GEOTECHNICAL INVESTIGATION
PROPOSED WAL★MART STORE #95094
NWC MOUNTAIN AVENUE AND FIFTH STREET
ONTARIO, CALIFORNIA

Prepared for:
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Project No. 1974.I

July 22, 2004

TABLE OF CONTENTS

LIST OF FIGURES

1.0 INTRODUCTION

1.1 GENERAL

This report presents the results of a geotechnical investigation performed by Geotechnical Professionals Inc. (GPI) for the proposed Wal-Mart store in Ontario, California. The project site consists of over 15± acres near the northwest corner of Mountain Avenue and 5th Street. The geographical site location is shown on Figure 1, Site Location Map.

1.2 PROJECT DESCRIPTION

Based on a site plan by Hall & Foreman dated April 27, 2004, the proposed project will consist of an approximately 172,300± square foot Wal-Mart building with a potential 50,871 square foot expansion. Associated parking and landscaping are also planned. The planned site layout is shown on Figure 2, Site Plan.

Based on information provided by Wal-Mart (Wal-Mart Criteria dated January 2004), the Wal-Mart building will be constructed of masonry block walls with steel interior columns. We anticipate maximum column and wall loads on the order of 150 kips and 6 kips per lineal foot, respectively. Floor loads will range from 125 pounds per square foot. Maximum concentrated floor loads will be 5 kips. Retaining and screen walls up to 6 feet in height are planned along the northern and western site limits. Main Street will be extended into the northeast portion of the parking lot.

An existing store building is in place and extends across the majority of the planned Wal-Mart building pad. The building will be demolished as part of the development. It is also planned to demolish a former "Toys 'R' Us" store building located in the planned Wal-Mart parking area. The existing service station and Hollywood Video store building will remain.

The proposed site grades are not anticipated to change significantly from the existing grades. The finished floor level for the Wal-Mart store is planned to be at Elevation 1124. We anticipate that cuts and fills of up to about 2 feet will be required to develop the site. We should be provided with a copy of the grading plans when available to review the recommendations contained herein.

Our recommendations are based upon the above structural and assumed grading information. We should be notified if the actual loads and/or grades change significantly during the project design to either confirm or modify our recommendations.

1.3 PURPOSE OF INVESTIGATION

The primary purpose of this investigation and report is to provide an evaluation of the existing geotechnical conditions at the site as they relate to the design and construction of the proposed development. More specifically, this investigation was aimed at providing geotechnical recommendations for earthwork, and design of foundations and pavements.

2.0 SCOPE OF WORK

Our scope of work for this investigation consisted of field exploration, laboratory testing, engineering analysis, and the preparation of this report.

The field exploration consisted of 23 Cone Penetration Tests (CPT's) and 23 exploratory borings. The locations of the subsurface explorations are shown on Figure 2. The CPT's were advanced to depths ranging from 5 to 17 feet below existing site grades. Several of the CPT's were terminated prior to the planned depths because of refusal in the dense conditions. Detailed logs of the CPT's and a summary of the equipment used are presented in Appendix A. The exploratory borings were drilled using truck-mounted hollow-stem auger drilling equipment to depths ranging from 8 to 20 feet below existing site grades. Details of the drilling and Logs of Borings are presented in Appendix B.

Because of the existing building within the footprint of the planned Wal-Mart, we were not able to complete the number of explorations required in the building pad. As such, we recommend additional explorations be performed after demolition of the existing store buildings to confirm the recommendations presented herein.

Laboratory soil tests were performed on selected representative samples as an aid in soil classification and to evaluate the engineering properties of the soils. The geotechnical laboratory testing included determinations of moisture content and dry density, gradation, shear strength (direct shear), compressibility (collapse), compaction, soil corrosivity, and R-value. Laboratory testing procedures and results are summarized in Appendix C.

GMU Inc. performed R-value testing and M. J. Schiff and Associates performed soil corrosivity testing under subcontract to GPI. Their test results are presented in Appendix C.

The Wal-Mart Foundation Design Criteria, Geotechnical Investigation Fact Sheet, and Foundation Subsurface Preparation forms are included in Appendix D.

Engineering evaluations were performed to provide earthwork criteria, foundation and slab design parameters, preliminary pavement sections and assessments of seismic hazards. The results of our evaluations are presented in the remainder of the report.

3.0 SITE CONDITIONS

3.1 SURFACE CONDITIONS

The project site is bounded by Mountain Avenue to the east, 5th Street to the south, and existing developments to the north and west.

The site is comprised of about 15± acres and is currently a predominantly vacant retail center. The ground surface across the site slopes down to the south, with a change in grade of about 15 feet. The most significant grade change occurs in the northeastern portion of the site. The asphalt pavement sections at our boring locations consisted of about 3 to 9 inches of asphalt concrete with average depths of about 4 to 5 inches. Evidence of a pavement overlay, including the use of a pavement geofabric, was observed in some borings. The pavement was in generally fair condition.

3.2 SUBSURFACE SOILS

Our field investigation disclosed a subsurface profile consisting of natural soils. Undocumented fill soils were not encountered, although fills may be in-place between our exploration locations. Detailed descriptions of the subsurface conditions encountered in our explorations are provided in Appendixes A and B. A brief summary of the subsurface conditions is provided below.

The natural soils encountered in our explorations consist of predominantly of dry to moist, loose to dense silty sands, sands with silts, and sands to the depth explored. Varying amounts of gravel and cobbles (up to about 4 inches in diameter) were encountered. Because of the small diameter of the drilling equipment (8 inches), localized cobbles larger than 4 inches in diameter may be encountered on-site. The consistency of natural soils is highly variable with depth, with dense materials being immediately underlain by loose soils. The natural soils exhibit low compressibility and moderate to high strength characteristics. The expansion potential of the upper fills and natural soils encountered is considered to be very low. The hydro-collapse potential of the upper soils is low to moderate.

3.3 GROUNDWATER AND CAVING

Groundwater or caving was not encountered in our borings within the maximum depth explored. Caving was not measured during drilling because relatively small diameter hollow-stem auger drilling equipment was used. Caving in the dry, loose sands would likely have occurred if larger diameter equipment was used.

4.0 CONCLUSIONS AND RECOMMENDATIONS

4.1 GENERAL

Based on the results of our investigation, it is our opinion that from a geotechnical viewpoint it is feasible to develop the site as proposed. The proposed structures can be supported on shallow foundations with remedial grading to mitigate the geotechnical constraints discussed below. The most significant geotechnical issues that will affect the design and construction of the proposed structures are as follows:

- The natural soils encountered in the upper 10 feet were variable in both moisture content and consistency. The loose in-place soils have a moderate hydro-collapse potential. To provide uniform support for the planned building, we recommend that a portion of these materials be removed and replaced as properly compacted fill. The exposed subgrade after removals should be densified in place using vibratory compaction equipment. Partial removals in pavement areas are also recommended. The details are discussed in the "Earthwork" section of this report.

- The dry, granular soils at the site are susceptible to caving. Even relatively shallow vertical cuts into the dry, loose sandy deposits will experience caving. Significant moisture conditioning (wetting) will be necessary to achieve the required degree of compaction and facilitate excavations.

Our recommendations related to the geotechnical aspects of the development of the site are presented in the subsequent sections of this report.

4.2 SEISMIC CONSIDERATIONS

4.2.1 General

The site is located in a seismically active area, typical of Southern California, and is likely to be subjected to strong ground shaking due to earthquakes on nearby faults.

We assume the seismic design of the proposed development will be in accordance with UBC/CBC criteria. The site is located within Seismic Zone No. 4. For the 1997 UBC/2001 CBC, a soil profile S_C may be used. The site is approximately 3.7 kilometers from a Type B Seismic Source and 6.5 kilometers from a Type A Seismic Source. Therefore, the near-source factors from UBC/CBC Tables 16-S and 16-T are:

$$Na = 1.15 \quad \text{and} \quad Nv = 1.5$$

The Project Structural Engineer should determine the actual method of seismic design.

4.2.2 Strong Ground Motion Potential

Based on published information (Reference 1), the most significant faults in the proximity of the site are the San Jose and Cucamonga faults, which are located about 3.7 and 6.5 kilometers from the site, respectively. Based on our probabilistic ground motion analyses, the site could be subjected to a peak ground acceleration on the order of 0.62g. This acceleration has a 10 percent chance of being exceeded in 50 years.

4.2.3 Potential for Ground Rupture

The site is not located within an Alquist-Priolo Earthquake Fault Zone and there are no known faults crossings or projecting toward the site. Therefore, ground rupture due to faulting is considered unlikely at the site.

4.2.4 Liquefaction

Soil liquefaction is a phenomenon in which saturated cohesionless soils undergo a temporary loss of strength during severe ground shaking and acquire a degree of mobility sufficient to permit ground deformation. In extreme cases, the soil particles can become suspended in groundwater, resulting in the soil deposit becoming mobile and fluid-like. Liquefaction is generally considered to occur primarily in loose to medium dense deposits of saturated soils. Thus, three conditions are required for liquefaction to occur: (1) a cohesionless soil of loose to medium density; (2) a saturated condition; and (3) rapid large strain, cyclic loading, normally provided by earthquake motions.

Soil liquefaction is not likely to occur at this site primarily because existing groundwater level is very deep and the granular soils below depths of about 10 feet are predominantly dense to very dense.

4.2.5 Seismic Ground Subsidence

Seismic ground subsidence, not related to liquefaction, occurs when loose, sandy soils (above the groundwater) are densified during strong earthquake shaking. Significant subsidence during a strong earthquake is not expected to occur because the on-site sandy soils are predominantly dense to very dense.

4.3 EARTHWORK

The earthwork anticipated at the project site will consist of clearing and grubbing, excavation of loose soils, subgrade preparation, and placement and compaction of fill.

4.3.1 Clearing and Grubbing

Prior to grading, the areas to be developed should be cleared of all debris and pavements. Buried obstructions, such as utilities and tree roots, located within the proposed building areas should be removed. Deleterious materials generated during the clearing operations should be removed from the site. Inert demolition debris, such as concrete and asphalt, may be crushed for reuse in engineered fills outside the planned building areas in accordance with the criteria presented in the "Materials for Fill" section of this report.

Although not encountered during our investigation, cesspools or septic systems encountered during construction should be removed in their entirety. The resulting excavation should be backfilled as recommended in the "Subgrade Preparation" and "Placement and Compaction of Fill" sections of this report. As an alternative, cesspools can be cleaned of any contents and backfilled with a lean sand-cement slurry. At the conclusion of the clearing operation, a GPI representative should observe and accept the site prior to any further grading.

4.3.2 Excavations

Excavations at the site will include removal of loose natural soils and any undocumented fills, footing excavations, and trenching for utility lines.

Prior to placement of fills or construction of buildings, the upper loose natural soils and any existing undocumented fills within the proposed building pad (including the building, canopies, loading dock retaining walls, and other foundation supported improvements) should be removed and replaced as properly compacted fill, where not removed by cut. These materials require densification to provide adequate support of foundations and slab-on-grade floors. For planning purposes, we recommend that removals in the Wal-Mart building area extend to a depth of 6 feet below existing grades or 2 feet below the base of the planned footings, whichever is deeper. After the removals are performed, in-place densification of the subgrade using a heavy vibratory roller is recommended, as discussed under "Subgrade Preparation". The actual depths of removal should be determined in the field by the Geotechnical Engineer during grading. Existing grade refers to elevations at locations of explorations. The actual depths of removals will need to be determined during grading in the field by a representative of GPI.

The base of removals should extend laterally beyond the building line or perimeter footings a minimum distance of 10 feet. The contractor should obtain adequate survey control during the earthwork so that the Project Surveyor can confirm the lateral and vertical extent of the recommended removals. This is particularly important at building

corners and foundation supported improvements adjacent to the building proper such as canopies and loading dock walls.

Where not removed by cut, the subgrade soils in proposed pavement areas should be scarified, moisture conditioned, and compacted with a vibratory roller to achieve proper compaction to a depth of 2 feet.

Where not removed by the aforementioned excavations, existing utility trench backfill within building areas should be removed and replaced as properly compacted fill. This is especially important for deeper fills associated with existing sewers and storm drains. For planning purposes, removals over the utilities should extend to within 1 foot of the top of the pipe. For utilities that are 5 feet or shallower, the removal should extend laterally 1 foot beyond both sides of the pipe. For deeper utilities, the removals should include a zone defined by a 1:1 projection upward (and away from the pipe) from each side of the pipe. The actual limits of removal will be confirmed in the field. We recommend that all known utilities be shown on the grading plan.

Excavations in compacted fill or dense natural soils may be cut up to 4 feet vertically. In undocumented fill and the upper dry granular soils, even shallow vertical excavations may cave and will need to be shored or sloped back to an inclination if 1:1 or flatter. Excavations between 4 and 12 feet deep should be shored or sloped back to 1:1 or flatter. A flatter inclination should be used if it is desired to reduce the potential for caving and raveling. Surcharge loads should not be permitted within a horizontal distance equal to the height of cut from the top of the excavation or 5 feet from the top of the slopes, whichever is greater, unless the cut is properly shored. Excavations that extend below an imaginary plane, inclined at 45 degrees below the edge of an adjacent existing site facility should be properly shored to maintain support of adjacent elements. All excavations and shoring systems should meet the minimum requirements given in the most current State of California Occupational Safety and Health Standards.

4.3.3 Subgrade Preparation

After completion of the removals recommended for the building pad and to prepare the subgrade in pavement and hardscape areas, the exposed subgrade should be scarified to a depth of at least 12 inches, moisture-conditioned (wetted), and compacted to at least 95 percent of maximum dry density to a depth of at least 2 feet using a vibratory roller (minimum 40,000 pounds dynamic force). We recommend a minimum of six passes with the roller. The purpose of the vibratory roller is to density localized loose soils left in-place after the overexcavation. Moistening can usually be accomplished by deep ripping and liberal watering.

4.3.4 Material for Fill

The on-site soils are, in general, suitable for use as compacted fill and retaining wall backfill. Retaining wall backfill should consist of on-site or imported granular soils as defined below.

Imported and select fill material should be predominately granular (contain no more than 40 percent fines - portion passing No. 200 sieve) and non-expansive (Expansion Index of 20 or less). If placed in pavement areas, the import fill should have an R-value of at least 50. The Geotechnical Engineer should be provided with a sample (at least 50 pounds) and notified of the location of any soils proposed for import at least 72 hours in advance. Each proposed import source should be sampled, tested and accepted for use prior to delivery of the soils to the site. Soils imported prior to acceptance by the Geotechnical Engineer may be rejected if not suitable.

Soils used in compacted fills should be free of debris and should not contain material larger than 6 inches in any dimension. Soils placed within 2 feet of the finished grade in building pad areas should not contain any particles larger than 2 inches in size. Wal-Mart has additional requirements for the Wal-Mart store related to the size of rock as indicated in the project specifications.

From a geotechnical engineering standpoint, on-site asphalt concrete or portland cement concrete can be incorporated into fills outside the building areas provided it is ground or crushed to the consistency of aggregate base. The use of these materials under buildings should be permitted only with the approval of the owner and regulatory agency.

4.3.5 Placement and Compaction of Fills

All fill soils should be placed in horizontal lifts, moisture-conditioned, and mechanically compacted to at least 95 percent (under the Wal-Mart and the upper 12 inches of the pavement areas) or 90 percent (greater than 12 inches below the finished pavement subgrade) of maximum dry density in accordance with ASTM D-1557. The optimum lift thickness will depend on the compaction equipment used and can best be determined in the field. The following uncompacted lift thickness can be used as preliminary guidelines.

Plate compactors	4-6 inches
Small vibratory or static rollers (5-ton±)	6-8 inches
Scrapers, heavy loaders, and heavy vibratory rollers	8-12 inches

The maximum lift thickness should not be greater than 12 inches.

The moisture content of the fill materials should be within two percent over optimum to readily achieve the required degree of compaction. The moisture content of the existing near-surface soils is, in general, below optimum moisture content and will require moistening prior to compaction.

During backfill of excavations, the fill should be properly benched into the construction slopes as it is placed in lifts.

If encountered, disposal of oversize materials (greater than 6 inches in diameter) should be confined to pavement areas. The particles should be covered with at least 1-foot of compacted fill below pavement subgrade and be placed in areas that will not conflict with buried utilities. The oversize particles should be mixed with at least 3 parts sandy soils, containing particles no greater than 3 inches in greatest dimension. After mixing and placement, a lift no thicker than the largest particle should be compacted with a heavy vibratory roller. Compaction should be performed to at least 95 percent of maximum density.

4.3.6 Shrinkage and Subsidence

Shrinkage is the loss of soil volume caused by compaction of fills to a higher density than before grading. Subsidence is the settlement of in-place subgrade soils caused by loads generated by large earthmoving equipment. For earthwork volume estimating purposes, an average shrinkage value of 10 to 15 percent and subsidence of 0.1 feet (0.2 feet when using a vibratory roller) may be assumed for the surficial soils. It should be realized that the on-site soils exhibit variable densities, making shrinkage factors difficult to determine. These values are estimates only and exclude losses due to removal of vegetation or debris. Actual shrinkage and subsidence will depend on the types of earthmoving equipment used and should be determined during grading.

4.3.7 Trench/Wall Backfill

Utility trench backfill, consisting of the on-site sandy soils, should be mechanically compacted in lifts. Bedding should be provided to protect the pipe in accordance with the pipe manufacture's instructions. Wall backfill should consist of non-expansive granular soils. The lift thickness should not exceed those values given in the "Compacted Fill" section of this report. Jetting or flooding of wall and trench backfill materials should not be permitted. The Geotechnical Engineer should observe and test all trench and wall backfills as they are placed.

In backfill areas where mechanical compaction of soil backfill is impractical due to space constraints, sand-cement slurry may be substituted for compacted backfill. The slurry should contain one sack of cement per cubic yard and have a maximum slump of 5 inches. When set, such a mix typically has the consistency of compacted soil. When used beneath foundations, the slurry should contain two sacks of cement per cubic yard.

4.3.8 Observation and Testing

A representative of GPI should observe all excavations, subgrade preparation, and fill placement activities. Sufficient in-place field density tests should be performed during fill placement to evaluate the overall compaction of the soils. Soils that do not meet minimum compaction requirements should be reworked and tested prior to placement of any additional fill.

4.4 FOUNDATIONS

4.4.1 Foundation Type

The proposed structures may be supported on conventional isolated and/or continuous shallow spread footings, provided the subsurface soils are prepared in accordance with the recommendations given in this report. All footings should be supported by properly compacted fill.

4.4.2 Allowable Bearing Pressures

Based on the shear strength and elastic settlement characteristics of the undisturbed and recompacted on-site soils, a static allowable net bearing pressure of up to 3,500 pounds per square foot (psf) may be used for both continuous footings and isolated column footings. These bearing pressures are for dead-plus-live loads, and may be increased by one-third for short-term, transient, wind and seismic loading. The actual bearing pressure used may be less, and can be based on economics and structural loads to determine the minimum width and depth of footings as discussed below. The maximum edge pressures induced by eccentric loading or overturning moments should not be allowed to exceed these recommended values.

4.4.3 Minimum Footing Widths and Embedments

The following minimum footing widths and embedments are recommended for the corresponding allowable bearing pressure.

STATIC BEARING PRESSURE (psf)	MINIMUM FOOTING WIDTH (inches)	MINIMUM FOOTING* EMBEDMENT (inches)
3,500	24	24
3,000	18	24
2,500	18	18
1,500	15	15

* Refers to minimum depth below lowest adjacent grade.

A minimum footing width of 15 inches should be used even if the actual bearing pressure is less than 1,500 psf.

4.4.4 Estimated Settlements

Maximum total settlement of the more heavily loaded column footings (150 kips) is expected to be less than 1-inch. Settlement of the more heavily loaded wall footings (6 kips per lineal foot) is expected to be about ½-inch. Maximum differential settlements are expected to be about ¼-inch between similarly loaded adjacent footings or along a 40-foot span of a continuous footing. The majority of the settlement will occur immediately upon load application.

The above estimates are based on the assumption that the recommended earthwork will be performed and that the footings will be sized in accordance with our recommendations.

4.4.5 Lateral Load Resistance

Soil resistance to lateral loads will be provided by a combination of frictional resistance between the bottom of footings and underlying soils and by passive soil pressures acting against the embedded sides of the footings. For frictional resistance, a coefficient of friction of 0.40 may be used for design. In addition, an allowable lateral bearing pressure equal to an equivalent fluid weight of 300 pounds per cubic foot may be used, provided the footings are poured tight against compacted fill soils. These values may be used in combination without reduction.

4.4.6 Foundation Concrete

Laboratory testing by M.J. Schiff and Associates (Appendix C) indicates soluble sulfate contents of 45 mg/kg (0.0045 percent by weight). Foundation concrete should conform to the requirements outlined in Table 19-A-4 of the UBC (Table 19-A-A-4 of CBC) for negligible levels of soluble sulfate exposure for soil.

4.4.7 Footing Excavation Observation

Prior to placement of concrete and steel, the Geotechnical Engineer should observe and approve all footing excavations.

4.5 BUILDING FLOOR SLABS

Slab-on-grade floors should be supported on granular, non-expansive soils compacted as discussed in the "Placement and Compaction of Fill" section. We understand that the floor surface of the Wal-Mart will be exposed concrete.

In accordance with Wal-Mart requirements, building floor slabs should be underlain by a 4-inch thick layer of coarse aggregate base, a 10-mil visqueen moisture vapor retarder, and 2 inches of fine aggregate base. The coarse aggregate base layer should consist of material that meets the requirements for Size No. 67 as outlined in ASTM D448-03 (90 to 100 percent passing ¾-inch sieve, 20 to 55 percent passing 3/8-inch sieve, and 0-10 percent passing the No. 4 sieve). The visqueen should be placed between the

coarse- and fine-aggregate. The fine aggregate base should meet the requirements for Size No. 10 as outlined in ASTM D448-03 (85 to 100 percent passing the No. 4 sieve) with an additional requirement of having between 6 and 12 percent passing the No. 200 sieve.

If a moisture-sensitive floor covering is planned, we recommend that the floor manufacturer be contacted regarding specific moisture vapor mitigation measures, such as water-cement ratios of the concrete used and curing methods and durations.

Based on maximum slab loads of 125 pounds per square foot for the Wal-Mart, both total and differential (over distance of 40 feet) settlement of the slab is expected to be less than ¼ of an inch. The estimates are based on the assumption that the recommended earthwork will be performed.

For elastic design of slabs supporting sustained concentrated loads, a modulus of subgrade reaction (k) of 200 pounds per cubic inch (pounds per square inch per inch of deflection) may be used.

A coefficient of friction of 0.40 may be used between the slab and subgrade soils. Where a vapor/moisture barrier (visqueen) is provided, the friction value should be reduced to 0.1.

4.6 LATERAL EARTH PRESSURES

Based on information available to us at the time this report was prepared, a retaining wall will be required along the northern and western property lines. The following recommendations are provided for retaining walls less than 6 feet in height. We recommend that all walls be backfilled with on-site or imported granular soils.

Active earth pressures can be used for designing walls that can yield at least ½ inch laterally in 10 feet of wall height under the imposed loads. For level backfill comprised of properly drained, on-site or imported sandy soils, the magnitude of active pressures is equivalent to the pressures imposed by a fluid weighing 35 pounds per cubic foot (pcf). For 2:1 (horizontal:vertical) backfill, a value of 50 pcf should be used. The Structural Engineer should indicate on the plans the type of backfill recommended above.

At-rest pressures should be used for restrained walls that remain rigid enough to be essentially non-yielding. At-rest pressures for the on-site or imported sandy soils are equivalent to the pressures imposed by a fluid weighing 50 pounds per cubic foot.

Walls subject to surcharge loads should be designed for an additional uniform lateral pressure equal to one-third and one-half the anticipated surcharge pressure for unrestrained and restrained walls, respectively. The wall backfill should be well-drained to relieve possible hydrostatic pressure or designed to withstand these pressures. Wall footings should be designed as discussed in the "Foundations" section.

4.7 CORROSIVITY

Resistivity testing (Appendix C) of a representative sample of the on-site soils indicates that they are mildly corrosive to ferrous metals. GPI does not practice corrosion engineering. Should the use of buried metal pipe be proposed, a corrosion engineer such as M.J. Schiff and Associates should be consulted.

4.8 DRAINAGE

Positive surface gradients should be provided adjacent to all structures so as to direct surface water run-off and roof drainage away from foundations and slabs and toward suitable discharge facilities. Long-term ponding of surface water should not be allowed on pavements or adjacent to buildings.

4.9 EXTERIOR CONCRETE AND MASONRY FLATWORK

Exterior concrete and masonry flatwork should be supported on non-expansive, compacted fill. Prior to placement of concrete, the subgrade should be prepared as recommended in "Subgrade Preparation". The use of clayey soils in the slab subgrade should not be permitted within 1 foot of the finished subgrade.

4.10 SLOPES

Slopes greater than 6 feet in height are not planned for the project. Permanent cut and fill slopes should be constructed at an inclination of 2:1 (horizontal:vertical) or flatter. Fill slopes should include a key of at least 3 feet deep and equipment width wide. The fill slopes should be overfilled and trimmed back to a hard surface. Slopes should be planted as soon as possible and erosion control measures should be implemented as required by the controlling governing agencies.

4.11 PAVED AREAS

R-value testing indicates that the subgrade soils have an R-value of greater than 50 (Appendix C). Preliminary pavement design has been based on an R-Value of 50. The California Division of Highways Design Method was used for design of the recommended preliminary pavement sections. These recommendations are based on the assumption that the pavement subgrades will consist of on-site materials. The traffic indices were estimated using traffic data provided by Wal-Mart. Final pavement design should be based on R-value testing performed near the conclusion of rough grading. The following pavement sections are recommended for planning purposes only.

PAVEMENT AREA	TRAFFIC INDEX	SECTION THICKNESS (inches)	
		ASPHALTIC CONCRETE	AGGREGATE BASE COURSE
Standard Duty (Wal-Mart)	7.0	3.0	7.0
Heavy Duty (Wal-Mart)	8.0	3.5	9.0
		Portland Cement Concrete	**Aggregate Base Course**
Standard Duty (Wal-Mart)	7.0	7.0	---
Heavy Duty (Wal-Mart)	8.0	7.0	---

Although the existing pavement is currently in fair condition, the thicknesses of the asphalt concrete do not meet the required sections outlined above. If desired, the current pavement section could be overlaid to meet the Wal-Mart requirements. We can provide recommendations for overlays if it is desired to maintain the existing parking lot grades and reuse the existing pavement.

Pavements subject to traffic from multiple users (i.e., a common truck driveway) should be designed for higher levels of traffic.

The pavement subgrade underlying the aggregate base should be properly prepared and compacted in accordance with the recommendations outlined under "Subgrade Preparation".

The pavement base course should be compacted to at least 95 percent of maximum dry density (ASTM D-1557). Aggregate base should conform to the requirements of Section 26 of the California Department of Transportation Standard Specifications for Class II aggregate base (three-quarter inch maximum) or Section 200-2 of the Standard Specifications for Public Works Construction (Green Book) for untreated base materials (except for processed miscellaneous base).

The portland cement concrete should have a modulus of rupture of at least 550 psi (equivalent to an approximate compressive strength of 3,700 psi at the time the pavement is subjected to traffic. The upper 12 inches of the subgrade soils should be compacted to at least 95 percent of maximum density (ASTM D-1557) as previously discussed.

The above recommendations are based on the assumption that the base course and compacted subgrade will be properly drained. The design of paved areas should incorporate measures to prevent moisture build-up within the base course that can otherwise lead to premature pavement failure. For example, curbing adjacent to landscaped areas should be deep enough to act as a barrier to infiltration of irrigation water into the adjacent base course.

5.0 LIMITATIONS

The report, exploration logs, and other materials resulting from GPI's efforts were prepared exclusively for use by Hall & Foreman and their consultants in designing the proposed development. The report is not intended to be suitable for reuse on extensions or modifications of the project or for use on any project other than the currently proposed development, as it may not contain sufficient or appropriate information for such uses. If this report or portions of this report are provided to contractors or included in specifications, it should be understood that they are provided for information only.

Soil deposits may vary in type, strength, and many other important properties between points of exploration due to non-uniformity of the geologic formations or to man-made cut and fill operations. While we cannot evaluate the consistency of the properties of materials in areas not explored, the conclusions drawn in this report are based on the assumption that the data obtained in the field and laboratory are reasonably representative of field conditions and are conducive to interpolation and extrapolation.

Furthermore, our recommendations were developed with the assumption that a proper level of field observation and construction review will be provided during grading, excavation, and foundation construction by GPI. If field conditions during construction appear to be different than is indicated in this report, we should be notified immediately so that we may assess the impact of such conditions on our recommendations. If others perform construction phase services, they must accept full responsibility for all geotechnical aspects of the project, including this report.

Our investigation and evaluations were performed using generally accepted engineering approaches and principles available at this time and the degree of care and skill ordinarily exercised under similar circumstances by reputable Geotechnical Engineers practicing in this area. No other representation, either expressed or implied, is included or intended in our report.

Respectfully submitted,
Geotechnical Professionals Inc.

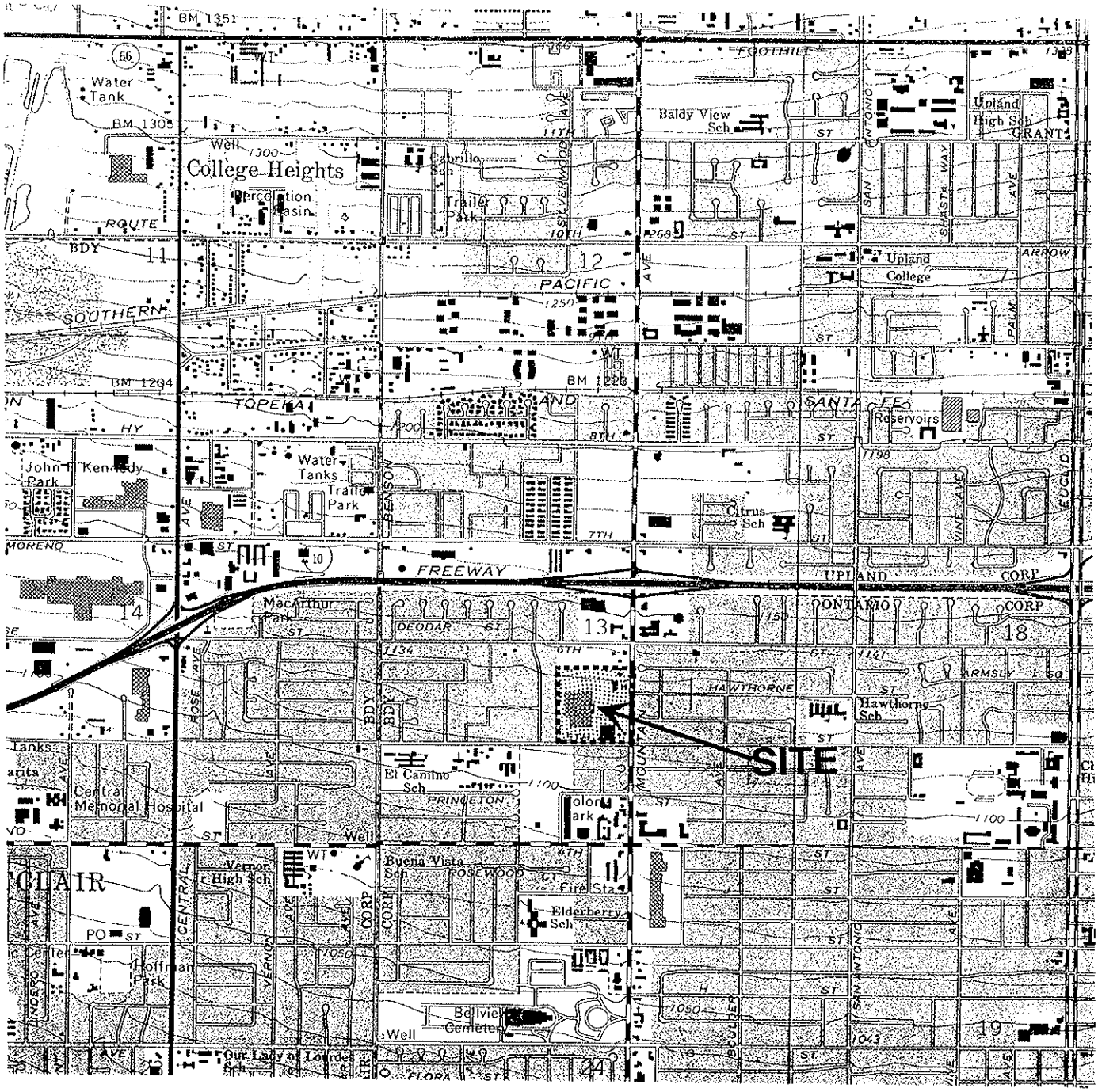
Paul R. Schade, G.E.
Associate

PS:sph

JUL 22 2004

REFERENCE

1. Blake, T.F. (1998), "FRISKSP, A Computer Program for the Probabilistic Estimation of Uniform-Hazard Spectra Using Faults as Earthquake Sources, User's Manual," Version 3.01b.



SITE PLAN REPRODUCED FROM U.S.G.S. TOPOGRAPHIC QUADRANGLE MAP

GPI GEOTECHNICAL PROFESSIONALS, INC.

WAL-MART-ONTARIO

GPI PROJECT NO.: 1974.I | 1" = 2000'

SITE LOCATION MAP

FIGURE 1

PROPOSED RETAINING WALL, MAX=7' HIGH

397.67'

MAIN STREET

R/W

25'-R

B-7 C-7 B-8 C-8 B-9 C-9 B-10 C-10

HOLLYWOOD VIDEO 7,035 SF

PARCEL 2

EXISTING DRIVEWAY TO BE MODIFIED

MODIFY EXISTING DECORATIVE WALL/W NEW CURB RETURNS

B-1 C-1 B-2 C-2 B-3 C-3 B-4 C-4 B-5 C-5 B-6 C-6 B-11 C-11 B-12 C-12 B-13 C-13 B-14 C-14 B-15 C-15 B-16 C-16 B-17 C-17 B-18 C-18 B-19 C-19 B-20 C-20 B-21 C-21 B-22 C-22 B-23 C-23

EXISTING POWER POLE FOR TARGET TO BE MODIFIED

STORAGE

SEASONAL GARDEN CENTER

PROPOSED

EXISTING DRIVE WAY

SIGNAL

HAWTHORNE STREET

RELOCATE EXISTING PYLON SIGN

NEW SEWER

MONITORING SEWER MANHOLE

PARCEL 1

800

BIKE RACK FOR 6 BIKES

468

AVENUE

MODIFY EXISTING DECORATIVE WALL/W NEW CURB RETURNS

EXISTING DRIVEWAY TO BE MODIFIED

PROPOSED RETAINING WALL H=6'

EXISTING FOOD FOR LESS AND TARGET STORE

WAL★MART

LR-100 MODIFIED-GR

MODIFICATIONS INCLUDE:

1. ELIMINATED TIRE CENTER, AREA FROM 112,000 SF TO 103,000 SF.
2. INCREASE GARDEN CENTER AREA FROM 13,000 SF TO 23,000 SF.
3. INCREASE (4) LOADING DOCK
4. REPLACED 100 GARDEN CENTER W/ 195 GARDEN CENTER
5. EXPANDED SEASONAL AREA FROM 4900 SF TO 9550 SF.
6. EXPANDED SEASONAL AREA FROM 9300 SF TO 13,000 SF.
7. RELOCATED GROCERY'S LOADING DOCK
8. INCREASE GROCERY'S TOTAL AREA FROM 48,500 SF TO 51,900 SF

EXISTING SCREEN WALL

9.0'

FUTURE ROCK WELL

104

120

TOYS-R-US

EXISTING GAS STATION

NEW FIRE SERVICE

EXISTING DRIVE WAY

MOUNTAIN

R/W

25'-R

413.34'

FOOTHILL BOULEVARD

EXISTING DRIVEWAY TO BE MODIFIED

EXISTING DRIVEWAY TO BE MODIFIED

EXPLANATION :

B-1 APPROXIMATE LOCATION OF EXPLORATORY BORING

C-1 APPROXIMATE LOCATION OF CONE PENETRATION TEST

N

0 100 200 FEET

EXISTING

BASE PLAN REPRODUCED FROM SITE PLAN PROVIDED BY HALL AND FOREMAN INC. (DATED 04/27/04).

GPI GEOTECHNICAL PROFESSIONALS, INC.

PROPOSED WAL-MART - ONTARIO

GPI PROJECT NO.: 1974. | SCALE 1" = 100 feet

SITE PLAN

FIGURE 2

APPENDIX A

APPENDIX A

CONE PENETRATION TESTS

Twenty-three Cone Penetration Tests (CPT's) were performed at the site during the present investigation. These soundings were advanced to depths ranging from 5 to 17 feet below existing grades. Several of the CPT's were terminated prior to the planned depths because of refusal in dense deposits. The locations of the CPT's are shown on the Site Plan, Figure 2.

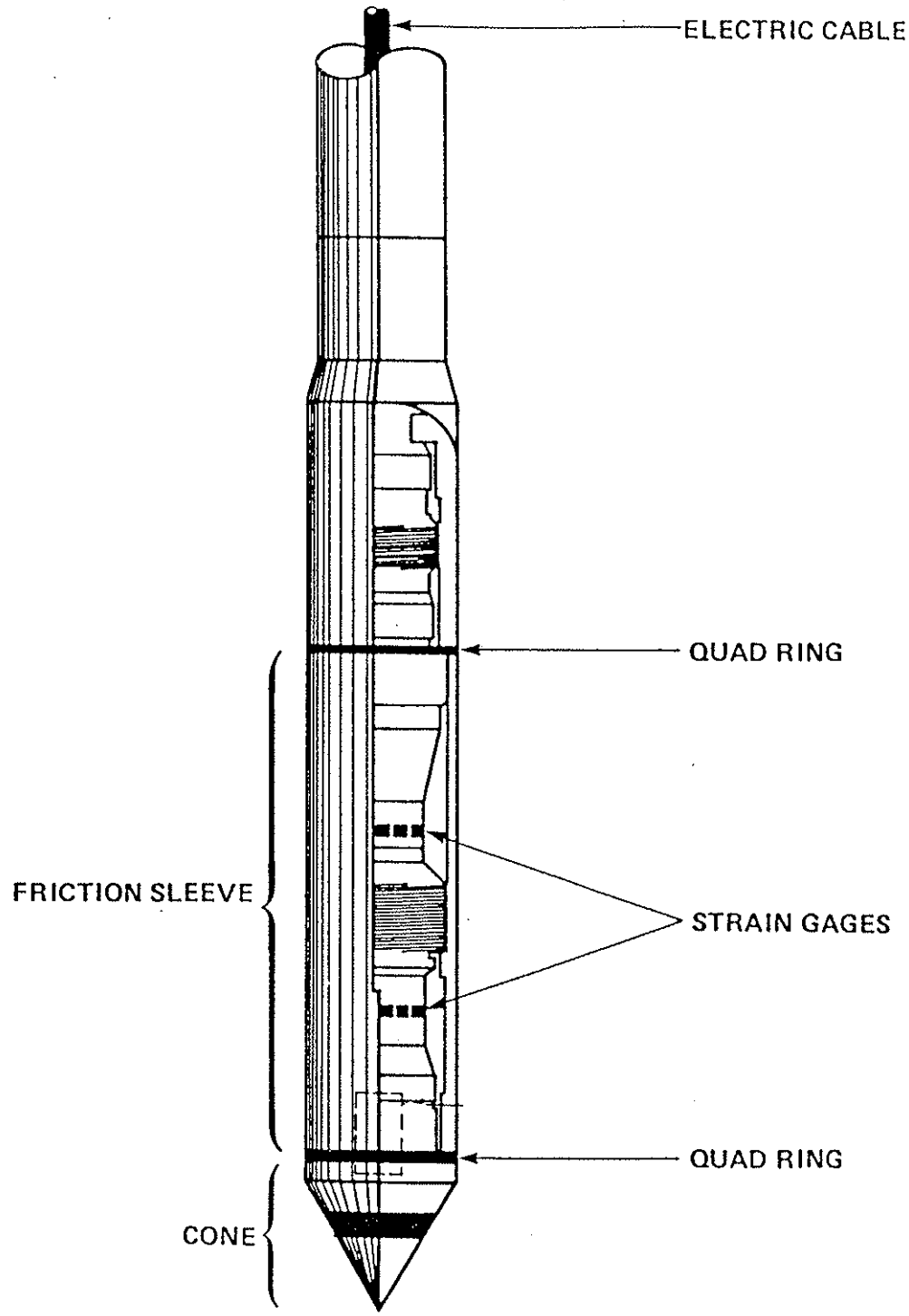
The Cone Penetration Test consists of pushing a cone-tipped probe into the soil deposit while simultaneously recording the cone tip resistance and side friction resistance of the soil to penetration (refer to Figure A-1). The CPT's described in this report were conducted in general accordance with ASTM specifications (ASTM D 3441) using an electric cone penetrometer.

The CPT equipment consists of a cone assembly mounted at the end of a series of hollow sounding rods. A set of hydraulic rams is used to push the cone and rods into the soil while a continuous record of cone and friction resistance versus depth is obtained in both analog and digital form at the ground surface. A specially designed all-wheel drive truck is used to transport and house the test equipment and to provide a 23-ton reaction to the thrust of the hydraulic rams.

Data obtained during a CPT consists of continuous stratigraphic information with close vertical resolution. Stratigraphic interpretation is based on relationships between cone tip resistance and friction resistance. The calculated friction ratio (CPT friction sleeve resistance divided by cone tip resistance) is used as an indicator of soil type. Granular soils typically have low friction ratios and high cone resistance, while cohesive or organic soils have high friction ratios and low cone resistance. These stratigraphic material categories form the basis for all subsequent calculations, which utilize the CPT data.

Computer plots of the reduced CPT data acquired for this investigation are presented in Figures A-2 through A-24 of this appendix. The field testing and computer processing for the current investigation was performed by Fugro Geoscience, Inc. under subcontract to Geotechnical Professionals Inc. (GPI). The interpreted soil descriptions were prepared by GPI.

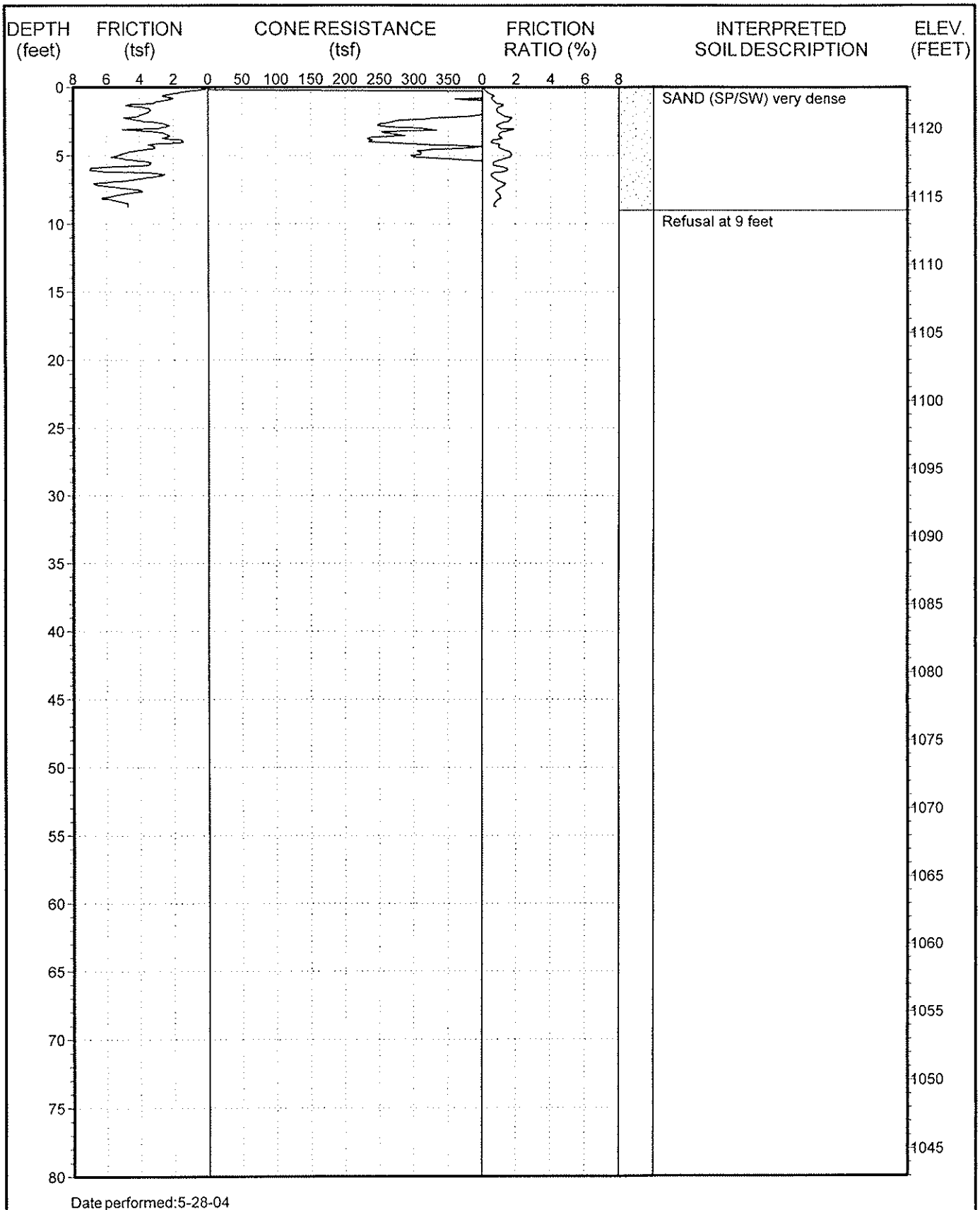
The CPT locations were laid out in the field by measuring from existing features. Ground surface elevations at the CPT locations were estimated from a topographic plan provided by Hall & Foreman, Inc.



GPI GEOTECHNICAL PROFESSIONALS INC.

CONE PENETROMETER

FIGURE A-1



Date performed:5-28-04

This summary applies only at the location of this cone penetration test and at the time of the exploration. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The interpreted soil description is derived from the friction ratio and cone resistance and is a simplification of actual conditions encountered.

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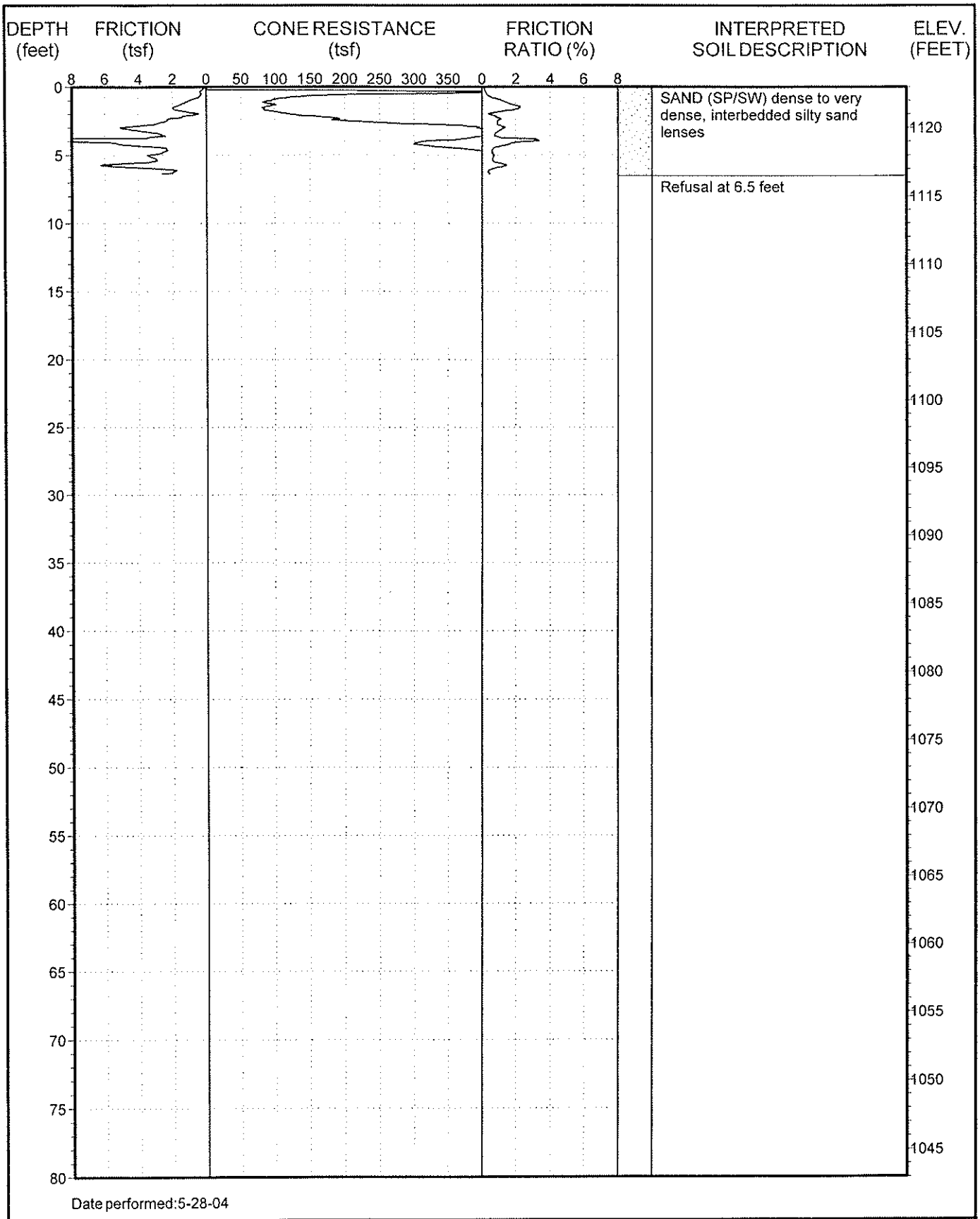
LOG OF CPT NO. C- 1

FIGURE A-2



Date performed:5-28-04

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PROJECT NO.: 1974.I
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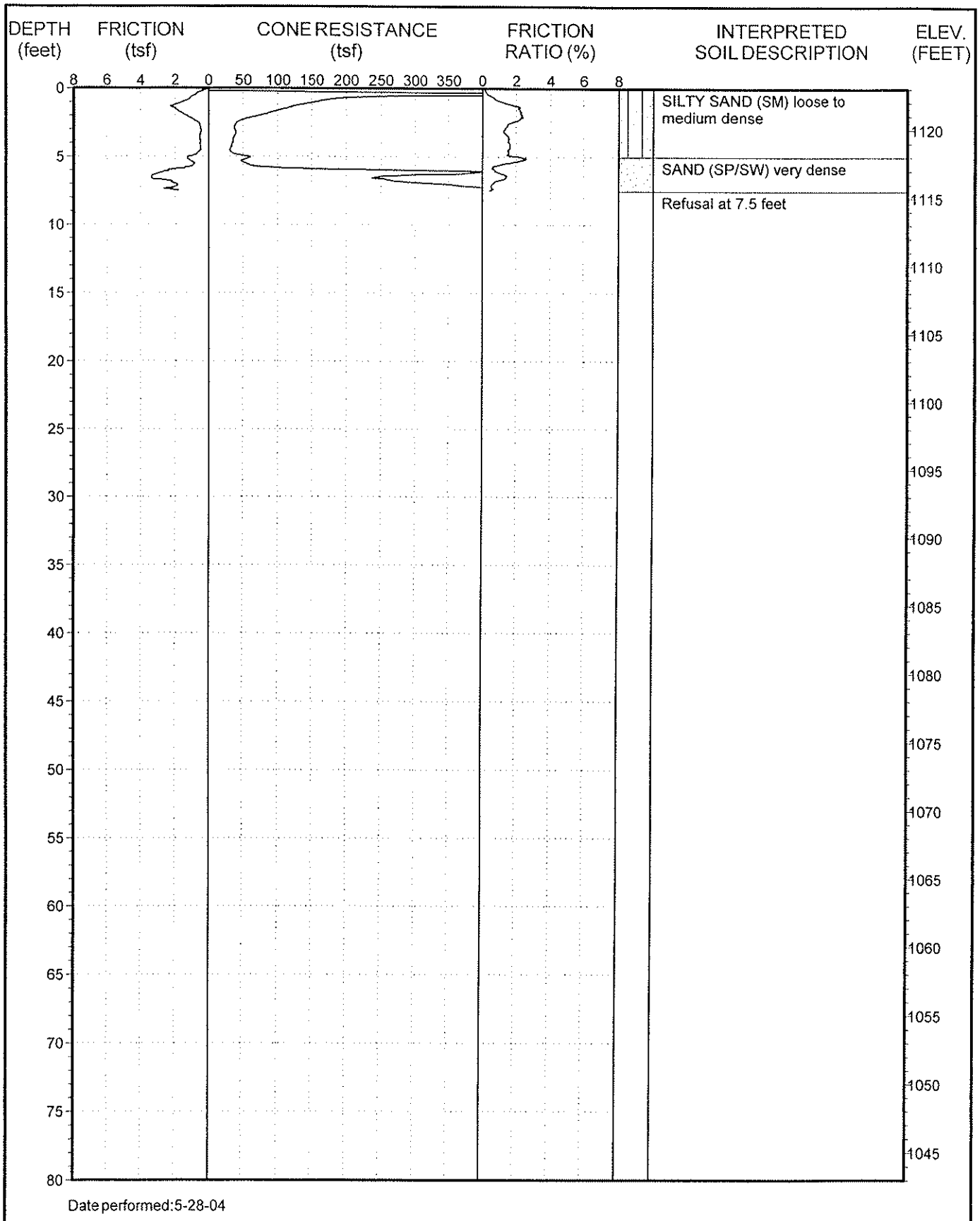
LOG OF CPT NO. C- 2

FIGURE A-3



Date performed:5-28-04

This summary applies only at the location of this cone penetration test and at the time of the exploration. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The interpreted soil description is derived from the friction ratio and cone resistance and is a simplification of actual conditions encountered.

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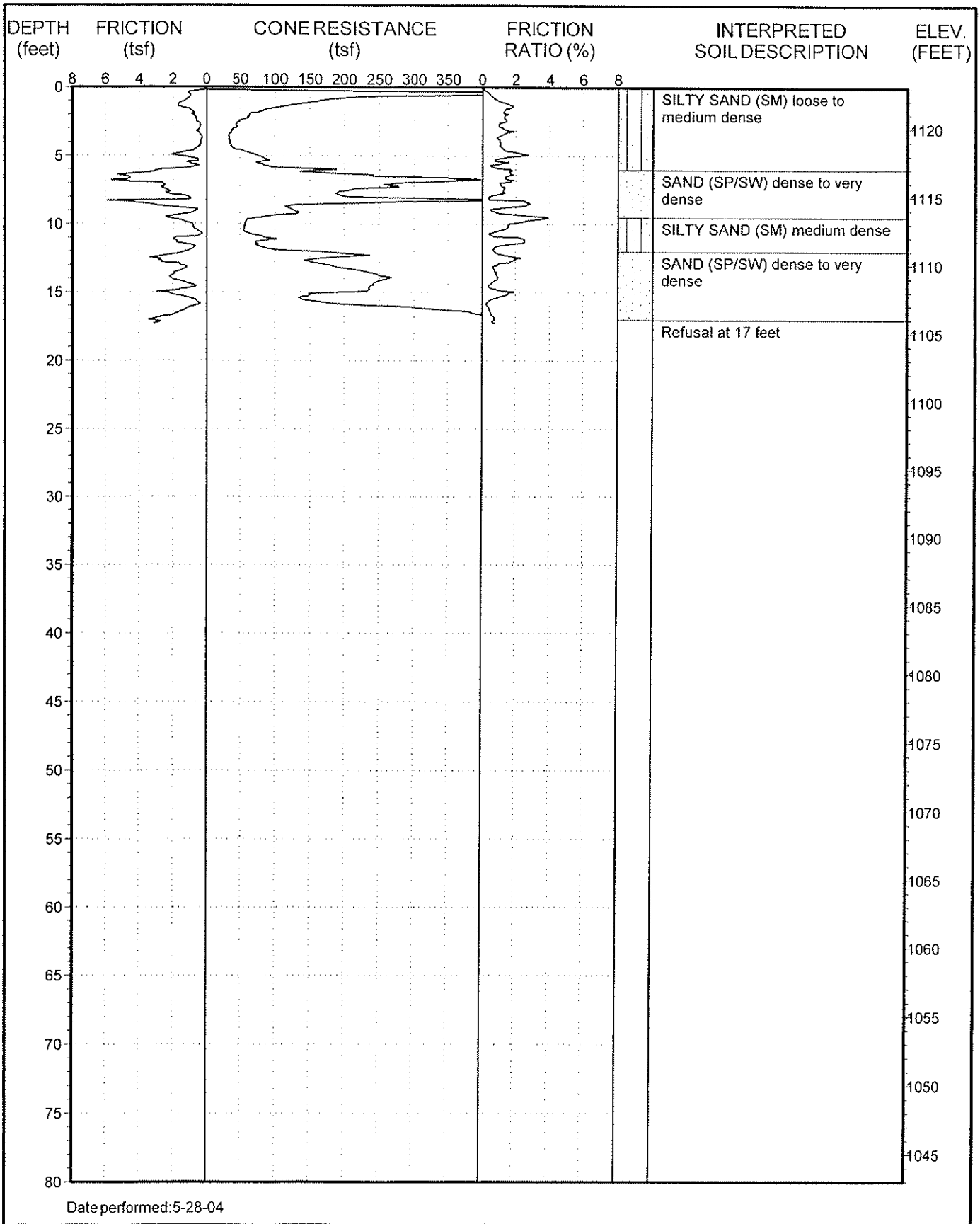
LOG OF CPT NO. C- 3

FIGURE A-4



Date performed: 5-28-04

This summary applies only at the location of this cone penetration test and at the time of the exploration. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The interpreted soil description is derived from the friction ratio and cone resistance and is a simplification of actual conditions encountered.

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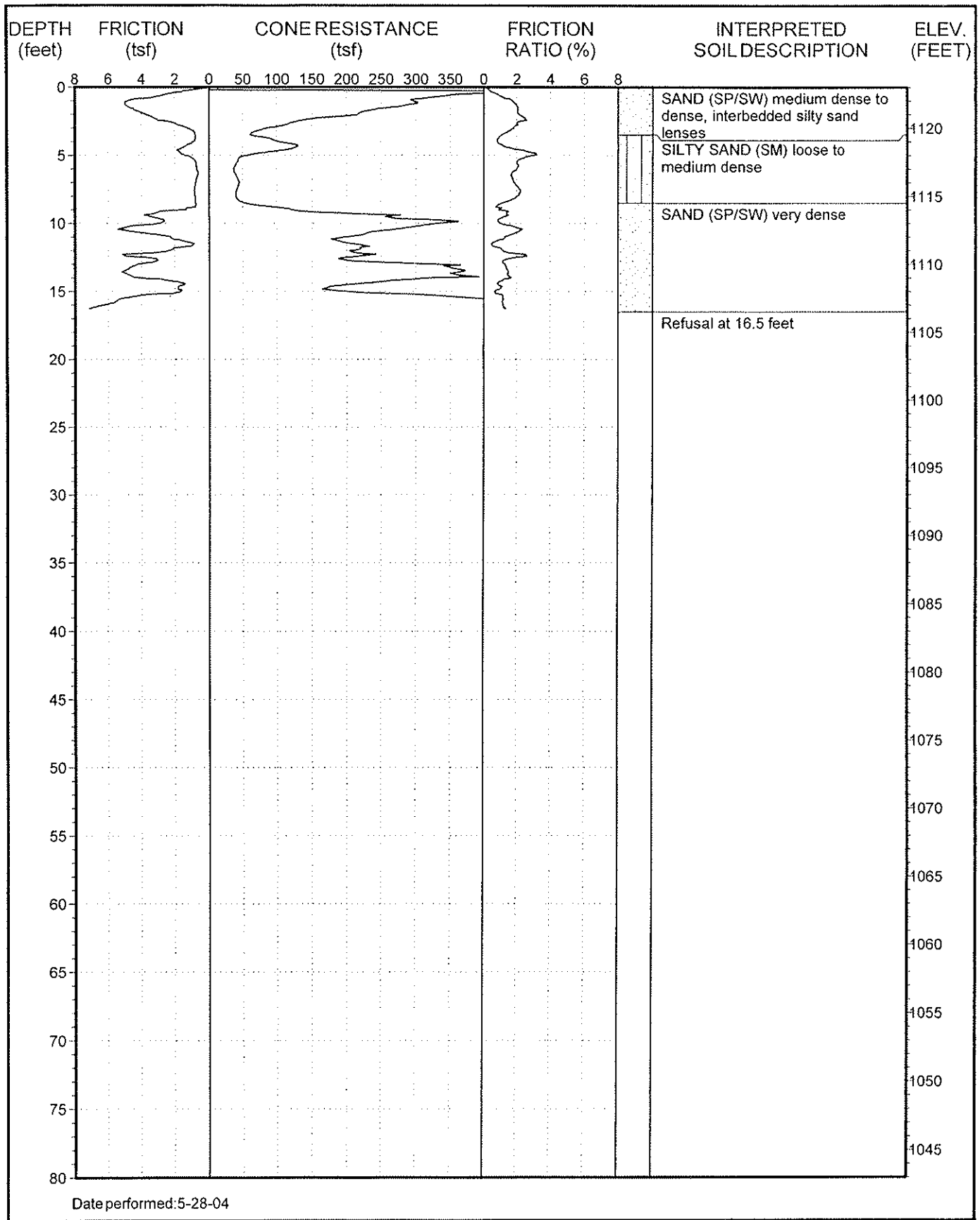
LOG OF CPT NO. C- 4

FIGURE A-5



Date performed:5-28-04

This summary applies only at the location of this cone penetration test and at the time of the exploration. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The interpreted soil description is derived from the friction ratio and cone resistance and is a simplification of actual conditions encountered.

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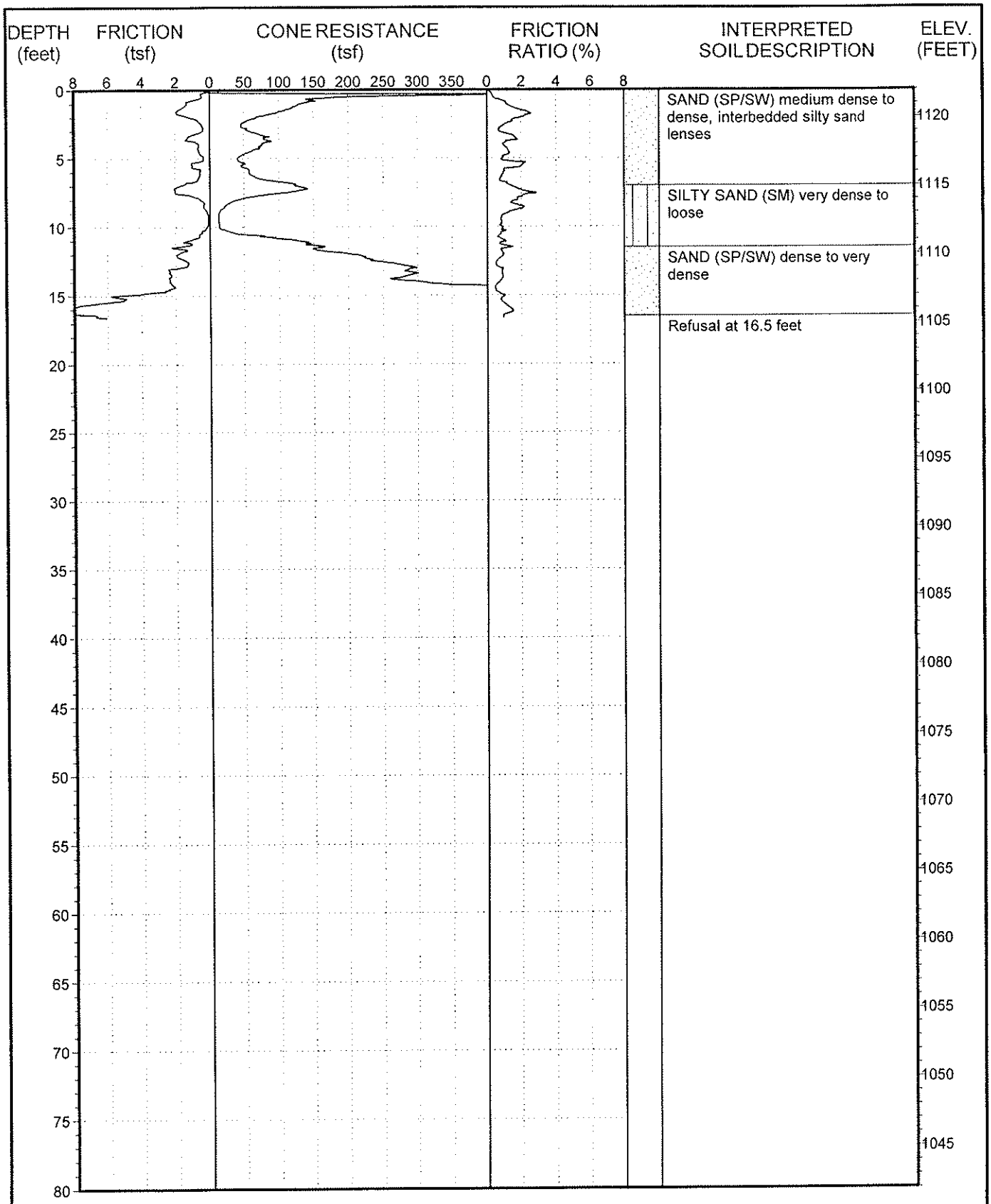
LOG OF CPT NO. C- 5

FIGURE A-6



Date performed:5-28-04

This summary applies only at the location of this cone penetration test and at the time of the exploration. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The interpreted soil description is derived from the friction ratio and cone resistance and is a simplification of actual conditions encountered.

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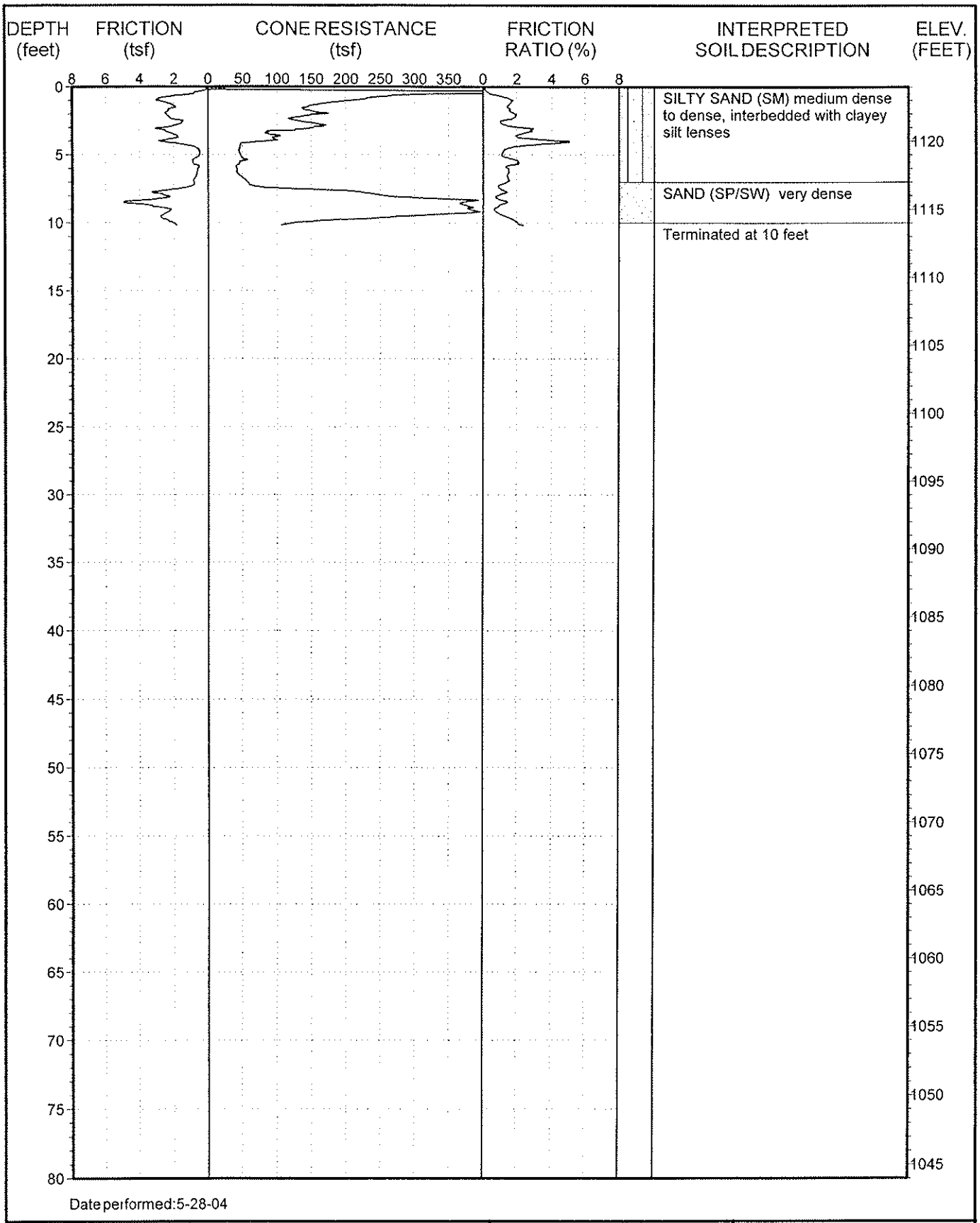
LOG OF CPT NO. C- 6

FIGURE A-7



Date performed:5-28-04

This summary applies only at the location of this cone penetration test and at the time of the exploration. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The interpreted soil description is derived from the friction ratio and cone resistance and is a simplification of actual conditions encountered.

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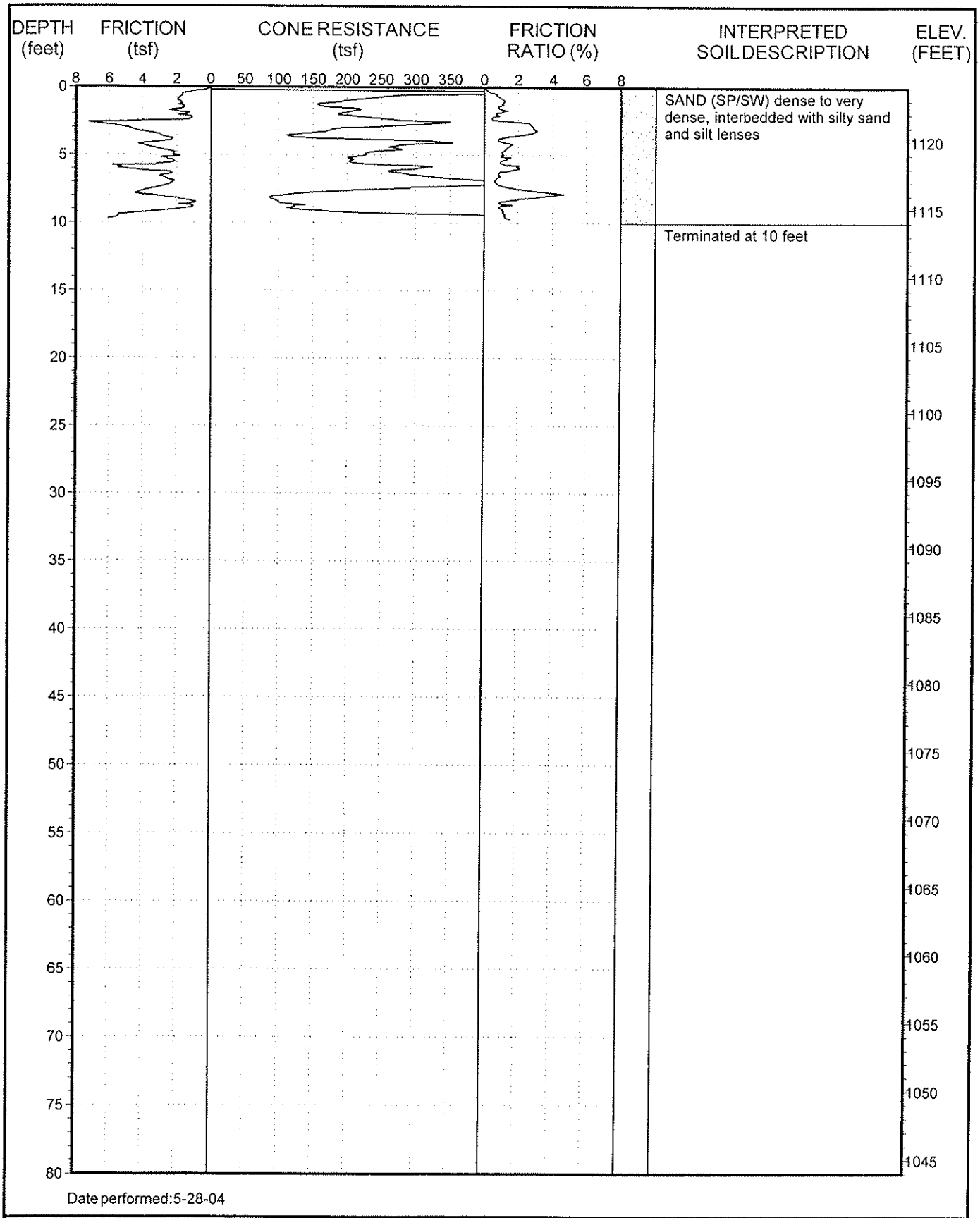
LOG OF CPT NO. C- 7

FIGURE A-8



Date performed: 5-28-04

This summary applies only at the location of this cone penetration test and at the time of the exploration. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The interpreted soil description is derived from the friction ratio and cone resistance and is a simplification of actual conditions encountered.

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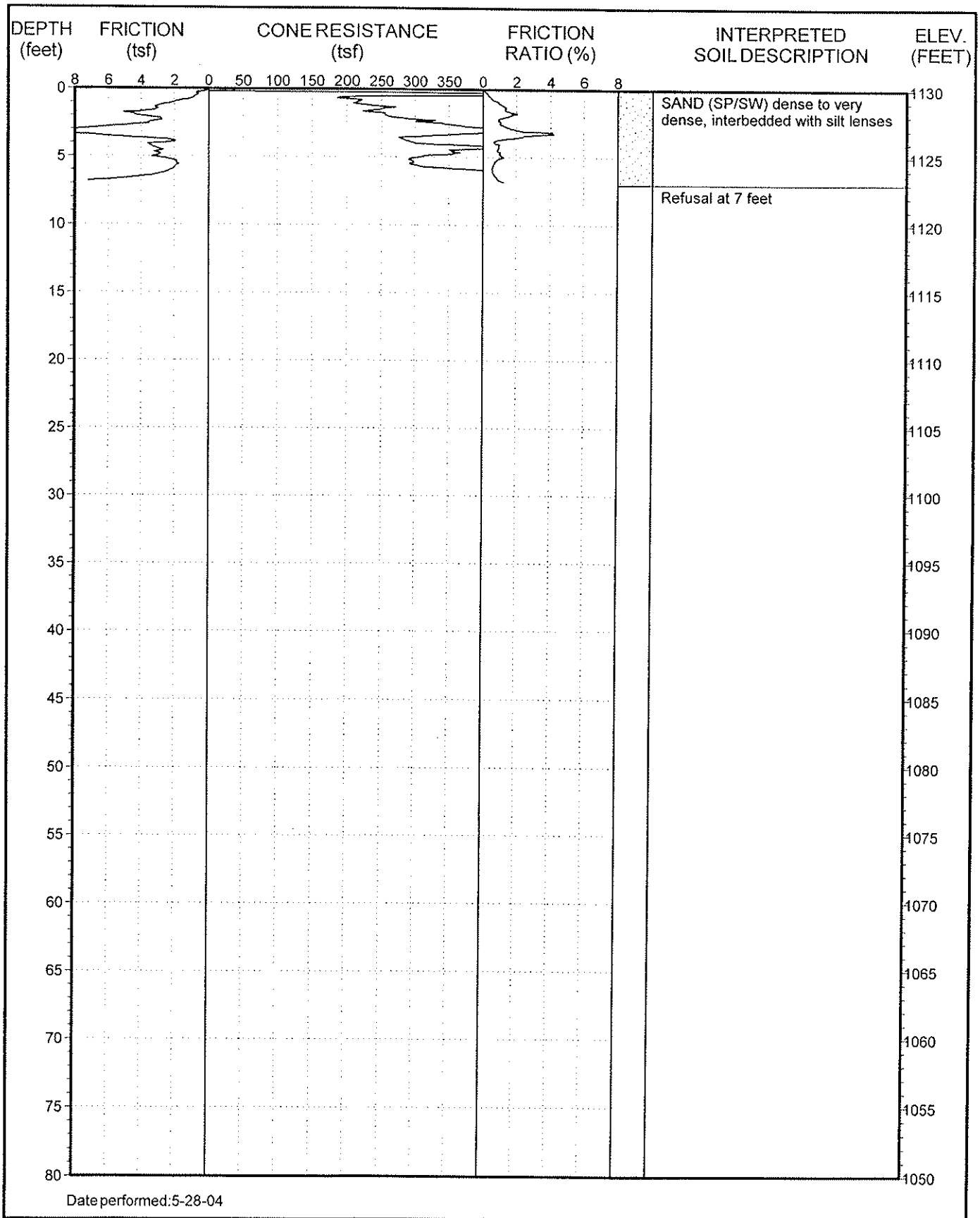
LOG OF CPT NO. C- 8

FIGURE A-9



Date performed:5-28-04

This summary applies only at the location of this cone penetration test and at the time of the exploration. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The interpreted soil description is derived from the friction ratio and cone resistance and is a simplification of actual conditions encountered.

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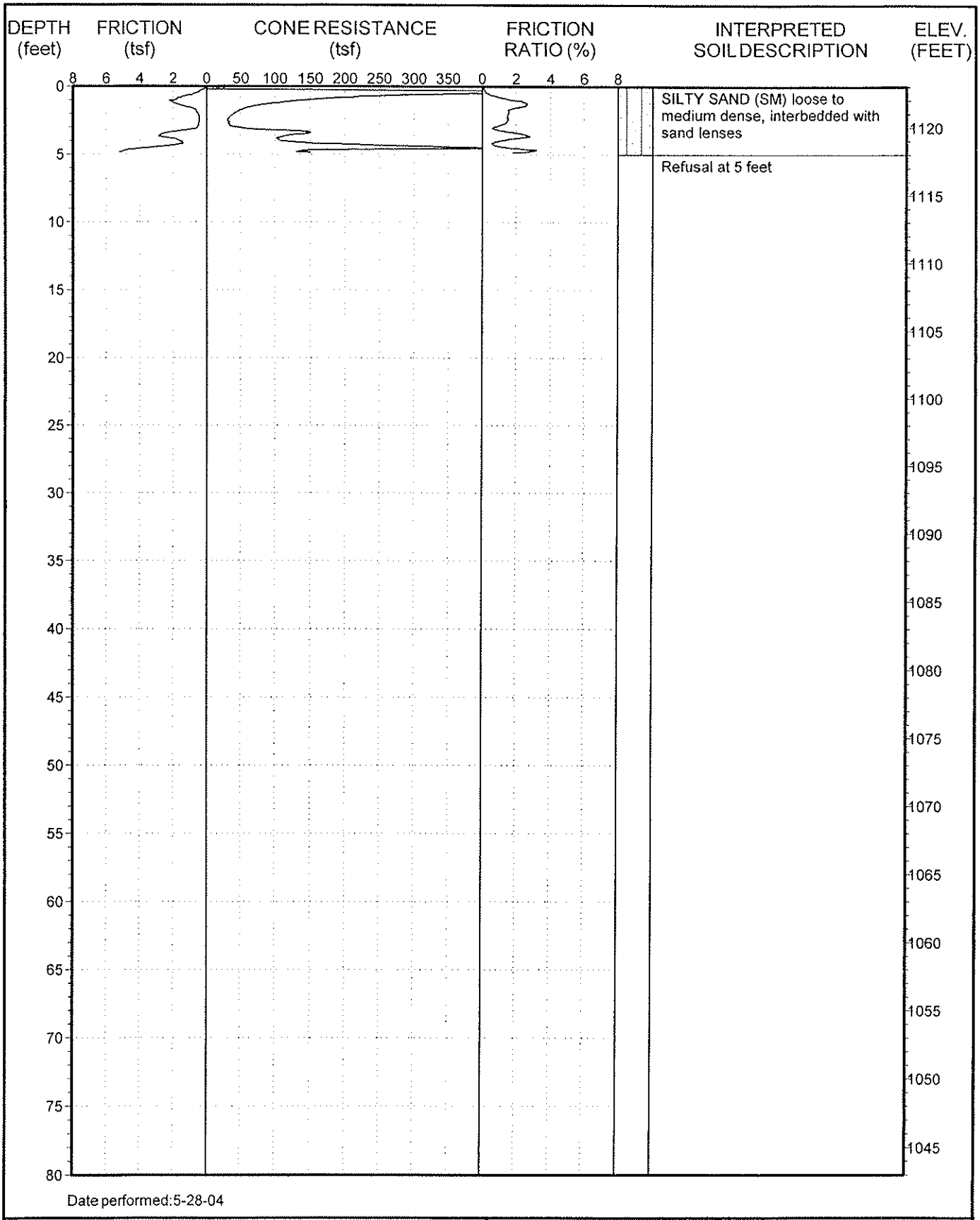
LOG OF CPT NO. C- 9

FIGURE A-10



Date performed:5-28-04

This summary applies only at the location of this cone penetration test and at the time of the exploration. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The interpreted soil description is derived from the friction ratio and cone resistance and is a simplification of actual conditions encountered.

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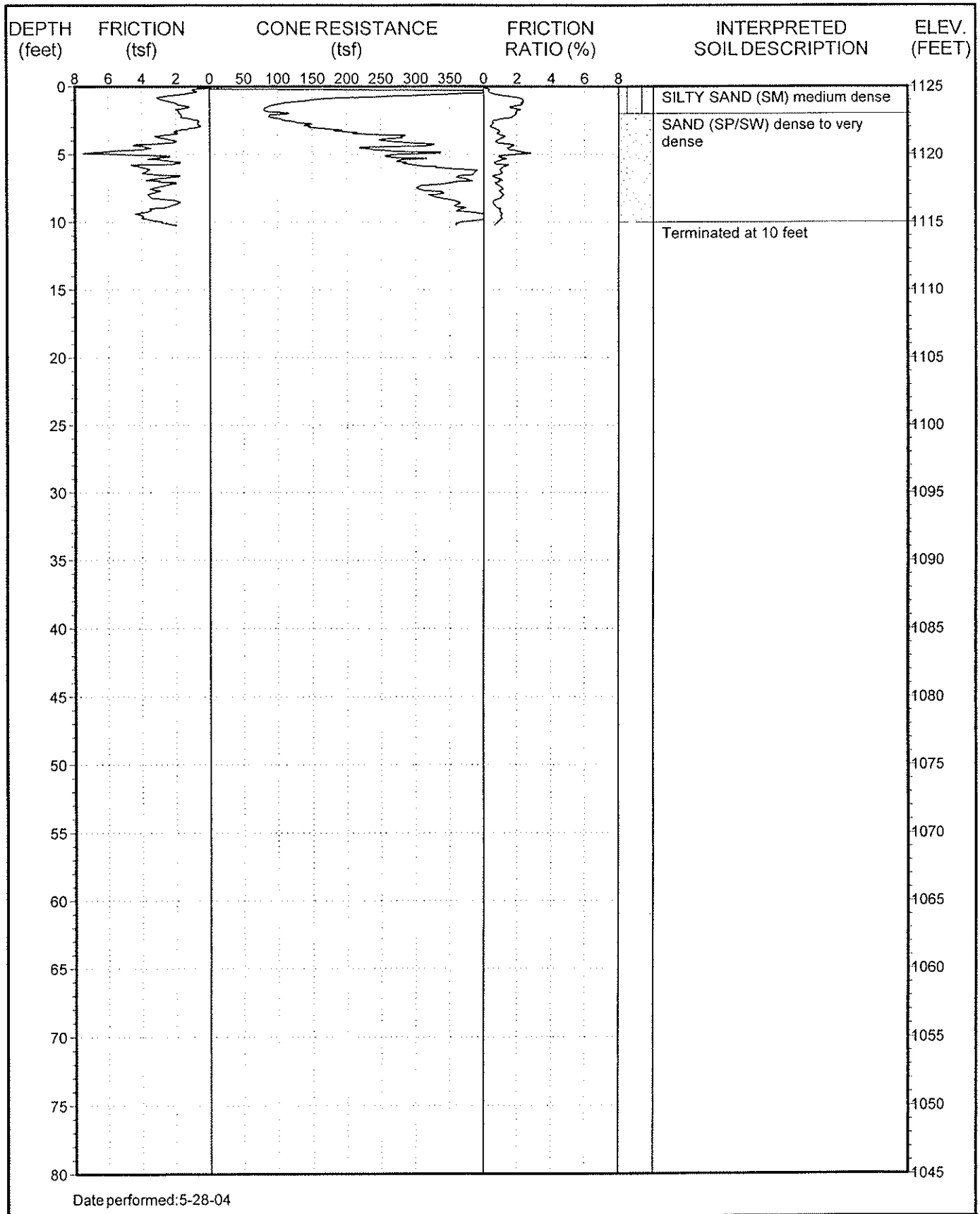
LOG OF CPT NO. C-11

FIGURE A-12



Date performed: 5-28-04

This summary applies only at the location of this cone penetration test and at the time of the exploration. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The interpreted soil description is derived from the friction ratio and cone resistance and is a simplification of actual conditions encountered.

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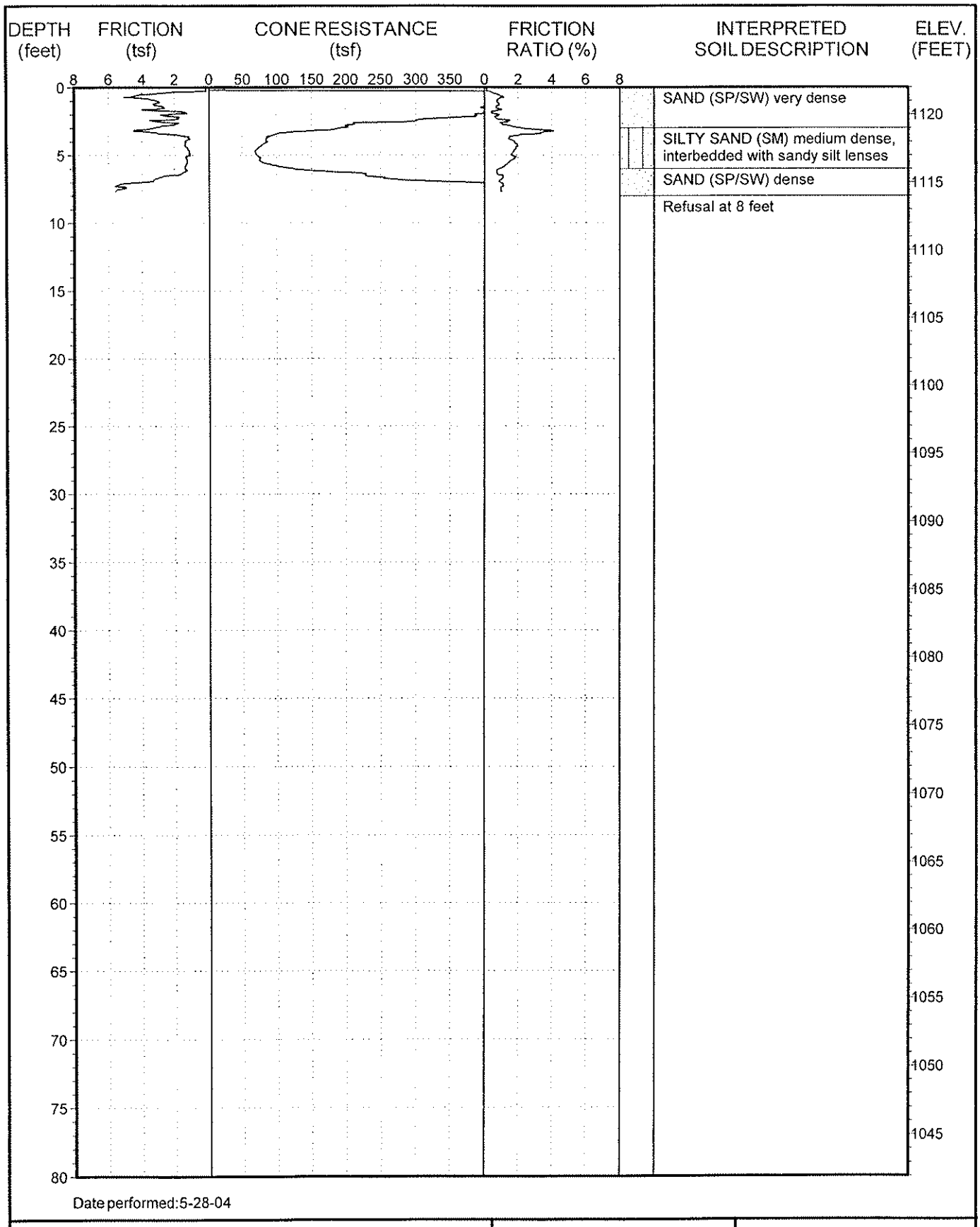
LOG OF CPT NO. C-12

FIGURE A-13



Date performed:5-28-04

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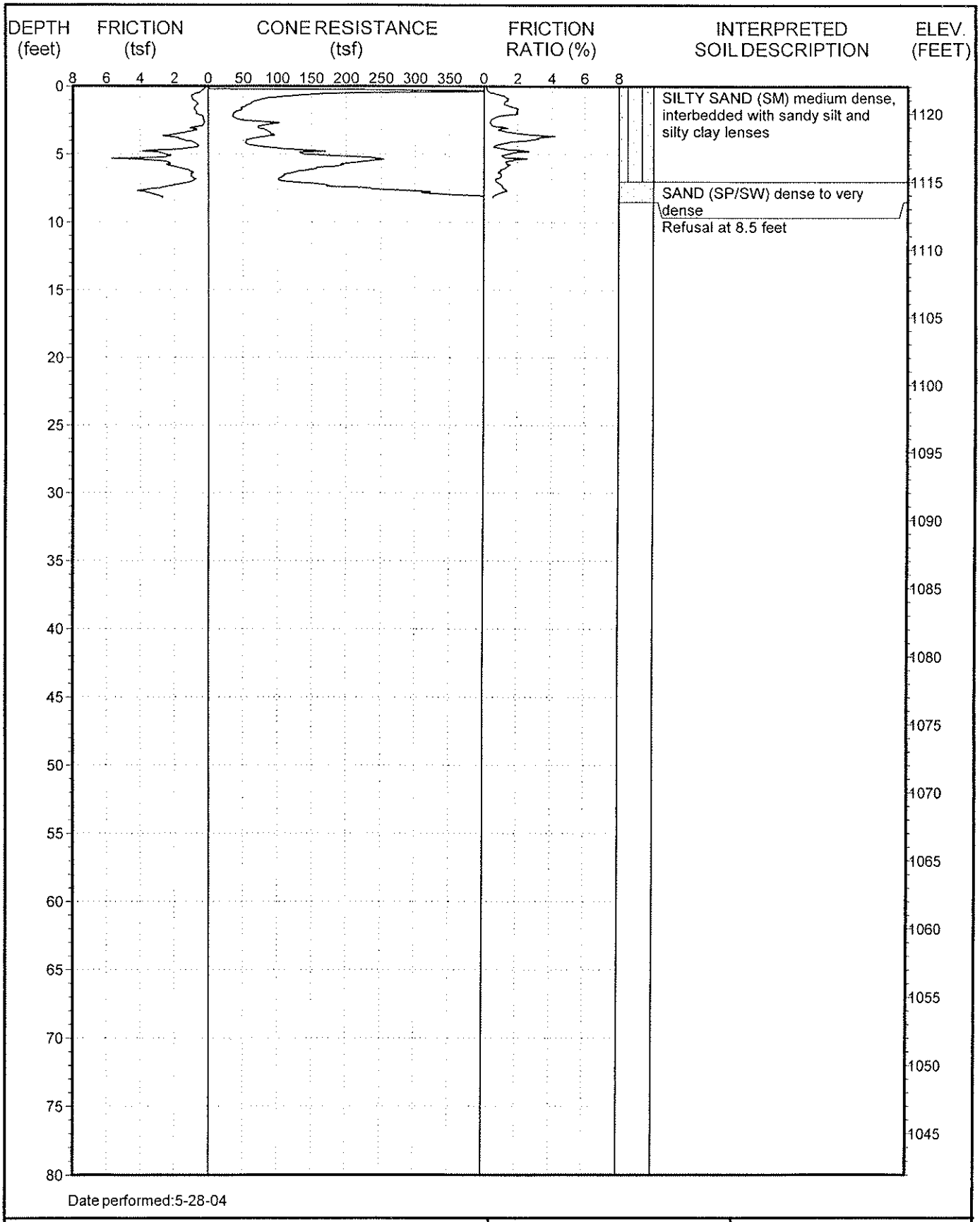
LOG OF CPT NO. C-13

FIGURE A-14



Date performed:5-28-04

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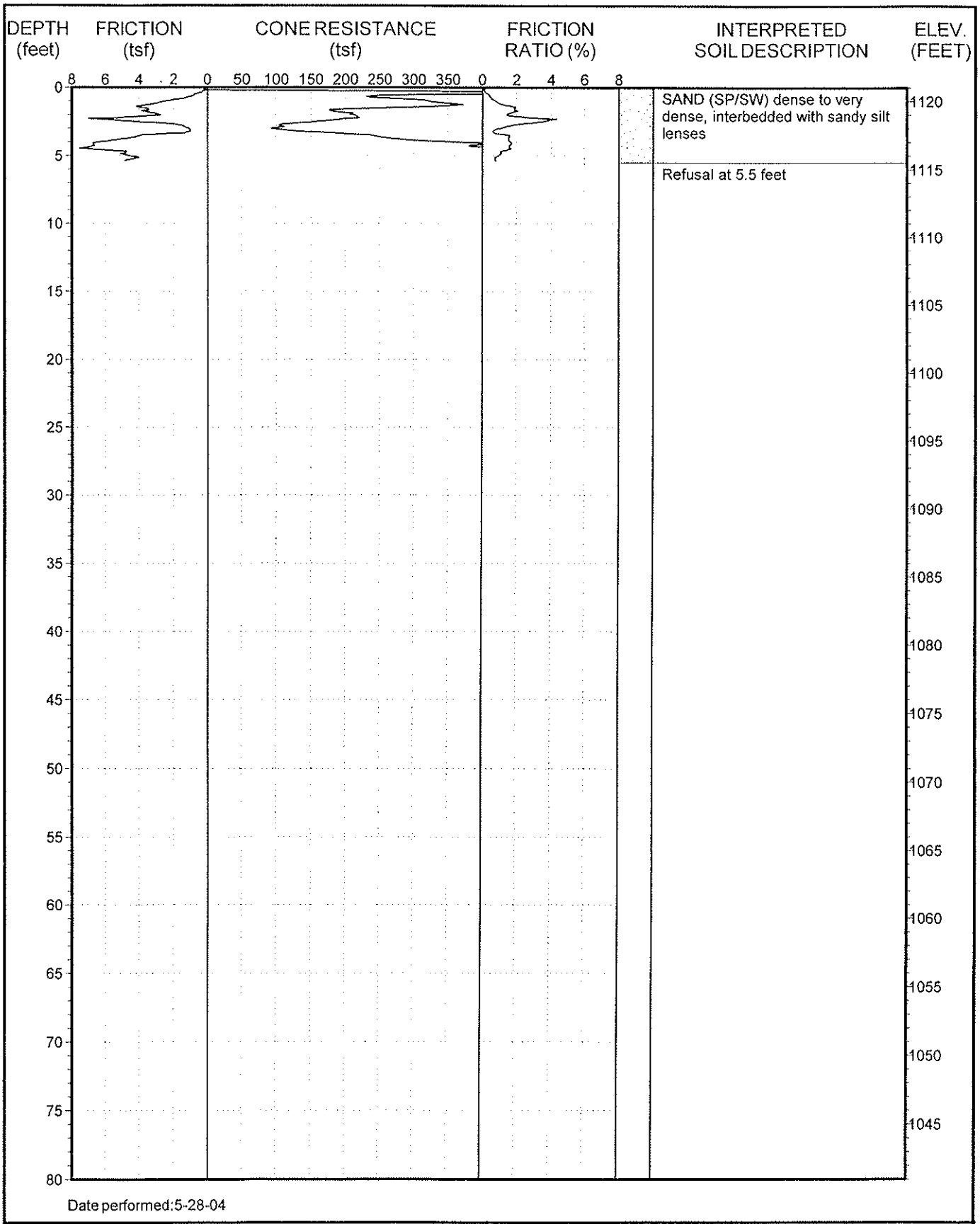
LOG OF CPT NO. C-14

FIGURE A-15



Date performed:5-28-04

This summary applies only at the location of this cone penetration test and at the time of the exploration. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The interpreted soil description is derived from the friction ratio and cone resistance and is a simplification of actual conditions encountered.

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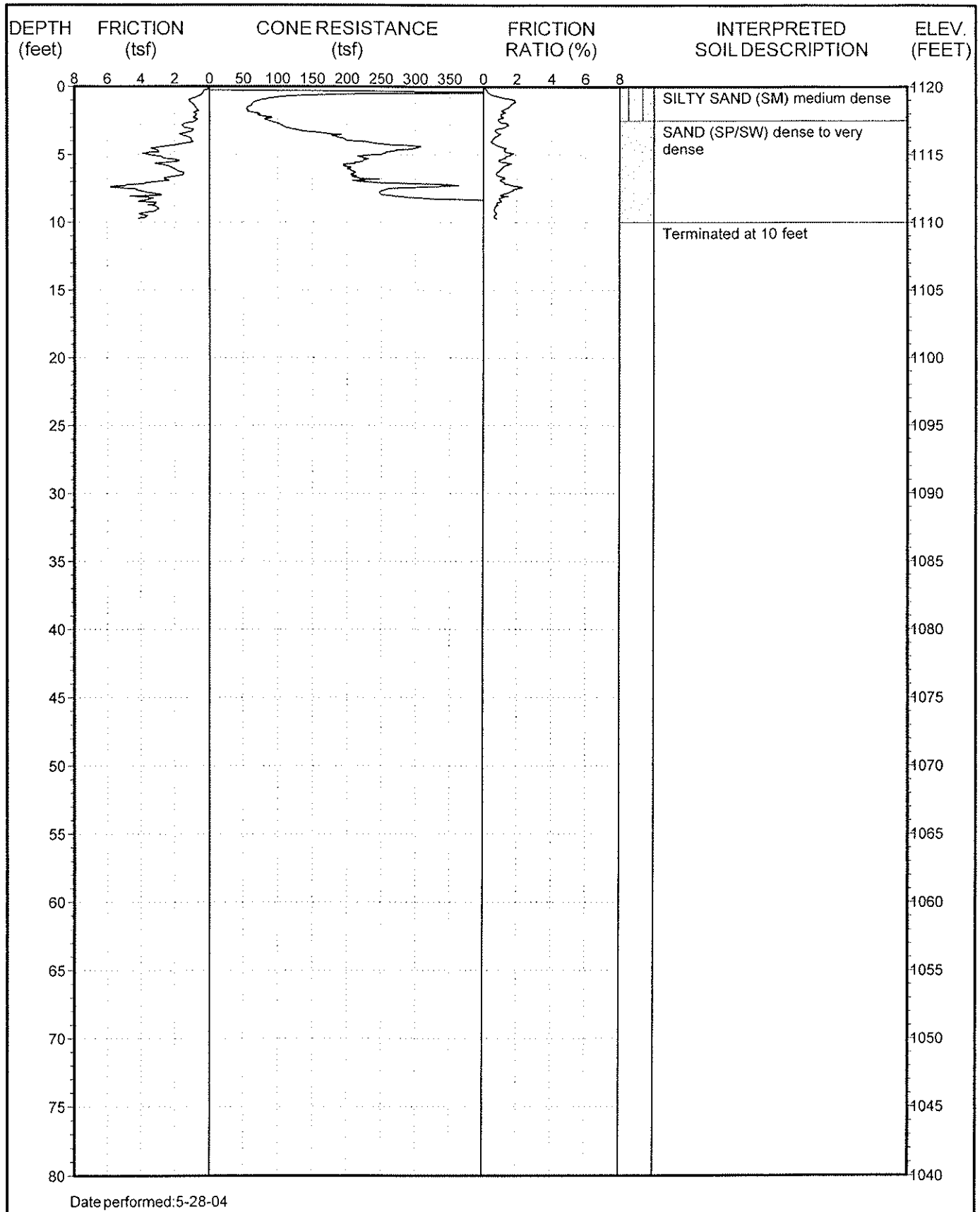
LOG OF CPT NO. C-15

FIGURE A-16



Date performed:5-28-04

This summary applies only at the location of this cone penetration test and at the time of the exploration. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The interpreted soil description is derived from the friction ratio and cone resistance and is a simplification of actual conditions encountered.

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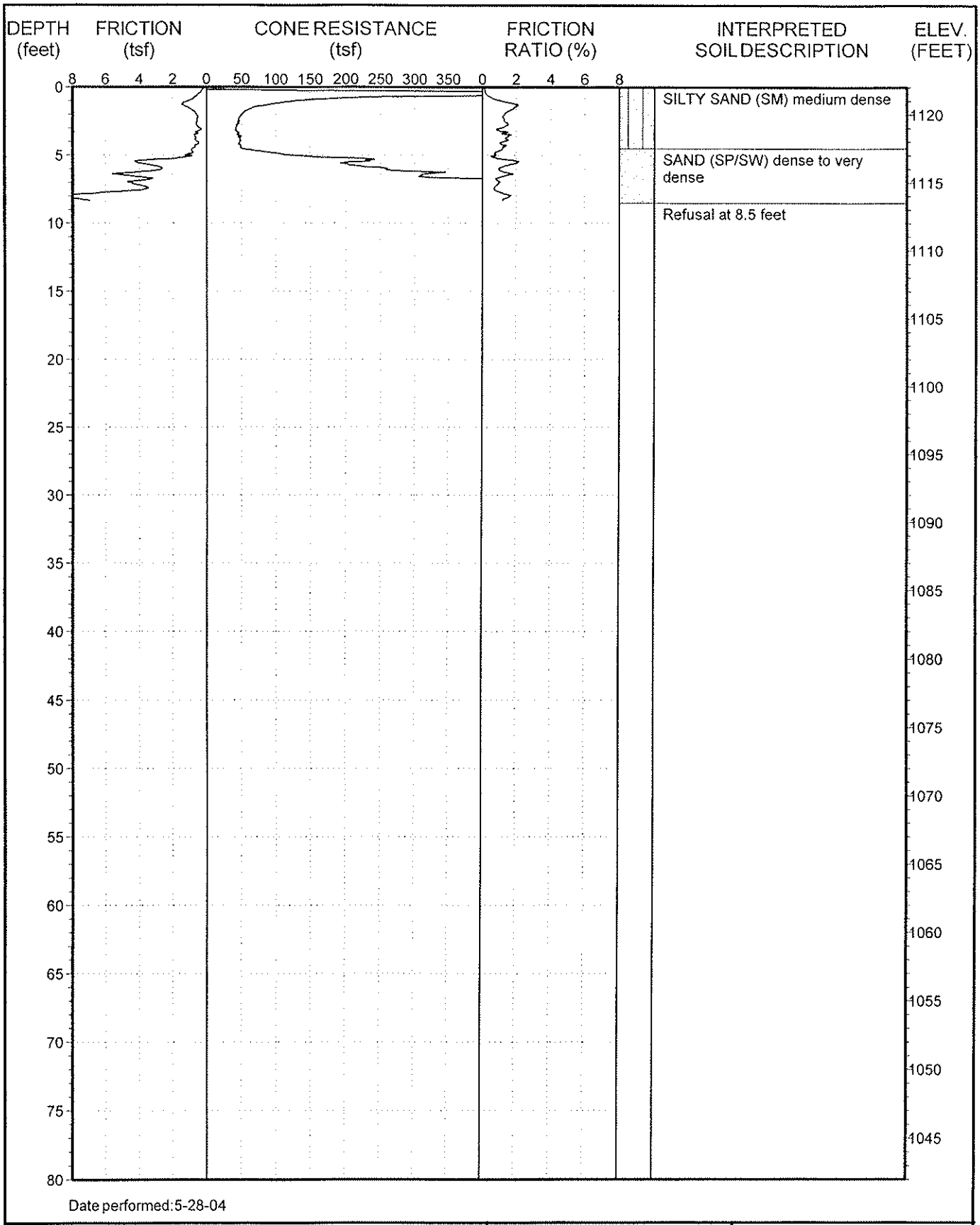
LOG OF CPT NO. C-16

FIGURE A-17



Date performed:5-28-04

This summary applies only at the location of this cone penetration test and at the time of the exploration. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The interpreted soil description is derived from the friction ratio and cone resistance and is a simplification of actual conditions encountered.

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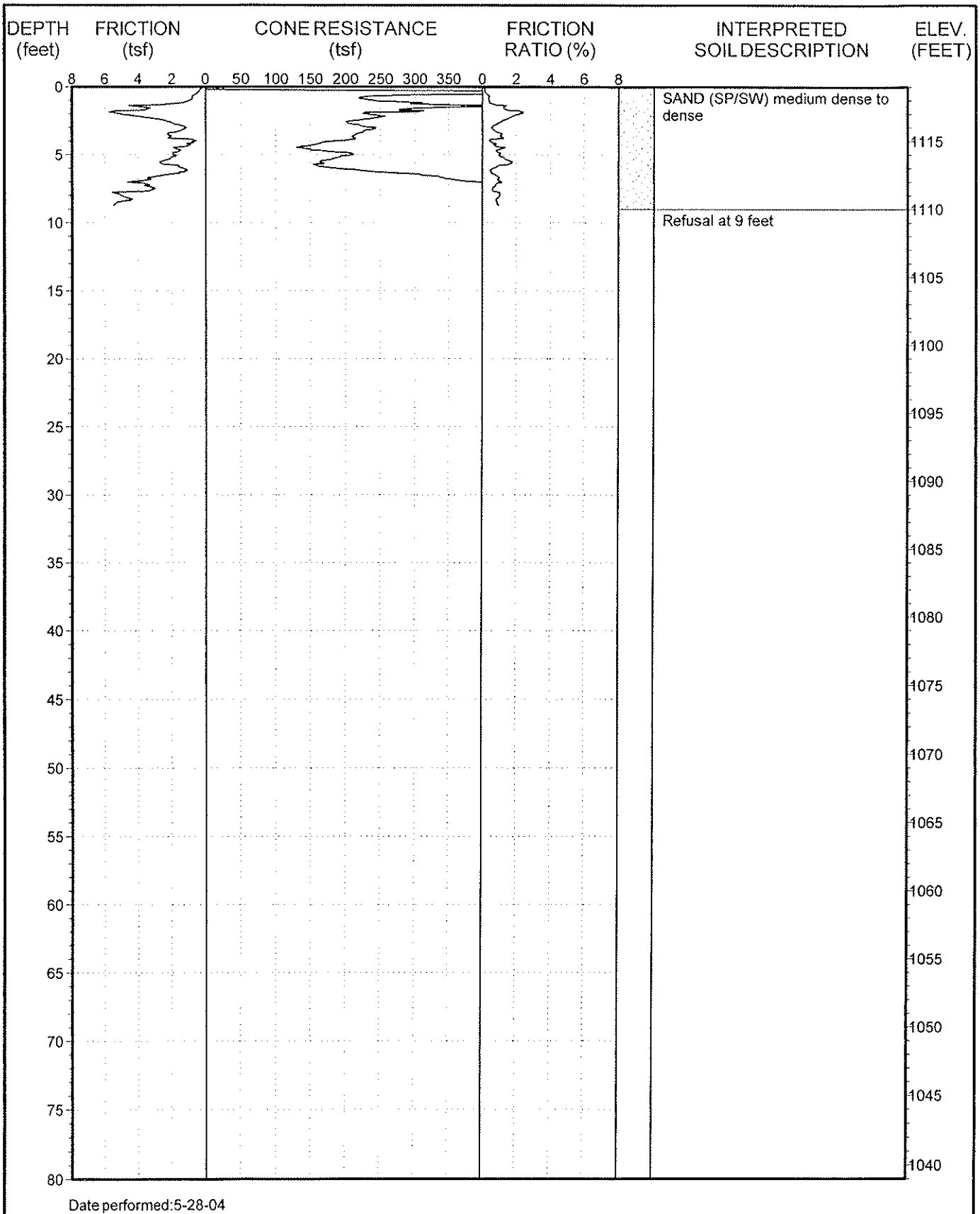
LOG OF CPT NO. C-17

FIGURE A-18



Date performed:5-28-04

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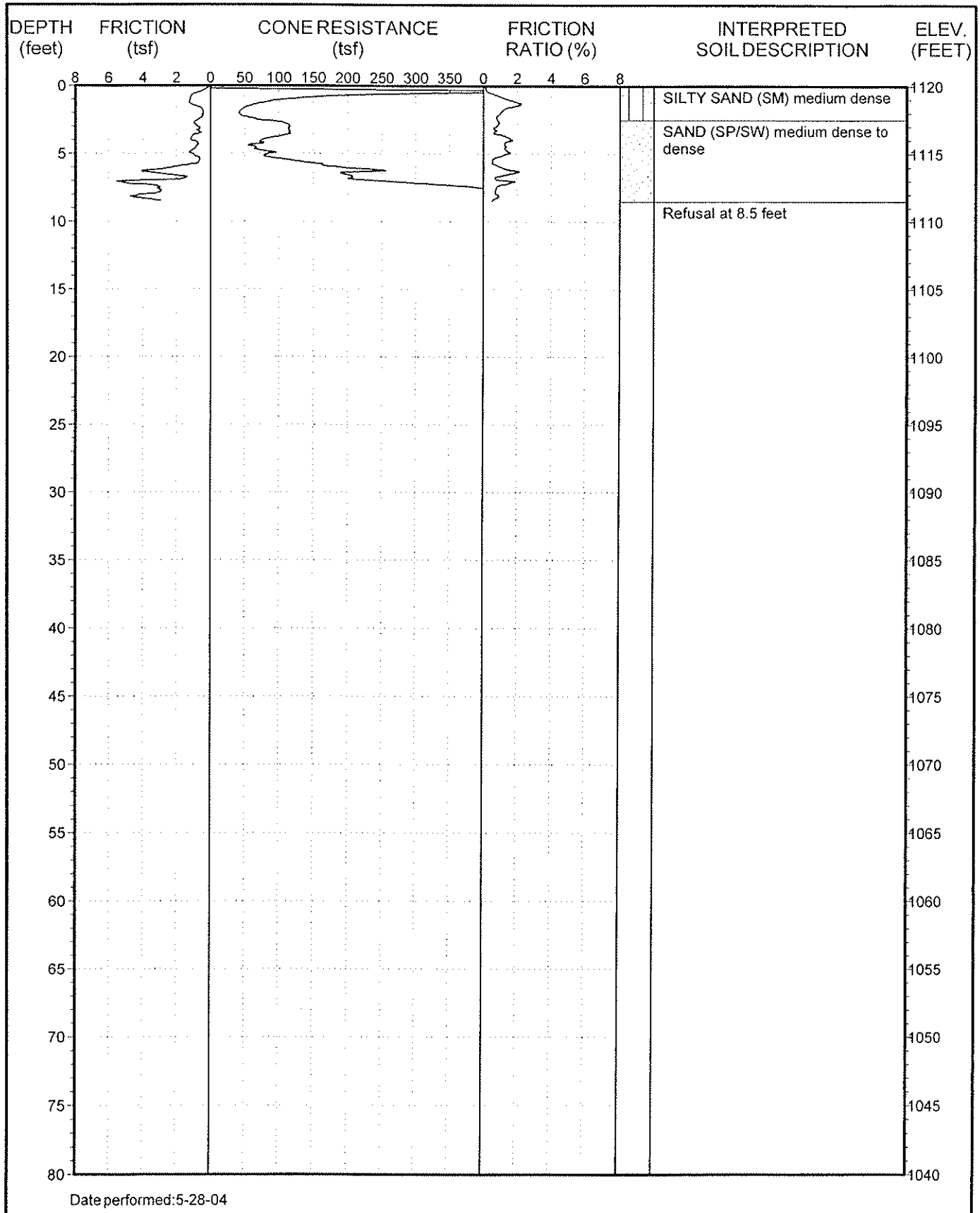
LOG OF CPT NO. C-18

FIGURE A-19



Date performed:5-28-04

This summary applies only at the location of this cone penetration test and at the time of the exploration. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The interpreted soil description is derived from the friction ratio and cone resistance and is a simplification of actual conditions encountered.

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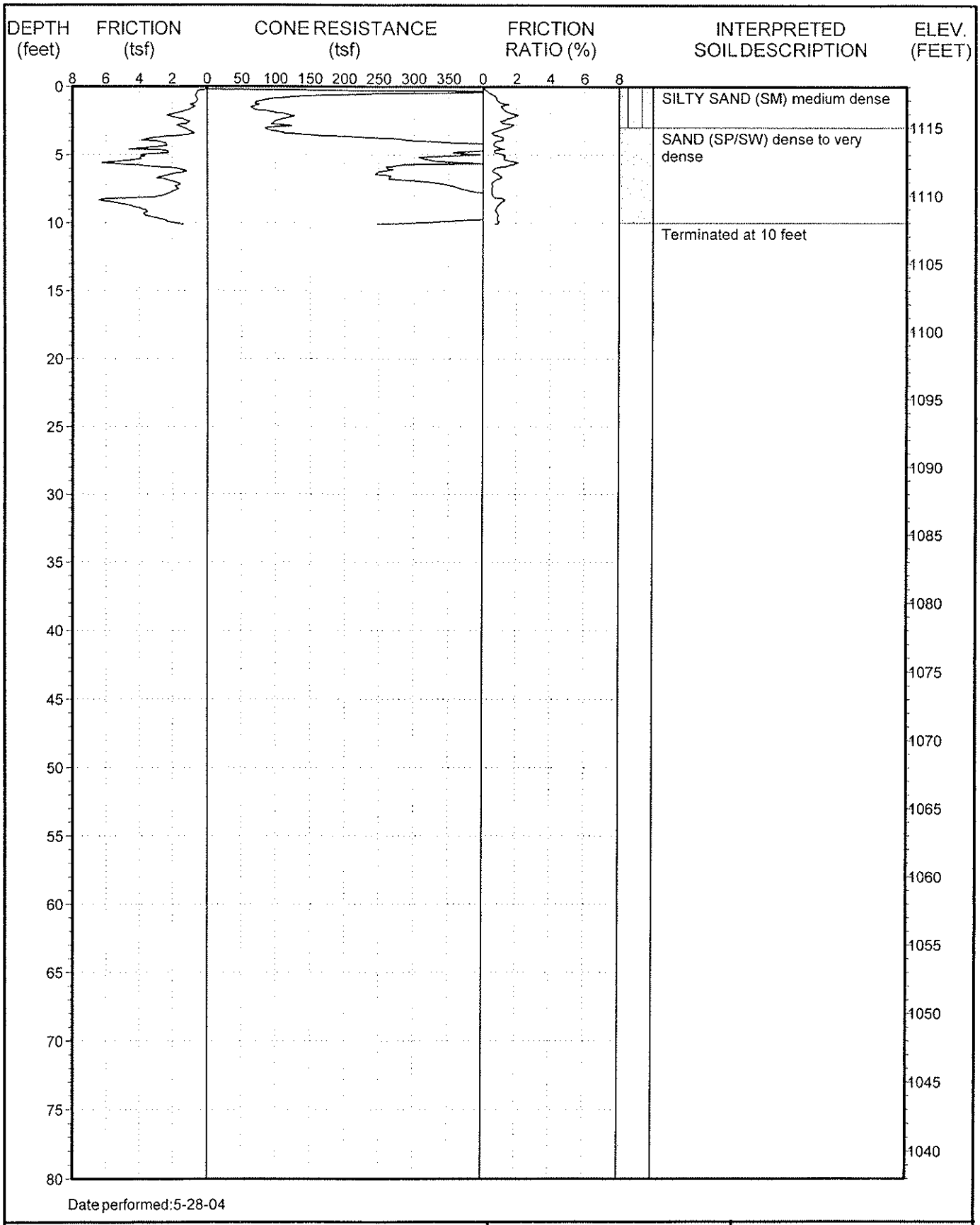
LOG OF CPT NO. C-19

FIGURE A-20



Date performed:5-28-04

This summary applies only at the location of this cone penetration test and at the time of the exploration. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The interpreted soil description is derived from the friction ratio and cone resistance and is a simplification of actual conditions encountered.

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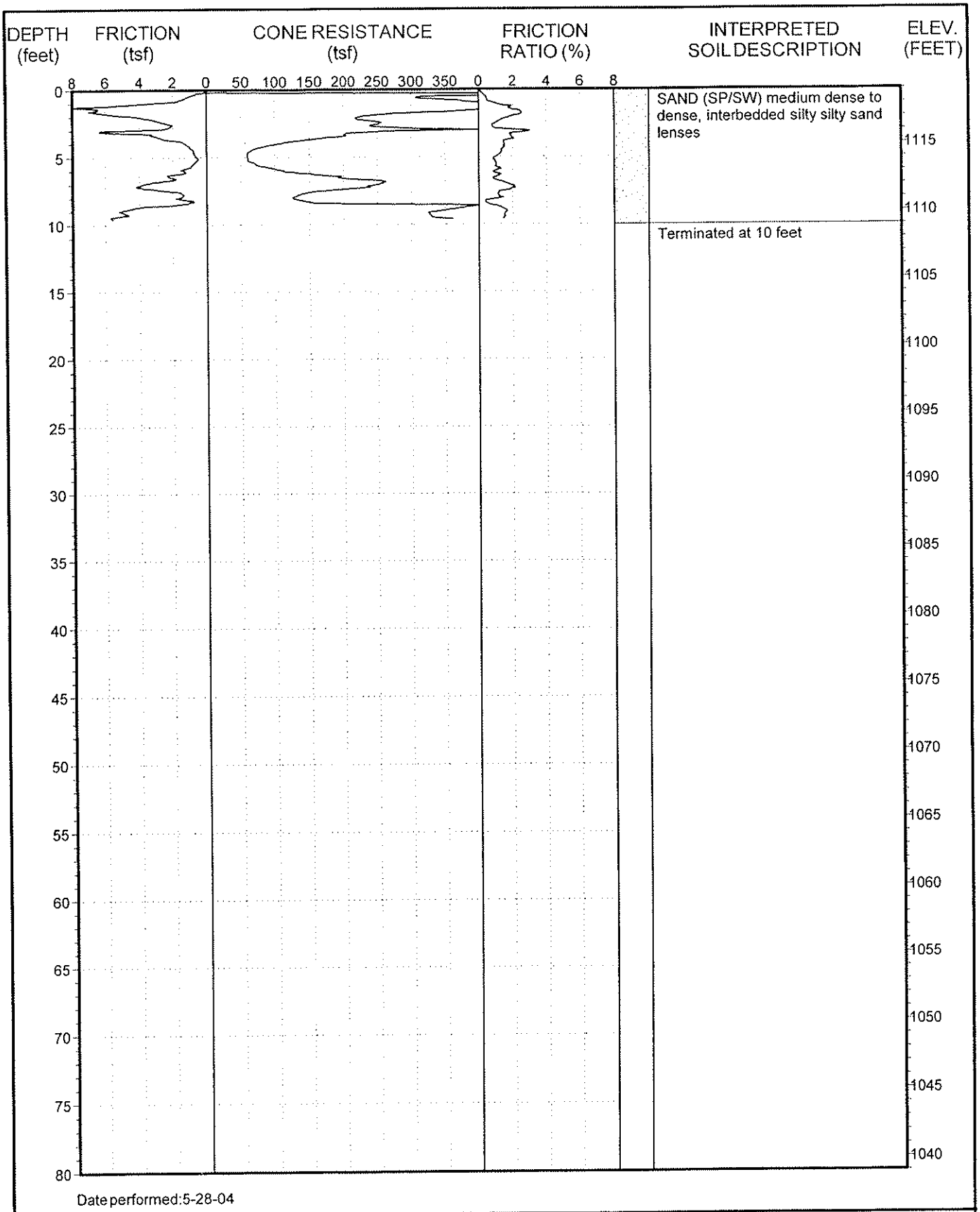
PROJECT NO.: 1974.I
WAL-MART-ONTARIO

LOG OF CPT NO. C-20

FIGURE A-21



Date performed:5-28-04

This summary applies only at the location of this cone penetration test and at the time of the exploration. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The interpreted soil description is derived from the friction ratio and cone resistance and is a simplification of actual conditions encountered.

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PROJECT NO.: 1974.I
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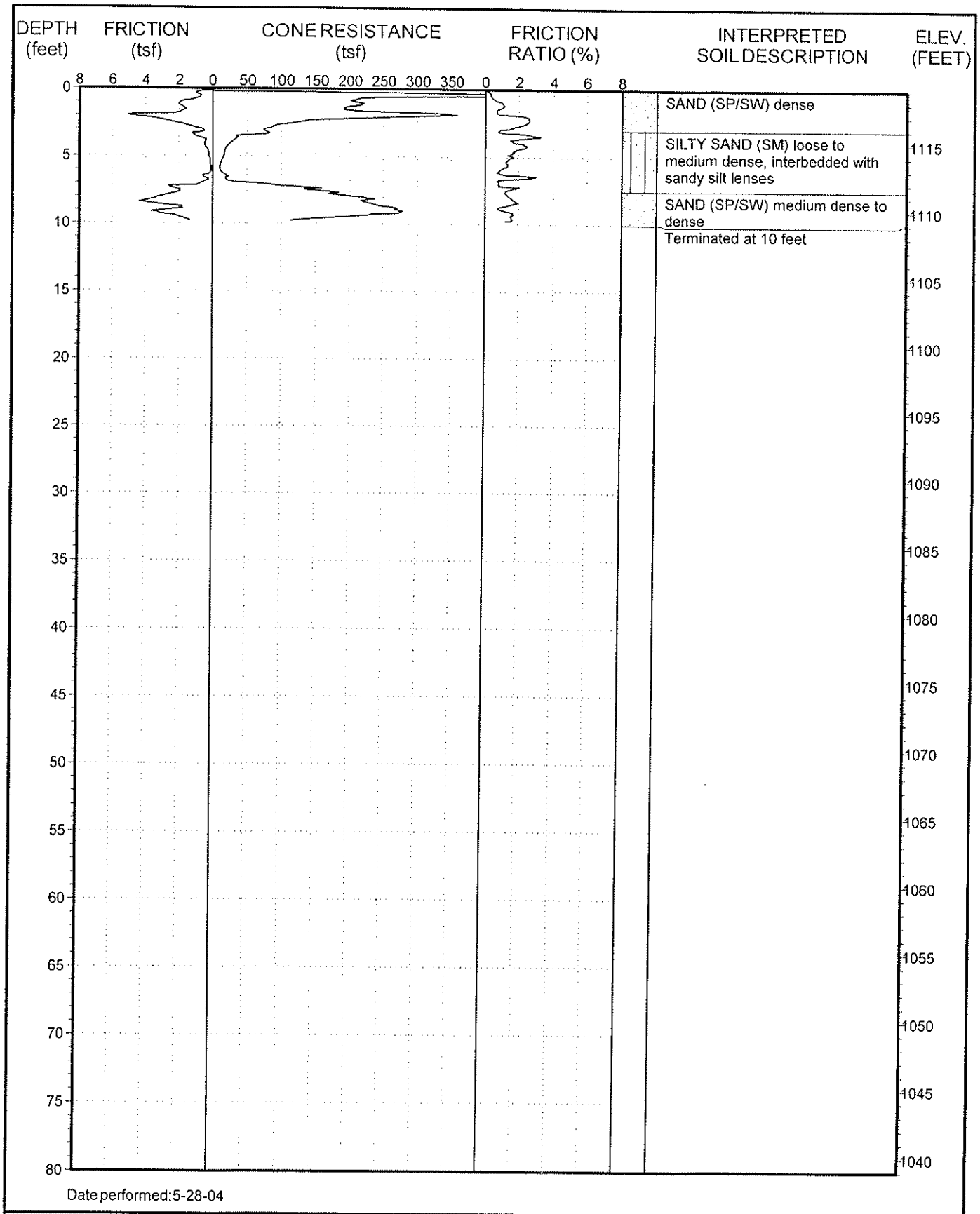
LOG OF CPT NO. C-21

FIGURE A-22



Date performed:5-28-04

This summary applies only at the location of this cone penetration test and at the time of the exploration. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The interpreted soil description is derived from the friction ratio and cone resistance and is a simplification of actual conditions encountered.

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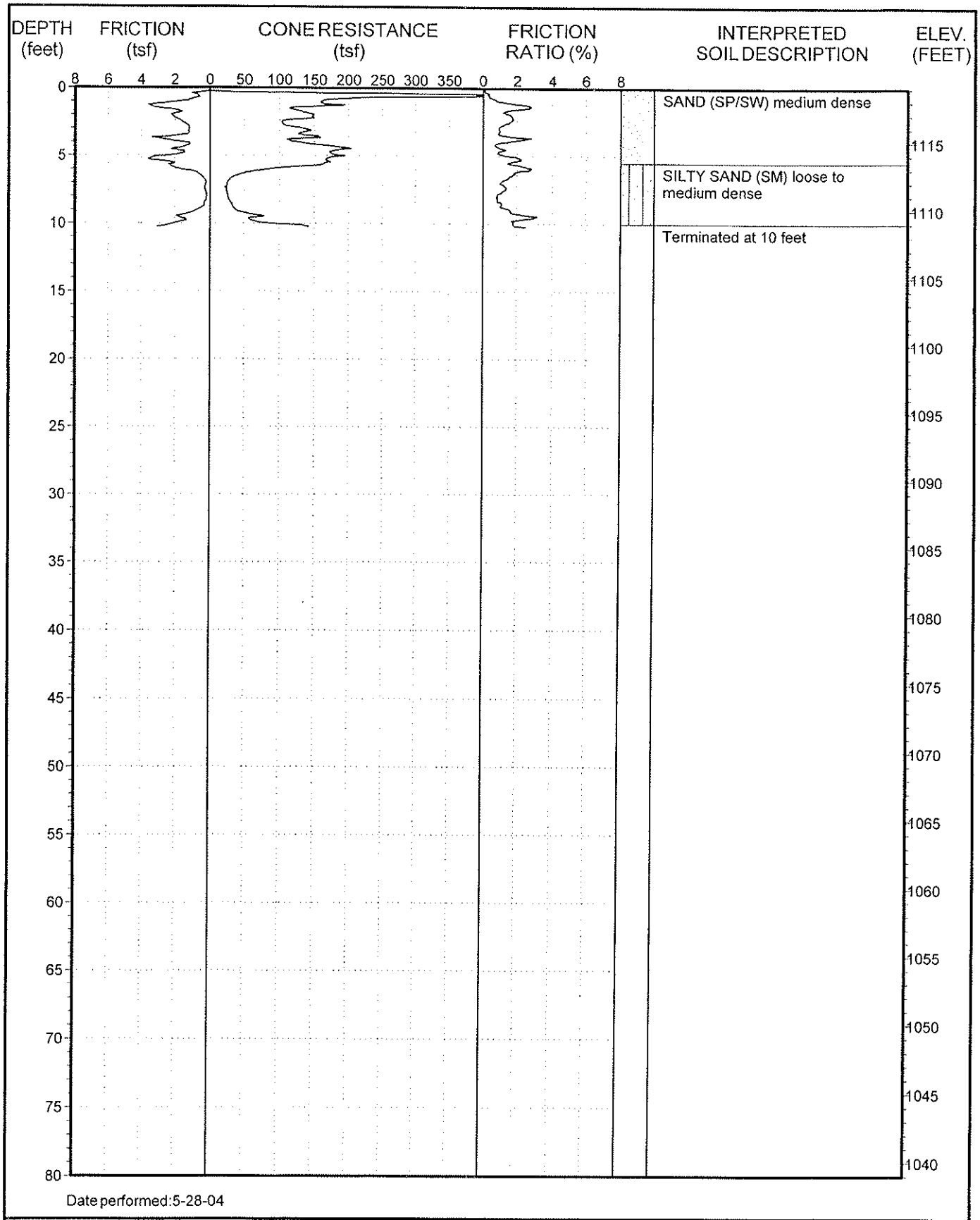
PROJECT NO.: 1974.I
WAL-MART-ONTARIO

LOG OF CPT NO. C-22

FIGURE A-23



Date performed:5-28-04

This summary applies only at the location of this cone penetration test and at the time of the exploration. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The interpreted soil description is derived from the friction ratio and cone resistance and is a simplification of actual conditions encountered.

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PROJECT NO.: 1974.I
WAL-MART-ONTARIO

LOG OF CPT NO. C-23

FIGURE A-24

APPENDIX B

APPENDIX B

EXPLORATORY BORINGS

The subsurface conditions at the site were investigated by drilling and sampling 23 exploratory borings. These borings were advanced to depths ranging from 8 to 20 feet below the existing ground surface. The exploration locations are shown on the Site Plan, Figure 2.

The borings were drilled using truck-mounted hollow-stem auger equipment. Relatively undisturbed samples were obtained using a brass-ring lined sampler (ASTM D 3550). The brass-rings have an inside diameter of 2.42 inches. The ring samples were driven into the soil by a 140-pound hammer dropping 30 inches. The number of blows needed to drive the sampler into the soil was recorded as the penetration resistance. Due to the use of a "free-fall" hammer (rather than a hammer attached to a rope), the blow-counts recorded with the drive (D) sampler are approximately equal to the Standard Penetration Test blow-count (N_{60}).

The field explorations for the investigation were performed under the continuous technical supervision of GPI's representative, who visually inspected the site, maintained detailed logs of the borings, classified the soils encountered, and obtained relatively undisturbed samples for examination and laboratory testing. The soils encountered in the borings were classified in the field and through further examination in the laboratory in accordance with the Unified Soils Classification System. Detailed logs of the borings are presented in Figures B-1 to B-23 in this appendix.

The boring locations were laid out in the field by measuring from existing site features. Ground surface elevations at the CPT locations were estimated from a grading plan provided by Hall & Foreman, Inc.

MOISTURE (%)	DRY DENSITY (PCF)	PENETRATION RESISTANCE (BLOWS/FOOT)	SAMPLE TYPE	DEPTH (FEET)	DESCRIPTION OF SUBSURFACE MATERIALS	ELEVATION (FEET)
					This summary applies only at the location of this boring and at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The data presented is a simplification of actual conditions encountered.	
			B	0	6 inches AC	
4.5	119	24	D		**SILTY SAND (SM)** brown, moist, medium dense, coarse sand, with gravel and small cobbles (approximately 3 inches in diameter)	1120
1.9		91	D	5	**SAND (SP/SW)** brown, dry to slightly moist, very dense, coarse sand, with gravel and cobbles	
3.4	125	86/11"	D		@ 6 feet, increase gravel and cobbles (to 4 inches in diameter)	1115
3.4	116	67	D	10		1110
7.2		23	S	15	@ 15 feet, slightly moist to moist	1105
3.7	112	49	D	20		
					Total Depth 20 feet	

SAMPLE TYPES
- C Rock Core
- S Standard Split Spoon
- D Drive Sample
- B Bulk Sample
- T Tube Sample

DATE DRILLED: 6-4-04

EQUIPMENT USED: 8" Hollow Stem Auger

GROUNDWATER LEVEL (ft): Not Encountered

GPI

PROJECT NO.: 1974.I
WAL-MART-ONTARIO

LOG OF BORING NO. B- 1

FIGURE B-1

MOISTURE (%)	DRY DENSITY (PCF)	PENETRATION RESISTANCE (BLOWS/FOOT)	SAMPLE TYPE	DEPTH (FEET)	DESCRIPTION OF SUBSURFACE MATERIALS	ELEVATION (FEET)
				0	This summary applies only at the location of this boring and at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The data presented is a simplification of actual conditions encountered.	
					5 inches AC	
2.0	116	31	D		**SAND (SP)** brown, dry to slightly moist, medium dense, coarse sand, with gravel and cobbles (to 3 inches in diameter)	1120
		85	D	5		
2.7		95/11"	D			1115
10.9	101	22	D	10	**SILTY SAND (SM)** brown, slightly moist to moist, medium dense, with gravel, trace clay	
						1110
13.6		8	S	15	@ 15 feet, moist, loose, trace gravel	
						1105
		17	D	20	**SANDY SILT (ML)** brown, moist, medium dense	
					Total Depth 20 feet	

SAMPLE TYPES
- C Rock Core
- S Standard Split Spoon
- D Drive Sample
- B Bulk Sample
- T Tube Sample

DATE DRILLED: 6-4-04

EQUIPMENT USED: 8" Hollow Stem Auger

GROUNDWATER LEVEL (ft): Not Encountered

GPI

PROJECT NO.: 1974.I
WAL-MART-ONTARIO

LOG OF BORING NO. B- 2

FIGURE B-2

MOISTURE (%)	DRY DENSITY (PCF)	PENETRATION RESISTANCE (BLOWS/FOOT)	SAMPLE TYPE	DEPTH (FEET)	DESCRIPTION OF SUBSURFACE MATERIALS	ELEVATION (FEET)
					This summary applies only at the location of this boring and at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The data presented is a simplification of actual conditions encountered.	
				0	5 inches AC	
4.4	119	41	D		**SILTY SAND (SM)** brown, slightly moist to moist, medium dense, with gravel	1120
		23	D	5	@ 5 feet, with cobbles (to 4 inches in diameter)	
5.6	113	15	D			1115
7.1		62/11"	D	10		1110
2.5		78/11"	D	15	**SAND (SP)** brown, slightly moist, very dense, coarse sand, with gravel and cobbles (to 4 inches in diameter)	1105
5.1		20	D	20	**SILTY SAND (SM)** brown, slightly moist to moist, medium dense, trace gravel and cobbles	
					Total Depth 20 feet	

SAMPLE TYPES
- C Rock Core
- S Standard Split Spoon
- D Drive Sample
- B Bulk Sample
- T Tube Sample

DATE DRILLED: 6-4-04

EQUIPMENT USED: 8" Hollow Stem Auger

GROUNDWATER LEVEL (ft): Not Encountered

GPI

PROJECT NO.: 1974.I
WAL-MART-ONTARIO

LOG OF BORING NO. B- 3

FIGURE B-3

MOISTURE (%)	DRY DENSITY (PCF)	PENETRATION RESISTANCE (BLOWS/FOOT)	SAMPLE TYPE	DEPTH (FEET)	DESCRIPTION OF SUBSURFACE MATERIALS	ELEVATION (FEET)
					This summary applies only at the location of this boring and at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The data presented is a simplification of actual conditions encountered.	
			B	0	7 inches AC	
6.0	115	20	D		**SILTY SAND (SM)** brown, moist, medium dense, with gravel	1120
13.3	111	7	D	5	@ 5 feet, loose	
3.3	115	21	D		@ 8 feet, slightly moist, with gravel and cobbles (to 4 inches in diameter)	1115
7.9		68	D	10	@ 12 feet, dense	1110
2.3		36	S	15	**SAND WITH SILT (SP-SM)** dry to slightly moist, slightly silty, with gravel and cobbles (to 3 inches in diameter)	1105
		28	D		@ 19 feet, silty clay, light brown, moist	
				20	Total Depth 20 feet	

SAMPLE TYPES
- C Rock Core
- S Standard Split Spoon
- D Drive Sample
- B Bulk Sample
- T Tube Sample

DATE DRILLED: 6-4-04

EQUIPMENT USED: 8" Hollow Stem Auger

GROUNDWATER LEVEL (ft): Not Encountered

GPI

PROJECT NO.: 1974.I
WAL-MART-ONTARIO

LOG OF BORING NO. B- 4

FIGURE B-4

MOISTURE (%)	DRY DENSITY (PCF)	PENETRATION RESISTANCE (BLOWS/FOOT)	SAMPLE TYPE	DEPTH (FEET)	*DESCRIPTION OF SUBSURFACE MATERIALS*	ELEVATION (FEET)
					This summary applies only at the location of this boring and at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The data presented is a simplification of actual conditions encountered.	
			B	0	4 inches AC	
6.3	115	12	D		**SAND WITH SILT (SP-SM)** brown, moist, loose, layers silty sand	1120
5.2	115	42	D	5	@ 5 feet, medium dense	
5.2	124	51	D		@ 7 feet, slightly moist, dense, with gravel and cobbles (to 4 inches in diameter)	1115
		23	D	10	@ 10 feet, moist, medium dense	1110
		87/7"	S	15	**SAND (SP)** slightly moist, very dense, coarse sand, with cobbles (to 4 inches in diameter)	1105
		76	D	20		
					Total Depth 20 feet	

SAMPLE TYPES
- C Rock Core
- S Standard Split Spoon
- D Drive Sample
- B Bulk Sample
- T Tube Sample

DATE DRILLED: 6-4-04

EQUIPMENT USED: 8" Hollow Stem Auger

GROUNDWATER LEVEL (ft): Not Encountered

GPI

PROJECT NO.: 1974.I
WAL-MART-ONTARIO

LOG OF BORING NO. B- 5

FIGURE B-5

MOISTURE (%)	DRY DENSITY (PCF)	PENETRATION RESISTANCE (BLOWS/FOOT)	SAMPLE TYPE	DEPTH (FEET)	DESCRIPTION OF SUBSURFACE MATERIALS	ELEVATION (FEET)
				0	This summary applies only at the location of this boring and at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The data presented is a simplification of actual conditions encountered.	
					9 inches AC	
6.6	116	13	D		**SILTY SAND (SM)** brown, moist, loose, with trace gravel	1120
8.8	107	6	D	5	@ 5 feet, very loose	
7.0	103	5	D			1115
4.4	123	24	D	10	**SAND (SP/SW)** brown, dry to slightly moist, medium dense, with gravel and cobbles (to 4 inches in diameter)	1110
		36	S	15	**SILTY SAND (SM)** brown, slightly moist, with gravel and cobbles (to 4 inches in diameter)	1105
		71	D	20	**SAND (SP/SW)** brown, with gravel and cobbles (to 4 inches in diameter)	
					Total Depth 20 feet	

SAMPLE TYPES
- C Rock Core
- S Standard Split Spoon
- D Drive Sample
- B Bulk Sample
- T Tube Sample

DATE DRILLED: 6-4-04

EQUIPMENT USED: 8" Hollow Stem Auger

GROUNDWATER LEVEL (ft): Not Encountered

GDI

PROJECT NO.: 1974.I
WAL-MART-ONTARIO

LOG OF BORING NO. B- 6

FIGURE B-6

MOISTURE (%)	DRY DENSITY (PCF)	PENETRATION RESISTANCE (BLOWS/FOOT)	SAMPLE TYPE	DEPTH (FEET)	DESCRIPTION OF SUBSURFACE MATERIALS	ELEVATION (FEET)
					This summary applies only at the location of this boring and at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The data presented is a simplification of actual conditions encountered.	
				0	5 inches AC	
9.4	114	28	D		**SILTY SAND (SM)** brown, slightly moist to moist, medium dense, with gravel and frequent cobbles	1120
		33	D	5	@ 5 feet, increase in gravel	1115
				10	Total Depth 10 feet	

SAMPLE TYPES
- C Rock Core
- S Standard Split Spoon
- D Drive Sample
- B Bulk Sample
- T Tube Sample

DATE DRILLED: 6-5-04

EQUIPMENT USED: 8" Hollow Stem Auger

GROUNDWATER LEVEL (ft): Not Encountered

GPI

PROJECT NO.: 1974.I
WAL-MART-ONTARIO

LOG OF BORING NO. B- 7

FIGURE B-7

MOISTURE (%)	DRY DENSITY (PCF)	PENETRATION RESISTANCE (BLOWS/FOOT)	SAMPLE TYPE	DEPTH (FEET)	*DESCRIPTION OF SUBSURFACE MATERIALS*	ELEVATION (FEET)
					This summary applies only at the location of this boring and at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The data presented is a simplification of actual conditions encountered.	
				0	3 inches AC	
4.3	120	27	D		**SILTY SAND (SM)** brown, moist, medium dense, with gravel and frequent cobbles	1120
		43	D	5		
				10		1115
					Total Depth 10 feet	

SAMPLE TYPES
- C Rock Core
- S Standard Split Spoon
- D Drive Sample
- B Bulk Sample
- T Tube Sample

DATE DRILLED: 6-5-04

EQUIPMENT USED: 8" Hollow Stem Auger

GROUNDWATER LEVEL (ft): Not Encountered

GPI

PROJECT NO.: 1974.I
WAL-MART-ONTARIO

LOG OF BORING NO. B- 8

FIGURE B-8

MOISTURE (%)	DRY DENSITY (PCF)	PENETRATION RESISTANCE (BLOWS/FOOT)	SAMPLE TYPE	DEPTH (FEET)	DESCRIPTION OF SUBSURFACE MATERIALS	ELEVATION (FEET)
					This summary applies only at the location of this boring and at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The data presented is a simplification of actual conditions encountered.	
				0	4 inches AC	1130
8.0	110	13	D		**SILTY SAND (SM)** brown, moist, loose, with occasional gravel and trace cobbles	
					@ 4 feet, increase gravel and cobbles	
		69/11"	D	5	@ 5 feet, becomes dense	1125
				10	Total Depth 10 feet	1120

SAMPLE TYPES
- C Rock Core
- S Standard Split Spoon
- D Drive Sample
- B Bulk Sample
- T Tube Sample

DATE DRILLED: 6-5-04

EQUIPMENT USED: 8" Hollow Stem Auger

GROUNDWATER LEVEL (ft): Not Encountered

GPI

PROJECT NO.: 1974.I
WAL-MART-ONTARIO

LOG OF BORING NO. B- 9

FIGURE B-9

MOISTURE (%)	DRY DENSITY (PCF)	PENETRATION RESISTANCE (BLOWS/FOOT)	SAMPLE TYPE	DEPTH (FEET)	DESCRIPTION OF SUBSURFACE MATERIALS	ELEVATION (FEET)
					This summary applies only at the location of this boring and at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The data presented is a simplification of actual conditions encountered.	
			B	0	3 inches AC	1125
2.7	125	44	D		**SILTY SAND (SM)** brown, slightly moist, medium dense, with gravel and cobbles (to 4 inches in diameter)	
		52	D	5	@ 6 feet, dense	1120
				10	Total Depth 10 feet	1115

SAMPLE TYPES
- C Rock Core
- S Standard Split Spoon
- D Drive Sample
- B Bulk Sample
- T Tube Sample

DATE DRILLED: 6-4-04

EQUIPMENT USED: 8" Hollow Stem Auger

GROUNDWATER LEVEL (ft): Not Encountered

GPI

PROJECT NO.: 1974.I
WAL-MART-ONTARIO

LOG OF BORING NO. B-10

FIGURE B-10

MOISTURE (%)	DRY DENSITY (PCF)	PENETRATION RESISTANCE (BLOWS/FOOT)	SAMPLE TYPE	DEPTH (FEET)	DESCRIPTION OF SUBSURFACE MATERIALS	ELEVATION (FEET)
					This summary applies only at the location of this boring and at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The data presented is a simplification of actual conditions encountered.	
				0	3 inches AC	
2.4		74	D		**SAND (SP)** light brown, slightly moist, very dense, with gravel and frequent cobbles	1120
		31	D	5	@ 5 feet, medium dense	1115
				10	Total Depth 10 feet	

SAMPLE TYPES
- C Rock Core
- S Standard Split Spoon
- D Drive Sample
- B Bulk Sample
- T Tube Sample

DATE DRILLED: 6-5-04

EQUIPMENT USED: 8" Hollow Stem Auger

GROUNDWATER LEVEL (ft): Not Encountered

GPI

PROJECT NO.: 1974.I
WAL-MART-ONTARIO

LOG OF BORING NO. B-11

FIGURE B-11

MOISTURE (%)	DRY DENSITY (PCF)	PENETRATION RESISTANCE (BLOWS/FOOT)	SAMPLE TYPE	DEPTH (FEET)	DESCRIPTION OF SUBSURFACE MATERIALS	ELEVATION (FEET)
					This summary applies only at the location of this boring and at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The data presented is a simplification of actual conditions encountered.	
				0	4 1/2 inches AC	1125
3.9	117	24	D		**SILTY SAND (SM)** brown, slightly moist, medium dense, with gravel and frequent cobbles	
		31	D	5		1120
				10	Total Depth 10 feet	1115

SAMPLE TYPES
- C Rock Core
- S Standard Split Spoon
- D Drive Sample
- B Bulk Sample
- T Tube Sample

DATE DRILLED: 6-5-04

EQUIPMENT USED: 8" Hollow Stem Auger

GROUNDWATER LEVEL (ft): Not Encountered

GPI

PROJECT NO.: 1974.I
WAL-MART-ONTARIO

LOG OF BORING NO. B-12

FIGURE B-12

MOISTURE (%)	DRY DENSITY (PCF)	PENETRATION RESISTANCE (BLOWS/FOOT)	SAMPLE TYPE	DEPTH (FEET)	DESCRIPTION OF SUBSURFACE MATERIALS	ELEVATION (FEET)
					This summary applies only at the location of this boring and at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The data presented is a simplification of actual conditions encountered.	
				0	3 inches AC	
2.7	120	56	D		**SILTY SAND (SM)** brown, slightly moist to moist, very dense, with gravel and frequent cobbles	1120
		66/11"	D	5		1115
				10	Total Depth 10 feet	

SAMPLE TYPES
- C Rock Core
- S Standard Split Spoon
- D Drive Sample
- B Bulk Sample
- T Tube Sample

DATE DRILLED: 6-5-04

EQUIPMENT USED: 8" Hollow Stem Auger

GROUNDWATER LEVEL (ft): Not Encountered

GPI

PROJECT NO.: 1974.I
WAL-MART-ONTARIO

LOG OF BORING NO. B-13

FIGURE B-13

MOISTURE (%)	DRY DENSITY (PCF)	PENETRATION RESISTANCE (BLOWS/FOOT)	SAMPLE TYPE	DEPTH (FEET)	DESCRIPTION OF SUBSURFACE MATERIALS	ELEVATION (FEET)
					This summary applies only at the location of this boring and at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The data presented is a simplification of actual conditions encountered.	
				0	3 inches AC	
8.1	111	12	D		**SILTY SAND (SM)** brown, slightly moist, loose	1120
					@ 4 feet, with gravel and occasional cobbles	
		35	D	5		
					@ 6 feet, becomes medium dense	1115
				10	Total Depth 10 feet	

SAMPLE TYPES
- C Rock Core
- S Standard Split Spoon
- D Drive Sample
- B Bulk Sample
- T Tube Sample

DATE DRILLED: 6-5-04

EQUIPMENT USED: 8" Hollow Stem Auger

GROUNDWATER LEVEL (ft): Not Encountered

GPI

PROJECT NO.: 1974.I
WAL-MART-ONTARIO

LOG OF BORING NO. B-14

FIGURE B-14

MOISTURE (%)	DRY DENSITY (PCF)	PENETRATION RESISTANCE (BLOWS/FOOT)	SAMPLE TYPE	DEPTH (FEET)	DESCRIPTION OF SUBSURFACE MATERIALS	ELEVATION (FEET)
					This summary applies only at the location of this boring and at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The data presented is a simplification of actual conditions encountered.	
				0	4 inches AC	
6.7	105	9	D		**SILTY SAND (SM)** brown, slightly moist to moist, loose, with trace gravel	1120
4.9	107	19	D	5	@ 5 feet, medium dense, with gravel and occasional cobbles	1115
				10	Total Depth 10 feet	

SAMPLE TYPES
- C Rock Core
- S Standard Split Spoon
- D Drive Sample
- B Bulk Sample
- T Tube Sample

DATE DRILLED: 6-5-04

EQUIPMENT USED: 8" Hollow Stem Auger

GROUNDWATER LEVEL (ft): Not Encountered

GPI

PROJECT NO.: 1974.I
WAL-MART-ONTARIO

LOG OF BORING NO. B-15

FIGURE B-15

MOISTURE (%)	DRY DENSITY (PCF)	PENETRATION RESISTANCE (BLOWS/FOOT)	SAMPLE TYPE	DEPTH (FEET)	DESCRIPTION OF SUBSURFACE MATERIALS	ELEVATION (FEET)
					This summary applies only at the location of this boring and at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The data presented is a simplification of actual conditions encountered.	
				0	5 inches AC	1120
6.5	116	41	D		**SILTY SAND (SM)** brown, moist, medium dense, with gravel and cobbles (to 4 inches in diameter)	
		43	D	5	**SAND WITH SILT (SP-SM)** brown, dry to slightly moist, medium dense, with gravel and cobbles (to 4 inches in diameter)	1115
					Refusal at 8 feet	

SAMPLE TYPES
- C Rock Core
- S Standard Split Spoon
- D Drive Sample
- B Bulk Sample
- T Tube Sample

DATE DRILLED: 6-4-04

EQUIPMENT USED: 8" Hollow Stem Auger

GROUNDWATER LEVEL (ft): Not Encountered

GPI

PROJECT NO.: 1974.I
WAL-MART-ONTARIO

LOG OF BORING NO. B-16

FIGURE B-16

MOISTURE (%)	DRY DENSITY (PCF)	PENETRATION RESISTANCE (BLOWS/FOOT)	SAMPLE TYPE	DEPTH (FEET)	DESCRIPTION OF SUBSURFACE MATERIALS	ELEVATION (FEET)
				0	This summary applies only at the location of this boring and at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The data presented is a simplification of actual conditions encountered.	
					5 inches AC	
4.3	115	30	D		**SILTY SAND (SM)** brown, slightly moist, medium dense, with gravel and frequent cobbles	1120
		40	D	5		1115
				10	Total Depth 10 feet	

SAMPLE TYPES
- C Rock Core
- S Standard Split Spoon
- D Drive Sample
- B Bulk Sample
- T Tube Sample

DATE DRILLED: 6-5-04

EQUIPMENT USED: 8" Hollow Stem Auger

GROUNDWATER LEVEL (ft): Not Encountered

GPI

PROJECT NO.: 1974.I
WAL-MART-ONTARIO

LOG OF BORING NO. B-17

FIGURE B-17

MOISTURE (%)	DRY DENSITY (PCF)	PENETRATION RESISTANCE (BLOWS/FOOT)	SAMPLE TYPE	DEPTH (FEET)	DESCRIPTION OF SUBSURFACE MATERIALS	ELEVATION (FEET)
					This summary applies only at the location of this boring and at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The data presented is a simplification of actual conditions encountered.	
				0	5 1/2 inches AC (overlay with fabric)	
6.1		9	D		**SILTY SAND (SM)** brown, slightly moist, loose, trace gravel	1115
7.2	117	6	D	5	@ 5 feet, loose to very loose	1110
				10	Total Depth 10 feet	

SAMPLE TYPES
- C Rock Core
- S Standard Split Spoon
- D Drive Sample
- B Bulk Sample
- T Tube Sample

DATE DRILLED: 6-5-04

EQUIPMENT USED: 8" Hollow Stem Auger

GROUNDWATER LEVEL (ft): Not Encountered

GPI

PROJECT NO.: 1974.I
WAL-MART-ONTARIO

LOG OF BORING NO. B-18

FIGURE B-18

MOISTURE (%)	DRY DENSITY (PCF)	PENETRATION RESISTANCE (BLOWS/FOOT)	SAMPLE TYPE	DEPTH (FEET)	*DESCRIPTION OF SUBSURFACE MATERIALS*	ELEVATION (FEET)
					This summary applies only at the location of this boring and at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The data presented is a simplification of actual conditions encountered.	
				0	6 inches AC	1120
4.3		48	D		**SILTY SAND (SM)** dark brown, moist, dense, with gravel and cobbles (to 3 inches in diameter)	
		34	D	5	@ 5 feet, brown, slightly moist, medium dense, with gravel and cobbles (to 2 inches)	1115
					@ 7 feet, with cobbles (to 4 inches in diameter)	
				10	Total Depth 10 feet	1110

SAMPLE TYPES
- C Rock Core
- S Standard Split Spoon
- D Drive Sample
- B Bulk Sample
- T Tube Sample

DATE DRILLED: 6-4-04

EQUIPMENT USED: 8" Hollow Stem Auger

GROUNDWATER LEVEL (ft): Not Encountered

GPI

PROJECT NO.: 1974.I
WAL-MART-ONTARIO

LOG OF BORING NO. B-19

FIGURE B-19

MOISTURE (%)	DRY DENSITY (PCF)	PENETRATION RESISTANCE (BLOWS/FOOT)	SAMPLE TYPE	DEPTH (FEET)	*DESCRIPTION OF SUBSURFACE MATERIALS*	ELEVATION (FEET)
					This summary applies only at the location of this boring and at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The data presented is a simplification of actual conditions encountered.	
			B	0	3 1/2 inches AC	
3.5	121	34	D		**SILTY SAND (SM)** brown, moist, medium dense, with gravel	1115
		59	D	5	**SAND WITH SILT (SP-SM)** brown, dry to slightly moist, dense, with gravel and cobbles (to 4 inches in diameter)	1110
				10	Total Depth 10 feet	

SAMPLE TYPES
- [C] Rock Core
- [S] Standard Split Spoon
- [D] Drive Sample
- [B] Bulk Sample
- [T] Tube Sample

DATE DRILLED: 6-4-04

EQUIPMENT USED: 8" Hollow Stem Auger

GROUNDWATER LEVEL (ft): Not Encountered

GPI

PROJECT NO.: 1974.I
WAL-MART-ONTARIO

LOG OF BORING NO. B-20

FIGURE B-20

MOISTURE (%)	DRY DENSITY (PCF)	PENETRATION RESISTANCE (BLOWS/FOOT)	SAMPLE TYPE	DEPTH (FEET)	DESCRIPTION OF SUBSURFACE MATERIALS	ELEVATION (FEET)
					This summary applies only at the location of this boring and at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The data presented is a simplification of actual conditions encountered.	
				0	5 inches AC	
5.4	114	9	D		**SILTY SAND (SM)** dark brown, moist, loose, with gravel	1115
		52	D	5	@ 5 feet, brown, dry to slightly moist, with gravel and cobbles (to 3 inches in diameter)	1110
				10	Total Depth 10 feet	

SAMPLE TYPES
- [C] Rock Core
- [S] Standard Split Spoon
- [D] Drive Sample
- [B] Bulk Sample
- [T] Tube Sample

DATE DRILLED: 6-4-04

EQUIPMENT USED: 8" Hollow Stem Auger

GROUNDWATER LEVEL (ft): Not Encountered

GPI

PROJECT NO.: 1974.I
WAL-MART-ONTARIO

LOG OF BORING NO. B-21

FIGURE B-21

MOISTURE (%)	DRY DENSITY (PCF)	PENETRATION RESISTANCE (BLOWS/FOOT)	SAMPLE TYPE	DEPTH (FEET)	DESCRIPTION OF SUBSURFACE MATERIALS	ELEVATION (FEET)
				0	This summary applies only at the location of this boring and at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The data presented is a simplification of actual conditions encountered.	
					4 inches AC	
6.2	109	18	D		**SILTY SAND (SM)** brown, moist, medium dense, with gravel	1115
		10	D	5	@ 5 feet, loose	
					@ 8 feet, with cobbles (to 3 inches in diameter)	1110
				10	Total Depth 10 feet	

SAMPLE TYPES
- C Rock Core
- S Standard Split Spoon
- D Drive Sample
- B Bulk Sample
- T Tube Sample

DATE DRILLED: 6-4-04

EQUIPMENT USED: 8" Hollow Stem Auger

GROUNDWATER LEVEL (ft): Not Encountered

GPI

PROJECT NO.: 1974.I
WAL-MART-ONTARIO

LOG OF BORING NO. B-22

FIGURE B-22

MOISTURE (%)	DRY DENSITY (PCF)	PENETRATION RESISTANCE (BLOWS/FOOT)	SAMPLE TYPE	DEPTH (FEET)	DESCRIPTION OF SUBSURFACE MATERIALS	ELEVATION (FEET)
				0	This summary applies only at the location of this boring and at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The data presented is a simplification of actual conditions encountered.	
					6 inches AC	
6.0	120	35	D		**SILTY SAND (SM)** brown, moist, medium dense, with gravel and trace cobbles (to 3 inches in diameter)	1115
		9	D	5	@ 5 feet, loose	
				10	Total Depth 10 feet	1110

SAMPLE TYPES
- C Rock Core
- S Standard Split Spoon
- D Drive Sample
- B Bulk Sample
- T Tube Sample

DATE DRILLED: 6-4-04

EQUIPMENT USED: 8" Hollow Stem Auger

GROUNDWATER LEVEL (ft): Not Encountered

GPI

PROJECT NO.: 1974.I
WAL-MART-ONTARIO

LOG OF BORING NO. B-23

FIGURE B-23

APPENDIX C

APPENDIX C

LABORATORY TESTS

INTRODUCTION

Representative undisturbed soil samples and bulk samples were carefully packaged in the field and sealed to prevent moisture loss. The samples were then transported to our Cypress office for examination and testing assignments. Laboratory tests were performed on selected representative samples as an aid in classifying the soils and to evaluate the physical properties of the soils affecting foundation design and construction procedures. Detailed descriptions of the laboratory tests are presented below under the appropriate test headings. Test results are presented in the figures that follow.

MOISTURE CONTENT AND DRY DENSITY

Moisture content and dry density were determined from a number of the ring samples. The samples were first trimmed to obtain volume and wet weight and then were dried in accordance with ASTM D 2216. After drying, the weight of each sample was measured, and moisture content and dry density were calculated. Moisture content and dry density values are presented on the boring logs in Appendix B.

GRADATION

A total of five soil samples were dried, weighed, soaked in water until individual soil particles were separated, and then washed on the No. 200 sieve. That portion of the material retained on the No. 200 sieve was oven-dried and weighed to determine the percentage of the material passing the No. 200 sieve. Two additional samples were passed through a series of sieves to determine the gradation of the soils. The results of the full sieve tests are presented on Figure C-1. The results of the No. 200 wash tests are tabulated as follows:

BORING NO.	DEPTH (ft)	SOIL DESCRIPTION	PERCENT PASSING NO. 200 SIEVE
B-1	5	Sand (SP/SW)	3
B-2	2	Sand (SP/SW)	3
B-3	7	Silty Sand (SM)	17
B-5	5	Sand with Silt (SP-SM)	10
B-6	2	Silty Sand (SM)	22

DIRECT SHEAR

Direct shear tests were performed on an undisturbed and a remolded bulk sample in accordance with ASTM D 3080. The bulk sample was remolded to approximately 95 percent of the maximum dry density (ASTM D 1557). The samples were placed in the shear

machine, and a normal load comparable to the in-situ overburden stress was applied. The samples were inundated, allowed to consolidate, and then were sheared to failure at a strain rate of 0.0042 inches per minute. The tests were repeated on additional test specimens under increased normal loads. Shear stress and sample deformation were monitored throughout the test. The results of the direct shear tests are presented in Figures C-2 and C-3.

COLLAPSE

A collapse test was performed on an undisturbed sample of silty sand in accordance with ASTM D 5333. After trimming the ends, the samples were placed in the consolidometer and loaded to 0.2 ksf. Thereafter, the samples were incrementally loaded to a maximum load of 3.2 ksf at the in-situ moisture content and then saturated. Sample deformation was measured to 0.0001 inch. The amount of collapse is shown below as percent compression of the sample.

BORING NO.	DEPTH (ft)	SOIL DESCRIPTION	IN-SITU MOISTURE CONTENT (%)	TOTAL COMPRESSION (%)	
				BEFORE SATURATION	AFTER SATURATION
B-6	7	Silty Sand (SM)		2.7	4.3

COMPACTION TEST

One maximum dry density/optimum moisture test was performed in accordance with ASTM D 1557 on representative bulk samples. The test results are as follows:

BORING NO.	DEPTH (ft)	SOIL DESCRIPTION	OPTIMUM MOISTURE (%)	MAXIMUM DRY DENSITY (pcf)
B-4	1 - 5	Silty Sand (SM)	8.5	130

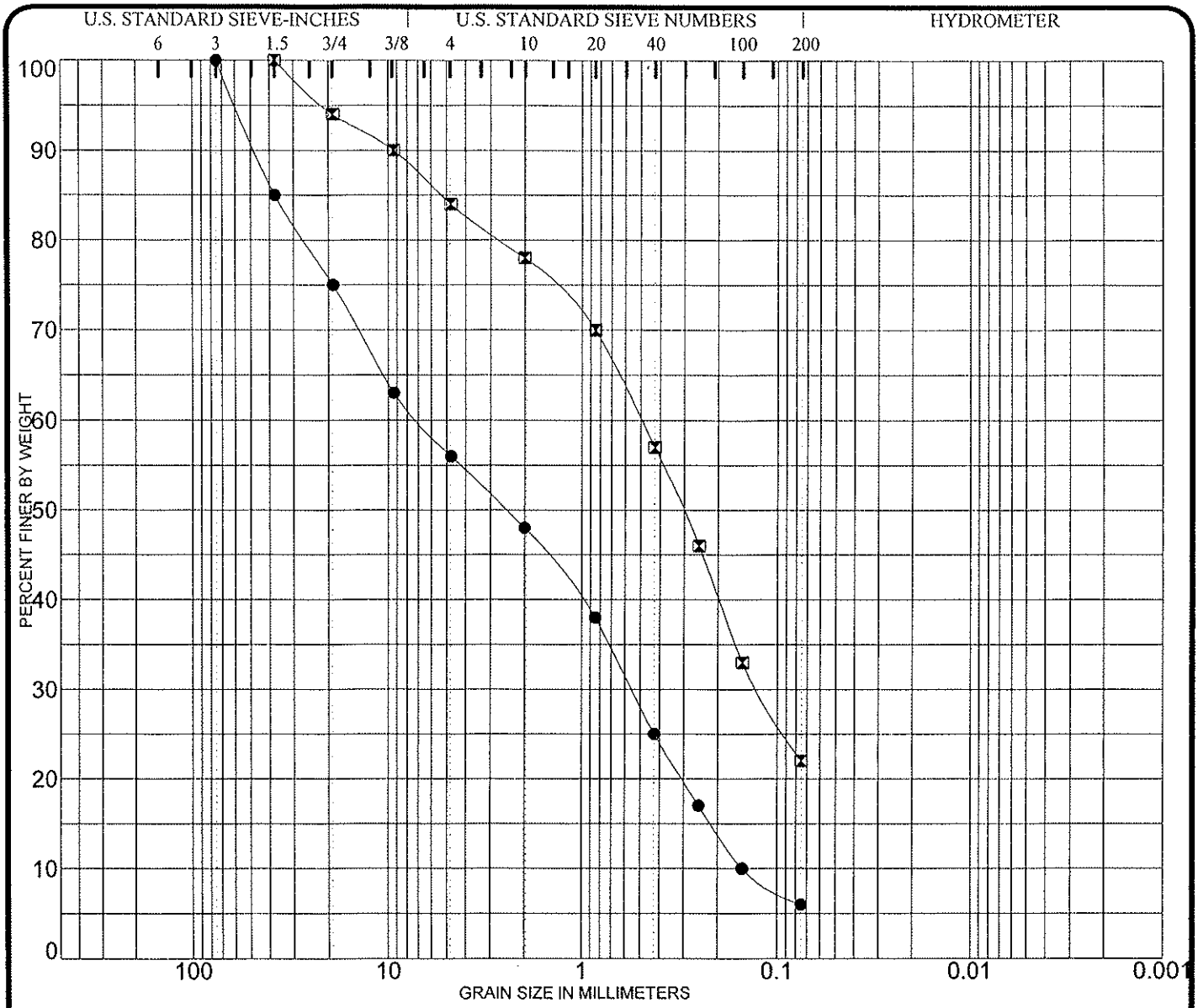
R-VALUE

One R-value test was performed on the near-surface soils to evaluate subgrade modulus and suitability for pavement support. The test was performed in accordance with ASTM D 2844 by GMU, Inc. under subcontract to GPI. The results of the tests are as follows:

BORING NO.	DEPTH (ft)	SOIL DESCRIPTION	R-VALUE BY EXUDATION
B-20	1-5	Silty Sand (SM)	78

CORROSIVITY

Soil corrosivity testing was performed by M.J. Schiff and Associates on one soil sample provided by GPI. The test results are summarized in Table 1 of this Appendix.



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	Sample Location		Classification	MC%	LL	PL	PI	Cc	Cu
●	B- 1	1-5	SAND WITH SILT (SP-SM)					0.29	46.6
⊠	B- 5	1-5	SILTY SAND (SM)						

	Sample Location		D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	B- 1	1-5	75.00	6.99	0.555	0.1500	44.0	50.0	6.0	
⊠	B- 5	1-5	37.50	0.50	0.124		16.0	62.0	22.0	

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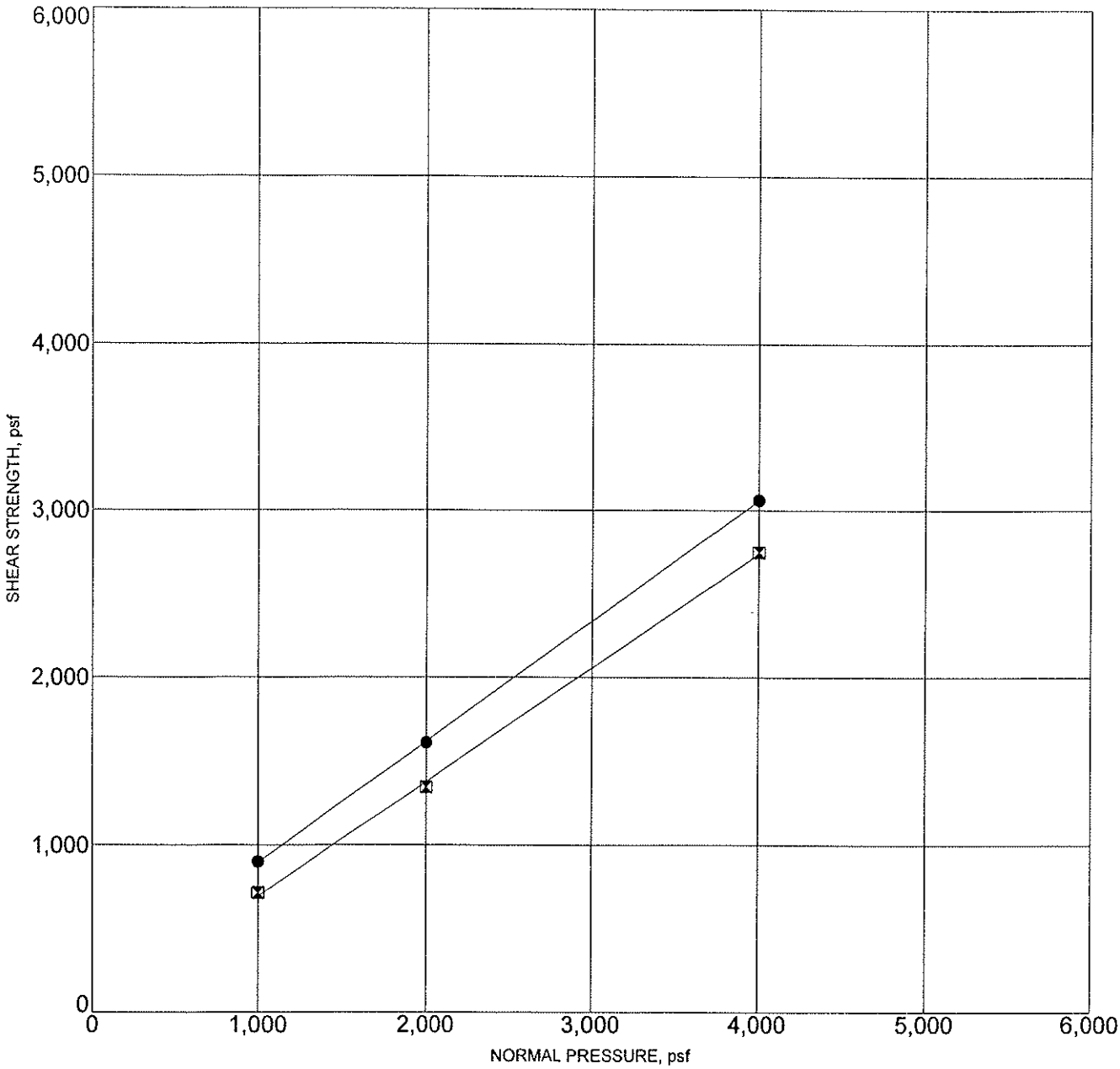
GRAIN SIZE DISTRIBUTION

FIGURE C-1



● **PEAK STRENGTH**
Friction Angle= 36 degrees
Cohesion= 174 psf

⊠ **ULTIMATE STRENGTH**
Friction Angle= 34 degrees
Cohesion= 13 psf

Note: Sample remolded to 95% of maximum dry density.

Sample Location		Classification	DD,pcf	MC,%
B- 4	1-5	SILTY SAND (SM)	127	8.5

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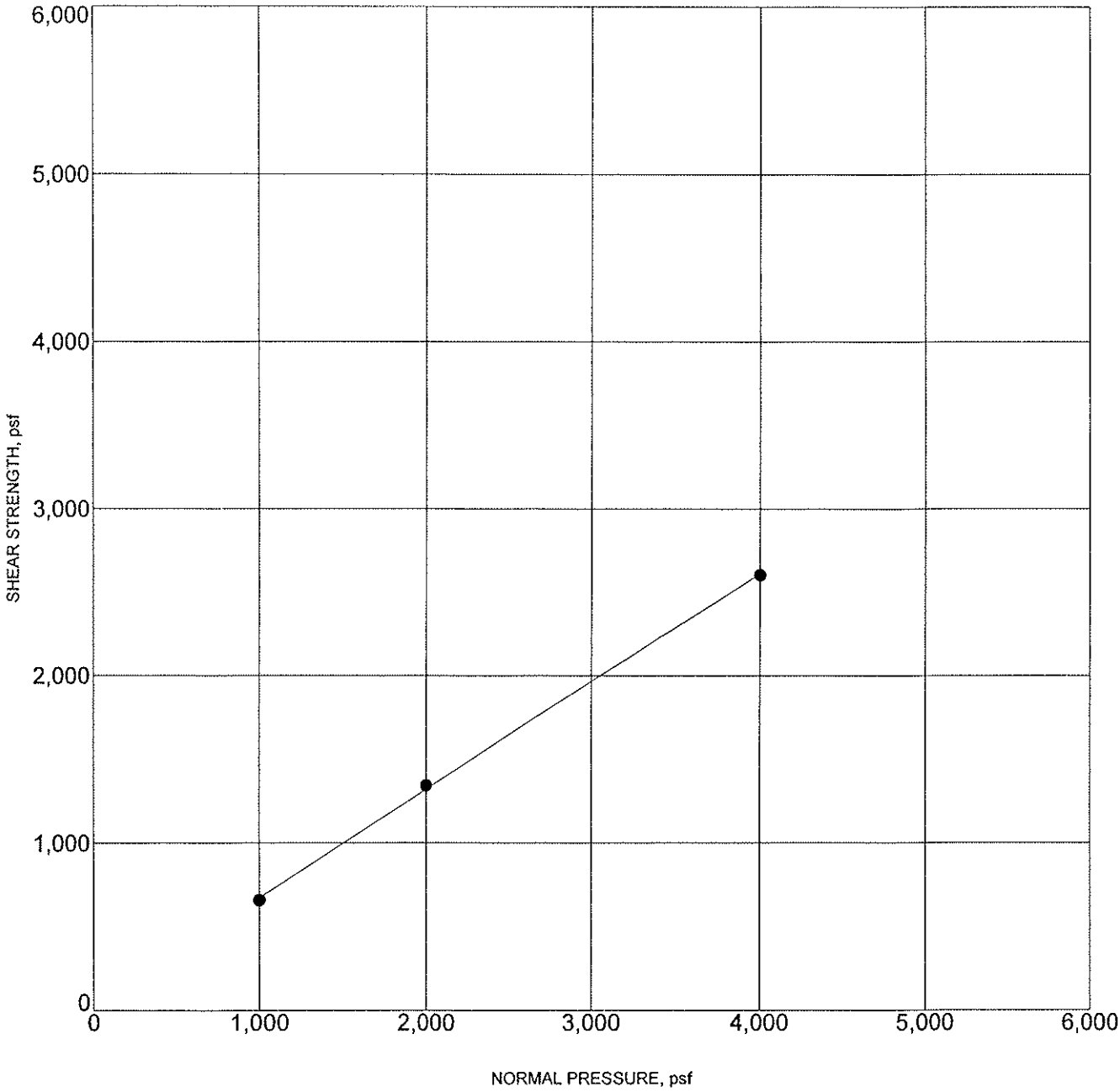
DIRECT SHEAR TEST RESULTS

FIGURE C-2



Friction Angle= 33 degrees
Cohesion= 30 psf

	Sample Location		Classification	DD,pcf	MC,%
●	B- 6	5.0	SILTY SAND (SM)	107	8.8

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DIRECT SHEAR TEST RESULTS

FIGURE C-3

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

Wal-Mart Ontario, Ontario, CA
Your #1974.I, MJS&A #04-0805LAB
11-Jun-04

Sample ID			B-4 @ 1-5' Silty Sand w/ Gravel
Resistivity		**Units**	
as-received		ohm-cm	37,000
saturated		ohm-cm	8,700
pH			7.2
Electrical Conductivity		mS/cm	0.08
Chemical Analyses			
Cations			
calcium	Ca^{2+}	mg/kg	40
magnesium	Mg^{2+}	mg/kg	7
sodium	Na^{1+}	mg/kg	ND
Anions			
carbonate	CO_3^{2-}	mg/kg	ND
bicarbonate	HCO_3^{1-}	mg/kg	70
chloride	Cl^{1-}	mg/kg	ND
sulfate	SO_4^{2-}	mg/kg	45
Other Tests			
ammonium	NH_4^{1+}	mg/kg	4.8
nitrate	NO_3^{1-}	mg/kg	11.3
sulfide	S^{2-}	qual	na
Redox		mV	na

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

GEOTECHNICAL INVESTIGATION FACT SHEET

PROJECT LOCATION: Ontario, California

Engineer: Paul R. Schade, G.E. **Phone#:** (714) 220-2211

Geotechnical Engineering Co: Geotechnical Professionals, Inc. **Report Date:** July 22, 2004

Ground Water Elevation: not encountered (If encountered) Fill Soils Characteristics: Silty Sands and Sands

Date Groundwater Measured: N/A Maximum Liquid Limit: N/A

Topsoil/Stripping Depth: N/A Maximum Plasticity Index: Non-plastic

Undercut (If Required): variable over entire pad (see report) Specified Compaction: 95%

Standard Proctor Results: Attach plots. SEE REPORT Moisture Content Range: 0 to +2 over optimum

Recommended Compaction Control Tests:

1 Test for Each 10,000 Sq. Ft. each Lift (bldg. area)
1 Test for Each 10,000 Sq. Ft. each Lift (parking area)

Structural Fill Maximum Lift Thickness 8 to 12 in. (Measured loose) - See Report

Subgrade Design R-value = 50

COMPONENT	ASPHALT		CONCRETE	
	Standard	Heavy	Standard	Heavy
Stabilized Subgrade (if applicable)	N/A	N/A	N/A	N/A
Base Material (stone/sand/shell, etc.)	7	9	N/A	N/A
Asphaltic Base Course	N/A	N/A	----	----
Leveling Binder Course	N/A	N/A	----	----
Surface Course	3	3.5	7.0	7.0

NOTE: This information shall not be used separately from the geotechnical report.

FOUNDATION DESIGN CRITERIA

PROJECT LOCATION: Ontario, California

Engineer: Paul R. Schade, G.E. **Phone#:** (714) 220-2211

Geotechnical Engineer Co.: Geotechnical Professionals, Inc. **Report Date:** July 22, 2004

Foundation type: Shallow Foundations

Allowable bearing pressure: up to 3,500 psf

Factor of Safety: 3

Minimum footing dimensions: Individual: up to 2' wide (See Report) Continuous: up to 2' wide (See Report)

Minimum footing embedment: Exterior: up to 2' Interior: up to 2' (See Report)

Frost depth: N/A

Maximum foundation settlements: Total: less than 1-inch
Differential: about ¼-inch

Slab: Potential vertical rise: N/A

Vapor barrier or capillary break (describe): Vapor retarder - Visqueen/Sand (See Report)

Subgrade reaction Modulus: 200 psi/in Method obtained: correlation with R-value

Perimeter Drains (describe): Building: N/A
Retaining walls: Fabric/Gravel/Perforated pipe

Cement Type: Type II

Retaining Wall: At rest pressure: 50 pcf for level granular backfill

Coefficient of friction: 0.40

COMMENTS: Footing dimensions vary with allowable bearing pressure, see report.

NOTE: This information should not be used separately from the geotechnical report.

FOUNDATION SUBSURFACE PREPARATION

Wal-Mart Store
Ontario, California
July 22, 2004

The final subgrade elevation shall be established below finished floor elevation to allow for a slab thickness to be determined by the structural engineer and 6 inches of aggregate base course (2 inches of fine aggregate, visqueen vapor retarder, and 4 inches of course aggregate base). The Contractor shall be responsible for obtaining accurate measurements for all cut and fill depths required.

Where not removed by the required cut, the existing loose natural soils and undocumented fill soils within the building area (defined as the building, canopies, and loading dock walls) should be removed and replaced as properly compacted fill. Removals should extend to a depth of 6 feet below the existing grades or 2 feet below the base of the planned footings, whichever is deeper. The base of removals should extend laterally beyond the building pad a minimum distance of 10 feet. The subgrade soils should be scarified to a depth of 12 inches, moisture-conditioned (wetted) and compacted to at least 95 percent using at least six passes with a heavy vibratory roller (minimum 40,000 pounds dynamic force).

Fill shall be placed in loose lifts not exceeding 8 to 12 inches in thickness and compacted to at least 95 percent of the modified proctor maximum dry density (ASTM 1557) at a moisture content within 0 percent below to 2 percent above the optimum. The on-site soils are, in general, suitable for use as compacted fill with the exception of any oversized materials. Fills placed in the upper 2 feet of the building pad should consist of on-site or imported silty sands or sands having particle sizes of 2 inches or less. Particles larger than 6 inches in diameter should be placed outside the building pad. Clayey soils are not suitable for direct support of concrete slabs or as wall backfill. Import fill shall be free of organic and other deleterious materials; and shall meet the following requirements:

- Predominantly granular (no more than 40 percent passing No. 200 sieve)
- Non-expansive (Expansion Index of 20 or less)
- R-value of at least 50

The foundation system shall be isolated spread footings at columns and continuous spread footings at walls.

This foundation subsurface preparation does not constitute a complete site work specification. Information covered in this preparation shall govern over the Wal-Mart specifications. Refer to the specifications and the geotechnical report for specific information not covered in this preparation.