

Appendix B Borehole and Test Pit Logs

BH1A

BH1B

BH2A

BH2B

BH3A

BH3B

BH3C

BH4A

BH4B

TP1

TP2

TP3

TP4

LOG OF DRILLHOLE

HOLE No. **BH1A**

PROJECT: Southern Landfill Consenting
CLIENT: Wellington City Council
GRID:
DATUM:

FEATURE: Consent #:
WGN070197(25906)
CO-ORDINATES: mN, mE
HAD GROUND: 130 m
HAD COLLAR: 130 m

LOCATION: Valley Floor
ANGLE FROM HORIZONTAL: 90°
DIRECTION:

INTERPRETATION	DESCRIPTION OF CORE				DEPTH (m)	GRAPHIC LOG	SPT N-VALUE	SPT INTERVAL SAMPLES	DEFECT DESCRIPTION				METHOD & SHIFT	HEAD TEST	DRILL WATER RETURN (%)	PIEZOMETER INSTALLATION
	COLOUR, WEATHERING, FABRIC, STRENGTH, ROCK TYPE, DEFECT SPACINGS, LITHOLOGICAL FEATURES (bedding, foliation, mineralogy, texture, cement etc) STRATIGRAPHIC NAME	CORE BOXES	WEATHERING	CORE LOSS / LIFT (%)					REDUCED LEVEL (RL)	PROMINENT JOINTS, BEDDING, SEAMS, SHATTER, SHEAR AND CRUSH ZONES, FOLIATION, SCHISTOSITY (altitude, spacing, continuity, roughness, infilling, etc.)	(OR SOIL DESCRIPTION) (consistency, relative density, water content, plasticity, grading, group symbol etc.)					
No core recovery					129	1										
Unweathered grey highly fractured GREYWACKE. Weak-moderate strength. Fractures 2-5 cm spacing, dominant dips 20° and 45°, crosscutting. Quartz veining spacing 1-2cm, 1mm thick, dip 70°.					127	3										
Unweathered grey fractured GREYWACKE. Weak. Fractures 2-5 cm spacing, dominant dips 30° and 70°. Quartz veining spacing 1-2cm, 1mm thick, dip 70°.					122	8										
					121	9										

LOGGED: JGP
2/08/2007

DRILLER: LR
Websters

REMARKS:
Well installation: 0 m - 24.0m blank screw together 50mm diameter uPVC,
24.0-30.0 m machine slotted uPVC 50mm diameter uPVC
Backfill: 0m-0.5m concrete, 0.5m-19.3m backfill, 19.3m-21.8m bentonite, 21.8m -
22.8m blinding sand, 22.8m-30.11m 7/14 Walton Park sand.

DRILLING WATER LEVELS:

LEVEL	HOLE DEPTH	DATE/TIME
0.00	30.11	22/08/2007 12:00:00 p.m.

HOLE LENGTH:
30.11 m

CHECKED: TJM

RIG: Diamond Coring
HQ

Sheet 1 of 4

LOG OF DRILLHOLE

HOLE No. **BH1A**

PROJECT: Southern Landfill Consenting
CLIENT: Wellington City Council
GRID:
DATUM:

FEATURE: Consent #: WGN070197(25906)
CO-ORDINATES: mN, mE
HAD GROUND: 130 m
HAD COLLAR: 130 m

LOCATION: Valley Floor
ANGLE FROM HORIZONTAL: 90°
DIRECTION:

INTERPRETATION	DESCRIPTION OF CORE COLOUR, WEATHERING, FABRIC, STRENGTH, ROCK TYPE, DEFECT SPACING, LITHOLOGICAL FEATURES (bedding, foliation, mineralogy, texture, cement etc) STRATIGRAPHIC NAME	CORE BOXES	WEATHERING SW NW HW	CORE LOSS / LIFT (%) -5 -10 -50	REDUCED LEVEL (RL)	DEPTH (m)	GRAPHIC LOG	SPT N-VALUE 10 20 30 40	SPT INTERVAL SAMPLES	DEFECT DESCRIPTION PROMINENT JOINTS, BEDDING, SEAMS, SHATTER, SHEAR AND CRUSH ZONES, FOLIATION, SCHISTOSITY (attitude, spacing, continuity, roughness, infilling, etc.) (OR SOIL DESCRIPTION) (consistency, relative density, water content, plasticity, grading, group symbol etc.)	METHOD & SHIFT	HEAD TEST	DRILL WATER RETURN (%) -25 -50 -75	PIEZOMETER INSTALLATION
	Unweathered grey fractured GREYWACKE. Weak. Fractures 2-5 cm spacing, dominant dips 30° and 70°. Quartz veining spacing 1-2cm, 1mm thick, dip 70°. (continued)				119	11								
	Unweathered grey fractured GREYWACKE. Moderate strength. Fractures 5-10 cm spacing, dominant dips 30°, 70°, and 80°. Quartz veining spacing 1-5cm, 1-3mm thick, cross cutting.				118	12								
					117	13								
					116	14								
					115	15								
	Unweathered grey fractured GREYWACKE. Moderate strength. Fractures 1-4 cm spacing, dominant dips 70°, 80° in one interval, 45°, 70° in another. Quartz vein spacing 5-10cm, 2-3mm thick, cross cutting.				114	16								
					113	17								
					112	18								
	Unweathered grey fractured GREYWACKE. Moderate strength. Fractures 5-10 cm spacing, dominant dip 70°. Quartz vein spacing 3-4cm, 1-2mm thick, cross cutting, dominant dips 30°, 45°.				111	19								

GEOTECH DRILL-HOLE - SOIL- GEN-DESC SOUTHERN_LANDFIL_DRILLING.GPJ AGS3_UK.GDT 11 7

LOGGED: JGP 2/08/2007	DRILLER: LR Websters
CHECKED: TJM	RIG: Diamond Coring HQ

REMARKS:
Well installation: 0 m - 24.0m blank screw together 50mm diameter uPVC, 24.0-30.0 m machine slotted uPVC 50mm diameter uPVC
Backfill: 0m-0.5m concrete, 0.5m-19.3m backfill, 19.3m-21.8m bentonite, 21.8m - 22.8m blinding sand, 22.8m-30.11m 7/14 Walton Park sand.

DRILLING WATER LEVELS:		
LEVEL	HOLE DEPTH	DATE/TIME
0.00	30.11	22/08/2007 12:00:00 p.m.

HOLE LENGTH: 30.11 m
Sheet 2 of 4

LOG OF DRILLHOLE

HOLE No. **BH1A**

PROJECT: Southern Landfill Consenting
CLIENT: Wellington City Council
GRID:
DATUM:

FEATURE: Consent #:
WGN070197(25906)
CO-ORDINATES: mN, mE
HAD GROUND: 130 m
HAD COLLAR: 130 m

LOCATION: Valley Floor
ANGLE FROM HORIZONTAL: 90°
DIRECTION:

INTERPRETATION	DESCRIPTION OF CORE	CORE BOXES	WEATHERING	CORE LOSS / LIFT (%)	REDUCED LEVEL (RL)	DEPTH (m)	GRAPHIC LOG	SPT N-VALUE	SPT INTERVAL	SAMPLES	DEFECT DESCRIPTION	METHOD & SHIFT	HEAD TEST	DRILL WATER RETURN (%)	PIEZOMETER INSTALLATION
											(OR SOIL DESCRIPTION)				
	Unweathered grey fractured GREYWACKE. Moderate strength. Fractures 5-10 cm spacing, dominant dip 70°. Quartz vein spacing 3-4cm, 1-2mm thick, cross cutting, dominant dips 30°, 45°. (continued)														
	Unweathered grey moderately fractured GREYWACKE. Moderately strong to weak. Fractures 1-5 cm spacing above 23.9m, 5-10cm spacing 23.9m - 28.16m.	4													
	Unweathered grey moderately fractured GREYWACKE. Weak. Fractures 1-5 cm spacing, dominant dips 30°, 70°-80°.	5													
		6													

GEO TECH DRILLHOLE - SOIL - GEN DESC SOUTHERN LANDFILL DRILLING.GPJ_AGS3_UK.GDT 1 7

LOGGED: JGP 2/08/2007	DRILLER: LR Websters
CHECKED: TJM	RIG: Diamond Coring HQ

REMARKS:
Well Installation: 0 m - 24.0m blank screw together 50mm diameter uPVC, 24.0-30.0 m machine slotted uPVC50mm diameter uPVC
Backfill: 0m-0.5m concrete, 0.5m-19.3m backfill, 19.3m-21.8m bentonite, 21.8m - 22.8m blinding sand, 22.8m-30.11m 7/14 Walton Park sand.

DRILLING WATER LEVELS:		
LEVEL	SOLE DEPTH	DATE/TIME
0.00	30.11	22/08/2007 12:00:00 p.m.

HOLE LENGTH:
30.11 m
Sheet 3 of 4

LOG OF DRILLHOLE

HOLE No. **BH1A**

PROJECT: Southern Landfill Consenting
 CLIENT: Wellington City Council
 GRID:
 DATUM:

FEATURE: Consent #:
 WGN070197(25906)
 CO-ORDINATES: mN, mE
 HAD GROUND: 130 m
 HAD COLLAR: 130 m

LOCATION: Valley Floor
 ANGLE FROM HORIZONTAL: 90°
 DIRECTION:

INTERPRETATION	DESCRIPTION OF CORE COLOUR, WEATHERING, FABRIC, STRENGTH, ROCK TYPE, DEFECT SPACING, LITHOLOGICAL FEATURES (bedding, foliation, mineralogy, texture, cement etc) STRATIGRAPHIC NAME	CORE BOXES	WEATHERING SW NW HW	CORE LOSS / LIFT (%) -5 -10 -50	REDUCED LEVEL (RL)	DEPTH (m)	GRAPHIC LOG	SPT N-VALUE 10 20 30 40	SPT INTERVAL SAMPLES	DEFECT DESCRIPTION PROMINENT JOINTS, BEDDING, SEAMS, SHATTER, SHEAR AND CRUSH ZONES, FOLIATION, SCHISTOSITY (altitude, spacing, continuity, roughness, infilling, etc.) (OR SOIL DESCRIPTION) (consistency, relative density, water content, plasticity, grading, group symbol etc.)	METHOD & SHIFT	HEAD TEST	DRILL WATER RETURN (%) -25 -50 -75	PIEZOMETER INSTALLATION
						99	31							
						98	32							
						97	33							
						96	34							
						95	35							
						94	36							
						93	37							
						92	38							
						91	39							

GEOTECH DRILLHOLE - SOIL- GEN DESC SOUTHERN LANDFILL_DRILLING.GPJ AGS3_UK.GDT 1 7

LOGGED:
JGP
2/08/2007

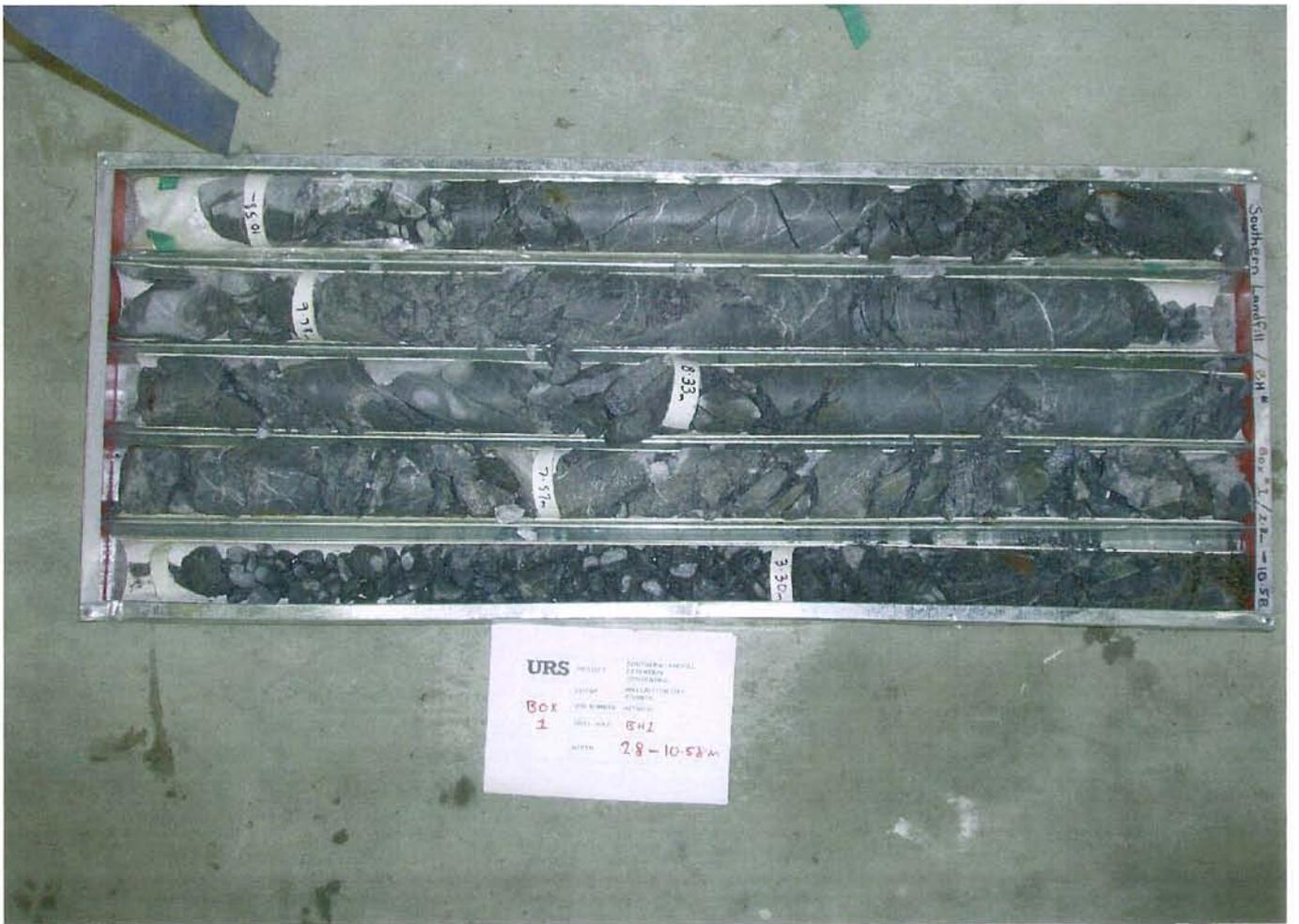
DRILLER:
LR
Websters

REMARKS:
Well installation: 0 m - 24.0m blank screw together 50mm diameter uPVC,
24.0-30.0 m machine slotted uPVC 50mm diameter uPVC
Backfill: 0m-0.5m concrete, 0.5m-19.3m backfill, 19.3m-21.8m bentonite, 21.8m -
22.8m blinding sand, 22.8m-30.11m 7/14 Wallon Park sand.

DRILLING WATER LEVELS:		
LEVEL	HOLE DEPTH	DATE/TIME
0.00	30.11	22/08/2007 12:00:00 p.m.

HOLE LENGTH:
30.11 m

Sheet 4 of 4







LOG OF DRILLHOLE

HOLE No. **BH1B**

PROJECT: Southern Landfill Consenting
CLIENT: Wellington City Council
GRID:
DATUM:

FEATURE: Consent #:
WGN070197(25906)
CO-ORDINATES: mN, mE
HAD GROUND: 130 m
HAD COLLAR: 130 m

LOCATION: Valley Floor
ANGLE FROM HORIZONTAL: 90°
DIRECTION:

INTERPRETATION	DESCRIPTION OF CORE COLOUR, WEATHERING, FABRIC, STRENGTH, ROCK TYPE, DEFECT SPACING, LITHOLOGICAL FEATURES (bedding, foliation, mineralogy, texture, cement etc) STRATIGRAPHIC NAME	CORE BOXES SW HW HW	WEATHERING SW HW HW	CORE LOSS 7 LIFT (%) 5 10 50	REDUCED LEVEL (RL)	DEPTH (m)	GRAPHIC LOG	SPT N-VALUE 10 20 30 40	SPT INTERVAL SAMPLES	DEFECT DESCRIPTION PROMINENT JOINTS, BEDDING, SEAMS, SHATTER, SHEAR AND CRUSH ZONES, FOLIATION, SCHISTOSITY (attitude, spacing, continuity, roughness, infilling, etc.) (OR SOIL DESCRIPTION) (consistency, relative density, water content, plasticity, grading, group symbol etc.)	METHOD & SHIFT	HEAD TEST	DRILL WATER RETURN (%) 25 50 75	PIEZOMETER INSTALLATION
	Hole drilled using air rotary - no core recovery. For geological details, see BH1A log.					129 1 128 2 127 3 126 4 125 5 124 6 123 7 122 8 121 9								

GEOTECH DRILLHOLE - SOIL-GEN.DESC SOUTHERN LANDFILL_DRILLING.GPJ AGS3_UK.GDT 11 7

LOGGED: JGP	DRILLER: LR Websters	REMARKS: Well installation: 0 m - 2.0 m blank push together 50mm diameter uPVC, 2.0 m - 11 m machine slotted uPVC50mm diameter uPVC Backfill: 0m-0.3m concrete, 0.3 - 1.3m bentonite, 1.3m-11m 7/14 Walton Park sand.	DRILLING WATER LEVELS:			HOLE LENGTH: 11.00 m
CHECKED: TJM	RIG: Air Rotary HQ		LEVEL	HOLE DEPTH	DATE/TIME	
			0.10 11.00	22/08/2007 12:00:00 p.m.	Sheet 1 of 2	

LOG OF DRILLHOLE

HOLE No. **BH1B**

PROJECT: Southern Landfill Consenting
CLIENT: Wellington City Council
GRID:
DATUM:

FEATURE: Consent #:
WGN070197(25906)
CO-ORDINATES: mN, mE
HAD GROUND: 130 m
HAD COLLAR: 130 m

LOCATION: Valley Floor
ANGLE FROM HORIZONTAL: 90°
DIRECTION:

INTERPRETATION	DESCRIPTION OF CORE COLOUR, WEATHERING, FABRIC, STRENGTH, ROCK TYPE, DEFECT SPACING, LITHOLOGICAL FEATURES (bedding, foliation, mineralogy, texture, cement etc) STRATIGRAPHIC NAME	CORE BOXES		WEATHERING SW MW HW	CORE LOSS /LIFT (%) -5 -10 -50	REDUCED LEVEL (RL)	DEPTH (m)	GRAPHIC LOG	SPT N-VALUE 10 20 30 40	SPT INTERVAL SAMPLES	DEFECT DESCRIPTION PROMINENT JOINTS, BEDDING, SEAMS, SHATTER, SHEAR AND CRUSH ZONES, FOLIATION, SCHISTOSITY (attitude, spacing, continuity, roughness, infilling, etc.) (OR SOIL DESCRIPTION) (consistency, relative density, water content, plasticity, grading, group symbol etc.)	METHOD & SHIFT	HEAD TEST	DRILL WATER RETURN (%) 25 50 75	PIEZOMETER INSTALLATION	
		SW	MW													
	Hole drilled using air rotary - no core recovery. For geological details, see BH1A log.(continued)					119	11									
						118	12									
						117	13									
						116	14									
						115	15									
						114	16									
						113	17									
						112	18									
						111	19									

GEOTECH DRILLHOLE - SOIL-GEN DESC SOUTHERN LANDFILL DRILLING.GPJ AGS3 UK.GDT 1: 7

LOGGED: JGP	DRILLER: LR Websters
CHECKED: TJM	RIG: Air Rotary HQ

REMARKS:
Well installation: 0 m - 2.0 m blank push together 50mm diameter uPVC, 2.0 m - 11 m machine slotted uPVC50mm diameter uPVC
Backfill: 0m-0.3m concrete, 0.3 - 1.3m bentonite, 1.3m-11m 7/14 Walton Park sand.

DRILLING WATER LEVELS:		
LEVEL	HOLE DEPTH	DATE/TIME
0.10	11.00	22/08/2007 12:00:00 p.m.

HOLE LENGTH:
11.00 m
Sheet 2 of 2

LOG OF DRILLHOLE

HOLE No. **BH2A**

PROJECT: Southern Landfill Consenting
CLIENT: Wellington City Council
GRID:
DATUM:

FEATURE: Consent #:
WGN070197(25906)
CO-ORDINATES: mN, mE
HAD GROUND: 290 m
HAD COLLAR: 290 m

LOCATION: Wind Turbine
ANGLE FROM HORIZONTAL: 90°
DIRECTION:

INTERPRETATION	DESCRIPTION OF CORE	CORE BOXES	WEATHERING	CORE LOSS / LIFT (%)	REDUCED LEVEL (RL)	DEPTH (m)	GRAPHIC LOG	SPT N-VALUE	SPT INTERVAL SAMPLES	DEFECT DESCRIPTION (OR SOIL DESCRIPTION)	METHOD & SHIFT	HEAD TEST	DRILL WATER RETURN (%)	PIEZOMETER INSTALLATION
	Highly weathered dark yellow-brown weak GREYWACKE, fractures 5-10cm scale, 70°-80° & 20° (more fractured section 21.2-21.4m), minor clayey silt weathered fractures, quartz veins not apparent over this interval.	4			269	21	XXXXXX							
	No core recovery.				267	23	XXXXXX							
	Incomplete core recovery, broken highly weathered dark yellow-brown GREYWACKE, weathered gravel and cobble sized fragments.				266	24	XXXXXX							
	Moderately weathered yellow-grey GREYWACKE, fractures 5-10cm spacing, 30° and 70°, occasional quartz veins on fracture planes, also black weathering on most planes, (but no sediment), weak.				265	25	XXXXXX							
	Incomplete core recovery, yellow, orange-brown, highly weathered gravel and cobble sized angular clasts in silty sand matrix, soft. Highly weathered yellow-brown, highly fractured (5cm spacing) GREYWACKE, fractures 80°, 60° and 50°, crosscutting, minor clayey silt in fractures, black weathering on fracture surfaces, weak to very weak.	5			264	26	XXXXXX							
	Highly weathered yellow-brown, highly fractured (5cm spacing) GREYWACKE, fractures 85°, 20° and 30°, quartz veins at 30° in line with fractures. no fines, weak.				263	27	XXXXXX							
	Moderately weathered brown-grey GREYWACKE, fractured (10-15cm spacing) 70° and 45°, weak to moderately strong, black and yellow weathering in fractures, no fines, weak.				262	28	XXXXXX							
					261	29	XXXXXX							

GEOTECH DRILLHOLE - SOIL- GEN DESC SOUTHERN LANDFILL DRILLING.GPJ AGSS_UK.GDT 19.

LOGGED: JGP 1/08/2007	DRILLER: LR/HW/LG Websters	REMARKS: Well installation: 0 m - 89.5 m blank screw together 50mm diameter uPVC, 89.5 m - 104.5 m machine slotted uPVC 50mm diameter uPVC Backfill: 1m-4m bentonite, 4m-16m backfill, 16m-18m bentonite, 18m - 36m backfill, 36m-38m bentonite, 38m-53.5m backfill, 53.5m-56m bentonite, 56m-74.5m backfill, 74.5m-80.5m bentonite, 80.5m-82.0m blinding sand, 82.0m-101.5m 7/14 Walton Park sand, 101.5m-104.5m hole collapse around piezo.	DRILLING WATER LEVELS:			HOLE LENGTH: 104.50 m
CHECKED: TJM	RIG: Diamond Coring HQ		LEVEL	HOLE DEPTH	DATE/TIME	
			3.62	14.75	21/07/2007 7:30:00 a.m.	
			3.86	59.96	2/08/2007 7:30:00 a.m.	
			5.08	30.24	25/07/2007 7:30:00 a.m.	
			11.27	41.68	30/07/2007 7:30:00 a.m.	
			12.32	88.60	8/08/2007 7:30:00 a.m.	
			12.70	104.11	16/08/2007 7:30:00 a.m.	
			13.16	70.61	4/08/2007 7:30:00 a.m.	
			13.30	98.87	13/08/2007 7:30:00 a.m.	

LOG OF DRILLHOLE

HOLE No. **BH2A**

PROJECT: Southern Landfill Consenting
CLIENT: Wellington City Council
GRID:
DATUM:

FEATURE: Consent #:
WGN070197(25906)
CO-ORDINATES: mN, mE
HAD GROUND: 290 m
HAD COLLAR: 290 m

LOCATION: Wind Turbine
ANGLE FROM HORIZONTAL: 90°
DIRECTION:

INTERPRETATION	DESCRIPTION OF CORE	CORE BOXES	WEATHERING	CORE LOSS / LIFT (%)	REDUCED LEVEL (RL)	DEPTH (m)	GRAPHIC LOG	SPT N-VALUE	SPT INTERVAL SAMPLES	DEFECT DESCRIPTION	METHOD & SHIFT	HEAD TEST	DRILL WATER RETURN (%)	PIEZOMETER INSTALLATION
										(OR SOIL DESCRIPTION) (consistency, relative density, water content, plasticity, grading, group symbol etc.)				
	Poor core recovery, moderately weathered angular cobbles of GREYWACKE, brown-grey, no fines, 10mm thick quartz vein. (continued)													
	Slightly to moderately weathered grey-black, moderately fractured GREYWACKE, moderately strong to strong, fractures 10-20cm spacing, dominant angles 40° and 65°, fractures have minor clay fill, no weathering or fractures, Quartz vein 1-5mm thick, spacing 1-5cm, all angles.					249	41							
	Moderately weathered brown-grey fractured GREYWACKE, weak to very weak, fractures 3-5cm spacing, 30°, 70° and 45°, all core shatters under light hammer blow.					248	42							
						247	43							
						246	44							
						245	45							
						244	46							
						243	47							
						242	48							
	Moderately weathered brown-grey fractured GREYWACKE, weak, fractures 2-5cm spacing, crosscutting 20°, 45° and 70°, fractures frequently filled with silty clay, quartz veining on much of the core.					241	49							

GEOTECH DRILLHOLE - SOIL - GEN DESC SOUTHERN_LANDFILL_DRILLING.GPJ AGS3_UK.GDT 19

LOGGED: JGP 1/08/2007	DRILLER: LR/HW/LG Websters	REMARKS: Well installation: 0 m - 89.5 m blank screw together 50mm diameter uPVC, 89.5 m - 104.5 m machine slotted uPVC 50mm diameter uPVC Backfill: 1m-4m bentonite, 4m-16m backfill, 16m-18m bentonite, 18m - 36m backfill, 36m-38m bentonite, 38m-53.5m backfill, 53.5m-56m bentonite, 56m-74.5m backfill, 74.5m-80.5m bentonite, 80.5m-82.0m blinding sand, 82.0m-101.5m 7/14 Waiton Park sand, 101.5m-104.5m hole collapse around piezo.	DRILLING WATER LEVELS:	HOLE LENGTH:																										
CHECKED: TJM	RIG: Diamond Coring HQ		<table border="1"> <thead> <tr> <th>LEVEL</th> <th>HOLE DEPTH</th> <th>DATE/TIME</th> </tr> </thead> <tbody> <tr><td>3.62</td><td>14.75</td><td>21/07/2007 7:30:00 a.m.</td></tr> <tr><td>3.86</td><td>59.96</td><td>2/08/2007 7:30:00 a.m.</td></tr> <tr><td>5.08</td><td>30.24</td><td>25/07/2007 7:30:00 a.m.</td></tr> <tr><td>11.27</td><td>41.68</td><td>30/07/2007 7:30:00 a.m.</td></tr> <tr><td>12.32</td><td>86.60</td><td>9/08/2007 7:30:00 a.m.</td></tr> <tr><td>12.70</td><td>104.11</td><td>16/08/2007 7:30:00 a.m.</td></tr> <tr><td>13.18</td><td>106.61</td><td>4/08/2007 7:30:00 a.m.</td></tr> <tr><td>13.30</td><td>98.87</td><td>13/08/2007 7:30:00 a.m.</td></tr> </tbody> </table>	LEVEL	HOLE DEPTH	DATE/TIME	3.62	14.75	21/07/2007 7:30:00 a.m.	3.86	59.96	2/08/2007 7:30:00 a.m.	5.08	30.24	25/07/2007 7:30:00 a.m.	11.27	41.68	30/07/2007 7:30:00 a.m.	12.32	86.60	9/08/2007 7:30:00 a.m.	12.70	104.11	16/08/2007 7:30:00 a.m.	13.18	106.61	4/08/2007 7:30:00 a.m.	13.30	98.87	13/08/2007 7:30:00 a.m.
LEVEL	HOLE DEPTH	DATE/TIME																												
3.62	14.75	21/07/2007 7:30:00 a.m.																												
3.86	59.96	2/08/2007 7:30:00 a.m.																												
5.08	30.24	25/07/2007 7:30:00 a.m.																												
11.27	41.68	30/07/2007 7:30:00 a.m.																												
12.32	86.60	9/08/2007 7:30:00 a.m.																												
12.70	104.11	16/08/2007 7:30:00 a.m.																												
13.18	106.61	4/08/2007 7:30:00 a.m.																												
13.30	98.87	13/08/2007 7:30:00 a.m.																												

LOG OF DRILLHOLE

HOLE No. **BH2A**

PROJECT: Southern Landfill Consenting
CLIENT: Wellington City Council
GRID:
DATUM:

FEATURE: Consent #:
WGN070197(25906)
CO-ORDINATES: mN, mE
HAD GROUND: 290 m
HAD COLLAR: 290 m

LOCATION: Wind Turbine

ANGLE FROM HORIZONTAL: 90°
DIRECTION: -

INTERPRETATION	DESCRIPTION OF CORE COLOUR, WEATHERING, FABRIC, STRENGTH, ROCK TYPE, DEFECT SPACING, LITHOLOGICAL FEATURES (bedding, foliation, mineralogy, texture, cement etc) STRATIGRAPHIC NAME	CORE BOXES	WEATHERING SW MW HW	CORE LOSS / LIFT (%) -5 -10 -50	REDUCED LEVEL (RL)	DEPTH (m)	GRAPHIC LOG	SPT N-VALUE 10 20 30 40	SPT INTERVAL	SAMPLES	DEFECT DESCRIPTION PROMINENT JOINTS, BEDDING, SEAMS, SHATTER, SHEAR AND CRUSH ZONES, FOLIATION, SCHISTOSITY (altitude, spacing, continuity, roughness, infilling, etc.) (OR SOIL DESCRIPTION) (consistency, relative density, water content, plasticity, grading, group symbol etc.)	METHOD & SHIFT	HEAD TEST	DRILL WATER RETURN (%) -25 -50 -75	PIEZOMETER INSTALLATION
	Moderately weathered brown-grey fractured GREYWACKE, weak, fractures 2-5cm spacing, crosscutting 20°, 45° and 70°, fractures frequently filled with silty clay, quartz veining on much of the core. (continued)				239	51	XXXXXX								
	Unweathered black-grey fractured massive GREYWACKE, strong, fractures 20cm spacing, 20° and 45°, not crosscutting, minor clay with fractures, 2-5mm, quartz veins, 1-5cm intervals, all angles.				238	52	XXXXXX								
	Unweathered black-grey fractured GREYWACKE, moderately strong, fractures 5-10cm spacing, 10°, 45° and 70°, crosscutting, fractures contain minor silty clay, 1cm thick layer of clayey silt at 57.6m.				237	53	XXXXXX								
	Unweathered black-grey fractured GREYWACKE, moderately strong, fractures 5-10cm spacing, 10°, 45° and 70°, crosscutting, fractures contain minor silty clay.				236	54	XXXXXX								
	Unweathered black-grey fractured GREYWACKE, moderately strong, fractures 5-10cm spacing, 10°, 45° and 70°, crosscutting, fractures contain minor silty clay.				235	55	XXXXXX								
	Unweathered black-grey fractured GREYWACKE, moderately strong, fractures 5-10cm spacing, 10°, 45° and 70°, crosscutting, fractures contain minor silty clay.				234	56	XXXXXX								
	Unweathered black-grey fractured GREYWACKE, moderately strong, fractures 5-10cm spacing, 10°, 45° and 70°, crosscutting, fractures contain minor silty clay.				233	57	XXXXXX								
	Unweathered black-grey fractured GREYWACKE, moderately strong, fractures 5-10cm spacing, 10°, 45° and 70°, crosscutting, fractures contain minor silty clay.				232	58	XXXXXX								
	Unweathered black-grey fractured GREYWACKE, moderately strong, fractures 5-10cm spacing, 10°, 45° and 70°, crosscutting, fractures contain minor silty clay.				231	59	XXXXXX								

GEOTECH DRILLHOLE - SOIL- GEN DESC SOUTHERN LANDFILL_DRILLING.GPJ AGS3 UKGDT 19

LOGGED: JGP 1/08/2007	DRILLER: LR/HW/LG Websters	REMARKS: Well installation: 0 m - 89.5 m blank screw together 50mm diameter uPVC, 89.5 m - 104.5 m machine slotted uPVC50mm diameter uPVC Backfill: 1m-4m bentonite, 4m-16m backfill, 16m-18m bentonite, 18m - 36m backfill, 36m-38m bentonite, 38m-53.5m backfill, 53.5m-56m bentonite, 56m-74.5m backfill, 74.5m-80.5m bentonite, 80.5m-82.0m blinding sand, 82.0m-101.5m 7/14 Walton Park sand, 101.5m-104.5m hole collapse around piezo.	DRILLING WATER LEVELS:			HOLE LENGTH: 104.50 m
CHECKED: TJM	RIG: Diamond Coring HQ		LEVEL	HOLE DEPTH	DATE/TIME	
			3.62	14.75	21/07/2007 7:30:00 a.m.	
			3.86	59.96	2/08/2007 7:30:00 a.m.	
			5.08	30.24	25/07/2007 7:30:00 a.m.	
			11.27	41.68	30/07/2007 7:30:00 a.m.	
			12.32	88.50	9/08/2007 7:30:00 a.m.	
			12.70	104.11	16/08/2007 7:30:00 a.m.	
			13.76	103.91	16/08/2007 7:30:00 a.m.	
			13.30	98.87	13/08/2007 7:30:00 a.m.	

LOG OF DRILLHOLE

HOLE No. **BH2A**

PROJECT: Southern Landfill Consenting
CLIENT: Wellington City Council
GRID:
DATUM:

FEATURE: Consent #:
WGN070197(25906)
CO-ORDINATES: mN, mE
HAD GROUND: 290 m
HAD COLLAR: 290 m

LOCATION: Wind Turbine

ANGLE FROM HORIZONTAL: 90°
DIRECTION:

INTERPRETATION	DESCRIPTION OF CORE	CORE BOXES	WEATHERING	CORE LOSS / LIFT (%)	REDUCED LEVEL (RL)	DEPTH (m)	GRAPHIC LOG	SPT N-VALUE	SPT INTERVAL SAMPLES	DEFECT DESCRIPTION (OR SOIL DESCRIPTION)	METHOD & SHIFT	HEAD TEST	DRILL WATER RETURN (%)	PIEZOMETER INSTALLATION
	Unweathered black-grey fractured GREYWACKE, moderately strong, fractures 5-10cm spacing, 10°, 45° and 70°, crosscutting, fractures contain minor silty clay. (continued)	12				229	61							
	Unweathered black-grey fractured GREYWACKE, strong, fractures every 10-20cm, 45°, 50° & 70°, very minor clay present in fractures. Frequent quartz veining (1-5mm thick, 1-3cm spacing).					228	62							
						227	63							
						226	64							
		13				225	65							
						224	66							
						223	67							
	Unweathered grey-black highly fractured GREYWACKE, weak, fractures every 1-3cm, 20° and 60°, 2cm thick sheared zone of sandy silt at 68.0-68.38m, 70°, apparently along quartz vein.					222	68							
	Unweathered grey-black highly fractured and sheared GREYWACKE, poor core recovery, mixture of soft silty clay and very weathered rock zones (68.5-68.8m and 71.1-71.65m) and strong gravel sized fragments with fines removed, 5cm of angular gravel and fine clayey sand at 69.35m (argillite - very angular fractures).	14				221	69							

GEOTECH DRILLHOLE - SOIL - GEN DESC SOUTHERN LANDFILL DRILLING.GPJ AGS3_UK.GDT 19.

LOGGED: JGP 1/08/2007	DRILLER: LR/HW/LG Websters	REMARKS: Well installation: 0 m - 89.5 m blank screw together 50mm diameter uPVC, 89.5 m - 104.5 m machine slotted uPVC 50mm diameter uPVC Backfill: 1m-4m bentonite, 4m-16m backfill, 16m-18m bentonite, 18m - 36m backfill, 36m-38m bentonite, 38m-53.5m backfill, 53.5m-56m bentonite, 56m-74.5m backfill, 74.5m-80.5m bentonite, 80.5m-82.0m blinding sand, 82.0m-101.5m 7/14 Walton Park sand, 101.5m-104.5m hole collapse around piezo.	DRILLING WATER LEVELS:			HOLE LENGTH: 104.50 m
CHECKED: TJM	RIG: Diamond Coring HQ		LEVEL	HOLE DEPTH	DATE/TIME	Sheet 7 of 11
		3.62	14.75	21/07/2007 7:30:00 a.m.		
		3.86	59.96	2/08/2007 7:30:00 a.m.		
		5.09	30.24	25/07/2007 7:30:00 a.m.		
		11.27	41.68	30/07/2007 7:30:00 a.m.		
		12.32	66.60	9/08/2007 7:30:00 a.m.		
		12.70	104.11	13/08/2007 7:30:00 a.m.		
		13.18	70.8	4/08/2007 7:30:00 a.m.		
		13.30	98.87	13/08/2007 7:30:00 a.m.		

LOG OF DRILLHOLE

HOLE No. **BH2A**

PROJECT: Southern Landfill Consenting
CLIENT: Wellington City Council
GRID:
DATUM:

FEATURE: Consent #:
WGN070197(25906)
CO-ORDINATES: mN, mE
HAD GROUND: 290 m
HAD COLLAR: 290 m

LOCATION: Wind Turbine
ANGLE FROM HORIZONTAL: 90°
DIRECTION:

INTERPRETATION	DESCRIPTION OF CORE	CORE BOXES	WEATHERING	CORE LOSS 7LIFT (%)	REDUCED LEVEL (RL)	DEPTH (m)	GRAPHIC LOG	SPT N-VALUE	SPT INTERVAL SAMPLES	DEFECT DESCRIPTION PROMINENT JOINTS, BEDDING, SEAMS, SHATTER, SHEAR AND CRUSH ZONES, FOLIATION, SCHISTOSITY (attitude, spacing, continuity, roughness, infilling, etc.) (OR SOIL DESCRIPTION) (consistency, relative density, water content, plasticity, grading, group symbol etc.)	METHOD & SHIFT	HEAD TEST	DRILL WATER RETURN (%)	PIEZOMETER INSTALLATION
	Unweathered grey-black highly fractured and sheared GREYWACKE, poor core recovery, mixture of soft silty clay and very weathered rock zones (68.5-68.8m and 71.1-71.65m) and strong gravel sized fragments with fines removed, 5cm of angular gravel and fine clayey sand at 69.35m (argillite - very angular fractures)(continued)				219	71	XXXXXX							
	Unweathered grey-black highly fractured and broken GREYWACKE, only 40cm whole core recovered over this interval, the rest is either: 1- sandy silt bound angular gravel sized clasts 71.62-72m, 73.61m, and 20cm above 77.83m, silty clay 5cm thick at 73.61m, other fractured zones only silty sand or sandy silt. 2- broken gravel to cobble sized strong angular greywacke fragments, no fines, clasts, grey-black to black argillite to fine gravel sandstone.				218	72	XXXXXX							
					217	73	XXXXXX							
					216	74	XXXXXX							
					215	75	XXXXXX							
					214	76	XXXXXX							
					213	77	XXXXXX							
					212	78	XXXXXX							
	Unweathered grey-black fractured and broken GREYWACKE, weak to very weak, fractures 2-5cm spacing, 20° and 60°, frequent quartz veining, frequent shear zones, of more highly fractured rock, consisting of very weak rock, clayey silt matrix, approximately every 20-40cm, one long run of core above 82.6m.				211	79	XXXXXX							

LOGGED: JGP 1/08/2007	DRILLER: LR/HW/LG Websters	REMARKS: Well installation: 0 m - 89.5 m blank screw together 50mm diameter uPVC, 89.5 m - 104.5 m machine slotted uPVC50mm diameter uPVC Backfill: 1m-4m bentonite, 4m-16m backfill, 16m-18m bentonite, 18m - 36m backfill, 36m-38m bentonite, 38m-53.5m backfill, 53.5m-56m bentonite, 56m-74.5m backfill, 74.5m-80.5m bentonite, 80.5m-82.0m blinding sand, 82.0m-101.5m 7/14 Walton Park sand, 101.5m-104.5m hole collapse around piezo.	DRILLING WATER LEVELS:			HOLE LENGTH: 104.50 m
CHECKED: TJM	RIG: Diamond Coring HQ		LEVEL	HOLE DEPTH	DATE/TIME	
			3.62	14.75	21/07/2007 7:30:00 a.m.	
			3.86	59.96	2/08/2007 7:30:00 a.m.	
			5.08	30.24	25/07/2007 7:30:00 a.m.	
			11.27	41.68	30/07/2007 7:30:00 a.m.	
			12.32	88.60	9/08/2007 7:30:00 a.m.	
			12.70	104.11	16/08/2007 7:30:00 a.m.	
			13.16	70.61	4/08/2007 7:30:00 a.m.	
			13.30	98.87	13/08/2007 7:30:00 a.m.	

GEOTECH DRILLHOLE - SOIL-GEN DESC SOUTHERN LANDFILL DRILLING.GPJ AGS3 UKGDT 19

LOG OF DRILLHOLE

HOLE No. **BH2A**

PROJECT: Southern Landfill Consenting
CLIENT: Wellington City Council
GRID:
DATUM:

FEATURE: Consent #:
WGN070197(25906)
CO-ORDINATES: mN, mE
HAD GROUND: 290 m
HAD COLLAR: 290 m

LOCATION: Wind Turbine
ANGLE FROM HORIZONTAL: 90°
DIRECTION:

INTERPRETATION	DESCRIPTION OF CORE	CORE BOXES	WEATHERING	CORE LOSS / LIFT (%)	REDUCED LEVEL (RL)	DEPTH (m)	GRAPHIC LOG	SPT N-VALUE	SPT INTERVAL SAMPLES	DEFECT DESCRIPTION	METHOD & SHIFT	HEAD TEST	DRILL WATER RETURN (%)	PIEZOMETER INSTALLATION
										(OR SOIL DESCRIPTION) (consistency, relative density, water content, plasticity, grading, group symbol etc.)				
	Unweathered grey-black fractured and broken GREYWACKE, weak to very weak, fractures 2-5cm spacing, 20° and 60°, frequent quartz veining, frequent shear zones, of more highly fractured rock, consisting of very weak rock, clayey silt matrix, approximately every 20-40cm, one long run of core above 82.6m.(continued)	16				81								
	Unweathered grey shattered crushed GREYWACKE, silty sand and clayey silt matrix with angular greywacke gravel and cobble sized fragments.					82								
	Unweathered grey-black highly fractured GREYWACKE, weak, fractures 2-6cm spacing, argillite texture, no continuous lengths of core.					83								
						84								
						85								
		17				86								
						87								
	Unweathered grey highly fractured GREYWACKE, moderately strong, fractures 5cm spacing, 20° and 45°, silty clay in fracture planes, quartz veining abundant, 1mm spacing, 5cm thick, highly fractured intervals at 87.7, 88.1, 88.6 and 88.9m.					88								
						89								
	Unweathered grey highly fractured GREYWACKE and argillite, poor core recovery (very broken core), weak to very weak, fracture interval <1- 5cm in occasional intervals, no sheared clayey intervals observed.	18												

GEOTECH DRILLHOLE - SOIL-GEN DESC SOUTHERN LANDFILL DRILLING.GPJ AGSS_UK.GDT 19.

LOGGED: JGP 1/08/2007	DRILLER: LR/HW/LG Websters	REMARKS: Well installation: 0 m - 89.5 m blank screw together 50mm diameter uPVC, 89.5 m - 104.5 m machine slotted uPVC 50mm diameter uPVC Backfill: 1m-4m bentonite, 4m-16m backfill, 16m-18m bentonite, 18m - 36m backfill, 36m-38m bentonite, 38m-53.5m backfill, 53.5m-56m bentonite, 56m-74.5m backfill, 74.5m-80.5m bentonite, 80.5m-82.0m blinding sand, 82.0m-101.5m 7/14 Walton Park sand, 101.5m-104.5m hole collapse around piezo.	DRILLING WATER LEVELS:			HOLE LENGTH: 104.50 m
CHECKED: TJM	RIG: Diamond Coring HQ		LEVEL	HOLE DEPTH	DATE/TIME	
			3.62	14.75	21/07/2007 7:30:00 a.m.	
			3.85	59.96	2/08/2007 7:30:00 a.m.	
			5.08	30.24	25/07/2007 7:30:00 a.m.	
			11.27	41.68	30/07/2007 7:30:00 a.m.	
			12.32	66.60	9/08/2007 7:30:00 a.m.	
			12.70	104.11	16/08/2007 7:30:00 a.m.	
			13.76	100.1	17/08/2007 7:30:00 a.m.	
			13.30	98.87	13/08/2007 7:30:00 a.m.	

LOG OF DRILLHOLE

HOLE No. **BH2A**

PROJECT: Southern Landfill Consenting
 CLIENT: Wellington City Council
 GRID:
 DATUM:

FEATURE: Consent #:
 WGN070197(25906)
 CO-ORDINATES: mN, mE
 HAD GROUND: 290 m
 HAD COLLAR: 290 m

LOCATION: Wind Turbine
 ANGLE FROM HORIZONTAL: 90°
 DIRECTION:

INTERPRETATION	DESCRIPTION OF CORE	CORE BOXES	WEATHERING	CORE LOSS / LIFT (%)	REDUCED LEVEL (RL)	DEPTH (m)	GRAPHIC LOG	SPT N-VALUE	SPT INTERVAL SAMPLES	DEFECT DESCRIPTION (OR SOIL DESCRIPTION)	METHOD & SHIFT	HEAD TEST	DRILL WATER RETURN (%)	PIEZOMETER INSTALLATION
	Unweathered grey highly fractured GREYWACKE and argillite, poor core recovery (very broken core), weak to very weak, fracture interval <1- 5cm in occasional intervals, no sheared clayey intervals observed. (continued)				199	91	X							
	Unweathered grey very highly fractured ARGILLITE, 30cm extremely weathered silty clay, soft, high plasticity, remainder highly fractured very weathered argillite.				198	92	X							
	No core recovered.				197	93	X							
	Unweathered grey highly fractured GREYWACKE and argillite, weak to very weak, fracture spacing 3-10cm, 30° and 45°, argillite zones 10-30cm thick greywacke 20-40cm thick, 2cm thick silty clay interval, 45° at 96.0m (shear along 5mm quartz vein).	19			196	94	X							
	Very poor core recovery (<20%), three 20-40cm thick intervals of unweathered highly fractured gouged GREYWACKE, extremely weathered silty sand, silty clay, soft, moderately plastic, remaining core grey moderately fractured GREYWACKE and argillite, weak to moderately strong, regular 1-2mm thick quartz veins all orientations.				193	97	X							
					192	98	X							
					191	99	X							

GEO TECH DRILLHOLE - SOIL - GEN DESC SOUTHERN LANDFILL DRILLING.GPJ AGS3_UK.GDT 19.

LOGGED: JGP 1/08/2007	DRILLER: LR/HW/LG Websters	REMARKS: Well installation; 0 m - 89.5 m blank screw together 50mm diameter uPVC, 89.5 m - 104.5 m machine slotted uPVC50mm diameter uPVC Backfill: 1m-4m bentonite, 4m-16m backfill, 16m-18m bentonite, 18m - 36m backfill, 36m-38m bentonite, 38m-53.5m backfill, 53.5m-56m bentonite, 56m-74.5m backfill, 74.5m-80.5m bentonite, 80.5m-82.0m blinding sand, 82.0m-101.5m 7/14 Wallon Park sand, 101.5m-104.5m hole collapse around piezo.	DRILLING WATER LEVELS:			HOLE LENGTH: 104.50 m
CHECKED: TJM	RIG: Diamond Coring HQ		LEVEL	HOLE DEPTH	DATE/TIME	
			3.62	14.75	21/07/2007 7:30:00 a.m.	
			3.86	59.96	2/08/2007 7:30:00 a.m.	
			5.08	30.24	25/07/2007 7:30:00 a.m.	
			11.27	41.68	30/07/2007 7:30:00 a.m.	
			12.32	88.60	9/08/2007 7:30:00 a.m.	
			12.70	104.11	16/08/2007 7:30:00 a.m.	
			13.16	70.61	4/08/2007 7:30:00 a.m.	
			13.30	98.87	13/08/2007 7:30:00 a.m.	

LOG OF DRILLHOLE

HOLE No. **BH2A**

PROJECT: Southern Landfill Consenting
CLIENT: Wellington City Council
GRID:
DATUM:

FEATURE: Consent #:
WGN070197(25906)
CO-ORDINATES: mN, mE
HAD GROUND: 290 m
HAD COLLAR: 290 m

LOCATION: Wind Turbine
ANGLE FROM HORIZONTAL: 90°
DIRECTION:

INTERPRETATION	DESCRIPTION OF CORE	CORE BOXES	WEATHERING	CORE LOSS / LIFT (%)	REDUCED LEVEL (RL)	DEPTH (m)	GRAPHIC LOG	SPT N-VALUE	SPT INTERVAL SAMPLES	DEFECT DESCRIPTION (OR SOIL DESCRIPTION)	METHOD & SHIFT	HEAD TEST	DRILL WATER RETURN (%)	PIEZOMETER INSTALLATION
	Very poor core recovery (<20%), three 20-40cm thick intervals of unweathered highly fractured gouged GREYWACKE, extremely weathered silty sand, silty clay, soft, moderately plastic, remaining core grey moderately fractured GREYWACKE and argyllite, weak to moderately strong, regular 1-2mm thick quartz veins all orientations. (continued)	21			189	101	XXXXXX							
	103.0m - 104.5m This interval drilled using casing advancer with a tricone bit - no core recovery possible.				188	102	XXXXXX							
					187	103	XXXXXX							
					186	104	XXXXXX							
					185	105	XXXXXX							
					184	106	XXXXXX							
					183	107	XXXXXX							
					182	108	XXXXXX							
					181	109	XXXXXX							

LOGGED: JGP 1/08/2007	DRILLER: LR/HW/LG Websters	REMARKS: Well installation: 0 m - 89.5 m blank screw together 50mm diameter uPVC, 89.5 m - 104.5 m machine slotted uPVC50mm diameter uPVC Backfill: 1m-4m bentonite, 4m-16m backfill, 16m-18m bentonite, 18m - 36m backfill, 36m-38m bentonite, 38m-53.5m backfill, 53.5m-56m bentonite, 56m-74.5m backfill, 74.5m-80.5m bentonite, 80.5m-82.0m blinding sand, 82.0m-101.5m 7/14 Walton Park sand, 101.5m-104.5m hole collapse around piezo.	DRILLING WATER LEVELS:			HOLE LENGTH: 104.50 m
CHECKED: TJM	RIG: Diamond Coring HQ		LEVEL	HOLE DEPTH	DATE/TIME	

GEO TECH DRILLHOLE - SOIL- GEN DESC SOUTHERN LANDFIL DRILLING.GPJ AGSS UK.GDT 19/





















URS
80121
342
101.98 - 103.09m

LOG OF DRILLHOLE

HOLE No. **BH2B**

PROJECT: Southern Landfill Consenting
 CLIENT: Wellington City Council
 GRID:
 DATUM:

FEATURE: Consent #:
 WGN070197(25906)
 CO-ORDINATES: mN, mE
 HAD GROUND: 290 m
 HAD COLLAR: 290 m

LOCATION: WindTurbine
 ANGLE FROM HORIZONTAL: 90°
 DIRECTION:

INTERPRETATION	DESCRIPTION OF CORE COLOUR, WEATHERING, FABRIC, STRENGTH, ROCK TYPE, DEFECT SPACING, LITHOLOGICAL FEATURES (bedding, foliation, mineralogy, texture, cement etc) STRATIGRAPHIC NAME	CORE BOXES			WEATHERING SW MW HW	CORE LOSS / LIFT (%) -5 -10 -50	REDUCED LEVEL (RL)	DEPTH (m)	GRAPHIC LOG	SPT N-VALUE 10 20 30 40	SPT INTERVAL SAMPLES	DEFECT DESCRIPTION PROMINENT JOINTS, BEDDING, SEAMS, SHATTER, SHEAR AND CRUSH ZONES, FOLIATION, SCHISTOSITY (altitude, spacing, continuity, roughness, infilling, etc.) (OR SOIL DESCRIPTION) (consistency, relative density, water content, plasticity, grading, group symbol etc.)	METHOD & SHIFT	HEAD TEST	DRILL WATER RETURN (%) -25 -50 -75	PIEZOMETER INSTALLATION
		SW	MW	HW												
	Hole drilled using air rotary - no core recovery. For geological details, see BH2A log.						289	1								
							288	2								
							287	3								
							286	4								
							285	5								
							284	6								
							283	7								
							282	8								
							281	9								

GEOTECH DRILLHOLE - SOIL- GEN DESC SOUTHERN_LANDFILL_DRILLING.GPJ AGS3_UK.GDT 19

LOGGED: JGP	DRILLER: LG/HW Websters
CHECKED: TJM	RIG: Air Rotary PQ

REMARKS:
 Well installation: 0 m - 30.0 m blank screw together 50mm diameter uPVC, 30.0 m - 45.0 m machine slotted uPVC 50mm diameter uPVC
 Backfill: 0m-0.5m concrete, 0.5 - 18.0m pea gravel, 18.0-24.0m bentonite, 24.0m-25.0m blinding sand, 25.0m-45.0m 7/14 Walton Park sand, 45.0m - 47.5m hole collapse.

DRILLING WATER LEVELS:		
LEVEL	HOLE DEPTH	DATE/TIME
13.20	32.00	29/08/2007 9:00:00 a.m.
13.60	36.00	30/08/2007 10:00:00 a.m.

HOLE LENGTH:
47.50 m

Sheet 1 of 5



URS Wellington
160 Lambton Quay, Wellington
Phone: 64.4.496.3750
Fax: 64.4.496.3755

LOG OF DRILLHOLE

HOLE No. **BH2B**

PROJECT: Southern Landfill Consenting
CLIENT: Wellington City Council
GRID:
DATUM:

FEATURE: Consent #:
WGN070197(25906)
CO-ORDINATES: mN, mE
HAD GROUND: 290 m
HAD COLLAR: 290 m

LOCATION: WindTurbine

ANGLE FROM HORIZONTAL: 90°
DIRECTION:

INTERPRETATION	DESCRIPTION OF CORE	CORE BOXES	WEATHERING	CORE LOSS / LIFT (%)	REDUCED LEVEL (RL)	DEPTH (m)	GRAPHIC LOG	SPT N-VALUE	SPT INTERVAL	SAMPLES	DEFECT DESCRIPTION	METHOD & SHIFT	HEAD TEST	DRILL WATER RETURN (%)	PIEZOMETER INSTALLATION	
											PROMINENT JOINTS, BEDDING, SEAMS, SHATTER, SHEAR AND CRUSH ZONES, FOLIATION, SCHISTOSITY (attitude, spacing, continuity, roughness, infilling, etc.) (OR SOIL DESCRIPTION) (consistency, relative density, water content, plasticity, grading, group symbol etc.)					
	Hole drilled using air rotary - no core recovery. For geological details, see BH2A log.(continued)					279 278 277 276 275 274 273 272 271	11 12 13 14 15 16 17 18 19									

GEOTECH DRILLHOLE - SOIL- GEN DESC SOUTHERN LANDFIL_DRILLING.GPJ AGS3_UK.GDT_19/

LOGGED: JGP	DRILLER: LG/HW Websters
CHECKED: TJM	RIG: Air Rotary PQ

REMARKS:
Well installation: 0 m - 30.0 m blank screw together 50mm diameter uPVC, 30.0 m - 45.0 m machine slotted uPVC50mm diameter uPVC
Backfill: 0m-0.5m concrete, 0.5 - 18.0m pea gravel, 18.0-24.0m bentonite, 24.0m-25.0m blinding sand, 25.0m-45.0m 7/14 Walton Park sand, 45.0m - 47.5m hole collapse.

DRILLING WATER LEVELS:		
LEVEL	HOLE DEPTH	DATE/TIME
13.20	32.00	29/08/2007 9:00:00 a.m.
13.60	36.00	30/08/2007 10:00:00 a.m.

HOLE LENGTH:
47.50 m
Sheet 2 of 5

PROJECT NO: 4276030

LOG OF DRILLHOLE

HOLE No. **BH2B**

PROJECT: Southern Landfill Consenting
CLIENT: Wellington City Council
GRID:
DATUM:

FEATURE: Consent #:
WGN070197(25906)
CO-ORDINATES: mN, mE
HAD GROUND: 290 m
HAD COLLAR: 290 m

LOCATION: WindTurbine
ANGLE FROM HORIZONTAL: 90°
DIRECTION:

INTERPRETATION	DESCRIPTION OF CORE COLOUR, WEATHERING, FABRIC, STRENGTH, ROCK TYPE, DEFECT SPACING, LITHOLOGICAL FEATURES (bedding, foliation, mineralogy, texture, cement etc) STRATIGRAPHIC NAME	CORE BOXES			WEATHERING	CORE LOSS / LIFT (%)	REDUCED LEVEL (RL)	DEPTH (m)	GRAPHIC LOG	SPT INTERVAL SAMPLES			DEFECT DESCRIPTION PROMINENT JOINTS, BEDDING, SEAMS, SHATTER, SHEAR AND CRUSH ZONES, FOLIATION, SCHISTOSITY (attitude, spacing, continuity, roughness, infilling, etc.) (OR SOIL DESCRIPTION) (consistency, relative density, water content, plasticity, grading, group symbol etc.)	METHOD & SHIFT	HEAD TEST	DRILL WATER RETURN (%)	PIEZOMETER INSTALLATION
		SW	MW	HW						10	20	30					
	Hole drilled using air rotary - no core recovery. For geological details, see BH2A log (continued)						269	21									
							268	22									
							267	23									
							266	24									
							265	25									
							264	26									
							263	27									
							262	28									
							261	29									

LOGGED: JGP	DRILLER: LG/HW Websters	REMARKS: Well installation: 0 m - 30.0 m blank screw together 50mm diameter uPVC, 30.0 m - 45.0 m machine slotted uPVC 50mm diameter uPVC Backfill: 0m-0.5m concrete, 0.5 - 18.0m pea gravel, 18.0-24.0m bentonite, 24.0m-25.0m blinding sand, 25.0m-45.0m 7/14 Walton Park sand, 45.0m - 47.5m hole collapse.	DRILLING WATER LEVELS:			HOLE LENGTH: 47.50 m
CHECKED: TJM	RIG: Air Rotary PQ		LEVEL	HOLE DEPTH	DATE/TIME	
			13.20 13.60	32.00 36.00	29/08/2007 9:00:00 a.m. 30/08/2007 10:00:00 a.m.	

LOG OF DRILLHOLE

HOLE No. **BH2B**

PROJECT: Southern Landfill Consenting
CLIENT: Wellington City Council
GRID:
DATUM:

FEATURE: Consent #:
WGN070197(25906)
CO-ORDINATES: mN, mE
HAD GROUND: 290 m
HAD COLLAR: 290 m

LOCATION: WindTurbine
ANGLE FROM HORIZONTAL: 90°
DIRECTION:

INTERPRETATION	DESCRIPTION OF CORE COLOUR, WEATHERING, FABRIC, STRENGTH, ROCK TYPE, DEFECT SPACING, LITHOLOGICAL FEATURES (bedding, foliation, mineralogy, texture, cement etc) STRATIGRAPHIC NAME	CORE BOXES	WEATHERING	CORE LOSS / LIFT (%)	REDUCED LEVEL (RL)	DEPTH (m)	GRAPHIC LOG	SPT N-VALUE	SPT INTERVAL	SAMPLES	DEFECT DESCRIPTION PROMINENT JOINTS, BEDDING, SEAMS, SHATTER, SHEAR AND CRUSH ZONES, FOLIATION, SCHISTOSITY (attitude, spacing, continuity, roughness, infilling, etc.) (OR SOIL DESCRIPTION) (consistency, relative density, water content, plasticity, grading, group symbol etc.)	METHOD & SHIFT	HEAD TEST	DRILL WATER RETURN (%)	PIEZOMETER INSTALLATION
	Hole drilled using air rotary - no core recovery. For geological details, see BH2A log (continued)					259	31								
						258	32								
						257	33								
						256	34								
						255	35								
						254	36								
						253	37								
						252	38								
						251	39								

GEOTECH DRILLHOLE - SOIL - GEN DESC SOUTHERN LANDFILL DRILLING.GPJ AGS3_UK.GDT 19/

LOGGED: JGP	DRILLER: LG/HW Websters	REMARKS: Well installation: 0 m - 30.0 m blank screw together 50mm diameter uPVC, 30.0 m - 45.0 m machine slotted uPVC 50mm diameter uPVC Backfill: 0m-0.5m concrete, 0.5 - 18.0m pea gravel, 18.0-24.0m bentonite, 24.0m-25.0m blinding sand, 25.0m-45.0m 7/14 Walton Park sand, 45.0m - 47.5m hole collapse.	DRILLING WATER LEVELS:			HOLE LENGTH: 47.50 m
CHECKED: TJM	RIG: Air Rotary PQ		LEVEL	HOLE DEPTH	DATE/TIME	
			13.20	32.00	29/08/2007 9:00:00 a.m.	
			13.60	36.00	30/08/2007 10:00:00 a.m.	

LOG OF DRILLHOLE

HOLE No. **BH2B**

PROJECT: Southern Landfill Consenting
CLIENT: Wellington City Council
GRID:
DATUM:

FEATURE: Consent #:
WGN070197(25906)
CO-ORDINATES: mN, mE
HAD GROUND: 290 m
HAD COLLAR: 290 m

LOCATION: WindTurbine
ANGLE FROM HORIZONTAL: 90°
DIRECTION:

INTERPRETATION	DESCRIPTION OF CORE COLOUR, WEATHERING, FABRIC, STRENGTH, ROCK TYPE, DEFECT SPACING, LITHOLOGICAL FEATURES (bedding, foliation, mineralogy, texture, cement etc) STRATIGRAPHIC NAME	CORE BOXES		WEATHERING SW MW HW	CORE LOSS 7 LIFT (%) .5 .10 .50	REDUCED LEVEL (RL)	DEPTH (m)	GRAPHIC LOG	SPT INTERVAL SAMPLES			DEFECT DESCRIPTION PROMINENT JOINTS, BEDDING, SEAMS, SHATTER, SHEAR AND CRUSH ZONES, FOLIATION, SCHISTOSITY (altitude, spacing, continuity, roughness, infilling, etc.) (OR SOIL DESCRIPTION) (consistency, relative density, water content, plasticity, grading, group symbol etc.)	METHOD & SHIFT	HEAD TEST	DRILL WATER RETURN (%) .25 .50 .75	PIEZOMETER INSTALLATION	
		10	20						30	40							
	Hole drilled using air rotary - no core recovery. For geological details, see BH2A log (continued)						249	41									
							248	42									
							247	43									
							246	44									
							245	45									
							244	46									
							243	47									
							242	48									
							241	49									

GEOTECH DRILLHOLE - SOIL- GEN DESC SOUTHERN LANDFILL_DRILLING.GPJ AGS3_UK.GDT 19:

LOGGED: JGP	DRILLER: LG/HW Websters	REMARKS: Well installation: 0 m - 30.0 m blank screw together 50mm diameter uPVC, 30.0 m - 45.0 m machine slotted uPVC 50mm diameter uPVC Backfill: 0m-0.5m concrete, 0.5 - 18.0m pea gravel, 18.0-24.0m bentonite, 24.0m-25.0m blinding sand, 25.0m-45.0m 7/14 Walton Park sand, 45.0m - 47.5m hole collapse.	DRILLING WATER LEVELS:			HOLE LENGTH: 47.50 m
CHECKED: TJM	RIG: Air Rotary PQ		LEVEL	HOLE DEPTH	DATE/TIME	Sheet 5 of 5
		13.20	32.00	29/08/2007 9:00:00 a.m.		
		13.60	38.00	30/08/2007 10:00:00 a.m.		

DRILL HOLE NO. BH3A

 URS New Zealand Limited
 13-15 College Hill, Auckland

 Phone: (09) 355 1300
 Fax: (09) 355 1333

 Project No.:
42775090

 Project Reference:
Southern Landfill - Stage 4

 Drilling Contractor: **Webster Drilling & Exploration**

 Drill Type:
HQ triple tube, wire line coring

 Logged By: **E. Ross / N O'Rourke**
 Checked By: **P. Salter**
 Date Started: **16-12-10**
 Date Finished: **21-12-10**

 Relative Level: **205.87 mRL**
 Coordinates: **5986379.00 mN**
2656113.00 mE
 Permit No:

 Client:
Wellington City Council

SAMPLE TYPE	TESTING	DRILL RUN (m)	TCR (%)	RQD (%)	WEATHERING	DEFECT SPACING (mm)	STRENGTH	PIEZOMETER CONSTRUCTION	DEPTH (m)	DEFECT LOG	LEGEND	DESCRIPTION OF STRATA	GEOLOGICAL DESCRIPTION
HQ TRIPLE TUBE WIRE LINE CORING		0.00 0.13	0 50 100	0 50 100	sw fhw	20 50 100 200	ew s es		0			Core Loss - loose surface gravel. Moderately weathered grey SANDSTONE; weak to moderately strong; thin quartz veins (1mm to 2mm), extremely closely to closely spaced; fracture spacing, 20mm to 200mm. Joint set (JS) 1, 0°-10°, very close to closely spaced, continuous in core, undulating smooth, very narrow, weathered reddish brown; JS2, 60°-70°, closely to moderately widely spaced, continuous in core, planar to undulating smooth, very narrow, weathered reddish brown, minor grey clay infill; JS3, 45°-55°, closely spaced, continuous in core, undulating smooth, very narrow, weathered reddish brown, minor grey clay infill. JS2 and JS3 intersect at ~100°.	
		1.33 1.91 1.91							1 2			... From 0.13m to 0.56m: rock very highly fractured, recovered non-intact. ... From 0.81m to 1.11m: Calcite mineral veins (1mm to 2mm), very steeply inclined (70°). ... From 1.91m to 2.15: Recovered non-intact, due to drilling. ... From 1.91m to 2.30m: Discontinuities have grey clay infilling.	
		3.05 3.21 3.33							3			... From 3.21m to 3.30m: core loss due to drilling.	
		4.60							4			Moderately weathered dark grey SANDSTONE and MUDSTONE; weak; calcite veins (1mm to 2mm), very steeply inclined; quartz veins (<1mm), extremely closely to closely spaced; calcite veins (1mm to 2mm), very steeply inclined; fracture spacing, 50mm.	
		4.60							5			JS1, 0°-10°, very close to closely spaced, continuous in core, undulating smooth, very narrow, weathered reddish brown; JS2, 60°-70°, closely spaced, continuous in core, undulating smooth, very narrow, weathered reddish brown, minor grey clay infill. ... From 3.66m to 3.78m: recovered non-intact.	
		6.10							6			Slightly weathered grey SANDSTONE; Moderately strong; thin quartz veins (<1mm), extremely closely to closely spaced; calcite veins (1mm to 3mm), very steeply inclined; fracture spacing, 20mm to 120mm.	
		7.57 7.60							7			JS1, 60°-80°, closely to Moderately widely spaced, continuous in core, undulating smooth, very narrow, weathered red and brown, minor grey and brown clay infill; JS2, 35°-45°, closely spaced, continuous in core, planar to undulating smooth, very narrow, weathered red and brown, minor dark grey clay infill. JS2 and JS3 intersect at ~95°.	
		8.65							8			... From 4.60m to 5.20m: JS, 20°-30°, closely spaced, continuous in core, undulating smooth, very narrow to tight, minor brown clay infill / weathered mineral. ... From 7.3m to 7.57m: rock highly fractured, clay infill. ... From 7.57m to 7.60m: core loss due to drilling. ... From 7.6m to 8.1m: Rock highly fractured, with light brown and yellowish brown friable clay infill.	
		9.41							9			... From 8.5m to 8.75m: Moderately weathered and highly fractured. ... From 8.85m to 9.25m: Joint, subvertical to vertical, undulating smooth, tight, weathered reddish brown.	
												... From 9.41m to 9.47m: highly fractured, drilling induced. ... From 9.5m to 9.65m: highly fractured, grey clay infilling. Slightly weathered grey thin to moderately thin bedded	

RAKAIA TERRANE (GREYWACKE)

REMARKS: About 3.00m depth of overburden removed to create drilling platform.
 Casing installed to 1.64m to allow for return of drilling water flush.
 Well installation: machine slotted 50mm diameter uPVC; Walton Park 7/14 Sand Filter Pack in response zone, flush toby box.

FIELDLOG 42775090 SOUTHERN LANDFILL STAGE 4 GI - DRAFT 110311.GPJ WCCNZ.GDT 18/3/11



DRILL HOLE NO. BH3A

URS New Zealand Limited
13-15 College Hill, Auckland

Phone: (09) 355 1300
Fax: (09) 355 1333

Project No.:
42775090

Project Reference:
Southern Landfill - Stage 4

Drilling Contractor: **Webster Drilling & Exploration**

Drill Type:
HQ triple tube, wire line coring

Logged By: **E. Ross / N O'Rourke**
Checked By: **P. Salter**
Date Started: **16-12-10**
Date Finished: **21-12-10**

Relative Level: **205.87 mRL**
Coordinates: **5986379.00 mN**
2656113.00 mE
Permit No:

Client:
Wellington City Council

FIELDLOG 42775090 SOUTHERN LANDFILL STAGE 4 GI - DRAFT 110311.GPJ WCCNZ.GDT 18/03/11

SAMPLE TYPE	TESTING	DRILL RUN (m)	TCR (%)	RQD (%)	WEATHERING	DEFECT SPACING (mm)	STRENGTH	PIEZOMETER CONSTRUCTION	DEPTH (m)	DEFECT LOG	LEGEND	DESCRIPTION OF STRATA	GEOLOGICAL DESCRIPTION
HQ TRIPLE TUBE WIRE LINE CORING		10.46							10			SANDSTONE; Moderately strong; interbedded with Moderately weathered dark grey to black thinly laminated to laminated MUDSTONE; very weak; thin quartz veins (<1mm); calcite veins (1mm to 2mm), very steeply inclined; fracture spacing, 30mm to 90mm.	
		10.94							11			JS1, 15°, continuous in core, planar smooth, closely spaced, tight, weathered grey and brown; JS2, 60°-80°, closely to Moderately widely spaced, continuous in core, undulating smooth, tight, weathered brown; JS3, 35°-45°, closely spaced, continuous in core, planar to undulating smooth, tight, weathered red and brown, minor dark grey clay infill. JS2 and JS3 intersect at ~95°.	
		12.44							12			... From 9.70m to 10.30m: healed shear zone. Extremely close to very closely spaced parallel defects, mineral staining. ... From 11.75m to 11.90m: very weak.	
		13.67							13			Slightly weathered grey SANDSTONE; Moderately strong; thin quartz veins, subhorizontal to vertical (<1mm), extremely closely to closely spaced; calcite veins (1mm to 2mm), very steeply inclined to vertical; fracture spacing, 20mm to 85mm.	
		13.82							14			JS1, 15°, closely spaced, continuous in core, planar smooth, tight, surface staining; JS2, 60°-70°, closely to Moderately widely spaced, continuous in core, undulating smooth, tight, grey clay infill / weathered mineral; JS3, 30°-35°, very close to closely spaced, continuous in core, undulating smooth, tight, grey clay infill / weathered infill. JS2 and JS3 intersect at ~90°.	
		15.12							15			... From 12.41m to 12.44m: core loss due to drilling. ... From 13.37m to 13.67m: highly fractured.	
		16.04							16			Unweathered grey to dark grey SANDSTONE; strong; extensive quartz veins (<1mm), predominantly slightly inclined (<1mm), extremely closely to closely spaced; calcite veins (1mm to 3mm), very steeply inclined; fracture spacing, 20mm to 80mm.	
		17.79							17			JS1, 15°, closely spaced, continuous in core, planar smooth, tight, surface staining; JS2, 60°-80°, very closely to closely spaced, continuous in core, undulating smooth, tight, grey clay infill / weathered mineral; JS3, 30°-35°, very close to closely spaced, continuous in core, undulating smooth, tight, grey clay infill / weathered infill. JS2 and JS3 intersect at ~90°.	
		19.29							18			... From 14.00m: increase in calcite veining, gently inclined (~10°), extremely closely spaced. ... From 15.47m 25mm to 30mm interbeds of very steeply inclined dark grey to black MUDSTONE; very weak.	
		19.88							19			Highly weathered, dark grey SANDSTONE and MUDSTONE. Discontinuities, 20°, extremely closely spaced. (SHEAR ZONE) ... From 16.88m to 17.00m: Highly fractured, extremely weak, banded grey and dark grey clay with subangular gravel. (FAULT GOUGE) ... From 17.00m to 17.05m: Foliated MUDSTONE and SANDSTONE Unweathered grey SANDSTONE; Strong; quartz veins (<1mm), subhorizontal to subvertical, extremely closely spaced; fracture spacing, 10mm to 40mm. ... From 17.35m to 17.38m: slightly weathered dark grey to black MUDSTONE; very weak. ... From 17.53m to 17.63m: highly fractured.	RAKAIA TERRANE (GREYWACKE)
												CLAY with some fine to coarse gravel; banded grey and dark grey. (Soft, wet; gravel, subangular, sandstone (SHEAR ZONE) Unweathered grey SANDSTONE; Strong; quartz veins (<1mm); fracture spacing, 10mm to 95mm.	
												JS1, 10°-15°, closely spaced, continuous in core, planar smooth, tight, surface staining; JS2, very steeply inclined 60°-70°, very	

REMARKS:



DRILL HOLE NO. BH3A

URS New Zealand Limited
13-15 College Hill, Auckland

Phone: (09) 355 1300
Fax: (09) 355 1333

Project No.:
42775090

Project Reference:
Southern Landfill - Stage 4

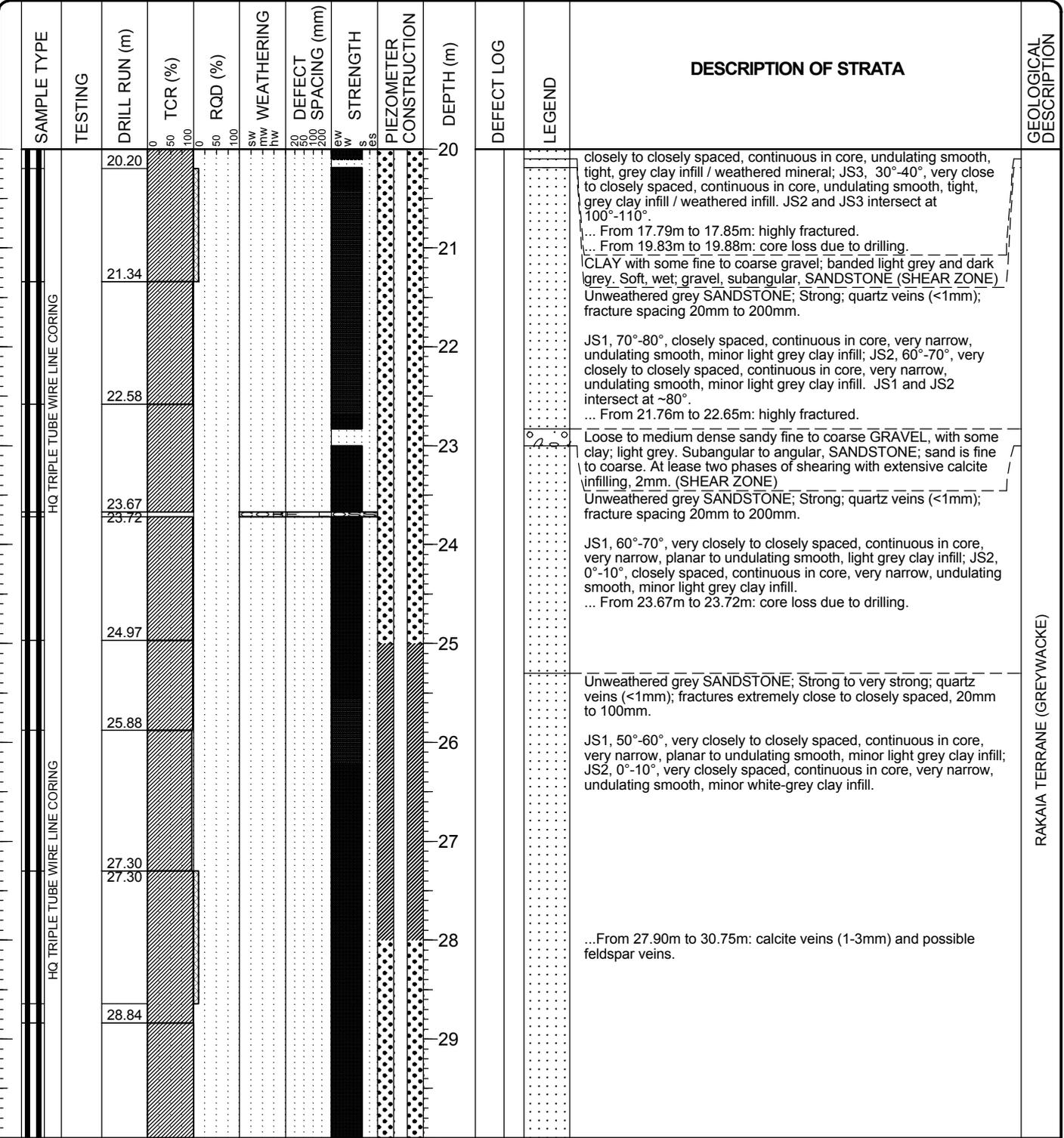
Drilling Contractor: **Webster Drilling & Exploration**

Drill Type:
HQ triple tube, wire line coring

Logged By: **E. Ross / N O'Rourke**
Checked By: **P. Salter**
Date Started: **16-12-10**
Date Finished: **21-12-10**

Relative Level: **205.87 mRL**
Coordinates: **5986379.00 mN**
2656113.00 mE
Permit No:

Client:
Wellington City Council



REMARKS: At 23.67m to 25.88m driller reported loss of drilling water pressure.



DRILL HOLE NO. BH3A

URS New Zealand Limited
13-15 College Hill, Auckland

Phone: (09) 355 1300
Fax: (09) 355 1333

Project No.:
42775090

Project Reference:
Southern Landfill - Stage 4

Drilling Contractor: **Webster Drilling & Exploration**

Drill Type:
HQ triple tube, wire line coring

Logged By: **E. Ross / N O'Rourke**
Checked By: **P. Salter**
Date Started: **16-12-10**
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Relative Level: **205.87 mRL**
Coordinates: **5986379.00 mN**
2656113.00 mE
Permit No:

Client:
Wellington City Council

FIELDLOG 42775090 SOUTHERN LANDFILL STAGE 4 GI - DRAFT 110311.GPJ WCCNZ.GDT 18/3/11

SAMPLE TYPE	TESTING	DRILL RUN (m)	TCR (%)	RQD (%)	WEATHERING	DEFECT SPACING (mm)	STRENGTH	PIEZOMETER CONSTRUCTION	DEPTH (m)	DEFECT LOG	LEGEND	DESCRIPTION OF STRATA	GEOLOGICAL DESCRIPTION
HQ TRIPLE TUBE WIRE LINE CORING		30.34							30			<p>Unweathered grey SANDSTONE; Strong to very strong; quartz veins (<1mm); fracture spacing 20mm to 200mm.</p> <p>JS1, 30°-40°, very closely to closely spaced, continuous in core, very narrow, undulating smooth; JS2, 0°-10°, very closely to closely spaced, continuous in core, very narrow, undulating smooth, white mineralization; JS3, 80°-90°, very closely to closely spaced, continuous in core, very narrow, light grey clay infilling (1mm).</p> <p>... From 32.19m to 32.69m: highly fractured.</p> <p>... At 36.70m: calcite vein, 15°, 10mm, healed fracture.</p> <p>... At 37.50: joint, 10°, continuous in core, planar, tight, mineral infilling (calcite).</p> <p>... At 38.00m: irregular calcite vein, 5mm, healed fracture.</p> <p>... From 39.09m to 39.15m: core loss due to drilling.</p>	RAKAIA TERRANE (GREYWACKE)
		31.74							31				
		32.69							32				
		34.19							33				
		34.84							34				
		35.60							35				
		36.34							36				
		37.59							37				
		38.33							38				
		39.09							39				
		39.15											

REMARKS:



DRILL HOLE NO. BH3A

URS New Zealand Limited
13-15 College Hill, Auckland

Phone: (09) 355 1300
Fax: (09) 355 1333

Project No.:
42775090

Project Reference:
Southern Landfill - Stage 4

Drilling Contractor: **Webster Drilling & Exploration**

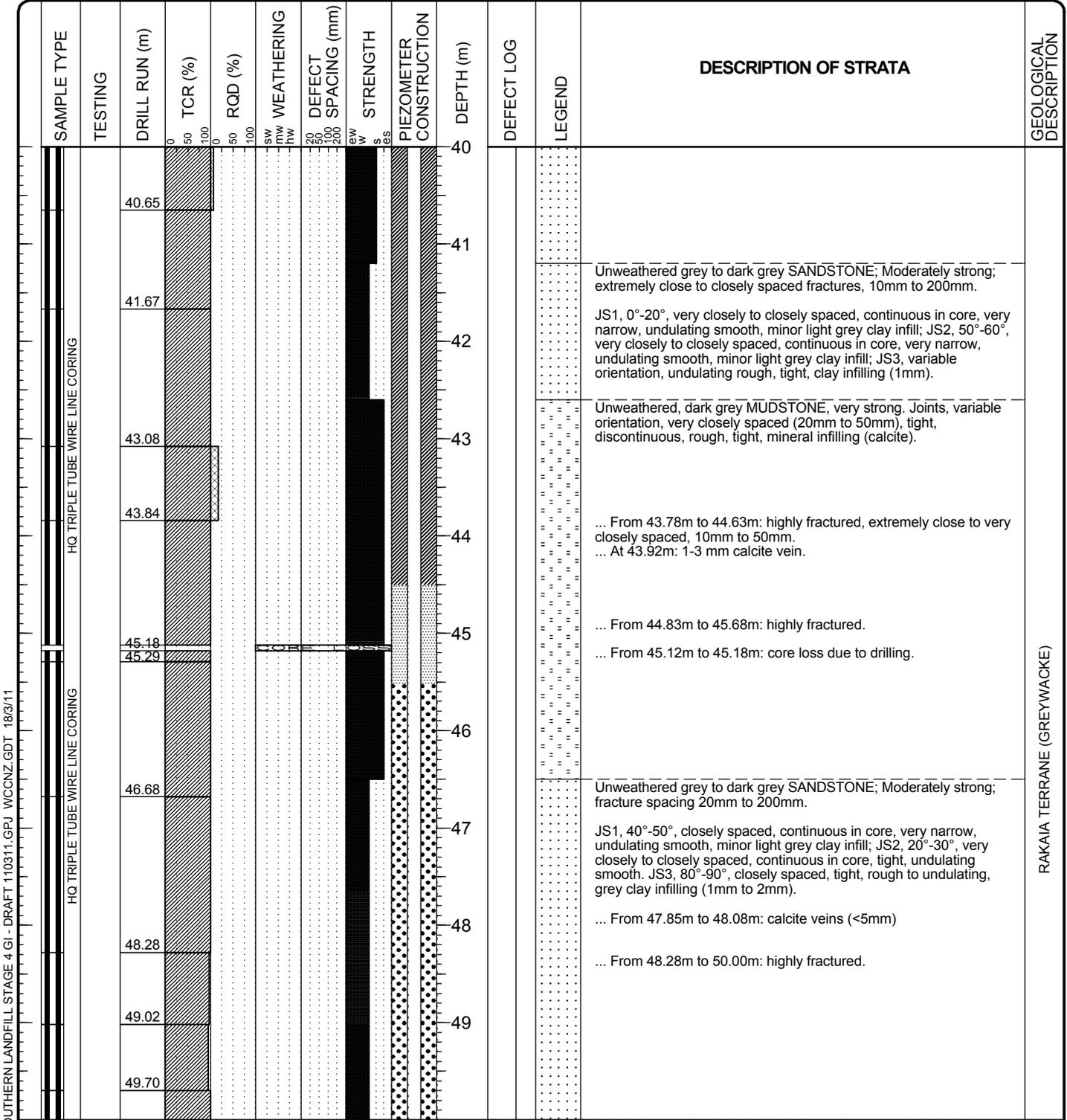
Drill Type:
HQ triple tube, wire line coring

Logged By: **E. Ross / N O'Rourke**
Checked By: **P. Salter**
Date Started: **16-12-10**
Date Finished: **21-12-10**

Relative Level: **205.87 mRL**
Coordinates: **5986379.00 mN**
2656113.00 mE

Client:
Wellington City Council

Permit No:



RAKAIA TERRANE (GREYWACKE)

FIELDLOG 42775090 SOUTHERN LANDFILL STAGE 4 GI - DRAFT 110311.GPJ WCCNZ.GDT 18/3/11

REMARKS:



DRILL HOLE NO. BH3A

URS New Zealand Limited
13-15 College Hill, Auckland

Phone: (09) 355 1300
Fax: (09) 355 1333

Project No.:
42775090

Project Reference:
Southern Landfill - Stage 4

Drilling Contractor: **Webster Drilling & Exploration**

Drill Type:
HQ triple tube, wire line coring

Logged By: **E. Ross / N O'Rourke**
Checked By: **P. Salter**
Date Started: **16-12-10**
Date Finished: **21-12-10**

Relative Level: **205.87 mRL**
Coordinates: **5986379.00 mN**
2656113.00 mE
Permit No:

Client:
Wellington City Council

SAMPLE TYPE	TESTING	DRILL RUN (m)	TCR (%)	RQD (%)	WEATHERING	DEFECT SPACING (mm)	STRENGTH	PIEZOMETER CONSTRUCTION	DEPTH (m)	DEFECT LOG	LEGEND	DESCRIPTION OF STRATA	GEOLOGICAL DESCRIPTION
HQ TRIPLE TUBE WIRE LINE CORING		51.00 51.17							50 51			Unweathered grey to dark grey SANDSTONE; Moderately strong; interbedded thin (10-30mm) dark grey to black MUDSTONE, weak, very steeply inclined (70°-80°); fracture spacing 20mm to 60mm. Clayey fine to coarse GRAVEL, minor fine to medium sand and silt, light grey and white. Moist; subangular to angular; sandstone and mudstone. (SHEAR ZONE)	RAKAIA TERRANE (GREYWACKE)
		52.10 52.84							52 53			Unweathered grey to dark grey SANDSTONE; Moderately strong; interbedded thin (20-30mm) dark grey to black MUDSTONE, weak, very steeply inclined (60°-70°); fracture spacing 20-200mm, dark grey clay infill on fractures between mudstone and sandstone.	
		53.40 54.57							54 55			JS1, 20°-30°, closely spaced, continuous in core, tight, undulating smooth; JS2, 70°-80°, closely spaced, continuous in core, very narrow, undulating smooth, white mineralization. ...From 51.00m to 51.17m: core loss due to drilling.	
		55.46 57.51							56 57			Unweathered grey to dark grey SANDSTONE; Strong; quartz veins (<1mm); fracture spacing 60mm to 200mm.	
		58.67 59.63							58 59			JS1, 60°-70°, closely spaced, continuous in core, very narrow, undulating smooth. ...From 53.87m to 55.46m: highly fractured. ... From 54.00m to 55.46m: becomes slightly weathered due to high level of fracturing.	
												Unweathered grey to dark grey SANDSTONE; Moderately strong; interbedded thin (20-30mm) dark grey to black MUDSTONE, weak, very steeply inclined (60°-70°); fracture spacing 20-200mm, dark grey clay infill on fractures between mudstone and sandstone.	
												JS1, 60°-70°, closely spaced, continuous in core, very narrow, undulating smooth. ...From 56.26m to 57.05m: highly fractured. ...From 56.26m to 58.55m: calcite veins (1-3mm).	
												CLAY with some fine to coarse gravel and fine to medium sand, grey. Soft; moist to wet; gravel, subangular to angular, sandstone. (SHEAR ZONE)	
												Unweathered grey to dark grey SANDSTONE; Moderately strong; extremely close to closely spaced fractures, quartz veins (<1mm). ... From 59.90m to 59.95m: discontinuities extremely closely spaced (5mm to 10mm), variable orientation, clay infilling (1mm to 2mm).	

REMARKS: Borehole completed at target depth of 60.00m

Southern Landfill Stage 4 - 42775090
Core Photographs – BH3A (Note: BH3 renamed BH3A)



BH3A: 0.0m to 2.75m



BH3A: 2.75m to 5.15m

Southern Landfill Stage 4 - 42775090
Core Photographs – BH3A (Note: BH3 renamed BH3A)



BH3A: 5.15m to 8.16m



BH3A: 8.16m to 10.82m

Southern Landfill Stage 4 - 42775090
Core Photographs – BH3A (Note: BH3 renamed BH3A)



BH3A: 10.82m to 13.47m



BH3A: 13.47m to 16.24m

Southern Landfill Stage 4 - 42775090
Core Photographs – BH3A (Note: BH3 renamed BH3A)



BH3A: 16.24m to 19.03m



BH3A: 19.03m to 21.76m

Southern Landfill Stage 4 - 42775090
Core Photographs – BH3A (Note: BH3 renamed BH3A)



BH3A: 21.76m to 24.54m



BH3A: 24.54m to 27.30m

Southern Landfill Stage 4 - 42775090
Core Photographs – BH3A (Note: BH3 renamed BH3A)



BH3A: 27.30m to 30.06m



BH3A: 30.06m to 32.86m

Southern Landfill Stage 4 - 42775090
Core Photographs – BH3A (Note: BH3 renamed BH3A)



BH3A: 32.86m to 35.60m



BH3A: 35.60m to 38.33m

Southern Landfill Stage 4 - 42775090
Core Photographs – BH3A (Note: BH3 renamed BH3A)



BH3A: 38.33m to 41.09m



BH3A: 41.09m to 43.78m

Southern Landfill Stage 4 - 42775090
Core Photographs – BH3A (Note: BH3 renamed BH3A)



BH3A: 43.78m to 46.58m



BH3A: 46.58m to 49.30m

Southern Landfill Stage 4 - 42775090
Core Photographs – BH3A (Note: BH3 renamed BH3A)



BH3A: 49.30m to 54.80m



BH3A: 54.80m to 57.51m

Southern Landfill Stage 4 - 42775090
Core Photographs – BH3A (Note: BH3 renamed BH3A)



BH3A: 57.51m to 60.00m



DRILL HOLE NO. BH3B

URS New Zealand Limited
13-15 College Hill, Auckland

Phone: (09) 355 1300
Fax: (09) 355 1333

Project No.:
42775090

Project Reference:
Southern Landfill - Stage 4

Drilling Contractor: **Webster Drilling & Exploration**

Drill Type:
Air hammer

Logged By: **G. Haldane**
Checked By: **P. Salter**
Date Started: **22-12-10**
Date Finished: **5-1-11**

Relative Level: **206.07 mRL**
Coordinates: **5986381.00 mN**
2656112.00 mE
Permit No:

Client:
Wellington City Council

FIELDLOG 42775090 SOUTHERN LANDFILL STAGE 4 GI - DRAFT 110311.GPJ WCCNZ.GDT 18/3/11

SAMPLE TYPE	TESTING	DRILL RUN (m)	TCR (%)	RQD (%)	WEATHERING	DEFECT SPACING (mm)	STRENGTH	PIEZOMETER CONSTRUCTION	DEPTH (m)	DEFECT LOG	LEGEND	DESCRIPTION OF STRATA	GEOLOGICAL DESCRIPTION
			0 50 100	0 50 100	sw fmw flw	20 50 100 200	ew w s		0 1 2 3 4 5 6 7 8 9			Hole drilled using air hammer - no core recovery. For geological details see BH3A log.	

REMARKS: Well installation: machine slotted 50mm diameter uPVC; Walton Park 7/14 Sand Filter Pack in response zone, flush toby box.



DRILL HOLE NO. BH3B

URS New Zealand Limited
13-15 College Hill, Auckland

Phone: (09) 355 1300
Fax: (09) 355 1333

Project No.:
42775090

Project Reference:
Southern Landfill - Stage 4

Drilling Contractor: **Webster Drilling & Exploration**

Drill Type:
Air hammer

Logged By: **G. Haldane**
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Date Started: **22-12-10**
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FIELDLOG 42775090 SOUTHERN LANDFILL STAGE 4 GI - DRAFT 110311.GPJ WCCNZ.GDT 18/3/11

SAMPLE TYPE	TESTING	DRILL RUN (m)	TCR (%)	RQD (%)	WEATHERING	DEFECT SPACING (mm)	STRENGTH	PIEZOMETER CONSTRUCTION	DEPTH (m)	DEFECT LOG	LEGEND	DESCRIPTION OF STRATA	GEOLOGICAL DESCRIPTION
			0 50 100	0 50 100	sw fmw flw	20 50 100 200	ew w s gs		10 11 12 13 14 15 16 17 18 19			Hole drilled using air hammer - no core recovery. For geological details see BH3A log.	

REMARKS:



DRILL HOLE NO. BH3B

URS New Zealand Limited
13-15 College Hill, Auckland

Phone: (09) 355 1300
Fax: (09) 355 1333

Project No.:
42775090

Project Reference:
Southern Landfill - Stage 4

Drilling Contractor: **Webster Drilling & Exploration**

Drill Type:
Air hammer

Logged By: **G. Haldane**
Checked By: **P. Salter**
Date Started: **22-12-10**
Date Finished: **5-1-11**

Relative Level: **206.07 mRL**
Coordinates: **5986381.00 mN**
2656112.00 mE
Permit No:

Client:
Wellington City Council

FIELDLOG 42775090 SOUTHERN LANDFILL STAGE 4 GI - DRAFT 110311.GPJ WCCNZ.GDT 18/3/11

SAMPLE TYPE	TESTING	DRILL RUN (m)	TCR (%)	RQD (%)	WEATHERING	DEFECT SPACING (mm)	STRENGTH	PIEZOMETER CONSTRUCTION	DEPTH (m)	DEFECT LOG	LEGEND	DESCRIPTION OF STRATA	GEOLOGICAL DESCRIPTION
			0 50 100	0 50 100	sw fmw flw	20 50 100 200	ew w s gs		20 21 22 23 24 25 26 27 28 29			Hole drilled using air hammer - no core recovery. For geological details see BH3A log.	

REMARKS: Borehole completed at target depth of 26.50m.



DRILL HOLE NO. BH3C

URS New Zealand Limited
13-15 College Hill, Auckland

Phone: (09) 355 1300
Fax: (09) 355 1333

Project No.:
42775090

Project Reference:
Southern Landfill - Stage 4

Drilling Contractor: **Webster Drilling & Exploration**

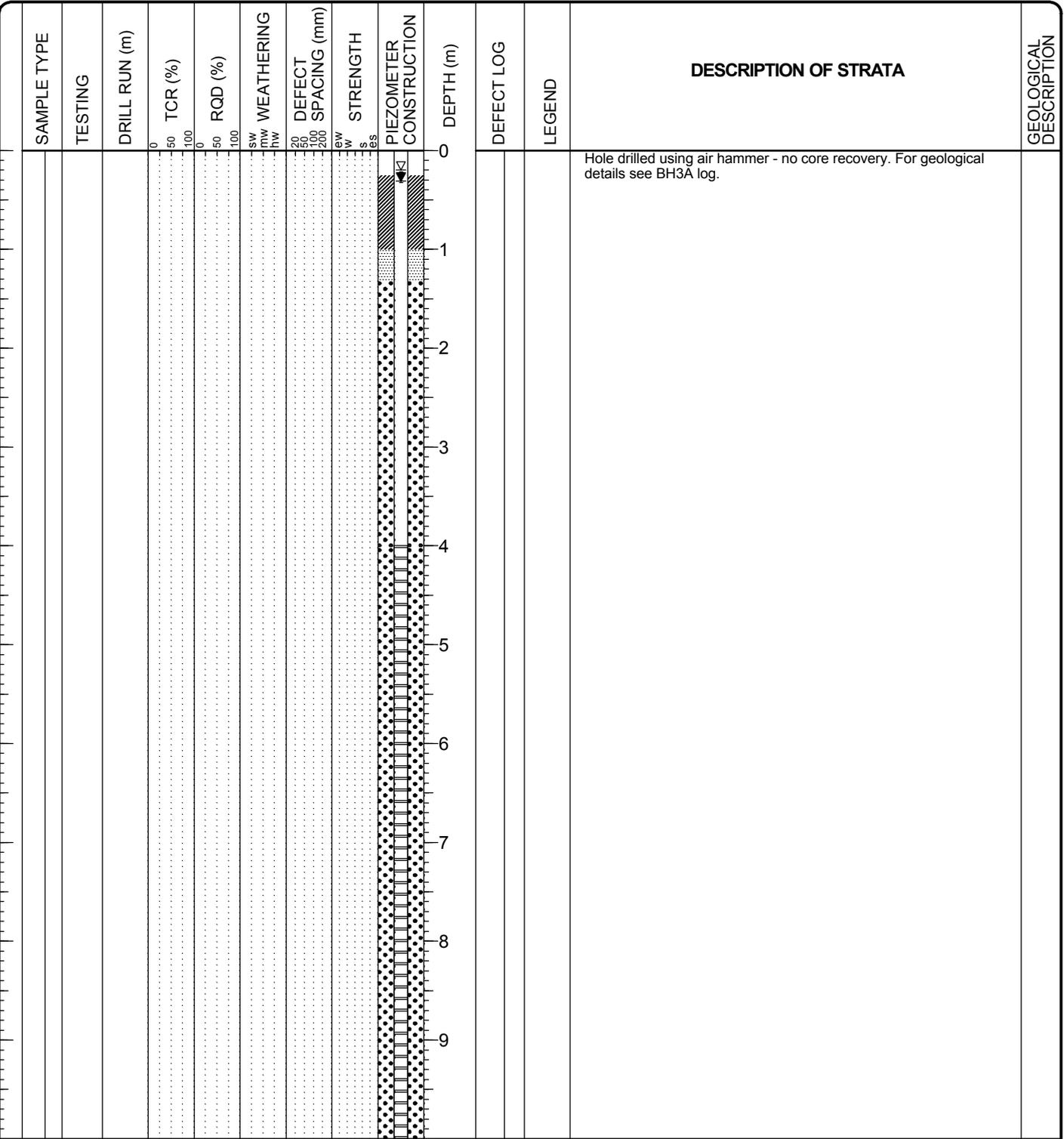
Drill Type:
Air hammer

Logged By: **G. Haldane**
Checked By: **P. Salter**
Date Started: **6-1-11**
Date Finished: **8-1-11**

Relative Level: **205.72 mRL**
Coordinates: **5986377.00 mN**
2656114.00 mE
Permit No:

Client:
Wellington City Council

FIELDLOG 42775090 SOUTHERN LANDFILL STAGE 4 GI - DRAFT 110311.GPJ WCCNZ.GDT 18/3/11



REMARKS: Well installation: machine slotted 50mm diameter uPVC; Walton Park 7/14 Sand Filter Pack in response zone, flush toby box.



DRILL HOLE NO. BH3C

URS New Zealand Limited
13-15 College Hill, Auckland

Phone: (09) 355 1300
Fax: (09) 355 1333

Project No.:
42775090

Project Reference:
Southern Landfill - Stage 4

Drilling Contractor: **Webster Drilling & Exploration**

Drill Type:
Air hammer

Logged By: **G. Haldane**
Checked By: **P. Salter**
Date Started: **6-1-11**
Date Finished: **8-1-11**

Relative Level: **205.72 mRL**
Coordinates: **5986377.00 mN**
2656114.00 mE
Permit No:

Client:
Wellington City Council

FIELDLOG 42775090 SOUTHERN LANDFILL STAGE 4 GI - DRAFT 110311.GPJ WCCNZ.GDT 18/3/11

SAMPLE TYPE	TESTING	DRILL RUN (m)	TCR (%)	RQD (%)	WEATHERING	DEFECT SPACING (mm)	STRENGTH	PIEZOMETER CONSTRUCTION	DEPTH (m)	DEFECT LOG	LEGEND	DESCRIPTION OF STRATA	GEOLOGICAL DESCRIPTION
			0 50 100	0 50 100	sw fmw flw	20 50 100 200	ew w s		10				
									11				
									12				
									13				
									14				
									15				
									16				
									17				
									18				
									19				

REMARKS: Borehole completed at target depth of 10.50m.

DRILL HOLE NO. BH4A

 URS New Zealand Limited
 13-15 College Hill, Auckland

 Phone: (09) 355 1300
 Fax: (09) 355 1333

 Project No.:
42775090

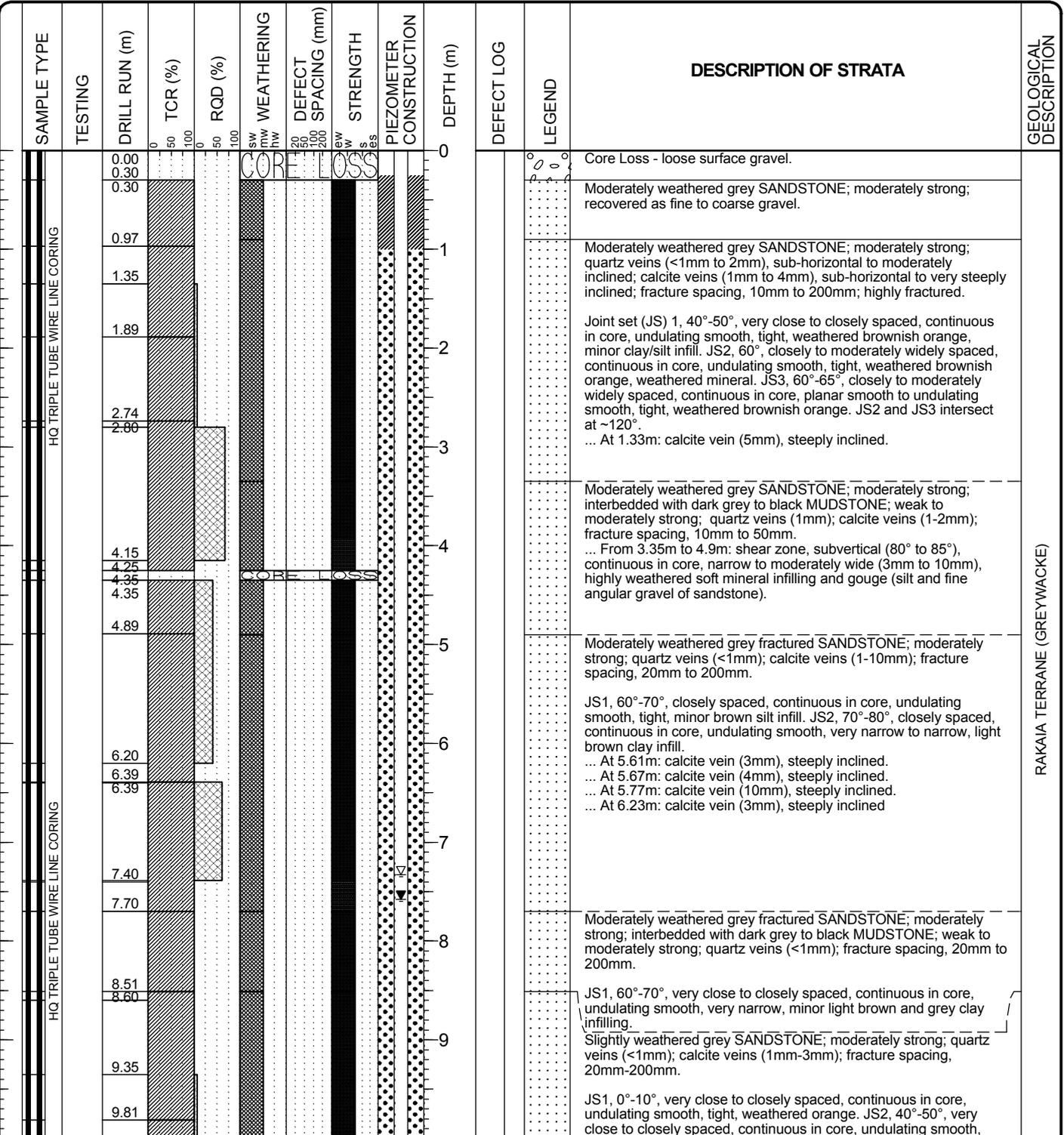
 Project Reference:
Southern Landfill - Stage 4

 Drilling Contractor: **Webster Drilling & Exploration**

 Drill Type:
HQ triple tube, wire line coring

 Logged By: **E. Ross / N O'Rourke**
 Checked By: **P. Salter**
 Date Started: **18-1-11**
 Date Finished: **28-1-11**

 Relative Level: **189.79 mRL**
 Coordinates: **5986046.00 mN**
2656311.00 mE
 Permit No:

 Client:
Wellington City Council


RAKAIA TERRANE (GREYWACKE)

REMARKS: About 6.00m depth of overburden removed in area of create drilling platform.
 Casing installed to 1.5m to allow for return of drilling water flush.
 Groundwater dipped at 2.6m below ground level at 08:30 on 20/01/2011
 Well installation: machine slotted 50mm diameter uPVC; Walton Park 7/14 Sand Filter Pack in response zone, flush toby box.



DRILL HOLE NO. BH4A

URS New Zealand Limited
13-15 College Hill, Auckland

Phone: (09) 355 1300
Fax: (09) 355 1333

Project No.:
42775090

Project Reference:
Southern Landfill - Stage 4

Drilling Contractor: **Webster Drilling & Exploration**

Drill Type:
HQ triple tube, wire line coring

Logged By: **E. Ross / N O'Rourke**
Checked By: **P. Salter**
Date Started: **18-1-11**
Date Finished: **28-1-11**

Relative Level: **189.79 mRL**
Coordinates: **5986046.00 mN**
2656311.00 mE
Permit No:

Client:
Wellington City Council

FIELDLOG 42775090 SOUTHERN LANDFILL STAGE 4 GI - DRAFT 110311.GPJ WCCNZ.GDT 18/3/11

SAMPLE TYPE	TESTING	DRILL RUN (m)	TCR (%)	RQD (%)	WEATHERING	DEFECT SPACING (mm)	STRENGTH	PIEZOMETER CONSTRUCTION	DEPTH (m)	DEFECT LOG	LEGEND	DESCRIPTION OF STRATA	GEOLOGICAL DESCRIPTION
HQ TRIPLE TUBE WIRE LINE CORING		10.89							10			very narrow, minor brown silt infill. JS3, 60°-70°, closely, continuous in core, undulating smooth, very narrow, minor brown silt infill.	RAKAIA TERRANE (GREYWACKE)
		11.40							11				
		11.96							12				
		12.85							13			Moderately weathered dark grey to black MUDSTONE; weak; quartz veins (1mm); highly fractured.	
		13.00							13				
		13.89							14			Moderately weathered grey SANDSTONE; moderately strong; quartz veins (<1mm); highly fractured.	
		14.78							15			Moderately weathered dark grey to black MUDSTONE; weak; calcite veins; highly fractured, grey clay infilling. JS1, 60°-70°, continuous in core, undulating smooth, tight, whitish grey mineral on joint surface. ... From 14.63m to 15.88m: very weak.	
		16.28							16			... From 16.28m to 16.32m: core loss due to drilling. ... From 16.4m: fewer fractures, calcite veins (1-3mm)	
		16.32							17				
		16.87							17				
		18.08							18				
		18.39							18			Slightly weathered grey fractured SANDSTONE; moderately strong; quartz veins (<1mm); calcite veins (1-3mm); fracture spacing, 80mm-200mm.	
		19.00							19			JS1, 50°-60°, closely spaced, continuous in core, undulating smooth, tight, whitish grey mineral on joint surface	
		19.07							19			Slightly weathered grey SANDSTONE; moderately strong; interbedded with dark grey to black MUDSTONE; weak to moderately strong; quartz veins (<1mm); fracture spacing, 20mm-200mm.	
		19.82							19			JS1, 40°-50°, very closely to closely spaced, continuous in core,	
		20.02							20				

REMARKS:



DRILL HOLE NO. BH4A

URS New Zealand Limited
13-15 College Hill, Auckland
Phone: (09) 355 1300
Fax: (09) 355 1333

Project No.:
42775090

Project Reference:
Southern Landfill - Stage 4

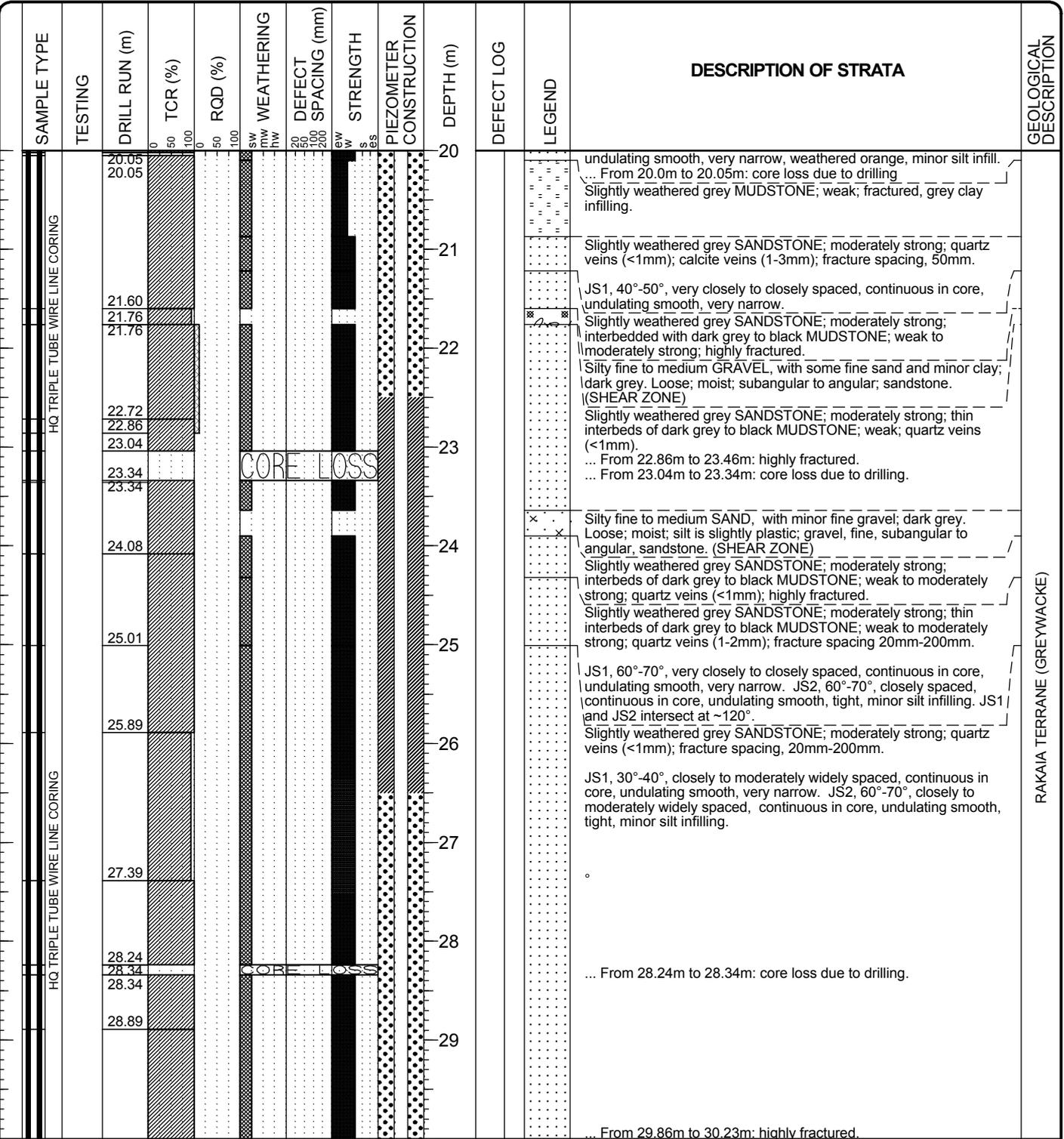
Drilling Contractor: **Webster Drilling & Exploration**

Drill Type: **HQ triple tube, wire line coring**
 Logged By: **E. Ross / N O'Rourke**
 Checked By: **P. Salter**
 Date Started: **18-1-11**
 Date Finished: **28-1-11**

Relative Level: **189.79 mRL**
 Coordinates: **5986046.00 mN**
2656311.00 mE
 Permit No:

Client:
Wellington City Council

FIELDLOG 42775090 SOUTHERN LANDFILL STAGE 4 GI - DRAFT 110311.GPJ WCCNZ.GDT 18/3/11



REMARKS:



DRILL HOLE NO. BH4A

URS New Zealand Limited
13-15 College Hill, Auckland

Phone: (09) 355 1300
Fax: (09) 355 1333

Project No.:
42775090

Project Reference:
Southern Landfill - Stage 4

Drilling Contractor: **Webster Drilling & Exploration**

Drill Type:
HQ triple tube, wire line coring

Logged By: **E. Ross / N O'Rourke**
Checked By: **P. Salter**
Date Started: **18-1-11**
Date Finished: **28-1-11**

Relative Level: **189.79 mRL**
Coordinates: **5986046.00 mN**
2656311.00 mE
Permit No:

Client:
Wellington City Council

FIELDLOG 42775090 SOUTHERN LANDFILL STAGE 4 GI - DRAFT 110311.GPJ WCCNZ.GDT 18/03/11

SAMPLE TYPE	TESTING	DRILL RUN (m)	TCR (%)	RQD (%)	WEATHERING	DEFECT SPACING (mm)	STRENGTH	PIEZOMETER CONSTRUCTION	DEPTH (m)	DEFECT LOG	LEGEND	DESCRIPTION OF STRATA	GEOLOGICAL DESCRIPTION
HQ TRIPLE TUBE WIRE LINE CORING		30.35							30			<p>Silty fine to medium GRAVEL, minor medium sand; grey. Loose; moist; angular; sandstone. (SHEAR ZONE)</p> <p>Slightly weathered grey SANDSTONE; Moderately strong; thin interbeds of dark grey to black MUDSTONE; quartz veins (<1mm), fracture spacing, 20mm to 200mm.</p> <p>JS1, 40°-50°, very closely to closely spaced, continuous in core, undulating smooth, tight. JS2, 70°-80°, closely spaced, continuous in core, undulating smooth, very narrow.</p>	RAKAIA TERRANE (GREYWACKE)
		30.39							31				
		31.89							32				
		32.34							33				
		33.39							34				
		34.89							35				
		36.07							36				
		37.39							37				
		37.89							38				
		39.39							39				
		40.00											

REMARKS:



DRILL HOLE NO. BH4A

URS New Zealand Limited
13-15 College Hill, Auckland

Phone: (09) 355 1300
Fax: (09) 355 1333

Project No.:
42775090

Project Reference:
Southern Landfill - Stage 4

Drilling Contractor: **Webster Drilling & Exploration**

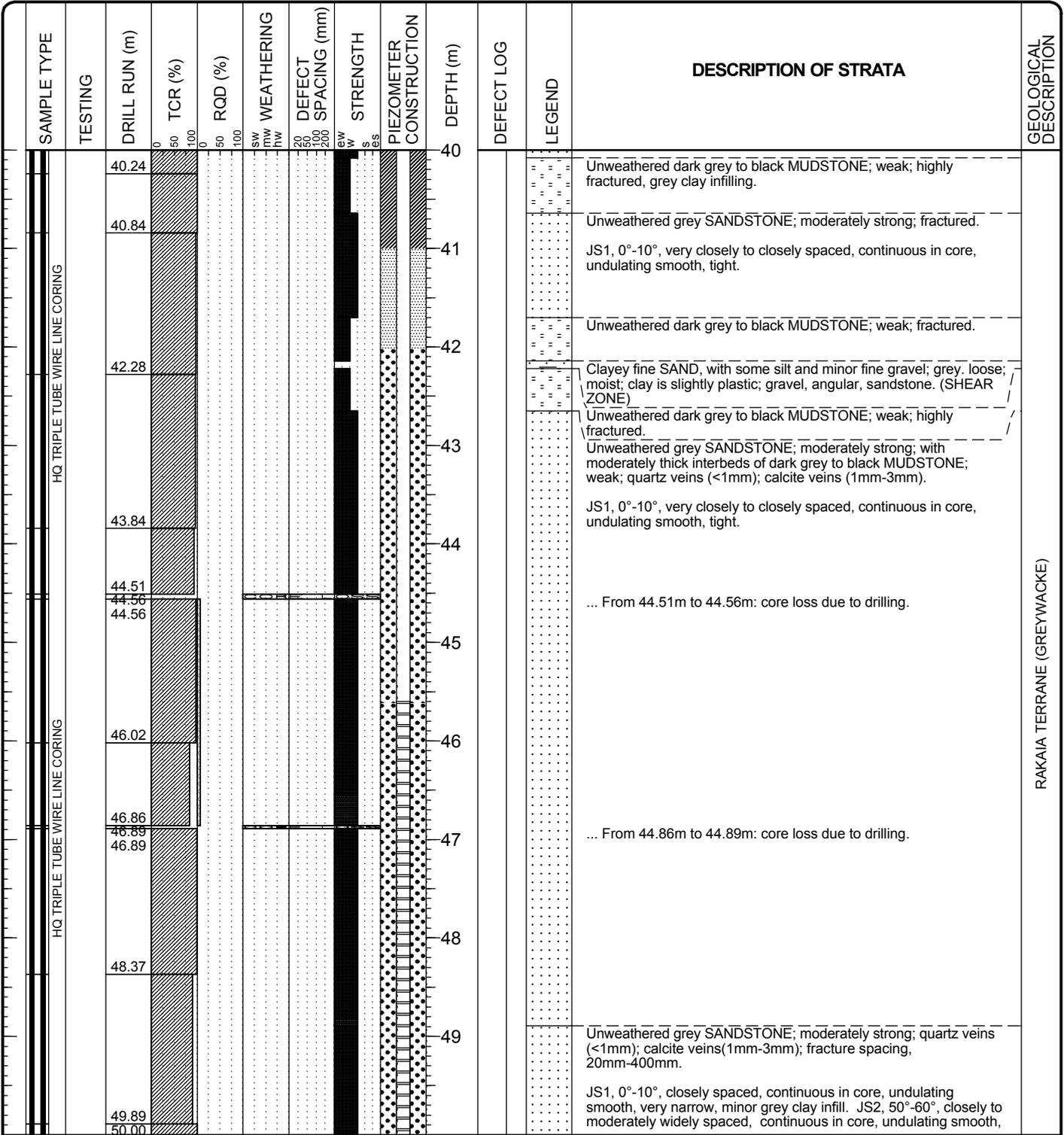
Drill Type:
HQ triple tube, wire line coring

Logged By: **E. Ross / N O'Rourke**
Checked By: **P. Salter**
Date Started: **18-1-11**
Date Finished: **28-1-11**

Relative Level: **189.79 mRL**
Coordinates: **5986046.00 mN**
2656311.00 mE
Permit No:

Client:
Wellington City Council

FIELDLOG 42775090 SOUTHERN LANDFILL STAGE 4 GI - DRAFT 110311.GPJ WCCNZ.GDT 18/3/11



REMARKS:



DRILL HOLE NO. BH4A

URS New Zealand Limited
13-15 College Hill, Auckland

Phone: (09) 355 1300
Fax: (09) 355 1333

Project No.:
42775090

Project Reference:
Southern Landfill - Stage 4

Drilling Contractor: **Webster Drilling & Exploration**

Drill Type:
HQ triple tube, wire line coring

Logged By: **E. Ross / N O'Rourke**
Checked By: **P. Salter**
Date Started: **18-1-11**
Date Finished: **28-1-11**

Relative Level: **189.79 mRL**
Coordinates: **5986046.00 mN**
2656311.00 mE

Client:
Wellington City Council

Permit No:

SAMPLE TYPE	TESTING	DRILL RUN (m)	TCR (%)	RQD (%)	WEATHERING	DEFECT SPACING (mm)	STRENGTH	PIEZOMETER CONSTRUCTION	DEPTH (m)	DEFECT LOG	LEGEND	DESCRIPTION OF STRATA	GEOLOGICAL DESCRIPTION
HQ TRIPLE TUBE WIRE LINE CORING		50.55							50			tight. ... From 49.59m to 49.66m: thin steeply inclined interbed of dark grey to black MUDSTONE. Clay infilling of fractures. ... From 50.00m to 50.55m: core loss due to drilling.	
		50.55							51				
		52.12							52				
		52.89							53			Unweathered grey SANDSTONE; moderately strong; with thin interbeds of dark grey to black MUDSTONE; weak; quartz veins (<1mm); calcite veins (1mm-3mm); fracture spacing, 10mm to 200mm; grey clay infilling in bedding fractures between mudstone and sandstone.	
		53.87							54			JS1, 60°-70°, very closely to closely spaced, continuous in core, undulating smooth, tight.	
		54.99							55			Unweathered grey SANDSTONE; moderately strong; quartz veins (1mm); calcite veins (1mm-3mm); fracture spacing 20mm-400mm.	
		55.09							56			JS1, 50°-60°, closely to moderately widely spaced, continuous in core, undulating smooth, very narrow, minor grey clay infill.	
		57.39							57				
		58.89							58				
		59.70							59				

RAKAIA TERRANE (GREYWACKE)

REMARKS: Borehole completed at target depth of 60.00m

Southern Landfill Stage 4 - 42775090
Core Photographs – BH4A



BH4A: 0.0m to 2.74m



BH4A: 2.74m to 5.44m

**Southern Landfill Stage 4 - 42775090
Core Photographs – BH4A**



BH4A: 5.44m to 8.20m



BH4A: 8.20m to 10.89m

**Southern Landfill Stage 4 - 42775090
Core Photographs – BH4A**



BH4A: 10.89m to 13.56m



BH4A: 13.56m to 16.32m

Southern Landfill Stage 4 - 42775090
Core Photographs – BH4A



BH4A: 16.32m to 19.07m



BH4A: 19.07m to 21.76m

Southern Landfill Stage 4 - 42775090
Core Photographs – BH4A



BH4A: 21.76m to 24.34m



BH4A: 24.34m to 27.09m

Southern Landfill Stage 4 - 42775090
Core Photographs – BH4A



BH4A: 27.09m to 29.80m



BH4A: 29.80m to 32.58m

Southern Landfill Stage 4 - 42775090
Core Photographs – BH4A



BH4A: 32.58m to 35.31m



BH4A: 35.31m to 37.89m

Southern Landfill Stage 4 - 42775090
Core Photographs – BH4A



BH4A: 37.89m to 40.64m



BH4A: 40.64m to 43.28m

Southern Landfill Stage 4 - 42775090
Core Photographs – BH4A



BH4A: 48.77m to 51.55m



BH4A: 51.55m to 54.29m

Southern Landfill Stage 4 - 42775090
Core Photographs – BH4A



BH4A: 54.29m to 56.99m



BH4A: 56.99m to 59.70m

**Southern Landfill Stage 4 - 42775090
Core Photographs – BH4A**



BH4A: 59.70m to 60.00m



DRILL HOLE NO. BH4B

URS New Zealand Limited
13-15 College Hill, Auckland

Phone: (09) 355 1300
Fax: (09) 355 1333

Project No.:
42775090

Project Reference:
Southern Landfill - Stage 4

Drilling Contractor: **Webster Drilling & Exploration**

Drill Type:
Air hammer

Logged By: **G. Haldane**
Checked By: **P. Salter**
Date Started: **29-1-11**
Date Finished: **1-2-11**

Relative Level: **189.70 mRL**
Coordinates: **5986043.00 mN**
2656312.00 mE
Permit No:

Client:
Wellington City Council

FIELDLOG 42775090 SOUTHERN LANDFILL STAGE 4 GI - DRAFT 110311.GPJ WCCNZ.GDT 18/3/11

SAMPLE TYPE	TESTING	DRILL RUN (m)	TCR (%)	RQD (%)	WEATHERING	DEFECT SPACING (mm)	STRENGTH	PIEZOMETER CONSTRUCTION	DEPTH (m)	DEFECT LOG	LEGEND	DESCRIPTION OF STRATA	GEOLOGICAL DESCRIPTION
			0 50 100	0 50 100	sw fmw flw	20 50 100 200	ew w s gs		0 1 2 3 4 5 6 7 8 9			Hole drilled using air hammer - no core recovery. For geological details see BH4A log.	

REMARKS: Well installation: machine slotted 50mm diameter uPVC; Walton Park 7/14 Sand Filter Pack in response zone, flush toby box.



DRILL HOLE NO. BH4B

URS New Zealand Limited
13-15 College Hill, Auckland

Phone: (09) 355 1300
Fax: (09) 355 1333

Project No.:
42775090

Project Reference:
Southern Landfill - Stage 4

Drilling Contractor: **Webster Drilling & Exploration**

Drill Type:
Air hammer

Logged By: **G. Haldane**
Checked By: **P. Salter**
Date Started: **29-1-11**
Date Finished: **1-2-11**

Relative Level: **189.70 mRL**
Coordinates: **5986043.00 mN**
2656312.00 mE
Permit No:

Client:
Wellington City Council

FIELDLOG 42775090 SOUTHERN LANDFILL STAGE 4 GI - DRAFT 110311.GPJ WCCNZ.GDT 18/3/11

SAMPLE TYPE	TESTING	DRILL RUN (m)	TCR (%)	RQD (%)	WEATHERING	DEFECT SPACING (mm)	STRENGTH	PIEZOMETER CONSTRUCTION	DEPTH (m)	DEFECT LOG	LEGEND	DESCRIPTION OF STRATA	GEOLOGICAL DESCRIPTION
			0 50 100	0 50 100	sw fmw flw	20 50 100 200	ew w s gs		10 11 12 13 14 15 16 17 18 19			Hole drilled using air hammer - no core recovery. For geological details see BH4A log.	

REMARKS:



DRILL HOLE NO. BH4B

URS New Zealand Limited
13-15 College Hill, Auckland

Phone: (09) 355 1300
Fax: (09) 355 1333

Project No.:
42775090

Project Reference:
Southern Landfill - Stage 4

Drilling Contractor: **Webster Drilling & Exploration**

Drill Type:
Air hammer

Logged By: **G. Haldane**
Checked By: **P. Salter**
Date Started: **29-1-11**
Date Finished: **1-2-11**

Relative Level: **189.70 mRL**
Coordinates: **5986043.00 mN**
2656312.00 mE
Permit No:

Client:
Wellington City Council

FIELDLOG 42775090 SOUTHERN LANDFILL STAGE 4 GI - DRAFT 110311.GPJ WCCNZ.GDT 18/3/11

SAMPLE TYPE	TESTING	DRILL RUN (m)	TCR (%)	RQD (%)	WEATHERING	DEFECT SPACING (mm)	STRENGTH	PIEZOMETER CONSTRUCTION	DEPTH (m)	DEFECT LOG	LEGEND	DESCRIPTION OF STRATA	GEOLOGICAL DESCRIPTION
			0 50 100	0 50 100	sw fmw flw	20 50 100 200	ew w s gs		20 21 22 23 24 25 26 27 28 29			Hole drilled using air hammer - no core recovery. For geological details see BH4A log.	

REMARKS: Borehole completed at target depth of 24.50m.



TEST PIT LOG TP1

URS New Zealand Limited
13-15 College Hill, Auckland

Phone: (09) 355 1300
Fax: (09) 355 1333

Project No.:
42775090

Project Reference:
Southern Landfill - Stage 4

Drilling Contractor: **URS NZ Ltd.**

Excavation Method: **Hand Dug**
 Logged By: **E. Ross**
 Checked By: **P. Salter**
 Date Started: **19-1-11**
 Date Finished: **19-1-11**

Relative Level: **190.00 mRL**
 Coordinates: **697983.00 mN**
297465.00 mE
 Permit No:

Client:
Wellington City Council

DESCRIPTION OF STRATA	GRAPHIC LOG	DEPTH (m)	GEOLOGICAL DESCRIPTION	FIELD SHEAR STRENGTH (kPa)	PENETROMETER BLOWS (N)	SAMPLING AND OTHER TESTING	GROUND WATER DATA AND COMMENTS																							
<p>TOPSOIL with roots; brown.</p> <p>sandy gravelly SILT, with some clay; brownish orange. Firm; moist; low plasticity; sand, fine to coarse; gravel, fine to coarse, subangular of sandstone. (COLLUVIUM)</p> <p>... At 0.6m becomes stiff to very stiff.</p>		0.0 0.2 0.4 0.6	COLLUVIUM	168/13		S1 Bulk Disturbed																								
<p>Trial pit completed at 0.7m depth due to cobble obstruction.</p> <p>Scala penetrometer test undertaken 1.5m away from hole in undisturbed ground.</p> <table border="1"> <thead> <tr> <th>Depth</th> <th>Blows/100mm penetration</th> </tr> </thead> <tbody> <tr><td>0.0m - 0.1m</td><td>0</td></tr> <tr><td>0.1m - 0.2m</td><td>2</td></tr> <tr><td>0.2m - 0.3m</td><td>2</td></tr> <tr><td>0.3m - 0.4m</td><td>2</td></tr> <tr><td>0.4m - 0.5m</td><td>2</td></tr> <tr><td>0.5m - 0.6m</td><td>2</td></tr> <tr><td>0.6m - 0.7m</td><td>6</td></tr> <tr><td>0.7m - 0.8m</td><td>5</td></tr> <tr><td>0.8m - 0.9m</td><td>5</td></tr> <tr><td>0.9m - 1.0m</td><td>5</td></tr> <tr><td>1.0m - 1.1m</td><td>20 / refusal</td></tr> </tbody> </table>	Depth	Blows/100mm penetration	0.0m - 0.1m	0	0.1m - 0.2m	2	0.2m - 0.3m	2	0.3m - 0.4m	2	0.4m - 0.5m	2	0.5m - 0.6m	2	0.6m - 0.7m	6	0.7m - 0.8m	5	0.8m - 0.9m	5	0.9m - 1.0m	5	1.0m - 1.1m	20 / refusal		0.8 1.0 1.2 1.4 1.6 1.8 2.0 2.2 2.4 2.6 2.8 3.0 3.2 3.4 3.6 3.8				
Depth	Blows/100mm penetration																													
0.0m - 0.1m	0																													
0.1m - 0.2m	2																													
0.2m - 0.3m	2																													
0.3m - 0.4m	2																													
0.4m - 0.5m	2																													
0.5m - 0.6m	2																													
0.6m - 0.7m	6																													
0.7m - 0.8m	5																													
0.8m - 0.9m	5																													
0.9m - 1.0m	5																													
1.0m - 1.1m	20 / refusal																													

TEST PIT SECTION

TEST PIT TERMINATED AT:

- Target Depth
- Refusal
- Flooding
- Caving/collapse

SAMPLE TYPE:

- Bulk Sample **BS**
- Tube Sample **TS**
- Disturbed Sample **DS**



TEST PIT LOG TP2

URS New Zealand Limited
13-15 College Hill, Auckland
Phone: (09) 355 1300
Fax: (09) 355 1333

Project No.:
42775090

Project Reference:
Southern Landfill - Stage 4

Drilling Contractor: **URS NZ Ltd.**

Excavation Method: **Hand Dug**
 Logged By: **E. Ross**
 Checked By: **P. Salter**
 Date Started: **19-1-11**
 Date Finished: **19-1-11**

Relative Level: **254.00 mRL**
 Coordinates: **697640.00 mN**
296910.00 mE
 Permit No:

Client:
Wellington City Council

DESCRIPTION OF STRATA	GRAPHIC LOG	DEPTH (m)	GEOLOGICAL DESCRIPTION	FIELD SHEAR STRENGTH (kPa)	PENETROMETER BLOWS (N)	SAMPLING AND OTHER TESTING	GROUND WATER DATA AND COMMENTS																														
TOPSOIL with some gravel and silt; brown.		0.0																																			
SILT with some fine to coarse gravel, minor cobbles; brownish orange. Stiff to very stiff; moist; non-plastic; gravel and cobbles, subangular to angular of sandstone. (COLLUVIUM)		0.2	COLLUVIUM	UTP due to gravel		S2 Bulk Disturbed																															
GRAVEL, with some fine to coarse sand and cobbles, minor silt, trace clay; brownish orange. Tightly packed; moist; subangular; sandstone; cobbles, subangular to angular of sandstone. (COLLUVIUM)		0.4																																			
		0.6																																			
		0.8																																			
		1.0																																			
Trial pit completed at 1.2m depth due to rock obstruction.		1.2																																			
Scala penetrometer test undertaken 1.5m away from hole in undisturbed ground.		1.4																																			
<table border="1"> <thead> <tr> <th>Depth</th> <th>Blows/100mm penetration</th> </tr> </thead> <tbody> <tr><td>0.0m - 0.1m</td><td>0</td></tr> <tr><td>0.1m - 0.2m</td><td>2</td></tr> <tr><td>0.2m - 0.3m</td><td>5</td></tr> <tr><td>0.3m - 0.4m</td><td>5</td></tr> <tr><td>0.4m - 0.5m</td><td>6</td></tr> <tr><td>0.5m - 0.6m</td><td>4</td></tr> <tr><td>0.6m - 0.7m</td><td>6</td></tr> <tr><td>0.7m - 0.8m</td><td>8</td></tr> <tr><td>0.8m - 0.9m</td><td>8</td></tr> <tr><td>0.9m - 1.0m</td><td>13</td></tr> <tr><td>1.0m - 1.1m</td><td>8</td></tr> <tr><td>1.1m - 1.2m</td><td>8</td></tr> <tr><td>1.2m - 1.3m</td><td>9</td></tr> <tr><td>1.3m - 1.4m</td><td>15 / bouncing</td></tr> </tbody> </table>	Depth	Blows/100mm penetration	0.0m - 0.1m	0	0.1m - 0.2m	2	0.2m - 0.3m	5	0.3m - 0.4m	5	0.4m - 0.5m	6	0.5m - 0.6m	4	0.6m - 0.7m	6	0.7m - 0.8m	8	0.8m - 0.9m	8	0.9m - 1.0m	13	1.0m - 1.1m	8	1.1m - 1.2m	8	1.2m - 1.3m	9	1.3m - 1.4m	15 / bouncing		1.6					
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TEST PIT SECTION

TEST PIT TERMINATED AT:

- Target Depth
- Refusal
- Flooding
- Caving/collapse

SAMPLE TYPE:

- Bulk Sample **BS**
- Tube Sample **TS**
- Disturbed Sample **DS**

