Table 4.3 continued Fill Material WAC Dublin Centre 2008

	Sample I.D.	BH-8	W-2	W-2	EU Limits for Inert	EU Limits for
Parameter	Depth (m)	1.0-2.0	0.5-1	1.0-2.0	Landfill	Non-Hazardous
	Unit	1.0-2.0			Landilli	Landfill
Arsenic	mg/kg	< 0.5	< 0.5	< 0.5	0.5	2
Barium	mg/kg	0.25	0.24	0.18	20	100
Cadmium	mg/kg	< 0.001	< 0.001	< 0.001	0.04	1
Chromium	mg/kg	<1	0.21	<1	0.5	10
Copper	mg/kg	<1	0.34	<1	2	50
Mercury	mg/kg	< 0.003	< 0.003	< 0.003	0.01	0.2
Molybdenum	mg/kg	0.095	0.066	0.081	0.5	10
Nickel	mg/kg	<1	0.13	<1	0.4	10
Lead	mg/kg	<1	0.43	<1	0.5	10
Antimony	mg/kg	< 0.3	0.36	< 0.3	0.06	0.7
Selenium	mg/kg	< 0.06	< 0.06	< 0.06	0.1	0.5
Zinc	mg/kg	<1	0.11	<1	4	50
Chloride	mg/kg	58	27	140	800	15000
Fluoride	mg/kg	<2	4.1	<2	10	150
Sulphate	mg/kg	14000	440	1600	1,000	20000
Phenols	mg/kg	< 0.5	< 0.5	< 0.5	1	
Dissolved Organic Carbon	mg/kg	73	45	60	500	800
Total Dissolved Solids	mg/kg	24000	2100	4200	4000	60000
Total Organic Carbon	%	3	5.6	5.4	3.33%	PART OF THE
BTEX	mg/kg	< 0.5	< 0.5	< 0.5	6	2 70
PCBs	mg/kg	< 0.01	< 0.01	< 0.01	1	
Mineral Oil	mg/kg	1800	150	5000	500	
PAH (16)	mg/kg	272	228.5	566		
PAH (17).	mg/kg	280	230	570	Murphy's 100mg/kg	

\*If DOC is less than 500 then a higher limit can be accepted
\*\* Limit is for Mineral Oil

Table 4.4 Natural Ground WAC Dublin Centre 2008

	Sample I.D.	BH-7	BH-7	BH-9	BH-12	EUI imite for Inset	EU Limits for
Parameter	Depth (m) Unit	4-5 m	13-14 m	4-5 m	4-5 m	EU Limits for Inert Landfill	Non-Hazardous Landfill
Arsenic	mg/kg	< 0.50	< 0.5	< 0.50	< 0.50	0.5	2
Barium	mg/kg	0.084	0.14	0.076	0.068	20	100
Cadmium	mg/kg	< 0.001	< 0.001	< 0.001	< 0.001	0.04	1
Chromium	mg/kg	< 0.10	< 0.1	< 0.10	< 0.10	0.5	10
Copper	mg/kg	< 0.10	< 0.1	< 0.10	< 0.10	2	50
Mercury	mg/kg	0.012	0.0038	0.0078	< 0.003	0.01	0.2
Molybdenum	mg/kg	< 0.03	0.085	0.056	0.2	0.5	10
Nickel	mg/kg	< 0.10	< 0.1	< 0.10	< 0.10	0.4	10
Lead	mg/kg	< 0.10	< 0.1	< 0.10	< 0.10	0.5	10
Antimony	mg/kg	< 0.30	< 0.3	< 0.30	< 0.30	0.06	0.7
Selenium	mg/kg	< 0.060	< 0.06	< 0.060	< 0.060	0.1	0.5
Zinc	mg/kg	< 0.10	< 0.1	< 0.10	< 0.10	4	50
Chloride	mg/kg	<25	71	<25	<25	800	15000
Fluoride	mg/kg	3	4.2	2.7	2.9	10	150
Sulphate	mg/kg	<110	<110	<110	<110	1,000	20000
Phenols	mg/kg	< 0.50	< 0.5	< 0.50	< 0.50	1	
Dissolved Organic Carbon	mg/kg	13	39	14	19	500	800
Total Dissolved Solids	mg/kg	<2000	<2000	<2000	<2000	4000	60000
Total Organic Carbon	%	3.1	0.52	2.8	2.4	3%*	Parla Valley
BTEX	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5	6	
PCBs	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	1	
TPH	mg/kg	<50	<50	<50	57	500**	The Name of the
PAH (16)	mg/kg	<1.0	<1.0	<1.0	<1.0		
PAH (17).	mg/kg	<1.0	<1.0	<1.0	<1.0	Murphy's 100mg/kg	

\*If DOC is less than 500 then a higher limit can be accepted
\*\* Limit is for Mineral Oil

Table 4.4 continued Natural Ground WAC Dublin Centre 2008

Parameter	Sample I.D. Depth (m) Unit	BH-12 8-10m	BH-14 3-4m	BH-14 8-10m	BH-15 12.0-13.0	EU Limits for Inert Landfill	EU Limits for Non-Hazardous Landfill
Arsenic	mg/kg	< 0.50	< 0.50	< 0.50	<0.5	0.5	2
Barium	mg/kg	0.17	0.046	0.27	0.17	20	100
Cadmium	mg/kg	< 0.001	< 0.001	< 0.001	< 0.001	0.04	1
Chromium	mg/kg	< 0.10	< 0.10	< 0.10	<0.1	0.5	10
Copper	mg/kg	< 0.10	< 0.10	< 0.10	0.15	2	50
Mercury	mg/kg	0.0047	0.0039	0.0036	< 0.003	0.01	0.2
Molybdenum	mg/kg	0.1	0.18	0.15	0.046	0.5	10
Nickel	mg/kg	< 0.10	< 0.10	< 0.10	0.14	0.4	10
Lead	mg/kg	< 0.10	< 0.10	< 0.10	0.41	0.5	10
Antimony	mg/kg	< 0.30	< 0.30	< 0.30	<0.3	0.06	0.7
Selenium	mg/kg	0.079	< 0.060	< 0.060	< 0.06	0.1	0.5
Zinc	mg/kg	0.19	< 0.10	< 0.10	< 0.1	4	50
Chloride	mg/kg	41	<25	35	100	800	15000
Fluoride	mg/kg	2.7	2.3	2.4	4.7	10	150
Sulphate	mg/kg	250	<110	420	130	1,000	20000
Phenols	mg/kg	< 0.50	< 0.50	< 0.50	< 0.5	1	-
Dissolved Organic Carbon	mg/kg	19	27	23	37	500	800
Total Dissolved Solids	mg/kg	<2000	<2000	<2000	<2000	4000	60000
Total Organic Carbon	%	1.4	3.5	1.4	0.34	3%*	
BTEX	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5	6	
PCBs	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	1	
TPH	mg/kg	<50	<50	<50	<50	500**	
PAH (16)	mg/kg	<1.0	<1.0	<1.0	<1.0		Annual Carlo
PAH (17).	mg/kg	<1.0	<1.0	<1.0	<1.0	Murphy's 100mg/kg	

\*If DOC is less than 500 then a higher limit can be accepted
\*\* Limit is for Mineral Oil

## 4.4 Groundwater

Samples were collected from four groundwater monitoring wells, OW-1 Subsoils (OW-1 S) and OW-1 Bedrock (OW-1 B) and RC-16 Subsoils (RC-16 S) and RC-16 Bedrock (RC-16 B). The samples were collected in accordance with OCM's Groundwater Sampling Protocol, a copy of which is included in Appendix 5.

All the samples were sent to the STL laboratory in Santry for analysis. The range of parameters tested was based on the nature of the historical site activities and included dissolved metals (arsenic, antimony, barium, cadmium, chromium, copper, iron, lead, manganese, mercury, nickel, tin and zinc.), sodium, chloride, potassium, magnesium, sulphate, sulphide, total hardness, bicarbonate, TPH, BTEX and PAH.

The laboratory test report is included in Appendix 5 and the results are shown in Table 4.5. The results are compared for discussion purposes with the EPA Interim Guideline Values (IGVs). The IGVs are not statutory guidelines but have been prepared by the EPA to assist in the assessment of impacts on groundwater quality.

TPH was only detected in one well-RC-16- at a level of 8 mg/l, which is above the IGV of 0.01 mg/l. Iron, manganese and potassium exceeded their respective IGVs in both the subsoil and bedrock samples from RC -16. Barium, sodium and copper exceeded the IGV in the bedrock sample from RC-16 and PAH exceeded the IGV in the bedrock sample from RC-16.

PAHs exceeded the IGV in the subsoil and bedrock samples from RC-16 Subsoil and the bedrock sample in OW-1.

Chloride exceeded the IGV of 30 mg/l in both subsoil and bedrock samples from RC-16 and OW-1. The sulphate level in the bedrock sample marginally exceeded the IGV and hardness also exceeded the IGV in the subsoil sample from OW-1 and both subsoil and bedrock samples from RC-16.

Table 4.5 Groundwater Results Dublin Centre December 2008

Sample I.D.	Units	Subsoi	il Wells	Bedroc	k Wells	IGV
Sample 1.D.	Units	RC-16 Subsoil	OW-1 Subsoil	RC-16 Bedrock	OW-1 Bedrock	IGV
Antimony	mg/l	0.00048	0.00017	0.0023	0.00015	
Arsenic	mg/l	0.0069	< 0.0001	0.0059	< 0.0001	0.01
Barium	mg/l	0.056	0.015	0.12	0.018	0.1
Cadmium	mg/l	< 0.0001	0.00014	0.00024	< 0.0001	0.005
Chromium	mg/l	< 0.03	< 0.03	< 0.03	< 0.03	0.03
Copper	mg/l	0.025	< 0.007	0.096	< 0.007	0.03
Iron	mg/l	0.41	0.045	0.55	0.041	0.2
Lead	mg/l	0.0033	< 0.0005	0.00081	< 0.0005	0.01
Manganese	mg/l	0.17	0.022	0.07	< 0.01	0.05
Mercury	mg/l	< 0.0003	< 0.00030	0.00074	< 0.00030	0.001
Nickel	mg/l	0.006	< 0.0005	0.0039	0.0005	0.02
Tin	mg/l	< 0.01	< 0.01	< 0.01	< 0.01	-
Zinc	mg/l	0.053	< 0.005	0.016	0.005	0.1
Magnesium	mg/l	6.6	8.8	28	8.4	50
Potassium	mg/l	60	11	7.6	10	5
Sodium	mg/l	100	35	680	35	150
Hardness (as CaCO3)	mg/l	100	360	210	360	200
Bicarbonate as CaCO3	mg/l	710	200	350	200	-
Chloride as Cl	mg/l	150	39	860	41	30
Sulphate as SO4	mg/l	<11	150	230	160	200
Sulphide as S	mg/l	0.14	< 0.010	0.011	< 0.010	-
ТРН	mg/l	8	< 0.1	<0.1	< 0.1	0.01
PAH Total (Sum of 16)	μg/l	16	< 0.10	0.25	1.7	0.1
Benzene	μg/l	<10	<10	<10	<10	1
Toluene	μg/l	<10	<10	<10	<10	10
Ethylbenzene	μg/l	<10	<10	<10	<10	10
p & m xylene	μg/l	<20	<20	<20	<20	10
o-Xylene	μg/l	<10	<10	<10	<10	10

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## 5. DISCUSSION

#### 5.1 Discussion

The purpose of environmental site investigation was to establish if there was contamination in the subsoils or groundwater associated with the historical use of the site. It was also undertaken to establish the nature of the fill material and underlying subsoils in terms of off-site management options for such materials that will have to be removed during site development.

The majority of the Dublin Centre area has been in use as shops, offices, stores and houses since the late 1700's. The 2006 assessment concluded that, given the nature of these historic landuses, the potential for subsurface soil or groundwater contamination is considered to be low. However, the assessment identified areas where there was potential for subsurface contamination. These included the Royal Dublin Hotel; car parking area for Dr. Quirke's Emporium; 5-11 Moore Lane, and 4-8 Henry Place.

The environmental investigation, in so far as the ground conditions allowed, targeted those risk areas identified in the 2006 assessment. Boreholes RC-8 and W-2 were installed in 48A-50 O' Connell Street, which had been designated at moderate risk. It is presently used as an unpaved car park and storage area for Dr. Quirke's Emporium.

#### 5.2 Soils

In RC-8 and W-2, the levels of sulphate, total dissolved solids, TPH and PAHs exceeded the inert waste WAC. However all of the levels were less than the non-hazardous WAC.

In BH-12, which was located on the southeast perimeter of the site TPH and mercury were detected above the inert waste WAC in the upper fill sample; however the levels of these parameters in the underlying fill and natural ground were less than the inert WAC.

There was no evidence of significant contamination in any of the other samples and the tested parameters, where detected, are at levels generally below the inert WAC.

## 5.3 Groundwater

TPH and PAHs above the IGV limits were detected in the well installed in the subsoil in RC-16. A strong hydrocarbon odour was noted during sampling. No TPH or PAH was detected in the bedrock well. RC-16 is located immediately to the south and not within the portion of the site where deep excavation will occur. It is possible therefore that the hydrocarbons detected in this well originate from an off-site location and not from within the development site.

Low levels of PAH were detected in the subsoil and bedrock wells at OW-1 in the centre of the site. While the levels detected are above the IGV limits, they are not indicative of significant pollution.

The elevated iron and manganese levels detected in the subsoil and bedrock wells and are most likely naturally occurring. The copper level detected in OW-1, while slightly above the IGV is less than the drinking water standard for this parameter (2mg/L) and this detection is not therefore considered to be significant.

Elevated potassium and chloride levels were detected in both wells with higher chloride leves detected in RC-16, which is closest to the River Liffey. The levels detected are not indicative of significant contamination from historical site activities and it is possible that there is link via the gravels beneath the site and the brackish waters in the River Liffey.

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OCM understand that pumping tests have been carried out to estimate the dewatering rate that will be necessary during the deep excavation and construction of the basement. While the volumes of groundwater in the fill, subsoil and bedrock, higher volumes may be expected from the gravels where present in significant thickness.

The groundwater quality monitoring data indicates that while low levels of PAH are present, the water should be suitable for discharge to sewer. Dublin City Council are likely to require on-site settlement to treat suspended solids and possibly pH control during any concrete forming or piling works.

## 6. CONCLUSIONS AND RECOMMENDATIONS

#### 6.1 Conclusions

The subsurface comprises made ground ranging in thickness from 2 - 5.2 m, which contains mainly grey brown gravelly clay fill with red brick. This is underlain by natural ground of between 11.1 m and 23.3 m in thickness, that comprises gravels underlain by clay. The minimum depth to bedrock is 12.6 m while the maximum is 27.3 m.

The bedrock ranges from interbedded argillaceous limestone, siliceous limestone and black fossiliferous shale which are part of the Calp Limestone formation. The bedrock is considered to be a Locally Important Aquifer (Ll), which is moderately productive only in local zones. Aquifer vulnerability is considered to be moderate to low.

The investigation has established that the fill material and the underlying subsoils can generally be categorised as inert and suitable either for disposal at inert landfill or for use in land reclamation projects. There are localised zones in the fill such as at BH-12, RC-8 and W-2, where the contaminant levels exceed the inert category limits. However in these cases the materials fall into the non-hazardous waste category.

Elevated PAH levels were detected in the groundwater wells immediately to the south but not within the portion of the site where deep excavation will occur. It is possible therefore that these from an off-site location and not from within the development site. Low levels of PAH were detected in the subsoil and bedrock wells in the centre of the site. While the levels are above the IGV limits they are not indicative of significant pollution and the water should be suitable for discharge to sewer during the dewatering programme.

#### 6.2 Recommendations

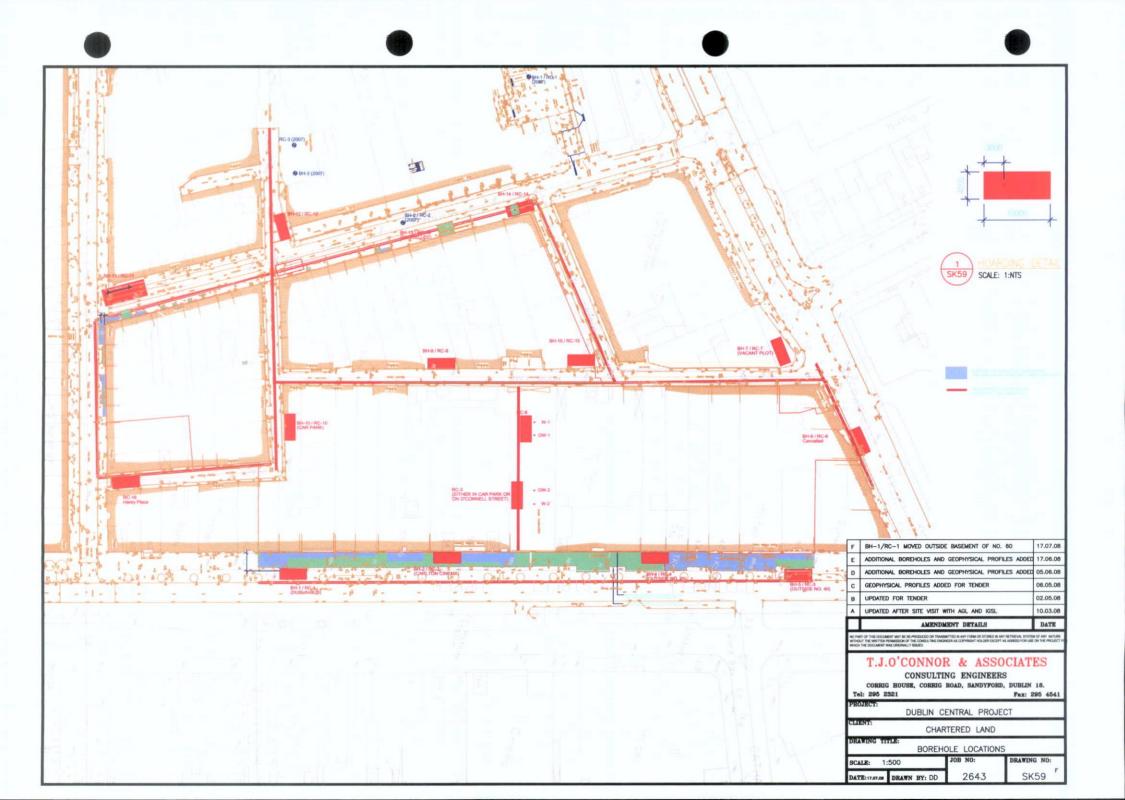
OCM recommend that following site clearance and as part of the bulk excavation samples of the fill and subsoil excavated in the vicinity of BH-12, W-2 and RC-8 be tested to confirm the waste characterisation i.e. inert or non-hazardous.

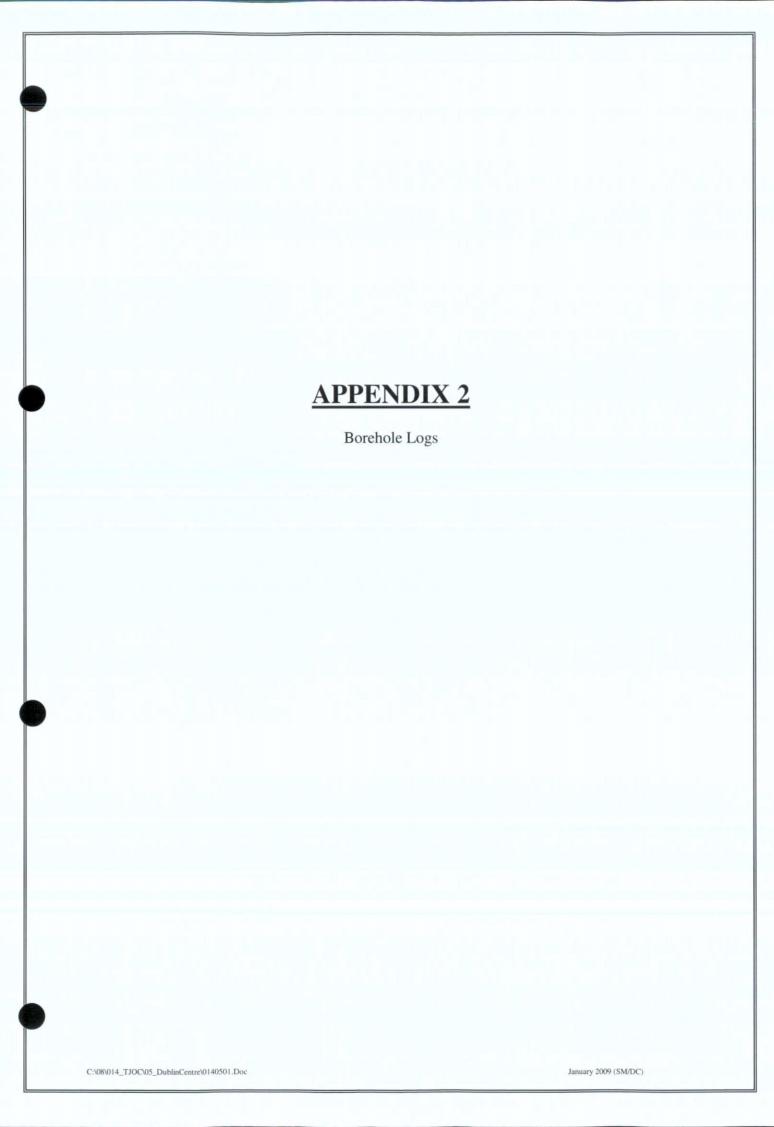
OCM recommend that all material excavated and removed from the site be disposed of in accordance with Dublin City Council Waste Management Regulations to suitably permitted or licensed waste management facilities.

# **APPENDIX 1**

Site Map

DCC PLAN NO.2861/21 01/06/2021







REPORT NUMBER

0	NTRAC	I Dui	olin C	entral	Developm	ent - Drat	n							BOREH SHEET	OLE	NU.	BH7 Sheet 1 of 2	
0	-ORDIN	ATES					RIG TYP					ando 15	0	DATE S			05/08/2008	
R	OUND	LEVEL (	m AC	DD)				OLE DIAM		, ,				DATE	OMP	LET	ED 12/08/2008	
LI	ENT	Dul	olin C	entral	Developm	ents Ltd		OLE DEPT				5.00		BORED			J. O'Hara	
NC	SINEER	AG	L Cor	sulting	g Ltd		CASING	DEPTH (	n)		16	3.00	_	PROCE	SSE	BY	S. Letch	_
-									2	= 2				ples	_	>		e o
in indo				Des	cription			puegend	300	Depth (m)		Ref. Number	Sample Type	Depth (m)		Recovery	Field Test Results	Standpipe
2								Leç		D D		Re N	Sa	De		Red		Sta
	MADE	GROUI	VD co	onsisti	ng of conc	ete.		<b>*******</b>										M
	MADE	GROUI gravell	ND co y clay	onsisti with s	ng of brow some cobb	n grey sa les and re	ndy ed brick.			0.3	0							
												AF4959	В	1.50-1.5	0		N = 7 (1, 1, 1, 2, 2, 2)	
																	N = 57 (5, 7, 15, 13, 11, 18)	
												AF4960	В	2.70-2.7	0			
																	N = 63 (6, 5, 9, 13, 17, 24)	Š
												AF4961	В	3.60-3.6	10			
												7.1 4001	3	0.00-0.0			N = 100/225 mm	
	Dense	grey sli	ghtly	claye	//silty sand	y GRAVE	L with	\$ - <u>1</u> -		4.2	20						(9, 20, 33, 38, 29)	
	many	cobbles.	Grav	vel is f	ine to coar r of limesto	se and		100 g				AF4962	В	4.50-4.5	10			
				33.3				0000									N = 26 (7, 7, 6, 7, 6, 7)	
								000				AF4963	В	5.50-5.5	10		100000000000000000000000000000000000000	
								2000				VI #303	10	0.00-0.0	.5			
								2000									N = 31	
								2000				AF4964	В	6.30-6.3	80		(2, 4, 6, 8, 8, 9)	
								0000										
								0000				AF4965	В	7.30-7.3	10		N = 13	
								\$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$				A1 4900	В	7.30-7.3	,5		(5, 3, 3, 3, 3, 4)	
								000										
								0000				AF4966	В	8.30-8.3	30		N = 21 (1, 1, 3, 5, 5, 8)	
								9000										
								5,00										X
IA	ARD ST	RATA E			IISELLING	i				RIKE	-		Die		Time			
_		To (m)	Tim (h	)	comments			Wate Strike		Casing Depth	5	ealed At	Ris To		rime min)	Co	omments	
	4 5.6 9	4.2 9 12.6	0.5 8 8	H	oulder ard Strata Bor ard Strata Bor			5.00		5.00		No	5.0	0	20	V	Moderate	
1	2.5 3.5	13.5 16	4 7	H	ard Strata Bor ard Strata Bor ard Strata Bor	ing		GROU	NDW	ATER	DET	AILS						
	16	16	2		oulder	-		Dat		Hole		Casing Depth	De V	pth to later	Com	ment	ts	
10	TALL	TION	-T.	10				01-08- 05-08-		2.00		2.00		-	End of Start o			
	STALLATION DETAILS  Date   Tip Depth   RZ Top   RZ Base   Type						/pe	05-08- 06-08-	80	5.60 5.00		6.00	1 8	5.10 4.80	End of Start o	shift of shift		
2	-08-08	15.00		13.00	15.00		m SP	06-08- 07-08-	08	8.60 8.60		9.00		5.40 5.00	End of Start o	shift		
_	MADK	Hand due	inspe	ction pit	excavated to	I.20m. Blowi	ng gravels fro	om										



BH

# **GEOTECHNICAL BORING RECORD**

REPORT NUMBER

13696

CONTRACT Dublin Central Development - Draft BOREHOLE NO. BH7 SHEET Sheet 2 of 2 CO-ORDINATES **RIG TYPE** Dando 150 DATE STARTED 05/08/2008 BOREHOLE DIAMETER (mm) 200 DATE COMPLETED 12/08/2008 GROUND LEVEL (m AOD) BOREHOLE DEPTH (m) 16.00 J. O'Hara CLIENT Dublin Central Developments Ltd **BORED BY ENGINEER** AGL Consulting Ltd CASING DEPTH (m) 16.00 PROCESSED BY S. Letch Samples Standpipe Details E  $\Xi$ Elevation Ref. Number Recovery Sample Type Field Test Legend Depth ( Depth ( Description Depth (m) Results 10.00 Dense grey slightly clayey/silty sandy GRAVEL with (8, 7, 7, 6, 6, 6) AF4967 R 10.20-10.20 many cobbles and lenses of brown slightly sandy gravelly clay. Gravel is fine to coarse and subrounded 10.40 to subangular of limestone. N = 100 Very dense grey slightly sandy GRAVEL with some (12 15 16 21 25 38) AF4968 В 11.00-11.00 cobbles. Gravel is fine to coarse and subrounded to subangular of limestone. N = 100/225 mm AF4969 12 B 12.00-12.00 (11, 20, 26, 33, 41) N = 100/90 mm AF4970 В 13.00-13.00 13 (25, 44, 56) N = 100/185 mm (8, 11, 33, 48, 19) AF4971 В 14.00-14.00 DCC PLAN NO.286 = 100/150 mm В 15.00-15.00 (17, 27, 39, 61) AF4972 9.000 Hard brown slightly sandy gravelly CLAY with some 15.80 AF4973 15.90-15.90 100/90 mm 16 16.00 AF4974 B 16.00-16.00 cobbles (25, 40, 60) Obstuction - possible boulder End of Borehole at 16.00 m 17 19 HARD STRATA BORING/CHISELLING WATER STRIKE DETAILS Water Time Casing Sealed Rise Time To (m) Comments Comments From (m) Strike Depth At To (min) (h) 4.2 0.5 8 8 4 7 2 Boulder 1/10/08 9 12.6 13.5 Hard Strata Boring Hard Strata Boring 5.6 9 12.5 13.5 16 Hard Strata Boring **GROUNDWATER DETAILS** GDT 16 16 Hard Strata Boring Hole Casing Depth to Water Date Comments GSL Depth Depth 07-08-08 12.50 12.50 End of shift 12.50 13.50 13.50 08-08-08 6.40 Start of shift GPJ INSTALLATION DETAILS

Date | Tip Depth | RZ Top | RZ Base 08-08-08 11-08-08 11-08-08 13.50 13.50 16.00 End of shift Start of shift End of shift 2.70 Type 16.00 4.80 5.20 12-08-08 15.00 13.00 15.00 50mm SP 12-08-08 16.00 Start of shift 12-08-08 16.00 8.80 End of shift OG DCD REMARKS Hand dug inspection pit excavated to 1.20m. Blowing gravels from 5.6m bgl to base of hole. Falling and rising head test completed.



REPORT NUMBER

0.	-ORDIN	ATES			1	RIG TYP	E			Dando 1	-0	SHEET DATE S	TAR	ΓED	Sheet 1 of 15/07/2008	
R	OUND L	EVEL (m	AOD)				DLE DIAME		mm)	200		DATE C	OMP	LETE	D 23/07/2008	3
	ENT SINEER		in Central Consulting	Developme Ltd	CITTO LIG		DEPTH (m			17.50 17.50		BORED PROCE		BY	J. McDonn S. Letch	ell
í.								_	<u></u>		T	ples				e
Depui (III)			Desc	ription			Legend	Elevation	Depth (m)	Ref. Number	Sample Type	Depth (m)		Kecovery	Field Test Results	Standpipe
1	MADE	GROUND	O consistir	g of brown	rced concr n grey sand les and red	yk			0.20	AF1908	В	1.00-1.0	0		N = 7 (2, 2, 2, 1, 1, 3)	
2	GRAVE	L with m	any cobbl	ghtly claye es. Gravel gular of lim	y/silty sand is fine to co	dy oarse	3000		2.00	AF1909	В	2.10-2.1			N = 36 (4, 6, 7, 2, 10, 17)	
	and Su	rounded	i to subanç	guiai oi iiiii	estone.		0000			AF1910 AF1911	В	3.00-3.0			N = 39	
3							2000					5,50°5.0			(7, 9, 8, 10, 10, 11	
į.										AF1912	В	4.00-4.0	0		N = 28 (2, 3, 6, 7, 8, 7)	
							\$ 4 5 4 5 4 5 5 5 5 5 5 5 5 5 5 5 5 5 5			AF1913	В	5.00-5.0	0		N = 34 (3, 4, 7, 7, 9, 11)	
										AF1914	В	6.00-6.0	0		N = 27 (3, 3, 4, 8, 8, 7)	
,							9000 8000			AF1915	В	7.00-7.0	0	(7	N = 77 7, 18, 20, 25, 20, 1	2)
							\$ 50 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0			AF1916	В	8.00-8.0	0	(6	N = 69 3, 12, 16, 20, 20, 1	3)
										AF1917	В	9,00-9.0	0		N = 18 (6, 6, 5, 5, 5, 3)	
HA	RD STF	АТА ВО	RING/CH	ISELLING			WATE	R STR	IKE DE	TAILS	1					_ NXI
		5 (m)	Time (h)	omments			Water Strike		sing epth	Sealed At	Rise To		ime min)	Com	nments	
	6.2 17	16.5 17.5		ulder ulder			5.50	-	.50	No	3.1		5	R	Rapid	
							GROUN		Hole	Casing		pth to	Com	ments		
NS	TALLA	ION DE	TAILS				15-07-0 16-07-0	8 8	2.00 2.00	2.00 2.00	W	-	End of Start of	shift shift		
	Date	Tip Dept	h RZ Top	RZ Base	Туре		16-07-0 17-07-0		7.00 7.00	7.00 7.00		4.50 4.50	End of Start of			
	-07-08 MARKS	13.50	12.00	13.50	50mm											



REPORT NUMBER

13696

BOREHOLE NO. CONTRACT BH9 Dublin Central Development - Draft SHEET Sheet 2 of 2 CO-ORDINATES **RIG TYPE** Dando 150 DATE STARTED 15/07/2008 GROUND LEVEL (m AOD) **BOREHOLE DIAMETER (mm)** 200 DATE COMPLETED 23/07/2008 **BOREHOLE DEPTH (m)** 17.50 CLIENT **Dublin Central Developments Ltd BORED BY** J. McDonnell CASING DEPTH (m) **ENGINEER** AGL Consulting Ltd 17.50 PROCESSED BY S. Letch Samples Standpipe Details E Depth (m) Elevation Ref. Number Sample Type Recovery Field Test Legend Description Depth Depth (m) Results 10 AF1918 10.00-10.00 00000 0 Very dense grey brown slightly clayey/silty sandy GRAVEL with many cobbles. Gravel is fine to coarse and subrounded to subangular of limestone. 200-(continued) 0000 No CPT as gravel blowing up casing AF1919 11.00-11.00 (11, 13, 11, 10, 10, 10) 000 N = 43 (7, 5, 8, 8, 13, 14) 12 AF1920 В 12 00-12 00 AF1921 В 13.00-13.00 N = 7813 (6, 6, 10, 18, 25, 25) 13.50 Hard dark brown slightly sandy gravelly CLAY with occasional cobbles. N = 68 (6, 11, 15, 17, 19, 17) AF1922 В 14.00-14.00 14 Very dense grey brown slightly sandy GRAVEL with 14.20 14.40-14.40 14.50-14.50 В some cobbles. Gravel is medium to coarse and 14.50 0% rec Failed subrounded to subangular of limestone. Hard dark brown slightly sandy gravelly CLAY with N = 45/150 mm (20, 35, 20, 25) AF1924 В 15.00-15.00 occasional cobbles. 8 286 DCC PLAN: 106. Very dense grey brown slightly sandy GRAVEL with some cobbles. Gravel is medium to coarse and 8 15.90 AF1925 В 16.00-16.00 80 0 subrounded to subangular of limestone 8 16.50 Hard black slightly sandy gravelly CLAY with occasional cobbles AF1828 16.80-16.80 B N = 100 (8, 12, 20, 30, 30, 20) 17.00 Obstuction - possible boulder AF1829 В 17.10-17.10 17.50 End of Borehole at 17.50 m 18 19 HARD STRATA BORING/CHISELLING WATER STRIKE DETAILS Water Rise Time Casing Sealed Time To (m) From (m) Comments Comments (h) Strike Depth At To (min) 16.2 16.5 1 2 Boulder 1/10/08 Boulde **GROUNDWATER DETAILS** GDT Depth to Water Hole Casing Date Comments Depth Depth IGSL 13.00 End of shift 13.00 13.00 18-07-08 4 60 Start of shift GP, INSTALLATION DETAILS 18-07-08 21-07-08 16.50 16.50 5.80 4.65 End of shift Start of shift 16.50 Tip Depth RZ Top RZ Base Date Type 22-07-08 12.00 13.50 50mm SP 13 50 REMARKS Hand dug inspection pit excavated to 1.20m. Falling and rising head tests completed. Standing from 24th to 28th July - No access OG H



1/10/08

GDT

IGSL

GPJ

# GEOTECHNICAL BORING RECORD

REPORT NUMBER

13696

BOREHOLE NO. CONTRACT **BH10** Dublin Central Development - Draft SHEET Sheet 1 of 2 **CO-ORDINATES** RIG TYPE Dando 150 DATE STARTED 30/07/2008 BOREHOLE DIAMETER (mm) DATE COMPLETED 13/08/2008 200 GROUND LEVEL (m AOD) BOREHOLE DEPTH (m) 15.45 CLIENT BORED BY Dublin Central Developments Ltd J. McDonnell **ENGINEER** CASING DEPTH (m) 15 45 PROCESSED BY AGL Consulting Ltd S. Letch Samples Standpipe Details E E Elevation Ref. Number Sample Recovery Field Test Legend Depth Description Depth ( Depth (m) Results - 0 MADE GROUND consisting of concrete.

MADE GROUND consisting of brown grey sandy 0.10 slightly gravelly clay with some cobbles and red brick. AF1830 1.00-1.00 N = 6 (1, 1, 2, 1, 1, 2) 2 AF1831 В 2 00-2 00 N = 51 (8, 18, 16, 11, 17, 7) AF1832 В 3.00-3.00 3.00 Very dense grey slightly clayey/silty sandy GRAVEL G with many cobbles. Gravel is fine to coarse and subrounded to subangular of limestone. AF1833 4.00-4.00 N = 30 (3, 5, 7, 7, 8, 8) N = 50 (8, 8, 14, 14, 12, 10) AF1834 R 5 00-5 00 Dense grey slightly clayey/silty sandy GRAVEL with many cobbles. GRAVEL is fine to coarse and 5.50 A subrounded to subangular of limestone. N = 28AF1835 В 6.00-6.00 6 (4, 6, 6, 7, 7, 8) 00 6.80 Very stiff black slightly sandy gravelly CLAY with AF1836 В 7.00-7.00 occasional cobbles (3, 15, 18, 12, 11, 15) 7.50 Very dense grey slightly clayey/silty sandy GRAVEL with many cobbles. Gravel is fine to coarse and 80 0 N = 100/225 mm (15, 24, 25, 30, 45) subrounded to subangular of limestone. 200 AF1837 B 8 00-8 00 N = 52AF1838 В 9.00-9.00 9 (7, 9, 14, 15, 13, 10) ع را 80 80 00 HARD STRATA BORING/CHISELLING WATER STRIKE DETAILS Time Water Casing Sealed Rise Time From (m) To (m) Comments Comments (h) Strike Depth At To (min) Hard Strata Boring Hard Strata Boring Boulder 8.00 8.00 No 6.50 20 Moderate 15.4 **GROUNDWATER DETAILS** Hole Casing Depth to Water Date Comments Depth Depth 30-07-08 4.80 End of shift 6.00 6.00 6.00 8.00 8.00 Start of shift End of shift Start of shift 08-08-08 6.00 4.80 INSTALLATION DETAILS 08-08-08 11-08-08 8.00 6.10 4.55 Tip Depth RZ Top RZ Base Date Type REMARKS Hand dug inspection pit excavated to 1.20m. Water added from 3.0m to aid drilling. Blowing gravels from 9.5m to 10.5m and 11.5m to 12.0m bgl. Falling and rising head test completed. Standing 5.5 days - stopped by Client due to Landowner request.



GP.J

DCD

100

Standing 5.5 days - stopped by Client due to Landowner request.

## GEOTECHNICAL BORING RECORD

REPORT NUMBER

13696

CONTRACT Dublin Central Development - Draft BOREHOLE NO. **BH10** SHEET Sheet 2 of 2 **CO-ORDINATES RIG TYPE** Dando 150 DATE STARTED 30/07/2008 GROUND LEVEL (m AOD) BOREHOLE DIAMETER (mm) 200 DATE COMPLETED 13/08/2008 BOREHOLE DEPTH (m) 15.45 CLIENT **Dublin Central Developments Ltd BORED BY** J. McDonnell **ENGINEER** AGL Consulting Ltd CASING DEPTH (m) 15.45 PROCESSED BY S. Letch Samples Standpipe Details E Depth (m) Ref. Number Elevation Recovery Sample Type Field Test Legend Description Depth Depth (m) Results AF1R30 10 00-10 00 Very dense grey slightly clayey/silty sandy GRAVEL (9, 13, 16, 24, 19, 17) with many cobbles. Gravel is fine to coarse and subrounded to subangular of limestone. (continued) N = 100/160 mm AF1840 В 11.00-11.00 (13, 39, 50, 40, 10) N = 100/170 mm (12, 30, 40, 45, 15) 12 AF1841 В 12.00-12.00 N = 100/125 mm (12, 23, 62, 38) AF1842 13 В 13 00-13 00 13.80 Hard black slightly sandy gravelly CLAY with N = 100/230 mm AF1843 В 14.00-14.00 occasional cobbles (4. 10. 20. 35. 40. 5) N = 100/75 mm (12, 43, 100) AF1844 15 В 15 00-15 00 15.45-1646C PLAN NO. 2861. 15.40 15.45 AF1845 Obstuction - possible boulder B End of Borehole at 15.45 m RECEIVED: 01/06/2021 16 17 18 19 HARD STRATA BORING/CHISELLING WATER STRIKE DETAILS Water Time Casing Sealed Rise Time From (m) To (m) Comments Comments (h) Strike Depth At To (min) Hard Strata Boring Hard Strata Boring 15.4 **GROUNDWATER DETAILS** GDT Hole Casing Depth to Water Date Comments IGSL Depth Depth 11.00 11.00 14.50 14.50 15.45 11-08-08 4.90 End of shift 11,00 11,00 4.60 5.60 4.50 Start of shift End of shift Start of shift INSTALLATION DETAILS

Date Tip Depth RZ Top RZ Base 12-08-08 12-08-08 12-08-08 13-08-08 14.50 14.50 15.45 Type 5.60 End of shift REMARKS Hand dug inspection pit excavated to 1.20m. Water added from 3.0m to aid drilling. Blowing gravels from 9.5m to 10.5m and 11.5m to 12.0m bgl. Falling and rising head test completed.

13696

BOREHOLE NO. **BH12** CONTRACT Dublin Central Development - Draft SHEET Sheet 1 of 2 **CO-ORDINATES RIG TYPE** Dando 2000 **DATE STARTED** 12/10/2008 200 **BOREHOLE DIAMETER (mm)** DATE COMPLETED 16/10/2008 GROUND LEVEL (m AOD) 13.60 BOREHOLE DEPTH (m) J. McDonnell CLIENT Dublin Central Developments Ltd BORED BY **ENGINEER** CASING DEPTH (m) 13.60 PROCESSED BY S. Letch AGL Consulting Ltd Samples Standpipe Details Depth (m) E Elevation Ref. Number Sample Recovery Field Test -egend Depth Description Depth (m) Results 0 MADE GROUND consisting of brown slightly sandy gravelly clay with some red brick and concrete. AF4857 В 1.00-1.00 (2, 2, 3, 3, 4, 4) N = 11 (2, 2, 2, 3, 3, 3) AF4858 В 2.00-2.00 N = 30AF4859 В 3.00-3.00 (4, 8, 10, 8, 6, 6) 3.40 Firm becoming stiff brown slightly sandy gravelly CLAY with occasional cobbles. N = 17 (4, 3, 4, 4, 4, 5) AF4860 В 4.00-4.00 AF4861 В 5.00-5.00 (4, 6, 8, 8, 9, 9) N = 49AF4862 В 6.00-6.00 Very stiff becoming hard black slightly sandy gravelly 6.00 (6, 6, 9, 10, 12, 18) CLAY with occasional cobbles N = 100/200 mm (14, 20, 35, 35, 30) AF4863 В 7.00-7.00 N = 54AF4864 В 8.00-8.00 (6, 8, 12, 12, 14, 16) N = 55 (7, 8, 11, 14, 14, 16) AF4865 В 9.00-9.00 9 HARD STRATA BORING/CHISELLING WATER STRIKE DETAILS Rise Time Water Casing Sealed Time From (m) To (m) Comments Comments (h) Strike Depth To (min) Boulder 5/11/08 GDT. GROUNDWATER DETAILS Hole Casing Depth to Water Date Comments IGSL Depth Depth End of shift 1.20 1.20 7.00 7.00 GPJ 1.20 7.00 7.00 13-10-08 14-10-08 Start of shift INSTALLATION DETAILS
Date Tip Depth RZ Top RZ Base End of shift 3696 Type 6.70 Start of shift 16-10-08 13.60 11.50 13.60 50mm SP OG DCD REMARKS Hand dug inspection pit excavated to 1.20m. Night work - shift started at 1800hrs.

			0 1 10										_		
100	NTRACT	Γ Dublin	Central Dev	/elopment	t - Draft							BOREHOL	E NO.	BH12	
0-	ORDINA	ATES				RIG TYP	F			Dando 20		SHEET	DTES	Sheet 2 of 2	
		EVEL (m A	OD)				OLE DIAME	TFR (m		200		DATE STA		12/10/2008 ED 16/10/2008	
	1912 CHA						OLE DEPTH		,	13.60					1
	ENT SINEER		Central Development Developmen		io Liu		DEPTH (m)			13.60		BORED BY PROCESS		J. McDonnel S. Letch	1
												nples			-
Deptn (m)			Descrip	tion			Legend	Elevation	Depth (m)	Ref. Number	Sample Type	Depth (m)	Recovery	Field Test Results	Standpipe
10	Very st	tiff becoming with occasio	hard black nal cobbles	slightly sa (continue	andy graved)	velly				AF4866 AF4867	В	11.00-11.00		N = 100/50 mm (8, 42, 100) N = 100/90 mm	
1							<u> </u>			A 4007		11.00-11.00		(10, 38, 80, 20)	
12	occasio	ense grey sli onal cobbles inded to sub	. Gravel is f	fine to coa	arse and	/EL with	\$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$		11.50	AF4868	В	12.00-12.00		N = 68 (9, 11, 15, 16, 18, 19)	
		lack slightly	sandy grave	elly CLAY	with occ	asional	9 3		12.50						
3	cobble	S								AF4869	В	13.00-13.00		N = 100/150 mm (22, 35, 40, 60)	
	Obstuc	ction - possib Borehole at	ole boulder						13.50 13.60					The state of the s	
- 1															
15												DC: REI	C PL/	N NO.2861. D: 01/06/2	/21 2021
5 6 7												SE(	C PLI	AN NO.2861.	421 2021
5 6 7 8 9	T	(m) (	ime Com				Water	Ca	KE DE	Sealed	Ris	e Tim	ne C		/21 2021
66 77 88	T	To (m)	me	ments				Ca De			Rissing Td	e Tim	ne Co	M NO . 2861. D: 01/06/2	421 2021
66 77 88	m (m) 1	To (m)	me h) Com	ments			Water Strike 11.50	Ca De	epth	Sealed At No	To	e Tim	ne Co	omments	21 2021
5 6 7 8 HA	m (m) 1	To (m)	me h) Com	ments			Water Strike 11.50	Ca De 11	epth .50	Sealed At No	10.5	e Tim (min	ne Co	omments Moderate	21 2021
15 16 17	m (m) 1	To (m)	me h) Com	ments			Water Strike 11.50 GROUN Date	Ca De 11	epth 1.50 ER DE Hole Depth	Sealed At No TAILS Casing Depth	10.5	e Tim (min 50 20	ne Co	omments Moderate	21 2021
HAA	m (m) 3.5	To (m) Ti (	me h) Com 2 Boulde	ments			Water Strike 11.50 GROUN Date	Ca De 11	ER DE Hole Depth 12.50 12.50	Sealed At No FAILS Casing Depth	De V	e Tim (min 50 20  pth to Cater 1.50 En 1.50 Sta	ommeni	omments Moderate	2021
HA H	m (m) 3.5	To (m) Ti (	me Com 2 Boulde	ments er	Тук		Water Strike 11.50 GROUN Date	Ca De 11	ER DE Hole Depth	Sealed At No FAILS Casing Depth	De V	e Tim (min 50 20  pth to Cater 1.50 En 1.50 Sta	ne Con)	omments Moderate	2021
ns.	m (m) 7	TO (m) Ti (	me Com 2 Boulde	nments	Tyr 50mm		Water Strike 11.50 GROUN Date	Ca De 11	ER DE Hole Depth 12.50 12.50	Sealed At No FAILS Casing Depth	De V	e Tim (min 50 20  pth to Cater 1.50 En 1.50 Sta	ommeni	omments Moderate	2021

13696

BOREHOLE NO. CONTRACT Dublin Central Development - Draft W2 SHEET Sheet 1 of 3 CO-ORDINATES RIG TYPE Dando 3000 DATE STARTED 25/09/2008 BOREHOLE DIAMETER (mm) GROUND LEVEL (m AOD) DATE COMPLETED 10/10/2008 BOREHOLE DEPTH (m) 21.40 CLIENT Dublin Central Developments Ltd BORED BY J. Edwards / J. McDonnell **ENGINEER** AGL Consulting Ltd CASING DEPTH (m) PROCESSED BY S. Letch Samples Standpipe Details  $\Xi$ E Elevation Ref. Number Recovery Sample Field Test -egend Depth ( Description Depth Depth (m) Type Results MADE GROUND consisting of brown slightly sandy gravelly clay with some red brick and concrete. AG3601 В 0.50-0.50 MADE GROUND consisting of concrete 0.60 MADE GROUND consisting of brown slightly sandy 0.90 AG3602 В 1.00-1.00 gravelly clay with some red brick and concrete. AG3603 В 2.00-2.00 AG3604 В 3.00-3.00 AG3605 В 4.00-4.00 4 4.20 Grey slightly clayey/silty sandy GRAVEL with occasional - A cobbles. Gravel is fine to coarse and subrounded to 80 0 subangular of limestone. 2000 0000 AG3606 В 000 6 AG3607 R 6 00-6 00 Grey slightly clayey/silty sandy GRAVEL with many 6.50 cobbles. Gravel is medium to coarse and subrounded to subangular of limestone. 2000 AG3608 В 7.00-7.00 0000 AG3609 В 8.00-8.00 90 80 800 000 AG3610 В 9 00-9 00 HARD STRATA BORING/CHISELLING WATER STRIKE DETAILS Water Casing Sealed Rise Time From (m) To (m) Comments Comments Depth (h) Strike At To (min) Made Ground Obstruction Made Ground Obstruction Made Ground Obstruction 5/11/08 Moderate 4.80 4.80 No 4.30 20 0.75 3.2 4.9 Boulder Boulder GDT **GROUNDWATER DETAILS** Boulder 6.5hrs Chiselling 3.5hrs Hard Strata Boring 7hrs Chiselling 3hrs Hard Strata Boring 7.5hrs Chiselling 2.5hrs Hard Strata Boring Hole Casing Depth to Water IGSL Date Comments 10 Depth Depth End of shift Start of shift End of shift 25-09-08 GPJ 26-09-08 26-09-08 2.00 2.00 INSTALLATION DETAILS
Date Tip Depth RZ Top RZ Base 13696.0 Type 6.00 8.00 8.00 9.00 6.00 5.40 5.00 4.20 4.80 Start of shift End of shift Start of shift End of shift 27-09-08 27-09-08 28-09-08 28-09-08 8.00 LOG DCD REMARKS

Hand dug inspection pit excavated to 1.20m. Water added from 3.0m to aid drilling. Blowing gravels from 4.9m to 6m bgl. Casing size reduced from 300mm to 250mm diameter at 14.0m bgl. Casing left in borehole to allow rotary follow on Re set up rig on 09/19/08 to advance hole after rotary rig advanced to rockhead and gravel falling in behind hammer. 29-09-08 9.00 4.50 9.00 Start of shift BH

,UI	Dublin Central Development - Draft							BOREHO SHEET	LE N	O.	W2 Sheet 2 of 3	
0-	D-ORDINATES	RIG TYP	E		С	ando 30	00	DATE ST	TARTI	ED	25/09/2008	
SRO	ROUND LEVEL (m AOD)	BOREHO	OLE DIAMET	ER (mm)				DATE CO				
LII	LIENT Dublin Central Developments Ltd	BOREHO	OLE DEPTH (	m)	2	1.40		BORED	BY		J. Edwards /	J. McDoi
NC	IGINEER AGL Consulting Ltd	CASING	DEPTH (m)			1		PROCES	SED	ВҮ	S. Letch	
E)				5	Ē		-	nples		_		be
Deptn (m)	Description		Legend	Elevation	Depth (m)	Ref. Number	Sample Type	Depth (m)	Necovery		Field Test Results	Standpipe Details
10	Grey slightly clayey/silty sandy GRAVEL with m cobbles. Gravel is medium to coarse and subror subangular of limestone. (continued)	any unded to				AG3611	В	10.00-10.0	-			
11	Grey slightly clayey/silty sandy GRAVEL with m	nedium /	82-00-		.20	AG3612	В	11.00-11.0	00			
12	to coarse and subrounded to subangular of lime Grey slightly clayey/silty sandy GRAVEL with m cobbles. Gravel is medium to coarse and subrousubangular of limestone.	anv	2000			AG3613	В	12.00-12.0				
13			000000000000000000000000000000000000000			AG3614	В	DCC REC: 13.00-13.0	FIAF	Section 1	l0 . 2861 / 21 01 / 06 / 202	Marrie (n
14			0000			AG3615	В	14.00-14.0	00			
15	, "The Hart					AG3616	В	15.00-15.0	00			
16	Brown slightly sandy gravelly CLAY with occasion cobbles	onal		15	.50	AG3617	В	16.00-16.0	00			
17	Black slightly sandy gravelly CLAY with occasio cobbles Re-set up rig after rotary rig advanced to rockhe gravel falling behind hammer so must be cased	ad -		16	.40							
18	3											
19												
HA	ARD STRATA BORING/CHISELLING			STRIKE I	-		F:	_				
12	om (m) To (m) Time (h) Comments  11 12.2 10 7hrs Chiselling 3hrs Hard St 12.2 14 10 7hrs Chiselling 3hrs Hard St	trata Boring	Water Strike	Casing Depth	-	Sealed At	Ris To		me nin)	Com	ments	
16	14         16         10         6hrs Chiselling 4hrs Hard St           16         16.2         2         Hard Strata Boring           16.2         16.4         3         Boulder           16.4         19.5         8         1hr Chiselling 7hrs Hard Str           19.5         21.4         8         2hrs Chiselling 6hrs Hard Str	ata Boring	GROUNE Date	Hole Dept	e th	Casing Depth	V	alei	Comm			
	STALLATION DETAILS  Date Tip Depth RZ Top RZ Base Ty	pe	29-09-08 30-09-08 30-09-08 01-10-08 01-10-08 02-10-08	11.00 11.00 12.20 12.20 14.00		11.00 11.00 12.20 12.20 14.00 14.00	4	4.50 S 4.80 E 4.80 S 5.00 E 4.50 S	End of some of	shift hift shift hift shift		
ŧΕΝ	EMARKS Hand dug inspection pit excavated to 1.20m. Wate 3.0m to aid drilling. Blowing gravels from 4.9m to Casing size reduced from 300mm to 250mm diam 14.0m bgl. Casing left in borehole to allow rotary from the control of the cont	6m bgl.	02-10-08	16.00 16.00 16.40 16.40 19.50		16.00 16.00 16.40 16.40 19.50	4	5.00 E 4.50 S 4.90 E 4.80 S	nd of s Start of s and of s Start of s and of s	hift shift hift shift		

Standpipe Optails Optails
08 08 ds / J. McDo
ds / J. McDo
ds / J. McDo
Standpipe
Standpipe
0,1
4



REPORT NUMBER

13696

BOREHOLE NO. CONTRACT Dublin Central Development - Draft **BH14** SHEET Sheet 1 of 2 CO-ORDINATES() RIG TYPE Dando 2000 DATE STARTED 09/11/2008 GROUND LEVEL (m AOD) BOREHOLE DIAMETER (mm) 200 DATE COMPLETED 13/11/2008 BOREHOLE DEPTH (m) 12.00 CLIENT Dublin Central Developments Ltd **BORED BY** J. McDonnell **ENGINEER** AGL Consulting Ltd 12.00 CASING DEPTH (m) PROCESSED BY S. Letch Samples (E) E Standpipe Elevation Ref. Number Sample Type Recovery Field Test Legend Depth ( Description Depth ( Depth (m) Results - 0 MADE GROUND consisting of granite cobblelock. 0.10 MADE GROUND consisting of concrete 0.20 MADE GROUND consisting of brown slightly sandy gravelly clay with some red brick and concrete. 1.00-1.00 1.00-1.00 (3, 3, 5, 5, 4, 4) AF4832 ENV 2.00-2.00 2 (2, 2, 3, 3, 3, 3) AF4833 2.00-2.00 DOC PLAN NO. 2861 N = 11 2. gl 8, 3 lbg. 3.00-3.00 -3 AF4834 Stiff brown slightly sandy gravelly CLAY. 3.20 N = 22 (3, 3, 5, 5, 6, 6) 4.00-4.00 4.00-4.00 ENV AF4835 N = 57AF4836 В 5.00-5.00 Very stiff brown slightly sandy very gravelly CLAY. 5.00 (8, 14, 16, 16, 15, 10) Ô to AF4837 В 6.00-6.00 6 (14 20 20 24 20 20) 000 6.50 Very dense grey slightly clayey/silty sandy GRAVEL with occasional cobbles. Gravel is fine to coarse and 0000 N = 84 (9, 14, 15, 19, 20, 30) subrounded to subangular of limestone. AF4838 B 7 00-7 00 0000 000 N = 100/225 mm AF4839 В 8.00-8.00 8 (14, 21, 30, 30, 40) e o N = 100/275 mm AF4840 В 9.00-9.00 9 (12, 16, 20, 20, 32, 28) 00. HARD STRATA BORING/CHISELLING WATER STRIKE DETAILS Rise Time Water Casing Sealed Time From (m) To (m) Comments Comments Strike Depth At To (min) 26/11/08 8.3 Boulder 8.1 6.60 6.60 No 5.00 5 Moderate GDT **GROUNDWATER DETAILS** Depth to Water Hole Casing Date IGSL. Comments Depth Depth End of shift GPJ 11-11-08 12-11-08 13-11-08 6.50 9.70 9.70 6.50 6.00 Start of shift INSTALLATION DETAILS
Date Tip Depth RZ Top RZ Base 9.70 9.70 5.60 5.40 End of shift Start of shift 13696 Type LOG DCD REMARKS Hand dug inspection pit excavated to 1.20m. Night work - shift started at 1800hrs to accommodate Moore Street traders. Shift finished at 2300hrs due to T2 licence restrictions. Standing 5 hours each day totalling 20 hours standing. 2 No. Falling and 1 No. Rising head test completed. Casing left in borehole to allow rotary follow on. BH



IGSL.GDT 26/11/08

13696.GPJ

COG DCD

BH

# GEOTECHNICAL BORING RECORD

REPORT NUMBER

13696

BOREHOLE NO. **BH14** CONTRACT Dublin Central Development - Draft SHEET Sheet 2 of 2 CO-ORDINATES() **RIG TYPE** Dando 2000 DATE STARTED 09/11/2008 BOREHOLE DIAMETER (mm) 200 DATE COMPLETED 13/11/2008 GROUND LEVEL (m AOD) 12.00 BOREHOLE DEPTH (m) CLIENT Dublin Central Developments Ltd **BORED BY** J. McDonnell **ENGINEER** AGL Consulting Ltd CASING DEPTH (m) 12.00 PROCESSED BY S. Letch Samples Standpipe Details (E) Depth (m) Elevation Ref. Number Sample Type Recovery Field Test Legend Depth ( Description Depth (m) Results AF484 N = 82 (9, 13, 16, 19, 22, 25) 2000 10.00-10.00 Very dense grey slightly clayey/silty sandy GRAVEL with occasional cobbles. Gravel is fine to coarse and 2000 subrounded to subangular of limestone. (continued) N = 100/225 mm (15, 19, 35, 31, 34) AF4842 В 11.00-11.00 000 80 12.00 End of Borehole at 12.00 m 13 16 18 19 HARD STRATA BORING/CHISELLING WATER STRIKE DETAILS Rise Time Water Casing Sealed Time To (m) Comments From (m) Comments (h) Strike Depth To (min) 11.9 12 Boulder 1.25 GROUNDWATER DETAILS Hole Casing Depth to Water Date Comments Depth Depth 12.00 End of shift INSTALLATION DETAILS
Date Tip Depth RZ Top RZ Base Type REMARKS

Hand dug inspection pit excavated to 1.20m. Night work - shift started at 1800hrs to accommodate Moore Street traders. Shift finished at 2300hrs due to T2 licence restrictions. Standing 5 hours each day totalling 20 hours standing. 2 No. Falling and 1 No. Rising head test completed. Casing left in berehole to allow rotary follow on.



REPORT NUMBER

13696

BOREHOLE NO. CONTRACT Dublin Central Development - Draft **BH15** SHEET Sheet 1 of 3 **CO-ORDINATES RIG TYPE** Dando 150 DATE STARTED 15/09/2008 GROUND LEVEL (m AOD) BOREHOLE DIAMETER (mm) 200 DATE COMPLETED 24/09/2008 BOREHOLE DEPTH (m) 21.20 CLIENT Dublin Central Developments Ltd **BORED BY** J. McDonnell **ENGINEER** AGL Consulting Ltd CASING DEPTH (m) 21.20 PROCESSED BY S. Letch Samples Standpipe Details E  $\widehat{\Xi}$ Elevation Ref. Number Sample Type Recovery Field Test Legend Description Depth ( Depth ( Depth (m) Results 0 MADE GROUND consisting of tarmacadam. MADE GROUND consisting of brown slightly sandy 0.20 gravelly clay with some red brick, ash and concrete. AF4821 В 1.20-1.20 (1, 1, 1, 1, 1, 1) N = 7 (1, 2, 2, 2, 1, 2) 2 AF4822 В 2.00-2.00 AF4823 В 3.00-3.00 3 (4, 4, 4, 3, 2, 8) DCC .2861/2 3 50 Very dense grey slightly clayey/silty sandy GRAVEL 000 01/06/203 with occasional cobbles. Gravel is fine to coarse and 0 subrounded to subangular of limestone. N = 111 (12, 16, 25, 30, 27, 29 AF4824 В 4.00-4.00 N = 100/150 mm AF4825 В 5.00-5.00 (35, 48, 52) 80 AF4826 В 6.00-6.00 6 (15, 22, 30, 29, 27, 33) 000 AF4827 B 7 00-7 00 200 (4, 6, 4, 5, 4, 4) 00 -8 0000 N = 56AF4828 В 8.00-8.00 (6, 9, 11, 16, 15, 14) AF4829 9.00-9.00 В q (9, 11, 16, 25, 20, 26) 80-HARD STRATA BORING/CHISELLING WATER STRIKE DETAILS Water Rise Time Casing Sealed Time From (m) To (m) Comments Comments (h) Strike Depth At To (min) 0.5 3.8 Boulder 6.00 6.00 No 4.70 5 Moderate Boulder Boulder 0.5 5.8 Boulder **GROUNDWATER DETAILS** 14.4 16.7 18.5 21 Hard Strata Boring Hard Strata Boring Hard Strata Boring Hard Strata Boring 14.4 16.7 Hole Casing Depth to Water Date Comments Depth Depth 18.5 15-09-08 End of shift 21.2 3.50 21 Boulder 3.50 3.50 16-09-08 Start of shift INSTALLATION DETAILS

Date Tip Depth RZ Top RZ Base 16-09-08 17-09-08 6.00 End of shift Start of shift 6.00 Type DCD REMARKS Hand dug inspection pit excavated to 1.20m. Water added from 3.5m to aid drilling. 90

GDT IGSL GPJ



REPORT NUMBER

13696

BOREHOLE NO. CONTRACT **BH15** Dublin Central Development - Draft SHEET Sheet 2 of 3 CO-ORDINATES **RIG TYPE** Dando 150 DATE STARTED 15/09/2008 BOREHOLE DIAMETER (mm) DATE COMPLETED 24/09/2008 200 GROUND LEVEL (m AOD) BOREHOLE DEPTH (m) 21.20 CLIENT BORED BY Dublin Central Developments Ltd J. McDonnell CASING DEPTH (m) **ENGINEER** AGL Consulting Ltd 21 20 PROCESSED BY S. Letch Samples Standpipe Details (E) Ε Elevation Ref. Number Sample Type Recovery Field Test Legend Depth ( Depth Description Depth (m) Results 3000 Very dense grey slightly clayey/silty sandy GRAVEL (7, 10, 11, 11, 17, 15) with occasional cobbles. Gravel is fine to coarse and subrounded to subangular of limestone. (continued) 200 0000 N = 47 (3, 5, 9, 9, 14, 15) AF4831 В 11.00-11.00 000 80 8080 AF4832 12 В 12.00-12.00 (5, 7, 20, 15, 16, 18) 000 N = 100/150 mmAF4833 В 13.00-13.00 13 (3, 11, 26, 74) AF4834 В 14.00-14.00 14 -8-14.40 Hard black slightly sandy gravelly CLAY with 0 AF4835 U 14.50-14.50 1% rec 150 blow occasional cobbles 15 0 N = 100/240 mmAF4836 В 15.50-15.50 (11, 15, 20, 25, 45, 10) 00 16 AF4837 В 16.50-16.50 N = 100(10, 15, 19, 24, 30, 27) N = 100/150 mm (20, 29, 40, 60) AF4838 B 17 50-17 50 18 N = 100/210 mmAF4839 В 18.50-18.50 (12, 26, 34, 37, 29) 19 ō N = 100/180 mm AF4840 В 19.50-19.50 (12, 30, 36, 44, 20) HARD STRATA BORING/CHISELLING WATER STRIKE DETAILS Time Water Casing Sealed Rise Time To (m) From (m) Comments Comments (h) Strike Depth At To (min) 0.5 3.8 Boulder Boulder Boulder 3.9 6 14.4 16.7 18.5 21 0.5 5.8 Boulder **GROUNDWATER DETAILS** GDT Hard Strata Boring 14.4 16.7 18.5 Hard Strata Boring Hard Strata Boring Hard Strata Boring Hole Casing Depth to Water Date Comments IGSL Depth Depth 5.50 End of shift GPJ INSTALLATION DETAILS

Date Tip Depth RZ Top RZ Base 18-09-08 11 00 11.00 5 50 Start of shift 14.40 14.40 16.70 16.70 14.40 14.40 16.70 16.70 18.50 18.50 18-09-08 19-09-08 19-09-08 5.80 5.80 End of shift Start of shift Type End of shift Start of shift End of shift Start of shift 6.40 22-09-08 22-09-08 6.50 REMARKS Hand dug inspection pit excavated to 1.20m. Water added from 3.5m to aid drilling. 00



REPORT NUMBER

13696

CONTRACT Dublin Central Development - Draft BOREHOLE NO. **BH15** SHEET Sheet 3 of 3 CO-ORDINATES **RIG TYPE** Dando 150 DATE STARTED 15/09/2008 BOREHOLE DIAMETER (mm) DATE COMPLETED 24/09/2008 GROUND LEVEL (m AOD) 200 BOREHOLE DEPTH (m) Dublin Central Developments Ltd 21.20 CLIENT BORED BY J. McDonnell AGL Consulting Ltd **ENGINEER** CASING DEPTH (m) PROCESSED BY 21.20 S. Letch Samples Standpipe Details E Depth (m) Elevation Recovery Ref. Number Sample Type Field Test Description Legend Depth Depth (m) Results 20 Hard black slightly sandy gravelly CLAY with occasional cobbles (continued) N = 100/175 mm (13, 29, 35, 42, 23) AF4841 В 20.50-20.50 - 21 End of Borehole at 21.20 m 21.20 22 23 25 26 27 28 29 HARD STRATA BORING/CHISELLING WATER STRIKE DETAILS Water Casing Sealed Rise Time Time From (m) To (m) Comments Comments Strike (h) Depth At To (min) 0.5 Boulder 3.8 Boulder Boulder Boulder Boulder Hard Strata Boring 3.9 5 6 14.4 16.7 18.5 21 21.2 0.5 **GROUNDWATER DETAILS** GDT 11 14.4 16.7 18.5 8 Hard Strata Boring Hard Strata Boring Hard Strata Boring Hole Casing Depth to Water Date Comments IGSL Depth Depth 23-09-08 21.20 21.20 6.00 End of shift Boulder GPJ INSTALLATION DETAILS

Date Tip Depth RZ Top RZ Base Type LOG DCD **REMARKS** Hand dug inspection pit excavated to 1.20m. Water added from 3.5m to aid drilling. BH



REPORT NUMBER

CON	ITRA	ACT	D	ublin	Central Developme	ent - Dra						DRILLI SHEET	HOLE N	0	OW1	1 of 4
	ORD	DINA			Central Developme	ante I tel	С	ROUND L ORE DIAM	METER (mm)		90		STARTE COMPLI		15/09 16/09 Millen	/2008
	INE	ER			onsulting Engineers	TILS LIG.		LUSH		F	Polymer Ge				A. Ma	
	Core Run Depth (m)	T.C.R.%	S.C.R.%	R.Q.D.%	Fracture Spacing (mm)	Legend	Non-intact zones (shaded)		description	Depth (m)	Disc	ontinuities		Elevation	Standpipe Details	SPT (N Value)
								made gr	on Pit - d by driller as ound consisting I and cobbles.						11188111 11188111	
1						~~~				1.20						
2	£							HOLE D Observe madegro	TRIX OPEN PRILLING: and by driller as bund consisting wood and clay.						7,887,7,887,7,887,7 7,887,7,887,7,887,7 7,887,7,887,7,887,7	,
3	1									4.20					1,841,1841,1841 1,841,1841,1841 1,841,1841,1	
5								HOLE D	TRIX OPEN PRILLING: std by driller as of gravel	4.20					178411784117841178411784117841 1784117841	
7															IN IN IN	
8						00000000									KUTTKUTTKUTTKUTTKUTTKUTTKUTTKUTTKU KUTTKUTT	
9						000000									XX///XX///XX/ XX///XX///XX/ XX///XX///	
	MAR		noot	or -	t to 1.2m				INSTALLATION	ON REM	ARKS				'A 'N 'N	
ian	ia al	ag ins	pect	on pi	t to 1.2m.				Headworks.							
									GROUNDWA		-					
									Date	Hole Depth	Casing Depth	Depth to Water	Comm	nents		
	<b>TAL</b>	LAT			NILS  RZ Top RZ Base	.1	Туре									



REPORT NUMBER

0-	ORE	OINA"	ΓES(	_)			С	GROUND LEVEL (m) ORE DIAMETER (mm				STARTE	D 1	5/09/2008 6/09/2008
	ENT	ER			Central Developments			ICLINATION LUSH		-90 Polymer Ge		ED BY ED BY		fillennium . Mahony
	Core Run Depth (m)	T.C.R.%	S.C.R.%	R.Q.D.%	Fracture Spacing (mm)  0 250 500	Legend	Non-intact zones (shaded)	Strata description	Depth (m)	Disc	continuities		Elevation	Standpipe Details
10								SYMMETRIX OPEN HOLE DRILLING: Observed by driller a returns of gravel (continued)					9///	
						000						C PLA	N NO	2 61/21
13								SYMMETRIX OPEN HOLE DRILLING: Observed by driller a returns of clay and gravel						76/2021
16								SYMMETRIX OPEN HOLE DRILLING: Observed by driller a returns of clay	16.20					KSTIRSTIRSTIRSTIRS
REN Han						0			19.20					<u> </u>
REN Han	d du		pecti	on pit	to 1.2m.			INSTALLA Headworks		ARKS				
								GROUNDV	VATER DE	TAILS				
								Date	Hole Depth	Casing Depth	Depth to Water	Comme	ents	
NS <sup>-</sup>	TAL Date 09-0	8	2000	epth 0	RZ Top RZ Base 10.50 13.50 27.00 33.00	50r	Type nm S	SP				1		



REPORT NUMBER

CONT	TRA	СТ	Du	ıblin	Central De	evelopme	nt - Draf	t							HOLE N	0	OW	
CO-0	RDI	INAT	ES(	)				GRO	UND L	EVEL (m)				SHEET	STARTE	-D		t 3 of 4 0/2008
			(,	- /				CORI	E DIAN	IETER (m	m)				COMPL			9/2008
CLIE	NT		Di	ıblin	Central De	evelopme	nts Ltd.	INCL	INATIO	N		-	-90	DRILLI	ED BY		Miller	nnium
ENGI	NEE	R	AC	SL C	onsulting E	ngineers		FLUS	SH			- 1	Polymer Ge	LOGG	ED BY		A. Ma	ahony
Downhole	Core Kun Depth (m)	T.C.R.%	S.C.R.%	R.Q.D.%	Fractu Spaci (mm	ng 1) 500	Legend	Non-intact 2		descriptio		Depth (m)	Disc	continuities		Elevation	Standpipe Details	SPT (N Value)
222 23 24 25 26 27 27 28 29								H O re 200 H O re 100 D D D D	OLE Di bservere eturns of ravel (cr YMME* OLE Di bservere eturns of obbles. YMME* OLE Di bbservere eturns of ock	G: No rec I by driller	as N as as as a sed	20.70 21.50 22.00						
REM	ARK	S					<del></del>			INSTAL	ATION	REM	ARKS				I∵.‡:	
Hand	dug	g insp	ectio	n pit	t to 1.2m.					Headwor								
									-									
										GROUN				D. ".				
										Date		lole epth	Casing Depth	Depth to Water	Comm	ents		
INST						D7.5												
16-0	ate 19-08		ip De 13.5		RZ Top 10.50	RZ Base 13.50		ype nm SP										
16-0			33.0	0	27.00	33.00	50n	nm SP										



REPORT NUMBER

		OINA					С	ORE DIAMETER (mm)		00	DATE	STARTE		16/0	9/2008 9/2008
	ENT	ER			Central Developme onsulting Engineers	ents Ltd.		ICLINATION LUSH		-90 Polymer Ge	DRILL LOGG			nnium ahony	
Downhole Depth (m)	Core Run Depth (m)	T.C.R.%	S.C.R.%	R.Q.D.%	Fracture Spacing (mm)	Legend	Non-intact zones (shaded)	Strata description	Depth (m)		continuities		Elevation	Standpipe Details	SPT (N Value)
31 32								OPEN HOLE DRILLING: No recove observed by driller as returns of rock. (continued)	ry,		DO	C PLI	IN M		61/21 16/2021
33								End of Corehole at 33 (m)	33.00	2					
35															
37															
38															
	MAR ad du		pecti	on pit	t to 1.2m.			INSTALLAT	TON REM	MARKS					
- 441		313		part				Headworks.	ATED DE	TAILS					
								GROUNDW.  Date	Hole	Casing	Depth to Water	Comm	ents		
	Date			epth	ILS  RZ Top RZ Base 10.50 13.50		Гуре nm S		Depth	Depth	vvalei				



REPORT NUMBER

ONTRACT Dublin Central Development -					DRILLI- SHEET	HOLE NO		RC08		
O-ORDINATES(_)	C	ORE DIAMETER (mm)		102	DATE	STARTE	ETED			
LIENT Dublin Central Developments  NGINEER AGL Consulting Engineers	LtG.	LUSH		90 Polymer Gel	LOGGI			Millenn A. Mah		
	Non-intact zones (shaded)	Description	Depth (m)	Discor	ntinuities		Elevation	Standpipe Details	SPT (N Value)	
		Inspection Pit - observed by driller as made ground consisting of gravel, sand, brick and timber.					X///X///X///X///X///X///X///X///X///X/	KUTIKUTIKUTIKUTIKUTIKUTIKUTIKUTIKUTIKUTI		
EMARKS		INSTALLATION	REM	ARKS						
land dug inspection pit to 1.2m.		Headworks.								
		GROUNDWATE			Double to					
			lole epth	Casing   Depth	Depth to Water	Comm	ents			
NSTALLATION DETAILS	Type 50mm S									



REPORT NUMBER

13696

DRILLHOLE NO CONTRACT Dublin Central Development - Draft **RC08** SHEET Sheet 2 of 33 GROUND LEVEL (m) CO-ORDINATES(\_) DATE STARTED 13/09/2008 CORE DIAMETER (mm) 102 DATE COMPLETED 14/09/2008 INCLINATION -90 CLIENT Dublin Central Developments Ltd. **DRILLED BY** Millennium AGL Consulting Engineers **ENGINEER FLUSH** Polymer Gel LOGGED BY A. Mahony (E) E zones (shaded) Downhole Depth Details Core Run Depth SPT (N Value) Fracture Spacing Description Discontinuities (m) Standpipe % (mm) Elevation S.C.R.% Non-intact 0 Legend Depth ( œ ø J.C. 250 œ ستسسسس Inspection Pit -61/21 6/2021 observed by driller as made ground consisting of gravel, sand, brick and timber. (continued) 1.20 DCC PLAN SYMMETRIX OPEN HOLE DRILLING: Observed by driller as returns of gravelly clay with cobbles 11/11/08 GDT IGSL REMARKS INSTALLATION REMARKS Hand dug inspection pit to 1.2m. Headworks. NEWLOG 1M PER PG **GROUNDWATER DETAILS** Hole Casing Depth to Water Date Comments Depth Depth **INSTALLATION DETAILS** Tip Depth RZ Top RZ Base RC ! Date Type 14-09-08 13.00 6.00 13.00 50mm SP 14-09-08 32.50 26.50 32.50 50mm SP



REPORT NUMBER

CO-C		OINA			Central Developme	ent - Dra	_	GROUND L	LEVEL (m)			SHEET	HOLE NO			08 t 3 of 33
							С	ORE DIAM	METER (mm)	1	02		COMPLE			9/2008
CLIE	NT	ER			Central Development			NCLINATIO	DN		90 Polymer Gel	DRILLI				nnium ahony
	Core Run Depth (m)	T.C.R.%	S.C.R.%	R.Q.D.%	Fracture Spacing (mm)	Legend	Non-intact zones (shaded)		scription	Depth (m)	Disco	ontinuities		Elevation	Standpipe Details	SPT (N Value)
2								SYMME HOLE D Observe	TRIX OPEN RILLING: d by driller as of gravelly clay bles (continued)  TRIX OPEN ORILLING: ed by driller as of gravelly clay	2.70					XVII XVII XVII XVII XVII XVII XVII XVII	
REN									INSTALLATIO	N REM	ARKS				ммк	1
Han	d du	ig ins	spect	ion p	it to 1.2m.				Headworks.							
									GROUNDWAT			D				
										Hole Depth	Casing Depth	Depth to Water	Comm	ents		
14-	TAL Date 09-0	08		00	AILS  RZ Top RZ Base  6.00 13.00  26.50 32.50	50	Type mm mm	SP								



REPORT NUMBER

13696

DRILLHOLE NO RC08 Dublin Central Development - Draft CONTRACT SHEET Sheet 4 of 33 CO-ORDINATES( ) GROUND LEVEL (m) DATE STARTED 13/09/2008 CORE DIAMETER (mm) 14/09/2008 102 DATE COMPLETED -90 INCLINATION CLIENT Dublin Central Developments Ltd. DRILLED BY Millennium **ENGINEER** AGL Consulting Engineers **FLUSH** Polymer Gel LOGGED BY A. Mahony Downhole Depth (m)  $\Xi$ Non-intact zones (shaded) Standpipe Details Core Run Depth (N Value) Fracture Spacing Description Discontinuities Œ Elevation % (mm) S.C.R.% Q.D.9 Legend ď Depth SPT T.C. 250 œ <u>.....</u> 0\_ SYMMETRIX OPEN HOLE DRILLING: Observed by driller as returns of gravelly clay (continued) 06/2021 GDT IGSL REMARKS INSTALLATION REMARKS GPJ Hand dug inspection pit to 1.2m. Headworks. NEWLOG 1M PER PG **GROUNDWATER DETAILS** Depth to Water Hole Casing Date Comments Depth Depth **INSTALLATION DETAILS** Tip Depth RZ Top RZ Base Date RC 1 Type 14-09-08 13.00 6.00 13.00 50mm SP 14-09-08 32.50 26.50 32.50 50mm SP



REPORT NUMBER

GROUND LEVEL (m) CORE DIAMETER (mm) AGL Consulting Engineers  Dublin Central Developments Ltd.  REMARKS  REMARKS  CHARACK  CORE DIAMETER (mm) AGL Consulting Engineers  Dublin Central Developments Ltd.  Discontinuities  Disconti	CONTRACT		ublin	Central Developme	ent - Draf	t					HOLE N	0	RC0	
REMARKS  REMARKS    Act   Consuming Engineers   Expenses   Expense	O-ORDINA	TES(	_)							DATE	STARTE		13/09	9/2008
SYMMETRIX OPEN HOLE DRILLING Observed by driller as returns of gravel.  SYMMETRIX OPEN HOLE DRILLING Observed by driller as returns of gravel.  SYMMETRIX OPEN HOLE DRILLING Observed by driller as returns of gravel.  SYMMETRIX OPEN HOLE DRILLING Observed by driller as returns of gravel.  SYMMETRIX OPEN HOLE DRILLING Observed by driller as returns of gravel.  SYMMETRIX OPEN HOLE DRILLING Observed by driller as returns of gravel.  SYMMETRIX OPEN HOLE DRILLING Observed by driller as returns of gravel.  SYMMETRIX OPEN HOLE DRILLING Observed by driller as returns of gravel.  SYMMETRIX OPEN HOLE DRILLING Observed by driller as returns of gravel.  SYMMETRIX OPEN HOLE DRILLING Observed by driller as returns of gravel.  SYMMETRIX OPEN HOLE DRILLING Observed by driller as returns of gravel.  SYMMETRIX OPEN HOLE DRILLING Observed by driller as returns of gravel.  SYMMETRIX OPEN HOLE DRILLING Observed by driller as returns of gravel.  SYMMETRIX OPEN HOLE DRILLING Observed by driller as returns of gravel.  SYMMETRIX OPEN HOLE DRILLING Observed by driller as returns of gravel.  SYMMETRIX OPEN HOLE DRILLING Observed by driller as returns of gravel.  SYMMETRIX OPEN HOLE DRILLING Observed by driller as returns of gravel.  SYMMETRIX OPEN HOLE DRILLING Observed by driller as returns of gravel.  SYMMETRIX OPEN HOLE DRILLING Observed by driller as returns of gravel.					ents Ltd.									
NEMARKS  Hand dug inspection pit to 1.2m.  HOLE DRILLING  Observed by driller as returns of gravelly clay  (continued)  SYMMETRIX OPEN HOLE DRILLING Observed by driller as returns of gravel.  SYMMETRIX OPEN HOLE DRILLING Observed by driller as returns of gravel.  A 20  SYMMETRIX OPEN HOLE DRILLING Observed by driller as returns of gravel.  A 20  SYMMETRIX OPEN HOLE DRILLING Observed by driller as returns of gravel.  A 20  SYMMETRIX OPEN HOLE DRILLING Observed by driller as returns of gravel.  A 20  SYMMETRIX OPEN HOLE DRILLING Observed by driller as returns of gravel.  A 20  SYMMETRIX OPEN HOLE DRILLING Observed by driller as returns of gravel.  A 20  SYMMETRIX OPEN HOLE DRILLING Observed by driller as returns of gravel.  A 20  SYMMETRIX OPEN HOLE DRILLING Observed by driller as returns of gravel.  A 20  SYMMETRIX OPEN HOLE DRILLING Observed by driller as returns of gravel.  A 20  SYMMETRIX OPEN HOLE DRILLING Observed by driller as returns of gravel.  A 20  SYMMETRIX OPEN HOLE DRILLING Observed by driller as returns of gravel.  A 20  SYMMETRIX OPEN HOLE DRILLING Observed by driller as returns of gravel.  A 20  SYMMETRIX OPEN HOLE DRILLING Observed by driller as returns of gravel.  A 20  SYMMETRIX OPEN HOLE DRILLING Observed by driller as returns of gravel.  A 20  SYMMETRIX OPEN HOLE DRILLING Observed by driller as returns of gravel.  A 20  SYMMETRIX OPEN HOLE DRILLING Observed by driller as returns of gravel.  A 20  SYMMETRIX OPEN HOLE DRILLING Observed by driller as returns of gravel.  A 20  SYMMETRIX OPEN HOLE DRILLING Observed by driller as returns of gravel.  A 20  SYMMETRIX OPEN HOLE DRILLING Observed by driller as returns of gravel.  A 20  SYMMETRIX OPEN HOLE DRILLING Observed by driller as returns of gravel.  A 20  SYMMETRIX OPEN HOLE DRILLING Observed by driller as returns of gravel.  A 20  SYMMETRIX OPEN HOLE DRILLING Observed by driller as returns of gravel.  A 20  SYMETRIX OPEN HOLE DRILLING Observed by driller as returns of gravel.  A 20  SYMETRIX OPEN HOLE DRILLING Observed by driller as returns of		S.C.R.%	a.D	Spacing (mm)		Non-intact zones (shaded)	Description	Depth (m)	Disco	ontinuities		Elevation		SPT (N Value)
REMARKS INSTALLATION REMARKS Headworks.  GROUNDWATER DETAILS  Date Hole Casing Depth to Comments							HOLE DRILLING: Observed by driller as returns of gravelly clay (continued)  SYMMETRIX OPEN HOLE DRILLING: Observed by driller as							
		spect	ion pit	t to 1.2m.	000		Headworks.							
							Date			Depth to Water	Comm	nents		
NSTALLATION DETAILS  Date   Tip Depth   RZ Top   RZ Base   Type						Туре								



REPORT NUMBER

50	NTR	ACT	D	ublin	Central De	evelopm	ent - Dra	ft					HOLE N	0	RC0	
00	-ORE	OINA	res(	_)					ROUND LEVEL (m) ORE DIAMETER (mm)		102	I PERSONAL PROPERTY.	STARTE COMPL		13/09/ 14/09/	
	ENT	ER			Central De				CLINATION			DRILLED BY LOGGED BY				
Downhole Depth (m)	Core Run Depth (m)	T.C.R.%	S.C.R.%	R.Q.D.%	Fracti Spaci (mn	ing n)	Legend	Non-intact zones (shaded)	Description	Depth (m)	Dise	continuities		Elevation	Standpipe Details	SPT (N Value)
5.5									SYMMETRIX OPEN HOLE DRILLING: Observed by driller as returns of gravel. (continued)				occ ill		XVII KVII KVII KVII KVII KVII KVII KVII	861/21 06/2021
	MARI nd du		pectio	on pit	to 1.2m.				Headworks.	N REM	ARKS					
									GROUNDWATI	ER DET	TAILS					
									Date	lole	Casing	Depth to Water	Comm	ents		
										epth	Depth	vvalei				
IS	TALI					RZ Base	7	Typo								
-	Date		41 1 1 16	1111111	127 TOD	rk base	1	Гуре					1			



REPORT NUMBER

CONT	ΓRA	СТ	D	ublin	Central Developme	nt - Dra	ft						DRILLI SHEET	HOLE N	0	RC	<b>08</b> et 7 of 33
co-o	RD	INAT	ES(	_)				GROUND L	EVEL (m) NETER (mm)		1	02	DATE	STARTE		13/0	9/2008 9/2008
CLIE		R			Central Developme onsulting Engineers	nts Ltd.		NCLINATIO LUSH			DRILLE				ennium lahony		
	Core Kun Deptn (m)	T.C.R.%	S.C.R.%	R.Q.D.%	Fracture Spacing (mm)	Legend	Non-intact zones (shaded)		scription	Depth (m)	()	Disc	ontinuities		Elevation	Standpipe Details	SPT (N Value)
6								HOLE D	TRIX OPEN RILLING: d by driller as f gravel. ed)								
REM			nacti	ion ni	it to 1.2m	1.01			INSTALLA		M	ARKS				LILL	
nanc	uu	y IIIS	pecil	on pi	it to 1.2m.				Headworks								
									GROUNDV	VATER D	ET	Casing	Depth to	6			
									Date	Depth		Depth	Depth to Water	Comn	nents		
14-0 14-0	ate	8		epth 00	RZ Top RZ Base 6.00 13.00 26.50 32.50	50	Type mm :	SP									



REPORT NUMBER

CO-C					Central Developme		(	GROUND LEVEL (m) CORE DIAMETER (mm)	1	102	100000000000000000000000000000000000000	STARTI COMPL		13/09	et 8 of 33 9/2008
CLIE		ER			Central Developme onsulting Engineers	ents Ltd.		NCLINATION LUSH		90 Polymer Gel	mer Gel DRILLED BY LOGGED BY				nnium ahony
Downhole Depth (m)	Core Run Depth (m)	T.C.R.%	S.C.R.%	R.Q.D.%	Fracture Spacing (mm)	Legend	Non-intact zones (shaded)	Description	Depth (m)	Disco	ntinuities		Elevation	Standpipe Details	SPT (N Value)
7								SYMMETRIX OPEN HOLE DRILLING: Observed by driller as returns of gravel. (continued)				DCC	PLA		.2861/21 1/06/202
REM			pection	on pit	t to 1.2m.	1001		INSTALLATIO	N REM	ARKS			I		
16		30	, , , , , , , ,	, pi				Headworks.	ED D==	All C					
									Hole	Casing	Depth to Water	Comm	ents		
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0-0	RDIN	IATI	ES(	_)			С	GROUND LEVEL (m) ORE DIAMETER (mm)		102		DATE STARTED DATE COMPLETED		Sheet 9 of 33 13/09/2008 14/09/2008	
CLIEN		2			Central Developme onsulting Engineers	ents Ltd.		LUSH		90 Polymer Gel	DRILLI				nnium ahony
Downhole Depth (m)	Cole Ruil Depuil (III)	%.Y	S.C.R.%	R.Q.D.%	Fracture Spacing (mm)	Legend	Non-intact zones (shaded)	Description	Depth (m)	Disco	ontinuities		Elevation	Standpipe Details	SPT (N Value)
REMARK	ARKS							SYMMETRIX OPEN HOLE DRILLING: Observed by driller as returns of gravel. (continued)	N DEM	APKS					
			ectio	on pit	t to 1.2m.			Headworks.	NKEW	AKNS					
								GROUNDWAT	Annie de la company de la comp						
<b>NST</b>	<b>ALL</b> /ate				ILS  RZ Top RZ Base		Type	Date	Hole Depth	Casing Depth	Depth to Water	Comme	ents		)



REPORT NUMBER

13696

CONTRACT Dublin Central Development - Draft DRILLHOLE NO RC08 SHEET Sheet 10 of 33 GROUND LEVEL (m) CO-ORDINATES(\_) DATE STARTED 13/09/2008 CORE DIAMETER (mm) 102 DATE COMPLETED 14/09/2008 INCLINATION -90 CLIENT Dublin Central Developments Ltd. DRILLED BY Millennium **ENGINEER** AGL Consulting Engineers **FLUSH** Polymer Gel LOGGED BY A. Mahony Downhole Depth (m)  $\widehat{\mathbb{E}}$ Non-intact zones (shaded) Details Core Run Depth SPT (N Value) Fracture Spacing Description Discontinuities (m) Standpipe % Elevation % (mm) R.Q.D. Legend T.C.R. Depth ( 2 S.C. 250 500 ستسسلسست SYMMETRIX OPEN 000 HOLE DRILLING: 000 Observed by driller as returns of gravel. 000 (continued) DCC PLAN NO 2861/21 RECEIVED: 01 16/2021 000 000 000 000 000 000 000 000 000 000 000 000 000 000 000 000 000 11/11/08 000 GDT 000 IGSL GPJ REMARKS INSTALLATION REMARKS Hand dug inspection pit to 1.2m. Headworks RC NEWLOG 1M PER PG **GROUNDWATER DETAILS** Hole Casing Depth to Water Date Comments Depth Depth **INSTALLATION DETAILS** Date Tip Depth RZ Top RZ Base Type 14-09-08 13.00 6.00 13.00 50mm SP GSL 14-09-08 32.50 26.50 32.50 50mm SP