GEOTECHNICAL LOG OF NON-CORE DRILLHOLE

Borehole No:	**BH112**
Sheet No:	1 OF 2
Project No:	3003659

Client: QDTMR
Project: Smith Olsen Detailed Design Geotech Investigation **Co-ordinates System:** UTM Zone 56 **Surface RL (m):** 16.69
Feature: **Easting:** 536330.5m E **Angle from Horz:** 90
Location: Refer Location Plan **Northing:** 6906743.5m S **Direction:** n/a

DRILLING							TESTING				SUBSTANCE					
Method	Support	Rate: Fast	Rate: Medium	Rate: Slow	Water	Sample	Depth (m)	Depth/RL	Type	Sample or Field Test	Graphic Log	USC Symbol	Description Soil Type: density/consistency, grain size/plasticity, colour, particle shape/secondary components, minor constituents, moisture, origin, additional observations.	Moisture	Consistency/ Density	Other Observations
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
ATC						SPT	1	16.61 0.50 16.19	S	3,3,5 N=8		GM	ASPHALT: Silty GRAVEL: Dense, medium to coarse, grey, dry, road base, fill.	D	D	
												CH	Silty CLAY: Firm to stiff, medium to high plasticity, predominantly grey mixed orange-brown, some orange-red, some fine to medium gravel (highly weathered to extremely weathered Siltstone), moist, fill.	M	F St	
						SPT	2	2.50 14.19	S	4,9,12 N=21		CI	Silty CLAY: Very stiff, medium to low plasticity, grey, occasional laminations, moist, residual.		VSt	
WD						SPT	3	4.00 12.69	S	8,17,30/ 150mm			METASILTSTONE: Extremely low strength, extremely weathered, pale grey some grey to dark grey laminations, some iron staining in laminations.			
						SPT	4	5.50 11.19	S	8,16,15 N=31			Extremely low strength very low to low strenth in parts, extremely weathered, some high strength Quartz inclusions (remoulds to low to medium plasticity Silty CLAY some gravel).			
						SPT	5	7.00 9.69	S				Extremely low strength low to medium strength in parts, extremely weathered, brown and orange-brown pale grey and dark grey. Refer to Geotechnical Log of Cored Drillhole			
							6									
							7									
							8									
							9									

Notes (Instrumentation etc):

Contractor: GeoDrill **Commenced:** 21/07/11 **Logged By:** ME/BD
Equipment: Hydropower Scout **Completed:** 21/07/11 **Checked By:** AR

Basis of description and details of abbreviations are given on explanatory notes

SMEC GOLD COAST BOREHOLE NON CORE LOG I:\PROJECTS\3003659\005_OPERATION\SDD15 GEOTECHNICAL\INVESTIGATIONS\GINT FILES\SMITH - OLSEN BOREHOLES (CURRENT).GPJ 23/11/11

GEOTECHNICAL INVESTIGATIONS LOG

Borehole No: BH112
Sheet No: 2 OF 3
Project No: 3003659

Client: QDTMR
Project: Smith Olsen Detailed Design Geotech Investigation **Co-ordinates System:** UTM Zone 56
Feature: **E:** 536330.5
Location: Refer Location Plan **N:** 6906743.5

Surface RL (m): 16.69
Angle from Horz: 90
Direction: n/a

DRILLING						SUBSTANCE					TEST		DEFECTS		
Method	Water	TCR %	RQD %	Lift	Depth (m)	Depth/RL	Graphic Log	Description ROCK TYPE, mineralogy, grain size, colour, fabric, etc.	Weathering EW HW MW SW FS FR	Estimated Strength EL VL L M H VH EH	Type	Result	Fracture Spacing (mm) 20 40 100 300 1000	Description Depth	Type, Orientation, Spacing, Infilling, Coating, Planarity, Roughness, Thickness.
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
					1										
					2										
					3			Refer to Geotechnical log of Non-cored Drillhole							
					4										
					5										
					6										
					7	7.10		Start Coring at 7.10m							
NMLC		100	0	7.3	8	9.59 7.30 9.39		METASILTSTONE: Orange-grey some dark grey, some iron staining in defects, fragmented, extremely low strength to very low strength, extremely weathered.						7.30 7.32	J, 70, Vn, Cl, Pl, Sm J, 70, Vn, Cl, Ir, Ro
		100	80	7.8				Slightly fractured, thinly laminated in regular 60° planes, medium strength, moderately weathered.						7.80 7.81 7.90 7.91-8.09 8.10	J, 60, Ct, Cy, Pl, Sm J, 65, Cl, Pl, Sm Be, 60, St, Fe, Cu, Ro FZ, St, Fe, Ir, Ro Be, 80, St, Fe, Ir, Ro
		100	0	8.2		7.90 8.79		Fractured, clay infill in defects some iron staining, moderately to highly weathered.							
		100	62	8.6		8.30 8.39		Interbedded pale grey and dark grey, medium strength to high strength, moderately weathered.						8.25 8.55	SZ, 60, In, Cy, Pl, 50mm Be, 60, Ct, Cy, Pl, Ro
		100	86	10.0	9	8.90 7.79		Slightly lighter in colour, slightly weathered.						9.41 9.52	J, 40, Ct, Fe, Pl, Ro Be, 65, Ct, Fe, Pl, Ro

Notes (Instrumentation etc): Hole discontinued at 10.00m

Contractor: GeoDrill **Commenced:** 21/07/11 **Logged By:** ME/BD
Equipment: Hydropower Scout **Completed:** 21/07/11 **Checked By:** AR

Basis of description and details of abbreviations are given on explanatory notes

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GEOTECHNICAL INVESTIGATIONS LOG

Borehole No: BH112
Sheet No: 3 OF 3
Project No: 3003659

Client: QDTMR
Project: Smith Olsen Detailed Design Geotech Investigation **Co-ordinates System:** UTM Zone 56 **Surface RL (m):** 16.69
Feature: **E:** 536330.5 **Angle from Horz:** 90
Location: Refer Location Plan **N:** 6906743.5 **Direction:** n/a

DRILLING						SUBSTANCE						TEST		DEFECTS		
Method	Water	TCR %	RQD %	Lift	Depth (m)	Depth/RL	Graphic Log	Description ROCK TYPE, mineralogy, grain size, colour, fabric, etc.	Weathering EW HW MW SW FS FR	Estimated Strength EL VL L M H VH EH		Type	Result	Fracture Spacing (mm) 20 40 100 300 1000	Description Depth	Type, Orientation, Spacing, Infilling, Coating, Planarity, Roughness, Thickness.
1	2	3	4	5	6	7	8	9	10	11		12	13	14	15	16
															10.00	Be, 60, Vn, Cy, Pl, Sm

Notes (Instrumentation etc):

Contractor: GeoDrill **Commenced:** 21/07/11 **Logged By:** ME/BD
Equipment: Hydropower Scout **Completed:** 21/07/11 **Checked By:** AR
Basis of description and details of abbreviations are given on explanatory notes

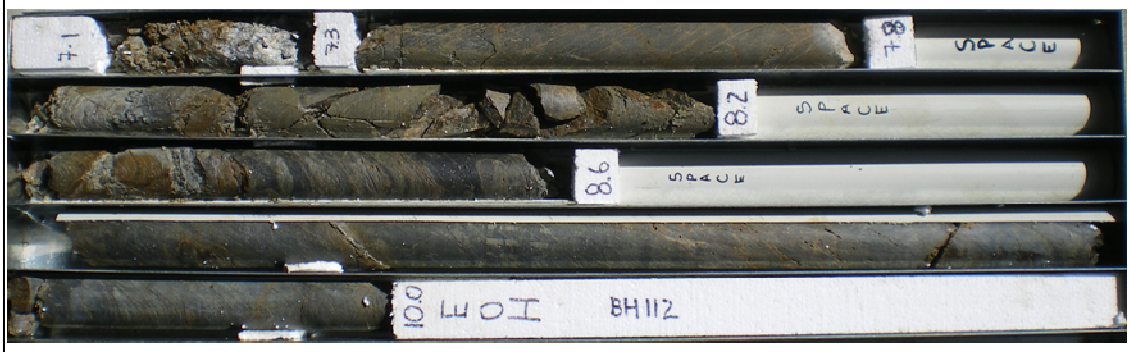
SMEC GOLD COAST BOREHOLE CORE LOG I:\PROJECTS\3003659\005_OPERATION\SDD\15 GEOTECHNICAL\INVESTIGATION\SIGINT FILES\SMITH - OLSEN BOREHOLES (CURRENT).GPJ 23/11/11

Grey Scale

Colour Scale

Borehole Number		BH112	
Box	1	of	1
Depth	7.1m	to	10.0m

Project	Smith St & Olsen Av
Number	3003659
Client	QDTMR



Member of the Surbana Jurong Group

NOTES RELATING TO GEOTECHNICAL REPORTS AND SITE INVESTIGATION LOGS

GEOTECHNICAL REPORTS AND SITE INVESTIGATION LOGS

Geotechnical reports/logs are prepared by qualified personnel on the information supplied or obtained and are based on current engineering standards of interpretation and analysis.

Information may be gained from limited subsurface testing, surface observations, previous work, and is supplemented by knowledge of the local geology and experience of the range of properties that may exhibited by the materials present. For this reason, geotechnical reports should be regarded as interpretative rather than factual documents, limited to some extent by the scope of information on which they rely.

Where the report/log has been prepared for a specific purpose (e.g. design of a three-storey building), the information and interpretation may not be appropriate if the design is changed (e.g. a twenty-storey building). In such cases, the report/log and the sufficiency of the existing work should be reviewed by SMEC in the light of the new proposal.

Every care is taken with the report/log content; however, it is not always possible to anticipate or assume responsibility for the following conditions:

- Unexpected variations in ground conditions. The potential for this depends on the amount of investigative work undertaken.
- Changes in policy or interpretation by statutory authorities
- The actions of contractors responding to commercial pressures

If these occur, SMEC would be pleased to resolve the matter through further investigation, analysis or advice.

UNFORESEEN CONDITIONS

Should conditions encountered on site differ markedly from those anticipated from the information contained in the report/log, SMEC should be notified immediately. Early identification of site anomalies generally results in any problems being more readily resolved and allows re-interpretation and assessment of the implications for future work.

SUBSURFACE INFORMATION

Logs of a borehole, recovered core, test pit, excavated face, or cone penetration test are an engineering and/or geological interpretation of the subsurface conditions. The reliability of the logged information depends on the drilling/testing method, sampling/observation spacing's and the ground conditions. It is not always possible or economic to obtain continuous high-quality data. It should also be recognised that the volume of material observed or tested is only a fraction of the total subsurface profile.

Interpretation of subsurface information and application to design and construction must take into consideration the spacing of the test locations, the frequency of observations and testing, and the possibility that geological boundaries may vary between observation points.

Groundwater observations and measurements outside of specially designed and constructed piezometers should be treated with care for the following reasons:

- In low permeability soils groundwater may not seep into an excavation or bore in the short time it is left open.
- A localised perched water table may not represent the true water table.
- Groundwater levels vary according to rainfall events or season.
- Some drilling and testing procedures mask or prevent groundwater inflow.

The installation of piezometers and long-term monitoring of groundwater levels may be required to adequately identify groundwater conditions.