FUGRO GEOTECHNICAL SERVICES LTD	DRILLHOLE RECORD	HOLE No. BH3
	CONTRACT No.: GE/2010/01	SHEET: 1 of 4

PROJECT: **PWP Item No. 7681 CL-2 Formation, Roads and Drains in Area 54, Tuen Mun, Phase 2 Package 1B Construction of Sewage Pumping Station and Associated Rising Mains**

METHOD: **Rotary Drilling**	CO-ORDINATES: E **815361.81** N **830445.43**	WORKS ORDER No. **GE/2010/01.32**
MACHINE & No.: **FDR-20**		DATE from: **18/08/2011** to **25/08/2011**
FLUSHING MEDIUM: **Water**	ORIENTATION: **Vertical**	GROUND LEVEL **+ 5.98** mPD

Drilling Progress	Casing depth/size	Water Level (m) Shift start/ end	Water Return %	T C R %	S C R %	R Q D %	F I	Tests	Samples No.	Type	Depth	Reduced Level	Depth (m)	Legend	Grade	Description
18/08/2011	SW											5.98	0.00			Firm, dark grey (5YR/4/1), sandy clayey SILT with slight organic odour. (ALLUVIUM)
									1	INSPECTION PIT	0.45 0.60					
1									2		0.85 1.00	4.98	1.00			Light grey (10R/7/1), silty clayey fine to coarse SAND. (ALLUVIUM)
									3		1.45	4.48	1.50			
				100				14 bls	4		1.50					Firm, light grey (10R/7/1), slightly sandy, clayey SILT. (ALLUVIUM)
2								1, 1, 1, 1, 2, 1 N=5	5		1.85 2.00					
									6		2.10					
									7		2.40 2.48					
3																
				100					8		3.50					
4			70					k=3.20E-7m/s								
									9		4.50 4.60					
								1, 1, 2, 1, 3, 3 N=9	10		4.70					
5									11		5.00 5.05					
												0.48	5.50		V	Extremely weak, yellowish brown (10YR/5/6), completely decomposed METACONGLOMERATE. (Slightly sandy, clayey SILT with some angular fine to coarse gravel)
				60					12		5.50					
6			70						13		6.50					
				100				48 bls	14		6.60					
7									15		7.05 7.10					
		0.00m at 18:00						5, 4, 11, 12, 11, 14 N=48	16		7.20					
18/08/2011		0.00m at 08:00							17		7.50 7.55					
19/08/2011																
8																
	SW 8.60 PW								18		8.60					
				50												
9			70													
				0				36 bls	19		9.60 9.70					
10												-4.02	10.00			

Small Disturbed Sample
Piston sample
U76 Undisturbed Sample
U100 Undisturbed Sample
Mazier Sample
76mm Vibrocore Sample
100mm Vibrocore Sample
Vibrocore Sub-sample
SPT Liner Sample

Standard Penetration Test
In-situ Vane Shear Test
Permeability Test
Pressuremeter Test
Televiewer Survey
Packer Test
Impression Packer Test
Water Sample
Standpipe
Piezometer Tip

LOGGED P. Zhang
DATE 29/08/2011
CHECKED A.B-Hollinshead
DATE 01/09/2011

REMARKS
1. An inspection pit was excavated to a depth of 1.50m.
2. Constant head permeability test was performed from 3.50m to 5.00m below existing ground level on 19/08/2011.

FUGRO GEOTECHNICAL SERVICES LTD	DRILLHOLE RECORD	HOLE No. BH3
	CONTRACT No.: GE/2010/01	SHEET: 2 of 4

PROJECT: PWP Item No. 7681 CL-2 Formation, Roads and Drains in Area 54, Tuen Mun, Phase 2 Package 1B Construction of Sewage Pumping Station and Associated Rising Mains

METHOD: Rotary Drilling	CO-ORDINATES:	WORKS ORDER No. GE/2010/01.32
MACHINE & No.: FDR-20	E 815361.81 N 830445.43	DATE from: 18/08/2011 to 25/08/2011
FLUSHING MEDIUM: Water	ORIENTATION: Vertical	GROUND LEVEL + 5.98 mPD

Drilling Progress	Casing depth/size	Water Level (m) Shift start/ end	Water Return %	T C R %	S C R %	R Q D %	F I	Tests	Samples No. Type Depth	Reduced Level	Depth (m)	Legend	Grade	Description
								4, 10, 17, 20, 15, 13 N=65		-4.02	10.00		V	As sheet 1 of 4.
11									20 18.15 18.28 21 18.30 22 18.89 18.95					
				70					23 11.70	-5.72	11.70		IV	Weak, light grey, highly decomposed METACONGLOMERATE. Recovered as slightly sandy angular fine to coarse gravel.
12			70											
19/08/2011	PW 12.80	0.30m at 18:00							24 12.70 12.80					
20/08/2011	HW	0.00m at 08:00					NI			-7.12	13.10		V	
13							NR			-7.33	13.31		III	No recovery, assumed to be completely decomposed METACONGLOMERATE.
				78	67	45			T2I01					Moderately weak to moderately strong, greyish green, moderately decomposed massive METACONGLOMERATE (comprising medium to coarse subrounded gravel size clasts in siltstone matrix) with some gravel size vugs (20-50mm) formed by the dissolution of calcareous clasts.
14									14.33					
							3.3							Joints are closely to medium spaced, rough planar, very narrow, iron and manganese oxide stained, chlorite coated and calcite infilled (20-30mm), dipping at 0°-10°, 30°-40° and subvertical.
15				100	100	97			T2I01					
									15.79					
16										-10.03	16.01			
				25	20	20	NR		T2I01				V	No recovery, assumed to be completely decomposed METACONGLOMERATE.
		0.20m at 18:00								-10.72	16.70			
20/08/2011									18.80				IV	Weak, light grey, highly decomposed METACONGLOMERATE.
22/08/2011		0.00m at 08:00		0			NI	77 bls	25 17.25 17.30					Extremely closely fractured, recovered as slightly silty sandy angular fine to coarse gravel.
17										-11.67	17.65			
							NI						V	17.65 - 18.30m : No recovery, assumed to be completely decomposed METACONGLOMERATE.
18				45	0	0	NR		T2I01	-12.32	18.30			
	HW 18.60						>20			-12.62	18.60		III	18.30 - 18.60m : Moderately weak, light grey, moderately decomposed massive METACONGLOMERATE. Closely fractured, non-intact, rough planar, iron and manganese oxide stained.
							NI		18.60	-12.72	18.70		IV II	
19				98	94	94			T2I01					Strong, greyish green, slightly decomposed massive METACONGLOMERATE (comprising medium to coarse subrounded gravel size clasts, occasionally with highly calcareous content, in siltstone matrix).
									19.66		20.00			
20														

Small Disturbed Sample
Piston sample
U76 Undisturbed Sample
U100 Undisturbed Sample
Mazier Sample
76mm Vibrocore Sample
100mm Vibrocore Sample
Vibrocore Sub-sample
SPT Liner Sample

Standard Penetration Test
In-situ Vane Shear Test
Permeability Test
Pressuremeter Test
Televiewer Survey
Packer Test
Impression Packer Test
Water Sample
Standpipe
Piezometer Tip

LOGGED P. Zhang
DATE 29/08/2011
CHECKED A.B-Hollinshead
DATE 01/09/2011

REMARKS

FUGRO GEOTECHNICAL SERVICES LTD	DRILLHOLE RECORD	HOLE No. BH3
	CONTRACT No.: GE/2010/01	SHEET: 3 of 4

PROJECT: **PWP Item No. 7681 CL-2 Formation, Roads and Drains in Area 54, Tuen Mun, Phase 2 Package 1B Construction of Sewage Pumping Station and Associated Rising Mains**

METHOD: **Rotary Drilling**	CO-ORDINATES:	WORKS ORDER No. **GE/2010/01.32**
MACHINE & No.: **FDR-20**	E **815361.81** N **830445.43**	DATE from: **18/08/2011** to **25/08/2011**
FLUSHING MEDIUM: **Water**	ORIENTATION: **Vertical**	GROUND LEVEL **+ 5.98** mPD

Drilling Progress	Casing depth/size	Water Level (m) Shift start/ end	Water Return %	T C R %	S C R %	R Q D %	F I	Tests	Samples No. Type Depth	Reduced Level	Depth (m)	Legend	Grade	Description
										-14.02	20.00			
21				100	100	100	0.9		T2|01 21.25				II	Joints are medium to widely spaced, rough planar, extremely narrow, iron and manganese oxide stained, dipping at 10°-20° and sub-vertical.
22				100	100	100			T2|01	-16.06	22.04		II	Strong, dark grey, slightly decomposed thickly to very thickly bedded METASILTSTONE with locally closely to medium spaced thinly to medium bedded metaconglomerate and occasional incipient joints infilled by calcite (1-2mm). Joints are closely spaced, locally very closely spaced, rough planar, extremely narrow, chlorite coated, dipping at 10°-20°, 30°-40° and sub-vertical.
23				100	93	84	6.1		T2|01 22.77					
24		0.30m at 18:00 22/08/2011							T2|01 24.26					
25		0.00m at 08:00 23/08/2011		100	92	89			T2|01 25.72					
26				100	100	85	3.9		T2|01					
27									27.21	-21.52	27.50		II	Strong, greyish green, slightly decomposed massive METACONGLOMERATE (comprising medium to coarse subrounded gravel size clasts, occasionally with highly calcareous content, in siltstone matrix). Joints are medium to widely spaced, rough planar, extremely narrow, iron and manganese oxide stained, dipping at 10°-20°, 40°-50° and sub-vertical.
28				100	100	100			T2|01 28.21					
29				100	100	100			T2|01 28.76					
30		0.30m		100	100	100			T2|01	-24.02	30.00			

Small Disturbed Sample
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Standard Penetration Test
In-situ Vane Shear Test
Permeability Test
Pressuremeter Test
Televiewer Survey
Packer Test
Impression Packer Test
Water Sample
Standpipe
Piezometer Tip

LOGGED P. Zhang
DATE 29/08/2011
CHECKED A.B-Hollinshead
DATE 01/09/2011

REMARKS

FUGRO GEOTECHNICAL SERVICES LTD	DRILLHOLE RECORD	HOLE No. BH3
	CONTRACT No.: GE/2010/01	SHEET: 4 of 4

PROJECT: PWP Item No. 7681 CL-2 Formation, Roads and Drains in Area 54, Tuen Mun, Phase 2 Package 1B Construction of Sewage Pumping Station and Associated Rising Mains

METHOD: Rotary Drilling	CO-ORDINATES:	WORKS ORDER No. GE/2010/01.32
MACHINE & No.: FDR-20	E 815361.81 N 830445.43	DATE from: 18/08/2011 to 25/08/2011
FLUSHING MEDIUM: Water	ORIENTATION: Vertical	GROUND LEVEL + 5.98 mPD

Drilling Progress	Casing depth/size	Water Level (m) Shift start/ end	Water Return %	T C R %	S C R %	R Q D %	F I	Tests	Samples No. Type Depth	Reduced Level -24.02	Depth (m) 30.00	Legend	Grade	Description
23/08/2011		at 18:00											II	As sheet 3 of 4.
24/08/2011		0.00m at 08:00					1.9		T2I01 30.20					
31				100	94	94			T2I01 31.65					
32				100	100	100			T2I01 33.17					
33										-27.42	33.40		II	Strong, dark grey, slightly decomposed thickly to very thickly bedded METASILTSTONE with locally closely to medium spaced thinly to medium bedded metaconglomerate and occasional incipient joints infilled by calcite (1-2mm).
34				100	100	100			T2I01 34.69					Joints are closely to medium spaced, locally very closely spaced, rough planar, extremely narrow, chlorite coated, dipping at 10°-20°, 30°-40° and sub-vertical.
35				100	94	89	3.4		T2I01 36.01					
36				100	98	98			T2I01 37.49					
37		0.30m at 18:00												
24/08/2011														
25/08/2011		0.00m at 08:00					2.6							
38				100	100	88			T2I01 39.03	-33.05	39.03			
26/08/2011														End of investigation hole at 39.03m.
40											40.00			

Small Disturbed Sample
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Standard Penetration Test
In-situ Vane Shear Test
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Pressuremeter Test
Televiewer Survey
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Water Sample
Standpipe
Piezometer Tip

LOGGED P. Zhang
DATE 29/08/2011
CHECKED A.B-Hollinshead
DATE 01/09/2011

REMARKS

CEDD Contract No. GE/2010/01
Ground Investigation - New Territories West (Term Contract)
W. O. No. : GE/2010/01.32

Job Title : PWP Item No. 7681 CL-2 Formation Roads & Drains in Area 54, Tuen Mun, Phase 2 Package 1B. Construction of Sewage Pumping Station and Associated Rising Mains

Fugro Geotechnical Services Ltd.

Hole No. : BH 3
Box No. : 1 of 10
Depth : 0.00 m. To (13.88) m.
Date of Photograph : 30/8/2011



CEDD Contract No. GE/2010/01
Ground Investigation - New Territories West (Term Contract)
W. O. No. : GE/2010/01.32

Job Title : PWP Item No. 7681 CL-2 Formation Roads & Drains in Area 54, Tuen Mun, Phase 2 Package 1B. Construction of Sewage Pumping Station and Associated Rising Mains

Fugro Geotechnical Services Ltd.

Hole No. : BH 3
Box No. : 2 of 10
Depth : (13.88) m. To 16.80 m.
Date of Photograph : 30/8/2011



CEDD Contract No. GE/2010/01
Ground Investigation - New Territories West (Term Contract)
W. O. No. : GE/2010/01.32

Job Title : PWP Item No. 7681 CL-2 Formation Roads & Drains in Area 54, Tuen Mun, Phase 2 Package 1B. Construction of Sewage Pumping Station and Associated Rising Mains

Fugro Geotechnical Services Ltd.

Hole No. : BH 3
Box No. : 3 of 10
Depth : 16.80 m. To (20.49) m.
Date of Photograph : 30/8/2011



CEDD Contract No. GE/2010/01
Ground Investigation - New Territories West (Term Contract)
W. O. No. : GE/2010/01.32
Job Title : PWP Item No. 7681 CL-2 Formation Roads & Drains in Area 54, Tuen Mun, Phase 2 Package 1B. Construction of Sewage Pumping Station and Associated Rising Mains

Fugro Geotechnical Services Ltd.

Hole No. : BH 3
Box No. : 4 of 10
Depth : (20.49) m. To (23.07) m.
Date of Photograph : 30/8/2011



CEDD Contract No. GE/2010/01
Ground Investigation - New Territories West (Term Contract)
W. O. No. : GE/2010/01.32
Job Title : PWP Item No. 7681 CL-2 Formation Roads & Drains in Area 54, Tuen Mun, Phase 2 Package 1B. Construction of Sewage Pumping Station and Associated Rising Mains

Fugro Geotechnical Services Ltd.

Hole No. : BH 3
Box No. : 5 of 10
Depth : (23.07) m. To 25.72 m.
Date of Photograph : 30/8/2011



CEDD Contract No. GE/2010/01
Ground Investigation - New Territories West (Term Contract)
W. O. No. : GE/2010/01.32
Job Title : PWP Item No. 7681 CL-2 Formation Roads & Drains in Area 54, Tuen Mun, Phase 2 Package 1B. Construction of Sewage Pumping Station and Associated Rising Mains

Fugro Geotechnical Services Ltd.

Hole No. : BH 3
Box No. : 6 of 10
Depth : 25.72 m. To 28.21 m.
Date of Photograph : 30/8/2011





CEDD Contract No. GE/2010/01
Ground Investigation - New Territories West (Term Contract)
W. O. No. : GE/2010/01.32
Job Title : PWP Item No. 7681 CL-2 Formation Roads & Drains in Area 54, Tuen Mun, Phase 2 Package 1B. Construction of Sewage Pumping Station and Associated Rising Mains

Fugro Geotechnical Services Ltd.

Hole No. : BH 3
Box No. : 7 of 10
Depth : 28.21 m. To (30.82) m.
Date of Photograph : 30/8/2011



CEDD Contract No. GE/2010/01
Ground Investigation - New Territories West (Term Contract)
W. O. No. : GE/2010/01.32
Job Title : PWP Item No. 7681 CL-2 Formation Roads & Drains in Area 54, Tuen Mun, Phase 2 Package 1B. Construction of Sewage Pumping Station and Associated Rising Mains

Fugro Geotechnical Services Ltd.

Hole No. : BH 3
Box No. : 8 of 10
Depth : (30.82) m. To (33.69) m.
Date of Photograph : 30/8/2011



CEDD Contract No. GE/2010/01
Ground Investigation - New Territories West (Term Contract)
W. O. No. : GE/2010/01.32
Job Title : PWP Item No. 7681 CL-2 Formation Roads & Drains in Area 54, Tuen Mun, Phase 2 Package 1B. Construction of Sewage Pumping Station and Associated Rising Mains

Fugro Geotechnical Services Ltd.

Hole No. : BH 3
Box No. : 9 of 10
Depth : (33.69) m. To (36.19) m.
Date of Photograph : 30/8/2011



CEDD Contract No. GE/2010/01
Ground Investigation - New Territories West (Term Contract)
W. O. No. : GE/2010/01.32
Job Title : PWP Item No. 7681 CL-2 Formation Roads & Drains in Area 54, Tuen Mun, Phase 2 Package 1B. Construction of Sewage Pumping Station and Associated Rising Mains

Fugro Geotechnical Services Ltd.

Hole No. : BH 3
Box No. : 10 of 10
Depth : (36.19) m. To 39.03 m.
Date of Photograph : 30/8/2011

