Addendum 2 >> IT-17-005-RT

Construction of the Cornell Bus Terminal,

467 Rustle Woods Avenue, City of Markham, ON

Date and time of closing:
October 3, 2017
on or before 1:00 pm
[local time]

Addendum Issued:
September 15, 2017

Bidders are requested to incorporate the changes/clarifications noted below to the above noted Request for Tender (RFT) documents in their possession and be governed accordingly.

The purpose of this addendum is to:

1. Revise the date of Substantial Performance of the Work indicated in the tender documents to November 30, 2017.

2. Address questions raised during the bidding period.

1. Revisions to the tender documents to correct the date of the Substantial Performance of the Work

a. Instructions to Bidders

Section 29 of the Instructions to Bidders has been revised as follows:

- The date of Substantial Performance of the Work has been changed from November 1, 2018 to November 30, 2018; and

- The anticipated date of notification of award of the Contract has been changed from November 2017 to November 30, 2017.

The revised Section 29 shall read as follows:

"Bidders are advised that this is a completion date Contract and Substantial Performance of the Work must be achieved on or before November 30, 2018. The anticipated date of notification of award of the Contract is November 30, 2017. If the date of notification of award of the Contract is delayed beyond November 30, 2017, then this shall be considered a cause of delay which could not be reasonably anticipated to occur and which YRRTC deems to be beyond the Contractor's reasonable control pursuant to GC 5.1(e) of the General Conditions."

b. Articles of Agreement

Article A-1 (c) of the Articles of Agreement has been revised to change the date of the Substantial Performance of the Work from September 30, 2018 to November 30, 2018.

The revised Article A-1(c) shall read as follows:

"(c) achieve Substantial Performance of the Work by November 30, 2018."

c. Bid Form

Section 3 of the Bid Form has been revised to change the date of the Substantial Performance of the Work from September 30, 2018 to November 30, 2018.

The revised Section 4 of the Articles of Agreement shall read as follows:

"The undersigned hereby offers to perform the Work required by the Contract, do and fulfill everything indicated by the Contract and achieve Substantial Performance of the Work strictly in accordance with the Contract on or before November 30, 2018, subject to adjustment pursuant to GC 5 of the General Conditions."

2. Responses to Bidders' questions

Q1 Please refer to *Instruction to Bidders*

Please clarify the date of Substantial Performance. Item 4 on the Bid Form lists Substantial Performance as September 30, 2018. Item 29 of Instructions to Bidders lists Substantial Performance as November 1, 2018. This is extremely urgent as this would effect when the liquidated damages of $8,500 per day would begin if the project were not to be completed by the Substantial Performance date.

A1. Please refer to the revisions to the tender documents indicated in Section 1 of this Addendum.

Q2 Can York Region provide the CAD files and/or the Model for this project?

A2. CAD Files will only be released to the successful bidder after the award of the Contract.

Q3. We are requesting an extension of two (2) weeks from the stated closing date as many major trades are requiring more time to submit a competitive bid.

A3 The closing date has been extended to October 3, 2017 by Addendum #1.

Q4 Request for Alternate Products Approval

Please find attached product information for your review and submittal for approval as an alternate vapour permeable air barrier on this project.

SECTION 07 27 00 – Air and Vapour Control

A4 *Proposals for substitutions of products and materials will not be considered during the tender process. Following the Contract award, the Contractor's requests for substitutions will be considered in accordance with GC 43 "Equivalents" of the General Conditions and Specifications Section 01 25 00 "Product Substitution Procedures". The Bidders' submissions shall based on the requirements specified in the Contract Documents.*

Q5 Re-review of Section 09 29 00 GYPSUM WALLBOARD, we would appreciate your consideration in approving CGC for the following:

SECTION 09 29 00 GYPSUM WALLBOARD (PAGE 5)

2.2.6.7.1 Base bid: DensArmor Plus by Georgia Pacific
CGC equivalent: Sheetrock Glass Mat Mold Tough (Regular)

2.2.6.7.2 Base bid: DensArmor Plus Fireguard
CGC equivalent: Sheetrock Glass Mat Mold Tough (Firecode X)

A5 *Proposals for substitutions of products and materials will not be considered during the tender process. Following the Contract award, the Contractor's requests for substitutions will be considered in accordance with GC 43 "Equivalents" of the General Conditions and Specifications Section 01 25 00 "Product Substitution Procedures". The Bidders' submissions shall based on the requirements specified in the Contract Documents.*

Q6 Section 08 42 29 Automatic Sliding Doors

Regarding specification Section 08 42 29 Automatic Sliding Doors, we respectfully request that our RECORD 5100 series automatic sliding door be accepted as an approved alternate product. I have attached product information for you to review. The RECORD 5100 series automatic door is approved for Canadian Tire, Petsmart, LCBO, BMO, TD Canada Trust and Home Hardware. I have also attached a copy of the specifications for the York Region Admin Annex which shows the RECORD product to be approved for that project. Please let me know if you require additional information.

A6 *Proposals for substitutions of products and materials will not be considered during the tender process. Following the Contract award, the Contractor's requests for substitutions will be considered in accordance with GC 43 "Equivalents" of the General Conditions and Specifications Section 01 25 00 "Product Substitution Procedures". The Bidders' submissions shall based on the requirements specified in the Contract Documents.*

Q7 **071800 – TRAFFIC COATINGS; 2.1**

Currently, **071800 – TRAFFIC COATINGS; 2.1** calls for VULKEM by TREMCO and we would like to request that our **GEM-CRETE TWM PLUS** be reviewed for alternate approval. Attached are the required documents to assist with review, please let us know if this materials may proceed as approved.

A7 Proposals for substitutions of products and materials will not be considered during the tender process. Following the Contract award, the Contractor's requests for substitutions will be considered in accordance with GC 43 "Equivalents" of the General Conditions and Specifications Section 01 25 00 "Product Substitution Procedures". The Bidders' submissions shall based on the requirements specified in the Contract Documents.

Q8 Collins Sales represents American Dryer for a wide range of hand dryer units within Ontario. We would like to be considered as an equivalent to the Xlerator XL-SB-ECO model specified already with our ExtremeAir EXT7-SS model. I have attached a copy of the specification sheet for your convenience.

I would like to seek your assistance in being used in future projects as well. Would you be able to list on specifications in the future?

A8 *Proposals for substitutions of products and materials will not be considered during the tender process. Following the Contract award, the Contractor's requests for substitutions will be considered in accordance with GC 43 "Equivalents" of the General Conditions and Specifications Section 01 25 00 "Product Substitution Procedures". The Bidders' submissions shall based on the requirements specified in the Contract Documents.*

Q9 The Drawing. No. A-001 shows the total Architectural Drawing Nos. from A-001 to A-931. The Drawing Nos. A-807 to A-931 is missing in the folder for Contract Drawings. Is these missing drawings are to be issued through addendum?

A9 All of the Architectural Drawings Sheets included in the tender documents are listed on page A-001. Drawings A-807 to A-931 were included in the issued tender documents.

Q10 **Re: Door Schedule - Hollow Metal Doors & Frames**
Doors 301, 302, ST1A and ST1B are indicated in the hardware schedule that the doors are 82 mm thickness, this information is not indicated on door schedule. Please confirm.

A10 Doors 301, 302, ST1A and ST1B will have zinc cladding added. These doors are to use a standard 45mm door construction. The hinges are for a 82mm door to allow for 45mm door, 3mm drainage layer, 16mm sheathing and 19mm standing seam zinc. See drawing details 1/2-A865.

Q11 Doors 307, 308 and 404 are indicated in the hardware schedule that the doors and frames are S.STL however the door schedule does not indicate that these doors are S.STL. please confirm.

A11 Refer to the revised Schedule of Finished Hardware, Section 08 71 00.01 included with this Addendum.

Q12 As per section 31 23 15 Excavation and Fill 1.5.1.1 For information on geotechnical conditions and soils and groundwater management strategy, refer to the "Geotechnical Investigation Report Proposed Cornell Bus Terminal, Report Ref. No. 14-072" dated September 3, 2014 and Geotechnical Support for Design of Foundations and Pavement, Report Ref No.: 16-105 dated June 1, 2017 as appended to the Contract Documents. However we are unable to find Geotechnical Report. Could you provide us?

A12 Copies of the Geotechnical Report Ref. No. 14-07, dated September 3, 2014 and Geotechnical Support for Design of Foundations and Pavement, Report Ref No. 16-105, dated June 1, 2017, are attached to this Addendum.

Q13 As per section 01 50 00 1.5.1 Contractors Site Office as described below and there isn't any details for that. Could please clarify if any?

A13 "As described below" refers to items 1.5.1.4 through 1.5.1.6 of Specification Section 01 50 00.

Q14 I am writing to you knowing that you may not be accepting alternatives for the above listed project at this time. With that, I still wanted to provide you with our information in the invent that we find that some of the contractor base may choose to provide CPI pricing on a voluntary basis. We have found that in some cases our product may present a cost savings over a fibreglass system as our manufacturing process can be far less complex.

A14 *Proposals for substitutions of products and materials will not be considered during the tender process. Following the Contract award, the Contractor's requests for substitutions will be considered in accordance with GC 43 "Equivalents" of the General Conditions and Specifications Section 01 25 00 "Product Substitution Procedures". The Bidders' submissions shall based on the requirements specified in the Contract Documents.*

Q15 Re: Wall Louvres
Specification for Louvres cannot be found in documents, kindly provide specification.

A15 The architectural louvres (or Fixed-Position Aerofoil Louvre screens) can be found in Specification Section 10 91 00, paragraph 2.3.7.

Q16 The Summary of Work (Specification Section 01 11 00, clause 8.1.3, is for the Permits to be obtained by Contractor.

Who should we contact for the Right of Way Permit and Road Cut Permit, in the region? It will be appreciated if we can have the contact persons for the other permits, except the above, to be obtained by contractor.

It will be helpful if the cost of permits is included in the Cash Allowance proposed for this project, to keep all the bidders on the same page.

A16 Bidders are instructed to contact the City of Markham Permit Department and other Authorities Having Jurisdiction for all inquiries relating to permits.

As the permits are the responsibility of the Contractor as indicated in Specification Section 01 11 00, clause 8.1.3, all costs associated with obtaining required permits shall be included in the Contract Price. There is no Cash Allowance for obtaining permits.

Q17 The Supplementary Conditions, clause SC 13, is for the Owner Controlled Insurance Program.

It includes Builders Risk Policy for the full amount of the Contract Price until the substantial completion of the work, as well as Wrap Up Liability Policy for the project in the amount of $25,000,000.00 until the substantial completion and extension for a minimum of 24 months. Is The Regional Municipality of York and The York Region Rapid Transit Corporation will be providing these two insurance? Or do we need to carry the cost of these two insurance?

A17 YRRTC will put in place the Builders Risk Policy as well as the Wrap up Liability Policy. The Contractor will not be required to carry the costs of these two insurance policies.

Q18 Have you specified a permanent filtration system for the diesel fuel inside the storage tank backing up the Standby Power Generator System or for the storage tanks involved in refueling the buses, if any?

A18 There is no permanent filtration system specified for the Diesel Generator.

Q19 We are requesting acceptable manufacture for approved alternate from Mechanical items as mention below,
23 21 23 Hydronic Pumps – Equals Request for Bell and Gosset
23 52 00 Boilers – Equals Request for Viesmann
23 70 00 Packaged indoor/outdoor air handling equipment – Equals Request for Daikin
23 72 13 Heat Reclaim Devices – Equals Request for Novel Aire
23 81 26 RTU – Equals Request for Daikin
23 81 26 Split System Air Conditioning Split heat pumps – Equals Request for Daikin
23 82 33 Finned Tube – Equals Request for Sigma
23 84 13 Humidifier – Equals Request for DriSteem
25 00 00 Controls – Equals Request for HTS/Alerton

A19 *Proposals for substitutions of products and materials will not be considered during the tender process. Following the Contract award, the Contractor's requests for substitutions will be considered in accordance with GC 43 "Equivalents" of the General Conditions and Specifications Section 01 25 00 "Product Substitution Procedures". The Bidders' submissions shall based on the requirements specified in the Contract Documents.*

Where applicable Bidders must acknowledge receipt of all addenda issued in the space provided on the Bid Form. Where there is no evidence of receipt of all addenda, save and except any addenda which the Region/YRRTC deems, in its sole discretion, to be administrative in nature, the Bid shall be rejected.

Yours truly,

Marie Kavanagh, CPPO
Senior Purchasing Analyst
Regional Municipality of York

PARTIAL PLANS
W/R CONCESSION BUILDING

Heading # 024

1 SGL DOOR 307 CORRIDOR 303 TO WOMEN'S PUBLIC WASHROOM 307 90-RH

TYPE A1/A1 965 X 2150 X 45 ***HM DR X HM FR***

3	HINGE	CB199 114 X 101	NRP	C32D
1	PASSAGE	ND10S RHODES		C260
1	AUTO DOOR OPERATOR	HORTON 7100 SERIES 39″		AL
2	PUSH BUTTON	CM-45/4 GRFSE1 4 1/2″ SQUARE		630
1	RELAY	CX-33		
1	ELECTRIC STRIKE	1006 FAIL SAFE 12/24 VDC		C32D
1	POWER SUPPLY	PS902		
1	SIGN	WOMEN PICTOGRAM	TAPE	SILVER
1	ARMORPLATE	GSH80A 863 X 925	TAPE	32D
1	FLOOR STOP	GSH 209		C26D

NOTE: LOW VOLTAGE AND 120 VOLT SUPPLIED AND WIRED BY ELECTRICAL CONTRACTOR

Heading # 025

1 SGL DOOR 308 CORRIDOR 303 TO MEN'S PUBLIC WASHROOM 307 90-LH

TYPE A1/A1 965 X 2150 X 45 ***HM DR X HM FR***

3	HINGE	CB199 114 X 101	NRP	C32D
1	PASSAGE	ND10S RHODES		C260
1	AUTO DOOR OPERATOR	HORTON 7100 SERIES 39″		AL
2	PUSH BUTTON	CM-45/4 GRFSE1 4 1/2″ SQUARE		630
1	ELECTRIC STRIKE	1006 FAIL SAFE 12/24 VDC		C32D
1	RELAY	CX-33		
1	POWER SUPPLY	PS902		
1	SIGN	MEN PICTOGRAM	TAPE	SILVER
1	ARMORPLATE	GSH80A 863 X 925	TAPE	32D
1	FLOOR STOP	GSH 209		C26D

NOTE: LOW VOLTAGE AND 120 VOLT SUPPLIED AND WIRED BY ELECTRICAL CONTRACTOR

PARTIAL
PLANS NORTH
PLAZA BUILDING

Heading # 032

1 PAIR DOORS 404 EXTERIOR FROM ELECTRICAL ROOM 404 90-LHR/RHRA

TYPE A2/E1 2/965 X 2150 X 45 ***HM DR X HM FR***
3/4 HOUR "C" FIRE RATED

2	SET PIVOT	7226F 3/4 OFFSET	US32D
2	POWER TRANSFER PIVOT	7226PT 3/4 OFFSET X 8 WIRE	US32D
1	EXIT DEVICE	98-NL-OP-F 110NL-MD 65mm WIDE DR. FOR 3 1/4" THICK DOORS	630
1	RIM CYLINDER IC CORE	FULL SIZE # 20-057 EV-29 GGMK/CMK FOR 3 1/4" THICK DOORS	626
1	CONSTRUCTION CORE	23-030-ICX	626
1	ELECTRIC STRIKE	9600 24VDC FSE	32D
1	SURFACE MOUNTING BOX	MODEL SMB	BLK
1	POWER SUPPLY	PS904 – 4RL	
2	DOOR PULLS	GSH 1180-2 4B MOUNTING	C32D
1	DOOR CLOSER	4040XP-72MC T.B. EDA RH	689
1	DOOR CLOSER	4040XP-72MC T.B. EDA LH	689
2	OVERHEAD STOP	104S 90 DEGREES	630
2	KICKPLATE	GSH80A 254 X 940 TAPE	32D
2	JANB WEATHERSTRIP	W-13 2 X 2150	CA
1	HEADER WEATHERSTRIP	W-13 1 X 965	CA
2	DOOR SWEEP	W-13S X 965	CA
1	THRESHOLD	CT-75 X 1930	AL

NOTE: LOW VOLTAGE AND 120 VOLT SUPPLIED AND WIRED BY ELECTRICAL CONTRACTOR

NOTE: CARD READER, DOOR CONTACT,REQUEST TO EXIT MOTION SENSOR, SUPPLIED BY ELECTRICAL SECURITY CONTRACTOR

alston associates
geotechnical division of TERRAPEX

geotechnics
construction materials testing

June 1, 2017
Revised on June 21, 2017

Ref No.: 16-105

HDR Canada
100 York Boulevard, Suite 300
Richmond Hill, ON L4B 1J8

Att: Maher Sayed, Project Manager

Subject: Geotechnical Support for Design of Foundations and Pavement
Cornell Bus Terminal, Markham, Ontario

Alston Associates (AA) was commissioned by HDR Canada (HDR) to provide geotechnical consulting and support associated with the design of the pavement structure and foundations for the proposed Cornell Bus Terminal in Markham, Ontario.

The following geotechnical investigation report was prepared by Alston Associates Inc. in 2014 for Cole Engineering Group Ltd. acting on behalf of the Region of York: "Geotechnical Investigation Proposed Cornell Bus Terminal, Highway 7 and Ninth Line, South of Rose Way Extension, Markham, Ontario. Report Ref. No. 14-072, dated September 3, 2014.

The geotechnical investigation report recommended an asphaltic concrete pavement for the bus station. However HDR advised that the proposed pavement structure will be a rigid concrete pavement incorporating a 250 mm thick reinforced concrete slab. HDR also advised that the terminal building will be an open; unheated structure.

The design and construction recommendations provided by **AA** to HDR are detailed below:

Pavement Design

The following asphaltic concrete pavement structure was recommended in our geotechnical investigation report for the bus terminal.

Pavement Layer	Compaction Requirements	Heavy Duty Pavement Minimum Component Thickness
Surface Course Asphaltic Concrete	As per OPSS 310	50 mm Hot-Laid HL3 (HS)
Binder Course Asphaltic Concrete	As per OPSS 310	100 mm Hot-Laid HL8 (HDBC)
Granular Base	100% SPMDD*	200 mm Granular 'A'
Granular Sub-base	100% SPMDD*	450 mm Granular 'B' Type II

90 scarsdale road
toronto, ontario
M3B 2R7

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A gross weight of the articulated bus; 6800 kg for front axle, 8440 kg for middle axle, 12600 kg for rear axle; for a total load of 27840 kg, with an AADT of 700 was used for the pavement design recommended in the geotechnical report.

Based on recent understanding that a concrete pavement will be constructed within the bus terminal and that the terminal will be an open structure; unheated, in order to prevent frost related heave of the pavement structure, it is recommended that free draining granular soils be used within the frost penetration depth. Consequently, the following pavement structure is recommended for the terminal.

Pavement Layer	Compaction Requirements	Minimum Pavement Component Thickness
Concrete		250 mm
Granular Base	100% SPMDD*	150 mm Granular 'A'
Granular Sub-base	100% SPMDD*	300 mm Granular 'B' Type II
Free draining Soil	100% SPMDD*	600 mm Granular 'B' Type I

* Note: Standard Proctor Maximum Dry Density (ASTM-D698).

The rigid pavement recommended above will provide significantly better support than the flexible pavement recommended in the geotechnical report, and will heave much less (if any) than the flexible pavement.

Sub-surface drainage must be provided to prevent accumulation of water within the free draining granular material. In addition to providing better support to the pavement, the granular soil will provide higher resistance to the top of caisson foundations proposed to support the superstructure.

Prior to placement of the Granular B Type I material, the subgrade must be compacted to at least 98% SPMDD. The granular pavement structure materials should be placed in lifts not exceeding 150 mm thick and be compacted to a minimum of 100% SPMDD. The granular materials should conform to the gradation requirements of OPSS 1010 (Material specifications for aggregates).

The granular materials must be extended a minimum of 1.5 m out from the outside edges of the pavement structure and the perimeter of the caisson foundations.

The long-term performance of the proposed pavement structure is highly dependent upon the subgrade support conditions. Stringent construction control procedures should be maintained to ensure that uniform subgrade moisture and density conditions are achieved.

In addition, the need for adequate drainage cannot be over-emphasized. The subgrade underlying the granular soils should be free of depressions and should be sloped to provide effective drainage. Surface

water should not be allowed to pond adjacent to the outside edges of pavement areas. Sub-drains must be provided under the base of the granular B Type I material to facilitate effective and assured drainage of the granular materials and prevent frost related heave of the pavement structure. The invert of sub-drains should be maintained at least 0.3 m below subgrade level. A minimum of two lines of sub-drains are recommend to be placed along the length of the terminal.

Additional comments on the construction of pavement areas are as follows:

As part of the subgrade preparation, proposed pavement areas should be stripped of topsoil, unsuitable earth fill, organic soils and other obvious objectionable material. Fill required to raise the grades to design elevations should be free of organic material and at a moisture content which will permit compaction to the specified densities. The subgrade should be properly shaped, crowned, and then proof-rolled. Soft or spongy subgrade areas should be sub-excavated and properly replaced with suitable approved backfill compacted to 98% SPMDD.

For fine-grained soils as encountered at the site, the degree of compaction specification alone cannot ensure distress free subgrade. Proof-rolling of the subgrade must be carried out and witnessed by geotechnical staff prior to placement of the specified granular materials.

Foundation Design

It is understood that drilled shaft piles (caissons) would be utilized to support the proposed structure. We also understand that the loading applied by the proposed structure on the pile heads would be as follows:

- vertical - 400 to 1300 kN
- lateral - 70 to 150 kN
- moment - 100 to 300 kNm

Analyses of the caisson foundations assuming a minimum embedment of 1 m into the very dense sandy silt or hard silty clay till soils, and placement of compacted granular soil surrounding the upper 1.2 m depth of the caisson, has revealed that the lateral movement of the pile heads should be limited to a maximum of 6 mm, and the anticipated settlement should be no more than 5 mm.

The results of the analyses calculated based on maximum loading condition of 1300 kN (vertical), 150 kN (lateral), and 300 kNm (moment) are summarized in the following Table:

Diameter (m)	Geotechnical resistance at ULS (kN)	Base of caisson depth below ground surface (m)	Horizontal Displacement (mm)	Approximate Settlement (mm)
1.2	1800	5.5	6	5
1.5	2825	5.5	5	3
1.8	4075	5.5	5	2

The results of the analyses calculated based on minimum loading condition of 400 kN (vertical), 70 kN (lateral), and 100 kNm (moment) are summarized in the following Table:

Diameter (m)	Geotechnical resistance at ULS (kN)	Base of caisson depth below ground surface (m)	Horizontal Displacement (mm)	Approximate Settlement (mm)
1.2	1475	4	6	1
1.5	2300	4	6	1
1.8	3300	4	6	1

In order to achieve a minimum embedment of 1 m into the very dense soil, it will be necessary to found the caissons at or below the elevations tabulated below:

Borehole Location	Ground Elevation	Found caissons at or below elevation
MW1	195.32 m	191.0m
MW2	194.31 m	190.8 m
BH3	195.77 m	190.8 m
BH4	195.79 m	190.8 m
BH5	195.55 m	191.0 m
MW6	194.48 m	191.0 m
BH7	194.35 m	190.3 m
BH8	194.61 m	190.6 m
BH9	194.69 m	190.0 m
MW10	194.74 m	190.2 m
MW11	194.81 m	190.1 m

The minimum spacing between adjacent caissons should be twice the diameter of the larger caisson.

It may be necessary to install temporary liners for the excavation of the footing holes.

Due to variations in the consistency of the founding soils and/or loosening caused by excavating disturbance and/or seasonal frost effects, all footing subgrade must be evaluated by the Geotechnical Engineer prior to placing foundation concrete to ensure that the soil exposed at the excavation base is consistent with the design geotechnical bearing resistance, and the bases of the caisson holes are adequately cleaned prior to concreting.

In the event necessary, the stepping of the footings at different elevations should be carried out at an angle no steeper than 2 horizontal (clear horizontal distance between footings) to 1 vertical (difference in elevation).

The native soils are susceptible to disturbance when wet, so construction scheduling should consider the amount of excavation left exposed to the elements, during foundation preparation.

Rainwater or groundwater seepage entering the foundation excavation must be pumped away (not allowed to pond). The foundation subgrade soils should be protected from freezing, inundation and equipment traffic at all times.

The native soils tend to weather and deteriorate rapidly on exposure to atmosphere or surface water. **AA** recommends that footings placed on the exposed native soil should be poured on the same day as they are excavated, after removal of all unsuitable founding materials and approval of the bearing surface. Alternatively, a concrete mud slab could be used to protect a bearing surface where footing construction is to be delayed.

All exterior footings should be provided by at least 1.2 m of soil cover or equivalent artificial thermal insulation for frost protection purposes. As a subsurface drainage system will be installed below the pavement granular material that will be placed under the proposed pavement, it should not be necessary to insulate grade beams founded within the granular soil.

Exposed soil foundation subgrades should be protected against freezing and surface water should be kept away from the foundation subgrade areas to prevent softening.

If construction proceeds during freezing weather conditions, adequate temporary frost protection for the footing bases and concrete must be provided.

Should you have any questions regarding this letter, please do not hesitate to contact our office.

Yours very truly,
alston associates
A division of Terrapex Environmental Ltd.

Vic Nersesian, P.Eng.
Vice President, Geotechnical Services

Attachments:

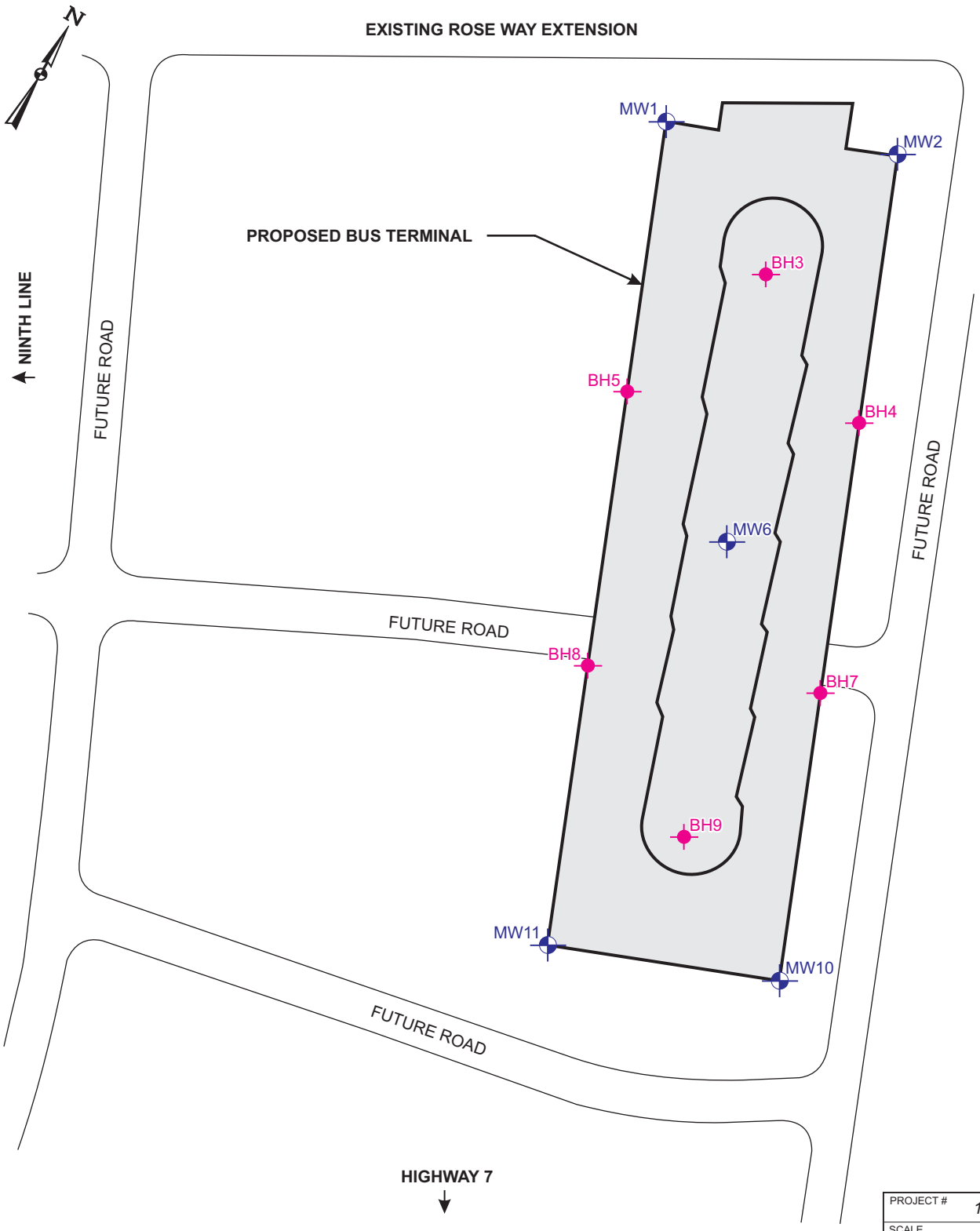
Borehole Location Plan
Logs of Boreholes

alston associates inc.
consulting engineers

BOREHOLE LOCATION PLAN

HIGHWAY 7 AND NINTH LINE
MARKHAM, ONTARIO

CLIENT
COLE ENGINEERING GROUP LIMITED



0 25m 50m
(APPROXIMATE)

LEGEND

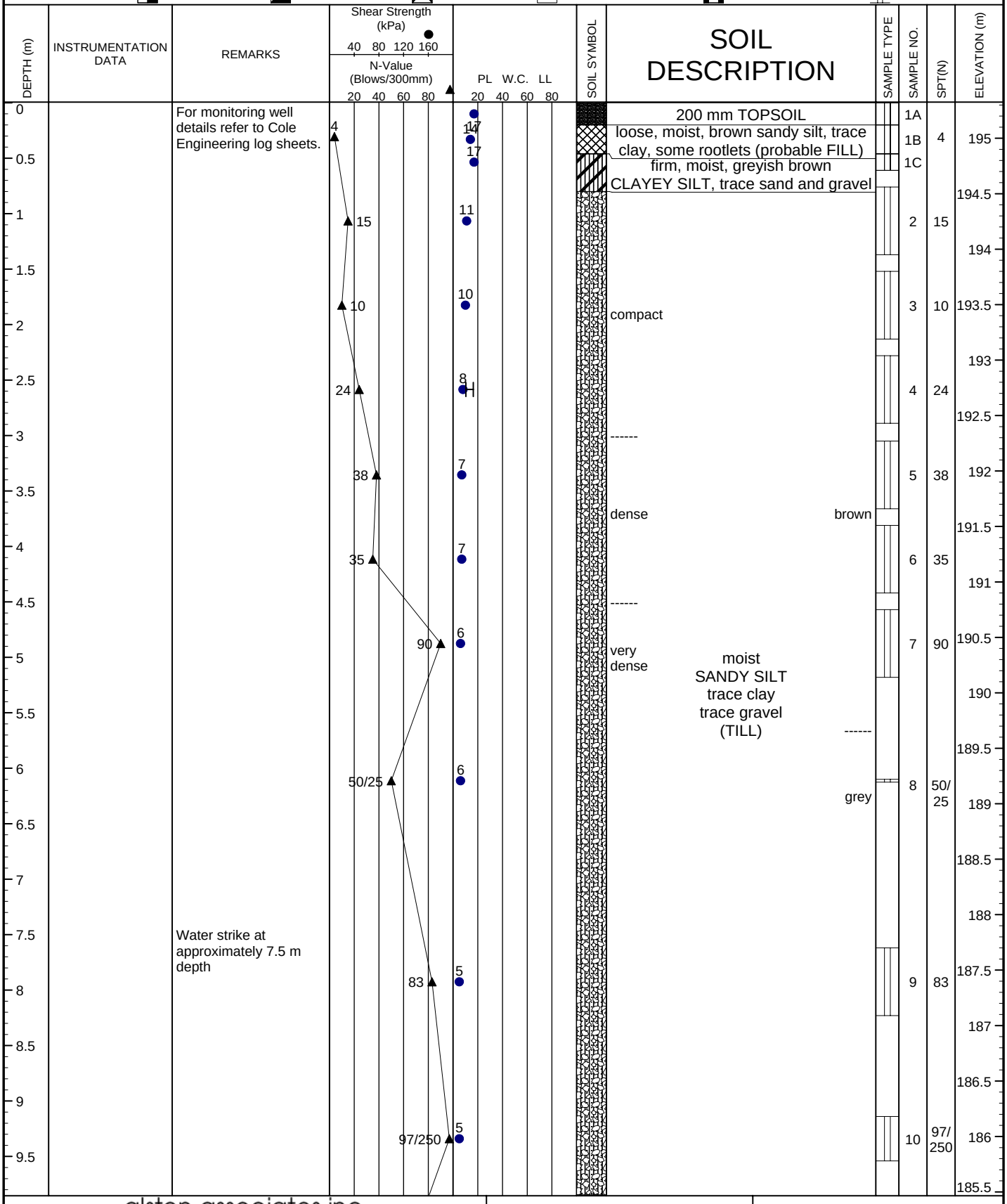
- MONITORING WELL
- BOREHOLE

SOURCE: APPENDIX 2 SCHEMATIC BUS TERMINAL LAYOUT
DRAWING RFP-14-052-RT PROVIDED BY CLIENT.

PROJECT #	14-072
SCALE	AS SHOWN
DATE	JULY 2014
DRAWN	SF
CHECKED	
DRAWING #	DRAWING 1

CLIENT: Cole Engineering	METHOD: Augering and Split Spoon Sampling		**BH No.: MW1**
PROJECT: Proposed Cornell Bus Terminal	PROJECT ENGINEER: VN	ELEV. (m) 195.32	
LOCATION: Hwy 7/Ninth Line, Markham	NORTHING:	EASTING:	PROJECT NO.: 14-072

SAMPLE TYPE: AUGER | DRIVEN | CORING | DYNAMIC CONE | SHELBY | SPLIT SPOON



alston associates inc. consulting engineers	LOGGED BY: ML	DRILLING DATE: 21 July 2014
	REVIEWED BY: VN	Page 1 of 2

CLIENT: Cole Engineering | METHOD: Augering and Split Spoon Sampling | **BH No.: MW1**

PROJECT: Proposed Cornell Bus Terminal | PROJECT ENGINEER: VN | ELEV. (m) 195.32

LOCATION: Hwy 7/Ninth Line, Markham | NORTHING: | EASTING: | PROJECT NO.: 14-072

SAMPLE TYPE: AUGER | DRIVEN | CORING | DYNAMIC CONE | SHELBY | SPLIT SPOON

DEPTH (m)	INSTRUMENTATION DATA	REMARKS	Shear Strength (kPa) 40 80 120 160 / N-Value (Blows/300mm) 20 40 60 80	PL W.C. LL 20 40 60 80	SOIL SYMBOL	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE NO.	SPT(N)	ELEVATION (m)
10										185
10.5			50/125	5				11	50/125	184.5
11										184
11.5										183.5
12			50/100	7		very dense moist, grey SANDY SILT trace clay trace gravel (TILL)		12	50/100	183
12.5										182.5
13										182
13.5										
14			50/125	10		(wet)		13	50/125	181.5
14.5										181
15						hard, moist, grey SILTY CLAY trace sand, trace gravel (TILL)				180.5
15.5			87/250	9				14	87/250	180
						END OF BOREHOLE				

alston associates inc.
consulting engineers

LOGGED BY: ML | DRILLING DATE: 21 July 2014

REVIEWED BY: VN |

CLIENT: Cole Engineering	METHOD: Augering and Split Spoon Sampling	**BH No.: MW2**
PROJECT: Proposed Cornell Bus Terminal	PROJECT ENGINEER: VN / ELEV. (m) 194.31	
LOCATION: Hwy 7/Ninth Line, Markham	NORTHING: / EASTING:	PROJECT NO.: 14-072

SAMPLE TYPE: AUGER | DRIVEN | CORING | DYNAMIC CONE | SHELBY | SPLIT SPOON

DEPTH (m)	INSTRUMENTATION DATA	REMARKS	Shear Strength (kPa) 40 80 120 160 / N-Value (Blows/300mm) 20 40 60 80	PL W.C. LL 20 40 60 80	SOIL SYMBOL	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE NO.	SPT(N)	ELEVATION (m)
0		For monitoring well details refer to Cole Engineering log sheets. Borehole cave-in at 4.9 m and groundwater level at 1.8 m below ground surface on completion.	6			300 mm TOPSOIL		1A	6	194
0.5						firm, moist, brown mottled grey CLAYEY SILT, trace sand trace rootlets		1B 1C		
1			7	H		firm moist, brown SANDY SILTY CLAY trace sand trace gravel (TILL)		2	7	193.5
1.5						------ very stiff		3A		193
2			26			------ compact		3B	26	192.5
2.5			82			brown		4	82	192
3						very dense ------				191.5
3.5			97/275			brownish grey		5	97/ 275	191
4		Water strike at approimately 3.7 m depth.	99/250			------ grey		6	99/ 250	190.5
4.5			50/150			(wet)		7	50/ 150	190
5										189.5
5.5						moist SANDY SILT trace clay trace gravel (TILL)				189
6			50/140					8	50/ 140	188.5
6.5										188
7										187.5
7.5			50/100					9	50/ 100	187
8										186.5
8.5										186
9			50/75					10	50/ 75	185.5
9.5										185
										184.5

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CLIENT: Cole Engineering	METHOD: Augering and Split Spoon Sampling	**BH No.: MW2**
PROJECT: Proposed Cornell Bus Terminal	PROJECT ENGINEER: VN / ELEV. (m) 194.31	
LOCATION: Hwy 7/Ninth Line, Markham	NORTHING: / EASTING:	PROJECT NO.: 14-072

SAMPLE TYPE: AUGER | DRIVEN | CORING | DYNAMIC CONE | SHELBY | SPLIT SPOON

DEPTH (m)	INSTRUMENTATION DATA	REMARKS	Shear Strength (kPa) 40 80 120 160 / N-Value (Blows/300mm) 20 40 60 80	PL W.C. LL 20 40 60 80	SOIL SYMBOL	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE NO.	SPT(N)	ELEVATION (m)
10										184
10.5			50/100 ▲					11	50/100	183.5
11										183
11.5										182.5
12			50/100 ▲			very dense moist, grey SANDY SILT trace clay trace gravel (TILL)		12	50/100	182
12.5										181.5
13										181
13.5										
14			50/150 ▲					13	50/150	180.5
14.5										180
15										179.5
			50/100 ▲					14	50/100	179
						END OF BOREHOLE				

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CLIENT: Cole Engineering	METHOD: Augering and Split Spoon Sampling	**BH No.: 3**
PROJECT: Proposed Cornell Bus Terminal	PROJECT ENGINEER: VN	ELEV. (m) 195.77
LOCATION: Hwy 7/Ninth Line, Markham	NORTHING:	EASTING: PROJECT NO.: 14-072

SAMPLE TYPE: AUGER | DRIVEN | CORING | DYNAMIC CONE | SHELBY | SPLIT SPOON

DEPTH (m)	INSTRUMENTATION DATA	REMARKS	Shear Strength (kPa) 40 80 120 160 / N-Value (Blows/300mm) 20 40 60 80	PL W.C. LL 20 40 60 80	SOIL SYMBOL	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE NO.	SPT(N)	ELEVATION (m)
0		Borehole cave-in at 5.5 m and groundwater level at 2.1 m below ground surface on completion.	6			350 mm TOPSOIL		1A	6	195.5
0.5						loose ------ moist, brown silty fine sand (FILL)		1B		
1			15			compact		2A	15	195
1.5						loose, moist, brown SANDY SILT trace clay, trace gravel (TILL)		2B		194.5
2			7					3	7	194
2.5			8			firm moist, brown SILTY CLAY trace sand, trace gravel (TILL)		4	8	193.5
3						very stiff		5A		193
3.5			16					5B	16	192.5
4			88			brown very dense moist SANDY SILT trace clay trace gravel (TILL)		6	88	192
4.5										191.5
5			79			------ brownish grey		7	79	191
5.5		Water strike at approximate 5.5 m depth.								190.5
6						------ grey		8A		190
6.5			58			hard, moist, grey SILTY CLAY trace sand, trace gravel (TILL)		8B	58	189.5
7										189
7.5						wet				188.5
8			76			very dense grey SANDY SILT trace clay trace gravel (TILL)		9	76	188
8.5										187.5
9						------				187
9.5			92			moist		10	92	186.5
										186

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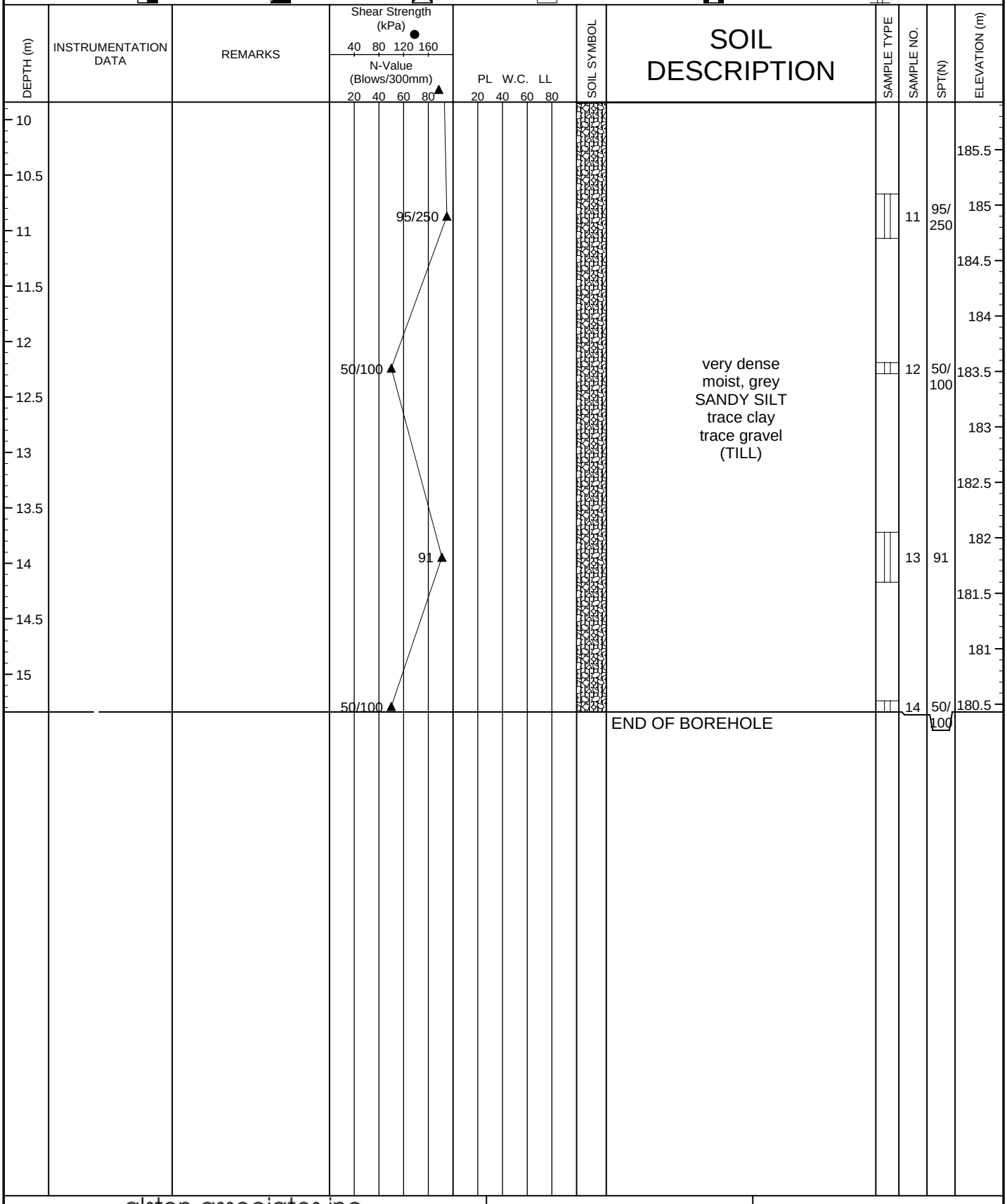
CLIENT: Cole Engineering	METHOD: Augering and Split Spoon Sampling		**BH No.: 3**
PROJECT: Proposed Cornell Bus Terminal	PROJECT ENGINEER: VN	ELEV. (m) 195.77	
LOCATION: Hwy 7/Ninth Line, Markham	NORTHING:	EASTING:	PROJECT NO.: 14-072

SAMPLE TYPE: AUGER | DRIVEN | CORING | DYNAMIC CONE | SHELBY | SPLIT SPOON



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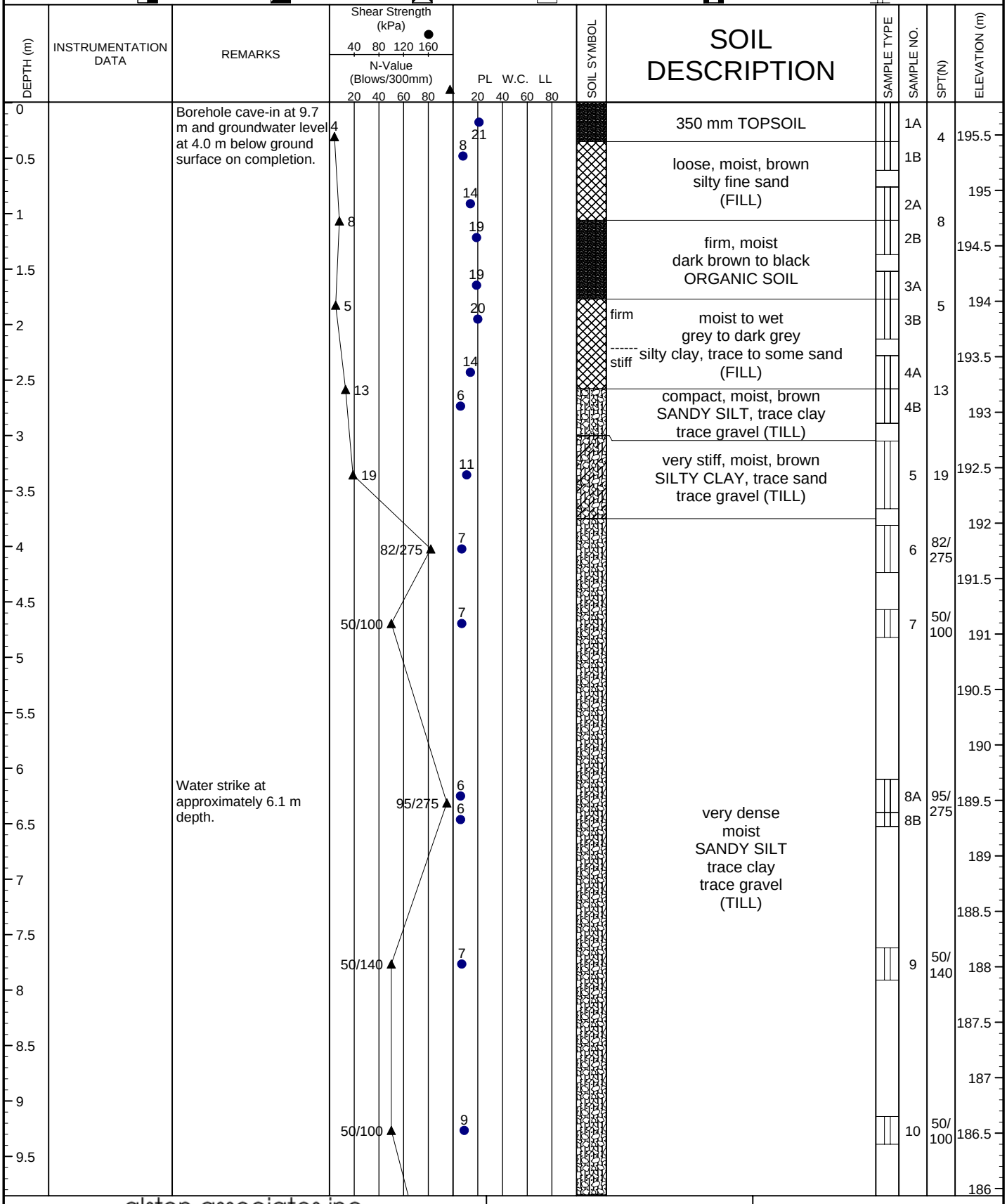
CLIENT: Cole Engineering	METHOD: Augering and Split Spoon Sampling	**BH No.: 4**
PROJECT: Proposed Cornell Bus Terminal	PROJECT ENGINEER: VN / ELEV. (m) 195.79	
LOCATION: Hwy 7/Ninth Line, Markham	NORTHING: / EASTING:	PROJECT NO.: 14-072

SAMPLE TYPE: AUGER | DRIVEN | CORING | DYNAMIC CONE | SHELBY | SPLIT SPOON



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CLIENT: Cole Engineering	METHOD: Augering and Split Spoon Sampling	**BH No.: 4**
PROJECT: Proposed Cornell Bus Terminal	PROJECT ENGINEER: VN	ELEV. (m) 195.79
LOCATION: Hwy 7/Ninth Line, Markham	NORTHING:	EASTING: PROJECT NO.: 14-072

SAMPLE TYPE: AUGER | DRIVEN | CORING | DYNAMIC CONE | SHELBY | SPLIT SPOON

DEPTH (m)	INSTRUMENTATION DATA	REMARKS	Shear Strength (kPa) 40 80 120 160 / N-Value (Blows/300mm) 20 40 60 80	PL W.C. LL 20 40 60 80	SOIL SYMBOL	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE NO.	SPT(N)	ELEVATION (m)
10										185.5
10.5										
11			88	7		very dense		11	88	185
11.5										184.5
12										184
12.5			61	7		moist to wet grey SANDY SILT trace clay trace gravel (TILL)		12	61	183.5
13										183
13.5						------				182.5
14			47	7		dense		13	47	182
14.5										181.5
15						------				181
15.5			63	8		very dense		14	63	180.5
						END OF BOREHOLE				

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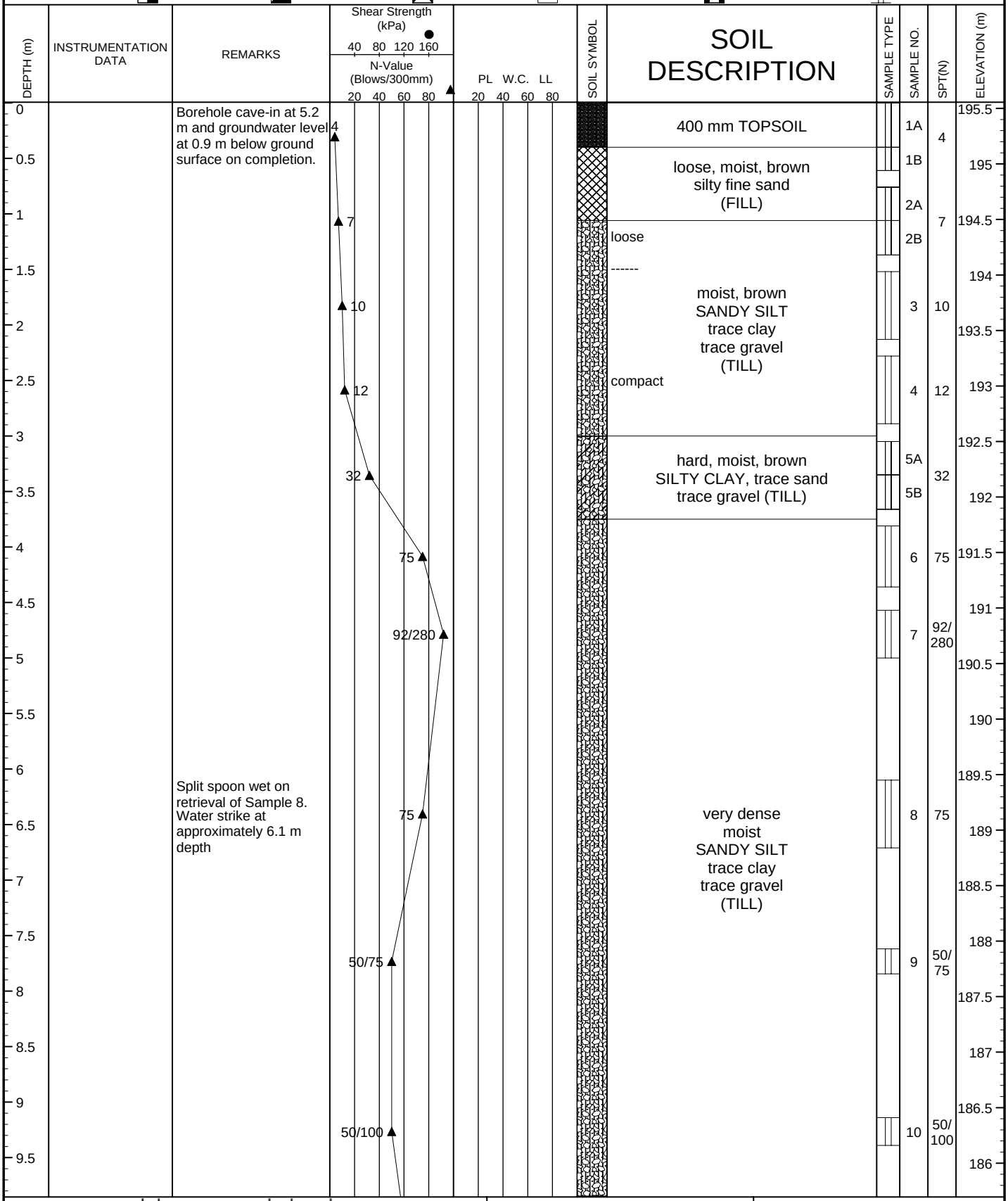
CLIENT: Cole Engineering	METHOD: Augering and Split Spoon Sampling		**BH No.: 5**
PROJECT: Proposed Cornell Bus Terminal	PROJECT ENGINEER: VN	ELEV. (m) 195.55	
LOCATION: Hwy 7/Ninth Line, Markham	NORTHING:	EASTING:	PROJECT NO.: 14-072

SAMPLE TYPE: AUGER | DRIVEN | CORING | DYNAMIC CONE | SHELBY | SPLIT SPOON



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CLIENT: Cole Engineering	METHOD: Augering and Split Spoon Sampling		**BH No.: 5**
PROJECT: Proposed Cornell Bus Terminal	PROJECT ENGINEER: VN	ELEV. (m) 195.55	
LOCATION: Hwy 7/Ninth Line, Markham	NORTHING:	EASTING:	PROJECT NO.: 14-072

SAMPLE TYPE: AUGER | DRIVEN | CORING | DYNAMIC CONE | SHELBY | SPLIT SPOON

DEPTH (m)	INSTRUMENTATION DATA	REMARKS	Shear Strength (kPa) 40 80 120 160 / N-Value (Blows/300mm) 20 40 60 80	PL W.C. LL 20 40 60 80	SOIL SYMBOL	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE NO.	SPT(N)	ELEVATION (m)
10						very dense moist, grey SANDY SILT trace clay trace gravel (TILL)				185.5
10.5										185
11			70					11	70	184.5
11.5										184
12										183.5
12.5			50/75					12	50/75	183
13										182.5
13.5										182
14			50/100					13	50/100	181.5
14.5										181
15										180.5
			50/100					14	50/100	
						END OF BOREHOLE				

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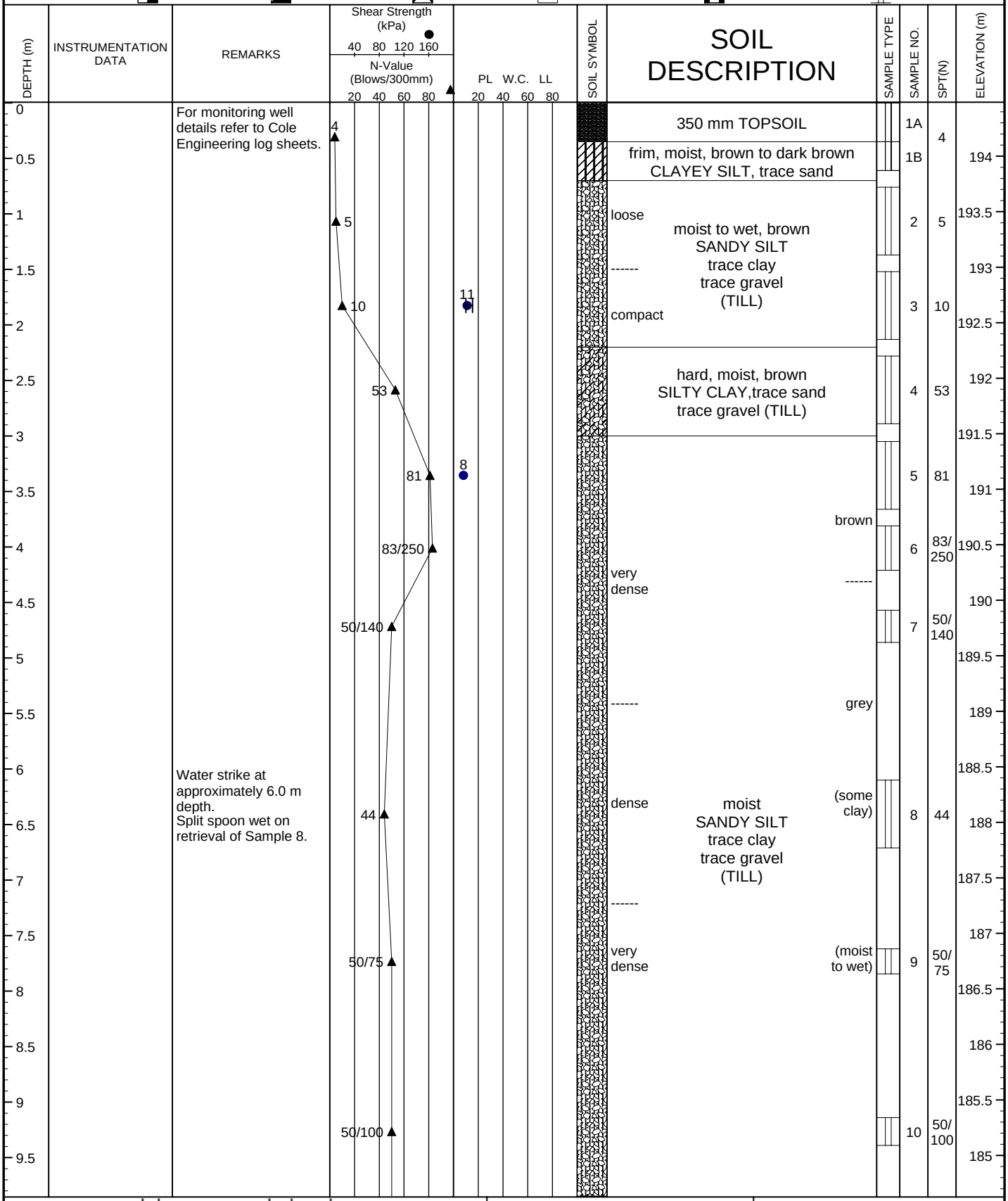
CLIENT: Cole Engineering	METHOD: Augering and Split Spoon Sampling		**BH No.: MW6**
PROJECT: Proposed Cornell Bus Terminal	PROJECT ENGINEER: VN	ELEV. (m) 194.48	
LOCATION: Hwy 7/Ninth Line, Markham	NORTHING:	EASTING:	PROJECT NO.: 14-072

SAMPLE TYPE: AUGER | DRIVEN | CORING | DYNAMIC CONE | SHELBY | SPLIT SPOON



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CLIENT: Cole Engineering	METHOD: Augering and Split Spoon Sampling	**BH No.: MW6**
PROJECT: Proposed Cornell Bus Terminal	PROJECT ENGINEER: VN / ELEV. (m) 194.48	
LOCATION: Hwy 7/Ninth Line, Markham	NORTHING: / EASTING:	PROJECT NO.: 14-072

SAMPLE TYPE: AUGER | DRIVEN | CORING | DYNAMIC CONE | SHELBY | SPLIT SPOON

DEPTH (m)	INSTRUMENTATION DATA	REMARKS	Shear Strength (kPa) 40 80 120 160 / N-Value (Blows/300mm) 20 40 60 80	PL W.C. LL 20 40 60 80	SOIL SYMBOL	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE NO.	SPT(N)	ELEVATION (m)
10										184.5
10.5										184
11			50/150 ▲					11	50/150	183.5
11.5										183
12						very dense moist, grey SANDY SILT trace clay trace gravel (TILL)				182.5
12.5			50/75 ▲					12	50/75	182
13										181.5
13.5										181
14			50/125 ▲					13	50/125	180.5
14.5										180
15						hard, moist, grey SILTY CLAY, trace sand trace gravel (TILL)				179.5
			50/150 ▲					14	50/150	
						END OF BOREHOLE				

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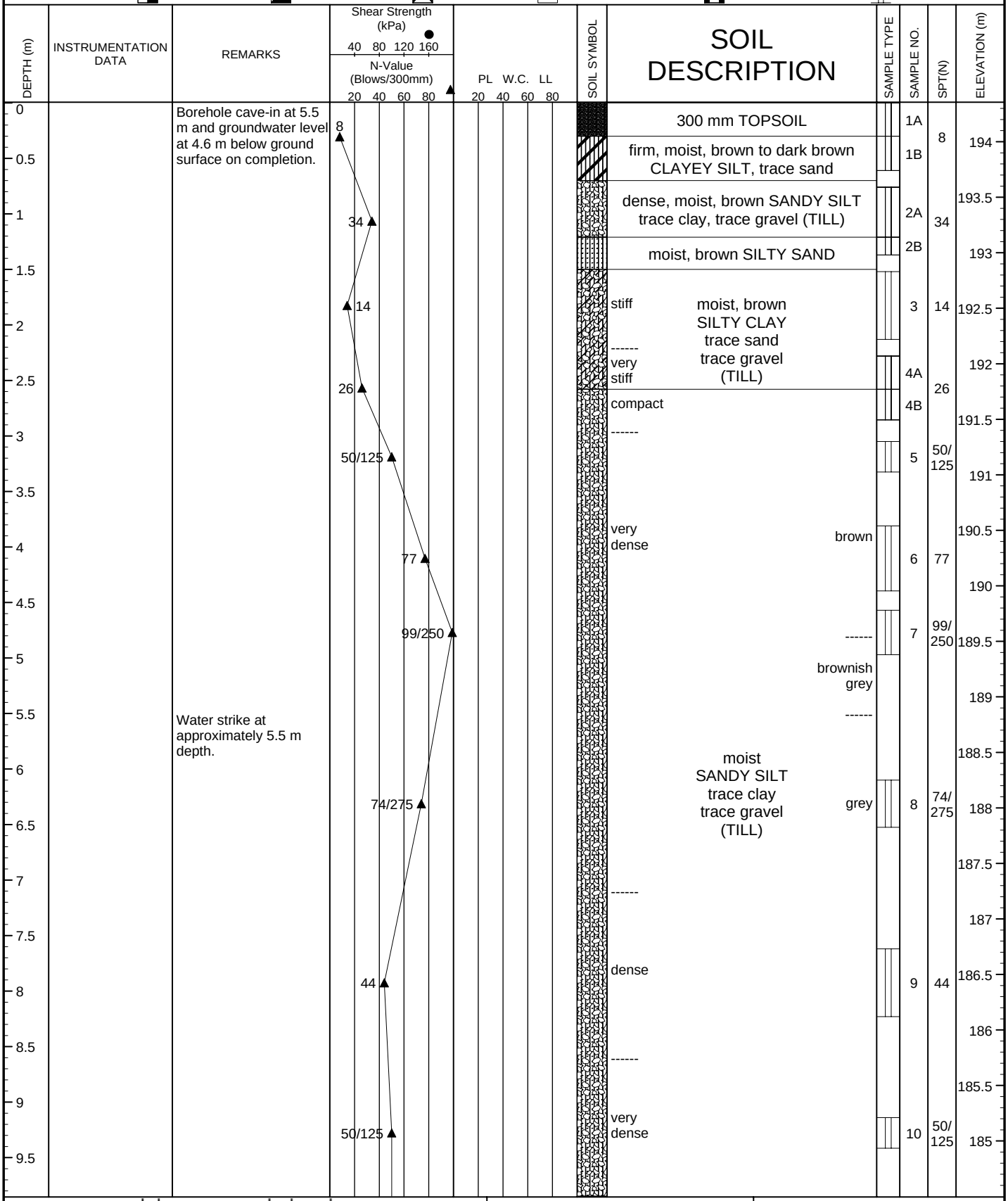
CLIENT: Cole Engineering	METHOD: Augering and Split Spoon Sampling	**BH No.: 7**
PROJECT: Proposed Cornell Bus Terminal	PROJECT ENGINEER: VN	ELEV. (m) 194.35
LOCATION: Hwy 7/Ninth Line, Markham	NORTHING:	EASTING: PROJECT NO.: 14-072

SAMPLE TYPE: AUGER | DRIVEN | CORING | DYNAMIC CONE | SHELBY | SPLIT SPOON



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CLIENT: Cole Engineering	METHOD: Augering and Split Spoon Sampling	**BH No.: 7**
PROJECT: Proposed Cornell Bus Terminal	PROJECT ENGINEER: VN / ELEV. (m) 194.35	
LOCATION: Hwy 7/Ninth Line, Markham	NORTHING: / EASTING:	PROJECT NO.: 14-072

SAMPLE TYPE: AUGER | DRIVEN | CORING | DYNAMIC CONE | SHELBY | SPLIT SPOON

DEPTH (m)	INSTRUMENTATION DATA	REMARKS	Shear Strength (kPa) 40 80 120 160 / N-Value (Blows/300mm) 20 40 60 80	PL W.C. LL 20 40 60 80	SOIL SYMBOL	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE NO.	SPT(N)	ELEVATION (m)
10						very dense moist, grey SANDY SILT trace clay trace gravel (TILL)				184.5
10.5										184
11			50/125 ▲					11	50/125	183.5
11.5										183
12			50/50 ▲					12	50/50	182.5
12.5										182
13										181.5
13.5			50/50 ▲					13	50/50	181
14										180.5
14.5						hard, moist, grey SILTY CLAY, trace sand trace gravel (TILL)				180
15			50/125 ▲					14	50/125	179.5
						END OF BOREHOLE				179

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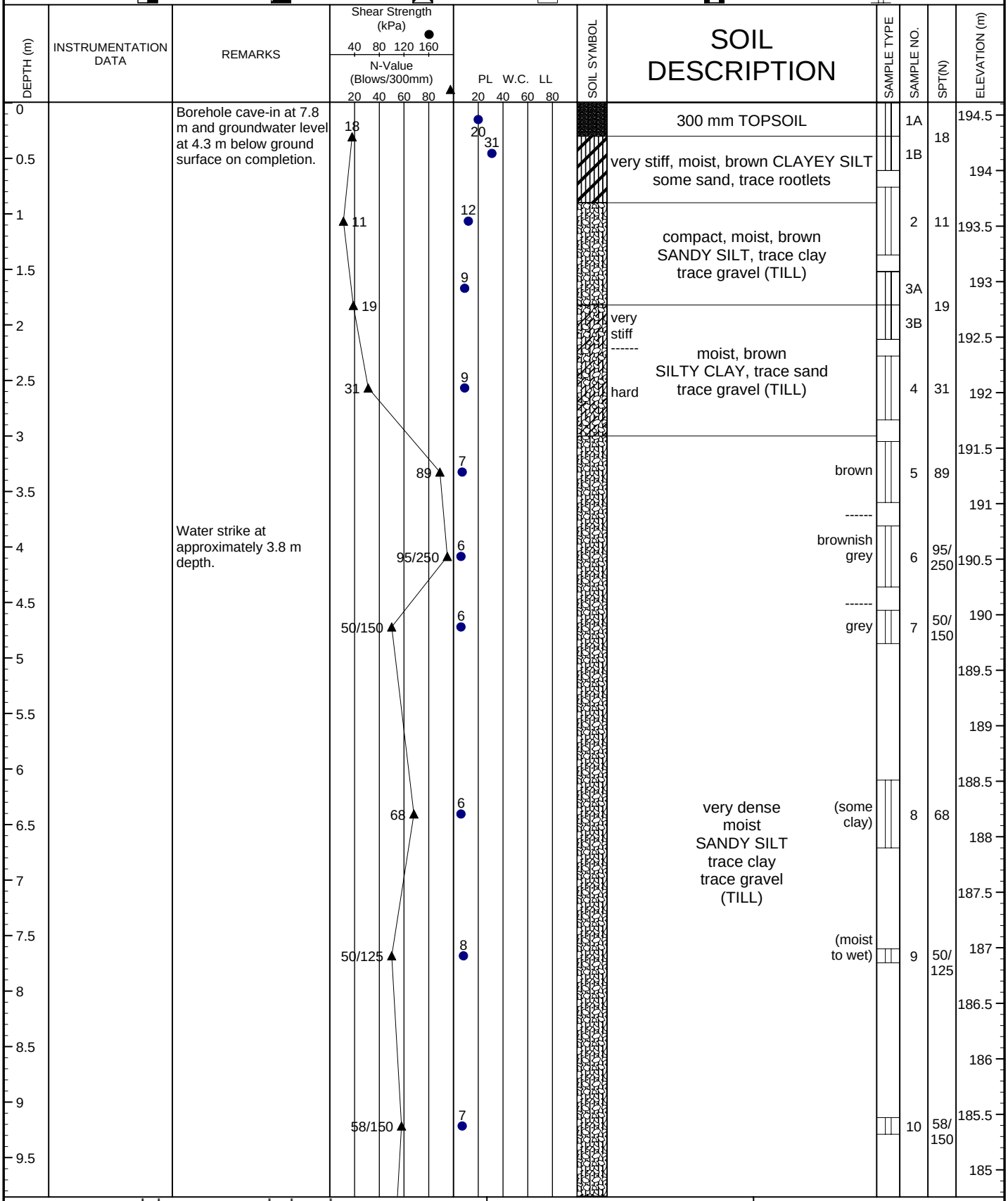
CLIENT: Cole Engineering	METHOD: Augering and Split Spoon Sampling	**BH No.: 8**
PROJECT: Proposed Cornell Bus Terminal	PROJECT ENGINEER: VN / ELEV. (m) 194.61	
LOCATION: Hwy 7/Ninth Line, Markham	NORTHING: / EASTING:	PROJECT NO.: 14-072

SAMPLE TYPE: AUGER | DRIVEN | CORING | DYNAMIC CONE | SHELBY | SPLIT SPOON



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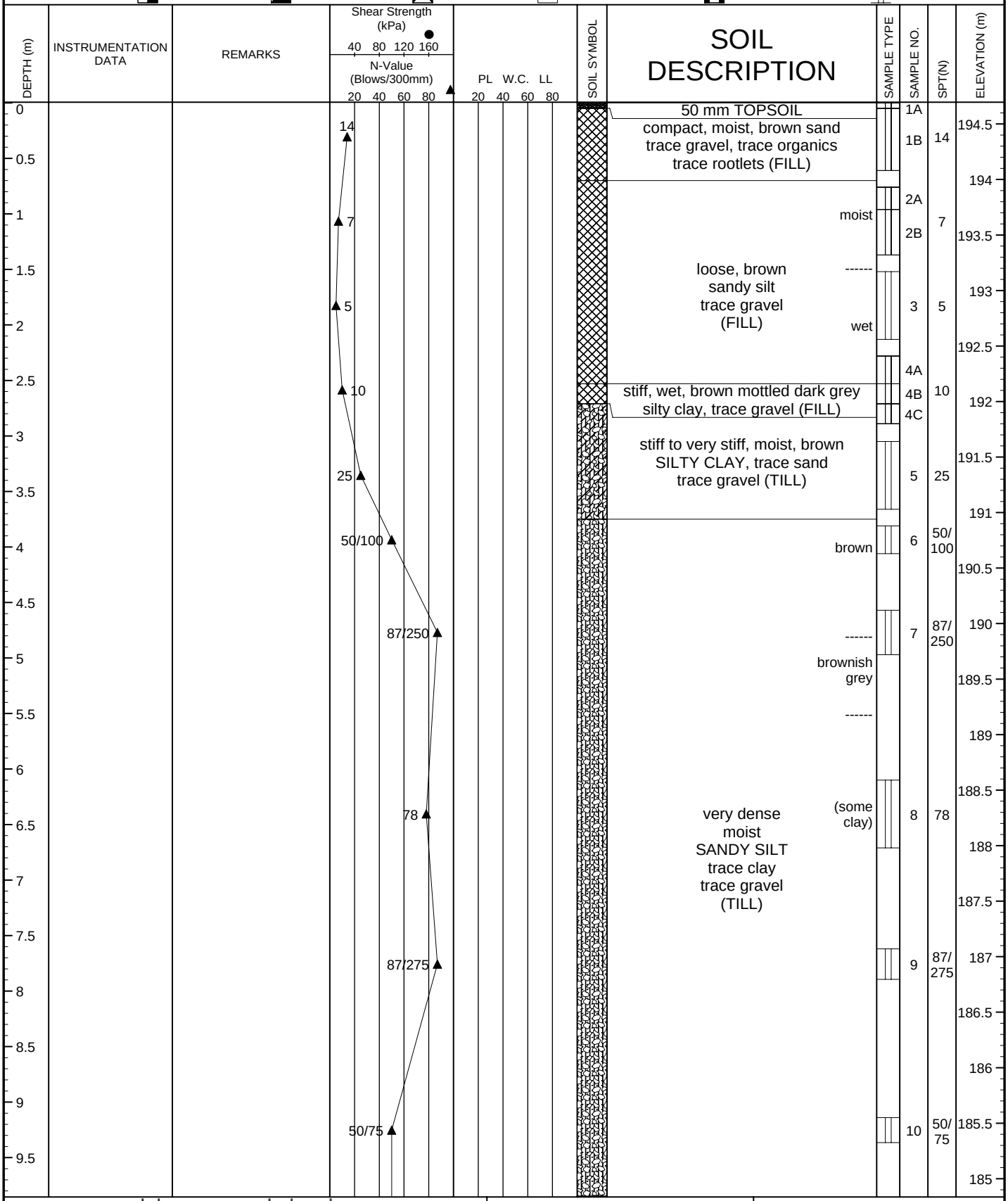
CLIENT: Cole Engineering	METHOD: Augering and Split Spoon Sampling		**BH No.: 8**
PROJECT: Proposed Cornell Bus Terminal	PROJECT ENGINEER: VN	ELEV. (m) 194.61	
LOCATION: Hwy 7/Ninth Line, Markham	NORTHING:	EASTING:	PROJECT NO.: 14-072

SAMPLE TYPE: AUGER | DRIVEN | CORING | DYNAMIC CONE | SHELBY | SPLIT SPOON

DEPTH (m)	INSTRUMENTATION DATA	REMARKS	Shear Strength (kPa) 40 80 120 160 / N-Value (Blows/300mm) 20 40 60 80	PL W.C. LL 20 40 60 80	SOIL SYMBOL	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE NO.	SPT(N)	ELEVATION (m)
10										184.5
10.5			50/125	8		very dense moist, grey SANDY SILT trace clay trace gravel (TILL)		11	50/125	184
11										183.5
11.5										183
12			50/50	9				12	50/50	182.5
12.5										182
13										181.5
13.5			50/100	8		hard moist, grey SILTY CLAY trace sand trace gravel (TILL)		13	50/100	181
14										180.5
14.5										180
15			50/100	11				14	50/100	179.5
						END OF BOREHOLE				

CLIENT: Cole Engineering	METHOD: Augering and Split Spoon Sampling	**BH No.: 9**
PROJECT: Proposed Cornell Bus Terminal	PROJECT ENGINEER: VN	ELEV. (m) 194.69
LOCATION: Hwy 7/Ninth Line, Markham	NORTHING:	EASTING: PROJECT NO.: 14-072

SAMPLE TYPE: AUGER | DRIVEN | CORING | DYNAMIC CONE | SHELBY | SPLIT SPOON



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CLIENT: Cole Engineering	METHOD: Augering and Split Spoon Sampling	**BH No.: 9**
PROJECT: Proposed Cornell Bus Terminal	PROJECT ENGINEER: VN / ELEV. (m) 194.69	
LOCATION: Hwy 7/Ninth Line, Markham	NORTHING: / EASTING:	PROJECT NO.: 14-072

SAMPLE TYPE: AUGER | DRIVEN | CORING | DYNAMIC CONE | SHELBY | SPLIT SPOON

DEPTH (m)	INSTRUMENTATION DATA	REMARKS	Shear Strength (kPa) 40 80 120 160 / N-Value (Blows/300mm) 20 40 60 80	PL W.C. LL 20 40 60 80	SOIL SYMBOL	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE NO.	SPT(N)	ELEVATION (m)
10										184.5
10.5			50/125					11	50/125	184
11										183.5
11.5										183
12						very dense moist, grey SANDY SILT trace clay trace gravel (TILL)				
12.5			50/100					12	50/100	182.5
13										182
13.5										181.5
14			50/100					13	50/100	181
14.5										180.5
15						hard, moist, grey SILTY CLAY, trace sand trace gravel (TILL)				180
15.5			93/250					14	93/250	179.5
						END OF BOREHOLE				

CLIENT: Cole Engineering	METHOD: Augering and Split Spoon Sampling		**BH No.: MW10**
PROJECT: Proposed Cornell Bus Terminal	PROJECT ENGINEER: VN	ELEV. (m) 194.74	
LOCATION: Hwy 7/Ninth Line, Markham	NORTHING:	EASTING:	PROJECT NO.: 14-072

SAMPLE TYPE: AUGER | DRIVEN | CORING | DYNAMIC CONE | SHELBY | SPLIT SPOON

DEPTH (m)	INSTRUMENTATION DATA	REMARKS	Shear Strength (kPa) 40 80 120 160 / N-Value (Blows/300mm) 20 40 60 80	PL W.C. LL 20 40 60 80	SOIL SYMBOL	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE NO.	SPT(N)	ELEVATION (m)
0		For monitoring well details refer to Cole Engineering log sheets.Borehole cave-in at 8.5 m and groundwater level at 4.6 m below ground surface on completion.	12	13		350 mm TOPSOIL		1A	12	194.5
0.5				13		firm, moist, brown mottled grey CLAYEY SILT, trace sand trace organics		1B		194
1			7	12				2A	7	
1.5						loose		2B		193.5
2			11	11		------ compact		3	11	193
2.5			7	12		brown moist to wet SANDY SILT trace clay trace gravel (TILL) ------ loose		4	7	192.5
3										192
3.5			34	8		hard, moist, brown SILTY CLAY, trace sand trace gravel (TILL)		5	34	191.5
4			49	8		brown		6	49	191
4.5						------ brownish grey				190.5
5			49	7		dense ------ grey		7	49	190
5.5						------				189.5
6										189
6.5			88	6		very dense (some clay) moist SANDY SILT trace clay trace gravel (TILL)		8	88	188.5
7										188
7.5						------				187.5
8			40	7		dense		9	40	187
8.5										186.5
9						-------				186
9.5			88/290	8		very dense		10	88/ 290	185.5
										185

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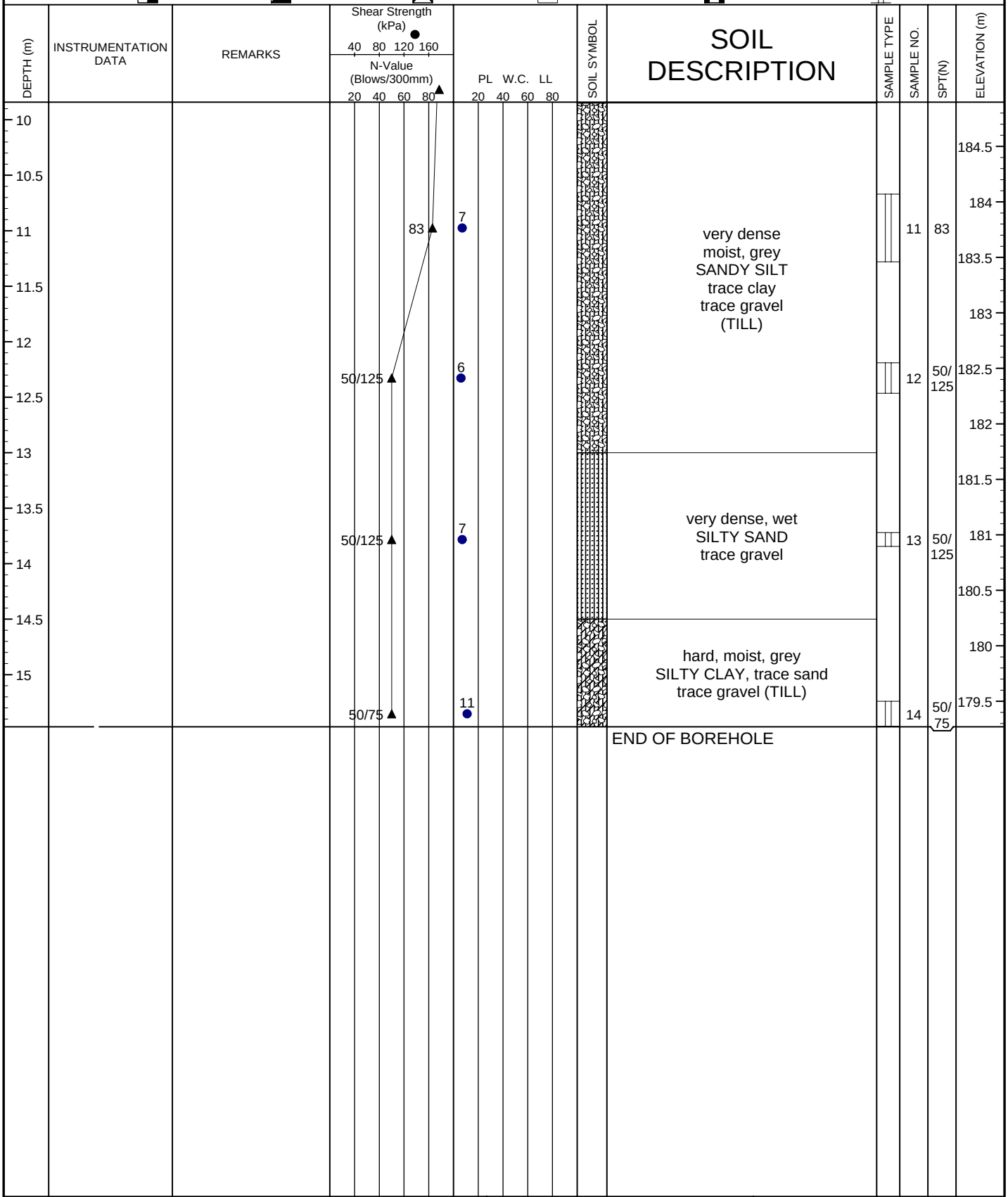
CLIENT: Cole Engineering	METHOD: Augering and Split Spoon Sampling		**BH No.: MW10**
PROJECT: Proposed Cornell Bus Terminal	PROJECT ENGINEER: VN	ELEV. (m) 194.74	
LOCATION: Hwy 7/Ninth Line, Markham	NORTHING:	EASTING:	PROJECT NO.: 14-072

SAMPLE TYPE: AUGER | DRIVEN | CORING | DYNAMIC CONE | SHELBY | SPLIT SPOON



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CLIENT: Cole Engineering	METHOD: Augering and Split Spoon Sampling		**BH No.: MW11**
PROJECT: Proposed Cornell Bus Terminal	PROJECT ENGINEER: VN	ELEV. (m) 194.81	
LOCATION: Hwy 7/Ninth Line, Markham	NORTHING:	EASTING:	PROJECT NO.: 14-072

SAMPLE TYPE: AUGER | DRIVEN | CORING | DYNAMIC CONE | SHELBY | SPLIT SPOON

DEPTH (m)	INSTRUMENTATION DATA	REMARKS	Shear Strength (kPa) 40 80 120 160 / N-Value (Blows/300mm) 20 40 60 80	PL W.C. LL 20 40 60 80	SOIL SYMBOL	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE NO.	SPT(N)	ELEVATION (m)
0		For monitoring well details refer to Cole Engineering log sheets. Borehole cave-in at 3.7 m and groundwater level at 2.7 m below ground surface on completion.	12			250 mm TOPSOIL		1A		194.5
0.5						compact, moist, brown sand trace gravel (probable FILL)		1B	12	
1			5			firm, moist, brown CLAYEY SILT, trace gravel		2	5	194
1.5										193.5
2			19			compact, moist, brown SANDY SILT, trace clay trace gravel (TILL)		3	19	193
2.5			18			very stiff moist, brown SILTY CLAY, trace sand trace gravel (TILL)		4	18	192.5
3										192
3.5			23					5A	23	191.5
4			50/100			brown		5B		
4.5		Wet soil caving from Sample 7 onward.	50/100			------ brownish grey ------		6	50/100	191
5						grey		7	50/100	190.5
5.5										190
6										189.5
6.5			63			very dense moist SANDY SILT trace clay trace gravel (TILL)		8	63	189
7										188.5
7.5										188
8			50/75					9	50/75	187.5
8.5										187
9			50/100					10	50/100	186.5
9.5										186
										185.5
										185

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CLIENT: Cole Engineering	METHOD: Augering and Split Spoon Sampling		**BH No.: MW11**
PROJECT: Proposed Cornell Bus Terminal	PROJECT ENGINEER: VN	ELEV. (m) 194.81	
LOCATION: Hwy 7/Ninth Line, Markham	NORTHING:	EASTING:	PROJECT NO.: 14-072

SAMPLE TYPE: AUGER | DRIVEN | CORING | DYNAMIC CONE | SHELBY | SPLIT SPOON

DEPTH (m)	INSTRUMENTATION DATA	REMARKS	Shear Strength (kPa) 40 80 120 160 / N-Value (Blows/300mm) 20 40 60 80	PL W.C. LL 20 40 60 80	SOIL SYMBOL	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE NO.	SPT(N)	ELEVATION (m)
10										184.5
10.5			50/75			very dense moist, grey SANDY SILT trace clay trace gravel (TILL)		11	50/75	184
11										183.5
11.5										183
12						dense, wet SAND and GRAVEL		12	31	182.5
12.5			31							182
13										181.5
13.5			50/100			hard moist, grey SILTY CLAY trace sand trace gravel (TILL)		13	50/100	181
14										180.5
14.5										180
15										179.5
15.5			50/25					14	50/25	
						END OF BOREHOLE				