



**Box: 9 of 9 - Depth: 25.70m to 28.50m of 28.50m**

Date Drilled 12/01/2022 to 14/01/2022 - Date Photographed: 10/05/2022

Client Auckland Transport  
 Project Eastern Busway  
 Project number 60644113

Co-ordinates 412270.62mE 794791.97mN  
 Orientation -90° Elevation 10.02m  
 Location Reserve: 1R Burswood Drive  
 Feature Retaining wall/slope design

GEOLOGICAL DESCRIPTION <small>Weathering, Colour, Fabric, ROCK NAME. Strength, Discontinuities, Lithological Features (bedding, foliation, mineralogy, cement, etc).</small>	Test Records		Drilling Method <small>Casing remarks</small>	Core Loss/Lift	Relative Strength	Rock Weathering	Depth	Graphic Log	TCR [RQD] (%)	Spacing of Natural Defects (mm)	SOIL PROPERTIES	Instrumentation
	Shear Vane/ SPT	SPT N Values									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	
0.0m: TOPSOIL.											0.0m: Fine sandy SILT with some clay; dark brown. Soft, dry, low plasticity.	
0.6m: ALLUVIUM comprising silty clay and peat.	ss 0,0,0, 1,1,1 N=3		HA				1		100		0.6m: Silty CLAY; light grey stained orange. Firm, moist, high plasticity.	
			SPT				2		100		1.4m: Orange staining ceases.	
			HQ3				3		100		2.2 to 2.3m: Contains minor organics, brownish grey. 2.5m: Becomes soft.	
	10/0 ss 0,0,0, 0,0,1 N=1		SPT				4		100		3.0m: Becomes whitish grey.	
			HQ3				5		100		4.05m: PEAT; black. Very soft, wet, high plasticity, amorphous.	
	0/0		PT				6		100			
	ss 0,0,0, 0,0,0 N=0 SUOW		SPT				7		100			
			HQ3				8		100			
	0/0 ss 0,0,0, 0,0,0 N=0 SUOW		SPT				9		100			
		HQ3				9		100			6.45 to 7.95m: Brownish dark grey, contains more inorganic material.	
		SPT				9		100			7.95m: Fine to medium SAND; brownish grey. Dense, dry, poorly graded. (Pumice) 8.2m: PEAT; dark grey to black. Soft, moist, high plasticity.	
35/0 ss 0,0,1, 4,7,10 N=22		SPT				9		100			9.2m: Fine to medium SAND; light grey. Very dense, dry, poorly graded, pumiceous. 9.5m: PEAT; black. Soft, moist, high plasticity. 9.6 to 11.1m: Brownish dark grey with black specks and blotches.	
For explanation of symbols and observations, see key sheet			RELATIVE STRENGTH		WEATHERING		Date logged 2/02/2022		Driller			
FLUID DEPTHS AND DRILLING PROGRESS (m)			VS - Very strong S - Strong MS - Moderately strong W - Weak VW - Very weak EW - Extremely weak		UW - Unweathered SW - Slightly weathered MW - Moderately weathered HW - Highly weathered CW - Completely weathered		Logged SK Checked GP		McMillan			
Date Time Drilled Depth Casing Depth Fluid Depth									Started			
01/02/2022 14:40 19.95 3.0 0.16									1/02/2022			
02/02/2022 07:40 19.95 3.0 1.32									Finished			
									2/02/2022			
Hand Held Shear Vane			Remarks						Drill Rig			
DR1980: 19mm (A). Calibrated 28/06/21. CF's: A = 1.781, B = -11.22			50 mm standpipe piezometer installed on completion.						N119			
vane shear strength per NZGS guideline			Horizontal / Vertical Survey Datums: NZGD2000 - Mount Eden 2000 / New Zealand Vertical Datum 2016						Core Boxes 9			
									Page 1 of 8			

2021 EB DRILLHOLE LOG 2022-04-12 SBS MASTER.GPJ BASE.GDT 12/04/22

Client Auckland Transport  
 Project Eastern Busway  
 Project number 60644113

Co-ordinates 412270.62mE 794791.97mN  
 Orientation -90° Elevation 10.02m  
 Location Reserve: 1R Burswood Drive  
 Feature Retaining wall/slope design

GEOLOGICAL DESCRIPTION <small>Weathering, Colour, Fabric, ROCK NAME. Strength, Discontinuities, Lithological Features (bedding, foliation, mineralogy, cement, etc).</small>	Test Records <small>Shear Vane/ SPT N Values</small>	Drilling Method <small>Casing remarks</small>	Core Loss/Lift <small>0-100%</small>	Relative Strength <small>MS VS W VW EW</small>	Rock Weathering <small>SW MW HW CW</small>	Depth	Graphic Log	TCR [RQD] (%)	Spacing of Natural Defects (mm)	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>	Instrumentation
										DEFECT DESCRIPTION <small>(Joints, Bedding Seams, Shatter, Shear and Crush Zones, Foliation, Schistosity, Attitude, Spacing, continuity, roughness, infilling, etc.)</small>	
TAURANGA GROUP	12/0 ss 0,0,1, 1,0,0 N=2	HQ3						100		9.5m: PEAT; black. Soft, moist, high plasticity. (continued)	
		SPT						100			
		HQ3						100		11.1m: Silty CLAY; light greenish grey. Soft, moist, high plasticity.	
	0,0,0, 2, 1,2 N=5	SPT						100			
		HQ3						100			
	0,1,0, 0,0,0 N=0	SPT						100		13.95m: Spongy PEAT; black. Firm, moist, high plasticity.	
		HQ3						100		14.2m: Silty CLAY; bluish grey. Firm, moist, high plasticity.	
	60/0 ss 0,0,0, 1,2,2 N=5	SPT						100		14.2 to 15.05m: Speckled dark grey.	
		HQ3						100			
	39/10 ss 0,0,0, 0,0,1 N=1	SPT						100			
	HQ3						100				
60/14 ss 1,1,2, 1,2,2 N=7	SPT						100				
	HQ3						100				
32/1 ss 2,3,3, 6,9,11 N=29	SPT						100		19.1 to 19.4m: With minor fine sand.		
									19.4m: Silty fine to coarse SAND; grey. Medium dense, moist, well graded.		
For explanation of symbols and observations, see key sheet						RELATIVE STRENGTH	WEATHERING	Date logged 2/02/2022		Driller McMillan Started 1/02/2022 Finished 2/02/2022 Drill Rig N119 Core Boxes 9	
FLUID DEPTHS AND DRILLING PROGRESS (m) Date Time Drilled Depth Casing Depth Fluid Depth						VS - Very strong S - Strong MS - Moderately strong W - Weak VW - Very weak EW - Extremely weak	UW - Unweathered SW - Slightly weathered MW - Moderately weathered HW - Highly weathered CW - Completely weathered	Logged SK Checked GP			
Hand Held Shear Vane DR1980: 19mm (A). Calibrated 28/06/21. CF's: A = 1.781, B = -11.22 vane shear strength per NZGS guideline						Remarks 50 mm standpipe piezometer installed on completion.		Horizontal / Vertical Survey Datums: NZGD2000 - Mount Eden 2000 / New Zealand Vertical Datum 2016			
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2021 EB DRILLHOLE LOG 2022-04-12 SBS MASTER.GPJ BASE.GDT 12/04/22

Client Auckland Transport  
 Project Eastern Busway  
 Project number 60644113

Co-ordinates 412270.62mE 794791.97mN  
 Orientation -90° Elevation 10.02m  
 Location Reserve: 1R Burswood Drive  
 Feature Retaining wall/slope design

GEOLOGICAL DESCRIPTION <small>Weathering, Colour, Fabric, ROCK NAME. Strength, Discontinuities, Lithological Features (bedding, foliation, mineralogy, cement, etc).</small>	Test Records		Drilling Method <small>Casing remarks</small>	Core Loss/Lift <small>0 - 100%</small>	Relative Strength <small>MS S W MS W</small>	Rock Weathering <small>SW MW CW</small>	Depth	Graphic Log	TCR [RQD] (%)	Spacing of Natural Defects <small>mm</small>	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>	Instrumentation	
	Shear Vane/ SPT	SPT N Values <small>0 - 50</small>									DEFECT DESCRIPTION <small>(Joints, Bedding Seams, Shatter, Shear and Crush Zones, Foliation, Schistosity, Attitude, Spacing, continuity, roughness, infilling, etc.)</small>		
EAST COAST BAYS FORMATION  19.4m: Completely weathered, grey, fine to coarse SANDSTONE. Extremely weak. <i>(continued)</i>  20.7m: Highly weathered, grey, fine to coarse SANDSTONE. Extremely weak. 20.9 to 21.75m: Moderately weathered.  21.75m: MW, grey, SILTSTONE. EW.  22.1m: Moderately weathered, grey, fine to coarse SANDSTONE. Extremely weak. Moderately thickly bedded, poorly defined.			HQ3						100		19.4m: Silty fine to coarse SAND; grey. Medium dense, moist, well graded. <i>(continued)</i> 20.25 to 20.75m: Fracture zone, 60 degree fractures.  20.9 to 21.75m: Closely spaced drilling breaks.		
	ss 5,8,9,10,15,16 for 60mm N>50		SPT				21		100				
				HQ3						100		21.75m: Clayey SILT; grey. Hard. 21.95 to 22.15m: Subvertical joint, planar smooth, no infill or mineralisation.	
	ss 11,16,30,20 for 40mm N>50		SPT				22		100			22.1m: Silty fine to coarse SAND; grey. Very dense.	
				HQ3						100			
	ss 8,14,20,30 for 55mm N>50		SPT				23		53				
							24		100				
							25					DH326_P terminated at 24.8m Depth Criteria Achieved	
							26						
							27						
							28						
							29						

For explanation of symbols and observations, see key sheet

FLUID DEPTHS AND DRILLING PROGRESS (m)  
 Date Time Drilled Depth Casing Depth Fluid Depth

RELATIVE STRENGTH

VS - Very strong  
 S - Strong  
 MS - Moderately strong  
 W - Weak  
 VW - Very weak  
 EW - Extremely weak

WEATHERING

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

Date logged 2/02/2022

Logged SK

Checked GP

Driller

McMillan

Started

1/02/2022

Finished

2/02/2022

Drill Rig

N119

Core Boxes 9

Remarks

50 mm standpipe piezometer installed on completion.

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

Hand Held Shear Vane

DR1980: 19mm (A). Calibrated 28/06/21. CF's: A = 1.781, B = -11.22

vane shear strength per NZGS guideline



**Box: 1 of 9 - Depth: 00.00m to 03.05m of 24.78m**  
 Date Drilled 1/02/2022 to 2/02/2022 - Date Photographed: 1/02/2022



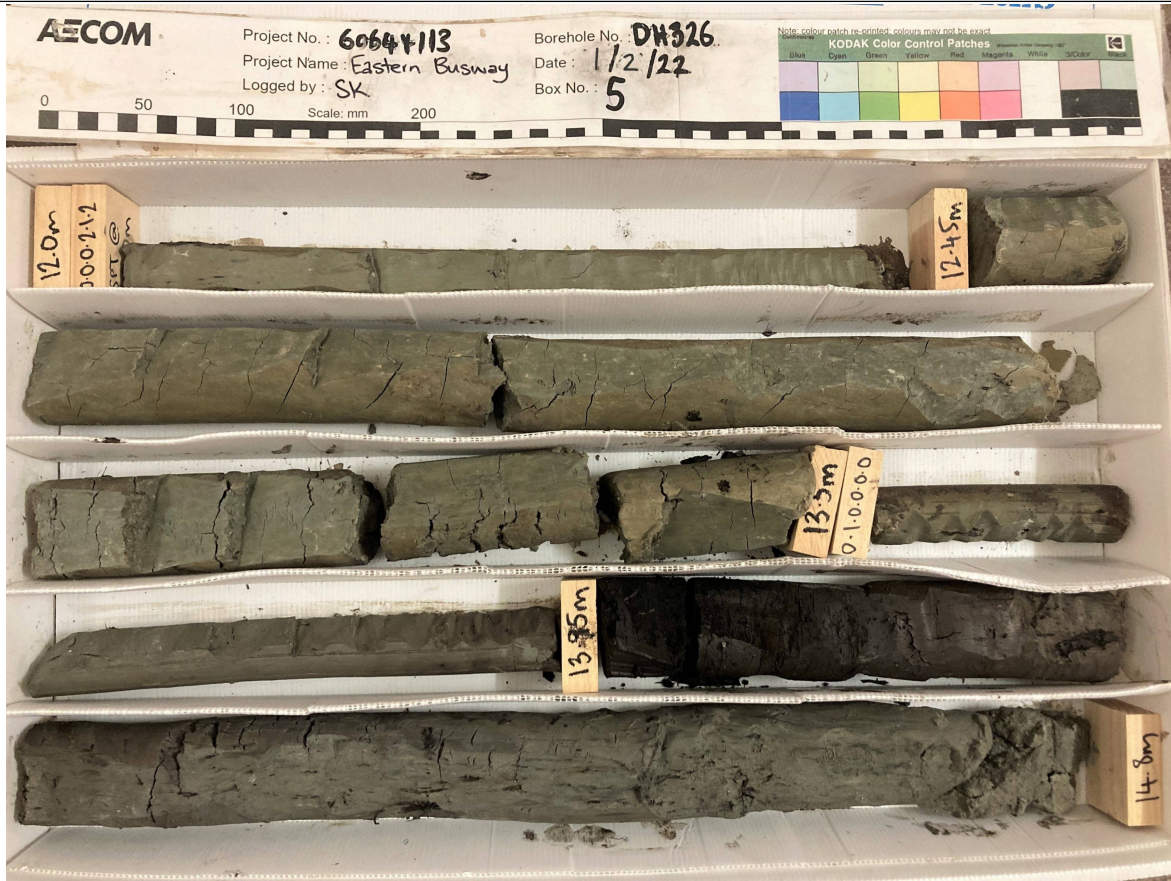
**Box: 2 of 9 - Depth: 03.05m to 06.45m of 24.78m**  
 Date Drilled 1/02/2022 to 2/02/2022 - Date Photographed: 1/02/2022



**Box: 3 of 9 - Depth: 06.45m to 09.20m of 24.78m**  
 Date Drilled 1/02/2022 to 2/02/2022 - Date Photographed: 1/02/2022



**Box: 4 of 9 - Depth: 09.20m to 12.00m of 24.78m**  
 Date Drilled 1/02/2022 to 2/02/2022 - Date Photographed: 1/02/2022



**Box: 5 of 9 - Depth: 12.00m to 14.80m of 24.78m**  
 Date Drilled 1/02/2022 to 2/02/2022 - Date Photographed: 1/02/2022



**Box: 6 of 9 - Depth: 14.80m to 17.60m of 24.78m**  
 Date Drilled 1/02/2022 to 2/02/2022 - Date Photographed: 1/02/2022

Project Eastern Busway  
 Location Reserve: 1R Burswood Drive

HOLE IDENTIFICATION **DH326\_P**



**Box: 7 of 9 - Depth: 17.60m to 20.30m of 24.78m**  
 Date Drilled 1/02/2022 to 2/02/2022 - Date Photographed: 2/02/2022



**Box: 8 of 9 - Depth: 20.30m to 22.50m of 24.78m**  
 Date Drilled 1/02/2022 to 2/02/2022 - Date Photographed: 2/02/2022



Project Eastern Busway  
 Location Reserve: 1R Burswood Drive

HOLE IDENTIFICATION **DH326\_P**



**Box: 9 of 9 - Depth: 23.00m to 24.78m of 24.78m**  
 Date Drilled 1/02/2022 to 2/02/2022 - Date Photographed: 2/02/2022

Client Auckland Transport  
 Project Eastern Busway  
 Project number 60644113

Co-ordinates 412274.22mE 794839.80mN  
 Orientation -90° Elevation 9.08m  
 Location Burswood Reserve  
 Feature Busway through Burswood Reserve

GEOLOGICAL DESCRIPTION <small>Weathering, Colour, Fabric, ROCK NAME, Strength, Discontinuities, Lithological Features (bedding, foliation, mineralogy, cement, etc.)</small>	Test Records		Drilling Method <small>Casing remarks</small>	Core Loss/Lift <small>0 - 100%</small>	Relative Strength <small>MS MSW VW W</small>	Rock Weathering <small>SW MW HW</small>	Depth	Graphic Log	TCR [RQD] (%)	Spacing of Natural Defects (mm) <small>500 100 50 20 10</small>	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>	Instrumentation	
	Shear Vane/ SPT	SPT N Values <small>0 - 50</small>									DEFECT DESCRIPTION <small>(Joints, Bedding Seams, Shatter, Shear and Crush Zones, Foliation, Schistosity, Attitude, Spacing, continuity, roughness, infilling, etc.)</small>		
0.0m: Alluvium comprising clay, silt, sand and organic soil  <b>TAURANGA GROUP</b>	128/23		HA				1		100		0.0m: Topsoil 0.1m: Silty CLAY; yellowish brown, very stiff, moist, high plasticity	0.40 ▽	
	144/30												
	146/41												
	135/51		HQ3				2		100		1.45m: Silty CLAY some organics; brown. Soft, moist, high plasticity.		
	152/43												
	128/28												
	0.0,0 0.0,1 N=1		PT				3		100		1.95m: Silty CLAY trace organics; light brown mottled orange. Soft, moist, high plasticity 1.5 to 25.5m: Using water		
	14/6												
	0.0,0 0.0,0 N=0 SUOW		SPT				4		100		3.0 to 3.3m: Organics cease, greyish brown mottled orange 3.2 to 3.3m: Becomes Very Soft.		
			HQ3				5		100		3.6m: Organic CLAY with trace fibrous peat; black. Soft, moist, high plasticity. 3.85m: Fibres approximately 30 mm 4.2m: Becomes stiff 4.4m: Fibres approximately 60 to 80 mm		
		PT				6		100		4.5m: Organic CLAY; black. Firm, moist, high plasticity. 4.5m: Shear vane push back 0,0 result			
32/6													
0.0,0 0.0,0 N=0 SUOW		SPT				7		100		6.9m: Organic Silty SAND trace clay; black, moderately packed, moist, moderate plasticity. Sand, fine. 7.5m: Shear vane push back 0,0 result 7.5 to 7.6m: light grey, sandy SILT; pumiceous.			
		HQ3				8		100		7.6m: Organic CLAY; black. Firm, moist, high plasticity. 7.85m: Organic sandy SILT; black. Firm, moist, low plasticity. Sand, fine to medium			
		SPT				9		100		8.2m: Organic SILT; black - brown. Firm, moist, low plasticity. 8.75m: Organic CLAY; black. Soft, moist, high plasticity. 9.0 to 9.45m: Becomes firm.			
ss 0.0,0 0.0,0 N=0 SUOW													
										9.45m: SILT with trace sand; Light grey. Stiff, moist, low plasticity. 9.0m: Shear vane push back 0,0 result			

For explanation of symbols and observations, see key sheet

FLUID DEPTHS AND DRILLING PROGRESS (m)		
Date Time	Drilled Depth	Casing Depth Fluid Depth
03/01/2023 08:00	-	0.40

RELATIVE STRENGTH <small>VS - Very strong S - Strong MS - Moderately strong W - Weak VW - Very weak EW - Extremely weak</small>	WEATHERING <small>UW - Unweathered SW - Slightly weathered MW - Moderately weathered HW - Highly weathered CW - Completely weathered</small>	Date logged 2/02/2023 Logged SK Checked GP	Driller McMillan Started 2/02/2023 Finished 2/02/2023 Drill Rig N119 Core Boxes 9
Remarks Hole back filled with grout. Shear vane readings done downhole for top 1.5m. Below 1.5m readings are from the end of the barrel.		Horizontal / Vertical Survey Datums: NZGD2000 - Mount Eden 2000 / New Zealand Vertical Datum 2016	

Hand Held Shear Vane  
 GEOVANE1712: 19mm blade: Calibrated 08/22: Correction factor: 1.450  
 vane shear strength per NZGS guideline

Client Auckland Transport  
 Project Eastern Busway  
 Project number 60644113

Co-ordinates 412274.22mE 794839.80mN  
 Orientation -90° Elevation 9.08m  
 Location Burswood Reserve  
 Feature Busway through Burswood Reserve

GEOLOGICAL DESCRIPTION <small>Weathering, Colour, Fabric, ROCK NAME. Strength, Discontinuities, Lithological Features (bedding, foliation, mineralogy, cement, etc).</small>	Test Records		Drilling Method <small>Casing remarks</small>	Core Loss/Lift <small>0 - 100%</small>	Relative Strength <small>MS MS W WW</small>	Rock Weathering <small>SW MW EW</small>	Depth	Graphic Log	TCR [RQD] (%)	Spacing of Natural Defects (mm) <small>400 100 50 10</small>	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>	Instrumentation
	Shear Vane/ SPT	SPT N Values <small>0 - 50</small>									DEFECT DESCRIPTION <small>(Joints, Bedding Seams, Shatter, Shear and Crush Zones, Foliation, Schistosity, Attitude, Spacing, continuity, roughness, infilling, etc.)</small>	
TAURANGA GROUP	ss 1.0,0, 0.0,0 N=0		HQ3						100		10.2m: Fibrous PEAT with trace SILT; dark brown, moist. Organics, bark. Friable	
			SPT				11		100	10.5m: Organic CLAY; brownish black. Firm, moist, high plasticity. 10.5m: Shear vane UTP		
			HQ3				12		100	11.6m: Silty CLAY trace organics; greyish brown. Firm, moist, high plasticity.		
	49/9 ss 0.0,0, 0.0,0 N=0 SUOW		SPT				13		100	12.45m: Silty CLAY; bluish grey. Stiff moist, high plasticity.		
			HQ3				14		100	13.5m: Shear vane twisting material in drill tube 14.1 to 14.2m: trace organics turns dark grey		
	0.1,1, 2.1,2 N=6		SPT				15		100	15.0m: Shear vane can't reach material from tube		
			HQ3				16		100	15.9 to 16.7m: Organic CLAY; black. Stiff, moist, high plasticity.		
	ss 0.0,2, 1.2,1 N=6		SPT				17		100	16.7m: Silty CLAY; bluish grey. Stiff moist, high plasticity.		
			HQ3				18		100	18.0m: Shear vane pushed through		
	142/17 ss 1.0,1, 0.0,2 N=3		SPT				19		100	18.2m: Organic CLAY; black. Firm, moist, high plasticity. 18.45m: Silty CLAY; greenish grey. Firm, moist, high plasticity.		
			HQ3						100			
	17/6 ss 0.0,0, 0.1,1 N=2		SPT						100			
		HQ3						100				
17/6 ss 0.0,0, 0.1,2 N=3		SPT						100				
<p>For explanation of symbols and observations, see key sheet</p> <p>FLUID DEPTHS AND DRILLING PROGRESS (m)                      Date Time      Drilled Depth      Casing Depth      Fluid Depth</p>			<p>RELATIVE STRENGTH</p> <p>VS - Very strong S - Strong MS - Moderately strong W - Weak VW - Very weak EW - Extremely weak</p>		<p>WEATHERING</p> <p>UW - Unweathered SW - Slightly weathered MW - Moderately weathered HW - Highly weathered CW - Completely weathered</p>		<p>Date logged 2/02/2023</p> <p>Logged SK</p> <p>Checked GP</p>		<p>Driller McMillan</p> <p>Started 2/02/2023</p> <p>Finished 2/02/2023</p> <p>Drill Rig N119</p> <p>Core Boxes 9</p>			
<p>Hand Held Shear Vane</p> <p>GEOVANE1712: 19mm blade: Calibrated 08/22: Correction factor: 1.450</p> <p>vane shear strength per NZGS guideline</p>			<p>Remarks</p> <p>Hole back filled with grout. Shear vane readings done downhole for top 1.5m. Below 1.5m readings are from the end of the barrel.</p>		<p>Horizontal / Vertical Survey Datums: NZGD2000 - Mount Eden 2000 / New Zealand Vertical Datum 2016</p>		<p>Page 2 of 8</p>					

2021 EB DRILLHOLE LOG 2023-05-15 MASTER.GPJ BASE.GDT 17/05/23

Client Auckland Transport  
 Project Eastern Busway  
 Project number 60644113

Co-ordinates 412274.22mE 794839.80mN  
 Orientation -90° Elevation 9.08m  
 Location Burswood Reserve  
 Feature Busway through Burswood Reserve

GEOLOGICAL DESCRIPTION <small>Weathering, Colour, Fabric, ROCK NAME. Strength, Discontinuities, Lithological Features (bedding, foliation, mineralogy, cement, etc).</small>	Test Records		Drilling Method <small>Casing remarks</small>	Core Loss/Lift <small>0 - 100%</small>	Relative Strength <small>MS MSW VW W</small>	Rock Weathering <small>SW MW CW</small>	Depth	Graphic Log	TCR [RQD] (%)	Spacing of Natural Defects (mm) <small>500 100 50 10</small>	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>	Instrumentation
	Shear Vane/ SPT	SPT N Values <small>0 - 50</small>									DEFECT DESCRIPTION <small>(Joints, Bedding Seams, Shatter, Shear and Crush Zones, Foliation, Schistosity, Attitude, Spacing, continuity, roughness, infilling, etc.)</small>	
EAST COAST BAYS FORMATION  20.15m: Highly weathered, light grey, massive SANDSTONE. Extremely weak. 20.4m: Slightly weathered, light grey, massive SANDSTONE. Very weak.  23.65m: Moderately Weathered, light grey, moderately thinly bedded SILTSTONE. Extremely weak  24.55m: Moderately weathered light grey, fine SANDSTONE. Extremely weak.			HQ3		MS	SW	21		100		21.0 to 22.5m: DB, 0°, 10 drill breaks weakly cemented Sandstone  21.45 to 23.16m: Becomes coarser  22.95 to 23.05m: J, 45°, Ud, Sm 23.2 to 23.4m: J, 0°, 7 drill breaks, weakly cemented Sandstone 23.16 to 23.65m: Weakly cemented, extremely weak  23.4 to 23.65m: , Recovered as non-intact core  24.48 to 24.55m: Carbonaceous layer, dark grey 24.7 to 25.0m: Weakly cemented SANDSTONE disturbed by drilling	
	ss 6,7,10,12,14,14 for 70mm N>50		SPT		MS	SW	22		89			
			HQ3		MS	SW	23		100 [86]			
	sc 9,16,22,25,3 for 5mm N>50		SPT		MS	SW	24		78			
			HQ3		MS	SW	25		100 [67]			
	sc 7,19,24,16,10 for 5mm N>50		SPT		MS	SW	24		77			
			HQ3		MS	SW	25		57 [0]			
			HQ3		MS	SW	25					
							26				DH327 terminated at 25.5m Depth Criteria Achieved	
							27					
							28					
							29					

For explanation of symbols and observations, see key sheet

FLUID DEPTHS AND DRILLING PROGRESS (m)  
 Date Time Drilled Depth Casing Depth Fluid Depth

RELATIVE STRENGTH

VS - Very strong  
 S - Strong  
 MS - Moderately strong  
 W - Weak  
 VW - Very weak  
 EW - Extremely weak

WEATHERING

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

Date logged 2/02/2023

Logged SK

Checked GP

Driller

McMillan

Started

2/02/2023

Finished

2/02/2023

Drill Rig

N119

Core Boxes 9

Remarks

Hole back filled with grout.  
 Shear vane readings done downhole for top 1.5m. Below 1.5m readings are from the end of the barrel.

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

Hand Held Shear Vane  
 GEOVANE1712: 19mm blade: Calibrated 08/22: Correction factor: 1.450  
 vane shear strength per NZGS guideline



**Box: 1 of 9 - Depth: 00.00m to 03.00m of 25.50m**  
 Date Drilled 2/02/2023 to 2/02/2023 - Date Photographed: 2/02/2023



**Box: 2 of 9 - Depth: 03.00m to 05.70m of 25.50m**  
 Date Drilled 2/02/2023 to 2/02/2023 - Date Photographed: 2/02/2023



**Box: 3 of 9 - Depth: 05.70m to 08.85m of 25.50m**  
 Date Drilled 2/02/2023 to 2/02/2023 - Date Photographed: 2/02/2023



**Box: 4 of 9 - Depth: 08.85m to 11.65m of 25.50m**  
 Date Drilled 2/02/2023 to 2/02/2023 - Date Photographed: 2/02/2023



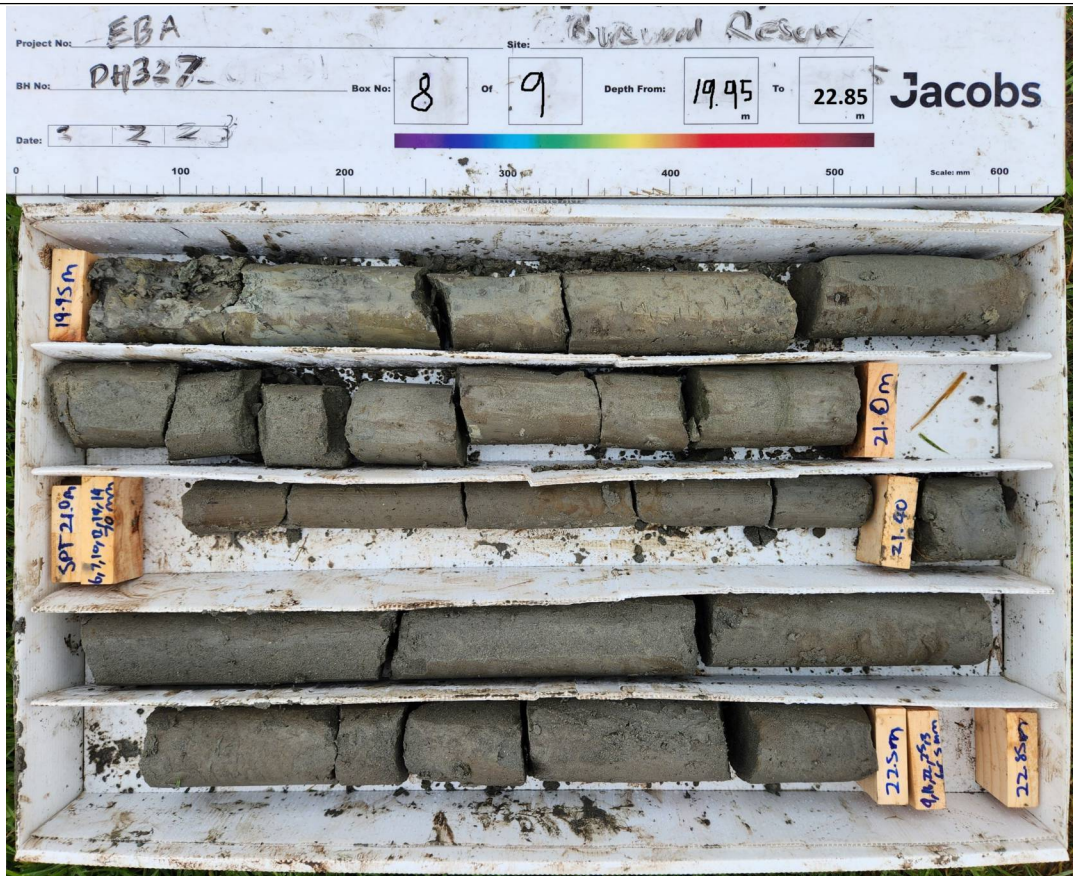
**Box: 5 of 9 - Depth: 11.65m to 14.45m of 25.50m**  
 Date Drilled 2/02/2023 to 2/02/2023 - Date Photographed: 2/02/2023



**Box: 6 of 9 - Depth: 14.45m to 17.25m of 25.50m**  
 Date Drilled 2/02/2023 to 2/02/2023 - Date Photographed: 2/02/2023



**Box: 7 of 9 - Depth: 17.25m to 19.95m of 25.50m**  
 Date Drilled 2/02/2023 to 2/02/2023 - Date Photographed: 2/02/2023



**Box: 8 of 9 - Depth: 19.95m to 22.85m of 25.50m**  
 Date Drilled 2/02/2023 to 2/02/2023 - Date Photographed: 3/02/2023





**Box: 9 of 9 - Depth: 22.85m to 25.50m of 25.50m**

Date Drilled 2/02/2023 to 2/02/2023 - Date Photographed: 3/02/2023

Client Auckland Transport  
 Project Eastern Busway  
 Project number 60644113

Co-ordinates 411888.6mE 794974.06mN  
 Orientation -90° Elevation 11.557m  
 Location 29 Dulwich Place, Pakuranga  
 Feature Ground conditions for western end of Burswood Station.

GEOLOGICAL DESCRIPTION <small>Weathering, Colour, Fabric, ROCK NAME. Strength, Discontinuities, Lithological Features (bedding, foliation, mineralogy, cement, etc).</small>	Test Records		Drilling Method <small>Casing remarks</small>	Core Loss/Lift <small>0 - 100%</small>	Relative Strength <small>MS, W, V, VW, EW</small>	Rock Weathering <small>SW, MW, HW, CW</small>	Depth	Graphic Log	TCR [RQD] (%)	Spacing of Natural Defects (mm) <small>400, 300, 200, 100, 50, 20, 10</small>	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>	Instrumentation
	Shear Vane/ SPT	SPT N Values <small>0 - 50</small>									DEFECT DESCRIPTION <small>(Joints, Bedding Seams, Shatter, Shear and Crush Zones, Foliation, Schistosity, Attitude, Spacing, continuity, roughness, infilling, etc.)</small>	
FILL 0.0m: TOPSOIL 0.1m: FILL comprising clay and silt.	38/15										0.0m: Silty CLAY; light brown mottled orange. Soft, moist, high plasticity.	
	34/11										0.1m: Silty CLAY; brownish grey mottled orangey brown. Soft, wet, high plasticity.	
TAURANGA GROUP 0.6m: ALLUVIUM comprising clay, silt, fine sand and organics.	51/23		HA				1		100		0.6m: Silty CLAY; brown. Firm, moist, high plasticity.	
	60/17											
	83/43											
	71/30		PT				2		50		1.75m: Silty CLAY with some sand; mottled orange. Soft, moist, moderate plasticity.	1.87
	ss 1,2,1, 2,1 for 30mm N>50		SPT						100			
AUCKLAND VOLCANIC FIELD 2.33m: Moderately weathered, dark grey, BASALT. Moderately strong. Highly vesicular. Vesicles of up to 30mm. 3.53m: Slightly weathered, dark grey, BASALT. Moderately strong. Moderately vesicular. Vesicles of up to 15mm. 4.5m: Slightly weathered, dark grey, BASALT. Strong. Slightly vesicular. Vesicles of up to 5mm.	114 HWT Casing		HQ3				3		100		2.51 to 2.75m: DB, 2 No. 3.03 to 3.26m: J, 80°, Ud, Ro, VN, Vn, SlT	
			HQ3				4		96 [69]		4.39 to 4.5m: J, 75°, Pl, Ro, VN, Vn, SlT 4.61 to 5.2m: DB, 3 No.	
			HQ3				5		88 [76]		5.45 to 5.7m: J, 80°, Ud, Ro, N, Vn, SlT	5.5
TAURANGA GROUP 5.65m: ALLUVIUM comprising clay, silt, sand and organics.			HQ3				6		100		5.65m: Alluvium washed away at bottom of run. (Drillers remarks) 5.8m: Silty CLAY with trace indistinct organics; light grey. Firm, moist, high plasticity. 6.0m: Pushed back.	
											6.3m: Silty CLAY; blueish grey. Firm, moist, high plasticity.	
											6.85m: Organic silty CLAY; black. Firm, moist, high plasticity.	
			PT				8		0		7.75m: Silty CLAY with trace indistinct organics; brownish dark grey. Soft, moist, high plasticity.	
			SPT						100		8.7m: Organic SILT with some clay; black. Soft, moist, slow dilatancy. 9.0m: Pushed back.	
	38/3 ss 1,0,0, 1,1,0 N=2										9.25m: Silty fine to medium micaceous SAND; brown. Homogeneous, medium dense, dry, gap graded.	
	ss 0,0,1, 5,5,4 N=15											
For explanation of symbols and observations, see key sheet			RELATIVE STRENGTH			WEATHERING			Date logged 14/10/2022		Driller McMillan	
FLUID DEPTHS AND DRILLING PROGRESS (m)			VS - Very strong			UW - Unweathered			Logged FK		Started	
Date Time Drilled Depth Casing Depth Fluid Depth			S - Strong			SW - Slightly weathered			Checked GP		13/10/2022	
13/10/2022 16:19 21.00 2.4 1.87			MS - Moderately strong			MW - Moderately weathered					Finished 14/10/2022	
14/10/2022 11:18 25.50 2.4 5.5			W - Weak			HW - Highly weathered					Drill Rig N119	
			VW - Very weak			CW - Completely weathered					Core Boxes 10	
			EW - Extremely weak								Page 1 of 8	
Hand Held Shear Vane DR1980: 19mm (A). Calibrated Jun 2022: Correction Factor: 1.876 vane shear strength per NZGS guideline			Remarks 50 mm standpipe piezometer installed on completion. Geology from 0.00m to 1.50m observed during hand auger clearance. Water leak observed at property causing shallow soils to be moist/wet.									

2021 EB DRILLHOLE LOG 2022-06-27 IR FIELD FILE (DH'S, HAS), GPJ BASE.GDT 02/12/22

Client Auckland Transport  
 Project Eastern Busway  
 Project number 60644113

Co-ordinates 411888.6mE 794974.06mN  
 Orientation -90° Elevation 11.557m  
 Location 29 Dulwich Place, Pakuranga  
 Feature Ground conditions for western end of Burswood Station.

GEOLOGICAL DESCRIPTION <small>Weathering, Colour, Fabric, ROCK NAME. Strength, Discontinuities, Lithological Features (bedding, foliation, mineralogy, cement, etc).</small>	Test Records		Drilling Method <small>Casing remarks</small>	Core Loss/Lift	Relative Strength	Rock Weathering	Depth	Graphic Log	TCR [RQD] (%)	Spacing of Natural Defects (mm)	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>	Instrumentation
	Shear Vane/ SPT	SPT N Values									DEFECT DESCRIPTION <small>(Joints, Bedding Seams, Shatter, Shear and Crush Zones, Foliation, Schistosity, Attitude, Spacing, continuity, roughness, infilling, etc.)</small>	
TAURANGA GROUP	12/3 SS 0,0,1 0,0,1 N=1		HQ3				11		100		10.2m: Organic silty CLAY; blackish brown. Soft, moist, high plasticity.	
			SPT						100		10.5 to 10.6m: Organic silty fine SAND with some clay, dark brown. Medium dense, moist, uniformly graded.	
			HQ3						100		10.6m: Silty CLAY with trace indistinct organics; greyish brown. Firm, moist, high plasticity.	
			HQ3						100		10.9m: Silty CLAY with trace indistinct organics; blueish grey. Very stiff, moist, high plasticity.	
	148/46 SS 1,2,2 2,3,4 N=11		SPT				12		100		12.18m: Organics cease.	
			HQ3						100		13.2m: Becomes stiff.	
			SPT						100		13.5m: Silty CLAY; greenish grey. Firm, moist, high plasticity.	
			HQ3						100		14.05m: Silty CLAY; blueish grey. Soft, moist, high plasticity.	
			SPT						100		15.45m: Silty CLAY with some sand; light grey. Firm, moist, low plasticity.	
	23/6 SS 0,0,0 0,0,0 N=0 SUOW		SPT				15		100		15.65m: Silty CLAY; greenish grey. Firm, moist, high plasticity.	
			HQ3						100		17.0m: Organic silty CLAY; dark grey. Stiff, moist, high plasticity.	
			HQ3						100		17.35m: Becomes soft.	
		SPT						100		17.5m: Silty CLAY with trace indistinct organics; light brown. Firm, moist, high plasticity.		
		HQ3						100		17.7m: Grades to blueish grey, becomes soft.		
41/14 SS 0,0,1 2,2,1 N=6		SPT				18		100		18.0m: Silty CLAY; blueish grey. Very stiff, moist, high plasticity.		
		HQ3						100		18.85 to 18.95m: Trace indistinct organics.		
		SPT						100		19.5m: Silty CLAY; blueish grey. Soft, moist, high plasticity.		
		SUOW								19.5m: Shear vane pushed back.		

For explanation of symbols and observations, see key sheet

FLUID DEPTHS AND DRILLING PROGRESS (m)  
 Date Time Drilled Depth Casing Depth Fluid Depth

RELATIVE STRENGTH VS - Very strong S - Strong MS - Moderately strong W - Weak VW - Very weak EW - Extremely weak	WEATHERING UW - Unweathered SW - Slightly weathered MW - Moderately weathered HW - Highly weathered CW - Completely weathered	Date logged 14/10/2022 Logged FK Checked GP	Driller McMillan Started 13/10/2022 Finished 14/10/2022 Drill Rig N119 Core Boxes 10
Remarks 50 mm standpipe piezometer installed on completion.			
Geology from 0.00m to 1.50m observed during hand auger clearance.			
Water leak observed at property causing shallow soils to be moist/wet.			

Hand Held Shear Vane  
 DR1980: 19mm (A). Calibrated Jun 2022: Correction Factor: 1.876  
 vane shear strength per NZGS guideline

Client Auckland Transport  
 Project Eastern Busway  
 Project number 60644113

Co-ordinates 411888.6mE 794974.06mN  
 Orientation -90° Elevation 11.557m  
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 Feature Ground conditions for western end of Burswood Station.

GEOLOGICAL DESCRIPTION <small>Weathering, Colour, Fabric, ROCK NAME. Strength, Discontinuities, Lithological Features (bedding, foliation, mineralogy, cement, etc).</small>	Test Records		Drilling Method <small>Casing remarks</small>	Core Loss/Lift	Relative Strength	Rock Weathering	Depth	Graphic Log	TCR [RQD] (%)	Spacing of Natural Defects (mm)	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>	Instrumentation
	Shear Vane/ SPT	SPT N Values									DEFECT DESCRIPTION <small>(Joints, Bedding Seams, Shatter, Shear and Crush Zones, Foliation, Schistosity, Attitude, Spacing, continuity, roughness, infilling, etc.)</small>	
TAURANGA GROUP	ss 1,2,2 3,2,3 N=10	0-50	HQ3						100		20.12m: Silty CLAY with some sand; light grey. Stiff, moist, low plasticity.	
			SPT						100	20.52m: Amorphous PEAT; dark brownish black. Very stiff, moist. 21.0m: Silty CLAY with trace indistinct organics; blueish grey. Stiff, moist, high plasticity. 21.4 to 21.7m: Trace fine sand.		
EAST COAST BAYS FORMATION			HQ3						100		21.7 to 22.5m: DB, 8 No.	
			HQ3						100 [46]	22.8 to 23.02m: J, 90°, Ud, Ro, VN, Vn, Cc 23.35 to 23.55m: J, 60°, Ud, Ro		
			HQ3						100 [91]	23.7 to 23.8m: J, 50°, Ud, Ro, VN, Vn, Cc 23.84 to 24.03m: J, 90°, Ud, Ro, VN, Vn, Cc 24.0 to 25.5m: DB, 9 No.		
			HQ3						100 [87]	25.0m: J, Ud, Ro, N, Cg, Cc 25.6 to 25.88m: Ve, 90°, Cc		
			HQ3						87 [50]	26.38 to 26.42m: Indistinct laminations. 26.91m: J, 20°, Ud, Ro 27.0 to 28.3m: DB, 9 No.		
21.7m: HW, dark grey, volcanoclastic fine to coarse SANDSTONE. VW. [PARNELL GRIT] 22.0m: Slightly weathered, grey speckled light grey, dark grey and reddish grey, volcanoclastic fine to coarse SANDSTONE with some fine gravel, subrounded, in places up to medium gravel. Moderately strong. Thickly bedded. [PARNELL GRIT] 25.9m: Some coarsening toward base. 26.3m: Moderately weathered, grey, fine SANDSTONE. Very weak. 27.35m: Moderately weathered, grey, SILTSTONE. Very weak. 27.85m: Slightly weathered, grey, fine to medium SANDSTONE. Very weak.												
											28.3 to 28.5m: Core Loss: Washed out.	
											DH328_P terminated at 28.5m Depth Criteria Achieved	
For explanation of symbols and observations, see key sheet			RELATIVE STRENGTH		WEATHERING		Date logged 14/10/2022		Driller McMillan			
FLUID DEPTHS AND DRILLING PROGRESS (m) Date Time Drilled Depth Casing Depth Fluid Depth			VS - Very strong S - Strong MS - Moderately strong W - Weak VW - Very weak EW - Extremely weak		UW - Unweathered SW - Slightly weathered MW - Moderately weathered HW - Highly weathered CW - Completely weathered		Logged FK Checked GP		Started 13/10/2022			
Hand Held Shear Vane DR1980: 19mm (A). Calibrated Jun 2022: Correction Factor: 1.876 vane shear strength per NZGS guideline			Remarks 50 mm standpipe piezometer installed on completion. Geology from 0.00m to 1.50m observed during hand auger clearance. Water leak observed at property causing shallow soils to be moist/wet.						Finished 14/10/2022 Drill Rig N119 Core Boxes 10			
										Page 3 of 8		

2021 EB DRILLHOLE LOG 2022-06-27 IR FIELD FILE (DH'S, HA'S), GPJ BASE.GDT 02/12/22



**Box: 1 of 10 - Depth: P\DH328\_P 00.00m to 03.80m of 28.50m**  
 Date Drilled 13/10/2022 to 14/10/2022 - Date Photographed: 13/10/2022



**Box: 2 of 10 - Depth: P\DH328\_P 03.80m to 07.00m of 28.50m**  
 Date Drilled 13/10/2022 to 14/10/2022 - Date Photographed: 13/10/2022



**Box: 3 of 10 - Depth: P\DH328\_P 07.00m to 09.95m of 28.50m**  
 Date Drilled 13/10/2022 to 14/10/2022 - Date Photographed: 13/10/2022



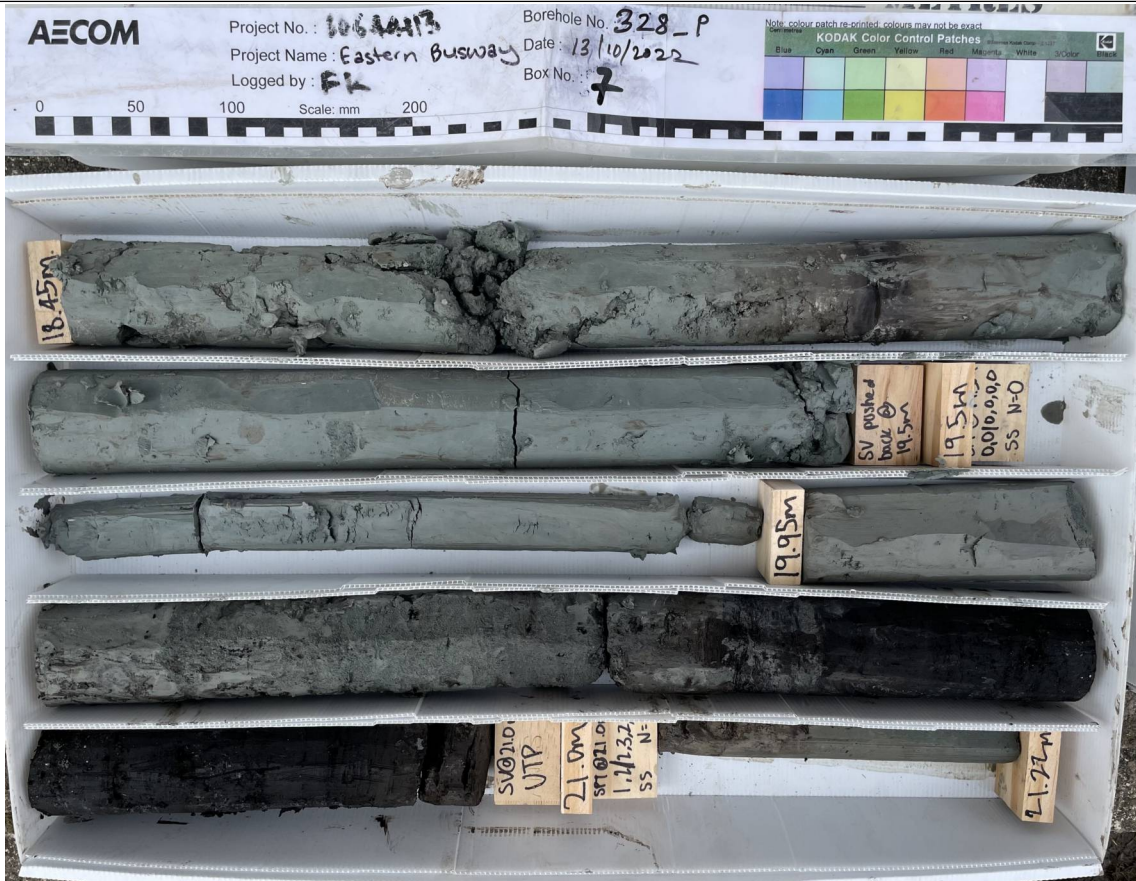
**Box: 4 of 10 - Depth: P\DH328\_P 09.95m to 12.85m of 28.50m**  
 Date Drilled 13/10/2022 to 14/10/2022 - Date Photographed: 13/10/2022



**Box: 5 of 10 - Depth: P\DH328\_P 12.85m to 15.80m of 28.50m**  
 Date Drilled 13/10/2022 to 14/10/2022 - Date Photographed: 13/10/2022



**Box: 6 of 10 - Depth: P\DH328\_P 15.80m to 18.45m of 28.50m**  
 Date Drilled 13/10/2022 to 14/10/2022 - Date Photographed: 13/10/2022



**Box: 7 of 10 - Depth: P\DH328\_P 18.45m to 21.22 of 28.50m**  
 Date Drilled 13/10/2022 to 14/10/2022 - Date Photographed: 13/10/2022



**Box: 8 of 10 - Depth: P\DH328\_P 21.22m to 24.0m of 28.50m**  
 Date Drilled 13/10/2022 to 14/10/2022 - Date Photographed: 14/10/2022