APPENDIX 5

LOR GEOTECHNICAL GROUP, INC.
Soil Engineering ▲ Geology ▲ Environmental

PRELIMINARY GEOTECHNICAL INVESTIGATION
PROPOSED COMMERCIAL DEVELOPMENT
APN's 910-020-009 AND -014
MURRIETA, CALIFORNIA

PROJECT NO. 13613.1
MARCH 3, 2020

Prepared For:

Hotel Murrieta
c/o Smith Kading Investments
35411 Paseo Viento
Capistrano Beach CA 92624

Attention: Mr. Ag Kading

6121 Quail Valley Court ▲ Riverside, CA 92507 ▲ (951) 653-1760 ▲ (951) 653-1741 (Fax) ▲ www.lorgeo.com

LOR GEOTECHNICAL GROUP, INC.
Soil Engineering ▲ Geology ▲ Environmental

March 3, 2020

Hotel Murrieta
c/o Smith Kading Investments
35411 Paseo Viento
Capistrano Beach CA 92624

Project No. 13613.1

Attention: Mr. Ag Kading

Subject: Preliminary Geotechnical Investigation, Proposed Commercial Development, APN's 910-020-009 and -014, Murrieta, California.

LOR Geotechnical Group, Inc., is pleased to present this report summarizing our geotechnical investigation for the above referenced project. In summary, it is our opinion that the proposed development is feasible from a geotechnical perspective, provided the recommendations presented in the attached report are incorporated into design and construction.

To provide adequate support for the proposed structure, we recommend that a compacted fill mat be constructed beneath footings and slabs. The compacted fill mat will provide a dense, high-strength soil layer to uniformly distribute the anticipated foundation loads over the underlying soils. All fill/topsoil material and any loose alluvial or loose Pauba Formation materials should be removed from structural areas and areas to receive engineered compacted fill. The data developed during this investigation indicates that removals on the order of 2 to 5 feet from existing grades will be required to encounter competent native materials within elevated portions of the site and that removals on the order of 5 to 7 feet from existing grades will be required to encounter competent native materials within low-lying (drainage) areas of the site. However, deeper removals may be required locally. The given removal depths are preliminary. The actual depths of the removals should be determined during the grading operations by observation and/or in-place density testing.

In lieu of a compacted fill mat, deep foundation systems may be used.

Very low expansive soils and poor R-value quality soils were encountered on the site. A negligible sulfate content was found for the soils tested. Near completion and/or at the completion of site grading, additional foundation and subgrade soils should be tested to verify their expansion potential, soluble sulfate content, and R-value quality.

LOR Geotechnical Group, Inc.

Table of Contents

Page No.

Table of Contents

Table of Contents

Table of Contents

Page No.

Hotel Murrieta, LLC
c/o Smith Kading Investments
March 3, 2020

Project No. 13613.1

INTRODUCTION

During February and March of 2020, a Preliminary Geotechnical Investigation was performed by LOR Geotechnical Group, Inc. for proposed commercial development of APN's 910-020-009 and -014 in the City of Murrieta, California. The purpose of this investigation was to conduct a technical evaluation of the geologic setting of the site and to provide geotechnical design recommendations for the proposed improvements. The scope of our services included:

- Review of available geotechnical literature, reports, maps, and agency information pertinent to the study area;
- Interpretation of aerial photographs of the site and surrounding region dated 1938 through 2018;
- Geologic field reconnaissance mapping to verify the areal distribution of earth units and significance of surficial features as compiled from the reviewed documents, literature, and reports;
- A subsurface field investigation to determine the physical soil conditions pertinent to the proposed development;
- Infiltration testing via the double ring infiltrometer method and the percolation test procedure.
- Laboratory testing of selected soil samples obtained during the field investigation;
- Development of geotechnical recommendations for site grading and foundation design; and
- Preparation of this report summarizing our findings and providing conclusions and recommendations for site development.

The approximate location of the site is shown on the attached Index Map, Enclosure A-1, within Appendix A.

To orient our investigation at the site, you provided us with a Conceptual Grading Plan, prepared by EXCEL Engineering, dated October 15, 2019, that showed the proposed development. As noted on that map, the site will be developed with a multi-story hotel and the associated improvements. The Conceptual Grading Plan was utilized as a base map for our field investigation and is presented as Enclosures A-2 through A-4, within Appendix A.

PROJECT CONSIDERATIONS

The proposed structure will be nine stories in height and is anticipated to be of wood or steel frame construction with an exterior plaster veneer or of concrete construction. Moderate foundation loads are anticipated with such a structure. Cuts up to 20± feet and fills up to 25± feet to are proposed for the project (EXCEL, 2019).

EXISTING SITE CONDITIONS

The subject site consists of approximately 13± acres of vacant land with an irregular outline, located along the east side of Monroe Avenue, between Newton Azark and Fig Streets. Site topography consists of a northeast to southwest orientated ridge in the central portion of the site with descending slopes to the northwest and southeast. The slopes are approximately 25 feet tall and at a 1.5 horizontal to 1 vertical inclination. The top of the ridge is relatively planar. Two active washes flank the ridge with a smaller, similar trending ridge in the far southern portion of the site. The active channel areas appear to be partially incised and contains a moderate to dense growth of trees and shrubs. The remainder of the site contains a light growth of weeds. At the time of our site investigation, the wash in the southern portion of the site contained water which was ponding on Monroe Avenue, just north of Fig Street. The source of the water is unknown, but it comes from an outlet underneath the I-215 adjacent to the east of the site.

The site is bound on the north, west, and south by vacant land, similar to the site. Further west and south of adjacent vacant land are large lot single family residences. Commercial properties lie to the northwest. The southbound I-215 ramp adjoining the southbound I-15 lies east of the site.

AERIAL PHOTOGRAPH ANALYSIS

The aerial photographs reviewed consisted of vertical aerial photographs of varying scales. We reviewed imagery available from Google Earth (2020) and from Historic Aerials (2020).

In summary, the site has remained vacant from 1938, the earliest photograph available, to today. Our review of the aerial photographs did not reveal any adverse geologic conditions, such as possible faults or landslides, as being present at or projecting into the site.

PREVIOUS GEOTECHNICAL REPORT

A previous geotechnical investigation was conducted for the site by C.H.J., Incorporated in 2007. At that time, the proposed development of the site was to consist of an educational campus and related infrastructure. Their work consisted of drilling 6 exploratory borings to a maximum depth of 50 feet, sampling of the earth materials encountered, laboratory testing of the materials encountered, and preparation of a report providing recommendations for site development. In brief summary, the site was found to be underlain by a sandstone member of the Pauba Formation. Within the on-site channels, the Pauba Formation was overlain by alluvial channel deposits. No groundwater was encountered during their field investigation. No evidence of faulting was noted during their aerial photograph review and site reconnaissance. No evidence of landslides was noted during their aerial photograph review and site reconnaissance. A liquefaction analysis was conducted based on a historic high groundwater of 30 feet, a peak horizontal ground acceleration of 0.52g, and an earthquake magnitude of 6.7. They concluded that their analysis found that liquefaction is not considered to be a potential hazard to the site. Earthwork recommendations consisted of removals of the upper 2 feet of soil beneath any fills that may be present and up to 10 feet of removals of the alluvium within the drainage areas which were reported to have a hydroconsolidation strain of 3.0 percent based on testing of a sample obtained from a depth of approximately 7 feet. A minimum of 2 feet of compacted fill under foundations was also recommended. Conventional spread foundations were considered feasible with the above earthwork. The earth materials were considered to be non-critically expansive, severely corrosive to ferrous metals, and negligible to exposure to sulfate attack. Used for formulation of the reported seismic design criteria, a site class of D was utilized. It was recommended that fill slopes be constructed no steeper than 2(horizontal) to 1(vertical) and cut slopes be evaluated by the project engineering geologist and geotechnical engineer during construction.

FIELD EXPLORATION PROGRAM

Our subsurface field exploration program was conducted on February 10th and 11th , 2020 and consisted of drilling 6 exploratory borings with a truck-mounted Mobile B-61 drill rig equipped with 8-inch diameter hollow stem augers. The borings were drilled to depths of approximately 21.5 to 71.5 below the existing ground surface. The approximate locations of our exploratory borings are presented on the attached Boring and Infiltration Test Location Plan, Enclosures A-2 through A-4 within Appendix A.

The subsurface conditions encountered in the exploratory borings were logged by a geologist from this firm. Relatively undisturbed and bulk samples were obtained at a maximum depth interval of 5 feet and returned to our geotechnical laboratory in sealed containers for further testing and evaluation. A detailed description of the field exploration program and the boring logs are presented in Appendix B.

LABORATORY TESTING PROGRAM

Selected soil samples obtained during the field investigation were subjected to laboratory testing to evaluate their physical and engineering properties. Laboratory testing included in-place moisture content and dry density, laboratory compaction characteristics, direct shear, sieve analysis, sand equivalent, R-value, consolidation, expansion index, and soluble sulfate content. A detailed description of the laboratory testing program and the test results are presented in Appendix C.

GEOLOGIC CONDITIONS

Regional Geologic Setting

The site is situated within the Peninsular Ranges Geomorphic Province of southern California. This province incorporates several northwest trending mountain ranges, such as the Santa Ana and San Jacinto Mountains, which extend from the Transverse Ranges geomorphic province, north east of Los Angeles, into the Baja California Peninsula. Lying in-between the larger mountain ranges are a series of valleys and basins, such as the Elsinore Valley and the Perris Plain. The Elsinore Valley is a linear, fault controlled, valley along the eastern side of the Santa Ana Mountains from Corona south to Temecula. The eastern margin of this valley is joined by a higher relatively flat plain which extends east to the San Jacinto Mountains, called the Perris Plain. The core of the Perris Plain is composed of rocks of the Peninsular Ranges batholith, a very large mass of crystalline igneous rocks metasedimentary and metavolcanic rocks which predate the intrusion of the batholith. The batholithic rocks actually consist of numerous separate plutonic intrusions which range in composition from gabbro to granite, with tonalite the predominate lithology. The metasedimentary rocks occur as remnant pendants within and between the plutons and are composed predominantly of schist, with lessor quartzite and gneiss. While the floor of the Perris plain is relatively flat, it is dotted with small erosional remnant hills, consisting predominately of intrusive igneous crystalline bedrock and very old metamorphic rocks.

Subsequent erosion of the highlands has resulted in the in filling of the Elsinore Valley with a relatively thick sequence of alluvial sediments. Along the eastern and central portion of the Elsinore Valley, the bedrock units are covered with sightly older deposits of sedimentary bedrock units. In the area that the site is situated within, these are composed of a succession of late Pleistocene siltstone, sandstone, and conglomerate named the Pauba Formation.

The interior of the Perris Plain is considered to be relatively stable with few known active faults. However, the Plain is bounded by active faults. These include the Elsinore fault zone on the west, the San Jacinto fault zone on the east, the Cucamonga fault zone on the north, and the Agua-Tibia fault zone on the south.

As previously mentioned, the Elsinore valley is bounded on both sides by active earthquake faults. In the study by the State of California (Kennedy 1977), the fault along the eastern side of the valley was named the Wildomar fault, and was reported to lie approximately 3 kilometers (1.9 miles) southwest of the site. However, more recent mapping by the U.S.G.S. (Kennedy and Morton, 2003) shows a splay of the Wildomar fault west of the previously mapped location and lying approximately 0.75 kilometers (0.5 miles) to the southwest of the site.

The regional geology as mapped by the U.S.G.S. (Kennedy and Morton, 2003) and partial legend is shown on Enclosure A-5, within Appendix A.

Site Geologic Conditions

Fill/Topsoil: As encountered within our exploratory borings placed at the site, fill materials to a depth of 2 feet are present. These materials mainly consist of silty sand. The fill/topsoil materials are a result of past and current weed abatement practices (discing).

Alluvium: Underlying the fill/topsoil materials within the low lying areas of the site, alluvial materials were encountered within our exploratory borings to depths of approximately 5 to 7 feet. These units were noted to consist of silty sand. The alluvial materials were in a relatively loose to medium dense state based on our equivalent Standard Penetration Test (SPT) data and in-place density testing.

Colluvium: Within the elevated portions of the site, colluvial materials were found to underlie the fill/topsoil described above. These materials generally consisted of silty sand with a trace clay.

The colluvial materials were in a relatively medium dense state based on our equivalent Standard Penetration Test Data and in-place density testing.

Pauba Formation: Underlying both the alluvium and colluvium above, units of the Pauba Formation were encountered. These typically consisted of the sandstone member in the upper 20 to 55 feet followed by finer grained silt and clay. Based on our equivalent Standard Penetration Test Data and in-place density testing, the Pauba Formation was in a relatively dense to very dense state.

A detailed description of the subsurface soil conditions as encountered within our exploratory borings is presented on the Boring Logs within Appendix B.

Groundwater Hydrology

Groundwater was not encountered within our exploratory borings advanced to a maximum depth of approximately 70 feet below the existing ground surface.

Records for nearby wells which were readily available from the State of California Department of Water Resources online database (CDWR, 2020) were reviewed as a part of this investigation.

This database indicates that the nearest water well is state well number 07S03W22K001S which is located approximately 0.3 kilometers (0.2 miles) to the east. This well lies at an elevation of approximately 1,097 feet above mean sea level (m.s.l.). Only one recorded groundwater measurement was available from 1968. The record indicates that groundwater in this well lied at a depth of 51 feet.

Two other nearby wells on this database, state well numbers 07S03W22H001S and 002S, are located approximately 0.7 kilometers (0.5 miles) to the east. These wells lie at elevations of approximately 1,080 and 1,077 feet above m.s.l., respectively, Again, only one recorded groundwater measurement was available for each. These depths were 36 and 39 feet, respectively.

A conversation with the property owner of 25631 Addison Lane, located approximately 0.5 kilometers (0.3 miles) to the northwest of the site, indicated groundwater in his well lies at a depth of approximately 185 feet. The property lies an elevation of approximately 1,120 feet above m.s.l.

As illustrated on Enclosures A-2 through A-4, the lowest elevation of the site is approximately 1,081 feet above m.s.l. in the southern portion of the site. Based on the information above, groundwater is anticipated to have lied at a depth of approximately 43 feet below the lowest elevation of the site in the past. However, current data suggests groundwater lies at a greater depth of approximately 175 feet.

Surface Runoff

Current surface runoff of precipitation waters across the site is generally as sheet flow to the two on-site drainages which in turn flow to the southwest.

Mass Movement

Mass movement features such as landslides, rockfalls, and/or debris flows have been noted within the site vicinity by others, including a landslide in an area just southwest of the site (Morton and Kennedy, 2003). No evidence of mass movement was observed on the site during our review of aerial photographs or our site reconnaissance.

Faulting

There are no known active faults at the site. In addition, according to the Official Maps of Alquist-Priolo Earthquake Fault Zones of California (Hart and Bryant, 1997) the subject site does not lie within a current State of California Earthquake Fault Zone. No faults are shown at the site on the County of Riverside Land Information System (RCLIS, 2020). The nearest such zones are located just across Madison Avenue to the southwest and are associated with the Wildomar fault zone.

During our investigation, we reviewed aerial photographs of the site and immediate surrounding region from Google Earth (2020) and from Historic Aerials (2020). This review found no evidence for fault related features at or projecting into the site.

The Wildomar fault is the closest, known, active fault and this fault is considered a part of the larger Elsinore fault zone. This zone constitutes a discontinuous zone of faults which strike nearly normal to the prominent northwest trend of the Elsinore trough.

The Elsinore fault zone is one of the largest in southern California. At its northern end it splays into two segments, named the Chino and Whittier faults, and at its southern end it is cut by the Yuba Wells fault.

The primary sense of slip along the Elsinore fault is right lateral strike-slip. Several of the fault strands which make up the Elsinore fault zone possess their own names. Heading southeast from Lake Elsinore, the two parallel fault strands are the Wildomar fault (the more easterly) and the Willard fault. The Wildomar fault zone marks the boundary between the Elsinore trough and the Perris Block while the Willard fault zone marks the boundary between the Elsinore trough and the Santa Ana Mountains. It is believed that the Elsinore fault zone is capable of producing an earthquake magnitude on the order of 6.5 to 7.5.

Other nearby, known, active faults include the Murrieta Hot Springs fault located approximately 1.4 kilometers (0.9 miles) to the north, the San Jacinto fault located approximately 32 kilometers (20 miles) to the northeast, the Newport-Inglewood fault located approximately 45 kilometers (27 miles) to the southwest, and the San Andreas fault located approximately 60 kilometers (37 miles) to the northeast.

A study in 1990 by Hull postulated that the Murrieta Hot Springs fault is "riedel" shearing from movement along the Elsinore fault zone, and thus may accommodate only a small component of the total movement within the Elsinore fault zone, which is currently thought to be on the order of 6mm/year. Hull therefore utilized a slip rate of 0.6 -2 mm/year for the Murrieta Hot Springs fault. To date, the State of California has not reclassified this fault as an active fault and it is therefore not included on the more recent State fault zone maps (CDMG, 2020).

The San Jacinto fault is a sub-parallel branch of the San Andreas fault, extending from the northwestern San Bernardino area, southward, into the El Centro region. This fault has been active in recent times with several large magnitude events. The average slip rate on this fault is thought to be on the order of 6 to 12 mm per year, and, like the San Andreas fault, is thought to be capable of generating large magnitude events, on the order of 6.7 or greater.

According to a study conducted by Cao et al. (2003), the Newport-Inglewood fault system has a slip rate of 1 mm per year and is anticipated to be capable of generating an earthquake with a moment magnitude on the order of 7.1.

The San Andreas fault is considered to be the major tectonic feature of California, separating the Pacific Plate from the North American Plate. While estimates vary, the San Andreas fault is generally thought to have an average slip rate on the order of 24 mm per year and capable of generating large magnitude events on the order of 7.3 or greater.

Current standards of practice have included a discussion of all potential earthquake sources within a 100 kilometer (62 mile) radius. However, while there are other large earthquake faults within a 100 kilometer (62 mile) radius of the site, none of these are considered as relevant to the site as the faults described above, due to their greater distance and smaller anticipated magnitudes.

Historical Seismicity

In order to obtain a general perspective of the historical seismicity of the site and surrounding region a search was conducted for seismic events at and around the area within various radii. This search was conducted utilizing the historical seismic search website of the USGS (2020). This website conducts a search of a user selected cataloged seismic events database, within a specified radius and selected magnitudes, and then plots the events onto a map. At the time of our search, the database contained data from January 1, 1932 through February 24, 2020.

In our first search, the general seismicity of the region was analyzed by selecting an epicenter map listing all events of magnitude 4.0 and greater, recorded since 1932, within a 100 kilometer (62 mile)radius of the site, in accordance with guidelines of the California Division of Mines and Geology. This map illustrates the regional seismic history of moderate to large events. As depicted on Enclosure A-6, within Appendix A, the site lies within a relatively quiet region lying between the more active region to the east and west associated with the San Andreas fault to the east and the Newport-Inglewood fault zone to the west.

In the second search, the micro seismicity of the area lying within a 10 kilometer (6.2 mile) radius of the site was examined by selecting an epicenter map listing events on the order of 1.0 and greater since 1978. In addition, only the “A” events, or most accurate events were selected. Caltech indicates the accuracy of the “A” events to be approximately 1 km. The results of this search is a map that presents the seismic history around the area of the site with much greater detail, not permitted on the larger map. The reason for limiting the events to the last 40± years on the detail map is to enhance the accuracy of the map. Events recorded prior the mid 1970's are generally considered to be less accurate due to advancements in technology. As depicted on this map, Enclosure A-7, while not distinct, the Elsinore fault zone is conspicuous as a northwest trending lineation of small seismic events located west of the site. In addition to these events there is a distinct band of seismic events north of the site, roughly trending with the Murrieta Hot Springs fault zone.

In summary, the historical seismicity of the site entails numerous small to medium magnitude earthquake events occurring around the subject site, predominately associated with the presence of the Elsinore fault zone. Any future developments at the subject site should anticipate that moderate to large seismic events could occur very near the site.

Secondary Seismic Hazards

Other secondary seismic hazards generally associated with severe ground shaking during an earthquake include liquefaction, seiches and tsunamis, earthquake induced flooding, landsliding and rockfalls, and seismic-induced settlement.

Liquefaction: The potential for liquefaction generally occurs during strong ground shaking within granular loose sediments where the groundwater is usually less than 50 feet. As the site is underlain by relatively dense to very dense deposits of Pauba Formation, the possibility of liquefaction within these units is considered nil. In addition, the liquefaction evaluation performed by C.H.J. found liquefaction to not be a potential hazard at the site.

Seiches/Tsunamis: The potential for the site to be affected by a seiche or tsunami (earthquake generated wave) is considered nil due to the absence of any large bodies of water near the site.

Flooding (Water Storage Facility Failure): There are no large water storage facilities located on or upstream near the site which could possibly rupture during an earthquake and affect the site by flooding.

Seismically-Induced Landsliding: No landsliding was observed at or immediately adjacent to the site. However, nearby landsliding has been documented just west of the site (Morton and Kennedy, 2003). Since it is anticipated that the site will experience a large seismic event during its lifetime, seismically-induced landsliding cannot be completely ruled out. However, the remedial earthwork recommended herein should mitigate the potential for seismically induced landsliding.

Rockfalls: No large, exposed, loose or unrooted boulders that could affect the integrity of the site are present upon or above the site.

Seismically-Induced Settlement: Settlement generally occurs within areas of loose, granular soils with relatively low density. Since the site is underlain by dense to very dense materials, the potential for settlement is considered low. In addition, the earthwork operations recommended to be conducted during the development of the site will mitigate any near surface loose soil conditions.

SOILS AND SEISMIC DESIGN CRITERIA (California Building Code 2019)

Design requirements for structures can be found within Chapter 16 of the 2019 California Building Code (CBC) based on building type, use and/or occupancy. The classification of use and occupancy of all proposed structures at the site, and thus the design requirements, shall be the responsibility of the structural engineer and the building official. For structures at the site to be designed in accordance with the provisions of Chapter 16, the subject site specific criteria is provided below:

Site Classification

Chapter 20 of the ASCE 7-16 defines six possible site classes for earth materials that underlie any given site. Bedrock is assigned one of three of these six site classes and these are: A, B, or C. Per ASCE 7-16, Site Class A and Site Class B shall be measured on-site or estimated by a geotechnical engineer, engineering geologist or seismologist for competent rock with moderate fracturing and weathering. Site Class A and Site Class B shall not be used if more than 10 feet of soil is between the rock surface and bottom of the spread footing or mat foundation. Site Class C can be used for very dense soil and soft rock with values greater than 50 blows per foot. Site Class D can be used for stiff soil with values ranging from 15 to 50 blows per foot. Site Class E is for soft clay soils with values less than 15 blows per foot. Our Standard Penetration Test (SPT) data indicate that the materials beneath the site are considered Site Class D soils.

CBC Earthquake Design Summary

As determined in the previous section, earthquake design criteria have been formulated for the site. However, these values should be reviewed and the final design should be performed by a qualified structural engineer familiar with the region. Our design values are provided in Appendix E.

INFILTRATION TESTING AND TEST RESULTS

Four falling head infiltration tests were conducted within the general area proposed for infiltration. The locations are illustrated on Enclosures A-2 and A-3. Testing consisted of test holes which were excavated using a hollow stem auger drill rig to depths of approximately 10, 15, 17, and 22 feet below the existing ground surface to correspond with the proposed depth of the infiltration systems.

The holes were 8-inches in diameter. Test holes were filled with approximately 24-inches of water. The depth of the water was measured at approximately 30-minute intervals for a total of 6 hours. Test holes were refilled with water after each reading. The infiltration rate was established utilizing the Porchet Method on the final un-refilled reading.

Infiltration test results are summarized in the following table:

Test No.	Depth (ft.)*	Clear Water Infiltration Rate** (in/hr)
FH-1	22	2.9
FH-2	10	2.1
FH-3	17	2.5
FH-4	15	2.7
* depth measured below existing ground surface ** Porchet Method		

The results of our falling head infiltration testing are attached as Enclosures D-1 through D-4.

Two double ring infiltration tests were conducted at the general locations and depths requested. The locations are illustrated on Enclosures A-3 and A-4. Test pits were excavated to a depth of approximately 1-foot below the existing ground surface and a 12-inch diameter casing was installed within the center of the test locations with a 24-inch diameter casing centered around it. Each 20-inch tall casing was imbedded to a depth of approximately 3.5-inches. The test locations were tested immediately after the casings were installed by filling both the inside and outside casings and maintaining a water level to a depth of approximately 2.5 and 4-inches.

The testing procedure was as follows:

Both the inside and outside areas of the casings were filled with water to a level of approximately 2.5 and 4-inches above the ground surface. Water was then metered to maintain this water level within both rings. The volume of water use in a given time period was recorded at various time intervals to establish the infiltration rate of the water within the inner ring.

The infiltration rate is measured as the drop in water level compared to the permeability of the bottom surface area soils in the bottom of the test hole. If casing is not used, the water column in the test hole is allowed to seep into both the bottom and sidewalls of the hole, for which the drop in water level must be corrected and reduced for the volume of water seeping into the sidewall and for the diameter of the test hole. As described above, the tests described herein were conducted using a 12-inch diameter inner casing and 24-inch diameter outer casing.

The test holes were found to have the following measured clear water infiltration rates:

Test No.	Depth (ft)*	Clear Water Infiltration Rate** in/hr
DRI-1	1	5.2
DRI-2	1	2.2
* depth measured below existing ground surface ** final reading		

The results of our infiltration testing are attached as Enclosures D-5 and D-6.

CONCLUSIONS

General

This investigation provides a broad overview of the geotechnical and geologic factors which are expected to influence future site planning and development. On the basis of our field investigation and testing program, it is the opinion of LOR Geotechnical Group, Inc., that the proposed development is feasible from a geotechnical standpoint, provided the recommendations presented in this report are incorporated into design and implemented during grading and construction.

The subsurface conditions encountered in our exploratory borings are indicative of the locations explored. The subsurface conditions presented here are not to be construed as being present the same everywhere on the site.
If conditions are encountered during the construction of the project which differ significantly from those presented in this report, this firm should be notified immediately so we may assess the impact to the recommendations provided.

Foundation Support

Based upon the field investigation and test data, it is our opinion that the existing fill/topsoil and fill soils will not, in their present condition, provide uniform and/or adequate support for the proposed improvements. Left as is, this condition could cause unacceptable differential and/or overall settlements upon application of the anticipated foundation loads.

To provide adequate support for the proposed structural improvements, we recommend that a compacted fill mat be constructed beneath footings and slabs. This compacted fill mat will provide a dense, high-strength soil layer to uniformly distribute the anticipated foundation loads over the underlying soils. Conventional foundation systems, using either individual spread footings and/or continuous wall footings, will provide adequate support for the anticipated downward and lateral loads when utilized in conjunction with the recommended fill mat.

As discussed in subsequent sections of this report, deep foundation systems may be used in lieu of a compacted fill mat.

Soil Expansiveness

Our laboratory testing found that the soils tested have a very low expansion potential. Therefore, conventional design and construction should be applicable for the project.

Careful evaluation of on-site soils and any import fill for their expansion potential should be conducted during the grading operation.

Sulfate Protection

The results of the soluble sulfate tests conducted on selected subgrade soils expected to be encountered at foundation levels indicate that there is a negligible sulfate exposure to

concrete elements in contact with the on site soils per the 2019 CBC. Therefore, no specific recommendations are given for concrete elements to be in contact with the onsite soils.

Geologic Mitigations

No special geologic recommendation methods are deemed necessary at this time, other than the geotechnical recommendations provided in the following sections.

Seismicity

Seismic ground rupture is generally considered most likely to occur along pre-existing active faults. Since no known faults are known to exist at, or project into the site, the probability of ground surface rupture occurring at the site is considered nil.

Due to the site's close proximity to the faults described above, it is reasonable to expect a strong ground motion seismic event to occur during the lifetime of the proposed development on the site. Large earthquakes could occur on other faults in the general area, but because of their lesser anticipated magnitude and/or greater distance, they are considered less significant than the faults described above from a ground motion standpoint.

The effects of ground shaking anticipated at the subject site should be mitigated by the seismic design requirements and procedures outlined in Chapter 16 of the California Building Code. However, it should be noted that the current building code requires the minimum design to allow a structure to remain standing after a seismic event, in order to allow for safe evacuation. A structure built to code may still sustain damage which might ultimately result in the demolishing of the structure (Larson and Slosson, 1992).

RECOMMENDATIONS

Geologic Recommendations

All cut slopes proposed for the project should be observed during construction by the project engineering geologist. As proposed, cut slopes should be at a maximum gradient of 2 horizontal to 1 vertical. Such slopes are considered stable at such an inclination. Observations should be conducted at intervals no greater than 10 feet. Although not anticipated at this time, mitigation measures such as stabilization fill, buttress fill, or other measures may be required if unfavorable conditions are encountered.

General Site Grading

It is imperative that no clearing and/or grading operations be performed without the presence of a qualified geotechnical engineer. An on-site, pre-job meeting with the owner, the developer, the contractor, and geotechnical engineer should occur prior to all grading related operations. Operations undertaken at the site without the geotechnical engineer present may result in exclusions of affected areas from the final compaction report for the project.

Grading of the subject site should be performed in accordance with the following recommendations as well as applicable portions of the California Building Code, and/or applicable local ordinances.

All areas to be graded should be stripped of significant vegetation and other deleterious materials.

It is our recommendation that any existing fills under any proposed flatwork and/or paved areas be removed and replaced with engineered compacted fill. If this is not done, premature structural distress (settlement) of the flatwork and pavement may occur. Any undocumented fills encountered during grading should be completely removed and cleaned of significant deleterious materials. These may then be reused as compacted fill.

Cavities created by removal of undocumented fill soils and/or subsurface obstructions should be thoroughly cleaned of loose soil, organic matter and other deleterious materials, shaped to provide access for construction equipment, and backfilled as recommended in the following Engineered Compacted Fill section of this report.

Initial Site Preparation

Any and all existing uncontrolled fill/topsoil, loose/soft native alluvial soils, and loose Pauba Formation should be removed from structural areas and areas to receive structural fills. The data developed during this investigation indicates that within elevated portions of the site, removals on the order of 2 to 5 feet from existing grades will be required to encounter competent native materials. Within the low lying areas (drainages), removals on the order of 5 to 7 feet from existing grades will be required to encounter competent native materials.

However, deeper removals may be required locally. Removals should extend horizontally at a distance equal to the depth of the removals plus proposed fill and at least a minimum of 5 feet. The actual depths of removals should be determined during the grading operation by observation and/or by in-place density testing.

Preparation of Fill Areas

After completion of the removals described above and prior to placing fill, the surfaces of all areas to receive fill should be scarified to a depth of at least 6 inches. The scarified soil should be brought to near optimum moisture content and compacted to a relative compaction of at least 90 percent (ASTM D 1557).

Preparation of Shallow Foundation Areas

All footings should rest upon a minimum of 24 inches of properly compacted fill material placed over competent natural alluvial soils. In areas where the required fill thickness is not accomplished by the removal of unsuitable soils, the footing areas should be further subexcavated to a depth of at least 24 inches below the proposed footing base grade, with the subexcavation extending at least 5 feet beyond the footing lines. The bottom of this excavation should then be scarified to a depth of at least 6 inches, brought to between 2 to 4 percent optimum moisture content, and recompacted to at least 90 percent relative compaction (ASTM D 1557) prior to refilling the excavation to grade as properly compacted fill. Fill areas should not be constructed so as to place structures across any area where the maximum depth of fill to minimum depth of fill is greater than a 3:1 ratio.

To provide adequate support, concrete slabs-on-grade should bear on a minimum of 24 inches of compacted soil. The remedial grading recommended above is anticipated to accomplish the minimum 24 inches of compacted fill. The final pad surfaces should be rolled to provide smooth, dense surfaces upon which to place the concrete.

Engineered Compacted Fill

Unless approved by the geotechnical engineer, rock or similar irreducible material with a maximum dimension greater than 6 inches should not be buried or placed in fills.

Import fill, if required, should be inorganic, non-expansive granular soils free from rocks or lumps greater than 6 inches in maximum dimension. Sources for import fill should be approved by the geotechnical engineer prior to their use.

Fill should be spread in maximum 8-inch uniform, loose lifts, with each lift brought to 2 to 4 percent above optimum moisture content prior to, during and/or after placement, and compacted to a relative compaction of at least 90 percent in accordance with ASTM D 1557.

Based upon the relative compaction of the near surface soils determined during this investigation and the relative compaction anticipated for compacted fill soil, we estimate a compaction shrinkage factor of approximately 10 to 15 percent. Therefore, 1.10 to 1.15 cubic yards of in-place materials would be necessary to yield one cubic yard of properly compacted fill material. Subsidence is anticipated to be 0.10 feet. These values are for estimating purposes only, and are exclusive of losses due to stripping or the removal of subsurface obstructions.

These values may vary due to differing conditions within the project boundaries and the limitations of this investigation. Shrinkage should be monitored during construction. If percentages vary, provisions should be made to revise final grades or adjust quantities of borrow or export.

Short-Term Excavations

Following the California Occupational and Safety Health Act (CAL-OSHA) requirements, excavations 5 feet deep and greater should be sloped or shored. All excavations and shoring should conform to CAL-OSHA requirements.

Short-term excavations 5-feet deep and greater shall conform to Title 8 of the California Code of Regulations, Construction Safety Orders, Section 1504 and 1539 through 1547. Based on our exploratory borings, it appears that Type C soil is the predominant type of soil on the project and all short-term excavations should be based on this type of soil. Deviation from the standard short-term slopes are permitted using Option 4, Design by a Registered Professional Engineer (Section 1541.1).

Short-term slope construction and maintenance are the responsibility of the contractor, and should be a consideration of his methods of operation and the actual soil conditions encountered.

Slope Construction

Preliminary data indicates that cut and fill slopes should be constructed no steeper than two horizontal to one vertical. Fill slopes should be overfilled during construction and then cut back to expose fully compacted soil. A suitable alternative would be to compact the slopes during construction, then roll the final slopes to provide dense, erosion-resistant surfaces.

Where fills are to be placed against existing slopes steeper than five horizontal to one vertical, the existing slopes should be properly keyed and benched into competent native materials. The key, constructed across the toe of the slope, should be a minimum of 12 to 15 feet wide, a minimum of 2 feet deep at the toe, and sloped back to 2 percent. Benches should be constructed at approximately 2 to 4 foot vertical intervals.

Slope Protection

Since the site soils are susceptible to erosion by running water, measures should be provided to prevent surface water from flowing over slope faces. Slopes at the project should be planted with a deep rooted ground cover as soon as possible after completion. The use of succulent ground covers such as iceplant or sedum is not recommended. If watering is necessary to sustain plant growth on slopes, the watering system should be monitored to assure proper operation and to prevent over watering.

Shallow Foundation Design

If the site is prepared as recommended, the proposed structures may be safely founded on conventional shallow foundations, either individual spread footings and/or continuous wall footings, bearing on a minimum of 24 inches of engineered compacted fill or entirely upon competent alluvium. All foundations should have a minimum width of 12 inches and be established a minimum of 12 inches below lowest adjacent grade. Depending on the number of stories, per the California Building Code, footing depths may need to be deeper than that indicated above.

For the minimum width and depth, spread foundations may be designed using an allowable bearing pressure of 2,000 pounds per square foot (psf). This bearing pressure may be increased by 300 psf for each additional foot of width, and by 600 psf for each additional foot of depth, up to a maximum of 5,000 psf.

The above values are net pressures; therefore, the weight of the foundations and the backfill over the foundations may be neglected when computing dead loads. The values apply to the maximum edge pressure for foundations subjected to eccentric loads or overturning. The recommended pressures apply for the total of dead plus frequently applied live loads, and incorporate a factor of safety of at least 3.0. The allowable bearing pressures may be increased by one-third for temporary wind or seismic loading. The resultant of the combined vertical and lateral seismic loads should act within the middle one-third of the footing width. The maximum calculated edge pressure under the toe of foundations subjected to eccentric loads or over turning should not exceed the increased allowable pressure. Buildings should be setback from slopes in accordance with the California Building Code.

Resistance to lateral loads will be provided by passive earth pressure and base friction. For footings bearing against compacted fill, passive earth pressure may be considered to be developed at a rate of 300 pounds per square foot per foot of depth. Base friction may be computed at 0.25 times the normal load. Base friction and passive earth pressure may be combined without reduction. These values are for dead load plus live load and may be increased by one-third for wind or seismic loading.

Settlement

Total settlement of individual foundations will vary depending on the width of the foundation and the actual load supported. Maximum settlement of shallow foundations designed and constructed in accordance with the preceding recommendations are estimated to be on the order of 0.5 inch. Differential settlements between adjacent footings should be about one-half of the total settlement. Settlement of all foundations is expected to occur rapidly, primarily as a result of elastic compression of supporting soils as the loads are applied, and should be essentially completed shortly after initial application of the loads.

Deep Foundation Design

Cast-in-drilled hole (CIDH) piles may be utilized for this project as indicated in the following sections. As a minimum, the piles should be installed to at least 20 feet below the existing ground surface. Deep foundations should be further embedded as per the direction of the structural engineer. The capacities provided are based on shear strength data obtained during this investigation and should be confirmed through observation and/or additional testing during excavation when the actual conditions are exposed and as necessary.

Vertical Capacities

Pile capacities were calculated utilizing the computer program, SHAFT, Version 2017.8.10, created by Ensoft (2012).The maximum allowable downward capacity utilized a factor of safety of 2.0 for skin friction and zero tip bearing. Zero friction was considered in the upper 5 feet due to artificial fill conditions. Utilizing these values, the combined dead plus live loads should be limited to the values presented in the Allowable Capacity vs. Foundation Depth chart (see Enclosure F-1 in Appendix F). These capacities may be increased by one-third for wind or seismic loading. Use of casing during construction should reduce the allowable capacity by 10 percent. The capacities provided are based on soil strength. Structural capacities of piles must be verified by the design engineer.

Ultimate downward capacities for piles are also provided should calculations utilizing other factors of safety be desired (see Enclosure F-2 in Appendix F). Use of casing during construction should reduce the ultimate capacity by 10 percent.

For properly installed piles, it is anticipated that a total settlement of approximately 1/4 inch will be required to mobilize allowable vertical capacity. Differential settlement between similarly loaded piles is anticipated to be on the order of 1/2 the total settlement in 40 feet.

Consideration may be given by the contractor to verify pile capacities in the field in accordance with 2019 CBC. At least one pile should be load tested for each pile type. Additional elements may be load tested where necessary to establish the safe design capacity. The appropriate test method should be selected by the contractor and approved by the client. The resulting allowable loads shall not be more than one-half of the ultimate axial load capacity of the test pile as provided in this section.

Lateral Capacities of CIDH Pile

Lateral load analysis and design of the piles will be performed by the structural designer using the geotechnical parameter presented in this report. The following table presents recommended geotechnical parameters for static soil conditions for use within the computer program, LPILE, Version 2019.11.04, created by Ensoft (2016). We have primarily focused on B-1 through B-4 to develop the strength parameters for the pile design.

Recommended LPILE Input Parameters								
Layer	**Depth to Top and Bottom of Layer (ft)**		**LPILE p-y Curve Type**	**Effective Unit Weight γ_t (pcf)**	**Friction Angle φ (deg)**	**Undrained Cohesion for Clays (psf)**	**p-y Modulus k, (pci)**	**Strain Factor E_{50} for Clay**
1	0	38	Sand (Reese)	117	40	N/A	0	N/A
2	38	68	Soft Clay (Matlock)	110	N/A	384	N/A	0

Design groundwater was estimated to be at an elevation of +70 feet bgs

Results of the laterally loaded pile analysis are presented in Enclosure G of this report.

Consideration may be given for full-scale lateral load testing on selected piles. The required lateral capacity should be achieved while limiting movement to acceptable levels as determined by the structural engineer. Minimum factors of safety may be determined by the structural engineer that can be applied to the ultimate lateral capacity as determined from the lateral load testing.

Pile Spacing and Group Efficiency:

Both axial and lateral capacities recommended in the above sections are for single piles. In the case of grouped piles, the total capacity will be subject to pile spacing. Per the 2019 CBC (1810.2.5), group effects should be considered for axial downward capacities where the center-to-center spacing is less than 3.0D and for lateral capacities where the center-to-center spacing is less than 6.0D, where D is the pile diameter or width.

For pile groups subjected to uplift, the allowable working uplift load for the group should be the lesser of:

a. The proposed individual pile uplift working load times the number of piles in the group.

b. Two-thirds of the effective weight of the pile group and the soil contained within a block defined by the perimeter of the group and the length of the pile. A conservative unit weight of 120 pcf may be utilized in the calculation of soil weight.

CIDH Pile Installation:

The installation of the CIDH piles should be observed by the geotechnical engineer to verify the soil condition and that the desired diameter and depth of pile are achieved. CIDH piles should be true and plumb.

Because of the granular nature of some of the soils encountered and the anticipated diameter of the drilled holes, caving could occur during the drilling and the construction of piles within the on-site soils. Appropriate precautions should therefore be taken during the construction of piles to reduce caving and raveling.

The drilling speed should be reduced as necessary to minimize vibration and caving. Based on the data developed during our investigation, the contractor should be prepared to use casing, drilling mud, or other approved means to prevent caving.

Closely spaced piles (closer than 3 diameter) should be drilled and filled alternately, allowing the concrete to set at least twenty-four hours before drilling the adjacent pile. All excavations should be filled with concrete as soon after drilling as possible. In no event should pile shafts be left open overnight. The concrete should be placed with appropriate equipment, so that the concrete is not allowed to fall freely more than 5 feet and to prevent concrete from striking the walls of the shaft, thus causing caving. All loose materials should be cleared from the bottom of the pile excavation. Casing should be withdrawn concurrently with the concrete placement.

The pile contractor may confirm the homogeneity of the concrete in the CIDH piles using the gamma-gamma test method or alternative methods.

Building Area Slab-On-Grade

Concrete floor slabs should bear on a minimum of 24 inches of engineered fill compacted to at least 90 percent (ASTM D 1557). The final pad surfaces should be rolled to provide smooth, dense surfaces upon which to place the concrete.

Slabs to receive moisture-sensitive coverings should be provided with a moisture vapor barrier. This barrier may consist of an impermeable membrane. Two inches of sand over the membrane will reduce punctures and aid in obtaining a satisfactory concrete cure. The sand should be moistened just prior to placing of concrete.

The slabs should be protected from rapid and excessive moisture loss which could result in slab curling. Careful attention should be given to slab curing procedures, as the site area is subject to large temperature extremes, humidity, and strong winds.

Exterior Flatwork

To provide adequate support, exterior flatwork improvements should rest on a minimum of 12 inches of soil compacted to at least 90 percent (ASTM D 1557).

Flatwork surface should be sloped a minimum of 1 percent away from buildings and slopes, to approved drainage structures.

Wall Pressures

The design of footings for retaining structures should be performed in accordance with the recommendations described earlier under Preparation of Foundation Areas and Foundation Design. For design of retaining wall footings, the resultant of the applied loads should act in the middle one-third of the footing, and the maximum edge pressure should not exceed the basic allowable value without increase.

For design of retaining walls unrestrained against movement at the top, we recommend an equivalent fluid density of 46 pounds per cubic foot (pcf) be used. This assumes level backfill consisting of recompacted, non-expansive, soils placed against the structures and with the backcut slope extending upward from the base of the stem at 35 degrees from the vertical or flatter.

To avoid overstressing or excessive tilting during placement of backfill behind walls, heavy compaction equipment should not be allowed within the zone delineated by a 45 degree line extending from the base of the wall to the fill surface.

The backfill directly behind the walls should be compacted using light equipment such as hand operated vibrating plates and rollers. No material larger than 3-inches in diameter should be placed in direct contact with the wall.

Wall pressures should be verified prior to construction, when the actual backfill materials and conditions have been determined. Recommended pressures are applicable only to level, non-expansive, properly drained backfill (with no additional surcharge loadings).

If inclined backfills are proposed, this firm should be contacted to develop appropriate active earth pressure parameters. Toe bearing pressure for non-structural walls on soils, not prepared as described earlier under Preparation of Foundation Areas, should not exceed California Building Code values.

Sulfate Protection

The results of the soluble sulfate tests conducted on selected subgrade soils expected to be encountered at foundation levels are presented on Enclosure C.

Based on the test results it appears that there is a negligible sulfate exposure to concrete elements in contact with on site soils. The CBC, therefore, does not recommend special design criteria for concrete elements in conduct with such materials.

Preliminary Pavement Design

Testing and design for preliminary on-site pavement was conducted in accordance with the California Highway Design Manual. Based upon our preliminary sampling and testing, and upon Traffic Indices typical for such projects, it appears that the structural section tabulated below should provide satisfactory pavement for the subject pavement improvements:

AREA	T.I.*	DESIGN R-VALUE	PRELIMINARY SECTION
Parking and Drive Areas (light vehicular traffic and occasional truck traffic)	6.0	10	0.25' AC/1.05' AB
Industrial Collector Secondary Major - Off-site	8.0	10	See city standard No.120 (Enclosure H-1 within Appendix H)
AC - Asphalt Concrete AB - Class 2 Aggregate Base *Actual Traffic Index should be determined by others			

The above structural section is predicated upon 90 percent relative compaction (ASTM D 1557) of all utility trench backfills and 95 percent relative compaction (ASTM D 1557) of the upper 12 inches of pavement subgrade soils and of any aggregate base utilized. In addition, the aggregate base should meet Caltrans specifications for Class 2 Aggregate Base.

In areas of the pavement which will receive high abrasion loads due to start-ups and stops, or where trucks will move on a tight turning radius, consideration should be given to installing concrete pads. Such pads should be a minimum of 0.5-foot thick concrete, with a 0.35-foot thick aggregate base. Concrete pads are also recommended in areas adjacent to trash storage areas where heavier loads will occur due to operation of trucks lifting trash dumpsters. The recommended 0.5 feet thick portland cement concrete (PCC) pavement section should have a minimum modulus of rupture (MR) of 550 pounds per square inch (psi).

It should be noted that all of the above pavement design was based upon the results of preliminary sampling and testing, and should be verified by additional sampling and testing during construction when the actual subgrade soils are exposed.

I

Infiltration

Based upon our field investigation and infiltration test data, a clear water absorption rate of approximately 2.1 to 5.2 inches per hour was obtained. It is our opinion that a design clear water rate of 2.1 inches per hour appears to be applicable for the planned infiltration in the areas and depths tested.

A factor of safety should be applied as indicated by the Design Handbook for Low Impact Development Best Management Practices (RCFCWCD, 2011). The design infiltration rate should be adjusted using a factor of safety 3.0.

To ensure continued infiltration capability of the infiltration area, a program to maintain the facility should be considered. This program should include periodic removal of accumulated materials, which can slow the infiltration considerably and decrease the water quality. Materials to be removed from the catch basin areas typically consist of litter, dead plant matter, and soil fines (silts and clays). Proper maintenance of the system is critical. A maintenance program should be prepared and properly executed. At a minimum, the program should be as outlined in the Design Handbook for Low Impact Development Best Management Practices (RCFCWCD, 2011).

The program should also incorporate the recommendations contained within this report and any other jurisdictional agency requirements.

- Systems should be set back at least 10 feet from foundations or as required by the design engineer.

- Any geotextile filter fabric utilized should consist of such that it prevents soil piping but has greater permeability than the existing soil.

- During site development, care should be taken to not disturb the area(s) proposed for infiltration as changes in the soil structure could occur resulting in a change of the soil infiltration characteristics.

Construction Monitoring

Post investigative services are an important and necessary continuation of this investigation. Project plans and specifications should be reviewed by the project geotechnical consultant prior to construction to confirm that the intent of the recommendations presented herein have been incorporated into the design. Additional

expansion index, R-value, and soluble sulfate testing may be required during site rough grading.

During construction, sufficient and timely geotechnical observation and testing should be provided to correlate the findings of this investigation with the actual subsurface conditions exposed during construction. Items requiring observation and testing include, but are not necessarily limited to, the following:

1. Site preparation-stripping and removals.

2. Excavations, including approval of the bottom of excavation prior to processing and/or filling.

3. Cut slope excavations.

4. Processing and compaction of removal and/or over-excavation of bottom soils prior to fill placement.

5. Subgrade preparation for pavements and slabs-on-grade.

6. Placement of engineered compacted fill and backfill, including approval of fill materials and the performance of sufficient density tests to evaluate the degree of compaction being achieved.

7. Foundation excavations, including deep foundations.

8. Installation of reinforcement/rebar cages for deep foundations.

9. Concrete placement within deep foundations.

LIMITATIONS

This report contains geotechnical conclusions and recommendations developed solely for use by Hotel Murrieta, LLC c/o Smith Kading Investments, and their design consultants, for the purposes described earlier. It may not contain sufficient information for other uses or the purposes of other parties. The contents should not be extrapolated to other areas or used for other facilities without consulting LOR Geotechnical Group, Inc.

The recommendations are based on interpretations of the subsurface conditions concluded from information gained from subsurface explorations and a surficial site reconnaissance.

The interpretations may differ from actual subsurface conditions, which can vary horizontally and vertically across the site. If conditions are encountered during the construction of the project which differ significantly from those presented in this report, this firm should be notified immediately in order that we may assess the impact to the recommendations provided.

Due to possible subsurface variations, all aspects of field construction addressed in this report should be observed and tested by the project geotechnical consultant.

If parties other than LOR Geotechnical Group, Inc., provide construction monitoring services, they must be notified that they will be required to assume responsibility for the geotechnical phase of the project being completed by concurring with the recommendations provided in this report or by providing alternative recommendations.

The report was prepared using generally accepted geotechnical engineering practices under the direction of a state licensed geotechnical engineer. No warranty, expressed or implied, is made as to conclusions and professional advice included in this report. Any persons using this report for bidding or construction purposes should perform such independent investigations as deemed necessary to satisfy themselves as to the surface and subsurface conditions to be encountered and the procedures to be used in the performance of work on this project.

TIME LIMITATIONS

The findings of this report are valid as of this date. Changes in the condition of a property can, however, occur with the passage of time, whether they be due to natural processes or the work of man on this or adjacent properties. In addition, changes in the Standards-of-Practice and/or Governmental Codes may occur. Due to such changes, the findings of this report may be invalidated wholly or in part by changes beyond our control. Therefore, this report should not be relied upon after a significant amount of time without a review by LOR Geotechnical Group, Inc., verifying the suitability of the conclusions and recommendations.

CLOSURE

It has been a pleasure to assist you with this project. We look forward to being of further assistance to you as construction begins. Should conditions be encountered during construction that appear to be different than as indicated by this report, please contact this office immediately in order that we might evaluate these conditions.

Should you have any questions regarding this report, please do not hesitate to contact our office at your convenience.

Respectfully submitted,
LOR Geotechnical Group, Inc.

Andrew A. Tardie
Staff Geologist

Robert M. Markoff, CEG
Engineering Geologist

John P. Leuer, GE 2030
President

AAT:RMM:JPL:ss

Distribution: Addressee (4) and PDF via email akading@cox.net

REFERENCES

Alan G. Hull, Craig Nicholson, 1990, Seismotectonics of the northern Elsinore fault zone, southern California. Bulletin of the Seismological Society of America ; 82 (2): 800–818.

American Society of Civil Engineers, 2016, Minimum Design Load for Buildings and other Structures, ASCE 7-16.

California Building Standards Commission, 2019, California Building Code.

California Department of Water Resources, 2020, http://www.water.ca.gov/waterdatalibrary/.

C.H.J., Incorporated, 2007, Preliminary Geotechnical Investigation, Proposed Murrieta Campus Project, Northwest of Monroe Avenue and Fig Street, Murrieta, California, Job No. 07791-3, dated October 31, 2007.

County of Riverside, Transportation and Land Management Agency, 2020, Geographic Information System, http://www3.tlma.co.riverside.ca.us.

Ensoft, Inc., 2012, SHAFT version 2017.8. 10, A Program for the Study of Drilled Shafts Under Axial Loads.

Ensoft, Inc., 2016, LPILE version 2019.11.04, A Program for the Analysis of Piles and Drilled Shafts under Lateral Loads.

EXCEL Engineering, 2019, Conceptual Grading Plan for Hotel Murrieta, dated October 15, 2019, 7 sheets.

Google Earth, 2020, Imagery from various years, www.google.com/earth.

Hart, E.W. and W.A. Bryant, 1997, revised 2003, Fault-Rupture Hazard Zones in California, Alquist-Priolo Earthquake Fault Zoning Act with Index to Earthquake Fault Zones Maps: California Dept. of Conservation Division of Mines and Geology Special Publication 42, Revised Edition with Supplements 1, 2 and 3.

Historic Aerials, 2020, Imagery from various years, www.historicaerials.com.

Kennedy, M.P., 1977, Recency and Character Faulting Along the Elsinore Fault Zone in Southern Riverside County, California, California Division of Mines and Geology, Special Report 131.

Kennedy, M.P. and Morton, D.M., 2003, Geologic Map of the Murrieta 7.5' Quadrangle, Riverside County, California, Open-File Report 03-189.

Larson, R., and Slosson, J., 1992, The Role of Seismic Hazard Evaluation in Engineering Reports, in Engineering Geology Practice in Southern California, AEG Special Publication Number 4, pp 191-194.

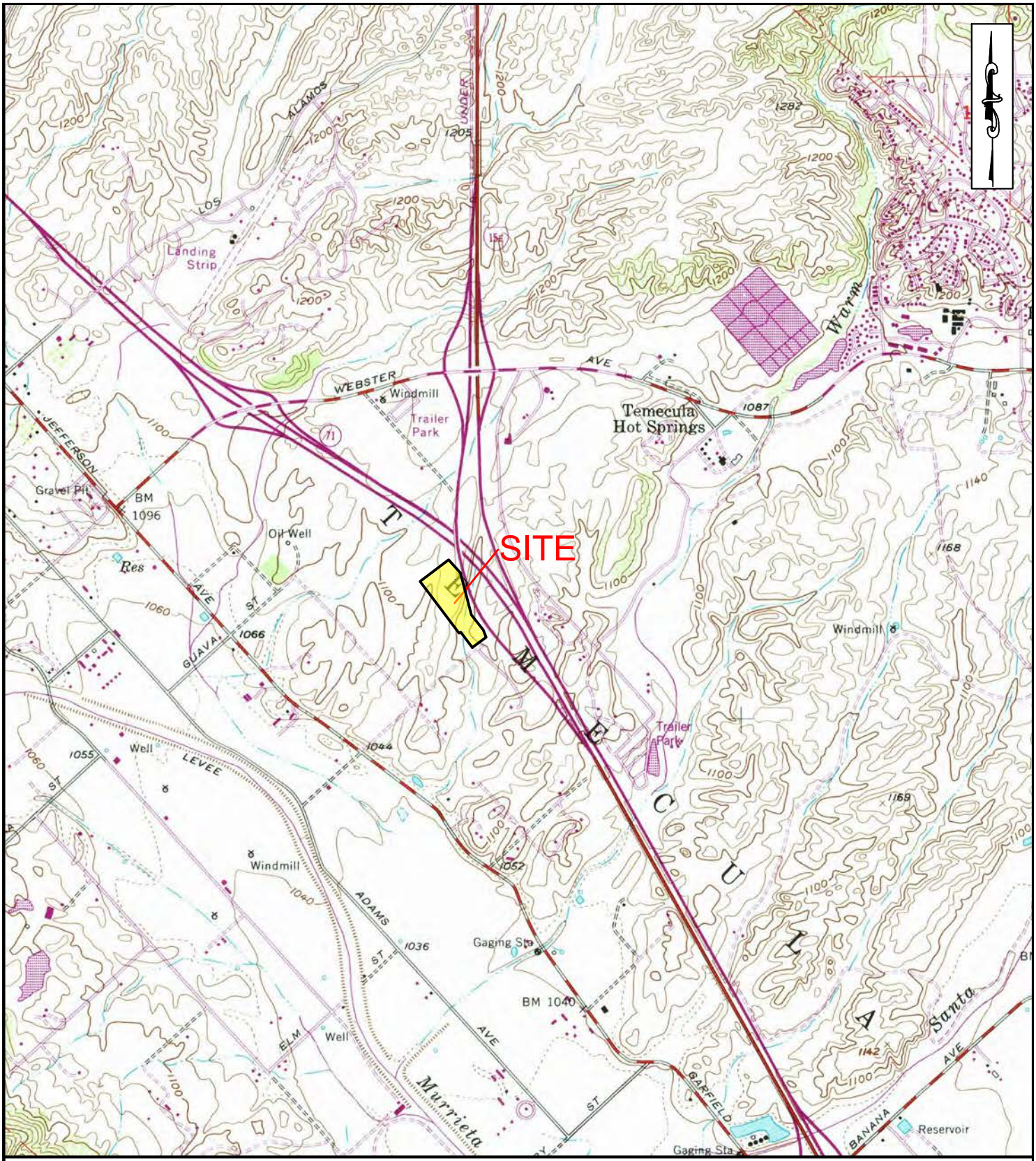
OSPHD, 2020 ,US Seismic Design Maps, https://seismicmaps.org.

Riverside County Flood Control and Water Conservation District, 2011, Design Handbook for Low Impact Development Best Management Practices, dated September 2011.

U.S.G.S., 2020, https://earthquake.usgs.gov/earthquakes/search/.

APPENDIX A

Index Map, Exploratory Boring and Infiltration Test Location Maps, Regional Geologic Map, and Historical Seismicity Maps



INDEX MAP

PROJECT:	HOTEL MURRIETA, MURRIETA, CA	**PROJECT NO:**	13613.1
CLIENT:	HOTEL MURRIETA, LLC / SMITH KADING INVESTMENTS	**ENCLOSURE:**	A-1
LOR Geotechnical Group, Inc.		**DATE:**	MARCH 2020
		SCALE:	1" ≈ 2000'

EXPLORATORY BORING AND INFILTRATION TEST LOCATION MAP

PROJECT NO:	13613.1
ENCLOSURE:	A-2
DATE:	MARCH 2020
SCALE:	1" ≈ 60'

HOTEL MURRIETA, MURRIETA, CA

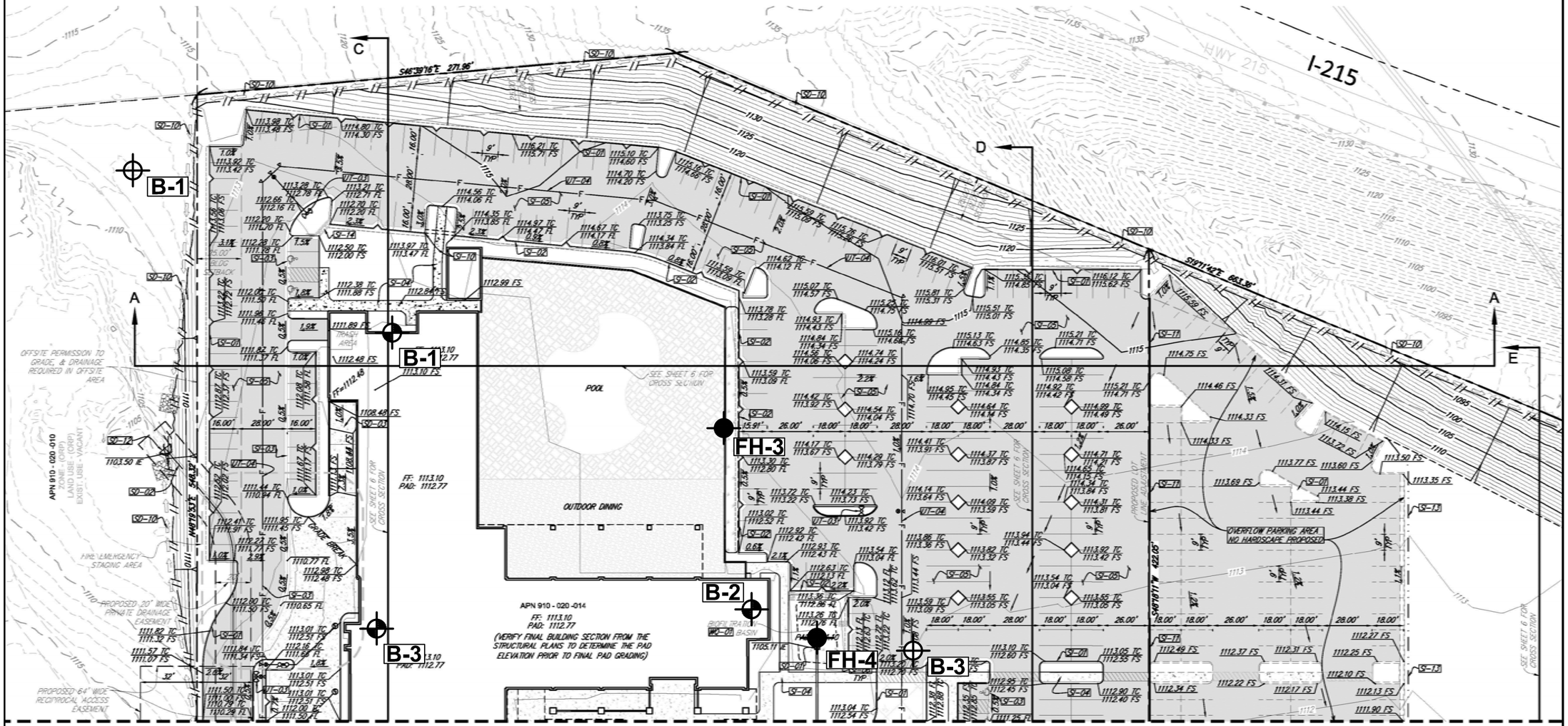
PROJECT:

MURRIETA, LLC / SMITH KADING INVESTMENTS

CLIENT:

HOTEL MURRIETA

LOR Geotechnical Group, Inc.



MATCHLINE SEE SHEET 3 FOR CONTINUATION

SCALE 1"=30'

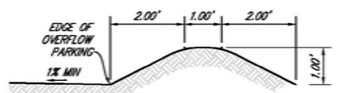
0 30 60 Feet

CONSTRUCTION NOTES

SI-01 6" PCC CURB	SD-04 RIPRAP
SI-02 6" PCC CURB & GUTTER	SD-05 SD HEADWALL (PUBLIC)
SI-03 PCC RIBBON GUTTER	SD-06 STORM DRAIN PIPE (PUBLIC)
SI-04 PCC SIDEWALK	SD-07 SD TRANSISTION STRUCTURE
SI-05 AC PAVEMENT	SD-08 RIPRAP (PUBLIC)
SI-06 2" WIDE CURB CUT WITH RIPRAP	SD-09 CURB INLET (PUBLIC)
SI-07 RETAINING WALL	SD-10 PCC BROW DITCH
SI-08 PCC DRIVEWAY	SD-11 PCC CHUTE OUTLET
SI-09 2" WIDE PCC CHUTE	SD-12 SD HEADWALL
SI-10 PCC SIDEWALK UNDERDRAIN	SD-13 DETENTION PIPE
SI-11 REDWOOD HEADER	VI-01 FIRELINE SERVICE LATERAL
SI-12 STREET LIGHT	VI-02 FIRELINE (ONSITE)
SI-13 EARTHERN BERM (SEE SHEET 2 FOR DETAIL)	VI-03 FIRELINE APPURTENANCES (ONSITE)
SI-14 RIVER ROCK THEMED DRAINAGE CHANNEL	VI-04 DOMESTIC / IRRIGATION WATER SERVICE
SI-15 PCC PAVEMENT / STAMPED PCC	VI-05 WATER MAIN (PUBLIC)
MWQ-01 BIOFILTRATION BASIN	VI-06 WATER APPURTENANCES (PUBLIC)
	VI-07 SEWER MAIN (PUBLIC)

LEGEND

BOUNDARY LINE
RIGHT OF WAY LINE ·RW
PARCEL LOT LINE ·PL
PCC CURB
PCC CURB & GUTTER
SEWER LINE S S S
WATER LINE
FIRE LINE
FIRE HYDRANT
BLDG FIRE SERVICE LATERAL
WATER SERVICE LATERAL
SEWER SERVICE LATERAL
DOUBLE DETECTOR CHECK V
FIRELINE SERVICE LATERAL
AIR VALVE
STORM DRAIN INLETS / CLE
EXIST. TOPO MAJOR CONTOU
EXIST. TOPO MINOR CONTOU
PROPOSED TOPO MAJOR CO
PROPOSED TOPO MINOR CONTOUR



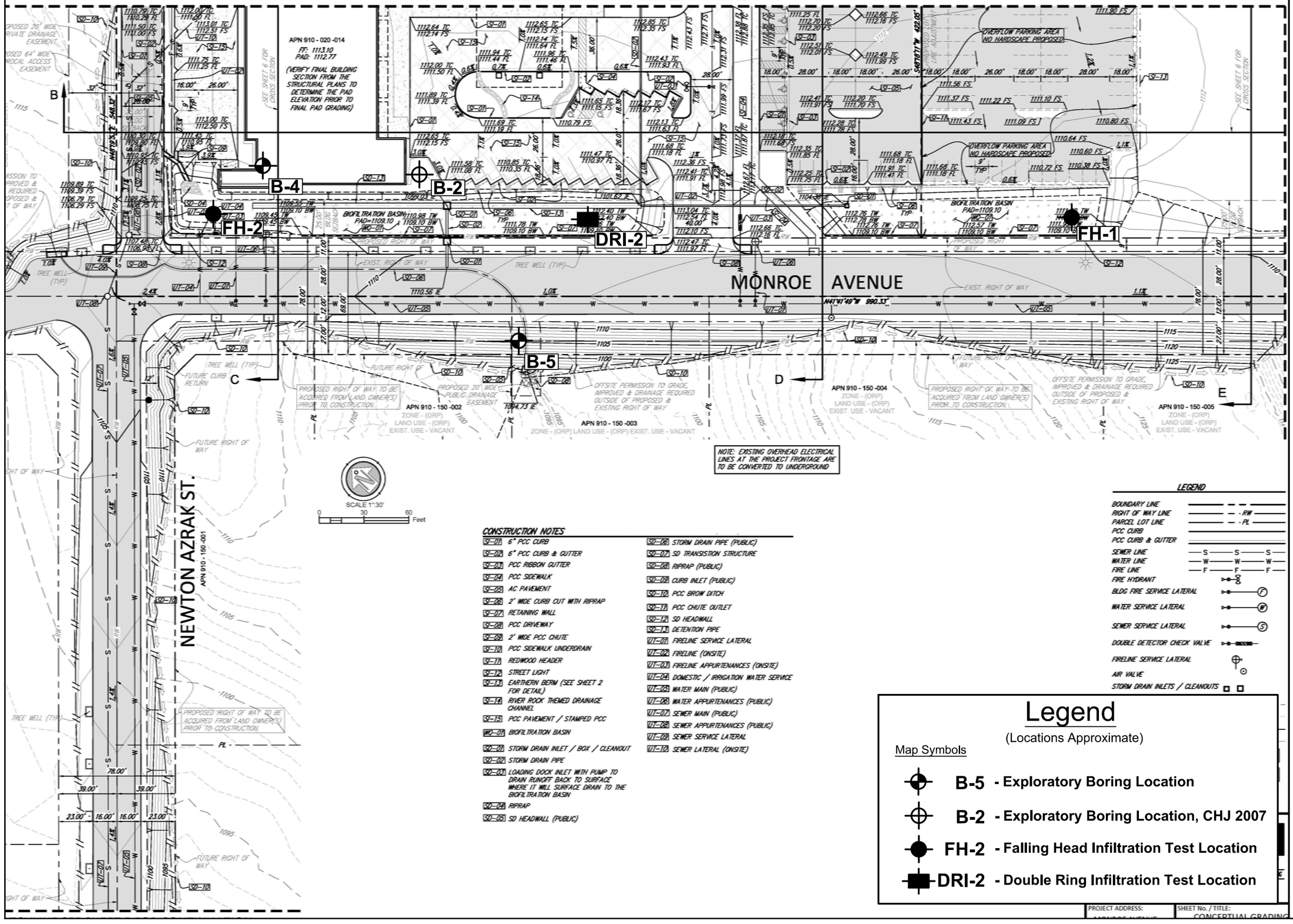
Legend

(Locations Approximate)

Map Symbols

- **B-3** - Exploratory Boring Location, CHJ 2007
- **B-3** - Exploratory Boring Location
- **FH-4** - Falling Head Infiltration Test Location

MATCHLINE SEE SHEET 2 FOR CONTINUATION



SCALE 1"=30'
0 30 60 Feet

CONSTRUCTION NOTES

SI-01 6" PCC CURB	SD-06 STORM DRAIN PIPE (PUBLIC)
SI-02 6" PCC CURB & GUTTER	SD-07 SD TRANSISTION STRUCTURE
SI-03 PCC RIBBON GUTTER	SD-08 RIPRAP (PUBLIC)
SI-04 PCC SIDEWALK	SD-09 CURB INLET (PUBLIC)
SI-05 AC PAVEMENT	SD-10 PCC BROW DITCH
SI-06 2' WIDE CURB CUT WITH RIPRAP	SD-11 PCC CHUTE OUTLET
SI-07 RETAINING WALL	SD-12 SD HEADWALL
SI-08 PCC DRIVEWAY	SD-13 DETENTION PIPE
SI-09 2' WIDE PCC CHUTE	UT-01 FIRELINE SERVICE LATERAL
SI-10 PCC SIDEWALK UNDERDRAIN	UT-02 FIRELINE (ONSITE)
SI-11 REDWOOD HEADER	UT-03 FIRELINE APPURTENANCES (ONSITE)
SI-12 STREET LIGHT	UT-04 DOMESTIC / IRRIGATION WATER SERVICE
SI-13 EARTHERN BERM (SEE SHEET 2 FOR DETAIL)	UT-05 WATER MAIN (PUBLIC)
SI-14 RIVER ROCK THEMED DRAINAGE CHANNEL	UT-06 WATER APPURTENANCES (PUBLIC)
SI-15 PCC PAVEMENT / STAMPED PCC	UT-07 SEWER MAIN (PUBLIC)
WQ-01 BIOFILTRATION BASIN	UT-08 SEWER APPURTENANCES (PUBLIC)
SD-01 STORM DRAIN INLET / BOX / CLEANOUT	UT-09 SEWER SERVICE LATERAL
SD-02 STORM DRAIN PIPE	UT-10 SEWER LATERAL (ONSITE)
SD-03 LOADING DOCK INLET WITH PUMP TO DRAIN RUNOFF BACK TO SURFACE WHERE IT WILL SURFACE DRAIN TO THE BIOFILTRATION BASIN	
SD-04 RIPRAP	
SD-05 SD HEADWALL (PUBLIC)	

LEGEND

BOUNDARY LINE
RIGHT OF WAY LINE - RW
PARCEL LOT LINE - PL
PCC CURB
PCC CURB & GUTTER
SEWER LINE — S — S — S
WATER LINE — W — W — W
FIRE LINE — F — F — F
FIRE HYDRANT
BLDG FIRE SERVICE LATERAL (F)
WATER SERVICE LATERAL (W)
SEWER SERVICE LATERAL (S)
DOUBLE DETECTOR CHECK VALVE
FIRELINE SERVICE LATERAL
AIR VALVE
STORM DRAIN INLETS / CLEANOUTS

Legend

(Locations Approximate)

Map Symbols

B-5 - Exploratory Boring Location

B-2 - Exploratory Boring Location, CHJ 2007

FH-2 - Falling Head Infiltration Test Location

DRI-2 - Double Ring Infiltration Test Location

EXPLORATORY BORING AND INFILTRATION TEST LOCATION MAP

PROJECT:	HOTEL MURRIETA, MURRIETA, CA
PROJECT NO:	13613.1
CLIENT:	HOTEL MURRIETA, LLC / SMITH KADING INVESTMENTS
ENCLOSURE:	A-3
DATE:	MARCH 2020
SCALE:	1" ≈ 60'

PROJECT ADDRESS: MONROE AVENUE

SHEET No. / TITLE: CONCEPTUAL GRADING

LOR Geotechnical Group, Inc.

EXPLORATORY BORING AND INFILTRATION TEST LOCATION MAP

PROJECT NO:	13613.1
ENCLOSURE:	A-4
DATE:	MARCH 2020
SCALE:	1" ≈ 50'

PROJECT: HOTEL MURRIETA, MURRIETA, CA

CLIENT: HOTEL MURRIETA, LLC / SMITH KADING INVESTMENTS

LOR Geotechnical Group, Inc.

MATCHLINE SEE SHEETS _&__ FOR CONTINUATION

I-215

MONROE AVENUE

FIG ST.

B-4 · B-5 · B-6 · B-6 · DRI-1

F · G · X

PROPOSED PRIVATE 20' WIDE DRAINAGE EASEMENT

EXISTING LOTLINE TO BE ADJUSTED

PRIVATE STORM DRAIN PRIVATELY MAINTAIN BY OWNER/DEVELOPER

SEE SHEET 6 FOR CROSS SECTION

INSTALL BMP-1 BIOFILTRATION BASIN:
BOTTOM AREA=3019 SF
BOTTOM EL=1108.00
RISER EL=1108.66
TOP EL=1109.00
MEDIA SOIL=18"
GRAVEL=0"
SEE WQMP FOR DETAILS.

PRIVATE STORM DRAIN PRIVATELY MAINTAIN BY OWNER/DEVELOPER ENDS AT POINT BEGINS PUBLIC STORM DRAIN LINE

PROPOSED RIGHT OF WAY

EXIST. ROW TO BE VACATED

25.00' BLDG SETBACK

OFFSITE PERMISSION TO GRADE, IMPROVED & DRAINAGE REQUIRED OUTSIDE OF PROPOSED & EXISTING RIGHT OF WAY

PROPOSED 20' WIDE PUBLIC DRAINAGE EASEMENT

FUTURE RIGHT OF WAY

PROPOSED RIGHT OF WAY TO BE ACQUIRED FROM LAND OWNER(S) PRIOR TO CONSTRUCTION.

TREE WELL (TYP)

APN 910 - 020 -014

APN 910 - 020 -009

APN 910 - 007 -008
ZONE - (ORP)
LAND USE - (ORP)
EXIST. USE - VACANT

APN 910 - 007 -001
ZONE - (ORP)
LAND USE - (ORP)
EXIST. USE - VACANT

APN 910 - 150 -005
ZONE - (ORP)
LAND USE - (ORP)
EXIST. USE - VACANT

S42°45'18"E 106.28'

S42°45'18"E 185.92'

S26°21'45"E 118.39'

S40°18'11"W 318.90' 289.90'

S40°18'32"W 262.03'

N41°41'49"W 890.33'

N41°41'49"W 300.18'

1081.66' E

1098.80' E

1080.71' E

NOTE: EXISTING OVERHEAD ELECTRICAL LINES AT THE PROJECT FRONTAGE ARE TO BE CONVERTED TO UNDERGROUND

Legend

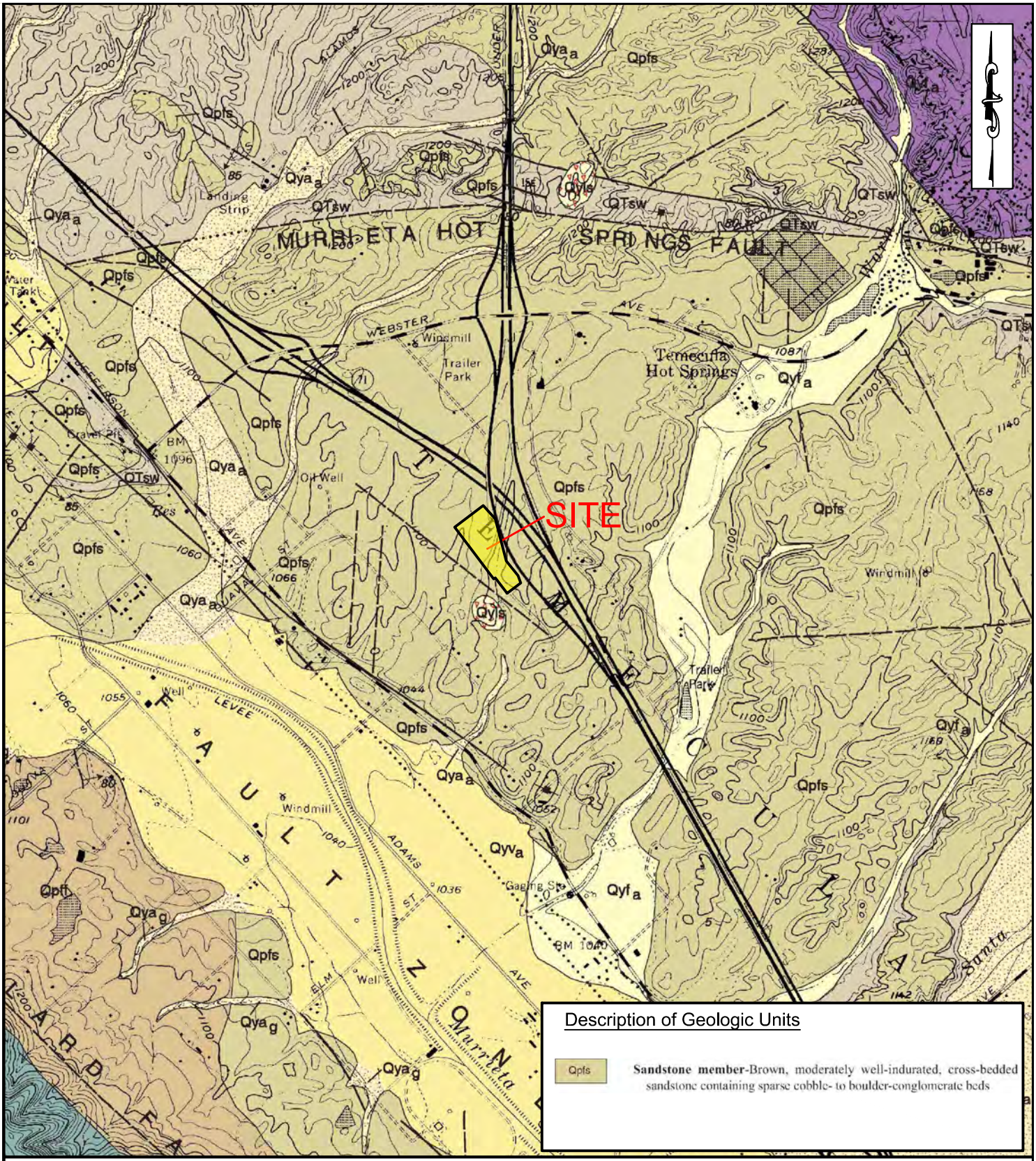
(Locations Approximate)

Map Symbols

- B-6 - Exploratory Boring Location
- B-6 - Exploratory Boring Location, CHJ 2007
- DRI-2 - Double Ring Infiltration Test Location

SCALE 1"=30'

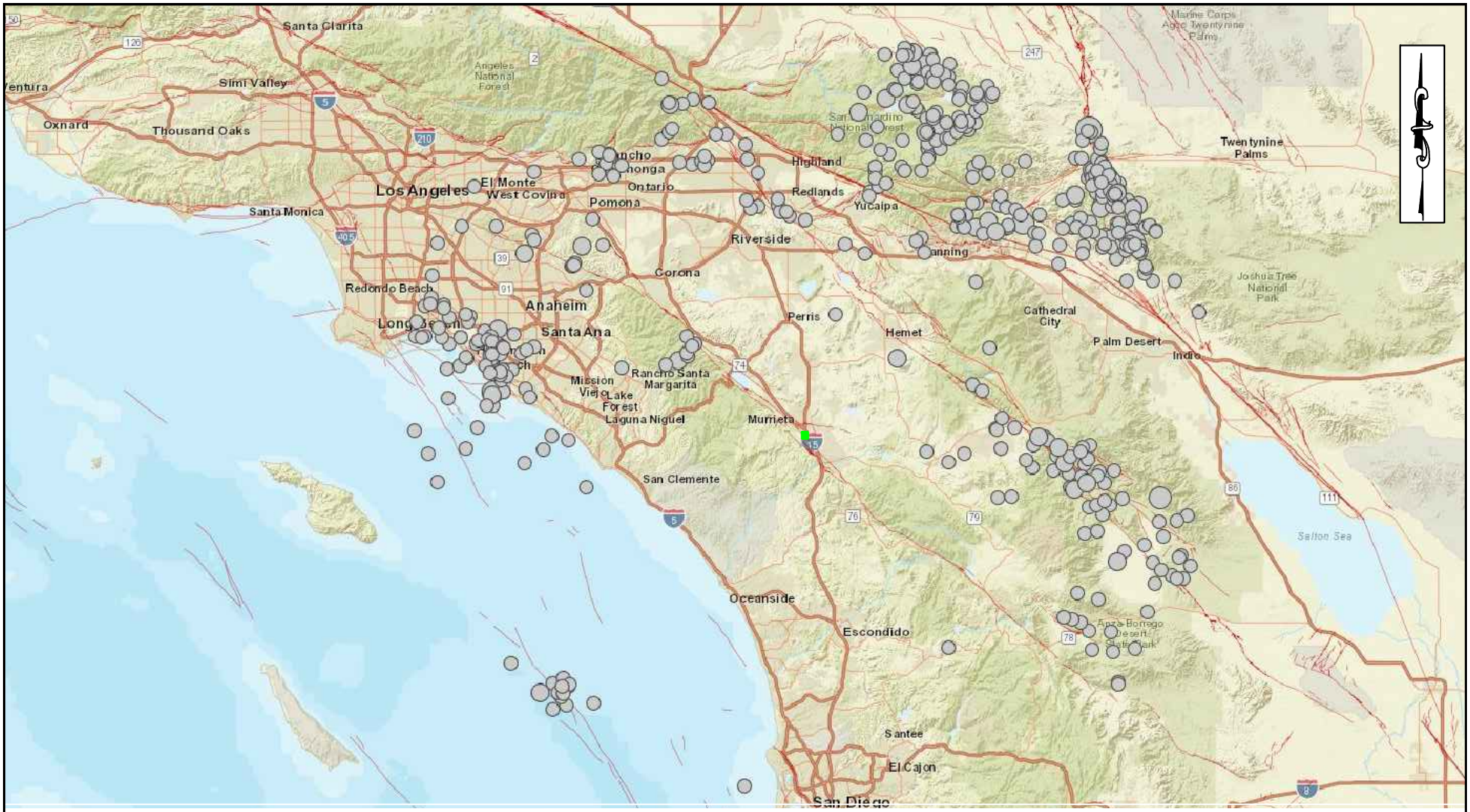
0 30 60 Feet



REGIONAL GEOLOGIC MAP

KENNEDY & MORTON, 2003

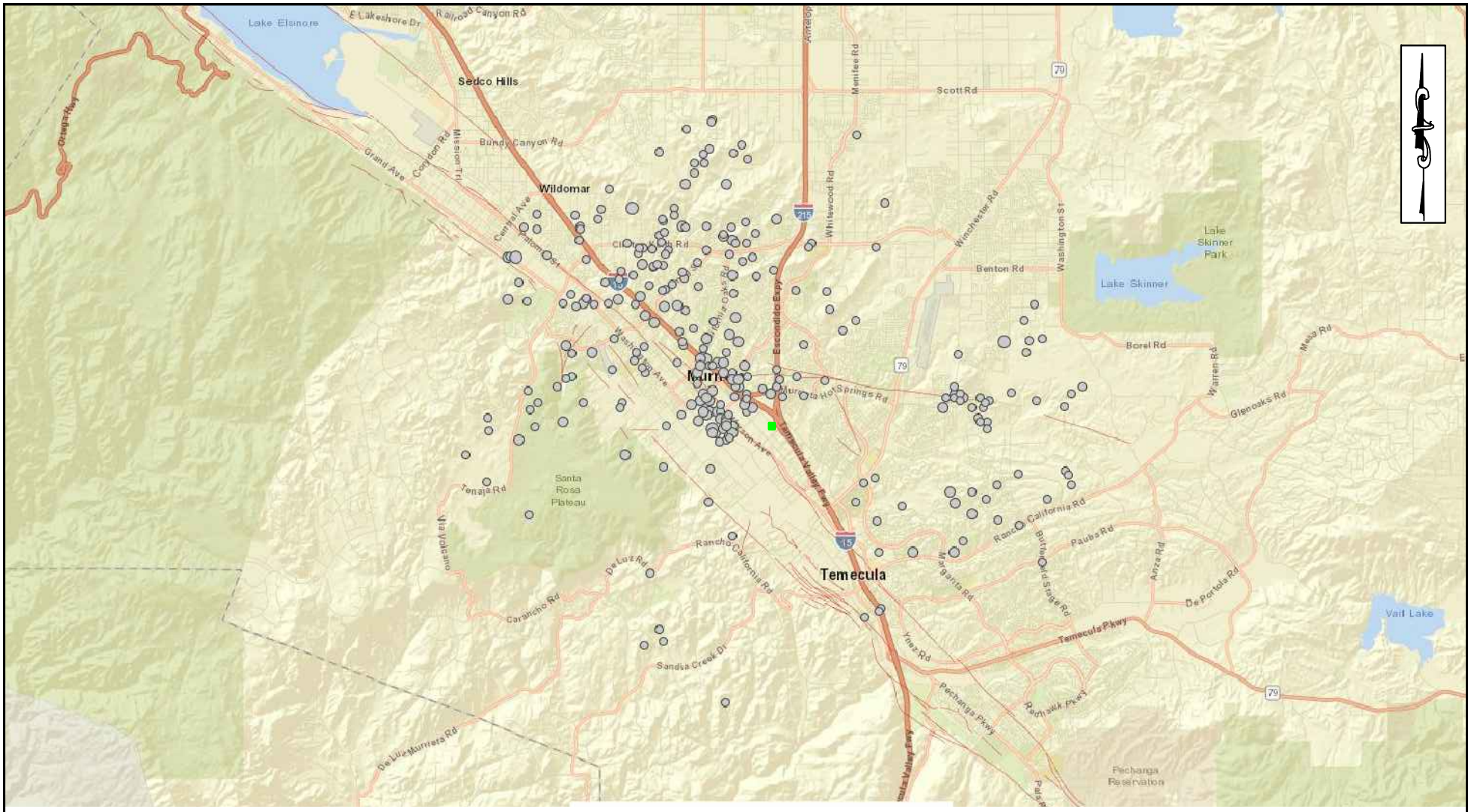
PROJECT:	HOTEL MURRIETA, MURRIETA, CA	**PROJECT NO:**	13613.1
CLIENT:	HOTEL MURRIETA, LLC / SMITH KADING INVESTMENTS	**ENCLOSURE:**	A-5
LOR Geotechnical Group, Inc.		**DATE:**	MARCH 2020
		SCALE:	1" ≈ 2000'



U.S. Geologic Survey (2020) real-time earthquake epicenter map. Plotted are 430 epicenters of instrument-recored events from 1932 to present (02/08/20) of local magnitude greater than M4.0 within a radius of ~62 miles (100 kilometers) of the site. Location accuracy varies. The site is indicated by the green square. The selected magnitude corresponds to a threshold intensity value where very light damage potential begins. These events are also generally widely felt by persons. Red lines mark the surface traces of known Quaternary-age faults.

HISTORICAL SEISMICITY MAP - 100km Radius

PROJECT:	HOTEL MURRIETA, MURRIETA, CA	**PROJECT NO:**	13613.1
CLIENT:	HOTEL MURRIETA, LLC / SMITH KADING INVESTMENTS	**ENCLOSURE:**	A-6
LOR Geotechnical Group, Inc.		**DATE:**	MARCH 2020
		SCALE:	1" ≈ 60km



U.S. Geologic Survey (2020) real-time earthquake epicenter map. Plotted are 369 epicenters of instrument-recored events from 1978 to present (02/08/20) of local magnitude greater than M1.0 within a radius of ~6.2 miles (10 kilometers) of the site. Location accuracy varies. The site is indicated by the green square. Red lines mark the surface traces of known Quaternary-age faults.

HISTORICAL SEISMICITY MAP - 10km Radius

PROJECT:	HOTEL MURRIETA, MURRIETA, CA	**PROJECT NO:**	13613.1
CLIENT:	HOTEL MURRIETA, LLC / SMITH KADING INVESTMENTS	**ENCLOSURE:**	A-7
LOR Geotechnical Group, Inc.		**DATE:**	MARCH 2020
		SCALE:	1" ≈ 7.5km

APPENDIX B

Field Investigation Program and Boring Logs

APPENDIX B
FIELD INVESTIGATION

Subsurface Exploration

The site was investigated on February 10th and 11th , 2020 and consisted of advancing 6 exploratory borings to depths from approximately 21.5 feet and 71.5 feet below the existing ground surface. The approximate locations of the borings are shown on Enclosures A-2 through A-4, within Appendix A.

The drilling exploration was conducted using a truck-mounted CME-75 drill rig equipped with 8-inch diameter hollow stem augers. The soils were continuously logged by our geologist who inspected the site, created detailed logs of the borings, obtained undisturbed, as well as disturbed, soil samples for evaluation and testing, and classified the soils by visual examination in accordance with the Unified Soil Classification System.

Relatively undisturbed samples of the subsoils were obtained at a maximum interval of 5 feet. The samples were recovered by using a California split barrel sampler of 2.50 inch inside diameter and 3.25 inch outside diameter or a Standard Penetration Sampler (SPT) from the ground surface to the total depth explored. The samplers were driven by a 140 pound automatic trip hammer dropped from a height of 30 inches. The number of hammer blows required to drive the sampler into the ground the final 12 inches were recorded and further converted to an equivalent SPT N-value. Factors such as efficiency of the automatic trip hammer used during this investigation (80%), borehole diameter (8"), and rod length at the test depth were considered for further computing of equivalent SPT N-values corrected for field procedures (N60) which are included in the boring logs, Enclosures B-1 through B-6.

The undisturbed soil samples were retained in brass sample rings of 2.42 inches in diameter and 1.00 inch in height, and placed in sealed containers. Disturbed soil samples were obtained at selected levels within the borings and placed in sealed containers for transport to the laboratory.

All samples obtained were taken to our geotechnical laboratory for storage and testing. Detailed logs of the borings are presented on the enclosed Boring Logs, Enclosures B-1 through B-6. A Boring Log Legend and Soil Classification Chart are presented on Enclosures B-I and B-ii, respectively.

CONSISTENCY OF SOIL

SANDS

SPT BLOWS	CONSISTENCY
0-4	Very Loose
4-10	Loose
10-30	Medium Dense
30-50	Dense
Over 50	Very Dense

COHESIVE SOILS

SPT BLOWS	CONSISTENCY
0-2	Very Soft
2-4	Soft
4-8	Medium
8-15	Stiff
15-30	Very Stiff
30-60	Hard
Over 60	Very Hard

SAMPLE KEY

Symbol	Description
	INDICATES CALIFORNIA SPLIT SPOON SOIL SAMPLE INDICATES BULK SAMPLE INDICATES SAND CONE OR NUCLEAR DENSITY TEST INDICATES STANDARD PENETRATION TEST (SPT) SOIL SAMPLE

TYPES OF LABORATORY TESTS

1	Atterberg Limits
2	Consolidation
3	Direct Shear (undisturbed or remolded)
4	Expansion Index
5	Hydrometer
6	Organic Content
7	Proctor (4", 6", or Cal216)
8	R-value
9	Sand Equivalent
10	Sieve Analysis
11	Soluble Sulfate Content
12	Swell
13	Wash 200 Sieve

BORING LOG LEGEND

PROJECT:	PROPOSED HOTEL MURRIETA, MURRIETA, CALIFORNIA	PROJECT NO.:	13613.1
CLIENT:	HOTEL MURRIETA, LLC/SMITH KADING, INVESTMENTS	ENCLOSURE:	B-I
LOR Geotechnical Group, Inc.		DATE:	FEBRUARY 2020

SOIL CLASSIFICATION CHART

MAJOR DIVISIONS			SYMBOLS GRAPH	SYMBOLS LETTER	TYPICAL DESCRIPTIONS
COARSE GRAINED SOILS — MORE THAN 50% OF MATERIAL IS LARGER THAN NO. 200 SIEVE SIZE	GRAVEL AND GRAVELLY SOILS — MORE THAN 50% OF COARSE FRACTION RETAINED ON NO. 4 SIEVE	CLEAN GRAVELS (LITTLE OR NO FINES)		GW	WELL-GRADED GRAVELS, GRAVEL - SAND MIXTURES, LITTLE OR NO FINES
				GP	POORLY-GRADED GRAVELS, GRAVEL - SAND MIXTURES, LITTLE OR NO FINES
		GRAVELS WITH FINES (APPRECIABLE AMOUNT OF FINES)		GM	SILTY GRAVELS, GRAVEL - SAND - SILT MIXTURES
				GC	CLAYEY GRAVELS, GRAVEL - SAND - CLAY MIXTURES
	SAND AND SANDY SOILS — MORE THAN 50% OF COARSE FRACTION PASSING ON NO. 4 SIEVE	CLEAN SANDS (LITTLE OR NO FINES)		SW	WELL-GRADED SANDS, GRAVELLY SANDS, LITTLE OR NO FINES
				SP	POORLY-GRADED SANDS, GRAVELLY SAND, LITTLE OR NO FINES
		SANDS WITH FINES (APPRECIABLE AMOUNT OF FINES)		SM	SILTY SANDS, SAND - SILT MIXTURES
				SC	CLAYEY SANDS, SAND - CLAY MIXTURES
FINE GRAINED SOILS — MORE THAN 50% OF MATERIAL IS SMALLER THAN NO. 200 SIEVE SIZE	SILTS AND CLAYS	LIQUID LIMIT LESS THAN 50		ML	INORGANIC SILTS AND VERY FINE SANDS, ROCK FLOUR, SILTY OR CLAYEY FINE SANDS OR CLAYEY SILTS WITH SLIGHT PLASTICITY
				CL	INORGANIC CLAYS OF LOW TO MEDIUM PLASTICITY, GRAVELLY CLAYS, SANDY CLAYS, SILTY CLAYS, LEAN CLAYS
				OL	ORGANIC SILTS AND ORGANIC SILTY CLAYS OF LOW PLASTICITY
	SILTS AND CLAYS	LIQUID LIMIT GREATER THAN 50		MH	INORGANIC SILTS, MICACEOUS OR DIATOMACEOUS FINE SAND OR SILTY SOILS
				CH	INORGANIC CLAYS OF HIGH PLASTICITY
				OH	ORGANIC CLAYS OF MEDIUM TO HIGH PLASTICITY, ORGANIC SILTS
HIGHLY ORGANIC SOILS				PT	PEAT, HUMUS, SWAMP SOILS WITH HIGH ORGANIC CONTENTS

NOTE: DUAL SYMBOLS ARE USED TO INDICATE BORDERLINE SOIL CLASSIFICATIONS

PARTICLE SIZE LIMITS

BOULDERS	COBBLES	GRAVEL		SAND			SILT OR CLAY
		COARSE	FINE	COARSE	MEDIUM	FINE	

12" 3" 3/4" No. 4 No. 10 No. 40 200

(U.S. STANDARD SIEVE SIZE)

SOIL CLASSIFICATION CHART

PROJECT	PROPOSED HOTEL MURRIETA, MURRIETA, CALIFORNIA	PROJECT NO.	13613.1
CLIENT:	HOTEL MURRIETA, LLC/SMITH KADING, INVESTMENTS	ENCLOSURE:	B-ii
LOR Geotechnical Group, Inc.		DATE:	FEBRUARY 2020

LOG OF BORING B-1

DEPTH IN FEET	SPT BLOW COUNTS	LABORATORY TESTS	MOISTURE CONTENT (%)		DRY DENSITY (PCF)	SAMPLE TYPE	LITHOLOGY	U.S.C.S.	DESCRIPTION
	TEST DATA								
0	23	3, 4, 7, 8, 9, 10, 11	8.2		125.0			SM	@ 0 feet, FILL: SILTY SAND, approximately 10% coarse grained sand, 25% medium grained sand, 45% fine grained sand, 20% silty fines, dark brown, damp, loose.
5	64		2.4		117.0				@ 2 feet, COLLUVIUM: SILTY SAND, approximately 25% coarse grained sand, 25% medium grained sand, 25% fine grained sand, 25% silty fines with trace clay, brown, moist, trace root hairs, trace pinhole porosity.
10	74	11	3.2		108.5			SW	@ 5 feet, PAUBA FORMATION: SILTY SAND, approximately 15% coarse grained sand, 30% medium grained sand, 25% fine grained sand, 20% silty fines with trace clay, tan, dry.
15	65		1.9		109.9				@ 10 feet, WELL GRADED SAND, trace fine gravel, approximately 30% coarse grained sand, 30% medium grained sand, 35% fine grained sand, 5% silty fines, white, dry, weakly cemented, friable.
20	64	3	3.9		108.4				@ 15 feet, becomes slightly finer grained.
25	90	11	5.4		110.9				
30	66		6.6					SW SM	@ 30 feet, WELL GRADED SAND with SILT, approximately 30% coarse grained sand, 30% medium grained sand, 30% fine grained sand, 10% silty fines, yellow brown, dry.
35	64		5.2						
40	64		4.3					SW	@ 40 feet, WELL GRADED SAND, approximately 30% coarse grained sand, 30% medium grained sand, 35% fine grained sand, 5% silty fines, white, dry.
45	51		5.9						
50	78		5.3						
55	63		14.0					ML	@ 55 feet, SANDY SILT, approximately 40% fine grained sand, 60% silty fines, gray brown, damp.
60	43		12.2						
65	37		14.0						@ 63 feet, difficult to drill. @ 65 feet, contains trace clay.
70	46		20.3					CL	@ 70 feet, LEAN CLAY with SAND, approximately 40% fine grained sand, 60% clayey fines of low plasticity, brown, moist.
75									END OF BORING @ 71.5'
80									Fill to 2' No groundwater No bedrock

PROJECT:	**Proposed Hotel Murrieta**	PROJECT NUMBER:	**13613.1**
CLIENT:	**Hotel Murrieta, LLC/Smith Kading Inv.**	ELEVATION:	**1115**
LOR GEOTECHNICAL GROUP INC.		DATE DRILLED:	**February 10, 2020**
		EQUIPMENT:	**CME-75**
		HOLE DIA.: **8"**	ENCLOSURE: **B-1**

LOG OF BORING B-2

DEPTH IN FEET	SPT BLOW COUNTS	LABORATORY TESTS	MOISTURE CONTENT (%)		DRY DENSITY (PCF)	SAMPLE TYPE	LITHOLOGY	U.S.C.S.	DESCRIPTION
0	77 for 10"		7.9		122.3			SM	@ 0 feet, FILL/TOPSOIL: SILTY SAND, approximately 10% coarse grained sand, 30% medium grained sand, 35% fine grained sand, 20% silty fines, dark brown, moist, loose.
5	54 for 10"	3, 7, 11	13.5		107.1			SW SM	@ 2 feet, PAUBA FORMATION: SILTY SAND, approximately 15% coarse grained sand, 30% medium grained sand, 30% fine grained sand, 25% silty fines with trace clay, brown, damp, trace root hairs.
10	64 for 11"		4.5		109.2			SW	@ 5 feet, WELL GRADED SAND with SILT, approximately 25% coarse grained sand, 30% medium grained sand, 35% fine grained sand, 10% silty fines, tan, moist, slightly cemented, friable.
15	64	11	2.8		112.7				
20	97		5.9		113.0				@ 10 feet, WELL GRADED SAND, approximately 30% coarse grained sand, 30% medium grained sand, 35% fine grained sand, 5% silty fines, tan, dry.
25	62 for 11"	3, 11	7.9		126.5			SM	@ 25 feet, SILTY SAND, approximately 15% coarse grained sand, 35% medium grained sand, 35% fine grained sand, 15% silty fines, brown, damp.
30	78 for 11"		8.4		124.3				
35	83 for 11"		4.4		105.7			SW	@ 35 feet, WELL GRADED SAND, approximately 30% coarse grained sand, 30% medium grained sand, 35% fine grained sand, 5% silty fines, red brown, dry to damp, weakly cemented, friable.
40	98		6.4		115.9				
45	88		6.6		110.4				
50	102 for 11"	3	4.4		113.0				
55	83		7.5						
60	26		17.7					CL	@ 60 feet, LEAN CLAY with SAND, approximately 35% fine grained sand, 65% clayey fines of low plasticity, brown, damp, difficult drilling.
65	32		17.0						
70	29		19.3						END OF BORING @ 71.5'
75									Fill to 2'
80									No groundwater No bedrock

TEST DATA

PROJECT:	Proposed Hotel Murrieta	PROJECT NUMBER:	13613.1
CLIENT:	Hotel Murrieta, LLC/Smith Kading Inv.	ELEVATION:	1120
LOR GEOTECHNICAL GROUP INC.		DATE DRILLED:	February 10, 2020
		EQUIPMENT:	CME-75
		HOLE DIA.: 8"	ENCLOSURE: B-2

LOG OF BORING B-3

DEPTH IN FEET	SPT BLOW COUNTS	LABORATORY TESTS	MOISTURE CONTENT (%)		DRY DENSITY (PCF)	SAMPLE TYPE	LITHOLOGY	U.S.C.S.	DESCRIPTION
0		9,10						SM	@ 0 feet, FILL/TOPSOIL: SILTY SAND, approximately 10% coarse grained sand, 25% medium grained sand, 35% fine grained sand, 30% silty fines, brown, moist, loose.
	14		7.2		121.2				@ 2 feet, ALLUVIUM: SILTY SAND, approximately 20% medium grained sand, 60% fine grained sand, 20% silty fines, dark brown, damp to moist.
5	19	11	9.1		126.9				
	17		9.3		118.1			SW SM	@ 5 feet, SILTY SAND, approximately 15% coarse grained sand, 30% medium grained sand, 30% fine grained sand, 25% silty fines with trace clay, brown, moist.
10	38	11	10.4		121.8			SW	@ 7 feet, PAUBA FORMATION: highly weathered WELL GRADED SAND with SILT, approximately 30% coarse grained sand, 30% medium grained sand, 30% fine grained sand, 10% silty fines, tan, damp.
15	81	3	6.0		120.7				@ 10 feet, much less weathered, approximately 5% silty fines.
									@ 15 feet, slightly cemented, friable.
20	71	11	7.1		115.0				
25	109 for 11"		5.6		118.2				
30	82		11.6		102.6				
35	99		19.0		108.0			CL	@ 20 feet, LEAN CLAY with SAND, approximately 30% fine grained sand, 70% clayey fines of low plasticity, brown, damp.
40	68	3	18.3		107.0				
45	88 for 11"		12.8		118.5				
50	34		17.8		110.2				END OF BORING @ 51.5'
									Fill to 2'
55									No groundwater
									No bedrock

PROJECT:	**Proposed Hotel Murrieta**	PROJECT NUMBER:	**13613.1**
CLIENT:	**Hotel Murrieta, LLC/Smith Kading Inv.**	ELEVATION:	**1105**
LOR GEOTECHNICAL GROUP INC.		DATE DRILLED:	**February 10, 2020**
		EQUIPMENT:	**CME-75**
		HOLE DIA.: **8"**	ENCLOSURE: **B-3**

LOG OF BORING B-4

DEPTH IN FEET	SPT BLOW COUNTS	LABORATORY TESTS	MOISTURE CONTENT (%)		DRY DENSITY (PCF)	SAMPLE TYPE	LITHOLOGY	U.S.C.S.	DESCRIPTION
	TEST DATA								
0	27		5.9		124.2			SM	@ 0 feet, FILL/TOPSOIL: SILTY SAND, approximately 5% coarse grained sand, 25% medium grained sand, 45% fine grained sand, 25% silty fines, brown, damp.
5	40 for 6"		15.3		113.5				@ 2 feet, COLLUVIUM: SILTY SAND, approximately 15% coarse grained sand, 30% medium grained sand, 35% fine grained sand, 20% silty fines with trace clay, brown, damp.
									@ 5 feet, PAUBA FORMATION: SILTY SAND, approximately 10% coarse grained sand, 30% medium grained sand, 45% fine grained sand, 15% silty fines, yellow brown, moist.
10	82 for 11"	3	6.1		123.7			SW	@ 10 feet, WELL GRADED SAND, approximately 30% coarse grained sand, 30% medium grained sand, 35% fine grained sand, 5% silty fines, yellow brown, damp, weakly cemented, friable.
15	44		6.3						
20	35		6.8						
25	57		6.3						
30	48		12.0					ML	@ 30 feet, SANDY SILT, approximately 10% medium grained sand, 30% fine grained sand, 60% silty fines, gray brown, damp.
35	43		12.5						
40	38		13.5						
45	61		4.3						@ 45 feet, becomes dry.
50	46		18.0					SW	@ 50 feet, WELL GRADED SAND, approximately 30% coarse grained sand, 30% medium grained sand, 35% fine grained sand, 5% silty fines, tan, moist.
55									END OF BORING @ 51.5'
									Fill to 2'
									No groundwater
									No bedrock

PROJECT:	**Proposed Hotel Murrieta**	PROJECT NUMBER:	**13613.1**
CLIENT:	**Hotel Murrieta, LLC/Smith Kading Inv.**	ELEVATION:	**1105**
LOR GEOTECHNICAL GROUP INC.		DATE DRILLED:	**February 11, 2020**
		EQUIPMENT:	**CME-75**
		HOLE DIA.: **8"**	ENCLOSURE: **B-4**

LOG OF BORING B-5

DEPTH IN FEET	SPT BLOW COUNTS	LABORATORY TESTS	MOISTURE CONTENT (%)		DRY DENSITY (PCF)	SAMPLE TYPE	LITHOLOGY	U.S.C.S.	DESCRIPTION
	TEST DATA								
0	25		5.9		123.7			SM	@ 0 feet, FILL/TOPSOIL: SILTY SAND, approximately 5% coarse grained sand, 25% medium grained sand, 55% fine grained sand, 15% silty fines, dark brown, moist, loose. @ 2 feet, ALLUVIUM: SILTY SAND, approximately 15% coarse grained sand, 30% medium grained sand, 30% fine grained sand, 25% silty fines, dark brown, damp.
5	65		7.1		129.0				@ 5 feet, PAUBA FORMATION: SILTY SAND, approximately 15% coarse grained sand, 25% medium grained sand, 35% fine grained sand, 25% silty fines, yellow brown, damp, weakly cemented, friable.
10	73		10.6		123.6				@ 10 feet, becomes finer grained, approximately 50% fine grained sand, 40% silty fines, red brown, damp.
15	56		12.0		112.3				@ 15 feet, approximately 65% fine grained sand, 35% silty fines, yellow brown, damp.
20	57		11.9		123.6			ML	@ 20 feet, SANDY SILT, approximately 30% fine grained sand, 70% silty fines with trace clay, gray brown, damp.
25	71		9.0		111.1			SP	@ 25 feet, POORLY GRADED SAND, approximately 10% medium grained sand, 85% fine grained sand, 5% silty fines, yellow brown, damp. END OF BORING @ 26' Fill to 2' No groundwater No bedrock
30									

PROJECT:	Proposed Hotel Murrieta	PROJECT NUMBER:	13613.1
CLIENT:	Hotel Murrieta, LLC/Smith Kading Inv.	ELEVATION:	1098
LOR GEOTECHNICAL GROUP INC.		DATE DRILLED:	February 11, 2020
		EQUIPMENT:	CME-75
		HOLE DIA.: 8"	ENCLOSURE: B-5

LOG OF BORING B-6

DEPTH IN FEET	SPT BLOW COUNTS	LABORATORY TESTS	MOISTURE CONTENT (%)		DRY DENSITY (PCF)	SAMPLE TYPE	LITHOLOGY	U.S.C.S.	DESCRIPTION
0								SM	@ 0 feet, FILL/TOPSOIL: SILTY SAND, approximately 15% coarse grained sand, 30% medium grained sand, 30% fine grained sand, 25% silty fines, dark brown, damp, loose.
	10		10.9		122.2				@ 2 feet, ALLUVIUM: SILTY SAND, approximately 20% coarse grained sand, 25% medium grained sand, 35% fine grained sand, 20% silty fines, dark brown, wet due to nearby ponding of off-site nussaince water.
5	7		10.5		116.5				@ 5 feet, becomes slightly coarser grained.
	15		7.3		111.3			SW	@ 7 feet, PAUBA FORMATION: weathered into WELL GRADED SAND, trace gravel to 1/2", approximately 30% coarse grained sand, 30% medium grained sand, 35% fine grained sand, 5% silty fines, red brown, moist.
10	51		9.4		123.9				@ 10 feet, much less weathered, slightly cemented, friable.
15	51		8.5		119.8				
20	51		19.7		110.5				@ 20 feet, becomes moist.
									END OF BORING @ 21.5'
									Fill to 2'
									No groundwater
									No bedrock
25									

TEST DATA

PROJECT:	Proposed Hotel Murrieta	PROJECT NUMBER:	13613.1
CLIENT:	Hotel Murrieta, LLC/Smith Kading Inv.	ELEVATION:	1083
LOR GEOTECHNICAL GROUP INC.		DATE DRILLED:	February 11, 2020
		EQUIPMENT:	CME-75
		HOLE DIA.: 8"	ENCLOSURE: B-6

APPENDIX C

Laboratory Testing Program and Test Results

APPENDIX C
LABORATORY TESTING

General

Selected soil samples obtained from our borings were tested in our geotechnical laboratory to evaluate the physical properties of the soils affecting foundation design and construction procedures. The laboratory testing program performed in conjunction with our investigation included in-place moisture content and dry density, laboratory compaction characteristics, direct shear, sieve analysis, sand equivalent, R-value, consolidation, expansion index, and soluble sulfate content. Descriptions of the laboratory tests are presented in the following paragraphs:

Moisture Density Tests

The moisture content and dry density information provides an indirect measure of soil consistency for each stratum, and can also provide a correlation between soils on this site. The dry unit weight and field moisture content were determined for selected undisturbed samples, in accordance with ASTM D 2922 and ASTM D 2216, respectively, and the results are shown on the Boring Logs, Enclosures B-1 through B-6 for convenient correlation with the soil profile.

Laboratory Compaction

Selected soil samples were tested in the laboratory to determine compaction characteristics using the ASTM D 1557 compaction test method. The results are presented in the following table:

LABORATORY COMPACTION				
Boring Number	**Sample Depth (feet)**	**Soil Description (U.S.G.S.)**	**Maximum Dry Density (pcf)**	**Optimum Moisture Content (percent)**
B-1	1-4	(SM) Silty Sand	131.0	9.0
B-2	8-10	(SW) Well Graded Sand	126.5	10.0

Direct Shear Tests

Shear tests are performed with a direct shear machine in general accordance with ASTM D 3080 at a constant rate-of-strain (usually 0.04 inches/minute). The machine is designed to test a sample partially extruded from a sample ring in single shear. Samples are tested at varying normal loads in order to evaluate the shear strength parameters, angle of internal friction and cohesion. Samples are tested in a relatively undisturbed (u) condition or a remolded (r) condition (90 percent relative compaction per ASTM D 1557) and soaked, to represent the worst case conditions expected in the field.

The results of the shear tests are presented in the following table:

DIRECT SHEAR TESTS				
Boring Number	**Sample Depth (feet)**	**Soil Description (U.S.G.S.)**	**Angle of Internal Friction (degrees)**	**Apparent Cohesion (psf)**
B-1 (r)	1-4	(SM) Silty Sand	28	150
B-2 (r)	8-10	(SW) Well Graded Sand	29	290
B-1 (u)	20	(SW) Well Graded Sand	40	280
B-2 (u)	30	(SM) Silty Sand	44	390
B-2 (u)	50	(SW) Well Graded Sand	43	280
B-3 (u)	15	(SW) Well Graded Sand	43	500
B-3 (u)	40	(CL) Lean Clay with Sand	38	380
B-4 (u)	10	(SW) Well Graded Sand	38	850

Sieve Analysis

A quantitative determination of the grain size distribution was performed for selected samples in accordance with the ASTM D 422 laboratory test procedure. The determination is performed by passing the soil through a series of sieves, and recording the weights of retained particles on each screen. The results of the sieve analyses are presented graphically on Enclosure C-1.

Sand Equivalent

The sand equivalent of selected soils were evaluated using the California Sand Equivalent Test Method, Caltrans Number 217. The results of the sand equivalent tests are presented with the grain size distribution analyses on Enclosure C-1.

R-Value Test

Soil samples were obtained at probable pavement subgrade level and was tested to determine its R-value using the California R-Value Test Method, Caltrans Number 301. The results of the R-value test is presented on Enclosure C-1.

Expansion Index Tests

Remolded samples are tested to determine their expansion potential in accordance with the Expansion Index (EI) test. The test is performed in accordance with the Uniform Building Code Standard 18-2. The test results are presented in the following table:

EXPANSION INDEX TESTS

Boring Number	Sample Depth (feet)	Soil Description (U.S.C.S.)	Expansion Index (EI)	Expansion Potential
B-1	1-4	(SM) Silty Sand	5	Very Low

Expansion Index:	0-20	21-50	51-90	91-130
Expansion Potential:	Very low	Low	Medium	High

Consolidation Tests

The apparatus used for the consolidation tests (odometer) is designed to test a one-inch high portion of the undisturbed soil sample as contained in a sample ring. Porous stones and filler paper are placed in contact with the top and bottom of the specimen to permit the addition or release of water. Loads are applied to the test specimen in specified increments, and the resulting axial deformations are recorded. The results are plotted as log of axial pressure versus consolidation or compression, expressed as strain or sample height.

Samples are tested at field and greater-than field moisture contents. The results are shown on Enclosures C-2 through C-3.

Soluble Sulfate Content Tests

The soluble sulfate content of selected subgrade soils was evaluated and the concentration of soluble sulfates in the soils was determined by measuring the optical density of a barium sulfate precipitate. The precipitate results from a reaction of barium chloride with water extractions from the soil samples. The measured optical density is correlated with readings on precipitates of known sulfate concentrations. The test results are presented on the following table:

SOLUBLE SULFATE CONTENT TESTS

Boring Number	Sample Depth (feet)	Soil Description (U.S.G.S.)	Sulfate Content (percent by weight)
B-1	1-4	(SM) Silty Sand	< 0.005
B-1	10	(SW) Well Graded Sand	< 0.005
B-1	25	(SW) Well Graded Sand	< 0.005
B-2	8-10	(SW) Well Graded Sand	< 0.005
B-2	15	(SM) Silty Sand	< 0.005
B-2	30	(SM) Silty Sand	< 0.005
B-3	20	(SW) Well Graded Sand	< 0.005

APPENDIX D

Infiltration Test Results

FALLING HEAD PERCOLATION TEST RESULTS

Project:	Hotel Murrieta	Test Date:	February 6, 2020
Project No.:	13613.10	Test Hole No.:	FH-1
Soil Classificaiton:	(SW) Well Graded Sand	Test Hole Diameter (in):	8
Depth of Test Hole (ft):	22.00	Date Drilled:	February 5, 2020
Tested By:	A.L.		

READING	TIME START	TIME STOP	TIME INTERVAL		TOTAL TIME	INITIAL WATER LEVEL	FINAL WATER LEVEL	INITIAL HOLE DEPTH	FINAL HOLE DEPTH	CHANGE IN WATER LEVEL	AVERAGE WETTED DEPTH	Q
			min	hr.	hr.	ft.	ft.	ft.	ft.	ft.	ft.	gal/sq.ft./day
1	11:21 AM	11:51 AM	30	0.50	0.50	20.00	21.50	22.00	22.00	1.50	1.25	72.0
2	11:51 AM	12:21 PM	30	0.50	1.00	19.92	21.00	22.00	22.00	1.08	1.54	42.1
3	12:23 PM	12:53 PM	30	0.50	1.50	19.75	20.92	22.00	22.00	1.17	1.67	42.2
4	12:53 PM	1:23 PM	30	0.50	2.00	20.00	20.83	22.00	22.00	0.83	1.59	31.4
5	1:23 PM	1:53 PM	30	0.50	2.50	20.00	21.50	22.00	22.00	1.50	1.25	72.0
6	1:53 PM	2:23 PM	30	0.50	3.00	19.92	21.16	22.00	22.00	1.24	1.46	51.0
7	2:23 PM	2:53 PM	30	0.50	3.50	19.75	20.75	22.00	22.00	1.00	1.75	34.3
8	2:53 PM	3:23 PM	30	0.50	4.00	20.00	21.00	22.00	22.00	1.00	1.50	40.0
9	3:23 PM	3:53 PM	30	0.50	4.50	20.00	21.00	22.00	22.00	1.00	1.50	40.0
10	3:53 PM	4:23 PM	30	0.50	5.00	19.83	20.83	22.00	22.00	1.00	1.67	35.9
11	4:23 PM	4:53 PM	30	0.50	5.50	20.00	20.92	22.00	22.00	0.92	1.54	35.8
12	4:53 PM	5:23 PM	30	0.50	6.00	20.92	21.58	22.00	22.00	0.66	0.75	52.8

Boring Depth:	22.0	ft
Initial Depth of Test Hole:	22.0	ft
Final Depth of Test Hole:	22.0	ft
Clear Water Application Rage (Q):	52.8	gal/sq. ft./day

PERCOLATION RATE CONVERSION (Porchet Method):

H_O	12.96	
H_f	5.04	
delta H	7.92	
H_{avg}	9.00	
I_t	**2.88**	in/hr

FALLING HEAD PERCOLATION TEST RESULTS

Project:	Hotel Murrieta	Test Date:	February 6, 2020
Project No.:	13613.1	Test Hole No.:	FH-2
Soil Classificaiton:	(SW) Well Graded Sand	Test Hole Diameter (in):	8
Depth of Test Hole (ft):	10.00	Date Excavated:	February 5, 2020
Tested By:	A.L.		

READING	TIME START	TIME STOP	TIME INTERVAL		TOTAL TIME	INITIAL WATER LEVEL	FINAL WATER LEVEL	INITIAL HOLE DEPTH	FINAL HOLE DEPTH	CHANGE IN WATER LEVEL	AVERAGE WETTED DEPTH	Q
			min	hr.	hr.	ft.	ft.	ft.	ft.	ft.	ft.	gal/sq.ft./day
1	11:26 AM	11:56 AM	30	0.50	0.50	7.83	9.67	10.00	10.00	1.84	1.25	88.3
2	11:56 AM	12:26 PM	30	0.50	1.00	7.83	9.16	10.00	10.00	1.33	1.51	53.0
3	12:26 PM	12:56 PM	30	0.50	1.50	7.83	8.92	10.00	10.00	1.09	1.63	40.2
4	12:56 PM	1:56 PM	60	1.00	2.50	8.08	8.83	10.00	10.00	0.75	1.55	14.6
5	1:56 PM	2:26 PM	30	0.50	3.00	8.08	8.75	10.00	10.00	0.67	1.59	25.4
6	2:26 PM	2:56 PM	30	0.50	3.50	8.00	8.75	10.00	10.00	0.75	1.63	27.7
7	2:56 PM	3:26 PM	30	0.50	4.00	8.00	8.75	10.00	10.00	0.75	1.63	27.7
8	3:26 PM	3:56 PM	30	0.50	4.50	8.00	8.75	10.00	10.00	0.75	1.63	27.7
9	3:26 PM	3:56 PM	30	0.50	5.00	8.08	8.83	10.00	10.00	0.75	1.55	29.1
10	3:56 PM	4:26 PM	30	0.50	5.50	8.00	8.67	10.00	10.00	0.67	1.67	24.1
11	4:26 PM	4:56 PM	30	0.50	6.00	8.00	8.75	10.00	10.00	0.75	1.63	27.7
12	4:56 PM	5:26 PM	30	0.50	6.50	8.75	9.33	10.00	10.00	0.58	0.96	36.2

Boring Depth:	10.00	ft
Initial Depth of Test Hole:	10.00	ft
Final Depth of Test Hole:	10.00	ft
Clear Water Application Rage (Q):	36.2	gal/sq. ft./day

PERCOLATION RATE CONVERSION (Porchet Method):

H_O	15.00	
H_f	8.04	
delta H	6.96	
H_{avg}	11.52	
I_t	**2.06**	in/hr

FALLING HEAD PERCOLATION TEST RESULTS

Project:	Hotel Murrieta	Test Date:	February 6, 2020
Project No.:	13613.1	Test Hole No.:	FH-3
Soil Classificaiton:	(SW) Well Graded Sand	Test Hole Diameter (in):	8
Depth of Test Hole (ft):	15.00	Date Excavated:	February 6,2020
Tested By:	A.L.		

READING	TIME START	TIME STOP	TIME INTERVAL		TOTAL TIME	INITIAL WATER LEVEL	FINAL WATER LEVEL	INITIAL HOLE DEPTH	FINAL HOLE DEPTH	CHANGE IN WATER LEVEL	AVERAGE WETTED DEPTH	Q
			min	hr.	hr.	ft.	ft.	ft.	ft.	ft.	ft.	gal/sq.ft./day
1	11:30 AM	12:00 PM	30	0.50	0.50	13.16	14.42	15.00	15.00	1.26	1.21	62.5
2	12:00 PM	12:30 PM	30	0.50	1.00	13.00	14.16	15.00	15.00	1.16	1.42	49.0
3	12:30 PM	1:00 PM	30	0.50	1.50	13.00	14.00	15.00	15.00	1.00	1.50	40.0
4	1:00 PM	1:30 PM	30	0.50	2.00	13.00	13.83	15.00	15.00	0.83	1.59	31.4
5	1:30 PM	2:00 PM	30	0.50	2.50	13.00	13.75	15.00	15.00	0.75	1.63	27.7
6	2:00 PM	2:30 PM	30	0.50	3.00	13.00	13.75	15.00	15.00	0.75	1.63	27.7
7	2:30 PM	3:00 PM	30	0.50	3.50	12.75	13.50	15.00	15.00	0.75	1.88	24.0
8	3:00 PM	3:30 PM	30	0.50	4.00	13.00	13.67	15.00	15.00	0.67	1.67	24.1
9	3:30 PM	4:00 PM	30	0.50	4.50	12.92	13.67	15.00	15.00	0.75	1.71	26.4
10	4:00 PM	4:30 PM	30	0.50	5.00	13.00	13.75	15.00	15.00	0.75	1.63	27.7
11	4:30 PM	5:00 PM	30	0.50	5.50	13.00	13.75	15.00	15.00	0.75	1.63	27.7
12	5:00 PM	5:30 PM	30	0.50	6.00	13.75	14.42	15.00	15.00	0.67	0.92	43.9

Boring Depth:	15.00	ft
Initial Depth of Test Hole:	15.00	ft
Final Depth of Test Hole:	15.00	ft
Clear Water Application Rage (Q):	43.9	gal/sq. ft./day

PERCOLATION RATE CONVERSION (Porchet Method):

H_O	15.00	
H_f	6.96	
delta H	8.04	
H_{avg}	10.98	
I_t	**2.48**	in/hr

FALLING HEAD PERCOLATION TEST RESULTS

Project:	Hotel Murrieta	Test Date:	February 6, 2020
Project No.:	13613.1	Test Hole No.:	FH-4
Soil Classificaiton:	(SW) Well Graded Sand	Test Hole Diameter (in):	8
Depth of Test Hole (ft):	17.00	Date Excavated:	February 5, 2020
Tested By:	A.L.		

READING	TIME START	TIME STOP	TIME INTERVAL		TOTAL TIME	INITIAL WATER LEVEL	FINAL WATER LEVEL	INITIAL HOLE DEPTH	FINAL HOLE DEPTH	CHANGE IN WATER LEVEL	AVERAGE WETTED DEPTH	Q
			min	hr.	hr.	ft.	ft.	ft.	ft.	ft.	ft.	gal/sq.ft./day
1	11:33 AM	12:03 PM	30	0.50	0.50	15.25	16.83	17.00	17.00	1.58	0.96	98.7
2	12:03 PM	12:33 PM	30	0.50	1.00	15.00	16.42	17.00	17.00	1.42	1.29	66.0
3	12:33 PM	1:03 PM	30	0.50	1.50	15.00	16.25	17.00	17.00	1.25	1.38	54.5
4	1:03 PM	1:33 PM	30	0.50	2.00	15.00	16.08	17.00	17.00	1.08	1.46	44.4
5	1:33 PM	2:03 PM	30	0.50	2.50	15.00	16.00	17.00	17.00	1.00	1.50	40.0
6	2:03 PM	2:33 PM	30	0.50	3.00	14.92	16.25	17.00	17.00	1.33	1.42	56.4
7	2:33 PM	3:03 PM	30	0.50	3.50	14.83	16.25	17.00	17.00	1.42	1.46	58.4
8	3:03 PM	3:33 PM	30	0.50	4.00	15.00	16.25	17.00	17.00	1.25	1.38	54.5
9	3:33 PM	4:03 PM	30	0.50	4.50	14.92	16.16	17.00	17.00	1.24	1.46	51.0
10	4:03 PM	4:33 PM	30	0.50	5.00	15.00	16.16	17.00	17.00	1.16	1.42	49.0
11	4:33 PM	5:03 PM	30	0.50	5.50	15.00	16.16	17.00	17.00	1.16	1.42	49.0
12	5:03 PM	5:33 PM	30	0.50	6.00	16.16	16.67	17.00	17.00	0.51	0.58	52.3

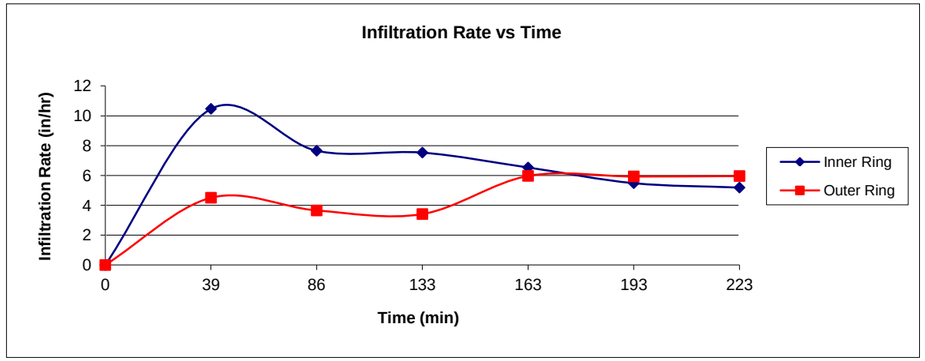
Boring Depth:	17.00	ft
Initial Depth of Test Hole:	17.00	ft
Final Depth of Test Hole:	17.00	ft
Clear Water Application Rage (Q):	52.3	gal/sq. ft./day

PERCOLATION RATE CONVERSION (Porchet Method):

H_O	10.08
H_f	3.96
delta H	6.12
H_{avg}	7.02
I_t	**2.71** in/hr

DOUBLE RING INFILTROMETER TEST DATA

Project:	Hotel Murrieta	**Client:**	Hotel Murrieta, LLC
Project No.:	13613.1	**Test Date:**	February 3, 2020
Soil Classification:	(SW) Well Graded Sand	**Test Hole No.:**	DRI-1
Depth of Test Hole:	1 ft	**Test Hole Diameter:**	12 in. inner, 24 in. annular
Liquid Used:	Tap Water	**Date Excavated:**	February 3, 2020
Area of Rings:	Inner = 0.785 ft^2 , Annular 2.36 ft^2	**pH:**	7.8
Tested By:	R.L.	**Depth of Water in Rings:**	4.0"
Liquid Level Maintained Using:	Vacuum Seal	**Ring Penetration:**	3.5"
Depth to Water Table:	175'		

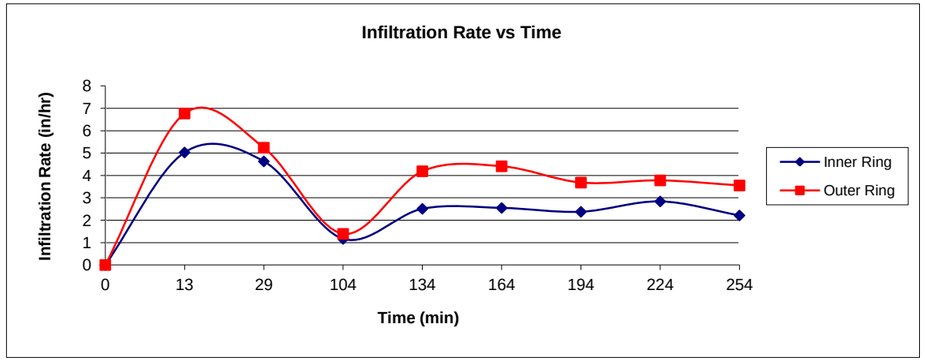


TEST PERIOD

TRIAL NO.	INNER				ANNULAR SPACE			WATER USED (lbs.)		WATER USED (gal)		INFILTRATION RATE (gal/sf.day)		INFILTRATION RATE (in/hr)		LIQUID TEMP (°F)	REMARKS
	TIME		TIME INTERVAL (minutes)	TOTAL ELASPED TIME (minutes)	TIME	TIME INTERVAL (minutes)	TOTAL ELASPED TIME (minutes)	inner	annular space	inner	annular space	inner	annular space	inner	annular space		
1	S	11:02	39	39	11:02	39	39	27.67	35.82	3.322	4.300	156.2	67.3	10.5	4.5	60	
	E	11:41			11:41											60	
2	S	11:45	47	86	11:45	47	86	24.39	35.02	2.928	4.204	114.3	54.6	7.7	3.7	60	refilled both
	E	12:32			12:32											60	
3	S	12:45	47	133	12:45	47	133	24.00	32.70	2.881	3.926	112.5	51.0	7.5	3.4	60	refilled both
	E	13:32			13:32											60	
4	S	13:35	30	163	13:35	30	163	13.29	36.51	1.595	4.383	97.6	89.1	6.5	6.0	60	refilled both
	E	14:05			14:05											60	
5	S	14:05	30	193	14:05	30	193	11.15	36.28	1.339	4.355	81.8	88.6	5.5	5.9	60	refilled outer
	E	14:35			14:35											60	
6	S	14:35	30	223	14:35	30	223	10.55	36.45	1.267	4.376	77.4	89.0	5.2	6.0	60	refilled outer
	E	15:05			15:05											60	

DOUBLE RING INFILTROMETER TEST DATA

Project:	Hotel Murrieta	**Client:**	Hotel Murrieta, LLC
Project No.:	13613.1	**Test Date:**	February 3, 2020
Soil Classification:	(SM) Silty Sand	**Test Hole No.:**	DRI-2
Depth of Test Hole:	1 ft	**Test Hole Diameter:**	12 in. inner, 24 in. annular
Liquid Used:	Tap Water	**Date Excavated:**	February 3, 2020
Area of Rings:	Inner = 0.785 ft^2 , Annular 2.36 ft^2	**pH:**	7.8
Tested By:	R.L.	**Depth of Water in Rings:**	2.5"
Liquid Level Maintained Using:	Vacuum Seal	**Ring Penetration:**	3.5"
Depth to Water Table:	175'		



TEST PERIOD

TRIAL NO.	INNER				ANNULAR SPACE			WATER USED (lbs.)		WATER USED (gal)		INFILTRATION RATE (gal/sf.day)		INFILTRATION RATE (in/hr)		LIQUID TEMP (°F)	REMARKS
	TIME		TIME INTERVAL (minutes)	TOTAL ELASPED TIME (minutes)	TIME	TIME INTERVAL (minutes)	TOTAL ELASPED TIME (minutes)	inner	annular space	inner	annular space	inner	annular space	inner	annular space		
1	S	11:24	13	13	11:24	13	13	4.43	17.93	0.532	2.152	75.0	101.0	5.0	6.8	60	
	E	11:37			11:37											60	
2	S	11:37	16	29	11:37	16	29	5.02	17.08	0.603	2.050	69.1	78.2	4.6	5.2	60	
	E	11:53			11:53											60	
3	S	11:06	75	104	11:06	75	104	5.92	21.24	0.711	2.550	17.4	20.7	1.2	1.4	60	refilled outer
	E	12:21			12:21											60	
4	S	12:21	30	134	12:21	30	134	5.10	25.60	0.612	3.073	37.4	62.5	2.5	4.2	60	
	E	12:51			12:51											60	
5	S	13:30	30	164	13:30	30	164	5.18	26.96	0.622	3.236	38.0	65.8	2.5	4.4	60	refilled both
	E	14:00			14:00											60	
6	S	14:10	30	194	14:10	30	194	4.83	22.50	0.580	2.701	35.5	54.9	2.4	3.7	60	refilled outer
	E	14:40			14:40											60	
7	S	14:40	30	224	14:40	30	224	5.77	23.10	0.693	2.773	42.4	56.4	2.8	3.8	60	
	E	15:10			15:10											60	
8	S	15:10	30	254	15:10	30	254	4.50	21.72	0.540	2.607	33.0	53.0	2.2	3.6	60	
	E	15:40			15:40											60	

APPENDIX E

Seismic Design Spectra

Project: Hotel Murrieta
Project Number: 13613.1
Client: Hotel Murrieta, LLC c/o Smith Kading Investments
Site Lat/Long; 33.5476/-117.1827
Controlling Seismic Source: Elsinore fault

REFERENCE	NOTATION	VALUE	
Site Class	A, B, C, D, E or F	D	(Site Class D (Measured) only)
Site Class D - 21.2.2.(ii)	F_a	1	
Site Class D - 21.2.2.(ii)	F_v	2.5	
$0.2*(S_{D1}/S_{DS})$	T_0	0.128	
S_{D1}/S_{DS}	T_S	0.639	
Fundamental Period (12.8.2)	T	Period	
Seismic Design Maps or Fig 22-14	T_L	8	
$2/3*S_{M1}$	S_{D1}	0.680	
F_V*S_1	S_{M1}	1.020	

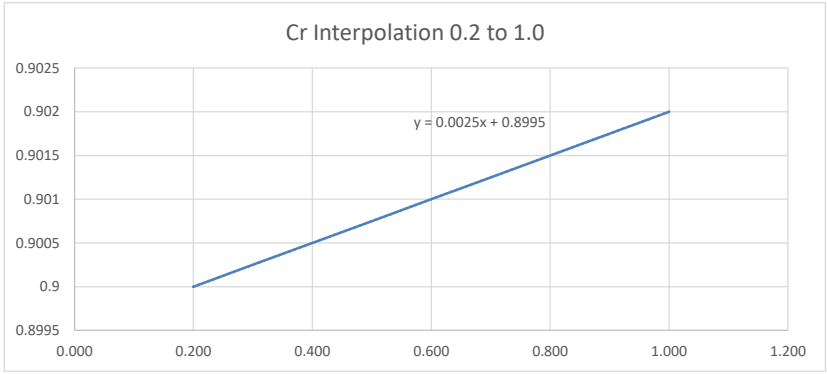
REFERENCE	NOTATION	VALUE
F_v (Table 11.4-2)[Used for General Spectrum]	F_v	1.7
Design Maps	S_{MS}	1.598
Design Maps	S_{DS}	1.065
Design Maps	S_1	0.599
Design Maps	F_{PGA}	1.1
Design Maps	PGA	0.711
Equation 11.8-1	PGA_M	0.782
Section 21.5.3	80% of PGA_M	0.626
Design Maps	CR1	0.902
Design Maps	Crs	0.9

RISK COEFFICIENT

Cr - At Perods <=0.2, Cr=CRS	Cr	0.9
Cr - At Periods >=1.0, Cr=Cr1	Cr	0.902

Cr - At Periods between 0.2 and 1.0
use trendline formula to complete

Period	Cr
0.200	0.9
0.300	0.900
0.400	0.901
0.500	0.901
0.600	0.901
0.680	0.901
1.000	0.902



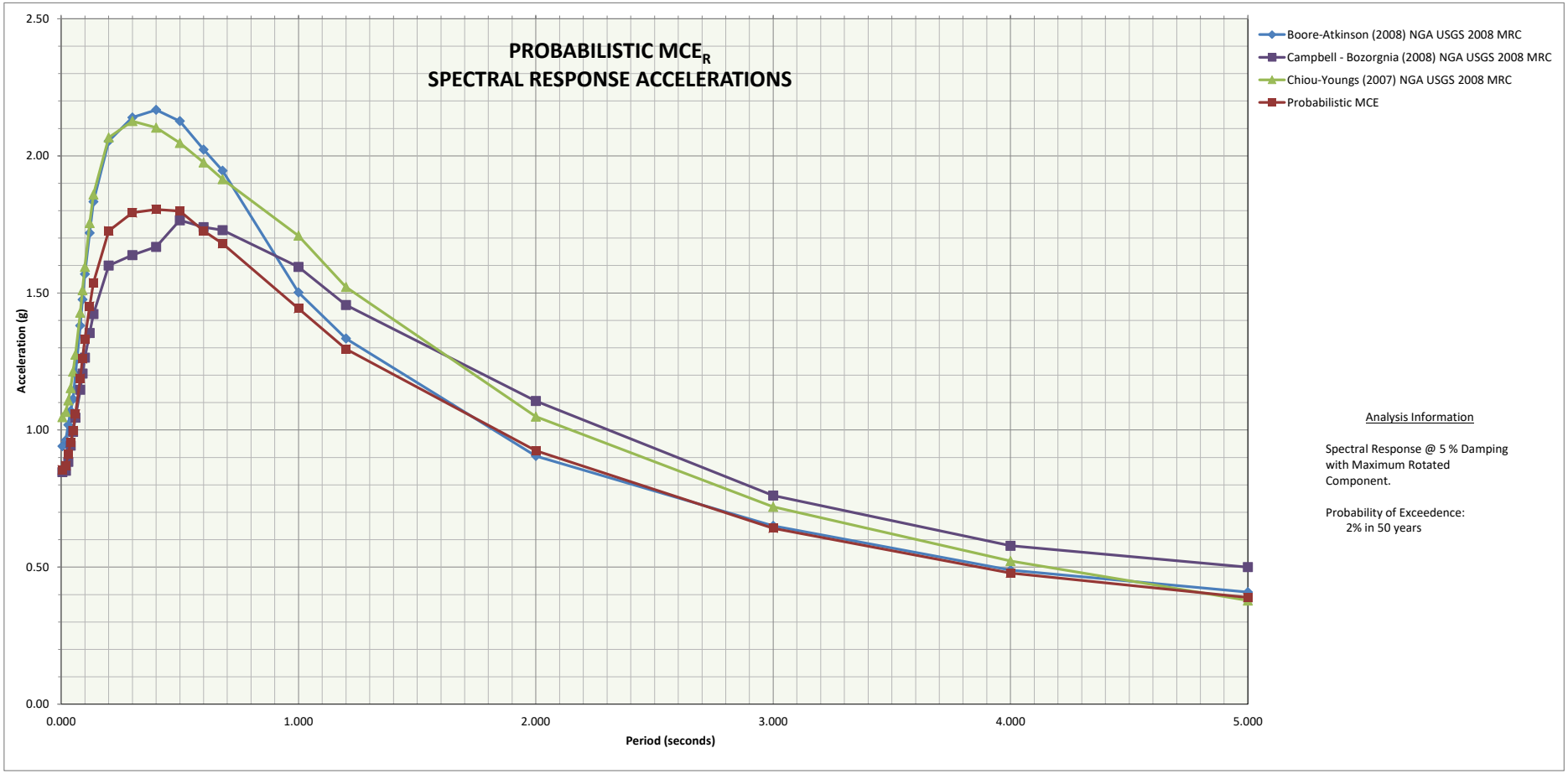
PROBABILISTIC SPECTRA
2% in 50 year Exceedence

Period	B - A	C - B	C - Y	Mean	Risk Coefficient (C_R)	Probabilistic MCE
0.005	0.94	0.85	1.05	0.95	0.900	0.855
0.020	0.96	0.85	1.07	0.97	0.900	0.871
0.030	1.02	0.88	1.11	1.01	0.900	0.913
0.040	1.07	0.94	1.15	1.06	0.900	0.955
0.050	1.11	0.99	1.21	1.11	0.900	0.998
0.060	1.20	1.05	1.28	1.18	0.900	1.058
0.080	1.38	1.15	1.43	1.32	0.900	1.189
0.090	1.48	1.21	1.51	1.40	0.900	1.260
0.100	1.57	1.26	1.60	1.48	0.900	1.331
0.120	1.72	1.35	1.76	1.61	0.900	1.452
0.136	1.83	1.42	1.86	1.71	0.900	1.537
0.200	2.05	1.60	2.07	1.92	0.900	1.726
0.300	2.14	1.64	2.13	1.99	0.900	1.792
0.400	2.17	1.67	2.10	2.00	0.901	1.805
0.500	2.13	1.77	2.05	2.00	0.901	1.799
0.600	2.02	1.74	1.98	1.92	0.901	1.726
0.680	1.95	1.73	1.92	1.86	0.901	1.680
1.000	1.50	1.60	1.71	1.60	0.902	1.443
1.200	1.33	1.46	1.52	1.44	0.902	1.295
2.000	0.91	1.11	1.05	1.03	0.902	0.925
3.000	0.65	0.76	0.72	0.71	0.902	0.642
4.000	0.49	0.58	0.52	0.53	0.902	0.478
5.000	0.41	0.50	0.38	0.43	0.902	0.389

B-A - Boore-Atkinson (2008) NGA USGS 2008 MRC
C-B - Campbell-Bozorgnia (2008) NGA USGS 2008 MRC
C-Y - Chiou-Youngs (2007) NGA USGS 2008 MRC

Probabilistic PGA: 0.855

Project No: 13613.1


PROBABILISTIC MCE$_R$
SPECTRAL RESPONSE ACCELERATIONS
Boore-Atkinson (2008) NGA USGS 2008 MRC
Campbell - Bozorgnia (2008) NGA USGS 2008 MRC
Chiou-Youngs (2007) NGA USGS 2008 MRC
Probabilistic MCE
Acceleration (g)
Period (seconds)
0.00
0.50
1.00
1.50
2.00
2.50
0.000
1.000
2.000
3.000
4.000
5.000
Analysis Information
Spectral Response @ 5 % Damping with Maximum Rotated Component.
Probability of Exceedence:
2% in 50 years

DETERMINISTIC SPECTRUM AND LOWER LIMIT

Largest Amplitudes of Ground Motions Considering All Sources Calculated using Weighted Mean of Attenuation Equations*.

Controlling Source: Elsinore fault

Period	DETERMINISTIC (RAW)	DETERMINISTIC LOWER LIMIT	DETERMINISTIC MCE 84 FRACTILE
0.005	1.031	0.623	1.031
0.020	1.050	0.692	1.050
0.030	1.102	0.739	1.102
0.040	1.156	0.785	1.156
0.050	1.208	0.831	1.208
0.060	1.270	0.877	1.270
0.080	1.399	0.970	1.399
0.090	1.469	1.016	1.469
0.100	1.538	1.062	1.538
0.120	1.658	1.154	1.658
0.136	1.743	1.228	1.743
0.200	1.977	1.500	1.977
0.300	2.196	1.500	2.196
0.400	2.288	1.500	2.288
0.500	2.367	1.500	2.367
0.600	2.364	1.500	2.364
0.680	2.360	1.500	2.360
1.000	2.169	1.500	2.169
1.200	2.028	1.250	2.028
2.000	1.532	0.750	1.532
3.000	1.121	0.500	1.121
4.000	0.848	0.375	0.848
5.000	0.695	0.300	0.695

Deterministic PGA: 1.031

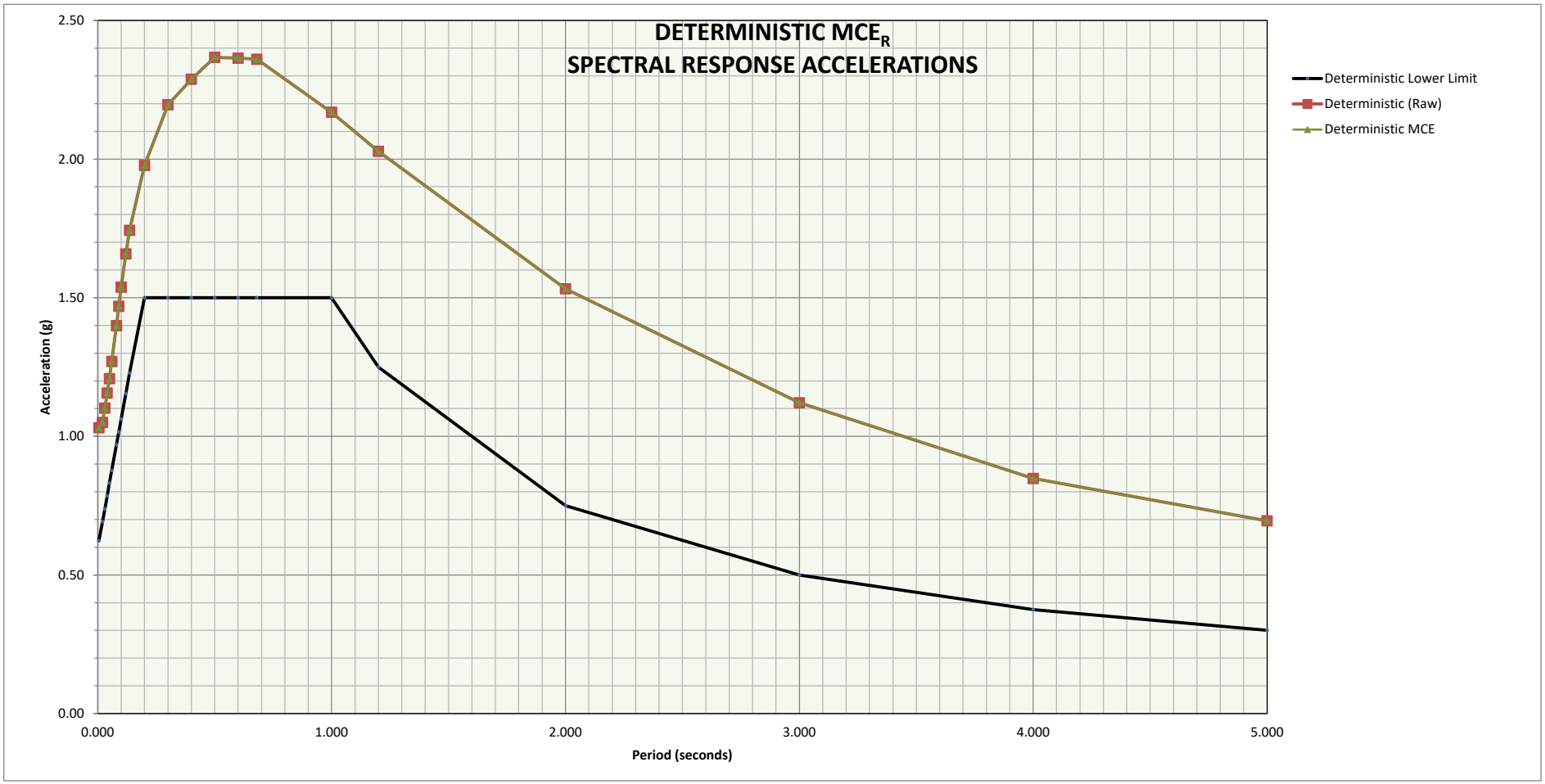
*Attenuation Equations

Boore - Atkinson (2008) NGA USGS 2008 MRC

Campbell - Bozorgnia (2008) NGA USGS 2008 MRC

Chiou - Youngs (2007) NGA USGS 2008 MRC

Project No: 13613.1



Project No: 13613.1

SITE SPECIFIC SPECTRA

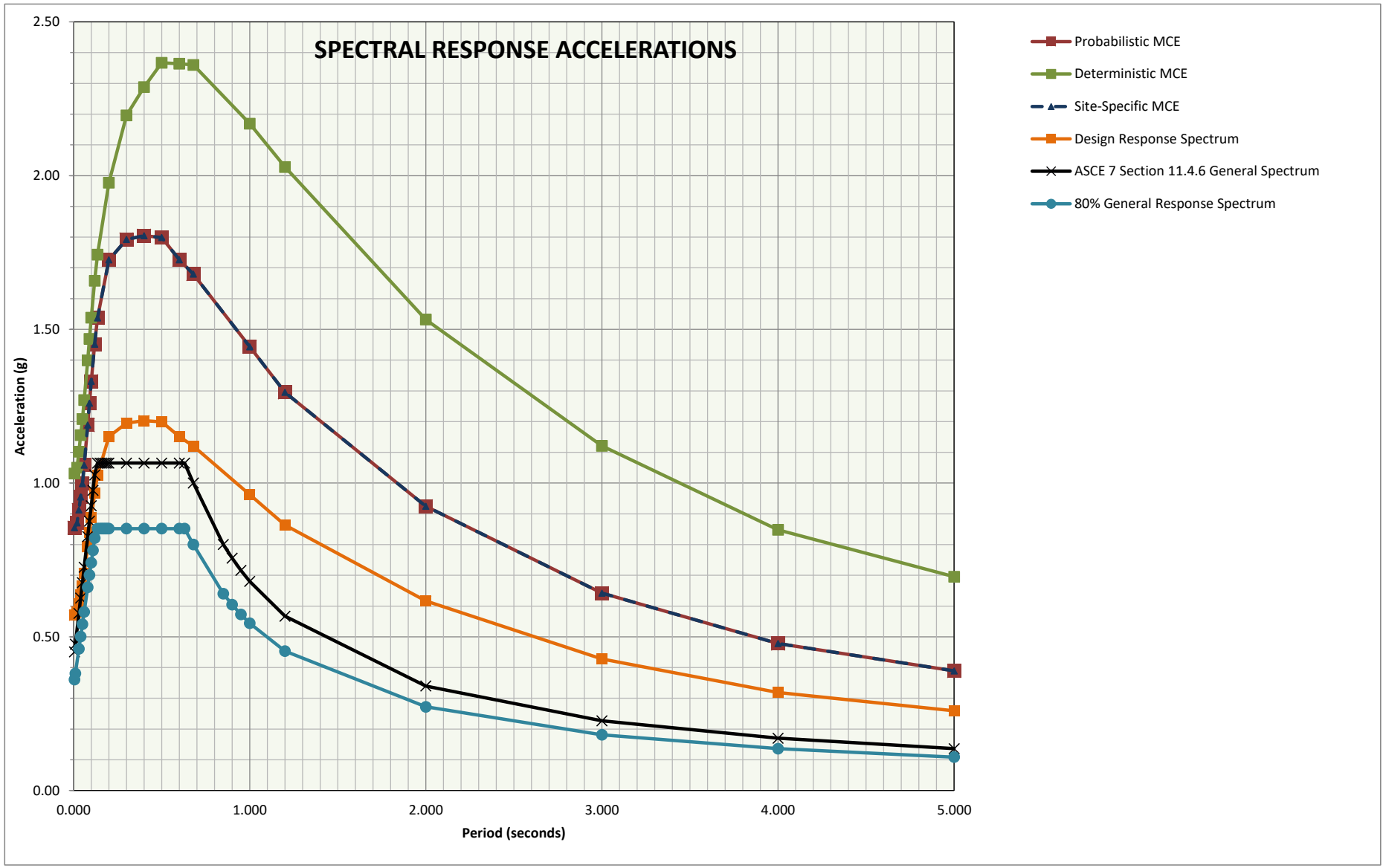
Period	Probabilistic MCE	Deterministic MCE	Site-Specific MCE	Design Response Spectrum (Sa)
0.005	0.855	1.031	0.855	0.570
0.020	0.871	1.050	0.871	0.580
0.030	0.913	1.102	0.913	0.608
0.040	0.955	1.156	0.955	0.637
0.050	0.998	1.208	0.998	0.665
0.060	1.058	1.270	1.058	0.706
0.080	1.189	1.399	1.189	0.793
0.090	1.260	1.469	1.260	0.840
0.100	1.331	1.538	1.331	0.887
0.120	1.452	1.658	1.452	0.968
0.136	1.537	1.743	1.537	1.025
0.200	1.726	1.977	1.726	1.151
0.300	1.792	2.196	1.792	1.195
0.400	1.805	2.288	1.805	1.203
0.500	1.799	2.367	1.799	1.199
0.600	1.726	2.364	1.726	1.151
0.680	1.680	2.360	1.680	1.120
1.000	1.443	2.169	1.443	0.962
1.200	1.295	2.028	1.295	0.864
2.000	0.925	1.532	0.925	0.616
3.000	0.642	1.121	0.642	0.428
4.000	0.478	0.848	0.478	0.319
5.000	0.389	0.695	0.389	0.259

ASCE 7-16: Section 21.4

	Calculated Value	Design Value
SDS:	1.083	1.083
SD1:	1.296	1.296
SMS:	1.624	1.624
SM1:	1.945	1.945
Site Specific PGAm:	0.855	0.855
Site Class:	D - measured	

Period	ASCE 7 SECTION 11.4.6 General Spectrum	80% General Response Spectrum
0.005	0.451	0.361
0.010	0.476	0.381
0.030	0.576	0.461
0.040	0.626	0.501
0.050	0.676	0.541
0.060	0.726	0.581
0.080	0.826	0.661
0.090	0.876	0.701
0.100	0.926	0.741
0.110	0.976	0.781
0.120	1.026	0.821
0.136	1.065	0.852
0.150	1.065	0.852
0.160	1.065	0.852
0.170	1.065	0.852
0.180	1.065	0.852
0.190	1.065	0.852
0.200	1.065	0.852
0.300	1.065	0.852
0.400	1.065	0.852
0.500	1.065	0.852
0.600	1.065	0.852
0.630	1.065	0.852
0.680	1.000	0.800
0.850	0.800	0.640
0.900	0.756	0.605
0.950	0.716	0.573
1.000	0.680	0.544
1.200	0.567	0.453
2.000	0.340	0.272
3.000	0.227	0.181
4.000	0.170	0.136
5.000	0.136	0.109

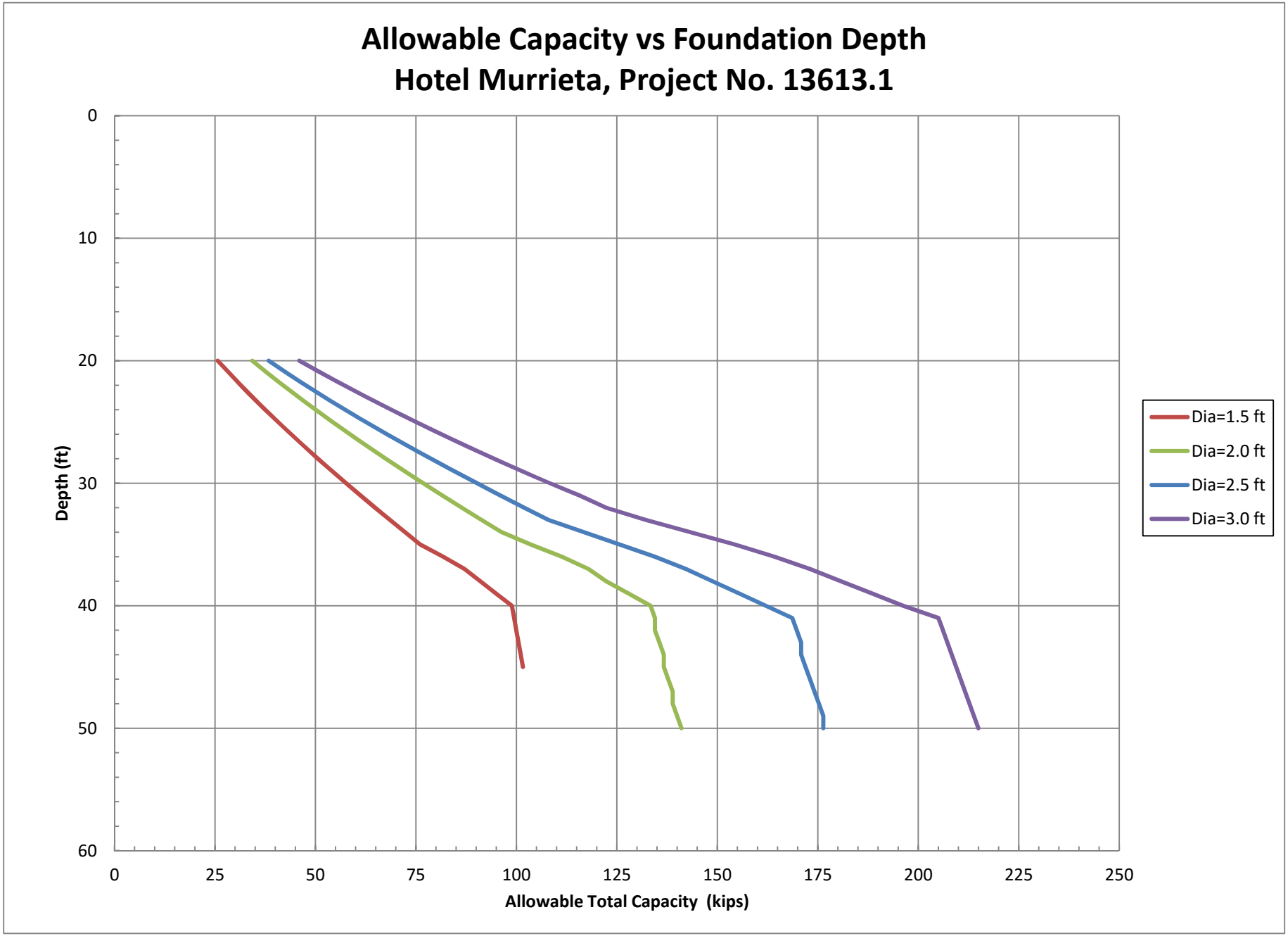
Project No: 13613.1

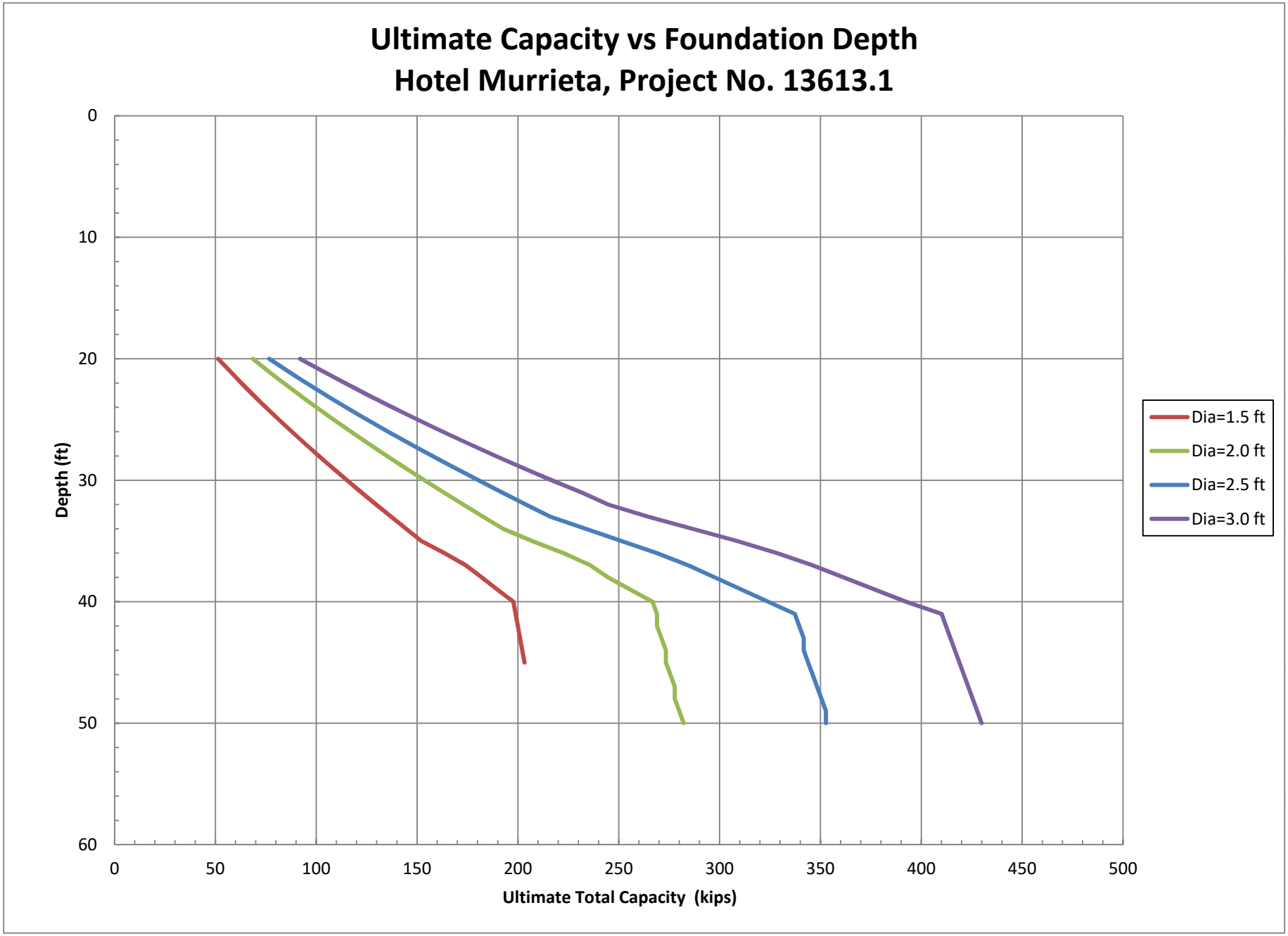


Project No: 13613.1

APPENDIX F

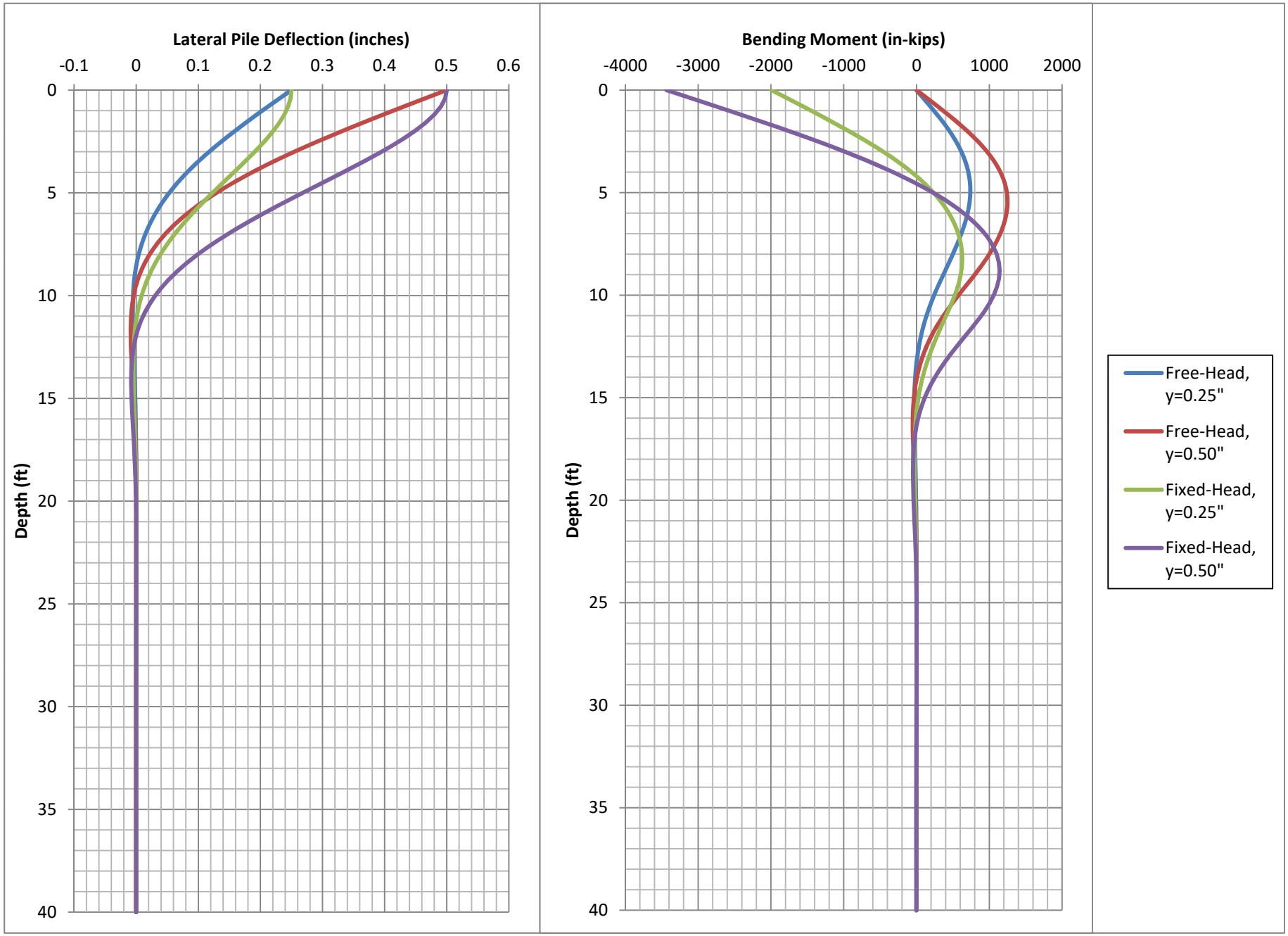
CIDH Capacities


Allowable Capacity vs Foundation Depth
Hotel Murrieta, Project No. 13613.1
Depth (ft)
0
10
20
30
40
50
60
0
25
50
75
100
125
150
175
200
225
250
Allowable Total Capacity (kips)
Dia=1.5 ft
Dia=2.0 ft
Dia=2.5 ft
Dia=3.0 ft

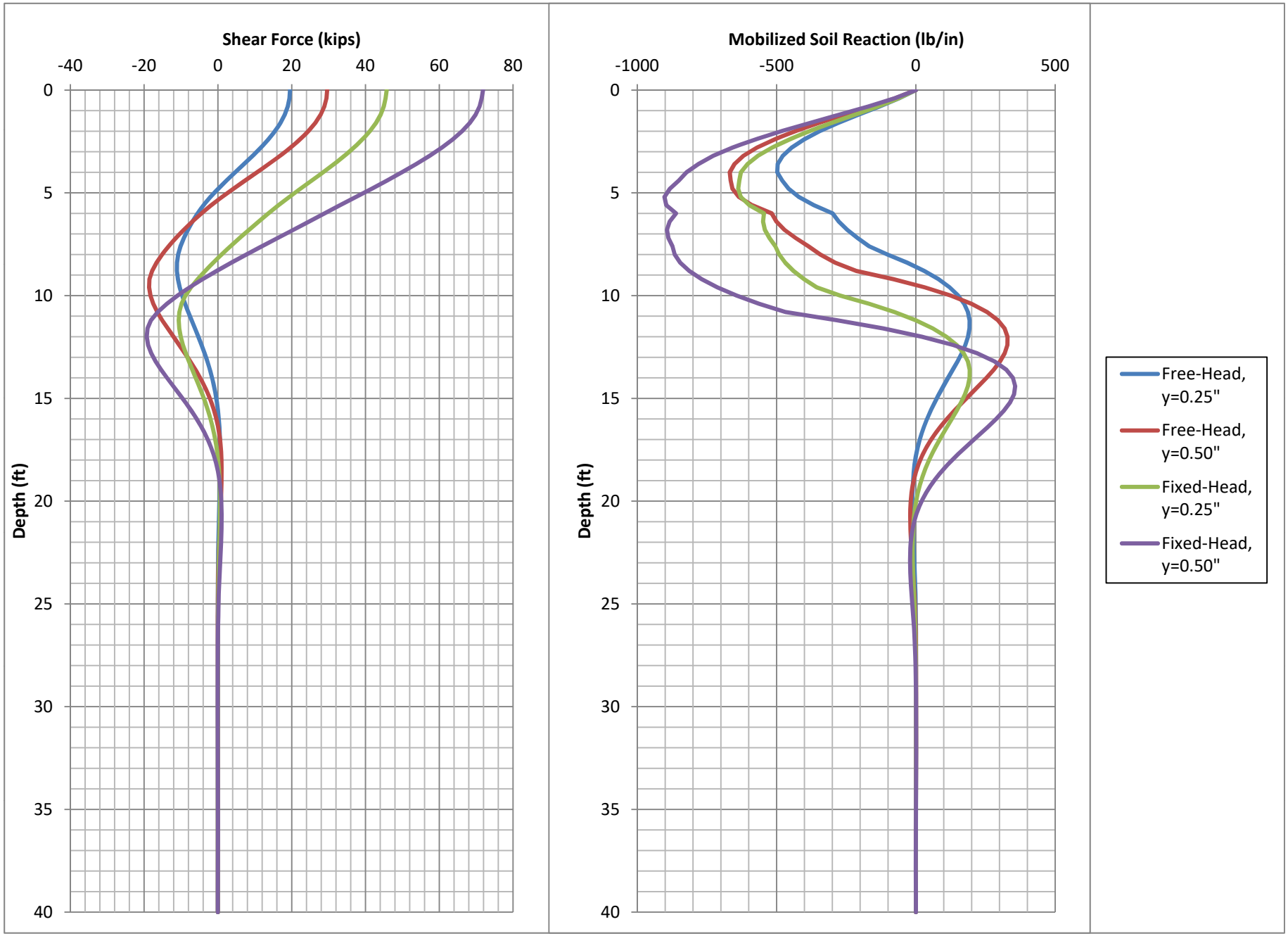

Ultimate Capacity vs Foundation Depth
Hotel Murrieta, Project No. 13613.1
Depth (ft)
0
10
20
30
40
50
60
0
50
100
150
200
250
300
350
400
450
500
Ultimate Total Capacity (kips)
Dia=1.5 ft
Dia=2.0 ft
Dia=2.5 ft
Dia=3.0 ft

APPENDIX G

Lateral Pile Analysis



The analyses were performed for 18-Inch CIDH piles
This may be used for vertical load of 150 kips.



The analyses were performed for 18-Inch CIDH piles
This may be used for vertical load of 150 kips.

==========

LPile for Windows, Version 2019-11.004

Analysis of Individual Piles and Drilled Shafts
Subjected to Lateral Loading Using the p-y Method

==========

This copy of LPile is being used by:

LOR Geotechnical Group, Inc.
Riverside, CA
Serial Number of Security Device: 562484320

This copy of LPile is licensed for exclusive use by:

Lor Geotechnical Group, Inc., Ri

Use of this program by any entity other than Lor Geotechnical Group, Inc., Ri
is a violation of the software license agreement.

Files Used for Analysis

Path to file locations on this computer:
\\lor_server\Common\Clarissa\13613.1_Proposed Hotel Murrieta\13613.1 CIDH capaci
ty\13613.1_CIDH lateral capacity_cmtp\

Name of the input data file:
13613.1_CIDH 18 in. lateral capacity_cmtp.lp11d

Name of the output report file:
13613.1_CIDH 18 in. lateral capacity_cmtp.lp11o

Name of the plot output file:
13613.1_CIDH 18 in. lateral capacity_cmtp.lp11p

Name of the runtime message file:
13613.1_CIDH 18 in. lateral capacity_cmtp.lp11r

Date and Time of Analysis

Date: February 28, 2020 Time: 8:39:44

Problem Title

Project Name: Hotel Murrieta

Job Number: 13613.1

Client: Hotel Murrieta

Engineer: C. Pappo

Description: 18-inch CIDH Lateral Capacity

Program Options and Settings

Computational Options:
- Conventional Analysis

Engineering Units Used for Data Input and Computations:
- US Customary System Units (pounds, feet, inches)

Analysis Control Options:

- Maximum number of iterations allowed	=	500
- Deflection tolerance for convergence	=	1.0000E-05 in
- Maximum allowable deflection	=	100.0000 in
- Number of pile increments	=	100

Loading Type and Number of Cycles of Loading:
- Static loading specified

- Use of p-y modification factors for p-y curves not selected
- Analysis uses layering correction (Method of Georgiadis)

- No distributed lateral loads are entered
- Loading by lateral soil movements acting on pile not selected
- Input of shear resistance at the pile tip not selected
- Input of moment resistance at the pile tip not selected
- Input of side resistance moment along pile not selected
- Computation of pile-head foundation stiffness matrix not selected
- Push-over analysis of pile not selected
- Buckling analysis of pile not selected

Output Options:
- Output files use decimal points to denote decimal symbols.
- Values of pile-head deflection, bending moment, shear force, and soil reaction are printed for full length of pile.
- Printing Increment (nodal spacing of output points) = 1
- No p-y curves to be computed and reported for user-specified depths
- Print using narrow report formats
  (Note: Some output information is omitted from the narrow report formats)

Pile Structural Properties and Geometry

Number of pile sections defined = 1
Total length of pile = 40.000 ft
Depth of ground surface below top of pile = 0.0000 ft

Pile diameters used for p-y curve computations are defined using 2 points.

p-y curves are computed using pile diameter values interpolated with depth over the length of the pile. A summary of values of pile diameter vs. depth follows.

Point No.	Depth Below Pile Head feet	Pile Diameter inches
1	0.000	18.0000
2	40.000	18.0000

Input Structural Properties for Pile Sections:

Pile Section No. 1:

Section 1 is an elastic pile
Cross-sectional Shape = Circular Pile
Length of section = 40.000000 ft

Width of top of section	=	18.000000 in
Width of bottom of section	=	18.000000 in
Top Area	=	254.469005 sq. in
Bottom Area	=	254.469005 sq. in
Moment of Inertia at Top	=	5153. in^4
Moment of Inertia at Bottom	=	5153. in^4
Elastic Modulus	=	3122000. psi

Ground Slope and Pile Batter Angles

Ground Slope Angle	=	0.000 degrees
	=	0.000 radians
Pile Batter Angle	=	0.000 degrees
	=	0.000 radians

Soil and Rock Layering Information

The soil profile is modelled using 2 layers

Layer 1 is sand, p-y criteria by Reese et al., 1974

Distance from top of pile to top of layer	=	0.0000 ft
Distance from top of pile to bottom of layer	=	38.000000 ft
Effective unit weight at top of layer	=	117.000000 pcf
Effective unit weight at bottom of layer	=	117.000000 pcf
Friction angle at top of layer	=	40.000000 deg.
Friction angle at bottom of layer	=	40.000000 deg.
Subgrade k at top of layer	=	0.0000 pci
Subgrade k at bottom of layer	=	0.0000 pci

NOTE: Default values for subgrade k will be computed for this layer.

Layer 2 is soft clay, p-y criteria by Matlock, 1970

Distance from top of pile to top of layer	=	38.000000 ft
Distance from top of pile to bottom of layer	=	68.000000 ft
Effective unit weight at top of layer	=	110.000000 pcf
Effective unit weight at bottom of layer	=	110.000000 pcf
Undrained cohesion at top of layer	=	384.000000 psf
Undrained cohesion at bottom of layer	=	384.000000 psf
Epsilon-50 at top of layer	=	0.0000

Epsilon-50 at bottom of layer = 0.0000

NOTE: Default values for Epsilon-50 will be computed for this layer.

(Depth of the lowest soil layer extends 28.000 ft below the pile tip)

Static Loading Type

Static loading criteria were used when computing p-y curves for all analyses.

Pile-head Loading and Pile-head Fixity Conditions

Number of loads specified = 4

Load No.	Load Type	Condition 1	Condition 2	Axial Thrust Force, lbs
1	4	y = 0.250000 in	M = 0.0000 in-lbs	150000.
2	4	y = 0.500000 in	M = 0.0000 in-lbs	150000.
3	5	y = 0.250000 in	S = 0.0000 in/in	150000.
4	5	y = 0.500000 in	S = 0.0000 in/in	150000.

V = shear force applied normal to pile axis
M = bending moment applied to pile head
y = lateral deflection normal to pile axis
S = pile slope relative to original pile batter angle
R = rotational stiffness applied to pile head
Values of top y vs. pile lengths can be computed only for load types with specified shear loading (Load Types 1, 2, and 3).
Thrust force is assumed to be acting axially for all pile batter angles.

Computations of Nominal Moment Capacity and Nonlinear Bending Stiffness

---

Axial thrust force values were determined from pile-head loading conditions

Number of Pile Sections Analyzed = 1

Pile Section No. 1:

Moment-curvature properties were derived from elastic section properties

---
Layering Correction Equivalent Depths of Soil & Rock Layers

Layer No.	Top of Layer Below Pile Head ft	Equivalent Top Depth Below Grnd Surf ft	Same Layer Type As Layer Above	Layer is Rock or is Below Rock Layer	F0 Integral for Layer lbs	F1 Integral for Layer lbs
1	0.00	0.00	N.A.	No	0.00	8937920.
2	38.0000	1727.	No	No	8937920.	N.A.

Notes: The F0 integral of Layer n+1 equals the sum of the F0 and F1 integrals for Layer n. Layering correction equivalent depths are computed only for soil types with both shallow-depth and deep-depth expressions for peak lateral load transfer. These soil types are soft and stiff clays, non-liquefied sands, and cemented c-phi soil.

Computed Values of Pile Loading and Deflection
for Lateral Loading for Load Case Number 1

Pile-head conditions are Displacement and Moment (Loading Type 4)
Displacement of pile head = 0.250000 inches
Moment at pile head = 0.0 in-lbs
Axial load at pile head = 150000.0 lbs

Depth X feet	Deflect. y inches	Bending Moment in-lbs	Shear Force lbs	Soil Res. p lb/inch	Bending Stiffness lb-in^2
0.000	0.25000	0.000	19538.	0.000	1.609E+10
0.40000	0.23112	96615.	19393.	-60.43311	1.609E+10
0.80000	0.21238	191818.	18933.	-131.47260	1.609E+10
1.20000	0.19391	283950.	18121.	-206.85668	1.609E+10
1.60000	0.17585	371255.	16953.	-279.62233	1.609E+10
2.00000	0.15832	452038.	15453.	-345.48201	1.609E+10
2.40000	0.14143	524763.	13661.	-400.94833	1.609E+10
2.80000	0.12530	588139.	11628.	-446.08589	1.609E+10

3.20000	0.11001	641110.	9411.	-477.83105	1.609E+10
3.60000	0.09564	682934.	7074.	-496.00582	1.609E+10
4.00000	0.08225	713183.	4689.	-497.77400	1.609E+10
4.40000	0.06988	731811.	2342.	-480.05782	1.609E+10
4.80000	0.05856	739220.	93.58093	-456.77773	1.609E+10
5.20000	0.04829	735947.	-2011.	-420.06464	1.609E+10
5.60000	0.03908	722837.	-3898.	-366.30315	1.609E+10
6.00000	0.03091	701133.	-5495.	-299.02495	1.609E+10
6.40000	0.02373	672388.	-6877.	-276.67813	1.609E+10
6.80000	0.01753	637124.	-8132.	-246.59266	1.609E+10
7.20000	0.01223	596042.	-9226.	-209.25913	1.609E+10
7.60000	0.007789	550011.	-10132.	-167.94074	1.609E+10
8.00000	0.004135	499992.	-10781.	-102.49160	1.609E+10
8.40000	0.001197	447504.	-11102.	-31.14402	1.609E+10
8.80000	-0.001101	394202.	-11104.	30.01206	1.609E+10
9.20000	-0.002833	341508.	-10838.	80.76970	1.609E+10
9.60000	-0.004077	290600.	-10353.	121.27458	1.609E+10
10.00000	-0.004905	242425.	-9698.	151.96717	1.609E+10
10.40000	-0.005385	197699.	-8917.	173.52328	1.609E+10
10.80000	-0.005582	156928.	-8052.	186.79551	1.609E+10
11.20000	-0.005555	120427.	-7141.	192.75736	1.609E+10
11.60000	-0.005355	88342.	-6216.	192.45206	1.609E+10
12.00000	-0.005028	60672.	-5306.	186.94683	1.609E+10
12.40000	-0.004615	37296.	-4432.	177.29379	1.609E+10
12.80000	-0.004148	17997.	-3611.	164.49760	1.609E+10
13.20000	-0.003655	2484.	-2858.	149.49007	1.609E+10
13.60000	-0.003159	-9586.	-2179.	133.11157	1.609E+10
14.00000	-0.002676	-18586.	-1581.	116.09867	1.609E+10
14.40000	-0.002221	-24908.	-1065.	99.07750	1.609E+10
14.80000	-0.001800	-28941.	-629.00640	82.56220	1.609E+10
15.20000	-0.001422	-31066.	-270.15926	66.95744	1.609E+10
15.60000	-0.001088	-31641.	16.69321	52.56442	1.609E+10
16.00000	-0.000799	-30999.	237.86243	39.58942	1.609E+10
16.40000	-0.000554	-29438.	400.44709	28.15419	1.609E+10
16.80000	-0.000352	-27222.	511.95492	18.30741	1.609E+10
17.20000	-0.000188	-24578.	579.98076	10.03669	1.609E+10
17.60000	-6.016E-05	-21698.	611.94207	3.28052	1.609E+10
18.00000	3.694E-05	-18737.	614.87063	-2.06029	1.609E+10
18.40000	0.000107	-15820.	595.25731	-6.11192	1.609E+10
18.80000	0.000155	-13040.	558.94558	-9.01796	1.609E+10
19.20000	0.000184	-10466.	511.06809	-10.93099	1.609E+10
19.60000	0.000198	-8141.	456.02054	-12.00549	1.609E+10
20.00000	0.000200	-6090.	397.46634	-12.39209	1.609E+10
20.40000	0.000194	-4324.	338.36604	-12.23303	1.609E+10
20.80000	0.000181	-2839.	281.02542	-11.65889	1.609E+10
21.20000	0.000164	-1622.	227.15684	-10.78635	1.609E+10
21.60000	0.000145	-653.17401	177.94895	-9.71694	1.609E+10
22.00000	0.000125	92.03513	134.14040	-8.53662	1.609E+10
22.40000	0.000105	640.54072	96.09414	-7.31599	1.609E+10
22.80000	8.651E-05	1020.	63.86931	-6.11102	1.609E+10

23.20000	6.906E-05	1259.	37.28868	-4.96424	1.609E+10
23.60000	5.342E-05	1383.	15.99996	-3.90607	1.609E+10
24.00000	3.976E-05	1417.	-0.47007	-2.95644	1.609E+10
24.40000	2.813E-05	1383.	-12.66888	-2.12639	1.609E+10
24.80000	1.848E-05	1299.	-21.17942	-1.41966	1.609E+10
25.20000	1.068E-05	1182.	-26.58877	-0.83423	1.609E+10
25.60000	4.586E-06	1046.	-29.46391	-0.36375	1.609E+10
26.00000	-1.530E-08	900.60912	-30.33394	0.001232	1.609E+10
26.40000	-3.327E-06	755.51710	-29.67792	0.27211	1.609E+10
26.80000	-5.556E-06	616.53222	-27.91761	0.46135	1.609E+10
27.20000	-6.902E-06	488.04443	-25.41428	0.58170	1.609E+10
27.60000	-7.550E-06	372.85422	-22.46870	0.64562	1.609E+10
28.00000	-7.663E-06	272.45899	-19.32366	0.66482	1.609E+10
28.40000	-7.386E-06	187.32260	-16.16820	0.64996	1.609E+10
28.80000	-6.841E-06	117.12098	-13.14317	0.61047	1.609E+10
29.20000	-6.128E-06	60.95951	-10.34732	0.55446	1.609E+10
29.60000	-5.328E-06	17.55977	-7.84378	0.48868	1.609E+10
30.00000	-4.503E-06	-14.58457	-5.66637	0.41857	1.609E+10
30.40000	-3.699E-06	-37.08185	-3.82566	0.34839	1.609E+10
30.80000	-2.947E-06	-51.54423	-2.31444	0.28128	1.609E+10
31.20000	-2.270E-06	-59.51480	-1.11269	0.21945	1.609E+10
31.60000	-1.678E-06	-62.41653	-0.19175	0.16428	1.609E+10
32.00000	-1.175E-06	-61.51988	0.48212	0.11650	1.609E+10
32.40000	-7.603E-07	-57.92576	0.94492	0.07633	1.609E+10
32.80000	-4.286E-07	-52.56058	1.23265	0.04356	1.609E+10
33.20000	-1.721E-07	-46.18056	1.37968	0.01770	1.609E+10
33.60000	1.822E-08	-39.38270	1.41762	-0.001897	1.609E+10
34.00000	1.522E-07	-32.62009	1.37459	-0.01603	1.609E+10
34.40000	2.394E-07	-26.21976	1.27489	-0.02551	1.609E+10
34.80000	2.890E-07	-20.40164	1.13886	-0.03117	1.609E+10
35.20000	3.095E-07	-15.29718	0.98306	-0.03375	1.609E+10
35.60000	3.080E-07	-10.96712	0.82051	-0.03398	1.609E+10
36.00000	2.909E-07	-7.41751	0.66110	-0.03244	1.609E+10
36.40000	2.631E-07	-4.61380	0.51203	-0.02967	1.609E+10
36.80000	2.287E-07	-2.49268	0.37825	-0.02607	1.609E+10
37.20000	1.907E-07	-0.97176	0.26292	-0.02198	1.609E+10
37.60000	1.513E-07	0.04294	0.16785	-0.01763	1.609E+10
38.00000	1.120E-07	0.65139	0.07918	-0.01931	1.609E+10
38.40000	7.368E-08	0.81474	0.002354	-0.01270	1.609E+10
38.80000	3.649E-08	0.68532	-0.04322	-0.006289	1.609E+10
39.20000	2.704E-10	0.41086	-0.05842	-4.660E-05	1.609E+10
39.60000	-3.536E-08	0.13524	-0.04391	0.006094	1.609E+10
40.00000	-7.079E-08	0.000	0.000	0.01220	1.609E+10

Output Summary for Load Case No. 1:

Pile-head deflection = 0.25000000 inches
Computed slope at pile head = -0.00393363 radians
Maximum bending moment = 739220. inch-lbs
Maximum shear force = 19538. lbs

Depth of maximum bending moment = 4.80000000 feet below pile head
Depth of maximum shear force = 0.000000 feet below pile head
Number of iterations = 7
Number of zero deflection points = 5

Computed Values of Pile Loading and Deflection
for Lateral Loading for Load Case Number 2

Pile-head conditions are Displacement and Moment (Loading Type 4)
Displacement of pile head = 0.500000 inches
Moment at pile head = 0.0 in-lbs
Axial load at pile head = 150000.0 lbs

Depth X feet	Deflect. y inches	Bending Moment in-lbs	Shear Force lbs	Soil Res. p lb/inch	Bending Stiffness lb-in^2
0.000	0.50000	0.000	29610.	0.000	1.609E+10
0.40000	0.46542	147314.	29431.	-74.54587	1.609E+10
0.80000	0.43105	292880.	28861.	-163.11420	1.609E+10
1.20000	0.39710	434624.	27852.	-256.95216	1.609E+10
1.60000	0.36377	570355.	26399.	-348.51374	1.609E+10
2.00000	0.33126	697933.	24524.	-432.83848	1.609E+10
2.40000	0.29975	815389.	22269.	-506.78656	1.609E+10
2.80000	0.26940	920993.	19683.	-570.68566	1.609E+10
3.20000	0.24038	1013251.	16828.	-619.10031	1.609E+10
3.60000	0.21281	1091027.	13779.	-651.13283	1.609E+10
4.00000	0.18680	1153567.	10613.	-668.10075	1.609E+10
4.40000	0.16244	1200466.	7413.	-665.04434	1.609E+10
4.80000	0.13980	1231784.	4237.	-658.37130	1.609E+10
5.20000	0.11892	1247669.	1132.	-635.34792	1.609E+10
5.60000	0.09983	1248647.	-1804.	-588.00364	1.609E+10
6.00000	0.08253	1235810.	-4457.	-517.49375	1.609E+10
6.40000	0.06700	1210784.	-6900.	-500.41558	1.609E+10
6.80000	0.05320	1173968.	-9233.	-471.66204	1.609E+10
7.20000	0.04109	1126033.	-11401.	-431.62409	1.609E+10
7.60000	0.03059	1067912.	-13362.	-385.66273	1.609E+10
8.00000	0.02161	1000675.	-15112.	-343.27321	1.609E+10
8.40000	0.01407	925314.	-16630.	-289.47410	1.609E+10
8.80000	0.007858	843086.	-17839.	-214.25892	1.609E+10
9.20000	0.002851	755739.	-18549.	-81.25700	1.609E+10
9.60000	-0.001075	666358.	-18667.	31.96353	1.609E+10
10.00000	-0.004045	577570.	-18289.	125.34463	1.609E+10
10.40000	-0.006189	491547.	-17510.	199.43549	1.609E+10
10.80000	-0.007629	410012.	-16419.	255.28321	1.609E+10
11.20000	-0.008481	334271.	-15100.	294.32252	1.609E+10

11.60000	-0.008855	265240.	-13629.	318.26882	1.609E+10
12.00000	-0.008849	203485.	-12076.	329.01799	1.609E+10
12.40000	-0.008552	149266.	-10498.	328.55567	1.609E+10
12.80000	-0.008040	102585.	-8944.	318.87786	1.609E+10
13.20000	-0.007382	63229.	-7454.	301.92401	1.609E+10
13.60000	-0.006633	30816.	-6058.	279.52292	1.609E+10
14.00000	-0.005841	4837.	-4780.	253.35151	1.609E+10
14.40000	-0.005041	-15306.	-3632.	224.90574	1.609E+10
14.80000	-0.004263	-30265.	-2623.	195.48273	1.609E+10
15.20000	-0.003528	-40712.	-1755.	166.17289	1.609E+10
15.60000	-0.002852	-47323.	-1025.	137.86060	1.609E+10
16.00000	-0.002244	-50747.	-427.34921	111.23199	1.609E+10
16.40000	-0.001708	-51597.	47.89926	86.78820	1.609E+10
16.80000	-0.001246	-50437.	411.86180	64.86285	1.609E+10
17.20000	-0.000856	-47771.	677.07371	45.64211	1.609E+10
17.60000	-0.000535	-44043.	856.66205	29.18636	1.609E+10
18.00000	-0.000277	-39634.	963.79474	15.45225	1.609E+10
18.40000	-7.568E-05	-34860.	1011.	4.31428	1.609E+10
18.80000	7.579E-05	-29979.	1011.	-4.41478	1.609E+10
19.20000	0.000184	-25193.	974.08138	-10.96514	1.609E+10
19.60000	0.000257	-20655.	910.34092	-15.59339	1.609E+10
20.00000	0.000300	-16471.	828.35326	-18.56814	1.609E+10
20.40000	0.000319	-12712.	735.41023	-20.15812	1.609E+10
20.80000	0.000320	-9414.	637.53648	-20.62261	1.609E+10
21.20000	0.000308	-6590.	539.55237	-20.20411	1.609E+10
21.60000	0.000286	-4230.	445.16678	-19.12322	1.609E+10
22.00000	0.000258	-2309.	357.09039	-17.57528	1.609E+10
22.40000	0.000227	-792.67661	277.16094	-15.72866	1.609E+10
22.80000	0.000194	361.35362	206.47338	-13.72449	1.609E+10
23.20000	0.000162	1199.	145.50899	-11.67734	1.609E+10
23.60000	0.000132	1768.	94.25889	-9.67687	1.609E+10
24.00000	0.000105	2113.	52.33842	-7.79000	1.609E+10
24.40000	8.020E-05	2278.	19.09004	-6.06350	1.609E+10
24.80000	5.891E-05	2303.	-6.32670	-4.52681	1.609E+10
25.20000	4.092E-05	2223.	-24.85864	-3.19484	1.609E+10
25.60000	2.611E-05	2069.	-37.49613	-2.07079	1.609E+10
26.00000	1.426E-05	1867.	-45.22297	-1.14873	1.609E+10
26.40000	5.086E-06	1638.	-48.97840	-0.41603	1.609E+10
26.80000	-1.742E-06	1399.	-49.62979	0.14461	1.609E+10
27.20000	-6.565E-06	1163.	-47.95479	0.55330	1.609E+10
27.60000	-9.723E-06	940.03122	-44.63135	0.83147	1.609E+10
28.00000	-1.153E-05	735.65093	-40.23425	1.00066	1.609E+10
28.40000	-1.229E-05	554.16783	-35.23673	1.08164	1.609E+10
28.80000	-1.226E-05	397.48662	-30.01598	1.09367	1.609E+10
29.20000	-1.165E-05	265.91824	-24.86129	1.05412	1.609E+10
29.60000	-1.067E-05	158.57955	-19.98390	0.97813	1.609E+10
30.00000	-9.452E-06	73.74293	-15.52777	0.87859	1.609E+10
30.40000	-8.133E-06	9.13321	-11.58051	0.76610	1.609E+10
30.80000	-6.802E-06	-37.82756	-8.18407	0.64909	1.609E+10
31.20000	-5.524E-06	-69.82523	-5.34462	0.53401	1.609E+10

31.60000	-4.347E-06	-89.50422	-3.04164	0.42556	1.609E+10
32.00000	-3.297E-06	-99.35900	-1.23572	0.32690	1.609E+10
32.40000	-2.390E-06	-101.66058	0.12468	0.23993	1.609E+10
32.80000	-1.628E-06	-98.41237	1.09771	0.16550	1.609E+10
33.20000	-1.008E-06	-91.32991	1.74374	0.10368	1.609E+10
33.60000	-5.182E-07	-81.83898	2.12205	0.05394	1.609E+10
34.00000	-1.456E-07	-71.08761	2.28832	0.01534	1.609E+10
34.40000	1.252E-07	-59.96757	2.29312	-0.01334	1.609E+10
34.80000	3.100E-07	-49.14198	2.18088	-0.03343	1.609E+10
35.20000	4.245E-07	-39.07602	1.98954	-0.04630	1.609E+10
35.60000	4.830E-07	-30.06839	1.75054	-0.05328	1.609E+10
36.00000	4.985E-07	-22.28190	1.48922	-0.05560	1.609E+10
36.40000	4.821E-07	-15.77176	1.22528	-0.05437	1.609E+10
36.80000	4.430E-07	-10.51087	0.97356	-0.05051	1.609E+10
37.20000	3.889E-07	-6.41157	0.74474	-0.04483	1.609E+10
37.60000	3.257E-07	-3.34378	0.54609	-0.03794	1.609E+10
38.00000	2.576E-07	-1.14943	0.34846	-0.04440	1.609E+10
38.40000	1.879E-07	0.02215	0.16417	-0.03239	1.609E+10
38.80000	1.182E-07	0.44751	0.03753	-0.02038	1.609E+10
39.20000	4.921E-08	0.40322	-0.03174	-0.008482	1.609E+10
39.60000	-1.924E-08	0.16342	-0.04414	0.003316	1.609E+10
40.00000	-8.746E-08	0.000	0.000	0.01507	1.609E+10

Output Summary for Load Case No. 2:

```
Pile-head deflection             =     0.50000000 inches
Computed slope at pile head      =    -0.00720432 radians
Maximum bending moment           =       1248647. inch-lbs
Maximum shear force              =         29610. lbs
Depth of maximum bending moment  =     5.60000000 feet below pile head
Depth of maximum shear force     =       0.000000 feet below pile head
Number of iterations             =              8
Number of zero deflection points =              5
```

Computed Values of Pile Loading and Deflection
for Lateral Loading for Load Case Number 3

```
Pile-head conditions are Displacement and Pile-head Rotation (Loading Type 5)
Displacement of pile head                          =     0.250000 inches
Rotation of pile head                              =    0.000E+00 radians
Axial load on pile head                            =     150000.0 lbs
```

Depth X feet	Deflect. y inches	Bending Moment in-lbs	Shear Force lbs	Soil Res. p lb/inch	Bending Stiffness lb-in^2

0.000	0.25000	-1993010.	45734.	0.000	1.609E+10
0.40000	0.24857	-1774005.	45433.	-61.63665	1.609E+10
0.80000	0.24461	-1556040.	44957.	-136.87049	1.609E+10
1.20000	0.23841	-1340893.	44101.	-219.66455	1.609E+10
1.60000	0.23029	-1130520.	42847.	-302.98366	1.609E+10
2.00000	0.22056	-926884.	41203.	-382.10341	1.609E+10
2.40000	0.20949	-731854.	39198.	-453.20633	1.609E+10
2.80000	0.19738	-547107.	36871.	-516.31977	1.609E+10
3.20000	0.18449	-374139.	34271.	-567.11408	1.609E+10
3.60000	0.17106	-214158.	31459.	-604.49597	1.609E+10
4.00000	0.15732	-68057.	28501.	-628.17208	1.609E+10
4.40000	0.14348	63584.	25472.	-633.91183	1.609E+10
4.80000	0.12974	180607.	22419.	-638.04345	1.609E+10
5.20000	0.11626	282891.	19379.	-628.77145	1.609E+10
5.60000	0.10318	370627.	16435.	-597.86482	1.609E+10
6.00000	0.09063	444508.	13691.	-545.25667	1.609E+10
6.40000	0.07871	505731.	11066.	-548.64992	1.609E+10
6.80000	0.06753	554205.	8448.	-542.13499	1.609E+10
7.20000	0.05713	590069.	5885.	-525.59973	1.609E+10
7.60000	0.04758	613696.	3413.	-504.53261	1.609E+10
8.00000	0.03891	625567.	1024.	-490.78649	1.609E+10
8.40000	0.03114	625996.	-1280.	-469.12391	1.609E+10
8.80000	0.02426	615482.	-3460.	-439.46219	1.609E+10
9.20000	0.01826	594710.	-5479.	-401.72285	1.609E+10
9.60000	0.01312	564555.	-7297.	-355.70988	1.609E+10
10.00000	0.008780	526083.	-8803.	-272.02477	1.609E+10
10.40000	0.005196	481231.	-9858.	-167.44829	1.609E+10
10.80000	0.002303	432417.	-10445.	-77.05284	1.609E+10
11.20000	2.809E-05	381735.	-10632.	-0.97493	1.609E+10
11.60000	-0.001700	330948.	-10488.	61.09166	1.609E+10
12.00000	-0.002954	281498.	-10078.	109.81856	1.609E+10
12.40000	-0.003804	234518.	-9463.	146.16443	1.609E+10
12.80000	-0.004319	190855.	-8701.	171.29873	1.609E+10
13.20000	-0.004561	151098.	-7843.	186.53019	1.609E+10
13.60000	-0.004586	115606.	-6931.	193.24182	1.609E+10
14.00000	-0.004445	84541.	-6005.	192.83392	1.609E+10
14.40000	-0.004184	57901.	-5094.	186.67590	1.609E+10
14.80000	-0.003840	35550.	-4223.	176.06710	1.609E+10
15.20000	-0.003444	17248.	-3411.	162.20677	1.609E+10
15.60000	-0.003024	2679.	-2671.	146.17256	1.609E+10
16.00000	-0.002600	-8523.	-2011.	128.90699	1.609E+10
16.40000	-0.002189	-16752.	-1435.	111.21096	1.609E+10
16.80000	-0.001801	-22416.	-942.86629	93.74337	1.609E+10
17.20000	-0.001445	-25915.	-533.02053	77.02570	1.609E+10
17.60000	-0.001127	-27634.	-200.67742	61.45060	1.609E+10
18.00000	-0.000848	-27932.	60.30807	47.29335	1.609E+10
18.40000	-0.000609	-27133.	257.15304	34.72538	1.609E+10
18.80000	-0.000409	-25529.	397.68308	23.82880	1.609E+10
19.20000	-0.000246	-23370.	489.93959	14.61141	1.609E+10
19.60000	-0.000116	-20869.	541.85826	7.02137	1.609E+10

20.00000	-1.551E-05	-18203.	561.01648	0.96122	1.609E+10
20.40000	5.853E-05	-15510.	554.44501	-3.69933	1.609E+10
20.80000	0.000110	-12899.	528.49807	-7.11189	1.609E+10
21.20000	0.000144	-10449.	488.77473	-9.43950	1.609E+10
21.60000	0.000162	-8214.	440.08406	-10.84828	1.609E+10
22.00000	0.000169	-6228.	386.44641	-11.50074	1.609E+10
22.40000	0.000166	-4505.	331.12321	-11.55059	1.609E+10
22.80000	0.000158	-3047.	276.66825	-11.13897	1.609E+10
23.20000	0.000145	-1846.	224.99404	-10.39195	1.609E+10
23.60000	0.000129	-883.12269	177.44742	-9.41914	1.609E+10
24.00000	0.000112	-137.33071	134.88974	-8.31323	1.609E+10
24.40000	9.458E-05	416.95397	97.77735	-7.15026	1.609E+10
24.80000	7.796E-05	806.40698	66.23949	-5.99051	1.609E+10
25.20000	6.250E-05	1058.	40.15089	-4.87974	1.609E+10
25.60000	4.855E-05	1196.	19.19762	-3.85079	1.609E+10
26.00000	3.631E-05	1246.	2.93508	-2.92527	1.609E+10
26.40000	2.586E-05	1228.	-9.16249	-2.11538	1.609E+10
26.80000	1.717E-05	1161.	-17.66086	-1.42561	1.609E+10
27.20000	1.014E-05	1061.	-23.13284	-0.85439	1.609E+10
27.60000	4.627E-06	940.60796	-26.13290	-0.39564	1.609E+10
28.00000	4.622E-07	811.23690	-27.17868	-0.04010	1.609E+10
28.40000	-2.540E-06	680.76760	-26.73847	0.22352	1.609E+10
28.80000	-4.568E-06	555.30208	-25.22378	0.40759	1.609E+10
29.20000	-5.800E-06	439.10825	-22.98618	0.52474	1.609E+10
29.60000	-6.403E-06	334.91005	-20.31739	0.58726	1.609E+10
30.00000	-6.527E-06	244.17039	-17.45189	0.60670	1.609E+10
30.40000	-6.301E-06	167.35654	-14.57143	0.59350	1.609E+10
30.80000	-5.835E-06	104.18093	-11.81055	0.55687	1.609E+10
31.20000	-5.220E-06	53.81321	-9.26287	0.50466	1.609E+10
31.60000	-4.529E-06	15.06132	-6.98757	0.44338	1.609E+10
32.00000	-3.815E-06	-13.47824	-5.01564	0.37825	1.609E+10
32.40000	-3.121E-06	-33.29995	-3.35593	0.31329	1.609E+10
32.80000	-2.474E-06	-45.89629	-2.00054	0.25146	1.609E+10
33.20000	-1.893E-06	-52.68924	-0.92958	0.19478	1.609E+10
33.60000	-1.388E-06	-54.98319	-0.11527	0.14452	1.609E+10
34.00000	-9.616E-07	-53.93565	0.47469	0.10130	1.609E+10
34.40000	-6.123E-07	-50.54259	0.87442	0.06526	1.609E+10
34.80000	-3.353E-07	-45.63515	1.11781	0.03615	1.609E+10
35.20000	-1.237E-07	-39.88494	1.23695	0.01349	1.609E+10
35.60000	3.077E-08	-33.81531	1.26119	-0.003394	1.609E+10
36.00000	1.368E-07	-27.81661	1.21642	-0.01526	1.609E+10
36.40000	2.030E-07	-22.16354	1.12484	-0.02290	1.609E+10
36.80000	2.375E-07	-17.03327	1.00489	-0.02708	1.609E+10
37.20000	2.476E-07	-12.52324	0.87142	-0.02853	1.609E+10
37.60000	2.397E-07	-8.66795	0.73592	-0.02792	1.609E+10
38.00000	2.194E-07	-5.45418	0.57814	-0.03782	1.609E+10
38.40000	1.913E-07	-3.11059	0.40823	-0.03298	1.609E+10
38.80000	1.588E-07	-1.52612	0.26340	-0.02737	1.609E+10
39.20000	1.241E-07	-0.57190	0.14639	-0.02138	1.609E+10
39.60000	8.852E-08	-0.11021	0.05846	-0.01526	1.609E+10

40.00000	5.281E-08	0.000	0.000	-0.009102	1.609E+10

Output Summary for Load Case No. 3:

Pile-head deflection = 0.25000000 inches
Computed slope at pile head = 0.000000 radians
Maximum bending moment = -1993010. inch-lbs
Maximum shear force = 45734. lbs
Depth of maximum bending moment = 0.000000 feet below pile head
Depth of maximum shear force = 0.000000 feet below pile head
Number of iterations = 7
Number of zero deflection points = 4

Computed Values of Pile Loading and Deflection
for Lateral Loading for Load Case Number 4

Pile-head conditions are Displacement and Pile-head Rotation (Loading Type 5)
Displacement of pile head = 0.500000 inches
Rotation of pile head = 0.000E+00 radians
Axial load on pile head = 150000.0 lbs

Depth X feet	Deflect. y inches	Bending Moment in-lbs	Shear Force lbs	Soil Res. p lb/inch	Bending Stiffness lb-in^2
0.000	0.50000	-3437005.	71875.	0.000	1.609E+10
0.40000	0.49754	-3092553.	71500.	-76.42694	1.609E+10
0.80000	0.49065	-2749198.	70906.	-171.32254	1.609E+10
1.20000	0.47982	-2409200.	69833.	-275.78415	1.609E+10
1.60000	0.46554	-2075038.	68255.	-381.59577	1.609E+10
2.00000	0.44829	-1749222.	66181.	-482.58001	1.609E+10
2.40000	0.42854	-1434149.	63644.	-574.66146	1.609E+10
2.80000	0.40673	-1132008.	60684.	-658.42638	1.609E+10
3.20000	0.38330	-844794.	57358.	-727.57980	1.609E+10
3.60000	0.35866	-574162.	53738.	-780.54353	1.609E+10
4.00000	0.33320	-321390.	49889.	-823.35104	1.609E+10
4.40000	0.30728	-87520.	45871.	-850.88718	1.609E+10
4.80000	0.28123	126765.	41709.	-883.11268	1.609E+10
5.20000	0.25536	320676.	37424.	-902.43870	1.609E+10
5.60000	0.22996	493726.	33108.	-895.93025	1.609E+10
6.00000	0.20526	646027.	28892.	-860.75450	1.609E+10
6.40000	0.18148	778358.	24704.	-884.06231	1.609E+10
6.80000	0.15882	890153.	20438.	-893.47695	1.609E+10
7.20000	0.13744	981171.	16162.	-888.13016	1.609E+10
7.60000	0.11746	1051515.	11933.	-873.93331	1.609E+10
8.00000	0.09898	1101499.	7758.	-865.79054	1.609E+10

8.40000	0.08209	1131298.	3650.	-845.74452	1.609E+10
8.80000	0.06681	1141367.	-332.12140	-813.59863	1.609E+10
9.20000	0.05317	1132447.	-4131.	-769.28067	1.609E+10
9.60000	0.04115	1105559.	-7688.	-712.78701	1.609E+10
10.00000	0.03071	1062010.	-10944.	-644.07486	1.609E+10
10.40000	0.02180	1003395.	-13841.	-562.84500	1.609E+10
10.80000	0.01432	931595.	-16315.	-468.05045	1.609E+10
11.20000	0.008175	848812.	-18119.	-283.70420	1.609E+10
11.60000	0.003247	759310.	-19080.	-116.69688	1.609E+10
12.00000	-0.000594	666956.	-19307.	22.09476	1.609E+10
12.40000	-0.003480	574967.	-18934.	133.70917	1.609E+10
12.80000	-0.005543	485936.	-18085.	219.81969	1.609E+10
13.20000	-0.006909	401865.	-16879.	282.57957	1.609E+10
13.60000	-0.007700	324219.	-15422.	324.47480	1.609E+10
14.00000	-0.008027	253978.	-13808.	348.18919	1.609E+10
14.40000	-0.007990	191706.	-12117.	356.48456	1.609E+10
14.80000	-0.007678	137605.	-10416.	352.09814	1.609E+10
15.20000	-0.007170	91588.	-8761.	337.65812	1.609E+10
15.60000	-0.006530	53330.	-7193.	315.61724	1.609E+10
16.00000	-0.005814	22333.	-5744.	288.20404	1.609E+10
16.40000	-0.005065	-2029.	-4434.	257.39032	1.609E+10
16.80000	-0.004320	-20460.	-3277.	224.87327	1.609E+10
17.20000	-0.003604	-33706.	-2276.	192.07043	1.609E+10
17.60000	-0.002936	-42519.	-1431.	160.12521	1.609E+10
18.00000	-0.002330	-47634.	-734.79037	129.92101	1.609E+10
18.40000	-0.001791	-49745.	-177.93553	102.10184	1.609E+10
18.80000	-0.001324	-49493.	252.14283	77.09747	1.609E+10
19.20000	-0.000927	-47454.	569.53990	55.15130	1.609E+10
19.60000	-0.000599	-44134.	789.14194	36.34955	1.609E+10
20.00000	-0.000333	-39967.	925.94148	20.65026	1.609E+10
20.40000	-0.000125	-35316.	994.48910	7.91125	1.609E+10
20.80000	3.234E-05	-30475.	1008.	-2.08395	1.609E+10
21.20000	0.000146	-25675.	980.42661	-9.60271	1.609E+10
21.60000	0.000223	-21091.	921.51744	-14.94278	1.609E+10
22.00000	0.000270	-16847.	841.45897	-18.41492	1.609E+10
22.40000	0.000293	-13024.	748.47431	-20.32869	1.609E+10
22.80000	0.000297	-9666.	649.33058	-20.98120	1.609E+10
23.20000	0.000287	-6789.	549.41861	-20.64879	1.609E+10
23.60000	0.000268	-4387.	452.86658	-19.58122	1.609E+10
24.00000	0.000242	-2435.	362.67601	-17.99818	1.609E+10
24.40000	0.000213	-897.18061	280.86997	-16.08766	1.609E+10
24.80000	0.000182	270.24393	208.64533	-14.00594	1.609E+10
25.20000	0.000152	1115.	146.52203	-11.87877	1.609E+10
25.60000	0.000124	1686.	94.48447	-9.80355	1.609E+10
26.00000	9.747E-05	2030.	52.11098	-7.85207	1.609E+10
26.40000	7.425E-05	2193.	18.68925	-6.07365	1.609E+10
26.80000	5.417E-05	2216.	-6.68398	-4.49852	1.609E+10
27.20000	3.727E-05	2135.	-25.01906	-3.14110	1.609E+10
27.60000	2.343E-05	1981.	-37.36542	-2.00322	1.609E+10
28.00000	1.242E-05	1780.	-44.75814	-1.07708	1.609E+10

28.40000	3.954E-06	1554.	-48.17821	-0.34795	1.609E+10
28.80000	-2.282E-06	1319.	-48.52464	0.20360	1.609E+10
29.20000	-6.628E-06	1089.	-46.59685	0.59964	1.609E+10
29.60000	-9.414E-06	873.15918	-43.08564	0.86336	1.609E+10
30.00000	-1.095E-05	676.52435	-38.57098	1.01774	1.609E+10
30.40000	-1.152E-05	503.19302	-33.52518	1.08467	1.609E+10
30.80000	-1.136E-05	354.74451	-28.31979	1.08424	1.609E+10
31.20000	-1.070E-05	231.20058	-23.23530	1.03430	1.609E+10
31.60000	-9.706E-06	131.43733	-18.47223	0.95031	1.609E+10
32.00000	-8.524E-06	53.54095	-14.16304	0.84519	1.609E+10
32.40000	-7.266E-06	-4.89379	-10.38392	0.72944	1.609E+10
32.80000	-6.015E-06	-46.52112	-7.16617	0.61129	1.609E+10
33.20000	-4.830E-06	-74.05435	-4.50654	0.49689	1.609E+10
33.60000	-3.752E-06	-90.12336	-2.37658	0.39059	1.609E+10
34.00000	-2.802E-06	-97.17374	-0.73063	0.29522	1.609E+10
34.40000	-1.992E-06	-97.40136	0.48749	0.21233	1.609E+10
34.80000	-1.321E-06	-92.71601	1.33900	0.14247	1.609E+10
35.20000	-7.833E-07	-84.72828	1.88595	0.08543	1.609E+10
35.60000	-3.666E-07	-74.75409	2.18803	0.04044	1.609E+10
36.00000	-5.698E-08	-63.83218	2.30033	0.006356	1.609E+10
36.40000	1.612E-07	-52.75010	2.27195	-0.01818	1.609E+10
36.80000	3.039E-07	-42.07560	2.14516	-0.03465	1.609E+10
37.20000	3.863E-07	-32.19035	1.95515	-0.04452	1.609E+10
37.60000	4.226E-07	-23.32395	1.73015	-0.04923	1.609E+10
38.00000	4.254E-07	-15.58675	1.43602	-0.07333	1.609E+10
38.40000	4.060E-07	-9.53568	1.09208	-0.06998	1.609E+10
38.80000	3.729E-07	-5.09487	0.76987	-0.06428	1.609E+10
39.20000	3.325E-07	-2.13389	0.47805	-0.05732	1.609E+10
39.60000	2.891E-07	-0.49298	0.22091	-0.04983	1.609E+10
40.00000	2.450E-07	0.000	0.000	-0.04222	1.609E+10

Output Summary for Load Case No. 4:

```
Pile-head deflection             =     0.50000000 inches
Computed slope at pile head      =       0.000000 radians
Maximum bending moment           =      -3437005. inch-lbs
Maximum shear force              =         71875. lbs
Depth of maximum bending moment  =       0.000000 feet below pile head
Depth of maximum shear force     =       0.000000 feet below pile head
Number of iterations             =              8
Number of zero deflection points =              4
```

Summary of Pile-head Responses for Conventional Analyses

Definitions of Pile-head Loading Conditions:

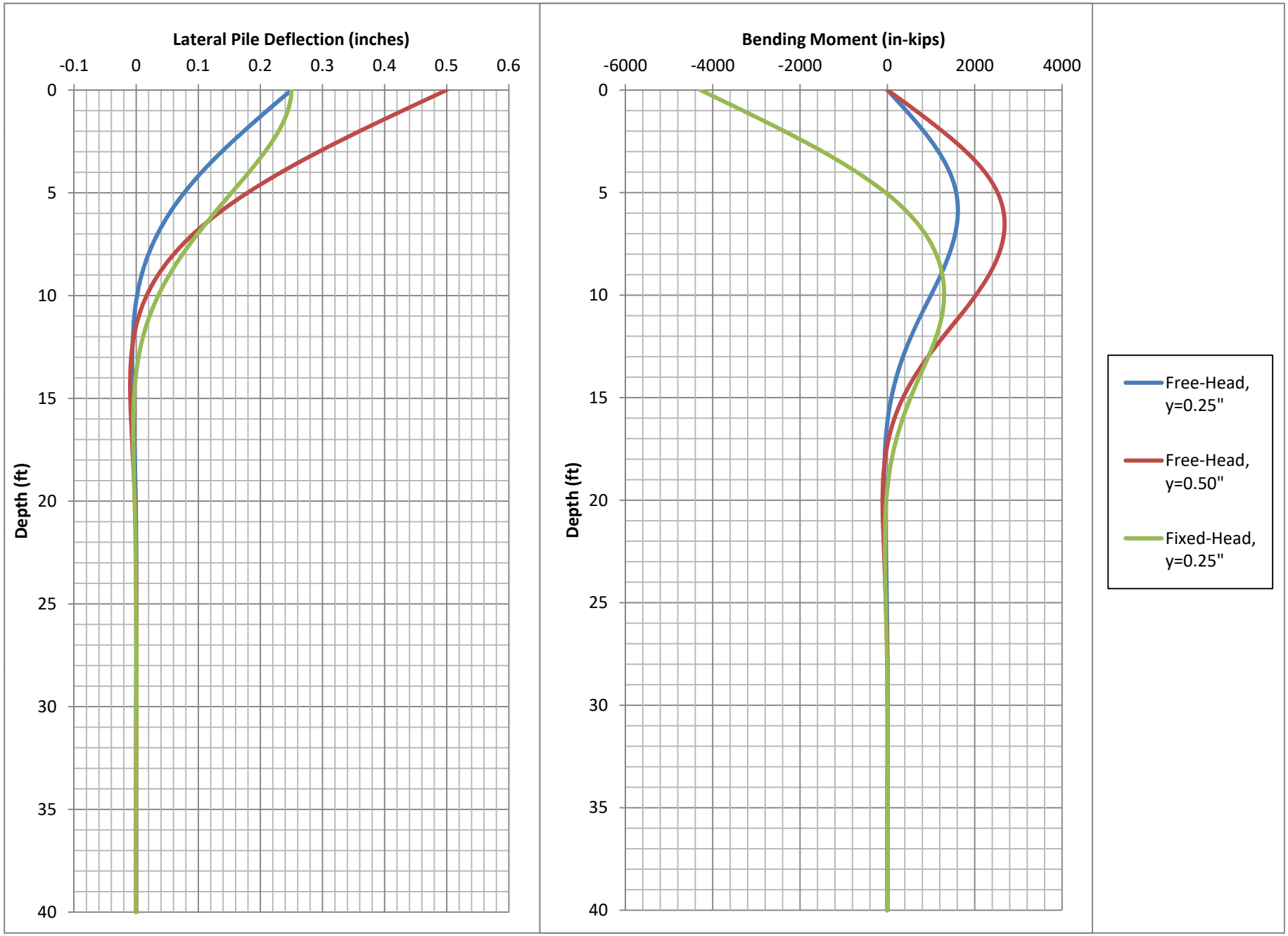
Load Type 1: Load 1 = Shear, V, lbs, and Load 2 = Moment, M, in-lbs

Load Type 2: Load 1 = Shear, V, lbs, and Load 2 = Slope, S, radians
Load Type 3: Load 1 = Shear, V, lbs, and Load 2 = Rot. Stiffness, R, in-lbs/rad.
Load Type 4: Load 1 = Top Deflection, y, inches, and Load 2 = Moment, M, in-lbs
Load Type 5: Load 1 = Top Deflection, y, inches, and Load 2 = Slope, S, radians

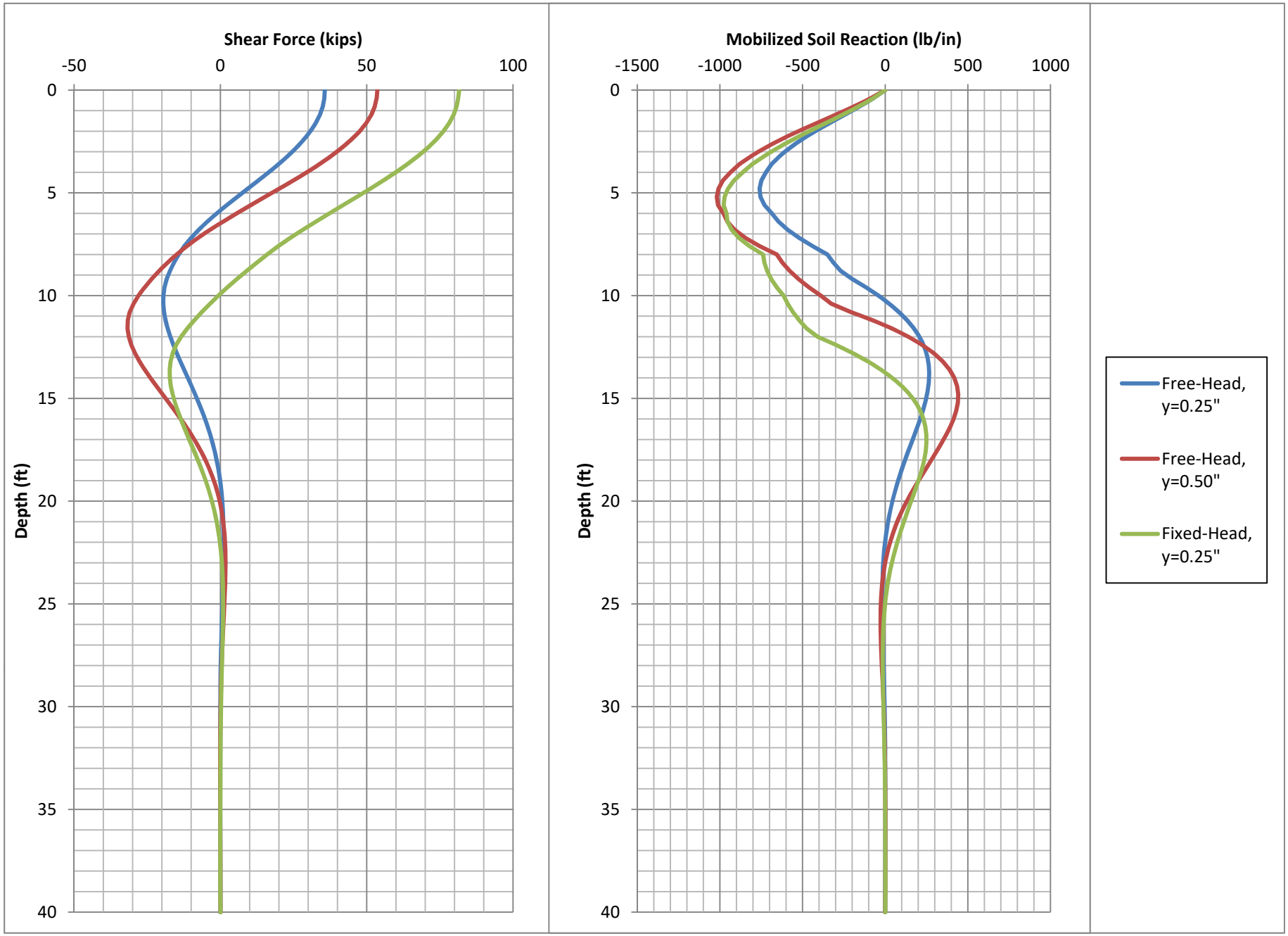
Load Case No.	Load Type	Pile-head Deflection inches	Pile-head Rotation radians	Max Shear in Pile lbs	Max Moment in Pile in-lbs
1	4	0.250000	-0.003934	19538.	739220.
2	4	0.500000	-0.007204	29610.	1248647.
3	5	0.250000	0.0000	45734.	-1993010.
4	5	0.500000	0.0000	71875.	-3437005.

Maximum pile-head deflection = 0.5000000000 inches
Maximum pile-head rotation = -0.0072043247 radians = -0.412777 deg.

The analysis ended normally.



The analyses were performed for 24-Inch CIDH piles
This may be used for vertical load of 150 kips.



The analyses were performed for 24-Inch CIDH piles
This may be used for vertical load of 150 kips.

==

LPile for Windows, Version 2019-11.004

Analysis of Individual Piles and Drilled Shafts
Subjected to Lateral Loading Using the p-y Method

==

This copy of LPile is being used by:

LOR Geotechnical Group, Inc.
Riverside, CA
Serial Number of Security Device: 562484320

This copy of LPile is licensed for exclusive use by:

Lor Geotechnical Group, Inc., Ri

Use of this program by any entity other than Lor Geotechnical Group, Inc., Ri
is a violation of the software license agreement.

Files Used for Analysis

Path to file locations on this computer:
\\lor_server\Common\Clarissa\13613.1_Proposed Hotel Murrieta\13613.1 CIDH capaci
ty\13613.1_CIDH lateral capacity_cmtp\

Name of the input data file:
13613.1_CIDH 24 in. lateral capacity_cmtp.lp11d

Name of the output report file:
13613.1_CIDH 24 in. lateral capacity_cmtp.lp11o

Name of the plot output file:
13613.1_CIDH 24 in. lateral capacity_cmtp.lp11p

Name of the runtime message file:
13613.1_CIDH 24 in. lateral capacity_cmtp.lp11r

Date and Time of Analysis

Date: February 28, 2020 Time: 8:41:12

Problem Title

Project Name: Hotel Murrieta

Job Number: 13613.1

Client: Hotel Murrieta

Engineer: C. Pappo

Description: 24-inch CIDH Lateral Capacities

Program Options and Settings

Computational Options:
- Conventional Analysis

Engineering Units Used for Data Input and Computations:
- US Customary System Units (pounds, feet, inches)

Analysis Control Options:

- Maximum number of iterations allowed	=	500
- Deflection tolerance for convergence	=	1.0000E-05 in
- Maximum allowable deflection	=	100.0000 in
- Number of pile increments	=	100

Loading Type and Number of Cycles of Loading:
- Static loading specified

- Use of p-y modification factors for p-y curves not selected
- Analysis uses layering correction (Method of Georgiadis)

```
 - No distributed lateral loads are entered
 - Loading by lateral soil movements acting on pile not selected
 - Input of shear resistance at the pile tip not selected
 - Input of moment resistance at the pile tip not selected
 - Input of side resistance moment along pile not selected
 - Computation of pile-head foundation stiffness matrix not selected
 - Push-over analysis of pile not selected
 - Buckling analysis of pile not selected

Output Options:
 - Output files use decimal points to denote decimal symbols.
 - Values of pile-head deflection, bending moment, shear force, and
   soil reaction are printed for full length of pile.
 - Printing Increment (nodal spacing of output points) = 1
 - No p-y curves to be computed and reported for user-specified depths
 - Print using narrow report formats
   (Note: Some output information is omitted from the narrow report formats)



--------------------------------------------------------------------------------
                     Pile Structural Properties and Geometry
--------------------------------------------------------------------------------

Number of pile sections defined                        =            1
Total length of pile                                   =       40.000 ft
Depth of ground surface below top of pile              =       0.0000 ft

Pile diameters used for p-y curve computations are defined using 2 points.

p-y curves are computed using pile diameter values interpolated with depth over
the length of the pile. A summary of values of pile diameter vs. depth follows.

            Depth Below          Pile
Point        Pile Head         Diameter
 No.            feet            inches
-----      -------------     -------------
  1             0.000           24.0000
  2            40.000           24.0000


Input Structural Properties for Pile Sections:
----------------------------------------------

Pile Section No. 1:

   Section 1 is an elastic pile
   Cross-sectional Shape                               =   Circular Pile
   Length of section                                   =    40.000000 ft
```

Width of top of section	=	24.000000 in
Width of bottom of section	=	24.000000 in
Top Area	=	452.389342 sq. in
Bottom Area	=	452.389342 sq. in
Moment of Inertia at Top	=	16286. in^4
Moment of Inertia at Bottom	=	16286. in^4
Elastic Modulus	=	3122000. psi

Ground Slope and Pile Batter Angles

Ground Slope Angle	=	0.000 degrees
	=	0.000 radians
Pile Batter Angle	=	0.000 degrees
	=	0.000 radians

Soil and Rock Layering Information

The soil profile is modelled using 2 layers

Layer 1 is sand, p-y criteria by Reese et al., 1974

Distance from top of pile to top of layer	=	0.0000 ft
Distance from top of pile to bottom of layer	=	38.000000 ft
Effective unit weight at top of layer	=	117.000000 pcf
Effective unit weight at bottom of layer	=	117.000000 pcf
Friction angle at top of layer	=	40.000000 deg.
Friction angle at bottom of layer	=	40.000000 deg.
Subgrade k at top of layer	=	0.0000 pci
Subgrade k at bottom of layer	=	0.0000 pci

NOTE: Default values for subgrade k will be computed for this layer.

Layer 2 is soft clay, p-y criteria by Matlock, 1970

Distance from top of pile to top of layer	=	38.000000 ft
Distance from top of pile to bottom of layer	=	68.000000 ft
Effective unit weight at top of layer	=	110.000000 pcf
Effective unit weight at bottom of layer	=	110.000000 pcf
Undrained cohesion at top of layer	=	384.000000 psf
Undrained cohesion at bottom of layer	=	384.000000 psf
Epsilon-50 at top of layer	=	0.0000

Epsilon-50 at bottom of layer = 0.0000

NOTE: Default values for Epsilon-50 will be computed for this layer.

(Depth of the lowest soil layer extends 28.000 ft below the pile tip)

Static Loading Type

Static loading criteria were used when computing p-y curves for all analyses.

Pile-head Loading and Pile-head Fixity Conditions

Number of loads specified = 4

Load No.	Load Type	Condition 1	Condition 2	Axial Thrust Force, lbs
1	4	y = 0.250000 in	M = 0.0000 in-lbs	150000.
2	4	y = 0.500000 in	M = 0.0000 in-lbs	150000.
3	5	y = 0.250000 in	S = 0.0000 in/in	150000.
4	5	y = 0.500000 in	S = 0.0000 in/in	150000.

V = shear force applied normal to pile axis
M = bending moment applied to pile head
y = lateral deflection normal to pile axis
S = pile slope relative to original pile batter angle
R = rotational stiffness applied to pile head
Values of top y vs. pile lengths can be computed only for load types with specified shear loading (Load Types 1, 2, and 3).
Thrust force is assumed to be acting axially for all pile batter angles.

Computations of Nominal Moment Capacity and Nonlinear Bending Stiffness

---

Axial thrust force values were determined from pile-head loading conditions

Number of Pile Sections Analyzed = 1

Pile Section No. 1:

Moment-curvature properties were derived from elastic section properties

---
Layering Correction Equivalent Depths of Soil & Rock Layers

Layer No.	Top of Layer Below Pile Head ft	Equivalent Top Depth Below Grnd Surf ft	Same Layer Type As Layer Above	Layer is Rock or is Below Rock Layer	F0 Integral for Layer lbs	F1 Integral for Layer lbs
1	0.00	0.00	N.A.	No	0.00	9393572.
2	38.0000	1363.	No	No	9393572.	N.A.

Notes: The F0 integral of Layer n+1 equals the sum of the F0 and F1 integrals for Layer n. Layering correction equivalent depths are computed only for soil types with both shallow-depth and deep-depth expressions for peak lateral load transfer. These soil types are soft and stiff clays, non-liquefied sands, and cemented c-phi soil.

Computed Values of Pile Loading and Deflection
for Lateral Loading for Load Case Number 1

Pile-head conditions are Displacement and Moment (Loading Type 4)
Displacement of pile head = 0.250000 inches
Moment at pile head = 0.0 in-lbs
Axial load at pile head = 150000.0 lbs

Depth X feet	Deflect. y inches	Bending Moment in-lbs	Shear Force lbs	Soil Res. p lb/inch	Bending Stiffness lb-in^2
0.000	0.25000	0.000	35678.	0.000	5.084E+10
0.40000	0.23431	173606.	35504.	-72.31889	5.084E+10
0.80000	0.21870	345535.	34957.	-155.47296	5.084E+10
1.20000	0.20324	513858.	33998.	-244.44422	5.084E+10
1.60000	0.18802	676514.	32606.	-335.21148	5.084E+10
2.00000	0.17311	831400.	30789.	-422.07446	5.084E+10
2.40000	0.15857	976506.	28567.	-503.93870	5.084E+10
2.80000	0.14447	1109934.	25978.	-574.77634	5.084E+10

3.20000	0.13088	1230044.	23072.	-636.04766	5.084E+10
3.60000	0.11784	1335416.	19896.	-687.16339	5.084E+10
4.00000	0.10541	1424865.	16516.	-721.15758	5.084E+10
4.40000	0.09363	1497602.	12986.	-749.45928	5.084E+10
4.80000	0.08252	1552969.	9363.	-760.38713	5.084E+10
5.20000	0.07212	1590711.	5727.	-754.42983	5.084E+10
5.60000	0.06244	1610964.	2164.	-730.27049	5.084E+10
6.00000	0.05348	1614281.	-1235.	-685.81980	5.084E+10
6.40000	0.04526	1601687.	-4431.	-645.80379	5.084E+10
6.80000	0.03777	1574105.	-7396.	-589.62362	5.084E+10
7.20000	0.03099	1532832.	-10057.	-519.28262	5.084E+10
7.60000	0.02490	1479489.	-12354.	-437.92463	5.084E+10
8.00000	0.01948	1415957.	-14245.	-349.87681	5.084E+10
8.40000	0.01471	1344267.	-15836.	-313.07384	5.084E+10
8.80000	0.01054	1265272.	-17233.	-269.17581	5.084E+10
9.20000	0.006951	1179989.	-18355.	-198.14762	5.084E+10
9.60000	0.003894	1090062.	-19109.	-115.81853	5.084E+10
10.00000	0.001330	997391.	-19485.	-41.21540	5.084E+10
10.40000	-0.000781	903703.	-19524.	25.17837	5.084E+10
10.80000	-0.002483	810534.	-19264.	83.10298	5.084E+10
11.20000	-0.003818	719224.	-18747.	132.50094	5.084E+10
11.60000	-0.004827	630919.	-18012.	173.49376	5.084E+10
12.00000	-0.005550	546567.	-17101.	206.35748	5.084E+10
12.40000	-0.006025	466933.	-16050.	231.49765	5.084E+10
12.80000	-0.006289	392601.	-14895.	249.42453	5.084E+10
13.20000	-0.006375	323989.	-13671.	260.72903	5.084E+10
13.60000	-0.006314	261363.	-12407.	266.05980	5.084E+10
14.00000	-0.006135	204848.	-11130.	266.10199	5.084E+10
14.40000	-0.005862	154451.	-9863.	261.55784	5.084E+10
14.80000	-0.005520	110069.	-8628.	253.12946	5.084E+10
15.20000	-0.005128	71512.	-7441.	241.50377	5.084E+10
15.60000	-0.004703	38514.	-6316.	227.33984	5.084E+10
16.00000	-0.004261	10752.	-5263.	211.25843	5.084E+10
16.40000	-0.003815	-12144.	-4291.	193.83393	5.084E+10
16.80000	-0.003373	-30573.	-3404.	175.58825	5.084E+10
17.20000	-0.002946	-44954.	-2606.	156.98691	5.084E+10
17.60000	-0.002539	-55715.	-1897.	138.43678	5.084E+10
18.00000	-0.002157	-63283.	-1276.	120.28558	5.084E+10
18.40000	-0.001804	-68075.	-740.56581	102.82266	5.084E+10
18.80000	-0.001481	-70494.	-286.71665	86.28116	5.084E+10
19.20000	-0.001191	-70920.	90.37641	70.84095	5.084E+10
19.60000	-0.000933	-69709.	396.31277	56.63254	5.084E+10
20.00000	-0.000706	-67188.	637.21018	43.74138	5.084E+10
20.40000	-0.000510	-63655.	819.50010	32.21275	5.084E+10
20.80000	-0.000342	-59375.	949.74666	22.05665	5.084E+10
21.20000	-0.000202	-54583.	1034.	13.25295	5.084E+10
21.60000	-8.601E-05	-49483.	1080.	5.75637	5.084E+10
22.00000	7.316E-06	-44246.	1093.	-0.49870	5.084E+10
22.40000	8.059E-05	-39017.	1078.	-5.59356	5.084E+10
22.80000	0.000136	-33915.	1042.	-9.62106	5.084E+10

23.20000	0.000176	-29032.	988.06746	-12.68164	5.084E+10
23.60000	0.000203	-24440.	921.91963	-14.87996	5.084E+10
24.00000	0.000219	-20188.	847.03531	-16.32184	5.084E+10
24.40000	0.000226	-16312.	766.79463	-17.11177	5.084E+10
24.80000	0.000226	-12828.	684.08466	-17.35071	5.084E+10
25.20000	0.000219	-9743.	601.32029	-17.13444	5.084E+10
25.60000	0.000209	-7053.	520.47235	-16.55220	5.084E+10
26.00000	0.000195	-4743.	443.10112	-15.68581	5.084E+10
26.40000	0.000179	-2795.	370.39360	-14.60899	5.084E+10
26.80000	0.000161	-1182.	303.20305	-13.38707	5.084E+10
27.20000	0.000143	121.40554	242.08950	-12.07691	5.084E+10
27.60000	0.000125	1147.	187.36000	-10.72705	5.084E+10
28.00000	0.000108	1925.	139.10790	-9.37800	5.084E+10
28.40000	9.163E-05	2487.	97.25015	-8.06273	5.084E+10
28.80000	7.629E-05	2864.	61.56225	-6.80723	5.084E+10
29.20000	6.224E-05	3083.	31.71026	-5.63110	5.084E+10
29.60000	4.959E-05	3172.	7.27974	-4.54828	5.084E+10
30.00000	3.838E-05	3156.	-12.19866	-3.56772	5.084E+10
30.40000	2.860E-05	3058.	-27.22703	-2.69410	5.084E+10
30.80000	2.021E-05	2898.	-38.32121	-1.92848	5.084E+10
31.20000	1.313E-05	2693.	-45.99513	-1.26899	5.084E+10
31.60000	7.266E-06	2458.	-50.74806	-0.71141	5.084E+10
32.00000	2.519E-06	2207.	-53.05480	-0.24974	5.084E+10
32.40000	-1.228E-06	1950.	-53.35824	0.12330	5.084E+10
32.80000	-4.092E-06	1696.	-52.06433	0.41583	5.084E+10
33.20000	-6.187E-06	1451.	-49.53898	0.63640	5.084E+10
33.60000	-7.624E-06	1221.	-46.10669	0.79372	5.084E+10
34.00000	-8.508E-06	1009.	-42.05058	0.89633	5.084E+10
34.40000	-8.936E-06	817.24586	-37.61361	0.95241	5.084E+10
34.80000	-8.993E-06	647.68080	-33.00075	0.96962	5.084E+10
35.20000	-8.756E-06	500.41173	-28.38176	0.95496	5.084E+10
35.60000	-8.293E-06	375.11094	-23.89456	0.91470	5.084E+10
36.00000	-7.659E-06	270.85942	-19.64886	0.85434	5.084E+10
36.40000	-6.903E-06	186.27345	-15.72990	0.77856	5.084E+10
36.80000	-6.063E-06	119.61286	-12.20227	0.69128	5.084E+10
37.20000	-5.168E-06	68.87134	-9.11356	0.59568	5.084E+10
37.60000	-4.242E-06	31.84956	-6.49781	0.49422	5.084E+10
38.00000	-3.302E-06	6.21241	-3.94585	0.56910	5.084E+10
38.40000	-2.359E-06	-6.31311	-1.60430	0.40655	5.084E+10
38.80000	-1.419E-06	-9.47138	-0.04182	0.24449	5.084E+10
39.20000	-4.825E-07	-6.99604	0.74454	0.08317	5.084E+10
39.60000	4.503E-07	-2.60407	0.75789	-0.07761	5.084E+10
40.00000	1.382E-06	0.000	0.000	-0.23818	5.084E+10

Output Summary for Load Case No. 1:

Pile-head deflection = 0.25000000 inches
Computed slope at pile head = -0.00326877 radians
Maximum bending moment = 1614281. inch-lbs
Maximum shear force = 35678. lbs

Depth of maximum bending moment = 6.00000000 feet below pile head
Depth of maximum shear force = 0.000000 feet below pile head
Number of iterations = 7
Number of zero deflection points = 4

Computed Values of Pile Loading and Deflection
for Lateral Loading for Load Case Number 2

Pile-head conditions are Displacement and Moment (Loading Type 4)
Displacement of pile head = 0.500000 inches
Moment at pile head = 0.0 in-lbs
Axial load at pile head = 150000.0 lbs

Depth X feet	Deflect. y inches	Bending Moment in-lbs	Shear Force lbs	Soil Res. p lb/inch	Bending Stiffness lb-in^2
0.000	0.50000	0.000	53618.	0.000	5.084E+10
0.40000	0.47146	261645.	53408.	-87.42709	5.084E+10
0.80000	0.44305	521259.	52743.	-189.41774	5.084E+10
1.20000	0.41487	776472.	51569.	-299.87304	5.084E+10
1.60000	0.38704	1024724.	49857.	-413.52487	5.084E+10
2.00000	0.35967	1263379.	47607.	-524.11476	5.084E+10
2.40000	0.33288	1489872.	44837.	-629.76002	5.084E+10
2.80000	0.30676	1701754.	41589.	-723.56353	5.084E+10
3.20000	0.28142	1896849.	37915.	-807.58284	5.084E+10
3.60000	0.25693	2073209.	33861.	-881.23304	5.084E+10
4.00000	0.23339	2229124.	29501.	-935.63943	5.084E+10
4.40000	0.21085	2363331.	24898.	-982.44294	5.084E+10
4.80000	0.18938	2474742.	20119.	-1009.	5.084E+10
5.20000	0.16904	2562742.	15252.	-1019.	5.084E+10
5.60000	0.14986	2627093.	10380.	-1011.	5.084E+10
6.00000	0.13186	2667965.	5603.	-978.90345	5.084E+10
6.40000	0.11508	2686102.	960.15851	-955.76791	5.084E+10
6.80000	0.09951	2682035.	-3520.	-910.79489	5.084E+10
7.20000	0.08516	2656802.	-7732.	-844.47520	5.084E+10
7.60000	0.07201	2611931.	-11579.	-758.49674	5.084E+10
8.00000	0.06005	2549406.	-14974.	-655.97058	5.084E+10
8.40000	0.04924	2471595.	-18041.	-621.75073	5.084E+10
8.80000	0.03955	2379291.	-20919.	-577.59392	5.084E+10
9.20000	0.03094	2273517.	-23563.	-523.88828	5.084E+10
9.60000	0.02336	2155518.	-25927.	-461.10828	5.084E+10
10.00000	0.01676	2026749.	-27969.	-389.68459	5.084E+10
10.40000	0.01108	1888864.	-29685.	-325.63818	5.084E+10
10.80000	0.006246	1743348.	-30968.	-209.01073	5.084E+10
11.20000	0.002207	1592897.	-31654.	-76.59107	5.084E+10

11.60000	-0.001110	1440574.	-31742.	39.89722	5.084E+10
12.00000	-0.003774	1289072.	-31309.	140.33676	5.084E+10
12.40000	-0.005855	1140715.	-30433.	224.93807	5.084E+10
12.80000	-0.007418	997464.	-29187.	294.19546	5.084E+10
13.20000	-0.008529	860923.	-27644.	348.84191	5.084E+10
13.60000	-0.009251	732361.	-25871.	389.80408	5.084E+10
14.00000	-0.009640	612731.	-23932.	418.15850	5.084E+10
14.40000	-0.009752	502693.	-21884.	435.08996	5.084E+10
14.80000	-0.009636	402645.	-19779.	441.85264	5.084E+10
15.20000	-0.009337	312750.	-17663.	439.73472	5.084E+10
15.60000	-0.008897	232965.	-15576.	430.02675	5.084E+10
16.00000	-0.008351	163073.	-13550.	413.99410	5.084E+10
16.40000	-0.007731	102708.	-11614.	392.85361	5.084E+10
16.80000	-0.007065	51387.	-9788.	367.75439	5.084E+10
17.20000	-0.006375	8536.	-8090.	339.76275	5.084E+10
17.60000	-0.005682	-26488.	-6531.	309.85099	5.084E+10
18.00000	-0.005001	-54371.	-5118.	278.88987	5.084E+10
18.40000	-0.004344	-75825.	-3855.	247.64433	5.084E+10
18.80000	-0.003721	-91568.	-2740.	216.77227	5.084E+10
19.20000	-0.003140	-102310.	-1771.	186.82582	5.084E+10
19.60000	-0.002606	-108740.	-943.21191	158.25486	5.084E+10
20.00000	-0.002121	-111518.	-248.01065	131.41234	5.084E+10
20.40000	-0.001686	-111259.	323.12536	106.56100	5.084E+10
20.80000	-0.001302	-108538.	780.18666	83.88121	5.084E+10
21.20000	-0.000966	-103877.	1134.	63.47941	5.084E+10
21.60000	-0.000678	-97747.	1395.	45.39713	5.084E+10
22.00000	-0.000435	-90564.	1575.	29.62001	5.084E+10
22.40000	-0.000232	-82692.	1685.	16.08684	5.084E+10
22.80000	-6.651E-05	-74444.	1735.	4.69821	5.084E+10
23.20000	6.504E-05	-66083.	1735.	-4.67523	5.084E+10
23.60000	0.000167	-57825.	1694.	-12.18509	5.084E+10
24.00000	0.000242	-49843.	1622.	-17.99832	5.084E+10
24.40000	0.000295	-42273.	1525.	-22.29090	5.084E+10
24.80000	0.000329	-35214.	1411.	-25.24245	5.084E+10
25.20000	0.000346	-28734.	1286.	-27.03151	5.084E+10
25.60000	0.000351	-22875.	1154.	-27.83166	5.084E+10
26.00000	0.000345	-17655.	1020.	-27.80838	5.084E+10
26.40000	0.000332	-13075.	888.66837	-27.11660	5.084E+10
26.80000	0.000312	-9119.	761.43116	-25.89891	5.084E+10
27.20000	0.000288	-5759.	640.99134	-24.28435	5.084E+10
27.60000	0.000262	-2958.	528.97820	-22.38779	5.084E+10
28.00000	0.000234	-672.54228	426.50445	-20.30961	5.084E+10
28.40000	0.000206	1145.	334.23504	-18.13598	5.084E+10
28.80000	0.000179	2544.	252.45454	-15.93923	5.084E+10
29.20000	0.000152	3577.	181.13154	-13.77869	5.084E+10
29.60000	0.000128	4291.	119.97905	-11.70152	5.084E+10
30.00000	0.000105	4735.	68.51017	-9.74385	5.084E+10
30.40000	8.421E-05	4955.	26.08842	-7.93188	5.084E+10
30.80000	6.584E-05	4992.	-8.02748	-6.28308	5.084E+10
31.20000	4.973E-05	4883.	-34.64468	-4.80742	5.084E+10

31.60000	3.583E-05	4664.	-54.60283	-3.50848	5.084E+10
32.00000	2.405E-05	4363.	-68.74627	-2.38462	5.084E+10
32.40000	1.425E-05	4007.	-77.90146	-1.43004	5.084E+10
32.80000	6.255E-06	3618.	-82.85915	-0.63567	5.084E+10
33.20000	-9.596E-08	3214.	-84.36106	0.009871	5.084E+10
33.60000	-4.991E-06	2810.	-83.09045	0.51955	5.084E+10
34.00000	-8.612E-06	2417.	-79.66617	0.90724	5.084E+10
34.40000	-1.114E-05	2046.	-74.63963	1.18715	5.084E+10
34.80000	-1.274E-05	1701.	-68.49435	1.37338	5.084E+10
35.20000	-1.357E-05	1389.	-61.64747	1.47949	5.084E+10
35.60000	-1.376E-05	1110.	-54.45291	1.51825	5.084E+10
36.00000	-1.346E-05	865.74884	-47.20575	1.50141	5.084E+10
36.40000	-1.276E-05	656.35306	-40.14739	1.43957	5.084E+10
36.80000	-1.177E-05	480.08042	-33.47138	1.34210	5.084E+10
37.20000	-1.056E-05	334.69713	-27.32932	1.21709	5.084E+10
37.60000	-9.197E-06	217.33283	-21.83693	1.07141	5.084E+10
38.00000	-7.735E-06	124.63898	-16.06582	1.33322	5.084E+10
38.40000	-6.218E-06	62.65410	-10.29419	1.07162	5.084E+10
38.80000	-4.671E-06	25.35521	-5.78996	0.80513	5.084E+10
39.20000	-3.114E-06	6.60488	-2.56965	0.53666	5.084E+10
39.60000	-1.553E-06	0.21882	-0.63924	0.26768	5.084E+10
40.00000	7.704E-09	0.000	0.000	-0.001328	5.084E+10

Output Summary for Load Case No. 2:

```
Pile-head deflection             =     0.50000000 inches
Computed slope at pile head      =    -0.00594491 radians
Maximum bending moment           =       2686102. inch-lbs
Maximum shear force              =         53618. lbs
Depth of maximum bending moment  =     6.40000000 feet below pile head
Depth of maximum shear force     =       0.000000 feet below pile head
Number of iterations             =              8
Number of zero deflection points =              4
```

Computed Values of Pile Loading and Deflection
for Lateral Loading for Load Case Number 3

```
Pile-head conditions are Displacement and Pile-head Rotation (Loading Type 5)
Displacement of pile head                          =     0.250000 inches
Rotation of pile head                              =    0.000E+00 radians
Axial load on pile head                            =     150000.0 lbs
```

Depth X feet	Deflect. y inches	Bending Moment in-lbs	Shear Force lbs	Soil Res. p lb/inch	Bending Stiffness lb-in^2

0.000	0.25000	-4280799.	81602.	0.000	5.084E+10
0.40000	0.24903	-3889823.	81247.	-73.50690	5.084E+10
0.80000	0.24630	-3500276.	80685.	-160.69902	5.084E+10
1.20000	0.24198	-3114194.	79682.	-256.95776	5.084E+10
1.60000	0.23625	-2733821.	78206.	-358.22286	5.084E+10
2.00000	0.22928	-2361515.	76245.	-458.69563	5.084E+10
2.40000	0.22124	-1999616.	73807.	-556.99060	5.084E+10
2.80000	0.21230	-1650416.	70919.	-646.54556	5.084E+10
3.20000	0.20260	-1315999.	67618.	-728.91141	5.084E+10
3.60000	0.19231	-998287.	63940.	-803.41053	5.084E+10
4.00000	0.18157	-699017.	59944.	-861.76611	5.084E+10
4.40000	0.17052	-419556.	55679.	-915.28662	5.084E+10
4.80000	0.15927	-161154.	51200.	-951.04084	5.084E+10
5.20000	0.14795	75347.	46584.	-972.04366	5.084E+10
5.60000	0.13666	289447.	41906.	-977.23742	5.084E+10
6.00000	0.12550	481012.	37257.	-959.99857	5.084E+10
6.40000	0.11456	650426.	32663.	-953.96405	5.084E+10
6.80000	0.10392	797816.	28145.	-928.68557	5.084E+10
7.20000	0.09364	923755.	23795.	-883.91562	5.084E+10
7.60000	0.08378	1029266.	19705.	-820.23559	5.084E+10
8.00000	0.07438	1115809.	15962.	-739.23658	5.084E+10
8.40000	0.06549	1185244.	12433.	-731.03165	5.084E+10
8.80000	0.05713	1237755.	8965.	-714.27164	5.084E+10
9.20000	0.04934	1273725.	5596.	-689.09378	5.084E+10
9.60000	0.04212	1293732.	2369.	-655.81678	5.084E+10
10.00000	0.03549	1298541.	-681.14713	-614.94037	5.084E+10
10.40000	0.02945	1289094.	-3573.	-590.15894	5.084E+10
10.80000	0.02400	1265962.	-6331.	-558.67680	5.084E+10
11.20000	0.01911	1229871.	-8920.	-520.41560	5.084E+10
11.60000	0.01479	1181707.	-11310.	-475.22472	5.084E+10
12.00000	0.01100	1122513.	-13432.	-408.82001	5.084E+10
12.40000	0.007713	1053824.	-15124.	-296.34730	5.084E+10
12.80000	0.004909	978235.	-16303.	-194.67780	5.084E+10
13.20000	0.002547	898095.	-17020.	-104.18615	5.084E+10
13.60000	0.000593	815493.	-17330.	-24.99023	5.084E+10
14.00000	-0.000992	732260.	-17287.	43.02048	5.084E+10
14.40000	-0.002245	649968.	-16943.	100.15481	5.084E+10
14.80000	-0.003203	569939.	-16350.	146.88901	5.084E+10
15.20000	-0.003903	493256.	-15556.	183.83590	5.084E+10
15.60000	-0.004380	420775.	-14607.	211.71480	5.084E+10
16.00000	-0.004666	353144.	-13544.	231.32289	5.084E+10
16.40000	-0.004792	290818.	-12404.	243.50850	5.084E+10
16.80000	-0.004786	234083.	-11222.	249.14676	5.084E+10
17.20000	-0.004675	183072.	-10026.	249.11781	5.084E+10
17.60000	-0.004480	137789.	-8842.	244.28776	5.084E+10
18.00000	-0.004222	98124.	-7690.	235.49259	5.084E+10
18.40000	-0.003921	63879.	-6589.	223.52484	5.084E+10
18.80000	-0.003590	34779.	-5550.	209.12311	5.084E+10
19.20000	-0.003244	10495.	-4585.	192.96423	5.084E+10
19.60000	-0.002893	-9344.	-3701.	175.65786	5.084E+10

20.00000	-0.002546	-25135.	-2900.	157.74339	5.084E+10
20.40000	-0.002210	-37289.	-2187.	139.68886	5.084E+10
20.80000	-0.001891	-46223.	-1559.	121.89157	5.084E+10
21.20000	-0.001594	-52346.	-1015.	104.68026	5.084E+10
21.60000	-0.001320	-56053.	-551.75378	88.31850	5.084E+10
22.00000	-0.001071	-57721.	-164.56789	73.00896	5.084E+10
22.40000	-0.000849	-57703.	152.01015	58.89856	5.084E+10
22.80000	-0.000652	-56324.	403.96822	46.08397	5.084E+10
23.20000	-0.000482	-53880.	597.65178	34.61751	5.084E+10
23.60000	-0.000335	-50635.	739.56521	24.51308	5.084E+10
24.00000	-0.000212	-46821.	836.20166	15.75210	5.084E+10
24.40000	-0.000110	-42641.	893.90083	8.28922	5.084E+10
24.80000	-2.678E-05	-38267.	918.73365	2.05778	5.084E+10
25.20000	3.874E-05	-33843.	916.41205	-3.02512	5.084E+10
25.60000	8.893E-05	-29487.	892.22215	-7.05401	5.084E+10
26.00000	0.000126	-25291.	850.97834	-10.13091	5.084E+10
26.40000	0.000151	-21327.	796.99619	-12.36165	5.084E+10
26.80000	0.000167	-17646.	734.08151	-13.85280	5.084E+10
27.20000	0.000175	-14283.	665.53326	-14.70898	5.084E+10
27.60000	0.000176	-11258.	594.15785	-15.03077	5.084E+10
28.00000	0.000172	-8579.	522.29269	-14.91304	5.084E+10
28.40000	0.000164	-6242.	451.83661	-14.44366	5.084E+10
28.80000	0.000154	-4238.	384.28553	-13.70263	5.084E+10
29.20000	0.000141	-2550.	320.77138	-12.76160	5.084E+10
29.60000	0.000127	-1155.	262.10287	-11.68361	5.084E+10
30.00000	0.000113	-29.44424	208.80674	-10.52311	5.084E+10
30.40000	9.901E-05	853.73140	161.16840	-9.32620	5.084E+10
30.80000	8.520E-05	1522.	119.27111	-8.13101	5.084E+10
31.20000	7.208E-05	2003.	83.03286	-6.96826	5.084E+10
31.60000	5.987E-05	2323.	52.24059	-5.86185	5.084E+10
32.00000	4.871E-05	2508.	26.58127	-4.82953	5.084E+10
32.40000	3.869E-05	2581.	5.66969	-3.88363	5.084E+10
32.80000	2.983E-05	2565.	-10.92721	-3.03175	5.084E+10
33.20000	2.214E-05	2479.	-23.66938	-2.27749	5.084E+10
33.60000	1.557E-05	2340.	-33.02600	-1.62110	5.084E+10
34.00000	1.006E-05	2164.	-39.46097	-1.06014	5.084E+10
34.40000	5.536E-06	1963.	-43.42132	-0.59001	5.084E+10
34.80000	1.897E-06	1748.	-45.32830	-0.20456	5.084E+10
35.20000	-9.492E-07	1528.	-45.57079	0.10352	5.084E+10
35.60000	-3.103E-06	1311.	-44.50090	0.34226	5.084E+10
36.00000	-4.663E-06	1102.	-42.43130	0.52007	5.084E+10
36.40000	-5.723E-06	904.29245	-39.63411	0.64543	5.084E+10
36.80000	-6.373E-06	721.58166	-36.34101	0.72669	5.084E+10
37.20000	-6.697E-06	555.56487	-32.74442	0.77188	5.084E+10
37.60000	-6.769E-06	407.29453	-28.99938	0.78855	5.084E+10
38.00000	-6.656E-06	277.16466	-24.35365	1.14717	5.084E+10
38.40000	-6.418E-06	173.44685	-18.94581	1.10609	5.084E+10
38.80000	-6.101E-06	95.20158	-13.76769	1.05146	5.084E+10
39.20000	-5.740E-06	41.17551	-8.86963	0.98940	5.084E+10
39.60000	-5.362E-06	9.94230	-4.27721	0.92411	5.084E+10

```
   40.00000   -4.978E-06        0.000        0.000      0.85806    5.084E+10

Output Summary for Load Case No. 3:

Pile-head deflection             =     0.25000000 inches
Computed slope at pile head      =       0.000000 radians
Maximum bending moment           =      -4280799. inch-lbs
Maximum shear force              =         81602. lbs
Depth of maximum bending moment  =       0.000000 feet below pile head
Depth of maximum shear force     =       0.000000 feet below pile head
Number of iterations             =              7
Number of zero deflection points =              3


Analysis Case 4 has failed to converge within 500 iterations.

The following lines are a few of the results from the last five iterations.

Iteration 496,   Y(top) =  5.0000E-01, dYmax =  1.0336E-05 at node 101, Delta dYmax
=  1.6873E-18
Iteration 497,   Y(top) =  5.0000E-01, dYmax =  1.0336E-05 at node 101, Delta dYmax
=  2.9189E-18
Iteration 498,   Y(top) =  5.0000E-01, dYmax =  1.0336E-05 at node 101, Delta dYmax
=  1.6873E-18
Iteration 499,   Y(top) =  5.0000E-01, dYmax =  1.0336E-05 at node 101, Delta dYmax
=  2.9189E-18
Iteration 500,   Y(top) =  5.0000E-01, dYmax =  1.0336E-05 at node 101, Delta dYmax
=  1.6873E-18


--------------------------------------------------------------------------------
                   Lateral Loading Analysis for Load Case Number 4
--------------------------------------------------------------------------------



-----------------------------------
  ****  Runtime Error No. 10  ****
-----------------------------------

The analysis failed to converge within the limit of 500 iterations.

Maximum change in nodal deflections                     =   1.0336E-05 in

Maximum change in nodal deflections from prior iteration =   1.6873E-18 in

Minimum change in nodal deflections in all interations   =   1.0336E-05 in

Specified convergence tolerance on nodal deflections     =   1.0000E-05 in
```

Analysis of Convergence Performance and Recommendations for
Modification of Iterations Limit and Convergence Tolerance

The following recommendations are made on the basis of an analysis of convergence performance for the last analysis.

The estimated number of iterations needed to obtain a solution for the current convergence
tolerance value is 199015684172 iterations.

The estimated number of iterations required to obtain a solution is greater than 1000, so a
solution can only be obtained if the convergence tolerance is increased in value.

The current value for convergence tolerance is less than the recommended upper limit of
0.0001 inches, so a solution is possible if the convergence tolerance is raised to a value
greater than 1.0336E-05 in.

It is recommended that the convergence tolerance not be raised above 0.0001 inches.

Summary of Pile-head Responses for Conventional Analyses

Definitions of Pile-head Loading Conditions:

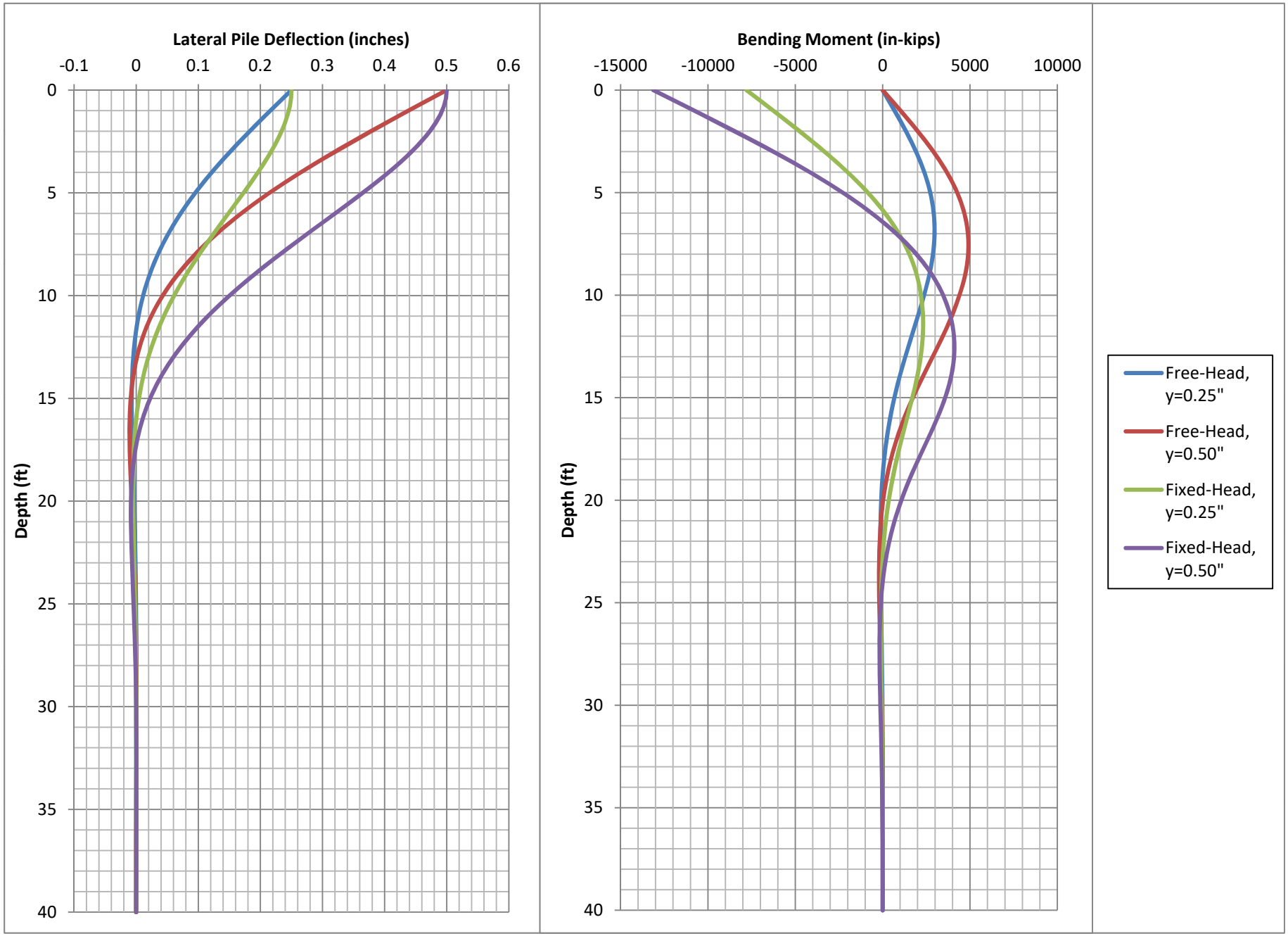
Load Type 1: Load 1 = Shear, V, lbs, and Load 2 = Moment, M, in-lbs
Load Type 2: Load 1 = Shear, V, lbs, and Load 2 = Slope, S, radians
Load Type 3: Load 1 = Shear, V, lbs, and Load 2 = Rot. Stiffness, R, in-lbs/rad.
Load Type 4: Load 1 = Top Deflection, y, inches, and Load 2 = Moment, M, in-lbs
Load Type 5: Load 1 = Top Deflection, y, inches, and Load 2 = Slope, S, radians

Load Case No.	Load Type	Pile-head Deflection inches	Pile-head Rotation radians	Max Shear in Pile lbs	Max Moment in Pile in-lbs
1	4	0.250000	-0.003269	35678.	1614281.
2	4	0.500000	-0.005945	53618.	2686102.
3	5	0.250000	0.0000	81602.	-4280799.

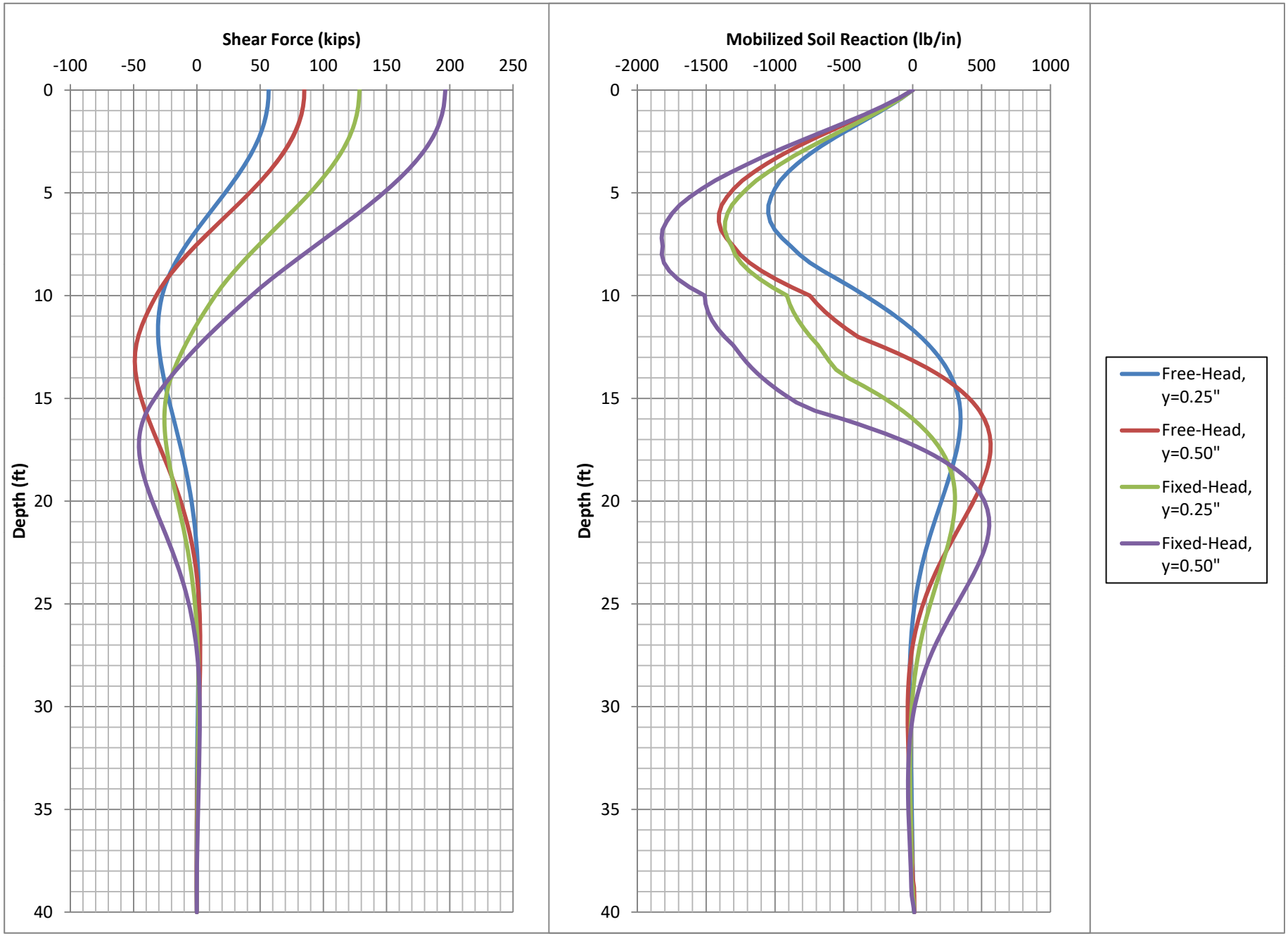
Maximum pile-head deflection = 0.5000000000 inches

Maximum pile-head rotation   = -0.0059449050 radians = -0.340618 deg.

The analysis ended with one or more load cases with no solution.



The analyses were performed for 30-Inch CIDH piles
This may be used for vertical load of 150 kips.



The analyses were performed for 30-Inch CIDH piles
This may be used for vertical load of 150 kips.

==========

LPile for Windows, Version 2019-11.004

Analysis of Individual Piles and Drilled Shafts
Subjected to Lateral Loading Using the p-y Method

==========

This copy of LPile is being used by:

LOR Geotechnical Group, Inc.
Riverside, CA
Serial Number of Security Device: 562484320

This copy of LPile is licensed for exclusive use by:

Lor Geotechnical Group, Inc., Ri

Use of this program by any entity other than Lor Geotechnical Group, Inc., Ri
is a violation of the software license agreement.

Files Used for Analysis

Path to file locations on this computer:
\\lor_server\Common\Clarissa\13613.1_Proposed Hotel Murrieta\13613.1 CIDH capaci
ty\13613.1_CIDH lateral capacity_cmtp\

Name of the input data file:
13613.1_CIDH 30 in. lateral capacity_cmtp.lp11d

Name of the output report file:
13613.1_CIDH 30 in. lateral capacity_cmtp.lp11o

Name of the plot output file:
13613.1_CIDH 30 in. lateral capacity_cmtp.lp11p

Name of the runtime message file:
13613.1_CIDH 30 in. lateral capacity_cmtp.lp11r

Date and Time of Analysis

Date: February 28, 2020 Time: 8:30:32

Problem Title

Project Name: Hotel Murrieta

Job Number: 13613.1

Client: Hotel Murrieta

Engineer: C. Pappo

Description: CIDH Lateral Capacities

Program Options and Settings

Computational Options:
- Conventional Analysis

Engineering Units Used for Data Input and Computations:
- US Customary System Units (pounds, feet, inches)

Analysis Control Options:

- Maximum number of iterations allowed	=	500
- Deflection tolerance for convergence	=	1.0000E-05 in
- Maximum allowable deflection	=	100.0000 in
- Number of pile increments	=	100

Loading Type and Number of Cycles of Loading:
- Static loading specified

- Use of p-y modification factors for p-y curves not selected
- Analysis uses layering correction (Method of Georgiadis)

- No distributed lateral loads are entered
- Loading by lateral soil movements acting on pile not selected
- Input of shear resistance at the pile tip not selected
- Input of moment resistance at the pile tip not selected
- Input of side resistance moment along pile not selected
- Computation of pile-head foundation stiffness matrix not selected
- Push-over analysis of pile not selected
- Buckling analysis of pile not selected

Output Options:
- Output files use decimal points to denote decimal symbols.
- Values of pile-head deflection, bending moment, shear force, and soil reaction are printed for full length of pile.
- Printing Increment (nodal spacing of output points) = 1
- No p-y curves to be computed and reported for user-specified depths
- Print using narrow report formats
  (Note: Some output information is omitted from the narrow report formats)

Pile Structural Properties and Geometry

Number of pile sections defined	=	1
Total length of pile	=	40.000 ft
Depth of ground surface below top of pile	=	0.0000 ft

Pile diameters used for p-y curve computations are defined using 2 points.

p-y curves are computed using pile diameter values interpolated with depth over the length of the pile. A summary of values of pile diameter vs. depth follows.

Point No.	Depth Below Pile Head feet	Pile Diameter inches
1	0.000	30.0000
2	40.000	30.0000

Input Structural Properties for Pile Sections:

Pile Section No. 1:

Section 1 is an elastic pile		
Cross-sectional Shape	=	Circular Pile
Length of section	=	40.000000 ft

Width of top of section	=	30.000000 in
Width of bottom of section	=	30.000000 in
Top Area	=	706.858347 sq. in
Bottom Area	=	706.858347 sq. in
Moment of Inertia at Top	=	39761. in^4
Moment of Inertia at Bottom	=	39761. in^4
Elastic Modulus	=	3122000. psi

Ground Slope and Pile Batter Angles

Ground Slope Angle	=	0.000 degrees
	=	0.000 radians
Pile Batter Angle	=	0.000 degrees
	=	0.000 radians

Soil and Rock Layering Information

The soil profile is modelled using 2 layers

Layer 1 is sand, p-y criteria by Reese et al., 1974

Distance from top of pile to top of layer	=	0.0000 ft
Distance from top of pile to bottom of layer	=	38.000000 ft
Effective unit weight at top of layer	=	117.000000 pcf
Effective unit weight at bottom of layer	=	117.000000 pcf
Friction angle at top of layer	=	40.000000 deg.
Friction angle at bottom of layer	=	40.000000 deg.
Subgrade k at top of layer	=	0.0000 pci
Subgrade k at bottom of layer	=	0.0000 pci

NOTE: Default values for subgrade k will be computed for this layer.

Layer 2 is soft clay, p-y criteria by Matlock, 1970

Distance from top of pile to top of layer	=	38.000000 ft
Distance from top of pile to bottom of layer	=	68.000000 ft
Effective unit weight at top of layer	=	110.000000 pcf
Effective unit weight at bottom of layer	=	110.000000 pcf
Undrained cohesion at top of layer	=	384.000000 psf
Undrained cohesion at bottom of layer	=	384.000000 psf
Epsilon-50 at top of layer	=	0.0000

Epsilon-50 at bottom of layer = 0.0000

NOTE: Default values for Epsilon-50 will be computed for this layer.

(Depth of the lowest soil layer extends 28.000 ft below the pile tip)

Static Loading Type

Static loading criteria were used when computing p-y curves for all analyses.

Pile-head Loading and Pile-head Fixity Conditions

Number of loads specified = 4

Load No.	Load Type	Condition 1	Condition 2	Axial Thrust Force, lbs
1	4	y = 0.250000 in	M = 0.0000 in-lbs	150000.
2	4	y = 0.500000 in	M = 0.0000 in-lbs	150000.
3	5	y = 0.250000 in	S = 0.0000 in/in	150000.
4	5	y = 0.500000 in	S = 0.0000 in/in	150000.

V = shear force applied normal to pile axis
M = bending moment applied to pile head
y = lateral deflection normal to pile axis
S = pile slope relative to original pile batter angle
R = rotational stiffness applied to pile head
Values of top y vs. pile lengths can be computed only for load types with specified shear loading (Load Types 1, 2, and 3).
Thrust force is assumed to be acting axially for all pile batter angles.

Computations of Nominal Moment Capacity and Nonlinear Bending Stiffness

---

Axial thrust force values were determined from pile-head loading conditions

Number of Pile Sections Analyzed = 1

Pile Section No. 1:

Moment-curvature properties were derived from elastic section properties

---
Layering Correction Equivalent Depths of Soil & Rock Layers

Layer No.	Top of Layer Below Pile Head ft	Equivalent Top Depth Below Grnd Surf ft	Same Layer Type As Layer Above	Layer is Rock or is Below Rock Layer	F0 Integral for Layer lbs	F1 Integral for Layer lbs
1	0.00	0.00	N.A.	No	0.00	9589133.
2	38.0000	1114.	No	No	9589133.	N.A.

Notes: The F0 integral of Layer n+1 equals the sum of the F0 and F1 integrals for Layer n. Layering correction equivalent depths are computed only for soil types with both shallow-depth and deep-depth expressions for peak lateral load transfer. These soil types are soft and stiff clays, non-liquefied sands, and cemented c-phi soil.

Computed Values of Pile Loading and Deflection
for Lateral Loading for Load Case Number 1

Pile-head conditions are Displacement and Moment (Loading Type 4)
Displacement of pile head = 0.250000 inches
Moment at pile head = 0.0 in-lbs
Axial load at pile head = 150000.0 lbs

Depth X feet	Deflect. y inches	Bending Moment in-lbs	Shear Force lbs	Soil Res. p lb/inch	Bending Stiffness lb-in^2
0.000	0.25000	0.000	56753.	0.000	1.241E+11
0.40000	0.23637	274457.	56552.	-83.52413	1.241E+11
0.80000	0.22280	546982.	55925.	-177.85859	1.241E+11
1.20000	0.20933	815394.	54831.	-278.05386	1.241E+11
1.60000	0.19600	1077377.	53245.	-382.63700	1.241E+11
2.00000	0.18288	1330514.	51158.	-486.91682	1.241E+11
2.40000	0.17001	1572395.	48581.	-586.76850	1.241E+11
2.80000	0.15742	1800713.	45537.	-681.57842	1.241E+11

3.20000	0.14517	2013278.	42059.	-767.54023	1.241E+11
3.60000	0.13330	2208103.	38199.	-840.96400	1.241E+11
4.00000	0.12183	2383490.	34005.	-906.53026	1.241E+11
4.40000	0.11081	2537924.	29522.	-961.53431	1.241E+11
4.80000	0.10026	2670134.	24814.	-1000.	1.241E+11
5.20000	0.09020	2779225.	19945.	-1028.	1.241E+11
5.60000	0.08066	2864544.	14963.	-1047.	1.241E+11
6.00000	0.07165	2925650.	9930.	-1050.	1.241E+11
6.40000	0.06318	2962493.	4928.	-1034.	1.241E+11
6.80000	0.05527	2975419.	42.22543	-1001.	1.241E+11
7.20000	0.04790	2965191.	-4640.	-949.36118	1.241E+11
7.60000	0.04109	2933006.	-9042.	-885.12164	1.241E+11
8.00000	0.03482	2880347.	-13142.	-822.90332	1.241E+11
8.40000	0.02909	2808647.	-16908.	-746.63615	1.241E+11
8.80000	0.02387	2719667.	-20263.	-650.91073	1.241E+11
9.20000	0.01916	2615615.	-23136.	-546.27987	1.241E+11
9.60000	0.01494	2498903.	-25514.	-444.41824	1.241E+11
10.00000	0.01118	2371882.	-27412.	-346.45969	1.241E+11
10.40000	0.007863	2236813.	-28851.	-253.36901	1.241E+11
10.80000	0.004959	2095844.	-29858.	-165.94414	1.241E+11
11.20000	0.002444	1950993.	-30459.	-84.82074	1.241E+11
11.60000	0.000292	1804133.	-30688.	-10.47886	1.241E+11
12.00000	-0.001526	1656982.	-30577.	56.74861	1.241E+11
12.40000	-0.003037	1511093.	-30161.	116.66596	1.241E+11
12.80000	-0.004266	1367849.	-29475.	169.20362	1.241E+11
13.20000	-0.005242	1228465.	-28554.	214.40617	1.241E+11
13.60000	-0.005990	1093988.	-27434.	252.41978	1.241E+11
14.00000	-0.006535	965295.	-26148.	283.47939	1.241E+11
14.40000	-0.006901	843107.	-24728.	307.89578	1.241E+11
14.80000	-0.007110	727990.	-23207.	326.04276	1.241E+11
15.20000	-0.007184	620364.	-21612.	338.34478	1.241E+11
15.60000	-0.007143	520516.	-19972.	345.26500	1.241E+11
16.00000	-0.007006	428609.	-18310.	347.29404	1.241E+11
16.40000	-0.006788	344692.	-16648.	344.93950	1.241E+11
16.80000	-0.006507	268712.	-15007.	338.71636	1.241E+11
17.20000	-0.006176	200529.	-13405.	329.13830	1.241E+11
17.60000	-0.005808	139924.	-11854.	316.70999	1.241E+11
18.00000	-0.005414	86612.	-10370.	301.92040	1.241E+11
18.40000	-0.005003	40253.	-8961.	285.23710	1.241E+11
18.80000	-0.004585	465.65162	-7635.	267.10153	1.241E+11
19.20000	-0.004168	-33168.	-6399.	247.92522	1.241E+11
19.60000	-0.003756	-61088.	-5256.	228.08697	1.241E+11
20.00000	-0.003355	-83752.	-4210.	207.93080	1.241E+11
20.40000	-0.002971	-101623.	-3260.	187.76474	1.241E+11
20.80000	-0.002605	-115164.	-2407.	167.86036	1.241E+11
21.20000	-0.002260	-124835.	-1648.	148.45289	1.241E+11
21.60000	-0.001939	-131083.	-980.06307	129.74193	1.241E+11
22.00000	-0.001642	-134337.	-400.14002	111.89267	1.241E+11
22.40000	-0.001369	-135009.	96.49238	95.03750	1.241E+11
22.80000	-0.001122	-133488.	514.84940	79.27793	1.241E+11

23.20000	-0.000900	-130137.	860.36484	64.68684	1.241E+11
23.60000	-0.000702	-125292.	1139.	51.31087	1.241E+11
24.00000	-0.000527	-119261.	1356.	39.17296	1.241E+11
24.40000	-0.000374	-112324.	1518.	28.27495	1.241E+11
24.80000	-0.000242	-104733.	1630.	18.60019	1.241E+11
25.20000	-0.000130	-96710.	1699.	10.11620	1.241E+11
25.60000	-3.501E-05	-88451.	1730.	2.77714	1.241E+11
26.00000	4.312E-05	-80126.	1728.	-3.47374	1.241E+11
26.40000	0.000106	-71879.	1699.	-8.70180	1.241E+11
26.80000	0.000156	-63830.	1647.	-12.97883	1.241E+11
27.20000	0.000194	-56079.	1577.	-16.38115	1.241E+11
27.60000	0.000222	-48703.	1492.	-18.98774	1.241E+11
28.00000	0.000241	-41764.	1396.	-20.87865	1.241E+11
28.40000	0.000252	-35304.	1293.	-22.13362	1.241E+11
28.80000	0.000256	-29354.	1185.	-22.83082	1.241E+11
29.20000	0.000255	-23928.	1075.	-23.04581	1.241E+11
29.60000	0.000249	-19033.	964.80436	-22.85068	1.241E+11
30.00000	0.000240	-14664.	856.41062	-22.31338	1.241E+11
30.40000	0.000228	-10808.	751.26534	-21.49715	1.241E+11
30.80000	0.000214	-7448.	650.56775	-20.46018	1.241E+11
31.20000	0.000199	-4558.	555.25064	-19.25528	1.241E+11
31.60000	0.000183	-2113.	466.00633	-17.92984	1.241E+11
32.00000	0.000167	-79.95472	383.31298	-16.52572	1.241E+11
32.40000	0.000150	1572.	307.46086	-15.07933	1.241E+11
32.80000	0.000134	2877.	238.57821	-13.62178	1.241E+11
33.20000	0.000118	3867.	176.65621	-12.17906	1.241E+11
33.60000	0.000103	4577.	121.57297	-10.77229	1.241E+11
34.00000	8.940E-05	5039.	73.11619	-9.41803	1.241E+11
34.40000	7.626E-05	5283.	31.00433	-8.12857	1.241E+11
34.80000	6.411E-05	5340.	-5.09372	-6.91228	1.241E+11
35.20000	5.294E-05	5238.	-35.54066	-5.77395	1.241E+11
35.60000	4.275E-05	5002.	-60.71455	-4.71517	1.241E+11
36.00000	3.348E-05	4658.	-80.99420	-3.73468	1.241E+11
36.40000	2.508E-05	4227.	-96.74639	-2.82873	1.241E+11
36.80000	1.747E-05	3731.	-108.31475	-1.99142	1.241E+11
37.20000	1.054E-05	3190.	-116.01027	-1.21505	1.241E+11
37.60000	4.210E-06	2620.	-120.10356	-0.49049	1.241E+11
38.00000	-1.635E-06	2038.	-120.60435	0.28183	1.241E+11
38.40000	-7.102E-06	1464.	-116.99014	1.22409	1.241E+11
38.80000	-1.230E-05	916.85435	-108.96543	2.11954	1.241E+11
39.20000	-1.732E-05	418.99116	-84.42225	8.10679	1.241E+11
39.60000	-2.227E-05	107.89669	-43.79921	8.81948	1.241E+11
40.00000	-2.720E-05	0.000	0.000	9.43019	1.241E+11

Output Summary for Load Case No. 1:

Pile-head deflection = 0.25000000 inches
Computed slope at pile head = -0.00283875 radians
Maximum bending moment = 2975419. inch-lbs
Maximum shear force = 56753. lbs

Depth of maximum bending moment = 6.80000000 feet below pile head
Depth of maximum shear force = 0.000000 feet below pile head
Number of iterations = 6
Number of zero deflection points = 3

Computed Values of Pile Loading and Deflection
for Lateral Loading for Load Case Number 2

Pile-head conditions are Displacement and Moment (Loading Type 4)
Displacement of pile head = 0.500000 inches
Moment at pile head = 0.0 in-lbs
Axial load at pile head = 150000.0 lbs

Depth X feet	Deflect. y inches	Bending Moment in-lbs	Shear Force lbs	Soil Res. p lb/inch	Bending Stiffness lb-in^2
0.000	0.50000	0.000	84987.	0.000	1.241E+11
0.40000	0.47531	411643.	84746.	-100.54192	1.241E+11
0.80000	0.45070	820958.	83987.	-215.69201	1.241E+11
1.20000	0.42623	1225281.	82653.	-340.02027	1.241E+11
1.60000	0.40200	1621735.	80709.	-470.27146	1.241E+11
2.00000	0.37807	2007310.	78137.	-601.41758	1.241E+11
2.40000	0.35450	2378971.	74944.	-728.80195	1.241E+11
2.80000	0.33139	2733775.	71152.	-851.27558	1.241E+11
3.20000	0.30877	3068890.	66794.	-964.38828	1.241E+11
3.60000	0.28673	3381699.	61927.	-1064.	1.241E+11
4.00000	0.26532	3669905.	56600.	-1156.	1.241E+11
4.40000	0.24458	3931384.	50859.	-1236.	1.241E+11
4.80000	0.22458	4164266.	44775.	-1299.	1.241E+11
5.20000	0.20535	4367105.	38420.	-1349.	1.241E+11
5.60000	0.18693	4538741.	31851.	-1388.	1.241E+11
6.00000	0.16935	4678278.	25145.	-1406.	1.241E+11
6.40000	0.15264	4785281.	18392.	-1408.	1.241E+11
6.80000	0.13682	4859718.	11671.	-1393.	1.241E+11
7.20000	0.12190	4901932.	5078.	-1354.	1.241E+11
7.60000	0.10789	4912805.	-1296.	-1301.	1.241E+11
8.00000	0.09479	4893558.	-7427.	-1253.	1.241E+11
8.40000	0.08260	4845298.	-13280.	-1185.	1.241E+11
8.80000	0.07131	4769592.	-18761.	-1098.	1.241E+11
9.20000	0.06091	4668445.	-23784.	-994.50578	1.241E+11
9.60000	0.05137	4544254.	-28274.	-876.34319	1.241E+11
10.00000	0.04268	4399746.	-32172.	-747.74352	1.241E+11
10.40000	0.03480	4237888.	-35636.	-695.72042	1.241E+11
10.80000	0.02771	4059882.	-38829.	-634.70086	1.241E+11
11.20000	0.02137	3867140.	-41708.	-564.82340	1.241E+11

11.60000	0.01575	3661276.	-44230.	-486.04371	1.241E+11
12.00000	0.01081	3444113.	-46352.	-397.80670	1.241E+11
12.40000	0.006507	3217687.	-47906.	-249.98783	1.241E+11
12.80000	0.002802	2985413.	-48773.	-111.14357	1.241E+11
13.20000	-0.000348	2750494.	-49006.	14.21983	1.241E+11
13.60000	-0.002987	2515827.	-48669.	125.87945	1.241E+11
14.00000	-0.005160	2283990.	-47830.	223.82654	1.241E+11
14.40000	-0.006909	2057246.	-46553.	308.24480	1.241E+11
14.80000	-0.008276	1837547.	-44903.	379.48793	1.241E+11
15.20000	-0.009301	1626540.	-42940.	438.05667	1.241E+11
15.60000	-0.01003	1425581.	-40726.	484.57594	1.241E+11
16.00000	-0.01048	1235747.	-38316.	519.77235	1.241E+11
16.40000	-0.01071	1057854.	-35762.	544.45251	1.241E+11
16.80000	-0.01075	892475.	-33112.	559.48234	1.241E+11
17.20000	-0.01062	739962.	-30412.	565.76764	1.241E+11
17.60000	-0.01035	600464.	-27700.	564.23617	1.241E+11
18.00000	-0.009966	473949.	-25011.	555.82131	1.241E+11
18.40000	-0.009497	360227.	-22378.	541.44739	1.241E+11
18.80000	-0.008962	258970.	-19826.	522.01685	1.241E+11
19.20000	-0.008378	169733.	-17377.	498.39916	1.241E+11
19.60000	-0.007763	91975.	-15049.	471.42143	1.241E+11
20.00000	-0.007130	25075.	-12857.	441.86090	1.241E+11
20.40000	-0.006494	-31645.	-10812.	410.43894	1.241E+11
20.80000	-0.005862	-78907.	-8920.	377.81671	1.241E+11
21.20000	-0.005246	-117462.	-7186.	344.59228	1.241E+11
21.60000	-0.004651	-148075.	-5612.	311.29901	1.241E+11
22.00000	-0.004084	-171511.	-4197.	278.40527	1.241E+11
22.40000	-0.003549	-188528.	-2937.	246.31517	1.241E+11
22.80000	-0.003049	-199865.	-1829.	215.37018	1.241E+11
23.20000	-0.002585	-206234.	-866.33730	185.85165	1.241E+11
23.60000	-0.002161	-208315.	-41.13183	157.98396	1.241E+11
24.00000	-0.001774	-206750.	654.68126	131.93816	1.241E+11
24.40000	-0.001426	-202140.	1230.	107.83603	1.241E+11
24.80000	-0.001116	-195040.	1695.	85.75452	1.241E+11
25.20000	-0.000842	-185958.	2058.	65.73023	1.241E+11
25.60000	-0.000602	-175357.	2331.	47.76403	1.241E+11
26.00000	-0.000395	-163650.	2522.	31.82577	1.241E+11
26.40000	-0.000218	-151206.	2641.	17.85871	1.241E+11
26.80000	-6.966E-05	-138346.	2698.	5.78399	1.241E+11
27.20000	5.334E-05	-125349.	2701.	-4.49519	1.241E+11
27.60000	0.000153	-112452.	2659.	-13.08966	1.241E+11
28.00000	0.000232	-99853.	2579.	-20.12059	1.241E+11
28.40000	0.000292	-87715.	2469.	-25.71614	1.241E+11
28.80000	0.000336	-76167.	2335.	-30.00844	1.241E+11
29.20000	0.000366	-65309.	2184.	-33.13088	1.241E+11
29.60000	0.000384	-55212.	2020.	-35.21572	1.241E+11
30.00000	0.000392	-45925.	1848.	-36.39210	1.241E+11
30.40000	0.000391	-37475.	1672.	-36.78427	1.241E+11
30.80000	0.000383	-29871.	1496.	-36.51023	1.241E+11
31.20000	0.000369	-23108.	1323.	-35.68052	1.241E+11

31.60000	0.000351	-17166.	1155.	-34.39745	1.241E+11
32.00000	0.000330	-12017.	993.58039	-32.75441	1.241E+11
32.40000	0.000307	-7621.	840.96461	-30.83550	1.241E+11
32.80000	0.000283	-3936.	698.04258	-28.71534	1.241E+11
33.20000	0.000257	-912.62323	565.62406	-26.45904	1.241E+11
33.60000	0.000232	1501.	444.22887	-24.12229	1.241E+11
34.00000	0.000206	3360.	334.13136	-21.75167	1.241E+11
34.40000	0.000182	4717.	235.40339	-19.38498	1.241E+11
34.80000	0.000158	5627.	147.95538	-17.05169	1.241E+11
35.20000	0.000135	6144.	71.57498	-14.77348	1.241E+11
35.60000	0.000114	6320.	5.96305	-12.56482	1.241E+11
36.00000	9.354E-05	6207.	-49.23318	-10.43361	1.241E+11
36.40000	7.432E-05	5854.	-94.39027	-8.38184	1.241E+11
36.80000	5.619E-05	5307.	-129.88184	-6.40632	1.241E+11
37.20000	3.904E-05	4612.	-156.05549	-4.49937	1.241E+11
37.60000	2.274E-05	3814.	-173.21314	-2.64965	1.241E+11
38.00000	7.159E-06	2954.	-182.53360	-1.23387	1.241E+11
38.40000	-7.878E-06	2066.	-182.23629	1.35775	1.241E+11
38.80000	-2.253E-05	1209.	-157.74165	8.84835	1.241E+11
39.20000	-3.696E-05	556.04690	-111.42943	10.44841	1.241E+11
39.60000	-5.128E-05	143.70012	-58.36881	11.66018	1.241E+11
40.00000	-6.558E-05	0.000	0.000	12.66015	1.241E+11

Output Summary for Load Case No. 2:

```
Pile-head deflection             =     0.50000000 inches
Computed slope at pile head      =    -0.00514387 radians
Maximum bending moment           =       4912805. inch-lbs
Maximum shear force              =         84987. lbs
Depth of maximum bending moment  =     7.60000000 feet below pile head
Depth of maximum shear force     =       0.000000 feet below pile head
Number of iterations             =              8
Number of zero deflection points =              3
```

Computed Values of Pile Loading and Deflection
for Lateral Loading for Load Case Number 3

```
Pile-head conditions are Displacement and Pile-head Rotation (Loading Type 5)
Displacement of pile head                              =     0.250000 inches
Rotation of pile head                                  =    0.000E+00 radians
Axial load on pile head                                =     150000.0 lbs
```

Depth X feet	Deflect. y inches	Bending Moment in-lbs	Shear Force lbs	Soil Res. p lb/inch	Bending Stiffness lb-in^2

0.000	0.25000	-7796551.	128613.	0.000	1.241E+11
0.40000	0.24928	-7180087.	128204.	-84.71073	1.241E+11
0.80000	0.24722	-6565374.	127562.	-182.99481	1.241E+11
1.20000	0.24395	-5954695.	126426.	-290.35761	1.241E+11
1.60000	0.23957	-5350539.	124756.	-405.32863	1.241E+11
2.00000	0.23419	-4755574.	122528.	-523.22155	1.241E+11
2.40000	0.22794	-4172531.	119736.	-639.77553	1.241E+11
2.80000	0.22091	-3604112.	116391.	-754.15427	1.241E+11
3.20000	0.21321	-3052969.	112512.	-862.16620	1.241E+11
3.60000	0.20494	-2521605.	108139.	-959.61174	1.241E+11
4.00000	0.19621	-2012280.	103312.	-1052.	1.241E+11
4.40000	0.18710	-1527132.	98063.	-1136.	1.241E+11
4.80000	0.17771	-1068105.	92448.	-1204.	1.241E+11
5.20000	0.16812	-636789.	86527.	-1263.	1.241E+11
5.60000	0.15841	-234552.	80345.	-1313.	1.241E+11
6.00000	0.14866	137443.	73965.	-1345.	1.241E+11
6.40000	0.13894	478435.	67467.	-1362.	1.241E+11
6.80000	0.12930	788030.	60923.	-1364.	1.241E+11
7.20000	0.11981	1066169.	54420.	-1345.	1.241E+11
7.60000	0.11052	1313278.	48037.	-1314.	1.241E+11
8.00000	0.10147	1530079.	41789.	-1290.	1.241E+11
8.40000	0.09270	1717123.	35700.	-1247.	1.241E+11
8.80000	0.08426	1875377.	29855.	-1188.	1.241E+11
9.20000	0.07616	2006217.	24339.	-1111.	1.241E+11
9.60000	0.06844	2111408.	19228.	-1019.	1.241E+11
10.00000	0.06110	2193068.	14591.	-913.67415	1.241E+11
10.40000	0.05418	2253616.	10253.	-893.79266	1.241E+11
10.80000	0.04767	2293509.	6028.	-866.43650	1.241E+11
11.20000	0.04158	2313374.	1952.	-831.84312	1.241E+11
11.60000	0.03593	2314010.	-1941.	-790.35603	1.241E+11
12.00000	0.03071	2296372.	-5620.	-742.41973	1.241E+11
12.40000	0.02591	2261564.	-9054.	-688.57102	1.241E+11
12.80000	0.02153	2210828.	-12259.	-646.76667	1.241E+11
13.20000	0.01757	2145130.	-15263.	-604.85446	1.241E+11
13.60000	0.01400	2065436.	-18051.	-556.75660	1.241E+11
14.00000	0.01081	1972856.	-20512.	-468.93423	1.241E+11
14.40000	0.007991	1869418.	-22493.	-356.52977	1.241E+11
14.80000	0.005518	1757713.	-23956.	-253.04739	1.241E+11
15.20000	0.003372	1640129.	-24945.	-158.80073	1.241E+11
15.60000	0.001530	1518840.	-25503.	-73.94789	1.241E+11
16.00000	-3.016E-05	1395806.	-25677.	1.49528	1.241E+11
16.40000	-0.001331	1272767.	-25511.	67.64102	1.241E+11
16.80000	-0.002396	1151251.	-25050.	124.71480	1.241E+11
17.20000	-0.003247	1032576.	-24335.	173.04027	1.241E+11
17.60000	-0.003906	917860.	-23409.	213.02410	1.241E+11
18.00000	-0.004395	808026.	-22309.	245.14120	1.241E+11
18.40000	-0.004735	703817.	-21073.	269.92038	1.241E+11
18.80000	-0.004943	605808.	-19734.	287.93066	1.241E+11
19.20000	-0.005039	514416.	-18324.	299.76853	1.241E+11
19.60000	-0.005040	429917.	-16870.	306.04606	1.241E+11

20.00000	-0.004960	352457.	-15397.	307.38013	1.241E+11
20.40000	-0.004816	282068.	-13929.	304.38280	1.241E+11
20.80000	-0.004619	218686.	-12484.	297.65280	1.241E+11
21.20000	-0.004381	162154.	-11079.	287.76825	1.241E+11
21.60000	-0.004113	112249.	-9728.	275.28042	1.241E+11
22.00000	-0.003825	68683.	-8442.	260.70884	1.241E+11
22.40000	-0.003523	31122.	-7229.	244.53723	1.241E+11
22.80000	-0.003216	-806.48330	-6097.	227.21072	1.241E+11
23.20000	-0.002909	-27500.	-5050.	209.13379	1.241E+11
23.60000	-0.002608	-49373.	-4090.	190.66930	1.241E+11
24.00000	-0.002315	-66853.	-3219.	172.13811	1.241E+11
24.40000	-0.002035	-80364.	-2437.	153.81959	1.241E+11
24.80000	-0.001769	-90330.	-1742.	135.95255	1.241E+11
25.20000	-0.001521	-97160.	-1130.	118.73689	1.241E+11
25.60000	-0.001290	-101252.	-599.69777	102.33549	1.241E+11
26.00000	-0.001078	-102984.	-145.58874	86.87660	1.241E+11
26.40000	-0.000886	-102710.	236.81041	72.45638	1.241E+11
26.80000	-0.000712	-100765.	552.64573	59.14167	1.241E+11
27.20000	-0.000557	-97454.	807.32082	46.97295	1.241E+11
27.60000	-0.000421	-93059.	1006.	35.96718	1.241E+11
28.00000	-0.000301	-87832.	1155.	26.12086	1.241E+11
28.40000	-0.000198	-82000.	1260.	17.41282	1.241E+11
28.80000	-0.000110	-75766.	1325.	9.80709	1.241E+11
29.20000	-3.598E-05	-69303.	1357.	3.25557	1.241E+11
29.60000	2.507E-05	-62763.	1359.	-2.29946	1.241E+11
30.00000	7.448E-05	-56274.	1337.	-6.92302	1.241E+11
30.40000	0.000113	-49944.	1294.	-10.68522	1.241E+11
30.80000	0.000143	-43858.	1236.	-13.65936	1.241E+11
31.20000	0.000165	-38086.	1165.	-15.92017	1.241E+11
31.60000	0.000179	-32679.	1085.	-17.54229	1.241E+11
32.00000	0.000188	-27676.	997.98175	-18.59892	1.241E+11
32.40000	0.000191	-23100.	907.35858	-19.16074	1.241E+11
32.80000	0.000190	-18965.	815.06493	-19.29495	1.241E+11
33.20000	0.000185	-15275.	723.00209	-19.06457	1.241E+11
33.60000	0.000178	-12023.	632.78039	-18.52781	1.241E+11
34.00000	0.000168	-9198.	545.74311	-17.73772	1.241E+11
34.40000	0.000157	-6781.	462.99202	-16.74190	1.241E+11
34.80000	0.000145	-4749.	385.41379	-15.58237	1.241E+11
35.20000	0.000131	-3077.	313.70675	-14.29556	1.241E+11
35.60000	0.000117	-1734.	248.40750	-12.91246	1.241E+11
36.00000	0.000103	-687.75076	189.91667	-11.45873	1.241E+11
36.40000	8.827E-05	94.01391	138.52355	-9.95507	1.241E+11
36.80000	7.382E-05	646.41108	94.42923	-8.41756	1.241E+11
37.20000	5.950E-05	1005.	57.76769	-6.85808	1.241E+11
37.60000	4.536E-05	1205.	28.62475	-5.28482	1.241E+11
38.00000	3.145E-05	1284.	-7.88764	-9.92868	1.241E+11
38.40000	1.777E-05	1134.	-51.42052	-8.21002	1.241E+11
38.80000	4.309E-06	794.28893	-72.90710	-0.74272	1.241E+11
39.20000	-9.008E-06	437.77639	-70.96331	1.55263	1.241E+11
39.60000	-2.224E-05	117.02421	-46.01500	8.84250	1.241E+11

40.00000	-3.546E-05	0.000	0.000	10.33042	1.241E+11

Output Summary for Load Case No. 3:

Pile-head deflection	=	0.25000000 inches
Computed slope at pile head	=	0.000000 radians
Maximum bending moment	=	-7796551. inch-lbs
Maximum shear force	=	128613. lbs
Depth of maximum bending moment	=	0.000000 feet below pile head
Depth of maximum shear force	=	0.000000 feet below pile head
Number of iterations	=	7
Number of zero deflection points	=	3

Computed Values of Pile Loading and Deflection
for Lateral Loading for Load Case Number 4

Pile-head conditions are Displacement and Pile-head Rotation (Loading Type 5)

Displacement of pile head	=	0.500000 inches
Rotation of pile head	=	0.000E+00 radians
Axial load on pile head	=	150000.0 lbs

Depth X feet	Deflect. y inches	Bending Moment in-lbs	Shear Force lbs	Soil Res. p lb/inch	Bending Stiffness lb-in^2
0.000	0.50000	-13133014.	196442.	0.000	1.241E+11
0.40000	0.49878	-12191095.	195951.	-101.83661	1.241E+11
0.80000	0.49530	-11251183.	195175.	-221.33653	1.241E+11
1.20000	0.48973	-10316058.	193795.	-353.64475	1.241E+11
1.60000	0.48225	-9388793.	191757.	-495.49614	1.241E+11
2.00000	0.47302	-8472684.	189027.	-641.90992	1.241E+11
2.40000	0.46222	-7571128.	185595.	-788.12779	1.241E+11
2.80000	0.45001	-6687519.	181465.	-932.74245	1.241E+11
3.20000	0.43657	-5825215.	176656.	-1071.	1.241E+11
3.60000	0.42204	-4987422.	171212.	-1198.	1.241E+11
4.00000	0.40659	-4177087.	165169.	-1320.	1.241E+11
4.40000	0.39036	-3397052.	158558.	-1434.	1.241E+11
4.80000	0.37350	-2649969.	151439.	-1532.	1.241E+11
5.20000	0.35615	-1938102.	143881.	-1618.	1.241E+11
5.60000	0.33844	-1263452.	135936.	-1693.	1.241E+11
6.00000	0.32049	-627769.	127680.	-1747.	1.241E+11
6.40000	0.30243	-32327.	119196.	-1787.	1.241E+11
6.80000	0.28436	521936.	110545.	-1817.	1.241E+11
7.20000	0.26639	1034310.	101807.	-1824.	1.241E+11
7.60000	0.24861	1504641.	93071.	-1816.	1.241E+11
8.00000	0.23111	1933087.	84338.	-1823.	1.241E+11

8.40000	0.21397	2319487.	75628.	-1807.	1.241E+11
8.80000	0.19726	2664193.	67049.	-1768.	1.241E+11
9.20000	0.18105	2968095.	58713.	-1705.	1.241E+11
9.60000	0.16538	3232625.	50735.	-1619.	1.241E+11
10.00000	0.15032	3459758.	43224.	-1511.	1.241E+11
10.40000	0.13589	3651994.	35988.	-1504.	1.241E+11
10.80000	0.12215	3809472.	28811.	-1487.	1.241E+11
11.20000	0.10911	3932594.	21745.	-1458.	1.241E+11
11.60000	0.09680	4022023.	14844.	-1418.	1.241E+11
12.00000	0.08524	4078679.	8162.	-1367.	1.241E+11
12.40000	0.07444	4103737.	1751.	-1305.	1.241E+11
12.80000	0.06440	4098612.	-4403.	-1259.	1.241E+11
13.20000	0.05511	4064369.	-10333.	-1212.	1.241E+11
13.60000	0.04659	4002086.	-16018.	-1157.	1.241E+11
14.00000	0.03880	3913045.	-21414.	-1092.	1.241E+11
14.40000	0.03174	3798737.	-26479.	-1018.	1.241E+11
14.80000	0.02539	3660859.	-31168.	-935.58637	1.241E+11
15.20000	0.01972	3501324.	-35437.	-843.12464	1.241E+11
15.60000	0.01469	3322265.	-39165.	-710.18285	1.241E+11
16.00000	0.01029	3126751.	-42094.	-509.90234	1.241E+11
16.40000	0.006459	2919403.	-44105.	-328.18694	1.241E+11
16.80000	0.003174	2704411.	-45289.	-165.19115	1.241E+11
17.20000	0.000390	2485538.	-45735.	-20.80307	1.241E+11
17.60000	-0.001931	2266117.	-45533.	105.32631	1.241E+11
18.00000	-0.003833	2049059.	-44767.	213.75304	1.241E+11
18.40000	-0.005354	1836869.	-43521.	305.21010	1.241E+11
18.80000	-0.006534	1631660.	-41875.	380.57754	1.241E+11
19.20000	-0.007411	1435174.	-39904.	440.85356	1.241E+11
19.60000	-0.008021	1248805.	-37677.	487.12689	1.241E+11
20.00000	-0.008400	1073625.	-35258.	520.55067	1.241E+11
20.40000	-0.008580	910409.	-32707.	542.31826	1.241E+11
20.80000	-0.008591	759662.	-30077.	553.64109	1.241E+11
21.20000	-0.008460	621650.	-27415.	555.72879	1.241E+11
21.60000	-0.008215	496425.	-24761.	549.77145	1.241E+11
22.00000	-0.007877	383852.	-22153.	536.92442	1.241E+11
22.40000	-0.007468	283640.	-19621.	518.29526	1.241E+11
22.80000	-0.007006	195361.	-17189.	494.93305	1.241E+11
23.20000	-0.006508	118480.	-14879.	467.81986	1.241E+11
23.60000	-0.005988	52375.	-12705.	437.86430	1.241E+11
24.00000	-0.005458	-3644.	-10680.	405.89701	1.241E+11
24.40000	-0.004929	-50311.	-8811.	372.66789	1.241E+11
24.80000	-0.004410	-88390.	-7104.	338.84503	1.241E+11
25.20000	-0.003906	-118660.	-5558.	305.01500	1.241E+11
25.60000	-0.003425	-141898.	-4174.	271.68442	1.241E+11
26.00000	-0.002970	-158874.	-2948.	239.28267	1.241E+11
26.40000	-0.002545	-170331.	-1874.	208.16537	1.241E+11
26.80000	-0.002151	-176988.	-945.85277	178.61877	1.241E+11
27.20000	-0.001790	-179525.	-155.09286	150.86453	1.241E+11
27.60000	-0.001462	-178580.	507.13814	125.06506	1.241E+11
28.00000	-0.001168	-174749.	1050.	101.32904	1.241E+11

28.40000	-0.000906	-168579.	1485.	79.71714	1.241E+11
28.80000	-0.000675	-160567.	1821.	60.24776	1.241E+11
29.20000	-0.000474	-151163.	2068.	42.90271	1.241E+11
29.60000	-0.000301	-140766.	2238.	27.63271	1.241E+11
30.00000	-0.000155	-129729.	2339.	14.36269	1.241E+11
30.40000	-3.182E-05	-118357.	2380.	2.99684	1.241E+11
30.80000	6.892E-05	-106912.	2372.	-6.57674	1.241E+11
31.20000	0.000150	-95616.	2321.	-14.48173	1.241E+11
31.60000	0.000213	-84651.	2236.	-20.84961	1.241E+11
32.00000	0.000260	-74165.	2124.	-25.81619	1.241E+11
32.40000	0.000294	-64270.	1991.	-29.51844	1.241E+11
32.80000	0.000316	-55055.	1844.	-32.09181	1.241E+11
33.20000	0.000327	-46577.	1686.	-33.66791	1.241E+11
33.60000	0.000330	-38873.	1522.	-34.37257	1.241E+11
34.00000	0.000326	-31961.	1358.	-34.32426	1.241E+11
34.40000	0.000316	-25838.	1195.	-33.63291	1.241E+11
34.80000	0.000300	-20489.	1036.	-32.39900	1.241E+11
35.20000	0.000282	-15887.	884.58029	-30.71296	1.241E+11
35.60000	0.000260	-11991.	742.09743	-28.65490	1.241E+11
36.00000	0.000236	-8756.	610.21892	-26.29448	1.241E+11
36.40000	0.000210	-6126.	490.25333	-23.69118	1.241E+11
36.80000	0.000183	-4041.	383.24747	-20.89460	1.241E+11
37.20000	0.000156	-2438.	290.03220	-17.94510	1.241E+11
37.60000	0.000128	-1249.	211.26499	-14.87457	1.241E+11
38.00000	9.943E-05	-401.79874	141.01765	-14.39516	1.241E+11
38.40000	7.112E-05	113.50168	75.79387	-12.78142	1.241E+11
38.80000	4.282E-05	334.31505	19.63967	-10.61616	1.241E+11
39.20000	1.458E-05	310.52268	-22.34506	-6.87747	1.241E+11
39.60000	-1.360E-05	128.26466	-33.22632	2.34362	1.241E+11
40.00000	-4.175E-05	0.000	0.000	11.50068	1.241E+11

Output Summary for Load Case No. 4:

```
Pile-head deflection             =     0.50000000 inches
Computed slope at pile head      =       0.000000 radians
Maximum bending moment           =     -13133014. inch-lbs
Maximum shear force              =        196442. lbs
Depth of maximum bending moment  =       0.000000 feet below pile head
Depth of maximum shear force     =       0.000000 feet below pile head
Number of iterations             =              8
Number of zero deflection points =              3
```

Summary of Pile-head Responses for Conventional Analyses

Definitions of Pile-head Loading Conditions:

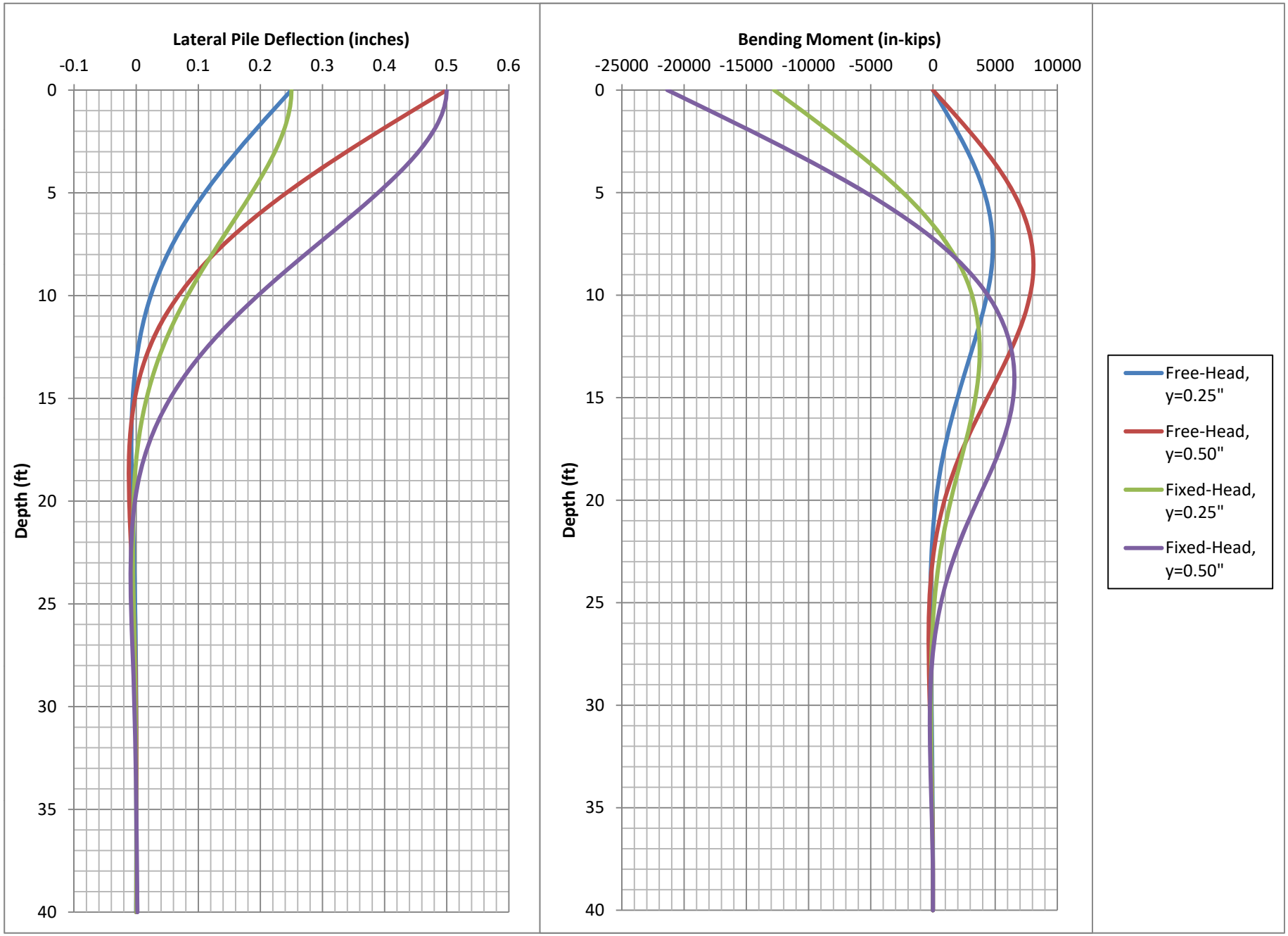
Load Type 1: Load 1 = Shear, V, lbs, and Load 2 = Moment, M, in-lbs

Load Type 2: Load 1 = Shear, V, lbs, and Load 2 = Slope, S, radians
Load Type 3: Load 1 = Shear, V, lbs, and Load 2 = Rot. Stiffness, R, in-lbs/rad.
Load Type 4: Load 1 = Top Deflection, y, inches, and Load 2 = Moment, M, in-lbs
Load Type 5: Load 1 = Top Deflection, y, inches, and Load 2 = Slope, S, radians

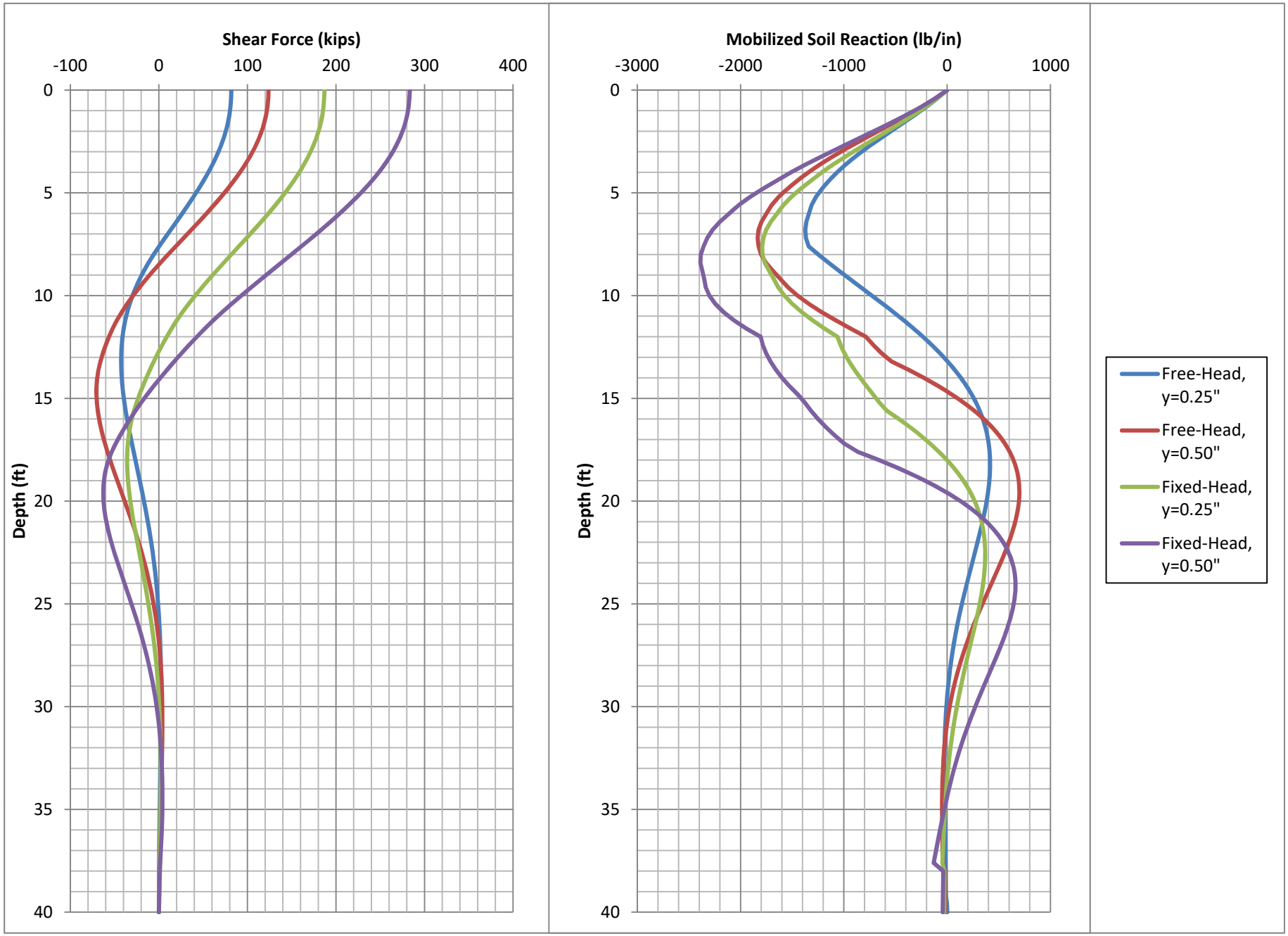
Load Case No.	Load Type	Pile-head Deflection inches	Pile-head Rotation radians	Max Shear in Pile lbs	Max Moment in Pile in-lbs
1	4	0.250000	-0.002839	56753.	2975419.
2	4	0.500000	-0.005144	84987.	4912805.
3	5	0.250000	0.0000	128613.	-7796551.
4	5	0.500000	0.0000	196442.	-13133014.

Maximum pile-head deflection = 0.5000000000 inches
Maximum pile-head rotation = -0.0051438689 radians = -0.294722 deg.

The analysis ended normally.



The analyses were performed for 36-Inch CIDH piles
This may be used for vertical load of 150 kips.



The analyses were performed for 36-Inch CIDH piles
This may be used for vertical load of 150 kips.

==========

LPile for Windows, Version 2019-11.004

Analysis of Individual Piles and Drilled Shafts
Subjected to Lateral Loading Using the p-y Method

==========

This copy of LPile is being used by:

LOR Geotechnical Group, Inc.
Riverside, CA
Serial Number of Security Device: 562484320

This copy of LPile is licensed for exclusive use by:

Lor Geotechnical Group, Inc., Ri

Use of this program by any entity other than Lor Geotechnical Group, Inc., Ri
is a violation of the software license agreement.

Files Used for Analysis

Path to file locations on this computer:
\\lor_server\Common\Clarissa\13613.1_Proposed Hotel Murrieta\13613.1 CIDH capaci
ty\13613.1_CIDH lateral capacity_cmtp\

Name of the input data file:
13613.1_CIDH 36 in. lateral capacity_cmtp.lp11d

Name of the output report file:
13613.1_CIDH 36 in. lateral capacity_cmtp.lp11o

Name of the plot output file:
13613.1_CIDH 36 in. lateral capacity_cmtp.lp11p

Name of the runtime message file:
13613.1_CIDH 36 in. lateral capacity_cmtp.lp11r

Date and Time of Analysis

Date: February 28, 2020 Time: 8:32:02

Problem Title

Project Name: Hotel Murrieta

Job Number: 13613.1

Client: Hotel Murrieta

Engineer: C. Pappo

Description: CIDH Lateral Capacities

Program Options and Settings

Computational Options:
- Conventional Analysis

Engineering Units Used for Data Input and Computations:
- US Customary System Units (pounds, feet, inches)

Analysis Control Options:

- Maximum number of iterations allowed	=	500
- Deflection tolerance for convergence	=	1.0000E-05 in
- Maximum allowable deflection	=	100.0000 in
- Number of pile increments	=	100

Loading Type and Number of Cycles of Loading:
- Static loading specified

- Use of p-y modification factors for p-y curves not selected
- Analysis uses layering correction (Method of Georgiadis)

- No distributed lateral loads are entered
- Loading by lateral soil movements acting on pile not selected
- Input of shear resistance at the pile tip not selected
- Input of moment resistance at the pile tip not selected
- Input of side resistance moment along pile not selected
- Computation of pile-head foundation stiffness matrix not selected
- Push-over analysis of pile not selected
- Buckling analysis of pile not selected

Output Options:
- Output files use decimal points to denote decimal symbols.
- Values of pile-head deflection, bending moment, shear force, and soil reaction are printed for full length of pile.
- Printing Increment (nodal spacing of output points) = 1
- No p-y curves to be computed and reported for user-specified depths
- Print using narrow report formats
  (Note: Some output information is omitted from the narrow report formats)

Pile Structural Properties and Geometry

Number of pile sections defined = 1
Total length of pile = 40.000 ft
Depth of ground surface below top of pile = 0.0000 ft

Pile diameters used for p-y curve computations are defined using 2 points.

p-y curves are computed using pile diameter values interpolated with depth over the length of the pile. A summary of values of pile diameter vs. depth follows.

Point No.	Depth Below Pile Head feet	Pile Diameter inches
1	0.000	36.0000
2	40.000	36.0000

Input Structural Properties for Pile Sections:

Pile Section No. 1:

Section 1 is an elastic pile
Cross-sectional Shape = Circular Pile
Length of section = 40.000000 ft

Width of top of section	=	36.000000 in
Width of bottom of section	=	36.000000 in
Top Area	=	1018. sq. in
Bottom Area	=	1018. sq. in
Moment of Inertia at Top	=	82448. in^4
Moment of Inertia at Bottom	=	82448. in^4
Elastic Modulus	=	3122000. psi

Ground Slope and Pile Batter Angles

Ground Slope Angle	=	0.000 degrees
	=	0.000 radians
Pile Batter Angle	=	0.000 degrees
	=	0.000 radians

Soil and Rock Layering Information

The soil profile is modelled using 2 layers

Layer 1 is sand, p-y criteria by Reese et al., 1974

Distance from top of pile to top of layer	=	0.0000 ft
Distance from top of pile to bottom of layer	=	38.000000 ft
Effective unit weight at top of layer	=	117.000000 pcf
Effective unit weight at bottom of layer	=	117.000000 pcf
Friction angle at top of layer	=	40.000000 deg.
Friction angle at bottom of layer	=	40.000000 deg.
Subgrade k at top of layer	=	0.0000 pci
Subgrade k at bottom of layer	=	0.0000 pci

NOTE: Default values for subgrade k will be computed for this layer.

Layer 2 is soft clay, p-y criteria by Matlock, 1970

Distance from top of pile to top of layer	=	38.000000 ft
Distance from top of pile to bottom of layer	=	68.000000 ft
Effective unit weight at top of layer	=	110.000000 pcf
Effective unit weight at bottom of layer	=	110.000000 pcf
Undrained cohesion at top of layer	=	384.000000 psf
Undrained cohesion at bottom of layer	=	384.000000 psf
Epsilon-50 at top of layer	=	0.0000

Epsilon-50 at bottom of layer = 0.0000

NOTE: Default values for Epsilon-50 will be computed for this layer.

(Depth of the lowest soil layer extends 28.000 ft below the pile tip)

Static Loading Type

Static loading criteria were used when computing p-y curves for all analyses.

Pile-head Loading and Pile-head Fixity Conditions

Number of loads specified = 4

Load No.	Load Type	Condition 1	Condition 2	Axial Thrust Force, lbs
1	4	y = 0.250000 in	M = 0.0000 in-lbs	150000.
2	4	y = 0.500000 in	M = 0.0000 in-lbs	150000.
3	5	y = 0.250000 in	S = 0.0000 in/in	150000.
4	5	y = 0.500000 in	S = 0.0000 in/in	150000.

V = shear force applied normal to pile axis
M = bending moment applied to pile head
y = lateral deflection normal to pile axis
S = pile slope relative to original pile batter angle
R = rotational stiffness applied to pile head
Values of top y vs. pile lengths can be computed only for load types with specified shear loading (Load Types 1, 2, and 3).
Thrust force is assumed to be acting axially for all pile batter angles.

Computations of Nominal Moment Capacity and Nonlinear Bending Stiffness

---

Axial thrust force values were determined from pile-head loading conditions

Number of Pile Sections Analyzed = 1

Pile Section No. 1:

Moment-curvature properties were derived from elastic section properties

---
Layering Correction Equivalent Depths of Soil & Rock Layers

Layer No.	Top of Layer Below Pile Head ft	Equivalent Top Depth Below Grnd Surf ft	Same Layer Type As Layer Above	Layer is Rock or is Below Rock Layer	F0 Integral for Layer lbs	F1 Integral for Layer lbs
1	0.00	0.00	N.A.	No	0.00	9800789.
2	38.0000	949.5352	No	No	9800789.	N.A.

Notes: The F0 integral of Layer n+1 equals the sum of the F0 and F1 integrals for Layer n. Layering correction equivalent depths are computed only for soil types with both shallow-depth and deep-depth expressions for peak lateral load transfer. These soil types are soft and stiff clays, non-liquefied sands, and cemented c-phi soil.

Computed Values of Pile Loading and Deflection
for Lateral Loading for Load Case Number 1

Pile-head conditions are Displacement and Moment (Loading Type 4)
Displacement of pile head = 0.250000 inches
Moment at pile head = 0.0 in-lbs
Axial load at pile head = 150000.0 lbs

Depth X feet	Deflect. y inches	Bending Moment in-lbs	Shear Force lbs	Soil Res. p lb/inch	Bending Stiffness lb-in^2
0.000	0.25000	0.000	81812.	0.000	2.574E+11
0.40000	0.23795	394506.	81586.	-94.22889	2.574E+11
0.80000	0.22594	786836.	80882.	-199.12271	2.574E+11
1.20000	0.21400	1174567.	79659.	-310.61341	2.574E+11
1.60000	0.20217	1555126.	77892.	-425.65400	2.574E+11
2.00000	0.19047	1925857.	75564.	-544.06839	2.574E+11
2.40000	0.17895	2284027.	72673.	-660.75336	2.574E+11
2.80000	0.16763	2626943.	69233.	-772.66832	2.574E+11

3.20000	0.15655	2952021.	65268.	-879.10703	2.574E+11
3.60000	0.14573	3256804.	60810.	-978.59643	2.574E+11
4.00000	0.13520	3538998.	55900.	-1067.	2.574E+11
4.40000	0.12499	3796560.	50599.	-1142.	2.574E+11
4.80000	0.11512	4027759.	44950.	-1212.	2.574E+11
5.20000	0.10560	4230989.	38995.	-1270.	2.574E+11
5.60000	0.09647	4404906.	32798.	-1312.	2.574E+11
6.00000	0.08773	4548528.	26437.	-1338.	2.574E+11
6.40000	0.07940	4661266.	19955.	-1363.	2.574E+11
6.80000	0.07149	4742529.	13387.	-1373.	2.574E+11
7.20000	0.06400	4792089.	6811.	-1367.	2.574E+11
7.60000	0.05694	4810094.	312.30243	-1341.	2.574E+11
8.00000	0.05031	4797141.	-5899.	-1247.	2.574E+11
8.40000	0.04411	4755391.	-11647.	-1148.	2.574E+11
8.80000	0.03834	4687127.	-16911.	-1045.	2.574E+11
9.20000	0.03298	4594717.	-21676.	-940.12851	2.574E+11
9.60000	0.02804	4480585.	-25934.	-833.95250	2.574E+11
10.00000	0.02349	4347178.	-29682.	-727.94852	2.574E+11
10.40000	0.01934	4196941.	-32925.	-623.22294	2.574E+11
10.80000	0.01556	4032288.	-35671.	-520.77254	2.574E+11
11.20000	0.01215	3855583.	-37932.	-421.48263	2.574E+11
11.60000	0.009074	3669115.	-39726.	-326.12668	2.574E+11
12.00000	0.006330	3475084.	-41074.	-235.36729	2.574E+11
12.40000	0.003898	3275583.	-41998.	-149.75827	2.574E+11
12.80000	0.001759	3072588.	-42525.	-69.74794	2.574E+11
13.20000	-0.000106	2867944.	-42682.	4.31670	2.574E+11
13.60000	-0.001713	2663362.	-42498.	72.18496	2.574E+11
14.00000	-0.003082	2460407.	-42004.	133.69671	2.574E+11
14.40000	-0.004231	2260499.	-41230.	188.77610	2.574E+11
14.80000	-0.005178	2064910.	-40207.	237.42484	2.574E+11
15.20000	-0.005939	1874764.	-38966.	279.71513	2.574E+11
15.60000	-0.006533	1691038.	-37537.	315.78242	2.574E+11
16.00000	-0.006976	1514564.	-35949.	345.81804	2.574E+11
16.40000	-0.007283	1346037.	-34231.	370.06188	2.574E+11
16.80000	-0.007469	1186019.	-32410.	388.79508	2.574E+11
17.20000	-0.007550	1034943.	-30511.	402.33300	2.574E+11
17.60000	-0.007537	893122.	-28559.	411.01834	2.574E+11
18.00000	-0.007445	760760.	-26576.	415.21466	2.574E+11
18.40000	-0.007285	637953.	-24583.	415.30016	2.574E+11
18.80000	-0.007067	524707.	-22598.	411.66196	2.574E+11
19.20000	-0.006803	420938.	-20639.	404.69077	2.574E+11
19.60000	-0.006501	326488.	-18720.	394.77603	2.574E+11
20.00000	-0.006169	241129.	-16855.	382.30154	2.574E+11
20.40000	-0.005816	164575.	-15055.	367.64158	2.574E+11
20.80000	-0.005449	96489.	-13330.	351.15750	2.574E+11
21.20000	-0.005073	36493.	-11688.	333.19486	2.574E+11
21.60000	-0.004693	-15827.	-10134.	314.08094	2.574E+11
22.00000	-0.004315	-60911.	-8675.	294.12283	2.574E+11
22.40000	-0.003942	-99217.	-7312.	273.60586	2.574E+11
22.80000	-0.003578	-131218.	-6049.	252.79254	2.574E+11

23.20000	-0.003226	-157392.	-4885.	231.92177	2.574E+11
23.60000	-0.002888	-178222.	-3822.	211.20854	2.574E+11
24.00000	-0.002566	-194182.	-2857.	190.84389	2.574E+11
24.40000	-0.002262	-205743.	-1989.	170.99511	2.574E+11
24.80000	-0.001976	-213361.	-1214.	151.80636	2.574E+11
25.20000	-0.001709	-217479.	-529.38680	133.39935	2.574E+11
25.60000	-0.001461	-218521.	68.87003	115.87433	2.574E+11
26.00000	-0.001233	-216889.	585.31523	99.31117	2.574E+11
26.40000	-0.001024	-212967.	1025.	83.77067	2.574E+11
26.80000	-0.000835	-207112.	1392.	69.29585	2.574E+11
27.20000	-0.000663	-199657.	1693.	55.91341	2.574E+11
27.60000	-0.000510	-190912.	1931.	43.63523	2.574E+11
28.00000	-0.000374	-181158.	2114.	32.45984	2.574E+11
28.40000	-0.000254	-170655.	2246.	22.37395	2.574E+11
28.80000	-0.000150	-159633.	2331.	13.35396	2.574E+11
29.20000	-5.933E-05	-148302.	2376.	5.36741	2.574E+11
29.60000	1.772E-05	-136845.	2385.	-1.62559	2.574E+11
30.00000	8.253E-05	-125424.	2363.	-7.67103	2.574E+11
30.40000	0.000136	-114177.	2314.	-12.81963	2.574E+11
30.80000	0.000179	-103225.	2242.	-17.12574	2.574E+11
31.20000	0.000214	-92665.	2151.	-20.64612	2.574E+11
31.60000	0.000239	-82581.	2046.	-23.43896	2.574E+11
32.00000	0.000258	-73035.	1928.	-25.56291	2.574E+11
32.40000	0.000270	-64077.	1802.	-27.07628	2.574E+11
32.80000	0.000276	-55742.	1669.	-28.03625	2.574E+11
33.20000	0.000277	-48052.	1534.	-28.49822	2.574E+11
33.60000	0.000274	-41018.	1397.	-28.51532	2.574E+11
34.00000	0.000267	-34641.	1261.	-28.13787	2.574E+11
34.40000	0.000257	-28911.	1128.	-27.41306	2.574E+11
34.80000	0.000245	-23813.	998.43481	-26.38467	2.574E+11
35.20000	0.000230	-19322.	874.88879	-25.09284	2.574E+11
35.60000	0.000214	-15410.	758.08844	-23.57398	2.574E+11
36.00000	0.000196	-12040.	649.04514	-21.86073	2.574E+11
36.40000	0.000177	-9173.	548.62264	-19.98198	2.574E+11
36.80000	0.000158	-6767.	457.55472	-17.96298	2.574E+11
37.20000	0.000137	-4775.	376.46234	-15.82551	2.574E+11
37.60000	0.000117	-3147.	305.86976	-13.58807	2.574E+11
38.00000	9.569E-05	-1832.	234.24928	-16.25379	2.574E+11
38.40000	7.458E-05	-891.78563	159.33225	-14.96164	2.574E+11
38.80000	5.338E-05	-296.17016	91.28820	-13.39005	2.574E+11
39.20000	3.217E-05	-9.05745	31.98050	-11.32149	2.574E+11
39.60000	1.095E-05	17.20825	0.28042	-1.88688	2.574E+11
40.00000	-1.027E-05	0.000	0.000	1.77004	2.574E+11

Output Summary for Load Case No. 1:

Pile-head deflection = 0.25000000 inches
Computed slope at pile head = -0.00250956 radians
Maximum bending moment = 4810094. inch-lbs
Maximum shear force = 81812. lbs

Depth of maximum bending moment = 7.60000000 feet below pile head
Depth of maximum shear force = 0.000000 feet below pile head
Number of iterations = 6
Number of zero deflection points = 3

Computed Values of Pile Loading and Deflection
for Lateral Loading for Load Case Number 2

Pile-head conditions are Displacement and Moment (Loading Type 4)
Displacement of pile head = 0.500000 inches
Moment at pile head = 0.0 in-lbs
Axial load at pile head = 150000.0 lbs

Depth X feet	Deflect. y inches	Bending Moment in-lbs	Shear Force lbs	Soil Res. p lb/inch	Bending Stiffness lb-in^2
0.000	0.50000	0.000	123788.	0.000	2.574E+11
0.40000	0.47802	597477.	123516.	-113.29579	2.574E+11
0.80000	0.45610	1192335.	122666.	-240.85872	2.574E+11
1.20000	0.43429	1781628.	121180.	-378.21200	2.574E+11
1.60000	0.41263	2362183.	119020.	-521.57028	2.574E+11
2.00000	0.39119	2930690.	116163.	-669.22851	2.574E+11
2.40000	0.37001	3483738.	112598.	-816.18717	2.574E+11
2.80000	0.34914	4017934.	108337.	-958.86765	2.574E+11
3.20000	0.32863	4529984.	103405.	-1096.	2.574E+11
3.60000	0.30852	5016719.	97832.	-1226.	2.574E+11
4.00000	0.28887	5475137.	91664.	-1344.	2.574E+11
4.40000	0.26970	5902518.	84966.	-1447.	2.574E+11
4.80000	0.25106	6296483.	77785.	-1545.	2.574E+11
5.20000	0.23299	6654762.	70161.	-1631.	2.574E+11
5.60000	0.21551	6975365.	62167.	-1700.	2.574E+11
6.00000	0.19866	7256711.	53891.	-1749.	2.574E+11
6.40000	0.18246	7497674.	45383.	-1796.	2.574E+11
6.80000	0.16692	7697150.	36691.	-1825.	2.574E+11
7.20000	0.15208	7854465.	27906.	-1835.	2.574E+11
7.60000	0.13794	7969396.	19119.	-1826.	2.574E+11
8.00000	0.12451	8042145.	10413.	-1802.	2.574E+11
8.40000	0.11180	8073277.	1877.	-1755.	2.574E+11
8.80000	0.09982	8063866.	-6381.	-1686.	2.574E+11
9.20000	0.08855	8015503.	-14300.	-1614.	2.574E+11
9.60000	0.07801	7929854.	-21870.	-1540.	2.574E+11
10.00000	0.06817	7808611.	-29043.	-1449.	2.574E+11
10.40000	0.05904	7653885.	-35737.	-1340.	2.574E+11
10.80000	0.05058	7468177.	-41874.	-1217.	2.574E+11
11.20000	0.04280	7254332.	-47389.	-1081.	2.574E+11

11.60000	0.03567	7015482.	-52230.	-936.25068	2.574E+11
12.00000	0.02916	6754967.	-56364.	-786.17138	2.574E+11
12.40000	0.02326	6476247.	-59967.	-715.01732	2.574E+11
12.80000	0.01794	6180966.	-63207.	-634.75416	2.574E+11
13.20000	0.01317	5870978.	-66022.	-538.54253	2.574E+11
13.60000	0.008925	5548503.	-68217.	-376.06431	2.574E+11
14.00000	0.005178	5217288.	-69659.	-224.61182	2.574E+11
14.40000	0.001899	4880829.	-70401.	-84.70887	2.574E+11
14.80000	-0.000944	4542352.	-70501.	43.28923	2.574E+11
15.20000	-0.003380	4204812.	-70015.	159.18498	2.574E+11
15.60000	-0.005440	3870883.	-69002.	262.92702	2.574E+11
16.00000	-0.007153	3542960.	-67520.	354.59774	2.574E+11
16.40000	-0.008549	3223159.	-65626.	434.40039	2.574E+11
16.80000	-0.009656	2913324.	-63377.	502.64590	2.574E+11
17.20000	-0.01050	2615030.	-60828.	559.73955	2.574E+11
17.60000	-0.01112	2329598.	-58029.	606.16781	2.574E+11
18.00000	-0.01152	2058100.	-55033.	642.48525	2.574E+11
18.40000	-0.01174	1801378.	-51884.	669.30205	2.574E+11
18.80000	-0.01180	1560052.	-48629.	687.27177	2.574E+11
19.20000	-0.01172	1334540.	-45306.	697.07996	2.574E+11
19.60000	-0.01152	1125071.	-41955.	699.43324	2.574E+11
20.00000	-0.01122	931702.	-38608.	695.04935	2.574E+11
20.40000	-0.01083	754334.	-35296.	684.64789	2.574E+11
20.80000	-0.01038	592730.	-32048.	668.94193	2.574E+11
21.20000	-0.009875	446531.	-28886.	648.63060	2.574E+11
21.60000	-0.009330	315270.	-25830.	624.39243	2.574E+11
22.00000	-0.008756	198391.	-22899.	596.87968	2.574E+11
22.40000	-0.008165	95261.	-20107.	566.71354	2.574E+11
22.80000	-0.007566	5188.	-17464.	534.48008	2.574E+11
23.20000	-0.006966	-72572.	-14979.	500.72717	2.574E+11
23.60000	-0.006372	-138794.	-12659.	465.96201	2.574E+11
24.00000	-0.005791	-194278.	-10507.	430.64954	2.574E+11
24.40000	-0.005228	-239837.	-8525.	395.21142	2.574E+11
24.80000	-0.004685	-276287.	-6713.	360.02565	2.574E+11
25.20000	-0.004168	-304439.	-5068.	325.42680	2.574E+11
25.60000	-0.003678	-325089.	-3587.	291.70669	2.574E+11
26.00000	-0.003216	-339014.	-2265.	259.11553	2.574E+11
26.40000	-0.002786	-346963.	-1096.	227.86349	2.574E+11
26.80000	-0.002386	-349659.	-73.53871	198.12246	2.574E+11
27.20000	-0.002018	-347785.	810.02296	170.02824	2.574E+11
27.60000	-0.001680	-341988.	1563.	143.68287	2.574E+11
28.00000	-0.001373	-332877.	2194.	119.15708	2.574E+11
28.40000	-0.001097	-321016.	2711.	96.49291	2.574E+11
28.80000	-0.000848	-306927.	3125.	75.70641	2.574E+11
29.20000	-0.000628	-291090.	3443.	56.79033	2.574E+11
29.60000	-0.000433	-273941.	3674.	39.71680	2.574E+11
30.00000	-0.000263	-255873.	3828.	24.44001	2.574E+11
30.40000	-0.000116	-237238.	3913.	10.89880	2.574E+11
30.80000	1.028E-05	-218349.	3937.	-0.98086	2.574E+11
31.20000	0.000117	-199480.	3907.	-11.28344	2.574E+11

31.60000	0.000205	-180868.	3832.	-20.10166	2.574E+11
32.00000	0.000278	-162717.	3718.	-27.53431	2.574E+11
32.40000	0.000336	-145197.	3571.	-33.68428	2.574E+11
32.80000	0.000380	-128452.	3397.	-38.65680	2.574E+11
33.20000	0.000414	-112596.	3202.	-42.55772	2.574E+11
33.60000	0.000437	-97719.	2991.	-45.49205	2.574E+11
34.00000	0.000451	-83889.	2768.	-47.56260	2.574E+11
34.40000	0.000458	-71154.	2536.	-48.86878	2.574E+11
34.80000	0.000459	-59543.	2300.	-49.50561	2.574E+11
35.20000	0.000454	-49073.	2062.	-49.56273	2.574E+11
35.60000	0.000445	-39743.	1825.	-49.12371	2.574E+11
36.00000	0.000433	-31545.	1592.	-48.26538	2.574E+11
36.40000	0.000417	-24459.	1363.	-47.05725	2.574E+11
36.80000	0.000400	-18456.	1141.	-45.56116	2.574E+11
37.20000	0.000380	-13503.	926.11350	-43.83090	2.574E+11
37.60000	0.000360	-9559.	720.33061	-41.91197	2.574E+11
38.00000	0.000338	-6581.	560.22745	-24.79768	2.574E+11
38.40000	0.000316	-4175.	442.49334	-24.25820	2.574E+11
38.80000	0.000294	-2327.	327.43261	-23.68377	2.574E+11
39.20000	0.000272	-1024.	215.21330	-23.07428	2.574E+11
39.60000	0.000249	-253.86336	106.00759	-22.42810	2.574E+11
40.00000	0.000226	0.000	0.000	-21.74172	2.574E+11

Output Summary for Load Case No. 2:

```
Pile-head deflection             =     0.50000000 inches
Computed slope at pile head      =    -0.00457813 radians
Maximum bending moment           =       8073277. inch-lbs
Maximum shear force              =        123788. lbs
Depth of maximum bending moment  =     8.40000000 feet below pile head
Depth of maximum shear force     =       0.000000 feet below pile head
Number of iterations             =              8
Number of zero deflection points =              2
```

Computed Values of Pile Loading and Deflection
for Lateral Loading for Load Case Number 3

```
Pile-head conditions are Displacement and Pile-head Rotation (Loading Type 5)
Displacement of pile head                          =     0.250000 inches
Rotation of pile head                              =    0.000E+00 radians
Axial load on pile head                            =     150000.0 lbs
```

Depth X feet	Deflect. y inches	Bending Moment in-lbs	Shear Force lbs	Soil Res. p lb/inch	Bending Stiffness lb-in^2

0.000	0.25000	-12772602.	187102.	0.000	2.574E+11
0.40000	0.24943	-11875533.	186643.	-95.40845	2.574E+11
0.80000	0.24779	-10980502.	185924.	-204.16499	2.574E+11
1.20000	0.24518	-10090027.	184660.	-322.59056	2.574E+11
1.60000	0.24166	-9206850.	182810.	-447.84402	2.574E+11
2.00000	0.23731	-8333867.	180345.	-579.59474	2.574E+11
2.40000	0.23222	-7474126.	177243.	-712.77521	2.574E+11
2.80000	0.22646	-6630707.	173506.	-844.18200	2.574E+11
3.20000	0.22011	-5806649.	169145.	-972.91177	2.574E+11
3.60000	0.21323	-5004930.	164177.	-1097.	2.574E+11
4.00000	0.20591	-4228422.	158634.	-1213.	2.574E+11
4.40000	0.19821	-3479795.	152565.	-1316.	2.574E+11
4.80000	0.19020	-2761444.	146005.	-1417.	2.574E+11
5.20000	0.18195	-2075704.	138984.	-1509.	2.574E+11
5.60000	0.17350	-1424693.	131559.	-1585.	2.574E+11
6.00000	0.16493	-810184.	123806.	-1645.	2.574E+11
6.40000	0.15629	-233569.	115763.	-1706.	2.574E+11
6.80000	0.14762	303733.	107463.	-1752.	2.574E+11
7.20000	0.13898	800672.	98988.	-1780.	2.574E+11
7.60000	0.13042	1256599.	90419.	-1791.	2.574E+11
8.00000	0.12196	1671245.	81828.	-1788.	2.574E+11
8.40000	0.11366	2044666.	73299.	-1766.	2.574E+11
8.80000	0.10554	2377376.	64927.	-1723.	2.574E+11
9.20000	0.09763	2670365.	56764.	-1678.	2.574E+11
9.60000	0.08996	2924650.	48812.	-1635.	2.574E+11
10.00000	0.08255	3141217.	41105.	-1576.	2.574E+11
10.40000	0.07543	3321438.	33724.	-1500.	2.574E+11
10.80000	0.06860	3467058.	26743.	-1409.	2.574E+11
11.20000	0.06208	3580170.	20231.	-1304.	2.574E+11
11.60000	0.05588	3663183.	14249.	-1188.	2.574E+11
12.00000	0.05001	3718774.	8848.	-1063.	2.574E+11
12.40000	0.04448	3749833.	3823.	-1031.	2.574E+11
12.80000	0.03927	3757084.	-1035.	-993.09063	2.574E+11
13.20000	0.03441	3741404.	-5696.	-948.73457	2.574E+11
13.60000	0.02988	3703815.	-10129.	-898.39636	2.574E+11
14.00000	0.02568	3645477.	-14307.	-842.46549	2.574E+11
14.40000	0.02181	3567680.	-18204.	-781.37719	2.574E+11
14.80000	0.01825	3471832.	-21797.	-715.59814	2.574E+11
15.20000	0.01501	3359450.	-25090.	-656.65137	2.574E+11
15.60000	0.01207	3231893.	-28066.	-583.38177	2.574E+11
16.00000	0.009417	3090853.	-30587.	-466.84419	2.574E+11
16.40000	0.007041	2939014.	-32566.	-357.79000	2.574E+11
16.80000	0.004928	2778893.	-34040.	-256.54038	2.574E+11
17.20000	0.003064	2612823.	-35048.	-163.30964	2.574E+11
17.60000	0.001434	2442956.	-35628.	-78.21201	2.574E+11
18.00000	2.275E-05	2271254.	-35818.	-1.26905	2.574E+11
18.40000	-0.001185	2099492.	-35659.	67.58241	2.574E+11
18.80000	-0.002206	1929260.	-35189.	128.48203	2.574E+11
19.20000	-0.003053	1761961.	-34444.	181.63756	2.574E+11
19.60000	-0.003743	1598824.	-33463.	227.31635	2.574E+11

20.00000	-0.004290	1440903.	-32279.	265.83687	2.574E+11
20.40000	-0.004708	1289087.	-30927.	297.56050	2.574E+11
20.80000	-0.005010	1144110.	-29438.	322.88347	2.574E+11
21.20000	-0.005210	1006556.	-27842.	342.22916	2.574E+11
21.60000	-0.005320	876874.	-26166.	356.04081	2.574E+11
22.00000	-0.005351	755384.	-24436.	364.77470	2.574E+11
22.40000	-0.005315	642287.	-22675.	368.89372	2.574E+11
22.80000	-0.005221	537682.	-20905.	368.86162	2.574E+11
23.20000	-0.005080	441568.	-19143.	365.13770	2.574E+11
23.60000	-0.004898	353860.	-17407.	358.17210	2.574E+11
24.00000	-0.004685	274400.	-15711.	348.40165	2.574E+11
24.40000	-0.004448	202964.	-14068.	336.24629	2.574E+11
24.80000	-0.004192	139272.	-12488.	322.10603	2.574E+11
25.20000	-0.003924	82999.	-10980.	306.35847	2.574E+11
25.60000	-0.003648	33784.	-9550.	289.35678	2.574E+11
26.00000	-0.003369	-8764.	-8204.	271.42821	2.574E+11
26.40000	-0.003091	-45059.	-6946.	252.87305	2.574E+11
26.80000	-0.002818	-75528.	-5777.	233.96398	2.574E+11
27.20000	-0.002550	-100604.	-4700.	214.94584	2.574E+11
27.60000	-0.002292	-120727.	-3714.	196.03570	2.574E+11
28.00000	-0.002045	-136332.	-2817.	177.42333	2.574E+11
28.40000	-0.001810	-147847.	-2009.	159.27180	2.574E+11
28.80000	-0.001588	-155690.	-1287.	141.71846	2.574E+11
29.20000	-0.001380	-160266.	-647.15644	124.87602	2.574E+11
29.60000	-0.001187	-161963.	-86.25266	108.83388	2.574E+11
30.00000	-0.001008	-161150.	399.73143	93.65949	2.574E+11
30.40000	-0.000843	-158177.	815.07391	79.39988	2.574E+11
30.80000	-0.000692	-153373.	1164.	66.08331	2.574E+11
31.20000	-0.000556	-147044.	1452.	53.72084	2.574E+11
31.60000	-0.000432	-139475.	1682.	42.30804	2.574E+11
32.00000	-0.000321	-130930.	1860.	31.82669	2.574E+11
32.40000	-0.000222	-121649.	1990.	22.24641	2.574E+11
32.80000	-0.000133	-111854.	2076.	13.52635	2.574E+11
33.20000	-5.460E-05	-101747.	2122.	5.61682	2.574E+11
33.60000	1.478E-05	-91508.	2132.	-1.53916	2.574E+11
34.00000	7.598E-05	-81304.	2109.	-8.00425	2.574E+11
34.40000	0.000130	-71283.	2056.	-13.84536	2.574E+11
34.80000	0.000177	-61580.	1977.	-19.13216	2.574E+11
35.20000	0.000219	-52317.	1874.	-23.93563	2.574E+11
35.60000	0.000257	-43604.	1748.	-28.32674	2.574E+11
36.00000	0.000290	-35544.	1603.	-32.37507	2.574E+11
36.40000	0.000321	-28229.	1438.	-36.14746	2.574E+11
36.80000	0.000348	-21747.	1256.	-39.70675	2.574E+11
37.20000	0.000374	-16179.	1057.	-43.11042	2.574E+11
37.60000	0.000398	-11605.	842.43754	-46.40929	2.574E+11
38.00000	0.000422	-8099.	667.02292	-26.68014	2.574E+11
38.40000	0.000444	-5208.	537.82895	-27.15068	2.574E+11
38.80000	0.000466	-2943.	406.43596	-27.59639	2.574E+11
39.20000	0.000488	-1313.	272.94896	-28.02319	2.574E+11
39.60000	0.000510	-328.92589	137.44878	-28.43522	2.574E+11

40.00000	0.000532	0.000	0.000	-28.83511	2.574E+11

Output Summary for Load Case No. 3:

Pile-head deflection = 0.25000000 inches
Computed slope at pile head = 0.000000 radians
Maximum bending moment = -12772602. inch-lbs
Maximum shear force = 187102. lbs
Depth of maximum bending moment = 0.000000 feet below pile head
Depth of maximum shear force = 0.000000 feet below pile head
Number of iterations = 7
Number of zero deflection points = 2

Computed Values of Pile Loading and Deflection
for Lateral Loading for Load Case Number 4

Pile-head conditions are Displacement and Pile-head Rotation (Loading Type 5)
Displacement of pile head = 0.500000 inches
Rotation of pile head = 0.000E+00 radians
Axial load on pile head = 150000.0 lbs

Depth X feet	Deflect. y inches	Bending Moment in-lbs	Shear Force lbs	Soil Res. p lb/inch	Bending Stiffness lb-in^2
0.000	0.50000	-21345265.	283464.	0.000	2.574E+11
0.40000	0.49904	-19985826.	282912.	-114.59096	2.574E+11
0.80000	0.49630	-18628758.	282045.	-246.43293	2.574E+11
1.20000	0.49189	-17277118.	280514.	-391.54637	2.574E+11
1.60000	0.48593	-15934268.	278263.	-546.43381	2.574E+11
2.00000	0.47855	-14603793.	275249.	-709.18038	2.574E+11
2.40000	0.46985	-13289461.	271448.	-874.90627	2.574E+11
2.80000	0.45997	-11995109.	266852.	-1040.	2.574E+11
3.20000	0.44902	-10724555.	261470.	-1203.	2.574E+11
3.60000	0.43710	-9481570.	255316.	-1361.	2.574E+11
4.00000	0.42434	-8269824.	248423.	-1511.	2.574E+11
4.40000	0.41084	-7092769.	240845.	-1647.	2.574E+11
4.80000	0.39670	-5953564.	232615.	-1782.	2.574E+11
5.20000	0.38203	-4855341.	223759.	-1908.	2.574E+11
5.60000	0.36692	-3801010.	214339.	-2017.	2.574E+11
6.00000	0.35147	-2793104.	204439.	-2108.	2.574E+11
6.40000	0.33578	-1833727.	194103.	-2199.	2.574E+11
6.80000	0.31992	-924983.	183376.	-2271.	2.574E+11
7.20000	0.30397	-68545.	172352.	-2323.	2.574E+11
7.60000	0.28803	734381.	161119.	-2358.	2.574E+11
8.00000	0.27214	1482976.	149737.	-2385.	2.574E+11

8.40000	0.25639	2176598.	138277.	-2390.	2.574E+11
8.80000	0.24083	2815134.	126855.	-2370.	2.574E+11
9.20000	0.22553	3399038.	115526.	-2351.	2.574E+11
9.60000	0.21053	3928726.	104273.	-2338.	2.574E+11
10.00000	0.19588	4404505.	93137.	-2302.	2.574E+11
10.40000	0.18163	4827178.	82222.	-2245.	2.574E+11
10.80000	0.16781	5198051.	71634.	-2166.	2.574E+11
11.20000	0.15445	5518940.	61476.	-2066.	2.574E+11
11.60000	0.14159	5792152.	51848.	-1945.	2.574E+11
12.00000	0.12924	6020466.	42846.	-1806.	2.574E+11
12.40000	0.11744	6207098.	34231.	-1784.	2.574E+11
12.80000	0.10619	6352538.	25742.	-1753.	2.574E+11
13.20000	0.09551	6457513.	17430.	-1711.	2.574E+11
13.60000	0.08540	6522983.	9342.	-1659.	2.574E+11
14.00000	0.07589	6550138.	1525.	-1598.	2.574E+11
14.40000	0.06695	6540389.	-5976.	-1527.	2.574E+11
14.80000	0.05861	6495358.	-13118.	-1448.	2.574E+11
15.20000	0.05084	6416871.	-19903.	-1378.	2.574E+11
15.60000	0.04365	6306537.	-26374.	-1318.	2.574E+11
16.00000	0.03702	6165750.	-32537.	-1250.	2.574E+11
16.40000	0.03095	5996091.	-38351.	-1173.	2.574E+11
16.80000	0.02541	5799326.	-43777.	-1088.	2.574E+11
17.20000	0.02039	5577416.	-48774.	-994.19880	2.574E+11
17.60000	0.01587	5332525.	-53237.	-865.25471	2.574E+11
18.00000	0.01182	5067627.	-56896.	-659.44189	2.574E+11
18.40000	0.008235	4787468.	-59605.	-469.46789	2.574E+11
18.80000	0.005074	4496428.	-61442.	-295.55853	2.574E+11
19.20000	0.002316	4198517.	-62481.	-137.75734	2.574E+11
19.60000	-6.683E-05	3897377.	-62802.	4.05863	2.574E+11
20.00000	-0.002100	3596277.	-62480.	130.16245	2.574E+11
20.40000	-0.003812	3298128.	-61590.	240.96057	2.574E+11
20.80000	-0.005229	3005487.	-60202.	336.97605	2.574E+11
21.20000	-0.006376	2720569.	-58389.	418.83183	2.574E+11
21.60000	-0.007280	2445265.	-56214.	487.23449	2.574E+11
22.00000	-0.007965	2181153.	-53742.	542.95835	2.574E+11
22.40000	-0.008455	1929523.	-51030.	586.83035	2.574E+11
22.80000	-0.008772	1691386.	-48134.	619.71574	2.574E+11
23.20000	-0.008938	1467506.	-45105.	642.50459	2.574E+11
23.60000	-0.008973	1258409.	-41988.	656.09932	2.574E+11
24.00000	-0.008894	1064411.	-38826.	661.40331	2.574E+11
24.40000	-0.008721	885638.	-35657.	659.31053	2.574E+11
24.80000	-0.008468	722044.	-32513.	650.69635	2.574E+11
25.20000	-0.008151	573432.	-29424.	636.40935	2.574E+11
25.60000	-0.007782	439475.	-26415.	617.26436	2.574E+11
26.00000	-0.007374	319734.	-23508.	594.03647	2.574E+11
26.40000	-0.006937	213675.	-20720.	567.45612	2.574E+11
26.80000	-0.006482	120688.	-18066.	538.20520	2.574E+11
27.20000	-0.006015	40099.	-15558.	506.91404	2.574E+11
27.60000	-0.005545	-28811.	-13204.	474.15936	2.574E+11
28.00000	-0.005077	-86796.	-11008.	440.46292	2.574E+11

28.40000	-0.004617	-134631.	-8976.	406.29103	2.574E+11
28.80000	-0.004169	-173104.	-7108.	372.05463	2.574E+11
29.20000	-0.003737	-203002.	-5404.	338.11010	2.574E+11
29.60000	-0.003323	-225108.	-3861.	304.76050	2.574E+11
30.00000	-0.002929	-240189.	-2476.	272.25729	2.574E+11
30.40000	-0.002557	-248994.	-1245.	240.80255	2.574E+11
30.80000	-0.002206	-252247.	-161.51477	210.55141	2.574E+11
31.20000	-0.001879	-250646.	779.68437	181.61490	2.574E+11
31.60000	-0.001574	-244857.	1585.	154.06294	2.574E+11
32.00000	-0.001290	-235515.	2262.	127.92755	2.574E+11
32.40000	-0.001028	-223223.	2817.	103.20630	2.574E+11
32.80000	-0.000786	-208549.	3256.	79.86574	2.574E+11
33.20000	-0.000562	-192033.	3587.	57.84505	2.574E+11
33.60000	-0.000356	-174182.	3814.	37.05974	2.574E+11
34.00000	-0.000165	-155474.	3945.	17.40538	2.574E+11
34.40000	1.162E-05	-136363.	3984.	-1.23854	2.574E+11
34.80000	0.000176	-117279.	3935.	-19.00472	2.574E+11
35.20000	0.000330	-98631.	3803.	-36.03407	2.574E+11
35.60000	0.000476	-80812.	3591.	-52.47169	2.574E+11
36.00000	0.000614	-64201.	3301.	-68.46266	2.574E+11
36.40000	0.000746	-49167.	2934.	-84.14776	2.574E+11
36.80000	0.000874	-36070.	2493.	-99.65909	2.574E+11
37.20000	0.000999	-25269.	1978.	-115.11538	2.574E+11
37.60000	0.001121	-17120.	1388.	-130.61726	2.574E+11
38.00000	0.001242	-11981.	982.91522	-38.17843	2.574E+11
38.40000	0.001362	-7721.	796.80156	-39.36893	2.574E+11
38.80000	0.001481	-4367.	605.15168	-40.48519	2.574E+11
39.20000	0.001600	-1947.	408.29197	-41.53969	2.574E+11
39.60000	0.001718	-483.32157	206.49645	-42.54178	2.574E+11
40.00000	0.001837	0.000	0.000	-43.49841	2.574E+11

Output Summary for Load Case No. 4:

```
Pile-head deflection             =     0.50000000 inches
Computed slope at pile head      =       0.000000 radians
Maximum bending moment           =     -21345265. inch-lbs
Maximum shear force              =        283464. lbs
Depth of maximum bending moment  =       0.000000 feet below pile head
Depth of maximum shear force     =       0.000000 feet below pile head
Number of iterations             =              8
Number of zero deflection points =              2
```

Summary of Pile-head Responses for Conventional Analyses

Definitions of Pile-head Loading Conditions:

Load Type 1: Load 1 = Shear, V, lbs, and Load 2 = Moment, M, in-lbs

Load Type 2: Load 1 = Shear, V, lbs, and Load 2 = Slope, S, radians
Load Type 3: Load 1 = Shear, V, lbs, and Load 2 = Rot. Stiffness, R, in-lbs/rad.
Load Type 4: Load 1 = Top Deflection, y, inches, and Load 2 = Moment, M, in-lbs
Load Type 5: Load 1 = Top Deflection, y, inches, and Load 2 = Slope, S, radians

Load Case No.	Load Type	Pile-head Deflection inches	Pile-head Rotation radians	Max Shear in Pile lbs	Max Moment in Pile in-lbs
1	4	0.250000	-0.002510	81812.	4810094.
2	4	0.500000	-0.004578	123788.	8073277.
3	5	0.250000	0.0000	187102.	-12772602.
4	5	0.500000	0.0000	283464.	-21345265.

Maximum pile-head deflection = 0.5000000000 inches
Maximum pile-head rotation = -0.0045781319 radians = -0.262308 deg.

The analysis ended normally.

APPENDIX H

City of Murrieta Roadway

Structural Section Requirements

MINIMUM STRUCTURAL SECTION IN INCHES

T.I.	4.0		4.5		5.0		6.0		8.0		8.5		9.0	
TYPE	ALLEY/ PRKNG LTS		CUL-DE-SAC		LOCAL ROAD		RESIDENTIAL COLLECTOR		INDUSTRIAL COLLECTOR SECONDARY/MAJOR		ARTERIALS		EXPRESSWAY	
SUBGRADE														
R-VALUE	AC	AB	AC	AB	AC	AB	AC	AB	AC	AB	AC	AB	AC	AB
8					3	10	4	13						
10			3	8					4	18	5	18	6	18
12	3	6			3	9	4	12						
14									4	17	5	17	6	17
16			3	7			4	11			5	16	6	16
18	3	6			3	8			4	16				
20							4	10	4	15	5	15	6	15
22			3	6									6	14
24	3	6			3	7	4	9	4	14	5	14		
26											5	13	6	13
28							4	8	4	13				
30					3	6					5	12	6	12
32							4	7	4	12			6	11
34									4	11	5	11		
36							4	6					6	10
38									4	10	5	10	6	9
40											5	9		
42									4	9			6	8
44											5	8		
46									4	8			6	7
48											5	7	6	6
50									4	7	5	6		
52														
54									4	6				

NOTES:
1. AC = ASPHALT CONCRETE 95% COMPACTION.
2. AB = AGGREGATE BASE MATERIAL SHALL BE CLASS 2 PER CALTRANS SPECIFICATIONS OR CRUSHED AGGREGATE BASE PER GREENBOOK SPECIFICATIONS FOR PUBLIC STREETS. AB USED ON PRIVATE PROPERTY MAY USE CRUSHED MISCELLANEOUS BASE. PROCESSED MISCELLANEOUS BASE SHALL NOT BE PERMITTED. ALL OTHER CONSIDERED BASE MATERIAL TO BE APPROVED BY CITY ENGINEER. AB SHALL BE COMPACTED TO 95%.
3. SG = SUBGRADE SHALL BE COMPACTED TO 95% FOR TOP 12"
4. ON-SITE PARKING AREAS SHALL BE DETERMINED BY SEPARATE SOILS ANALYSIS WITH MIN. TI=4.
5. PRIVATE STREET SECTION SHALL BE PER LOCAL ROAD.

CITY OF MURRIETA
DEPARTMENT OF PUBLIC WORKS

REVISIONS	
5/92	
10/98	
APPROVED 1/14/10	

ROADWAY STRUCTURAL SECTION REQUIREMENTS

STD. NO.

120