Appendix 6-1

Irish Drilling Report

IRISH DRILLING LIMITED

CONTRACT DRILLING SITE INVESTIGATION

LOUGHREA, CO. GALWAY, IRELAND

Phone: (091) 841 274 Fax: (091) 847 687

email: declan@irishdrilling.ie

MIXED DEVELOPMENT CROWN SITE, MERVUE GALWAY

SITE INVESTIGATION REPORT

Michael Punch & Ptns., Consulting Engineers, 97 Henry St., Limerick

May 2007

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1.0 Introduction.

Irish Drilling Ltd. were instructed by Michael Punch & Partners, Consulting Engineers, to carry out a site investigation on the site of a proposed development at the 'Crown' site, Mervue, Galway.

The site investigation has therefore been carried out to assess the ground conditions and provide data to assist in the design of foundations.

The investigation was carried out between 19th January 2007 and 22nd March 2007.

2.0 Site & Geology

The site is located on the Mervue Road at the recently vacated 'Crown' site.

Much of the site was greenfield lawn area and the remainder had a factory and associated yards and parking area, during the period of this investigation.

A Site Plan is included in this report and shows the positions of the trial pits and boreholes.

Geological Survey maps of the area indicate that the site is underlain by the Carboniferous Limestone Formation.

3.0 Fieldwork.

Sixteen (including one re-bore at Bh-5a) shell and auger (light cable percussion) boreholes were bored on the site. Standard Penetration Tests were carried out at approximately one metre intervals and samples were taken and returned to the laboratory for examination. The borehole records are included in Appendix 1.

Seven rotary core boreholes were drilled using HQ (65mm) wire-line drilling equipment, to depth of between 5.0m and 14.0m below existing ground levels. The boreholes were logged by an engineering geologist and the records are included in Appendix 2.

Eleven trial pits were excavated with a 13 tonne tracked excavator and subsequently a 20 tonne tracked excavator was used at a number of locations to try to penetrate deeper into a hard Glacial till which was presenting difficulties for the lighter machine. The trial pits records are included in Appendix 3

Contaminant testing was carried out at a number of locations and the tests were carried out by Alcontrol Geochem. Laboratory classification testing was carried out on a number of representative soil samples. Tests carried out were natural moisture content, Atterberg Limits and Particle Size Distribution tests. The results are included in Appendix 4

Photographs of some of the trial pits are included in Appendix 5.

Standpipe piezometers were installed in Boreholes 1, 3, 5, 7, 9, 13 and 15 to monitor groundwater and gas levels. Water and gas level readings are included in Appendix 6.

4.0 Ground Conditions

Generally the sub-soils consist of alayer of topsoil or fill over gravelly sandy clay with cobbles and boulders that becomes stiffer with increasing depth. The Till frequently becomes very stiff to hard.

Rock was encountered at between 0.60m on the western side of the site to a maximum depth of 10.8m in the south-western corner of the site. Generally rockhead appears to slope downwards from north to south. Rock is generally very strong, grey, slightly weathered limestone with close to medium spaced fractures. Rockhead was encountered at the following levels:

RC-1	2.40m
RC-3	10.80m
RC-5	6.20m.
RC-7	4.30m
RC-9	6.10m
RC-13	2.50m
RC-15	1.50m

4.1 Groundwater

Groundwater was not encountered in the trial pits or in the shell and auger boreholes, possibly as casing was used in the boreholes that prevented slow water inflows from entering the boreholes. Standpipes installed in some of the boreholes encountered groundwater and these levels are included in Appendix 6. The shallowest water table measured was at 2.40m depth in Bh-15 on 14th March 2007.

5.0 Foundations.

There are proposals to construct basements over part of this site. It is expected to be unlikely to be able to excavate into the soils and to maintain stability of excavations without some form of ground support. Alternatively consideration could be given to battering excavation sides at slopes no greater than 2:1 (horizontal:vertical).

Foundations on clean sound limestone may be designed using an allowable bearing pressure of 1,000kN/m². On the hard Glacial Till foundations may be designed using an allowable bearing pressure of 300kN/m². Formation should not be exposed to rainfall or groundwater as it is expected to soften rapidly under those conditions.

Consideration could also be given to using piled foundations. The length of pile would depend on the pile type and diameter, the design loads and the strength of the soils or rock. The advice of specialist contractors should be sought as to the feasibility of their type of pile.

5.1 Retaining Walls

For the design of retaining walls the following parameters may be used (4):

Strata	Unit Wt. saturated/dry kN/m³	Cohesion (undrained) kPa	Angle of internal friction
Fill	22/20	0	20
Loose Sand and Gravel	20/16	0	30
Dense Sand and Gravel	21/17	0	35
Very soft organic clay	14/6	10	0
Soft slightly organic clay	16/10	20	0
Firm sandy clay	17/12	40	0
Firm to stiff glacial till	20/17	75	0
Stiff glacial till	20/17	100	0
Very stiff glacial till	20/17	200	0
Hard glacial till	20/17	300	0
Limestone	24/24	10,000	40

6.0 Excavations

Excavations are likely to be unstable, particularly in sandy and gravelly soils and some form of side supports of excavation sides is likely to be necessary.

In the interest of safety, personnel should not be allowed enter unsupported excavations deeper than 1.0m.

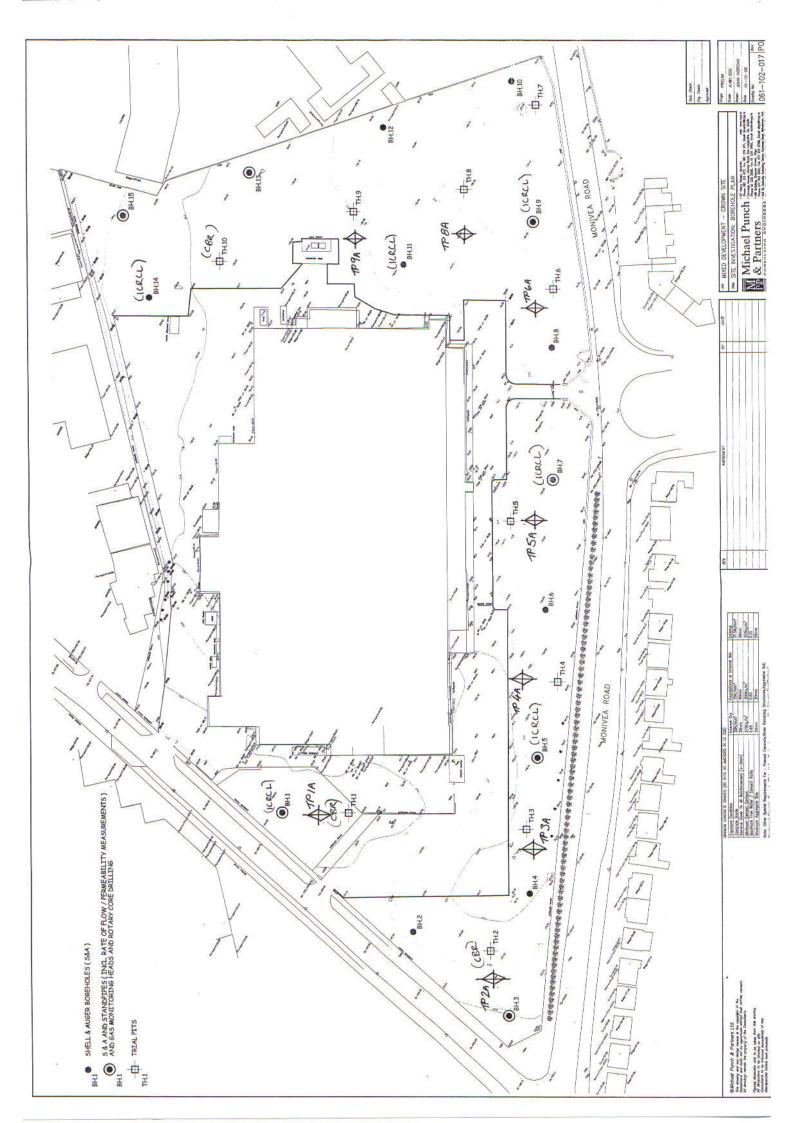
7.0 Environmental tests

The results of environmental tests on representative samples indicate that the level of contaminants in the samples are within acceptable limits for a commercial/residential development.

Declan Joyce, B.E., M.Eng.Sc., C.Eng., MIEI.

REFERENCES:

- (1) B.S.5930:(1999), Code of Practice for Site Investigation.
- (2) B.S.1377:(1990), Methods of Test for Soils for Civil Engineering Purposes.
- (3) B.S.8004:(1986), Foundations.
- (4) Hoek E. & Bray J.W. (1991) Rock Slope Engineering. Revised 3rd ed. IMM
- (5) Kauzenkamp, K.W., Roels, J.M. and Hoppener, C. (1993), <u>Assessment of soil contamination: General criteria and site specific modifications. In contaminated soil '93.</u> Fourth Int. TNO /KfK Conference on Contaminated Soil. F Arendt, G.J. Annokkee, R. Bosman and W.J. van den Brink (eds.). Kluwer Academic Publishers.



APPENDIX 1 BOREHOLE RECORDS

(SHELL & AUGER)



Project														В	OREH	IOLE	No
	ed Dev	elopment,	Mervu	ie,	Galwa											1	
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2.50-3.00	B CPT	N20 (3, 4, 4, 5, 5, 6)			0	(3.70))							
3.50-4.00	B	N35 (3, 4, 6, 6, 9, 14)												
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0.50	CPI	N13 (2, 3, 3, 4, 3, 3)			9	-	1.00	Stiff g	rey gravel	lly sandy (CLAY with o	cobbles.			
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-		5, 8, 12, 12, 10, 10))			-									
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3.50-4.00	В				7-3	-									
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_		(8, 15, 22, 28)			\$	ŀ	4.20								
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SAM	PLES &	& TESTS	;		,			STRA	TA				y	ient/
Depth	Type No	Test Result	Water	Reduced Level	Legeno	De (Thickness)			DES	SCRIPTION	1		Geology	Instrument/ Backfill
- 0.00-0.50	В				1/ 7/1/	(0.60	TOPS Loos	SOIL e brown si	It with cobb	bles.				
0.50-1.00	В				11. 11	F `	0.60							
0.50	D CPT	N13			<u>o_</u>	-	Firm	grey grave	elly sandy C	CLAY with	cobbles.			
- 0.30	CFI	(1, 2, 2, 3, 4, 4)			8	(0.90	0)							
-					F -60	1	1.50							
1.50-2.00 1.50	B CPT	N15			<u>0</u>		Stiff	grey grave	lly sandy C	CLAY with	cobbles.			
1.50		(3, 4, 4, 4, 3, 4)												
- -						-								
2.50-3.00	В					(2.00	0)							
2.50	CPT	N20 (2, 5, 3, 5, 6, 6)				-								
<u></u>		(2, 3, 3, 3, 0, 0)				<u></u>								
Ē					<u> </u>	- 1	3.50							
3.50-4.00 3.50	B CPT	N48/			<u>o</u>	L	Verv							
- 3.30 -		150	10		<u>~</u> _	- (0.30	t.00							
4.00	CPT	, 10, 10, 12, 12, 1 N75/	14)			-	Refus	sal - possib	ole boulders	s or rock				
Ė		150 (25, 50)				-								
E						-								
-						-								
Ē						-								
- - -														
_						-								
-						-								
<u>-</u> -						-								
						-								
<u></u>						-								
- - -														
E														
<u> </u>		1 ***			-	<u> </u>		~1. 11.		T				
Born	ng Prog	ress and Wate				ter	From	Chiselling To	Hours	Water	Added To	GENE REMA		
Date 18-01-07	16.00	Depth Dep 0.00 0.0		ng Dıa. mm	D	pt			0.5	FIOIII	10	TCEATA		
18-01-07	18.00	4.00 4.0	ŏ		dr	ту	2.1 3.6	2.3 4	1					
Borin Date 18-01-07 18-01-07 All dimensic metres Scale 1:5	ons in Cl	ient Harmack (Crow	n Cont	rol		Metl	nod/ Da	ndo 2000	<u> </u>	Bit	Logged I	Ву	
metres Scale 1:5	50						Plan	t Used			Design			



Project												BOREH	OLE	No
	ed Dev	relopment, Mo	ervue,	Galwa] ,	8	
Job No		Date 19	-01-0' -01-0'	7 7	Grou	nd Lev	el (m)	Co-Oı	rdinates ()				•	
Engineer		I				9	GROUNDWA STRIKES		dry	ose to (@ 20 r	nin.): Sealed at:	Sheet		
Ml.	Punch	& Ptns.						2nd: 3rd:				1 0	of 1	
SAM	PLES	& TESTS						STRA	TA				, x	ent/
Depth	Type No	Test Result	Water	Reduced Level	Legeno	De _l (Thick ness)	ξ-		DES	SCRIPTION	N		Geology	Instrument/ Backfill
0.00-0.50	В				1 71 V	(0.50)		SOIL e brown si	lt with cobb	oles.				
0.50-1.00 0.50 0.50	B D CPT	N15 (3, 3, 4, 3, 4, 4)		0-0	(0.50)	.00		elly sandy C					_
1.50-2.00	B	N22 (2, 4, 5, 5, 6, 6)			(2.50)		5.0) 5.000	,	2222	•			
2.50-3.00	B CPT	N27 (3, 3, 5, 7, 8, 7)				,							
3.50-3.80	В				0-	1	.50 Verv	stiff grev	gravelly sar	ndv CLAY	with cobbles.			-
3.50	CPT	N31/ 95)	3.	.80		ole boulders	-				_
3.80	СРТ	(18, 19, 19, 12 N75/ 85 (25, 50)				-		-						
-						- - - - - -								
- - - - - - -						- - - - - -								
						- - - - - - -								
j - j - - - - - - -						- - -								
Borii	ng Prog	gress and Wa					(Chisellin	g	Water	Added	GENE		
Date	Time			ng Dia. mm	wa D	iter pt	From	То	Hours	From	То	REMA		
Borin Date 19-01-07 19-01-07 All dimensic metres Scale 1:5	08.00 10.30	0.00 0.	00 80		di		3.4	3.8	1					
All dimension metres Scale 1:5	ons in C	lient Harmack	Crow	n Cont	rol		Meth Plan	nod/ Da t Used	ndo 2000)	Bit Design	Logged I	Зу	
Scale 1:5	DU L													



Project												BOREH	OLE	No
	ed Dev	elopment,	Mervue	, Galwa				_					9	
Job No		Date	19-01-0 19-01-0)7)7	Grou	nd Level	(m)	Co-Oı	rdinates ()			•	9	
Engineer				- 7		GR	OUNDWAT RIKES	TER Wate 1st:	er strikes: R	ose to (@ 20 n	nin.): Sealed at:	Sheet		
Ml.	Punch	& Ptns.						2nd: 3rd:				1 0	of 1	
SAM	PLES	& TESTS						STRA	TA					ent/
Depth	Type No	Test Result	Water	Reduced Level	Legend	Depth (Thick- ness)	ı		DES	SCRIPTION	N		Geology	Instrument/ Backfill
0.00-0.50	В				1 7 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	(0.60)		OIL brown sil	lt with cobb	oles.				
0.50-1.00 0.50 0.50	B D CPT	N17 (3, 3, 4, 3,	5, 5)			(0.90)	Stiff gr	rey grave	lly sandy C	LAY with	cobbles.			_
1.50-2.00	B	N35 (5, 8, 8, 7, 9	9, 11)			1.50	Very s	tiff grey §	gravelly sar	ndy CLAY	with cobbles.			-
2.50-3.00	B	N50/ 225 (10, 10, 15, 1				(1.70)								
3.20	CPT N75/ 125 (25, 50)					-	Refusa	l - possib	ole boulders	or rock				
-														
- - - - - - -						-								
						-								
						-								
Borii	ng Prog	gress and \			ions		Cl	nisellin	g	Water	Added	GENE		
Date	Time	Depth		sing Dia. mm	Wa D ₁	ter	From	То	Hours	From	То	REMA	RKS	
Borii Date 19-01-07 19-01-07 All dimensic metres Scale 1-5	10.30 13.30	0.00 3.20	0.00 3.20		dr	у	2.5	3.2	1					
All dimension metres	dimensions in metres Scale 1:50 Client Harmack Crown Control							od/ Da Used	ndo 2000)	Bit Design	Logged I	Ву	



	Project	oject Mixed Development, Mervue,										BOREH	IOLE	No		
		xed De			/ue,	Galwa								1	0	
	Job No		Dat	19-0 19-0	1-07	7	Grou	ınd Lev	el (m)	Co-C	Ordinates ()					
	Engineer			19-0	1-0	/			GROUND' STRIKES	WATER Wa		Rose to (@ 20 1	min.): Sealed at:	Sheet		
		. Punch	& Ptns.					,	STRIKES	1st 2nd 3rd	l:			1 (of 1	
ĺ	SAN	/PLES	& TEST	rs .	L					STRA						ent/
	Depth	Type No	Te Res	st ult	Water	Reduced Level		De _l d(Thick ness)	pth c-		DE	SCRIPTIO1	N		Geology	Instrument/ Backfill
	0.00-0.50	В					1 71 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	(0.60) Loc	PSOIL ose brown s	ilt with cob	bles.				
	0.50-1.00	B CPT	N4 (4, 8, 8, 10	10 0, 10, 12)	١			(0.80		y stiff grey	gravelly sai	ndy CLAY	with cobbles.			
	1.40	СРТ	N1 20)			8-	1	.40 Ref	usal - possi	ible boulders	s or rock				
	- - - - -		(17, 32	2, 18)				- - - -								
	- - - -							- - - -								
	- - - - -															
	- - - - -							- - - -								
	- - - -							- - - -								
	- - - - -							- - -								
	- - - -							- - - -								
	- - - -							- - - -								
	- - - -							_ - - -								
T 02/02/07	- - - - -							- - - -								
DL AGS3 UK BH GALWAY CROWN.GPJ IDL TP TEMPLATE.GDT 02/02/07	- - - -							- - - -								
TPTE	Bor		gress and	d Wate	r Ot	servati	ions			Chisellin	ng	Water	Added	GENE		
PJ IDI	Date	Time	Depth			ng Dıa. mm	Wa D	ater pt	From	То	Hours	From	То	REMA	RKS	
CROWN.G	19-01-07 19-01-07	13.30 16.30	0.00 1.40	0.00 1.40			d	ry	0.9	1.1	1.5					
GALWAY (
S3 UK BH	All dimara	ions in L	711	1.0		<u> </u>	1		13.5	41 - 1/	1.200			Y	D	
OL AG	All dimens metre Scale 1	1011S III (S ·50	Client Har	mack C	row	n Cont	rol		Pla	ethod/ D ant Used	ando 2000	J	Bit Design	Logged 1	ву	



Project		1		0.1		201						BOREH	OLE	No
Job No	ed Dev	Date 23-0 23-0	01-0	7	-	ınd Leve	el (m)	Co-Oı	rdinates ()			1	1	
Engineer		25 (71 0	,		S	GROUNDWA STRIKES	TER Wate	drv	ose to (@ 20 n	nin.): Sealed at:	Sheet		
Ml.	Punch	& Ptns.						2nd: 3rd:	•			1 (of 1	
SAM	PLES	& TESTS	H					STRA	TA				, A	lent/
Depth	Type No	Test Result	Water	Reduced Level	Legen	Dep d(Thick- ness)	-		DES	SCRIPTION	Ŋ		Geology	Instrument/
0.00-1.00	В				7 7 7	(0.60)	'	OIL brown si	lt with cobb	oles.				
1.00-1.50	B CPT	N39 (2, 3, 7, 9, 10, 13))		1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	(2.30)		grey SAI	ND and GR	AVEL with	n cobbles.			
2.00-2.50	B CPT	N46 2, 2, 11, 10, 11, 1	4)			(2.30)	90							
-2.90	СРТ	N30/ 75 (30)				-	Refuse	ii - possic	ole boulders	OFFICE				
						-								
Borir	ng Prog	gress and Wate					C	hisellin	g	Water		GENE	RAL	
Date 23-01-07 23-01-07	Time 09.00 13.00	Depth Dep 0.00 0.00 2.90 2.90)	ng Dia. mm		ater pt ry	From 2.9	То	Hours 1	From	То	REMA	RKS	
Borir Date 23-01-07 23-01-07 All dimension metres Scale 1:5														
All dimensio metres Scale 1:5	ons in C	lient Harmack (Crow	n Cont	rol		Methodol Plant	od/ Da Used	ndo 2000)	Bit Design	Logged 1	Зу	



Project												BOREH	OLE	No
	ed Dev	elopment, Mo	ervue,	Galwa								1	2	
Job No		Date 22 22	2-01-0° 2-01-0°	7 7	Grou	nd Level	(m)	Co-Or	rdinates ()				4	
Engineer						GI ST	ROUNDWAT RIKES	ER Wate	drv	ose to (@ 20 r	nin.): Sealed at:	Sheet		
Ml.	Punch	& Ptns.						2nd: 3rd:				1 0	of 1	
SAM	PLES	& TESTS	- I					STRA	TA					ent/
Depth	Type No	Test Result	Water	Reduced Level	Legeno	Dept (Thick- ness)	h		DES	SCRIPTION	N		Geology	Instrument/ Backfill
0.00-1.00	В				1 71 V	(0.60)		OIL brown sil	lt with cobb	oles.				
ŧ					%) - 0	0.6	Dense	orev siltv	SAND and	d GRAVEI	with cobbles			
1.00-1.50	В					-	Dense	grey siny	SAND and	u ORAVEI	2 with coobles	•		
1.00	CPT	N39 (1, 3, 5, 10, 10,	14)			- -								
-					8) ×	(2.20)								
2.00-2.50	B CPT	N40 (1, 2, 8, 9, 10, 1	.3)		SON X	- - - -								
-						2.8	0 Pafers	1	1-114	1-				-
-2.90		N30/ 0				- - -	Kerusa	I - possib	le boulders	or rock				
-		(30)				- - -								
-						- - -								
-						- - -								
-						- - -								
_														
-						- - -								
-						- - -								
-						- - -								
- 5-						- - -								
- - -						- - -								
6 - - - -						- - - -								
Bori	ng Pros	gress and Wa	ter Ol	oservat	ions	<u> </u>	Cł	niselling	φ	Water	Added	GENE	R A I	
Date	Time	Depth De	Casi	ng Dia. mm	Wa D	ter	From	То	Hours	From	То	REMA		
22-01-07 22-01-07	09.00 13.00	0.00	.00		dr		2.8		1					
0450														
Borii Date 22-01-07 22-01-07 All dimensic metres Scale 1:5	ng in I c	N: (XX 1			1			1/ 5	1.2000		D:	r · · ·		
All dimension metres Scale 1:5	ліз III С 50	lient Harmack	Crow	n Cont	rol		Metho Plant U	Jsed Da	ndo 2000)	Bit Design	Logged I	3 y	



Project													BOREH	IOLE	No
	ed Dev	velopment, Mer	vue,	Galwa									1	3	
Job No		Date 22-0 22-0)1-0)1-0	7 7	Grou	nd Lev	vel (m)		Co-Orc	dinates ()					
Engineer				-			GROUN STRIKE	DWATER S		r strikes: R	ose to (@ 20 n	nin.): Sealed at:	Sheet		
Ml.	Punch	& Ptns.							2nd: 3rd:				1 (of 1	
SAM	PLES	& TESTS	1					S	TRA	ГА					ent/
Depth	Type No	Test Result	Water	Reduced Level	Legen	De (Thicl ness)	epth k-			DES	SCRIPTION	1		Geology	Instrument/ Backfill
0.00-1.00	В				1/ 1/1/ 1/ 1/1/	(0.50)) L	OPSOII	own silt	with cobb	oles.				
- - - -					80 00 X		0.50 D	ense lig	ht brow	n silty SA	ND and GI	RAVEL with o	cobbles.		
1.00	СРТ	N35 (2, 2, 7, 9, 8, 11)			000	1.20)))								
- - 1.70	СРТ	N45/			Ø ×	1	.70 B	ofical	noggihl	e boulders	or rook				-
- 1.70	CPI	150				-	K	erusar -	possibi	e boulders	OI TOCK				
-		(15, 30)				-									
• • •						-									
- - -						-									
-						-									
- - -						-									
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Borir Date 22-01-07 22-01-07 All dimension metres Scale 1:5	ng Prog	gress and Wate	er O	bservat	ions			Chis	elling	5	Water	Added	GENE	RAL	
Date	Time	Depth Dept	Casi th	ng Dia. mm	Wa D	nter pt	Fron	n '	Го	Hours	From	То	REMA	RKS	
22-01-07 22-01-07	13.00 18.00	0.00 0.00 1.70 1.70)		dı	rv	1.7			1					
All dimension metres Scale 1:5	ons in C	lient Harmack (Crow	n Cont	rol		N P	/lethod/ lant Us	Dar ed	ndo 2000)	Bit Design	Logged	Ву	
	- 1														



Project												BOREH	OLE	No
	ed Deve	elopment, Mei	vue,	Galwa									4	
Job No		Date 23-0	01-0′ 01-0′	7 7	Grou	nd Leve	el (m)	Co-Or	rdinates ()			'	7	
Engineer						S	GROUNDWA STRIKES	TER Wate	dry	ose to (@ 20 n	nin.): Sealed at:	Sheet		
Ml.	Punch &	& Ptns.						2nd: 3rd:				1 (of 1	
SAM	PLES &	& TESTS	_ r					STRA	TA				, <u>y</u>	lent/
Depth	Type No	Test Result	Water	Reduced Level	Legeno	Dep (Thick ness)	-		DES	SCRIPTION	N		Geology	Instrument/ Backfill
0.00-1.00	В				\(\begin{align*} \frac{1}{7} & \overline{7} & \overline{7} \\ \overline{7} & \ov	(0.50)	50	OIL brown sil	lt with cobb	oles.				
						(0.50)	Dense	light brov	wn silty SA	ND and GI	RAVEL with o	cobbles.		
1.00	СРТ	N30/ 0 (30)			1000	- - -	Refus	al - possib	ole boulders	or rock				
-		(30)				- - -								
<u>-</u>						- - -								
-						- - -								
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Borir		ress and Wate	er Ol	servat	ions		C	hisellinį	g	Water	Added	GENE		<u> </u>
Date	Time			ng Dia. mm	Wa D	ter pt	From	То	Hours	From	То	REMA	RKS	
Borit Date 23-01-07 23-01-07 All dimension metres Scale 1:5	13.00 18.00	0.00 1.00 0.0 1.0	0		dr	у	1		1					
7 A A A A A A A A A A A A A A A A A A A														
All dimension metres	ons in Cl	ient Harmack	Crow	n Cont	rol		Meth Plant	od/ Da	ndo 2000)	Bit	Logged 1	Зу	
metres Scale 1:5	0						Flant	Useu			Design			



Project	rad Day	elopment, l	Mamma	Calvya	•							BOREH	IOLE	No
Job No	red Dev	Date	22-01-07 22-01-07	,		nd Leve	el (m)	Co-Or	rdinates ()			1	5	
Engineer			22-01-07			S	GROUNDWA'	FER Water	er strikes: R	ose to (@ 20 n	nin.): Sealed at:	Sheet		
Ml.	Punch o	& Ptns.						2nd: 3rd:	u1,			1 (of 1	
SAM	IPLES &	& TESTS	er er					STRA	TA				>>	nent/
Depth	Type No	Test Result	Water	Reduced Level	Legend	Dep (Thick ness)			DES	SCRIPTION	1		Geology	Instrument/ Backfill
0.00-1.00	В				7 77	(0.40)	TOPSO Loose	OIL brown sil	t with cobb	oles.				
						(0.60)	Dense				RAVEL with o	cobbles.		_
1.00	СРТ	N30/ 0 (30)			0	<u> </u>		ıl - possib	le boulders	or rock				
		(30)												
- - - -						-								
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Bori	1	gress and V	Vater Ob Casir Depth 1	servat	ions Wa	ter		hiselling		Water		GENE REM <i>A</i>		
Date 22-01-07 22-01-07	Time 13.00 18.00	0.00 1.00	Depth 1 0.00 1.00	<u> Dia. mm</u>	Wa Dı dr		From 1	То	Hours 1	From	То	KLIVIF	11110	
Bori Date 22-01-07 22-01-07 All dimensi metres Scale 1:														
All dimensi metres Scale 1:	ons in C	lient Harma	ck Crow	n Cont	rol		Metho	od/ Da Used	ndo 2000)	Bit Design	Logged	Ву	
Scale 1:	50										1 22-0.1	1		



Project														BORE	EHOLE	No
	xed Dev	elopment,	, Merv	ue,	Galwa										5a	
Job No		Date	18-01 18-01	-07 -07	7 7	Grou	nd Lev	vel (r	n)	Co-Ot	rdinates ()				Ja	
Engineer								GRO STRI	UNDWA'		er strikes: R	Rose to (@ 20 r	nin.): Sealed at:	Sheet		
Ml.	Punch	& Ptns.								2nd: 3rd:				1	of 1	
SAN	IPLES	& TESTS	,	H						STRA	TA					ent/
Depth	Type No	Test Resul	t	Water	Reduced Level	Legeno	De (Thicl ness)	epth k-			DES	SCRIPTION	N		Geology	Instrument/ Backfill
- 0.00-0.50	В					71/2	-		TOPSO	OIL brown sil	t with cobl	hles				
0.50-1.00	B CPT	N13				<u> </u>	(0.90	0)	Loose	010 WH 3H	tt with cool	ores.				
1.00	D	(3, 3, 4, 2,	3, 4)			0_0	(0.60	0)	Firm g	rey grave	lly sandy (CLAY with	cobbles.			
1.50-2.00	B CPT	N16 (4, 3, 3, 4,	5, 4)			8	- 1 	1.50	Stiff g	rey grave	lly sandy C	CLAY with	cobbles.			
2.50-3.00	B CPT	N27 (4, 8, 7, 7,	5, 8)				(1.90	0)								
3.20	СРТ	N60/ 135 (4, 18, 29				<u> </u>	- - 3	3.40	Refusa	ıl - possib	le boulders	s or rock				
							- - - - - -									
							-									
-							- - - - -									
							- - - - -									
02/02/07							- - - - -									
EMPLATE.GD							- - - -									
Bori	ng Pro	gress and	Water	Ob	servat	ions			C	hiselling	g	Water	Added		IERAL	
Date	Time	Depth		asır	ng Dia. mm	Wa D	ter pt		rom	То	Hours	From	То	REM	IARKS	S
Bori Date 18-01-07 18-01-07 18-01-07 South of the state	11.00 14.00	0.00 3.40	0.00 3.20			dr	у	2	2.8	3.2	1					
All dimensi metres Scale 1:	ons in C	lient Harm	ack Cr	ow	n Cont	rol			Metho	od/ Da Used	ndo 2000)	Bit Design	Logge	d By	

APPENDIX 2 BOREHOLE RECORDS (ROTARY CORE)



															-	DRILLH	OLL	INO
		Mixed	Develop	ment, Me	rvue, G											RC	:_1	
J	lob No			Date 26	-02-07		Ground Lev	rel (m)		Co-Ordin	ates (О				1	,- 1	
L	Enginee	ar		26-	-02-07										-	Sheet	1	
1	_		nch & Pt	ns												Silect	of 1	
F			ΓAILS						S	ΓRΑΤΑ								nt/
	Depth	TCR (SCR)		Red'cd		Depth					SCR	IPT	ION				Geology	Instrument/ Backfill
	ate	(SCR) RQD	Fracture Spacing	Lavial	Legenal	Thick- ness)	Discontin	uities		Det				Main			Geo	Instr Back
26	5-020.00	20 (11) 8	1			. (2.40)						Bou	lder Clay					
	3.00		4				2.40 - 6.20 dipping 30 undulose,	0 - 35 de	g's, irr	egular.	.	bedo	ded, fine	y strong gre to coarse gr E, slightly v	ained	d		
26	5-02	100	6			-												
		100 (98) 68	7			(3.80)	3.80 - 4.00 planar, sm	0 Joint, s nooth, op	sub-ve ben	rtical,								
26	5.00	100 (89) 79	4			-	4.90 - 4.9 irregular, open 5.80 - 6.0	smooth, 0 Joint, s	grey s	ilt smeare	d,							
L	6.20					6.20	unduloco	rough, c	orange	silt	/							
						-												
				gress and	Water	Obsei	rvations	***		-	1		Flush			GENE		
2 -	Date	Tin		oth Dept	Casing	a Core	e Dia m Strik	Water e Stan	ding	From	Т	Го	Type	Returns		REMA	RKS	
2 2	6-02-07 6-02-07	7 09. 7 11.	00 0.00 6.2															
A	All dime me Scale	ensions i etres e 1:50	Client	Harmack	Crown	Contro	ol	M Pl	ethod/ ant Us	Hydro ed	eq			Bit N Design	Q	Logged F	Ву	



Project]	DRILLH	OLE	No
	Mixed	Develop	ment, Me	rvue,	Galway								PC	-13	
Job No			Date 28-	-02-07	,	Ground Level	l (m)	Co-Ordina	ites ()				IXO	-13	
г .			28-	-02-07										1	
Engine		nch & Pt	en a									5	heet	1 of 1	1
			.115.					TDATA							[
	TCP	(SPT)	D 11 1		Depth	1		STRATA DES	CRI	PTION				gy	ımen fill
Depth Date	(SCR) RQD	Fracture Spacing	Red'cd Level	Legend	(Thick- ness)	Discontinui	ties	Deta		111011	Main			Geology	Instrument/ Backfill
28-020.00	RQB	Spacing			-	D 15 Continue				OPEN HOLE					
2.000	0 (-)	-			-(2.00)					no recovery					
2.00	30			0000	2.00	<u>)</u>				GRAVEL of	limestone				
2.50	(-)	-		000	(0.50)	0									
28-02	100 (96)	5				2.50 - 2.60 . sub-vertical silt smeared 2.50 - 6.00	l, undulose, l, open Closely spac	rough, grey	l 1	Strong to very bedded, fine to fossiliferous weathered.	o coarse gra	ined	l,		
	3.00 20 3 100 8 (87) 60					25 deg's, locinterlocking smeared 3.75 - 4.05 sub-vertical	cally undulog, smooth, by Joint:, dippi	ose, rown silt ng ocally plana	ır,						
4.50	8 100 (97) 73 3					stepped, sm smeared, op 4.10 - 4.15 dirregular, sn iron stained 4.55 - 4.70 d	oen Joint:, dippi nooth, black l, open Joint:, dippi	ng 50 deg's, s silt smeare	d,						
6.00						sub-vertical silt smeared	l, undulose, l, open	smooth, gre	У						
					-										
					- - - - - - -										
	Dril	ling Pro	gress and			rvations		F	Rotar	y Flush			GENE		
Date	Tin			Casing n E	Dia Con	re Dia nm Strike	ater Standing	From	Тс	o Type	Returns		REMA	RKS	
28-02-0 28-02-0	28-02-07 11.00 0.00 28-02-07 14.00 6.00 2.00														
All dime	ensions i etres e 1:50	in Client	Harmack	Crow	n Contr	ol	Method Plant U	/ Hydre	q		Bit NO Design	<u></u>	Logged H	 Ву	
≥Scal	t 1:50														



Project]	DRILLE	IOLE	No
	Mixed	Develop		ervue, Ga											RC	-15	
Job No			Date 28	-02-07		Groun	d Level (m)	Co-Ordina	ates	0				110	-10	
Engine	er		28	-02-07										S	heet	1	
		nch & Pt	ns.													of 1	l
RU	N DE	ΓAILS						S	TRATA								nt/
Depth	TCR (SCR)	(SPT) Fracture	Red'cd	Legend (T	Depth				DES	SCR	RIPT	YON				Geology	Instrument/ Backfill
Date	RQD	Spacing	Level	Legend (1	ss)	Disc	ontinuitie	es	Deta	ail			Main			Gec	Inst Bac
²⁸⁻⁰² 0.00												EN HOLE recovery	Į.				
	0																
	(-)	-		[1.50)												
1.50					1.50												
28-02	100					1.50	- 5.00 Ved. dippi	ery closely	to medium	1	Ver to c	ry strong g	rey, thinly l ned, fossilif	edde	ed, fine		
2.00	44	7				undu	lose and	locally irr	egular,		LIN	MESTÖNI	E, slightly w	eath	ered.		
26-02						stain	ed ed	Sitt Silicul	ou, iron								
	100	13															
	(59)					2.80	- 3.80 Jo	int:. dippi	ng vertical,								
					2.50)	plan	ar, locally	y undulose	e, smooth, stained, ope								
3.50					3.50)	814)	5110 511100		линген, оре								
28-02		16															
	100																
	(81)					4.20	- 4.45 Jo	int:, dippi	ng								
	40	11				sub-	vertical, ı ar, smoot	undulose, l h, grey sil	locally t smeared,								
5.00					5.00	open	l										
				-													
				-													
5				[E													
8				l F													
				[[
	Dril	ling Pro	orece and	d Water ()hear	vatio	ne		Т	Rote	arv, 1	Flush			CENT	DAT	
Date	Tin			Casing h Dia	Core	e Dia	Wat Strike	ter Standing	From		То	Type	Returns		GENE REMA		
28-02-0	3-02-07 14.00 0.00				11		SHIKE	Jununig									
28-02-0	3-02-07 18.00 5.00 1.50																
5																	
All dime	ensions	in Client	Harmack	Crown C	Contro	ol		Method	/ Hydre	eq		<u> </u>	Bit No	 ?	Logged I	Ву	
Scal	etres e 1:50							Plant U	sed				Design	-	-		



Project N	/lixed	Develop	ment, Me	ervue, Galwa	ıy							DRILLE		. No
Job No			Date 26 26	-02-07 -02-07	Ground Leve	el (m)	Co-Ordina	ates ()				R	C-3	
Enginee							1				S	Sheet	1 of 2)
		nch & Pt	ns.										01 2	
		TAILS		D.	41.	S	STRATA	CDID	DION!				55 25	Instrument/
Depth Date	TCR (SCR)	(SPT) Fracture	Red'cd Level	Dep Legend (Thick	ζ-			SCRIPT	TON				Geology	strur
²⁶⁻⁰² 0.00	RQD	Spacing		ness)	Discontinu	ities	Deta	OP	EN HOLI	Main			5	12 0
2.00	0 (-)			(3.00										
3.00 26-02 5.00	28 (-)			\$\times \times \	000			col	cht grey sl T with an obles. ulder Clay	ightly sandy gular to sul	y grav b-rour	velly nded		-
6.50	13 (-)	-		* 0- * 0-)									
8.00	20 (-)			*	80									-
8.00	Dril	ling Pro	oress and	d Water Obs	ervations		I	Rotary	Flush			GENE	DAI	
Date	Tin		oth Dent	Casing C h Dia	ore Dia V mm Strike	Vater Standing	From	To	Type	Returns		REMA	RKS	ı
26-02-07	7 13.0	00 0.0												
All dime met Scale	nsions i tres : 1:50	in Client	Harmack	Crown Con	trol	Method Plant U	d/ Hydre	eq		Bit N Design	Q	Logged I	Ву	



Project 1	Mixed	Develop	ment, Me	ervue, Galwa	ay					DRILL		3 No
Job No			Date 26 26	-02-07 -02-07	Ground Level (m)	Co-Ordinate	es ()		K	C-3	
Engine										Sheet	2 of 2	2
1	Ml. Pu	nch & Pt	ns.									
RU		TAILS			. [S	TRATA					Instrument/
Depth Date	TCR (SCR)	(SPT) Fracture	Red'cd Level	Legend (1 IIIC	k-			RIPTION			Geology	strun
26-02	RQD	Spacing	Level	ness)	Discontinuitie	es	Detail	Light brown	Main speckled bla	ck fine to	<u> </u>	Hig 2
	10 (-)			(1.70				medium slig Boulder Cla	htly gravelly	SAND.		
9.50	20 (10) 9			© × × × × × × × × × × × × × × × × × × ×)) 80			Light grey sl SILT with an cobbles. Boulder Clay	ngular to sub-	gravelly -rounded		_
11.00		5			10.80 - 14.00 spaced, dippi			Strong, grey		led, fine to NE, slightly	1	1
26-02			_		smooth, brow	n silt smea	ared	weathered.	a Livies i C	, slightly		
	100 (82) 38	8		(2.50	11.33 - 12.00 vertical, undu gravelly clay	lose to pla	anar, smooth,					
12.50 26-02		10										
	80 (42)	2		13	.30							
14.00	18	NI		0 0 0 0 0 0 0 0 0 (0.70 0 0 0 14	13.30 - 14.00	Non intac	t	Coarse GRA clay. (possible inf				
	_		gress and	d Water Ob	servations	,		tary Flush			ERAL	
Date	Tir				Core Dia War mm Strike	ter Standing	From	To Type	Returns	REMA	4RKS	,
26-02-0	7 18.	00 14.	0.00	0								
All dime	ensions :	in Client	Harmack	Crown Con	trol	Method	/ Hydreq	<u>'</u>	Bit NO Design	Q Logged	Ву	
Scale	tres e 1:50					Plant U	sed		Design			



Project												DRILLHOLE No						
	Mixed Development, Mervue, Galway b No Date 27-02-07 Ground Level (m) Co-Ordinates ()													RC	RC-5			
Job No			Z /·	-02-07		Grou	Ground Level (m) Co-Ordinates ()							1.0-3				
Engine	or		27	-02-07											<u> </u>	Sheet	1	
_		nch & Pi	tns													meet	of 2	2
		TAILS						9	T	RATA								ıt/
Depth	TCR (SCR)	(SPT)	Red'cd	Depth DESCRIPTION											ogy	Instrument/ Backfill		
Date	(SCR) RQD	Fracture Spacing	Lavial	Legend	(Thick- ness)	Dis	scontinuiti	Detail Main							Geology	Instr Back		
²⁷⁻⁰² 0.00		-			-								EN HOLE recovery	,				
2.00	0 (-)	-			(3.00)							no i	recovery					
3.00 27-02 5.00 27-02	23 (-)	-				3.0 dip into sm	ping 30 d	eg's, irregu	dium spaced, ılar, ht brown silt				AVEL and estone.	d COBBLE	S of			
6.50	27 (17) 9				6.2	00						Strong to very strong, grey, thickly bedded, fine to medium grained,						
27-02		8			1- 	uno	dulose, ste	epped, smo	nt, sub-vertical, ped, smooth, lig			foss	siliferous athered.	erous LIMESTONE, slightly				
8.00	100 (82) 13	11			(3.10)	7.2 und sm	20 - 8.00 Jo dulose, sm	oint, sub-vo nooth, brown stained, o	eared, open vertical, own silt									
	Dril	ling Pro	gress and	l Wate	er Obse		ons			J	Rota	ary l	Flush			GENE		
Date	Tin		pth Dept	Casing	Dia Co	re Dia mm	Strike	ter Standing		From	,	То	Туре	Returns		REMA	RKS	
27-02-0	7 08.0	0.0	00															
All dime me Scale	ensions i etres e 1:50	in Client	Harmack	Crowi	n Cont	rol		Method Plant U	l/ sec	Hydre	eq			Bit N Design	Q	Logged F	Ву	



Project Job No	Mixed Development, Mervue, Galway ob No Date 27-02-07 Ground Level (m) Co-Ordinates ()												-	RC-5				
			1 21	-02-07														
Engine		nch & P	t											S	Sheet	2 of 2	2	
		TAILS							STRATA							1		
Depth	TCR	(SPT) Fracture	Red'cd		Depth	n					IPTION					Geology	Instrument/	
Date	(SCR) RQD	Fracture Spacing	Level	Legenal	(Thick-ness)	Disc	continuiti	es	Det	tail			Main			Geol	Instr	
9.30	100 (90) 62	4			9.30)					Strong to bedded, fi fossilifero weathered	very some to bus L. (con	strong, gr medium IMESTO ntinued)	ey, the grain NE, s	ickly ed, ilightly			
	Dri	lling Pro	gress and	d Water	Obse	rvatic	ons			Rota	ıry Flush				GENE	ERAL		
Date	Tiı	ne De	pth Dept	Casing h Dia	a Cor	e Dia	Wa Strike	ter Standing	From	Т	Го Тур	e i	Returns		REMA	ARKS		
27-02-0	7 13.	00 9.3																
All dime	ensions etres	in Client	Harmack	Crown	Contro	ol		Method Plant U	d/ Hydre	eq			Bit N Design	Q	Logged	Ву		



Project N	Mixed	Develop	ment, Me	ervue, Galw	ay								DRILLE		, No	
Job No			Date 27-	-02-07 -02-07	Grou	Ground Level (m) Co-Ordinates ()						RC-7				
Enginee												S	heet	1 of 1	1	
N	Ml. Pu	nch & Pt	ns.											01 1		
RUI		TAILS					S	TRATA						Geology	Instrument/	
Depth Date	TCR (SCR)	(SPT) Fracture		De Legend (Thic	k-				IPTION					strun		
²⁷⁻⁰² 0.00	RQD	Spacing	Level	ness)	Di	scontinuitie	es .	Deta		PEN HOLE	Main			Ğ	II À	
	0 (-)	-		(3.50	0))				no	recovery						
3.50 27-02 4.00 27-02	90 (-) - 100 (65) 63	- 2		(0.80	.30	30 - 7.10 Mo deg's, irreg ugh, black s	edium spa ular, inter ilt smeare	ced, dippinį locking, d	g Str be	OULDERS t. oulder Clay rong to ver dded, fine ssiliferous	OBBLES at with orge government of the coarse grant of the coarse grant LIMESTO.	ickly		-		
5.00	100 (99) 73	4		(2.80		15 - 6.50 Joi	int. sub-ve	ertical.	We	eathered.						
6.50 27-02 7.10	100 (95) 90	5		7	un	6.15 - 6.50 Joint, sub-vertical, undulose, smooth, orange brown silt smeared, open										
			gress and	Water Ob	servat Core Dia	ions	25		Rotary	1			GENE	RAL		
Date	Tin			Casing Ch Dia	mm	Strike S	Standing	From	То	Type	Returns		REMA	KKS		
27-02-07 27-02-07	7 13.0 7 18.0	00 00 7.1	3.50													
All dime	nsions i	in Client	Harmack	Crown Cor	itrol		Method	Hydre	q		Bit No	Q	Logged I	Зу		
Scale	tres e 1:50						Plant Us	sea			Design					



Project M	lixed l	Develop	ment, Me	ervue, Galwa	ıy]]	DRILLH		No
Job No			Date 28-	-02-07 -02-07	Groui	nd Level	(m)	Co-Ordina	ates ()		K	RC-9			
Engineer					•							S	heet	1 of 2)
		nch & Pt	ns.											01 2	
	RUN DETAILS Depth TCR (SPT) Red'ed Depth							TRATA		TION				Geology	Instrument/ Backfill
Depth Date	TCR (SCR)	Fracture	Red'cd Level	Legend (Thick	(- 	continuit	ios	DES		RIPTION Main					nstru
28-020.00	RQD	Spacing		ness)	Dis	continuit	ies	Det	OI	PEN HOLI recovery				0	11 11 11
	0 (-)	-		(3.00)										
3.00 28-02	30 (-)))					RAVEL an nestone	d COBBLE	ES of			
	20 (-)			8 1 (3.10 8 1 (3.10	<u>10</u>	0 - 9 20 N	∕ledium and	1	Str	rong to ver	y strong, gr	ev th	ickly		
6.50	(76) 48	5			occ 20	asionally	closely spa	aced dippir	ng be	dded, fine	to coarse gi LIMESTO	ained			
	100 (91) 85	3		(3.10)										
8.00	D.:11	l' D		1 11/2-4 Ol					D - 4 - 11	P1 .1.	1				
Date	Tim			d Water Obs	ore Dia	UIIS Wa	ater Standing	From	Rotary To	Type	Returns		GENE REMA	KAL RKS	
28-02-07	08.0			n Dia	mm	Strike	Standing	110111	10	Турс	Teculio				
All dimen metr Scale	nsions in res 1:50	n Client	Harmack	Crown Con	trol	<u> </u>	Method Plant U	Hydre sed	eq		Bit N Design	Q	Logged I	3y	



Project N	Mixed	Develop	ment, Me	ervue, Galwa	ay								DRILLE		No
Job No			_	-02-07 -02-07		nd Level (m)	Co-Ordina		RC-9					
Engine												S	Sheet	2	
ľ	Ml. Pu	nch & Pt	ns.											of 2	
RU.		ΓAILS					S	TRATA						>	Instrument/
Depth Date	TCR (SCR)	(SPT) Fracture	Red'cd Level	il egendi (Tilici	<- 			PTION		Geology	strun				
28-02	RQD	Spacing	Level	ness)	Dis	continuitie	es	Det		Strong to very	Main	rev th	nickly.	Ğ	II.
9.20	100 (99) 95	4		9.	20				f v	Strong to very bedded, fine to cossiliferous weathered. (co	to coarse gr LIMESTO ontinued)	rained ONE, s	l, lightly		
	Dril	ling Pro	gress and	d Water Obs	ervatio	ons			Rotar	y Flush			GENE	RAL	
Date	Tin		oth Dept	Casing C h Dia	ore Dia mm	Wat Strike	ter Standing	From	То		Returns		REMA	RKS	
28-02-0			3.00	0											
All dime me Scale	ensions i tres e 1:50	In Client	Harmack	Crown Con	trol		Method Plant Us	Hydre sed	eq		Bit N Design	IQ	Logged I	Ву	

APPENDIX 3 TRIAL PIT RECORDS

	OJECT: 1			opment, M	ervue,	Galw	ay					TRIALPIT: Sheet 1 of 1	ГР 1А
CLI		ırma	ck Cro	wn Control						Co-ordinates: N E		Rig: Kanamoto E	EX200
Grou	ınd level: n	1 O.D.		cc i tiis.								DATE: 22.3.07	
Wate 1st: 2nd: 3rd:	OUNDWA er strikes: dry	ATE	K			PIT 1	DIREC DIMEN GED I	CTION NSION BY:	: 000 : 1.50 MM	6 6 A C C	В	Shoring/Support: Stability: Pit sides	s stable
Depth (m)	Date	Water	Samples	Depth (m)	SPT (N)	LEGEND	Elevation m O.D.	Depth (m)		DE	SCRII	PTION	
-0	22.03.07					<u>31/2 31</u>		0.20	TOPSC (Brown	sandy gravelly clay)			
- -1	22.03.07		В	1.00				1.30	and bou		Y with i	many sub-rounded to sub	o-angular cobbles
- -2						END			Kelusai	- limestone rock			
-													
- 3													
- -4													
-													
- 5													
- 6													
-													
- 7													
- -8													
- 9													
-													
	narks: P	it dry	during ex	cavation	<u> </u>	ı			<u> </u>				Scale:
					Iri	sh D	rillin	σLt	d. I.	oughrea. Co. Galwa	av		1:50 Ph. 091 841274 Fax 091 847687

	OJECT: 1 CATION:			opment, M	ervue,	Galw	ay					TRIALPIT: Sheet 1 of 1	TP 2A
CLI	ENT: Ha	ırma	ck Cro	wn Control						Co-ordinates:		Rig: Kanamoto	EX200
	GINEER: und level: n			& Ptns.						N E		DATE: 22.3.07	
GR	OUNDWA er strikes: dry	ATE	R			PIT I	DIREC DIMEN GED I	NSION	: 000 [: 1.50 MM	6.00m D	- z B	Shoring/Support: Stability: Pit side	es stable
Depth (m)	Date	Water	Samples	Depth (m)	SPT (N)	LEGEND	Elevation m O.D.	Depth (m)		1	DESCRII	PTION	
-0 - -1	22.03.07		В	1.00				1.30		ark brown sandy gravelly clay			
- -2 -			В	2.00		× × × × × × × × × × × × × × × × × × ×			Firm lig	ht brown/grey slightly gravel	lly sandy SII	LIT.	
- 3			В	3.00		× × ×		3.00	Hard lig cobbles (Glacia	tht grey / brown slightly grave and boulders. Till)	elly sandy C	CLAY with many round	ed to sub-rounded
-	22.03.07					END		3.70	Refusal	- very slow digging in hard T	Γill		
-4 - -5													
- -6 -													
- 7													
- 8													
-9 -													
	narks: P	it dry	during ex	cavation	1								Scale:
					Iri	sh D	rillin	g Lta	d. L	oughrea, Co. Gal	lwav		1:50 Ph. 091 841274 Fay 091 847687

	OJECT: 1 CATION:			opment, M	ervue,	Galw	ay					TRIALPIT: Sheet 1 of 1	TP 3A
CLI	ENT: Ha	ırma	ck Cro	wn Control						Co-ordinates: N E		Rig: Kanamoto I	EX200
	GINEER: und level: n			& Puis.								DATE: 22.3.07	
	OUNDWA er strikes: dry	ATEI	R			PIT 1	DIREC DIMEN GED I	CTION NSION BY:	: 000 I: 1.50 MM	6.00m _D	6 A B	Shoring/Support: Stability: Pit side	s stable
Depth (m)	Date	Water	Samples	Depth (m)	SPT (N)	LEGEND	Elevation m O.D.	Depth (m)			DESCRI	PTION	
-0	22.03.07					1/ 1/ 1/		0.35	TOPSC (Firm d	IL ark brown sandy very g	gravelly clay)		
-						*9 × × × × × *		0.33	Stiff gr	y slightly gravelly sand	dy SILT with occa	asional rounded to sub-re	ounded cobbles.
-1			В	1.00		× × Ø—,		1.10	Firm to	ange grey slightly sand		rith occasional rounded t	to sub-rounded
- -2			В	2.00					cobbles (Glacia	and boulders.			
-						() () () () () () () () () ()		2.50	Hard li	ht grey / brown slightly	y gravelly sandy C	CLAY with many rounde	ed to sub-rounded
- 3	22.03.07		В	3.00				3.50	cobbles (Glacia	and boulders. Till)		-	
						END			Refusal	- very slow digging in	hard Till		
-4													
-5													
-													
- 6													
-													
- 7													
-													
- 8													
-													
- 9													
-													
-10													
	narks: P	it dry	during ex	cavation		<u> </u>			<u> </u>				Scale:
					Iri	sh D	rillin	σ I .t.	d. L	oughrea, Co.	Galway		1:50 Ph. 091 841274 For 091 847687

	OJECT: CATION			elopment, M	Iervue,	, Galw	ay				TRIALPIT: Sheet 1 of 1	TP 4A
				own Contro	l				Co-ord	inates:		EV200
EN	GINEER:	Ml.	. Punch	& Ptns.						N E	Rig: Kanamoto	EX200
GR						PIT 1	DIRE(DIME) GED	CTION NSION BY:	: 000 : 1.50 * 6.00m	6 A B	DATE: 22.3.07 Shoring/Support Stability: Pit sid	: es stable
Depth (m)	Date	Water	Samples	Depth (m)	SPT (N)	LEGEND	Elevation m O.D.	Depth (m)		DESCRI	IPTION	
-0	22.03.07					<u>11 11 11 11 11 11 11 11 11 11 11 11 11 </u>		0.55	TOPSOIL (Firm dark brown san	ndy very gravelly clay)		
-1			В	1.00		11/ 11 0 X		1.10	Grey slightly silty SA some boulders. (medium dense)	AND and GRAVEL with m	nany rounded to sub-rou	nded cobbles and
			В	1.00		Ø			Firm to stiff grey slig gravelly SAND with (Glacial Till)	shtly gravelly slightly sand some rounded to sub-roun	y SILT interbedded with ded cobbles and boulder	n layers of coarse rs.
2			В	2.00								
-3	22.03.07							2.80	Hard light grey / brov	wn slightly gravelly sandy	CLAY with many round	ded to sub-rounded
						END			(Glacial Till) Refusal - very slow of			
4												
5												
6												
O												
7												
8												
.9												
-8 9 10 Ren												
-10 Re n	narks: I	l Pit dry	during ex	xcavation								Scale:
												1:50
					Iri	ish D	rillir	ıg Lt	d. Loughrea	, Co. Galway		Ph. 091 841274 Fax 091 847687

	OJECT: 1 CATION:			opment, M	ervue,	Galw	ay					TRIALPIT: Sheet 1 of 1	TP 5A
CLI	ENT: Ha	ırma	ck Cro	wn Control	[Co-ordinates:		Rig: Kanamoto	EX200
	GINEER: und level: n			& Ptns.						11	•	DATE: 22.3.07	
	OUNDWA er strikes: dry	ATEI	R			PIT I	DIREC DIMEN GED I	NSION	: 000 : 1.50 MM	6.00m _D	= + − z B	Shoring/Support: Stability: Pit side	es stable
Depth (m)	Date	Water	Samples	Depth (m)	SPT (N)	LEGEND	Elevation m O.D.	Depth (m)			DESCRII	PTION	
- 0	22.03.07					7 11 1 21 1 1		0.90		ark brown sandy sligh			
-1 -			В	1.00		*		0.50	Firm to sub-rou (Glacia	stiff grey slightly grav nded cobbles and boul Till)	velly slightly sandy lders.	SILT with occasional i	ounded to
- 2			В	2.00		× × × × × × × × × × × × × × × × × × ×		2.30	Stiff lig	ht grev / brown slightl	v gravelly sandy C	LAY with some rounde	ed to sub-rounded
- 3			В	3.00				2.70	cobbles (Glacia	and boulders. Till) tht grey / brown slight and boulders.		CLAY with some round	
- -4	22.03.07							3.90	Refusa	- presumed limestone	rock		
-						LIVE			recrusus	presumed innestone	TOOK		
- 5													
- 6													
- 7													
-8													
- 9													
-10													
Ren	narks: P	it dry	during ex	cavation									Scale:
					Iri	sh D	rillin	σ L.t.	d. L	oughrea, Co.	Galway		1:50 Ph. 091 841274 For 001 847687

	OJECT: I			opment, M	ervue,	Galw	ay				TRIALPIT: Sheet 1 of 1	TP 6A
CLI	ENT: Ha	ırma	ck Cro	wn Control					Co-ordinates:		Rig: Kanamoto I	EX200
	GINEER: ind level: n			& Ptns.					N E		DATE: 22.3.07	
GR	OUNDWA er strikes: dry	ATE	R			PIT 1	DIREC DIMEN GED I	CTION NSION BY:	· 150 * 600m	z B	Shoring/Support: Stability: Pit side:	s stable
Depth (m)	Date	Water	Samples	Depth (m)	(N) TAS	LEGEND	Elevation m O.D.	Depth (m)	D	DESCRIP	PTION	
-0	22.03.07		J 1			74 1 ^N · 7 _I		0.20	TOPSOIL			
- -1 -			В	1.00				0.40	(Dark brown sandy gravelly clay) SUBSOIL (Soft to firm brown slightly gravelly soft to stiff light brown/grey very grasub-angular cobbles and boulders.	andy CLAY	Y) / CLAY with some sub-	-rounded to
- 2			В	2.00				2.80				
- 3			В	3.00					Hard light brown slightly gravelly sand (Glacial Till)	dy CLAY v	with occasional sub-rou	nded cobbles.
- 4	22.03.07		В	4.00		0 0 0		4.60				
- 5						END			Refusal - limestone rock			
- 6												
- 7												
- 8												
-9 -												
Ren	narks: P	it dry	during ex	cavation	ı	!						Scale: 1:50
					Iri	sh D	rillin	σ Lta	d. Loughrea, Co. Galv	wav		Ph. 091 841274

	OJECT: 1			opment, M	ervue,	Galw	ay				TRIALPIT: Sheet 1 of 1	ГР 8А
CLI	ENT: Ha	ırma	ck Cro	wn Control					Co-ordin	nates: N E	Rig: Kanamoto E	X200
	GINEER: ind level: n			& Ptns.					1	N E	DATE: 22.3.07	
GR	OUNDWA er strikes: dry	ATE	R			PIT I	DIREC DIMEN GED I	TION NSION BY:	000 1.50 * 6.00m _D	6 — A B	Shoring/Support: Stability: Pit sides	unstable
Depth (m)	Date	Water	Samples	Depth (m)	SPT (N)	LEGEND	Elevation m O.D.	Depth (m)		DESCRI	PTION	
-0	22.03.07					74 1N 71		0.25	TOPSOIL	v alav)		
- -1			В	1.00				0.50	(Brown sandy gravelly SUBSOIL (Soft to firm brown sli Firm to stiff brown ve and boulders (to 600m	ightly gravelly sandy CLA	Y) vith some sub-rounded to	sub-angular cobbles
- 2			В	2.00								
- 3			В	3.00				3.50	Hard light brown sligh	ntly gravelly sandy CLAY.		
-4 -	22.03.07		в <i>18888</i> 1	4.00-4.50				4.70	(Glacial Till)	my graveny samuy CLAT.		
- 5						END			Refusal - limestone ro	ck		
- 6												
- 7												
-8												
-9 -												
-10 Ren	narks: P	it dry	during ex	cavation								Scale:
					Iri	sh D	rillin	σI.t	l. Loughrea.	. Co. Galway		1:50 Ph. 091 841274 Fay 091 847687

1				lopment, M	Iervue,	, Galw	ay					1	TP 9A	
	CATION:			salway own Contro						Co-ordinates:		Sheet 1 of 1		
ı	GINEER:									N E		Rig: Kanamoto	EX200	
Grou	und level: 1	m O.D										DATE: 22.3.07		
	OUNDW. er strikes: dry	ATE	R			PIT I PIT I LOG	DIREC DIMEI GED 1	CTION NSION BY:	i: 000 l: 1.50 DJ	* 6.00m D	z B	Shoring/Support: Stability: Pit side	es unstable	
Depth (m)	Date	Water	Samples	Depth (m)	SPT (N)	LEGEND	Elevation m O.D.	Depth (m)			DESCRI	IPTION		
-0 -	22.03.07		В	1.00				0.30	TOPSO (Brown Firm li	OIL n sandy gravelly clay) ght brown very gravelly sand	ly CLAY wi	th some sub-rounded to	sub-angular cobbles.	
Light grey very silty sandy GRAVEL with some sub-angular to sub-rounded and the sub-angular to s														
-	22.02.07	_				S X END		2.70	Refusa	l - limestone rock				
-3 -	22.03.07 22.03.07													
-4														
- 5														
-														
- -7														
-														
-8 -														
-8 - -9 -10 Ren														
- 10		1 4 4	disa:										IcI	
Ken	narks: I	rit dry	during ex	kcavation									Scale: 1:50	
					Iri	ish D	rillin	ıg Lt	d. L	oughrea, Co. Ga	lway		Ph. 091 841274 Fax 091 847687	



Project										Т	RIAL PIT No
Mix Job No	ked D	Date 19-01 19-01	-07	Ground Leve	el (m)	Co-Ordinates ()					TP-1
Engineer		17 01	0,	S	GROUNDWATE TRIKES	R Water strikes: F	Rose to (@ 20	min.):	Sealed at:	She	et
Ml.	Punc	ch & Ptns.				2nd: 3rd:					1 of 1
0		A	В		С		Γ	,			Legend Very Very Very Very Very Very Very Very
4			- CI	ED A EL A					<u>E</u> 4	(DI	
Depth	No		Si	TRATA DESCRIPTION	OM.		In Situ Tests	Water	SAN Depth (m	_	ES & TESTS Remarks/Tests
0.00-0.60		TOPSOIL (Brown sandy gravelly Refusal - possible rock		ge boulders					0.40	D	
Shoring/S Stability:		ort: cides stable 2.5 A C B 1 1								F	GENERAL REMARKS
All dimension metres Scale 1:5	ons in	Client Harmack Cr	own Contr	rol	Method Plant Us	Hitachi EX	135	E	Bit Design	L	ogged By DK



Project								TF	RIAL PIT No
Job No	Date 19-	01-07	Ground Le	vel (m)	Co-Ordinates ()			TP-10
Engineer	19-	01-07		GROUNDWATE STRIKES	R Water strikes: 1st: dry	Rose to (@ 20 1	min.): Sealed at:	Shee	t
Ml. Pı	ınch & Ptns.				2nd: 3rd:				1 of 1
2 - 3	A	В		C		D		* 1 ALTITURE 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	Legend
4-		ST.	RATA				<u> </u>	MDI E	ES & TESTS
Depth No	0		DESCRIPT	ION		In Situ Tests	Vater Depth (n		
0.00-0.30 0.30-1.70	TOPSOIL (Brown sandy clay) Grey silty SAND at cobbles and boulde Refusal - possible r	nd GRAVEL wi rs (to 400mm siz		p-rounded to su	b-angular		1.00	ВВВ	NENIED AL
Shoring/Sup Stability: P	- + - z	1 1						R	GENERAL EMARKS
All dimensions metres Scale 1:50	in Client Harmack	Crown Contro	ol	Method Plant U	/ Hitachi E	X135	Bit Design	Lo	ogged By DK



Project								Tl	RIAL PIT No
Job No	Development, Mervue	07 Gro	ound Level (m	1)	Co-Ordinates ()			TP-2
Engineer	19-01-	0/	GROU STRII	JNDWATEI KES	R Water strikes: 1st: dry	Rose to (@ 20	min.): Sealed at:	Shee	t
Ml. Pu	nch & Ptns.				2nd: 3rd:				1 of 1
	A	В		C		D			Legend Legend
4 -		STRA	\ T A				<u> </u>	MDI E	ES & TESTS
Depth No			SCRIPTION			In Situ Tests	Water Depth (1		
0.00-1.20	TOPSOIL (Brown sandy gravelly of Firm grey gravelly sand		come sub round	idad cabb	les and houlders		0.50	D	
1.20-2.00	(to 400mm size)	y CLAT With S	some suo-rour	ided coop	es and bourders		1.50	В	
							2.00	D	
2.60	Refusal - possible rock	or very large bo	oulders				2.60	В	
Shoring/Supp Stability: Pit	oort: sides stable							R	GENERAL EMARKS
D =	A B 1								
All dimensions i metres Scale 1:50	n Client Harmack Cro	wn Control		Method/ Plant Us	Hitachi Ez	X135	Bit Design	Lo	ogged By DK



Project	32. 091 047007		IMAI		LOG				Т	RIAL PIT No
-	Development, Me	ervue Galway	,						1	
Job No	Date 19	-01-07 -01-07	Ground Level (m	1)	Co-Ordinates ()					TP-3
Engineer	1	l	GROU STRIF	JNDWATE KES		Rose to (@ 20	0 min.)	: Sealed at:	She	et
Ml. Pu	nch & Ptns.				2nd: 3rd:					1 of 1
2 - 3 - 3 - 3 - 3 - 3 - 3 - 3 - 3 - 3 -	A	В		C		J				Legend
4 -		CT	ND A FE A					<u> </u>) (DI	EG A TERGTEG
Depth No	. [RATA DESCRIPTION			In Situ	Water	Depth (ES & TESTS Remarks/Tests
0.00-0.30 0.30-1.30	TOPSOIL (Brown sandy grav Soft to firm brown	elly clay)				Tests	Water.	0.30	D	TOTALING TESTS
1.30-2.70	Firm to stiff grey g cobbles and boulded	ravelly sandy CI ers (to 300mm si	AY with some roze)	ounded to	sub-rounded			1.00	В	
								2.00	D B	
2.70	Refusal - possible	rock or very larg	e boulders							
Shoring/Sup Stability: Pi	port: t sides unstable					1			(GENERAL REMARKS
D	A B	↑ 1 ↓								
All dimensions metres Scale 1:50	in Client Harmack	Crown Contr	ol	Method/ Plant Us	Hitachi EX	135	I	Bit Design	L	ogged By DK



Project										Т	RIAL PIT No
Mix Job No	ed D	Date 19-01-19-01-	07	Ground Leve	l (m)	Co-Ordinates ()					TP-4
Engineer		15 01	07	G	ROUNDWAT TRIKES	ER Water strikes: R 1st: dry	lose to (@ 20	min.):	Sealed at:	She	et
Ml.	Punc	ch & Ptns.				2nd: 3rd:					1 of 1
1 - 2 - 3		A	В		C						Legend
4 -			CT	RATA					<u> </u>	MDL	ES & TESTS
Depth	No			DESCRIPTION)N		In Situ Tests	Water	Depth (n		
0.00-0.50 0.50-2.70		TOPSOIL (Brown sandy gravelly Firm to stiff grey grave cobbles and boulders (t	lly sandy C o 700mm si		ne rounded t	o sub-rounded			0.40 1.50 2.50	В	
Shoring/S Stability:		ort: ides unstable A.5 B 1 C									GENERAL REMARKS
All dimension metres Scale 1:5	ons in	Client Harmack Cro	own Contr	rol	Method Plant U	Hitachi EX	135	B	it esign	L	ogged By DK



Project		~ .						T	RIAL PIT No
Mixed I Job No	Development, Mervuo Date 18-01- 18-01-	07	Ground Level (m)	Co	o-Ordinates ()				TP-5
Engineer			GROUN STRIKI	ES	Water strikes: Ro 1st: dry	ose to (@ 20 r	nin.): Sealed at:	Shee	et
Ml. Pun	ch & Ptns.				2nd: 3rd:				1 of 1
2 - 3	A	В		C		D			Legend
4		OTE) A T A					VADI I	EG 0 TEGTG
Depth No			RATA DESCRIPTION			In Situ Tests	Vater Depth (r		ES & TESTS Remarks/Tests
0.00-0.60	TOPSOIL (Brown sandy gravelly of Abandoned - 100mm bl								
	ort: sides unstable 4.5								GENERAL REMARKS
All dimensions in metres Scale 1:50	Client Harmack Cro	wn Contro	1	Method/ Plant Used	Hitachi EX1	35	Bit Design	L	ogged By DK



Project										TR	IAL PIT No
Mix Job No	ked I	Development, Mervu		Ground Le	vel (m)	Co-Ordinates ()					TP-5a
300 110		Date 18-01- 18-01-	-07 -07	Ground Le	ver (m)	Co-Ordinates ()					
Engineer					GROUNDWAT STRIKES	1st: dry	Rose to (@ 20	min.): Seale	d at:	Sheet	
Ml.	Pun	ch & Ptns.				2nd: 3rd:					1 of 1
1		A	В		C				1		Legend Legend
4								<u> </u>	1		
	.,		ST	RATA	7007		In Situ	Water Dep			S & TESTS Remarks/Tests
Depth 0.00-0.60	No	TOPSOIL (Brown sandy clay)		DESCRIPT			Tests	water Dep	ur (m)	NO	Kemarks/Tests
0.60-2.60		Firm to stiff grey grave cobbles and boulders (t	lly sandy C o 300mm si	LAY with so	ome rounded t	o sub-rounded		1.00		В	
								2.00		В	
2.60		Refusal - possible rock	or very larg	ge boulders				2.60		В	
Shoring/S	Supp	ort: sides unstable									ENERAL
A A B 1 C											EMARKS
All dimensi metres Scale 1:	ons ii 50	Client Harmack Cro	own Conti	rol	Method Plant U	Hitachi EX	X135	Bit Design	n	Log	gged By DK



Project								,	TRIAL PIT No
Mixed I Job No	Development, Mervu Date 18-01-	-07	Ground Level (m)		Co-Ordinates ()				TP-6
Engineer	18-01-	-07	GROUN	DWATER	R Water strikes: Re	ose to (@ 20 n	in.): Sealed a	ıt: Ch	eet
	ch & Ptns.		STRIKE	DWATER S	1st: dry 2nd:		,	Sil	1 of 1
	A	В		С	3rd:	D	0		Legend
2							1 2 2 3		
4 -		CTD	ATA				$\frac{\bot_4}{\varsigma}$	A MDI	LES & TESTS
Depth No			ESCRIPTION			In Situ W	ater Depth		
0.00-0.30	TOPSOIL		ESCRIPTION			Tests	пери	(111)	Temarks/Tests
0.30-2.40	(Brown sandy clay) Firm to stiff brownish g sub-rounded cobbles ar	grey gravelly s id boulders (to	andy CLAY with o 700mm size)	some ro	ounded to		0.50 1.50 2.00	I	3
2.40	Refusal - possible rock	or very large	boulders						
	ort: sides unstable								GENERAL REMARKS
D	4.5 A B 1 C								
All dimensions in metres Scale 1:50	Client Harmack Cro	own Control	l N	Method/ Plant Us	Hitachi EX1	35	Bit Design		Logged By DK



Project										Т	RIAL PIT No
Mix Job No	ked I	Development, Mervu		Ground Le	vel (m)	Co-Ordinates ()				TP-7
		18-01- 18-01-	-07 -07		()		,				
Engineer					GROUNDWATI STRIKES	ER Water strikes: 1st: dry 2nd:	Rose to (@ 20) min.):	Sealed at:	She	
Ml.	Pun	ch & Ptns.				3rd:	т				1 of 1
2		A	В		C)			Legend
4 =			~						<u>E</u> 4_		
D41	NT.		Si	RATA	TION		In Situ	Water	SA Depth (1		ES & TESTS Remarks/Tests
Depth 0.00-0.25	No	TOPSOIL		DESCRIPT	ION		Tests	vv ater	Depui (I	11) 110	IXCIIIAI KS/ I ESIS
0.25-1.30	Sunn	(Brown sandy clay) Firm to stiff grey grave cobbles and boulders (t			ome rounded to	o sub-rounded			1.00	В	CENEDAI
Shoring/S Stability:		ort: sides unstable 2.5									GENERAL REMARKS
All dimension metres Scale 1::	ons ir	Client Harmack Cro	own Conti	rol	Method Plant U	d/ Hitachi EZ Jsed	X135	В	Bit Design	L	ogged By DK



Project									TI	RIAL PIT No
Job No	ked L	Development, Mervue, Date 18-01-0	7 G1	round Le	vel (m)	Co-Ordinates ()			TP-8
Engineer		18-01-0	/		GROUNDWATE STRIKES	R Water strikes: 1st: dry	Rose to (@ 20 mi	n.): Sealed at:	Shee	t
Ml.	Pun	ch & Ptns.			STRIKES	2nd: 3rd:				1 of 1
2		A	В		C		D			Legend
4			- Comp					<u>E</u> 4		
Depth	No		STR	ATA ESCRIPT	ION		In Situ Wa	ter Depth (n		ES & TESTS Remarks/Tests
0.00-0.30 0.30-3.00		TOPSOIL (Brown sandy clay) Firm to stiff grey gravelly cobbles and boulders (to	y sandy CLA 900mm size)	Y with so	ome rounded to	sub-rounded		2.00	В	
3.00 Shoring/S	Suppo Pit	Refusal - possible rock or ort:	very large b	oulders				3.00	B C R	GENERAL EMARKS
D	-	4.5 — B 1 C C Client Harmack Crow	m Carriel		Made	/ 11:41: FX	W125	Bit		
metres Scale 1:	50	Спон паннаск Crow	ıı Control		Method Plant U	/ Hitachi EX	A133	Design	LC	ogged By DK



Project									TI	RIAL PIT No
Job No	ed D	Date 19-01-	07	Ground Le	vel (m)	Co-Ordinates ()			TP-9
Engineer		19-01-	07		GROUNDWATE STRIKES	R Water strikes: 1st: dry	Rose to (@ 20 n	nin.): Sealed at:	Shee	t
Ml. F	unc	h & Ptns.				2nd: 3rd:				1 of 1
2		A	В		C		D	- 1 - 2 - 3 - 3 - 3 - 3 - 3 - 3 - 3 - 3 - 3		Legend
4			- CITE	VD 4 TF 4				<u> </u>		20.0 TEXT
Depth 1	No			RATA DESCRIPT	TON		In Situ Tests	SAI ater Depth (n		Remarks/Tests
0.00-0.25	\rightarrow	TOPSOIL (Brown sandy clay) Firm to stiff grey gravel cobbles and boulders (to	lly sandy CI o 600mm siz	_AY with so	ome rounded to	sub-rounded		2.00	В	
Shoring/Su Stability: I	ippo Pit si	rt: ides unstable	or very larg	e boulders					CR	GENERAL EMARKS
D	= (B 1								
All dimensior metres Scale 1:50	ns in)	Client Harmack Cro	wn Contr	ol	Method Plant U	Hitachi Ex	X135	Bit Design	Lo	ogged By DK

APPENDIX 4 LABORATORY TEST RESULTS



18a Rosemount Business Park, Ballycoolin, Dublin 11 Ireland

Tel: +353 (0) 1 8829893 Fax: +353 (0) 1 8829895

CERTIFICATE OF ANALYSIS

Client:

Irish Drilling Limited (Loughrea)

Loughrea Co. Galway Ireland

Attention:

Dympna Darcy

Date:

14 March, 2007

Our Reference:

07-B01570/01

Your Reference:

Crown Site

Location:

Galway

A total of 6 samples was received for analysis on Tuesday, 6 March 2007 and authorised on Wednesday, 14 March 2007. Accredited laboratory tests are defined in the log sheet, but opinions, interpretations and on-site data expressed herein are outside the scope of ISO 17025 accreditation. We are pleased to enclose our final report, it was a pleasure to be of service to you, and we look forward to our continuing association.

Should this report require incorporation into client reports, it must be used in its entirety and not simply with the data sections alone.

Signed

Ken Scally

General Manager, Ireland

Lorseine Mr Nomerry

Lorraine McNamara

Laboratory Technical Manager

Compiled By

Paul Barry

UKAS
TESTING
1291

* SUBCONTRACTED TO OTHER LABORATORY / ** SAMPLES ANALYSED AT THE CHESTER LABORATORY

ALcontrol Laboratories Ireland

Test Schedule

Ref Number: 07-B01570/01

Client: Irish Drilling Limited (Loughrea)

Date of Receipt: 06/03/2007

Sample Type: SOIL

Location: Galway

Client Contact: Dympna Darcy

Client Ref: Crown Site

UKAS Accre	07-B01570-S0010-A01	07-B01570-S0012-A01	07-801570-S0014-A01	07-B01570-S0015-A01					
UKAS Accredited [Testing Laboratory] No.		BH7	BH11	BH14					
аboratory] 0-0.5м 0.5-1м 0.5-1м 0.5-1м	0-0.5M	0.5-1M	1-1.5M	0-1M					
No. 1291 A A Mon-Alcontrol Plastic Tub Mon-Alcontrol Plastic Tub Mon-Alcontrol Plastic Tub Mon-Alcontrol Plastic Tub Mon-Alcontrol Plastic Tub	Non-Alcontrol Plastic Tub	Non-Alcontrol Plastic Tub	Non-Alcontrol Plastic Tub	Non-Alcontrol Plastic Tub					
Chromium VI									
×××× (91) AGH HAG	××	×	××	×					
XXXX tnestno Seruteio M Isrutei	××	×	××	×					
XXXXX Total Phenols by HPLC	××	×	××	×					
Total Sulphate (Acid **(aldulo2	××	×	××	×					
×××× (9) slsteM <	××	×	××	×		-			
×××× moro⊟ eldulo€ 1938W	××	×	××	×	a man i supranta di su manuali di di supranta di su				
XXXX əbinqlu& əldulo& bioA	××	×	×	×					
Total Sulphur**	××	×	××	×					
×××× (bilo2) Hq <	××	×	××	×					
Free Cyanide $ imes imes imes imes$	××	×	××	×					
Thiocyanate	××	×	××	×					
Total Cyanide	××	×	××	×					

ALcontrol Laboratories Ireland

Test Schedule Summary

Ref Number: 07-B01570/01

Client: Irish Drilling Limited (Loughrea)

Date of Receipt: 06/03/2007

Sample Type: SOIL

Location: Galway

Client Contact: Dympna Darcy Client Ref: Crown Site

* SUBCONTRACTED TO OTHER LABORATORY / ** SAMPLES ANALYSED AT THE CHESTER LABORATORY

SCHEDULE	METHOD	TEST NAME	TOTAL
X	DR LANGE	Chromium VI	6
X	GCMS	PAH EPA (16)	6
X	GRAVIMETRIC	Natural Moisture Content	6
X	HPLC	Total Phenols by HPLC	6
Х	ICP	Total Sulphate (Acid Soluble)**	6
X	ICP	Metals (9)	6
X	ICP OES	Water Soluble Boron	6
X	KONE	Acid Soluble Sulphide	6
X	LECO	Total Sulphur**	6
Х	METER	pH (Solid)	6
Х	SPECTRO	Free Cyanide	6
Х	SPECTRO	Thiocyanate	6
Χ	SPECTRO	Total Cyanide	6

Printed at 10:58 on 15/03/2007

ALcontrol Laboratories Ireland

Table Of Results

Ref Number: 07-B01570/01

✓ Validated Interim

Client: Irish Drilling Limited (Loughrea)

Date of Receipt: 06/03/2007

(of first sample)

Sample Type: SOIL

Client Contact: Dympna Darcy Location: Galway

Client Ref: Crown Site

Notes:		8						0/-0013/0-30013	07 001570 50015	07-801570-S0014	07-B01570-S0013	07-B01570-S0012	07-B01570-S0011	07-B01570-S0010		i	ALcontrol Reference	UKAS Accredited		
Notes: METHOD DETECTION LIMITS ARE NOT ALWAYS ACHIEVABLE DUE TO VARIOUS CIRCUMSTANCES BEYOND OUR CONTROL								C 141	ם ליוד ד	RT11	BH9	BH7	BH5	BH1			Sample Identity	ed [Testing Laboratory] No. 1291	Method Detection Limit	Detection Method
IMITS ARE NO								- F	O 1M	1-1 KM	0.5-1M	0.5-1M	0.5-1M	0-0,5M			Other ID	ry] No. 1291	ion Limit	ethod
T ALWAYS								70,1	10.1	<u>ر</u> ۱ ا	<0.1	<0.1	<0.1	<0.1	2	mg/kg	IV muimo1dЭ		<0.1mg/kg	DR LANGE
ACHIEVAB								1	1	1	۲,	A	Δ	21	Į,	ug/kg	Naphthalene	<	<1ug/kg	GCMS
LE DUE TO								/ .	7,	1	۲,	4	Δ	20	200	ug/kg	Асепарћіћујеле	<	<1ug/kg	GCMS
VARIOUS								/	7 /	7	<u>,</u>	41	1	24	9	ug/kg	ənərijiqsnəcA	<	<1ug/kg	GCMS
CIRCUMST								/	٤ ١	<u>\</u>	۲,	4	<u>^</u>	13	9.	ug/kg	Fluorene	<	<1ug/kg	GCMS
ANCES BEY								/	٤ ١	<u>\</u>	^1	<u><1</u>	<u>^</u>	46	9	ug/kg	Phenanthrene	<	<1ug/kg	GCMS
OND OUR					000			1	7 1	<u>\</u>	۲.	<1	<u>^</u>	<u>ω</u>		ug/kg	өпөэвициЧ	<	<1ug/kg	GCMS
CONTROL.								7	٤ ٢	^.	<1	<u>^</u> 1	2	61		ug/kg	Fluoranthene	<	<1ug/kg	GCMS
								7.7	\ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \	<u>^.</u>	<u><1</u>	<u>~1</u>	<u>^</u>	55	1	ug/kg	Pyrene	<	<1ug/kg	GCMS
								,	7 %	۸.	<u><1</u>	<u>^</u>	<u>^</u>	54	1	ug/kg	Benzo(a)anthracene	<	<1ug/kg	GCMS
NDP = NO						- A STATE OF THE S		7,1	\ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \	۸.	<u>^</u> 1	4	<u><1</u>	37	2	ug/kg	Сһтуѕепе	<	<1ug/kg	GCMS
DETERMI								,	7	۸.	4	4	4	59	1	ug/kg	fluoranthene fluoranthene	<	<1ug/kg	GCMS
NDP = NO DETERMINATION POSSIBLE								,	\\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\	<u> </u>	<u>^1</u>	4	41	30	3	ug/kg	Benzo(a)pyrene	\ \	<1ug/kg	GCMS
JSSIBLE								i	2	<u></u>	4	7	Δ	21	1	ug/kg	lndeno(123cd)pyrene	<	<1ug/kg	GCMS
								į	\ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \	<u>^</u>	Δ	4	<u>^</u>	2	,	ug/kg	Dibenzo(ah)anthracene	<	<1ug/kg	GCMS

Checked By: Paul Barry

* SUBCONTRACTED TO OTHER LABORATORY / ** SAMPLES ANALYSED AT THE CHESTER LABORATORY

* SUBCONTRACTED TO OTHER LABORATORY / ** SAMPLES ANALYSED AT THE CHESTER LABORATORY

Checked By:

Paul Barry

ALcontrol Laboratories Ireland

Table Of Results

Ref Number: 07-B01570/01

✓ Validated Interim

Client: Irish Drilling Limited (Loughrea)

Date of Receipt: 06/03/2007

(of first sample)

Sample Type: SOIL

Client Contact: Dympna Darcy Location: Galway

Client Ref: Crown Site

Notes:				07-B01570-S0015	07-B01570-S0014	07-B01570-S0013	07-B01570-S0012	07-B01570-S0011	07-B01570-S0010		ALcontrol Reference	UKAS Accredit		
Notes : METHOD DETECTION LIMITS ARE NOT ALWAYS ACHIEVABLE DUE TO VARIOUS CIRCUMSTANCES BEYOND OUR CONTROL				BH14	BH11	вн9	BH7	BH5	BH1	1220000000	Çtitnəbl əlqms2	UKAS Accredited [Testing Laboratory] No. 1291	Method Detection Limit	Detection Method
MITS ARE NO				P.17	1-1.5M	0.5-1M	0.5-1M	0.5-1M	0-0.5M		Gl 19thO	y] No. 1291	on Limit	ethod
T ALWAYS				ᄼ	7	1.	<1	4	4	ug/kg	Benzo(ghi)perylene	<	<1ug/kg	GCMS
ACHIEVAE				<u>^</u>	<,	<u>^</u>	<1	Δ	479	ug/kg	Total 16 EPA PAHs	<	<1ug/kg	GCMS
SLE DUE TO				17.7	7.2	8.4	3.6	6.8	22.0	%	Matural Moisture Content		<0.1%	GRAVIMETRIC
) VARIOUS				<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	mg/kg	slonad IstoT	<	<0.01mg/kg	HPLC
CIRCUMS				300	230	180	160	180	740	mg/kg	**atsdqlu2 lstoT		<0.01mg/kg <100mg/kg	ICP
ANCES BE				1>	<u>۸</u>	1>	۵	<u>^</u>	4	mg/kg	oinserA	<	<1mg/kg	ICP
YOND OUR				1>	Δ	Δ	Δ	4	4	mg/kg	muimbsƏ	<	<1mg/kg	Ϊ́́
CONTROL				15	9	12	9	10	22	mg/kg	тијтол4Э	<	<1mg/kg	ІСР
				11	ω	6	u	Ç	12	mg/kg	Copper	<	<1mg/kg	ICP
		- ANNA MARKATANA		12	2	ω	2	w	20	mg/kg	рвед	<	<1mg/kg	ICP
NDP = N				<u></u>	<u>^</u>	<u>^</u>	Δ	<u>^</u>	<u>^</u>	mg/kg	Мегситу	<	<1mg/kg	ICP
O DETERM				11	œ	10	7	œ	16	mg/kg	МіскеI	<	<1mg/kg	ĬCP
NDP = NO DETERMINATION POSSIBLE		II LANGUATION		<u>^</u>	<u>^1</u>	<u>۵</u>	<u>^</u>	<u>^</u>	<u>ئ</u>	mg/kg	muinələ8	<	<1mg/kg	ICP
OSSIBLE				34	18	20	15	15	37	mg/kg	əuiZ	<	<1mg/kg	ICP
				<u>^</u>	<u>^1</u>	<u>^</u>	<u>^</u>	<u>^</u>	<u>۲</u>	mg/kg	Water Soluble Boron	ou owns	<img kg<="" td=""/> <td>ICP OES</td>	ICP OES

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Printed at 10:58 on 15/03/2007

*SUBCONTRACTED TO OTHER LABORATORY / ** SAMPLES ANALYSED AT THE CHESTER LABORATORY

Checked By:

Paul Barry

ALcontrol Laboratories Ireland

Table Of Results

Ref Number: 07-B01570/01

✓ Validated Interim

Client: Irish Drilling Limited (Loughrea)

Date of Receipt: 06/03/2007

(of first sample)

Sample Type: SOIL

Location: Galway

Client Contact: Dympna Darcy

Client Ref: Crown Site

Notes:	07-B01570-S0015	07-B01570-S0014	07-B01570-S0013	07-B01570-S0012	07-B01570-S0011	07-B01570-S0010		өэпетејеЯ ІотіпоэДА	UKAS Accredited		
Notes: METHOD DETECTION LIMITS ARE NOT ALWAYS ACHIEVABLE DUE TO VARIOUS CIRCUMSTANCES REYOND OUR CONTROL	BH14	BH11	ВН9	ВН7	B72	BHI		Sample Identity	ed [Testing Laboratory] No. 1291	Method Detection Limit	Detection Method
TMITS ARE NO	0-1M	1-1.5M	0.5-1M	0.5-1M	0.5-1M	0-0.5M	10 000	Ofher ID	ory] No. 1291	tion Limit	/lethod
T A	12	10	24	13	15	11	mg/kg	ebinqlu2 eldulo2 bioA		<5mg/kg	KONE
ACHTEVAE	0.05	0.04	0.04	0.04	0.04	0.07	%	**1udqlu& lsjoT	<	<0.01%	LECO
	8.05	8.44	8.36	8.34	8.33	7.86	pH Units	Hq	\	napH Unit	METER
O VARIOUS	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	mg/kg	Free Cyanide		napH Units <0.5mg/kg <1mg/kg	SPECTRO
TROING	A	41	<u>^</u>	Δ	4	<1	mg/kg	ejsnsγ3oidT		g <1mg/k	SPECTRO
TAKOES BEY	<2.5	<2.5	<2,5	<2.5	<2.5	<2.5	mg/kg	Fotal Cyanide	<] <2.5mg/kg	SPECTRO SPECTRO
						87	(news)				
ONTRO									Lune		
									o alexano	Wasser La	

ND = NO DETERMINATION POSSIBLE									, course		
SSIBIE							эсстен	овення пот	e de servicion		
							unumun				denomina i

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APPENDIX

APPENDIX

- Results are expressed as mg/kg dry weight (dried at 30°C) on all soil analyses except for the following: NRA Leach tests, flash point, and ammoniacal N₂ by the BRE method, VOC, PRO, Cyanide, Acid Soluble Sulphide, SVOC, DRO, PAH, PCB, TPH CWG, TPH by IR, OFGs and SEM.
- 2. Samples will be run in duplicate upon request, but an additional charge may be incurred.
- 3. A sub sample of all samples received will be retained free of charge for one month for soils and one month for waters (sample size permitting), but may then be discarded unless we are instructed to the contrary. Once the initial period has expired, a storage charge will be applied for each month or part thereof until the client cancels the request for sample storage.
- 4. With respect to turnaround, we will always endeavour to meet client requirements wherever possible, but turnaround times cannot be absolutely guaranteed due to so many variables beyond our control.
- 5. We take responsibility for any test performed by sub-contractors (marked with an asterisk). We endeavour to use UKAS Accredited Laboratories, who either complete a quality questionnaire or are audited by ourselves. For some determinands there are no UKAS Accredited Laboratories, in this instance a laboratory with a known track record will be utilised.
- 6. When requested, an asbestos screen is done in-house on soils and if no fibres are found will be reported as NFD no fibres detected. If fibres are detected, then identification and quantification is carried out by ALcontrol Technichem or Alcontrol Shutlers in the UK. If a sample is suspected of containing asbestos, then drying and crushing will be suspended on that sample until the asbestos results are known. If asbestos is present, then no analysis requiring dry sample are undertaken.
- 7. If no separate volatile sample is supplied by the client, the integrity of the data may be compromised if the laboratory is required to create a sub-sample from the bulk sample similarly, if a headspace is present in the volatile sample.
- 8. NDP No Determination Possible due to insufficient/unsuitable sample.
- 9. Metals in water are performed on a filtered sample, and therefore represent dissolved metals total metals must be requested separately.
- 10. A table containing the date of analysis for each parameter is not routinely included with the report, but is available upon request.

Last updated February 2005

IRISH DRILLING LTD.

Loughrea Co. Galway.

Contract: Crown Site, Mervue, Galway. Client: Engineer:

Date:

3.4.07

Checked:

Tested By: DMH

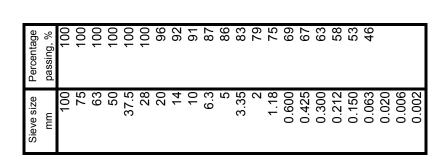
Tel: (091)841274 Fax: (091) 847687

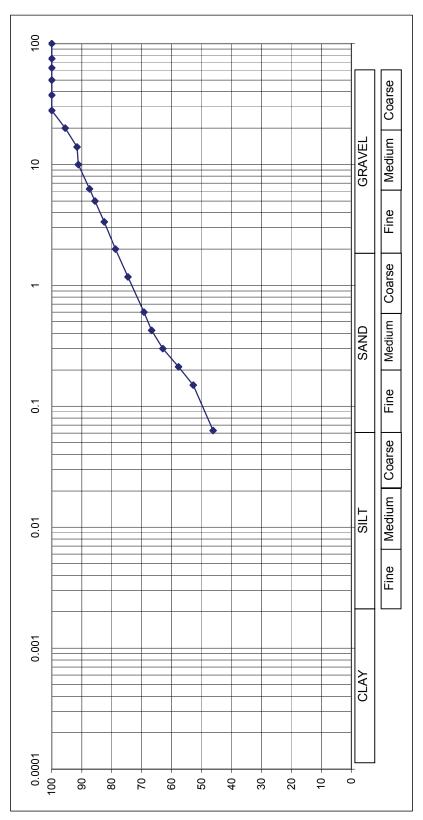
2007/G/002 DJ

Summary of Soil Classification Tests BS1377: Part 2: 1990

Description of fraction	passing 4z5 micron sieve.				
% passing	425 MICION %	<i>L</i> 9	89		
Plasticity	"idex "				
Plastic	// // // // // // // // // // // // //	NON PLASTIC	NON PLASTIC		
Liquid	%				
Particle	Derisity Mg/m3				
Moisture	Mg/m3 %	7.7	7.1		
	Derisity Mg/m3				
Type Depth	ш	3.0	4.0-4.5		
Type					
Borehole/	mapir	TP 6A	TP 8A		

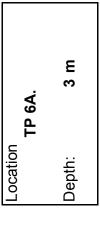
BS 1377: 1990: PART 2 (9.2, 9.5) PARTICLE SIZE DISTRIBUTION





Light brown slightly gravelly slightly sandy SILT. Soil Description:

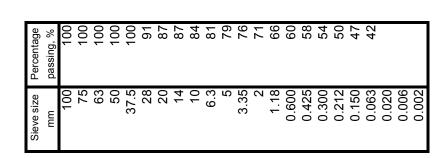
lway.			Job Code:	20
Crown Site, Mervue, Galway.				Checked:
Crown Sit			3.4.07	QQ
Contract:	Client:	Engineer:	Date:	Tested by:
IRISH DRILLING LTD. Contract:	Loughrea Co. Galway Client:		Tel: (091) 841274	Fax: (091) 847687

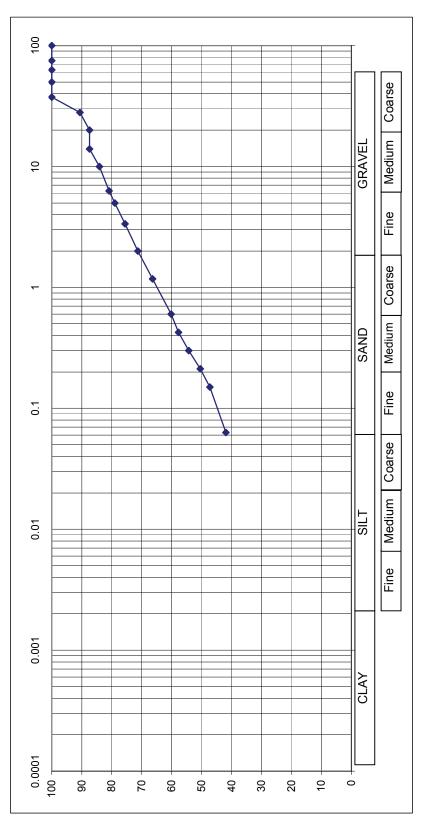


2007/G/002

07/06/2007

PARTICLE SIZE DISTRIBUTION BS 1377: 1990: PART 2 (9.2, 9.5)



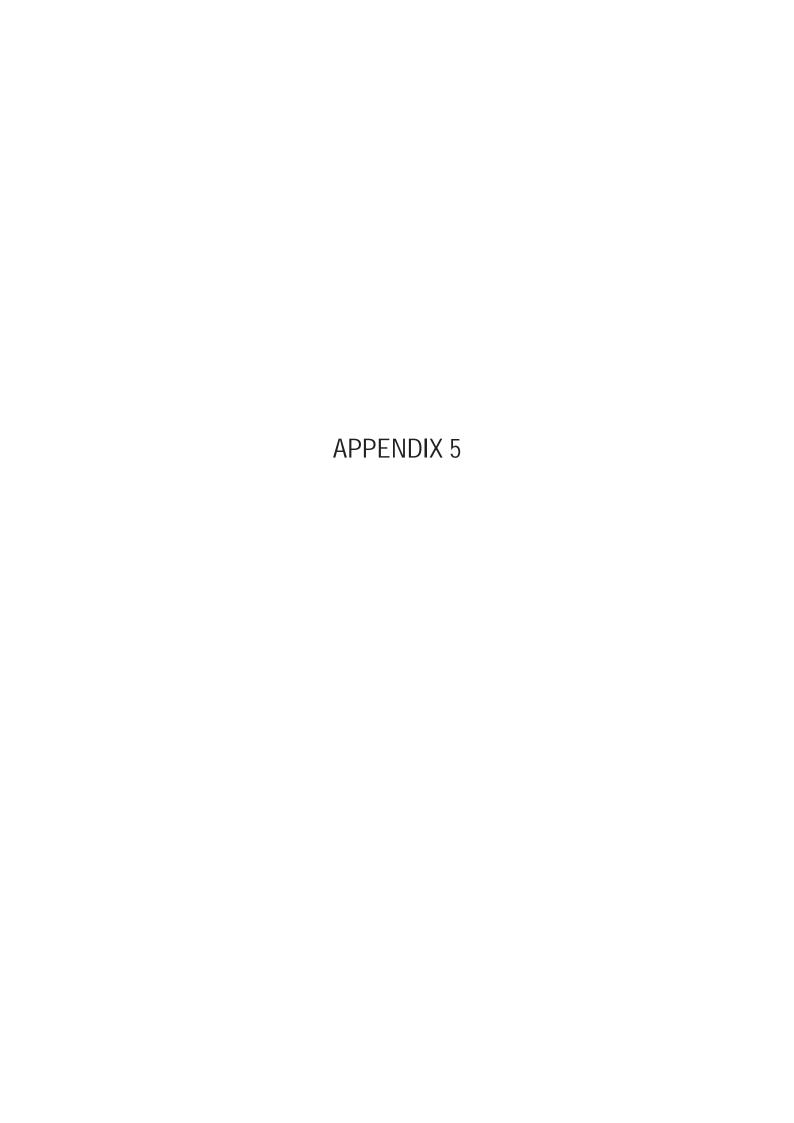


Soil Description: Light brown slightly gravelly slightly sandy SILT.

IRISH DRILLING LTD. Contract:	Contract:	Crown Site,	Crown Site, Mervue, Galway.	ay.
Loughrea Co. Galway Client:	Client:			
	Engineer:			
Tel: (091) 841274	Date:	3.4.07		Job Code:
Fax: (091) 847687	Tested by:	DD	Checked:	DJ

	TP 8A.	4.0-4.5 m
Location	<u></u>	Depth: 4

2007/G/002

































APPENDIX 6 GAS & WATER LEVELS

Gas & Water Levels				
Contract:	Crown Site, Mervue	Test carried out by:	Irish Drilling Ltd.	
Location:	Mervue, Galway	Operators:	D. Kivlehan	
Client:	Harmack	Date installed:	February March 2007	
Engineer:	Ml. Punch & Ptns.	Monitoring Period:		

Date: 14.03.'2007	CH⁴	CO_2	02	BAL	H_2S	00	LEL CH ₄	Peak CH₄	Barometric Press	Relative Press.	Relative Press. Groundwater level
	%	%	%	%	ppm	ppm		%	mbar	mbar	m bgl
Bh-1	0.0	0.0	20.6	79.3	0	0	0.0	0.0	1024	-0.04	5.92
Bh-3	0.0	0.0	20.7	79.2	0	0	0.0	0.0	1024	-0.04	dry (to 10.0m)
Bh-5	0.0	0.0	20.7	79.3	0	0	0.0	0.0	1024	0.01	8.40
Bh-7	0.0	0.0	19.4	9.62	0	0	0.0	0.0	1023	0.01	6.14
Bh-9	0.0	0.0	20.2	79.2	0	0	0.0	0.0	1024	0.02	5.50
Bh-13	0.0	0.0	20.2	79.3	0	0	0.0	0.0	1023	-0.01	3.26
Bh-15	0.0	0.0	20.8	79.3	0	0	0.0	0.0	1024	-0.01	2.40

Date:22.03.'2007	CH₄	CO_2	02	BAL	H_2S	00	LEL CH4	Peak CH₄	Peak CH₄ Barometric Press	Relative Press.	Relative Press. Groundwater level
	%	%	%	%	ppm	ppm		%	mbar	mbar	m bgl
Bh-1	0.0	0.0	20.5	79.5	0	0	0.0	0.0	1014	0.04	5.18
Bh-3	0.0	0.1	20.6	79.4	0	0	0.0	0.0	1024	-0.04	dry (to 10.0m)
Bh-5	0.0	0.0	20.6	79.4	0	0	0.0	0.0	1024	-0.61	8.40
Bh-7	0.0	0.7	19.6	9.62	0	7	0.0	0.0	1023	-0.53	dry
Bh-9	0.0	0.0	20.5	79.5	0	0	0.0	0.0	1024	1.38	6.49
Bh-13	0.0	0.0	20.5	79.4	0	0	0.0	0.0	1023	-0.08	3.30
Bh-15	0.0	0.0	20.6	79.3	0	0	0.0	0.0	1024	0.02	2.45
Notes:											
LEL	Lower Explosive Limit	splosiv	e Limit								
BAL	Balance	- All ot	her gase	Balance - All other gases except CH4, O2 and CO2 (usually Nitrogen)	λ_2 and C	O ₂ (usu	ally Nitrogen				
^, ^, ^,	Concentr	ation	above me	Concentration above measurable range							
V	Concentr	ation	selow me	Concentration below measurable range							
Relative Pressure	Differenc	e betw	/een air ⊧	Difference between air pressure and well pressure	all press	nre					