

Report No. 3933/R02/lb/dl

Roadstone Dublin Ltd.

Inert Waste Recovery Facilities Fassaroe, Bray, Co. Wicklow

Factual Report on Groundwater Well installation and Hydrochemical Testing

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January 2009



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1 INTRODUCTION

This factual report was prepared for Roadstone Dublin Ltd. by SLR Consulting and presents details of the installation of three groundwater monitoring wells installed at Fassaroe pit during December 2008 by Glover Site Investigations under the supervision of SLR staff.

1.1 Purpose of Site Investigations

The purpose of installations was to determine the subsoil geology at the site, to facilitate monitoring of the groundwater levels around the quarry periphery and to facilitate sampling of groundwater for hydrochemical analysis. These investigations were undertaken in support of an application for a waste licence for the recovery of inert soil and construction and demolition waste materials.

1.2 Site Description

The site at Fassaroe, Co. Wicklow is located approximately 2km to the west of Bray town on the western side of the N11 National Primary Road. The site is a former sand and gravel pit quarry which has been fully worked-out. The application site now houses a ready-mix concrete plant, an aggregate processing (washing) facility and a paving / stone retail centre.

2 REGIONAL GEOLOGY

2.1 Quaternary Subsoil Geology

The available Teagasc (2004) subsoil mapping indicates that the site at Fassaroe is located entirely within an area of Carboniferous limestone sand and gravel. Sand and gravel material has been excavated at the existing quarry within the site. Exposures in the quarry indicate that the sand and gravel material extends to approximately 3m thickness in the northern part of the existing quarry and up to 10m in thickness in the eastern part of the quarry.

2.2 Solid Geology

The site at Fassaroe is underlain by Ordovician greywacke and tuff from the Glencullen Formation and Ordovician slate, phyllite and schist from the Maulin formation. No bedrock is exposed in the existing sand and gravel pit quarry.

3 INSTALLATION OF GROUNDWATER MONITORING WELLS

Groundwater well drilling started at Fassaroe on the 1st December 2008. The objective of the drilling was

- i. to identify the nature of the subsoils;
- ii. to obtain subsoil samples for visual description;
- iii. to establish the depth to groundwater;; and
- iv. to facilitate groundwater sampling.

A total of three monitoring wells were installed at Fassaroe, BH01, BH02 and BH03. The well locations are shown in Figure 1. Groundwater well logs are presented in Appendix A.

BH01

Monitoring well BH01 is located down-gradient of the quarry in the southern part of the site. The well was drilled at 152mm (6 inches) with self advancing casing (symmetrix). The casing was advanced through course to fine sand and gravel to the limit of the machine at 15m and the borehole was open holed thereafter. A water strike was encountered at 18m below surface. The borehole was open holed to depth of 23m. However below 21m depth, the subsoil began to collapse into the hole and the hole was stabilised to this depth.

The piezometer installation comprised 6m of slotted pipe with 15.5m of riser. The annulus of the borehole was filled with 7m of a gravel filter pack at the base and backfilled to the surface with bentonite. The top 1m of the borehole was completed with concrete and a protective well head installed.

BH02

Monitoring well BH02 is located down-gradient of the pit at the eastern side of the site. The well was drilled using symmetrix at a diameter of 152mm. Casing was advanced through sand and gravel to 20m where the subsoil became more clayey. The casing advanced to 24m, which was the limit of machine. The machine was not able to open hole below this depth. A significant water strike was encountered at 20m below surface in clayey sands and gravels.

The piezometer installation comprised of 6m slotted pipe with 18.5m of riser. The annulus of the borehole was filled with 7m of a gravel filter pack at the base and backfilled to the surface with bentonite. The top 1m of the borehole was completed with concrete and a protective well head installed.

BH03

Monitoring well BH03 is located up-gradient of the pit at the western side of the site. The well was drilled using symmetrix at a diameter of 152mm. Casing was advanced through a silty sand and gravel to 15m where a 3m thick stiff brown clay was encountered. Below the clay the subsoils comprised of clayey sand and gravel. The casing was advanced to 24m and below this depth the borehole was open holed. A minor groundwater strike was encountered at 15m below surface above the stiff clay. There were no water strikes below this depth, but the subsoil became noticeably damp at 27m.

The piezometer installation comprised of 6m of slotted pipe with 15.5m of riser. The annulus of the borehole was filled with 7m of a gravel filter pack at the base and backfilled to the surface with bentonite. The top 1m of the borehole was completed with concrete and a protective well head installed.

4 GROUNDWATER LEVEL DATA

Groundwater levels were measured during and following completion of each well. Groundwater level may be temporarily raised during the drilling process and piezometer installation and as such, following completion of the wells the groundwater level was allowed to stabilise. Stabilisation of a well in a sand and gravel aquifer tends to be relatively rapid and is likely to be complete within a couple of days. The groundwater levels for each well are presented in the table below.

Borehole Name	Surface OD	Depth of Hole	Water Strike during drilling	Water level 08/12/08	Water level 07/01/09
BH01	79	21.00	c.18	19.75	dry
BH02	81	24.00	c.20	19.02	19.29
BH03	87	30.00	c.15	21.19	21.26

Table all measurements in metres below ground level

In wells BH01 and BH03, the water strikes encountered during the drilling were above the groundwater table, whilst in BH02 the water strike was encountered below the groundwater level measured following well completion. These data indicate that the water strikes in BH01 and BH03 were due to minor perched water tables present within the aquifer, most likely associated with the presence of clay layers. The resting water table of BH02 above the initial water strike indicates that the water table may be locally confined by areas of clay.

The water level in wells BH02 and BH03 stabilised rapidly following well completion. However, BH01 stabilised over an estimated period of approximately 2 weeks. The measured water level in BH01 lowered by >1.25m following completion, causing the well to become dry at that time. This unusual drop in water level is attributed to the water table encountered at 18m depth being a perched water table at a local clay band. Following the perforation of the layer by the borehole the perched water drained to a lower level over a period of c. two weeks. Based upon the groundwater contours derived for the site (based on wells BH02 and BH03) the base of BH01 is estimated to lie at or slightly above the groundwater level.

5 LABORATORY HYDROCHEMICAL DATA

Groundwater wells BH02 (ALcontrol Ref FW2) and BH03 (ALcontrol ref FW1) as well as standing water on the pit floor (ALcontrol ref SW1) were sampled on the 7th January 2009 by SLR staff. The wells were purged prior to sampling as detailed in the groundwater field sheets presented in Appendix B.

Water samples were forwarded to ALcontrol Geochem for hydrochemical analysis and the resultant data is presented in Appendix C.

FIGURES

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NOTES
 1. Based on OSI 6inch sheet no. 21
 2. Ordnance Survey Ireland Licence no. SU 0000709
 (c) Ordnance Survey of Ireland & Government of Ireland

LEGEND

	Applicant's Land Interest (c. 65.1 ha)
	Waste Licence Application Area (c. 21.4 ha)
	Borehole Location
	Internal Unpaved Road
	Internal Paved Road
	Building
	Cross Sections
	Surface Water Monitoring Location

roadstone
 ROADSTONE DUBLIN LTD.
 FORTUNESTOWN
 TALLAGHT
 DUBLIN 24

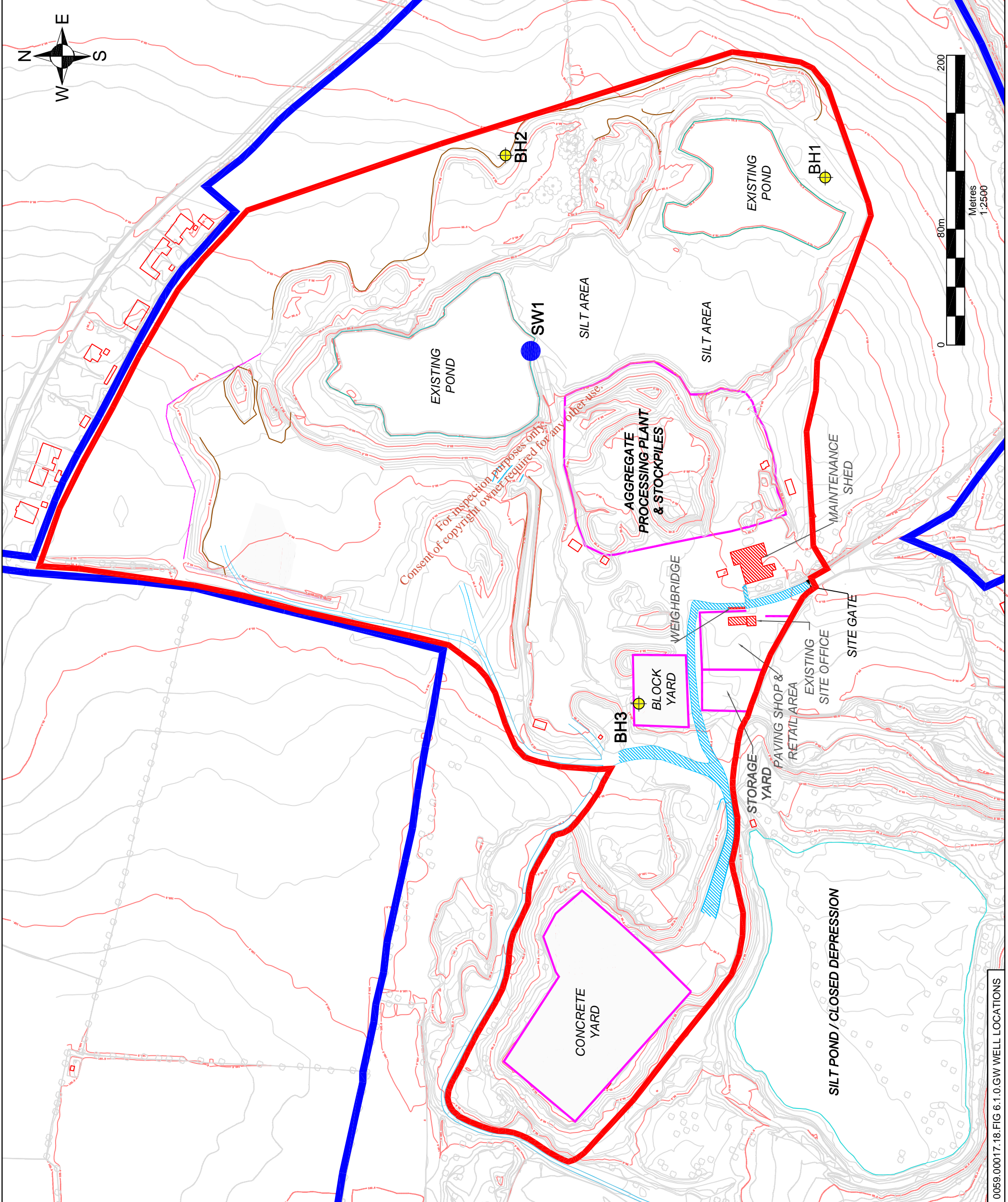
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 WASTE LICENCE APPLICATION
 FASSAROE WASTE RECOVERY FACILITY
 FASSAROE, BRAY, CO. WICKLOW

GROUNDWATER WELL LOCATIONS

FIGURE 1

Scale 1:2,500 @ A3 Date APRIL 2009



APPENDIX A
WELL DRILLING LOGS

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Glover Site Investigations Ltd

Site
Fassaroe Quarry, Bray, Co. Wicklow
Borehole Number
BH01

Boring Method Symmetrix & Open Hole Drilling	Casing Diameter 152mm cased to 21.00m	Ground Level (mOD)	Client Roadstone Dublin Ltd	Job Number 08-0821
	Location	Dates 01/12/2008	Engineer John Barnett & Associates/SLR Consulting Ireland	Sheet 1/1

Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
				Water Strike(1) at 18.00m.		(21.00)	Brown sandy subangular to subrounded fine to coarse GRAVEL and fine SAND (Driller's description)		
				01/12/2008:		21.00	Complete at 21.00m		

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Remarks
Standpipe installed to 21.00m.

Scale (approx)	Logged By
1:200	PD:HH
Figure No.	
08-0821.BH01	

Glover Site Investigations Ltd

Site
Fassaroe Quarry, Bray, Co. Wicklow

Borehole
Number
BH01

Installation Type
Standpipe

Dimensions
Internal Diameter of Tube [A] = 50 mm
Diameter of Filter Zone = 152 mm

Client
Roadstone Dublin Ltd

Job
Number
08-0821

Location

Ground Level (mOD)

Engineer

John Barnett & Associates/SLR Consulting Ireland

Sheet
1/1

Legend	Water	Instr (A)	Level (mOD)	Depth (m)	Description	Groundwater Strikes During Drilling										
						Date	Time	Depth Struck (m)	Casing Depth (m)	Inflow Rate	Readings				Depth Sealed (m)	
				1.00	Concrete			18.00		Water Strike						
Groundwater Observations During Drilling																
						Start of Shift					End of Shift					
		Date		Time		Depth Hole (m)	Casing Depth (m)	Water Depth (m)	Water Level (mOD)	Time		Depth Hole (m)	Casing Depth (m)	Water Depth (m)	Water Level (mOD)	
		01/12/08										21.00				
Instrument Groundwater Observations																
Inst. [A] Type :																
		Date				Instrument [A]			Remarks							
		Time		Depth (m)	Level (mOD)											
				14.00	Slotted Standpipe											
				20.00	Gravel Filter											
				21.00												

Remarks
Upright cover fitted.

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Glover Site Investigations Ltd

Site
Fassaroe Quarry, Bray, Co. Wicklow

Borehole Number
BH02

Boring Method
Symmetrix & Open Hole Drilling

Casing Diameter
152mm cased to 24.00m

Ground Level (mOD)

Client
Roadstone Dublin Ltd

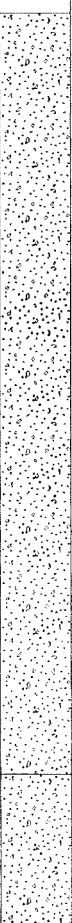

Job Number
08-0821

Location

Dates
03/12/2008

Engineer
John Barnett & Associates/SLR Consulting Ireland

Sheet
1/1

Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
							Brown sandy subangular to subrounded fine to coarse GRAVEL and very fine SAND (Driller's description)		
						(20.00)			
				Water Strike (1) at 20.00m.		20.00	Brown sandy subangular to subrounded fine to coarse GRAVEL and very fine SAND (Driller's description)		
				03/12/2008:		24.00	Complete at 24.00m		

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Remarks
Standpipe installed to 24.00m.

Scale (approx)
1:200

Logged By
PD/HH

Figure No.
08-0821.BH02

Glover Site Investigations Ltd

Site
Fassaroe Quarry, Bray, Co. Wicklow
Borehole Number
BH02

Installation Type
Standpipe
Dimensions
Internal Diameter of Tube [A] = 50 mm
Diameter of Filter Zone = 152 mm
Client
Roadstone Dublin Ltd
Job Number
08-0821

Location
Ground Level (mOD)
Engineer
John Barnett & Associates/SLR Consulting Ireland
Sheet
1/1

Legend	Water	Instr (A)	Level (mOD)	Depth (m)	Description	Groundwater Strikes During Drilling										
						Date	Time	Depth Struck (m)	Casing Depth (m)	Inflow Rate	Readings				Depth Sealed (m)	
				1.00	Concrete			20.00		Water Strike						
						Groundwater Observations During Drilling										
						Start of Shift					End of Shift					
						Date	Time	Depth Hole (m)	Casing Depth (m)	Water Depth (m)	Water Level (mOD)	Time	Depth Hole (m)	Casing Depth (m)	Water Depth (m)	Water Level (mOD)
						03/12/08							24.00			
					Bentonite Seal											
						Instrument Groundwater Observations										
						Inst. [A] Type :										
						Date	Instrument [A]			Remarks						
							Time	Depth (m)	Level (mOD)							
				18.00												
				24.00	Slotted Standpipe											

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Remarks
Upright cover fitted.

Glover Site Investigations Ltd

Site
Fassaroe Quarry, Bray, Co. Wicklow

Borehole Number
BH03

Boring Method Symmetrix & Open Hole Drilling	Casing Diameter 152mm cased to 30.00m	Ground Level (mOD)	Client Roadstone Dublin Ltd	Job Number 08-0821
	Location	Dates 09/12/2008	Engineer John Barnett & Associates/SLR Consulting Ireland	Sheet 1/1

Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
							Brown sandy SILT and fine SAND and GRAVEL (Driller's description)		
						(15.00)			
				Water Strike(1) at 15.00m.	15.00	(3.00)	Stiff brown CLAY (Driller's description)		∇1
						18.00	Brown gravelly CLAY (Driller's description)		
						(12.00)			
				09/12/2008:		30.00	Complete at 30.00m		

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Remarks Standpipe installed to 30.00m	Scale (approx)	Logged By
	1:200	PD/HH
	Figure No. 08-0821.BH03	

Glover Site Investigations Ltd

Site
Fassaroe Quarry, Bray, Co. Wicklow
Borehole Number
BH03

Installation Type
Standpipe
Dimensions
Internal Diameter of Tube [A] = 50 mm
Diameter of Filter Zone = 152 mm
Client
Roadstone Dublin Ltd
Job Number
08-0821

Location
Ground Level (mOD)
Engineer
John Barnett & Associates/SLR Consulting Ireland
Sheet
1/1

Legend	Water	Instr (A)	Level (mOD)	Depth (m)	Description	Groundwater Strikes During Drilling										
						Date	Time	Depth Struck (m)	Casing Depth (m)	Inflow Rate	Readings				Depth Sealed (m)	
				1.00	Concrete			15.00		Water Strike						
						Groundwater Observations During Drilling										
						Start of Shift					End of Shift					
						Date	Time	Depth Hole (m)	Casing Depth (m)	Water Depth (m)	Water Level (mOD)	Time	Depth Hole (m)	Casing Depth (m)	Water Depth (m)	Water Level (mOD)
						09/12/08							30.00			
						Instrument Groundwater Observations										
						Inst. [A] Type :										
						Date	Instrument [A]			Remarks						
							Time	Depth (m)	Level (mOD)							
						19.00										
						Slotted Standpipe										
						25.00										

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Remarks
Upright cover fitted.

APPENDIX B
SAMPLING RECORD SHEETS

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SAMPLING PROTOCOLS

(Adapted from the Landfill Manual: Landfill Monitoring,
Environmental Protection Agency, 1995)



Sampling Protocol For: Groundwater, Surface Water and Leachate.	
Compiled By: Peter Glanville (SLR)	
Protocol No. 01	Version: 0
Issue date: 9 th January 2009	Supersedes Version – 0 (Jan. 2003)
Reasons for update – SLR Consulting Ireland	

1 **Background (to be completed)**

Sampling: (groundwater/surface water/leachate)	
Purpose of sample: Obtain baseline water quality sample for EIS	
Location: Fassaroe Co. Wicklow	Date: 7 th January 2009
Client: RDL	Protocol form completed by: PG
Sampling Regime: (monthly/quarterly/annual): EIS	
Persons on site: (Client/Engineers/Contractors/Sub Consultants/ Others) Peter Glanville and Eoin Walsh	
Weather Conditions: Very cold and sunny.	

2 **Site Responsibilities (to be completed)**

Supervision of sampling on Site:	
Name: Peter Glanville	Company: SLR Consulting Ireland




3 Locations Sampled (to be completed)

No.	Location ID	Date	No.	Location ID	Date
1	FW1	2009/01/07	21		
2	FW2	2009/01/07	22		
3	FW3	2009/01/07	23		
4	SW1	2009/01/07	24		
5			25		
6			26		
7			27		
8			28		
9			29		
10			30		
11			31		
12			32		
13			33		
14			34		
15			35		
16			36		
17			37		
18			38		
19			39		
20			40		

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4 Materials (to be completed)

	
<p>Instrumentation and Equipment: (Equipment used to obtain a valid and representative sample of the medium being investigated, including equipment used to measure field parameters)</p>	
<p>Pump/Bailer: Waterra Peristaltic Pump and high flow tubing</p>	
<p>Sample Bailers: Waterra Disposable Bailers</p>	<p>Dip metre: 30m Electronic</p>
<p>Equipment decontamination:</p>	
<p>Sample containers used: 1l Glass, 1l Plastic, 125ml Plastic for Anions, 125ml Plastic with H₂SO₄ preservative</p>	
<p>Field record sheets: Field Note Book</p>	<p>Chain of custody documentation: 42033 Laboratory: Alcontrol</p>
<p>Ancillary Items: (maps/drawings/stationary/PPE etc.) Standard PPE including latex gloves.</p>	

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5 Methods (to be completed)

Sampling Procedure: (Stepwise procedure for sampling)



- (a) Dip Well.
- (b) Purge well with Waterra pump and high flow tubing to obtain minimum of 3 no. well volumes where possible (i.e where well does not run dry).
- (c) Remove purging equipment and take water sample with disposable bailer.

Equipment used for sampling: Disposable well bailers (Aquabailers/Clearview).

Procedure for labelling of samples:

Client/Site/Sample ID/Date

Sample Storage: Cooler box to Alcontrol Lab.

Sample collection and delivery to lab: Same day to ALcontrol Lab.

Procedure for field parameter measurement:

Sub Sample taken from well - field readings prior to sampling or at end of each well volume.

Equipment used for measurement if field parameters: YSI Multiprobe meter; T (°C), EC (ms), DO (%), DO (mg/l), pH (pH units), pH mV, ORP.

6 Sample Plan (to be completed)

Sample details: For number and date of samples see Section 3.




Location of surface water samples:

Location ID	Location	Location ID	Location
SW1	Sample from beside access ramp to silt lagoon		

Frequency of sampling:

No.	Sample ID	Depth of sample (m)	No.	Sample ID	Depth of sample (m)
1	FW1	Na.	19		
2	FW2	Na.	20		
3			21		
4			22		
5			23		
6			24		
7			25		
8			26		
9			27		
10			38		
11			39		
12			30		
13			31		
14			32		
15			33		
16			34		
17			35		
18			36		

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Quantity Sample Obtained.	
	
Sample volume: 2.5l	
Sample container type and no.:	1l Glass 1l Plastic 1 125ml plastic (Anions) 1 125ml plastic H2SO4 preservative
Sample preservatives used (if any)	H2SO4

7 Records (to be completed at end of sampling round)

QA Records: The following records are required to demonstrate sampling protocol has been adhered to (check Box).	
Record of:	Completed
Date of sampling	✓
Name of sampling personnel	✓
Weather conditions	✓
Amount of sample obtained	✓
Location sample points	✓
Sample preservatives used	✓
Results of field parameters (see site record of groundwater sampling sheet)	✓
Compilation of appropriate forms (i.e. site record, sampling sheet, chain of custody form)	✓
Deviations from protocol (see notes)	✓
Sampling difficulties (see notes)	✓

8 Comments

Notes:



Well FW1: Well was pumped dry after 50l. Left to recharge for 20 min. and a further 10l was purged. Very sandy and silty returns in groundwater purged. Returned to take sample after sampling other well on site.

Well FW2: Well was pumped dry after 35l. Left to recharge for 20 min. and a further 10l was purged. Very sandy and silty returns in groundwater purged. Sampled.

Well FW3: No groundwater present in well when dipped.

Surface Water SW1: Sample of surface water taken from the silt lagoon at the access ramp location.

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Groundwater Sampling Field Record Sheet

SLR Consulting Ireland Ltd.,
Unit 7, Dundrum Business Park,
Windy Arbour, Dublin 14.



RECORD OF GROUNDWATER SAMPLING

Site Location: Fassaroe, Co. Wicklow	SLR Job No. 3933
Date/Time: 07/01/2009	
Borehole ID. BH03	
Borehole Location: N. Side of Block yard	
Engineer: SLR	Sub Consultant:

WELL DETAILS

Elevation of steel casing cover above ground level (m)	0.92
Groundwater level from ground level (m)	21.26 bgl
Depth of well from ground level (m)	27
Standpipe diameter (mm)	50mm
Well Volume (l)	84 l

Well Development	Volume removed (l) 30
------------------	-----------------------

WELL PURGING (see Field Parameters Sheet)

Purge volume	pH	EC (μ S)	Temp ($^{\circ}$ C)	Dissolved Oxygen (mg/l)	ORP
30l	7.58	644	10.02	7.12	253.1

Notes: Purged using Waterra Inertial Pump, and dedicated Waterra Tubing

Visual inspection

Odour: None

Colour: Purge water was silty and very sandy.

Sheen: No oil sheen or film.

Groundwater Sampling Field Record Sheet

SLR Consulting Ireland Ltd.,
Unit 7, Dundrum Business Park,
Windy Arbour, Dublin 14.



RECORD OF GROUNDWATER SAMPLING

Site Location: Fassaroe, Co. Wicklow	SLR Job No. 3933
Date/Time: 07/01/2009	
Borehole ID. BH02	
Borehole Location: E. side of pit void	
Engineer: SLR	Sub Consultant:

WELL DETAILS

Elevation of steel casing cover above ground level (m)	0.34
Groundwater level from ground level (m)	19.29 bgl
Depth of well from ground level (m)	25
Standpipe diameter (mm)	50mm
Well Volume (l)	90 l

Well Development	Volume removed (l) 30
------------------	-----------------------

WELL PURGING (see Field Parameters Sheet)

Purge volume	pH	EC (μ S)	Temp ($^{\circ}$ C)	Dissolved Oxygen (mg/l)	ORP
30 l	8.11	457	8.4	12.3	-340

Notes: Purged using Clearview disposable bailer

Visual inspection Silty and slightly sandy

Odour: None

Colour: Silty

Oil Sheen: None

APPENDIX C
HYDROCHEMICAL TEST RESULTS

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CERTIFICATE OF ANALYSIS

Client: SLR Consulting Ltd.
Treenwood House
Rowden Lane
Bradford On Avon
Wiltshire
BA15 2AU

Attention: Peter Glanville

Date: 19 January, 2009

Our Reference: 09-B00063/01

Your Reference: 00501.0059.0021

Location: FASSAROE EIS

A total of 3 samples was received for analysis on Wednesday, 7 January 2009. 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

Dylan Halpin

Lorraine McNamara

Dylan Halpin
Team Leader Project Co-ordination

Lorraine McNamara
General Manager

Compiled By

Caoimhe McLoughlin

.....
Caoimhe McLoughlin



ALcontrol Laboratories Ireland

Test Schedule

Ref Number: 09-B00063/01

Sample Type: WATER

Client: SLR Consulting Ltd.

Location: FASSAROE EIS

Date of Receipt: 07/01/2009

Client Contact: Peter Glanville

Client Ref: 00501.0059.0021

UKAS Accredited [Testing Laboratory] No. 1291	Detection Method																
	5 DAY ATU	GC	GC	GC	GC	GC	GC	GC	GC	ICP MS	ICP MS	ICP MS	ICP MS				
ALcontrol Reference																	
	Sample Identity	Other ID	P / V	BOD Unfiltered	Diesel Range Organics	Mineral Oil by GC	DRO Interpretation	Benzene	Ethylbenzene	Petrol Range Organics C5-C9	Petrol Range Organics C10-12	Toluene	Total Xylene	Total Hardness	Dissolved Magnesium Low Level	Dissolved Calcium Low Level	Dissolved Manganese Low Level
09-B00063-S0011-A01	FW1 (EHS)	7/1/09	Glass Bottle	-	-	-	-	-	-	-	-	-	-	-	-	-	-
09-B00063-S0011-A03	FW1	7/1/09	Plastic Bottle	-	-	-	-	-	-	-	-	-	-	X	X	X	X
09-B00063-S0011-A08	FW1	7/1/09	Plastic Bottle + H2SO4	-	-	-	-	-	-	-	-	-	-	-	-	-	-
09-B00063-S0011-A10	FW1	7/1/09	100ml Plastic Amino Bottle	-	-	-	-	-	-	-	-	-	-	-	-	-	-
09-B00063-S0012-A01	FW2 (EHS)	7/1/09	Glass Bottle	-	-	-	-	-	-	-	-	-	-	-	-	-	-
09-B00063-S0012-A03	FW2	7/1/09	Plastic Bottle	-	-	-	-	-	-	-	-	-	-	X	X	X	X
09-B00063-S0012-A08	FW2	7/1/09	Plastic Bottle + H2SO4	-	-	-	-	-	-	-	-	-	-	-	-	-	-
09-B00063-S0013-A10	FW2	7/1/09	100ml Plastic Amino Bottle	-	-	-	-	-	-	-	-	-	-	-	-	-	-
09-B00063-S0013-A01	SW1	7/1/09	Glass Bottle	-	X	-	X	X	X	X	X	X	X	-	-	-	-
09-B00063-S0013-A05	SW1	7/1/09	Plastic Bottle	X	-	-	-	-	-	-	-	-	-	X	X	X	X
09-B00063-S0013-A11	SW1	7/1/09	Plastic Bottle + H2SO4	-	-	-	-	-	-	-	-	-	-	-	-	-	-
09-B00063-S0013-A13	SW1	7/1/09	100ml Plastic Amino Bottle	-	-	-	-	-	-	-	-	-	-	-	-	-	-

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Notes : NUMERIC VALUES INDICATE ADDITIONAL SCHEDULING

ALcontrol Laboratories Ireland

Test Schedule

Ref Number: 09-B00063/01

Sample Type: WATER

Client: SLR Consulting Ltd.

Location: FASSAROE EIS

Date of Receipt: 07/01/2009

Client Contact: Peter Glanville

Client Ref: 00501.0059.0021

		Detection Method													
UKAS Accredited [Testing Laboratory] No. 1291		ICP MS	ICP MS	ICP OES	ICP OES	IR	KONE	KONE	KONE	KONE	SPECTRO	TITRATION			
ALcontrol Reference	Sample Identity	Other ID	P / V	Dissolved Iron Low Level	Dissolved Aluminium Low Level	Dissolved Potassium	Dissolved Sodium	Total Organic Carbon	Nitrate as NO3	ortho Phosphate as PO4	Nitrite as NO2	Chloride	Sulphate	Ammoniacal Nitrogen as N	Total Alkalinity as CaCO3
09-B00063-S0011-A01	FW1 (S) (S)	7/1/09	Glass Bottle	-	-	-	-	X	-	-	-	-	-	-	-
09-B00063-S0011-A03	FW1 (S)	7/1/09	Plastic Bottle	X	X	-	X	-	-	-	-	-	-	-	-
09-B00063-S0011-A08	FW1 (S)	7/1/09	Plastic Bottle + H2SO4	-	-	-	-	-	-	-	-	-	-	X	-
09-B00063-S0011-A10	FW1 (S)	7/1/09	100ml Plastic Amon Bottle	-	-	-	-	-	X	X	X	X	X	-	-
09-B00063-S0012-A01	FW2 (S) (S)	7/1/09	Glass Bottle	-	-	-	-	-	-	-	-	-	-	-	-
09-B00063-S0012-A03	FW2 (S)	7/1/09	Plastic Bottle	X	X	-	X	-	-	-	-	-	-	-	X
09-B00063-S0012-A10	FW2 (S)	7/1/09	Plastic Bottle + H2SO4	-	-	-	-	-	-	-	-	-	-	X	-
09-B00063-S0012-A08	FW2 (S)	7/1/09	100ml Plastic Amon Bottle	-	-	-	-	-	X	X	X	X	X	-	-
09-B00063-S0013-A01	SW1	7/1/09	Glass Bottle	-	-	-	-	-	-	-	-	-	-	-	-
09-B00063-S0013-A05	SW1	7/1/09	Plastic Bottle	X	X	-	X	-	-	-	-	-	-	-	X
09-B00063-S0013-A11	SW1	7/1/09	Plastic Bottle + H2SO4	-	-	-	-	-	-	-	-	-	-	X	-
09-B00063-S0013-A13	SW1	7/1/09	100ml Plastic Amon Bottle	-	-	-	-	-	X	X	X	X	X	-	-

Notes : NUMERIC VALUES INDICATE ADDITIONAL SCHEDULING

ALcontrol Laboratories Ireland

Test Schedule Summary

Ref Number: **09-B00063/01**
 Client: SLR Consulting Ltd.
 Date of Receipt: 07/01/2009

Sample Type: **WATER**
 Location: FASSAROE EIS
 Client Contact: Peter Glanville
 Client Ref: 00501.0059.0021

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

SCHEDULE	METHOD	TEST NAME	TOTAL
X	5 DAY ATU	BOD Unfiltered	1
X	GC	DRO + Mineral Oil by GC	1
X	GC	DRO Interpretation	1
X	GC	PRO & BTEX	1
X	ICP MS	Total Hardness (ICP MS)	3
X	ICP MS	Dissolved Aluminium Low Level	3
X	ICP MS	Dissolved Calcium Low Level	3
X	ICP MS	Dissolved Iron Low Level	3
X	ICP MS	Dissolved Magnesium Low Level	3
X	ICP MS	Dissolved Manganese Low Level	3
X	ICP OES	Dissolved Potassium	3
X	ICP OES	Dissolved Sodium	3
X	IR	Total Organic Carbon	2
X	KONE	Chloride	3
X	KONE	Nitrate as NO3	3
X	KONE	Nitrite as NO2	3
X	KONE	ortho Phosphate	3
X	KONE	Sulphate	3
X	SPECTRO	Ammoniacal Nitrogen	3
X	TITRATION	Total Alkalinity	3

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ALcontrol Laboratories Ireland

Table Of Results

Interim
 Validated

Ref Number: 09-B00063/01

Sample Type: WATER

Client: SLR Consulting Ltd.

Location: FASSAROE EIS

Date of Receipt: 07/01/2009

Client Contact: Peter Glanville

(of first sample)

Client Ref: 00501.0059.0021

ALcontrol Reference	Sample Identity	Other ID	UKAS Accredited [Testing Laboratory] No. 1291														
			Detection Method	5 DAY ATU	GC	GC	GC	GC	GC	GC	GC	GC	ICP MS	ICP MS	ICP MS		
			Method Detection Limit	<2mg/l	<10ug/l	n/a	<10ug/l	<10ug/l	<10ug/l	<10ug/l	<10ug/l	<10ug/l	<10ug/l	<2ug/l	<120ug/l	<2ug/l	<100ug/l
				✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
			BOD Unfiltered	mg/l	-	-	-	-	-	-	-	-	-	-	-	-	-
			Diesel Range Organics	ug/l	-	-	-	-	-	-	-	-	-	-	-	-	-
			Mineral Oil by GC	ug/l	-	-	-	-	-	-	-	-	-	-	-	-	-
			DRO Interpretation		-	-	-	-	-	-	-	-	-	-	-	-	-
			Petrol Range Organics C5-C9	ug/l	-	-	-	-	-	-	-	-	-	-	-	-	-
			Petrol Range Organics C10-12	ug/l	-	-	-	-	-	-	-	-	-	-	-	-	-
			Benzene	ug/l	-	-	-	-	-	-	-	-	-	-	-	-	-
			Toluene	ug/l	-	-	-	-	-	-	-	-	-	-	-	-	-
			Ethylbenzene	ug/l	-	-	-	-	-	-	-	-	-	-	-	-	-
			Total Xylene	ug/l	-	-	-	-	-	-	-	-	-	-	-	-	-
			Total Hardness	mg/l	274	213	100	274	213	100	274	213	100	274	213	100	274
			Dissolved Aluminium Low Level	ug/l	103	14	11	103	14	11	103	14	11	103	14	11	103
			Dissolved Calcium Low Level	ug/l	97970	67200	36370	97970	67200	36370	97970	67200	36370	97970	67200	36370	97970
			Dissolved Iron Low Level	ug/l	20	36	9	20	36	9	20	36	9	20	36	9	20
			Dissolved Magnesium Low Level	ug/l	7167	11050	2266	7167	11050	2266	7167	11050	2266	7167	11050	2266	7167

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Notes : METHOD DETECTION LIMITS ARE NOT ALWAYS ACHIEVABLE DUE TO VARIOUS CIRCUMSTANCES BEYOND OUR CONTROL. **NDP = NO DETERMINATION POSSIBLE**

Checked By : Caoimhe McLoughlin

ALcontrol Laboratories Ireland

Table Of Results

Interim
 Validated

Ref Number: 09-B00063/01

Sample Type: WATER

Client: SLR Consulting Ltd.

Location: FASSAROE EIS

Date of Receipt: 07/01/2009

Client Contact: Peter Glanville

(of first sample)

Client Ref: 00501.0059.0021

ALcontrol Reference	Sample Identity	Other ID	Detection Method										
			ICP MS	ICP OES	ICP OES	IR	KONE	KONE	KONE	KONE	SPECTRO	TITRATION	
Method Detection Limit			<1ug/l	<0.2mg/l	<0.2mg/l	<2mg/l	<1mg/l	<3mg/l	<0.03mg/l	<0.3mg/l	<0.05mg/l	<0.2mg/l	<1mg/l
UKAS Accredited [Testing Laboratory] No. 1291			✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
			Dissolved Manganese Low Level	ug/l									
			Dissolved Potassium	mg/l	2.3	2.8	4.4						
			Dissolved Sodium	mg/l	22.7	15.6	13.7						
			Total Organic Carbon	mg/l	<2	3	-						
			Chloride	mg/l	15	23	17						
			Sulphate	mg/l	38	29	40						
			ortho Phosphate as PO4	mg/l	0.06	0.04	0.08						
			Nitrate as NO3	mg/l	13.0	3.6	3.6						
			Nitrite as NO2	mg/l	0.11	0.12	0.09						
			Ammoniacal Nitrogen as N	mg/l	<0.2	<0.2	<0.2						
			Total Alkalinity as CaCO3	mg/l	210	130	80						
09-B00063-S0011	FW1 (PH03)	7/1/09											
09-B00063-S0012	FW2 (PH02)	7/1/09											
09-B00063-S0013	SW1	7/1/09											

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Notes : METHOD DETECTION LIMITS ARE NOT ALWAYS ACHIEVABLE DUE TO VARIOUS CIRCUMSTANCES BEYOND OUR CONTROL. **NDP = NO DETERMINATION POSSIBLE**

Checked By : Caoimhe McLoughlin

Geochem Analytical Services
Diesel Range Organics/Mineral Oil

by
G.C.

Client Name SLR Consulting Ltd. Job Number B00063 Separatory Funnel Ext No
 Client Ref 00501.0059.0021 Date Extracted/Prepared 12.01.09 Soxtec Extraction No
 Sample Matrix Water Date Analysed 13.01.09 Column Extraction No

Sample number	Sample Identity	Depth	Diesel Range Hydrocarbons		Mineral Oil	Interpretation
			(µg/litre)	(µg/litre)		
013	SW1	-	< 10	< 10	< 10	No Identification Possible

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Checked by Magda Dzedzic

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APPENDIX

APPENDIX

1. 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, 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