





PLATE 1: BH27\_6.4-6.85, SPT sample. Quaternary Sediments and Moorabool Viaduct Sand



PLATE 2: BH27\_9.0-9.4, U63 tube sample. Moorabool Viaduct Sand



PLATE 3: BH27\_12.4-12.85, SPT sample. Moorabool Viaduct Sand

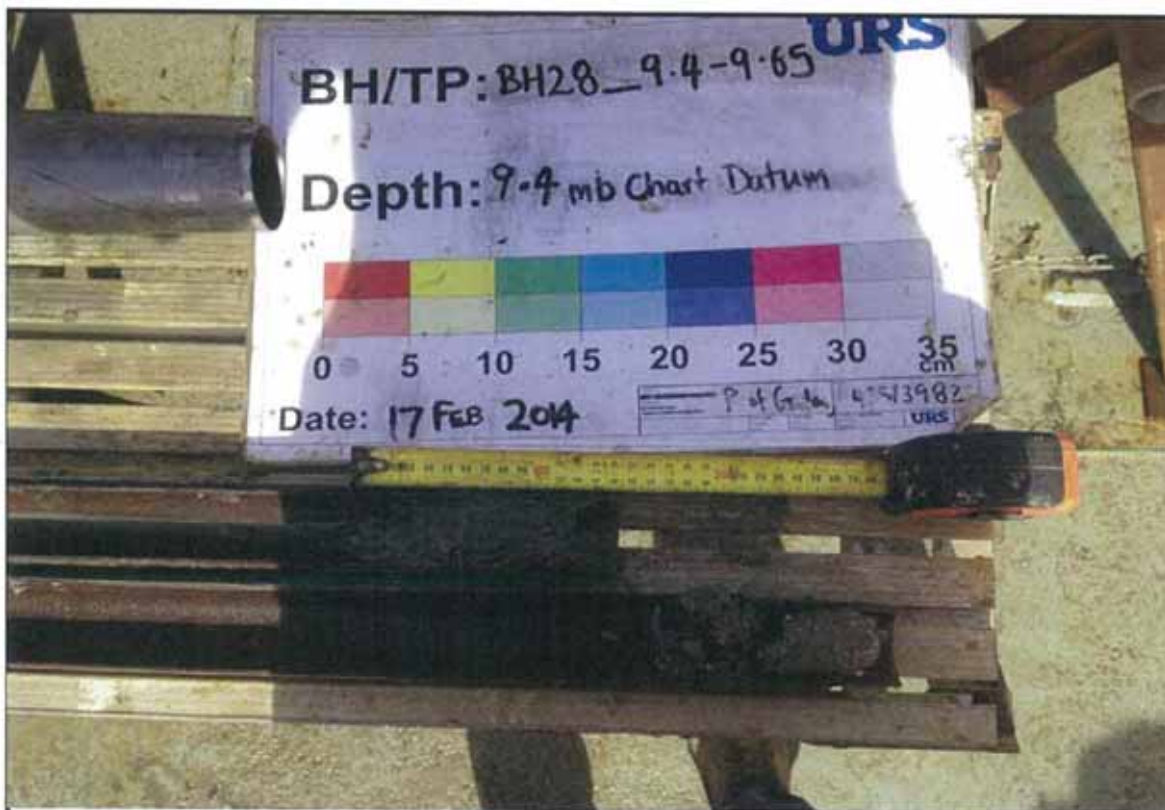


PLATE 4: BH28\_9.4-9.85, SPT sample. Quaternary Sediments





PLATE 5: BH28\_12.4-12.85, SPT sample. Moorabool Viaduct Sand



PLATE 6: BH29\_12.0-12.4, extruded U63 tube sample. Quaternary Sediments





PLATE 7: BH29\_18.3-18.75, SPT sample. Moorabool Viaduct Sand



PLATE 8: BH30\_12.0-12.4, extruded U63 tube sample. Quaternary Sediments

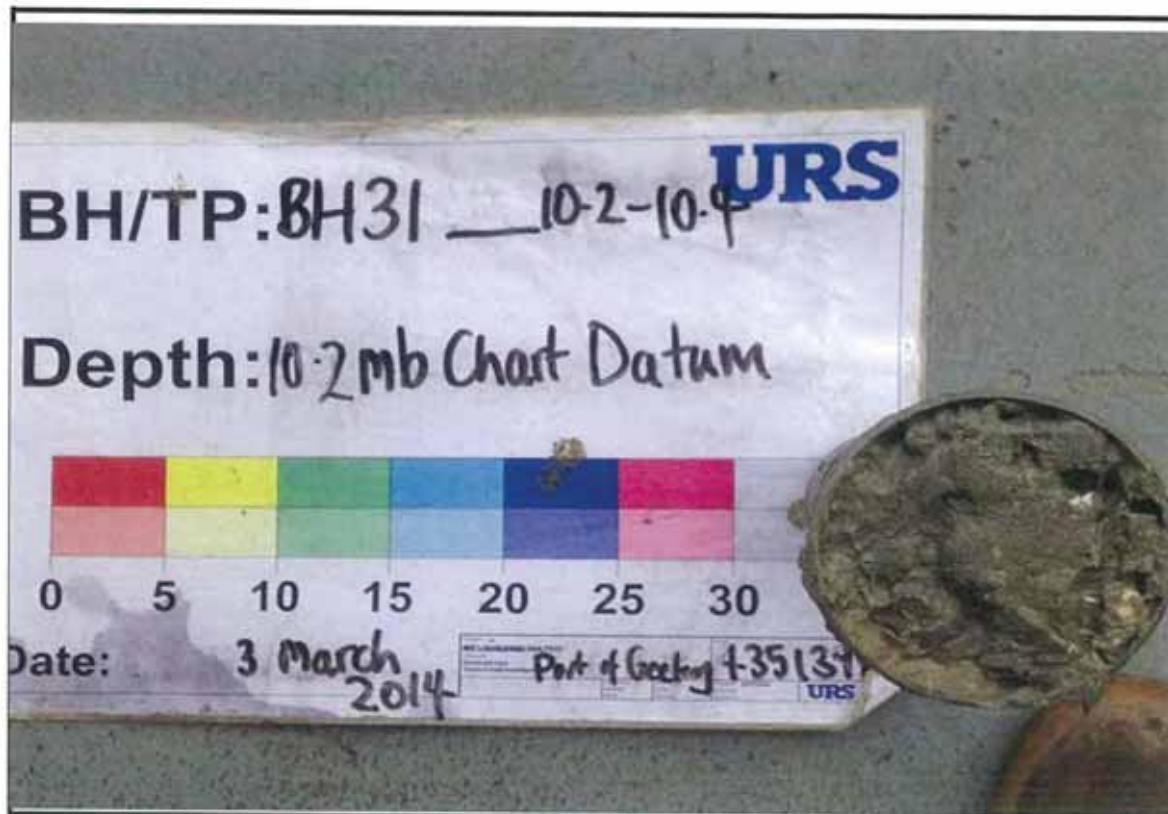


PLATE 9: BH31\_10.2-10.6, U63 tube sample. Unconsolidated Sediment

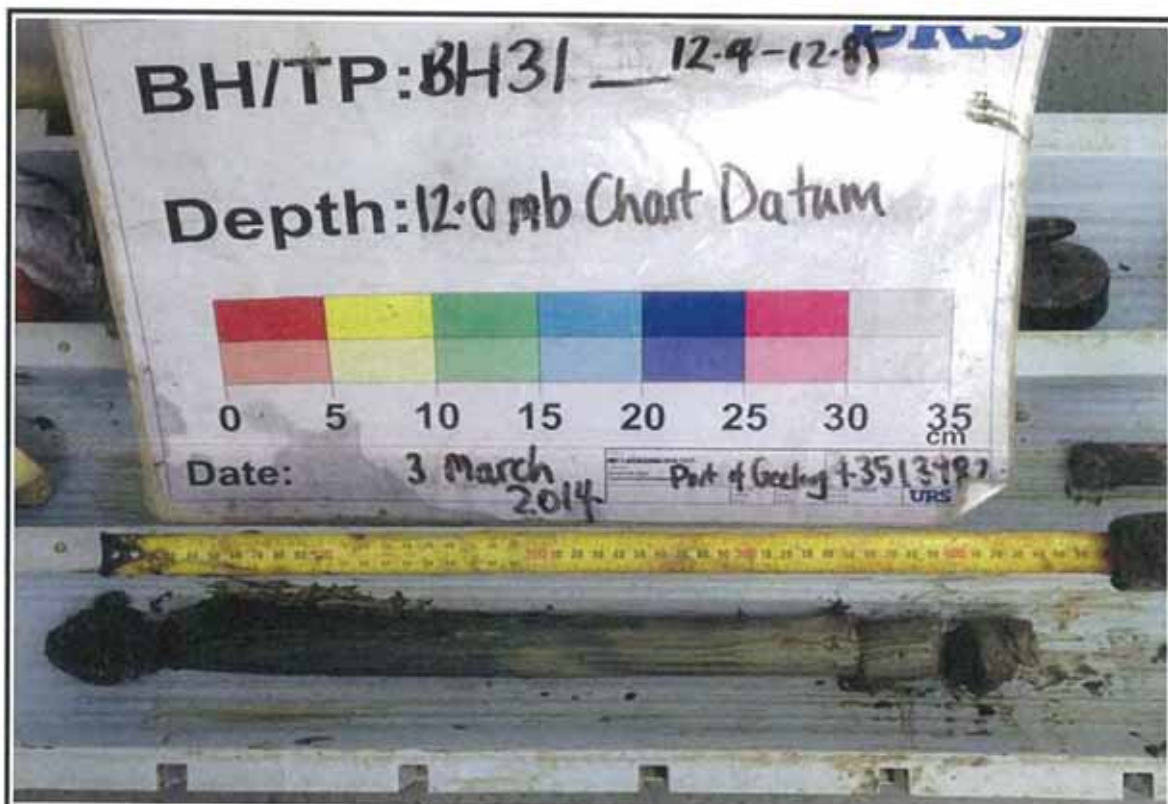


PLATE 10: BH31\_12.4-12.85, SPT sample. Basaltic Soil



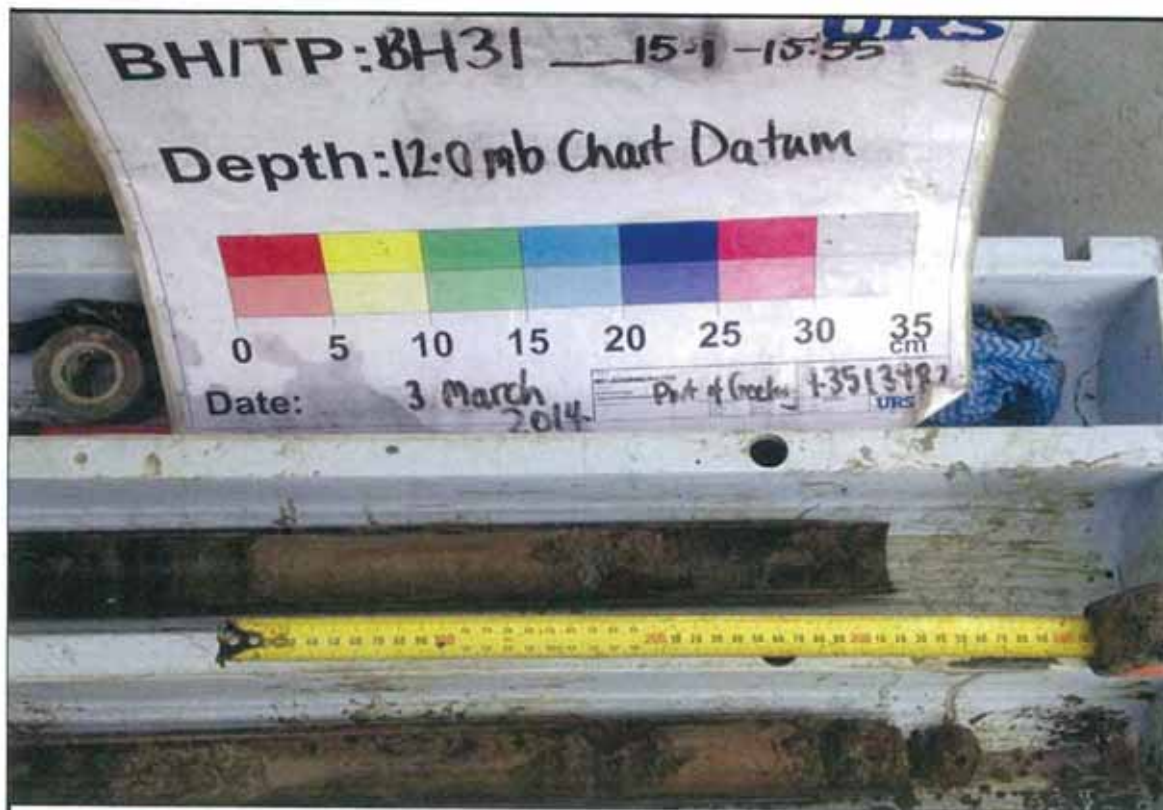


PLATE 11: BH31\_15.1-15.55, SPT sample. Basaltic Soil



PLATE 12: BH32\_10.1-10.55, SPT sample. Unconsolidated Sediment



PLATE 13: BH32\_12.0-12.4, extruded U63 tube sample. Quaternary Sediment

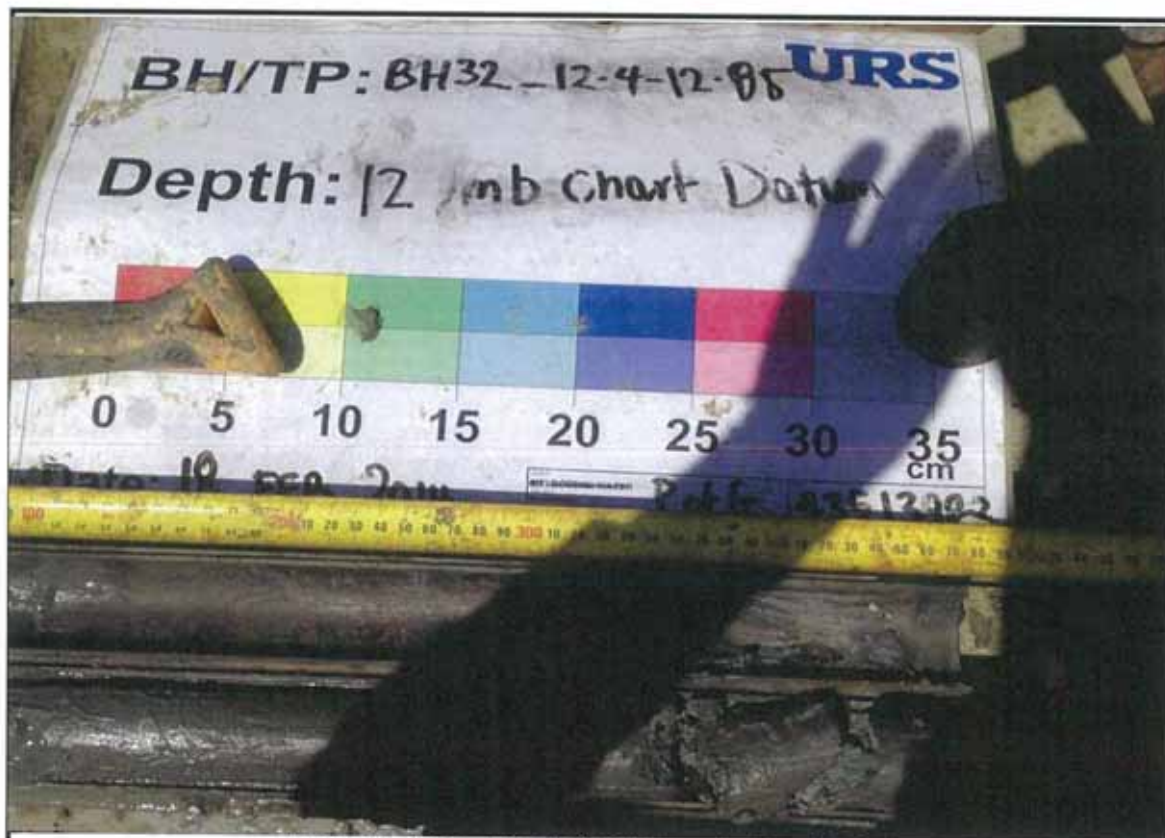


PLATE 14: BH32\_12.4-12.85, SPT sample. Basaltic Soil



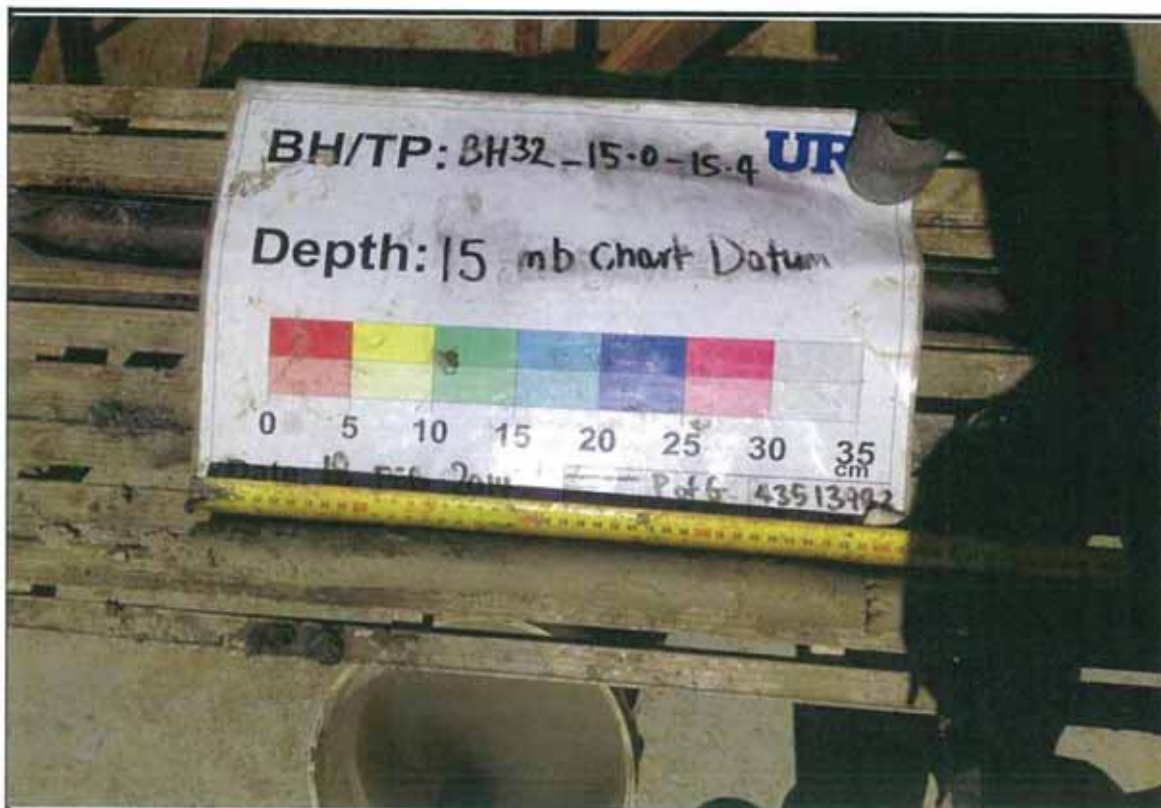


PLATE 15: BH32\_15.0-15.4, SPT sample. Basaltic Soil



PLATE 16: BH32\_18.2-20.7, Rock Core. Older Volcanics Basalt



PLATE 17: BH33\_12.4-12.85, SPT sample. Quaternary Sediment and Basaltic Soil.

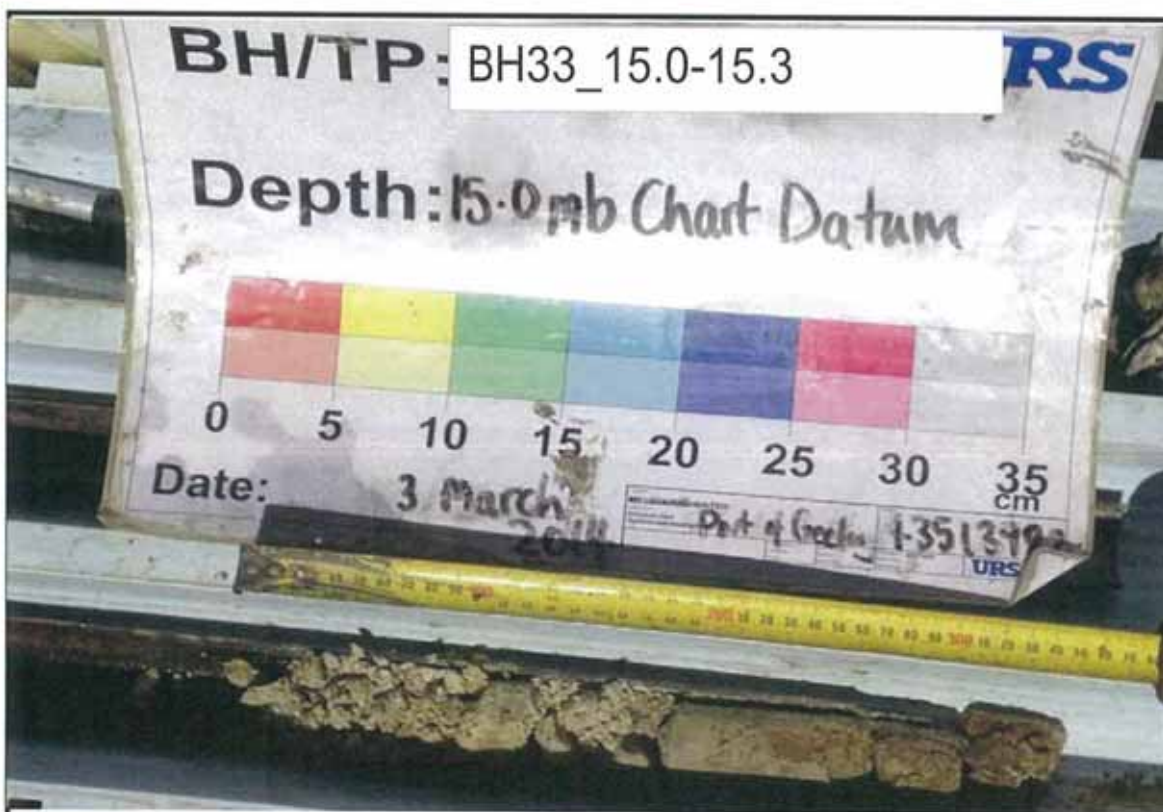


PLATE 18: BH33\_15.0-15.3, SPT sample. Basaltic Soil



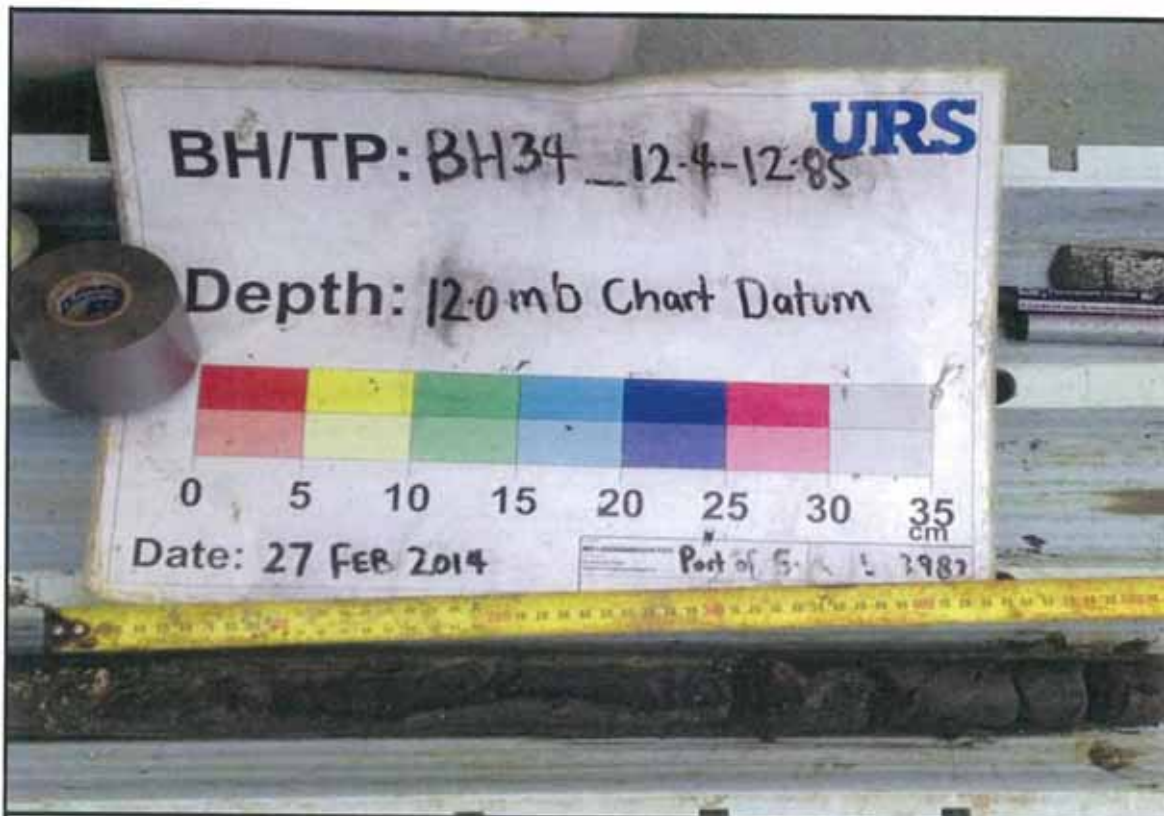


PLATE 19: BH34\_12.4-12.85, SPT sample. Quaternary Sediment

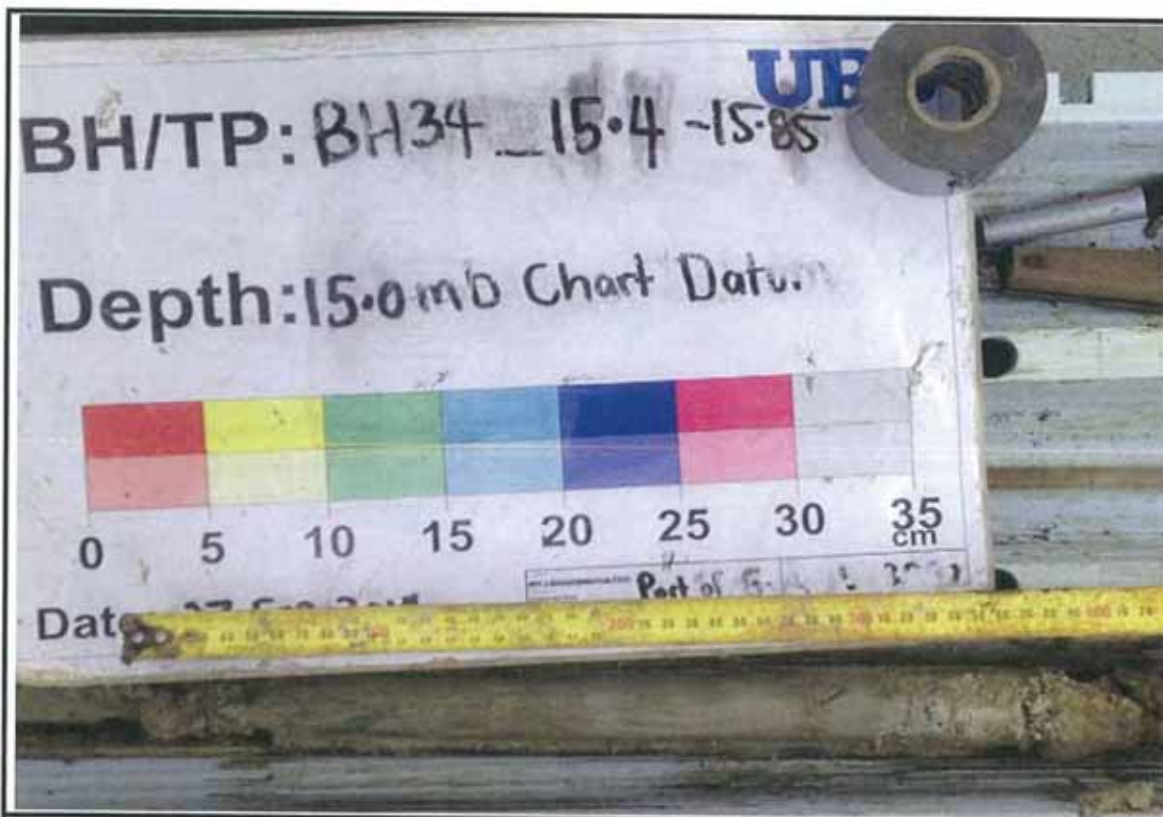


PLATE 20: BH34\_15.4-15.85, SPT sample. Basaltic Soil



PLATE 21: BH35\_12.4-12.85, SPT sample. Quaternary Clay and Basaltic Soil



PLATE 22: BH35\_13.2-13.25, SPT sample. Basaltic Soil





PLATE 23: BH36\_12.0-12.4, extruded U63 tube sample. Quaternary Sediment

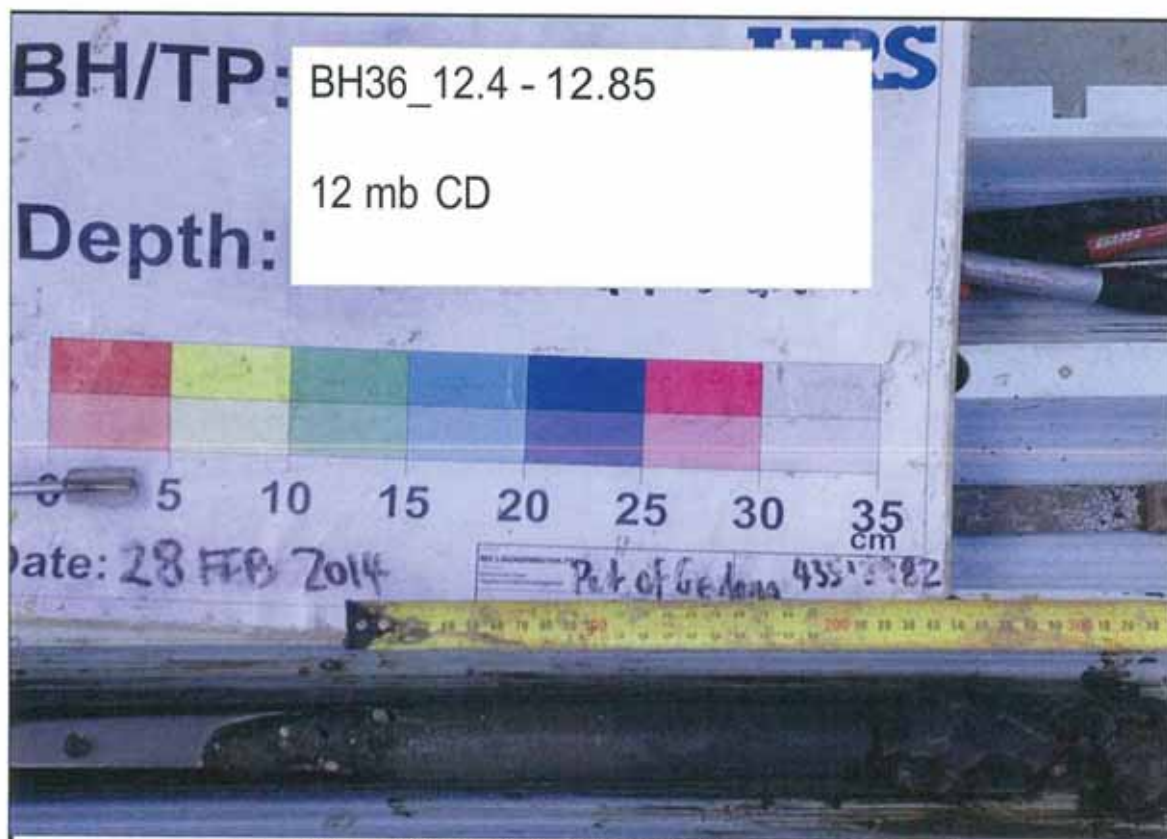


PLATE 24: BH36\_12.4-12.85, SPT sample. Quaternary Sediment

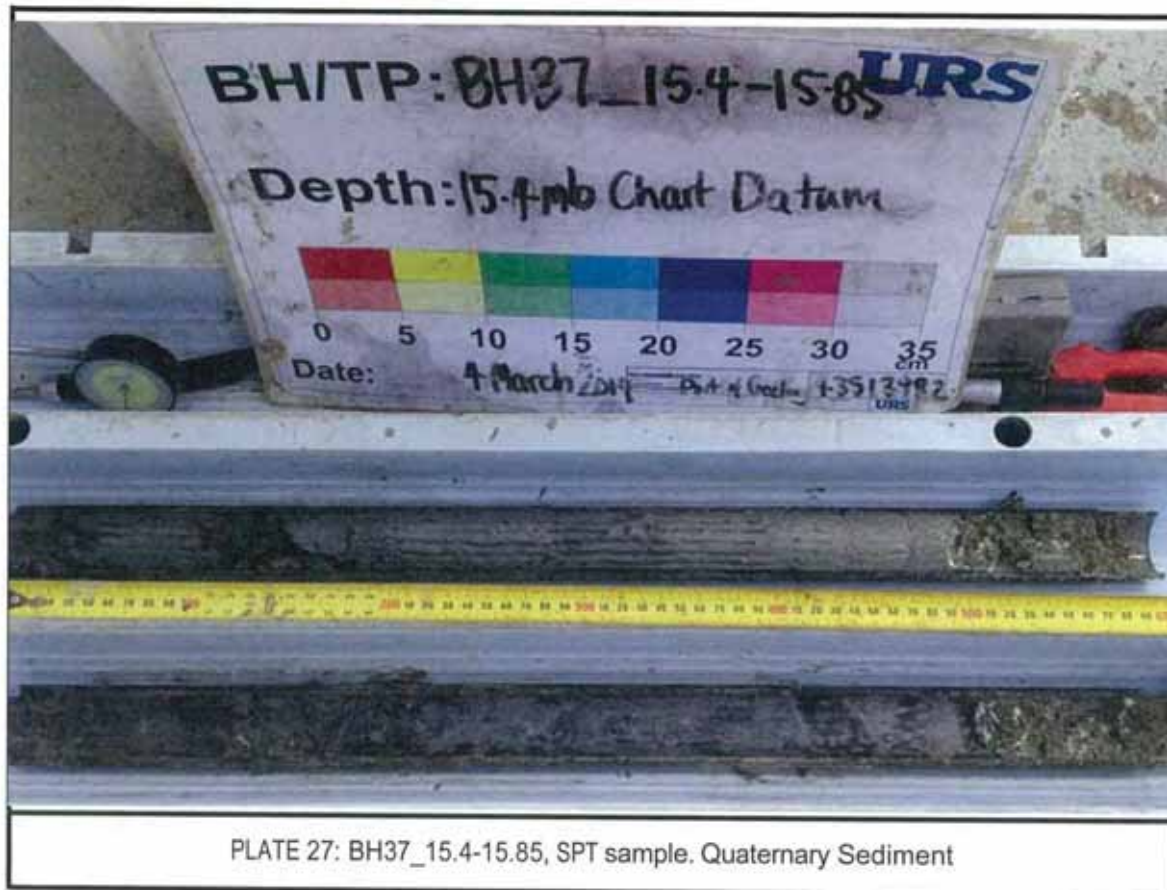


PLATE 25: BH36A\_16.3-21.0, rock core sample. Older Volcanics















PLATE 26: BH37\_12.0-12.4, extruded U63 tube sample. Quaternary Sediment





URS Australia Level 6, 1 Southbank Boulevard, Southbank		Phone (03) 8699 7500 Fax (03) 8699 7550	Project No.:  <b>43513982</b>	Project Reference:  <b>Future Channel Improvement Options</b>
Drilling Contractor: <b>SouthWestern Drilling</b>				
Drill Type: <b>DB520</b>	Logged By: <b>KF</b> Checked By: <b>DW</b> Date Started: <b>13-3-14</b> Date Finished: <b>13-3-14</b>	Sea Bed Relative Level: <b>9.90 mbCD</b> Coordinates: <b>5776510.00 mN</b> <b>284030.00 mE</b> Area: <b>PRC1</b>	Client: <b>Victorian Regional Channels Authority</b>  Location: <b>Port of Geelong</b>	

METHOD		GEOLOGY	DEPTH (mbCD)	GRAPHIC LOG	USCS CLASSIFICATION	DESCRIPTION OF STRATA	MOISTURE	CONSISTENCY/ REL DENSITY	SAMPLING TUBE	SPT	SAMPLE ID	DRILLERS COMMENTS	DRY DENSITY (t/m3)	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	% FINES (%)	TRIAxIAL UU (kPa)	SHEAR VANE (kPa)	PENETROMETER (kPa)	SPT (blows)
			0																	
			1																	
			2																	
			3																	
			4																	
			5			SEAWATER														
			6																	
			7																	
			8																	
			9			Sea bed at 9.9 m below CD														
			10			NO SAMPLE COLLECTED						Drilling is soft at 9.9 mbCD								
		UNCON	11		CH	CLAY: medium plasticity, grey slightly brown, trace sand, medium grained, rounded, trace shell fragments, up to 16mm, whole shells 16mm, while	W	VS			BH38_10.8-11.25	Attempted tube sample, sediment too soft to gain recovery (10.4-10.8 mbCD)	-	73	46	NA*	-			0, 0, 0 N=0
			12		CH	CLAY: high plasticity, dark grey - grey		VS			BH38_11.3-11.7 435mm recovery						4	0, 0, 0		
			13			Becoming dark grey, with some shells, whole shell up to 5mm, shell fragments up to 5mm, white, with trace sand, medium grained, white and grey, with trace silt at 12.65 mbCD					BH38_12.0-12.4 470mm recovery BH38_12.4-12.65 BH38_12.65-12.85	Hydrogen sulphide odour at 12.0 mbCD	0.71	87	59	99.5	10	0	0, 0, 0	0, 0, 0 N=0
		QS	14									Drilling is firm at 15 mbCD								

**REMARKS:** Drilling undertaken using casing advancing technique, therefore cuttings were not obtained between sample intervals

— Inferred boundary between geologic units (ie. MVS and QS)

- - - Observed change in lithology

..... Inferred change in lithology (depth of boundary not observed, marked as top of sample depth)

MVS- Moorabool Viaduct Sands inferred geology

QS- Quaternary Sediment inferred geology

UNCON- Unconsolidated inferred geology










BS- Basaltic Soil inferred geology

NA\*: Insufficient sample mass for analysis



## GEOTECHNICAL BOREHOLE BH38

URS Australia Level 6, 1 Southbank Boulevard, Southbank		Phone (03) 8699 7500 Fax (03) 8699 7550	Project No.:  <b>43513982</b>	Project Reference:  <b>Future Channel Improvement Options</b>
Drilling Contractor: <b>SouthWestern Drilling</b>				
Drill Type: <b>DB520</b>	Logged By: <b>KF</b> Checked By: <b>DW</b> Date Started: <b>13-3-14</b> Date Finished: <b>13-3-14</b>	Sea Bed Relative Level: <b>9.90 mbCD</b> Coordinates: <b>5776510.00 mN</b> <b>284030.00 mE</b> Area: <b>PRC1</b>	Client: <b>Victorian Regional Channels Authority</b>  Location: <b>Port of Geelong</b>	

METHOD	GEOLOGY	DEPTH (mbCD)	GRAPHIC LOG	USCS CLASSIFICATION	DESCRIPTION OF STRATA	MOISTURE	CONSISTENCY/ REL DENSITY	SAMPLING TUBE	SPT	SAMPLE ID	DRILLERS COMMENTS	DRY DENSITY (t/m3)	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	% FINES (%)	TRIAxIAL UU (kPa)	SHEAR VANE (kPa)	PENETROMETER (kPa)	SPT (blows)	
Washboring - Casing Advancer BS		15		CH	CLAY: high plasticity, pale grey with trace orange mottling, trace sand, trace silt		St			BH38_15.0-15.4 445mm recovery BH38_15.4-15.85	Drilling is soft at 15.85 mbCD	0.93	97	65	100	73	98	110, 110, 110	0, 0, 0 N=0	
		16																		
		17																		
		18		CH	CLAY: high plasticity, pale grey  Becoming orange mottled at 18.6 mbCD	St			BH38_18.0-18.4 420mm recovery BH38_18.4-18.85			-	102	69	98.6	-	60	50, 60, 65	0, 0, 0 N=0	
		19																		
		20																		
		21		CH GP	CLAY: high plasticity, pale grey - green grey, some orange and white mottling, with some cemented nodules, white, sandy, hard, crumbly, nodules are 4mm to 16mm	VSt			BH38_21.0-21.45	Drilling becoming firmer at 20.9 mbCD									5, 9, 18 N=27	
		22			GRAVEL: basalt gravels, dark brown, mottled orange, up to 35mm, vesicular, extremely weathered, angular, with some sand, sands are coarse grained, angular, dark brown mottled orange, with trace clay Clay lense at 21.35 mbCD															
		23			END OF BOREHOLE AT 21.45 m CD - TARGET DEPTH															
		24																		
		25																		
		26																		
		27																		
		28																		
	29																			

REMARKS:

URS Australia Level 6, 1 Southbank Boulevard, Southbank		Phone (03) 8699 7500 Fax (03) 8699 7550	Project No.:  <b>43513982</b>	Project Reference:  <b>Future Channel Improvement Options</b>
Drilling Contractor: <b>SouthWestern Drilling</b>				
Drill Type: <b>DB520</b>	Logged By: <b>KF</b> Checked By: <b>DW</b> Date Started: <b>6-3-14</b> Date Finished: <b>14-3-14</b>	Sea Bed Relative Level: <b>10.00 mbCD</b> Coordinates: <b>5777223.00 mN</b> <b>284666.00 mE</b> Area: <b>PRC1</b>	Client: <b>Victorian Regional Channels Authority</b>  Location: <b>Port of Geelong</b>	

METHOD	GEOLOGY	DEPTH (mbCD)	GRAPHIC LOG	USCS CLASSIFICATION	DESCRIPTION OF STRATA	MOISTURE	CONSISTENCY/REL DENSITY	SAMPLING TUBE	SPT	SAMPLE ID	DRILLERS COMMENTS	DRY DENSITY (t/m3)	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	% FINES (%)	TRIAxIAL UU (kPa)	SHEAR VANE (kPa)	PENETROMETER (kPa)	SPT (blows)
		0																	
		1																	
		2																	
		3																	
		4																	
		5																	
		6																	
		7																	
		8																	
		9																	
		10			SEA WATER														
		11		CH	CLAY: high plasticity, grey, trace shells, whole shells up to 25mm and shell fragments up to 3mm, white	W	VS			BH39_10.5-10.9 260mm recovery		-	64	41	85.0	-	0	0, 0, 0	0, 0, 0 N=0
		12		CH	SANDY CLAY: high plasticity, grey, sand fine grained, trace shell fragments, up to 3mm, white														
		13		CH	CLAY: high plasticity, grey, trace fine grained sands		VS			BH39_12.0-12.4 460mm recovery		0.67	82	50	99.8	10	1	0, 0, 0	0, 0, 0 N=0
		14		CH	Decreasing sand content at 12.65 mbCD CLAY: high plasticity, dark grey, high shell content, shells up to 2mm No longer shells at 12.75 mbCD					BH39_12.4-12.85									
											Drilling is soft at 11.35 mbCD Drilling is very soft at 11.5 mbCD Hydrogen sulphide odour at 12 mbCD								
											Drilling is soft with occasional firm layers at 14.6 mbCD								

### REMARKS:

Drilling undertaken using casing advancing technique, therefore cuttings were not obtained between sample intervals.  
 --- Inferred boundary between geologic units (ie. MVS and OS)  
 ..... Observed change in lithology  
 ..... Inferred change in lithology (depth of boundary not observed, marked as top of sample depth)  
 MVS- Moorabool Viaduct Sands inferred geology  
 OS- Quaternary Sediment inferred geology  
 UNCON- Unconsolidated inferred geology  
 BS- Basaltic Soil inferred geology  
 BH39A coordinates E 284673 N 5777227



## GEOTECHNICAL BOREHOLE BH39

URS Australia Level 6, 1 Southbank Boulevard, Southbank		Phone (03) 8699 7500 Fax (03) 8699 7550	Project No.:  <b>43513982</b>	Project Reference:  <b>Future Channel Improvement Options</b>
Drilling Contractor: <b>SouthWestern Drilling</b>				
Drill Type: <b>DB520</b>	Logged By: <b>KF</b> Checked By: <b>DW</b> Date Started: <b>6-3-14</b> Date Finished: <b>14-3-14</b>	Sea Bed Relative Level: <b>10.00 mbCD</b> Coordinates: <b>5777223.00 mN</b> <b>284666.00 mE</b> Area: <b>PRC1</b>	Client: <b>Victorian Regional Channels Authority</b>  Location: <b>Port of Geelong</b>	

METHOD		GEOLOGY	DEPTH (mbCD)	GRAPHIC LOG	USCS CLASSIFICATION	DESCRIPTION OF STRATA	MOISTURE	CONSISTENCY/ REL DENSITY	SAMPLING TUBE	SPT	SAMPLE ID	DRILLERS COMMENTS	DRY DENSITY (t/m <sup>3</sup> )	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	% FINES (%)	TRIAXIAL UU (kPa)	SHEAR VANE (kPa)	PENETROMETER (kPa)	SPT (blows)
Washboring - Casing Advancer	BS	BASALT	15		CH	CLAY: high plasticity, pale grey mottled pale brown-orange, with some silt, with some degraded rootlets Becoming pale grey mottled pale brown-orange and mottled grey at 15.6 mbCD With some silt at 15.82 mbCD	WV	VS			BH39_15.0-15.4 460mm recovery BH39_15.4-15.85		1.06	74	46	98.9	49	9	80, 90, 00	0, 0, 0 N=0
			16		GC	INTERBEDDED CLAY AND BASALT GRAVELS: clay, medium plasticity, pale grey to green-grey mottled pale brown-orange and brown, trace sands, sand is fine to coarse grained, well sorted, rounded, with some basaltic gravels, gravels are fine grained, up to 2mm, rounded, brown, calcareous nodules Increasing content of sand and basalt gravels, sub-rounded, brown at 18.3 mbCD  BASALT: distinctly weathered, dark grey, massive, vesicular, vesicles between 1 - 5 mm, high strength, fracture zone, planar to irregular, sub-horizontal, smooth to rough, coated with grey to green clay, iron oxide staining Alternating layers of clay and distinctly weathered basalt, 70 mm layers, clay is high plasticity, grey to green with trace sand, soft, fracture zone becoming joints, sub-horizontal, stepped to irregular, rough at 19 mbCD Becoming slightly weathered, dark grey, vesicular, vesicles between 1 - 2 mm, very high strength at 19.6 mbCD Becoming distinctly weathered with calcite inclusions and iron oxide staining at 20 mbCD END OF BOREHOLE AT 21 m CD - TARGET DEPTH	VS	VS			BH39_18.0-18.2 330mm recovery BH39_18.2-18.45	Tube slightly bent when recovered, refusal at 200mm SPT refusal	-	88	29	83.6	-	80	410, 350, 340	30, 30 Refusal
Diamond Coring	BASALT	18		GC			INTERBEDDED CLAY AND BASALT GRAVELS: clay, medium plasticity, pale grey to green-grey mottled pale brown-orange and brown, trace sands, sand is fine to coarse grained, well sorted, rounded, with some basaltic gravels, gravels are fine grained, up to 2mm, rounded, brown, calcareous nodules Increasing content of sand and basalt gravels, sub-rounded, brown at 18.3 mbCD  BASALT: distinctly weathered, dark grey, massive, vesicular, vesicles between 1 - 5 mm, high strength, fracture zone, planar to irregular, sub-horizontal, smooth to rough, coated with grey to green clay, iron oxide staining Alternating layers of clay and distinctly weathered basalt, 70 mm layers, clay is high plasticity, grey to green with trace sand, soft, fracture zone becoming joints, sub-horizontal, stepped to irregular, rough at 19 mbCD Becoming slightly weathered, dark grey, vesicular, vesicles between 1 - 2 mm, very high strength at 19.6 mbCD Becoming distinctly weathered with calcite inclusions and iron oxide staining at 20 mbCD END OF BOREHOLE AT 21 m CD - TARGET DEPTH	RQD 0%	ROCK DEFECT 19.1 mbCD joint, sub-vertical, 50 degrees, stepped, rough, coated in grey to green clay 19.75 - 19.85 mbCD series of vertical joints, 80 degrees, wavy, slightly rough 20.2 mbCD joint, sub-horizontal, 10 degrees, curved, in filled with yellow clay 20.45 and 20.5 mbCD joint, sub-horizontal, 15 degrees, in filled with yellow rock 20.7 mbCD fracture zone, planar to irregular, slightly rough to rough, coated in clay	DEFECT SPACING 18.8 - 19.4 mbCD: 40 mm 19.4 - 19.6 mbCD: 100 mm 19.6 - 21.0 mbCD: 40 mm										
		RQD 7%																		
			19																	
			20																	
			21																	
			22																	
			23																	
			24																	
			25																	
			26																	
			27																	
			28																	
			29																	

REMARKS:

URS Australia Level 6, 1 Southbank Boulevard, Southbank		Phone (03) 8699 7500 Fax (03) 8699 7550	Project No.: <b>43513982</b>	Project Reference: <b>Future Channel Improvement Options</b>
Drilling Contractor: <b>SouthWestern Drilling</b>				
Drill Type: <b>DB520</b>	Logged By: <b>KF</b> Checked By: <b>DW</b> Date Started: <b>6-3-14</b> Date Finished: <b>6-3-14</b>	Sea Bed Relative Level: <b>10.30 mbCD</b> Coordinates: <b>5777624.00 mN</b> <b>285554.00 mE</b> Area: <b>PRC1</b>	Client: <b>Victorian Regional Channels Authority</b>  Location: <b>Port of Geelong</b>	

METHOD	GEOLOGY	DEPTH (mbCD)	GRAPHIC LOG	USCS CLASSIFICATION	DESCRIPTION OF STRATA	MOISTURE	CONSISTENCY/REL DENSITY	SAMPLING TUBE	SPT	SAMPLE ID	DRILLERS COMMENTS	DRY DENSITY (t/m3)	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	% FINES (%)	TRIAxIAL UU (kPa)	SHEAR VANE (kPa)	PENETROMETER (kPa)	SPT (blows)
		0																	
		1																	
		2																	
		3																	
		4																	
		5																	
		6																	
		7																	
		8																	
		9																	
		10																	
		11																	
		12		CH	CLAY: high plasticity, grey, trace silt, trace shell fragments, up to 3mm	W	VS			BH40_12.0-12.4 455mm recovery BH40_12.4-12.85	Drilling is soft at 10.3 mbCD Tube samples attempted 10.8-11.2 and 11.2-11.6, no recovery, inferred soft sediments  Hydrogen sulphide odour at 12 mbCD	0.67	80	51	99.7	12	5	0, 0, 0, 0	0, 0, 0 N=0
		13																	
		14																	

**REMARKS:** Drilling undertaken using casing advancing technique, therefore cuttings were not obtained between sample intervals

— Inferred boundary between geologic units (ie. MVS and QS)

- - - Observed change in lithology

..... Inferred change in lithology (depth of boundary not observed, marked as top of sample depth)

MVS- Moorabool Viaduct Sands inferred geology

QS- Quaternary Sediment inferred geology

UNCON- Unconsolidated inferred geology

BS- Basaltic Soil inferred geology





# GEOTECHNICAL BOREHOLE BH40

Sheet 2 of 2

URS Australia Level 6, 1 Southbank Boulevard, Southbank		Phone (03) 8699 7500 Fax (03) 8699 7550	Project No.: <b>43513982</b>	Project Reference: <b>Future Channel Improvement Options</b>
Drilling Contractor: <b>SouthWestern Drilling</b>				
Drill Type: <b>DB520</b>	Logged By: <b>KF</b> Checked By: <b>DW</b> Date Started: <b>6-3-14</b> Date Finished: <b>6-3-14</b>	Sea Bed Relative Level: <b>10.30 mbCD</b> Coordinates: <b>5777624.00 mN</b> <b>285554.00 mE</b> Area: <b>PRC1</b>	Client: <b>Victorian Regional Channels Authority</b>  Location: <b>Port of Geelong</b>	

METHOD	GEOLOGY	DEPTH (mbCD)	GRAPHIC LOG	USCS CLASSIFICATION	DESCRIPTION OF STRATA	MOISTURE	CONSISTENCY/ REL DENSITY	SAMPLING TUBE	SPT	SAMPLE ID	DRILLERS COMMENTS	DRY DENSITY (t/m3)	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	% FINES (%)	TRIAXIAL UU (kPa)	SHEAR VANE (kPa)	PENETROMETER (kPa)	SPT (blows)
WB-CA	BS	15		GC	INTERBEDDED BASALT GRAVELS AND CLAY: gravels (basaltic, dark brown, up to 40mm, highly weathered, vesicular) and gravelly clays (medium plasticity, pale grey to green-grey, trace sand, fine to coarse grained, poorly sorted, up to 1mm, grey, white brown, rounded, gravels are basaltic, dark brown, up to 40mm, highly weathered, vesicular)	M	VS			BH40_15.0-15.4 BH40_15.4-15.45 BH40_15.45-15.55 BH40_15.55-15.65	SPT sample at BH40_15.4 encountered refusal at 250mm	0.96	71	47	96.1	68	18	600 250, 310	14, 20, +10 DB/ 50mm Refusal
		16			END OF BOREHOLE AT 15.65 m CD - REFUSAL ON BASALT														
		17																	
		18																	
		19																	
		20																	
		21																	
		22																	
		23																	
		24																	
		25																	
		26																	
		27																	
		28																	
		29																	

REMARKS: \* pentrometer refusing on gravel

URS Australia Level 6, 1 Southbank Boulevard, Southbank		Phone (03) 8699 7500 Fax (03) 8699 7550	Project No.:  <b>43513982</b>	Project Reference:  <b>Future Channel Improvement Options</b>
Drilling Contractor: <b>SouthWestern Drilling</b>				
Drill Type: <b>DB520</b>	Logged By: <b>KF</b> Checked By: <b>DW</b> Date Started: <b>18-3-14</b> Date Finished: <b>18-3-14</b>	Sea Bed Relative Level: <b>10.80 mbCD</b> Coordinates: <b>5778361.00 mN</b> <b>286209.00 mE</b> Area: <b>PRC1</b>	Client: <b>Victorian Regional Channels Authority</b>  Location: <b>Port of Geelong</b>	

METHOD	GEOLOGY	DEPTH (mbCD)	GRAPHIC LOG	USCS CLASSIFICATION	DESCRIPTION OF STRATA	MOISTURE	CONSISTENCY/REL DENSITY	SAMPLING TUBE	SPT	SAMPLE ID	DRILLERS COMMENTS	DRY DENSITY (t/m3)	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	% FINES (%)	TRIAXIAL UU (kPa)	SHEAR VANE (kPa)	PENETROMETER (kPa)	SPT (blows)
		0																	
		1																	
		2																	
		3																	
		4																	
		5																	
		6																	
		7																	
		8																	
		9																	
		10																	
		11																	
		12																	
		13																	
		14																	

**REMARKS:** Drilling undertaken using casing advancing technique, therefore cuttings were not obtained between sample intervals

--- Inferred boundary between geologic units (ie. MVS and QS)

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.... Inferred change in lithology (depth of boundary not observed, marked as top of sample depth)

MVS- Moorabool Viaduct Sands inferred geology

QS- Quaternary Sediment inferred geology

UNCON- Unconsolidated inferred geology

BS- Basaltic Soil inferred geology

NA\* insufficient sample mass for analysis



URS Australia Level 6, 1 Southbank Boulevard, Southbank Phone (03) 8699 7500 Fax (03) 8699 7550		Project No.: <b>43513982</b>	Project Reference: <b>Future Channel Improvement Options</b>
Drilling Contractor: <b>SouthWestern Drilling</b>		Sea Bed Relative Level: <b>10.80 mbCD</b> Coordinates: <b>5778361.00 mN</b> <b>286209.00 mE</b> Area: <b>PRC1</b>	Client: <b>Victorian Regional Channels Authority</b> Location: <b>Port of Geelong</b>
Drill Type: <b>DB520</b>	Logged By: <b>KF</b> Checked By: <b>DW</b> Date Started: <b>18-3-14</b> Date Finished: <b>18-3-14</b>		

METHOD	GEOLOGY	DEPTH (mbCD)	GRAPHIC LOG	USCS CLASSIFICATION	DESCRIPTION OF STRATA	MOISTURE	CONSISTENCY/REL DENSITY	SAMPLING TUBE	SPT	SAMPLE ID	DRILLERS COMMENTS	DRY DENSITY (t/m3)	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	% FINES (%)	TRIAXIAL UU (kPa)	SHEAR VANE (kPa)	PENETROMETER (kPa)	SPT (blows)
Washboring - Casing Advancer	OS	15		CH	CLAY: high plasticity, pale grey mottled pale brown, some sand, sand is fine to coarse grained, trace shell fragments, up to 1.5mm, Becoming grey mottled pale brown, no longer shell fragments at 15.55 mbCD	MWW	F			BH41_15.0-15.4 440mm recovery BH41_15.4-15.85	Drilling is soft-firm at 15.85 mbCD  Alternating layers (50mm) of firm and soft sediments between 16.9 and 18 mbCD	1.14	65	41	92.2	54	48	50, 50, 70	0, 0, 2
	BS	16		SP CH	SAND lense of fine to medium grained, grey to dark grey	W MWW	L S												N=2
		17			CLAY: high plasticity, grey mottled pale brown, some sand, sand is fine to medium grained														
		18		GC	INTERBEDDED BASALT GRAVELS AND CLAY: basalt gravels, clay is medium plasticity, green to grey mottled white, brown, sand is fine to coarse grained, poorly sorted					BH41_18.0-18.4 450mm recovery BH41_18.4-18.63 BH41_18.63-18.65		-	78	50	71.4	-	NFP	360, 460, 350	9, 14, 10mm Refusal
		19			With some gravels, up to 12mm, rounded to sub-rounded, increasing sand content, sands becoming calcareous at 18.6 mbCD														
		20			Weathered basalt gravel content increased, fine to coarse grained, up to 30mm, brown, vesicular														
		21			END OF BOREHOLE AT 18.65 m CD - REFUSAL ON BASALT														
		22																	
		23																	
		24																	
		25																	
		26																	
		27																	
		28																	
		29																	

REMARKS: NFP: Petrometer did not fully penetrate sample tube

URS Australia Level 6, 1 Southbank Boulevard, Southbank		Phone (03) 8699 7500 Fax (03) 8699 7550	Project No.:  <b>43513982</b>	Project Reference:  <b>Future Channel Improvement Options</b>
Drilling Contractor: <b>SouthWestern Drilling</b>				
Drill Type: <b>DB520</b>	Logged By: <b>KF</b> Checked By: <b>DW</b> Date Started: <b>19-3-14</b> Date Finished: <b>19-3-14</b>	Sea Bed Relative Level: <b>10.70 mbCD</b> Coordinates: <b>5778681.00 mN</b> <b>286977.00 mE</b> Area: <b>PRC1</b>	Client: <b>Victorian Regional Channels Authority</b>  Location: <b>Port of Geelong</b>	

METHOD	GEOLOGY	DEPTH (mbCD)	GRAPHIC LOG	USCS CLASSIFICATION	DESCRIPTION OF STRATA	MOISTURE	CONSISTENCY/REL DENSITY	SAMPLING TUBE	SPT	SAMPLE ID	DRILLERS COMMENTS	DRY DENSITY (t/m3)	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	% FINES (%)	TRIAxIAL UU (kPa)	SHEAR VANE (kPa)	PENETROMETER (kPa)	SPT (blows)
		0																	
		1																	
		2																	
		3																	
		4																	
		5																	
		6																	
		7																	
		8																	
		9																	
		10																	
		11																	
		12																	
		13		CH	CLAY: high plasticity, grey, some sand, fine to coarse grained, trace shell fragments, shell fragments up to 26mm, whole shells up to 5 - 8mm (conical shells), trace organic matter					BH42_11.2-11.65 no recovery	Drilling is soft at 10.7 mbCD								0, 0, 0 N=0
		14		CH	CLAY: high plasticity, some silt, pale grey, mottled pale brown, trace sand, fine to medium grained					BH42_12.4-12.85	Drilling is very soft at 11.65 mbCD. Attempted tube sample, no recovery due to soft sediments at 12 mbCD								0, 0, 0 N=0
		15		CH	CLAY: high plasticity, some silt, pale grey, mottled pale brown, trace sand, fine to medium grained					BH42_12.9-13.3 110mm recovery		0.94	64	40	77.9	12	4	0, 0, 0, 70, 60, 70	
		16								BH42_13.3-13.7 430mm recovery									

**REMARKS:** Drilling undertaken using casing advancing technique, therefore cuttings were not obtained between sample intervals  
 --- Inferred boundary between geologic units (ie. MVS and QS)  
 --- Observed change in lithology  
 .... Inferred change in lithology (depth of boundary not observed, marked as top of sample depth)  
 MVS- Moorabool Viaduct Sands inferred geology  
 QS- Quaternary Sediment inferred geology  
 UNCON- Unconsolidated inferred geology  
 BS- Basaltic Soil inferred geology



## GEOTECHNICAL BOREHOLE BH42

URS Australia Level 6, 1 Southbank Boulevard, Southbank		Phone (03) 8699 7500 Fax (03) 8699 7550	Project No.: <b>43513982</b>	Project Reference: <b>Future Channel Improvement Options</b>
Drilling Contractor: <b>SouthWestern Drilling</b>				
Drill Type: <b>DB520</b>	Logged By: <b>KF</b> Checked By: <b>DW</b> Date Started: <b>19-3-14</b> Date Finished: <b>19-3-14</b>	Sea Bed Relative Level: <b>10.70 mbCD</b> Coordinates: <b>5778681.00 mN</b> <b>286977.00 mE</b> Area: <b>PRC1</b>	Client: <b>Victorian Regional Channels Authority</b>  Location: <b>Port of Geelong</b>	

METHOD	GEOLOGY	DEPTH (mbCD)	GRAPHIC LOG	USCS CLASSIFICATION	DESCRIPTION OF STRATA	MOISTURE	CONSISTENCY/REL DENSITY	SAMPLING TUBE	SPT	SAMPLE ID	DRILLERS COMMENTS	DRY DENSITY (t/m3)	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	% FINES (%)	TRIAxIAL UU (kPa)	SHEAR VANE (kPa)	PENETROMETER (kPa)	SPT (blows)
Washboring - Casing Advancer	BS	15		CH	CLAY: high plasticity, pale grey, mottled pale brown, trace sand, fine to medium grained, no longer some silt		ST			BH42_15.0-15.4 435mm recovery BH42_15.4-15.85		1.08	88	59	99.9	51	86	50, 80, 100	0, 2, 2, N=4
		16									Firmer lense at 16.7 mbCD Drilling is soft at 16.9 mbCD Drilling is soft with firm lenses at 17.5 mbCD								
		17																	
		18		GC	INTERBEDDED CLAY AND BASALT GRAVELS, clay (medium plasticity, grey-green mottled pale brown mottled grey) and gravels (dark grey, up to 35mm, vesicular, hard, weathered) END OF BOREHOLE AT 18.01 m CD - REFUSAL ON BASALT.		H			BH42_18.0-18.005 BH42_18.005-18.01									10 DB/10mm Refusal
		19																	
		20																	
		21																	
		22																	
		23																	
		24																	
		25																	
		26																	
		27																	
		28																	
		29																	

REMARKS:

URS Australia Level 6, 1 Southbank Boulevard, Southbank		Phone (03) 8699 7500 Fax (03) 8699 7550	Project No.: <b>43513982</b>	Project Reference: <b>Future Channel Improvement Options</b>
Drilling Contractor: <b>SouthWestern Drilling</b>				
Drill Type: <b>DB520</b>	Logged By: <b>KF</b> Checked By: <b>DW</b> Date Started: <b>19-3-14</b> Date Finished: <b>19-3-14</b>	Sea Bed Relative Level: <b>11.20 mbCD</b> Coordinates: <b>5779497.00 mN</b> <b>287755.00 mE</b> Area: <b>PRC1</b>	Client: <b>Victorian Regional Channels Authority</b>  Location: <b>Port of Geelong</b>	

METHOD	GEOLOGY	DEPTH (mbCD)	GRAPHIC LOG	USCS CLASSIFICATION	DESCRIPTION OF STRATA	MOISTURE	CONSISTENCY/REL DENSITY	SAMPLING TUBE	SPT	SAMPLE ID	DRILLERS COMMENTS	DRY DENSITY (t/m <sup>3</sup> )	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	% FINES (%)	TRIAXIAL UU (kPa)	SHEAR VANE (kPa)	PENETROMETER (kPa)	SPT (blows)
		0																	
		1																	
		2																	
		3																	
		4																	
		5																	
		6																	
		7																	
		8																	
		9																	
		10																	
		11																	
		12		CH	CLAY: high plasticity, grey, trace sand, fine to coarse grained, trace shells; whole up to 16mm, fragments 1 - 3mm	W	VS			BH43_12.0-12.4 445mm recovery BH43_12.4-12.85	Drilling is soft at 11.5 mbCD	0.77	76	50	95.0	7	2	0, 0, 0	0, 0, 0 N=0
		13		CH	CLAY: high plasticity, pale grey mottled grey, high shell content, lenses that are mottled grey are sandy, fine grained At 12.65m, becoming pale grey, no longer mottled, sands becoming fine grained, no longer shells														
		14		CH	CLAY: high plasticity, grey-green, trace gravels, up to 5mm, fine grained, dark grey					BH43_15.0-15.01	Occasional firmer lenses (200mm thick), alternating with soft sediment at 13.9 mbCD								

**REMARKS:** Drilling undertaken using casing advancing technique, therefore cuttings were not obtained between sample intervals

— Inferred boundary between geologic units (ie. MVS and QS)

- - - Observed change in lithology

..... Inferred change in lithology (depth of boundary not observed, marked as top of sample depth)

MVS- Moorabool Viaduct Sands inferred geology

QS- Quaternary Sediment inferred geology

UNCON- Unconsolidated inferred geology

BS- Basaltic Soil inferred geology





# GEOTECHNICAL BOREHOLE BH43

Sheet 2 of 2

URS Australia Level 6, 1 Southbank Boulevard, Southbank		Phone (03) 8699 7500 Fax (03) 8699 7550	Project No.: <b>43513982</b>	Project Reference: <b>Future Channel Improvement Options</b>
Drilling Contractor: <b>SouthWestern Drilling</b>				
Drill Type: <b>DB520</b>	Logged By: <b>KF</b> Checked By: <b>DW</b> Date Started: <b>19-3-14</b> Date Finished: <b>19-3-14</b>	Sea Bed Relative Level: <b>11.20 mbCD</b> Coordinates: <b>5779497.00 mN</b> <b>287755.00 mE</b> Area: <b>PRC1</b>	Client: <b>Victorian Regional Channels Authority</b>  Location: <b>Port of Geelong</b>	

METHOD	GEOLOGY	DEPTH (mbCD)	GRAPHIC LOG	USCS CLASSIFICATION	DESCRIPTION OF STRATA	MOISTURE	CONSISTENCY/REL DENSITY	SAMPLING TUBE	SPT	SAMPLE ID	DRILLERS COMMENTS	DRY DENSITY (t/m3)	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	% FINES (%)	TRIAxIAL UU (kPa)	SHEAR VANE (kPa)	PENETROMETER (kPa)	SPT (blows)
		15		GP	GRAVEL: basalt gravels, up to 6mm, dark brown, vesicular END OF BOREHOLE AT 15.01 m CD - REFUSAL ON BASALT	WV	H			No recovery	Tube sample refusal at 15 mbCD								8 DB Refusal
		16																	
		17																	
		18																	
		19																	
		20																	
		21																	
		22																	
		23																	
		24																	
		25																	
		26																	
		27																	
		28																	
		29																	
REMARKS:																			

URS Australia Level 6, 1 Southbank Boulevard, Southbank		Phone (03) 8699 7500 Fax (03) 8699 7550	Project No.:  <b>43513982</b>	Project Reference:  <b>Future Channel Improvement Options</b>
Drilling Contractor: <b>SouthWestern Drilling</b>				
Drill Type: <b>DB520</b>	Logged By: <b>KF</b> Checked By: <b>DW</b> Date Started: <b>20-3-14</b> Date Finished: <b>20-3-14</b>	Sea Bed Relative Level: <b>11.40 mbCD</b> Coordinates: <b>5779801.00 mN</b> <b>288502.00 mE</b> Area: <b>PRC1</b>	Client: <b>Victorian Regional Channels Authority</b>  Location: <b>Port of Geelong</b>	

METHOD	GEOLOGY	DEPTH (mbCD)	GRAPHIC LOG	USCS CLASSIFICATION	DESCRIPTION OF STRATA	MOISTURE	CONSISTENCY/REL DENSITY	SAMPLING TUBE	SPT	SAMPLE ID	DRILLERS COMMENTS	DRY DENSITY (t/m3)	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	% FINES (%)	TRIAxIAL UU (kPa)	SHEAR VANE (kPa)	PENETROMETER (kPa)	SPT (blows)
		0																	
		1																	
		2																	
		3																	
		4																	
		5																	
		6																	
		7																	
		8																	
		9																	
		10																	
		11																	
		12		CH	CLAY: high plasticity, some sand / silt, dark grey, sand is fine to medium grained, well sorted, trace shell fragments, white, up to 2mm	W	VS			BH44_12.0-12.4 365mm recovery BH44_12.4-12.85	Drilling is soft at 11.5 mbCD	0.78	68	44	93.7	8	0	0	0, 0, 0 N=0
		13		CH	CLAY: high plasticity, dark grey, trace sand, fine to medium grained, well sorted, trace shell fragments, white, up to 2mm														
		14									Firmer lense (100mm thick) at 14.2 mbCD and 14.6 mbCD								

**REMARKS:** Drilling undertaken using casing advancing technique, therefore cuttings were not obtained between sample intervals

— Inferred boundary between geologic units (ie. MVS and QS)

--- Observed change in lithology

..... Inferred change in lithology (depth of boundary not observed, marked as top of sample depth)

MVS- Moorabool Viaduct Sands inferred geology








QS- Quaternary Sediment inferred geology

UNCON- Unconsolidated inferred geology



## GEOTECHNICAL BOREHOLE BH44

URS Australia Level 6, 1 Southbank Boulevard, Southbank		Phone (03) 8699 7500 Fax (03) 8699 7550	Project No.:  <b>43513982</b>	Project Reference:  <b>Future Channel Improvement Options</b>
Drilling Contractor: <b>SouthWestern Drilling</b>				
Drill Type: <b>DB520</b>	Logged By: <b>KF</b> Checked By: <b>DW</b> Date Started: <b>20-3-14</b> Date Finished: <b>20-3-14</b>	Sea Bed Relative Level: <b>11.40 mbCD</b> Coordinates: <b>5779801.00 mN</b> <b>288502.00 mE</b> Area: <b>PRC1</b>	Client: <b>Victorian Regional Channels Authority</b>  Location: <b>Port of Geelong</b>	

METHOD	GEOLOGY	DEPTH (mbCD)	GRAPHIC LOG	USCS CLASSIFICATION	DESCRIPTION OF STRATA	MOISTURE	CONSISTENCY/REL DENSITY	SAMPLING TUBE	SPT	SAMPLE ID	DRILLERS COMMENTS	DRY DENSITY (t/m3)	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	% FINES (%)	TRIAxIAL UII (kPa)	SHEAR VANE (kPa)	PENETROMETER (kPa)	SPT (blows)
Washboring - Casing Advancer OS		15		CH	CLAY: high plasticity, pale grey with trace orange to pale brown mottling, trace fine to medium grained sand, well sorted, trace shell fragments, white, up to 2mm	MW	Vst			BH44_15.0-15.4 440mm recovery BH44_15.4-15.85		1.11	82	54	99.7	72	112	180, 140, 170	0, 1, 4 N=5
		16																	
		17																	
		18			CLAY: high plasticity, grey, with trace dark grey mottling, some sand, fine to medium grained, well sorted, white, grey, high shell content, shell fragments, white, up to 33mm	M	St			BH44_18.0-18.4 445mm recovery BH44_18.4-18.85	Occasional firmer lenses alternating with soft sediment at 19 mbCD	-	73	44	95.4	-	86	140, 140, 110	0, 0, 2 N=2
		19																	
		20																	
		21			CLAY: high plasticity, pale grey trace mottled pale brown-orange, some sand, fine to medium grained, well sorted, white, grey, high shell content, shell fragments, white, up to 33mm	MW	F			BH44_21.0-21.45	Drilling is firm at 20.8 mbCD								1, 2, 4 N=6
		22			END OF BOREHOLE AT 21.45 m CD - TARGET DEPTH														
		23																	
		24																	
		25																	
		26																	
		27																	
		28																	
		29																	

REMARKS:

URS Australia Level 6, 1 Southbank Boulevard, Southbank		Phone (03) 8699 7500 Fax (03) 8699 7550	Project No.:  <b>43513982</b>	Project Reference:  <b>Future Channel Improvement Options</b>
Drilling Contractor: <b>SouthWestern Drilling</b>				
Drill Type: <b>DB520</b>	Logged By: <b>KF</b> Checked By: <b>DW</b> Date Started: <b>20-3-14</b> Date Finished: <b>20-3-14</b>	Sea Bed Relative Level: <b>11.70 mbCD</b> Coordinates: <b>5780428.00 mN</b> <b>289046.00 mE</b> Area: <b>PRC1</b>	Client: <b>Victorian Regional Channels Authority</b>  Location: <b>Port of Geelong</b>	

METHOD	GEOLOGY	DEPTH (mbCD)	GRAPHIC LOG	USCS CLASSIFICATION	DESCRIPTION OF STRATA	MOISTURE	CONSISTENCY/REL DENSITY	SAMPLING TUBE	SPT	SAMPLE ID	DRILLERS COMMENTS	DRY DENSITY (t/m3)	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	% FINES (%)	TRIAXIAL UU (kPa)	SHEAR VANE (kPa)	PENETROMETER (kPa)	SPT (blows)
		0																	
		1																	
		2																	
		3																	
		4																	
		5																	
		6																	
		7																	
		8																	
		9																	
		10																	
		11																	
		12		CL															
		13		CL															
		14		CH															

**REMARKS:** Drilling undertaken using casing advancing technique, therefore cuttings were not obtained between sample intervals

— Inferred boundary between geologic units (ie. MVS and OS)

- - - Observed change in lithology

..... Inferred change in lithology (depth of boundary not observed, marked as top of sample depth)

MVS- Moorabool Viaduct Sands inferred geology

QS- Quaternary Sediment inferred geology

UNCON- Unconsolidated inferred geology

NA\*- sample too disturbed for analysis








URS Australia Level 6, 1 Southbank Boulevard, Southbank Phone (03) 8699 7500 Fax (03) 8699 7550		Project No.: <b>43513982</b>	Project Reference: <b>Future Channel Improvement Options</b>
Drilling Contractor: <b>SouthWestern Drilling</b>		Sea Bed Relative Level: <b>11.70 mbCD</b> Coordinates: <b>5780428.00 mN</b> <b>289046.00 mE</b> Area: <b>PRC1</b>	Client: <b>Victorian Regional Channels Authority</b> Location: <b>Port of Geelong</b>
Drill Type: <b>DB520</b>	Logged By: <b>KF</b> Checked By: <b>DW</b> Date Started: <b>20-3-14</b> Date Finished: <b>20-3-14</b>		

METHOD	GEOLOGY	DEPTH (mbCD)	GRAPHIC LOG	USCS CLASSIFICATION	DESCRIPTION OF STRATA	MOISTURE	CONSISTENCY/REL DENSITY	SAMPLING TUBE	SPT	SAMPLE ID	DRILLERS COMMENTS	DRY DENSITY (t/m3)	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	% FINES (%)	TRIAxIAL UU (kPa)	SHEAR VANE (kPa)	PENETROMETER (kPa)	SPT (blows)
Washboring - Casing Advancer	MVS QS	15		CH	CLAY: high plasticity, pale grey to green grey mottled orange-pale brown, with some sands, fine to medium grained, rounded, trace cemented sandy nodules With trace shell fragments, up to 3mm, white at 15.68 mbCD With a high shell content, shell fragments are up to 7mm, white, whole shells are up to 2mm and conical at 15.75 mbCD		F			BH45_15.0-15.4 400mm recovery BH45_15.4-15.75 BH45_15.75-15.8 BH45_15.8-15.85		1.01	78	51	100	91	44	40, 60, 50	0, 0, 1 N=1
		16																	
		17																	
		18			CLAY: high plasticity, dark grey, some fine to medium grained sand, rounded, poorly sorted, white, with some whole shells (up to 5mm) and shell fragments (up to 9mm), white		St			BH45_18.0-18.4 460mm recovery BH45_18.4-18.85		-	74	48	96	-	52	70, 80, 110	0, 0, 0 N=0
		19																	
		20																	
		21		CH	Sandy CLAY: high plasticity, pale grey mottled pale brown-orange, sand is medium grained, rounded, dark brown		St			BH45_21.0-21.45									0, 4, 5 N=9
		22			END OF BOREHOLE AT 21.45 m CD - TARGET DEPTH														
		23																	
		24																	
		25																	
		26																	
		27																	
		28																	
		29																	

REMARKS:

URS Australia Level 6, 1 Southbank Boulevard, Southbank		Phone (03) 8699 7500 Fax (03) 8699 7550	Project No.:  <b>43513982</b>	Project Reference:  <b>Future Channel Improvement Options</b>
Drilling Contractor: <b>SouthWestern Drilling</b>				
Drill Type: <b>DB520</b>	Logged By: <b>KF</b> Checked By: <b>DW</b> Date Started: <b>24-3-14</b> Date Finished: <b>24-3-14</b>	Sea Bed Relative Level: <b>11.00 mbCD</b> Coordinates: <b>5780755.00 mN</b> <b>289880.00 mE</b> Area: <b>PRC1</b>	Client: <b>Victorian Regional Channels Authority</b>  Location: <b>Port of Geelong</b>	

METHOD		GEOLOGY	DEPTH (mbCD)	GRAPHIC LOG	USCS CLASSIFICATION	DESCRIPTION OF STRATA	MOISTURE	CONSISTENCY/REL DENSITY	SAMPLING TUBE	SPT	SAMPLE ID	DRILLERS COMMENTS	DRY DENSITY (t/m3)	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	% FINES (%)	TRIAXIAL UU (kPa)	SHEAR VANE (kPa)	PENETROMETER (kPa)	SPT (blows)	
Washboring - Casing Advancer	UNCON		0			SEAWATER															
			1																		
			2																		
			3																		
			4																		
			5																		
			6																		
			7																		
			8																		
			9																		
			10					Sea bed at 11 m below CD													
		11			NO SAMPLE COLLECTED - CLAY INFERRED																
	QS		12		CH	CLAY: medium plasticity, pale brown with trace pale grey mottling, with trace sands, fine to coarse grained	W	F				BH46_12.0-12.4 430mm recovery	Hard crust on seabed at 11mbCD for 300mm Drilling is soft at 11.3 mbCD Harder lense (100mm thick) at 11.6 mbCD Drilling is soft at 11.7 mbCD	1.31	66	41	98.8	78	32	70, 90, 70	
			13		SC	CLAYEY SAND: fine to medium grained, brown, clay is brown and low plasticity		L	 			No recovery, BH46_12.4-12.85 BH46_12.9-13.2 BH46_13.2-13.35									0, 1, 3 N=3 2, 3, 5 N=8
		14																			

**REMARKS:** Drilling undertaken using casing advancing technique, therefore cuttings were not obtained between sample intervals  
 — Inferred boundary between geologic units (ie. MVS and QS)  
 - - - Observed change in lithology  
 . . . . Inferred change in lithology (depth of boundary not observed, marked as top of sample depth)  
 MVS- Moorabool Viaduct Sands inferred geology  
 QS- Quaternary Sediment inferred geology  
 UNCON- Unconsolidated inferred geology



URS Australia Level 6, 1 Southbank Boulevard, Southbank		Phone (03) 8699 7500 Fax (03) 8699 7550	Project No.: <b>43513982</b>	Project Reference: <b>Future Channel Improvement Options</b>
Drilling Contractor: <b>SouthWestern Drilling</b>				
Drill Type: <b>DB520</b>	Logged By: <b>KF</b> Checked By: <b>DW</b> Date Started: <b>24-3-14</b> Date Finished: <b>24-3-14</b>	Sea Bed Relative Level: <b>11.00 mbCD</b> Coordinates: <b>5780755.00 mN</b> <b>289880.00 mE</b> Area: <b>PRC1</b>	Client: <b>Victorian Regional Channels Authority</b>  Location: <b>Port of Geelong</b>	

METHOD	GEOLOGY	DEPTH (mbCD)	GRAPHIC LOG	USCS CLASSIFICATION	DESCRIPTION OF STRATA	MOISTURE	CONSISTENCY/REL DENSITY	SAMPLING TUBE	SPT	SAMPLE ID	DRILLERS COMMENTS	DRY DENSITY (t/m3)	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	% FINES (%)	TRIAxIAL UU (kPa)	SHEAR VANE (kPa)	PENETROMETER (kPa)	SPT (blows)
Washboring - Casing Advancer	MVS QS	15		CL	Sandy CLAY: brown, medium plasticity, sands fine to medium grained, grey	S	S			BH46_15.0-15.4 445 mm recovery		1.05	45	28	95.9	74	20	50, 60, 70	0, 0, 0 N=0
		16		CH	Sandy CLAY: high plasticity, pale grey, sand is fine grained					BH46_15.4-15.8 BH46_15.8-15.85									
		17		CH	CLAY: high plasticity, pale grey mottled pale brown with some shell fragments, up to 9mm, whole shells, up to 6mm, white, orange	S				BH46_18.0-18.4 450mm recovery	Drilling is firm at 18.3 mbCD	-	72	45	94	-	24	60, 90, 80	0, 0, 0 N=0
		18		CL	CLAY: high plasticity, pale grey, with some sand, medium to coarse grained, poorly sorted, decreasing shell content with depth					BH46_18.4-18.85									
		19				VSI				BH46_21.0-21.45	No recovery from 21-21.4 5mbCD SPT							4, 1, 3 N=4	8, 13, 13 N=26
		20		SW	SAND: fine to medium grained, well sorted, brown, trace mottled dark brown, trace clay					BH46_21.5-21.95									
		21			No longer dark brown mottling, decreasing clay content at 21.6 mbCD														
		22			END OF BOREHOLE AT 21.95 m CD - TARGET DEPTH														
		23																	
		24																	
		25																	
		26																	
		27																	
		28																	
		29																	

REMARKS:

URS Australia Level 6, 1 Southbank Boulevard, Southbank		Phone (03) 8699 7500 Fax (03) 8699 7550	Project No.:  <b>43513982</b>	Project Reference:  <b>Future Channel Improvement Options</b>
Drilling Contractor: <b>SouthWestern Drilling</b>				
Drill Type: <b>DB520</b>	Logged By: <b>KF</b> Checked By: <b>DW</b> Date Started: <b>31-3-14</b> Date Finished: <b>31-3-14</b>	Sea Bed Relative Level: <b>10.60 mbCD</b> Coordinates: <b>5781407.00 mN</b> <b>290751.00 mE</b> Area: <b>PRC1</b>	Client: <b>Victorian Regional Channels Authority</b>  Location: <b>Port of Geelong</b>	

METHOD	GEOLOGY	DEPTH (mbCD)	GRAPHIC LOG	USCS CLASSIFICATION	DESCRIPTION OF STRATA	MOISTURE	CONSISTENCY/REL DENSITY	SAMPLING TUBE	SPT	SAMPLE ID	DRILLERS COMMENTS	DRY DENSITY (t/m3)	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	% FINES (%)	TRIAXIAL UU (kPa)	SHEAR VANE (kPa)	PENETROMETER (kPa)	SPT (blows)
		0																	
		1																	
		2																	
		3																	
		4																	
		5																	
		6																	
		7																	
		8																	
		9																	
		10																	
		11																	
		12																	
		13																	
		14																	

**REMARKS:** Drilling undertaken using casing advancing technique, therefore cuttings were not obtained between sample intervals  
 --- Inferred boundary between geologic units (ie. MVS and QS)  
 - - - Observed change in lithology  
 . . . . Inferred change in lithology (depth of boundary not observed, marked as top of sample depth)  
 MVS- Moorabool Viaduct Sands inferred geology  
 QS- Quaternary Sediment inferred geology  
 NA- Insufficient sample for analysis



URS Australia Level 6, 1 Southbank Boulevard, Southbank		Phone (03) 8699 7500 Fax (03) 8699 7550	Project No.: <b>43513982</b>	Project Reference: <b>Future Channel Improvement Options</b>
Drilling Contractor: <b>SouthWestern Drilling</b>				
Drill Type: <b>DB520</b>	Logged By: <b>KF</b> Checked By: <b>DW</b> Date Started: <b>31-3-14</b> Date Finished: <b>31-3-14</b>	Sea Bed Relative Level: <b>10.60 mbCD</b> Coordinates: <b>5781407.00 mN</b> <b>290751.00 mE</b> Area: <b>PRC1</b>	Client: <b>Victorian Regional Channels Authority</b>  Location: <b>Port of Geelong</b>	

METHOD	GEOLOGY	DEPTH (mbCD)	GRAPHIC LOG	USCS CLASSIFICATION	DESCRIPTION OF STRATA	MOISTURE	CONSISTENCY/REL DENSITY	SAMPLING TUBE	SPT	SAMPLE ID	DRILLERS COMMENTS	DRY DENSITY (t/m3)	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	% FINES (%)	TRIAxIAL UU (kPa)	SHEAR VANE (kPa)	PENETROMETER (kPa)	SPT (blows)
Washboring - Casing Advancer	MVS	15		CH	CLAY: high plasticity, pale grey trace mottled grey, some sand, sand is fine grained, uniform  With trace shell fragments and whole shells, up to 8mm, white, orange at 15.75 mbCD High shell content lense, fragments up to 8mm and whole shells up to 5mm at 15.8 mbCD					BH47_15.0-15.4 360mm recovery BH47_15.4-15.85		1.03	77	46	98.2	50	44	100, 50, 50	0, 0, 0 N=0
		16																	
		17																	
		18		CH	CLAY: high plasticity, grey, trace sand, sand is fine grained, uniform, trace shell fragments up to 6mm, white	St				BH47_18.0-18.4 370mm recovery BH47_18.4-18.82 BH47_18.82-18.85		-	59	34	75.8	-	56	70, 60, 70	0, 0, 2 N=2
		19		CH	With some sand at 18.65 mbCD Sandy CLAY: high plasticity, grey, sand is fine to coarse grained, rounded														
		20		CH	CLAY: medium plasticity, orange-pale brown, mottled pale grey, trace mottled grey, sand is fine to medium grained, rounded, sands are brown, grey, increasing sand content with depth	M/W	St			BH47_21.0-21.3 BH47_21.3-21.45	Drilling is firm at 20.1 mbCD								4, 4, 5 N=9
		21			Becoming brown at 21.3 mbCD END OF BOREHOLE AT 21.45 m CD - TARGET DEPTH														
		22																	
		23																	
		24																	
		25																	
		26																	
		27																	
		28																	
		29																	

REMARKS:

URS Australia Level 6, 1 Southbank Boulevard, Southbank		Phone (03) 8699 7500 Fax (03) 8699 7550	Project No.:  <b>43513982</b>	Project Reference:  <b>Future Channel Improvement Options</b>
Drilling Contractor: <b>SouthWestern Drilling</b>				
Drill Type: <b>DB520</b>	Logged By: <b>KF</b> Checked By: <b>DW</b> Date Started: <b>21-3-14</b> Date Finished: <b>28-3-14</b>	Sea Bed Relative Level: <b>9.50 mbCD</b> Coordinates: <b>5781474.00 mN</b> <b>291595.00 mE</b> Area: <b>PRC1</b>	Client: <b>Victorian Regional Channels Authority</b>  Location: <b>Port of Geelong</b>	


METHOD	GEOLOGY	DEPTH (mbCD)	GRAPHIC LOG	USCS CLASSIFICATION	DESCRIPTION OF STRATA	MOISTURE	CONSISTENCY/REL DENSITY	SAMPLING TUBE	SPT	SAMPLE ID	DRILLERS COMMENTS	DRY DENSITY (t/m <sup>3</sup> )	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	% FINES (%)	TRIAxIAL UU (kPa)	SHEAR VANE (kPa)	PENETROMETER (kPa)	SPT (blows)
		0																	
		1																	
		2																	
		3																	
		4																	
		5																	
		6																	
		7																	
		8																	
		9																	
		10																	
		11																	
		12																	
		13																	
		14																	

**REMARKS:** Drilling undertaken using casing advancing technique, therefore cuttings were not obtained between sample intervals  
 --- Inferred boundary between geologic units (ie. MVS and QS)  
 - - - Observed change in lithology  
 . . . . . Inferred change in lithology (depth of boundary not observed, marked as top of sample depth)  
 MVS- Moorabool Viaduct Sands inferred geology  
 BH48A coordinates: E 291594 N 578467



## GEOTECHNICAL BOREHOLE BH48

URS Australia Level 6, 1 Southbank Boulevard, Southbank		Phone (03) 8699 7500 Fax (03) 8699 7550	Project No.:  <b>43513982</b>	Project Reference:  <b>Future Channel Improvement Options</b>
Drilling Contractor: <b>SouthWestern Drilling</b>				
Drill Type: <b>DB520</b>	Logged By: <b>KF</b> Checked By: <b>DW</b> Date Started: <b>21-3-14</b> Date Finished: <b>28-3-14</b>	Sea Bed Relative Level: <b>9.50 mbCD</b> Coordinates: <b>5781474.00 mN</b> <b>291595.00 mE</b> Area: <b>PRC1</b>	Client: <b>Victorian Regional Channels Authority</b>  Location: <b>Port of Geelong</b>	

METHOD	GEOLOGY	DEPTH (mbCD)	GRAPHIC LOG	USCS CLASSIFICATION	DESCRIPTION OF STRATA	MOISTURE	CONSISTENCY/REL DENSITY	SAMPLING TUBE	SPT	SAMPLE ID	DRILLERS COMMENTS	DRY DENSITY (gm3)	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	% FINES (%)	TRIAxIAL UU (kPa)	SHEAR VANE (kPa)	PENETROMETER (kPa)	SPT (blows)
Washboring - Casing Advancer	MVS	15		CH	CLAY: medium plasticity, pale grey mottled pale brown, sand is fine to medium grained, poorly sorted, rounded, trace shell fragments up to 3mm Becoming pale grey mottled pale brown and grey, with some white nodules, sandy, clayey nodules, calcified, sand is medium grained, rounded at 15.5 mbCD	H				BH48A_15.0-15.4 390mm recovery BH48A_15.4-15.6 BH48A_15.6-15.85	Drilling is soft-firm at 15.85 mbCD	1.4	63	36	85.2	188	216	390, 250, 240	2, 2, 4 N=6
		16																	
		17																	
		18			CLAY: high plasticity, pale grey mottled pale brown and grey With trace grey staining, possibly organic matter, decayed roots at 18.4 mbCD	Vst				BH48A_18.0-18.4 450mm recovery BH48A_18.4-18.85		-	71	47	89.6	-	166	220, 240, 270	2, 3, 4 N=7
		19																	
		20																	
		21		CH	CLAY: some sand, some silt, high plasticity, pale grey mottled dark grey, black (possibly charcoal), sand is fine grained, uniform, some charcoal pieces, up to 2mm, black, crumbly	S				BH48A_21.0-21.45									0, 0, 3 N=3
		22			END OF BOREHOLE AT 21.45 m CD - TARGET DEPTH														
		23																	
		24																	
		25																	
		26																	
		27																	
		28																	
		29																	

REMARKS:

URS Australia Level 6, 1 Southbank Boulevard, Southbank		Phone (03) 8699 7500 Fax (03) 8699 7550	Project No.:  <b>43513982</b>	Project Reference:  <b>Future Channel Improvement Options</b>
Drilling Contractor: <b>SouthWestern Drilling</b>				
Drill Type: <b>DB520</b>	Logged By: <b>KF</b> Checked By: <b>DW</b> Date Started: <b>31-3-14</b> Date Finished: <b>31-3-14</b>	Sea Bed Relative Level: <b>10.00 mbCD</b> Coordinates: <b>5781871.00 mN</b> <b>292389.00 mE</b> Area: <b>PRC1</b>	Client: <b>Victorian Regional Channels Authority</b>  Location: <b>Port of Geelong</b>	

METHOD	GEOLOGY	DEPTH (mbCD)	GRAPHIC LOG	USCS CLASSIFICATION	DESCRIPTION OF STRATA	MOISTURE	CONSISTENCY/REL DENSITY	SAMPLING TUBE	SPT	SAMPLE ID	DRILLERS COMMENTS	DRY DENSITY (t/m <sup>3</sup> )	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	% FINES (%)	TRIAXIAL UU (kPa)	SHEAR VANE (kPa)	PENETROMETER (kPa)	SPT (blows)
		0																	
		1																	
		2																	
		3																	
		4																	
		5																	
		6																	
		7																	
		8																	
		9																	
		10																	
		11		CH	CLAY: high plasticity, pale brown-orange mottled pale grey mottled white, sand is fine to coarse grained, well sorted, brown, grey, white, rounded, some gravels, fine to medium grained, calcified nodules, white, cemented sand nodules Gravels becoming fine to coarse grained, up to 35mm, cemented sands forming gravels and calcified nodules at 11.25mbCD CLAY: high plasticity, pale brown-orange mottled pale grey mottled white, sand is fine to coarse grained, well sorted, brown, grey, white, rounded	MW	VSI			BH49_10.5-10.85 460mm recovery BH49_10.85-11.3	Drilling is firm at 10 mbCD Refusal of tube at 350mm Drilling is hard at 11.3 mbCD	-	52	31	61	-	NP	>600, >600, >600	8, 11, 15 N=26
		12					VSI			BH49_12.0-12.4 440mm recovery BH49_12.4-12.85	Drilling is firm at 12.85 mbCD	1.51	53	39	89.9	211	160 (NFP)	280, 270, 310	4, 7, 10 N=17
		13																	
		14																	

**REMARKS:** Drilling undertaken using casing advancing technique, therefore cuttings were not obtained between sample intervals  
 — Inferred boundary between geologic units (ie. MVS and QS)  
 - - - - - Observed change in lithology  
 . . . . . Inferred change in lithology (depth of boundary not observed, marked as top of sample depth)  
 MVS: Moorabool Viaduct Sands inferred geology  
 NP: No penetration of shear vane  
 NFP: Shear vane not fully penetrating into tube sample



## GEOTECHNICAL BOREHOLE BH49

URS Australia Level 6, 1 Southbank Boulevard, Southbank		Phone (03) 8699 7500 Fax (03) 8699 7550	Project No.: <b>43513982</b>	Project Reference: <b>Future Channel Improvement Options</b>
Drilling Contractor: <b>SouthWestern Drilling</b>				
Drill Type: <b>DB520</b>	Logged By: <b>KF</b> Checked By: <b>DW</b> Date Started: <b>31-3-14</b> Date Finished: <b>31-3-14</b>	Sea Bed Relative Level: <b>10.00 mbCD</b> Coordinates: <b>5781871.00 mN</b> <b>292389.00 mE</b> Area: <b>PRC1</b>	Client: <b>Victorian Regional Channels Authority</b>  Location: <b>Port of Geelong</b>	

METHOD	GEOLOGY	DEPTH (mbCD)	GRAPHIC LOG	USCS CLASSIFICATION	DESCRIPTION OF STRATA	MOISTURE	CONSISTENCY/REL DENSITY	SAMPLING TUBE	SPT	SAMPLE ID	DRILLERS COMMENTS	DRY DENSITY (t/m <sup>3</sup> )	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	% FINES (%)	TRIAXIAL UU (kPa)	SHEAR VANE (kPa)	PENETROMETER (kPa)	SPT (blows)
Washboring - Casing Advancer	MVS	15		CH	CLAY: high plasticity, pale brown and pale grey mottled, trace sand, fine to medium grained, well sorted, brown, grey, white, rounded		H			BH49_15.0-15.4 410mm recovery BH49_15.4-15.85		1.38	68	38	93.4	225	220	230, 310, 310	7, 9, 12 N=21
		16																	
		17																	
		18		CH	CLAY: high plasticity, pale brown and pale grey mottled, trace sand, fine to medium grained, well sorted, brown, grey, white, rounded Increasing sand content, becoming fine to medium grained at 18.65 mbCD	VS				BH49_18.0-18.4 445mm recovery BH49_18.4-18.85		-	73	47	94.8	-	190	220, 270, 260	4, 6, 7 N=13
		19																	
		20																	
		21		SW CH	SAND: pale brown, fine to medium grained, rounded, uniform, trace clay CLAY: high plasticity, pale brown-orange, mottled pale grey, some sand, sand is fine to coarse grained, brown, rounded END OF BOREHOLE AT 21.45 m CD - TARGET DEPTH	W M/W	MD SI			BH48_21.0-21.3 BH48_21.3-21.45									9, 5, 3 N=8
		22																	
		23																	
		24																	
		25																	
		26																	
		27																	
		28																	
		29																	

REMARKS:




URS Australia Level 6, 1 Southbank Boulevard, Southbank		Phone (03) 8699 7500 Fax (03) 8699 7550	Project No.:  <b>43513982</b>	Project Reference:  <b>Future Channel Improvement Options</b>
Drilling Contractor: <b>SouthWestern Drilling</b>				
Drill Type: <b>DB520</b>	Logged By: <b>KF</b> Checked By: <b>DW</b> Date Started: <b>27-3-14</b> Date Finished: <b>27-3-14</b>	Sea Bed Relative Level: <b>12.00 mbCD</b> Coordinates: <b>5781869.00 mN</b> <b>293389.00 mE</b> Area: <b>PRC1</b>	Client: <b>Victorian Regional Channels Authority</b>  Location: <b>Port of Geelong</b>	

METHOD	GEOLOGY	DEPTH (mbCD)	GRAPHIC LOG	USCS CLASSIFICATION	DESCRIPTION OF STRATA	MOISTURE	CONSISTENCY/REL DENSITY	SAMPLING TUBE	SPT	SAMPLE ID	DRILLERS COMMENTS	DRY DENSITY (t/m3)	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	% FINES (%)	TRIAxIAL UU (kPa)	SHEAR VANE (kPa)	PENETROMETER (kPa)	SPT (blows)
		0																	
		1																	
		2																	
		3																	
		4																	
		5																	
		6																	
		7																	
		8																	
		9																	
		10																	
		11																	
		12																	
		13																	
		14																	

REMARKS: Drilling undertaken using casing advancing technique, therefore cuttings were not obtained between sample intervals  
 — Inferred boundary between geologic units (ie. MVS and QS)  
 - - - Observed change in lithology  
 . . . . Inferred change in lithology (depth of boundary not observed, marked as top of sample depth)  
 MVS- Moorabool Viaduct Sands inferred geology



URS Australia Level 6, 1 Southbank Boulevard, Southbank		Phone (03) 8699 7500 Fax (03) 8699 7550	Project No.:  <b>43513982</b>	Project Reference:  <b>Future Channel Improvement Options</b>
Drilling Contractor: <b>SouthWestern Drilling</b>				
Drill Type: <b>DB520</b>	Logged By: <b>KF</b> Checked By: <b>DW</b> Date Started: <b>27-3-14</b> Date Finished: <b>27-3-14</b>	Sea Bed Relative Level: <b>12.00 mbCD</b> Coordinates: <b>5781869.00 mN</b> <b>293389.00 mE</b> Area: <b>PRC1</b>	Client: <b>Victorian Regional Channels Authority</b>  Location: <b>Port of Geelong</b>	

METHOD	GEOLOGY	DEPTH (mbCD)	GRAPHIC LOG	USCS CLASSIFICATION	DESCRIPTION OF STRATA	MOISTURE	CONSISTENCY/ REL DENSITY	SAMPLING TUBE	SPT	SAMPLE ID	DRILLERS COMMENTS	DRY DENSITY (t/m3)	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	% FINES (%)	TRIAxIAL UU (kPa)	SHEAR VANE (kPa)	PENETROMETER (kPa)	SPT (blows)		
Washboring - Casing Advancer  MVS		15		CL	CLAY: pale grey and orange to brown mottled, medium plasticity, trace fine to medium grained sands, trace calcareous nodules, white, cemented sands	MW	ST			BH50_15.0-15.4 455mm recovery BH50_15.4-15.85	Drilling is soft to firm at 15.85 mbCD	1.67	50	31	85.1	163	81	190, 250, 220	4, 7, 12 N=19		
		16																			
		17																			
		18		CL	CLAY: pale grey and orange to brown mottled, low plasticity, shell fragments up to 20mm, whole shells up to 15mm, with trace gravels, gravels are cemented sands, fine to medium grained Increasing sand and shell content with depth from 18.6 mbCD	F				BH50_18.0-18.4 450mm recovery BH50_18.4-18.85		-	34	15	88.7	-	46 (NFP)	150, 160, 120	1, 1, 2 N=3		
		19																			
		20																			
		21		CL	CLAY: pale grey and orange to brown mottled, low plasticity	F				BH50_21.0-21.45											3, 3, 3 N=6
		22			END OF BOREHOLE AT 21.45 m CD - TARGET DEPTH																
		23																			
		24																			
25																					
26																					
27																					
28																					
29																					

REMARKS: NFP: Not fully penetrating into tube sample


URS Australia Level 6, 1 Southbank Boulevard, Southbank		Phone (03) 8699 7500 Fax (03) 8699 7550	Project No.: <b>43513982</b>	Project Reference: <b>Future Channel Improvement Options</b>
Drilling Contractor: <b>SouthWestern Drilling</b>				
Drill Type: <b>DB520</b>	Logged By: <b>KF</b> Checked By: <b>DW</b> Date Started: <b>1-4-14</b> Date Finished: <b>1-4-14</b>	Sea Bed Relative Level: <b>12.80 mbCD</b> Coordinates: <b>5782226.00 mN</b> <b>294240.00 mE</b> Area: <b>PRC1</b>	Client: <b>Victorian Regional Channels Authority</b>  Location: <b>Port of Geelong</b>	

METHOD	GEOLOGY	DEPTH (mbCD)	GRAPHIC LOG	USCS CLASSIFICATION	DESCRIPTION OF STRATA	MOISTURE	CONSISTENCY/REL DENSITY	SAMPLING TUBE	SPT	SAMPLE ID	DRILLERS COMMENTS	DRY DENSITY (t/m3)	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	% FINES (%)	TRIAxIAL UU (kPa)	SHEAR VANE (kPa)	PENETROMETER (kPa)	SPT (blows)
		0																	
		1																	
		2																	
		3																	
		4																	
		5																	
		6																	
		7																	
		8																	
		9																	
		10																	
		11																	
		12																	
		13																	
		14		CH	CLAY: high plasticity, pale brown mottled pale grey, sand is fine to medium grained, rounded, brown Trace black staining / colouration of clay at 14.35 mbCD	W	St			BH51_13.8-14.2 250mm recovery BH51_14.2-14.65	Drilling is firm from 12.8 mbCD	1.27	85	55	97.9	103	124	230, 120, 200	0, 2, 3 N=5

REMARKS: Drilling undertaken using casing advancing technique, therefore cuttings were not obtained between sample intervals  
 \_\_\_\_ Inferred boundary between geologic units (ie. MVS and QS)  
 --- Observed change in lithology  
 .... Inferred change in lithology (depth of boundary not observed, marked as top of sample depth)  
 MVS- Moorabool Viaduct Sands inferred geology



URS Australia Level 6, 1 Southbank Boulevard, Southbank		Phone (03) 8699 7500 Fax (03) 8699 7550	Project No.:  <b>43513982</b>	Project Reference:  <b>Future Channel Improvement Options</b>
Drilling Contractor: <b>SouthWestern Drilling</b>				
Drill Type: <b>DB520</b>	Logged By: <b>KF</b> Checked By: <b>DW</b> Date Started: <b>1-4-14</b> Date Finished: <b>1-4-14</b>	Sea Bed Relative Level: <b>12.80 mbCD</b> Coordinates: <b>5782226.00 mN</b> <b>294240.00 mE</b> Area: <b>PRC1</b>	Client: <b>Victorian Regional Channels Authority</b>  Location: <b>Port of Geelong</b>	

METHOD	GEOLOGY	DEPTH (mbCD)	GRAPHIC LOG	USCS CLASSIFICATION	DESCRIPTION OF STRATA	MOISTURE	CONSISTENCY/REL DENSITY	SAMPLING TUBE	SPT	SAMPLE ID	DRILLERS COMMENTS	DRY DENSITY (t/m3)	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	% FINES (%)	TRIAxIAL UU (kPa)	SHEAR VANE (kPa)	PENETROMETER (kPa)	SPT (blows)
Washboring - Casing Advancer	MVS	15		CH	CLAY: high plasticity, pale grey to grey and orange to brown mottled, trace sand, sand is fine to medium grained, rounded, brown With some gravels, fine to medium grained, up to 20mm, subangular, grey, brown, white, pale brown, cemented sands / calcareous nodules at 15.4 mbCD Becoming trace gravels at 15.6 mbCD		VSI			BH51_15.0-15.4 340mm recovery BH51_15.4-15.65	Drilling is soft - firm at 15.85 mbCD	1.4	66	41	89.2	171	126	200, 150, 150	3, 3, 5 N=8
		16																	
		17																	
		18			Sandy CLAY: sand is fine to medium grained, rounded, pale orange mottled pale brown, trace gravels, gravels are feldspars, subrounded, medium grained, 10mm, white		St			BH51_18.0-18.4 430mm recovery BH51_18.4-18.45 BH51_18.45-18.85		-	32	18	54.6	-	84	280, 240, 260	2, 2, 4 N=6
		19																	
		20																	
		21		CH	CLAY: some sand, high plasticity, pale brown orange, sand is fine to coarse grained, rounded Sandy CLAY: high plasticity, pale grey mottled pale brown - orange With some gravels, fine grained, rounded, 4mm at 21.35 mbCD END OF BOREHOLE AT 21.45 m CD - TARGET DEPTH		F			BH51_21.0-21.45									0, 3, 4 N=7
		22																	
		23																	
		24																	
		25																	
		26																	
		27																	
		28																	
		29																	

REMARKS:

Project Reference:

### Future Channel Improvement Options

Location: Port of Geelong

REMARKS: Drilling undertaken using casing advancing technique, therefore cuttings were not obtained between sample intervals  
 \_\_\_\_ Inferred boundary between geologic units (ie. MVS and QS)  
 ---- Observed change in lithology  
 .... Inferred change in lithology (depth of boundary not observed, marked as top of sample depth)  
 MVS- Moorabool Viaduct Sands inferred geology



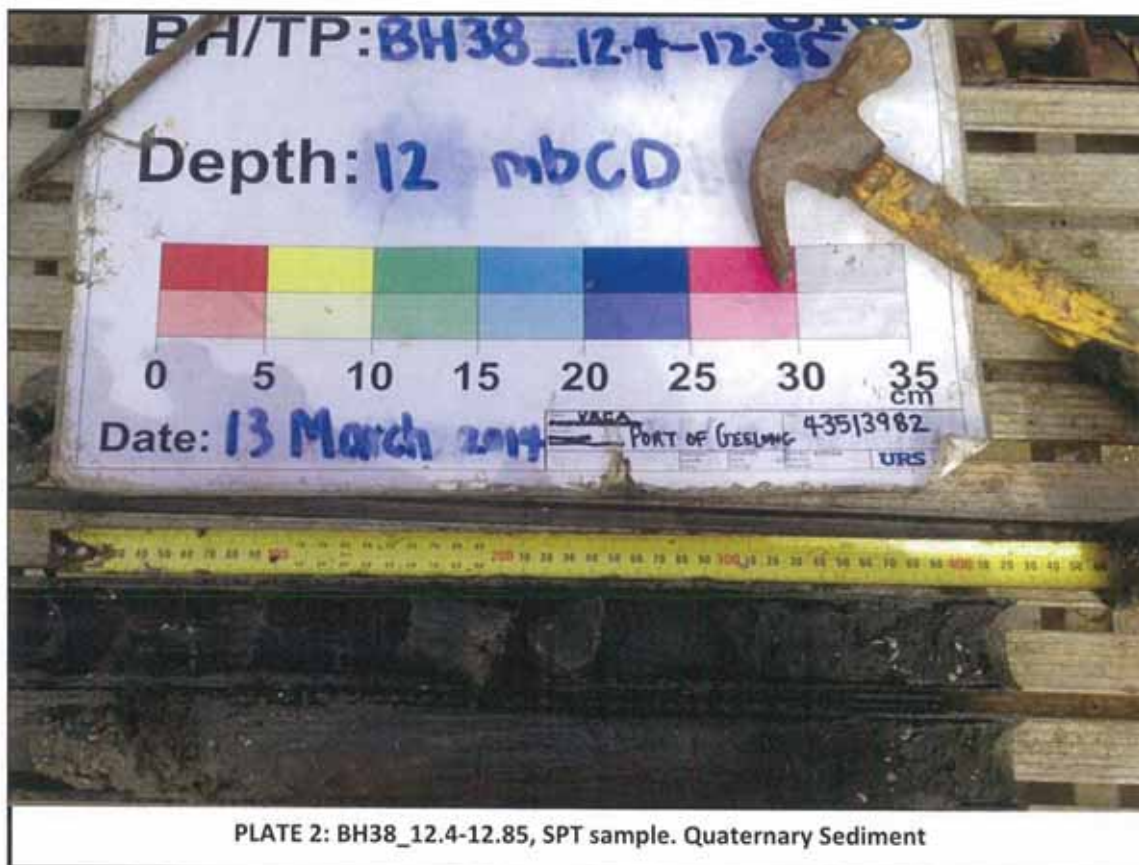
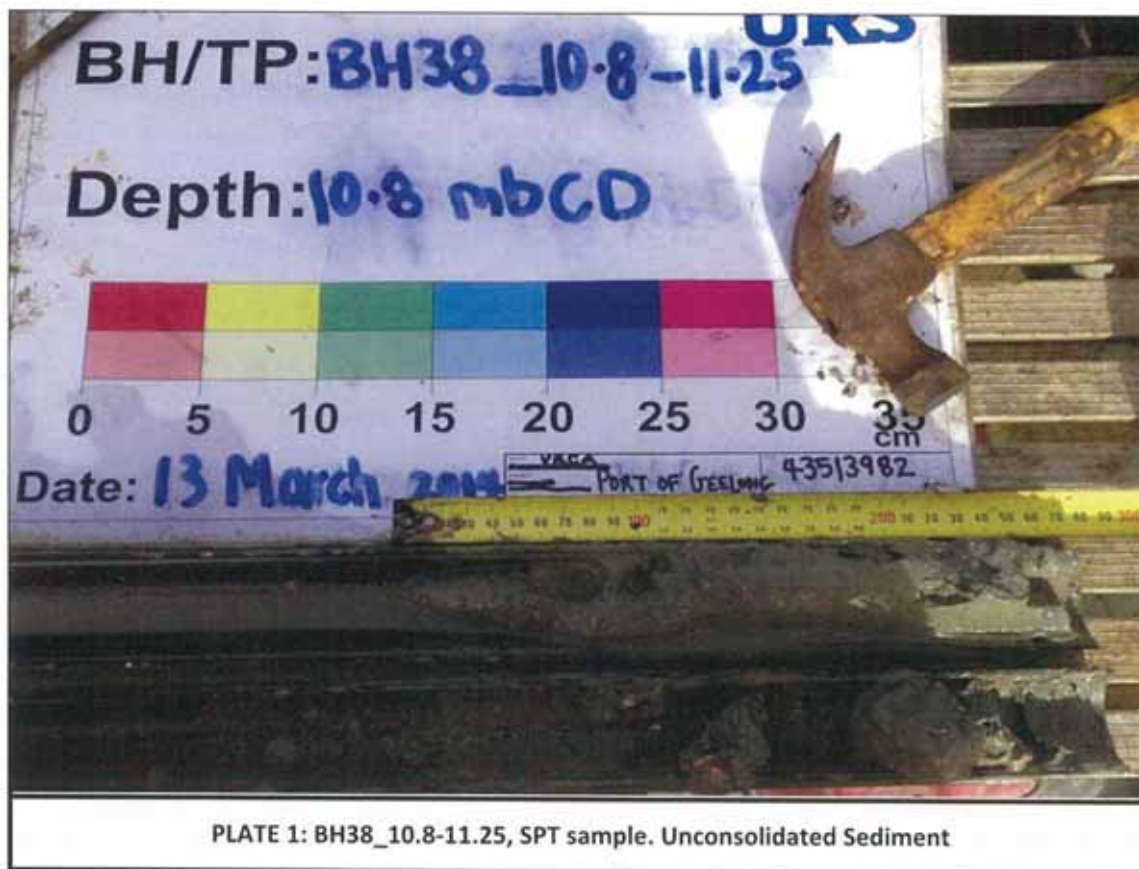




PLATE 3: BH38\_15.0-15.4, extruded U63 tube sample. Basaltic Soil.

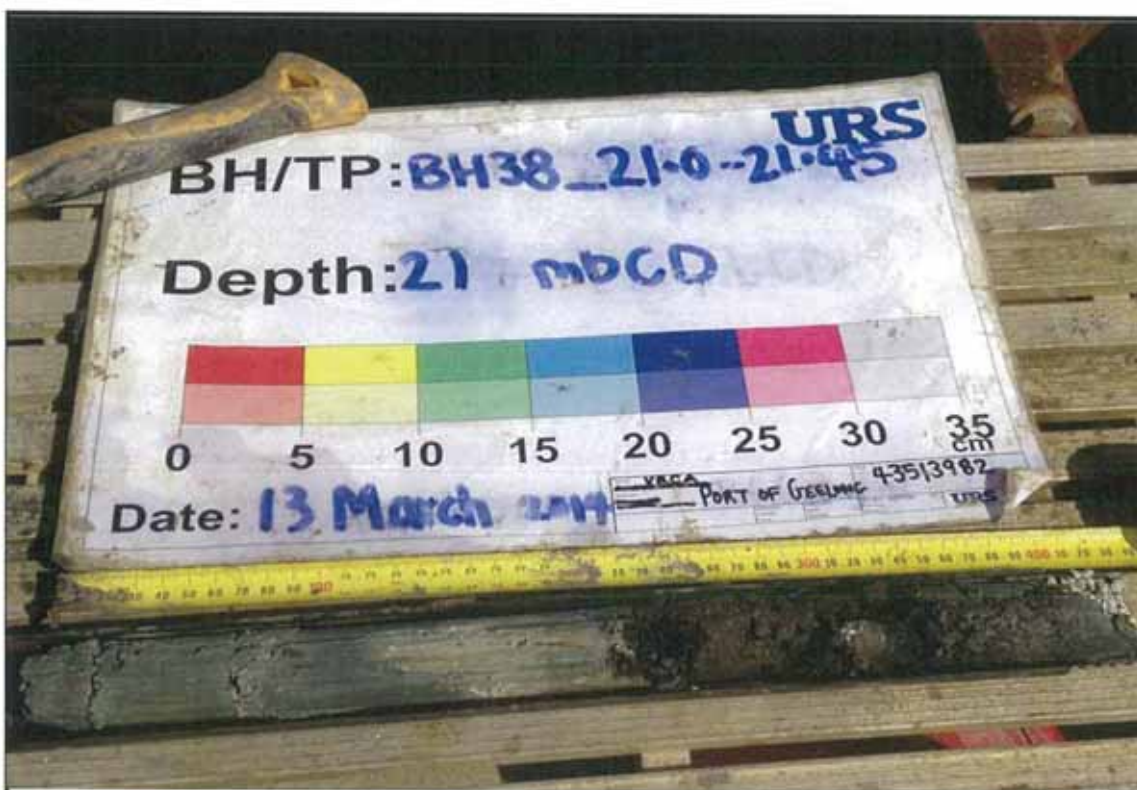


PLATE 4: BH38\_21.0-21.45, SPT sample. Basaltic Soil.



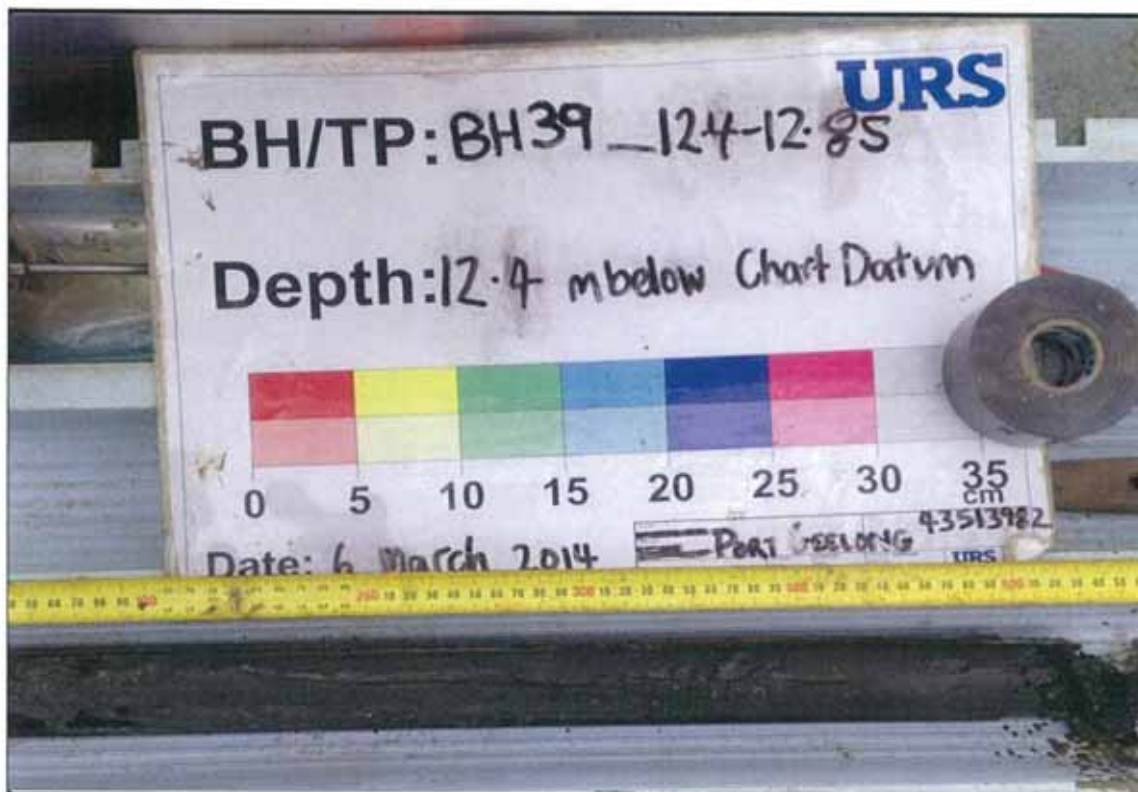
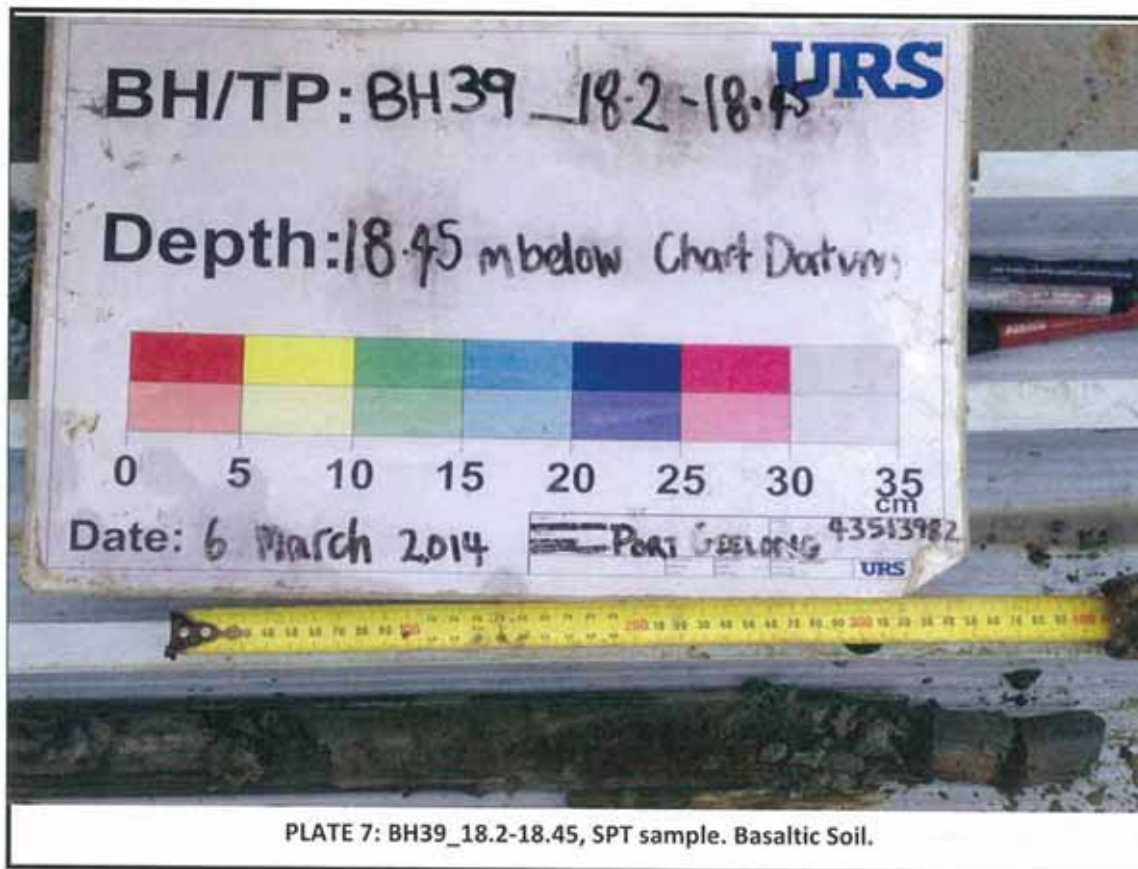


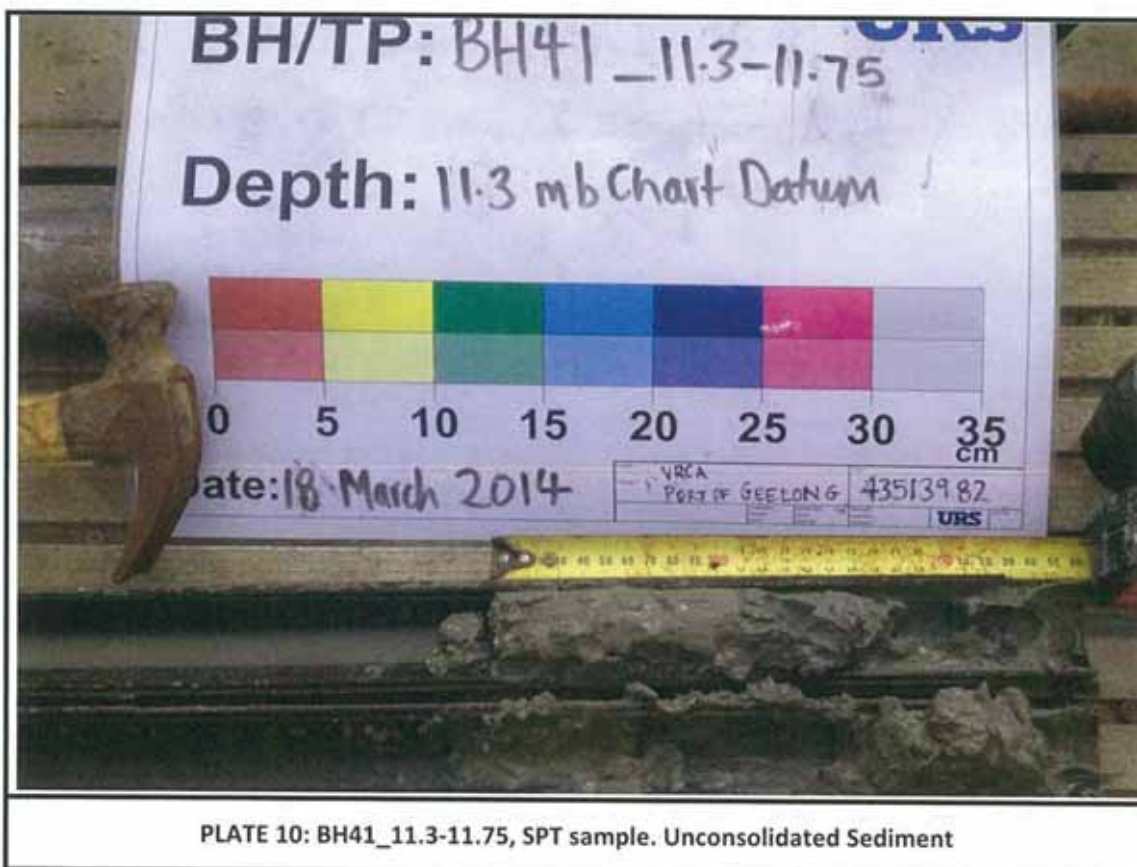
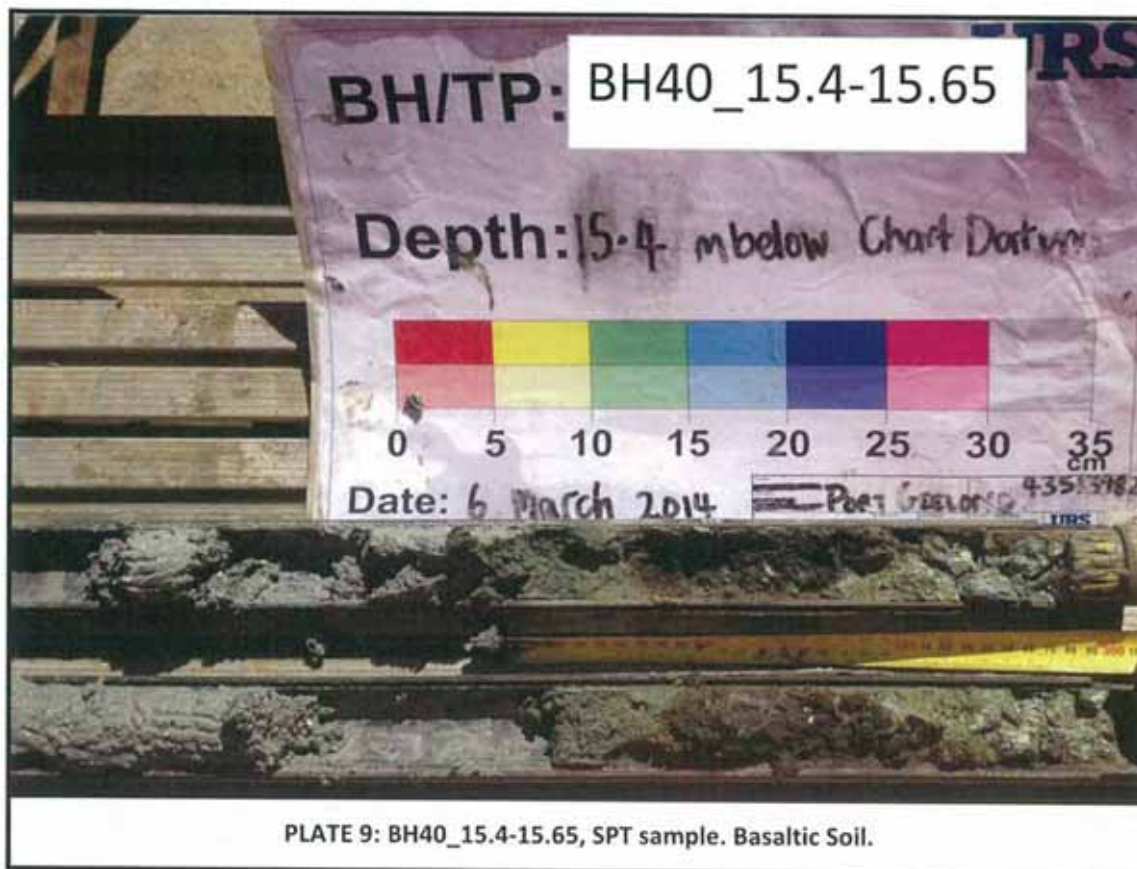
PLATE 5: BH39\_12.4-12.85, SPT sample. Quaternary Sediment

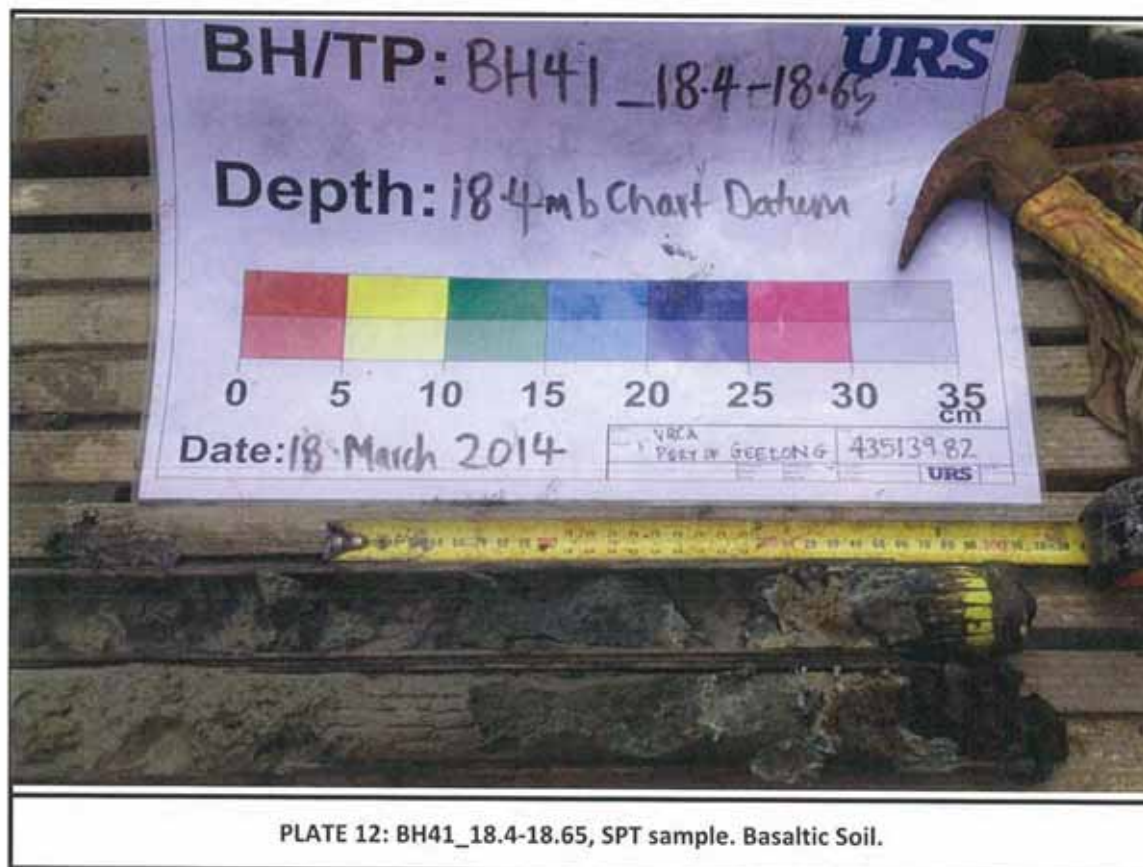
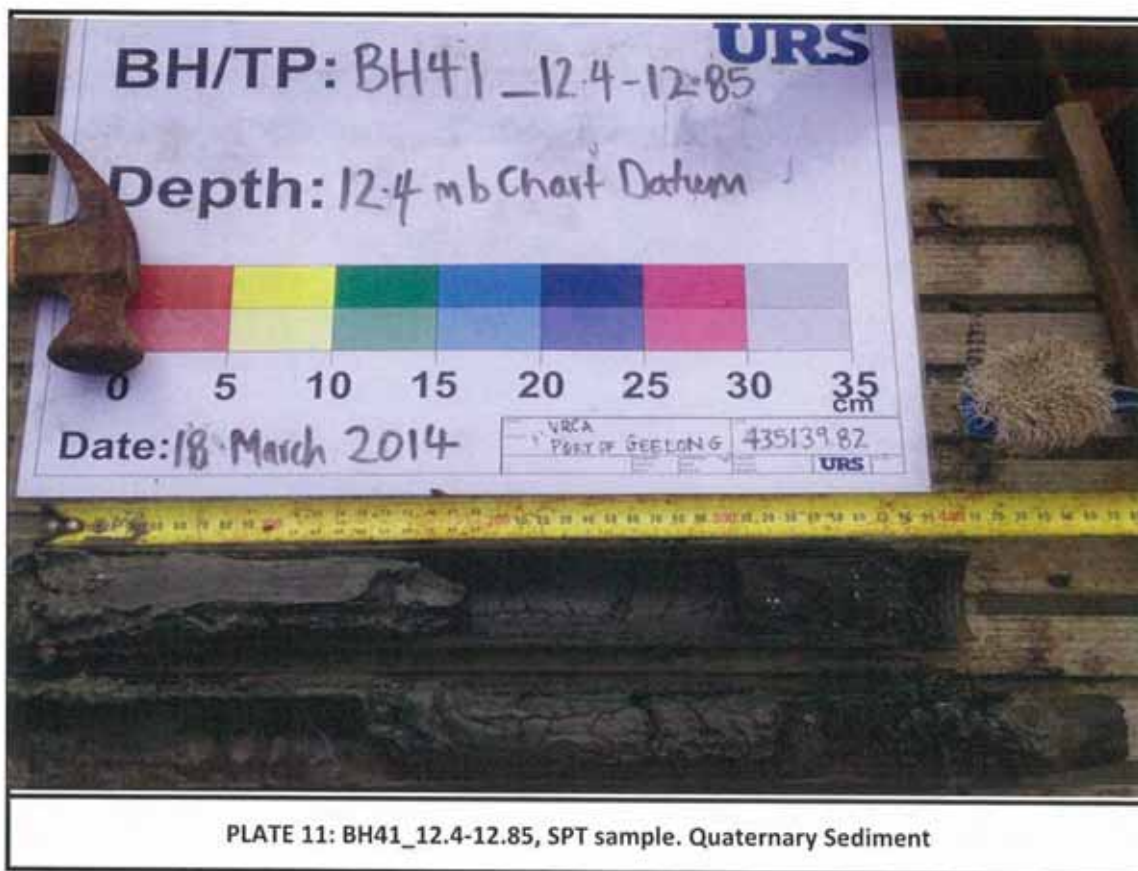


PLATE 6: BH39\_15.0-15.4, extruded U63 tube sample. Basaltic Soil.

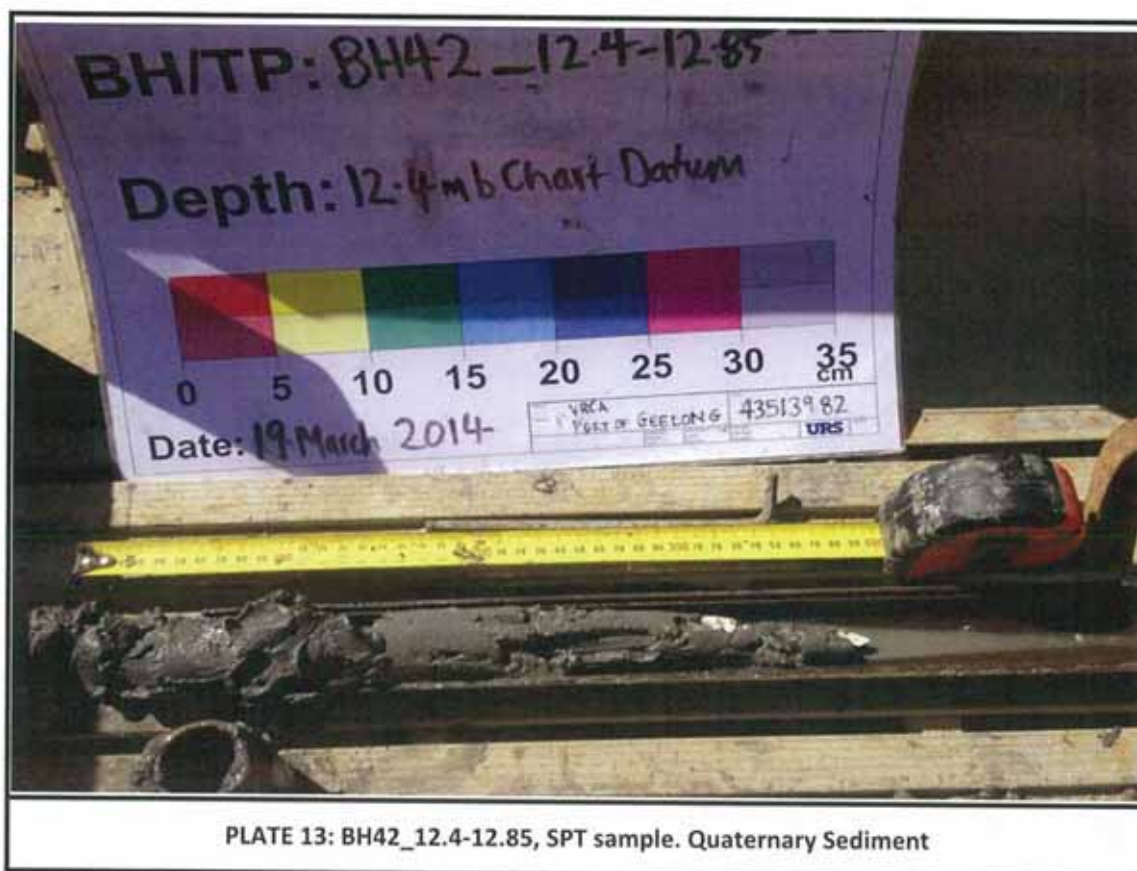














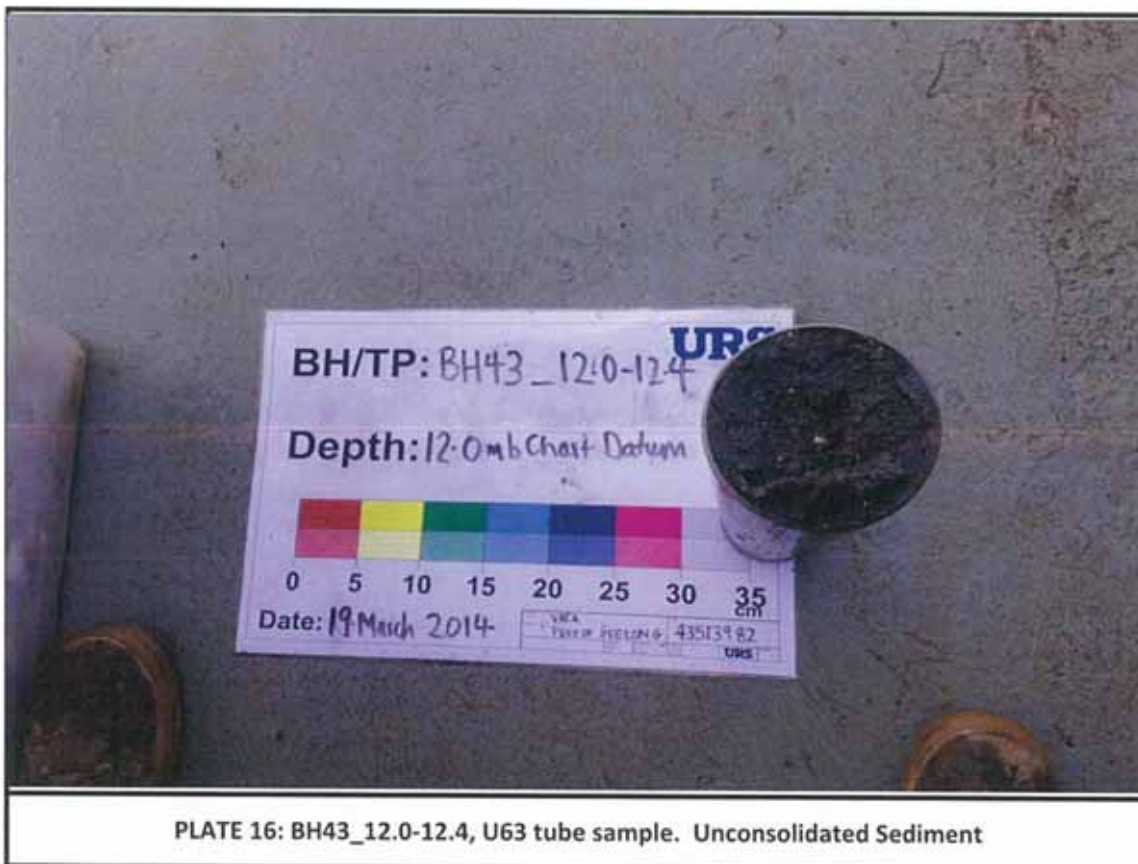
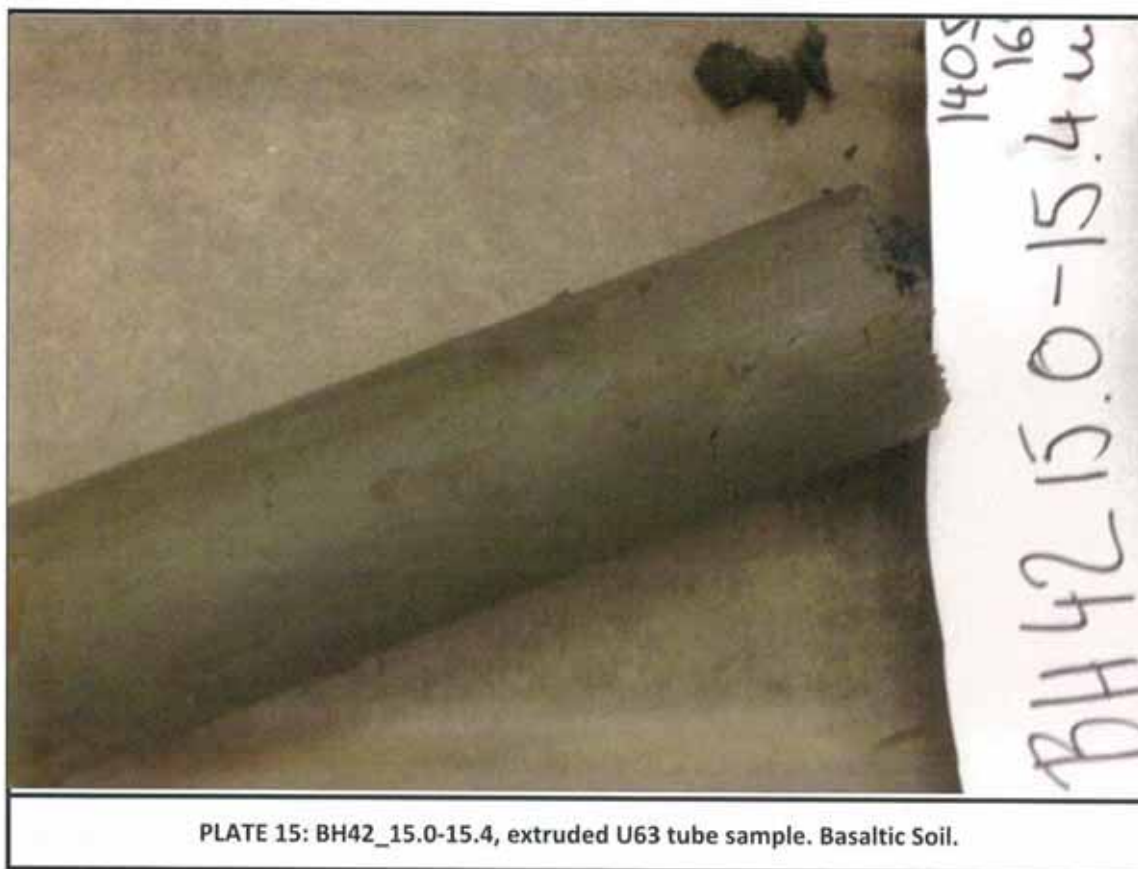


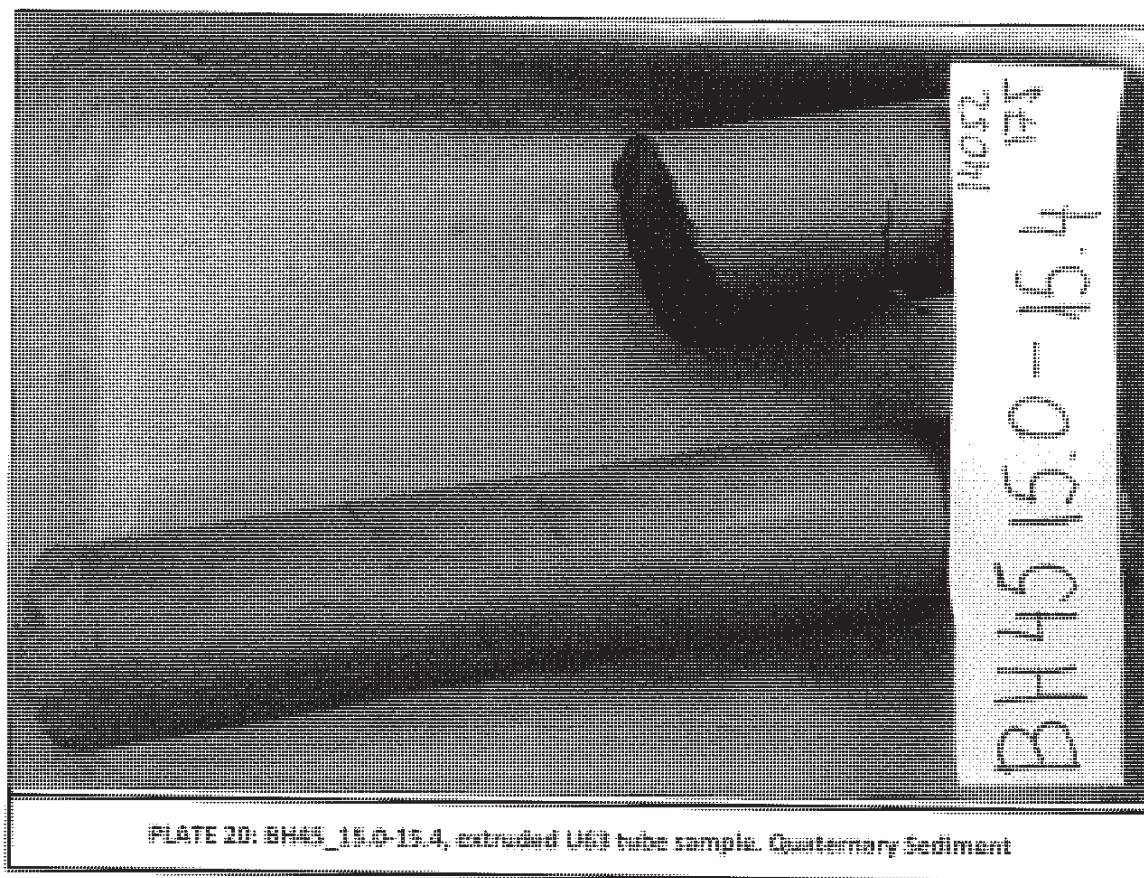
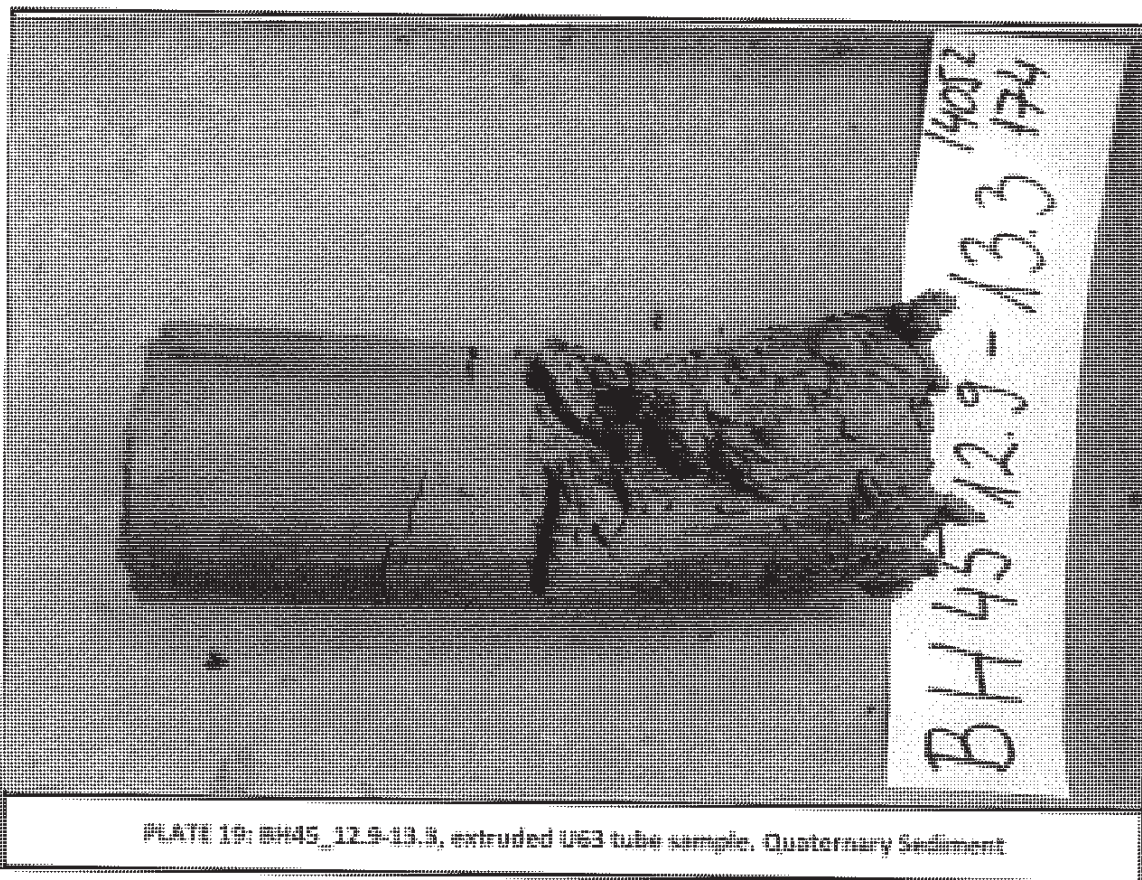


PLATE 17: BH44\_12.0-12.4, extruded U63 tube sample. Unconsolidated Sediment



PLATE 18: BH44\_15.4-15.85, SPT sample. Quaternary Sediment







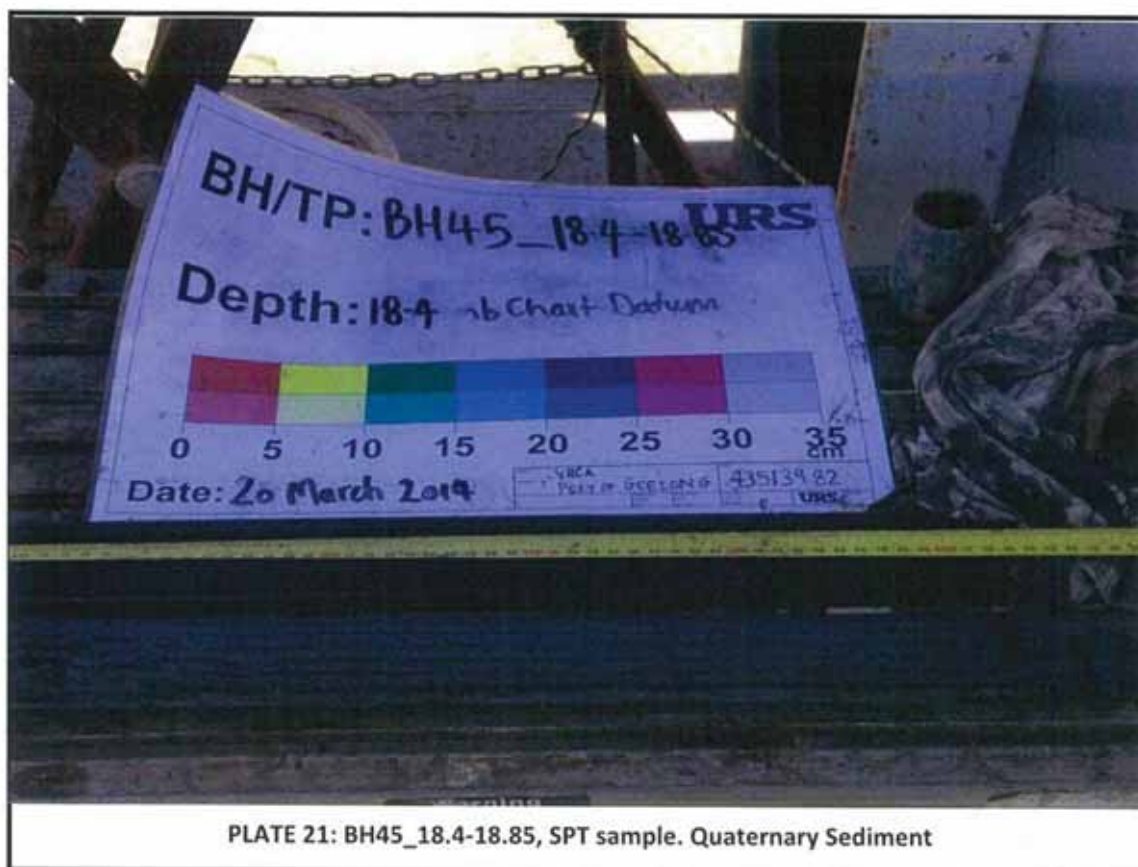
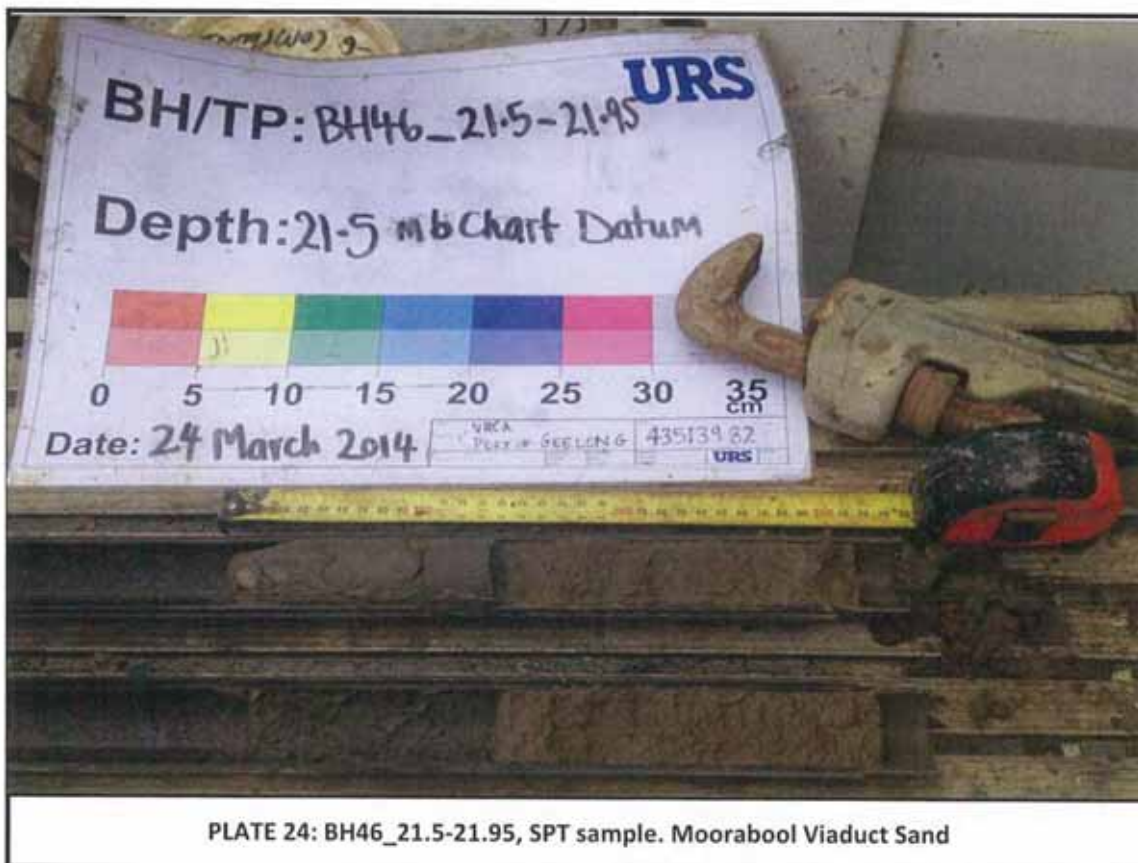
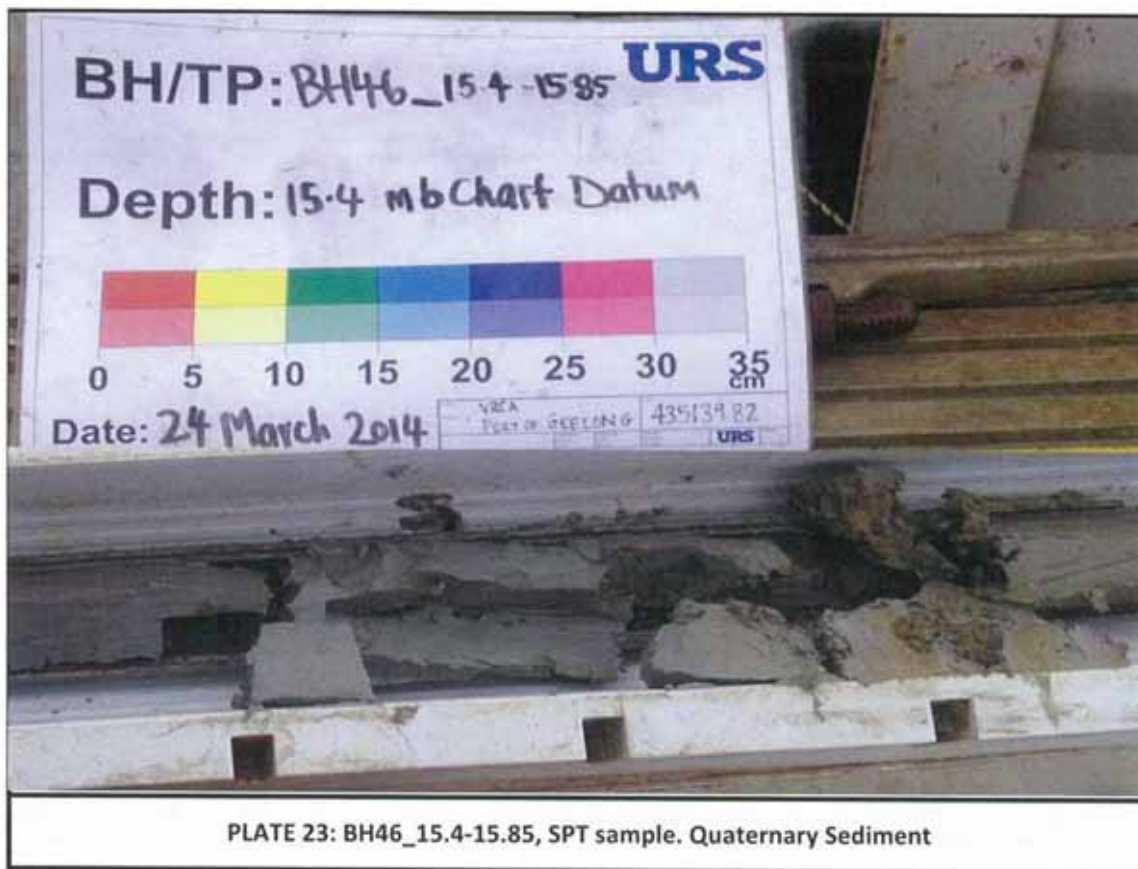


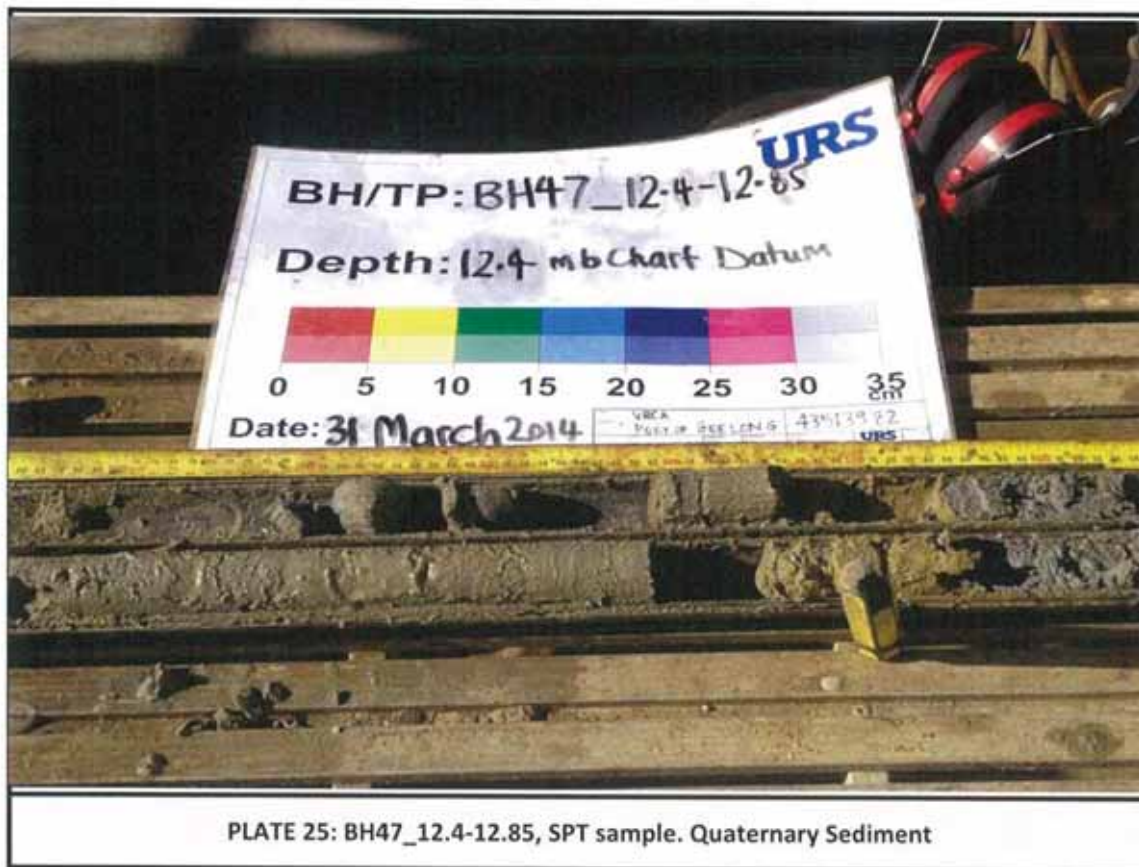
PLATE 21: BH45\_18.4-18.85, SPT sample. Quaternary Sediment



PLATE 22: BH46\_12.9-13.35, SPT sample. Quaternary Sediment









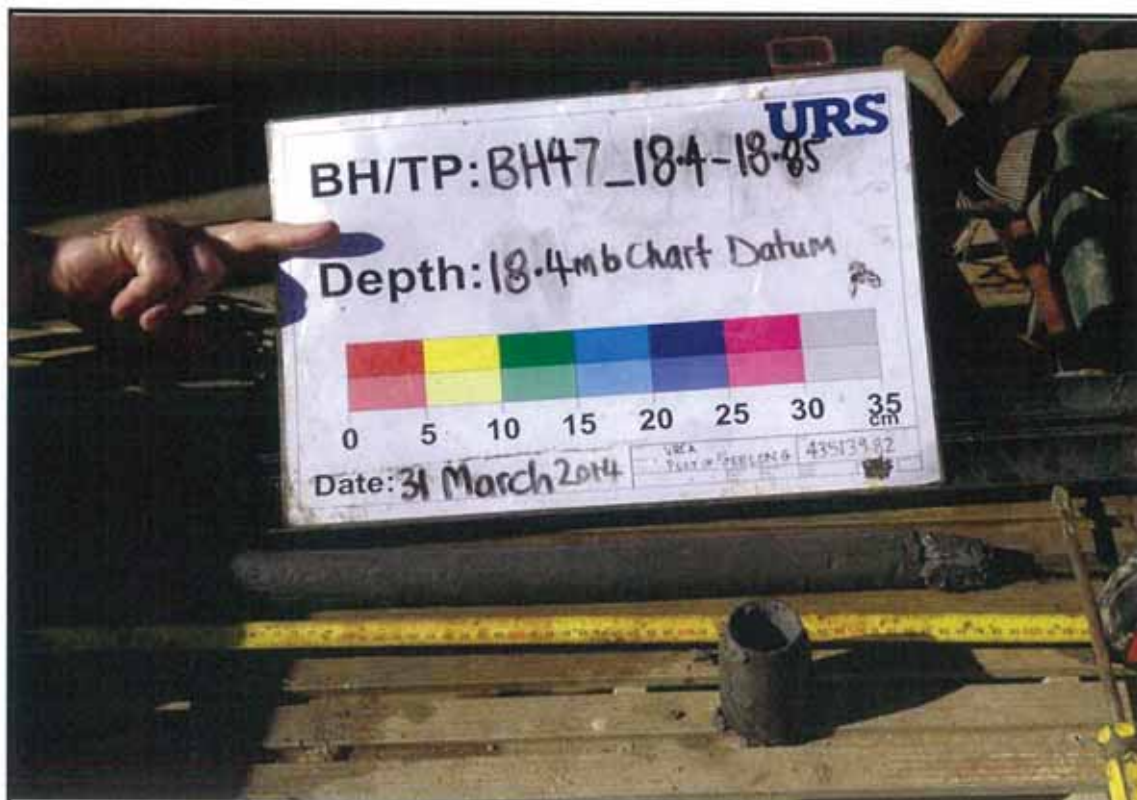


PLATE 27: BH47\_18.4-18.85, SPT sample. Quaternary Sediment

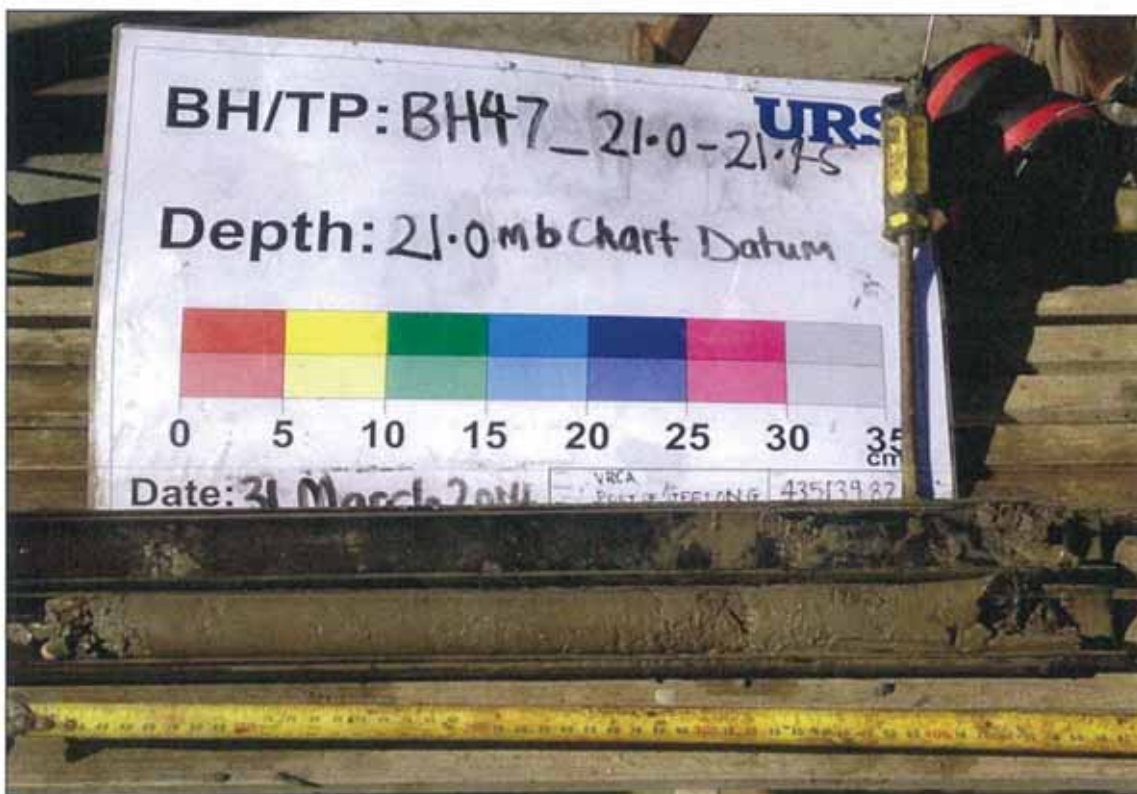


PLATE 28: BH47\_21.0-21.45, SPT sample. Moorabool Viaduct Sand

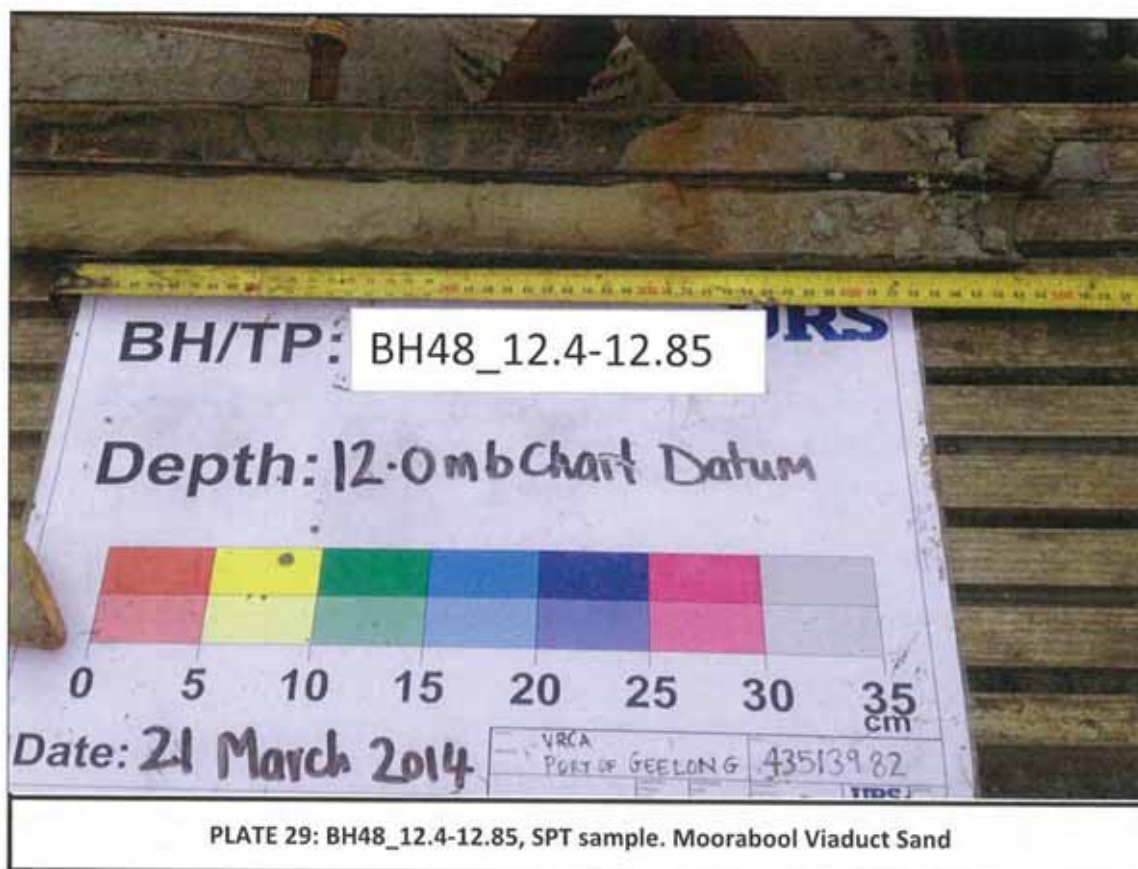


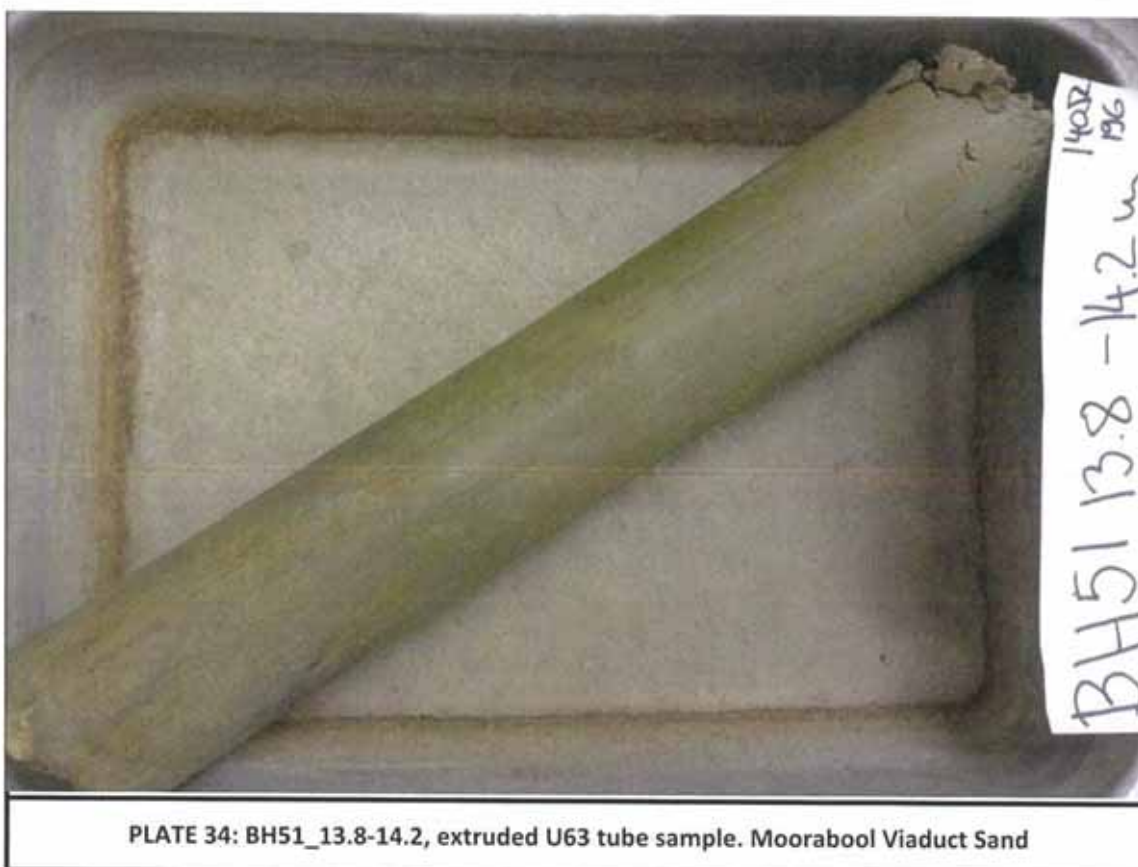




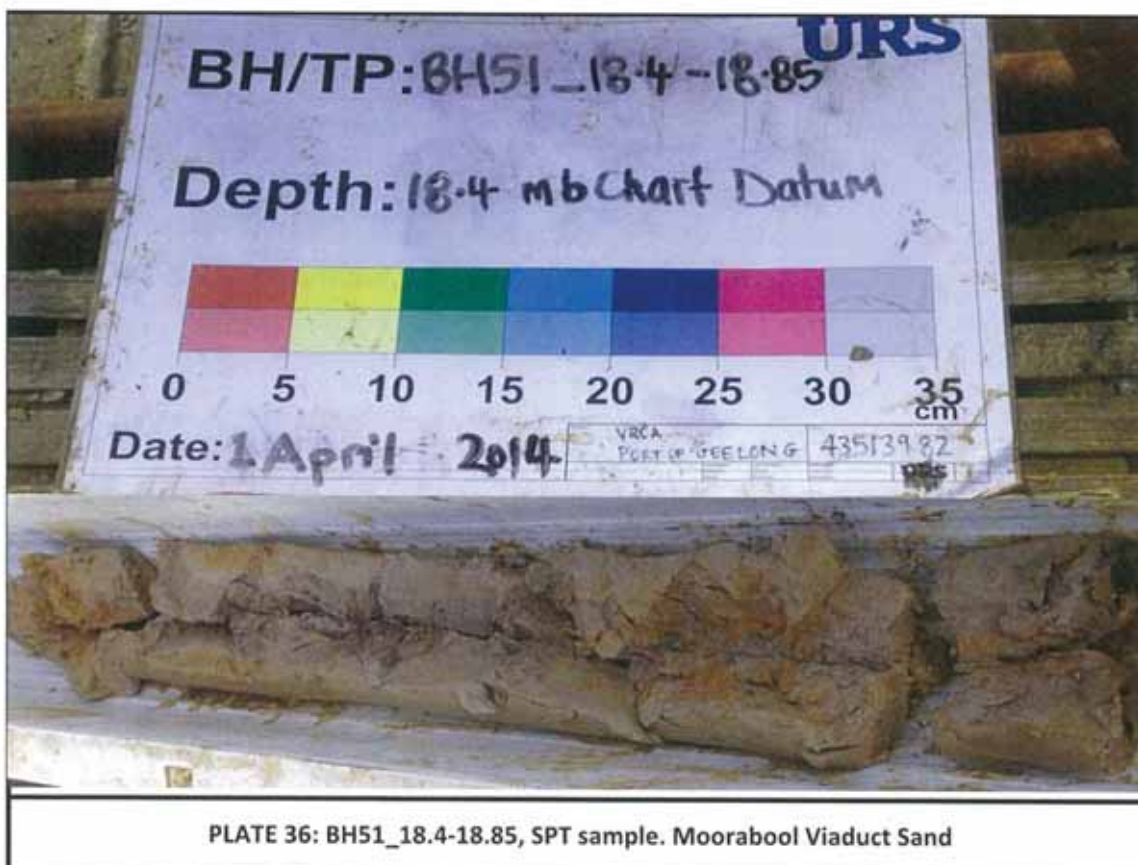
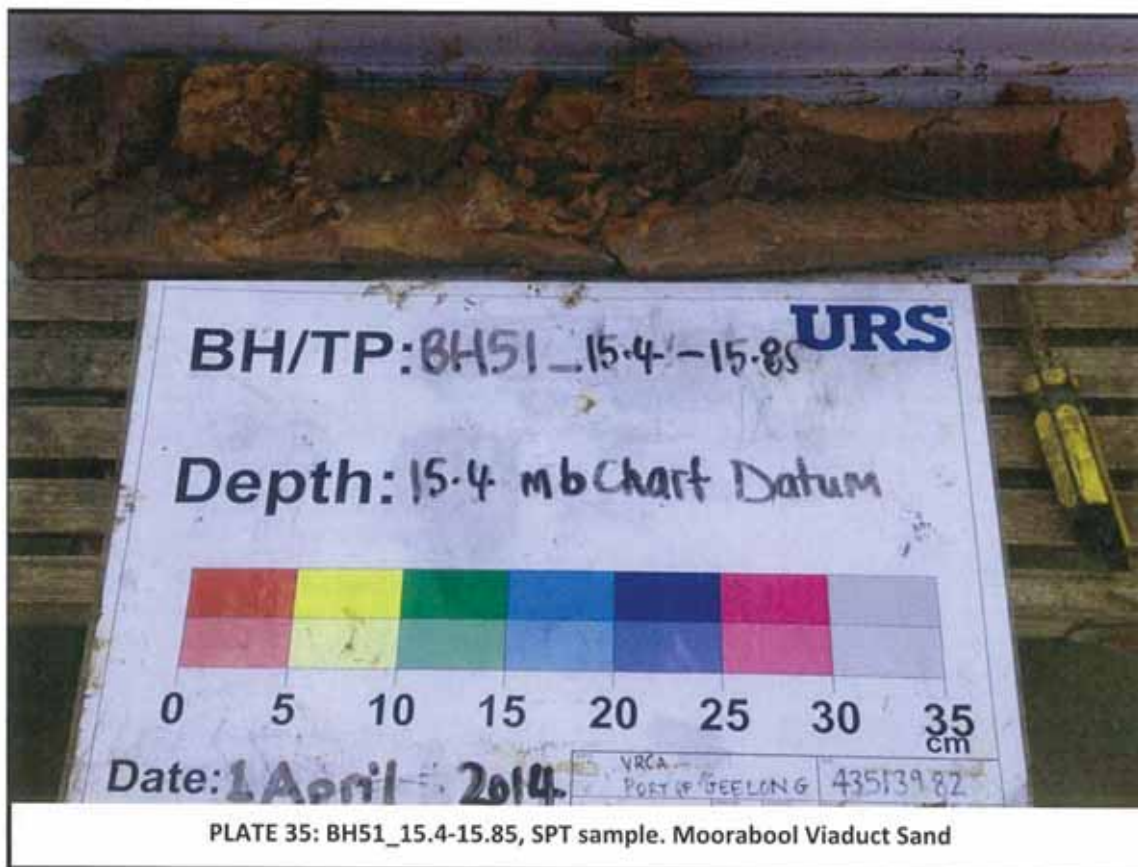
PLATE 31: BH49\_12.4-12.85, SPT sample. Moorabool Viaduct Sand.



PLATE 32: BH49\_15.0-15.4, extruded U63 tube sample. Moorabool Viaduct Sand







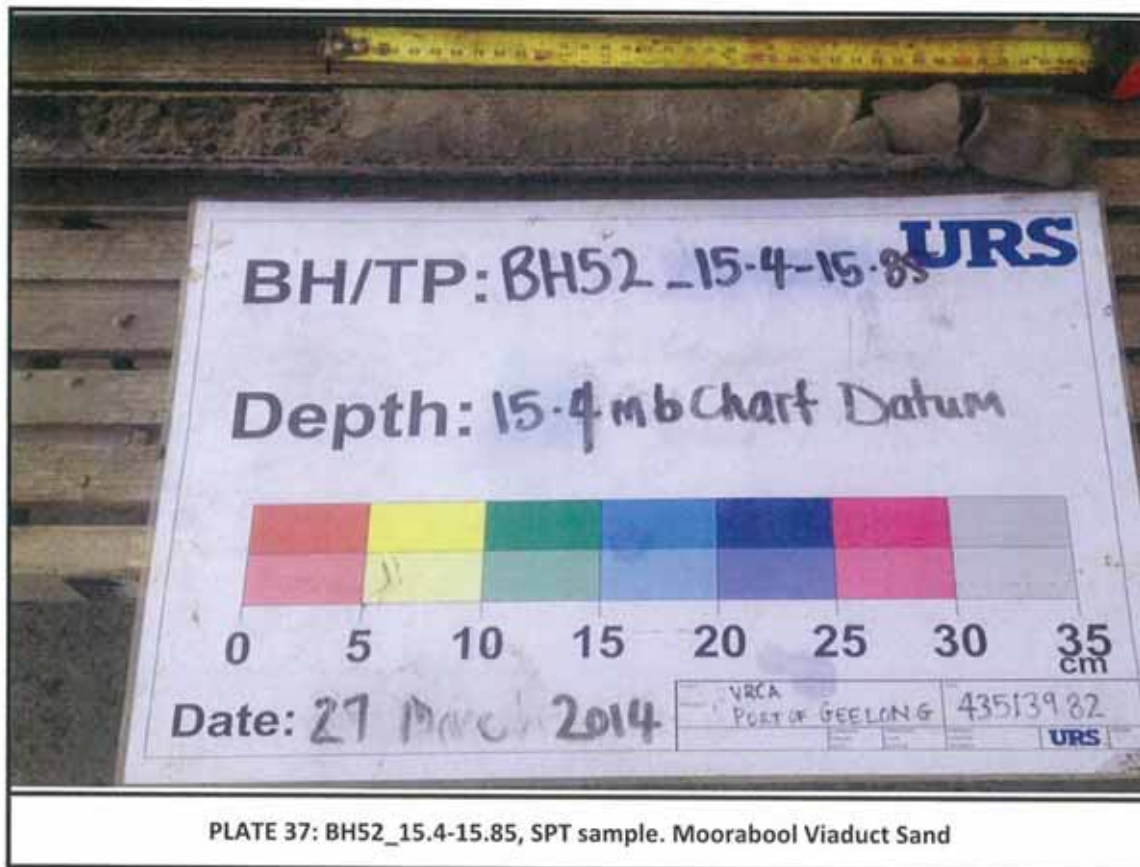






Table 6 URS 2014 and GHD 1993 BH Lithological Information

BH name	From depth (m)	To depth (m)	From Depth (m negative)	To depth (m negative)	Depth from	Depth to		Description	Stratigraphy	Colour	Consistency/Density	Detailed description	Comment
URS_BH27													
URS_BH27	5.8	6.8	-5.8	-6.8	0	1		Clayey Sand	SC	pale brown to orange brown	VSt	Fine to coarse grained, pale brown to orange brown, mottled grey, clay is low plasticity, white alteration, with some gravels, fine to medium grained. White alteration decreasing with depths from 6.1 mbCD	
URS_BH27	6.8	9	-6.8	-9	1	3.2		Sandy Clay	CL	orange brown, mottled pale grey	VSt	Medium plasticity, orange brown mottled pale grey, sand is fine grained, uniform, some silt	
URS_BH27	9	12	-9	-12	3.2	6.2		Sandy Clay		orange brown, mottled pale grey	VSt	Medium plasticity, orange brown mottled pale grey, sand is fine grained, uniform, some silt. With trace gravels and cobble, gravels are fine to coarse grained, 3 mm to 15 mm, rounded to sub-rounded, dark grey, white, cobble is sub-angular, 31 mm x 20 mm at 9.8 mbCD	
URS_BH27	12	12.6	-12	-12.6	6.2	6.8		Clay	CH	orange brown, mottled pale grey	VSt	High plasticity, orange brown mottled pale grey, sands becoming fine to coarse grained, poorly sorted, rounded, grey quartz sands, no cobbles. With some gravels, medium to coarse grained, up to 15 mm, rounded, cemented, white at 12.6 mbCD	
URS_BH27	12.6	12.65	-12.6	-12.65	6.8	6.85		Gravels	GP	brown	L		
URS_BH27	12.6	15	-12.6	-15	6.8	9.2		Sand	SP	pale brown, orange, white, grey	MD	Some clay, sand is medium to coarse grained, well sorted, rounded, pale brown, orange, white, grey quartz sands, clay is orange brown. Sands becoming fine grained sands, pale grey, uniform at 12.8 mbCD	
URS_BH27	15	18	-15	-18	9.2	12.2		Clay	CH	orange brown, mottled pale grey	VSt	High plasticity, orange brown mottled pale grey, some sand, sand is medium grained, rounded	
URS_BH27	18	21	-18	-21	12.2	15.2		Silty Sand	SM	orange brown, mottled pale grey	VD	Fine to medium grained, orange brown mottled pale grey	
URS_BH27	21	21.45	-21	-21.45	15.2	15.65		Clay	CH	orange brown, mottled orange brown	St	High plasticity, orange brown mottled orange brown, trace nodules, Target depth at 21.45 mCD	





URS_BH30A	9.4	12	-9.4	-12	0.4	3		CH	Clay		grey and dark grey	VS		
URS_BH30A	12	12.4	-12	-12.4	3	3.4		CH	Clay		grey and dark grey	F		
URS_BH30A	12.4	15	-12.4	-15	3.4	6		CH	Clay		pale grey to green mottled pale brown	F		15.0 m CD Refusal on basalt (inferred)
URS_BH31	9.7	10.6	-9.7	-10.6	0	0.9		CH	Clay		grey	VS		
URS_BH31	10.6	12	-10.6	-12	0.9	2.3		CH	Clay		grey	VS		
URS_BH31	12	15	-12	-15	2.3	5.3		CH	Clay		pale grey mottled grey, mottled green, mottled orange	St		
URS_BH31	15	15.55	-15	-15.55	5.3	5.85		GC	Interbedded basalt Gravels and Clay		brown-red, dark brown mottled pale grey	DVS/D		15.55 m CD Refusal on basalt
URS_BH32A	9.2	10.5	-9.2	-10.5	0	1.3		CH	Clay		grey	VS		
URS_BH32A	10.5	12.7	-10.5	-12.7	1.3	3.5		CH	Clay		dark grey-black-green	VS		
URS_BH32A	12.7	15	-12.7	-15	3.5	5.8		CH	Sandy Clay		pale grey to green	S		
URS_BH32A	15	18	-15	-18	5.8	8.8		CH	Clay		pale grey some orange mottling	St		
URS_BH32A	18	19	-18	-19	8.8	9.8		Basalt	Basalt		dark grey, iron staining	Distinctly weathered		Very high strength
URS_BH32A	19	20.7	-19	-20.7	9.8	11.5		Basalt	Basalt		dark grey, iron staining	Slightly weathered		Target depth at 20.7 mCD
URS_BH33	9.4	10.6	-9.4	-10.6	0	1.2		CH	Clay		grey	VS		
URS_BH33	10.6	12.6	-10.6	-12.6	1.2	3.2		CH	Clay		dark grey	VS		



URS_BH33	12.6	15	-12.6	-15	3.2	5.6			Sandy Clay	CH	CH	pale grey mottled pale brown orange	F		
URS_BH33	15	15.4	-15	-15.4	5.6	6			Interbedded Basalt Gravels and Clay	GC	GC			Basalt gravels (white, pale grey, yellow brown); sandy clay (pale grey mottled orange brown-pale brown)	15.4 m CD Refusal on basalt
URS_BH34	9.5	10.4	-9.5	-10.4	0	0.9			Clay	CH	CH	grey	VS		
URS_BH34	10.4	10.8	-10.4	-10.8	0.9	1.3			Clay	CH	CH	pale brown mottled grey	VS		
URS_BH34	10.8	12.7	-10.8	-12.7	1.3	3.2			Clay	CH	CH	dark grey	VS		
URS_BH34	12.7	12.9	-12.7	-12.9	3.2	3.4			Clay	CH	CH	pale grey mottled pale brown	VS		
URS_BH34	12.9	15.7	-12.9	-15.7	3.4	6.2			Clay	CH	CH	pale grey	St		
URS_BH34	15.7	17.75	-15.7	-17.75	6.2	8.25			Gravel	GC	GC	blue pale grey	L/D		17.75 m CD Refusal on basalt
URS_BH35	9.8	10.7	-9.8	-10.7	0	0.9			No sample collected						very soft material
URS_BH35	10.7	11.15	-10.7	-11.15	0.9	1.35			Sandy Clay	CL	CL	grey-brown	VS		
URS_BH35	11.15	11.7	-11.15	-11.7	1.35	1.9			Clay	CH	CH	pale grey - grey	VS		
URS_BH35	11.7	12.6	-11.7	-12.6	1.9	2.8			Clay	CH	CH	dark grey	VS		
URS_BH35	12.6	12.7	-12.6	-12.7	2.8	2.9			Sand	SP	SP	pale grey mottled dark grey mottled pale brown orange	F		
URS_BH35	12.7	13.2	-12.7	-13.2	2.9	3.4			Sandy Clay	CH	CH	pale grey mottled pale brown-orange, dark grey and white	L		
URS_BH35	13.2	13.25	-13.2	-13.25	3.4	3.45			Gravel	GP	GP	brown mottled dark brown	St		13.25 m CD Refusal on basalt
URS_BH36A	9.7	10.8	-9.7	-10.8	0	1.1			Clay	CH	CH	grey to brown	VS		
URS_BH36A	10.8	14	-10.8	-14	1.1	4.3			Clay	CH	CH	dark grey	VS		
URS_BH36A	14	15.4	-14	-15.4	4.3	5.7			Clay	CH	CH	grey and pale grey	VS		
URS_BH36A	15.4	15.5	-15.4	-15.5	5.7	5.8			Sandy Clay	CL	CL	dark brown			
URS_BH36A	15.5	16.3	-15.5	-16.3	5.8	6.6			Clayey Gravels	GC	GC	brown, dark grey, pale brown-orange			
URS_BH36A	16.3	18.4	-16.3	-18.4	6.6	8.7			Basalt	Basalt	Basalt	dark grey	Fresh		No core
URS_BH36A	18.4	18.7	-18.4	-18.7	8.7	9			No core						
URS_BH36A	18.7	19.4	-18.7	-19.4	9	9.7			Basalt	Basalt	Basalt	dark grey	Fresh		

URS_BH36A	19.4	19.75	-19.4	-19.75	9.7	10.05		No core	Basalt		dark grey	Distinctly weathered, becoming slightly weathered at 20.6 mCD, becoming fresh at 20.8 mCD	No core
URS_BH36A	19.75	21	-19.75	-21	10.05	11.3		Basalt					Target depth at 21.0 mCD
URS_BH37	9.4	10.3	-9.4	-10.3	0	0.9		No sample				VS	No sample collected
URS_BH37	10.3	11.2	-10.3	-11.2	0.9	1.8		Clay	CH		grey-brown	VS	
URS_BH37	11.2	12.7	-11.2	-12.7	1.8	3.3		Clay	CH		grey	VS	
URS_BH37	12.7	15	-12.7	-15	3.3	5.6		Clay	CH		dark grey	VS	
URS_BH37	15	17.3	-15	-17.3	5.6	7.9		Clay	CH		pale grey mottled pale brown	S	
URS_BH37	17.3	18.6	-17.3	-18.6	7.9	9.2		Clay	CH		grey and brown mottled	S	
URS_BH37	18.6	18.8	-18.6	-18.8	9.2	9.4		Sandy Clay	CH		grey to green grey	VSt	
URS_BH37	18.8	20.4	-18.8	-20.4	9.4	11		Gravel	GP		brown	H	Refusal on basalt at 20.4 mCD
URS_BH38	9.9	10.8	-9.9	-10.8	0	0.9		no sample				VS	no sample collected
URS_BH38	10.8	11.3	-10.8	-11.3	0.9	1.4		Clay	CH		grey slightly brown	VS	
URS_BH38	11.3	15	-11.3	-15	1.4	5.1		Clay	CH		dark grey, grey	VS	
URS_BH38	15	18	-15	-18	5.1	8.1		Clay	CH		pale grey with trace orange mottling	St	
URS_BH38	18	18.6	-18	-18.6	8.1	8.7		Clay	CH		pale grey	St	
URS_BH38	18.6	21	-18.6	-21	8.7	11.1		Clay	CH		pale grey orange mottled	St	
URS_BH38	21	21.2	-21	-21.2	11.1	11.3		Clay	CH		pale grey - green grey	Vst	
URS_BH38	21.2	21.45	-21.2	-21.45	11.3	11.55		Gravel	GP		dark brown, mottled orange	Vst	21.45 mCD Target depth
URS_BH39A	10	10.9	-10	-10.9	0	0.9		Clay	CH		grey	VS	
URS_BH39A	10.9	11.6	-10.9	-11.6	0.9	1.6		Sandy Clay	CH		grey	VS	
URS_BH39A	11.6	12.7	-11.6	-12.7	1.6	2.7		Clay	CH		grey	VS	
URS_BH39A	12.7	15	-12.7	-15	2.7	5		Clay	CH		dark grey	VS	
URS_BH39A	15	18	-15	-18	5	8		Clay	CH		pale grey mottled pale brown-orange	VS	
URS_BH39A	18	18.8	-18	-18.8	8	8.8		Interbedded basalt Gravels and Clay	GC		pale grey to green grey mottled pale brown orange	St	
URS_BH39A	18.8	21	-18.8	-21	8.8	11		Basalt	Basalt		dark grey	Distinctly weathered	21 mCD Target depth
URS_BH40	10.3	12	-10.3	-12	0	1.7		inferred Clay				VS	no sample collected
URS_BH40	12	15	-12	-15	1.7	4.7		Clay	CH		grey	VS	



URS_BH40	15	15.65	-15	-15.65	4.7	5.35			Interbedded basalt Gravels and Clay	GC			VS	Basalt (dark brown): Clay (pale grey to green grey)	15.65 mCD Refusal on basalt
URS_BH41	10.8	11.3	-10.8	-11.3	0	0.5			no sample					50 mm sediment crust layer at seabed	
URS_BH41	11.3	11.8	-11.3	-11.8	0.5	1			Clay	CH		grey, grey- brown	VS		
URS_BH41	11.8	15	-11.8	-15	1	4.2			Clay	CH		grey, dark grey	VS		
URS_BH41	15	15.8	-15	-15.8	4.2	5			Clay	CH		pale grey mottled pale brown	F		
URS_BH41	15.8	15.85	-15.8	-15.85	5	5.05			Sand	SP		grey to dark grey	L	sand lense	
URS_BH41	15.85	18	-15.85	-18	5.05	7.2			Clay	CH		grey mottled pale brown	S		
URS_BH41	18	18.65	-18	-18.65	7.2	7.85			Interbedded basalt Gravels and Clay	GC			H	Clay (green to grey mottled white, brown)	18.65 mCD Refusal on basalt
URS_BH42	10.7	12.4	-10.7	-12.4	0	1.7			Clay inferred				VS		
URS_BH42	12.4	12.85	-12.4	-12.85	1.7	2.15			Clay	CH		grey	VS		
URS_BH42	12.85	13.3	-12.85	-13.3	2.15	2.6			Clay	CH		pale grey, mottled pale brown	VS		
URS_BH42	13.3	15	-13.3	-15	2.6	4.3			Clay	CH		pale grey, mottled pale brown	S		
URS_BH42	15	18	-15	-18	4.3	7.3			Clay	CH		pale grey, mottled pale brown	St		
URS_BH42	18	18.01	-18	-18.01	7.3	7.31			Interbedded basalt Gravels and Clay	GC			H	Clay (grey green mottled pale brown mottled grey); gravels (dark grey)	18.01 mCD Refusal on basalt
URS_BH43	11.2	12	-11.2	-12	0	0.8			no sample						
URS_BH43	12	12.5	-12	-12.5	0.8	1.3			Clay	CH		grey	VS		
URS_BH43	12.5	12.65	-12.5	-12.65	1.3	1.45			Clay	CH		pale grey mottled grey	VS		
URS_BH43	12.65	14	-12.65	-14	1.45	2.8			Clay	CH		pale grey	VS		
URS_BH43	14	15	-14	-15	2.8	3.8			Clay	CH		grey green	VS		
URS_BH43	15	15.01	-15	-15.01	3.8	3.81			Gravel	GP		dark brown	H		15.01 mCD Refusal on basalt
URS_BH44	11.4	12	-11.4	-12	0	0.6			no sample						
URS_BH44	12	12.8	-12	-12.8	0.6	1.4			Clay	CH		dark grey	VS		
URS_BH44	12.8	15	-12.8	-15	1.4	3.6			Clay	CH		dark grey	VS		
URS_BH44	15	18	-15	-18	3.6	6.6			Clay	CH		pale grey with trace pale orange to pale	Vst		



URS_BH47	20.1	21.45	-20.1	-21.45	9.5	10.85		Clay	CH	orange-pale brown, mottled pale grey	St		21.45 mCD Target depth
URS_BH48A	9.5	10	-9.5	-10	0	0.5		no sample					
URS_BH48A	10	10.45	-10	-10.45	0.5	0.95		Clay	CL	pale brown-orange mottled pale grey	St		
URS_BH48A	10.45	10.5	-10.45	-10.5	0.95	1		Sandy Clay	CL	pale brown-orange mottled pale grey	MD		
URS_BH48A	10.5	12.4	-10.5	-12.4	1	2.9		Sand	SP	pale grey	St		
URS_BH48A	12.4	12.5	-12.4	-12.5	2.9	3		Sandy Clay		pale brown mottled pale grey	S		
URS_BH48A	12.5	15	-12.5	-15	3	5.5		Sand	SP	pale brown mottled pale grey	MD		
URS_BH48A	15	18	-15	-18	5.5	8.5		Clay	CH	pale grey mottled pale brown	H		
URS_BH48A	18	21	-18	-21	8.5	11.5		Clay	CH	pale grey mottled pale brown and grey	Vst		
URS_BH48A	21	21.45	-21	-21.45	11.5	11.95		Clay	CH	pale grey mottled dark grey, black	S		21.45 mCD Target depth
URS_BH49	10	10.5	-10	-10.5	0	0.5		no sample					
URS_BH49	10.5	12	-10.5	-12	0.5	2		Clay	CH	pale brown-orange mottled pale grey mottled white	Vst		
URS_BH49	12	15	-12	-15	2	5		Clay	CH	pale brown-orange mottled pale grey mottled white	Vst		
URS_BH49	15	18	-15	-18	5	8		Clay	CH	pale brown and pale grey mottled	H		
URS_BH49	18	21	-18	-21	8	11		Clay	CH	pale brown and pale grey mottled	Vst		
URS_BH49	21	21.3	-21	-21.3	11	11.3		Sand	SW	pale brown	MD		
URS_BH49	21.3	21.45	-21.3	-21.45	11.3	11.45		Clay	CH	pale brown-orange mottled pale grey	St		21.45 mCD Target depth
URS_BH50	12	13	-12	-13	0	1		no sample					



URS_BH50	13	15	-13	-15	1	3		Clay	CH	pale grey mottled pale brown-orange	F		
URS_BH50	15	18	-15	-18	3	6		Clay	CL	pale grey and orange to brown mottled	St		
URS_BH50	18	21	-18	-21	6	9		Clay	CL	pale grey and orange to brown mottled	F		
URS_BH50	21	21.45	-21	-21.45	9	9.45		Clay	CL	pale grey and orange to brown mottled	F		21.45 mCD Target depth
URS_BH51	12.8	13.8	-12.8	-13.8			0	1					
URS_BH51	13.8	15	-13.8	-15	1	2.2		Clay	CH	pale brown mottled pale grey	St		
URS_BH51	15	18	-15	-18	2.2	5.2		Clay	CH	pale grey to grey and orange to brown mottled	VSt		
URS_BH51	18	21	-18	-21	5.2	8.2		Sandy Clay	CH	pale orange mottled pale brown	St		
URS_BH51	21	21.15	-21	-21.15	8.2	8.35		Clay	CH	pale brown orange	F		
URS_BH51	21.15	21.45	-21.15	-21.45	8.35	8.65		Sandy Clay	CH	pale grey mottled pale brown-orange	F		21.45 mCD Target depth
URS_BH52	13.9	15	-13.9	-15	0	1.1		Inferred Clay	CH			no sample recorded	
URS_BH52	15	18	-15	-18	1.1	4.1		Clay	CH	pale brown-brown mottled pale grey	VSt		
URS_BH52	18	18.4	-18	-18.4	4.1	4.5		Clayey Sand	SC	orange, pale brown	L		
URS_BH52	18.4	21	-18.4	-21	4.5	7.1		Silty Clay	CH	pale brown mottled orange	F		
URS_BH52	21	21.45	-21	-21.45	7.1	7.55		Sandy Clay	CH	pale grey mottled pale brown	St		21.45 mCD Target depth
GHD_BH70	10.84	11.45	-10.84	-11.45	0	0.61		Silty Clay	CH	pale yellow brown	VS		
GHD_BH70	11.45	11.85	-11.45	-11.85	0.61	1.01		Silty Clay	CH	dark grey, black	S		
GHD_BH70	11.85	12.22	-11.85	-12.22	1.01	1.38		Silty Clay	CH	green grey	S/L/F		
GHD_BH70	12.2	14.1	-12.2	-14.1	1.36	3.26		Silty Clay	CH	light grey to yellow brown mottle	Vst/H		14.1 m end of BH
GHD_BH71	11.04	11.58	-11.04	-11.58	0	0.54		Silty Clay	CH	pale brown yellow	VS		
GHD_BH71	11.58	12	-11.58	-12	0.54	0.96		Silty Clay	CH	dark grey, black			
GHD_BH71	12	12.32	-12	-12.32	0.96	1.28		Silty Clay	CH		VSt		

GHD_BH71	12.32	13.1	-12.32	-13.1	1.28	2.06		Silty Clay	CH		yellow brown pale grey mottled	VS		
GHD_BH71	13.1	14.1	-13.1	-14.1	2.06	3.06		Silty Clay	CH		light grey mottle	VSt		14.1m end of BH
GHD_BH72	12.43	12.55	-12.43	-12.55	0.11	0.23		Shells				L		
GHD_BH72	12.55	12.69	-12.55	-12.69	0.23	0.37		Silty Clay	CH		green grey	St		
GHD_BH72	12.69	13.5	-12.69	-13.5	0.37	1.18		Silty Clay	CH		green grey, yellow green mottle	VSt		
GHD_BH72	13.5	14	-13.5	-14	1.18	1.68		Basalt	GC		brown	Extremely Weathered/VSt		14 m end of BH
GHD_BH73	11.44	11.55	-11.44	-11.55	0	0.11		Silty Sandy Clay	CL		grey	VS		
GHD_BH73	11.55	11.89	-11.55	-11.89	0.11	0.45		Silty Clay	CH		pale brown, grey	VS		
GHD_BH73	11.89	12.4	-11.89	-12.4	0.45	0.96		Silty Clay	CH		light grey, grey	S		
GHD_BH73	12.4	14.1	-12.4	-14.1	0.96	2.66		Silty Clay	CH		green grey, green grey yellow brown pale grey mottle	St to VSt		14.1 m end of BH
GHD_BH74	10.2	10.45	-10.2	-10.45	0	0.25		Silty Clay	CH		pale (brown, grey)	VS		
GHD_BH74	10.45	11.2	-10.45	-11.2	0.25	1		Silty Clay	CH		light grey, some orange, brown	VS		
GHD_BH74	11.2	12.2	-11.2	-12.2	1	2		Clay?	CH			S		
GHD_BH74	12.2	12.25	-12.2	-12.25	2	2.05		Basalt	GC			Highly weathered / H		
GHD_BH74	12.25	13.18	-12.25	-13.18	2.05	2.98		Basalt	GC			Fresh		13.18 m end of BH
GHD_BH75	11.19	11.39	-11.19	-11.39	0	0.2		Clayey Silt	ML		yellow brown grey	VS		
GHD_BH75	11.39	11.89	-11.39	-11.89	0.2	0.7		Silty Clay	CH			S		
GHD_BH75	11.89	12.48	-11.89	-12.48	0.7	1.29		Silty Clay	CH		light grey	S to F		
GHD_BH75	12.48	13	-12.48	-13	1.29	1.81		Silty Clay	CH		dark grey, black	S		
GHD_BH75	13	14	-13	-14	1.81	2.81		Silty Clay	CH		green grey	St to VSt		14 m end of BH
GHD_BH76	11.22	11.58	-11.22	-11.58	0	0.36		Silty Clay	CH		light grey, pale yellow brown	VS		
GHD_BH76	11.58	12.35	-11.58	-12.35	0.36	1.13		Silty Clay	CH		pale light grey	S		
GHD_BH76	12.35	13.65	-12.35	-13.65	1.13	2.43		Silty Clay	CH		mid grey, light grey	S to F		
GHD_BH76	13.65	14.05	-13.65	-14.05	2.43	2.83		Silty Clay	CH		light green grey	St to VSt		14.05 m end of BH
GHD_BH77	11.1	11.3	-11.1	-11.3	0	0.2		Silty Clay	CH		yellow brown, light grey	VS		
GHD_BH77	11.3	11.8	-11.3	-11.8	0.2	0.7		Silty Clay	CH		brown, grey	S		
GHD_BH77	11.8	12.4	-11.8	-12.4	0.7	1.3		Silty Clay	CH		light grey	S to F		

GHD_BH77	12.4	12.9	-12.4	-12.9	1.3	1.8		Silty Clay	CH		light grey, mid, dark grey	S to F	
GHD_BH77	12.9	14	-12.9	-14	1.8	2.9		Silty Clay	CH		green grey	S to F	14 m end of BH
GHD_BH78	11.6	11.82	-11.6	-11.82	0	0.22		Silty Clay	CH		pale grey brown	VS	
GHD_BH78	11.82	12.22	-11.82	-12.22	0.22	0.62		Silty Clay	CH		light grey	S	
GHD_BH78	12.22	12.26	-12.22	-12.26	0.62	0.66		Shells			white		
GHD_BH78	12.26	12.4	-12.26	-12.4	0.66	0.8		Silty Clay	CH		light grey	S	
GHD_BH78	12.4	12.8	-12.4	-12.8	0.8	1.2		Silty Clay	CH		mid grey	S to F	
GHD_BH78	12.8	14.4	-12.8	-14.4	1.2	2.8		Silty Clay	CH		light grey, mid grey	S to F	14.4 m end of BH
GHD_BH79	11.2	11.33	-11.2	-11.33	0	0.13		Silty Clay	CH			VS	
GHD_BH79	11.33	11.5	-11.33	-11.5	0.13	0.3		Silty Clay	CH		light grey	S	
GHD_BH79	11.5	11.65	-11.5	-11.65	0.3	0.45		Silty Clay	CH		light brown yellow	S	
GHD_BH79	11.65	12.8	-11.65	-12.8	0.45	1.6		Silty Clay	CH		light grey	S	
GHD_BH79	12.8	13.3	-12.8	-13.3	1.6	2.1		Silty Clay	CH		mid grey, pale brown yellow	S	
GHD_BH79	13.3	14.2	-13.3	-14.2	2.1	3		Silty Clay	CH		yellow brown, light grey	S to F	14.2 m end of BH
GHD_BH80	11.26	11.35	-11.26	-11.35	0	0.09		Clayey Silt	ML		pale grey, light grey	VS	
GHD_BH80	11.35	11.65	-11.35	-11.65	0.09	0.39		Silty Clay	CH		pale grey	S	
GHD_BH80	11.65	11.95	-11.65	-11.95	0.39	0.69		Silty Clay	CH		pale grey	S	
GHD_BH80	11.95	12.85	-11.95	-12.85	0.69	1.59		Silty Clay	CH		light pale gret	S to F	
GHD_BH80	12.85	14	-12.85	-14	1.59	2.74		Clayey Silt	CL		mid grey	S to F	14 m end of BH
GHD_BH81	12.51	12.6	-12.51	-12.6	0	0.09		Silty Clay	CH		grey	VS	
GHD_BH81	12.6	13	-12.6	-13	0.09	0.49		Silty Clay	CH		light grey	S	
GHD_BH81	13	14	-13	-14	0.49	1.49		Clayey Silt	ML		mid grey, light grey	F	14 m end of BH ?
GHD_BH82	11.25	11.75	-11.25	-11.75	0	0.5		Clayey Silt	ML		pale brown, light grey	VS	
GHD_BH82	11.75	12.25	-11.75	-12.25	0.5	1		Silty Clay	CH		light grey	S	
GHD_BH82	12.25	12.55	-12.25	-12.55	1	1.3		Silty Clay	CH		mid grey	S	
GHD_BH82	12.55	13.05	-12.55	-13.05	1.3	1.8		Silty Clay	CH		light grey	S	
GHD_BH82	13.05	14.05	-13.05	-14.05	1.8	2.8		Silty Clay	CH		yellow brown, light grey mottle	S to F	14.05 m end of BH
GHD_BH83	11.9	12.4	-11.9	-12.4	0	0.5		Silty Clay	CH		pale grey, brown	VS	
GHD_BH83	12.4	13	-12.4	-13	0.5	1.1		Silty Clay	CH		light grey	S	
GHD_BH83	13	13.3	-13	-13.3	1.1	1.4		Silty Clay	CH		mid - dark grey	S	
GHD_BH83	13.3	13.6	-13.3	-13.6	1.4	1.7		Silty Clay	CH		light grey	S	
GHD_BH83	13.6	14.1	-13.6	-14.1	1.7	2.2		Clayey Silt	ML		pale yellow brown, light grey	St	14.1 m end of BH
GHD_BH84	12	12.3	-12	-12.3	0	0.3		Silty Clay	CH		light grey	VS	



GHD_BH84	12.3	12.8	-12.3	-12.8	0.3	0.8			Silty Clay	CH		light grey	S		
GHD_BH84	12.8	13	-12.8	-13	0.8	1			Silty Clay	CH		light to mid grey	S		
GHD_BH84	13	13.55	-13	-13.55	1	1.55			Silty Clay	CH		light to mid grey	S to F		
GHD_BH84	13.55	14.2	-13.55	-14.2	1.55	2.2			Clayey Silt	ML		pale yellow brown, light grey	S to F		14.2 m end of BH
GHD_BH85	11.1	11.4	-11.1	-11.4	0	0.3			Clayey Silt	ML		pale brown, grey	VS		
GHD_BH85	11.4	12.42	-11.4	-12.42	0.3	1.32			Silty Clay	CH		light grey	S		
GHD_BH85	12.42	13.95	-12.42	-13.95	1.32	2.85			Silty Clay	CH		yellow, light grey	St		
GHD_BH85	13.95	14.25	-13.95	-14.25	2.85	3.15			Silty Clay	CH		yellow, light grey	St to VSt		14.25 m end of BH
GHD_BH86	11.6	11.9	-11.6	-11.9	0	0.3			Silty Clay	CH		pale brown	VS		
GHD_BH86	11.9	13.2	-11.9	-13.2	0.3	1.6			Silty Clay	CH		light grey	S		
GHD_BH86	13.2	13.6	-13.2	-13.6	1.6	2			Silty Clay	CH		mid grey	S to F		
GHD_BH86	13.6	14.1	-13.6	-14.1	2	2.5			Silty Clay	CH		light grey, yellow brown mottled	St		14.1 m end of BH
GHD_BH87	11.28	11.6	-11.28	-11.6	0	0.32			Clayey Silt	ML		pale grey, brown	VS		
GHD_BH87	11.6	11.98	-11.6	-11.98	0.32	0.7			Silty Clay	CH		light grey	S		
GHD_BH87	11.98	12.5	-11.98	-12.5	0.7	1.22			Silty Clay	CH		mid to dark grey	S		
GHD_BH87	12.5	12.98	-12.5	-12.98	1.22	1.7			Silty Clay	CH		light grey	S		
GHD_BH87	12.98	14.1	-12.98	-14.1	1.7	2.82			Silty Clay	CH		pale yellow brown, mottled	St to VSt		14.1 m end of BH

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