



TRIAL PIT RECORD

REPORT NUMBER

16695

CONTRACT Greater Dublin Drainage Scheme	TRIAL PIT NO. TP04
	SHEET Sheet 1 of 1
LOGGED BY JL	CO-ORDINATES
	DATE STARTED 24/01/2013
	DATE COMPLETED 24/01/2013
CLIENT Fingal County Council	GROUND LEVEL (m)
ENGINEER	EXCAVATION METHOD Kubota KX080-3a

Depth (m)	Geotechnical Description	Legend	Depth (m)	Elevation	Water Strike	Samples			Vane Test (KPa)	Hand Penetrometer (KPa)
						Sample Ref	Type	Depth		
0.0	TOPSOIL: Soft grey brown silty CLAY									
0.30	Soft to firm brown to yellow brown slightly sandy silty CLAY. Sand is fine to medium.		0.30							
0.50	Soft to firm grey brown occasionally mottled yellow brown slightly sandy slightly gravelly silty CLAY. Sand is fine to medium. Gravel is subangular to subrounded fine to medium of limestone.		0.50			AN4642	B	0.60-0.80		
0.90	Firm grey brown sandy gravelly CLAY with a low cobble content. Sand is fine to medium. Gravel is angular to subrounded fine to coarse of limestone. Cobbles are subangular to subrounded of limestone.		0.90			AN4643	B	1.00-1.10		
1.60	Stiff dark grey brown slightly sandy gravelly CLAY with a medium cobble content. Sand is fine to medium. Gravel is subangular to subrounded fine to coarse of limestone. Cobbles are subrounded of limestone.		1.60			AN4644	B	1.90-2.00		
2.30	Very stiff dark grey brown gravelly CLAY with a low to medium cobble content. Gravel is subangular to subrounded fine to coarse of limestone. Cobbles are subangular to subrounded of limestone.		2.30			AN4645	B	2.50-2.60		
3.20	End of Trial Pit at 3.20m		3.20							

Groundwater Conditions
Dry

Stability
Good

General Remarks
Pit terminated on very stiff clay

IGSL TP LOG 16695.GPJ IGSL_GDT 5/4/13



TRIAL PIT RECORD

REPORT NUMBER

16695

CONTRACT Greater Dublin Drainage Scheme	TRIAL PIT NO. TP05
	SHEET Sheet 1 of 1
LOGGED BY JL	CO-ORDINATES
	DATE STARTED 24/01/2013
	DATE COMPLETED 24/01/2013
CLIENT Fingal County Council	GROUND LEVEL (m)
ENGINEER	EXCAVATION METHOD Kubota KX080-3a

Depth (m)	Geotechnical Description	Legend	Depth (m)	Elevation	Water Strike	Samples			Vane Test (KPa)	Hand Penetrometer (KPa)
						Sample Ref	Type	Depth		
0.0	TOPSOIL: Soft brown slightly sandy silty CLAY. Sand is fine.									
	Soft to firm yellow brown sandy silty CLAY. Sand is fine to medium.		0.30			AN4626	B	0.50-0.60		
	Soft to firm grey brown occasionally mottled orange brown sandy gravelly CLAY. Sand is fine to medium. Gravel is subangular to subrounded fine to coarse of limestone.		0.90			AN4627	B	1.20-1.30		
1.0	Firm to stiff grey brown occasionally mottled light grey slightly sandy gravelly silty CLAY with a low to medium cobble content. Sand is fine to medium. Gravel is subangular to subrounded fine to coarse of limestone. Cobbles are subrounded of limestone.		1.40			AN4628	B	1.50-1.70		
2.0	Stiff to very stiff grey brown slightly sandy gravelly CLAY with a low to medium cobble content and a low boulder content. Sand is fine to medium. Gravel is subangular to subrounded fine to coarse of limestone. Cobbles are subangular to subrounded of limestone. Boulders are subrounded of limestone (up to 300mm).		2.40			AN4629	B	2.60-2.70		
3.0	End of Trial Pit at 3.00m		3.00		↓ (Seepage)					

Groundwater Conditions
Very slight seepage at 2.15m

Stability
Good

General Remarks
Pit terminated on stiff to very stiff clay

IGSL TP LOG 16695.GPJ IGSL.GDT 5/4/13



TRIAL PIT RECORD

REPORT NUMBER

16695

CONTRACT Greater Dublin Drainage Scheme		TRIAL PIT NO. TP06	
LOGGED BY JL		SHEET Sheet 1 of 1	
CLIENT ENGINEER Fingal County Council		DATE STARTED 24/01/2013	
CO-ORDINATES		DATE COMPLETED 24/01/2013	
GROUND LEVEL (m)		EXCAVATION METHOD Kubota KX080-3a	

Depth (m)	Geotechnical Description	Legend	Depth (m)	Elevation	Water Strike	Samples			Vane Test (KPa)	Hand Penetrometer (KPa)
						Sample Ref	Type	Depth		
0.0	TOPSOIL: Soft grey brown to brown silty CLAY									
0.40	Soft to firm yellow brown mottled light grey brown slightly gravelly silty CLAY. Gravel is subangular to subrounded fine to coarse of limestone.		0.40			AN4634	B	0.50-0.60		
0.80	Firm grey brown mottled light grey slightly sandy gravelly CLAY with a low cobble content. Sand is fine to medium. Gravel is subangular to subrounded fine to coarse of limestone. Cobbles are subangular to subrounded of limestone.		0.80			AN4635	B	0.90-1.10		
1.80	Stiff grey brown slightly sandy gravelly CLAY with a low to medium cobble content and a low boulder content. Sand is fine to medium. Gravel is subangular to subrounded fine to coarse of limestone. Cobbles and boulders are subangular to subrounded occasionally tabular of limestone.		1.80			AN4636	B	1.90-2.00		
2.60	Very stiff to hard grey brown slightly sandy gravelly CLAY with a medium cobble content. Sand is fine to medium. Gravel is subangular to subrounded fine to coarse of limestone. Cobbles are subangular to subrounded of limestone.		2.60			AN4637	B	2.70-2.90		
2.90	End of Trial Pit at 2.90m		2.90							

Groundwater Conditions
Dry

Stability
Good

General Remarks
Pit terminated on very stiff clay

IGSL TP LOG 16695.GPJ IGSL_GDT 5/4/13



TRIAL PIT RECORD

REPORT NUMBER

16695

CONTRACT Greater Dublin Drainage Scheme	TRIAL PIT NO. TP07
	SHEET Sheet 1 of 1
LOGGED BY JL	CO-ORDINATES
	DATE STARTED 24/01/2013
	DATE COMPLETED 24/01/2013
CLIENT ENGINEER Fingal County Council	GROUND LEVEL (m)
	EXCAVATION METHOD Kubota KX080-3a

Depth (m)	Geotechnical Description	Legend	Depth (m)	Elevation	Water Strike	Samples			Vane Test (KPa)	Hand Penetrometer (KPa)
						Sample Ref	Type	Depth		
0.0	TOPSOIL: Soft brown silty CLAY									
0.40	Soft to firm yellow brown to brown slightly sandy silty CLAY. Sand is fine to medium.		0.40							
0.60	Soft to firm brown slightly sandy slightly gravelly silty CLAY. Sand is fine to medium. Gravel is subangular to subrounded fine to medium of limestone.		0.60							
1.00	Firm brown mottled orange brown sandy slightly gravelly CLAY with a medium cobble content. Sand is fine to medium. Gravel is subangular to subrounded fine to coarse of limestone. Cobbles are subrounded of limestone.		1.00			AN4630	B	0.70-0.80		
1.60	Soft to firm brown occasionally mottled reddish brown sandy gravelly CLAY with a medium cobble content. Sand is fine to medium. Gravel is subangular to subrounded fine to coarse of limestone. Cobbles are subangular to subrounded of limestone.		1.60		↓ (Seepage)	AN4631	B	1.10-1.20		
2.10	Very stiff dark grey brown slightly sandy gravelly CLAY with a low to medium cobble content. Sand is fine. Gravel is subangular to subrounded fine to coarse of limestone. Cobbles are subrounded of limestone.		2.10			AN4632	B	1.70-1.90		
2.30			2.30			AN4633	B	2.30-2.40		
3.00	End of Trial Pit at 3.00m		3.00							

Groundwater Conditions
Moist at 1.10m. Seepage at 1.80m

Stability
Poor stability

General Remarks
Pit terminated on stiff clay coupled with poor stability from ground level to 2.10m

IGSL TP LOG 16695.GPJ IGSL.GDT 5/4/13



TRIAL PIT RECORD

REPORT NUMBER

16695

CONTRACT Greater Dublin Drainage Scheme	TRIAL PIT NO. TP08
LOGGED BY JL	SHEET Sheet 1 of 1
CLIENT ENGINEER Fingal County Council	DATE STARTED 24/01/2013 DATE COMPLETED 24/01/2013
CO-ORDINATES	EXCAVATION METHOD Kubota KX080-3a
GROUND LEVEL (m)	

Depth (m)	Geotechnical Description	Legend	Depth (m)	Elevation	Water Strike	Samples			Vane Test (KPa)	Hand Penetrometer (KPa)
						Sample Ref	Type	Depth		
0.0	TOPSOIL: Soft to firm brown slightly sandy CLAY. Sand is fine to medium.									
0.40	Soft to firm brown to yellow brown slightly sandy silty CLAY. Sand is fine to medium.		0.40							
0.55	Soft to firm grey brown slightly sandy slightly gravelly silty CLAY with rare rootlets. Sand is fine. Gravel is subangular to subrounded fine to medium of limestone.		0.55			AN4622	B	0.60-0.80		
0.80	Firm grey mottled brown and orange brown slightly sandy gravelly CLAY. Sand is fine to medium.		0.80			AN4623	B	1.00-1.10		
1.40	1.40m - Occasional subrounded boulder of limestone (up to 250mm)									
2.0	Very stiff grey to grey brown gravelly CLAY with a medium cobble content. Gravel is subrounded fine to coarse of limestone. Cobbles are subrounded of limestone.		2.00			AN4624	B	2.10-2.20		
3.0										
3.20	End of Trial Pit at 3.20m		3.20			AN4625	B	3.10-3.20		
4.0										

Groundwater Conditions
Dry

Stability
Good

General Remarks
Pit terminated on very stiff clay

IGSL TP LOG 16695.GPJ IGSL.GDT 5/4/13



TRIAL PIT RECORD

REPORT NUMBER

16695

CONTRACT Greater Dublin Drainage Scheme		TRIAL PIT NO. TP09	
LOGGED BY JL		SHEET Sheet 1 of 1	
CLIENT ENGINEER Fingal County Council		DATE STARTED 24/01/2013	
CO-ORDINATES		DATE COMPLETED 24/01/2013	
GROUND LEVEL (m)		EXCAVATION METHOD Kubota KX080-3a	

Depth (m)	Geotechnical Description	Legend	Depth (m)	Elevation	Water Strike	Samples			Vane Test (KPa)	Hand Penetrometer (KPa)
						Sample Ref	Type	Depth		
0.0	TOPSOIL: Soft brown slightly sandy silty CLAY. Sand is fine to medium.		0.10							
	Soft grey organic CLAY with occasional rootlet		0.30							
	Soft becoming firm yellow brown mottled brown slightly sandy slightly gravelly CLAY. Sand is fine to medium. Gravel is subangular to subrounded fine to medium of limestone.		0.60			AN4638	B	0.40-0.60		
1.0	Firm grey brown mottled light grey and orange brown slightly sandy gravelly CLAY with a low to medium cobble content. Sand is fine to medium. Gravel is subangular to subrounded fine to coarse of limestone. Cobbles are subangular to subrounded of limestone.		1.75		↓ (Seepage)	AN4639	B	1.00-1.10		
2.0	Firm to stiff grey brown mottled yellow brown very gravelly CLAY with a medium cobble content. Gravel is angular to subrounded fine to coarse of limestone. Cobbles are subangular to subrounded of limestone.		2.50			AN4640	B	1.80-2.00		
3.0	Stiff to very stiff dark grey black gravelly CLAY with a low cobble content. Gravel is subangular to subrounded fine to coarse of limestone. Cobbles are subrounded of limestone.		3.30			AN4641	B	3.20-3.30		
	End of Trial Pit at 3.30m									

Groundwater Conditions
Seepage at 1.50m

Stability
Good

General Remarks
Pit terminated on stiff clay

IGSL TP LOG 16695.GPJ IGSL.GDT 5/4/13



GEOTECHNICAL BORING RECORD

REPORT NUMBER

16695

CONTRACT Greater Dublin Drainage Scheme		BOREHOLE NO. BH05
CO-ORDINATES		SHEET Sheet 1 of 2
GROUND LEVEL (m AOD)	RIG TYPE Dando 2000	DATE COMMENCED 13/02/2013
	BOREHOLE DIAMETER (mm) 200	DATE COMPLETED 13/02/2013
	BOREHOLE DEPTH (m) 13.20	
CLIENT Fingal County Council	SPT HAMMER REF. NO. SPT6	BORED BY WC
ENGINEER	ENERGY RATIO (%) 55	PROCESSED BY JL

Depth (m)	Description	Legend	Elevation	Depth (m)	Samples				Field Test Results	Standpipe Details
					Ref. Number	Sample Type	Depth (m)	Recovery		
0	Soft becoming firm light brown sandy gravelly CLAY									
1					AN3715	B	1.00-1.45		N = 5 (2, 1, 1, 2, 1, 1)	
2					AN3716	B	2.00-2.45		N = 3 (0, 1, 1, 0, 1, 1)	
			2.90							
3	Medium dense grey brown sandy subangular to subrounded fine to coarse GRAVEL				AN3717	B	3.00-3.45		N = 14 (1, 2, 2, 3, 4, 5)	
			4.00							
4	Stiff dark brown sandy gravelly CLAY				AN3718	B	4.00-4.45		N = 49 (3, 6, 8, 11, 14, 16)	
5					AN3719	B	5.00-5.45		N = 25 (4, 6, 6, 5, 7, 7)	
6										
			8.60							
9	Medium dense to dense dark grey sandy GRAVEL. Gravel is subangular to subrounded fine to coarse of limestone.				AN3720	B	6.50-6.95		N = 30 (6, 6, 7, 7, 8, 8)	
			9.20							
	Stiff dark brown sandy gravelly CLAY with a medium cobble content				AN3722	B	9.50-9.95		N = 35 (6, 7, 8, 8, 9, 10)	
10										
			10.90							

HARD STRATA BORING/CHISELLING				WATER STRIKE DETAILS					
From (m)	To (m)	Time (h)	Comments	Water Strike	Casing Depth	Sealed At	Rise To	Time (min)	Comments
8.8	8.9	0.75		2.90	2.90	4.00	1.60	20	Slow Moderate
10.6	10.8	0.75		8.60	8.60		7.10	20	
11.7	11.9	0.5							
12.9	13.2	1.25							

INSTALLATION DETAILS					GROUNDWATER PROGRESS				
Date	Tip Depth	RZ Top	RZ Base	Type	Date	Hole Depth	Casing Depth	Depth to Water	Comments

REMARKS	Sample Legend U - Undisturbed 100mm Diameter Sample D - Small Disturbed (tub) P - Undisturbed Piston Sample B - Bulk Disturbed LB - Large Bulk Disturbed Env - Environmental Sample (Jar + Vial + Tub) W - Water Sample
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IGSLBH LOG 16695.GPJ IGSLGDT 5/4/13



GEOTECHNICAL BORING RECORD

REPORT NUMBER

16695

CONTRACT Greater Dublin Drainage Scheme		BOREHOLE NO. BH05
CO-ORDINATES		SHEET Sheet 2 of 2
GROUND LEVEL (m AOD)	RIG TYPE Dando 2000 BOREHOLE DIAMETER (mm) 200 BOREHOLE DEPTH (m) 13.20	DATE COMMENCED 13/02/2013 DATE COMPLETED 13/02/2013
CLIENT ENGINEER Fingal County Council	SPT HAMMER REF. NO. SPT6 ENERGY RATIO (%) 55	BORED BY WC PROCESSED BY JL

Depth (m)	Description	Legend	Elevation	Depth (m)	Samples			Field Test Results	Standpipe Details
					Ref. Number	Sample Type	Depth (m)		
11	Stiff to very stiff light brown sandy gravelly silty CLAY with a medium cobble and boulder content (<i>continued</i>)				AN3723	B	11.00-11.45	N = 34 (4, 6, 7, 7, 8, 12)	
12					AN3724	B	12.50-12.95		
13	End of Borehole at 13.20 m			13.20					
14									
15									
16									
17									
18									
19									
20									
21									

HARD STRATA BORING/CHISELLING				WATER STRIKE DETAILS					
From (m)	To (m)	Time (h)	Comments	Water Strike	Casing Depth	Sealed At	Rise To	Time (min)	Comments
8.8	8.9	0.75							
10.6	10.8	0.75							
11.7	11.9	0.5							
12.9	13.2	1.25							

INSTALLATION DETAILS					GROUNDWATER PROGRESS				
Date	Tip Depth	RZ Top	RZ Base	Type	Date	Hole Depth	Casing Depth	Depth to Water	Comments

REMARKS	Sample Legend D - Small Disturbed (tub) P - Undisturbed Piston Sample B - Bulk Disturbed LB - Large Bulk Disturbed Env - Environmental Sample (Jar + Vial + Tub) U - Undisturbed 100mm Diameter Sample W - Water Sample
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IGSLBH LOG 16695.GPJ IGSLGDT 5/4/13



GEOTECHNICAL BORING RECORD

REPORT NUMBER

16695

CONTRACT Greater Dublin Drainage Scheme		BOREHOLE NO. BH06
CO-ORDINATES		SHEET Sheet 1 of 2
GROUND LEVEL (m AOD)	RIG TYPE Dando 2000	DATE COMMENCED 14/02/2013
	BOREHOLE DIAMETER (mm) 200	DATE COMPLETED 15/02/2013
	BOREHOLE DEPTH (m) 13.70	
CLIENT Fingal County Council	SPT HAMMER REF. NO. SPT6	BORED BY WC
ENGINEER	ENERGY RATIO (%) 55	PROCESSED BY JL

Depth (m)	Description	Legend	Elevation	Depth (m)	Samples				Field Test Results	Standpipe Details
					Ref. Number	Sample Type	Depth (m)	Recovery		
0	Soft to firm light brown sandy gravelly CLAY									
1				1.70	AN3725	B	1.00-1.45		N = 9 (1, 2, 2, 2, 2, 3)	
2	Firm to stiff dark brown mottled orange brown sandy gravelly CLAY with a medium cobble content				AN3726	B	2.00-2.45		N = 11 (2, 3, 3, 2, 3, 3)	
3					AN3727	B	3.00-3.45		N = 15 (2, 3, 3, 4, 4, 4)	
4					AN3728	B	4.00-4.45		N = 24 (4, 5, 6, 6, 7, 5)	
5					AN3729	B	5.00-5.45		N = 24 (6, 6, 5, 5, 7, 7)	
6	Dense BOULDERS with some dark brown clayey sand			5.80						
7					AN3730	B	6.50-6.95		N = 30 (4, 5, 7, 7, 8, 8)	
8				8.20	AN3731	B	8.00-8.45		N = 50/190 mm (11, 14, 16, 19, 15)	
9	Very stiff black slightly sandy gravelly CLAY with a medium cobble and low to medium boulder content									
9.30										
10	Very stiff dark brown sandy gravelly CLAY with a medium boulder content				AN3732	B	9.50-9.95		N = 50/225 mm (9, 11, 14, 16, 18, 2)	

HARD STRATA BORING/CHISELLING				WATER STRIKE DETAILS					
From (m)	To (m)	Time (h)	Comments	Water Strike	Casing Depth	Sealed At	Rise To	Time (min)	Comments
2.7	2.9	0.5		5.80	5.80	6.50	5.80	20	Seepage
6	6.2	1							
7.8	7.9	0.5							
10	10.25	0.75							
13.5	13.7	1							

INSTALLATION DETAILS					GROUNDWATER PROGRESS				
Date	Tip Depth	RZ Top	RZ Base	Type	Date	Hole Depth	Casing Depth	Depth to Water	Comments

REMARKS	Sample Legend U - Undisturbed 100mm Diameter Sample D - Small Disturbed (tub) P - Undisturbed Piston Sample B - Bulk Disturbed LB - Large Bulk Disturbed Env - Environmental Sample (Jar + Vial + Tub) W - Water Sample
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IGSLBH LOG 16695.GPJ IGSL.GDT 5/4/13



GEOTECHNICAL BORING RECORD

REPORT NUMBER

16695

CONTRACT Greater Dublin Drainage Scheme		BOREHOLE NO. BH06
CO-ORDINATES		SHEET Sheet 2 of 2
GROUND LEVEL (m AOD)	RIG TYPE Dando 2000	DATE COMMENCED 14/02/2013
	BOREHOLE DIAMETER (mm) 200	DATE COMPLETED 15/02/2013
	BOREHOLE DEPTH (m) 13.70	
CLIENT Fingal County Council	SPT HAMMER REF. NO. SPT6	BORED BY WC
ENGINEER	ENERGY RATIO (%) 55	PROCESSED BY JL

Depth (m)	Description	Legend	Elevation	Depth (m)	Samples			Field Test Results	Standpipe Details
					Ref. Number	Sample Type	Depth (m)		
11	Very stiff dark brown sandy gravelly CLAY with a medium boulder content (<i>continued</i>)				AN3733	B	11.00-11.45	N = 49 (6, 8, 11, 12, 12, 14)	
12					AN3734	B	12.50-12.95		
13				13.70					
14	End of Borehole at 13.70 m								
15									
16									
17									
18									
19									
20									
21									

HARD STRATA BORING/CHISELLING				WATER STRIKE DETAILS					
From (m)	To (m)	Time (h)	Comments	Water Strike	Casing Depth	Sealed At	Rise To	Time (min)	Comments
2.7	2.9	0.5							
6	6.2	1							
7.8	7.9	0.5							
10	10.25	0.75							
13.5	13.7	1							

INSTALLATION DETAILS					GROUNDWATER PROGRESS				
Date	Tip Depth	RZ Top	RZ Base	Type	Date	Hole Depth	Casing Depth	Depth to Water	Comments

REMARKS	Sample Legend U - Undisturbed 100mm Diameter Sample D - Small Disturbed (tub) P - Undisturbed Piston Sample B - Bulk Disturbed LB - Large Bulk Disturbed Env - Environmental Sample (Jar + Vial + Tub) W - Water Sample
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IGSL BH LOG 16695.GPJ IGSL.GDT 5/4/13



GEOTECHNICAL CORE LOG RECORD

REPORT NUMBER

16695

CONTRACT Greater Dublin Drainage Scheme	DRILLHOLE NO RC05
	SHEET Sheet 1 of 3
CO-ORDINATES	DATE DRILLED 12/03/2013
GROUND LEVEL (mOD)	DATE LOGGED 13/03/2013
CLIENT Fingal County Council	RIG TYPE Casagrande C6
ENGINEER	FLUSH Air/Mist
	INCLINATION (deg) -90
	DRILLED BY M. Newland
	LOGGED BY JL
	CORE DIAMETER (mm) 80

Downhole Depth (m)	Core Run Depth (m)	T.C.R.%	S.C.R.%	R.Q.D.%	Fracture Spacing Log (mm)	Non-intact Zone	Legend	Description	Depth (m)	Elevation	Standpipe Details	SPT (N Value)
0					0 250 500			Cased down Shell & Auger Hole				
1												
2												
3												
3.50									3.50			
4								SYMMETRIX DRILLING: No recovery, observed by driller as returns of Shell & Auger Fill				
5												
6												
7												
8												
9												

REMARKS					WATER STRIKE DETAILS							
Hole cased 0.00-24.0m					Water Strike	Casing Depth	Sealed At	Rise To	Time (min)	Comments		
					22.00							
INSTALLATION DETAILS					GROUNDWATER DETAILS							
Date	Tip Depth	RZ Top	RZ Base	Type	Date	Hole Depth	Casing Depth	Depth to Water	Comments			
13-03-13	24.00	22.50	24.00	50mm SP								

IGSLRC FL10M 16695.GPJ IGSL.GDT 16/4/13



GEOTECHNICAL CORE LOG RECORD

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CONTRACT Greater Dublin Drainage Scheme	DRILLHOLE NO RC05
	SHEET Sheet 2 of 3
CO-ORDINATES	DATE DRILLED 12/03/2013
GROUND LEVEL (mOD)	DATE LOGGED 13/03/2013
CLIENT Fingal County Council	RIG TYPE Casagrande C6
ENGINEER	FLUSH Air/Mist
	INCLINATION (deg) -90
	DRILLED BY M. Newland
	LOGGED BY JL
	CORE DIAMETER (mm) 80

Downhole Depth (m)	Core Run Depth (m)	T.C.R.%	S.C.R.%	R.Q.D.%	Fracture Spacing Log (mm)	Non-intact Zone	Legend	Description	Depth (m)	Elevation	Standpipe Details	SPT (N Value)
10								SYMMETRIX DRILLING: No recovery, observed by driller as returns of Shell & Auger Fill <i>(continued)</i>				
11												
12												
13									13.20			
14								SYMMETRIX DRILLING: No recovery, observed by driller as returns of boulder clay with gravel bands.				
15									15.00			N = 50/85 mm (5, 20, 32, 18)
16								SYMMETRIX DRILLING: No recovery, observed by driller as returns of boulder clay				
17												N = 50/80 mm (8, 17, 35, 15)
18												N = 50/80 mm (18, 7, 44, 6)
19												N = 50/135 mm (7, 18, 32, 18)

REMARKS Hole cased 0.00-24.0m					WATER STRIKE DETAILS						
					Water Strike	Casing Depth	Sealed At	Rise To	Time (min)	Comments	
					22.00						
INSTALLATION DETAILS					GROUNDWATER DETAILS						
					Date	Hole Depth	Casing Depth	Depth to Water	Comments		
Date	Tip Depth	RZ Top	RZ Base	Type	12-03-13	18.00	18.00	7.00	Water level recorded at start of shift		
13-03-13	24.00	22.50	24.00	50mm SP							

IGSLRC FL10M 16695.GPJ IGSL.GDT 16/4/13



GEOTECHNICAL CORE LOG RECORD

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CONTRACT Greater Dublin Drainage Scheme		DRILLHOLE NO RC05
		SHEET Sheet 3 of 3
CO-ORDINATES		DATE DRILLED 12/03/2013
GROUND LEVEL (mOD)		DATE LOGGED 13/03/2013
CLIENT Fingal County Council		DRILLED BY M. Newland
ENGINEER		LOGGED BY JL
RIG TYPE Casagrande C6		
FLUSH Air/Mist		
INCLINATION (deg) -90		
CORE DIAMETER (mm) 80		

Downhole Depth (m)	Core Run Depth (m)	T.C.R.%	S.C.R.%	R.Q.D.%	Fracture Spacing Log (mm)	Non-intact Zone	Legend	Description	Depth (m)	Elevation	Standpipe Details	SPT (N Value)
20					0 250 500			SYMMETRIX DRILLING: No recovery, observed by driller as returns of boulder clay (<i>continued</i>)				
21												N = 50/30 mm (7, 25, 50)
22												N = 50/0 mm (9, 16, 50)
23												
24		0	0	0				Attempted Coring observed by driller as possible limestone boulder with some clay	24.00			N = 50/0 mm (25, 50)
25	25.00							End of Borehole at 25.00 m	25.00			
26												
27												
28												
29												

REMARKS					WATER STRIKE DETAILS					
Hole cased 0.00-24.0m					Water Strike	Casing Depth	Sealed At	Rise To	Time (min)	Comments
					22.00					
INSTALLATION DETAILS					GROUNDWATER DETAILS					
Date	Tip Depth	RZ Top	RZ Base	Type	Date	Hole Depth	Casing Depth	Depth to Water	Comments	
13-03-13	24.00	22.50	24.00	50mm SP	12-03-13	25.00	24.00	16.50	Water level recorded at end of borehole	

IGSLRC F1.10M 16695.GPJ IGSL.GDT 16/4/13



GEOTECHNICAL CORE LOG RECORD

REPORT NUMBER

16695

CONTRACT Greater Dublin Drainage Scheme	DRILLHOLE NO RC06
	SHEET Sheet 1 of 3
CO-ORDINATES	DATE DRILLED 14/03/2013
GROUND LEVEL (mOD)	DATE LOGGED 20/03/2013
CLIENT Fingal County Council	RIG TYPE Casagrande C6
ENGINEER	FLUSH Air/Mist
	INCLINATION (deg) -90
	DRILLED BY M. Newland
	LOGGED BY JL
	CORE DIAMETER (mm) 82

Downhole Depth (m)	Core Run Depth (m)	T.C.R.%	S.C.R.%	R.Q.D.%	Fracture Spacing Log (mm)	Non-intact Zone	Legend	Description	Depth (m)	Elevation	Standpipe Details	SPT (N Value)
0					0 250 500			SYMMETRIX DRILLING: No recovery, observed by driller as returns of boulder clay				
1												
2												
3												
4												
5												
6												
7												
8												
9												

REMARKS					WATER STRIKE DETAILS						
Hole cased 0.00-18.00m					Water Strike	Casing Depth	Sealed At	Rise To	Time (min)	Comments	
										No water strike recorded	
INSTALLATION DETAILS					GROUNDWATER DETAILS						
Date	Tip Depth	RZ Top	RZ Base	Type	Date	Hole Depth	Casing Depth	Depth to Water	Comments		
20-03-13	18.00	15.00	18.00	50mm SP	14-03-13			2.50	Water level recorded in open cable tool pre-bore		

IGSLRC FL10M 16695.GPJ IGSL.GDT 16/4/13



GEOTECHNICAL CORE LOG RECORD

REPORT NUMBER

16695

CONTRACT Greater Dublin Drainage Scheme	DRILLHOLE NO RC06
	SHEET Sheet 2 of 3
CO-ORDINATES	DATE DRILLED 14/03/2013
GROUND LEVEL (mOD)	DATE LOGGED 20/03/2013
CLIENT Fingal County Council	RIG TYPE Casagrande C6
ENGINEER	FLUSH Air/Mist
	INCLINATION (deg) -90
	DRILLED BY M. Newland
	LOGGED BY JL
	CORE DIAMETER (mm) 82

Downhole Depth (m)	Core Run Depth (m)	T.C.R.%	S.C.R.%	R.Q.D.%	Fracture Spacing Log (mm)	Non-intact Zone	Legend	Description	Depth (m)	Elevation	Standpipe Details	SPT (N Value)
10								SYMMETRIX DRILLING: No recovery, observed by driller as returns of boulder clay (<i>continued</i>)				
11												
12												
13												
14												
15								SYMMETRIX DRILLING: No recovery, observed by driller as returns of boulder clay with bands of gravel	15.00			
16												
17												
18								Medium strong thinly bedded grey fine grained argillaceous LIMESTONE with occasional medium to widely spaced medium strong to weak very thin black MUDSTONE. Weathering: Negligable	18.00			N = 50/15 mm (11, 14, 50)
18.40	100	30	30									N = 50/35 mm (9, 16, 50)
18.85	100	56	33									N = 50/0 mm (25, 50)
19								Discontinuities 18.0-22.15m 0-10° very closely to medium spaced smooth planar tight to partly open, clean. Occasional extremely closely spaced fractures in mudstone				
19.70	100	84	46					18.0-18.12m Fracture 90° smooth planar				
	100	64	0					18.60-18.86m Fracture 90° smooth planar				

REMARKS Hole cased 0.00-18.00m					WATER STRIKE DETAILS						
					Water Strike	Casing Depth	Sealed At	Rise To	Time (min)	Comments	
										No water strike recorded	
INSTALLATION DETAILS					GROUNDWATER DETAILS						
					Date	Hole Depth	Casing Depth	Depth to Water	Comments		
Date	Tip Depth	RZ Top	RZ Base	Type	14-03-13	15.00	15.00	14.00	Water level recorded 10mins after end of drilling		
20-03-13	18.00	15.00	18.00	50mm SP	15-03-13	15.00	15.00	12.50	Water level recorded at start of shift		

IGSLRC FL10M 16695.GPJ IGSL.GDT 16/4/13



GEOTECHNICAL CORE LOG RECORD

REPORT NUMBER

16695

CONTRACT Greater Dublin Drainage Scheme		DRILLHOLE NO RC06
		SHEET Sheet 3 of 3
CO-ORDINATES		DATE DRILLED 14/03/2013
GROUND LEVEL (mOD)		DATE LOGGED 20/03/2013
CLIENT Fingal County Council		DRILLED BY M. Newland
ENGINEER		LOGGED BY JL
RIG TYPE Casagrande C6		
FLUSH Air/Mist		
INCLINATION (deg) -90		
CORE DIAMETER (mm) 82		

Downhole Depth (m)	Core Run Depth (m)	T.C.R.%	S.C.R.%	R.Q.D.%	Fracture Spacing Log (mm)	Non-intact Zone	Legend	Description	Depth (m)	Elevation	Standpipe Details	SPT (N Value)
20	20.15							19.70m Coarse sand-sized disseminated cubic pyrite Medium strong thinly bedded grey fine grained agrillaceous LIMESTONE with occasional medium to widely spaced medium strong to weak very thin black MUDSTONE. Weathering: Negligible				
	20.50	100	57	34								
	20.95	100	80	31								
21	21.50	100	73	42			Discontinuities 18.0-22.15m 0-10° very closely to medium spaced smooth planar tight to partly open, clean. Occasional extremely closely spaced fractures in mudstone (<i>continued</i>)					
	21.80	100	90	37			21.26-21.30m Soft to firm black CLAY with some subangular gravel-sized fragments of very weak mudstone					
22	22.15	100	14	0			22.15 SYMMETRIX DRILLING: No recovery, observed by driller as returns of LIMESTONE	22.15				
23												
24								End of Borehole at 22.15 m	24.00			
25												
26												
27												
28												
29												

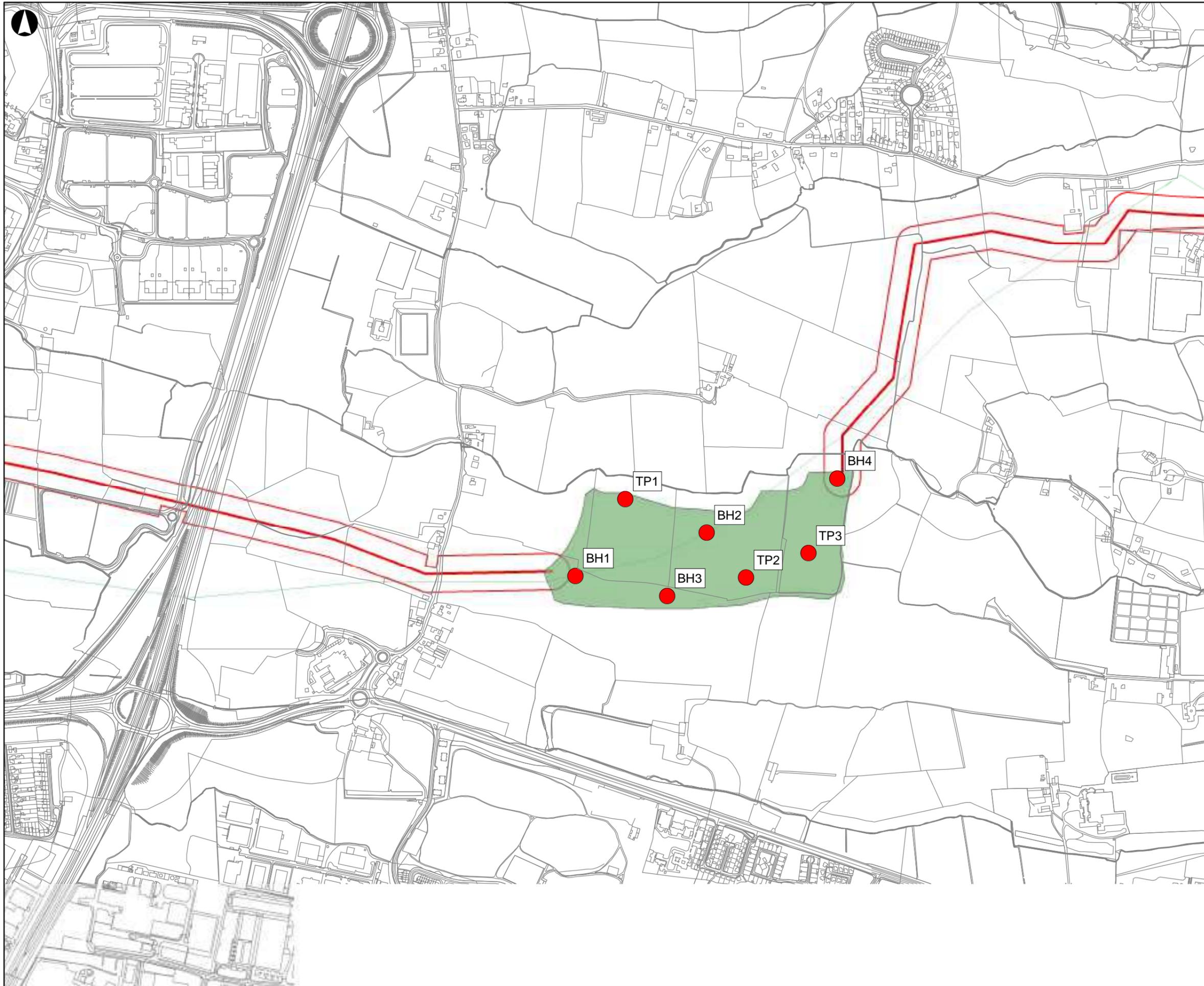
REMARKS					WATER STRIKE DETAILS					
Hole cased 0.00-18.00m					Water Strike	Casing Depth	Sealed At	Rise To	Time (min)	Comments
										No water strike recorded
INSTALLATION DETAILS					GROUNDWATER DETAILS					
Date	Tip Depth	RZ Top	RZ Base	Type	Date	Hole Depth	Casing Depth	Depth to Water	Comments	
20-03-13	18.00	15.00	18.00	50mm SP	15-03-13	20.50	18.00	17.30	Water level recorded at end of shift	
					19-03-13	20.50	18.00	18.70	Water level recorded at start of shift	
					19-03-13	22.15	18.00	20.00	Water level recorded at end of shift	

IGSLRC FL10M 16695.GPJ IGSL.GDT 16/4/13

Appendix B

**Clonshaugh - Site Plan, Graphs
and Logs**

B1

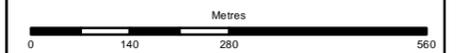


Legend

- Sites
- BH + RF
- Amended Pipeline
- Previous Pipeline
- GeoPhysics
- Pipe Corridor

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P1	12-04-12	DF	BA	SM
Issue	Date	By	Chkd	Appd

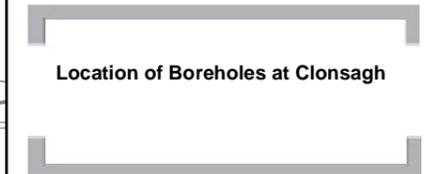


ARUP

50 Ringsend Road
 Dublin 4
 Tel +353 (0)1 233 4455 Fax +353 (0)1 668 3169
 www.arup.com

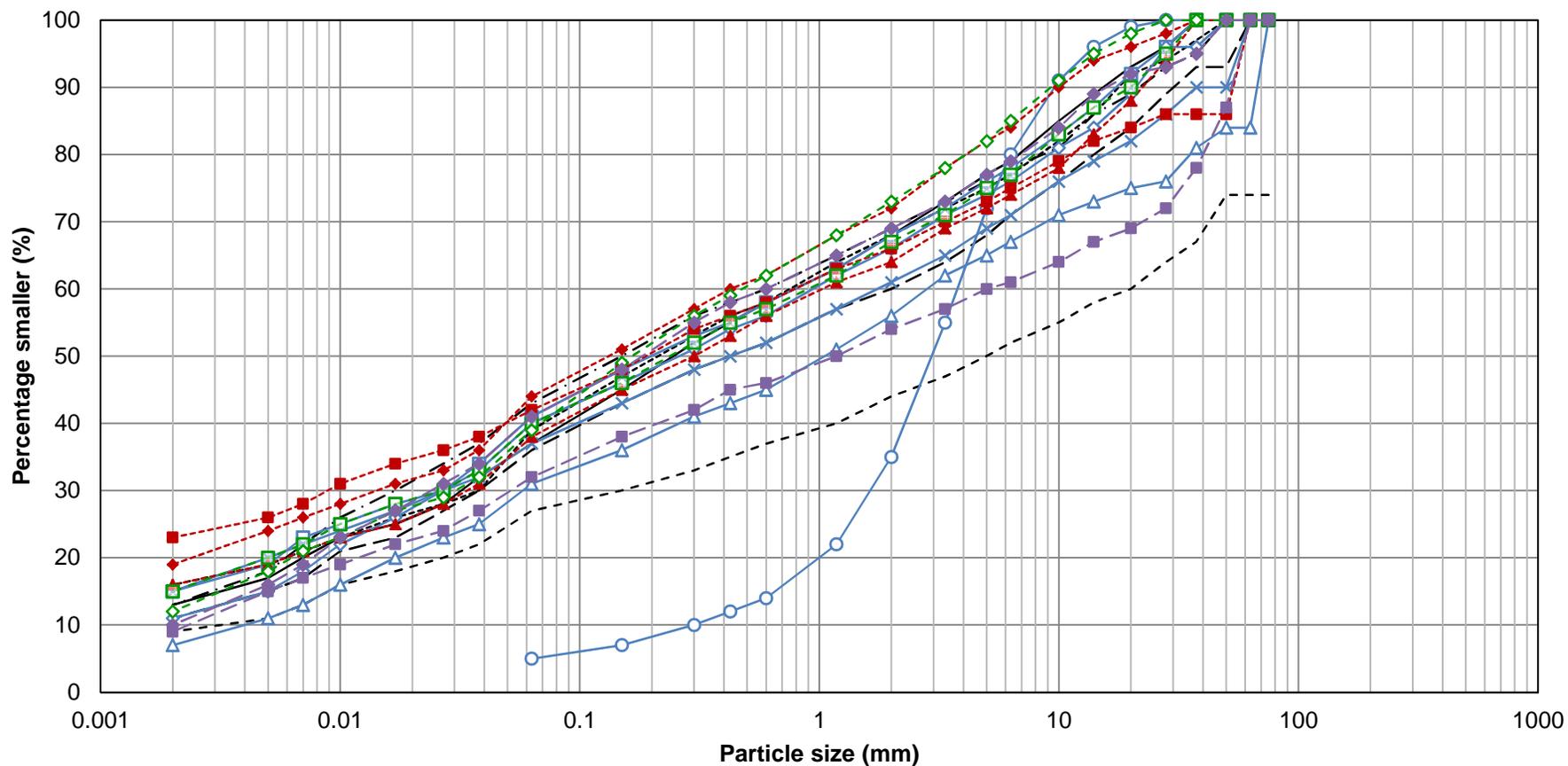
Client
Fingal County Council

Job Title
Dublin Greater Drainage Scheme



Scale at A3
1:10,000

Job No 218525-00	Drawing Status For Information
Drawing No G-003	Issue P1



Clay	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	Cobbles	Boulders
	Silt			Sand			Gravel				

—	TP01 (0.5 m)	-----	TP02 (0.6 m)	----	TP02 (1.6 m)
- - -	TP03 (2.0 m)	- · - ·	TP09 (1.0 m)	—□—	BH01 (2.0 m)
—◇—	BH01 (4.0 m)	—△—	BH01 (6.5 m)	—○—	BH01 (8.0 m)
—×—	BH01 (10.5 m)	- - -■-	BH02 (1.0 m)	- - -◆-	BH02 (3.0 m)
- - -▲-	BH02 (9.5 m)	- - -□-	BH03 (3.0 m)	- - -◇-	BH03 (5.0 m)
- - -■-	BH04 (1.0 m)	- - -◆-	BH04 (3.0 m)		

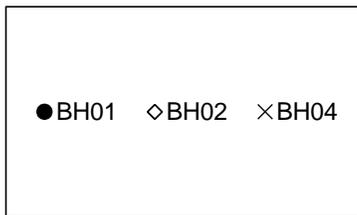
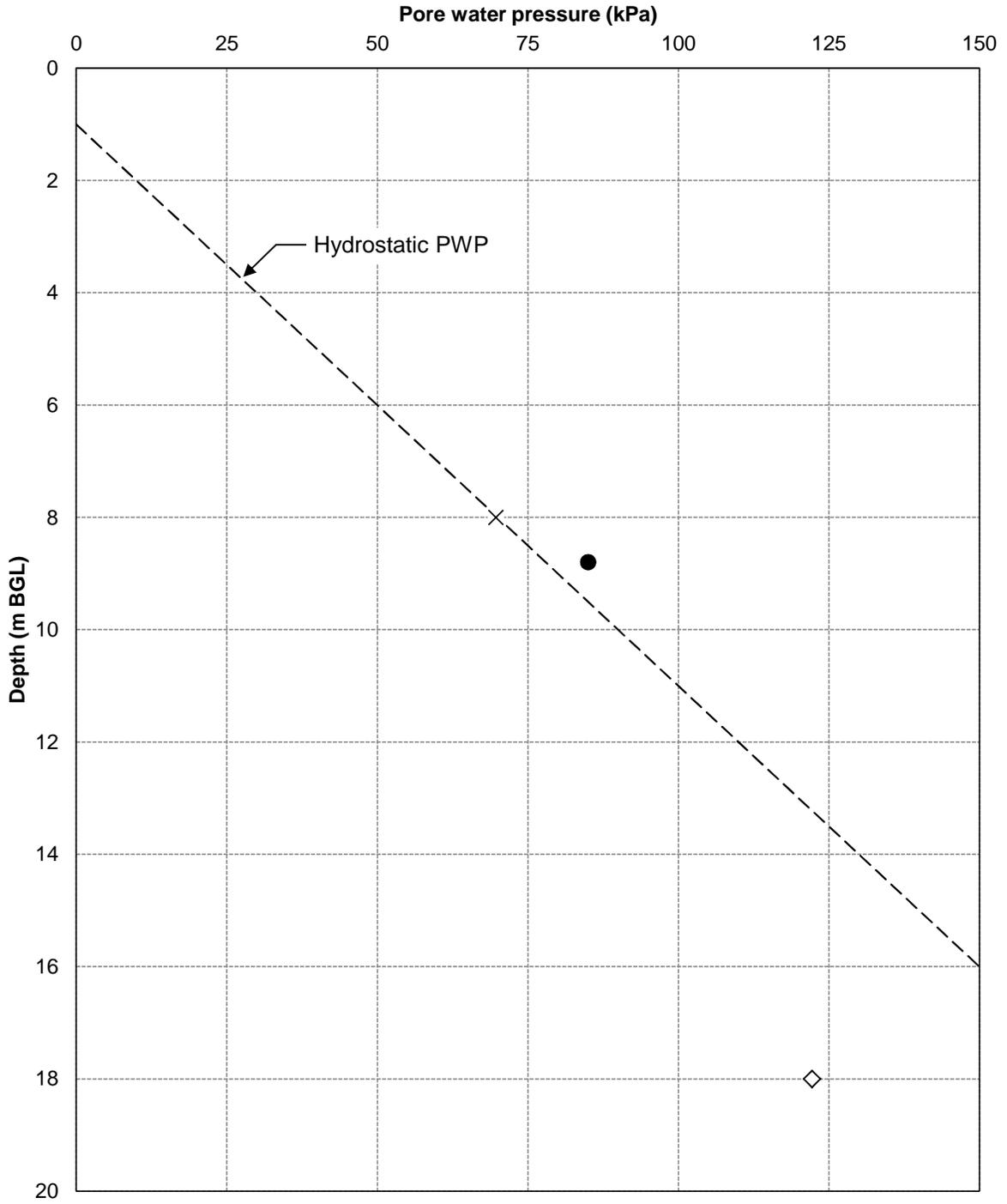
**GREATER DUBLIN DRAINAGE SCHEME
CLONSHAUGH**

Particle Size Distribution

218525-00

FIGURE

B.1

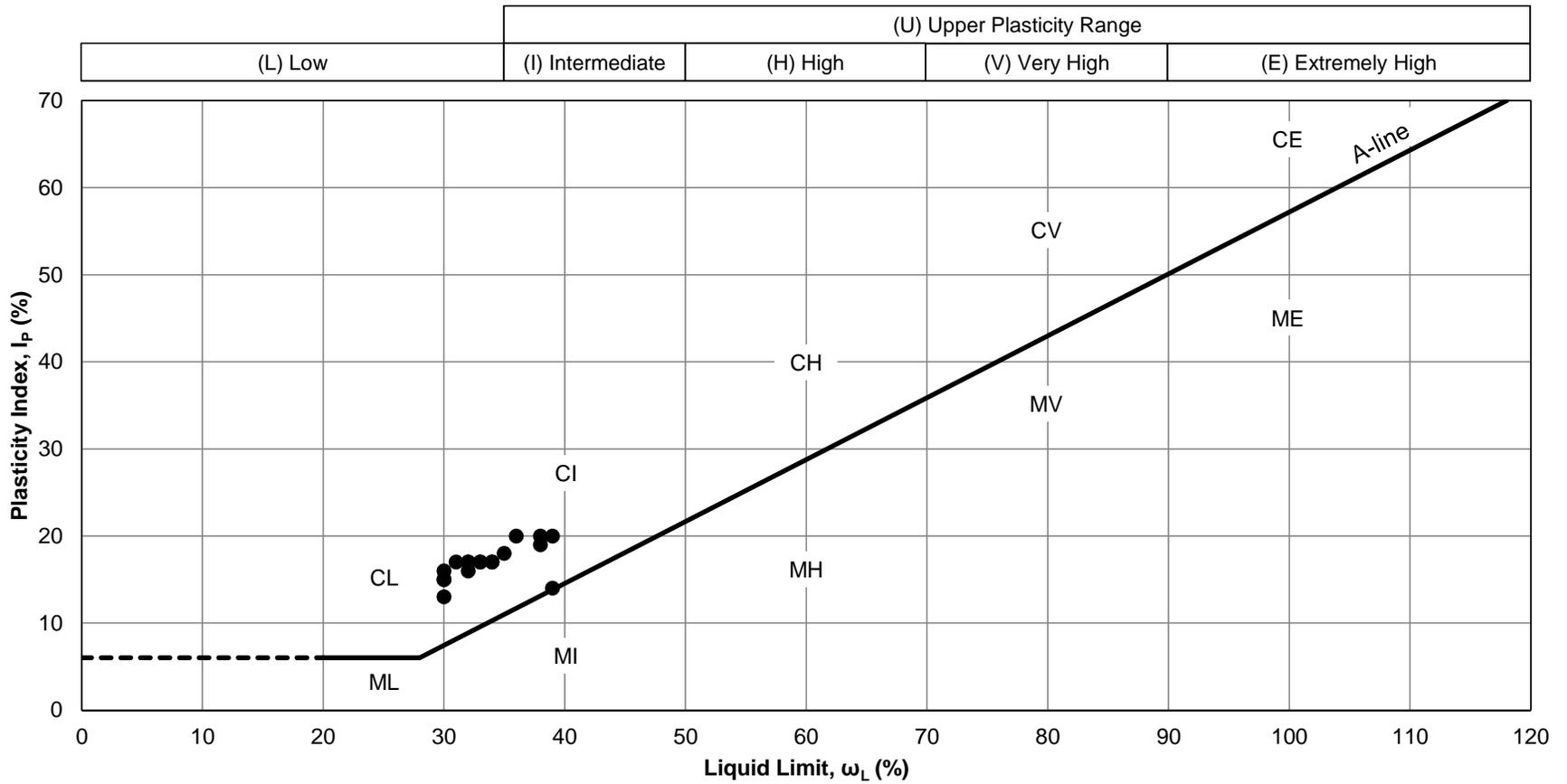


**GREATER DUBLIN DRAINAGE SCHEME
CLONSHAUGH**

Groundwater Profile

218525-00

FIGURE B.2

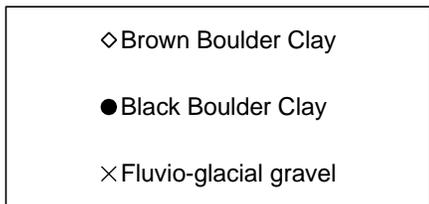
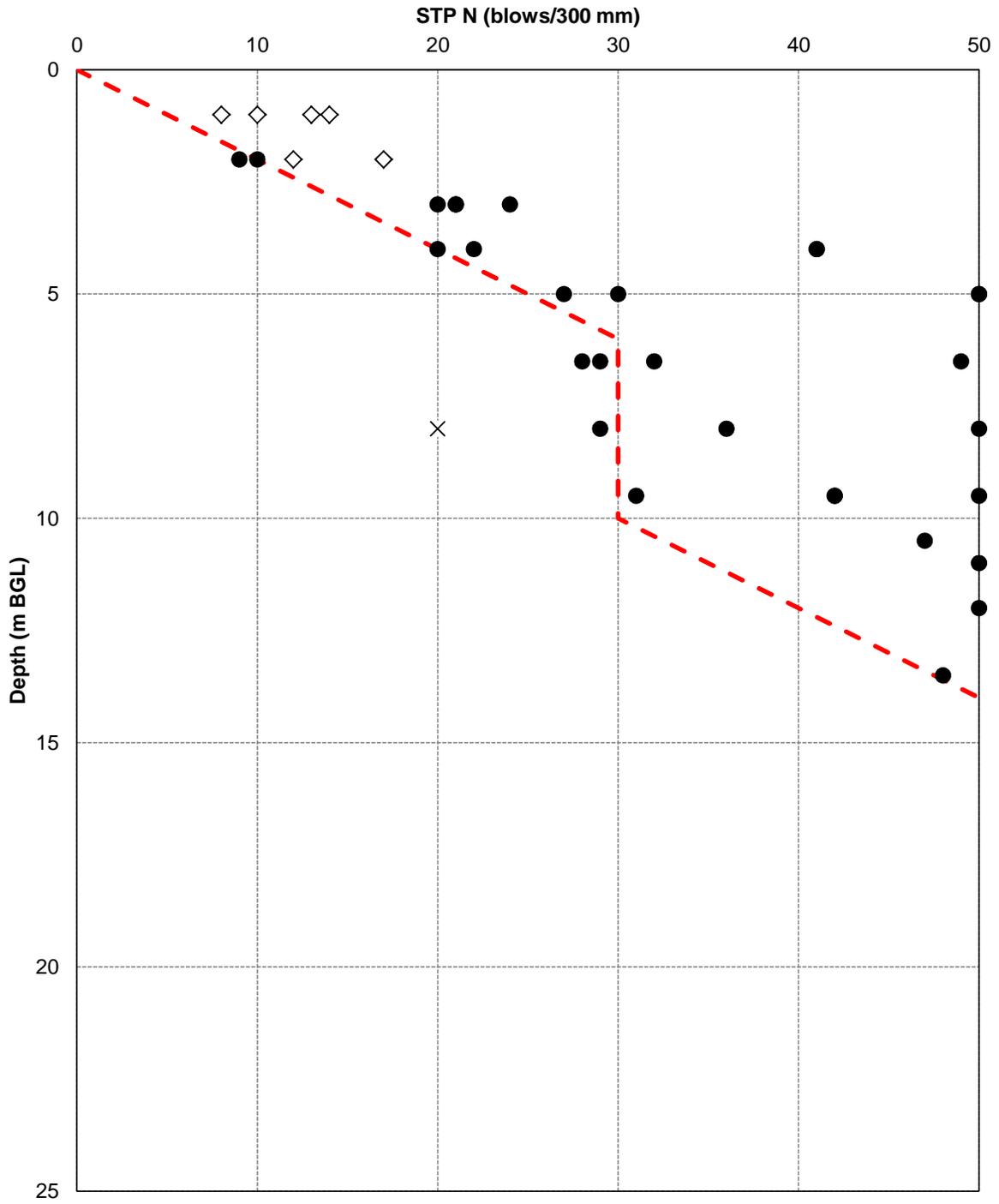


GREATER DUBLIN DRAINAGE SCHEME
CLONSHAUGH

Atterberg Limits

218525-00

FIGURE B.3



**GREATER DUBLIN DRAINAGE SCHEME
CLONSHAUGH**

Particle Size Distribution

218525-00

FIGURE B.4



TRIAL PIT RECORD

REPORT NUMBER

16695

CONTRACT Greater Dublin Drainage Scheme	TRIAL PIT NO. TP01
	SHEET Sheet 1 of 1
LOGGED BY JL	CO-ORDINATES
	DATE STARTED 23/01/2013
	DATE COMPLETED 23/01/2013
CLIENT ENGINEER Fingal County Council	GROUND LEVEL (m)
	EXCAVATION METHOD Kubota KX080-3a

Depth (m)	Geotechnical Description	Legend	Depth (m)	Elevation	Water Strike	Samples			Vane Test (KPa)	Hand Penetrometer (KPa)
						Sample Ref	Type	Depth		
0.0	TOPSOIL: Soft to firm brown to grey brown slightly sandy CLAY. Sand is fine to medium.									
0.40	Firm grey brown sandy gravelly CLAY with a low cobble content. Sand is fine to coarse. Gravel is subangular to subrounded fine to coarse of limestone. Cobbles are subrounded of limestone.		0.40			AN4615	B	0.50-0.70		
1.0	1.40 - 1.60m - Pocket of grey subrounded medium GRAVEL with a medium cobble content				↓ (Seepage)					
1.75	Firm to stiff dark grey black slightly sandy gravelly CLAY with a low to medium cobble content. Sand is fine to medium. Gravel is subangular to subrounded fine to coarse of limestone. Cobbles are subrounded of limestone.		1.75			AN4616	B	1.90-2.00		
2.0										
2.50	Stiff to very stiff dark grey black slightly sandy gravelly CLAY with a low to medium cobble content. Sand is fine to medium. Gravel is angular to subrounded fine to medium of limestone. Cobbles are subangular to subrounded of limestone.		2.50			AN4617	B	2.60-2.70		
3.0										
3.20	End of Trial Pit at 3.20m		3.20							
4.0										

Groundwater Conditions
Very slight seepage at 1.30m

Stability
Good

General Remarks
Pit terminated on stiff clay

IGSL TP LOG 16695.GPJ IGSL.GDT 5/4/13



TRIAL PIT RECORD

REPORT NUMBER

16695

CONTRACT Greater Dublin Drainage Scheme		TRIAL PIT NO. TP02
LOGGED BY JL		SHEET Sheet 1 of 1
CLIENT ENGINEER Fingal County Council		DATE STARTED 23/01/2013 DATE COMPLETED 23/01/2013
CO-ORDINATES		EXCAVATION METHOD Kubota KX080-3a
GROUND LEVEL (m)		

Depth (m)	Geotechnical Description	Legend	Depth (m)	Elevation	Water Strike	Samples			Vane Test (KPa)	Hand Penetrometer (KPa)
						Sample Ref	Type	Depth		
0.0	TOPSOIL: Soft to firm grey brown sandy CLAY. Sand is fine to medium.									
0.40	Soft to firm yellow brown to brown slightly sandy slightly gravelly CLAY. Sand is fine to medium. Gravel is subangular to subrounded fine to medium of limestone.		0.40							
0.60	Firm brown mottled grey brown sandy gravelly CLAY. Sand is fine to medium. Gravel is subangular to subrounded fine to coarse of limestone.		0.60			AN4618	B	0.60-0.80		
1.0										
1.75			1.75			AN4619	B	1.60-1.70		
2.0	Stiff dark grey black slightly sandy gravelly CLAY with a low to medium cobble content. Sand is fine to medium. Gravel is subangular to subrounded fine to coarse of limestone. Cobbles are subangular to subrounded of limestone.					AN4620	B	1.85-2.00		
2.75			2.75							
3.0	Stiff to very stiff dark grey black slightly sandy gravelly CLAY with a medium cobble content. Sand is fine to medium. Gravel is subangular to subrounded fine to coarse of limestone. Cobbles are subrounded of limestone.					AN4621	B	2.80-3.00		
3.15	End of Trial Pit at 3.15m		3.15							
4.0										

Groundwater Conditions
Dry

Stability
Good

General Remarks
Pit terminated on stiff clay

IGSL TP LOG 16695.GPJ IGSL.GDT 5/4/13



TRIAL PIT RECORD

REPORT NUMBER

16695

CONTRACT Greater Dublin Drainage Scheme	TRIAL PIT NO. TP03
LOGGED BY JL	SHEET Sheet 1 of 1
CLIENT ENGINEER Fingal County Council	DATE STARTED 23/01/2013 DATE COMPLETED 23/01/2013
CO-ORDINATES	EXCAVATION METHOD Kubota KX080-3a
GROUND LEVEL (m)	

Depth (m)	Geotechnical Description	Legend	Depth (m)	Elevation	Water Strike	Samples			Vane Test (KPa)	Hand Penetrometer (KPa)
						Sample Ref	Type	Depth		
0.0	TOPSOIL: Soft brown slightly sandy gravelly CLAY. Sand is fine to coarse. Gravel is subangular to subrounded fine to medium of various lithologies.									
	Soft to firm yellow brown slightly sandy silty CLAY. Sand is fine to medium.		0.40			AN4611	B	0.50-0.65		
	Firm becoming stiff dark grey brown slightly sandy gravelly CLAY with a low to medium cobble content. Sand is fine to medium. Gravel is subangular to subrounded fine to coarse of limestone. Cobbles are subangular to subrounded of limestone.		0.90			AN4612	B	0.90-1.10		
2.0						AN4613	B	2.00-2.10		
3.0										
	Stiff to very stiff dark grey black slightly gravelly slightly silty CLAY with a medium cobble content. Gravel is subangular to subrounded fine to coarse of limestone. Cobbles are subrounded of limestone.		3.20			AN4614	B	3.50-3.60		
4.0	End of Trial Pit at 3.85m		3.85							

Groundwater Conditions
Dry

Stability
Good

General Remarks
Pit terminated on stiff clay

IGSL TP LOG 16695.GPJ IGSL.GDT 5/4/13



GEOTECHNICAL BORING RECORD

REPORT NUMBER

16695

CONTRACT Greater Dublin Drainage Scheme		BOREHOLE NO. BH01
CO-ORDINATES		SHEET Sheet 1 of 2
GROUND LEVEL (m AOD)	RIG TYPE Dando 2000	DATE COMMENCED 04/02/2013
	BOREHOLE DIAMETER (mm) 200	DATE COMPLETED 05/02/2013
	BOREHOLE DEPTH (m) 14.80	
CLIENT Fingal County Council	SPT HAMMER REF. NO. SPT6	BORED BY WC
ENGINEER	ENERGY RATIO (%) 55	PROCESSED BY JL

Depth (m)	Description	Legend	Elevation	Depth (m)	Samples				Field Test Results	Standpipe Details
					Ref. Number	Sample Type	Depth (m)	Recovery		
0	Firm dark brown sandy gravelly CLAY									
1					AN3091	B	1.00-1.45		N = 10 (2, 2, 2, 2, 3, 3)	
2					AN3092	B	2.00-2.45		N = 12 (3, 3, 2, 3, 4, 3)	
				2.80						
3	Stiff black sandy silty CLAY with a low to medium cobble and boulder content				AN3093	B	3.00-3.45		N = 21 (3, 4, 4, 5, 5, 7)	
4					AN3094	B	4.00-4.45		N = 41 (6, 7, 9, 11, 11, 10)	
5					AN3095	B	5.00-5.45		N = 50/220 mm (16, 9, 14, 17, 19)	
6					AN3096	B	6.50-6.95		N = 32 (4, 7, 7, 9, 7, 9)	
				7.30						
8	Medium dense black to greyish black sandy GRAVEL. Sand is coarse. Gravel is subangular to subrounded fine to medium of limestone.				AN3097	B	8.00-8.45		N = 20 (3, 4, 4, 5, 5, 6)	
				8.70						
9	Stiff to very stiff black sandy silty CLAY with a medium cobble and a low to medium boulder content				AN3098	B	9.50-9.95		N = 42 (5, 8, 9, 11, 12, 10)	
10					AN3099	B	10.50-10.95		N = 47 (9, 10, 10, 11, 12, 14)	

HARD STRATA BORING/CHISELLING				WATER STRIKE DETAILS					
From (m)	To (m)	Time (h)	Comments	Water Strike	Casing Depth	Sealed At	Rise To	Time (min)	Comments
4.6	4.7	0.75		7.30	7.30	8.70	2.40	20	Rapid
5.1	5.4	0.75							
12.55	12.75	0.75							
14.4	14.8	1.5							

INSTALLATION DETAILS					GROUNDWATER PROGRESS				
Date	Tip Depth	RZ Top	RZ Base	Type	Date	Hole Depth	Casing Depth	Depth to Water	Comments
					05-02-13	7.30	7.30	0.00	Start of Shift

REMARKS	<p>Sample Legend</p> <p>D - Small Disturbed (tub) P - Undisturbed Piston Sample B - Bulk Disturbed LB - Large Bulk Disturbed Env - Environmental Sample (Jar + Vial + Tub)</p> <p style="text-align: right; font-size: 0.8em;">U - Undisturbed 100mm Diameter Sample W - Water Sample</p>
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IGSLBH.LOG 16695.GPJ IGSL.GDT 5/4/13



GEOTECHNICAL BORING RECORD

REPORT NUMBER

16695

CONTRACT Greater Dublin Drainage Scheme		BOREHOLE NO. BH01
CO-ORDINATES		SHEET Sheet 2 of 2
GROUND LEVEL (m AOD)	RIG TYPE Dando 2000	DATE COMMENCED 04/02/2013
	BOREHOLE DIAMETER (mm) 200	DATE COMPLETED 05/02/2013
	BOREHOLE DEPTH (m) 14.80	
CLIENT Fingal County Council	SPT HAMMER REF. NO. SPT6	BORED BY WC
ENGINEER	ENERGY RATIO (%) 55	PROCESSED BY JL

Depth (m)	Description	Legend	Elevation	Depth (m)	Samples				Field Test Results	Standpipe Details
					Ref. Number	Sample Type	Depth (m)	Recovery		
11	Stiff to very stiff black sandy silty CLAY with a medium cobble and a low to medium boulder content (<i>continued</i>)				AN3100	B	12.00-12.45		N = 50/285 mm (8, 10, 12, 12, 14, 12)	
12										
13										
14										
14.80	End of Borehole at 14.80 m									
15										
16										
17										
18										
19										
20										
21										

HARD STRATA BORING/CHISELLING				WATER STRIKE DETAILS					
From (m)	To (m)	Time (h)	Comments	Water Strike	Casing Depth	Sealed At	Rise To	Time (min)	Comments
4.6	4.7	0.75							
5.1	5.4	0.75							
12.55	12.75	0.75							
14.4	14.8	1.5							

INSTALLATION DETAILS					GROUNDWATER PROGRESS				
Date	Tip Depth	RZ Top	RZ Base	Type	Date	Hole Depth	Casing Depth	Depth to Water	Comments

REMARKS	Sample Legend D - Small Disturbed (tub) P - Undisturbed Piston Sample B - Bulk Disturbed LB - Large Bulk Disturbed Env - Environmental Sample (Jar + Vial + Tub) U - Undisturbed 100mm Diameter Sample W - Water Sample
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IGSLBH LOG 16695.GPJ IGSLGDT 5/4/13



GEOTECHNICAL BORING RECORD

REPORT NUMBER

16695

CONTRACT Greater Dublin Drainage Scheme		BOREHOLE NO. BH02
		SHEET Sheet 1 of 2
CO-ORDINATES	RIG TYPE Dando 2000	DATE COMMENCED 31/01/2013
GROUND LEVEL (m AOD)	BOREHOLE DIAMETER (mm) 200	DATE COMPLETED 04/02/2013
	BOREHOLE DEPTH (m) 12.00	
CLIENT Fingal County Council	SPT HAMMER REF. NO. SPT6	BORED BY WC
ENGINEER	ENERGY RATIO (%) 55	PROCESSED BY JL

Depth (m)	Description	Legend	Elevation	Depth (m)	Samples				Field Test Results	Standpipe Details
					Ref. Number	Sample Type	Depth (m)	Recovery		
0	Firm dark brown mottled grey brown sandy gravelly CLAY									
1					AN3082	B	1.00-1.45	N = 14 (3, 4, 4, 3, 4, 3)		
2					AN3083	B	2.00-2.45	N = 17 (2, 3, 2, 4, 5, 6)		
			2.60							
3	Stiff to very stiff black slightly sandy gravelly CLAY with a medium cobble and a low to medium boulder content				AN3084	B	3.00-3.45	N = 24 (3, 4, 6, 6, 7, 5)		
4					AN3085	B	4.00-4.45	N = 41 (6, 7, 8, 10, 11, 12)		
5					AN3086	B	5.00-5.45	N = 50/245 mm (10, 9, 11, 14, 16, 9)		
6										
7					AN3087	B	6.50-6.95	N = 49 (5, 9, 11, 11, 13, 14)		
8					AN3088	B	8.00-8.45	N = 50/225 mm (14, 9, 13, 16, 19, 2)		
			9.00							
9	Very stiff to hard black slightly sandy gravelly CLAY with a low to medium cobble and boulder content				AN3089	B	9.50-9.95	N = 50/125 mm (18, 7, 26, 24)		
10										

HARD STRATA BORING/CHISELLING				WATER STRIKE DETAILS					
From (m)	To (m)	Time (h)	Comments	Water Strike	Casing Depth	Sealed At	Rise To	Time (min)	Comments
3.7	3.9	1							No water strike
6	6.2	0.5							
8.1	8.4	1							
9.6	9.9	0.75							
11.7	12	1							

INSTALLATION DETAILS					GROUNDWATER PROGRESS				
Date	Tip Depth	RZ Top	RZ Base	Type	Date	Hole Depth	Casing Depth	Depth to Water	Comments

REMARKS	Sample Legend U - Undisturbed 100mm Diameter Sample D - Small Disturbed (tub) P - Undisturbed Piston Sample B - Bulk Disturbed LB - Large Bulk Disturbed Env - Environmental Sample (Jar + Vial + Tub) W - Water Sample
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IGSLBH LOG 16695.GPJ IGSL.GDT 5/4/13



GEOTECHNICAL BORING RECORD

REPORT NUMBER

16695

CONTRACT Greater Dublin Drainage Scheme		BOREHOLE NO. BH02
		SHEET Sheet 2 of 2
CO-ORDINATES	RIG TYPE Dando 2000	DATE COMMENCED 31/01/2013
GROUND LEVEL (m AOD)	BOREHOLE DIAMETER (mm) 200	DATE COMPLETED 04/02/2013
	BOREHOLE DEPTH (m) 12.00	
CLIENT Fingal County Council	SPT HAMMER REF. NO. SPT6	BORED BY WC
ENGINEER	ENERGY RATIO (%) 55	PROCESSED BY JL

Depth (m)	Description	Legend	Elevation	Depth (m)	Samples				Field Test Results	Standpipe Details
					Ref. Number	Sample Type	Depth (m)	Recovery		
11	Very stiff to hard black slightly sandy gravelly CLAY with a low to medium cobble and boulder content (<i>continued</i>)				AN3090	B	11.00-11.45		N = 50/220 mm (12, 12, 16, 18, 16)	
12	End of Borehole at 12.00 m			12.00						
13										
14										
15										
16										
17										
18										
19										
20										
21										

HARD STRATA BORING/CHISELLING				WATER STRIKE DETAILS					
From (m)	To (m)	Time (h)	Comments	Water Strike	Casing Depth	Sealed At	Rise To	Time (min)	Comments
3.7	3.9	1							No water strike
6	6.2	0.5							
8.1	8.4	1							
9.6	9.9	0.75							
11.7	12	1							

INSTALLATION DETAILS					GROUNDWATER PROGRESS				
Date	Tip Depth	RZ Top	RZ Base	Type	Date	Hole Depth	Casing Depth	Depth to Water	Comments

REMARKS	Sample Legend U - Undisturbed 100mm Diameter Sample D - Small Disturbed (tub) P - Undisturbed Piston Sample B - Bulk Disturbed LB - Large Bulk Disturbed Env - Environmental Sample (Jar + Vial + Tub) W - Water Sample
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IGSLBH LOG 16695.GPJ IGSL.GDT 5/4/13



GEOTECHNICAL BORING RECORD

REPORT NUMBER

16695

CONTRACT Greater Dublin Drainage Scheme		BOREHOLE NO. BH03
CO-ORDINATES		SHEET Sheet 1 of 1
GROUND LEVEL (m AOD)	RIG TYPE Dando 2000	DATE COMMENCED 06/02/2013
	BOREHOLE DIAMETER (mm) 200	DATE COMPLETED 06/02/2013
	BOREHOLE DEPTH (m) 10.00	
CLIENT Fingal County Council	SPT HAMMER REF. NO. SPT6	BORED BY WC
ENGINEER	ENERGY RATIO (%) 55	PROCESSED BY JL

Depth (m)	Description	Legend	Elevation	Depth (m)	Samples				Field Test Results	Standpipe Details
					Ref. Number	Sample Type	Depth (m)	Recovery		
0	TOPSOIL: Soft dark brown sandy gravelly CLAY			0.40						
1	Firm light brown sandy gravelly CLAY				AN3836	B	1.00-1.45		N = 13 (2, 2, 3, 4, 3, 3)	
2	Firm to stiff black gravelly CLAY with a low to medium cobble and boulder content			1.60	AN3837	B	2.00-2.45		N = 9 (2, 2, 2, 2, 2, 3)	
3					AN3838	B	3.00-3.45		N = 21 (3, 4, 4, 5, 5, 7)	
4					AN3839	B	4.00-4.45		N = 20 (2, 4, 4, 5, 5, 6)	
5					AN3840	B	5.00-5.45		N = 27 (4, 5, 6, 7, 7, 7)	
6	Medium dense dark brown sandy GRAVEL. Sand is coarse. Gravel is subangular to subrounded fine to medium of limestone.			5.80						
7	Stiff becoming very stiff black slightly sandy gravelly CLAY with a low to medium cobble and low boulder content			6.10	AN3841	B	6.50-6.95		N = 29 (3, 6, 6, 7, 7, 9)	
8					AN3842	B	8.00-8.45		N = 36 (10, 12, 9, 8, 9, 10)	
9					AN3843	B	9.50-9.95		N = 42 (8, 12, 11, 12, 10, 9)	
10	End of Borehole at 10.00 m			10.00						

HARD STRATA BORING/CHISELLING				WATER STRIKE DETAILS					
From (m)	To (m)	Time (h)	Comments	Water Strike	Casing Depth	Sealed At	Rise To	Time (min)	Comments
5.8	5.9	0.5		5.80	5.80		5.30	20	Slow
7	7.2	0.75							
7.5	7.9	1							
9.2	9.3	1							

INSTALLATION DETAILS					GROUNDWATER PROGRESS				
Date	Tip Depth	RZ Top	RZ Base	Type	Date	Hole Depth	Casing Depth	Depth to Water	Comments

REMARKS Borehole terminated at required depth	Sample Legend U - Undisturbed 100mm Diameter Sample D - Small Disturbed (tub) P - Undisturbed Piston Sample B - Bulk Disturbed LB - Large Bulk Disturbed Env - Environmental Sample (Jar + Vial + Tub) W - Water Sample
--	---

IGSLBH.LOG 16695.GPJ IGSL.GDT 5/4/13



GEOTECHNICAL BORING RECORD

REPORT NUMBER

16695

CONTRACT Greater Dublin Drainage Scheme		BOREHOLE NO. BH04
CO-ORDINATES		SHEET Sheet 1 of 1
GROUND LEVEL (m AOD)	RIG TYPE Dando 2000	DATE COMMENCED 07/02/2013
	BOREHOLE DIAMETER (mm) 200	DATE COMPLETED 07/02/2013
	BOREHOLE DEPTH (m) 10.00	
CLIENT Fingal County Council	SPT HAMMER REF. NO. SPT6	BORED BY WC
ENGINEER	ENERGY RATIO (%) 55	PROCESSED BY JL

Depth (m)	Description	Legend	Elevation	Depth (m)	Samples				Field Test Results	Standpipe Details
					Ref. Number	Sample Type	Depth (m)	Recovery		
0	Soft light brown sandy CLAY with a low to medium cobble content			0.60						
1	Firm to stiff dark brown sandy CLAY with a low to medium cobble content			1.80	AN3844	B	1.00-1.45		N = 8 (1, 2, 2, 2, 2, 2)	
2	Stiff black slightly sandy gravelly CLAY with a medium cobble content and a low to medium boulder content				AN3845	B	2.00-2.45		N = 10 (2, 3, 3, 2, 3, 2)	
3					AN3846	B	3.00-3.45		N = 20 (3, 4, 4, 5, 5, 6)	
4					AN3847	B	4.00-4.45		N = 22 (3, 4, 5, 5, 6, 6)	
5					AN3848	B	5.00-5.45		N = 30 (4, 6, 7, 7, 8, 8)	
6					AN3849	B	6.50-6.95		N = 28 (5, 6, 6, 7, 7, 8)	
7					AN3850	B	8.00-8.45		N = 29 (6, 7, 7, 7, 7, 8)	
8					AN3851	B	9.50-9.95		N = 31 (7, 7, 6, 8, 8, 9)	
10	End of Borehole at 10.00 m			10.00						

HARD STRATA BORING/CHISELLING				WATER STRIKE DETAILS					
From (m)	To (m)	Time (h)	Comments	Water Strike	Casing Depth	Sealed At	Rise To	Time (min)	Comments
4.7	4.9	0.75							No water strike
6	6.2	0.75							
7.5	7.75	1							
9	9.35	0.75							

INSTALLATION DETAILS					GROUNDWATER PROGRESS				
Date	Tip Depth	RZ Top	RZ Base	Type	Date	Hole Depth	Casing Depth	Depth to Water	Comments
07-02-13	8.00	2.00	8.00	50mm SP					

REMARKS Borehole terminated at required depth. 50mm diameter standpipe installed.

Sample Legend
 U - Undisturbed 100mm Diameter Sample
 D - Small Disturbed (tub)
 P - Undisturbed Piston Sample
 B - Bulk Disturbed
 LB - Large Bulk Disturbed
 Env - Environmental Sample (Jar + Vial + Tub)
 W - Water Sample

IGSL.BH.LOG 16695.GPJ IGSL.GDT 5/4/13



GEOTECHNICAL CORE LOG RECORD

REPORT NUMBER

16695

CONTRACT Greater Dublin Drainage Scheme	DRILLHOLE NO RC01
	SHEET Sheet 1 of 2
CO-ORDINATES	DATE DRILLED 26/02/2013
GROUND LEVEL (mOD)	DATE LOGGED 26/02/2013
CLIENT Fingal County Council	DRILLED BY Petersen
ENGINEER	LOGGED BY D.O'Shea
RIG TYPE Knebel	
FLUSH Air/Mist	
INCLINATION (deg) -90	
CORE DIAMETER (mm)	

Downhole Depth (m)	Core Run Depth (m)	T.C.R.%	S.C.R.%	R.Q.D.%	Fracture Spacing Log (mm)	Non-intact Zone	Legend	Description	Depth (m)	Elevation	Standpipe Details	SPT (N Value)
0					0 250 500			Cased down Shell & Auger Hole				
1												
2												
3												
4												
5												
6												
7												
8												
9												

REMARKS					WATER STRIKE DETAILS					
Hole cased 0.00-18.00m					Water Strike	Casing Depth	Sealed At	Rise To	Time (min)	Comments
										No water strike recorded
INSTALLATION DETAILS					GROUNDWATER DETAILS					
Date	Tip Depth	RZ Top	RZ Base	Type	Date	Hole Depth	Casing Depth	Depth to Water	Comments	
26-02-13	8.80	6.80	8.80	50mm SP						

IGSLRC F110M 16695.GPJ IGSL.GDT 16/4/13



GEOTECHNICAL CORE LOG RECORD

REPORT NUMBER

16695

CONTRACT Greater Dublin Drainage Scheme	DRILLHOLE NO RC01
	SHEET Sheet 2 of 2
CO-ORDINATES	DATE DRILLED 26/02/2013
GROUND LEVEL (mOD)	DATE LOGGED 26/02/2013
CLIENT Fingal County Council	DRILLED BY Petersen
ENGINEER	LOGGED BY D.O'Shea
RIG TYPE Knebel	
FLUSH Air/Mist	
INCLINATION (deg) -90	
CORE DIAMETER (mm)	

Downhole Depth (m)	Core Run Depth (m)	T.C.R.%	S.C.R.%	R.Q.D.%	Fracture Spacing Log (mm)	Non-intact Zone	Legend	Description	Depth (m)	Elevation	Standpipe Details	SPT (N Value)
10					0 250 500			Cased down Shell & Auger Hole (<i>continued</i>)	10.50			
11								SYMMETRIX DRILLING: No recovery, observed by driller as returns of madeground consisting of Shell & Auger Fill				
12												
13												
14												
15								SYMMETRIX DRILLING: No recovery, observed by driller as returns of grey sandy gravelly clay with occasional cobbles and boulders.	14.80			N = 75/125 mm (25, 50)
16												N = 50/125 mm (14, 11, 32, 18)
17												N = 50/230 mm (13, 12, 15, 18, 14, 3)
18								End of Borehole at 18.00 m	18.00			N = 50/115 mm (16, 9, 29, 21)
19												

REMARKS					WATER STRIKE DETAILS							
Hole cased 0.00-18.00m					Water Strike	Casing Depth	Sealed At	Rise To	Time (min)	Comments		
										No water strike recorded		
INSTALLATION DETAILS					GROUNDWATER DETAILS							
					Date	Hole Depth	Casing Depth	Depth to Water	Comments			
Date	Tip Depth	RZ Top	RZ Base	Type								
26-02-13	8.80	6.80	8.80	50mm SP								

IGSLRC FL10M 16695.GPJ IGSL.GDT 16/4/13



GEOTECHNICAL CORE LOG RECORD

REPORT NUMBER

16695

CONTRACT Greater Dublin Drainage Scheme	DRILLHOLE NO RC02
	SHEET Sheet 1 of 2
CO-ORDINATES	DATE DRILLED 25/02/2013
GROUND LEVEL (mOD)	DATE LOGGED 26/02/2013
CLIENT Fingal County Council	RIG TYPE Knebel
ENGINEER	FLUSH Air/Mist
	INCLINATION (deg) -90
	DRILLED BY Petersen
	LOGGED BY D.O'Shea

Downhole Depth (m)	Core Run Depth (m)	T.C.R.%	S.C.R.%	R.Q.D.%	Fracture Spacing Log (mm)	Non-intact Zone	Legend	Description	Depth (m)	Elevation	Standpipe Details	SPT (N Value)
0					0 250 500			Cased down Shell & Auger Hole				
1												
2												
3												
4												
5												
6												
6.50								SYMMETRIX DRILLING: No recovery, observed by driller as returns of madeground consisting of Shell & Auger Fill	6.50			
7												
8												
9												

REMARKS					WATER STRIKE DETAILS							
Hole cased 0.00-18.00m					Water Strike	Casing Depth	Sealed At	Rise To	Time (min)	Comments		
										No water strike recorded		
INSTALLATION DETAILS					GROUNDWATER DETAILS							
Date	Tip Depth	RZ Top	RZ Base	Type	Date	Hole Depth	Casing Depth	Depth to Water	Comments			
26-02-13	18.00	13.00	18.00	50mm SP								

IGSLRC FL10M 16695.GPJ IGSL.GDT 16/4/13



GEOTECHNICAL CORE LOG RECORD

REPORT NUMBER

16695

CONTRACT Greater Dublin Drainage Scheme	DRILLHOLE NO RC02
	SHEET Sheet 2 of 2
CO-ORDINATES	DATE DRILLED 25/02/2013
GROUND LEVEL (mOD)	DATE LOGGED 26/02/2013
CLIENT Fingal County Council	DRILLED BY Petersen
ENGINEER	LOGGED BY D.O'Shea
RIG TYPE Knebel	
FLUSH Air/Mist	
INCLINATION (deg) -90	
CORE DIAMETER (mm)	

Downhole Depth (m)	Core Run Depth (m)	T.C.R.%	S.C.R.%	R.Q.D.%	Fracture Spacing Log (mm)	Non-intact Zone	Legend	Description	Depth (m)	Elevation	Standpipe Details	SPT (N Value)
10					0 250 500			SYMMETRIX DRILLING: No recovery, observed by driller as returns of madeground consisting of Shell & Auger Fill (continued)				
11												
12								SYMMETRIX DRILLING: No recovery, observed by driller as returns of grey sandy very gravelly clay with occasional cobbles and boulders.	12.00			
13												N = 50/115 mm (16, 9, 32, 18)
14								SYMMETRIX DRILLING: No recovery, observed by driller as returns of grey sandy gravelly clay with occasional cobbles and boulders.	13.60			N = 44 (7, 9, 11, 13, 10, 10)
15												N = 50/295 mm (10, 12, 14, 12, 12, 12)
16												N = 44 (6, 10, 12, 9, 10, 13)
17								SYMMETRIX DRILLING: No recovery, observed by driller as returns of grey fine sand	17.40			
18								SYMMETRIX DRILLING: No recovery, observed by driller as returns of grey sandy gravelly clay with occasional cobbles and boulders.	17.80			
								End of Borehole at 18.00 m	18.00			N = 50/115 mm (17, 8, 29, 21)
19												

REMARKS Hole cased 0.00-18.00m						WATER STRIKE DETAILS						
						Water Strike	Casing Depth	Sealed At	Rise To	Time (min)	Comments	
											No water strike recorded	
INSTALLATION DETAILS						GROUNDWATER DETAILS						
						Date	Hole Depth	Casing Depth	Depth to Water	Comments		
Date	Tip Depth	RZ Top	RZ Base	Type	26-02-13	18.00	18.00	13.30	Water level recorded 10mins after end of drilling			
26-02-13	18.00	13.00	18.00	50mm SP								

IGSLRC F110M 16695.GPJ IGSL.GDT 16/4/13

Appendix C

Newtowncorduff - Site Plan,
Graphs and Logs

C1

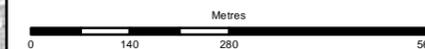


Legend

- Sites
- BH + RF
- Amended Pipeline
- Previous Pipeline
- GeoPhysics
- Pipe Corridor

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P1	12-04-12	DF	BA	SM
Issue	Date	By	Chkd	Appd



ARUP

50 Ringsend Road
 Dublin 4
 Tel +353 (0)1 233 4455 Fax +353 (0)1 668 3169
 www.arup.com

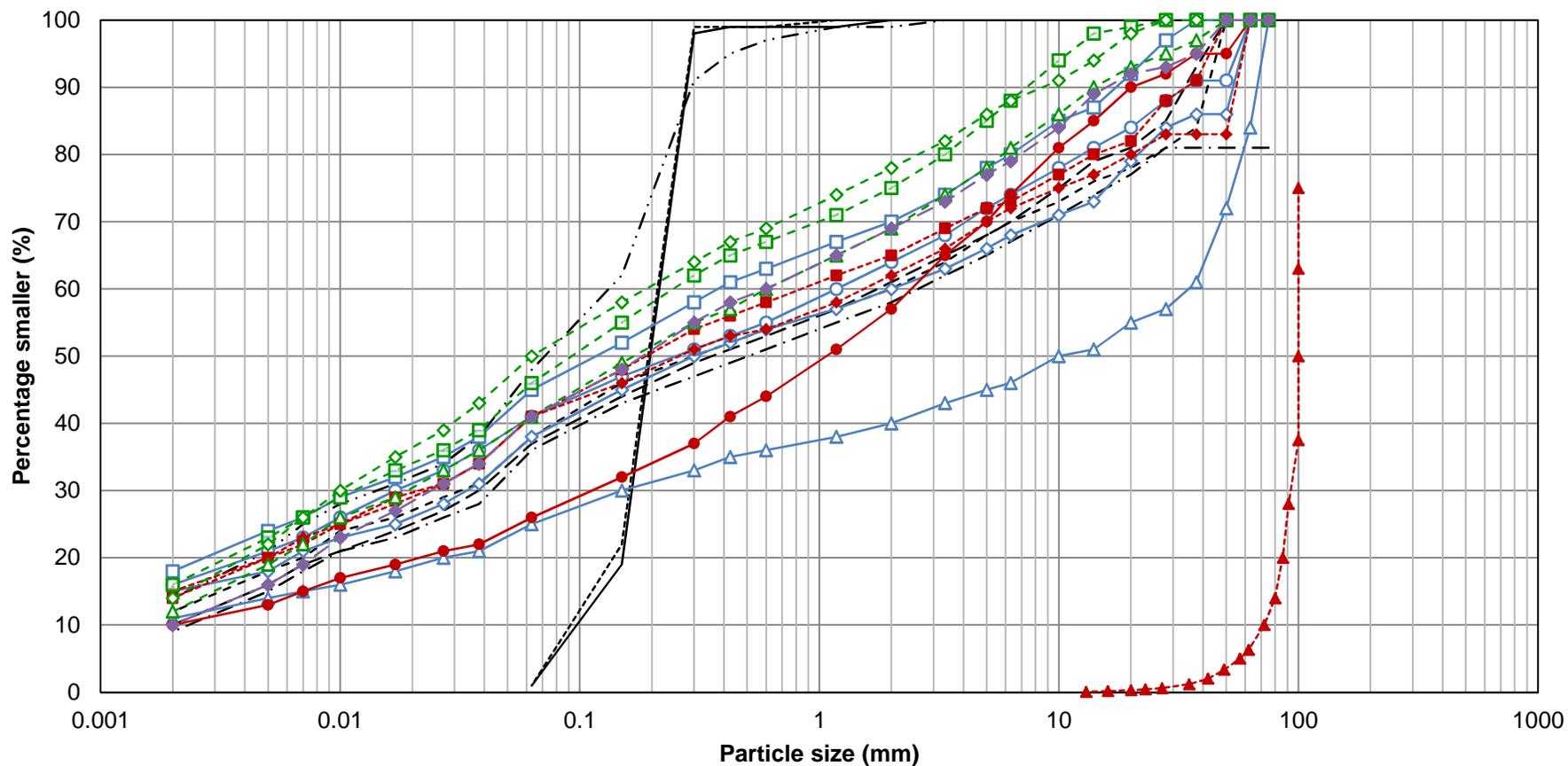
Client
Fingal County Council

Job Title
Dublin Greater Drainage Scheme



Scale at A3
1:10,000

Job No 218525-00	Drawing Status For Information
Drawing No G-004	Issue P1



Clay	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	Cobbles	Boulders
	Silt			Sand			Gravel				

— TP12 (0.7 m)	----- TP12 (1.4 m)	---- TP10 (1.1 m)
- - - TP11 (1.2 m)	- · - · TP11 (2.0 m)	- · - TP13 (1.8 m)
—□— BH07 (2.0 m)	—◇— BH07 (4.0 m)	—△— BH07 (6.5 m)
—○— BH07 (9.5 m)	- - -■- BH08 (2.0 m)	- - -◆- BH08 (5.0 m)
- - -▲- BH08 (8.0 m)	- · -●- BH08 (11.0 m)	- - -□- BH09 (2.0 m)
- - -◇- BH09 (5.0 m)	- - -△- BH09 (11.0 m)	- · -◆- BH04 (3.0 m)

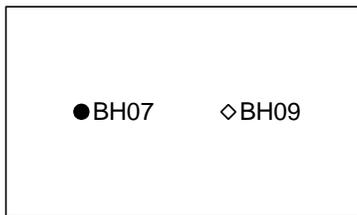
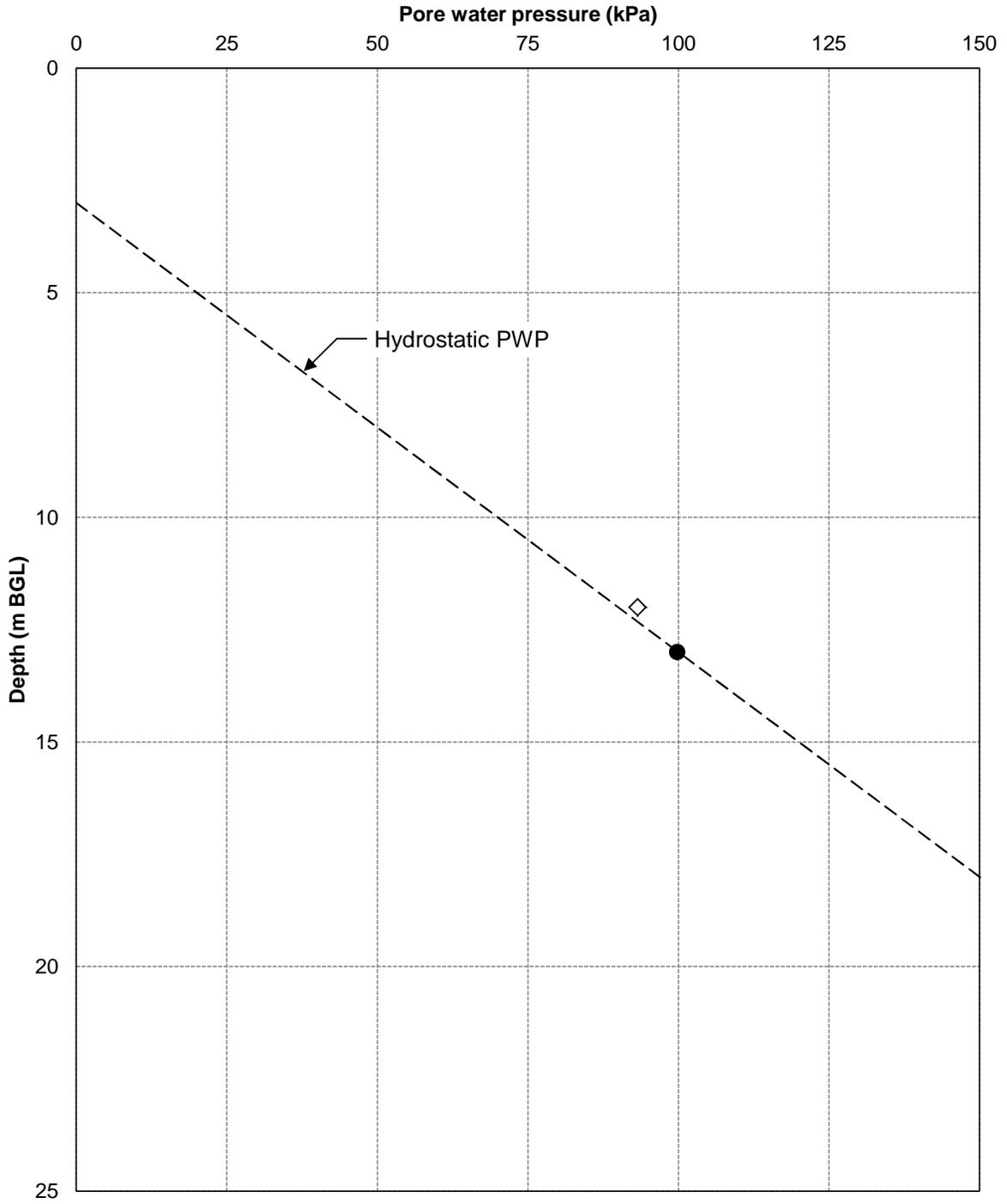
**GREATER DUBLIN DRAINAGE SCHEME
NEWTONCORDUFF**

Particle Size Distribution

218525-00

FIGURE

C.1

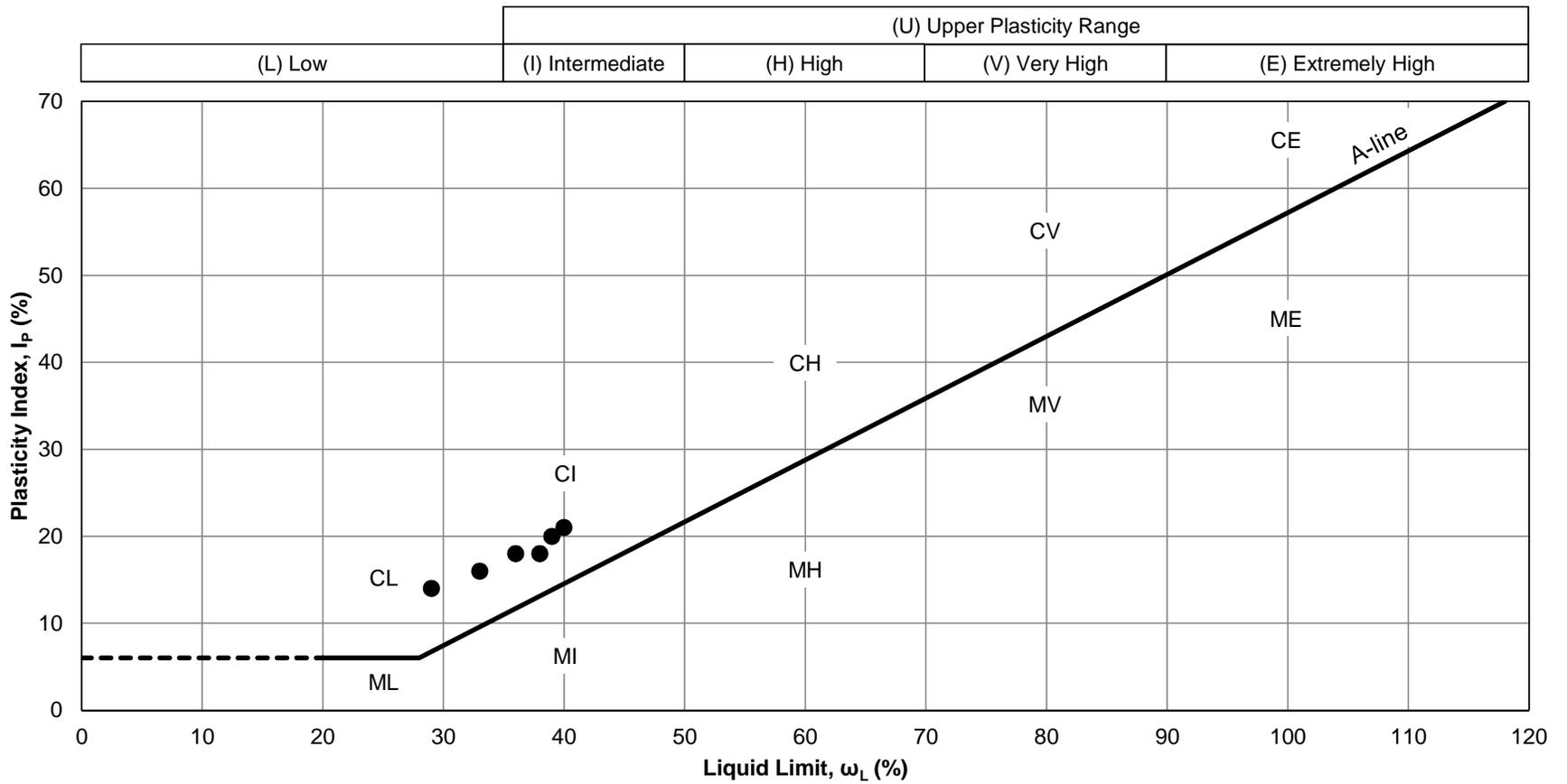


**GREATER DUBLIN DRAINAGE SCHEME
NEWTONCORDUFF**

Groundwater Profile

218525-00

FIGURE C.2



**GREATER DUBLIN DRAINAGE SCHEME
NEWTONCORDUFF**

Atterberg Limits

218525-00

FIGURE C.3



TRIAL PIT RECORD

REPORT NUMBER

16695

CONTRACT Greater Dublin Drainage Scheme		TRIAL PIT NO. TP10	
LOGGED BY JL		SHEET Sheet 1 of 1	
CLIENT ENGINEER Fingal County Council		DATE STARTED 07/03/2013	
CO-ORDINATES		DATE COMPLETED 07/03/2013	
GROUND LEVEL (m)		EXCAVATION METHOD Hitachi Zaxis 80SB	

Depth (m)	Geotechnical Description	Legend	Depth (m)	Elevation	Water Strike	Samples			Vane Test (KPa)	Hand Penetrometer (KPa)
						Sample Ref	Type	Depth		
0.0	TOPSOIL: Soft brown slightly sandy CLAY. Sand is fine to medium.									
0.45	Soft to firm brown and yellow brown sandy gravelly CLAY. Sand is fine to medium. Gravel is angular to subrounded fine to medium of limestone.		0.45			AA0211	B	0.50-0.60		
0.80	Firm to stiff grey brown occasionally mottled yellow brown gravelly slightly silty CLAY with a medium cobble content and a low boulder content. Gravel is angular to subrounded fine to coarse of limestone. Cobbles and boulders are subangular to subrounded of limestone (up to 300mm).		0.80			AA0212	LB	1.10-1.20		
1.80	Very stiff to hard dark greyish brown slightly sandy gravelly CLAY with a low to medium cobble content. Sand is fine to medium. Gravel is subangular to subrounded fine to coarse of limestone. Cobbles are subrounded of limestone.		1.80			AA0213	B	2.00-2.10		
2.60	End of Trial Pit at 2.60m		2.60							
3.0										
4.0										

Groundwater Conditions
Dry

Stability
Good

General Remarks
Pit terminated on very stiff clay

IGSL TP LOG 16695.GPJ IGSL_GDT 5/4/13



TRIAL PIT RECORD

REPORT NUMBER

16695

CONTRACT Greater Dublin Drainage Scheme	TRIAL PIT NO. TP11
	SHEET Sheet 1 of 1
LOGGED BY JL	CO-ORDINATES
	DATE STARTED 07/03/2013
	DATE COMPLETED 07/03/2013
CLIENT ENGINEER Fingal County Council	GROUND LEVEL (m)
	EXCAVATION METHOD Hitachi Zaxis 80SB

Depth (m)	Geotechnical Description	Legend	Depth (m)	Elevation	Water Strike	Samples			Vane Test (KPa)	Hand Penetrometer (KPa)
						Sample Ref	Type	Depth		
0.0	TOPSOIL: Soft light brown CLAY									
	Soft light brown occasionally mottled yellow brown sandy slightly silty CLAY. Sand is fine to medium.		0.50			AA0214	B	0.60-0.70		
1.0	Firm to stiff grey brown occasionally mottled yellow brown sandy gravelly CLAY with a low to medium cobble content. Sand is fine to medium. Gravel is subangular to subrounded fine to coarse of limestone. Cobbles are subrounded of limestone.		0.95			AA0215	B	1.20-1.30		
2.0	Stiff dark grey to dark greyish brown slightly sandy gravelly CLAY with a medium cobble content. Sand is fine to medium. Gravel is subangular to subrounded fine to coarse predominantly fine to medium of limestone. Cobbles are subangular to subrounded of limestone.		1.80			AA0216	LB	2.00-2.10		
	End of Trial Pit at 2.70m		2.70							
3.0										
4.0										

Groundwater Conditions
Dry

Stability
Good

General Remarks
Pit terminated on stiff clay

IGSL TP LOG 16695.GPJ IGSL.GDT 5/4/13



TRIAL PIT RECORD

REPORT NUMBER

16695

CONTRACT Greater Dublin Drainage Scheme		TRIAL PIT NO. TP12
LOGGED BY JL		SHEET Sheet 1 of 1
CLIENT ENGINEER Fingal County Council		DATE STARTED 23/01/2013 DATE COMPLETED 23/01/2013
CO-ORDINATES		EXCAVATION METHOD Kubota KX080-3a
GROUND LEVEL (m)		

Depth (m)	Geotechnical Description	Legend	Elevation	Water Strike	Samples			Vane Test (KPa)	Hand Penetrometer (KPa)
					Sample Ref	Type	Depth		
0.0	TOPSOIL: Soft brown to grey brown sandy SILT with occasional rootlets. Sand is fine to medium.	x							
0.40	(Moderately Compact) Grey mottled orange brown silty fine to medium SAND with rare rootlets	x			AN4605	B	0.30-0.40		
1.00	(Moderately Compact) Brown to grey brown fine to coarse SAND	.			AN4606	B	0.70-0.90		
1.00	(Moderately Compact) Grey medium to coarse SAND with occasional shell fragments	.			AN4607	B	1.40-1.50		
2.30	End of Trial Pit at 2.30m			↓ (Seepage)					

Groundwater Conditions
Seepage at 2.30m

Stability
Very poor stability with sidewall collapse from 0.40m - 1.40m

General Remarks
Pit terminated due to sidewall instability

IGSL TP LOG 16695.GPJ IGSL_GDT 5/4/13



TRIAL PIT RECORD

REPORT NUMBER

16695

CONTRACT Greater Dublin Drainage Scheme		TRIAL PIT NO. TP13
LOGGED BY JL		SHEET Sheet 1 of 1
CLIENT ENGINEER Fingal County Council		DATE STARTED 07/03/2013 DATE COMPLETED 07/03/2013
CO-ORDINATES		EXCAVATION METHOD Hitachi Zaxis 80SB
GROUND LEVEL (m)		

Depth (m)	Geotechnical Description	Legend	Depth (m)	Elevation	Water Strike	Samples			Vane Test (KPa)	Hand Penetrometer (KPa)
						Sample Ref	Type	Depth		
0.0	TOPSOIL: Soft brown sandy CLAY with frequent rootlets. Sand is fine to medium.		0.05							
	Soft to firm light grey brown slightly sandy slightly gravelly silty CLAY with rare rootlet. Sand is fine to medium. Gravel is subangular to subrounded fine to medium of limestone.					AA0206	B	0.40-0.50		
1.0	Firm grey to grey brown occasionally mottled orange slightly sandy gravelly CLAY. Sand is fine to medium. Gravel is subangular to subrounded fine to coarse of limestone.		0.90			AA0207	B	1.10-1.20		
2.0	Soft to firm brown mottled orange, yellow and light grey blue sandy CLAY. Sand is fine to medium.		1.75			AA0208	B	1.80-2.00		
	Uncompact dark grey brown silty SAND with occasional lense of soft silt. Sand is fine to medium.		2.20		↓ (Seepage)	AA0209	B	2.60-2.70		
3.0	Stiff to very stiff dark greyish brown slightly sandy gravelly CLAY. Sand is fine to medium. Gravel is subangular to subrounded fine to medium of limestone.		2.80			AA0210	B	2.80-3.00		
	End of Trial Pit at 3.20m		3.20							

Groundwater Conditions
Slight seepage at 2.40m

Stability
Poor from 1.40m. Sidewall collapse from ground level upon completion of dig.

General Remarks
Pit terminated on stiff to very stiff clay

IGSL TP LOG 16695.GPJ IGSL_GDT 5/4/13



GEOTECHNICAL BORING RECORD

REPORT NUMBER

16695

CONTRACT Greater Dublin Drainage Scheme		BOREHOLE NO. BH07
CO-ORDINATES		SHEET Sheet 1 of 1
GROUND LEVEL (m AOD)	RIG TYPE Dando 2000	DATE COMMENCED 07/03/2013
	BOREHOLE DIAMETER (mm) 200	DATE COMPLETED 08/03/2013
	BOREHOLE DEPTH (m) 10.60	
CLIENT ENGINEER Fingal County Council	SPT HAMMER REF. NO. SPT6	BORED BY WC
	ENERGY RATIO (%) 55	PROCESSED BY JL

Depth (m)	Description	Legend	Elevation	Depth (m)	Samples				Field Test Results	Standpipe Details
					Ref. Number	Sample Type	Depth (m)	Recovery		
0	Soft to firm light brown sandy gravelly CLAY									
1	Firm dark brown silty sandy gravelly CLAY			1.30	AN8543	B	1.00-1.45		N = 10 (3, 4, 4, 2, 2, 2)	
2					AN8544	B	2.00-2.45		N = 14 (3, 3, 3, 4, 4, 3)	
3	Firm becoming stiff black silty sandy slightly gravelly CLAY with a low to medium cobble content			3.10	AN8545	B	3.00-3.45		N = 15 (3, 4, 4, 4, 3, 4)	
4					AN8546	B	4.00-4.45		N = 25 (5, 5, 6, 6, 6, 7)	
5					AN8547	B	5.00-5.45		N = 28 (3, 6, 6, 8, 7, 7)	
6					AN8548	B	6.50-6.95		N = 36 (4, 6, 7, 9, 9, 11)	
8					AN8549	B	8.00-8.45		N = 50/285 mm (6, 8, 11, 13, 14, 12)	
9	Stiff to very stiff dark brown sandy silty CLAY with a medium cobble content			8.90	AN8550	B	9.50-9.95		N = 46 (7, 7, 10, 11, 10, 15)	
10	End of Borehole at 10.60 m			10.60						

HARD STRATA BORING/CHISELLING				WATER STRIKE DETAILS					
From (m)	To (m)	Time (h)	Comments	Water Strike	Casing Depth	Sealed At	Rise To	Time (min)	Comments
2.85	2.95	0.5							No water strike
7.2	7.4	0.75							
8.9	9.1	0.75							
10.4	10.6	1							

INSTALLATION DETAILS					GROUNDWATER PROGRESS				
Date	Tip Depth	RZ Top	RZ Base	Type	Date	Hole Depth	Casing Depth	Depth to Water	Comments

REMARKS	Sample Legend U - Undisturbed 100mm Diameter Sample D - Small Disturbed (tub) P - Undisturbed Piston Sample B - Bulk Disturbed LB - Large Bulk Disturbed Env - Environmental Sample (Jar + Vial + Tub) W - Water Sample
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IGSLBH LOG 16695.GPJ IGSL.GDT 5/4/13



GEOTECHNICAL BORING RECORD

REPORT NUMBER

16695

CONTRACT Greater Dublin Drainage Scheme		BOREHOLE NO. BH08
CO-ORDINATES		SHEET Sheet 1 of 2
GROUND LEVEL (m AOD)	RIG TYPE Dando 2000	DATE COMMENCED 05/03/2013
	BOREHOLE DIAMETER (mm) 200	DATE COMPLETED 06/03/2013
	BOREHOLE DEPTH (m) 12.60	
CLIENT Fingal County Council	SPT HAMMER REF. NO. SPT6	BORED BY WC
ENGINEER	ENERGY RATIO (%) 55	PROCESSED BY JL

Depth (m)	Description	Legend	Elevation	Depth (m)	Samples				Field Test Results	Standpipe Details
					Ref. Number	Sample Type	Depth (m)	Recovery		
0	Soft becoming firm dark brown sandy gravelly silty CLAY									
1					AN8525	B	1.00-1.45	N = 9 (2, 2, 2, 3, 2, 2)		
2					AN8526	B	2.00-2.45	N = 14 (2, 3, 3, 3, 4, 4)		
3			3.20		AN8527	B	3.00-3.45	N = 25 (4, 4, 5, 6, 7, 7)		
4	Stiff black sandy silty slightly gravelly CLAY with a medium cobble content				AN8528	B	4.00-4.45	N = 25 (3, 5, 5, 6, 6, 8)		
5					AN8529	B	5.00-5.45	N = 28 (5, 5, 7, 7, 6, 8)		
6					AN8530	B	6.50-6.95	N = 27 (4, 6, 6, 7, 6, 8)		
7			7.20							
8	Stiff dark brown sandy gravelly silty CLAY with a low to medium cobble content			7.80						
9	Dense BOULDERS with some grey brown silty sandy subangular to subrounded fine to coarse GRAVEL				AN8531	B	8.00-8.45	N = 50/190 mm (12, 13, 16, 18, 16)		
10					AN8532	B	9.50-9.95	N = 36 (4, 7, 8, 8, 9, 11)		
	Dense subangular to subrounded fine to coarse GRAVEL			9.80						
				10.40						
	Stiff black silty slightly gravelly CLAY with a low to medium cobble content									

HARD STRATA BORING/CHISELLING				WATER STRIKE DETAILS					
From (m)	To (m)	Time (h)	Comments	Water Strike	Casing Depth	Sealed At	Rise To	Time (min)	Comments
3.8	3.9	0.5		7.80	7.80	10.50	7.00	20	Slow
7.8	7.9	0.5							
8.2	8.6	1							
9.8	10	0.75							
12.4	12.6	1							

GROUNDWATER PROGRESS				
Date	Hole Depth	Casing Depth	Depth to Water	Comments

INSTALLATION DETAILS				
Date	Tip Depth	RZ Top	RZ Base	Type

REMARKS	Sample Legend U - Undisturbed 100mm Diameter Sample D - Small Disturbed (tub) P - Undisturbed Piston Sample B - Bulk Disturbed LB - Large Bulk Disturbed Env - Environmental Sample (Jar + Vial + Tub) W - Water Sample
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IGSLBH LOG 16695.GPJ IGSL.GDT 5/4/13



GEOTECHNICAL BORING RECORD

REPORT NUMBER

16695

CONTRACT Greater Dublin Drainage Scheme		BOREHOLE NO. BH08
CO-ORDINATES		SHEET Sheet 2 of 2
GROUND LEVEL (m AOD)	RIG TYPE Dando 2000 BOREHOLE DIAMETER (mm) 200 BOREHOLE DEPTH (m) 12.60	DATE COMMENCED 05/03/2013 DATE COMPLETED 06/03/2013
CLIENT Fingal County Council ENGINEER	SPT HAMMER REF. NO. SPT6 ENERGY RATIO (%) 55	BORED BY WC PROCESSED BY JL

Depth (m)	Description	Legend	Elevation	Depth (m)	Samples			Field Test Results	Standpipe Details
					Ref. Number	Sample Type	Depth (m)		
11	Stiff black silty slightly gravelly CLAY with a low to medium cobble content (<i>continued</i>)				AN8533	B	11.00-11.45		
12				12.50					
	Dense subangular to subrounded fine to coarse GRAVEL			12.60	AN8534	B	12.50-12.95		N = 50/75 mm (22, 3, 46, 4)
13	End of Borehole at 12.60 m								
14									
15									
16									
17									
18									
19									
20									
21									

HARD STRATA BORING/CHISELLING				WATER STRIKE DETAILS					
From (m)	To (m)	Time (h)	Comments	Water Strike	Casing Depth	Sealed At	Rise To	Time (min)	Comments
3.8	3.9	0.5		12.60	12.60		11.00	20	Moderate
7.8	7.9	0.5							
8.2	8.6	1							
9.8	10	0.75							
12.4	12.6	1							

INSTALLATION DETAILS					GROUNDWATER PROGRESS				
Date	Tip Depth	RZ Top	RZ Base	Type	Date	Hole Depth	Casing Depth	Depth to Water	Comments

REMARKS	Sample Legend U - Undisturbed 100mm Diameter Sample D - Small Disturbed (tub) P - Undisturbed Piston Sample B - Bulk Disturbed LB - Large Bulk Disturbed Env - Environmental Sample (Jar + Vial + Tub) W - Water Sample
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IGSLBH.LOG 16695.GPJ IGSL.GDT 5/4/13



GEOTECHNICAL BORING RECORD

REPORT NUMBER

16695

CONTRACT Greater Dublin Drainage Scheme		BOREHOLE NO. BH09
CO-ORDINATES		SHEET Sheet 1 of 2
GROUND LEVEL (m AOD)	RIG TYPE Dando 2000	DATE COMMENCED 06/03/2013
	BOREHOLE DIAMETER (mm) 200	DATE COMPLETED 07/03/2013
	BOREHOLE DEPTH (m) 11.70	
CLIENT Fingal County Council	SPT HAMMER REF. NO. SPT6	BORED BY WC
ENGINEER	ENERGY RATIO (%) 55	PROCESSED BY JL

Depth (m)	Description	Legend	Elevation	Depth (m)	Samples				Field Test Results	Standpipe Details
					Ref. Number	Sample Type	Depth (m)	Recovery		
0	Soft to firm light brown sandy gravelly CLAY									
1	Firm to stiff light and dark brown sandy gravelly CLAY			1.30	AN8534	B	1.00-1.45		N = 10 (2, 2, 2, 2, 3, 3)	
2					AN8535	B	2.00-2.45		N = 20 (3, 4, 4, 5, 5, 6)	
3	Stiff black silty sandy slightly gravelly CLAY with a low to medium cobble content			2.70	AN8536	B	3.00-3.45		N = 26 (4, 6, 6, 7, 7, 6)	
4					AN8537	B	4.00-4.45		N = 22 (3, 4, 5, 5, 6, 6)	
5					AN8538	B	5.00-5.45		N = 23 (3, 4, 5, 5, 6, 7)	
6					AN8539	B	6.50-6.95		N = 35 (6, 7, 7, 8, 11, 9)	
7	Stiff dark brown sandy gravelly CLAY with a low to medium cobble content			6.80						
8					AN8540	B	8.00-8.45		N = 24 (4, 5, 5, 6, 6, 7)	
9	Stiff black silty sandy slightly gravelly CLAY with a low to medium cobble content			9.00						
				9.40						
	Medium dense silty sandy subangular to subrounded fine to coarse GRAVEL. Sand is fine to medium.			9.60	AN8541	B	9.50-9.95		N = 41 (6, 7, 8, 10, 12, 11)	
10	Very stiff black silty sandy slightly gravelly CLAY with a low to medium cobble content									

HARD STRATA BORING/CHISELLING				WATER STRIKE DETAILS					
From (m)	To (m)	Time (h)	Comments	Water Strike	Casing Depth	Sealed At	Rise To	Time (min)	Comments
6	6.2	0.5		9.40	9.40	10.00	8.60	20	Slow
9	9.2	0.75							
9.75	9.9	0.75							
11.4	11.7	1.5							

INSTALLATION DETAILS					GROUNDWATER PROGRESS				
Date	Tip Depth	RZ Top	RZ Base	Type	Date	Hole Depth	Casing Depth	Depth to Water	Comments

REMARKS	Sample Legend U - Undisturbed 100mm Diameter Sample D - Small Disturbed (tub) P - Undisturbed Piston Sample B - Bulk Disturbed LB - Large Bulk Disturbed Env - Environmental Sample (Jar + Vial + Tub) W - Water Sample
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IGSLBH LOG 16695.GPJ IGSL.GDT 5/4/13



GEOTECHNICAL BORING RECORD

REPORT NUMBER

16695

CONTRACT Greater Dublin Drainage Scheme		BOREHOLE NO. BH09
CO-ORDINATES		SHEET Sheet 2 of 2
GROUND LEVEL (m AOD)	RIG TYPE Dando 2000 BOREHOLE DIAMETER (mm) 200 BOREHOLE DEPTH (m) 11.70	DATE COMMENCED 06/03/2013 DATE COMPLETED 07/03/2013
CLIENT Fingal County Council ENGINEER	SPT HAMMER REF. NO. SPT6 ENERGY RATIO (%) 55	BORED BY WC PROCESSED BY JL

Depth (m)	Description	Legend	Elevation	Depth (m)	Samples			Field Test Results	Standpipe Details
					Ref. Number	Sample Type	Depth (m)		
11	Very stiff black silty sandy slightly gravelly CLAY with a low to medium cobble content (<i>continued</i>)	[Symbol]		11.70	AN8542	B	11.00-11.45		
	End of Borehole at 11.70 m								
12									
13									
14									
15									
16									
17									
18									
19									
20									
21									

HARD STRATA BORING/CHISELLING				WATER STRIKE DETAILS					
From (m)	To (m)	Time (h)	Comments	Water Strike	Casing Depth	Sealed At	Rise To	Time (min)	Comments
6	6.2	0.5							
9	9.2	0.75							
9.75	9.9	0.75							
11.4	11.7	1.5							

INSTALLATION DETAILS					GROUNDWATER PROGRESS				
Date	Tip Depth	RZ Top	RZ Base	Type	Date	Hole Depth	Casing Depth	Depth to Water	Comments

REMARKS	Sample Legend U - Undisturbed 100mm Diameter Sample D - Small Disturbed (tub) P - Undisturbed Piston Sample B - Bulk Disturbed LB - Large Bulk Disturbed W - Water Sample Env - Environmental Sample (Jar + Vial + Tub)
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IGSL.BH.LOG 16695.GPJ IGSL.GDT 5/4/13



GEOTECHNICAL CORE LOG RECORD

REPORT NUMBER

16695

CONTRACT Greater Dublin Drainage Scheme	DRILLHOLE NO RC07
	SHEET Sheet 1 of 2
CO-ORDINATES	DATE DRILLED 03/04/2013
GROUND LEVEL (mOD)	DATE LOGGED 04/04/2013
CLIENT Fingal County Council	DRILLED BY M. Newland
ENGINEER	LOGGED BY JL
RIG TYPE Casagrande C6	
FLUSH Air/Mist	
INCLINATION (deg) -90	
CORE DIAMETER (mm) 90	

Downhole Depth (m)	Core Run Depth (m)	T.C.R.%	S.C.R.%	R.Q.D.%	Fracture Spacing Log (mm)	Non-intact Zone	Legend	Description	Depth (m)	Elevation	Standpipe Details	SPT (N Value)
0					0 250 500			Cased down Shell & Auger Hole				
1												
2												
3												
4												
5												
6												
7												
8								SYMMETRIX DRILLING: No recovery, observed by driller as returns of Shell & Auger Fill	7.50			
9												

REMARKS					WATER STRIKE DETAILS					
Hole cased 0.00-15.0m					Water Strike	Casing Depth	Sealed At	Rise To	Time (min)	Comments
					12.00					
INSTALLATION DETAILS					GROUNDWATER DETAILS					
Date	Tip Depth	RZ Top	RZ Base	Type	Date	Hole Depth	Casing Depth	Depth to Water	Comments	
04-04-13	13.00	11.50	13.00	50mm SP						

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GEOTECHNICAL CORE LOG RECORD

REPORT NUMBER

16695

CONTRACT Greater Dublin Drainage Scheme		DRILLHOLE NO RC07
		SHEET Sheet 2 of 2
CO-ORDINATES		DATE DRILLED 03/04/2013
GROUND LEVEL (mOD)		DATE LOGGED 04/04/2013
CLIENT Fingal County Council		DRILLED BY M. Newland
ENGINEER		LOGGED BY JL
RIG TYPE Casagrande C6		
FLUSH Air/Mist		
INCLINATION (deg) -90		
CORE DIAMETER (mm) 90		

Downhole Depth (m)	Core Run Depth (m)	T.C.R.%	S.C.R.%	R.Q.D.%	Fracture Spacing Log (mm)	Non-intact Zone	Legend	Description	Depth (m)	Elevation	Standpipe Details	SPT (N Value)
10								SYMMETRIX DRILLING: No recovery, observed by driller as returns of Shell & Auger Fill (<i>continued</i>)	10.60			
11								SYMMETRIX DRILLING: No recovery, observed by driller as returns of boulder clay				
12								SYMMETRIX DRILLING: No recovery, observed by driller as returns of SAND	12.00			
13								SYMMETRIX DRILLING: No recovery, observed by driller as returns of gravelly CLAY	12.80			
14								SYMMETRIX DRILLING: No recovery, observed by driller as returns of gravelly BOULDERS (Possible Weathered Rockhead)	13.50			
15								Medium strong thinly to medium bedded dark grey fine to medium grained argillaceous LIMESTONE with medium to widely spaced very thin medium strong black MUDSTONE bands. Weathering: Loss of wall strength to very weak in extremely closely fractured / laminated mudstone. (16.40 - 16.48m)	15.00			N = 50/0 mm (25, 50)
16		100	86	49				Discontinuities 15.0-17.80m 0-10° extremely closely to medium predominantly closely spaced smooth planar tight, clean.				
16.40		100	97	16				15.45-15.48m Non intact angular to subangular gravel-sized fragments of argillaceous limestone with some black clay				
17		100	100	0				15.92-16.32m Fracture 80° to subvertical smooth undulating with thin (1-2mm thick) brown CLAY veneer				
17.10		94	78	45				17.34-17.43m Fracture 60° smooth planar with brown non-penetrative discolouration				
17.16								End of Borehole at 17.80 m	17.80			
17.80												
18												
19												

REMARKS						WATER STRIKE DETAILS					
Hole cased 0.00-15.0m						Water Strike	Casing Depth	Sealed At	Rise To	Time (min)	Comments
						12.00					
INSTALLATION DETAILS						GROUNDWATER DETAILS					
Date	Tip Depth	RZ Top	RZ Base	Type	Date	Hole Depth	Casing Depth	Depth to Water	Comments		
04-04-13	13.00	11.50	13.00	50mm SP	03-04-13	12.50	12.50	DRY	DRY at end of shift		
					04-04-13	12.50	12.50	10.00	Water level recorded at start of shift		
					04-04-13	17.80	15.00	9.30	Water level recorded at end of borehole		

IGSLRC FL10M 16695.GPJ IGSL.GDT 16/4/13



GEOTECHNICAL CORE LOG RECORD

REPORT NUMBER

16695

CONTRACT Greater Dublin Drainage Scheme	DRILLHOLE NO RC09
	SHEET Sheet 1 of 2
CO-ORDINATES	DATE DRILLED 05/04/2013
GROUND LEVEL (mOD)	DATE LOGGED 06/04/2013
CLIENT Fingal County Council	DRILLED BY M. Newland
ENGINEER	LOGGED BY JL
RIG TYPE Casagrande C6	
FLUSH Air/Mist	
INCLINATION (deg) -90	
CORE DIAMETER (mm) 90	

Downhole Depth (m)	Core Run Depth (m)	T.C.R.%	S.C.R.%	R.Q.D.%	Fracture Spacing Log (mm)	Non-intact Zone	Legend	Description	Depth (m)	Elevation	Standpipe Details	SPT (N Value)
0					0 250 500			SYMMETRIX DRILLING: No recovery, observed by driller as returns of boulder clay				
1												
2												
3												
4												
5												
6												
7												
8												
9												

REMARKS					WATER STRIKE DETAILS					
Hole cased 0.00-15.0m					Water Strike	Casing Depth	Sealed At	Rise To	Time (min)	Comments
					11.00					
INSTALLATION DETAILS					GROUNDWATER DETAILS					
Date	Tip Depth	RZ Top	RZ Base	Type	Date	Hole Depth	Casing Depth	Depth to Water	Comments	
06-04-13	12.00	10.00	12.00	50mm SP						

IGSLRC FL10M 16695.GPJ IGSL.GDT 16/4/13



GEOTECHNICAL CORE LOG RECORD

REPORT NUMBER

16695

CONTRACT Greater Dublin Drainage Scheme		DRILLHOLE NO RC09
		SHEET Sheet 2 of 2
CO-ORDINATES		DATE DRILLED 05/04/2013
GROUND LEVEL (mOD)		DATE LOGGED 06/04/2013
CLIENT Fingal County Council		DRILLED BY M. Newland
ENGINEER		LOGGED BY JL
RIG TYPE Casagrande C6		
FLUSH Air/Mist		
INCLINATION (deg) -90		
CORE DIAMETER (mm) 90		

Downhole Depth (m)	Core Run Depth (m)	T.C.R.%	S.C.R.%	R.Q.D.%	Fracture Spacing Log (mm)	Non-intact Zone	Legend	Description	Depth (m)	Elevation	Standpipe Details	SPT (N Value)
10								SYMMETRIX DRILLING: No recovery, observed by driller as returns of boulder clay (<i>continued</i>)				
11												
12												
13								SYMMETRIX DRILLING: No recovery, observed by driller as returns of black CLAY (Possible Weathered Rockhead)	13.00			
14												
15								Medium strong to strong medium to thickly bedded dark grey fine grained argillaceous LIMESTONE. Weathering: Negligible	15.00			N = 50/10 mm (6, 19, 50)
16		100	73	55				Discontinuities 15.0-18.0m 0-10° closely to medium spaced smooth planar to undulating, tight, clean. Rare brown surface discolouration on fracture surfaces (16.50m & 17.80m)				N = 50/0 mm (25, 50)
16.50												
17		100	67	57								
18								End of Borehole at 18.00 m	18.00			
19												

REMARKS					WATER STRIKE DETAILS					
Hole cased 0.00-15.0m					Water Strike	Casing Depth	Sealed At	Rise To	Time (min)	Comments
					11.00					
INSTALLATION DETAILS					GROUNDWATER DETAILS					
Date	Tip Depth	RZ Top	RZ Base	Type	Date	Hole Depth	Casing Depth	Depth to Water	Comments	
06-04-13	12.00	10.00	12.00	50mm SP	05-04-13	18.00	15.00	10.20	Water level recorded at end of shift	
					06-04-13	18.00	15.00	3.30	Water level recorded at start of shift	

IGSLRC FL10M 16695.GPJ IGSL.GDT 16/4/13

Appendix D

Northern Outfall - Site Plan,
Graphs and Logs

D1

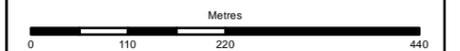


Legend

- Sites
- BH + RF
- Amended Pipeline
- Previous Pipeline
- GeoPhysics
- Pipe Corridor

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P1	12-04-12	DF	BA	SM
Issue	Date	By	Chkd	Appd



ARUP

50 Ringsend Road
 Dublin 4
 Tel +353 (0)1 233 4455 Fax +353 (0)1 668 3169
 www.arup.com

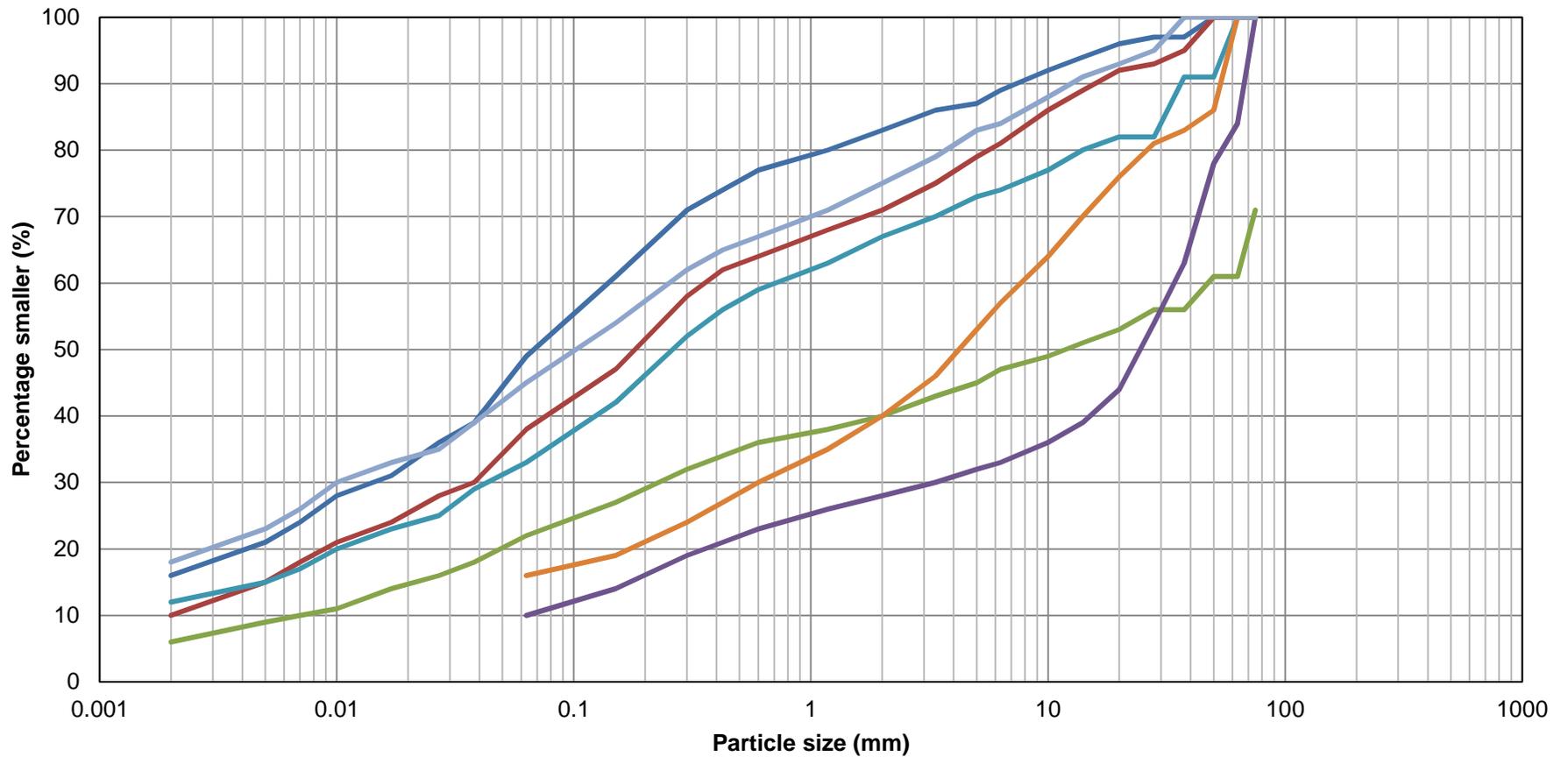
Client
Fingal County Council

Job Title
Dublin Greater Drainage Scheme



Scale at A3
1:8,000

Job No 218525-00	Drawing Status For Information
Drawing No G-006	Issue P1



Clay	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	Cobbles	Boulders
	Silt			Sand			Gravel				

- TP14 0.4m
- BH10 1m
- BH10 5m
- BH10 6.5m
- BH11 3m
- BH11 4m
- BH12 3m

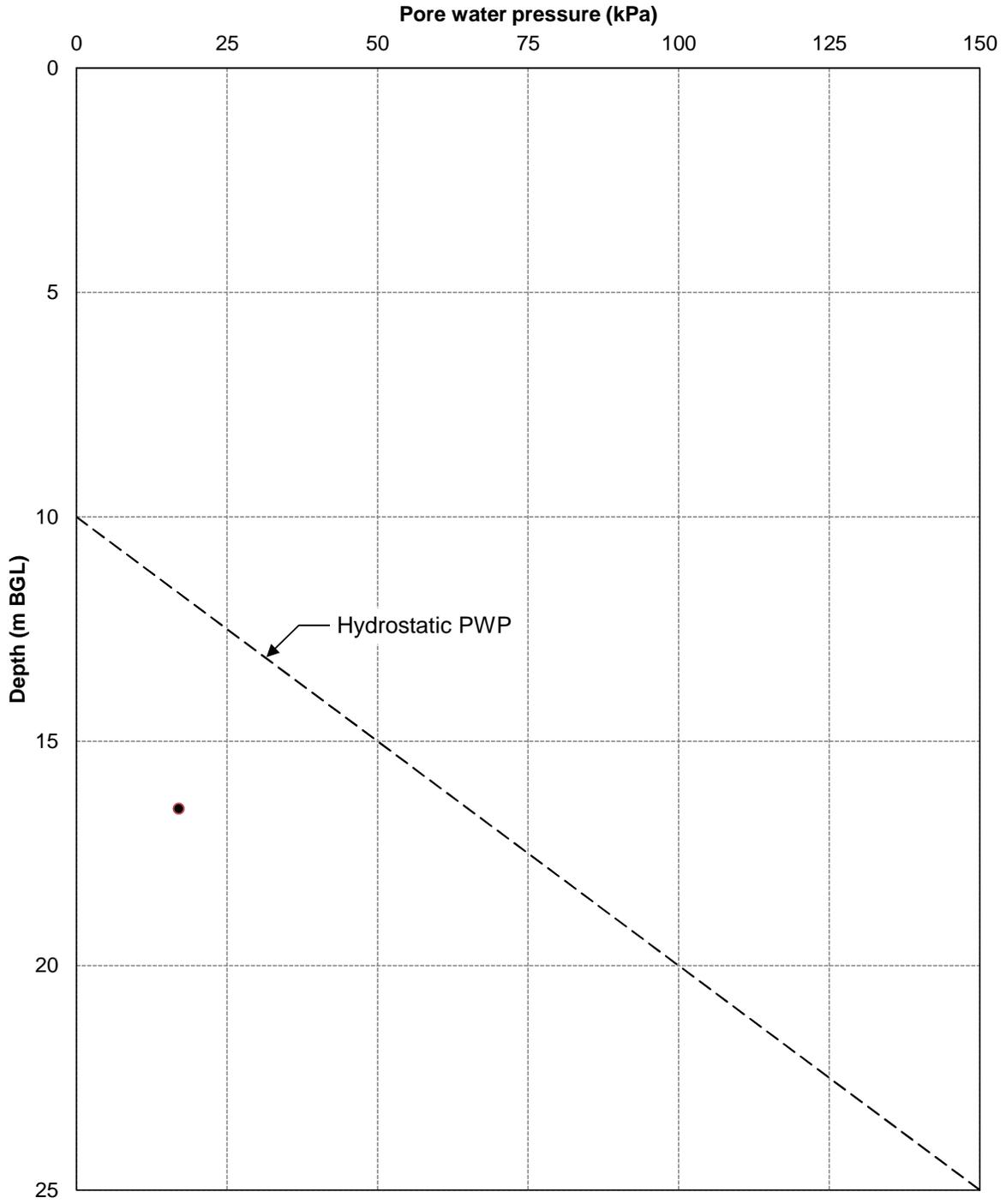
**GREATER DUBLIN DRAINAGE SCHEME
NORTHERN OUTFALL**

Particle Size Distribution

218525-00

FIGURE

D.1



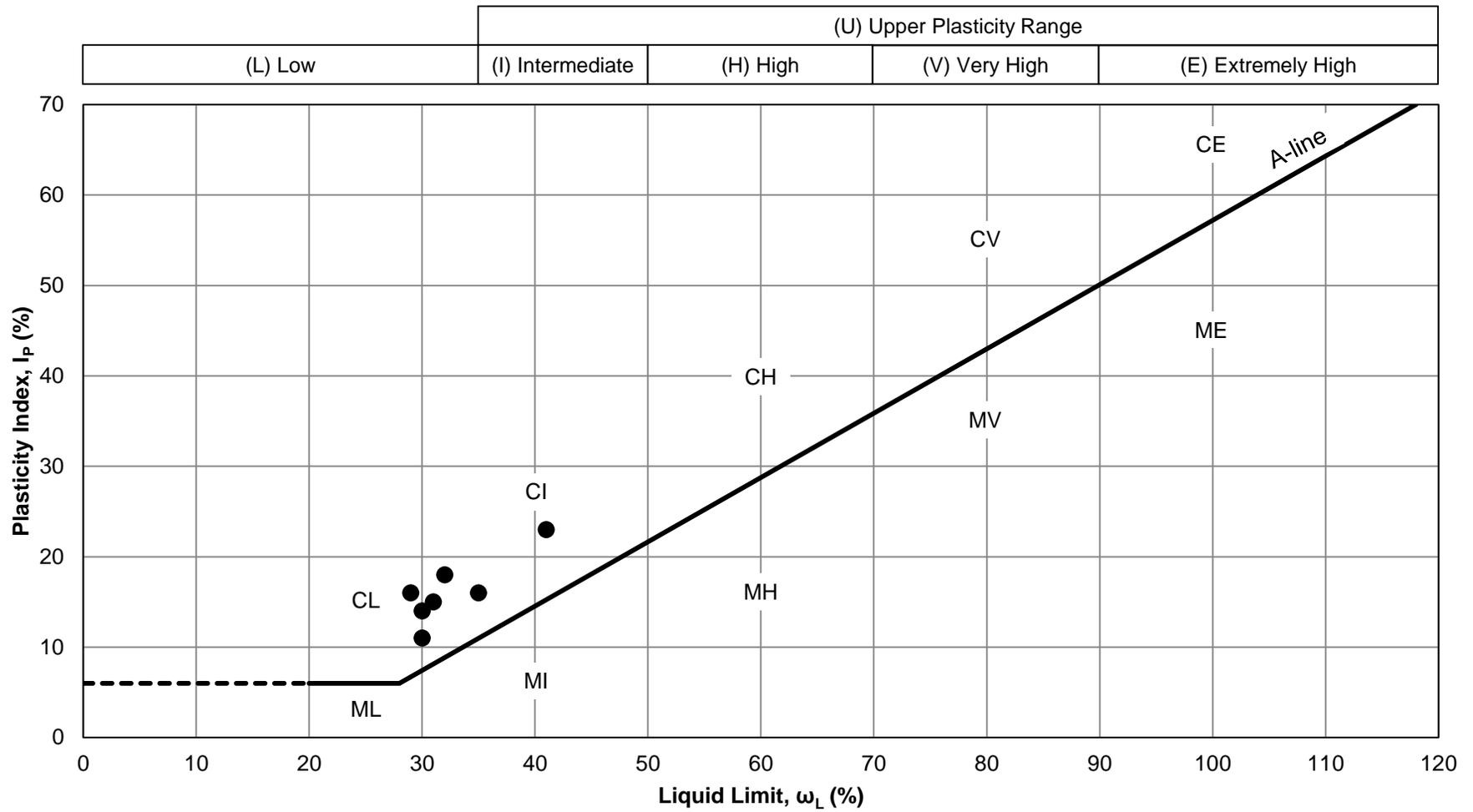
● BH12

**GREATER DUBLIN DRAINAGE SCHEME
NORTHERN OUTFALL**

Groundwater Profile

218525-00

FIGURE D.2



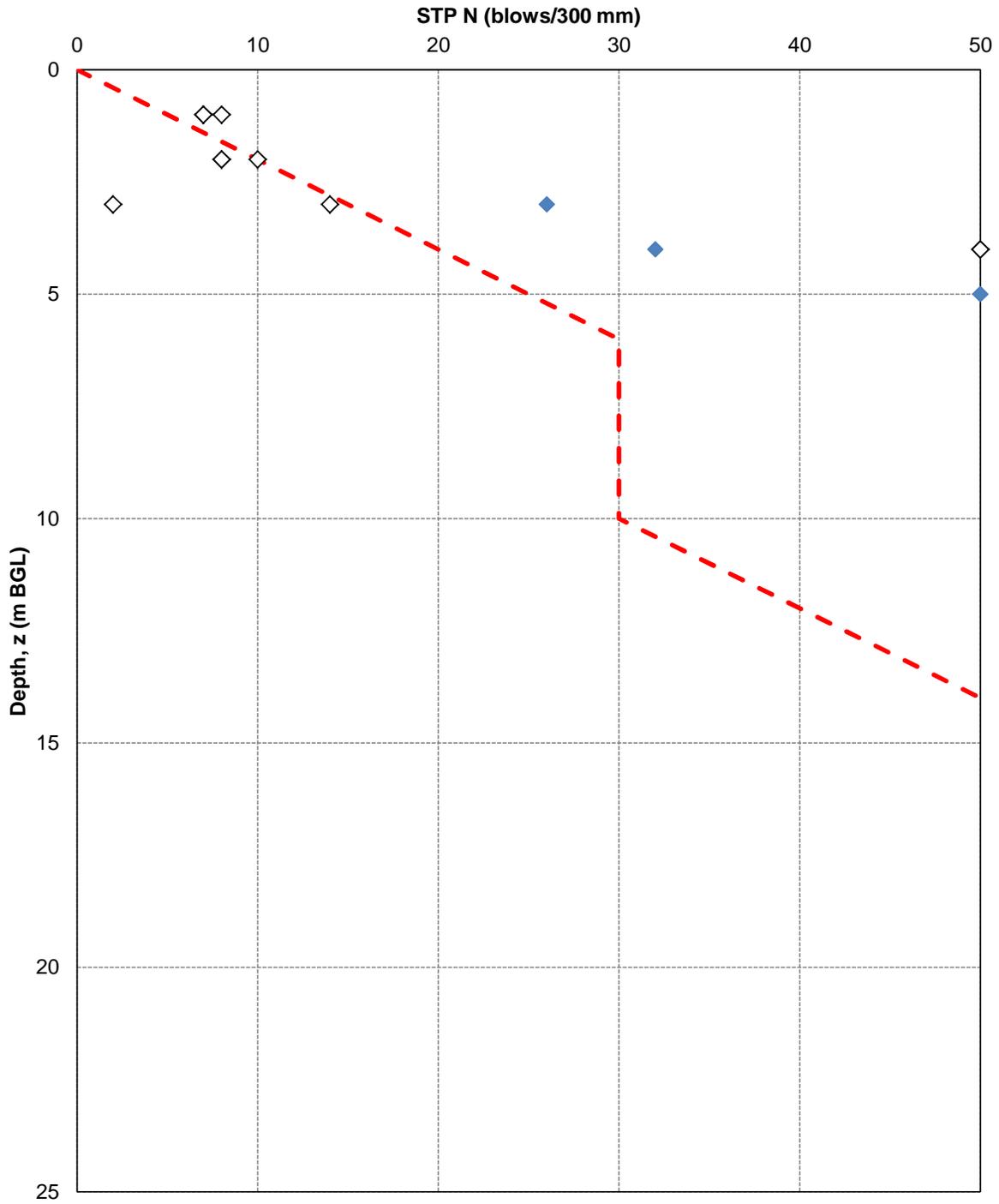
**GREATER DUBLIN DRAINAGE SCHEME
NORTHERN OUTFALL**

Atterberg Limits

218525-00

FIGURE

D.3



- ◇ Brown Boulder Clay
- ◆ Black Boulder Clay
- ▲ Boulders

**GREATER DUBLIN DRAINAGE SCHEME
NORTHERN OUTFALL**

Standard Penetration Test

218525-00

FIGURE D.4



TRIAL PIT RECORD

REPORT NUMBER

16695

CONTRACT Greater Dublin Drainage Scheme		TRIAL PIT NO. TP14
LOGGED BY JL		SHEET Sheet 1 of 1
CO-ORDINATES		DATE STARTED 07/03/2013
GROUND LEVEL (m)		DATE COMPLETED 07/03/2013
CLIENT ENGINEER Fingal County Council	EXCAVATION METHOD Hitachi Zaxis 80SB	

Depth (m)	Geotechnical Description	Legend	Depth (m)	Elevation	Water Strike	Samples			Vane Test (KPa)	Hand Penetrometer (KPa)
						Sample Ref	Type	Depth		
0.0	TOPSOIL: Soft grey brown slightly sandy CLAY. Sand is fine to medium.									
0.35	Firm brown to orange brown sandy slightly gravelly CLAY with a low to medium cobble content. Sand is fine to medium. Gravel is subangular to subrounded fine to coarse of limestone. Cobbles are subangular to subrounded of limestone.		0.35			AA0221	B	0.40-0.60		
1.10	Compact orange brown clayey gravelly SAND with a high cobble and medium boulder content. Sand is fine to coarse. Gravel is angular to subrounded fine to coarse of limestone. Cobbles and boulders are angular to subrounded of limestone (up to 350mm)		1.10			AA0222	LB	1.20-1.30		
3.10	End of Trial Pit at 3.10m		3.10			AA0223	B	3.00-3.10		

Groundwater Conditions
Dry

Stability
Good

General Remarks
Pit terminated on compact coarse material

IGSL TP LOG 16695.GPJ IGSL.GDT 5/4/13



TRIAL PIT RECORD

REPORT NUMBER

16695

CONTRACT Greater Dublin Drainage Scheme		TRIAL PIT NO. TP15	
LOGGED BY JL		SHEET Sheet 1 of 1	
CLIENT ENGINEER Fingal County Council		DATE STARTED 07/03/2013	
CO-ORDINATES		DATE COMPLETED 07/03/2013	
GROUND LEVEL (m)		EXCAVATION METHOD Hitachi Zaxis 80SB	

Depth (m)	Geotechnical Description	Legend	Depth (m)	Elevation	Water Strike	Samples			Vane Test (KPa)	Hand Penetrometer (KPa)
						Sample Ref	Type	Depth		
0.0	TOPSOIL: Soft to firm brown sandy CLAY with rootlets. Sand is fine to medium.		0.25							
	Soft to firm brown sandy gravelly CLAY. Sand is fine to medium. Gravel is subangular to subrounded fine to coarse of limestone.					AA0224	B	0.40-0.65		
1.0						AA0225	B	1.20-1.30		
2.0	Firm brown sandy gravelly CLAY with a medium cobble and boulder content. Sand is fine to coarse. Gravel is subangular to subrounded fine to coarse of limestone. Cobbles and boulders are subangular to subrounded of limestone. (up to 400mm)		2.10			AA0226	B	2.50-2.70		
3.0	Stiff brown slightly sandy gravelly CLAY with a medium cobble content. Sand is fine to medium. Gravel is subangular to subrounded fine to medium of limestone. Cobbles are subrounded of limestone.		3.00			AA0227	B	3.10-3.20		
	End of Trial Pit at 3.30m		3.30							
4.0										

Groundwater Conditions
Dry

Stability
Good

General Remarks
Pit terminated on stiff clay and coarse material

IGSL TP LOG 16695.GPJ IGSL.GDT 5/4/13



GEOTECHNICAL BORING RECORD

REPORT NUMBER

16695

CONTRACT Greater Dublin Drainage Scheme		BOREHOLE NO. BH10
		SHEET Sheet 1 of 1
CO-ORDINATES	RIG TYPE Dando 2000	DATE COMMENCED 18/02/2013
GROUND LEVEL (m AOD)	BOREHOLE DIAMETER (mm) 200	DATE COMPLETED 18/02/2013
	BOREHOLE DEPTH (m) 7.20	
CLIENT Fingal County Council	SPT HAMMER REF. NO. SPT6	BORED BY WC
ENGINEER	ENERGY RATIO (%) 55	PROCESSED BY JL

Depth (m)	Description	Legend	Elevation	Depth (m)	Samples				Field Test Results	Standpipe Details
					Ref. Number	Sample Type	Depth (m)	Recovery		
0	Soft light brown sandy gravelly silty CLAY with a low to medium cobble content									
1					AN3735	B	1.00-1.45		N = 7 (1, 1, 2, 2, 2, 1)	
2					AN3736	B	2.00-2.45		N = 8 (1, 2, 2, 1, 2, 3)	
	Stiff dark brown sandy gravelly CLAY			2.60						
3					AN3737	B	3.00-3.45		N = 26 (3, 4, 6, 6, 7, 7)	
	Stiff black slightly sandy gravelly CLAY with a medium cobble content			3.20						
4					AN3738	B	4.00-4.45		N = 32 (5, 6, 7, 7, 8, 10)	
5					AN3739	B	5.00-5.45		N = 50/285 mm (7, 9, 11, 12, 14, 13)	
6										
	Dense BOULDERS with some grey gravel			6.30						
					AN3740	B	6.50-6.95		N = 50/105 mm (21, 4, 36, 14)	
7										
	Very stiff dark brown sandy gravelly CLAY with a medium boulder content			6.70						
	End of Borehole at 7.20 m			7.20						
8										
9										
10										

HARD STRATA BORING/CHISELLING				WATER STRIKE DETAILS					
From (m)	To (m)	Time (h)	Comments	Water Strike	Casing Depth	Sealed At	Rise To	Time (min)	Comments
4.75	4.85	0.5							No water strike
6.4	6.6	0.75							
7	7.2	1.5							

INSTALLATION DETAILS					GROUNDWATER PROGRESS				
Date	Tip Depth	RZ Top	RZ Base	Type	Date	Hole Depth	Casing Depth	Depth to Water	Comments

REMARKS	Sample Legend U - Undisturbed 100mm Diameter Sample D - Small Disturbed (tub) P - Undisturbed Piston Sample B - Bulk Disturbed LB - Large Bulk Disturbed Env - Environmental Sample (Jar + Vial + Tub) W - Water Sample
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IGSLBH LOG 16695.GPJ IGSL.GDT 5/4/13



GEOTECHNICAL BORING RECORD

REPORT NUMBER

16695

CONTRACT Greater Dublin Drainage Scheme		BOREHOLE NO. BH11
		SHEET Sheet 1 of 1
CO-ORDINATES	RIG TYPE Dando 2000	DATE COMMENCED 19/02/2013
GROUND LEVEL (m AOD)	BOREHOLE DIAMETER (mm) 200	DATE COMPLETED 19/02/2013
	BOREHOLE DEPTH (m) 4.80	
CLIENT Fingal County Council	SPT HAMMER REF. NO. SPT6	BORED BY WC
ENGINEER	ENERGY RATIO (%) 55	PROCESSED BY JL

Depth (m)	Description	Legend	Elevation	Depth (m)	Samples				Field Test Results	Standpipe Details
					Ref. Number	Sample Type	Depth (m)	Recovery		
0	Soft dark brown sandy gravelly CLAY			0.90						
1	Soft to firm light brown sandy gravelly CLAY				AM2742	B	1.00-1.45		N = 7 (1, 2, 2, 2, 2, 1)	
2					AM2743	B	2.00-2.45		N = 8 (2, 2, 2, 2, 2, 2)	
3	Soft to firm light brown and grey sandy gravelly silty CLAY			2.80	AM2744	B	3.00-3.45		N = 2 (2, 1, 0, 0, 1, 1)	
4					AM2745	B	4.00-4.45		N = 50/180 mm (13, 12, 16, 19, 15)	
5	End of Borehole at 4.80 m			4.80						
6										
7										
8										
9										
10										

HARD STRATA BORING/CHISELLING				WATER STRIKE DETAILS					
From (m)	To (m)	Time (h)	Comments	Water Strike	Casing Depth	Sealed At	Rise To	Time (min)	Comments
4.4	4.8	1.5							No water strike

INSTALLATION DETAILS					GROUNDWATER PROGRESS				
Date	Tip Depth	RZ Top	RZ Base	Type	Date	Hole Depth	Casing Depth	Depth to Water	Comments

REMARKS	Sample Legend U - Undisturbed 100mm Diameter Sample D - Small Disturbed (tub) P - Undisturbed Piston Sample B - Bulk Disturbed LB - Large Bulk Disturbed Env - Environmental Sample (Jar + Vial + Tub) W - Water Sample
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IGSLBH.LOG 16695.GPJ IGSL.GDT 5/4/13



GEOTECHNICAL BORING RECORD

REPORT NUMBER

16695

CONTRACT Greater Dublin Drainage Scheme		BOREHOLE NO. BH12
CO-ORDINATES		SHEET Sheet 1 of 1
GROUND LEVEL (m AOD)	RIG TYPE Dando 2000	DATE COMMENCED 21/02/2013
	BOREHOLE DIAMETER (mm) 200	DATE COMPLETED 21/02/2013
	BOREHOLE DEPTH (m) 4.70	
CLIENT Fingal County Council	SPT HAMMER REF. NO. SPT6	BORED BY WC
ENGINEER	ENERGY RATIO (%) 55	PROCESSED BY JL

Depth (m)	Description	Legend	Elevation	Depth (m)	Samples				Field Test Results	Standpipe Details
					Ref. Number	Sample Type	Depth (m)	Recovery		
0	Soft becoming firm light reddish brown sandy gravelly CLAY with a medium cobble content			4.70						
1					AN3748	B	1.00-1.45		N = 8 (1, 2, 2, 2, 2, 2)	
2					AN3749	B	2.00-2.45		N = 10 (2, 2, 2, 3, 3, 2)	
3					AN3750	B	3.00-3.45		N = 14 (2, 3, 3, 4, 3, 4)	
4					AN3751	B	4.00-4.45		N = 50/225 mm (7, 8, 11, 14, 16, 9)	
5	End of Borehole at 4.70 m									
6										
7										
8										
9										
10										

HARD STRATA BORING/CHISELLING				WATER STRIKE DETAILS					
From (m)	To (m)	Time (h)	Comments	Water Strike	Casing Depth	Sealed At	Rise To	Time (min)	Comments
4.3	4.7	1.2							No water strike

INSTALLATION DETAILS					GROUNDWATER PROGRESS				
Date	Tip Depth	RZ Top	RZ Base	Type	Date	Hole Depth	Casing Depth	Depth to Water	Comments

REMARKS	Sample Legend U - Undisturbed 100mm Diameter Sample D - Small Disturbed (tub) P - Undisturbed Piston Sample B - Bulk Disturbed LB - Large Bulk Disturbed Env - Environmental Sample (Jar + Vial + Tub) W - Water Sample
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IGSLBH.LOG 16695.GPJ IGSL.GDT 5/4/13



GEOTECHNICAL CORE LOG RECORD

REPORT NUMBER

16695

CONTRACT Greater Dublin Drainage Scheme	DRILLHOLE NO RC11
	SHEET Sheet 1 of 2
CO-ORDINATES	DATE DRILLED 01/03/2013
GROUND LEVEL (mOD)	DATE LOGGED 04/03/2013
CLIENT Fingal County Council	DRILLED BY Petersen
ENGINEER	LOGGED BY JL
RIG TYPE Knebel	
FLUSH Air/Mist	
INCLINATION (deg) -90	
CORE DIAMETER (mm) 82	

Downhole Depth (m)	Core Run Depth (m)	T.C.R.%	S.C.R.%	R.Q.D.%	Fracture Spacing Log (mm)	Non-intact Zone	Legend	Description	Depth (m)	Elevation	Standpipe Details	SPT (N Value)
0					0 250 500			Cased down Shell & Auger Hole				
1												
2												
3												
4								SYMMETRIX DRILLING: No recovery, observed by driller as returns of Shell & Auger Fill	3.80			
5								SYMMETRIX DRILLING: No recovery, observed by driller as returns of brown sandy gravelly CLAY with occasional limestone boulders	4.80			
6	6.30	100	0	0				Strong grey calcisiltite limestone BOULDER with some stiff to very stiff yellow brown to brown sandy gravelly CLAY	5.30			
7								SYMMETRIX DRILLING: No recovery, observed by driller as returns of brown sandy gravelly CLAY with occasional limestone boulders	6.30			
8								SYMMETRIX DRILLING: No recovery, observed by driller as returns of brown sandy Boulder CLAY	7.80			
9												

N = 50/260 mm
(9, 12, 16, 11, 16, 7)

N = 45
(7, 9, 10, 10, 14, 11)

REMARKS Hole cased 0.00-13.40m						WATER STRIKE DETAILS					
						Water Strike	Casing Depth	Sealed At	Rise To	Time (min)	Comments
						15.60					
INSTALLATION DETAILS						GROUNDWATER DETAILS					
						Date	Hole Depth	Casing Depth	Depth to Water	Comments	
Date	Tip Depth	RZ Top	RZ Base	Type							

IGSLRC FI.10M 16695.GPJ IGSL.GDT 16/4/13



GEOTECHNICAL CORE LOG RECORD

REPORT NUMBER

16695

CONTRACT Greater Dublin Drainage Scheme		DRILLHOLE NO RC11
		SHEET Sheet 2 of 2
CO-ORDINATES		DATE DRILLED 01/03/2013
GROUND LEVEL (mOD)		DATE LOGGED 04/03/2013
CLIENT Fingal County Council		DRILLED BY Petersen
ENGINEER		LOGGED BY JL
		RIG TYPE Knebel
		FLUSH Air/Mist
		INCLINATION (deg) -90
		CORE DIAMETER (mm) 82

Downhole Depth (m)	Core Run Depth (m)	T.C.R.%	S.C.R.%	R.Q.D.%	Fracture Spacing Log (mm)	Non-intact Zone	Legend	Description	Depth (m)	Elevation	Standpipe Details	SPT (N Value)
10								SYMMETRIX DRILLING: No recovery, observed by driller as returns of brown sandy Boulder CLAY (<i>continued</i>)				N = 50/95 mm (25, 38, 12)
11												
12								SYMMETRIX DRILLING: No recovery, observed by driller as returns of greyish brown LIMESTONE with some calcite veinfill	12.10			N = 50/190 mm (6, 11, 17, 21, 12)
13												
14		100	90	52				Strong massively bedded light grey and brown calcisiltite LIMESTONE with significant brecciation coupled with penetrative brown discoloration and honeycomb dissolution features / pitting of core walls (up to 20mm). Weathering: Slight loss of core strength in areas displaying dissolution to medium strong occasionally weak	13.40			
14.40												
15		100	96	41				Discontinuities 13.40-16.10m SET 1: 0-10° closely to medium spaced rough undulating occasionally smooth partly open, occasionally with brown fine sand on fracture surfaces. SET 2: Subvertical widely spaced rough undulating, open with yellow clay smearing on fracture surfaces				
15.40												
16		100	92	44				Medium strong medium bedded light grey green fine grained argillaceous LIMESTONE with localised brecciation often loosely cemented. Weathering: Occasional loss of wall strength to weak at fractures. Penetrative (up to 5mm) orange brown discoloration noted on subvertical fracture surfaces	16.10			
17												
17.00												
18		100	88	31				Discontinuities 16.10-19.30m SET 1: 0-10° closely spaced rough undulating tight to partly open, clean. SET 2: 60-80° closely to medium spaced rough undulating, open often displaying orange brown discoloration, occasionally with light grey green sandy CLAY veneer on surfaces. Fracture set often associated with non intact angular to subrounded fine to medium gravel-sized fragments of light grey green limestone.				
18.50												
19		100	100	95				18.35-18.50m 10mm thick subvertical to undulating calcite vein	19.30			
19.30								End of Borehole at 19.30 m				

REMARKS						WATER STRIKE DETAILS					
Hole cased 0.00-13.40m						Water Strike	Casing Depth	Sealed At	Rise To	Time (min)	Comments
						15.60					
INSTALLATION DETAILS						GROUNDWATER DETAILS					
Date	Tip Depth	RZ Top	RZ Base	Type	Date	Hole Depth	Casing Depth	Depth to Water	Comments		

IGSLRC Fl.10M 16695.GPJ IGSL.GDT 16/4/13



GEOTECHNICAL CORE LOG RECORD

REPORT NUMBER

16695

CONTRACT Greater Dublin Drainage Scheme	DRILLHOLE NO RC12
CO-ORDINATES	SHEET Sheet 1 of 3
GROUND LEVEL (mOD)	DATE DRILLED 04/03/2013
CLIENT Fingal County Council	DATE LOGGED 08/03/2013
ENGINEER	DRILLED BY Petersen
RIG TYPE Knebel	LOGGED BY JL
FLUSH Air/Mist	
INCLINATION (deg) -90	
CORE DIAMETER (mm) 82	

Downhole Depth (m)	Core Run Depth (m)	T.C.R.%	S.C.R.%	R.Q.D.%	Fracture Spacing Log (mm)	Non-intact Zone	Legend	Description	Depth (m)	Elevation	Standpipe Details	SPT (N Value)
0					0 250 500			SYMMETRIX DRILLING: No recovery, observed by driller as returns of Brown TOPSOIL SYMMETRIX DRILLING: No recovery, observed by driller as returns of Brown sandy gravelly Boulder CLAY	0.20			
1												
2												
3												
4												
5												
6												
7												N = 44 (9, 12, 15, 10, 8, 11)
8												N = 50/205 mm (6, 9, 14, 18, 18)
9												N = 50/175 mm (4, 10, 12, 29,

REMARKS Hole cased 0.00m-20.50m					WATER STRIKE DETAILS						
					Water Strike	Casing Depth	Sealed At	Rise To	Time (min)	Comments	
					14.80						
INSTALLATION DETAILS					GROUNDWATER DETAILS						
					Date	Hole Depth	Casing Depth	Depth to Water	Comments		
Date	Tip Depth	RZ Top	RZ Base	Type							
08-03-13	16.50	10.50	16.50	50mm SP							

IGSLRC FL10M 16695.GPJ IGSL.GDT 16/4/13



GEOTECHNICAL CORE LOG RECORD

REPORT NUMBER

16695

CONTRACT Greater Dublin Drainage Scheme	DRILLHOLE NO RC12
CO-ORDINATES	SHEET Sheet 2 of 3
GROUND LEVEL (mOD)	DATE DRILLED 04/03/2013
CLIENT Fingal County Council	DATE LOGGED 08/03/2013
ENGINEER	DRILLED BY Petersen
RIG TYPE Knebel	LOGGED BY JL
FLUSH Air/Mist	
INCLINATION (deg) -90	
CORE DIAMETER (mm) 82	

Downhole Depth (m)	Core Run Depth (m)	T.C.R.%	S.C.R.%	R.Q.D.%	Fracture Spacing Log (mm)	Non-intact Zone	Legend	Description	Depth (m)	Elevation	Standpipe Details	SPT (N Value)
10								SYMMETRIX DRILLING: No recovery, observed by driller as returns of greyish brown LIMESTONE, possible boulder	10.10			9)
11								SYMMETRIX DRILLING: No recovery, observed by driller as returns of Brown sandy CLAY	10.90			N = 38 (6, 6, 8, 9, 9, 12)
12												N = 50/60 mm (25, 50)
13								SYMMETRIX DRILLING: No recovery, observed by driller as returns of Soft dark brown sandy CLAY with some limestone fragments (Possible Weathered Rockhead)	13.20			N = 21 (2, 4, 5, 6, 5, 5)
14												N = 22 (3, 4, 4, 7, 5, 6)
15												N = 38 (6, 13, 16, 8, 7, 7)
16												N = 25 (4, 6, 6, 4, 7, 8)
17												
18												
19												

REMARKS Hole cased 0.00m-20.50m					WATER STRIKE DETAILS						
					Water Strike	Casing Depth	Sealed At	Rise To	Time (min)	Comments	
					14.80						
INSTALLATION DETAILS					GROUNDWATER DETAILS						
					Date	Hole Depth	Casing Depth	Depth to Water	Comments		
Date	Tip Depth	RZ Top	RZ Base	Type							
08-03-13	16.50	10.50	16.50	50mm SP							

IGSLRC FL10M 16695.GPJ IGSL.GDT 16/4/13



GEOTECHNICAL CORE LOG RECORD

REPORT NUMBER

16695

CONTRACT Greater Dublin Drainage Scheme	DRILLHOLE NO RC12
	SHEET Sheet 3 of 3
CO-ORDINATES	DATE DRILLED 04/03/2013
GROUND LEVEL (mOD)	DATE LOGGED 08/03/2013
CLIENT Fingal County Council	DRILLED BY Petersen
ENGINEER	LOGGED BY JL
RIG TYPE Knebel	
FLUSH Air/Mist	
INCLINATION (deg) -90	
CORE DIAMETER (mm) 82	

Downhole Depth (m)	Core Run Depth (m)	T.C.R.%	S.C.R.%	R.Q.D.%	Fracture Spacing Log (mm)	Non-intact Zone	Legend	Description	Depth (m)	Elevation	Standpipe Details	SPT (N Value)
20									20.50			
21		0	0	0				Medium strong dark greyish brown argillaceous LIMESTONE recovered as angular to subangular medium to coarse gravel-sized fragments. (Poor Recovery)				
21.50								Discontinuities 20.50-24.80m Difficult to discern given non-intact nature				
22		6	0	0								
23												
23.20												
24		13	0	0								
24.80									24.80			
25								End of Borehole at 23.20 m				
26												
27												
28												
29												

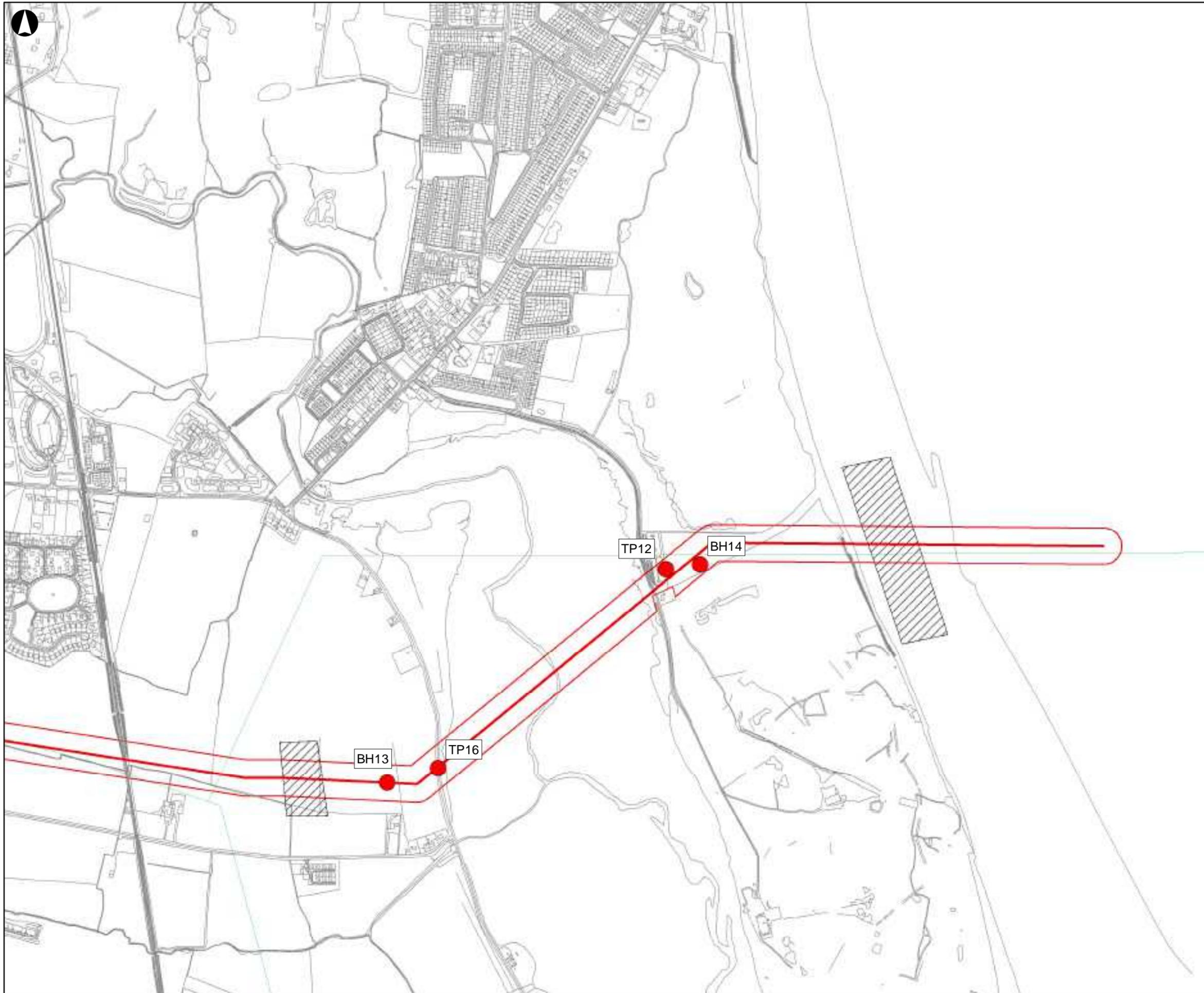
REMARKS					WATER STRIKE DETAILS					
Hole cased 0.00m-20.50m					Water Strike	Casing Depth	Sealed At	Rise To	Time (min)	Comments
					14.80					
INSTALLATION DETAILS					GROUNDWATER DETAILS					
Date	Tip Depth	RZ Top	RZ Base	Type	Date	Hole Depth	Casing Depth	Depth to Water	Comments	
08-03-13	16.50	10.50	16.50	50mm SP						

IGSLRC FI.10M 16695.GPJ IGSL.GDT 16/4/13

Appendix E

Southern Outfall - Site Plan,
Graphs and Logs

E1

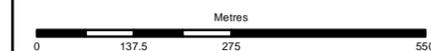


Legend

- Sites
- BH + RF
- Amended Pipeline
- Previous Pipeline
- GeoPhysics
- Pipe Corridor

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Issue	Date	By	Chkd	Appd
P1	12-04-12	DF	BA	SM

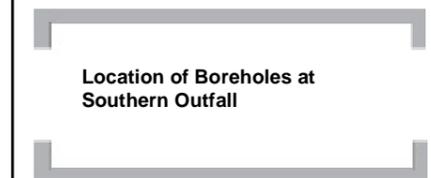


ARUP

50 Ringsend Road
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 www.arup.com

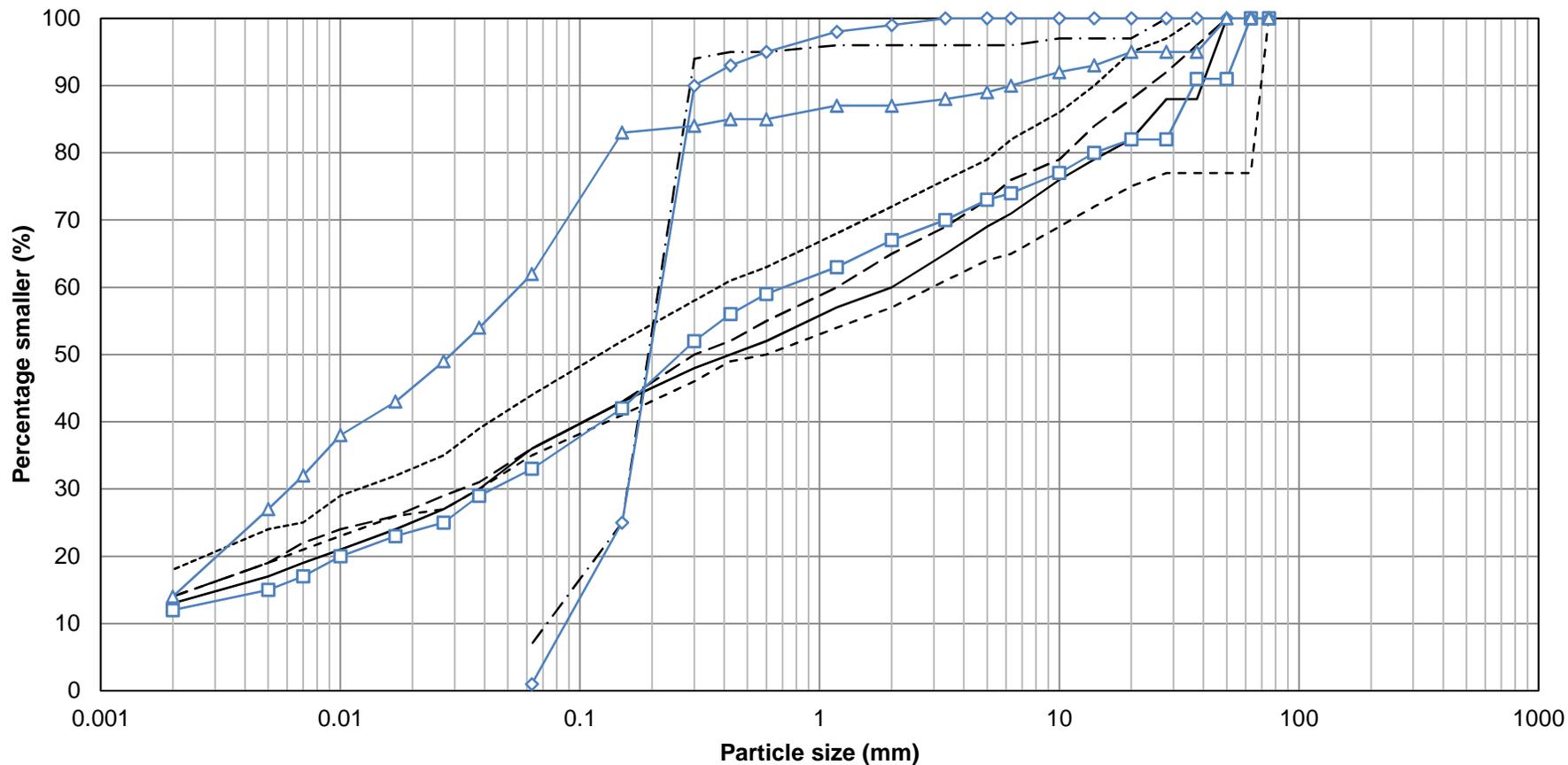
Client
Fingal County Council

Job Title
Dublin Greater Drainage Scheme

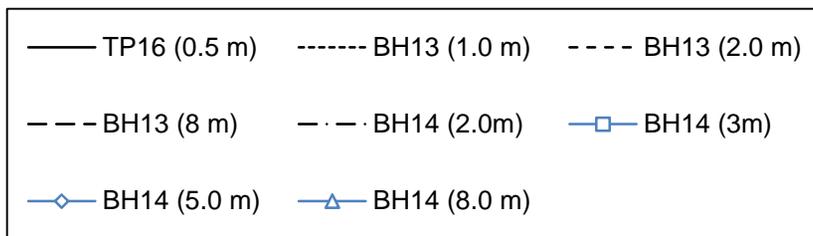


Scale at A3
1:10,000

Job No 218525-00	Drawing Status For Information
Drawing No G-005	Issue P1



Clay	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	Cobbles	Boulders
	Silt			Sand			Gravel				



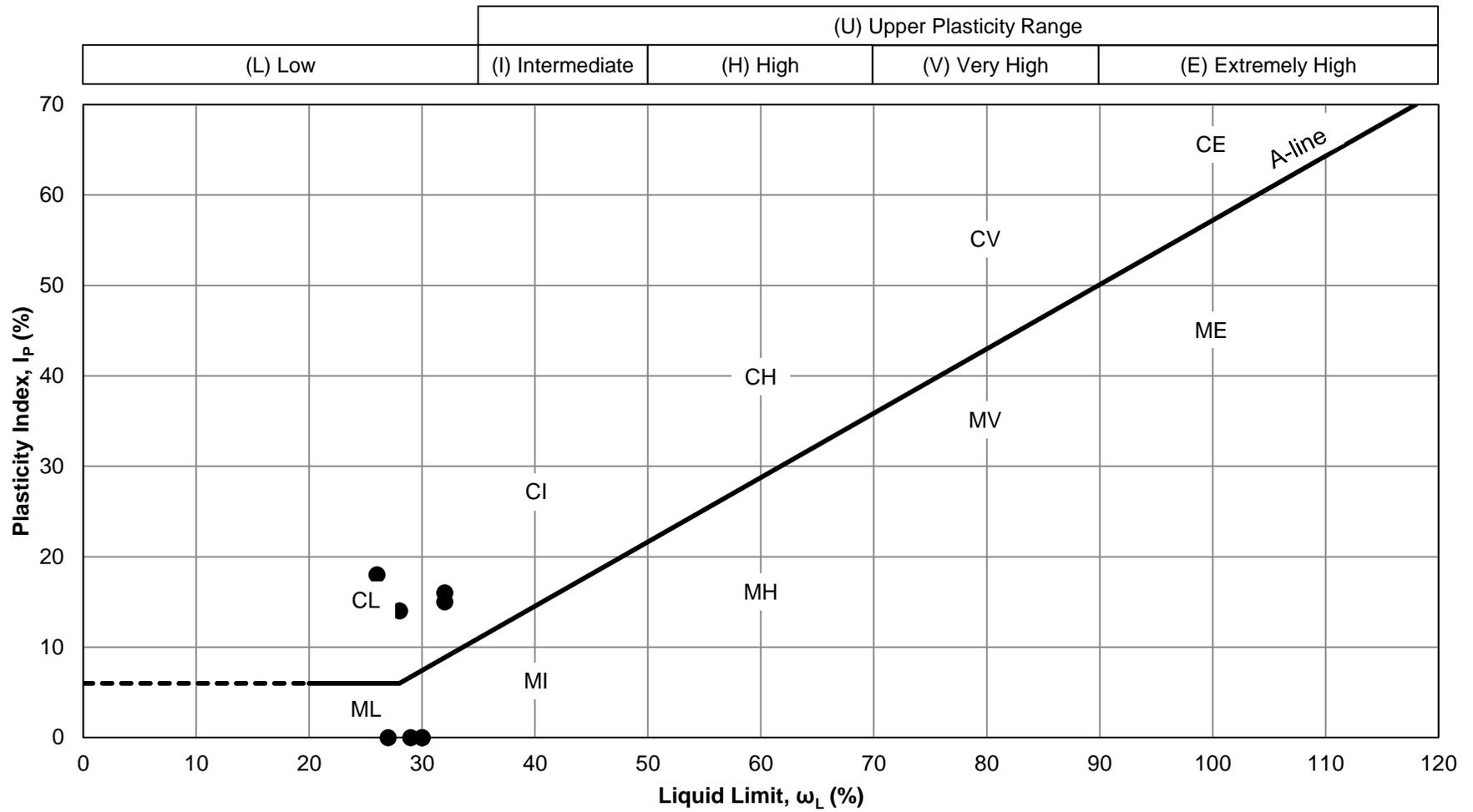
**GREATER DUBLIN DRAINAGE SCHEME
SOUTHERN OUTFALL**

Particle Size Distribution

218525-00

FIGURE

E.1



**GREATER DUBLIN DRAINAGE SCHEME
SOUTHERN OUTFALL**

Atterberg Limits

218525-00

FIGURE

E.2



TRIAL PIT RECORD

REPORT NUMBER

16695

CONTRACT Greater Dublin Drainage Scheme		TRIAL PIT NO. TP16
LOGGED BY JL		SHEET Sheet 1 of 1
CLIENT ENGINEER Fingal County Council		DATE STARTED 23/01/2013 DATE COMPLETED 23/01/2013
CO-ORDINATES		EXCAVATION METHOD Kubota KX080-3a
GROUND LEVEL (m)		

Depth (m)	Geotechnical Description	Legend	Depth (m)	Elevation	Water Strike	Samples			Vane Test (KPa)	Hand Penetrometer (KPa)
						Sample Ref	Type	Depth		
0.0	TOPSOIL: Soft to firm brown sandy slightly gravelly CLAY. Sand is fine to coarse. Gravel is subangular to subrounded fine to medium of limestone.		0.30		↓ (Seepage)	AN4608	B	0.50-0.60		
1.0	Firm to stiff brown sandy gravelly silty CLAY with a medium cobble content. Sand is fine to medium. Gravel is subangular to subrounded fine to coarse of limestone. Cobbles are subrounded of limestone.		1.30			AN4609	B	1.50-1.60		
2.0	Stiff to very stiff dark grey slightly sandy gravelly CLAY with a medium cobble content. Sand is fine to medium. Gravel is subangular to subrounded fine to coarse of limestone. Cobbles are subangular to subrounded of limestone.		2.50			AN4610	B	2.80-3.10		
3.0	Very stiff dark grey black slightly sandy gravelly CLAY with a low to medium cobble content. Sand is fine to medium. Gravel is subangular to subrounded fine to coarse of limestone. Cobbles are subrounded of limestone.		3.40							
4.0	End of Trial Pit at 3.40m									

Groundwater Conditions
Very slight seepage at 0.40m

Stability
Good

General Remarks
Pit terminated on very stiff clay

IGSL TP LOG 16695.GPJ IGSL_GDT 5/4/13



TRIAL PIT RECORD

REPORT NUMBER

16695

CONTRACT Greater Dublin Drainage Scheme	TRIAL PIT NO. TP17
	SHEET Sheet 1 of 1
LOGGED BY JL	CO-ORDINATES
	DATE STARTED 07/03/2013
	DATE COMPLETED 07/03/2013
CLIENT ENGINEER Fingal County Council	GROUND LEVEL (m)
	EXCAVATION METHOD Hitachi Zaxis 80SB

Depth (m)	Geotechnical Description	Legend	Depth (m)	Elevation	Water Strike	Samples			Vane Test (KPa)	Hand Penetrometer (KPa)
						Sample Ref	Type	Depth		
0.0	TOPSOIL: Soft brown slightly sandy CLAY with frequent rootlets. Sand is fine to medium.									
	Soft occasionally firm yellow brown and grey slightly sandy silty CLAY with frequent roots and rootlets. Sand is fine to medium.		0.30			AA0217	B	0.40-0.60		
	Firm grey brown occasionally mottled yellow orange sandy gravelly CLAY. Sand is fine to medium. Gravel is angular to subrounded fine to medium of limestone.		0.90			AA0218	B	1.00-1.20		
	Firm occasionally stiff brown slightly sandy gravelly CLAY with a low to medium cobble content. Sand is fine to medium. Gravel is subangular to subrounded fine to coarse of limestone. Cobbles are subrounded of limestone.		1.55							
	Very stiff dark grey brown slightly sandy gravelly CLAY with a medium cobble content. Sand is fine to medium. Gravel is subangular to subrounded fine to coarse of limestone. Cobbles are subrounded of limestone.		2.30			AA0219	LB	1.90-2.00		
	2.80m - Occasional subrounded boulder of limestone (up to 350mm)					AA0220	B	2.35-2.40		
3.0	End of Trial Pit at 3.00m		3.00							
4.0										

↓
(Seepage)

Groundwater Conditions
Slight seepage from 1.90m

Stability
Good

General Remarks
Pit terminated on very stiff clay

IGSL TP LOG 16695.GPJ IGSL.GDT 5/4/13



GEOTECHNICAL BORING RECORD

REPORT NUMBER

16695

CONTRACT Greater Dublin Drainage Scheme		BOREHOLE NO. BH13
CO-ORDINATES		SHEET Sheet 1 of 2
GROUND LEVEL (m AOD)	RIG TYPE Dando 2000 BOREHOLE DIAMETER (mm) 200 BOREHOLE DEPTH (m) 13.00	DATE COMMENCED 30/01/2013 DATE COMPLETED 31/01/2013
CLIENT Fingal County Council ENGINEER	SPT HAMMER REF. NO. SPT6 ENERGY RATIO (%) 55	BORED BY WC PROCESSED BY JL

Depth (m)	Description	Legend	Elevation	Depth (m)	Samples				Field Test Results	Standpipe Details			
					Ref. Number	Sample Type	Depth (m)	Recovery					
0	Soft to firm dark brown sandy silty CLAY with a low to medium cobble content												
1					AN3072	B	1.00-1.45			N = 8 (1, 2, 2, 3, 1, 2)			
2					AN3073	B	2.00-2.45			N = 9 (2, 2, 2, 3, 2, 2)			
				2.70									
3	Very stiff to hard black sandy gravelly silty CLAY with a medium cobble and a low to medium boulder content				AN3074	B	3.00-3.45			N = 22 (3, 4, 4, 5, 6, 7)			
4					AN3075	B	4.00-4.45			N = 32 (6, 7, 7, 8, 8, 9)			
5					AN3076	B	5.00-5.45			N = 33 (4, 6, 6, 8, 10, 9)			
6					AN3077	B	6.50-6.95			N = 50/265 mm (7, 8, 11, 12, 14, 13)			
7													
8					AN3078	B	8.00-8.45			N = 50/95 mm (25, 36, 14)			
9					AN3079	B	9.50-9.95			N = 50/225 mm (9, 11, 14, 17, 17, 2)			
10													

HARD STRATA BORING/CHISELLING				WATER STRIKE DETAILS					
From (m)	To (m)	Time (h)	Comments	Water Strike	Casing Depth	Sealed At	Rise To	Time (min)	Comments
4	4.2	0.75							No water strike
7.9	8.3	1							
9	9.2	0.75							
12.7	13	2							

INSTALLATION DETAILS					GROUNDWATER PROGRESS				
Date	Tip Depth	RZ Top	RZ Base	Type	Date	Hole Depth	Casing Depth	Depth to Water	Comments

REMARKS	Sample Legend U - Undisturbed 100mm Diameter Sample D - Small Disturbed (tub) P - Undisturbed Piston Sample B - Bulk Disturbed LB - Large Bulk Disturbed Env - Environmental Sample (Jar + Vial + Tub) W - Water Sample
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IGSLBH LOG 16695.GPJ IGSL.GDT 5/4/13



GEOTECHNICAL BORING RECORD

REPORT NUMBER

16695

CONTRACT Greater Dublin Drainage Scheme		BOREHOLE NO. BH13
CO-ORDINATES		SHEET Sheet 2 of 2
GROUND LEVEL (m AOD)	RIG TYPE Dando 2000 BOREHOLE DIAMETER (mm) 200 BOREHOLE DEPTH (m) 13.00	DATE COMMENCED 30/01/2013 DATE COMPLETED 31/01/2013
CLIENT ENGINEER Fingal County Council	SPT HAMMER REF. NO. SPT6 ENERGY RATIO (%) 55	BORED BY WC PROCESSED BY JL

Depth (m)	Description	Legend	Elevation	Depth (m)	Samples			Field Test Results	Standpipe Details
					Ref. Number	Sample Type	Depth (m)		
11	Very stiff to hard black sandy gravelly silty CLAY with a medium cobble and a low to medium boulder content <i>(continued)</i>				AN3080	B	11.00-11.45	N = 50/225 mm (7, 9, 11, 12, 19, 8)	
12					AN3081	B	12.50-12.95		
13	End of Borehole at 13.00 m			13.00					
14									
15									
16									
17									
18									
19									
20									
21									

HARD STRATA BORING/CHISELLING				WATER STRIKE DETAILS					
From (m)	To (m)	Time (h)	Comments	Water Strike	Casing Depth	Sealed At	Rise To	Time (min)	Comments
4	4.2	0.75							No water strike
7.9	8.3	1							
9	9.2	0.75							
12.7	13	2							

INSTALLATION DETAILS					GROUNDWATER PROGRESS				
Date	Tip Depth	RZ Top	RZ Base	Type	Date	Hole Depth	Casing Depth	Depth to Water	Comments

REMARKS	Sample Legend D - Small Disturbed (tub) P - Undisturbed Piston Sample B - Bulk Disturbed LB - Large Bulk Disturbed Env - Environmental Sample (Jar + Vial + Tub) U - Undisturbed 100mm Diameter Sample W - Water Sample
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IGSLBH LOG 16695.GPJ IGSLGDT 5/4/13



GEOTECHNICAL BORING RECORD

REPORT NUMBER

16695

CONTRACT Greater Dublin Drainage Scheme		BOREHOLE NO. BH14
CO-ORDINATES		SHEET Sheet 1 of 1
GROUND LEVEL (m AOD)	RIG TYPE Dando 2000	DATE COMMENCED 23/01/2013
	BOREHOLE DIAMETER (mm) 200	DATE COMPLETED 24/01/2013
	BOREHOLE DEPTH (m) 10.50	
CLIENT Fingal County Council	SPT HAMMER REF. NO. SPT6	BORED BY WC
ENGINEER	ENERGY RATIO (%) 55	PROCESSED BY CB

Depth (m)	Description	Legend	Elevation	Depth (m)	Samples				Field Test Results	Standpipe Details
					Ref. Number	Sample Type	Depth (m)	Recovery		
0	Loose, dark brown SAND.	•••••								
1	Loose to medium dense, pale brown, silty SAND, with shell material.	•••••		1.20	AN3061	B	1.00-1.45		N = 7 (1, 1, 2, 2, 1, 2)	
2	Medium dense, pale brown, silty SAND, with shell material.	•••••		2.50	AN3062	B	2.00-2.45		N = 10 (2, 2, 2, 2, 3, 3)	
3		•••••			AN3063	B	3.00-3.45		N = 15 (2, 2, 3, 3, 4, 5)	
4		•••••			AN3064	B	4.00-4.45		N = 14 (2, 2, 3, 3, 4, 4)	
5	Stiff, dark grey, sandy SILT with shell material.	•••••		5.10	AN3065	B	5.00-5.45		N = 16 (1, 3, 3, 4, 4, 5)	
6		•••••			AN3066	B	6.50-6.95		N = 15 (3, 4, 4, 3, 4, 4)	
7	Firm, grey, sandy SILT, with shell material.	•••••		7.30						
	Medium dense, grey, silty, sandy GRAVEL with shell material.	•••••		7.60						
8	Stiff, dark brown, sandy SILT, with shell material.	•••••			AN3067	B	8.00-8.45		N = 13 (2, 2, 3, 3, 4, 3)	
9		•••••			AN3068	B	9.50-9.95		N = 9 (2, 2, 2, 2, 3, 2)	
10	Stiff, dark grey, sandy SILT.	•••••		9.90						
	Pit terminated due to unstable ground conditions. End of Borehole at 10.50 m			10.50						

HARD STRATA BORING/CHISELLING				WATER STRIKE DETAILS					
From (m)	To (m)	Time (h)	Comments	Water Strike	Casing Depth	Sealed At	Rise To	Time (min)	Comments
7.3	7.5	0.75		2.20	2.20	7.30	1.90	20	Slow
10	10.1	0.5		9.20	9.20		4.30	20	Slow
11.7	12	0.75							

INSTALLATION DETAILS					GROUNDWATER PROGRESS				
Date	Tip Depth	RZ Top	RZ Base	Type	Date	Hole Depth	Casing Depth	Depth to Water	Comments
					24-01-13	10.50	10.50	2.00	End of Borehole

REMARKS Boring rig became unstable at 10.50m depth with subsidence at ground level - sand beginning to collapse. On Health & Safety grounds borehole was abandoned, and borehole re-set-up.

Sample Legend
 D - Small Disturbed (tub)
 P - Undisturbed Piston Sample
 B - Bulk Disturbed
 LB - Large Bulk Disturbed
 Env - Environmental Sample (Jar + Vial + Tub)
 U - Undisturbed 100mm Diameter Sample
 W - Water Sample

IGSLBH.LOG 16695.GPJ IGSL.GDT 5/4/13



GEOTECHNICAL BORING RECORD

REPORT NUMBER

16695

CONTRACT Greater Dublin Drainage Scheme		BOREHOLE NO. BH14A
		SHEET Sheet 1 of 2
CO-ORDINATES	RIG TYPE Dando 2000	DATE COMMENCED 24/01/2013
GROUND LEVEL (m AOD)	BOREHOLE DIAMETER (mm) 200	DATE COMPLETED 24/01/2013
	BOREHOLE DEPTH (m) 13.70	
CLIENT Fingal County Council	SPT HAMMER REF. NO. SPT6	BORED BY WC
ENGINEER	ENERGY RATIO (%) 55	PROCESSED BY CB

Depth (m)	Description	Legend	Elevation	Depth (m)	Samples				Field Test Results	Standpipe Details
					Ref. Number	Sample Type	Depth (m)	Recovery		
0	Loose, dark brown SAND.	•••••								
1				1.20						
2	Loose to medium dense, pale brown, silty SAND, with shell material.	x x x x x								
3				2.50						
4	Medium dense, pale brown, silty SAND, with occasional shell material	x x x x x								
5	4.40 - 4.60m - Rare subangular to subrounded BOULDER	x x x x x								
5	Stiff, dark grey, sandy SILT with shell material.	x x x x x								
6				7.00						
7	Firm, grey, sandy SILT, with shell material.	x x x x x								
7				7.30						
8	Medium dense, grey, silty, sandy GRAVEL with shell material.	x x x x x								
8				7.60						
9	Stiff, dark brown, sandy SILT, with shell material.	x x x x x								
9				9.90						
10	Stiff, grey, sandy SILT, with shell material.	x x x x x			AN3069	B	10.50-10.95			
								N = 27 (5, 5, 6, 6, 7, 8)		

HARD STRATA BORING/CHISELLING				WATER STRIKE DETAILS					
From (m)	To (m)	Time (h)	Comments	Water Strike	Casing Depth	Sealed At	Rise To	Time (min)	Comments
4.4	4.6	1.5		2.20					
12.9	13	0.5		9.20					
13.4	13.5	0.75							
13.6	13.7	1							

INSTALLATION DETAILS					GROUNDWATER PROGRESS				
Date	Tip Depth	RZ Top	RZ Base	Type	Date	Hole Depth	Casing Depth	Depth to Water	Comments

REMARKS Progressing 200mm diameter casing becoming difficult in sandy silts. Casing reduced to 150mm diameter at 9.50m. Borehole completed in 150mm casing. Obstruction encountered at 13.4m. Following chiselling, borehole terminated at 13.7m.

Sample Legend
 D - Small Disturbed (tub)
 P - Undisturbed Piston Sample
 B - Bulk Disturbed
 LB - Large Bulk Disturbed
 Env - Environmental Sample (Jar + Vial + Tub)
 U - Undisturbed 100mm Diameter Sample
 W - Water Sample

IGSLBH.LOG 16695.GPJ IGSL.GDT 5/4/13



GEOTECHNICAL CORE LOG RECORD

REPORT NUMBER

16695

CONTRACT Greater Dublin Drainage Scheme	DRILLHOLE NO RC13
CO-ORDINATES	SHEET Sheet 1 of 3
GROUND LEVEL (mOD)	DATE DRILLED 27/02/2013
CLIENT Fingal County Council	DATE LOGGED 27/02/2013
ENGINEER	DRILLED BY Petersen
RIG TYPE Knebel	LOGGED BY D.O'Shea
FLUSH Air/Mist	
INCLINATION (deg) -90	
CORE DIAMETER (mm) 82	

Downhole Depth (m)	Core Run Depth (m)	T.C.R.%	S.C.R.%	R.Q.D.%	Fracture Spacing Log (mm)	Non-intact Zone	Legend	Description	Depth (m)	Elevation	Standpipe Details	SPT (N Value)
0					0 250 500			Cased down Shell & Auger Hole				
1												
2												
3												
4												
5												
6												
6.50									6.50			
7								SYMMETRIX DRILLING: No recovery, observed by driller as returns of madeground consisting of Shell & Auger Fill				
8												
9												

REMARKS					WATER STRIKE DETAILS							
Hole cased 0.00-24.50m					Water Strike	Casing Depth	Sealed At	Rise To	Time (min)	Comments		
					15.00					Slow		
INSTALLATION DETAILS					GROUNDWATER DETAILS							
Date	Tip Depth	RZ Top	RZ Base	Type	Date	Hole Depth	Casing Depth	Depth to Water	Comments			

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GEOTECHNICAL CORE LOG RECORD

REPORT NUMBER

16695

CONTRACT Greater Dublin Drainage Scheme	DRILLHOLE NO RC13
	SHEET Sheet 2 of 3
CO-ORDINATES	DATE DRILLED 27/02/2013
GROUND LEVEL (mOD)	DATE LOGGED 27/02/2013
CLIENT Fingal County Council	DRILLED BY Petersen
ENGINEER	LOGGED BY D.O'Shea
RIG TYPE Knebel	
FLUSH Air/Mist	
INCLINATION (deg) -90	
CORE DIAMETER (mm) 82	

Downhole Depth (m)	Core Run Depth (m)	T.C.R.%	S.C.R.%	R.Q.D.%	Fracture Spacing Log (mm)	Non-intact Zone	Legend	Description	Depth (m)	Elevation	Standpipe Details	SPT (N Value)
10					0 250 500			SYMMETRIX DRILLING: No recovery, observed by driller as returns of madeground consisting of Shell & Auger Fill (continued)				
11												
12												
13									13.50			
14								SYMMETRIX DRILLING: No recovery, observed by driller as returns of grey sandy very gravelly clay with occasional cobbles and boulders.				N = 45 (9, 12, 10, 9, 12, 14)
15									14.80			
16								SYMMETRIX DRILLING: No recovery, observed by driller as returns of grey/brown sandy very gravelly clay with occasional cobbles and boulders - possible highly weathered rock.				N = 21/100 mm (25, 29, 14, 7)
17												N = 50/190 mm (16, 9, 17, 19, 14)
18												N = 75/100 mm (25, 50)
19												

REMARKS Hole cased 0.00-24.50m						WATER STRIKE DETAILS					
						Water Strike	Casing Depth	Sealed At	Rise To	Time (min)	Comments
						15.00					Slow
INSTALLATION DETAILS						GROUNDWATER DETAILS					
						Date	Hole Depth	Casing Depth	Depth to Water	Comments	
Date	Tip Depth	RZ Top	RZ Base	Type							

IGSLRC FI.10M 16695.GPJ IGSL.GDT 16/4/13



GEOTECHNICAL CORE LOG RECORD

REPORT NUMBER

16695

CONTRACT Greater Dublin Drainage Scheme	DRILLHOLE NO RC13
	SHEET Sheet 3 of 3
CO-ORDINATES	DATE DRILLED 27/02/2013
GROUND LEVEL (mOD)	DATE LOGGED 27/02/2013
CLIENT Fingal County Council	DRILLED BY Petersen
ENGINEER	LOGGED BY D.O'Shea
RIG TYPE Knebel	
FLUSH Air/Mist	
INCLINATION (deg) -90	
CORE DIAMETER (mm) 82	

Downhole Depth (m)	Core Run Depth (m)	T.C.R.%	S.C.R.%	R.Q.D.%	Fracture Spacing Log (mm)	Non-intact Zone	Legend	Description	Depth (m)	Elevation	Standpipe Details	SPT (N Value)
20								SYMMETRIX DRILLING: No recovery, observed by driller as returns of grey/brown sandy very gravelly clay with occasional cobbles and boulders - possible highly weathered rock. (continued)				
21												
22												
23												
24								SYMMETRIX DRILLING: No recovery, observed by driller as returns of grey solid rock	23.60			
24.50									24.50			
25		100	76	21				Medium strong to very strong, medium to thinly bedded, grey/pale grey fine-grained, LIMESTONE (locally plastically sheared), fresh to slightly weathered.				
26								Discontinuities are medium to closely spaced, rough, irregular. Apertures are tight to moderately open, locally clay-smearred, commonly moderately iron-oxide stained, locally calcite-veined (1-8mm thick). Dips are 45° & sub-vertical.				
26.00												
27		100	92	32								
27.45								End of Borehole at 27.45 m	27.45			
28												
29												

REMARKS Hole cased 0.00-24.50m					WATER STRIKE DETAILS						
					Water Strike	Casing Depth	Sealed At	Rise To	Time (min)	Comments	
					15.00					Slow	
INSTALLATION DETAILS					GROUNDWATER DETAILS						
					Date	Hole Depth	Casing Depth	Depth to Water	Comments		
Date	Tip Depth	RZ Top	RZ Base	Type	27-02-13	27.45	24.50	12.80	Water level recorded 10mins after end of drilling		

IGSLRC FL10M 16695.GPJ IGSL.GDT 16/4/13



GEOTECHNICAL CORE LOG RECORD

REPORT NUMBER

16695

CONTRACT Greater Dublin Drainage Scheme		DRILLHOLE NO RC14A
		SHEET Sheet 1 of 3
CO-ORDINATES		DATE DRILLED 27/02/2013
GROUND LEVEL (mOD)		DATE LOGGED 28/02/2013
CLIENT Fingal County Council		DRILLED BY Petersen
ENGINEER		LOGGED BY D.O'Shea
		RIG TYPE Knebel
		FLUSH Air/Mist
		INCLINATION (deg) -90
		CORE DIAMETER (mm) 82

Downhole Depth (m)	Core Run Depth (m)	T.C.R.%	S.C.R.%	R.Q.D.%	Fracture Spacing Log (mm)	Non-intact Zone	Legend	Description	Depth (m)	Elevation	Standpipe Details	SPT (N Value)
0					0 250 500			SYMMETRIX DRILLING: No recovery, observed by driller as returns of brown sand				
1												
2												
3												
4												
5												
6												
7									7.30			
8								SYMMETRIX DRILLING: No recovery, observed by driller as returns of grey silty fine sand				
9												

REMARKS Hole cased 0.00-20.20m					WATER STRIKE DETAILS							
					Water Strike	Casing Depth	Sealed At	Rise To	Time (min)	Comments		
					7.30					Slow		
INSTALLATION DETAILS					GROUNDWATER DETAILS							
					Date	Hole Depth	Casing Depth	Depth to Water	Comments			
Date	Tip Depth	RZ Top	RZ Base	Type								

IGSLRC FI.10M 16695.GPJ IGSL.GDT 16/4/13



GEOTECHNICAL CORE LOG RECORD

REPORT NUMBER

16695

CONTRACT Greater Dublin Drainage Scheme	DRILLHOLE NO RC14A
	SHEET Sheet 2 of 3
CO-ORDINATES	DATE DRILLED 27/02/2013
GROUND LEVEL (mOD)	DATE LOGGED 28/02/2013
CLIENT Fingal County Council	DRILLED BY Petersen
ENGINEER	LOGGED BY D.O'Shea
RIG TYPE Knebel	
FLUSH Air/Mist	
INCLINATION (deg) -90	
CORE DIAMETER (mm) 82	

Downhole Depth (m)	Core Run Depth (m)	T.C.R.%	S.C.R.%	R.Q.D.%	Fracture Spacing Log (mm)	Non-intact Zone	Legend	Description	Depth (m)	Elevation	Standpipe Details	SPT (N Value)
10					0 250 500		x	SYMMETRIX DRILLING: No recovery, observed by driller as returns of grey silty fine sand (<i>continued</i>)				
11							x					
12							x	SYMMETRIX DRILLING: No recovery, observed by driller as returns of grey clay	12.00			
13							x					
14							x	SYMMETRIX DRILLING: No recovery, observed by driller as returns of brown sandy very gravelly clay with occasional cobbles and boulders - possible highly weathered rock.	13.50			
15							x					
16							x	SYMMETRIX DRILLING: No recovery, observed by driller as returns of grey highly weathered rock.	15.40			N = 50/115 mm (8, 17, 29, 21)
17							x					
18							x					
19							x					
							x		19.70			

REMARKS Hole cased 0.00-20.20m						WATER STRIKE DETAILS					
						Water Strike	Casing Depth	Sealed At	Rise To	Time (min)	Comments
						7.30					Slow
INSTALLATION DETAILS						GROUNDWATER DETAILS					
						Date	Hole Depth	Casing Depth	Depth to Water	Comments	
Date	Tip Depth	RZ Top	RZ Base	Type							

IGSLRC Fl 10M 16695.GPJ IGSL.GDT 16/4/13



GEOTECHNICAL CORE LOG RECORD

REPORT NUMBER

16695

CONTRACT Greater Dublin Drainage Scheme		DRILLHOLE NO RC14A
		SHEET Sheet 3 of 3
CO-ORDINATES		DATE DRILLED 27/02/2013
GROUND LEVEL (mOD)		DATE LOGGED 28/02/2013
CLIENT Fingal County Council		DRILLED BY Petersen
ENGINEER		LOGGED BY D.O'Shea
		RIG TYPE Knebel
		FLUSH Air/Mist
		INCLINATION (deg) -90
		CORE DIAMETER (mm) 82

Downhole Depth (m)	Core Run Depth (m)	T.C.R.%	S.C.R.%	R.Q.D.%	Fracture Spacing Log (mm)	Non-intact Zone	Legend	Description	Depth (m)	Elevation	Standpipe Details	SPT (N Value)
20	20.20							SYMMETRIX DRILLING: No recovery, observed by driller as returns of grey solid rock (<i>continued</i>)	20.20			
		100	70	26				Medium strong to very strong, medium to thinly bedded, grey/pale grey fine-grained, LIMESTONE (locally plastically sheared, predominantly calci-siltite but grading into argillaceous limestone approx every 1.00m), fresh to moderately weathered (at 20.80-20.91m).				
21	21.20							Discontinuities are medium to closely spaced, rough, planar. Apertures are tight to open, locally clay-smearred, locally slightly iron-oxide stained, locally calcite-veined (1-30mm thick). Dips are 45-60°.				
22		100	94	45								
	22.70							End of Borehole at 22.70 m	22.70			
23												
24												
25												
26												
27												
28												
29												

REMARKS					WATER STRIKE DETAILS					
Hole cased 0.00-20.20m					Water Strike	Casing Depth	Sealed At	Rise To	Time (min)	Comments
					7.30					Slow
					GROUNDWATER DETAILS					
INSTALLATION DETAILS					Date	Hole Depth	Casing Depth	Depth to Water	Comments	
Date	Tip Depth	RZ Top	RZ Base	Type	28-02-13	22.70	20.20	3.80	Water level recorded 10mins after end of drilling	

IGSLRC F1.10M 16695.GPJ IGSL.GDT 16/4/13

Appendix F

Chapelmidway to Northern
Outfall - Site Plan and Logs

F1

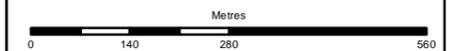


Legend

- Sites
- BH + RF
- Amended Pipeline
- Previous Pipeline
- GeoPhysics
- Pipe Corridor

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P1	12-04-12	DF	BA	SM
Issue	Date	By	Chkd	Appd



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Client
Fingal County Council

Job Title
Dublin Greater Drainage Scheme



Scale at A3
1:10,000

Job No 218525-00	Drawing Status For Information
Drawing No G-00+	Issue P1

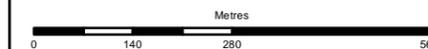


Legend

- Sites
- BH + RF
- Amended Pipeline
- Previous Pipeline
- GeoPhysics
- Pipe Corridor

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Issue	Date	By	Chkd	Appd
P1	12-04-12	DF	BA	SM

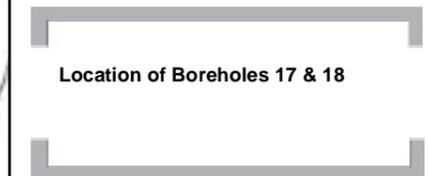


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Fingal County Council

Job Title
Dublin Greater Drainage Scheme



Scale at A3
1:10,000

Job No 218525-00	Drawing Status For Information
Drawing No G-009	Issue P1

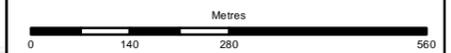


Legend

- Sites
- BH + RF
- Amended Pipeline
- Previous Pipeline
- GeoPhysics
- Pipe Corridor

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P1	12-04-12	DF	BA	SM
Issue	Date	By	Chkd	Appd

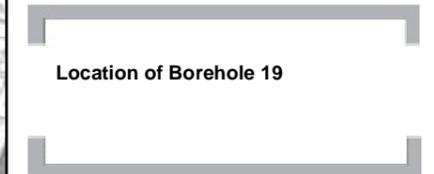


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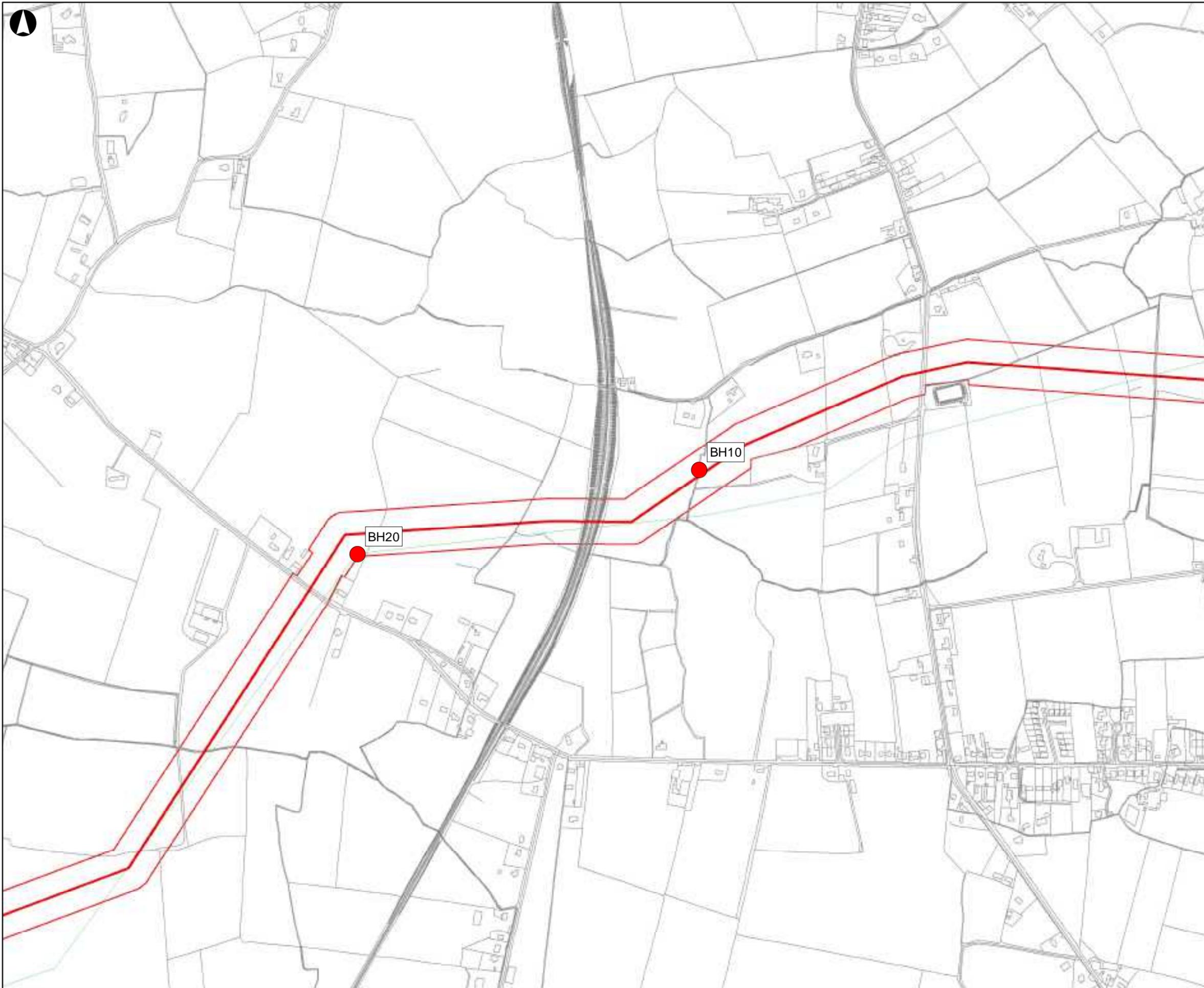
Client
Fingal County Council

Job Title
Dublin Greater Drainage Scheme



Scale at A3
1:10,000

Job No 218525-00	Drawing Status For Information
Drawing No G-010	Issue P1

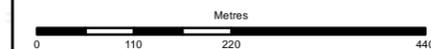


Legend

- Sites
- BH + RF
- Amended Pipeline
- Previous Pipeline
- GeoPhysics
- Pipe Corridor

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P1	12-04-12	DF	BA	SM
Issue	Date	By	Chkd	Appd

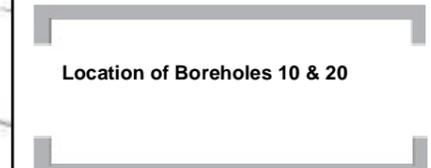


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Client
Fingal County Council

Job Title
Dublin Greater Drainage Scheme



Scale at A3
1:8,000

Job No 218525-00	Drawing Status For Information
Drawing No G-011	Issue P1



GEOTECHNICAL BORING RECORD

REPORT NUMBER

16695

CONTRACT Greater Dublin Drainage Scheme		BOREHOLE NO. BH15
CO-ORDINATES 313,067.51 E 247,560.39 N		SHEET Sheet 1 of 1
GROUND LEVEL (m AOD) 78.49	RIG TYPE Dando 2000	DATE COMMENCED 25/02/2013
	BOREHOLE DIAMETER (mm) 200	DATE COMPLETED 25/02/2013
	BOREHOLE DEPTH (m) 3.40	
CLIENT Fingal County Council	SPT HAMMER REF. NO. SPT6	BORED BY WC
ENGINEER	ENERGY RATIO (%) 55	PROCESSED BY JL

Depth (m)	Description	Legend	Elevation	Depth (m)	Samples				Field Test Results	Standpipe Details
					Ref. Number	Sample Type	Depth (m)	Recovery		
0	Soft becoming firm dark brown slightly sandy slightly gravity CLAY with a low cobble and boulder content.		75.09	3.40						
1					AN8502	II	1.00-1.45		N = 7 (1, 2, 2, 2, 1, 2)	
2					AN8503	II	2.00-2.45		N = 14 (2, 2, 3, 3, 4, 4)	
3					AN8504	II	3.00-3.40		N = 50(10) min (5, 7, 9, 16, 23)	
3.40	End of Borehole at 3.40 m									

HARD STRATA BORING/CHISELLING				WATER STRIKE DETAILS					
From (m)	To (m)	Time (h)	Comments	Water Strike	Casing Depth	Sealed At	Rise To	Time (min)	Comments
3.2	3.4	1.5		3.10	3.10		2.70	20	Slow

INSTALLATION DETAILS					GROUNDWATER PROGRESS				
Date	Tip Depth	RZ Top	RZ Base	Type	Date	Hole Depth	Casing Depth	Depth to Water	Comments

REMARKS

Sample Legend
 II - Small Disturbed (Sd)
 I - Bulk Disturbed
 LD - Large Bulk Disturbed
 Bm - Transmembrane Samples (200 - 300)

U - Undisturbed 100mm Diameter Sample
 P - Undisturbed Point Sample
 W - Water Sample

ESR: BH LOG 16695.GPJ ESSL.GDT 17/01/13



GEOTECHNICAL BORING RECORD

REPORT NUMBER

16695

CONTRACT Greater Dublin Drainage Scheme		BOREHOLE NO. BH17
CO-ORDINATES 315,274.53 E 251,201.85 N		SHEET Sheet 1 of 1
GROUND LEVEL (m AOD) 23.43	RIG TYPE Dando 2000	DATE COMMENCED 22/02/2013
	BOREHOLE DIAMETER (mm) 200	DATE COMPLETED 22/02/2013
	BOREHOLE DEPTH (m) 3.10	
CLIENT Fingal County Council	SPT HAMMER REF. NO. SPT6	BORED BY WC
ENGINEER	ENERGY RATIO (%) 65	PROCESSED BY JL

Depth (m)	Description	Legend	Elevation	Depth (m)	Samples				Field Test Results	Standpipe Details
					Ref. Number	Sample Type	Depth (m)	Recovery		
0	Soft dark brown sandy gravelly CLAY									
1	Loose becoming medium dense dark grey silty gravelly SAND		22.33	1.10	3750	B	1.00-1.45	N = 8 (1, 2, 2, 2, 2, 2)		
2	Firm to stiff black sandy gravelly silty CLAY		21.13	2.30	3750	B	2.00-2.45	N = 11 (1, 1, 2, 2, 3, 4)		
3	Medium dense dark grey sandy subangular fine to medium GRAVEL		20.53 20.33	2.90 3.10	3750	B	3.00-3.45	N = 500 mm (G3, G5)		
End of Borehole at 3.10 m										

HARD STRATA BORING/CHISELLING				WATER STRIKE DETAILS					
From (m)	To (m)	Time (h)	Comments	Water Strike	Casing Depth	Sealed At	Rise To	Time (min)	Comments
2.9	3.1	1.5		1.10	1.10	2.30	0.60	20	Slow

INSTALLATION DETAILS					GROUNDWATER PROGRESS				
Date	Tip Depth	RZ Top	RZ Base	Type	Date	Hole Depth	Casing Depth	Depth to Water	Comments

REMARKS	Sample Legend □ - Small Disturbed Port ○ - Bulk Disturbed □ - Large Bulk Disturbed □ - Environmental Sample (per 100 x 300)
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GSI BH LOG 16695.GPJ 10/06/2013 11:59:13

U - Undisturbed 100mm Diameter Sample
 P - Undisturbed Plastic Sample
 W - Water Sample



GEOTECHNICAL BORING RECORD

REPORT NUMBER

16695

CONTRACT Greater Dublin Drainage Scheme		BOREHOLE NO. BH19
CO-ORDINATES 320,704.27 E 266,469.62 N	RIG TYPE Dando 2009	SHEET Sheet 1 of 1
GROUND LEVEL (m AOD) 34.01	BOREHOLE DIAMETER (mm) 200	DATE COMMENCED 21/02/2013
CLIENT Fingal County Council	BOREHOLE DEPTH (m) 9.70	DATE COMPLETED 22/02/2013
ENGINEER	SPT HAMMER REF. NO. SPT8	BORED BY WC
	ENERGY RATIO (%) 55	PROCESSED BY JL

Depth (m)	Description	Legend	Elevation	Depth (m)	Samples				Field Test Results	Standpipe Details
					Ref. Number	Sample Type	Depth (m)	Recovery		
0	Soft dark brown sandy CLAY with a low to medium cobble content									
1.90			32.11	1.90	AN3752	B	1.80-1.45		N = 7 (1, 2, 2, 1, 2, 2)	
2.45	Firm light brown sandy gravelly CLAY with a medium cobble content				AN3753	B	2.40-2.45		N = 9 (2, 2, 3, 2, 2, 2)	
3.40					AN3754	B	3.00-3.40		N = 10 (3, 4, 7, 4, 4, 2)	
3.80			30.21	3.80	AN3755	B	4.00-4.40		N = 10 (4, 4, 5, 5, 5, 4)	
4.40	Firm to stiff dark brown sandy silty CLAY with a medium cobble content and a low boulder content				AN3756	B	5.00-5.45		N = 21 (6, 6, 6, 7, 8, 10)	
6.95					AN3757	B	6.50-6.95		N = 20 (20) mm (11, 13, 16, 17, 17)	
8.45	Very stiff black sandy gravelly silty CLAY with a medium cobble and boulder content		27.31	8.70	AN3758	B	8.00-8.45		N = 50 (50) mm (12, 13, 16, 16, 16)	
9.70	End of Borehole at 9.70 m		24.31	9.70	AN3759	B	9.60-9.95		N = 50 (50) mm (20, 5, 22, 18)	

HARD STRATA BORING/CHISELLING				WATER STRIKE DETAILS					
From (m)	To (m)	Time (h)	Comments	Water Strike	Casing Depth	Sealed At	Rise To	Time (min)	Comments
6.6	7	1							No water strike
7.75	7.85	0.5							
9.6	9.7	1							

INSTALLATION DETAILS					GROUNDWATER PROGRESS				
Date	Tip Depth	RZ Top	RZ Base	Type	Date	Hole Depth	Casing Depth	Depth to Water	Comments

REMARKS	Sample Legend C - Small Disturbed (SD) B - Bulk Disturbed LB - Large Bulk Disturbed Fm - Undisturbed Sample (FC - 7.40) U - Undisturbed (Down) Sample P - Undisturbed (Pore) Sample W - Water Sample
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GSI: BH LOG 16695.GPJ GSI: GDT 173973



GEOTECHNICAL BORING RECORD

REPORT NUMBER

16695

CONTRACT Greater Dublin Drainage Scheme		BOREHOLE NO. BH20	
CO-ORDINATES 324,487.08 E 257,266.58 N		SHEET Sheet 2 of 2	
GROUND LEVEL (m AOD) 54.06		DATE COMMENCED 01/03/2013	
CLIENT Fingal County Council		DATE COMPLETED 01/03/2013	
ENGINEER		BORED BY WC	
RIG TYPE Dando 2000		PROCESSED BY JL	
BOREHOLE DIAMETER (mm) 200		SPT HAMMER REF. NO. SPT6	
BOREHOLE DEPTH (m) 10.20		ENERGY RATIO (%) 55	

Depth (m)	Description	Legend	Elevation	Depth (m)	Samples				Field Test Results	Standpipe Details
					Ref. Number	Sample Type	Depth (m)	Recovery		
10	End of Borehole at 10.20 m		43.86	10.20						
11										
12										
13										
14										
15										
16										
17										
18										
19										
20										

HARD STRATA BORING/CHISELLING				WATER STRIKE DETAILS					
From (m)	To (m)	Time (h)	Comments	Water Strike	Casing Depth	Sealed At	Rise To	Time (min)	Comments
3.7	3.9	0.5							
5.3	5.6	0.75							
7.6	7.7	0.5							
9.9	10.2	1.5							

INSTALLATION DETAILS					GROUNDWATER PROGRESS				
Date	Tip Depth	RZ Top	RZ Base	Type	Date	Hole Depth	Casing Depth	Depth to Water	Comments

REMARKS	Sample Legend S - Small Standard (300) B - Bulk Disturbed LB - Large Bulk Disturbed Etc. - Unconventional Sample (See Notes)
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GSI, BH LOG, 16695-019, 10291, GBT, 17/07/13



GEOTECHNICAL CORE LOG RECORD

REPORT NUMBER

16695

CONTRACT Greater Dublin Drainage Scheme		DRILLHOLE NO RC15
CO-ORDINATES 313,087.51 E 247,880.39 N		SHEET Sheet 1 of 4
GROUND LEVEL (mOD) 78.49	RIG TYPE Casagrande CB	DATE DRILLED 21/03/2013
CLIENT Fingal County Council	FLUSH Air/Mist	DATE LOGGED 25/03/2013
ENGINEER	INCLINATION (deg) -90	DRILLED BY M. Newland
	CORE DIAMETER (mm) 90	LOGGED BY JL

Downhole Depth (m)	Core Run Depth (m)	T.C.R.%	S.C.R.%	R.Q.D.%	Fracture Spacing Log (mm)	Non-intact Zone	Legend	Description	Depth (m)	Elevation	Standpipe Details	SPT (N Value)
0								Cased down Shell & Auger Hole				
3.40									3.40	75.09		
4.70	100	35	15					Medium strong to strong medium to finely bedded gray and dark gray black fine grained argillaceous LIMESTONE with occasional widely spaced medium thickness band of calcisite LIMESTONE (3.70-3.90m, 7.50-7.70m, 8.80-9.11m, 29.85-29.90m) and occasional medium to widely spaced very thin calcite vein (rarely showing plastic shearing at 12.80-13.0m) Weathering: Slight brown and yellow brown non-penetrative staining on fracture surfaces (3.40-4.55m). Otherwise Negligable.				
5.10	100	85	25									
6.45	100	77	39					Discontinuities 3.40-8.25m SET 1: 0-10° closely spaced smooth planar tight, clean with rare yellow brown non-penetrative discolouration. SET 2: Subvertical widely spaced smooth planar to undulating partly open with occasional very thin calcite (~1mm) veneer on exposed surfaces - possible failed calcite vein				
7.70	100	80	61					7.45-7.70m incipient subvertical fracture with brown staining along fracture				
8.25	100	100	95									
8.80	100	100	95									
9.85	100	100	93					Discontinuities 8.25-29.80m SET 1: 0-10° closely to widely spaced predominantly medium spaced tight, clean. SET 2: 45-60° medium to widely spaced smooth planar occasionally undulating tight clean				
9.95	100	100	100									

REMARKS Hole cased 0.00-3.40m	WATER STRIKE DETAILS					
	Water Strike	Casing Depth	Sealed At	Rise To	Time (min)	Comments
	3.50					

INSTALLATION DETAILS					GROUNDWATER DETAILS				
Date	Tip Depth	RZ Top	RZ Base	Type	Date	Hole Depth	Casing Depth	Depth to Water	Comments
21-03-13					21-03-13	3.40		5.20	Water level recorded at start of shift
21-03-13					22-03-13	9.85	3.40	0.00	Water level recorded at end of shift
22-03-13						9.85	3.40	0.00	Water level recorded at start of shift

GSI, RC 15, 16M, 16695 CPU, KESL, GDT, 100313



GEOTECHNICAL CORE LOG RECORD

REPORT NUMBER

16695

CONTRACT Greater Dublin Drainage Scheme		DRILLHOLE NO RC15
CO-ORDINATES 313,067.51 E 247,660.39 N		SHEET Sheet 2 of 4
GROUND LEVEL (mOD) 78.49	RIG TYPE Casagrande CB	DATE DRILLED 21/03/2013
CLIENT Fingal County Council	FLUSH Air/Mist	DATE LOGGED 25/03/2013
ENGINEER	INCLINATION (deg) -90	DRILLED BY M. Newland
	CORE DIAMETER (mm) 90	LOGGED BY JL

Downhole Depth (m)	Core Run Depth (m)	T.C.R.%	S.C.R.%	R.Q.D.%	Fracture Spacing Log (mm)	Non-intact Zone	Legend	Description	Depth (m)	Elevation	Standpipe Details	SPT (N Value)
10		100	100	100				Medium strong to strong medium to thinly bedded grey and dark grey black fine grained argillaceous LIMESTONE with occasional widely spaced medium thickness band of calcisiltite LIMESTONE (3.70-3.90m, 7.50-7.70m, 8.80-9.11m, 29.95-29.90m) and occasional medium to widely spaced very thin calcite vein (rarely showing plastic shearing at 12.80-13.0m) Weathering: Slight brown and yellow brown non-penetrative staining on fracture surfaces (3.40-4.55m). Otherwise Negligable.				
11.05		100	100	92				Discontinuities 3.40-8.25m SET 1: 0-10° closely spaced smooth planar tight, clean with rare yellow brown non-penetrative discoloration. SET 2: Subvertical widey spaced smooth planar to undulating partly open with occasional very thin calcite (~1mm) veneer on exposed surfaces - possible failed calcite vein (continued)				
11.85		100	100	100				13.70-13.95m incipient fracture 70° partly open				
12.30		100	100	93				15.45m Cluster of cubic pyrite along incipient subvertical fracture tight				
13.50		100	100	88				15.50-15.80m 75° fracture smooth stepped				
14.80		100	100	71				15.35-16.70m incipient subvertical fracture tight				
15.45		100	100	100				19.60-19.70m 45° fracture smooth planar with non-penetrative yellow brown discoloration				
16.80		100	100	97								
18.30		100	100	94								
19.70												

REMARKS						
Hole cased 0.00-3.40m						
				WATER STRIKE DETAILS		
Water Strike	Casing Depth	Sealed At	Rise To	Time (min)	Comments	
3.50						
GROUNDWATER DETAILS						
INSTALLATION DETAILS						
Date	Tip Depth	RZ Top	RZ Base	Type	Comments	
22-03-13	14.80			3.40	Water level recorded at end of shift	
25-03-13	14.80			3.40	Water level recorded at start of shift	

ISGL RC F1 10W 16695.GPJ ISSL.GDT 10/09/13



GEOTECHNICAL CORE LOG RECORD

REPORT NUMBER

16695

CONTRACT Greater Dublin Drainage Scheme		DRILLHOLE NO RC15
CO-ORDINATES 313,067.51 E 247,660.39 N		SHEET Sheet 3 of 4
GROUND LEVEL (mOD) 78.49	RIG TYPE Casagrande O FLUSH Air/Mist	DATE DRILLED 21/03/2013 DATE LOGGED 25/03/2013
CLIENT Fingal County Council ENGINEER	INCLINATION (deg) -90 CORE DIAMETER (mm) 90	DRILLED BY M. Newland LOGGED BY JL

Downhole Depth (m)	Core Run Depth (m)	T.C.R. %	S.C.R. %	R.O.D. %	Fracture Spacing Log (mm)	Non-intact Zone	Legend	Description	Depth (m)	Elevation	Standpipe Details	SPT (N Value)
20		100	100	100								
21	21.20							21.60-22.0m 70-80° fracture smooth undulating with orange brown non-penetrative discolouration on fracture surfaces				
22	22.30	100	100	100				22.40-22.50m 50° fracture smooth undulating with orange brown non-penetrative discolouration on fracture surfaces				
23	23.00								23.00	55.49		
24	24.40	100	100	85				23.40-24.80m Strong matrix-supported fossiliferous mud-rich wackestone LIMESTONE (clasts up to 45mm) 24.0-25.0m Possible Limestone boulder				
25	25.90	97	93	73				25.0-25.10m Thin calcite (10mm) veinfill reduced to weak wall strength 25.67-25.68 Soft grey CLAY veneer on non-intact angular medium to coarse gravel fragments				
26	26.85	100	90	69								
27	27.40	100	100	100								
28	28.00	100	92	77								
29	28.95	100	100	100								
30	29.90	100	88	88				29.70-29.80m Non-intact angular medium to coarse				

REMARKS Hole cased 0.00-3.40m						WATER STRIKE DETAILS					
						Water Strike	Casing Depth	Sealed At	Rise To	Time (min)	Comments
						3.50					
INSTALLATION DETAILS						GROUNDWATER DETAILS					
						Date	Hole Depth	Casing Depth	Depth to Water	Comments	
Date	Tip Depth	RZ Top	RZ Base	Type	25-03-13		23.00	3.40	2.85	Water level recorded at end of borehole	

ISGL RC P: 10M; 16695.GPJ; 16695.GDT; 10/25/13



GEOTECHNICAL CORE LOG RECORD

REPORT NUMBER

16695

CONTRACT Greater Dublin Drainage Scheme		DRILLHOLE NO RC15
CO-ORDINATES 313,067.51 E 247,660.39 N		SHEET Sheet 4 of 4
GROUND LEVEL (mOD) 78.49		DATE DRILLED 21/03/2013
CLIENT Fingal County Council		DATE LOGGED 25/03/2013
ENGINEER		DRILLED BY M. Newland
RIG TYPE Casagrande Cb		LOGGED BY JL
FLUSH Air/Mist		
INCLINATION (deg) -90		
CORE DIAMETER (mm) 90		

Downhole Depth (m)	Core Run Depth (m)	T.C.R. %	S.C.R. %	R.Q.D. %	Fracture Spacing Log (mm)	Non-intact Zone	Legend	Description	Depth (m)	Elevation	Standpipe Details	SPT (N Value)
30								gravel-sized fragments of strong argillaceous limestone End of Borehole at 23.00 m				
31												
32												
33												
34												
35												
36												
37												
38												
39												
40												

REMARKS Hole cased 0.00-3.40m						WATER STRIKE DETAILS					
						Water Strike	Casing Depth	Sealed At	Rise To	Time (min)	Comments
						3.50					
INSTALLATION DETAILS						GROUNDWATER DETAILS					
						Date	Hole Depth	Casing Depth	Depth to Water	Comments	
Date	Tip Depth	RZ Top	RZ Base	Type							

ISBL RC P1 10M 16695.DPJ - ISBL.GDT 15/03/13



GEOTECHNICAL CORE LOG RECORD

REPORT NUMBER

16695

CONTRACT Greater Dublin Drainage Scheme		DRILLHOLE NO RC17
CO-ORDINATES 315,274.53 E 251,201.85 N		SHEET Sheet 1 of 2
GROUND LEVEL (mOD) 23.43	RIG TYPE Casagrande C	DATE DRILLED 27/03/2013
CLIENT Fingal County Council	FLUSH Air/Mist	DATE LOGGED 02/04/2013
ENGINEER	INCLINATION (deg) -90	DRILLED BY M. Newland
	CORE DIAMETER (mm) 80	LOGGED BY JL

Downhole Depth (m)	Core Run Depth (m)	T.C.R. %	S.C.R. %	R.O.D. %	Fracture Spacing Log (mm)	Non-intact Zone	Legend	Description	Depth (m)	Elevation	Standpipe Details	SPT (N Value)
0								Cased down Shell & Auger Hole				
3.00								Driller Reports Stiff black CLAY with cobbles. Cobbles are subangular to subrounded of arenaceous limestone	3.00	20.43		
4.00		10	0	0								
4.50								Highly Weathered Rockhead recovered as angular to subangular gravel- and cobble-sized fragments of Medium strong to very weak black and grey argillaceous LIMESTONE with subordinate black MUDSTONE. Frequent cobble-sized pockets of firm black gravelly clay (Poor Recovery). Weathering: Recovery completely non-intact. Rare orange-brown surface discolouration on cobble-sized fragments of argillaceous limestone. (8.0 - 8.10m)	4.50	18.93		N = 50/0 mm (0, 15, 50)
5.00		90	0	0				Discontinuities 4.50-13.0m Core recovered non intact				N = 50/10 mm (17, 6, 50)
7.50		100	0	0								N = 50/0 mm (18, 7, 50)
8.00		58	0	0								
9.00		50	0	0								
9.50												N = 50/0 mm (20, 50)

REMARKS Hole cased 0.00-12.00m	WATER STRIKE DETAILS					
	Water Strike	Casing Depth	Sealed At	Rise To	Time (min)	Comments
	1.20					

INSTALLATION DETAILS					GROUNDWATER DETAILS				
Date	Tip Depth	RZ Top	RZ Base	Type	Date	Hole Depth	Casing Depth	Depth to Water	Comments
27-03-13					27-03-13	3.10		1.20	Water level recorded in open cable tool one bore
28-03-13					28-03-13	7.50	7.50	5.50	Water level recorded at end of shift
						7.50	7.50	0.20	Water level recorded at start of shift

IGS: RC F 10M 16695.GPJ 10.8L.GDT 19/3/13



GEOTECHNICAL CORE LOG RECORD

REPORT NUMBER

16695

CONTRACT Greater Dublin Drainage Scheme		DRILLHOLE NO RC17
CO-ORDINATES 315,274.53 E 251,201.85 N		SHEET Sheet 2 of 2
GROUND LEVEL (mOD) 23.43	RIG TYPE Casagrande CB FLUSH Air/Mist	DATE DRILLED 27/03/2013 DATE LOGGED 02/04/2013
CLIENT Fingal County Council ENGINEER	INCLINATION (deg) -90 CORE DIAMETER (mm) 90	DRILLED BY M. Newland LOGGED BY JL

Downhole Depth (m)	Core Run Depth (m)	T.C.R.%	S.C.R.%	R.O.D.%	Fracture Spacing Log (mm)	Non-Intact Zone	Legend	Description	Depth (m)	Elevation	Standpipe Details	SPT (N Value)
10	30	0	0	0				Highly Weathered Rockhead recovered as angular to subangular gravel- and cobble-sized fragments of Medium strong to very weak black and grey argillaceous LIMESTONE with subordinate black MUDSTONE. Frequent cobble-sized pockets of firm black gravelly clay (Poor Recovery). Weathering: Recovery completely non-intact. Rare orange brown surface discoloration on cobble-sized fragments of argillaceous limestone. (8.0 - 8.10m)				N = 50/0 mm (16, 9, 60)
10.50												
11.00	100	0	0	0								
11	50	0	0	0								
12							Discontinuities 4.50-13.0m Core recovered non intact (continued)					
12.50	50	0	0	0								
13	100	0	0	0					13.00	10.43		
13.70	100	56	47				Medium strong dark grey and black very thin to thinly bedded fine grained argillaceous LIMESTONE with closely to medium spaced very thin weak MUDSTONE bands and occasional firm black clay often associated with brecciated limestone material (13.10-13.26, 13.45-13.61m & 14.44-14.75m). Weathering: Mudstone bands display occasional loss of wall strength to very weak.					
14	62	58	19									
15							Discontinuities 13.0-15.0m 0-10" very closely to closely spaced smooth planar occasionally associated with angular non intact gravel-sized fragments of argillaceous limestone and mudstone, partly open, with occasional black clay smear (<2mm)	15.00	8.43			
End of Borehole at 15.00 m												

REMARKS Hole cased 0.00-12.00m						WATER STRIKE DETAILS					
						Water Strike	Casing Depth	Sealed At	Rise To	Time (min)	Comments
						1.20					
INSTALLATION DETAILS						GROUNDWATER DETAILS					
						Date	Hole Depth	Casing Depth	Depth to Water	Comments	
Date	Tip Depth	RZ Top	RZ Base	Type							
28-03-13	13.00	12.00	9.00		Water level recorded at end of shift						
02-04-13	13.00	12.00	2.00		Water level recorded at start of shift						
02-04-13	15.00	12.00	9.00		Water level recorded at end of borehole						

IBSL RC F1 10M 16695.DPJ 10.05.13 10/03/13



GEOTECHNICAL CORE LOG RECORD

REPORT NUMBER

16695

CONTRACT Greater Dublin Drainage Scheme		DRILLHOLE NO RC19
CO-ORDINATES 320,704.27 E 255,488.62 N		SHEET Sheet 1 of 3
GROUND LEVEL (mOD) 34.01	RIG TYPE Knebel	DATE DRILLED 28/02/2013
CLIENT Fingal County Council	FLUSH Air/Mist	DATE LOGGED 01/03/2013
ENGINEER	INCLINATION (deg) -90	DRILLED BY Petersen
	CORE DIAMETER (mm)	LOGGED BY D. O'Shea

Downhole Depth (m)	Core Run Depth (m)	T.C.R.%	S.C.R.%	R.Q.D.%	Fracture Spacing Log (mm)	Non-intact Zone	Legend	Description	Depth (m)	Elevation	Standpipe Details	SPT (N Value)
0					0 100 500			Cased down Shell & Auger Hole				
3.80								SYMMETRIX DRILLING: No recovery, observed by driller as returns of madeground consisting of Shell & Auger Fill	3.80	30.21		
9.70									9.70	24.31		

REMARKS Hole cased 0.00-20.00m						WATER STRIKE DETAILS					
						Water Strike	Casing Depth	Sealed At	Rise To	Time (min)	Comments
						No water strike recorded					
INSTALLATION DETAILS						GROUNDWATER DETAILS					
						Date	Hole Depth	Casing Depth	Depth to Water	Comments	
Date	Tip Depth	RZ Top	RZ Base	Type							

IGSE, RC 19, 16695, GPH, 1031, 001, 10/01/13



GEOTECHNICAL CORE LOG RECORD

REPORT NUMBER

16695

CONTRACT Greater Dublin Drainage Scheme		DRILLHOLE NO RC19
CO-ORDINATES 320,704.27 E 256,469.62 N		SHEET Sheet 2 of 3
GROUND LEVEL (mOD) 34.01	RIG TYPE Knebel	DATE DRILLED 28/02/2013
	FLUSH Air/Mist	DATE LOGGED 01/03/2013
CLIENT Fingal County Council	INCLINATION (deg) -90	DRILLED BY Petersen
ENGINEER	CORE DIAMETER (mm)	LOGGED BY D. O'Shea

Downhole Depth (m)	Core Run Depth (m)	T.C.R. %	S.C.R. %	R.Q.D. %	Fracture Spacing Log (mm)	Non-intact Zone	Legend	Description	Depth (m)	Elevation	Standpipe Details	SPT (N Value)
10					200 300			SYMMETRIX DRILLING: No recovery, observed by driller as returns of grey sandy very gravelly clay with occasional cobbles and boulders. (continued)				
11									11.80	22.21		N = 50/180 mm (10, 14, 19, 22, 30)
12								SYMMETRIX DRILLING: No recovery, observed by driller as returns of grey sandy gravelly clay with occasional cobbles and boulders.				N = 40 (8, 8, 9, 11, 8, 12)
13									14.10	19.91		N = 50/116 mm (9, 18, 27, 20)
14								SYMMETRIX DRILLING: No recovery, observed by driller as returns of grey very sandy gravelly clay with occasional cobbles and boulders.				N = 75/110 mm (25, 50)
15									17.90	16.11		N = 50/145 mm (18, 8, 23, 27)
16								SYMMETRIX DRILLING: No recovery, observed by driller as returns of brown sandy gravelly clay with occasional cobbles and boulders.				N = 47 (7, 10, 9, 8, 14, 16)
17									18.60	14.41		
18								SYMMETRIX DRILLING: No recovery, observed by driller as returns of brown sandy very gravelly clay with occasional	20.00	14.01		

REMARKS
Hole cased 0.00-20.00m

WATER STRIKE DETAILS					
Water Strike	Casing Depth	Sealed At	Rise To	Time (min)	Comments
					No water strike recorded

INSTALLATION DETAILS				
Date	Tip Depth	RZ Top	RZ Base	Type

GROUNDWATER DETAILS				
Date	Hole Depth	Casing Depth	Depth to Water	Comments

IGS, RC P1, 10M, 10000, 0.00, 10000, 0.00, 10000, 0.00



GEOTECHNICAL CORE LOG RECORD

REPORT NUMBER

16695

CONTRACT Greater Dublin Drainage Scheme		DRILLHOLE NO RC19
CO-ORDINATES 320,704.27 E 255,469.82 N		SHEET Sheet 3 of 3
GROUND LEVEL (mOD) 34.01	RIG TYPE Knebel	DATE DRILLED 28/02/2013
CLIENT Fingal County Council	FLUSH Air/Mist	DATE LOGGED 01/03/2013
ENGINEER	INCLINATION (deg) -90	DRILLED BY Petersen
	CORE DIAMETER (mm)	LOGGED BY D.O'Shea

Downhole Depth (m)	Core Run Depth (m)	T.C.R. %	S.C.R. %	R.Q.D. %	Fracture Spacing Log (mm)	Non-intact Zone	Legend	Description	Depth (m)	Elevation	Standpipe Details	SPT (N Value)
20					0 200 300			cobbles and boulders - possible highly weathered rock. End of Borehole at 20.00 m				
21												
22												
23												
24												
25												
26												
27												
28												
29												
30												

REMARKS Hole cased 0.00-20.00m						WATER STRIKE DETAILS					
						Water Strike	Casing Depth	Sealed At	Rise To	Time (min)	Comments
											No water strike recorded
INSTALLATION DETAILS						GROUNDWATER DETAILS					
						Date	Hole Depth	Casing Depth	Depth to Water	Comments	
Date	Tip Depth	RZ Top	RZ Base	Type							

GSI, 80 Pl. 100, 16695.GPJ 1031, 01/03/13



GEOTECHNICAL CORE LOG RECORD

REPORT NUMBER

16695

CONTRACT Greater Dublin Drainage Scheme		DRILLHOLE NO RC20
CO-ORDINATES 324,487.08 E 257,266.58 N		SHEET Sheet 1 of 3
GROUND LEVEL (mOD) 54.06	RIG TYPE Knebel	DATE DRILLED 11/03/2013
	FLUSH Air/Mist	DATE LOGGED 11/03/2013
CLIENT Fingal County Council	INCLINATION (deg) -90	DRILLED BY Petersen
ENGINEER	CORE DIAMETER (mm) 82	LOGGED BY JL

Downhole Depth (m)	Core Run Depth (m)	T.C.R. %	S.C.R. %	R.Q.D. %	Fracture Spacing Log (mm)	Non-intact Zone	Legend	Description	Depth (m)	Elevation	Standpipe Details	SPT (N Value)
0 1 2 3 4 5 6 7 8 9					0 250 500			Cased down Shell & Auger Hole				
								SYMMETRIX DRILLING: No recovery, observed by driller as returns of Shell & Auger Fill	6.50	47.56		

REMARKS Hole cased 0.00-17.0m						WATER STRIKE DETAILS						
						Water Strike	Casing Depth	Sealed At	Rise To	Time (min)	Comments	
						13.20						
INSTALLATION DETAILS						GROUNDWATER DETAILS						
						Date	Hole Depth	Casing Depth	Depth to Water	Comments		
Date	Tip Depth	RZ Top	RZ Base	Type								

KSSL RC F: 10M: 16695.OPJ (03SL) 10/03/13



GEOTECHNICAL CORE LOG RECORD

REPORT NUMBER

16695

CONTRACT Greater Dublin Drainage Scheme		DRILLHOLE NO RC20
CO-ORDINATES 324,487.08 E 257,266.58 N		SHEET Sheet 2 of 3
GROUND LEVEL (mOD) 54.06	RIG TYPE Knobel	DATE DRILLED 11/03/2013
CLIENT Fingal County Council	FLUSH Air/Mist	DATE LOGGED 11/03/2013
ENGINEER	INCLINATION (deg) -90	DRILLED BY Peteran
	CORE DIAMETER (mm) 82	LOGGED BY JL

Downhole Depth (m)	Core Run Depth (m)	T.C.R. %	S.C.R. %	R.Q.D. %	Fracture Spacing Log (mm)	Non-Intact Zone	Legend	Description	Depth (m)	Elevation	Standpipe Details	SPT (N Value)
10								SYMMETRIX DRILLING: No recovery, observed by driller as returns of stiff grey gravelly boulder clay	10.20	43.85		
11												N = 50/125 mm (8, 16, 24, 28)
12												
13								SYMMETRIX DRILLING: No recovery, observed by driller as returns of brown very sandy gravelly boulder clay	12.80	41.26		N = 29 (3, 7, 7, 10, 6, 6)
14												
15								SYMMETRIX DRILLING: No recovery, observed by driller as returns of stiff grey gravelly boulder clay	14.00	40.06		N = 50/110 mm (11, 14, 15, 18, 17)
16												
17								SYMMETRIX DRILLING: No recovery, observed by driller as returns of black heavily fractured rock / Possible fault breccia.	16.10	37.96		N = 50/125 mm (25, 28, 21)
18	18.50	7	0	0				Medium strong dark grey argillaceous LIMESTONE with occasional gravel-sized pocket of firm black clay recovered as angular to subangular medium to coarse gravel-sized fragments. Weathering: Negligible.	17.00	37.06		
19	19.90	15	0	0				Discontinuities 17.0-21.20m Difficult to discern given non-intact nature	19.80	34.26		

REMARKS

Hole cased 0.00-17.0m

WATER STRIKE DETAILS					
Water Strike	Casing Depth	Sealed At	Rise To	Time (min)	Comments
13.20					

INSTALLATION DETAILS

Date	Tip Depth	RZ Top	RZ Base	Type

GROUNDWATER DETAILS				
Date	Hole Depth	Casing Depth	Depth to Water	Comments

1088L RC PI 10M 16695 GNG 005L.DOT 15/03/13



GEOTECHNICAL CORE LOG RECORD

REPORT NUMBER

16695

CONTRACT Greater Dublin Drainage Scheme		DRILLHOLE NO RC20
CO-ORDINATES 324,487.08 E 257,266.58 N		SHEET Sheet 3 of 3
GROUND LEVEL (mOD) 54.06	RIG TYPE Knobel	DATE DRILLED 11/03/2013
CLIENT Fingal County Council	FLUSH Air/Mist	DATE LOGGED 11/03/2013
ENGINEER	INCLINATION (deg) -60	DRILLED BY Petersen
	CORE DIAMETER (mm) 82	LOGGED BY JL

Downhole Depth (m)	Core Run Depth (m)	T.C.R.%	S.C.R.%	R.Q.D.%	Fracture Spacing Log (mm)	Non-Intact Zone	Legend	Description	Depth (m)	Elevation	Standpipe Details	SPT (N Value)
20		30	0	0				Medium strong dark grey brecciated argillaceous LIMESTONE with multiple very closely spaced incipient fractures and much firm black clay. Frequent very thin hair-line calcite veins associated with brecciation. (continued)	20.70	33.36		
20.70												
21		0	0	0				No Recovery	21.20	32.86		
End of Borehole at 21.20 m												

REMARKS Hole cased 0.00-17.0m						WATER STRIKE DETAILS					
						Water Strike	Casing Depth	Sealed At	Rise To	Time (min)	Comments
						13.20					
INSTALLATION DETAILS						GROUNDWATER DETAILS					
						Date	Hole Depth	Casing Depth	Depth to Water	Comments	
Date	Tip Depth	RZ Top	RZ Base	Type							

GSI, NC P: 10M, 16695.GPJ, 16695.GDT, 10/03/13

Appendix G

**Saucerrstown to Southern
Outfall - Site Plan and Logs**

G1

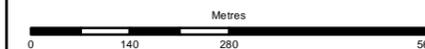


Legend

- Sites
- BH + RF
- Amended Pipeline
- Previous Pipeline
- GeoPhysics
- Pipe Corridor

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P1	12-04-12	DF	BA	SM
Issue	Date	By	Chkd	Appd



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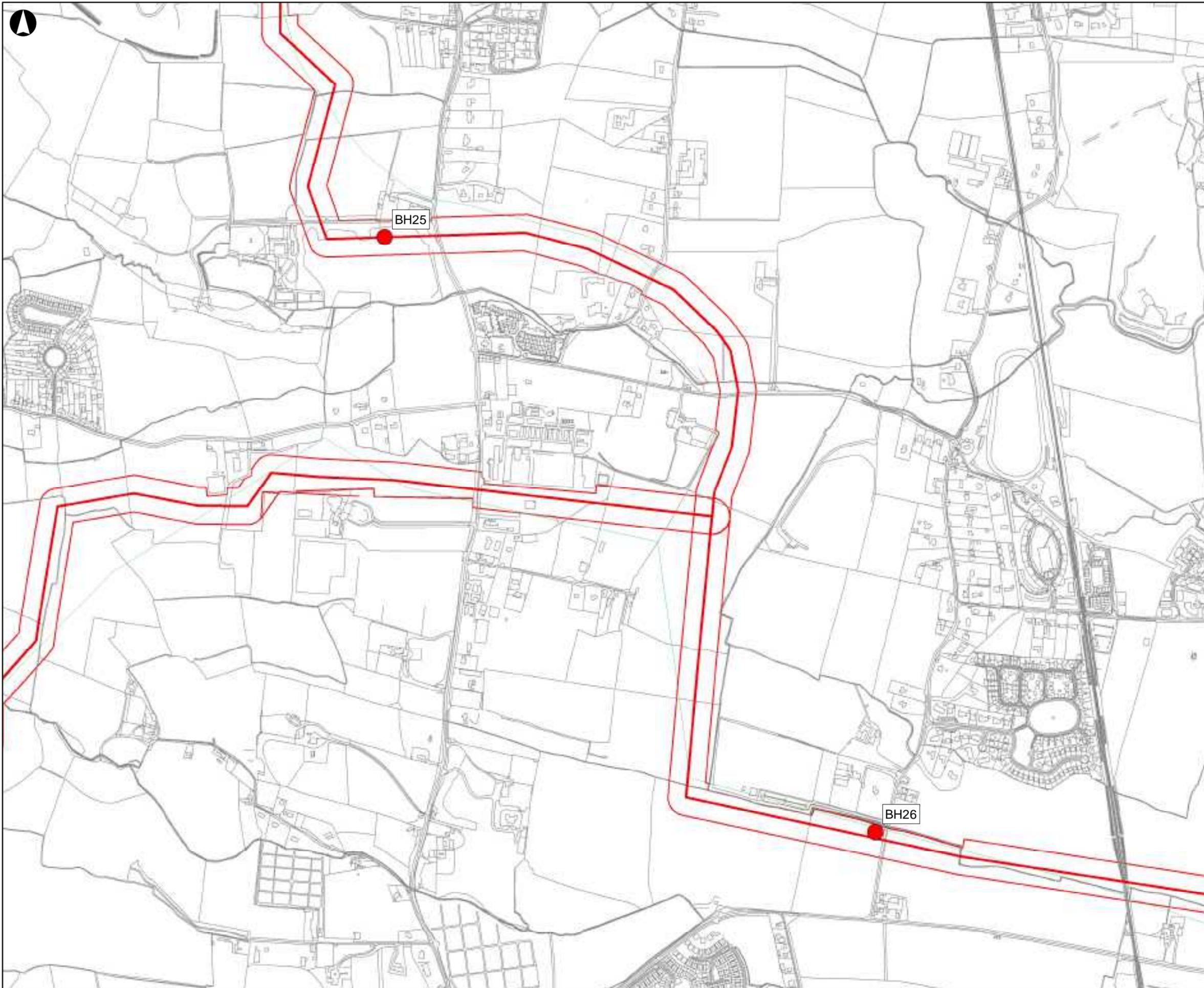
Client
Fingal County Council

Job Title
Dublin Greater Drainage Scheme



Scale at A3
1:10,000

Job No 218525-00	Drawing Status For Information
Drawing No G-012	Issue P1

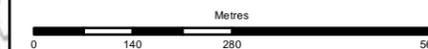


Legend

- Sites
- BH + RF
- Amended Pipeline
- Previous Pipeline
- GeoPhysics
- Pipe Corridor

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P1	12-04-12	DF	BA	SM
Issue	Date	By	Chkd	Appd

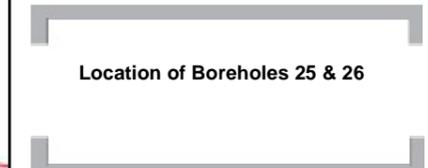


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Fingal County Council

Job Title
Dublin Greater Drainage Scheme



Scale at A3
1:10,000

Job No 218525-00	Drawing Status For Information
Drawing No G-013	Issue P1



GEOTECHNICAL BORING RECORD

REPORT NUMBER

16695

CONTRACT Greater Dublin Drainage Scheme		BOREHOLE NO. BH24	
CO-ORDINATES 317,057.22 E 249,126.22 N		SHEET Sheet 1 of 1	
GROUND LEVEL (m AOD) 10.76		DATE COMMENCED 26/02/2013	
CLIENT Fingal County Council		DATE COMPLETED 26/02/2013	
ENGINEER		SPT HAMMER REF. NO. SPT6	
		ENERGY RATIO (%) 55	
		BORED BY WC	
		PROCESSED BY JL	

Depth (m)	Description	Legend	Elevation	Depth (m)	Samples				Field Test Results	Standpipe Details
					Ref. Number	Sample Type	Depth (m)	Recovery		
0	Soft becoming firm dark brown sandy gravelly CLAY									
1					AN8506	B	1.00-1.40		N = 7 (1, 2, 2, 2, 1, 2)	
2	Loose to medium dense grey silty sandy GRAVEL Firm dark grey very sandy gravelly CLAY		8.76 8.66	2.00 2.10	AN8508	B	2.00-2.40		N = 11 (2, 3, 3, 3, 2, 3)	
3	Medium dense clayey/silty sandy subangular to subrounded fine to coarse GRAVEL. Sand is coarse.		7.66	2.80						
3	Firm black silty gravelly CLAY with a low cobble content		7.36	3.40	AN8527	B	3.00-3.40		N = 16 (3, 4, 4, 3, 4, 5)	
4	Medium dense grey slightly clayey/silty sandy subangular to subrounded fine to coarse GRAVEL		6.86	3.90						
4	End of Borehole at 4.20 m		6.56	4.20	AN8508	B	4.00-4.45		N = 5(75 mm) (2, 4, 40, 10)	

HARD STRATA BORING/CHISELLING				WATER STRIKE DETAILS					
From (m)	To (m)	Time (h)	Comments	Water Strike	Casing Depth	Sealed At	Rise To	Time (min)	Comments
2.6	2.9	0.5		2.40	2.40	3.40	1.80	20	Slow
3.9	4.2	1.5		3.90	3.90		3.00	20	Moderate

INSTALLATION DETAILS					GROUNDWATER PROGRESS				
Date	Tip Depth	RZ Top	RZ Base	Type	Date	Hole Depth	Casing Depth	Depth to Water	Comments

REMARKS	Sample Legend D - Small Disturbed Soil S - Bulk Disturbed LB - Large Bulk Disturbed E - Environmental Sample (see 104 & 105) U - Undisturbed 150mm Diameter Sample P - Undisturbed Piston Sample W - Water Sample
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M.S. BY LCG 19/04/13 G.S. GOT 17/5/13



GEOTECHNICAL BORING RECORD

REPORT NUMBER

16695

CONTRACT Greater Dublin Drainage Scheme		BOREHOLE NO. BH25
CO-ORDINATES 320,983.84 E 243,516.89 N	RIG TYPE Dando 2000	SHEET Sheet 1 of 1
GROUND LEVEL (m AOD) 17.69	BOREHOLE DIAMETER (mm) 200	DATE COMMENCED 08/02/2013
	BOREHOLE DEPTH (m) 10.00	DATE COMPLETED 08/02/2013
CLIENT Fingal County Council	SPT HAMMER REF. NO. SPT8	BORED BY WC
ENGINEER	ENERGY RATIO (%) 55	PROCESSED BY JL

Depth (m)	Description	Legend	Elevation	Depth (m)	Samples				Field Test Results	Standpipe Details
					Ref. Number	Sample Type	Depth (m)	Recovery		
0	Firm light brown slightly sandy gravelly CLAY with a low to medium cobble content				AN2852	B	1.00-1.65		N = 11 (2, 2, 1, 2, 2, 2)	
AN2853					B	2.00-2.48		N = 12 (2, 3, 3, 2, 1, 4)		
AN2854					B	3.00-3.45		N = 12 (3, 3, 4, 4, 2, 2)		
AN2855					B	4.00-4.45		N = 17 (3, 4, 4, 5, 4, 4)		
AN2856					B	5.00-5.45		N = 25 (4, 6, 5, 3, 5, 6)		
AN2857					B	6.50-6.95		N = 47(17) mm (3, 3, 4, 12, 31)		
7	Dense light brown sandy GRAVEL. Sand is coarse. Gravel is subangular to subrounded fine to medium of limestone.		10.09	6.80						
7	Very stiff to hard dark brown slightly sandy slightly gravelly CLAY									
10.39					7.30					
AN2858					B	8.00-8.45		N = 50(16) mm (5, 14, 18, 18, 15)		
9					AN2859	B	9.50-9.95		N = 50(16) mm (4, 12, 16, 21, 11)	

HARD STRATA BORING CORRELLING				WATER STRIKE DETAILS					
From (m)	To (m)	Time (h)	Comments	Water Strike	Casing Depth	Sealed At	Rise To	Time (min)	Comments
2.75	2.85	0.5		6.80	6.80	7.30	6.20	20	Slow
4.65	4.85	0.75							
6.8	7.2	1.5							

INSTALLATION DETAILS					GROUNDWATER PROGRESS				
Date	Tip Depth	RZ Top	RZ Base	Type	Date	Hole Depth	Casing Depth	Depth to Water	Comments

REMARKS Borehole terminated at required depth

Sample Legend
 D - Small Disturbed Full
 B - Bulk Disturbed
 LB - Large Bulk Disturbed
 Etc. - Environmental Samples (pH, etc.)
 U - Undisturbed 150mm Diameter Sample
 P - Undisturbed 100mm Sample
 W - Water Sample

GSI, BH LOG, 16695.GPJ, GSI, GDT, 1/18/13



GEOTECHNICAL BORING RECORD

REPORT NUMBER

16695

CONTRACT Greater Dublin Drainage Scheme		BOREHOLE NO. BH26
CO-ORDINATES 322,403.33 E 241,809.63 N		SHEET Sheet 1 of 1
GROUND LEVEL (m AOD) 12.80	RIG TYPE Dando 2000	DATE COMMENCED 02/03/2013
	BOREHOLE DIAMETER (mm) 200	DATE COMPLETED 02/03/2013
CLIENT Fingal County Council	SPT HAMMER REF. NO. SPT8	BORED BY WC
ENGINEER	ENERGY RATIO (%) 55	PROCESSED BY JL

Depth (m)	Description	Legend	Elevation	Depth (m)	Samples				Field Test Results	Standpipe Details
					Ref. Number	Sample Type	Depth (m)	Recovery		
0	Soft becoming firm dark brown to grey brown slightly sandy slightly gravelly CLAY		9.70	2.50	AN8517	B	1.00-1.45		N = 9 (2, 2, 2, 3, 2, 2)	
					AN8518	B	2.00-2.45		N = 9 (3, 3, 2, 2, 2, 3)	
3	Firm to stiff black slightly sandy slightly gravelly CLAY with a low to medium cobble content		5.70	2.50	AN8519	B	3.00-3.45		N = 10 (3, 4, 4, 3, 4, 4)	
					AN8520	B	4.00-4.45		N = 20 (5, 5, 5, 4, 5, 6)	
					AN8521	B	5.00-5.45		N = 20 (5, 6, 5, 7, 5, 6)	
					AN8522	B	6.50-6.95		N = 37 (6, 7, 6, 6, 10, 11)	
7	Stiff to very stiff dark brown sandy slightly gravelly CLAY with a low to medium cobble content		5.70	5.90					N = 41 (8, 2, 9, 10, 11, 11)	
					AN8523	B	6.00-6.45			
8					AN8524	B	8.50-9.95		N = 49/265 mm (7, 12, 12, 13, 13, 11)	
10			2.60	10.00						

HARD STRATA BORING CORRELLING				WATER STRIKE DETAILS					
From (m)	To (m)	Time (h)	Comments	Water Strike	Casing Depth	Sealed At	Rise To	Time (min)	Comments
3.55	3.8	0.75							No water strike
5.7	5.9	0.5							
8	8.3	0.75							

INSTALLATION DETAILS					GROUNDWATER PROGRESS				
Date	Tip Depth	RZ Top	RZ Base	Type	Date	Hole Depth	Casing Depth	Depth to Water	Comments

REMARKS Borehole terminated at required depth

Sample Legend
 D - Soil Disturbed (Dry)
 S - Soil Disturbed
 LB - Large Bulk Disturbed
 ETC - Unconsolidated Sample (see + Vol + Test)

U - Undisturbed 100mm Diameter Sample
 P - Undisturbed Plastic Sample
 W - Water Sample

ICSL BH LOG 16695.GPJ 438L 007 13/13/13



GEOTECHNICAL CORE LOG RECORD

REPORT NUMBER

16695

CONTRACT Greater Dublin Drainage Scheme		DRILLHOLE NO RC24
CO-ORDINATES 317,067.22 E 249,126.22 N		SHEET Sheet 1 of 2
GROUND LEVEL (mOD) 10.76	RIG TYPE Casagrande CB	DATE DRILLED 02/04/2013
CLIENT Fingal County Council	FLUSH Air/Mist	DATE LOGGED 03/04/2013
ENGINEER	INCLINATION (deg) -90	DRILLED BY M. Newland
	CORE DIAMETER (mm) 90	LOGGED BY JL

Downhole Depth (m)	Core Run Depth (m)	T.C.R.%	S.C.R.%	R.Q.D.%	Fracture Spacing Log (mm)	Non-intact Zone	Legend	Description	Depth (m)	Elevation	Standpipe Details	SPT (N Value)
0								Cased down Shell & Auger Hole				
4.20								SYMMETRIX DRILLING: No recovery	4.20	6.56		
5.40	100	100	28					Strong grey and dark grey thin to medium bedded slightly fossiliferous fine grained argillaceous LIMESTONE with occasional thin calcite veins (<1mm) and rarely plastically sheared matrix. Weathering: Negligible	5.00	5.70		
6.50	100	100	100					Discontinuities 5.0-10.10m 5-20" closely to widely spaced predominantly medium spaced smooth undulating, tight to moderately open, clean				
7.45	100	98	85									
8.75	100	100	100									
10.00									10.00	0.75		

REMARKS

Hole cased 0.00-5.00m

WATER STRIKE DETAILS

Water Strike	Casing Depth	Sealed At	Rise To	Time (min)	Comments
2.80					

GROUNDWATER DETAILS

INSTALLATION DETAILS

Date	Tip Depth	RZ Top	RZ Base	Type
02-04-13	7.45			
03-04-13	7.45			

Date	Hole Depth	Casing Depth	Depth to Water	Comments
02-04-13	7.45	5.00	2.50	Water level recorded at end of shift
03-04-13	7.45	5.00	0.50	Water level recorded at start of shift

KCSL RC F 10M 16695.DPJ 1025L.DPT 10/01/13



GEOTECHNICAL CORE LOG RECORD

REPORT NUMBER

16695

CONTRACT Greater Dublin Drainage Scheme		DRILLHOLE NO RC24
CO-ORDINATES 317,067.22 E 249,126.22 N		SHEET Sheet 2 of 2
GROUND LEVEL (mOD) 10.76	RIG TYPE Casagrande C	DATE DRILLED 02/04/2013
CLIENT Fingal County Council	FLUSH Air/Mist	DATE LOGGED 03/04/2013
ENGINEER	INCLINATION (deg) -90	DRILLED BY M. Newland
	CORE DIAMETER (mm) 90	LOGGED BY JL

Downhole Depth (m)	Core Run Depth (m)	T.C.R.%	S.C.R.%	R.Q.D.%	Fracture Spacing Log (mm)	Non-intact Zone	Legend	Description	Depth (m)	Elevation	Sample Details	SPT (N Value)
10.10	10.10				0 250 500			End of Borehole at 10.10 m				
11												
12												
13												
14												
15												
16												
17												
18												
19												

REMARKS Hole cased 0.00-5.00m					WATER STRIKE DETAILS						
					Water Strike	Casing Depth	Sealed At	Rise To	Time (min)	Comments	
					2.80						
INSTALLATION DETAILS					GROUNDWATER DETAILS						
					Date	Hole Depth	Casing Depth	Depth to Water	Comments		
Date	Tip Depth	RZ Top	RZ Base	Type	03-04-13	10.10	5.03	1.70	Water level recorded at end of borehole		

KGSJ, RC P: 10M, 16695.GPJ, 16SLJ.DJT, 10/03/13