

To:	Rick Beason	From:	Viola Lai
Company:	CenterCal Properties, LLC	Date:	February 12, 2016
Address:	1600 East Franklin Avenue El Segundo, CA 90245		

cc:	Patrick Burns, CenterCal Properties, LLC (via email only)
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GDI Project:	CenterCal-23-01
RE:	Totem Lake Mall

Original File Name	Date	Document Title
CenterCal-23-01-030215-geor	3/2/15	Report of Geotechnical Engineering Services; Totem Lake Mall; Kirkland, Washington

Addendum Number	Date	Description
1	11/13/15	Additional Explorations - Lower Mall
2	2/12/16	Additional Explorations - Lower Mall (attached)

kt

Attachment

One copy submitted (via email only)

Document ID: CenterCal-23-01-021216-geoat-2.docx

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February 12, 2016

CenterCal Properties, LLC
1600 East Franklin Avenue
El Segundo, CA 90245

Attention: Mr. Rick Beason

Addendum 2
Additional Explorations – Lower Mall
Totem Lake Mall
Kirkland, Washington
GeoDesign Project: CenterCal-23-01

INTRODUCTION

This addendum summarizes our additional explorations and updated geotechnical recommendations for the proposed Totem Lake Mall development located at 12650 Totem Lake Boulevard NE in Kirkland, Washington. We previously provided a geotechnical report¹ and Addendum 1². Since Addendum 1, which included additional explorations in the Lower Mall, the proposed site layout has been revised. The approximate locations of the planned buildings (Buildings A, B, C, D, K, L, and M) are shown on Figure 1. Additional explorations were drilled in locations requested by CenterCal Properties to further delineate the extent of peat in the proposed building areas.

The project structural engineer, John A. Martin & Associates, provided design column load estimates for Buildings A, B, and L:

Building A: 100 to 180 kips

Building B: 190 to 400 kips

Building L: 62 kips

¹ GeoDesign, Inc., *Report of Geotechnical Engineering Services; Totem Lake Mall; Kirkland, Washington*, dated March 2, 2015. GeoDesign Project: CenterCal-23-01

² GeoDesign, Inc., *Addendum 1; Additional Explorations – Lower Mall; Totem Lake Mall; Kirkland, Washington*, dated November 13, 2015. GeoDesign Project: CenterCal-23-01

Column loads for Buildings C, D, K, and M were previously estimated (by VLMK Consulting Engineers) as:

Building C: 480 kips

Building D (parking garage): 650 kips

Building K: 45 kips

Building M: 45 kips

PURPOSE AND SCOPE

The purpose of our additional explorations was to further identify the extent and location of the peat and to provide additional geotechnical recommendations for building foundation support in the proposed building locations. Specifically, we performed the following scope of services:

- Coordinated and managed the field investigation, utility locates, and scheduling of subcontractors and GeoDesign field staff.
- Completed a subsurface program that consists of 11 borings to depths ranging from 16.0 to 51.5 feet below ground surface (BGS).
- Obtained disturbed soil samples at selected depths from the explorations.
- Classified the materials encountered in the explorations. Maintained a detailed log of each exploration. Observed groundwater conditions in the explorations.
- Provided this addendum to our geotechnical report summarizing our findings.

SITE CONDITIONS

SUBSURFACE CONDITIONS

We drilled 11 borings (B-1 through B-11) to depths ranging from 16.0 to 51.5 feet BGS. The borings were drilled in the locations requested by CenterCal Properties. The approximate locations of our current and prior explorations are shown on Figure 1. Descriptions of the subsurface explorations and copies of the exploration logs are presented in the Attachment.

In general, soil conditions were consistent with the previous explorations and consist of variable amounts of fill overlying silt, clay, sand, and gravel, which in turn overlies medium dense to very dense gravel with sand.

Asphalt concrete (AC) pavement was present at the surface of all boring locations, with the exception of boring B-3, where gravel was encountered at the surface. Boring B-3 was drilled within the former Chevron gas station site, in the location of proposed Building K. The observed AC thickness ranges between approximately 4 and 6 inches. The aggregate base thickness beneath the AC ranges between 0 to 5 inches. The soil encountered in our explorations is described in the following sections.

Fill

Fill was encountered to depths of 2.5, 4.5, and 10.0 feet BGS in borings B-2, B-3, and B-5, respectively. The fill consists of medium dense, silty sand with gravel (B-2), medium dense gravel composed of 5/8-inch-minus crushed rock (B-3), and very dense gravel with clay (B-5). Fill

was previously encountered at depths ranging between approximately 7 and 20 feet BGS in the Lower Mall, with the deepest fill encountered at the former Chevron gas station.

Silt, Clay, Sand, and Gravel

Silt, clay, sand, and gravel deposits were encountered in all of the borings either directly beneath the AC or underlying the fill. These deposits generally extend to depths ranging between approximately 13 feet BGS to the maximum depth explored in boring B-11 (51.5 feet BGS). This is generally consistent with our prior borings in the Lower Mall. In the prior borings, these deposits extended to depths ranging between approximately 15 feet BGS to the maximum depth explored (46.5 feet BGS). The silt and clay is soft to very stiff ranging with trace amounts of organics. The sand ranges from loose to medium dense and contains varying amounts of silt. The gravel is medium dense with varying amounts of silt and sand. The peat zones are embedded within these deposits. The peat is described separately below.

Peat

Peat was encountered in borings B-3, B-4, B-6, and B-8 during our explorations at depths ranging between approximately 14 and 33.5 feet BGS. The peat was deepest (33.5 feet BGS) in boring B-3, which was drilled in the former Chevron gas station site, in the proposed Building K footprint. This is consistent with a prior boring (B-5; 2015) in which peat was encountered at 36.5 feet BGS. The thickness of peat ranged from approximately 1.5 to 12.5 feet thick. We did not encounter peat in boring B-1, which was drilled within the proposed Building M footprint. We reviewed the prior 2004 PSI boring (B-15), which is located within the Building M footprint, and have interpreted that the layer of soil encountered at 12 feet BGS is an organic silt, rather than peat.

Figure 1 summarizes the depths and estimated thicknesses of the peat encountered in our current and previous explorations at the site.

Lower Gravel

Medium dense to very dense gravel with various amounts of sand and silt was encountered in all borings, except B-11, at depths ranging between approximately 13 and 42.5 feet BGS.

GROUNDWATER

Groundwater was observed at depths ranging from 4 to 10 feet BGS in our explorations. This was consistent with the groundwater levels encountered in the previous explorations by GeoDesign and others, which ranged from approximately 3 to 16 feet BGS. The groundwater level was measured at a depth of approximately 1.7 feet BGS in the piezometer installed in our previous boring (B-9; 2015), located at the north end of the Lower Mall site. The groundwater level was previously measured at approximately 2.5 feet BGS in November 2015. The depth to groundwater may fluctuate in response to seasonal changes, prolonged rainfall, changes in surface topography, and other factors not observed in this study.

GEOTECHNICAL RECOMMENDATIONS

The approximate zones of potential peat in the subsurface have been refined in the proposed building locations based on these additional explorations. We recommend that the buildings

proposed within areas where peat was encountered be supported on a foundation system that extends through the peat to minimize the risk of future foundation settlement. Based on preliminary discussions with the project team and with design-build contractors, a ground improvement system can be used to mitigate foundation settlement so that buildings can be supported on shallow foundations. We understand that one type of ground improvement system consists of geopier or rigid inclusion elements extending past the peat layers and into the more competent soil layers below. A preliminary estimate from a contractor indicates the improved subgrade is capable of providing a bearing capacity of approximately 5,000 pounds per square foot. Ground improvement design is typically provided on a design-build basis. We recommend that the contractor design a system that is capable of supporting the building loads on spread footings, while limiting settlement to the criteria recommended in our geotechnical report and as required by the structural engineer.

Based on our explorations and the assumed building loads, our recommendations for each of the proposed buildings are as follows:

- Buildings A and B: These buildings can be supported on spread footings underlain by ground improved with geopier elements or rigid inclusions extending past the peat layers.
- Buildings C and D: We understand that Buildings C and D will be a part of the next phase of construction. Additional borings should be drilled to further define the peat in this area.
- Building K (former Chevron gas station): This building should be supported on deep foundations or rigid inclusions due to the presence of peat and uncontrolled fill. The foundation elements should be extended past the peat and fill into the underlying competent soil.
- Buildings L and M: These buildings can be supported on spread footings underlain by firm subgrade prepared as recommended in our geotechnical report.

LIMITATIONS

We have prepared this addendum for use by CenterCal Properties and the design and construction team for the proposed project. The data and addendum can be used for bidding or estimating purposes, but our addendum, conclusions, and interpretations should not be construed as warranty of the subsurface conditions and are not applicable to other sites. Exploration observations indicate soil conditions only at specific locations and only to the depths penetrated. They do not necessarily reflect soil strata or water level variations that may exist between exploration locations. If subsurface conditions differing from those described are noted during the course of excavation and construction, re-evaluation will be necessary.

The site development plans and design details were preliminary at the time this addendum was prepared. When the design has been finalized and if there are changes in plans, the conclusions and recommendations presented may not be applicable. If design changes are made, we request that we be retained to review our conclusions and recommendations and to provide a written modification or verification.

The scope of our services does not include services related to construction safety precautions, and our recommendations are not intended to direct the contractor's methods, techniques, sequences, or procedures, except as specifically described in our addendum for consideration in design.

Within the limitations of scope, schedule, and budget, our services have been executed in accordance with generally accepted practices in this area at the time the addendum was prepared. No warranty, express or implied, should be understood.

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We appreciate the opportunity to be of continued service to you. Please call if you have questions concerning this addendum or if we can provide additional services.

Sincerely,

GeoDesign, Inc.



Viola C. Lai, P.E.
Project Engineer



Brett A. Shipton, P.E.
Principal Engineer



Signed 02/12/2016

cc: Mr. Patrick Burns, CenterCal Properties, LLC (via email only)

VCL:BAS:kt

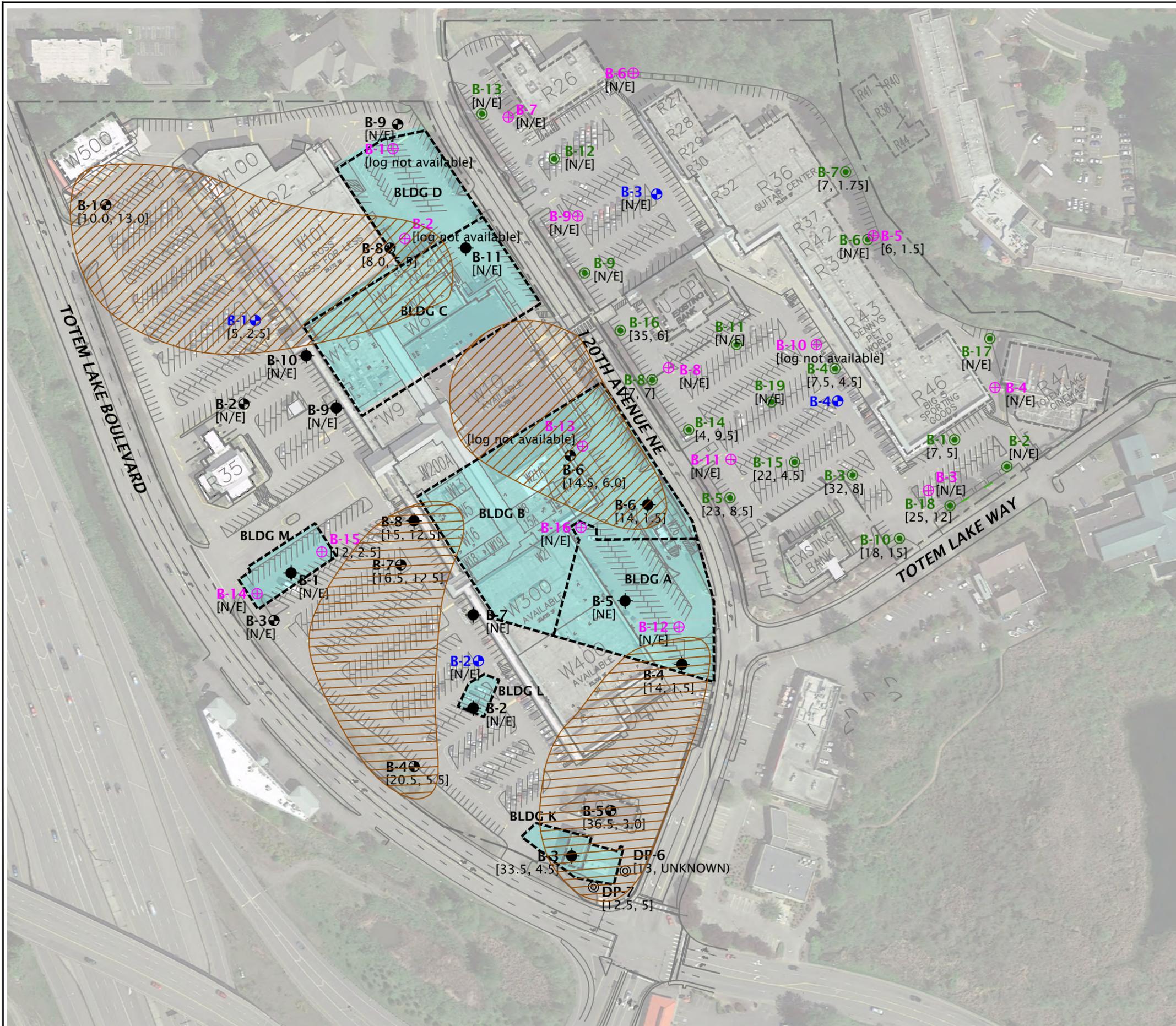
Attachments

One copy submitted (via email only)

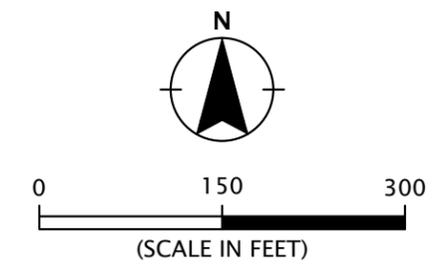
Document ID: CenterCal-23-01-021216-geoa-2.docx

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FIGURES



- LEGEND:**
- B-1 ● BORING (GEODESIGN, 2016)
 - B-1 ⊕ BORING (GEODESIGN, 2015)
 - DP-6 ⊙ DIRECT-PUSH BORING (GEODESIGN, 2015)
 - B-1 ⊕ BORING (GEODESIGN, 2014)
 - B-1 ● BORING (LANDAU ASSOCIATES, 2008)
 - B-1 ⊕ BORING (PSI, 2004)
 - [5, 2.5] PEAT AND WOOD ENCOUNTERED [DEPTH ENCOUNTERED, THICKNESS (FEET)]
 - [N/E] NOT ENCOUNTERED
 - APPROXIMATE ZONE OF POTENTIAL PEAT IN SUBSURFACE; DEEP FOUNDATIONS RECOMMENDED.
 - APPROXIMATE BUILDING LOCATIONS (BUILDINGS A, B, C, D, K, L, AND M)



SITE PLAN BASED ON DRAWING PROVIDED BY CENTERCAL AND IMAGE OBTAINED FROM GOOGLE EARTH PRO®, DECEMBER 26, 2014

SITE PLAN	FIGURE 1
CENTERCAL-23-01	TOTEM LAKE MALL KIRKLAND, WA
FEBRUARY 2016	
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ATTACHMENT

ATTACHMENT

FIELD EXPLORATIONS

GENERAL

We explored subsurface conditions by drilling 11 borings (B-1 through B-11) to depths ranging between 16 and 51.5 feet BGS. The borings were drilled on January 29 and February 1, 2016 by Holocene Drilling, Inc. of Puyallup, Washington, using a truck-mounted drill rig with hollow-stem auger drilling methods. Figure 1 shows the approximate exploration locations relative to the existing site features and the previous explorations by GeoDesign, Inc. and others. Locations were marked in the field by Layton Construction personnel based on locations requested by CenterCal Properties and should be considered accurate to the degree implied by the methods used. Members of our geology and geotechnical staff observed all explorations and obtained representative samples of the various soil encountered in the explorations. Classifications and sampling intervals are shown on the exploration logs presented in this attachment.

SOIL SAMPLING

Samples were obtained from the borings using a 1½-inch-inside diameter (SPT) split-spoon sampler in general accordance with ASTM D 1586. The split-spoon samplers were driven into the soil with a 140-pound hammer free-falling 30 inches. The samplers were driven a total distance of 18 inches. The number of blows required to drive the sampler the final 12 inches is shown on the boring logs, unless otherwise noted.

SOIL CLASSIFICATION

The soil samples were classified in accordance with the “Exploration Key” (Table A-1) and “Soil Classification System” (Table A-2), which are presented in this attachment. The exploration logs indicate the depths at which the soils or their characteristics change, although the change actually could be gradual. If the change occurred between sample locations, the depth was interpreted. Classifications and sampling intervals are shown on the exploration logs presented in this attachment.

The average efficiency of the automatic SPT hammer used by Holocene Drilling, Inc. was 73.2 percent for the drill rig used to drill borings B-1 and B-3 through B-6 on January 29, 2016. Calibration testing was not available for the drill rig used to drill borings B-2 and B-7 through B-11 on February 1, 2016. A copy of the calibration testing for the drill rig used on January 29, 2016 is presented at the end of this attachment.

SYMBOL	SAMPLING DESCRIPTION
	Location of sample obtained in general accordance with ASTM D 1586 Standard Penetration Test with recovery
	Location of sample obtained using thin-wall Shelby tube or Geoprobe® sampler in general accordance with ASTM D 1587 with recovery
	Location of sample obtained using Dames & Moore sampler and 300-pound hammer or pushed with recovery
	Location of sample obtained using Dames & Moore and 140-pound hammer or pushed with recovery
	Location of sample obtained using 3-inch-O.D. California split-spoon sampler and 140-pound hammer
	Location of grab sample
	Rock coring interval
	Water level during drilling
	Water level taken on date shown

Graphic Log of Soil and Rock Types

Observed contact between soil or rock units (at depth indicated)

Inferred contact between soil or rock units (at approximate depths indicated)

GEOTECHNICAL TESTING EXPLANATIONS

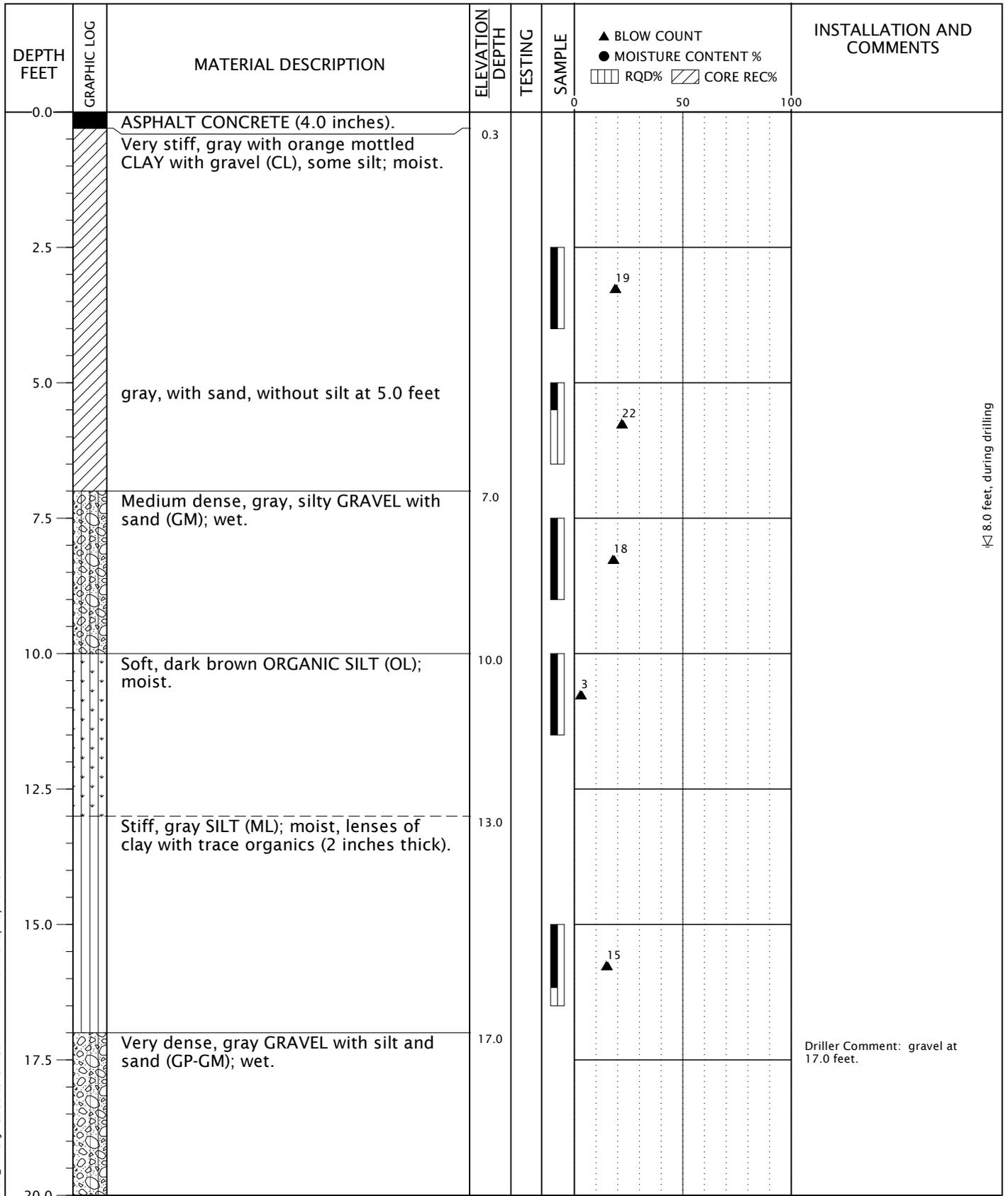
ATT	Atterberg Limits	PP	Pocket Penetrometer
CBR	California Bearing Ratio	P200	Percent Passing U.S. Standard No. 200 Sieve
CON	Consolidation	RES	Resilient Modulus
DD	Dry Density	SIEV	Sieve Gradation
DS	Direct Shear	TOR	Torvane
HYD	Hydrometer Gradation	UC	Unconfined Compressive Strength
MC	Moisture Content	VS	Vane Shear
MD	Moisture-Density Relationship	kPa	Kilopascal
OC	Organic Content		
P	Pushed Sample		

ENVIRONMENTAL TESTING EXPLANATIONS

CA	Sample Submitted for Chemical Analysis	ND	Not Detected
P	Pushed Sample	NS	No Visible Sheen
PID	Photoionization Detector Headspace Analysis	SS	Slight Sheen
		MS	Moderate Sheen
ppm	Parts per Million	HS	Heavy Sheen

RELATIVE DENSITY - COARSE-GRAINED SOILS									
Relative Density		Standard Penetration Resistance		Dames & Moore Sampler (140-pound hammer)		Dames & Moore Sampler (300-pound hammer)			
Very Loose		0 - 4		0 - 11		0 - 4			
Loose		4 - 10		11 - 26		4 - 10			
Medium Dense		10 - 30		26 - 74		10 - 30			
Dense		30 - 50		74 - 120		30 - 47			
Very Dense		More than 50		More than 120		More than 47			
CONSISTENCY - FINE-GRAINED SOILS									
Consistency		Standard Penetration Resistance		Dames & Moore Sampler (140-pound hammer)		Dames & Moore Sampler (300-pound hammer)		Unconfined Compressive Strength (tsf)	
Very Soft		Less than 2		Less than 3		Less than 2		Less than 0.25	
Soft		2 - 4		3 - 6		2 - 5		0.25 - 0.50	
Medium Stiff		4 - 8		6 - 12		5 - 9		0.50 - 1.0	
Stiff		8 - 15		12 - 25		9 - 19		1.0 - 2.0	
Very Stiff		15 - 30		25 - 65		19 - 31		2.0 - 4.0	
Hard		More than 30		More than 65		More than 31		More than 4.0	
PRIMARY SOIL DIVISIONS					GROUP SYMBOL		GROUP NAME		
COARSE-GRAINED SOILS (more than 50% retained on No. 200 sieve)		GRAVEL (more than 50% of coarse fraction retained on No. 4 sieve)		CLEAN GRAVELS (< 5% fines)		GW or GP		GRAVEL	
				GRAVEL WITH FINES (≥ 5% and ≤ 12% fines)		GW-GM or GP-GM		GRAVEL with silt	
						GW-GC or GP-GC		GRAVEL with clay	
				GRAVELS WITH FINES (> 12% fines)		GM		silty GRAVEL	
						GC		clayey GRAVEL	
						GC-GM		silty, clayey GRAVEL	
		SAND (50% or more of coarse fraction passing No. 4 sieve)		CLEAN SANDS (<5% fines)		SW or SP		SAND	
				SANDS WITH FINES (≥ 5% and ≤ 12% fines)		SW-SM or SP-SM		SAND with silt	
						SW-SC or SP-SC		SAND with clay	
				SANDS WITH FINES (> 12% fines)		SM		silty SAND	
SC						clayey SAND			
SC-SM						silty, clayey SAND			
FINE-GRAINED SOILS (50% or more passing No. 200 sieve)		Liquid limit less than 50		ML		SILT			
				CL		CLAY			
				CL-ML		silty CLAY			
		Liquid limit 50 or greater		OL		ORGANIC SILT or ORGANIC CLAY			
				MH		SILT			
				CH		CLAY			
				OH		ORGANIC SILT or ORGANIC CLAY			
HIGHLY ORGANIC SOILS					PT		PEAT		
MOISTURE CLASSIFICATION			ADDITIONAL CONSTITUENTS						
Term		Field Test		Secondary granular components or other materials such as organics, man-made debris, etc.					
dry		very low moisture, dry to touch		Silt and Clay In:			Sand and Gravel In:		
				Percent		Fine-Grained Soils	Coarse-Grained Soils	Percent	
moist		damp, without visible moisture		< 5	trace	trace	< 5	trace	trace
				5 - 12	minor	with	5 - 15	minor	minor
wet		visible free water, usually saturated		> 12	some	silty/clayey	15 - 30	with	with
							> 30	sandy/gravelly	Indicate %
 15575 SW Sequoia Parkway - Suite 100 Portland OR 97224 Off 503.968.8787 Fax 503.968.3068			SOIL CLASSIFICATION SYSTEM					TABLE A-2	

BORING LOG CENTERCAL-23-01-B1_11.GPJ GEODESIGN.GDT PRINT DATE: 2/12/16 RC:KT



8.0 feet, during drilling

DRILLED BY: Holocene Drilling, Inc.

LOGGED BY: JTW

COMPLETED: 01/29/16

BORING METHOD: hollow-stem auger (see document text)

BORING BIT DIAMETER: 4 1/4 inches



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BORING B-1

TOTEM LAKE MALL
 KIRKLAND, WA

FIGURE A-1

BORING LOG CENTERCAL-23-01-B1_11.CPJ GEODESIGN.GDT PRINT DATE: 2/12/16 RC:KT

DEPTH FEET	GRAPHIC LOG	MATERIAL DESCRIPTION	ELEVATION DEPTH	TESTING	SAMPLE	▲ BLOW COUNT ● MOISTURE CONTENT % ▨ RQD% ▩ CORE REC%	INSTALLATION AND COMMENTS
20.0		(continued from previous page)	25.8			0 50 100	Spoon wet; no recovery at 20.0 feet.
22.5							24-30-50/6"
25.0		Exploration completed at a depth of 25.8 feet.					No recovery. Attempted to drive a D&M sampler. Tried multiple times to set sample of gravel and unsuccessful due to possible gravel pressure or gravel diameter.
27.5		Hammer efficiency factor is 73.2 percent. Latitude: 47.711846 Longitude: -122.180679 (determined from smart phone with GPS application)					Surface elevation was not measured at the time of exploration.
30.0							
32.5							
35.0							
37.5							
40.0						0 50 100	

DRILLED BY: Holocene Drilling, Inc.

LOGGED BY: JTW

COMPLETED: 01/29/16

BORING METHOD: hollow-stem auger (see document text)

BORING BIT DIAMETER: 4 1/4 inches



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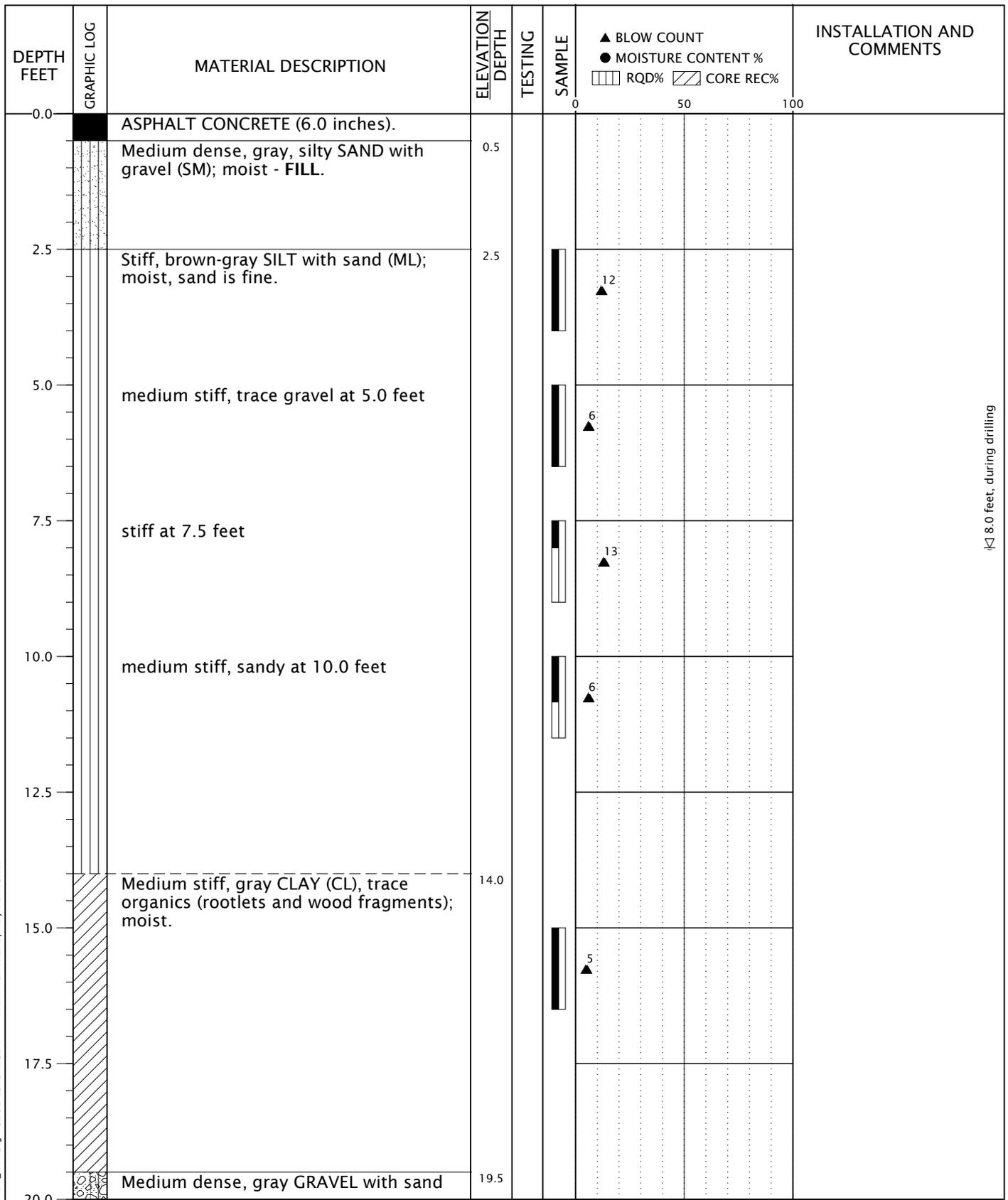
FEBRUARY 2016

BORING B-1
(continued)

TOTEM LAKE MALL
KIRKLAND, WA

FIGURE A-1

BORING LOG CENTERCAL-23-01-B1_11.GPJ GEODESIGN.GDT PRINT DATE: 2/12/16 RC:KT



8.0 feet, during drilling

DRILLED BY: Holocene Drilling, Inc.

LOGGED BY: JTW

COMPLETED: 02/01/16

BORING METHOD: hollow-stem auger (see document text)

BORING BIT DIAMETER: 4 inches



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BORING B-2

FEBRUARY 2016

TOTEM LAKE MALL
KIRKLAND, WA

FIGURE A-2

BORING LOG CENTERCAL-23-01-B1_11.GPJ GEODESIGN.GDT PRINT DATE: 2/12/16.RC:KT

DEPTH FEET	GRAPHIC LOG	MATERIAL DESCRIPTION	ELEVATION DEPTH	TESTING	SAMPLE	▲ BLOW COUNT ● MOISTURE CONTENT % ▨ RQD% ▩ CORE REC%	INSTALLATION AND COMMENTS
20.0		and silt (GP-GM); wet.	25.6			0 50 100 ▲ 18	Driller Comment: water at 20.0 feet.
22.5							
25.0		very dense at 25.0 feet				44-50/1'▲	Surface elevation was not measured at the time of exploration.
27.5		Exploration completed at a depth of 25.6 feet. Latitude: 47.411345 Longitude: -122.180679 (determined from smart phone with GPS application)					
30.0							
32.5							
35.0							
37.5							
40.0							

DRILLED BY: Holocene Drilling, Inc.

LOGGED BY: JTW

COMPLETED: 02/01/16

BORING METHOD: hollow-stem auger (see document text)

BORING BIT DIAMETER: 4 inches



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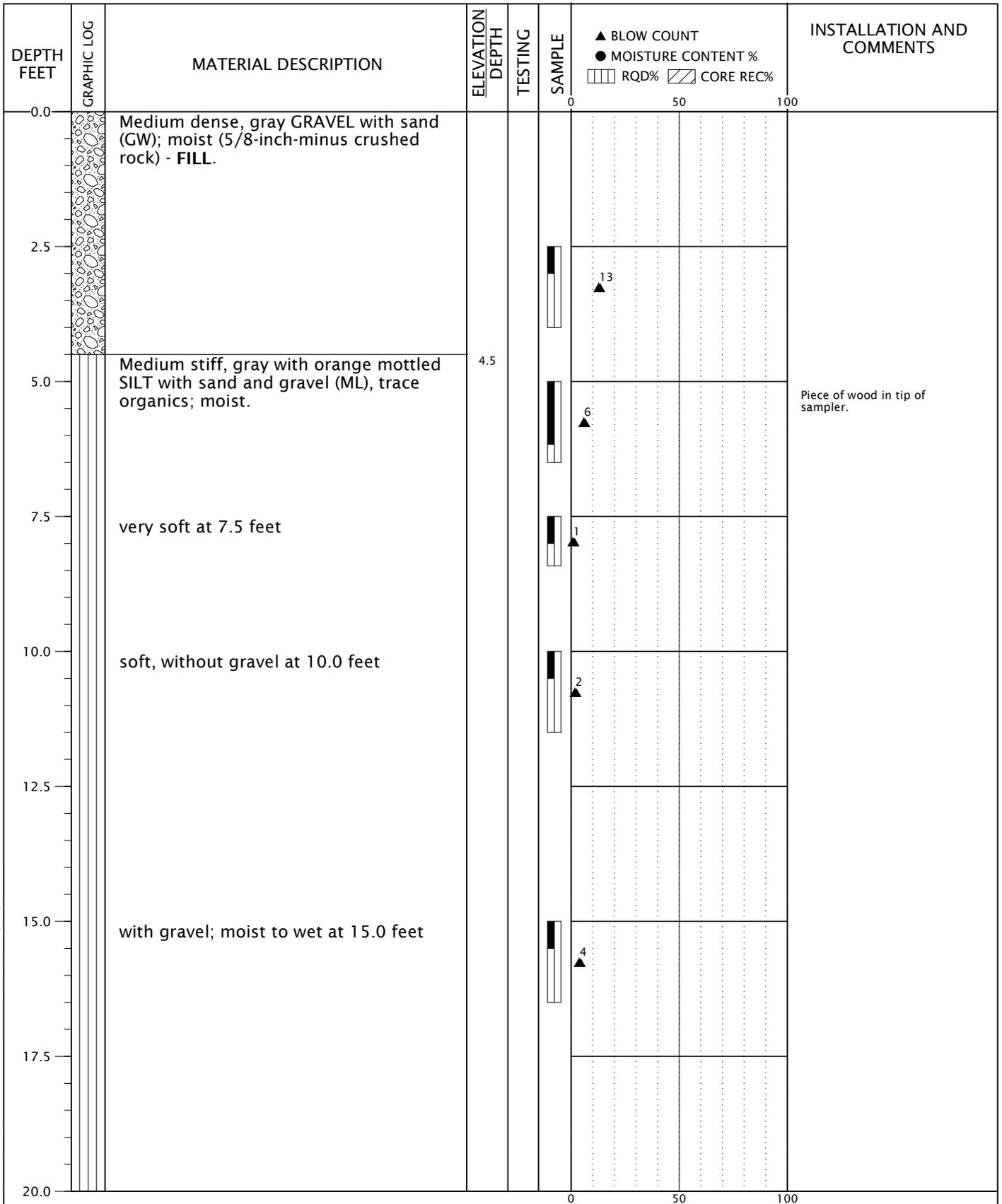
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BORING B-2
(continued)

TOTEM LAKE MALL
KIRKLAND, WA

FIGURE A-2



Piece of wood in tip of sampler.

DRILLED BY: Holocene Drilling, Inc.

LOGGED BY: JTW

COMPLETED: 01/29/16

BORING METHOD: hollow-stem auger (see document text)

BORING BIT DIAMETER: 4 1/4 inches

BORING LOG CENTERCAL-23-01-B1_11.GPJ GEODESIGN.GDT PRINT DATE: 2/12/16.RC:KT



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BORING B-3

TOTEM LAKE MALL
 KIRKLAND, WA

FIGURE A-3

BORING LOG CENTERCAL-23-01-B1_11.GPJ GEODESIGN.GDT PRINT DATE: 2/12/16 RC:KT

DEPTH FEET	GRAPHIC LOG	MATERIAL DESCRIPTION	ELEVATION DEPTH	TESTING	SAMPLE	▲ BLOW COUNT ● MOISTURE CONTENT % ▨ RQD% ▩ CORE REC%	INSTALLATION AND COMMENTS
20.0		sandy, wet at 20.0 feet					
20.5		lens of PEAT (2 inches thick) at 20.5 feet					
22.5							
23.5		Loose, gray, silty SAND with gravel (SM); wet.	23.5				
25.0							
27.5							
30.0							
31.0		Loose, gray GRAVEL with silt, sand, and organics (GP-GM); wet.	31.0				Piece of wood in tip of sampler.
32.5							
33.5		Medium stiff, brown to black PEAT with silt (PT); moist, strong organic odor.	33.5				Strong organic odor at 33.5 feet.
35.0							
37.5							
38.0		Soft, gray CLAY (CH); moist, high plasticity.	38.0				
40.0							

DRILLED BY: Holocene Drilling, Inc.

LOGGED BY: JTW

COMPLETED: 01/29/16

BORING METHOD: hollow-stem auger (see document text)

BORING BIT DIAMETER: 4 1/4 inches



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FEBRUARY 2016

BORING B-3
(continued)

TOTEM LAKE MALL
 KIRKLAND, WA

FIGURE A-3

DEPTH FEET	GRAPHIC LOG	MATERIAL DESCRIPTION	ELEVATION DEPTH	TESTING	SAMPLE	▲ BLOW COUNT ● MOISTURE CONTENT % ▨ RQD% ▩ CORE REC%	INSTALLATION AND COMMENTS
40.0		(continued from previous page)					
42.5		Medium dense, gray GRAVEL with sand and silt (GP-GM); wet.	42.0		2		Driller Comment: gravel starting at approximately 42 feet.
45.0							Sand heave in auger. Blow count not representative.
46.5		Exploration completed at a depth of 46.5 feet.	46.5		10		Surface elevation was not measured at the time of exploration.
47.5		Hammer efficiency factor is 73.2 percent. Latitude: 47.710772 Longitude: -122.1807176 (determined from smart phone with GPS application)					
50.0							
52.5							
55.0							
57.5							
60.0							

DRILLED BY: Holocene Drilling, Inc.

LOGGED BY: JTW

COMPLETED: 01/29/16

BORING METHOD: hollow-stem auger (see document text)

BORING BIT DIAMETER: 4 1/4 inches



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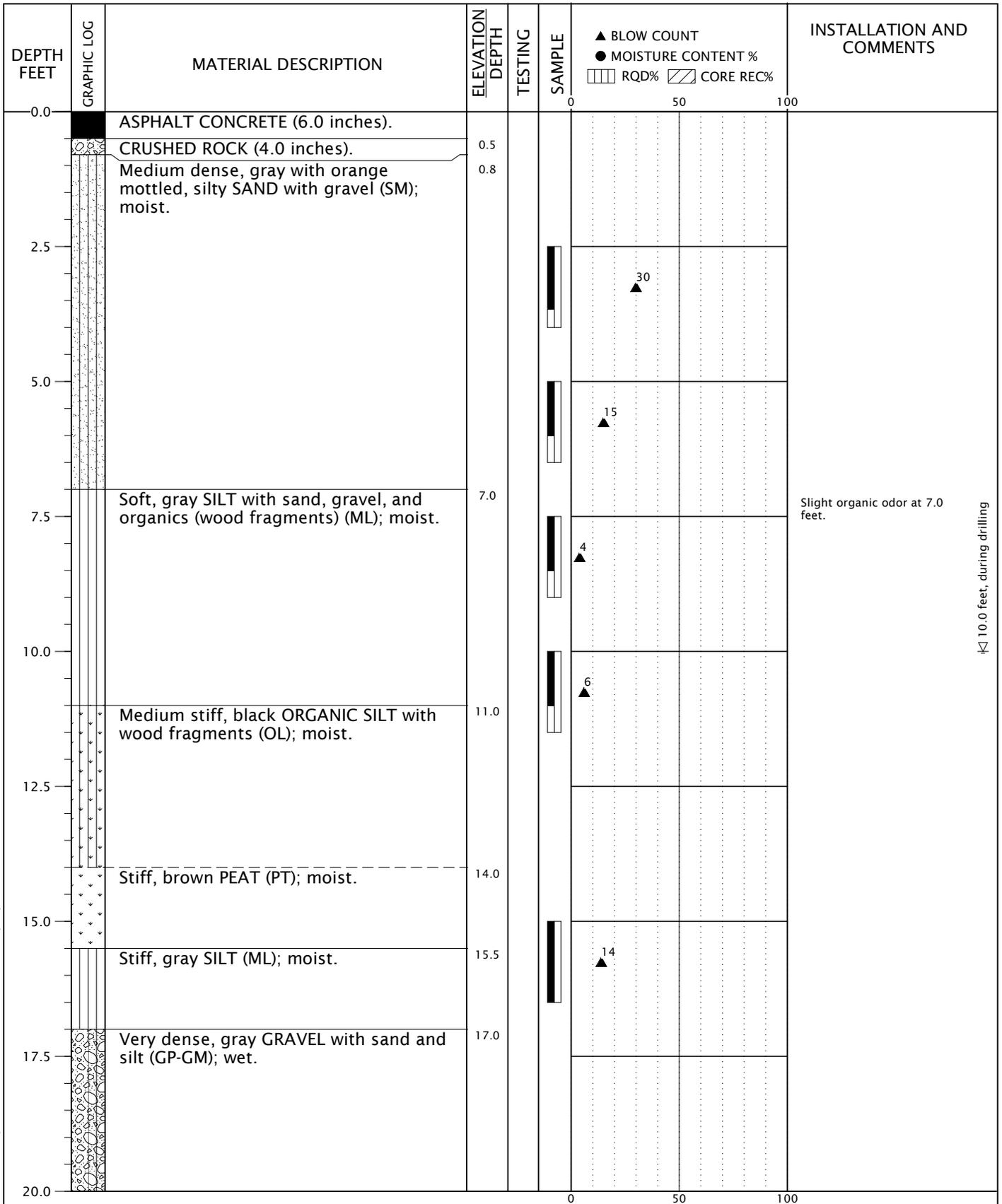
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BORING B-3
(continued)

TOTEM LAKE MALL
KIRKLAND, WA

FIGURE A-3

BORING LOG CENTERCAL-23-01-B1_11.GPJ GEODESIGN.GDT PRINT DATE: 2/12/16.RC:KT



10.0 feet, during drilling

DRILLED BY: Holocene Drilling, Inc.

LOGGED BY: JTW

COMPLETED: 01/29/16

BORING METHOD: hollow-stem auger (see document text)

BORING BIT DIAMETER: 4 inches

BORING LOG CENTERCAL-23-01-B1_11.GPJ GEODESIGN.GDT PRINT DATE: 2/12/16 RC:KT



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BORING B-4

TOTEM LAKE MALL
 KIRKLAND, WA

FIGURE A-4

DEPTH FEET	GRAPHIC LOG	MATERIAL DESCRIPTION	ELEVATION DEPTH	TESTING	SAMPLE	▲ BLOW COUNT ● MOISTURE CONTENT % ▨ RQD% ▩ CORE REC%	INSTALLATION AND COMMENTS
20.0		(continued from previous page)					
22.5							
25.0							
26.5		Exploration completed at a depth of 26.5 feet.	26.5				Surface elevation was not measured at the time of exploration.
27.5		Hammer efficiency factor is 73.2 percent. Latitude: 47.711490 Longitude: -122.179408 (determined from smart phone with GPS application)					
30.0							
32.5							
35.0							
37.5							
40.0							

DRILLED BY: Holocene Drilling, Inc.

LOGGED BY: JTW

COMPLETED: 01/29/16

BORING METHOD: hollow-stem auger (see document text)

BORING BIT DIAMETER: 4 inches

BORING LOG CENTERCAL-23-01-B1_11.GPJ GEODESIGN.GDT PRINT DATE: 2/12/16 RC:KT



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CENTERCAL-23-01

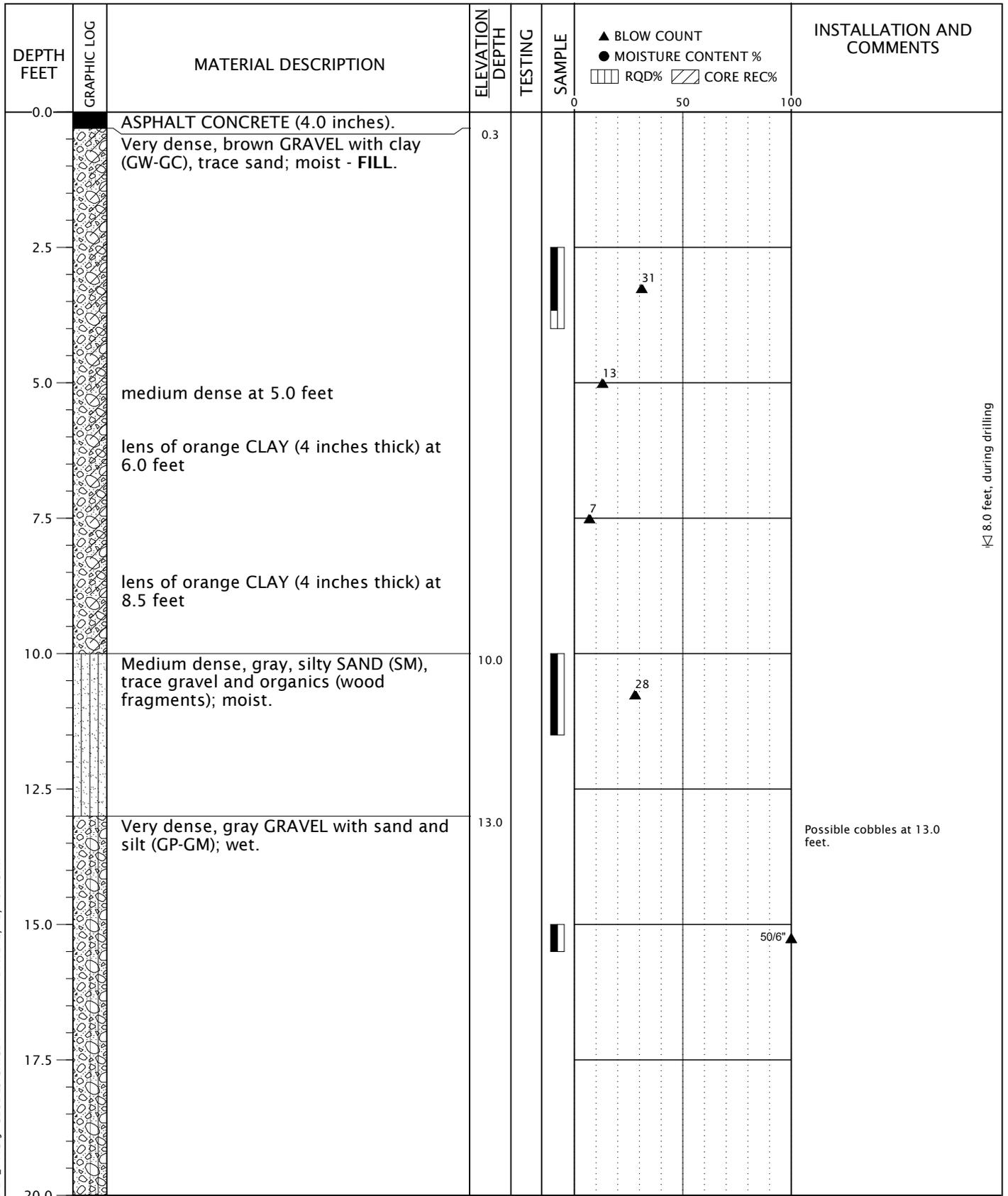
FEBRUARY 2016

BORING B-4
(continued)

TOTEM LAKE MALL
KIRKLAND, WA

FIGURE A-4

BORING LOG CENTERCAL-23-01-B1_11.GPJ GEODESIGN.GDT PRINT DATE: 2/12/16 RC:KT



8.0 feet, during drilling

DRILLED BY: Holocene Drilling, Inc.

LOGGED BY: JTW

COMPLETED: 01/29/16

BORING METHOD: hollow-stem auger (see document text)

BORING BIT DIAMETER: 4 1/4 inches



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CENTERCAL-23-01

BORING B-5

FEBRUARY 2016

TOTEM LAKE MALL
 KIRKLAND, WA

FIGURE A-5

BORING LOG CENTERCAL-23-01-B1_11.GPJ GEODESIGN.GDT PRINT DATE: 2/12/16 RC:KT

DEPTH FEET	GRAPHIC LOG	MATERIAL DESCRIPTION	ELEVATION DEPTH	TESTING	SAMPLE	▲ BLOW COUNT ● MOISTURE CONTENT % ▨ RQD% ▩ CORE REC%	INSTALLATION AND COMMENTS
20.0		(continued from previous page)					
21.0		Exploration completed at a depth of 21.0 feet.	21.0				Surface elevation was not measured at the time of exploration.
22.5		Hammer efficiency factor is 73.2 percent. Latitude: 47.711816 Longitude: -122.179789 (determined from smart phone with GPS application)					
25.0							
27.5							
30.0							
32.5							
35.0							
37.5							
40.0							

DRILLED BY: Holocene Drilling, Inc.

LOGGED BY: JTW

COMPLETED: 01/29/16

BORING METHOD: hollow-stem auger (see document text)

BORING BIT DIAMETER: 4 1/4 inches



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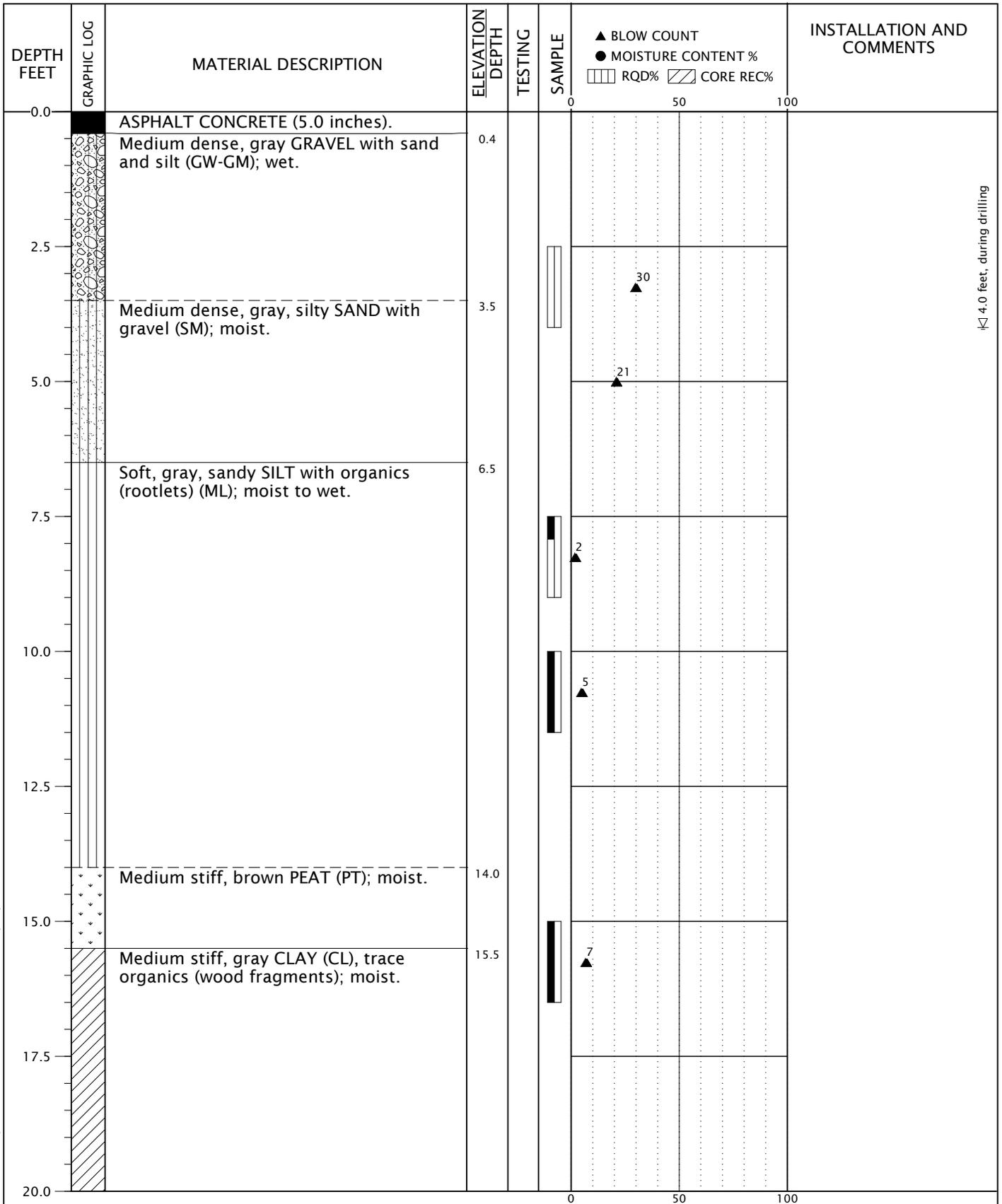
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BORING B-5
(continued)

TOTEM LAKE MALL
KIRKLAND, WA

FIGURE A-5



DRILLED BY: Holocene Drilling, Inc.

LOGGED BY: JTW

COMPLETED: 01/29/16

BORING METHOD: hollow-stem auger (see document text)

BORING BIT DIAMETER: 4 inches

BORING LOG CENTRAL-23-01-B1_11.GPJ GEODESIGN.GDT PRINT DATE: 2/12/16 RC:KT



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BORING B-6

TOTEM LAKE MALL
 KIRKLAND, WA

FIGURE A-6

BORING LOG CENTERCAL-23-01-B1_11.CPJ GEODESIGN.GDT PRINT DATE: 2/12/16 RC:KT

DEPTH FEET	GRAPHIC LOG	MATERIAL DESCRIPTION	ELEVATION DEPTH	TESTING	SAMPLE	▲ BLOW COUNT ● MOISTURE CONTENT % ▨ RQD% ▩ CORE REC%	INSTALLATION AND COMMENTS
20.0		(continued from previous page)					
21.0		Very dense, gray GRAVEL with sand and silt (GP-GM); wet.	21.0			▲ 30	
22.5							
25.0							
25.8		Exploration completed at a depth of 25.8 feet.	25.8			▲ 30-50/3"	Surface elevation was not measured at the time of exploration.
27.5		Hammer efficiency factor is 73.2 percent. Latitude: 47.711926 Longitude: -122.17618 (determined from smart phone with GPS application)					
30.0							
32.5							
35.0							
37.5							
40.0							

DRILLED BY: Holocene Drilling, Inc.

LOGGED BY: JTW

COMPLETED: 01/29/16

BORING METHOD: hollow-stem auger (see document text)

BORING BIT DIAMETER: 4 inches



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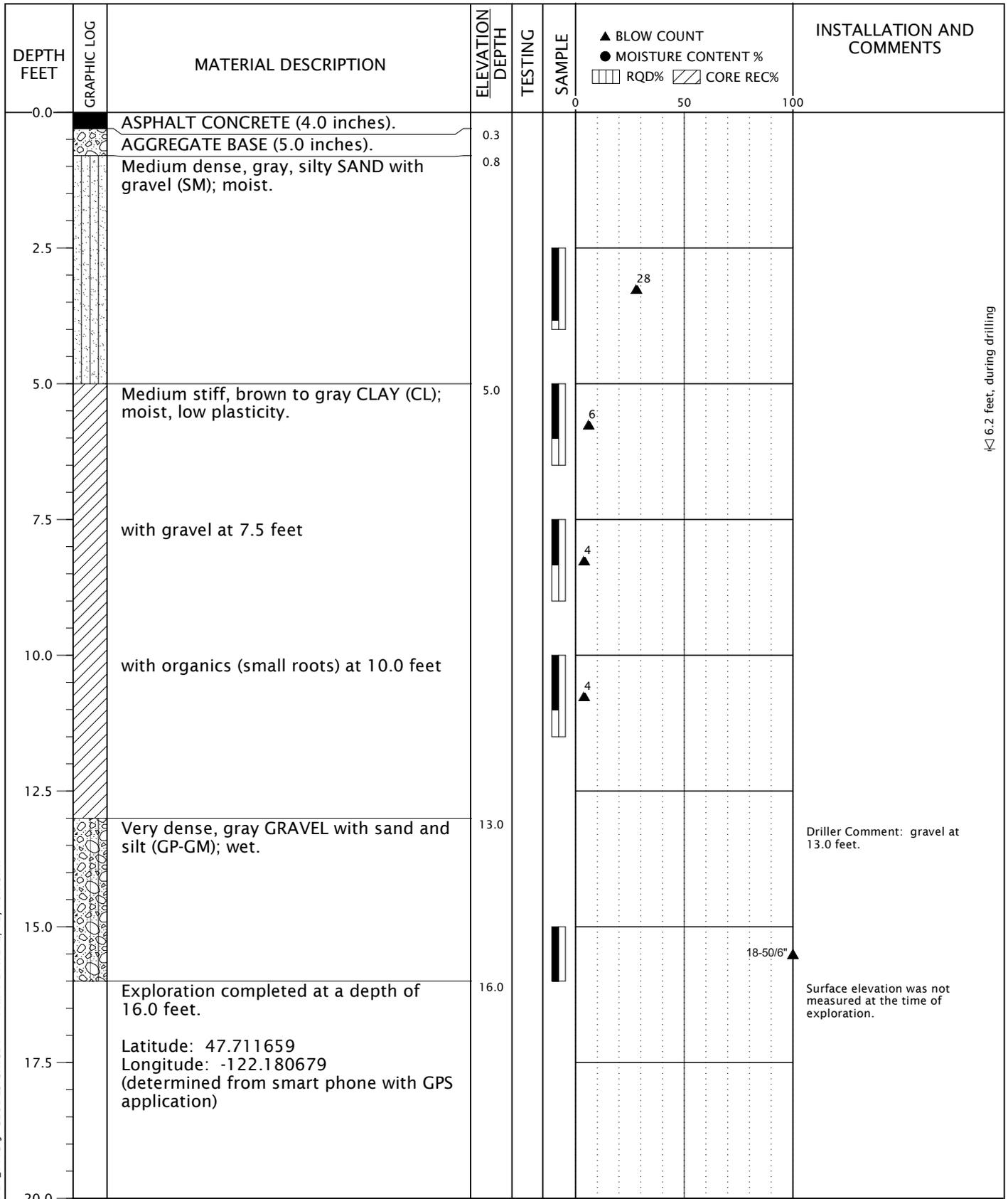
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BORING B-6
(continued)

TOTEM LAKE MALL
KIRKLAND, WA

FIGURE A-6

BORING LOG CENTERCAL-23-01-B1_11.GPJ GEODESIGN.GDT PRINT DATE: 2/12/16 RC:KT



6.2 feet, during drilling

DRILLED BY: Holocene Drilling, Inc.

LOGGED BY: JTW

COMPLETED: 02/01/16

BORING METHOD: hollow-stem auger (see document text)

BORING BIT DIAMETER: 4 inches



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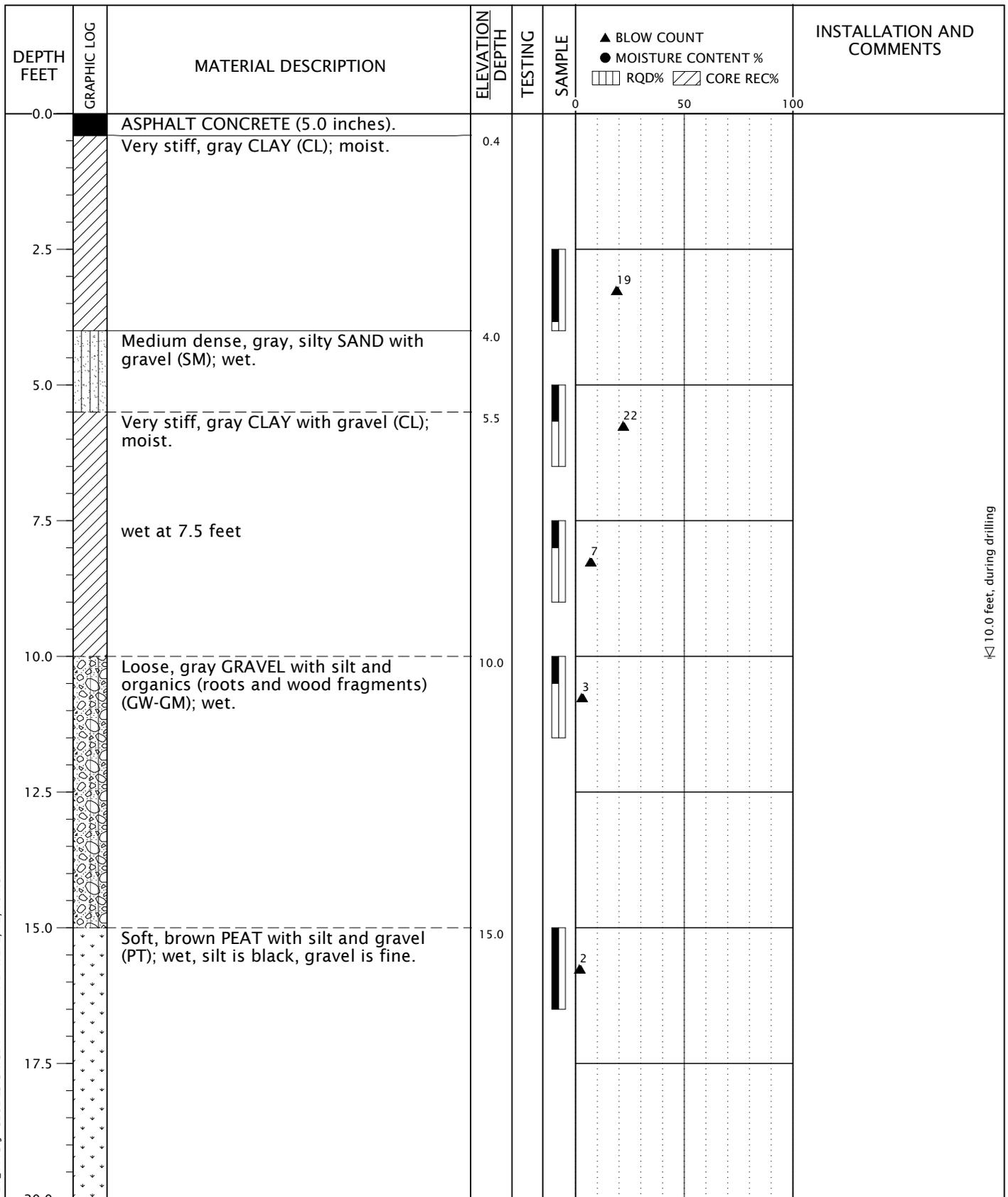
BORING B-7

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TOTEM LAKE MALL
KIRKLAND, WA

FIGURE A-7

BORING LOG CENTERCAL-23-01-B1_11.GPJ GEODESIGN.GDT PRINT DATE: 2/12/16 RC:KT



10.0 feet, during drilling

DRILLED BY: Holocene Drilling, Inc.

LOGGED BY: JTW

COMPLETED: 02/01/16

BORING METHOD: hollow-stem auger (see document text)

BORING BIT DIAMETER: 4 inches



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BORING B-8

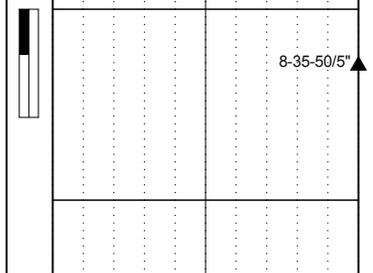
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TOTEM LAKE MALL
KIRKLAND, WA

FIGURE A-8

BORING LOG CENTERCAL-23-01-B1_11.GPJ GEODESIGN.GDT PRINT DATE: 2/12/16.RC:KT

DEPTH FEET	GRAPHIC LOG	MATERIAL DESCRIPTION	ELEVATION DEPTH	TESTING	SAMPLE	▲ BLOW COUNT ● MOISTURE CONTENT % ▨ RQD% ▩ CORE REC%	INSTALLATION AND COMMENTS
20.0		trace silt at 20.0 feet			0		
22.5					3		
25.0		without silt at 25.0 feet				2	
27.5		Soft, dark brown CLAY with organics (CL); moist, low plasticity.	27.5				
30.0							
32.5							
35.0							
35.5		Very dense, gray GRAVEL with sand and silt (GP-GM); wet.	35.5				
36.4		Exploration completed at a depth of 36.4 feet.	36.4				
37.5		Latitude: 47.712062 Longitude: -122.181134 (determined from smart phone with GPS application)					
40.0							



Surface elevation was not measured at the time of exploration.

DRILLED BY: Holocene Drilling, Inc.

LOGGED BY: JTW

COMPLETED: 02/01/16

BORING METHOD: hollow-stem auger (see document text)

BORING BIT DIAMETER: 4 inches



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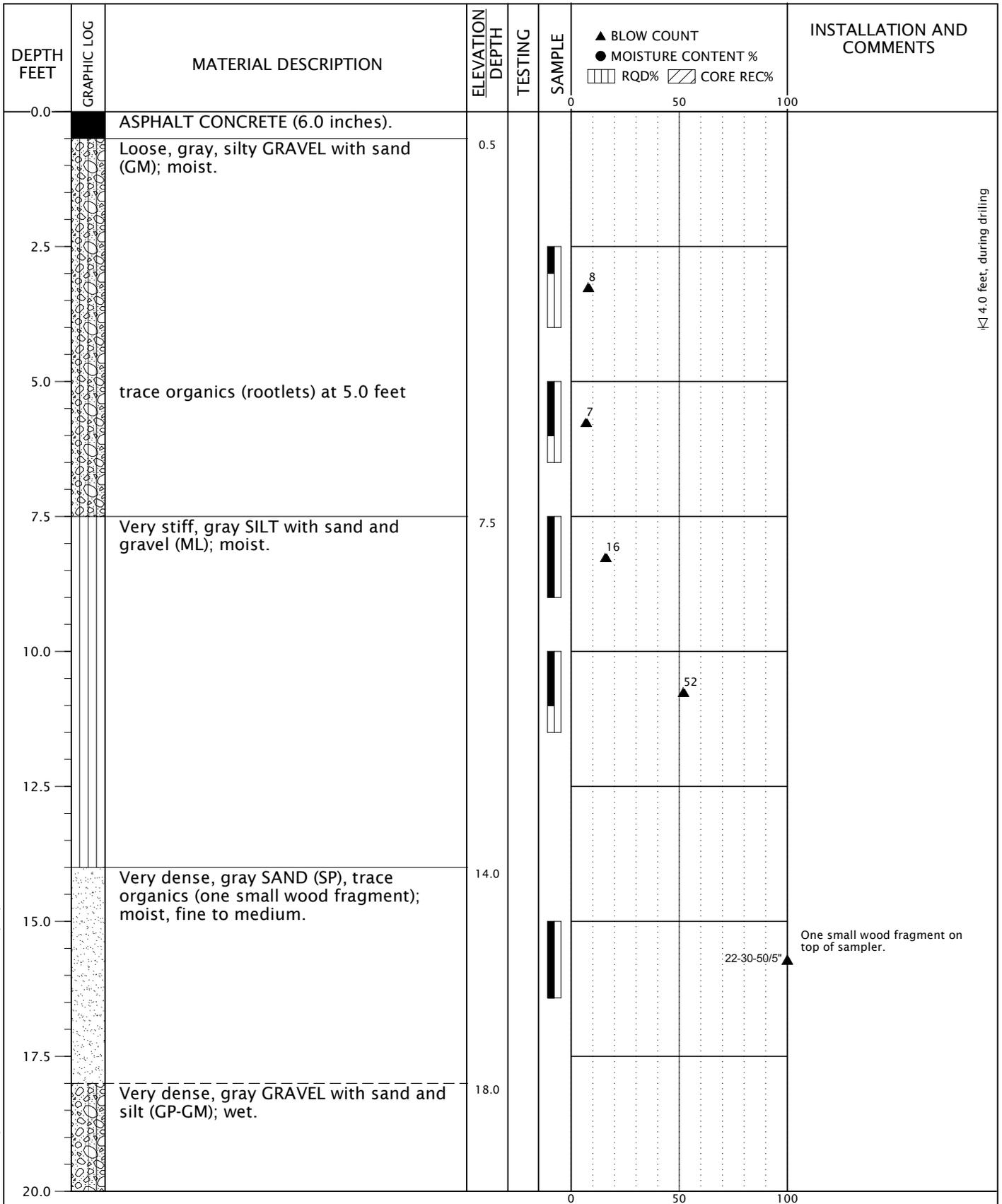
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BORING B-8
(continued)

TOTEM LAKE MALL
KIRKLAND, WA

FIGURE A-8



DRILLED BY: Holocene Drilling, Inc.

LOGGED BY: JTW

COMPLETED: 02/01/16

BORING METHOD: hollow-stem auger (see document text)

BORING BIT DIAMETER: 4 inches

BORING LOG CENTERCAL-23-01-B1_11.GPJ GEODESIGN.GDT PRINT DATE: 2/12/16.RC:KT



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BORING B-9

TOTEM LAKE MALL
KIRKLAND, WA

FIGURE A-9

BORING LOG CENTERCAL-23-01-B1_11.GPJ GEODESIGN.GDT PRINT DATE: 2/12/16 RC:KT

DEPTH FEET	GRAPHIC LOG	MATERIAL DESCRIPTION	ELEVATION DEPTH	TESTING	SAMPLE	▲ BLOW COUNT ● MOISTURE CONTENT % ▨ RQD% ▩ CORE REC%	INSTALLATION AND COMMENTS
20.0		(continued from previous page)					
20.5		Exploration completed at a depth of 20.5 feet. Latitude: 47.712493 Longitude: -122.181507 (determined from smart phone with GPS application)	20.5				Surface elevation was not measured at the time of exploration.
22.5							
25.0							
27.5							
30.0							
32.5							
35.0							
37.5							
40.0							

DRILLED BY: Holocene Drilling, Inc.

LOGGED BY: JTW

COMPLETED: 02/01/16

BORING METHOD: hollow-stem auger (see document text)

BORING BIT DIAMETER: 4 inches



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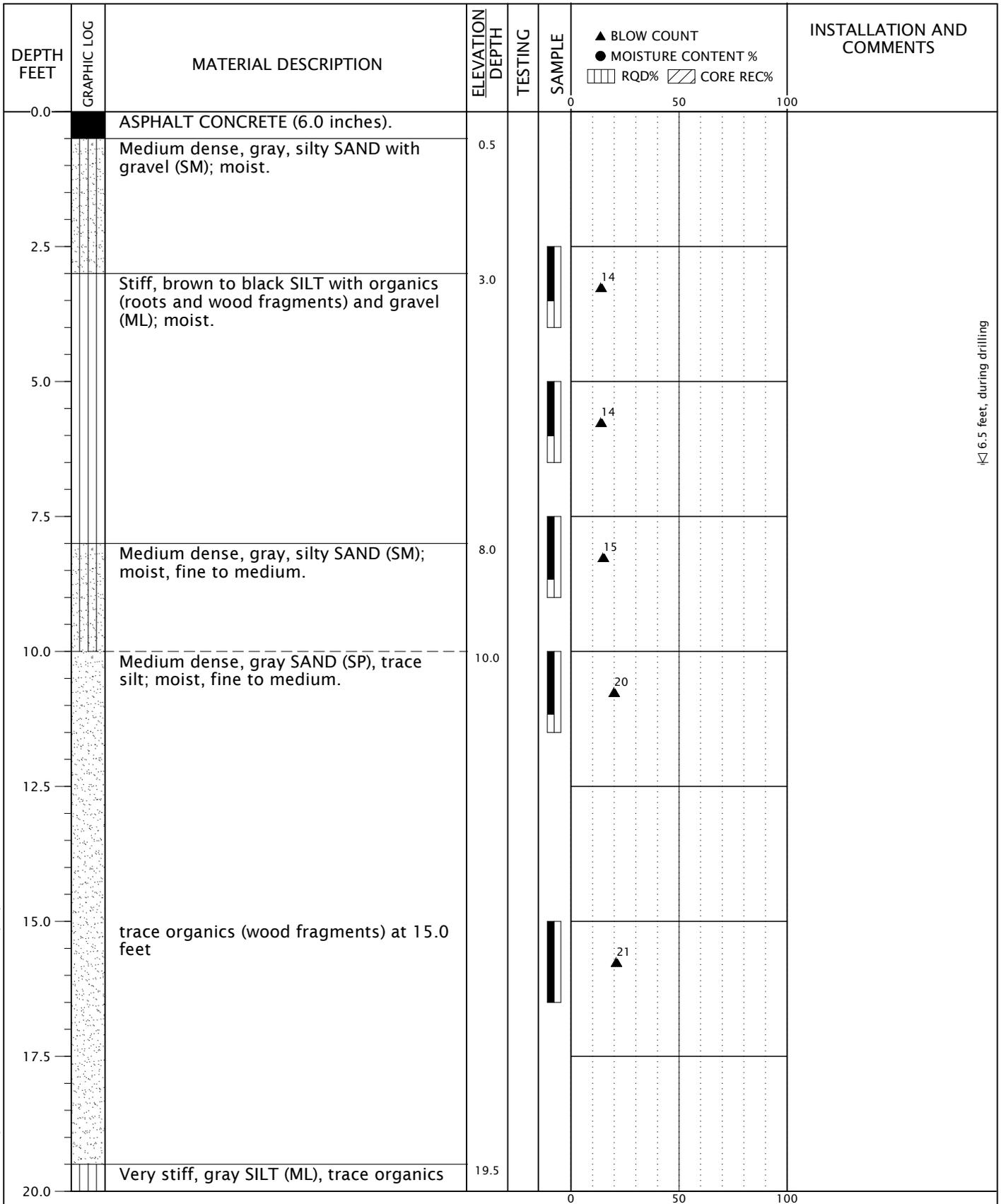
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BORING B-9
(continued)

TOTEM LAKE MALL
KIRKLAND, WA

FIGURE A-9



6.5 feet, during drilling

DRILLED BY: Holocene Drilling, Inc.

LOGGED BY: JTW

COMPLETED: 02/01/16

BORING METHOD: hollow-stem auger (see document text)

BORING BIT DIAMETER: 4 inches

BORING LOG CENTERCAL-23-01-B1_11.CPJ GEODESIGN.GDT PRINT DATE: 2/12/16 RC:KT



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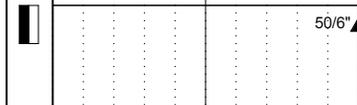
BORING B-10

TOTEM LAKE MALL
KIRKLAND, WA

FIGURE A-10

BORING LOG CENTERCAL-23-01-B1_11.GPJ GEODESIGN.GDT PRINT DATE: 2/12/16.RC:KT

DEPTH FEET	GRAPHIC LOG	MATERIAL DESCRIPTION	ELEVATION DEPTH	TESTING	SAMPLE	▲ BLOW COUNT ● MOISTURE CONTENT % ▨ RQD% ▩ CORE REC%	INSTALLATION AND COMMENTS
20.0		(wood fragments); wet.				0 50 100	
22.5							
25.0							
27.5		Very dense, gray GRAVEL with sand and silt (GP-GM); wet.	27.0				
30.0							
30.5		Exploration completed at a depth of 30.5 feet.	30.5				
32.5		Latitude: 47.712822 Longitude: -122.181814 (determined from smart phone with GPS application)					
35.0							
37.5							
40.0							



Surface elevation was not measured at the time of exploration.

DRILLED BY: Holocene Drilling, Inc.

LOGGED BY: JTW

COMPLETED: 02/01/16

BORING METHOD: hollow-stem auger (see document text)

BORING BIT DIAMETER: 4 inches



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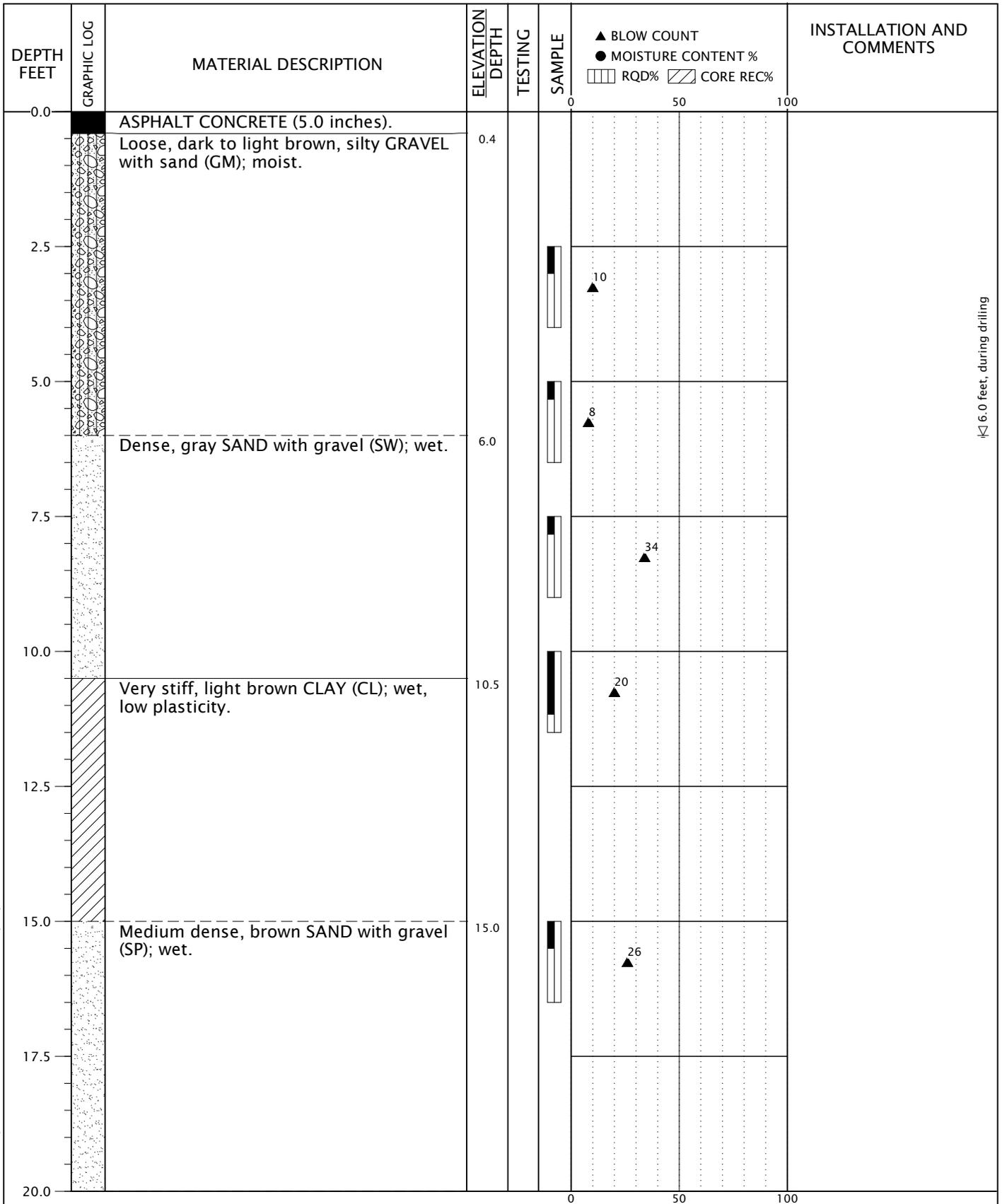
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BORING B-10
(continued)

TOTEM LAKE MALL
KIRKLAND, WA

FIGURE A-10



6.0 feet, during drilling

DRILLED BY: Holocene Drilling, Inc.

LOGGED BY: JTW

COMPLETED: 02/01/16

BORING METHOD: hollow-stem auger (see document text)

BORING BIT DIAMETER: 4 inches

BORING LOG CENTERCAL-23-01-B1_11.GPJ GEODESIGN.GDT PRINT DATE: 2/12/16 RC:KT



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BORING B-11

TOTEM LAKE MALL
KIRKLAND, WA

FIGURE A-11

BORING LOG CENTERCAL-23-01-B1_11.GPJ GEODESIGN.GDT PRINT DATE: 2/12/16.RC:KT

DEPTH FEET	GRAPHIC LOG	MATERIAL DESCRIPTION	ELEVATION DEPTH	TESTING	SAMPLE	▲ BLOW COUNT ● MOISTURE CONTENT % ▨ RQD% ▨ CORE REC%	INSTALLATION AND COMMENTS
20.0		Very stiff, gray CLAY (CL); wet, high plasticity.	20.0			▲ 25	
22.5							
25.0		with gravel at 25.0 feet				▲ 26	
27.5							
28.5		Medium dense, brown GRAVEL with sand and silt (GW-GM); wet.	28.5			▲ 23	
30.0							
32.5		Very stiff, gray CLAY (CH); moist, high plasticity.	32.5			▲ 22	
35.0							
37.5							
40.0							

DRILLED BY: Holocene Drilling, Inc.

LOGGED BY: JTW

COMPLETED: 02/01/16

BORING METHOD: hollow-stem auger (see document text)

BORING BIT DIAMETER: 4 inches



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BORING B-11
(continued)

TOTEM LAKE MALL
KIRKLAND, WA

FIGURE A-11

DEPTH FEET	GRAPHIC LOG	MATERIAL DESCRIPTION	ELEVATION DEPTH	TESTING	SAMPLE	▲ BLOW COUNT ● MOISTURE CONTENT % ▨ RQD% ▩ CORE REC%	INSTALLATION AND COMMENTS	
40.0		(continued from previous page)				0 50 100		
42.5						▲ 28		
45.0		trace gravel and organics at 45.0 feet						
47.5								
50.0								
51.5		Exploration completed at a depth of 51.5 feet.	51.5				▲ 27	Rock in tip of sampler.
52.5		Latitude: 47.713210 Longitude: -122.180780 (determined from smart phone with GPS application)						Surface elevation was not measured at the time of exploration.
55.0								
57.5								
60.0							0 50 100	

DRILLED BY: Holocene Drilling, Inc.

LOGGED BY: JTW

COMPLETED: 02/01/16

BORING METHOD: hollow-stem auger (see document text)

BORING BIT DIAMETER: 4 inches



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BORING B-11
(continued)

TOTEM LAKE MALL
KIRKLAND, WA

FIGURE A-11

BORING LOG CENTERCAL-23-01-B1_11.GPJ GEODESIGN.GDT PRINT DATE: 2/12/16 RC:KT

HOLOCENE DRILL - Truck 6 (SN 1892115)
OP: ECM

Brainard Kilman BK-81
Test date: 1-Nov-2013

AR: 1.41 in²
LE: 8.10 ft
WS: 16,807.9 f/s

SP: 0.492 k/ft³
EM: 30,000 ksi
JC: 0.35

FMX: Maximum Force
VMX: Maximum Velocity
BPM: Blows per Minute

EMX: Max Transferred Energy
ETR: Energy Transfer Ratio

BL#	depth ft	BLC bl/ft	FMX kips	VMX f/s	BPM **	EMX k-ft	ETR (%)
1	2.67	6	44	15.1	1.9	0.3	77.3
2	2.83	6	43	14.5	36.2	0.3	78.3
3	3.00	6	43	14.5	36.3	0.3	77.3
4	3.08	12	44	14.9	36.6	0.3	74.1
5	3.17	12	42	14.2	36.3	0.2	70.9
6	3.25	12	41	14.1	36.6	0.2	70.3
7	3.33	12	43	14.5	36.2	0.3	73.5
8	3.42	12	43	14.0	35.7	0.3	72.4
9	3.50	12	44	14.4	36.0	0.3	75.3
10	3.54	24	43	14.0	35.8	0.2	69.8
11	3.58	24	47	15.6	36.4	0.3	79.0
12	3.63	24	44	14.1	36.1	0.3	72.4
13	3.67	24	46	14.5	36.0	0.3	77.0
14	3.71	24	44	13.8	36.1	0.2	70.8
15	3.75	24	43	14.5	35.7	0.3	72.9
16	3.79	24	42	14.2	35.9	0.2	68.5
17	3.83	24	37	12.2	34.1	0.2	51.8
18	3.88	24	38	13.8	38.0	0.2	57.7
19	3.92	24	41	15.3	40.8	0.3	72.0
20	3.96	24	45	14.6	37.3	0.3	73.9
21	4.00	24	44	14.9	37.6	0.3	74.7
22	5.25	4	48	16.8	1.9	0.3	83.4
23	5.50	4	44	15.0	34.5	0.3	74.5
24	5.58	12	45	15.0	35.3	0.3	74.9
25	5.67	12	44	15.0	35.1	0.3	71.4
26	5.75	12	45	14.7	35.4	0.3	72.5
27	5.83	12	44	14.1	34.7	0.2	69.4
28	5.92	12	44	13.0	35.7	0.2	68.9
29	6.00	12	43	13.1	35.3	0.2	67.7
30	6.04	28	43	12.9	35.4	0.2	64.0
31	6.07	28	44	13.5	37.8	0.2	69.1
32	6.11	28	45	13.8	37.8	0.3	73.5
33	6.14	28	45	13.8	36.1	0.3	73.3
34	6.18	28	49	15.4	38.6	0.3	84.6
35	6.21	28	49	15.4	36.2	0.3	84.2
36	6.25	28	50	16.1	36.3	0.3	86.7
37	6.29	28	51	15.7	36.3	0.3	87.7
38	6.32	28	50	14.9	36.6	0.3	86.9
39	6.36	28	50	15.6	36.3	0.3	88.2
40	6.39	28	50	15.3	36.8	0.3	88.1
41	6.43	28	51	15.3	36.4	0.3	87.5
42	6.46	28	49	15.0	36.2	0.3	84.9
43	6.50	28	49	14.5	36.6	0.3	80.2
44	7.55	22	46	14.7	1.9	0.3	75.3
45	7.59	22	46	14.8	34.8	0.3	77.8
46	7.64	22	46	14.8	34.7	0.3	78.3
47	7.68	22	45	14.3	34.4	0.3	74.8
48	7.73	22	44	14.4	34.2	0.3	72.3
49	7.77	22	46	14.9	34.3	0.3	75.7
50	7.82	22	46	14.8	34.6	0.3	75.1
51	7.86	22	44	14.4	34.2	0.2	70.2
52	7.91	22	44	14.3	34.6	0.2	70.3
53	7.95	22	43	14.0	34.1	0.2	67.6
54	8.00	22	44	14.2	35.0	0.3	71.7
55	8.03	36	44	14.3	34.0	0.3	73.6
56	8.06	36	45	14.8	35.3	0.3	75.3
57	8.08	36	44	14.5	33.7	0.2	69.2
58	8.11	36	44	14.5	35.0	0.3	73.2
59	8.14	36	43	14.1	33.9	0.2	68.6
60	8.17	36	43	14.3	35.3	0.2	68.7
61	8.19	36	42	13.7	33.5	0.2	66.3
62	8.22	36	43	13.7	35.1	0.2	67.0
63	8.25	36	42	13.9	34.1	0.2	67.5
64	8.28	36	42	13.8	34.5	0.2	68.4
65	8.31	36	42	13.5	34.5	0.2	66.2

HOLOCENE DRILL - Truck 6 (SN 1892115)
OP: ECM

Brainard Kilman BK-81
Test date: 1-Nov-2013

BL#	depth ft	BLC bl/ft	FMX kips	VMX f/s	BPM **	EMX k-ft	ETR (%)
66	8.33	36	40	13.1	34.6	0.2	60.0
67	8.36	36	41	13.2	34.5	0.2	62.5
68	8.39	36	41	13.0	34.9	0.2	61.7
69	8.42	36	41	13.0	34.5	0.2	62.3
		Average	44	14.4	34.2	0.3	73.2
		Std. Dev.	3	0.8	7.0	0.0	7.4
		Maximum	51	16.8	40.8	0.3	88.2
		@ Blow#	41	22	19	39	39
		Minimum	37	12.2	1.9	0.2	51.8
		@ Blow#	17	17	1	17	17
Total number of blows analyzed: 69							