Appendix I

Geotechnical Investigation and Preliminary Lab Soils

REPORT OF
PRELIMINARY GEOTECHNICAL INVESTIGATION
PROPOSED INTEX CORPORATION BUILDING DEVELOPMENT
SITE BOUNDED BY CARSON STREET, VIA ORO
VIA PLATA, AND VIA ALCADE AVENUES
LONG BEACH, CALIFORNIA
FOR THE
UNITEX MANAGEMENT CORPORATION
(OUR JOB NO. AEF-88292)

LeROY CRANDALL AND ASSOCIATES geotechnical consultants □ p.o. box 25088 □ 900 grand central ave. □ glendale, ca. 91201-3009
a subsidiary of Law Engineering facsimile (818) 246-4308 telephone (818) 243-4140

September 8, 1988

Unitex Management Corporation
2402 Michelson Drive, Suite 145
Irvine, California 92715

(Our Job No. AEF-88292)

Attention: Mr. Jeff Pearson

Gentlemen:

Our "Report of Preliminary Geotechnical Investigation, Proposed Intex Corporation Building Development, Site Bounded by Carson Street, Via Oro, Via Plata, and Via Alcade Avenues, Long Beach, California, for the Unitex Management Corporation" is herewith submitted.

The scope of the investigation was planned in collaboration with Mr. Jeff Pearson.

The results of our preliminary study are presented in the report. Before final planning and design of the project proceed, additional studies should be performed to provide definite recommendations for grading and for foundation design.

Should you have any questions regarding the project or if we can be of further service to you on this phase of the project, please contact us.

Respectfully submitted,

LeROY CRANDALL AND ASSOCIATES

by
Jake Kharraz
Senior Engineer

by
Mervin E. Johnson, C.E.G. 26
Director of Geological Services
Vice President

by
P. A. Maljian
Director of Engineering Services
Vice President

X12/MS/sle
(6 copies submitted)

REPORT OF
PRELIMINARY GEOTECHNICAL INVESTIGATION
PROPOSED INTEX CORPORATION BUILDING DEVELOPMENT
SITE BOUNDED BY CARSON STREET, VIA ORO
VIA PLATA, AND VIA ALCADE AVENUES
LONG BEACH, CALIFORNIA
FOR THE
UNITEX MANAGEMENT CORPORATION

SUMMARY

It is planned to construct a mixed-use development on a 25-acre site bounded by Carson Street, Via Oro, Via Plata, and Via Alcade Avenues in Long Beach, California. The development will contain commercial and office buildings with a maximum height of 50 feet. Subterranean construction 1 or 1½ levels below grade may be included in the development.

This report provides a preliminary evaluation of the soil and geotechnical conditions of the site with regard to their possible effects on the proposed development and general information for preliminary planning and design. A more comprehensive investigation will be required for final design and construction.

This preliminary study indicates that there are no known geologic or soil conditions which would prevent the development of the property as planned. There are no known faults passing through or immediately adjacent to the site; accordingly, the possibility of

surface rupture of the site due to faulting is remote. The site appears as safe with respect to geologic and seismic hazards as any within the general area.

Shallow fill soils were encountered in the four borings drilled for this preliminary study. The natural soils beneath the site consist primarily of silt, silty sand, and sand with occasional layers of clay; the natural soils are generally firm and dense at the locations explored. The upper natural soils would become weaker and more compressible when wet. Water was measured at a depth of 43 feet below grade.

With proper grading of the site, typical one- or two-story buildings could be supported on shallow spread footings. For support of heavier buildings, or if a greater bearing value is desired, footings could extend into the underlying firmer natural soils at depths of about five feet below the existing grade. As an alternative foundation type, friction piling may be used. Either driven friction piling or drilled cast-in-place concrete piling would be feasible; the lengths of drilled piling would be restricted due to water.

No exceptional difficulties due to the soil conditions are anticipated in excavating at the site. Where space for a sloped excavation is not available, the walls of the excavation should be shored during construction. Water was encountered well below the planned level of excavation, and water should not be a factor in the subterranean construction.

Our environmental assessment of the site did not reveal any evidence of significant surface or subsurface contamination which would require major mitigation. However, there appears to be a moderate potential for environmental contamination due to a former oil/gas well on the site.

SCOPE

This report presents the results of a preliminary geotechnical investigation and preliminary environmental audit of the subject site which is being considered for development. The locations of the site and our exploration borings are shown on Plate 1, Site Plan. Also shown are the locations of borings drilled for a previous preliminary investigation which included the currently planned development.

This investigation was authorized to determine preliminary information on the soil and foundation conditions of the property and to identify any geologic hazards connected with the site. More comprehensive studies will be required prior to preparing final plans for development of the site.

In addition to the preliminary geotechnical studies, we were to perform a preliminary environmental audit to establish if any portions of the property were used for purposes which would have utilized or stored materials which are now considered toxic or hazardous.

Our investigation included a review of published and unpublished soil and geologic data with regard to the identification and delineation of hazardous features that may be present on the property or in the vicinity. Four exploration borings were drilled at the site in order to provide supplementary information on the subsurface foundation conditions. The recommendations included in this report are based on the previous as well as the current investigations. The results of the current field explorations and laboratory tests are presented in the attached Appendix.

Our professional services have been performed using that degree of care and skill ordinarily exercised, under similar circumstances, by reputable geotechnical engineers and geologists practicing in this or similar localities. No other warranty, expressed or implied, is made as to the professional advice included in this report.

SITE CONDITIONS

The property is bounded by Carson Street, Via Oro, Via Plata, and Via Alcade Avenues in Long Beach, California. The site is vacant and relatively flat. There is a three- to four-foot-high berm around the perimeter of the site. Existing vegetation consists of weeds and shrubs. There are existing structures adjacent to the site as indicated on Plate 1.

SOIL CONDITIONS

Existing fill soils, 2½ feet in thickness, were encountered in the four exploration borings. The existing fill soils, which are not uniformly well compacted, consist of silt and silty sand. Deeper and/or poorer quality fill could occur between borings.

The natural soils beneath the site consist primarily of silt, silty sand, and sand with occasional layers of clay; the natural soils are generally firm and dense at the locations explored. The upper natural soils would become weaker and more compressible when wet.

Water was measured at a depth of 43 feet below grade.

GEOLOGY

GENERAL

The site is located on essentially flat lying ground, within the Dominguez Gap, at an elevation of approximately 30 feet above sea level (U.S. Geological Survey Datum). The Dominguez Gap is a low lying area on the Los Angeles County Coastal Plain, bordered by Dominguez Hills to the north and Signal Hill to the south, through which the Los Angeles River flows. The hills bordering Dominguez Gap are part of a structural uplift along the Newport-Inglewood Fault Zone. This fault zone, which is comprised of several fault segments, is one of a series of fault zones defining a major northwesterly trending structural element within the Peninsular Ranges geomorphic province. This province comprises the northwesterly-trending mountain ranges and associated valleys, including those in the offshore borderland, extending from Baja California, northwestward, to the Transverse Ranges in Southern California.

The geology in the vicinity of the site is shown on Plate 2, Local Geology.

GEOLOGIC MATERIALS

The site is partially mantled by artificial fill, which extends to a depth of approximately 2½ feet below existing grade.

The natural materials underlying the site are comprised of Holocene age alluvium. These alluvial materials, which were encountered to the maximum 65-foot depth of our borings, primarily consist of poorly-graded sand, silty sand, and sandy silt deposits with some layers of clayey silt and silty clay. The Holocene age alluvium extends to an

estimated depth of 150 feet below the site, at which point it overlies early Pleistocene age deposits of the San Pedro Formation.

At a depth of about 900 feet, Tertiary sedimentary rocks of the Pico, Repetto, and Puente Formations, respectively, underlie the San Pedro Formation. These Tertiary rocks extend to a depth of approximately 14,000 feet beneath the site, where they rest on Mesozoic age Catalina Schist. The Catalina Schist is considered to be the basement rock of the area.

GROUND WATER

The site is located in Township 4 South, Range 13 West, Section 11 in the Central Hydrologic Subarea of the Coastal Plain of Los Angeles County. The property is situated on Holocene alluvial flood-plain deposits adjacent to the Los Angeles River. Shallow ground water is present within these alluvial materials.

Ground water data for State Well 04S/13W-11D01, located approximately 0.7 mile north-northwest of the site, indicate that the ground water level beneath the site dropped from approximately 32 feet below ground surface in 1931 to 77 feet in 1963. The water level subsequently rose to approximately 56 feet below ground surface in the Fall of 1979, the date of the last record. Data compiled by the Los Angeles Flood Control District in the Fall of 1985 indicate a water level at a depth of approximately 120 feet beneath the site. This water level is from deep aquifers in the San Pedro Formation.

Borings drilled to a maximum depth of 40 feet at the site in August 1967 (our Job No. A-67202) did not encounter ground water.

However, borings drilled for this investigation indicate the presence of perched ground water conditions beneath the site. Our borings encountered ground water at a depth of approximately 43 feet beneath the surface.

Ground water contours, established for deep aquifers by the Los Angeles County Flood Control District in the Fall of 1985, indicate that the ground water flow gradient is towards the north. However, the perched ground water present beneath the site may have a different flow direction. Although it cannot be substantiated at the present time, it is our opinion, based on the proximity to the Los Angeles River (0.3 mile), that the ground water gradient is generally towards the south-southeast.

GEOLOGIC HAZARDS

The geologic hazards at the site are essentially limited to those caused by earthquakes. The major cause of damage from earthquakes is the result of violent shaking from earthquake waves; damage due to actual displacement or fault movement beneath a structure is much less frequent. The violent shaking would occur not only immediately adjacent to the earthquake epicenter, but within areas for many miles in all directions.

Faults

The numerous faults in Southern California include active, potentially active, and inactive faults. The criteria for these major groups were established by the Association of Engineering Geologists (1973). No faults are known to pass beneath the site. The City of Long

Beach Seismic Safety Element was reviewed as part of our literature analysis. The site is not within an Alquist-Priolo Special Studies Zone. In our opinion, there is very little probability of surface rupture due to faulting occurring on-site.

The active fault nearest the site is the Cherry Hill Fault of the Newport-Inglewood Fault Zone, located approximately 0.3 mile east of the site. An Alquist-Priolo Special Studies Zone has been established along this fault and along other faults of the Newport-Inglewood Zone. Other nearby branches of the Newport-Inglewood Fault Zone include the Avalon-Compton and Reservoir Hill Faults, located 3.1 miles northwest and 4.1 miles southeast of the site, respectively. Other more distant faults of the Newport-Inglewood Fault Zone include the Potrero and Inglewood Faults, located 10.2 and 10.4 miles northwest of the site.

The active San Fernando Fault Zone is located 30 miles to the north-northwest and the major San Andreas Fault is located approximately 47 miles to the north-northeast.

The potentially active fault nearest the site is the Richfield Fault, located approximately 1.7 miles southwest of the site, at its nearest point. This fault appears to offset materials older than middle Pleistocene. The upper 300 feet of materials overlying the fault do not appear to be structurally displaced (LACFCD, 1962). The potential for movement on the Richfield Fault during the life of the structure is considered low.

Other potentially active faults in the area include the Palos Verdes, Charnock, Norwalk, and Overland Faults, located approximately 6.4 miles southwest, 7.5 miles west-northwest, 10.7 miles east, and 14.2 miles northwest of the site, respectively.

Seismicity

Three moderately large magnitude earthquakes, that have had disastrous consequences, have occurred in the metropolitan Los Angeles area within the last 60 years. The latest of these events was the Magnitude 5.9 Whittier Narrows Earthquake, which occurred on October 1, 1987, on a previously unrecognized fault. The earthquake epicenter was located approximately 18 miles north-northeast of the subject site. Eight deaths were directly attributed to this earthquake which caused damage losses over $215 million. The majority of structural damage occurred in buildings constructed prior to stringent building codes which were developed in response to the 1971 San Fernando Earthquake.

The epicenter of the Magnitude 6.4 February 9, 1971 San Fernando Earthquake was located about 42 miles north of the site. Surface rupture occurred on the Sylmar and Tujunga Faults, which are segments of the San Fernando Fault Zone. This earthquake resulted in the deaths of 64 people and an estimated $500 million in damage.

The earliest of the three earthquakes was the Long Beach Earthquake, which occurred March 10, 1933. The epicenter of this event was located 20 miles southeast of the site. This earthquake, although only Magnitude 6.3, ranks as one of the major disasters in Southern California. This earthquake resulted in the deaths of 120 people and an

estimated $41 million damage. The majority of damage was suffered by structures which were considered substandard construction by today's standards and/or were located on filled or saturated ground.

The location of the site in relation to known active faults indicates that the immediate area may be exposed to greater than normal seismic risk for the Los Angeles County Coastal Plain in general.

Subsidence

The Wilmington Oil Field Subsidence Area, a major zone of subsidence due to petroleum extraction, is located south of the site; however, subsidence is not known to have occurred at the site. Repressurization of the Wilmington Oil Field, which started in 1959, has substantially arrested the subsidence.

Stability

The property is located on relatively flat-lying ground with no slope stability problems and no potential for lurching (movement at right angles to a steep slope during strong ground shaking). Additionally, the property is not known to be on or in the path of any existing or potential landslide.

Flooding, Tsunamis, and Seiches

The site is not within a designated flood prone area, as designated by the Federal Emergency Management Agency. The Los Angeles River, located approximately 1,200 feet east of the site, has been channelized for flood control.

As the site is not within a coastal area, the risk of damage from earthquake induced sea waves, called tsunamis, need not be considered.

The site is not located downslope of any large bodies of water that would adversely affect the site in the event of earthquake induced failure or seiches (oscillations in a body of water due to earthquake shaking).

Liquefaction and Seismic Settlement

Liquefaction commonly occurs during earthquake shaking in areas underlain by shallow ground water (generally within 50 feet of the surface) and loose fine sands. According to the Long Beach Seismic Safety Element (1975), the site is within an area of moderate to significant liquefaction potential. Ground water was encountered in all four of our borings at a depth of approximately 43 feet. Standard penetration tests performed for this investigation indicate that the underlying deposits are generally dense. Therefore, it is our opinion that the potential for liquefaction occurring on-site is considered low.

Seismic settlement often occurs when loose granular materials densify during ground shaking. As previously stated, the geologic materials beneath the site generally consist of dense sand, silty sand, and sandy silt. Accordingly, the potential for seismic settlement is remote.

ENVIRONMENTAL AUDIT

GENERAL

The environmental audit included a site inspection/walkover to verify existing conditions. In addition, the soil samples from our borings were monitored with a Photovac photoionization detector (PID) for indications of contamination due to volatile organic vapors.

Our site history review included a review of various records and maps to determine prior use of the subject property. Records and maps reviewed included building permits at the City of Long Beach Department of Building and Safety, business directories at the Long Beach Central Library, historic site use maps compiled by the Sanborn Map Company, the California Division of Oil and Gas maps, and historic topographic maps.

Our research also involved a records search for nearby sites which store, generate, or dispose of hazardous or toxic materials that could affect the site. The City of Long Beach Fire Department was contacted to determine if any underground storage tanks exist or existed on or adjacent to the property. The City of Long Beach Department of Environmental Health was contacted regarding documentation of hazardous materials used or encountered in the immediate vicinity of the site. The California Office of Permit Assistance (OPA) Hazardous Waste and Substance Site List, for the Cities of Carson and Long Beach, was also reviewed. The Regional Water Quality Control Board was contacted regarding locations of nearby active or abandoned landfills and any ground water contamination problems in the area.

Our review also included an examination of historical aerial photographs from the Spence Collection at UCLA and from our in-house collection.

SITE RECONNAISSANCE/PID SURVEY

No indications of past or present site usage, which may have had an adverse environmental impact, were observed during our site survey. No indications of soil contamination, such as discoloration, unusual odors, or distressed vegetation, were noted.

A portable photoionization detector (PID) was used to monitor soil samples from the borings to determine the presence of any volatile organic vapors. No PID readings above background levels were recorded from the soil samples.

RECORD SEARCH

Building Permits

Building permits on file at the City of Long Beach Department of Building and Safety were examined to ascertain if any existing or previous buildings at the site might have stored or utilized materials currently considered toxic or hazardous during their occupancy. Based on the available records, there appears to be no potential for such occupancy.

No building permits have been issued for the subject property. Permits pertaining to properties immediately adjacent to the site indicate the presence of several office buildings and warehouses. Some former or current businesses include: a commercial/metal storage

building at 1000 West Carson Street (1987), an office building at 1500 West Carson Street (1987), an office building/warehouse/parts assembly building at 3900 Via Oro Avenue (1984) (including three spray paint booths), an office building at 3960 Via Oro Avenue (1986), an office building/warehouse at 4001 Via Oro Avenue (1986), and a commercial/ research building at 4031 Via Oro Avenue (1986). These buildings are depicted on Plate 1.

Business Directories

Historical business directory listings, available at the Long Beach Central Library, were also examined to determine if any existing or previous businesses in the immediate vicinity of the property might have stored or utilized toxic or hazardous materials. Based upon available directories (since 1958), there does not appear to be a potential for such occupancy.

Sanborn Map Collection

Historic site use maps, compiled by the Sanborn Map Company, were also examined to determine past site usage. These maps, which predominantly cover commercial areas, did not include the subject site due to lack of commercial development in the area prior to 1960.

Division of Oil and Gas Records

According to the Division of Oil and Gas (D.O.G.) Map Number 137, an oil/gas well was constructed on the site in 1944 (see Plate 1). The well was abandoned later the same year. Abandonment procedures for the well (General Explorations "Dominguez 2") included filling the hole

with heavy drilling fluid. Then a cement plug was placed and approved by the D.O.G. between 717 and 624 feet below the ground surface.

The abandonment procedures performed for this well are not up to present day standards, and the well will probably have to be re-abandoned during any future development. A venting system may also be required if future buildings are located over the oil well.

Topographic Maps

Based on our in-house collection of topographic maps, published by the U.S. Geological Survey, no structures were present at the subject property in 1949, 1964, 1972, or 1981. These maps indicate two oil wells were present east of the site at 1005 West Carson Street from 1964 to 1972. A 1972 map also depicts three above ground tanks east of the property at this site. A 1981 map indicates that only one of the oil wells was present at that time.

Fire Department Records

The Long Beach Fire Department was contacted regarding permits of installations or removals of underground storage tanks in the area. Although no such records were present pertaining to the subject property, records were available which pertained to 1005 West Carson Street. These records indicated that four tanks were removed from the site in August 1987, including: two 1,330-gallon above ground tanks, one 2,700-gallon above ground tank, and one 1,000-gallon below ground tank. All of these tanks were used to store petroleum oil. The soils surrounding the tanks were tested for hydrocarbon contamination and were found to

contain tolerable levels of toxic substances (according to the Environmental Protection Agency). The records also indicated that one 500-gallon oil tank and one 1,000-gallon oil tank were emptied and cleaned at this site. There were no indications of removal of the tanks.

Department of Health Records

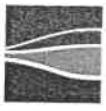
The City of Long Beach Department of Environmental Health was contacted regarding any documentation of hazardous materials use or incidences in the vicinity of the site. We are currently waiting for documentation from this agency. A supplementary letter will be sent when we have received this information.

Hazardous Waste and Substance Site List

The California Office of Permit Assistance (OPA) Hazardous Waste and Substance Site List for the Cities of Long Beach and Carson was also examined as part of our research. This list is compiled from data from the State Department of Health Services, the State Water Resources Control Board, and the California Waste Management Board. According to the OPA list, there are no reported sites within the immediate area of the site as of March 1988.

Landfills

According to the Regional Water Quality Control Board, two landfills are located within one mile of the site, including an oil waste landfill, located approximately 1,000 feet northeast of the site, and a landfill of unknown contents, located approximately 0.9 mile to the west (Plate 2).



HISTORIC PHOTOGRAPHS

In order to further identify past site use, historic aerial photographs from the Spence Collection at UCLA, and from our in-house collection, were reviewed. Photographs taken in 1963, 1970, and 1971 indicate that the subject property, and most of the surrounding area, was used for agricultural purposes. The photographs depict three above ground tanks at 1005 West Carson Street and a storage lot(?) at the southwest corner of West Carson Street and the Long Beach Freeway (Plate 3, Spence Collection Aerial Photograph).

PREVIOUS REPORTS

We reviewed our previous geotechnical investigations in the general area of the property. No evidence of local or regional contamination was noted in any of these reports.

CONCLUSIONS

GENERAL

The conclusions and recommendations presented below are preliminary and necessarily general in nature. A comprehensive investigation will be required to provide detailed recommendations prior to preparing final plans for site development.

GEOLOGY

Based on the geologic findings, no active or potentially active faults are known to exist within the site. The closest active fault to the site is the Cherry Hill Fault strand of the Newport-Inglewood Fault Zone, situated 0.3 mile east of the property.

The location of the site in relation to known active faults indicates that the site may be exposed to greater risk than other locations on the Los Angeles County coastal plain due to the proximity of the Newport-Inglewood Fault Zone. However, the effects of shaking can be minimized by proper structural design and proper construction.

The site is on essentially flat lying ground with no stability problems and no potential for lurching. Hazards from flooding, tsunamis, seiches, liquefaction, seismic settlement, and subsidence are considered negligible. No other geologic hazards are known to affect this site.

ENVIRONMENTAL CONSIDERATIONS

Based on the information developed, there appears to be only a very slight potential for significant environmental contamination at the subject site.

Our walk-over of the property did not reveal any conditions or structures which might suggest an environmental liability. Furthermore, neither the business directories, OPA List, or our previous investigations in the area indicate any type of environmental concern.

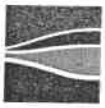
The Division of Oil and Gas records indicate that an oil/gas well was present on the site in 1944. Local contamination due to past drilling operations is possible; however, the well was abandoned without producing, and the likelihood of extensive contamination at the site due to the oil well is remote.

The D.O.G. may require re-abandonment of the on-site well during future development and construction of a venting system if buildings are placed over the oil well.

Fire department records indicate that several tanks were removed from 1005 West Carson Street, east of the site, in August 1987. The soils surrounding the tanks were tested for contamination and were found to contain tolerable levels of toxic substances (according to the Environmental Protection Agency). Our site survey revealed the presence of one remaining oil pump (not operating) and three associated above ground oil storage tanks at this location. Migration of any contaminates from these past operations will probably be directed toward the Los Angeles River (away from the subject site) and should not impact the site.

The Regional Water Quality Control Board indicates the presence of two landfills within one mile of the site. Neither of these landfills is upgradient from the property, with respect to ground water flow, and should therefore not represent an environmental threat to the site.

Historic photographs indicate that the site was used for agriculture purposes from 1963 to 1971; therefore, there is a slight possibility that low levels of residual pesticides may be present in the underlying soil.



FOUNDATION CONSIDERATIONS

Shallow fill soils were encountered in the four borings drilled for this preliminary study. The natural soils beneath the site consist primarily of silt, silty sand, and sand with occasional layers of clay; the natural soils are generally firm and dense at the locations explored. The upper natural soils would become weaker and more compressible when wet. Water was measured at a depth of 43 feet below grade.

With proper grading of the site, typical one- or two-story buildings could be supported on shallow spread footings. For preliminary design, it may be assumed that footings established on compacted fill or the undisturbed natural soils at a depth of at least two feet below the lowest adjacent grade or floor slab may be designed to impose a net dead plus live load pressure of 2,000 pounds per square foot.

For support of heavier buildings, or if a greater bearing value is desired, footings could extend into the underlying firm natural soils at a depth of about five feet below the existing grade. If subterranean construction is planned, footings should automatically extend into the firm natural soils. For preliminary design, it may be assumed that footings carried into the firm natural soils may be designed to impose a a net dead plus live load pressure of 4,000 pounds per square foot.

As an alternative foundation type, friction piling may be used. Either driven friction piling or drilled cast-in-place concrete piling would be feasible; the lengths of drilled piling would be restricted to about 40 feet below the existing grade due to water. For preliminary

design, it may be assumed that a 12-inch-square prestressed concrete driven pile, 40 feet long, will develop a downward capacity of about 180 kips. A 24-inch-diameter drilled cast-in-place concrete pile, 30 feet long, will develop a downward capacity of about 120 kips, and a 40 feet long pile will develop a downward capacity of about 180 kips. Shorter piles will have to be used if a basement is planned in order to keep the tips of the drilled piles within 40 feet of the present ground surface and above the ground water level.

EXCAVATION

No significant difficulties due to soil conditions are anticipated in excavating for basement construction. Conventional earth-moving equipment may be used. If the necessary space is available, temporary unsurcharged excavations may be sloped back at 3/4:1 (horizontal to vertical) in lieu of using shoring.

GRADING

To provide support for floor slabs and walks on grade, the existing fill materials and disturbed natural soils should be excavated and replaced with properly compacted fill. The on-site soils, less debris and organic matter within fill deposits, would be suitable for use in compacted fills.

FLOOR SLAB SUPPORT

The building floor slabs may be supported on grade. No special requirements are anticipated. Where a capillary break is considered necessary, the floor slabs may be supported on a layer of gravel or on an impermeable membrane.

BIBLIOGRAPHY

Association of Engineering Geologists, "Geology and Earthquake Hazards; Planners Guide to the Seismic Safety Element," Special Publication.

Association of Engineering Geologists, 1973, "Geology, Seismicity and Environmental Impact," Special Publication, October, 1973.

California Department of Water Resources, 1961, "Planned Utilization of Ground Water Basins of the Coastal Plain of Los Angeles County," Bulletin 104.

California Department of Water Resources, 1977, "Hydrologic Data, 1975," Bulletin 130-75, March 1977.

California Division of Mines and Geology, 1974, "A Review of the Geology and Earthquake History of the Newport-Inglewood Structural Zone, Southern California," Special Report 114.

California Division of Mines and Geology, 1975, "Guidelines for Evaluating the Hazards of Surface Fault Rupture," CDMG Note Number 49.

California Division of Mines and Geology, 1976, "Fault Hazard Zones in California," Special Publication 42.

City of Carson, "Seismic Safety Element of the General Plan," undated.

City of Long Beach, 1975, "Seismic Safety Element, General Plan Program."

Los Angeles County Flood Control District, 1962, "Dominguez Gap Barrier Project Geologic Investigation."

Los Angeles County, Planning Department, 1974, "Seismic Safety Element of Los Angeles County General Plan."

Poland, J.F., et al., 1946, "Hydrology of Long Beach - Santa Ana Area California with Special References to the Watertightness of the Newport-Inglewood Structural Zone," U.S.G.S. Open File Report.

Poland, J.F., Piper, A.M., et al., 1956, "Ground Water Geology of the Coastal Zone, Long Beach-Santa Ana Area, California," U.S. Geological Survey Water Supply Paper 1109.

Poland, J.F., Garrett, A.A., and Sinnote, A., 1959, "Geology, Hydrology, and Chemical Character of Ground Waters in the Torrance - Santa Monica Area, California," U.S. Geological Survey Water Supply Paper 1461.

Poland, J.F., et al., 1959, "Hydrology of the Long Beach-Santa Ana Area, California," U.S. Geological Survey Water Supply Paper 1471.

Stolz, H.P., "Long Beach Oil Field," California Department of Natural Resources, Division of Mines Bulletin 118, Chapter VIII, 1943a.

-oOo-

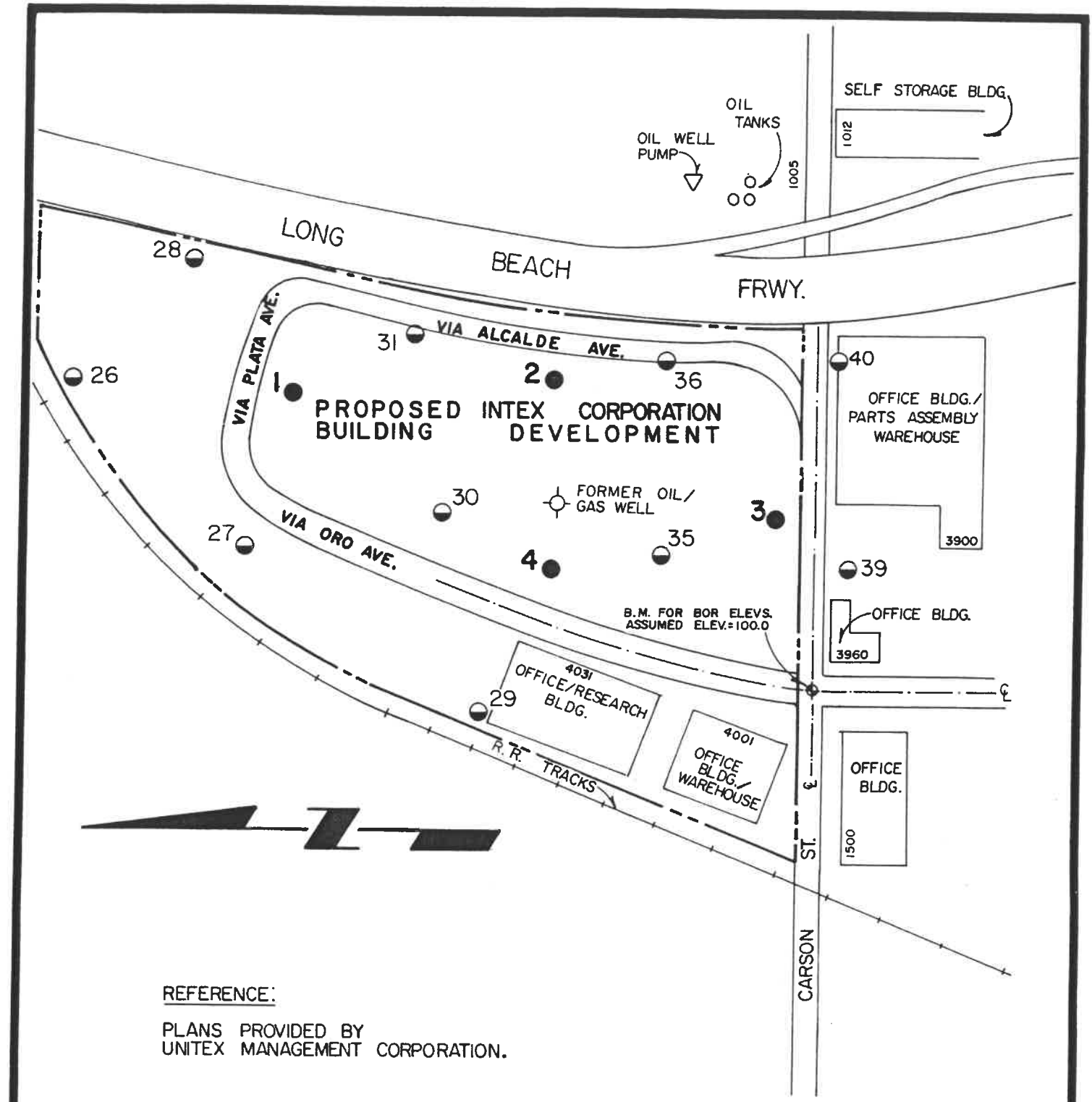
The following Plates and Appendix are attached and complete this report:

Plate 1 ---------- Site Plan

Plate 2 ---------- Local Geology

Plate 3 ---------- Spence Collection Aerial Photograph

Appendix --------- Explorations and Laboratory Tests



REFERENCE:

PLANS PROVIDED BY
UNITEX MANAGEMENT CORPORATION.

KEY:

2 ● CURRENT INVESTIGATION (AEF-88292)

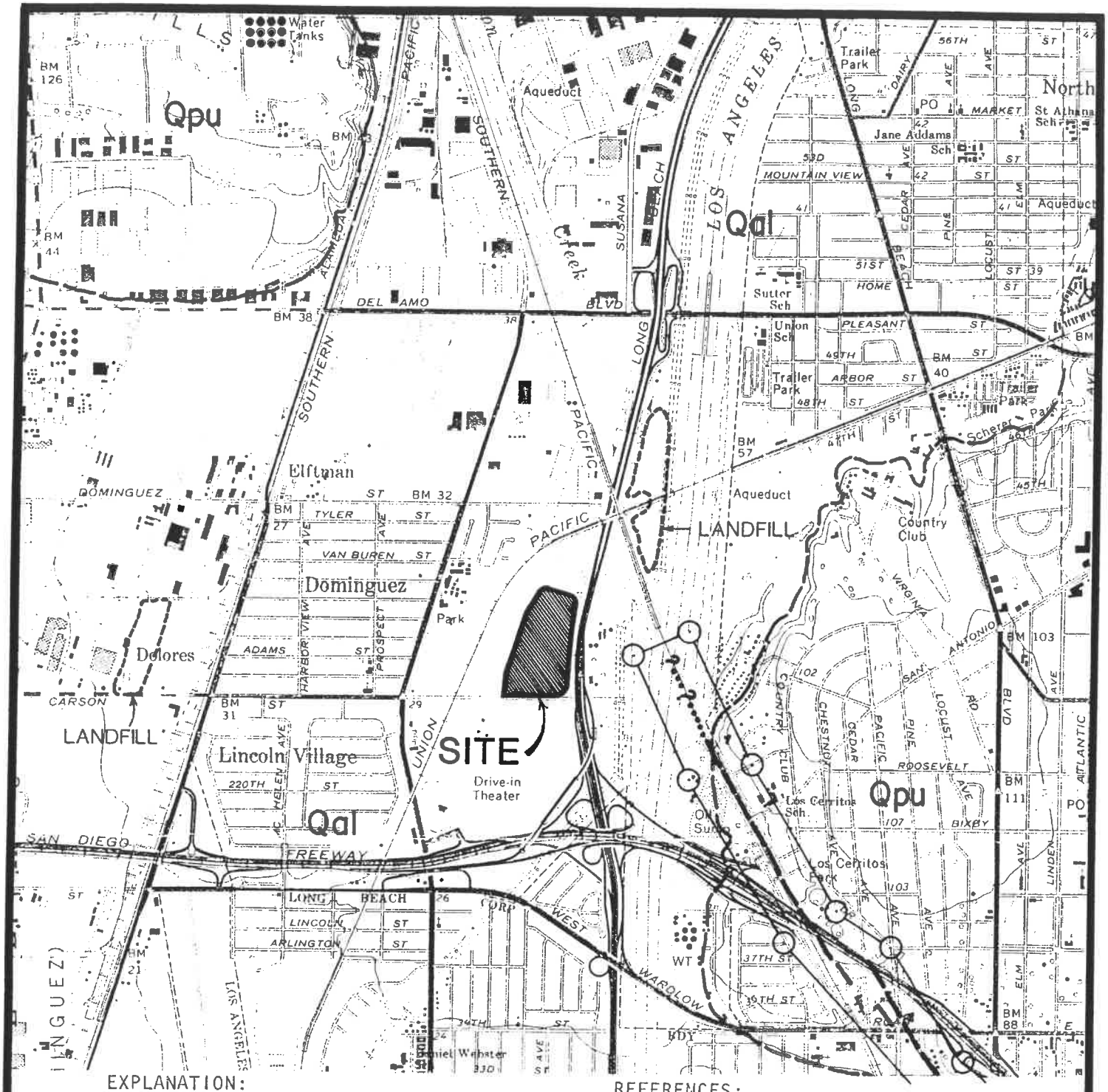
31 ◒ PREVIOUS INVESTIGATION (A-67202)

SITE PLAN

SCALE 1"=400' (APPROX.)

LeROY CRANDALL AND ASSOCIATES

PLATE 1



EXPLANATION:

Qal HOLOCENE ALLUVIUM

Qpu LATE PLEISTOCENE TERRACE DEPOSITS

GEOLOGIC CONTACT, APPROXIMATELY LOCATED

FAULT: DASHED WHERE APPROXIMATELY LOCATED, DOTTED WHERE CONCEALED, QUERIED WHERE UNCERTAIN

LIMITS OF SPECIAL STUDIES ZONE

REFERENCES:

BASE MAP FROM U.S.G.S. 7.5' LONG BEACH QUADRANGLE, PHOTOREVISED 1972.

GEOLOGY MODIFIED FROM POLAND, 1956; SPECIAL STUDIES ZONE MAP LONG BEACH QUADRANGLE, C.D.M.G., 1986. APPROXIMATE LANDFILL LOCATIONS FROM CALIFORNIA REGIONAL WATER QUALITY BOARD.

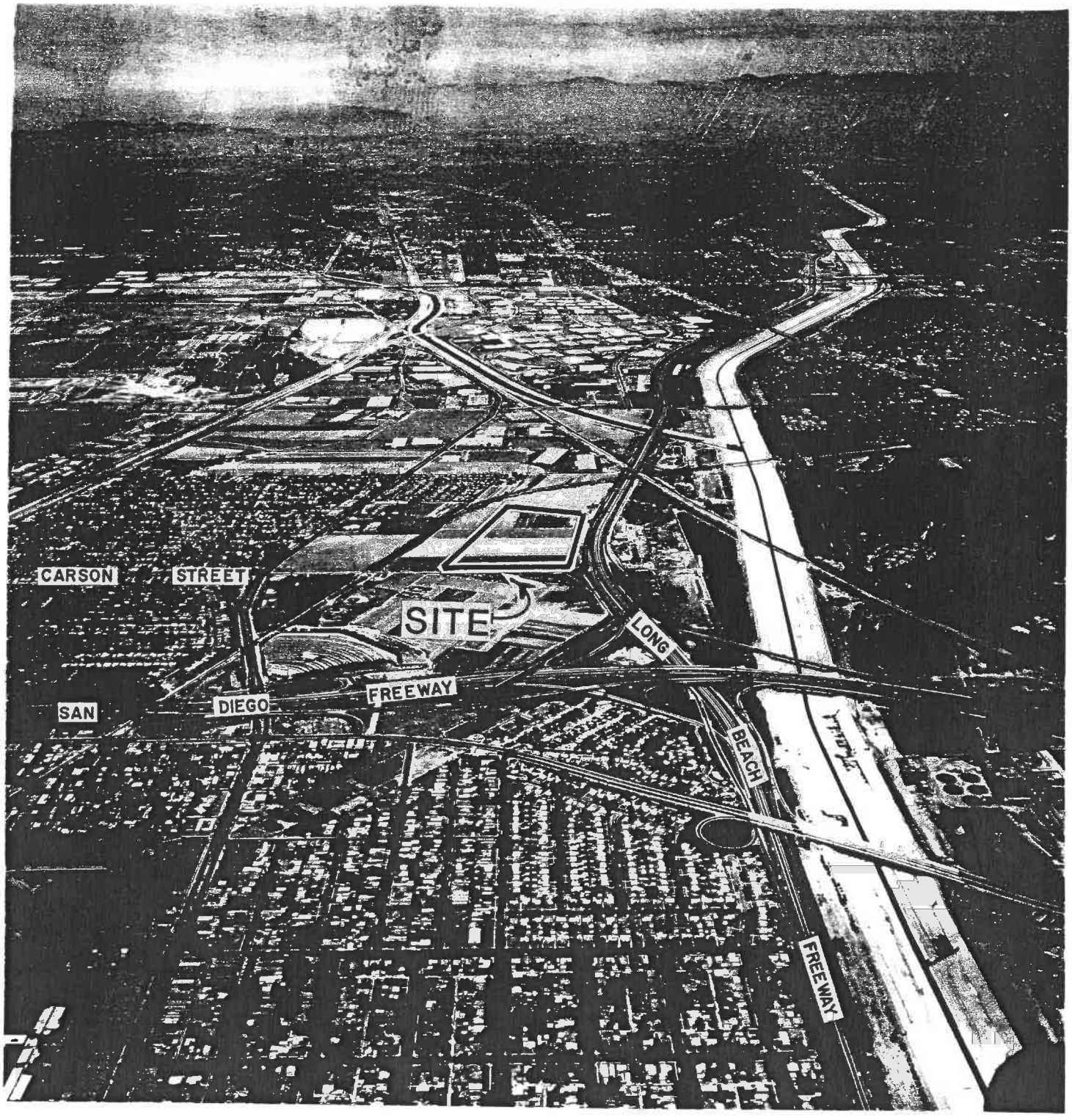
LOCAL GEOLOGY

SCALE 1"= 2000'

LeROY CRANDALL AND ASSOCIATES

PLATE 2

JOB AEF-88292



SPENCE COLLECTION AERIAL PHOTOGRAPH

8/4/71 LONG BEACH, CALIFORNIA

PLATE 3

APPENDIX

EXPLORATIONS

The soil conditions were explored by drilling four borings at the locations shown on Plate 1. (In addition, data were available from prior borings drilled on the site.) The borings were drilled to depths of 45 to 65 feet below the existing grade using 18-inch-diameter bucket-type drilling equipment and/or 5-inch-diameter rotary wash-type drilling equipment. Caving of the boring walls occurred in the bucket borings, as indicated on the boring logs; drilling mud was used with the rotary wash equipment to prevent caving. The mud was removed following completion of the drilling to permit future measurements of the water level.

The soils encountered were logged by our field technician, and undisturbed samples were obtained for laboratory inspection and testing. The logs of the borings are presented on Plates A-1.1 through A-1.4; the depths at which undisturbed samples were obtained are indicated to the left of the boring logs. The energy required to drive the Crandall sampler one foot is indicated to the left of the boring logs. In addition to obtaining undisturbed samples, standard penetration tests were performed in two of the borings; the results of the tests are indicated on the logs. The soils are classified in accordance with the Unified Soil Classification System described on Plate A-2.

LABORATORY TESTS

The field moisture content and dry density of the soils encountered were determined by performing tests on the undisturbed samples. The results of the tests are shown to the left of the boring logs.

Direct shear tests were performed on selected undisturbed samples to determine the strength of the soils. The tests were performed at field and increased moisture content and at various surcharge pressures. The yield-point values determined from the direct shear tests are presented on Plate A-3, Direct Shear Test Data.

Confined consolidation tests were performed on six undisturbed samples. Water was added to four of the samples during the tests to illustrate the effect of moisture on the compressibility. The results of the tests are presented on Plates A-4.1 through A-4.3, Consolidation Test Data.

To determine the particle size distribution of the soils and to aid in classifying the soils, mechanical analyses were performed on three samples. The results of the mechanical analyses are presented on Plates A-5.1 and A-5.2, Pareticle Size Distribution.

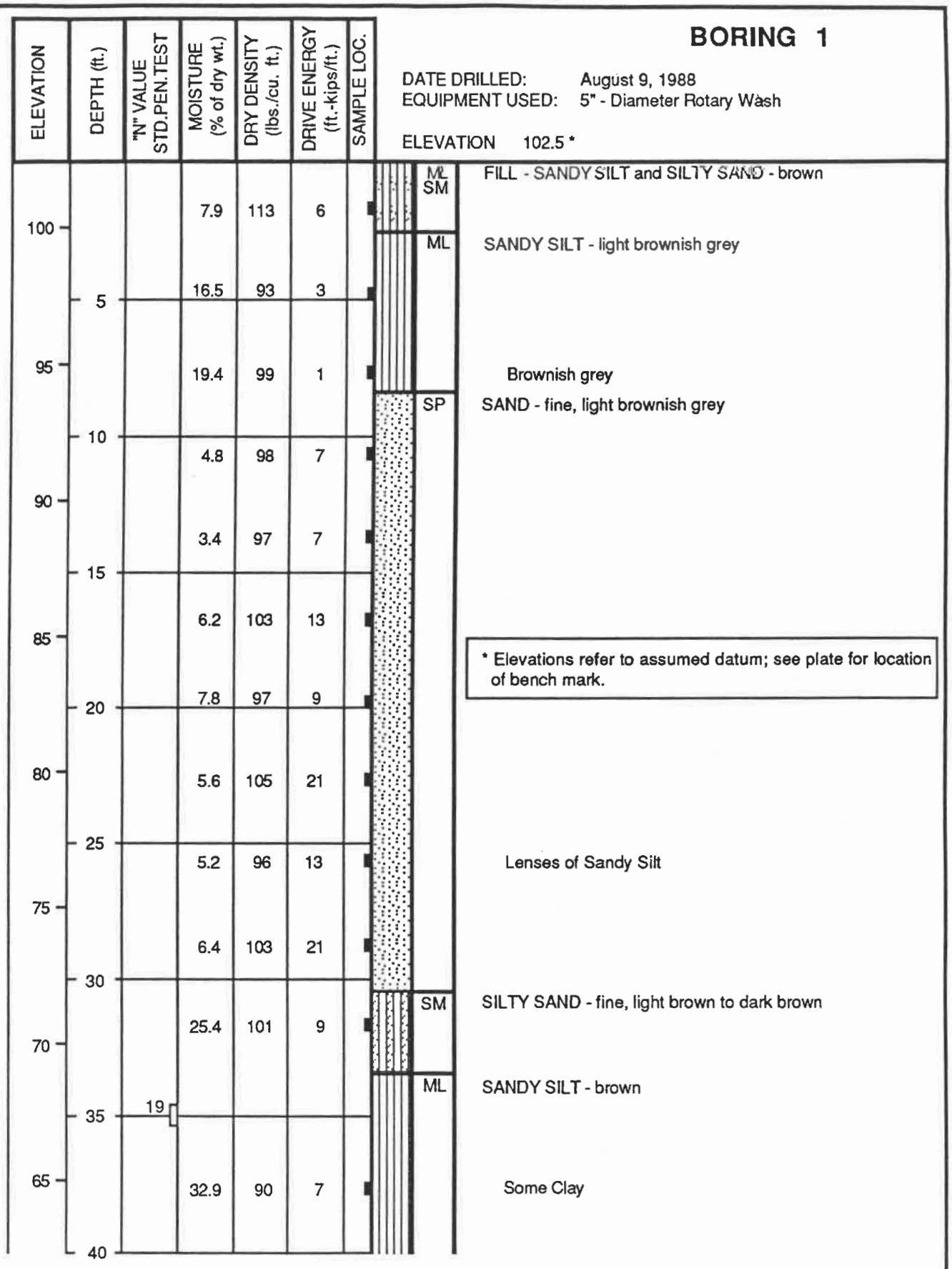
-o0o-

JOB AEF- 88292 DATE 8/24/88 F.T. LS DR. lp O.E. MS W.P. lp CHKD

BORING 1

DATE DRILLED: August 9, 1988
EQUIPMENT USED: 5" - Diameter Rotary Wash

ELEVATION 102.5 *



FILL - SANDY SILT and SILTY SAND - brown

SANDY SILT - light brownish grey

Brownish grey

SAND - fine, light brownish grey

Lenses of Sandy Silt

SILTY SAND - fine, light brown to dark brown

SANDY SILT - brown

Some Clay

* Elevations refer to assumed datum; see plate for location of bench mark.

Note : The log of subsurface conditions shown hereon applies only at the specific boring location and at the date indicated. It is not warranted to be representative of subsurface conditions at other locations and times.

(CONTINUED ON FOLLOWING PLATE)

LOG OF BORING

LeROY CRANDALL AND ASSOCIATES

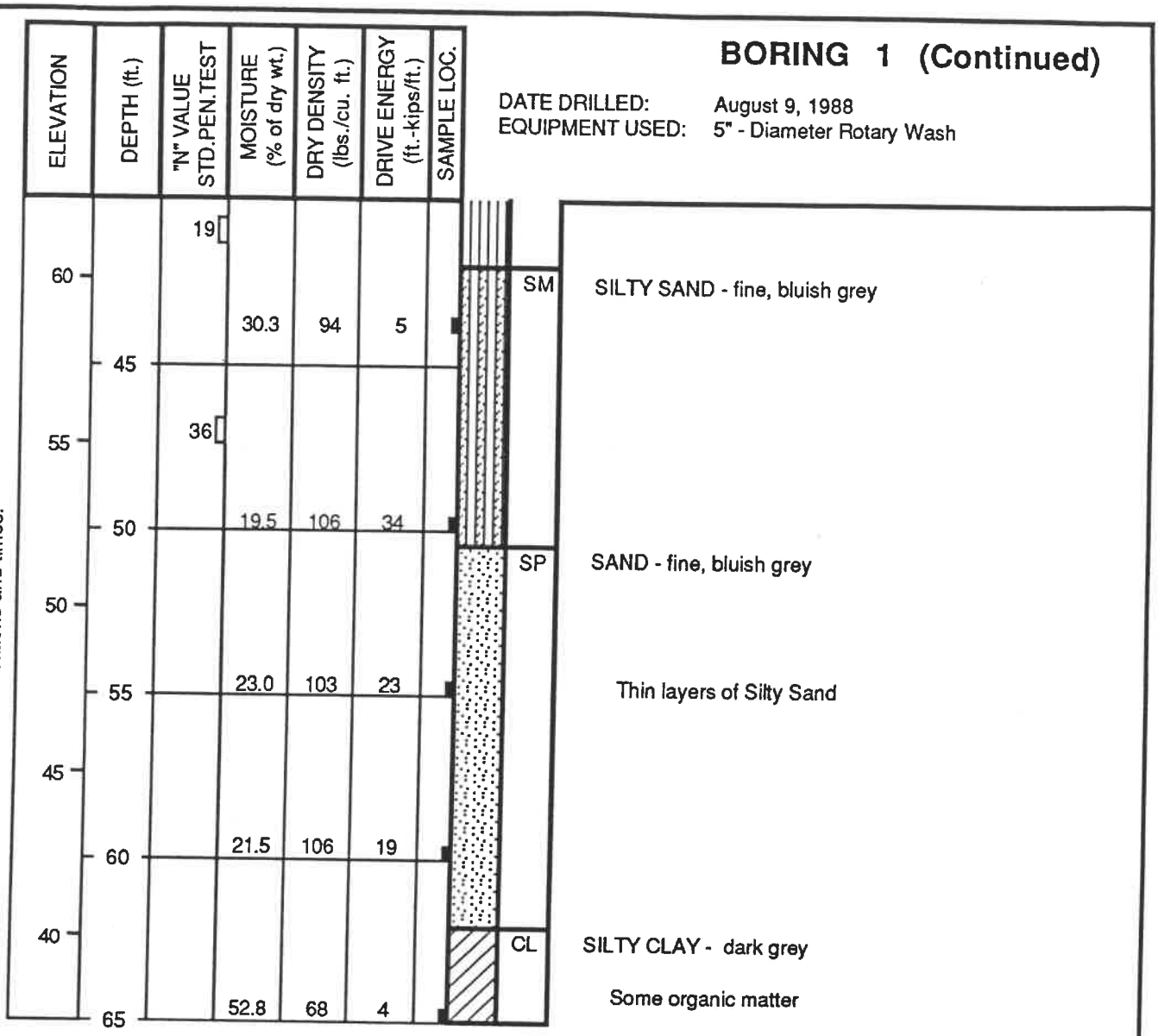
PLATE A - 1.1a

JOB AEF- 88292 DATE 8/24/88 F.T. LS DR. lp O.E. MS W.P. lp CHKD

Note : The log of subsurface conditions shown hereon applies only at the specific boring location and at the date indicated. It is not warranted to be representative of subsurface conditions at other locations and times.

BORING 1 (Continued)

DATE DRILLED: August 9, 1988
EQUIPMENT USED: 5" - Diameter Rotary Wash



NOTE: Drilling mud used in drilling process. Mud removed after completion of drilling. Water level measured at a depth of 43' 15 minutes after completion of drilling.

LOG OF BORING

LeROY CRANDALL AND ASSOCIATES

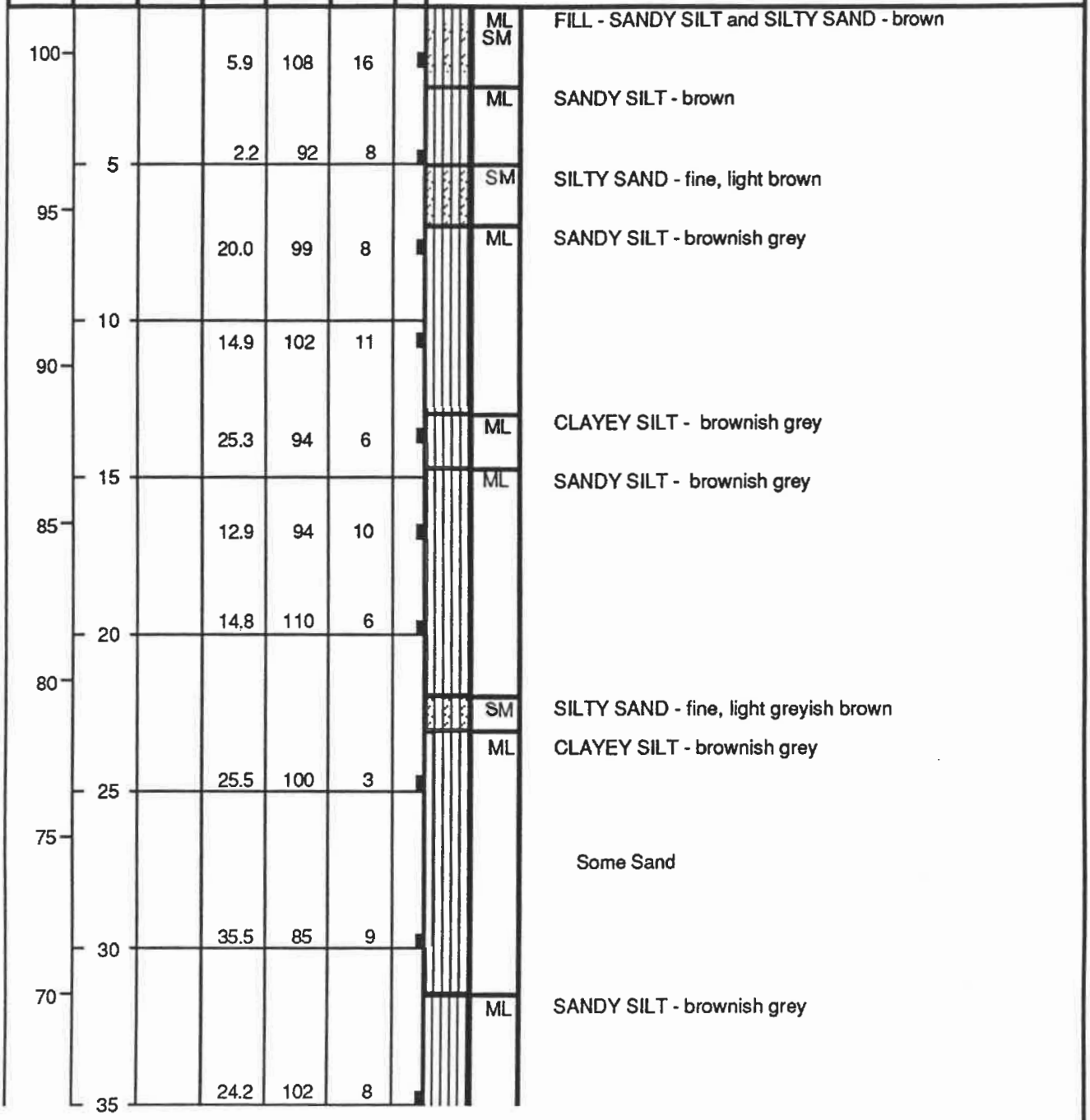
PLATE A - 1.1b

JOB AEF-88292 DATE 8/24/88 F.T. LS DR. lp O.E. MS W.P. lp CHKD

BORING 2

DATE DRILLED: August 5, 1988
EQUIPMENT USED: 18" - Diameter Bucket

ELEVATION 101.5



Note : The log of subsurface conditions shown hereon applies only at the specific boring location and at the date indicated. It is not warranted to be representative of subsurface conditions at other locations and times.

(CONTINUED ON FOLLOWING PLATE)

LOG OF BORING

LeROY CRANDALL AND ASSOCIATES

PLATE A - 1.2a

JOB AEF- 88292 DATE 8/24/88 F.T. LS DR. lp O.E. MS W.P. lp CHKD

BORING 2 (Continued)

DATE DRILLED: August 5, 1988
EQUIPMENT USED: 18" - Diameter Bucket

ELEVATION	DEPTH (ft.)	"N" VALUE STD.PEN.TEST	MOISTURE (% of dry wt.)	DRY DENSITY (lbs./cu. ft.)	DRIVE ENERGY (ft.-kips/ft.)	SAMPLE LOC.
65						
	40		34.9	87	7	
60						
	45		24.1	98	14	
55						
	50					

ML CLAYEY SILT - brownish grey

ML SANDY SILT - brownish grey

SP SAND - fine, bluish grey

(BORING TERMINATED AT A DEPTH OF 45' DUE TO CAVING AND SLOUGHING BELOW 43')

NOTE: Water level measured at a depth of 43' after completion of drilling. Caving and sloughing below 43'.

Note : The log of subsurface conditions shown hereon applies only at the specific boring location and at the date indicated. It is not warranted to be representative of subsurface conditions at other locations and times.

LOG OF BORING

LeROY CRANDALL AND ASSOCIATES

PLATE A - 1.2b

JOB AEF-88292 DATE 8/24/88 F.T. LS DR. lp O.E. MS W.P. lp CHKD

BORING 3

DATE DRILLED: August 8 & 9, 1988
EQUIPMENT USED: 18" - Diameter Bucket 0' to 45'
5" - Diameter Rotary Wash 0' to 65'
ELEVATION 101.4

ELEVATION	DEPTH (ft.)	"N" VALUE STD.PEN.TEST	MOISTURE (% of dry wt.)	DRY DENSITY (lbs./cu. ft.)	DRIVE ENERGY (ft.-kips/ft.)	SAMPLE LOC.		
100	0		7.0	112	19		ML	FILL - SANDY SILT - pieces of plaster, brown
							ML	SANDY SILT - brown
			2.1	91	8		SM	SILTY SAND - fine, brown
95	5						SP	SAND - fine, light brownish grey
			2.9	91	3			
							ML	SANDY SILT - brownish grey
90	10		9.8	99	5			
			16.0	109	10			
85	15		17.8	107	3			
			4.8	99	10		SM	SILTY SAND - fine, light brownish grey
80	20						ML	CLAYEY SILT - brownish grey
			30.9	94	5			
75	25						ML	SANDY SILT - brownish grey
			7.9	99	10		SM	SILTY SAND - fine, brownish grey
70	30						ML	SANDY SILT - brownish grey
			13.5	101	11			Thin layers of Silty Sand
65	35							
	40		26.9	94	11			

Note : The log of subsurface conditions shown hereon applies only at the specific boring location and at the date indicated. It is not warranted to be representative of subsurface conditions at other locations and times.

(CONTINUED ON FOLLOWING PLATE)

LOG OF BORING

LeROY CRANDALL AND ASSOCIATES

PLATE A - 1.3a

JOB AEF-88292 DATE 8/24/88 F.T. LS DR. lp O.E. MS W.P. lp CHKD

BORING 3 (Continued)

DATE DRILLED: August 8 & 9, 1988
EQUIPMENT USED: 18" - Diameter Bucket 0' to 45'
5" - Diameter Rotary Wash 0' to 65'

ELEVATION	DEPTH (ft.)	"N" VALUE STD.PEN.TEST	MOISTURE (% of dry wt.)	DRY DENSITY (lbs./cu. ft.)	DRIVE ENERGY (ft.-kips/ft.)	SAMPLE LOC.
60						
	45	49	19.5	104	11	
55			23.4	105	21	
	50	72				
50			20.6	105	34	
	55					
45			21.2	104	34	
	60					
40						
	65		19.9	109	34	

CL SILTY CLAY - bluish grey

SP SAND - fine, bluish grey

Layer of Silty Sand

NOTE: BUCKET BORING Water level measured at a depth of 43' after completion of bucket boring. Caving and sloughing below 43'.

ROTARY WASH BORING Drilling mud used in drilling process. Mud removed after completion of drilling. Water level measured at a depth of 43' 10 minutes after completion of drilling.

Note : The log of subsurface conditions shown hereon applies only at the specific boring location and at the date indicated. It is not warranted to be representative of subsurface conditions at other locations and times.

LOG OF BORING

LeROY CRANDALL AND ASSOCIATES

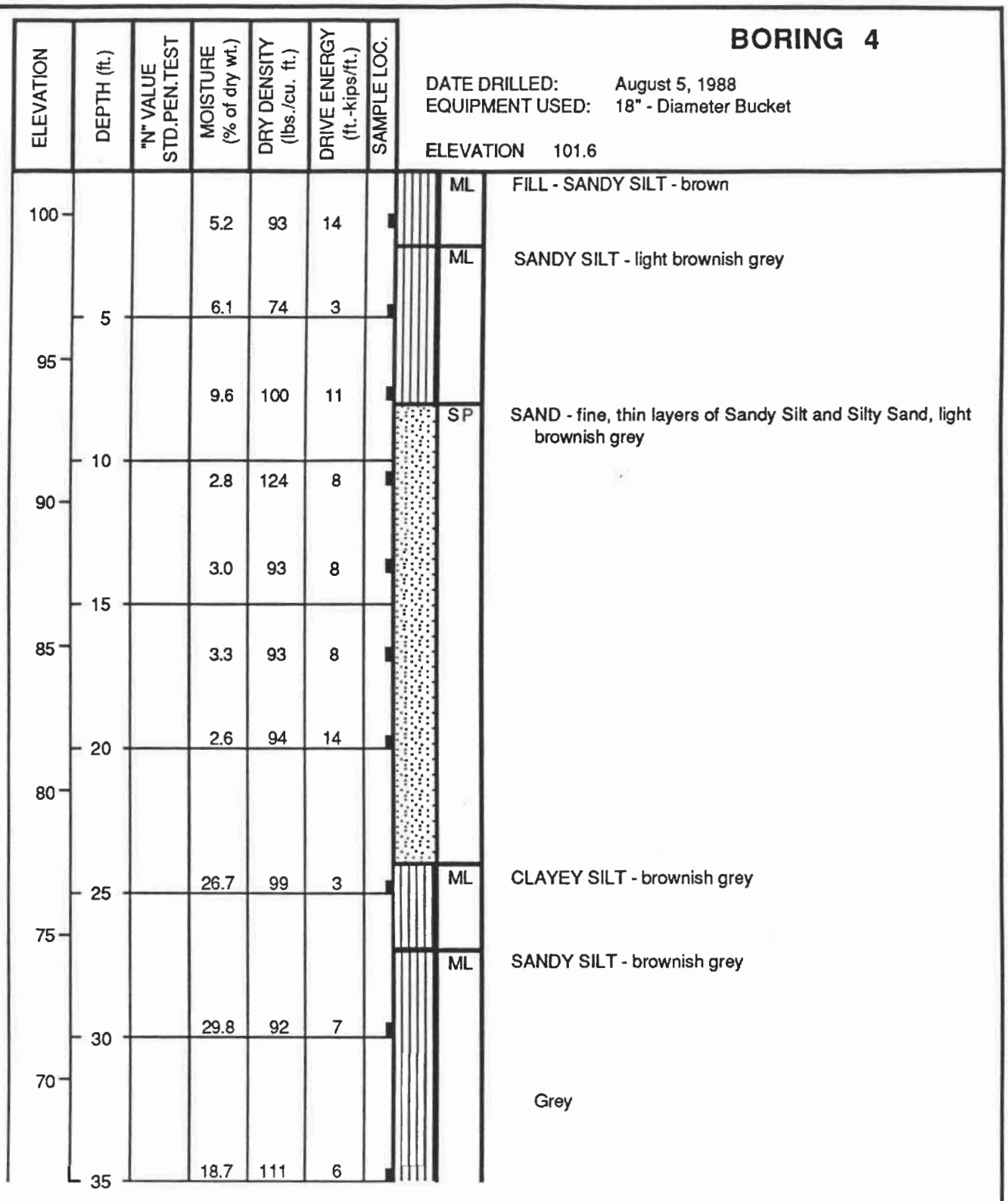
PLATE A - 1.3b

JOB AEF- 88292 DATE 8/24/88 F.T. LS DR. lp O.E. MS W.P. lp CHKD

BORING 4

DATE DRILLED: August 5, 1988
EQUIPMENT USED: 18" - Diameter Bucket

ELEVATION 101.6



(CONTINUED ON FOLLOWING PLATE)

Note : The log of subsurface conditions shown hereon applies only at the specific boring location and at the date indicated. It is not warranted to be representative of subsurface conditions at other locations and times.

LOG OF BORING

LeROY CRANDALL AND ASSOCIATES

PLATE A - 1.4a

JOB AEF- 88292 DATE 8/24/88 F.T. LS DR. lp O.E. MS W.P. lp CHKD

BORING 4 (Continued)

DATE DRILLED: August 5, 1988
EQUIPMENT USED: 18" - Diameter Bucket

ELEVATION	DEPTH (ft.)	"N" VALUE STD.PEN.TEST	MOISTURE (% of dry wt.)	DRY DENSITY (lbs./cu. ft.)	DRIVE ENERGY (ft.-kips/ft.)	SAMPLE LOC.
65						
	40		6.4	96	13	
60						
	45		24.9	98	16	
55						
	50					

SM SILTY SAND - fine, grey

SP SAND - fine, light bluish grey

(BORING TERMINATED AT A DEPTH OF 45' DUE TO CAVING AND SLOUGHING BELOW 43')

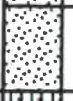
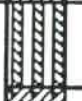
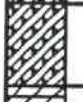
NOTE: Water level measured at a depth of 43' 10 minutes after completion of drilling. Caving and sloughing below 43'.

Note : The log of subsurface conditions shown hereon applies only at the specific boring location and at the date indicated. It is not warranted to be representative of subsurface conditions at other locations and times.

LOG OF BORING

LeROY CRANDALL AND ASSOCIATES

PLATE A - 1.4b

MAJOR DIVISIONS			GROUP SYMBOLS		TYPICAL NAMES
COARSE GRAINED SOILS (More than 50% of material is LARGER than No. 200 sieve size)	GRAVELS (More than 50% of coarse fraction is LARGER than the No. 4 sieve size)	CLEAN GRAVELS (Little or no fines)		GW	Well graded gravels, gravel - sand mixtures, little or no fines.
				GP	Poorly graded gravels or gravel - sand mixtures, little or no fines.
		GRAVELS WITH FINES (Appreciable amount of fines)		GM	Silty gravels, gravel - sand - silt mixtures.
				GC	Clayey gravels, gravel - sand - clay mixtures.
	SANDS (More than 50% of coarse fraction is SMALLER than the No. 4 sieve size)	CLEAN SANDS (Little or no fines)		SW	Well graded sands, gravelly sands, little or no fines.
				SP	Poorly graded sands or gravelly sands, little or no fines.
		SANDS WITH FINES (Appreciable amount of fines)		SM	Silty sands, sand - silt mixtures.
				SC	Clayey sands, sand - clay mixtures.
FINE GRAINED SOILS (More than 50% of material is SMALLER than No. 200 sieve size)	SILTS AND CLAYS (Liquid limit LESS than 50)			ML	Inorganic silts and very fine sands, rock flour, silty or clayey fine sands or clayey silts with slight plasticity.
				CL	Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, silty clays, lean clays.
				OL	Organic silts and organic silty clays of low plasticity.
	SILTS AND CLAYS (Liquid limit GREATER than 50)			MH	Inorganic silts, micaceous or diatomaceous fine sandy or silty soils, elastic silts.
				CH	Inorganic clays of high plasticity, fat clays.
				OH	Organic clays of medium to high plasticity, organic silts.
HIGHLY ORGANIC SOILS				Pt	Peat and other highly organic soils.

BOUNDARY CLASSIFICATIONS: Soils possessing characteristics of two groups are designated by combinations of group symbols.

PARTICLE SIZE LIMITS

SILT OR CLAY	SAND			GRAVEL		COBBLES	BOULDERS
	Fine	Medium	Coarse	Fine	Coarse		

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

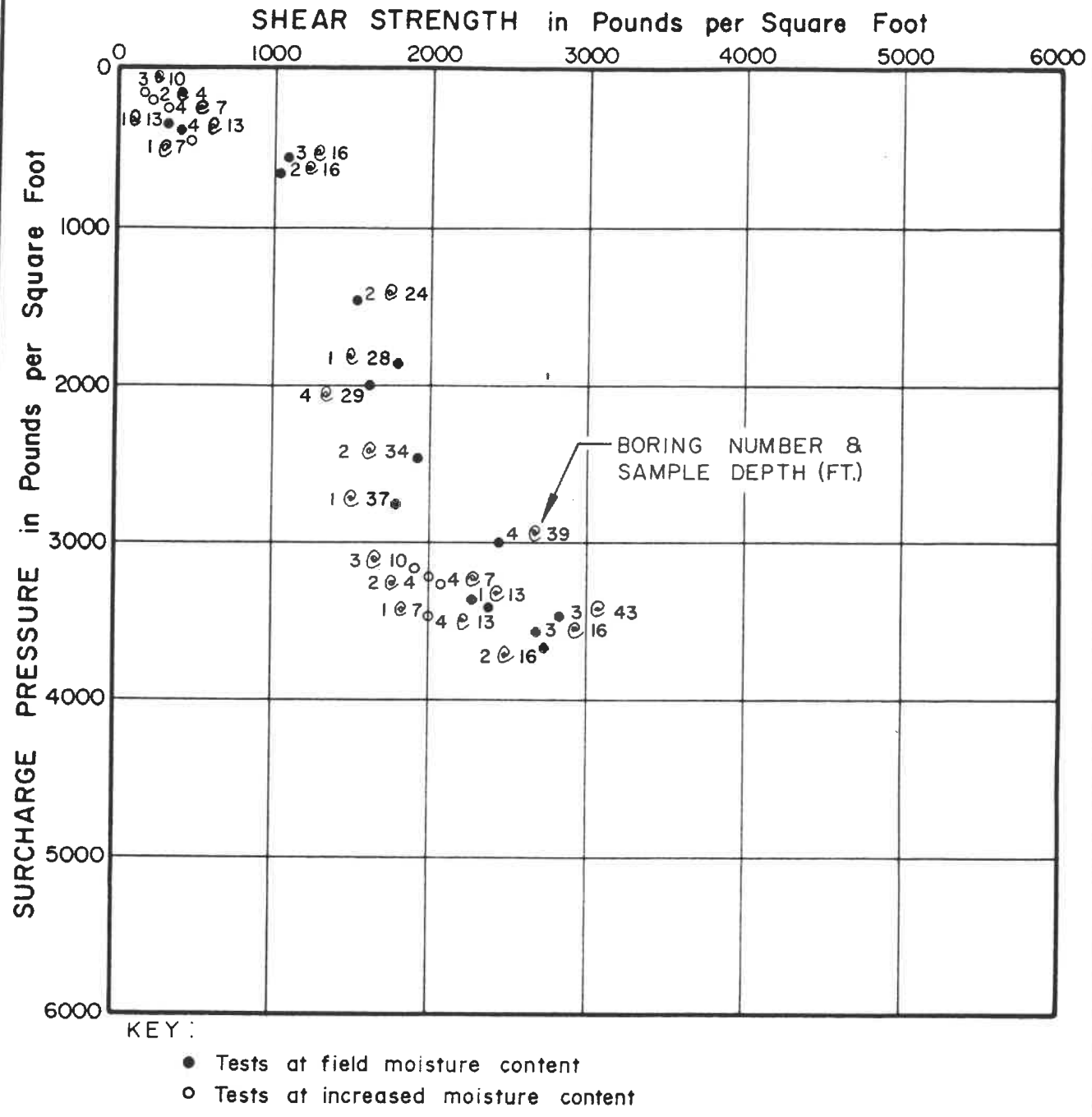
U. S. STANDARD SIEVE SIZE

UNIFIED SOIL CLASSIFICATION SYSTEM

Reference:
The Unified Soil Classification System, Corps of Engineers, U.S. Army Technical Memorandum No. 3-357, Vol. 1, March, 1953 (Revised April, 1960)

LeROY CRANDALL AND ASSOCIATES

PLATE A - 2

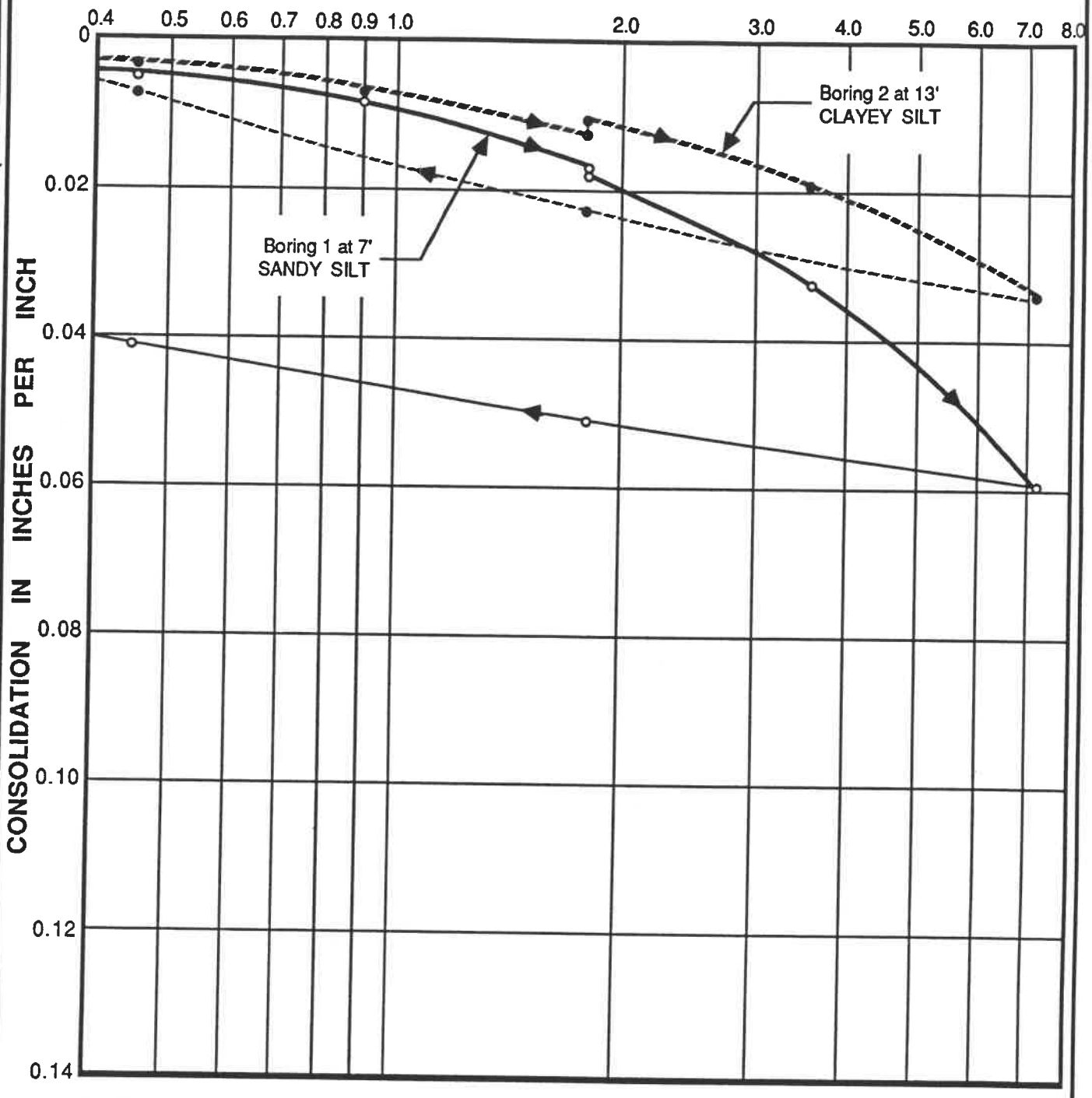


DIRECT SHEAR TEST DATA

LEROY CRANDALL & ASSOCIATES

PLATE A-3

JOB AEF- 88292 DATE 8/24/88 DR. Ip W.P. Ip O.E. MS CHKD



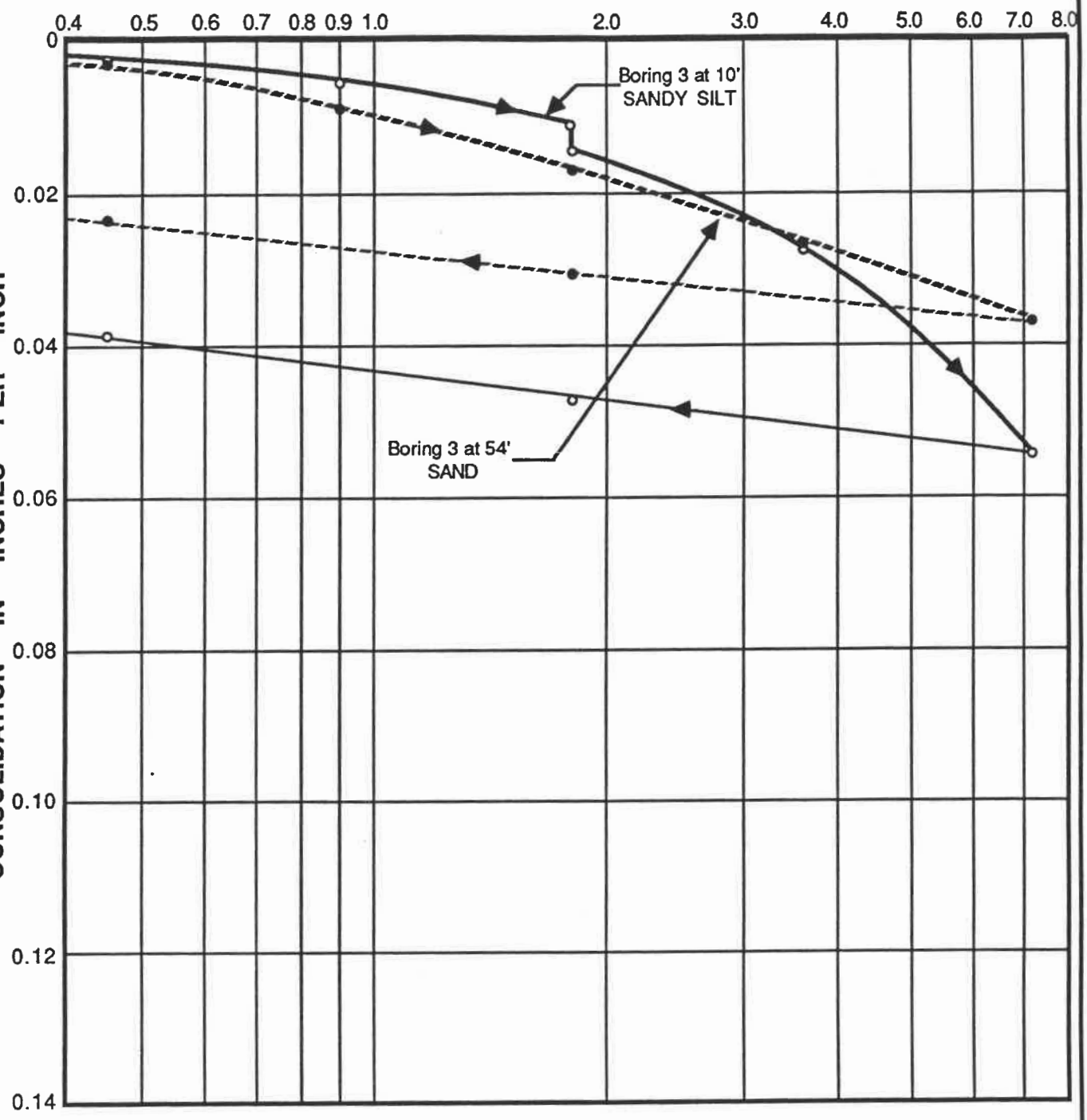
NOTE: Water added to samples after consolidation under a load of 1.8 kips per square foot.

CONSOLIDATION TEST DATA

LeROY CRANDALL AND ASSOCIATES

PLATE A - 4.1

JOB AEF-88292 DATE 8/24/88 DR. lp W.P. lp O.E. MS CHKD

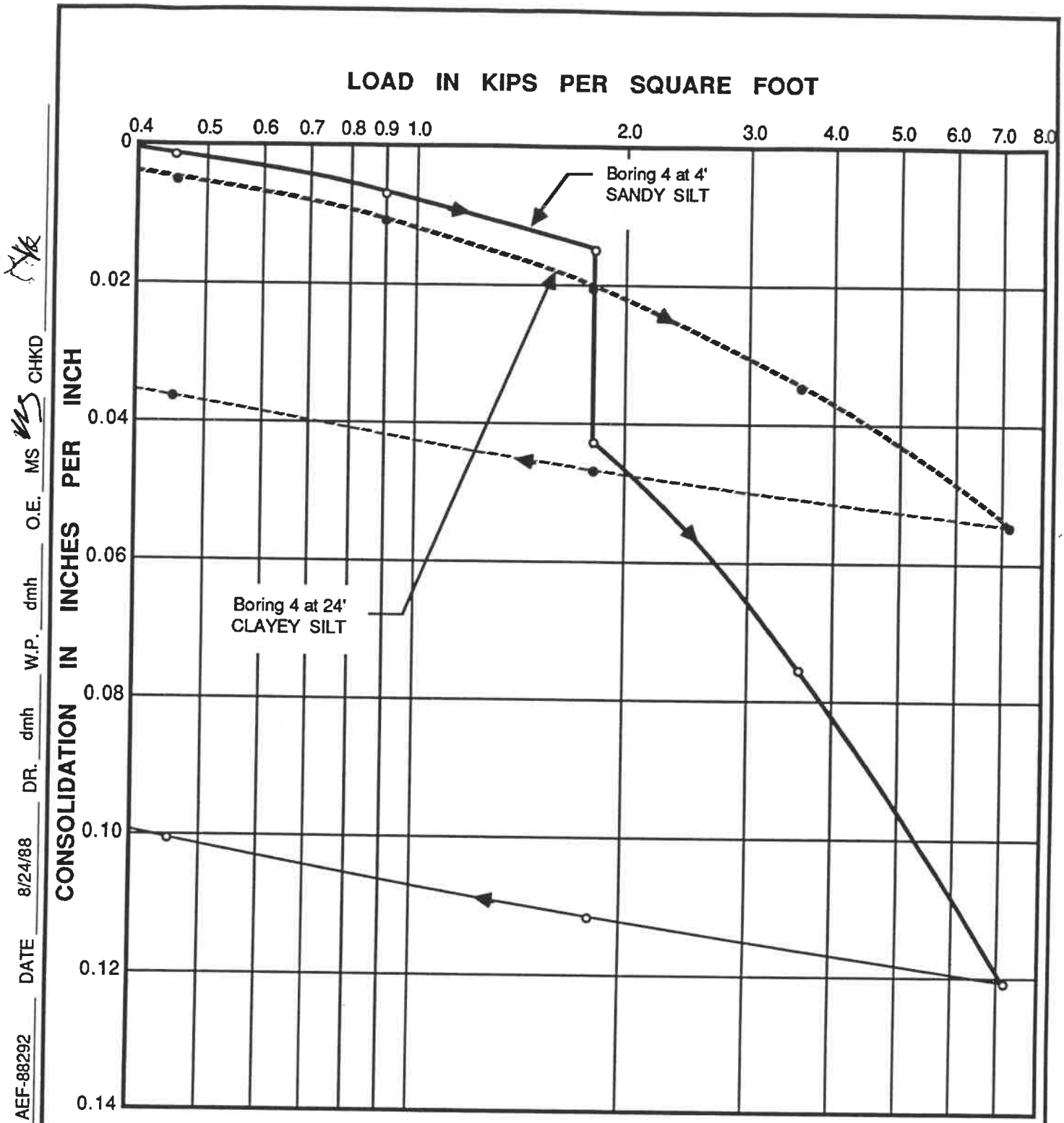


NOTE: Water added to sample from 10' after consolidation under a load of 1.8 kips per square foot. The other sample tested at field moisture content.

CONSOLIDATION TEST DATA

LeROY CRANDALL AND ASSOCIATES

PLATE A - 4.2



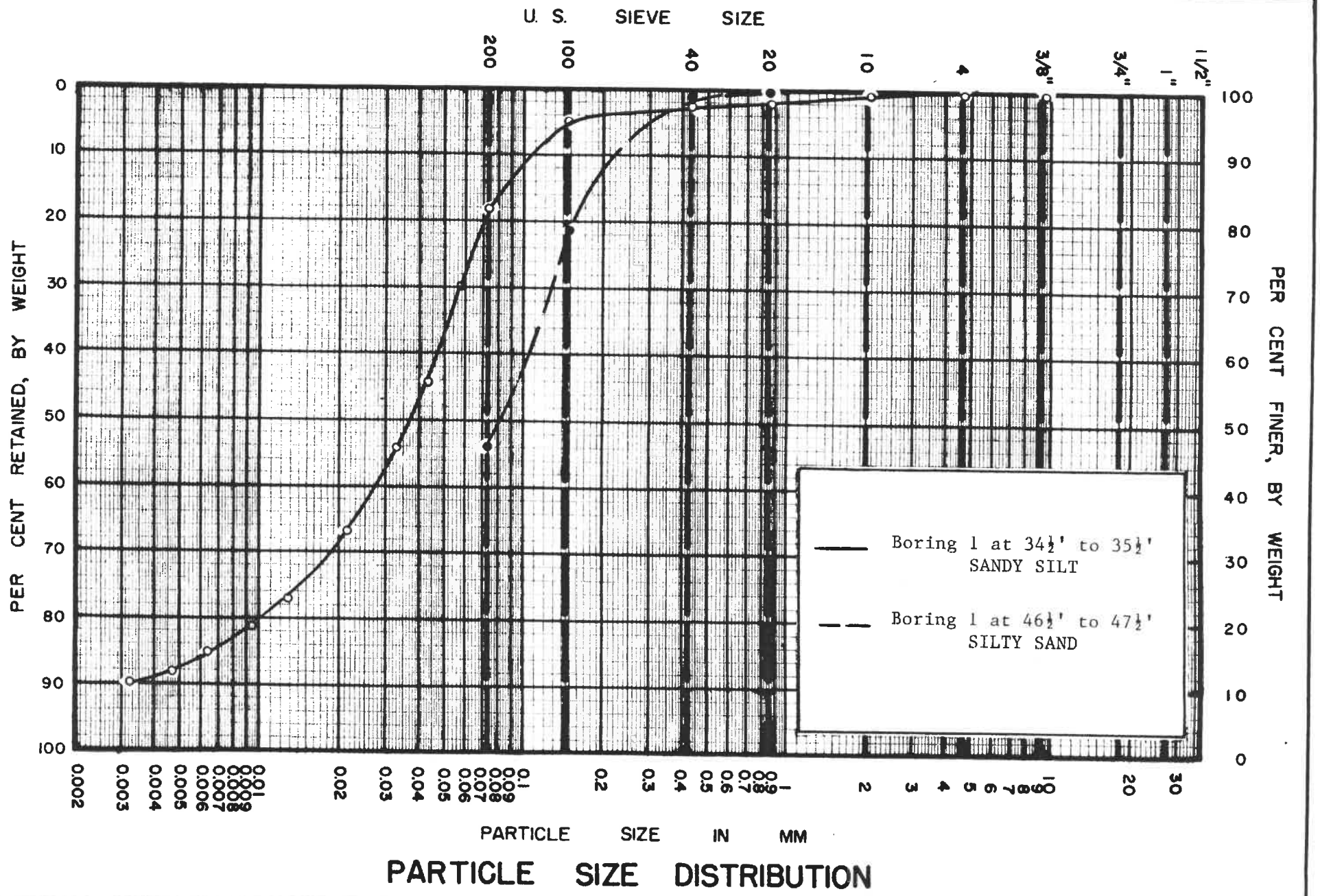
NOTE: Water added to sample from 4' after consolidation under a load of 1.8 kips per square foot. The other sample tested at field moisture content.

JOB AEF-88292 DATE 8/24/88 DR. dmh W.P. dmh O.E. MS CHKD

CONSOLIDATION TEST DATA

LeROY CRANDALL AND ASSOCIATES

PLATE A - 4.3



PARTICLE SIZE DISTRIBUTION

LEROY CRANDALL AND ASSOCIATES

PLATE A-C 1

4 May 1988
A881250

The Hewson Company
10100 Santa Monica Boulevard
Los Angeles, California 90067

ATTENTION: Mr. Bob Ebbert

SUBJECT: PRELIMINARY LABORATORY ANALYTICAL RESULTS FOR THE HEWSON SOUTHBAY OFFICE PARK

Dear Bob:

This letter presents the preliminary laboratory results of soil samples collected from a portion of the Southbay Office Park (site) in Long Beach, California. The analytical results are preliminary and have been reported to us as a verbal basis; therefore, the conclusions presented in this letter are preliminary in nature. Finalized conclusions will be presented in a future report.

Petroleum hydrocarbons and volatile organic compounds were not reported to be present in a surficial soil sample collected from the area observed to have dead vegetation as reported in the toxic hazard assessment prepared by Applied Geosciences Inc. These samples were analyzed in general accordance with Environmental Protection Agency (EPA) Method No.s 8015 and 8240 respectively.

Low concentrations of the chlorinated pesticides DDT and DDE were reported in three of four surficial soil samples collected at the site and analyzed in general accordance with EPA Method No. 8080. DDT concentrations were reported to range from 0.011 milligrams per kilogram (mg/kg; approximately equivalent to parts per million (ppm)) to 0.60 mg/kg. DDE concentrations were reported to range from 0.12 mg/kg to 0.40 mg/kg. The fourth surficial soil sample was not reported to contain chlorinated pesticides in concentrations greater than the detection limits for the analytical method used. The reported concentrations are below the Total Threshold Limit Concentration (TTLC) for the compounds reported. Because clean-up levels for soil do not currently exist, the TTLC is a level commonly used to judge whether a material is hazardous, and whether remediation may be warranted.

Based on the data presented above, it is our preliminary judgment that residual concentrations of DDT and DDE are present in the surficial soils at the site, but that soil mitigation would not be required under current regulatory guidelines.

If you have any questions concerning the material presented in this letter, feel free to contact me at your convenience. We can be reached at either (714) 838-8545 or (408) 452-0262.

Very truly yours,
APPLIED GEOSCIENCES INC.

John N Rapue for Mark Cousineau

Mark S. Cousineau, R.E.A.
Sr. Project Manager

Don Bransford
Staff Hydrogeologist