Facility Information Summary

AER Reporting Year	2013
Licence Register Number	W0184-01
Name of site	Enva Ireland Limited
Site Location	Clonminan Industrial Estate, Portlaoise, Co. Loias
NACE Code	3832
Class/Classes of Activity	**Fourth Schedule** - Class 6, Class 7, Class 12, Class 13. **Third Schedule** - Class 2, Class 4, Class 5, Class 8, Class 9, Class 11, Class 12, Class 13.
National Grid Reference (6E, 6 N)	2461 E, 1978 N
A description of the activities/processes at the site for the reporting year. This should include information such as production increases or decreases on site, any infrastructural changes, environmental performance which was measured during the reporting year **and an overview of compliance with your licence** listing all exceedances of licence limits (where applicable) and what they relate to e.g. air, water, noise.	The processing activities onsite include waste oil re-processing, treatment of contaminated soil, repacking of oily contaminated wastes, and paint wastes. The site also stores wastes in packages (barrels, ASPs, IBCs, etc.) prior to transfer off site for recovery or disposal. No significant change has occurred in the operations carried out onsite or to site infrastructure. No ELVs were breached during the reporting year. Fluctuations in waste quantities accepted onsite was subject to availability from customers rather than an intentional increase/decrease in waste volumes.

Declaration:

All the data and information presented in this report has been checked and certified as being accurate. The quality of the information is assured to meet licence requirements.

Donal Conroy	31.03.2014
Signature Group/Facility manager (or nominated, suitably qualified and experienced deputy)	Date

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Answer all questions and complete all tables where relevant

			Additional information
1	Does your site have licensed air emissions? If yes please complete table A1 and A2 below for the current reporting year and answer further questions. If **you do not have** licenced emissions and **do not complete a solvent management plan** (table A4 and A5) you do not need to complete the tables	Yes	

Periodic/Non-Continuous Monitoring

2	Are there any results in breach of licence requirements? If yes please provide brief details in the comment section of TableA1 below	No	
3	Was all monitoring carried out in accordance with EPA guidance note AG2 and using the basic air monitoring checklist? Basic air monitoring checklist AGN2	Yes	Yes Wright Environmental Services carry out emission monitoirng based on the AG" standard.

Table A1: Licensed Mass Emissions/Ambient data-periodic monitoring (non-continuous)

Emission reference no:	Parameter/ Substance	Frequency of Monitoring	ELV in licence or any revision therof	Licence Compliance criteria	Measured value	Unit of measurement	Compliant with licence limit	Method of analysis	Annual mass load (kg)	Comments - reason for change in % mass load from previous year if applicable
A-01	Carbon monoxide (CO)	Annually	N/A	No 30min mean can exceed the ELV	3	mg/Nm3	yes	EN 15058:2004	1.379	N/A
A-01	Sulphur oxides (SOx/SO2)	Annually	N/A	No 30min mean can exceed the ELV	<5	mg/Nm3	yes	EN 14791:2005	2.298	N/A
A-01	Nitrogen oxides (NOx/NO2)	Annually	N/A	No 30min mean can exceed the ELV	94	mg/Nm3	yes	EN 14792:2005	43.22	N/A
A-01	Combustion Efficiency	Annually	N/A	No 30min mean can exceed the ELV	83.6	%	yes	I.S. EN 13284		N/A
DP1	Dust	Quarter 1	Yes - 350 $mg/m^2/day$	Monitoring to occur 4 times a year	145.08	mg/m2/Year	yes	Standard Method VDI 2119 Part 2,	0.0529 Kg/m2/Year	N/A
DP2	Dust	Quarter 1	Yes - 350 $mg/m^2/day$	Monitoring to occur 4 times a year	67.9	mg/m2/day	yes	Standard Method VDI 2119 Part 2,	0.0247 Kg/m2/Year	N/A
DP3	Dust	Quarter 1	Yes - 350 $mg/m^2/day$	Monitoring to occur 4 times a year	49.37	mg/m2/day	yes	Standard Method VDI 2119 Part 2,	0.0180 Kg/m2/Year	N/A
DP1	Dust	Quarter 2	Yes - 350 $mg/m^2/day$	Monitoring to occur 4 times a year	308.95	mg/m2/day	yes	Standard Method VDI 2119 Part 2,	0.1127 Kg/m2/Year	N/A
DP2	Dust	Quarter 2	Yes - 350 $mg/m^2/day$	Monitoring to occur 4 times a year	90.76	mg/m2/day	yes	Standard Method VDI 2119 Part 2,	0.0331 Kg/m2/Year	N/A

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DP3	Dust	Quarter 2	Yes - 350 mg/m^2/day	Monitoring to occur 4 times a year	48.06	mg/m2/day	yes	Standard Method VDI 2119 Part 2,	0.0175 Kg/m2/Year	N/A
DP1	Dust	Quarter 3	Yes - 350 mg/m^2/day	Monitoring to occur 4 times a year	87.52	mg/m2/day	yes	Standard Method VDI 2119 Part 2,	0.0319 Kg/m2/Year	N/A
DP2	Dust	Quarter 3	Yes - 350 mg/m^2/day	Monitoring to occur 4 times a year	66.2	mg/m2/day	yes	Standard Method VDI 2119 Part 2,	0.0241 Kg/m2/Year	N/A
DP3	Dust	Quarter 3	Yes - 350 mg/m^2/day	Monitoring to occur 4 times a year	149.79	mg/m2/day	yes	Standard Method VDI 2119 Part 2,	0.0546 Kg/m2/Year	N/A
DP1	Dust	Quarter 4	Yes - 350 mg/m^2/day	Monitoring to occur 4 times a year	63.84	mg/m2/day	yes	Standard Method VDI 2119 Part 2,	0.0233 Kg/m2/Year	N/A
DP2	Dust	Quarter 4	Yes - 350 mg/m^2/day	Monitoring to occur 4 times a year	52.23	mg/m2/day	yes	Standard Method VDI 2119 Part 2,	0.0190 Kg/m2/Year	N/A
DP3	Dust	Quarter 4	Yes - 350 mg/m^2/day	Monitoring to occur 4 times a year	42.36	mg/m2/day	yes	Standard Method VDI 2119 Part 2,	0.01546 Kg/m2/Year	N/A
	SELECT			SELECT		SELECT	SELECT	SELECT		

Note 1: Volumetric flow shall be included as a reportable parameter

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Continuous Monitoring				

4	Does your site carry out continuous air emissions monitoring?	No
	If yes please review your continuous monitoring data and report the required fields below in Table A2 and compare it to its relevant Emission Limit Value (ELV)	
5	Did continuous monitoring equipment experience downtime? If yes please record downtime in table A2 below	N/A
6	Do you have a proactive service agreement for each piece of continuous monitoring equipment?	N/A
7	Did your site experience any abatement system bypasses? If yes please detail them in table A3 below	N/A

Table A2: Summary of average emissions -continuous monitoring

Emission reference no:	Parameter/ Substance	ELV in licence or any revision therof	Averaging Period	Compliance Criteria	Units of measurement	Annual Emission	Annual maximum	Monitoring Equipment downtime (hours)	Number of ELV exceedences in current reporting year	Comments
	SELECT			SELECT	SELECT					
	SELECT				SELECT					
	SELECT				SELECT					
	SELECT				SELECT					
	SELECT				SELECT					

note 1: Volumetric flow shall be included as a reportable parameter.

Table A3: Abatement system bypass reporting table Bypass protocol

Date*	Duration** (hours)	Location	Reason for bypass	Impact magnitude	Corrective action

* this should include all dates that an abatement system bypass occurred

** an accurate record of time bypass beginning and end should be logged on site and maintained for future Agency inspections please refer to bypass protocol link

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Solvent use and management on site

8 Do you have a total Emission Limit Value of direct and fugitive emissions on site? if yes please fill out tables A4 and A5 — No

Table A4: Solvent Management Plan Summary Total VOC Emission limit value			Solvent regulations	Please refer to linked solvent regulations to complete table 5 and 6	
Reporting year	Total solvent input on site (kg)	Total VOC emissions to Air from entire site (direct and fugitive)	Total VOC emissions as %of solvent input	Total Emission Limit Value (ELV) in licence or any revision therof	Compliance
					SELECT
					SELECT

Table A5: Solvent Mass Balance summary

	(I) Inputs (kg)	(O) Outputs (kg)						
Solvent	(I) Inputs (kg)	Organic solvent emission in waste	Solvents lost in water (kg)	Collected waste solvent (kg)	Fugitive Organic Solvent (kg)	Solvent released in other ways e.g. by-	Solvents destroyed onsite	Total emission of Solvent to air (kg)
							Total	

AER Monitoring returns summary template-WATER/WASTEWATER(SEWER) Lic No: W0184-01 Year 2013

Yes No

			Additional information
1	Does your site have licensed emissions direct to surface water or direct to sewer? If yes please complete table W2 and W3 below for the current reporting year and answer further questions. If **you do not have** licenced emissions you only need to complete table W1 and or W2 for storm water analysis and visual inspections	Yes	
2	Was it a requirement of your licence to carry out visual inspections on any surface water discharges or watercourses on or near your site? If yes please complete table W2 below summarising only any evidence of contamination noted during visual inspections	No	

Table W1 Storm water monitoring

Location reference	Location relative to site activities	PRTR Parameter	Licenced Parameter	Monitoring date	ELV or trigger level in licence or any revision thereof*	Licence Compliance criteria	Measured value	Unit of measurement	Compliant with licence	Comments
SW01	onsite		Fats, Oils and Greases	04/02/2013	15 mg/L	All values < ELV	1210	µg/L	yes	During a site inspection with Enva's designated EPA inspector, Ms Joan Fogarty advised that it would be satisfactory to enter the highest result for each parameter required as per licence W0184-01, for the reporting 2013 year. The results have already been submitted on a quarterly basis and no breaches of ELV's occurred.
SW01	onsite		pH	04.11.2013	N/A	All values < ELV	9.3	pH units	yes	During a site inspection with Enva's designated EPA inspector, Ms Joan Fogarty advised that it would be satisfactory to enter the highest result for each parameter required as per licence W0184-01, for the reporting 2013 year. The results have already been submitted on a quarterly basis and no breaches of ELV's occurred.
SW01	onsite		COD	02.07.2013	250 mg/L	All values < ELV	244	mg/L	yes	During a site inspection with Enva's designated EPA inspector, Ms Joan Fogarty advised that it would be satisfactory to enter the highest result for each parameter required as per licence W0184-01, for the reporting 2013 year. The results have already been submitted on a quarterly basis and no breaches of ELV's occurred.
SW01	onsite		Suspended Solids	10.12.2013	60 mg/L	All values < ELV	55.66	mg/L	yes	During a site inspection with Enva's designated EPA inspector, Ms Joan Fogarty advised that it would be satisfactory to enter the highest result for each parameter required as per licence W0184-01, for the reporting 2013 year. The results have already been submitted on a quarterly basis and no breaches of ELV's occurred.
SW01	onsite		Mineral oils	05.03.2013	5 mg/L	All values < ELV	<1000	µg/L	yes	During a site inspection with Enva's designated EPA inspector, Ms Joan Fogarty advised that it would be satisfactory to enter the highest result for each parameter required as per licence W0184-01, for the reporting 2013 year. The results have already been submitted on a quarterly basis and no breaches of ELV's occurred.
SW02	onsite		Fats, Oils and Greases	N/A	N/A	All values < ELV	N/A	N/A	N/A	During a site inspection with Enva's designated EPA inspector, Ms Joan Fogarty advised that it would be satisfactory to enter the highest result for each parameter required as per licence W0184-01, for the reporting 2013 year. The results have already been submitted on a quarterly basis and no breaches of ELV's occurred.
SW02	onsite		pH	23.01.2013	N/A	All values < ELV	8.29	pH units	yes	During a site inspection with Enva's designated EPA inspector, Ms Joan Fogarty advised that it would be satisfactory to enter the highest result for each parameter required as per licence W0184-01, for the reporting 2013 year. The results have already been submitted on a quarterly basis and no breaches of ELV's occurred.
SW02	onsite		COD	26.02.2013	250 mg/L	All values < ELV	173	mg/L	yes	During a site inspection with Enva's designated EPA inspector, Ms Joan Fogarty advised that it would be satisfactory to enter the highest result for each parameter required as per licence W0184-01, for the reporting 2013 year. The results have already been submitted on a quarterly basis and no breaches of ELV's occurred.
SW02	onsite		Suspended Solids	11.11.2013	60 mg/L	All values < ELV	59	mg/L	yes	During a site inspection with Enva's designated EPA inspector, Ms Joan Fogarty advised that it would be satisfactory to enter the highest result for each parameter required as per licence W0184-01, for the reporting 2013 year. The results have already been submitted on a quarterly basis and no breaches of ELV's occurred.
SW02	onsite		Mineral oils	05.03.2013	5 mg/L	All values < ELV	<1000	µg/L	yes	During a site inspection with Enva's designated EPA inspector, Ms Joan Fogarty advised that it would be satisfactory to enter the highest result for each parameter required as per licence W0184-01, for the reporting 2013 year. The results have already been submitted on a quarterly basis and no breaches of ELV's occurred.

*trigger values may be agreed by the Agency outside of licence conditions

Table W2 Visual inspections-Please only enter details where contamination was observed.

Location Reference	Date of inspection	Description of contamination				Source of contamination	Corrective action		Comments	
N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Licensed Emissions to water and /or wastewater(sewer)-periodic monitoring (non-continuous)

			Additional information
3	Was there any result in breach of licence requirements? If yes please provide brief details in the comment section of Table W3 below	No	
4	Was all monitoring carried out in accordance with EPA guidance and checklists for Quality of Aqueous Monitoring Data Reported to the EPA? If no please detail [External /Internal Lab Quality checklist] [Assessment of results checklist]	Yes	

Table W3: Licensed Emissions to water and /or wastewater (sewer)-periodic monitoring (non-continuous)

Emission reference no:	Emission released to	Parameter/ SubstanceNote 1	Type of sample	Frequency of monitoring	Averaging period	ELV or trigger values in licence or any revision therof Note 2	Licence Compliance criteria	Measured value	Unit of measurement	Compliant with licence	Method of analysis	Procedural reference source	Procedural reference standard number	Annual mass load (kg)	Comments
FS1	Wastewater/Sewer	pH	composite	12/02/2013	24 hour	6 - 8.5	All results < 1.2 times ELV, plus 8 from ten results must be < ELV	8.64	pH units	no (if no please enter details in comments box)	pH Meter (Electrode)	As per manufacturers guide	SOP 1134		During a site inspection with Enva's designated EPA inspector, Ms Joan Fogarty advised that it would be satisfactory to enter the highest result for each parameter required as per licence W0184-01, for the reporting 2013 year. The results have already been submitted on a quarterly basis and no breaches of ELV's occurred.
FS1	Wastewater/Sewer	Temperature	composite	13/08/2013	24 hour	43	All results < 1.2 times ELV, plus 8 from ten results must be < ELV	41.71	degrees C	yes	Temperature Probe	SCADA	SCADA		During a site inspection with Enva's designated EPA inspector, Ms Joan Fogarty advised that it would be satisfactory to enter the highest result for each parameter required as per licence W0184-01, for the reporting 2013 year. The results have already been submitted on a quarterly basis and no breaches of ELV's occurred.
FS1	Wastewater/Sewer	Suspended Solids	composite	18/10/2013	24 hour	400 mg/L	All results < 1.2 times ELV, plus 8 from ten results must be < ELV	385	mg/L	yes	Gravimetric analysis	APHA / AWWA "Standard Methods"	SOP 1291	480.79	During a site inspection with Enva's designated EPA inspector, Ms Joan Fogarty advised that it would be satisfactory to enter the highest result for each parameter required as per licence W0184-01, for the reporting 2013 year. The results have already been submitted on a quarterly basis and no breaches of ELV's occurred.
FS1	Wastewater/Sewer	Ammonia (as N)	composite	30/10/2013	24 hour	80 mg/L	All results < 1.2 times ELV, plus 8 from ten results must be < ELV	70.5	mg/L	yes	Spectrophotometry (Colorimetry)	APHA / AWWA "Standard Methods"	SOP 1245	270.15	During a site inspection with Enva's designated EPA inspector, Ms Joan Fogarty advised that it would be satisfactory to enter the highest result for each parameter required as per licence W0184-01, for the reporting 2013 year. The results have already been submitted on a quarterly basis and no breaches of ELV's occurred.
FS1	Wastewater/Sewer	Chlorides (as Cl)	composite	28/05/2013	24 hour	6000 mg/L	All results < 1.2 times ELV, plus 8 from ten results must be < ELV	3080	mg/L	yes	Titration	APHA / AWWA "Standard Methods"	SOP 1028	12147.08	During a site inspection with Enva's designated EPA inspector, Ms Joan Fogarty advised that it would be satisfactory to enter the highest result for each parameter required as per licence W0184-01, for the reporting 2013 year. The results have already been submitted on a quarterly basis and no breaches of ELV's occurred.
FS1	Wastewater/Sewer	Copper and compounds (as Cu)	composite	07/08/2013	24 hour	1 mg/L	All results < 1.2 times ELV, plus 8 from ten results must be < ELV	0.08	mg/L	yes	AAS (Atomic Absorption Spectroscopy	APHA / AWWA "Standard Methods"	SOP 1247	0.1048	During a site inspection with Enva's designated EPA inspector, Ms Joan Fogarty advised that it would be satisfactory to enter the highest result for each parameter required as per licence W0184-01, for the reporting 2013 year. The results have already been submitted on a quarterly basis and no breaches of ELV's occurred.
FS1	Wastewater/Sewer	Lead and compounds (as Pb)	composite	10/04/2013	24 hour	0.5 mg/L	All results < 1.2 times ELV, plus 8 from ten results must be < ELV	0.2	mg/L	yes	AAS (Atomic Absorption Spectroscopy	APHA / AWWA "Standard Methods"	SOP 1247	0.19	During a site inspection with Enva's designated EPA inspector, Ms Joan Fogarty advised that it would be satisfactory to enter the highest result for each parameter required as per licence W0184-01, for the reporting 2013 year. The results have already been submitted on a quarterly basis and no breaches of ELV's occurred.
FS1	Wastewater/Sewer	Zinc and compounds (as Zn)	composite	27/02/2013	24 hour	1 mg/L	All results < 1.2 times ELV, plus 8 from ten results must be < ELV	0.538	mg/L	yes	AAS (Atomic Absorption Spectroscopy	APHA / AWWA "Standard Methods"	SOP 1247	1.111	During a site inspection with Enva's designated EPA inspector, Ms Joan Fogarty advised that it would be satisfactory to enter the highest result for each parameter required as per licence W0184-01, for the reporting 2013 year. The results have already been submitted on a quarterly basis and no breaches of ELV's occurred.
FS1	Wastewater/Sewer	Cadmium and compounds (as Cd)	composite	26/06/2013	24 hour	0.15 mg/L	All results < 1.2 times ELV, plus 8 from ten results must be < ELV	0.02	mg/L	yes	AAS (Atomic Absorption Spectroscopy	APHA / AWWA "Standard Methods"	SOP 1247	0.0421	During a site inspection with Enva's designated EPA inspector, Ms Joan Fogarty advised that it would be satisfactory to enter the highest result for each parameter required as per licence W0184-01, for the reporting 2013 year. The results have already been submitted on a quarterly basis and no breaches of ELV's occurred.
FS1	Wastewater/Sewer	COD	composite	04/12/2013	24 hour	280Kg/day	All results < 1.2 times ELV, plus 8 from ten results must be < ELV	259	mg/L	yes	Spectrophotometry (Colorimetry)	APHA / AWWA "Standard Methods"	SOP 1241	21847.52	During a site inspection with Enva's designated EPA inspector, Ms Joan Fogarty advised that it would be satisfactory to enter the highest result for each parameter required as per licence W0184-01, for the reporting 2013 year. The results have already been submitted on a quarterly basis and no breaches of ELV's occurred.

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FS1	Wastewater/Sewer	Phenols (as total C)	composite	23/12/2013	24 hour	50 mg/L	All results < 1.2 times ELV, plus 8 from ten results must be < ELV	36.7	mg/L	yes	Spectrophotometry (Colorimetry)	APHA / AWWA "Standard Methods"	SOP 1289	96.272	During a site inspection with Enva's designated EPA inspector, Ms Joan Fogarty advised that it would be satisfactory to enter the highest result for each parameter required as per licence W0184-01, for the reporting 2013 year. The results have already been submitted on a quarterly basis and no breaches of ELV's occurred.	
FS1	Wastewater/Sewer	Sulphate	composite	22/05/2013	24 hour	1000 mg/L	All results < 1.2 times ELV, plus 8 from ten results must be < ELV	420	mg/L	yes	Spectrophotometry (Colorimetry)	APHA / AWWA "Standard Methods"	SOP 1032	495.33	During a site inspection with Enva's designated EPA inspector, Ms Joan Fogarty advised that it would be satisfactory to enter the highest result for each parameter required as per licence W0184-01, for the reporting 2013 year. The results have already been submitted on a quarterly basis and no breaches of ELV's occurred.	
FS1	Wastewater/Sewer	Fats, Oils and Greases	composite	09/01/2013	24 hour	100 mg/L	All results < 1.2 times ELV, plus 8 from ten results must be < ELV	88.8	mg/L	yes	Soxhlet Extraction Apparatus	APHA / AWWA "Standard Methods"	SOP 1050	90.283	During a site inspection with Enva's designated EPA inspector, Ms Joan Fogarty advised that it would be satisfactory to enter the highest result for each parameter required as per licence W0184-01, for the reporting 2013 year. The results have already been submitted on a quarterly basis and no breaches of ELV's occurred.	
FS2	Wastewater/Sewer	Total phosphorus	composite	27/02/2013	24 hour	150 mg/L	All results < 1.2 times ELV, plus 8 from ten results must be < ELV	134	mg/L	yes	Spectrophotometry (Colorimetry)	APHA / AWWA "Standard Methods"	SOP 1246	512	During a site inspection with Enva's designated EPA inspector, Ms Joan Fogarty advised that it would be satisfactory to enter the highest result for each parameter required as per licence W0184-01, for the reporting 2013 year. The results have already been submitted on a quarterly basis and no breaches of ELV's occurred.	
FS2	Wastewater/Sewer	volumetric flow	composite		24 hour	50 m3/day	All results < 1.2 times ELV, plus 8 from ten results must be < ELV	48.85	m3/day	yes	SCADA	APHA / AWWA "Standard Methods"	SCADA	6678100	During a site inspection with Enva's designated EPA inspector, Ms Joan Fogarty advised that it would be satisfactory to enter the highest result for each parameter required as per licence W0184-01, for the reporting 2013 year. The results have already been submitted on a quarterly basis and no breaches of ELV's occurred.	

Note 1: Volumetric flow shall be included as a reportable parameter

Note 2: Where Emission Limit Values (ELV) do not apply to your licence please compare results against EQS for Surface water or relevant receptor quality standards

AER Monitoring returns summary template-WATER/WASTEWATER(SEWER)	Lic No:	W0184-01	Year	2013

Continuous monitoring

		Additional Information
5 Does your site carry out continuous emissions to water/sewer monitoring?	No	
If yes please summarise your continuous monitoring data below in Table W4 and compare it to its relevant Emission Limit Value		
6 Did continuous monitoring equipment experience downtime? **If yes please record downtime in table W4 below**	No	
7 Do you have a proactive service contract for each piece of continuous monitoring equipment on site?	No	
8 Did abatement system bypass occur during the reporting year? **If yes please complete table W5 below**	No	

Table W4: Summary of average emissions -continuous monitoring

Emission reference no:	Emission released to	Parameter/ Substance	ELV or trigger values in licence or any revision thereof	Averaging Period	Compliance Criteria	Units of measurement	Annual Emission for current reporting year (kg)	% change +/- from previous reporting year	Monitoring Equipment downtime (hours)	Number of ELV exceedences in reporting year	Comments
N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

note 1: Volumetric flow shall be included as a reportable parameter.

Table W5: Abatement system bypass reporting table

Date	Duration (hours)	Location	Resultant emissions	Reason for bypass	Corrective action*	Was a report submitted to the EPA?	When was this report submitted?
N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

*Measures taken or proposed to reduce or limit bypass frequency

Bund/Pipeline testing template

Lic No: W0184-01 Year 2013

Bund testing — dropdown menu click to see options

			Additional information
1	Are you required by your licence to undertake integrity testing on bunds and containment structures ? if yes please fill out table B1 below listing all **new bunds and containment structures** on site, in addition to **all bunds which failed** the integrity test-**all bunding structures which failed including mobile bunds must be listed in the table below, please include all bunds outside the licenced testing period** (mobile bunds and chemstore included)	Yes	
2	Please provide integrity testing frequency period	3 years	
3	Does the site maintain a register of bunds, underground pipelines (including stormwater and foul), Tanks, sumps and containers? (containers refers to "Chemstore" type units and mobile bunds)	Yes	
4	How many bunds are on site?	9	
5	How many of these bunds have been tested within the required test schedule?	8	
6	How many mobile bunds are on site?	17	
7	Are the mobile bunds included in the bund test schedule?	No	Visual inspection and 6 hour hydrostatic test will be carried out by Enva personnel in 2014.
8	How many of these mobile bunds have been tested within the required test schedule?	0	
9	How many sumps on site are included in the integrity test schedule?	12	
10	How many of these sumps are integrity tested within the test schedule?	0	Sumps scheduled for inspection in February and March 2014
	Please list any sump integrity failures in table B1		
11	Do all sumps and chambers have high level liquid alarms?	No	
12	If yes to Q11 are these failsafe systems included in a maintenance and testing programme?	N/A	
13	Is the Fire Water Retention Pond included in your integrity test programme?	No	

Table B1: Summary details of bund /containment structure integrity test

Bund/Containment structure ID	Type	Specify Other type	Product containment	Actual capacity	Capacity required*	Type of integrity test	Other test type	Test date	Integrity reports maintained on site?	Results of test	Integrity test failure explanation <50 words	Corrective action taken	Scheduled date for retest	Results of retest(if in current reporting year)

* Capacity required should comply with 25% or 110% containment rule as detailed in your licence

				Commentary
15	Has integrity testing been carried out in accordance with licence requirements and are all structures tested in line with BS8007/EPA Guidance?	bunding and storage guidelines	Yes	
16	Are channels/transfer systems to remote containment systems tested?		N/A	
17	Are channels/transfer systems compliant in both integrity and available volume?		N/A	

Pipeline/underground structure testing

1	Are you required by your licence to undertake integrity testing* on underground structures e.g. pipelines or sumps etc ? if yes please fill out table 2 below listing all underground structures and pipelines on site **which failed the integrity test and all which have not been tested withing the integrity test period as specified**	Yes	
2	Please provide integrity testing frequency period	3 years	

*please note integrity testing means water tightness testing for process and foul pipelines (as required under your licence)

Table B2: Summary details of pipeline/underground structures integrity test

Structure ID	Type system	Material of construction:	Does this structure have Secondary containment?	Type of secondary containment	Type integrity testing	Integrity reports maintained on site?	Results of test	Integrity test failure explanation <50 words	Corrective action taken	Scheduled date for retest	Results of retest(if in current reporting year)

Please use commentary for additional details not answered by tables/ questions above

Groundwater/Soil monitoring template

Lic No: W0184-01 Year 2013

			Comments
1	Are you required to carry out groundwater monitoring as part of your licence requirements?	yes	
2	Are you required to carry out soil monitoring as part of your licence requirements?	no	
3	Do you extract groundwater for use on site? If yes please specify use in comment section	no	
4	Do monitoring results show that groundwater generic assessment criteria such as GTVs or IGVs are exceeded or is there an upward trend in results for a substance? If yes, please complete the Groundwater Monitoring Guideline Template Report (link in cell G8) and submit separately through ALDER as a licensee return AND answer questions 5-12 below. [Groundwater monitoring template]	no	
5	Is the contamination related to operations at the facility (either current and/or historic)	SELECT	
6	Have actions been taken to address contamination issues?If yes please summarise remediation strategies proposed/undertaken for the site	SELECT	
7	Please specify the proposed time frame for the remediation strategy	SELECT	
8	Is there a licence condition to carry out/update ELRA for the site?	SELECT	
9	Has any type of risk assesment been carried out for the site?	yes	
10	Has a Conceptual Site Model been developed for the site?	SELECT	
11	Have potential receptors been identified on and off site?	SELECT	
12	Is there evidence that contamination is migrating offsite?	SELECT	

Please provide an interpretation of groundwater monitoring data in the interpretation box below or if you require additional space please include a groundwater/contaminated land monitoring results interpretaion as an additional section in this AER

Please find attached the Quarterly Reports carried out by RPS for 2013.

Table 1: Upgradient Groundwater monitoring results

Date of sampling	Sample location reference	Parameter/ Substance	Methodology	Monitoring frequency	Maximum Concentration++	Average Concentration+	unit	GTV's*	SELECT**	Upward trend in pollutant concentration over last 5 years of monitoring data
N/A	N/A	N/A	N/A	N/A	N/A	N/A	SELECT	N/A	N/A	SELECT
N/A	N/A	N/A	N/A	N/A	N/A	N/A	SELECT	N/A	N/A	SELECT

.+ where average indicates arithmetic mean

.++ maximum concentration indicates the maximum measured concentration from all monitoring results produced during the reporting year

Table 2: Downgradient Groundwater monitoring results

Date of sampling	Sample location reference	Parameter/ Substance	Methodology	Monitoring frequency	Maximum Concentration	Average Concentration	unit	GTV's*	SELECT**	Upward trend in yearly average pollutant concentration over last 5 years of monitoring data
N/A	N/A	N/A	N/A	N/A	N/A	N/A	SELECT	N/A	N/A	SELECT
N/A	N/A	N/A	N/A	N/A	N/A	N/A	SELECT	N/A	N/A	SELECT

Groundwater/Soil monitoring template	Lic No:	W0184-01	Year	2013

*please note exceedance of generic assessment criteria (GAC) such as a Groundwater Threshold Value (GTV) or an Interim Guideline Value (IGV) or an upward trend in results for a substance indicates that further interpretation of monitoring results is required. In addition to completing the above table, please complete the Groundwater Monitoring Guideline Template Report at the link provided and submit separately through ALDER as a licensee return or as otherwise instructed by the EPA.	Groundwater monitoring template
More information on the use of soil and groundwater standards/ generic assessment criteria (GAC) and risk assessment tools is available in the EPA published guidance (see the link in G31)	Guidance on the Management of Contaminated Land and Groundwater at EPA Licensed Sites (EPA 2013).

**Depending on location of the site and proximity to other sensitive receptors alternative Receptor based Water Quality standards should be used in addition to the GTV e.g. if the site is close to surface water compare to Surface Water Environmental Quality Standards (SWEQS), If the site is close to a drinking water supply compare results to the Drinking Water Standards (DWS)	Surface water EQS	Groundwater regulations GTV's	Drinking water (private supply) standards	Drinking water (public supply) standards

Groundwater/Soil monitoring template Lic No: W0184-01 Year 2013

Table 3: Soil results

Date of sampling	Sample location reference	Parameter/ Substance	Methodology	Monitoring frequency	Maximum Concentration	Average Concentration	unit
N/A	N/A	N/A	N/A	N/A	N/A	N/A	SELECT
N/A	N/A	N/A	N/A	N/A	N/A	N/A	SELECT

Where additional detail is required please enter it here in 200 words or less

Environmental Liabilities template	Lic No:	W0184-01	Year	2013

[Click here to access EPA guidance on Environmental Liabilities and Financial provision]

			Commentary
1	ELRA initial agreement status	Submitted and not agreed by EPA;	Enva Ireland Limited (W0184-01) has currently submitted a revised ELRA for review and approval by the EPA. The proposed Financial Provision is currently determined to be €1,510,900. A meeting occurred on the 20/03/2014 to review the ELRA and Financial Provision proposed. This Financial Provision may be subject to change depending on the findings of the review.
2	ELRA review status	Review required and not completed;	
3	Amount of Financial Provision cover required as determined by the latest ELRA	ELRA currently under review.	
4	Financial Provision for ELRA status	Submitted and not agreed by EPA;	
5	Financial Provision for ELRA - amount of cover	ELRA currently under review.	
6	Financial Provision for ELRA - type	bond	
7	Financial provision for ELRA expiry date	ELRA currently under review.	
8	Closure plan initial agreement status	Closure plan submitted and not agreed by EPA	
9	Closure plan review status	Review required and not completed	
10	Financial Provision for Closure status	Submitted and not agreed by EPA;	
11	Financial Provision for Closure - amount of cover	€278,760	
12	Financial Provision for Closure - type	bond	To be determind.
13	Financial provision for Closure expiry date	11/01/2015	

Programme template

Lic No: W0184-01 Year 2013

Highlighted cells contain dropdown menu click to view

	Question	Answer	Additional Information
1	Do you maintain an Environmental Mangement System (EMS) for the site. If yes, please detail in additional information	Yes	
2	Does the EMS reference the most significant environmental aspects and associated impacts on-site	Yes	
3	Does the EMS maintain an Environmental Management Programme (EMP) as required in accordance with the licence requirements	Yes	
4	Do you maintain an environmental documentation/communication system to inform the public on environmental performance of the facility, as required by the licence	No	

Environmental Management Programme (EMP) report

Objective Category	Target	Status (% completed)	How target was progressed	Responsibility	Intermediate outcomes
Improvement of the quality of effluent released from the site	Continue to monitor effluent and ensure parameters are met. Investigate treatment options for parameters not in compliance with the site licence.	Ongoing	There were no significant trends in non-conformances during the reporting year. The monitoring of the quality the quality of the effluent will continue.	HSE & Operations	Increased compliance with licence conditions
Groundwater protection	Update ground water risk assessment for the site.	100%	This was completed in 2013.	HSE	Increased compliance with licence conditions
Review quality of self-monitoring compliance data	Review outcome of data generated from EPA intercalibration scheme.	Ongoing	Current performances against EPA inter-calibration samples are to be reviewed regularly. Currently performance for critical tests such as COD and Suspended Solids is at 98%. Ammonia and pH will be added to the inter-calibration scheme and will be brought up to par with the critical test standard. Metals will be removed from the inter-calibration scheme as they are not comparable.	Laboratory &Operations	Increased compliance with licence conditions
Review quality of self-monitoring compliance data	Determine key tests for validation	40%	COD must be recalibrated and revalidated due to a new Hach Spectrophotometer being purchased. Continue validation tests for oil tests.	Laboratory & HSE	Increased compliance with licence conditions
Review quality of self-monitoring compliance data	Carry out validation for significant self-monitoring parameters for effluent.	0%	Validations for significant self-monitored data for COD, Ammonia, pH and Suspended Solids will be carried out in 2014.	Laboratory & HSE	Increased compliance with licence conditions
Review quality of self-monitoring compliance data	Assess requirements for AQC's and implement where deemed necessary.	0%	COD must be recalibrated and revalidated due to a new Hach Spectrophotometer being purchased. An AQC will be reviewed upon completion of COD validation.	Laboratory & HSE	Increased compliance with licence conditions
Improve tank, pipeline, bund integrity, yard and expansion gap assessments.	Replace damaged concrete to upgrade yard integrity and reseal expansion gaps joints as required.	50%	Surface integrities and expansion gaps will be monitored on a quarterly basis. A log is in place to document any repairs that have taken place. A site map will be updated to include all crack/expansion repairs.	HSE & Operations	Remediation of contamination on site
Improve tank, pipeline, bund integrity, yard and expansion gap assessments.	Review the site with regards to tanks and pipelines, in order to draft a register of current bunds, sumps, mobile bunds and pipelines, with their inclusion/exclusion (if required) in the three yearly bund integrity assessment.	100%	All bunds, sumps, mobile bunds and pipelines are currently checked by means of a visual test on a three yearly basis.	HSE & Operations	Remediation of contamination on site
Improve tank, pipeline, bund integrity, yard and expansion gap assessments.	Review the site with regards to tanks and pipelines, in order to draft a register of current bunds, sumps, mobile bunds and pipelines, with their inclusion/exclusion (if required) in the three yearly bund integrity assessment.	0%	Re-concrete the stores area.	HSE & Operations	Remediation of contamination on site
Improve tank, pipeline, bund integrity, yard and expansion gap assessments.	Review the site with regards to tanks and pipelines, in order to draft a register of current bunds, sumps, mobile bunds and pipelines, with their inclusion/exclusion (if required) in the three yearly bund integrity assessment.	65%	A register of pipelines located outside of bunded areas has been established and currently 65% of these have been tested. A detailed drawing of the process pipelines is available for review at the Enva facility.	HSE & Operations	Remediation of contamination on site
Improve tank, pipeline, bund integrity, yard and expansion gap assessments.	Review the site with regards to tanks and pipelines, in order to draft a register of current bunds, sumps, mobile bunds and pipelines, with their inclusion/exclusion (if required) in the three yearly bund integrity assessment.	0%	A register of mobile bunds is to be drafted by 30.06.2014	HSE & Operations	Increased compliance with licence conditions
Improve tank, pipeline, bund integrity, yard and expansion gap assessments.	Review the site with regards to tanks and pipelines, in order to draft a register of current bunds, sumps, mobile bunds and pipelines, with their inclusion/exclusion (if required) in the three yearly bund integrity assessment.	0%	All mobile bunds to be tested hydrostatically tested by 31.03.2015	HSE & Operations	Remediation of contamination on site
Waste reduction/Raw material usage efficiency	Install a system to reduce water usage in site toilets.	100%	The system is now in place that diverts rain water to the toilets.	HSE & Operations	Improved Environmental Management Practices
Waste reduction/Raw material usage efficiency	Extension of existing rain water capture system from rain water coming from export shed to feed the trick power washer.	0%	Divert/capture rain water in storage containers/tanks in order to reduce the need for Enva HGV tankers to use the water from the public supply.	HSE & Operations	Improved Environmental Management Practices
Waste reduction/Raw material usage efficiency	Consider additional rain water harvesting/storage for additional use for Enva tankers.	0%	Divert rain water from the roof of the export shed to the truck power washer.	HSE & Operations	Improved Environmental Management Practices
Energy Efficiency/Utility conservation	Review lighting onsite in order to determine where motion sensors can be installed in order to reduce energy consumption.	0%	Installation will occur where areas of importance are identified.	HSE & Operations	Improved Environmental Management Practices
Energy Efficiency/Utility conservation	Install energy rated LED bulbs where possible.	20%	LED bulbs are installed where possible.	HSE & Operations	Improved Environmental Management Practices

Noise monitoring summary report Lic No: W0184-01 Year 2013

1	Was noise monitoring a licence requirement for the AER period? If yes please fill in table N1 noise summary below	Yes
2	Was noise monitoring carried out using the EPA Guidance note, including completion of the "Checklist for noise measurement report" included in the guidance note as table 6? Noise Guidance note NG4	Yes
3	Does your site have a noise reduction plan	No
4	When was the noise reduction plan last updated?	Enter date
5	Have there been changes relevant to site noise emissions (e.g. plant or operational changes) since the last noise survey?	No

Table N1: Noise monitoring summary

Date of monitoring	Time period	Noise location (on site)	Noise sensitive location -NSL (if applicable)	LA_{eq}	LA_1	LA_{10}	LA_{90}	Tonal or Impulsive noise* (Y/N)	If tonal /impulsive noise was identified was 5dB penalty applied?	Comments (ex. main noise sources on site, & extraneous noise ex. road traffic)	Is site compliant with noise limits (day/evening/night)?
04.09.13/05.09.14	10.20 am	N1	No	51	60	53	47	No	N/A	Traffic and industrial noise to the south is dominant. Enva activity audible and included: vehicle movement, forklift and occasional bang.	Yes
04.09.13/05.09.14	10.50 am	N1	No	55	61	54	48	No	N/A	Traffic and industrial noise to the south is dominant. Enva activity audible and included: vehicle movement, forklift, occasional bang, hand held tools. 2HGV's entered Enva.	Yes
04.09.13/05.09.14	11.30 am	N1	No	52	59	53	48	No	N/A	Traffic and industrial noise to the south is dominant. Faint hum from Enva boiler audible.	Yes
04.09.13/05.09.14	12.50 am	N1	No	41	49	42	34	No	N/A	Traffic and industrial noise to the south is dominant. Enva activity audible and included: vehicle movement, forklift, occasional bang and hand held tools.	Yes
04.09.13/05.09.14	1.20 am	N1	No	41	51	42	33	No	N/A	Traffic and industrial noise to the south is dominant. Enva activity audible and included: vehicle movement, forklift, occasional bang and hand held tools.	Yes
04.09.13/05.09.14	12.07 pm	N2	No	56	63	58	51	No	N/A	HGV movement in neighbouring facility is dominant. In the absence of HGV movement, noise levels were 52-53 dB(A). Industrial noise to the south also dominant in the absence of HGV movement. Boiler audible onsite.	Yes
04.09.13/05.09.14	13.00 pm	N2	No	56	68	59	50	No	N/A	HGV movement in neighbouring facility is dominant. In the absence of HGV movement, noise levels were 52-53 dB(A). Industrial noise to the south also dominant in the absence of HGV movement. Boiler audible onsite.	Yes
04.09.13/05.09.14	13.30 pm	N2	No	54	60	56	51	No	N/A	HGV movement in neighbouring facility is dominant. In the absence of HGV movement, noise levels were 52-53 dB(A). Industrial noise to the south also dominant in the absence of HGV movement. Boiler audible onsite.	Yes
04.09.13/05.09.14	23.00 pm	N2	No	44	52	45	41	No	N/A	Dominant noise industrial facility to the south. Boiler noise audible onsite.	Yes
04.09.13/05.09.14	23.35 pm	N2	No	45	49	46	43	No	N/A	Dominant noise industrial facility to the south. Boiler noise audible onsite.	Yes
04.09.13/05.09.14	12.57 pm	N3	No	50	54	49	41	No	N/A	Onsite noise/activity: vehicle movement, unloading tanker, forklift. Leaves rustling on trees. Industrial noise audible from south.	Yes

04.09.13/05.09.14	13.59 pm	N3	No	53	60	57	42	No	N/A	Onsite noise/activity: screening adjacent to N3, vehicle movement, unloading tanker, forklift. Leaves rustling on trees. Industrial noise audible from south.	Yes
04.09.13/05.09.14	14.39 pm	N3	No	50	61	50	44	No	N/A	Onsite noise/activity: vehicle movement, unloading tanker, forklift. Leaves rustling on trees. Industrial noise audible from south.	Yes
04.09.13/05.09.14	23.40 pm	N3	No	39	44	41	36	No	N/A	Dominant noise: Industrial noise audible from south. No noise audible from Enva.	Yes
04.09.13/05.09.14	00.10 am	N3	No	37	43	40	34	No	N/A	Dominant noise: Industrial noise audible from south. No noise audible from Enva.	Yes
04.09.13/05.09.14	8.30 am	N4	No	50	62	53	42	No	N/A	Dominant noise: Industrial noise audible from south and passing traffic. Traffic: approximately 30 cars and 12 vans. Enva is not audible at this location.	Yes
04.09.13/05.09.14	9.00 am	N4	No	50	62	52	42	No	N/A	Dominant noise: Industrial noise audible from south and passing traffic. Traffic: approximately 36 cars and 6 vans. Enva is not audible at this location.	Yes
04.09.13/05.09.14	9.30 am	N4	No	51	63	54	42	No	N/A	Dominant noise: Industrial noise audible from south and passing traffic. Traffic: approximately 20 cars and 8 vans. Enva is not audible at this location.	Yes
04.09.13/05.09.14	2.02 pm	N4	No	42	51	44	39	No	N/A	Dominant noise: Industrial noise audible from south and passing traffic. Traffic: approximately 18 cars. Enva is not audible at this location. Occasional horn from train.	Yes
04.09.13/05.09.14	2.32 pm	N4	No	42	50	43	38	No	N/A	Dominant noise: Industrial noise audible from south and passing traffic. Traffic: approximately 18 cars. Enva is not audible at this location. Occasional horn from train.	Yes
04.09.13/05.09.14	10.30 am	N5	No	51	60	52	47	No	N/A	Industrial noise to the south is dominant noise. Audible Enva activity onsite: vehicle movement, forklift, occasional banging.	Yes
04.09.13/05.09.14	11.00 am	N5	No	60	67	60	49	No	N/A	Industrial noise to the south is dominant noise. Audible Enva activity onsite: vehicle movement, forklift, occasional banging. 2 HGVs entered the Enva site.	Yes
04.09.13/05.09.14	11.30 am	N5	No	53	60	54	48	No	N/A	Industrial noise to the south is dominant noise. Audible Enva activity onsite: vehicle movement, forklift, occasional banging and hand held tools.	Yes
04.09.13/05.09.14	00.50 am	N5	No	38	47	41	31	No	N/A	Industrial noise to the south and traffic to the west dominant. No noise audible from Enva.	Yes
04.09.13/05.09.14	01.20 am	N5	No	35	42	35	29	No	N/A	Industrial noise to the south and traffic to the west dominant. No noise audible from Enva.	Yes
											Yes

*Please ensure that a tonal analysis has been carried out as per guidance note NG4. These records must be maintained onsite for future inspection

If noise limits exceeded as a result of noise attributed to site activities, please choose the corrective action from the following options?

N/A

** please explain the reason for not taking action/resolution of noise issues?

Any additional comments? (less than 200 words)

Resource Usage/Energy efficiency summary	Lic No:	W0184-01	Year	2013

				Additional information
1	When did the site carry out the most recent energy efficiency audit? Please list the recommendations in table 3 below		January	2007
2	Is the site a member of any accredited programmes for reducing energy usage/water conservation such as the SEAI programme linked to the right? If yes please list them in additional information	SEAI - Large Industry Energy Network (LIEN)	No	
3	Where Fuel Oil is used in boilers on site is the sulphur content compliant with licence conditions? Please state percentage in additional information		Yes	

Table R1 Energy usage on site

Energy Use	Previous year	Current year	Consumption +/- % compared to previous reporting year**	Consumption +/- % vs overall site production*
Total Energy Used (MWHrs)	5520.586	5168.76	-6.372982868	N/A
Total Energy Generated (MWHrs)	N/A	N/A	N/A	N/A
Total Renewable Energy Generated (M	N/A	N/A	N/A	N/A
Electricity Consumption (MWHrs)	524.73664	452.04	-13.85392871	N/A
Fossil Fuels Consumption:			N/A	N/A
Heavy Fuel Oil (m3)	N/A	N/A	N/A	N/A
Light Fuel Oil (m3)	53	0	-100	N/A
Natural gas (m3)	486,940.98	459,791.68	-5.575478835	N/A
Coal/Solid fuel (metric tonnes)	N/A	N/A	N/A	N/A
Peat (metric tonnes)	N/A	N/A	N/A	N/A
Renewable Biomass	N/A	N/A	N/A	N/A
Renewable energy generated on site	N/A	N/A	N/A	N/A

* where consumption of energy can be compared to overall site production please enter this information as percentage increase or decrease compared to the previous reporting year.
** where site production information is available please enter percentage increase or decrease compared to previous year

Table R2 Water usage on site

					Water Emissions	Water Consumption	
Water use	Water extracted Previous year m3/yr.	Water extracted Current year m3/yr.	Consumption +/- % compared to previous reporting year**	Energy Consumption +/- % vs overall site production*	Volume Discharged back to environment(m^3yr):	Volume used i.e not discharged to environment e.g. released as steam m3/yr	Unaccounted for Water:
Groundwater	N/A	N/A	N/A	N/A	N/A	N/A	No extraction of groundwater occurs onsite.
Surface water	N/A	N/A	N/A	N/A	N/A	N/A	No extraction of surface water occurs onsite.
Public supply	19100	24158	26.48	N/A	N/A	N/A	
Recycled water	N/A	N/A	N/A	N/A	N/A	N/A	Enva do not currently record the quantity of water recycled on site.
Total	19100	24158	26.48	N/A	N/A	N/A	

* where consumption of water can be compared to overall site production please enter this information as percentage increase or decrease compared to the previous reporting year.
** where site production information is available please enter percentage increase or decrease compared to previous year

Resource Usage/Energy efficiency summary

Lic No: W0184-01 Year 2013

Table R3 Waste Stream Summary

	Total	Landfill	Incineration	Recycled	Other
Hazardous (Tonnes)	27169.26	N/A	N/A	25145.26	Remaining waste sent offsite for recovery/disposal.
Non-Hazardous (Tonnes)	645	N/A	N/A	0	Remaining waste sent offsite for recovery/disposal.

Table R4: Energy Audit finding recommendations

Date of audit	Recommendations	Description of Measures proposed	Origin of measures	Predicted energy savings %	Implementation date	Responsibility	Completion date	Status and comments
Jan-07	Decrease MIC level.	Reduce the MIC to 200 KVA.	energy audit	N/A	Jan-07	Operations	Complete	Complete
Jan-07	Power Factor Correction.	Eliminate excess wattless charges.	energy audit	N/A	Jan-07	Operations	Complete	Complete
Jan-07	Optimise Compressed Air Systems.	Reduce Compressed Air.	energy audit	7	Jan-07	Operations	The compressed air was reduced, however this delayed the process and increased processing costs, i.e. more energy was required.	Obsolete
Jan-07	Relocation of new air compressor and air receiver.	Locate outside the building in order to reduce the temperature of the air, in order to increase the compressor efficiency.	energy audit	N/A	Jan-07	Operations	Complete	Complete
Jan-07	Lighting Controls.	Install PIR sensors through-out the site in order to reduce electricity usage.	energy audit	N/A	Jan-07	Operations	Complete	Complete
Jan-07	Good energy housekeeping.	Improve efficiency.	energy audit	N/A	Jan-07	Operations	Installed lagging, heat tracing on oil and on water lines.	Complete
Jan-07	Steam Pressure Reduction.	Reduce steam pressure form 10 bar to 6 bar.	energy audit	2	Jan-07	Operaions	Steam pressure was reduced to 6 bars, but due to the process inefficiency, the steam pressure was increased to 7.5 bars.	Complete

Table R5: Power Generation: Where power is generated onsite (e.g. power generation facilities/food and drink industry)please complete the following information

	Unit ID	Unit ID	Unit ID	Unit ID	Station Total
Technology	N/A	N/A	N/A	N/A	N/A
Primary Fuel	N/A	N/A	N/A	N/A	N/A
Thermal Efficiency	N/A	N/A	N/A	N/A	N/A
Unit Date of Commission	N/A	N/A	N/A	N/A	N/A
Total Starts for year	N/A	N/A	N/A	N/A	N/A
Total Running Time	N/A	N/A	N/A	N/A	N/A
Total Electricity Generated (GWH)	N/A	N/A	N/A	N/A	N/A
House Load (GWH)	N/A	N/A	N/A	N/A	N/A
KWH per Litre of Process Water	N/A	N/A	N/A	N/A	N/A
KWH per Litre of Total Water used on	N/A	N/A	N/A	N/A	N/A

Complaints and Incidents summary template	Lic No:	W0184-01	Year	2013

Complaints

	Additional information
Have you received any environmental complaints in the current reporting year? If yes please complete summary details of complaints received on site in table 1 below: Yes	

Table 1 Complaints summary

Date	Category	Other type (please specify)	Brief description of complaint (Free txt <20 words)	Corrective action< 20 words	Resolution status	Resolution date	Further information
16.04.2013	Air	Complaint regarding monitoring results.	Public complaint regarding air emissions.	Response sent to the agency clarifying the queries raised.	Complete	07/05/2013	

Total complaints open at start of reporting year	0
Total new complaints received during reporting year	1
Total complaints closed during reporting year	0
Balance of complaints end of reporting year	1

Incidents

	Additional information
Have any incidents occurred on site in the current reporting year? Please list all incidents for current reporting year in Table 2 below: Yes	

*For information on how to report and what constitutes an incident	What is an incident

Table 2 Incidents summary

Date of occurrence	Incident nature	Location of occurrence	Incident category*please refer to guidance	Receptor	Cause of incident	Other cause(please specify)	Activity in progress at time of incident	Communication	Occurrence	Corrective action<20 words	Preventative action <20 words	Resolution status	Resolution date	Likelihood of reoccurence
20.07.2013	Monitoring equipment offline	Licenced discharge point	1. Minor	Sewer	Plant or equipment issues		Normal activities	EPA	New	Auto sampler was temporarily replaced until repairs could be carried out on the existing unit.	A daily sign off is required to ensure valve is left open, for a sample to be analysed.	Complete	22.07.2013	Low
04.09.2013	Other - Acceptance of waste using the incorrect EWC code.	Enva Ireland Portlaoise	3. Serious	N/A	Operational controls		Normal activities	EPA	New	The waste acceptance procedure and training for hazardous/non-hazardous wastes is currently under review. Refresher EWC code training has been completed.	The waste acceptance procedure and training for hazardous/non-hazardous wastes has been modified.	Ongoing	Ongoing	Low

Total number of incidents current year	2
Total number of incidents previous year	2
% reduction/ increase	0

WASTE SUMMARY	Lic No:	W0184-01	Year	2013
SECTION A-PRTR ON SITE WASTE TREATMENT AND WASTE TRANSFERS TAB- TO BE COMPLETED BY ALL IPPC AND WASTE FACILITIES		PRTR facility logon		dropdown list click to see options

SECTION B- WASTE ACCEPTED ONTO SITE-TO BE COMPLETED BY ALL IPPC AND WASTE FACILITIES

			Additional Information
1	Were any wastes accepted onto your site for recovery or disposal or treatment prior to recovery or disposal within the boundaries of your facility ?; (waste generated within your boundaries is to be captured through PRTR reporting) If yes please enter details in table 1 below	Yes	
2	Did your site have any rejected consignments of waste in the current reporting year? If yes please give a brief explanation in the additional information	No	
3	Was waste accepted onto your site that was generated outside the Republic of Ireland? If yes please state the quantity in tonnes in additional information	Yes	

Table 1 Details of waste accepted onto your site for recovery, disposal or treatment (do not include wastes generated at your site, as these will have been reported in your PRTR workbook)

Licenced annual tonnage limit for your site (total tonnes/annum)	EWC code European Waste Catalogue EWC codes	Source of waste accepted	Description of waste accepted **Please enter an accurate and detailed description - which applies to relevant EWC code** European Waste Catalogue EWC codes	Quantity of waste accepted in current reporting year (tonnes)	Quantity of waste accepted in previous reporting year (tonnes)	Reduction/ Increase over previous year +/ - %	Reason for reduction/ increase from previous reporting year	Packaging Content (%)- only applies if the waste has a packaging component	Disposal/Recovery or treatment operation carried out at your site and the description of this operation	Quantity of waste remaining on site at the end of reporting year (tonnes)	Comments -
	*13 02 08**	*13- OIL WASTES AND WASTES OF LIQUID FUELS (except edible oils, and those in chapters 05, 12 and 19)*	*Waste Oil*	*19598.74*	*19112*	3%	*More waste oil was collected by Enva*	*N/A*	*R9-Oil re-refining or other reuses of oil*	*2860.53*	*Enva Ireland does not currently record the packaging content of waste as it arrives in on site.*
	*17 05 03**	*17- CONSTRUCTION AND DEMOLITION WASTES (INCLUDING EXCAVATED SOIL FROM CONTAMINATED SITES)*	*soil and stones containing dangerous substances*	*4830.889*	*4246*	14%	*Field Services collected and processed more contaminated soil.*	*N/A*	*R5-Recycling/reclamation or other inorganic materials which includes soil celaning resuling in recovery of the soil and recycling of inorganic construction materials*	*2977.159*	*Enva Ireland does not currently record the packaging content of waste as it arrives in on site.*
	*16 01 07**	*16- WASTES NOT OTHERWISE SPECIFIED IN THE LIST*	*oil filters*	*659.74*	658.00	0%	*N/A*	*N/A*	*R13-Storage of waste pending any of the operations numbered R1 to R12 (excluding temporary storage)*	*15.9*	*Enva Ireland does not currently record the packaging content of waste as it arrives in on site.*
	*08 04 15**	*08- WASTES FORM THE MANUFACTURE, FORMULATION, SUPPLY AND USE (MFSU) OF COATINGS (PAINTS, VARNISHES AND VITREOUS ENAMELS,) ADHESIVES, SEALANTS AND PRINTING INKS*	*aqueous liquid waste containing adhesives or sealants containing organic solvents or other dangerous substances*	*0.547*	*0*	0%	Increase/decrease in the tonnages of waste accepted in 2013 compared to 2012, was subject to the quantity of waste made available to Enva Ireland. In some instances some wastes were excepted onsite that were not accepted in previous years.	*N/A*	*R13-Storage of waste pending any of the operations numbered R1 to R12 (excluding temporary storage)*	*0*	*Enva Ireland does not currently record the packaging content of waste as it arrives in on site.*
	*05 01 03**	*05- WASTES FROM PETROLEUM REFINING, NATURAL GAS PURIFICATION AND PYROLYTIC TREATMENT OF COAL*	*tank bottom sludges*	*30.632*	*0*	0%	Increase/decrease in the tonnages of waste accepted in 2013 compared to 2012, was subject to the quantity of waste made available to Enva Ireland. In some instances some wastes were excepted onsite that were not accepted in previous years.	*N/A*	*R13-Storage of waste pending any of the operations numbered R1 to R12 (excluding temporary storage)*	*0*	*Enva Ireland does not currently record the packaging content of waste as it arrives in on site.*

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	20 01 21*	20- MUNICIPAL WASTES (HOUSEHOLD WASTE AND SIMILAR COMMERCIAL, INDUSTRIAL AND INSTITUTIONAL WASTES) INCLUDING SEPARATELY COLLECTED FRACTIONS	fluorescent tubes	1.793	0	0%	Increase/decrease in the tonnages of waste accepted in 2013 compared to 2012, was subject to the quantity of waste made available to Enva Ireland. In some instances some wastes were excepted onsite that were not accepted in previous years.	N/A	R13-Storage of waste pending any of the operations numbered R1 to R12 (excluding temporary storage)	1	Enva Ireland does not currently record the packaging content of waste as it arrives in on site.
	13 07 01*	13- OIL WASTES AND WASTES OF LIQUID FUELS (except edible oils, and those in chapters 05, 12 and 19)	fuel oil and diesel	12.346	0	0%	Increase/decrease in the tonnages of waste accepted in 2013 compared to 2012, was subject to the quantity of waste made available to Enva Ireland. In some instances some wastes were excepted onsite that were not accepted in previous years.	N/A	R9-Oil re-refining or other reuses of oil	0	Enva Ireland does not currently record the packaging content of waste as it arrives in on site.
	16 06 01*	16- WASTES NOT OTHERWISE SPECIFIED IN THE LIST	lead batteries	855.60	1992	-57%	Increase/decrease in the tonnages of waste accepted in 2013 compared to 2012, was subject to the quantity of waste made available to Enva Ireland. In some instances some wastes were excepted onsite that were not accepted in previous years.	N/A	R13-Storage of waste pending any of the operations numbered R1 to R12 (excluding temporary storage)	18.46	Enva Ireland does not currently record the packaging content of waste as it arrives in on site.
	15 02 02*	15- WASTE PACKAGING; ABSORBENTS, WIPING CLOTHS, FILTER MATERIALS AND PROTECTIVE CLOTHING NOT OTHERWISE SPECIFIED	absorbents, filter materials (including oil filters not otherwise specified), wiping cloths, protective clothing contaminated by dangerous substances	407.721	399	2%	Increase/decrease in the tonnages of waste accepted in 2013 compared to 2012, was subject to the quantity of waste made available to Enva Ireland. In some instances some wastes were excepted onsite that were not accepted in previous years.	N/A	R13-Storage of waste pending any of the operations numbered R1 to R12 (excluding temporary storage)	53	Enva Ireland does not currently record the packaging content of waste as it arrives in on site.
	16 07 08*	16- WASTES NOT OTHERWISE SPECIFIED IN THE LIST	wastes containing oil	30.08	32	-6%	Increase/decrease in the tonnages of waste accepted in 2013 compared to 2012, was subject to the quantity of waste made available to Enva Ireland. In some instances some wastes were excepted onsite that were not accepted in previous years.	N/A	R13-Storage of waste pending any of the operations numbered R1 to R12 (excluding temporary storage)	2	Enva Ireland does not currently record the packaging content of waste as it arrives in on site.
	16 01 13*	16- WASTES NOT OTHERWISE SPECIFIED IN THE LIST	brake fluids	9.09	5.5	65%	Increase/decrease in the tonnages of waste accepted in 2013 compared to 2012, was subject to the quantity of waste made available to Enva Ireland. In some instances some wastes were excepted onsite that were not accepted in previous years.	N/A	R13-Storage of waste pending any of the operations numbered R1 to R12 (excluding temporary storage)	0	Enva Ireland does not currently record the packaging content of waste as it arrives in on site.
	13 07 03*	13- OIL WASTES AND WASTES OF LIQUID FUELS (except edible oils, and those in chapters 05, 12 and 19)	other fuels (including mixtures)	57.76	50	16%	Increase/decrease in the tonnages of waste accepted in 2013 compared to 2012, was subject to the quantity of waste made available to Enva Ireland. In some instances some wastes were excepted onsite that were not accepted in previous years.	N/A	R13-Storage of waste pending any of the operations numbered R1 to R12 (excluding temporary storage)	28.31	Enva Ireland does not currently record the packaging content of waste as it arrives in on site.

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*13 07 02**	*13- OIL WASTES AND WASTES OF LIQUID FUELS (except edible oils, and those in chapters 05, 12 and 19)*	*petrol*	0.92	*65*	-99%	Increase/decrease in the tonnages of waste accepted in 2013 compared to 2012, was subject to the quantity of waste made available to Enva Ireland. In some instances some wastes were excepted onsite that were not accepted in previous years.	*N/A*	*R13-Storage of waste pending any of the operations numbered R1 to R12 (excluding temporary storage)*	*2*	*Enva Ireland does not currently record the packaging content of waste as it arrives in on site.*
16 05 04*	*16- WASTES NOT OTHERWISE SPECIFIED IN THE LIST*	*gases in pressure containers (including halons) containing dangerous substances*	*20.124*	*18.5*	9%	Increase/decrease in the tonnages of waste accepted in 2013 compared to 2012, was subject to the quantity of waste made available to Enva Ireland. In some instances some wastes were excepted onsite that were not accepted in previous years.	*N/A*	*R13-Storage of waste pending any of the operations numbered R1 to R12 (excluding temporary storage)*	*4*	*Enva Ireland does not currently record the packaging content of waste as it arrives in on site.*
08 01 11*	*08- WASTES FORM THE MANUFACTURE, FORMULATION, SUPPLY AND USE (MFSU) OF COATINGS (PAINTS, VARNISHES AND VITREOUS ENAMELS,) ADHESIVES, SEALANTS AND PRINTING INKS*	*waste paint and varnish containing organic solvents or other dangerous substances*	*318.385*	*369*	-14%	Increase/decrease in the tonnages of waste accepted in 2013 compared to 2012, was subject to the quantity of waste made available to Enva Ireland. In some instances some wastes were excepted onsite that were not accepted in previous years.	*N/A*	*R12-Exchange of waste for submission to any of the operations numbered R1 to R11 (if there is no other R code appropriate, this can include preliminary operations prior to recovery including pre-processing such as amongst others, dismantling, sorting, crushing, compacting, pelletising, drying, shredding, conditioning, repackaging, seperating, blending or mixing prior to submission to any of the operations numbered R1 to R11)*	*202.22*	*Enva Ireland does not currently record the packaging content of waste as it arrives in on site.*
09 01 04*	*09- WASTES FROM THE PHOTOGRAPHIC INDUSTRY*	*fixed solutions*	*0.731*	*0.11*	565%	Increase/decrease in the tonnages of waste accepted in 2013 compared to 2012, was subject to the quantity of waste made available to Enva Ireland. In some instances some wastes were excepted onsite that were not accepted in previous years.	*N/A*	*D15-Storage pending any of the operations numbered D1 to D14*	*0*	*Enva Ireland does not currently record the packaging content of waste as it arrives in on site.*
09 01 02*	*09- WASTES FROM THE PHOTOGRAPHIC INDUSTRY*	*water-based offset plate developer solutions*	*0.9*	*1.71*	-47%	Increase/decrease in the tonnages of waste accepted in 2013 compared to 2012, was subject to the quantity of waste made available to Enva Ireland. In some instances some wastes were excepted onsite that were not accepted in previous years.	*N/A*	*D15-Storage pending any of the operations numbered D1 to D14*	*0*	*Enva Ireland does not currently record the packaging content of waste as it arrives in on site.*
15 01 10*	*15- WASTE PACKAGING; ABSORBENTS, WIPING CLOTHS, FILTER MATERIALS AND PROTECTIVE CLOTHING NOT OTHERWISE SPECIFIED*	*Packaging containing residues of or contaminated by dangerous substances*	*178.984*	*239*	-25%	Increase/decrease in the tonnages of waste accepted in 2013 compared to 2012, was subject to the quantity of waste made available to Enva Ireland. In some instances some wastes were excepted onsite that were not accepted in previous years.	*N/A*	*R13-Storage of waste pending any of the operations numbered R1 to R12 (excluding temporary storage)*	*86.22*	*Enva Ireland does not currently record the packaging content of waste as it arrives in on site.*

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16 05 07*	16- WASTES NOT OTHERWISE SPECIFIED IN THE LIST	discarded inorganic chemicals consisting of or containing dangerous substances	0.292	0.07	317%	Increase/decrease in the tonnages of waste accepted in 2013 compared to 2012, was subject to the quantity of waste made available to Enva Ireland. In some instances some wastes were excepted onsite that were not accepted in previous years.	N/A	R13-Storage of waste pending any of the operations numbered R1 to R12 (excluding temporary storage)	0	Enva Ireland does not currently record the packaging content of waste as it arrives in on site.	
20 01 27*	20- MUNICIPAL WASTES (HOUSEHOLD WASTE AND SIMILAR COMMERCIAL, INDUSTRIAL AND INSTITUTIONAL WASTES) INCLUDING SEPARATELY COLLECTED FRACTIONS	paint, inks, adhesives and resins containing dangerous substances	4.299	17	-75%	Increase/decrease in the tonnages of waste accepted in 2013 compared to 2012, was subject to the quantity of waste made available to Enva Ireland. In some instances some wastes were excepted onsite that were not accepted in previous years.	N/A	R13-Storage of waste pending any of the operations numbered R1 to R12 (excluding temporary storage)	50	Enva Ireland does not currently record the packaging content of waste as it arrives in on site.	
08 04 09*	08- WASTES FORM THE MANUFACTURE, FORMULATION, SUPPLY AND USE (MFSU) OF COATINGS (PAINTS, VARNISHES AND VITREOUS ENAMELS,) ADHESIVES, SEALANTS AND PRINTING INKS	waste adhesives and sealants containing organic solvents or other dangerous substances	0.095	1.1	-91%	Increase/decrease in the tonnages of waste accepted in 2013 compared to 2012, was subject to the quantity of waste made available to Enva Ireland. In some instances some wastes were excepted onsite that were not accepted in previous years.	N/A	R13-Storage of waste pending any of the operations numbered R1 to R12 (excluding temporary storage)	0	Enva Ireland does not currently record the packaging content of waste as it arrives in on site.	
16 05 06*	16- WASTES NOT OTHERWISE SPECIFIED IN THE LIST	laboratory chemicals, consisting of or containing dangerous substances, including mixtures of laboratory chemicals	37.207	2.3	1518%	Increase/decrease in the tonnages of waste accepted in 2013 compared to 2012, was subject to the quantity of waste made available to Enva Ireland. In some instances some wastes were excepted onsite that were not accepted in previous years.	N/A	R13-Storage of waste pending any of the operations numbered R1 to R12 (excluding temporary storage)	0	Enva Ireland does not currently record the packaging content of waste as it arrives in on site.	
16 05 08*	16- WASTES NOT OTHERWISE SPECIFIED IN THE LIST	discarded organic chemicals consisting of or containing dangerous substances	0.952	5	-81%	Increase/decrease in the tonnages of waste accepted in 2013 compared to 2012, was subject to the quantity of waste made available to Enva Ireland. In some instances some wastes were excepted onsite that were not accepted in previous years.	N/A	R13-Storage of waste pending any of the operations numbered R1 to R12 (excluding temporary storage)	4	Enva Ireland does not currently record the packaging content of waste as it arrives in on site.	
06 02 05*	06- WASTES FROM INORGANIC CHEMICAL PROCESSES	other bases	0	0.26	-100%	Increase/decrease in the tonnages of waste accepted in 2013 compared to 2012, was subject to the quantity of waste made available to Enva Ireland. In some instances some wastes were excepted onsite that were not accepted in previous years.	N/A	D15-Storage pending any of the operations numbered D1 to D14	0	Enva Ireland does not currently record the packaging content of waste as it arrives in on site.	
14 06 03*	14- WASTE ORGANIC SOLVENTS, REFRIGERANTS AND PROPELLANTS (except 07 and 08)	other solvents and solvent mixtures	0	0.03	-100%	Increase/decrease in the tonnages of waste accepted in 2013 compared to 2012, was subject to the quantity of waste made available to Enva Ireland. In some instances some wastes were excepted onsite that were not accepted in previous years.	N/A	D15-Storage pending any of the operations numbered D1 to D14	0	Enva Ireland does not currently record the packaging content of waste as it arrives in on site.	

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17 02 04*	17- CONSTRUCTION AND DEMOLITION WASTES (INCLUDING EXCAVATED SOIL FROM CONTAMINATED SITES)	glass, plastic and wood containing or contaminated with dangerous substances	0	0.22	-100%	Increase/decrease in the tonnages of waste accepted in 2013 compared to 2012, was subject to the quantity of waste made available to Enva Ireland. In some instances some wastes were excepted onsite that were not accepted in previous years.	N/A	R13-Storage of waste pending any of the operations numbered R1 to R12 (excluding temporary storage)	0	Enva Ireland does not currently record the packaging content of waste as it arrives in on site.
08 03 12*	08- WASTES FORM THE MANUFACTURE, FORMULATION, SUPPLY AND USE (MFSU) OF COATINGS (PAINTS, VARNISHES AND VITREOUS ENAMELS,) ADHESIVES, SEALANTS AND PRINTING INKS	waste ink containing dangerous substances	5.88	7.8	-25%	Increase/decrease in the tonnages of waste accepted in 2013 compared to 2012, was subject to the quantity of waste made available to Enva Ireland. In some instances some wastes were excepted onsite that were not accepted in previous years.	N/A	R13-Storage of waste pending any of the operations numbered R1 to R12 (excluding temporary storage)	0	Enva Ireland does not currently record the packaging content of waste as it arrives in on site.
07 01 04*	07- WASTES FROM ORGANIC CHEMICAL PROCESSES	other organic solvents, washing liquids and mother liquors	0	0.45	-100%	Increase/decrease in the tonnages of waste accepted in 2013 compared to 2012, was subject to the quantity of waste made available to Enva Ireland. In some instances some wastes were excepted onsite that were not accepted in previous years.	N/A	R13-Storage of waste pending any of the operations numbered R1 to R12 (excluding temporary storage)	0	Enva Ireland does not currently record the packaging content of waste as it arrives in on site.
06 02 04*	06- WASTES FROM INORGANIC CHEMICAL PROCESSES	sodium and potassium hydroxide	5.46	0.38	1337%	Increase/decrease in the tonnages of waste accepted in 2013 compared to 2012, was subject to the quantity of waste made available to Enva Ireland. In some instances some wastes were excepted onsite that were not accepted in previous years.	N/A	D15-Storage pending any of the operations numbered D1 to D14	0	Enva Ireland does not currently record the packaging content of waste as it arrives in on site.
20 01 19*	20- MUNICIPAL WASTES (HOUSEHOLD WASTE AND SIMILAR COMMERCIAL, INDUSTRIAL AND INSTITUTIONAL WASTES) INCLUDING SEPARATELY COLLECTED FRACTIONS	Pesticides	0	1	-100%	Increase/decrease in the tonnages of waste accepted in 2013 compared to 2012, was subject to the quantity of waste made available to Enva Ireland. In some instances some wastes were excepted onsite that were not accepted in previous years.	N/A	R13-Storage of waste pending any of the operations numbered R1 to R12 (excluding temporary storage)	0	Enva Ireland does not currently record the packaging content of waste as it arrives in on site.
06 01 03*	06- WASTES FROM INORGANIC CHEMICAL PROCESSES	hydrochloric acid	0	4	-100%	Increase/decrease in the tonnages of waste accepted in 2013 compared to 2012, was subject to the quantity of waste made available to Enva Ireland. In some instances some wastes were excepted onsite that were not accepted in previous years.	N/A	D15-Storage pending any of the operations numbered D1 to D14	0	Enva Ireland does not currently record the packaging content of waste as it arrives in on site.
10 01 04*	10- WASTES FROM THERMAL PROCESSES	oil fly ash and boiler dust	0	1.4	-100%	Increase/decrease in the tonnages of waste accepted in 2013 compared to 2012, was subject to the quantity of waste made available to Enva Ireland. In some instances some wastes were excepted onsite that were not accepted in previous years.	N/A	D15-Storage pending any of the operations numbered D1 to D14	0	Enva Ireland does not currently record the packaging content of waste as it arrives in on site.

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12 01 09*	12-WASTES FROM SHAPING AND PHYSICAL AND MECHANICAL SURFACE TREATMENT OF METALS AND PLASTICS	machining emulsions and solutions free of halogens	0.99	0.68	46%	Increase/decrease in the tonnages of waste accepted in 2013 compared to 2012, was subject to the quantity of waste made available to Enva Ireland. In some instances some wastes were excepted onsite that were not accepted in previous years.	N/A	R13-Storage of waste pending any of the operations numbered R1 to R12 (excluding temporary storage)	0.002	Enva Ireland does not currently record the packaging content of waste as it arrives in on site.	
06 04 05*	06- WASTES FROM INORGANIC CHEMICAL PROCESSES	wastes containing other heavy metals	45.34	165	-73%	Increase/decrease in the tonnages of waste accepted in 2013 compared to 2012, was subject to the quantity of waste made available to Enva Ireland. In some instances some wastes were excepted onsite that were not accepted in previous years.	N/A	R13-Storage of waste pending any of the operations numbered R1 to R12 (excluding temporary storage)	0	Enva Ireland does not currently record the packaging content of waste as it arrives in on site.	
06 03 15*	06- WASTES FROM INORGANIC CHEMICAL PROCESSES	metallic oxides containing heavy metals	13.72	98	-86%	Increase/decrease in the tonnages of waste accepted in 2013 compared to 2012, was subject to the quantity of waste made available to Enva Ireland. In some instances some wastes were excepted onsite that were not accepted in previous years.	N/A	R13-Storage of waste pending any of the operations numbered R1 to R12 (excluding temporary storage)	0	Enva Ireland does not currently record the packaging content of waste as it arrives in on site.	
16 01 21*	16- WASTES NOT OTHERWISE SPECIFIED IN THE LIST	hazardous components other than those mentioned in 16 01 07 to 16 01 11 and 16 01 13 and 16 01 14	28.746	0	0%	Increase/decrease in the tonnages of waste accepted in 2013 compared to 2012, was subject to the quantity of waste made available to Enva Ireland. In some instances some wastes were excepted onsite that were not accepted in previous years.	N/A	R13-Storage of waste pending any of the operations numbered R1 to R12 (excluding temporary storage)	0	Enva Ireland does not currently record the packaging content of waste as it arrives in on site.	
16 01 14*	16- WASTES NOT OTHERWISE SPECIFIED IN THE LIST	antifreeze fluids containing dangerous substances	2.123	0	0%	Increase/decrease in the tonnages of waste accepted in 2013 compared to 2012, was subject to the quantity of waste made available to Enva Ireland. In some instances some wastes were excepted onsite that were not accepted in previous years.	N/A	R13-Storage of waste pending any of the operations numbered R1 to R12 (excluding temporary storage)	0	Enva Ireland does not currently record the packaging content of waste as it arrives in on site.	
20 01 14*	20- MUNICIPAL WASTES (HOUSEHOLD WASTE AND SIMILAR COMMERCIAL, INDUSTRIAL AND INSTITUTIONAL WASTES) INCLUDING SEPARATELY COLLECTED FRACTIONS	Acids	0.02	0	0%	Increase/decrease in the tonnages of waste accepted in 2013 compared to 2012, was subject to the quantity of waste made available to Enva Ireland. In some instances some wastes were excepted onsite that were not accepted in previous years.	N/A	R13-Storage of waste pending any of the operations numbered R1 to R12 (excluding temporary storage)	0	Enva Ireland does not currently record the packaging content of waste as it arrives in on site.	
08 03 14*	08- WASTES FORM THE MANUFACTURE, FORMULATION, SUPPLY AND USE (MFSU) OF COATINGS (PAINTS, VARNISHES AND VITREOUS ENAMELS,) ADHESIVES, SEALANTS AND PRINTING INKS	ink sludges containing dangerous substances	1.76	0	0%	Increase/decrease in the tonnages of waste accepted in 2013 compared to 2012, was subject to the quantity of waste made available to Enva Ireland. In some instances some wastes were excepted onsite that were not accepted in previous years.	N/A	R13-Storage of waste pending any of the operations numbered R1 to R12 (excluding temporary storage)	0	Enva Ireland does not currently record the packaging content of waste as it arrives in on site.	

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	*06 01 06**	*06- WASTES FROM INORGANIC CHEMICAL PROCESSES*	*Other acids*	*2.12*	*0*	0%	Increase/decrease in the tonnages of waste accepted in 2013 compared to 2012, was subject to the quantity of waste made available to Enva Ireland. In some instances some wastes were excepted onsite that were not accepted in previous years.	*N/A*	*R13-Storage of waste pending any of the operations numbered R1 to R12 (excluding temporary storage)*	*0*	*Enva Ireland does not currently record the packaging content of waste as it arrives in on site.*
	*13 01 10**	*13- OIL WASTES AND WASTES OF LIQUID FUELS (except edible oils, and those in chapters 05, 12 and 19)*	*mineral-based non-chlorinated hydraulic oils*	*3.66*	*0*	0%	Increase/decrease in the tonnages of waste accepted in 2013 compared to 2012, was subject to the quantity of waste made available to Enva Ireland. In some instances some wastes were excepted onsite that were not accepted in previous years.	*N/A*	*R9-Oil re-refining or other reuses of oil*	*0*	*Enva Ireland does not currently record the packaging content of waste as it arrives in on site.*
	*07 05 11**	*07- WASTES FROM ORGANIC CHEMICAL PROCESSES*	*sludges from on-site effluent treatment containing dangerous substances*	*0*	*116*	-100%	Increase/decrease in the tonnages of waste accepted in 2013 compared to 2012, was subject to the quantity of waste made available to Enva Ireland. In some instances some wastes were excepted onsite that were not accepted in previous years.	*N/A*	*D15-Storage pending any of the operations numbered D1 to D14*	*0*	*Enva Ireland does not currently record the packaging content of waste as it arrives in on site.*
	16 01 12	*16- WASTES NOT OTHERWISE SPECIFIED IN THE LIST*	*brake pads other than those mentioned in 16 01 11*	*26.409*	*28*	-6%	Increase/decrease in the tonnages of waste accepted in 2013 compared to 2012, was subject to the quantity of waste made available to Enva Ireland. In some instances some wastes were excepted onsite that were not accepted in previous years.	*N/A*	*R13-Storage of waste pending any of the operations numbered R1 to R12 (excluding temporary storage)*	*0*	*Enva Ireland does not currently record the packaging content of waste as it arrives in on site.*
	20 01 25	*20- MUNICIPAL WASTES (HOUSEHOLD WASTE AND SIMILAR COMMERCIAL, INDUSTRIAL AND INSTITUTIONAL WASTES) INCLUDING SEPARATELY COLLECTED FRACTIONS*	*edible oil and fat*	*69.167*	*77.6*	-11%	Increase/decrease in the tonnages of waste accepted in 2013 compared to 2012, was subject to the quantity of waste made available to Enva Ireland. In some instances some wastes were excepted onsite that were not accepted in previous years.	*N/A*	*R13-Storage of waste pending any of the operations numbered R1 to R12 (excluding temporary storage)*	*30*	*Enva Ireland does not currently record the packaging content of waste as it arrives in on site.*
	08 04 16	*08- WASTES FORM THE MANUFACTURE, FORMULATION, SUPPLY AND USE (MFSU) OF COATINGS (PAINTS, VARNISHES AND VITREOUS ENAMELS,) ADHESIVES, SEALANTS AND PRINTING INKS*	*aqueous liquid waste containing adhesives or sealants other than those mentioned in 08 04 15*	*74.32*	*11.9*	525%	Increase/decrease in the tonnages of waste accepted in 2013 compared to 2012, was subject to the quantity of waste made available to Enva Ireland. In some instances some wastes were excepted onsite that were not accepted in previous years.	*N/A*	*R13-Storage of waste pending any of the operations numbered R1 to R12 (excluding temporary storage)*	*74*	*Enva Ireland does not currently record the packaging content of waste as it arrives in on site.*
	16 10 02	*16- WASTES NOT OTHERWISE SPECIFIED IN THE LIST*	*aqueous liquid wastes other than those mentioned in 16 10 01*	*0*	*1*	-100%	Increase/decrease in the tonnages of waste accepted in 2013 compared to 2012, was subject to the quantity of waste made available to Enva Ireland. In some instances some wastes were excepted onsite that were not accepted in previous years.	*N/A*	*R13-Storage of waste pending any of the operations numbered R1 to R12 (excluding temporary storage)*	*0*	*Enva Ireland does not currently record the packaging content of waste as it arrives in on site.*

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08 04 10	08- WASTES FORM THE MANUFACTURE, FORMULATION, SUPPLY AND USE (MFSU) OF COATINGS (PAINTS, VARNISHES AND VITREOUS ENAMELS,) ADHESIVES, SEALANTS AND PRINTING INKS	Waste adhesives and sealants other than those mentioned in 08 04 09	0.49	0.45	9%	Increase/decrease in the tonnages of waste accepted in 2013 compared to 2012, was subject to the quantity of waste made available to Enva Ireland. In some instances some wastes were excepted onsite that were not accepted in previous years.	N/A	R13-Storage of waste pending any of the operations numbered R1 to R12 (excluding temporary storage)	0	Enva Ireland does not currently record the packaging content of waste as it arrives in on site.	
16 01 15	16- WASTES NOT OTHERWISE SPECIFIED IN THE LIST	antifreeze fluids other than those mentioned in 16 01 14	153.508	192	-20%	Increase/decrease in the tonnages of waste accepted in 2013 compared to 2012, was subject to the quantity of waste made available to Enva Ireland. In some instances some wastes were excepted onsite that were not accepted in previous years.	N/A	R13-Storage of waste pending any of the operations numbered R1 to R12 (excluding temporary storage)	0	Enva Ireland does not currently record the packaging content of waste as it arrives in on site.	
16 06 05	16- WASTES NOT OTHERWISE SPECIFIED IN THE LIST	other batteries and accumulators	0.5	1.7	-71%	Increase/decrease in the tonnages of waste accepted in 2013 compared to 2012, was subject to the quantity of waste made available to Enva Ireland. In some instances some wastes were excepted onsite that were not accepted in previous years.	N/A	R13-Storage of waste pending any of the operations numbered R1 to R12 (excluding temporary storage)	0.5	Enva Ireland does not currently record the packaging content of waste as it arrives in on site.	
16 05 09	16- WASTES NOT OTHERWISE SPECIFIED IN THE LIST	discarded chemicals other than those mentioned in 16 05 06, 16 05 07 or 16 05 08	1.577	2.34	-33%	Increase/decrease in the tonnages of waste accepted in 2013 compared to 2012, was subject to the quantity of waste made available to Enva Ireland. In some instances some wastes were excepted onsite that were not accepted in previous years.	N/A	R13-Storage of waste pending any of the operations numbered R1 to R12 (excluding temporary storage)	0	Enva Ireland does not currently record the packaging content of waste as it arrives in on site.	
20 01 40	20- MUNICIPAL WASTES (HOUSEHOLD WASTE AND SIMILAR COMMERCIAL, INDUSTRIAL AND INSTITUTIONAL WASTES) INCLUDING SEPARATELY COLLECTED FRACTIONS	Metals	73.426	2.45	2897%	Increase/decrease in the tonnages of waste accepted in 2013 compared to 2012, was subject to the quantity of waste made available to Enva Ireland. In some instances some wastes were excepted onsite that were not accepted in previous years.	N/A	R13-Storage of waste pending any of the operations numbered R1 to R12 (excluding temporary storage)	0	Enva Ireland does not currently record the packaging content of waste as it arrives in on site.	
16 01 03	16- WASTES NOT OTHERWISE SPECIFIED IN THE LIST	end-of-life tyres	0	0.18	-100%	Increase/decrease in the tonnages of waste accepted in 2013 compared to 2012, was subject to the quantity of waste made available to Enva Ireland. In some instances some wastes were excepted onsite that were not accepted in previous years.	N/A	R13-Storage of waste pending any of the operations numbered R1 to R12 (excluding temporary storage)	0	Enva Ireland does not currently record the packaging content of waste as it arrives in on site.	
17 05 04	17- CONSTRUCTION AND DEMOLITION WASTES (INCLUDING EXCAVATED SOIL FROM CONTAMINATED SITES)	soil and stones other than those mentioned in 17 05 03	100.059	186	-46%	Increase/decrease in the tonnages of waste accepted in 2013 compared to 2012, was subject to the quantity of waste made available to Enva Ireland. In some instances some wastes were excepted onsite that were not accepted in previous years.	N/A	R13-Storage of waste pending any of the operations numbered R1 to R12 (excluding temporary storage)	0	Enva Ireland does not currently record the packaging content of waste as it arrives in on site.	

WASTE SUMMARY				Lic No:	W0184-01		Year	2013		
20 03 06	20- MUNICIPAL WASTES (HOUSEHOLD WASTE AND SIMILAR COMMERCIAL, INDUSTRIAL AND INSTITUTIONAL WASTES) INCLUDING SEPARATELY COLLECTED FRACTIONS	waste from sewage cleaning	22.28	34	-34%	Increase/decrease in the tonnages of waste accepted in 2013 compared to 2012, was subject to the quantity of waste made available to Enva Ireland. In some instances some wastes were excepted onsite that were not accepted in previous years.	N/A	D15-Storage pending any of the operations numbered D1 to D14	0	Enva Ireland does not currently record the packaging content of waste as it arrives in on site.
19 08 05	19- WASTES FROM WASTE MANAGEMENT FACILITIES, OFF-SITE WASTE WATER TREATMENT PLANTS AND THE PREPARATION OF WATER INTENDED FOR HUMAN CONSUMPTION AND WATER FOR INDUSTRIAL USE	sludges from treatment of urban waste water	0	9.5	-100%	Increase/decrease in the tonnages of waste accepted in 2013 compared to 2012, was subject to the quantity of waste made available to Enva Ireland. In some instances some wastes were excepted onsite that were not accepted in previous years.	N/A	R13-Storage of waste pending any of the operations numbered R1 to R12 (excluding temporary storage)	0	Enva Ireland does not currently record the packaging content of waste as it arrives in on site.
19 08 02	19- WASTES FROM WASTE MANAGEMENT FACILITIES, OFF-SITE WASTE WATER TREATMENT PLANTS AND THE PREPARATION OF WATER INTENDED FOR HUMAN CONSUMPTION AND WATER FOR INDUSTRIAL USE	waste from desanding	24.06	1.3	1751%	Increase/decrease in the tonnages of waste accepted in 2013 compared to 2012, was subject to the quantity of waste made available to Enva Ireland. In some instances some wastes were excepted onsite that were not accepted in previous years.	N/A	R13-Storage of waste pending any of the operations numbered R1 to R12 (excluding temporary storage)	0	Enva Ireland does not currently record the packaging content of waste as it arrives in on site.
16 01 22	16- WASTES NOT OTHERWISE SPECIFIED IN THE LIST	components not otherwise specified	0.682	0.05	1264%	Increase/decrease in the tonnages of waste accepted in 2013 compared to 2012, was subject to the quantity of waste made available to Enva Ireland. In some instances some wastes were excepted onsite that were not accepted in previous years.	N/A	R13-Storage of waste pending any of the operations numbered R1 to R12 (excluding temporary storage)	0	Enva Ireland does not currently record the packaging content of waste as it arrives in on site.
19 09 04	19- WASTES FROM WASTE MANAGEMENT FACILITIES, OFF-SITE WASTE WATER TREATMENT PLANTS AND THE PREPARATION OF WATER INTENDED FOR HUMAN CONSUMPTION AND WATER FOR INDUSTRIAL USE	spent activated carbon	40.42	5.6	622%	Increase/decrease in the tonnages of waste accepted in 2013 compared to 2012, was subject to the quantity of waste made available to Enva Ireland. In some instances some wastes were excepted onsite that were not accepted in previous years.	N/A	R13-Storage of waste pending any of the operations numbered R1 to R12 (excluding temporary storage)	0	Enva Ireland does not currently record the packaging content of waste as it arrives in on site.
20 01 36	20- MUNICIPAL WASTES (HOUSEHOLD WASTE AND SIMILAR COMMERCIAL, INDUSTRIAL AND INSTITUTIONAL WASTES) INCLUDING SEPARATELY COLLECTED FRACTIONS	discarded electrical and electronic equipment other than those mentioned in 20 01 21, 20 01 23 and 20 01 35	0.01	0	0%	Increase/decrease in the tonnages of waste accepted in 2013 compared to 2012, was subject to the quantity of waste made available to Enva Ireland. In some instances some wastes were excepted onsite that were not accepted in previous years.	N/A	R13-Storage of waste pending any of the operations numbered R1 to R12 (excluding temporary storage)	0	Enva Ireland does not currently record the packaging content of waste as it arrives in on site.
16 01 19	16- WASTES NOT OTHERWISE SPECIFIED IN THE LIST	Plastic	0.54	0	0%	Increase/decrease in the tonnages of waste accepted in 2013 compared to 2012, was subject to the quantity of waste made available to Enva Ireland. In some instances some wastes were excepted onsite that were not accepted in previous years.	N/A	R13-Storage of waste pending any of the operations numbered R1 to R12 (excluding temporary storage)	0	Enva Ireland does not currently record the packaging content of waste as it arrives in on site.

WASTE SUMMARY						Lic No:	W0184-01		Year	2013	
	02 07 04	02-WASTES FROM AGRICULTURE, HORTICULTURE, AQUACULTURE, FORESTRY, HUNTING AND FISHING, FOOD PREPARATION AND PROCESSING	materials unsuitable for consumption or processing	10.48	0	0%	Increase/decrease in the tonnages of waste accepted in 2013 compared to 2012, was subject to the quantity of waste made available to Enva Ireland. In some instances some wastes were excepted onsite that were not accepted in previous years.	N/A	R13-Storage of waste pending any of the operations numbered R1 to R12 (excluding temporary storage)	0	Enva Ireland does not currently record the packaging content of waste as it arrives in on site.
110,000	19 02 06	19- WASTES FROM WASTE MANAGEMENT FACILITIES, OFF-SITE WASTE WATER TREATMENT PLANTS AND THE PREPARATION OF WATER INTENDED FOR HUMAN CONSUMPTION AND WATER FOR INDUSTRIAL USE	sludges from physico/chemical treatment other than those mentioned in 19 02 05	47.32	0	0%	Increase/decrease in the tonnages of waste accepted in 2013 compared to 2012, was subject to the quantity of waste made available to Enva Ireland. In some instances some wastes were excepted onsite that were not accepted in previous years.	N/A	R13-Storage of waste pending any of the operations numbered R1 to R12 (excluding temporary storage)	0	Enva Ireland does not currently record the packaging content of waste as it arrives in on site.

SECTION C-TO BE COMPLETED BY ALL WASTE FACILITIES (waste transfer stations, Composters, Material recovery facilities etc) EXCEPT LANDFILL SITES

4	Is all waste processing infrastructure as required by your licence and approved by the Agency in place? If no please list waste processing infrastructure required onsite	Yes	
5	Is all waste storage infrastructure as required by your licence and approved by the Agency in place? If no please list waste storage infrastructure required on site	Yes	
6	Does your facility have relevant nuisance controls in place?	Yes	
7	Do you have an odour management system in place for your facility? If no why?	Yes	Daily physical monitoirng of site and surrounding area.
8	Do you maintain a sludge register on site?	No	

SECTION D-TO BE COMPLETED BY LANDFILL SITES ONLY

Table 2 Waste type and tonnage-landfill only

Waste types permitted for disposal	Authorised/licenced annual intake for disposal (tpa)	Actual intake for disposal in reporting year (tpa)	Remaining licensed capacity at end of reporting year (m3)	Comments

Table 3 General information-Landfill only

Area ID	Date landfilling commenced	Date landfilling ceased	Currently landfilling	Private or Public Operated	Inert or non-hazardous	Predicted date to cease landfilling	Licence permits asbestos	Is there a separate cell for asbestos?	Accepted asbestos in reporting year	Total disposal area occupied by waste	Lined disposal area occupied by waste	Unlined area	Comments on liner type
										SELECT UNIT	SELECT UNIT	SELECT UNIT	
Cell 8													

WASTE SUMMARY

Lic No: W0184-01 Year 2013

Table 4 Environmental monitoring-landfill only

Landfill Manual-Monitoring Standards

Was meterological monitoring in compliance with Landfill Directive (LD) standard in reporting year +	Was leachate monitored in compliance with LD standard in reporting year	Was Landfill Gas monitored in compliance with LD standard in reporting year	Was SW monitored in compliance with LD standard in reporting year	Have GW trigger levels been established	Were emission limit values agreed with the Agency (ELVs)	Was topography of the site surveyed in reporting year	Has the statement under S53(A)(5) of WMA been submitted in reporting year	Comments

.+ please refer to Landfill Manual linked above for relevant Landfill Directive monitoring standards

Table 5 Capping-Landfill only

Area uncapped*	Area with temporary cap	Area with final cap to LD Standard m2 ha, a	Area capped other	Area with waste that should be permanently capped to date under licence	What materials are used in the cap	Comments
SELECT UNIT	SELECT UNIT					

*please note this includes daily cover area

Table 6 Leachate-Landfill only

9 Is leachate from your site treated in a Waste Water Treatment Plant? SELECT

10 Is leachate released to surface water? If yes please complete leachate mass load information below SELECT

Volume of leachate in reporting year(m3)	Leachate (BOD) mass load (kg/annum)	Leachate (COD) mass load (kg/annum)	Leachate (NH4) mass load (kg/annum)	Leachate (Chloride) mass load kg/annum	Leachate treatment on-site	Specify type of leachate treatment	Comments

Please ensure that all information reported in the landfill gas section is consistent with the Landfill Gas Survey submitted in conjunction with PRTR returns

Table 7 Landfill Gas-Landfill only

Gas Captured&Treated by LFG System m3	Power generated (MW / KWh)	Used on-site or to national grid	Was surface emissions monitoring performed during the reporting year?	Comments
			SELECT	

Facility Information Summary	
AER Reporting Year	2013
Licence Register Number	W0184-01
Name of site	Enva Ireland Limited
Site Location	Clonminan Industrial Estate, Portlaoise, Co. Loias
NACE Code	3832
Class/Classes of Activity	4.8, 3.12, 3.13, 3.6, 3.7, 4.11, 4.12, 4013, 4.2, 4.4, 4.5, 4.9
National Grid Reference (6E, 6 N)	2461 E, 1978 N
A description of the activities/processes at the site for the reporting year. This should include information such as production increases or decreases on site, any infrastructural changes, environmental performance which was measured during the reporting year **and an overview of compliance with your licence** listing all exceedances of licence limits (where applicable) and what they relate to e.g. air, water, noise.	The processing activities on site include waste oil re-processing, treatment of contaminated soil, repackaging of oily contaminated wastes and paint wastes. The site also stores wastes in packages (i.e. barrels ASPs, IBCs etc.) prior to transfer off site for recovery or disposal. 1.2 Waste Management Activities carried out at the Facility. **Third Schedule** Class 6. Biological treatment not referred to elsewhere in this Schedule which results in final compounds or mixtures which are

Declaration:

All the data and information presented in this report has been checked and certified as being accurate. The quality of the information is assured to meet licence requirements.

Dónal Conroy	31.03.2014
Signature	Date
~~Group~~/Facility manager	31/3/14.
(or nominated, suitably qualified and experienced deputy)	

| PRTR# : W0184 | Facility Name : Enva Ireland Limited (Portlaoise) | Filename : PRTR Final.xls | Return Year : 2013 |

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Guidance to completing the PRTR workbook

AER Returns Workbook

Version 1.1.18

REFERENCE YEAR	2013

1. FACILITY IDENTIFICATION

Parent Company Name	Enva Ireland Limited
Facility Name	Enva Ireland Limited (Portlaoise)
PRTR Identification Number	W0184
Licence Number	W0184-01

Waste or IPPC Classes of Activity

No.	**class_name**
4.8	Oil re-refining or other re-uses of oil.
3.12	Repackaging prior to submission to any activity referred to in a preceding paragraph of this Schedule.
3.13	Storage prior to submission to any activity referred to in a preceding paragraph of this Schedule, other than temporary storage, pending collection, on the premises where the waste concerned is produced.
3.6	Biological treatment not referred to elsewhere in this Schedule which results in final compounds or mixtures which are disposed of by means of any activity referred to in paragraphs 1. to 10. of this Schedule.
3.7	Physico-chemical treatment not referred to elsewhere in this Schedule (including evaporation, drying and calcination) which results in final compounds or mixtures which are disposed of by means of any activity referred to in paragraphs 1. to 10. of this Schedule.
4.11	Use of waste obtained from any activity referred to in a preceding paragraph of this Schedule.
4.12	Exchange of waste for submission to any activity referred to in a preceding paragraph of this Schedule.
4.13	Storage of waste intended for submission to any activity referred to in a preceding paragraph of this Schedule, other than temporary storage, pending collection, on the premises where such waste is produced.
4.2	Recycling or reclamation of organic substances which are not used as solvents (including composting and other biological transformation processes).
4.4	Recycling or reclamation of other inorganic materials.
4.5	Regeneration of acids or bases.
4.9	Use of any waste principally as a fuel or other means to generate energy.
Address 1	Clonminam Industrial Estate
Address 2	Portlaoise
Address 3	County Laois
Address 4	
	Laois
Country	Ireland
Coordinates of Location	-7.31391 53.0294
River Basin District	IESE
NACE Code	3832
Main Economic Activity	Recovery of sorted materials
AER Returns Contact Name	Mark Dowling
AER Returns Contact Email Address	Mdowling@enva.ie
AER Returns Contact Position	HSE Coordinator
AER Returns Contact Telephone Number	057-86-78600
AER Returns Contact Mobile Phone Number	
AER Returns Contact Fax Number	057-86-78699
Production Volume	0.0
Production Volume Units	
Number of Installations	0
Number of Operating Hours in Year	0
Number of Employees	78
User Feedback/Comments	
Web Address	

2. PRTR CLASS ACTIVITIES

Activity Number	**Activity Name**
5(a)	Installations for the recovery or disposal of hazardous waste
5(c)	Installations for the disposal of non-hazardous waste
50.1	General

3. SOLVENTS REGULATIONS (S.I. No. 543 of 2002)

Is it applicable?	
Have you been granted an exemption ?	

If applicable which activity class applies (as per Schedule 2 of the regulations) ?	
Is the reduction scheme compliance route being used ?	

4. WASTE IMPORTED/ACCEPTED ONTO SITE **Guidance on waste imported/accepted onto site**

Do you import/accept waste onto your site for on-site treatment (either recovery or disposal activities) ?	

This question is only applicable if you are an IPPC or Quarry site

4.1 RELEASES TO AIR Link to previous years emissions data | PRTR# : W0184 | Facility Name : Enva Ireland Limited (Portlaoise) | Filename : PRTR Final.xls | Return Year : 2013 | 31/03/2014 18:12

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SECTION A : SECTOR SPECIFIC PRTR POLLUTANTS

RELEASES TO AIR					Please enter all quantities in this section in KGs			
POLLUTANT		METHOD			QUANTITY			
			Method Used					
No. Annex II	Name	M/C/E	Method Code	Designation or Description	Emission Point 1	T (Total) KG/Year	A (Accidental) KG/Year	F (Fugitive) KG/Year
08 - Nitrogen oxides (NOx/NO2)	Nitrogen oxides (NOx/NO2)	C	OTH	Kane May Quintox KM9160 flue gas analyser.	43.22	43.22	0.0	0.0
11	Sulphur oxides (SOx/SO2)	C	EN 14791:2005		2.298	2.298	0.0	0.0
02	**Carbon monoxide (CO)**	C	OTH	Kane May Quintox KM9160 flue gas analyser.	1.379	0.0	0.0	0.0

* Select a row by double-clicking on the Pollutant Name (Column B) then click the delete button

SECTION B : REMAINING PRTR POLLUTANTS

RELEASES TO AIR					Please enter all quantities in this section in KGs			
POLLUTANT		METHOD			QUANTITY			
			Method Used					
No. Annex II	Name	M/C/E	Method Code	Designation or Description	Emission Point 1	T (Total) KG/Year	A (Accidental) KG/Year	F (Fugitive) KG/Year
					0.0	0.0	0.0	0.0

* Select a row by double-clicking on the Pollutant Name (Column B) then click the delete button

SECTION C : REMAINING POLLUTANT EMISSIONS (As required in your Licence)

RELEASES TO AIR					Please enter all quantities in this section in KGs			
POLLUTANT		METHOD			QUANTITY			
			Method Used					
Pollutant No.	Name	M/C/E	Method Code	Designation or Description	Emission Point 1	T (Total) KG/Year	A (Accidental) KG/Year	F (Fugitive) KG/Year
					0.0	0.0	0.0	0.0

* Select a row by double-clicking on the Pollutant Name (Column B) then click the delete button

Additional Data Requested from Landfill operators

For the purposes of the National Inventory on Greenhouse Gases, landfill operators are requested to provide summary data on landfill gas (Methane) flared or utilised on their facilities to accompany the figures for total methane generated. Operators should only report their Net methane (CH4) emission to the environment under T(total) KG/yr for Section A: Sector specific PRTR pollutants above. Please complete the table below:

Landfill: Enva Ireland Limited (Portlaoise)

Please enter summary data on the quantities of methane flared and / or utilised	**T (Total) kg/Year**	**M/C/E**	**Method Used** Method Code	**Designation or Description**	**Facility Total Capacity m3 per hour**	
Total estimated methane generation (as per site model)	0.0				N/A	
Methane flared	0.0				0.0	(Total Flaring Capacity)
Methane utilised in engine/s	0.0				0.0	(Total Utilising Capacity)
Net methane emission (as reported in Section A above)	0.0				N/A	

4.2 RELEASES TO WATERS Link to previous years emissions data | PRTR# : W0184 | Facility Name : Enva Ireland Limited (Portlaoise) | Filename : PRTR Final.xls | Return Year : 2013 | 31/03/2014 18:12

SECTION A : SECTOR SPECIFIC PRTR POLLUTANTS

Data on ambient monitoring of storm/surface water or groundwater, conducted as part of your licence requirements, should NOT be submitted under AER / PRTR Reporting as this only concerns Releases from your facil

RELEASES TO WATERS					Please enter all quantities in this section in KGs			
POLLUTANT					QUANTITY			
			Method Used					
No. Annex II	Name	M/C/E	Method Code	Designation or Description	Emission Point 1	T (Total) KG/Year	A (Accidental) KG/Year	F (Fugitive) KG/Year
					0.0	0.0	0.0	0.0

* Select a row by double-clicking on the Pollutant Name (Column B) then click the delete button

SECTION B : REMAINING PRTR POLLUTANTS

RELEASES TO WATERS					Please enter all quantities in this section in KGs			
POLLUTANT					QUANTITY			
			Method Used					
No. Annex II	Name	M/C/E	Method Code	Designation or Description	Emission Point 1	T (Total) KG/Year	A (Accidental) KG/Year	F (Fugitive) KG/Year
					0.0	0.0	0.0	0.0

* Select a row by double-clicking on the Pollutant Name (Column B) then click the delete button

SECTION C : REMAINING POLLUTANT EMISSIONS (as required in your Licence)

RELEASES TO WATERS					Please enter all quantities in this section in KGs			
POLLUTANT					QUANTITY			
			Method Used					
Pollutant No.	Name	M/C/E	Method Code	Designation or Description	Emission Point 1	T (Total) KG/Year	A (Accidental) KG/Year	F (Fugitive) KG/Year
					0.0	0.0	0.0	0.0

* Select a row by double-clicking on the Pollutant Name (Column B) then click the delete button

4.3 RELEASES TO WASTEWATER OR SEWER

Link to previous years emissions data

| PRTR# : W0184 | Facility Name : Enva Ireland Limited (Portlaoise) | Filename : PRTR Final.xls | Retu 31/03/2014 18:12

SECTION A : PRTR POLLUTANTS

OFFSITE TRANSFER OF POLLUTANTS DESTINED FOR WASTE-WATER TREATMENT OR SEWER — Please enter all quantities in this section in KGs

POLLUTANT		METHOD			QUANTITY			
			Method Used					
No. Annex II	Name	M/C/E	Method Code	Designation or Description	Emission Point 1	T (Total) KG/Year	A (Accidental) KG/Year	F (Fugitive) KG/Year
06	**Ammonia (NH3)**	C	OTH	Standard Methods for the Examination of Water and Wastewater, 18th edition, 1995, Part 4000, section 4500 –Nitrogen (Ammonia) F Phenate Method.	270.1537	0.0	0.0	0.0
79	Chlorides (as Cl)	C	OTH	Standard Methods for the Examination of Water and Wastewater, 18th edition, 1995, Part 4500 – Cl^- - C, Mercuric Nitrate Method.	12147.084	0.0	0.0	0.0
71	Phenols (as total C)	C	OTH	Standard Methods for the Examination of Water and Wastewater, 18th edition, 1995, Part 5530, Phenols.	96.272	0.0	0.0	0.0
13	Total phosphorus	C	OTH	Standard Methods for the Examination of Water and Wastewater, 18th edition, 1995, Part 4500–E, Phosphorus Ascorbic Acid Method.	512.005	0.0	0.0	0.0
20	Copper and compounds (as Cu)	C	OTH	Standard Methods for the Examination of Water and Wastewater, 18th edition, Metals by Flame Atomic Absorption Spectrometry – Direct Air-Acetylene Flame Method. 3111B - Modified	0.10482	0.0	0.0	0.0
18	Cadmium and compounds (as Cd)	C	OTH	Standard Methods for the Examination of Water and Wastewater, 18th edition, Metals by Flame Atomic Absorption Spectrometry – Direct Air-Acetylene Flame Method. 3111B - Modified	0.0421	0.0	0.0	0.0
24	Zinc and compounds (as Zn)	C	OTH	Standard Methods for the Examination of Water and Wastewater, 18th edition, Metals by Flame Atomic Absorption Spectrometry – Direct Air-Acetylene Flame Method. 3111B - Modified	1.111	0.0	0.0	0.0
23	Lead and compounds (as Pb)	C	OTH	Standard Methods for the Examination of Water and Wastewater, 18th edition, Metals by Flame Atomic Absorption Spectrometry – Direct Air-Acetylene Flame Method. 3111B - Modified	1.19008	0.0	0.0	0.0
					0.0	0.0	0.0	0.0

* Select a row by double-clicking on the Pollutant Name (Column B) then click the delete button

SECTION B : REMAINING POLLUTANT EMISSIONS (as required in your Licence)

OFFSITE TRANSFER OF POLLUTANTS DESTINED FOR WASTE-WATER TREATMENT OR SEWER — Please enter all quantities in this section in KGs

POLLUTANT		METHOD			QUANTITY			
			Method Used					
Pollutant No.	Name	M/C/E	Method Code	Designation or Description	Emission Point 1	T (Total) KG/Year	A (Accidental) KG/Year	F (Fugitive) KG/Year
314	Fats, Oils and Greases	C	OTH	Standard Methods for the Examination of Water and Wastewater, 18th edition, 1995, Part 5520 D Soxhlet Extraction Method	90.283	90.283	0.0	0.0

240	Suspended Solids	C	OTH	Standard Methods for the Examination of Water and Wastewater, 18th edition, 1995, Part 2540, D - Solids.	480.7921	0.0	0.0	0.0
343	Sulphate	C	OTH	Standard Methods for the Examination of Water and Wastewater, 18th edition, 1995, Part 4500 - $SO4^{2-}$ E	495.333	0.0	0.0	0.0
306	COD	C	OTH	Standard Methods for the Examination of Water and Wastewater, 21st edition, 2005.– Chemical Oxygen Demand.	21847.52	0.0	0.0	0.0

* Select a row by double-clicking on the Pollutant Name (Column B) then click the delete button

4.4 RELEASES TO LAND Link to previous years emissions data | PRTR# : W0184 | Facility Name : Enva Ireland Limited (Portlaoise) | Filename : PRTR Final.xls | Return Year : 2013 | 31/03/2014 18:12

SECTION A : PRTR POLLUTANTS

RELEASES TO LAND					Please enter all quantities in this section in KGs		
POLLUTANT		METHOD			QUANTITY		
			Method Used				
No. Annex II	Name	M/C/E	Method Code	Designation or Description	Emission Point 1	T (Total) KG/Year	A (Accidental) KG/Year
					0.0	0.0	0.0

* Select a row by double-clicking on the Pollutant Name (Column B) then click the delete button

SECTION B : REMAINING POLLUTANT EMISSIONS (as required in your Licence)

RELEASES TO LAND					Please enter all quantities in this section in KGs		
POLLUTANT		METHOD			QUANTITY		
			Method Used				
Pollutant No.	Name	M/C/E	Method Code	Designation or Description	Emission Point 1	T (Total) KG/Year	A (Accidental) KG/Year
					0.0	0.0	0.0

* Select a row by double-clicking on the Pollutant Name (Column B) then click the delete button

5. ONSITE TREATMENT & OFFSITE TRANSFERS OF WASTE | PRTR# : W0184 | Facility Name : Enva Ireland Limited (Portlaoise) | Filename : PRTR Final.xls | Return Year : 2013 | 31/03/2014 18:12

Please enter all quantities on this sheet in Tonnes

0

Transfer Destination	European Waste Code	Hazardous	Quantity (Tonnes per Year)	Description of Waste	Waste Treatment Operation	Method Used M/C/E	Method Used	Location of Treatment	Haz Waste : Name and Licence/Permit No of Next Destination Facility Non Haz Waste: Name and Licence/Permit No of Recover/Disposer	Haz Waste : Address of Next Destination Facility Non Haz Waste: Address of Recover/Disposer	Name and License / Permit No. and Address of Final Recoverer / Disposer (HAZARDOUS WASTE ONLY)	Actual Address of Final Destination i.e. Final Recovery / Disposal Site (HAZARDOUS WASTE ONLY)
To Other Countries	08 01 11	Yes	76.88	waste paint and varnish containing organic solvents or other dangerous substances	R1	M	Weighed	Abroad	Geocycle ,38.152/BP	Rue de Courriere 49 Zoning Industrial de Feluy ,. ,. ,B 7181 Seneffe ,Belgium	Geocycle ,38.152/BP, Rue de Courriere 49 Zoning Industrial de Feluy ,.,.,B 7181 Seneffe ,Belgium	Rue de Courriere 49 Zoning Industrial de Feluy ,.,.,B 7181 Seneffe ,Belgium
To Other Countries	08 01 11	Yes	123.28	waste paint and varnish containing organic solvents or other dangerous substances	R3	M	Weighed	Abroad	Nehlsen GmbH & Co.kg, A-4187 HH	Louis-Krages-Strabe ,.,Bremen., D-28237 ,Germany	Nehlsen GmbH & Co.kg, A-4187 HH,Louis-Krages-Strabe ,.,Bremen., D-28237 ,Germany	Louis-Krages-Strabe ,.,Bremen., D-28237 ,Germany
To Other Countries	09 01 04	Yes	1.27	fixed solutions	R1	M	Weighed	Abroad	Enva ,W041-1	Smithstown Industrial estate ,.,Shannon ,Co. Clare,Ireland	Lindenschmidt , 04 714 98089,Krombacher Strasse 42-46 ,.,Kreutzal,D57223 ,Germany	Krombacher Strasse 42-46 ,.,Kreutzal,D57223 ,Germany
Within the Country	13 05 07	Yes	40.0	oily water from oil/water separators	D9	M	Weighed	Offsite in Ireland	Enva,W0196-1	JFK Road Naas Road,.,Dublin,Dublin 12,Ireland	Enva,W0196-01,JFK Road Naas Road,.,Dublin,Dublin 12,Ireland	JFK Road Naas Road,.,Dublin,Dublin 12,Ireland
To Other Countries	13 07 03	Yes	79.54	other fuels (including mixtures)	R1	M	Weighed	Abroad	KS Recycling ,12 150 13984/01TMS	Raiffeisenstraße 38 ,.,., D-47665 Sonsbeck ,Germany	KS Recycling ,12 150 13984/01TMS,Raiffeisenstraße 38 ,.,., D-47665 Sonsbeck ,Germany	Raiffeisenstraße 38 ,.,., D-47665 Sonsbeck ,Germany
Within the Country	13 08 02	Yes	68.26	other emulsions	D9	M	Weighed	Offsite in Ireland	Enva,W0196-1	JFK Road Naas Road,.,Dublin,Dublin 12,Ireland	Enva,W0196-01,JFK Road Naas Road,.,Dublin,Dublin 12,Ireland	JFK Road Naas Road,.,Dublin,Dublin 12,Ireland
Within the Country	15 01 01	No	1.2	paper and cardboard packaging	R3	M	Weighed	Offsite in Ireland	ROC Recycling Solutions,WFP-LS-11-00001-01	Ballymacken Industrial Estate,.,Portlaoise,Co. Laois,Ireland		
To Other Countries	15 01 10	Yes	4.0	packaging containing residues of or contaminated by dangerous substances	R3	M	Weighed	Abroad	Enva ,W041-1	Smithstown Industrial estate ,.,Shannon ,Co. Clare,Ireland	Lindenschmidt , 04 714 98089,Krombacher Strasse 42-46 ,.,Kreutzal,D57223 ,Germany	Krombacher Strasse 42-46 ,.,Kreutzal,D57223 ,Germany
To Other Countries	15 01 10	Yes	63.06	packaging containing residues of or contaminated by dangerous substances	R3	M	Weighed	Abroad	Nehlsen GmbH & Co.kg, A-4187 HH	Louis-Krages-Strabe ,.,Bremen., D-28237 ,Germany	Nehlsen GmbH & Co.kg, A-4187 HH,Louis-Krages-Strabe ,.,Bremen., D-28237 ,Germany	Louis-Krages-Strabe ,.,Bremen., D-28237 ,Germany
Within the Country	15 01 10	Yes	3.286	packaging containing residues of or contaminated by dangerous substances	D9	M	Weighed	Offsite in Ireland	Enva ,W041-1	Smithstown Industrial estate ,.,Shannon ,Co. Clare,Ireland	Enva ,W041-1,Smithstown Industrial estate ,.,Shannon ,Co. Clare,Ireland	Smithstown Industrial estate ,.,Shannon ,Co. Clare,Ireland
To Other Countries	15 02 02	Yes	1.124	absorbents, filter materials (including oil filters not otherwise specified), wiping cloths, protective clothing contaminated by dangerous substances	R12	M	Weighed	Abroad	Enva ,W041-1	Smithstown Industrial estate ,.,Shannon ,Co. Clare,Ireland	Lindenschmidt , 04 714 98089,Krombacher Strasse 42-46 ,.,Kreutzal,D57223 ,Germany	Krombacher Strasse 42-46 ,.,Kreutzal,D57223 ,Germany
To Other Countries	16 01 07	Yes	684.06	oil filters	R12	M	Weighed	Abroad	RD Recycling ,Ovam approved	Centrum Zuid 3017 ,.,.,3530,Belgium.	RD Recycling ,Ovam approved,Centrum Zuid 3017 ,.,.,3530,Belgium.	Centrum Zuid 3017 ,.,.,3530,Belgium.
To Other Countries	16 01 15	No	0.3	antifreeze fluids other than those mentioned in 16 01 14	R1	M	Weighed	Abroad	Lindenschmidt , 04 714 98089	Krombacher Strasse 42-46 ,.,Kreutzal,D57223 ,Germany		
To Other Countries	16 01 15	No	196.48	antifreeze fluids other than those mentioned in 16 01 14	R1	M	Weighed	Abroad	KS Recycling ,12 150 13984/01TMS	Raiffeisenstraße 38 ,.,., D-47665 Sonsbeck ,Germany		

Transfer Destination	European Waste Code	Hazardous	Quantity (Tonnes per Year)	Description of Waste	Waste Treatment Operation	Method Used		Location of Treatment	Haz Waste : Name and Licence/Permit No of Next Destination Facility Non Haz Waste: Name and Licence/Permit No of Recover/Disposer	Haz Waste : Address of Next Destination Facility Non Haz Waste: Address of Recover/Disposer	Name and License / Permit No. and Address of Final Recoverer / Disposer (HAZARDOUS WASTE ONLY)	Actual Address of Final Destination i.e. Final Recovery / Disposal Site (HAZARDOUS WASTE ONLY)
						M/C/E	Method Used					
To Other Countries	16 05 04	Yes	19.42	gases in pressure containers (including halons) containing dangerous substances	R4	M	Weighed	Abroad	SBH ,121296753	Austrabe 5 ,.,.,D74238 Krautheim,Germany	SBH ,121296753,Austrabe 5 ,.,.,D74238 Krautheim,Germany	Austrabe 5 ,.,.,D74238 Krautheim,Germany
To Other Countries	16 05 06	Yes	38.5	laboratory chemicals, consisting of or containing dangerous substances, including mixtures of laboratory chemicals	R1	M	Weighed	Abroad	Enva ,W041-1	Smithstown Industrial estate ,.,Shannon ,Co. Clare,Ireland	Lindenschmidt , 04 714 98089,Krombacher Strasse 42-46 ,.,Kreutzal,D57223 ,Germany	Krombacher Strasse 42-46 ,.,Kreutzal,D57223 ,Germany
To Other Countries	16 05 07	Yes	0.706	discarded inorganic chemicals consisting of or containing dangerous substances	R1	M	Weighed	Abroad	Enva ,W041-1	Smithstown Industrial estate ,.,Shannon ,Co. Clare,Ireland	Lindenschmidt , 04 714 98089,Krombacher Strasse 42-46 ,.,Kreutzal,D57223 ,Germany	Krombacher Strasse 42-46 ,.,Kreutzal,D57223 ,Germany
To Other Countries	16 05 08	Yes	0.239	discarded organic chemicals consisting of or containing dangerous substances	R1	M	Weighed	Abroad	Enva ,W041-1	Smithstown Industrial estate ,.,Shannon ,Co. Clare,Ireland	Lindenschmidt , 04 714 98089,Krombacher Strasse 42-46 ,.,Kreutzal,D57223 ,Germany	Krombacher Strasse 42-46 ,.,Kreutzal,D57223 ,Germany
Within the Country	16 05 09	No	0.466	discarded chemicals other than those mentioned in 16 05 06, 16 05 07 or 16 05 08	R1	M	Weighed	Offsite in Ireland	Enva ,W041-1	Smithstown Industrial estate ,.,Shannon ,Co. Clare,Ireland		
To Other Countries	16 06 01	Yes	894.58	lead batteries	R4	M	Weighed	Abroad	Campine,Ovam Approved	Niljverheidsstraat 2 Belgium.,.,.,B- 2340 Beerse ,Belgium	Campine,Ovam Approved, Niljverheidsstraat 2 Belgium.,.,.,B- 2340 Beerse ,Belgium	Niljverheidsstraat 2 Belgium.,.,.,B- 2340 Beerse ,Belgium
Within the Country	17 02 01	No	5.96	wood	R5	M	Weighed	Offsite in Ireland	AES Advanced Environmental Solutions (Ireland) Limited,W0104-02	.,.,Tullamore,Co. Offaly,Ireland		
Within the Country	17 05 04	No	2052.21	soil and stones other than those mentioned in 17 05 03	R5	M	Weighed	Offsite in Ireland	Hinch Plant hire ,WFP-LS-09-0002-01	Straboe ,. , Portlaoise ,Co Laois ,Ireland		
Within the Country	17 09 04	No	4.88	mixed construction and demolition wastes other than those mentioned in 17 09 01, 17 09 02 and 17 09 03	R5	M	Weighed	Offsite in Ireland	Guessford Ltd.,WFP-10-OY-0183-02	Barnan,.,Daingean,Co. Offaly,Ireland		
To Other Countries	19 02 09	Yes	855.862	solid combustible wastes containing dangerous substances	R1	M	Weighed	Abroad	Lindenschmidt , 04 714 98089	Krombacher Strasse 42-46 ,.,Kreutzal,D57223 ,Germany	Lindenschmidt , 04 714 98089,Krombacher Strasse 42-46 ,.,Kreutzal,D57223 ,Germany	Krombacher Strasse 42-46 ,.,Kreutzal,D57223 ,Germany
Within the Country	19 08 14	No	0.0	sludges from other treatment of industrial waste water other than those mentioned in 19 08 13	D9	M	Weighed	Offsite in Ireland	Enva,W0196-1	JFK Road Naas Road,.,Dublin,Dublin 12,Ireland		
Within the Country	19 11 03	Yes	6392.75	aqueous liquid wastes	D9	C	Volume Calculation	Offsite in Ireland	Laois County Council,DO00 1-0 1	Ridge Road,.,Portlaoise,.,Ireland	Laois County Council,DO00 1-0 1,Ridge Road,.,Portlaoise,.,Ireland	Ridge Road,.,Portlaoise,.,Ireland
To Other Countries	19 12 11	Yes	164.5	other wastes (including mixtures of materials) from mechanical treatment of waste containing dangerous substances	D10	M	Weighed	Abroad	KWA,E17012100	Graftstr. 25 ,.,.,47475 Kamp-Lintfort ,Germany	KWA,E17012100,Graftstr. 25 ,.,.,47475 Kamp-Lintfort ,Germany	Graftstr. 25 ,.,.,47475 Kamp-Lintfort ,Germany
Within the Country	20 01 21	Yes	2.32	fluorescent tubes and other mercury-containing waste	R4	M	Weighed	Offsite in Ireland	Irish Lamp Recycling ,WFP-KE-08-0348-01	Woodstock Industrial Estate ,.,Athy ,Co. Kildare. ,Ireland	Irish Lamp Recycling ,WFP-KE-08-0348-01,Woodstock Industrial Estate ,.,Athy ,Co. Kildare. ,Ireland	Woodstock Industrial Estate ,.,Athy ,Co. Kildare. ,Ireland

Transfer Destination	European Waste Code	Hazardous	Quantity (Tonnes per Year)	Description of Waste	Waste Treatment Operation	Method Used		Location of Treatment	Haz Waste : Name and Licence/Permit No of Next Destination Facility Non Haz Waste: Name and Licence/Permit No of Recover/Disposer	Haz Waste : Address of Next Destination Facility Non Haz Waste: Address of Recover/Disposer	Name and License / Permit No. and Address of Final Recoverer / Disposer (HAZARDOUS WASTE ONLY)	Actual Address of Final Destination i.e. Final Recovery / Disposal Site (HAZARDOUS WASTE ONLY)
						M/C/E	Method Used					
Within the Country	20 01 25	No	0.68	edible oil and fat	R9	M	Weighed	Offsite in Ireland	Frylite ,WFP-DS-10-0009-01	Ballymount Drive Ballymount Industrial Estate,Unit J1 ,Dublin,Dublin 12,Ireland		
Within the Country	20 01 25	No	71.16	edible oil and fat	D8	M	Weighed	Offsite in Ireland	Beofs ,WFP-KK-09-0004-01	Camphill Community Ballytobin ,.,Callan ,Co. Kilkenny,Ireland		
To Other Countries	20 01 27	Yes	0.84	paint, inks, adhesives and resins containing dangerous substances	R1	M	Weighed	Abroad	Enva ,W041-1	Smithstown Industrial estate ,.,Shannon ,Co. Clare,Ireland	Lindenschmidt , 04 714 98089,Krombacher Strasse 42-46 ,.,Kreutzal,D57223 ,Germany	Krombacher Strasse 42-46 ,.,Kreutzal,D57223 ,Germany
Within the Country	20 03 06	No	18.12	waste from sewage cleaning	D9	M	Weighed	Offsite in Ireland	Enva,W0196-1	JFK Road Naas Road,.,Dublin,Dublin 12,Ireland		
To Other Countries	08 01 11	Yes	2.5	waste paint and varnish containing organic solvents or other dangerous substances	R1	M	Weighed	Abroad	Enva ,W041-1	Smithstown Industrial estate ,.,Shannon ,Co. Clare,Ireland	Lindenschmidt , 04 714 98089,Krombacher Strasse 42-46 ,.,Kreutzal,D57223 ,Germany	Krombacher Strasse 42-46 ,.,Kreutzal,D57223 ,Germany
To Other Countries	12 01 14	Yes	35.5	machining sludges containing dangerous substances	R1	M	Weighed	Abroad	Geocycle ,38.152/BP	Rue de Courriere 49 Zoning Industrial de Feluy ,. ,. ,B 7181 Seneffe ,Belgium	Geocycle ,38.152/BP, Rue de Courriere 49 Zoning Industrial de Feluy ,.,.,B 7181 Seneffe ,Belgium	Rue de Courriere 49 Zoning Industrial de Feluy ,.,.,B 7181 Seneffe ,Belgium
To Other Countries	13 05 07	Yes	28.0	oily water from oil/water separators	R1	M	Weighed	Abroad	Geocycle ,38.152/BP	Rue de Courriere 49 Zoning Industrial de Feluy ,. ,. ,B 7181 Seneffe ,Belgium	Geocycle ,38.152/BP, Rue de Courriere 49 Zoning Industrial de Feluy ,.,.,B 7181 Seneffe ,Belgium	Rue de Courriere 49 Zoning Industrial de Feluy ,.,.,B 7181 Seneffe ,Belgium
Within the Country	20 01 40	No	234.02	metals	R4	M	Weighed	Offsite in Ireland	MSM Recycling,WFP-TN-11-0003-02	Annagh,.,Birr,Co. Tipperary,Ireland		
To Other Countries	13 07 03	Yes	2.05	other fuels (including mixtures)	R1	M	Weighed	Abroad	Geocycle ,38.152/BP	Rue de Courriere 49 Zoning Industrial de Feluy ,. ,. ,B 7181 Seneffe ,Belgium	Geocycle ,38.152/BP, Rue de Courriere 49 Zoning Industrial de Feluy ,.,.,B 7181 Seneffe ,Belgium	Rue de Courriere 49 Zoning Industrial de Feluy ,.,.,B 7181 Seneffe ,Belgium
To Other Countries	08 04 10	No	0.08	waste adhesives and sealants other than those mentioned in 08 04 09	R1	M	Weighed	Abroad	Enva ,W041-1	Smithstown Industrial estate ,.,Shannon ,Co. Clare,Ireland		
Within the Country	16 06 04	No	1.2	alkaline batteries (except 16 06 03)	R4	M	Weighed	Offsite in Ireland	KNK Metals Recycling Limited,W0113-04	Cappincur Industrial Estate ,Daingean Road,Tullamore,Co. Offaly,Ireland		
To Other Countries	13 05 07	Yes	1378.46	oily water from oil/water separators	D10	M	Weighed	Abroad	Scori Lillebonne,.	Z1 Avenue de Port Jerome,76170 Lillebonne,.,.,France	Scori Lillebonne,.,Z1 Avenue de Port Jerome,76170,Lillebonne,.,France	Z1 Avenue de Port Jerome,76170,Lillebonne,.,France
Within the Country	16 05 04	Yes	0.024	gases in pressure containers (including halons) containing dangerous substances	R13	M	Weighed	Offsite in Ireland	Enva ,W041-1	Smithstown Industrial estate ,.,Shannon ,Co. Clare,Ireland	Enva ,W041-1,Smithstown Industrial estate ,.,Shannon ,Co. Clare,Ireland	Smithstown Industrial estate ,.,Shannon ,Co. Clare,Ireland

Transfer Destination	European Waste Code	Hazardous	Quantity (Tonnes per Year)	Description of Waste	Waste Treatment Operation	Method Used		Location of Treatment	Haz Waste : Name and Licence/Permit No of Next Destination Facility Non Haz Waste: Name and Licence/Permit No of Recover/Disposer	Haz Waste : Address of Next Destination Facility Non Haz Waste: Address of Recover/Disposer	Name and License / Permit No. and Address of Final Recoverer / Disposer (HAZARDOUS WASTE ONLY)	Actual Address of Final Destination i.e. Final Recovery / Disposal Site (HAZARDOUS WASTE ONLY)
						M/C/E	Method Used					
To Other Countries	13 02 08	Yes	1.5	other engine, gear and lubricating oils	R1	M	Weighed	Abroad	Enva ,W041-1	Smithstown Industrial estate ,,,Shannon ,Co. Clare,Ireland	Lindenschmidt , 04 714 98089,Krombacher Strasse 42-46 ,.,Kreutzal,D57223 ,Germany	Krombacher Strasse 42-46 ,.,Kreutzal,D57223 ,Germany
To Other Countries	20 01 29	Yes	0.378	detergents containing dangerous substances	R1	M	Weighed	Abroad	Enva ,W041-1	Smithstown Industrial estate ,,,Shannon ,Co. Clare,Ireland	Lindenschmidt , 04 714 98089,Krombacher Strasse 42-46 ,.,Kreutzal,D57223 ,Germany	Krombacher Strasse 42-46 ,.,Kreutzal,D57223 ,Germany
Within the Country	13 05 07	Yes	16.18	oily water from oil/water separators	R13	M	Weighed	Offsite in Ireland	Enva ,W041-1	Smithstown Industrial estate ,,,Shannon ,Co. Clare,Ireland	Enva ,W041-1,Smithstown Industrial estate ,.,Shannon ,Co. Clare,Ireland	Smithstown Industrial estate ,.,Shannon ,Co. Clare,Ireland
Within the Country	20 03 04	No	2.58	septic tank sludge	R3	M	Weighed	Offsite in Ireland	Acorn Recycling ltd ,W0249-01	Ballybeg Composting facility Ballybeg Littleton ,.,.,Co. Tipperary. ,Ireland		
Within the Country	02 07 04	No	10.48	materials unsuitable for consumption or processing	R13	M	Weighed	Offsite in Ireland	Enva ,W041-1	Smithstown Industrial estate ,,,Shannon ,Co. Clare,Ireland		

* Select a row by double-clicking the Description of Waste then click the delete button

Link to previous years waste data
Link to previous years waste summary data & percentage change
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Appendix 11: Annual Environmental Report Sign Off

Appendix 1

RPS

Enva Portlaoise

2013 Groundwater Compliance Monitoring Quarter 1 (Jan – March 2013)

DOCUMENT CONTROL SHEET

Client	Enva Ireland Ltd.					
Project Title	Enva Portlaoise 2013 Groundwater Compliance Monitoring					
Document Title	Quarter 1 (Jan – March 2013) Interpretative Report					
Document No.	MDE0973Rp0013D01					
This Document Comprises	DCS	TOC	Text	List of Tables	List of Figures	No. of Appendices
	1	1	36	1	1	-

Rev.	Status	Author(s)	Reviewed By	Approved By	Office of Origin	Issue Date
D01	Draft	M. Roche	C. Reilly	P. Chadwick	West Pier	28/03/2013
F01	Final	M. Roche	C. Reilly	P. Chadwick	West Pier	04/04/13

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1 INTRODUCTION

1.1 BACKGROUND

RPS has been commissioned by Enva Ireland Ltd to carry out groundwater quality monitoring for environmental compliance, at their facility in the Clonminam Industrial Estate, Portlaoise, Co Laois. Groundwater monitoring has being carried out in strict accordance with criteria set out in Schedule 4(ii) of the site's Waste Licence Register No. W0184-01.

Enva Ireland has been operating under Waste Licence Register No. W0184-01 since January 2004, and is required to submit a report to the Environmental Protection Agency (EPA) on a quarterly basis, outlining the existing groundwater quality underlying the site.

Suitably qualified environmental consultants from RPS, collected groundwater samples from a series of 8 monitoring wells (BH101, BH102, BH103, BH104B, MW01, MW02, MW03, MW04) within the site boundary on the 19th of February 2013. The samples underwent laboratory analysis for the suite of parameters specified in Schedule 4(ii) of Waste Licence W0184-01. This report outlines the results of the Quarter 1 monitoring for 2013 and reviews historical data recorded at the site.

1.2 OBJECTIVES & SCOPE OF WORK

The specific objectives and scope of work are as follows:

- Review of previous data as provided by Enva Portlaoise;
- Graphical presentation of key compounds and trends; and
- Discussion of results for Quarter 1 2013 within the context of previous results and available guideline concentrations.

2 REVIEW OF PREVIOUS DATA

2.1 INFORMATION SOURCES

The following documents were reviewed as part of this project:

- Waste Licence W0184-01 and any available EPA documents from the EPA website
- Quarterly Groundwater Monitoring Reports (Quarter 1 to Quarter 4), URS (2004)
- Quarterly Groundwater Monitoring Reports (Quarter 1 to Quarter 4), URS (2005)
- Quarterly Groundwater Monitoring Reports (Quarter 1 to Quarter 4), RPS (2006)
- Quarterly Groundwater Monitoring Reports (Quarter 1 to Quarter 4), RPS (2007)
- Quarterly Groundwater Monitoring Reports (Quarter 1 to Quarter 4), RPS (2008)
- Quarterly Groundwater Monitoring Reports (Quarter 1 to Quarter 4), RPS (2009)
- Summary Report on Trend of Contaminant Levels at Enva Ireland Ltd since 2005, Ref: MDE0647RP0001, RPS (2007)
- Groundwater Risk Assessment, Ref: MDE0788Rp0001, RPS (2008)
- Quarterly Groundwater Monitoring Reports (Quarter 1 to Quarter 4), RPS (2010)
- Quarterly Groundwater Monitoring Reports (Quarter 1 to Quarter 4), RPS (2011)
- Quarterly Groundwater Monitoring Reports (Quarter 1 to Quarter 4), RPS (2012)

2.2 SITE SETTING

The site is located to the southwest of the town of Portlaoise immediately to the south of the Dublin to Cork railway line. The general area is gently undulating. The site slopes gently to the southwest but to the east of the site the ground slopes gently towards the River Triogue, which is located approximately 1 km to the east. The site occupies an area of approximately 1.5 hectares and comprises of an operational waste oil and contaminated soil treatment plant.

The site is located on the outskirts of Portlaoise in an area of agricultural and light industrial development. The site is bounded to the north and east by land belonging to Irish rail, comprising sidings and general storage areas. To the south is a vehicle repair garage, which is elevated above the level of the site by approximately 1.5 m. To the west the site is adjoined by further industrial land, as well as residential land. The site location is presented on **Figure 1**.

The site has been in operation since 1978, and the layout has remained relatively consistent. The site layout is presented on **Figure 2**. The site is largely covered in hardstanding with some open areas in the far north and northwest of the site. All oil and soil storage areas are suitably bunded and the general standard of housekeeping is good.

2.3 REGIONAL SETTING

2.3.1 Geology

The Geological Survey of Ireland indicates that the regional geology of Portlaoise is typified by Carboniferous Limestone. In the vicinity of the site itself the solid geology comprises the Ballysteen

Formation, a micaceous-bioclastic limestone. This well-bedded limestone, with interbeds of shale, is extensively folded, with axes trending north-east to south-west, and becomes increasingly muddy towards the top of the formation. North-east to south-west trending faults are found in the region, with one located approximately 500m to the east of the site. The subsoil's in the region comprise mainly Made Ground, around the industrial area, and Limestone Till in the surrounding regions.

2.3.2 Hydrogeology

The limestone is classified by the Geological survey of Ireland (GSI) as a locally important karstified aquifer. Porosity is predominantly in the form of fractures, in this aquifer, however the muddy nature of this formation greatly reduces permeability. Vulnerability of this aquifer beneath the site is classified as high, with moderate vulnerability to the east of the site.

The public water supply for Portlaoise is derived from groundwater, utilising five extraction wells in total. This supply currently comes from the Straboe area, approximately 5.5 km to the north-east of the site. The source protection zone for this water supply extends north-west south-east with the boundary of the outer protection zone at least 4 km to the north-east of the site. A further public abstraction well-field is currently being developed to the north-west of the current area in the townland of Eyne, approximately 6 km to the north of the site, and will comprise a further five abstraction wells. The Source Protection Zone for these wells has not yet been defined but it is not anticipated to affect the Enva site.

The GSI record a number of other dug wells and boreholes within the Portlaoise area, including the boreholes installed on the site. The accuracy of the locations of these wells varies. One well, which was drilled in 1899 is recorded as being located immediately to the south of the Enva site. The use of this well is not known and its location is only accurate to 1 km. A second borehole, drilled in 1973 is recorded 1.5 km to the north of the site at Clonroosk, the accuracy of this location is also 1 km so that it could be closer or further from the site. The use of this well is not known but its yield is recorded as being poor. There are no other wells recorded within 1 km of the site.

Enva is not aware of any abstraction boreholes within the immediate vicinity of their site.

2.4 SITE GROUND CONDITIONS

A total of eight boreholes have been drilled at the site and the general sequence of ground conditions is presented in **Table 2**.

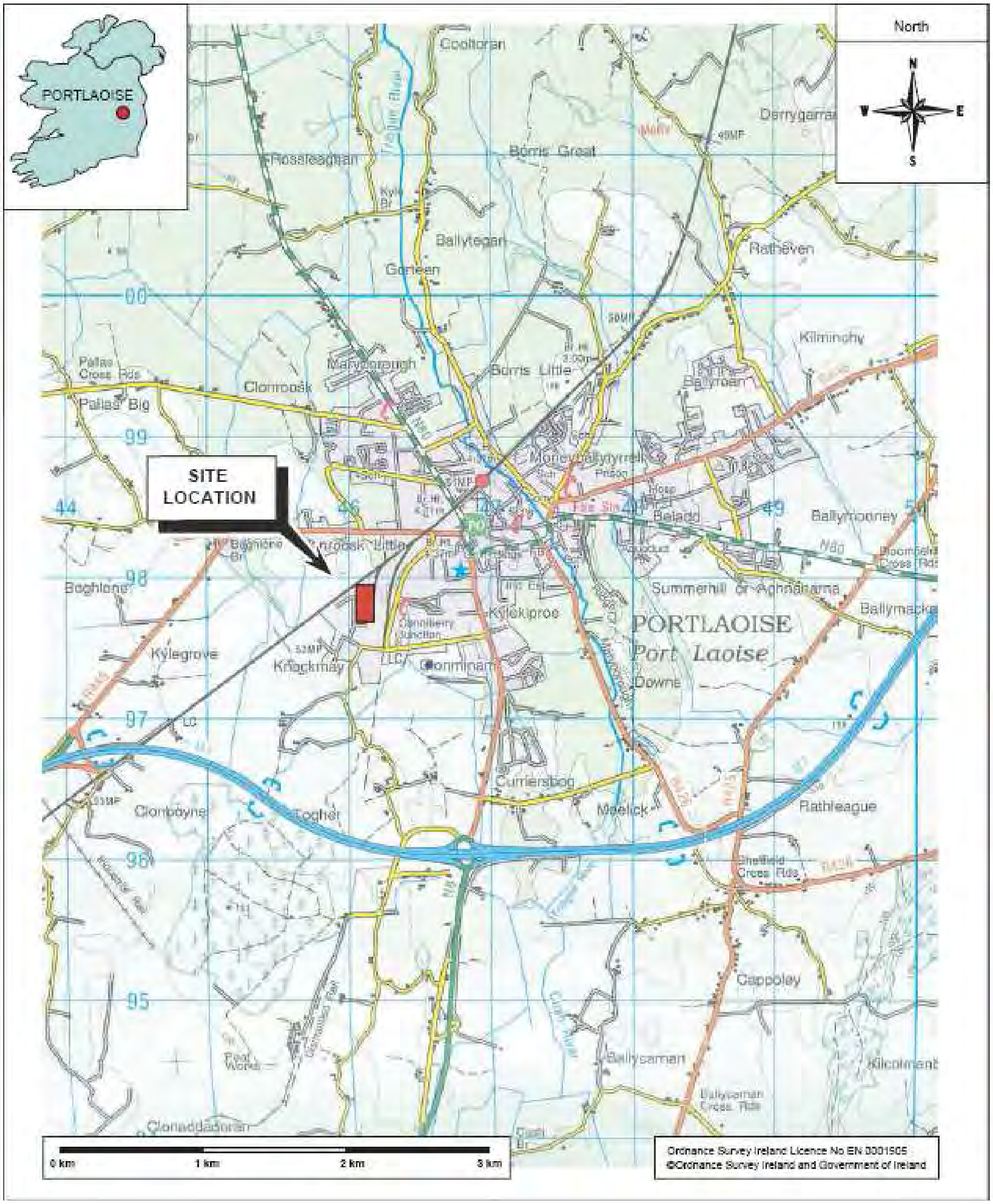
Table 2.1: Ground Conditions

Strata	Extent	Thickness	Description
Made Ground	BH104	0-3.5 m	Predominantly concrete, with hardcore fill, and clay.
Boulder Clay	All boreholes	<8.5 m	Includes fine to medium, well rounded gravels.
Sand and Gravel	Confined to south east corner of site (BH101, BH104 and MW03)	0-2 m	In general the transition from boulder clay to sand is gradual with changes from gravel, to sandy gravel, to sand.
Limestone Bedrock	Encountered in MW01, MW02 and MW03	Top of limestone ranges from 7.7m to 9m	Pale grey, fine-grained bedrock, differentiated from boulders by its un-weathered nature.

Strata	Extent	Thickness	Description
		below ground level.	

The logs for each of the boreholes were previously presented as Appendix B in the RPS Groundwater Risk Assessment Report (Ref: MDE0788Rp0001).

Figure 1 Site Location



2.4.1 Licence Conditions

The waste management licence requires the regular monitoring and sampling of boreholes BH101, BH102, BH103, BH104B, MW01, MW02, MW03 and MW04. The parameters requiring measurement or analysis are presented in Table 2.2.

Table 2.2: Licence Parameters

Group	Parameters requiring Quarterly Measurement	Parameters requiring Annual Measurement
Field Parameters	Groundwater Level pH Temperature Dissolved Oxygen Electrical Conductivity Visual Inspection	Groundwater Level pH Temperature Dissolved Oxygen Electrical Conductivity Visual Inspection
Organics	Mineral Oil BTEX & MTBE PAH's Phenols VOC's SVOC's	Mineral Oil BTEX & MTBE PAH's Phenols VOC's SVOC's
Inorganics	-	Total Alkalinity, Calcium, Manganese, Sulphate, Cyanide (Total), Chloride, Sodium,

3 METHODOLOGY

Groundwater samples were collected from 8 no. on-site groundwater monitoring wells (BH101, BH102, BH103, BH104B, MW01, MW02, MW03, MW04), (See Figure 2) using dedicated Waterra tubing, in accordance with RPS's standard sampling protocol. A non-return foot valve was fixed to the bottom of the tubing and inserted into the well, close to the base of the borehole. Separate tubing and foot valves were used at each monitoring well to eliminate the possibility of cross contamination.

Groundwater in the well casing is not considered representative of the groundwater quality at a given location. For this reason, three well volumes were purged from each well prior to collection of the groundwater sample. By the time purging was complete all field test water parameters (namely pH, Temperature, Electrical Conductivity and Dissolved Oxygen) were within 10% variance in three consecutive measurements. This ensured that the groundwater sample extracted from the monitoring borehole was representative of the water held in the subsurface strata and not water held stagnant in the borehole casing. The purged volumes were calculated on-site from the measured static water levels and total well depths using an electronic dip meter.

Groundwater samples were collected in laboratory supplied containers and stored in chilled cool boxes following sampling and during transit to the laboratory. A rigorous chain of custody procedure was used during the sample round.

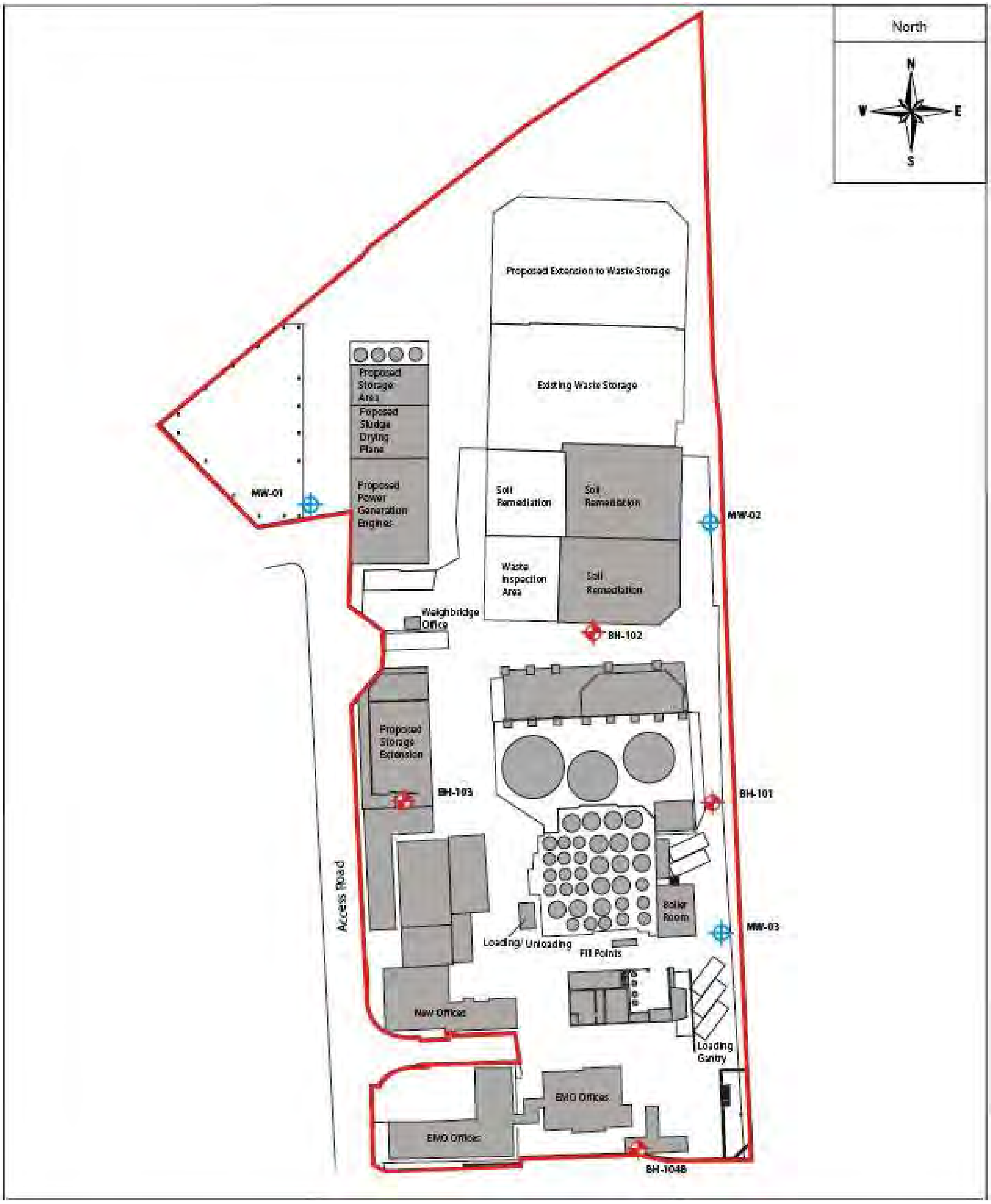
3.1 LABORATORY ANALYSIS

All groundwater samples were analysed at a UKAS accredited laboratory, I2 Analytical Ltd for the suite of analyses listed in Table 3.1. Table 3.1 also indicates the analytical techniques used by the laboratory.

Table 3.1: Analytical Methodologies – I2 Analytical Ltd

Parameter	Analytical Methodology
Phenols	GC-MS
Speciated PAHs	GC-MS
BTEX & MTBE	Headspace GC-MS
Petroleum Hydrocarbons	Headspace GC-MS
Volatile Organic compounds & Tentatively Identified Organic Compounds (VOCs & TICs)	Headspace GC-MS
Semi-Volatile Organic compounds & Tentatively Identified Organic Compounds (SVOCs & TICs)	GC-MS

Figure 2 Site Layout Plan with groundwater monitoring well locations



Shallow Monitoring Well locations

Deep Monitoring Well locations

Source: *URS Environmental Consultants (Ref: 45078497 Issue No. 1)*

3.2 PRESENTATION & INTERPRETATION OF RESULTS

The Quarter 1 2013 results are tabulated in Section 4 and discussed with respect to previous results. The results have been compared to the EPA Interim Guideline Values (IGV) as set out in the Report 'Towards Setting Guideline Values for the Protection of Groundwater in Ireland' 2004. It is important to note that the IGVs are based on the lowest acceptable value for either drinking water or environmental quality in surface water and is therefore conservative in nature.

Previous monitoring reports (as listed in Section 2.1) provide details of contaminant concentrations since 2004. The data available within these reports has been reviewed and time series plots of key parameters have been compiled. Trends for chlorinated solvents, petroleum hydrocarbons and phenol parameters have been plotted.

Time series plots are presented in Section 6 and include the results of this Quarter 1 2013 monitoring round. As the monitoring continues in accordance with the waste licence requirements, the plots will be updated with the results of subsequent rounds used to illustrate the results.

Time series plots are also provided for manual water levels where available from previous reports.

4 QUARTER 1 RESULTS AUGUST 2013

The results of all field measurements and laboratory analysis are presented in this section.

The results are discussed in relation to appropriate guideline values in Section 5. Results that are shown to be above the relevant guideline values are highlighted in bold and shaded. Results that are shown to be above the relevant laboratory detection limits are highlighted in italics.

Site-specific field parameter measurements were collected during the site visit as per RPS Water sampling protocol.

Table 4.1: Groundwater Levels (Quarter 1, 2013)

Monitoring Well	BH101	BH102	BH103	BH104B	MW01	MW02	MW03	MW04
Depth (mbgl)	7.70	6.44	4.35	4.65	23.00	31.00	14.67	6.38
Static Water Level (mbgl)	3.93	2.97	1.68	0.50	3.10	4.44	3.70	3.59
Ground Level (mAOD)	103.06	102.55	101.16	101.52	102.10	103.12	102.77	-
Water Level (mAOD)	99.13	99.58	99.48	101.02	99.00	98.68	99.07	-
Free Phase Oil (mm)	No detection	No detection	No detection	No detection	No detection	No detection	No detection	No detection

mbgl = metres below ground level

Table 4.2: Results of Field Parameters Measured at each Groundwater Monitoring Well (Quarter 1, 2013)

Monitoring Well	pH (pH Units)	Temperature (℃)	Conductivity (µS/cm)	Dissolved O_2 (ppm)	Observations
BH101	7.33	9.4	724	3.27	White cloudy colour, black suspended solids, odourless.
BH102	6.59	9.3	867	2.30	Purged water yellowish in colour, slight H_2S odour detected on purging, some suspended solids.
BH103	7.18	8.2	652	3.21	Black/grey colour at start of purging, clear in sample. Odourless.
BH104B	7.66	7.4	787	3.35	Slight green tinge to water, slight H_2S odour on purging.
MW01	7.38	10.2	859	2.48	Purged water grey in colour, no odour detected, fine sediment noted. Difficult to purge at this location.
MW02	7.25	10.0	589	2.31	Purged water clear, odourless, some suspended solids.
MW03	7.05	10.5	**1051**	2.91	Grey colour, slight hydrocarbon sheen on surface, slight hydrocarbon odour.
MW04	7.27	8.2	958	3.61	Purged water light grey/brown in colour, sediment in sample, odourless.
Interim EPA Guideline Values (Units as indicated)	**>6.5 & <9.5**	**25℃**	**1000**	**No abnormal change**	**-**

Note: Results above the relevant IGV are highlighted in bold and shaded.

Table 4.3: Results of BTEX & MTBE

Parameter	Units	Laboratory Limit of Detection	BH101	BH102	BH103	BH104B	MW01	MW02	MW03	MW04	Interim EPA Guideline Values (Units as indicated)
Benzene	µg/l	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	1.0
Toluene	µg/l	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	10
Ethylbenzene	µg/l	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	10
p & m-xylene	µg/l	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	10 [Note 1]
o-xylene	µg/l	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	10 [Note 1]
MTBE (Methyl Tertiary Butyl Ether)	µg/l	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	30

Note 1: No specific IGV for parameter. IGV for Total Xylenes is used as guideline.

Table 4.4: Results of Speciated PAH's

Parameter	Units	Laboratory Limit of Detection	BH101	BH102	BH103	BH104B	MW01	MW02	MW03	MW04	Interim EPA Guideline Values (Units as indicated)
Naphthalene	µg/l	0.01	<0.01	<0.01	<0.01	< 0.01	<0.01	<0.01	<0.01	< 0.01	1.0
Acenaphthylene	µg/l	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	-
Acenaphthene	µg/l	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	-
Fluorene	µg/l	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	-
Phenanthrene	µg/l	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	-
Anthracene	µg/l	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	10,000
Fluoranthene	µg/l	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	1.0
Pyrene	µg/l	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	-
Benzo(a)anthracene	µg/l	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	-

Parameter	Units	Laboratory Limit of Detection	BH101	BH102	BH103	BH104B	MW01	MW02	MW03	MW04	Interim EPA Guideline Values (Units as indicated)
Chrysene	µg/l	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	-
Benzo(b)fluoranthene	µg/l	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.5
Benzo(k)fluoranthene	µg/l	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.05
Benzo(a)pyrene	µg/l	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.01
Indeno(1,2,3-cd)pyrene	µg/l	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.05
Dibenz(a,h)anthracene	µg/l	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	-
Benzo(g,h,i)perylene	µg/l	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.05
Total EPA-16 PAH's	µg/l	0.2	**< 0.2**	**< 0.2**	**< 0.2**	**< 0.2**	**< 0.2**	**< 0.2**	**< 0.2**	**< 0.2**	0.1

Note: Results above the relevant IGV are highlighted in bold and shaded.
Note: Results above the relevant laboratory limit of detection are in italics.

Table 4.5: Results of Total Phenols

Parameter	Units	Laboratory Limit of Detection	BH101	BH102	BH103	BH104B	MW01	MW02	MW03	MW04	Interim EPA Guideline Values (Units as indicated)
Total Phenols (monohydric)	µg/l	10	<10	<10	<10	<10	<10	<10	<10	<10	0.5
Total Phenols (GC-MS)	µg/l	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.5

Table 4.6: Results of Speciated Phenols

Parameter	Unit s	Laboratory Limit of Detection	BH101	BH102	BH103	BH104B	MW01	MW02	MW03	MW04	Interim EPA Guideline Values (Units as indicated)
Phenol	µg/l	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.5
2,4,5-Trichlorophenol	µg/l	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	-
2,4,6-Trichlorophenol	µg/l	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	200
2,4-Dichlorophenol	µg/l	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	-
2,4-Dimethylphenol	µg/l	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	-
2-Chlorophenol	µg/l	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	200
2-Methylphenol	µg/l	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	-
2-Nitrophenol	µg/l	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	-
4-Chloro-3-methylphenol	µg/l	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	-
4-Methylphenol	µg/l	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	-

Note: Results above the relevant laboratory limit of detection are in italics.

Table 4.7: Results of Semi-Volatile Organic Compounds (sVOCs)

Parameter	Units	Laboratory Limit of Detection	BH101	BH102	BH103	BH104B	MW01	MW02	MW03	MW04	Interim EPA Guideline Values (Units as indicated)
Aniline	µg/l	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	-
Phenol	µg/l	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.5
2-Chlorophenol	µg/l	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	200
Bis(2-chloroethyl)ether	µg/l	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	-
1,3-Dichlorobenzene	µg/l	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	-
1,2-Dichlorobenzene	µg/l	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	10
1,4-Dichlorobenzene	µg/l	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	-
Bis(2-chloroisopropyl)ether	µg/l	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	-
2-Methylphenol	µg/l	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	-
Hexachloroethane	µg/l	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	-
Nitrobenzene	µg/l	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	10
4-Methylphenol	µg/l	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	-
Isophorone	µg/l	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	-
2-Nitrophenol	µg/l	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	-
2,4-Dimethylphenol	µg/l	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	-
Bis(2-chloroethoxy)methane	µg/l	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	-
1,2,4-Trichlorobenzene	µg/l	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.40
Naphthalene	µg/l	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	1.0

Parameter	Units	Laboratory Limit of Detection	BH101	BH102	BH103	BH104B	MW01	MW02	MW03	MW04	Interim EPA Guideline Values (Units as indicated)
2,4-Dichlorophenol	µg/l	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	-
4-Chloroaniline	µg/l	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	-
Hexachlorobutadiene	µg/l	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.10
4-Chloro-3-methylphenol	µg/l	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	-
2,4,6-Trichlorophenol	µg/l	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	200
2,4,5-Trichlorophenol	µg/l	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	-
2-Methylnaphthalene	µg/l	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.13	<0.05	-
2-Chloronaphthalene	µg/l	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	-
Dimethylphthalate	µg/l	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	-
2,6-Dinitrotoluene	µg/l	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	-
Acenaphthylene	µg/l	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	-
Acenaphthene	µg/l	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	-
2,4-Dinitrotoluene	µg/l	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	-
Dibenzofuran	µg/l	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	-
4-Chlorophenyl phenyl ether	µg/l	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	-
Diethyl phthalate	µg/l	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	-
4-Nitroaniline	µg/l	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	-
Fluorene	µg/l	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	-
Azobenzene	µg/l	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	-

Parameter	Units	Laboratory Limit of Detection	BH101	BH102	BH103	BH104B	MW01	MW02	MW03	MW04	Interim EPA Guideline Values (Units as indicated)
Bromophenyl phenyl ether	µg/l	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	-
Hexachlorobenzene	µg/l	0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	0.03
Phenanthrene	µg/l	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	-
Anthracene	µg/l	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	10,000
Carbazole	µg/l	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	-
Dibutyl phthalate	µg/l	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	2.0
Anthraquinone	µg/l	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	-
Fluoranthene	µg/l	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	1.0
Pyrene	µg/l	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	-
Butyl benzyl phthalate	µg/l	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	-
Benzo(a)anthracene	µg/l	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	-
Chrysene	µg/l	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	-
Benzo(b)fluoranthene	µg/l	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.5
Benzo(k)fluoranthene	µg/l	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.05
Benzo(a)pyrene	µg/l	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.01
Indeno(1,2,3-cd)pyrene	µg/l	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.05
Dibenz(a,h)anthracene	µg/l	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	-
Benzo(g,h,i)perylene	µg/l	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.05

Note: Results above the relevant laboratory limit of detection in italics.

Table 4.8: Results of Volatile Organic Compounds (VOCs)

Parameter	Units	Laboratory Limit of Detection	BH101	BH102	BH103	BH104B	MW01	MW02	MW03	MW04	Interim EPA Guideline Values (Units as indicated)
Chloromethane	µg/l	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	-
Chloroethane	µg/l	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	-
Bromomethane	µg/l	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	-
Vinyl Chloride	µg/l	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	-
Trichlorofluoromethane	µg/l	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	-
1,1-dichloroethene	µg/l	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	30
1,1,2-Trichloro 1,2,2-Trifluoroethane	µg/l	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	-
Cis-1,2-dichloroethene	µg/l	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	-
MTBE (Methyl Tertiary Butyl Ether)	µg/l	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	30
1,1-dichloroethane	µg/l	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	-
2,2-Dichloropropane	µg/l	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	-
Trichloromethane	µg/l	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	12
1,1,1-Trichloroethane	µg/l	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	500
1,2-dichloroethane	µg/l	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	-
1,1-Dichloropropene	µg/l	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	-
Trans-1,2-dichloroethene	µg/l	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	-
Benzene	µg/l	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	1.0
Tetrachloromethane	µg/l	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	2.0

Parameter	Units	Laboratory Limit of Detection	BH101	BH102	BH103	BH104B	MW01	MW02	MW03	MW04	Interim EPA Guideline Values (Units as indicated)
1,2-dichloropropane	µg/l	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	-
Trichloroethene	µg/l	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	70
Dibromomethane	µg/l	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	-
Bromodichloromethane	µg/l	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	-
Cis-1,3-dichloropropene	µg/l	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	-
Trans-1,3-dichloropropene	µg/l	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	-
Toluene	µg/l	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	10
1,1,2-Trichloroethane	µg/l	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	-
1,3-Dichloropropane	µg/l	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	-
Dibromochloromethane	µg/l	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	-
Tetrachloroethene	µg/l	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	40
1,2-Dibromoethane	µg/l	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	-
Chlorobenzene	µg/l	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	1.0
1,1,1,2-Tetrachloroethane	µg/l	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	-
Ethylbenzene	µg/l	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	10
p & m-xylene	µg/l	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	10
Styrene	µg/l	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	-
Tribromomethane	µg/l	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	-
o-xylene	µg/l	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	10

Parameter	Units	Laboratory Limit of Detection	BH101	BH102	BH103	BH104B	MW01	MW02	MW03	MW04	Interim EPA Guideline Values (Units as indicated)
Isopropylbenzene	µg/l	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	-
Bromobenzene	µg/l	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	-
N-Propylbenzene	µg/l	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	-
2-Chlorotoluene	µg/l	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	-
4-Chlorotoluene	µg/l	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	-
1,3,5-Trimethylbenzene	µg/l	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	-
Tert-Butylbenzene	µg/l	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	-
1,2,4-Trimethylbenzene	µg/l	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	-
Sec-Butylbenzene	µg/l	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	-
1,3-dichlorobenzene	µg/l	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	-
P-Isopropyltoluene	µg/l	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	-
1,2-dichlorobenzene	µg/l	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	10
1,4-dichlorobenzene	µg/l	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	-
Butylbenzene	µg/l	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	-
1,2-Dibromo-3-chloropropane	µg/l	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	-
1,2,4-Trichlorobenzene	µg/l	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.40
Hexachlorobutadiene	µg/l	0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.10
1,2,3-Trichlorobenzene	µg/l	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	-

Note: Results above the relevant IGV are highlighted in bold and shaded.
Note: Results above the relevant laboratory limit of detection are highlighted in bold italics.

Table 4.9: Results of Total Petroleum Hydrocarbons (Aliphatic/Aromatic)

Parameter	Units	Laboratory Limit of Detection	BH101	BH102	BH103	BH104B	MW01	MW02	MW03	MW04	Interim EPA Guideline Values (Units as indicated)
Aliphatic > C5-C6	µg/l	10	<10	<10	<10	<10	<10	<10	<10	<10	-
Aliphatic > C6-C8	µg/l	10	<10	<10	<10	<10	<10	<10	<10	<10	-
Aliphatic > C8-C10	µg/l	10	<10	<10	<10	<10	<10	<10	<10	<10	-
Aliphatic > C10-C12	µg/l	10	<10	<10	<10	<10	<10	<10	<10	<10	-
Aliphatic > C12-C16	µg/l	10	<10	<10	***70***	<10	<10	<10	<10	<10	-
Aliphatic > C16-C21	µg/l	10	<10	<10	***100***	<10	<10	<10	<10	<10	-
Aliphatic >C21-C35	µg/l	10	<10	<10	***90***	<10	<10	<10	<10	<10	-
Aliphatic (C5-C35)	µg/l	10	<10	<10	**260**	<10	<10	<10	<10	<10	10
Aromatic > C5-C7	µg/l	10	<10	<10	<10	<10	<10	<10	<10	<10	-
Aromatic > C7-C8	µg/l	10	<10	<10	<10	<10	<10	<10	<10	<10	-
Aromatic > C8-C10	µg/l	10	<10	<10	<10	<10	<10	<10	<10	<10	-
Aromatic > C10-C12	µg/l	10	<10	<10	<10	***30***	<10	<10	<10	***20***	-
Aromatic > C12-C16	µg/l	10	<10	<10	***30***	***110***	<10	<10	<10	***60***	-
Aromatic > C16-C21	µg/l	10	<10	<10	***280***	***80***	<10	<10	<10	<10	-
Aromatic > C21-C35	µg/l	10	<10	<10	***100***	<10	<10	<10	<10	<10	-
Aromatic (C5-C35)	µg/l	10	<10	<10	**410**	**220**	<10	<10	<10	80	10

Note: Results above the relevant IGV are highlighted in bold and shaded.
Note: Results above the relevant laboratory limit of detection are highlighted in bold italics.

5 DISCUSSION OF QUARTER 1 RESULTS

The results of the Quarter 1 monitoring event for 2013 are presented in Table 4.1 to 4.9 of this report. For the purpose of this report, the results are compared to the EPA Interim Guideline Values (IGV) as set out in the Interim Report *'Towards Setting Guideline Values for the Protection of Groundwater in Ireland' 2004.* A discussion of the results and their significance is included below.

5.1 FIELD PARAMETERS

The results of the field parameters measured at each groundwater monitoring well are presented in Table 4.2. Groundwater samples recorded pH levels ranging between 6.59 and 7.66. All pH measurements were inside the EPA Interim guideline range of ≥6.5 to ≤9.5. Temperature measurements ranged from 7.4℃ to 10.5℃ and were w ithin the EPA IGV of 25℃.

Field measurements of Electrical Conductivity levels ranged between 589 µS/cm and 1051 µS/cm and were above the Interim Guideline Value of 1000 µS/cm at all locations with the exception of MW03 (1050 µS/cm).

Dissolved oxygen levels ranged between 2.30 and 3.61 ppm. Factors such as climate, nutrients in the water, suspended solids; organic wastes and groundwater inflow can all influence the dissolved oxygen values.

Observations relating to colour and odour varied from well to well as detailed in Table 4.2.

5.2 RESULTS OF BTEX & MTBE

The results of the **BTEX** and **MTBE** analysis are presented in Table 4.3 and demonstrate concentrations below the laboratory limit of detections and associated IGV's at all locations.

The last detection of MTBE was in the Quarter 1 monitoring event of 2012. MTBE was recorded above the laboratory limit of detection at a concentration of 280 µg/l at BH104B. This was the only recorded exceedance in Quarter 1 2012. Previous monitoring during Quarter 1 and Quarter 2 of 2010 detected exceedances of MTBE at BH103 at a concentration of 16 µg/l. During Quarter 3 and Quarter 4 of 2010 concentrations were below the laboratory limit of detection. Prior to these 2010 monitoring events, concentrations of MTBE at BH103 were recorded at 63 µg/l in December 2009.

5.3 RESULTS OF SPECIATED PAH'S

The results of the Speciated PAH analysis during this monitoring period are presented in Table 4.4.

The laboratory limit of detection for Total EPA-16 PAH's is 0.2 µg/l. This laboratory limit of detection is above the EPA IGV of 0.1 µg/l. To identify the compounds, which attributed to these concentrations, speciated PAH analysis was carried out, which reduces the limit of detection for individual parameters to 0.01 µg/l.

The results of the speciated polycyclic aromatic hydrocarbon analysis detected no concentrations above the laboratory limit of detection. The laboratory is accredited to achieve a detection limit of 0.2 µg/l for EPA-16 PAH's. The laboratory has confirmed that the detection limit for total EPA-16 PAH's can be lowered to 0.1 µg/l for comparison with the EPA IGV of 0.1 µg/l, however this will not be accredited.

5.4 RESULTS OF SPECIATED PHENOLS

The results of Total Phenol analysis are presented in Table 4.5. All samples detected concentrations of monohydric phenol below the laboratory limit of detection of 10 µg/l. It should be noted that the laboratory limit of detection is above the IGV of 0.5 µg/l for phenols.

For this reason, samples were analysed for phenols to include chlorophenols. The results of the speciated phenols analysis are presented in Table 4.6. The speciated phenol analysis reduces the laboratory limit of detection to 0.05 µg/l for individual parameters.

The results of the current Quarter 1 2013 speciated phenol analysis confirm concentrations of phenols were below the laboratory limit of detection of 0.05 µg/l at all locations. This is consistent with the results from the previous 2012 monitoring events.

5.5 RESULTS OF SEMI-VOLATILE ORGANIC COMPOUNDS

The results of the Semi-Volatile Organic Compound analysis are presented in Table 4.7.

No SVOC's were detected during this monitoring period above the relevant IGV's. The Quarter 3 monitoring event of 2012 detected concentrations of Naphthalene and Acenaphthylene at 2.4 µg/l and 0.12 µ/l respectively in MW03.

5.6 RESULTS OF VOLATILE ORGANIC COMPOUNDS

The results of the Volatile Organic Compound analysis are presented in Table 4.8. The results of the current Quarter 1 2013 monitoring event indicate that there were no exceedances of VOC parameters detected above the relevant IGV's.

In November 2009, corresponding to Quarter 4 of 2009, no VOC's were detected above the relevant IGV's. However some parameters were detected above the laboratory limits of detection (1,1-Dichloroethane, 1,2,4-trimethylbenzene, 1,3,5-trimethylbenzene, MTBE, n-butylbenzene, n-propylbenzene, o-xylene, p-isopropyltoluene, sec-butylbenzene and tert-butylbenzene).

The Quarter 1 and Quarter 2 monitoring results of 2010 detected MTBE in BH103 raised above the laboratory limit of detection of 1.0 µg/l at a concentration of 16 µg/l.

The results of the Quarter 3 and Quarter 4 monitoring events of 2010 and all subsequent monitoring events indicate that there were no exceedances of the IGV for specific parameters.

5.7 RESULTS OF TOTAL PETROLEUM HYDROCARBONS

In order to provide a more accurate profile of TPH within the groundwater, speciated hydrocarbon analysis using the Total Petroleum Hydrocarbon Criteria Working Group (TPHCWG) method was carried out on samples taken at all boreholes. The results of the TPH analysis are presented in Table 4.9.

No detections of TPH in the aliphatic range were observed in the monitoring well locations during the current monitoring event with the exception of BH103. Aliphatic TPH of the range C12-C16, C16-C21 and C21-C35 were detected during the Quarter 1 2013 monitoring event.

TPH in the mid to high aromatic ranges were detected in BH103, BH104B and MW04 during the current Quarter 1 2013 monitoring event. Aromatic TPH of the ranges C12-C16, C16-C21 and C21-C35 were detected in BH103, the ranges C10-C12, C12-C16 and C16-C21 were detected in BH104B and aromatic TPH of the ranges C10-C12 and C12-C16 were detected in MW04.

The EPA IGV of 10 µg/l for Total Hydrocarbons is deemed comparable with the results for total petroleum hydrocarbons (TPH). Total aliphatic hydrocarbons were detected at 260 µg/l in BH103 and total aromatic petroleum hydrocarbons were detected at 410 µg/l in BH103, 220 µg/l in BH104B and 80 µg/l in MW04.

The Quarter 2 monitoring event of 2012 detected elevated TPH of the aliphatic range C12-C16, C16-C21 and C21-C25 in BH103. Hydrocarbons have been detected in borehole MW03 during Quarter 1 2010, in borehole BH104B during the Quarter 2 2010 monitoring event and in borehole BH104B and MW03 during the Quarter 3 2010 monitoring events. Hydrocarbons have also been detected in BH103, BH104B and MW03 in the Quarter 2 2011 monitoring event and in MW03 in the Quarter 3 and Quarter 4 2011. These detections are discussed further in Section 6.2.3.

6 HISTORICAL RESULTS & TRENDS

Time series plots are presented in this section and include the results of the Quarter 1 2013 monitoring round. As the monitoring continues in accordance with the waste licence requirements, the plots will be updated with the results of subsequent rounds and used to illustrate the results.

6.1 GROUNDWATER LEVELS OVER TIME

Figure 3 to Figure 5 below illustrates the manually recorded water levels using an electronic probe. The graphs show that groundwater levels can vary considerably between monitoring rounds.

Figure 4 illustrates groundwater elevations (mAOD) in shallow groundwater wells (BH101 to BH104B) ranging between approximately 98 mAOD and 102 mAOD.

Figure 5 illustrates groundwater elevation (mAOD) in the deeper groundwater wells (MW01 to MW03). The groundwater elevation (mAOD) for these deeper groundwater wells ranges from approximately 97.5 mAOD to approximately 100 mAOD.

Figure 3 Groundwater Elevation (mAOD) in all Monitoring Wells

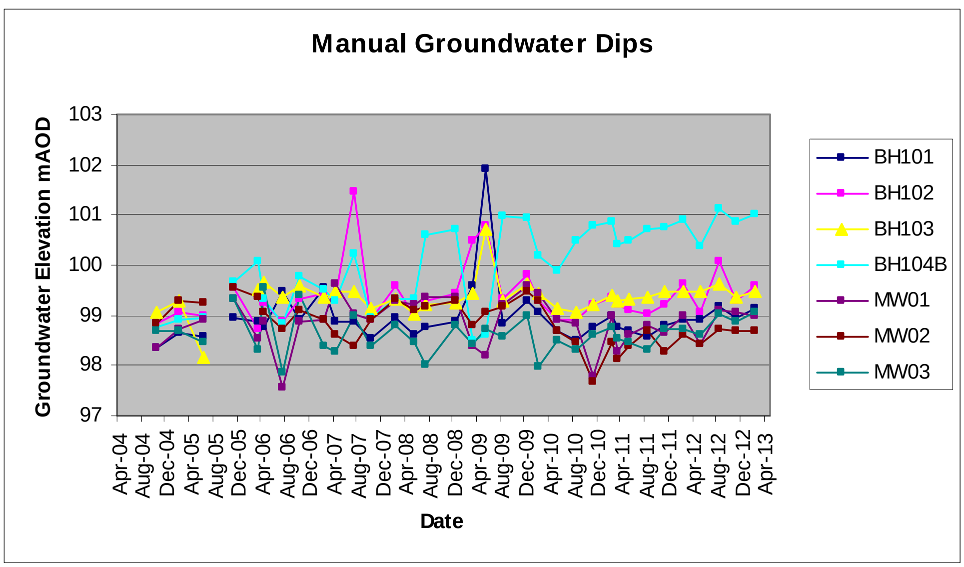


Figure 4 Groundwater Elevation (mAOD) in Shallow Monitoring Wells

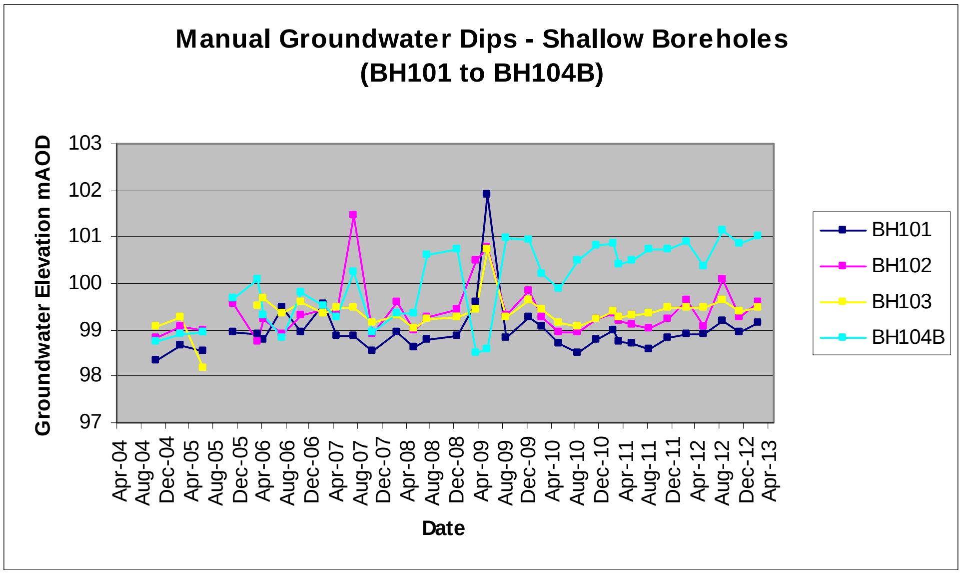
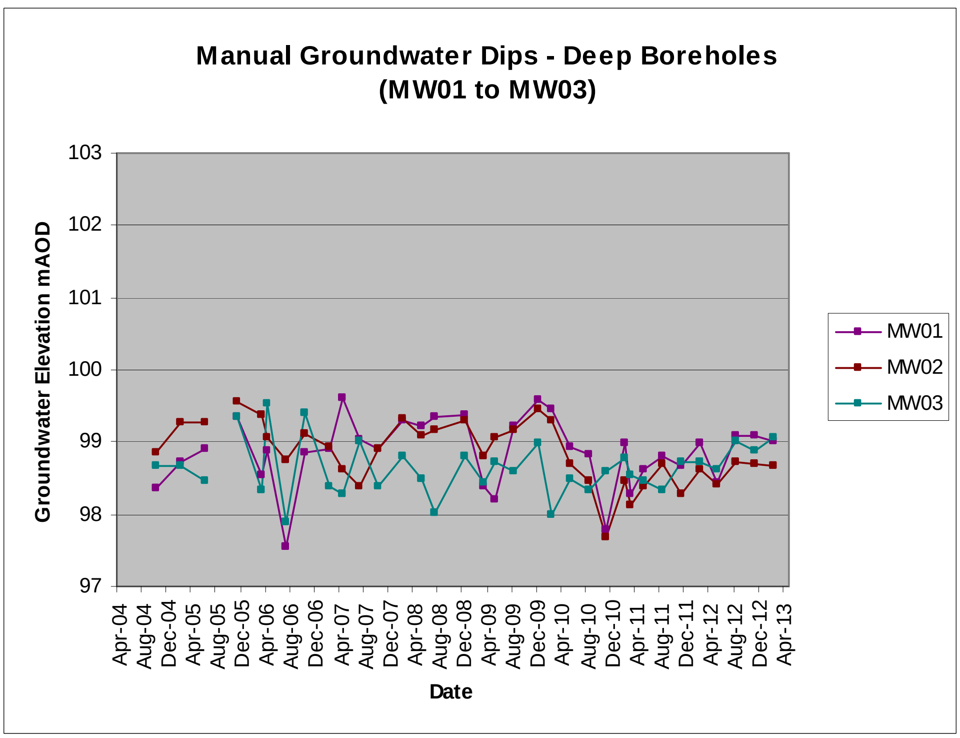


Figure 5 Groundwater Elevation (mAOD) in Deep Monitoring Wells



The groundwater levels generally show a similar pattern of fluctuation over time indicating a degree of connection between boreholes. The graphs demonstrate that groundwater levels can vary considerably between monitoring rounds; however, the general direction of flow in the shallow and deeper groundwater bearing unit is predominantly in a south easterly direction and occasionally in a southerly direction.

In addition, monthly rainfall data for Oak Park, Carlow have been tabulated from Met Eireann to examine the relationship between compounds and rainfall events. The data from Oak Park was chosen as the weather station at Birr, Co. Offaly closed in October 2009. A summary of the rainfall data is in Tables 5.1 to 5.4.

Table 5.1: Monthly Rainfall data for Year 2009 for Oak Park, Carlow

Month	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec
Rainfall (mm)	113.4	29.2	32.6	102.4	69.0	65.4	152.4	100.9	41.8	127.8	215.5	73.7

Table 5.2: Monthly Rainfall data for Year 2010 for Oak Park, Carlow

Month	Jan	Feb	Mar	Apr	May	June	July	August	Sept	Oct	Nov	Dec
Rainfall (mm)	71.5	48.0	80.7	49.0	51.4	37.7	93.6	25.5	108.7	68.9	87.7	52.2

Table 5.3: Monthly Rainfall data for Year 2011 for Oak Park, Carlow

Month	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec
Rainfall (mm)	50.6	121.9	16.0	19.5	51.2	72.7	46.4	25.5	93.9	93.9	89.2	55.5

Table 5.4: Monthly Rainfall data for 2012 to date for Oak Park, Carlow

Month	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec
Rainfall (mm)	70.8	24.5	18.0	56.3	50.2	155.8	76.2	127.7	37.9	63.4	80.9	68.1

Table 5.5: Monthly Rainfall data for 2013 to date for Oak Park, Carlow

Month	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec
Rainfall (mm)	76.2	35.2	57.6									

Note: Data for the most recent months are provisional.

6.2 GROUNDWATER CONCENTRATIONS OVER TIME

Groundwater quality trends have previously been examined in two reports (URS 2005 and RPS 2007). In addition, RPS carried out a groundwater risk assessment (Ref: MDE0788RP0001, dated November 2008) in which the general trend of contaminant concentrations over time was observed to be erratic with compounds rarely being detected in the same borehole on two consecutive monitoring rounds.

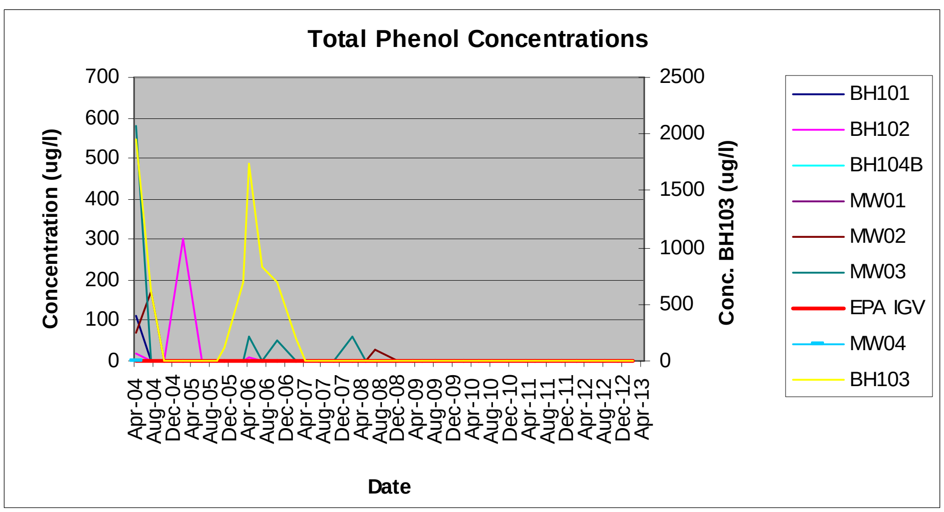
The data available within these reports has been reviewed and time series plots of key parameters have been compiled based on notable trends. Trends for phenols, petroleum hydrocarbons and chlorinated solvents have been plotted as outlined in the following sections.

6.2.1 Phenols

Phenols have been detected historically in all boreholes with the highest concentrations recorded in BH103. However concentrations in BH103 have declined since April 2007. Phenol concentrations have since been recorded below the IGV of 0.5 µg/l in all monitoring wells since December 2008 indicating natural attenuating conditions within the groundwater.

2,4-Dimethylphenol was detected at a concentration of 0.12 µg/l during the Quarter 1, 2010 monitoring event. There is no recommended IGV for this parameter. Subsequent to the Quarter 1 2010 monitoring event no detections of phenols have been noted at any monitoring location up to and including the current Quarter 1 2013 monitoring event.

Figure 6 Phenol Concentrations in all Monitoring Wells



6.2.2 Polycyclic Aromatic Hydrocarbons (PAH's)

Figure 7 below illustrates that PAH's (Polycyclic Aromatic Hydrocarbons) have previously been detected within all monitoring wells above the recommended EPA IGV of 0.1 µg/l. Historically the highest concentrations have been detected within MW03 and BH104B. In addition, a range of PAH's including Benzo(a)pyrene, Benzo(g,h,i)perylene, Indeno(1,2,3)cd pyrene, Fluoranthene and Napthalene have previously been detected in MW03 with Figures 8 to 11 illustrating some of the PAH compounds which were detected above their respective IGV's.

Figure 7 illustrates that **Total PAH** has been detected in all groundwater monitoring wells at the site above the IGV of 0.1 µg/l since 2005. Elevated concentrations have been detected in MW03 and BH104B, with the highest concentration detected in March 2006 (107 µg/l) and in October 2007 (19.72 µg/l) respectively. Since then, the concentrations have shown a marked decrease with no elevated Total PAH concentrations in this current Quarter 1 monitoring period of 2013.

The results from the Quarter 4, 2009 monitoring round in December 2009 recorded total EPA-16 PAH concentrations above the IGV at all locations with the exception of MW02. These concentrations may be linked to the heavy rainfall event, which occurred in November of 2009, which may have mobilized traces of these compounds from soil.

The results from the Quarter 1 monitoring round, 2010 recorded Total PAH concentrations below the IGV of 0.2 µg/l at all locations with the exception of MW03, which detected a concentration of 0.3 µg/l. There has been a decrease in Total PAH concentrations at all locations since the Quarter 4 event in December 2009 with the most notable decrease at MW03 reducing from 4.58 µg/l to <0.1 µg/l.

The only concentrations of Total PAH above the IGV in 2010 were detected during the Quarter 1 monitoring event in MW03 (0.3 µg/l), Quarter 2 monitoring event in BH104B (1.2 µg/l) and Quarter 3 monitoring event in MW02 (2.0 µgl) and BH104B (0.2 µgl). There were no elevated concentrations of Total PAH during the Quarter 4 2010, the Q1, Q2, Q3 and Q4 2011 monitoring events, and the Q1 2012 monitoring event. Total PAH was detected above the IGV in MW03 in the Q2 2012 monitoring event. No Total PAH exceedances were detected in the following Q3 and Q4 2012 monitoring events or the current Q1 2013 monitoring event suggesting that elevations detected in the Q2 2012 monitoring event were an isolated occurrence.

Figure 7 PAH (Total) Concentrations in all Monitoring Wells

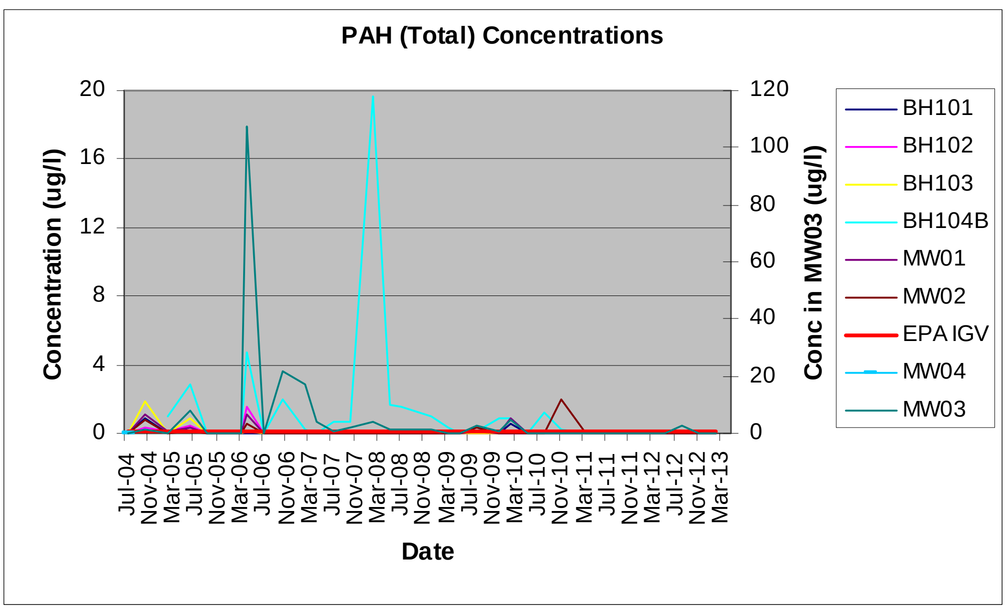


Figure 8 Fluoroanthene Concentrations in all Monitoring Wells

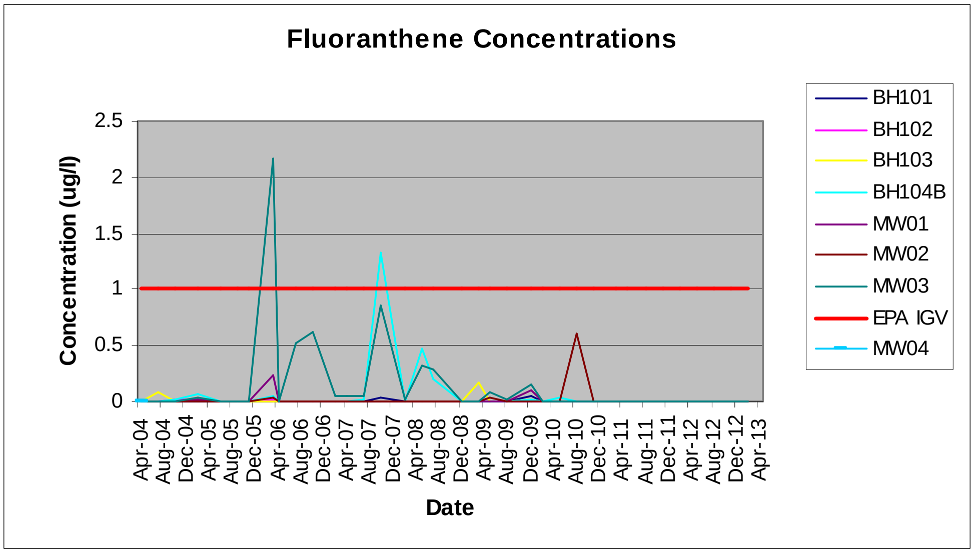
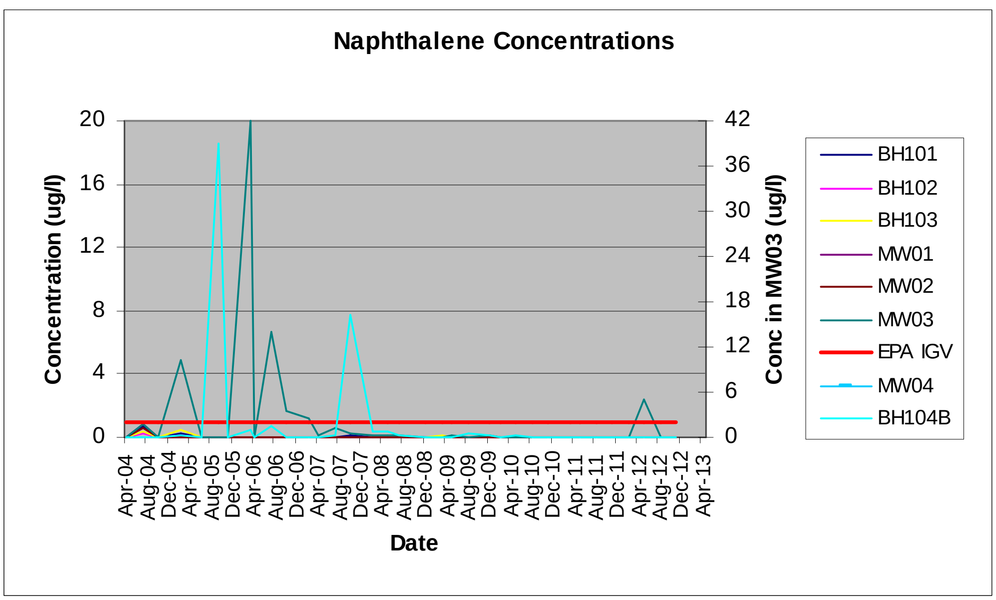


Figure 8 illustrates that **Fluoroanthene** was previously detected above the IGV of 1.0 µg/l in groundwater monitoring wells BH104B (October 2007, 1.33 µg/l) and MW03 (March 2006, 2.158 µg/l) only. The remaining monitoring wells recorded concentrations below the IGV of 1.0 µg/l.

Figure 9 Naphthalene Concentrations in all Monitoring Wells



A similar trend to Fluoroanthene has been noted in Figure 9, with concentrations of **Naphthalene** recorded above the IGV of 1.0 µg/l in BH104B and MW03 only. 4 no. exceedances of the IGV were noted in BH104B in September 2005 (39 µg/l), March 2006 (1.069 µg/l), July 2006 (1.594 µg/l) and October 2007 (16.31 µg/l). Since October 2007, the concentrations in BH104B have decreased below the IGV. There have been 6 exceedances of the IGV of 1.0 µg/l in MW03, with the highest concentration detected in March 2006 (19.986 µg/l) and the most recent being the detected in the Quarter 2 2012 monitoring event (2.4 µg/l). The concentrations detected in August 2010 were slightly above the laboratory limit of detection of 0.01 µg/l at BH104B (0.08 µg/l) and MW03 (0.05 µg/l);

however these levels are deemed low. Concentrations of Naphthalene were below the EPA IGV limit of detection of 1.0 µg/l at all locations during the Quarter 4 2010, the 2011 quarterly monitoring events and the Quarter 1, Quarter 3 and Quarter 4 2012 monitoring periods. No detections of Naphthalene were noted in the current Quarter 1 2013 monitoring event.

Figure 10 Benzo (g,h,i) perylene in all Monitoring Wells

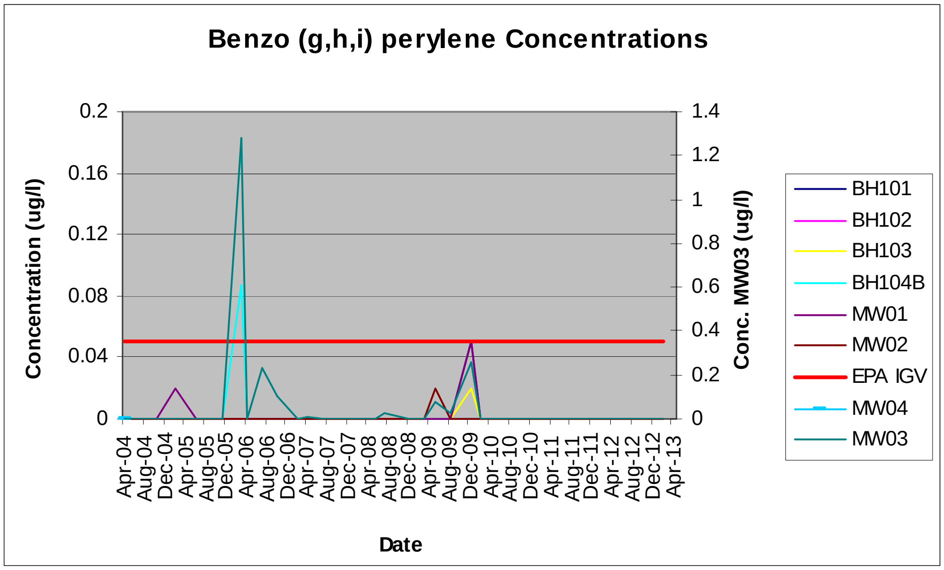


Figure 10 illustrates the concentrations of **Benzo(g,h,i)perylene** in BH104B and MW03 over time. Elevated concentrations above the IGV were recorded at BH104B (0.087 µg/l) on one occasion only in March 2006.

Figure 10a illustrates elevated concentrations above the IGV recorded at MW03 on 5 no. occasions with the most recent elevated concentration detected in December 2009 (0.26 µg/l). The results of monitoring events in May, August, November 2010, March, May, September and November 2011, February, May, August and November 2012 and the current Quarter 1 2013 monitoring event recorded concentrations below the laboratory limit of detection of 0.01 µg/l at all locations.

Figure 10a Benzo (g,h,i) perylene in Monitoring Wells BH104B & MW03

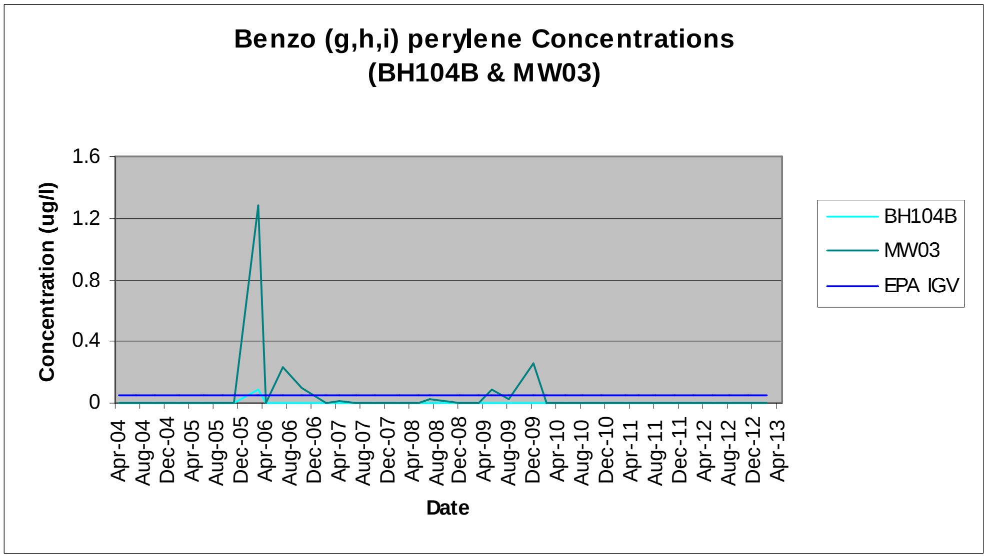
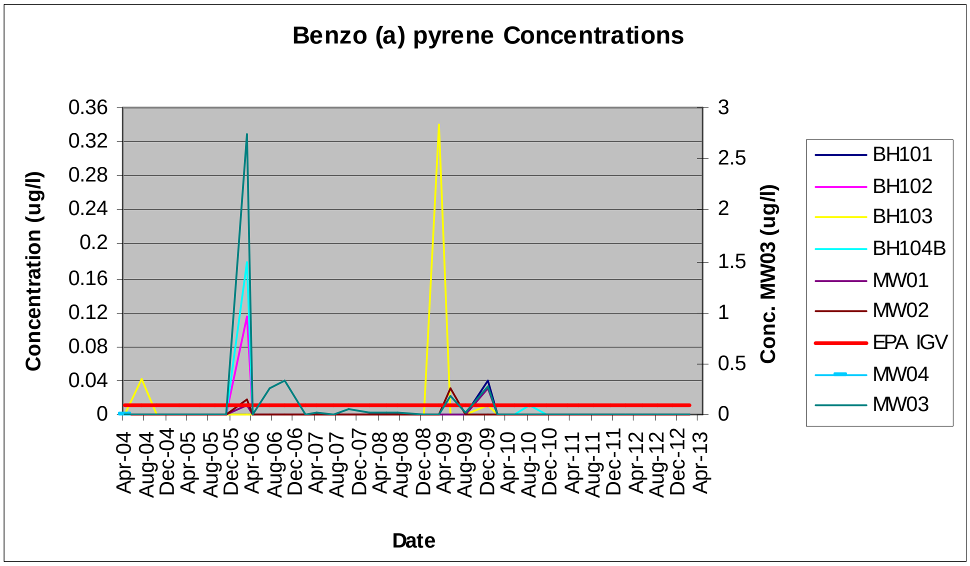


Figure 11 illustrates the concentrations of **Benzo(a)pyrene** in all groundwater monitoring wells and indicates that Benzo(a)pyrene has been detected historically in all boreholes above the IGV of 0.01 µg/l. Similarly with the above mentioned trends, the highest concentrations have been detected in MW03 and BH104B. Concentrations have markedly decreased since March 2006 when an elevated concentration of 2.751 µg/l was detected in MW03, however there have been a number of detections above the IGV, with the most recent elevated level detected in December 2009. Elevated concentrations above the IGV were recorded in BH101, BH103 and MW01 during this same period. The results of all monitoring events in 2010, 2011 and 2012 indicate concentrations below the IGV. The results of the previous Quarterly monitoring event of 2012 and the current Quarter 1 2013 event also recorded concentrations below the IGV.

The slightly higher concentrations of Benzo(g,h,i)perylene and Benzo(a)pyrene detected in Quarter 4, 2009 may be attributed to heavy rainfall, which occurred in November of 2009 and as a result possibly mobilized traces of these compounds from the soil. The static water levels for December 2009 ranged between 0.58 and 3.78 mbgl. Since December 2009, concentrations of compounds have notably decreased to below the IGV's.

Figure 11 Benzo(a)pyrene in all Monitoring Wells

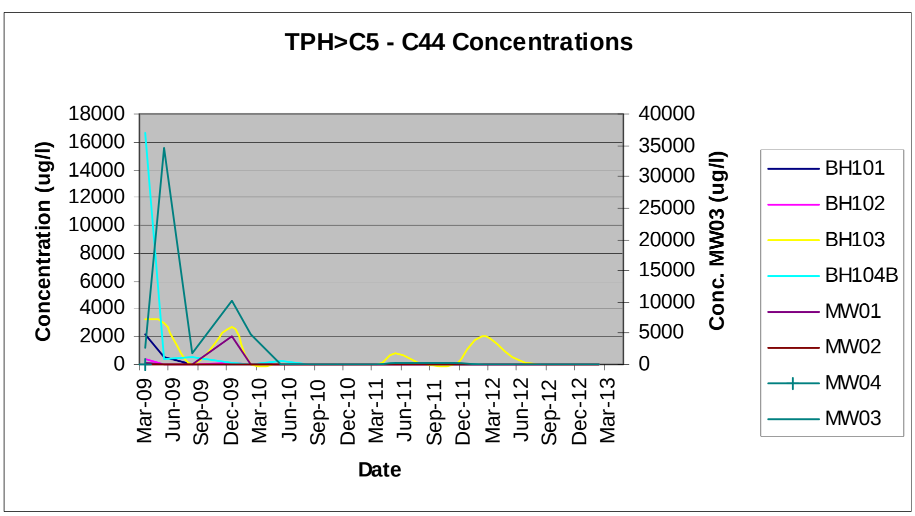


6.2.3 Petroleum Hydrocarbons (TPH)

Historically **Total Petroleum Hydrocarbons (TPH)** including mineral oil, petrol range organics (PRO) and diesel range organics (DRO) have been detected within BH103, BH104B and MW03. Since 2009, speciated hydrocarbon analysis using the Total Hydrocarbon Criteria Working Group (TPHCWG) method has been carried out on all samples to obtain a more accurate profile of TPH within groundwater.

The results of the TPHCWG analysis has indicated that the predominant hydrocarbons detected are in the heavier chain carbon fractions, most notably in the carbon range C12 – C16, C16 – C21 and C21 – C35. Figure 12 illustrates the TPH analysis for the total TPH analysis from C5 – C44 in all monitoring wells since 2009. The highest concentrations detected historically are at monitoring wells MW03, BH104B and BH103 respectively.

Figure 12 TPH (Carbon Range C5-C44) in all Monitoring Wells



During the Quarter 1, 2010 monitoring event, hydrocarbons were detected in borehole MW03. The predominant aliphatic carbon range in MW03 comprised of C16-C21 (1000 µg/l), C21-C35 (2300 µg/l) and C25-C44 (990 µg/l). The predominant aromatic carbon range in MW03 comprised of C16-C21 (220 µg/l) and C21-C35 (620 µg/l). No detections were observed at other locations.

During the Quarter 2, 2010 monitoring event, hydrocarbons were detected in borehole BH104B, with the predominant aliphatic carbon range comprising C12-C16 (130 µg/l) and C16-C21 (130 µg/l), while the predominant aromatic carbon range comprising C12-C16 (21 µg/l) and C16-C21 (47 µg/l). There were no detections of hydrocarbons in MW03 during the Quarter 2 monitoring event.

During the Quarter 3, 2010 monitoring event, hydrocarbons were detected in borehole BH104B and MW03. The predominant aliphatic carbon range in BH104B comprised of C12-C16 (12 µg/l) and C16-C21 (19 µg/l). The predominant aliphatic carbon range in MW03 comprised of C16-C21 (35 µg/l) and C21-C34 (46 µg/l). No aromatic carbons were detected above the laboratory limit of detection of 10 µg/l in all monitoring wells.

During the Quarter 4, 2010 and Quarter 1, 2011 monitoring event, there were no detections of TPH concentrations above the laboratory limit of detection of 10 µg/l at any location. No aliphatic or aromatic carbons were detected above the laboratory limit of detection of 10 µg/l in all monitoring wells.

During the Quarter 2, 2011 monitoring event, hydrocarbons were detected in borehole BH103, BH104B and MW03. The predominant aliphatic carbon range comprised of C16-C21 (340 µg/l, 20 µg/l and 46 µg/l) and C21-C35 (420 µg/l, 96 µg/l and 150 µg/l in BH103, BH104B and MW03 respectively). The predominant aromatic carbon range also comprised of C16-C21 (78 µg/l, 52 µg/l and 50 µg/l) and C21-C35 (110 µg/l, 49 µg/l and 93 µg/l in BH103, BH104B and MW03 respectively).

During the Quarter 3, 2011 monitoring event, hydrocarbons were detected in borehole MW03 only. The predominant aliphatic carbon range comprised of C10-C12 (18 µg/l), C12-C16 (57 µg/l), C16-C21 (35 µg/l) and C21-C35 (210 µg/l). The predominant aromatic carbon range comprised of C12-C16 (42 µg/l), C16-C21 (66 µg/l) and C21-C35 (45 µg/l).

During the Quarter 4, 2011 monitoring event, hydrocarbons were detected in borehole MW03 only. The predominant aliphatic carbon range comprised C10-C12 (22 µg/l), C12-C16 (51 µg/l), C16-C21 (85 µg/l) and C21-C35 (110 µg/l). The predominant aromatic carbon range comprised of C12-C16 (16 µg/l), C16-C21 (14 µg/l) and C21-C35 (91 µg/l).

During the Quarter 1, 2012 monitoring event, hydrocarbons were detected in borehole BH103 only. The predominant aliphatic carbon range comprised C10-C12 (13 µg/l), C12-C16 (270 µg/l), C16-C21 (690 µg/l) and C21-C35 (980 µg/l). The predominant aromatic carbon range comprised of C16-C21 (250 µg/l) and C21-C25 (680 µg/l). No hydrocarbons were detected in MW03 during the current Quarter 1 monitoring event.

During the Quarter 2, 2012 monitoring event, hydrocarbons were detected in BH103 only. The detected aliphatic carbon range comprised C12-C16 (98 µg/l), C16-C21 (230 µg/l) and C21-C25 (170 µg/l). No detections of aromatic carbons were measured during the Quarter 2 2012 monitoring event.

No hydrocarbons were detected at any location during the previous Quarter 3 and Quarter 4, 2012 monitoring events.

During the current Quarter 1, 2013 monitoring event aromatic hydrocarbons were detected in BH103, BH104b and MW04. The predominant aromatic carbon range comprised C12-C16 (30 µg/l), C16-C21 (280 µg/l) and C21-C35 (100 µg/l) in BH103, C10-C12 (30 µg/l), C12-C16 (110 µg/l) and C16-C21 (80 µg/l) in BH104B and C10-C12 (20 µg/l) and C12-C16 (80 µg/l) in MW04. Aliphatic hydrocarbons were detected in BH103 in the ranges C12-C16 (70 µg/l), C16-C21 (100 µg/l) and C21-C35 (90 µg/l).

7 CONCLUSIONS

- In accordance with the criteria set out in Schedule 4(ii) of the site's Waste Licence Register No. W0184-01, groundwater monitoring was carried out at the ENVA Ireland site on the 19th February 2013 corresponding to Quarter 1 of 2013. A suitably qualified consultant from RPS collected groundwater samples from 8 on-site monitoring wells and submitted these samples to an accredited laboratory for analysis.

- The results presented have been referenced against the Environmental Protection Agency's (EPA) Interim Guideline Values (IGV) as set out in the Interim Report *'Towards Setting Guideline Values for the Protection of Groundwater in Ireland' 2004.*

- Results of the BTEX and MTBE demonstrate that the levels of Benzene, Toluene, Ethylbenzene and Xylene were below the recommended EPA IGV's

- The Quarter 1, 2013 results of the speciated polycyclic aromatic hydrocarbons indicate that the laboratory limit of detection of 0.2 µg/l for Total PAH's was above the EPA IGV of 0.1 µg/l. There were no detections of speciated PAHs at any location during the current monitoring event. The previous Quarter 2 2012 monitoring event detected Total PAH at MW03 and this is thought to be an isolated occurrence as the general trend of PAH concentrations appeared to have reduced over time. Further monitoring at these locations is recommended to determine the persistency of these detections.

- There have been no exceedances of the IGV for SVOC's since Quarter 1 2010.

- There have been no exceedances of the IGV for VOC's in this Quarter 1 2013 monitoring event. The Quarter 1 2012 monitoring event recorded a concentration of MTBE above the IGV of 30 µg/l in BH104B (280 µg/l). MTBE was previously recorded on two occasions in BH104B in April 2007 (49 µg/l) and in October 2007 (3 µg/l). Since then the concentrations had decreased to below the laboratory limit of detection.

- The results of the phenol analysis by GC-MS detected concentrations below the laboratory limit of detection of 1.0 µg/l at all locations. However, the laboratory limit of detection is above the IGV of 0.5 µg/l for phenols. Samples were subsequently also analysed for phenols to include chlorophenols and the results indicate that there were no detections above the laboratory limit of detection of 0.05 µg/l. A low level of 2,4-Dimethylphenol (0.12 µg/l) was detected in MW03 during the Quarter 1, 2010 monitoring event. There have been no detections of this compound since February 2010.

- Hydrocarbons were detected in boreholes BH104B and MW03 in the aliphatic carbon ranges during the Quarter 3, 2010 monitoring event. There were no detections of aromatic carbon above the laboratory limit of detection of 10 µg/l in BH104B and MW03. Hydrocarbons were detected during the Quarter 2 (BH103, BH104B, MW03), Quarter 3 (MW03) and Quarter 4 (MW03) 2011 monitoring events. Hydrocarbons in the aliphatic range were detected in BH103 during the Quarter 1 2013 monitoring event and hydrocarbons of the aromatic range were detected in BH103, BH104b and MW04 were also detected during the current monitoring event. Further monitoring at these locations is recommended to determine the persistency of these detections.

- The general trend of contaminant concentrations over time continues to be somewhat variable with compounds not being continually detected in the same borehole on two or three consecutive monitoring rounds. In general, the contaminant levels detected at the Enva facility appear to indicate reducing contaminant concentrations over time with infrequent elevations in some parameters. Further monitoring is recommended to confirm these reductions.

Enva Portlaoise

2013 Groundwater Compliance Monitoring Quarter 2 (April – June 2013)

DOCUMENT CONTROL SHEET

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Project Title	Enva Portlaoise 2013 Groundwater Compliance Monitoring					
Document Title	Quarter 2 (April – June 2013) Interpretative Report					
Document No.	MDE0973Rp0014D01					
This Document Comprises	DCS	TOC	Text	List of Tables	List of Figures	No. of Appendices
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1 INTRODUCTION

1.1 BACKGROUND

RPS has been commissioned by Enva Ireland Ltd to carry out groundwater quality monitoring for environmental compliance, at their facility in the Clonminam Industrial Estate, Portlaoise, Co Laois. Groundwater monitoring has being carried out in strict accordance with criteria set out in Schedule 4(ii) of the site's Waste Licence Register No. W0184-01.

Enva Ireland has been operating under Waste Licence Register No. W0184-01 since January 2004, and is required to submit a report to the Environmental Protection Agency (EPA) on a quarterly basis, outlining the existing groundwater quality underlying the site.

Suitably qualified environmental consultants from RPS, collected groundwater samples from a series of 8 monitoring wells (BH101, BH102, BH103, BH104B, MW01, MW02, MW03, MW04) within the site boundary on the 17th of April 2013. The samples underwent laboratory analysis for the suite of parameters specified in Schedule 4(ii) of Waste Licence W0184-01. This report outlines the results of the Quarter 2 monitoring for 2013 and reviews historical data recorded at the site.

1.2 OBJECTIVES & SCOPE OF WORK

The specific objectives and scope of work are as follows:

- Review of previous data as provided by Enva Portlaoise;
- Graphical presentation of key compounds and trends; and
- Discussion of results for Quarter 2 2013 within the context of previous results and available guideline concentrations.

2 REVIEW OF PREVIOUS DATA

2.1 INFORMATION SOURCES

The following documents were reviewed as part of this project:

- Waste Licence W0184-01 and any available EPA documents from the EPA website
- Quarterly Groundwater Monitoring Reports (Quarter 1 to Quarter 4), URS (2004)
- Quarterly Groundwater Monitoring Reports (Quarter 1 to Quarter 4), URS (2005)
- Quarterly Groundwater Monitoring Reports (Quarter 1 to Quarter 4), RPS (2006)
- Quarterly Groundwater Monitoring Reports (Quarter 1 to Quarter 4), RPS (2007)
- Quarterly Groundwater Monitoring Reports (Quarter 1 to Quarter 4), RPS (2008)
- Quarterly Groundwater Monitoring Reports (Quarter 1 to Quarter 4), RPS (2009)
- Summary Report on Trend of Contaminant Levels at Enva Ireland Ltd since 2005, Ref: MDE0647RP0001, RPS (2007)
- Groundwater Risk Assessment, Ref: MDE0788Rp0001, RPS (2008)
- Quarterly Groundwater Monitoring Reports (Quarter 1 to Quarter 4), RPS (2010)
- Quarterly Groundwater Monitoring Reports (Quarter 1 to Quarter 4), RPS (2011)
- Quarterly Groundwater Monitoring Reports (Quarter 1 to Quarter 4), RPS (2012)
- Quarter 1 Groundwater Monitoring Report, RPS (2013)

2.2 SITE SETTING

The site is located to the southwest of the town of Portlaoise immediately to the south of the Dublin to Cork railway line. The general area is gently undulating. The site slopes gently to the southwest but to the east of the site the ground slopes gently towards the River Triogue, which is located approximately 1 km to the east. The site occupies an area of approximately 1.5 hectares and comprises of an operational waste oil and contaminated soil treatment plant.

The site is located on the outskirts of Portlaoise in an area of agricultural and light industrial development. The site is bounded to the north and east by land belonging to Irish rail, comprising sidings and general storage areas. To the south is a vehicle repair garage, which is elevated above the level of the site by approximately 1.5 m. To the west the site is adjoined by further industrial land, as well as residential land. The site location is presented on **Figure 1**.

The site has been in operation since 1978, and the layout has remained relatively consistent. The site layout is presented on **Figure 2**. The site is largely covered in hardstanding with some open areas in the far north and northwest of the site. All oil and soil storage areas are suitably bunded and the general standard of housekeeping is good.

2.3 REGIONAL SETTING

2.3.1 Geology

The Geological Survey of Ireland indicates that the regional geology of Portlaoise is typified by Carboniferous Limestone. In the vicinity of the site itself the solid geology comprises the Ballysteen Formation, a micaceous-bioclastic limestone. This well-bedded limestone, with interbeds of shale, is extensively folded, with axes trending north-east to south-west, and becomes increasingly muddy towards the top of the formation. North-east to south-west trending faults are found in the region, with one located approximately 500m to the east of the site. The subsoil's in the region comprise mainly Made Ground, around the industrial area, and Limestone Till in the surrounding regions.

2.3.2 Hydrogeology

The limestone is classified by the Geological Survey of Ireland (GSI) as a locally important karstified aquifer. Porosity is predominantly in the form of fractures, in this aquifer, however the muddy nature of this formation greatly reduces permeability. Vulnerability of this aquifer beneath the site is classified as high, with moderate vulnerability to the east of the site.

The public water supply for Portlaoise is derived from groundwater, utilising five extraction wells in total. This supply currently comes from the Straboe area, approximately 5.5 km to the north-east of the site. The source protection zone for this water supply extends north-west south-east with the boundary of the outer protection zone at least 4 km to the north-east of the site. A further public abstraction well-field has been developed to the north-west of the Straboe area in the townland of Eyne, approximately 6 km to the north of the site, and comprises a further four (GSI) abstraction wells. The Source Protection Zone for these wells has not yet been defined but it is not anticipated to affect the Enva site.

The GSI record a number of other dug wells and boreholes within the Portlaoise area, including the boreholes installed on the site. The accuracy of the locations of these wells varies. One well, which was drilled in 1899 is recorded as being located immediately to the south of the Enva site. The use of this well is not known and its location is only accurate to 1 km. A second borehole, drilled in 1973 is recorded 1.5 km to the north of the site at Clonroosk, the accuracy of this location is also 1 km so that it could be closer or further from the site. The use of this well is not known but its yield is recorded as being poor. There are no other wells recorded within 1 km of the site.

Enva is not aware of any abstraction boreholes within the immediate vicinity of their site.

2.4 SITE GROUND CONDITIONS

A total of eight boreholes have been drilled at the site and the general sequence of ground conditions is presented in **Table 2**.

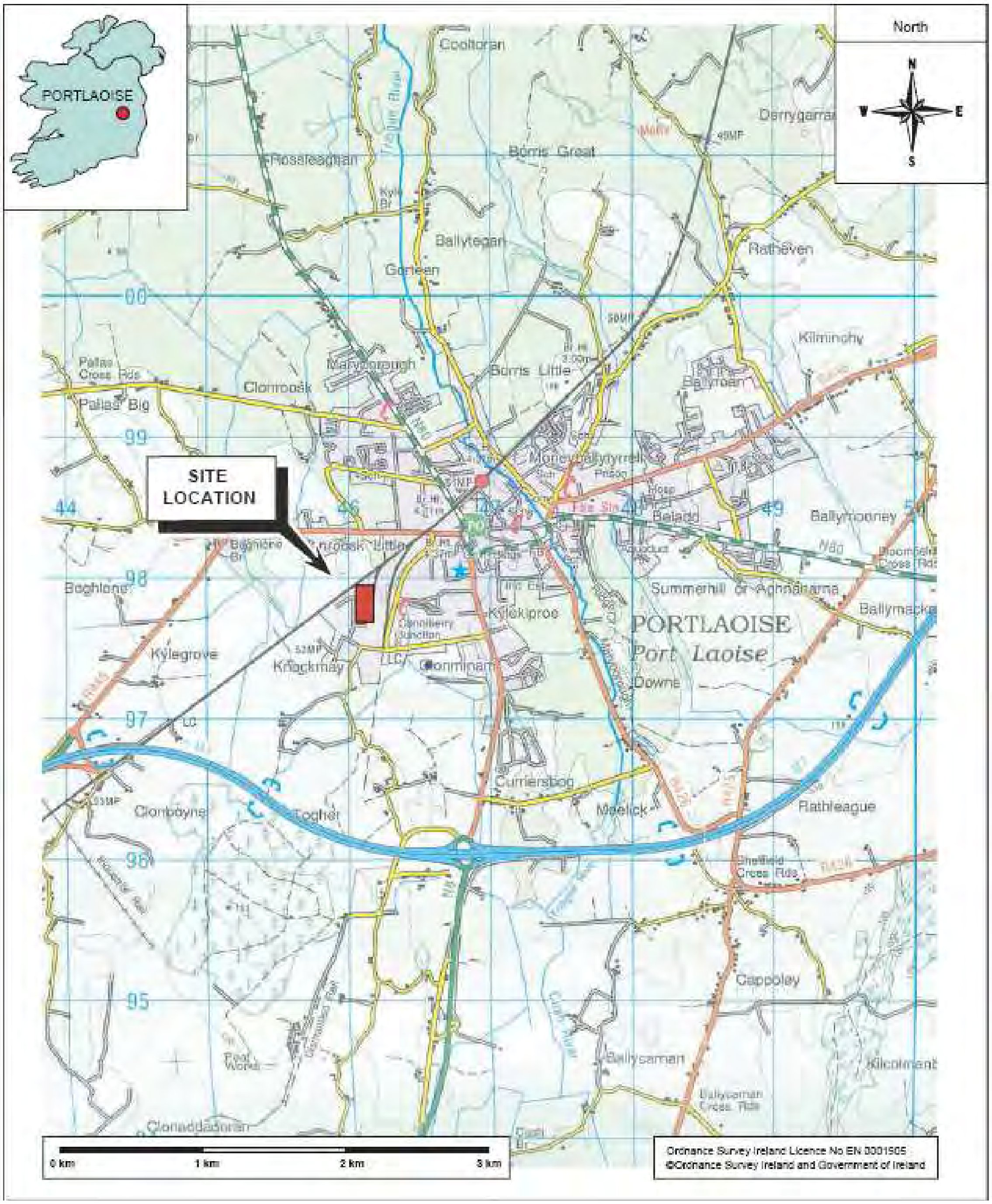
Table 2.1: Ground Conditions

Strata	Extent	Thickness	Description
Made Ground	BH104	0-3.5 m	Predominantly concrete, with hardcore fill, and clay.
Boulder Clay	All boreholes	<8.5 m	Includes fine to medium, well rounded gravels.
Sand and Gravel	Confined to south east	0-2 m	In general the transition from boulder clay to sand is gradual with changes from gravel, to

Strata	Extent	Thickness	Description
	corner of site (BH101, BH104 and MW03)		sandy gravel, to sand.
Limestone Bedrock	Encountered in MW01, MW02 and MW03	Top of limestone ranges from 7.7m to 9m below ground level.	Pale grey, fine-grained bedrock, differentiated from boulders by its un-weathered nature.

The logs for each of the boreholes were previously presented as Appendix B in the RPS Groundwater Risk Assessment Report (Ref: MDE0788Rp0001).

Figure 1 Site Location



2.4.1 Licence Conditions

The waste management licence requires the regular monitoring and sampling of boreholes BH101, BH102, BH103, BH104B, MW01, MW02, MW03 and MW04. The parameters requiring measurement or analysis are presented in Table 2.2.

Table 2.2: Licence Parameters

Group	Parameters requiring Quarterly Measurement	Parameters requiring Annual Measurement
Field Parameters	Groundwater Level pH Temperature Dissolved Oxygen Electrical Conductivity Visual Inspection	Groundwater Level pH Temperature Dissolved Oxygen Electrical Conductivity Visual Inspection
Organics	Mineral Oil BTEX & MTBE PAH's Phenols VOC's SVOC's	Mineral Oil BTEX & MTBE PAH's Phenols VOC's SVOC's
Inorganics	-	Total Alkalinity, Calcium, Manganese, Sulphate, Cyanide (Total), Chloride, Sodium,

3 METHODOLOGY

Groundwater samples were collected from 8 no. on-site groundwater monitoring wells (BH101, BH102, BH103, BH104B, MW01, MW02, MW03, MW04), (See Figure 2) using dedicated Waterra tubing, in accordance with RPS's standard sampling protocol. A non-return foot valve was fixed to the bottom of the tubing and inserted into the well, close to the base of the borehole. Separate tubing and foot valves were used at each monitoring well to eliminate the possibility of cross contamination.

Groundwater in the well casing is not considered representative of the groundwater quality at a given location. For this reason, three well volumes were purged from each well prior to collection of the groundwater sample. By the time purging was complete all field test water parameters (namely pH, Temperature, Electrical Conductivity and Dissolved Oxygen) were within 10% variance in three consecutive measurements. This ensured that the groundwater sample extracted from the monitoring borehole was representative of the water held in the subsurface strata and not water held stagnant in the borehole casing. The purged volumes were calculated on-site from the measured static water levels and total well depths using an electronic dip meter.

Groundwater samples were collected in laboratory supplied containers and stored in chilled cool boxes following sampling and during transit to the laboratory. A rigorous chain of custody procedure was used during the sample round.

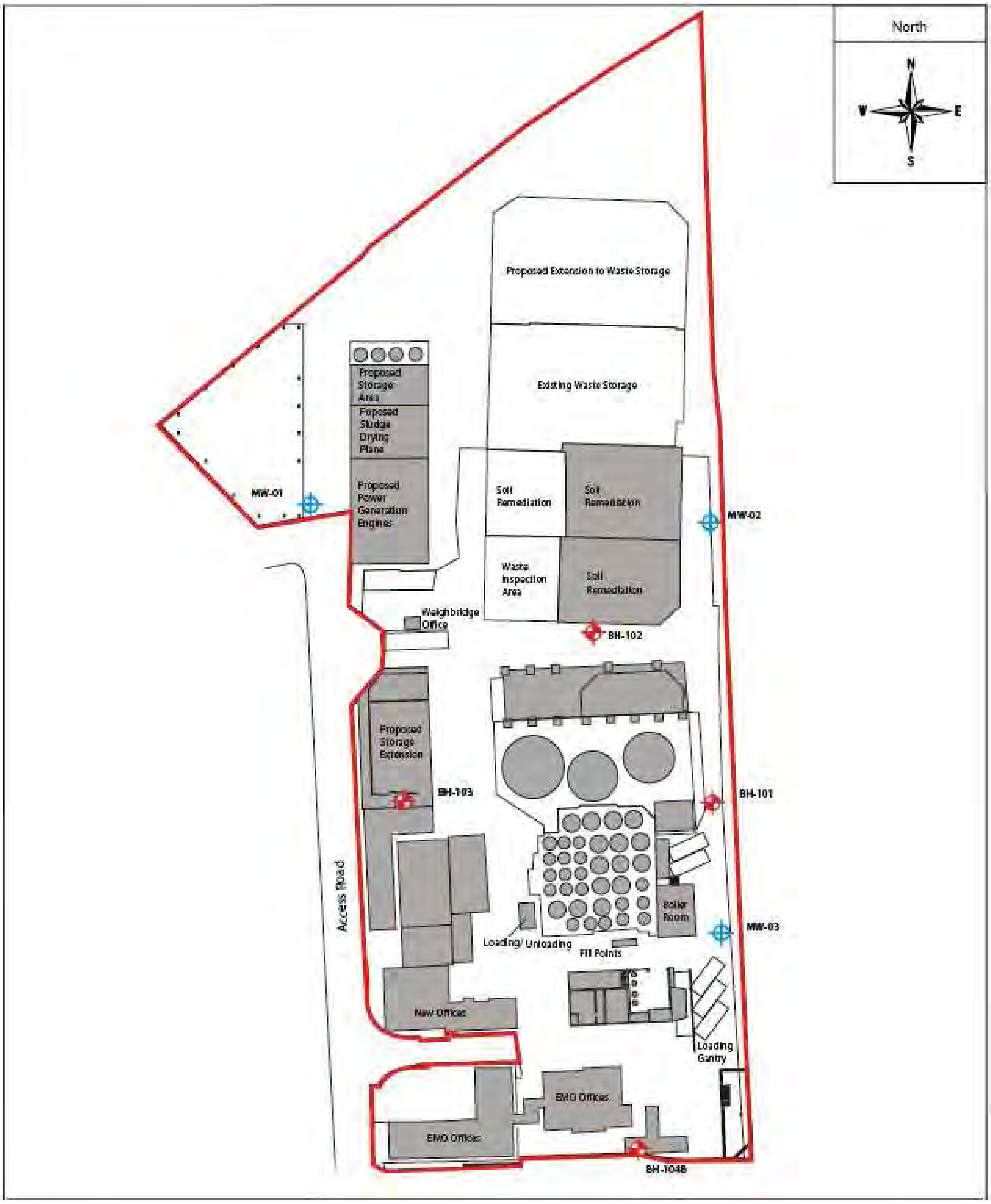
3.1 LABORATORY ANALYSIS

All groundwater samples were analysed at a UKAS accredited laboratory, I2 Analytical Ltd for the suite of analyses listed in Table 3.1. Table 3.1 also indicates the analytical techniques used by the laboratory.

Table 3.1: Analytical Methodologies – I2 Analytical Ltd

Parameter	Analytical Methodology
Phenols	GC-MS
Speciated PAHs	GC-MS
BTEX & MTBE	Headspace GC-MS
Petroleum Hydrocarbons	Headspace GC-MS
Volatile Organic compounds & Tentatively Identified Organic Compounds (VOCs & TICs)	Headspace GC-MS
Semi-Volatile Organic compounds & Tentatively Identified Organic Compounds (SVOCs & TICs)	GC-MS

Figure 2 Site Layout Plan with groundwater monitoring well locations



Shallow Monitoring Well locations

Deep Monitoring Well locations

Source: *URS Environmental Consultants (Ref: 45078497 Issue No. 1)*

3.2 PRESENTATION & INTERPRETATION OF RESULTS

The Quarter 2 2013 results are tabulated in Section 4 and discussed with respect to previous results. The results have been compared to the EPA Interim Guideline Values (IGV) as set out in the Report 'Towards Setting Guideline Values for the Protection of Groundwater in Ireland' 2004. It is important to note that the IGVs are based on the lowest acceptable value for either drinking water or environmental quality in surface water and is therefore conservative in nature.

Previous monitoring reports (as listed in Section 2.1) provide details of contaminant concentrations since 2004. The data available within these reports has been reviewed and time series plots of key parameters have been compiled. Trends for chlorinated solvents, petroleum hydrocarbons and phenol parameters have been plotted.

Time series plots are presented in Section 6 and include the results of this Quarter 2 2013 monitoring round. As the monitoring continues in accordance with the waste licence requirements, the plots will be updated with the results of subsequent rounds used to illustrate the results.

Time series plots are also provided for manual water levels where available from previous reports.

4 QUARTER 2 RESULTS AUGUST 2013

The results of all field measurements and laboratory analysis are presented in this section.

The results are discussed in relation to appropriate guideline values in Section 5. Results that are shown to be above the relevant guideline values are highlighted in bold and shaded. Results that are shown to be above the relevant laboratory detection limits are highlighted in italics.

Site-specific field parameter measurements were collected during the site visit as per RPS Water sampling protocol.

Table 4.1: Groundwater Levels (Quarter 2, 2013)

Monitoring Well	BH101	BH102	BH103	BH104B	MW01	MW02	MW03	MW04
Depth (mbgl)	6.80	6.54	4.42	4.73	22.90	31.28	14.96	6.50
Static Water Level (mbgl)	4.22	2.62	0.76	1.06	3.10	4.34	4.04	3.88
Ground Level (mAOD)	103.06	102.55	101.16	101.52	102.10	103.12	102.77	-
Water Level (mAOD)	98.84	99.93	100.40	100.46	99.00	98.78	98.73	-
Free Phase Oil (mm)	No detection	No detection	No detection	No detection	No detection	No detection	No detection	No detection

mbgl = metres below ground level

Table 4.2: Results of Field Parameters Measured at each Groundwater Monitoring Well (Quarter 2, 2013)

Monitoring Well	pH (pH Units)	Temperature (℃)	Conductivity (µS/cm)	Dissolved O_2 (ppm)	Observations
BH101	6.80	10.3	**1108**	3.15	Grey cloudy colour, black suspended solids, odourless.
BH102	6.61	9.3	907	2.15	Clear, slight yellow colour, slight H_2S odour detected on purging, some suspended solids.
BH103	6.03	8.5	**1038**	3.45	Light grey cloudy colour. Odourless.
BH104B	6.97	8.5	780	3.56	Grey cloudy colour at start of purging, clear at 10L. Odourless.
MW01	6.68	11.8	697	2.41	Purged water cloudy grey in colour, no odour detected. Difficult to purge at this location.
MW02	7.21	11.1	643	2.54	Light grey cloudy colour. Small number of suspended solids. Odourless.
MW03	6.85	11.3	**1399**	3.05	Grey colour, slight hydrocarbon sheen on surface, slight hydrocarbon odour.
MW04	6.89	10.0	**1680**	3.78	Cloudy brown in colour, a lot of sediment in sample, odourless.
Interim EPA Guideline Values (Units as indicated)	**>6.5 & <9.5**	**25℃**	**1000**	**No abnormal change**	**-**

Note: Results above the relevant IGV are highlighted in bold and shaded.

Table 4.3: Results of BTEX & MTBE

Parameter	Units	Laboratory Limit of Detection	BH101	BH102	BH103	BH104B	MW01	MW02	MW03	MW04	Interim EPA Guideline Values (Units as indicated)
Benzene	µg/l	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	1.0
Toluene	µg/l	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	10
Ethylbenzene	µg/l	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	10
p & m-xylene	µg/l	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	10 Note 1
o-xylene	µg/l	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	10 Note 1
MTBE (Methyl Tertiary Butyl Ether)	µg/l	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	30

Note 1: No specific IGV for parameter. IGV for Total Xylenes is used as guideline.

Table 4.4: Results of Speciated PAH's

Parameter	Units	Laboratory Limit of Detection	BH101	BH102	BH103	BH104B	MW01	MW02	MW03	MW04	Interim EPA Guideline Values (Units as indicated)
Naphthalene	µg/l	0.01	<0.01	<0.01	<0.01	< 0.01	<0.01	<0.01	<0.01	< 0.01	1.0
Acenaphthylene	µg/l	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	-
Acenaphthene	µg/l	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	-
Fluorene	µg/l	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	-
Phenanthrene	µg/l	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	-
Anthracene	µg/l	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	10,000
Fluoranthene	µg/l	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	1.0
Pyrene	µg/l	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	-
Benzo(a)anthracene	µg/l	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	-

Parameter	Units	Laboratory Limit of Detection	BH101	BH102	BH103	BH104B	MW01	MW02	MW03	MW04	Interim EPA Guideline Values (Units as indicated)
Chrysene	µg/l	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	-
Benzo(b)fluoranthene	µg/l	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.5
Benzo(k)fluoranthene	µg/l	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.05
Benzo(a)pyrene	µg/l	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.01
Indeno(1,2,3-cd)pyrene	µg/l	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.05
Dibenz(a,h)anthracene	µg/l	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	-
Benzo(g,h,i)perylene	µg/l	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.05
Total EPA-16 PAH's	µg/l	0.2	**< 0.2**	**< 0.2**	**< 0.2**	**< 0.2**	**< 0.2**	**< 0.2**	**< 0.2**	**< 0.2**	0.1

Note: Results above the relevant IGV are highlighted in bold and shaded.
Note: Results above the relevant laboratory limit of detection are in italics.

Table 4.5: Results of Total Phenols

Parameter	Units	Laboratory Limit of Detection	BH101	BH102	BH103	BH104B	MW01	MW02	MW03	MW04	Interim EPA Guideline Values (Units as indicated)
Total Phenols (monohydric)	µg/l	10	<10	<10	<10	<10	<10	<10	<10	<10	0.5
Total Phenols (GC-MS)	µg/l	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.5

Table 4.6: Results of Speciated Phenols

Parameter	Units	Laboratory Limit of Detection	BH101	BH102	BH103	BH104B	MW01	MW02	MW03	MW04	Interim EPA Guideline Values (Units as indicated)
Phenol	µg/l	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.5
2,4,5-Trichlorophenol	µg/l	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	-
2,4,6-Trichlorophenol	µg/l	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	200
2,4-Dichlorophenol	µg/l	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	-
2,4-Dimethylphenol	µg/l	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	-
2-Chlorophenol	µg/l	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	200
2-Methylphenol	µg/l	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	-
2-Nitrophenol	µg/l	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	-
4-Chloro-3-methylphenol	µg/l	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	-
4-Methylphenol	µg/l	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	-

Note: Results above the relevant laboratory limit of detection are in italics.

Table 4.7: Results of Semi-Volatile Organic Compounds (sVOCs)

Parameter	Units	Laboratory Limit of Detection	BH101	BH102	BH103	BH104B	MW01	MW02	MW03	MW04	Interim EPA Guideline Values (Units as indicated)
Aniline	µg/l	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	-
Phenol	µg/l	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.5
2-Chlorophenol	µg/l	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	200
Bis(2-chloroethyl)ether	µg/l	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	-
1,3-Dichlorobenzene	µg/l	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	-
1,2-Dichlorobenzene	µg/l	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	10
1,4-Dichlorobenzene	µg/l	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	-
Bis(2-chloroisopropyl)ether	µg/l	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	-
2-Methylphenol	µg/l	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	-
Hexachloroethane	µg/l	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	-
Nitrobenzene	µg/l	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	10
4-Methylphenol	µg/l	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	-
Isophorone	µg/l	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	-
2-Nitrophenol	µg/l	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	-
2,4-Dimethylphenol	µg/l	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	-
Bis(2-chloroethoxy)methane	µg/l	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	-
1,2,4-Trichlorobenzene	µg/l	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.40
Naphthalene	µg/l	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	1.0

Parameter	Units	Laboratory Limit of Detection	BH101	BH102	BH103	BH104B	MW01	MW02	MW03	MW04	Interim EPA Guideline Values (Units as indicated)
2,4-Dichlorophenol	µg/l	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	-
4-Chloroaniline	µg/l	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	-
Hexachlorobutadiene	µg/l	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.10
4-Chloro-3-methylphenol	µg/l	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	-
2,4,6-Trichlorophenol	µg/l	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	200
2,4,5-Trichlorophenol	µg/l	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	-
2-Methylnaphthalene	µg/l	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	-
2-Chloronaphthalene	µg/l	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	-
Dimethylphthalate	µg/l	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	-
2,6-Dinitrotoluene	µg/l	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	-
Acenaphthylene	µg/l	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	-
Acenaphthene	µg/l	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	-
2,4-Dinitrotoluene	µg/l	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	-
Dibenzofuran	µg/l	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	-
4-Chlorophenyl phenyl ether	µg/l	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	-
Diethyl phthalate	µg/l	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	-
4-Nitroaniline	µg/l	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	-
Fluorene	µg/l	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	-
Azobenzene	µg/l	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	-

Parameter	Units	Laboratory Limit of Detection	BH101	BH102	BH103	BH104B	MW01	MW02	MW03	MW04	Interim EPA Guideline Values (Units as indicated)
Bromophenyl phenyl ether	µg/l	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	-
Hexachlorobenzene	µg/l	0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	0.03
Phenanthrene	µg/l	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	-
Anthracene	µg/l	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	10,000
Carbazole	µg/l	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	-
Dibutyl phthalate	µg/l	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	2.0
Anthraquinone	µg/l	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	-
Fluoranthene	µg/l	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	1.0
Pyrene	µg/l	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	-
Butyl benzyl phthalate	µg/l	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	-
Benzo(a)anthracene	µg/l	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	-
Chrysene	µg/l	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	-
Benzo(b)fluoranthene	µg/l	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.5
Benzo(k)fluoranthene	µg/l	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.05
Benzo(a)pyrene	µg/l	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.01
Indeno(1,2,3-cd)pyrene	µg/l	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.05
Dibenz(a,h)anthracene	µg/l	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	-
Benzo(g,h,i)perylene	µg/l	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.05

Note: Results above the relevant laboratory limit of detection in italics.

Table 4.8: Results of Volatile Organic Compounds (VOCs)

Parameter	Units	Laboratory Limit of Detection	BH101	BH102	BH103	BH104B	MW01	MW02	MW03	MW04	Interim EPA Guideline Values (Units as indicated)
Chloromethane	µg/l	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	-
Chloroethane	µg/l	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	-
Bromomethane	µg/l	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	-
Vinyl Chloride	µg/l	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	-
Trichlorofluoromethane	µg/l	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	-
1,1-dichloroethene	µg/l	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	30
1,1,2-Trichloro 1,2,2-Trifluoroethane	µg/l	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	-
Cis-1,2-dichloroethene	µg/l	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	-
MTBE (Methyl Tertiary Butyl Ether)	µg/l	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	30
1,1-dichloroethane	µg/l	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	-
2,2-Dichloropropane	µg/l	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	-
Trichloromethane	µg/l	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	12
1,1,1-Trichloroethane	µg/l	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	500
1,2-dichloroethane	µg/l	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	-
1,1-Dichloropropene	µg/l	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	-
Trans-1,2-dichloroethene	µg/l	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	-
Benzene	µg/l	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	1.0
Tetrachloromethane	µg/l	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	2.0

Parameter	Units	Laboratory Limit of Detection	BH101	BH102	BH103	BH104B	MW01	MW02	MW03	MW04	Interim EPA Guideline Values (Units as indicated)
1,2-dichloropropane	µg/l	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	-
Trichloroethene	µg/l	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	70
Dibromomethane	µg/l	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	-
Bromodichloromethane	µg/l	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	-
Cis-1,3-dichloropropene	µg/l	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	-
Trans-1,3-dichloropropene	µg/l	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	-
Toluene	µg/l	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	10
1,1,2-Trichloroethane	µg/l	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	-
1,3-Dichloropropane	µg/l	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	-
Dibromochloromethane	µg/l	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	-
Tetrachloroethene	µg/l	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	40
1,2-Dibromoethane	µg/l	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	-
Chlorobenzene	µg/l	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	1.0
1,1,1,2-Tetrachloroethane	µg/l	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	-
Ethylbenzene	µg/l	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	10
p & m-xylene	µg/l	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	10
Styrene	µg/l	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	-
Tribromomethane	µg/l	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	-
o-xylene	µg/l	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	10

Parameter	Units	Laboratory Limit of Detection	BH101	BH102	BH103	BH104B	MW01	MW02	MW03	MW04	Interim EPA Guideline Values (Units as indicated)
Isopropylbenzene	µg/l	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	-
Bromobenzene	µg/l	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	-
N-Propylbenzene	µg/l	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	-
2-Chlorotoluene	µg/l	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	-
4-Chlorotoluene	µg/l	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	-
1,3,5-Trimethylbenzene	µg/l	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	-
Tert-Butylbenzene	µg/l	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	-
1,2,4-Trimethylbenzene	µg/l	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	-
Sec-Butylbenzene	µg/l	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	-
1,3-dichlorobenzene	µg/l	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	-
P-Isopropyltoluene	µg/l	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	-
1,2-dichlorobenzene	µg/l	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	10
1,4-dichlorobenzene	µg/l	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	-
Butylbenzene	µg/l	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	-
1,2-Dibromo-3-chloropropane	µg/l	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	-
1,2,4-Trichlorobenzene	µg/l	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.40
Hexachlorobutadiene	µg/l	0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.10
1,2,3-Trichlorobenzene	µg/l	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	-

Note: Results above the relevant IGV are highlighted in bold and shaded.
Note: Results above the relevant laboratory limit of detection are highlighted in bold italics.

Table 4.9: Results of Total Petroleum Hydrocarbons (Aliphatic/Aromatic)

Parameter	Units	Laboratory Limit of Detection	BH101	BH102	BH103	BH104B	MW01	MW02	MW03	MW04	Interim EPA Guideline Values (Units as indicated)
Aliphatic > C5-C6	µg/l	10	<10	<10	<10	<10	<10	<10	<10	<10	-
Aliphatic > C6-C8	µg/l	10	<10	<10	<10	<10	<10	<10	<10	<10	-
Aliphatic > C8-C10	µg/l	10	<10	<10	<10	<10	<10	<10	<10	<10	-
Aliphatic > C10-C12	µg/l	10	<10	<10	<10	<10	<10	<10	<10	<10	-
Aliphatic > C12-C16	µg/l	10	<10	<10	<10	<10	<10	<10	<10	<10	-
Aliphatic > C16-C21	µg/l	10	<10	<10	<10	<10	<10	<10	<10	<10	-
Aliphatic >C21-C35	µg/l	10	<10	<10	<10	<10	<10	<10	<10	<10	-
Aliphatic (C5-C35)	µg/l	10	<10	<10	<10	<10	<10	<10	<10	<10	10
Aromatic > C5-C7	µg/l	10	<10	<10	<10	<10	<10	<10	<10	<10	-
Aromatic > C7-C8	µg/l	10	<10	<10	<10	<10	<10	<10	<10	<10	-
Aromatic > C8-C10	µg/l	10	<10	<10	<10	<10	<10	<10	<10	<10	-
Aromatic > C10-C12	µg/l	10	<10	<10	<10	<10	<10	<10	<10	<10	-
Aromatic > C12-C16	µg/l	10	<10	<10	<10	<10	<10	<10	<10	<10	-
Aromatic > C16-C21	µg/l	10	<10	<10	<10	<10	<10	<10	<10	<10	-
Aromatic > C21-C35	µg/l	10	<10	<10	<10	<10	<10	<10	<10	<10	-
Aromatic (C5-C35)	µg/l	10	<10	<10	<10	<10	<10	<10	<10	<10	10

Note: Results above the relevant IGV are highlighted in bold and shaded.
Note: Results above the relevant laboratory limit of detection are highlighted in bold italics.

5 DISCUSSION OF QUARTER 2 RESULTS

The results of the Quarter 2 monitoring event for 2013 are presented in Table 4.1 to 4.9 of this report. For the purpose of this report, the results are compared to the EPA Interim Guideline Values (IGV) as set out in the Interim Report *'Towards Setting Guideline Values for the Protection of Groundwater in Ireland' 2004.* A discussion of the results and their significance is included below.

5.1 FIELD PARAMETERS

The results of the field parameters measured at each groundwater monitoring well are presented in Table 4.2. Groundwater samples recorded pH levels ranging between 6.03 and 7.21. All pH measurements were inside the EPA Interim guideline range of ≥6.5 to ≤9.5. Temperature measurements ranged from 8.5℃ to 11.8℃ and were w ithin the EPA IGV of 25℃.

Field measurements of Electrical Conductivity levels ranged between 643 µS/cm and 1680 µS/cm and were above the Interim Guideline Value of 1000 µS/cm at BH101 (1108 µS/cm), BH103 (1038 µS/cm), MW03 (1399 µS/cm) and MW04 (1680 µS/cm).

Dissolved oxygen levels ranged between 2.15 and 3.78 ppm. Factors such as climate, nutrients in the water, suspended solids; organic wastes and groundwater inflow can all influence the dissolved oxygen values.

Observations relating to colour and odour varied from well to well as detailed in Table 4.2.

5.2 RESULTS OF BTEX & MTBE

The results of the **BTEX** and **MTBE** analysis are presented in Table 4.3 and demonstrate concentrations below the laboratory limit of detections and associated IGV's at all locations.

The last detection of MTBE was in the Quarter 1 monitoring event of 2012. MTBE was recorded above the laboratory limit of detection at a concentration of 280 µg/l at BH104B. This was the only recorded exceedance in Quarter 1 2012. Previous monitoring during Quarter 1 and Quarter 2 of 2010 detected exceedances of MTBE at BH103 at a concentration of 16 µg/l. During Quarter 3 and Quarter 4 of 2010 concentrations were below the laboratory limit of detection. Prior to these 2010 monitoring events, concentrations of MTBE at BH103 were recorded at 63 µg/l in December 2009.

5.3 RESULTS OF SPECIATED PAH'S

The results of the Speciated PAH analysis during this monitoring period are presented in Table 4.4.

The laboratory limit of detection for Total EPA-16 PAH's is 0.2 µg/l. This laboratory limit of detection is above the EPA IGV of 0.1 µg/l. To identify the compounds, which attributed to these concentrations, speciated PAH analysis was carried out, which reduces the limit of detection for individual parameters to 0.01 µg/l.

The results of the speciated polycyclic aromatic hydrocarbon analysis detected no concentrations above the laboratory limit of detection. The laboratory is accredited to achieve a detection limit of 0.2 µg/l for EPA-16 PAH's. The laboratory has confirmed that the detection limit for total EPA-16 PAH's can be lowered to 0.1 µg/l for comparison with the EPA IGV of 0.1 µg/l, however this will not be accredited.

5.4 RESULTS OF SPECIATED PHENOLS

The results of Total Phenol analysis are presented in Table 4.5. All samples detected concentrations of monohydric phenol below the laboratory limit of detection of 10 µg/l. It should be noted that the laboratory limit of detection is above the IGV of 0.5 µg/l for phenols.

For this reason, samples were analysed for phenols to include chlorophenols. The results of the speciated phenols analysis are presented in Table 4.6. The speciated phenol analysis reduces the laboratory limit of detection to 0.05 µg/l for individual parameters.

The results of the current Quarter 2 2013 speciated phenol analysis confirm concentrations of phenols were below the laboratory limit of detection of 0.05 µg/l at all locations. This is consistent with the results from the previous Quarter 1 2013 monitoring event.

5.5 RESULTS OF SEMI-VOLATILE ORGANIC COMPOUNDS

The results of the Semi-Volatile Organic Compound analysis are presented in Table 4.7.

No SVOC's were detected during this monitoring period above the relevant IGV's. The Quarter 3 monitoring event of 2012 detected concentrations of Naphthalene and Acenaphthylene at 2.4 µg/l and 0.12 µ/l respectively in MW03.

5.6 RESULTS OF VOLATILE ORGANIC COMPOUNDS

The results of the Volatile Organic Compound analysis are presented in Table 4.8. The results of the current Quarter 2 2013 monitoring event indicate that there were no exceedances of VOC parameters detected above the relevant IGV's.

In November 2009, corresponding to Quarter 4 of 2009, no VOC's were detected above the relevant IGV's. However some parameters were detected above the laboratory limits of detection (1,1-Dichloroethane, 1,2,4-trimethylbenzene, 1,3,5-trimethylbenzene, MTBE, n-butylbenzene, n-propylbenzene, o-xylene, p-isopropyltoluene, sec-butylbenzene and tert-butylbenzene).

The Quarter 1 and Quarter 2 monitoring results of 2010 detected MTBE in BH103 raised above the laboratory limit of detection of 1.0 µg/l at a concentration of 16 µg/l.

The results of the Quarter 3 and Quarter 4 monitoring events of 2010 and all subsequent monitoring events indicate that there were no exceedances of the IGV for specific parameters.

5.7 RESULTS OF TOTAL PETROLEUM HYDROCARBONS

In order to provide a more accurate profile of TPH within the groundwater, speciated hydrocarbon analysis using the Total Petroleum Hydrocarbon Criteria Working Group (TPHCWG) method was carried out on samples taken at all boreholes. The results of the TPH analysis are presented in Table 4.9.

No detections of TPH in the aliphatic range were observed in the monitoring well locations during the current monitoring event. Similarly, no detections of TPH in the aromatic range were observed in any monitoring well locations during the current Quarter 2 2013 monitoring event.

The EPA IGV of 10 µg/l for Total Hydrocarbons is deemed comparable with the results for total petroleum hydrocarbons (TPH).

The previous Quarter 1 2013 monitoring event detected aliphatic TPH of the range C12-C16, C16-C21 and C21-C35. TPH in the mid to high aromatic ranges were detected in BH103, BH104B and MW04 during the previous Quarter 1 2013 monitoring event. Aromatic TPH of the ranges C12-C16, C16-C21 and C21-C35 were detected in BH103, the ranges C10-C12, C12-C16 and C16-C21 were detected in BH104B and aromatic TPH of the ranges C10-C12 and C12-C16 were detected in MW04.

The Quarter 2 monitoring event of 2012 detected elevated TPH of the aliphatic range C12-C16, C16-C21 and C21-C25 in BH103. Hydrocarbons have been detected in borehole MW03 during Quarter 1 2010, in borehole BH104B during the Quarter 2 2010 monitoring event and in borehole BH104B and MW03 during the Quarter 3 2010 monitoring events. Hydrocarbons have also been detected in BH103, BH104B and MW03 in the Quarter 2 2011 monitoring event and in MW03 in the Quarter 3 and Quarter 4 2011. These detections are discussed further in Section 6.2.3.

6 HISTORICAL RESULTS & TRENDS

Time series plots are presented in this section and include the results of the Quarter 2 2013 monitoring round. As the monitoring continues in accordance with the waste licence requirements, the plots will be updated with the results of subsequent rounds and used to illustrate the results.

6.1 GROUNDWATER LEVELS OVER TIME

Figure 3 to Figure 5 below illustrates the manually recorded water levels using an electronic probe. The graphs show that groundwater levels can vary considerably between monitoring rounds.

Figure 4 illustrates groundwater elevations (mAOD) in shallow groundwater wells (BH101 to BH104B) ranging between approximately 98 mAOD and 102 mAOD.

Figure 5 illustrates groundwater elevation (mAOD) in the deeper groundwater wells (MW01 to MW03). The groundwater elevation (mAOD) for these deeper groundwater wells ranges from approximately 97.5 mAOD to approximately 100 mAOD.

Figure 3 Groundwater Elevation (mAOD) in all Monitoring Wells

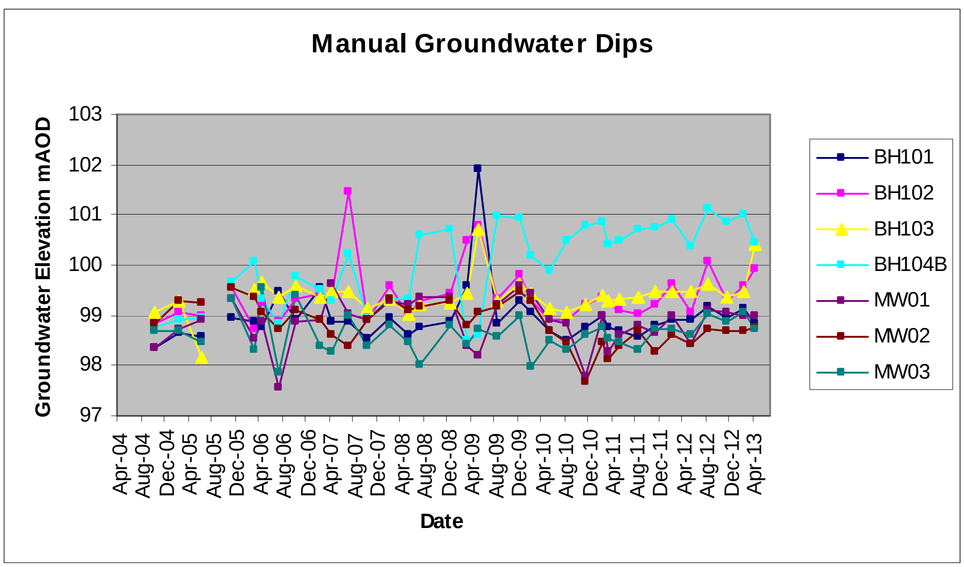


Figure 4 Groundwater Elevation (mAOD) in Shallow Monitoring Wells

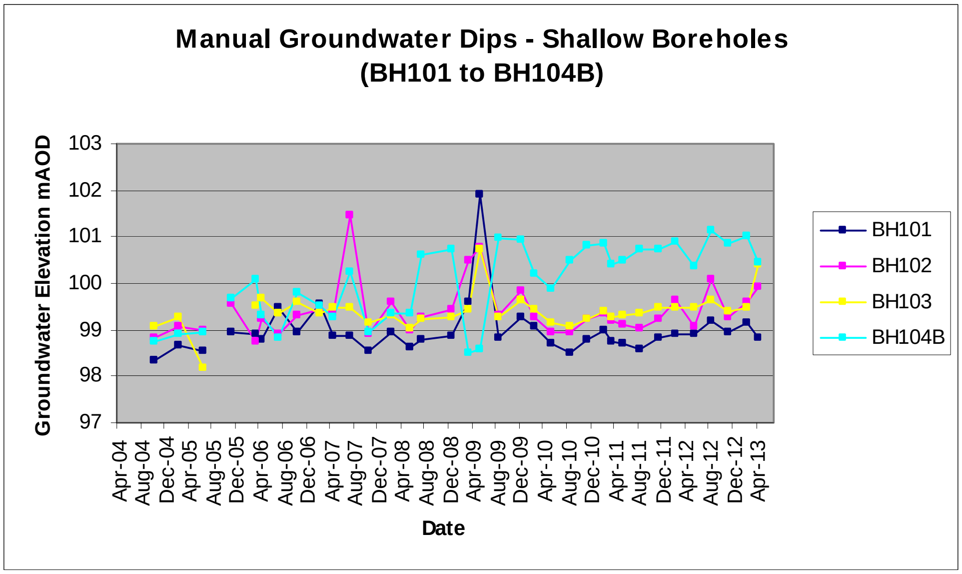
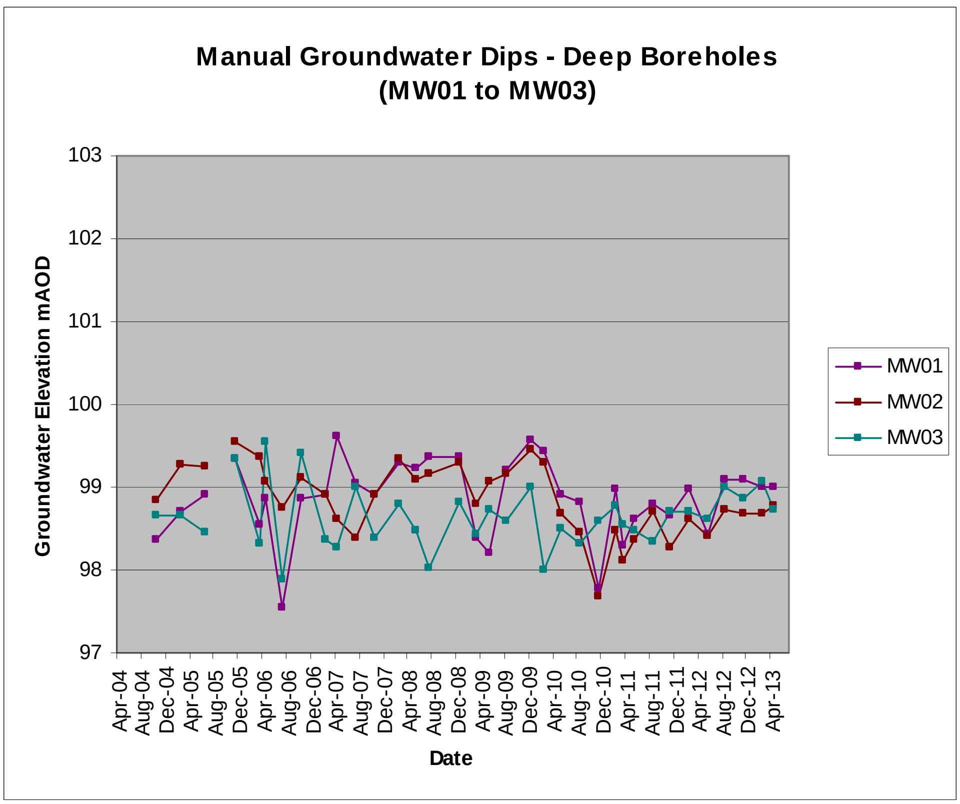


Figure 5 Groundwater Elevation (mAOD) in Deep Monitoring Wells



The groundwater levels generally show a similar pattern of fluctuation over time indicating a degree of connection between boreholes. The graphs demonstrate that groundwater levels can vary considerably between monitoring rounds; however, the general direction of flow in the shallow and deeper groundwater bearing unit is in an easterly or north easterly direction however there have been some occasional historic cases of groundwater flowing in a south-easterly direction.

In addition, monthly rainfall data for Oak Park, Carlow have been tabulated from Met Eireann to examine the relationship between compounds and rainfall events. The data from Oak Park was chosen as the weather station at Birr, Co. Offaly closed in October 2009. A summary of the rainfall data is in Tables 5.1 to 5.5.

Table 5.1: Monthly Rainfall data for Year 2009 for Oak Park, Carlow

Month	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec
Rainfall (mm)	113.4	29.2	32.6	102.4	69.0	65.4	152.4	100.9	41.8	127.8	215.5	73.7

Table 5.2: Monthly Rainfall data for Year 2010 for Oak Park, Carlow

Month	Jan	Feb	Mar	Apr	May	June	July	August	Sept	Oct	Nov	Dec
Rainfall (mm)	71.5	48.0	80.7	49.0	51.4	37.7	93.6	25.5	108.7	68.9	87.7	52.2

Table 5.3: Monthly Rainfall data for Year 2011 for Oak Park, Carlow

Month	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec
Rainfall (mm)	50.6	121.9	16.0	19.5	51.2	72.7	46.4	25.5	93.9	93.9	89.2	55.5

Table 5.4: Monthly Rainfall data for 2012 to date for Oak Park, Carlow

Month	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec
Rainfall (mm)	70.8	24.5	18.0	56.3	50.2	155.8	76.2	127.7	37.9	63.4	80.9	68.1

Table 5.5: Monthly Rainfall data for 2013 to date for Oak Park, Carlow

Month	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec
Rainfall (mm)	76.2	35.2	57.6	44.4	35.6	36.9						

Note: Data for the most recent months are provisional.

6.2 GROUNDWATER CONCENTRATIONS OVER TIME

Groundwater quality trends have previously been examined in two reports (URS 2005 and RPS 2007). In addition, RPS carried out a groundwater risk assessment (Ref: MDE0788RP0001, dated November 2008) in which the general trend of contaminant concentrations over time was observed to be erratic with compounds rarely being detected in the same borehole on two consecutive monitoring rounds.

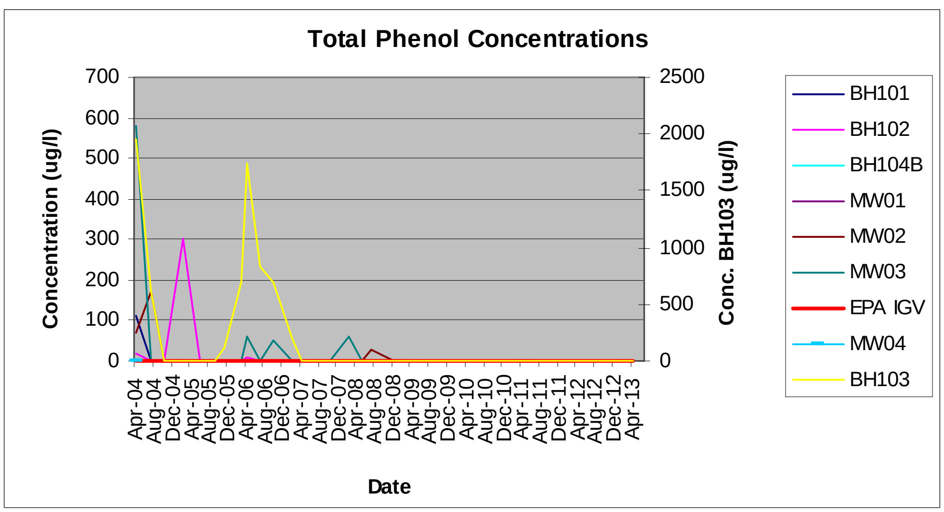
The data available within these reports has been reviewed and time series plots of key parameters have been compiled based on notable trends. Trends for phenols, petroleum hydrocarbons and chlorinated solvents have been plotted as outlined in the following sections.

6.2.1 Phenols

Phenols have been detected historically in all boreholes with the highest concentrations recorded in BH103. However concentrations in BH103 have declined since April 2007. Phenol concentrations have since been recorded below the IGV of 0.5 µg/l in all monitoring wells since December 2008 indicating natural attenuating conditions within the groundwater.

2,4-Dimethylphenol was detected at a concentration of 0.12 µg/l during the Quarter 1, 2010 monitoring event. There is no recommended IGV for this parameter. Subsequent to the Quarter 1 2010 monitoring event no detections of phenols have been noted at any monitoring location up to and including the current Quarter 2 2013 monitoring event.

Figure 6 Phenol Concentrations in all Monitoring Wells



6.2.2 Polycyclic Aromatic Hydrocarbons (PAH's)

Figure 7 below illustrates that PAH's (Polycyclic Aromatic Hydrocarbons) have previously been detected within all monitoring wells above the recommended EPA IGV of 0.1 µg/l. Historically the highest concentrations have been detected within MW03 and BH104B. In addition, a range of PAH's including Benzo(a)pyrene, Benzo(g,h,i)perylene, Indeno(1,2,3)cd pyrene, Fluoranthene and Napthalene have previously been detected in MW03 with Figures 8 to 11 illustrating some of the PAH compounds which were detected above their respective IGV's.

Figure 7 illustrates that **Total PAH** has been detected in all groundwater monitoring wells at the site above the IGV of 0.1 µg/l since 2005. Elevated concentrations have been detected in MW03 and BH104B, with the highest concentration detected in March 2006 (107 µg/l) and in October 2007 (19.72 µg/l) respectively. Since then, the concentrations have shown a marked decrease with no elevated Total PAH concentrations in this current Quarter 2 monitoring period of 2013.

The results from the Quarter 4, 2009 monitoring round in December 2009 recorded total EPA-16 PAH concentrations above the IGV at all locations with the exception of MW02. These concentrations may be linked to the heavy rainfall event, which occurred in November of 2009, which may have mobilized traces of these compounds from soil.

The results from the Quarter 1 monitoring round, 2010 recorded Total PAH concentrations below the IGV of 0.2 µg/l at all locations with the exception of MW03, which detected a concentration of 0.3 µg/l. There has been a decrease in Total PAH concentrations at all locations since the Quarter 4 event in December 2009 with the most notable decrease at MW03 reducing from 4.58 µg/l to <0.1 µg/l.

The only concentrations of Total PAH above the IGV in 2010 were detected during the Quarter 1 monitoring event in MW03 (0.3 µg/l), Quarter 2 monitoring event in BH104B (1.2 µg/l) and Quarter 3 monitoring event in MW02 (2.0 µgl) and BH104B (0.2 µgl). There were no elevated concentrations of Total PAH during the Quarter 4 2010, the Q1, Q2, Q3 and Q4 2011 monitoring events, and the Q1 2012 monitoring event. Total PAH was detected above the IGV in MW03 in the Q2 2012 monitoring event. No Total PAH exceedances were detected in the following Q3 and Q4 2012 monitoring events, the previous Q1 2013 monitoring event and the current Q2 2013 monitoring event suggesting that elevations detected in the Q2 2012 monitoring event were an isolated occurrence.

Figure 7 PAH (Total) Concentrations in all Monitoring Wells

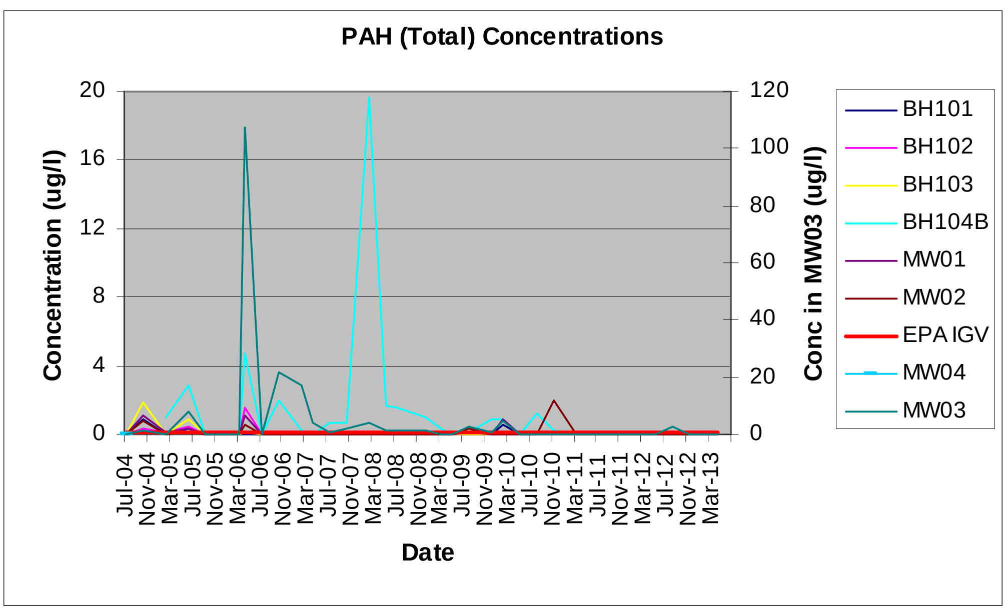


Figure 8 Fluoroanthene Concentrations in all Monitoring Wells

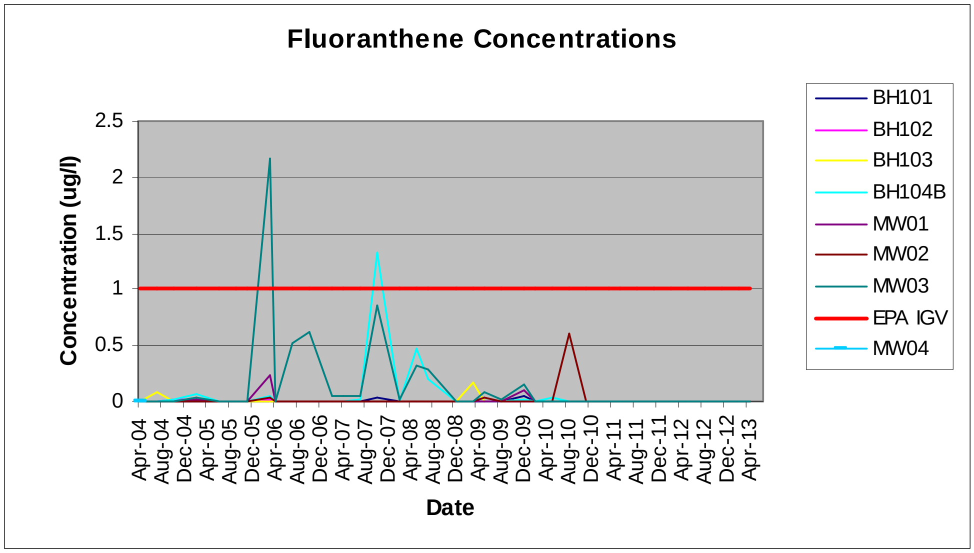
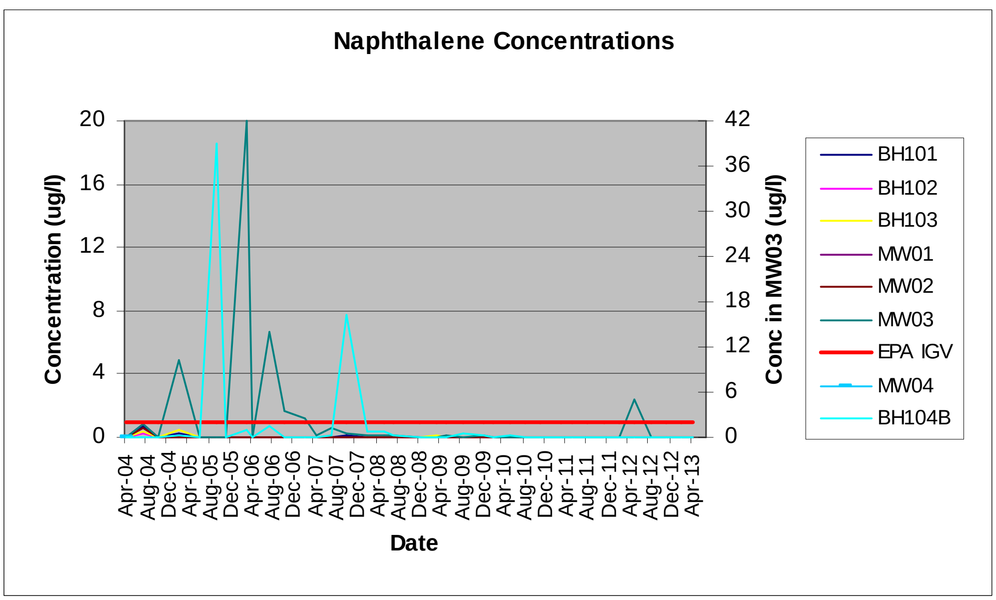


Figure 8 illustrates that **Fluoroanthene** was previously detected above the IGV of 1.0 µg/l in groundwater monitoring wells BH104B (October 2007, 1.33 µg/l) and MW03 (March 2006, 2.158 µg/l) only. The remaining monitoring wells recorded concentrations below the IGV of 1.0 µg/l.

Figure 9 Naphthalene Concentrations in all Monitoring Wells



A similar trend to Fluoroanthene has been noted in Figure 9, with concentrations of **Naphthalene** recorded above the IGV of 1.0 µg/l in BH104B and MW03 only. 4 no. exceedances of the IGV were noted in BH104B in September 2005 (39 µg/l), March 2006 (1.069 µg/l), July 2006 (1.594 µg/l) and October 2007 (16.31 µg/l). Since October 2007, the concentrations in BH104B have decreased below the IGV. There have been 6 exceedances of the IGV of 1.0 µg/l in MW03, with the highest concentration detected in March 2006 (19.986 µg/l) and the most recent being the detected in the Quarter 2 2012 monitoring event (2.4 µg/l). The concentrations detected in August 2010 were slightly above the laboratory limit of detection of 0.01 µg/l at BH104B (0.08 µg/l) and MW03 (0.05 µg/l);

however these levels are deemed low. Concentrations of Naphthalene were below the EPA IGV limit of detection of 1.0 µg/l at all locations during the Quarter 4 2010, the 2011 quarterly monitoring events and the Quarter 1, Quarter 3 and Quarter 4 2012 monitoring periods. No detections of Naphthalene were noted in the current Quarter 2 2013 monitoring event.

Figure 10 Benzo (g,h,i) perylene in all Monitoring Wells

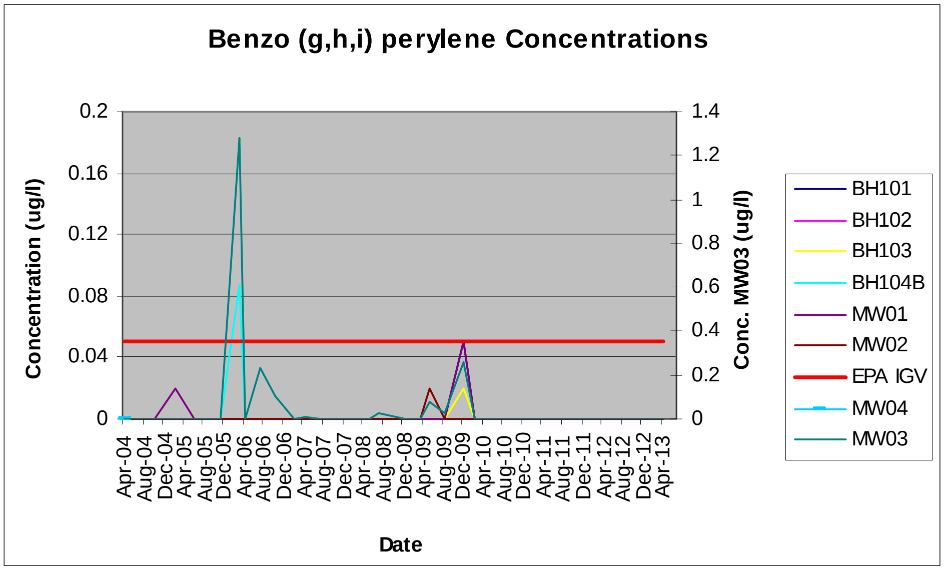


Figure 10 illustrates the concentrations of **Benzo(g,h,i)perylene** in BH104B and MW03 over time. Elevated concentrations above the IGV were recorded at BH104B (0.087 µg/l) on one occasion only in March 2006.

Figure 10a illustrates elevated concentrations above the IGV recorded at MW03 on 5 no. occasions with the most recent elevated concentration detected in December 2009 (0.26 µg/l). The results of monitoring events in May, August, November 2010, March, May, September and November 2011, February, May, August and November 2012, February 2013 and the current April Quarter 2 2013 monitoring event recorded concentrations below the laboratory limit of detection of 0.01 µg/l at all locations.

Figure 10a Benzo (g,h,i) perylene in Monitoring Wells BH104B & MW03

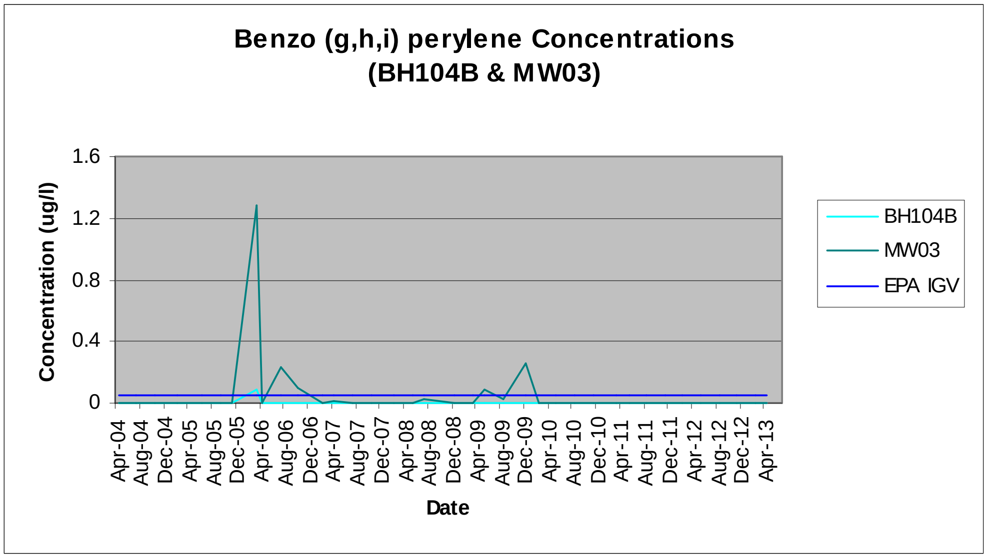
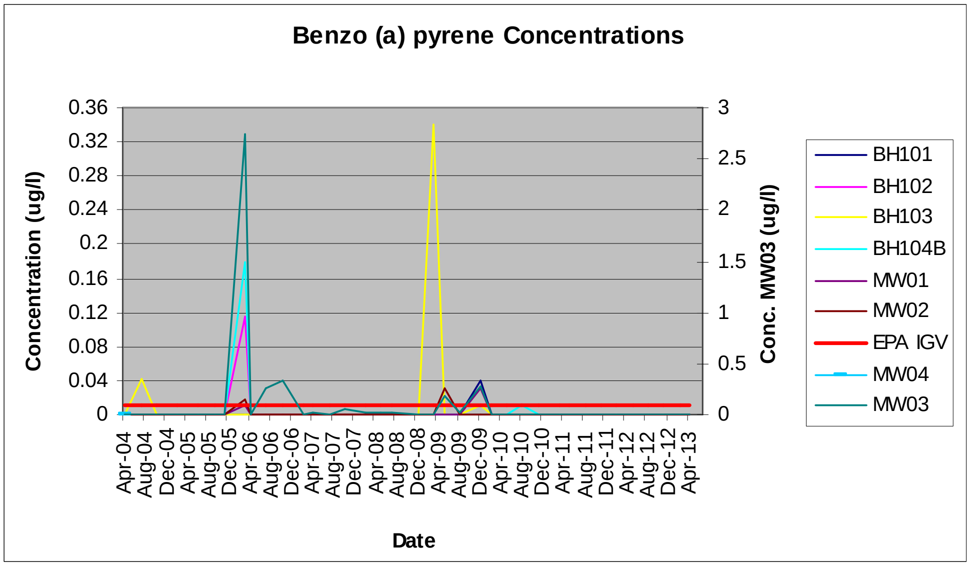


Figure 11 illustrates the concentrations of **Benzo(a)pyrene** in all groundwater monitoring wells and indicates that Benzo(a)pyrene has been detected historically in all boreholes above the IGV of 0.01 µg/l. Similarly with the above mentioned trends, the highest concentrations have been detected in MW03 and BH104B. Concentrations have markedly decreased since March 2006 when an elevated concentration of 2.751 µg/l was detected in MW03, however there have been a number of detections above the IGV, with the most recent elevated level detected in December 2009. Elevated concentrations above the IGV were recorded in BH101, BH103 and MW01 during this same period. The results of all monitoring events in 2010, 2011 and 2012 indicate concentrations below the IGV. The results of the previous quarterly monitoring event of 2013 and the current Quarter 2 2013 event also recorded concentrations below the IGV.

The slightly higher concentrations of Benzo(g,h,i)perylene and Benzo(a)pyrene detected in Quarter 4, 2009 may be attributed to heavy rainfall, which occurred in November of 2009 and as a result possibly mobilized traces of these compounds from the soil. The static water levels for December 2009 ranged between 0.58 and 3.78 mbgl. Since December 2009, concentrations of compounds have notably decreased to below the IGV's.

Figure 11 Benzo(a)pyrene in all Monitoring Wells

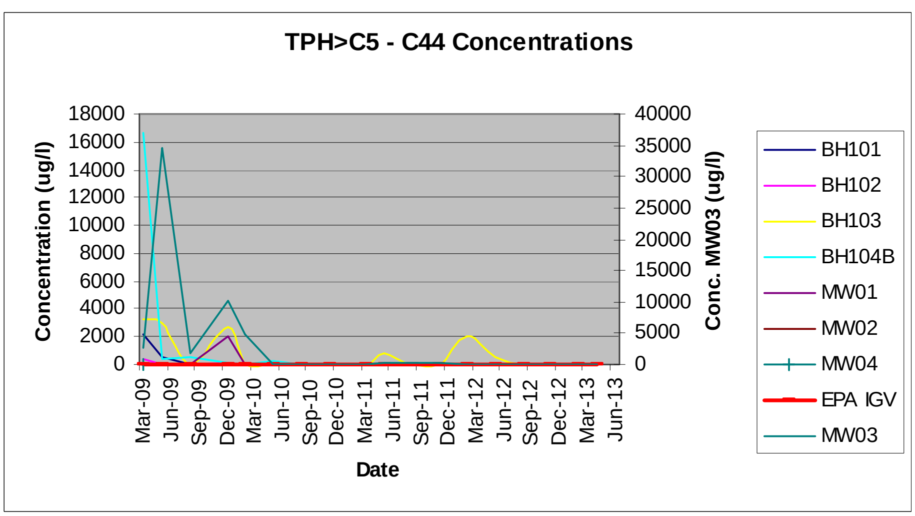


6.2.3 Petroleum Hydrocarbons (TPH)

Historically **Total Petroleum Hydrocarbons (TPH)** including mineral oil, petrol range organics (PRO) and diesel range organics (DRO) have been detected within BH103, BH104B and MW03. Since 2009, speciated hydrocarbon analysis using the Total Hydrocarbon Criteria Working Group (TPHCWG) method has been carried out on all samples to obtain a more accurate profile of TPH within groundwater.

The results of the TPHCWG analysis has indicated that the predominant hydrocarbons detected are in the heavier chain carbon fractions, most notably in the carbon range C12 – C16, C16 – C21 and C21 – C35. Figure 12 illustrates the TPH analysis for the total TPH analysis from C5 – C44 in all monitoring wells since 2009. The highest concentrations detected historically are at monitoring wells MW03, BH104B and BH103 respectively.

Figure 12 TPH (Carbon Range C5-C44) in all Monitoring Wells



During the Quarter 1, 2010 monitoring event, hydrocarbons were detected in borehole MW03. The predominant aliphatic carbon range in MW03 comprised of C16-C21 (1000 µg/l), C21-C35 (2300 µg/l) and C25-C44 (990 µg/l). The predominant aromatic carbon range in MW03 comprised of C16-C21 (220 µg/l) and C21-C35 (620 µg/l). No detections were observed at other locations.

During the Quarter 2, 2010 monitoring event, hydrocarbons were detected in borehole BH104B, with the predominant aliphatic carbon range comprising C12-C16 (130 µg/l) and C16-C21 (130 µg/l), while the predominant aromatic carbon range comprising C12-C16 (21 µg/l) and C16-C21 (47 µg/l). There were no detections of hydrocarbons in MW03 during the Quarter 2 monitoring event.

During the Quarter 3, 2010 monitoring event, hydrocarbons were detected in borehole BH104B and MW03. The predominant aliphatic carbon range in BH104B comprised of C12-C16 (12 µg/l) and C16-C21 (19 µg/l). The predominant aliphatic carbon range in MW03 comprised of C16-C21 (35 µg/l) and C21-C34 (46 µg/l). No aromatic carbons were detected above the laboratory limit of detection of 10 µg/l in all monitoring wells.

During the Quarter 4, 2010 and Quarter 1, 2011 monitoring event, there were no detections of TPH concentrations above the laboratory limit of detection of 10 µg/l at any location. No aliphatic or aromatic carbons were detected above the laboratory limit of detection of 10 µg/l in all monitoring wells.

During the Quarter 2, 2011 monitoring event, hydrocarbons were detected in borehole BH103, BH104B and MW03. The predominant aliphatic carbon range comprised of C16-C21 (340 µg/l, 20 µg/l and 46 µg/l) and C21-C35 (420 µg/l, 96 µg/l and 150 µg/l in BH103, BH104B and MW03 respectively). The predominant aromatic carbon range also comprised of C16-C21 (78 µg/l, 52 µg/l and 50 µg/l) and C21-C35 (110 µg/l, 49 µg/l and 93 µg/l in BH103, BH104B and MW03 respectively).

During the Quarter 3, 2011 monitoring event, hydrocarbons were detected in borehole MW03 only. The predominant aliphatic carbon range comprised of C10-C12 (18 µg/l), C12-C16 (57 µg/l), C16-C21 (35 µg/l) and C21-C35 (210 µg/l). The predominant aromatic carbon range comprised of C12-C16 (42 µg/l), C16-C21 (66 µg/l) and C21-C35 (45 µg/l).

During the Quarter 4, 2011 monitoring event, hydrocarbons were detected in borehole MW03 only. The predominant aliphatic carbon range comprised C10-C12 (22 µg/l), C12-C16 (51 µg/l), C16-C21 (85 µg/l) and C21-C35 (110 µg/l). The predominant aromatic carbon range comprised of C12-C16 (16 µg/l), C16-C21 (14 µg/l) and C21-C35 (91 µg/l).

During the Quarter 1, 2012 monitoring event, hydrocarbons were detected in borehole BH103 only. The predominant aliphatic carbon range comprised C10-C12 (13 µg/l), C12-C16 (270 µg/l), C16-C21 (690 µg/l) and C21-C35 (980 µg/l). The predominant aromatic carbon range comprised of C16-C21 (250 µg/l) and C21-C25 (680 µg/l). No hydrocarbons were detected in MW03 during the current Quarter 1 monitoring event.

During the Quarter 2, 2012 monitoring event, hydrocarbons were detected in BH103 only. The detected aliphatic carbon range comprised C12-C16 (98 µg/l), C16-C21 (230 µg/l) and C21-C25 (170 µg/l). No detections of aromatic carbons were measured during the Quarter 2 2012 monitoring event.

No hydrocarbons were detected at any location during the previous Quarter 3 and Quarter 4, 2012 monitoring events.

During the previous Quarter 1, 2013 monitoring event aromatic hydrocarbons were detected in BH103, BH104b and MW04. The predominant aromatic carbon range comprised C12-C16 (30 µg/l), C16-C21 (280 µg/l) and C21-C35 (100 µg/l) in BH103, C10-C12 (30 µg/l), C12-C16 (110 µg/l) and C16-C21 (80 µg/l) in BH104B and C10-C12 (20 µg/l) and C12-C16 (80 µg/l) in MW04. Aliphatic hydrocarbons were detected in BH103 in the ranges C12-C16 (70 µg/l), C16-C21 (100 µg/l) and C21-C35 (90 µg/l).

During the current Quarter 2, 2013 monitoring event no aliphatic or aromatic hydrocarbons were detected at any location.

7 CONCLUSIONS

- In accordance with the criteria set out in Schedule 4(ii) of the site's Waste Licence Register No. W0184-01, groundwater monitoring was carried out at the ENVA Ireland site on the 17th April 2013 corresponding to Quarter 2 of 2013. A suitably qualified consultant from RPS collected groundwater samples from 8 on-site monitoring wells and submitted these samples to an accredited laboratory for analysis.

- The results presented have been referenced against the Environmental Protection Agency's (EPA) Interim Guideline Values (IGV) as set out in the Interim Report *'Towards Setting Guideline Values for the Protection of Groundwater in Ireland' 2004.*

- Results of the BTEX and MTBE demonstrate that the levels of Benzene, Toluene, Ethylbenzene and Xylene were below the recommended EPA IGV's

- The Quarter 2, 2013 results of the speciated polycyclic aromatic hydrocarbons indicate that the laboratory limit of detection of 0.2 µg/l for Total PAH's was above the EPA IGV of 0.1 µg/l. There were no detections of speciated PAHs at any location during the current monitoring event. The previous Quarter 2 2012 monitoring event detected Total PAH at MW03 and this is thought to be an isolated occurrence as the general trend of PAH concentrations appeared to have reduced over time. Further monitoring at these locations is recommended to determine the persistency of these detections.

- There have been no exceedances of the IGV for SVOC's since Quarter 1 2010.

- There have been no exceedances of the IGV for VOC's in this Quarter 2 2013 monitoring event. The Quarter 1 2012 monitoring event recorded a concentration of MTBE above the IGV of 30 µg/l in BH104B (280 µg/l). MTBE was previously recorded on two occasions in BH104B in April 2007 (49 µg/l) and in October 2007 (3 µg/l). Since then the concentrations had decreased to below the laboratory limit of detection.

- The results of the phenol analysis by GC-MS detected concentrations below the laboratory limit of detection of 1.0 µg/l at all locations. However, the laboratory limit of detection is above the IGV of 0.5 µg/l for phenols. Samples were subsequently also analysed for phenols to include chlorophenols and the results indicate that there were no detections above the laboratory limit of detection of 0.05 µg/l. A low level of 2,4-Dimethylphenol (0.12 µg/l) was detected in MW03 during the Quarter 1, 2010 monitoring event. There have been no detections of this compound since February 2010.

- Hydrocarbons were detected in boreholes BH104B and MW03 in the aliphatic carbon ranges during the Quarter 3, 2010 monitoring event. There were no detections of aromatic carbon above the laboratory limit of detection of 10 µg/l in BH104B and MW03. Hydrocarbons were detected during the Quarter 2 (BH103, BH104B, MW03), Quarter 3 (MW03) and Quarter 4 (MW03) 2011 monitoring events. Hydrocarbons in the aliphatic range were detected in BH103 during the Quarter 1 2013 monitoring event and hydrocarbons of the aromatic range were detected in BH103, BH104b and MW04. No detections of hydrocarbons were found at any location during the current Quarter 2 2013 monitoring event.

- The general trend of contaminant concentrations over time continues to be somewhat variable with compounds not being continually detected in the same borehole on two or three consecutive monitoring rounds. In general, the contaminant levels detected at the Enva facility appear to indicate reducing contaminant concentrations over time with infrequent elevations in some parameters. Further monitoring is recommended to confirm these reductions.

Enva Portlaoise

2013 Groundwater Compliance Monitoring Quarter 3 (July – September 2013)

DOCUMENT CONTROL SHEET

Client	Enva Ireland Ltd.					
Project Title	Enva Portlaoise 2013 Groundwater Compliance Monitoring					
Document Title	Quarter 3 (July – September 2013) Interpretative Report					
Document No.	MDE0973Rp0015D01					
This Document Comprises	DCS	TOC	Text	List of Tables	List of Figures	No. of Appendices
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1 INTRODUCTION

1.1 BACKGROUND

RPS has been commissioned by Enva Ireland Ltd to carry out groundwater quality monitoring for environmental compliance, at their facility in the Clonminam Industrial Estate, Portlaoise, Co Laois. Groundwater monitoring has being carried out in strict accordance with criteria set out in Schedule 4(ii) of the site's Waste Licence Register No. W0184-01.

Enva Ireland has been operating under Waste Licence Register No. W0184-01 since January 2004, and is required to submit a report to the Environmental Protection Agency (EPA) on a quarterly basis, outlining the existing groundwater quality underlying the site.

Suitably qualified environmental consultants from RPS, collected groundwater samples from a series of 8 monitoring wells (BH101, BH102, BH103, BH104B, MW01, MW02, MW03, MW04) within the site boundary on the 23rd of September 2013. The samples underwent laboratory analysis for the suite of parameters specified in Schedule 4(ii) of Waste Licence W0184-01. This report outlines the results of the Quarter 3 monitoring for 2013 and reviews historical data recorded at the site.

1.2 OBJECTIVES & SCOPE OF WORK

The specific objectives and scope of work are as follows:

- Review of previous data as provided by Enva Portlaoise;
- Graphical presentation of key compounds and trends; and
- Discussion of results for Quarter 3 2013 within the context of previous results and available guideline concentrations.

2 REVIEW OF PREVIOUS DATA

2.1 INFORMATION SOURCES

The following documents were reviewed as part of this project:

- Waste Licence W0184-01 and any available EPA documents from the EPA website
- Quarterly Groundwater Monitoring Reports (Quarter 1 to Quarter 4), URS (2004)
- Quarterly Groundwater Monitoring Reports (Quarter 1 to Quarter 4), URS (2005)
- Quarterly Groundwater Monitoring Reports (Quarter 1 to Quarter 4), RPS (2006)
- Quarterly Groundwater Monitoring Reports (Quarter 1 to Quarter 4), RPS (2007)
- Quarterly Groundwater Monitoring Reports (Quarter 1 to Quarter 4), RPS (2008)
- Quarterly Groundwater Monitoring Reports (Quarter 1 to Quarter 4), RPS (2009)
- Summary Report on Trend of Contaminant Levels at Enva Ireland Ltd since 2005, Ref: MDE0647RP0001, RPS (2007)
- Groundwater Risk Assessment, Ref: MDE0788Rp0001, RPS (2008)
- Quarterly Groundwater Monitoring Reports (Quarter 1 to Quarter 4), RPS (2010)
- Quarterly Groundwater Monitoring Reports (Quarter 1 to Quarter 4), RPS (2011)
- Quarterly Groundwater Monitoring Reports (Quarter 1 to Quarter 4), RPS (2012)
- Quarter 1 Groundwater Monitoring Report, RPS (2013)
- Quarter 2 Groundwater Monitoring Report, RPS (2013)

2.2 SITE SETTING

The site is located to the southwest of the town of Portlaoise immediately to the south of the Dublin to Cork railway line. The general area is gently undulating. The site slopes gently to the southwest but to the east of the site the ground slopes gently towards the River Triogue, which is located approximately 1 km to the east. The site occupies an area of approximately 1.5 hectares and comprises of an operational waste oil and contaminated soil treatment plant.

The site is located on the outskirts of Portlaoise in an area of agricultural and light industrial development. The site is bounded to the north and east by land belonging to Irish rail, comprising sidings and general storage areas. To the south is a vehicle repair garage, which is elevated above the level of the site by approximately 1.5 m. To the west the site is adjoined by further industrial land, as well as residential land. The site location is presented on **Figure 1**.

The site has been in operation since 1978, and the layout has remained relatively consistent. The site layout is presented on **Figure 2**. The site is largely covered in hardstanding with some open areas in the far north and northwest of the site. All oil and soil storage areas are suitably bunded and the general standard of housekeeping is good.

2.3 REGIONAL SETTING

2.3.1 Geology

The Geological Survey of Ireland indicates that the regional geology of Portlaoise is typified by Carboniferous Limestone. In the vicinity of the site itself the solid geology comprises the Ballysteen Formation, a micaceous-bioclastic limestone. This well-bedded limestone, with interbeds of shale, is extensively folded, with axes trending north-east to south-west, and becomes increasingly muddy towards the top of the formation. North-east to south-west trending faults are found in the region, with one located approximately 500m to the east of the site. The subsoil's in the region comprise mainly Made Ground, around the industrial area, and Limestone Till in the surrounding regions.

2.3.2 Hydrogeology

The limestone is classified by the Geological Survey of Ireland (GSI) as a locally important karstified aquifer. Porosity is predominantly in the form of fractures, in this aquifer, however the muddy nature of this formation greatly reduces permeability. Vulnerability of this aquifer beneath the site is classified as high, with moderate vulnerability to the east of the site.

The public water supply for Portlaoise is derived from groundwater, utilising five extraction wells in total. This supply currently comes from the Straboe area, approximately 5.5 km to the north-east of the site. The source protection zone for this water supply extends north-west south-east with the boundary of the outer protection zone at least 4 km to the north-east of the site. A further public abstraction well-field has been developed to the north-west of the Straboe area in the townland of Eyne, approximately 6 km to the north of the site, and comprises a further four (GSI) abstraction wells. The Source Protection Zone for these wells has not yet been defined but it is not anticipated to affect the Enva site.

The GSI record a number of other dug wells and boreholes within the Portlaoise area, including the boreholes installed on the site. The accuracy of the locations of these wells varies. One well, which was drilled in 1899 is recorded as being located immediately to the south of the Enva site. The use of this well is not known and its location is only accurate to 1 km. A second borehole, drilled in 1973 is recorded 1.5 km to the north of the site at Clonroosk, the accuracy of this location is also 1 km so that it could be closer or further from the site. The use of this well is not known but its yield is recorded as being poor. There are no other wells recorded within 1 km of the site.

Enva is not aware of any abstraction boreholes within the immediate vicinity of their site.

2.4 SITE GROUND CONDITIONS

A total of eight boreholes have been drilled at the site and the general sequence of ground conditions is presented in **Table 2**.

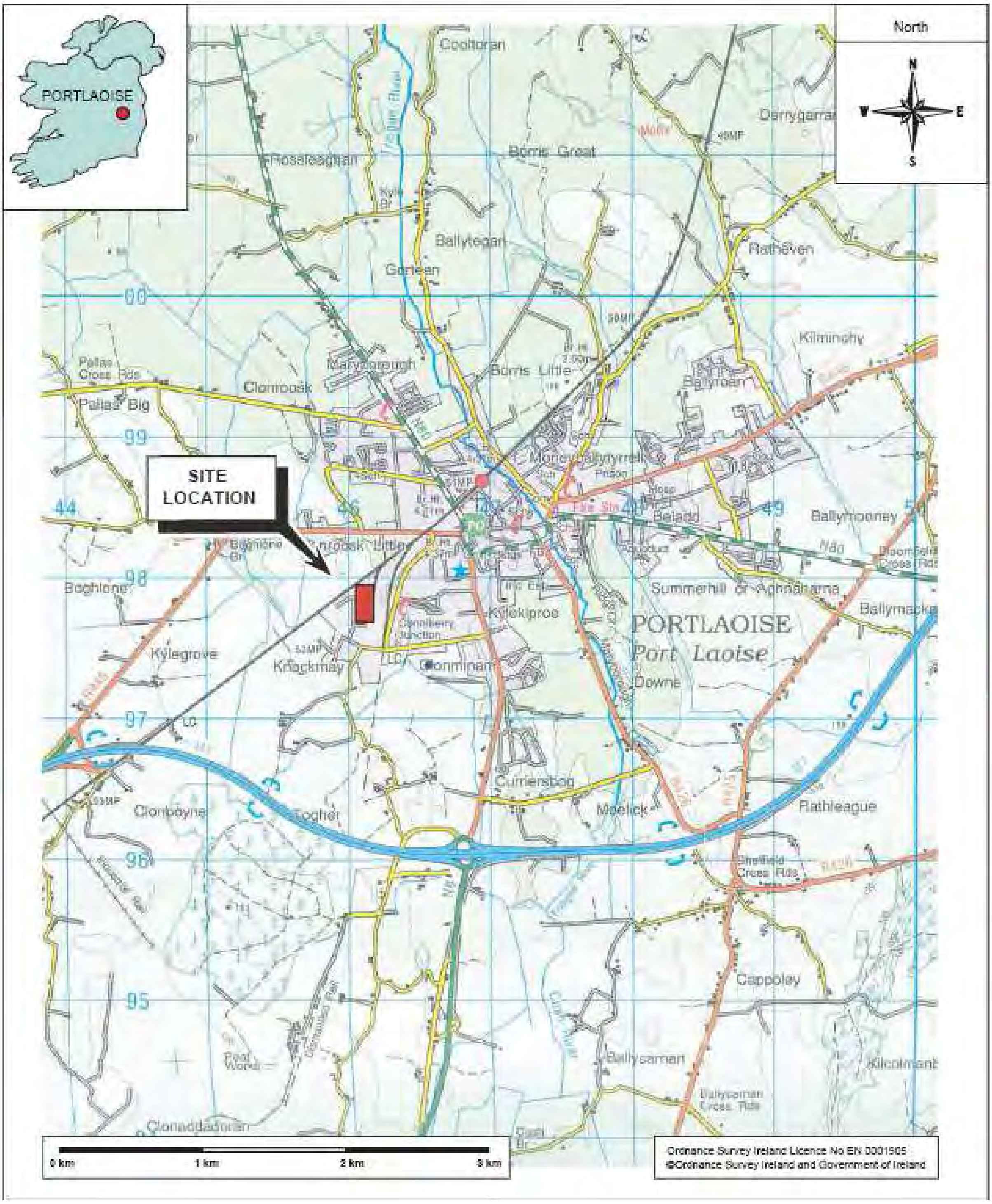
Table 2.1: Ground Conditions

Strata	Extent	Thickness	Description
Made Ground	BH104	0-3.5 m	Predominantly concrete, with hardcore fill, and clay.
Boulder Clay	All boreholes	<8.5 m	Includes fine to medium, well rounded gravels.
Sand and Gravel	Confined to south east	0-2 m	In general the transition from boulder clay to sand is gradual with changes from gravel, to

Strata	Extent	Thickness	Description
	corner of site (BH101, BH104 and MW03)		sandy gravel, to sand.
Limestone Bedrock	Encountered in MW01, MW02 and MW03	Top of limestone ranges from 7.7m to 9m below ground level.	Pale grey, fine-grained bedrock, differentiated from boulders by its un-weathered nature.

The logs for each of the boreholes were previously presented as Appendix B in the RPS Groundwater Risk Assessment Report (Ref: MDE0788Rp0001).

Figure 1 Site Location



2.4.1 Licence Conditions

The waste management licence requires the regular monitoring and sampling of boreholes BH101, BH102, BH103, BH104B, MW01, MW02, MW03 and MW04. The parameters requiring measurement or analysis are presented in Table 2.2.

Table 2.2: Licence Parameters

Group	Parameters requiring Quarterly Measurement	Parameters requiring Annual Measurement
Field Parameters	Groundwater Level pH Temperature Dissolved Oxygen Electrical Conductivity Visual Inspection	Groundwater Level pH Temperature Dissolved Oxygen Electrical Conductivity Visual Inspection
Organics	Mineral Oil BTEX & MTBE PAH's Phenols VOC's SVOC's	Mineral Oil BTEX & MTBE PAH's Phenols VOC's SVOC's
Inorganics	-	Total Alkalinity, Calcium, Manganese, Sulphate, Cyanide (Total), Chloride, Sodium,

3 METHODOLOGY

Groundwater samples were collected from 8 no. on-site groundwater monitoring wells (BH101, BH102, BH103, BH104B, MW01, MW02, MW03, MW04), (See Figure 2) using dedicated Waterra tubing, in accordance with RPS's standard sampling protocol. A non-return foot valve was fixed to the bottom of the tubing and inserted into the well, close to the base of the borehole. Separate tubing and foot valves were used at each monitoring well to eliminate the possibility of cross contamination.

Groundwater in the well casing is not considered representative of the groundwater quality at a given location. For this reason, three well volumes were purged from each well prior to collection of the groundwater sample. By the time purging was complete all field test water parameters (namely pH, Temperature, Electrical Conductivity and Dissolved Oxygen) were within 10% variance in three consecutive measurements. This ensured that the groundwater sample extracted from the monitoring borehole was representative of the water held in the subsurface strata and not water held stagnant in the borehole casing. The purged volumes were calculated on-site from the measured static water levels and total well depths using an electronic dip meter.

Groundwater samples were collected in laboratory supplied containers and stored in chilled cool boxes following sampling and during transit to the laboratory. A rigorous chain of custody procedure was used during the sample round.

3.1 LABORATORY ANALYSIS

All groundwater samples were analysed at a UKAS accredited laboratory, I2 Analytical Ltd for the suite of analyses listed in Table 3.1. Table 3.1 also indicates the analytical techniques used by the laboratory.

Table 3.1: Analytical Methodologies – I2 Analytical Ltd

Parameter	Analytical Methodology
Phenols	GC-MS
Speciated PAHs	GC-MS
BTEX & MTBE	Headspace GC-MS
Petroleum Hydrocarbons	Headspace GC-MS
Volatile Organic compounds & Tentatively Identified Organic Compounds (VOCs & TICs)	Headspace GC-MS
Semi-Volatile Organic compounds & Tentatively Identified Organic Compounds (SVOCs & TICs)	GC-MS

Figure 2 Site Layout Plan with groundwater monitoring well locations

Source: *URS Environmental Consultants (Ref: 45078497 Issue No. 1)*

3.2 PRESENTATION & INTERPRETATION OF RESULTS

The Quarter 3 2013 results are tabulated in Section 4 and discussed with respect to previous results. The results have been compared to the EPA Interim Guideline Values (IGV) as set out in the Report 'Towards Setting Guideline Values for the Protection of Groundwater in Ireland' 2004. It is important to note that the IGVs are based on the lowest acceptable value for either drinking water or environmental quality in surface water and is therefore conservative in nature.

Previous monitoring reports (as listed in Section 2.1) provide details of contaminant concentrations since 2004. The data available within these reports has been reviewed and time series plots of key parameters have been compiled. Trends for chlorinated solvents, petroleum hydrocarbons and phenol parameters have been plotted.

Time series plots are presented in Section 6 and include the results of this Quarter 3 2013 monitoring round. As the monitoring continues in accordance with the waste licence requirements, the plots will be updated with the results of subsequent rounds used to illustrate the results.

Time series plots are also provided for manual water levels where available from previous reports.

4 QUARTER 3 RESULTS SEPTEMBER 2013

The results of all field measurements and laboratory analysis are presented in this section.

The results are discussed in relation to appropriate guideline values in Section 5. Results that are shown to be above the relevant guideline values are highlighted in bold and shaded. Results that are shown to be above the relevant laboratory detection limits are highlighted in italics.

Site-specific field parameter measurements were collected during the site visit as per RPS Water sampling protocol.

Table 4.1: Groundwater Levels (Quarter 3, 2013)

Monitoring Well	BH101	BH102	BH103	BH104B	MW01	MW02	MW03	MW04
Depth (mbgl)	6.73	6.60	4.51	4.70	23.10	31.17	14.98	6.50
Static Water Level (mbgl)	4.37	3.53	1.89	0.66	3.21	4.51	4.12	3.97
Ground Level (mAOD)	103.06	102.55	101.16	101.52	102.10	103.12	102.77	-
Water Level (mAOD)	98.69	99.02	99.27	100.86	99.89	98.61	98.65	-
Free Phase Oil (mm)	No detection	No detection	No detection	No detection	No detection	No detection	No detection	No detection

mbgl = metres below ground level

Table 4.2: Results of Field Parameters Measured at each Groundwater Monitoring Well (Quarter 3, 2013)

Monitoring Well	pH (pH Units)	Temperature (°C)	Conductivity (µS/cm)	Dissolved O_2 (ppm)	Observations
BH101	7.27	14.0	864	3.63	Grey cloudy colour, small black suspended solids, odourless.
BH102	6.71	13.2	737	2.17	Clear, slight yellow colour, strong H_2S odour detected on purging, some suspended solids.
BH103	7.23	14.5	**1261**	3.42	Light grey cloudy colour, suspended solids, odourless.
BH104B	7.38	14.2	422	2.54	Clear with yellow tinge, strong H_2S odour on purging. Water in well head.
MW01	7.52	14.5	985	2.47	Clear, no odour detected, small suspended solids. Difficult to purge at this location.
MW02	7.34	13.5	568	3.14	Clear, suspended solids, slight sheen on water surface, odourless.
MW03	7.38	12.9	**1251**	2.89	Dark grey colour, slight hydrocarbon sheen on surface, slight hydrocarbon odour.
MW04	6.58	13.5	995	3.21	Cloudy brown in colour, a lot of sediment in sample, slight H_2S odour.
Interim EPA Guideline Values (Units as indicated)	**>6.5 & <9.5**	**25°C**	**1000**	**No abnormal change**	**-**

Note: Results above the relevant IGV are highlighted in bold and shaded.

Table 4.3: Results of Inorganic Analysis (as per Annual Licence Requirements)

Parameter	Units	Laboratory Limit of Detection	BH101	BH102	BH103	BH104B	MW01	MW02	MW03	MW04	Interim EPA Guideline Values (Units as indicated)
Total Alkalinity	mg/l	10	490	480	550	240	390	420	460	480	No abnormal change
Calcium	mg/l	0.2	100	130	110	85	68	65	130	130	200
Manganese	mg/l	0.3	0.0014	**1.7**	**1.0**	**0.094**	0.0035	0.011	**0.34**	**1.8**	0.05
Sulphate	mg/l	0.1	60.6	42.2	34.8	59.4	25.1	20.8	14.0	6.12	200
Cyanide (Total)	mg/l	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.01
Chloride	mg/l	4	**80**	20	26	12	14	15	**190**	**280**	30
Sodium	mg/l	0.1	120	16	18	20	18	22	95	140	150

Table 4.4: Results of BTEX & MTBE

Parameter	Units	Laboratory Limit of Detection	BH101	BH102	BH103	BH104B	MW01	MW02	MW03	MW04	Interim EPA Guideline Values (Units as indicated)
Benzene	µg/l	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	1.0
Toluene	µg/l	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	10
Ethylbenzene	µg/l	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	10
p & m-xylene	µg/l	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	10 [Note 1]
o-xylene	µg/l	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	10 [Note 1]
MTBE (Methyl Tertiary Butyl Ether)	µg/l	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	30

Note 1: No specific IGV for parameter. IGV for Total Xylenes is used as guideline.

Table 4.5: Results of Speciated PAH's

Parameter	Units	Laboratory Limit of Detection	BH101	BH102	BH103	BH104B	MW01	MW02	MW03	MW04	Interim EPA Guideline Values (Units as indicated)
Naphthalene	µg/l	0.01	<0.01	<0.01	<0.01	< 0.01	<0.01	<0.01	<0.01	< 0.01	1.0
Acenaphthylene	µg/l	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	-
Acenaphthene	µg/l	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	1.1	<0.01	-
Fluorene	µg/l	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	1.5	<0.01	-
Phenanthrene	µg/l	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	-
Anthracene	µg/l	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	10,000
Fluoranthene	µg/l	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	1.0
Pyrene	µg/l	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	-
Benzo(a)anthracene	µg/l	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	-
Chrysene	µg/l	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	-
Benzo(b)fluoranthene	µg/l	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.5
Benzo(k)fluoranthene	µg/l	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.05
Benzo(a)pyrene	µg/l	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.01
Indeno(1,2,3-cd)pyrene	µg/l	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.05
Dibenz(a,h)anthracene	µg/l	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	-
Benzo(g,h,i)perylene	µg/l	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.05
Total EPA-16 PAH's	µg/l	0.2	**< 0.2**	**< 0.2**	**< 0.2**	**< 0.2**	**< 0.2**	**< 0.2**	**2.62**	**< 0.2**	0.1

Note: Results above the relevant IGV are highlighted in bold and shaded.
Note: Results above the relevant laboratory limit of detection are in italics.

Table 4.6: Results of Total Phenols

Parameter	Units	Laboratory Limit of Detection	BH101	BH102	BH103	BH104B	MW01	MW02	MW03	MW04	Interim EPA Guideline Values (Units as indicated)
Total Phenols (monohydric)	µg/l	10	<10	<10	<10	<10	<10	<10	<10	<10	0.5
Total Phenols (GC-MS)	µg/l	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.5

Table 4.7: Results of Speciated Phenols

Parameter	Unit s	Laboratory Limit of Detection	BH101	BH102	BH103	BH104B	MW01	MW02	MW03	MW04	Interim EPA Guideline Values (Units as indicated)
Phenol	µg/l	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.5
2,4,5-Trichlorophenol	µg/l	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	-
2,4,6-Trichlorophenol	µg/l	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	200
2,4-Dichlorophenol	µg/l	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	-
2,4-Dimethylphenol	µg/l	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	-
2-Chlorophenol	µg/l	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	200
2-Methylphenol	µg/l	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	-
2-Nitrophenol	µg/l	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	-
4-Chloro-3-methylphenol	µg/l	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	-
4-Methylphenol	µg/l	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	-

Note: Results above the relevant laboratory limit of detection are in italics.

Table 4.8: Results of Semi-Volatile Organic Compounds (sVOCs)

Parameter	Units	Laboratory Limit of Detection	BH101	BH102	BH103	BH104B	MW01	MW02	MW03	MW04	Interim EPA Guideline Values (Units as indicated)
Aniline	µg/l	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	-
Phenol	µg/l	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.5
2-Chlorophenol	µg/l	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	200
Bis(2-chloroethyl)ether	µg/l	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	-
1,3-Dichlorobenzene	µg/l	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	-
1,2-Dichlorobenzene	µg/l	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	10
1,4-Dichlorobenzene	µg/l	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	-
Bis(2-chloroisopropyl)ether	µg/l	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	-
2-Methylphenol	µg/l	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	-
Hexachloroethane	µg/l	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	-
Nitrobenzene	µg/l	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	10
4-Methylphenol	µg/l	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	-
Isophorone	µg/l	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	-
2-Nitrophenol	µg/l	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	-
2,4-Dimethylphenol	µg/l	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	-
Bis(2-chloroethoxy)methane	µg/l	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	-
1,2,4-Trichlorobenzene	µg/l	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.40
Naphthalene	µg/l	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	1.0

Parameter	Units	Laboratory Limit of Detection	BH101	BH102	BH103	BH104B	MW01	MW02	MW03	MW04	Interim EPA Guideline Values (Units as indicated)
2,4-Dichlorophenol	µg/l	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	-
4-Chloroaniline	µg/l	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	-
Hexachlorobutadiene	µg/l	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.10
4-Chloro-3-methylphenol	µg/l	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	-
2,4,6-Trichlorophenol	µg/l	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	200
2,4,5-Trichlorophenol	µg/l	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	-
2-Methylnaphthalene	µg/l	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	-
2-Chloronaphthalene	µg/l	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	-
Dimethylphthalate	µg/l	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	-
2,6-Dinitrotoluene	µg/l	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	-
Acenaphthylene	µg/l	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	-
Acenaphthene	µg/l	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	1.0	<0.01	-
2,4-Dinitrotoluene	µg/l	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	-
Dibenzofuran	µg/l	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	-
4-Chlorophenyl phenyl ether	µg/l	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	-
Diethyl phthalate	µg/l	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	-
4-Nitroaniline	µg/l	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	-
Fluorene	µg/l	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	1.5	<0.01	-
Azobenzene	µg/l	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	-

Parameter	Units	Laboratory Limit of Detection	BH101	BH102	BH103	BH104B	MW01	MW02	MW03	MW04	Interim EPA Guideline Values (Units as indicated)
Bromophenyl phenyl ether	µg/l	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	-
Hexachlorobenzene	µg/l	0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	0.03
Phenanthrene	µg/l	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	-
Anthracene	µg/l	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	10,000
Carbazole	µg/l	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	-
Dibutyl phthalate	µg/l	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	2.0
Anthraquinone	µg/l	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	-
Fluoranthene	µg/l	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	1.0
Pyrene	µg/l	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	-
Butyl benzyl phthalate	µg/l	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	-
Benzo(a)anthracene	µg/l	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	-
Chrysene	µg/l	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	-
Benzo(b)fluoranthene	µg/l	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.5
Benzo(k)fluoranthene	µg/l	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.05
Benzo(a)pyrene	µg/l	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.01
Indeno(1,2,3-cd)pyrene	µg/l	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.05
Dibenz(a,h)anthracene	µg/l	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	-
Benzo(g,h,i)perylene	µg/l	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.05

Note: Results above the relevant laboratory limit of detection in italics.

Table 4.9: Results of Volatile Organic Compounds (VOCs)

Parameter	Units	Laboratory Limit of Detection	BH101	BH102	BH103	BH104B	MW01	MW02	MW03	MW04	Interim EPA Guideline Values (Units as indicated)
Chloromethane	µg/l	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	-
Chloroethane	µg/l	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	-
Bromomethane	µg/l	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	-
Vinyl Chloride	µg/l	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	-
Trichlorofluoromethane	µg/l	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	-
1,1-dichloroethene	µg/l	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	30
1,1,2-Trichloro 1,2,2-Trifluoroethane	µg/l	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	-
Cis-1,2-dichloroethene	µg/l	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	-
MTBE (Methyl Tertiary Butyl Ether)	µg/l	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	30
1,1-dichloroethane	µg/l	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	-
2,2-Dichloropropane	µg/l	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	-
Trichloromethane	µg/l	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	12
1,1,1-Trichloroethane	µg/l	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	500
1,2-dichloroethane	µg/l	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	-
1,1-Dichloropropene	µg/l	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	-
Trans-1,2-dichloroethene	µg/l	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	-
Benzene	µg/l	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	1.0
Tetrachloromethane	µg/l	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	2.0

Parameter	Units	Laboratory Limit of Detection	BH101	BH102	BH103	BH104B	MW01	MW02	MW03	MW04	Interim EPA Guideline Values (Units as indicated)
1,2-dichloropropane	µg/l	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	-
Trichloroethene	µg/l	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	70
Dibromomethane	µg/l	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	-
Bromodichloromethane	µg/l	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	-
Cis-1,3-dichloropropene	µg/l	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	-
Trans-1,3-dichloropropene	µg/l	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	-
Toluene	µg/l	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	10
1,1,2-Trichloroethane	µg/l	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	-
1,3-Dichloropropane	µg/l	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	-
Dibromochloromethane	µg/l	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	-
Tetrachloroethene	µg/l	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	40
1,2-Dibromoethane	µg/l	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	-
Chlorobenzene	µg/l	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	1.0
1,1,1,2-Tetrachloroethane	µg/l	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	-
Ethylbenzene	µg/l	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	10
p & m-xylene	µg/l	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	10
Styrene	µg/l	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	-
Tribromomethane	µg/l	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	-
o-xylene	µg/l	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	10

Parameter	Units	Laboratory Limit of Detection	BH101	BH102	BH103	BH104B	MW01	MW02	MW03	MW04	Interim EPA Guideline Values (Units as indicated)
Isopropylbenzene	µg/l	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	-
Bromobenzene	µg/l	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	-
N-Propylbenzene	µg/l	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	-
2-Chlorotoluene	µg/l	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	-
4-Chlorotoluene	µg/l	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	-
1,3,5-Trimethylbenzene	µg/l	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	-
Tert-Butylbenzene	µg/l	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	-
1,2,4-Trimethylbenzene	µg/l	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	-
Sec-Butylbenzene	µg/l	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	-
1,3-dichlorobenzene	µg/l	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	-
P-Isopropyltoluene	µg/l	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	-
1,2-dichlorobenzene	µg/l	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	10
1,4-dichlorobenzene	µg/l	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	-
Butylbenzene	µg/l	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	-
1,2-Dibromo-3-chloropropane	µg/l	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	-
1,2,4-Trichlorobenzene	µg/l	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.40
Hexachlorobutadiene	µg/l	0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.10
1,2,3-Trichlorobenzene	µg/l	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	-

Note: Results above the relevant IGV are highlighted in bold and shaded.
Note: Results above the relevant laboratory limit of detection are highlighted in bold italics.

Table 4.10: Results of Total Petroleum Hydrocarbons (Aliphatic/Aromatic)

Parameter	Units	Laboratory Limit of Detection	BH101	BH102	BH103	BH104B	MW01	MW02	MW03	MW04	Interim EPA Guideline Values (Units as indicated)
Aliphatic > C5-C6	µg/l	10	<10	<10	<10	<10	<10	<10	<10	<10	-
Aliphatic > C6-C8	µg/l	10	<10	<10	<10	<10	<10	<10	<10	<10	-
Aliphatic > C8-C10	µg/l	10	<10	<10	<10	<10	<10	<10	<10	<10	-
Aliphatic > C10-C12	µg/l	10	<10	<10	<10	<10	<10	<10	200	<10	-
Aliphatic > C12-C16	µg/l	10	<10	<10	<10	<10	<10	<10	190	<10	-
Aliphatic > C16-C21	µg/l	10	<10	<10	<10	<10	<10	<10	<10	<10	-
Aliphatic >C21-C35	µg/l	10	<10	<10	<10	<10	<10	<10	<10	<10	-
Aliphatic (C5-C35)	µg/l	10	<10	<10	<10	<10	<10	<10	390	<10	10
Aromatic > C5-C7	µg/l	10	<10	<10	<10	<10	<10	<10	<10	<10	-
Aromatic > C7-C8	µg/l	10	<10	<10	<10	<10	<10	<10	<10	<10	-
Aromatic > C8-C10	µg/l	10	<10	<10	<10	<10	<10	<10	<10	<10	-
Aromatic > C10-C12	µg/l	10	<10	<10	<10	<10	<10	<10	<10	<10	-
Aromatic > C12-C16	µg/l	10	<10	<10	<10	<10	<10	<10	<10	<10	-
Aromatic > C16-C21	µg/l	10	<10	<10	<10	<10	<10	<10	<10	<10	-
Aromatic > C21-C35	µg/l	10	<10	<10	<10	<10	<10	<10	<10	<10	-
Aromatic (C5-C35)	µg/l	10	<10	<10	<10	<10	<10	<10	<10	<10	10

Note: Results above the relevant IGV are highlighted in bold and shaded.
Note: Results above the relevant laboratory limit of detection are highlighted in bold italics.

5 DISCUSSION OF QUARTER 3 RESULTS

The results of the Quarter 3 monitoring event for 2013 are presented in Table 4.1 to 4.10 of this report. For the purpose of this report, the results are compared to the EPA Interim Guideline Values (IGV) as set out in the Interim Report *'Towards Setting Guideline Values for the Protection of Groundwater in Ireland' 2004.* A discussion of the results and their significance is included below.

5.1 FIELD PARAMETERS

The results of the field parameters measured at each groundwater monitoring well are presented in Table 4.2. Groundwater samples recorded pH levels ranging between 6.58 and 7.52. All pH measurements were inside the EPA Interim guideline range of ≥6.5 to ≤9.5. Temperature measurements ranged from 12.9°C to 14.5°C and were within the EPA IGV of 25°C.

Field measurements of Electrical Conductivity levels ranged between 422 µS/cm and 1261 µS/cm and were above the Interim Guideline Value of 1000 µS/cm at BH103 (1261 µS/cm) and MW03 (1251 µS/cm).

Dissolved oxygen levels ranged between 2.17 and 3.63 ppm. Factors such as climate, nutrients in the water, suspended solids; organic wastes and groundwater inflow can all influence the dissolved oxygen values.

Observations relating to colour and odour varied from well to well as detailed in Table 4.2.

5.2 RESULTS OF INORGANIC ANALYSIS

The results of the inorganic analysis are presented in Table 4.3. The following inorganic parameters are required to be analysed on an annual basis in accordance with Schedule D of the Waste Licence Register Number W0184-01; Total Alkalinity, Calcium, Manganese, Sulphate, Cyanide (Total), Chloride and Sodium.

The results of the inorganic analysis for this monitoring event indicate that Manganese and Chloride were recorded above their respective recommended IGV's. The remaining parameters were below their IGV's at all locations.

Concentrations of Manganese exceeded the IGV of 0.05 mg/l at 5 no. locations (BH102, BH103, BH104B, MW03 and MW04) ranging between 0.094 mg/l and 1.8 mg/l.

Concentrations of Chloride were recorded above the IGV of 30 mg/l at 3 no. locations (BH101, MW03 and MW04) ranging between 80 mg/l and 280 mg/l.

5.3 RESULTS OF BTEX & MTBE

The results of the **BTEX** and **MTBE** analysis are presented in Table 4.4 and demonstrate concentrations below the laboratory limit of detections and associated IGV's at all locations.

The last detection of MTBE was in the Quarter 1 monitoring event of 2012. MTBE was recorded above the laboratory limit of detection at a concentration of 280 µg/l at BH104B. This was the only recorded exceedance in Quarter 1 2012. Previous monitoring during Quarter 1 and Quarter 2 of 2010 detected exceedances of MTBE at BH103 at a concentration of 16 µg/l. During Quarter 3 and Quarter 4 of 2010 concentrations were below the laboratory limit of detection. Prior to these 2010 monitoring events, concentrations of MTBE at BH103 were recorded at 63 µg/l in December 2009.

5.4 RESULTS OF SPECIATED PAH'S

The results of the Speciated PAH analysis during this monitoring period are presented in Table 4.4.

The laboratory limit of detection for Total EPA-16 PAH's is 0.2 µg/l. This laboratory limit of detection is above the EPA IGV of 0.1 µg/l. To identify the compounds, which attributed to these concentrations, speciated PAH analysis was carried out, which reduces the limit of detection for individual parameters to 0.01 µg/l.

The results of the speciated polycyclic aromatic hydrocarbon analysis detected no concentrations above the laboratory limit of detection with the exception of two compounds in MW03. Acenaphthene was detected at a concentration of 1.1 µg/l and Fluorene was detected at a concentration of 1.5 µg/l in MW03.

The laboratory is accredited to achieve a detection limit of 0.2 µg/l for EPA-16 PAH's. The laboratory has confirmed that the detection limit for total EPA-16 PAH's can be lowered to 0.1 µg/l for comparison with the EPA IGV of 0.1 µg/l, however this will not be accredited.

5.5 RESULTS OF SPECIATED PHENOLS

The results of Total Phenol analysis are presented in Table 4.5. All samples detected concentrations of monohydric phenol below the laboratory limit of detection of 10 µg/l. It should be noted that the laboratory limit of detection is above the IGV of 0.5 µg/l for phenols.

For this reason, samples were analysed for phenols to include chlorophenols. The results of the speciated phenols analysis are presented in Table 4.6. The speciated phenol analysis reduces the laboratory limit of detection to 0.05 µg/l for individual parameters.

The results of the current Quarter 3 2013 speciated phenol analysis confirm concentrations of phenols were below the laboratory limit of detection of 0.05 µg/l at all locations. This is consistent with the results from the previous Quarter 1 and Quarter 2 2013 monitoring event.

5.6 RESULTS OF SEMI-VOLATILE ORGANIC COMPOUNDS

The results of the Semi-Volatile Organic Compound analysis are presented in Table 4.7.

No SVOC's were detected during this monitoring period above the relevant IGV's with the exception of two SVOC's detected in MW03. The compounds detected under the SVOC suite were Acenaphthene and Fluorene, the same compounds as detected under the laboratories PAH suite. These compounds were detected at the same concentration in both suites of analysis. The Quarter 3 monitoring event of 2012 detected concentrations of Naphthalene and Acenaphthylene at 2.4 µg/l and 0.12 µ/l respectively in MW03.

5.7 RESULTS OF VOLATILE ORGANIC COMPOUNDS

The results of the Volatile Organic Compound analysis are presented in Table 4.8. The results of the current Quarter 3 2013 monitoring event indicate that there were no exceedances of VOC parameters detected above the relevant IGV's.

In November 2009, corresponding to Quarter 4 of 2009, no VOC's were detected above the relevant IGV's. However some parameters were detected above the laboratory limits of detection (1,1-Dichloroethane, 1,2,4-trimethylbenzene, 1,3,5-trimethylbenzene, MTBE, n-butylbenzene, n-propylbenzene, o-xylene, p-isopropyltoluene, sec-butylbenzene and tert-butylbenzene).

The Quarter 1 and Quarter 2 monitoring results of 2010 detected MTBE in BH103 raised above the laboratory limit of detection of 1.0 µg/l at a concentration of 16 µg/l.

The results of the Quarter 3 and Quarter 4 monitoring events of 2010 and all subsequent monitoring events indicate that there were no exceedances of the IGV for specific parameters.

5.8 RESULTS OF TOTAL PETROLEUM HYDROCARBONS

In order to provide a more accurate profile of TPH within the groundwater, speciated hydrocarbon analysis using the Total Petroleum Hydrocarbon Criteria Working Group (TPHCWG) method was carried out on samples taken at all boreholes. The results of the TPH analysis are presented in Table 4.9.

No detections of TPH in the aliphatic or aromatic range were observed in any shallow monitoring well locations during the current monitoring event. TPH in the aliphatic range were detected in one deep groundwater well, MW03, during the Quarter 3, 2013 event. TPH of the range C10-C12 and C12-C16 were detected at concentrations of 290 µg/l and 190 µg/l respectively. No detections of TPH in the aromatic range were observed in any monitoring deep monitoring well locations during the current Quarter 3 2013 monitoring event.

The EPA IGV of 10 µg/l for Total Hydrocarbons is deemed comparable with the results for total petroleum hydrocarbons (TPH).

The previous Quarter 1 2013 monitoring event detected aliphatic TPH of the range C12-C16, C16-C21 and C21-C35. TPH in the mid to high aromatic ranges were detected in BH103, BH104B and MW04 during the previous Quarter 1 2013 monitoring event. Aromatic TPH of the ranges C12-C16, C16-C21 and C21-C35 were detected in BH103, the ranges C10-C12, C12-C16 and C16-C21 were detected in BH104B and aromatic TPH of the ranges C10-C12 and C12-C16 were detected in MW04.

The Quarter 2 monitoring event of 2012 detected elevated TPH of the aliphatic range C12-C16, C16-C21 and C21-C25 in BH103. Hydrocarbons have been detected in borehole MW03 during Quarter 1 2010, in borehole BH104B during the Quarter 2 2010 monitoring event and in borehole BH104B and MW03 during the Quarter 3 2010 monitoring events. Hydrocarbons have also been detected in BH103, BH104B and MW03 in the Quarter 2 2011 monitoring event and in MW03 in the Quarter 3 and Quarter 4 2011. These detections are discussed further in Section 6.2.3.

6 HISTORICAL RESULTS & TRENDS

Time series plots are presented in this section and include the results of the Quarter 3 2013 monitoring round. As the monitoring continues in accordance with the waste licence requirements, the plots will be updated with the results of subsequent rounds and used to illustrate the results.

6.1 GROUNDWATER LEVELS OVER TIME

Figure 3 to Figure 5 below illustrates the manually recorded water levels using an electronic probe. The graphs show that groundwater levels can vary considerably between monitoring rounds.

Figure 4 illustrates groundwater elevations (mAOD) in shallow groundwater wells (BH101 to BH104B) ranging between approximately 98 mAOD and 102 mAOD.

Figure 5 illustrates groundwater elevation (mAOD) in the deeper groundwater wells (MW01 to MW03). The groundwater elevation (mAOD) for these deeper groundwater wells ranges from approximately 97.5 mAOD to approximately 100 mAOD.

Figure 3 Groundwater Elevation (mAOD) in all Monitoring Wells

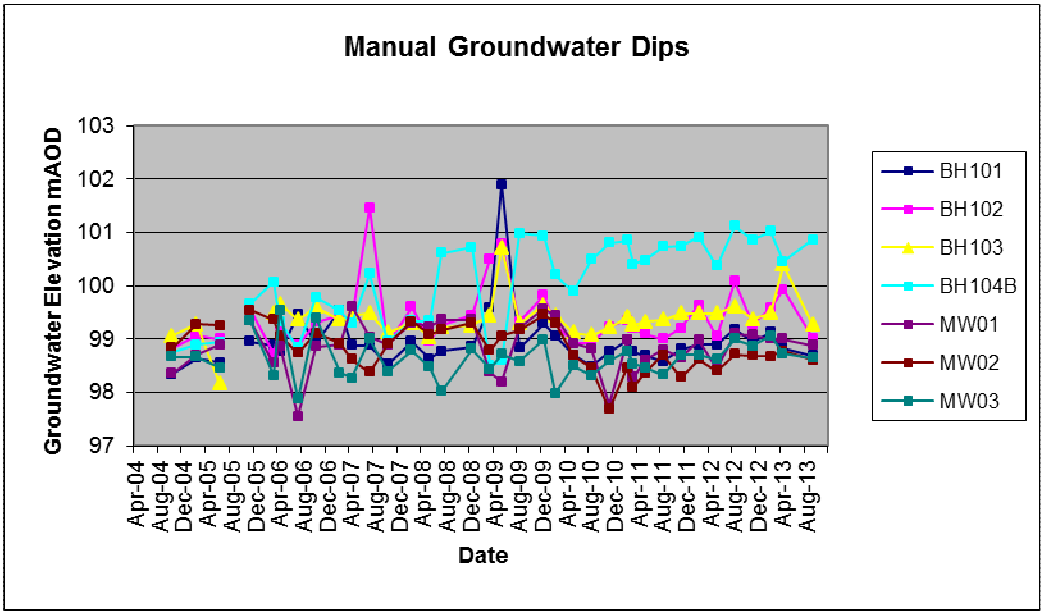


Figure 4 Groundwater Elevation (mAOD) in Shallow Monitoring Wells

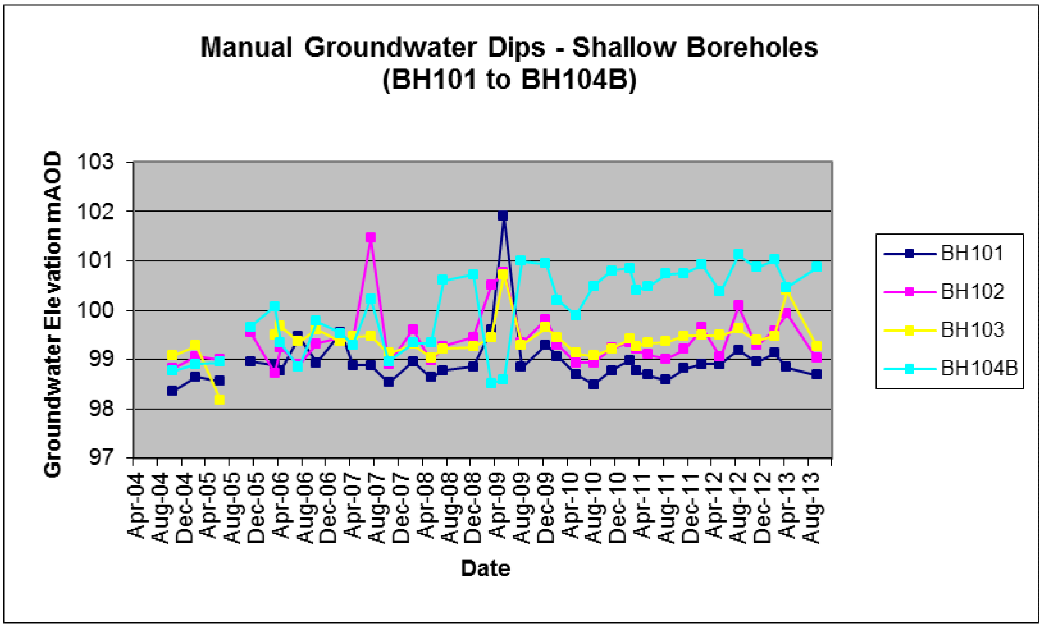
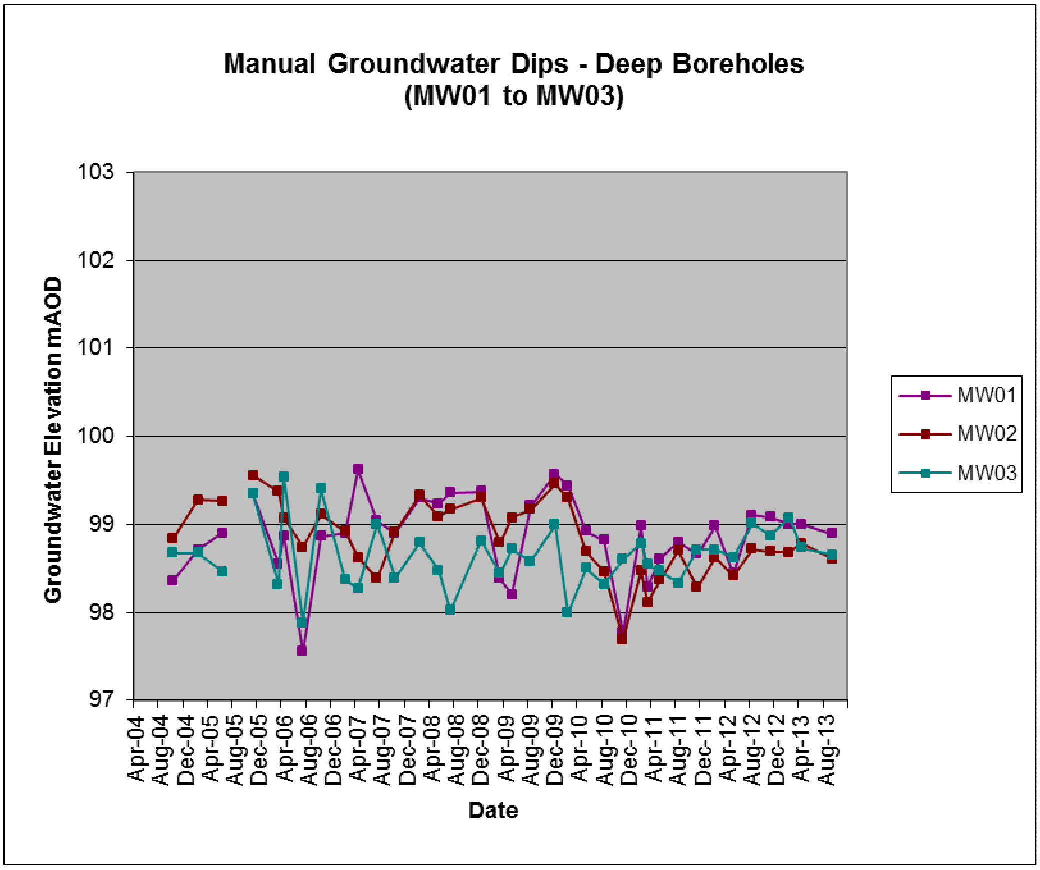


Figure 5 Groundwater Elevation (mAOD) in Deep Monitoring Wells



The groundwater levels generally show a similar pattern of fluctuation over time indicating a degree of connection between boreholes. The graphs demonstrate that groundwater levels can vary considerably between monitoring rounds; however, the general direction of flow in the shallow and deeper groundwater bearing unit is in an easterly or north easterly direction however there have been some occasional historic cases of groundwater flowing in a south-easterly direction.

In addition, monthly rainfall data for Oak Park, Carlow have been tabulated from Met Eireann to examine the relationship between compounds and rainfall events. The data from Oak Park was chosen as the weather station at Birr, Co. Offaly closed in October 2009. A summary of the rainfall data is in Tables 5.1 to 5.5.

Table 5.1: Monthly Rainfall data for Year 2009 for Oak Park, Carlow

Month	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec
Rainfall (mm)	113.4	29.2	32.6	102.4	69.0	65.4	152.4	100.9	41.8	127.8	215.5	73.7

Table 5.2: Monthly Rainfall data for Year 2010 for Oak Park, Carlow

Month	Jan	Feb	Mar	Apr	May	June	July	August	Sept	Oct	Nov	Dec
Rainfall (mm)	71.5	48.0	80.7	49.0	51.4	37.7	93.6	25.5	108.7	68.9	87.7	52.2

Table 5.3: Monthly Rainfall data for Year 2011 for Oak Park, Carlow

Month	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec
Rainfall (mm)	50.6	121.9	16.0	19.5	51.2	72.7	46.4	25.5	93.9	93.9	89.2	55.5

Table 5.4: Monthly Rainfall data for 2012 to date for Oak Park, Carlow

Month	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec
Rainfall (mm)	70.8	24.5	18.0	56.3	50.2	155.8	76.2	127.7	37.9	63.4	80.9	68.1

Table 5.5: Monthly Rainfall data for 2013 to date for Oak Park, Carlow

Month	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec
Rainfall (mm)	76.2	35.8	57.6	44.4	35.6	37.5	32.3	85.6	24.4			

Note: Data for the most recent months are provisional.

6.2 GROUNDWATER CONCENTRATIONS OVER TIME

Groundwater quality trends have previously been examined in two reports (URS 2005 and RPS 2007). In addition, RPS carried out a groundwater risk assessment (Ref: MDE0788RP0001, dated November 2008) in which the general trend of contaminant concentrations over time was observed to be erratic with compounds rarely being detected in the same borehole on two consecutive monitoring rounds.

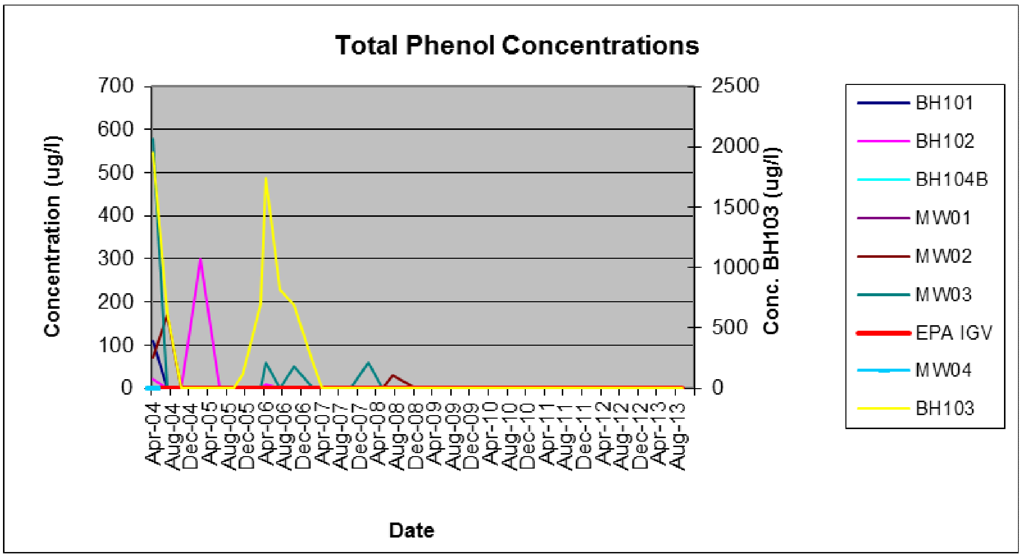
The data available within these reports has been reviewed and time series plots of key parameters have been compiled based on notable trends. Trends for phenols, petroleum hydrocarbons and chlorinated solvents have been plotted as outlined in the following sections.

6.2.1 Phenols

Phenols have been detected historically in all boreholes with the highest concentrations recorded in BH103. However concentrations in BH103 have declined since April 2007. Phenol concentrations have since been recorded below the IGV of 0.5 µg/l in all monitoring wells since December 2008 indicating natural attenuating conditions within the groundwater.

2,4-Dimethylphenol was detected at a concentration of 0.12 µg/l during the Quarter 1, 2010 monitoring event. There is no recommended IGV for this parameter. Subsequent to the Quarter 1 2010 monitoring event no detections of phenols have been noted at any monitoring location up to and including the current Quarter 3 2013 monitoring event.

Figure 6 Phenol Concentrations in all Monitoring Wells



6.2.2 Polycyclic Aromatic Hydrocarbons (PAH's)

Figure 7 below illustrates that PAH's (Polycyclic Aromatic Hydrocarbons) have previously been detected within all monitoring wells above the recommended EPA IGV of 0.1 µg/l. Historically the highest concentrations have been detected within MW03 and BH104B. In addition, a range of PAH's including Benzo(a)pyrene, Benzo(g,h,i)perylene, Indeno(1,2,3)cd pyrene, Fluoranthene and Napthalene have previously been detected in MW03 with Figures 8 to 11 illustrating some of the PAH compounds which were detected above their respective IGV's.

Figure 7 illustrates that **Total PAH** has been detected in all groundwater monitoring wells at the site above the IGV of 0.1 µg/l since 2005. Elevated concentrations have been detected in MW03 and BH104B, with the highest concentration detected in March 2006 (107 µg/l) and in October 2007 (19.72 µg/l) respectively. Since then, the concentrations have shown a marked decrease.

The results from the Quarter 4, 2009 monitoring round in December 2009 recorded total EPA-16 PAH concentrations above the IGV at all locations with the exception of MW02. These concentrations may be linked to the heavy rainfall event, which occurred in November of 2009, which may have mobilized traces of these compounds from soil.

The results from the Quarter 1 monitoring round, 2010 recorded Total PAH concentrations below the IGV of 0.2 µg/l at all locations with the exception of MW03, which detected a concentration of 0.3 µg/l. There has been a decrease in Total PAH concentrations at all locations since the Quarter 4 event in December 2009 with the most notable decrease at MW03 reducing from 4.58 µg/l to <0.1 µg/l.

Concentrations of Total PAH above the IGV in 2010 were detected during the Quarter 1 monitoring event in MW03 (0.3 µg/l), Quarter 2 monitoring event in BH104B (1.2 µg/l) and Quarter 3 monitoring event in MW02 (2.0 µgl) and BH104B (0.2 µgl). There were no elevated concentrations of Total PAH during the Quarter 4 2010, the Q1, Q2, Q3 and Q4 2011 monitoring events, and the Q1 2012 monitoring event. Total PAH was detected above the IGV in MW03 in the Q2 2012 monitoring event. No Total PAH exceedances were detected in the following Q3 and Q4 2012 monitoring events and the previous Q1 and Q2 2013 monitoring events. Total PAH was detected at a concentration of 2.62 µg/l in MW03 during the current Q3 2013 monitoring event.

Figure 7 PAH (Total) Concentrations in all Monitoring Wells

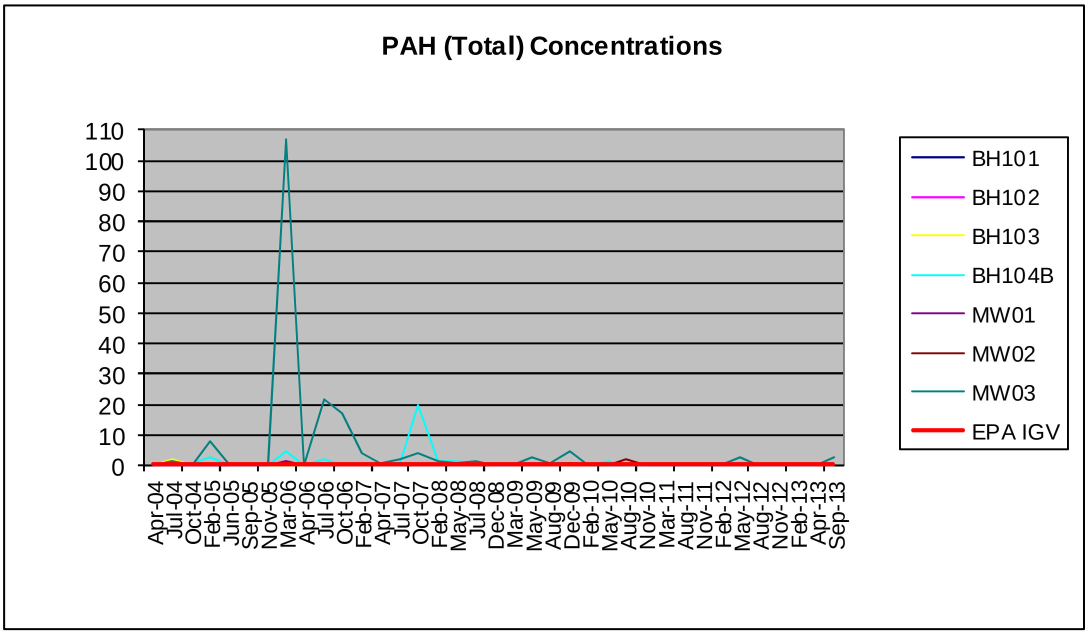


Figure 8 Fluoroanthene Concentrations in all Monitoring Wells

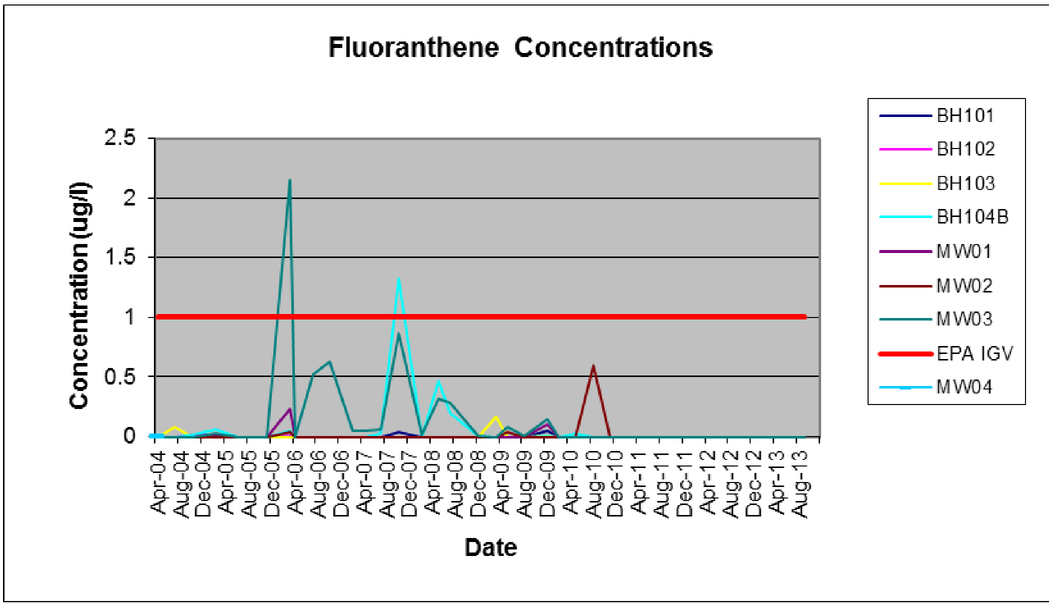
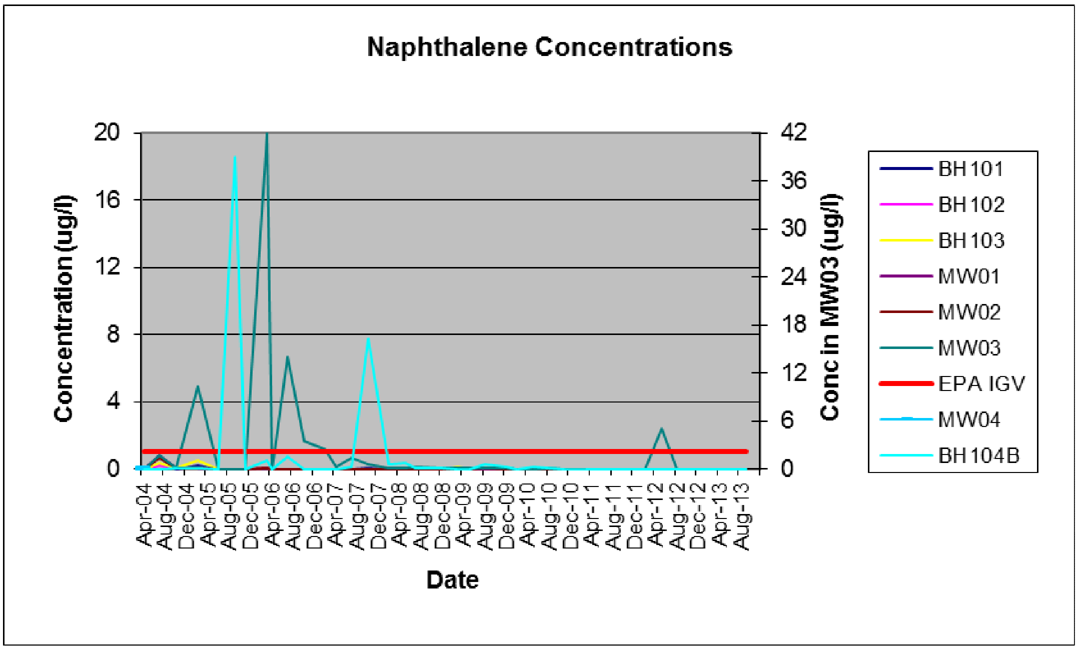


Figure 8 illustrates that **Fluoroanthene** was previously detected above the IGV of 1.0 µg/l in groundwater monitoring wells BH104B (October 2007, 1.33 µg/l) and MW03 (March 2006, 2.158 µg/l) only. The remaining monitoring wells recorded concentrations below the IGV of 1.0 µg/l.

Figure 9 Naphthalene Concentrations in all Monitoring Wells



A similar trend to Fluoroanthene has been noted in Figure 9, with concentrations of **Naphthalene** recorded above the IGV of 1.0 µg/l in BH104B and MW03 only. 4 no. exceedances of the IGV were noted in BH104B in September 2005 (39 µg/l), March 2006 (1.069 µg/l), July 2006 (1.594 µg/l) and October 2007 (16.31 µg/l). Since October 2007, the concentrations in BH104B have decreased below the IGV. There have been 6 exceedances of the IGV of 1.0 µg/l in MW03, with the highest concentration detected in March 2006 (19.986 µg/l) and the most recent being the detected in the Quarter 2 2012 monitoring event (2.4 µg/l). The concentrations detected in August 2010 were slightly above the laboratory limit of detection of 0.01 µg/l at BH104B (0.08 µg/l) and MW03 (0.05 µg/l);

however these levels are deemed low. Concentrations of Naphthalene were below the EPA IGV limit of detection of 1.0 µg/l at all locations during the Quarter 4 2010, the 2011 quarterly monitoring events and the Quarter 1, Quarter 3 and Quarter 4 2012 monitoring periods. No detections of Naphthalene were noted in the current Quarter 3 2013 monitoring event.

Figure 10 Benzo (g,h,i) perylene in all Monitoring Wells

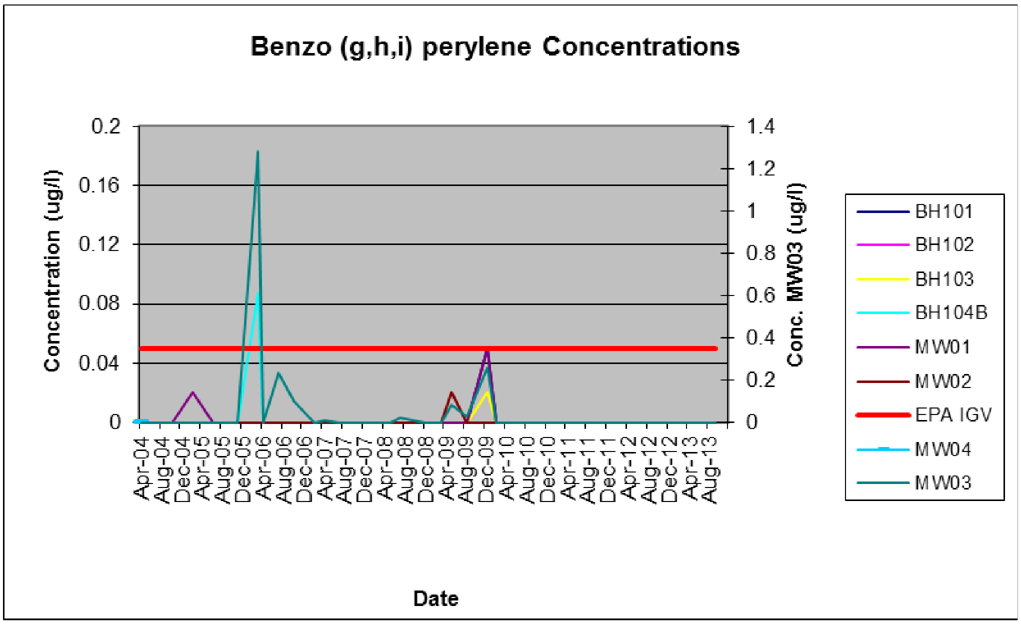


Figure 10 illustrates the concentrations of **Benzo(g,h,i)perylene** in all monitoring wells over time. Elevated concentrations above the IGV were recorded at BH104B (0.087 µg/l) on one occasion only in March 2006.

Figure 10a illustrates elevated concentrations above the IGV recorded at MW03 on 5 no. occasions with the most recent elevated concentration detected in December 2009 (0.26 µg/l). The results of monitoring events in May, August, November 2010, March, May, September and November 2011, February, May, August and November 2012, February 2013, April 2013 and the current September Quarter 3 2013 monitoring event recorded concentrations below the laboratory limit of detection of 0.01 µg/l at all locations.

Figure 10a Benzo (g,h,i) perylene in Monitoring Wells BH104B & MW03

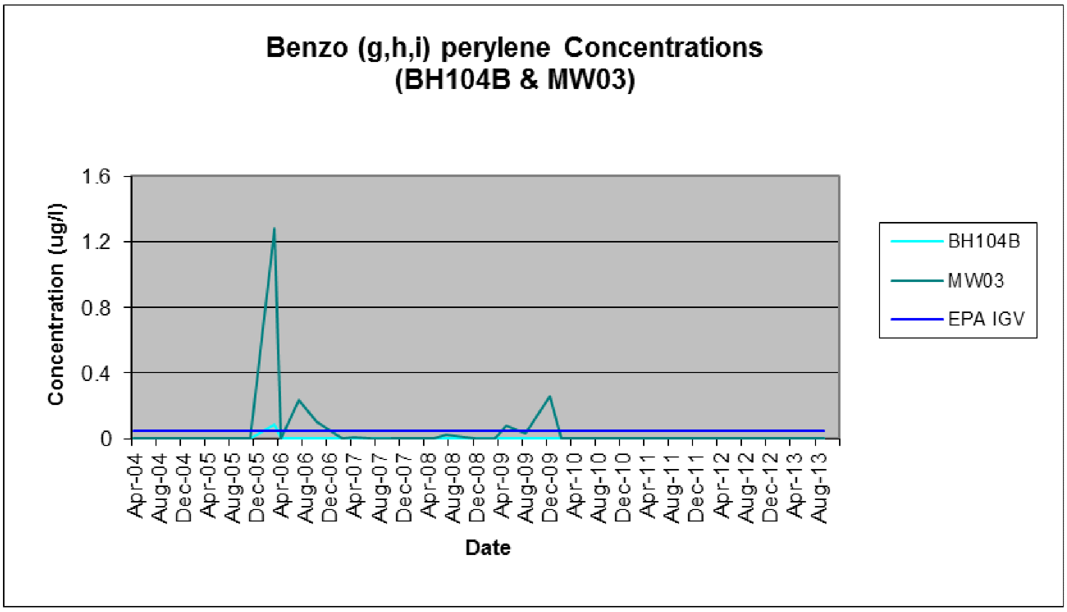
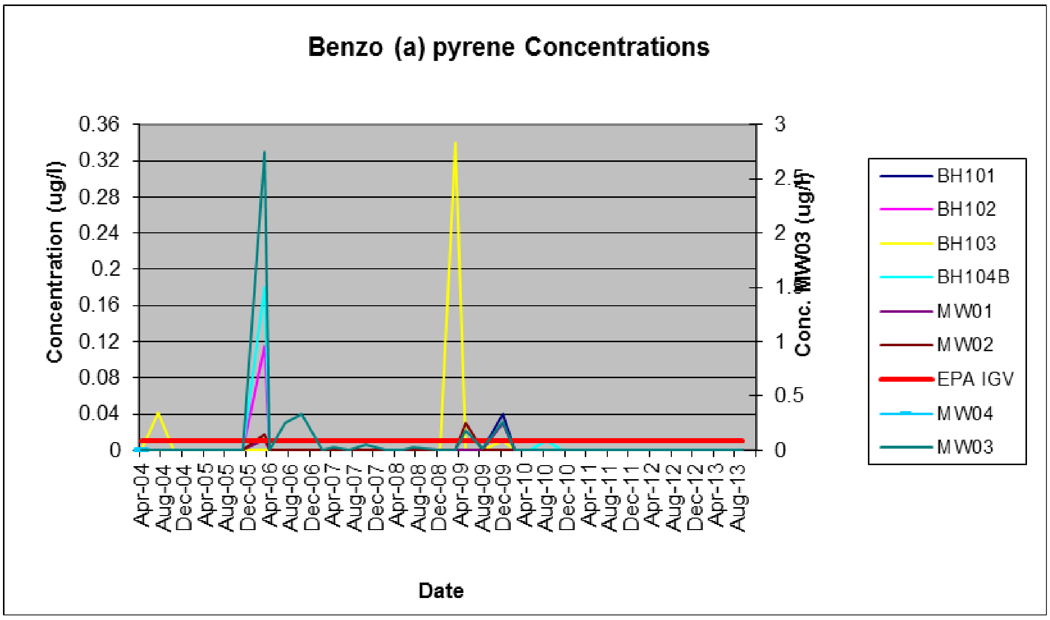


Figure 11 illustrates the concentrations of **Benzo(a)pyrene** in all groundwater monitoring wells and indicates that Benzo(a)pyrene has been detected historically in all boreholes above the IGV of 0.01 µg/l. Similarly with the above mentioned trends, the highest concentrations have been detected in MW03 and BH104B. Concentrations have markedly decreased since March 2006 when an elevated concentration of 2.751 µg/l was detected in MW03, however there have been a number of detections above the IGV, with the most recent elevated level detected in December 2009. Elevated concentrations above the IGV were recorded in BH101, BH103 and MW01 during this same period. The results of all monitoring events in 2010, 2011 and 2012 indicate concentrations below the IGV. The results of the previous quarterly monitoring events of 2013 and the current Quarter 3 2013 event also recorded concentrations below the IGV.

The slightly higher concentrations of Benzo(g,h,i)perylene and Benzo(a)pyrene detected in Quarter 4, 2009 may be attributed to heavy rainfall, which occurred in November of 2009 and as a result possibly mobilized traces of these compounds from the soil. The static water levels for December 2009 ranged between 0.58 and 3.78 mbgl. Since December 2009, concentrations of compounds have notably decreased to below the IGV's.

Figure 11 Benzo(a)pyrene in all Monitoring Wells

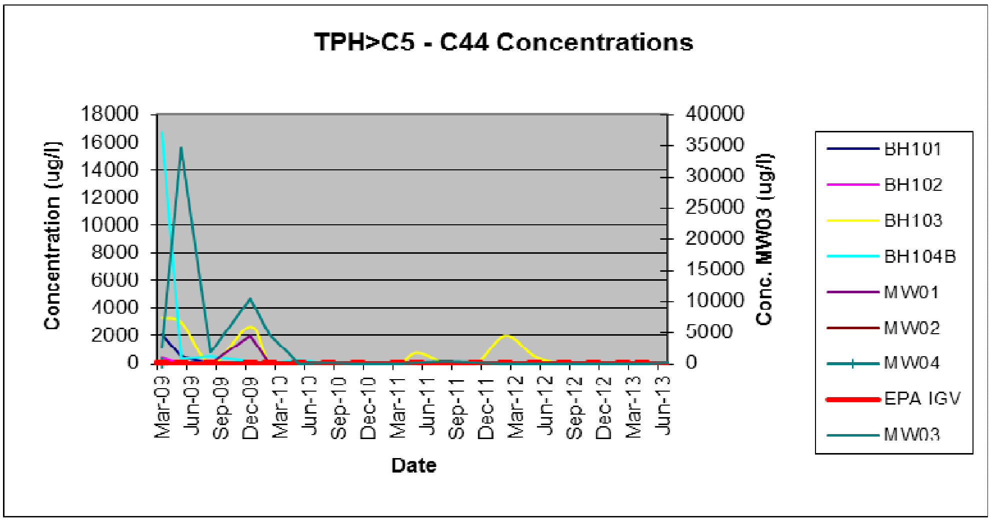


6.2.3 Petroleum Hydrocarbons (TPH)

Historically **Total Petroleum Hydrocarbons (TPH)** including mineral oil, petrol range organics (PRO) and diesel range organics (DRO) have been detected within BH103, BH104B and MW03. Since 2009, speciated hydrocarbon analysis using the Total Hydrocarbon Criteria Working Group (TPHCWG) method has been carried out on all samples to obtain a more accurate profile of TPH within groundwater.

The results of the TPHCWG analysis has indicated that the predominant hydrocarbons detected are in the heavier chain carbon fractions, most notably in the carbon range C12 – C16, C16 – C21 and C21 – C35. Figure 12 illustrates the TPH analysis for the total TPH analysis from C5 – C44 in all monitoring wells since 2009. The highest concentrations detected historically are at monitoring wells MW03, BH104B and BH103 respectively.

Figure 12 TPH (Carbon Range C5-C44) in all Monitoring Wells



During the Quarter 1, 2010 monitoring event, hydrocarbons were detected in borehole MW03. The predominant aliphatic carbon range in MW03 comprised of C16-C21 (1000 µg/l), C21-C35 (2300 µg/l) and C25-C44 (990 µg/l). The predominant aromatic carbon range in MW03 comprised of C16-C21 (220 µg/l) and C21-C35 (620 µg/l). No detections were observed at other locations.

During the Quarter 2, 2010 monitoring event, hydrocarbons were detected in borehole BH104B, with the predominant aliphatic carbon range comprising C12-C16 (130 µg/l) and C16-C21 (130 µg/l), while the predominant aromatic carbon range comprising C12-C16 (21 µg/l) and C16-C21 (47 µg/l). There were no detections of hydrocarbons in MW03 during the Quarter 2 monitoring event.

During the Quarter 3, 2010 monitoring event, hydrocarbons were detected in borehole BH104B and MW03. The predominant aliphatic carbon range in BH104B comprised of C12-C16 (12 µg/l) and C16-C21 (19 µg/l). The predominant aliphatic carbon range in MW03 comprised of C16-C21 (35 µg/l) and C21-C34 (46 µg/l). No aromatic carbons were detected above the laboratory limit of detection of 10 µg/l in all monitoring wells.

During the Quarter 4, 2010 and Quarter 1, 2011 monitoring event, there were no detections of TPH concentrations above the laboratory limit of detection of 10 µg/l at any location. No aliphatic or aromatic carbons were detected above the laboratory limit of detection of 10 µg/l in all monitoring wells.

During the Quarter 2, 2011 monitoring event, hydrocarbons were detected in borehole BH103, BH104B and MW03. The predominant aliphatic carbon range comprised of C16-C21 (340 µg/l, 20 µg/l and 46 µg/l) and C21-C35 (420 µg/l, 96 µg/l and 150 µg/l in BH103, BH104B and MW03 respectively). The predominant aromatic carbon range also comprised of C16-C21 (78 µg/l, 52 µg/l and 50 µg/l) and C21-C35 (110 µg/l, 49 µg/l and 93 µg/l in BH103, BH104B and MW03 respectively).

During the Quarter 3, 2011 monitoring event, hydrocarbons were detected in borehole MW03 only. The predominant aliphatic carbon range comprised of C10-C12 (18 µg/l), C12-C16 (57 µg/l), C16-C21 (35 µg/l) and C21-C35 (210 µg/l). The predominant aromatic carbon range comprised of C12-C16 (42 µg/l), C16-C21 (66 µg/l) and C21-C35 (45 µg/l).

During the Quarter 4, 2011 monitoring event, hydrocarbons were detected in borehole MW03 only. The predominant aliphatic carbon range comprised C10-C12 (22 µg/l), C12-C16 (51 µg/l), C16-C21 (85 µg/l) and C21-C35 (110 µg/l). The predominant aromatic carbon range comprised of C12-C16 (16 µg/l), C16-C21 (14 µg/l) and C21-C35 (91 µg/l).

During the Quarter 1, 2012 monitoring event, hydrocarbons were detected in borehole BH103 only. The predominant aliphatic carbon range comprised C10-C12 (13 µg/l), C12-C16 (270 µg/l), C16-C21 (690 µg/l) and C21-C35 (980 µg/l). The predominant aromatic carbon range comprised of C16-C21 (250 µg/l) and C21-C25 (680 µg/l). No hydrocarbons were detected in MW03 during the current Quarter 1 monitoring event.

During the Quarter 2, 2012 monitoring event, hydrocarbons were detected in BH103 only. The detected aliphatic carbon range comprised C12-C16 (98 µg/l), C16-C21 (230 µg/l) and C21-C25 (170 µg/l). No detections of aromatic carbons were measured during the Quarter 2 2012 monitoring event.

No hydrocarbons were detected at any location during the previous Quarter 3 and Quarter 4, 2012 monitoring events.

During the previous Quarter 1, 2013 monitoring event aromatic hydrocarbons were detected in BH103, BH104b and MW04. The predominant aromatic carbon range comprised C12-C16 (30 µg/l), C16-C21 (280 µg/l) and C21-C35 (100 µg/l) in BH103, C10-C12 (30 µg/l), C12-C16 (110 µg/l) and C16-C21 (80 µg/l) in BH104B and C10-C12 (20 µg/l) and C12-C16 (80 µg/l) in MW04. Aliphatic hydrocarbons were detected in BH103 in the ranges C12-C16 (70 µg/l), C16-C21 (100 µg/l) and C21-C35 (90 µg/l).

During the previous Quarter 2, 2013 monitoring event no aliphatic or aromatic hydrocarbons were detected at any location.

During the current Quarter 3, 2013 monitoring event, hydrocarbons of the aliphatic range were detected in MW03 only. The detected aliphatic carbon range comprised C10-C16 (290 µg/l) and C12-C16 (190 µg/l). No detections of aromatic carbons were measured during the Quarter 3 2013 monitoring event

7 CONCLUSIONS

- In accordance with the criteria set out in Schedule 4(ii) of the site's Waste Licence Register No. W0184-01, groundwater monitoring was carried out at the ENVA Ireland site on the 23rd September 2013 corresponding to Quarter 3 of 2013. A suitably qualified consultant from RPS collected groundwater samples from 8 on-site monitoring wells and submitted these samples to an accredited laboratory for analysis.

- The results presented have been referenced against the Environmental Protection Agency's (EPA) Interim Guideline Values (IGV) as set out in the Interim Report *'Towards Setting Guideline Values for the Protection of Groundwater in Ireland' 2004.*

- Results of the BTEX and MTBE demonstrate that the levels of Benzene, Toluene, Ethylbenzene and Xylene were below the recommended EPA IGV's

- The Quarter 3, 2013 results of the speciated polycyclic aromatic hydrocarbons indicate that the laboratory limit of detection of 0.2 µg/l for Total PAH's was above the EPA IGV of 0.1 µg/l. There were no detections of speciated PAHs at any location during the current monitoring event with the exception of acenaphthene and flourene at MW03. Total PAH have not been detected at MW03 since the Quarter 2 2012 monitoring event. Further monitoring at these locations is recommended to determine the persistency of these detections.

- Acenaphthene and flourene were detected in MW03 under the SVOC suite of analysis aswell as the PAH suite of analysis. Prior to this there have been no exceedances of the IGV for SVOC's since Quarter 1 2010.

- There have been no exceedances of the IGV for VOC's in this Quarter 3 2013 monitoring event. The Quarter 1 2012 monitoring event recorded a concentration of MTBE above the IGV of 30 µg/l in BH104B (280 µg/l). MTBE was previously recorded on two occasions in BH104B in April 2007 (49 µg/l) and in October 2007 (3 µg/l). Since then the concentrations had decreased to below the laboratory limit of detection.

- The results of the phenol analysis by GC-MS detected concentrations below the laboratory limit of detection of 1.0 µg/l at all locations. However, the laboratory limit of detection is above the IGV of 0.5 µg/l for phenols. Samples were subsequently also analysed for phenols to include chlorophenols and the results indicate that there were no detections above the laboratory limit of detection of 0.05 µg/l. A low level of 2,4-Dimethylphenol (0.12 µg/l) was detected in MW03 during the Quarter 1, 2010 monitoring event. There have been no detections of this compound since February 2010.

- Hydrocarbons of the aliphatic range were detected in MW03 during this Quarter 3, 2013 monitoring event. Hydrocarbons were detected in boreholes BH104B and MW03 in the aliphatic carbon ranges during the Quarter 3, 2010 monitoring event. There were no detections of aromatic carbon above the laboratory limit of detection of 10 µg/l in BH104B and MW03. Hydrocarbons were detected during the Quarter 2 (BH103, BH104B, MW03), Quarter 3 (MW03) and Quarter 4 (MW03) 2011 monitoring events. Hydrocarbons in the aliphatic range were detected in BH103 during the Quarter 1 2013 monitoring event and hydrocarbons of the aromatic range were detected in BH103, BH104B and MW04. No detections of hydrocarbons were found at any location during the Quarter 2 2013 monitoring event.

- The general trend of contaminant concentrations over time continues to be somewhat variable with compounds not being continually detected in the same borehole on two or three consecutive monitoring rounds. In general, the contaminant levels detected at the Enva facility appear to indicate reducing contaminant concentrations over time with infrequent elevations in some parameters. Further monitoring is recommended to confirm these reductions.

Enva Portlaoise

2013 Groundwater Compliance Monitoring Quarter 4 (October – December 2013)

DOCUMENT CONTROL SHEET

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Project Title	Enva Portlaoise 2013 Groundwater Compliance Monitoring					
Document Title	Quarter 4 (October – December 2013) Interpretative Report					
Document No.	MDE0973Rp0016F01					
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1 INTRODUCTION

1.1 BACKGROUND

RPS has been commissioned by Enva Ireland Ltd to carry out groundwater quality monitoring for environmental compliance, at their facility in the Clonminam Industrial Estate, Portlaoise, Co Laois. Groundwater monitoring has being carried out in strict accordance with criteria set out in Schedule 4(ii) of the site's Waste Licence Register No. W0184-01.

Enva Ireland has been operating under Waste Licence Register No. W0184-01 since January 2004, and is required to submit a report to the Environmental Protection Agency (EPA) on a quarterly basis, outlining the existing groundwater quality underlying the site.

Suitably qualified environmental consultants from RPS, collected groundwater samples from a series of 8 monitoring wells (BH101, BH102, BH103, BH104B, MW01, MW02, MW03, MW04) within the site boundary on the 5th November 2013. The samples underwent laboratory analysis for the suite of parameters specified in Schedule 4(ii) of Waste Licence W0184-01. This report outlines the results of the Quarter 4 monitoring for 2013 and reviews historical data recorded at the site.

1.2 OBJECTIVES & SCOPE OF WORK

The specific objectives and scope of work are as follows:

- Review of previous data as provided by Enva Portlaoise;
- Graphical presentation of key compounds and trends; and
- Discussion of results for Quarter 4 2013 within the context of previous results and available guideline concentrations.

2 REVIEW OF PREVIOUS DATA

2.1 INFORMATION SOURCES

The following documents were reviewed as part of this project:

- Waste Licence W0184-01 and any available EPA documents from the EPA website
- Quarterly Groundwater Monitoring Reports (Quarter 1 to Quarter 4), URS (2004)
- Quarterly Groundwater Monitoring Reports (Quarter 1 to Quarter 4), URS (2005)
- Quarterly Groundwater Monitoring Reports (Quarter 1 to Quarter 4), RPS (2006)
- Quarterly Groundwater Monitoring Reports (Quarter 1 to Quarter 4), RPS (2007)
- Quarterly Groundwater Monitoring Reports (Quarter 1 to Quarter 4), RPS (2008)
- Quarterly Groundwater Monitoring Reports (Quarter 1 to Quarter 4), RPS (2009)
- Summary Report on Trend of Contaminant Levels at Enva Ireland Ltd since 2005, Ref: MDE0647RP0001, RPS (2007)
- Groundwater Risk Assessment, Ref: MDE0788Rp0001, RPS (2008)
- Quarterly Groundwater Monitoring Reports (Quarter 1 to Quarter 4), RPS (2010)
- Quarterly Groundwater Monitoring Reports (Quarter 1 to Quarter 4), RPS (2011)
- Quarterly Groundwater Monitoring Reports (Quarter 1 to Quarter 4), RPS (2012)
- Quarter 1 Groundwater Monitoring Report, RPS (2013)
- Quarter 2 Groundwater Monitoring Report, RPS (2013)
- Quarter 3 Groundwater Monitoring Report, RPS (2013)

2.2 SITE SETTING

The site is located to the southwest of the town of Portlaoise immediately to the south of the Dublin to Cork railway line. The general area is gently undulating. The site slopes gently to the southwest but to the east of the site the ground slopes gently towards the River Triogue, which is located approximately 1 km to the east. The site occupies an area of approximately 1.5 hectares and comprises of an operational waste oil and contaminated soil treatment plant.

The site is located on the outskirts of Portlaoise in an area of agricultural and light industrial development. The site is bounded to the north and east by land belonging to Irish rail, comprising sidings and general storage areas. To the south is a vehicle repair garage, which is elevated above the level of the site by approximately 1.5 m. To the west the site is adjoined by further industrial land, as well as residential land. The site location is presented on **Figure 1**.

The site has been in operation since 1978, and the layout has remained relatively consistent. The site layout is presented on **Figure 2**. The site is largely covered in hardstanding with some open areas in the far north and northwest of the site. All oil and soil storage areas are suitably bunded and the general standard of housekeeping is good.

2.3 REGIONAL SETTING

2.3.1 Geology

The Geological Survey of Ireland indicates that the regional geology of Portlaoise is typified by Carboniferous Limestone. In the vicinity of the site itself the solid geology comprises the Ballysteen Formation, a micaceous-bioclastic limestone. This well-bedded limestone, with interbeds of shale, is extensively folded, with axes trending north-east to south-west, and becomes increasingly muddy towards the top of the formation. North-east to south-west trending faults are found in the region, with one located approximately 500m to the east of the site. The subsoil's in the region comprise mainly Made Ground, around the industrial area, and Limestone Till in the surrounding regions.

2.3.2 Hydrogeology

The limestone is classified by the Geological Survey of Ireland (GSI) as a locally important karstified aquifer. Porosity is predominantly in the form of fractures, in this aquifer, however the muddy nature of this formation greatly reduces permeability. Vulnerability of this aquifer beneath the site is classified as high, with moderate vulnerability to the east of the site.

The public water supply for Portlaoise is derived from groundwater, utilising five extraction wells in total. This supply currently comes from the Straboe area, approximately 5.5 km to the north-east of the site. The source protection zone for this water supply extends north-west south-east with the boundary of the outer protection zone at least 4 km to the north-east of the site. A further public abstraction well-field has been developed to the north-west of the Straboe area in the townland of Eyne, approximately 6 km to the north of the site, and comprises a further four (GSI) abstraction wells. The Source Protection Zone for these wells has not yet been defined but it is not anticipated to affect the Enva site.

The GSI record a number of other dug wells and boreholes within the Portlaoise area, including the boreholes installed on the site. The accuracy of the locations of these wells varies. One well, which was drilled in 1899 is recorded as being located immediately to the south of the Enva site. The use of this well is not known and its location is only accurate to 1 km. A second borehole, drilled in 1973 is recorded 1.5 km to the north of the site at Clonroosk, the accuracy of this location is also 1 km so that it could be closer or further from the site. The use of this well is not known but its yield is recorded as being poor. There are no other wells recorded within 1 km of the site.

Enva is not aware of any abstraction boreholes within the immediate vicinity of their site.

2.4 SITE GROUND CONDITIONS

A total of eight boreholes have been drilled at the site and the general sequence of ground conditions is presented in **Table 2**.

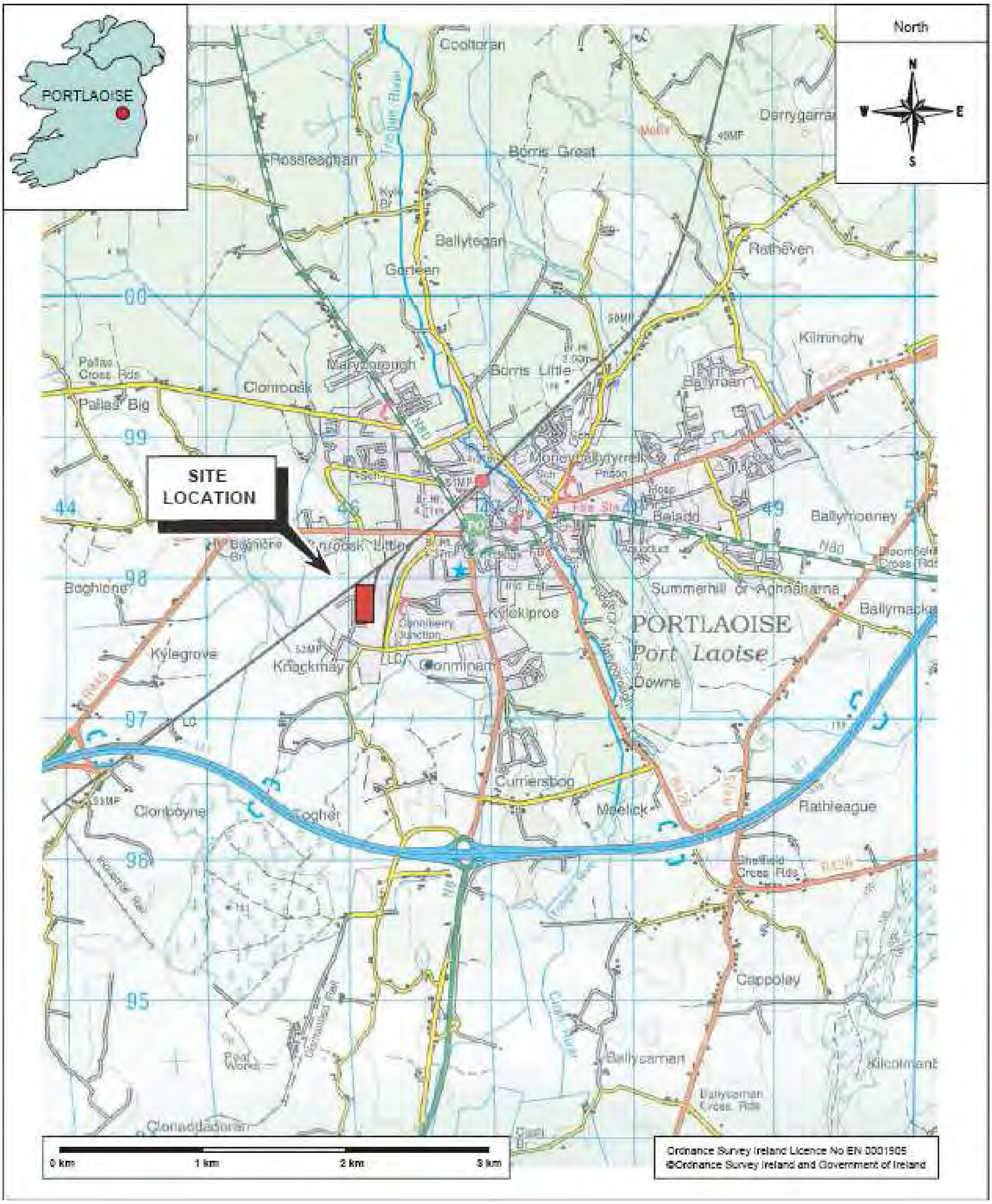
Table 2.1: Ground Conditions

Strata	Extent	Thickness	Description
Made Ground	BH104	0-3.5 m	Predominantly concrete, with hardcore fill, and clay.
Boulder Clay	All boreholes	<8.5 m	Includes fine to medium, well rounded gravels.
Sand and Gravel	Confined to south east	0-2 m	In general the transition from boulder clay to sand is gradual with changes from gravel, to

Strata	Extent	Thickness	Description
	corner of site (BH101, BH104 and MW03)		sandy gravel, to sand.
Limestone Bedrock	Encountered in MW01, MW02 and MW03	Top of limestone ranges from 7.7m to 9m below ground level.	Pale grey, fine-grained bedrock, differentiated from boulders by its un-weathered nature.

The logs for each of the boreholes were previously presented as Appendix B in the RPS Groundwater Risk Assessment Report (Ref: MDE0788Rp0001).

Figure 1 Site Location



2.4.1 Licence Conditions

The waste management licence requires the regular monitoring and sampling of boreholes BH101, BH102, BH103, BH104B, MW01, MW02, MW03 and MW04. The parameters requiring measurement or analysis are presented in Table 2.2.

Table 2.2: Licence Parameters

Group	Parameters requiring Quarterly Measurement	Parameters requiring Annual Measurement
Field Parameters	Groundwater Level pH Temperature Dissolved Oxygen Electrical Conductivity Visual Inspection	Groundwater Level pH Temperature Dissolved Oxygen Electrical Conductivity Visual Inspection
Organics	Mineral Oil BTEX & MTBE PAH's Phenols VOC's SVOC's	Mineral Oil BTEX & MTBE PAH's Phenols VOC's SVOC's
Inorganics	-	Total Alkalinity, Calcium, Manganese, Sulphate, Cyanide (Total), Chloride, Sodium,

3 METHODOLOGY

Groundwater samples were collected from 8 no. on-site groundwater monitoring wells (BH101, BH102, BH103, BH104B, MW01, MW02, MW03, MW04), (See Figure 2) using dedicated Waterra tubing, in accordance with RPS's standard sampling protocol. A non-return foot valve was fixed to the bottom of the tubing and inserted into the well, close to the base of the borehole. Separate tubing and foot valves were used at each monitoring well to eliminate the possibility of cross contamination.

Groundwater in the well casing is not considered representative of the groundwater quality at a given location. For this reason, three well volumes were purged from each well prior to collection of the groundwater sample. By the time purging was complete all field test water parameters (namely pH, Temperature, Electrical Conductivity and Dissolved Oxygen) were within 10% variance in three consecutive measurements. This ensured that the groundwater sample extracted from the monitoring borehole was representative of the water held in the subsurface strata and not water held stagnant in the borehole casing. The purged volumes were calculated on-site from the measured static water levels and total well depths using an electronic dip meter.

Groundwater samples were collected in laboratory supplied containers and stored in chilled cool boxes following sampling and during transit to the laboratory. A rigorous chain of custody procedure was used during the sample round.

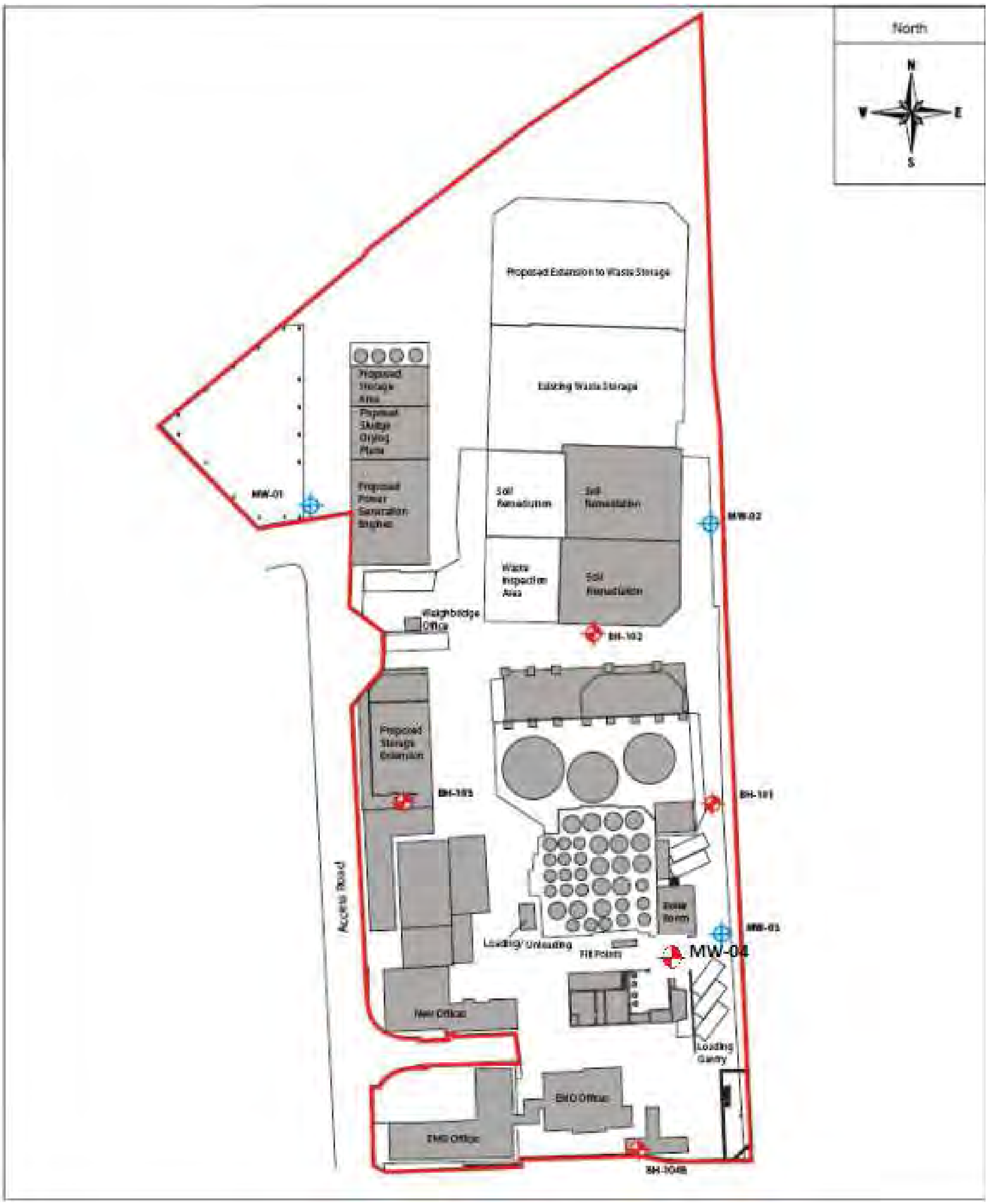
3.1 LABORATORY ANALYSIS

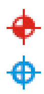
All groundwater samples were analysed at a UKAS accredited laboratory, I2 Analytical Ltd for the suite of analyses listed in Table 3.1. Table 3.1 also indicates the analytical techniques used by the laboratory.

Table 3.1: Analytical Methodologies – I2 Analytical Ltd

Parameter	Analytical Methodology
Phenols	GC-MS
Speciated PAHs	GC-MS
BTEX & MTBE	Headspace GC-MS
Petroleum Hydrocarbons	Headspace GC-MS
Volatile Organic compounds & Tentatively Identified Organic Compounds (VOCs & TICs)	Headspace GC-MS
Semi-Volatile Organic compounds & Tentatively Identified Organic Compounds (SVOCs & TICs)	GC-MS

Figure 2 Site Layout Plan with groundwater monitoring well locations





Shallow Monitoring Well locations

Deep Monitoring Well locations

Source: *URS Environmental Consultants (Ref: 45078497 Issue No. 1)*

3.2 PRESENTATION & INTERPRETATION OF RESULTS

The Quarter 4 2013 results are tabulated in Section 4 and discussed with respect to previous results. The results have been compared to the EPA Interim Guideline Values (IGV) as set out in the Report ‘Towards Setting Guideline Values for the Protection of Groundwater in Ireland’ 2004. It is important to note that the IGVs are based on the lowest acceptable value for either drinking water or environmental quality in surface water and is therefore conservative in nature.

Previous monitoring reports (as listed in Section 2.1) provide details of contaminant concentrations since 2004. The data available within these reports has been reviewed and time series plots of key parameters have been compiled. Trends for chlorinated solvents, petroleum hydrocarbons and phenol parameters have been plotted.

Time series plots are presented in Section 6 and include the results of this Quarter 4 2013 monitoring round. As the monitoring continues in accordance with the waste licence requirements, the plots will be updated with the results of subsequent rounds used to illustrate the results.

Time series plots are also provided for manual water levels where available from previous reports.

4 QUARTER 4 RESULTS SEPTEMBER 2013

The results of all field measurements and laboratory analysis are presented in this section.

The results are discussed in relation to appropriate guideline values in Section 5. Results that are shown to be above the relevant guideline values are highlighted in bold and shaded. Results that are shown to be above the relevant laboratory detection limits are highlighted in italics.

Site-specific field parameter measurements were collected during the site visit as per RPS Water sampling protocol.

Table 4.1: Groundwater Levels (Quarter 4, 2013)

Monitoring Well	BH101	BH102	BH103	BH104B	MW01	MW02	MW03	MW04
Depth (mbgl)	6.83	6.51	4.50	4.72	23.10	31.12	14.20	6.61
Static Water Level (mbgl)	4.09	2.29	1.74	0.37	2.61	3.67	3.83	3.70
Ground Level (mAOD)	103.06	102.55	101.16	101.52	102.10	103.12	102.77	-
Water Level (mAOD)	98.97	100.26	99.42	101.15	99.49	99.45	98.94	-
Free Phase Oil (mm)	No detection	No detection	No detection	No detection	No detection	No detection	No detection	No detection

mbgl = metres below ground level

Table 4.2: Results of Field Parameters Measured at each Groundwater Monitoring Well (Quarter 4, 2013)

Monitoring Well	pH (pH Units)	Temperature (°C)	Conductivity (µS/cm)	Dissolved O_2 (ppm)	Observations
BH101	7.67	13.2	966	3.25	Grey very cloudy colour, small black suspended solids, odourless.
BH102	7.54	12.6	524	2.36	Clear, slight H_2S odour detected on purging, some suspended solids.
BH103	7.10	12.9	947	2.96	Light grey cloudy colour, suspended solids, odourless.
BH104B	7.80	11.7	404	2.95	Clear with yellow tinge, slight H_2S odour on purging. Water in well head.
MW01	7.68	11.5	622	3.17	Cloudy grey, no odour detected, small suspended solids. Difficult to purge at this location.
MW02	7.39	11.3	608	2.59	Clear, suspended solids, odourless.
MW03	7.42	11.5	896	2.74	Light grey cloudy, slight hydrocarbon sheen on surface, no odour.
MW04	7.46	13.5	**1619**	2.36	Cloudy brown in colour, a lot of sediment in sample, no odour.
Interim EPA Guideline Values (Units as indicated)	**>6.5 & <9.5**	**25°C**	**1000**	**No abnormal change**	**-**

Note: Results above the relevant IGV are highlighted in bold and shaded.

Table 4.3: Results of BTEX & MTBE

Parameter	Units	Laboratory Limit of Detection	BH101	BH102	BH103	BH104B	MW01	MW02	MW03	MW04	Interim EPA Guideline Values (Units as indicated)
Benzene	µg/l	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	1.0
Toluene	µg/l	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	10
Ethylbenzene	µg/l	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	10
p & m-xylene	µg/l	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	10 Note 1
o-xylene	µg/l	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	10 Note 1
MTBE (Methyl Tertiary Butyl Ether)	µg/l	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	30

Note 1: No specific IGV for parameter. IGV for Total Xylenes is used as guideline.

Table 4.4: Results of Speciated PAH's

Parameter	Units	Laboratory Limit of Detection	BH101	BH102	BH103	BH104B	MW01	MW02	MW03	MW04	Interim EPA Guideline Values (Units as indicated)
Naphthalene	µg/l	0.01	<0.01	<0.01	<0.01	< 0.01	<0.01	<0.01	<0.01	< 0.01	1.0
Acenaphthylene	µg/l	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	-
Acenaphthene	µg/l	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	-
Fluorene	µg/l	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	-
Phenanthrene	µg/l	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	-
Anthracene	µg/l	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	10,000
Fluoranthene	µg/l	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	1.0
Pyrene	µg/l	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	-

Parameter	Units	Laboratory Limit of Detection	BH101	BH102	BH103	BH104B	MW01	MW02	MW03	MW04	Interim EPA Guideline Values (Units as indicated)
Benzo(a)anthracene	µg/l	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	-
Chrysene	µg/l	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	-
Benzo(b)fluoranthene	µg/l	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.5
Benzo(k)fluoranthene	µg/l	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.05
Benzo(a)pyrene	µg/l	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.01
Indeno(1,2,3-cd)pyrene	µg/l	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.05
Dibenz(a,h)anthracene	µg/l	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	-
Benzo(g,h,i)perylene	µg/l	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.05
Total EPA-16 PAH’s	µg/l	0.2	**< 0.2**	**< 0.2**	**< 0.2**	**< 0.2**	**< 0.2**	**< 0.2**	**<0.2**	**< 0.2**	0.1

Note: Results above the relevant IGV are highlighted in bold and shaded.
Note: Results above the relevant laboratory limit of detection are in italics.

Table 4.5: Results of Total Phenols

Parameter	Units	Laboratory Limit of Detection	BH101	BH102	BH103	BH104B	MW01	MW02	MW03	MW04	Interim EPA Guideline Values (Units as indicated)
Total Phenols (monohydric)	µg/l	10	<10	<10	<10	<10	<10	<10	<10	<10	0.5
Total Phenols (GC-MS)	µg/l	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.5

Table 4.6: Results of Speciated Phenols

Parameter	Units	Laboratory Limit of Detection	BH101	BH102	BH103	BH104B	MW01	MW02	MW03	MW04	Interim EPA Guideline Values (Units as indicated)
Phenol	µg/l	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.5
2,4,5-Trichlorophenol	µg/l	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	-
2,4,6-Trichlorophenol	µg/l	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	200
2,4-Dichlorophenol	µg/l	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	-
2,4-Dimethylphenol	µg/l	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	-
2-Chlorophenol	µg/l	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	200
2-Methylphenol	µg/l	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	-
2-Nitrophenol	µg/l	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	-
4-Chloro-3-methylphenol	µg/l	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	-
4-Methylphenol	µg/l	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	-

Note: Results above the relevant laboratory limit of detection are in italics.

Table 4.7: Results of Semi-Volatile Organic Compounds (sVOCs)

Parameter	Units	Laboratory Limit of Detection	BH101	BH102	BH103	BH104B	MW01	MW02	MW03	MW04	Interim EPA Guideline Values (Units as indicated)
Aniline	µg/l	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	-
Phenol	µg/l	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.5
2-Chlorophenol	µg/l	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	200
Bis(2-chloroethyl)ether	µg/l	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	-
1,3-Dichlorobenzene	µg/l	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	-
1,2-Dichlorobenzene	µg/l	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	10
1,4-Dichlorobenzene	µg/l	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	-
Bis(2-chloroisopropyl)ether	µg/l	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	-
2-Methylphenol	µg/l	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	-
Hexachloroethane	µg/l	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	-
Nitrobenzene	µg/l	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	10
4-Methylphenol	µg/l	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	-
Isophorone	µg/l	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	-
2-Nitrophenol	µg/l	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	-
2,4-Dimethylphenol	µg/l	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	-
Bis(2-chloroethoxy)methane	µg/l	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	-
1,2,4-Trichlorobenzene	µg/l	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.40
Naphthalene	µg/l	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	1.0

Parameter	Units	Laboratory Limit of Detection	BH101	BH102	BH103	BH104B	MW01	MW02	MW03	MW04	Interim EPA Guideline Values (Units as indicated)
2,4-Dichlorophenol	µg/l	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	-
4-Chloroaniline	µg/l	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	-
Hexachlorobutadiene	µg/l	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.10
4-Chloro-3-methylphenol	µg/l	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	-
2,4,6-Trichlorophenol	µg/l	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	200
2,4,5-Trichlorophenol	µg/l	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	-
2-Methylnaphthalene	µg/l	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	-
2-Chloronaphthalene	µg/l	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	-
Dimethylphthalate	µg/l	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	-
2,6-Dinitrotoluene	µg/l	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	-
Acenaphthylene	µg/l	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	-
Acenaphthene	µg/l	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	-
2,4-Dinitrotoluene	µg/l	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	-
Dibenzofuran	µg/l	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	-
4-Chlorophenyl phenyl ether	µg/l	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	-
Diethyl phthalate	µg/l	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	-
4-Nitroaniline	µg/l	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	-
Fluorene	µg/l	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	-
Azobenzene	µg/l	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	-

Parameter	Units	Laboratory Limit of Detection	BH101	BH102	BH103	BH104B	MW01	MW02	MW03	MW04	Interim EPA Guideline Values (Units as indicated)
Bromophenyl phenyl ether	µg/l	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	-
Hexachlorobenzene	µg/l	0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	0.03
Phenanthrene	µg/l	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	-
Anthracene	µg/l	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	10,000
Carbazole	µg/l	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	-
Dibutyl phthalate	µg/l	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	2.0
Anthraquinone	µg/l	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	-
Fluoranthene	µg/l	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	1.0
Pyrene	µg/l	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	-
Butyl benzyl phthalate	µg/l	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	-
Benzo(a)anthracene	µg/l	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	-
Chrysene	µg/l	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	-
Benzo(b)fluoranthene	µg/l	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.5
Benzo(k)fluoranthene	µg/l	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.05
Benzo(a)pyrene	µg/l	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.01
Indeno(1,2,3-cd)pyrene	µg/l	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.05
Dibenz(a,h)anthracene	µg/l	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	-
Benzo(g,h,i)perylene	µg/l	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.05

Note: Results above the relevant laboratory limit of detection in italics.

Table 4.8: Results of Volatile Organic Compounds (VOCs)

Parameter	Units	Laboratory Limit of Detection	BH101	BH102	BH103	BH104B	MW01	MW02	MW03	MW04	Interim EPA Guideline Values (Units as indicated)
Chloromethane	µg/l	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	-
Chloroethane	µg/l	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	*7.9*	-
Bromomethane	µg/l	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	-
Vinyl Chloride	µg/l	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	-
Trichlorofluoromethane	µg/l	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	-
1,1-dichloroethene	µg/l	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	*10.1*	30
1,1,2-Trichloro 1,2,2-Trifluoroethane	µg/l	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	-
Cis-1,2-dichloroethene	µg/l	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	-
MTBE (Methyl Tertiary Butyl Ether)	µg/l	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	30
1,1-dichloroethane	µg/l	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	-
2,2-Dichloropropane	µg/l	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	-
Trichloromethane	µg/l	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	12
1,1,1-Trichloroethane	µg/l	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	500
1,2-dichloroethane	µg/l	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	-
1,1-Dichloropropene	µg/l	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	-
Trans-1,2-dichloroethene	µg/l	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	-
Benzene	µg/l	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	1.0
Tetrachloromethane	µg/l	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	2.0

Parameter	Units	Laboratory Limit of Detection	BH101	BH102	BH103	BH104B	MW01	MW02	MW03	MW04	Interim EPA Guideline Values (Units as indicated)
1,2-dichloropropane	µg/l	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	-
Trichloroethene	µg/l	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	70
Dibromomethane	µg/l	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	-
Bromodichloromethane	µg/l	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	-
Cis-1,3-dichloropropene	µg/l	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	-
Trans-1,3-dichloropropene	µg/l	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	-
Toluene	µg/l	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	10
1,1,2-Trichloroethane	µg/l	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	-
1,3-Dichloropropane	µg/l	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	-
Dibromochloromethane	µg/l	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	-
Tetrachloroethene	µg/l	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	40
1,2-Dibromoethane	µg/l	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	-
Chlorobenzene	µg/l	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	1.0
1,1,1,2-Tetrachloroethane	µg/l	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	-
Ethylbenzene	µg/l	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	10
p & m-xylene	µg/l	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	10
Styrene	µg/l	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	-
Tribromomethane	µg/l	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	-
o-xylene	µg/l	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	10

Parameter	Units	Laboratory Limit of Detection	BH101	BH102	BH103	BH104B	MW01	MW02	MW03	MW04	Interim EPA Guideline Values (Units as indicated)
Isopropylbenzene	µg/l	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	-
Bromobenzene	µg/l	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	-
N-Propylbenzene	µg/l	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	-
2-Chlorotoluene	µg/l	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	-
4-Chlorotoluene	µg/l	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	-
1,3,5-Trimethylbenzene	µg/l	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	-
Tert-Butylbenzene	µg/l	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	-
1,2,4-Trimethylbenzene	µg/l	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	-
Sec-Butylbenzene	µg/l	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	-
1,3-dichlorobenzene	µg/l	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	-
P-Isopropyltoluene	µg/l	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	-
1,2-dichlorobenzene	µg/l	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	10
1,4-dichlorobenzene	µg/l	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	-
Butylbenzene	µg/l	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	-
1,2-Dibromo-3-chloropropane	µg/l	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	-
1,2,4-Trichlorobenzene	µg/l	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.40
Hexachlorobutadiene	µg/l	0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.10
1,2,3-Trichlorobenzene	µg/l	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	-

Note: Results above the relevant IGV are highlighted in bold and shaded.
Note: Results above the relevant laboratory limit of detection are highlighted in bold italics.

Table 4.9: Results of Total Petroleum Hydrocarbons (Aliphatic/Aromatic)

Parameter	Units	Laboratory Limit of Detection	BH101	BH102	BH103	BH104B	MW01	MW02	MW03	MW04	Interim EPA Guideline Values (Units as indicated)
Aliphatic > C5-C6	µg/l	10	<10	<10	<10	<10	<10	<10	<10	<10	-
Aliphatic > C6-C8	µg/l	10	<10	<10	<10	<10	<10	<10	<10	<10	-
Aliphatic > C8-C10	µg/l	10	<10	<10	<10	<10	<10	<10	<10	<10	-
Aliphatic > C10-C12	µg/l	10	<10	<10	<10	<10	<10	<10	<10	<10	-
Aliphatic > C12-C16	µg/l	10	<10	<10	<10	<10	<10	<10	<10	<10	-
Aliphatic > C16-C21	µg/l	10	<10	<10	<10	<10	<10	<10	<10	<10	-
Aliphatic >C21-C35	µg/l	10	<10	<10	<10	<10	<10	<10	<10	<10	-
Aliphatic (C5-C35)	µg/l	10	<10	<10	<10	<10	<10	<10	<10	<10	10
Aromatic > C5-C7	µg/l	10	<10	<10	<10	<10	<10	<10	<10	<10	-
Aromatic > C7-C8	µg/l	10	<10	<10	<10	<10	<10	<10	<10	<10	-
Aromatic > C8-C10	µg/l	10	<10	<10	<10	<10	<10	<10	<10	<10	-
Aromatic > C10-C12	µg/l	10	<10	<10	<10	<10	<10	<10	<10	<10	-
Aromatic > C12-C16	µg/l	10	<10	<10	<10	<10	<10	<10	<10	<10	-
Aromatic > C16-C21	µg/l	10	<10	<10	<10	<10	<10	<10	<10	<10	-
Aromatic > C21-C35	µg/l	10	<10	<10	<10	<10	<10	<10	<10	<10	-
Aromatic (C5-C35)	µg/l	10	<10	<10	<10	<10	<10	<10	<10	<10	10

Note: Results above the relevant IGV are highlighted in bold and shaded.
Note: Results above the relevant laboratory limit of detection are highlighted in bold italics.

5 DISCUSSION OF QUARTER 4 RESULTS

The results of the Quarter 4 monitoring event for 2013 are presented in Table 4.1 to 4.9 of this report. For the purpose of this report, the results are compared to the EPA Interim Guideline Values (IGV) as set out in the Interim Report *'Towards Setting Guideline Values for the Protection of Groundwater in Ireland' 2004.* A discussion of the results and their significance is included below.

5.1 FIELD PARAMETERS

The results of the field parameters measured at each groundwater monitoring well are presented in Table 4.2. Groundwater samples recorded pH levels ranging between 7.10 and 7.80. All pH measurements were inside the EPA Interim guideline range of ≥6.5 to ≤9.5. Temperature measurements ranged from 11.3°C to 13.5°C and were within the EPA IGV of 25°C.

Field measurements of Electrical Conductivity levels ranged between 404 µS/cm and 1619 µS/cm and were above the Interim Guideline Value of 1000 µS/cm at MW04 (1619 µS/cm).

Dissolved oxygen levels ranged between 2.36 and 3.25 ppm. Factors such as climate, nutrients in the water, suspended solids; organic wastes and groundwater inflow can all influence the dissolved oxygen values.

Observations relating to colour and odour varied from well to well as detailed in Table 4.2.

5.2 RESULTS OF BTEX & MTBE

The results of the **BTEX** and **MTBE** analysis are presented in Table 4.3 and demonstrate concentrations below the laboratory limit of detections and associated IGV's at all locations.

The last detection of MTBE was in the Quarter 1 monitoring event of 2012. MTBE was recorded above the laboratory limit of detection at a concentration of 280 µg/l at BH104B. This was the only recorded exceedance in Quarter 1 2012. Previous monitoring during Quarter 1 and Quarter 2 of 2010 detected exceedances of MTBE at BH103 at a concentration of 16 µg/l. During Quarter 3 and Quarter 4 of 2010 concentrations were below the laboratory limit of detection. Prior to these 2010 monitoring events, concentrations of MTBE at BH103 were recorded at 63 µg/l in December 2009.

5.3 RESULTS OF SPECIATED PAH'S

The results of the Speciated PAH analysis during this monitoring period are presented in Table 4.4.

The laboratory limit of detection for Total EPA-16 PAH's is 0.2 µg/l. This laboratory limit of detection is above the EPA IGV of 0.1 µg/l. To identify the compounds, which attributed to these concentrations, speciated PAH analysis was carried out, which reduces the limit of detection for individual parameters to 0.01 µg/l.

The results of the speciated polycyclic aromatic hydrocarbon analysis detected no concentrations above the laboratory limit of detection during the Quarter 4 2013 monitoring event. The laboratory has confirmed that the detection limit for total EPA-16 PAH's can be lowered to 0.1 µg/l for comparison with the EPA IGV of 0.1 µg/l, however this will not be accredited.

5.4 RESULTS OF SPECIATED PHENOLS

The results of Total Phenol analysis are presented in Table 4.5. All samples detected concentrations of monohydric phenol below the laboratory limit of detection of 10 µg/l. It should be noted that the laboratory limit of detection is above the IGV of 0.5 µg/l for phenols.

For this reason, samples were analysed for phenols to include chlorophenols. The results of the speciated phenols analysis are presented in Table 4.6. The speciated phenol analysis reduces the laboratory limit of detection to 0.05 µg/l for individual parameters.

The results of the current Quarter 4 2013 speciated phenol analysis confirm concentrations of phenols were below the laboratory limit of detection of 0.05 µg/l at all locations. This is consistent with the results from the previous 2013 quarterly monitoring events.

5.5 RESULTS OF SEMI-VOLATILE ORGANIC COMPOUNDS

The results of the Semi-Volatile Organic Compound analysis are presented in Table 4.7.

No SVOC’s were detected above the relevant IGV’s during this monitoring period. The Quarter 3 2013 monitoring event detected two SVOC compounds, Acenaphthene (1.1 µg/l) and Fluorene (1.5 µg/l) in MW03. Previous to this detection the Quarter 2 monitoring event of 2012 detected concentrations of Naphthalene and Acenaphthylene in MW03 at concentrations of 2.4 µg/l and 0.12 µ/l respectively.

5.6 RESULTS OF VOLATILE ORGANIC COMPOUNDS

The results of the Volatile Organic Compound analysis are presented in Table 4.8. The results of the current Quarter 4 2013 monitoring event indicate that there were no exceedances of VOC parameters detected above the relevant IGV’s. Two VOC’s were detected above the laboratory limit of detection during this monitoring round, chloroethane (7.9 µg/l) and 1-1 dichloroethene (10.1 µg/l). No EPA IGV exists for chloroethane however 1-1 dichloroethene has an IGV of 30 µg/l.

In November 2009, corresponding to Quarter 4 of 2009, no VOC’s were detected above the relevant IGV’s. However some parameters were detected above the laboratory limits of detection (1,1-Dichloroethane, 1,2,4-trimethylbenzene, 1,3,5-trimethylbenzene, MTBE, n-butylbenzene, n-propylbenzene, o-xylene, p-isopropyltoluene, sec-butylbenzene and tert-butylbenzene).

The Quarter 1 and Quarter 2 monitoring results of 2010 detected MTBE in BH103 raised above the laboratory limit of detection of 1.0 µg/l at a concentration of 16 µg/l.

The results of the Quarter 3 and Quarter 4 monitoring events of 2010 and all subsequent monitoring events indicate that there were no exceedances of the IGV for specific parameters.

5.7 RESULTS OF TOTAL PETROLEUM HYDROCARBONS

In order to provide a more accurate profile of TPH within the groundwater, speciated hydrocarbon analysis using the Total Petroleum Hydrocarbon Criteria Working Group (TPHCWG) method was carried out on samples taken at all boreholes. The results of the TPH analysis are presented in Table 4.9.

No detections of TPH in the aliphatic or aromatic range were observed in any shallow or deep monitoring well locations during the current monitoring event.

The EPA IGV of 10 µg/l for Total Hydrocarbons is deemed comparable with the results for total petroleum hydrocarbons (TPH).

The previous Quarter 3, 2013 monitoring event detected TPH in the aliphatic range in one deep groundwater well, MW03. TPH of the range C10-C12 and C12-C16 were detected at concentrations of 290 µg/l and 190 µg/l respectively.

The Quarter 1 2013 monitoring event detected aliphatic TPH of the range C12-C16, C16-C21 and C21-C35. TPH in the mid to high aromatic ranges were detected in BH103, BH104B and MW04 during the previous Quarter 1 2013 monitoring event. Aromatic TPH of the ranges C12-C16, C16-C21 and C21-C35 were detected in BH103, the ranges C10-C12, C12-C16 and C16-C21 were detected in BH104B and aromatic TPH of the ranges C10-C12 and C12-C16 were detected in MW04.

The Quarter 2 monitoring event of 2012 detected elevated TPH of the aliphatic range C12-C16, C16-C21 and C21-C25 in BH103. Hydrocarbons have been detected in borehole MW03 during Quarter 1 2010, in borehole BH104B during the Quarter 2 2010 monitoring event and in borehole BH104B and MW03 during the Quarter 3 2010 monitoring events. Hydrocarbons have also been detected in BH103, BH104B and MW03 in the Quarter 2 2011 monitoring event and in MW03 in the Quarter 3 and Quarter 4 2011. These detections are discussed further in Section 6.2.3.

6 HISTORICAL RESULTS & TRENDS

Time series plots are presented in this section and include the results of the Quarter 4 2013 monitoring round. As the monitoring continues in accordance with the waste licence requirements, the plots will be updated with the results of subsequent rounds and used to illustrate the results.

6.1 GROUNDWATER LEVELS OVER TIME

Figure 3 to Figure 5 below illustrates the manually recorded water levels using an electronic probe. The graphs show that groundwater levels can vary considerably between monitoring rounds.

Figure 4 illustrates groundwater elevations (mAOD) in shallow groundwater wells (BH101 to BH104B) ranging between approximately 98 mAOD and 102 mAOD.

Figure 5 illustrates groundwater elevation (mAOD) in the deeper groundwater wells (MW01 to MW03). The groundwater elevation (mAOD) for these deeper groundwater wells ranges from approximately 97.5 mAOD to approximately 100 mAOD.

Figure 3 Groundwater Elevation (mAOD) in all Monitoring Wells

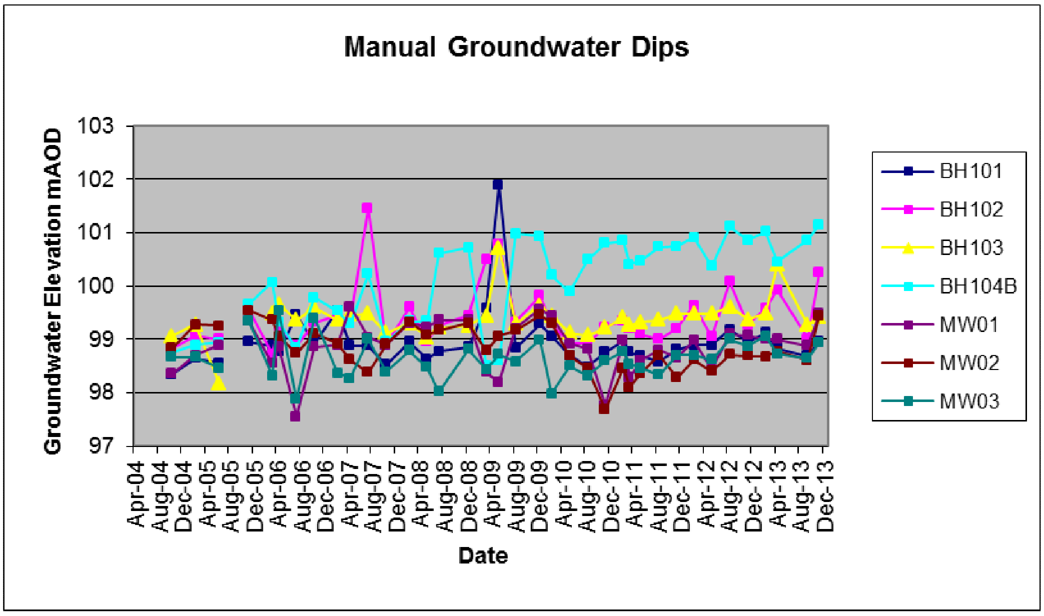


Figure 4 Groundwater Elevation (mAOD) in Shallow Monitoring Wells

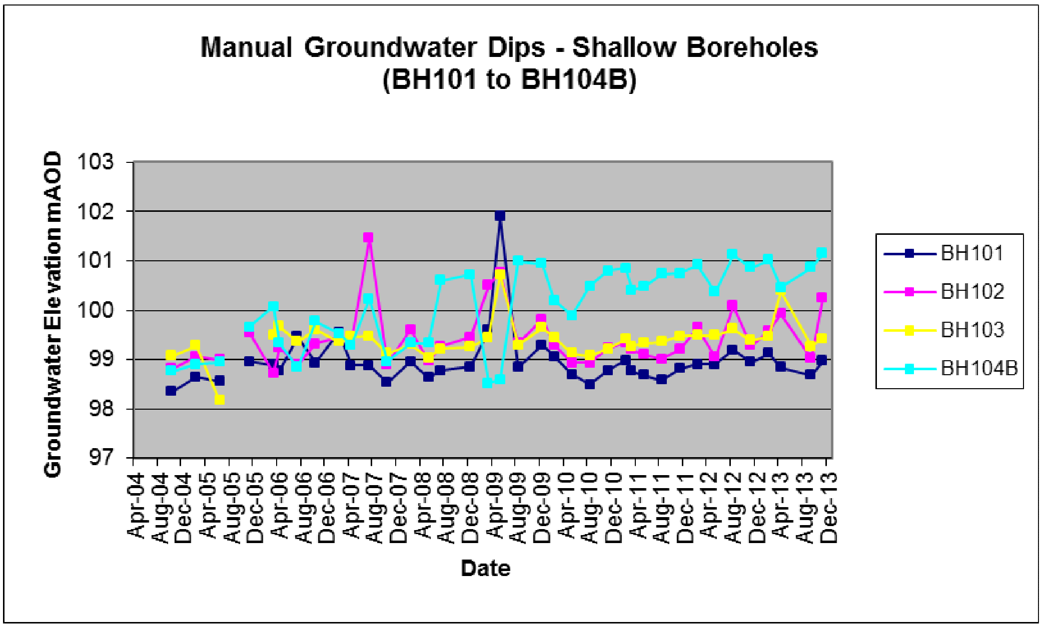
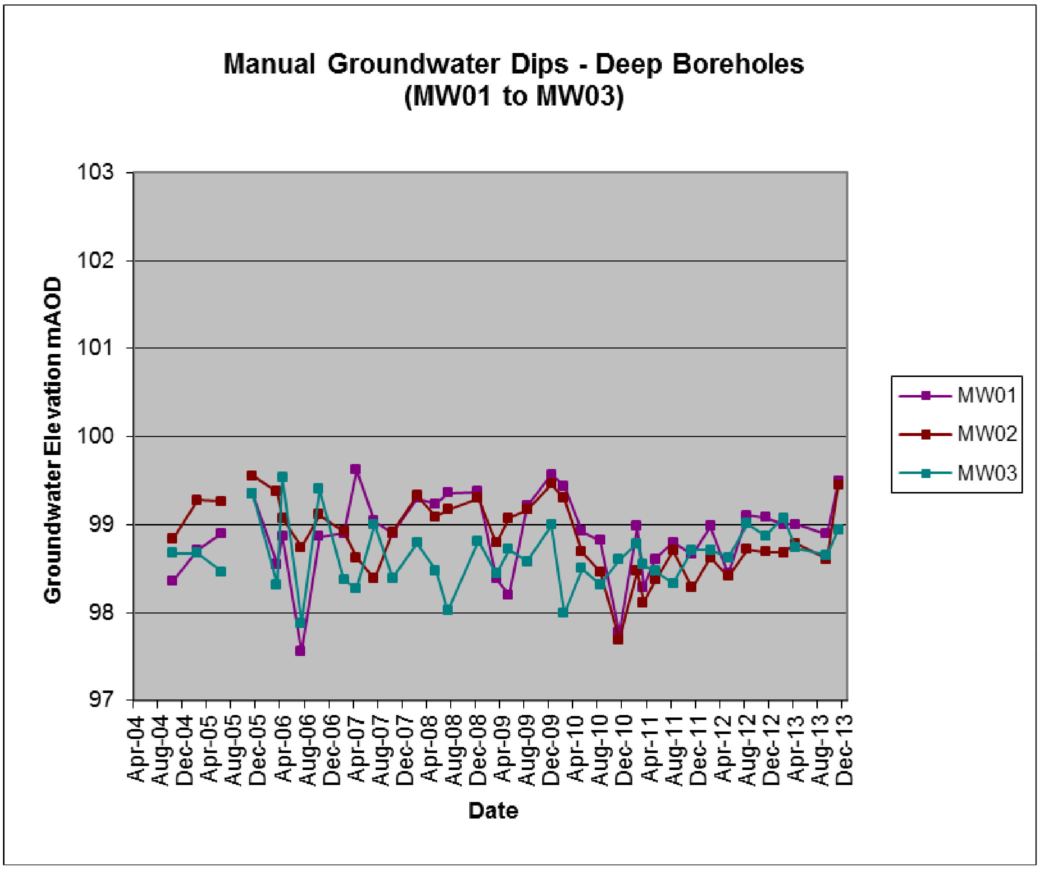


Figure 5 Groundwater Elevation (mAOD) in Deep Monitoring Wells



The groundwater levels generally show a similar pattern of fluctuation over time indicating a degree of connection between boreholes. The graphs demonstrate that groundwater levels can vary considerably between monitoring rounds; however, the general direction of flow in the shallow and deeper groundwater bearing unit is in an easterly or north easterly direction however there have been some occasional historic cases of groundwater flowing in a south-easterly direction.

In addition, monthly rainfall data for Oak Park, Carlow have been tabulated from Met Eireann to examine the relationship between compounds and rainfall events. The data from Oak Park was chosen as the weather station at Birr, Co. Offaly closed in October 2009. A summary of the rainfall data is in Tables 5.1 to 5.5.

Table 5.1: Monthly Rainfall data for Year 2009 for Oak Park, Carlow

Month	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec
Rainfall (mm)	113.4	29.2	32.6	102.4	69.0	65.4	152.4	100.9	41.8	127.8	215.5	73.7

Table 5.2: Monthly Rainfall data for Year 2010 for Oak Park, Carlow

Month	Jan	Feb	Mar	Apr	May	June	July	August	Sept	Oct	Nov	Dec
Rainfall (mm)	71.5	48.0	80.7	49.0	51.4	37.7	93.6	25.5	108.7	68.9	87.7	52.2

Table 5.3: Monthly Rainfall data for Year 2011 for Oak Park, Carlow

Month	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec
Rainfall (mm)	50.6	121.9	16.0	19.5	51.2	72.7	46.4	25.5	93.9	93.9	89.2	55.5

Table 5.4: Monthly Rainfall data for 2012 to date for Oak Park, Carlow

Month	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec
Rainfall (mm)	70.8	24.5	18.0	56.3	50.2	155.8	76.2	127.7	37.9	63.4	80.9	68.1

Table 5.5: Monthly Rainfall data for 2013 to date for Oak Park, Carlow

Month	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec
Rainfall (mm)	76.2	35.8	57.6	44.4	35.6	37.5	32.3	85.6	24.4	170.0	27.7	0.9

Note: Data for the most recent months are provisional.

6.2 GROUNDWATER CONCENTRATIONS OVER TIME

Groundwater quality trends have previously been examined in two reports (URS 2005 and RPS 2007). In addition, RPS carried out a groundwater risk assessment (Ref: MDE0788RP0001, dated November 2008) in which the general trend of contaminant concentrations over time was observed to be erratic with compounds rarely being detected in the same borehole on two consecutive monitoring rounds.

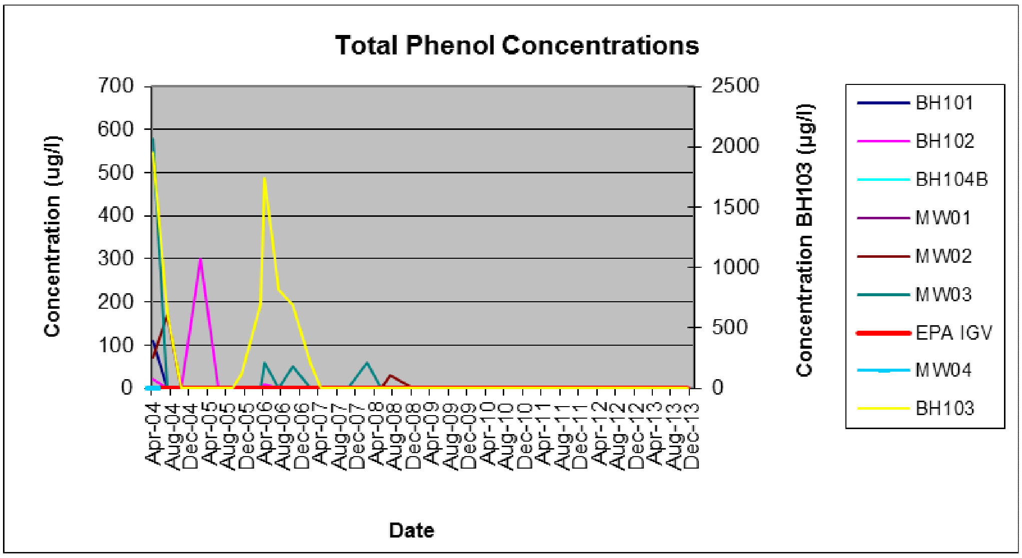
The data available within these reports has been reviewed and time series plots of key parameters have been compiled based on notable trends. Trends for phenols, petroleum hydrocarbons and chlorinated solvents have been plotted as outlined in the following sections.

6.2.1 Phenols

Phenols have been detected historically in all boreholes with the highest concentrations recorded in BH103. However concentrations in BH103 have declined since April 2007. Phenol concentrations have since been recorded below the IGV of 0.5 µg/l in all monitoring wells since December 2008 indicating natural attenuating conditions within the groundwater.

2,4-Dimethylphenol was detected at a concentration of 0.12 µg/l during the Quarter 1, 2010 monitoring event. There is no recommended IGV for this parameter. Subsequent to the Quarter 1 2010 monitoring event no detections of phenols have been noted at any monitoring location up to and including the current Quarter 4 2013 monitoring event.

Figure 6 Phenol Concentrations in all Monitoring Wells



6.2.2 Polycyclic Aromatic Hydrocarbons (PAH's)

Figure 7 below illustrates that PAH's (Polycyclic Aromatic Hydrocarbons) have previously been detected within all monitoring wells above the recommended EPA IGV of 0.1 µg/l. Historically the highest concentrations have been detected within MW03 and BH104B. In addition, a range of PAH's including Benzo(a)pyrene, Benzo(g,h,i)perylene, Indeno(1,2,3)cd pyrene, Fluoranthene and Napthalene have previously been detected in MW03 with Figures 8 to 11 illustrating some of the PAH compounds which were detected above their respective IGV's.

Figure 7 illustrates that **Total PAH** has been detected in all groundwater monitoring wells at the site above the IGV of 0.1 µg/l since 2005. Elevated concentrations have been detected in MW03 and BH104B, with the highest concentration detected in March 2006 (107 µg/l) and in October 2007 (19.72 µg/l) respectively. Since then, the concentrations have shown a marked decrease.

The results from the Quarter 4, 2009 monitoring round in December 2009 recorded total EPA-16 PAH concentrations above the IGV at all locations with the exception of MW02. These concentrations may be linked to the heavy rainfall event, which occurred in November of 2009, which may have mobilized traces of these compounds from soil.

The results from the Quarter 1 monitoring round, 2010 recorded Total PAH concentrations below the IGV of 0.2 µg/l at all locations with the exception of MW03, which detected a concentration of 0.3 µg/l. There has been a decrease in Total PAH concentrations at all locations since the Quarter 4 event in December 2009 with the most notable decrease at MW03 reducing from 4.58 µg/l to <0.1 µg/l.

Concentrations of Total PAH above the IGV in 2010 were detected during the Quarter 1 monitoring event in MW03 (0.3 µg/l), Quarter 2 monitoring event in BH104B (1.2 µg/l) and Quarter 3 monitoring event in MW02 (2.0 µgl) and BH104B (0.2 µgl). There were no elevated concentrations of Total PAH during the Quarter 4 2010, the Q1, Q2, Q3 and Q4 2011 monitoring events, and the Q1 2012 monitoring event. Total PAH was detected above the IGV in MW03 in the Q2 2012 monitoring event. No Total PAH exceedances were detected in the following Q3 and Q4 2012 monitoring events and the previous Q1 and Q2 2013 monitoring events. Total PAH was detected at a concentration of 2.62 µg/l in MW03 during the previous Q3 2013 monitoring event however, no detections above the Laboratory limit were noted during the current monitoring event.

Figure 7 PAH (Total) Concentrations in all Monitoring Wells

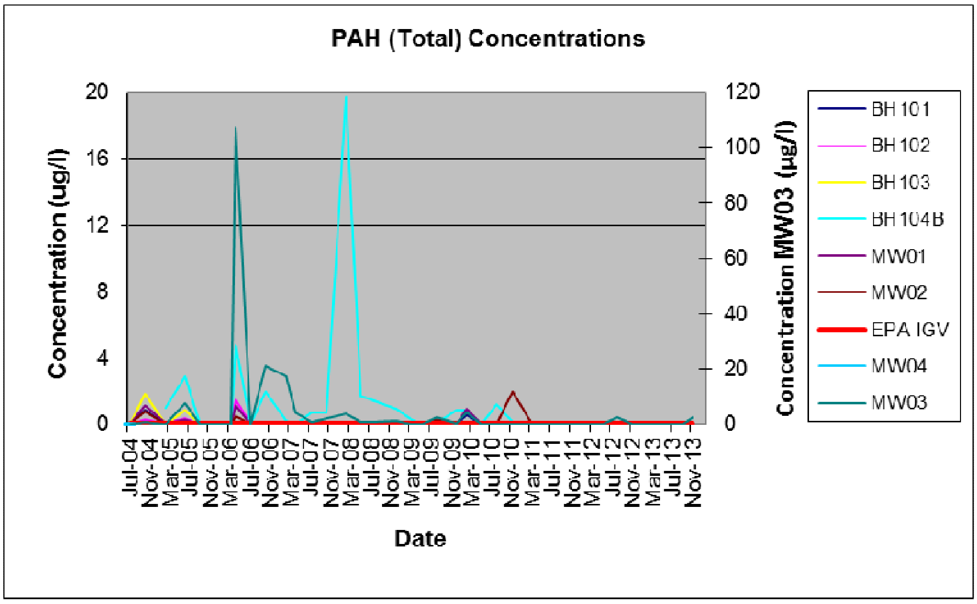


Figure 8 Fluoroanthene Concentrations in all Monitoring Wells

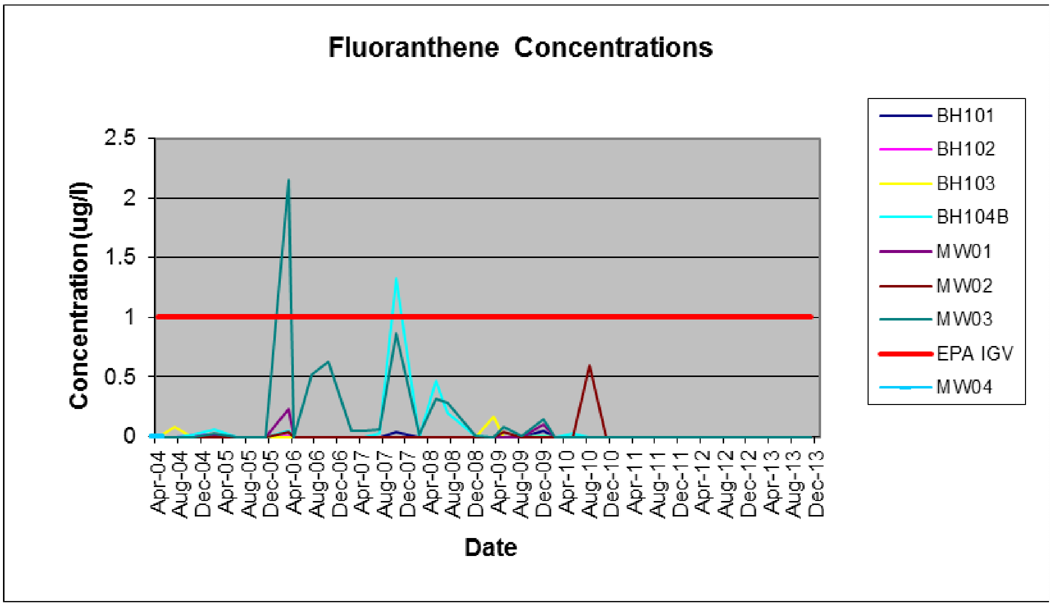
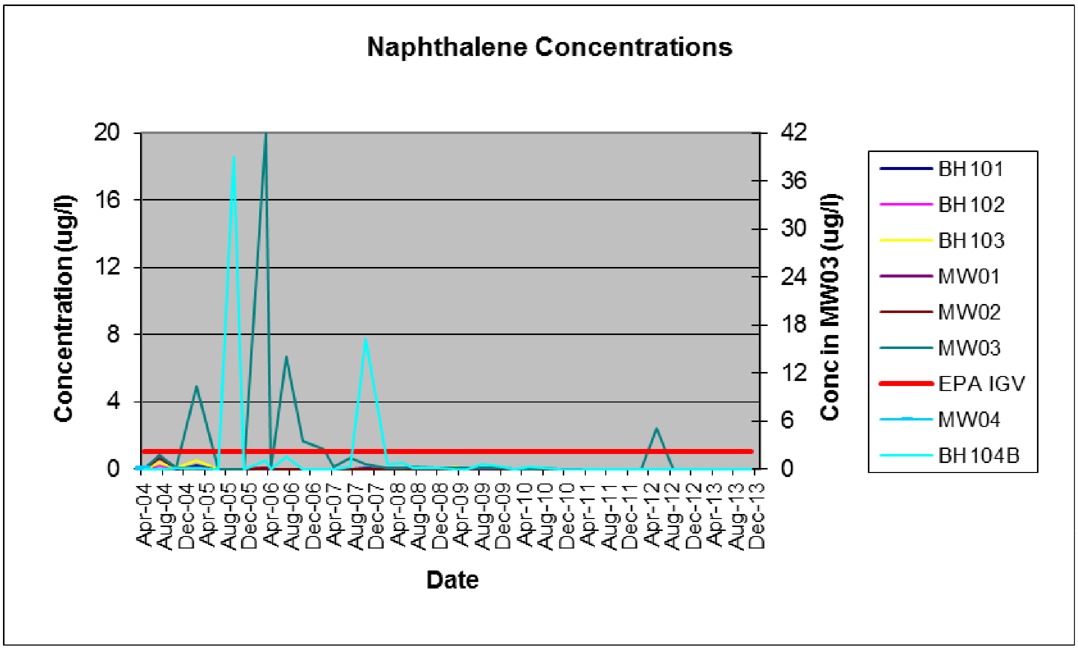


Figure 8 illustrates that **Fluoroanthene** was previously detected above the IGV of 1.0 µg/l in groundwater monitoring wells BH104B (October 2007, 1.33 µg/l) and MW03 (March 2006, 2.158 µg/l) only. The remaining monitoring wells recorded concentrations below the IGV of 1.0 µg/l.

Figure 9 Naphthalene Concentrations in all Monitoring Wells



A similar trend to Fluoroanthene has been noted in Figure 9, with concentrations of **Naphthalene** recorded above the IGV of 1.0 µg/l in BH104B and MW03 only. 4 no. exceedances of the IGV were noted in BH104B in September 2005 (39 µg/l), March 2006 (1.069 µg/l), July 2006 (1.594 µg/l) and October 2007 (16.31 µg/l). Since October 2007, the concentrations in BH104B have decreased below the IGV. There have been 6 exceedances of the IGV of 1.0 µg/l in MW03, with the highest concentration detected in March 2006 (19.986 µg/l) and the most recent being the detected in the Quarter 2 2012 monitoring event (2.4 µg/l). The concentrations detected in August 2010 were slightly above the laboratory limit of detection of 0.01 µg/l at BH104B (0.08 µg/l) and MW03 (0.05 µg/l);

however these levels are deemed low. Concentrations of Naphthalene were below the EPA IGV limit of detection of 1.0 µg/l at all locations during the Quarter 4 2010, the 2011 quarterly monitoring events and the Quarter 1, Quarter 3 and Quarter 4 2012 monitoring periods. No detections of Naphthalene were noted in the current Quarter 4 2013 monitoring event.

Figure 10 Benzo (g,h,i) perylene in all Monitoring Wells

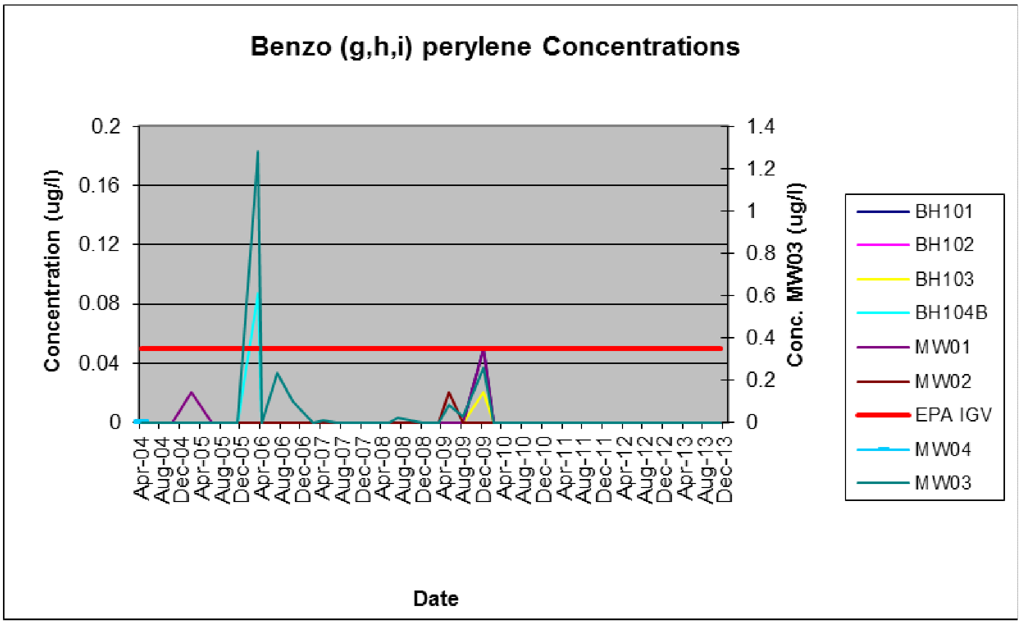


Figure 10 illustrates the concentrations of **Benzo(g,h,i)perylene** in all monitoring wells over time. Elevated concentrations above the IGV were recorded at BH104B (0.087 µg/l) on one occasion only in March 2006.

Figure 10a illustrates elevated concentrations above the IGV recorded at MW03 on 5 no. occasions with the most recent elevated concentration detected in December 2009 (0.26 µg/l). The results of monitoring events in May, August, November 2010, March, May, September and November 2011, February, May, August and November 2012, February 2013, April 2013, September 2013 and the current November Quarter 4 2013 monitoring event recorded concentrations below the laboratory limit of detection of 0.01 µg/l at all locations.

Figure 10a Benzo (g,h,i) perylene in Monitoring Wells BH104B & MW03

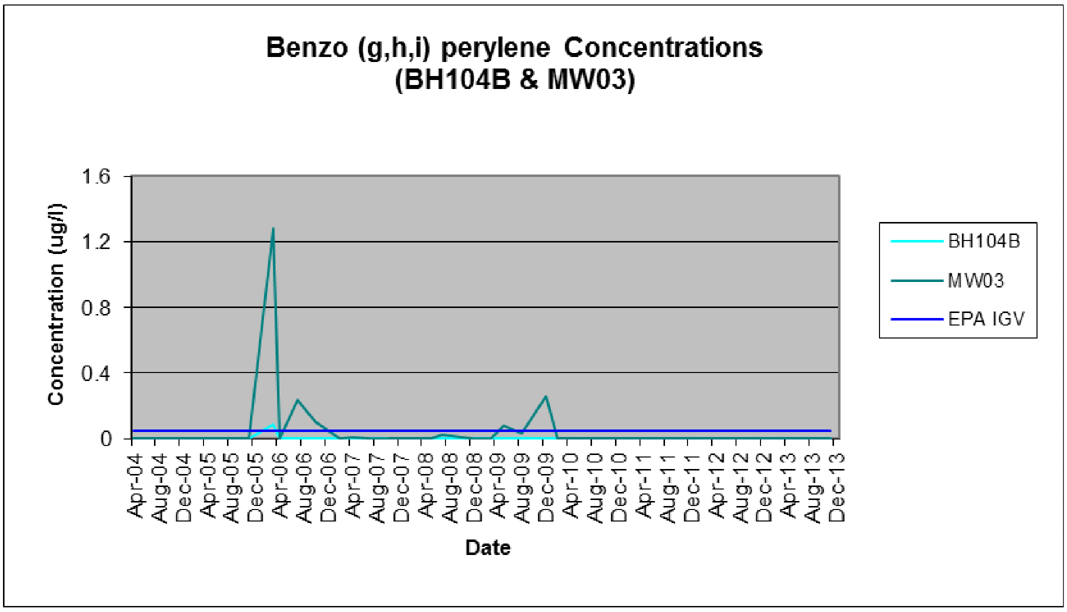
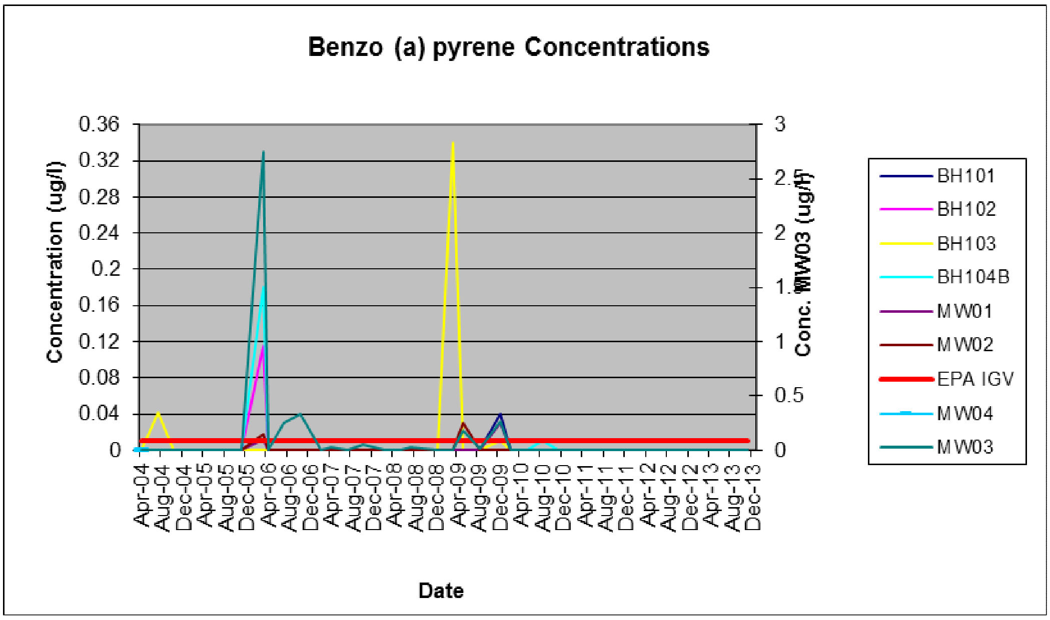


Figure 11 illustrates the concentrations of **Benzo(a)pyrene** in all groundwater monitoring wells and indicates that Benzo(a)pyrene has been detected historically in all boreholes above the IGV of 0.01 µg/l. Similarly with the above mentioned trends, the highest concentrations have been detected in MW03 and BH104B. Concentrations have markedly decreased since March 2006 when an elevated concentration of 2.751 µg/l was detected in MW03, however there have been a number of detections above the IGV, with the most recent elevated level detected in December 2009. Elevated concentrations above the IGV were recorded in BH101, BH103 and MW01 during this same period. The results of all monitoring events in 2010, 2011 and 2012 indicate concentrations below the IGV. The results of the previous quarterly monitoring events of 2013 and the current Quarter 4 2013 event also recorded concentrations below the IGV.

The slightly higher concentrations of Benzo(g,h,i)perylene and Benzo(a)pyrene detected in Quarter 4, 2009 may be attributed to heavy rainfall, which occurred in November of 2009 and as a result possibly mobilized traces of these compounds from the soil. The static water levels for December 2009 ranged between 0.58 and 3.78 mbgl. Since December 2009, concentrations of compounds have notably decreased to below the IGV's.

Figure 11 Benzo(a)pyrene in all Monitoring Wells

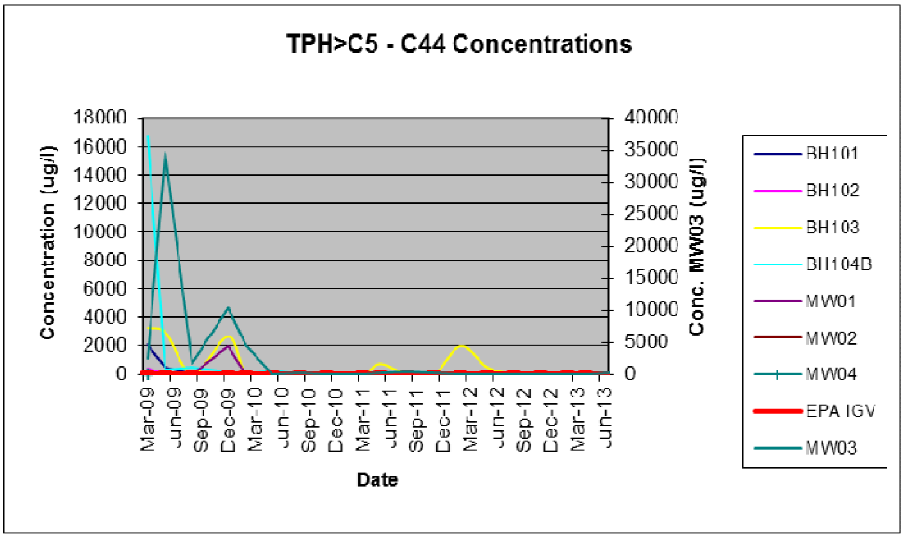


6.2.3 Petroleum Hydrocarbons (TPH)

Historically **Total Petroleum Hydrocarbons (TPH)** including mineral oil, petrol range organics (PRO) and diesel range organics (DRO) have been detected within BH103, BH104B and MW03. Since 2009, speciated hydrocarbon analysis using the Total Hydrocarbon Criteria Working Group (TPHCWG) method has been carried out on all samples to obtain a more accurate profile of TPH within groundwater.

The results of the TPHCWG analysis has indicated that the predominant hydrocarbons detected are in the heavier chain carbon fractions, most notably in the carbon range C12 – C16, C16 – C21 and C21 – C35. Figure 12 illustrates the TPH analysis for the total TPH analysis from C5 – C44 in all monitoring wells since 2009. The highest concentrations detected historically are at monitoring wells MW03, BH104B and BH103 respectively.

Figure 12 TPH (Carbon Range C5-C44) in all Monitoring Wells



During the Quarter 1, 2010 monitoring event, hydrocarbons were detected in borehole MW03. The predominant aliphatic carbon range in MW03 comprised of C16-C21 (1000 µg/l), C21-C35 (2300 µg/l) and C25-C44 (990 µg/l). The predominant aromatic carbon range in MW03 comprised of C16-C21 (220 µg/l) and C21-C35 (620 µg/l). No detections were observed at other locations.

During the Quarter 2, 2010 monitoring event, hydrocarbons were detected in borehole BH104B, with the predominant aliphatic carbon range comprising C12-C16 (130 µg/l) and C16-C21 (130 µg/l), while the predominant aromatic carbon range comprising C12-C16 (21 µg/l) and C16-C21 (47 µg/l). There were no detections of hydrocarbons in MW03 during the Quarter 2 monitoring event.

During the Quarter 3, 2010 monitoring event, hydrocarbons were detected in borehole BH104B and MW03. The predominant aliphatic carbon range in BH104B comprised of C12-C16 (12 µg/l) and C16-C21 (19 µg/l). The predominant aliphatic carbon range in MW03 comprised of C16-C21 (35 µg/l) and C21-C34 (46 µg/l). No aromatic carbons were detected above the laboratory limit of detection of 10 µg/l in all monitoring wells.

During the Quarter 4, 2010 and Quarter 1, 2011 monitoring event, there were no detections of TPH concentrations above the laboratory limit of detection of 10 µg/l at any location. No aliphatic or aromatic carbons were detected above the laboratory limit of detection of 10 µg/l in all monitoring wells.

During the Quarter 2, 2011 monitoring event, hydrocarbons were detected in borehole BH103, BH104B and MW03. The predominant aliphatic carbon range comprised of C16-C21 (340 µg/l, 20 µg/l and 46 µg/l) and C21-C35 (420 µg/l, 96 µg/l and 150 µg/l in BH103, BH104B and MW03 respectively). The predominant aromatic carbon range also comprised of C16-C21 (78 µg/l, 52 µg/l and 50 µg/l) and C21-C35 (110 µg/l, 49 µg/l and 93 µg/l in BH103, BH104B and MW03 respectively).

During the Quarter 3, 2011 monitoring event, hydrocarbons were detected in borehole MW03 only. The predominant aliphatic carbon range comprised of C10-C12 (18 µg/l), C12-C16 (57 µg/l), C16-C21 (35 µg/l) and C21-C35 (210 µg/l). The predominant aromatic carbon range comprised of C12-C16 (42 µg/l), C16-C21 (66 µg/l) and C21-C35 (45 µg/l).

During the Quarter 4, 2011 monitoring event, hydrocarbons were detected in borehole MW03 only. The predominant aliphatic carbon range comprised C10-C12 (22 µg/l), C12-C16 (51 µg/l), C16-C21 (85 µg/l) and C21-C35 (110 µg/l). The predominant aromatic carbon range comprised of C12-C16 (16 µg/l), C16-C21 (14 µg/l) and C21-C35 (91 µg/l).

During the Quarter 1, 2012 monitoring event, hydrocarbons were detected in borehole BH103 only. The predominant aliphatic carbon range comprised C10-C12 (13 µg/l), C12-C16 (270 µg/l), C16-C21 (690 µg/l) and C21-C35 (980 µg/l). The predominant aromatic carbon range comprised of C16-C21 (250 µg/l) and C21-C25 (680 µg/l). No hydrocarbons were detected in MW03 during the current Quarter 1 monitoring event.

During the Quarter 2, 2012 monitoring event, hydrocarbons were detected in BH103 only. The detected aliphatic carbon range comprised C12-C16 (98 µg/l), C16-C21 (230 µg/l) and C21-C25 (170 µg/l). No detections of aromatic carbons were measured during the Quarter 2 2012 monitoring event.

No hydrocarbons were detected at any location during the previous Quarter 3 and Quarter 4, 2012 monitoring events.

During the previous Quarter 1, 2013 monitoring event aromatic hydrocarbons were detected in BH103, BH104b and MW04. The predominant aromatic carbon range comprised C12-C16 (30 µg/l), C16-C21 (280 µg/l) and C21-C35 (100 µg/l) in BH103, C10-C12 (30 µg/l), C12-C16 (110 µg/l) and C16-C21 (80 µg/l) in BH104B and C10-C12 (20 µg/l) and C12-C16 (80 µg/l) in MW04. Aliphatic hydrocarbons were detected in BH103 in the ranges C12-C16 (70 µg/l), C16-C21 (100 µg/l) and C21-C35 (90 µg/l).

During the Quarter 2, 2013 monitoring event no aliphatic or aromatic hydrocarbons were detected at any location.

During the previous Quarter 3, 2013 monitoring event, hydrocarbons of the aliphatic range were detected in MW03 only. The detected aliphatic carbon range comprised C10-C16 (290 µg/l) and C12-C16 (190 µg/l). No detections of aromatic carbons were measured during the Quarter 3 2013 monitoring event.

No detections of aliphatic or aromatic hydrocarbons were noted during the current Quarter 4 2013 monitoring event.

7 CONCLUSIONS

- In accordance with the criteria set out in Schedule 4(ii) of the site's Waste Licence Register No. W0184-01, groundwater monitoring was carried out at the ENVA Ireland site on the 5th November 2013 corresponding to Quarter 4 of 2013. A suitably qualified consultant from RPS collected groundwater samples from 8 on-site monitoring wells and submitted these samples to an accredited laboratory for analysis.

- The results presented have been referenced against the Environmental Protection Agency's (EPA) Interim Guideline Values (IGV) as set out in the Interim Report *'Towards Setting Guideline Values for the Protection of Groundwater in Ireland' 2004.*

- Results of the BTEX and MTBE demonstrate that the levels of Benzene, Toluene, Ethylbenzene and Xylene were below the recommended EPA IGV's

- The Quarter 4, 2013 results of the speciated polycyclic aromatic hydrocarbons indicate that the laboratory limit of detection of 0.2 µg/l for Total PAH's was above the EPA IGV of 0.1 µg/l. There were no detections of speciated PAHs at any location during the current monitoring event. Total PAH were detected at MW03 in the Quarter 3 2013 monitoring event. Further monitoring at these locations is recommended to determine the persistency of these detections.

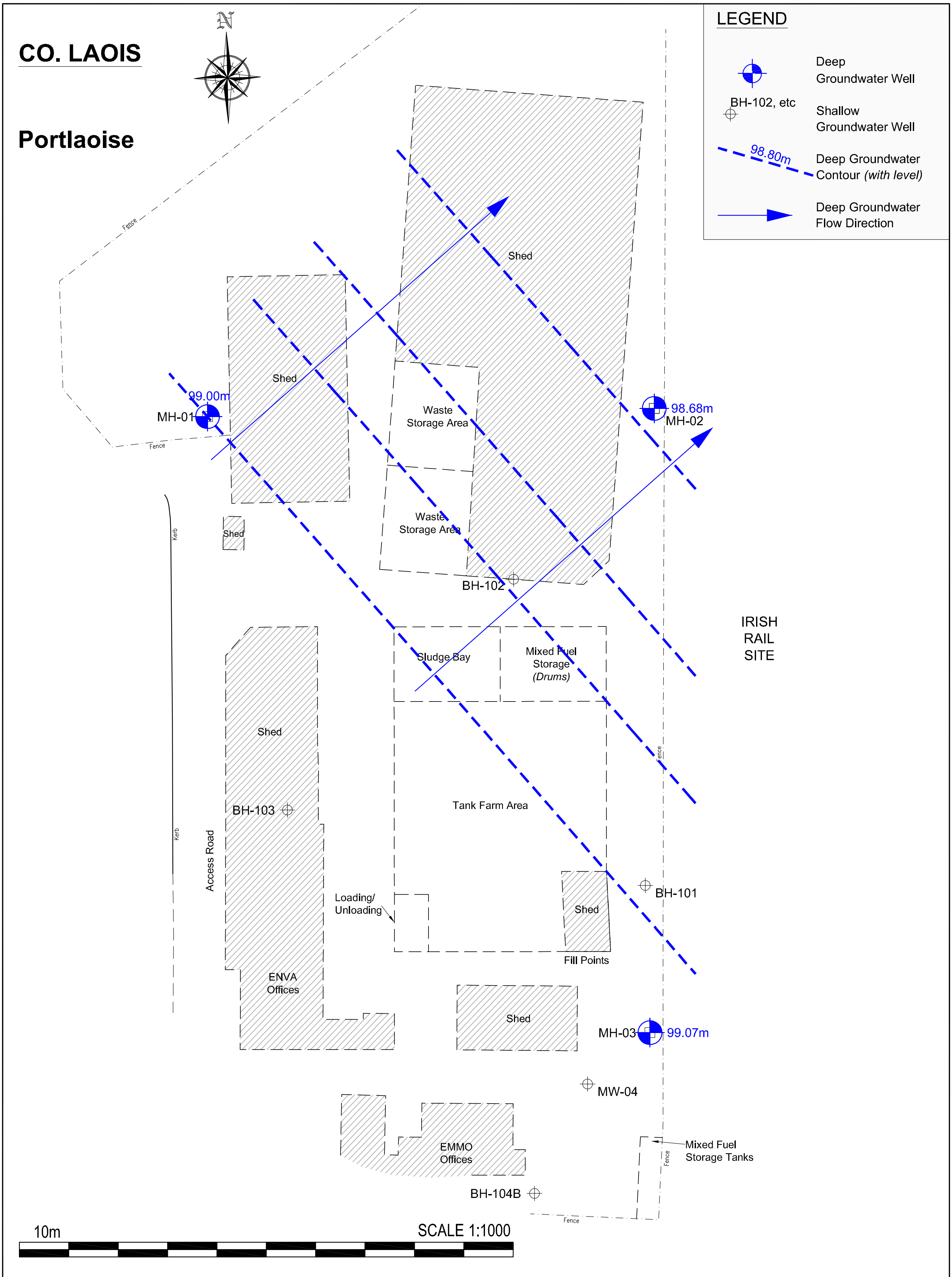
- There were no exceedances of the IGV for SVOC's in the current monitoring event.

- There have been no exceedances of the IGV for VOC's in this Quarter 4 2013 monitoring event however there were two detections of VOC's. Chloroethene and 1-1 dichloroethene were detected at concentrations of 7.9 µg/l and 10.1 µg/l respectively. The Quarter 1 2012 monitoring event recorded a concentration of MTBE above the IGV of 30 µg/l in BH104B (280 µg/l). MTBE was previously recorded on two occasions in BH104B in April 2007 (49 µg/l) and in October 2007 (3 µg/l). Since then the concentrations had decreased to below the laboratory limit of detection.

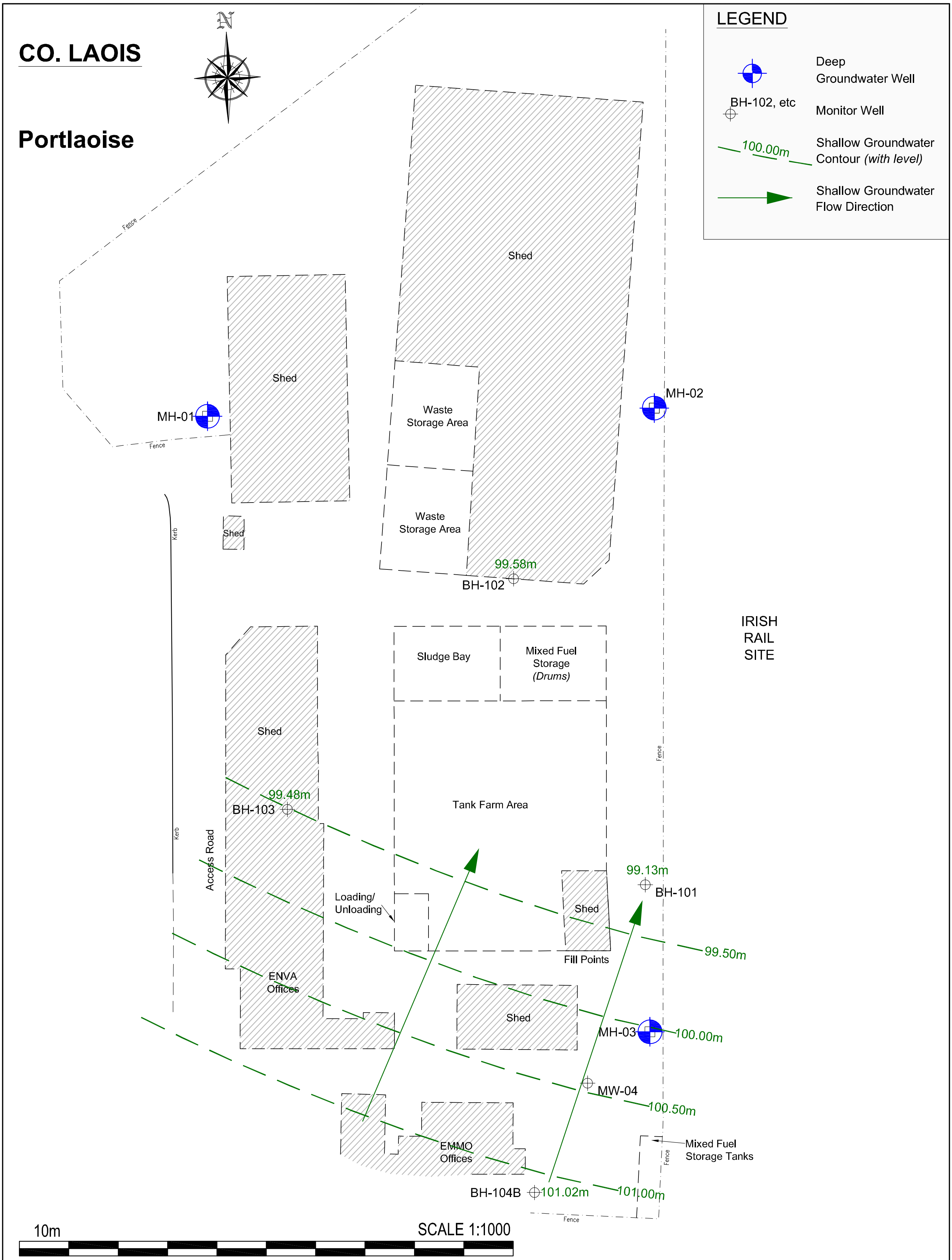
- The results of the phenol analysis by GC-MS detected concentrations below the laboratory limit of detection of 1.0 µg/l at all locations. However, the laboratory limit of detection is above the IGV of 0.5 µg/l for phenols. Samples were subsequently also analysed for phenols to include chlorophenols and the results indicate that there were no detections above the laboratory limit of detection of 0.05 µg/l. A low level of 2,4-Dimethylphenol (0.12 µg/l) was detected in MW03 during the Quarter 1, 2010 monitoring event. There have been no detections of this compound since February 2010.

- Hydrocarbons were not detected in any monitoring location during the Quarter 4 2013 monitoring event. Hydrocarbons were detected in boreholes BH104B and MW03 in the aliphatic carbon ranges during the Quarter 3, 2010 monitoring event. There were no detections of aromatic carbon above the laboratory limit of detection of 10 µg/l in BH104B and MW03. Hydrocarbons were detected during the Quarter 2 (BH103, BH104B, MW03), Quarter 3 (MW03) and Quarter 4 (MW03) 2011 monitoring events. Hydrocarbons in the aliphatic range were detected in BH103 during the Quarter 1 2013 monitoring event and hydrocarbons of the aromatic range were detected in BH103, BH104B and MW04. No detections of hydrocarbons were found at any location during the Quarter 2 2013 monitoring event.

- The general trend of contaminant concentrations over time continues to be somewhat variable with compounds not being continually detected in the same borehole on two or three consecutive monitoring rounds. In general, the contaminant levels detected at the Enva facility appear to indicate reducing contaminant concentrations over time with infrequent elevations in some parameters. Further monitoring is recommended to confirm these reductions.



Client:		Project: ENVA Monitoring	Issue Details	Office Use Only
Enva Ireland Ltd. *Portlaoise*	RPS, West Pier Business Campus, Dun Laoghaire, Co. Dublin, Ireland. T: +353 1 288 4499 - F: +353 1 283 5676 E: ireland@rpsgroup.com W: www.rpsgroup.com/ireland	Title: Deep Groundwater Contours - February 2013	Drawn: D. Byrne	Job No. MDE0973
			Checked: M. Roche	File Ref. MDE0973SK2002F01
			Approved: P. Chadwick	Fig No. Figure 2
			Scale: 1:1,000 (A4)	Rev. F01
			Date: April '13	



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enva Enva Ireland Ltd. *Portlaoise*	RPS **RPS, West Pier Business Campus, Dun Laoghaire, Co. Dublin, Ireland.** T: +353 1 288 4499 - F: +353 1 283 5676 E: ireland@rpsgroup.com W: www.rpsgroup.com/ireland		Drawn:	D. Byrne	Job No.	MDE0973
			Checked:	M. Roche	File Ref.	MDE0973SK2001F01
		Title: Shallow Groundwater Contours - February 2013	Approved:	P. Chadwick	Fig No.	Rev.
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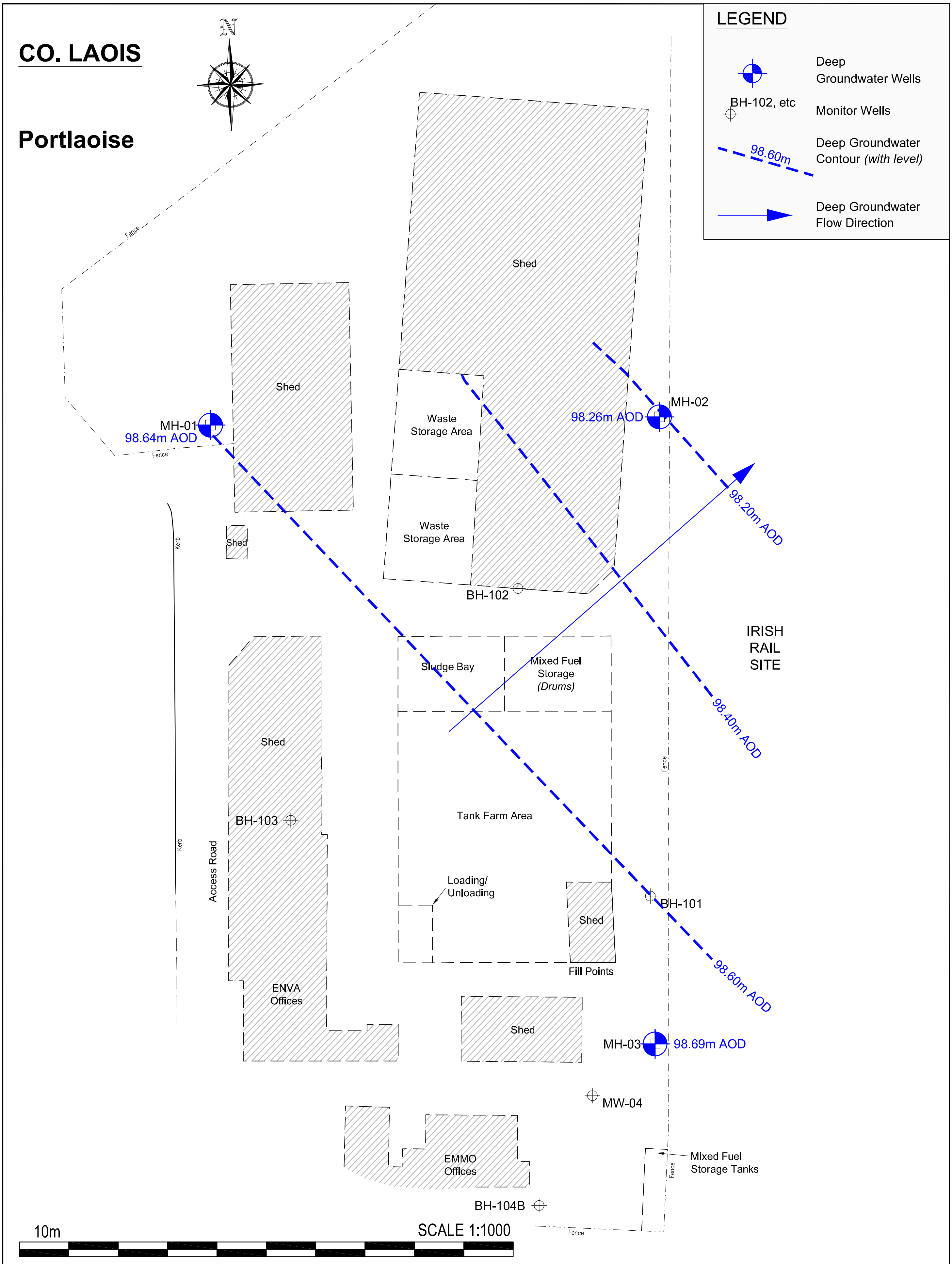

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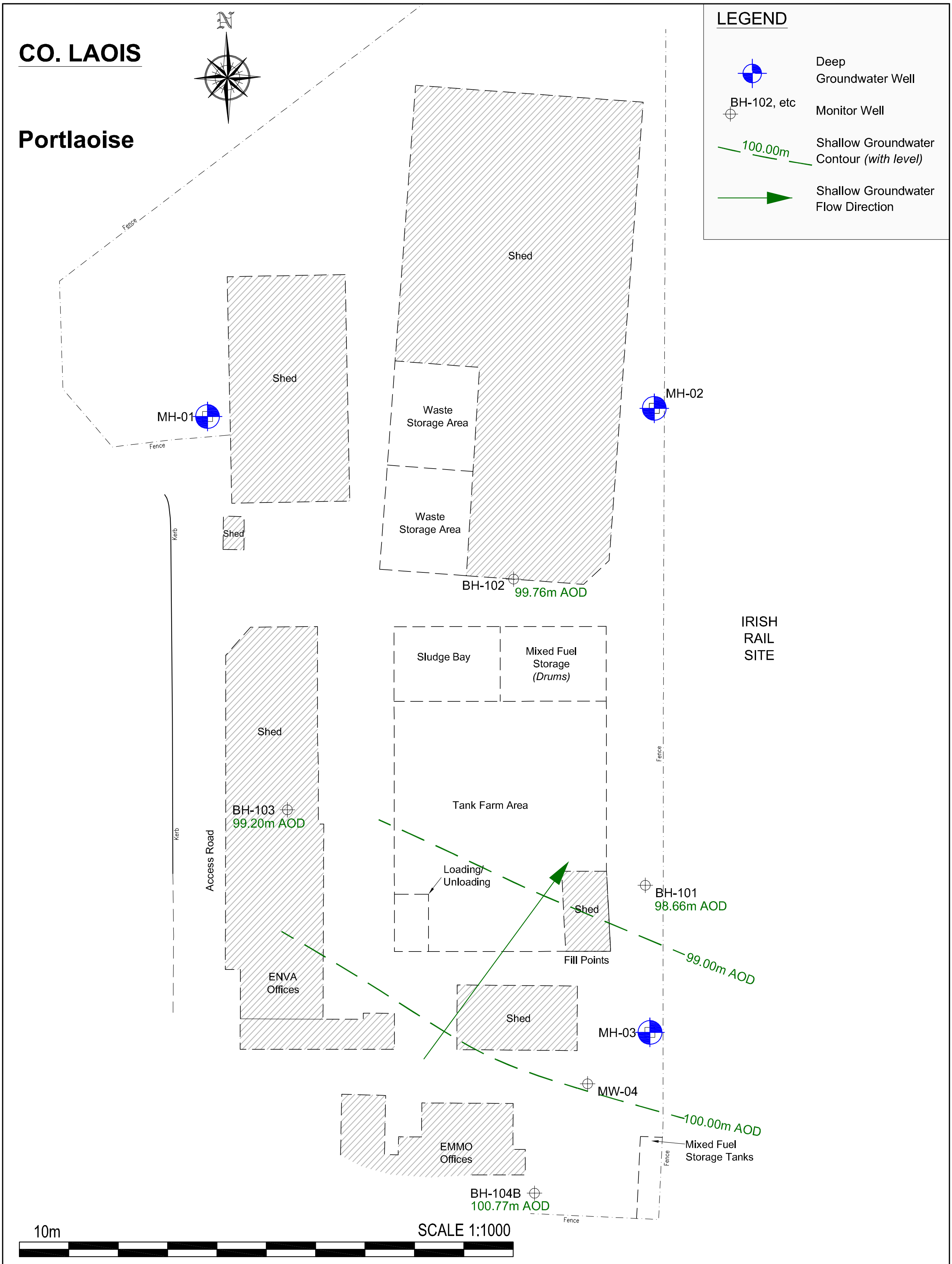
Enva Ireland Ltd. *Portlaoise*	RPS, West Pier Business Campus, Dun Laoghaire, Co. Dublin, Ireland. T: +353 1 288 4499 - F: +353 1 283 5676 E: ireland@rpsgroup.com W: www.rpsgroup.com/ireland		Drawn: D. Byrne		Job No. MDE0973	
			Checked: M. Roche		File Ref. MDE0973SK4002F01	
		Title: Deep Groundwater Contours - August 2013	Approved: P. Chadwick		Fig No. Figure 2	Rev. F01
			Scale: 1:1,000 (A4)			
			Date: Nov. '13			



Client:		Project: ENVA Monitoring	Issue Details		Office Use Only	
Enva Ireland Ltd. *Portlaoise*	RPS, West Pier Business Campus, Dun Laoghaire, Co. Dublin, Ireland. T: +353 1 288 4499 - F: +353 1 283 5676 E: ireland@rpsgroup.com W: www.rpsgroup.com/ireland		Drawn:	D. Byrne	Job No.	MDE0973
			Checked:	M. Roche	File Ref.	MDE0973SK4001F01
		Title: Shallow Groundwater Contours - August 2013	Approved:	P. Chadwick	Fig No.	Rev.
			Scale:	1:1,000 (A4)	Figure 1	F01
			Date:	November '13		

Appendix 2

Summary of Metal Screen Results 2013

Q1 Effluent Metal Screen

	Detection Method		ICP MS	ICP MS	ICP MS	ICP MS	ICP MS	ICP MS	ICP MS	ICP MS	ICP MS	CV AA	ICP MS
	Method Detection Limit		<0.1ug/l	<0.036ug/l	<0.1ug/l	<0.22ug/l	<0.85ug/l	<0.019ug/l	<0.04ug/l	<0.15ug/l	<0.41ug/l	<0.01ug/l	<0.02ug/l
	UKAS Accredited		✓	✓	✓	✓	✓	✓	✓	✓	✓	▪	▪
Alcontrol Reference	Sample Identity	Other ID	Dissolved Calcium	Dissolved Magnesium	Dissolved Cadmium Low Level	Dissolved Chromium Low Level	Dissolved Copper Low Level	Dissolved Iron Low Level	Dissolved Manganese Low Level	Dissolved Nickel Low Level	Dissolved Zinc Low Level	Dissolved Mercury Low Level	Dissolved Lead Low Level
			ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l
Report No: 214384	Quarterly Effluent	D/E 20.02.13	375000	54800	0.255	11.1	1.47	181	586	28.2	29.1	<0.01	0.242

Q2 Effluent Metal Screen

	Detection Method		ICP MS	ICP MS	ICP MS	ICP MS	ICP MS	ICP MS	ICP MS	ICP MS	ICP MS	CV AA	ICP MS
	Method Detection Limit		<0.1ug/l	<0.036ug/l	<0.1ug/l	<0.22ug/l	<0.85ug/l	<0.019ug/l	<0.04ug/l	<0.15ug/l	<0.41ug/l	<0.01ug/l	<0.02ug/l
	UKAS Accredited		✓	✓	✓	✓	✓	✓	✓	✓	✓	▪	▪
Alcontrol Reference	Sample Identity	Other ID	Dissolved Calcium	Dissolved Magnesium	Dissolved Cadmium Low Level	Dissolved Chromium Low Level	Dissolved Copper Low Level	Dissolved Iron Low Level	Dissolved Manganese Low Level	Dissolved Nickel Low Level	Dissolved Zinc Low Level	Dissolved Mercury Low Level	Dissolved Lead Low Level
			ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l
Report No: 13/3763	Quarterly Effluent	04.04.13	575000	102000	1.79	14.3	3.9	407	320	44.9	68.4	<0.01	0.203

Q3 Effluent Metal Screen

	Detection Method		ICP OES	ICP OES	ICP OES	ICP OES	ICP OES	ICP OES	ICP OES	ICP OES	ICP OES	ICP OES	ICP OES
	Method Detection Limit		<0.2	<0.1	<0.5	<1.5	<7	<20	<2	<2	<3	<1	<5
	ISO 17025 Accredited		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Jones Environmental Reference No	Sample Identity	Other ID	Dissolved Calcium	Dissolved Magnesium	Dissolved Cadmium	Dissolved Chromium	Dissolved Copper	Total Dissolved Iron	Dissolved Manganese	Dissolved Nickel	Dissolved Zinc	Dissolved Mercury	Dissolved Lead
			mg/l	mg/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l
Report No 13/6587	Quarterly Effluent 17/07/13	PO 13070	737.1	29.9	<0.5	10.1	<7	344	63	65	16	<1	6

Q4 Effluent Metal Screen

	Detection Method		ICP OES	ICP OES	ICP OES	ICP OES	ICP OES	ICP OES	ICP OES	ICP OES	ICP OES	ICP OES	ICP OES
	Method Detection Limit		<0.2mg/l	<0.1mg/l	<0.5ug/l	<1.5ug/l	<7ug/l	<20ug/l	<2ug/l	<1ug/l	<1ug/l	<0.1ug/l	<5ug/l
	UKAS Accredited		✓	✓	✓	✓	✓	✓	✓	✓	✓	▪	▪
Jones Reference	Sample Identity	Other ID	Dissolved Calcium	Dissolved Magnesium	Dissolved Cadmium Low Level	Dissolved Chromium Low Level	Dissolved Copper Low Level	Dissolved Iron Low Level	Dissolved Manganese Low Level	Dissolved Nickel Low Level	Dissolved Zinc Low Level	Dissolved Mercury Low Level	Dissolved Lead Low Level
			mg/l	mg/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l
Report No: 13/9127	Quarterly Effluent Metal screen	2/10/13	479.9	101.2	<0.5	4.8	<7	701	403	17	<2	<1	6

Appendix 3

CONFIDENTIAL REPORT

Client	**Title**
Enva Ireland Ltd	Measure Emissions to Atmosphere
Clonminam Industrial Estate	from Boiler – October 2013
Portlaoise	at Enva Ireland Ltd. – Portlaoise
Co. Laois	
Attn. Ms. Anna O'Brien	

EPA Waste Licence Reg. No. 184-1

Report Ref:	1346	Report by:	Frances Wright Frances Wright *BSc, PgDip Env, Dip SHWW, CertOH*
Date recd:		Approved by:	Paddy Wright Paddy Wright *BSc, PgDip ChemEng, CertOH*
Copies to:		Date:	21st October 2013

CONTENTS

1. INTRODUCTION

Enva Ireland Ltd. operate a waste recovery facility at Clonminam Industrial Estate, Portlaoise which is licensed under the EPA Waste Licence system (Reg. No. 184-1).

Enva Ireland Ltd are required to measure annually the following emissions to atmosphere from their boiler under Schedule D of their Waste Licence.

- Oxides of Sulphur
- Nitrogen Oxides
- Carbon Monoxide
- Combustion Efficiency

At the request of Ms. Anna O'Brien of Enva Ireland Ltd., Wright Environmental Services carried out this monitoring on the 3rd October 2013.

This report contains the results of these tests. There are no limits set for these parameters in the company's licence.

2. RESULTS

Emissions to atmosphere, as required by the company's Waste Licence, were measured from the boiler at Clonminam Industrial Estate, Portlaoise on the 3rd October 2013. The boiler was running on gas and operating on medium fire during the monitoring periods.

A summary of the concentrations measured are given in Table 1. Detailed test results are presented in Appendix 1. Sampling and analytical methods are presented in Appendix 2.

Table 1

Summary of Emissions from Boiler

3rd October 2013

Parameter	Measured mg/Nm^3	
	Test 1	**Test 2**
Carbon Monoxide	3	3
Nitrogen Oxides (as NO_2)	92	96
Oxides of Sulphur	Less than 5	Less than 5
Combustion Efficiency (%)	83.5	83.6

Appendix 1

Detailed Test Results

Emissions from Oil Fired Boiler

3rd October 2013 – Test 1

Time	Temperature	Oxygen	Carbon Monoxide	Nitrogen Oxides	Efficiency
	^{o}C	%	mg/Nm^3	mg/Nm^3	%
10:26	170	2.7	2	91	83.6
10:27	175	2.2	2	91	84.0
10:28	176	2.2	2	91	84.0
10:29	176	2.2	2	89	84.0
10:30	179	2.2	2	91	83.9
10:31	179	2.2	2	91	83.9
10:32	179	2.1	2	90	83.9
10:33	180	2.1	2	90	83.9
10:34	181	2.1	5	90	83.7
10:35	182	2.1	2	92	83.7
10:36	183	2.1	2	90	83.7
10:37	183	2.1	2	92	83.7
10:38	184	2.1	2	92	83.6
10:39	185	2.1	2	92	83.6
10:40	185	2.1	2	92	83.6
10:41	186	2.3	2	91	83.5
10:42	187	2.1	5	92	83.5
10:43	188	2.1	5	92	83.5
10:44	189	2.1	2	92	83.5
10:45	189	2.1	2	92	83.3
10:46	190	2.1	5	92	83.3
10:47	190	2.1	5	92	83.3
10:48	191	2.1	5	92	83.2
10:49	192	2.1	5	94	83.2
10:50	192	2.1	5	94	83.2
10:51	193	2.1	5	92	83.2
10:52	193	2.1	2	92	83.2
10:53	194	2.1	2	94	83.1
10:54	193	2.1	2	92	83.2
10:55	194	2.1	2	94	83.1
Average	**185**	**2.1**	**3**	**92**	**83.5**

Emissions from Oil Fired Boiler

3rd October 2013– Test 2

Time	Temperature	Oxygen	Carbon Monoxide	Nitrogen Oxides	Efficiency
	°C	%	mg/Nm^3	mg/Nm^3	%
11:38	171	2.3	2	91	84.1
11:39	171	2.3	2	91	84.1
11:40	173	2.3	2	93	84.0
11:41	174	2.3	2	93	84.0
11:42	175	2.2	2	95	84.0
11:43	175	2.2	5	95	84.0
11:44	175	2.2	5	95	84.0
11:45	176	2.2	2	95	84.0
11:46	176	2.2	2	95	84.0
11:47	177	2.4	5	92	83.8
11:48	178	2.2	2	95	83.8
11:49	180	2.2	2	97	83.7
11:50	180	2.2	2	97	83.7
11:51	182	2.2	5	97	83.7
11:52	182	2.2	5	97	83.7
11:53	184	2.2	5	97	83.6
11:54	185	2.2	2	97	83.6
11:55	186	2.2	5	97	83.5
11:56	187	2.2	2	97	83.5
11:57	188	2.2	5	97	83.4
11:58	189	2.2	2	99	83.3
11:59	190	2.2	2	97	83.3
12:00	191	2.2	5	97	83.3
12:01	191	2.2	5	97	81.0
12:02	191	2.2	2	97	83.3
12:03	191	2.2	5	99	83.3
12:04	192	2.2	2	99	83.3
12:05	192	2.1	2	98	83.3
12:06	192	2.2	2	99	83.2
12:07	192	2.2	5	99	83.2
Average	**183**	**2.2**	**3**	**96**	**83.6**

Appendix 2

Sampling and Analytical Methods

Sampling and Analytical Methods

Wright Environmental Services carryout emission monitoring based on the requirements of the EPA published document "Air Emissions Guidance Note #2 (AG2)".

Emissions to Atmosphere

Oxygen, Nitrogen Oxides and Temperature

Oxygen, nitrogen oxides and temperature were measured using a Kane May Quintox KM9160 flue gas analyser. The gases are measured by electro chemical cells. The temperature is measured by thermocouple. Uncertainty assigned +/-2%.

Sulphur Dioxide

Sulphur dioxide was determined using BS EN 14791:2005 Stationary source emissions — Determination of mass concentration of sulphur dioxide — Reference method. This specifies drawing a measured volume of flue gas through dilute hydrogen peroxide and determining the collected sulphate by ion chromatography or by titration by the Thorin method. Uncertainty assigned +/-5%.

Standard Reference Conditions

The concentration of the emissions were calculated and reported in mg/Nm^3 as follows :

- temperature 273^oK
- pressure 101.3 kPa
- dry gas
- corrected to 3% oxygen

Appendix 4

WRIGHT ENVIRONMENTAL
S E R V I C E S

CONFIDENTIAL REPORT

Client	**Title**
Enva Ireland Ltd	Annual Environmental
Clonminam Industrial Estate	Noise Survey 2013
Portlaoise	Enva Ireland Ltd. – Portlaoise
Co. Laois	EPA Waste Licence Reg. No. 184-1
Attn. Ms. Mark Dowling	

Report Ref:	1347	Survey and Report by:	Frances Wright Frances Wright *BSc, PgDip Env, Dip SHWW, CertOH*
Date recd:		Approved by:	Paddy Wright Paddy Wright *BSc, PgDip ChemEng, CertOH*
Copies to:		Date:	30th December 2013

CONTENTS PAGE

1. INTRODUCTION:

Enva Ireland Ltd. (Enva) operate a waste recovery facility at Clonminam Industrial Estate, Portlaoise which is licensed under the EPA Waste Licence (Reg. No. 184-1). Schedule D of the company's licence requires an annual Environmental Noise Survey to be undertaken.

At the request of Ms. Anna O'Brien of Enva Ireland Ltd., Wright Environmental Services carried out this Noise Survey on the 4th and 5th September 2013.

This report presents and interprets the results of the survey with reference to the company's Waste Licence noise criteria. The methodology used for the survey is described in Appendix I. Instrumentation and calibration is described in Appendix II. Monitoring locations are shown in the site map in Appendix III. Appendix IV presents the 1/3 octave band analysis of the noise at monitoring locations.

2. SUMMARY

Enva are required by their EPA Waste Licence (Reg. No. 184-1) to have an annual Environmental Noise Survey undertaken. Wright Environmental Services carried out this survey on the 4th and 5th September 2013. The following noise monitoring was carried out.

	N1 *boundary location*	**N2** *boundary location*	**N3** *boundary location*	**N4** *noise sensitive location*	**N5** *abandoned noise sensitive location*
Day Time Survey	**3 sampling periods**	**3 sampling periods**	**3 sampling periods**	**3 sampling periods**	**3 sampling periods**
Night Time Survey	**2 sampling periods**	**2 sampling periods**	**2 sampling periods**	**2 sampling periods**	**2 sampling periods**

Noise levels were below the criterion levels at the boundary locations. Therefore the noise attributable to Enva at a noise sensitive locations beyond the boundary locations in each of these directions would be less than the criterion values set out in their licence.

There was no noise audible from Enva at the noise sensitive location, N4. The noise levels measured at this location were within the criterion levels for day and night. The noise level at N5 during one of the daytime sampling periods was above the criterion level. Two HGVs entered the Enva site and passed close to N5 (approx. 20 m) during this sampling period. The HGVs had a very significant impact on the 30 minute Leq noise level. As is this no longer an occupied noise sensitive location, the Inverse Square Law was used to calculate the expected reduction in noise level at the nearest noise sensitive location. The resultant noise attributable to the Enva would be approximately 42 dB(A) at the nearest NSL, due to distance attenuation alone. This is well below the criterion levels.

The noise was perceived at each of the monitoring locations to investigate the presence of tones. No tones were subjectively identified. Using the sound level meter, one third octave band analysis of the noise was also carried out at the boundary locations. No tones were identified using the one third octave band analysis method.

It is therefore concluded that Enva Ireland Ltd. are in compliance with the noise criteria set out in their EPA Waste Licence (Reg. No. 184-1).

3. MONITORING RESULTS AND DISCUSSION:

Wright Environmental Services carried out the day and night Environmental Noise Survey on the 4th and 5th September 2013. The monitoring locations are described below and are shown in the site map in Appendix III.

Location **N1**:Along the mid western site boundary.
Location **N2**: In the corner of the site, along the south eastern boundary
Location **N3**:In the corner of the site, along the north eastern boundary.
Location **N4**:Nearby residential area, east/south east of Enva, on the corner of Knockmay Road and Marian Avenue. The railway yard is the main land use between Enva in this monitoring location.
Location **N5**:North west of Enva site, on the corner with access road for Rowan parhalting site (currently deserted). Note access to this point is now restricted, therefore monitoring was carried out at the barrier, blocking access to this point (see map in Appendix III).

The following "A-Weighted" data was determined for each discrete sampling period.

L_{eq} : The equivalent continuous noise level for the measurement period. (This is defined as the sound level of a steady sound having the same energy as a fluctuating sound over the specified measuring period).

L_1 : The noise level exceeded for 1% of the measurement period. (This parameter gives a good indication of typical maximum levels.)

L_{10} : The noise level exceeded for 10% of the measurement period.

L_{90} : The noise level exceeded for 90% of the measurement period. (This is taken to represent the background noise level).

Detailed results are presented in Table 1to 5 below along with appropriate comments regarding noise in the monitoring environment.

Table 1

N1 - Monitoring Location

Start Time t = 30mins	L_{eq} (dBA)	L_1 (dBA)	L_{10} (dBA)	L_{90} (dBA)	Comments	
10:20	**51**	60	53	47	Traffic and industrial noise to the south is dominant. Enva activity audible and included : vehicle movement, forklift, occasional bang.	DAY
10:50	**55**	61	54	48	Traffic and industrial noise to the south is dominant. Enva activity audible and included : vehicle movement, forklift, occasional bang, hand held tools. 2HGVs entered Enva.	
11:30	**52**	59	53	48	Traffic and industrial noise to the south is dominant. Enva activity audible and included : vehicle movement, forklift, occasional bang, hand held tools.	
00:50	**41**	49	42	34	Traffic and industrial noise to the south is dominant. Faint hum from the Enva boiler audible.	NIGHT
01:20	**41**	51	42	33	Traffic and industrial noise to the south is dominant. Faint hum from the Enva boiler audible.	

Table 2

N2 - Monitoring Location

Start Time t = 30mins	L_{eq} (dBA)	L_1 (dBA)	L_{10} (dBA)	L_{90} (dBA)	Comments	
12:07	**56**	63	58	51	HGV movement in neighbouring facility is dominant. In the absence of HGV movement, noise levels were 52 – 53 dB(A). Industrial noise to the south also dominant in the absence of HGV movement. Boiler audible onsite.	DAY
13:00	**56**	68	59	50	HGV movement in neighbouring facility is dominant. In the absence of HGV movement, noise levels were 52 – 53 dB(A). Industrial noise to the south also dominant in the absence of HGV movement. Boiler audible onsite.	
13:30	**54**	60	56	51	HGV movement in neighbouring facility is dominant. In the absence of HGV movement, noise levels were 52 – 53 dB(A). Industrial noise to the south also dominant in the absence of HGV movement. Boiler audible onsite.	
23:00	**44**	52	45	41	Dominant noise industrial facility to the south. Boiler noise audible onsite.	NIGHT
23:35	**45**	49	46	43	Dominant noise industrial facility to the south. Boiler noise audible onsite.	

Table 3

N3 - Monitoring Location

Start Time t = 30mins	L_{eq} (dBA)	L_1 (dBA)	L_{10} (dBA)	L_{90} (dBA)	Comments	
12:57	**50**	54	49	41	Onsite noise/activity: vehicle movement, unloading tanker, forklift. Leaves rustling on trees. Industrial noise audible from south.	DAY
13:59	**53**	60	57	42	Onsite noise/activity: screening adjacent to N3, vehicle movement, unloading tanker, forklift. Leaves rustling on trees. Industrial noise audible from south.	
14:39	**50**	61	50	44	Onsite noise/activity: vehicle movement, unloading tanker, forklift. Leaves rustling on trees. Industrial noise audible from south.	
23:40	**39**	44	41	36	Dominant noise: Industrial noise audible from south. No noise audible from Enva.	NIGHT
00:10	**37**	43	40	34	Dominant noise: Industrial noise audible from south. No noise audible from Enva.	

Table 4

N4 - Monitoring Location

Start Time t = 30mins	L_{eq} (dBA)	L_1 (dBA)	L_{10} (dBA)	L_{90} (dBA)	Comments	
08:30	**50**	62	53	42	Dominant noise: industrial noise to the south and passing traffic. Traffic: approximately 30 cars and 12 vans. Enva is not audible at this location.	DAY
9:00	**50**	62	52	42	Dominant noise: industrial noise to the south and passing traffic. Traffic: approximately 20 cars and 8 vans. Enva is not audible at this location.	
9:30	**51**	63	54	42	Dominant noise: industrial noise to the south and passing traffic. Traffic: approximately 36 cars and 6 vans. Enva is not audible at this location.	
02:02	**42**	51	44	39	Dominant noise: industrial noise to the south and passing traffic. Traffic: approximately 18 cars. Enva is not audible at this location. Occasional horn from train.	NIGHT
02:32	**42**	50	43	38	Dominant noise: industrial noise to the south and passing traffic. Traffic: approximately 18 cars. Enva is not audible at this location. Occasional horn from train.	

Table 5

N5 - Monitoring Location

Start Time t = 30mins	L_{eq} (dBA)	L_1 (dBA)	L_{10} (dBA)	L_{90} (dBA)	Comments	
10:30	**51**	60	52	47	Industrial noise to the south is dominant noise. Audible Enva activity onsite: vehicle movement, forklift, occasional banging.	DAY
11:00	**60**	67	60	49	Industrial noise to the south is dominant noise. Audible Enva activity onsite: vehicle movement, forklift, occasional banging. 2 HGVs entered the Enva site.	
11:30	**53**	60	54	48	Industrial noise to the south is dominant noise. Audible Enva activity onsite: vehicle movement, forklift, occasional banging, hand held tools.	
00:50	**38**	47	41	31	Industrial noise to the south and traffic to the west dominant. No noise audible from Enva.	NIGHT
01:20	**35**	42	35	29	Industrial noise to the south and traffic to the west dominant. No noise audible from Enva.	

In accordance with their waste licence, Enva are required to comply with maximum noise limit values. Criterion noise levels are set for day and night time, for noise measured at Noise Sensitive Locations (NSLs). The criterion noise levels are presented in Schedule C of the licence as follows:

Day *55 dB(A) LAeq(30 minutes)*

Night *45 dB(A) LAeq(30 minutes)*

Section 7.7.1 states that noise from the facility should not exceed this level by more than 2dB(A).

7.1.1 Noise from the activity shall not give rise to sound pressure levels (LAeq 30min) measured at noise sensitive locations which exceed the limit value(s) by more than 2dB(A).

Noise levels were below the criterion levels at the boundary locations. Therefore the noise attributable to Enva at a noise sensitive locations beyond the boundary locations in each of these directions would be less than the criterion values set out in their licence.

There was no noise audible from Enva at the noise sensitive location, N4. This location is on the corner of Knockmay Road and Marian Avenue. The noise levels measured at this location were within the criterion levels for day and night. An L_{eq} noise level of 60dB(A) was measured at N5 during the daytime survey during one of the sampling periods. It was noted that 2 HGVs entered the Enva site and passed close to N5 (approx. 20 m) during this sampling period. The HGVs had a very significant impact on the 30 minute Leq noise level. This location is a deserted hauling site and no longer a noise sensitive location. The nearest noise sensitive location in that direction is approximately 200 meters on the opposite side of the railway tracks. The Inverse Square Law can be used to calculate the expected reduction in noise levels as one moves away from a given noise source, which is assumed to radiate uniformly in all directions. Using the daytime L_{eq} of 60dB(A) measured at N5, the noise attributable to Enva would be expected to be reduced to approximately 42 dB(A) at the nearest NSL, due to distance attenuation alone. This is well below the criterion levels.

Section 6.7 of the company's licence states that

> *"There shall be no clearly audible tonal component or impulsive component in the noise emissions from the activity at the noise sensitive locations."*

The noise was perceived at each of the monitoring locations to investigate the presence of tones. No tones were subjectively identified. Using the sound level meter, one third octave band analysis of the noise was also carried out at the boundary locations, where noise from Enva is audible. No tones were identified using the one third octave band analysis method. The one third octave band analysis is presented in Appendix IV.

APPENDIX I

Methodology

METHODOLOGY

The methodology of the survey was based upon procedures set out in the International Standard, ISO 1996-2:2007 (Acoustics – description, measurement and assessment of environmental noise Part 2: Determination of Environmental Noise Levels.). The survey was carried out in accordance with EPA published document *(NG4) Guidance Note for Noise: Licence Applications, Surveys and Assessments in Relation to Scheduled Activities.*

Environmental noise levels were determined by using a Pulsar Model 33 , Type 1 Real Time Sound Level Meter, with half inch condenser microphone. The instrumentation was calibrated directly before and after the noise measurements. Details of the instrumentation and external calibration are presented in Appendix II of this report. A series of 1/3 Octave Band level measurements were simultaneously taken using the Sound Level Analyser and this data was used to evaluate the presence of tones. This analysis is presented in Appendix IV.

Results reported were determined using the fast response, A-Weighting (ref. 20 μPa) and are rounded off to the nearest whole decibel. Monitoring was conducted in relatively calm, dry weather conditions during the day (08:00 – 22:00) and night (22:00 – 08:00). Throughout the monitoring, the microphone was situated 1.5 m above ground level, away from any reflective surfaces. The monitoring equipment was manned throughout the sampling intervals and comments were recorded in order to aid the interpretation of the results.

During the survey air temperature and humidity measurements were undertaken using a Delta Ohm Hygrometer HD 8501 H. Wind speed measurements were taken using a TSI VelociCalc and the wind direction was noted using a compass. Details of the weather conditions are presented in the Table below.

Summary of Weather Conditions

Date/Time	Air Temperature °C	Relative Humidity %	Wind Direction	Wind Speed m/s	General Conditions
04.09.2013 09:00	12	82	ESE	2.8	Dry – no precipitation.
04.09.2013 11:00	14	72	SSE	2.1	Dry – no precipitation.
04.09.2013 13:00	20	41	SE	3.0	Dry – no precipitation.
04.09.2013 23:00	14	68	SW	3.6	Dry – no precipitation.
05.09.2013 01:00	13	70	WSE	3.2	Dry – no precipitation.

The Inverse Square Law can be used to calculate the expected reduction in noise levels as one moves away from a given noise source, which is assumed to radiate uniformly in all directions. The Inverse Square Law states that as one doubles the distance from a source, a reduction of 6 dB is achieved as follows:

$$\mathbf{L_{p2} = L_{p1} - 20\ Log\ ({}^{R2}/{}_{R1})}$$

where:

- L_{p1} is the measured reference Sound Pressure Level (SPL) at a distance of R1 metres from the source.
- L_{p2} is the calculated SPL at a distance of R2 metres from the source.

APPENDIX II

Instrumentation and External Calibration Details

INSTRUMENTATION AND EXTERNAL CALIBRATION DETAILS

Instrumentation:

Pulsar Model 33 , Type 1 Real Time Sound Level Meter, with half inch condenser microphone, Serial Number T223417. On-site calibrations were carried out before and after sampling with a Pulsar Calibrator – model 100B, Serial Number: 42171.

B&K Type 2250 Light, Type 1 Real Time Sound Level Meter, with half inch condenser microphone, Serial Number 2754170. On-site calibrations were carried out before and after sampling with a Pulsar Calibrator – model 100B, Serial Number: 42171.

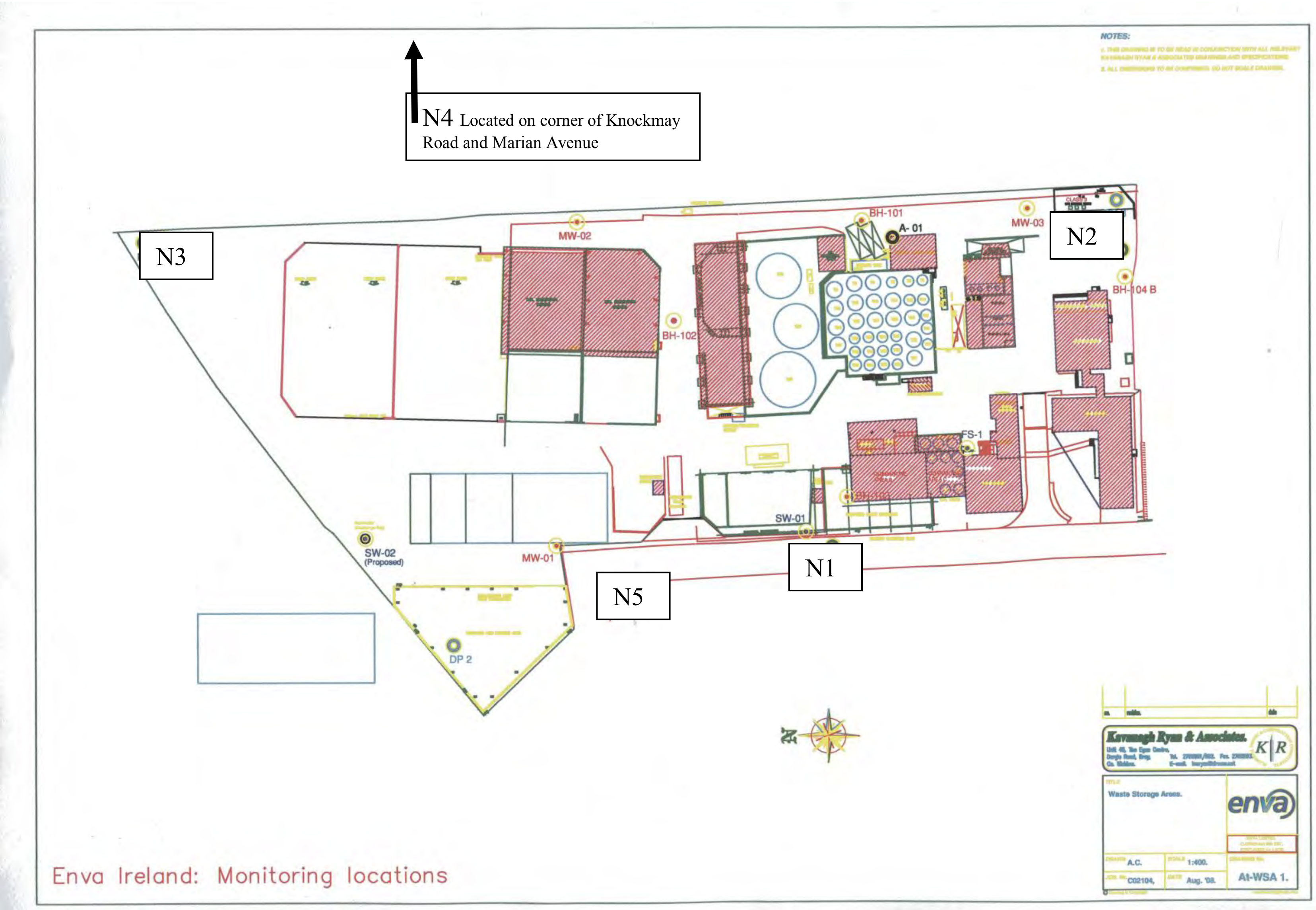
External Calibration:

External Calibration of instrumentation was undertaken by Pulsar Instruments Plc:

Unit	Calibration Date	Calibration Certificate Number
Pulsar Model 33 Sound Level Meter Serial No. T223417	7th June 2012	197623
B&K Type 2250 Light Sound Level Meter Serial No. T223417	20th July 2012	2754170
Calibrator – Serial No. 42171	7th June 2012	197624

APPENDIX III

Site Plan showing Noise Monitoring Positions


N4 Located on corner of Knockmay Road and Marian Avenue
N3
N2
N1
N5
MW-02
MW-03
MW-01
BH-101
BH-102
BH-104 B
A- 01
FS-1
SW-01
SW-02
(Proposed)
DP 2
NOTES:
Kavanagh Ryan & Associates.
Waste Storage Areas.
enva
A.C.
1:400.
C02104.
Aug. '08.
At-WSA 1.
Enva Ireland: Monitoring locations

APPENDIX IV

1/3 Octave Band Analysis (OBA)

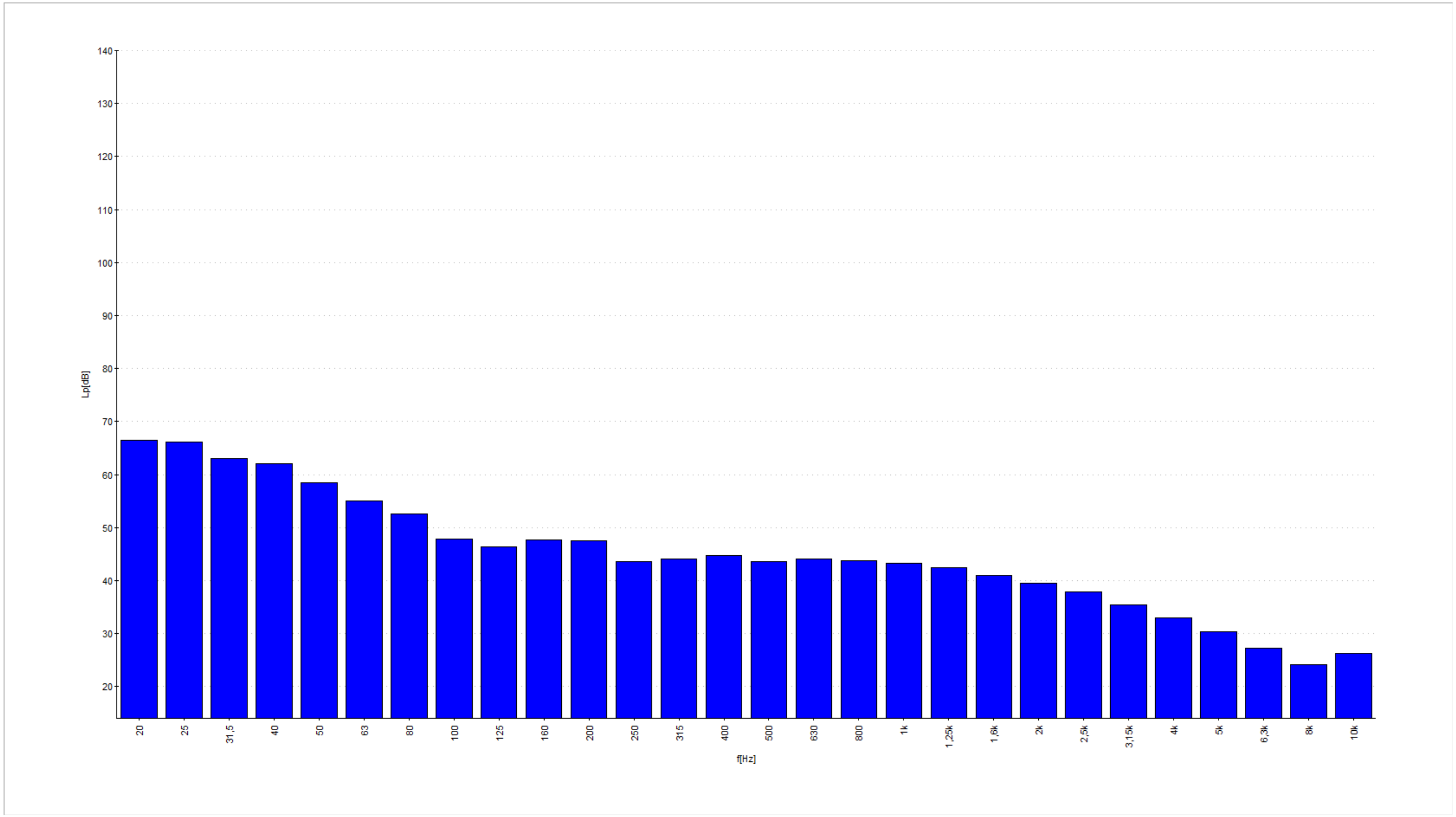


Figure 1: N 1 - Daytime

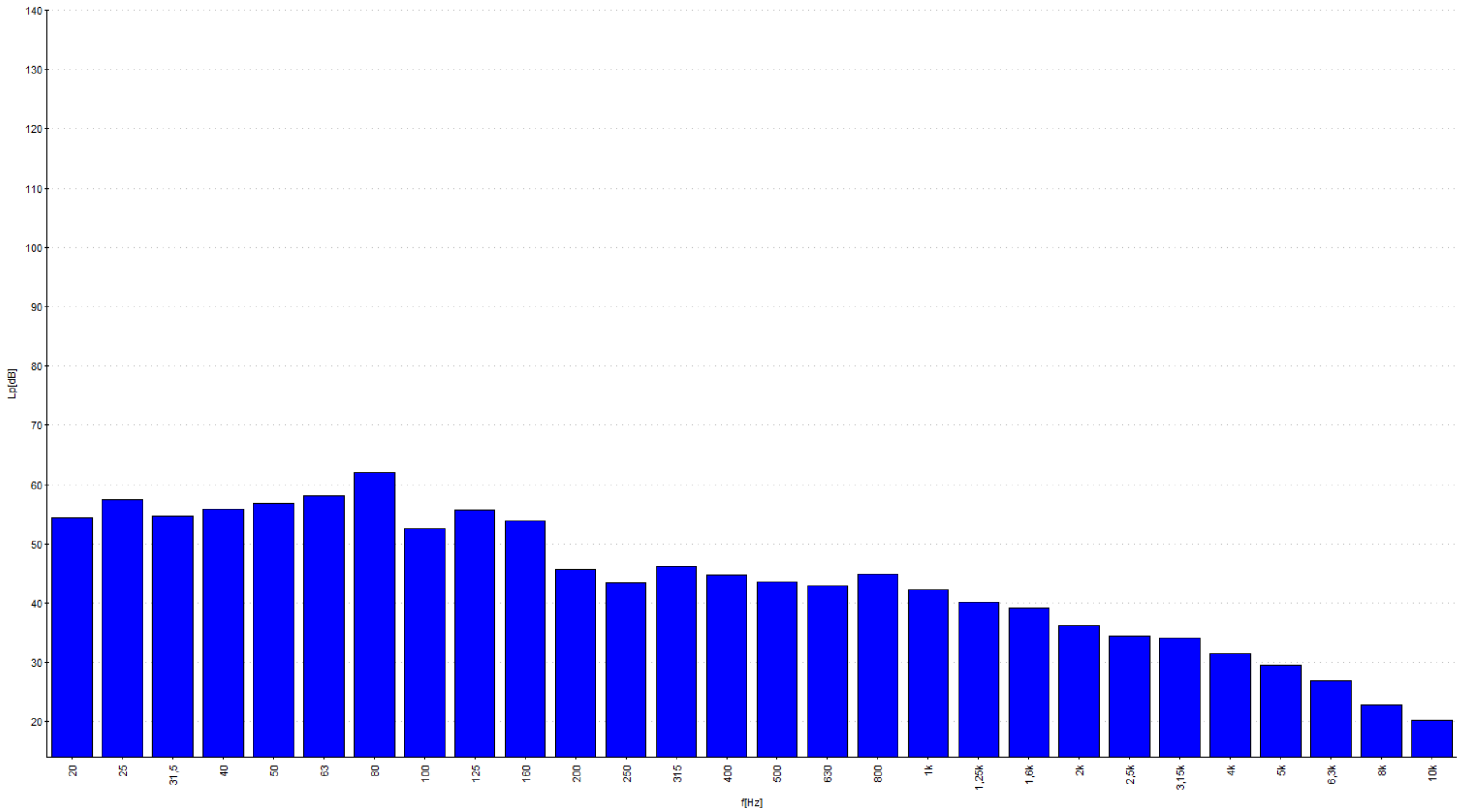


Figure 2: N 2 - Daytime

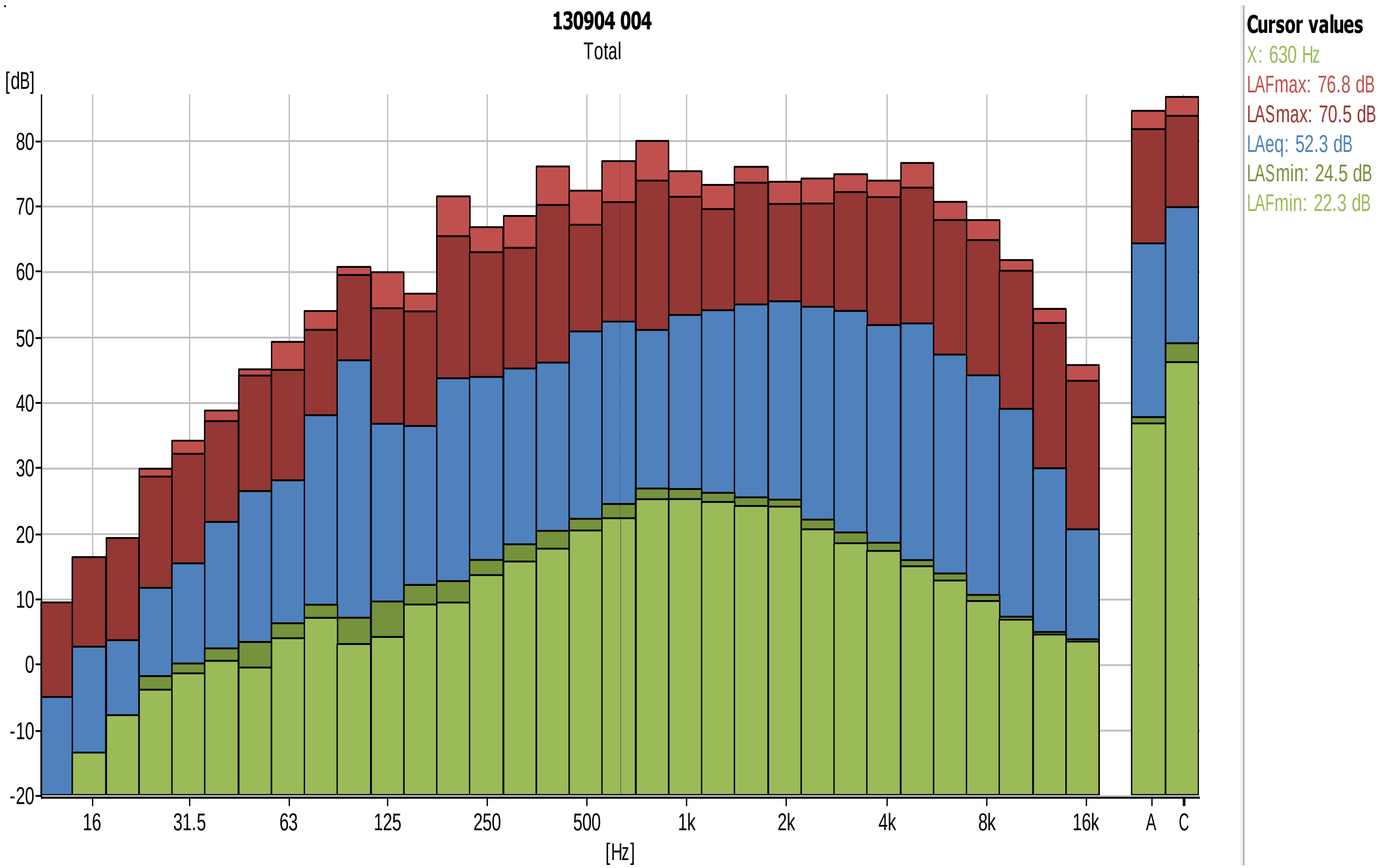


Figure 3: N 3 - Daytime

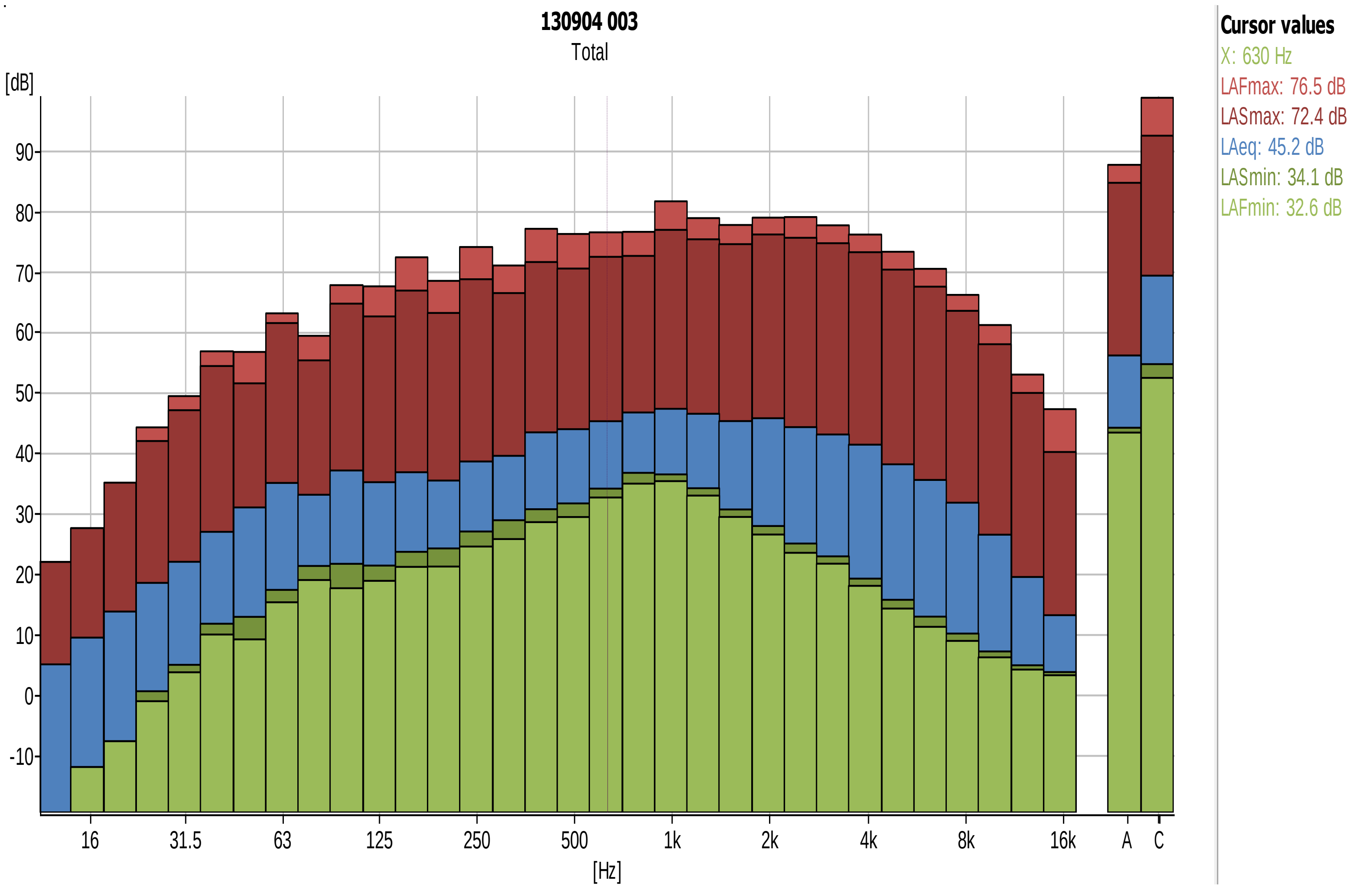


Figure 4: N 5 – Day time

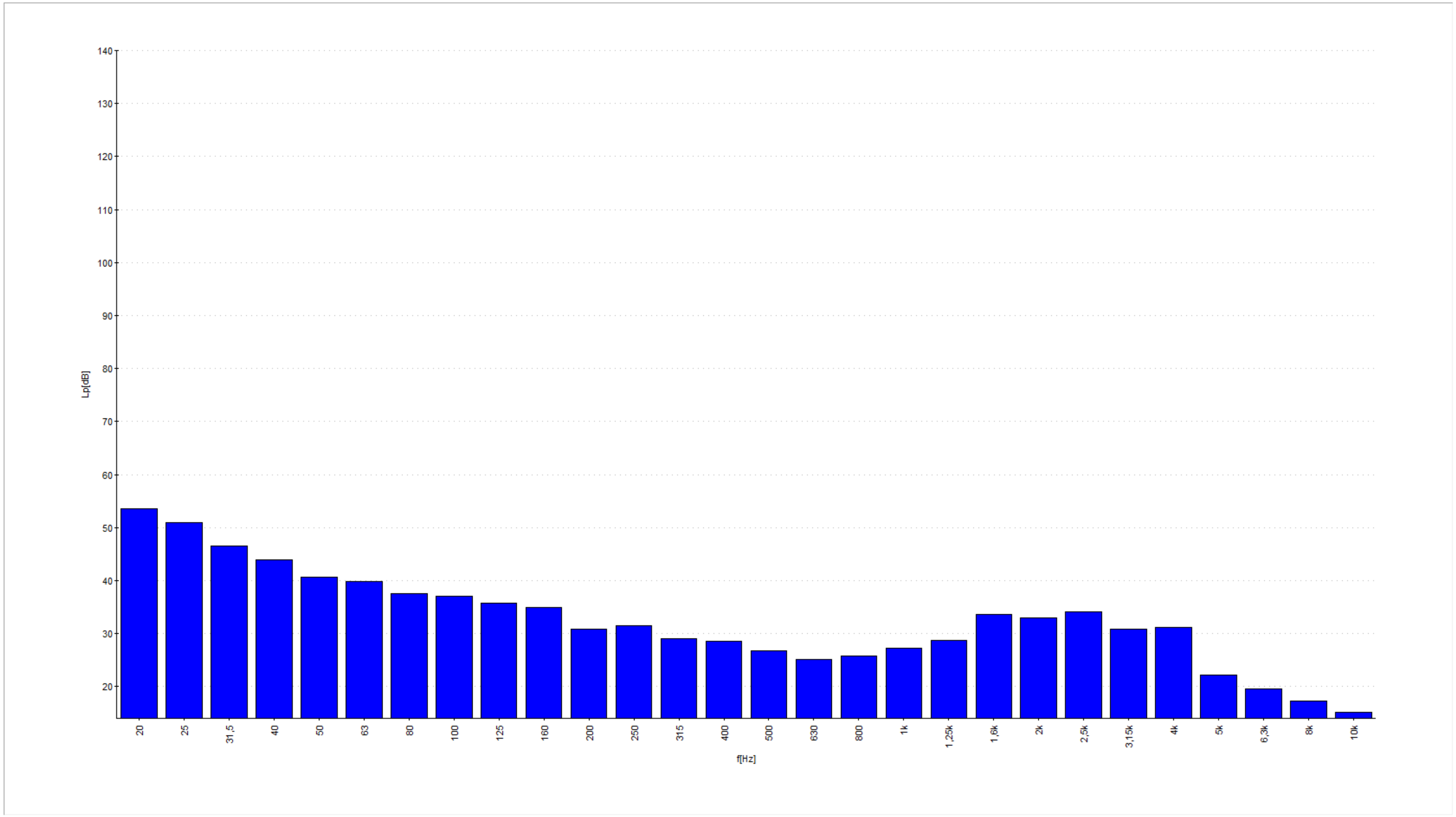


Figure 5: N 1 – Night time

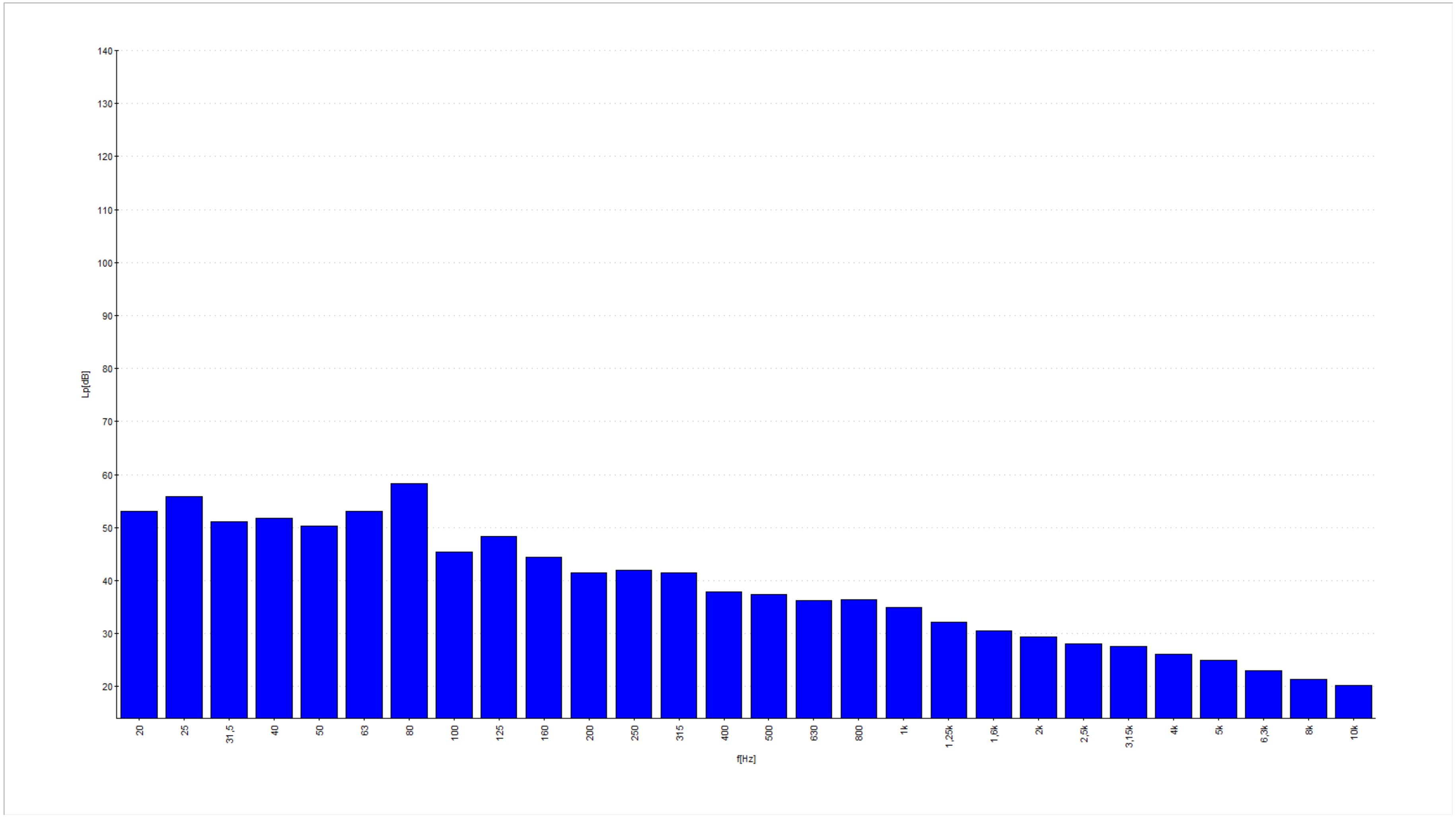


Figure 6: N 2 – Night time

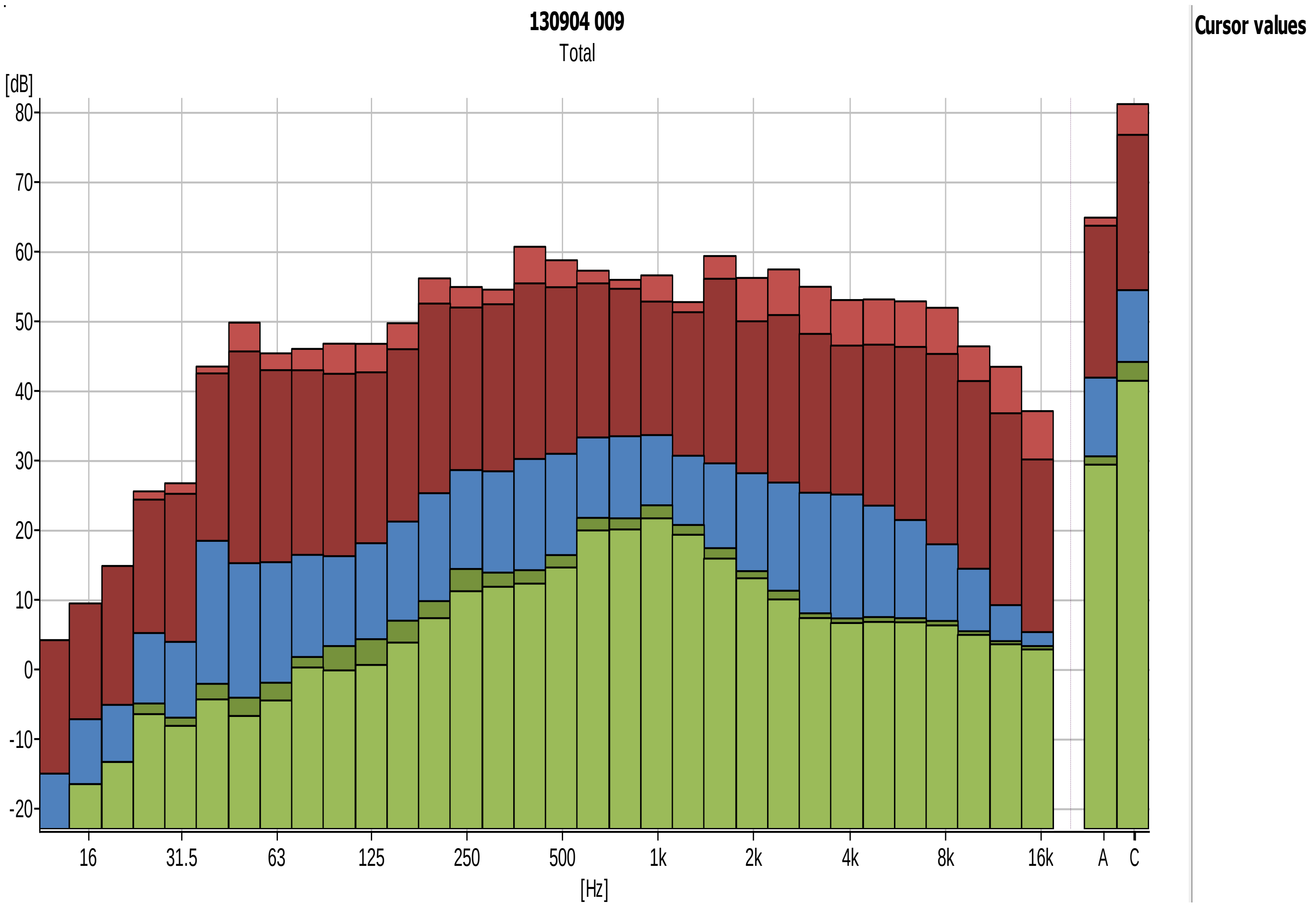


Figure 7: N 3 – Night time

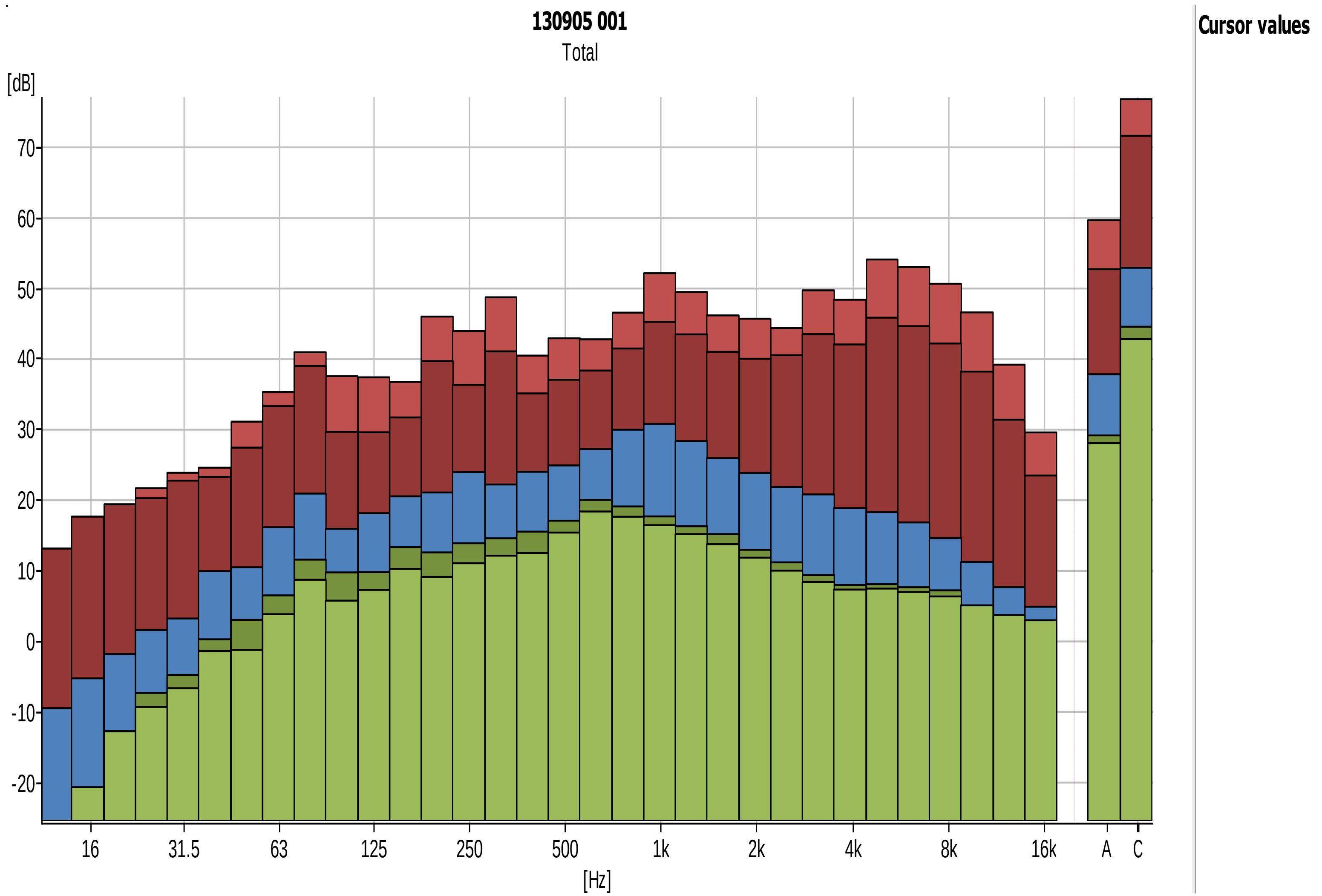
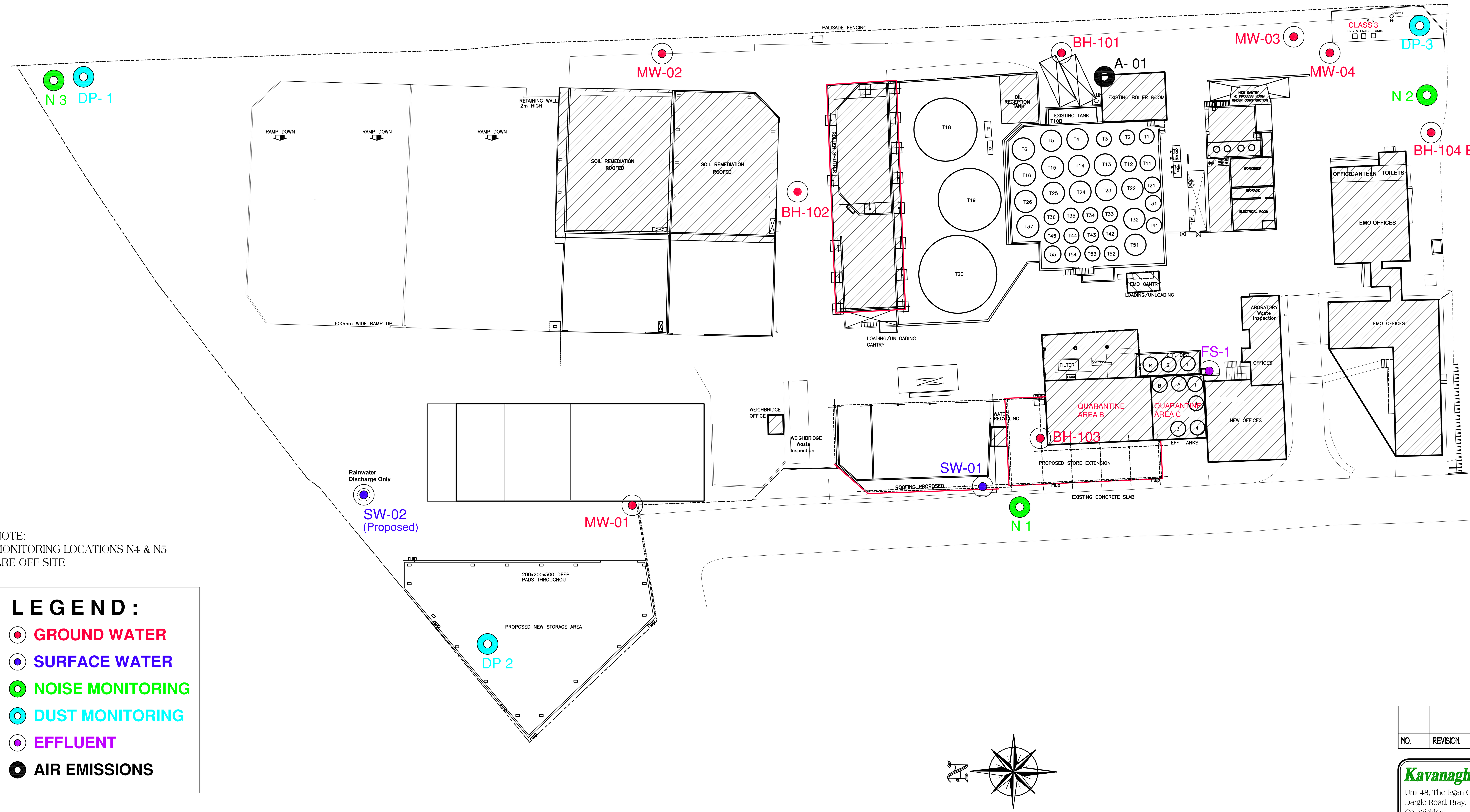


Figure 8: N 5 – Night time

Appendix 5

NOTES:

1. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL RELEVANT KAVANAGH RYAN & ASSOCIATES DRAWINGS AND SPECIFICATIONS.
2. ALL DIMENSIONS TO BE CONFIRMED. DO NOT SCALE DRAWING.



NOTE:
MONITORING LOCATIONS N4 & N5
ARE OFF SITE

LEGEND:

- GROUND WATER
- SURFACE WATER
- NOISE MONITORING
- DUST MONITORING
- EFFLUENT
- AIR EMISSIONS

NO.	REVISION.	DATE

Kavanagh Ryan & Associates.
Unit 48, The Egan Centre,
Dargle Road, Bray,
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Tel. 2765661. Fax. 2765663.
E-mail. kmryan@eircom.net

CLIENT
Waste Storage Areas.

ENVA LIMITED, CLONMINAM IND. EST., PORTLAOISE, Co. LAOIS.

TITLE

DRAWN A.C.	SCALE 1:400.	DRAWING No.
JOB. No. C02104,	DATE Aug. '08.	At-WSA 1.

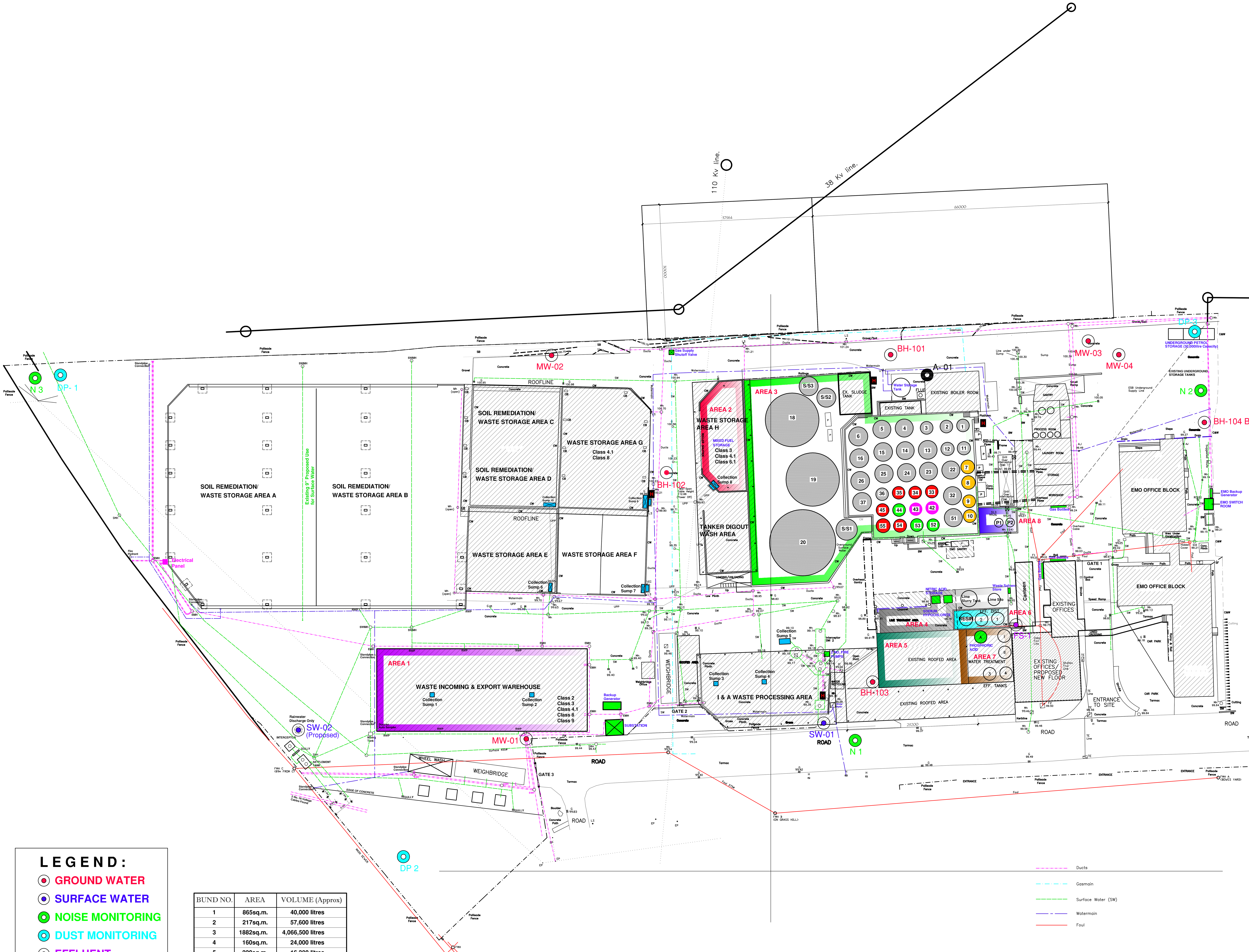
Enva Ireland: Monitoring locations

Appendix 6

NOTES:

1. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL RELEVANT KAVANAGH RYAN & ASSOCIATES DRAWINGS AND SPECIFICATIONS.

2. ALL DIMENSIONS TO BE CONFIRMED. DO NOT SCALE DRAWING.



LEGEND:

- GROUND WATER
- SURFACE WATER
- NOISE MONITORING
- DUST MONITORING
- EFFLUENT
- AIR EMISSIONS

BUND NO.	AREA	VOLUME (Approx)
1	865sq.m.	40,000 litres
2	217sq.m.	57,600 litres
3	1882sq.m.	4,066,500 litres
4	160sq.m.	24,000 litres
5	220sq.m.	16,380 litres
6	49sq.m.	21,400 litres
7	140sq.m.	11,400 litres
8	43sq.m.	43,263 litres

OIL TANK REGISTER

TANK NO.	GRADE	CAPACITY	FLASH POINT
1	11 LS	50,000 Ltr.	Above 38°
2	11 LS	50,000 Ltr.	Above 38°
3	11 LS	50,000 Ltr.	Above 38°
4	11 LS	100,000 Ltr.	Above 38°
5	11 LS	100,000 Ltr.	Above 38°
6	11 LS	140,000 Ltr.	Above 38°
7	Waste Oil	60,000 Ltr.	Above 36°
8	Waste Oil	60,000 Ltr.	Above 36°
9	Waste Oil	60,000 Ltr.	Above 36°
10	Waste Oil	60,000 Ltr.	Above 36°
11	Waste Oil	50,000 Ltr.	Above 36°
12	Waste Oil	50,000 Ltr.	Above 36°
13	Waste Oil	100,000 Ltr.	Above 36°
14	Waste Oil	100,000 Ltr.	Above 36°
15	Waste Oil	100,000 Ltr.	Above 36°
16	Waste Oil	140,000 Ltr.	Above 36°
18	Waste Oil	1,000,000 Ltr.	Above 36°
19	Waste Oil	1,000,000 Ltr.	Above 36°
20	11 LS	2,000,000 Ltr.	Above 38°
22	Waste Oil	100,000 Ltr.	Above 36°
23	Waste Oil	100,000 Ltr.	Above 36°
24	Waste Oil	100,000 Ltr.	Above 36°
25	Waste Oil	100,000 Ltr.	Above 36°
26	Waste Oil	140,000 Ltr.	Above 36°
32	Waste Oil	100,000 Ltr.	Above 36°
33	Kero	50,000 Ltr.	Above 36°
34	Kero	48,000 Ltr.	Above 36°
35	Kero	50,000 Ltr.	Above 36°
36	Waste Oil	50,000 Ltr.	Above 36°
37	Waste Oil	140,000 Ltr.	Above 36°
42	Derv	50,000 Ltr.	Above 56°
43	Derv	50,000 Ltr.	Above 56°
44	Gas Oil	50,000 Ltr.	Above 56°
45	Kero	50,000 Ltr.	Above 36°
51	14 LS	100,000 Ltr.	Above 56°
52	Gas Oil	50,000 Ltr.	Above 36°
53	Gas Oil	50,000 Ltr.	Above 56°
54	Kero	50,000 Ltr.	Above 36°
55	Kero	50,000 Ltr.	Above 36°
S/S1	Waste Oil	200,000 Ltr.	Above 36°
S/S2	Waste Oil	200,000 Ltr.	Above 36°
S/S3	Waste Oil	200,000 Ltr.	Above 36°
UGST	Petrol	30,000 Ltr.	Above -40°
P1	Waste Oil	10,000 Ltr.	Above 36°
P2	Waste Oil	10,000 Ltr.	Above 36°

NO.	REVISION.	DATE
I.	MW-04 ADDED.	16/03/'12.
H.	TANK LAYOUT & GENERAL ADDITIONS.	09/03/'11.
G.	DRAINAGE UPDATED.	19/06/'09.
F.	TK. 10 added, 21, 31 & 41 renamed	11/12/'07.
E.	DUCTING ADDED	23/10/'07.
D.	TANK TABLE AND NOTES ADDED	16/08/'06.
C.	DRAINAGE&ROOFED AREAS ADDED	23/05/'06.
B.	DRAINAGE ADDED	23/11/'05.
A.	DRAWING REVISED TO LATEST LAYOUT	15/08/'05.

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PLANNING, DESIGN & CONSTRUCTION CONSULTANTS.

CLIENT

**Enva Ltd.,
Clonminam Ind. Est.,
Portlaoise,
Co. Laois.**

ENVA LIMITED,
CLONMINAM IND. EST.,
PORTLAOISE, Co. LAOIS.

TITLE

DRAWN A.C.	*SCALE* 1:400.	*DRAWING No.* Site-NR01.
JOB. No. C05015.	*DATE* Sept. '03.	

www.kavanaghryan.com

Appendix 7

CERTIFICATE OF CALIBRATION

Customer	***Enva Portlaoise***	**Contract**	*141101*
Customer Instrument ID	HE 2 Temp	Location	Tank Farm
Device Description	PT100 Temperature Probe	Calibration Range	0 – 150 Deg C
Calibration Date	12th March 2014	Interval	12 month
Instrument Accuracy	+ or – 0.1 Dec C	Calibration Due Date	March 2015

Loop Calibration Results

INPUT	AS FOUND	AS LEFT	DEVIATION
0.0	0.2	0.2	+0.2
25.0	25.1	25.1	+0.1
50.0	50.4	50.4	+0.4
75.0	75.4	75.4	+0.4
100.0	100.5	100.5	+0.5

Instrument Calibration Results

75.0	74.5	74.5	-0.5

Comment:

Calibration Equipment

Manufacturer	**Model**	**Serial Number.**	**Calibration Date**	**Certificate No.**
Eurolec	PC Temp PT2	84/PT2/100	10th Feb 2014	11861
Time Electronics	1042 Resistance	1203B2	10th Feb 2014	11860

DECLARATION: The calibration references used can be traced back to recognised national standards.

Tested By: Signature	Date 12/3/14	**Accepted By:** Signature	Date 18/3/14

SCADA IRELAND LTD

Valentia Place, Newcastle, Co Down

Tel: 028 43725970 Mobile 07767 272203 email: scadaireland@aolcom

CERTIFICATE OF CALIBRATION

Customer	***Enva Portlaoise***	**Contract**	***141101***
Customer Instrument ID	HE 1 Temp	Location	Tank Farm
Device Description	PT100 Temperature Probe	Calibration Range	0 – 150 Deg C
Calibration Date	12th March 2014	Interval	12 month
Instrument Accuracy	+ or – 0.1 Dec C	Calibration Due Date	March 2015

Loop Calibration Results

INPUT	AS FOUND	AS LEFT	DEVIATION
0.0	0.6	0.6	+0.6
25.0	25.5	25.5	+0.5
50.0	50.6	50.6	+0.6
75.0	75.6	75.6	+0.6
100.0	100.7	100.7	+0.7

Instrument Calibration Results

75.0	74.9	74.9	-0.1

Comment:

Calibration Equipment

Manufacturer	**Model**	**Serial Number**	**Calibration Date**	**Certificate No.**
Eurolec	PC Temp PT2	84/PT2/100	10th Feb 2014	11861
Time Electronics	1042 Resistance	1203B2	10th Feb 2014	11860

DECLARATION: The calibration references used can be traced back to recognised national standards.

Tested By: Signature		Date 12/3/14	
Accepted By: Signature		Date 18/3/14	

SCADA IRELAND LTD

Valentia Place, Newcastle, Co Down

Tel: 028 43725970 Mobile 07767 272203 email: scadaireland@aolcom

CERTIFICATE OF CALIBRATION

Customer	***Enva Portlaoise***	**Contract**	***141101***
Customer Instrument ID	V20 Temp	Location	Tank Farm
Device Description	PT100 Temperature Probe	Calibration Range	0 – 150 Deg C
Calibration Date	12th March 2014	Interval	12 month
Instrument Accuracy	+ or – 0.1 Dec C	Calibration Due Date	March 2015

Loop Calibration Results

INPUT	AS FOUND	AS LEFT	DEVIATION
0.0	0.3	0.3	+ 0.3
25.0	25.2	25.2	+ 0.2
50.0	50.4	50.4	+ 0.4
75.0	75.4	75.4	+ 0.4
100.0	100.5	100.5	+ 0.5

Instrument Calibration Results

75.0	74.8	74.8	-0.2

Comment: New probe fitted and programmed February 2014. High level sounder and SCADA screen Alarm found working OK.

Calibration Equipment

Manufacturer	**Model**	**Serial Number.**	**Calibration Date**	**Certificate No.**
Eurolec	PC Temp PT2	84/PT2/100	10th Feb 2014	11861
Time Electronics	1042 Resistance	1203B2	10th Feb 2014	11860

DECLARATION: The calibration references used can be traced back to recognised national standards.

Tested By: Signature [signature]	Date 12/3/14	**Accepted By:** Signature [signature]	Date 13/3/14

SCADA IRELAND LTD

Valentia Place, Newcastle, Co Down

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CERTIFICATE OF CALIBRATION

Customer	***Enva Portlaoise***	**Contract**	***141101***
Customer Instrument ID	V3 Temp	Location	Tank Farm
Device Description	PT100 Temperature Probe	Calibration Range	0 – 150 Deg C
Calibration Date	12th March 2014	Interval	12 month
Instrument Accuracy	+ or – 0.1 Dec C	Calibration Due Date	March 2015

Loop Calibration Results

INPUT	AS FOUND	AS LEFT	DEVIATION
0.0	0.3	0.3	+ 0.3
25.0	25.3	25.3	+ 0.3
50.0	50.4	50.4	+ 0.4
75.0	75.4	75.4	+ 0.4
100.0	100.5	100.5	+ 0.5

Instrument Calibration Results

75.0	74.4	74.4	-0.6

Comment: New probe fitted and programmed Oct 2013. High level sounder and SCADA screen Alarm found working OK.

Calibration Equipment

Manufacturer	**Model**	**Serial Number.**	**Calibration Date**	**Certificate No.**
Eurolec	PC Temp PT2	84/PT2/100	10th Feb 2014	11861
Time Electronics	1042 Resistance	1203B2	10th Feb 2014	11860

DECLARATION: The calibration references used can be traced back to recognised national standards.

Tested By: Signature	Date 12/3/14	**Accepted By:** Signature	Date 18/3/14

SCADA IRELAND LTD

Valentia Place, Newcastle, Co Down

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CERTIFICATE OF CALIBRATION

Customer	***Enva Portlaoise***	**Contract**	***I41101***
Customer Instrument ID	UC10 Top Temp	Location	Tank Farm
Device Description	PT100 Temperature Probe	Calibration Range	0 – 150 Deg C
Calibration Date	12th March 2014	Interval	12 month
Instrument Accuracy	+ or – 0.1 Dec C	Calibration Due Date	Marxh 2015

Loop Calibration Results

INPUT	AS FOUND	AS LEFT	DEVIATION
0.0	0.2	0.2	+ 0.2
25.0	25.3	25.3	+ 0.3
50.0	50.4	50.4	+ 0.4
75.0	75.3	75.3	+ 0.3
100.0	100.5	100.5	+ 0.5

Instrument Calibration Results

75.0	74.9	74.9	-0.1

Comment: High level sounder and SCADA screen Alarm found working OK

Calibration Equipment

Manufacturer	**Model**	**Serial Number**	**Calibration Date**	**Certificate No.**
Eurolec	PC Temp PT2	84/PT2/100	10th Feb 2014	11861
Time Electronics	1042 Resistance	1203B2	10th Feb 2014	11860

DECLARATION: The calibration references used can be traced back to recognised national standards.

Tested By: Signature	Date 12/3/14	**Accepted By:** Signature	Date 18/3/14

SCADA IRELAND LTD
Valentia Place, Newcastle, Co Down
Tel: 028 43725970 Mobile 07767 272203 email: scadaireland@aolcom

CERTIFICATE OF CALIBRATION

Customer	***Enva Portlaoise***	**Contract**	***I41101***
Customer Instrument ID	UC10 Bottom Temp	Location	Tank Farm
Device Description	PT100 Temperature Probe	Calibration Range	0 – 150 Deg C
Calibration Date	12th March 2014	Interval	12 month
Instrument Accuracy	+ or – 0.1 Dec C	Calibration Due Date	March 2015

Loop Calibration Results

INPUT	AS FOUND	AS LEFT	DEVIATION
0.0	+ 0.3	+ 0.3	+ 0.3
25.0	25.4	25.4	+ 0.4
50.0	50.5	50.5	+ 0.5
75.0	75.5	75.5	+ 0.5
100.0	100.6	100.6	+ 0.6

Instrument Calibration Results

75.0	74.4	74.4	-0.6

Comment: High level sounder and SCADA screen Alarm found working OK

Calibration Equipment

Manufacturer	**Model**	**Serial Number**	**Calibration Date**	**Certificate No.**
Eurolec	PC Temp PT2	84/PT2/100	10th Feb 2014	11861
Time Electronics	1042 Resistance	1203B2	10th Feb 2014	11860

DECLARATION: The calibration references used can be traced back to recognised national standards.

Tested By: Signature [signature] Date 12/3/14	**Accepted By:** Signature [signature] Date 18/3/14

SCADA IRELAND LTD

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CERTIFICATE OF CALIBRATION

Customer	***Enva Portlaoise***	**Contract**	***141101***
Customer Instrument ID	UC09 Bottom Temp	Location	Tank Farm
Device Description	PT100 Temperature Probe	Calibration Range	0 – 150 Deg C
Calibration Date	12th March 2014	Interval	12 month
Instrument Accuracy	+ or – 0.1 Dec C	Calibration Due Date	March 2015

Loop Calibration Results

INPUT	AS FOUND	AS LEFT	DEVIATION
0.0	0.4	0.4	+0.4
25.0	25.5	25.5	+0.5
50.0	50.6	50.6	+0.6
75.0	75.4	75.4	+0.4
100.0	100.8	100.8	+0.8

Instrument Calibration Results

75.0	74.5	74.5	-0.5

Comment: High level sounder and SCADA screen Alarm found working OK

Calibration Equipment

Manufacturer	**Model**	**Serial Number**	**Calibration Date**	**Certificate No.**
Eurolec	PC Temp PT2	84/PT2/100	10th Feb 2014	11861
Time Electronics	1042 Resistance	1203B2	10th feb 2014	11860

DECLARATION: The calibration references used can be traced back to recognised national standards.

Tested By: Signature [signature]	Date 12/3/14	**Accepted By:** Signature [signature]	Date 18/3/14

SCADA IRELAND LTD
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CERTIFICATE OF CALIBRATION

Customer	***Enva Portlaoise***	**Contract**	*I41101*
Customer Instrument ID	SS1 Temp	Location	Tank Farm
Device Description	PT100 Temperature Probe	Calibration Range	0 – 150 Deg C
Calibration Date	12th March 2014	Interval	12 month
Instrument Accuracy	+ or – 0.1 Dec C	Calibration Due Date	March 2015

Loop Calibration Results

INPUT	AS FOUND	AS LEFT	DEVIATION
0.0	20.3	0.2	+ 0.2
25.0	48.3	25.2	+ 0.2
50.0	76.4	50.5	+ 0.5
75.0	93.2	75.7	+ 0.7
100.0	118.6	100.6	+ 0.6

Instrument Calibration Results

75.0	75.1	75.1	+ 0.1

Comment: PT100 transmitter head found faulty and replaced.

Calibration Equipment

Manufacturer	Model	Serial Number.	Calibration Date	Certificate No.
Eurolec	PC Temp PT2	84/PT2/100	10th Feb 2014	11861
Time Electronics	1042 Resistance	1203B2	10th Feb 2014	11860

DECLARATION: The calibration references used can be traced back to recognised national standards.

Tested By: Signature		Date 12/3/14	
Accepted By: Signature		Date 18/3/14	

SCADA IRELAND LTD

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CERTIFICATE OF CALIBRATION

Customer	***Enva Portlaoise***	**Contract**	*141101*
Customer Instrument ID	SST 2 Temp	Location	Tank Farm
Device Description	PT100 Temperature Probe	Calibration Range	0 – 150 Deg C
Calibration Date	12th March 2014	Interval	12 month
Instrument Accuracy	+ or – 0.1 Dec C	Calibration Due Date	March 2015

Loop Calibration Results

INPUT	AS FOUND	AS LEFT	DEVIATION
0.0	0.4	0.4	+ 0.4
25.0	26.5	26.5	+ 1.5
50.0	50.7	50.7	+ 0.7
75.0	75.2	75.2	+ 0.2
100.0	100.9	100.9	+ 0.9

Instrument Calibration Results

75.0	74.6	74.6	-0.4

Comment: High level sounder and SCADA screen Alarm found working OK.

Calibration Equipment

Manufacturer	**Model**	**Serial Number.**	**Calibration Date**	**Certificate No.**
Eurolec	PC Temp PT2	84/PT2/100	10th Feb 2014	11861
Time Electronics	1042 Resistance	1203B2	10th Feb 2014	11860

DECLARATION: The calibration references used can be traced back to recognised national standards.

Tested By: Signature	Date 12/3/14	**Accepted By:** Signature	Date 18/3/14

SCADA IRELAND LTD

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CERTIFICATE OF CALIBRATION

Customer	***Enva Portlaoise***	**Contract**	***141101***
Customer Instrument ID	SS3 Temp	Location	Tank Farm
Device Description	PT100 Temperature Probe	Calibration Range	0 – 150 Deg C
Calibration Date	12th March 2014	Interval	12 month
Instrument Accuracy	+ or – 0.1 Dec C	Calibration Due Date	March 2015

Loop Calibration Results

INPUT	AS FOUND	AS LEFT	DEVIATION
0.0	+ 0.6	+ 0.6	+ 0.6
25.0	25.6	25.6	+ 0.6
50.0	50.7	50.7	+ 0.7
75.0	75.8	75.8	+ 0.8
100.0	100.8	100.8	+ 0.8

Instrument Calibration Results

75.0	74.6	74.6	-0.4

Comment: High level sounder and SCADA screen Alarm found working OK

Calibration Equipment

Manufacturer	**Model**	**Serial Number**	**Calibration Date**	**Certificate No.**
Eurolec	PC Temp PT2	84/PT2/100	10th Feb 2014	11861
Time Electronics	1042 Resistance	1203B2	10th Feb 2014	11860

DECLARATION: The calibration references used can be traced back to recognised national standards.

Tested By: Signature	Date 12/3/14	**Accepted By:** Signature	Date 18/3/14

SCADA IRELAND LTD
Valentia Place, Newcastle, Co Down
Tel: 028 43725970 Mobile 07767 272203 email: scadaireland@aolcom

CERTIFICATE OF CALIBRATION

Customer	***Enva Portlaoise***	**Contract**	***I41101***
Customer Instrument ID	PFO 8	Location	Tank Farm
Device Description	PT100 Temperature Probe	Calibration Range	0 – 150 Deg C
Calibration Date	12th March 2014	Interval	12 month
Instrument Accuracy	+ or – 0.1 Dec C	Calibration Due Date	March 2015

Loop Calibration Results

INPUT	AS FOUND	AS LEFT	DEVIATION
0.0	0.4	0.4	+0.4
25.0	25.5	25.5	+0.5
50.0	50.7	50.7	+0.7
75.0	75.7	75.7	+0.7
100.0	100.8	100.8	+0.8

Instrument Calibration Results

75.0	74.6	74.6	-0.4

Comment: Instrument renamed and fitted to new PFO tank Dec 10

Calibration Equipment

Manufacturer	Model	Serial Number	Calibration Date	Certificate No.
Eurolec	PC Temp PT2	84/PT2/100	10th Feb 2014	11861
Time Electronics	1042 Resistance	1203B2	10th Feb 2014	11860

DECLARATION: The calibration references used can be traced back to recognised national standards.

Tested By: Signature [signature] Date 12/3/14	**Accepted By:** Signature [signature] Date 18/3/14

SCADA IRELAND LTD

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CERTIFICATE OF CALIBRATION

Customer	***Enva Portlaoise***	**Contract**	***141101***
Customer Instrument ID	V18 Top Temp	Location	Tank Farm
Device Description	PT100 Temperature Probe	Calibration Range	0 – 150 Deg C
Calibration Date	10th March 2014	Interval	12 month
Instrument Accuracy	+ or – 0.1 Dec C	Calibration Due Date	March 2015

Loop Calibration Results

INPUT	AS FOUND	AS LEFT	DEVIATION
0.0	+0.4	+0.4	+0.4
25.0	25.1	25.1	+0.1
50.0	50.3	50.3	+0.3
75.0	75.0	75.0	0
100.0	100.0	100.0	0
150.0			

Instrument Calibration Results

75.0	74.6	74.6	-0.4

Comments: High level sounder and SCADA screen Alarm found working OK.

Calibration Equipment

Manufacturer	**Model**	**Serial Number.**	**Calibration Date**	**Certificate No.**
Eurolec	PC Temp PT2	84/PT2/100	10th Feb 2014	11861
Time Electronics	1042 Resistance	1203B2	10th Feb 2014	11860

DECLARATION: The calibration references used can be traced back to recognised national standards.

Tested By: Signature	Date 12/3/14	**Accepted By:** Signature	Date 18/3/14

SCADA IRELAND LTD

Valentia Place, Newcastle, Co Down

Tel: 028 43725970 Mobile 07767 272203 email: scadaireland@aol.com

CERTIFICATE OF CALIBRATION

Customer	***Enva Portlaoise***	**Contract**	***141101***
Customer Instrument ID	PFO 7	Location	Tank Farm
Device Description	PT100 Temperature Probe	Calibration Range	0 – 150 Deg C
Calibration Date	12th March 2014	Interval	12 month
Instrument Accuracy	+ or – 0.1 Dec C	Calibration Due Date	March 2015

Loop Calibration Results

INPUT	AS FOUND	AS LEFT	DEVIATION
0.0	0.6	0.6	+0.6
25.0	25.6	25.6	+0.6
50.0	50.9	50.9	+0.9
75.0	75.8	75.8	+0.8
100.0	101.0	101.0	+1.0

Instrument Calibration Results

75.0	74.5	74.5	-0.5

Comment: High Level Sounder and SCADA screen Alarm Ok

Calibration Equipment

Manufacturer	**Model**	**Serial Number**	**Calibration Date**	**Certificate No.**
Eurolec	PC Temp PT2	84/PT2/100	10th Feb 2014	11861
Time Electronics	1042 Resistance	1203B2	10th Feb 2014	11860

DECLARATION: The calibration references used can be traced back to recognised national standards.

Tested By: Signature	Date 12/3/14	**Accepted By:** Signature	Date 08/3/14

SCADA IRELAND LTD

Valentia Place, Newcastle, Co Down

Tel: 028 43725970 Mobile 07767 272203 email: scadaireland@aolcom

CERTIFICATE OF CALIBRATION

Customer	***Enva Portlaoise***	**Contract**	***141101***
Customer Instrument ID	V18 Bottom	Location	Tank Farm
Device Description	PT100 Temperature Probe	Calibration Range	0 – 150 Deg C
Calibration Date	12th March 2014	Interval	12 month
Instrument Accuracy	+ or – 0.1 Dec C	Calibration Due Date	March 2015

Loop Calibration Results

INPUT	AS FOUND	AS LEFT	DEVIATION
0.0	+ 0.8	+ 0.8	+ 0.8
25.0	25.7	25.7	+ 0.7
50.0	50.4	50.4	+ 0.4
75.0	75.2	75.2	+ 0.2
100.0	100.3	100.3	+ 0.3

Instrument Calibration Results

75.0	74.6	74.6	- 0.4

Comment: High level sounder and SCADA screen Alarm found working OK

Calibration Equipment

Manufacturer	**Model**	**Serial Number**	**Calibration Date**	**Certificate No.**
Eurolec	PC Temp PT2	84/PT2/100	10th Feb 2014	11861
Time Electronics	1042 Resistance	1203B2	10th Feb 2014	11860

DECLARATION: The calibration references used can be traced back to recognised national standards.

Tested By: Signature	Date 12/3/14	**Accepted By:** Signature	Date 18/3/14

SCADA IRELAND LTD

Valentia Place, Newcastle, Co Down

Tel: 028 43725970 Mobile 07767 272203 email: scadaireland@aol.com

CERTIFICATE OF CALIBRATION

Customer	***Enva Portlaoise***	**Contract**	***141101***
Customer Instrument ID	V37 Temp	Location	Tank Farm
Device Description	PT100 Temperature Probe	Calibration Range	0 – 150 Deg C
Calibration Date	10th March 2014	Interval	12 month
Instrument Accuracy	+ or – 0.1 Dec C	Calibration Due Date	March 2015

Loop Calibration Results

INPUT	AS FOUND	AS LEFT	DEVIATION
0.0	+ 0.5	+ 0.5	+ 0.5
25.0	25.6	25.6	+ 0.6
50.0	50.5	50.5	+ 0.5
75.0	75.5	75.5	+ 0.5
100.0	100.5	100.5	+ 0.5

Instrument Calibration Results

75.0	74.4	74.4	-0.6

Comment: High level sounder and SCADA screen Alarm found working OK

Calibration Equipment

Manufacturer	**Model**	**Serial Number.**	**Calibration Date**	**Certificate No.**
Eurolec	PC Temp PT2	84/PT2/100	10th Feb 2014	11861
Time Electronics	1042 Resistance	1203B2	10th Feb 2014	11860

DECLARATION: The calibration references used can be traced back to recognised national standards.

Tested By: Signature Date 12/3/14	**Accepted By:** Signature Date 12/3/14

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Tel: 028 43725970 Mobile 07767 272203 email: scadaireland@aol.com

CERTIFICATE OF CALIBRATION

Customer	***Enva Portlaoise***	**Contract**	***141101***
Customer Instrument ID	V22 Temp	Location	Tank Farm
Device Description	PT100 Temperature Probe	Calibration Range	0 – 150 Deg C
Calibration Date	12th March 2014	Interval	12 month
Instrument Accuracy	+ or – 0.1 Dec C	Calibration Due Date	March 2015

Loop Calibration Results

INPUT	AS FOUND	AS LEFT	DEVIATION
0.0	+ 0.7	+ 0.7	+ 0.7
25.0	25.7	25.7	+ 0.7
50.0	50.7	50.7	+ 0.7
75.0	75.7	75.7	+ 0.7
100.0	100.7	100.7	+ 0.7

Instrument Calibration Results

75.0	74.4	74.4	-0.6

Comment: High Level sounder and screen alarm found working OK

Calibration Equipment

Manufacturer	**Model**	**Serial Number**	**Calibration Date**	**Certificate No.**
Eurolec	PC Temp PT2	84/PT2/100	10th Feb 2014	11861
Time Electronics	1042 Resistance	1203B2	10th Feb 2014	11860

DECLARATION: The calibration references used can be traced back to recognised national standards.

Tested By: Signature	Date 12/3/14	**Accepted By:** Signature	Date 18/3/14

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CERTIFICATE OF CALIBRATION

Customer	***Enva Portlaoise***	**Contract**	***141101***
Customer Instrument ID	V26 Temp	Location	Tank Farm
Device Description	PT100 Temperature Probe	Calibration Range	0 – 150 Deg C
Calibration Date	12th March 2014	Interval	12 month
Instrument Accuracy	+ or – 0.1 Dec C	Calibration Due Date	March 2015

Loop Calibration Results

INPUT	AS FOUND	AS LEFT	DEVIATION
0.0	+ 0.9	+ 0.9	+ 0.9
25.0	26.0	26.0	+ 1.0
50.0	51.1	51.1	+ 1.1
75.0	76.0	76.0	+ 1.0
100.0	101.0	101.0	+ 1.0

Instrument Calibration Results

75.0	74.6	74.6	-0.4

Comment: High level sounder and SCADA screen Alarm found working OK

Calibration Equipment

Manufacturer	Model	Serial Number.	Calibration Date	Certificate No.
Eurolec	PC Temp PT2	84/PT2/100	10th Feb 2014	11861
Time Electronics	1042 Resistance	1203B2	10th Feb 2014	11860

DECLARATION: The calibration references used can be traced back to recognised national standards.

Tested By: Signature	Date 12/3/14	**Accepted By:** Signature	Date 18/3/14

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CERTIFICATE OF CALIBRATION

Customer	***Enva Portlaoise***	**Contract**	***141101***
Customer Instrument ID	V16 Temp	Location	Tank Farm
Device Description	PT100 Temperature Probe	Calibration Range	0 – 150 Deg C
Calibration Date	12th March 2014	Interval	12 month
Instrument Accuracy	+ or – 0.1 Dec C	Calibration Due Date	March 2015

Loop Calibration Results

INPUT	AS FOUND	AS LEFT	DEVIATION
0.0	+ 0.8	+ 0.8	+ 0.8
25.0	25.6	25.6	+ 0.6
50.0	50.7	50.7	+ 0.7
75.0	75.5	75.5	+ 0.5
100.0	100.6	100.6	+ 0.6

Instrument Calibration Results

75.0	74.9	74.9	-0.1

Comment: High level sounder and SCADA screen Alarm found working OK

Calibration Equipment

Manufacturer	**Model**	**Serial Number.**	**Calibration Date**	**Certificate No.**
Eurolec	PC Temp PT2	84/PT2/100	10th Feb 2014	11861
Time Electronics	1042 Resistance	1203B2	10th Feb 2014	11860

DECLARATION: The calibration references used can be traced back to recognised national standards.

Tested By: Signature	Date 12/3/14	**Accepted By:** Signature	Date 12/3/14

SCADA IRELAND LTD
Valentia Place, Newcastle, Co Down
Tel: 028 43725970 Mobile 07767 272203 email: scadaireland@aol.com

CERTIFICATE OF CALIBRATION

Customer	***Enva Portlaoise***	**Contract**	***141101***
Customer Instrument ID	V15 Temp	Location	Tank Farm
Device Description	PT100 Temperature Probe	Calibration Range	0 – 150 Deg C
Calibration Date	12th March 2014	Interval	12 month
Instrument Accuracy	+ or – 0.1 Dec C	Calibration Due Date	March 2105

Loop Calibration Results

INPUT	AS FOUND	AS LEFT	DEVIATION
0.0	+ 0.3	+ 0.3	+ 0.3
25.0	25.3	25.3	+ 0.3
50.0	50.4	50.4	+ 0.4
75.0	75.4	75.4	+ 0.4
100.0	100.4	100.4	+ 0.4

Instrument Calibration Results

75.0	75.2	75.2	+ 0.2

Comment: High Level Sounder Alarm & SCADA screen Alarm found working OK

Calibration Equipment

Manufacturer	**Model**	**Serial Number.**	**Calibration Date**	**Certificate No.**
Eurolec	PC Temp PT2	84/PT2/100	10th Feb 2014	11861
Time Electronics	1042 Resistance	1203B2	10th Feb 2014	11860

DECLARATION: The calibration references used can be traced back to recognised national standards.

Tested By: Signature	[signature]	Date	12/3/14
Accepted By: Signature	[signature]	Date	18/3/14

SCADA IRELAND LTD

Valentia Place, Newcastle, Co Down

Tel: 028 43725970 Mobile 07767 272203 email: scadaireland@aol.com

CERTIFICATE OF CALIBRATION

Customer	***Enva Portlaoise***	**Contract**	***I41101***
Customer Instrument ID	V14 Temp	Location	Tank Farm
Device Description	PT100 Temperature Probe	Calibration Range	0 – 150 Deg C
Calibration Date	12th March 2014	Interval	12 month
Instrument Accuracy	+ or – 0.1 Dec C	Calibration Due Date	March 15

Loop Calibration Results

INPUT	AS FOUND	AS LEFT	DEVIATION
0.0	+ 0.8	+ 0.8	+ 0.8
25.0	25.6	25.6	+ 0.6
50.0	50.6	50.6	+ 0.6
75.0	75.6	75.6	+ 0.6
100.0	100.6	100.6	+ 0.6

Instrument Calibration Results

75.0			

Comment: High Level Sounder Alarm & SCADA screen Alarm found working OK
PT100 Pocket found leaking: instrument calibration only possible with tank empty

Calibration Equipment

Manufacturer	**Model**	**Serial Number.**	**Calibration Date**	**Certificate No.**
Eurolec	PC Temp PT2	84/PT2/100	10th Feb 2014	11861
Time Electronics	1042 Resistance	1203B2	10th Feb 2014	11860

DECLARATION: The calibration references used can be traced back to recognised national standards.

Tested By: Signature	Date 12/3/14	**Accepted By:** Signature	Date 18/3/14

SCADA IRELAND LTD
Valentia Place, Newcastle, Co Down
Tel: 028 43725970 Mobile 07767 272203 email: scadaireland@aol.com

CERTIFICATE OF CALIBRATION

Customer	***Enva Portlaoise***	**Contract**	***141101***
Customer Instrument ID	V13 Temp	Location	Tank Farm
Device Description	PT100 Temperature Probe	Calibration Range	0 – 150 Deg C
Calibration Date	12th March 2014	Interval	12 month
Instrument Accuracy	+ or – 0.1 Dec C	Calibration Due Date	March 2015

Loop Calibration Results

INPUT	AS FOUND	AS LEFT	DEVIATION
0.0	+0.5	+0.5	+0.5
25.0	25.4	25.4	+0.4
50.0	50.4	50.4	+0.4
75.0	75.4	75.4	+0.4
100.0	100.4	100.4	+0.4

Instrument Calibration Results

75.0	74.4	74.4	-0.6

Comment: High Level Sounder Alarm & SCADA screen Alarm found working OK

Calibration Equipment

Manufacturer	**Model**	**Serial Number.**	**Calibration Date**	**Certificate No.**
Eurolec	PC Temp PT2	84/PT2/100	10th Feb 2014	11861
Time Electronics	1042 Resistance	1203B2	10th Feb 2014	11860

DECLARATION: The calibration references used can be traced back to recognised national standards.

Tested By: Signature	Date 12/3/14	**Accepted By:** Signature	Date 08/3/14

SCADA IRELAND LTD

Valentia Place, Newcastle, Co Down

Tel: 028 43725970 Mobile 07767 272203 email: scadaireland@aol.com

CERTIFICATE OF CALIBRATION

Customer	***Enva Portlaoise***	**Contract**	***141101***
Customer Instrument ID	V12 Temp	Location	Tank Farm
Device Description	PT100 Temperature Probe	Calibration Range	0 – 150 Deg C
Calibration Date	12th March 2014	Interval	12 month
Instrument Accuracy	+ or – 0.1 Dec C	Calibration Due Date	March 2015

Loop Calibration Results

INPUT	AS FOUND	AS LEFT	DEVIATION
0.0	+ 0.6	+ 0.6	+ 0.6
25.0	25.5	25.5	+ 0.6
50.0	50.6	50.6	+ 0.6
75.0	75.5	75.5	+ 0.5
100.0	100.5	100.5	+ 0.5

Instrument Calibration Results

75.0	74.7	74.7	-0.3

Comment: High Level Sounder Alarm & SCADA screen Alarm found working OK

Calibration Equipment

Manufacturer	**Model**	**Serial Number.**	**Calibration Date**	**Certificate No.**
Eurolec	PC Temp PT2	84/PT2/100	10th Feb 2014	11861
Time Electronics	1042 Resistance	1203B2	10th Feb 2014	11860

DECLARATION: The calibration references used can be traced back to recognised national standards.

Tested By: Signature	[signature]	Date	12/3/14
Accepted By: Signature	[signature]	Date	08/3/14

SCADA IRELAND LTD

Valentia Place, Newcastle, Co Down

Tel: 028 43725970 Mobile 07767 272203 email: scadaireland@aolcom

CERTIFICATE OF CALIBRATION

Customer	***Enva Portlaoise***	**Contract**	***I11401***
Customer Instrument ID	V11 Temp	Location	Tank Farm
Device Description	PT100 Temperature Probe	Calibration Range	0 – 150 Deg C
Calibration Date	12th March 2014	Interval	12 month
Instrument Accuracy	+ or – 0.1 Dec C	Calibration Due Date	March 2015

Loop Calibration Results

INPUT	AS FOUND	AS LEFT	DEVIATION
0.0	0.5	0.5	+0.5
25.0	25.5	25.5	+0.5
50.0	50.4	50.4	+0.4
75.0	75.5	75.5	+0.5
100.0	100.5	100.5	+0.5

Instrument Calibration Results

75.0	74.1	74.1	-0.9

Comment:. High Level Sounder Alarm & SCADA screen Alarm found working OK

Calibration Equipment

Manufacturer	**Model**	**Serial Number.**	**Calibration Date**	**Certificate No.**
Eurolec	PC Temp PT2	84/PT2/100	10th Feb 2014	11861
Time Electronics	1042 Resistance	1203B2	10th Feb 2014	11860

DECLARATION: The calibration references used can be traced back to recognised national standards.

Tested By: Signature	Date 12/3/14	**Accepted By:** Signature	Date 18/3/14

SCADA IRELAND LTD

Valentia Place, Newcastle, Co Down

Tel: 028 43725970 Mobile 07767 272203 email: scadaireland@aolcom

CERTIFICATE OF CALIBRATION

Customer	***Enva Portlaoise***	**Contract**	***111401***
Customer Instrument ID	V32 Temp	Location	Tank Farm
Device Description	PT100 Temperature Probe	Calibration Range	0 – 150 Deg C
Calibration Date	12th March 2014	Interval	12 month
Instrument Accuracy	+ or – 0.1 Dec C	Calibration Due Date	March 2015

Loop Calibration Results

INPUT	AS FOUND	AS LEFT	DEVIATION
0.0	+ 0.3	+ 0.3	+ 0.3
25.0	25.3	25.3	+ 0.3
50.0	50.3	50.3	+ 0.3
75.0	75.1	75.1	+ 0.1
100.0	100.1	100.1	+ 0.1

Instrument Calibration Results

75.0	74.8	74.8	-0.2

Comment:* *High Level Sounder & SCADA screen Alarm found OK

Calibration Equipment

Manufacturer	Model	Serial Number.	Calibration Date	Certificate No.
Eurolec	PC Temp PT2	84/PT2/100	10th Feb 2014	11861
Time Electronics	1042 Resistance	1203B2	10th Feb 2014	11860

DECLARATION: The calibration references used can be traced back to recognised national standards.

Tested By: Signature	Date 12/3/14	**Accepted By:** Signature	Date 18/3/14

SCADA IRELAND LTD

Valentia Place, Newcastle, Co Down

Tel: 028 43725970 Mobile 07767 272203 email: scadaireland@aol.com

CERTIFICATE OF CALIBRATION

Customer	***Enva Portlaoise***	**Contract**	***111401***
Customer Instrument ID	V24 Temp	Location	Tank Farm
Device Description	PT100 Temperature Probe	Calibration Range	0 – 150 Deg C
Calibration Date	12th March 2014	Interval	12 month
Instrument Accuracy	+ or – 0.1 Dec C	Calibration Due Date	March 2015

Loop Calibration Results

INPUT	AS FOUND	AS LEFT	DEVIATION
0.0	0.0	0.0	0
25.0	25.0	25.0	0
50.0	49.7	49.7	- 0.3
75.0	74.7	74.7	- 0.3
100.0	100.0	100.0	0

Instrument Calibration Results

75.0	74.8	74.8	-0.2

Comment: Wire terminations in PT100 head rewired. High Level Sounder and SCADA screen Alarm found working OK

Calibration Equipment

Manufacturer	**Model**	**Serial Number.**	**Calibration Date**	**Certificate No.**
Eurolec	PC Temp PT2	84/PT2/100	10th Feb 2014	11861
Time Electronics	1042 Resistance	1203B2	10th Feb 2014	11860

DECLARATION: The calibration references used can be traced back to recognised national standards.

Tested By: Signature [signature] Date 12/3/14	**Accepted By:** Signature [signature] Date 18/3/14

SCADA IRELAND LTD

Valentia Place, Newcastle, Co Down

Tel: 028 43725970 Mobile 07767 272203 email: scadaireland@aol.com

CERTIFICATE OF CALIBRATION

Customer	***Enva Portlaoise***	**Contract**	***I11401***
Customer Instrument ID	V25 Temp	Location	Tank Farm
Device Description	PT100 Temperature Probe	Calibration Range	0 – 150 Deg C
Calibration Date	12th March 2014	Interval	12 month
Instrument Accuracy	+ or – 0.1 Dec C	Calibration Due Date	March 2015

Loop Calibration Results

INPUT	AS FOUND	AS LEFT	DEVIATION
0.0	0.2	0.2	+0.2
25.0	25.0	25.0	0
50.0	49.7	49.7	- 0.3
75.0	75.0	75.0	0
100.0	100.2	100.2	+0.2

Instrument Calibration Results

75.0	74.4	74.4	-0.6

Comment: High level sounder and SCADA screen Alarm found working OK

Calibration Equipment

Manufacturer	**Model**	**Serial Number.**	**Calibration Date**	**Certificate No.**
Eurolec	PC Temp PT2	84/PT2/100	10th Feb 2014	11861
Time Electronics	1042 Resistance	1203B2	10th Feb 2014	11860

DECLARATION: The calibration references used can be traced back to recognised national standards.

Tested By: Signature	Date 12/3/14	**Accepted By:** Signature	Date 18/3/14

SCADA IRELAND LTD

Valentia Place, Newcastle, Co Down

Tel: 028 43725970 Mobile 07767 272203 email: scadaireland@aol.com

CERTIFICATE OF CALIBRATION

Customer	***Enva Portlaoise***	**Contract**	***141101***
Customer Instrument ID	V19 Bottom Temp	Location	Tank Farm
Device Description	PT100 Temperature Probe	Calibration Range	0 – 150 Deg C
Calibration Date	12th March 14	Interval	12 month
Instrument Accuracy	+ or – 0.1 Dec C	Calibration Due Date	March 15

Loop Calibration Results

INPUT	AS FOUND	AS LEFT	DEVIATION
0.0	0.2	0.2	+0.2
25.0	25.1	25.1	+0.1
50.2	50.0	50.0	0
75.2	74.9	74.9	-0.1
100.2	99.9	99.9	-0.1

Instrument Calibration Results

75.0	74.3	74.3	-0.7

Comments: No Pocket in Tank. High Level Sounder & SCADA Screen Alarm found OK

Calibration Equipment

Manufacturer	**Model**	**Serial Number.**	**Calibration Date**	**Certificate No.**
Eurolec	PC Temp PT2	84/PT2/100	20th Feb 2014	11861
Time Electronics	1042 Resistance	1203B2	20th Feb 2014	11860

DECLARATION: The calibration references used can be traced back to recognised national standards.

Tested By: Signature	Date 12/3/14	**Accepted By:** Signature	Date 18/3/14

SCADA IRELAND LTD

Valentia Place, Newcastle, Co Down

Tel: 028 43725970 Mobile 07767 272203 email: scadaireland@aol.com

CERTIFICATE OF CALIBRATION

Customer	***Enva Portlaoise***	**Contract**	*141101*
Customer Instrument ID	V19 Top Temp	Location	Tank Farm
Device Description	PT100 Temperature Probe	Calibration Range	0 – 150 Deg C
Calibration Date	12th March 14	Interval	12 month
Instrument Accuracy	+ or – 0.1 Dec C	Calibration Due Date	March 15

Loop Calibration Results

INPUT	AS FOUND	AS LEFT	DEVIATION
0.0	- 0.2	- 0.2	- 0.2
25.0	24.7	24.7	- 0.3
50.0	49.9	49.9	- 0.1
75.0	74.4	74.4	- 0.6
100.0	99.7	99.7	- 0.3

Instrument Calibration Results

75.0	74.4	74.4	- 0.6

Comments:* *No pocket in tank. High level sounder and SCADA screen Alarm found OK

Calibration Equipment

Manufacturer	**Model**	**Serial Number.**	**Calibration Date**	**Certificate No.**
Eurolec	PC Temp PT2	84/PT2/100	10th Feb 2014	11861
Time Electronics	1042 Resistance	1203B2	10th Feb 2014	11860

DECLARATION: The calibration references used can be traced back to recognised national standards.

Tested By: Signature		Date 12/3/14	
Accepted By: Signature		Date 18/3/14	

SCADA IRELAND LTD

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Appendix 8

| PRTR# : W0184 | Facility Name : Enva Ireland Limited (Portlaoise) | Filename : PRTR Final.xls | Return Year : 2013 |

31/03/2014 18:12

Guidance to completing the PRTR workbook

AER Returns Workbook

Version 1.1.18

REFERENCE YEAR	2013

1. FACILITY IDENTIFICATION

Parent Company Name	Enva Ireland Limited
Facility Name	Enva Ireland Limited (Portlaoise)
PRTR Identification Number	W0184
Licence Number	W0184-01

Waste or IPPC Classes of Activity

No.	class_name
4.8	Oil re-refining or other re-uses of oil.
3.12	Repackaging prior to submission to any activity referred to in a preceding paragraph of this Schedule.
3.13	Storage prior to submission to any activity referred to in a preceding paragraph of this Schedule, other than temporary storage, pending collection, on the premises where the waste concerned is produced.
3.6	Biological treatment not referred to elsewhere in this Schedule which results in final compounds or mixtures which are disposed of by means of any activity referred to in paragraphs 1. to 10. of this Schedule.
3.7	Physico-chemical treatment not referred to elsewhere in this Schedule (including evaporation, drying and calcination) which results in final compounds or mixtures which are disposed of by means of any activity referred to in paragraphs 1. to 10. of this Schedule.
4.11	Use of waste obtained from any activity referred to in a preceding paragraph of this Schedule.
4.12	Exchange of waste for submission to any activity referred to in a preceding paragraph of this Schedule.
4.13	Storage of waste intended for submission to any activity referred to in a preceding paragraph of this Schedule, other than temporary storage, pending collection, on the premises where such waste is produced.
4.2	Recycling or reclamation of organic substances which are not used as solvents (including composting and other biological transformation processes).
4.4	Recycling or reclamation of other inorganic materials.
4.5	Regeneration of acids or bases.
4.9	Use of any waste principally as a fuel or other means to generate energy.
Address 1	Clonminam Industrial Estate
Address 2	Portlaoise
Address 3	County Laois
Address 4	
	Laois
Country	Ireland
Coordinates of Location	-7.31391 53.0294
River Basin District	IESE
NACE Code	3832
Main Economic Activity	Recovery of sorted materials
AER Returns Contact Name	Mark Dowling
AER Returns Contact Email Address	Mdowling@enva.ie
AER Returns Contact Position	HSE Coordinator
AER Returns Contact Telephone Number	057-86-78600
AER Returns Contact Mobile Phone Number	
AER Returns Contact Fax Number	057-86-78699
Production Volume	0.0
Production Volume Units	
Number of Installations	0
Number of Operating Hours in Year	0
Number of Employees	78
User Feedback/Comments	
Web Address	

2. PRTR CLASS ACTIVITIES

Activity Number	Activity Name
5(a)	Installations for the recovery or disposal of hazardous waste
5(c)	Installations for the disposal of non-hazardous waste
50.1	General

3. SOLVENTS REGULATIONS (S.I. No. 543 of 2002)

Is it applicable?	
Have you been granted an exemption ?	

If applicable which activity class applies (as per Schedule 2 of the regulations) ?	
Is the reduction scheme compliance route being used ?	

4. WASTE IMPORTED/ACCEPTED ONTO SITE **Guidance on waste imported/accepted onto site**

Do you import/accept waste onto your site for on-site treatment (either recovery or disposal activities) ?	

This question is only applicable if you are an IPPC or Quarry site

4.1 RELEASES TO AIR Link to previous years emissions data

10

SECTION A : SECTOR SPECIFIC PRTR POLLUTANTS

RELEASES TO AIR					Please enter all quantities in this section in KGs			
POLLUTANT		METHOD			QUANTITY			
			Method Used					
No. Annex II	Name	M/C/E	Method Code	Designation or Description	Emission Point 1	T (Total) KG/Year	A (Accidental) KG/Year	F (Fugitive) KG/Year
08 - Nitrogen oxides (NOx/NO2)	Nitrogen oxides (NOx/NO2)	C	OTH	Kane May Quintox KM9160 flue gas analyser.	43.22	43.22	0.0	0.0
11	Sulphur oxides (SOx/SO2)	C	EN 14791:2005		2.298	2.298	0.0	0.0
02	**Carbon monoxide (CO)**	C	OTH	Kane May Quintox KM9160 flue gas analyser.	1.379	0.0	0.0	0.0

* Select a row by double-clicking on the Pollutant Name (Column B) then click the delete button

SECTION B : REMAINING PRTR POLLUTANTS

RELEASES TO AIR					Please enter all quantities in this section in KGs			
POLLUTANT		METHOD			QUANTITY			
			Method Used					
No. Annex II	Name	M/C/E	Method Code	Designation or Description	Emission Point 1	T (Total) KG/Year	A (Accidental) KG/Year	F (Fugitive) KG/Year
					0.0	0.0	0.0	0.0

* Select a row by double-clicking on the Pollutant Name (Column B) then click the delete button

SECTION C : REMAINING POLLUTANT EMISSIONS (As required in your Licence)

RELEASES TO AIR					Please enter all quantities in this section in KGs			
POLLUTANT		METHOD			QUANTITY			
			Method Used					
Pollutant No.	Name	M/C/E	Method Code	Designation or Description	Emission Point 1	T (Total) KG/Year	A (Accidental) KG/Year	F (Fugitive) KG/Year
					0.0	0.0	0.0	0.0

* Select a row by double-clicking on the Pollutant Name (Column B) then click the delete button

Additional Data Requested from Landfill operators

For the purposes of the National Inventory on Greenhouse Gases, landfill operators are requested to provide summary data on landfill gas (Methane) flared or utilised on their facilities to accompany the figures for total methane generated. Operators should only report their Net methane (CH4) emission to the environment under T(total) KG/yr for Section A: Sector specific PRTR pollutants above. Please complete the table below:

Landfill: Enva Ireland Limited (Portlaoise)

Please enter summary data on the quantities of methane flared and / or utilised	T (Total) kg/Year	M/C/E	Method Used: Method Code	Method Used: Designation or Description	Facility Total Capacity m3 per hour	
Total estimated methane generation (as per site model)	0.0				N/A	
Methane flared	0.0				0.0	(Total Flaring Capacity)
Methane utilised in engine/s	0.0				0.0	(Total Utilising Capacity)
Net methane emission (as reported in Section A above)	0.0				N/A	

4.2 RELEASES TO WATERS Link to previous years emissions data | PRTR# : W0184 | Facility Name : Enva Ireland Limited (Portlaoise) | Filename : PRTR Final.xls | Return Year : 2013 | 31/03/2014 18:12

SECTION A : SECTOR SPECIFIC PRTR POLLUTANTS

Data on ambient monitoring of storm/surface water or groundwater, conducted as part of your licence requirements, should NOT be submitted under AER / PRTR Reporting as this only concerns Releases from your facil

RELEASES TO WATERS					Please enter all quantities in this section in KGs			
POLLUTANT					QUANTITY			
			Method Used					
No. Annex II	Name	M/C/E	Method Code	Designation or Description	Emission Point 1	T (Total) KG/Year	A (Accidental) KG/Year	F (Fugitive) KG/Year
					0.0	0.0	0.0	0.0

* Select a row by double-clicking on the Pollutant Name (Column B) then click the delete button

SECTION B : REMAINING PRTR POLLUTANTS

RELEASES TO WATERS					Please enter all quantities in this section in KGs			
POLLUTANT					QUANTITY			
			Method Used					
No. Annex II	Name	M/C/E	Method Code	Designation or Description	Emission Point 1	T (Total) KG/Year	A (Accidental) KG/Year	F (Fugitive) KG/Year
					0.0	0.0	0.0	0.0

* Select a row by double-clicking on the Pollutant Name (Column B) then click the delete button

SECTION C : REMAINING POLLUTANT EMISSIONS (as required in your Licence)

RELEASES TO WATERS					Please enter all quantities in this section in KGs			
POLLUTANT					QUANTITY			
			Method Used					
Pollutant No.	Name	M/C/E	Method Code	Designation or Description	Emission Point 1	T (Total) KG/Year	A (Accidental) KG/Year	F (Fugitive) KG/Year
					0.0	0.0	0.0	0.0

* Select a row by double-clicking on the Pollutant Name (Column B) then click the delete button

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4.3 RELEASES TO WASTEWATER OR SEWER

Link to previous years emissions data

| PRTR# : W0184 | Facility Name : Enva Ireland Limited (Portlaoise) | Filename : PRTR Final.xls | Retu 31/03/2014 18:12

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SECTION A : PRTR POLLUTANTS

OFFSITE TRANSFER OF POLLUTANTS DESTINED FOR WASTE-WATER TREATMENT OR SEWER

Please enter all quantities in this section in KGs

POLLUTANT		METHOD			QUANTITY			
			Method Used					
No. Annex II	Name	M/C/E	Method Code	Designation or Description	Emission Point 1	T (Total) KG/Year	A (Accidental) KG/Year	F (Fugitive) KG/Year
06	**Ammonia (NH3)**	C	OTH	Standard Methods for the Examination of Water and Wastewater, 18th edition, 1995, Part 4000, section 4500 –Nitrogen (Ammonia) F Phenate Method.	270.1537	0.0	0.0	0.0
79	Chlorides (as Cl)	C	OTH	Standard Methods for the Examination of Water and Wastewater, 18th edition, 1995, Part 4500 – Cl^- - C, Mercuric Nitrate Method.	12147.084	0.0	0.0	0.0
71	Phenols (as total C)	C	OTH	Standard Methods for the Examination of Water and Wastewater, 18th edition, 1995, Part 5530, Phenols.	96.272	0.0	0.0	0.0
13	Total phosphorus	C	OTH	Standard Methods for the Examination of Water and Wastewater, 18th edition, 1995, Part 4500–E, Phosphorus Ascorbic Acid Method.	512.005	0.0	0.0	0.0
20	Copper and compounds (as Cu)	C	OTH	Standard Methods for the Examination of Water and Wastewater, 18th edition, Metals by Flame Atomic Absorption Spectrometry – Direct Air-Acetylene Flame Method. 3111B - Modified	0.10482	0.0	0.0	0.0
18	Cadmium and compounds (as Cd)	C	OTH	Standard Methods for the Examination of Water and Wastewater, 18th edition, Metals by Flame Atomic Absorption Spectrometry – Direct Air-Acetylene Flame Method. 3111B - Modified	0.0421	0.0	0.0	0.0
24	Zinc and compounds (as Zn)	C	OTH	Standard Methods for the Examination of Water and Wastewater, 18th edition, Metals by Flame Atomic Absorption Spectrometry – Direct Air-Acetylene Flame Method. 3111B - Modified	1.111	0.0	0.0	0.0
23	Lead and compounds (as Pb)	C	OTH	Standard Methods for the Examination of Water and Wastewater, 18th edition, Metals by Flame Atomic Absorption Spectrometry – Direct Air-Acetylene Flame Method. 3111B - Modified	1.19008	0.0	0.0	0.0
					0.0	0.0	0.0	0.0

* Select a row by double-clicking on the Pollutant Name (Column B) then click the delete button

SECTION B : REMAINING POLLUTANT EMISSIONS (as required in your Licence)

OFFSITE TRANSFER OF POLLUTANTS DESTINED FOR WASTE-WATER TREATMENT OR SEWER

Please enter all quantities in this section in KGs

POLLUTANT		METHOD			QUANTITY			
			Method Used					
Pollutant No.	Name	M/C/E	Method Code	Designation or Description	Emission Point 1	T (Total) KG/Year	A (Accidental) KG/Year	F (Fugitive) KG/Year
314	Fats, Oils and Greases	C	OTH	Standard Methods for the Examination of Water and Wastewater, 18th edition, 1995, Part 5520 D Soxhlet Extraction Method	90.283	90.283	0.0	0.0

240	Suspended Solids	C	OTH	Standard Methods for the Examination of Water and Wastewater, 18th edition, 1995, Part 2540, D - Solids.	480.7921	0.0	0.0	0.0
343	Sulphate	C	OTH	Standard Methods for the Examination of Water and Wastewater, 18th edition, 1995, Part 4500 - $SO4^{2-}$ E	495.333	0.0	0.0	0.0
306	COD	C	OTH	Standard Methods for the Examination of Water and Wastewater, 21st edition, 2005.– Chemical Oxygen Demand.	21847.52	0.0	0.0	0.0

* Select a row by double-clicking on the Pollutant Name (Column B) then click the delete button

4.4 RELEASES TO LAND Link to previous years emissions data | PRTR# : W0184 | Facility Name : Enva Ireland Limited (Portlaoise) | Filename : PRTR Final.xls | Return Year : 2013 | 31/03/2014 18:12

SECTION A : PRTR POLLUTANTS

RELEASES TO LAND					Please enter all quantities in this section in KGs		
POLLUTANT		METHOD			QUANTITY		
			Method Used				
No. Annex II	Name	M/C/E	Method Code	Designation or Description	Emission Point 1	T (Total) KG/Year	A (Accidental) KG/Year
					0.0	0.0	0.0

* Select a row by double-clicking on the Pollutant Name (Column B) then click the delete button

SECTION B : REMAINING POLLUTANT EMISSIONS (as required in your Licence)

RELEASES TO LAND					Please enter all quantities in this section in KGs		
POLLUTANT		METHOD			QUANTITY		
			Method Used				
Pollutant No.	Name	M/C/E	Method Code	Designation or Description	Emission Point 1	T (Total) KG/Year	A (Accidental) KG/Year
					0.0	0.0	0.0

* Select a row by double-clicking on the Pollutant Name (Column B) then click the delete button

5. ONSITE TREATMENT & OFFSITE TRANSFERS OF WASTE | PRTR# : W0184 | Facility Name : Enva Ireland Limited (Portlaoise) | Filename : PRTR Final.xls | Return Year : 2013 | 31/03/2014 18:12

Please enter all quantities on this sheet in Tonnes

0

Transfer Destination	European Waste Code	Hazardous	Quantity (Tonnes per Year)	Description of Waste	Waste Treatment Operation	Method Used M/C/E	Method Used	Location of Treatment	Haz Waste : Name and Licence/Permit No of Next Destination Facility Non Haz Waste: Name and Licence/Permit No of Recover/Disposer	Haz Waste : Address of Next Destination Facility Non Haz Waste: Address of Recover/Disposer	Name and License / Permit No. and Address of Final Recoverer / Disposer (HAZARDOUS WASTE ONLY)	Actual Address of Final Destination i.e. Final Recovery / Disposal Site (HAZARDOUS WASTE ONLY)
To Other Countries	08 01 11	Yes	76.88	waste paint and varnish containing organic solvents or other dangerous substances	R1	M	Weighed	Abroad	Geocycle ,38.152/BP	Rue de Courriere 49 Zoning Industrial de Feluy ,. ,. ,B 7181 Seneffe ,Belgium	Geocycle ,38.152/BP, Rue de Courriere 49 Zoning Industrial de Feluy ,.,.,B 7181 Seneffe ,Belgium	Rue de Courriere 49 Zoning Industrial de Feluy ,.,.,B 7181 Seneffe ,Belgium
To Other Countries	08 01 11	Yes	123.28	waste paint and varnish containing organic solvents or other dangerous substances	R3	M	Weighed	Abroad	Nehlsen GmbH & Co.kg, A-4187 HH	Louis-Krages-Strabe ,.,Bremen., D-28237 ,Germany	Nehlsen GmbH & Co.kg, A-4187 HH,Louis-Krages-Strabe ,.,Bremen., D-28237 ,Germany	Louis-Krages-Strabe ,.,Bremen., D-28237 ,Germany
To Other Countries	09 01 04	Yes	1.27	fixed solutions	R1	M	Weighed	Abroad	Enva ,W041-1	Smithstown Industrial estate ,.,Shannon ,Co. Clare,Ireland	Lindenschmidt , 04 714 98089,Krombacher Strasse 42-46 ,.,Kreutzal,D57223 ,Germany	Krombacher Strasse 42-46 ,.,Kreutzal,D57223 ,Germany
Within the Country	13 05 07	Yes	40.0	oily water from oil/water separators	D9	M	Weighed	Offsite in Ireland	Enva,W0196-1	JFK Road Naas Road,.,Dublin,Dublin 12,Ireland	Enva,W0196-01,JFK Road Naas Road,.,Dublin,Dublin 12,Ireland	JFK Road Naas Road,.,Dublin,Dublin 12,Ireland
To Other Countries	13 07 03	Yes	79.54	other fuels (including mixtures)	R1	M	Weighed	Abroad	KS Recycling ,12 150 13984/01TMS	Raiffeisenstraße 38 ,.,., D-47665 Sonsbeck ,Germany	KS Recycling ,12 150 13984/01TMS,Raiffeisenstraße 38 ,.,., D-47665 Sonsbeck ,Germany	Raiffeisenstraße 38 ,.,., D-47665 Sonsbeck ,Germany
Within the Country	13 08 02	Yes	68.26	other emulsions	D9	M	Weighed	Offsite in Ireland	Enva,W0196-1	JFK Road Naas Road,.,Dublin,Dublin 12,Ireland	Enva,W0196-01,JFK Road Naas Road,.,Dublin,Dublin 12,Ireland	JFK Road Naas Road,.,Dublin,Dublin 12,Ireland
Within the Country	15 01 01	No	1.2	paper and cardboard packaging	R3	M	Weighed	Offsite in Ireland	ROC Recycling Solutions,WFP-LS-11-00001-01	Ballymacken Industrial Estate,.,Portlaoise,Co. Laois,Ireland		
To Other Countries	15 01 10	Yes	4.0	packaging containing residues of or contaminated by dangerous substances	R3	M	Weighed	Abroad	Enva ,W041-1	Smithstown Industrial estate ,.,Shannon ,Co. Clare,Ireland	Lindenschmidt , 04 714 98089,Krombacher Strasse 42-46 ,.,Kreutzal,D57223 ,Germany	Krombacher Strasse 42-46 ,.,Kreutzal,D57223 ,Germany
To Other Countries	15 01 10	Yes	63.06	packaging containing residues of or contaminated by dangerous substances	R3	M	Weighed	Abroad	Nehlsen GmbH & Co.kg, A-4187 HH	Louis-Krages-Strabe ,.,Bremen., D-28237 ,Germany	Nehlsen GmbH & Co.kg, A-4187 HH,Louis-Krages-Strabe ,.,Bremen., D-28237 ,Germany	Louis-Krages-Strabe ,.,Bremen., D-28237 ,Germany
Within the Country	15 01 10	Yes	3.286	packaging containing residues of or contaminated by dangerous substances	D9	M	Weighed	Offsite in Ireland	Enva ,W041-1	Smithstown Industrial estate ,.,Shannon ,Co. Clare,Ireland	Enva ,W041-1,Smithstown Industrial estate ,.,Shannon ,Co. Clare,Ireland	Smithstown Industrial estate ,.,Shannon ,Co. Clare,Ireland
To Other Countries	15 02 02	Yes	1.124	absorbents, filter materials (including oil filters not otherwise specified), wiping cloths, protective clothing contaminated by dangerous substances	R12	M	Weighed	Abroad	Enva ,W041-1	Smithstown Industrial estate ,.,Shannon ,Co. Clare,Ireland	Lindenschmidt , 04 714 98089,Krombacher Strasse 42-46 ,.,Kreutzal,D57223 ,Germany	Krombacher Strasse 42-46 ,.,Kreutzal,D57223 ,Germany
To Other Countries	16 01 07	Yes	684.06	oil filters	R12	M	Weighed	Abroad	RD Recycling ,Ovam approved	Centrum Zuid 3017 ,.,.,3530,Belgium.	RD Recycling ,Ovam approved,Centrum Zuid 3017 ,.,.,3530,Belgium.	Centrum Zuid 3017 ,.,.,3530,Belgium.
To Other Countries	16 01 15	No	0.3	antifreeze fluids other than those mentioned in 16 01 14	R1	M	Weighed	Abroad	Lindenschmidt , 04 714 98089	Krombacher Strasse 42-46 ,.,Kreutzal,D57223 ,Germany		
To Other Countries	16 01 15	No	196.48	antifreeze fluids other than those mentioned in 16 01 14	R1	M	Weighed	Abroad	KS Recycling ,12 150 13984/01TMS	Raiffeisenstraße 38 ,.,., D-47665 Sonsbeck ,Germany		

Transfer Destination	European Waste Code	Hazardous	Quantity (Tonnes per Year)	Description of Waste	Waste Treatment Operation	Method Used		Location of Treatment	Haz Waste : Name and Licence/Permit No of Next Destination Facility Non Haz Waste: Name and Licence/Permit No of Recover/Disposer	Haz Waste : Address of Next Destination Facility Non Haz Waste: Address of Recover/Disposer	Name and License / Permit No. and Address of Final Recoverer / Disposer (HAZARDOUS WASTE ONLY)	Actual Address of Final Destination i.e. Final Recovery / Disposal Site (HAZARDOUS WASTE ONLY)
						M/C/E	Method Used					
To Other Countries	16 05 04	Yes	19.42	gases in pressure containers (including halons) containing dangerous substances	R4	M	Weighed	Abroad	SBH ,121296753	Austrabe 5 ,.,.,D74238 Krautheim,Germany	SBH ,121296753,Austrabe 5 ,.,.,D74238 Krautheim,Germany	Austrabe 5 ,.,.,D74238 Krautheim,Germany
To Other Countries	16 05 06	Yes	38.5	laboratory chemicals, consisting of or containing dangerous substances, including mixtures of laboratory chemicals	R1	M	Weighed	Abroad	Enva ,W041-1	Smithstown Industrial estate ,.,Shannon ,Co. Clare,Ireland	Lindenschmidt , 04 714 98089,Krombacher Strasse 42-46 ,.,Kreutzal,D57223 ,Germany	Krombacher Strasse 42-46 ,.,Kreutzal,D57223 ,Germany
To Other Countries	16 05 07	Yes	0.706	discarded inorganic chemicals consisting of or containing dangerous substances	R1	M	Weighed	Abroad	Enva ,W041-1	Smithstown Industrial estate ,.,Shannon ,Co. Clare,Ireland	Lindenschmidt , 04 714 98089,Krombacher Strasse 42-46 ,.,Kreutzal,D57223 ,Germany	Krombacher Strasse 42-46 ,.,Kreutzal,D57223 ,Germany
To Other Countries	16 05 08	Yes	0.239	discarded organic chemicals consisting of or containing dangerous substances	R1	M	Weighed	Abroad	Enva ,W041-1	Smithstown Industrial estate ,.,Shannon ,Co. Clare,Ireland	Lindenschmidt , 04 714 98089,Krombacher Strasse 42-46 ,.,Kreutzal,D57223 ,Germany	Krombacher Strasse 42-46 ,.,Kreutzal,D57223 ,Germany
Within the Country	16 05 09	No	0.466	discarded chemicals other than those mentioned in 16 05 06, 16 05 07 or 16 05 08	R1	M	Weighed	Offsite in Ireland	Enva ,W041-1	Smithstown Industrial estate ,.,Shannon ,Co. Clare,Ireland		
To Other Countries	16 06 01	Yes	894.58	lead batteries	R4	M	Weighed	Abroad	Campine,Ovam Approved	Niljverheidsstraat 2 Belgium.,.,.,B- 2340 Beerse ,Belgium	Campine,Ovam Approved, Niljverheidsstraat 2 Belgium.,.,.,B- 2340 Beerse ,Belgium	Niljverheidsstraat 2 Belgium.,.,.,B- 2340 Beerse ,Belgium
Within the Country	17 02 01	No	5.96	wood	R5	M	Weighed	Offsite in Ireland	AES Advanced Environmental Solutions (Ireland) Limited,W0104-02	.,.,Tullamore,Co. Offaly,Ireland		
Within the Country	17 05 04	No	2052.21	soil and stones other than those mentioned in 17 05 03	R5	M	Weighed	Offsite in Ireland	Hinch Plant hire ,WFP-LS-09-0002-01	Straboe ,, , Portlaoise ,Co Laois ,Ireland		
Within the Country	17 09 04	No	4.88	mixed construction and demolition wastes other than those mentioned in 17 09 01, 17 09 02 and 17 09 03	R5	M	Weighed	Offsite in Ireland	Guessford Ltd.,WFP-10-OY-0183-02	Barnan,.,Daingean,Co. Offaly,Ireland		
To Other Countries	19 02 09	Yes	855.862	solid combustible wastes containing dangerous substances	R1	M	Weighed	Abroad	Lindenschmidt , 04 714 98089	Krombacher Strasse 42-46 ,.,Kreutzal,D57223 ,Germany	Lindenschmidt , 04 714 98089,Krombacher Strasse 42-46 ,.,Kreutzal,D57223 ,Germany	Krombacher Strasse 42-46 ,.,Kreutzal,D57223 ,Germany
Within the Country	19 08 14	No	0.0	sludges from other treatment of industrial waste water other than those mentioned in 19 08 13	D9	M	Weighed	Offsite in Ireland	Enva,W0196-1	JFK Road Naas Road,.,Dublin,Dublin 12,Ireland		
Within the Country	19 11 03	Yes	6392.75	aqueous liquid wastes	D9	C	Volume Calculation	Offsite in Ireland	Laois County Council,DO00 1-0 1	Ridge Road,.,Portlaoise,.,Ireland	Laois County Council,DO00 1-0 1,Ridge Road,.,Portlaoise,.,Ireland	Ridge Road,.,Portlaoise,.,Ireland
To Other Countries	19 12 11	Yes	164.5	other wastes (including mixtures of materials) from mechanical treatment of waste containing dangerous substances	D10	M	Weighed	Abroad	KWA,E17012100	Graftstr. 25 ,.,.,47475 Kamp-Lintfort ,Germany	KWA,E17012100,Graftstr. 25 ,.,.,47475 Kamp-Lintfort ,Germany	Graftstr. 25 ,.,.,47475 Kamp-Lintfort ,Germany
Within the Country	20 01 21	Yes	2.32	fluorescent tubes and other mercury-containing waste	R4	M	Weighed	Offsite in Ireland	Irish Lamp Recycling ,WFP-KE-08-0348-01	Woodstock Industrial Estate ,.,Athy ,Co. Kildare. ,Ireland	Irish Lamp Recycling ,WFP-KE-08-0348-01,Woodstock Industrial Estate ,.,Athy ,Co. Kildare. ,Ireland	Woodstock Industrial Estate ,.,Athy ,Co. Kildare. ,Ireland

Transfer Destination	European Waste Code	Hazardous	Quantity (Tonnes per Year)	Description of Waste	Waste Treatment Operation	Method Used		Location of Treatment	Haz Waste : Name and Licence/Permit No of Next Destination Facility Non Haz Waste: Name and Licence/Permit No of Recover/Disposer	Haz Waste : Address of Next Destination Facility Non Haz Waste: Address of Recover/Disposer	Name and License / Permit No. and Address of Final Recoverer / Disposer (HAZARDOUS WASTE ONLY)	Actual Address of Final Destination i.e. Final Recovery / Disposal Site (HAZARDOUS WASTE ONLY)
						M/C/E	Method Used					
Within the Country	20 01 25	No	0.68	edible oil and fat	R9	M	Weighed	Offsite in Ireland	Frylite ,WFP-DS-10-0009-01	Ballymount Drive Ballymount Industrial Estate,Unit J1 ,Dublin,Dublin 12,Ireland		
Within the Country	20 01 25	No	71.16	edible oil and fat	D8	M	Weighed	Offsite in Ireland	Beofs ,WFP-KK-09-0004-01	Camphill Community Ballytobin ,.,Callan ,Co. Kilkenny,Ireland		
To Other Countries	20 01 27	Yes	0.84	paint, inks, adhesives and resins containing dangerous substances	R1	M	Weighed	Abroad	Enva ,W041-1	Smithstown Industrial estate ,.,Shannon ,Co. Clare,Ireland	Lindenschmidt , 04 714 98089,Krombacher Strasse 42-46 ,.,Kreutzal,D57223 ,Germany	Krombacher Strasse 42-46 ,.,Kreutzal,D57223 ,Germany
Within the Country	20 03 06	No	18.12	waste from sewage cleaning	D9	M	Weighed	Offsite in Ireland	Enva,W0196-1	JFK Road Naas Road,.,Dublin,Dublin 12,Ireland		
To Other Countries	08 01 11	Yes	2.5	waste paint and varnish containing organic solvents or other dangerous substances	R1	M	Weighed	Abroad	Enva ,W041-1	Smithstown Industrial estate ,.,Shannon ,Co. Clare,Ireland	Lindenschmidt , 04 714 98089,Krombacher Strasse 42-46 ,.,Kreutzal,D57223 ,Germany	Krombacher Strasse 42-46 ,.,Kreutzal,D57223 ,Germany
To Other Countries	12 01 14	Yes	35.5	machining sludges containing dangerous substances	R1	M	Weighed	Abroad	Geocycle ,38.152/BP	Rue de Courriere 49 Zoning Industrial de Feluy ,. ,. ,B 7181 Seneffe ,Belgium	Geocycle ,38.152/BP, Rue de Courriere 49 Zoning Industrial de Feluy ,.,.,B 7181 Seneffe ,Belgium	Rue de Courriere 49 Zoning Industrial de Feluy ,.,.,B 7181 Seneffe ,Belgium
To Other Countries	13 05 07	Yes	28.0	oily water from oil/water separators	R1	M	Weighed	Abroad	Geocycle ,38.152/BP	Rue de Courriere 49 Zoning Industrial de Feluy ,. ,. ,B 7181 Seneffe ,Belgium	Geocycle ,38.152/BP, Rue de Courriere 49 Zoning Industrial de Feluy ,.,.,B 7181 Seneffe ,Belgium	Rue de Courriere 49 Zoning Industrial de Feluy ,.,.,B 7181 Seneffe ,Belgium
Within the Country	20 01 40	No	234.02	metals	R4	M	Weighed	Offsite in Ireland	MSM Recycling,WFP-TN-11-0003-02	Annagh,.,Birr,Co. Tipperary,Ireland		
To Other Countries	13 07 03	Yes	2.05	other fuels (including mixtures)	R1	M	Weighed	Abroad	Geocycle ,38.152/BP	Rue de Courriere 49 Zoning Industrial de Feluy ,. ,. ,B 7181 Seneffe ,Belgium	Geocycle ,38.152/BP, Rue de Courriere 49 Zoning Industrial de Feluy ,.,.,B 7181 Seneffe ,Belgium	Rue de Courriere 49 Zoning Industrial de Feluy ,.,.,B 7181 Seneffe ,Belgium
To Other Countries	08 04 10	No	0.08	waste adhesives and sealants other than those mentioned in 08 04 09	R1	M	Weighed	Abroad	Enva ,W041-1	Smithstown Industrial estate ,.,Shannon ,Co. Clare,Ireland		
Within the Country	16 06 04	No	1.2	alkaline batteries (except 16 06 03)	R4	M	Weighed	Offsite in Ireland	KNK Metals Recycling Limited,W0113-04	Cappincur Industrial Estate ,Daingean Road,Tullamore,Co. Offaly,Ireland		
To Other Countries	13 05 07	Yes	1378.46	oily water from oil/water separators	D10	M	Weighed	Abroad	Scori Lillebonne,.	Z1 Avenue de Port Jerome,76170 Lillebonne,.,.,France	Scori Lillebonne,.,Z1 Avenue de Port Jerome,76170,Lillebonne,.,France	Z1 Avenue de Port Jerome,76170,Lillebonne,.,France
Within the Country	16 05 04	Yes	0.024	gases in pressure containers (including halons) containing dangerous substances	R13	M	Weighed	Offsite in Ireland	Enva ,W041-1	Smithstown Industrial estate ,.,Shannon ,Co. Clare,Ireland	Enva ,W041-1,Smithstown Industrial estate ,.,Shannon ,Co. Clare,Ireland	Smithstown Industrial estate ,.,Shannon ,Co. Clare,Ireland

Transfer Destination	European Waste Code	Hazardous	Quantity (Tonnes per Year)	Description of Waste	Waste Treatment Operation	Method Used		Location of Treatment	Haz Waste : Name and Licence/Permit No of Next Destination Facility Non Haz Waste: Name and Licence/Permit No of Recover/Disposer	Haz Waste : Address of Next Destination Facility Non Haz Waste: Address of Recover/Disposer	Name and License / Permit No. and Address of Final Recoverer / Disposer (HAZARDOUS WASTE ONLY)	Actual Address of Final Destination i.e. Final Recovery / Disposal Site (HAZARDOUS WASTE ONLY)
						M/C/E	Method Used					
To Other Countries	13 02 08	Yes	1.5	other engine, gear and lubricating oils	R1	M	Weighed	Abroad	Enva ,W041-1	Smithstown Industrial estate ,.,Shannon ,Co. Clare,Ireland	Lindenschmidt , 04 714 98089,Krombacher Strasse 42-46 ,.,Kreutzal,D57223 ,Germany	Krombacher Strasse 42-46 ,.,Kreutzal,D57223 ,Germany
To Other Countries	20 01 29	Yes	0.378	detergents containing dangerous substances	R1	M	Weighed	Abroad	Enva ,W041-1	Smithstown Industrial estate ,.,Shannon ,Co. Clare,Ireland	Lindenschmidt , 04 714 98089,Krombacher Strasse 42-46 ,.,Kreutzal,D57223 ,Germany	Krombacher Strasse 42-46 ,.,Kreutzal,D57223 ,Germany
Within the Country	13 05 07	Yes	16.18	oily water from oil/water separators	R13	M	Weighed	Offsite in Ireland	Enva ,W041-1	Smithstown Industrial estate ,.,Shannon ,Co. Clare,Ireland	Enva ,W041-1,Smithstown Industrial estate ,.,Shannon ,Co. Clare,Ireland	Smithstown Industrial estate ,.,Shannon ,Co. Clare,Ireland
Within the Country	20 03 04	No	2.58	septic tank sludge	R3	M	Weighed	Offsite in Ireland	Acorn Recycling ltd ,W0249-01	Ballybeg Composting facility Ballybeg Littleton ,.,.,Co. Tipperary. ,Ireland		
Within the Country	02 07 04	No	10.48	materials unsuitable for consumption or processing	R13	M	Weighed	Offsite in Ireland	Enva ,W041-1	Smithstown Industrial estate ,.,Shannon ,Co. Clare,Ireland		

* Select a row by double-clicking the Description of Waste then click the delete button

Link to previous years waste data
Link to previous years waste summary data & percentage change
Link to Waste Guidance

Appendix 9

Enva Ireland Ltd
Raffeen Ind Est, Ringaskiddy, Co.Cork

Tel: 021 438 7200
Fax: 021 438 7299
Email: cork@enva.ie

RESPIROMETRY REPORT
ENVA Portlaoise

A sample was received on 20.06.13 from Enva Portlaoise for evaluation of its effect on activated sludge micro organisms. The methodology for this is by respirometry, which assesses the oxygen uptake of a standard activated sludge versus sludge containing the sample for evaluation, over a 30-minute period. The sample submitted was as follows:

Sample	Sludge Portlaoise June 2013

The result was as follows: (all results mg/l 0_2)

Sample Time/Mins.	*Control*	*Sample $^1/2$ Dilution*
0	9.2	8.8
1	6.7	5.1
2	6.4	4.9
3	6.1	4.6
4	5.9	4.3
5	5.7	3.9
10	4.8	2.3
15	4.0	0.7
20	3.2	0
25	2.3	
30	1.2	
% Inhibition		-10%

Only samples showing +30% or greater inhibition are considered to have a negative effect on the activated sludge.
As we can see the sample is lower than +30% so this indicates that there was no inhibition of the activity of the activated sludge micro organisms.

Signed: ____________ Date: 2/7/13

Enva Ireland Ltd
Raffeen Ind Est, Ringaskiddy, Co.Cork

Tel: 021 438 7200
Fax: 021 438 7299
Email: cork@enva.ie
Web: www.enva.ie

nqa. ISO 9001 Registered

RESPIROMETRY REPORT

ENVA PORTLAOISE

One sample was received on the 12/12/2013 for evaluation of their effect on activated sludge micro organisms at given dilutions. The methodology for this is by respirometry, which assesses the oxygen uptake of a standard activated sludge versus sludge containing the samples for evaluation, over a 30 minute period. The samples submitted were as follows:

Effluent 11.12.13	Enva Portlaoise

The results were as follows: (all results mg/l 0_2)

Sample Time/Mins.	*Control*	*1/5 Dilution*	*1/10 Dilution*
0	9.5	9.3	9.8
1	8.7	8.6	8.9
2	7.9	7.5	8.0
3	6.3	6.5	6.7
4	5.8	5.6	6.0
5	4.6	4.9	4.9
10	3.8	4.0	4.2
15	3.1	3.3	3.4
20	2.6	2.9	2.8
25	2.1	2.4	2.3
30	1.5	1.9	1.7
% Inhibition		6.9%	0 %

Only samples showing +30% or greater inhibition are considered to have a negative effect on the activated sludge.

As we can see all of the samples proved lower than this in inhibition terms. This indicates that there was no inhibition of the activity of the activated sludge micro organisms from the samples at their respective dilutions.

Signed: ______________ Date: 8/1/14

Appendix 10

Bank of Ireland
Corporate

Head Office, Lower Baggot Street
Dublin 2, Ireland
Tel +353 (0)1 604 4000
Fax +353 (0)1 604 4005
www.boi.ie/corporate

PERFORMANCE BOND

KNOW ALL MEN BY THESE PRESENTS that we **ATLAS ENVIRONMENTAL IRELAND LIMITED** whose registered office is at C/O Atlas Oil, Clonminan Industrial Estate, Portlaoise, Co Laois (hereinafter called "the Licensee") and **THE GOVERNOR & COMPANY OF THE BANK OF IRELAND** whose registered office is at Lower Baggot Street, Dublin 2 (hereinafter called "the Surety") are held and firmly bound unto the **ENVIRONMENTAL PROTECTION AGENCY** having its registered office at PO Box 3000 Johnstown Castle Estate, County Wexford (hereinafter called "the Agency") in the sum of € 278,670 (Two hundred and seventy eight thousand six hundred and seventy Euro) to be paid to the Agency for the payment of which said sum well and truly to be made and done the said Licensee and the Surety bind themselves, their successors and assigns jointly and severally by these presents.

Signed/sealed with our respective seals and dated this ....11th..... day of ...JAN..... 2005

WHEREAS the Bond of Surety is supplemental to a Waste Licence Register number 184-1 dated 16th January 2004 (hereinafter called the "Licence") allowing the Licensee to carry on waste activities at Clonminam Industrial Estate, Portlaoise, County Laois in strict accordance with the terms of the said Licence. The Licensee is required to observe all of the conditions of the Licence, and in particular to clean up the site in the event of a closure. NOW THEREFORE the condition of the above-written bond is such that (i) if the Licensee shall duly perform and observe all the terms provisions conditions and stipulations of the said Licence on the Licensee's part to be performed and observed or (ii) if on default by the Licensee the Surety shall satisfy and discharge the damages sustained by the Agency thereby up to the amount of the above-written bond or (iii) if no claim is made by the Agency on or before the expiry date then this obligation shall be null and void, but otherwise shall be and remain in full force and effect.

The initial expiry date of this Bond is 31st January 2006 and it is a condition of this Bond that it shall be deemed automatically extended without amendment for one year from its expiry date, or from any future expiry date, unless at least thirty (30) days prior to any such expiry date the Surety shall notify the Agency by registered mail, that it elects not to consider this Bond renewed for any such additional period.

The Surety shall be notified in writing of any non-performance or non-observance on the part of the Licensee of any of the said terms covenants clauses provisions stipulations and conditions contained in the said Licence or on its part to be performed and observed which may involve a loss for which the Surety is responsible hereunder within three months after such non-performance or non-observance shall have come to the knowledge of the Agency or their representative or representatives having supervision of the said Licence and a Registered Letter posted to the Surety at its registered offices shall be notice required within the meaning of this Bond and the Agency shall in so far as it may be lawful permit the Surety (at the Surety's request and solely at the Surety's option) to perform the terms covenants clauses provisions stipulations and conditions of the same Contract which the Licensee shall have failed to perform or observe.

PROVIDED ALWAYS that:

(1) No liability shall attach to the Surety under this bond in consequence of any delay or failure by the Licensee to honour the terms of the Licence whether directly or indirectly arising out of War Invasion Act of Foreign Enemy Hostilities Civil War Rebellion Revolution Insurrection or Military or Usurped Power.

This Bond and the benefits thereof shall not be assigned without the prior written consent of the Surety.

This Bond shall be construed in accordance with and governed by the laws of Ireland and there parties hereto hereby submit to the non-executive jurisdiction of the Courts of Ireland

In witness whereof the Licensee and the Surety have signed this document by an Authorised Signatory or caused their common seals to be hereunto affixed the day and year first written above.

The Common Seal of the Licensee
was hereunto affixed in the presence of:

____

12th January 2005
____

Signed by

____

____
on behalf of The Governor and Bank of Ireland

Appendix 11

Facility Information Summary

AER Reporting Year	2013
Licence Register Number	W0184-01
Name of site	Enva Ireland Limited
Site Location	Clonminan Industrial Estate, Portlaoise, Co. Loias
NACE Code	3832
Class/Classes of Activity	4.8, 3.12, 3.13, 3.6, 3.7, 4.11, 4.12, 4013, 4.2, 4.4, 4.5, 4.9
National Grid Reference (6E, 6 N)	2461 E, 1978 N
A description of the activities/processes at the site for the reporting year. This should include information such as production increases or decreases on site, any infrastructural changes, environmental performance which was measured during the reporting year **and an overview of compliance with your licence** listing all exceedances of licence limits (where applicable) and what they relate to e.g. air, water, noise.	The processing activities on site include waste oil re-processing, treatment of contaminated soil, repackaging of oily contaminated wastes and paint wastes. The site also stores wastes in packages (i.e. barrels ASPs, IBCs etc.) prior to transfer off site for recovery or disposal. 1.2 Waste Management Activities carried out at the Facility. **Third Schedule** Class 6. Biological treatment not referred to elsewhere in this Schedule which results in final compounds or mixtures which are

Declaration:

All the data and information presented in this report has been checked and certified as being accurate. The quality of the information is assured to meet licence requirements.

Signature	31.03.2014
~~Group~~/Facility manager (or nominated, suitably qualified and experienced deputy)	Date 31/3/14.