#### COMHAIRLE CONTAE PHORT LAIRGE

Stiurthoir Pleanala, Comhshaoil & Seirbhisi Eigeandala

#### WATERFORD COUNTY COUNCIL

Director of Planning, Environment & Emergency Services

Oifigí Cathartha, Dun Garbhan, Co. Phort Lairge

Tel.: 058-22011 Fax: 058-45606

E-mail: dmccarty@waterfordcoco.ie

My Reference: Mo Thag

Your Reference:

Civic Offices, Dung arvan, Co. Waterford Date: Dáta: 15th August 2005

PD: 04/1831

E.P.A. **Environmental Protection Agency** PO Box 3000 Johnstown Castle Wexford

Re: PD. 04/1831 plant for the treatment of effluents and for composting organic wastes. The facility will require modifications including some demolition and extension to the existing building, relocation of electrical substation, an in vessel composting system and biofilter, weighbridge and kiosk. An Environmental Impact Statement accompanies this application. The development will also require a waste licence at Kilowen, Portlaw, Co Waterford - AES(Irl) Ltd.

A Chara.

I refer to the above file and the further information received by the Planning Authority as attached for your attention. As the E.P.A were the governing body over the previous Tannery facility on site, your comments in relation to the above are requested. It is understood that the E.P.A. previously requested an investigation be undertaken at agreed locations and that samples be analysed for a range of potential contaminants within the site. The Planning Authority therefore wish to clarify if the information previously. requested by the E.P.A. and the information presented under the further information request are consistent. Given the time constraints involved the Planning Authority would be obliged for your response within three weeks.

Is mise le meas

p.p. Director of Services

Consent of copyright owner required for any other use.

'APPENDIX 7

Soils and Grc undwater Investic ation and Analysis

to the delical purposes only any other

# Submission in response to Waterford County Council request for 'Further Information' re the proposed development in Portlaw

#### Addendum to EIS - Soil, Geology and Groundwater

The EIS should detail the current condition of the soils on site and determine if any contamination has resulted on site as a result of Michell Tannary.

In order to comply with this request, the applicant contracted the independent consultants *Geotechnical and Environmental Services (GES) Limited* to investigate the site in order to sample and analyse soil and groundwater at the facility. This response to Waterford County Council contains the results from these independent investigations at the site. GES undertook *two* distinct investigative campaigns, Groundwater in late 2004 and Soil in 2005; their reports are appended to this EIS.

- Groundwater Report 3<sup>rd</sup> December 2004
  - Additional explanatory note from FBA laboratories (on sample from 3/12/04 report)
- Residual Contamination Assessment Report April 2005

#### Groundwater Report 3<sup>rd</sup> December 2004

This original assessment was requested and carried out under the instruction and supervision of the Environmental Protection Agency. The report is appended to this EIS, in summary the conclusions state that "there is no indication of significant impact on the groundwater environment from previous activities [Tanning] on the site"

The additional explanatory note from ESA aboratories was forwarded to the EPA following a request from the Agency as to the methodologies employed in the analysis of the groundwater samples in the above report.

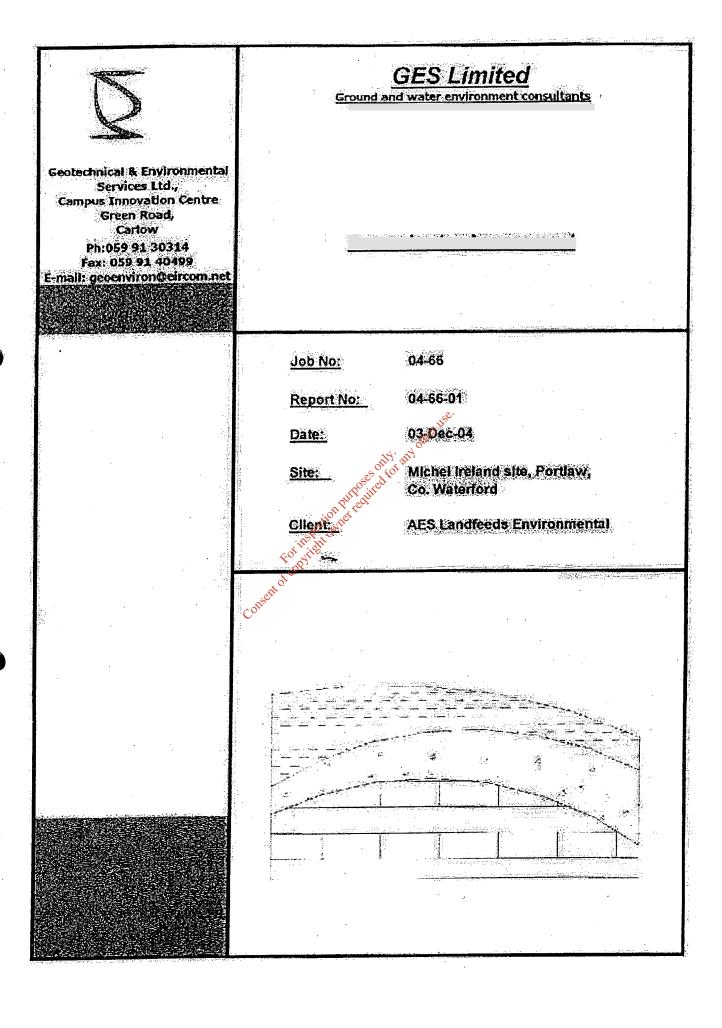
#### Residual Contamination Assessment Report - April 2005

Again this report was requested and carried out under the instruction and supervision of the Environmental Protection Agency. A schedule of works was agreed with the EPA and carried out by **GES** during March and April 2005. This report which is also appended to this EIS is primarily concerned with an examination of soil samples from potentially vulnerable areas around the Portlaw facility. The salient conclusions from this report state that "a comprehensive investigation has been undertaken, which demonstrates consistent ground conditions across the area investigated. The results of the analysis do not indicate residual contamination, that may impact the environment or have an affect on structure associated with future development of the site"

#### Conclusion

It is therefore evident from the independent reports that the previous activities carried out by Michell Tannery did **not** result in any contamination to the soil or groundwater at the facility.

Consent of copyright owner required for any other use.



#### Contents

- 1. Introduction
- 2 Works undertaken
- 3 Drilling
- 4. Pumping and Analysis
- 5. Conclusions

#### Appendices

- 1. Borehole Location Map
- 2. Borehole Log
- 3. Groundwater Analysis

Report prepared and checked by:

W Keonaine

Consent of conditation but the direction of the state of

EPA Export 25-07-2013:18:13:45

#### 1. INTRODUCTION

Geotechnical and Environmental Services Limited were requested by AES Landfeeds Environmental to co-ordinate an assessment of down gradient groundwater quality on the former Michel Ireland site at Portlaw, Co. Waterford.

The assessment was requested by the Environmental Protection Agency, as part of the return of the licence, covering the previous activities on site (Tannery).

#### 2. WORK UNDERTAKEN

A borehole location was identified on 16 September 2004 and approval sought from the agency for the location and proposed method of drilling. Approval was received with a request to move the location 30m to 40m to the east on 27 September 2004.

The borehole was drilled by Fogarty Drilling of Gowran between 13th and 16th October 2004.

A pump was installed in the well and a sample recovered, which was analysed by FBA Laboratories of Cappoquin, Co. Waterford.

This report has been prepared to summarise and interpret the findings.

#### 3. DRILLING

A log of the borehole is provided in the appendices. The borehole encountered 10.3m of sity CLAY over LIMESTONE Bedrock. The borehole was drilled to 50m total depth. A fissure at 43m yielded approximately 1m<sup>3</sup> per hour. The overburden is effectively sealed out, which means that only groundwater from the aquifer is allowed to enter the borehole.

#### 4. PUMPING and ANALYSIS

A pump was fitted to the borehole and the borehole pumped for 5 hours. A sample was recovered and sent to FBA Laboratories for analysis. The results of analysis are provided in the appendices.

The results demonstrate a good quality groundwater, with low concentrations for the main pollution indicators of Chloride, Phosphate, Potassium, Sodium, Ammonia, Nitrite and Nitrate. Very low concentrations of total Chromium were encountered in the sample.

#### 5. CONCLUSIONS

The findings from the borehole indicate LOW groundwater vulnerability conditions, with confined conditions, indicating an upward hydraulic pressure.

The works confirm that there is no indication of a significant impact on the groundwater environment from previous activities on the site.

A:\michel report.doc

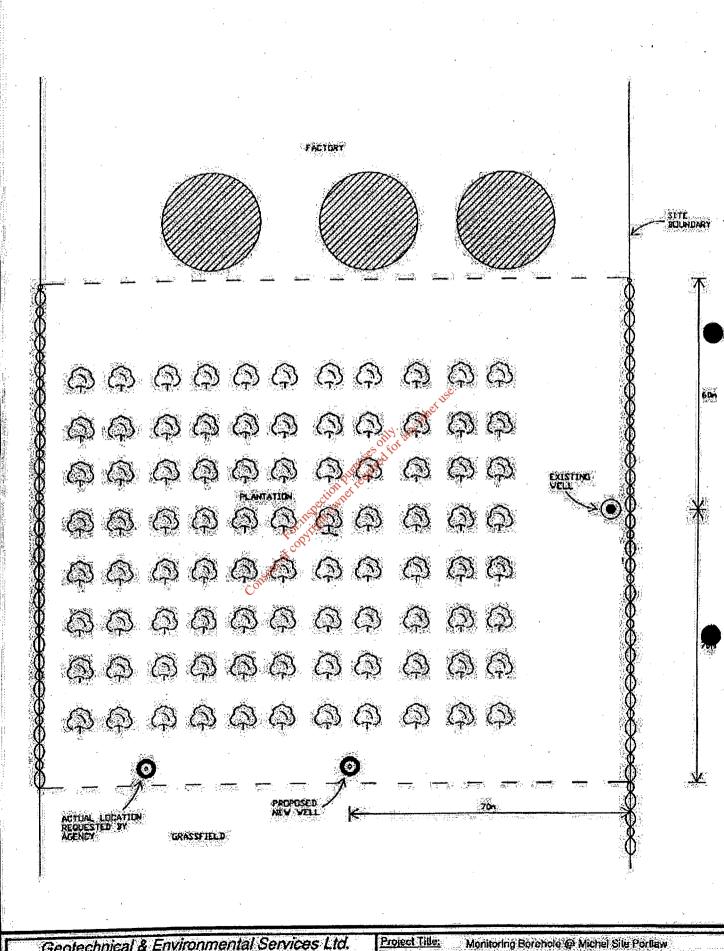
# **Appendices**

Consent of convitation of convitations of the convitation of the convi

## Appendix 1

### **Borehole Location Map**

Consent of convided on the tention of the conviction of the convic



# Geolechnical & Environmental Services Ltd. Experiment in Controlletion: Hydrogeology & Finger metal & Roders Ges Ltd., Campus Innovation Gentre: Fax: 059-9130314 Gampus Innovation Gentre: Fax: 059-9140499 Green Rd., Cantow: Project Title: Monitoring Boroholo @ Michel Site Portlaw Project Title: Monitoring Boroholo @ Michel Site Portlaw Client: Landlecds: AES Drg.: Title: Location of Proposed Downgradient Boroholo Green Rd., Cantow: Dwg.Scala: Date: Dwg.No: Job No: Revision: Drn By: 17/09/04 D4-66-01 04/66 A. LM.

For inspection but pages only any other us

Borehole Log

S xibnaqqA

Marie .

	4,356	npus Inno	<i>tironmental Services</i> vation Centre,	Boreho	le Log
		Greer Carl		BI	<b>E</b> 1
January Champan		Ph: 059- Fax: 059-	9130314 9140499	Sheet	1 of 1
Method: Rotory	Date: / 13to16/	10/04	<u>Site:</u> Michel   Port		
Dig.mm: Coords:	G.L.mO		Clienta Londfeeds Er	ixironmento	e e e e e e e e e e e e e e e e e e e
250-160				New York Call to the Control of the	
<u>Water and Progress</u>	<u>Completion</u>	Depth	Description of	Strata	Legen
		0.00m			=
250mm open höle		=1.50	Dark brown CLAY topsol	And the second s	
250mm steel cosing—+			Soft red-brown silty CL, limestone boulders and		
to 10.5m		-500	gravels	Assertation (New Assertation Control	CLAY
Grout-					
160mm steel cosing-		=10.00			
to 13.6m			Dark shaley - Limeston		LIMESTON
		 _13.60	anter .		
		<u>=15.00</u>	Dork muddy Limestone is	vith dork	
160mm open hole -		at Pos	shale layers. Limestone increasing layers of clea	is any. n Limestone	1
125mm uPVC 13.6m.—		Solution to	with depth.		
to 49.6m		-2000 			
					A.
		<del></del> 3000	•		
					I
		-35.00.			
			R		-
		<u>-40.00</u>			
,					
3		<u> </u>	Fissure in clean Limesto	je layer	
		-45,00	Dork shaley Limestone	_	
·					
		64960	End of Borehole	and the second s	
Remarks:		15 C		nd Carling Depth: Job	Nox
Remarks. 1. Upon reaching the 49.6m de pirlifted for 1 hour until the	valer ran clear.	output	T.F. 1/250		04-66
estimated at 1 cubic m/hour. 2.After development 49.6m of was installed consisting of: 1.	S. Land	1		The second secon	
was installed consisting of: 1. 30m of screen to bottom at	som of cosing o BH,	nd€			

## Appendix 3

強い強

4. 44

### **Groundwater Analysis**

Consent of copyright and other use.

# FBA Taboratories Ita.

ANALYSTS: Agricultural and Environmental

CONSULTANTS: Agricultural and Nutritional

Carrigeen
Industrial Estate
Cappoquin,
Co. Waterford,

Tel: 06 8-52861 Fax: 05 8-52865 fbslabs@iol.ic

#### CERTIFICATE OF ANALYSIS

Landfeeds, Unit 16 Hebron and Est, Co. Kilkenny

Ground water sample received 03.11.04

Ref. Mitchell Ireland

Lab Ref: WC0165

Parameter	Dofts of aualysis  PH  µS/cm  @ 25°C  mg/l Cl  mg/l Cl  mg/l P  mg/l Na  mg/l Na  mg/l Na  mg/l NH3-N	only any or Result
्राच्या (प्रस्ताराच्या श्रेष्ट्रणस्यापार यान्या श्राप्तर शास्तर । 	Compared and the control of the cont	5° 20' 10' 10' 10' 10' 10' 10' 10' 10' 10' 1
pH	pH purp	child
Conductivity	µS/cm @ 25°℃ (8° € 8° € 8° € 8° € 8° € 8° € 8° € 8°	564
Chloride	mg//Cl gg car	22.5
Phosphate.	mg/P cotitight	0.15
Polessium	mylk (8) =	2,30
Sodium	mg/I Na &	10,6
Ammonia	mgl NH3-N	0.04
Total Chromium	μg/CC <del>T</del>	e 1.0
Nuriles	µg1NO₂	8.0
Mittates	mg/I NOz-N	4.8

COMMENT: Due to very low level of Total Chromium present it is unfeasible to do further analysis for hexavalent Chromium as detection limits are in the range ppm and Total Chromium was analysed as < 1.0 ppb.

Signed\_

men

5/11/04

Directors: TM Betler M.Agr.50., Phil C.M. Butter Dif Sci.

Co. Rts. No. 250639



ANALYSTS: Agricultural and Environmental

CONSULTANTS: Agricultural and Nutritional

Carrigeer Industrial Estate Cappoquin Co. Waterford

Tel: 058-52861 Fax: 058-52865 fbalabs@iol.ie

#### **CERTIFICATE OF ANALYSIS**

John Mc Namara, Landfeeds, Unit16 Hebron Ind Est, Co. Kilkenny.

Ground water sample received 03.11.04

Lab Ref: WC0165

"Parameter	Units of analysis  pH  µS/cm @ 25°C post of the mg/l Cl  mg/l P  mg/l K  mg/l K  mg/l K	ather 14 Result
рН	pH 35 OHY and	7.1
Conductivity	ينS/cm @ 25°C	564
Chloride	mg/l Cl	22.5
Phosphate	mg/l P citomer	0.15
Potassium	mg/l K 115 1160	2.30
Sodium	mg/l Na site	10.6
Ammonia	mg/l NH3-N	0.04
<b>Total Chromium</b>	µg∕ <b>l</b> o	< 1.0
<b>Nitrites</b>	ug/l NO <sub>2</sub>	8.0
<b>Nitrates</b>	mg/l NO <sub>3</sub> -N	4.8

COMMENT: Due to very low level of Total Chromium present it is unfeasible to do further analysis for hexavalent Chromium as detection limits are in the range ppm and Total Chromium was analysed as < 1.0 ppb.

Signed\_\_\_\_\_\_Oonagh Mee

Date 14/2/05-

DIRECTORS: T.M. BUTLER M.AGR.Sc., PHD C.M. BUTLER DIP Sci.

Co. Reg. No: 250639



# &BA Jaboratories Ita.

ANALYSTS: Agricultural and Environmental

CONSULTANTS: Agricultural and Nutritional

Co. Kilkenny.

Carrigee: Industrial Estate Cappoquin Co. Waterford

Tel: 058-5286]

Fax: 058-5286f fbalabs@iol.i.

John Mc Namara, Landfeeds, Unit 16 Hebron Ind Est,

With regard to ground water sample received 03.11.04 ref; Mitchell Ireland, Lab Ref: WC0165 analytical methods used are from the "Standard Methods for the Examination of Water & Wastewater, 20° edition. Individual reference numbers for analysis are listed below. The only exception is Ammonia Nitrogen which is analysed using a Hach DR/2500 with the method adapted from Clin. Chim. Acta, 14, 403 [1966]. We partake in the EPA: Intercalibration Scheme which monitors our analysis on all of

We partake in the EPA Intercalibration Scheme which monitors our analysis on all of the parameters you requested except nitrate nitragen.

4500-H&B рΗ μS/cm\ @ 25°C 2510 B Conductivity. mg/l/Cl 4500- CF B Chloride mg/l P 4500-PB&E Phosphate Potassium mg/l K 3120 B ICP-OES Sodium mg/l Na 3120 B ICP-OES **Total Chromium** μg/l **3120 B ICP-OES** µg/l NO<sub>2</sub> 4500-NO<sub>3</sub>-B **Nitrites** 4500-NO<sub>2</sub>- B mg/l NO<sub>3</sub>-N **Nitrates** Ammonia mg/l NH3-N see above

Signed\_\_\_\_\_

Franklin State

Oonagh Mee

Date 14/2/05

DIRECTORS: T.M. BUTLER M.AGR.SC., PHD C.M. BUTLER DIP SCI.

Export 25 mostrus: 8:13:46

Co. Reg. No: 250639

#### Jer Keohane

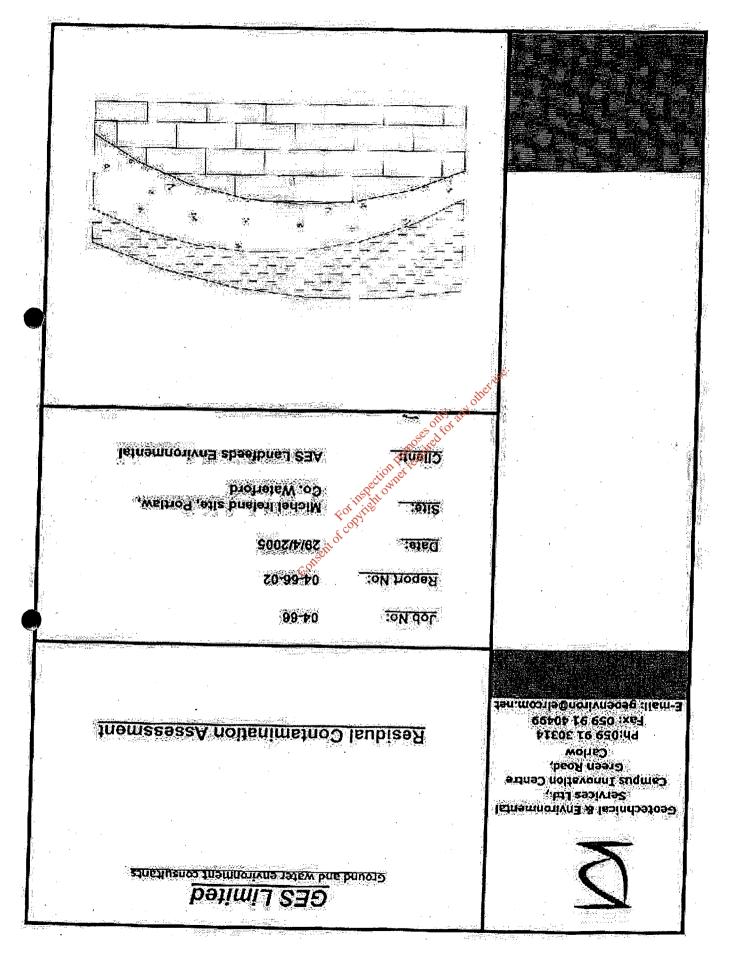
#### Report prepared by:

- ne i all'AllenT esigle #
- Soll Analysis Results
- (S bne f 3H bne 3 bne 8 (1H), 3 and 2, 8H); 3 and 8 bne H9 lent 2
  - Figure 1 Site Map detailing Actual Investigation (

#### Appendices

- A: Conclusions
- 3.2 Sampling
  - gnilling r.e
    - 3 Findings
- 2.2 Actual Works
- 2.1 Proposed Works
  - SITE WORKS
  - Introduction

etnetnoD



there appears to be variable chloride concentrations with higher values measured at the factory. However the chloride concentrations are not considered likely to affect concrete have any adverse environmental effect.

The Total Chromium concentrations are consistently low ranging from 10mg/kg to 20 mg/kg, well below the Dutch intervention concentration

The total ammonia concentration is generally low, only slightly elevated at TP1, which is considered to be related to breakdown of vegetation close to the surface and not related to any influence from the burial pit.

#### 4. CONCLUSIONS

A comprehensive investigation has been undertaken, which demonstrates consistent ground conditions across the area investigated.

The results of analysis do not indicate residual contamination, that may impact the environment or have an affect on structures associated with future development of the site

Consent of copyright owner leading differ any other tise.

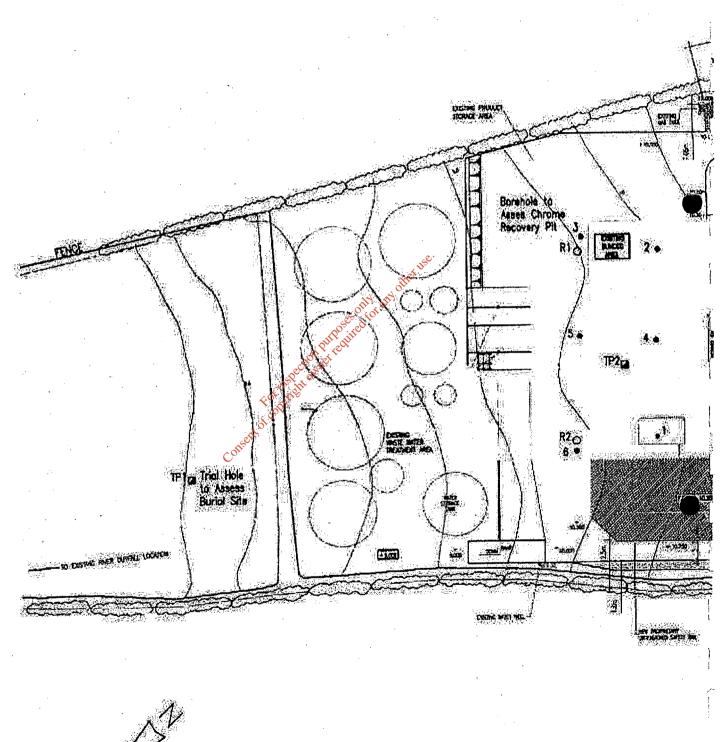
# **Appendices**

Consent of convince the convince the convenience of the convince the convince the convince the convince the convenience the convince the convince the convenience the convenie

# Appendix 1

Site Map detailing Actual investigation Points

onsent of copyright owner required for any other use.

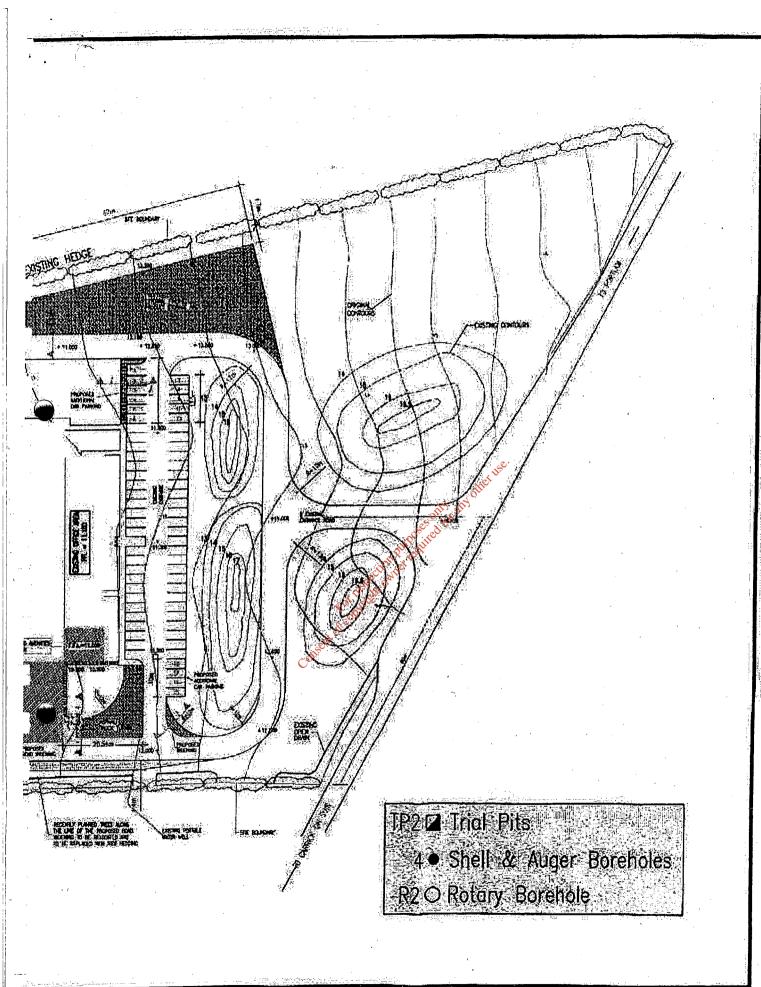




Geotechnical & Experies in George

Ges Ltd., Campus innovation Centra, Green Rd. Carlow.

Actual Investigation Points



onmental Services Ltd.		Project Title:	Monitorin Borahole @ Michel Site Portlaw
geology & Sovicemental Studies	The state of the s	Project Address:	Killowen Portlem Co. Waterford
ROSS PARTIES.		Client	Landovice AES
130814 140499		Drg. Tales:	Actual Investigation Points (Fig. 1)
ecenviron@elicom.nat		Dwg.Scaler. 1/1000	Oato: Owg.No: Job No: Revision: Owg.By: 24/02/05 04-66-02 04-66 A M

# Appendix 2

Trial Pit and Borehole Logs
(TP 1 and 2, BH 1, 3, 5 and RC 1 and 2)

For its region buffer serviced for any

	والمراب والمان المنتف المنتف المنتف المنتفي والمنتفي والمنتفي والمنتفي والمنتفي والمنتفي والمنتفق والم	ampus Inn	vironmental Services ovation Centre,	Triel	Pit
	. :		an Ad., Now.	TP :	
		Ph: 059	) 9130314 ) 9140499	Sheet 1	of 1
Method:	Dote:	/03/05	Sita: Portion	Street and the second second second second second second	- 100 A
Dio.mm: Coord			Client: AES		The state of the s
Soil Samples	- Woter&	Deptr			
Type test Depth	<del>- 1</del> - 12480 €	(m)	Description of St	rata	Legend
		<u>-0.004</u>	TOPSOIL		
		-0.20	Light brown gravelly CLAY		
· · · · · · · · · · · · · · · · · · ·	Y Company	-0.50			
	•	-0.80			
Sample taken <b>0</b> 1.0m -	A control of the second	-E-190	Grey brown gravelly CLAY		
e constitue de la constitue de		=1:50		· ·	
		Ė	es of M. and other use.		
A STATE OF THE STA		->/0	off, and office	**************************************	3
	i		es of total		
Somple token <b>0</b> 2:5m-			Kill (	7	
		ection err			
	GO GO	120	6 - 15 Sept. 19 2 24 2 1 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	### ### #### #########################	
	Consett of the	- -350	End of Triol Pit		
	Con			,	A Common of the
		= <b>4.60</b>			
	:				
		E-450		,	
	,	Ė	} •		
		525			
				•	
Y S	1	 550			
				•	
	2 2 4	-K02	· ·		
Remarks	A STATE OF THE STA	1 - 4	Loopped by: Scole: Erid: Co	ising Depth: Job M	
1_Slight wet patches 2_No evidence of stro	ang groundwater flow	<i>(</i> -	JK 1/50	<u> </u>	04-66
3 Samples loken 💆 1	.0m & 2.5m				
					Harmon Company

	<i>Geotechnic</i> Car	al & Em	<i>rironmental Services</i> vation Centre,	Trial P.
	SER TO CO.	Gree	n Rd., fo <del>e</del> .	TP 2
		Ph: 059	9130314 -9140499	Sheet 1 of 1
Method:	Dote:		Site Portio	Ň.
Excav Dia:mm: Coords	34.5	03/05 .D.	Client: AES	
		alas in the		
<u>Soil Samples</u> Type test Depth	<u>Water&amp;</u> <u>Progress</u>	Depth (m)	Description of S	trata Legend
		-0.00a		24000.3, 7, 9
	House and the second of the se	015 -	CONCRETE Yellow brown sandy gravelly Cl	
S. S		<u>-</u> 0.50		
Sample \token @0.8m—		-100	and the second s	
			End of Trial Plt	
		-1.40	athe.	
The state of the s		210 210	Sould and other use.	
		cionner rec		
	for ins	100		is provided to the control
To the second se	Consent	-150 -150		
		440		***
		-25°		
		-500		
		-5.59		
Remorks:	ountered.		JK 1/50	Сынц рарне   Jab No.   04-66
No groundwater enc 2.Sample taken <b>©</b> 0.8	30m.		INCOVE FAIR	

# ĐĨ ÛÔÓÓÔBĨ Ç





eliten IC Egges 15 Kecked	End 07/88/2035	Cable percussion 2004	ds and Remiesta endanteds from 3 \$2003	en veren er Se Aldrine Se Cartago	Depth bron to D COOr Athm	anvin Catta Dapth Carin 3 Screen	Ground Lave Copydinates National Grid	•	
Samples a	and Tests			Strata	STATE OF THE STATE			· c man man	
<b>De</b> oth	Type 8 No.	-Records	Date Time Casing Water		Discription:	· · · · · · · · · · · · · · · · · · ·	Depth (b-*)	Lagranic In.	Br id
4.16	The state of the s			MACE SROUND H MACH CHOUND H B DAN VAION DINGY IGHT IN OCCASEDING SUPPLY	Bricore"  grovely CLAY with blues Grayells unded fine to medium		0.12 (b)50) 0.60		
erioria. E <mark>igi</mark>		ì		Cobbins was action planticipe.  Brown yellow algoby appropy CLAY with a Grayor is subangular	išur io subrounded ô! sandy slightly cassional cobblen.	1.30 in Landinging Nos Landy	2,40)	70	
e de la constant	D.S.			Gryydria arbengully Io colifae Cooties a Sinestora	ie angendnyngt		7 N 22 N		
#30%A9					the later through	A Control of the Cont	325U)		
<b>4</b>			ormpoxos likes 3 40	Me and and	LE ESSE AT LECT		<b>.40</b> \$		
A the state of the			CO CONTRACTOR OF THE PROPERTY	ingection purposes of	to, ar.		The first terms of the second		
Community and the state of the								Commission of H. American	
The second secon		· ·				(例》 4.1 ] [1] [1] [1] [2] [4] [4] [4] [4] [4] [4] [4] [4] [4] [4	commission (the fact of the same of the sa		
esdi;	Tripe & No.	Records	Cate Time	enting the state of the state o	and the second s			,	
organ China Soniak Post 17) Olympics (68	sinke behaviou			Sepila Resjej Romarki 1860 - Soli			Chlaelling Depositm) 11th	Transissu ans	
CIA CHENNYOF ( Michigan Symbol Michigan Symbol Chennyon	of Byrnocks end ninks (All regions and is Unidowns glean bi	Coouder Enschera		F&= ⊋238	anna er <del>Medder i 12 - e</del>		lorehole B		i natici i

# ĐĨ ÛÔ¢ÓxÒBĨ Ç





greeked	Start 07/03/2005 End 07/03/2005	Equipment Metho Capie (Articles) 2008	49 and Remarks milleride from 2 cons	Cating Depth 4 UUm	Ground Level Coordinates National Crid	inger et lasten et.	**)(1) (1) (1) (1) (1) (1) (1) (1) (1) (1)		
Samples a	nd Tests	era o zestane mijarama		Strata		mercy of the state of	: 		ar Maria
Supih	Type 8.40	Records	Date Time Casing Water	ale Produced vilance communicati	Description	Same of the second second	Cupth()	Legand	Bajbili Mathirine
				NADE SHOUND: CHI	A STATE OF THE STA		<b>a</b> .16:		
			· ways and it is a second of the second of t	·			\$13 <b>10</b> )		
				Brown gray cayey sig gravely CODILES Of traubrounce: fire to are engine to extens	hulp statedy paves his publication photoner Countries				
		· .		ese anguar staceng	ARRISTA SERVICIONIS		(2.64)		
. <b></b>	<b>19.8</b>								
ute			drakorská sere	Brown years a spinty a CAY, Cypyde it august Ang is course.	andy privately of		184 (0.62)		
			1.00	ESPIDINICALAGO	CLHD3AI 4 17 m		3,12		
		•		d its gold hard sedired	<b>,</b> 		e Million and the second secon		1
	The second secon			of install					
	1 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2		Consent		•			4.5	
Transport of the Control of the Cont	The state of the s							The state of the s	:
	The state of the s	11 12 12 13 14 14 14 14 14 14 14 14 14 14 14 14 14					**************************************		r.
Professional Assessment	**************************************								in the second se
			Uste Des		•			Annual Sauch	
126 205 genanderer Ferde Silling Pan (127) The Charges (3)	t welke behavi	4.	Casing Water  Dapth sealed (m)	Depth Related Remarks *			Chicalang  Mappellin  1.00 (120 5)  1.00 (100 5)	res Toats Dynlist Dynidg	gaye.
ri fa sabangar Negresa (d) indy 1 a a serie Sebb 1 di danna	200 may 1		Affilian Co.	pitu			Borehole	3149	
ed paints 150	S. S			£3/			- 1		in Silver of

# ĐÎ ĐÔS ÔS Î Ç





Dag  _C gued	\$1841 0640312005 End 0840312005	Equiperent, Mathe Calle (inituizion 203)	ne and Aema nedament for	nes innomi	Color Now 16 Claim 100-7 3040 200i	ster: Casing Dapen un 3 Kro	Ground Leve Coordinates National Grid		
Samplen at	d Tests				Strata	representative (March			********
teath	rype à No	Becords	Date Caskey	Menn Walne	Ognetican		Depth ( Third reas)	Legithet	insir 18 Lusir 18
			. \$2 10 1 4 		MADE SHOUND Concrete"		0.70	公式	
				.4	WADE SROUND hardcore**		0.50	$\times$	L.III.
					MADE GROUND Contribution and BITT		0.30	1.7	
element Se	Terrar				B DWI Vallow sundy gravelly CLAY with management authors. Gravel is subangular	· -		<b>A</b> 1.12	
anio i	<b>35</b> 4				to nutrounded fini to source. Cobbles and mission of all limestics.	100		n	
3100	D2							.,2	:
								0	i. G
1						\$ <del>\$</del>	(2.50)	. 4	
		•				- 145 - 145			
**	02	•	-			9 m		2	
200	174		4			*		65.41	
		•	3 70 (6-47-500s	1805		To the second se		* o	
.7.5	*		april a	· · · · · · · · · · · · · · · · · · ·	UPPLUMATORY HOLE BNDS AT JUM M		3.08	•	÷
			***************************************		itegerian purposes only any other use.	). E	<b>l</b>	1	
: 4 **			:		چو.				
				.1	anet it			. Ale	i, f
	1 i i				14. 24 off.	4			
	,	•	4	1	Eagle gr.		ĵ		7. No
			1.	1	no red 1			sin i	
					Ditt Schitt			24,	
	Y 2000 A 10.00		1	- 1	edion det 1				
			4	J	TO THE OTHER				ļ,
A STATE OF THE STA		*	1	Ą.	Wild a			ī	1. 3.
			3	ξ,	8, 1992			*	
			Cond	onto					
	*4		· One	~					1
Ň	21							erde (	
								. 1	né né
anno -				1					!
	2		1	1		×		1	
	7 to 14 to 1				•	<u>.</u>			
	200		1	ľ		-	9	* 1	:
				1		1		•	:
				I		-		F	
					•	I			
				ľ	,	Ī	ļ.	Character	
1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1		•	nember (prop	1		- 9		, , , , , , , , , , , , , , , , , , ,	
.00	ope ::		. 🖣			:- 3			
•			1 1					-	
1.	to the time	and the control of th	l la companyone					]	:
straki 7	ype & No	Reports	Daja 71 Casing W	mer nere		ering Line Line Long to Long	<u> </u>		: gagagan
ravet Inde				100	Septit Ralas pd. Remarks		Chicefing		1964 (1964) 1885 (1965)
erdiebler Elizies Ezgen Post Vill	strike behaviti	#.	Depth see	r)	त्यात के हरे		Chicelling Dephis (n) In 0.20 0.50 30 3,00-3,06 60	→ Telb. Mins mkja	#IC
o čtře vád (ša	s Key Shindly			1				T <b>S</b> C.	
fer o elegandos r	· beauticities		Project		div	no - est <u>est in</u> cide P	Borchole		
fir u playance i Livi is seekurist is hefir Strallin Micaturan	ical Ali depuis di Bilakacea pista	nd Jeducels In handkele	Project No.		NIB	2 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 -	7 7 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3	Hö	
III declarate	n, povisni i Narah (1797) i kudi. T		Carried out			- 1	4.5	s of i	

## PRELIMINARY

# Borehole Log

llaca TE Cavo n-ched	Start 21/04/2005 End 21/04/2005	Equapment, Mathon I many open hits 147 3 75 year from a s	en ele lich D.O ulica io B. Kon	Desiby 4 (	CC Pedag 1000	Chago from to Diami Cross 400m 10- 400% \$30m 75-	*** 4.00m	Ground Level Coordinates Nellonel Grid	Ĭ.
3amples a	nd Tests				Strata		Section ( a distribution )		
Depth Depth	Тура & No	Records	Costing	Time Violar		Danchiston		Copmiteyel (Thickness)	Legino 34
J-1000	**************************************				Soci CLAY fer/ cobbles!	ž.			Ja
				1					, - 4 ! <u>.</u>
		:							<b>o</b> 17
ę							14		
. 3							19 <del>1</del>		
4				:: !#			*** ***		
		:					5, 17 7 (d)		
					;; ,		ial n		
			4		,		# <u></u>	46-9901	o <del>-                                  </del>
							14	(4.00)	<b>37</b> -77-39.
				1		•	. De		0.74
				1			: 5 55	j.	
	ľ	:	1	1				l i	A
	Į.		,	1					S-3-1
							> <u>}</u>		P4-12
J	**************************************					ilse.	r Ž		1 C
	The second			J		netw	) <del>(*</del>		# **
. () . (8)	en e		1	1		N Company		4.00	
1.g1 41		·			Sod CLAY WAY WAS AN	,		826004 L	
	.ii H			1	Get di	<i>y</i> .	: • • · · · · · · · · · · · · · · · · ·		
156164	80				THE CHILL	٠			1-16 - C
	<b>3</b>		ar a sandar	1	ion & rect		<b>*</b>		
		1.50			Dectioning				
		E. 3.	4. 4	1	of install	·	4		9 %
				*	ON THE	•	( <del>)</del>	Y	
				Å			ż	<u> </u>	
506800 <b>3</b> 5	92 10 0		Con	ent				(435)	
MISTER	<b>3</b>		Con				<u>*</u>	<b>经现</b> 有	ere tiv
		i.			(			8	
		2		1			Ä	H. 4	
				I			4	,	
ori re decensaria				ľ			·		
	23						Ĵ.	S	10 Table
<b>经</b> 用施	23 9 0	i						4	****
1		1					11		
	1 4		01/04/AIDS 4100	1603					
+	-4		***		. Extention for E	NEIŠĀLESĀ:#		8.35	<b>0</b>
- #		TOO		1					1
							<u> </u>	: :	3.1
		,		1		•		"	· · · · · · · · · · · · · · · · · · ·
							Î	:	
				1.				å	
							9	e i	
	يداڭ يىسى ي		Date Tu	العد			-		
- and the marking price parties	and a manage of the second	Records/Samples	Cosing Wa	DEF		<u> </u>	and the property of the second	.4139 Va	
Stives Sorte Stives Post	i Strike Makevia	Buffil	Depth cash	6d   4	Capth Rateled Remodis*			Chiaeiling Deposition Tir	no Toga pair
317114			Depth seek	n) [	· · · · · · · · · · · · · · · · · · ·			gradika 11754 - 1175 G	AS SEEDINGS
ni spovidlje	e Key Sheet)	;		ŀ	•			i	
						e para elemento de la contrata esta a contrata elemento.	100669 +0 00 00	.a Nemaka di Lilah Lilah da Ada	
(Captianaic)	of nymbods and		roject.	Po	áti v	Long and the Control of Name of Control of State of Control of Con	Parties of the Partie	Borehole	
o on set kees In the case of his bill	al nyriduals ardi neet: All capilse a dilck/ess give	and reduced in in brackeds	voject /No.		5038				C 1
			THE STATE OF THE STATE OF A	. :555 <u>C</u>	<b>3</b> .			7.2	

# PRELIMINARY





Tenha TR Louged Crecked	8tart 02:04:2 End 02:04:2	DOS JEM	algument, Med inympenhile 14: m dwifel-clinai	ode and Remarks Sanear ton 200m u Lught to 8.00m	Acceptus	Deportism to 1 CCC+ LOOK LOCS 1200m	thiomater Casing Depth (427) 43Cm 78mm	Ground Lovet Coordinates Nations! Cris	
Samula	s and Te	ste	Takangan ing	Televisian in the important in the impor	Strata	n week more make	Contract of Asset Section 1	1	
Depth	Тура А		Records :	Date Tin Casing Wa		Description		Depth Level	Legend Picks).
خسرت المتوسدين	<u> </u>	A. A. C. B			Sat CLAY with occasio	nal cobles"		(timestimes)	
						And the second second			the same of the same of the same of the same
1000 A				Consent	a inspection purposes of the distribution of t	o's	· · · · · · · · · · · · · · · · · · ·		
<b>▶85 ★</b>		And the second s		Chimerophic 195	SCELORA, 15777 - A), E	C4123 3/( 3.00 m		<b>8.00</b>	
Le-241 Aroni gabler. Aroni gabler. Aro. Società 1711 Valle Cosepyà	Post sinke b	Enaviour	orde/Sample a	Cuts Time Casing Water Depth sealed (co)	Depth Related Remarks *			Chiselling Depteron) Time	Tage 2 - Oct
up 29. Pr. amiliti nabrana: one sub- no-fant natura: rulpjil ralluno rulpjil ralluno	altor af apraint Lýg stáid, Alf (*21,000,000,000) (*21,000,000,000)			Pyolect Project Mo Casted out for	Portu-	84. U 170. 444. U 1883. 2 m. 1997. – 1997. 1997. 1997. 1997. 1997. 1997. 1997. 1997. 1997. 1997. 1997. 1997. 1997. 1997. 1997. 1997. 1997.			52 1701

£ xibneqqA

Soil Analysis Results

EPA Export 25-07-2013:18:13:47

							EMPRESS E SOLAND							
Parameter	tints.	Units Soft Sectioner Dents List			in the second second			davidili sasi	Control of the contro	- 100 miles	41.47	1	A Section of the Australia	G. Translation Called
				ti :				100 2500 (100 (100 (100 (100 (100 (100 (100 (	. 55 - 600- 	Andrew Control	Carry many	**************************************	The second of	19,347 (3,922345) 150,371,413
		12.00		BH1 D-1	8H1 D-3	BH3 D-1	8003	84501	BHS D-3	7912-1	JP10-1	TP2.D-1	RIO4	R2 D4
		Intervention Level	Action Level	Sampled: 1.8m	Sempled 20m	Sarcted 20at	Sampled 1.8m	Sampled 4.0m	Sampled 2 3re	Sampled: 1.0m	Samples: 25m	Sampled: C.bm	Buth Sampled in & Bm	Bulk Sampled a
	a years between	MARKE ARTON	100 mm. 2000			794-700 King	Bandy Star over	THE STATE OF STREET	g <del>sa paragera</del>	Parallic Control			State of the state	
plet so ?	p#1.Unite			. /96	2.9	31.9	9.1		9.6	<b>7.8</b> 3	84	24,5	8.7	8.6
Chlorida	13 (A)		<b>*</b> ***********************************	164	510	171	/123	610	<b>352</b> (	39	24		139	220
Civors un	ආලබ්ද Čr	100	280	72	16.9	394	<b>70</b> /4	102	<b>924</b>	12.0	4.8	[grin 11 11 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1		164
Tutal Aminoria	mg/kg Hira			- <b>- 1.</b>	u 20	160	10	07		(3)	Q.T	1,7	.23	334
Access (1992) and the		Register and Server	Charles Committee			1	Talling Control of the State of	C.V.C. C.V.C. C.	7		1-14 C			ACTION TO PRODUCE SERVICE

Consent of copyright owner required for any other use.

Angel Charle	JULIS **	ing/kg Flankss	ICPMSS	WENT TO	KONE Z											No.	Farmer
	Mether Reporting Limbs: UKAS Accredised:	2,5	0.€		50		COLUMN TAN			above to the second	1. c 5/2.5			-			
	UKAS Acceptated:	Ye.	YEG	<b>723</b>	75									Visit			
	-						:		A NAME OF THE PARTY OF THE PART								
TES 15 VALUE 20 50	Clieft Sämple Description	Asumoeds and Attropen.	Chronium (MS)	Section (Control of Control of Co	QH deirite		A Commence of the commence of			A CONTRACTOR OF THE PROPERTY O		Total Committee		The state of the s			
sarait i	The same of a supplemental contraction	i i i	120	38	151		Low, and opening the			and the second second			4 1.55 AAS 1.50	- Paragraphy	22 ···	-	
502910	ARTES -	2.0	15 P	7.0	6:0			The second					4	<del>\</del>		4.	<b>_</b>
507717	heut 18	- 5	19.50	17.3	171	A		1 3 mg	P. American de la companya de la com		<del></del>		<del> </del>	1	V 20 1		
กราเก	mires ya	• 0	20.2	y,1	126			1 - 7	100 - 100 -		to the second	827	· <del> </del>	1		1.000.1 6.1.	-
in <del>t</del> riffin	BP65 11	9.7	10.2	3.5	518						g of Lagran			<del> </del>	<del></del>	1	Sea est
03020	BLUL BEST	* 1	17.4	4.6	424			g : #577	100	The same	· mayarov.	100.80		<del></del>	and a second		
04/5/24	materia	53	13.2	76	40			all? all		ariaca.	Marketon Property Commencer Street		<del> </del>	4	ψ, .		
107(121	TP10225	9.7. 1.8	14.8	K4		A STATE OF THE CONTRACTOR		3 KO			-	7:00	and special lives	<u> </u>	<del></del>	el - squaiss	
107027	TPS DARR	7.7	Angelia de la compania de la compani	8,1	73	-Vanareaus Cure			MINISTER STREET	in magazine		1:	3 - Apriliana	direction.	+		-
1			1.11771 - 11.0	1	me Aller Park Indiana	1 Paparahahisaspaceerin	7 Philes	X	American Same	-		À		-		. inesgr.	ķ
	MANAGER AND			- A TOTAL PROPERTY OF THE PARTY		**************************************	ction net .				žn.	-	+	<b></b>		i india.	
	Proprietation to the company of the		1:1 2			25	0		10 m F 14			-	( Saraman)	age.		-	
	The state of the s		C.L S - conjument	# Marketon Processing	N 6 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3	forti	There's a second of the second		** · · · · · · · ·	· ·		-	4 679	<b>1</b>		-	ļ
	- 10- Accessoration-res-201					For Split	ac management			100 m		<del> </del> -	-	· · · · ·			1
			. g.mm	***************************************	1	3	2427 7 7 7 7 7 7	200				<del>-</del>	ar meridin	<del> </del>			
3				***************************************	i in	Sty minutes					-	-			1		24.52.525.1
	The state of the s		***************************************		ල් ල්		Trip Serves P				i Samo e <del>stina</del>	-		16	ile Syromometries	1 20	:-
			The second of th	39-7m/201006			TURNS	F. 4 430 RATE	<del>- 19</del> 14		AND THE RESERVE		A Company	Acres Se manuscom		1	
		ri etti.	· · · · · · · · · · · · · · · · · · ·	×				Company (	January <del>State and S</del>	4						and the	
	To be a second and the second and th	1000	-		gainer v	No. of the second	Allen of the same	Constants.	1	و سیسی سیا						er Silvania era era era era era era era era era er	
	and the state of t	· · · · · · · · · · · · · · · · · · ·	2.42			1 12672	A		<u> </u>	<u> </u>				,			
TES Brellby		Client Name Geotech Specialists									CAUS COMMUNICATION						
		- 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1										Solls Sample Analysis					
	anlind so thent Shill so littless the 52 (1881)	Contact									_						ES
		]:	Fortlaw								Date Printed. 0544pt=05					ā.	
	n (44 pg (2)), t-Nam										Report Number: EFSros						
ï	H-154 01 1715 - 1428	1			3	e of the	VV.				Table N			A total and a second	3 210331970		A 4
		1.					,				ALL INC. IN		<u> </u>	Tell May and	j <u>ujement. Haj</u> ri		

SEA Breiby		-  +sc(so/s  gu-id\v-zz		√əldimi	SelioS  Oate Frinted  report Number  redmut Abet				· · · · · · · · · · · · · · · · · · ·	TES Brethy The desired for the control of the cont							
				w.r.								II Speciali			Cliency		
		,		<u></u>				<u> </u>		· · · · · · · · · · · · · · · · · · ·				erena, ap	i i	and the second s	*** * * * * * * * * * * * * * * * * * *
			<b>,</b> , , , , , , , , , , , , , , , , , ,			Inguitation of the last					3 (4000 0 222 ) 		2	1 April 1			
			<u> </u>		<i>:</i>			1 117 - 1194		r griw r.		- 200-112	<u> </u>				
		anasa + 1	i Gunnayes as		anna a an	Ladero Lincold				ener er e	Angeles (1) Belles (1)	o de la		, , , , , , , , , , , , , , , , , , ,		A CONTRACTOR OF THE PROPERTY O	شي دون
	<u>د میں دی۔</u> انسان داند	in the same of	milita a f. i alia:				<b>1</b>		See See				عز تأريبيو فليديس مائند. - فانديد ترينان والأروان				icilian A
		olongi ya ma Ca Sansiyaniman				<u></u>						13°C	ļau azīļ	and an action	والمستعددة والمالية		
						NA 19					thei				Linima and and the		in'ilia
								****			303				laussium (194 Spillionnes		l
	and a state of the				1							ahari banggapan denar	according to the second		*****	A Committee of the Comm	
	2020042.101			DESCRIPTION OF THE PARTY.	. Note that is government respective and stocking, as	***************************************				dig dig	Š.			amii		and the second s	* 1 * 1
					Section of the sectio	Charles and the second	A comment		etio <sup>3</sup> s					AC COLONO COMMONTANT SAR OF	1 41 Cannas as (c) 1 2 40	A STATE OF THE STA	
								10 JUNE BAR	360			false.				grani de destrutation de participa de la compansión de la	2. 11. 2- 110-1
-								***	50		E rec	. 66 <del>7</del> 7	*5 <b>a</b>	- <b>2</b> 41	70	<b>5</b> (0.41	411
			*1					Š		Fishere	To an	'd¢i	(2, <b>0</b> )	6 kit	. <b>6 8</b>		911
	*							Onserie				201 201	A CONTRACTOR OF THE PARTY OF TH	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1		The state of the s	
					:		.[				3	12. 12. 12. 12. 12.					
1						o concentration of the concent					accomplete.	A Axes	, and	Chromaum (NS)	Ammoniaca Mingsh		
						i i						Chlonder	pH units	COTTE	N.	nothinseed signal treats.	
						14.					77.74m/u	5	盂	b.com	10613		
			Tv.	\$	:		7 ¥				union.			্ঞ	Ymer.		
					:	Garage Control					uice :	1.00	8				
- A 17   U.S.					1 225 y <sub>2</sub> - 11 2 2 200			i i i i i i i i i i i i i i i i i i i			<b>1</b>	A dille	ZAMV.	164	18%	· poupoisty syste	1_
	# Table 1	1.32.4			- 3							til 474 Lu≣NGN Esyau	· hindakinghaka	9 <u>'''</u> 95'', 17'', 1 11'', 17'', 18''	33 HM 47.1 (31 HM 47.1 (3) (4) (4)	Sind : 13652 bodieli : elen: I gint også honteli : borbosså Sistl	
	- in the	<u> </u>									( ) ( ) ( ) ( ) ( ) ( ) ( ) ( ) ( ) ( )	- 98 9tc	SWITH.	іздін	ns.dia		- 42 17

# **Report Notes**

```
Soil/Solid enalysis specific
     Results expressed as maley universurated atterwise
     S04 analysis, not conducted in accordance with BS1327 unless otherwise stated
     Water Sciuble Suichate on 7.1 water upit extract
     AR canning applying conducted on the As Received sample
     # tro-crosed with perso(b)fluoranmene
     ## co-olcled with minnio(123 cd)pyrene
     HTFX analysis vapressed as using As Received
    Phenol HPLC results expressed as replay As Received
  Waldi analysis specific:
    Results expressed of mps unions studies otherwise.
 Oil analysis specific:
    Remills expressed by impligualists stated afterwise
   S G Arminiscou us glem' (D 15'C
 Filter analyzis specific
   Reports expressed as my on files unless catal otherwise
VOC analysis specific
   Explantiony oster for data flagging
   U = undeterted above reporting limit
  J. r. continuitation of instrument was below hypercular usen stendars.
E. e. concentration at instrument was obove too caparason standard.
B. e. compositor was dielected in method blank.
Gas (Tedlar bag) analysis specific:
  Results expressed as upd unlass stated commencer.
Air Carton Inhofunalysis specific
  Percula expressed as upon more under stated of everse
Asbestos analysis specifici
  CH denotes Chrysotlis
  CR denotes Crocsuples
  AM delives Amosite
  NADIS centrale No Astronia Delecer in Semple:
  NBFO perceios No Buill fores Coserved
  T Trace
  L'Low (2-15%)
 M Medium (15-50%)
H High (>50%)
General notes:
  this ariginal was subcontracted to ancide anarology
  $ Within leboratory teleraness
 3$ unable to analyse tipe to nature of same e
 * Results for guidance only, possible interference.
 & Blank corrected
 LS insufficient comme for enalysis
 Inti Unacie to analyse due in mesternice:
 N.D. Not determinen
 N.R. Vel. voordec
N.Det Ivot detectes
 Req Anayals Recuested see acached sheets for our its
  denotes this result not UKAS accordited on the semple
 P Related destraining that our to naticle of sample
 T Denotes that an element of the quelly copied system is correctly exhibiting sustained plan from the
 normal working pattern. The QC has not taken whom make and the cause of the is, builty investigated
 and fect had.
 This poet not invasibate the CVZ DL TU quests seety specifies that you will be kept informed when this
```

## Appendix 4

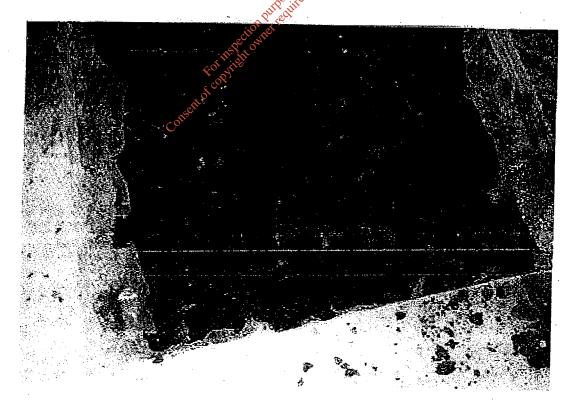
· 探晓

Plates of Trial Pits 1 and 2

Consent of copyright owner required for any other use.



Trial Pit TP1



Trial Fit TP2