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**A REPORT TO  
HALTON HILLS ONE LIMITED PARTNERSHIP**

**A GEOTECHNICAL INVESTIGATION FOR  
PROPOSED COMMERCIAL/INDUSTRIAL DEVELOPMENT**

**9094 REGIONAL ROAD 25**

**TOWN OF HALTON HILLS**

**REFERENCE NO. 2507-S174**

**MARCH 2026  
(REVISION OF REPORT DATED OCTOBER 2025)**

**DISTRIBUTION**

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## 1.0 **INTRODUCTION**

In accordance with a Purchase Order No. 11 issued by Halton Hills One Limited Partnership, dated July 25, 2025, a geotechnical investigation was carried out at 9094 Regional Road 25 in the Town of Halton Hills.

The purpose of the investigation was to reveal the subsurface conditions and to determine the engineering properties of the disclosed soils for the design and construction of a proposed commercial/industrial development. The geotechnical findings and resulting recommendations are presented in this Report. It should be noted that this present geotechnical report only focuses on the Phase 1 development land only (i.e. east portion of the property). The geotechnical report specific for the future employment area will be presented under separate cover.

## 2.0 **SITE AND PROJECT DESCRIPTION**

The site is located within the physiographic region of South Slope, consisting of Drumlinized Till Plains derived from glaciolacustrine deposits or shale, which are clay to silt in texture. In the southwest portion of the site, within the wood lot, Modern Alluvial deposits of clay, silt, sand, gravel may be encountered.

The subject site is located on the west quadrant of Regional Road 25 and 5<sup>th</sup> Side Road in the Town of Halton Hills. The property encompasses an approximate area of 27.61 hectare. The site is currently occupied by a driving range, a farm field and several structures, sheds and associated paved driveway with access to Regional Road 25 and 5<sup>th</sup> Side Road. The overall grading of the property ascends towards the southeast.

A review of the Site Plan prepared by Turner Fleischer Architects Inc., dated March 26, 2026 indicates that the Phase 1 development will consist of 8 slab-on-grade commercial retail buildings and a gas station. The existing heritage house within the property will also be relocated to a new location in the future employment area. The development will be provided with access driveways and municipal services meeting urban standards.

## 3.0 **FIELD WORK**

The field work, consisting of 15 sampled boreholes extending to depths of 6.6 to 9.6 m from the prevailing ground surface, was carried out on August 25 to August 29, 2025, at the locations shown on the Borehole and Monitoring Well Location Plan, Drawing No. 1.



The boreholes were advanced at intervals to the sampling depths by a truck-mounted machine with solid-stem augers equipped with split spoon sampler for soil sampling. Standard Penetration Tests, using the procedures described on the enclosed “List of Abbreviations and Terms,” were performed at the sampling depths. The test results are recorded as the Standard Penetration Resistance (or ‘N’ values) of the subsoil. The compactness of the cohesionless strata and the consistency of the cohesive strata are inferred from the ‘N’ values. Split-spoon samples were recovered for soil classification and laboratory testing.

The field work was supervised and the findings were recorded by a Geotechnical Technician. The ground elevation at each of the borehole location was obtained using the Global Navigation Satellite System (GNSS).

#### 4.0 **SUBSURFACE CONDITIONS**

The investigation has disclosed that beneath the pavement structure, topsoil and/or a layer of earth fill, the site is underlain by a stratum of silty clay till, sandy silt and sand/silty sand.

Detailed descriptions of the encountered subsurface conditions from the boreholes are presented on the Borehole Logs, comprising Figures 1 to 15, inclusive. The revealed stratigraphy is plotted on the Subsurface Profile, Drawing No. 2. The engineering properties of the disclosed soils are discussed herein.

#### 4.1 **Pavement Structure**

Borehole 11 is located on the paved driveway. The pavement structure consists of 50 mm thick asphalt concrete overlying a layer of 200 mm thick granular fill.

#### 4.2 **Topsoil**

The topsoil was contacted at the surface of all Boreholes except Borehole 11. It ranges from 5 cm to 20 cm in thickness.

#### 4.3 **Earth Fill**

A layer of earth fill was encountered at Boreholes 1 and 14, which are located on an elevated area, beneath the pavement structure or topsoil. The fill consists of sandy silt and fine sand and extends to depths of 2.3 m and 3.1 m below the prevailing ground surface.



#### 4.4 **Silty Clay Till**

The silty clay till was encountered beneath the pavement structure or topsoil in all boreholes except Boreholes 1, 10 and 14. It extends to the depths of 1.5 to 6.6 m from the ground surface. The clay till consists of a random mixture of particle sizes ranging from clay to gravel, with the silt and clay being the dominant fraction. Sample examination indicates that it is sandy and contains a trace of gravel with occasional cobbles, boulders and shale fragments. Grain size analysis was performed on a representative sample of silty clay till in Borehole 5 and the result is plotted on Figure 16.

The obtained 'N' values range from 6 to 46 blows, with a median of 18 blows per 30 cm of penetration, indicating the silty clay till is firm to hard, being generally very stiff in consistency. The surficial silty clay till is weathered, extending to depths of 0.6 to 1.3 m below the prevailing ground surface.

The water content of silty clay till samples range between 11% and 29%, with a median of 14%, indicating moist to wet, generally moist condition.

The engineering properties of the silty clay till deposit are presented below:

- High frost susceptibility and high soil-adsfreezing potential.
- Low water erodibility.
- It will generally be stable in a relatively steep cut; however, prolonged exposure will allow the fissures in the weathered zone and the wet sand seams and layers to become saturated, which may lead to localized sloughing

#### 4.5 **Sandy Silt**

The sandy silt deposit was encountered in Boreholes 2, 3, 4, 7, 10, 11, 12 and 14, extending to the depths of 4.6 to 6.6 m from the ground surface. Sample examinations show that the silt is sandy and contains a trace of clay. Grain size analysis was performed on 1 sandy silt sample; the result is plotted on Figure 17.

The recorded 'N' values of the silt range from 4 to 62, with a median of 25 blows per 30 cm of penetration, showing the silt is loose to very dense, generally compact in compactness.

The natural water content of the silt deposit ranges from 4% to 25%, with a median of 19%, indicating the silt is damp to wet, generally very moist.



The engineering properties of the silt deposit are presented below:

- High in frost susceptibility and high soil adfreezing potential.
- Highly water erodible; it is susceptible to migration through small openings under seepage pressure.
- High capillarity and water retention capacity, the wet silt will dilate when disturbed.
- Due to its dilatancy, the shear strength of the wet silt is susceptible to dynamic disturbance.
- In excavation, the silt will slough, run with seepage and the bottom will boil under a piezometric head of 0.3 m.

#### 4.6 **Silty Sand and Sand**

The silty sand deposit was contacted at Boreholes 9, 10, 13 and 14 in the lower portion of the borehole stratigraphy. It is fine grained and silty, containing traces of clay and medium sand. The fine to coarse grained sand was observed at Boreholes 1, 5 and 15 at the bottom of the borehole. It contains some silt and traces of clay and gravel.

The obtained 'N' values range from 9 to 74 blows, with a median of 21 blows per 30 cm of penetration, indicating the sand is loose to very dense, being generally compact in compactness.

The water content of sand samples range between 3% and 22%, with a median of 20%, indicating damp to wet, generally wet condition.

The engineering properties of the sand deposit are given below:

- Low to high frost susceptibility, depending on silt content.
- High water erodibility.
- In excavation, the sand will slough and run with water seepage. It will boil with a piezometric head of 0.3 m.

#### 4.7 **Compaction Characteristics of the Revealed Soils**

The obtainable degree of compaction is primarily dependent on the soil moisture and, to a lesser extent, on the type of compactor used and the effort applied. As a general guide, the typical water content values of the revealed soils for Standard Proctor compaction are presented in Table 1.



**Table 1 - Estimated Water Content for Compaction of On-Site Material**

Soil Type	Determined Natural Water Content (%)	Water Content (%) for Standard Proctor Compaction	
		100% (optimum)	Range for 95% or +
Silty Clay Till	11 to 29 (median 14)	16	12 to 21
Sandy Silt	4 to 25 (median 19)	13	8 to 17
Sand/Silty Sand	3 to 22 (median 20)	18	12 to 20

\* The above values are provided as a guideline. Standard Proctor Tests must be performed on bulk samples collected from site during construction prior to backfill and compaction.

5.0 **GROUNDWATER CONDITION**

Upon the completion of borehole drilling, groundwater was observed on completion in 9 of the 15 boreholes. Groundwater level in the monitoring wells was recorded following the completion of the boreholes. The boreholes where groundwater was observed on completion and monitoring wells are summarized in Table 2.

**Table 2 - Groundwater Levels on Borehole Completion/Monitoring Wells**

BH No.	Ground El. (m)	Monitoring Well Depth (m)	Measured Groundwater Level			
			On Completion		September 10, 2025	
			Depth (m)	El. (m)	Depth (m)	El. (m)
1	234.5	6.1	Dry	-	Dry	-
2	225.7	No well	1.5	224.2	No well installed	
3	226.0	6.1	2.4	223.6	1.6	224.4
4	223.6	No well	5.2	218.4	No well installed	
5	225.1	5.8	5.2	219.9	1.0	224.1
6	222.7	No well	Dry	-	No well installed	
7	221.5	6.1	4.0	217.5	-0.8*	222.3*
8	223.8	6.1	5.8	218.0	0.1	223.7
9	226.1	No well	4.3	221.8	No well installed	
10	226.8	No well	3.7	223.1	No well installed	
11	228.6	6.1	Not measured		4.2	224.4
12	226.0	6.6	Not measured		1.3	224.7
13	234.9	No well	Dry	-	No well installed	

**Table 2 - Groundwater Levels on Borehole Completion/Monitoring Wells (cont'd)**

BH No.	Ground El. (m)	Monitoring Well Depth (m)	Measured Groundwater Level			
			On Completion		September 10, 2025	
			Depth (m)	El. (m)	Depth (m)	El. (m)
14	238.7	6.1	Dry	-	Dry	-
15	228.6	No well	3.0	225.6	No well installed	

\* Groundwater was recorded above the ground surface in the monitoring well

Groundwater levels in the boreholes on completion range from 1.5 to 5.8 m below the existing ground surface, or from El. 217.5 to 225.6 m. Boreholes 1, 6, 13 and 14 remained dry on completion. Groundwater levels recorded in monitoring wells range from 0.8 m above the ground surface to 4.2 m below existing grade, or from El. 222.3 to 224.7 m. Boreholes 1 and 14 remained dry in the monitoring wells. It is subject to seasonal fluctuation.

Additional discussion on the groundwater condition within the property will be presented in the hydrogeological report, under separate cover.

## 6.0 **DISCUSSION AND RECOMMENDATIONS**

The investigation has disclosed that beneath the pavement structure/topsoil and a layer of earth fill, the site is underlain by a stratum of silty clay till, sandy silt and sand.

Groundwater levels in boreholes on completion ranges from 1.5 to 5.8 m below existing grade, or from El. 217.5 to 225.6 m. Boreholes 1, 6, 13 and 14 remained dry on completion. Groundwater levels in monitoring wells range from 0.8 m above the ground surface to 4.2 m below the ground surface, or from El. 222.3 to 224.7 m. Boreholes 1 and 14 remained dry in the monitoring wells. It is subject to seasonal fluctuation. The groundwater level is subject to seasonal fluctuation.

It is understood that the proposed development will consist of 8 slab-on-grade commercial retail buildings and a gas station within the Phase 1 development. The existing heritage house within the property will also be relocated to a new location. The development will be provided with access driveways and municipal services meeting urban standards.

The geotechnical findings which warrant special consideration are presented below:

1. After demolition of the existing structures and foundations, the debris must be removed and disposed off-site.



2. The existing earth fill, pavement structure and weathered soil are not suitable to support any structures sensitive to movement. In using the granular fill and weathered soil to support the structure, it should be subexcavated, sorted free of topsoil, organic or deleterious material, if any, and uniformly recompacted in layers.
3. The native soils are weathered extending to depths of 0.6 to 1.3 m from the prevailing ground surface. It is weak and will consolidate under surcharge loads. To upgrade the weathered soils to engineered status suitable for normal footing construction, they must be subexcavated, sorted, aerated and properly compacted.
4. The sound native soils are suitable for supporting the proposed structures on conventional footings and for construction of underground services and road pavement.
5. The proposed structures can be supported on conventional spread and strip footing founded on the native soils below the frost penetration depth. The foundation subgrade must be inspected by the geotechnical engineer or a senior geotechnical technician to ensure that the revealed conditions are compatible with the foundation design requirements.

The recommendations appropriate for the design of the development are presented herein. One must be aware that the subsurface conditions may vary between boreholes. Should subsurface variances become apparent during construction, a geotechnical engineer must be consulted.

## 6.1 **Site Preparation**

The topsoil must be stripped prior to the development. It can be stockpiled at designated area for reuse in landscaped area only. Any surplus must be removed off site.

The existing structures and foundations must be demolished and the debris must be removed and disposed off-site. The cavities must be backfilled with soil that is free of topsoil or deleterious material, placed and compacted to engineered fill specifications.

The weathered soils must be subexcavated, sorted free of topsoil inclusions and deleterious materials, if any, prior to its reuse as a backfill material.

In areas where earth fill is required to raise the site or extended footings are required, it is generally more economical to place an engineered fill for normal footing, underground services and pavement construction. The engineering requirements for a certifiable fill for pavement construction, municipal services, slab-on-grade, and footings are presented below:



1. The exposed subgrade must be inspected and proof-rolled prior to any fill placement. Badly weathered soils should also be subexcavated, sorted free of topsoil inclusions and any deleterious materials, if any, aerated and properly compacted in layers.
2. Inorganic soils must be used for the fill, and they must be uniformly compacted in lifts 20 cm thick to 98% or + of their maximum Standard Proctor dry density (SPDD) up to the proposed finished grade. The soil moisture must be properly controlled near the optimum. If the foundations are to be built soon after the fill placement, the densification process for the engineered fill must be increased to 100% of the maximum Standard Proctor compaction.
3. If the engineered fill is compacted with the moisture content on the wet side of the optimum, the underground services and pavement construction should not begin until the pore pressure within the fill mantle has completely dissipated. This must be further assessed at the time of the engineered fill construction.
4. If imported fill is to be used, it should be inorganic soils, free of any deleterious material with environmental issue (contamination). Any potential imported earth fill from off-site must be reviewed for geotechnical and environmental quality by the appropriate personnel as authorized by the developer or agency, before it is hauled to the site.
5. If the engineered fill is to be left over the winter months, adequate earth cover or equivalent must be provided for protection against frost action.
6. The engineered fill must extend over the entire graded area, and the engineered fill envelope must be clearly and accurately defined in the field and precisely documented by qualified surveyors.
7. Foundations partially on engineered fill must be reinforced and designed by a structural engineer to properly distribute the stress induced by the abrupt differential settlement (estimated to be  $15 \pm$  mm) between the natural soils and engineered fill.
8. The engineered fill must not be placed during the period from late November to early April when freezing ambient temperatures occur either persistently or intermittently. This is to ensure that the fill is free of frozen soils, ice and snow.
9. The fill operation must be fully supervised and monitored by a technician under the direction of a geotechnical engineer.
10. The footing and underground services subgrade must be inspected by the geotechnical consulting firm that supervised the engineered fill placement. This is to ensure that the foundations are placed within the engineered fill envelope, and the integrity of the fill has not been compromised by interim construction, environmental degradation and/or disturbance by the footing excavation.
11. Any excavation carried out in certified engineered fill must be reported to the geotechnical consultant who supervised the fill placement in order to document the locations of excavation and/or to supervise reinstatement of the excavated areas to engineered fill status. If construction on the engineered fill does not commence



within a period of 2 years from the date of certification, the condition of the engineered fill must be assessed for recertification.

12. Despite stringent control in the placement of the engineered fill, variations in soil type and density may occur in the engineered fill. Therefore, the foundations must be properly reinforced and designed by structural engineer for the project. The total and differential settlements of 25 mm and 15 mm, respectively, should be considered in the design of the foundations founded on engineered fill. In sewer construction, the engineered fill is considered to have the same structural proficiency as a natural inorganic soil.

## 6.2 Foundations

The proposed Phase 1 development will consist of slab-on-grade commercial retail buildings and a gas station. A review of the existing grade and the proposed finished floor elevations of the buildings, and the borehole elevation indicates that some of the buildings will be constructed on engineered fill, at current grade or below the existing grade. In general, the proposed buildings can be constructed on conventional spread and strip footings founded on the sound native soils below the earth fill and weathered soil, or on engineered fill. The recommended bearing pressures for the design of the conventional strip and spread footings are presented in Table 3:

**Table 3 - Founding Levels**

Borehole No.	Recommended Maximum Allowable Soil Pressure (SLS)/ Factored Ultimate Soil Bearing Pressure (ULS) and Suitable Founding Level			
	Sound Native Soils			
	150 kPa (SLS)/225 kPa (ULS)		200 kPa (SLS)/320 kPa (ULS)	
	Depth (m)	Elevation (m)	Depth (m)	Elevation (m)
1	-	-	3.1 or +	231.4 or -
2	1.8 or +	223.9 or -	2.3 or +	223.4 or -
3	1.3 or +	224.7 or -	2.5	223.5
4	0.9 or +	222.7 or -	2.5 or +	221.1 or -
5	0.8 or +	224.3 or -	1.5 or +	223.6 or -
6	1.5 or +	221.2 or -	-	-

**Table 3 - Founding Levels (Cont'd)**

Borehole No.	Recommended Maximum Allowable Soil Pressure (SLS)/ Factored Ultimate Soil Bearing Pressure (ULS) and Suitable Founding Level			
	Sound Native Soils			
	150 kPa (SLS)/225 kPa (ULS)		200 kPa (SLS)/320 kPa (ULS)	
	Depth (m)	Elevation (m)	Depth (m)	Elevation (m)
7	1.2 or +	220.3 or -	-	-
8	-	-	1.0 or +	222.8 or -
9	1.5 or +	224.6 or -	-	-
10	1.7 or +	225.1 or -	2.3 or +	224.5 or -
11	1.0 or +	227.6 or -	1.8 or +	226.8 or -
12	1.0 or +	225.0 or -	-	-
13	-	-	1.0 or +	233.9 or -
14	-	-	2.3 or +	236.4 or -
15	-	-	1.0 or +	227.6 or -

One must recognize that the above-recommended soil bearing values are given as a general guide for the design of foundations. The subgrade conditions may vary; therefore, further investigations is required once the detailed design and layout of the site is finalized.

The total and differential settlements of foundations designed for the recommended bearing pressures at SLS are estimated between 25 mm and 20 mm, respectively.

The foundation subgrade must be inspected by either a geotechnical engineer, or a geotechnical technician under the supervision of a geotechnical engineer, to ensure that the revealed conditions are compatible with the design of the foundation.

Footings exposed to weathering or in unheated areas should have at least 1.2 m of earth cover for protection against frost action.

The building foundation must meet the requirements specified in the latest Ontario Building Code. As a guide, the structure should be designed to resist an earthquake force using Site Classification 'D' (stiff soil). A Multichannel Analysis of Surface Waves (MASW) to determine the shear wave velocity ( $V_s$ ) and determine if a higher site class can be provided.

If groundwater seepage is encountered in excavation, the foundation must be poured immediately after subgrade inspection or the subgrade should be protected by a concrete



mud-slab immediately after exposure. This will prevent construction disturbance and costly rectification of the bearing subsoil.

**Additional boreholes must be completed for each slab-on-grade building once the grading and the detail design for the development becomes available.**

### 6.3 Slab-On-Grade Construction

The subgrade for slab-on-grade structures must consist of sound native soil or properly compacted inorganic earth fill. The subgrade should be inspected and assessed by proof-rolling. Any weathered and/or loose soil should be subexcavated, sorted free of any deleterious material, aerated and uniformly compacted to at least 98% SPDD.

The concrete floor slab should be constructed on a granular base, 20 cm in thickness, consisting of 19-mm Crusher-Run Limestone (CRL), or equivalent, compacted to 100% SPDD. A Modulus of Subgrade Reaction of 30 MPa/m is recommended for the design of the floor slab.

The ground around the buildings must be graded to direct water away from the structures.

### 6.4 Underground Services

The underground services should be founded on sound native soil or properly compacted inorganic earth fill. Where incompetent or weathered soil is encountered, it should be subexcavated and replaced with the bedding material, compacted to at least 98% SPDD.

The subgrade for the underground services should consist of sound natural soil or properly compacted, inorganic earth fill. A Class 'B' bedding, consisting of compacted 19-mm CRL, is recommended for the underground service construction. Where the services lies in erodible sand and silt, or extensive dewatering is required, a Class 'A' (concrete) bedding can be considered.

Service pipes connecting into manholes and catch basins must be connected by leak-proof joints, or the joints should be wrapped with a water proof membrane, to prevent any soil penetration upfiltration through the joints.

In order to prevent pipe floatation when the sewer trench is deluged with water derived from precipitation, a minimum soil cover of at least the diameter of the pipe should be in place at all times after completion of the pipe installation. Openings to subdrains and catch basins should be shielded with a fabric filter to prevent blockage by silting.



The on-site clayey soils are considered moderately high in corrosivity to ductile iron pipes and metal fittings; therefore, the underground services should be protected against soil corrosion. For estimation for the anode weight requirements, the electrical resistivities disclosed in Table 5 can be used. The proposed anode weight must meet the minimum requirements as specified by the Region and Municipality Standard.

#### 6.5 **Backfilling Service Trenches and Excavation Areas**

On-site inorganic soils are suitable to be reused as trench backfill. Where the soils are too dry, they will require wetting or mixing with drier soils. Where the soils are too wet, they should be aerated by spreading them thinly on the ground in dry warm weather. The sand can also be stockpiled to drain of excess water.

The backfill in trenches and excavated areas should be compacted to at least 95% SPDD. Below concrete slab and in the zone within 1.0 m below the pavement subgrade, the material should be compacted to 98% SPDD with the water content 2% to 3% drier than the optimum. This is to provide the required stiffness for pavement and slab construction.

The lift of each backfill layer should either be limited to a thickness of 20 cm, or the thickness should be determined by test strips performed by the compaction equipment. Large boulders (15 cm or larger) should be sorted out and should not be used for backfilling.

In normal construction practice, the problem areas of settlement largely occur adjacent to manholes, catch basins, service crossings, foundation walls and columns. In areas which are inaccessible to a heavy compactor, light duty compactor can be used on imported sand or granular backfill.

#### 6.6 **Perimeter Walls at Truck Loading Docks**

Where truck loading docks are provided for the proposed development, the perimeter walls at the loading areas should be designed with Active ( $K_a$ ) lateral earth pressure coefficient provided in Table 5 in Section 6.9.

The loading dock will need to be provided with subdrains and catch basins to avoid ponding of surface runoff where it is lower than the surrounding area.

The backfill against the wall must consist of free-draining granular fill. The walls exposed to weathering should be properly insulated with 50-mm Styrofoam, or equivalent, and the insulation should extend 1.2 m internally under the slab at the loading entrance.



### 6.7 **Pylon Sign and Light Standard for Parking Lot**

The founding depth for the pylon sign and light standard must be adequate to provide lateral stability and resistance of the pylon sign with respect to the movement induced by lateral wind loads. It should be noted that, due to the effects of yearly freezing and thawing, the lateral resistance of the soils within the frost depth will be weakened. Therefore, the retaining capacity for the lateral load within the frost depth, i.e., about 1.2 m, should be ignored. The recommended earth pressure coefficients for the soils for use in assessing the passive resistance of the foundations are given in Section 6.9.

The footings must meet the requirements specified in the Ontario Building Code.

The passive lateral earth pressure coefficient ( $K_p$ ) given in Table 5 can be used for the light standard design.

### 6.8 **Pavement Design**

The recommended pavement design for the private commercial/industrial access roads for the proposed development is presented in Table 4.

**Table 4 - Pavement Design for Private Access Roads**

<b>Course</b>	<b>Thickness (mm)</b>	<b>OPS Specifications</b>
Asphalt Surface	40	HL3
Asphalt Binder	50	HL8
Granular Base	150	Granular 'A'
Granular Sub-base	300	Granular 'B', Type I

After fine grading, the pavement subgrade should be inspected and proof-rolled. Any soft spots identified should be subexcavated and replaced by properly compacted inorganic earth fill. The subgrade within the 1.0 m zone below the underside of the granular base should be compacted to at least 98% SPDD with the moisture content 2% to 3% drier than the optimum. All the granular bases should be compacted to their maximum SPDD.

All the granular bases should be compacted in 150 to 200 mm lifts to 100% SPDD. The area around the pavement should be graded to direct surface runoffs away from the paved area.

Within the parking lot, along the perimeter where surface runoff may drain onto the pavement, an intercept subdrain system should be installed to prevent infiltrating precipitation from seeping into the granular bases (since this may inflict frost damage on the



flexible pavement). The subdrains should consist of filter-wrapped weepers, and they should be connected to the catch basins or storm manholes in the paved areas. Catch basins with stub drains in all four directions should also be provided. The invert of the subdrains should be at least 0.3 m beneath the underside of the granular sub-base and backfilled with free-draining granular material.

**6.9 Soil Parameters**

The recommended soil parameters for the project design are given in Table 5:

**Table 5 - Soil Parameters**

<b><u>Unit Weight and Bulk Factor</u></b>	<b>Unit Weight <math>\gamma</math> (kN/m<sup>3</sup>)</b>		<b>Estimated Bulk Factor</b>	
	<b>Bulk</b>	<b>Submerged</b>	<b>Loose</b>	<b>Compacted</b>
Silty Clay Till	21.5	11.5	1.30	1.05
Sandy Silt	20.5	10.5	1.20	1.00
Sand/Silty Sand	20.5	10.5	1.25	1.00
<b><u>Lateral Earth Pressure Coefficients</u></b>	<b>Active K<sub>a</sub></b>	<b>At Rest K<sub>o</sub></b>	<b>Passive K<sub>p</sub></b>	
Silty Clay Till	0.35	0.45	2.86	
Sandy Silt	0.33	0.43	3.00	
Sand/Silty Sand	0.30	0.40	3.33	
<b><u>Coefficient of Permeability (K) and Percolation Time (T)</u></b>				
	<b>K (cm/sec)</b>	<b>T (min/cm)</b>		
Silty Clay Till	10 <sup>-7</sup>	80+		
Sandy Silt	10 <sup>-5</sup>	20		
Sand/Silty Sand	10 <sup>-3</sup> to 10 <sup>-4</sup>	8 to 12		
<b><u>Effective Shear Strength Parameters</u></b>				
	<b>Cohesion c' (kPa)</b>	<b>Angle of Internal Friction, <math>\phi'</math></b>		
Silty Clay Till	5	30°		
Sandy Silt	0	30°		
Sand/Silty Sand	0	33°		

**Table 5 - Soil Parameters (Cont'd)**

<b><u>Estimated Electrical Resistivity (ohm·cm)</u></b>	
Silty Clay Till	3000
Sandy Silt	5000
Sand/Silty Sand	6000
<b><u>Coefficients of Friction</u></b>	
Between Concrete and Granular Base	0.50
Between Concrete and Sound Native Soils	0.35

### 6.10 **Excavation**

Excavation should be carried out in accordance with Ontario Regulation 213/91. The types of soils are classified in Table 6.

**Table 6 - Classification of Soils for Excavation**

<b>Material</b>	<b>Type</b>
Silty Clay Till	2
Earth Fill, weathered Tills, Drained Sand and Silt	3
Saturated Sand and Silt	4

In the till deposit, any perched groundwater yield can be collected and removed by conventional pumping from sumps. Water seepage can be expected from the wet sand and silt. The groundwater seepage in the sand and silt below groundwater, if encountered during excavation, can be controlled by pumping from closely spaced sump pits, or if necessary, the use of well point dewatering system. The appropriate dewatering method should be assessed by test pumping at the site, if required, under the direction of a hydrogeologist.

The hard till contain cobbles and boulders. Extra effort and a properly equipped backhoe will be required for excavation. Boulders and shale fragments larger than 15 cm in size are not suitable for structural backfill.

Prospective contractors must be asked to assess the in situ subsurface conditions for soil cuts by digging test pits to 1.0 m below the anticipated depth of excavation. These test pits should be allowed to remain open for a few hours to assess the trenching conditions.



## 7.0 LIMITATIONS OF REPORT

This report was prepared by Soil Engineers Ltd. for the account of Halton Hills One Limited Partnership, and for review by the designated consultants, financial institutions and government agencies. The material in the report reflects the judgement of Sze Wing Yu, B.Eng. and Kelvin Hung, P.Eng. in light of the information available to it at the time of preparation.

Use of this report is subject to the conditions and limitations of the contractual agreement. Any use which a Third Party makes of this report, or any reliance on decisions to be made based on it, is the responsibility of such Third Parties. Soil Engineers Ltd. accepts no responsibility for damages, if any, suffered by any Third Party as a result of decisions made or actions based on this report.

### **SOIL ENGINEERS LTD.**

Sze Wing Yu, B.Eng.  
SY/KH

Kelvin Hung, P.Eng.



# LIST OF ABBREVIATIONS AND DESCRIPTION OF TERMS

The abbreviations and terms commonly employed on the borehole logs and figures, and in the text of the report, are as follows:

## SAMPLE TYPES

AS	Auger sample
CS	Chunk sample
DO	Drive open (split spoon)
DS	Denison type sample
FS	Foil sample
RC	Rock core (with size and percentage recovery)
ST	Slotted tube
TO	Thin-walled, open
TP	Thin-walled, piston
WS	Wash sample

## PENETRATION RESISTANCE

Standard Penetration Resistance or 'N' Value:

The number of blows of a 63.5 kg hammer falling from a height of 76 cm required to advance a 51 mm outer diameter drive open sampler 30 cm into undisturbed soil, after an initial penetration of 15 cm.

Plotted as '○'

Dynamic Cone Penetration Resistance:

A continuous profile showing the number of blows per each 30 cm of penetration of a 51 mm diameter, 90° point cone driven by a 63.5 kg hammer falling from a height of 76 cm.

Plotted as '—●—'

WH	Sampler advanced by static weight
PH	Sampler advanced by hydraulic pressure
PM	Sampler advanced by manual pressure
NP	No penetration

## SOIL DESCRIPTION

Cohesionless Soils:

'N' (blows/30 cm)	Compactness
0 to 4	very loose
4 to 10	loose
10 to 30	compact
30 to 50	dense
> 50	very dense

Cohesive Soils:

Undrained Shear Strength (kPa)	'N' (blows/30 cm)	Consistency
<12	<2	very soft
12 to <25	2 to <4	soft
25 to <50	4 to <8	firm
50 to <100	8 to <15	stiff
100 to 200	15 to 30	very stiff
>200	>30	hard

Method of Determination of Undrained Shear Strength of Cohesive Soils:

x 0.0 Field vane test in borehole; the number denotes the sensitivity to remoulding

△ Laboratory vane test

## METRIC CONVERSION FACTORS

1 ft	= 0.3048 m
1 inch	= 25.4 mm
1 lb	= 0.454 kg
1 ksf	= 47.88 kPa



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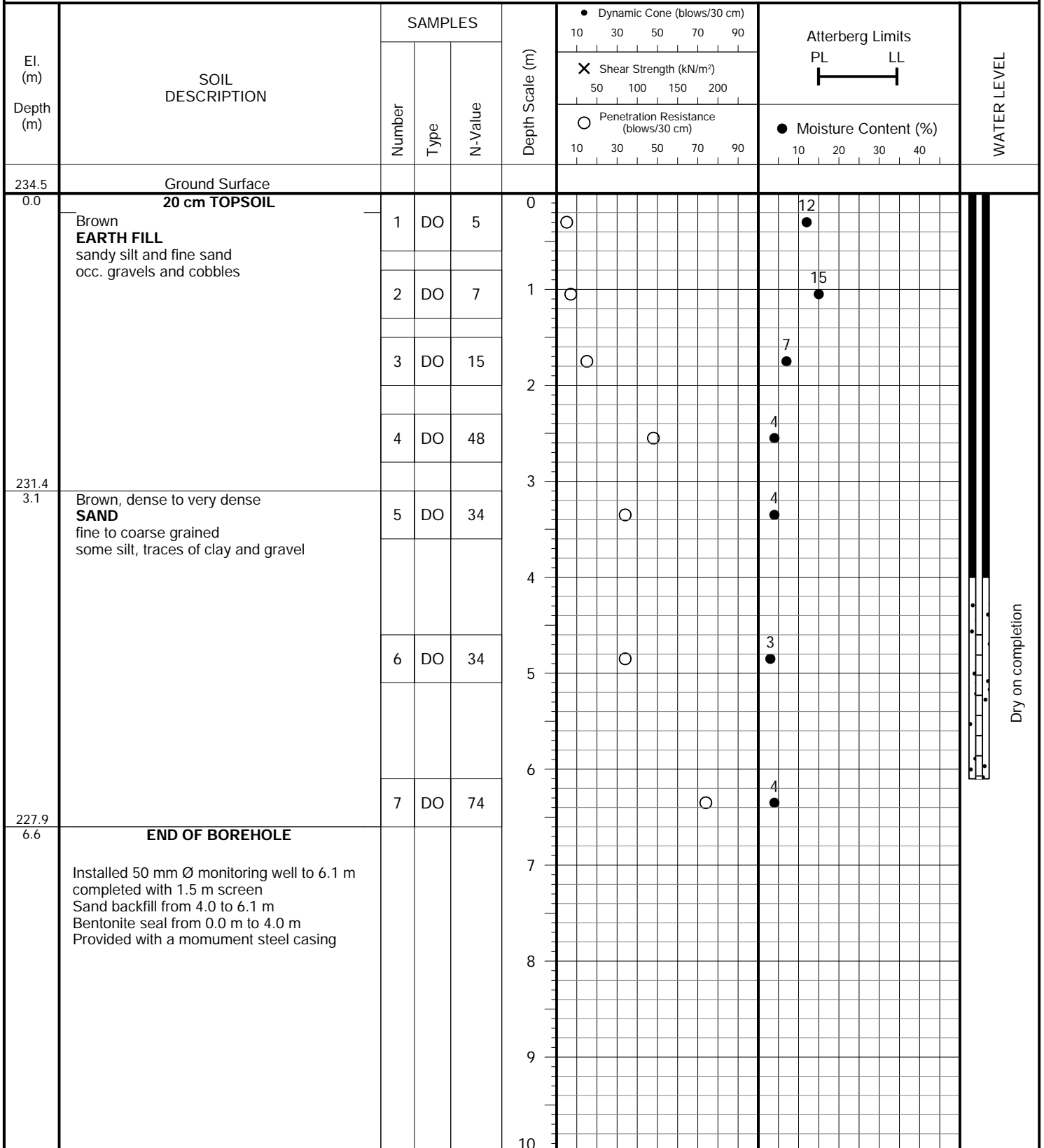
GEOTECHNICAL • ENVIRONMENTAL • HYDROGEOLOGICAL • BUILDING SCIENCE

**PROJECT DESCRIPTION:** Proposed Commercial/Industrial Development

**METHOD OF BORING:** Solid Stem Augers

**PROJECT LOCATION:** 9094 Regional Road 25, Town of Halton Hills

**DRILLING DATE:** August 29, 2025

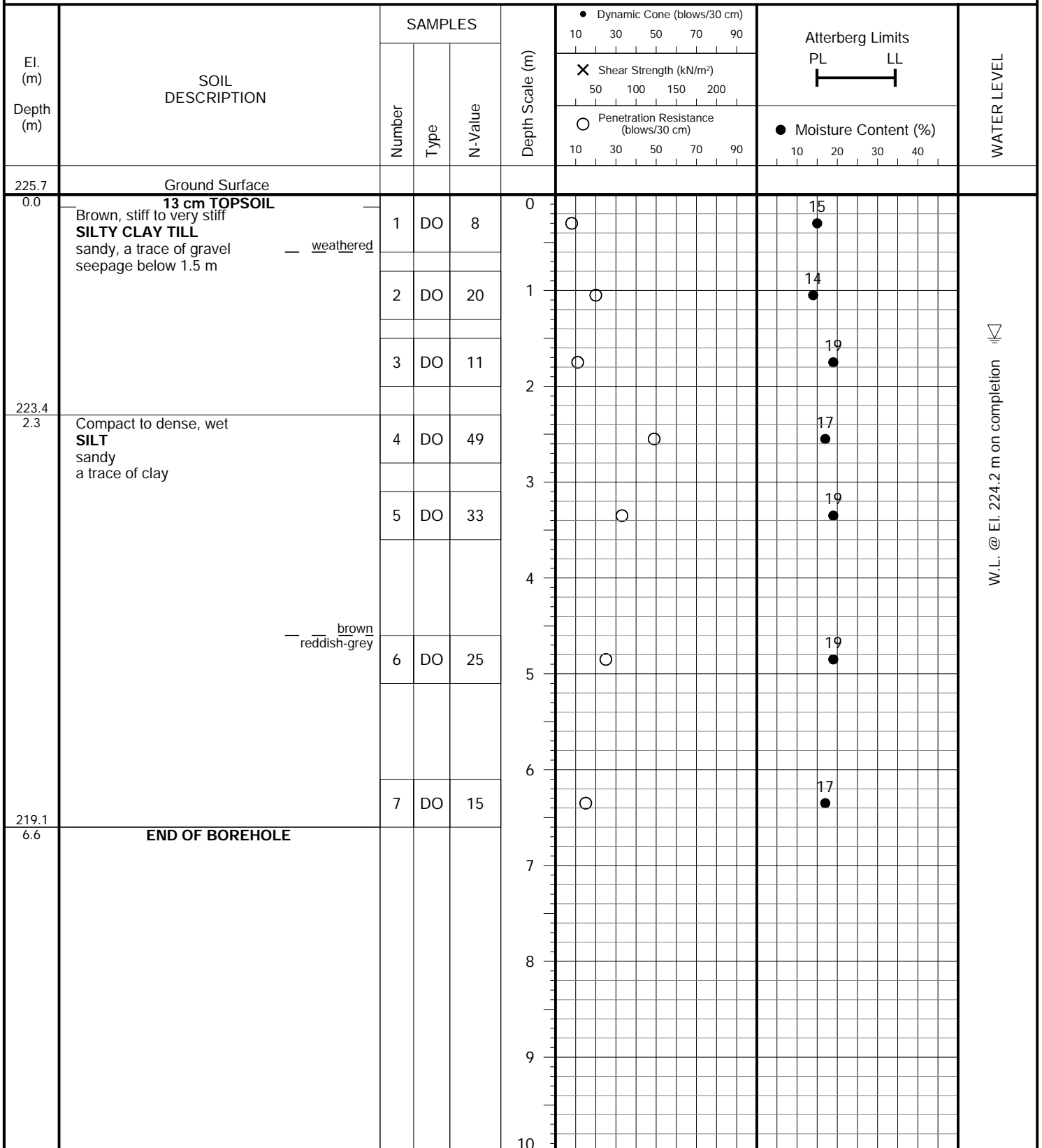


**PROJECT DESCRIPTION:** Proposed Commercial/Industrial Development

**METHOD OF BORING:** Solid Stem Augers

**PROJECT LOCATION:** 9094 Regional Road 25, Town of Halton Hills

**DRILLING DATE:** August 26, 2025

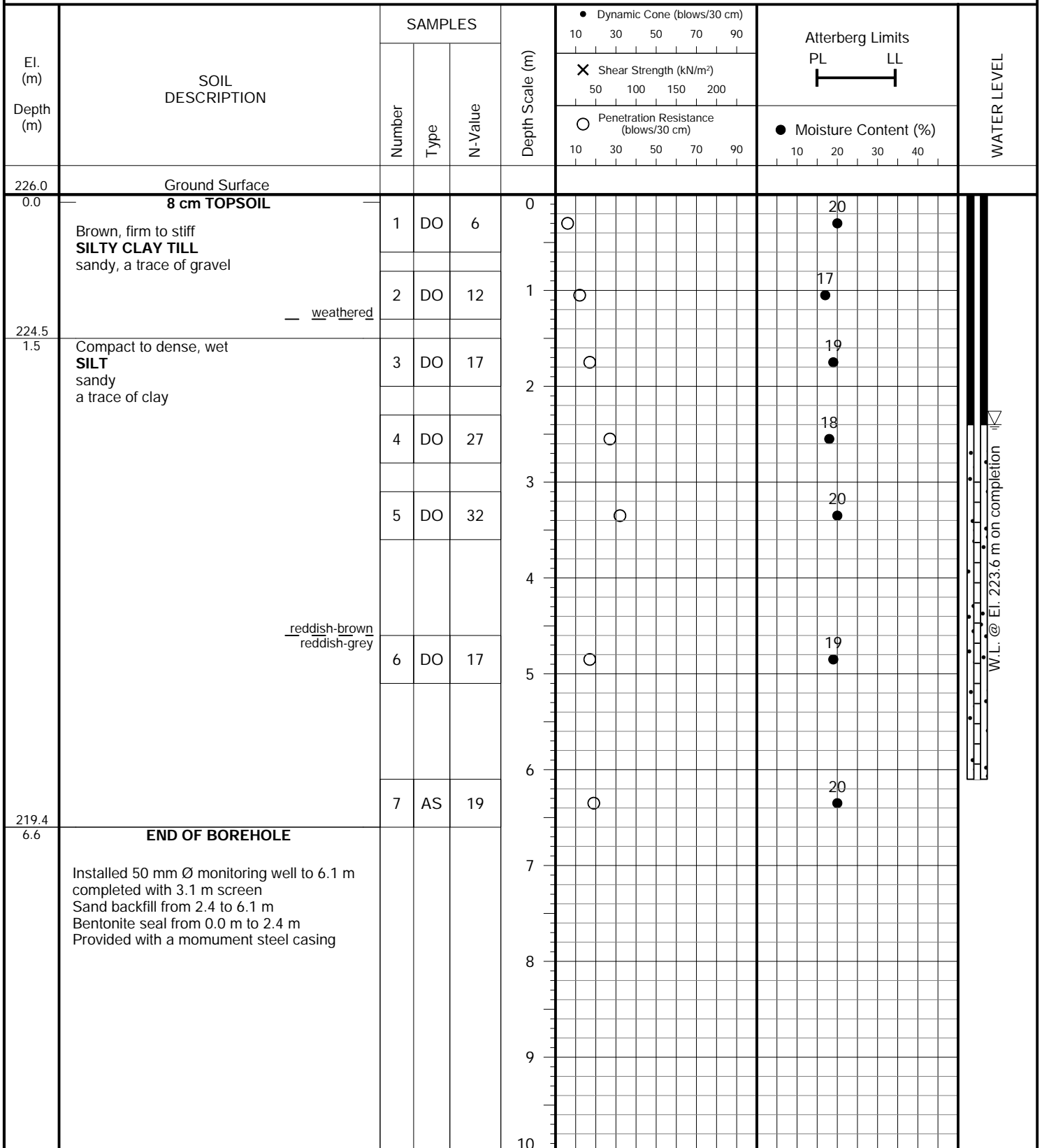


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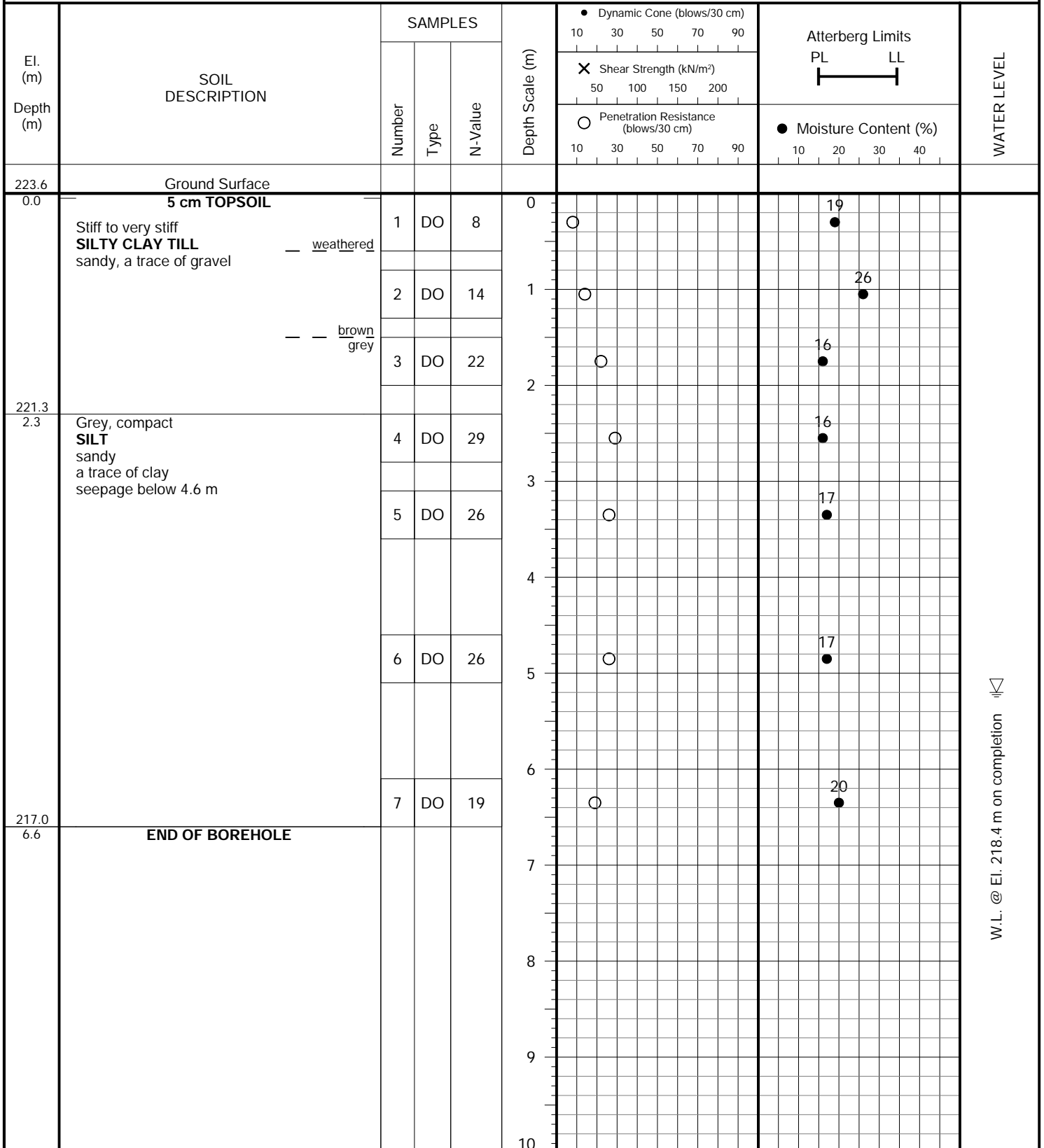


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W.L. @ El. 218.4 m on completion

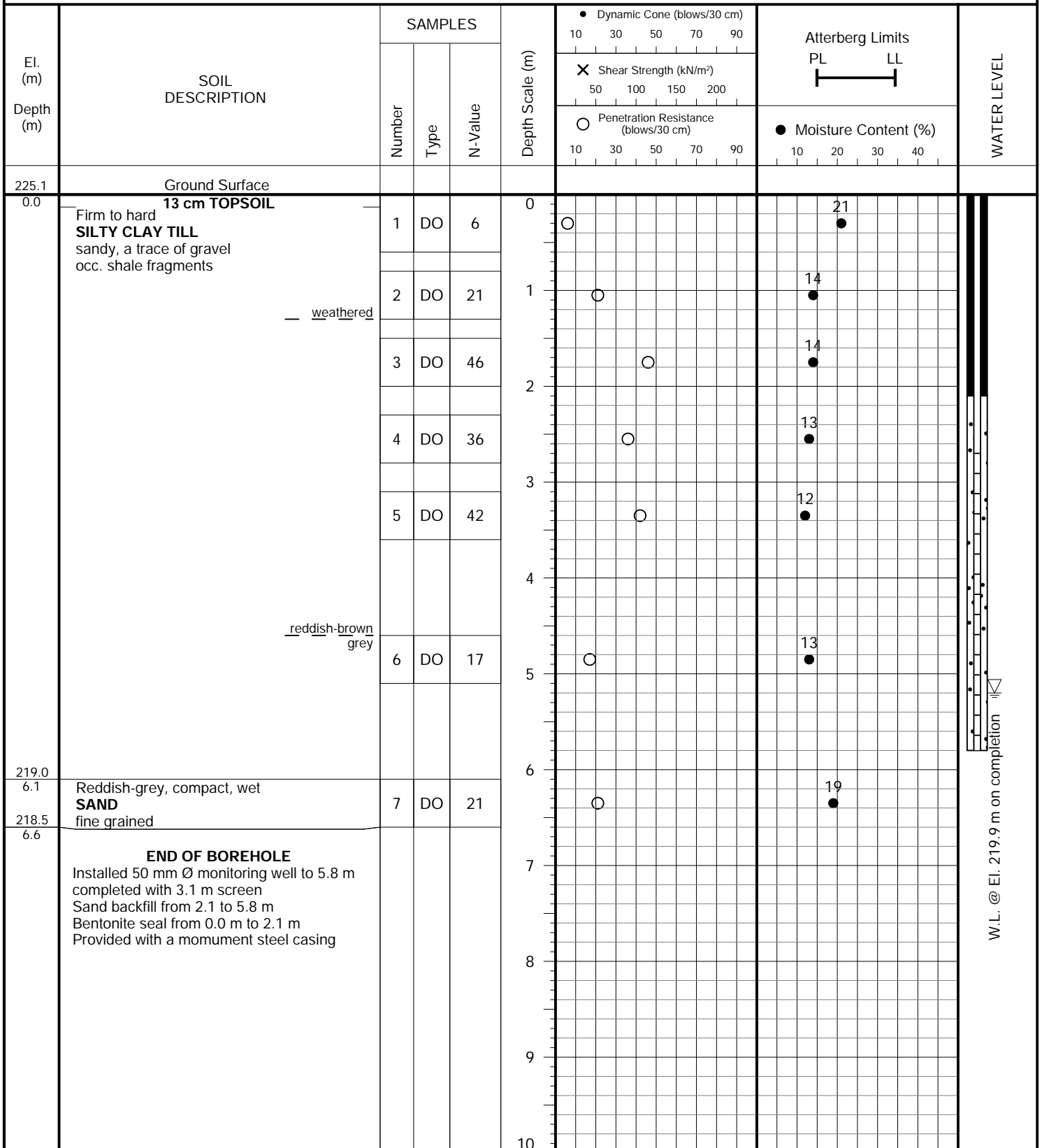


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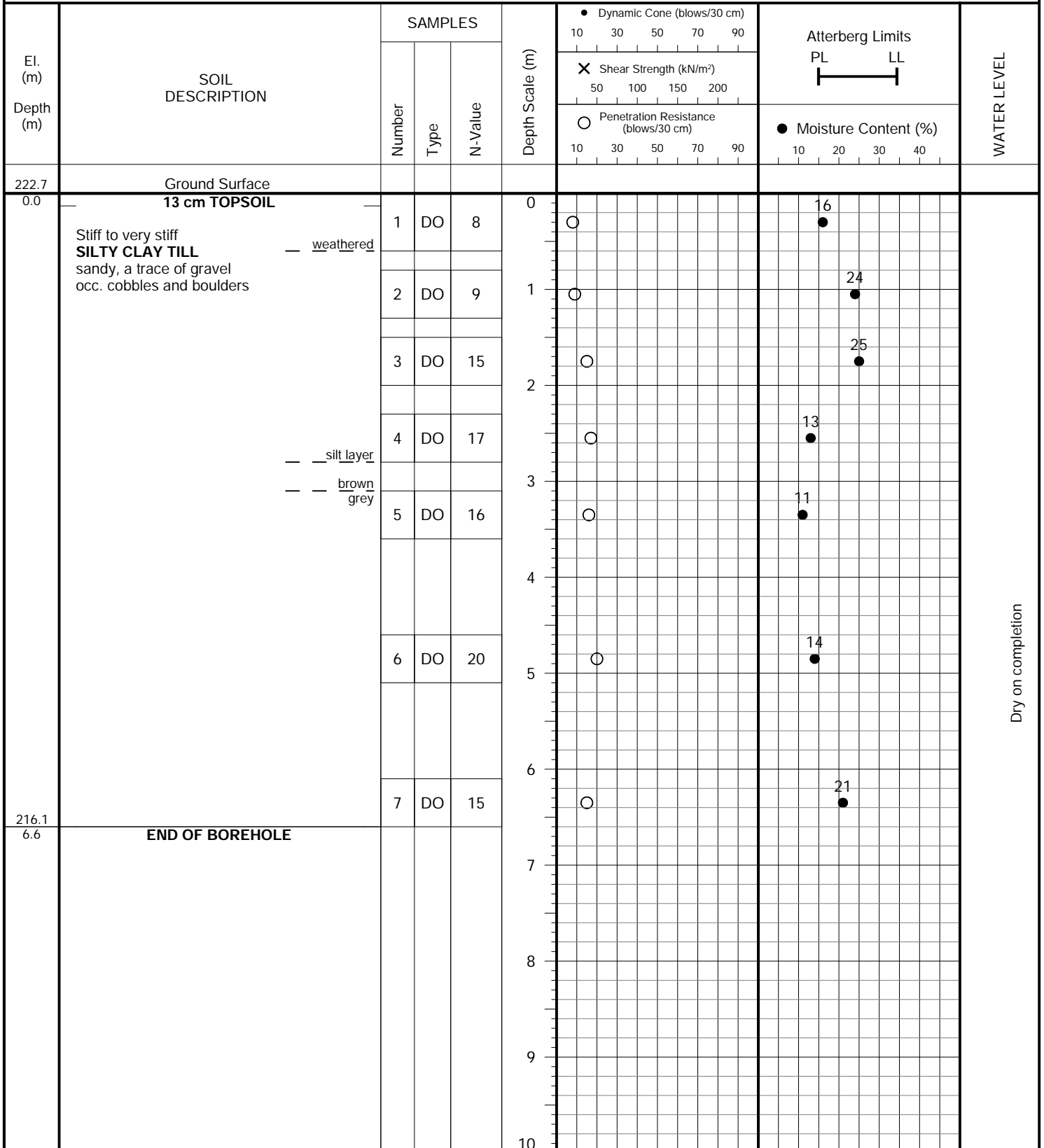


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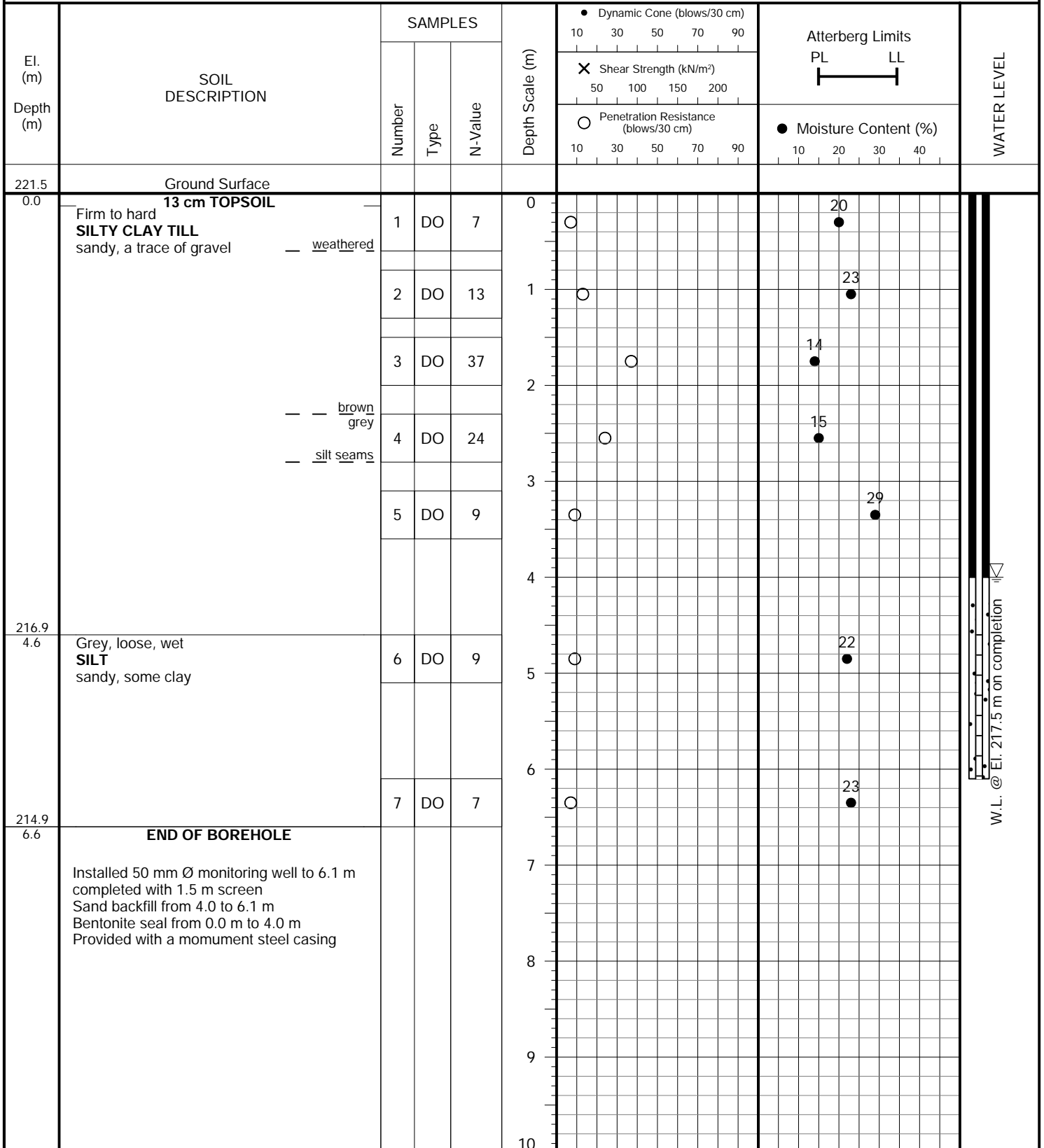


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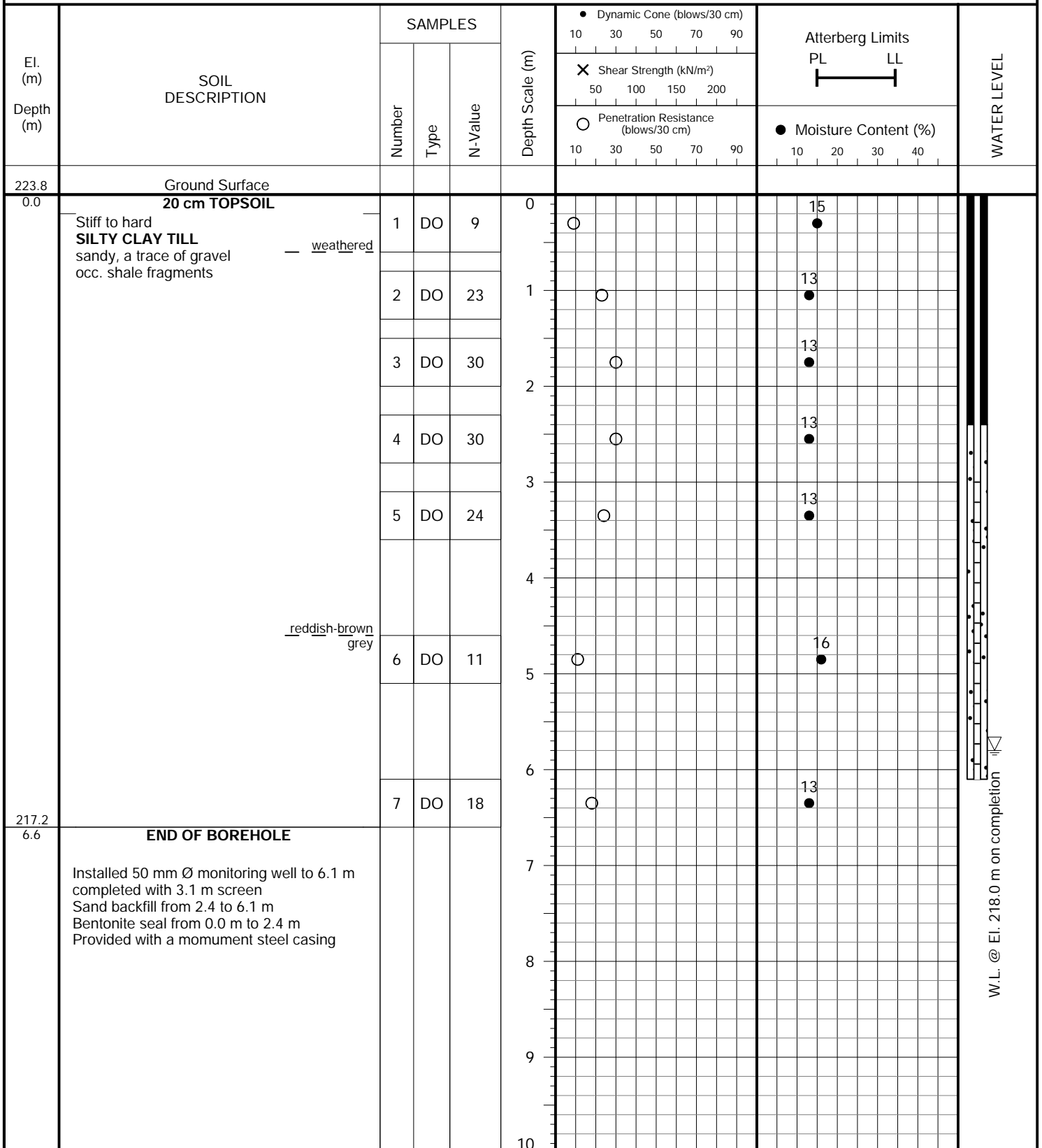


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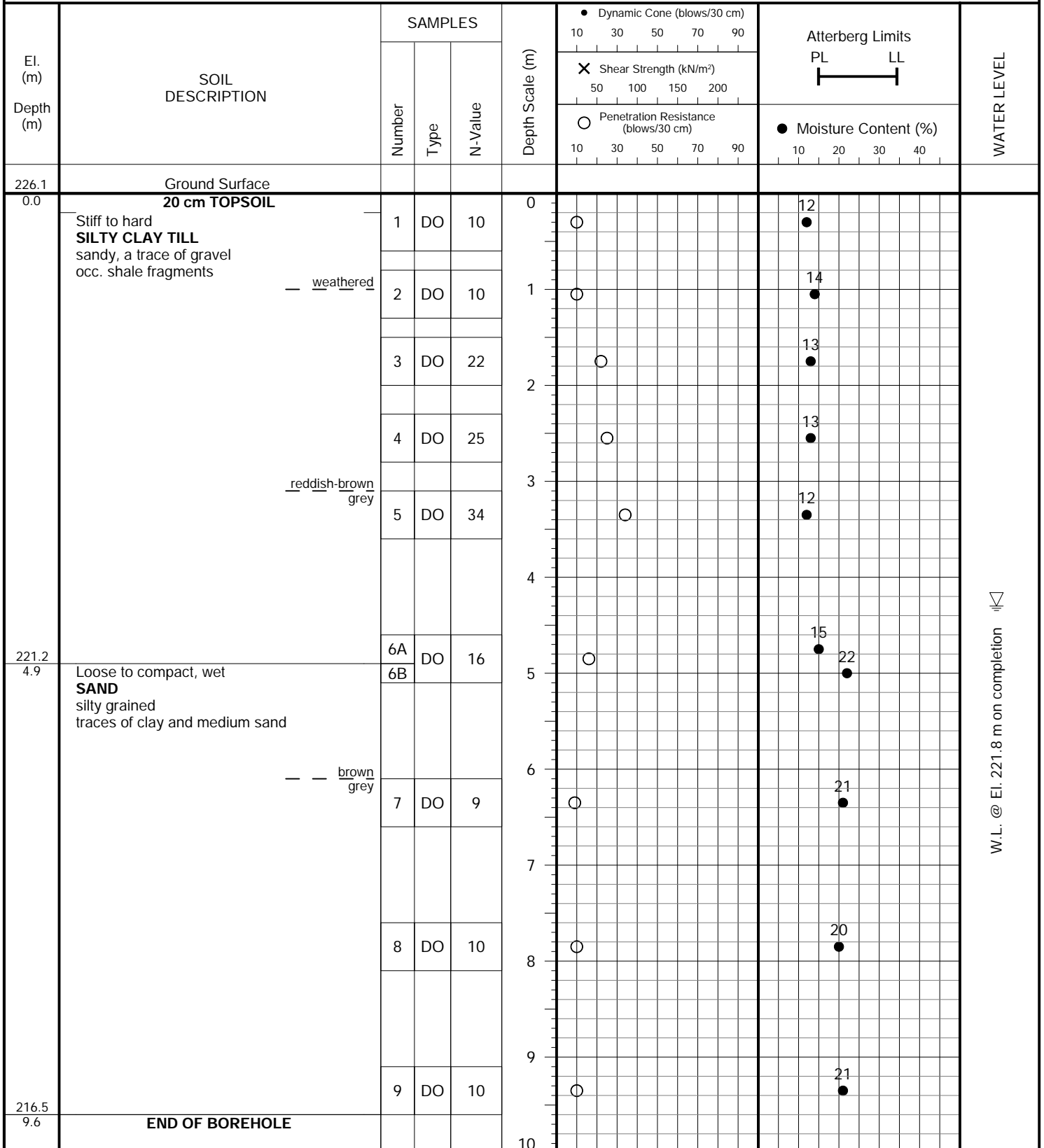


PROJECT DESCRIPTION: Proposed Commercial/Industrial Development

METHOD OF BORING: Solid Stem Augers

PROJECT LOCATION: 9094 Regional Road 25, Town of Halton Hills

DRILLING DATE: August 28, 2025

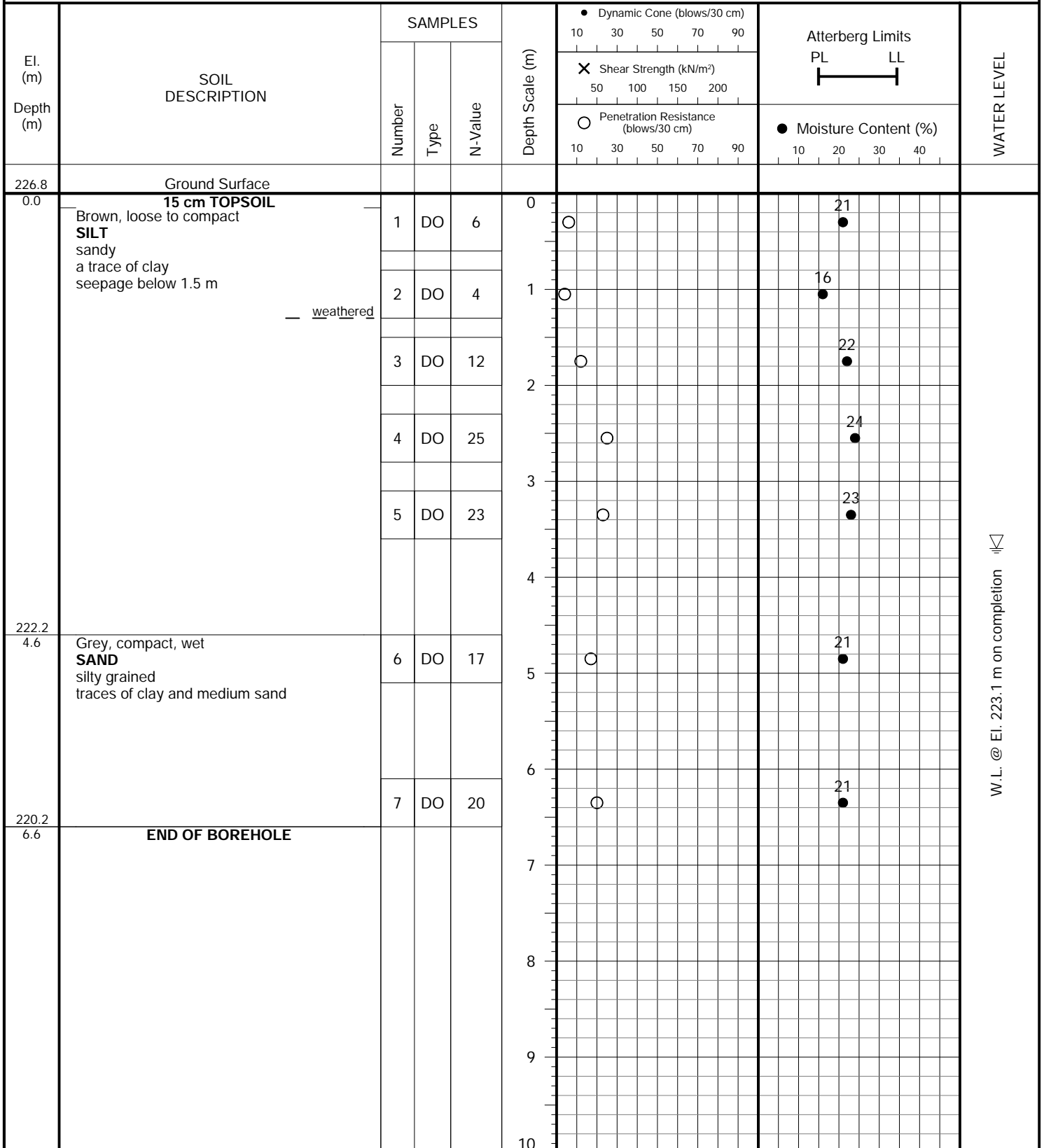


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**PROJECT LOCATION:** 9094 Regional Road 25, Town of Halton Hills

**DRILLING DATE:** August 28, 2025

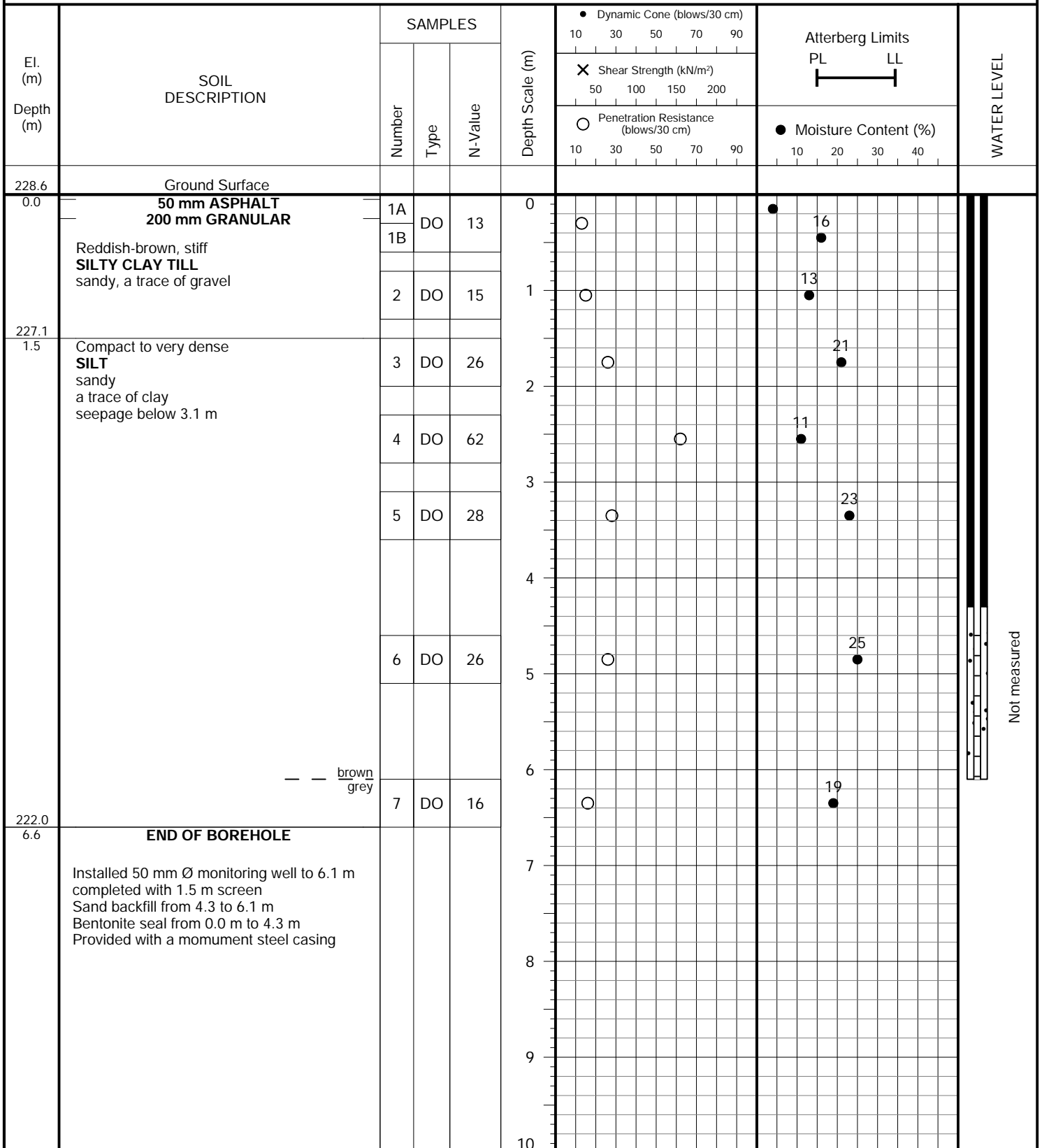


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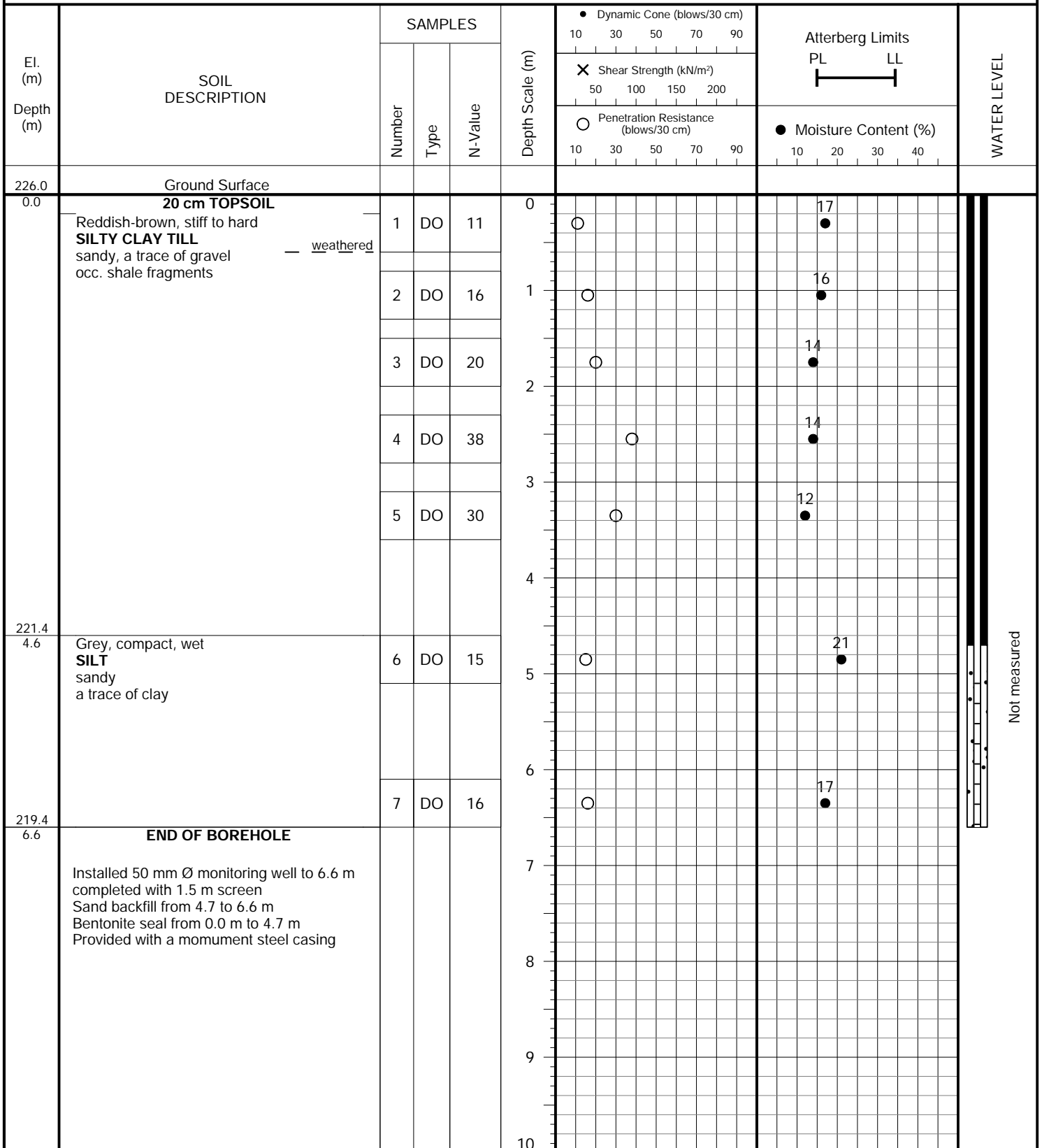


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**DRILLING DATE:** August 29, 2025



Not measured

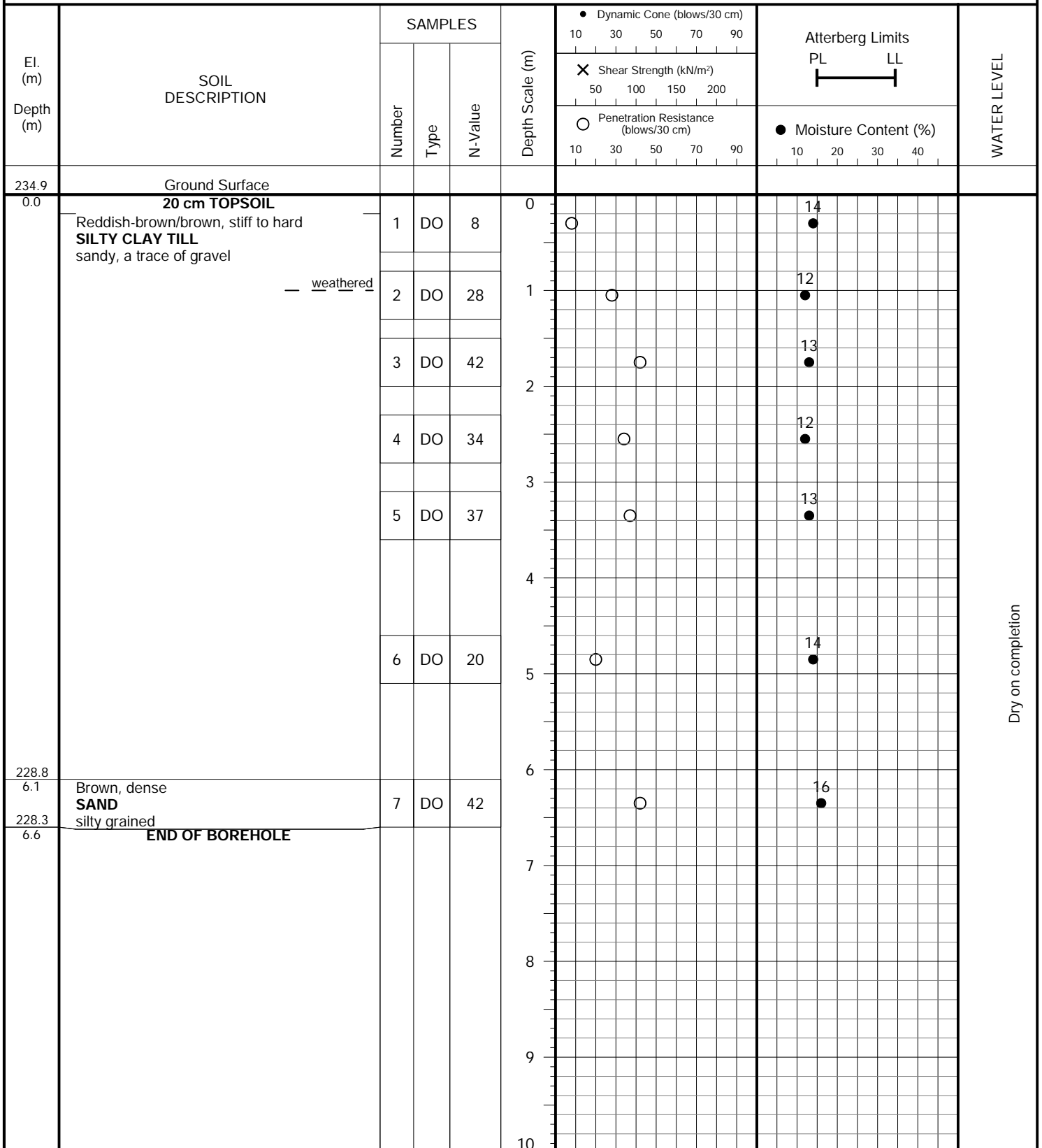


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Dry on completion

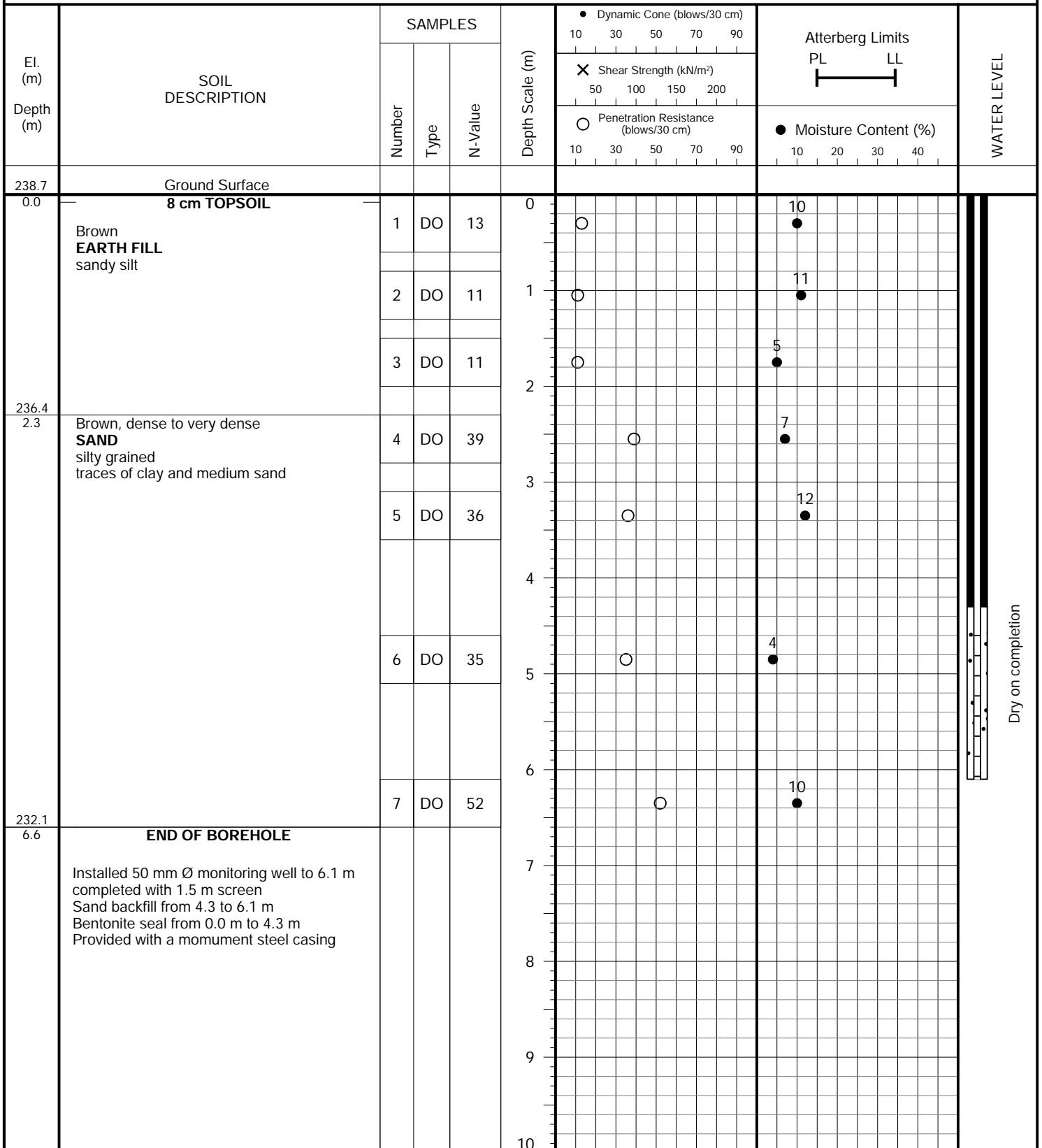


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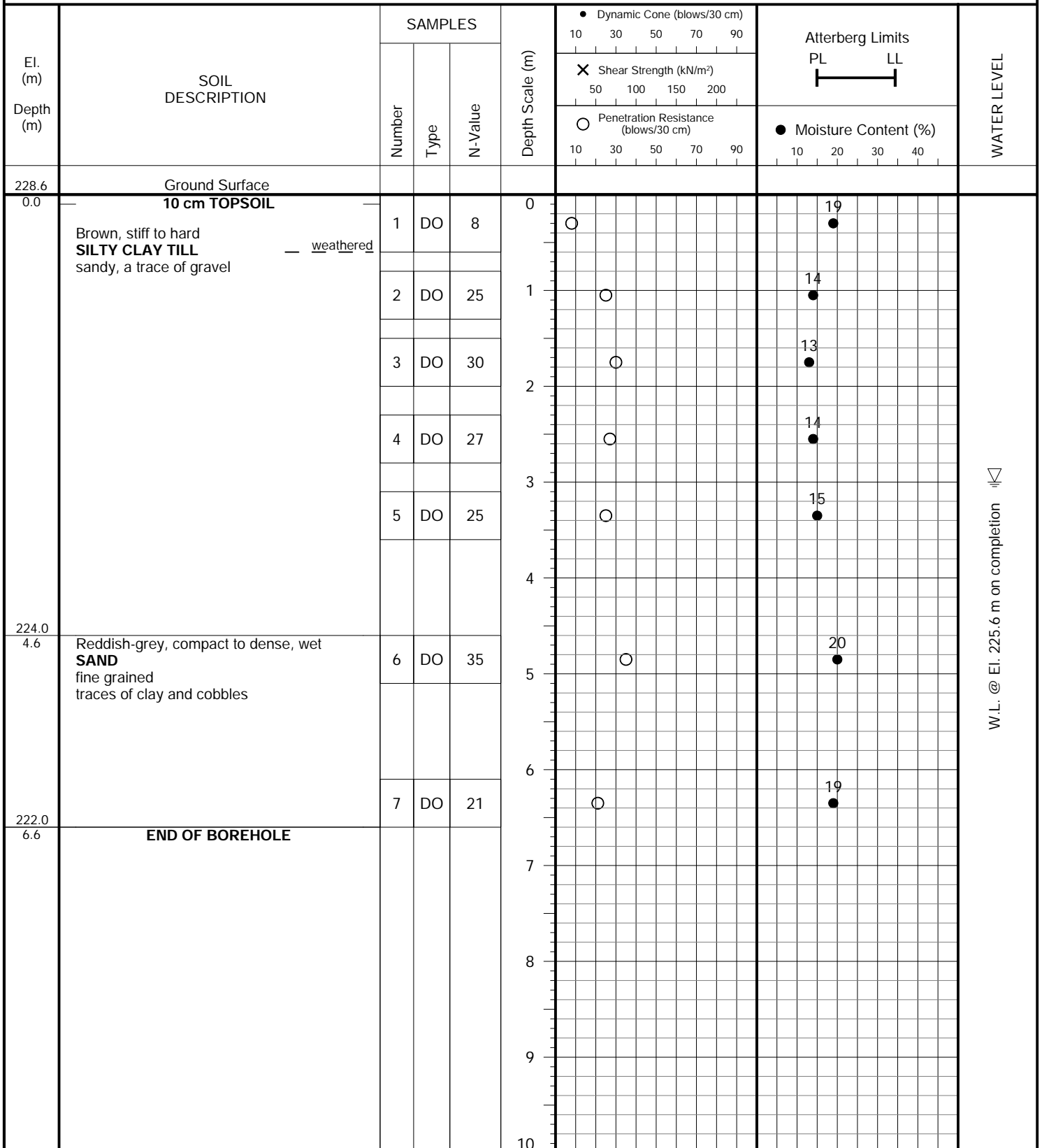


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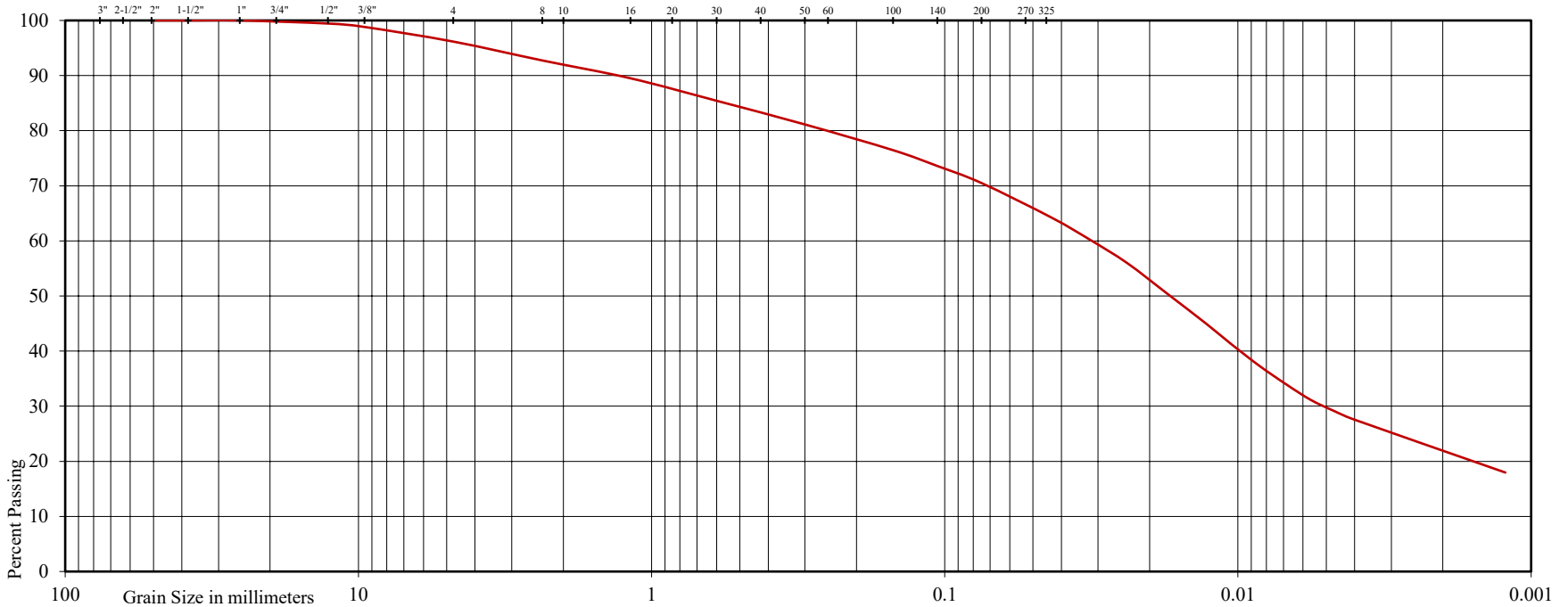


U.S. BUREAU OF SOILS CLASSIFICATION

GRAVEL		SAND				SILT	CLAY
COARSE	FINE	COARSE	MEDIUM	FINE	V. FINE		

UNIFIED SOIL CLASSIFICATION

GRAVEL		SAND			SILT & CLAY
COARSE	FINE	COARSE	MEDIUM	FINE	



Project: Proposed Commercial/Industrial Development

Location: 9094 Regional Road 25, Town of Halton Hills

BH./Sa. 5/4

Liquid Limit (%) = -

Plastic Limit (%) = -

Plasticity Index (%) = -

Moisture Content (%) = 13

Estimated Permeability (cm./sec.) = 10<sup>-7</sup>

Borehole No: 5

Sample No: 4

Depth (m): 2.6

Elevation (m): 222.5

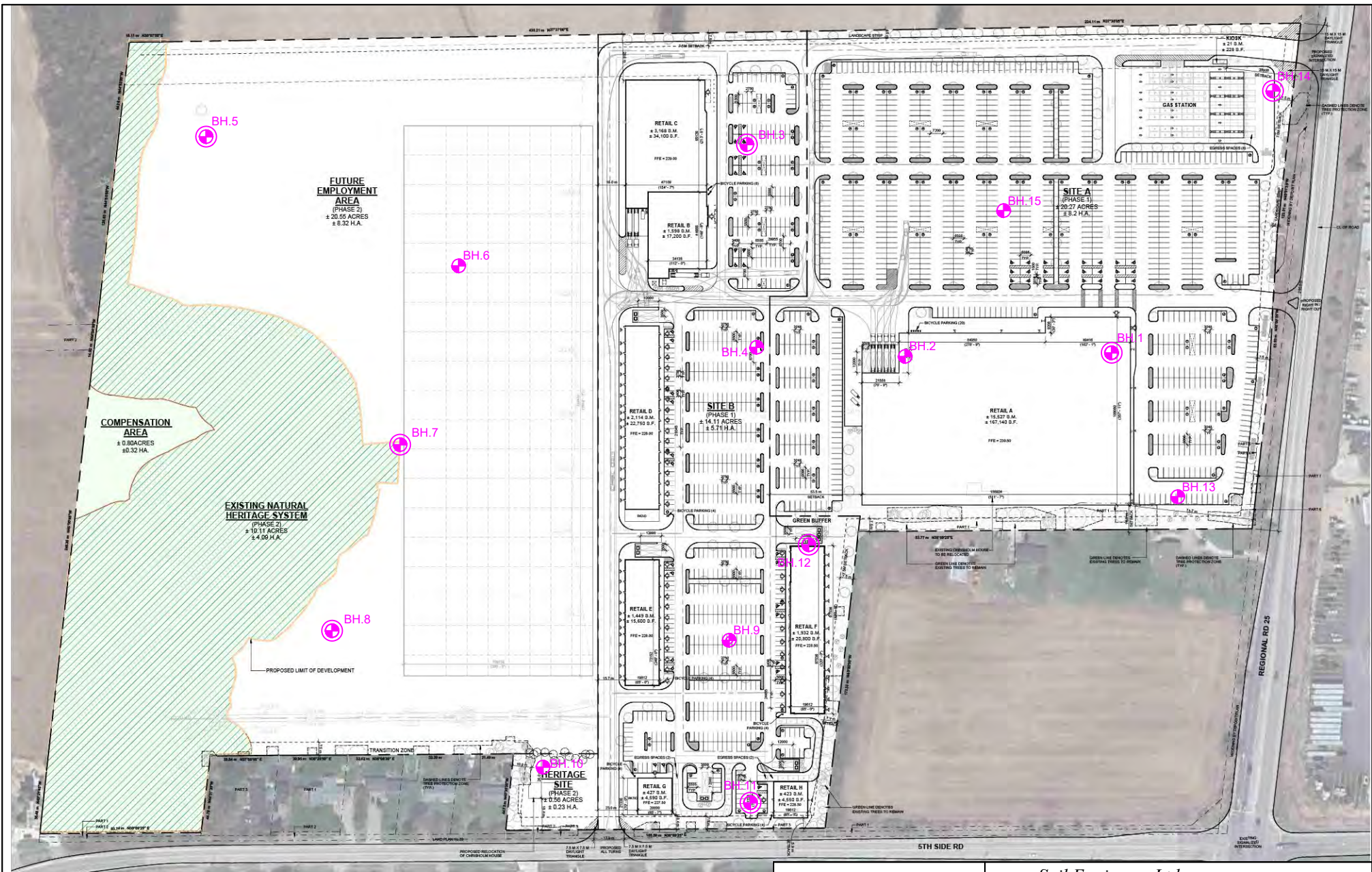
Classification of Sample [& Group Symbol]:	SILTY CLAY TILL sandy, a trace of gravel
--	---

Figure: 16











1 SITE PLAN  
1:1000

**LEGEND**

-  - Borehole with monitoring well
-  - Borehole

**Soil Engineers Ltd.**  
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 GEOTECHNICAL | ENVIRONMENTAL | HYDROGEOLOGICAL | BUILDING SCIENCE  
 90 WEST BEAVER CREEK ROAD, SUITE #100, RICHMOND HILL, ONTARIO L4B 1E7 TEL: (416) 754-8515 FAX: (905) 881-8335

**BOREHOLE AND MONITORING WELL LOCATION PLAN**

**SITE:** 9094 Regional Road 25, Town of Halton Hills

<b>DESIGNED BY:</b> -	<b>CHECKED BY:</b> -	<b>DWG NO.:</b> 1
<b>SCALE:</b> 1:3000	<b>REF. NO.:</b> 2507-S174	<b>DATE:</b> April 2026
		<b>REV</b> 2



# Soil Engineers Ltd

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## SUBSURFACE PROFILE DRAWING NO. 2 SCALE: AS SHOWN

**JOB NO.:** 2507-S174  
**REPORT DATE:** September 2025  
**PROJECT DESCRIPTION:** Proposed Commercial/Industrial Development  
**PROJECT LOCATION:** 9094 Regional Road 25, Town of Halton Hills

### LEGEND

-  TOPSOIL
-  GRANULAR
-  SAND
-  SANDY SILT
-  ASPHALT
-  FILL
-  SILTY SAND
-  SILTY CLAY TILL
-  WATER LEVEL (END OF DRILLING)

