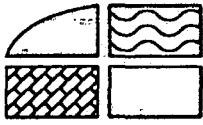


Attachment A

Hydro Environmental Services submission dated 18/03/2016

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HYDRO ENVIRONMENTAL SERVICES

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Date: 18th March, 2016
Our Ref: P1317-0_001

Environmental Licensing Program

Office of Climate, Licensing, Resources & Research,
Environmental Protection Agency Headquarters,
Johnstown Castle Estate,
Co Wexford.

Attn: Inspector Babiarczyk

Dear Ms. Babiarczyk,

Re: Clashford Recovery Facility, Naul, Co. Meath (W0265-01)

Further to your letter of 2nd October 2015 (Re: Notice in Accordance with Article 14(2)(B)(ii) of the Waste Management (Licensing) Regulations) in respect of W0265-01, please find outlined below responses to items relating to the hydrology and hydrogeology of the Clashford Recovery Facility Site in Co. Meath. Other [non water] elements of the Notice are being addressed by JSPE (John Sheils Planning and Environmental Ltd).

For clarity we have included the Article 12 compliance requirement items in numbered italics and provided our responses to each item thereafter. These responses are supported by maps and appendices as referenced.

Item 1

'state the source of elevated Ammoniacal Nitrogen, Arsenic, Calcium, Chloride, Chromium, Iron, Lead, Mercury, Phosphorous, Potassium and Sulphate and other contaminants detected in the surface water discharge (emission point SW-2) on 13.01.2009'.

Item 1 Response

Given the time lapse we cannot state with certainty what the cause of the historic elevated results were, but we can clarify that some results were elevated relative to local background parameter values but were not in exceedance of relevant EQS's. This conclusion was included in the 2009 submission at page 20 of 28, in Appendix I.2.1 (Hydrogeological Risk Assessment – February 2009). This section also suggests that the small increases in background concentrations of Arsenic, Chloride, Chromium, Iron, Lead, Phosphorus, Potassium and Sulphate is most probably due to wheel wash waters that were being discharged at that time, and not as a result of leaching from the fill material.

We have also noted that some additional confusion may have been caused by Appendix C (to Appendix I.2.1 of the Application) that shows the laboratory data results are reported in mg/L and µg/L, but the EQSs shown on the right hand side of the results table is in units of mg/L. While this does not affect the assessment of all results, the metals are reported in units of µg/L and these need to be divided by 1000 to be in units of mg/L (to be comparable to the listed EQS values). As such for Arsenic, Chromium, Iron, and Lead there is no exceedance of the relevant EQS.

In order to clarify these data we have collated and tabulated the original laboratory data, and checked these against the original laboratory result sheet and re-presented these data as a revised Table in Appendix I. This revised table summarises the original laboratory results using standard units (i.e. the same as the relevant EQS) and we have also highlighted the elevated results and compared same with appropriate EQS's or Groundwater Assessment Criteria (See Appendix I).

It is important to note that while the discharge water (from 2009) may be elevated for certain parameters there is no indication in the downstream results that these slight elevations in the discharge water were causing a significant alteration of water quality (see increase/decrease magnitude in Table A). In order to demonstrate this we have tabulated certain parameters for upstream and downstream results in Table A. Using the upstream and downstream water quality data from 2009 it is possible, using standard assimilation capacity assessment calculations, to determine the ratio of flow in the receiving water to the discharge flow. The ratio is approximately 6.6 to 1.

Parameter (mg/L)	Upstream	Discharge	Downstream	Increase/Decrease
Ammoniacal Nitrogen	<0.008	0.31	<0.08	None
Chloride	31	64	34	3 mg/L
Conductivity	506	692	529	23 μ S/cm
Flouride	<0.1	0.25	<0.1	None
Iron	0.18	0.37	0.23	0.05 mg/L
Phosphorus	0.09	0.27	0.07	-0.02 mg/L
Potassium	2	7	3	1 mg/L
Residue on Evaporation	340	508	318	-22 mg/L
Sodium	14	44	17	3 mg/L
Sulphate	27	151	41	14 mg/L

Table A: Comparison of Upstream and Downstream [of discharge]. 2009 surface water data

There are some anomalies [showing a no change or a reduction in downstream concentrations despite slight elevations in the discharge result] such as Flouride, Phosphorus and Residue on Evaporation. Again these cannot be explained but there is no exceedance of any relevant EQS or Groundwater Assessment Criteria (refer to Appendix I) for these anomalous parameters. However these parameters show a reduction in downstream concentration.

Finally, it is the case that one discharge result exceeds an EQS limit, this is Ammoniacal Nitrogen. However downstream results show no increase in receiving water concentration for this parameter, and subsequent sampling in respect of the 2014 EIS (Table 3.4.7 of 2104 EIS, Section 3.4 – Water) show no evidence of contamination.

In summary, we cannot definitively attribute the 2009 slight elevations in certain parameters to any one issue. However, we have reviewed the data and clarified units, and completed an assessment of dilution available in the receiving water [stream] at that time. We can therefore conclude based on the downstream monitoring results that while there were some slight elevations in certain parameters these did not cause any significant impact on water quality in the receiving stream, and therefore could not have caused any significant impact on the downstream waters of the Delvin River.

Item 2

'Provide monitoring results for the surface water discharge conducted within the last three years. Submit also monitoring results for upstream and downstream locations of the discharge and grid reference numbers of the upstream and downstream locations. Also, include grid reference numbers for the location of discharge from the ground drainage to River Delvin.'

Item 2 Response

Surface water monitoring within the last three years was carried out as part of the 2014 EIS. There are no monitoring data for discharge water from the site for the last three year. Also, surface water discharge from the site will only occur in high flow conditions in the tributary stream and Delvin River. Therefore discharges from the site are intermittent.

Surface water quality data for upstream and downstream locations on the tributary to the Delvin River are provided in the 2009 submission and in the 2014 EIS. These data are included as Appendix II.

We would like to take this opportunity to point out there is no specific requirement, unless requested to do so by Meath County Council, to undertake routine monitoring under the existing Waste Permit. The applicant was also not expecting such a significant time lapse between the EIS and the Article 12 notice (or a decision on the application), and therefore was waiting for a decision before any further monitoring was undertaken.

In addition it should be noted that discharge of surface water from the site is intermittent. There is not a continuous discharge. Having inspected the site and viewed the settlement ponds it is clear that discharge overflow from the settlement ponds only occurs in very wet weather, and as such only occurs when stream and downstream river flows are highest.

Grid locations for upstream and downstream monitoring locations and also for groundwater drain discharge locations are presented in **Table B** below. **Figure A** shows the locations of surface water monitoring SW-1, SW-2, SW-3, SW-4 (2014 only) and SW-5 (2014 only). **Figure B** shows the locations of the discharge location (DL-1), and the groundwater drain discharge locations to the Delvin River (GD-1, GD2, and GD-3).

ID	Easting	Northing	Location
SW-1	313,170	261,158	Upstream (Delvin River)
SW-2	313,291	261,184	Downstream of Kilsaran Batching Plant (Delvin River)
SW-3	314,000	261,917	Downstream of Site (Delvin River)
SW-4	313,399	261,785	Upstream of discharge point (Northern tributary)
SW-5	313,456	261,816	Downstream of Discharge point (Northern Tributary)
DL-1	313,333	261,758	Surface water discharge location to tributary to the Delvin River
GD-1	313,586	261,410	Groundwater drain 1
GD-2	313,672	261,490	Groundwater drain 2
GD-3	313742	261541	Groundwater drain 3
GD-4	313741	261582	Groundwater drain 4 (not a direct discharge to the river, this drain discharges onto the ground in a low area close to the river)

Table A: Surface Water Monitoring Locations

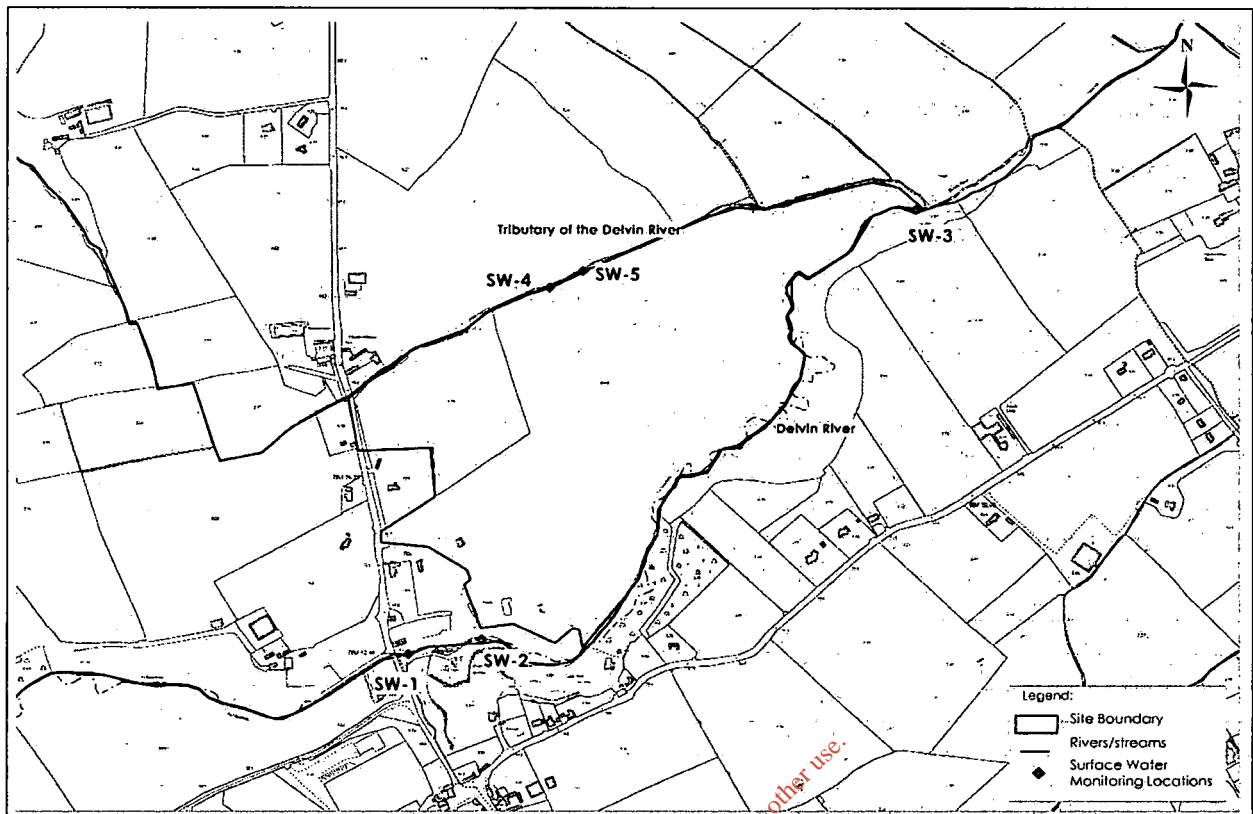


Figure A: Surface Water Monitoring Locations

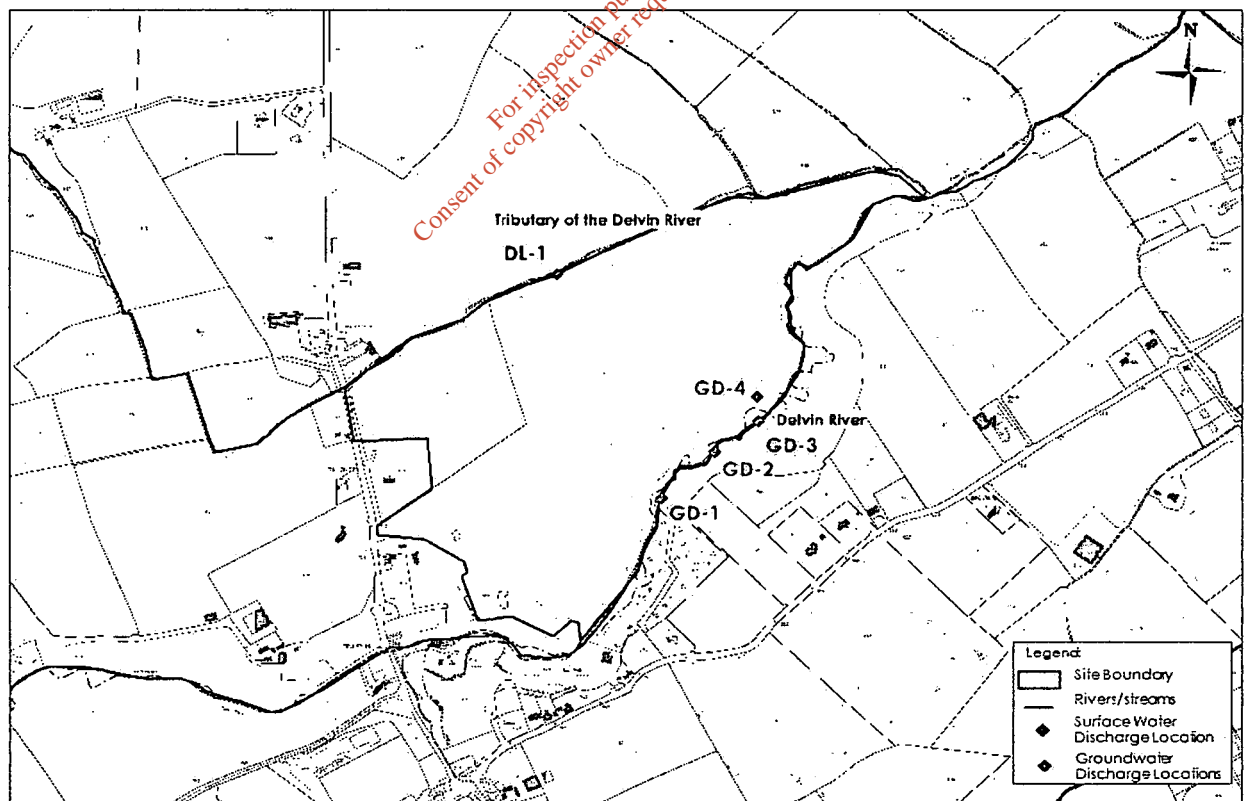


Figure B: Surface water and groundwater discharge locations

Item 3

'Provide results for groundwater, dust and noise monitoring conducted within the last three years. In addition confirm whether GW-2 is currently the only active down-gradient monitoring location for the site. Include a drawing showing all monitoring locations.'

Item 3 Response

Dust and noise monitoring results do not form part of this submission and is being addressed within a separate part of the submission by JSPE.

Groundwater results for 2009 and 2014 have been tabulated and are included as Appendix III (Table 1 and Table 2). There are no other data available for these locations. Grid references for groundwater monitoring well locations are presented in **Table C** below, and shown on **Figure C**.

GW-2, GW-3 and GW-4 are all location down-gradient of the site, between the fill area and the Delvin River. The direction of groundwater flow at the site is from the northwest towards the southeast in the direction of the Delvin River. The exceedances of IGV values noted (in Appendix III_Table 2) for Ammoniacal N, chloride and microbial pathogens are most likely related to land spreading of organic fertilizer at the land to encourage grass growth following restoration. This issue is discussed in detail in the 2014 EIS.

ID	Easting	Northing	Location
GW-1	313,153	261,367	Up-gradient
GW-2	313,387	261,240	Down-gradient
GW-3	313,508	261,437	Down-gradient
GW-4	313,747	261,559	Down-gradient

Table C: Groundwater Monitoring Locations

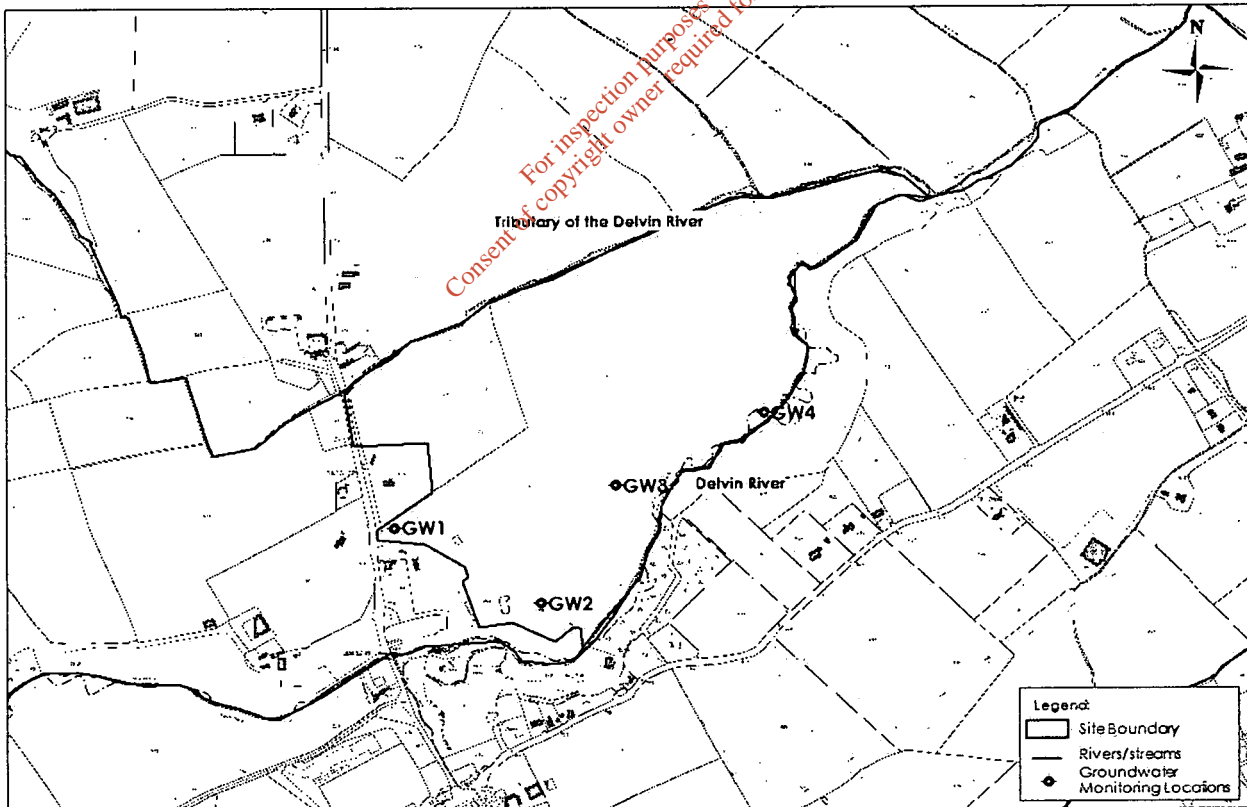


Figure C: Groundwater Monitoring Locations

Item 4

'State whether the proposed reed bed polishing filter is still planned for the site. If yes, provide information on its location, design and operation, including the commencement date for its operation.'

Item 4 Response

The reed bed polishing filter has not been constructed at the site, and there are no plans to construct same in the future.

Alternatively, a large settlement lagoon was constructed and was in place before 2009, and this were designed to provide sufficient settlement of fines prior to discharge. **Figure D** shows the location of this lagoon. It is important to note, that the overflow discharge from this lagoon outfalls to the stream (Tributary 1) on the northern boundary of the site, which is a tributary of the River Delvin, and such overflow discharge only occurs in periods of high precipitation, when the stream is in a fast flowing state.

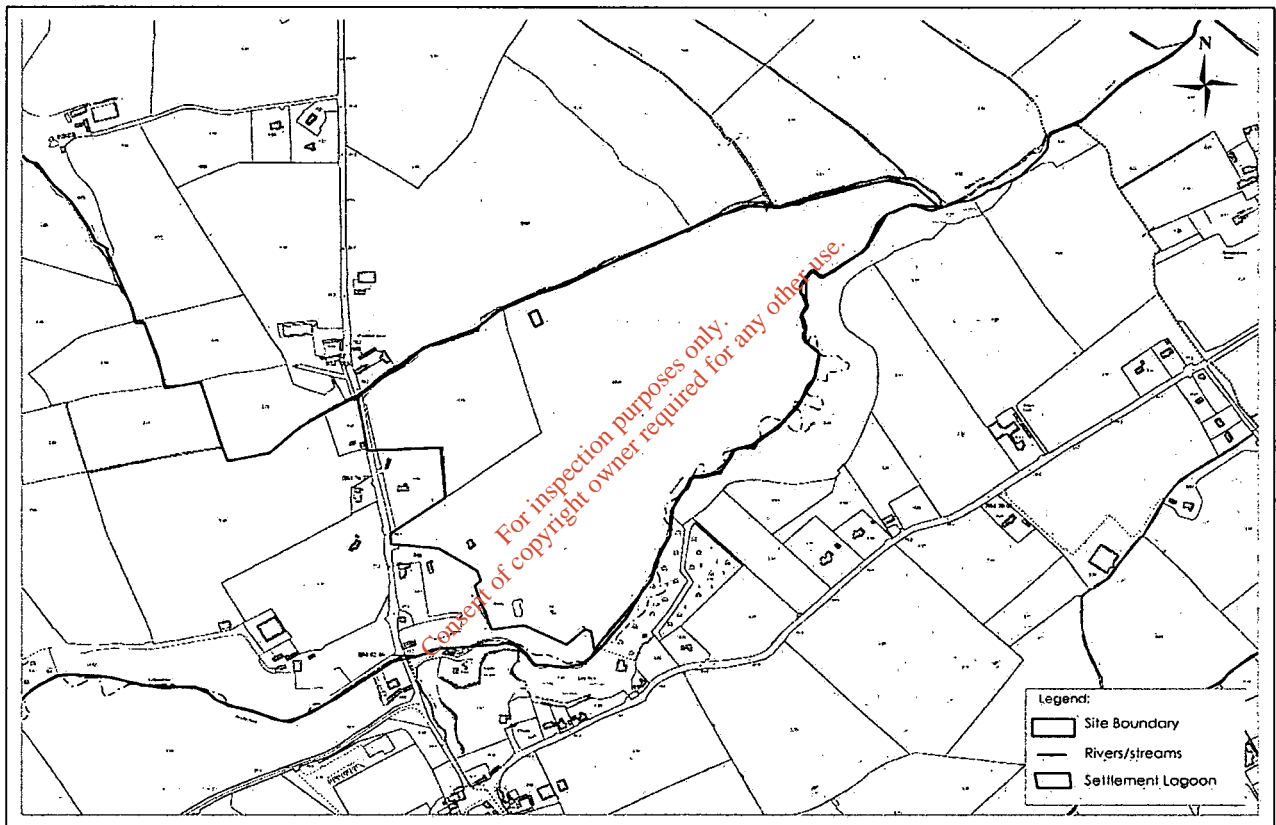


Figure D: Settlement Lagoon Location

Item 5

'Provide copies of the Annual Environmental Reports submitted to date to Meath County Council as required under the Waste Permit Reg. No. 2005/25.'

Item 5 Response

As stated, there are no water quality results in any AERs, as there is no requirement to complete same under WMP2005/25. Copies of available monitoring data are provided in Appendix I, II, and III. AERs will be submitted by JSPE.

Item 7

'A screening for Appropriate Assessment was undertaken on 29 September 2015 and the agency determined that an Appropriate Assessment of the activity is required. You are thereby required to submit a Natura Impact Statement as defined in Regulation 2 (1) of the European Communities (Birds and Natural Habitats) Regulations (S.I. No. 477 of 2011).

You are furthermore advised to refer to the document 'Appropriate Assessment of Plans and Projects in Ireland –Guidance for Planning Authorities', issued in 2009 by the Department of the Environment, Heritage and Local Government, and revised in 2010.'

Item 7 Response

We note the above request.

However, we wish to point out that the site is located adjacent to the Delvin River at Clashford. The Delvin River flows in a northeasterly direction and enters the Irish Sea at some 8.9kms from the site. We have also consulted with the ecologist that prepared the AA Screening report and his additional comments are outlined below.

"The recent monitoring of the Delvin River has shown that outflows from the site have not altered the condition of the river to any significant extent. In addition EPA Q- values show that on all sampling occasions the river below the development site is in better condition than that above it. Invertebrates (what Q-values are based on) are more sensitive to substances in the water than birds, so if they are not affected then neither will the visiting birdlife which is the basis of the SPA designation". (Dr. Roger Goodwillie, Consulting Ecologist 2016, pers. comm., 22nd January 2016).

With regards to Appropriate Assessment there are a number of Natura 2000 sites within 15km of the Clashford Facility, namely:

- River Nanny Estuary and Shore SPA (Site Code: 004158)
- Boyne Coast Estuary SAC (Site Code: 001957)
- Boyne Estuary SPA (Site Code: 004080)
- Rockabill to Dalkey Island (Site Code: 003000)
- Rockabill SPA (Site Code: 004014)
- Skerries Islands SPA (Site Code: 004122)
- Rogerstown Estuary SAC (Site Code: 000208)
- Rogerstown Estuary SPA (Site Code: 004015)
- Lambay Island SAC (Site Code: 000204)
- Lambay Island SPA (Site Code: 004069)

In order for potential to exist for any of these sites to be impacted by the proposed development at Clashford there firstly has to be a hydrological connection between the Clashford Site and any of the local Natura 2000 sites.

The only pathways for hydrological connection area via surface water or groundwater flows.

Groundwater at the Clashford site discharges to the Delvin River, therefore any wider discharge of groundwater is not considered further, as groundwater pathways to the Nanny River, the Boyne or south to the Rogerstown Estuary cannot physically exist.

Therefore the only conceivable pathway for contact/potential impact with any of the Natura 2000 sites listed above is via the water flow provided within the Delvin River, i.e. sediment or contaminated surface water is transmitted by the Delvin River to any of the Natura 2000 sites listed above.

The determination requiring a Stage II Appropriate Assessment/NIS for the development at Clashford is based on two reasons, namely:

- Monitoring results submitted by the Applicant for surface water run-off discharge from the site show that this discharge is contaminated with parameters such as ammoniacal nitrogen, arsenic, calcium, chloride, chromium, lead, and others.
- There is uncertainty about whether the contaminated run-off has potential to reach and impact the European Sites.

The 2009 surface water discharge data is discussed above, and we conclude that the only parameter to exceed an EQS was ammoniacal nitrogen, but downstream monitoring indicates this did not cause any impact on water quality. The remainder of the parameters, while locally elevated did not exceed any EQS, and also did not result in any significant alteration of water quality in the Delvin River. Surface water discharge from the site will only occur in high flow conditions in the stream and Delvin River.

Further surface water monitoring provided in the 2014 EIS indicates that agricultural runoff may be affecting water quality in the tributary to the Delvin River, but there is no suggestion that the activity at the site is causing contamination of surface water downstream of the site.

There is a considerable distance between the Clashford site and any of the Natura 2000 sites. For all Natura 2000 sites sediment or surface water has to travel in the river and then the sea to get to any of the Natura 2000 sites. The shortest flowpath is to the River Nanny Estuary and Shore SPA (Site Code: 004158), and this is some 10.5kms (including 1.5kms of open sea water). Assuming an average near shore sea depth of 5m, and using the near shore 500m width (as a likely flow path from the Delvin estuary towards the SPA), the volume of this near shore body of water is some 3,750,000m³ of sea water. The dilution available in the sea for any minor water quality issue in the Delvin River is significant and will buffer the SPA from any significant potential impact.

Furthermore, the proposed facility is for soil and stone, and no contaminated material has or will be deposited at the site. As such the risk to surface water and to groundwater from the site is not significant. Given the separation distances, and the very unlikely scenario of significant pollution emerging or being discharged from the site, the risk to downstream Natura 2000 sites is not significant.

Appropriate best practice drainage mitigation as outlined in the EIS and the application will be implemented on site to ensure surface water quality downstream of the site is protected, and therefore ensures there will be no significant impact on the downstream Natura 2000 sites. This approach is in line with the 2014 judgement of Mr. Justice Hedigan in Rossmore and Killross v An Bord Pleanála, the State and Eirgrid¹.

On the basis of the above, the requirement to complete a Stage II Appropriate Assessment/NIS appears to be an extreme interpretation of the Habitats Directive requirements. We therefore request that you re consider this determination.

Closure

I trust the above meets your requirements and we look forward to a favourable response on this matter.

Yours sincerely,



Michael Gill P. Geo
BA, BAI, MSc, Dip. Geol, MIEI, MCIWEM

¹ Hedigan (2014) Mr. Justice Hedigan in Rossmore and Killross v An Bord Pleanála, the State and Eirgrid

APPENDIX I

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Appendix 1
Clashford Recovery Facility, Naul, Co. Meath
Summary of 2009 Surface Water Chemistry Data

Sample Date	LAB ID	Upstream	Discharge	Downstream	EQS - Surface Water mg/l	Water Guidelines		
						2009 SW Regs AA (mg/l)	2009 SW Regs MAC (mg/l)	Salmonid water regulations SI 293/1988
Parameters								
Alkalinity (mg/l)	n/a	220	165	220	-			
Ammoniacal Nitrogen (mg/l)	n/a	<0.08	0.31	<0.08	0.02 NH ₃			<0.02
Arsenic (mg/l)	++	<u>0.001</u>	<u>0.0051</u>	<u>0.0015</u>	0.025	0.025		
Barium (mg/l)	++	<u>0.034</u>	<u>0.037</u>	<u>0.034</u>	0.1			
Boron	++	0.05	0.06	0.05	2			
Cadmium(mg/l)	**	<u>0.00027</u>	<u>0.00028</u>	<u><0.0001</u>	0.005			
Calcium	**	94	109	96		0.0047/0.0034	32/-	
Chloride	**	31	64	34	250			
Chromium(mg/l)	**	<u><0.001</u>	<u>0.019</u>	<u><0.001</u>	0.03			
Conductivity (µS/cm @ 20°C)	**	506	692	529	1000			
Copper	**	<0.05	<0.05	<0.05	0.03	0.005/0.03		
Cyanide	n/a	<0.01	<0.01	<0.01	0.01	0.01		
Dissolved Oxygen	n/a	11.5	11.3	11.7				50% or ≥9(mg/L)
Fluoride	**	<0.1	0.25	<0.1	5	5		
Iron#	**	0.18	<u>0.37</u>	0.23	1			
Lead(mg/l)	**	<u><0.002</u>	<u>0.004</u>	<u><0.002</u>	0.01	0.0072	n/a	
Magnesium	**	8	10	8				
Manganese#	**	0.06	0.08	0.06	0.3			
Mercury (mg/l)	++	<u><0.00005</u>	<u><0.00005</u>	<u><0.00005</u>	0.001	0.00005	0.00007	
Nickel#	**	<0.10	<0.10	<0.10	0.05	0.02	n/a	
Nitrate	**	25	2	23	50			
Nitrite	**	<0.2	<0.2	<0.2	0.2			≤0.05
pH	**	7.9	7.8	7.9				>6 and <9
Phosphate (low Level)	n/a	0.08	0.11	0.1				
Phosphorus	n/a	0.09	0.27	0.07				
Potassium	**	2	7	3				
Residue on Evaporation @ 180°C	n/a	340	508	318				
Selenium(mg/l)	++	<u>0.0015</u>	<u>0.002</u>	<u>0.0016</u>				
Silver	++	<0.01	0.02	0.01				
Sodium	**	14	44	17				
Sulphate	**	27	151	41	200			
Temperature	n/a	-	-	-				
TOC	n/a	3.6	6.6	4				
TON	**	5.8	0.51	5.2				
Total Phenols by colourimetry	n/a	<0.05	<0.05	<0.05		0.008	0.046	
Zinc#	**	0.18	0.03	0.01	0.1	0.008/0.05/0.1	-	
Faecal Coliforms (cfu/100ml)	n/a	>100	18	>100				
Total Coliforms (cfu/100ml)	n/a	>100	>100	>100				

- means no data available

** = INAB Accredited Tests

++ = Subcontracted Tests

n/a = Non-INAB Accredited Tests

Analysis of metals are performed on the filtered sample

0.001 - Original lab results were in µg/L, and results shown are converted to mg/L

bold - above EQS

0.001 - Original lab results were in µg/L, and results shown are converted to mg/L

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APPENDIX II

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T.E. LABORATORIES LIMITED
Trading as

TelLab 

Tullow Industrial Estate, Tullow, Co. Carlow
Phone: 059-9152881 Fax: 059-9152886

CERTIFICATE OF ANALYSIS

Page 1 of 2

Project Description:	Analysis of Aqueous Sample		
Attention:	Mr. Shane Ryan	Lab ID:	77766
Address:	I.E. Consulting Innovation Centre RTC Campus Carlow	Date Sampled:	08.01.2009
Certificate No:	L/09/0205	Date Rec'd:	08.01.2009
Issue Date:	30.01.2009	Our Ref:	WS-23403

Project Summary: One sample was analysed for a range of determinands.
Please see page 2 for results. Terms & Conditions and methods used are outlined in the attached appendix.

No. of Pages: Results page 2

Mr. Mark Bowkett
Chief Executive

Ms Breda Moore
Technical Manager

**ANALYSIS OF AQUEOUS SAMPLE.**

Date Sampled:08.01.2009
 Date Received: 08.01.2009
 Date Analysis Commenced: 08.01.2009
 Our Ref:WS-23403
 Certificate No: L/09/0205

	Sample ID	GW1	GW Interim Guideline Value mg/l
Determinand	Lab ID	77766	
Alkalinity	n/a	230	no abnormal change
Ammoniacal Nitrogen	n/a	<0.08	0.15
Arsenic(ug/l)	++	0.6	0.01
Barium(ug/l)	++	29	0.1
Boron	++	0.03	1.0
Cadmium(ug/l)#	**	<0.10	0.005
Calcium	**	67	200
Chloride	**	19	30
Chromium (ug/l)#	**	<1	0.03
Conductivity(uS/cm @ 20°C)	**	417	1000
Copper	**	<0.06	0.03
Cyanide	n/a	0.01	0.01
Dissolved Oxygen	n/a	5.8	no abnormal change
Fluoride	**	0.11	1
Iron#	**	0.13	0.2
Lead(ug/l)	**	0.2	0.01
Magnesium	**	13	60
Manganese#	**	0.03	0.05
Mercury(ug/l)	++	<0.05	0.001
Nicke(ug/l)	++	5	0.02
Nitrate	**	0.8	25
Nitrite	**	<0.2	0.1
pH	**	7.5	>=6.5 and <=9.5
Phosphate	**	<1	0.03
Phosphorus	n/a	<0.05	
Potassium	**	2	5
Residue on Evaporation @ 180°C	n/a	235	
Selenium(ug/l)	++	1.2	
Silver	++	<0.01	
Sodium	**	20	150
Sulphate	**	16	200
Temperature	n/a	not recorded	25
TOC	n/a	1.2	no abnormal change
TON	n/a	<0.24	no abnormal change
Total phenols	n/a	<0.05	
Zinc#	**	0.02	0.1
Total Coliforms(cfu/100ml)	n/a	>100	0 counts per 100ml
Faecal Coliforms(cfu/100ml)	n/a	0	0 counts per 100ml

Results expressed as mg/l (ppm)
 unless stated otherwise

** = INAB Accredited Tests ++ = Subcontracted Tests n/a = Non-INAB Accredited Tests

The above results relate only to the sample tested
 This report should not be regenerated except in full and with the consent of T.E. Laboratories Ltd.

Analysis of metals are performed on the filtered sample

T.E. Laboratories



T.E. LABORATORIES LIMITED
Trading as

TelLab

Tullow Industrial Estate, Tullow, Co. Carlow
Phone: 059-9152881 Fax: 059-9152886

CERTIFICATE OF ANALYSIS

Page 1 of 2

Project Description: Analysis of Aqueous Sample

Attention: Mr. Shane Ryan

Lab ID: 77881-77883

Company: Geotechnical & Environmental
Services Ltd.
Address: Innovation Centre,
RTC Campus,
Carlow

Date Sampled: 13.01.2009

Certificate No: L/09/0256

Date Rec'd: 13.01.2009

Issue Date: 04.02.2009

Our Ref: WS-23444, 153842

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Project Summary: Three samples were analysed for a range of determinands.
Please see page 2 for results. Terms & Conditions and methods
used are outlined in the attached appendix.

No. of Pages: Results page 2

Mr Mark Bowkett
Chief Executive

Ms Breda Moore
Technical Manager



ANALYSIS OF AQUEOUS SAMPLE.

Date Sampled :13.01.2009
 Date Received: 13.01.2009
 Date Analysis Commenced: 13.01.2009
 Our Ref.: WS-23444, 153842
 Certificate No: L/09/0256
 Your Ref.: Clashford

DETERMINAND	Sample ID	Clashford			EQSs Surface Water mg/l
	Lab ID	Upstream 77883	Discharge 77881	Downstream 77882	
Alkalinity	n/a	220	165	220	/
Ammoniacal Nitrogen	n/a	<0.08	0.31	<0.08	0.02 NH3
Arsenic(ug/l)	++	1.0	5.1	1.5	0.025
Barium(ug/l)	++	34	37	34	0.1
Boron	++	0.05	0.06	0.05	2.0
Cadmium(ug/l)	**	0.27	0.28	<0.1	0.005
Calcium	**	94	109	96	
Chloride	**	31	64	34	250
Chromium(ug/l)	**	<1	1.9	<1	0.03
Conductivity (uS/cm @ 20°C)	**	506	692	529	1000
Copper	**	<0.05	<0.05	<0.05	0.03
Cyanide	n/a	<0.01	<0.01	<0.01	0.01
Dissolved Oxygen	n/a	1.5	1.3	1.7	
Fluoride	**	<0.1	0.25	<0.1	5
Iron#	**	0.18	0.37	0.23	1.0
Lead(ug/l)	**	<2	4.0	<2	0.01
Magnesium	**	8	10	8	
Manganese#	**	0.06	0.08	0.06	0.3
Mercury (ug/l)	**	<0.05	<0.05	<0.05	0.001
Nickel#	**	<0.10	<0.10	<0.10	0.05
Nitrate	**	25	2	23	50
Nitrite	**	<0.2	<0.2	<0.2	0.2
pH	**	7.9	7.8	7.9	
Phosphate (low Level)	n/a	0.08	0.11	0.10	
Phosphorus	n/a	0.09	0.27	0.07	
Potassium	**	2	7	3	
Residue on Evaporation @ 180°C	n/a	340	508	318	
Selenium(ug/l)	++	1.5	2.0	1.6	
Silver	++	<0.01	0.02	0.01	
Sodium	**	14	44	17	
Sulphate	**	27	151	41	200
Temperature	n/a	not recorded	not recorded	not recorded	
TOC	n/a	3.6	6.6	4.0	
TON	**	5.8	0.51	5.2	
Total Phenols by colourimetry	n/a	<0.05	<0.05	<0.05	
Zinc#	**	0.18	0.03	0.01	0.1
Faecal Coliforms (cfu/100ml)	n/a	>100	18	>100	
Total Coliforms (cfu/100ml)	n/a	>100	>100	>100	

Concentrations are expressed as mg/l (ppm)
 unless otherwise specified.

** = INAB Accredited Tests ++ = Subcontracted Tests n/a = Non-INAB Accredited Tests
 # Analysis of metals are performed on the filtered sample

The above results relate only to the sample tested
 This report should not be regenerated except in full and with the consent of T.E. Laboratories Ltd.

T.E. Laboratories

EPA Export 26-07-2013:03:53

EPA Export 31-03-2016:00:46:02



Jones Environmental Laboratory

Registered Address: Unit 3 Deeside Point, Zone 3, Deeside Industrial Park, Deeside, CH5 2UA, UK

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IE Consulting
Innovation Centre
Green Road
Carlow
Co. Carlow

Tel: +44 (0) 1244 833780
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Attention : Aine McElhinney
 Date : 13th August, 2014
 Your reference : IE912
 Our reference : Test Report 14/8935 Batch 1
 Location :
 Date samples received : 7th August, 2014
 Status : Final report
 Issue : 1

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Eight samples were received for analysis on 7th August, 2014. Please find attached our Test Report which should be read with notes at the end of the report and should include all sections if reproduced. Interpretations and opinions are outside the scope of any accreditation, and all results relate only to samples supplied.
All analysis is carried out on as received samples and reported on a dry weight basis unless stated otherwise. Results are not surrogate corrected.

Compiled By:

Bruce Leslie
Project Co-ordinator

Bob Millward BSc FRSC
Principal Chemist

Jones Environmental Laboratory

Client Name: IE Consulting
Reference: IE912
Location:
Contact: Aine McElhinney
JE Job No.: 14/8935

Report : Liquid

Liquids/products: V=40ml vial, G=glass bottle, P=plastic bottle
H=H₂SO₄, Z=ZnAc, N=NaOH, HN=HNO₃

J E Sample No.	1-5	6-10	11-15	16-20	21-25	26-30	31-35	36-40				
Sample ID	LARRY KIERNAN IE912 GW1	LARRY KIERNAN IE912 GW2	LARRY KIERNAN IE912 GW4	LARRY KIERNAN IE912 SW1	LARRY KIERNAN IE912 SW2	LARRY KIERNAN IE912 SW3	LARRY KIERNAN IE912 SW4	LARRY KIERNAN IE912 SW5				
Depth												
COC No / misc												
Containers	H HN P G	H HN P G	H HN P G	H HN P BOD G	H HN P BOD G	H HN P BOD G	H HN P BOD G	H HN P BOD G				
Sample Date	05/08/2014	05/08/2014	05/08/2014	05/08/2014	05/08/2014	05/08/2014	05/08/2014	05/08/2014				
Sample Type	Ground Water	Ground Water	Ground Water	Surface Water	Surface Water	Surface Water	Surface Water	Surface Water				
Batch Number	1	1	1	1	1	1	1	1				
Date of Receipt	07/08/2014	07/08/2014	07/08/2014	07/08/2014	07/08/2014	07/08/2014	07/08/2014	07/08/2014				
										LOD/LOR	Units	Method No.
Dissolved Calcium *	65.8	90.7	109.3	95.9	94.0	93.1	81.3	94.3		<0.2	mg/l	TM30/PM14
Total Dissolved Iron *	118	28	154	77	81	72	39	21		<20	ug/l	TM30/PM14
Dissolved Magnesium *	13.1	22.9	19.5	6.7	6.6	6.5	7.7	8.6		<0.1	mg/l	TM30/PM14
Dissolved Manganese *	24	455	937	-	-	-	-	-		<2	ug/l	TM30/PM14
Dissolved Potassium *	2.1	1.9	75.2	6.2	6.5	6.2	3.6	4.6		<0.1	mg/l	TM30/PM14
Dissolved Sodium *	20.4	20.2	94.8	11.2	11.5	11.9	14.5	50.2		<0.1	mg/l	TM30/PM14
Total Phosphorus	22	34	54	222	178	165	93	67		<5	ug/l	TM30/PM14
EPH (C8-C40) *	<10	<10	<10	<10	<10	<10	<10	<10		<10	ug/l	TM5/PM30
C8-C40 Mineral Oil (Calculation)	<10	<10	<10	<10	<10	<10	<10	<10		<10	ug/l	TM5/PM30
Sulphate *	22.75	73.97	138.27	42.44	41.99	66.63	24.03	66.33		<0.05	mg/l	TM38/PM0
Chloride *	18.9	25.0	120.4	23.7	23.6	28.5	28.9	79.3		<0.3	mg/l	TM38/PM0
Nitrate as NO3 *	0.6	0.7	0.4	9.3	19.5	9.5	18.9	18.4		<0.2	mg/l	TM38/PM0
Nitrite as NO2 *	<0.02	<0.02	<0.02	0.04	0.03	0.04	0.02	<0.02		<0.02	mg/l	TM38/PM0
Ortho Phosphate as PO4 *	<0.06	<0.06	<0.06	0.35	0.34	0.42	0.06	<0.06		<0.06	mg/l	TM38/PM0
Ammoniacal Nitrogen as NH4 *	<0.03	0.08	1.40	0.13	0.24	0.11	0.08	0.07		<0.03	mg/l	TM38/PM0
Total Ammonia as N *	<0.03	0.06	1.09	0.10	0.19	0.09	0.06	0.05		<0.03	mg/l	TM38/PM0
Total Alkalinity as CaCO3 *	226	278	230	330	220	220	190	204		<1	mg/l	TM75/PM0
BOD (Settled) *	-	-	-	11	13	9	8	6		<1	mg/l	TM58/PM0
Electrical Conductivity @25C *	458	629	1140	532	523	562	514	714		<2	uS/cm	TM76/PM0
Faecal Coliforms *	0	0	20	-	-	-	-	-			CFU/100ml	Subcontracted
Free Ammonia as NH3	<0.07	<0.07	0.77	0.12	0.18	0.11	<0.07	<0.07		<0.07	mg/l	TM53/PM0
pH *	7.82	7.72	10.64	7.98	8.06	8.12	8.02	7.93		<0.01	pH units	TM73/PM0
Total Coliforms *	0	3	600	-	-	-	-	-			CFU/100ml	Subcontracted
Total Suspended Solids *	-	-	-	<10	12	13	11	11		<10	mg/l	TM37/PM0
Turbidity	0.3	0.3	0.5	-	-	-	-	-		<0.1	NTU	TM34/PM0

Please see attached notes for all abbreviations and acronyms

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Jones Environmental Laboratory

Notification of Deviating Samples

Client Name: IE Consulting
Reference: IE912
Location:
Contact: Aine McElhinney

Matrix : Liquid

J E Job No.	Batch	Sample ID	Depth	J E Sample No.	Analysis	Reason
14/8935	1					Samples were received at a temperature above 9°C.

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Please note that only samples that are deviating are mentioned in this report. If no samples are listed it is because none were deviating.
 Only analyses which are accredited are recorded as deviating if set criteria are not met.

NOTES TO ACCOMPANY ALL SCHEDULES AND REPORTS

JE Job No.: 14/8935

SOILS

Please note we are only MCERTS accredited for sand, loam and clay and any other matrix is outside our scope of accreditation.

Where an MCERTS report has been requested, you will be notified within 48 hours of any samples that have been identified as being outside our MCERTS scope. As validation has been performed on clay, sand and loam, only samples that are predominantly these matrices, or combinations of them will be within our MCERTS scope. If samples are not one of a combination of the above matrices they will not be marked as MCERTS accredited.

It is assumed that you have taken representative samples on site and require analysis on a representative subsample. Stones will generally be included unless we are requested to remove them.

All samples will be discarded one month after the date of reporting, unless we are instructed to the contrary. If we are instructed to keep samples, a storage charge of £1 (1.5 Euros) per sample per month will be applied until we are asked to dispose of them.

If you have not already done so, please send us a purchase order if this is required by your company.

Where appropriate please make sure that our detection limits are suitable for your needs, if they are not, please notify us immediately.

All analysis is reported on a dry weight basis unless stated otherwise. Results are not surrogate corrected. Samples are dried at 35°C ±5°C unless otherwise stated. Moisture content for CEN Leachate tests are dried at 105°C ±5°C.

Where Mineral Oil or Fats, Oils and Grease is quoted, this refers to Total Aliphatics C10-C40.

Where a CEN 10:1 ZERO Headspace VOC test has been carried out, a 10:1 ratio of water to wet (as received) soil has been used.

% Asbestos in Asbestos Containing Materials (ACMs) is determined by reference to HSG 264 The Survey Guide - Appendix 2 : ACMs in buildings listed in order of ease of fibre release.

WATERS

Please note we are not a Drinking Water Inspectorate (DWI) Approved Laboratory. It is important that detection limits are carefully considered when requesting water analysis.

UKAS accreditation applies to surface water and groundwater and one other matrix which is analysis specific, any other liquids are outside our scope of accreditation

As surface waters require different sample preparation to groundwaters the laboratory must be informed of the water type when submitting samples.

Where Mineral Oil or Fats, Oils and Grease is quoted, this refers to Total Aliphatics C10-C40.

DEVIATING SAMPLES

Samples must be received in a condition appropriate to the requested analyses. All samples should be submitted to the laboratory in suitable containers with sufficient ice packs to sustain an appropriate temperature for the requested analysis. If this is not the case you will be informed and any test results that may be compromised highlighted on your deviating samples report.

SURROGATES

Surrogate compounds are added during the preparation process to monitor recovery of analytes. However low recovery in soils is often due to peat, clay or other organic rich matrices. For waters this can be due to oxidants, surfactants, organic rich sediments or remediation fluids. Acceptable limits for most organic methods are 70 - 130% and for VOCs are 50 - 150%. When surrogate recoveries are outside the performance criteria but the associated AQC passes this is assumed to be due to matrix effect. Results are not surrogate corrected.

DILUTIONS

A dilution suffix indicates a dilution has been performed and the reported result takes this into account. No further calculation is required.

NOTE

Data is only reported if the laboratory is confident that the data is a true reflection of the samples analysed. Data is only reported as accredited when all the requirements of our Quality System have been met. In certain circumstances where all the requirements of the Quality System have not been met, for instance if the associated AQC has failed, the reason is fully investigated and documented. The sample data is then evaluated alongside the other quality control checks performed during analysis to determine its suitability. Following this evaluation, provided the sample results have not been effected, the data is reported but accreditation is removed. It is a UKAS requirement for data not reported as accredited to be considered indicative only, but this does not mean the data is not valid.

Where possible, and if requested, samples will be re-extracted and a revised report issued with accredited results. Please do not hesitate to contact the laboratory if further details are required of the circumstances which have led to the removal of accreditation.

Please include all sections of this report if it is reproduced

ABBREVIATIONS and ACRONYMS USED

#	UKAS accredited.
B	Indicates analyte found in associated method blank.
DR	Dilution required.
M	MCERTS accredited.
NA	Not applicable
NAD	No Asbestos Detected.
ND	None Detected (usually refers to VOC and/SVOC TICs).
NDP	No Determination Possible
SS	Calibrated against a single substance
SV	Surrogate recovery outside performance criteria. This may be due to a matrix effect.
W	Results expressed on as received basis.
+	AQC failure, accreditation has been removed from this result, if appropriate, see 'Note' on previous page.
++	Result outside calibration range, results should be considered as indicative only and are not accredited.
*	Analysis subcontracted to a Jones Environmental approved laboratory.
CO	Suspected carry over
LOD/LOR	Limit of Detection (Limit of Reporting) in line with ISO 17025 and MCERTS
ME	Matrix Effect
NFD	No Fibres Detected
OC	Outside Calibration Range

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JE Job No: 14/8935

Test Method No.	Description	Prep Method No. (if appropriate)	Description	UKAS	MCERTS (soils only)	Analysis done on As Received (AR) or Air Dried (AD)	Reported on dry weight basis
TM5	In-House method based on USEPA 8015B. Determination of Extractable Petroleum Hydrocarbons (EPH) in the carbon chain length range of C8-40 by GC-FID. Accredited to ISO 17025 on soil and water samples and MCERTS (carbon banding only) on soils. All accreditation is matrix specific.	PM30	In-house method based on USEPA 3510. Liquid samples are mixed with solvent and agitated with an automatic magnetic stirrer with a stir bar for 15 minutes to extract organic molecules. ISO 17025 accredited extraction method. All accreditation is matrix specific				
TM5	In-House method based on USEPA 8015B. Determination of Extractable Petroleum Hydrocarbons (EPH) in the carbon chain length range of C8-40 by GC-FID. Accredited to ISO 17025 on soil and water samples and MCERTS (carbon banding only) on soils. All accreditation is matrix specific.	PM30	In-house method based on USEPA 3510. Liquid samples are mixed with solvent and agitated with an automatic magnetic stirrer with a stir bar for 15 minutes to extract organic molecules. ISO 17025 accredited extraction method. All accreditation is matrix specific	Yes			
TM30	Trace Metal elements by ICP-OES (Inductively Coupled Plasma - Optical Emission Spectrometry) using Thermo iCAP 6000 series instrument. Accredited to ISO 17025 for soils and waters and MCERTS accredited for Soils. All accreditation is matrix specific.	PM14	In-house method based on USEPA 3005A. Acid digestion of water samples and analysis by ICP-OES as per method TM030W.ISO 17025 accredited extraction method. All accreditation is matrix specific				
TM30	Trace Metal elements by ICP-OES (Inductively Coupled Plasma - Optical Emission Spectrometry) using Thermo iCAP 6000 series instrument. Accredited to ISO 17025 for soils and waters and MCERTS accredited for Soils. All accreditation is matrix specific.	PM14	In-house method based on USEPA 3005A. Acid digestion of water samples and analysis by ICP-OES as per method TM030W.ISO 17025 accredited extraction method. All accreditation is matrix specific	Yes			
TM34	Turbidity by Turbidimeter	PM0	No preparation is required.				
TM37	Total Suspended Solids- gravimetric	PM0	No preparation is required.	Yes			
TM38	Ionic analysis using the Thermo Aquakem Photometric Automatic Analyser. Accredited to ISO17025 and MCERTS for most analytes. All accreditation is matrix specific.	PM0	No preparation is required.	Yes			
TM53	Ammonia by Colourimetric measurement	PM0	No preparation is required.				
TM58	In-house method based on USEPA 405.1 and BS 5887-3. Measurement of Biochemical Oxygen Demand by oxygen probe. ISO 17025 accredited. Accreditation is matrix specific.	PM0	No preparation is required.	Yes			
TM73	pH in by Metrohm	PM0	No preparation is required.	Yes			

JE Job No: 14/8935

Test Method No.	Description	Prep Method No. (if appropriate)	Description	UKAS	MCERTS (soils only)	Analysis done on As Received (AR) or Air Dried (AD)	Reported on dry weight basis
TM75	Alkalinity by Metrohm	PM0	No preparation is required.	Yes			
TM76	Electrical Conductivity by Metrohm	PM0	No preparation is required.	Yes			
Subcontracted	Subcontracted analysis, sent to an ISO 17025 accredited laboratory where possible.						

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Jones Environmental Laboratory

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Attention : Aine McElhinney.

Date : 22nd August, 2014

Your reference : IE912

Our reference : Test Report 14/9172 Batch 1

Location : Naul

Date samples received : 14th August, 2014

Status : Final report

Issue : 1

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One sample was received for analysis on 14th August, 2014. Please find attached our Test Report which should be read with notes at the end of the report and should include all sections if reproduced. Interpretations and opinions are outside the scope of any accreditation; and all results relate only to samples supplied.
All analysis is carried out on as received samples and reported on a dry weight basis unless stated otherwise. Results are not surrogate corrected.

Compiled By:

**Phil Sommerton BSc
Project Manager**

**Bob Millward BSc FRSC
Principal Chemist**

Jones Environmental Laboratory

Client Name: IE Consulting
Reference: IE912
Location: Naul
Contact: Aine McElhinney
JE Job No.: 14/9172

Report: Liquid

Liquids/products: V=40ml vial, G=glass bottle, P=plastic bottle
 H=H₂SO₄, Z=ZnAc, N=NaOH, HN=HNO₃

J E Sample No. 1-5								Please see attached notes for all abbreviations and acronyms		
Sample ID	gw3									
Depth										
COC No / misc										
Containers	H H N P G									
Sample Date	11/08/2014									
Sample Type	Ground Water									
Batch Number	1									
Date of Receipt	14/08/2014							LOD/LOR	Units	Method No.
Dissolved Calcium *	119.1							<0.2	mg/l	TM30/PM14
Total Dissolved Iron *	<20							<20	ug/l	TM30/PM14
Dissolved Magnesium *	30.7							<0.1	mg/l	TM30/PM14
Dissolved Manganese *	104							<2	ug/l	TM30/PM14
Dissolved Potassium *	9.9							<0.1	mg/l	TM30/PM14
Dissolved Sodium *	28.6							<0.1	mg/l	TM30/PM14
Total Phosphorus	460							<5	ug/l	TM30/PM14
EPH (C8-C40) *	<10							<10	ug/l	TM5/PM30
C8-C40 Mineral Oil (Calculation)	<10							<10	ug/l	TM5/PM30
Sulphate *	90.82							<0.05	mg/l	TM38/PM0
Chloride *	110.1							<0.3	mg/l	TM38/PM0
Nitrate as NO3 *	0.2							<0.2	mg/l	TM38/PM0
Nitrite as NO2 *	<0.02							<0.02	mg/l	TM38/PM0
Ortho Phosphate as PO4 *	<0.06							<0.06	mg/l	TM38/PM0
Ammoniacal Nitrogen as NH4 *	<0.03							<0.03	mg/l	TM38/PM0
Total Ammonia as N *	<0.03							<0.03	mg/l	TM38/PM0
Total Alkalinity as CaCO3 *	270							<1	mg/l	TM75/PM0
Electrical Conductivity @25C *	938							<2	uS/cm	TM78/PM0
Faecal Coliforms *	>100								CFU/100ml	Subcontracted
Free Ammonia as NH3	<0.07							<0.07	mg/l	TM53/PM0
pH *	7.62							<0.01	pH units	TM73/PM0
Total Coliforms *	>100								CFU/100ml	Subcontracted
Turbidity	0.5							<0.1	NTU	TM34/PM0

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Client Name: IE Consulting
Reference: IE912
Location: Naul
Contact: Aine McElhinney

Matrix : Liquid

J E Job No.	Batch	Sample ID	Depth	J E Sample No.	Analysis	Reason
14/9172						

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Please note that only samples that are deviating are mentioned in this report. If no samples are listed it is because none were deviating.
 Only analyses which are accredited are recorded as deviating if set criteria are not met.

NOTES TO ACCOMPANY ALL SCHEDULES AND REPORTS

JE Job No.:

14/9172

SOILS

Please note we are only MCERTS accredited for sand, loam and clay and any other matrix is outside our scope of accreditation.

Where an MCERTS report has been requested, you will be notified within 48 hours of any samples that have been identified as being outside our MCERTS scope. As validation has been performed on clay, sand and loam, only samples that are predominantly these matrices, or combinations of them will be within our MCERTS scope. If samples are not one of a combination of the above matrices they will not be marked as MCERTS accredited.

It is assumed that you have taken representative samples on site and require analysis on a representative subsample. Stones will generally be included unless we are requested to remove them.

All samples will be discarded one month after the date of reporting, unless we are instructed to the contrary. If we are instructed to keep samples, a storage charge of £1 (1.5 Euros) per sample per month will be applied until we are asked to dispose of them.

If you have not already done so, please send us a purchase order if this is required by your company.

Where appropriate please make sure that our detection limits are suitable for your needs, if they are not, please notify us immediately.

All analysis is reported on a dry weight basis unless stated otherwise. Results are not surrogate corrected. Samples are dried at 35°C ±5°C unless otherwise stated. Moisture content for CEN Leachate tests are dried at 105°C ±5°C.

Where Mineral Oil or Fats, Oils and Grease is quoted, this refers to Total Aliphatics C10-C40.

Where a CEN 10:1 ZERO Headspace VOC test has been carried out, a 10:1 ratio of water to wet (as received) soil has been used.

% Asbestos in Asbestos Containing Materials (ACMs) is determined by reference to HSG 264 The Survey Guide - Appendix 2 : ACMs in buildings listed in order of ease of fibre release.

WATERS

Please note we are not a Drinking Water Inspectorate (DWI) Approved Laboratory. It is important that detection limits are carefully considered when requesting water analysis.

UKAS accreditation applies to surface water and groundwater and one other matrix which is analysis specific, any other liquids are outside our scope of accreditation

As surface waters require different sample preparation to groundwaters the laboratory must be informed of the water type when submitting samples.

Where Mineral Oil or Fats, Oils and Grease is quoted, this refers to Total Aliphatics C10-C40.

DEVIATING SAMPLES

Samples must be received in a condition appropriate to the requested analyses. All samples should be submitted to the laboratory in suitable containers with sufficient ice packs to sustain an appropriate temperature for the requested analysis. If this is not the case you will be informed and any test results that may be compromised highlighted on your deviating samples report.

SURROGATES

Surrogate compounds are added during the preparation process to monitor recovery of analytes. However low recovery in soils is often due to peat, clay or other organic rich matrices. For waters this can be due to oxidants, surfactants, organic rich sediments or remediation fluids. Acceptable limits for most organic methods are 70 - 130% and for VOCs are 50 - 150%. When surrogate recoveries are outside the performance criteria but the associated AQC passes this is assumed to be due to matrix effect. Results are not surrogate corrected.

DILUTIONS

A dilution suffix indicates a dilution has been performed and the reported result takes this into account. No further calculation is required.

NOTE

Data is only reported if the laboratory is confident that the data is a true reflection of the samples analysed. Data is only reported as accredited when all the requirements of our Quality System have been met. In certain circumstances where all the requirements of the Quality System have not been met, for instance if the associated AQC has failed, the reason is fully investigated and documented. The sample data is then evaluated alongside the other quality control checks performed during analysis to determine its suitability. Following this evaluation, provided the sample results have not been effected, the data is reported but accreditation is removed. It is a UKAS requirement for data not reported as accredited to be considered indicative only, but this does not mean the data is not valid.

Where possible, and if requested, samples will be re-extracted and a revised report issued with accredited results. Please do not hesitate to contact the laboratory if further details are required of the circumstances which have led to the removal of accreditation.

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QF-PM 3.1.9 v30

All solid results are expressed on a dry weight basis unless stated otherwise.

4 of 7

EPA Export 20-10-2014:23:28:21

EPA Export 31-03-2016:00:46:02

ABBREVIATIONS and ACRONYMS USED

#	UKAS accredited.
B	Indicates analyte found in associated method blank.
DR	Dilution required.
M	MCERTS accredited.
NA	Not applicable
NAD	No Asbestos Detected.
ND	None Detected (usually refers to VOC and/SVOC TICs).
NDP	No Determination Possible
SS	Calibrated against a single substance
SV	Surrogate recovery outside performance criteria. This may be due to a matrix effect.
W	Results expressed on as received basis.
+	AQC failure, accreditation has been removed from this result, if appropriate, see 'Note' on previous page.
++	Result outside calibration range, results should be considered as indicative only and are not accredited.
*	Analysis subcontracted to a Jones Environmental approved laboratory.
AD	Samples are dried at 35°C ±5°C.
CO	Suspected carry over
LOD/LOR	Limit of Detection (Limit of Reporting) in line with ISO 17025 and MCERTS
ME	Matrix Effect
NFD	No Fibres Detected
OC	Outside Calibration Range

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JE Job No: 14/9172

Test Method No.	Description	Prep Method No. (if appropriate)	Description	UKAS	MCERTS (soils only)	Analysis done on As Received (AR) or Dried (AD)	Reported on dry weight basis
TM5	In-House method based on USEPA 8015B. Determination of Extractable Petroleum Hydrocarbons (EPH) in the carbon chain length range of C8-40 by GC-FID. Accredited to ISO 17025 on soil and water samples and MCERTS (carbon banding only) on soils. All accreditation is matrix specific.	PM30	In-house method based on USEPA 3510. Liquid samples are mixed with solvent and agitated with an automatic magnetic stirrer with a stir bar for 15 minutes to extract organic molecules. ISO 17025 accredited extraction method. All accreditation is matrix specific				
TM5	In-House method based on USEPA 8015B. Determination of Extractable Petroleum Hydrocarbons (EPH) in the carbon chain length range of C8-40 by GC-FID. Accredited to ISO 17025 on soil and water samples and MCERTS (carbon banding only) on soils. All accreditation is matrix specific.	PM30	In-house method based on USEPA 3510. Liquid samples are mixed with solvent and agitated with an automatic magnetic stirrer with a stir bar for 15 minutes to extract organic molecules. ISO 17025 accredited extraction method. All accreditation is matrix specific	Yes			
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TM34	Turbidity by Turbidimeter	PMO	No preparation is required.				
TM38	Ionic analysis using the Thermo Aquakem Photometric Automatic Analyser. Accredited to ISO17025 and MCERTS for most analytes. All accreditation is matrix specific.	PMO	No preparation is required.	Yes			
TM53	Ammonia by Colourimetric measurement	PMO	No preparation is required.				
TM73	pH in by Metrohm	PMO	No preparation is required.	Yes			
TM75	Alkalinity by Metrohm	PMO	No preparation is required.	Yes			
TM76	Electrical Conductivity by Metrohm	PMO	No preparation is required.	Yes			

JE Job No: 14/9172

Test Method No.	Description	Prep Method No. (if appropriate)	Description	UKAS	MCERTS (soils only)	Analysis done on As Received (AR) or Dried (AD)	Reported on dry weight basis
Subcontracted	Subcontracted analysis, sent to an ISO 17025 accredited laboratory where possible.						

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Jones Environmental Laboratory

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Attention : Aine McElhinney
 Date : 24th September, 2014
 Your reference : IE912
 Our reference : Test Report 14/10407 Batch 1
 Location : Naul
 Date samples received : 12th September, 2014
 Status : Final report
 Issue : 1

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Two samples were received for analysis on 12th September, 2014. Please find attached our Test Report which should be read with notes at the end of the report and should include all sections if reproduced. Interpretations and opinions are outside the scope of any accreditation, and all results relate only to samples supplied. All analysis is carried out on as received samples and reported on a dry weight basis unless stated otherwise. Results are not surrogate corrected.

Compiled By:

Bruce Leslie
Project Co-ordinator

Bob Millward BSc FRSC
Principal Chemist

Jones Environmental Laboratory

Notification of Deviating Samples

Client Name: IE Consulting
Reference: IE912
Location: Naul
Contact: Aine McElhinney

J E Job No.	Batch	Sample ID	Depth	J E Sample No.	Analysis	Reason
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Please note that only samples that are deviating are mentioned in this report. If no samples are listed it is because none were deviating.
Only analyses which are accredited are recorded as deviating if set criteria are not met.

NOTES TO ACCOMPANY ALL SCHEDULES AND REPORTS

JE Job No.: 14/10407

SOILS

Please note we are only MCERTS accredited for sand, loam and clay and any other matrix is outside our scope of accreditation.

Where an MCERTS report has been requested, you will be notified within 48 hours of any samples that have been identified as being outside our MCERTS scope. As validation has been performed on clay, sand and loam, only samples that are predominantly these matrices, or combinations of them will be within our MCERTS scope. If samples are not one of a combination of the above matrices they will not be marked as MCERTS accredited.

It is assumed that you have taken representative samples on site and require analysis on a representative subsample. Stones will generally be included unless we are requested to remove them.

All samples will be discarded one month after the date of reporting, unless we are instructed to the contrary. If we are instructed to keep samples, a storage charge of £1 (1.5 Euros) per sample per month will be applied until we are asked to dispose of them.

If you have not already done so, please send us a purchase order if this is required by your company.

Where appropriate please make sure that our detection limits are suitable for your needs, if they are not, please notify us immediately.

All analysis is reported on a dry weight basis unless stated otherwise. Results are not surrogate corrected. Samples are dried at 35°C ±5°C unless otherwise stated. Moisture content for CEN Leachate tests are dried at 105°C ±5°C.

Where Mineral Oil or Fats, Oils and Grease is quoted, this refers to Total Aliphatics C10-C40.

Where a CEN 10:1 ZERO Headspace VOC test has been carried out, a 10:1 ratio of water to wet (as received) soil has been used.

% Asbestos in Asbestos Containing Materials (ACMs) is determined by reference to HSG 264 The Survey Guide - Appendix 2 : ACMs in buildings listed in order of ease of fibre release.

WATERS

Please note we are not a Drinking Water Inspectorate (DWI) Approved Laboratory. It is important that detection limits are carefully considered when requesting water analysis.

UKAS accreditation applies to surface water and groundwater and one other matrix which is analysis specific, any other liquids are outside our scope of accreditation

As surface waters require different sample preparation to groundwaters the laboratory must be informed of the water type when submitting samples.

Where Mineral Oil or Fats, Oils and Grease is quoted, this refers to Total Aliphatics C10-C40.

DEVIATING SAMPLES

Samples must be received in a condition appropriate to the requested analyses. All samples should be submitted to the laboratory in suitable containers with sufficient ice packs to sustain an appropriate temperature for the requested analysis. If this is not the case you will be informed and any test results that may be compromised highlighted on your deviating samples report.

SURROGATES

Surrogate compounds are added during the preparation process to monitor recovery of analytes. However low recovery in soils is often due to peat, clay or other organic rich matrices. For waters this can be due to oxidants, surfactants, organic rich sediments or remediation fluids. Acceptable limits for most organic methods are 70 - 130% and for VOCs are 50 - 150%. When surrogate recoveries are outside the performance criteria but the associated AQC passes this is assumed to be due to matrix effect. Results are not surrogate corrected.

DILUTIONS

A dilution suffix indicates a dilution has been performed and the reported result takes this into account. No further calculation is required.

NOTE

Data is only reported if the laboratory is confident that the data is a true reflection of the samples analysed. Data is only reported as accredited when all the requirements of our Quality System have been met. In certain circumstances where all the requirements of the Quality System have not been met, for instance if the associated AQC has failed, the reason is fully investigated and documented. The sample data is then evaluated alongside the other quality control checks performed during analysis to determine its suitability. Following this evaluation, provided the sample results have not been effected, the data is reported but accreditation is removed. It is a UKAS requirement for data not reported as accredited to be considered indicative only, but this does not mean the data is not valid.

Where possible, and if requested, samples will be re-extracted and a revised report issued with accredited results. Please do not hesitate to contact the laboratory if further details are required of the circumstances which have led to the removal of accreditation.

Please include all sections of this report if it is reproduced

ABBREVIATIONS and ACRONYMS USED

#	UKAS accredited.
B	Indicates analyte found in associated method blank.
DR	Dilution required.
M	MCERTS accredited.
NA	Not applicable
NAD	No Asbestos Detected.
ND	None Detected (usually refers to VOC and/SVOC TICs).
NDP	No Determination Possible
SS	Calibrated against a single substance
SV	Surrogate recovery outside performance criteria. This may be due to a matrix effect.
W	Results expressed on as received basis.
+	AQC failure, accreditation has been removed from this result, if appropriate, see 'Note' on previous page.
++	Result outside calibration range, results should be considered as indicative only and are not accredited.
*	Analysis subcontracted to a Jones Environmental approved laboratory.
AD	Samples are dried at 35°C ±5°C
CO	Suspected carry over
LOD/LOR	Limit of Detection (Limit of Reporting) in line with ISO 17025 and MCERTS
ME	Matrix Effect
NFD	No Fibres Detected
OC	Outside Calibration Range

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JE Job No: 14/10407

Test Method No.	Description	Prep Method No. (if appropriate)	Description	UKAS	MCERTS (soils only)	Analysis done on As Received (AR) or Dried (AD)	Reported on dry weight basis
TM5	In-House method based on USEPA 8015B. Determination of Extractable Petroleum Hydrocarbons (EPH) in the carbon chain length range of C8-40 by GC-FID. Accredited to ISO 17025 on soil and water samples and MCERTS (carbon banding only) on soils. All accreditation is matrix specific.	PM30	In-house method based on USEPA 3510. Liquid samples are mixed with solvent and agitated with an automatic magnetic stirrer with a stir bar for 15 minutes to extract organic molecules. ISO 17025 accredited extraction method. All accreditation is matrix specific				
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TM34	Turbidity by Turbidimeter	PM0	No preparation is required.				
TM38	Ionic analysis using the Thermo Aquakem Photometric Automatic Analyser. Accredited to ISO17025 and MCERTS for most analytes. All accreditation is matrix specific.	PM0	No preparation is required.	Yes			
TM53	Ammonia by Colourimetric measurement	PM0	No preparation is required.				
TM73	pH in by Metrohm	PM0	No preparation is required.	Yes			
TM75	Alkalinity by Metrohm	PM0	No preparation is required.	Yes			
TM76	Electrical Conductivity by Metrohm	PM0	No preparation is required.	Yes			

JE Job No: 14/10407

Test Method No.	Description	Prep Method No. (if appropriate)	Description	UKAS	MCERTS (soils only)	Analysis done on As Received (AR) or Dried (AD)	Reported on dry weight basis
Subcontracted	Subcontracted analysis, sent to an ISO 17025 accredited laboratory where possible.						

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APPENDIX III

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Appendix 3_Table 1
 Clashford Recovery Facility, Naul, Co. Meath
 Summary of 2009 Groundwater Chemistry Data

Sample Date	LAB ID	GW1 2009	GW Interim Guideline Value mg/l (Groundwater Assessment Criteria)
Parameters			
Alkalinity	n/a	230	no abnormal change
Ammoniacal Nitrogen	n/a	<0.08	0.15
Arsenic(mg/l)	++	<u>0.0006</u>	0.01
Barium(mg/l)	++	<u>0.029</u>	0.1
Boron	++	0.03	1
Cadmium(mg/l)#	**	<u><0.0001</u>	0.005
Calcium	**	67	200
Chloride	**	19	30
Chromium (mg/l)#	**	<u><0.001</u>	0.03
Conductivity(µS/cm @ 20°C)	**	417	1000
Copper	**	<0.05	0.03
Cyanide	n/a	<0.01	0.01
Dissolved Oxygen	n/a	5.8	no abnormal change
Fluoride	**	0.11	1
Iron#	**	0.13	0.2
Lead(mg/l)	**	<u><0.002</u>	0.01
Magnesium	**	13	50
Manganese#	**	0.03	0.05
Mercury(mg/l)	++	<u><0.00005</u>	0.001
Nickel(mg/l)	++	<u>0.005</u>	0.02
Nitrate	**	0.8	25
Nitrite	**	<0.2	0.1
pH	**	7.5	>=6.5 and <=9.5
Phosphate	**	<1	0.03
Phosphorus	n/a	<0.05	
Potassium	**	2	5
Residue on Evaporation @ 180°C	n/a	235	
Selenium(mg/l)	++	<u>0.0012</u>	
Silver	++	<u><0.01</u>	
Sodium	**	20	150
Sulphate	**	16	200
Temperature	n/a	not recorded	25
TOC	n/a	1.2	no abnormal change
TON	n/a	<0.24	no abnormal change
Total phenols	n/a	<0.05	
Zinc#	**	0.02	0.1
Faecal Coliforms (cfu/100ml)	n/a	>100	0 counts per 100ml
Total Coliforms (cfu/100ml)	n/a	0	0 counts per 100ml

-/ means no data available

** = INAB Accredited Tests

++ = Subcontracted Tests

n/a = Non-INAB Accredited Tests

Analysis of metals are performed on the filtered sample

bold - exceeds IGV

0.001 - Original lab results were in µg/L, and results shown are converted to mg/L

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Appendix 3_Table 2
Clashford Recovery Facility, Naul, Co. Meath
Summary of 2014 Groundwater Chemistry Data

Sample Date	GW1 Aug 2014	GW2 Aug 2014	GW3 Aug 2014	GW4 Aug 2014	GW3 Sep 2014	GW4 Sep 2014	GW Interim Guideline Value mg/l (Groundwater Assessment Criteria)
Parameters							
Total Alkalinity as CaCO ₃ (mg/l)	226	278	270	230	0.9	0.5	no abnormal change
Ammoniacal Nitrogen as NH ₄ (mg/l)	<0.03	0.08	<0.03	1.4	<0.03	0.65	0.15
Dissolved Calcium (mg/l)	65.6	90.7	119.1	109.3	102.2	169.1	200
Chloride (mg/l)	18.9	25	110.1	120.4	48.6	127.9	30
Conductivity(µS/cm @ 20°C)	458	629	938	1140	755	1245	1000
Dissolved Iron (mg/l)	116	28	<20	154	<20	1981	0.2
Lead(mg/l)							0.01
Magnesium (mg/l)	13.1	22.9	30.7	19.5	23.6	22	50
Manganese (mg/l)	24	455	104	937	50	2683	0.05
Nitrate (mg/l)	0.6	0.7	0.2	0.4	1.3	<0.2	25
Nitrite (mg/l)	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	0.1
pH	7.82	7.72	7.62	10.64	7.7	7.46	>=6.5 and <=9.5
Ortho Phosphate as PO ₄ (mg/l)	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06	0.03
Total Phosphorus (µg/l)	22	34	460	54	315	97	
Dissolved Potassium (mg/l)	2.1	1.9	9.9	75.2	7.5	5.2	5
Dissolved Sodium (mg/l)	20.4	20.2	26.6	94.8	21.3	70.1	150
Sulphate (mg/l)	22.75	73.97	90.82	138.27	84.88	70.39	200
Turbidity NTU	0.3	0.3	0.5	0.5	0.9	0.1	
EPH (C8 - C40) (µg/l)	<10	<10	<10	<10	<10	<10	
C8 - C40 Mineral Oil (µg/l)	<10	<10	<10	<10	<10	<10	
Faecal Coliforms (cfu/100ml)	0	0	>100	20	10	30	0 counts per 100ml
Total Coliforms (cfu/100ml)	0	3	>100	600	40	97	0 counts per 100ml

bold - exceeds IGV