APPENDIX 10G

Geologic and Foundation Design Criteria

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10G1 Introduction

This appendix includes the results of a recent subsurface investigation, and geotechnical assessment conducted by CHJ Incorporated (2005) for the Walnut Creek Energy Park (WCEP) to support the Application for Certification (AFC). The geotechnical appendix is included as an attachment to this appendix.

This appendix contains a description of the site conditions, and preliminary foundation-related subsurface conditions. Soil related hazards addressed include soil liquefaction, hydrocompaction (or collapsible soils), and expansive soils. Preliminary foundation and earthwork considerations are based on general published information available for the project area including recent geotechnical investigations for the property, and established geotechnical engineering practices. During the preparation of the Design Build Specification, a detailed geotechnical investigation will be conducted to address the subsurface soil conditions in order to develop site-specific and detailed design conditions.

Information contained in this appendix reflects the codes, standards, criteria and practices generally used in the design and construction of site and foundation engineering systems for the facility. More specific project information will be developed during execution of the project to support detailed design, engineering, material procurement, and construction specifications.

10G2 Site Conditions

The Walnut Creek Energy Park (WCEP) project site is an 11.48-acre parcel located on Bixby Drive in the City of Industry, California, Los Angeles County. The site is relatively flat and is underlain by Quaternary alluvial and older marine sediments.

A site-specific geotechnical investigation was performed in August 2005 at the project site by CHL, Incorporated. The scope of the study included an evaluation of geotechnical data to develop recommendations for site-specific grading, foundation design, and mitigation of geotechnical constraints. A copy of the geotechnical report is included as an attachment to this Appendix.

10G3 Site Subsurface Conditions

10G3.1 Stratigraphy

Generalized stratigraphy is discussed in Section 8.4, Geologic Hazards and Resources.

10G3.2 Seismicity/Ground Shaking

The project area has experienced seismic activity with strong ground motion during past earthquakes and it is likely that strong earthquakes causing seismic shaking will occur in this area in the future. According to the site-specific geotechnical study conducted for the project site, the estimated peak horizontal ground acceleration with a 10 percent probability of exceedance in 50 years is 0.47g (CHJ Incorporated, 2005). A description of the local geology and the relative location of major geologic faults in the area is presented in Section 8.4, Geologic Hazards and Resources.

10G3.3 Ground Rupture

Ground rupture is caused when an earthquake ruptures the ground surface. Since no known faults exist at the project site, the likelihood of ground rupture at the WCEP site is low.

10G3.4 Groundwater

The historic depth to groundwater at the project site is relatively shallow, approximately 23 to 27 feet.

10G4 Assessment of Soil-Related Hazards

10G4.1 Liquefaction

During strong earthquakes, loose, saturated, cohesionless soils can experience a temporary loss of shear strength and act as a fluid. This phenomenon is known as liquefaction. Liquefaction is dependent on depth to water, grain size distribution, relative density of the soils, degree of saturation, and intensity and duration of the earthquake. The potential hazard associated with liquefaction is seismically induced settlement. Soil liquefaction can lead to foundation bearing failures and excessive settlements when:

- The design ground acceleration is high
- The water level is relatively shallow
- Low SPT blow counts are measured in granular deposits (suggesting low soil density)

The historic depth to groundwater at the project site is approximately 23 to 27 feet, and the soil types generally consist of loose to medium dense sandy and gravelly units considered to be susceptible to liquefaction. In addition, this area is within an area identified to have a potential for liquefaction. Based site-specific soil testing, however, CHJ Incorporated (2005) determined the potential for liquefaction on site to be negligible.

10G4.2 Expansive Soils

Expansive soils shrink and swell with wetting and drying. The shrink-swell capacity of expansive soils can result in differential movement beneath foundations. Site-specific borings conducted in the vicinity of the project site have identified clay soils near the surface. Expansion potential testing was conducted and the results showed that a "medium" potential for expansion is present (CHJ, Incorporated, 2005). Based on this potential, foundation design criteria contain provisions to include the potential for expansive soils at

the site (see discussion, below). Expansive soils are further discussed in Section 8.11, Soils and Agriculture.

10G4.3 Collapsible Soils

Soil collapse (hydrocompaction) is a phenomenon that results in relatively rapid settlement of soil deposits due to addition of water. This generally occurs in soils having a loose particle structure cemented together with soluble minerals or with small quantities of clay. Water infiltration into such soils can break down the interparticle cementation, resulting in collapse of the soil structure. Collapsible soils are usually identified with index tests, such as dry density and liquid limit, and consolidation tests where soil collapse potential is measured after inundation under load.

Based on the available data, the potential for soil collapse at the site is expected to be remote (CHJ Incorporated, 2005).

10G5 Preliminary Foundation Considerations

10G5.1 General Foundation Design Criteria

For satisfactory performance, the foundation of any structure must satisfy two independent design criteria. First, it must have an acceptable factor of safety against bearing failure in the foundation soils under maximum design load. Second, settlements during the life of the structure must not be of a magnitude that will cause structural damage, endanger piping connections or impair the operational efficiency of the facility. Selection of the foundation type to satisfy these criteria depends on the nature and magnitude of dead and live loads, the base area of the structure and the settlement tolerances. Where more than one foundation type satisfies these criteria, then cost, scheduling, material availability and local practice will probably influence or determine the final selection of the type of foundation.

An evaluation of the information collected for the AFC indicates that no adverse foundation-related subsurface and ground water conditions would be encountered that would preclude the construction and operation of the proposed structures. The site can be considered suitable for development of the proposed structures in consideration of the geotechnical investigation to support of the engineering design, and using the information to address the preliminary foundation and earthwork considerations discussed in this appendix.

10G5.2 Deep Foundations

Based on the findings of the geotechnical report (CHJ Incorporated, 2005), attached, the power plant facility would be supported on a deep foundation system of pre-stressed concrete driven piles for heavily loaded structures. For lightly loaded structures, the geotechnical report recommends post-tensioned slabs to resist the potential effects of expansive soils.

10G5.3 Corrosion Potential and Ground Aggressiveness

Corrosivity tests will be conducted to determine whether the site soils to be non-corrosive or corrosive for buried steel based on the chloride content and pH values.

10G6 Preliminary Earthwork Considerations

10G6.1 Site Preparation and Grading

Site grading may include (1) removal of existing deleterious materials and (2) fill to bring the site to a final grade. The geotechnical report (CHJ Incorporated, 2005) indicates that undocumented fill was encountered at depths between 4 and 6 feet in borings at the site. The report recommends removal of at least the top 12 inches of soil at the site, for further investigation of the site, and additional search for undocumented fill. The site fill work should be performed as detailed below. All soil surfaces to receive fill should be proof rolled with a heavy vibratory roller or a fully loaded dump truck to detect soft areas.

10G6.2 Temporary Excavations

It is anticipated that confined temporary excavations at the site will be required during construction. All excavations should be sloped in accordance with OSHA requirements. Sheet piling could also be used to support any excavation. The need for internal supports in the excavation will be determined based on the final depth of the excavation. Any excavation below the water table should be dewatered using well points installed prior to the start of excavation.

10G6.3 Backfill Requirements

All fill material must be free of organic matter, debris or clay balls, with a maximum size not exceeding 2 inches. Structural fill must also be well graded and granular. Granular material with similar specifications can be used for pipe bedding, except that the maximum size should not exceed 0.5 inch.

Structural fill should be compacted to at least 95 percent of the maximum dry density as determined by ASTM D 1557 when used for raising the grade throughout the site, below footings or mats, or for rough grading. Fill placed behind retaining structures may be compacted to 90 percent of the maximum dry density as determined by ASTM D 1557. Initially, structural fill should be placed in lifts not exceeding 8 inches loose thickness. Thicker lifts may be used pursuant to approval based on results of field compaction performance. The moisture content of all compacted fill should fall within 3 percentage points of the optimum moisture content measured by ASTM D 1557, except compact the top 12 inches of subgrade to 95 percent of ASTM D 1557 maximum density.

Pipe bedding can be compacted in 12-inch lifts to 90 percent of the maximum dry density as determined by ASTM D 1557. Common fill to be placed in remote and/or unsurfaced areas may be compacted in 12-inch lifts to 85 percent of the maximum dry density as determined by ASTM D 1557.

10G7 Inspection and Monitoring

A California-registered Geotechnical Engineer or Engineering Geologist will monitor geotechnical aspects of foundation construction and/or installation, and fill placement. At a minimum the Geotechnical Engineer/Engineering Geologist will monitor the following activities:

- All surfaces to receive fill should be inspected prior to fill placement to verify that no pockets of loose/soft or otherwise unsuitable material were left in place and that the subgrade is suitable for structural fill placement.
- All fill placement operations should be monitored by an independent testing agency. Field compaction control testing should be performed regularly and in accordance with the applicable specification to be issued by the Geotechnical Engineer.
- The Geotechnical Engineer must witness all pile load testing and initial stages of production pile installation.
- Settlement monitoring of significant foundations and equipment is recommended on at least a quarterly basis during construction and the first year of operation, and then semi-annually for the next 2 years.

10G8 Site Design Criteria

10G8.1 General

The project will be located in the City of Industry. The 11.48-acre site is relatively flat. The site would be accessible from Bixby Drive.

10G8.2 Datum

The site grade varies between 320 to 335 feet, mean sea level. Final site grade elevation will be determined.

10G9 Foundation Design Criteria

10G9.1 General

Reinforced concrete structures (spread footings, mats and deep foundations) will be designed consistent with Appendix 10B.

Allowable soil bearing pressures for foundation design will be in accordance with this appendix.

10G9.2 Groundwater Pressures

Hydrostatic pressures due to groundwater or temporary water loads will be considered.

10G9.3 Factors of Safety

The factor of safety for structures, tanks and equipment supports with respect to overturning, sliding, and uplift due to wind and buoyancy will be as defined in Appendix 10B, Structural Engineering Design Criteria.

10G9.4 Load Factors and Load Combinations

For reinforced concrete structures and equipment supports, using the strength method, the load factors and load combinations will be in accordance with Appendix 10B, Structural Engineering Design Criteria.

10G9.4 Attachment 1, CHJ Incorporated. Geotechnical Investigation

10G10 References

California Building Code. 2004.

APPENDIX 10G

Attachment 1: Geotechnical Report

GEOTECHNICAL INVESTIGATION
911 BIXBY DRIVE
WALNUT ENERGY SITE
CITY OF INDUSTRY
LOS ANGELES COUNTY, CALIFORNIA
PREPARED FOR
TIC - THE INDUSTRIAL COMPANY
JOB NO. 05770-3

C.H.J. Incorporated
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August 12, 2005

TIC - The Industrial Company
35 North Lake Avenue, Suite 800
Pasadena, California 91101
Attention: Mr. Allen Woncha

Job No. 05770-3

Dear Mr. Woncha:

Attached herewith is the Geotechnical Investigation report prepared for the proposed power facility known as the Walnut Energy site, to be located at 911 Bixby Drive, City of Industry California.

This report was based upon a scope of services generally outlined in verbal communications with you.

We appreciate this opportunity to provide geotechnical services for this project. If you have questions or comments concerning this report, please contact this firm at your convenience.

Respectfully submitted,
C.H.J., INCORPORATED

James F. Cooke, Senior Staff Engineer

JFC:sra

Distribution: TIC - The Industrial Company (6)

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GEOTECHNICAL INVESTIGATION
WALNUT ENERGY SITE
911 BIXBY DRIVE
CITY OF INDUSTRY
LOS ANGELES COUNTY, CALIFORNIA
PREPARED FOR
TIC - THE INDUSTRIAL COMPANY
JOB NO. 05770-3

INTRODUCTION

During August of 2005, a geotechnical investigation was performed by this firm for the proposed power facility known as the Walnut Energy Site, to be located at 911 Bixby Drive in City of Industry, California. The subject project consists of approximately five proposed generators and associated structures. The purpose of this investigation was to explore and evaluate the geotechnical conditions at the subject site and to provide appropriate geotechnical recommendations for design and construction of the proposed facility.

To orient our investigation at the site, an undated, unscaled Site Plan was furnished for our use. The Site Plan indicated the locations of the proposed generators and other proposed structures. The approximate location of the site is shown on the attached Index Map (Enclosure "A-1").

The results of our investigation, together with our conclusions and recommendations, are presented in this report.

SCOPE OF SERVICES

The scope of services provided during this geotechnical investigation included the following:

- Review and analysis of stereoscopic aerial photographs flown from 1927 to 1963
- A geologic field reconnaissance of the site and surrounding area
- Placement of four exploratory borings on the site
- Logging and sampling of exploratory borings for testing and evaluation
- Laboratory testing on selected samples
- Evaluation of the geotechnical data to develop site-specific recommendations for site grading, foundation design, and mitigation of potential geotechnical constraints

PROJECT CONSIDERATIONS

Information furnished this office indicates that the project will consist of a power generator facility. Approximately five generators are proposed for the western two-thirds portion of the site. Loads range up to 620 kips for the turbine structures.

The project grading plan was not available at the time of our investigation. The general topography and the observation of the nearby development indicates that the construction of the site will entail minor cuts and fills. The final grading plan should be reviewed by the geotechnical engineer.

SITE DESCRIPTION

The site is located at 911 Bixby Drive, City of Industry, Los Angeles County, California. The site was developed as a warehouse in use for computer recycling. The remainder of the site was paved with asphalt concrete pavement. Railroad tracks bound the site to the south. To the north lies a power line easement with the San Jose Creek Channel beyond. To the east was Bixby Drive with additional warehouses beyond. The area to the west was undeveloped.

At the time of our investigation, the site was relatively level and near planar. Underground utilities are expected at the site.

As part of this investigation, stereoscopic aerial photographs of the site and surrounding area flown during the period 1927 through 1963 were reviewed. The oldest aerial photographs reviewed, flown in 1927, show most of the site developed with a distressed grove, probably citrus. The distressed citrus grove was apparently cleared after the date of the 1935 aerial photographs but prior to the date of the 1946 aerial photographs. The 1946 through 1953 photographs show the site in a relatively natural state, possibly in use for dry farming. The 1953 and 1954 photographs show most of the site in use for irrigated agricultural purposes, probably alfalfa and possibly row crops. The 1958 and 1963 photographs show the site again in a relatively natural state, possibly in use for dry farming.

No other surface features pertinent to this investigation were noted.

FIELD INVESTIGATION

The soil conditions underlying the subject site were explored by means of four exploratory borings drilled to a maximum depth of 68.5 feet below the existing ground surface with a truck-mounted CME 55 drill rig equipped for soil sampling. The approximate locations of our exploratory borings are indicated on the attached Plat (Enclosure "A-2").

Continuous logs of the subsurface conditions, as encountered within the exploratory borings, were recorded at the time of drilling by a geologist from this firm. Relatively undisturbed samples were obtained by driving either a split-spoon ring sampler or standard penetration sampler ahead of the borings at selected levels. After the required seating of the sampler, the number of hammer blows required to advance the sampler a total of 12 inches was converted to equivalent standard penetration test (SPT) data and recorded on the boring logs. The number is the equivalent SPT-N_{60} value and has been corrected for hammer type (automatic vs. manual cathead) and sampler size (California sampler vs. SPT sampler). Undisturbed as well as bulk samples of typical soil types obtained were returned to the laboratory in sealed containers for testing and evaluation.

Our exploratory boring logs, together with our equivalent SPT data, are presented in Appendix "B". The stratification lines presented on the boring logs represent approximate boundaries between soil types, which may include gradual transitions.

LABORATORY INVESTIGATION

Included in our laboratory testing program were field moisture content determinations on all samples returned to the laboratory and field dry densities on all undisturbed samples. The results are included on the boring logs. An optimum moisture content - maximum dry density relationship was established for a typical soil type. Direct shear testing was performed on selected remolded and undisturbed samples in order to provide shear strength parameters for bearing capacity, earth pressure evaluations and pile design. Sieve and hydrometer analyses were performed on selected samples as an aid to classification. Expansion and Atterberg Limits testing was performed to verify the expansive characteristics of clayey soils. A selected sample of material was delivered to M. J. Schiff and Associates, Inc. for corrosivity analysis.

Summaries of the laboratory test results appear in Appendix "C".

SITE GEOLOGY AND SUBSURFACE SOIL CONDITIONS

The site is located in the southeastern portion of the Los Angeles basin within a small east-west trending alluvial valley situated between the San Jose Hills and Puente Hills located north and south of the site, respectively. The San Jose Hills and Puente Hills are formed primarily in faulted and folded Tertiary age marine sedimentary rocks and are located within the Peninsular Ranges geomorphic province. The Peninsular Ranges province is characterized by northwest-trending topography and geologic structure including the Whittier fault zone located to the southwest.

The site is underlain by younger alluvium deposited as flood plain and valley sediments as mapped by Dibblee (1999) and is assigned an age of middle Holocene by Morton and Miller (2003). A geologic index map is included as Enclosure "A-3".

Data from our exploratory borings indicated that the soil profile at the site typically consists of fine-grained silt, sand, and clay units with coarser-grained sand and gravel lenses locally. These soils were in a loose to medium dense state with layers in a dense state occurring locally below a depth of about 20 feet. The approximate locations of the exploratory borings are shown on the attached Plat (Enclosure "A-2").

Fill was encountered in the exploratory borings to depths between 4 and 6.5 feet and consists of clayey sand.

Groundwater was encountered in the exploratory borings at depths between 23 and 27 feet. Bedrock was not encountered, nor was refusal experienced in any of the exploratory borings.

The results of our soluble sulfate testing indicate a "negligible" exposure to sulfate attack according to the American Concrete Institute. The soil is classified as severely corrosive to ferrous metals. Further information on soluble sulfate testing and the corrosivity analysis is included in Appendix "C".

A more detailed description of the subsurface soil conditions encountered is included within our exploratory boring logs.

FAULTING

The site does not lie within or immediately adjacent to an Alquist-Priolo Earthquake Fault Zone designated by the State of California to include traces of suspected active faulting. A table of significant faults within a 100 kilometer radius is included as Enclosure "G-1". A regional fault map (Jennings, 1994) is included as Enclosure "A-5".

The tectonics of the Southern California area is dominated by the interaction of the North American Plate and the Pacific Plate, which are sliding past each other in a apparent translational manner. Although some of the motion may be accommodated by rotation of crustal blocks such as the western Transverse Ranges (Dickinson, 1996), the San Andreas fault zone is thought to represent the major surface expression of the tectonic boundary and to be accommodating most of the translational motion between the Pacific Plate and the North American Plate. However, some of the plate motion is apparently also accommodated on other northwest-trending strike-slip faults that are thought to be related to the San Andreas system. These faults include the San Jacinto fault and the Elsinore fault. Local compressional or extensional strain resulting from the translational motion along this boundary is accommodated by left-lateral, reverse, and normal faults such as the Cucamonga fault, the Crafton Hills fault zone, and the blind thrust faults of the Los Angeles Basin (Matti and others, 1992; Morton and Matti, 1993).

WALNUT CREEK FAULT:

The southwestern terminus of the concealed Walnut Creek fault is shown approximately 1 1/4 miles northeast of the site on the fault map of the County of Los Angeles Safety Element (1990). The Walnut Creek fault is not included within an Alquist-Priolo Earthquake Fault Zone. According to Jennings (1994), the location and/or existence of the Walnut Creek is uncertain. The Walnut Creek fault is known only through groundwater data and petroleum investigations and has no surface expression (Smith, 1977). Smith (1997) concluded that there was no significant evidence to include the Walnut Creek in an Alquist-Priolo Zone. Geologic mapping by Dibblee (1999) does not show the trace of the Walnut Creek fault. The Walnut Creek fault is not considered to present a ground rupture or seismic shaking hazard to the site.

WHITTIER FAULT:

The northern trace of the active Whittier fault is located approximately 3 1/4 miles southwest of the site as depicted on the Alquist-Priolo Earthquake Fault Zone map of the La Habra quadrangle. The Whittier fault exhibits right-lateral strike slip motion (Rockwell and others, 1988). Evidence for activity of the

Whittier fault includes offset of Holocene materials (Hannan and Lung, 1979) and microseismicity (Ziony and Yerkes, 1985). The Working Group on California Earthquake Probabilities (1995) tentatively assigned a 5 percent (±3 percent) probability of a major earthquake on the Whittier fault for the 30 year interval from 1994 to 2024.

SIERRA MADRE FAULT ZONE:

The Sierra Madre fault zone is located approximately 10 miles north of the site. The Sierra Madre fault zone is a series of east-west trending, predominantly reverse and thrust faults coincident with the southern margin of the San Gabriel Mountains known as the Transverse Ranges frontal fault system.

PUENTE HILLS BLIND THRUST SYSTEM:

The Puente Hills Blind Thrust system (PHT) is a series of east-west trending, north-dipping reverse faults that terminate updip at a depth of about 3 kilometers (thus the term "blind" thrust). These faults form a series of anticlines at the surface expressed as hills that extend from the downtown Los Angeles area to the Coyote Hills in northern Orange County (Shaw and others, 2002). These faults are identified based on seismic reflection profiles and oil well data. The 1987 Whittier Narrows earthquake and the 1994 Northridge earthquake are examples of blind thrust faulting on previously unknown faults. Shaw and others (2002) estimate that a multi-segment rupture scenario on the Puente Hills blind-thrust system could generate earthquakes of M_w 7.1. The surface of the Coyote Hills segment of the PHT is located at a depth of about 5 miles beneath the site.

HISTORICAL EARTHQUAKES

A map of recorded earthquake epicenters is included as Enclosure "A-4" (Epi Software, 2000). This map includes the Cal Tech database for earthquakes with magnitudes of 4.0 or greater from 1977 through 2005. The following table summarizes significant earthquakes that have occurred in the site region.

LIST OF HISTORICAL EARTHQUAKES

Earthquake	Date	Magnitude (Mw)	Epicentral Distance (miles)	Direction from Site
Long Beach	03/11/1933	6.4	26	South
Sylmar	02/09/1971	6.6	40	Northwest
Whittier Narrows	10/01/1987	5.9	10	West

Earthquake	Date	Magnitude (Mw)	Epicentral Distance (miles)	Direction from Site
Sierra Madre	06/28/1991	5.8	18	North-Northwest
Landers	06/28/1992	7.3	82	East-Northeast
Big Bear	06/28/1992	6.4	60	East-Northeast
Northridge	01/17/1994	6.7	38	Northwest
Hector Mine	03/16/1999	7.4	104	Northeast

SEISMIC ANALYSIS

The precise relationship between magnitude and recurrence interval of large earthquakes for a given fault is not known due to the relatively short time span of recorded seismic activity. As a result, a number of assumptions must be made to quantify the ground shaking hazard at a particular site. Seismic hazard evaluations can be conducted from both a probabilistic and a deterministic standpoint. The probabilistic method is prescribed by current codes and was utilized to estimate the seismic hazard to the site during this investigation.

PROBABILISTIC HAZARD ANALYSIS:

The probabilistic analysis of seismic hazard is a statistical analysis of seismicity of all known regional faults and seismic sources attenuated to a particular geographic location. The results of a probabilistic seismic hazard analysis (PSHA) are presented as the annual probability of exceedance of a given strong motion parameter for a particular exposure time (Johnson and others, 1992).

For this report, the seismic hazard analysis computer program EZFRISK, version 7.12 (Risk Engineering, 2005) was used to analyze the location of the site under the criteria for a "soil" site type with an average shear wave velocity of 270 m/s in the upper 30 meters (100 feet). The estimated value for the peak ground acceleration (PGA) was calculated as the average of the accelerations computed using the attenuation relations of Boore et al. (1997), Sadigh et al. (1997), and Abrahamson and Silva (1997) in relation to seismogenic faults within a 93-mile (150-km) radius of the site. The EZFRISK program considers seismicity from mapped seismogenic faults and background sources (those earthquakes not associated with a mapped fault source) and assumes that the occurrence rate of earthquakes on a fault is proportional to the estimated slip rate of that fault. Potential earthquake magnitudes are correlated to expected seismic sources and the resultant maximum ground acceleration at the site is computed.

Based on the site-specific PSHA performed for the site, the estimated peak horizontal ground acceleration with a 10 percent probability of exceedance in 50 years (statistical return period of 475 years) is 0.47g. This corresponds to the Design Basis Earthquake as defined in the 2001 California Building Code (CBC). The estimated peak horizontal ground acceleration with a 10 percent probability of exceedance in 100 years (statistical return period of 949 years) is 0.59g and corresponds to the Upper Bound Earthquake as defined in the 2001 CBC.

SEISMIC ZONE:

Figure 16A-2 presented in the 2001 CBC places Los Angeles County, including the site, within Seismic Zone 4. Table 16-I of the 1997 Uniform Building Code (UBC) assigns a Seismic Zone Factor "Z" of 0.40 to Seismic Zone 4.

NEAR-SOURCE EFFECTS:

The Coyote Hills segment of the Puente Hills thrust fault system is located below the site at a depth of approximately 5 miles (8 kilometers) and is capable of generating an earthquake of Mw 7.1 (Shaw and others, 2002). The surface trace of the Whittier fault is located approximately 3 1/4 miles (2 kilometers) and is capable of generating an earthquake of Mw 7.2. Based on these data, we consider the Whittier fault to be the dominant seismic hazard to the site. For the purpose of near-source effect evaluation, maps of near-source zones in California, including a classification table for the faults involved, were prepared by the California Division of Mines and Geology to be used with the 1997 UBC (International Conference of Building Officials, 1997). The Whittier fault is classified as a Type "B" fault by the California Division of Mines and Geology (Petersen and others, 1998). Based on the distance of 3 1/4 miles (2 kilometers) to the Whittier fault, the near-source acceleration factor N_A, as defined in the 2001 CBC, is 1.3, and the near-source velocity factor N_V is 1.6.

SUBSIDENCE

Subsidence of the ground surface has been reported in some areas of southern California. Principal causes have been fluid withdrawal (oil, gas, and water), soil collapse, and oxidation of organic-rich soil. No organic-rich soils with significant collapse potential were encountered during this investigation nor would any be expected to be present in the general area of the site. Oil is currently being extracted in the Puente Hills and other areas. Current oil extraction practices, which include water injection methods, have been shown to essentially halt subsidence and cause rebound of previously subsided surfaces

(Allen, 1973). Although tectonic subsidence of the central trough of the Los Angeles Basin is thought to be continuing (Troxel, 1954; Wright, 1991), the amount of tectonic subsidence expected over the lifetime of the project (100 years) would not be significant.

GROUNDWATER AND LIQUEFACTION

The site is located within an area identified by the State of California to have a potential for liquefaction and associated ground displacement. Also, according to the County of Los Angeles Safety Element (1990) the site is located within an area susceptible to liquefaction (1990).

According to a map of ground water level contours prepared by the California Geological Survey (1998), the historic high water level beneath the site is between 10 and 20 feet below the ground surface (bgs). Based on recent ground water level measurements in monitoring wells located about 1/2 mile northwest of the site, groundwater was at a depth between 13 and 20 feet bgs on April 6, 2005.

Groundwater was encountered at depths between 23 and 27 feet bgs in the exploratory borings conducted as part of this investigation.

Liquefaction is a process in which strong ground shaking causes saturated soils to lose their strength and behave as a fluid (Matti and Carson, 1991). Ground failure associated with liquefaction can result in severe damage to structures. The geologic conditions for increased susceptibility to liquefaction are: 1) shallow groundwater (less than 50 feet in depth), 2) presence of unconsolidated sandy alluvium, typically Holocene in age, and 3) strong ground shaking. All three of these conditions must be present for liquefaction to occur. The site is underlain by clayey and silty alluvial materials that include granular sandy and gravelly units considered to be susceptible to liquefaction. Therefore, we have performed a site-specific liquefaction evaluation based on a ground water level of 10 feet bgs (the estimated historic high ground water level).

The liquefaction potential of the site has been evaluated using the procedure described by Seed and Idriss (1982) and Seed and others (1985) and as recently modified by the National Center for Earthquake Engineering Research (Youd and Idriss, 2001).

Liquefaction typically occurs when relatively loose to medium dense granular soils below the water table are subject to strong ground motion. If a saturated sandy soil is subjected to vibration, it tends to

compact and decrease in volume. The tendency to decrease in volume results in an increase in pore water pressure. If the pore water pressure builds up to the point at which it is equal to the overburden pressure, the effective stress becomes zero, and the soil loses its strength and develops a liquefied state (Seed and Idriss, 1982).

The method of evaluating liquefaction potential consists of comparing the cyclic stress ratio (CSR) developed in the soil by the earthquake motion to the cyclic stress ratio or cyclic resistance ratio (CRR) that will cause liquefaction of the soil for a given number of cycles. In the simplified procedure, the CSR developed in the soil is calculated from a formula that incorporates ground surface acceleration, total and effective stresses in the soil at different depths (which in turn are related to the location of the groundwater table), non-rigidity of the soil column, and a number of simplifying assumptions.

The CSR that will cause liquefaction is related to the relative density of the soil, expressed in terms of SPT blowcounts (N_{60}), normalized for an effective overburden pressure of 1 ton per square foot $(N_1)_{60}$. Projected future minimum depths to groundwater of 10 feet bgs at the site were utilized to calculate the liquefaction potential in the area. A peak horizontal ground acceleration of 0.42g and an earthquake magnitude 7.1 were utilized as input into the liquefaction analysis program ALISE (Yi, 2002).

Exploratory Boring No. 2 was drilled utilizing the SPT sampler in order to provide the necessary data for liquefaction calculations. In addition, data from other borings was considered in order to obtain general in-place density information for our calculations. The site's liquefaction potential has been evaluated utilizing data from the boring profiles and the above mentioned projected future depth of groundwater. Our calculations indicated that during a major seismic event, the potential for liquefaction appears to negligible

The detailed results are included in Appendix "D".

SLOPE STABILITY

No significant natural slopes exist on the site, and no significant cut slopes are anticipated for the proposed construction. No evidence of landsliding was observed on the site and landsliding is not anticipated.

FLOODING AND EROSION

No evidence of recent significant flooding at the site was observed during the geologic field reconnaissance. The site is located in an unmapped area (065035) by the Federal Emergency Management Agency (FEMA). San Jose Creek is channelized along the northern boundary of the site.

SEISMIC SETTLEMENT

Equivalent SPT blow counts and density testing performed on relatively undisturbed samples indicate that the soils encountered generally consisted of stiff to very stiff soils without a potential for significant consolidation or settlement.

Based upon the data from our exploratory borings, soils encountered in this site were basically sandy clay and clayey silt. For these types of soils, it is anticipated that seismically-induced settlement will be not significant.

EXPANSION POTENTIAL

An expansion index (E.I.) test was performed to determine the expansion potential of the upper soil layer. The result is presented in the Test Data Summary (Enclosure "C-1"). The value of E.I. obtained indicates a "medium" potential for expansion. According to the 1997 UBC and 2001 CBC, special provisions should be made in the foundation design and construction to safeguard against damage due to this expansion index.

CONCLUSIONS

On the basis of our research and field and laboratory investigations, it is the opinion of this firm that construction of the proposed power facility is feasible from a geotechnical standpoint, provided the recommendations contained in this report are implemented during planning, grading, and construction.

No evidence of active faulting was observed on or adjacent to the site.

Severe seismic shaking of the site can be expected during the lifetime of the proposed facility.

Fill was encountered in the exploratory borings to depths between 4 and 6.5 feet.

All of our exploratory borings experienced slight caving upon removal of the drilling augers.

Bedrock was not encountered, nor was refusal experienced in any of the exploratory borings.

Groundwater was encountered in the exploratory borings at depths between 23 and 27 feet bgs. Holocene-age granular soils were also encountered. However, based on our site-specific liquefaction evaluation, the potential for liquefaction appears to negligible.

No evidence of recent flooding of the site or surrounding area was observed. A channelized drainage is located along the northern property boundary. Major flooding of the site appears unlikely.

No significant natural slopes exist on the site, and significant cut slopes are not expected for the proposed construction.

Due to the clayey lithology of the soils encountered, the potential for hydroconsolidation and seismic settlement is considered to be very low.

Conditions conducive to subsidence due to fluid withdrawal do not appear to be present at this site.

Based upon our field investigation and test data, it is our opinion that the proposed power facility should be supported on a deep foundation system. For heavily loaded structures, we have provided recommendation for pre-stressed concrete driven piles. Pile foundations need to bear a minimum of 36 feet below the pile cap. Based on the investigation performed, we are unable to provide bearing recommendations for piles that extend more than 55 feet below the existing ground elevation at the time of this report.

For lightly loaded structures, we are providing recommendations for posttensioned slabs to resist the effects of expansive soil. Other types of foundations may also be utilized to resist the effects of expansion.

Because of the site conditions, it is our recommendation that a minimum of the upper 12 inches of existing soil over the entire site, including those area where structures are supported by piles or posttensioned

slabs, be removed. The underlying soil should then be observed by our engineering geologist and any additional undocumented fill be removed and replaced as properly compacted fill. This minimum mandatory removal (12 inches) is to be performed in order to locate and facilitate removal of undocumented fill, unsuitable materials, and debris that may exist.

The on-site soils encountered are generally clay with fine sand. The clayey soils are considered to have a "medium" potential for expansion. These on-site soils should not be utilized for wall backfill material because of their "medium" expansion potential.

Results of corrosivity testing indicate that the on-site soils may be severely corrosive to ferrous metals. Results of soluble sulfate testing indicate a "negligible" anticipated exposure to sulfate attack. Soluble chloride content of the soil was not at levels high enough to be a concern to reinforcing steel.

RECOMMENDATIONS

SEISMIC DESIGN CONSIDERATIONS:

Severe seismic shaking of the site can be expected during the lifetime of the proposed facility. Therefore, the proposed structure, appurtenances, and any future structures should be designed accordingly.

The site is subject to the near-source effects of strong motion. The applicable near-source acceleration factor N_A, as defined in the 2001 CBC, is 1.3, and the near source velocity factor N_V is 1.6.

The site is located within Seismic Zone 4.

This site is classified as type S_D, stiff soil, according to the 2001 CBC.

GENERAL SITE GRADING:

It is imperative that no clearing and/or grading operations be performed without the presence of a representative of the geotechnical engineer. An on-site, pre-job meeting with the developer, the contractor, and the 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, at a minimum, in accordance with these recommendations and with applicable portions of the CBC. The following recommendations are presented for your assistance in establishing proper grading criteria.

INITIAL SITE PREPARATION:

All areas to be graded should be stripped of significant vegetation, existing pavement, and other deleterious materials. These materials should be removed from the site for disposal. Any existing utility lines and/or other underground structures should be traced, removed, and rerouted from the grading areas.

All existing pockets of undocumented fill or loose disturbed soils encountered during construction should be completely removed, cleaned of significant deleterious materials, and may be reused as compacted fill. Deleterious materials encountered at this time should be removed and replaced with compacted fill.

To assist in undocumented fill and disturbed native soil identification and removal, it is our opinion that a minimum depth of 12 inches of existing soils below the existing ground surface within the building area and 5 feet beyond, where practical, should be completely removed and cleaned of significant deleterious materials. The removed soils may be reused as compacted fill. Deeper fills and/or deeper disturbed native soils requiring complete removal will exist. The bottom of this excavation should be observed by the engineering geologist to verify the complete removal of undocumented fill material and disturbed native soils. Following approval, the bottom should be scarified to a depth of approximately 12 inches, brought to between optimum moisture content and 2 percent above, and recompacted to at least 90 percent relative compaction (ASTM D 1557-00) prior to refilling the excavation to grade as properly compacted fill.

Cavities created by removal of subsurface obstructions such as utility lines should be thoroughly cleaned of loose soils, organic matters, and other deleterious materials, shaped to provide access for construction equipment, and backfilled as recommended for site fill. A lean sand cement slurry may be considered to fill void areas difficult to compact.

PREPARATION OF FILL AREAS:

Prior to placing fill, after the mandatory subexcavation operation, observation, and approval by the engineering geologist, the surfaces of all areas to receive fill should be scarified to a depth of approxi-

mately 12 inches. The scarified soils should be brought to at least 2 percent above optimum moisture content and recompacted to a relative compaction of at least 90 percent in accordance with ASTM D 1557-00.

SHRINKAGE AND SUBSIDENCE:

Based upon the relative compaction of the soils determined during this investigation and the relative compaction anticipated for compacted fill soils, we estimate a compaction shrinkage of approximately 2 to 7 percent. Therefore, 1.02 to 1.07 cubic yards of in-place soil material would be necessary to yield 1 cubic yard of properly compacted fill material. In addition, we would anticipate subsidence of approximately 0.5 to 1 inch. These values are exclusive of losses due to stripping, or the removal of other subsurface obstructions, if encountered, and may vary due to differing conditions within the project boundaries and the limitations of this investigation.

Values presented for shrinkage and subsidence are estimates only. Final grades should be adjusted, and/or contingency plans to import or export material should be made to accommodate possible variations in actual quantities during site grading.

COMPACTED FILLS:

The on-site soils should provide adequate quality fill material provided they are free from roots, other organic matter, and deleterious materials. 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.

Although not anticipated, import fill 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 observed and approved by the geotechnical engineer prior to their use.

Fill should be spread in near-horizontal layers, approximately 8 inches in thickness. Thicker lifts may be approved by the geotechnical engineer if testing indicates that the grading procedures are adequate to achieve the required compaction. Each lift shall be spread evenly, thoroughly mixed during spreading to attain uniformity of the material and moisture in each layer, brought to between optimum moisture content and 2 percent above, and compacted to a minimum relative compaction of 90 percent in accordance with ASTM D 1557-00.

If the compacted fills are prepared as recommended, the differential settlement is expected to be on the order of 0.5 inch.

SHALLOW FOUNDATION RECOMMENDATIONS

PREPARATION OF POSTTENSIONED SLAB AREAS:

All posttensioned slabs should rest upon at least 12 inches of properly compacted fill material. In areas where the required thickness of compacted fill is not accomplished by the mandatory subexcavation operation, the posttensioned slabs areas should be subexcavated to a depth of at least 12 inches below the proposed footing base grade. The subexcavation should horizontally extend beyond the slab lines a minimum distance of 5 feet at the base of the excavation where possible. The bottom of this excavation should then be scarified to a depth of at least 12 inches, brought to at least 2 percent above optimum moisture content, and recompacted to at least 90 percent relative compaction in accordance with ASTM D 1557-00 prior to refilling the excavation to grade as properly compacted fill.

POSTTENSIONED SLAB DESIGN:

Based upon the results of the tests, we are providing the following parameters required for the design of post-tensioned slabs (Ch. 18, Div. III, 2001 CBC):

1. Allowable soil bearing pressure	1,000 psf
2. Edge moisture variation distance	3.0 feet edge lift 6.0 feet center lift
3. Differential soil movement	0.512 inch edge lift 4.702 inch center lift
4. Slab-subgrade friction coefficient	0.15

Numbers 2 and 3 above relate to expansive soils and are based upon a Thornwaite Moisture Index of -20, a constant suction of 3.6 pF at a depth of 5 feet, a velocity of moisture flow of 0.7 inch per month, and predominantly illite clay soil with 60 percent clay.

Utility line connections should be flexible to allow for differential movement.

LATERAL LOADING:

Resistance to lateral loads will be provided by passive earth pressure and base friction. For footings bearing against compacted fill or approved native soils, passive earth pressure may be considered to be developed at a rate of 250 psf per foot of depth. Base friction may be computed at 0.15 times the normal load. Base friction and passive earth pressure may be combined without reduction.

DEEP FOUNDATION RECOMMENDATIONS

ALLOWABLE AXIAL PILE CAPACITY:

The results of our pile analyses indicate an ultimate downward capacity of 1093 kip and uplift capacity of 223 kip for a driven 20-inch in square pre-stressed concrete piles, 36 feet embedment length. The ultimate and allowable vertical capacity vs. pile length for both downward and uplift are included in Enclosures "E-2" and "E-3".

The maximum allowable downward capacity utilized a factor of safety of 3.0 for skin friction and 3.0 for tip bearing. The maximum allowable uplift capacity utilized a factor of safety of 4.0 for skin friction and 2.0 for pile weight. Because of the vertical variability of the soils and the requirement to limit settlement to 0.25 inch, it is our recommendation to limit the allowable downward capacity to a maximum of 200 kips for the minimum depth of embedment of 36 feet. These capacities may be increased by one-third for wind or seismic loading. The capacities provided are based on soil strengths. Structural capacities of piles must be verified by the design engineer.

For properly installed piles, it is anticipated that a total settlement of 1/4 inch per pile is required to fully mobilize the indicated capacities.

LATERAL PILE CAPACITY:

As a part of our lateral pile capacity evaluations, we analyzed the behavior of 20-inch pre-stressed concrete piles embedded into the generalized soil profile encountered at the site for both free head and fixed head conditions. Base shear force were applied at the top of the pile which was assumed to be ground surface. The graphed results showing lateral load vs head deflection and lateral load vs maximum moment for both free and fixed head conditions are included in Enclosures "E-7" and "E-10".

A section rigidity (EI) of 5.36×10^{10} kip·in^2 was utilized for 20-inch pre-stressed concrete pile. This should be verified by the structural engineer.

PILE SPACING, GROUP EFFICIENCY:

Generally, piles in groups should be spaced at a minimum of two and one-half times the pile diameter width, center to center. For this recommended spacing, there is no reduction in axial capacities. If the spacing is smaller than this value, following group efficiency should be considered.

AXIAL GROUP EFFICIENCY:

The axial load capacity of pile groups can be calculated as follows (Coduto, 1994):

$$P_{ag} = \eta \cdot N \cdot P_{as}$$

where:

P_{ag}	=	net allowable capacity of pile group
h	=	group efficiency factor
N	=	number of piles in group
P_{as}	=	net allowable capacity of a single isolated pile

The group efficiency factor can calculated using the following formula:

$$\eta = 1 - \theta \frac{(n-1)m + (m-1)n}{90mn}$$

where:

m	=	number of rows of piles
n	=	number of piles per row
q	=	$\tan^{-1}(B/s)$ (expressed in degree)
B	=	diameter of a single pile
s	=	center-to-center spacing of piles

LATERAL PILE GROUP EFFICIENCY:

For lateral loaded pile groups, the pile-soil-pile interaction will make the leading row of piles carry more than its share of the applied shear load. The subgrade reaction coefficient for the piles behind the leading row can be calculated as follows (Japan Road Association, 2002).

$$(k_H)_{gi} = \eta \cdot k_H$$

where:

k_H = subgrade reaction coefficient for single pile. For the foundation of Bent 7, an average value at top 30 feet is 88 kip/ft^3

η = group efficiency factor

$$\eta = 1 - 0.2\left(2.5 - \frac{s}{B}\right) \quad (s<2.5B)$$

where:

B = diameter of a single pile

s = center-to-center spacing of piles

No group effect will be considered when s/B>2.5.

The load carried by the leading row is assumed to be twice its share of the applied load:

$$V \approx \frac{2V_g}{N}$$

where:

V = shear load on a leading row pile

V_g = applied shear load on the pile group

N = number of piles in the group

Under a large earthquake load, the pile group will experience a large lateral nonlinear deformation. The group efficiency factor is usually taken as:

$$\eta = 0.5$$

This group efficiency factor can be applied to both subgrade reaction factor and lateral bearing capacity.

DRIVEN PILE INSTALLATION:

After the minimum depth of embedment has been attained, piles should be driven to practical refusal. The axial capacity of piles driven to practical refusal may be established by structural considerations.

For driven piles, pre-drilling is anticipated to be necessary to obtain minimum depths. The size of auger and depth of drilling should be reviewed by the project geotechnical engineer. Pre-drilling should extend to within no more than 5 feet of the final pile tip elevation. Modification of drilled depth maybe necessary during installation. The cross-sectional area of the auger should not exceed 70 percent of the pile cross-sectional area. Piles in groups should be driven starting from the center of the group, proceeding outward.

Prior to concrete placement, any disturbed soils under and within the areas of the pile caps, or at the sides of pile caps should be compacted to at least 90 percent relative compaction (ASTM D 1557).

Once the pile type and hammer model are known, criteria for practical refusal may be established.

Prior to the actual driving of piles for the proposed structures, it is recommended that "indicator" piles be driven at various locations across the site to verify established driving criteria and to verify the underlying soil profile. These piles may be utilized for foundation support if driven in their final position. The driving criteria can be modified as needed based upon the results of these indicator piles.

RETAINING WALLS:

For preliminary retaining wall or shoring design purposes, a lateral active earth pressure developed at a rate of 40psf per foot of depth should be utilized for unrestrained conditions. For restrained conditions, an at rest earth pressure of 65 psf per foot of depth should be utilized. Because of the expansive nature of the existing near surface soils, on-site soils should not be utilized for wall backfill. Retaining walls should be backfill with a non-expansive soil (E.I. < 20) to a distance behind the wall equal to the elevation above the top of the retaining wall footing. These values should be verified prior to construction when the backfill materials and conditions have been determined and are applicable only to level 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.

Foundation concrete should be placed in neat excavations with vertical sides, or the concrete should be formed and the excavations properly backfilled as recommended for site fill.

Seismic Earth Pressure

The seismic earth pressure acting on a retaining wall was calculated by the Mononobe-Okabe method. Pseudostatic horizontal acceleration coefficient (K_h) was assumed to be one-half of the maximum acceleration for an earthquake of statistical return period of 475 years (0.42g). The pseudostatic vertical acceleration coefficient (K_v) was taken as half of K_h. For retaining walls with on-site soils as backfill, a unit weight of 115 pcf, and friction angle of 16 degrees were used in the calculation.

An inverted triangular distribution of lateral earth pressure of the seismic component only was determined as 25H for level backfill, where H is the height of the wall in feet. For sloped backfill, the pseudostatic horizontal acceleration of the site was too high and beyond the limits of the method. Further evaluation should be performed by other method such as finite element analysis if it is required.

Concrete should be placed in neat excavations with vertical sides, or the concrete should be formed and the excavations properly backfilled.

Backfill behind the retaining wall should consist of a soil of sufficient granularity that the backfill will properly drain. The granular soil should be classified per the USCS as either a GW, GP, SW, SP, SW-SM, or SP-SM. Surface drainage should be provided to prevent ponding of water behind walls. A drainage system should be installed behind all retaining walls consisting of any of the following:

1. A 4-inch diameter perforated PVC (Schedule 40) pipe or equivalent at the base of the stem encased in 2 cubic feet of granular drain material per linear foot of pipe.
2. Synthetic drains such as Enkadrain, Miradrain, Hydraway 300, or equivalent.

Perforations in the PVC pipe should be 3/8-inch diameter. Granular drain material should be wrapped with filter cloth to prevent clogging of the drains with fines. The wall should be waterproofed to prevent nuisance seepage. The water will need to outlet to an approved drain.

SLABS-ON-GRADE:

Slabs for structures supported on a deep foundation system should be design to be structurally supported by the foundation system. To provide adequate support during construction, the structurally supported slabs-on-grade should bear on a minimum of 12 inches of compacted soil. The soil should be compacted

to 90 percent relative compaction. The final pad surfaces should be rolled to provide smooth, dense surfaces.

Slabs for structures supported on a shallow foundation system utilizing the existing shallow on-site soils should be design and construction utilizing procedures described in EXPANSIVE SOILS below.

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.

For design proposes, vertical and lateral subgrade reaction coefficients of the existing on site soils have been provide in Appendix "F".

EXPANSIVE SOILS:

Clayey soil materials tested during this investigation exhibited a "medium" potential for expansion with an E.I. of 58 in accordance with UBC Standard Test Method 18-2 (2001 CBC). This material exhibited a plasticity index of 33 as per ASTM D 4318. The results of these tests are presented in the Test Data Summary (Enclosure "C-1"). Therefore, special design and construction procedures to mitigate the effects of expansive soils will be necessary at this time.

For structures founded on a deep pile foundation system, no further mitigation measures are necessary For structures founded on shallow foundation system, mitigation of the expansive soils will be necessary. Mitigation measures may include removal and replacement of the expansive soils with granular non-expansive (E.I. = 0) soils to a depth of 4 feet below pad grade or the use of a rigid foundation system such as posttensioned slab-on-grade. Appropriate CBC design parameters from Chapter 18, Division III of the 2001 CBC are included below.

CONCRETE FLATWORK:

The expansive soils conditions identified on the site may adversely affect areas of portland cement concrete (PCC) flatwork such as sidewalks, driveways, curbs, and other non structural pavement areas. PCC flatwork will require special geotechnical or structural design considerations to accommodate the effects of expansion. For structural building slab areas, we have provided recommendations for post-

tensioned slab design; however, posttensioned slabs are not practical for concrete flatwork. As such, we are including the following general recommendations for concrete flatwork.

Geotechnical Methods of Mitigation:

If a granular non-expansive soil is to be imported, the weighted E.I. method outlined in the CBC could be utilized to incrementally decrease the potential effects of expansive soils. The expansive effects can be reduced to a level of insignificance by supporting the flatwork on a minimum of 36 inches of granular non-expansive material.

The expansive soils should be pre-saturated to a depth of 24 inches at least 7 days prior to placement of concrete. The pre-saturation should be to at least 5 percent above optimum moisture content.

The expansive soils should be protected from moisture fluctuations to the extent practical. This may involve such factors as providing positive drainage away from the flatwork, avoidance of adjacent landscaping (especially trees) requiring irrigation, or perhaps placement of impermeable membranes. Irrigation pipes should not be placed near flatwork and must be properly maintained in order to avoid distress related to leaks and rupture. Landscape areas should slope away from the flatwork and structural areas by at least 3 percent. All surface water runoff must be diverted away from the margins of flatwork and structural areas and directed into paved roadways or appropriate drainage features.

Structural Methods of Mitigation:

All flatwork should be designed to resist the effects of expansion. We are providing what we consider typical recommendations. The actual design including reinforcement should be provided by the structural or civil engineer.

All concrete flatwork subject to the effects of expansive soils should be a minimum of 4 inches in thickness and reinforced by utilizing a minimum of 6×6-10×10 wire mesh or #3 Bars at 14 inches each way at mid-height. Curbing should contain at least one #4 Bar continuous top and bottom.

Where the flatwork abuts structures or adjacent flatwork, the flatwork should be doweled into the adjacent structure to avoid differential elevation. The dowels should be smooth and either wrapped or lubricated on one end to prevent bonding and allow for movement. In addition, felt or similar material should be placed between adjacent slab edges.

It should be cautioned that some distress to concrete flatwork may occur in spite of the measures taken to mitigate the effects. However, the distress will be lessened by incorporating as many of the above measures as practical into the design and construction of the flatwork. The costs of these preventative measures should be weighed against the costs of future repairs and maintenance.

Additional evaluation of soils for expansion potential should be conducted by the geotechnical engineer during the grading operation.

POTENTIAL EROSION:

The potential for erosion should be mitigated by proper drainage design. Water should not be allowed to flow over graded areas or natural areas so as to cause erosion. Graded areas should be planted or otherwise protected from erosion by wind or water.

SOIL CORROSIVITY TESTS:

Selected samples of material were delivered to M. J. Schiff & Associates, Inc. for soil corrosivity tests. Laboratory testing consisted of pH, resistivity, and major soluble salts commonly found in soils. The results of the laboratory tests performed by M. J. Schiff & Associates, Inc. are enclosed...

Values from the soil tested are considered mildly corrosive at as-received and severely corrosive at saturated moisture conditions to ferrous metals at the site.

Testing indicated that the ammonium content may be slightly corrosive to copper. Testing indicated that the nitrate content was not corrosive to copper.

Results of the soluble sulfate testing indicate a "negligible" anticipated exposure to sulfate attack, as indicated on the enclosed test results. Based upon the criteria from Table 4.3.1. of the American Concrete Institute (ACI) Manual of Concrete Practice (2000), no special measures, such as specific cement types, water-cement ratios, etc., will be needed for this "negligible" exposure to sulfate attack.

Soluble chloride content of soil was not at levels high enough to be of concern with respect to corrosion of reinforcing steel. The results should be considered in combination with the soluble chloride content of the hardened concrete in determining the effect of chloride on the corrosion of reinforcing steel.

It should be understood that C.H.J., Incorporated does not practice corrosion engineering and that the chemical/corrosivity suite of tests was performed for preliminary screening and possible evaluation by a competent corrosion engineer. If further information concerning the corrosion characteristics, or interpretation of the results submitted herein, are required, then a competent corrosion engineer could be consulted.

CONSTRUCTION OBSERVATION:

All grading operations, including site clearing and stripping, should be observed by a representative of this firm. The presence of our field representative will be for the purpose of providing observation and field testing, and will not include any supervising or directing of the actual work of the contractor, his employees, or agents. Neither the presence of our field representative nor the observations and testing by our firm shall excuse the contractor in any way for defects discovered in his work. It is understood that our firm will not be responsible for job or site safety on this project, which will be the sole responsibility of the contractor.

LIMITATIONS

C.H.J., Incorporated has striven to perform our services within the limits prescribed by our client, and in a manner consistent with the usual thoroughness and competence of reputable geotechnical engineers and engineering geologists practicing under similar circumstances. No other representation, express or implied, and no warranty or guarantee is included or intended by virtue of the services performed or reports, opinion, documents, or otherwise supplied.

This report reflects the testing conducted on the site as the site existed during the investigation, which is the subject of this report. However, changes in the conditions of a property can occur with the passage of time, due to natural processes or the works of man on this or adjacent properties. Changes in applicable or appropriate standards may also occur whether as a result of legislation, application, or the broadening of knowledge. Therefore, this report is indicative of only those conditions tested at the time of the subject investigation, and the findings of this report may be invalidated fully or partially by changes outside of the control of C.H.J., Incorporated. This report is therefore subject to review and should not be relied upon after a period of one year.

The conclusions and recommendations in this report are based upon observations performed and data collected at separate locations, and interpolation between these locations, carried out for the project and the scope of services described. It is assumed and expected that the conditions between locations observed and/or sampled are similar to those encountered at the individual locations where observation and sampling was performed. However, conditions between these locations may vary significantly. Should conditions be encountered in the field, by the client or any firm performing services for the client or the client's assign, that appear different than those described herein, this firm should be contacted immediately in order that we might evaluate their effect.

If this report or portions thereof are provided to contractors or included in specifications, it should be understood by all parties that they are provided for information only and should be used as such.

The report and its contents resulting from this investigation are not intended or represented to be suitable for reuse on extensions or modifications of the project, or for use on any other project.

CLOSURE

We appreciate this opportunity to be of service and trust this report provides the information desired at this time. Should questions arise, please do not hesitate to contact this office.

Respectfully submitted,
C.H.J., INCORPORATED

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JFC/JSM/JJM/RJJ:sra

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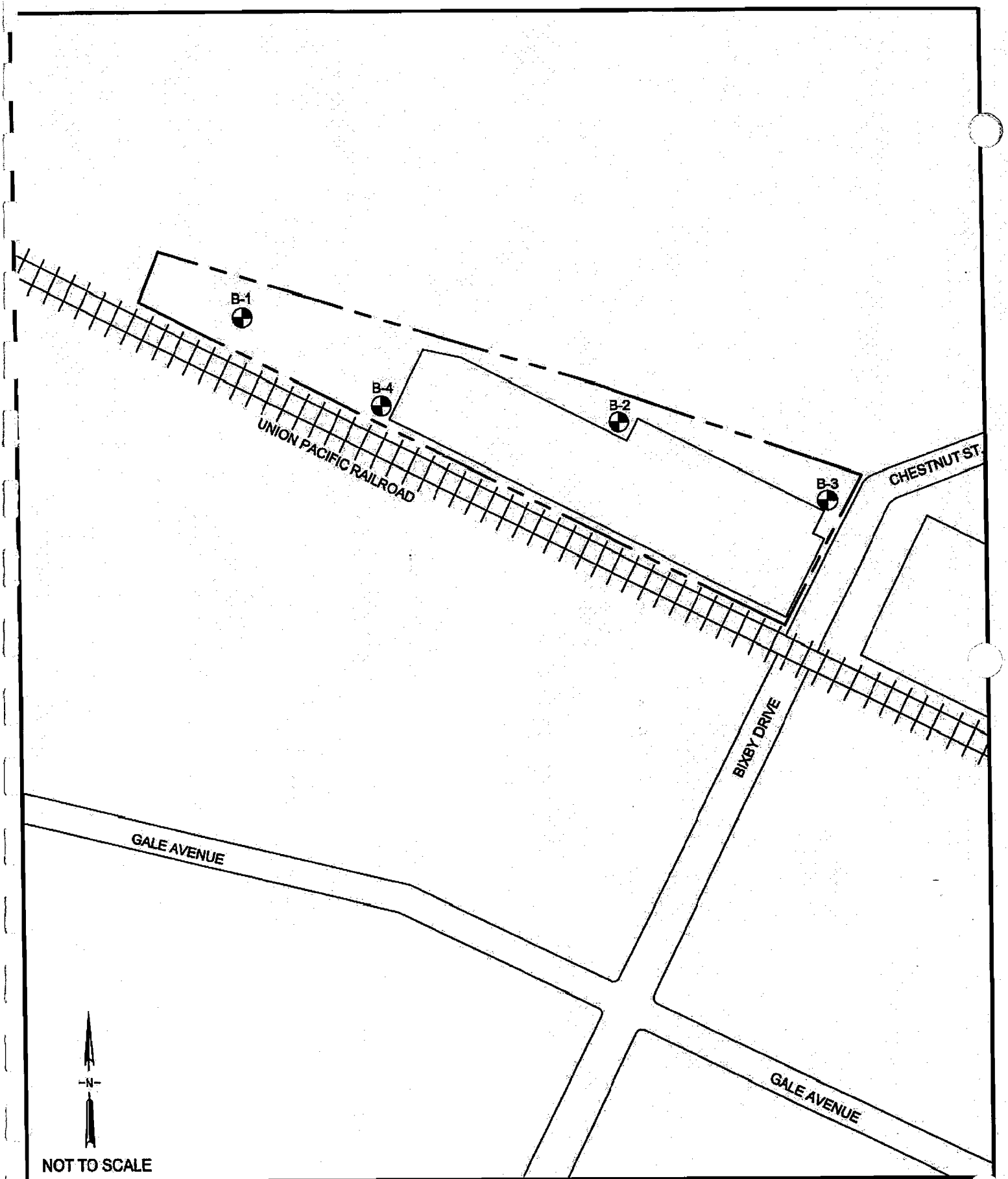
APPENDIX "A"

GEOTECHNICAL MAPS

-N-

SCALE: 1"= 2,000'

INDEX MAP		
FOR: TIC-THE INDUSTRIAL COMPANY	GEOTECHNICAL INVESTIGATION 911 BIXBY DRIVE CITY OF INDUSTRY, CALIFORNIA	ENCLOSURE "A-1"
DATE: AUGUST 2005		JOB NUMBER 05770-3
		C.H.J. Incorporated



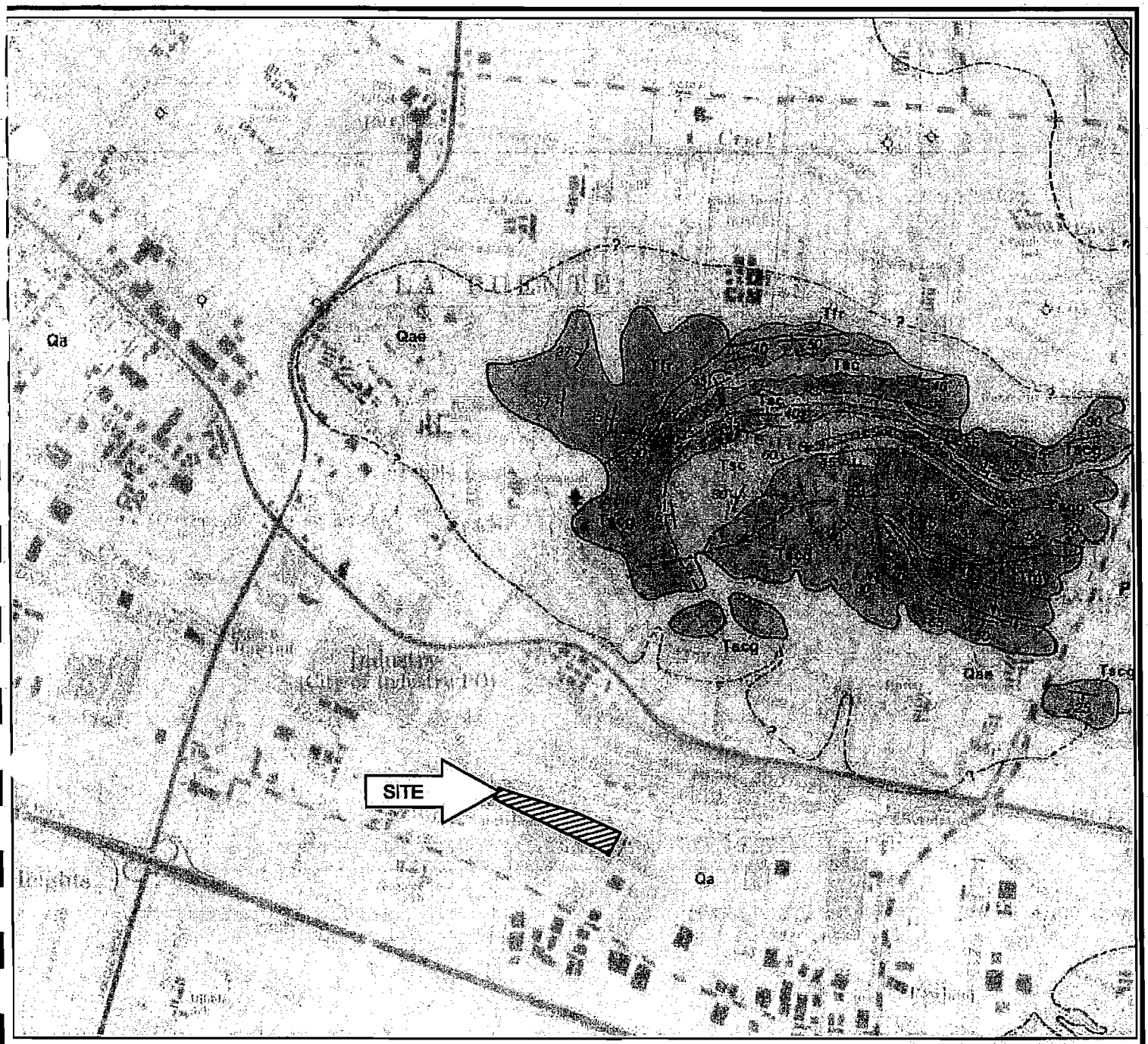
LEGEND:

B-4 — BORING LOCATIONS

PLAT

FOR: TIC-THE INDUSTRIAL COMPANY	GEOTECHNICAL INVESTIGATION 911 BIXBY DRIVE CITY OF INDUSTRY, CALIFORNIA	ENCLOSURE "A-2"
DATE: AUGUST 2005		JOB NUMBER 05770-3

C.H.J. Incorporated



(Base Map: Dibblee, 1999)

GEOLOGIC UNITS:

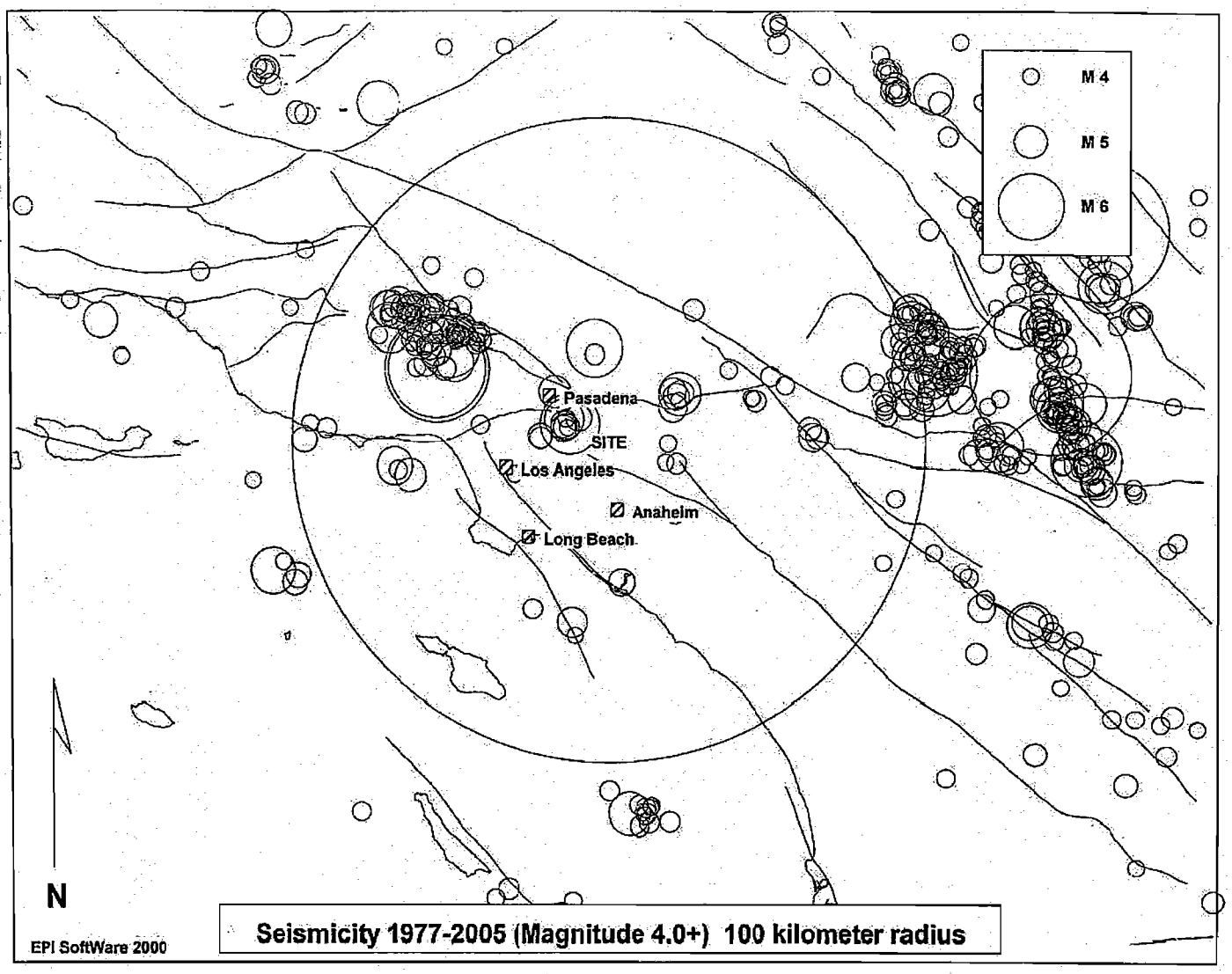
Qa - Alluvial gravel, sand and silt of valleys and flood plains (Holocene)
Qae - slightly elevated and locally dissected alluvial gravel and sand at base of hill areas (Pleistocene)
Tf-r - "Repetto" claystone member (Pleistocene)
Tscg - Conglomerate and sandstone (Miocene)
Tsc - gray silty clay shale (Miocene)
Tmy - Yorba Shale Member (Miocene)

approximate geologic contact queried where questioned

-N-

SCALE: 1"= 2,000'

GEOLOGIC INDEX MAP		
FOR: TIC-THE INDUSTRIAL COMPANY	GEOTECHNICAL INVESTIGATION 911 BIXBY DRIVE CITY OF INDUSTRY, CALIFORNIA	ENCLOSURE "A-3"
DATE: AUGUST 2005		JOB NUMBER 05770-3
		C.H.J. Incorporated



SITE LOCATION: 34.00847 LAT. -117.94451 LONG.

MINIMUM LOCATION QUALITY: C

TOTAL # OF EVENTS ON PLOT: 502

TOTAL # OF EVENTS WITHIN SEARCH RADIUS: 137

0 50 100
KILOMETERS

MAGNITUDE DISTRIBUTION OF SEARCH RADIUS EVENTS:

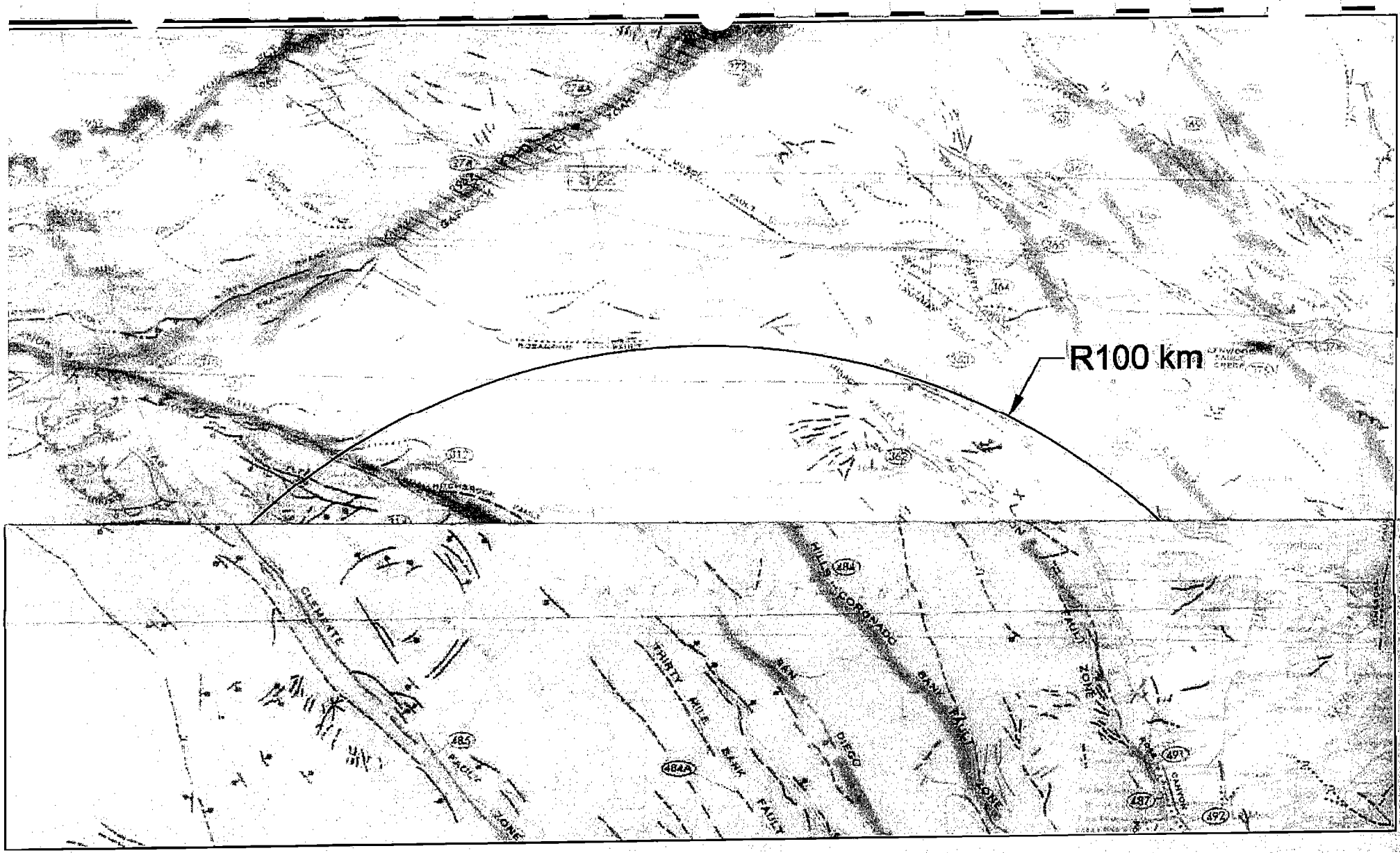
4.0- 4.9 : 115
5.0- 5.9 : 20
6.0- 6.9 : 2
7.0- 7.9 : 0
8.0- 8.9 : 0

CLOSEST EVENT: 4.7 ON THURSDAY, FEBRUARY 11, 1988 LOCATED APPROX. 12 KILOMETERS NORTHWEST OF THE SITE

LARGEST 5 EVENTS:

6.7 ON MONDAY, JANUARY 17, 1994 LOCATED APPROX. 59 KILOMETERS NORTHWEST OF THE SITE
6.6 ON MONDAY, JANUARY 17, 1994 LOCATED APPROX. 59 KILOMETERS NORTHWEST OF THE SITE
5.9 ON MONDAY, JANUARY 17, 1994 LOCATED APPROX. 58 KILOMETERS NORTHWEST OF THE SITE
5.9 ON THURSDAY, OCTOBER 01, 1987 LOCATED APPROX. 13 KILOMETERS NORTHWEST OF THE SITE
5.8 ON FRIDAY, JUNE 28, 1991 LOCATED APPROX. 29 KILOMETERS NORTH OF THE SITE

EARTHQUAKE EPICENTER MAP		
FOR: TIC-THE INDUSTRIAL COMPANY	GEOTECHNICAL INVESTIGATION 911 BIXBY DRIVE CITY OF INDUSTRY, CALIFORNIA	ENCLOSURE "A-4"
DATE: AUGUST 2005		JOB NUMBER 05770-3
		C.H.J. Incorporated



REGIONAL FAULT MAP

FOR: TIC-THE INDUSTRIAL COMPANY	GEOTECHNICAL INVESTIGATION 911 BIXBY DRIVE CITY OF INDUSTRY, CALIFORNIA	ENCLOSURE "A-5"
DATE: AUGUST 2005		JOB NUMBER 05770-3

C.H.J. Incorporated

APPENDIX "B"

EXPLORATORY BORING LOGS

KEY TO LOGS

LEGEND OF LAB/FIELD TESTS:

Bulk	Indicates Disturbed or Bulk Sample
Cor.	Chemical/Corrosivity Tests
DS	Direct Shear Test (ASTM D 3080)
Exp.	Expansion Index (UBC Standard Test Method 18-2)
Hydro	Hydrometer analysis (ASTM D 422)
MDC	Maximum Density Optimum Moisture Determination (ASTM D 1557)
PI	Atterberg Limits (ASTM D 4318)
Ring	Indicates Undisturbed Ring Sample. Undisturbed Ring Samples are obtained with a "California Sampler" (3.25" O.D. and 2.42" I.D.) driven with a 140-pound weight falling 30 inches. The blows per foot are converted to equivalent SPT values.
SA	Sieve Analysis (ASTM C 136)
SPT	Indicates Standard Penetration Test. The SPT N-value is the number of blows required to drive an SPT sampler 12 inches using a 140 pound weight falling 30 inches. The SPT sampler is 2" O.D. and 1-3/8" I.D.

ENGINEERING PROPERTIES FROM SPT BLOWS

Relationship of Penetration Resistance to Relative Density for Cohesionless Soils*
(After Mitchell and Katti, 1981)

No. of SPT Blows (N_{60})	Descriptive Relative Density	Approximate Relative Density (%)
<4	Very Loose	0-15
4-10	Loose	15-35
10-30	Medium Dense	35-65
30-50	Dense	65-85
>50	Very Dense	85-100

* At an effective overburden pressure of 1 ton per square foot (100 kPa)

Approximate Values of Undrained Shear Strength for Cohesive Soils
(Terzaghi and Peck, 1967)

No. of SPT Blows (N_{60})	Soil Consistency	Approximate Undrained Shear Strength (psf)
<2	Very Soft	Less Than 250
2-4	Soft	250-500
4-8	Medium Stiff	500-1000
8-15	Stiff	1000-2000
15-30	Very Stiff	2000-4000
>30	Hard	More Than 4000

SOIL CLASSIFICATION CHART

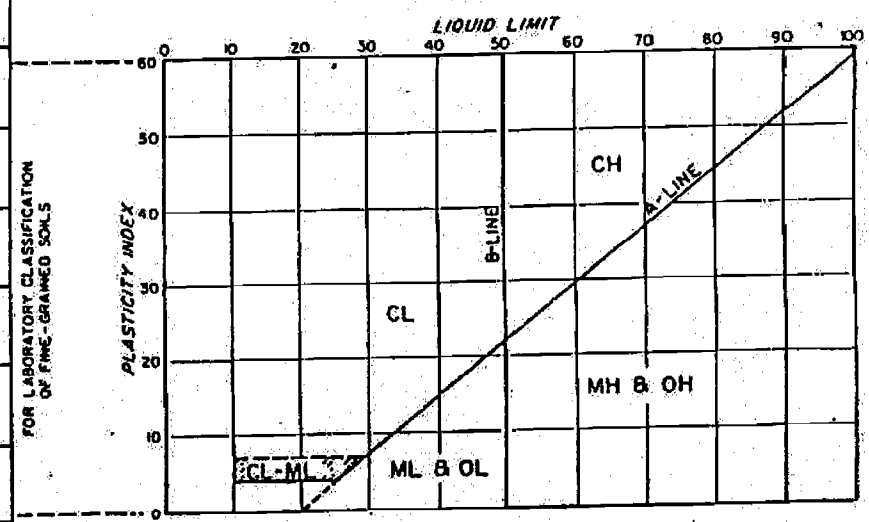
MAJOR DIVISIONS			GRAPH SYMBOL	LETTER SYMBOL	TYPICAL DESCRIPTIONS
COARSE GRAINED SOILS	GRAVEL AND GRAVELLY SOILS	CLEAN GRAVELS (LITTLE OR NO FINES)		GW	WELL-GRADED GRAVELS, GRAVEL-SAND MIXTURES, LITTLE OR NO FINES
				GP	POORLY-GRADED GRAVELS, GRAVEL-SAND MIXTURES, LITTLE OR NO FINES
	MORE THAN 50% OF COARSE FRACTION RETAINED ON NO. 4 SIEVE	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	CLEAN SAND (LITTLE OR NO FINES)		SW	WELL-GRADED SANDS, GRAVELLY SANDS, LITTLE OR NO FINES
				SP	POORLY-GRADED SANDS, GRAVELLY SANDS, LITTLE OR NO FINES
MORE THAN 50% OF MATERIAL IS LARGER THAN NO. 200 SIEVE SIZE	MORE THAN 50% OF COARSE FRACTION PASSING NO. 4 SIEVE	SANDS WITH FINES (APPRECIABLE AMOUNT OF FINES)		SM	SILTY SANDS, SAND-SILT MIXTURES
				SC	CLAYEY SANDS, SAND-CLAY MIXTURES
FINE GRAINED SOILS	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
MORE THAN 50% OF MATERIAL IS SMALLER THAN NO. 200 SIEVE SIZE				CH	INORGANIC CLAYS OF HIGH PLASTICITY, FAT CLAYS
				OH	ORGANIC CLAYS OF MEDIUM TO HIGH PLASTICITY, ORGANIC SILTS
HIGHLY ORGANIC SOILS				PT	PEAT, HUMUS, SWAMP SOILS WITH HIGH ORGANIC CONTENTS

GRADATION CHART

MATERIAL SIZE		PARTICLE SIZE			
		LOWER LIMIT		UPPER LIMIT	
		MILLIMETERS	SIEVE SIZE	MILLIMETERS	SIEVE SIZE
SAND	FINE	.074	#200 ‡	0.42	#40 ‡
	MEDIUM	0.42	#40 ‡	2.00	#10 ‡
	COARSE	2.00	#10 ‡	4.76	#4 ‡
GRAVEL	FINE	4.76	#4 ‡	19.1	3/4" *
	COARSE	19.1	3/4" *	76.2	3" *
COBBLES		76.2	3"	304.8	12"
BOULDERS		304.8	12	914.4	36"

‡ US STANDARD * CLEAR SQUARE OPENINGS

PLASTICITY CHART



FOR LABORATORY CLASSIFICATION OF FINE-GRAINED SOILS

UNIFIED SOIL CLASSIFICATION SYSTEM

C.H.J. Incorporated

Enclosure "B" (2of2)
Job No. 05770-3

EXPLORATORY BORING NO. 1

Date Drilled: 8/5/05 | Client: TIC - The Industrial Company

Equipment: CME 55 Drill Rig | Driving Weight / Drop: 140 lbs/30 in

Surface Elevation(ft): N/A | Logged by: J.R. | Measured Depth to Water(ft): 23.5

DEPTH (ft)	VISUAL CLASSIFICATION	REMARKS	SAMPLES DRIVE	SAMPLES BULK	BLOWS/FOOT (Equiv. SPT)	FIELD MOISTURE (%)	DRY UNIT WT. (pcf)	LAB/FIELD TESTS
	4" Asphalt Concrete, 3" Aggregate Base							
	(CL) Clay with fine sand, dark gray	Fill				21.4		
			X		11	22.2	103	Ring
	(CL) Clay with fine sand, brown	Qa				23.4		
5			X		13	17.9	109	Ring
10			X		12	17.8	107	Ring
15			X		11	21.3	98	Ring
	(SC) Clayey Sand, fine to medium, olive gray					9.4		
20			X		9	29.7	93	Ring
		Groundwater						
25			X		16	18.6	110	Ring
	(CL) Clay, fine to medium, olive gray					37.2		
30			X		8	37.6	85	Ring
	END OF BORING NO REFUSAL, NO BEDROCK, FILL TO 4.0' SLIGHT CAVING, GROUNDWATER AT 23.5'							

BORING_LOG 05770-3.GPJ CHJ.GDT 8/12/05

C.H.J.

911 BIXBY DRIVE
CITY OF INDUSTRY, CALIFORNIA

Job No. 05770-3

Enclosure B-1

EXPLORATORY BORING NO. 2

Date Drilled: 8/5/05 | Client: TIC - The Industrial Company

Equipment: CME 55 Drill Rig | Driving Weight / Drop: 140 lbs/30 in

Surface Elevation(ft): N/A | Logged by: J.R. | Measured Depth to Water(ft): 26.0

DEPTH (ft)	GRAPHIC LOG	VISUAL CLASSIFICATION	REMARKS	SAMPLES DRIVE	SAMPLES BULK	BLOWS/FOOT (Equiv. SPT)	FIELD MOISTURE (%)	DRY UNIT WT. (pcf)	LAB/FIELD TESTS
		4" Asphalt Concrete, 8" Aggregate Base							
		(CL) Clay with fine to medium sand, dark gray	Fill				19.1		
				X		8	21.2		SPT
		(CL) Clay with fine sand, brown	Qa				23.0		
5									
				X		13	12.1		SPT, Hydro
10									
				X		17	17.3		SPT
15									
				X		6	15.9		SPT
20		(SC) Clayey Sand, fine to medium, gray							
				X		24	14.9		SPT, SA, Hydro
25		(SC) Clayey Sand, fine to medium, olive gray	Groundwater						
				X		42	19.7		SPT, SA, Hydro
30		(SP-SM) Sand, fine to coarse with gravel to 1 1/2" and silt, gray							
				X		70	10.2		SPT

BORING LOG 05770-3.GPJ CHJ.GDT 8/12/05

C.H.J.

911 BIXBY DRIVE
CITY OF INDUSTRY, CALIFORNIA

Job No. 05770-3

Enclosure B-2a

EXPLORATORY BORING NO. 2

Date Drilled: 8/5/05 | Client: TIC - The Industrial Company

Equipment: CME 55 Drill Rig | Driving Weight / Drop: 140 lbs/30 in

Surface Elevation(ft): N/A | Logged by: J.R. | Measured Depth to Water(ft): 26.0

DEPTH (ft)	GRAPHIC LOG	VISUAL CLASSIFICATION	REMARKS	SAMPLES DRIVE	SAMPLES BULK	BLOWS/FOOT (Equiv. SPT)	FIELD MOISTURE (%)	DRY UNIT WT. (pcf)	LAB/FIELD TESTS
		(SP-SM) Sand, fine to coarse with gravel to 1 1/2" and silt, gray		X		49	9.0		SPT
40		(CL) Clay with fine sand, olive gray		X		17	25.8		SPT, SA, Hydro
45				X		22	N.R.		SPT
		END OF BORING							
50		NO REFUSAL NO BEDROCK FILL TO 4.0' SLIGHT CAVING GROUNDWATER AT 26.0'							
55									
60									
65									

BORING LOG 05770-3.GPJ CHJ.GDT 8/12/05

C.H.J.

911 BIXBY DRIVE
CITY OF INDUSTRY, CALIFORNIA

Job No. 05770-3

Enclosure B-2b

EXPLORATORY BORING NO. 3

Date Drilled: 8/5/05 | Client: TIC - The Industrial Company

Equipment: CME 55 Drill Rig | Driving Weight / Drop: 140 lbs/30 in

Surface Elevation(ft): N/A | Logged by: J.R. | Measured Depth to Water(ft): 23.0

DEPTH (ft)	VISUAL CLASSIFICATION	REMARKS	SAMPLES DRIVE	SAMPLES BULK	BLOWS/FOOT (Equiv. SPT)	FIELD MOISTURE (%)	DRY UNIT WT. (pcf)	LAB/FIELD TESTS
	4" Asphalt Concrete, 6" Aggregate Base							
	(CL) Clay with fine sand, dark gray	Fill				19.1		
			X		13	22.5	104	Ring
5			X		10	21.9	103	Ring
	(ML) Sandy Silt, fine and clay, brown	Qa						
10			X		11	21.3	102	Ring
	(SM) Silty Sand, fine, brown							
15			X		14	19.9	107	Ring
20	(ML) Sandy Silt, fine, gray					37.2		
			X		9	27.9	98	Ring
		Groundwater						
25	(SM) Silty Sand, fine, gray					22.0		
			X		17	22.8	104	Ring
30			X		19	24.1	104	Ring
	END OF BORING NO REFUSAL, NO BEDROCK, FILL TO 6.5' SLIGHT CAVING, GROUNDWATER AT 23.0'							

BORING LOG 05770-3.GPJ CHJ.GDT 8/12/05

C.H.J.

911 BIXBY DRIVE
CITY OF INDUSTRY, CALIFORNIA

Job No. 05770-3

Enclosure B-3

EXPLORATORY BORING NO. 4

Date Drilled: 8/5/05 | Client: TIC - The Industrial Company

Equipment: CME 55 Drill Rig | Driving Weight / Drop: 140 lbs/30 in

Surface Elevation(ft): N/A | Logged by: J.R. | Measured Depth to Water(ft): 27.0

DEPTH (ft)	GRAPHIC LOG	VISUAL CLASSIFICATION	REMARKS	SAMPLES DRIVE	SAMPLES BULK	BLOWS/FOOT (Equiv. SPT)	FIELD MOISTURE (%)	DRY UNIT WT. (pcf)	LAB/FIELD TESTS
		5" Asphalt Concrete, 10" Aggregate Base							
		(CL) Clay with fine sand, dark gray	Fill						
				X		11	22.8	100	Ring
5		(CL) Clay with fine sand, brown	Qa						
				X		16	19.4	109	Ring
10									
		(ML) Silt with fine sand and clay, brown					19.4		
				X		13	19.8	103	Ring, DS
15									
				X		11	26.3	95	Ring
20		(SC) Clayey Sand, fine to medium, gray					25.4		
				X		10	24.8	100	Ring
25		(CL) Clay with fine sand, olive gray					35.1		
			Groundwater	X		7	35.1	87	Ring
30		(SM) Silty Sand, fine to medium, olive gray					23.0		
				X		22	22.9	104	Ring

BORING_LOG 05770-3.GPJ CHJ.GDT 8/12/05

C.H.J.

911 BIXBY DRIVE
CITY OF INDUSTRY, CALIFORNIA

Job No. 05770-3

Enclosure B-4a

EXPLORATORY BORING NO. 4

Date Drilled: 8/5/05 | Client: TIC - The Industrial Company

Equipment: CME 55 Drill Rig | Driving Weight / Drop: 140 lbs/30 in

Surface Elevation(ft): N/A | Logged by: J.R. | Measured Depth to Water(ft): 27.0

DEPTH (ft)	GRAPHIC LOG	VISUAL CLASSIFICATION	REMARKS	SAMPLES DRIVE	SAMPLES BULK	BLOWS/FOOT (Equiv. SPT)	FIELD MOISTURE (%)	DRY UNIT WT. (pcf)	LAB/FIELD TESTS
		(GP) Sandy Gravel, fine to coarse with gravel to 1" and silt, gray							
				X		24	11.8	127	Ring
40		(ML) Sandy Silt, fine to medium, olive brown			X		19.4		
				X		16	22.3	104	Ring, DS
45									
				X		21	19.6	110	Ring
50		(SP-SM) Sand, fine to meduim with coarse and silt, gray			X				
				X		37	16	114	Ring
55		(SM) Silty Sand, fine to medium with coarse, clay, and gravel to 1 1/2", olive gray			X		21.6		
				X		17	22.3	107	Ring
60									
				X		18	26.8	97	Ring
65		END OF BORING NO REFUSAL, NO BEDROCK, FILL TO 5.0' SLIGHT CAVING, GROUNDWATER AT 27.0'			X		16.6		
				X		31	17.8	112	Ring

BORING_LOG 05770-3.GPJ CHJ.GDT 8/12/05

C.H.J.

911 BIXBY DRIVE
CITY OF INDUSTRY, CALIFORNIA

Job No. 05770-3

Enclosure B-4b

APPENDIX "C"

LABORATORY TESTING

Enclosure "C-1"
Job No. 05770-3

TEST DATA SUMMARY

PLASTICITY INDEX:

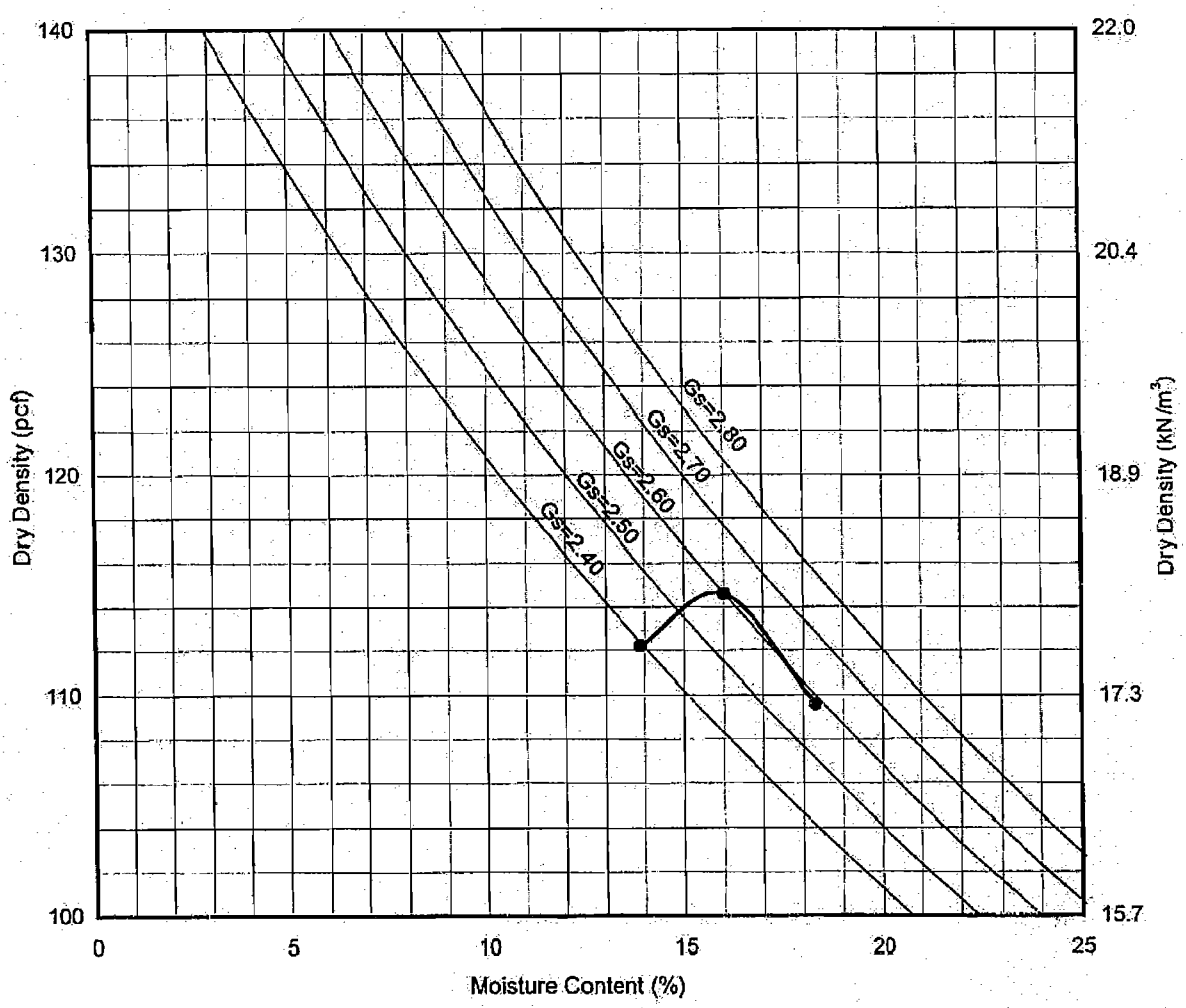
Boring Nos.	Depth of Sample (ft.)	Classification	Liquid Limit %	Plastic Limit %	Plasticity Index %
4	0.0	Clay, with fine sand, dark gray (CL)	49.8	17.1	32.7

EXPANSION INDEX:

Uniform Building Code Standard Test Method 18-2

Boring Nos.	Depth of Sample (ft.)	Initial Moisture (%)	Final Moisture (%)	Degree of Saturation (%)	Expansion Index	Expansion Potential
4	0.0	14.5	22.5	51	58	"medium"

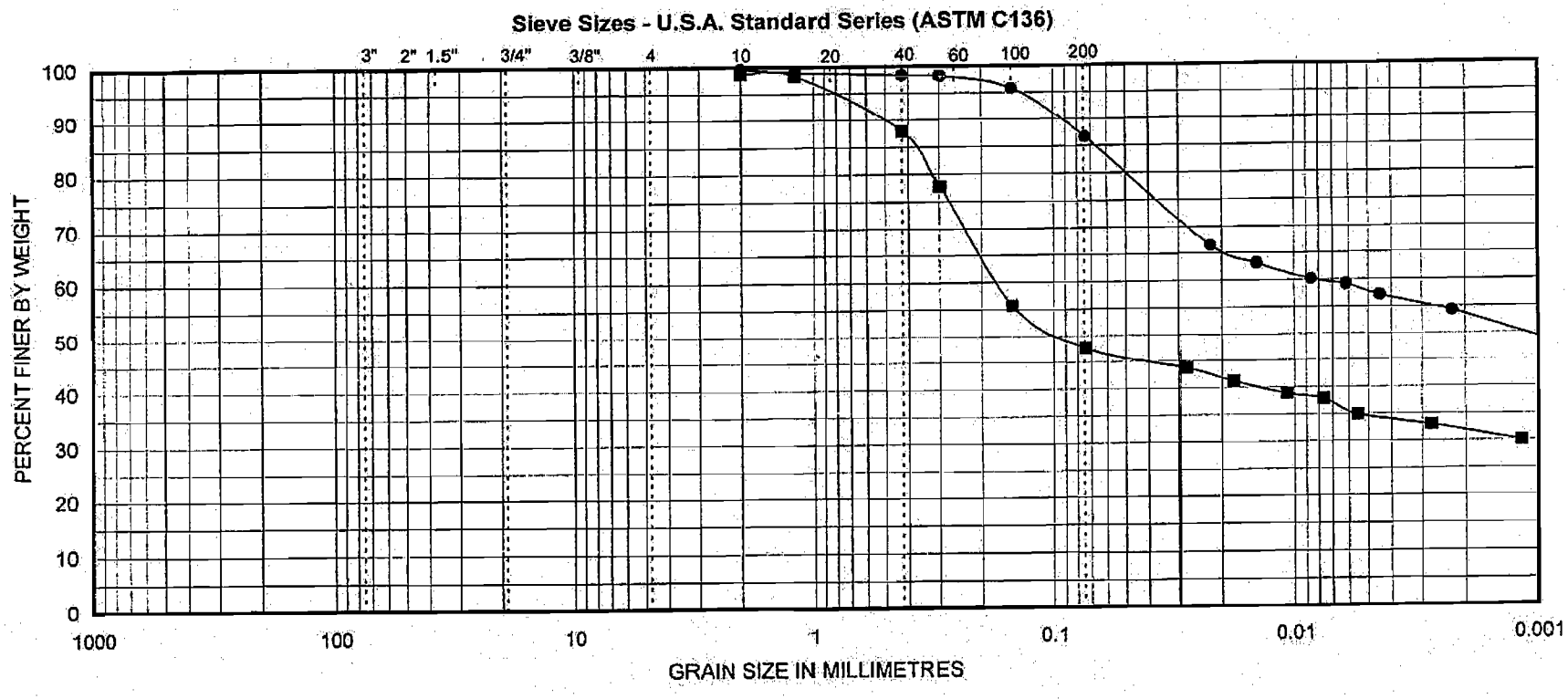
Maximum Density Optimum Moisture Determination Test (ASTM 1557)



	Boring #	Depth(ft)	Soil/Sample Type	γ_{max} (pcf)	w_{opt} (%)
•	4	0	(CL) Clay with fine sand	115	16.0

C.H.J. Incorporated

MOISTURE DENSITY TEST			
Project:	TIC - The Industrial Company, Walnut Energy Site		
Location:	911 Bixby Drive, City of Industry, CA		
Job No.:	05770-3	Enclosure:	"C-2"



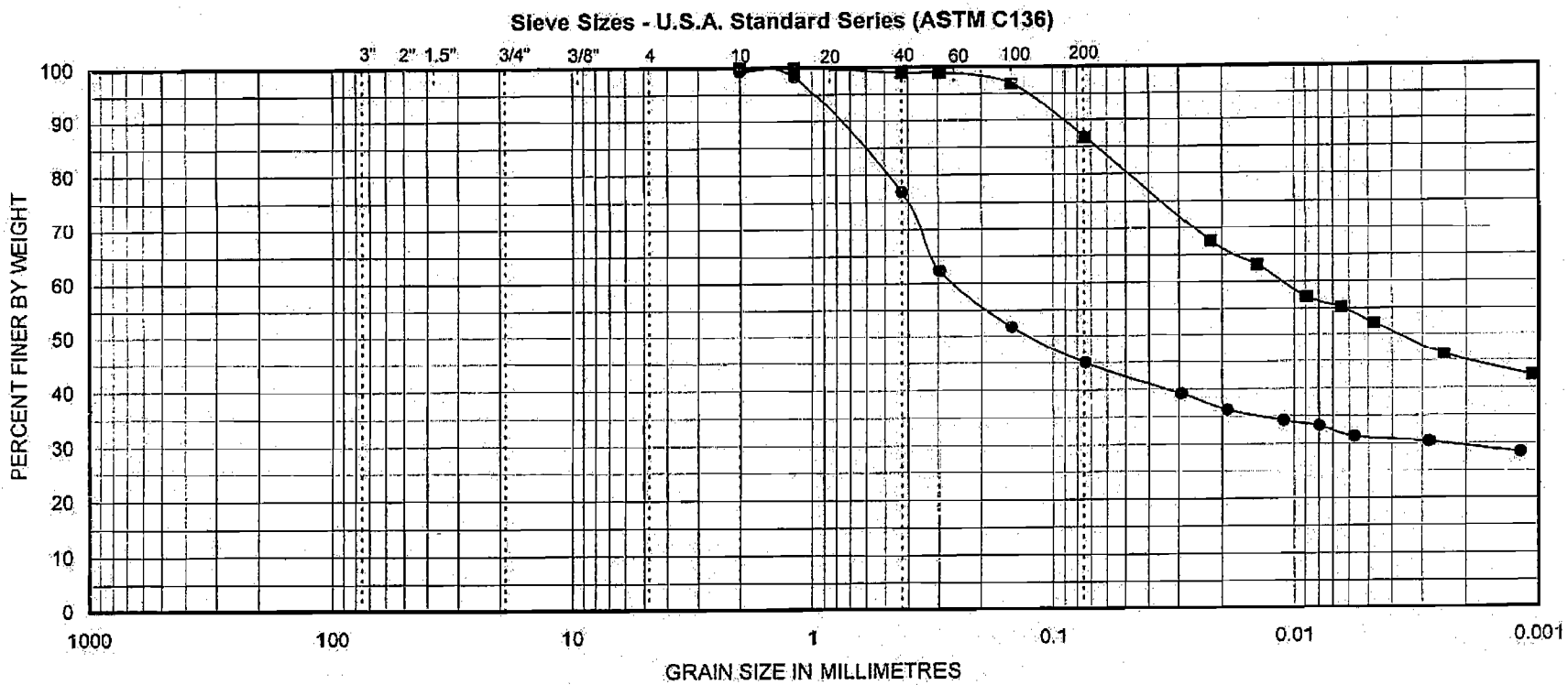
Cobbles & Boulders	Gravel		Sand			Silt or Clay
	Coarse	Fine	Coarse	Medium	Fine	

Symbol	Boring	Depth (ft)	Classification	D_{10} (mm)	D_{30} (mm)	D_{50} (mm)	D_{60} (mm)	C_u	C_c
●	B-2	7.0	(CL) Clay with fine sand			0.001	0.008		
■	B-2	22.0	(SC) Clayey sand, fine to medium			0.102	0.181		

C.H.J. Incorporated

GRADATION CURVES

Project:	TIC - The Industrial Company		
Location:	911 Bixby Drive, City of Industry, Calif.		
Job Number:	05770-3	Enclosure:	"C-3"



Cobbles & Boulders	Gravel		Sand			Silt or Clay
	Coarse	Fine	Coarse	Medium	Fine	

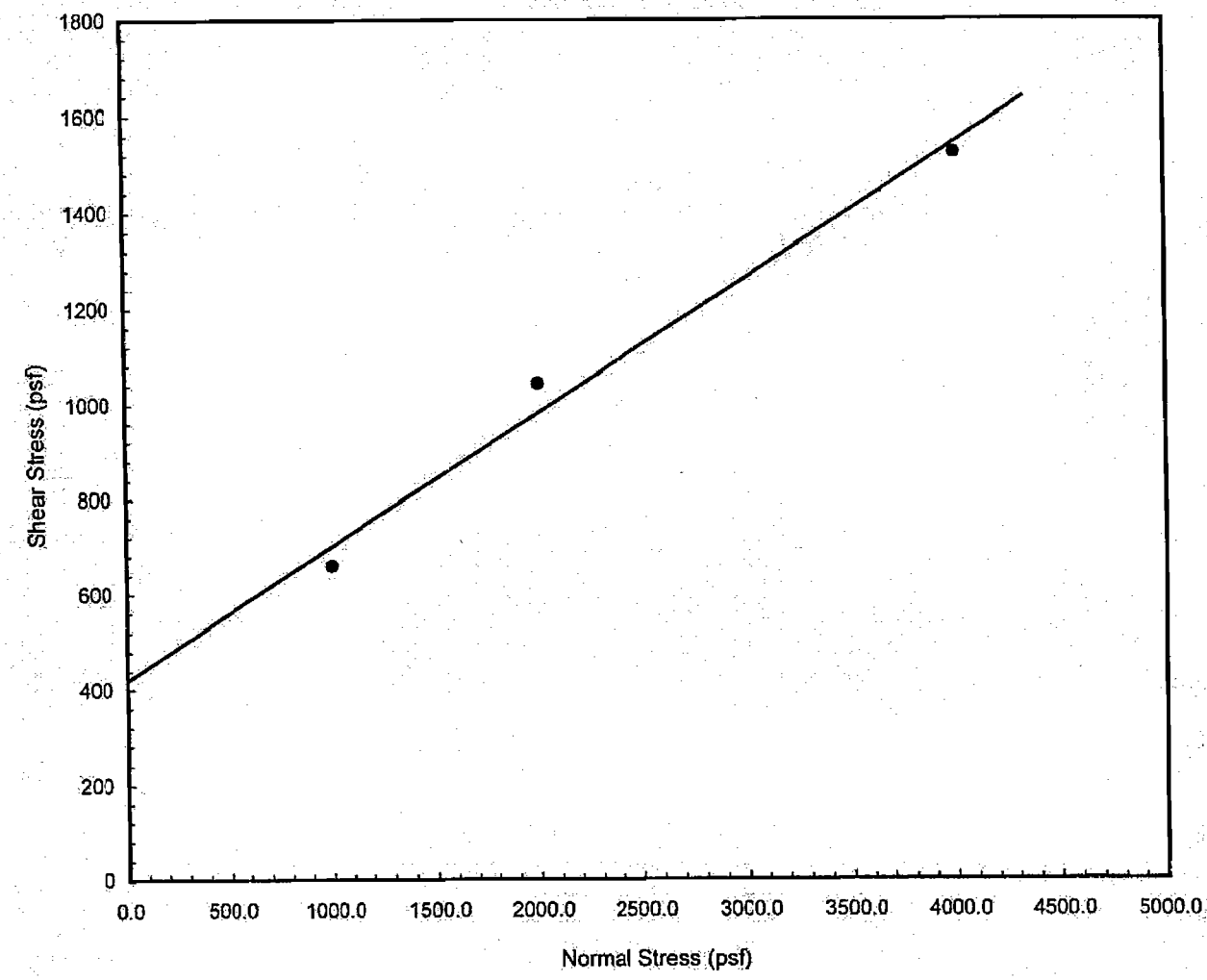
Symbol	Boring	Depth (ft)	Classification	D_{10} (mm)	D_{30} (mm)	D_{50} (mm)	D_{60} (mm)	C_u	C_c
●	B-2	27.0	(SC) Clayey sand, fine to medium		0.002	0.141	0.277		
■	B-2	42.0	(CL) Clay with fine sand			0.004	0.011		

C.H.J. Incorporated

GRADATION CURVES

Project:	TIC - The Industrial Company		
Location:	911 Bixby Drive, City of Industry, Calif.		
Job Number:	05770-3	Enclosure:	"C-4"

Direct Shear Test (ASTM D 3080)

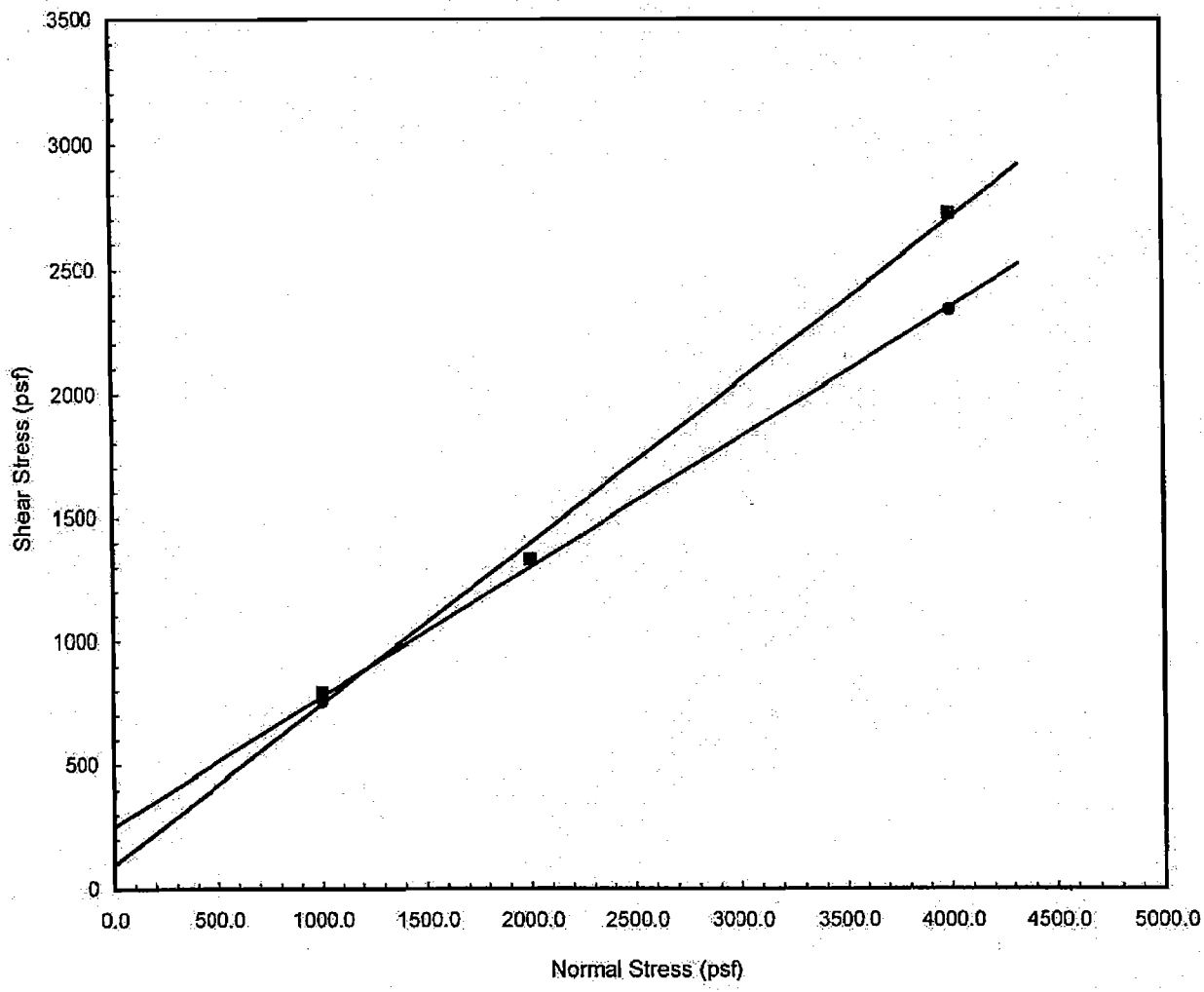


	Boring #	Depth(ft)	Soil/Sample Type	γ_d (pcf)	MC(%)	C (psf)	φ(°)
•	B-4	0.0	(CL) Clay, with fine sand / remolded to 90%	104	18.5	420	16

C.H.J. Incorporated

DIRECT SHEAR TEST			
Project:	TIC - The Industrial Company, Walnut Energy Site		
Location:	911 Bixby Dr., City of Industry, Ca		
Job No.:	05770-3	Enclosure:	"C-5"

Direct Shear Test (ASTM D 3080)



	Boring #	Depth(ft)	Soil/Sample Type	γ_d (pcf)	MC(%)	C (psf)	φ(°)
●	B-4	12.0	(ML) Silt, with fine sand and clay / undistrubed	103	19.8	252	28
■	B-4	42.0	(ML) Sandy Silt, fine to medium / undistrubed	104	22.3	84	33

C.H.J. Incorporated

DIRECT SHEAR TEST			
Project:	TIC - The Industrial Company, Walnut Energy Sile		
Location:	911 Bixby Dr., City of Industry, Ca		
Job No.:	05770-3	Enclosure:	"C-6"

M. J. Schiff & Associates, Inc.

Consulting Corrosion Engineers - Since 1959
431 W. Baseline Road
Claremont, CA 91711

Phone: (909) 626-0967 Fax: (909) 626-3316
E-mail lab@mjschiff.com
website: mjschiff.com

Table 1 - Laboratory Tests on Soil Samples

CHJ Inc.
TIC
Your #05770-J, MJS&A #05-1128LAB
9-Aug-05

Sample ID			4-A 0'
Resistivity		**Units**	
as-received		ohm-cm	20,000
saturated		ohm-cm	800
pH			7.6
Electrical Conductivity		mS/cm	0.51
Chemical Analyses			
Cations			
calcium	Ca^{2+}	mg/kg	128
magnesium	Mg^{2+}	mg/kg	53
sodium	Na^{1+}	mg/kg	61
Anions			
carbonate	CO_3^{2-}	mg/kg	ND
bicarbonate	HCO_3^{1-}	mg/kg	430
chloride	Cl^{1-}	mg/kg	ND
sulfate	SO_4^{2-}	mg/kg	307
Other Tests			
ammonium	NH_4^{1+}	mg/kg	10.5
nitrate	NO_3^{1-}	mg/kg	ND
sulfide	S^{2-}	qual	Positive
Redox		mV	-18

Electrical conductivity in millisiemens/cm and chemical analysis were made on a 1:5 soil-to-water extract.
mg/kg = milligrams per kilogram (parts per million) of dry soil.
Redox = oxidation-reduction potential in millivolts
ND = not detected
na = not analyzed

APPENDIX "D"

LIQUEFACTION AND SEISMIC SETTLEMENT CALCULATIONS

LIQUEFACTION ANALYSIS

Project:	TIC - The Industrial Company		
Job Number:	05770-3	Boring No.	2

Location:	911 Bixby Drive, City of Industry, California		
Date:	11-Aug-2005	Enclosure:	D-1

0.2 0.4

Anticipated Magnitude	7.1	Maximum Acceleration	0.42	Boring GW (ft)	26	Project GW (ft)	10

C_N=Depth correction factor — Seed & Idriss (1982) method

C_E=Hammer energy ratio (ER) correction factor — 1.40

C_B=Borehole diameter correction factor — 1.15

C_R=Rod stick up length (length above ground surface) — 3

C_S=Correction factor for samplers with or without liners — 1.20

MSF_{Lower} = 1.14

MSF_{Upper} = 1.19

$$(N_1)_{60} = C_N \cdot C_E \cdot C_B \cdot C_R \cdot C_S \cdot N$$

$$FS = (CRR_{7.5}/CRS) \cdot MSF \cdot K_\sigma$$

Layer No.	Depth (ft)	Field Blow Count, N	Ground Water	σ_{v0} (tsf)	σ_{v0}' (tsf)	C_N	$(N_1)_{60}$	r_d	CSR	$CRR_{7.5}$	K_σ	$(FS)_{Lower}$	$(FS)_{Upper}$	$(D_E)_{Lower}$	$(D_E)_{Upper}$	
1	0.25	6		0.015	0.015	1.700	45	1.000	0.273		7.066	Above GW	Above GW			
1	0.75	6		0.046	0.046	1.700	45	1.000	0.273		4.224	Above GW	Above GW			
1	1.25	6		0.077	0.077	1.700	45	0.998	0.273		3.325	Above GW	Above GW			
1	1.75	6		0.108	0.108	1.682	45	0.997	0.272		2.840	Above GW	Above GW			
1	2.25	6		0.138	0.138	1.644	45	0.996	0.272		2.525	Above GW	Above GW			
1	2.75	6		0.169	0.169	1.607	45	0.995	0.272		2.299	Above GW	Above GW			
1	3.25	6		0.200	0.200	1.572	45	0.994	0.271		2.126	Above GW	Above GW			
1	3.75	6		0.231	0.231	1.538	45	0.993	0.271		1.988	Above GW	Above GW			
2	4.25	9		0.262	0.262	1.505	34	0.991	0.271		1.754	Above GW	Above GW			
2	4.75	9		0.295	0.295	1.472	34	0.990	0.270		1.664	Above GW	Above GW			
2	5.25	9		0.327	0.327	1.440	33	0.989	0.270		1.587	Above GW	Above GW			
2	5.75	9		0.360	0.360	1.410	33	0.988	0.270		1.522	Above GW	Above GW			
2	6.25	9		0.392	0.392	1.382	32	0.987	0.269		1.465	Above GW	Above GW			
2	6.75	9		0.425	0.425	1.354	31	0.986	0.269		1.415	Above GW	Above GW			
2	7.25	9		0.457	0.457	1.328	45	0.985	0.269		1.443	Above GW	Above GW			
2	7.75	9		0.490	0.490	1.302	45	0.983	0.268		1.397	Above GW	Above GW			
2	8.25	9		0.522	0.522	1.277	45	0.982	0.268		1.356	Above GW	Above GW			

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Layer No.	Depth (ft)	Field Blow Count, N	Ground Water	σ_{v0} (tsf)	σ_{v0}' (tsf)	C_N	$(N_1)_{60}$	r_d	CSR	$CRR_{7.5}$	K_σ	$(FS)_{Lower}$	$(FS)_{Upper}$	$(D_E)_{Lower}$	$(D_E)_{Upper}$	
2	8.75	9		0.555	0.555	1.254	45	0.981	0.268		1.318	Above GW	Above GW			
2	9.25	9		0.587	0.587	1.231	45	0.980	0.268		1.283	Above GW	Above GW			
2	9.75	9		0.620	0.620	1.209	45	0.979	0.267		1.251	Above GW	Above GW			
3	10.25	8	P. GW	0.651	0.651	1.188	45	0.978	0.267		1.222	NonLiq	NonLiq			
3	10.75	8	P. GW	0.682	0.682	1.169	45	0.977	0.267		1.197	NonLiq	NonLiq			
3	11.25	8	P. GW	0.712	0.712	1.150	45	0.976	0.266		1.172	NonLiq	NonLiq			
3	11.75	8	P. GW	0.743	0.743	1.132	45	0.975	0.266		1.149	NonLiq	NonLiq			
3	12.25	8	P. GW	0.773	0.773	1.115	45	0.974	0.266		1.128	NonLiq	NonLiq			
3	12.75	8	P. GW	0.804	0.804	1.098	45	0.973	0.266		1.108	NonLiq	NonLiq			
3	13.25	8	P. GW	0.834	0.834	1.081	45	0.972	0.265		1.089	NonLiq	NonLiq			
3	13.75	8	P. GW	0.865	0.865	1.066	45	0.971	0.265		1.070	NonLiq	NonLiq			
3	14.25	8	P. GW	0.895	0.895	1.050	45	0.970	0.265		1.053	NonLiq	NonLiq			
3	14.75	8	P. GW	0.926	0.926	1.035	45	0.969	0.264		1.037	NonLiq	NonLiq			
3	15.25	8	P. GW	0.956	0.956	1.020	45	0.967	0.264		1.021	NonLiq	NonLiq			
3	15.75	8	P. GW	0.987	0.987	1.006	45	0.966	0.264		1.006	NonLiq	NonLiq			
3	16.25	8	P. GW	1.017	1.017	0.992	45	0.965	0.264		0.992	NonLiq	NonLiq			
3	16.75	8	P. GW	1.048	1.048	0.979	45	0.964	0.263		0.978	NonLiq	NonLiq			
3	17.25	8	P. GW	1.078	1.078	0.966	45	0.963	0.263		0.965	NonLiq	NonLiq			
3	17.75	8	P. GW	1.109	1.109	0.953	45	0.962	0.263		0.953	NonLiq	NonLiq			
3	18.25	8	P. GW	1.139	1.139	0.940	45	0.961	0.262		0.941	NonLiq	NonLiq			
3	18.75	8	P. GW	1.170	1.170	0.928	45	0.959	0.262		0.929	NonLiq	NonLiq			
3	19.25	8	P. GW	1.200	1.200	0.917	45	0.958	0.262		0.918	NonLiq	NonLiq			
3	19.75	8	P. GW	1.231	1.231	0.905	45	0.957	0.261		0.907	NonLiq	NonLiq			
4	20.25	17	P. GW	1.261	1.261	0.894	45	0.956	0.261		0.897	NonLiq	NonLiq			
4	20.75	17	P. GW	1.291	1.291	0.883	45	0.954	0.261		0.887	NonLiq	NonLiq			
4	21.25	17	P. GW	1.322	1.322	0.872	45	0.953	0.260		0.878	NonLiq	NonLiq			
4	21.75	17	P. GW	1.352	1.352	0.862	45	0.951	0.260		0.868	NonLiq	NonLiq			
4	22.25	17	P. GW	1.382	1.382	0.852	45	0.950	0.259		0.859	NonLiq	NonLiq			
4	22.75	17	P. GW	1.412	1.412	0.842	45	0.948	0.259		0.851	NonLiq	NonLiq			
4	23.25	17	P. GW	1.443	1.443	0.833	45	0.947	0.258		0.842	NonLiq	NonLiq			
4	23.75	17	P. GW	1.473	1.473	0.823	45	0.945	0.258		0.834	NonLiq	NonLiq			
4	24.25	17	P. GW	1.503	1.503	0.814	44	0.944	0.258		0.827	NonLiq	NonLiq			
4	24.75	17	P. GW	1.533	1.533	0.805	44	0.942	0.257		0.819	NonLiq	NonLiq			

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Layer No.	Depth (ft)	Field Blow Count, N	Ground Water	σ_{v0} (tsf)	σ_{v0}' (tsf)	C_N	$(N_1)_{60}$	r_d	CSR	$CRR_{7.5}$	K_σ	$(FS)_{Lower}$	$(FS)_{Upper}$	$(D_E)_{Lower}$	$(D_E)_{Upper}$	
5	25.25	30	P. GW	1.565	1.565	0.796	45	0.940	0.257		0.811	NonLiq	NonLiq			
5	25.75	30	P. GW	1.597	1.597	0.786	45	0.938	0.256		0.803	NonLiq	NonLiq			
6	26.25	30	B. GW	1.622	1.614	0.782	45	0.936	0.257		0.799	NonLiq	NonLiq			
6	26.75	30	B. GW	1.639	1.616	0.781	45	0.934	0.259		0.799	NonLiq	NonLiq			
6	27.25	30	B. GW	1.656	1.617	0.781	45	0.932	0.261		0.798	NonLiq	NonLiq			
6	27.75	30	B. GW	1.673	1.618	0.781	45	0.930	0.262		0.798	NonLiq	NonLiq			
6	28.25	30	B. GW	1.690	1.620	0.780	45	0.928	0.264		0.798	NonLiq	NonLiq			
6	28.75	30	B. GW	1.707	1.621	0.780	45	0.925	0.266		0.797	NonLiq	NonLiq			
6	29.25	30	B. GW	1.724	1.623	0.779	45	0.923	0.268		0.797	NonLiq	NonLiq			
6	29.75	30	B. GW	1.741	1.624	0.779	45	0.921	0.269		0.797	NonLiq	NonLiq			
7	30.25	43	B. GW	1.758	1.626	0.779	45	0.918	0.271		0.796	NonLiq	NonLiq			
7	30.75	43	B. GW	1.776	1.628	0.778	45	0.915	0.273		0.796	NonLiq	NonLiq			
7	31.25	43	B. GW	1.793	1.629	0.778	45	0.913	0.274		0.796	NonLiq	NonLiq			
7	31.75	43	B. GW	1.811	1.631	0.777	45	0.910	0.276		0.795	NonLiq	NonLiq			
7	32.25	43	B. GW	1.828	1.633	0.776	45	0.907	0.277		0.795	NonLiq	NonLiq			
7	32.75	43	B. GW	1.846	1.635	0.776	45	0.904	0.279		0.794	NonLiq	NonLiq			
7	33.25	43	B. GW	1.863	1.637	0.775	45	0.901	0.280		0.794	NonLiq	NonLiq			
7	33.75	43	B. GW	1.881	1.639	0.775	45	0.897	0.281		0.793	NonLiq	NonLiq			
7	34.25	43	B. GW	1.898	1.641	0.774	45	0.894	0.282		0.793	NonLiq	NonLiq			
7	34.75	43	B. GW	1.916	1.643	0.774	45	0.891	0.284		0.793	NonLiq	NonLiq			
7	35.25	43	B. GW	1.933	1.645	0.773	45	0.887	0.285		0.792	NonLiq	NonLiq			
7	35.75	43	B. GW	1.951	1.647	0.773	45	0.883	0.286		0.792	NonLiq	NonLiq			
7	36.25	43	B. GW	1.968	1.648	0.772	45	0.880	0.287		0.791	NonLiq	NonLiq			
7	36.75	43	B. GW	1.986	1.650	0.772	45	0.876	0.288		0.791	NonLiq	NonLiq			
7	37.25	43	B. GW	2.003	1.652	0.771	45	0.872	0.289		0.790	NonLiq	NonLiq			
7	37.75	43	B. GW	2.021	1.654	0.771	45	0.868	0.289		0.790	NonLiq	NonLiq			
7	38.25	43	B. GW	2.038	1.656	0.770	45	0.864	0.290		0.790	NonLiq	NonLiq			
7	38.75	43	B. GW	2.056	1.658	0.770	45	0.860	0.291		0.789	NonLiq	NonLiq			
7	39.25	43	B. GW	2.073	1.660	0.769	45	0.855	0.292		0.789	NonLiq	NonLiq			
7	39.75	43	B. GW	2.091	1.662	0.769	45	0.851	0.292		0.788	NonLiq	NonLiq			
8	40.25	14	B. GW	2.108	1.663	0.768	36	0.847	0.293		0.804	NonLiq	NonLiq			
8	40.75	14	B. GW	2.125	1.664	0.768	36	0.842	0.293		0.804	NonLiq	NonLiq			
8	41.25	14	B. GW	2.141	1.666	0.768	36	0.837	0.294		0.804	NonLiq	NonLiq			

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Layer No.	Depth (ft)	Field Blow Count, N	Ground Water	σ_{v0} (tsf)	σ_{v0}' (tsf)	C_N	$(N_1)_{60}$	r_d	CSR	$CRR_{7.5}$	K_σ	$(FS)_{Lower}$	$(FS)_{Upper}$	$(D_E)_{Lower}$	$(D_E)_{Upper}$	
8	41.75	14	B. GW	2.158	1.667	0.767	36	0.833	0.294		0.803	NonLiq	NonLiq			
8	42.25	14	B. GW	2.175	1.668	0.767	36	0.828	0.295		0.803	NonLiq	NonLiq			
8	42.75	14	B. GW	2.192	1.669	0.767	36	0.823	0.295		0.803	NonLiq	NonLiq			
8	43.25	14	B. GW	2.208	1.670	0.767	36	0.818	0.295		0.803	NonLiq	NonLiq			
8	43.75	14	B. GW	2.225	1.671	0.766	36	0.814	0.296		0.802	NonLiq	NonLiq			
8	44.25	14	B. GW	2.242	1.672	0.766	36	0.809	0.296		0.802	NonLiq	NonLiq			
8	44.75	14	B. GW	2.259	1.674	0.766	36	0.804	0.296		0.802	NonLiq	NonLiq			
8	45.25	14	B. GW	2.275	1.675	0.765	36	0.799	0.296		0.802	NonLiq	NonLiq			
8	45.75	14	B. GW	2.292	1.676	0.765	36	0.794	0.296		0.802	NonLiq	NonLiq			
8	46.25	14	B. GW	2.309	1.677	0.765	36	0.788	0.296		0.801	NonLiq	NonLiq			
8	46.75	14	B. GW	2.326	1.678	0.764	36	0.783	0.296		0.801	NonLiq	NonLiq			
8	47.25	14	B. GW	2.342	1.679	0.764	36	0.778	0.296		0.801	NonLiq	NonLiq			
8	47.75	14	B. GW	2.359	1.681	0.764	36	0.773	0.296		0.801	NonLiq	NonLiq			
8	48.25	14	B. GW	2.376	1.682	0.763	36	0.768	0.296		0.801	NonLiq	NonLiq			
8	48.75	14	B. GW	2.393	1.683	0.763	36	0.763	0.296		0.800	NonLiq	NonLiq			
8	49.25	14	B. GW	2.409	1.684	0.763	36	0.758	0.296		0.800	NonLiq	NonLiq			
8	49.75	14	B. GW	2.426	1.685	0.763	36	0.753	0.296		0.800	NonLiq	NonLiq			

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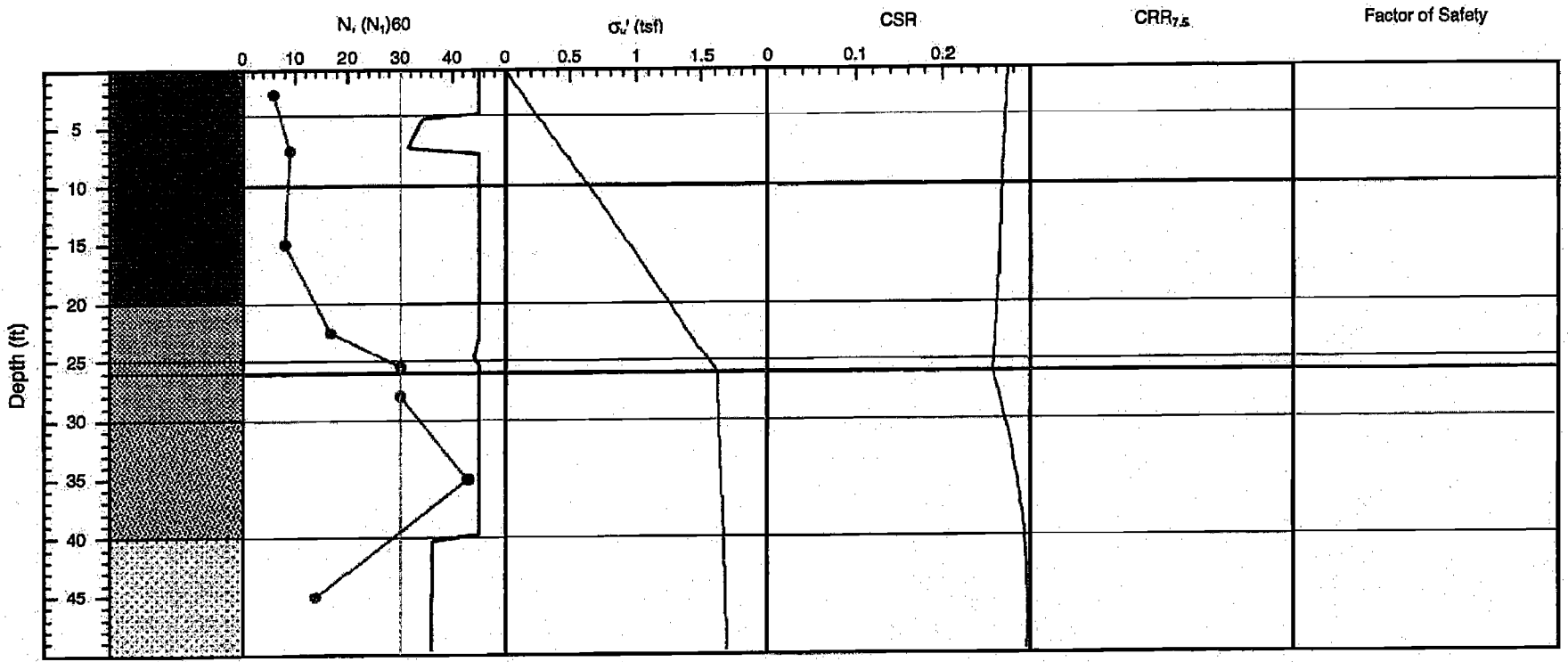

GW, GP, GM, GC

SW-SP

SW-SM, SW-SC, SP-SM, SP-SC

SM, SC, SC-SM

ML

CL

Legend of N value

N

$(N_1)_{60}$

Youd, T. L. and Idriss, I. M. (2001), "Liquefaction Resistance of Soil: Summary Report from the 1996 NCEER and 1998 NCEER/NSF Workshops on Evaluation of Liquefaction Resistance of Soils", *Journal of Geotechnical and Geoenvironmental Engineering*, Vol 127, No. 4, April 2001, pp. 297-313

Lew, Marshall (2001), "Liquefaction Evaluation Guidelines for Practicing Engineering and Geological Professionals and Regulators", *Environmental & Engineering Geoscience*, Vol. VII, No. 4, November 2001, pp. 301-320

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

C.H.J. Incorporated

LIQUEFACTION ANALYSIS

Project:	TIC - The Industrial Company				
Location	911 Bixby Drive, City of Industry, California				
Job Number	05770-3	Boring No.:	2	Enclosure:	D-2

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SEISMIC SETTLEMENT IN SANDS

Project:	TIC - The Industrial Company		
Job Number:	05770-3	Boring No.	2

Location:	911 Bixby Drive, City of Industry, California		
Date:	8-Aug-2005	Enclosure:	D-3

DRY SAND SETTLEMENT

Anticipated Magnitude	7.1	Maximum Acceleration	0.42	Boring GW (ft)	26	Project GW (ft)	10

C_N=Depth correction factor — Seed & Idriss (1982) method

C_E=Hammer energy ratio (ER) correction factor — 1.4

C_B=Borehole diameter correction factor — 1.15

C_R=Rod stick up length (length above ground surface) (ft) — 3

C_S=Correction factor for samplers with or without liners — 1.20

$$(N_1)_{60} = C_N \cdot C_E \cdot C_B \cdot C_R \cdot C_S \cdot N$$

Layer No.	Depth	Field Blow Count	Unit Weight	Fine Content	Friction Angle	Ground Water	σ_{v0}	σ_m'	C_N	$(N_1)_{60}$	Maximum Shear Modulus	Shear Stress	Shear Strain	Volumetric Strain	Settle-ment	Cumulative Settlement
	(ft)	N	(pcf)	(%)	ϕ(°)		(tsf)	(tsf)			G_{max}(tsf)	τ_{av} (tsf)	γ (%)	ε_{NC} (%)	(in)	(in)
1	4.0	6	123	85	20		0.11	0.08	1.68	45	458.3	0.029	0.010	0.003	0.00	0.00
2	10.0	9	130	87	20		0.42	0.33	1.35	31	808.3	0.114	0.022	0.012	0.00	0.00
3	20.0	8	122	87	20	P. GW	0.93	0.71	1.03	45		0.245			0.00	0.00
4	25.0	17	121	48	32	P. GW	1.38	0.89	0.85	45		0.358			0.00	0.00
5	26.0	30	130	45	32	P. GW	1.56	1.01	0.80	45		0.402			0.00	0.00
6	30.0	30	68	45	32	B. GW	1.67	1.05	0.78	45		0.425			0.00	0.00
7	40.0	43	70	10	36	B. GW	1.92	1.00	0.77	45		0.466			0.00	0.00
8	50.0	14	67	60	33	B. GW	2.26	1.07	0.77	36		0.496			0.00	0.00

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SEISMIC SETTLEMENT IN SATURATED SANDS

Project:	TIC - The Industrial Company		
Job Number:	05770-3	Boring No.	2

Location:	911 Bixby Drive, City of Industry, California		
Date:	11-Aug-2005	Enclosure:	D-4

DRY AND SATURATED SAND SETTLEMENT

Anticipated Magnitude	7.1

Maximum Acceleration	0.42

Project Ground Water (ft)	10

Seed & Idriss (1982) method

C_N=Depth correction factor

C_E=Hammer energy ratio (ER) correction factor 1.4

C_B=Borehole diameter correction factor 1.15

C_R=Rod stick up length (length above ground surface) (ft) 3

C_S=Correction factor for samplers with or without liners 1.20

$$(N_1)_{60} = C_N \cdot C_E \cdot C_B \cdot C_R \cdot C_S \cdot N$$

Layer No.	Depth	Field Blow Count	Unit Weight	Fine Content	Ground Water	Pore Pressure	σ_{v0}	σ_{v0}'	C_N	$(N_1)_{60}$	τ_{av}/σ_{v0}'	Volumetric Strain	Settlement	Cumulative Settlement
	(ft)	N	(pcf)	(%)		(tsf)	(tsf)	(tsf)				ε_{NC} (%)	(in)	(in)
1	4	6	123	85		0.00	0.11	0.11	1.68	45	0.238		0.00	0.00
2	10	9	130	87		0.00	0.42	0.42	1.35	31	0.235		0.00	0.00
3	20	8	122	87	P. GW	0.00	0.93	0.93	1.03	45	0.231	0.000	0.00	0.00
4	25	17	121	48	P. GW	0.00	1.38	1.38	0.85	45	0.227	0.000	0.00	0.00
5	26	30	130	45	P. GW	0.00	1.56	1.56	0.80	45	0.224	0.000	0.00	0.00
6	30	30	68	45	B. GW	0.05	1.67	1.62	0.78	45	0.229	0.000	0.00	0.00
7	40	43	70	10	B. GW	0.27	1.92	1.64	0.77	45	0.2477	0	0.00	0.00
8	50	14	67	60	B. GW	0.59	2.26	1.67	0.77	36	0.2586	0	0.00	0.00

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APPENDIX "E"

PILE CALCULATIONS

ALLPILE INPUT DATA

Date: 8/11/2005 File Name: F:\Users\JimC\Prelim Lab work\05770-3 - TIC - City of Industry\20 inch concrete.alp
Unit: English

* Pile Type Page *
Title 1: TIC - The Industrial Company
Title 2: 911 Bixby Drive, City of Industry, CA
20 inch concrete driven piles
Pile Type: Driving Concrete

* Pile Profile *
Pile Length: 36 - ft
Top Distance: 0 - ft
Slope Angle: 0
Pile Angle: 0

* Pile Properties *

Depth - ft	Width - in	Area - in2	Perim. - in	I - in4	E - kip/in2	Weight - kip/ft	Outside Material	Inside Material	% inside in total area
0	20	400.0	80.0	13342.7	3597	0.43	Concrete (rough)	Steel	1.0

* Group-Head-Load *
Head Condition: 2
Vertical Load, Q: 200 - kip
Shear Load, P: 25 - kip
Shear Condition: Cyclic
Number of Cycles: 15
Moment, M: kip-ft
Displacement, yt: - in
Slope, St:
Stiffness, Kt: kip-ft
Pile Number: Single
Group Type: 1
Head Type: 2
Diameter: 16.0 - in
Sx: 36 - in
Sy: 36 - in
Nx: 4 - in
Ny: 4 - in

Water Table: 10 - ft

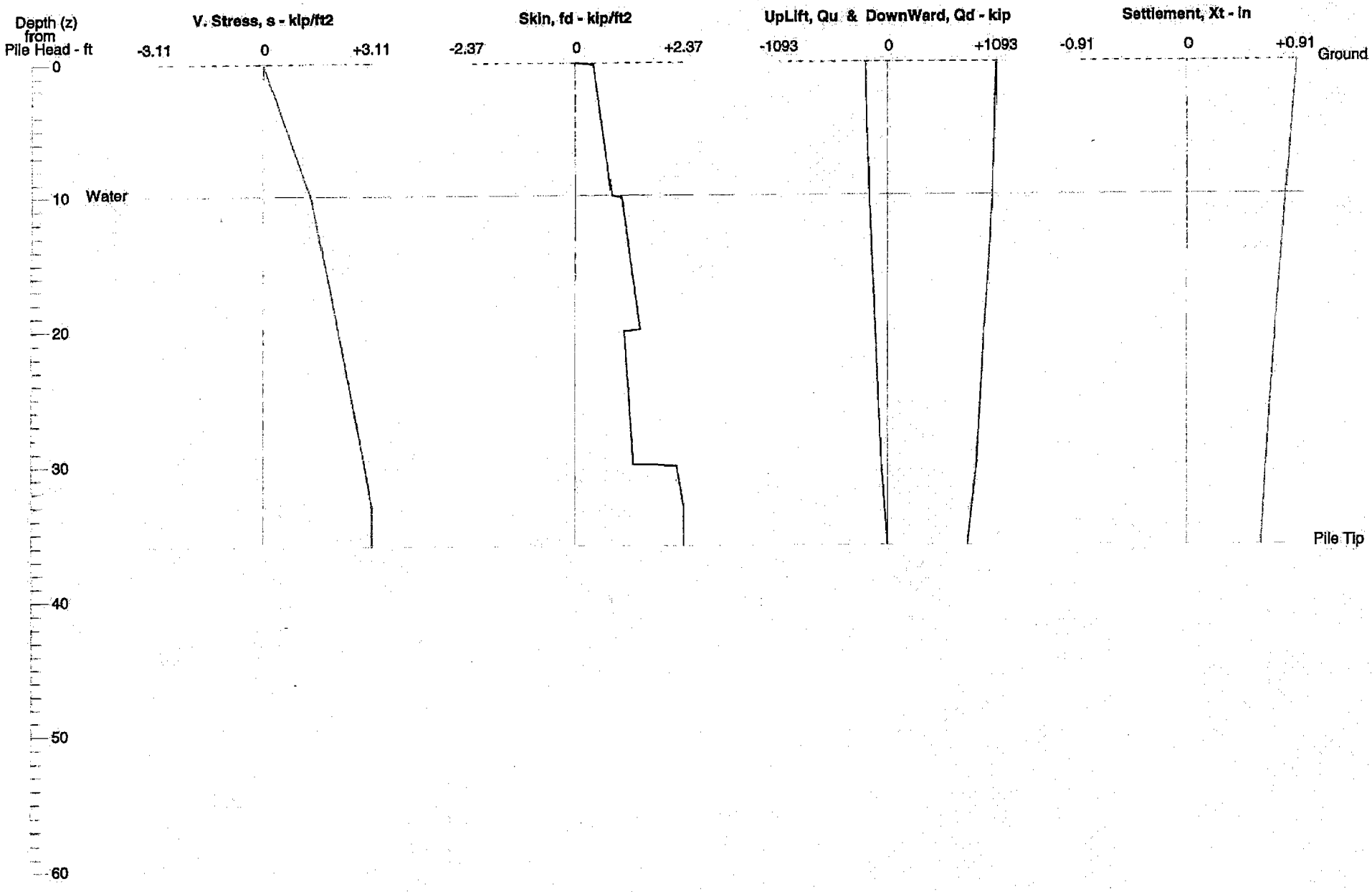
* Soil Properties *

Depth - ft	Gamma - lb/ft3	Phi o	C - kip/ft2	K - lb/in3	E50/Dr - %	Nspt	Type	Soil
0	135.9	16	.4	604.5	0.44	30	3	Clay
10	77.2	28	.25	956.8	0.35	45	2	Silt
20	74.9	15	.5	693.0	0.42	34	3	Clay
25	77.2	15	.5	956.8	0.35	45	3	Clay
30	64.9	38	0.00	139.0	80.06	45	1	Sand/Gravel
40	73.3	28	.25	594.7	0.45	30	2	Silt
50	61.8	38	0.00	113.6	71.91	37	1	Sand/Gravel
55	73.4	15	.5	597.1	0.45	30	3	Clay
65	60.8	38.1	0.00	97.6	66.15	31	1	Sand/Gravel

END OF INPUT DATA

PILE FORCE & SETTLEMENT vs DEPTH

Based on Ultimate Load Condition

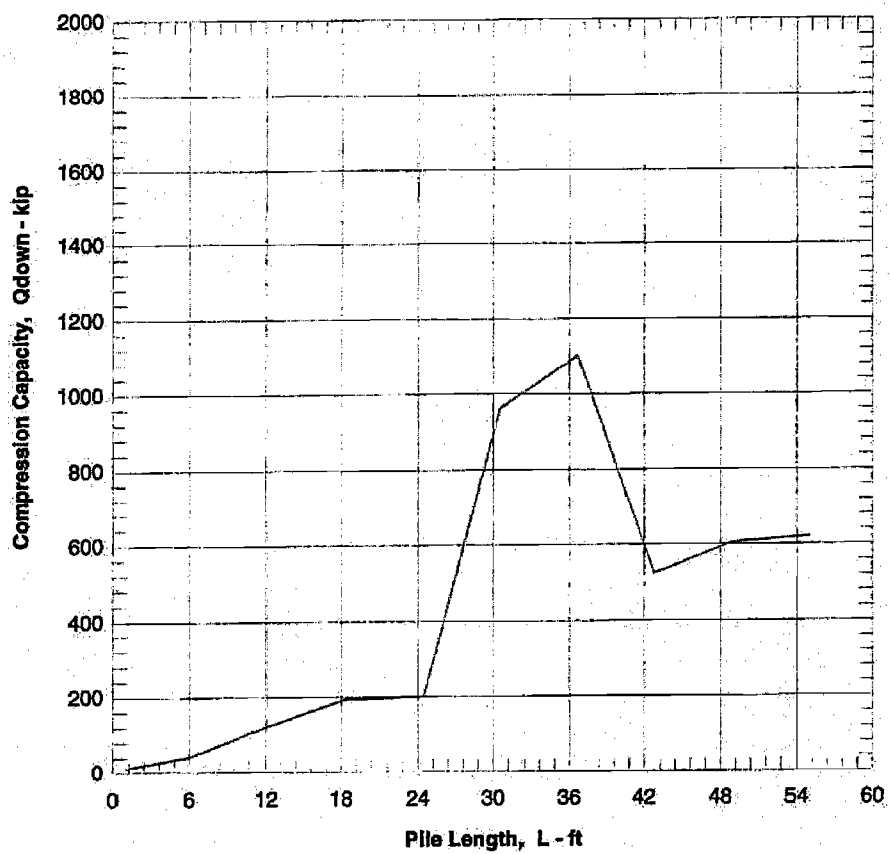


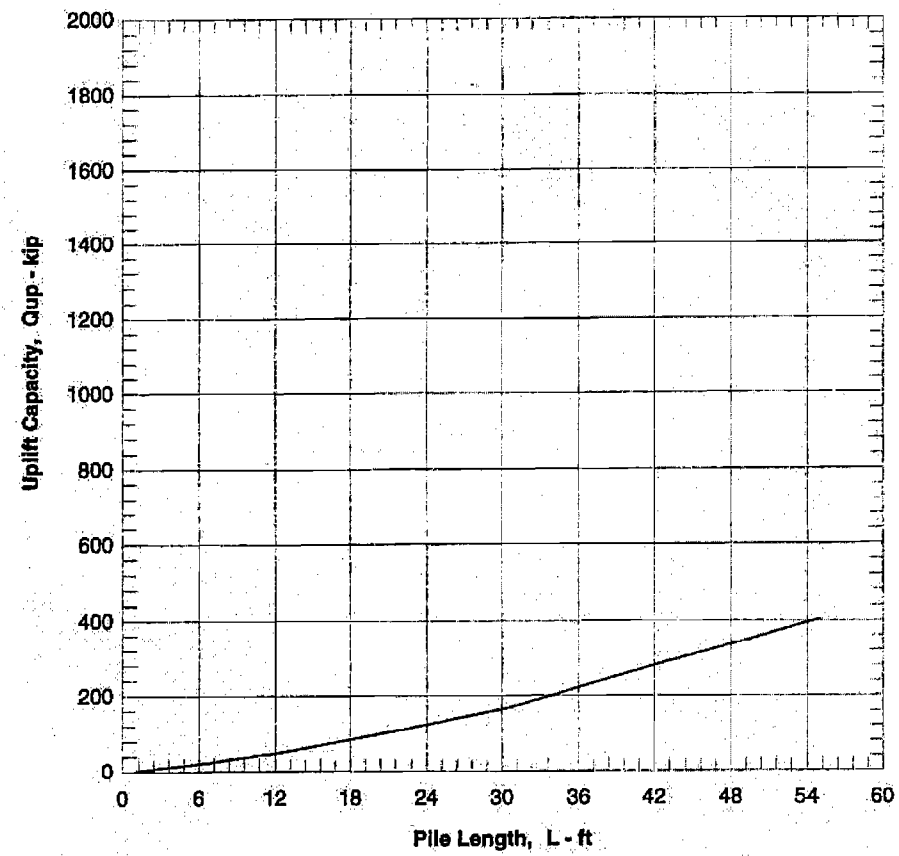
C.H.J. Incorporated

TIC - The Industrial Company
911 Pixby Drive, City of Industry, CA

Enclosure "E-2"
Job No. 05770-3

ULTIMATE CAPACITY vs PILE LENGTH



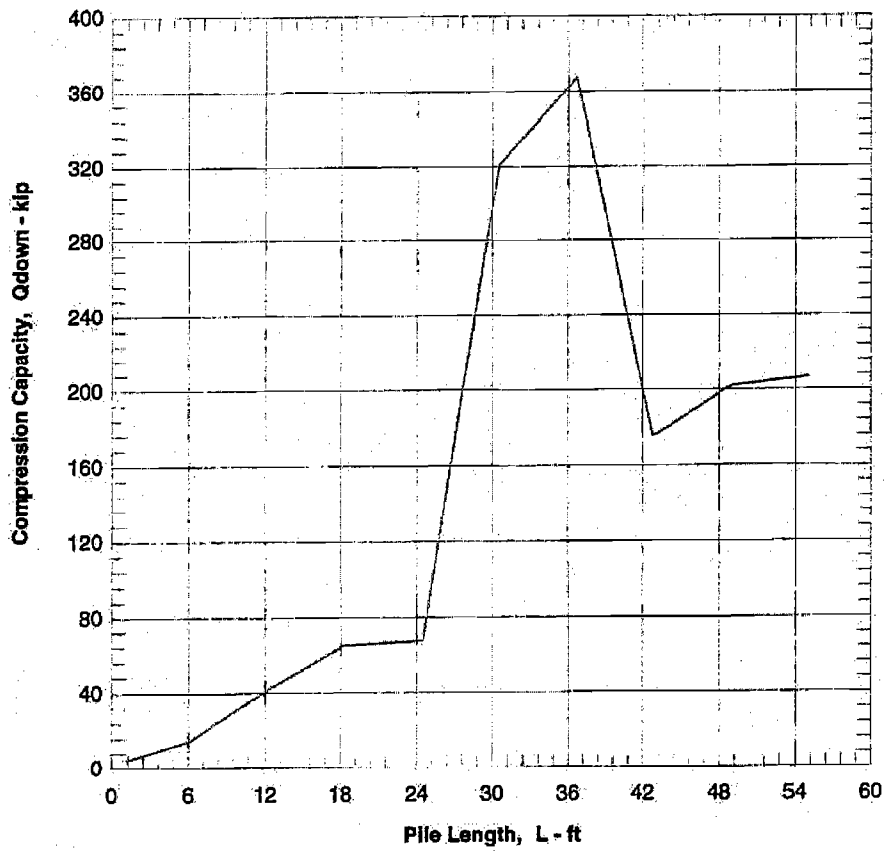


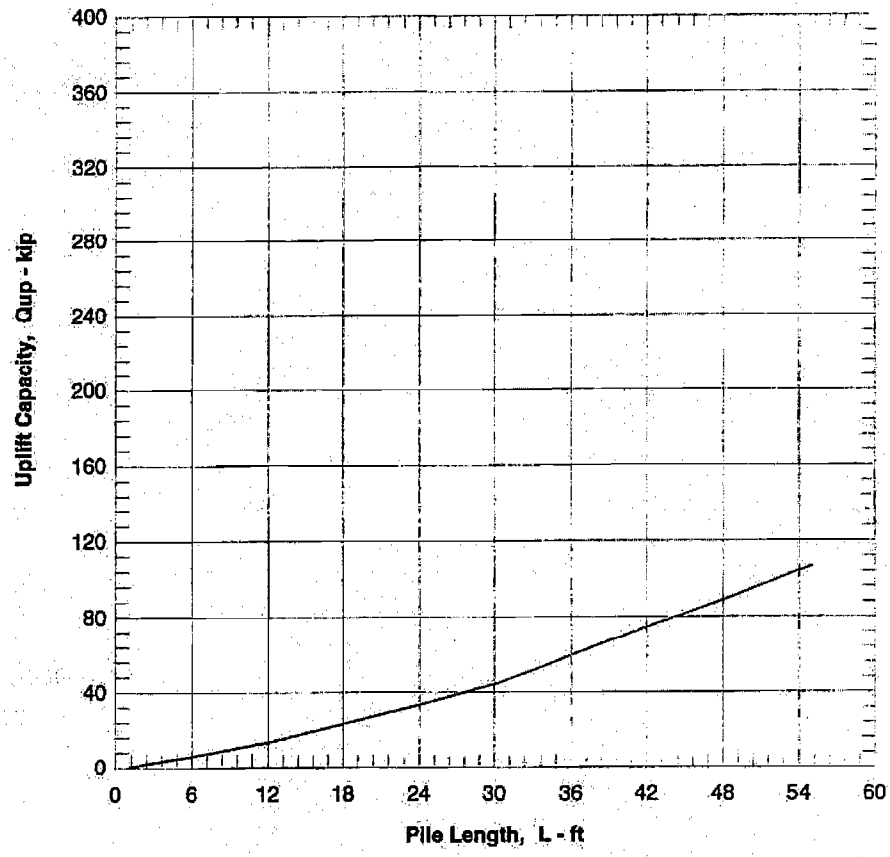
Enclosure "E-3"
Job No. 05770-3

C.H.J. Incorporated

TIC - The Industrial Company
911 Bixby Drive, City of Industry, CA

ALLOWABLE CAPACITY vs PILE LENGTH





Enclosure "E-4"
Job No. 05770-3

C.H.J. Incorporated

TIC - The Industrial Company
911 P[illegible]by Drive, City of Industry, CA

Vertical Pile Calculations

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ALL-PILE VERSION 3.2E CALCULATION DETAILS
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****

TIP RESISTANCE CALCULATION:

Ztip - ft	Z/B	Z_lim - ft	qo_lim - kip/ft2	Width - ft	Area - ft2	Phi - o	C - kip/ft2	Nq	Nc	Sv - kip/ft2	q0 - kip/ft2	Qt - kip
36.0	20	33.3	999.0	1.7	2.78	38.0	0.00	93.0	9.0	3.1	289.3	803.6

SKIN RESISTANCE CALCULATION:

B - ft	Z/B	Z_lim - ft	f0_lim - kip/ft2	K_down	K_up	dz - ft
1.67	20.0	33.33	99.0	1.3	0.8	0.12

SKIN RESISTANCE CALCULATION AT DEPTH:

Z - ft	Pre. - ft	Sv - kip/ft2	Phi - o	Delta - Rad.	Sf_dw - kip/ft2	Sf_up - kip/ft2	C - kip/ft2	KcKa - kip/ft2	Ca_dw - kip/ft2	Ca_up - kip/ft2	f0_dw - kip/ft2	f0_up - kip/ft2	Weight - kip	Qneg - kip	Q_dw - kip	Q_up - kip
35.88	6.67	3.11	38.0	0.5	2.4	1.46	0.00	1.25	0.00	0.00	2.37	1.46	0.05	0.00	805.5	1.2
35.76	6.67	3.11	38.0	0.5	2.4	1.46	0.00	1.25	0.00	0.00	2.37	1.46	0.10	0.00	807.4	2.4
35.64	6.67	3.11	38.0	0.5	2.4	1.46	0.00	1.25	0.00	0.00	2.37	1.46	0.16	0.00	809.3	3.7
35.52	6.67	3.11	38.0	0.5	2.4	1.46	0.00	1.25	0.00	0.00	2.37	1.46	0.21	0.00	811.3	4.9
35.40	6.67	3.11	38.0	0.5	2.4	1.46	0.00	1.25	0.00	0.00	2.37	1.46	0.26	0.00	813.2	6.1
35.28	6.67	3.11	38.0	0.5	2.4	1.46	0.00	1.25	0.00	0.00	2.37	1.46	0.31	0.00	815.1	7.3
35.16	6.67	3.11	38.0	0.5	2.4	1.46	0.00	1.25	0.00	0.00	2.37	1.46	0.36	0.00	817.0	8.6
35.04	6.67	3.11	38.0	0.5	2.4	1.46	0.00	1.25	0.00	0.00	2.37	1.46	0.41	0.00	818.9	9.8
34.92	6.67	3.11	38.0	0.5	2.4	1.46	0.00	1.25	0.00	0.00	2.37	1.46	0.47	0.00	820.8	11.0
34.80	6.67	3.11	38.0	0.5	2.4	1.46	0.00	1.25	0.00	0.00	2.37	1.46	0.52	0.00	822.7	12.2
34.68	6.67	3.11	38.0	0.5	2.4	1.46	0.00	1.25	0.00	0.00	2.37	1.46	0.57	0.00	824.6	13.5
34.56	6.67	3.11	38.0	0.5	2.4	1.46	0.00	1.25	0.00	0.00	2.37	1.46	0.62	0.00	826.5	14.7
34.43	6.67	3.11	38.0	0.5	2.4	1.46	0.00	1.25	0.00	0.00	2.37	1.46	0.67	0.00	828.4	15.9
34.31	6.67	3.11	38.0	0.5	2.4	1.46	0.00	1.25	0.00	0.00	2.37	1.46	0.72	0.00	830.3	17.1
34.19	6.67	3.11	38.0	0.5	2.4	1.46	0.00	1.25	0.00	0.00	2.37	1.46	0.78	0.00	832.2	18.3
34.07	6.67	3.11	38.0	0.5	2.4	1.46	0.00	1.25	0.00	0.00	2.37	1.46	0.83	0.00	834.1	19.6
33.95	6.67	3.11	38.0	0.5	2.4	1.46	0.00	1.25	0.00	0.00	2.37	1.46	0.88	0.00	836.0	20.8
33.83	6.67	3.11	38.0	0.5	2.4	1.46	0.00	1.25	0.00	0.00	2.37	1.46	0.93	0.00	837.9	22.0
33.71	6.67	3.11	38.0	0.5	2.4	1.46	0.00	1.25	0.00	0.00	2.37	1.46	0.98	0.00	839.8	23.2
33.59	6.67	3.11	38.0	0.5	2.4	1.46	0.00	1.25	0.00	0.00	2.37	1.46	1.04	0.00	841.7	24.5
33.47	6.67	3.11	38.0	0.5	2.4	1.46	0.00	1.25	0.00	0.00	2.37	1.46	1.09	0.00	843.6	25.7
33.35	6.67	3.11	38.0	0.5	2.4	1.46	0.00	1.25	0.00	0.00	2.37	1.46	1.14	0.00	845.5	26.9
33.23	6.67	3.11	38.0	0.5	2.4	1.46	0.00	1.25	0.00	0.00	2.37	1.46	1.19	0.00	847.4	28.1
33.11	6.67	3.10	38.0	0.5	2.4	1.46	0.00	1.25	0.00	0.00	2.37	1.46	1.24	0.00	849.3	29.4
32.99	6.67	3.09	38.0	0.5	2.4	1.45	0.00	1.25	0.00	0.00	2.36	1.45	1.29	0.00	851.2	30.6
32.87	6.67	3.09	38.0	0.5	2.4	1.45	0.00	1.25	0.00	0.00	2.35	1.45	1.35	0.00	853.1	31.8
32.75	6.67	3.08	38.0	0.5	2.3	1.44	0.00	1.25	0.00	0.00	2.35	1.44	1.40	0.00	855.0	33.0
32.63	6.67	3.07	38.0	0.5	2.3	1.44	0.00	1.25	0.00	0.00	2.34	1.44	1.45	0.00	856.9	34.2
32.51	6.67	3.06	38.0	0.5	2.3	1.44	0.00	1.25	0.00	0.00	2.34	1.44	1.50	0.00	858.7	35.4
32.39	6.67	3.05	38.0	0.5	2.3	1.43	0.00	1.25	0.00	0.00	2.33	1.43	1.55	0.00	860.6	36.6
32.27	6.67	3.05	38.0	0.5	2.3	1.43	0.00	1.25	0.00	0.00	2.32	1.43	1.60	0.00	862.5	37.8
32.15	6.67	3.04	38.0	0.5	2.3	1.43	0.00	1.25	0.00	0.00	2.32	1.43	1.65	0.00	864.3	39.0
32.03	6.67	3.03	38.0	0.5	2.3	1.42	0.00	1.25	0.00	0.00	2.31	1.42	1.71	0.00	866.2	40.2

31.91	6.67	3.02	38.0	0.5	2.3	1.42	0.00	1.25	0.00	0.00	2.31	1.42	1.76	0.00	868.0	41.4
31.79	6.67	3.02	38.0	0.5	2.3	1.42	0.00	1.25	0.00	0.00	2.30	1.42	1.81	0.00	869.9	42.6
31.67	6.67	3.01	38.0	0.5	2.3	1.41	0.00	1.25	0.00	0.00	2.29	1.41	1.86	0.00	871.7	43.8
31.55	6.67	3.00	38.0	0.5	2.3	1.41	0.00	1.25	0.00	0.00	2.29	1.41	1.92	0.00	873.6	44.9
31.42	6.67	2.99	38.0	0.5	2.3	1.40	0.00	1.25	0.00	0.00	2.28	1.40	1.97	0.00	875.4	46.1
31.30	6.67	2.98	38.0	0.5	2.3	1.40	0.00	1.25	0.00	0.00	2.28	1.40	2.02	0.00	877.2	47.3
31.18	6.67	2.98	38.0	0.5	2.3	1.40	0.00	1.25	0.00	0.00	2.27	1.40	2.07	0.00	879.0	48.5
31.06	6.67	2.97	38.0	0.5	2.3	1.39	0.00	1.25	0.00	0.00	2.26	1.39	2.12	0.00	880.9	49.6
30.94	6.67	2.96	38.0	0.5	2.3	1.39	0.00	1.25	0.00	0.00	2.26	1.39	2.17	0.00	882.7	50.8
30.82	6.67	2.95	38.0	0.5	2.3	1.39	0.00	1.25	0.00	0.00	2.25	1.39	2.23	0.00	884.5	52.0
30.70	6.67	2.95	38.0	0.5	2.2	1.38	0.00	1.25	0.00	0.00	2.25	1.38	2.28	0.00	886.3	53.1
30.58	6.67	2.94	38.0	0.5	2.2	1.38	0.00	1.25	0.00	0.00	2.24	1.38	2.33	0.00	888.1	54.3
30.46	6.67	2.93	38.0	0.5	2.2	1.37	0.00	1.25	0.00	0.00	2.23	1.37	2.38	0.00	889.9	55.5
30.34	6.67	2.92	38.0	0.5	2.2	1.37	0.00	1.25	0.00	0.00	2.23	1.37	2.43	0.00	891.7	56.6
30.22	6.67	2.91	38.0	0.5	2.2	1.37	0.00	1.25	0.00	0.00	2.22	1.37	2.49	0.00	893.4	57.8
30.10	6.67	2.91	38.0	0.5	2.2	1.36	0.00	1.25	0.00	0.00	2.22	1.36	2.54	0.00	895.2	58.9
29.98	6.67	2.90	15.0	0.2	0.8	0.49	0.50	0.94	0.47	0.47	1.27	0.96	2.59	0.00	896.2	59.7
29.86	6.67	2.89	15.0	0.2	0.8	0.49	0.50	0.94	0.47	0.47	1.27	0.96	2.64	0.00	897.3	60.5
29.74	6.67	2.88	15.0	0.2	0.8	0.49	0.50	0.94	0.47	0.47	1.26	0.96	2.69	0.00	898.3	61.4
29.62	6.67	2.87	15.0	0.2	0.8	0.49	0.50	0.94	0.47	0.47	1.26	0.96	2.74	0.00	899.3	62.2
29.50	6.67	2.86	15.0	0.2	0.8	0.49	0.50	0.94	0.47	0.47	1.26	0.95	2.80	0.00	900.3	63.0
29.38	6.67	2.85	15.0	0.2	0.8	0.48	0.50	0.94	0.47	0.47	1.26	0.95	2.85	0.00	901.3	63.8
29.26	6.67	2.84	15.0	0.2	0.8	0.48	0.50	0.94	0.47	0.47	1.25	0.95	2.90	0.00	902.3	64.6
29.14	6.67	2.83	15.0	0.2	0.8	0.48	0.50	0.94	0.47	0.47	1.25	0.95	2.95	0.00	903.3	65.5
29.02	6.67	2.82	15.0	0.2	0.8	0.48	0.50	0.94	0.47	0.47	1.25	0.95	3.00	0.00	904.3	66.3
28.90	6.67	2.81	15.0	0.2	0.8	0.48	0.50	0.94	0.47	0.47	1.25	0.95	3.05	0.00	905.3	67.1
28.78	6.67	2.80	15.0	0.2	0.8	0.48	0.50	0.94	0.47	0.47	1.24	0.95	3.11	0.00	906.3	67.9
28.66	6.67	2.79	15.0	0.2	0.8	0.48	0.50	0.94	0.47	0.47	1.24	0.94	3.16	0.00	907.3	68.7
28.54	6.67	2.79	15.0	0.2	0.8	0.47	0.50	0.94	0.47	0.47	1.24	0.94	3.21	0.00	908.3	69.5
28.41	6.67	2.78	15.0	0.2	0.8	0.47	0.50	0.94	0.47	0.47	1.24	0.94	3.26	0.00	909.3	70.3
28.29	6.67	2.77	15.0	0.2	0.8	0.47	0.50	0.94	0.47	0.47	1.23	0.94	3.31	0.00	910.3	71.1
28.17	6.67	2.76	15.0	0.2	0.8	0.47	0.50	0.94	0.47	0.47	1.23	0.94	3.37	0.00	911.3	71.9
28.05	6.67	2.75	15.0	0.2	0.8	0.47	0.50	0.94	0.47	0.47	1.23	0.94	3.42	0.00	912.3	72.7
27.93	6.67	2.74	15.0	0.2	0.8	0.47	0.50	0.94	0.47	0.47	1.23	0.93	3.47	0.00	913.2	73.5
27.81	6.67	2.73	15.0	0.2	0.8	0.46	0.50	0.94	0.47	0.47	1.22	0.93	3.52	0.00	914.2	74.3
27.69	6.67	2.72	15.0	0.2	0.8	0.46	0.50	0.94	0.47	0.47	1.22	0.93	3.57	0.00	915.2	75.1
27.57	6.67	2.71	15.0	0.2	0.7	0.46	0.50	0.94	0.47	0.47	1.22	0.93	3.62	0.00	916.2	75.9
27.45	6.67	2.70	15.0	0.2	0.7	0.46	0.50	0.94	0.47	0.47	1.21	0.93	3.68	0.00	917.2	76.7
27.33	6.67	2.69	15.0	0.2	0.7	0.46	0.50	0.94	0.47	0.47	1.21	0.93	3.73	0.00	918.1	77.5
27.21	6.67	2.68	15.0	0.2	0.7	0.46	0.50	0.94	0.47	0.47	1.21	0.92	3.78	0.00	919.1	78.3
27.09	6.67	2.67	15.0	0.2	0.7	0.45	0.50	0.94	0.47	0.47	1.21	0.92	3.83	0.00	920.1	79.1
26.97	6.67	2.66	15.0	0.2	0.7	0.45	0.50	0.94	0.47	0.47	1.20	0.92	3.88	0.00	921.0	79.9
26.85	6.67	2.66	15.0	0.2	0.7	0.45	0.50	0.94	0.47	0.47	1.20	0.92	3.93	0.00	922.0	80.7
26.73	6.67	2.65	15.0	0.2	0.7	0.45	0.50	0.94	0.47	0.47	1.20	0.92	3.99	0.00	923.0	81.5
26.61	6.67	2.64	15.0	0.2	0.7	0.45	0.50	0.94	0.47	0.47	1.20	0.92	4.04	0.00	923.9	82.3
26.49	6.67	2.63	15.0	0.2	0.7	0.45	0.50	0.94	0.47	0.47	1.19	0.92	4.09	0.00	924.9	83.0
26.37	6.67	2.62	15.0	0.2	0.7	0.45	0.50	0.94	0.47	0.47	1.19	0.91	4.14	0.00	925.8	83.8
26.25	6.67	2.61	15.0	0.2	0.7	0.44	0.50	0.94	0.47	0.47	1.19	0.91	4.19	0.00	926.8	84.6
26.13	6.67	2.60	15.0	0.2	0.7	0.44	0.50	0.94	0.47	0.47	1.19	0.91	4.25	0.00	927.8	85.4
26.01	6.67	2.59	15.0	0.2	0.7	0.44	0.50	0.94	0.47	0.47	1.18	0.91	4.30	0.00	928.7	86.2
25.89	6.67	2.58	15.0	0.2	0.7	0.44	0.50	0.94	0.47	0.47	1.18	0.91	4.35	0.00	929.7	87.0
25.77	6.67	2.57	15.0	0.2	0.7	0.44	0.50	0.94	0.47	0.47	1.18	0.91	4.40	0.00	930.6	87.7
25.65	6.67	2.56	15.0	0.2	0.7	0.44	0.50	0.94	0.47	0.47	1.18	0.90	4.45	0.00	931.5	88.5
25.53	6.67	2.55	15.0	0.2	0.7	0.43	0.50	0.94	0.47	0.47	1.17	0.90	4.50	0.00	932.5	89.3
25.40	6.67	2.54	15.0	0.2	0.7	0.43	0.50	0.94	0.47	0.47	1.17	0.90	4.56	0.00	933.4	90.1
25.28	6.67	2.53	15.0	0.2	0.7	0.43	0.50	0.94	0.47	0.47	1.17	0.90	4.61	0.00	934.4	90.8
25.16	6.67	2.52	15.0	0.2	0.7	0.43	0.50	0.94	0.47	0.47	1.17	0.90	4.66	0.00	935.3	91.6
25.04	6.67	2.52	15.0	0.2	0.7	0.43	0.50	0.94	0.47	0.47	1.16	0.90	4.71	0.00	936.2	92.4
24.92	6.67	2.51	15.0	0.2	0.7	0.43	0.50	0.94	0.47	0.47	1.16	0.89	4.76	0.00	937.2	93.2
24.80	6.67	2.50	15.0	0.2	0.7	0.42	0.50	0.94	0.47	0.47	1.16	0.89	4.81	0.00	938.1	93.9
24.68	6.67	2.49	15.0	0.2	0.7	0.42	0.50	0.94	0.47	0.47	1.16	0.89	4.87	0.00	939.0	94.7
24.56	6.67	2.48	15.0	0.2	0.7	0.42	0.50	0.94	0.47	0.47	1.15	0.89	4.92	0.00	939.9	95.5
24.44	6.67	2.47	15.0	0.2	0.7	0.42	0.50	0.94	0.47	0.47	1.15	0.89	4.97	0.00	940.9	96.2

24.32	6.67	2.46	15.0	0.2	0.7	0.42	0.50	0.94	0.47	0.47	1.15	0.89	5.02	0.00	941.8	97.0
24.20	6.67	2.45	15.0	0.2	0.7	0.42	0.50	0.94	0.47	0.47	1.15	0.89	5.07	0.00	942.7	97.7
24.08	6.67	2.44	15.0	0.2	0.7	0.42	0.50	0.94	0.47	0.47	1.14	0.88	5.13	0.00	943.6	98.5
23.96	6.67	2.43	15.0	0.2	0.7	0.41	0.50	0.94	0.47	0.47	1.14	0.88	5.18	0.00	944.5	99.3
23.84	6.67	2.43	15.0	0.2	0.7	0.41	0.50	0.94	0.47	0.47	1.14	0.88	5.23	0.00	945.5	100.0
23.72	6.67	2.42	15.0	0.2	0.7	0.41	0.50	0.94	0.47	0.47	1.14	0.88	5.28	0.00	946.4	100.8
23.60	6.67	2.41	15.0	0.2	0.7	0.41	0.50	0.94	0.47	0.47	1.13	0.88	5.33	0.00	947.3	101.5
23.48	6.67	2.40	15.0	0.2	0.7	0.41	0.50	0.94	0.47	0.47	1.13	0.88	5.38	0.00	948.2	102.3
23.36	6.67	2.39	15.0	0.2	0.7	0.41	0.50	0.94	0.47	0.47	1.13	0.87	5.44	0.00	949.1	103.1
23.24	6.67	2.38	15.0	0.2	0.7	0.40	0.50	0.94	0.47	0.47	1.13	0.87	5.49	0.00	950.0	103.8
23.12	6.67	2.37	15.0	0.2	0.7	0.40	0.50	0.94	0.47	0.47	1.12	0.87	5.54	0.00	950.9	104.6
23.00	6.67	2.36	15.0	0.2	0.7	0.40	0.50	0.94	0.47	0.47	1.12	0.87	5.59	0.00	951.8	105.3
22.88	6.67	2.35	15.0	0.2	0.7	0.40	0.50	0.94	0.47	0.47	1.12	0.87	5.64	0.00	952.7	106.1
22.76	6.67	2.34	15.0	0.2	0.6	0.40	0.50	0.94	0.47	0.47	1.12	0.87	5.69	0.00	953.6	106.8
22.64	6.67	2.34	15.0	0.2	0.6	0.40	0.50	0.94	0.47	0.47	1.11	0.87	5.75	0.00	954.5	107.5
22.52	6.67	2.33	15.0	0.2	0.6	0.40	0.50	0.94	0.47	0.47	1.11	0.86	5.80	0.00	955.4	108.3
22.39	6.67	2.32	15.0	0.2	0.6	0.39	0.50	0.94	0.47	0.47	1.11	0.86	5.85	0.00	956.3	109.0
22.27	6.67	2.31	15.0	0.2	0.6	0.39	0.50	0.94	0.47	0.47	1.11	0.86	5.90	0.00	957.2	109.8
22.15	6.67	2.30	15.0	0.2	0.6	0.39	0.50	0.94	0.47	0.47	1.10	0.86	5.95	0.00	958.0	110.5
22.03	6.67	2.29	15.0	0.2	0.6	0.39	0.50	0.94	0.47	0.47	1.10	0.86	6.01	0.00	958.9	111.3
21.91	6.67	2.28	15.0	0.2	0.6	0.39	0.50	0.94	0.47	0.47	1.10	0.86	6.06	0.00	959.8	112.0
21.79	6.67	2.27	15.0	0.2	0.6	0.39	0.50	0.94	0.47	0.47	1.10	0.85	6.11	0.00	960.7	112.7
21.67	6.67	2.26	15.0	0.2	0.6	0.38	0.50	0.94	0.47	0.47	1.09	0.85	6.16	0.00	961.6	113.5
21.55	6.67	2.25	15.0	0.2	0.6	0.38	0.50	0.94	0.47	0.47	1.09	0.85	6.21	0.00	962.4	114.2
21.43	6.67	2.25	15.0	0.2	0.6	0.38	0.50	0.94	0.47	0.47	1.09	0.85	6.26	0.00	963.3	114.9
21.31	6.67	2.24	15.0	0.2	0.6	0.38	0.50	0.94	0.47	0.47	1.09	0.85	6.32	0.00	964.2	115.7
21.19	6.67	2.23	15.0	0.2	0.6	0.38	0.50	0.94	0.47	0.47	1.08	0.85	6.37	0.00	965.1	116.4
21.07	6.67	2.22	15.0	0.2	0.6	0.38	0.50	0.94	0.47	0.47	1.08	0.85	6.42	0.00	965.9	117.1
20.95	6.67	2.21	15.0	0.2	0.6	0.38	0.50	0.94	0.47	0.47	1.08	0.84	6.47	0.00	966.8	117.9
20.83	6.67	2.20	15.0	0.2	0.6	0.37	0.50	0.94	0.47	0.47	1.08	0.84	6.52	0.00	967.7	118.6
20.71	6.67	2.19	15.0	0.2	0.6	0.37	0.50	0.94	0.47	0.47	1.07	0.84	6.58	0.00	968.5	119.3
20.59	6.67	2.18	15.0	0.2	0.6	0.37	0.50	0.94	0.47	0.47	1.07	0.84	6.63	0.00	969.4	120.1
20.47	6.67	2.17	15.0	0.2	0.6	0.37	0.50	0.94	0.47	0.47	1.07	0.84	6.68	0.00	970.2	120.8
20.35	6.67	2.16	15.0	0.2	0.6	0.37	0.50	0.94	0.47	0.47	1.07	0.84	6.73	0.00	971.1	121.5
20.23	6.67	2.15	15.0	0.2	0.6	0.37	0.50	0.94	0.47	0.47	1.06	0.83	6.78	0.00	972.0	122.2
20.11	6.67	2.15	15.0	0.2	0.6	0.36	0.50	0.94	0.47	0.47	1.06	0.83	6.83	0.00	972.8	122.9
19.99	6.67	2.14	28.0	0.4	1.1	0.70	0.25	1.08	0.27	0.27	1.41	0.97	6.89	0.00	973.9	123.8
19.87	6.67	2.13	28.0	0.4	1.1	0.70	0.25	1.08	0.27	0.27	1.41	0.97	6.94	0.00	975.1	124.6
19.75	6.67	2.12	28.0	0.4	1.1	0.70	0.25	1.08	0.27	0.27	1.40	0.97	6.99	0.00	976.2	125.4
19.63	6.67	2.11	28.0	0.4	1.1	0.70	0.25	1.08	0.27	0.27	1.40	0.96	7.04	0.00	977.3	126.3
19.51	6.67	2.10	28.0	0.4	1.1	0.69	0.25	1.08	0.27	0.27	1.39	0.96	7.09	0.00	978.4	127.1
19.38	6.67	2.09	28.0	0.4	1.1	0.69	0.25	1.08	0.27	0.27	1.39	0.96	7.14	0.00	979.6	127.9
19.26	6.67	2.08	28.0	0.4	1.1	0.69	0.25	1.08	0.27	0.27	1.38	0.96	7.20	0.00	980.7	128.7
19.14	6.67	2.07	28.0	0.4	1.1	0.68	0.25	1.08	0.27	0.27	1.38	0.95	7.25	0.00	981.8	129.5
19.02	6.67	2.06	28.0	0.4	1.1	0.68	0.25	1.08	0.27	0.27	1.37	0.95	7.30	0.00	982.9	130.4
18.90	6.67	2.05	28.0	0.4	1.1	0.68	0.25	1.08	0.27	0.27	1.37	0.95	7.35	0.00	984.0	131.2
18.78	6.67	2.04	28.0	0.4	1.1	0.67	0.25	1.08	0.27	0.27	1.36	0.94	7.40	0.00	985.1	132.0
18.66	6.67	2.03	28.0	0.4	1.1	0.67	0.25	1.08	0.27	0.27	1.36	0.94	7.46	0.00	986.2	132.8
18.54	6.67	2.03	28.0	0.4	1.1	0.67	0.25	1.08	0.27	0.27	1.35	0.94	7.51	0.00	987.2	133.6
18.42	6.67	2.02	28.0	0.4	1.1	0.66	0.25	1.08	0.27	0.27	1.35	0.93	7.56	0.00	988.3	134.4
18.30	6.67	2.01	28.0	0.4	1.1	0.66	0.25	1.08	0.27	0.27	1.34	0.93	7.61	0.00	989.4	135.2
18.18	6.67	2.00	28.0	0.4	1.1	0.66	0.25	1.08	0.27	0.27	1.34	0.93	7.66	0.00	990.5	136.0
18.06	6.67	1.99	28.0	0.4	1.1	0.66	0.25	1.08	0.27	0.27	1.33	0.92	7.71	0.00	991.6	136.8
17.94	6.67	1.98	28.0	0.4	1.1	0.65	0.25	1.08	0.27	0.27	1.33	0.92	7.77	0.00	992.6	137.6
17.82	6.67	1.97	28.0	0.4	1.1	0.65	0.25	1.08	0.27	0.27	1.32	0.92	7.82	0.00	993.7	138.3
17.70	6.67	1.96	28.0	0.4	1.1	0.65	0.25	1.08	0.27	0.27	1.32	0.92	7.87	0.00	994.7	139.1
17.58	6.67	1.95	28.0	0.4	1.0	0.64	0.25	1.08	0.27	0.27	1.31	0.91	7.92	0.00	995.8	139.9
17.46	6.67	1.94	28.0	0.4	1.0	0.64	0.25	1.08	0.27	0.27	1.31	0.91	7.97	0.00	996.8	140.7
17.34	6.67	1.93	28.0	0.4	1.0	0.64	0.25	1.08	0.27	0.27	1.30	0.91	8.02	0.00	997.9	141.5
17.22	6.67	1.92	28.0	0.4	1.0	0.63	0.25	1.08	0.27	0.27	1.30	0.90	8.08	0.00	998.9	142.3
17.10	6.67	1.91	28.0	0.4	1.0	0.63	0.25	1.08	0.27	0.27	1.29	0.90	8.13	0.00	1000.0	143.0
16.98	6.67	1.90	28.0	0.4	1.0	0.63	0.25	1.08	0.27	0.27	1.29	0.90	8.18	0.00	1001.0	143.8
16.86	6.67	1.89	28.0	0.4	1.0	0.62	0.25	1.08	0.27	0.27	1.28	0.89	8.23	0.00	1002.0	144.6

16.74	6.67	1.89	28.0	0.4	1.0	0.62	0.25	1.08	0.27	0.27	1.28	0.89	8.28	0.00	1003.1	145.3
16.62	6.67	1.88	28.0	0.4	1.0	0.62	0.25	1.08	0.27	0.27	1.27	0.89	8.34	0.00	1004.1	146.1
16.49	6.67	1.87	28.0	0.4	1.0	0.62	0.25	1.08	0.27	0.27	1.27	0.88	8.39	0.00	1005.1	146.9
16.37	6.67	1.86	28.0	0.4	1.0	0.61	0.25	1.08	0.27	0.27	1.26	0.88	8.44	0.00	1006.1	147.6
16.25	6.67	1.85	28.0	0.4	1.0	0.61	0.25	1.08	0.27	0.27	1.26	0.88	8.49	0.00	1007.1	148.4
16.13	6.67	1.84	28.0	0.4	1.0	0.61	0.25	1.08	0.27	0.27	1.25	0.88	8.54	0.00	1008.1	149.1
16.01	6.67	1.83	28.0	0.4	1.0	0.60	0.25	1.08	0.27	0.27	1.25	0.87	8.59	0.00	1009.1	149.9
15.89	6.67	1.82	28.0	0.4	1.0	0.60	0.25	1.08	0.27	0.27	1.24	0.87	8.65	0.00	1010.1	150.6
15.77	6.67	1.81	28.0	0.4	1.0	0.60	0.25	1.08	0.27	0.27	1.24	0.87	8.70	0.00	1011.1	151.4
15.65	6.67	1.80	28.0	0.4	1.0	0.59	0.25	1.08	0.27	0.27	1.23	0.86	8.75	0.00	1012.1	152.1
15.53	6.67	1.79	28.0	0.4	1.0	0.59	0.25	1.08	0.27	0.27	1.23	0.86	8.80	0.00	1013.1	152.9
15.41	6.67	1.78	28.0	0.4	1.0	0.59	0.25	1.08	0.27	0.27	1.22	0.86	8.85	0.00	1014.1	153.6
15.29	6.67	1.77	28.0	0.4	1.0	0.58	0.25	1.08	0.27	0.27	1.22	0.85	8.90	0.00	1015.1	154.3
15.17	6.67	1.76	28.0	0.4	0.9	0.58	0.25	1.08	0.27	0.27	1.21	0.85	8.96	0.00	1016.1	155.1
15.05	6.67	1.76	28.0	0.4	0.9	0.58	0.25	1.08	0.27	0.27	1.21	0.85	9.01	0.00	1017.0	155.8
14.93	6.67	1.75	28.0	0.4	0.9	0.58	0.25	1.08	0.27	0.27	1.20	0.84	9.06	0.00	1018.0	156.5
14.81	6.67	1.74	28.0	0.4	0.9	0.57	0.25	1.08	0.27	0.27	1.20	0.84	9.11	0.00	1019.0	157.3
14.69	6.67	1.73	28.0	0.4	0.9	0.57	0.25	1.08	0.27	0.27	1.19	0.84	9.16	0.00	1019.9	158.0
14.57	6.67	1.72	28.0	0.4	0.9	0.57	0.25	1.08	0.27	0.27	1.19	0.84	9.22	0.00	1020.9	158.7
14.45	6.67	1.71	28.0	0.4	0.9	0.56	0.25	1.08	0.27	0.27	1.18	0.83	9.27	0.00	1021.8	159.4
14.33	6.67	1.70	28.0	0.4	0.9	0.56	0.25	1.08	0.27	0.27	1.18	0.83	9.32	0.00	1022.8	160.2
14.21	6.67	1.69	28.0	0.4	0.9	0.56	0.25	1.08	0.27	0.27	1.17	0.83	9.37	0.00	1023.7	160.9
14.09	6.67	1.68	28.0	0.4	0.9	0.55	0.25	1.08	0.27	0.27	1.17	0.82	9.42	0.00	1024.6	161.6
13.97	6.67	1.67	28.0	0.4	0.9	0.55	0.25	1.08	0.27	0.27	1.16	0.82	9.47	0.00	1025.6	162.3
13.85	6.67	1.66	28.0	0.4	0.9	0.55	0.25	1.08	0.27	0.27	1.16	0.82	9.53	0.00	1026.5	163.0
13.73	6.67	1.65	28.0	0.4	0.9	0.55	0.25	1.08	0.27	0.27	1.15	0.81	9.58	0.00	1027.4	163.7
13.61	6.67	1.64	28.0	0.4	0.9	0.54	0.25	1.08	0.27	0.27	1.15	0.81	9.63	0.00	1028.4	164.4
13.48	6.67	1.63	28.0	0.4	0.9	0.54	0.25	1.08	0.27	0.27	1.14	0.81	9.68	0.00	1029.3	165.1
13.36	6.67	1.63	28.0	0.4	0.9	0.54	0.25	1.08	0.27	0.27	1.14	0.80	9.73	0.00	1030.2	165.8
13.24	6.67	1.62	28.0	0.4	0.9	0.53	0.25	1.08	0.27	0.27	1.13	0.80	9.79	0.00	1031.1	166.5
13.12	6.67	1.61	28.0	0.4	0.9	0.53	0.25	1.08	0.27	0.27	1.13	0.80	9.84	0.00	1032.0	167.2
13.00	6.67	1.60	28.0	0.4	0.9	0.53	0.25	1.08	0.27	0.27	1.12	0.80	9.89	0.00	1032.9	167.9
12.88	6.67	1.59	28.0	0.4	0.9	0.52	0.25	1.08	0.27	0.27	1.12	0.79	9.94	0.00	1033.8	168.6
12.76	6.67	1.58	28.0	0.4	0.8	0.52	0.25	1.08	0.27	0.27	1.11	0.79	9.99	0.00	1034.7	169.3
12.64	6.67	1.57	28.0	0.4	0.8	0.52	0.25	1.08	0.27	0.27	1.11	0.79	10.04	0.00	1035.6	169.9
12.52	6.67	1.56	28.0	0.4	0.8	0.51	0.25	1.08	0.27	0.27	1.10	0.78	10.10	0.00	1036.5	170.6
12.40	6.67	1.55	28.0	0.4	0.8	0.51	0.25	1.08	0.27	0.27	1.10	0.78	10.15	0.00	1037.4	171.3
12.28	6.67	1.54	28.0	0.4	0.8	0.51	0.25	1.08	0.27	0.27	1.09	0.78	10.20	0.00	1038.3	172.0
12.16	6.67	1.53	28.0	0.4	0.8	0.51	0.25	1.08	0.27	0.27	1.09	0.77	10.25	0.00	1039.1	172.6
12.04	6.67	1.52	28.0	0.4	0.8	0.50	0.25	1.08	0.27	0.27	1.09	0.77	10.30	0.00	1040.0	173.3
11.92	6.67	1.51	28.0	0.4	0.8	0.50	0.25	1.08	0.27	0.27	1.08	0.77	10.35	0.00	1040.9	174.0
11.80	6.67	1.50	28.0	0.4	0.8	0.50	0.25	1.08	0.27	0.27	1.08	0.77	10.41	0.00	1041.7	174.7
11.68	6.67	1.50	28.0	0.4	0.8	0.49	0.25	1.08	0.27	0.27	1.07	0.76	10.46	0.00	1042.6	175.3
11.56	6.67	1.49	28.0	0.4	0.8	0.49	0.25	1.08	0.27	0.27	1.07	0.76	10.51	0.00	1043.4	176.0
11.44	6.67	1.48	28.0	0.4	0.8	0.49	0.25	1.08	0.27	0.27	1.06	0.76	10.56	0.00	1044.3	176.6
11.32	6.67	1.47	28.0	0.4	0.8	0.48	0.25	1.08	0.27	0.27	1.06	0.75	10.61	0.00	1045.1	177.3
11.20	6.67	1.46	28.0	0.4	0.8	0.48	0.25	1.08	0.27	0.27	1.05	0.75	10.67	0.00	1046.0	177.9
11.08	6.67	1.45	28.0	0.4	0.8	0.48	0.25	1.08	0.27	0.27	1.05	0.75	10.72	0.00	1046.8	178.6
10.96	6.67	1.44	28.0	0.4	0.8	0.47	0.25	1.08	0.27	0.27	1.04	0.74	10.77	0.00	1047.7	179.2
10.84	6.67	1.43	28.0	0.4	0.8	0.47	0.25	1.08	0.27	0.27	1.04	0.74	10.82	0.00	1048.5	179.9
10.72	6.67	1.42	28.0	0.4	0.8	0.47	0.25	1.08	0.27	0.27	1.03	0.74	10.87	0.00	1049.3	180.5
10.60	6.67	1.41	28.0	0.4	0.8	0.47	0.25	1.08	0.27	0.27	1.03	0.73	10.92	0.00	1050.1	181.2
10.47	6.67	1.40	28.0	0.4	0.8	0.46	0.25	1.08	0.27	0.27	1.02	0.73	10.98	0.00	1051.0	181.8
10.35	6.67	1.39	28.0	0.4	0.7	0.46	0.25	1.08	0.27	0.27	1.02	0.73	11.03	0.00	1051.8	182.5
10.23	6.67	1.38	28.0	0.4	0.7	0.46	0.25	1.08	0.27	0.27	1.01	0.73	11.08	0.00	1052.6	183.1
10.11	6.67	1.37	28.0	0.4	0.7	0.45	0.25	1.08	0.27	0.27	1.01	0.72	11.13	0.00	1053.4	183.7
9.99	6.67	1.36	16.0	0.2	0.4	0.25	0.40	0.99	0.40	0.40	0.80	0.64	11.18	0.00	1054.0	184.3
9.87	6.67	1.34	16.0	0.2	0.4	0.24	0.40	0.99	0.40	0.40	0.79	0.64	11.23	0.00	1054.7	184.8
9.75	6.67	1.33	16.0	0.2	0.4	0.24	0.40	0.99	0.40	0.40	0.79	0.64	11.29	0.00	1055.3	185.4
9.63	6.67	1.31	16.0	0.2	0.4	0.24	0.40	0.99	0.40	0.40	0.78	0.63	11.34	0.00	1055.9	186.0
9.51	6.67	1.29	16.0	0.2	0.4	0.23	0.40	0.99	0.40	0.40	0.78	0.63	11.39	0.00	1056.5	186.5
9.39	6.67	1.28	16.0	0.2	0.4	0.23	0.40	0.99	0.40	0.40	0.77	0.63	11.44	0.00	1057.2	187.1
9.27	6.67	1.26	16.0	0.2	0.4	0.23	0.40	0.99	0.40	0.40	0.77	0.62	11.49	0.00	1057.8	187.

9.15	6.67	1.24	16.0	0.2	0.4	0.23	0.40	0.99	0.40	0.40	0.76	0.62	11.55	0.00	1058.4	188.2
9.03	6.67	1.23	16.0	0.2	0.4	0.22	0.40	0.99	0.40	0.40	0.76	0.62	11.60	0.00	1059.0	188.7
8.91	6.67	1.21	16.0	0.2	0.4	0.22	0.40	0.99	0.40	0.40	0.75	0.62	11.65	0.00	1059.6	189.3
8.79	6.67	1.19	16.0	0.2	0.4	0.22	0.40	0.99	0.40	0.40	0.75	0.61	11.70	0.00	1060.2	189.8
8.67	6.67	1.18	16.0	0.2	0.3	0.21	0.40	0.99	0.40	0.40	0.74	0.61	11.75	0.00	1060.8	190.4
8.55	6.67	1.16	16.0	0.2	0.3	0.21	0.40	0.99	0.40	0.40	0.74	0.61	11.80	0.00	1061.4	190.9
8.43	6.67	1.15	16.0	0.2	0.3	0.21	0.40	0.99	0.40	0.40	0.73	0.60	11.86	0.00	1062.0	191.4
8.31	6.67	1.13	16.0	0.2	0.3	0.21	0.40	0.99	0.40	0.40	0.73	0.60	11.91	0.00	1062.6	192.0
8.19	6.67	1.11	16.0	0.2	0.3	0.20	0.40	0.99	0.40	0.40	0.72	0.60	11.96	0.00	1063.2	192.5
8.07	6.67	1.10	16.0	0.2	0.3	0.20	0.40	0.99	0.40	0.40	0.72	0.59	12.01	0.00	1063.7	193.0
7.95	6.67	1.08	16.0	0.2	0.3	0.20	0.40	0.99	0.40	0.40	0.71	0.59	12.06	0.00	1064.3	193.6
7.83	6.67	1.06	16.0	0.2	0.3	0.19	0.40	0.99	0.40	0.40	0.71	0.59	12.11	0.00	1064.9	194.1
7.71	6.67	1.05	16.0	0.2	0.3	0.19	0.40	0.99	0.40	0.40	0.70	0.59	12.17	0.00	1065.4	194.6
7.59	6.67	1.03	16.0	0.2	0.3	0.19	0.40	0.99	0.40	0.40	0.70	0.58	12.22	0.00	1066.0	195.1
7.46	6.67	1.01	16.0	0.2	0.3	0.18	0.40	0.99	0.40	0.40	0.70	0.58	12.27	0.00	1066.6	195.6
7.34	6.67	1.00	16.0	0.2	0.3	0.18	0.40	0.99	0.40	0.40	0.69	0.58	12.32	0.00	1067.1	196.2
7.22	6.67	0.98	16.0	0.2	0.3	0.18	0.40	0.99	0.40	0.40	0.69	0.57	12.37	0.00	1067.7	196.7
7.10	6.67	0.97	16.0	0.2	0.3	0.18	0.40	0.99	0.40	0.40	0.68	0.57	12.43	0.00	1068.2	197.2
6.98	6.67	0.95	16.0	0.2	0.3	0.17	0.40	0.99	0.40	0.40	0.68	0.57	12.48	0.00	1068.8	197.7
6.86	6.67	0.93	16.0	0.2	0.3	0.17	0.40	0.99	0.40	0.40	0.67	0.57	12.53	0.00	1069.3	198.2
6.74	6.67	0.92	16.0	0.2	0.3	0.17	0.40	0.99	0.40	0.40	0.67	0.56	12.58	0.00	1069.8	198.7
6.62	6.67	0.90	16.0	0.2	0.3	0.16	0.40	0.99	0.40	0.40	0.66	0.56	12.63	0.00	1070.4	199.2
6.50	6.67	0.88	16.0	0.2	0.3	0.16	0.40	0.99	0.40	0.40	0.66	0.56	12.68	0.00	1070.9	199.7
6.38	6.67	0.87	16.0	0.2	0.3	0.16	0.40	0.99	0.40	0.40	0.65	0.55	12.74	0.00	1071.4	200.2
6.26	6.67	0.85	16.0	0.2	0.3	0.15	0.40	0.99	0.40	0.40	0.65	0.55	12.79	0.00	1071.9	200.7
6.14	6.67	0.83	16.0	0.2	0.2	0.15	0.40	0.99	0.40	0.40	0.64	0.55	12.84	0.00	1072.4	201.2
6.02	6.67	0.82	16.0	0.2	0.2	0.15	0.40	0.99	0.40	0.40	0.64	0.54	12.89	0.00	1073.0	201.7
5.90	6.67	0.80	16.0	0.2	0.2	0.15	0.40	0.99	0.40	0.40	0.63	0.54	12.94	0.00	1073.5	202.2
5.78	6.67	0.79	16.0	0.2	0.2	0.14	0.40	0.99	0.40	0.40	0.63	0.54	12.99	0.00	1074.0	202.6
5.66	6.67	0.77	16.0	0.2	0.2	0.14	0.40	0.99	0.40	0.40	0.62	0.54	13.05	0.00	1074.5	203.1
5.54	6.67	0.75	16.0	0.2	0.2	0.14	0.40	0.99	0.40	0.40	0.62	0.53	13.10	0.00	1075.0	203.6
5.42	6.67	0.74	16.0	0.2	0.2	0.13	0.40	0.99	0.40	0.40	0.61	0.53	13.15	0.00	1075.5	204.1
5.30	6.67	0.72	16.0	0.2	0.2	0.13	0.40	0.99	0.40	0.40	0.61	0.53	13.20	0.00	1075.9	204.6
5.18	6.67	0.70	16.0	0.2	0.2	0.13	0.40	0.99	0.40	0.40	0.60	0.52	13.25	0.00	1076.4	205.0
5.06	6.67	0.69	16.0	0.2	0.2	0.12	0.40	0.99	0.40	0.40	0.60	0.52	13.31	0.00	1076.9	205.5
4.94	6.67	0.67	16.0	0.2	0.2	0.12	0.40	0.99	0.40	0.40	0.59	0.52	13.36	0.00	1077.4	206.0
4.82	6.67	0.65	16.0	0.2	0.2	0.12	0.40	0.99	0.40	0.40	0.59	0.51	13.41	0.00	1077.9	206.4
4.70	6.67	0.64	16.0	0.2	0.2	0.12	0.40	0.99	0.40	0.40	0.58	0.51	13.46	0.00	1078.3	206.9
4.58	6.67	0.62	16.0	0.2	0.2	0.11	0.40	0.99	0.40	0.40	0.58	0.51	13.51	0.00	1078.8	207.3
4.45	6.67	0.61	16.0	0.2	0.2	0.11	0.40	0.99	0.40	0.40	0.57	0.51	13.56	0.00	1079.2	207.8
4.33	6.67	0.59	16.0	0.2	0.2	0.11	0.40	0.99	0.40	0.40	0.57	0.50	13.62	0.00	1079.7	208.3
4.21	6.67	0.57	16.0	0.2	0.2	0.10	0.40	0.99	0.40	0.40	0.56	0.50	13.67	0.00	1080.2	208.7
4.09	6.67	0.56	16.0	0.2	0.2	0.10	0.40	0.99	0.40	0.40	0.56	0.50	13.72	0.00	1080.6	209.2
3.97	6.67	0.54	16.0	0.2	0.2	0.10	0.40	0.99	0.40	0.40	0.56	0.49	13.77	0.00	1081.1	209.6
3.85	6.67	0.52	16.0	0.2	0.2	0.10	0.40	0.99	0.40	0.40	0.55	0.49	13.82	0.00	1081.5	210.1
3.73	6.67	0.51	16.0	0.2	0.1	0.09	0.40	0.99	0.40	0.40	0.55	0.49	13.88	0.00	1081.9	210.5
3.61	6.67	0.49	16.0	0.2	0.1	0.09	0.40	0.99	0.40	0.40	0.54	0.48	13.93	0.00	1082.4	210.9
3.49	6.67	0.47	16.0	0.2	0.1	0.09	0.40	0.99	0.40	0.40	0.54	0.48	13.98	0.00	1082.8	211.4
3.37	6.67	0.46	16.0	0.2	0.1	0.08	0.40	0.99	0.40	0.40	0.53	0.48	14.03	0.00	1083.2	211.8
3.25	6.67	0.44	16.0	0.2	0.1	0.08	0.40	0.99	0.40	0.40	0.53	0.48	14.08	0.00	1083.6	212.2
3.13	6.67	0.43	16.0	0.2	0.1	0.08	0.40	0.99	0.40	0.40	0.52	0.47	14.13	0.00	1084.1	212.7
3.01	6.67	0.41	16.0	0.2	0.1	0.07	0.40	0.99	0.40	0.40	0.52	0.47	14.19	0.00	1084.5	213.1
2.89	6.67	0.39	16.0	0.2	0.1	0.07	0.40	0.99	0.40	0.40	0.51	0.47	14.24	0.00	1084.9	213.5
2.77	6.67	0.38	16.0	0.2	0.1	0.07	0.40	0.99	0.40	0.40	0.51	0.46	14.29	0.00	1085.3	214.0
2.65	6.67	0.36	16.0	0.2	0.1	0.07	0.40	0.99	0.40	0.40	0.50	0.46	14.34	0.00	1085.7	214.4
2.53	6.67	0.34	16.0	0.2	0.1	0.06	0.40	0.99	0.40	0.40	0.50	0.46	14.39	0.00	1086.1	214.8
2.41	6.67	0.33	16.0	0.2	0.1	0.06	0.40	0.99	0.40	0.40	0.49	0.46	14.44	0.00	1086.5	215.2
2.29	6.67	0.31	16.0	0.2	0.1	0.06	0.40	0.99	0.40	0.40	0.49	0.45	14.50	0.00	1086.9	215.6
2.17	6.67	0.29	16.0	0.2	0.1	0.05	0.40	0.99	0.40	0.40	0.48	0.45	14.55	0.00	1087.3	216.0
2.05	6.67	0.28	16.0	0.2	0.1	0.05	0.40	0.99	0.40	0.40	0.48	0.45	14.60	0.00	1087.7	216.5
1.93	6.67	0.26	16.0	0.2	0.1	0.05	0.40	0.99	0.40	0.40	0.47	0.44	14.65	0.00	1088.0	216.9
1.81	6.67	0.25	16.0	0.2	0.1	0.04	0.40	0.99	0.40	0.40	0.47	0.44	14.70	0.00	1088.4	217.3
1.69	6.67	0.23	16.0	0.2	0.1	0.04	0.40	0.99	0.40	0.40	0.46	0.44	14.76	0.00	1088.8	217.7

1.57	6.67	0.21	16.0	0.2	0.1	0.04	0.40	0.99	0.40	0.40	0.46	0.43	14.81	0.00	1089.1	218.1
1.44	6.67	0.20	16.0	0.2	0.1	0.04	0.40	0.99	0.40	0.40	0.45	0.43	14.86	0.00	1089.5	218.5
1.32	6.67	0.18	16.0	0.2	0.1	0.03	0.40	0.99	0.40	0.40	0.45	0.43	14.91	0.00	1089.9	218.9
1.20	6.67	0.16	16.0	0.2	0.0	0.03	0.40	0.99	0.40	0.40	0.44	0.43	14.96	0.00	1090.2	219.3
1.08	6.67	0.15	16.0	0.2	0.0	0.03	0.40	0.99	0.40	0.40	0.44	0.42	15.01	0.00	1090.6	219.6
0.96	6.67	0.13	16.0	0.2	0.0	0.02	0.40	0.99	0.40	0.40	0.43	0.42	15.07	0.00	1090.9	220.0
0.84	6.67	0.11	16.0	0.2	0.0	0.02	0.40	0.99	0.40	0.40	0.43	0.42	15.12	0.00	1091.3	220.4
0.72	6.67	0.10	16.0	0.2	0.0	0.02	0.40	0.99	0.40	0.40	0.42	0.41	15.17	0.00	1091.6	220.8
0.60	6.67	0.08	16.0	0.2	0.0	0.01	0.40	0.99	0.40	0.40	0.42	0.41	15.22	0.00	1092.0	221.2
0.48	6.67	0.07	16.0	0.2	0.0	0.01	0.40	0.99	0.40	0.40	0.41	0.41	15.27	0.00	1092.3	221.6
0.36	6.67	0.05	16.0	0.2	0.0	0.01	0.40	0.99	0.40	0.40	0.41	0.40	15.32	0.00	1092.6	221.9
0.24	6.67	0.03	16.0	0.2	0.0	0.01	0.40	0.99	0.40	0.40	0.41	0.40	15.38	0.00	1092.9	222.3
0.12	6.67	0.02	16.0	0.2	0.0	0.00	0.40	0.99	0.40	0.40	0.40	0.40	15.43	0.00	1093.3	222.7
0.00	6.67	0.00	16.0	0.2	0.0	0.00	0.40	0.99	0.00	0.00	0.00	0.00	15.48	0.00	1093.3	222.7

SETTLEMENT CALCULATION:

Depth - ft	Cp	Cs	Qdown - kip	Area - ft2	E - kip/in2	Xpp - in	Xps - in	Xs - in	Xall - in
35.9	0.03	0.05	806	2.8	3597	0.600	0.017	0.001	0.618
35.8	0.03	0.05	807	2.8	3597	0.600	0.017	0.001	0.618
35.6	0.03	0.05	809	2.8	3597	0.600	0.017	0.001	0.619
35.5	0.03	0.05	811	2.8	3597	0.600	0.017	0.001	0.620
35.4	0.03	0.05	813	2.8	3597	0.600	0.017	0.001	0.621
35.3	0.03	0.05	815	2.8	3597	0.600	0.017	0.001	0.622
35.2	0.03	0.05	817	2.8	3597	0.600	0.017	0.001	0.622
35.0	0.03	0.05	819	2.8	3597	0.600	0.017	0.001	0.623
34.9	0.03	0.05	821	2.8	3597	0.600	0.017	0.001	0.624
34.8	0.03	0.05	823	2.8	3597	0.600	0.017	0.001	0.625
34.7	0.03	0.05	825	2.8	3597	0.600	0.017	0.001	0.626
34.6	0.03	0.05	826	2.8	3597	0.600	0.017	0.001	0.627
34.4	0.03	0.05	828	2.8	3597	0.600	0.017	0.001	0.627
34.3	0.03	0.05	830	2.8	3597	0.600	0.017	0.001	0.628
34.2	0.03	0.05	832	2.8	3597	0.600	0.017	0.001	0.629
34.1	0.03	0.05	834	2.8	3597	0.600	0.017	0.001	0.630
34.0	0.03	0.05	836	2.8	3597	0.600	0.017	0.001	0.631
33.8	0.03	0.05	838	2.8	3597	0.600	0.017	0.001	0.632
33.7	0.03	0.05	840	2.8	3597	0.600	0.017	0.001	0.632
33.6	0.03	0.05	842	2.8	3597	0.600	0.017	0.001	0.633
33.5	0.03	0.05	844	2.8	3597	0.600	0.017	0.001	0.634
33.4	0.03	0.05	846	2.8	3597	0.600	0.017	0.001	0.635
33.2	0.03	0.05	847	2.8	3597	0.600	0.017	0.001	0.636
33.1	0.03	0.05	849	2.8	3597	0.600	0.017	0.001	0.637
33.0	0.03	0.05	851	2.8	3597	0.600	0.017	0.001	0.638
32.9	0.03	0.05	853	2.8	3597	0.600	0.017	0.001	0.638
32.7	0.03	0.05	855	2.8	3597	0.600	0.017	0.001	0.639
32.6	0.03	0.05	857	2.8	3597	0.600	0.017	0.001	0.640
32.5	0.03	0.05	859	2.8	3597	0.600	0.017	0.001	0.641
32.4	0.03	0.05	861	2.8	3597	0.600	0.017	0.001	0.642
32.3	0.03	0.05	862	2.8	3597	0.600	0.017	0.001	0.643
32.1	0.03	0.05	864	2.8	3597	0.600	0.017	0.001	0.644
32.0	0.03	0.05	866	2.8	3597	0.600	0.017	0.001	0.644
31.9	0.03	0.05	868	2.8	3597	0.600	0.017	0.001	0.645
31.8	0.03	0.05	870	2.8	3597	0.600	0.017	0.001	0.646
31.7	0.03	0.05	872	2.8	3597	0.600	0.017	0.001	0.647
31.5	0.03	0.05	874	2.8	3597	0.600	0.017	0.001	0.648
31.4	0.03	0.05	875	2.8	3597	0.600	0.017	0.001	0.649
31.3	0.03	0.05	877	2.8	3597	0.600	0.017	0.001	0.650
31.2	0.03	0.05	879	2.8	3597	0.600	0.017	0.001	0.651
31.1	0.03	0.05	881	2.8	3597	0.600	0.017	0.001	0.651
30.9	0.03	0.05	883	2.8	3597	0.600	0.017	0.001	0.652
30.8	0.03	0.05	884	2.8	3597	0.600	0.017	0.001	0.653
30.7	0.03	0.05	886	2.8	3597	0.600	0.017	0.001	0.654

30.6	0.03	0.05	888	2.8	3597	0.600	0.017	0.001	0.655
30.5	0.03	0.05	890	2.8	3597	0.600	0.017	0.001	0.656
30.3	0.03	0.05	892	2.8	3597	0.600	0.017	0.001	0.657
30.2	0.03	0.05	893	2.8	3597	0.600	0.017	0.001	0.658
30.1	0.03	0.05	895	2.8	3597	0.600	0.017	0.001	0.659
30.0	0.03	0.05	896	2.8	3597	0.600	0.017	0.001	0.660
29.9	0.03	0.05	897	2.8	3597	0.600	0.017	0.001	0.660
29.7	0.03	0.05	898	2.8	3597	0.600	0.017	0.001	0.661
29.6	0.03	0.05	899	2.8	3597	0.600	0.017	0.001	0.662
29.5	0.03	0.05	900	2.8	3597	0.600	0.017	0.001	0.663
29.4	0.03	0.05	901	2.8	3597	0.600	0.017	0.001	0.664
29.3	0.03	0.05	902	2.8	3597	0.600	0.017	0.001	0.665
29.1	0.03	0.05	903	2.8	3597	0.600	0.017	0.001	0.666
29.0	0.03	0.05	904	2.8	3597	0.600	0.017	0.001	0.667
28.9	0.03	0.05	905	2.8	3597	0.600	0.017	0.001	0.668
28.8	0.03	0.05	906	2.8	3597	0.600	0.017	0.001	0.669
28.7	0.03	0.05	907	2.8	3597	0.600	0.017	0.001	0.669
28.5	0.03	0.05	908	2.8	3597	0.600	0.017	0.001	0.670
28.4	0.03	0.05	909	2.8	3597	0.600	0.017	0.001	0.671
28.3	0.03	0.05	910	2.8	3597	0.600	0.017	0.001	0.672
28.2	0.03	0.05	911	2.8	3597	0.600	0.017	0.001	0.673
28.1	0.03	0.05	912	2.8	3597	0.600	0.017	0.001	0.674
27.9	0.03	0.05	913	2.8	3597	0.600	0.017	0.001	0.675
27.8	0.03	0.05	914	2.8	3597	0.600	0.017	0.001	0.676
27.7	0.03	0.05	915	2.8	3597	0.600	0.017	0.001	0.677
27.6	0.03	0.05	916	2.8	3597	0.600	0.017	0.001	0.678
27.5	0.03	0.05	917	2.8	3597	0.600	0.017	0.001	0.679
27.3	0.03	0.05	918	2.8	3597	0.600	0.017	0.001	0.680
27.2	0.03	0.05	919	2.8	3597	0.600	0.017	0.001	0.681
27.1	0.03	0.05	920	2.8	3597	0.600	0.017	0.001	0.681
27.0	0.03	0.05	921	2.8	3597	0.600	0.017	0.001	0.682
26.8	0.03	0.05	922	2.8	3597	0.600	0.017	0.001	0.683
26.7	0.03	0.05	923	2.8	3597	0.600	0.017	0.001	0.684
26.6	0.03	0.05	924	2.8	3597	0.600	0.017	0.001	0.685
26.5	0.03	0.05	925	2.8	3597	0.600	0.017	0.001	0.686
26.4	0.03	0.05	926	2.8	3597	0.600	0.017	0.001	0.687
26.2	0.03	0.05	927	2.8	3597	0.600	0.017	0.001	0.688
26.1	0.03	0.05	928	2.8	3597	0.600	0.017	0.001	0.689
26.0	0.03	0.05	929	2.8	3597	0.600	0.017	0.001	0.690
25.9	0.03	0.05	930	2.8	3597	0.600	0.017	0.001	0.691
25.8	0.03	0.05	931	2.8	3597	0.600	0.017	0.001	0.692
25.6	0.03	0.05	932	2.8	3597	0.600	0.017	0.001	0.693
25.5	0.03	0.05	932	2.8	3597	0.600	0.017	0.001	0.694
25.4	0.03	0.05	933	2.8	3597	0.600	0.017	0.001	0.694
25.3	0.03	0.05	934	2.8	3597	0.600	0.017	0.001	0.695
25.2	0.03	0.05	935	2.8	3597	0.600	0.017	0.001	0.696
25.0	0.03	0.05	936	2.8	3597	0.600	0.017	0.001	0.697
24.9	0.03	0.05	937	2.8	3597	0.600	0.017	0.001	0.698
24.8	0.03	0.05	938	2.8	3597	0.600	0.017	0.001	0.699
24.7	0.03	0.05	939	2.8	3597	0.600	0.017	0.001	0.700
24.6	0.03	0.05	940	2.8	3597	0.600	0.017	0.001	0.701
24.4	0.03	0.05	941	2.8	3597	0.600	0.017	0.001	0.702
24.3	0.03	0.05	942	2.8	3597	0.600	0.017	0.001	0.703
24.2	0.03	0.05	943	2.8	3597	0.600	0.017	0.001	0.704
24.1	0.03	0.05	944	2.8	3597	0.600	0.017	0.001	0.705
24.0	0.03	0.05	945	2.8	3597	0.600	0.017	0.001	0.706
23.8	0.03	0.05	945	2.8	3597	0.600	0.017	0.001	0.707
23.7	0.03	0.05	946	2.8	3597	0.600	0.017	0.001	0.708
23.6	0.03	0.05	947	2.8	3597	0.600	0.017	0.001	0.709
23.5	0.03	0.05	948	2.8	3597	0.600	0.017	0.001	0.710
23.4	0.03	0.05	949	2.8	3597	0.600	0.017	0.001	0.711
23.2	0.03	0.05	950	2.8	3597	0.600	0.017	0.001	0.711
23.1	0.03	0.05	951	2.8	3597	0.600	0.017	0.001	0.712

23.0	0.03	0.05	952	2.8	3597	0.600	0.017	0.001	0.713
22.9	0.03	0.05	953	2.8	3597	0.600	0.017	0.001	0.714
22.8	0.03	0.05	954	2.8	3597	0.600	0.017	0.001	0.715
22.6	0.03	0.05	954	2.8	3597	0.600	0.017	0.001	0.716
22.5	0.03	0.05	955	2.8	3597	0.600	0.017	0.001	0.717
22.4	0.03	0.05	956	2.8	3597	0.600	0.017	0.001	0.718
22.3	0.03	0.05	957	2.8	3597	0.600	0.017	0.001	0.719
22.2	0.03	0.05	958	2.8	3597	0.600	0.017	0.001	0.720
22.0	0.03	0.05	959	2.8	3597	0.600	0.017	0.001	0.721
21.9	0.03	0.05	960	2.8	3597	0.600	0.017	0.001	0.722
21.8	0.03	0.05	961	2.8	3597	0.600	0.017	0.001	0.723
21.7	0.03	0.05	962	2.8	3597	0.600	0.017	0.001	0.724
21.6	0.03	0.05	962	2.8	3597	0.600	0.017	0.001	0.725
21.4	0.03	0.05	963	2.8	3597	0.600	0.017	0.001	0.726
21.3	0.03	0.05	964	2.8	3597	0.600	0.017	0.001	0.727
21.2	0.03	0.05	965	2.8	3597	0.600	0.017	0.001	0.728
21.1	0.03	0.05	966	2.8	3597	0.600	0.017	0.001	0.729
20.9	0.03	0.05	967	2.8	3597	0.600	0.017	0.001	0.730
20.8	0.03	0.05	968	2.8	3597	0.600	0.017	0.001	0.731
20.7	0.03	0.05	969	2.8	3597	0.600	0.017	0.001	0.732
20.6	0.03	0.05	969	2.8	3597	0.600	0.017	0.001	0.733
20.5	0.03	0.05	970	2.8	3597	0.600	0.017	0.001	0.734
20.3	0.03	0.05	971	2.8	3597	0.600	0.017	0.001	0.735
20.2	0.03	0.05	972	2.8	3597	0.600	0.017	0.001	0.736
20.1	0.03	0.05	973	2.8	3597	0.600	0.017	0.001	0.737
20.0	0.03	0.05	974	2.8	3597	0.600	0.017	0.001	0.738
19.9	0.03	0.05	975	2.8	3597	0.600	0.017	0.001	0.739
19.7	0.03	0.05	976	2.8	3597	0.600	0.017	0.001	0.740
19.6	0.03	0.05	977	2.8	3597	0.600	0.017	0.001	0.741
19.5	0.03	0.05	978	2.8	3597	0.600	0.017	0.001	0.742
19.4	0.03	0.05	980	2.8	3597	0.600	0.017	0.001	0.742
19.3	0.03	0.05	981	2.8	3597	0.600	0.017	0.001	0.743
19.1	0.03	0.05	982	2.8	3597	0.600	0.017	0.001	0.744
19.0	0.03	0.05	983	2.8	3597	0.600	0.017	0.001	0.745
18.9	0.03	0.05	984	2.8	3597	0.600	0.017	0.001	0.746
18.8	0.03	0.05	985	2.8	3597	0.600	0.017	0.001	0.747
18.7	0.03	0.05	986	2.8	3597	0.600	0.017	0.001	0.748
18.5	0.03	0.05	987	2.8	3597	0.600	0.017	0.001	0.749
18.4	0.03	0.05	988	2.8	3597	0.600	0.017	0.001	0.750
18.3	0.03	0.05	989	2.8	3597	0.600	0.017	0.001	0.751
18.2	0.03	0.05	990	2.8	3597	0.600	0.017	0.001	0.752
18.1	0.03	0.05	992	2.8	3597	0.600	0.017	0.001	0.753
17.9	0.03	0.05	993	2.8	3597	0.600	0.017	0.001	0.754
17.8	0.03	0.05	994	2.8	3597	0.600	0.017	0.001	0.755
17.7	0.03	0.05	995	2.8	3597	0.600	0.017	0.001	0.756
17.6	0.03	0.05	996	2.8	3597	0.600	0.017	0.001	0.757
17.5	0.03	0.05	997	2.8	3597	0.600	0.017	0.001	0.758
17.3	0.03	0.05	998	2.8	3597	0.600	0.017	0.001	0.759
17.2	0.03	0.05	999	2.8	3597	0.600	0.017	0.001	0.760
17.1	0.03	0.05	1000	2.8	3597	0.600	0.017	0.001	0.761
17.0	0.03	0.05	1001	2.8	3597	0.600	0.017	0.001	0.762
16.9	0.03	0.05	1002	2.8	3597	0.600	0.017	0.001	0.763
16.7	0.03	0.05	1003	2.8	3597	0.600	0.017	0.001	0.764
16.6	0.03	0.05	1004	2.8	3597	0.600	0.017	0.001	0.765
16.5	0.03	0.05	1005	2.8	3597	0.600	0.017	0.001	0.766
16.4	0.03	0.05	1006	2.8	3597	0.600	0.017	0.001	0.767
16.3	0.03	0.05	1007	2.8	3597	0.600	0.017	0.001	0.768
16.1	0.03	0.05	1008	2.8	3597	0.600	0.017	0.001	0.769
16.0	0.03	0.05	1009	2.8	3597	0.600	0.017	0.001	0.770
15.9	0.03	0.05	1010	2.8	3597	0.600	0.017	0.001	0.771
15.8	0.03	0.05	1011	2.8	3597	0.600	0.017	0.001	0.773
15.7	0.03	0.05	1012	2.8	3597	0.600	0.017	0.001	0.774
15.5	0.03	0.05	1013	2.8	3597	0.600	0.017	0.001	0.775

15.4	0.03	0.05	1014	2.8	3597	0.600	0.017	0.001	0.776
15.3	0.03	0.05	1015	2.8	3597	0.600	0.017	0.001	0.777
15.2	0.03	0.05	1016	2.8	3597	0.600	0.017	0.001	0.778
[illegible].1	0.03	0.05	1017	2.8	3597	0.600	0.017	0.001	0.779
14.9	0.03	0.05	1018	2.8	3597	0.600	0.017	0.001	0.780
14.8	0.03	0.05	1019	2.8	3597	0.600	0.017	0.001	0.781
14.7	0.03	0.05	1020	2.8	3597	0.600	0.017	0.001	0.782
14.6	0.03	0.05	1021	2.8	3597	0.600	0.017	0.001	0.783
14.4	0.03	0.05	1022	2.8	3597	0.600	0.017	0.001	0.784
14.3	0.03	0.05	1023	2.8	3597	0.600	0.017	0.001	0.785
14.2	0.03	0.05	1024	2.8	3597	0.600	0.017	0.001	0.786
14.1	0.03	0.05	1025	2.8	3597	0.600	0.017	0.001	0.787
14.0	0.03	0.05	1026	2.8	3597	0.600	0.017	0.001	0.788
13.8	0.03	0.05	1027	2.8	3597	0.600	0.017	0.001	0.789
13.7	0.03	0.05	1027	2.8	3597	0.600	0.017	0.001	0.790
13.6	0.03	0.05	1028	2.8	3597	0.600	0.017	0.001	0.791
13.5	0.03	0.05	1029	2.8	3597	0.600	0.017	0.001	0.792
13.4	0.03	0.05	1030	2.8	3597	0.600	0.017	0.001	0.793
13.2	0.03	0.05	1031	2.8	3597	0.600	0.017	0.001	0.794
13.1	0.03	0.05	1032	2.8	3597	0.600	0.017	0.001	0.795
13.0	0.03	0.05	1033	2.8	3597	0.600	0.017	0.001	0.796
12.9	0.03	0.05	1034	2.8	3597	0.600	0.017	0.001	0.797
12.8	0.03	0.05	1035	2.8	3597	0.600	0.017	0.001	0.798
12.6	0.03	0.05	1036	2.8	3597	0.600	0.017	0.001	0.799
12.5	0.03	0.05	1036	2.8	3597	0.600	0.017	0.001	0.800
12.4	0.03	0.05	1037	2.8	3597	0.600	0.017	0.001	0.801
12.3	0.03	0.05	1038	2.8	3597	0.600	0.017	0.001	0.802
12.2	0.03	0.05	1039	2.8	3597	0.600	0.017	0.001	0.803
12.0	0.03	0.05	1040	2.8	3597	0.600	0.017	0.001	0.804
11.9	0.03	0.05	1041	2.8	3597	0.600	0.017	0.001	0.805
11.8	0.03	0.05	1042	2.8	3597	0.600	0.017	0.001	0.807
11.7	0.03	0.05	1043	2.8	3597	0.600	0.017	0.001	0.808
11.6	0.03	0.05	1043	2.8	3597	0.600	0.017	0.001	0.809
11.4	0.03	0.05	1044	2.8	3597	0.600	0.017	0.001	0.810
11.3	0.03	0.05	1045	2.8	3597	0.600	0.017	0.001	0.811
11.2	0.03	0.05	1046	2.8	3597	0.600	0.017	0.001	0.812
11.1	0.03	0.05	1047	2.8	3597	0.600	0.017	0.001	0.813
11.0	0.03	0.05	1048	2.8	3597	0.600	0.017	0.001	0.814
10.8	0.03	0.05	1048	2.8	3597	0.600	0.017	0.001	0.815
10.7	0.03	0.05	1049	2.8	3597	0.600	0.017	0.001	0.816
10.6	0.03	0.05	1050	2.8	3597	0.600	0.017	0.001	0.817
10.5	0.03	0.05	1051	2.8	3597	0.600	0.017	0.001	0.818
10.4	0.03	0.05	1052	2.8	3597	0.600	0.017	0.001	0.819
10.2	0.03	0.05	1053	2.8	3597	0.600	0.017	0.001	0.820
10.1	0.03	0.05	1053	2.8	3597	0.600	0.017	0.001	0.821
10.0	0.03	0.05	1054	2.8	3597	0.600	0.017	0.001	0.822
9.9	0.03	0.05	1055	2.8	3597	0.600	0.017	0.001	0.823
9.8	0.03	0.05	1055	2.8	3597	0.600	0.017	0.001	0.824
9.6	0.03	0.05	1056	2.8	3597	0.600	0.017	0.001	0.826
9.5	0.03	0.05	1057	2.8	3597	0.600	0.017	0.001	0.827
9.4	0.03	0.05	1057	2.8	3597	0.600	0.017	0.001	0.828
9.3	0.03	0.05	1058	2.8	3597	0.600	0.017	0.001	0.829
9.2	0.03	0.05	1058	2.8	3597	0.600	0.017	0.001	0.830
9.0	0.03	0.05	1059	2.8	3597	0.600	0.017	0.001	0.831
8.9	0.03	0.05	1060	2.8	3597	0.600	0.017	0.001	0.832
8.8	0.03	0.05	1060	2.8	3597	0.600	0.017	0.001	0.833
8.7	0.03	0.05	1061	2.8	3597	0.600	0.017	0.001	0.834
8.5	0.03	0.05	1061	2.8	3597	0.600	0.017	0.001	0.835
8.4	0.03	0.05	1062	2.8	3597	0.600	0.017	0.001	0.836
8.3	0.03	0.05	1063	2.8	3597	0.600	0.017	0.001	0.837
8.2	0.03	0.05	1063	2.8	3597	0.600	0.017	0.001	0.838
8.1	0.03	0.05	1064	2.8	3597	0.600	0.017	0.001	0.839
7.9	0.03	0.05	1064	2.8	3597	0.600	0.017	0.001	0.840

7.8	0.03	0.05	1065	2.8	3597	0.600	0.017	0.001	0.841
7.7	0.03	0.05	1065	2.8	3597	0.600	0.017	0.001	0.843
7.6	0.03	0.05	1066	2.8	3597	0.600	0.017	0.001	0.844
7.5	0.03	0.05	1067	2.8	3597	0.600	0.017	0.001	0.845
7.3	0.03	0.05	1067	2.8	3597	0.600	0.017	0.001	0.846
7.2	0.03	0.05	1068	2.8	3597	0.600	0.017	0.001	0.847
7.1	0.03	0.05	1068	2.8	3597	0.600	0.017	0.001	0.848
7.0	0.03	0.05	1069	2.8	3597	0.600	0.017	0.001	0.849
6.9	0.03	0.05	1069	2.8	3597	0.600	0.017	0.001	0.850
6.7	0.03	0.05	1070	2.8	3597	0.600	0.017	0.001	0.851
6.6	0.03	0.05	1070	2.8	3597	0.600	0.017	0.001	0.852
6.5	0.03	0.05	1071	2.8	3597	0.600	0.017	0.001	0.853
6.4	0.03	0.05	1071	2.8	3597	0.600	0.017	0.001	0.854
6.3	0.03	0.05	1072	2.8	3597	0.600	0.017	0.001	0.855
6.1	0.03	0.05	1072	2.8	3597	0.600	0.017	0.001	0.857
6.0	0.03	0.05	1073	2.8	3597	0.600	0.017	0.001	0.858
5.9	0.03	0.05	1073	2.8	3597	0.600	0.017	0.001	0.859
5.8	0.03	0.05	1074	2.8	3597	0.600	0.017	0.001	0.860
5.7	0.03	0.05	1074	2.8	3597	0.600	0.017	0.001	0.861
5.5	0.03	0.05	1075	2.8	3597	0.600	0.017	0.001	0.862
5.4	0.03	0.05	1075	2.8	3597	0.600	0.017	0.001	0.863
5.3	0.03	0.05	1076	2.8	3597	0.600	0.017	0.001	0.864
5.2	0.03	0.05	1076	2.8	3597	0.600	0.017	0.001	0.865
5.1	0.03	0.05	1077	2.8	3597	0.600	0.017	0.001	0.866
4.9	0.03	0.05	1077	2.8	3597	0.600	0.017	0.001	0.867
4.8	0.03	0.05	1078	2.8	3597	0.600	0.017	0.001	0.868
4.7	0.03	0.05	1078	2.8	3597	0.600	0.017	0.001	0.869
4.6	0.03	0.05	1079	2.8	3597	0.600	0.017	0.001	0.871
4.5	0.03	0.05	1079	2.8	3597	0.600	0.017	0.001	0.872
4.3	0.03	0.05	1080	2.8	3597	0.600	0.017	0.001	0.873
4.2	0.03	0.05	1080	2.8	3597	0.600	0.017	0.001	0.874
4.1	0.03	0.05	1081	2.8	3597	0.600	0.017	0.001	0.875
4.0	0.03	0.05	1081	2.8	3597	0.600	0.017	0.001	0.876
3.9	0.03	0.05	1081	2.8	3597	0.600	0.017	0.001	0.877
3.7	0.03	0.05	1082	2.8	3597	0.600	0.017	0.001	0.878
3.6	0.03	0.05	1082	2.8	3597	0.600	0.017	0.001	0.879
3.5	0.03	0.05	1083	2.8	3597	0.600	0.017	0.001	0.880
3.4	0.03	0.05	1083	2.8	3597	0.600	0.017	0.001	0.881
3.3	0.03	0.05	1084	2.8	3597	0.600	0.017	0.001	0.883
3.1	0.03	0.05	1084	2.8	3597	0.600	0.017	0.001	0.884
3.0	0.03	0.05	1084	2.8	3597	0.600	0.017	0.001	0.885
2.9	0.03	0.05	1085	2.8	3597	0.600	0.017	0.001	0.886
2.8	0.03	0.05	1085	2.8	3597	0.600	0.017	0.001	0.887
2.6	0.03	0.05	1086	2.8	3597	0.600	0.017	0.001	0.888
2.5	0.03	0.05	1086	2.8	3597	0.600	0.017	0.001	0.889
2.4	0.03	0.05	1086	2.8	3597	0.600	0.017	0.001	0.890
2.3	0.03	0.05	1087	2.8	3597	0.600	0.017	0.001	0.891
2.2	0.03	0.05	1087	2.8	3597	0.600	0.017	0.001	0.892
2.0	0.03	0.05	1088	2.8	3597	0.600	0.017	0.001	0.893
1.9	0.03	0.05	1088	2.8	3597	0.600	0.017	0.001	0.895
1.8	0.03	0.05	1088	2.8	3597	0.600	0.017	0.001	0.896
1.7	0.03	0.05	1089	2.8	3597	0.600	0.017	0.001	0.897
1.6	0.03	0.05	1089	2.8	3597	0.600	0.017	0.001	0.898
1.4	0.03	0.05	1090	2.8	3597	0.600	0.017	0.001	0.899
1.3	0.03	0.05	1090	2.8	3597	0.600	0.017	0.001	0.900
1.2	0.03	0.05	1090	2.8	3597	0.600	0.017	0.001	0.901
1.1	0.03	0.05	1091	2.8	3597	0.600	0.017	0.001	0.902
1.0	0.03	0.05	1091	2.8	3597	0.600	0.017	0.001	0.903
0.8	0.03	0.05	1091	2.8	3597	0.600	0.017	0.001	0.904
0.7	0.03	0.05	1092	2.8	3597	0.600	0.017	0.001	0.905
0.6	0.03	0.05	1092	2.8	3597	0.600	0.017	0.001	0.907
0.5	0.03	0.05	1092	2.8	3597	0.600	0.017	0.001	0.908
0.4	0.03	0.05	1093	2.8	3597	0.600	0.017	0.001	0.909

0.2	0.03	0.05	1093	2.8	3597	0.600	0.017	0.001	0.910
0.1	0.03	0.05	1093	2.8	3597	0.600	0.017	0.001	0.911
0.0	0.03	0.05	1093	2.8	3597	0.600	0.017	0.000	0.911

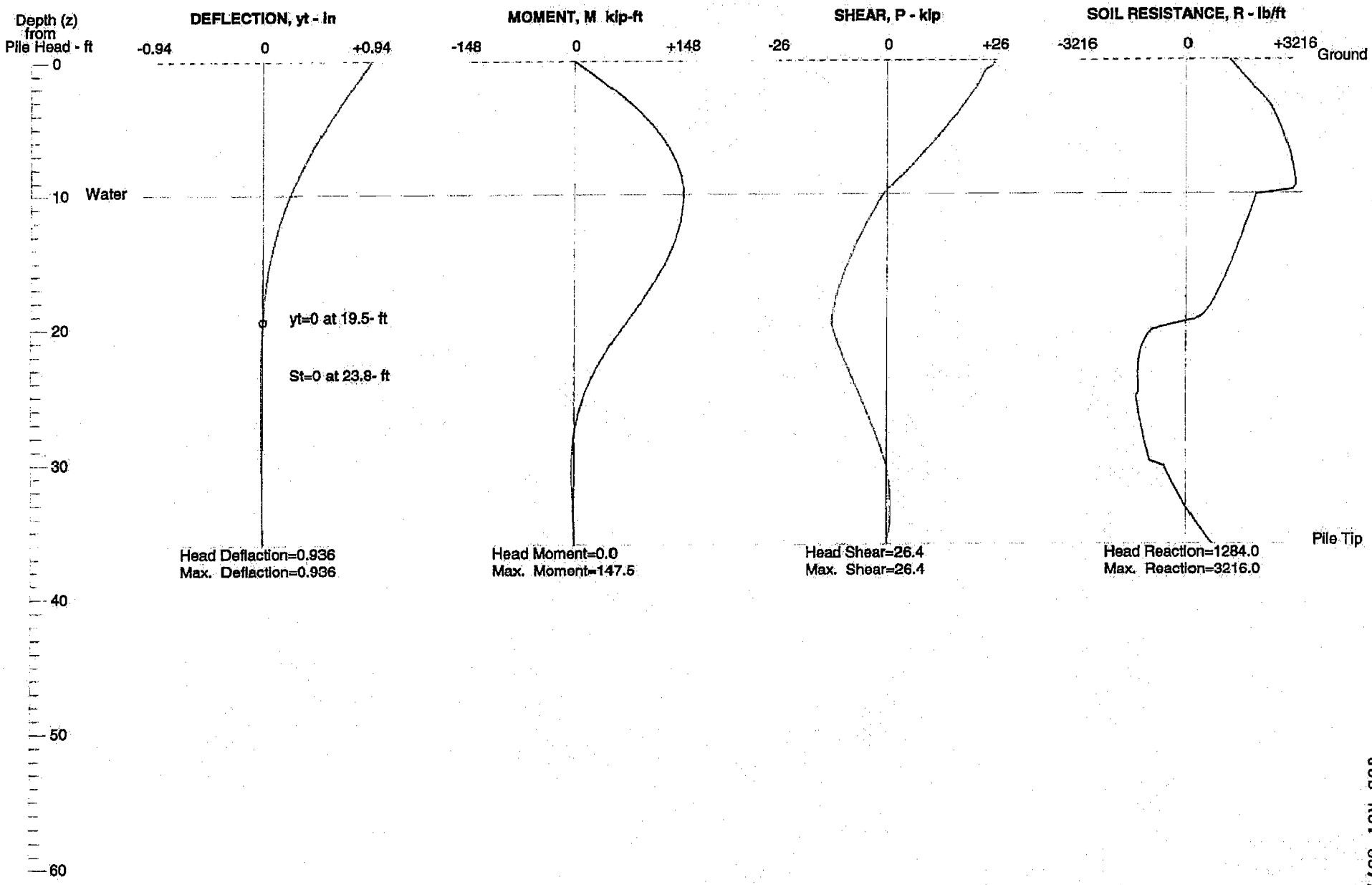
ACTOR OF SAFETY:

FSskin	FStip	FSup	FSweight
3.0	3.0	4.0	2.0

RUSULTS:

Qd_sk - kip	Qtip - kip	Qd_alw - kip	Qu_sk - kip	Weight - kip	Qu_alw - kip	Qneg - kip	Qd_work - kip	FSwork
289.6	803.6	364.4	207.3	15.5	59.6	0.0	200.0	5.5

PILE DEFLECTION & FORCE vs DEPTH



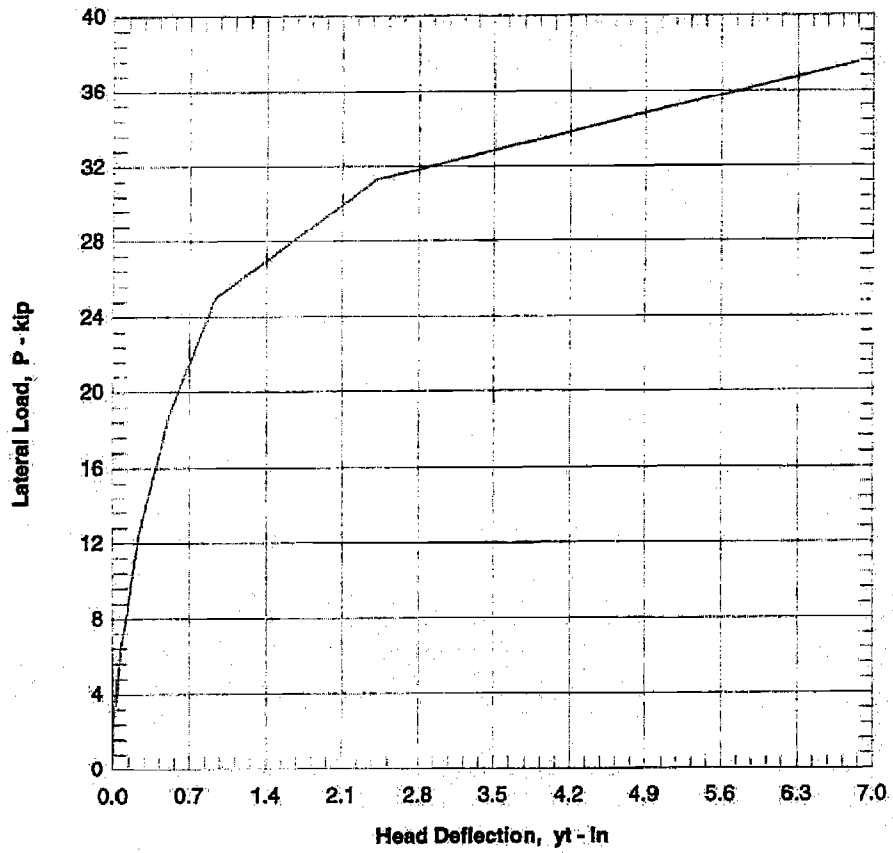
C.H.J. Incorporated

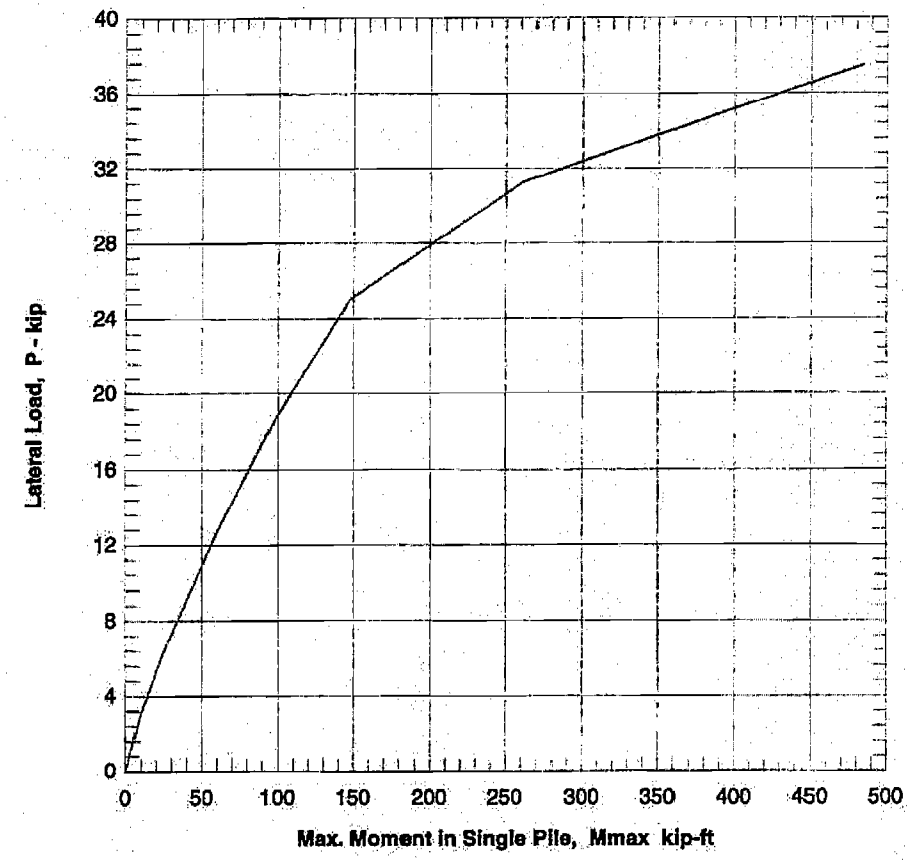
TIC - The Industrial Company
911 P[illegible]by Drive, City of Industry, CA

Free Head

Enclosure "E-6"
Job No. 05770-3

LATERAL LOAD vs DEFLECTION & MAX. MOMENT





Enclosure "E-7"
Job No. 05770-3

C.H.J. Incorporated

TIC - The Industrial Company
911 Bixby Drive, City of Industry, CA

Free Head

LATERAL ANALYSIS OUTPUT DATA (FREE HEAD)

ALLPILE Version 3.2E -

****
<Single Pile Analysis>

Pile Length = 36- ft

* Point of Fixity:
Point of zero deflection: yt = 0, at z = 19.5- ft from pile top
Lateral Stiffness based on zero deflection = 1.3- kip/ft
Point of zero slope, St = 0, at z = 23.8- ft from pile top
Lateral Stiffness based on zero slope = 1.1- kip/ft

* Depth vs. Deflection, Moment, Shear, & Resistance in Single Pile:
z - Depth from pile head
yt - Pile deflection
St - Deflection slope
M - Moment in pile shaft
P - Shear force in pile shaft
R - Soil Reaction between soils and pile

Vertical load at head = 200- kip
Lateral load at head = 25- kip

z - ft	yt - in	M kip-ft	P - kip	R - lb/ft
0.0	0.936	0.0	26.40	1284.00
0.4	0.906	9.4	25.90	1416.00
0.7	0.876	18.7	24.00	1536.00
1.1	0.847	27.7	23.40	1656.00
1.4	0.817	36.5	22.80	1788.00
1.8	0.788	45.1	22.10	1920.00
2.2	0.759	53.4	21.40	2040.00
2.5	0.730	61.4	20.60	2172.00
2.9	0.701	69.2	19.80	2304.00
3.2	0.673	76.7	19.00	2424.00
3.6	0.645	84.2	18.10	2532.00
4.0	0.618	90.8	17.20	2604.00
4.3	0.591	96.7	16.20	2676.00
4.7	0.564	103.3	15.20	2736.00
5.0	0.538	109.2	14.30	2796.00
5.4	0.512	114.2	13.20	2856.00
5.8	0.487	119.2	12.20	2904.00
6.1	0.463	124.2	11.10	2952.00
6.5	0.439	128.3	10.10	3000.00
6.8	0.415	131.7	8.98	3048.00
7.2	0.392	135.0	7.88	3084.00
7.6	0.370	138.3	6.76	3108.00
7.9	0.349	140.8	5.64	3144.00
8.3	0.328	143.3	4.50	3168.00
8.6	0.308	145.0	3.36	3180.00
9.0	0.288	145.8	2.21	3204.00
9.4	0.270	147.5	1.05	3216.00
9.7	0.252	147.5	-0.09	3132.00
10.1	0.234	147.5	-1.02	2064.00
10.4	0.217	147.5	-1.76	2016.00

10.8	0.201	146.7	-2.48	1968.00
11.2	0.186	145.8	-3.17	1908.00
11.5	0.171	145.0	-3.85	1860.00
11.9	0.157	144.2	-4.51	1812.00
12.2	0.144	142.5	-5.16	1752.00
12.6	0.131	140.8	-5.78	1704.00
13.0	0.119	138.3	-6.38	1656.00
13.3	0.108	136.7	-6.97	1596.00
13.7	0.097	134.2	-7.53	1536.00
14.0	0.087	131.7	-8.08	1488.00
14.4	0.078	128.3	-8.60	1428.00
14.8	0.069	125.8	-9.11	1368.00
15.1	0.061	122.5	-9.59	1320.00
15.5	0.053	119.2	-10.10	1260.00
15.8	0.046	115.0	-10.50	1197.60
16.2	0.039	111.7	-10.90	1136.40
16.6	0.033	107.5	-11.30	1074.00
16.9	0.027	103.3	-11.70	1009.20
17.3	0.022	99.2	-12.00	942.00
17.6	0.018	95.0	-12.40	870.00
18.0	0.013	90.8	-12.70	793.20
18.4	0.009	85.8	-12.90	709.20
18.7	0.006	81.3	-13.20	612.00
19.1	0.003	76.6	-13.40	487.20
19.4	0.000	71.8	-13.50	248.40
19.8	-0.002	67.0	-13.50	-416.40
20.2	-0.004	62.2	-13.20	-996.00
20.5	-0.006	57.5	-12.80	-1124.40
20.9	-0.007	53.0	-12.40	-1212.00
21.2	-0.008	48.6	-12.00	-1284.00
21.6	-0.009	44.4	-11.50	-1332.00
22.0	-0.010	40.3	-11.00	-1368.00
22.3	-0.011	36.5	-10.50	-1392.00
22.7	-0.011	32.8	-10.00	-1404.00
23.0	-0.011	29.3	-9.52	-1416.00
23.4	-0.012	25.9	-9.01	-1428.00
23.8	-0.012	22.8	-8.50	-1428.00
24.1	-0.011	19.8	-7.99	-1416.00
24.5	-0.011	17.0	-7.48	-1404.00
24.8	-0.011	14.4	-6.97	-1404.00
25.2	-0.010	12.0	-6.46	-1476.00
25.6	-0.010	9.8	-5.93	-1452.00
25.9	-0.010	7.7	-5.41	-1428.00
26.3	-0.009	5.8	-4.90	-1404.00
26.6	-0.009	4.2	-4.40	-1380.00
27.0	-0.008	2.7	-3.91	-1356.00
27.4	-0.008	1.3	-3.43	-1320.00
27.7	-0.007	0.2	-2.96	-1284.00
28.1	-0.007	-0.8	-2.50	-1260.00
28.4	-0.006	-1.6	-2.05	-1224.00
28.8	-0.005	-2.3	-1.62	-1183.20
29.2	-0.005	-2.8	-1.20	-1144.80
29.5	-0.004	-3.2	-0.80	-1104.00
29.9	-0.004	-3.4	-0.41	-1062.00
30.2	-0.003	-3.5	-0.10	-649.20
30.6	-0.003	-3.5	0.12	-585.60
31.0	-0.003	-3.4	0.32	-517.20
31.3	-0.002	-3.3	0.49	-446.40
31.7	-0.002	-3.1	0.64	-373.20
32.0	-0.001	-2.8	0.76	-297.60
32.4	-0.001	-2.5	0.86	-218.40
32.8	-0.001	-2.2	0.92	-135.60
33.1	0.000	-1.9	0.95	-51.48
33.5	0.000	-1.6	0.96	36.24

33.8	0.000	-1.2	0.93	127.20
34.2	0.001	-0.9	0.86	222.00
34.6	0.001	-0.6	0.77	320.40
34.9	0.002	-0.4	0.63	422.40
35.3	0.002	-0.2	0.46	529.20
35.6	0.002	0.0	0.00	639.60
36.0	0.003	0.0	0.00	756.00

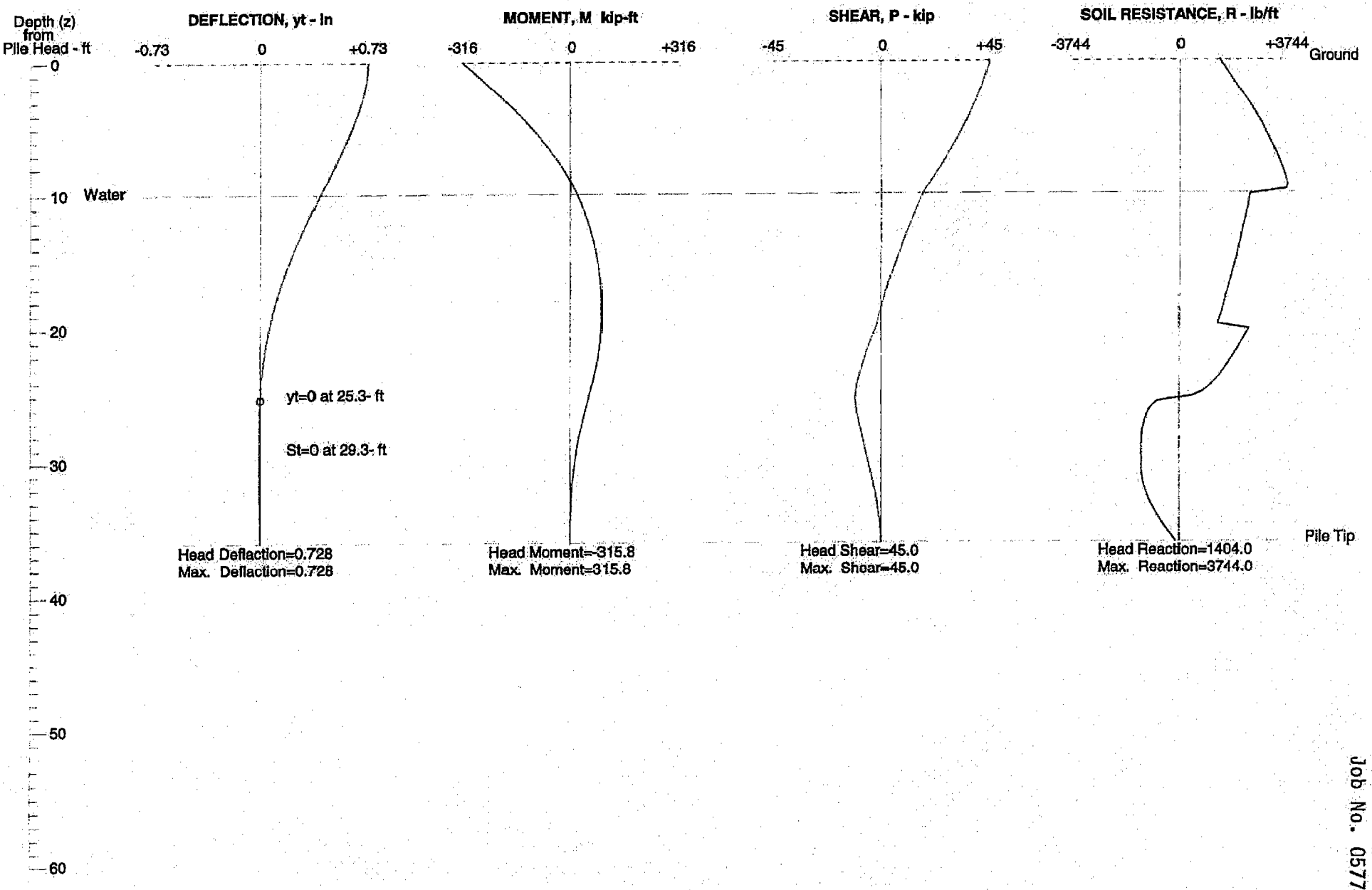
* Lateral load vs. yt, & Max. Moment in Single Pile:
P - Lateral Load at pile head
yt - Pile deflection
Mmax - Maximum moment in pile shaft
St - Top slope
Smax - Maximum stress in pile shaft

Vertical load at pile top = 200- kip

P - kip	yt - in	Mmax kip-ft	St - in/in	Smax - lb/in2
3.1	0.017	9.6	-2.4E-4	587.00
6.3	0.063	23.8	-7.2E-4	714.00
12.5	0.233	58.7	-2.2E-3	1030.00
18.8	0.509	99.2	-4.1E-3	1390.00
25.0	0.936	147.5	-6.9E-3	1830.00
31.3	2.420	261.7	-1.5E-2	2860.00
37.5	6.850	484.2	-3.3E-2	4850.00

END

PILE DEFLECTION & FORCE vs DEPTH



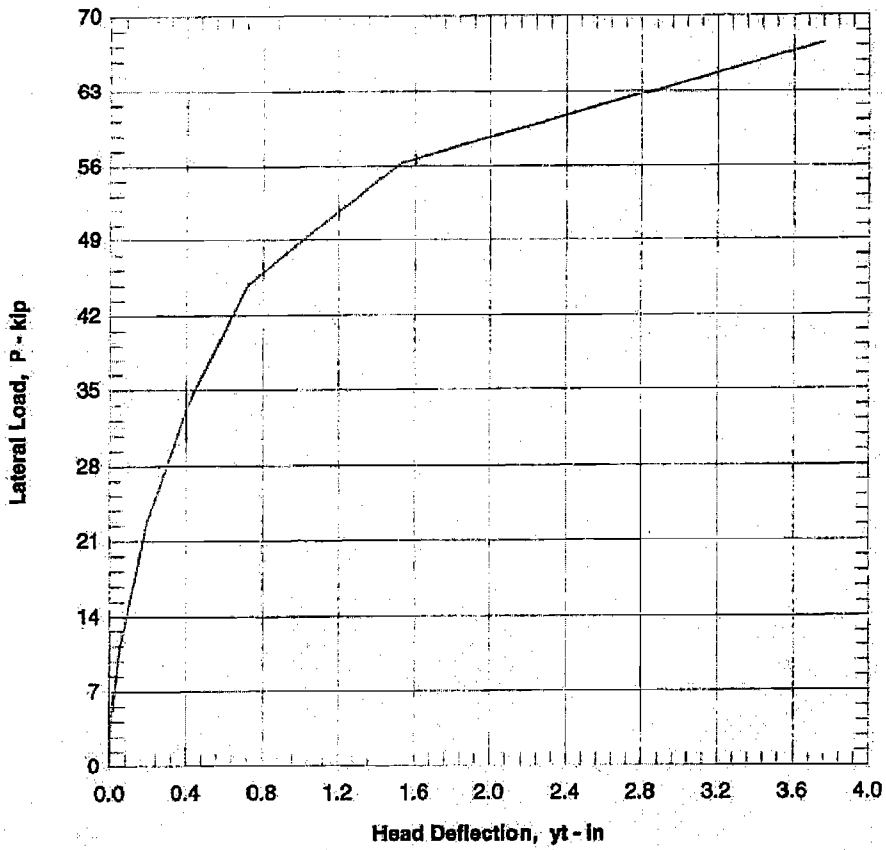
C.H.J. Incorporated

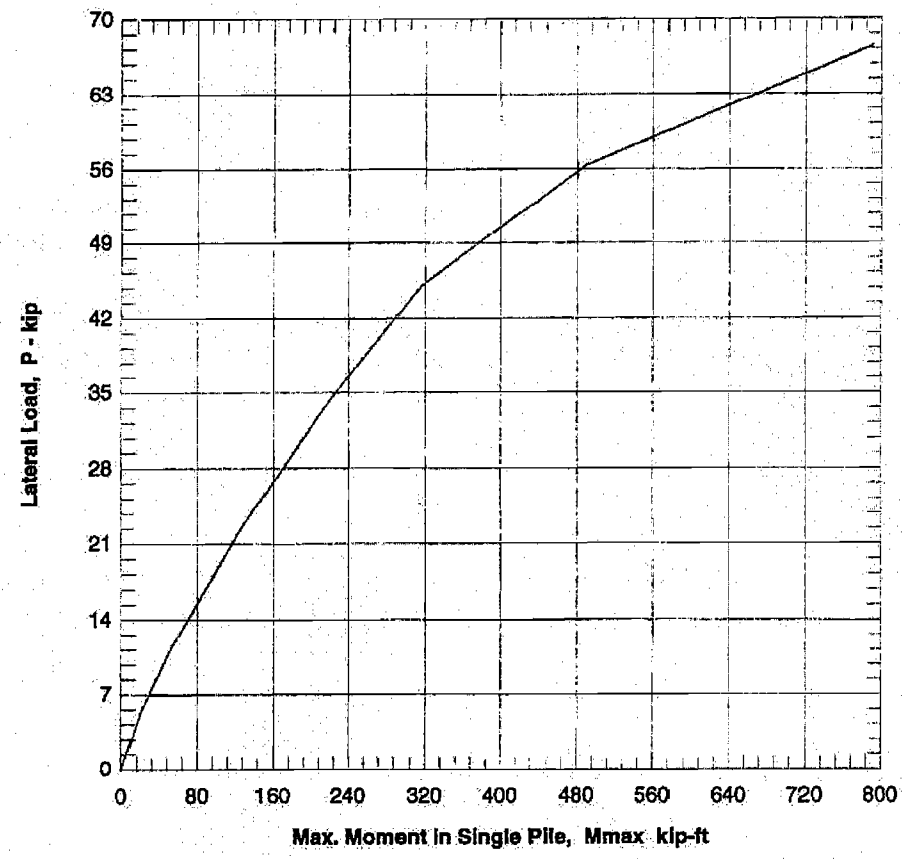
TIC - The Industrial Company
911 Bixby Drive, City of Industry, CA

Fixed Head

Enclosure "E-9"
Job No. 05770-3

LATERAL LOAD vs DEFLECTION & MAX. MOMENT





Enclosure "E-10"
Job No. 05770-3

C.H.J. Incorporated

TIC - The Industrial Company
911 F[illegible]by Drive, City of Industry, CA

Fixed Hea[illegible]

LATERAL ANALYSIS OUTPUT DATA (FIXED HEAD)

ALLPILE Version 3.2E -
****
<Single Pile Analysis>

Pile Length = 36- ft

* Point of Fixity:
Point of zero deflection: yt = 0, at z = 25.3- ft from pile top
Lateral Stiffness based on zero deflection = 1.8- kip/ft
Point of zero slope, St = 0, at z = 29.3- ft from pile top
Lateral Stiffness based on zero slope = 1.5- kip/ft

* Depth vs. Deflection, Moment, Shear, & Resistance in Single Pile:
z - Depth from pile head
yt - Pile deflection
St - Deflection slope
M - Moment in pile shaft
P - Shear force in pile shaft
R - Soil Reaction between soils and pile

Vertical load at head = 200- kip
Lateral load at head = 45- kip

z - ft	yt - in	M kip-ft	P - kip	R - lb/ft
0.0	0.728	-315.8	45.00	1404.00
0.4	0.727	-300.0	44.50	1512.00
0.7	0.725	-284.2	43.90	1620.00
1.1	0.721	-268.3	43.30	1740.00
1.4	0.717	-252.5	42.70	1848.00
1.8	0.711	-237.5	42.00	1968.00
2.2	0.704	-222.5	41.20	2076.00
2.5	0.696	-207.5	40.50	2196.00
2.9	0.687	-192.5	39.70	2316.00
3.2	0.677	-178.3	38.80	2424.00
3.6	0.666	-164.2	37.90	2544.00
4.0	0.655	-150.8	37.00	2652.00
4.3	0.642	-137.5	36.00	2748.00
4.7	0.630	-124.2	35.00	2844.00
5.0	0.616	-111.7	34.00	2928.00
5.4	0.602	-99.2	32.90	3012.00
5.8	0.588	-87.5	31.80	3096.00
6.1	0.573	-76.1	30.70	3180.00
6.5	0.558	-65.0	29.50	3252.00
6.8	0.542	-54.3	28.30	3324.00
7.2	0.527	-44.1	27.10	3396.00
7.6	0.511	-34.3	25.90	3468.00
7.9	0.495	-24.9	24.60	3528.00
8.3	0.478	-16.0	23.30	3588.00
8.6	0.462	-7.6	22.00	3648.00
9.0	0.446	0.4	20.70	3696.00
9.4	0.429	7.9	19.40	3744.00
9.7	0.413	14.8	18.00	3696.00
10.1	0.397	21.4	16.90	2460.00
10.4	0.381	27.6	16.00	2424.00
10.8	0.365	33.5	15.20	2400.00

11.2	0.349	39.1	14.30	2364.00
11.5	0.333	44.3	13.50	2328.00
11.9	0.318	49.3	12.60	2292.00
12.2	0.303	53.9	11.80	2256.00
12.6	0.288	58.3	11.00	2208.00
13.0	0.273	62.3	10.20	2172.00
13.3	0.259	66.2	9.46	2136.00
13.7	0.245	69.7	8.69	2100.00
14.0	0.231	72.8	7.95	2052.00
14.4	0.217	75.8	7.21	2016.00
14.8	0.204	78.5	6.50	1980.00
15.1	0.192	80.9	5.79	1932.00
15.5	0.179	83.1	5.10	1884.00
15.8	0.167	85.0	4.43	1848.00
16.2	0.156	86.7	3.77	1800.00
16.6	0.145	88.3	3.13	1764.00
16.9	0.134	89.2	2.51	1716.00
17.3	0.124	90.0	1.90	1668.00
17.6	0.114	90.8	1.30	1620.00
18.0	0.104	91.7	0.73	1572.00
18.4	0.095	91.7	0.17	1536.00
18.7	0.087	91.7	-0.38	1488.00
19.1	0.079	91.7	-0.90	1440.00
19.4	0.071	91.7	-1.41	1380.00
19.8	0.063	90.8	-1.90	1332.00
20.2	0.056	90.0	-2.58	2424.00
20.5	0.050	89.2	-3.43	2328.00
20.9	0.044	88.3	-4.25	2220.00
21.2	0.038	86.7	-5.03	2124.00
21.6	0.033	85.0	-5.78	2028.00
22.0	0.028	82.6	-6.49	1920.00
22.3	0.024	80.2	-7.16	1812.00
22.7	0.020	77.6	-7.80	1704.00
23.0	0.016	74.7	-8.39	1584.00
23.4	0.013	71.7	-8.94	1464.00
23.8	0.009	68.3	-9.44	1332.00
24.1	0.007	64.9	-9.90	1191.60
24.5	0.004	61.3	-10.30	1027.20
24.8	0.002	57.6	-10.60	817.20
25.2	0.000	53.8	-10.90	451.20
25.6	-0.001	49.8	-10.80	-734.40
25.9	-0.003	46.0	-10.50	-933.60
26.3	-0.004	42.3	-10.20	-1052.40
26.6	-0.005	38.8	-9.77	-1134.00
27.0	-0.006	35.3	-9.36	-1192.80
27.4	-0.006	32.0	-8.92	-1236.00
27.7	-0.007	28.9	-8.47	-1272.00
28.1	-0.007	25.9	-8.01	-1284.00
28.4	-0.007	23.1	-7.54	-1296.00
28.8	-0.007	20.5	-7.08	-1308.00
29.2	-0.007	18.0	-6.60	-1308.00
29.5	-0.007	15.8	-6.13	-1308.00
29.9	-0.007	13.6	-5.67	-1296.00
30.2	-0.007	11.7	-5.20	-1308.00
30.6	-0.007	9.8	-4.72	-1308.00
31.0	-0.006	8.2	-4.25	-1296.00
31.3	-0.006	6.8	-3.79	-1272.00
31.7	-0.006	5.5	-3.34	-1248.00
32.0	-0.005	4.4	-2.90	-1196.40
32.4	-0.005	3.4	-2.48	-1138.80
32.8	-0.005	2.6	-2.08	-1072.80
33.1	-0.004	1.9	-1.71	-997.20
33.5	-0.004	1.3	-1.36	-912.00
33.8	-0.003	0.9	-1.05	-819.60

34.2	-0.003	0.6	-0.77	-720.00
34.6	-0.002	0.3	-0.53	-612.00
34.9	-0.002	0.2	-0.33	-496.80
35.3	-0.001	0.1	-0.18	-375.60
35.6	-0.001	0.0	0.00	-247.20
36.0	0.000	0.0	0.00	-111.60

* Lateral load vs. yt, & Max. Moment in Single Pile:
P - Lateral Load at pile head
yt - Pile deflection
Mmax - Maximum moment in pile shaft
St - Top slope
Smax - Maximum stress in pile shaft

Vertical load at pile top = 200- kip

P - kip	yt - in	Mmax kip-ft	St - in/in	Smax - lb/in2
5.6	0.013	-21.1	2.0E-19	690.00
11.3	0.050	-51.7	-1.6E-18	964.00
22.5	0.189	-126.7	6.4E-18	1640.00
33.8	0.414	-215.0	-6.4E-18	2440.00
45.0	0.728	-315.8	2.6E-17	3340.00
56.3	1.520	-488.3	0.0E+0	4890.00
67.5	3.760	-792.5	0.0E+0	7630.00

END

APPENDIX "F"

SUBGRADE REACTION COEFFICENTS

Vertical and Lateral Subgrade Reaction Coefficients

Project:	TIC - The Industrial Company
Location:	911 Bixby Drive, City of Industry, California

Job No:	05770-3	Boring No.	B-2
Date:	08/09/05	Enclosure:	F-1

Anticipated Magnitude	7.1
Maximum Acceleration	0.42

Boring GW (ft)	26
Project GW (ft)	10

C_N=Depth correction factor	Seed & Idriss (1982) method	
C_E=Hammer energy ratio (ER) correction factor	1.4	
C_B=Borehole diameter correction factor	1.15	$(N_1)_{60} = C_N \cdot C_E \cdot C_B \cdot C_R \cdot C_S \cdot N$
C_R=Rod stick up length (length above ground surface) (ft)	3	
C_S=Correction factor for samplers with or without liners	1.20	

Layer No.	Depth	Field Blow Count	Unit Weight	Fine Content	Ground Water	C_N	$(N_1)_{60}$	Relative Density	q_u	Kvi	f
	(ft)	N	(pcf)	(%)				D_r(%)	(tsf)	(tcf)	(tcf)
1	4.0	6.0	123.0	85.0		1.68	26.94		3.58	249.53	61.32
2	10.0	9.0	130.0	87.0		1.35	30.00		3.98	293.42	72.13
3	20.0	8.0	122.0	87.0	P. GW	1.03	25.73		3.42	232.81	57.26
4	25.0	17.0	121.0	48.0	P. GW	0.85	45.31	93.51		329.67	55.23
5	26.0	30.0	130.0	45.0	P. GW	0.80	50.00	83.34		277.39	46.66
6	30.0	30.0	68.0	45.0	B. GW	0.78	50.00	83.34		277.39	46.66
7	40.0	43.0	70.0	10.0	B. GW	0.77	50.00	83.34		277.39	46.66
8	50.0	14.0	67.0	65.0	B. GW	0.77	36.06	85.58		288.61	48.52

Footing Width (ft)	1.00	3.00	5.00	10.00	15.00	20.00	30.00
Average Vertical Kvi* (tcf)	252.80	254.03	256.22	260.19	261.65	262.43	263.97

* Based on Westergaard's stress distribution.

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APPENDIX "G"

SEISMIC DATA

Enclosure "G-1"
Job No. 05770-3

FAULT TABLE				
Abbreviated Fault Name	Closest Distance (mi)	Fault Area (cm2)	Maximum Magnitude	Slip Rate (mm/year)
WHITTIER	3.3	5.70×10^{12}	6.8	2.5
PUENTE HILLS THRUST SYSTEM	5.0	2.46×10^{13}	7.1	1.3
SAN JOSE	7.8	2.60×10^{12}	6.4	0.6
ELYSIAN PARK THRUST	9.0	8.2×10^{12}	7.1	1.7
SIERRA MADRE	10.0	1.03×10^{13}	7.2	0.6
RAYMOND	11.0	2.99×10^{12}	6.7	0.4
CLAMSHELL-SAWPIT	11.5	2.4×10^{12}	6.6	0.6
CHINO-CENTRAL AVE. (Elsinore)	12.0	4.76×10^{12}	6.7	12.0
CUCAMONGA	16.0	5.04×10^{12}	6.9	0.5
VERDUGO	16.5	5.22×10^{12}	6.9	1.0
HOLLYWOOD	18.0	2.38×10^{12}	6.4	3.0
ELSINORE-Glen Ivy	19.0	5.40×10^{12}	6.8	3.0
NEWPORT-INGLEWOOD (L.A.Basin)	19.0	8.58×10^{12}	7.1	2.0
SAN JOAQUIN HILLS THRUST	21.0	2.5×10^{12}	6.7	0.6
PALOS VERDES	26.0	1.25×10^{12}	7.3	5.0
SANTA MONICA	27.0	3.64×10^{12}	6.7	1.0
SAN JACINTO-San Bernardino	29.0	5.40×10^{12}	6.7	1.5
SAN GABRIEL	29.0	9.36×10^{12}	7.2	0.6
SAN ANDREAS - Mojave	30.0	1.24×10^{13}	7.4	5.0
NORTHRIDGE	32.0	6.82×10^{12}	7.1	4.0
CLEGHORN	35.0	3.25×10^{12}	6.5	1.0
NORTH FRONTAL FAULT ZONE (West)	45.0	9.18×10^{12}	7.2	5.0
HELENDALE - S. LOCKHARDT	64.0	1.26×10^{13}	7.3	1.5
LENWOOD-LOCKHART-OLD WOMAN SPRGS	77.0	1.89×10^{12}	7.5	5.0