

TERMINOLOGY AND SYMBOLS

Drilling / Investigation Methods

CFHSA	- Continuous Flight Hollow Stem Auger.
CFSSA	- Continuous Flight Solid Stem Auger.
DC	- Dynamic Coring (eg Terrier Rig).
DCP	- Dynamic Cone Penetrometer.
HA	- Hand Auger.
HQ3	- HQ Triple Tube.
HQWL	- HQ Wire Line.
HWOB	- Heavy Weight Open Barrel.
NQ3	- NQ Triple Tube.
NQWL	- NQ Wire Line.
OB	- 100mm diameter Open Barrel.
OB70	- 70mm diameter Open Barrel.
PERC	- Percussion.
PS	- Piston Sample.
PQ3	- PQ Triple Tube.
PQWL	- PQ Wire Line.
RC	- Reverse Circulation.
RCDHH	- Reverse Circulation Down Hole Hammer.
SPT	- Standard Penetration Test.
SPERC	- Sonic Percussion.
PT	- Push Tube Sample
VAC EX	- Vacuum Excavation.
WASH	- Wash Drilling.

Test Results

SPT "N" value; uncorrected blow count for 300 mm penetration
/ # / # / # / # / # blows per 75 mm penetration

ss - Standard Penetration Test - split spoon
sc - Standard Penetration Test - solid cone (no sample recovery)
SUOW - Sunk Under Own Weight

Vane Shear Strength Tests

/ # Vane shear strength test results given as peak / remoulded shear strengths (kPa). Test as per NZGS Guideline, 2001.

= Vane test performed on core recovered prior to extrusion from core barrel.
* = Vane test performed on excavated material of suitable size.

UTP - Unable to penetrate.

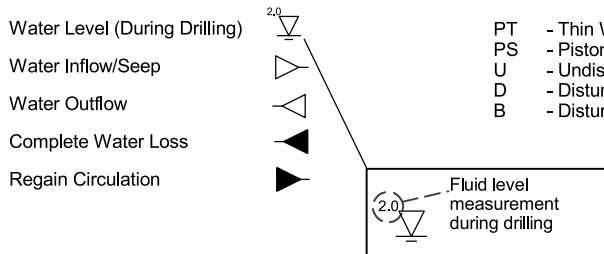
Unit/Geological Boundary Lines

———— Known
- - - - Inferred/Unknown

Installation & Backfill

Standpipe		Grout	
Slotted Standpipe		Cement	
Collapse/Cuttings /Spoil		Gravel Pack Filter	
Bentonite		Sand Pack Filter	
Inclinometer		Gravel Backfill	

Groundwater Records



Samples

PT	- Thin Wall Push Sample
PS	- Piston Sample
U	- Undisturbed
D	- Disturbed (Core)
B	- Disturbed (Pit)

Rock Descriptions

Relative Strength

ES	- Extremely strong	> 250
VS	- Very Strong	100 - 250
S	- Strong	50 - 100
MS	- Moderately Strong	20 - 50
W	- Weak	5 - 20
VW	- Very Weak	1 - 5
EW	- Extremely Weak	< 1

Weathering

UW	- Unweathered
SW	- Slightly Weathered
MW	- Moderately Weathered
HW	- Highly Weathered
CW	- Completely Weathered

Soil Descriptions

Consistency Cohesive Soils

Very Soft	Su (kPa) < 12
Soft	12 - 25
Firm	25 - 50
Stiff	50 - 100
Very Stiff	100 - 200
Hard	200 - 500

Relative Density Non-cohesive soils

Very Loose	SPT "N" Value (uncorrected) < 4
Loose	4 - 10
Medium Dense	10 - 30
Dense	30 - 50
Very Dense	> 50

Rock Defect Abbreviations

Defect Type

BP	= Bedding Plane Defect
CZ	= Crush Zone
DB	= Drilling Break
FZ	= Fracture Zone
HJ	= Healed Joint
J	= Joint
SZ	= Shear Zone
Ve	= Vein

Defect Aperture

T	= Tight (Nil)
VN	= Very Narrow (>0-2mm)
N	= Narrow (2-6mm)
MN	= Moderately Narrow (6-20mm)
MW	= Moderately Wide (20-60mm)
W	= Wide (60-200mm)
VW	= Very Wide (>200mm)

Defect Roughness

Pl	= Planar
St	= Stepped
Ud	= Undulating
Ro	= Rough
Sm	= Smooth
Slk	= Slickensided
	= Parallel
Po	= Polished

Infill Thickness

Sn	= Stained
Vn	= Veneer (<0.5mm)
Cg	= Coating
P	= Partially infilled
C	= Completely Infilled

Infill Colour

bl	= Blue
bn	= Brown
bk	= Black
gn	= Green
gy	= Grey
or	= Orange
pk	= Pink
rd	= Red
wh	= White
ye	= Yellow

Infill Material

Calc	= Calcareous
Cb	= Carbonaceous
Cc	= Calcite
Cl	= Clay
Fe	= Iron Oxide
Mn	= Manganese
NF	= No Infill
Py	= Pyrite
Qtz	= Quartz
S	= Sand
Slt	= Silt

Graphic Log (typical symbols)

	Peat		Mudstone
	Clay		Siltstone
	Silt		Sandstone
	Sand		Basalt
	Gravel / Cobbles		No recovery
	Welded Tuff		

Core Measurements

TCR	= Total Core Recovery
RQD	= Rock Quality Designation

Soil and rock descriptions generally as in "Guidelines for the Field Description of Soil and Rock for Engineering Purposes" by the NZ Geotechnical Society Inc, December 2005.

Client Auckland Transport
 Project Eastern Busway
 Project number 60644113

Co-ordinates 412291.83mE 794837.51mN
 Orientation -90° Elevation 9.3m
 Location Reserve: 1R Burswood Drive
 Feature Slope design/Road realignment

Depth	GEOLOGICAL DESCRIPTION <small>Weathering, Colour, Fabric, ROCK NAME, Strength, Discontinuities, Lithological Features (bedding, foliation, mineralogy, cement, etc).</small>	Test Records Shear Vane (kPa) <small>Residual - Peak</small> 0 kPa 100 kPa 200 kPa	Sampling	Dynamic Cone Penetrometer (Blows per 100 mm) 2 4 6 8	SOIL PROPERTIES	Graphic Log	Instrumentation		
					<small>Subordinate MAJOR minor; colour, structure, Strength, moisture condition, grading, bedding, plasticity, sensitivity, major fraction description, subordinate fraction description, minor fraction description, additional structures, additional information, etc</small> Depth Related Remarks				
FILL	0.0m: TOPSOIL				0.0m: Clayey SILT with minor rootlets; light brownish grey. Very stiff, dry, friable.				
	0.1m: Fill comprising clay, silt and gravel.	207*			0.1m: Clayey SILT with trace fine to coarse gravel; light brownish grey. Hard, dry. Gravel is subangular basalt. 0.4 to 0.65m: Moist with orange mottling.				
1 TAURANGA GROUP	0.65m: Alluvium comprising silts, clays, organic clay and peat.	163/50		1	0.65m: Silty CLAY with trace rootlets and fine to medium gravel; light brownish grey. Very stiff, moist, moderate plasticity. Gravel is subangular basalt.				
		118/52		2					
		89/56		1	1.25 to 1.5m: Stiff.				
		109/44		2					
		118/71		2	1.6m: Silty CLAY with trace indistinct organics and rootlets; dark brownish grey. Very stiff, moist, high plasticity.				
		81/46		2					
		133/77		2	2.0 to 2.25m: Stiff.				
		103/72		2					
		2		74/59		1	2.5m: Silty CLAY; light grey streaked orange. Very stiff, moist, high plasticity.		
				59/52		2			
89/56				1	3.0 to 3.8m: Orange streaks cease.				
46/22				2					
3		89/37		1	3.8 to 3.9m: Organic CLAY. Indistinct.				
		59/52		2					
		4				0	3.9m: Silty PEAT with minor clay; dark brownish black. Firm, wet, low plasticity. Amorphous.		
				0					
				0	4.2m: PEAT; black. Stiff, wet. Amorphous, plastic.				
				1					
5				1	4.5m: Silty PEAT with minor clay; black. Stiff, wet, low plasticity. Amorphous.				
				1					
				2	HA301 terminated at 5.0m				
				1					
				1					
6				1					
				1					

For explanation of symbols and observations, see key sheet

GROUNDWATER OBSERVATIONS (m)
 Date Time Drilled Depth Casing Depth Fluid Depth

Remarks
 Backfilled with cuttings upon completion. DCP undertaken in base of hole and adjacent starting hole.
 No groundwater encountered.

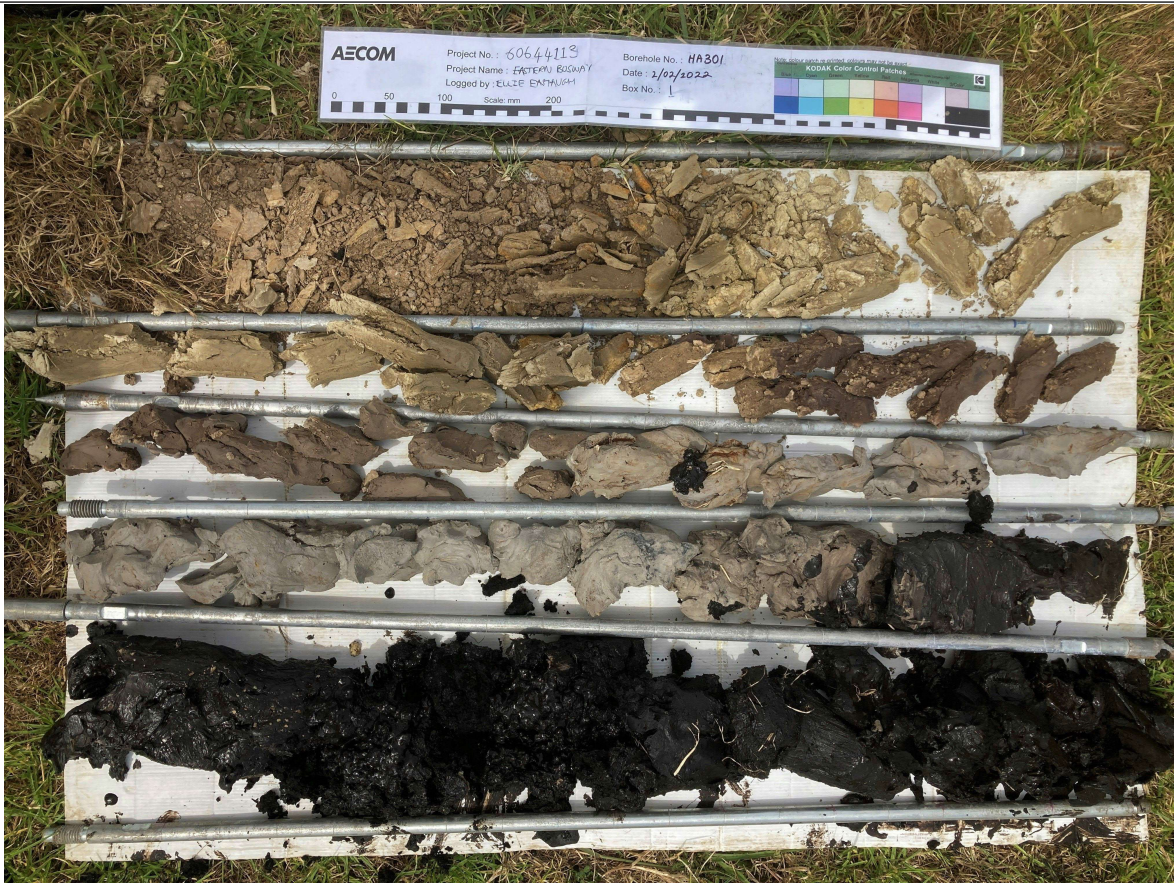
Horizontal / Vertical Survey Datums: NZGD2000 - Mount Eden 2000 / New Zealand Vertical Datum 2016

Started 02/02/2022
 Finished 02/02/2022
 Date logged 02/02/2022
 Logged GS
 Checked GP

Hand Held Shear Vane
 GEOVANE1179: 19mm blade: Cal. 10/21: Correction Factor = 1.478
 Vane shear strength per NZGS guideline

Project Eastern Busway
Location Reserve: 1R Burswood Drive

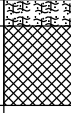

HOLE IDENTIFICATION	HA301
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Depth: 00.00m to 05.00m
Date: 2/02/2022

Client Auckland Transport
 Project Eastern Busway
 Project number 60644113

Co-ordinates 412271.65mE 794732.14mN
 Orientation -90° Elevation 12.6m
 Location Reserve: 1R Burswood Drive
 Feature Slope design/Road realignment

Depth	GEOLOGICAL DESCRIPTION <small>Weathering, Colour, Fabric, ROCK NAME. Strength, Discontinuities, Lithological Features (bedding, foliation, mineralogy, cement, etc).</small>	Test Records		Sampling	Dynamic Cone Penetrometer (Blows per mm) 2 4 6 8	SOIL PROPERTIES <small>Subordinate MAJOR minor; colour, structure. Strength, moisture condition, grading, bedding, plasticity, sensitivity, major fraction description, subordinate fraction description, minor fraction description, additional structures, additional information, etc</small>	Graphic Log	Instrumentation	
		Shear Vane (kPa) <small>Residual - Peak</small>							Depth Related Remarks
FILL	0.0m: TOPSOIL	UTP	UTP			0.0m: Clayey SILT with minor rootlets; light brownish grey. Hard, dry, friable. 0.1m: Clayey SILT with some fine to coarse gravel and cobbles; greyish brown. Hard, moist. Gravel is subangular basalt and greywacke. HA302 terminated at 0.4m Unable to advance as too difficult to auger			
	0.1m: Fill comprising silt, clay and gravel.								
1									
2									
3									
4									
<p><i>For explanation of symbols and observations, see key sheet</i></p> <p>GROUNDWATER OBSERVATIONS (m) Date Time Drilled Depth Casing Depth Fluid Depth</p>						<p>Remarks Several starter holes attempted, unable to get through gravels. Pit dug to 0.4m, still unable to get through. No groundwater encountered.</p> <p>Horizontal / Vertical Survey Datums: NZGD2000 - Mount Eden 2000 / New Zealand Vertical Datum 2016</p>		<p>Started 02/02/2022 Finished 02/02/2022 Date logged 02/02/2022 Logged GS Checked GP</p>	
<p>Hand Held Shear Vane GEOVANE1179: 19mm blade: Cal. 10/21: Correction Factor = 1.478 <i>Vane shear strength per NZGS guideline</i></p>						<p>Page 1 of 2</p>			









2021 EB AUGERHOLE LOG_2022-04-11 SBS MASTER.GPJ BASE.GDT 11/04/22



Depth: 00.00m to 00.40m
Date: 2/02/2022

Client Auckland Transport
 Project Eastern Busway
 Project number 60644113

Co-ordinates 411862.07mE 794978.6mN
 Orientation -90° Elevation 11.5m
 Location 25 Dulwich Place
 Feature Zone 5 general ground conditions

Depth	GEOLOGICAL DESCRIPTION <small>Weathering, Colour, Fabric, ROCK NAME, Strength, Discontinuities, Lithological Features (bedding, foliation, mineralogy, cement, etc).</small>	Test Records Shear Vane (kPa) <small>Residual - Peak</small> 0 kPa 100 kPa 200 kPa	Sampling	Dynamic Cone Penetrometer (Blows per 100 mm) 0 2 4 6 8	SOIL PROPERTIES	Graphic Log	Instrumentation	
					<small>Subordinate MAJOR minor, colour, structure, Strength, moisture condition, grading, bedding, plasticity, sensitivity, major fraction description, subordinate fraction description, minor fraction description, additional structures, additional information, etc</small> Depth Related Remarks			
0.0m	TOPSOIL			0	0.0m: CLAY with minor rootlets; dark brown. Stiff, moist, moderate plasticity.			
0.2m	Alluvium comprising clay, silt and sand.	83/45		1	0.2m: Silty CLAY with trace rootlets; light brownish grey mottled orange. Stiff, moist, moderate plasticity.			
	TAURANGA GROUP	144/64		2	0.5 to 1.3m: Very stiff.			
		154/64		2				
		101/41		3				
		UTP		3	1.3 to 1.37m: Silty fine SAND with minor clay; reddish brown. Densely packed, moist. Slow dilatancy when water applied.			
				4	HA305 terminated at 1.37m Unable to advance due to an obstruction			
2				8				
3				6				
4								
<p><i>For explanation of symbols and observations, see key sheet</i></p> <p>GROUNDWATER OBSERVATIONS (m) Date Time Drilled Depth Casing Depth Fluid Depth</p> <p>Hand Held Shear Vane DR1980: 19mm (A). Calibrated Jun 2022: Correction Factor: 1.876 Vane shear strength per NZGS guideline</p>					<p>Remarks Obstruction at base of hole interpreted as basalt. Backfilled with cuttings upon completion. DCP undertaken in adjacent hole. No groundwater encountered. 225 kPa is the shear vane limit Horizontal / Vertical Survey Datums: NZGD2000 / Mount Eden 2000 / New Zealand Vertical Datum 2016</p>		<p>Started 05/12/2022 Finished 05/12/2022 Date logged 05/12/2022 Logged GS Checked GP</p>	
					Page 1 of 2			

2021 EB AUGERHOLE LOG_2022-02-02_GS FIELD FILE (DH'S, HA'S), GP J_BASE_GDT_22/12/22



Depth: HA305 00.00m to 01.37m 0.00 to 1.37m
Date: 5/12/2022

Client Auckland Transport
 Project Eastern Busway
 Project number 60644113

Co-ordinates 411772.95mE 794996.61mN
 Orientation -90° Elevation 11.15m
 Location 18 Tullis Place
 Feature Ground Conditions

Depth	GEOLOGICAL DESCRIPTION <small>Weathering, Colour, Fabric, ROCK NAME, Strength, Discontinuities, Lithological Features (bedding, foliation, mineralogy, cement, etc).</small>	Test Records Shear Vane (kPa) <small>Residual - Peak</small> 0 kPa 100 kPa 200 kPa	Sampling	Dynamic Cone Penetrometer (Blows per mm) 2 4 6 8	SOIL PROPERTIES <small>Subordinate MAJOR minor; colour, structure, Strength, moisture condition, grading, bedding, plasticity, sensitivity, major fraction description, subordinate fraction description, minor fraction description, additional structures, additional information, etc</small>	Graphic Log	Instrumentation
					Depth Related Remarks		
1	0.0m: TOPSOIL				0.0m: Silty CLAY; some fine sand and trace rootlets; brown. Stiff, wet, low plasticity.		
	0.3m: Alluvium comprising clay and silt.	98/15 165/49 191/109			0.3m: Silty CLAY; bluish light grey mottled orange. Stiff, wet, moderate plasticity. 0.5m: Becomes very stiff.		
	UTP				0.7m: Silty CLAY; bluish grey heavily mottled orangey brown. Very stiff, moist, high plasticity. 0.8 to 0.9m: Micaceous specks HA306 terminated at 0.9m Unable to advance due to practical refusal		
2							
3							
4							
<p><i>For explanation of symbols and observations, see key sheet</i></p> <p>GROUNDWATER OBSERVATIONS (m) Date Time Drilled Depth Casing Depth Fluid Depth 22/11/2022 15:08 00.90 - 0.74</p> <p>Hand Held Shear Vane DR1980: 19mm (A). Calibrated Jun 2022: Correction Factor: 1.876 <i>Vane shear strength per NZGS guideline</i></p>					<p>Remarks Termination due to practical refusal. Interpreted as being due to basalt lying beneath.</p> <p>Horizontal / Vertical Survey Datums: NZGD2000 - Mount Eden 2000 / New Zealand Vertical Datum 2016</p>		<p>Started 22/11/2022 Finished 22/11/2022 Date logged 22/11/2022 Logged IR Checked GP</p>
						Page 1 of 2	

2021 EB AUGERHOLE LOG 2023-04-06 MASTER.GPJ BASE.GDT 17/04/23



Box: 1 of 1 - Depth: 00.00m to 00.90m of 0.90m

Date Drilled 22/11/2022 to 22/11/2022 - Date Photographed: 24/11/2022