.2

CRITICAL CIRCLES

circle	radius	X-center	Y-center	F.S.
1	135.0	200.0	20.0	2.074
2	215.0	220.0	-60.0	2.076
3	155.0	200.0	0.0	2.104
4	175.0	200.0	-20.0	2.171
5	195.0	200.0	-40.0	2.258
6	175.0	220.0	-20.0	2.309
7	195.0	220.0	-40.0	2.329
8	215.0	200.0	-60.0	2.333
9	155.0	220.0	0.0	2.372
10	155.0	180.0	0.0	2.375

File No. S22-634-2
July 20, 1993

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Problem Title: he-kcs

User's Name:kcs
Date: 06-07-1993

Project: Highland Estates
Slope : GS-7b
Loading: Seismic

GENERAL DATA

UNITS

Unit Weight of Water: 62.4

GEOMETRY

Number of Sections : 14

Section	X	Y-crk.	Y-grd.
1	-175.0	0.0	0.0
2	-55.0	10.0	10.0
3	40.0	55.0	55.0
4	62.0	55.0	55.0
5	100.0	75.0	75.0
6	120.0	77.0	77.0
7	145.0	80.0	80.0
8	152.0	80.0	80.0
9	155.0	80.0	80.0
10	160.0	85.0	85.0
11	185.0	108.0	108.0
12	220.0	140.0	140.0
13	220.0	140.0	140.0
14	500.0	140.0	140.0

CIRCLE DATA

Coordinates of first circle (X,Y): 140 -60
Intervals of circle coordinates
X-direction: 20
Y-direction: 20
Number of intervals
X-direction: 5
Y-direction: 5

Elevation of upper-most tangent: 155
Tangent interval: 10
Number of tangents: 5

CONTROL DATA/ANALYSIS OPTIONS

Seismic coefficient: .15
Number of slices: 10

Total stress analysis

Soil parameters defined in SOIL PROPERTIES

File No. S22-634-2
July 20, 1993

HIGHLAND ESTATES
Slope: GS-7b
Loading: Seismic

SOIL PROPERTIES

Layer Number	Cohesion	Friction Angle	Unit Weight
1	4000.0	30.0	130.0
2	1500.0	20.0	130.0
3	1000.0	15.0	125.0
4	1000.0	25.0	125.0
5	1250.0	30.0	125.0
6	1500.0	35.0	125.0
7	2000.0	37.0	125.0

SOIL PROFILE

Section Number	X	elevation to bottom of layer, layer number 1	2	3	4	5	6	7
1	-175.0	0.0	0.0	0.0	10.0	20.0	40.0	300.0
2	-55.0	10.0	42.0	52.0	62.0	72.0	92.0	300.0
3	40.0	55.0	80.0	90.0	100.0	110.0	130.0	300.0
4	62.0	55.0	90.0	100.0	110.0	120.0	140.0	300.0
5	100.0	75.0	105.0	115.0	125.0	135.0	155.0	300.0
6	120.0	80.0	115.0	125.0	135.0	145.0	165.0	300.0
7	145.0	125.0	125.0	135.0	145.0	155.0	175.0	300.0
8	152.0	135.0	135.0	135.0	145.0	155.0	175.0	300.0
9	155.0	140.0	140.0	140.0	148.0	158.0	178.0	300.0
10	160.0	150.0	150.0	150.0	150.0	160.0	180.0	300.0
11	185.0	150.0	150.0	150.0	160.0	170.0	190.0	300.0
12	220.0	150.0	150.0	160.0	170.0	180.0	200.0	300.0
13	220.0	140.0	150.0	160.0	170.0	180.0	200.0	300.0
14	500.0	140.0	230.0	240.0	250.0	260.0	280.0	400.0

RESULTS

circle	radius	X-center	Y-center	F.S.	ROVER	RESIST	ARCL
1	215.0	140.0	-60.0	1.154	0.34329D+09	0.39620D+09	345.5
2	225.0	140.0	-60.0	1.077	0.45956D+09	0.49498D+09	386.7
3	235.0	140.0	-60.0	1.164	0.54613D+09	0.63560D+09	425.1
4	245.0	140.0	-60.0	1.257	0.63407D+09	0.79714D+09	461.5
5	255.0	140.0	-60.0	1.353	0.72694D+09	0.98329D+09	496.6
6	195.0	140.0	-40.0	1.201	0.27758D+09	0.33336D+09	328.4
7	205.0	140.0	-40.0	1.093	0.38647D+09	0.42231D+09	367.8
8	215.0	140.0	-40.0	1.180	0.46533D+09	0.54889D+09	405.0
9	225.0	140.0	-40.0	1.275	0.53919D+09	0.68750D+09	440.4
10	235.0	140.0	-40.0	1.378	0.62351D+09	0.85923D+09	474.5
11	175.0	140.0	-20.0	1.221	0.22918D+09	0.27976D+09	307.0
12	185.0	140.0	-20.0	1.190	0.31827D+09	0.37885D+09	343.1
13	195.0	140.0	-20.0	1.225	0.37551D+09	0.46005D+09	381.9
14	205.0	140.0	-20.0	1.301	0.45341D+09	0.58980D+09	416.7
15	215.0	140.0	-20.0	1.407	0.52862D+09	0.74352D+09	449.8

HIGHLAND ESTATES
Slope: GS-7b
Loading: Seismic

16	155.0	140.0	0.0	1.391	0.17542D+09	0.24404D+09	284.6
17	165.0	140.0	0.0	1.233	0.25419D+09	0.31341D+09	315.9
18	175.0	140.0	0.0	1.264	0.30311D+09	0.38327D+09	352.8
19	185.0	140.0	0.0	1.352	0.37590D+09	0.50812D+09	387.6
20	195.0	140.0	0.0	1.457	0.43612D+09	0.63552D+09	420.8
21	135.0	140.0	20.0	1.443	0.13575D+09	0.19594D+09	261.0
22	145.0	140.0	20.0	1.327	0.18890D+09	0.25068D+09	286.8
23	155.0	140.0	20.0	1.316	0.23732D+09	0.31240D+09	321.7
24	165.0	140.0	20.0	1.414	0.29641D+09	0.41907D+09	354.6
25	175.0	140.0	20.0	1.535	0.34367D+09	0.52762D+09	386.1
26	215.0	160.0	-60.0	0.986	0.31633D+09	0.31186D+09	337.6
27	225.0	160.0	-60.0	1.054	0.40718D+09	0.42910D+09	384.6
28	235.0	160.0	-60.0	1.095	0.50865D+09	0.55714D+09	423.6
29	245.0	160.0	-60.0	1.179	0.61805D+09	0.72892D+09	460.0
30	255.0	160.0	-60.0	1.286	0.69626D+09	0.89522D+09	495.2
31	195.0	160.0	-40.0	0.997	0.25535D+09	0.25459D+09	314.5
32	205.0	160.0	-40.0	1.061	0.34231D+09	0.36318D+09	360.1
33	215.0	160.0	-40.0	1.115	0.42697D+09	0.47611D+09	401.6
34	225.0	160.0	-40.0	1.203	0.52361D+09	0.62965D+09	439.1
35	235.0	160.0	-40.0	1.307	0.59861D+09	0.78229D+09	473.3
36	175.0	160.0	-20.0	1.091	0.20956D+09	0.22855D+09	291.0
37	185.0	160.0	-20.0	1.078	0.27001D+09	0.29113D+09	334.9
38	195.0	160.0	-20.0	1.135	0.35318D+09	0.40100D+09	375.0
39	205.0	160.0	-20.0	1.249	0.42313D+09	0.52868D+09	412.6
40	215.0	160.0	-20.0	1.345	0.49966D+09	0.67211D+09	448.4
41	155.0	160.0	0.0	1.107	0.16526D+09	0.18293D+09	266.9
42	165.0	160.0	0.0	1.098	0.22156D+09	0.24319D+09	308.9
43	175.0	160.0	0.0	1.154	0.28887D+09	0.33342D+09	347.3
44	185.0	160.0	0.0	1.278	0.34814D+09	0.44482D+09	383.4
45	195.0	160.0	0.0	1.386	0.41158D+09	0.57056D+09	417.8
46	135.0	160.0	20.0	1.127	0.12771D+09	0.14396D+09	241.8
47	145.0	160.0	20.0	1.125	0.17369D+09	0.19532D+09	281.7
48	155.0	160.0	20.0	1.212	0.22263D+09	0.26974D+09	318.2
49	165.0	160.0	20.0	1.321	0.27777D+09	0.36705D+09	352.4
50	175.0	160.0	20.0	1.438	0.33181D+09	0.47698D+09	385.2
51	215.0	180.0	-60.0	0.936	0.26659D+09	0.24943D+09	325.6
52	225.0	180.0	-60.0	1.037	0.34035D+09	0.35307D+09	373.7
53	235.0	180.0	-60.0	1.078	0.44801D+09	0.48290D+09	417.4
54	245.0	180.0	-60.0	1.149	0.54579D+09	0.62719D+09	458.5
55	255.0	180.0	-60.0	1.221	0.66799D+09	0.81589D+09	493.8
56	195.0	180.0	-40.0	0.936	0.22289D+09	0.20865D+09	303.1
57	205.0	180.0	-40.0	1.040	0.28819D+09	0.29961D+09	349.7
58	215.0	180.0	-40.0	1.084	0.38177D+09	0.41393D+09	392.2
59	225.0	180.0	-40.0	1.151	0.46928D+09	0.54028D+09	432.2
60	235.0	180.0	-40.0	1.239	0.57021D+09	0.70647D+09	470.3
61	175.0	180.0	-20.0	0.943	0.17830D+09	0.16806D+09	280.1
62	185.0	180.0	-20.0	1.049	0.23789D+09	0.24957D+09	325.3
63	195.0	180.0	-20.0	1.110	0.30939D+09	0.34357D+09	366.5
64	205.0	180.0	-20.0	1.162	0.39436D+09	0.45811D+09	405.2
65	215.0	180.0	-20.0	1.290	0.47231D+09	0.60928D+09	442.2
66	155.0	180.0	0.0	0.945	0.13822D+09	0.13055D+09	256.7
67	165.0	180.0	0.0	1.039	0.19703D+09	0.20463D+09	300.2
68	175.0	180.0	0.0	1.117	0.25452D+09	0.28438D+09	339.9
69	185.0	180.0	0.0	1.196	0.32231D+09	0.38536D+09	377.3
70	195.0	180.0	0.0	1.331	0.38583D+09	0.51370D+09	412.9
71	135.0	180.0	20.0	0.939	0.11027D+09	0.10349D+09	237.3
72	145.0	180.0	20.0	1.016	0.15747D+09	0.16003D+09	274.3
73	155.0	180.0	20.0	1.159	0.19725D+09	0.22867D+09	312.3
74	165.0	180.0	20.0	1.220	0.26039D+09	0.31778D+09	348.0
75	175.0	180.0	20.0	1.372	0.31471D+09	0.43178D+09	382.1

76	215.0	200.0	-60.0	0.929	0.21792D+09	0.20238D+09	312.4
77	225.0	200.0	-60.0	1.022	0.30935D+09	0.31619D+09	361.6
78	235.0	200.0	-60.0	1.134	0.37282D+09	0.42259D+09	406.3
79	245.0	200.0	-60.0	1.117	0.50464D+09	0.56350D+09	448.3
80	255.0	200.0	-60.0	1.203	0.59242D+09	0.71255D+09	488.4
81	195.0	200.0	-40.0	0.921	0.17943D+09	0.16534D+09	290.3
82	205.0	200.0	-40.0	1.025	0.25449D+09	0.26090D+09	338.1
83	215.0	200.0	-40.0	1.142	0.31545D+09	0.36013D+09	381.7
84	225.0	200.0	-40.0	1.133	0.42610D+09	0.48292D+09	422.7
85	235.0	200.0	-40.0	1.221	0.50483D+09	0.61649D+09	461.8
86	175.0	200.0	-20.0	0.925	0.14308D+09	0.13240D+09	269.1
87	185.0	200.0	-20.0	1.036	0.20627D+09	0.21378D+09	314.3
88	195.0	200.0	-20.0	1.118	0.26694D+09	0.29849D+09	356.6
89	205.0	200.0	-20.0	1.142	0.36047D+09	0.41168D+09	396.5
90	215.0	200.0	-20.0	1.252	0.42602D+09	0.53330D+09	434.5
91	155.0	200.0	0.0	0.927	0.11400D+09	0.10572D+09	254.0
92	165.0	200.0	0.0	1.028	0.17123D+09	0.17597D+09	292.3
93	175.0	200.0	0.0	1.084	0.22178D+09	0.24046D+09	330.9
94	185.0	200.0	0.0	1.164	0.29311D+09	0.34132D+09	369.5
95	195.0	200.0	0.0	1.262	0.35863D+09	0.45252D+09	406.3
96	135.0	200.0	20.0	0.929	0.86466D+08	0.80335D+08	233.2
97	145.0	200.0	20.0	1.044	0.12628D+09	0.13188D+09	274.0
98	155.0	200.0	20.0	1.111	0.17929D+09	0.19926D+09	308.2
99	165.0	200.0	20.0	1.204	0.22883D+09	0.27545D+09	341.6
100	175.0	200.0	20.0	1.297	0.28863D+09	0.37432D+09	377.0
101	215.0	220.0	-60.0	0.934	0.16829D+09	0.15726D+09	297.7
102	225.0	220.0	-60.0	1.015	0.24499D+09	0.24877D+09	348.4
103	235.0	220.0	-60.0	1.093	0.34970D+09	0.38225D+09	394.2
104	245.0	220.0	-60.0	1.173	0.42816D+09	0.50214D+09	437.2
105	255.0	220.0	-60.0	1.206	0.56258D+09	0.67821D+09	478.1
106	195.0	220.0	-40.0	1.203	0.12695D+09	0.15275D+09	283.1
107	205.0	220.0	-40.0	1.010	0.20678D+09	0.20882D+09	325.3
108	215.0	220.0	-40.0	1.106	0.29249D+09	0.32342D+09	370.1
109	225.0	220.0	-40.0	1.183	0.36441D+09	0.43123D+09	412.0
110	235.0	220.0	-40.0	1.237	0.46871D+09	0.57989D+09	452.0
111	175.0	220.0	-20.0	1.221	0.10002D+09	0.12211D+09	269.1
112	185.0	220.0	-20.0	1.019	0.17184D+09	0.17504D+09	308.8
113	195.0	220.0	-20.0	1.112	0.24017D+09	0.26716D+09	345.5
114	205.0	220.0	-20.0	1.214	0.29082D+09	0.35303D+09	386.4
115	215.0	220.0	-20.0	1.263	0.39242D+09	0.49551D+09	425.4
116	155.0	220.0	0.0	1.257	0.79653D+08	0.10010D+09	245.1
117	165.0	220.0	0.0	1.041	0.12935D+09	0.13465D+09	290.8
118	175.0	220.0	0.0	1.140	0.18938D+09	0.21583D+09	327.8
119	185.0	220.0	0.0	1.222	0.24242D+09	0.29622D+09	361.9
120	195.0	220.0	0.0	1.283	0.32595D+09	0.41829D+09	398.2
121	135.0	220.0	20.0	1.676	0.52486D+08	0.87946D+08	220.7
122	145.0	220.0	20.0	1.025	0.10366D+09	0.10629D+09	264.7
123	155.0	220.0	20.0	1.145	0.15241D+09	0.17455D+09	304.9
124	165.0	220.0	20.0	1.279	0.19491D+09	0.24922D+09	341.1
125	175.0	220.0	20.0	1.279	0.26382D+09	0.33745D+09	373.2

CRITICAL CIRCLES

circle	radius	X-center	Y-center	F.S.
1	195.0	200.0	-40.0	0.921
2	175.0	200.0	-20.0	0.925
3	155.0	200.0	0.0	0.927
4	215.0	200.0	-60.0	0.929
5	135.0	200.0	20.0	0.929
6	215.0	220.0	-60.0	0.934
7	215.0	180.0	-60.0	0.936
8	195.0	180.0	-40.0	0.936
9	135.0	180.0	20.0	0.939
10	175.0	180.0	-20.0	0.943

GS8A.R

Problem Title: Highland Estates: Profile No. 8-a
Loading: Static

User's Name:P. F.
Date: 06-07-1993

GENERAL DATA

UNITS

Unit Weight of Water: 62.4

GEOMETRY

Number of Sections : 14

Section	X	Y-crk.	Y-grd.
1	-200.0	0.0	0.0
2	-180.0	0.0	0.0
3	-125.0	0.0	0.0
4	-50.0	0.0	0.0
5	2.0	30.0	30.0
6	12.0	35.0	35.0
7	12.0	35.0	35.0
8	20.0	35.0	35.0
9	70.0	60.0	60.0
10	125.0	65.0	65.0
11	185.0	90.0	90.0
12	210.0	90.0	90.0
13	235.0	115.0	115.0
14	300.0	115.0	115.0

CIRCLE DATA

Coordinates of first circle (X,Y): 20 -120
Intervals of circle coordinates
X-direction: 10
Y-direction: 10
Number of intervals
X-direction: 5
Y-direction: 5

Elevation of upper-most tangent: 55
Tangent interval: 5
Number of tangents: 4

CONTROL DATA/ANALYSIS OPTIONS

No seismic analysis
Number of slices: 10

Total stress analysis

Soil parameters defined in SOIL PROPERTIES

File No. S22-634-2
July 20, 1993

HIGHLAND ESTATES
Slope: GS-8a
Loading: Static

SOIL PROPERTIES

Layer Number	Cohesion	Friction Angle	Unit Weight
1	9000.0	0.0	130.0
2	1000.0	15.0	125.0
3	1000.0	25.0	125.0
4	1000.0	30.0	125.0
5	1000.0	30.0	130.0

SOIL PROFILE

Section Number	X	elevation to bottom of layer, layer number 1	2	3	4	5
1	-200.0	0.0	0.0	0.0	200.0	200.0
2	-180.0	0.0	0.0	0.0	200.0	200.0
3	-125.0	0.0	0.0	12.0	200.0	200.0
4	-50.0	0.0	18.0	28.0	200.0	200.0
5	2.0	30.0	30.0	40.0	200.0	200.0
6	12.0	35.0	35.0	43.0	200.0	200.0
7	12.0	35.0	35.0	35.0	35.0	200.0
8	20.0	35.0	35.0	35.0	35.0	200.0
9	70.0	60.0	60.0	60.0	60.0	200.0
10	125.0	65.0	65.0	65.0	65.0	200.0
11	185.0	90.0	90.0	90.0	90.0	200.0
12	210.0	115.0	90.0	90.0	90.0	200.0
13	235.0	115.0	115.0	115.0	115.0	200.0
14	300.0	115.0	115.0	115.0	115.0	200.0

RESULTS

circle	radius	X-center	Y-center	F.S.	ROVER	RESIST	ARCL
1	175.0	20.0	-120.0	3.104	0.25214D+08	0.78275D+08	176.2
2	180.0	20.0	-120.0	3.073	0.31143D+08	0.95711D+08	192.2
3	185.0	20.0	-120.0	3.059	0.37621D+08	0.11509D+09	207.9
4	190.0	20.0	-120.0	3.057	0.44752D+08	0.13682D+09	227.7
5	165.0	20.0	-110.0	3.028	0.23295D+08	0.70547D+08	172.1
6	170.0	20.0	-110.0	3.024	0.28987D+08	0.87670D+08	187.9
7	175.0	20.0	-110.0	3.013	0.35075D+08	0.10567D+09	203.3
8	180.0	20.0	-110.0	3.014	0.41787D+08	0.12595D+09	222.3
9	155.0	20.0	-100.0	2.989	0.21339D+08	0.63780D+08	167.8
10	160.0	20.0	-100.0	2.989	0.26640D+08	0.79623D+08	183.4
11	165.0	20.0	-100.0	2.970	0.32475D+08	0.96449D+08	198.7
12	170.0	20.0	-100.0	2.971	0.38833D+08	0.11538D+09	216.7
13	145.0	20.0	-90.0	2.930	0.19434D+08	0.56948D+08	163.3
14	150.0	20.0	-90.0	2.954	0.24341D+08	0.71904D+08	178.7
15	155.0	20.0	-90.0	2.936	0.29751D+08	0.87361D+08	193.8
16	160.0	20.0	-90.0	2.939	0.35673D+08	0.10486D+09	211.0
17	135.0	20.0	-80.0	2.889	0.17585D+08	0.50810D+08	158.7
18	140.0	20.0	-80.0	2.917	0.22100D+08	0.64474D+08	173.9

HIGHLAND ESTATES
Slope: GS-8a
Loading: Static

19	145.0	20.0	-80.0	2.903	0.27093D+08	0.78651D+08	188.8
20	150.0	20.0	-80.0	2.908	0.32579D+08	0.94740D+08	205.0
21	175.0	30.0	-120.0	2.944	0.23437D+08	0.69000D+08	168.7
22	180.0	30.0	-120.0	2.933	0.29583D+08	0.86773D+08	185.1
23	185.0	30.0	-120.0	2.900	0.36317D+08	0.10531D+09	202.1
24	190.0	30.0	-120.0	2.941	0.43557D+08	0.12808D+09	225.4
25	165.0	30.0	-110.0	2.905	0.21556D+08	0.62621D+08	164.6
26	170.0	30.0	-110.0	2.895	0.27290D+08	0.78995D+08	180.8
27	175.0	30.0	-110.0	2.862	0.33604D+08	0.96167D+08	197.2
28	180.0	30.0	-110.0	2.903	0.40467D+08	0.11748D+09	220.0
29	155.0	30.0	-100.0	2.865	0.19726D+08	0.56516D+08	160.4
30	160.0	30.0	-100.0	2.855	0.25056D+08	0.71540D+08	176.4
31	165.0	30.0	-100.0	2.823	0.30950D+08	0.87380D+08	192.1
32	170.0	30.0	-100.0	2.865	0.37432D+08	0.10725D+09	214.5
33	145.0	30.0	-90.0	2.831	0.17854D+08	0.50545D+08	156.1
34	150.0	30.0	-90.0	2.765	0.22881D+08	0.63256D+08	171.9
35	155.0	30.0	-90.0	2.786	0.28356D+08	0.79008D+08	187.2
36	160.0	30.0	-90.0	2.827	0.34456D+08	0.97398D+08	208.8
37	135.0	30.0	-80.0	2.816	0.15865D+08	0.44678D+08	151.6
38	140.0	30.0	-80.0	2.737	0.20608D+08	0.56394D+08	167.2
39	145.0	30.0	-80.0	2.755	0.25887D+08	0.71315D+08	182.3
40	150.0	30.0	-80.0	2.788	0.31539D+08	0.87937D+08	202.9
41	175.0	40.0	-120.0	2.865	0.21268D+08	0.60927D+08	160.7
42	180.0	40.0	-120.0	2.778	0.27394D+08	0.76103D+08	177.5
43	185.0	40.0	-120.0	2.802	0.34370D+08	0.96322D+08	199.2
44	190.0	40.0	-120.0	2.862	0.41528D+08	0.11885D+09	223.0
45	165.0	40.0	-110.0	2.843	0.19299D+08	0.54871D+08	156.7
46	170.0	40.0	-110.0	2.739	0.25235D+08	0.69116D+08	173.3
47	175.0	40.0	-110.0	2.765	0.31825D+08	0.87992D+08	194.3
48	180.0	40.0	-110.0	2.822	0.38575D+08	0.10885D+09	217.7
49	155.0	40.0	-100.0	2.831	0.17320D+08	0.49034D+08	152.6
50	160.0	40.0	-100.0	2.721	0.22946D+08	0.62425D+08	169.0
51	165.0	40.0	-100.0	2.733	0.29231D+08	0.79889D+08	189.3
52	170.0	40.0	-100.0	2.781	0.35679D+08	0.99228D+08	212.2
53	145.0	40.0	-90.0	2.821	0.15429D+08	0.43521D+08	148.4
54	150.0	40.0	-90.0	2.707	0.20640D+08	0.55873D+08	164.6
55	155.0	40.0	-90.0	2.698	0.26452D+08	0.71356D+08	184.1
56	160.0	40.0	-90.0	2.760	0.32457D+08	0.89597D+08	206.6
57	135.0	40.0	-80.0	2.777	0.13672D+08	0.37970D+08	144.0
58	140.0	40.0	-80.0	2.695	0.18432D+08	0.49666D+08	160.0
59	145.0	40.0	-80.0	2.682	0.23758D+08	0.63710D+08	178.8
60	150.0	40.0	-80.0	2.742	0.29321D+08	0.80389D+08	200.8
61	175.0	50.0	-120.0	2.842	0.18118D+08	0.51489D+08	152.1
62	180.0	50.0	-120.0	2.732	0.24594D+08	0.67190D+08	169.4
63	185.0	50.0	-120.0	2.756	0.31590D+08	0.87066D+08	196.1
64	190.0	50.0	-120.0	2.803	0.39036D+08	0.10942D+09	220.5
65	165.0	50.0	-110.0	2.839	0.16318D+08	0.46335D+08	148.1
66	170.0	50.0	-110.0	2.720	0.22307D+08	0.60680D+08	165.4
67	175.0	50.0	-110.0	2.737	0.28834D+08	0.78923D+08	191.3
68	180.0	50.0	-110.0	2.783	0.35888D+08	0.99870D+08	215.3
69	155.0	50.0	-100.0	2.850	0.14503D+08	0.41339D+08	144.1
70	160.0	50.0	-100.0	2.709	0.20122D+08	0.54514D+08	161.1
71	165.0	50.0	-100.0	2.683	0.26175D+08	0.70229D+08	186.4
72	170.0	50.0	-100.0	2.763	0.32834D+08	0.90711D+08	209.9
73	145.0	50.0	-90.0	2.913	0.12519D+08	0.36463D+08	139.9
74	150.0	50.0	-90.0	2.707	0.17965D+08	0.48629D+08	156.8
75	155.0	50.0	-90.0	2.664	0.23618D+08	0.62922D+08	181.3
76	160.0	50.0	-90.0	2.718	0.29878D+08	0.81195D+08	204.3
77	135.0	50.0	-80.0	2.939	0.10664D+08	0.31342D+08	135.6
78	140.0	50.0	-80.0	2.750	0.15551D+08	0.42768D+08	152.3

HIGHLAND ESTATES
Slope: GS-8a
Loading: Static

79	145.0	50.0	-80.0	2.665	0.21063D+08	0.56135D+08	176.0
80	150.0	50.0	-80.0	2.697	0.27023D+08	0.72888D+08	198.6
81	175.0	60.0	-120.0	2.880	0.14635D+08	0.42144D+08	142.6
82	180.0	60.0	-120.0	2.754	0.21119D+08	0.58170D+08	160.8
83	185.0	60.0	-120.0	2.742	0.28096D+08	0.77041D+08	192.8
84	190.0	60.0	-120.0	2.806	0.35563D+08	0.99772D+08	217.9
85	165.0	60.0	-110.0	2.967	0.12677D+08	0.37606D+08	138.7
86	170.0	60.0	-110.0	2.728	0.18888D+08	0.51537D+08	156.7
87	175.0	60.0	-110.0	2.725	0.25646D+08	0.69877D+08	188.1
88	180.0	60.0	-110.0	2.787	0.32579D+08	0.90786D+08	212.8
89	155.0	60.0	-100.0	3.075	0.10839D+08	0.33335D+08	134.7
90	160.0	60.0	-100.0	2.781	0.16465D+08	0.45783D+08	152.6
91	165.0	60.0	-100.0	2.743	0.22888D+08	0.62773D+08	183.2
92	170.0	60.0	-100.0	2.769	0.29678D+08	0.82191D+08	207.4
93	145.0	60.0	-90.0	3.272	0.89446D+07	0.29264D+08	130.6
94	150.0	60.0	-90.0	2.846	0.14188D+08	0.40384D+08	148.3
95	155.0	60.0	-90.0	2.775	0.20175D+08	0.55990D+08	178.2
96	160.0	60.0	-90.0	2.792	0.26337D+08	0.73531D+08	201.9
97	135.0	60.0	-80.0	3.611	0.69418D+07	0.25066D+08	124.7
98	140.0	60.0	-80.0	2.946	0.12038D+08	0.35467D+08	143.9
99	145.0	60.0	-80.0	2.818	0.17549D+08	0.49450D+08	173.1
100	150.0	60.0	-80.0	2.820	0.23172D+08	0.65346D+08	196.2

CRITICAL CIRCLES

circle	radius	X-center	Y-center	F.S.
1	155.0	50.0	-90.0	2.664
2	145.0	50.0	-80.0	2.665
3	145.0	40.0	-80.0	2.682
4	165.0	50.0	-100.0	2.683
5	140.0	40.0	-80.0	2.695
6	150.0	50.0	-80.0	2.697
7	155.0	40.0	-90.0	2.698
8	150.0	50.0	-90.0	2.707
9	150.0	40.0	-90.0	2.707
10	160.0	50.0	-100.0	2.709

GS8A.S

Problem Title: Highland Estates: Profile No. 8-a
Loading: Seismic

User's Name:P. F.
Date: 06-07-1993

GENERAL DATA

UNITS

Unit Weight of Water: 62.4

GEOMETRY

Number of Sections : 14

Section	X	Y-crk.	Y-grd.
1	-200.0	0.0	0.0
2	-180.0	0.0	0.0
3	-125.0	0.0	0.0
4	-50.0	0.0	0.0
5	2.0	30.0	30.0
6	12.0	35.0	35.0
7	12.0	35.0	35.0
8	20.0	35.0	35.0
9	70.0	60.0	60.0
10	125.0	65.0	65.0
11	185.0	90.0	90.0
12	210.0	90.0	90.0
13	235.0	115.0	115.0
14	300.0	115.0	115.0

CIRCLE DATA

Coordinates of first circle (X,Y): 20 -120
Intervals of circle coordinates
X-direction: 10
Y-direction: 10
Number of intervals
X-direction: 5
Y-direction: 5

Elevation of upper-most tangent: 55
Tangent interval: 5
Number of tangents: 4

CONTROL DATA/ANALYSIS OPTIONS

Seismic coefficient: .15
Number of slices: 10

Total stress analysis

Soil parameters defined in SOIL PROPERTIES

File No. S22-634-2
July 20, 1993

HIGHLAND ESTATES
Slope: GS-8a
Loading: Seismic

SOIL PROPERTIES

Layer Number	Cohesion	Friction Angle	Unit Weight
1	9000.0	0.0	130.0
2	1000.0	15.0	125.0
3	1000.0	25.0	125.0
4	1000.0	30.0	125.0
5	1000.0	30.0	130.0

SOIL PROFILE

Section Number	X	elevation to bottom of layer, layer number 1	2	3	4	5
1	-200.0	0.0	0.0	0.0	200.0	200.0
2	-180.0	0.0	0.0	0.0	200.0	200.0
3	-125.0	0.0	0.0	12.0	200.0	200.0
4	-50.0	0.0	18.0	28.0	200.0	200.0
5	2.0	30.0	30.0	40.0	200.0	200.0
6	12.0	35.0	35.0	43.0	200.0	200.0
7	12.0	35.0	35.0	35.0	35.0	200.0
8	20.0	35.0	35.0	35.0	35.0	200.0
9	70.0	60.0	60.0	60.0	60.0	200.0
10	125.0	65.0	65.0	65.0	65.0	200.0
11	185.0	90.0	90.0	90.0	90.0	200.0
12	210.0	115.0	90.0	90.0	90.0	200.0
13	235.0	115.0	115.0	115.0	115.0	200.0
14	300.0	115.0	115.0	115.0	115.0	200.0

RESULTS

circle	radius	X-center	Y-center	F.S.	ROVER	RESIST	ARCL
1	175.0	20.0	-120.0	1.676	0.44658D+08	0.74827D+08	176.2
2	180.0	20.0	-120.0	1.703	0.53916D+08	0.91801D+08	192.2
3	185.0	20.0	-120.0	1.730	0.63983D+08	0.11070D+09	207.9
4	190.0	20.0	-120.0	1.759	0.75004D+08	0.13196D+09	227.7
5	165.0	20.0	-110.0	1.693	0.39960D+08	0.67655D+08	172.1
6	170.0	20.0	-110.0	1.692	0.49665D+08	0.84032D+08	187.9
7	175.0	20.0	-110.0	1.719	0.59071D+08	0.10157D+09	203.3
8	180.0	20.0	-110.0	1.749	0.69398D+08	0.12141D+09	222.3
9	155.0	20.0	-100.0	1.692	0.36134D+08	0.61144D+08	167.8
10	160.0	20.0	-100.0	1.691	0.45119D+08	0.76290D+08	183.4
11	165.0	20.0	-100.0	1.712	0.54122D+08	0.92662D+08	198.7
12	170.0	20.0	-100.0	1.741	0.63862D+08	0.11117D+09	216.7
13	145.0	20.0	-90.0	1.700	0.32207D+08	0.54768D+08	163.3
14	150.0	20.0	-90.0	1.690	0.40743D+08	0.68870D+08	178.7
15	155.0	20.0	-90.0	1.712	0.49009D+08	0.83904D+08	193.8
16	160.0	20.0	-90.0	1.741	0.58019D+08	0.10100D+09	211.0
17	135.0	20.0	-80.0	1.702	0.28707D+08	0.48861D+08	158.7
18	140.0	20.0	-80.0	1.690	0.36520D+08	0.61724D+08	173.9

19	145.0	20.0	-80.0	1.713	0.44078D+08	0.75518D+08	188.8
20	150.0	20.0	-80.0	1.742	0.52363D+08	0.91229D+08	205.0
21	175.0	30.0	-120.0	1.675	0.39526D+08	0.66210D+08	168.7
22	180.0	30.0	-120.0	1.650	0.50259D+08	0.82922D+08	185.1
23	185.0	30.0	-120.0	1.666	0.60569D+08	0.10093D+09	202.1
24	190.0	30.0	-120.0	1.729	0.71361D+08	0.12337D+09	225.4
25	165.0	30.0	-110.0	1.673	0.35903D+08	0.60071D+08	164.6
26	170.0	30.0	-110.0	1.645	0.45861D+08	0.75443D+08	180.8
27	175.0	30.0	-110.0	1.661	0.55456D+08	0.92122D+08	197.2
28	180.0	30.0	-110.0	1.724	0.65624D+08	0.11311D+09	220.0
29	155.0	30.0	-100.0	1.672	0.32422D+08	0.54199D+08	160.4
30	160.0	30.0	-100.0	1.641	0.41619D+08	0.68281D+08	176.4
31	165.0	30.0	-100.0	1.656	0.50506D+08	0.83658D+08	192.1
32	170.0	30.0	-100.0	1.719	0.60049D+08	0.10322D+09	214.5
33	145.0	30.0	-90.0	1.675	0.28928D+08	0.48467D+08	156.1
34	150.0	30.0	-90.0	1.669	0.36445D+08	0.60819D+08	171.9
35	155.0	30.0	-90.0	1.654	0.45723D+08	0.75608D+08	187.2
36	160.0	30.0	-90.0	1.715	0.54639D+08	0.93701D+08	208.8
37	135.0	30.0	-80.0	1.693	0.25311D+08	0.42855D+08	151.6
38	140.0	30.0	-80.0	1.677	0.32344D+08	0.54229D+08	167.2
39	145.0	30.0	-80.0	1.668	0.40928D+08	0.68288D+08	182.3
40	150.0	30.0	-80.0	1.712	0.49399D+08	0.84566D+08	202.9
41	175.0	40.0	-120.0	1.657	0.35190D+08	0.58293D+08	160.7
42	180.0	40.0	-120.0	1.645	0.44395D+08	0.73008D+08	177.5
43	185.0	40.0	-120.0	1.650	0.55867D+08	0.92195D+08	199.2
44	190.0	40.0	-120.0	1.705	0.67057D+08	0.11430D+09	223.0
45	165.0	40.0	-110.0	1.666	0.31513D+08	0.52498D+08	156.7
46	170.0	40.0	-110.0	1.641	0.40384D+08	0.66287D+08	173.3
47	175.0	40.0	-110.0	1.644	0.51198D+08	0.84174D+08	194.3
48	180.0	40.0	-110.0	1.696	0.61679D+08	0.10463D+09	217.7
49	155.0	40.0	-100.0	1.683	0.27886D+08	0.46926D+08	152.6
50	160.0	40.0	-100.0	1.669	0.35911D+08	0.59947D+08	169.0
51	165.0	40.0	-100.0	1.642	0.46512D+08	0.76391D+08	189.3
52	170.0	40.0	-100.0	1.689	0.56454D+08	0.95328D+08	212.2
53	145.0	40.0	-90.0	1.703	0.24471D+08	0.41664D+08	148.4
54	150.0	40.0	-90.0	1.685	0.31853D+08	0.53678D+08	164.6
55	155.0	40.0	-90.0	1.659	0.41280D+08	0.68478D+08	184.1
56	160.0	40.0	-90.0	1.695	0.50782D+08	0.86064D+08	206.6
57	135.0	40.0	-80.0	1.785	0.20494D+08	0.36591D+08	144.0
58	140.0	40.0	-80.0	1.703	0.28026D+08	0.47740D+08	160.0
59	145.0	40.0	-80.0	1.670	0.36616D+08	0.61145D+08	178.8
60	150.0	40.0	-80.0	1.703	0.45327D+08	0.77211D+08	200.8
61	175.0	50.0	-120.0	1.735	0.28497D+08	0.49454D+08	152.1
62	180.0	50.0	-120.0	1.663	0.38724D+08	0.64411D+08	169.4
63	185.0	50.0	-120.0	1.658	0.50382D+08	0.83518D+08	196.1
64	190.0	50.0	-120.0	1.703	0.61770D+08	0.10517D+09	220.5
65	165.0	50.0	-110.0	1.780	0.25036D+08	0.44575D+08	148.1
66	170.0	50.0	-110.0	1.679	0.34668D+08	0.58192D+08	165.4
67	175.0	50.0	-110.0	1.665	0.45472D+08	0.75703D+08	191.3
68	180.0	50.0	-110.0	1.707	0.56220D+08	0.95977D+08	215.3
69	155.0	50.0	-100.0	1.812	0.21965D+08	0.39790D+08	144.1
70	160.0	50.0	-100.0	1.694	0.30872D+08	0.52292D+08	161.1
71	165.0	50.0	-100.0	1.703	0.39743D+08	0.67682D+08	186.4
72	170.0	50.0	-100.0	1.713	0.50892D+08	0.87162D+08	209.9
73	145.0	50.0	-90.0	1.871	0.18773D+08	0.35128D+08	139.9
74	150.0	50.0	-90.0	1.715	0.27207D+08	0.46667D+08	156.8
75	155.0	50.0	-90.0	1.715	0.35375D+08	0.60661D+08	181.3
76	160.0	50.0	-90.0	1.727	0.45359D+08	0.78314D+08	204.3
77	135.0	50.0	-80.0	1.959	0.15499D+08	0.30368D+08	135.6
78	140.0	50.0	-80.0	1.764	0.23289D+08	0.41083D+08	152.3

79	145.0	50.0	-80.0	1.757	0.30851D+08	0.54206D+08	176.0
80	150.0	50.0	-80.0	1.736	0.40502D+08	0.70315D+08	198.6
81	175.0	60.0	-120.0	1.931	0.21189D+08	0.40908D+08	142.6
82	180.0	60.0	-120.0	1.704	0.32704D+08	0.55716D+08	160.8
83	185.0	60.0	-120.0	1.749	0.42509D+08	0.74345D+08	192.8
84	190.0	60.0	-120.0	1.741	0.55270D+08	0.96242D+08	217.9
85	165.0	60.0	-110.0	2.005	0.18216D+08	0.36530D+08	138.7
86	170.0	60.0	-110.0	1.768	0.28076D+08	0.49627D+08	156.7
87	175.0	60.0	-110.0	1.760	0.38318D+08	0.67456D+08	188.1
88	180.0	60.0	-110.0	1.748	0.50103D+08	0.87573D+08	212.8
89	155.0	60.0	-100.0	2.097	0.15456D+08	0.32410D+08	134.7
90	160.0	60.0	-100.0	1.821	0.24235D+08	0.44125D+08	152.6
91	165.0	60.0	-100.0	1.794	0.33809D+08	0.60642D+08	183.2
92	170.0	60.0	-100.0	1.756	0.45159D+08	0.79287D+08	207.4
93	145.0	60.0	-90.0	2.242	0.12703D+08	0.28485D+08	130.6
94	150.0	60.0	-90.0	1.885	0.20668D+08	0.38963D+08	148.3
95	155.0	60.0	-90.0	1.835	0.29503D+08	0.54130D+08	178.2
96	160.0	60.0	-90.0	1.790	0.39650D+08	0.70990D+08	201.9
97	135.0	60.0	-80.0	2.478	0.98639D+07	0.24445D+08	124.7
98	140.0	60.0	-80.0	2.001	0.17150D+08	0.34312D+08	143.9
99	145.0	60.0	-80.0	1.885	0.25390D+08	0.47849D+08	173.1
100	150.0	60.0	-80.0	1.831	0.34493D+08	0.63145D+08	196.2

CRITICAL CIRCLES

circle	radius	X-center	Y-center	F.S.
1	160.0	30.0	-100.0	1.641
2	170.0	40.0	-110.0	1.641
3	165.0	40.0	-100.0	1.642
4	175.0	40.0	-110.0	1.644
5	180.0	40.0	-120.0	1.645
6	170.0	30.0	-110.0	1.645
7	180.0	30.0	-120.0	1.650
8	185.0	40.0	-120.0	1.650
9	155.0	30.0	-90.0	1.654
10	165.0	30.0	-100.0	1.656

File No. S22-634-2
July 20, 1993

GS8B.R

Problem Title: Highland Estates: Profile No. 8-b

User's Name:P. F.
Loading: Static
Date: 06-07-1993

GENERAL DATA

UNITS

Unit Weight of Water: 62.4

GEOMETRY

Number of Sections : 14

Section	X	Y-crk.	Y-grd.
1	-200.0	0.0	0.0
2	-180.0	0.0	0.0
3	-125.0	0.0	0.0
4	-50.0	0.0	0.0
5	2.0	30.0	30.0
6	12.0	35.0	35.0
7	12.0	35.0	35.0
8	20.0	35.0	35.0
9	70.0	60.0	60.0
10	125.0	65.0	65.0
11	185.0	90.0	90.0
12	210.0	90.0	90.0
13	235.0	115.0	115.0
14	300.0	115.0	115.0

CIRCLE DATA

Coordinates of first circle (X,Y): 190 -20
Intervals of circle coordinates
X-direction: 10
Y-direction: 10
Number of intervals
X-direction: 5
Y-direction: 5

Elevation of upper-most tangent: 115
Tangent interval: 5
Number of tangents: 4

CONTROL DATA/ANALYSIS OPTIONS

No seismic analysis
Number of slices: 10

Total stress analysis

Soil parameters defined in SOIL PROPERTIES

File No. S22-634-2
July 20, 1993

HIGHLAND ESTATES
Slope: GS-8b
Loading: Static

SOIL PROPERTIES

Layer Number	Cohesion	Friction Angle	Unit Weight
1	9000.0	0.0	130.0
2	1000.0	15.0	125.0
3	1000.0	25.0	125.0
4	1000.0	30.0	125.0
5	1000.0	30.0	130.0

SOIL PROFILE

Section Number	X	elevation to bottom of layer, layer number 1	2	3	4	5
1	-200.0	0.0	0.0	0.0	200.0	200.0
2	-180.0	0.0	0.0	0.0	200.0	200.0
3	-125.0	0.0	0.0	12.0	200.0	200.0
4	-50.0	0.0	18.0	28.0	200.0	200.0
5	2.0	30.0	30.0	40.0	200.0	200.0
6	12.0	35.0	35.0	43.0	200.0	200.0
7	12.0	35.0	35.0	35.0	35.0	200.0
8	20.0	35.0	35.0	35.0	35.0	200.0
9	70.0	60.0	60.0	60.0	60.0	200.0
10	125.0	65.0	65.0	65.0	65.0	200.0
11	185.0	90.0	90.0	90.0	90.0	200.0
12	210.0	115.0	90.0	90.0	90.0	200.0
13	235.0	115.0	115.0	115.0	115.0	200.0
14	300.0	115.0	115.0	115.0	115.0	200.0

RESULTS

circle	radius	X-center	Y-center	F.S.	ROVER	RESIST	ARCL
1	135.0	190.0	-20.0	4.561	0.16317D+08	0.74421D+08	164.6
2	140.0	190.0	-20.0	3.497	0.20766D+08	0.72618D+08	177.7
3	145.0	190.0	-20.0	3.365	0.26105D+08	0.87841D+08	197.6
4	150.0	190.0	-20.0	3.453	0.31267D+08	0.10795D+09	223.9
5	125.0	190.0	-10.0	4.572	0.14490D+08	0.66244D+08	159.3
6	130.0	190.0	-10.0	3.505	0.18503D+08	0.64850D+08	172.3
7	135.0	190.0	-10.0	3.371	0.23319D+08	0.78613D+08	189.7
8	140.0	190.0	-10.0	3.426	0.28170D+08	0.96500D+08	212.3
9	115.0	190.0	0.0	4.609	0.12665D+08	0.58372D+08	153.8
10	120.0	190.0	0.0	4.338	0.16370D+08	0.71004D+08	166.6
11	125.0	190.0	0.0	3.384	0.20646D+08	0.69867D+08	182.4
12	130.0	190.0	0.0	3.412	0.25168D+08	0.85881D+08	203.6
13	105.0	190.0	10.0	5.467	0.10885D+08	0.59503D+08	148.1
14	110.0	190.0	10.0	4.384	0.14195D+08	0.62228D+08	160.8
15	115.0	190.0	10.0	3.402	0.18082D+08	0.61510D+08	174.7
16	120.0	190.0	10.0	3.404	0.22275D+08	0.75830D+08	195.4
17	95.0	190.0	20.0	5.576	0.91830D+07	0.51205D+08	142.2
18	100.0	190.0	20.0	4.463	0.12074D+08	0.53879D+08	154.6

HIGHLAND ESTATES
Slope: GS-8b
Loading: Static

19	105.0	190.0	20.0	3.452	0.15485D+08	0.53456D+08	167.0
20	110.0	190.0	20.0	3.414	0.19381D+08	0.66163D+08	186.9
21	135.0	200.0	-20.0	5.154	0.15312D+08	0.78923D+08	155.2
22	140.0	200.0	-20.0	3.261	0.19967D+08	0.65103D+08	170.2
23	145.0	200.0	-20.0	3.290	0.24993D+08	0.82217D+08	195.7
24	150.0	200.0	-20.0	3.286	0.30435D+08	0.10001D+09	217.9
25	125.0	200.0	-10.0	5.189	0.13482D+08	0.69967D+08	150.1
26	130.0	200.0	-10.0	3.258	0.17728D+08	0.57753D+08	163.8
27	135.0	200.0	-10.0	3.273	0.22397D+08	0.73304D+08	188.6
28	140.0	200.0	-10.0	3.254	0.27525D+08	0.89562D+08	210.4
29	115.0	200.0	0.0	5.231	0.11762D+08	0.61527D+08	144.8
30	120.0	200.0	0.0	3.269	0.15556D+08	0.50848D+08	157.7
31	125.0	200.0	0.0	3.268	0.19801D+08	0.64721D+08	181.3
32	130.0	200.0	0.0	3.253	0.24447D+08	0.79527D+08	202.5
33	105.0	200.0	10.0	5.327	0.10034D+08	0.53449D+08	139.2
34	110.0	200.0	10.0	3.290	0.13492D+08	0.44396D+08	152.0
35	115.0	200.0	10.0	3.267	0.17323D+08	0.56587D+08	173.7
36	120.0	200.0	10.0	3.266	0.21461D+08	0.70087D+08	194.4
37	95.0	200.0	20.0	5.483	0.83474D+07	0.45769D+08	133.4
38	100.0	200.0	20.0	3.352	0.11401D+08	0.38213D+08	146.0
39	105.0	200.0	20.0	3.271	0.14950D+08	0.48900D+08	165.8
40	110.0	200.0	20.0	3.284	0.18615D+08	0.61128D+08	185.9
41	135.0	210.0	-20.0	5.105	0.13889D+08	0.70905D+08	145.6
42	140.0	210.0	-20.0	3.201	0.18544D+08	0.59360D+08	169.0
43	145.0	210.0	-20.0	3.192	0.23497D+08	0.75006D+08	194.6
44	150.0	210.0	-20.0	3.288	0.28644D+08	0.94191D+08	216.8
45	125.0	210.0	-10.0	5.162	0.12145D+08	0.62687D+08	140.5
46	130.0	210.0	-10.0	3.184	0.16478D+08	0.52471D+08	162.6
47	135.0	210.0	-10.0	3.170	0.21046D+08	0.66721D+08	187.5
48	140.0	210.0	-10.0	3.274	0.25735D+08	0.84251D+08	209.3
49	115.0	210.0	0.0	5.260	0.10422D+08	0.54821D+08	135.4
50	120.0	210.0	0.0	3.192	0.14341D+08	0.45781D+08	156.0
51	125.0	210.0	0.0	3.152	0.18662D+08	0.58828D+08	180.2
52	130.0	210.0	0.0	3.260	0.22936D+08	0.74780D+08	201.5
53	105.0	210.0	10.0	5.393	0.87829D+07	0.47370D+08	130.0
54	110.0	210.0	10.0	3.212	0.12284D+08	0.39454D+08	149.2
55	115.0	210.0	10.0	3.174	0.16143D+08	0.51244D+08	172.7
56	120.0	210.0	10.0	3.263	0.20123D+08	0.65664D+08	193.4
57	95.0	210.0	20.0	5.651	0.71008D+07	0.40123D+08	123.7
58	100.0	210.0	20.0	3.249	0.10336D+08	0.33582D+08	142.0
59	105.0	210.0	20.0	3.212	0.13758D+08	0.44187D+08	164.8
60	110.0	210.0	20.0	3.287	0.17296D+08	0.56845D+08	184.9
61	135.0	220.0	-20.0	5.261	0.11945D+08	0.62842D+08	135.5
62	140.0	220.0	-20.0	3.191	0.16630D+08	0.53073D+08	167.8
63	145.0	220.0	-20.0	3.236	0.21519D+08	0.69642D+08	193.4
64	150.0	220.0	-20.0	3.277	0.26650D+08	0.87326D+08	215.7
65	125.0	220.0	-10.0	5.360	0.10315D+08	0.55290D+08	130.6
66	130.0	220.0	-10.0	3.207	0.14577D+08	0.46744D+08	161.5
67	135.0	220.0	-10.0	3.244	0.18977D+08	0.61559D+08	186.4
68	140.0	220.0	-10.0	3.272	0.23759D+08	0.77751D+08	208.2
69	115.0	220.0	0.0	5.576	0.86022D+07	0.47967D+08	125.4
70	120.0	220.0	0.0	3.231	0.12616D+08	0.40763D+08	154.9
71	125.0	220.0	0.0	3.254	0.16578D+08	0.53945D+08	179.1
72	130.0	220.0	0.0	3.284	0.20883D+08	0.68575D+08	200.4
73	105.0	220.0	10.0	5.731	0.71047D+07	0.40720D+08	117.2
74	110.0	220.0	10.0	3.316	0.10544D+08	0.34964D+08	148.1
75	115.0	220.0	10.0	3.277	0.14269D+08	0.46767D+08	171.6
76	120.0	220.0	10.0	3.294	0.18238D+08	0.60068D+08	192.4
77	95.0	220.0	20.0	6.900	0.57496D+07	0.39670D+08	108.9
78	100.0	220.0	20.0	3.389	0.86708D+07	0.29384D+08	138.3

79	105.0	220.0	20.0	3.350	0.11923D+08	0.39948D+08	163.7
80	110.0	220.0	20.0	3.328	0.15612D+08	0.51958D+08	184.0
81	135.0	230.0	-20.0	5.744	0.95113D+07	0.54632D+08	124.8
82	140.0	230.0	-20.0	3.384	0.14116D+08	0.47771D+08	166.6
83	145.0	230.0	-20.0	3.364	0.18907D+08	0.63612D+08	192.2
84	150.0	230.0	-20.0	3.421	0.23937D+08	0.81899D+08	214.6
85	125.0	230.0	-10.0	6.925	0.79978D+07	0.55385D+08	116.8
86	130.0	230.0	-10.0	3.455	0.12079D+08	0.41728D+08	160.3
87	135.0	230.0	-10.0	3.376	0.16680D+08	0.56318D+08	185.2
88	140.0	230.0	-10.0	3.429	0.21212D+08	0.72735D+08	207.1
89	115.0	230.0	0.0	7.114	0.66381D+07	0.47226D+08	108.8
90	120.0	230.0	0.0	3.512	0.10205D+08	0.35844D+08	151.4
91	125.0	230.0	0.0	3.449	0.14255D+08	0.49163D+08	178.0
92	130.0	230.0	0.0	3.446	0.18574D+08	0.63999D+08	199.3
93	105.0	230.0	10.0	7.299	0.54493D+07	0.39777D+08	100.8
94	110.0	230.0	10.0	3.568	0.85114D+07	0.30370D+08	141.8
95	115.0	230.0	10.0	3.522	0.11975D+08	0.42176D+08	168.6
96	120.0	230.0	10.0	3.524	0.15746D+08	0.55490D+08	191.3
97	95.0	230.0	20.0	7.429	0.44468D+07	0.33034D+08	92.7
98	100.0	230.0	20.0	3.618	0.70240D+07	0.25415D+08	132.0
99	105.0	230.0	20.0	3.592	0.98972D+07	0.35549D+08	158.0
100	110.0	230.0	20.0	3.605	0.13128D+08	0.47331D+08	181.0

CRITICAL CIRCLES

circle	radius	X-center	Y-center	F.S.
1	125.0	210.0	0.0	3.152
2	135.0	210.0	-10.0	3.170
3	115.0	210.0	10.0	3.174
4	130.0	210.0	-10.0	3.184
5	140.0	220.0	-20.0	3.191
6	145.0	210.0	-20.0	3.192
7	120.0	210.0	0.0	3.192
8	140.0	210.0	-20.0	3.201
9	130.0	220.0	-10.0	3.207
10	105.0	210.0	20.0	3.212

File No. S22-634-2
July 20, 1993

GS8B.S

Problem Title: Highland Estates: Profile No. 8-b
Loading: Seismic

User's Name:P. F.
Date: 06-07-1993

GENERAL DATA

UNITS

Unit Weight of Water: 62.4

GEOMETRY

Number of Sections : 14

Section	X	Y-crk.	Y-grd.
1	-200.0	0.0	0.0
2	-180.0	0.0	0.0
3	-125.0	0.0	0.0
4	-50.0	0.0	0.0
5	2.0	30.0	30.0
6	12.0	35.0	35.0
7	12.0	35.0	35.0
8	20.0	35.0	35.0
9	70.0	60.0	60.0
10	125.0	65.0	65.0
11	185.0	90.0	90.0
12	210.0	90.0	90.0
13	235.0	115.0	115.0
14	300.0	115.0	115.0

CIRCLE DATA

Coordinates of first circle (X,Y): 190 -20
Intervals of circle coordinates
X-direction: 10
Y-direction: 10
Number of intervals
X-direction: 5
Y-direction: 5

Elevation of upper-most tangent: 115
Tangent interval: 5
Number of tangents: 4

CONTROL DATA/ANALYSIS OPTIONS

Seismic coefficient: .15
Number of slices: 10

Total stress analysis

Soil parameters defined in SOIL PROPERTIES

File No. S22-634-2
July 20, 1993

HIGHLAND ESTATES
Slope: GS-8b
Loading: Seismic

SOIL PROPERTIES

Layer Number	Cohesion	Friction Angle	Unit Weight
1	9000.0	0.0	130.0
2	1000.0	15.0	125.0
3	1000.0	25.0	125.0
4	1000.0	30.0	125.0
5	1000.0	30.0	130.0

SOIL PROFILE

Section Number	X	elevation to bottom of layer layer number 1	2	3	4	5
1	-200.0	0.0	0.0	0.0	200.0	200.0
2	-180.0	0.0	0.0	0.0	200.0	200.0
3	-125.0	0.0	0.0	12.0	200.0	200.0
4	-50.0	0.0	18.0	28.0	200.0	200.0
5	2.0	30.0	30.0	40.0	200.0	200.0
6	12.0	35.0	35.0	43.0	200.0	200.0
7	12.0	35.0	35.0	35.0	35.0	200.0
8	20.0	35.0	35.0	35.0	35.0	200.0
9	70.0	60.0	60.0	60.0	60.0	200.0
10	125.0	65.0	65.0	65.0	65.0	200.0
11	185.0	90.0	90.0	90.0	90.0	200.0
12	210.0	115.0	90.0	90.0	90.0	200.0
13	235.0	115.0	115.0	115.0	115.0	200.0
14	300.0	115.0	115.0	115.0	115.0	200.0

RESULTS

circle	radius	X-center	Y-center	F.S.	ROVER	RESIST	ARCL
1	135.0	190.0	-20.0	2.891	0.25280D+08	0.73085D+08	164.6
2	140.0	190.0	-20.0	2.171	0.32518D+08	0.70604D+08	177.7
3	145.0	190.0	-20.0	2.152	0.39748D+08	0.85521D+08	197.6
4	150.0	190.0	-20.0	2.201	0.47829D+08	0.10526D+09	223.9
5	125.0	190.0	-10.0	2.911	0.22347D+08	0.65041D+08	159.3
6	130.0	190.0	-10.0	2.186	0.28845D+08	0.63043D+08	172.3
7	135.0	190.0	-10.0	2.162	0.35397D+08	0.76521D+08	189.7
8	140.0	190.0	-10.0	2.198	0.42820D+08	0.94099D+08	212.3
9	115.0	190.0	0.0	2.945	0.19457D+08	0.57302D+08	153.8
10	120.0	190.0	0.0	2.788	0.24969D+08	0.69624D+08	166.6
11	125.0	190.0	0.0	2.178	0.31220D+08	0.67988D+08	182.4
12	130.0	190.0	0.0	2.206	0.37957D+08	0.83731D+08	203.6
13	105.0	190.0	10.0	3.662	0.16039D+08	0.58729D+08	148.1
14	110.0	190.0	10.0	2.836	0.21517D+08	0.61014D+08	160.8
15	115.0	190.0	10.0	2.199	0.27213D+08	0.59838D+08	174.7
16	120.0	190.0	10.0	2.221	0.33288D+08	0.73916D+08	195.4
17	95.0	190.0	20.0	3.751	0.13471D+08	0.50531D+08	142.2
18	100.0	190.0	20.0	2.903	0.18198D+08	0.52824D+08	154.6

19	105.0	190.0	20.0	2.238	0.23233D+08	0.51991D+08	167.0
20	110.0	190.0	20.0	2.247	0.28700D+08	0.64479D+08	186.9
21	135.0	200.0	-20.0	3.456	0.22543D+08	0.77909D+08	155.2
22	140.0	200.0	-20.0	2.081	0.30354D+08	0.63157D+08	170.2
23	145.0	200.0	-20.0	2.106	0.37963D+08	0.79959D+08	195.7
24	150.0	200.0	-20.0	2.137	0.45615D+08	0.97496D+08	217.9
25	125.0	200.0	-10.0	3.495	0.19757D+08	0.69060D+08	150.1
26	130.0	200.0	-10.0	2.086	0.26847D+08	0.55996D+08	163.8
27	135.0	200.0	-10.0	2.109	0.33796D+08	0.71263D+08	188.6
28	140.0	200.0	-10.0	2.136	0.40868D+08	0.87284D+08	210.4
29	115.0	200.0	0.0	3.532	0.17190D+08	0.60715D+08	144.8
30	120.0	200.0	0.0	2.098	0.23489D+08	0.49277D+08	157.7
31	125.0	200.0	0.0	2.118	0.29692D+08	0.62893D+08	181.3
32	130.0	200.0	0.0	2.148	0.36075D+08	0.77486D+08	202.5
33	105.0	200.0	10.0	3.596	0.14665D+08	0.52731D+08	139.2
34	110.0	200.0	10.0	2.119	0.20301D+08	0.43009D+08	152.0
35	115.0	200.0	10.0	2.131	0.25789D+08	0.54964D+08	173.7
36	120.0	200.0	10.0	2.167	0.31502D+08	0.68269D+08	194.4
37	95.0	200.0	20.0	3.693	0.12225D+08	0.45143D+08	133.4
38	100.0	200.0	20.0	2.159	0.17139D+08	0.37009D+08	146.0
39	105.0	200.0	20.0	2.151	0.22076D+08	0.47479D+08	165.8
40	110.0	200.0	20.0	2.192	0.27151D+08	0.59528D+08	185.9
41	135.0	210.0	-20.0	3.457	0.20248D+08	0.69990D+08	145.6
42	140.0	210.0	-20.0	2.054	0.28005D+08	0.57516D+08	169.0
43	145.0	210.0	-20.0	2.094	0.34829D+08	0.72945D+08	194.6
44	150.0	210.0	-20.0	2.133	0.43035D+08	0.91781D+08	216.8
45	125.0	210.0	-10.0	3.494	0.17705D+08	0.61864D+08	140.5
46	130.0	210.0	-10.0	2.053	0.24748D+08	0.50808D+08	162.6
47	135.0	210.0	-10.0	2.091	0.31017D+08	0.64852D+08	187.5
48	140.0	210.0	-10.0	2.135	0.38445D+08	0.82066D+08	209.3
49	115.0	210.0	0.0	3.554	0.15219D+08	0.54089D+08	135.4
50	120.0	210.0	0.0	2.066	0.21444D+08	0.44305D+08	156.0
51	125.0	210.0	0.0	2.091	0.27335D+08	0.57149D+08	180.2
52	130.0	210.0	0.0	2.139	0.34042D+08	0.72812D+08	201.5
53	105.0	210.0	10.0	3.633	0.12863D+08	0.46726D+08	130.0
54	110.0	210.0	10.0	2.087	0.18285D+08	0.38159D+08	149.2
55	115.0	210.0	10.0	2.109	0.23591D+08	0.49757D+08	172.7
56	120.0	210.0	10.0	2.153	0.29687D+08	0.63913D+08	193.4
57	95.0	210.0	20.0	3.769	0.10501D+08	0.39575D+08	123.7
58	100.0	210.0	20.0	2.113	0.15363D+08	0.32455D+08	142.0
59	105.0	210.0	20.0	2.136	0.20079D+08	0.42880D+08	164.8
60	110.0	210.0	20.0	2.182	0.25352D+08	0.55315D+08	184.9
61	135.0	220.0	-20.0	3.556	0.17448D+08	0.62040D+08	135.5
62	140.0	220.0	-20.0	2.083	0.24691D+08	0.51438D+08	167.8
63	145.0	220.0	-20.0	2.110	0.32081D+08	0.67700D+08	193.4
64	150.0	220.0	-20.0	2.151	0.39580D+08	0.85117D+08	215.7
65	125.0	220.0	-10.0	3.613	0.15103D+08	0.54572D+08	130.6
66	130.0	220.0	-10.0	2.092	0.21641D+08	0.45271D+08	161.5
67	135.0	220.0	-10.0	2.124	0.28161D+08	0.59824D+08	186.4
68	140.0	220.0	-10.0	2.160	0.35074D+08	0.75766D+08	208.2
69	115.0	220.0	0.0	3.727	0.12703D+08	0.47340D+08	125.4
70	120.0	220.0	0.0	2.106	0.18735D+08	0.39449D+08	154.9
71	125.0	220.0	0.0	2.141	0.24475D+08	0.52406D+08	179.1
72	130.0	220.0	0.0	2.179	0.30665D+08	0.66810D+08	200.4
73	105.0	220.0	10.0	3.769	0.10660D+08	0.40177D+08	117.2
74	110.0	220.0	10.0	2.147	0.15752D+08	0.33819D+08	148.1
75	115.0	220.0	10.0	2.165	0.20980D+08	0.45416D+08	171.6
76	120.0	220.0	10.0	2.193	0.26680D+08	0.58498D+08	192.4
77	95.0	220.0	20.0	4.721	0.83314D+07	0.39334D+08	108.9
78	100.0	220.0	20.0	2.177	0.13054D+08	0.28417D+08	138.3

HIGHLAND ESTATES
Slope: GS-8b
Loading: Seismic

79	105.0	220.0	20.0	2.206	0.17583D+08	0.38781D+08	163.7
80	110.0	220.0	20.0	2.220	0.22788D+08	0.50579D+08	184.0
81	135.0	230.0	-20.0	3.825	0.14107D+08	0.53966D+08	124.8
82	140.0	230.0	-20.0	2.190	0.21157D+08	0.46331D+08	166.6
83	145.0	230.0	-20.0	2.190	0.28261D+08	0.61884D+08	192.2
84	150.0	230.0	-20.0	2.206	0.36187D+08	0.79831D+08	214.6
85	125.0	230.0	-10.0	4.802	0.11448D+08	0.54976D+08	116.8
86	130.0	230.0	-10.0	2.223	0.18199D+08	0.40451D+08	160.3
87	135.0	230.0	-10.0	2.197	0.24918D+08	0.54756D+08	185.2
88	140.0	230.0	-10.0	2.222	0.31901D+08	0.70883D+08	207.1
89	115.0	230.0	0.0	4.876	0.96124D+07	0.46873D+08	108.8
90	120.0	230.0	0.0	2.246	0.15468D+08	0.34739D+08	151.4
91	125.0	230.0	0.0	2.233	0.21402D+08	0.47786D+08	178.0
92	130.0	230.0	0.0	2.245	0.27775D+08	0.62357D+08	199.3
93	105.0	230.0	10.0	4.936	0.79976D+07	0.39474D+08	100.8
94	110.0	230.0	10.0	2.268	0.12979D+08	0.29431D+08	141.8
95	115.0	230.0	10.0	2.272	0.18044D+08	0.40999D+08	168.6
96	120.0	230.0	10.0	2.298	0.23535D+08	0.54075D+08	191.3
97	95.0	230.0	20.0	4.938	0.66364D+07	0.32773D+08	92.7
98	100.0	230.0	20.0	2.283	0.10784D+08	0.24623D+08	132.0
99	105.0	230.0	20.0	2.319	0.14909D+08	0.34576D+08	158.0
100	110.0	230.0	20.0	2.354	0.19607D+08	0.46148D+08	181.0

CRITICAL CIRCLES

circle	radius	X-center	Y-center	F.S.
1	130.0	210.0	-10.0	2.053
2	140.0	210.0	-20.0	2.054
3	120.0	210.0	0.0	2.066
4	140.0	200.0	-20.0	2.081
5	140.0	220.0	-20.0	2.083
6	130.0	200.0	-10.0	2.086
7	110.0	210.0	10.0	2.087
8	125.0	210.0	0.0	2.091
9	135.0	210.0	-10.0	2.091
10	130.0	220.0	-10.0	2.092

gs9.r

Problem Title: Highland Estates: Profile No. 9
Loading: Static

User's Name:P. F.
Date: 06-07-1993

GENERAL DATA

UNITS

Unit Weight of Water: 62.4

GEOMETRY

Number of Sections : 14

Section	X	Y-crk.	Y-grd.
1	-200.0	0.0	0.0
2	-160.0	0.0	0.0
3	-120.0	0.0	0.0
4	-100.0	0.0	0.0
5	-50.0	10.0	10.0
6	-20.0	25.0	25.0
7	0.0	35.0	35.0
8	10.0	35.0	35.0
9	10.0	35.0	35.0
10	45.0	55.0	55.0
11	65.0	67.0	67.0
12	75.0	67.0	67.0
13	120.0	90.0	90.0
14	200.0	97.0	97.0

CIRCLE DATA

Coordinates of first circle (X,Y): 60 -155
Intervals of circle coordinates
X-direction: 10
Y-direction: 10
Number of intervals
X-direction: 5
Y-direction: 6

Elevation of upper-most tangent: 90
Tangent interval: 5
Number of tangents: 3

CONTROL DATA/ANALYSIS OPTIONS

No seismic analysis
Number of slices: 10

Total stress analysis

Soil parameters defined in SOIL PROPERTIES

File No. S22-634-2
July 20, 1993

HIGHLAND ESTATES
Slope: GS-9
Loading: Static

SOIL PROPERTIES

Layer Number	Cohesion	Friction Angle	Unit Weight
1	1000.0	15.0	125.0
2	1000.0	25.0	125.0
3	1000.0	30.0	125.0
4	1000.0	30.0	130.0

SOIL PROFILE

Section Number	X	elevation to bottom of layer, layer number 1	2	3	4
1	-200.0	0.0	0.0	200.0	200.0
2	-160.0	0.0	0.0	200.0	200.0
3	-120.0	0.0	10.0	200.0	200.0
4	-100.0	7.0	17.0	200.0	200.0
5	-50.0	20.0	30.0	200.0	200.0
6	-20.0	25.0	35.0	200.0	200.0
7	0.0	35.0	45.0	200.0	200.0
8	10.0	35.0	47.0	200.0	200.0
9	10.0	35.0	35.0	35.0	200.0
10	45.0	55.0	55.0	55.0	200.0
11	65.0	67.0	67.0	67.0	200.0
12	75.0	67.0	67.0	67.0	200.0
13	120.0	90.0	90.0	90.0	200.0
14	200.0	97.0	97.0	97.0	200.0

RESULTS

circle	radius	X-center	Y-center	F.S.	ROVER	RESIST	ARCL
1	245.0	60.0	-155.0	2.583	0.83076D+08	0.21458D+09	267.0
2	250.0	60.0	-155.0	2.567	0.96816D+08	0.24853D+09	282.6
3	255.0	60.0	-155.0	2.565	0.11145D+09	0.28586D+09	302.5
4	235.0	60.0	-145.0	2.568	0.77965D+08	0.20024D+09	262.5
5	240.0	60.0	-145.0	2.552	0.91022D+08	0.23230D+09	278.0
6	245.0	60.0	-145.0	2.548	0.10513D+09	0.26783D+09	297.2
7	225.0	60.0	-135.0	2.554	0.72966D+08	0.18636D+09	258.0
8	230.0	60.0	-135.0	2.537	0.85348D+08	0.21657D+09	273.3
9	235.0	60.0	-135.0	2.534	0.98726D+08	0.25014D+09	291.7
10	215.0	60.0	-125.0	2.527	0.68091D+08	0.17209D+09	253.3
11	220.0	60.0	-125.0	2.523	0.79797D+08	0.20133D+09	268.5
12	225.0	60.0	-125.0	2.520	0.92676D+08	0.23357D+09	286.2
13	205.0	60.0	-115.0	2.514	0.63467D+08	0.15955D+09	248.5
14	210.0	60.0	-115.0	2.509	0.74566D+08	0.18707D+09	263.6
15	215.0	60.0	-115.0	2.507	0.86363D+08	0.21649D+09	280.5
16	195.0	60.0	-105.0	2.512	0.58243D+08	0.14631D+09	243.6
17	200.0	60.0	-105.0	2.486	0.68996D+08	0.17150D+09	258.5
18	205.0	60.0	-105.0	2.494	0.80201D+08	0.20000D+09	274.6
19	245.0	70.0	-155.0	2.508	0.78290D+08	0.19638D+09	259.6

20	250.0	70.0	-155.0	2.495	0.92032D+08	0.22958D+09	275.4
21	255.0	70.0	-155.0	2.507	0.10691D+09	0.26806D+09	300.0
22	235.0	70.0	-145.0	2.490	0.73740D+08	0.18362D+09	255.2
23	240.0	70.0	-145.0	2.478	0.86731D+08	0.21493D+09	270.9
24	245.0	70.0	-145.0	2.491	0.10052D+09	0.25038D+09	294.7
25	225.0	70.0	-135.0	2.477	0.68676D+08	0.17010D+09	250.7
26	230.0	70.0	-135.0	2.452	0.81088D+08	0.19881D+09	266.3
27	235.0	70.0	-135.0	2.475	0.94262D+08	0.23327D+09	289.3
28	215.0	70.0	-125.0	2.473	0.63428D+08	0.15687D+09	246.1
29	220.0	70.0	-125.0	2.437	0.75544D+08	0.18413D+09	261.6
30	225.0	70.0	-125.0	2.458	0.88146D+08	0.21669D+09	283.8
31	205.0	70.0	-115.0	2.478	0.58061D+08	0.14387D+09	241.3
32	210.0	70.0	-115.0	2.435	0.69692D+08	0.16971D+09	256.7
33	215.0	70.0	-115.0	2.446	0.82077D+08	0.20076D+09	278.1
34	195.0	70.0	-105.0	2.482	0.52804D+08	0.13105D+09	235.1
35	200.0	70.0	-105.0	2.442	0.63690D+08	0.15553D+09	251.7
36	205.0	70.0	-105.0	2.439	0.75411D+08	0.18392D+09	272.3
37	245.0	80.0	-155.0	2.456	0.72851D+08	0.17895D+09	251.9
38	250.0	80.0	-155.0	2.431	0.86550D+08	0.21043D+09	272.2
39	255.0	80.0	-155.0	2.487	0.10073D+09	0.25049D+09	297.4
40	235.0	80.0	-145.0	2.452	0.67601D+08	0.16578D+09	247.6
41	240.0	80.0	-145.0	2.418	0.81036D+08	0.19594D+09	267.3
42	245.0	80.0	-145.0	2.469	0.94640D+08	0.23369D+09	292.2
43	225.0	80.0	-135.0	2.458	0.62148D+08	0.15276D+09	243.2
44	230.0	80.0	-135.0	2.418	0.75055D+08	0.18151D+09	262.3
45	235.0	80.0	-135.0	2.440	0.88746D+08	0.21653D+09	286.8
46	215.0	80.0	-125.0	2.461	0.56855D+08	0.13990D+09	237.2
47	220.0	80.0	-125.0	2.424	0.69115D+08	0.16750D+09	257.2
48	225.0	80.0	-125.0	2.439	0.82257D+08	0.20059D+09	281.4
49	205.0	80.0	-115.0	2.458	0.52114D+08	0.12808D+09	231.2
50	210.0	80.0	-115.0	2.423	0.63603D+08	0.15414D+09	250.8
51	215.0	80.0	-115.0	2.438	0.75966D+08	0.18522D+09	275.8
52	195.0	80.0	-105.0	2.455	0.47608D+08	0.11687D+09	225.0
53	200.0	80.0	-105.0	2.423	0.58315D+08	0.14128D+09	244.0
54	205.0	80.0	-105.0	2.436	0.69882D+08	0.17021D+09	269.0
55	245.0	90.0	-155.0	2.454	0.65152D+08	0.15991D+09	243.8
56	250.0	90.0	-155.0	2.429	0.79548D+08	0.19325D+09	268.9
57	255.0	90.0	-155.0	2.442	0.94604D+08	0.23106D+09	294.8
58	235.0	90.0	-145.0	2.455	0.59965D+08	0.14722D+09	238.1
59	240.0	90.0	-145.0	2.430	0.73864D+08	0.17950D+09	264.1
60	245.0	90.0	-145.0	2.441	0.88122D+08	0.21508D+09	289.6
61	225.0	90.0	-135.0	2.453	0.55279D+08	0.13559D+09	232.3
62	230.0	90.0	-135.0	2.428	0.68360D+08	0.16596D+09	258.1
63	235.0	90.0	-135.0	2.436	0.82240D+08	0.20032D+09	284.3
64	215.0	90.0	-125.0	2.452	0.50819D+08	0.12462D+09	226.5
65	220.0	90.0	-125.0	2.423	0.63060D+08	0.15277D+09	251.6
66	225.0	90.0	-125.0	2.437	0.75746D+08	0.18462D+09	278.1
67	205.0	90.0	-115.0	2.455	0.46552D+08	0.11428D+09	220.5
68	210.0	90.0	-115.0	2.417	0.57986D+08	0.14017D+09	245.0
69	215.0	90.0	-115.0	2.438	0.69503D+08	0.16943D+09	271.1
70	195.0	90.0	-105.0	2.482	0.41671D+08	0.10344D+09	214.5
71	200.0	90.0	-105.0	2.431	0.52371D+08	0.12732D+09	238.4
72	205.0	90.0	-105.0	2.440	0.63514D+08	0.15497D+09	264.0
73	245.0	100.0	-155.0	2.465	0.57462D+08	0.14167D+09	232.3
74	250.0	100.0	-155.0	2.450	0.72170D+08	0.17683D+09	264.3
75	255.0	100.0	-155.0	2.453	0.86649D+08	0.21252D+09	292.0
76	235.0	100.0	-145.0	2.465	0.53044D+08	0.13076D+09	226.6
77	240.0	100.0	-145.0	2.452	0.66458D+08	0.16295D+09	258.1
78	245.0	100.0	-145.0	2.457	0.80257D+08	0.19718D+09	286.2
79	225.0	100.0	-135.0	2.472	0.48657D+08	0.12027D+09	221.0

HIGHLAND ESTATES
Slope: GS-9
Loading: Static

80	230.0	100.0	-135.0	2.454	0.61009D+08	0.14970D+09	251.9
81	235.0	100.0	-135.0	2.460	0.74101D+08	0.18227D+09	279.5
82	215.0	100.0	-125.0	2.500	0.43762D+08	0.10942D+09	215.2
83	220.0	100.0	-125.0	2.472	0.55283D+08	0.13665D+09	245.5
84	225.0	100.0	-125.0	2.466	0.68062D+08	0.16786D+09	272.7
85	205.0	100.0	-115.0	2.515	0.39160D+08	0.98480D+08	209.4
86	210.0	100.0	-115.0	2.488	0.50024D+08	0.12447D+09	239.1
87	215.0	100.0	-115.0	2.479	0.62177D+08	0.15413D+09	265.8
88	195.0	100.0	-105.0	2.536	0.35180D+08	0.89216D+08	203.5
89	200.0	100.0	-105.0	2.499	0.45384D+08	0.11343D+09	232.5
90	205.0	100.0	-105.0	2.490	0.56701D+08	0.14116D+09	258.8

CRITICAL CIRCLES

circle	radius	X-center	Y-center	F.S.
1	210.0	90.0	-115.0	2.417
2	240.0	80.0	-145.0	2.418
3	230.0	80.0	-135.0	2.418
4	220.0	90.0	-125.0	2.423
5	200.0	80.0	-105.0	2.423
6	210.0	80.0	-115.0	2.423
7	220.0	80.0	-125.0	2.424
8	230.0	90.0	-135.0	2.428
9	250.0	90.0	-155.0	2.429
10	240.0	90.0	-145.0	2.430

File No. S22-634-2
July 20, 1993

GS9.S

Problem Title: Highland Estates: Profile No. 9
Loading: Seismic

User's Name:P. F.
Date: 06-07-1993

GENERAL DATA

UNITS

Unit Weight of Water: 62.4

GEOMETRY

Number of Sections : 14

Section	X	Y-crk.	Y-grd.
1	-200.0	0.0	0.0
2	-160.0	0.0	0.0
3	-120.0	0.0	0.0
4	-100.0	0.0	0.0
5	-50.0	10.0	10.0
6	-20.0	25.0	25.0
7	0.0	35.0	35.0
8	10.0	35.0	35.0
9	10.0	35.0	35.0
10	45.0	55.0	55.0
11	65.0	67.0	67.0
12	75.0	67.0	67.0
13	120.0	90.0	90.0
14	200.0	97.0	97.0

CIRCLE DATA

Coordinates of first circle (X,Y): 60 -155
Intervals of circle coordinates
X-direction: 10
Y-direction: 10
Number of intervals
X-direction: 5
Y-direction: 6

Elevation of upper-most tangent: 90
Tangent interval: 5
Number of tangents: 3

CONTROL DATA/ANALYSIS OPTIONS

Seismic coefficient: .15
Number of slices: 10

Total stress analysis

Soil parameters defined in SOIL PROPERTIES

File No. S22-634-2
July 20, 1993

HIGHLAND ESTATES
Slope: GS-9
Loading: Seismic

SOIL PROPERTIES

Layer Number	Cohesion	Friction Angle	Unit Weight
1	1000.0	15.0	125.0
2	1000.0	25.0	125.0
3	1000.0	30.0	125.0
4	1000.0	30.0	130.0

SOIL PROFILE

Section Number	X	elevation to bottom of layer, layer number 1	2	3	4
1	-200.0	0.0	0.0	200.0	200.0
2	-160.0	0.0	0.0	200.0	200.0
3	-120.0	0.0	10.0	200.0	200.0
4	-100.0	7.0	17.0	200.0	200.0
5	-50.0	20.0	30.0	200.0	200.0
6	-20.0	25.0	35.0	200.0	200.0
7	0.0	35.0	45.0	200.0	200.0
8	10.0	35.0	47.0	200.0	200.0
9	10.0	35.0	35.0	35.0	200.0
10	45.0	55.0	55.0	55.0	200.0
11	65.0	67.0	67.0	67.0	200.0
12	75.0	67.0	67.0	67.0	200.0
13	120.0	90.0	90.0	90.0	200.0
14	200.0	97.0	97.0	97.0	200.0

RESULTS

circle	radius	X-center	Y-center	F.S.	ROVER	RESIST	ARCL
1	245.0	60.0	-155.0	1.640	0.12566D+09	0.20613D+09	267.0
2	250.0	60.0	-155.0	1.640	0.14573D+09	0.23902D+09	282.6
3	255.0	60.0	-155.0	1.649	0.16699D+09	0.27531D+09	302.5
4	235.0	60.0	-145.0	1.638	0.11739D+09	0.19231D+09	262.5
5	240.0	60.0	-145.0	1.640	0.13622D+09	0.22336D+09	278.0
6	245.0	60.0	-145.0	1.645	0.15673D+09	0.25786D+09	297.2
7	225.0	60.0	-135.0	1.635	0.10944D+09	0.17888D+09	258.0
8	230.0	60.0	-135.0	1.636	0.12721D+09	0.20814D+09	273.3
9	235.0	60.0	-135.0	1.644	0.14645D+09	0.24076D+09	291.7
10	215.0	60.0	-125.0	1.642	0.10076D+09	0.16549D+09	253.3
11	220.0	60.0	-125.0	1.633	0.11842D+09	0.19343D+09	268.5
12	225.0	60.0	-125.0	1.657	0.13579D+09	0.22495D+09	286.2
13	205.0	60.0	-115.0	1.659	0.92539D+08	0.15356D+09	248.5
14	210.0	60.0	-115.0	1.647	0.10920D+09	0.17984D+09	263.6
15	215.0	60.0	-115.0	1.655	0.12593D+09	0.20842D+09	280.5
16	195.0	60.0	-105.0	1.667	0.84469D+08	0.14082D+09	243.6
17	200.0	60.0	-105.0	1.658	0.99637D+08	0.16522D+09	258.5
18	205.0	60.0	-105.0	1.654	0.11635D+09	0.19248D+09	274.6
19	245.0	70.0	-155.0	1.617	0.11668D+09	0.18863D+09	259.6

20	250.0	70.0	-155.0	1.603	0.13741D+09	0.22029D+09	275.4
21	255.0	70.0	-155.0	1.636	0.15771D+09	0.25805D+09	300.0
22	235.0	70.0	-145.0	1.630	0.10830D+09	0.17652D+09	255.2
23	240.0	70.0	-145.0	1.614	0.12783D+09	0.20637D+09	270.9
24	245.0	70.0	-145.0	1.632	0.14766D+09	0.24093D+09	294.7
25	225.0	70.0	-135.0	1.629	0.10034D+09	0.16346D+09	250.7
26	230.0	70.0	-135.0	1.621	0.11796D+09	0.19125D+09	266.3
27	235.0	70.0	-135.0	1.628	0.13785D+09	0.22435D+09	289.3
28	215.0	70.0	-125.0	1.634	0.92215D+08	0.15072D+09	246.1
29	220.0	70.0	-125.0	1.620	0.10930D+09	0.17708D+09	261.6
30	225.0	70.0	-125.0	1.624	0.12829D+09	0.20832D+09	283.8
31	205.0	70.0	-115.0	1.648	0.83913D+08	0.13825D+09	241.3
32	210.0	70.0	-115.0	1.627	0.10031D+09	0.16319D+09	256.7
33	215.0	70.0	-115.0	1.623	0.11891D+09	0.19294D+09	278.1
34	195.0	70.0	-105.0	1.662	0.75796D+08	0.12598D+09	235.1
35	200.0	70.0	-105.0	1.642	0.91113D+08	0.14959D+09	251.7
36	205.0	70.0	-105.0	1.645	0.10772D+09	0.17720D+09	272.3
37	245.0	80.0	-155.0	1.610	0.10668D+09	0.17175D+09	251.9
38	250.0	80.0	-155.0	1.604	0.12611D+09	0.20224D+09	272.2
39	255.0	80.0	-155.0	1.624	0.14833D+09	0.24083D+09	297.4
40	235.0	80.0	-145.0	1.614	0.98539D+08	0.15908D+09	247.6
41	240.0	80.0	-145.0	1.602	0.11752D+09	0.18825D+09	267.3
42	245.0	80.0	-145.0	1.618	0.13876D+09	0.22457D+09	292.2
43	225.0	80.0	-135.0	1.627	0.90070D+08	0.14658D+09	243.2
44	230.0	80.0	-135.0	1.610	0.10833D+09	0.17439D+09	262.3
45	235.0	80.0	-135.0	1.626	0.12827D+09	0.20850D+09	286.8
46	215.0	80.0	-125.0	1.641	0.81861D+08	0.13429D+09	237.2
47	220.0	80.0	-125.0	1.622	0.99210D+08	0.16095D+09	257.2
48	225.0	80.0	-125.0	1.634	0.11820D+09	0.19317D+09	281.4
49	205.0	80.0	-115.0	1.648	0.74628D+08	0.12296D+09	231.2
50	210.0	80.0	-115.0	1.631	0.90823D+08	0.14813D+09	250.8
51	215.0	80.0	-115.0	1.642	0.10864D+09	0.17835D+09	275.8
52	195.0	80.0	-105.0	1.654	0.67828D+08	0.11220D+09	225.0
53	200.0	80.0	-105.0	1.638	0.82898D+08	0.13578D+09	244.0
54	205.0	80.0	-105.0	1.648	0.99447D+08	0.16391D+09	269.0
55	245.0	90.0	-155.0	1.619	0.94694D+08	0.15330D+09	243.8
56	250.0	90.0	-155.0	1.611	0.11525D+09	0.18562D+09	268.9
57	255.0	90.0	-155.0	1.621	0.13722D+09	0.22242D+09	294.8
58	235.0	90.0	-145.0	1.630	0.86602D+08	0.14116D+09	238.1
59	240.0	90.0	-145.0	1.619	0.10648D+09	0.17240D+09	264.1
60	245.0	90.0	-145.0	1.627	0.12727D+09	0.20702D+09	289.6
61	225.0	90.0	-135.0	1.636	0.79484D+08	0.13001D+09	232.3
62	230.0	90.0	-135.0	1.624	0.98137D+08	0.15940D+09	258.1
63	235.0	90.0	-135.0	1.648	0.11710D+09	0.19302D+09	284.3
64	215.0	90.0	-125.0	1.642	0.72762D+08	0.11951D+09	226.5
65	220.0	90.0	-125.0	1.628	0.90103D+08	0.14673D+09	251.6
66	225.0	90.0	-125.0	1.657	0.10736D+09	0.17791D+09	278.1
67	205.0	90.0	-115.0	1.675	0.65528D+08	0.10979D+09	220.5
68	210.0	90.0	-115.0	1.653	0.81550D+08	0.13482D+09	245.0
69	215.0	90.0	-115.0	1.666	0.98022D+08	0.16329D+09	271.1
70	195.0	90.0	-105.0	1.706	0.58310D+08	0.99451D+08	214.5
71	200.0	90.0	-105.0	1.674	0.73213D+08	0.12253D+09	238.4
72	205.0	90.0	-105.0	1.676	0.89117D+08	0.14938D+09	264.0
73	245.0	100.0	-155.0	1.635	0.83005D+08	0.13573D+09	232.3
74	250.0	100.0	-155.0	1.650	0.10308D+09	0.17004D+09	264.3
75	255.0	100.0	-155.0	1.652	0.12390D+09	0.20474D+09	292.0
76	235.0	100.0	-145.0	1.641	0.76321D+08	0.12527D+09	226.6
77	240.0	100.0	-145.0	1.658	0.94490D+08	0.15670D+09	258.1
78	245.0	100.0	-145.0	1.662	0.11431D+09	0.18998D+09	286.2
79	225.0	100.0	-135.0	1.679	0.68784D+08	0.11546D+09	221.0

80	230.0	100.0	-135.0	1.668	0.86330D+08	0.14399D+09	251.9
81	235.0	100.0	-135.0	1.671	0.10510D+09	0.17564D+09	279.5
82	215.0	100.0	-125.0	1.709	0.61506D+08	0.10512D+09	215.2
83	220.0	100.0	-125.0	1.692	0.77750D+08	0.13152D+09	245.5
84	225.0	100.0	-125.0	1.684	0.96094D+08	0.16181D+09	272.7
85	205.0	100.0	-115.0	1.749	0.54297D+08	0.94992D+08	209.4
86	210.0	100.0	-115.0	1.715	0.69906D+08	0.11987D+09	239.1
87	215.0	100.0	-115.0	1.703	0.87267D+08	0.14865D+09	265.8
88	195.0	100.0	-105.0	1.773	0.48569D+08	0.86094D+08	203.5
89	200.0	100.0	-105.0	1.730	0.63149D+08	0.10926D+09	232.5
90	205.0	100.0	-105.0	1.719	0.79245D+08	0.13619D+09	258.8

CRITICAL CIRCLES

circle	radius	X-center	Y-center	F.S.
1	240.0	80.0	-145.0	1.602
2	250.0	70.0	-155.0	1.603
3	250.0	80.0	-155.0	1.604
4	230.0	80.0	-135.0	1.610
5	245.0	80.0	-155.0	1.610
6	250.0	90.0	-155.0	1.611
7	235.0	80.0	-145.0	1.614
8	240.0	70.0	-145.0	1.614
9	245.0	70.0	-155.0	1.617
10	245.0	80.0	-145.0	1.618

File No. S22-634-2
July 20, 1993

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Problem Title: hestates

User's Name:kcs
Date: 06-07-1993

GENERAL DATA

UNITS

Unit Weight of Water: 62.4

Project: HIGHLAND ESTATES
Slope : GS-10
Loading: Static

GEOMETRY

Number of Sections : 11

Section	X	Y-crk.	Y-grd.
1	-100.0	47.0	47.0
2	-85.0	47.0	47.0
3	-60.0	47.0	47.0
4	-35.0	47.0	47.0
5	15.0	47.0	47.0
6	15.0	47.0	47.0
7	30.0	47.0	47.0
8	35.0	75.0	75.0
9	40.0	75.0	75.0
10	95.0	110.0	110.0
11	200.0	115.0	115.0

CIRCLE DATA

Coordinates of first circle (X,Y): 20 -40
Intervals of circle coordinates
X-direction: 20
Y-direction: 20
Number of intervals
X-direction: 5
Y-direction: 5

Elevation of upper-most tangent: 80
Tangent interval: 10
Number of tangents: 5

CONTROL DATA/ANALYSIS OPTIONS

No seismic analysis
Number of slices: 10

Total stress analysis

Soil parameters defined in SOIL PROPERTIES

SOIL PROPERTIES

File No. S22-634-2
July 20, 1993

Layer Number	Cohesion	Friction Angle	Unit Weight
1	4000.0	30.0	130.0
2	1500.0	20.0	130.0
3	1000.0	15.0	125.0
4	1000.0	25.0	125.0
5	1000.0	30.0	125.0
6	1250.0	35.0	125.0
7	2000.0	35.0	125.0

HIGHLAND ESTATES
Slope: GS-10
Loading: Static

SOIL PROFILE

Section Number	X	elevation to bottom of layer, layer number 1	2	3	4	5	6	7
1	-100.0	47.0	47.0	47.0	47.0	55.0	75.0	300.0
2	-85.0	47.0	47.0	47.0	47.0	57.0	77.0	300.0
3	-60.0	47.0	47.0	47.0	57.0	67.0	87.0	300.0
4	-35.0	47.0	47.0	57.0	67.0	77.0	97.0	300.0
5	15.0	47.0	70.0	80.0	90.0	100.0	120.0	300.0
6	15.0	75.0	75.0	80.0	90.0	100.0	120.0	300.0
7	30.0	75.0	75.0	85.0	95.0	105.0	125.0	300.0
8	35.0	75.0	75.0	87.0	97.0	107.0	127.0	300.0
9	40.0	75.0	75.0	90.0	100.0	110.0	130.0	300.0
10	95.0	110.0	110.0	110.0	120.0	130.0	150.0	300.0
11	200.0	115.0	130.0	140.0	150.0	160.0	180.0	300.0

RESULTS

circle	radius	X-center	Y-center	F.S.	ROVER	RESIST	ARCL
1	120.0	20.0	-40.0	3.981	0.70828D+07	0.28198D+08	115.3
2	130.0	20.0	-40.0	4.089	0.12680D+08	0.51848D+08	144.9
3	140.0	20.0	-40.0	4.603	0.19458D+08	0.89559D+08	173.4
4	150.0	20.0	-40.0	4.804	0.28328D+08	0.13608D+09	200.2
5	160.0	20.0	-40.0	4.724	0.39033D+08	0.18437D+09	222.2
6	100.0	20.0	-20.0	3.830	0.57097D+07	0.21868D+08	107.2
7	110.0	20.0	-20.0	3.866	0.10351D+08	0.40017D+08	135.9
8	120.0	20.0	-20.0	4.532	0.15977D+08	0.72409D+08	163.5
9	130.0	20.0	-20.0	4.505	0.23704D+08	0.10679D+09	190.6
10	140.0	20.0	-20.0	4.683	0.32931D+08	0.15423D+09	216.0
11	80.0	20.0	0.0	3.677	0.43426D+07	0.15967D+08	98.3
12	90.0	20.0	0.0	3.699	0.80330D+07	0.29715D+08	125.8
13	100.0	20.0	0.0	4.332	0.12577D+08	0.54483D+08	152.6
14	110.0	20.0	0.0	4.260	0.19098D+08	0.81357D+08	179.0
15	120.0	20.0	0.0	4.705	0.26558D+08	0.12495D+09	204.9
16	60.0	20.0	20.0	3.365	0.30059D+07	0.10116D+08	87.9
17	70.0	20.0	20.0	3.588	0.57305D+07	0.20564D+08	114.3
18	80.0	20.0	20.0	4.137	0.93113D+07	0.38522D+08	140.2
19	90.0	20.0	20.0	4.311	0.14323D+08	0.61751D+08	165.6
20	100.0	20.0	20.0	4.724	0.20245D+08	0.95642D+08	190.8
21	40.0	20.0	40.0	3.353	0.16899D+07	0.56662D+07	74.0

File No. S22-634-2
July 20, 1993

HIGHLAND ESTATES
Slope: GS-10
Loading: Static

22	50.0	20.0	40.0	3.681	0.34583D+07	0.12730D+08	99.0
23	60.0	20.0	40.0	4.165	0.60797D+07	0.25323D+08	123.3
24	70.0	20.0	40.0	4.426	0.96065D+07	0.42520D+08	147.5
25	80.0	20.0	40.0	4.931	0.14028D+08	0.69176D+08	171.6
26	120.0	40.0	-40.0	2.686	0.74604D+07	0.20042D+08	98.6
27	130.0	40.0	-40.0	2.966	0.13347D+08	0.39584D+08	129.8
28	140.0	40.0	-40.0	3.267	0.20998D+08	0.68599D+08	159.2
29	150.0	40.0	-40.0	3.554	0.30746D+08	0.10926D+09	187.6
30	160.0	40.0	-40.0	3.838	0.42489D+08	0.16306D+09	215.6
31	100.0	40.0	-20.0	2.279	0.61075D+07	0.13920D+08	91.0
32	110.0	40.0	-20.0	2.623	0.10970D+08	0.28774D+08	121.2
33	120.0	40.0	-20.0	3.076	0.17572D+08	0.54044D+08	149.8
34	130.0	40.0	-20.0	3.453	0.25868D+08	0.89311D+08	177.5
35	140.0	40.0	-20.0	3.667	0.35742D+08	0.13108D+09	204.6
36	80.0	40.0	0.0	2.186	0.47794D+07	0.10446D+08	82.7
37	90.0	40.0	0.0	2.440	0.86942D+07	0.21212D+08	111.9
38	100.0	40.0	0.0	2.768	0.14136D+08	0.39132D+08	139.6
39	110.0	40.0	0.0	3.287	0.20806D+08	0.68396D+08	166.5
40	120.0	40.0	0.0	3.406	0.29134D+08	0.99237D+08	192.8
41	60.0	40.0	20.0	2.095	0.33591D+07	0.70357D+07	73.2
42	70.0	40.0	20.0	2.258	0.64560D+07	0.14577D+08	101.2
43	80.0	40.0	20.0	2.559	0.10516D+08	0.26915D+08	127.9
44	90.0	40.0	20.0	3.060	0.15933D+08	0.48761D+08	153.8
45	100.0	40.0	20.0	3.320	0.22823D+08	0.75771D+08	179.3
46	40.0	40.0	40.0	2.348	0.19560D+07	0.45934D+07	61.2
47	50.0	40.0	40.0	2.137	0.40468D+07	0.86478D+07	87.2
48	60.0	40.0	40.0	2.442	0.71200D+07	0.17386D+08	112.1
49	70.0	40.0	40.0	2.984	0.11232D+08	0.33511D+08	136.5
50	80.0	40.0	40.0	3.346	0.16508D+08	0.55239D+08	160.8
51	120.0	60.0	-40.0	3.379	0.63069D+07	0.21310D+08	77.8
52	130.0	60.0	-40.0	2.262	0.12374D+08	0.27986D+08	112.3
53	140.0	60.0	-40.0	2.482	0.20199D+08	0.50128D+08	143.5
54	150.0	60.0	-40.0	2.854	0.30254D+08	0.86334D+08	172.9
55	160.0	60.0	-40.0	3.116	0.43363D+08	0.13511D+09	213.2
56	100.0	60.0	-20.0	3.498	0.48744D+07	0.17051D+08	70.0
57	110.0	60.0	-20.0	2.073	0.99751D+07	0.20676D+08	104.1
58	120.0	60.0	-20.0	2.264	0.16628D+08	0.37641D+08	134.6
59	130.0	60.0	-20.0	2.613	0.25719D+08	0.67212D+08	163.3
60	140.0	60.0	-20.0	2.979	0.36201D+08	0.10785D+09	200.6
61	80.0	60.0	0.0	3.762	0.34307D+07	0.12906D+08	61.2
62	90.0	60.0	0.0	1.748	0.74676D+07	0.13051D+08	95.2
63	100.0	60.0	0.0	2.040	0.13555D+08	0.27651D+08	124.9
64	110.0	60.0	0.0	2.423	0.20813D+08	0.50433D+08	152.8
65	120.0	60.0	0.0	2.776	0.29275D+08	0.81269D+08	187.0
66	60.0	60.0	20.0	4.378	0.20037D+07	0.87734D+07	40.3
67	70.0	60.0	20.0	1.764	0.51820D+07	0.91407D+07	85.3
68	80.0	60.0	20.0	1.927	0.95629D+07	0.18431D+08	114.0
69	90.0	60.0	20.0	2.129	0.15558D+08	0.33120D+08	140.9
70	100.0	60.0	20.0	2.602	0.23301D+08	0.60627D+08	171.6
71	40.0	60.0	40.0	7.005	0.64711D+06	0.45331D+07	27.5
72	50.0	60.0	40.0	2.770	0.28036D+07	0.77672D+07	72.6
73	60.0	60.0	40.0	1.874	0.60656D+07	0.11368D+08	99.4
74	70.0	60.0	40.0	2.060	0.10567D+08	0.21765D+08	124.7
75	80.0	60.0	40.0	2.532	0.16384D+08	0.41489D+08	151.3
76	120.0	80.0	-40.0	4.902	0.35336D+07	0.17321D+08	44.3
77	130.0	80.0	-40.0	2.491	0.88069D+07	0.21937D+08	90.3
78	140.0	80.0	-40.0	1.949	0.17604D+08	0.34312D+08	125.2
79	150.0	80.0	-40.0	2.152	0.27550D+08	0.59289D+08	156.6
80	160.0	80.0	-40.0	2.692	0.41157D+08	0.11080D+09	210.6
81	100.0	80.0	-20.0	5.794	0.22637D+07	0.13115D+08	35.7

82	110.0	80.0	-20.0	3.015	0.67234D+07	0.20268D+08	81.6
83	120.0	80.0	-20.0	1.912	0.13182D+08	0.25210D+08	116.5
84	130.0	80.0	-20.0	2.013	0.22513D+08	0.45321D+08	147.4
85	140.0	80.0	-20.0	2.602	0.32940D+08	0.85716D+08	198.2
86	80.0	80.0	0.0	8.340	0.10498D+07	0.87554D+07	25.4
87	90.0	80.0	0.0	3.835	0.41512D+07	0.15919D+08	71.7
88	100.0	80.0	0.0	1.729	0.10168D+08	0.17577D+08	107.2
89	110.0	80.0	0.0	1.895	0.17908D+08	0.33927D+08	137.4
90	120.0	80.0	0.0	2.337	0.26957D+08	0.62988D+08	184.8
91	60.0	80.0	20.0	F.S. greater than 10			
91	60.0	80.0	20.0	%22.259	0.10652D+06	0.23710D+07	9.7
92	70.0	80.0	20.0	5.983	0.16524D+07	0.98861D+07	32.9
93	80.0	80.0	20.0	2.191	0.65123D+07	0.14267D+08	96.8
94	90.0	80.0	20.0	1.804	0.12929D+08	0.23320D+08	126.2
95	100.0	80.0	20.0	2.241	0.20577D+08	0.46105D+08	169.6
96	40.0	80.0	40.0	circle does not intercept slope			
97	50.0	80.0	40.0	circle does not intercept slope			
98	60.0	80.0	40.0	4.025	0.27032D+07	0.10879D+08	83.4
99	70.0	80.0	40.0	1.816	0.77615D+07	0.14097D+08	111.2
100	80.0	80.0	40.0	2.026	0.14255D+08	0.28877D+08	149.5
101	120.0	100.0	-40.0	F.S. greater than 10			
101	120.0	100.0	-40.0	%12.423	0.78153D+06	0.97088D+07	19.0
102	130.0	100.0	-40.0	4.659	0.38780D+07	0.18067D+08	40.3
103	140.0	100.0	-40.0	1.851	0.11350D+08	0.21004D+08	101.9
104	150.0	100.0	-40.0	1.819	0.22396D+08	0.40737D+08	137.5
105	160.0	100.0	-40.0	2.254	0.35925D+08	0.80963D+08	207.9
106	100.0	100.0	-20.0	F.S. greater than 10			
106	100.0	100.0	-20.0	%28.171	0.10786D+06	0.30384D+07	7.4
107	110.0	100.0	-20.0	6.846	0.19382D+07	0.13270D+08	29.6
108	120.0	100.0	-20.0	3.233	0.73524D+07	0.23769D+08	92.4
109	130.0	100.0	-20.0	1.776	0.16354D+08	0.29051D+08	128.4
110	140.0	100.0	-20.0	2.289	0.26647D+08	0.60986D+08	195.7
111	80.0	100.0	0.0	circle does not intercept slope			
112	90.0	100.0	0.0	F.S. greater than 10			
112	90.0	100.0	0.0	%13.493	0.41544D+06	0.56056D+07	15.1
113	100.0	100.0	0.0	4.887	0.38785D+07	0.18955D+08	81.5
114	110.0	100.0	0.0	1.922	0.11346D+08	0.21806D+08	118.7
115	120.0	100.0	0.0	2.175	0.21904D+08	0.47646D+08	182.5
116	60.0	100.0	20.0	circle does not intercept slope			
117	70.0	100.0	20.0	circle does not intercept slope			
118	80.0	100.0	20.0	F.S. greater than 10			
118	80.0	100.0	20.0	%12.866	0.47313D+06	0.60872D+07	18.7
119	90.0	100.0	20.0	3.481	0.62132D+07	0.21631D+08	107.9
120	100.0	100.0	20.0	2.422	0.14051D+08	0.34035D+08	167.5
121	40.0	100.0	40.0	circle does not intercept slope			
122	50.0	100.0	40.0	circle does not intercept slope			
123	60.0	100.0	40.0	circle does not intercept slope			
124	70.0	100.0	40.0	3.622	0.16161D+07	0.58541D+07	67.9
125	80.0	100.0	40.0	3.629	0.75300D+07	0.27330D+08	147.7

CRITICAL CIRCLES

circle	radius	X-center	Y-center	F.S.
1	100.0	80.0	0.0	1.729
2	90.0	60.0	0.0	1.748
3	70.0	60.0	20.0	1.764
4	130.0	100.0	-20.0	1.776
5	90.0	80.0	20.0	1.804
6	70.0	80.0	40.0	1.816
7	150.0	100.0	-40.0	1.819
8	140.0	100.0	-40.0	1.851
9	60.0	60.0	40.0	1.874
10	110.0	80.0	0.0	1.895

File No. S22-634-2
July 20, 1993

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Problem Title: hestates

User's Name:kcs
Date: 06-07-1993

Project: HIGHLAND ESTATES
Slope : GS-10
Loading: Seismic

GENERAL DATA

UNITS

Unit Weight of Water: 62.4

GEOMETRY

Number of Sections : 11

Section	X	Y-crk.	Y-grd.
1	-100.0	47.0	47.0
2	-85.0	47.0	47.0
3	-60.0	47.0	47.0
4	-35.0	47.0	47.0
5	15.0	47.0	47.0
6	15.0	47.0	47.0
7	30.0	47.0	47.0
8	35.0	75.0	75.0
9	40.0	75.0	75.0
10	95.0	110.0	110.0
11	200.0	115.0	115.0

CIRCLE DATA

Coordinates of first circle (X,Y): 20 -40
Intervals of circle coordinates
X-direction: 20
Y-direction: 20
Number of intervals
X-direction: 5
Y-direction: 5

Elevation of upper-most tangent: 80
Tangent interval: 10
Number of tangents: 5

CONTROL DATA/ANALYSIS OPTIONS

Seismic coefficient: .15
Number of slices: 10

Total stress analysis

Soil parameters defined in SOIL PROPERTIES

SOIL PROPERTIES

File No. S22-634-2
July 20, 1993

HIGHLAND ESTATES
Slope: GS-10
Loading: Seismic

Layer Number	Cohesion	Friction Angle	Unit Weight
1	4000.0	30.0	130.0
2	1500.0	20.0	130.0
3	1000.0	15.0	125.0
4	1000.0	25.0	125.0
5	1000.0	30.0	125.0
6	1250.0	35.0	125.0
7	2000.0	35.0	125.0

SOIL PROFILE

Section Number	X	elevation to bottom of layer, layer number 1	2	3	4	5	6	7
1	-100.0	47.0	47.0	47.0	47.0	55.0	75.0	300.0
2	-85.0	47.0	47.0	47.0	47.0	57.0	77.0	300.0
3	-60.0	47.0	47.0	47.0	57.0	67.0	87.0	300.0
4	-35.0	47.0	47.0	57.0	67.0	77.0	97.0	300.0
5	15.0	47.0	70.0	80.0	90.0	100.0	120.0	300.0
6	15.0	75.0	75.0	80.0	90.0	100.0	120.0	300.0
7	30.0	75.0	75.0	85.0	95.0	105.0	125.0	300.0
8	35.0	75.0	75.0	87.0	97.0	107.0	127.0	300.0
9	40.0	75.0	75.0	90.0	100.0	110.0	130.0	300.0
10	95.0	110.0	110.0	110.0	120.0	130.0	150.0	300.0
11	200.0	115.0	130.0	140.0	150.0	160.0	180.0	300.0

RESULTS

circle	radius	X-center	Y-center	F.S.	ROVER	RESIST	ARCL
1	120.0	20.0	-40.0	1.516	0.17724D+08	0.26871D+08	115.3
2	130.0	20.0	-40.0	1.488	0.32684D+08	0.48640D+08	144.9
3	140.0	20.0	-40.0	1.544	0.54032D+08	0.83399D+08	173.4
4	150.0	20.0	-40.0	1.612	0.78801D+08	0.12699D+09	200.2
5	160.0	20.0	-40.0	1.695	0.10202D+09	0.17290D+09	222.2
6	100.0	20.0	-20.0	1.469	0.14120D+08	0.20736D+08	107.2
7	110.0	20.0	-20.0	1.469	0.25627D+08	0.37647D+08	135.9
8	120.0	20.0	-20.0	1.514	0.44338D+08	0.67133D+08	163.5
9	130.0	20.0	-20.0	1.632	0.61146D+08	0.99764D+08	190.6
10	140.0	20.0	-20.0	1.693	0.85116D+08	0.14411D+09	216.0
11	80.0	20.0	0.0	1.441	0.10502D+08	0.15137D+08	98.3
12	90.0	20.0	0.0	1.472	0.18940D+08	0.27886D+08	125.8
13	100.0	20.0	0.0	1.495	0.33616D+08	0.50246D+08	152.6
14	110.0	20.0	0.0	1.668	0.45805D+08	0.76397D+08	179.0
15	120.0	20.0	0.0	1.702	0.68411D+08	0.11646D+09	204.9
16	60.0	20.0	20.0	1.380	0.69419D+07	0.95833D+07	87.9
17	70.0	20.0	20.0	1.439	0.13344D+08	0.19199D+08	114.3
18	80.0	20.0	20.0	1.524	0.23457D+08	0.35746D+08	140.2
19	90.0	20.0	20.0	1.703	0.34027D+08	0.57946D+08	165.6
20	100.0	20.0	20.0	1.748	0.51077D+08	0.89305D+08	190.8
21	40.0	20.0	40.0	1.447	0.36964D+07	0.53473D+07	74.0

22	50.0	20.0	40.0	1.525	0.78565D+07	0.11983D+08	99.0
23	60.0	20.0	40.0	1.605	0.14662D+08	0.23535D+08	123.3
24	70.0	20.0	40.0	1.815	0.21938D+08	0.39820D+08	147.5
25	80.0	20.0	40.0	1.926	0.33701D+08	0.64925D+08	171.6
26	120.0	40.0	-40.0	1.237	0.15388D+08	0.19031D+08	98.6
27	130.0	40.0	-40.0	1.248	0.29472D+08	0.36792D+08	129.8
28	140.0	40.0	-40.0	1.293	0.48645D+08	0.62901D+08	159.2
29	150.0	40.0	-40.0	1.391	0.72288D+08	0.10058D+09	187.6
30	160.0	40.0	-40.0	1.464	0.10265D+09	0.15025D+09	215.6
31	100.0	40.0	-20.0	1.213	0.11049D+08	0.13405D+08	91.0
32	110.0	40.0	-20.0	1.292	0.21044D+08	0.27181D+08	121.2
33	120.0	40.0	-20.0	1.250	0.39611D+08	0.49499D+08	149.8
34	130.0	40.0	-20.0	1.357	0.60275D+08	0.81782D+08	177.5
35	140.0	40.0	-20.0	1.451	0.83245D+08	0.12082D+09	204.6
36	80.0	40.0	0.0	1.203	0.82915D+07	0.99735D+07	82.7
37	90.0	40.0	0.0	1.215	0.16354D+08	0.19872D+08	111.9
38	100.0	40.0	0.0	1.219	0.29505D+08	0.35974D+08	139.6
39	110.0	40.0	0.0	1.338	0.46696D+08	0.62475D+08	166.5
40	120.0	40.0	0.0	1.494	0.61471D+08	0.91856D+08	192.8
41	60.0	40.0	20.0	1.202	0.55236D+07	0.66416D+07	73.2
42	70.0	40.0	20.0	1.181	0.11582D+08	0.13680D+08	101.2
43	80.0	40.0	20.0	1.245	0.20075D+08	0.24985D+08	127.9
44	90.0	40.0	20.0	1.358	0.32925D+08	0.44707D+08	153.8
45	100.0	40.0	20.0	1.531	0.45899D+08	0.70275D+08	179.3
46	40.0	40.0	40.0	1.514	0.28528D+07	0.43184D+07	61.2
47	50.0	40.0	40.0	1.236	0.65128D+07	0.80510D+07	87.2
48	60.0	40.0	40.0	1.245	0.12953D+08	0.16123D+08	112.1
49	70.0	40.0	40.0	1.369	0.22428D+08	0.30709D+08	136.5
50	80.0	40.0	40.0	1.571	0.32638D+08	0.51277D+08	160.8
51	120.0	60.0	-40.0	2.088	0.98874D+07	0.20649D+08	77.8
52	130.0	60.0	-40.0	1.112	0.23483D+08	0.26123D+08	112.3
53	140.0	60.0	-40.0	1.113	0.41050D+08	0.45692D+08	143.5
54	150.0	60.0	-40.0	1.190	0.65374D+08	0.77826D+08	172.9
55	160.0	60.0	-40.0	1.326	0.93390D+08	0.12380D+09	213.2
56	100.0	60.0	-20.0	2.497	0.66665D+07	0.16649D+08	70.0
57	110.0	60.0	-20.0	1.132	0.17190D+08	0.19452D+08	104.1
58	120.0	60.0	-20.0	1.120	0.30941D+08	0.34641D+08	134.6
59	130.0	60.0	-20.0	1.148	0.52770D+08	0.60578D+08	163.3
60	140.0	60.0	-20.0	1.318	0.74747D+08	0.98483D+08	200.6
61	80.0	60.0	0.0	2.928	0.43205D+07	0.12650D+08	61.2
62	90.0	60.0	0.0	1.116	0.11144D+08	0.12439D+08	95.2
63	100.0	60.0	0.0	1.079	0.23659D+08	0.25521D+08	124.9
64	110.0	60.0	0.0	1.110	0.40888D+08	0.45369D+08	152.8
65	120.0	60.0	0.0	1.301	0.56905D+08	0.74019D+08	187.0
66	60.0	60.0	20.0	3.743	0.23073D+07	0.86364D+07	40.3
67	70.0	60.0	20.0	1.180	0.73383D+07	0.86565D+07	85.3
68	80.0	60.0	20.0	1.159	0.14824D+08	0.17185D+08	114.0
69	90.0	60.0	20.0	1.166	0.26253D+08	0.30601D+08	140.9
70	100.0	60.0	20.0	1.274	0.43404D+08	0.55281D+08	171.6
71	40.0	60.0	40.0	6.441	0.69573D+06	0.44810D+07	27.5
72	50.0	60.0	40.0	2.180	0.34201D+07	0.74542D+07	72.6
73	60.0	60.0	40.0	1.205	0.88005D+07	0.10601D+08	99.4
74	70.0	60.0	40.0	1.191	0.16923D+08	0.20163D+08	124.7
75	80.0	60.0	40.0	1.310	0.28924D+08	0.37890D+08	151.3
76	120.0	80.0	-40.0	3.900	0.43772D+07	0.17073D+08	44.3
77	130.0	80.0	-40.0	1.649	0.12788D+08	0.21083D+08	90.3
78	140.0	80.0	-40.0	1.044	0.30444D+08	0.31778D+08	125.2
79	150.0	80.0	-40.0	1.059	0.50904D+08	0.53910D+08	156.6
80	160.0	80.0	-40.0	1.216	0.82929D+08	0.10082D+09	210.6
81	100.0	80.0	-20.0	4.780	0.27077D+07	0.12942D+08	35.7

82	110.0	80.0	-20.0	2.227	0.88243D+07	0.19648D+08	81.6
83	120.0	80.0	-20.0	1.100	0.21319D+08	0.23456D+08	116.5
84	130.0	80.0	-20.0	1.059	0.39053D+08	0.41366D+08	147.4
85	140.0	80.0	-20.0	1.221	0.63738D+08	0.77819D+08	198.2
86	80.0	80.0	0.0	7.190	0.12052D+07	0.86656D+07	25.4
87	90.0	80.0	0.0	3.190	0.48968D+07	0.15622D+08	71.7
88	100.0	80.0	0.0	1.093	0.15082D+08	0.16479D+08	107.2
89	110.0	80.0	0.0	1.023	0.30078D+08	0.30755D+08	137.4
90	120.0	80.0	0.0	1.175	0.48900D+08	0.57453D+08	184.8
91	60.0	80.0	20.0	F.S. greater than 10			
91	60.0	80.0	20.0	%20.374	0.11593D+06	0.23621D+07	9.7
92	70.0	80.0	20.0	5.353	0.18217D+07	0.97509D+07	32.9
93	80.0	80.0	20.0	1.524	0.88001D+07	0.13408D+08	96.8
94	90.0	80.0	20.0	1.097	0.19574D+08	0.21479D+08	126.2
95	100.0	80.0	20.0	1.162	0.36083D+08	0.41916D+08	169.6
96	40.0	80.0	40.0	circle does not intercept slope			
97	50.0	80.0	40.0	circle does not intercept slope			
98	60.0	80.0	40.0	3.422	0.30894D+07	0.10571D+08	83.4
99	70.0	80.0	40.0	1.270	0.10439D+08	0.13262D+08	111.2
100	80.0	80.0	40.0	1.221	0.22006D+08	0.26867D+08	149.5
101	120.0	100.0	-40.0	F.S. greater than 10			
101	120.0	100.0	-40.0	%10.403	0.92673D+06	0.96410D+07	19.0
102	130.0	100.0	-40.0	3.869	0.45962D+07	0.17781D+08	40.3
103	140.0	100.0	-40.0	1.225	0.16341D+08	0.20023D+08	101.9
104	150.0	100.0	-40.0	1.064	0.35423D+08	0.37678D+08	137.5
105	160.0	100.0	-40.0	1.204	0.62816D+08	0.75643D+08	207.9
106	100.0	100.0	-20.0	F.S. greater than 10			
106	100.0	100.0	-20.0	%24.524	0.12352D+06	0.30291D+07	7.4
107	110.0	100.0	-20.0	5.886	0.22275D+07	0.13110D+08	29.6
108	120.0	100.0	-20.0	2.627	0.88454D+07	0.23233D+08	92.4
109	130.0	100.0	-20.0	1.115	0.24347D+08	0.27144D+08	128.4
110	140.0	100.0	-20.0	1.280	0.44712D+08	0.57233D+08	195.7
111	80.0	100.0	0.0	circle does not intercept slope			
112	90.0	100.0	0.0	F.S. greater than 10			
112	90.0	100.0	0.0	%12.109	0.46002D+06	0.55705D+07	15.1
113	100.0	100.0	0.0	4.188	0.44579D+07	0.18668D+08	81.5
114	110.0	100.0	0.0	1.317	0.15623D+08	0.20574D+08	118.7
115	120.0	100.0	0.0	1.246	0.35754D+08	0.44538D+08	182.5
116	60.0	100.0	20.0	circle does not intercept slope			
117	70.0	100.0	20.0	circle does not intercept slope			
118	80.0	100.0	20.0	F.S. greater than 10			
118	80.0	100.0	20.0	%11.950	0.50613D+06	0.60483D+07	18.7
119	90.0	100.0	20.0	2.638	0.78247D+07	0.20643D+08	107.9
120	100.0	100.0	20.0	1.512	0.21270D+08	0.32153D+08	167.5
121	40.0	100.0	40.0	circle does not intercept slope			
122	50.0	100.0	40.0	circle does not intercept slope			
123	60.0	100.0	40.0	circle does not intercept slope			
124	70.0	100.0	40.0	2.633	0.21770D+07	0.57317D+07	67.9
125	80.0	100.0	40.0	2.375	0.10791D+08	0.25633D+08	147.7

CRITICAL CIRCLES

circle	radius	X-center	Y-center	F.S.
1	110.0	80.0	0.0	1.023
2	140.0	80.0	-40.0	1.044
3	150.0	80.0	-40.0	1.059
4	130.0	80.0	-20.0	1.059
5	150.0	100.0	-40.0	1.064
6	100.0	60.0	0.0	1.079
7	100.0	80.0	0.0	1.093
8	90.0	80.0	20.0	1.097
9	120.0	80.0	-20.0	1.100
10	110.0	60.0	0.0	1.110

File S22-634-2
July 20, 1993

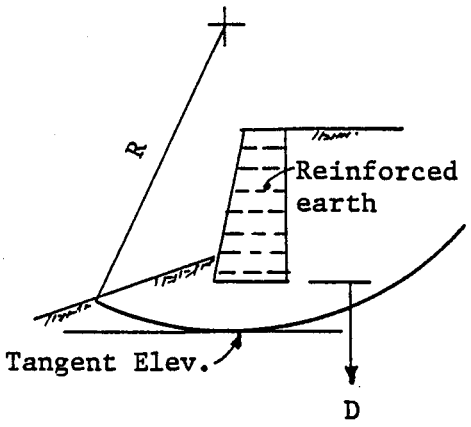
SLOPE STABILIZATION WITH PIERS

Slope: GS-1b

Resisting Force Computation:

$$P=(M_o/R)*[(F.S.)_r-(F.S.)_c]$$

M_o: Computed overturning moment
R : Radius of critical circle
$(F.S.)_r$: Required factor of safety
$(F.S.)_c$: Computed factor of safety



Slope Stability Analysis Computation Data

Computation Line No.	R ft.	Tangent Elev. ft.	M_o lb-ft.	$(F.S.)_c$	$(F.S.)_r$	P kip/ft
62	135	85 (D = 5')	$.2375 \times 10^8$	1.11	1.15	7.0
63	140	90 (D = 10')	$.3131 \times 10^8$	1.25	1.15	(-)22.0

SOIL FOUNDATION SYSTEMS, INC.

File No. S22-634-2
July 20, 1993

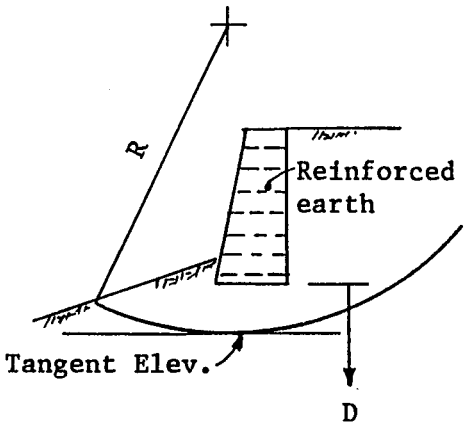
SLOPE STABILIZATION WITH PIERS

Slope: GS-5

Resisting Force Computation:

$$P=(M_o/R)*|(F.S.)_r-(F.S.)_c]$$

M_o: Computed overturning moment
R : Radius of critical circle
$(F.S.)_r$: Required factor of safety
$(F.S.)_c$: Computed factor of safety



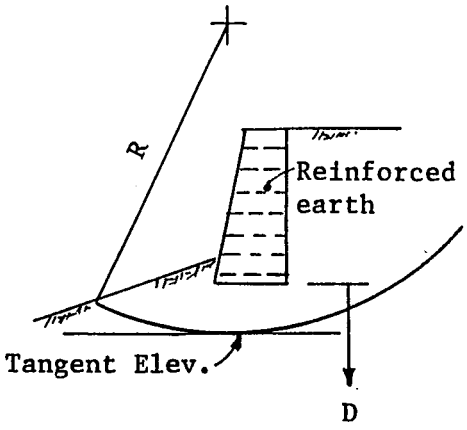
Slope Stability Analysis Computation Data

Computation Line No.	R ft.	Tangent Elev. ft.	M_o lb-ft.	$(F.S.)_c$	$(F.S.)_r$	P kip/ft
65	125	95 (D = 5')	$.3473 \times 10^8$	1.103	1.150	13∓0
66	135	105 (D = 15')	$.5865 \times 10^8$	1.30	1.15	(-)65.0

File No. S22-634-2
July 20, 1993

SLOPE STABILIZATION WITH PIERS

Slope: GS-6b (Retaining Wall)



Resisting Force Computation:

$$P=(M_o/R)*|(F.S.)_r-(F.S.)_c|$$

M_o: Computed overturning moment
R : Radius of critical circle
$(F.S.)_r$: Required factor of safety
$(F.S.)_c$: Computed factor of safety

Slope Stability Analysis Computation Data

Computation Line No.	R ft.	Tangent Elev. ft.	M_o lb-ft.	$(F.S.)_c$	$(F.S.)_r$	P kip/ft
29	130	70 (D = 5')	$.30247 \times 10^8$	1.047	1.150	24.0
30	140	80 (D = 15')	$.55487 \times 10^8$	1.175	1.150	(-)10.0

File No. S22-634-2
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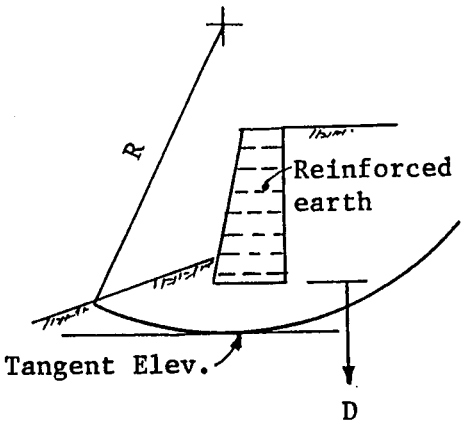
SLOPE STABILIZATION WITH PIERS

Slope: GS-7b



Resisting Force Computation:

$$P=(M_o/R)*|(F.S.)_r-(F.S.)_c|$$

M_o: Computed overturning moment
R : Radius of critical circle
$(F.S.)_r$: Required factor of safety
$(F.S.)_c$: Computed factor of safety

Slope Stability Analysis Computation Data

Computation Line No.	R ft.	Tangent Elev. ft.	M_o lb-ft.	$(F.S.)_c$	$(F.S.)_r$	P kip/ft
96	195	155 (D = 5')	$.17943 \times 10^9$	0.921	1.150	210
97	205	165 (D = 15')	$.25449 \times 10^9$	1.025	1.150	155
98	215	175 (D = 25')	$.31545 \times 10^9$	1.142	1.150	12
99	225	185 (D = 35')	$.4261 \times 10^9$	1.109	1.150	78
100	235	195 (D = 45')	$.50483 \times 10^9$	1.183	1.150	(-)71

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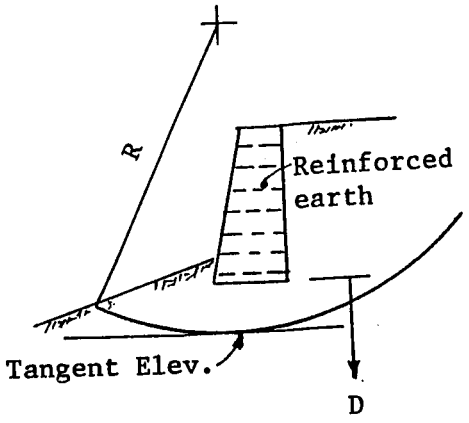
SLOPE STABILIZATION WITH PIERS

Slope: GS-10



Resisting Force Computation:

$$P=(M_o/R)*|(F.S.)_r-(F.S.)_c|$$

M_o: Computed overturning moment
R : Radius of critical circle
$(F.S.)_r$: Required factor of safety
$(F.S.)_c$: Computed factor of safety

Slope Stability Analysis Computation Data

Computation Line No.	R ft.	Tangent Elev. ft.	M_o lb-ft.	$(F.S.)_c$	$(F.S.)_r$	P kip/ft
88	100	100 (D = 25')	$.1508 \times 10^8$	1.093	1.150	8.5
89	110	110 (D = 35')	$.3008 \times 10^8$	1.023	1.150	35.0
90	120	120 (D = 45')	$.489 \times 10^8$	1.175	1.15	(-)10.0