

ANNUAL ENVIRONMENTAL REPORT 2015

Waste Licence Registration No.: W0076-1

Licencee: Limerick City Council

Location of Activity: Longpavement Landfill
Longpavement
Limerick

Attention: Ms Maria Lenihan
Office Environmental Enforcement
Environmental Protection Agency
Regional Inspectorate,
Inniscarra
Co. Cork

Submitted by: Ursula Ahern
Environment Department
Limerick City Council
City Hall
Limerick

Table of Contents

1.0	Reporting period	4
2.0	Report on restoration of completed cells / phases	4
3.0	Waste activities carried out at the facility	5
4.0	Summary of results & interpretation of environmental monitoring	5
4.1	Landfill gas	5
4.1.1	<i>Landfill gas wells</i>	5
4.1.2	<i>Perimeter gas wells</i>	5
4.1.3	<i>Interpretation</i>	6
4.2	Dust control - PM ₁₀ monitoring	6
4.3	Noise monitoring	6
4.4	Surface water	6
4.4.1	<i>Surface Water Results</i>	6
4.4.2	<i>Surface Water Interpretation</i>	7
4.4.2.1	S.I. No. 294 of 1989	7
4.4.2.2	S.I. No. 272 of 2009	7
4.5	Groundwater	8
4.5.1	<i>Groundwater Results</i>	8
4.5.2	<i>Groundwater Interpretation</i>	8
4.5.2.1	Towards Setting Guideline Values for the Protection Of Groundwater in Ireland – Interim Report, EPA 2003	8
4.5.2.2	S.I. No. 9 of 2010	8
4.6	Leachate	9
4.6.1	<i>Leachate Results</i>	9
4.6.2	<i>Leachate Interpretation</i>	9
4.7	Meteorological monitoring	9
4.8	Landfill gas combustion plant/enclosed flare monitoring	9
4.9	Monitoring of emissions to sewer	10
4.10	Monitoring of emissions from on-site leachate treatment plant	10
5.0	Volume of leachate produced & transported / discharged off-site	10
5.1	Leachate abstraction wells	10

6.0	Site survey showing existing levels of the facility at the end of the reporting period	10
7.0	Estimated annual & cumulative quantities of landfill gas emitted from the facility	10
8.0	Report on the progress towards achievement of the environmental objectives & targets contained in previous year's report	11
9.0	Schedule of environment objectives & targets for the forthcoming year	11
10.0	Reported incidents & complaint summaries	12
11.0	Review of nuisance controls	12
11.1	Pest control	12
11.2	Litter control	12
11.3	Dust control	12
11.4	Bird control	12
12.0	Reports on financial provision made under this licence, management & staffing structure of the facility, & a programme for public information	12

Appendix A: Map

Appendix B: Monthly gas monitoring results.

Appendix C: First Quarterly Report covering groundwater, surfacewater and leachate monitoring at Longpavement Landfill (Monitoring Period January-March 2015)

Appendix D: Second Quarterly Report covering groundwater, surfacewater and leachate monitoring at Longpavement Landfill (Monitoring Period April-June 2015)

Appendix E: Third Quarterly Report covering groundwater, surfacewater and leachate monitoring at Longpavement Landfill (Monitoring Period July-September 2015)

Appendix F: Fourth Quarterly Report covering groundwater, surfacewater and leachate monitoring at Longpavement Landfill (Monitoring Period October-December 2015)

Appendix G: Annual Report covering groundwater, surfacewater and leachate monitoring at Longpavement Landfill (Monitoring Period 2015)

Appendix H: Tables 4.1 to 4.8 indicating the parameters and frequencies to be monitored in accordance with the EPA licence 76-1.

1.0 REPORTING PERIOD

The period of reporting for this Report is from January 2015 to December 2015.

2.0 REPORT ON RESTORATION OF COMPLETED CELLS / PHASES

In February 2006 Tobin Consulting, Civil and Structural Engineers, acting on behalf of Limerick City Council tendered the following contract: “**Longpavement Landfill Restoration Capping of Waste Body, including Gas Collection, Leachate Collection, Methane Stripping and Civil Engineering Works**”.

McSweeney Building & Civil Engineering Ltd won the tender and was appointed in July 2006 and the following site works are now complete:

- **Landfill Gas:** The collection and flaring of landfill gases being generated by the decomposition of the material contained within the landfill mass.
- **Leachate:** The collection and treatment of leachate generated throughout the site.
- **The permanent capping of the landfill:** This involved covering the landfill with a synthetic sealing material and soils to prevent rainwater seeping into the landfill.
- **Reshaping and profiling** of the landfill mass, associated civil engineering works and landscaping. The landscape design now integrates the restored site into its surroundings and the area is now an amenity for the people of Limerick. New wetlands areas have been constructed which enhances existing wetlands.

The work involved a significant amount of earthworks in the capping of the landfill mass. As well as the landfill gas and leachate collection & treatment systems there is a new control building together with a compound, fencing and an access road to the Longpavement Road. It also involved the construction of pipelines, rising mains, manholes, a pumping station with associated mechanical and electrical aspects of the above elements.

3.0 WASTE ACTIVITIES CARRIED OUT AT THE FACILITY

No material was imported on to the site in 2015. All works on the site are now complete

4.0 SUMMARY OF RESULTS & INTERPRETATION OF ENVIRONMENTAL MONITORING

Drawing No. 2307-1004, contained in Appendix A of this Report, shows the locations of all the monitoring points at the Longpavement landfill facility. Monitoring was carried out by BHP Laboratories Ltd as part of compliance with EPA waste licence 76-1. See Appendix H for the parameters and frequencies to be monitored in accordance with the EPA licence 76-1.

4.1 Landfill Gas

In accordance with licence 76-1 requirements, landfill gas has been monitored on a monthly basis since February 2003. There are thirteen gas wells located in the vicinity of the landfill overall; eleven perimeter gas wells and two located within the waste mass of the pre-1984 landfill. Results of the monthly monitoring are included in Appendix B of this Report.

4.1.1 Landfill Gas Wells

Two landfill gas wells are monitored on the pre-1984 landfill site, LG13 and LG14. These two wells were drilled directly into the main waste pile. Gas well LG14 could not be monitored throughout 2015 as it has been covered. Exceedances in CO₂ (4.5% to 26.6%) and CH₄ (71.6% to 79.6.2%) were detected in gas well LG13 throughout the year.

4.1.2 Perimeter Gas Wells

There are eleven gas-monitoring points installed at perimeter locations in the vicinity of the landfill. These were installed to determine the degree, if any, of subsurface landfill gas migration. Nine of these wells were located in Moyross between the landfill and local housing estates. Only eight wells were available for monitoring as some wells were covered or flooded during the surveys. No exceedances in CH₄ were detected in any of the perimeter boreholes during the monitoring period, apart from LG11 on the single occasion it could be accessed in April 2015 (1.1%). CO₂ exceedances were detected on a number of occasions ranging from 1.6% to 6.3%.

4.1.3 Interpretation

There was no marked change in LG01 and LG05 between 2014 and 2015. In LG03 there was an increase in CO₂ levels across the year when compared to 2014 (12/12 exceedances in 2015 compared to 10/12 exceedances in 2014). There were fluctuations in LG06, LG07 and LG08 within 2015 for CO₂. These fluctuations were similar to 2014. LG11 was only accessible once during 2015 and exceeded the limit for methane. In comparison, LG11 was accessible 3 times in 2014 and did not exceed the limit for methane on any occasion. LG12 exceeded the limit for CO₂ on six of the seven occasions it was accessible. This is in contrast to 2014 where LG12 did not exceed the CO₂ limit of either of the two occasions it was accessed. LG13 within the waste body showed, on average, a slight increase of 1.7% in levels of methane and a slight decrease of 2.6% in levels of CO₂ in 2015 when compared to 2014 (when the anomalous readings from December 2015 are excluded from the statistical analysis).

Overall, there is evidence of methane migration from the site to LG11. There is evidence of CO₂ migration from the site to LG03, LG06, LG07, LG08 and LG12.

4.2 Dust Control - PM₁₀ Monitoring

No PM₁₀ monitoring was carried out in 2015 as the landfill is closed and has ceased operations.

4.3 Noise Monitoring

The landfill at Longpavement has been closed for the acceptance of waste since 2002 and, as restoration activity ceased in 2010, no noise monitoring was conducted in 2015.

4.4 Surface Water

4.4.1 Surface Water Results

Surface water sampling was carried out at 7 No. locations in the vicinity of the landfill boundary (SW-01, SW-02, SW-03, SW-04, SW-05, SW-06 and SW-07); refer to Drawing No 2307-1004 contained in Appendix A of this Report for exact locations. The quality of surface waters has been assessed against specific Environmental Quality Standards (EQS) listed in relevant legislation. Surface water limit concentrations have been evaluated against A1 – A3 quality standards in S.I. No. 294 of 1989 (European Communities (Quality of Surface Water intended for

the abstraction of Drinking Water) Regulations, 1989) and against S.I. No. 272 of 2009 (European Communities Environmental Objectives (Surface Water) Regulations 2009). Surface water sampling results are shown in Appendix C, D, E, F and G of this report, within the various quarterly and annual reports.

4.4.2 Surface Water Interpretation

4.4.2.1 S.I. No. 294 of 1989

All surface waters showed fluctuations in water quality through the year. SW-01 showed a decrease in quality from A2 in Q1 to below standard A3 in Q3 and Q4. SW-02 fluctuated between A2 and A3 throughout the year. SW-03 decreased in quality from A2 in Q1 to A3 in Q2 and Q3, before increasing in quality to A1 in Q4. SW-04 increased in quality from below standard A3 in the first 3 quarters to A2 in Q4. The quality of SW-05 increased throughout the year from below standard A3 in Q1 and Q2 to A3 in Q3 and A2 in Q4. SW-06 fluctuated between A2 and below standard A3 throughout the year. SW-07 slightly increased in quality from below standard A3 in the first 3 quarters to A3 in Q4.

The overall trend is that SW-01 has decreased in quality, while SW-03, SW-04, SW-05 and SW-07 have increased in quality. SW-02 and SW-06 remain unchanged.

The annual surface water analysis shows some decreases overall across the samples in calcium, magnesium, potassium, sodium, sulphate and nitrite compared to 2014. The results show some exceedances when compared to surface water and drinking water limits and guideline values.

4.4.2.2 S.I. No. 272 of 2009

All quarterly surface water samples failed to achieve Good status for ammonia (as N) according to S.I. No. 272 of 2009 except for SW-01 and SW-06 in Q3 and SW-03 in Q4. The majority of samples failed to achieve Good status for B.O.D. Exceptions were SW-01, SW-02, SW-03 and SW-06 in Q1; SW-03, SW-05 and SW-06 in Q3; and all samples except SW-02 in Q4. All samples except SW-02 and SW-06 in Q1, SW-03 in Q2, and SW-01 and SSW-03 in Q4 failed to achieve Good status for Dissolved Oxygen. All samples received Good status for pH throughout the year.

The orthophosphate (as P) result for all annual surface waters was below the mean limit value of 0.025 mg/L required for a river water body to be awarded a High status.

4.5 Groundwater

4.5.1 Groundwater Results

There are 6 No. Groundwater monitoring wells at the Longpavement landfill facility, GW-01, GW-02, GW-03, GW-04, GW-05 and GW-06 as shown on Drawing No. 2307/1004 contained in Appendix A of this Report. GW-06 is unavailable for sampling. Groundwater quality has been monitored on a quarterly and annual basis and assessed to European Communities Environmental Objectives (Groundwater) Regulations S.I. No. 9 of 2010 and Towards Setting Guideline Values for the Protection of Groundwater in Ireland – Interim Report, EPA 2003. Results for groundwater monitoring at the facility are shown in Appendix C, D, E, F and G of this report, within the various quarterly and annual reports.

4.5.2 Groundwater Interpretation

4.5.2.1 Towards Setting Guideline Values for the Protection of Groundwater in Ireland – Interim Report, EPA 2003

GW-04 Shallow and GW-05 Shallow were too shallow to sample in 2015. Calcium levels were above the Interim Guideline Value (IGV) of 200 mg/L in GW-01 Shallow, GW-02 Deep and GW-05 Deep. The magnesium level was above the IGV of 50 mg/L in GW-01 Shallow. Potassium levels were above the IGV of 5 mg/L in GW-01 Shallow, GW-01 Deep, GW-02 Shallow and GW-02 Deep. Iron and manganese levels were far in excess of the IGVs of 0.2 mg/L and 0.05 mg/L, respectively, in all GW samples.

4.5.2.2 S.I. No. 9 of 2010

GW-04 Shallow and GW-05 Shallow were too shallow to sample in 2015. Lead levels were above the limit of 18.75 µg/L set down in S.I. No. 9 of 2010 in GW-01 Shallow and GW-02 Shallow. Nickel levels were above the limit of 15 µg/L in GW-01 Shallow, GW-02 Shallow, GW-03 Shallow, GW-03 Deep and GW-05 Deep. Sodium levels were above the limit of 150 mg/L in GW-01 Shallow and GW-01 Deep. Sulphate levels were above the limit of 187.5 mg/L

in samples GW-01 Shallow and GW-02 Shallow. Cyanide levels were below the limits of detection in all samples except GW-02 Deep, which was above the limit of 37.5 µg/L.

The annual analysis indicates an overall decrease in lead, zinc and cyanide levels across the site when compared to 2014. The groundwater at the site is classified as being of poor chemical status as per S.I. No. 9 of 2010. This classification is the same as 2014.

4.6 Leachate

4.6.1 Leachate Results

There are 13 No. Leachate monitoring wells at the Longpavement landfill facility, which are currently 100 mm in diameter. All available wells were sampled. These wells have been identified as L01 to L011, and are located on the landfill as shown on Drawing No. 2307-1004, contained in Appendix A of this Report. Results for Leachate monitoring at the facility are shown in Appendix C, D, E, F and G of this report, within the various quarterly and annual reports.

4.6.2 Leachate Interpretation

The quarterly leachate samples had typical characteristics of leachate, including strong odour, high turbidity and dark colour. High levels of ammonia and heavy metals, such as chromium, lead, nickel and zinc were observed in the annual leachate samples. Conductivity readings were also high and B.O.D. levels above 10 mg/L recorded at the following locations: L01, L02, L03, L06, L08, L09, L10, Tank and Sump.

4.7 Meteorological Monitoring

Meteorological monitoring data for Shannon Airport is available and can be submitted to the Agency if required.

4.8 Landfill Gas Combustion Plant/Enclosed Flare Monitoring

The commissioning of the Landfill gas flare took place in June 2010 and is continuously in operation.

4.9 Monitoring of Emissions to Sewer

There are no emissions to sewer from the facility. However all emissions to sewer will be monitored when the treated leachate will be discharged from the treatment plant.

4.10 Monitoring of Emissions from onsite Leachate Treatment Plant

The construction of the on-site leachate treatment plant is now complete.

5.0 VOLUME OF LEACHATE PRODUCED & VOLUME OF LEACHATE TRANSPORTED / DISCHARGED OFF-SITE

5.1 Leachate Abstraction Wells

An existing network of 7 No. leachate abstraction wells are present on the site. 3 wells at the post 1984 and 4 wells on the pre-1984 site.

6.0 SITE SURVEY SHOWING EXISTING LEVELS OF THE FACILITY AT THE END OF THE REPORTING PERIOD

N/A

7.0 ESTIMATED ANNUAL & CUMULATIVE QUANTITIES OF LANDFILL GAS EMITTED FROM THE FACILITY

The installation of a landfill gas flare will form part of the rehabilitation proposals. It is proposed to install a permanent gas collection and treatment system at the site. A series of vertical gas extraction wells are being installed to actively extract gas from the waste body. A horizontal gas drainage/equalizing layer consisting of a synthetic material will be placed underneath the final cap.

A computer model was used to estimate the landfill gas production and extraction rates for the Longpavement landfill site. Full details of the computer model are given in Section 3.2.5 of the Longpavement Landfill Rehabilitation Design Report (April 2005) and the Design Report Addendum (July 2005).

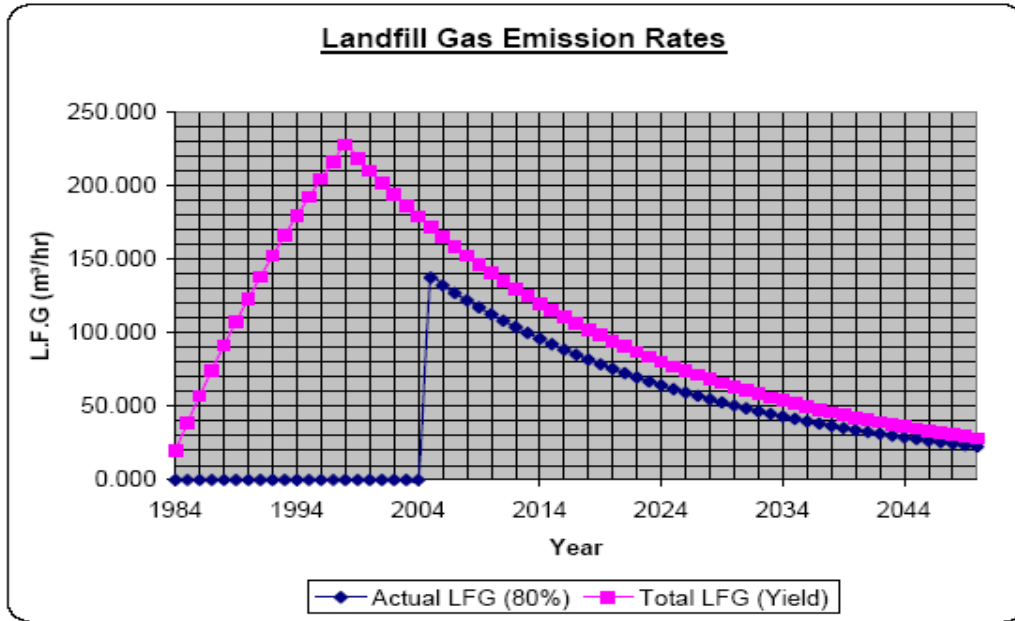


Figure 7.1: Projected Landfill Gas Emission Rates

The results of the model are presented in Figure 7.1 This model shows that in the course of the lifetime of the site that landfill gas production peaked in 1988 and that approx. 137m³/hr is theoretically available for extraction. It is estimated that gas production is on a downward cycle decreasing to 92 m³/hr in 2015 and approx. 75 m³/hr in 2020.

8.0 REPORT ON THE PROGRESS TOWARDS ACHIEVEMENT OF THE ENVIRONMENTAL OBJECTIVES & TARGETS CONTAINED IN PREVIOUS YEAR'S REPORT

All works are now complete on site. All equipment and systems on site were maintained.

9.0 SCHEDULE OF ENVIRONMENT OBJECTIVES & TARGETS FOR THE FORTHCOMING YEAR

The objective for the coming year includes:

1. Maintenance of gas flare System
2. Maintenance of Leachate Collection System

10.0 REPORTED INCIDENTS & COMPLAINT SUMMARIES

No complaints were received during the period from January 2015 to the December 2015.

11.0 REVIEW OF NUISANCE CONTROLS

As the site is now rehabilitated no nuisances are present on site.

11.1 Pest Control

Pest control is carried out regularly.

11.2 Litter Control

Litter is not an issue on the rehabilitated site.

11.3 Dust Control

No material was imported on to the site during 2015.

11.4 Bird Control

There is no evidence of bird nuisance at the landfill site. The site has closed for the acceptance of waste since March 1998.

12.0 REPORTS ON FINANCIAL PROVISION MADE UNDER THIS LICENCE, MANAGEMENT & STAFFING STRUCTURE OF THE FACILITY, & A PROGRAMME FOR PUBLIC INFORMATION

The contract value for the restoration works is €5.3m. 75% of the 2008 expenditure is grant aided by the Department of the Environment Heritage and Local Government. The remaining 25% is funded by Limerick City Councils internal capital fund. An on-going maintenance budget of €80,000 to €90,000 per annum is also in place. The SEE in environment oversees any works at Longpavement. A programme for public information prepared by Limerick City Council is in place.

Appendix A

Site map showing sampling locations



Appendix B

Monthly Gas Monitoring Results

Parameter	Unit	Limit
CH ₄	%v/v	1% v/v
CO ₂	%v/v	1.5% v/v
O ₂	%v/v	n/a
Temp.	°C	n/a
Pressure	mbar	n/a

Landfill Gas Monitoring Results – Longpavement Landfill 2015

Date	Operator	Location	LG 01	LG 02	LG 03	LG 04	LG 05	LG 06	LG 07	LG 08	LG 09	LG 10	LG 11	LG 12	LG 13	LG 14
08/01/2015	Aidan Daffy	CH ₄	0.2	Flooded	0.2	Covered	0.2	0.2	0.2	0.2	Covered	Covered	Well blocked	Well blocked	77.7	Covered
		CO ₂	0.3		3.7		0.1	1.7	2.6	1.4					12.7	
		O ₂	10.2		14.5		20.7	18.7	16.4	19.3					0.1	
		Temp.	6.0		6.2		6.8	6.4	6.4	6.3					6.2	
		Pressure	1019		1019		1019	1019	1019	1019					1019	
13/02/2015	Aidan Daffy	CH ₄	0.1	Flooded	0.1	Covered	0.1	0.1	0.1	0.1	Covered	Covered	Well blocked	Well blocked	71.7	Covered
		CO ₂	0.5		3.7		0.1	2.1	1.0	0.1					16.9	
		O ₂	17.3		12.6		21.4	1662	20.6	20.6					0.3	
		Temp.	-		9.4		8.3	8.7	8.0	8.0					7.5	
		Pressure	997		997		997	997	997	997					997	
30/03/2015	Aidan Daffy	CH ₄	0	Flooded	0	Covered	0	0	0	0	Covered	Covered	Well blocked	Well blocked	74.8	Covered
		CO ₂	0.3		4.0		0.1	2.8	1.9	0.7					17.5	
		O ₂	18.4		10.8		20.8	15.8	15.9	19.7					1.3	
		Temp.	10.5		10.3		9.8	10.0	10.0	10.2					10.5	
		Pressure	1000		1000		1000	1000	1000	1000					1000	
14/04/2015	Aidan Daffy	CH ₄	0	Flooded	0	Covered	0	0	0	0	Covered	Covered	1.1	0	77.7	Covered
		CO ₂	0.1		3.9		0.1	3.4	0.9	0.1					17.0	
		O ₂	20.9		11.0		21.3	15.2	20.4	21.3					0.7	
		Temp.	15.0		15.2		16.3	16.4	15.5	15.9					18.4	
		Pressure	1019		1019		1019	1019	1019	1019					1019	
29/05/2015	Aidan Daffy	CH ₄	0	Flooded	0	Covered	0	0	0	0	Covered	Covered	Well blocked	0	75.7	Covered
		CO ₂	0.1		4.7		0	3.5	3.7	1.1					19.2	
		O ₂	20.1		9.5		20.6	14.9	15.5	18.1					0.8	
		Temp.	15.5		15.3		18.0	15.0	15.9	16.6					14.2	
		Pressure	1011		1011		1011	1011	1011	1011					1011	
29/06/2015	Aidan Daffy	CH ₄	0	Flooded	0	Covered	0	0	0	0	Covered	Covered	Well blocked	0	75.1	Covered
		CO ₂	0.1		5.2		0.2	3.7	0.7	0.2					22.6	
		O ₂	20.7		8.6		19.5	10.1	20.0	20.4					0.4	
		Temp.	16.9		18.2		18.5	18.8	18.9	19.0					17.5	
		Pressure	1017		1017		1017	1017	1017	1017					1017	

Landfill Gas Monitoring Results – Longpavement Landfill 2015 contd.

Date	Operator	Location	LG 01	LG 02	LG 03	LG 04	LG 05	LG 06	LG 07	LG 08	LG 09	LG 10	LG 11	LG 12	LG 13*	LG 14*
30/07/2015	Aidan Daffy	CH ₄	0	Flooded	0	Covered	0	0	0	0	Covered	Covered	Well blocked	0	71.7	Covered
		CO ₂	0.1		5.9		0.1	5.4	1.5	0.5				3.7	24.6	
		O ₂	20.4		12.7		20.5	9.1	19.3	20.1				17.6	0.4	
		Temp.	18.1		19.5		19.0	18.6	18.2	20.1				14.5	16.7	
		Pressure	1022		1022		1022	1022	1022	1022				1022	1022	
28/08/2015	Aidan Daffy	CH ₄	0	Flooded	0	Covered	0	0	0	0	Covered	Covered	Well blocked	Flooded	71.6	Covered
		CO ₂	0.1		6.3		0.2	5.1	4.9	1.8				26.6		
		O ₂	20.4		13.0		20.4	14.9	15.0	19.3				0.3		
		Temp.	15.2		16.2		14.9	15.4	15.5	16.0				15.8		
		Pressure	1009		1009		1009	1009	1009	1009				1009		
29/09/2015	Aidan Daffy	CH ₄	0	Valve seized	0.1	Covered	0	0	0	0	Covered	Covered	Well blocked	0	72.4	Covered
		CO ₂	0.1		6.0		0.3	4.8	3.4	3.0				3.5	25.6	
		O ₂	20.1		11.0		20.3	15.3	14.2	15.8				17.5	0.3	
		Temp.	17.2		17.8		17.9	18.4	18.4	18.8				17.2	16.9	
		Pressure	1034		1034		1034	1034	1034	1034				1034		
30/10/2015	Aidan Daffy	CH ₄	<0.1	Flooded	<0.1	Covered	<0.1	<0.1	<0.1	<0.1	Covered	Covered	Well blocked	<0.1	73.4	Covered
		CO ₂	0.1		6.0		0.1	5.2	3.1	1.6				1.2	26.0	
		O ₂	20.6		9.8		19.8	15.4	18.3	19.0				18.7	0.5	
		Temp.	15.5		16.2		15.8	14.5	15.0	15.4				15.4	14.8	
		Pressure	1006		1006		1006	1006	1006	1006				1006		
16/11/2015	Aidan Daffy	CH ₄	<0.1	Flooded	<0.1	Covered	<0.1	<0.1	<0.1	<0.1	Covered	Covered	Well blocked	<0.1	79.6	Covered
		CO ₂	0.5		5.1		<0.1	1.7	1.2	0.4				1.7	19.4	
		O ₂	16.6		9.9		20.6	18.3	20.2	20.8				14.8	0.3	
		Temp.	10.4		10.5		10.3	9.8	10.0	10.2				10.8	9.7	
		Pressure	1006		1005		1006	1006	1006	1006				1006		
19/12/2014	Aidan Daffy	CH ₄	<0.1	Flooded	<0.1	Covered	<0.1	Flooded	<0.1	<0.1	Covered	Covered	Flooded	Flooded	0.3	Covered
		CO ₂	0.6		5.0		0.3	1.9	0.4	4.5						
		O ₂	16.6		10.2		20.4	18.3	19.2	17.3						
		Temp.	11.8		11.1		12.0	11.0	10.2	11.0						
		Pressure	1004		1004		1004	1004	1004	1004						

Appendix C:

**First quarterly report covering groundwater, surfacewater
and leachate monitoring at Longpavement Landfill**

(Monitoring Period January-March 2015)

TEST REPORT 116359.1Analysing
Testing
Consulting
CalibratingClient: Environmental Department
Limerick City Council
Dooradoyle
Co. Limerick

BHP Ref. No.: 15/01/719

Order No.:

Date Received: 29/01/15

Date Completed: 31/01/15

Test Specification: Nil

Item: Q1 Surface Water 2015

FTAO: Tara Flanagan

BHP
New Road
Thomondgate
Limerick
Ireland
Tel +353 61 455399
Fax + 353 61 455447
E Mail bhpccm2@bhp.ie

Test	Client Reference	Units	Results	Date Analysed	Standard Reference*
Odour	SW 01	-	No Odour	29/01/2015	APHA - 2110
Visual Inspection		-	Clear	29/01/2015	APHA - 2110
Ammoniacal Nitrogen (as NH ₃ -N)		mg/L	0.29	30/01/2015	APHA - 4500 - NH ₃ - D
B.O.D.		mg/L	2.5	30/01/2015	APHA - 5210 - B
C.O.D.		mg/L	14	30/01/2015	APHA - 5220 - D
Chloride		mg/L	25.854	31/01/2015	APHA - 4110 - D
Dissolved Oxygen		%	51.7	29/01/2015	APHA - 4500 - O - G
Electrical Conductivity		µS/cm	429	29/01/2015	APHA - 2510 - B
pH		-	7.53	29/01/2015	APHA - 4500 - H ⁺
Total Suspended Solids		mg/L	2.7	30/01/2015	APHA - 2540 - D
Temperature		°C	5.4	29/01/2015	APHA - 2550 - B

Additional information :

*Documented in-house methods based on stated standard references

For and on behalf of BHP laboratories :**John O' Halloran****Issue Date : 03/03/15**

This Test Report shall not be duplicated except in full and then only with the permission of the test laboratory

TEST REPORT 116359.2

Analysing
Testing
Consulting
Calibrating



Client: Environmental Department
Limerick City Council
Dooradoyle
Co. Limerick

FTAO: Tara Flanagan

BHP Ref. No.: 15/01/720

Order No.:

Date Received: 29/01/15

Date Completed: 31/01/15

Test Specification: Nil

Item: Q1 Surface Water 2015

BHP
New Road
Thomondgate
Limerick
Ireland
Tel +353 61 455399
Fax + 353 61 455447
E Mail bhpccm2@bhp.ie

Test	Client Reference	Units	Results	Date Analysed	Standard Reference*
Odour	SW 02	-	No Odour	29/01/2015	APHA - 2110
Visual Inspection		-	Clear	29/01/2015	APHA - 2110
Ammoniacal Nitrogen (as NH ₃ -N)		mg/L	1.22	30/01/2015	APHA - 4500 - NH ₃ - D
B.O.D.		mg/L	2.44	30/01/2015	APHA - 5210 - B
C.O.D.		mg/L	17	30/01/2015	APHA - 5220 - D
Chloride		mg/L	20.71	31/01/2015	APHA - 4110 - D
Dissolved Oxygen		%	90.3	29/01/2015	APHA - 4500 - O - G
Electrical Conductivity		µS/cm	378	29/01/2015	APHA - 2510 - B
pH		-	7.59	29/01/2015	APHA - 4500 - H ⁺
Total Suspended Solids		mg/L	<0.1	30/01/2015	APHA - 2540 - D
Temperature		°C	5.3	29/01/2015	APHA - 2550 - B

Additional information :

*Documented in-house methods based on stated standard references

For and on behalf of BHP laboratories :

John O' Halloran

Issue Date : 03/03/15

This Test Report shall not be duplicated except in full and then only with the permission of the test laboratory

TEST REPORT 116359.3Analysing
Testing
Consulting
CalibratingClient: Environmental Department
Limerick City Council
Dooradoyle
Co. Limerick

BHP Ref. No.: 15/01/721

Order No.:

Date Received: 29/01/15

Date Completed: 31/01/15

Test Specification: Nil

Item: Q1 Surface Water 2015

FTAO: Tara Flanagan

BHP
New Road
Thomondgate
Limerick
Ireland
Tel +353 61 455399
Fax + 353 61 455447
E Mail bhpccm2@bhp.ie

Test	Client Reference	Units	Results	Date Analysed	Standard Reference*
Odour	SW 03	-	No Odour	29/01/2015	APHA - 2110
Visual Inspection		-	Clear	29/01/2015	APHA - 2110
Ammoniacal Nitrogen (as NH ₃ -N)		mg/L	0.99	30/01/2015	APHA - 4500 - NH ₃ - D
B.O.D.		mg/L	1.88	30/01/2015	APHA - 5210 - B
C.O.D.		mg/L	34	30/01/2015	APHA - 5220 - D
Chloride		mg/L	20.342	31/01/2015	APHA - 4110 - D
Dissolved Oxygen		%	79.4	29/01/2015	APHA - 4500 - O - G
Electrical Conductivity		µS/cm	300	29/01/2015	APHA - 2510 - B
pH		-	8.13	29/01/2015	APHA - 4500 - H ⁺
Total Suspended Solids		mg/L	<0.1	30/01/2015	APHA - 2540 - D
Temperature		°C	4.7	29/01/2015	APHA - 2550 - B

Additional information :

*Documented in-house methods based on stated standard references

For and on behalf of BHP laboratories :

John O' Halloran

Issue Date : 03/03/15

This Test Report shall not be duplicated except in full and then only with the permission of the test laboratory

TEST REPORT 116359.4Analysing
Testing
Consulting
CalibratingClient: Environmental Department
Limerick City Council
Dooradoyle
Co. Limerick

BHP Ref. No.: 15/01/722

Order No.:

Date Received: 29/01/15

Date Completed: 31/01/15

Test Specification: Nil

Item: Q1 Surface Water 2015

FTAO: Tara Flanagan

BHP
New Road
Thomondgate
Limerick
Ireland
Tel +353 61 455399
Fax + 353 61 455447
E Mail bhpccm2@bhp.ie

Test	Client Reference	Units	Results	Date Analysed	Standard Reference*
Odour	SW 04	-	No Odour	29/01/2015	APHA - 2110
Visual Inspection		-	Slight Straw	29/01/2015	APHA - 2110
Ammoniacal Nitrogen (as NH ₃ -N)		mg/L	4.5	30/01/2015	APHA - 4500 - NH ₃ - D
B.O.D.		mg/L	2.66	30/01/2015	APHA - 5210 - B
C.O.D.		mg/L	32	30/01/2015	APHA - 5220 - D
Chloride		mg/L	22.343	31/01/2015	APHA - 4110 - D
Dissolved Oxygen		%	23.1	29/01/2015	APHA - 4500 - O - G
Electrical Conductivity		µS/cm	347	29/01/2015	APHA - 2510 - B
pH		-	7.25	29/01/2015	APHA - 4500 - H ⁺
Total Suspended Solids		mg/L	0.33	30/01/2015	APHA - 2540 - D
Temperature		°C	5.3	29/01/2015	APHA - 2550 - B

Additional information :

*Documented in-house methods based on stated standard references

For and on behalf of BHP laboratories :

John O' Halloran

Issue Date : 03/03/15

This Test Report shall not be duplicated except in full and then only with the permission of the test laboratory

TEST REPORT 116359.5Analysing
Testing
Consulting
CalibratingClient: Environmental Department
Limerick City Council
Dooradoyle
Co. Limerick

BHP Ref. No.: 15/01/723

Order No.:

Date Received: 29/01/15

Date Completed: 31/01/15

Test Specification: Nil

Item: Q1 Surface Water 2015

FTAO: Tara Flanagan

BHP
New Road
Thomondgate
Limerick
Ireland
Tel +353 61 455399
Fax + 353 61 455447
E Mail bhpccm2@bhp.ie

Test	Client Reference	Units	Results	Date Analysed	Standard Reference*
Odour	SW 05	-	No Odour	29/01/2015	APHA - 2110
Visual Inspection		-	Slight Straw	29/01/2015	APHA - 2110
Ammoniacal Nitrogen (as NH ₃ -N)		mg/L	7.25	30/01/2015	APHA - 4500 - NH ₃ - D
B.O.D.		mg/L	3.6	30/01/2015	APHA - 5210 - B
C.O.D.		mg/L	38	30/01/2015	APHA - 5220 - D
Chloride		mg/L	26.503	31/01/2015	APHA - 4110 - D
Dissolved Oxygen		%	25.2	29/01/2015	APHA - 4500 - O - G
Electrical Conductivity		µS/cm	400	29/01/2015	APHA - 2510 - B
pH		-	7.18	29/01/2015	APHA - 4500 - H ⁺
Total Suspended Solids		mg/L	<0.1	30/01/2015	APHA - 2540 - D
Temperature		°C	5.4	29/01/2015	APHA - 2550 - B

Additional information :

*Documented in-house methods based on stated standard references

For and on behalf of BHP laboratories :

John O' Halloran

Issue Date : 03/03/15

This Test Report shall not be duplicated except in full and then only with the permission of the test laboratory

TEST REPORT 116359.6Analysing
Testing
Consulting
CalibratingClient: Environmental Department
Limerick City Council
Dooradoyle
Co. Limerick

BHP Ref. No.: 15/01/724

Order No.:

Date Received: 29/01/15

Date Completed: 31/01/15

Test Specification: Nil

Item: Q1 Surface Water 2015

FTAO: Tara Flanagan

BHP
New Road
Thomondgate
Limerick
Ireland
Tel +353 61 455399
Fax + 353 61 455447
E Mail bhpccm2@bhp.ie

Test	Client Reference	Units	Results	Date Analysed	Standard Reference*
Odour	SW 06	-	No Odour	29/01/2015	APHA - 2110
Visual Inspection		-	Clear	29/01/2015	APHA - 2110
Ammoniacal Nitrogen (as NH ₃ -N)		mg/L	0.19	30/01/2015	APHA - 4500 - NH ₃ - D
B.O.D.		mg/L	1.86	30/01/2015	APHA - 5210 - B
C.O.D.		mg/L	30	30/01/2015	APHA - 5220 - D
Chloride		mg/L	17.4	31/01/2015	APHA - 4110 - D
Dissolved Oxygen		%	95.8	29/01/2015	APHA - 4500 - O - G
Electrical Conductivity		µS/cm	238	29/01/2015	APHA - 2510 - B
pH		-	8.60	29/01/2015	APHA - 4500 - H ⁺
Total Suspended Solids		mg/L	<0.1	30/01/2015	APHA - 2540 - D
Temperature		°C	4.2	29/01/2015	APHA - 2550 - B

Additional information :

*Documented in-house methods based on stated standard references

For and on behalf of BHP laboratories :

John O' Halloran

Issue Date : 03/03/15

This Test Report shall not be duplicated except in full and then only with the permission of the test laboratory

TEST REPORT 116359.7Analysing
Testing
Consulting
CalibratingClient: Environmental Department
Limerick City Council
Dooradoyle
Co. Limerick

BHP Ref. No.: 15/01/725

Order No.:

Date Received: 29/01/15

Date Completed: 31/01/15

Test Specification: Nil

Item: Q1 Surface Water 2015

FTAO: Tara Flanagan

BHP
New Road
Thomondgate
Limerick
Ireland
Tel +353 61 455399
Fax + 353 61 455447
E Mail bhpccm2@bhp.ie

Test	Client Reference	Units	Results	Date Analysed	Standard Reference*
Odour	SW 07	-	No Odour	29/01/2015	APHA - 2110
Visual Inspection		-	Clear	29/01/2015	APHA - 2110
Ammoniacal Nitrogen (as NH ₃ -N)		mg/L	10.75	30/01/2015	APHA - 4500 - NH ₃ - D
B.O.D.		mg/L	7.68	30/01/2015	APHA - 5210 - B
C.O.D.		mg/L	21.5	30/01/2015	APHA - 5220 - D
Chloride		mg/L	41.4	31/01/2015	APHA - 4110 - D
Dissolved Oxygen		%	42.7	29/01/2015	APHA - 4500 - O - G
Electrical Conductivity		µS/cm	533	29/01/2015	APHA - 2510 - B
pH		-	7.77	29/01/2015	APHA - 4500 - H ⁺
Total Suspended Solids		mg/L	<0.1	30/01/2015	APHA - 2540 - D
Temperature		°C	4.9	29/01/2015	APHA - 2550 - B

Additional information :

*Documented in-house methods based on stated standard references

For and on behalf of BHP laboratories :**John O' Halloran****Issue Date : 03/03/15**

This Test Report shall not be duplicated except in full and then only with the permission of the test laboratory

TEST REPORT 116368.1Analysing
Testing
Consulting
Calibrating**Client: Environmental Department
Limerick City Council
Dooradoyle
Co. Limerick****BHP Ref. No.: 15/01/740
Order No.:
Date Received: 30/01/15
Date Completed: 19/02/15
Test Specification: Nil
Item: Q1 Ground Water 2015****FTAO: Tara Flanagan****BHP
New Road
Thomondgate
Limerick
Ireland
Tel +353 61 455399
Fax + 353 61 455447
E Mail bhpcem2@bhp.ie**

Test	Client Reference	Units	Results	Date Analysed	Standard Reference*
Odour	GW 01 Shallow	-	Slight Odour	30/01/2015	APHA - 2150 - B
Visual Inspection		-	Black/Grey	30/01/2015	APHA - 2110
Ammoniacal Nitrogen (as NH ₃ -N)		mg/L	3	02/02/2015	APHA - 4500 - NH ₃ - D
Chloride		mg/L	251.7	19/02/2015	APHA - 4110 - D
Dissolved Oxygen		%	21	30/01/2015	APHA - 4500 - O - G
Electrical Conductivity		µS/cm	4419	30/01/2015	APHA - 2510 - B
pH		-	6.91	30/01/2015	APHA - 4500 - H ⁺
Temperature		°C	8.5	30/01/2015	APHA - 2550 - B
Total Organic Carbon		mg/L	7.3	18/02/2015	APHA - 5310 - C

Additional information :

*Documented in-house methods based on stated standard references

For and on behalf of BHP laboratories :**John O' Halloran
Issue Date : 25/02/15**

This Test Report shall not be duplicated except in full and then only with the permission of the test laboratory

TEST REPORT 116368.2Analysing
Testing
Consulting
Calibrating**Client: Environmental Department
Limerick City Council
Dooradoyle
Co. Limerick****BHP Ref. No.: 15/01/741
Order No.:
Date Received: 30/01/15
Date Completed: 19/02/15
Test Specification: Nil
Item: Q1 Ground Water 2015****FTAO: Tara Flanagan****BHP
New Road
Thomondgate
Limerick
Ireland
Tel +353 61 455399
Fax + 353 61 455447
E Mail bhpcem2@bhp.ie**

Test	Client Reference	Units	Results	Date Analysed	Standard Reference*
Odour	GW 01 Deep		Slight Odour	30/01/2015	APHA - 2150 - B
Visual Inspection		-	Grey	30/01/2015	APHA - 2110
Ammoniacal Nitrogen (as NH ₃ -N)		mg/L	33.5	02/02/2015	APHA - 4500 - NH ₃ - D
Chloride		mg/L	174.9	19/02/2015	APHA - 4110 - D
Dissolved Oxygen		%	23	30/01/2015	APHA - 4500 - O - G
Electrical Conductivity		µS/cm	1948	30/01/2015	APHA - 2510 - B
pH		-	7.01	30/01/2015	APHA - 4500 - H ⁺
Temperature		°C	9.7	30/01/2015	APHA - 2550 - B
Total Organic Carbon		mg/L	9	05/02/2015	APHA - 5310 - C

Additional information :

*Documented in-house methods based on stated standard references

For and on behalf of BHP laboratories :**John O' Halloran
Issue Date : 25/02/15**

This Test Report shall not be duplicated except in full and then only with the permission of the test laboratory

TEST REPORT 116368.3Analysing
Testing
Consulting
Calibrating**Client: Environmental Department
Limerick City Council
Dooradoyle
Co. Limerick****BHP Ref. No.: 15/01/742
Order No.:
Date Received: 30/01/15
Date Completed: 19/02/15
Test Specification: Nil
Item: Q1 Ground Water 2015****FTAO: Tara Flanagan****BHP
New Road
Thomondgate
Limerick
Ireland
Tel +353 61 455399
Fax + 353 61 455447
E Mail bhpcem2@bhp.ie**

Test	Client Reference	Units	Results	Date Analysed	Standard Reference*
Odour	GW 02 Shallow	-	None	30/01/2015	APHA - 2150 - B
Visual Inspection		-	Brown	30/01/2015	APHA - 2110
Ammoniacal Nitrogen (as NH ₃ -N)		mg/L	3	02/02/2015	APHA - 4500 - NH ₃ - D
Chloride		mg/L	207.6	19/02/2015	APHA - 4110 - D
Dissolved Oxygen		%	54	30/01/2015	APHA - 4500 - O - G
Electrical Conductivity		µS/cm	1745	30/01/2015	APHA - 2510 - B
pH		-	7.67	30/01/2015	APHA - 4500 - H ⁺
Temperature		°C	9.0	30/01/2015	APHA - 2550 - B
Total Organic Carbon		mg/L	17	05/02/2015	APHA - 5310 - C

Additional information :

*Documented in-house methods based on stated standard references

For and on behalf of BHP laboratories :**John O' Halloran
Issue Date : 25/02/15**

This Test Report shall not be duplicated except in full and then only with the permission of the test laboratory

TEST REPORT 116368.4Analysing
Testing
Consulting
Calibrating**Client: Environmental Department
Limerick City Council
Dooradoyle
Co. Limerick****BHP Ref. No.: 15/01/743
Order No.:
Date Received: 30/01/15
Date Completed: 19/02/15
Test Specification: Nil
Item: Q1 Ground Water 2015****FTAO: Tara Flanagan****BHP
New Road
Thomondgate
Limerick
Ireland
Tel +353 61 455399
Fax + 353 61 455447
E Mail bhpcem2@bhp.ie**

Test	Client Reference	Units	Results	Date Analysed	Standard Reference*
Odour	GW 02 Deep	-	Slight Odour	30/01/2015	APHA - 2150 - B
Visual Inspection		-	Light Brown	30/01/2015	APHA - 2110
Ammoniacal Nitrogen (as NH ₃ -N)		mg/L	17.5	02/02/2015	APHA - 4500 - NH ₃ - D
Chloride		mg/L	149.1	19/02/2015	APHA - 4110 - D
Dissolved Oxygen		%	28	30/01/2015	APHA - 4500 - O - G
Electrical Conductivity		µS/cm	2104	30/01/2015	APHA - 2510 - B
pH		-	6.90	30/01/2015	APHA - 4500 - H ⁺
Temperature		°C	10.3	30/01/2015	APHA - 2550 - B
Total Organic Carbon		mg/L	4	05/02/2015	APHA - 5310 - C

Additional information :

*Documented in-house methods based on stated standard references

For and on behalf of BHP laboratories :**John O' Halloran
Issue Date : 25/02/15**

This Test Report shall not be duplicated except in full and then only with the permission of the test laboratory

TEST REPORT 116368.5Analysing
Testing
Consulting
Calibrating**Client: Environmental Department
Limerick City Council
Dooradoyle
Co. Limerick****BHP Ref. No.: 15/01/744
Order No.:
Date Received: 30/01/15
Date Completed: 19/02/15
Test Specification: Nil
Item: Q1 Ground Water 2015****BHP
New Road
Thomondgate
Limerick
Ireland
Tel +353 61 455399
Fax + 353 61 455447
E Mail bhpcem2@bhp.ie****FTAO: Tara Flanagan**

Test	Client Reference	Units	Results	Date Analysed	Standard Reference*	
Odour	GW 03 Shallow	-	Slight Leachate Odour	30/01/2015	APHA - 2150 - B	
Visual Inspection		-	Clear	30/01/2015	APHA - 2110	
Ammoniacal Nitrogen (as NH ₃ -N)		mg/L	0.5		02/02/2015	APHA - 4500 - NH ₃ - D
Chloride		mg/L	5.8		16/02/2015	APHA - 4110 - D
Dissolved Oxygen		%	26		30/01/2015	APHA - 4500 - O - G
Electrical Conductivity		µS/cm	733		30/01/2015	APHA - 2510 - B
pH		-	6.87		30/01/2015	APHA - 4500 - H ⁺
Temperature		°C	7.9		30/01/2015	APHA - 2550 - B
Total Organic Carbon		mg/L	15		05/02/2015	APHA - 5310 - C

Additional information :

*Documented in-house methods based on stated standard references

For and on behalf of BHP laboratories :**John O' Halloran
Issue Date : 25/02/15**

This Test Report shall not be duplicated except in full and then only with the permission of the test laboratory

TEST REPORT 116368.6

Analysing
Testing
Consulting
Calibrating



BHP
New Road
Thomondgate
Limerick
Ireland
Tel +353 61 455399
Fax + 353 61 455447
E Mail bhpccem2@bhp.ie

Client: Environmental Department
Limerick City Council
Dooradoyle
Co. Limerick

FTAO: Tara Flanagan

BHP Ref. No.: 15/01/745
Order No.:
Date Received: 30/01/15
Date Completed: 19/02/15
Test Specification: Nil
Item: Q1 Ground Water 2015

Test	Client Reference	Units	Results	Date Analysed	Standard Reference*
Odour	GW 03 Deep	-	Slight Odour	30/01/2015	APHA - 2150 - B
Visual Inspection		-	Brown	30/01/2015	APHA - 2110
Ammoniacal Nitrogen (as NH ₃ -N)		mg/L	0.75	02/02/2015	APHA - 4500 - NH ₃ - D
Chloride		mg/L	8.3	16/02/2015	APHA - 4110 - D
Dissolved Oxygen		%	18	30/01/2015	APHA - 4500 - O - G
Electrical Conductivity		µS/cm	792	30/01/2015	APHA - 2510 - B
pH		-	6.86	30/01/2015	APHA - 4500 - H ⁺
Temperature		°C	9.7	30/01/2015	APHA - 2550 - B
Total Organic Carbon		mg/L	9	05/02/2015	APHA - 5310 - C

Additional information :

*Documented in-house methods based on stated standard references

For and on behalf of BHP laboratories :

John O' Halloran
Issue Date : 25/02/15

This Test Report shall not be duplicated except in full and then only with the permission of the test laboratory

TEST REPORT 116368.7Analysing
Testing
Consulting
CalibratingBHP
New Road
Thomondgate
Limerick
Ireland
Tel +353 61 455399
Fax + 353 61 455447
E Mail bhpцем2@bhp.ieClient: Environmental Department
Limerick City Council
Dooradoyle
Co. Limerick

FTAO: Tara Flanagan

BHP Ref. No.: 15/01/746
Order No.:
Date Received: 30/01/15
Date Completed: N/A**
Test Specification: Nil
Item: Q1 Ground Water 2015

Test	Client Reference	Units	Results	Date Analysed	Standard Reference*
Odour	GW 04 Shallow	-	N/A**	N/A**	APHA - 2150 - B
Visual Inspection		-	N/A**	N/A**	APHA - 2110
Ammoniacal Nitrogen (as NH ₃ -N)		mg/L	N/A**	N/A**	APHA - 4500 - NH ₃ - D
Chloride		mg/L	N/A**	N/A**	APHA - 4110 - D
Dissolved Oxygen		%	N/A**	N/A**	APHA - 4500 - O - G
Electrical Conductivity		µS/cm	N/A**	N/A**	APHA - 2510 - B
pH		-	N/A**	N/A**	APHA - 4500 - H ⁺
Temperature		°C	N/A**	N/A**	APHA - 2550 - B
Total Organic Carbon		mg/L	N/A**	N/A**	APHA - 5310 - C

Additional information :

*Documented in-house methods based on stated standard references

**Sample location dry

For and on behalf of BHP laboratories :**John O' Halloran****Issue Date : 25/02/15**

This Test Report shall not be duplicated except in full and then only with the permission of the test laboratory

TEST REPORT 116368.8

Analysing
Testing
Consulting
Calibrating



BHP
New Road
Thomondgate
Limerick
Ireland
Tel +353 61 455399
Fax + 353 61 455447
E Mail bhpccem2@bhp.ie

Client: Environmental Department
Limerick City Council
Dooradoyle
Co. Limerick

FTAO: Tara Flanagan

BHP Ref. No.: 15/01/747
Order No.:
Date Received: 30/01/15
Date Completed: 19/02/15
Test Specification: Nil
Item: Q1 Ground Water 2015

Test	Client Reference	Units	Results	Date Analysed	Standard Reference*
Odour	GW 04 Deep	-	None	30/01/2015	APHA - 2150 - B
Visual Inspection		-	Orange	30/01/2015	APHA - 2110
Ammoniacal Nitrogen (as NH ₃ -N)		mg/L	2.5	02/02/2015	APHA - 4500 - NH ₃ - D
Chloride		mg/L	55.9	16/02/2015	APHA - 4110 - D
Dissolved Oxygen		%	27	30/01/2015	APHA - 4500 - O - G
Electrical Conductivity		µS/cm	385	30/01/2015	APHA - 2510 - B
pH		-	7.08	30/01/2015	APHA - 4500 - H ⁺
Temperature		°C	10.3	30/01/2015	APHA - 2550 - B
Total Organic Carbon		mg/L	9.7	18/02/2015	APHA - 5310 - C

Additional information :

*Documented in-house methods based on stated standard references

For and on behalf of BHP laboratories :

John O' Halloran
Issue Date : 25/02/15

This Test Report shall not be duplicated except in full and then only with the permission of the test laboratory

TEST REPORT 116368.9Analysing
Testing
Consulting
Calibrating**Client: Environmental Department
Limerick City Council
Dooradoyle
Co. Limerick****BHP Ref. No.: 15/01/748
Order No.:
Date Received: 30/01/15
Date Completed: N/A**
Test Specification: Nil
Item: Q1 Ground Water 2015****FTAO: Tara Flanagan****BHP
New Road
Thomondgate
Limerick
Ireland
Tel +353 61 455399
Fax + 353 61 455447
E Mail bhpcem2@bhp.ie**

Test	Client Reference	Units	Results	Date Analysed	Standard Reference*
Odour	GW 05 Shallow	-	N/A**	N/A**	APHA - 2150 - B
Visual Inspection		-	N/A**	N/A**	APHA - 2110
Ammoniacal Nitrogen (as NH ₃ -N)		mg/L	N/A**	N/A**	APHA - 4500 - NH ₃ - D
Chloride		mg/L	N/A**	N/A**	APHA - 4110 - D
Dissolved Oxygen		%	N/A**	N/A**	APHA - 4500 - O - G
Electrical Conductivity		µS/cm	N/A**	N/A**	APHA - 2510 - B
pH		-	N/A**	N/A**	APHA - 4500 - H ⁺
Temperature		°C	N/A**	N/A**	APHA - 2550 - B
Total Organic Carbon		mg/L	N/A**	N/A**	APHA - 5310 - C

Additional information :

*Documented in-house methods based on stated standard references

**Sample location dry

For and on behalf of BHP laboratories :**John O' Halloran
Issue Date : 25/02/15**

This Test Report shall not be duplicated except in full and then only with the permission of the test laboratory

TEST REPORT 116368.10Analysing
Testing
Consulting
Calibrating**Client: Environmental Department
Limerick City Council
Dooradoyle
Co. Limerick****BHP Ref. No.: 15/01/749
Order No.:
Date Received: 30/01/15
Date Completed: 19/02/15
Test Specification: Nil
Item: Q1 Ground Water 2015****FTAO: Tara Flanagan****BHP
New Road
Thomondgate
Limerick
Ireland
Tel +353 61 455399
Fax + 353 61 455447
E Mail bhpcem2@bhp.ie**

Test	Client Reference	Units	Results	Date Analysed	Standard Reference*
Odour	GW 05 Deep	-	None	30/01/2015	APHA - 2150 - B
Visual Inspection		-	Light Brown	30/01/2015	APHA - 2110
Ammoniacal Nitrogen (as NH ₃ -N)		mg/L	4.5	02/02/2015	APHA - 4500 - NH ₃ - D
Chloride		mg/L	425.8	19/02/2015	APHA - 4110 - D
Dissolved Oxygen		%	15	30/01/2015	APHA - 4500 - O - G
Electrical Conductivity		µS/cm	1175	30/01/2015	APHA - 2510 - B
pH		-	6.25	30/01/2015	APHA - 4500 - H ⁺
Temperature		°C	11.1	30/01/2015	APHA - 2550 - B
Total Organic Carbon		mg/L	86	05/02/2015	APHA - 5310 - C

Additional information :

*Documented in-house methods based on stated standard references

For and on behalf of BHP laboratories :**John O' Halloran
Issue Date : 25/02/15**

This Test Report shall not be duplicated except in full and then only with the permission of the test laboratory

TEST REPORT NO.: 116387

Client: Environmental Department
Limerick City Council
Dooradoyle
Co. Limerick

FTAO: Tara Flanagan

BHP Ref. No.: 15/02/019-031
Order No.:
Date Received: 30/01/15
Date Completed: 30/01/15
Test Specification: Nil
Item: Q1 Leachate 2015

Analysing
Testing
Consulting
Calibrating



BHP
New Road
Thomondgate
Limerick
Ireland
Tel +353 61 455399
Fax + 353 61 455447
E Mail bhpcem2@bhp.ie

Test	Client Reference	Units	Results	Standard Reference
Odour	L 01	-	Leachate Odour	APHA - 2150
Visual Inspection		-	Black	APHA - 2110
Temperature		°C	14.9	APHA - 2550 - B
Odour	L 02	-	Leachate Odour	APHA - 2150
Visual Inspection		-	Grey	APHA - 2110
Temperature		°C	13.1	APHA - 2550 - B
Odour	L 03	-	Leachate Odour	APHA - 2150
Visual Inspection		-	Grey	APHA - 2110
Temperature		°C	9.7	APHA - 2550 - B
Odour	L 04	-	Leachate Odour	APHA - 2150
Visual Inspection		-	Light Grey	APHA - 2110
Temperature		°C	9.1	APHA - 2550 - B
Odour	L 05	-	Slight Leachate Odour	APHA - 2150
Visual Inspection		-	Light Brown	APHA - 2110
Temperature		°C	8.6	APHA - 2550 - B

Additional information :

*Documented in-house methods based on stated standard references

For and on behalf of BHP laboratories :

John O'Halloran
Issue Date : 19/02/15

This Test Report shall not be duplicated except in full and then only with the permission of the test laboratory

TEST REPORT NO.: 116387Analysing
Testing
Consulting
CalibratingClient: Environmental Department
Limerick City Council
Dooradoyle
Co. LimerickBHP Ref. No.: 15/02/019-031
Order No.:
Date Received: 30/01/15
Date Completed: 30/01/15
Test Specification: Nil
Item: Q1 Leachate 2015

FTAO: Tara Flanagan

BHP
New Road
Thomondgate
Limerick
Ireland
Tel +353 61 455399
Fax + 353 61 455447
E Mail bhpcem2@bhp.ie

Test	Client Reference	Units	Results	Standard Reference
Odour	L 06	-	No odour	APHA - 2150
Visual Inspection		-	Light Brown	APHA - 2110
Temperature		°C	8.0	APHA - 2550 - B
Odour	L 07	-	No Odour	APHA - 2150
Visual Inspection		-	Orange Brown	APHA - 2110
Temperature		°C	9.2	APHA - 2550 - B
Odour	L 08	-	Leachate Odour	APHA - 2150
Visual Inspection		-	Grey	APHA - 2110
Temperature		°C	10.9	APHA - 2550 - B
Odour	L 09	-	Leachate Odour	APHA - 2150
Visual Inspection		-	Grey	APHA - 2110
Temperature		°C	10.5	APHA - 2550 - B
Odour	L 10	-	Leachate Odour	APHA - 2150
Visual Inspection		-	Black	APHA - 2110
Temperature		°C	7.0	APHA - 2550 - B

Additional information :

*Documented in-house methods based on stated standard references

For and on behalf of BHP laboratories :**John O'Halloran**
Issue Date : 19/02/15

This Test Report shall not be duplicated except in full and then only with the permission of the test laboratory

TEST REPORT NO.: 116387

Analysing
Testing
Consulting
Calibrating



Client: Environmental Department
Limerick City Council
Dooradoyle
Co. Limerick

BHP Ref. No.: 15/02/019-031
Order No.:
Date Received: 30/01/15
Date Completed: 30/01/15
Test Specification: Nil
Item: Q1 Leachate 2015

FTAO: Tara Flanagan

BHP
New Road
Thomondgate
Limerick
Ireland
Tel +353 61 455399
Fax + 353 61 455447
E Mail bhpcem2@bhp.ie

Test	Client Reference	Units	Results	Standard Reference
Odour	L 11	-	Leachate Odour	APHA - 2150
Visual Inspection		-	Black	APHA - 2110
Temperature		°C	11.1	APHA - 2550 - B
Odour	Tank	-	Slight Leachate Odour	APHA - 2150
Visual Inspection		-	Orange	APHA - 2110
Temperature		°C	5.2	APHA - 2550 - B
Odour	Sump	-	No odour	APHA - 2150
Visual Inspection		-	Light Orange	APHA - 2110
Temperature		°C	8.1	APHA - 2550 - B

Additional information :

*Documented in-house methods based on stated standard references

For and on behalf of BHP laboratories :

John O'Halloran
Issue Date : 19/02/15

This Test Report shall not be duplicated except in full and then only with the permission of the test laboratory

Appendix D:

**Second quarterly report covering groundwater,
surfacewater and leachate monitoring at Longpavement**

Landfill (Monitoring Period April-June 2015)

TEST REPORT 117817.1

Analysing
Testing
Consulting
Calibrating



BHP
New Road
Thomondgate
Limerick
Ireland
Tel +353 61 455399
Fax + 353 61 455447
E Mail bhpccm2@bhp.ie

Client: Environmental Department
Limerick City Council
Dooradoyle
Co. Limerick

FTAO: Tara Flanagan

BHP Ref. No.: 15/06/351
Order No.:
Date Received: 11/06/15
Date Completed: N/A**
Test Specification: Nil
Item: Q2 Surface Water 2015

Test	Client Reference	Units	Results	Date Analysed	Standard Reference*
Odour	SW 01	-	N/A**	N/A**	APHA - 2110
Visual Inspection		-	N/A**	N/A**	APHA - 2110
Ammoniacal Nitrogen (as NH ₃ -N)		mg/L	N/A**	N/A**	APHA - 4500 - NH ₃ - G
B.O.D.		mg/L	N/A**	N/A**	APHA - 5210 - B
C.O.D.		mg/L	N/A**	N/A**	APHA - 5220 - D
Chloride		mg/L	N/A**	N/A**	APHA - 4500 - Cl ⁻ - E
Dissolved Oxygen		%	N/A**	N/A**	APHA - 4500 - O - G
Electrical Conductivity		µS/cm (25 °C)	N/A**	N/A**	APHA - 2510 - B
pH		-	N/A**	N/A**	APHA - 4500 - H ⁺
Total Suspended Solids		mg/L	N/A**	N/A**	APHA - 2540 - D
Temperature		°C	N/A**	N/A**	APHA - 2550 - B

Additional information :

*Documented in-house methods based on stated standard references
**Sample location dry

For and on behalf of BHP laboratories :

John O' Halloran
Issue Date: 02/07/15

This Test Report shall not be duplicated except in full and then only with the permission of the test laboratory

TEST REPORT 117817.2Analysing
Testing
Consulting
CalibratingBHP
New Road
Thomondgate
Limerick
Ireland
Tel +353 61 455399
Fax + 353 61 455447
E Mail bhpccm2@bhp.ieClient: **Environmental Department
Limerick City Council
Dooradoyle
Co. Limerick****BHP Ref. No.: 15/06/351
Order No.:
Date Received: 11/06/15
Date Completed: 23/06/15
Test Specification: Nil
Item: Q2 Surface Water 2015**

FTAO: Tara Flanagan

Test	Client Reference	Units	Results	Date Analysed	Standard Reference*
Odour	SW 02	-	Slight Odour	11/06/2015	APHA - 2110
Visual Inspection		-	Clear/Straw Yellow	11/06/2015	APHA - 2110
Ammoniacal Nitrogen (as NH ₃ -N)		mg/L	1.2	12/06/2015	APHA - 4500 - NH ₃ - G
B.O.D.		mg/L	4.3	12/06/2015	APHA - 5210 - B
C.O.D.		mg/L	29	12/06/2015	APHA - 5220 - D
Chloride		mg/L	25	23/06/2015	APHA - 4500 - Cl ⁻ - E
Dissolved Oxygen		%	130	11/06/2015	APHA - 4500 - O - G
Electrical Conductivity		µS/cm (25 °C)	492	12/06/2015	APHA - 2510 - B
pH		-	7.42	11/06/2015	APHA - 4500 - H ⁺
Total Suspended Solids		mg/L	<10	12/06/2015	APHA - 2540 - D
Temperature		°C	18.6	11/06/2015	APHA - 2550 - B

Additional information :

*Documented in-house methods based on stated standard references

For and on behalf of BHP laboratories :

**John O' Halloran
Issue Date: 02/07/15**

This Test Report shall not be duplicated except in full and then only with the permission of the test laboratory

TEST REPORT 117817.3

Analysing
Testing
Consulting
Calibrating



Client: Environmental Department
Limerick City Council
Dooradoyle
Co. Limerick

BHP Ref. No.: 15/06/351
Order No.:
Date Received: 11/06/15
Date Completed: 23/06/15
Test Specification: Nil
Item: Q2 Surface Water 2015

BHP
New Road
Thomondgate
Limerick
Ireland
Tel +353 61 455399
Fax + 353 61 455447
E Mail bhpcem2@bhp.ie

FTAO: Tara Flanagan

Test	Client Reference	Units	Results	Date Analysed	Standard Reference*
Odour	SW 03	-	No Odour	11/06/2015	APHA - 2110
Visual Inspection		-	Clear/Yellow Tinge	11/06/2015	APHA - 2110
Ammoniacal Nitrogen (as NH ₃ -N)		mg/L	2.4	12/06/2015	APHA - 4500 - NH ₃ - G
B.O.D.		mg/L	4.7	12/06/2015	APHA - 5210 - B
C.O.D.		mg/L	32	12/06/2015	APHA - 5220 - D
Chloride		mg/L	29	23/06/2015	APHA - 4500 - Cl ⁻ - E
Dissolved Oxygen		%	105	11/06/2015	APHA - 4500 - O - G
Electrical Conductivity		µS/cm (25 °C)	494	12/06/2015	APHA - 2510 - B
pH		-	8.09	11/06/2015	APHA - 4500 - H ⁺
Total Suspended Solids		mg/L	16	12/06/2015	APHA - 2540 - D
Temperature		°C	19.6	11/06/2015	APHA - 2550 - B

Additional information :

*Documented in-house methods based on stated standard references

For and on behalf of BHP laboratories :

John O' Halloran
Issue Date: 02/07/15

This Test Report shall not be duplicated except in full and then only with the permission of the test laboratory

TEST REPORT 117817.4Analysing
Testing
Consulting
CalibratingBHP
New Road
Thomondgate
Limerick
Ireland
Tel +353 61 455399
Fax + 353 61 455447
E Mail bhpcem2@bhp.ieClient: Environmental Department
Limerick City Council
Dooradoyle
Co. Limerick

FTAO: Tara Flanagan

BHP Ref. No.: 15/06/351
Order No.:
Date Received: 11/06/15
Date Completed: 23/06/15
Test Specification: Nil
Item: Q2 Surface Water 2015

Test	Client Reference	Units	Results	Date Analysed	Standard Reference*
Odour	SW 04	-	No Odour	11/06/2015	APHA - 2110
Visual Inspection		-	Clear/Straw Yellow	11/06/2015	APHA - 2110
Ammoniacal Nitrogen (as NH ₃ -N)		mg/L	12	12/06/2015	APHA - 4500 - NH ₃ - G
B.O.D.		mg/L	3.8	12/06/2015	APHA - 5210 - B
C.O.D.		mg/L	45	12/06/2015	APHA - 5220 - D
Chloride		mg/L	48	23/06/2015	APHA - 4500 - Cl ⁻ - E
Dissolved Oxygen		%	39	11/06/2015	APHA - 4500 - O - G
Electrical Conductivity		µS/cm (25 °C)	836	12/06/2015	APHA - 2510 - B
pH		-	7.18	12/06/2015	APHA - 4500 - H ⁺
Total Suspended Solids		mg/L	25	12/06/2015	APHA - 2540 - D
Temperature		°C	13.1	11/06/2015	APHA - 2550 - B

Additional information :

*Documented in-house methods based on stated standard references

For and on behalf of BHP laboratories :

John O' Halloran
Issue Date: 02/07/15

This Test Report shall not be duplicated except in full and then only with the permission of the test laboratory

TEST REPORT 117817.5

Analysing
Testing
Consulting
Calibrating



Client: Environmental Department
Limerick City Council
Dooradoyle
Co. Limerick

BHP Ref. No.: 15/06/351
Order No.:
Date Received: 11/06/15
Date Completed: 30/06/15
Test Specification: Nil
Item: Q2 Surface Water 2015

BHP
New Road
Thomondgate
Limerick
Ireland
Tel +353 61 455399
Fax + 353 61 455447
E Mail bhpccm2@bhp.ie

FTAO: Tara Flanagan

Test	Client Reference	Units	Results	Date Analysed	Standard Reference*
Odour	SW 05	-	Slight Odour	11/06/2015	APHA - 2110
Visual Inspection		-	Clear/Straw Yellow	11/06/2015	APHA - 2110
Ammoniacal Nitrogen (as NH ₃ -N)		mg/L	28	12/06/2015	APHA - 4500 - NH ₃ - G
B.O.D.		mg/L	5.4	12/06/2015	APHA - 5210 - B
C.O.D.		mg/L	43	12/06/2015	APHA - 5220 - D
Chloride		mg/L	71	23/06/2015	APHA - 4500 - Cl ⁻ - E
Dissolved Oxygen		%	43	11/06/2015	APHA - 4500 - O - G
Electrical Conductivity		µS/cm (25 °C)	1178	12/06/2015	APHA - 2510 - B
pH		-	7.22	11/06/2015	APHA - 4500 - H ⁺
Total Suspended Solids		mg/L	14	30/06/2015	APHA - 2540 - D
Temperature		°C	13.1	11/06/2015	APHA - 2550 - B

Additional information :

*Documented in-house methods based on stated standard references

For and on behalf of BHP laboratories :

John O' Halloran
Issue Date: 02/07/15

This Test Report shall not be duplicated except in full and then only with the permission of the test laboratory

TEST REPORT 117817.6Analysing
Testing
Consulting
CalibratingBHP
New Road
Thomondgate
Limerick
Ireland
Tel +353 61 455399
Fax + 353 61 455447
E Mail bhpccm2@bhp.ie**Client: Environmental Department
Limerick City Council
Dooradoyle
Co. Limerick****FTAO: Tara Flanagan****BHP Ref. No.: 15/06/351
Order No.:
Date Received: 11/06/15
Date Completed: 23/06/15
Test Specification: Nil
Item: Q2 Surface Water 2015**

Test	Client Reference	Units	Results	Date Analysed	Standard Reference*
Odour	SW 06	-	No Odour	11/06/2015	APHA - 2110
Visual Inspection		-	Clear/Clear	11/06/2015	APHA - 2110
Ammoniacal Nitrogen (as NH ₃ -N)		mg/L	16	12/06/2015	APHA - 4500 - NH ₃ - G
B.O.D.		mg/L	4.5	12/06/2015	APHA - 5210 - B
C.O.D.		mg/L	37	12/06/2015	APHA - 5220 - D
Chloride		mg/L	72	23/06/2015	APHA - 4500 - Cl ⁻ - E
Dissolved Oxygen		%	69	11/06/2015	APHA - 4500 - O - G
Electrical Conductivity		µS/cm (25 °C)	806	12/06/2015	APHA - 2510 - B
pH		-	7.61	11/06/2015	APHA - 4500 - H ⁺
Total Suspended Solids		mg/L	<5	12/06/2015	APHA - 2540 - D
Temperature		°C	14.1	11/06/2015	APHA - 2550 - B

Additional information :

*Documented in-house methods based on stated standard references

For and on behalf of BHP laboratories :**John O' Halloran
Issue Date: 02/07/15**

This Test Report shall not be duplicated except in full and then only with the permission of the test laboratory

TEST REPORT 117817.7Analysing
Testing
Consulting
CalibratingBHP
New Road
Thomondgate
Limerick
Ireland
Tel +353 61 455399
Fax + 353 61 455447
E Mail bhpcem2@bhp.ieClient: **Environmental Department
Limerick City Council
Dooradoyle
Co. Limerick****BHP Ref. No.: 15/06/351
Order No.:
Date Received: 11/06/15
Date Completed: 23/06/15
Test Specification: Nil
Item: Q2 Surface Water 2015**

FTAO: Tara Flanagan

Test	Client Reference	Units	Results	Date Analysed	Standard Reference*
Odour	SW 07	-	Slight Odour	11/06/2015	APHA - 2110
Visual Inspection		-	Clear/Clear	11/06/2015	APHA - 2110
Ammoniacal Nitrogen (as NH ₃ -N)		mg/L	9.1	12/06/2015	APHA - 4500 - NH ₃ - G
B.O.D.		mg/L	3.3	12/06/2015	APHA - 5210 - B
C.O.D.		mg/L	36	12/06/2015	APHA - 5220 - D
Chloride		mg/L	42	23/06/2015	APHA - 4500 - Cl ⁻ - E
Dissolved Oxygen		%	72	11/06/2015	APHA - 4500 - O - G
Electrical Conductivity		µS/cm (25 °C)	676	12/06/2015	APHA - 2510 - B
pH		-	7.44	11/06/2015	APHA - 4500 - H ⁺
Total Suspended Solids		mg/L	13	12/06/2015	APHA - 2540 - D
Temperature		°C	12.5	11/06/2015	APHA - 2550 - B

Additional information :

*Documented in-house methods based on stated standard references

For and on behalf of BHP laboratories :

**John O' Halloran
Issue Date: 02/07/15**

This Test Report shall not be duplicated except in full and then only with the permission of the test laboratory

TEST REPORT 117818.1Analysing
Testing
Consulting
CalibratingBHP
New Road
Thomondgate
Limerick
Ireland
Tel +353 61 455399
Fax + 353 61 455447
E Mail bhpцем2@bhp.ieClient: Environmental Department
Limerick City Council
Dooradoyle
Co. Limerick

FTAO: Tara Flanagan

BHP Ref. No.: 15/06/358
Order No.:
Date Received: 11/06/15
Date Completed: 24/06/15
Test Specification: Nil
Item: Q2 Ground Water 2015

Test	Client Reference	Units	Results	Date Analysed	Standard Reference*
Odour	GW 01	-	None	11/06/2015	APHA - 2150 - B
Visual Inspection	Shallow	-	Dark Grey/Very Turbid	11/06/2015	APHA - 2110
Ammoniacal Nitrogen (as NH ₃ -N)		mg/L	2.9	12/06/2015	APHA - 4500 - NH ₃ - G
Chloride		mg/L	255	24/06/2015	APHA - 4500 - Cl ⁻ - E
Dissolved Oxygen		%	52	11/06/2015	APHA - 4500 - O - G
Electrical Conductivity		µS/cm (25 °)	579	12/06/2015	APHA - 2510 - B
pH		-	7.03	11/06/2015	APHA - 4500 - H ⁺
Temperature		°C	11.7	11/06/2015	APHA - 2550 - B
Total Organic Carbon		mg/L	4.6	18/06/2015	APHA - 5310 - C

Additional information :

*Documented in-house methods based on stated standard references

For and on behalf of BHP laboratories :

John O' Halloran
Issue Date : 29/06/15

This Test Report shall not be duplicated except in full and then only with the permission of the test laboratory

TEST REPORT 117818.2Analysing
Testing
Consulting
CalibratingBHP
New Road
Thomondgate
Limerick
Ireland
Tel +353 61 455399
Fax + 353 61 455447
E Mail bhpccm2@bhp.ieClient: Environmental Department
Limerick City Council
Dooradoyle
Co. LimerickBHP Ref. No.: 15/06/358
Order No.:
Date Received: 11/06/15
Date Completed: 24/06/15
Test Specification: Nil
Item: Q2 Ground Water 2015

FTAO: Tara Flanagan

Test	Client Reference	Units	Results	Date Analysed	Standard Reference*
Odour	GW 01	-	None	11/06/2015	APHA - 2150 - B
Visual Inspection	Deep	-	Grey/ Very Turbid	11/06/2015	APHA - 2110
Ammoniacal Nitrogen (as NH ₃ -N)		mg/L	36	12/06/2015	APHA - 4500 - NH ₃ - G
Chloride		mg/L	191	24/06/2015	APHA - 4500 - Cl ⁻ - E
Dissolved Oxygen		%	54	11/06/2015	APHA - 4500 - O - G
Electrical Conductivity		µS/cm (25 °)	2320	12/06/2015	APHA - 2510 - B
pH		-	7.03	11/06/2015	APHA - 4500 - H ⁺
Temperature		°C	11.2	11/06/2015	APHA - 2550 - B
Total Organic Carbon		mg/L	4.2	19/06/2015	APHA - 5310 - C

Additional information :

*Documented in-house methods based on stated standard references

For and on behalf of BHP laboratories :

John O' Halloran
Issue Date : 29/06/15

This Test Report shall not be duplicated except in full and then only with the permission of the test laboratory

TEST REPORT 117818.3

Analysing
Testing
Consulting
Calibrating



BHP
New Road
Thomondgate
Limerick
Ireland
Tel +353 61 455399
Fax + 353 61 455447
E Mail bhpцем2@bhp.ie

Client: Environmental Department
Limerick City Council
Dooradoyle
Co. Limerick

BHP Ref. No.: 15/06/358
Order No.:
Date Received: 11/06/15
Date Completed: 24/06/15
Test Specification: Nil
Item: Q2 Ground Water 2015

FTAO: Tara Flanagan

Test	Client Reference	Units	Results	Date Analysed	Standard Reference*
Odour	GW 02	-	None	11/06/2015	APHA - 2150 - B
Visual Inspection	Shallow	-	Grey/Very Turbid	11/06/2015	APHA - 2110
Ammoniacal Nitrogen (as NH ₃ -N)		mg/L	0.25	12/06/2015	APHA - 4500 - NH ₃ - G
Chloride		mg/L	221	24/06/2015	APHA - 4500 - Cl ⁻ - E
Dissolved Oxygen		%	93	11/06/2015	APHA - 4500 - O - G
Electrical Conductivity		µS/cm (25 °)	4620	12/06/2015	APHA - 2510 - B
pH		-	7.74	11/06/2015	APHA - 4500 - H ⁺
Temperature		°C	14.2	11/06/2015	APHA - 2550 - B
Total Organic Carbon		mg/L	7.6	19/06/2015	APHA - 5310 - C

Additional information :

*Documented in-house methods based on stated standard references

For and on behalf of BHP laboratories :

John O' Halloran
Issue Date : 29/06/15

This Test Report shall not be duplicated except in full and then only with the permission of the test laboratory

TEST REPORT 117818.4Analysing
Testing
Consulting
CalibratingBHP
New Road
Thomondgate
Limerick
Ireland
Tel +353 61 455399
Fax + 353 61 455447
E Mail bhpцем2@bhp.ieClient: Environmental Department
Limerick City Council
Dooradoyle
Co. Limerick

FTAO: Tara Flanagan

BHP Ref. No.: 15/06/358
Order No.:
Date Received: 11/06/15
Date Completed: 24/06/15
Test Specification: Nil
Item: Q2 Ground Water 2015

Test	Client Reference	Units	Results	Date Analysed	Standard Reference*
Odour	GW 02	-	None	11/06/2015	APHA - 2150 - B
Visual Inspection	Deep	-	Grey/Very Turbid	11/06/2015	APHA - 2110
Ammoniacal Nitrogen (as NH ₃ -N)		mg/L	18	12/06/2015	APHA - 4500 - NH ₃ - G
Chloride		mg/L	154	24/06/2015	APHA - 4500 - Cl ⁻ - E
Dissolved Oxygen		%	24	11/06/2015	APHA - 4500 - O - G
Electrical Conductivity		µS/cm (25 °)	2480	12/06/2015	APHA - 2510 - B
pH		-	6.99	11/06/2015	APHA - 4500 - H ⁺
Temperature		°C	11.5	11/06/2015	APHA - 2550 - B
Total Organic Carbon		mg/L	20	19/06/2015	APHA - 5310 - C

Additional information :

*Documented in-house methods based on stated standard references

For and on behalf of BHP laboratories :

John O' Halloran
Issue Date : 29/06/15

This Test Report shall not be duplicated except in full and then only with the permission of the test laboratory

TEST REPORT 117818.5Analysing
Testing
Consulting
CalibratingBHP
New Road
Thomondgate
Limerick
Ireland
Tel +353 61 455399
Fax + 353 61 455447
E Mail bhpcem2@bhp.ie**Client:** Environmental Department
Limerick City Council
Dooradoyle
Co. Limerick**FTAO:** Tara Flanagan**BHP Ref. No.:** 15/06/358
Order No.:
Date Received: 11/06/15
Date Completed: 24/06/15
Test Specification: Nil
Item: Q2 Ground Water 2015

Test	Client Reference	Units	Results	Date Analysed	Standard Reference*
Odour	GW 03	-	N/A**	N/A**	APHA - 2150 - B
Visual Inspection	Shallow	-	N/A**	N/A**	APHA - 2110
Ammoniacal Nitrogen (as NH ₃ -N)		mg/L	N/A**	N/A**	APHA - 4500 - NH ₃ - G
Chloride		mg/L	N/A**	N/A**	APHA - 4500 - Cl ⁻ - E
Dissolved Oxygen		%	N/A**	N/A**	APHA - 4500 - O - G
Electrical Conductivity		µS/cm (25 °)	N/A**	N/A**	APHA - 2510 - B
pH		-	N/A**	N/A**	APHA - 4500 - H ⁺
Temperature		°C	N/A**	N/A**	APHA - 2550 - B
Total Organic Carbon		mg/L	N/A**	N/A**	APHA - 5310 - C

Additional information :

*Documented in-house methods based on stated standard references

**Sample location dry

For and on behalf of BHP laboratories :**John O' Halloran****Issue Date : 29/06/15**

This Test Report shall not be duplicated except in full and then only with the permission of the test laboratory

TEST REPORT 117818.6

Analysing
Testing
Consulting
Calibrating



BHP
New Road
Thomondgate
Limerick
Ireland
Tel +353 61 455399
Fax + 353 61 455447
E Mail bhpcem2@bhp.ie

Client: Environmental Department
Limerick City Council
Dooradoyle
Co. Limerick

BHP Ref. No.: 15/06/358
Order No.:
Date Received: 11/06/15
Date Completed: 24/06/15
Test Specification: Nil
Item: Q2 Ground Water 2015

FTAO: Tara Flanagan

Test	Client Reference	Units	Results	Date Analysed	Standard Reference*
Odour	GW 03	-	Slight Odour	11/06/2015	APHA - 2150 - B
Visual Inspection	Deep	-	Orange/Turbid	11/06/2015	APHA - 2110
Ammoniacal Nitrogen (as NH ₃ -N)		mg/L	1.1	12/06/2015	APHA - 4500 - NH ₃ - G
Chloride		mg/L	15	24/06/2015	APHA - 4500 - Cl ⁻ - E
Dissolved Oxygen		%	40	11/06/2015	APHA - 4500 - O - G
Electrical Conductivity		µS/cm (25 °)	947	12/06/2015	APHA - 2510 - B
pH		-	6.90	12/06/2015	APHA - 4500 - H ⁺
Temperature		°C	12.2	11/06/2015	APHA - 2550 - B
Total Organic Carbon		mg/L	20	19/06/2015	APHA - 5310 - C

Additional information :

*Documented in-house methods based on stated standard references

For and on behalf of BHP laboratories :

John O' Halloran
Issue Date : 29/06/15

This Test Report shall not be duplicated except in full and then only with the permission of the test laboratory

TEST REPORT 117818.7

Analysing
Testing
Consulting
Calibrating



BHP
New Road
Thomondgate
Limerick
Ireland
Tel +353 61 455399
Fax + 353 61 455447
E Mail bhpccm2@bhp.ie

Client: Environmental Department
Limerick City Council
Dooradoyle
Co. Limerick

BHP Ref. No.: 15/06/358
Order No.:
Date Received: 11/06/15
Date Completed: 24/06/15
Test Specification: Nil
Item: Q2 Ground Water 2015

FTAO: Tara Flanagan

Test	Client Reference	Units	Results	Date Analysed	Standard Reference*
Odour	GW 04	-	N/A**	N/A**	APHA - 2150 - B
Visual Inspection	Shallow	-	N/A**	N/A**	APHA - 2110
Ammoniacal Nitrogen (as NH ₃ -N)		mg/L	N/A**	N/A**	APHA - 4500 - NH ₃ - G
Chloride		mg/L	N/A**	N/A**	APHA - 4500 - Cl ⁻ - E
Dissolved Oxygen		%	N/A**	N/A**	APHA - 4500 - O - G
Electrical Conductivity		µS/cm (25 °)	N/A**	N/A**	APHA - 2510 - B
pH		-	N/A**	N/A**	APHA - 4500 - H ⁺
Temperature		°C	N/A**	N/A**	APHA - 2550 - B
Total Organic Carbon		mg/L	N/A**	N/A**	APHA - 5310 - C

Additional information :

*Documented in-house methods based on stated standard references

**Sample location dry

For and on behalf of BHP laboratories :

John O' Halloran

Issue Date : 29/06/15

This Test Report shall not be duplicated except in full and then only with the permission of the test laboratory

TEST REPORT 117818.8

Analysing
Testing
Consulting
Calibrating



BHP
New Road
Thomondgate
Limerick
Ireland
Tel +353 61 455399
Fax + 353 61 455447
E Mail bhpcem2@bhp.ie

Client: Environmental Department
Limerick City Council
Dooradoyle
Co. Limerick

BHP Ref. No.: 15/06/358
Order No.:
Date Received: 11/06/15
Date Completed: 24/06/15
Test Specification: Nil
Item: Q2 Ground Water 2015

FTAO: Tara Flanagan

Test	Client Reference	Units	Results	Date Analysed	Standard Reference*
Odour	GW 04	-	Slight Odour	11/06/2015	APHA - 2150 - B
Visual Inspection	Deep	-	Orange/Slightly Turbid	11/06/2015	APHA - 2110
Ammoniacal Nitrogen (as NH ₃ -N)		mg/L	0.75	12/06/2015	APHA - 4500 - NH ₃ - G
Chloride		mg/L	125	24/06/2015	APHA - 4500 - Cl ⁻ - E
Dissolved Oxygen		%	62	11/06/2015	APHA - 4500 - O - G
Electrical Conductivity		µS/cm (25 °)	1161	12/06/2015	APHA - 2510 - B
pH		-	6.94	11/06/2015	APHA - 4500 - H ⁺
Temperature		°C	13.0	11/06/2015	APHA - 2550 - B
Total Organic Carbon		mg/L	17	19/06/2015	APHA - 5310 - C

Additional information :

*Documented in-house methods based on stated standard references

For and on behalf of BHP laboratories :

John O' Halloran
Issue Date : 29/06/15

This Test Report shall not be duplicated except in full and then only with the permission of the test laboratory

TEST REPORT 117818.9

Analysing
Testing
Consulting
Calibrating



BHP
New Road
Thomondgate
Limerick
Ireland
Tel +353 61 455399
Fax + 353 61 455447
E Mail bhpccm2@bhp.ie

Client: Environmental Department
Limerick City Council
Dooradoyle
Co. Limerick

BHP Ref. No.: 15/06/358
Order No.:
Date Received: 11/06/15
Date Completed: 24/06/15
Test Specification: Nil
Item: Q2 Ground Water 2015

FTAO: Tara Flanagan

Test	Client Reference	Units	Results	Date Analysed	Standard Reference*
Odour	GW 05	-	N/A**	N/A**	APHA - 2150 - B
Visual Inspection	Shallow	-	N/A**	N/A**	APHA - 2110
Ammoniacal Nitrogen (as NH ₃ -N)		mg/L	N/A**	N/A**	APHA - 4500 - NH ₃ - G
Chloride		mg/L	N/A**	N/A**	APHA - 4500 - Cl ⁻ - E
Dissolved Oxygen		%	N/A**	N/A**	APHA - 4500 - O - G
Electrical Conductivity		µS/cm (25 °)	N/A**	N/A**	APHA - 2510 - B
pH		-	N/A**	N/A**	APHA - 4500 - H ⁺
Temperature		°C	N/A**	N/A**	APHA - 2550 - B
Total Organic Carbon		mg/L	N/A**	N/A**	APHA - 5310 - C

Additional information :

*Documented in-house methods based on stated standard references

**Sample location dry

For and on behalf of BHP laboratories :

John O' Halloran

Issue Date : 29/06/15

This Test Report shall not be duplicated except in full and then only with the permission of the test laboratory

TEST REPORT 117818.10

Analysing
Testing
Consulting
Calibrating



Client: Environmental Department
Limerick City Council
Dooradoyle
Co. Limerick

BHP Ref. No.: 15/06/358
Order No.:
Date Received: 11/06/15
Date Completed: 24/06/15
Test Specification: Nil
Item: Q2 Ground Water 2015

FTAO: Tara Flanagan

BHP
New Road
Thomondgate
Limerick
Ireland
Tel +353 61 455399
Fax + 353 61 455447
E Mail bhpccm2@bhp.ie

Test	Client Reference	Units	Results	Date Analysed	Standard Reference*
Odour	GW 05	-	None	11/06/2015	APHA - 2150 - B
	Deep	-	Light		
Visual Inspection			Brown/Slightly Turbid	11/06/2015	APHA - 2110
Ammoniacal Nitrogen (as NH ₃ -N)		mg/L	0.48	12/06/2015	APHA - 4500 - NH ₃ - G
Chloride		mg/L	358	24/06/2015	APHA - 4500 - Cl ⁻ - E
Dissolved Oxygen		%	59	11/06/2015	APHA - 4500 - O - G
Electrical Conductivity		µS/cm (25 °)	2170	12/06/2015	APHA - 2510 - B
pH		-	6.52	11/06/2015	APHA - 4500 - H ⁺
Temperature		°C	15.5	11/06/2015	APHA - 2550 - B
Total Organic Carbon		mg/L	20	19/06/2015	APHA - 5310 - C

Additional information :

*Documented in-house methods based on stated standard references

For and on behalf of BHP laboratories :

John O' Halloran
Issue Date : 29/06/15

This Test Report shall not be duplicated except in full and then only with the permission of the test laboratory

TEST REPORT NO.: 117819Analysing
Testing
Consulting
Calibrating**Client:** Environmental Department
Limerick City Council
Dooradoyle
Co. Limerick**BHP Ref. No.:** 15/06/368-380
Order No.:
Date Received: 11/06/15
Date Completed: 11/06/15
Test Specification: Nil
Item: Q2 Leachate 2015**FTAO:** Tara FlanaganBHP
New Road
Thomondgate
Limerick
Ireland
Tel +353 61 455399
Fax + 353 61 455447
E Mail bhpccm2@bhp.ie

Test	Client Reference	Units	Results	Standard Reference*
Odour	L 01	-	Leachate Odour	APHA - 2150
Visual Inspection		-	Black	APHA - 2110
Temperature		°C	18.1	APHA - 2550 - B
Odour	L 02	-	Leachate Odour	APHA - 2150
Visual Inspection		-	Dark Grey	APHA - 2110
Temperature		°C	18.1	APHA - 2550 - B
Odour	L 03	-	Leachate Odour	APHA - 2150
Visual Inspection		-	Black	APHA - 2110
Temperature		°C	16.9	APHA - 2550 - B
Odour	L 04	-	Slight Leachate Odour	APHA - 2150
Visual Inspection		-	Straw Colour	APHA - 2110
Temperature		°C	14.7	APHA - 2550 - B
Odour	L 05	-	Slight Leachate Odour	APHA - 2150
Visual Inspection		-	Brown	APHA - 2110
Temperature		°C	14.5	APHA - 2550 - B

Additional information :

*Documented in-house methods based on stated standard references

For and on behalf of BHP laboratories :**John O'Halloran**
Issue Date : 12/06/15

This Test Report shall not be duplicated except in full and then only with the permission of the test laboratory

TEST REPORT NO.: 117819Analysing
Testing
Consulting
Calibrating**Client:** Environmental Department
Limerick City Council
Dooradoyle
Co. Limerick**BHP Ref. No.:** 15/06/368-380
Order No.:
Date Received: 11/06/15
Date Completed: 11/06/15
Test Specification: Nil
Item: Q2 Leachate 2015**FTAO:** Tara FlanaganBHP
New Road
Thomondgate
Limerick
Ireland
Tel +353 61 455399
Fax + 353 61 455447
E Mail bhpccm2@bhp.ie

Test	Client Reference	Units	Results	Standard Reference*
Odour	L 06	-	No odour	APHA - 2150
Visual Inspection		-	Straw Colour	APHA - 2110
Temperature		°C	14.4	APHA - 2550 - B
Odour	L 07	-	Slight Odour	APHA - 2150
Visual Inspection		-	Orange	APHA - 2110
Temperature		°C	13.8	APHA - 2550 - B
Odour	L 08	-	Leachate Odour	APHA - 2150
Visual Inspection		-	Black	APHA - 2110
Temperature		°C	16.7	APHA - 2550 - B
Odour	L 09	-	N/A**	APHA - 2150
Visual Inspection		-	N/A**	APHA - 2110
Temperature		°C	N/A**	APHA - 2550 - B
Odour	L 10	-	No odour	APHA - 2150
Visual Inspection		-	Grey	APHA - 2110
Temperature		°C	18.7	APHA - 2550 - B

Additional information :

*Documented in-house methods based on stated standard references

**Sampling location dry

For and on behalf of BHP laboratories :**John O'Halloran****Issue Date : 12/06/15**

This Test Report shall not be duplicated except in full and then only with the permission of the test laboratory

TEST REPORT NO.: 117819

Analysing
Testing
Consulting
Calibrating



Client: Environmental Department
Limerick City Council
Dooradoyle
Co. Limerick

BHP Ref. No.: 15/06/368-380
Order No.:
Date Received: 11/06/15
Date Completed: 11/06/15
Test Specification: Nil
Item: Q2 Leachate 2015

FTAO: Tara Flanagan

BHP
New Road
Thomondgate
Limerick
Ireland
Tel +353 61 455399
Fax + 353 61 455447
E Mail bhpccm2@bhp.ie

Test	Client Reference	Units	Results	Standard Reference*
Odour	L 11	-	Leachate Odour	APHA - 2150
Visual Inspection		-	Grey	APHA - 2110
Temperature		°C	18.0	APHA - 2550 - B
Odour	Tank	-	Slight Leachate Odour	APHA - 2150
Visual Inspection		-	Orange	APHA - 2110
Temperature		°C	15.8	APHA - 2550 - B
Odour	Sump	-	No odour	APHA - 2150
Visual Inspection		-	Clear	APHA - 2110
Temperature		°C	12.7	APHA - 2550 - B

Additional information :

*Documented in-house methods based on stated standard references

For and on behalf of BHP laboratories :

John O'Halloran
Issue Date : 12/06/15

This Test Report shall not be duplicated except in full and then only with the permission of the test laboratory

Appendix E:

**Third quarterly report covering groundwater, surfacewater
and leachate monitoring at Longpavement Landfill**

(Monitoring Period July-September 2015)

TEST REPORT 118960.1

Analysing
Testing
Consulting
Calibrating



BHP
New Road
Thomondgate
Limerick
Ireland
Tel +353 61 455399
Fax + 353 61 455447
E Mail johnhalloran@bhp.ie

Client: Environmental Department
Limerick City Council
Dooradoyle
Co. Limerick

FTAO: Tara Flanagan

BHP Ref. No.: 15/09/453
Order No.:
Date Received: 17/09/15
Date Completed: 28/09/15
Test Specification: Nil
Item: Q3 Ground Water 2015

Test	Client Reference	Units	Results	Date Analysed	Test Method
Odour	GW 01 Shallow	-	None	17/09/2015	BHP AC 046
Visual Inspection		-	Grey/Very Turbid	17/09/2015	BHP AC 046
Ammoniacal Nitrogen (as NH ₃ -N)		mg/L	2.5	18/09/2015	BHP AC 095
Chloride		mg/L	236	28/09/2015	BHP AC 095
Dissolved Oxygen		%	23	17/09/2015	BHP AC 067
Electrical Conductivity		µS/cm (25 °C)	3161	17/09/2015	BHP AC 067
pH		-	7.16	17/09/2015	BHP AC 067
Temperature		°C	14.6	17/09/2015	BHP AC 067
Total Organic Carbon		mg/L	7.1	22/09/2015	BHP AC 016

Additional information :

For and on behalf of BHP laboratories :

John O' Halloran
Issue Date : 19/10/15

This Test Report shall not be duplicated except in full and then only with the permission of the test laboratory

TEST REPORT 118960.2

Analysing
Testing
Consulting
Calibrating



BHP
New Road
Thomondgate
Limerick
Ireland
Tel +353 61 455399
Fax + 353 61 455447
E Mail johnhalloran@bhp.ie

Client: Environmental Department
Limerick City Council
Dooradoyle
Co. Limerick

BHP Ref. No.: 15/09/454
Order No.:
Date Received: 17/09/15
Date Completed: 28/09/15
Test Specification: Nil
Item: Q3 Ground Water 2015

FTAO: Tara Flanagan

Test	Client Reference	Units	Results	Date Analysed	Test Method
Odour	GW 01 Deep	-	None	17/09/2015	BHP AC 046
Visual Inspection		-	Light Grey/Turbid	17/09/2015	BHP AC 046
Ammoniacal Nitrogen (as NH ₃ -N)		mg/L	35	18/09/2015	BHP AC 095
Chloride		mg/L	188	28/09/2015	BHP AC 095
Dissolved Oxygen		%	25	17/09/2015	BHP AC 067
Electrical Conductivity		µS/cm (25 °C)	2131	17/09/2015	BHP AC 067
pH		-	6.87	17/09/2015	BHP AC 067
Temperature		°C	12.2	17/09/2015	BHP AC 067
Total Organic Carbon		mg/L	33	28/09/2015	BHP AC 016

Additional information :

For and on behalf of BHP laboratories :

John O' Halloran
Issue Date : 19/10/15

This Test Report shall not be duplicated except in full and then only with the permission of the test laboratory

TEST REPORT 118960.3

Analysing
Testing
Consulting
Calibrating



BHP
New Road
Thomondgate
Limerick
Ireland
Tel +353 61 455399
Fax + 353 61 455447
E Mail johnohalloran@bhp.ie

Client: Environmental Department
Limerick City Council
Dooradoyle
Co. Limerick

BHP Ref. No.: 15/09/455
Order No.:
Date Received: 17/09/15
Date Completed: N/A*
Test Specification: Nil
Item: Q3 Ground Water 2015

FTAO: Tara Flanagan

Test	Client Reference	Units	Results	Date Analysed	Test Method
Odour	GW 02 Shallow	-	N/A*	N/A*	BHP AC 046
Visual Inspection		-	N/A*	N/A*	BHP AC 046
Ammoniacal Nitrogen (as NH ₃ -N)		mg/L	N/A*	N/A*	BHP AC 095
Chloride		mg/L	N/A*	N/A*	BHP AC 095
Dissolved Oxygen		%	N/A*	N/A*	BHP AC 067
Electrical Conductivity		µS/cm (25 °C)	N/A*	N/A*	BHP AC 067
pH		-	N/A*	N/A*	BHP AC 067
Temperature		°C	N/A*	N/A*	BHP AC 067
Total Organic Carbon		mg/L	N/A*	N/A*	BHP AC 016

Additional information :

*Sample location too shallow to sample

For and on behalf of BHP laboratories :

John O' Halloran
Issue Date : 19/10/15

This Test Report shall not be duplicated except in full and then only with the permission of the test laboratory

TEST REPORT 118960.4Analysing
Testing
Consulting
CalibratingBHP
New Road
Thomondgate
Limerick
Ireland
Tel +353 61 455399
Fax + 353 61 455447
E Mail johnhalloran@bhp.ieClient: Environmental Department
Limerick City Council
Dooradoyle
Co. Limerick

FTAO: Tara Flanagan

BHP Ref. No.: 15/09/456
Order No.:
Date Received: 17/09/15
Date Completed: 28/09/15
Test Specification: Nil
Item: Q3 Ground Water 2015

Test	Client Reference	Units	Results	Date Analysed	Test Method
Odour	GW 02 Deep	-	None	17/09/2015	BHP AC 046
Visual Inspection		-	Grey/ Turbid	17/09/2015	BHP AC 046
Ammoniacal Nitrogen (as NH ₃ -N)		mg/L	14	18/09/2015	BHP AC 095
Chloride		mg/L	162	28/09/2015	BHP AC 095
Dissolved Oxygen		%	20	17/09/2015	BHP AC 067
Electrical Conductivity		µS/cm (25 °C)	2416	17/09/2015	BHP AC 067
pH		-	6.86	17/09/2015	BHP AC 067
Temperature		°C	13.4	17/09/2015	BHP AC 067
Total Organic Carbon		mg/L	18	28/09/2015	BHP AC 016

Additional information :

For and on behalf of BHP laboratories :

John O' Halloran
Issue Date : 19/10/15

This Test Report shall not be duplicated except in full and then only with the permission of the test laboratory

TEST REPORT 118960.5

Analysing
Testing
Consulting
Calibrating



BHP
New Road
Thomondgate
Limerick
Ireland
Tel +353 61 455399
Fax + 353 61 455447
E Mail johnohalloran@bhp.ie

Client: Environmental Department
Limerick City Council
Dooradoyle
Co. Limerick

BHP Ref. No.: 15/09/457
Order No.:
Date Received: 17/09/15
Date Completed: N/A*
Test Specification: Nil
Item: Q3 Ground Water 2015

FTAO: Tara Flanagan

Test	Client Reference	Units	Results	Date Analysed	Test Method
Odour	GW 03 Shallow	-	N/A*	N/A*	BHP AC 046
Visual Inspection		-	N/A*	N/A*	BHP AC 046
Ammoniacal Nitrogen (as NH ₃ -N)		mg/L	N/A*	N/A*	BHP AC 095
Chloride		mg/L	N/A*	N/A*	BHP AC 095
Dissolved Oxygen		%	N/A*	N/A*	BHP AC 067
Electrical Conductivity		µS/cm (25 °C)	N/A*	N/A*	BHP AC 067
pH		-	N/A*	N/A*	BHP AC 067
Temperature		°C	N/A*	N/A*	BHP AC 067
Total Organic Carbon		mg/L	N/A*	N/A*	BHP AC 016

Additional information :

*Sample location too shallow to sample

For and on behalf of BHP laboratories :

John O' Halloran
Issue Date : 19/10/15

This Test Report shall not be duplicated except in full and then only with the permission of the test laboratory

TEST REPORT 118960.6

Analysing
Testing
Consulting
Calibrating



BHP
New Road
Thomondgate
Limerick
Ireland
Tel +353 61 455399
Fax + 353 61 455447
E Mail johnohalloran@bhp.ie

Client: Environmental Department
Limerick City Council
Dooradoyle
Co. Limerick

BHP Ref. No.: 15/09/458
Order No.:
Date Received: 17/09/15
Date Completed: 28/09/15
Test Specification: Nil
Item: Q3 Ground Water 2015

FTAO: Tara Flanagan

Test	Client Reference	Units	Results	Date Analysed	Test Method
Odour	GW 03 Deep	-	None	17/09/2015	BHP AC 046
Visual Inspection		-	Light Brown/Turbid	17/09/2015	BHP AC 046
Ammoniacal Nitrogen (as NH ₃ -N)		mg/L	1.4	18/09/2015	BHP AC 095
Chloride		mg/L	13	28/09/2015	BHP AC 095
Dissolved Oxygen		%	18	17/09/2015	BHP AC 067
Electrical Conductivity		µS/cm (25 °C)	1038	17/09/2015	BHP AC 067
pH		-	6.63	17/09/2015	BHP AC 067
Temperature		°C	12.1	17/09/2015	BHP AC 067
Total Organic Carbon		mg/L	15	28/09/2015	BHP AC 016

Additional information :

For and on behalf of BHP laboratories :

John O' Halloran
Issue Date : 19/10/15

This Test Report shall not be duplicated except in full and then only with the permission of the test laboratory

TEST REPORT 118960.7

Analysing
Testing
Consulting
Calibrating



BHP
New Road
Thomondgate
Limerick
Ireland
Tel +353 61 455399
Fax + 353 61 455447
E Mail johnohalloran@bhp.ie

Client: Environmental Department
Limerick City Council
Dooradoyle
Co. Limerick

FTAO: Tara Flanagan

BHP Ref. No.: 15/09/459
Order No.:
Date Received: 17/09/15
Date Completed: N/A*
Test Specification: Nil
Item: Q3 Ground Water 2015

Test	Client Reference	Units	Results	Date Analysed	Test Method
Odour	GW 04 Shallow	-	N/A*	N/A*	BHP AC 046
Visual Inspection		-	N/A*	N/A*	BHP AC 046
Ammoniacal Nitrogen (as NH ₃ -N)		mg/L	N/A*	N/A*	BHP AC 095
Chloride		mg/L	N/A*	N/A*	BHP AC 095
Dissolved Oxygen		%	N/A*	N/A*	BHP AC 067
Electrical Conductivity		µS/cm (25 °C)	N/A*	N/A*	BHP AC 067
pH		-	N/A*	N/A*	BHP AC 067
Temperature		°C	N/A*	N/A*	BHP AC 067
Total Organic Carbon		mg/L	N/A*	N/A*	BHP AC 016

Additional information : *Sample location dry

For and on behalf of BHP laboratories :

John O' Halloran
Issue Date : 19/10/15

This Test Report shall not be duplicated except in full and then only with the permission of the test laboratory

TEST REPORT 118960.8

Analysing
Testing
Consulting
Calibrating



Client: Environmental Department
Limerick City Council
Dooradoyle
Co. Limerick

BHP Ref. No.: 15/09/460
Order No.:
Date Received: 17/09/15
Date Completed: 28/09/15
Test Specification: Nil
Item: Q3 Ground Water 2015

FTAO: Tara Flanagan

BHP
New Road
Thomondgate
Limerick
Ireland
Tel +353 61 455399
Fax + 353 61 455447
E Mail johnohalloran@bhp.ie

Test	Client Reference	Units	Results	Date Analysed	Test Method
Odour	GW 04 Deep	-	None	17/09/2015	BHP AC 046
Visual Inspection		-	Brown/Turbid	17/09/2015	BHP AC 046
Ammoniacal Nitrogen (as NH ₃ -N)		mg/L	1.1	18/09/2015	BHP AC 095
Chloride		mg/L	407	28/09/2015	BHP AC 095
Dissolved Oxygen		%	17	17/09/2015	BHP AC 067
Electrical Conductivity		µS/cm (25 °C)	2363	17/09/2015	BHP AC 067
pH		-	6.38	17/09/2015	BHP AC 067
Temperature		°C	13.3	17/09/2015	BHP AC 067
Total Organic Carbon		mg/L	38	28/09/2015	BHP AC 016

Additional information :

For and on behalf of BHP laboratories :

John O' Halloran
Issue Date : 19/10/15

This Test Report shall not be duplicated except in full and then only with the permission of the test laboratory

TEST REPORT 118960.9

Analysing
Testing
Consulting
Calibrating



BHP
New Road
Thomondgate
Limerick
Ireland
Tel +353 61 455399
Fax + 353 61 455447
E Mail johnhalloran@bhp.ie

Client: Environmental Department
Limerick City Council
Dooradoyle
Co. Limerick

FTAO: Tara Flanagan

BHP Ref. No.: 15/09/461
Order No.:
Date Received: 17/09/15
Date Completed: N/A*
Test Specification: Nil
Item: Q3 Ground Water 2015

Test	Client Reference	Units	Results	Date Analysed	Test Method
Odour	GW 05 Shallow	-	N/A*	N/A*	BHP AC 046
Visual Inspection		-	N/A*	N/A*	BHP AC 046
Ammoniacal Nitrogen (as NH ₃ -N)		mg/L	N/A*	N/A*	BHP AC 095
Chloride		mg/L	N/A*	N/A*	BHP AC 095
Dissolved Oxygen		%	N/A*	N/A*	BHP AC 067
Electrical Conductivity		µS/cm (25 °C)	N/A*	N/A*	BHP AC 067
pH		-	N/A*	N/A*	BHP AC 067
Temperature		°C	N/A*	N/A*	BHP AC 067
Total Organic Carbon		mg/L	N/A*	N/A*	BHP AC 016

Additional information : *Sample location dry

For and on behalf of BHP laboratories :

John O' Halloran
Issue Date : 19/10/15

This Test Report shall not be duplicated except in full and then only with the permission of the test laboratory

TEST REPORT 118960.10

Analysing
Testing
Consulting
Calibrating



BHP
New Road
Thomondgate
Limerick
Ireland
Tel +353 61 455399
Fax + 353 61 455447
E Mail johnhalloran@bhp.ie

Client: Environmental Department
Limerick City Council
Dooradoyle
Co. Limerick

FTAO: Tara Flanagan

BHP Ref. No.: 15/09/462
Order No.:
Date Received: 17/09/15
Date Completed: 28/09/15
Test Specification: Nil
Item: Q3 Ground Water 2015

Test	Client Reference	Units	Results	Date Analysed	Test Method
Odour	GW 05 Deep	-	None	17/09/2015	BHP AC 046
Visual Inspection		-	Orange/Turbid	17/09/2015	BHP AC 046
Ammoniacal Nitrogen (as NH ₃ -N)		mg/L	2.7	18/09/2015	BHP AC 095
Chloride		mg/L	177	28/09/2015	BHP AC 095
Dissolved Oxygen		%	22	17/09/2015	BHP AC 067
Electrical Conductivity		µS/cm (25 °C)	1426	17/09/2015	BHP AC 067
pH		-	6.53	17/09/2015	BHP AC 067
Temperature		°C	12.9	17/09/2015	BHP AC 067
Total Organic Carbon		mg/L	18	22/09/2015	BHP AC 016

Additional information :

For and on behalf of BHP laboratories :

John O' Halloran
Issue Date : 19/10/15

This Test Report shall not be duplicated except in full and then only with the permission of the test laboratory

TEST REPORT 118961.1Analysing
Testing
Consulting
CalibratingBHP
New Road
Thomondgate
Limerick
Ireland
Tel +353 61 455399
Fax + 353 61 455447
E Mail bhpccm2@bhp.ieClient: **Environmental Department
Limerick City Council
Dooradoyle
Co. Limerick**FTAO: **Tara Flanagan**BHP Ref. No.: **15/09/463**
Order No.:
Date Received: **17/09/15**
Date Completed: **28/09/15**
Test Specification: **Nil**
Item: **Q3 Surface Water 2015**

Test	Client Reference	Units	Results	Date Analysed	Test Method
Odour	SW 01	-	No Odour	17/09/2015	BHP AC 046
Visual Inspection		-	Clear/Slight Colour	17/09/2015	BHP AC 046
Ammoniacal Nitrogen (as NH ₃ -N)		mg/L	<0.1	18/09/2015	BHP AC 095
B.O.D.		mg/L	4.0	18/09/2015	BHP AC 005
C.O.D.		mg/L	68	18/09/2015	BHP AC 006
Chloride		mg/L	21.6	28/09/2015	BHP AC 095
Dissolved Oxygen		%	22	17/09/2015	BHP AC 067
Electrical Conductivity		µS/cm (25 °C)	557	17/09/2015	BHP AC 067
pH		-	7.60	17/09/2015	BHP AC 067
Total Suspended Solids		mg/L	34	22/09/2015	BHP AC 012
Temperature		°C	13.9	17/09/2015	BHP AC 067

Additional information :

For and on behalf of BHP laboratories :

John O' Halloran
Issue Date: 06/10/15

This Test Report shall not be duplicated except in full and then only with the permission of the test laboratory

TEST REPORT 118961.2Analysing
Testing
Consulting
CalibratingBHP
New Road
Thomondgate
Limerick
Ireland
Tel +353 61 455399
Fax + 353 61 455447
E Mail bhpцем2@bhp.ieClient: **Environmental Department
Limerick City Council
Dooradoyle
Co. Limerick**

FTAO: Tara Flanagan

BHP Ref. No.: 15/09/464
Order No.:
Date Received: 17/09/15
Date Completed: 28/09/15
Test Specification: Nil
Item: Q3 Surface Water 2015

Test	Client Reference	Units	Results	Date Analysed	Test Method
Odour	SW 02	-	Slight Odour	17/09/2015	BHP AC 046
Visual Inspection		-	Clear/No Colour	17/09/2015	BHP AC 046
Ammoniacal Nitrogen (as NH ₃ -N)		mg/L	0.38	18/09/2015	BHP AC 095
B.O.D.		mg/L	3.5	18/09/2015	BHP AC 005
C.O.D.		mg/L	30	18/09/2015	BHP AC 006
Chloride		mg/L	25.1	28/09/2015	BHP AC 095
Dissolved Oxygen		%	70	17/09/2015	BHP AC 067
Electrical Conductivity		µS/cm (25 °C)	293	17/09/2015	BHP AC 067
pH		-	7.78	17/09/2015	BHP AC 067
Total Suspended Solids		mg/L	<10	22/09/2015	BHP AC 012
Temperature		°C	19.0	17/09/2015	BHP AC 067

Additional information :

For and on behalf of BHP laboratories :

John O' Halloran
Issue Date: 06/10/15

This Test Report shall not be duplicated except in full and then only with the permission of the test laboratory

TEST REPORT 118961.3Analysing
Testing
Consulting
Calibrating**Client: Environmental Department
Limerick City Council
Dooradoyle
Co. Limerick****BHP Ref. No.: 15/09/465
Order No.:
Date Received: 17/09/15
Date Completed: 28/09/15
Test Specification: Nil
Item: Q3 Surface Water 2015****BHP
New Road
Thomondgate
Limerick
Ireland
Tel +353 61 455399
Fax + 353 61 455447
E Mail bhpcem2@bhp.ie****FTAO: Tara Flanagan**

Test	Client Reference	Units	Results	Date Analysed	Test Method
Odour	SW 03	-	No Odour	17/09/2015	BHP AC 046
Visual Inspection		-	Clear/Slight Colour	17/09/2015	BHP AC 046
Ammoniacal Nitrogen (as NH ₃ -N)		mg/L	<0.1	18/09/2015	BHP AC 095
B.O.D.		mg/L	2.5	18/09/2015	BHP AC 005
C.O.D.		mg/L	36	18/09/2015	BHP AC 006
Chloride		mg/L	18.9	28/09/2015	BHP AC 095
Dissolved Oxygen		%	47	17/09/2015	BHP AC 067
Electrical Conductivity		µS/cm (25 °C)	399	17/09/2015	BHP AC 067
pH		-	7.89	17/09/2015	BHP AC 067
Total Suspended Solids		mg/L	<10	22/09/2015	BHP AC 012
Temperature		°C	14.2	17/09/2015	BHP AC 067

Additional information :**For and on behalf of BHP laboratories :****John O' Halloran
Issue Date: 06/10/15**

This Test Report shall not be duplicated except in full and then only with the permission of the test laboratory

TEST REPORT 118961.4

Analysing
Testing
Consulting
Calibrating



BHP
New Road
Thomondgate
Limerick
Ireland
Tel +353 61 455399
Fax + 353 61 455447
E Mail bhpcem2@bhp.ie

Client: Environmental Department
Limerick City Council
Dooradoyle
Co. Limerick

FTAO: Tara Flanagan

BHP Ref. No.: 15/09/466
Order No.:
Date Received: 17/09/15
Date Completed: 28/09/15
Test Specification: Nil
Item: Q3 Surface Water 2015

Test	Client Reference	Units	Results	Date Analysed	Test Method
Odour	SW 04	-	No Odour	17/09/2015	BHP AC 046
Visual Inspection		-	Clear/Slight Colour	17/09/2015	BHP AC 046
Ammoniacal Nitrogen (as NH ₃ -N)		mg/L	2.1	18/09/2015	BHP AC 095
B.O.D.		mg/L	3.0	18/09/2015	BHP AC 005
C.O.D.		mg/L	28	18/09/2015	BHP AC 006
Chloride		mg/L	33.3	28/09/2015	BHP AC 095
Dissolved Oxygen		%	20	17/09/2015	BHP AC 067
Electrical Conductivity		µS/cm (25 °C)	545	17/09/2015	BHP AC 067
pH		-	7.24	17/09/2015	BHP AC 067
Total Suspended Solids		mg/L	<10	22/09/2015	BHP AC 012
Temperature		°C	12.4	17/09/2015	BHP AC 067

Additional information :

For and on behalf of BHP laboratories :

John O' Halloran
Issue Date: 06/10/15

This Test Report shall not be duplicated except in full and then only with the permission of the test laboratory

TEST REPORT 118961.5

Analysing
Testing
Consulting
Calibrating



BHP
New Road
Thomondgate
Limerick
Ireland
Tel +353 61 455399
Fax + 353 61 455447
E Mail bhpccm2@bhp.ie

Client: Environmental Department
Limerick City Council
Dooradoyle
Co. Limerick

BHP Ref. No.: 15/09/467
Order No.:
Date Received: 17/09/15
Date Completed: 28/09/15
Test Specification: Nil
Item: Q3 Surface Water 2015

FTAO: Tara Flanagan

Test	Client Reference	Units	Results	Date Analysed	Test Method
Odour	SW 05	-	No Odour	17/09/2015	BHP AC 046
Visual Inspection		-	Clear/Brown	17/09/2015	BHP AC 046
			Colour		
Ammoniacal Nitrogen (as NH ₃ -N)		mg/L	1	18/09/2015	BHP AC 095
B.O.D.		mg/L	2.5	18/09/2015	BHP AC 005
C.O.D.		mg/L	28	18/09/2015	BHP AC 006
Chloride		mg/L	28.7	28/09/2015	BHP AC 095
Dissolved Oxygen		%	33	17/09/2015	BHP AC 067
Electrical Conductivity		µS/cm (25 °C)	488	17/09/2015	BHP AC 067
pH		-	7.44	17/09/2015	BHP AC 067
Total Suspended Solids		mg/L	<5	22/09/2015	BHP AC 012
Temperature		°C	12.7	17/09/2015	BHP AC 067

Additional information :

For and on behalf of BHP laboratories :

John O' Halloran
Issue Date: 06/10/15

This Test Report shall not be duplicated except in full and then only with the permission of the test laboratory

TEST REPORT 118961.6

Analysing
Testing
Consulting
Calibrating



BHP
New Road
Thomondgate
Limerick
Ireland
Tel +353 61 455399
Fax + 353 61 455447
E Mail bhpccm2@bhp.ie

Client: Environmental Department
Limerick City Council
Dooradoyle
Co. Limerick

FTAO: Tara Flanagan

BHP Ref. No.: 15/09/468
Order No.:
Date Received: 17/09/15
Date Completed: 28/09/15
Test Specification: Nil
Item: Q3 Surface Water 2015

Test	Client Reference	Units	Results	Date Analysed	Test Method
Odour	SW 06	-	No Odour	17/09/2015	BHP AC 046
Visual Inspection		-	Clear/Slight Colour	17/09/2015	BHP AC 046
Ammoniacal Nitrogen (as NH ₃ -N)		mg/L	0.12	18/09/2015	BHP AC 095
B.O.D.		mg/L	2.0	18/09/2015	BHP AC 005
C.O.D.		mg/L	35	18/09/2015	BHP AC 006
Chloride		mg/L	20.5	28/09/2015	BHP AC 095
Dissolved Oxygen		%	42	17/09/2015	BHP AC 067
Electrical Conductivity		µS/cm (25 °C)	398	17/09/2015	BHP AC 067
pH		-	7.34	17/09/2015	BHP AC 067
Total Suspended Solids		mg/L	<10	22/09/2015	BHP AC 012
Temperature		°C	13.7	17/09/2015	BHP AC 067

Additional information :

For and on behalf of BHP laboratories :

John O' Halloran
Issue Date: 06/10/15

This Test Report shall not be duplicated except in full and then only with the permission of the test laboratory

TEST REPORT 118961.7

Analysing
Testing
Consulting
Calibrating



BHP
New Road
Thomondgate
Limerick
Ireland
Tel +353 61 455399
Fax + 353 61 455447
E Mail bhpcem2@bhp.ie

Client: Environmental Department
Limerick City Council
Dooradoyle
Co. Limerick

BHP Ref. No.: 15/09/469
Order No.:
Date Received: 17/09/15
Date Completed: 28/09/15
Test Specification: Nil
Item: Q3 Surface Water 2015

FTAO: Tara Flanagan

Test	Client Reference	Units	Results	Date Analysed	Test Method
Odour	SW 07	-	Slight Odour	17/09/2015	BHP AC 046
Visual Inspection		-	Clear/No Colour	17/09/2015	BHP AC 046
Ammoniacal Nitrogen (as NH ₃ -N)		mg/L	5.0	18/09/2015	BHP AC 095
B.O.D.		mg/L	3.0	18/09/2015	BHP AC 005
C.O.D.		mg/L	32	18/09/2015	BHP AC 006
Chloride		mg/L	30.6	28/09/2015	BHP AC 095
Dissolved Oxygen		%	30	17/09/2015	BHP AC 067
Electrical Conductivity		µS/cm (25 °C)	820	17/09/2015	BHP AC 067
pH		-	7.30	17/09/2015	BHP AC 067
Total Suspended Solids		mg/L	<10	22/09/2015	BHP AC 012
Temperature		°C	12.7	17/09/2015	BHP AC 067

Additional information :

For and on behalf of BHP laboratories :

John O' Halloran
Issue Date: 06/10/15

This Test Report shall not be duplicated except in full and then only with the permission of the test laboratory

TEST REPORT NO.: 118962Analysing
Testing
Consulting
Calibrating**Client: Environmental Department
Limerick City Council
Dooradoyle
Co. Limerick****BHP Ref. No.: 15/09/470-482
Order No.:
Date Received: 17/09/15
Date Completed: 17/09/15
Test Specification: Nil
Item: Q3 Leachate 2015****BHP
New Road
Thomondgate
Limerick
Ireland
Tel +353 61 455399
Fax + 353 61 455447
E Mail bhpccm2@bhp.ie****FTAO: Tara Flanagan**

Test	Client Reference	Units	Results	Standard Reference*
Odour	L 01	-	Leachate Odour	BHP AC 046
Visual Inspection		-	Black/Very Turbid	BHP AC 046
Temperature		°C	18.4	BHP AC 067
Odour	L 02	-	Slight Leachate Odour	BHP AC 046
Visual Inspection		-	Black/Very Turbid	BHP AC 046
Temperature		°C	18.9	BHP AC 067
Odour	L 03	-	Very Strong Leachate Odour	BHP AC 046
Visual Inspection		-	Black/Very Turbid	BHP AC 046
Temperature		°C	20.0	BHP AC 067
Odour	L 04	-	Leachate Odour	BHP AC 046
Visual Inspection		-	Straw Colour/Slightly Turbid	BHP AC 046
Temperature		°C	13.9	BHP AC 067
Odour	L 05	-	Slight Leachate Odour	BHP AC 046
Visual Inspection		-	Grey/Turbid	BHP AC 046
Temperature		°C	15.3	BHP AC 067

Additional information :**For and on behalf of BHP laboratories :****John O'Halloran
Issue Date : 23/09/15**

This Test Report shall not be duplicated except in full and then only with the permission of the test laboratory

TEST REPORT NO.: 118962Analysing
Testing
Consulting
Calibrating**Client: Environmental Department
Limerick City Council
Dooradoyle
Co. Limerick****BHP Ref. No.: 15/09/470-482
Order No.:
Date Received: 17/09/15
Date Completed: 17/09/15
Test Specification: Nil
Item: Q3 Leachate 2015****BHP
New Road
Thomondgate
Limerick
Ireland
Tel +353 61 455399
Fax + 353 61 455447
E Mail bhpцем2@bhp.ie****FTAO: Tara Flanagan**

Test	Client Reference	Units	Results	Standard Reference*
Odour	L 06	-	Slight Leachate Odour	BHP AC 046
Visual Inspection		-	Clear	BHP AC 046
Temperature		°C	11.9	BHP AC 067
Odour	L 07	-	Slight Leachate Odour	BHP AC 046
Visual Inspection		-	Orange/Turbid	BHP AC 046
Temperature		°C	12.7	BHP AC 067
Odour	L 08	-	Leachate Odour	BHP AC 046
Visual Inspection		-	Black/Turbid	BHP AC 046
Temperature		°C	17.6	BHP AC 067
Odour	L 09	-	Slight Leachate Odour	BHP AC 046
Visual Inspection		-	Brown/Turbid	BHP AC 046
Temperature		°C	18.3	BHP AC 067
Odour	L 10	-	Leachate Odour	BHP AC 046
Visual Inspection		-	Black/Very Turbid	BHP AC 046
Temperature		°C	18.6	BHP AC 067

Additional information :**For and on behalf of BHP laboratories :****John O'Halloran
Issue Date : 23/09/15**

This Test Report shall not be duplicated except in full and then only with the permission of the test laboratory

TEST REPORT NO.: 118962

Analysing
Testing
Consulting
Calibrating



Client: Environmental Department
Limerick City Council
Dooradoyle
Co. Limerick

BHP Ref. No.: 15/09/470-482
Order No.:
Date Received: 17/09/15
Date Completed: 17/09/15
Test Specification: Nil
Item: Q3 Leachate 2015

FTAO: Tara Flanagan

BHP
New Road
Thomondgate
Limerick
Ireland
Tel +353 61 455399
Fax + 353 61 455447
E Mail bhpccm2@bhp.ie

Test	Client Reference	Units	Results	Standard Reference*
Odour	L 11	-	Leachate Odour	BHP AC 046
Visual Inspection		-	Black/Very Turbid	BHP AC 046
Temperature		°C	18.4	BHP AC 067
Odour	Tank	-	No Odour	BHP AC 046
Visual Inspection		-	Orange	BHP AC 046
Temperature		°C	13.1	BHP AC 067
Odour	Sump	-	No odour	BHP AC 046
Visual Inspection		-	Orange	BHP AC 046
Temperature		°C	14.4	BHP AC 067

Additional information :

*Documented in-house methods based on stated standard references

For and on behalf of BHP laboratories :

John O'Halloran
Issue Date : 23/09/15

This Test Report shall not be duplicated except in full and then only with the permission of the test laboratory

Appendix F:

**Fourth quarterly report covering groundwater,
surfacewater and leachate monitoring at Longpavement
Landfill (Monitoring Period October- December 2015)**

TEST REPORT 119961.1Analysing
Testing
Consulting
CalibratingBHP
New Road
Thomondgate
Limerick
Ireland
Tel +353 61 455399
Fax + 353 61 455447
E Mail johnhalloran@bhp.ieClient: Environmental Department
Limerick City Council
Dooradoyle
Co. Limerick

FTAO: Tara Flanagan

BHP Ref. No.: 15/12/372
Order No.:
Date Received: 14/12/15
Date Completed: 23/12/15
Test Specification: Nil
Item: Q4 Ground Water 2015

Test	Client Reference	Units	Results	Date Analysed	Test Method
Odour	GW 03	-	Yes	14/12/2015	BHP AC 046
Visual Inspection	Shallow	-	Pale Yellow/ Slightly Turbid	14/12/2015	BHP AC 046
Ammoniacal Nitrogen (as NH ₃ -N)		mg/L	0.18	15/12/2015	BHP AC 095
Chloride		mg/L	10.1	22/12/2015	BHP AC 095
Dissolved Oxygen		%	29	14/12/2015	BHP AC 067
Electrical Conductivity		µS/cm (25 °C)	923	14/12/2015	BHP AC 067
pH		-	6.92	14/12/2015	BHP AC 067
Temperature		°C	11.6	14/12/2015	BHP AC 067
Total Organic Carbon		mg/L	7.5	23/12/2015	BHP AC 016

Additional information :

For and on behalf of BHP laboratories :

John O' Halloran
Issue Date : 29/01/16

This Test Report shall not be duplicated except in full and then only with the permission of the test laboratory

TEST REPORT 119961.2Analysing
Testing
Consulting
CalibratingBHP
New Road
Thomondgate
Limerick
Ireland
Tel +353 61 455399
Fax + 353 61 455447
E Mail johnohalloran@bhp.ieClient: Environmental Department
Limerick City Council
Dooradoyle
Co. Limerick

FTAO: Tara Flanagan

BHP Ref. No.: 15/12/373
Order No.:
Date Received: 14/12/15
Date Completed: 23/12/15
Test Specification: Nil
Item: Q4 Ground Water 2015

Test	Client Reference	Units	Results	Date Analysed	Test Method
Odour	GW 03	-	None	14/12/2015	BHP AC 046
Visual Inspection	Deep	-	Yellow- Brown/Turbid	14/12/2015	BHP AC 046
Ammoniacal Nitrogen (as NH ₃ -N)		mg/L	0.37	15/12/2015	BHP AC 095
Chloride		mg/L	<10	22/12/2015	BHP AC 095
Dissolved Oxygen		%	18	14/12/2015	BHP AC 067
Electrical Conductivity		µS/cm (25 °C)	956	14/12/2015	BHP AC 067
pH		-	6.83	14/12/2015	BHP AC 067
Temperature		°C	11.7	14/12/2015	BHP AC 067
Total Organic Carbon		mg/L	9.0	23/12/2015	BHP AC 016

Additional information :

For and on behalf of BHP laboratories :

John O' Halloran
Issue Date : 29/01/16

This Test Report shall not be duplicated except in full and then only with the permission of the test laboratory

TEST REPORT 119961.3

Analysing
Testing
Consulting
Calibrating



BHP
New Road
Thomondgate
Limerick
Ireland
Tel +353 61 455399
Fax + 353 61 455447
E Mail johnohalloran@bhp.ie

Client: Environmental Department
Limerick City Council
Dooradoyle
Co. Limerick

BHP Ref. No.: N/A*
Order No.:
Date Received: 14/12/15
Date Completed: N/A*
Test Specification: Nil
Item: Q4 Ground Water 2015

FTAO: Tara Flanagan

Test	Client Reference	Units	Results	Date Analysed	Test Method
Odour	GW 04	-	N/A*	N/A*	BHP AC 046
Visual Inspection	Shallow	-	N/A*	N/A*	BHP AC 046
Ammoniacal Nitrogen (as NH ₃ -N)		mg/L	N/A*	N/A*	BHP AC 095
Chloride		mg/L	N/A*	N/A*	BHP AC 095
Dissolved Oxygen		%	N/A*	N/A*	BHP AC 067
Electrical Conductivity		µS/cm (25 °C)	N/A*	N/A*	BHP AC 067
pH		-	N/A*	N/A*	BHP AC 067
Temperature		°C	N/A*	N/A*	BHP AC 067
Total Organic Carbon		mg/L	N/A*	N/A*	BHP AC 016

Additional information : *Sample location dry

For and on behalf of BHP laboratories :

John O' Halloran
Issue Date : 29/01/16

This Test Report shall not be duplicated except in full and then only with the permission of the test laboratory

TEST REPORT 119961.4Analysing
Testing
Consulting
CalibratingBHP
New Road
Thomondgate
Limerick
Ireland
Tel +353 61 455399
Fax + 353 61 455447
E Mail johnohalloran@bhp.ieClient: Environmental Department
Limerick City Council
Dooradoyle
Co. Limerick

FTAO: Tara Flanagan

BHP Ref. No.: 15/12/374
Order No.:
Date Received: 14/12/15
Date Completed: 23/12/15
Test Specification: Nil
Item: Q4 Ground Water 2015

Test	Client Reference	Units	Results	Date Analysed	Test Method
Odour	GW 04	-	Yes	14/12/2015	BHP AC 046
Visual Inspection	Deep	-	Pale Yellow/Not Turbid	14/12/2015	BHP AC 046
Ammoniacal Nitrogen (as NH ₃ -N)		mg/L	0.53	15/12/2015	BHP AC 095
Chloride		mg/L	27.7	22/12/2015	BHP AC 095
Dissolved Oxygen		%	40	14/12/2015	BHP AC 067
Electrical Conductivity		µS/cm (25 °C)	633	14/12/2015	BHP AC 067
pH		-	7.31	14/12/2015	BHP AC 067
Temperature		°C	11.4	14/12/2015	BHP AC 067
Total Organic Carbon		mg/L	28	23/12/2015	BHP AC 016

Additional information :

For and on behalf of BHP laboratories :

John O' Halloran
Issue Date : 29/01/16

This Test Report shall not be duplicated except in full and then only with the permission of the test laboratory

TEST REPORT 119961.5

Analysing
Testing
Consulting
Calibrating



BHP
New Road
Thomondgate
Limerick
Ireland
Tel +353 61 455399
Fax + 353 61 455447
E Mail johnhalloran@bhp.ie

Client: Environmental Department
Limerick City Council
Dooradoyle
Co. Limerick

BHP Ref. No.: N/A*
Order No.:
Date Received: 14/12/15
Date Completed: N/A*
Test Specification: Nil
Item: Q4 Ground Water 2015

FTAO: Tara Flanagan

Test	Client Reference	Units	Results	Date Analysed	Test Method
Odour	GW 05	-	N/A*	N/A*	BHP AC 046
Visual Inspection	Shallow	-	N/A*	N/A*	BHP AC 046
Ammoniacal Nitrogen (as NH ₃ -N)		mg/L	N/A*	N/A*	BHP AC 095
Chloride		mg/L	N/A*	N/A*	BHP AC 095
Dissolved Oxygen		%	N/A*	N/A*	BHP AC 067
Electrical Conductivity		µS/cm (25 °C)	N/A*	N/A*	BHP AC 067
pH		-	N/A*	N/A*	BHP AC 067
Temperature		°C	N/A*	N/A*	BHP AC 067
Total Organic Carbon		mg/L	N/A*	N/A*	BHP AC 016

Additional information : *Sample location dry

For and on behalf of BHP laboratories :

John O' Halloran
Issue Date : 29/01/16

This Test Report shall not be duplicated except in full and then only with the permission of the test laboratory

TEST REPORT 119961.6

Analysing
Testing
Consulting
Calibrating



BHP
New Road
Thomondgate
Limerick
Ireland
Tel +353 61 455399
Fax + 353 61 455447
E Mail johnohalloran@bhp.ie

Client: Environmental Department
Limerick City Council
Dooradoyle
Co. Limerick

FTAO: Tara Flanagan

BHP Ref. No.: 15/12/375
Order No.:
Date Received: 14/12/15
Date Completed: 23/12/15
Test Specification: Nil
Item: Q4 Ground Water 2015

Test	Client Reference	Units	Results	Date Analysed	Test Method
Odour	GW 05	-	None	14/12/2015	BHP AC 046
Visual Inspection	Deep	-	Yellow- Brown/Turbid	14/12/2015	BHP AC 046
Ammoniacal Nitrogen (as NH ₃ -N)		mg/L	0.37	15/12/2015	BHP AC 095
Chloride		mg/L	379	22/12/2015	BHP AC 095
Dissolved Oxygen		%	13	14/12/2015	BHP AC 067
Electrical Conductivity		µS/cm (25 °C)	2490	14/12/2015	BHP AC 067
pH		-	6.54	14/12/2015	BHP AC 067
Temperature		°C	12.1	14/12/2015	BHP AC 067
Total Organic Carbon		mg/L	35	23/12/2015	BHP AC 016

Additional information :

For and on behalf of BHP laboratories :

John O' Halloran
Issue Date : 29/01/16

This Test Report shall not be duplicated except in full and then only with the permission of the test laboratory

TEST REPORT 119983.1

Analysing
Testing
Consulting
Calibrating



BHP
New Road
Thomondgate
Limerick
Ireland
Tel +353 61 455399
Fax + 353 61 455447
E Mail johnhalloran@bhp.ie

Client: Environmental Department
Limerick City Council
Dooradoyle
Co. Limerick

BHP Ref. No.: 15/12/426
Order No.:
Date Received: 16/12/15
Date Completed: 23/12/15
Test Specification: Nil
Item: Q4 Ground Water 2015

FTAO: Tara Flanagan

Test	Client Reference	Units	Results	Date Analysed	Test Method
Odour	GW 01	-	Yes	16/12/2015	BHP AC 046
Visual Inspection	Deep	-	Pale Yellow/ Slightly Turbid	16/12/2015	BHP AC 046
Ammoniacal Nitrogen (as NH ₃ -N)		mg/L	34	17/12/2015	BHP AC 095
Chloride		mg/L	183	22/12/2015	BHP AC 095
Dissolved Oxygen		%	42	16/12/2015	BHP AC 067
Electrical Conductivity		µS/cm (25 °C)	2068	16/12/2015	BHP AC 067
pH		-	6.99	16/12/2015	BHP AC 067
Temperature		°C	12.7	16/12/2015	BHP AC 067
Total Organic Carbon		mg/L	22	23/12/2015	BHP AC 016

Additional information :

For and on behalf of BHP laboratories :

John O' Halloran
Issue Date : 29/01/16

This Test Report shall not be duplicated except in full and then only with the permission of the test laboratory

TEST REPORT 119983.2Analysing
Testing
Consulting
CalibratingBHP
New Road
Thomondgate
Limerick
Ireland
Tel +353 61 455399
Fax + 353 61 455447
E Mail johnohalloran@bhp.ieClient: Environmental Department
Limerick City Council
Dooradoyle
Co. Limerick

FTAO: Tara Flanagan

BHP Ref. No.: 15/12/427
Order No.:
Date Received: 16/12/15
Date Completed: 23/12/15
Test Specification: Nil
Item: Q4 Ground Water 2015

Test	Client Reference	Units	Results	Date Analysed	Test Method
Odour	GW 01	-	Yes	16/12/2015	BHP AC 046
	Shallow	-			BHP AC 046
Visual Inspection			Black/Turbid	16/12/2015	
Ammoniacal Nitrogen (as NH ₃ -N)		mg/L	4.0	17/12/2015	BHP AC 095
Chloride		mg/L	246	22/12/2015	BHP AC 095
Dissolved Oxygen		%	33	16/12/2015	BHP AC 067
Electrical Conductivity		µS/cm (25 °C)	6290	16/12/2015	BHP AC 067
pH		-	6.95	16/12/2015	BHP AC 067
Temperature		°C	12.3	16/12/2015	BHP AC 067
Total Organic Carbon		mg/L	8.0	23/12/2015	BHP AC 016

Additional information :

For and on behalf of BHP laboratories :

John O' Halloran
Issue Date : 29/01/16

This Test Report shall not be duplicated except in full and then only with the permission of the test laboratory

TEST REPORT 119983.3

Analysing
Testing
Consulting
Calibrating



BHP
New Road
Thomondgate
Limerick
Ireland
Tel +353 61 455399
Fax + 353 61 455447
E Mail johnohalloran@bhp.ie

Client: Environmental Department
Limerick City Council
Dooradoyle
Co. Limerick

FTAO: Tara Flanagan

BHP Ref. No.: 15/12/428
Order No.:
Date Received: 16/12/15
Date Completed: 23/12/15
Test Specification: Nil
Item: Q4 Ground Water 2015

Test	Client Reference	Units	Results	Date Analysed	Test Method
Odour	GW 02	-	Yes	16/12/2015	BHP AC 046
	Deep	-	Pale		
Visual Inspection			Yellow/Slightly Turbid	16/12/2015	BHP AC 046
Ammoniacal Nitrogen (as NH ₃ -N)		mg/L	19	17/12/2015	BHP AC 095
Chloride		mg/L	219	22/12/2015	BHP AC 095
Dissolved Oxygen		%	23	16/12/2015	BHP AC 067
Electrical Conductivity		µS/cm (25 °C)	2740	16/12/2015	BHP AC 067
pH		-	6.85	16/12/2015	BHP AC 067
Temperature		°C	12.9	16/12/2015	BHP AC 067
Total Organic Carbon		mg/L	25	23/12/2015	BHP AC 016

Additional information :

*Sample location dry

For and on behalf of BHP laboratories :

John O' Halloran
Issue Date : 29/01/16

This Test Report shall not be duplicated except in full and then only with the permission of the test laboratory

TEST REPORT 119983.4

Analysing
Testing
Consulting
Calibrating



BHP
New Road
Thomondgate
Limerick
Ireland
Tel +353 61 455399
Fax + 353 61 455447
E Mail johnohalloran@bhp.ie

Client: Environmental Department
Limerick City Council
Dooradoyle
Co. Limerick

BHP Ref. No.: 15/12/429
Order No.:
Date Received: 16/12/15
Date Completed: 23/12/15
Test Specification: Nil
Item: Q4 Ground Water 2015

FTAO: Tara Flanagan

Test	Client Reference	Units	Results	Date Analysed	Test Method
Odour	GW 02	-	No	16/12/2015	BHP AC 046
	Shallow	-			BHP AC 046
Visual Inspection			Pale Brown/Turbid	16/12/2015	
Ammoniacal Nitrogen (as NH ₃ -N)		mg/L	0.68	17/12/2015	BHP AC 095
Chloride		mg/L	29.6	22/12/2015	BHP AC 095
Dissolved Oxygen		%	80	16/12/2015	BHP AC 067
Electrical Conductivity		µS/cm (25 °C)	1220	16/12/2015	BHP AC 067
pH		-	7.93	16/12/2015	BHP AC 067
Temperature		°C	11.4	16/12/2015	BHP AC 067
Total Organic Carbon		mg/L	6	23/12/2015	BHP AC 016

Additional information :

For and on behalf of BHP laboratories :

John O' Halloran
Issue Date : 29/01/16

This Test Report shall not be duplicated except in full and then only with the permission of the test laboratory

TEST REPORT 119960.1

Analysing
Testing
Consulting
Calibrating



BHP
New Road
Thomondgate
Limerick
Ireland
Tel +353 61 455399
Fax + 353 61 455447

Client: Environmental Department
Limerick City Council
Dooradoyle
Co. Limerick

FTAO: Tara Flanagan

BHP Ref. No.: 15/12/365
Order No.:
Date Received: 14/12/15
Date Completed: 22/12/15
Test Specification: Nil
Item: Q4 Surface Water 2015

Test	Client Reference	Units	Results	Date Analysed	Test Method
Odour	SW 01	-	No Odour	14/12/2015	BHP AC 046
Visual Inspection		-	Clear/Pale Yellow/Brown	14/12/2015	BHP AC 046
Ammoniacal Nitrogen (as NH ₃ -N)		mg/L	0.41	15/12/2015	BHP AC 095
B.O.D.		mg/L	2.5	16/12/2015	BHP AC 005
C.O.D.		mg/L	79	15/12/2015	BHP AC 006
Chloride		mg/L	18	22/12/2015	BHP AC 095
Dissolved Oxygen		%	80	14/12/2015	BHP AC 067
Electrical Conductivity		µS/cm (25 °C)	404	14/12/2015	BHP AC 067
pH		-	7.33	14/12/2015	BHP AC 067
Total Suspended Solids		mg/L	14	18/12/2015	BHP AC 012
Temperature		°C	10.3	14/12/2015	BHP AC 067

Additional information :

For and on behalf of BHP laboratories :

John O' Halloran
Issue Date: 06/01/16

This Test Report shall not be duplicated except in full and then only with the permission of the test laboratory

TEST REPORT 119960.2Analysing
Testing
Consulting
CalibratingBHP
New Road
Thomondgate
Limerick
Ireland
Tel +353 61 455399
Fax + 353 61 455447**Client:** Environmental Department
Limerick City Council
Dooradoyle
Co. Limerick**FTAO:** Tara Flanagan**BHP Ref. No.:** 15/12/366
Order No.:
Date Received: 14/12/15
Date Completed: 22/12/15
Test Specification: Nil
Item: Q4 Surface Water 2015

Test	Client Reference	Units	Results	Date Analysed	Test Method
Odour	SW 02	-	No Odour	14/12/2015	BHP AC 046
Visual Inspection		-	Clear/Pale Yellow	14/12/2015	BHP AC 046
Ammoniacal Nitrogen (as NH ₃ -N)		mg/L	3.1	15/12/2015	BHP AC 095
B.O.D.		mg/L	3.0	16/12/2015	BHP AC 005
C.O.D.		mg/L	17	15/12/2015	BHP AC 006
Chloride		mg/L	21	22/12/2015	BHP AC 095
Dissolved Oxygen		%	70	14/12/2015	BHP AC 067
Electrical Conductivity		µS/cm (25 °C)	628	14/12/2015	BHP AC 067
pH		-	7.16	14/12/2015	BHP AC 067
Total Suspended Solids		mg/L	<10	18/12/2015	BHP AC 012
Temperature		°C	10.3	14/12/2015	BHP AC 067

Additional information :**For and on behalf of BHP laboratories :****John O' Halloran**
Issue Date: 06/01/16

This Test Report shall not be duplicated except in full and then only with the permission of the test laboratory

TEST REPORT 119960.3

Analysing
Testing
Consulting
Calibrating



BHP
New Road
Thomondgate
Limerick
Ireland
Tel +353 61 455399
Fax + 353 61 455447

Client: Environmental Department
Limerick City Council
Dooradoyle
Co. Limerick

BHP Ref. No.: 15/12/367
Order No.:
Date Received: 14/12/15
Date Completed: 22/12/15
Test Specification: Nil
Item: Q4 Surface Water 2015

FTAO: Tara Flanagan

Test	Client Reference	Units	Results	Date Analysed	Test Method
Odour	SW 03	-	No Odour	14/12/2015	BHP AC 046
Visual Inspection		-	Clear/Pale Yellow	14/12/2015	BHP AC 046
Ammoniacal Nitrogen (as NH ₃ -N)		mg/L	<0.1	15/12/2015	BHP AC 095
B.O.D.		mg/L	2.0	16/12/2015	BHP AC 005
C.O.D.		mg/L	32	15/12/2015	BHP AC 006
Chloride		mg/L	18	22/12/2015	BHP AC 095
Dissolved Oxygen		%	90	14/12/2015	BHP AC 067
Electrical Conductivity		µS/cm (25 °C)	373	14/12/2015	BHP AC 067
pH		-	8.36	14/12/2015	BHP AC 067
Total Suspended Solids		mg/L	<10	18/12/2015	BHP AC 012
Temperature		°C	8.8	14/12/2015	BHP AC 067

Additional information :

For and on behalf of BHP laboratories :

John O' Halloran
Issue Date: 06/01/16

This Test Report shall not be duplicated except in full and then only with the permission of the test laboratory

TEST REPORT 119960.4

Analysing
Testing
Consulting
Calibrating



BHP
New Road
Thomondgate
Limerick
Ireland
Tel +353 61 455399
Fax + 353 61 455447

Client: Environmental Department
Limerick City Council
Dooradoyle
Co. Limerick

BHP Ref. No.: 15/12/368
Order No.:
Date Received: 14/12/15
Date Completed: 22/12/15
Test Specification: Nil
Item: Q4 Surface Water 2015

FTAO: Tara Flanagan

Test	Client Reference	Units	Results	Date Analysed	Test Method
Odour	SW 04	-	No Odour	14/12/2015	BHP AC 046
Visual Inspection		-	Clear/Pale Yellow	14/12/2015	BHP AC 046
Ammoniacal Nitrogen (as NH ₃ -N)		mg/L	0.22	15/12/2015	BHP AC 095
B.O.D.		mg/L	2.0	16/12/2015	BHP AC 005
C.O.D.		mg/L	26	15/12/2015	BHP AC 006
Chloride		mg/L	17	22/12/2015	BHP AC 095
Dissolved Oxygen		%	72	14/12/2015	BHP AC 067
Electrical Conductivity		µS/cm (25 °C)	366	14/12/2015	BHP AC 067
pH		-	7.69	14/12/2015	BHP AC 067
Total Suspended Solids		mg/L	<10	18/12/2015	BHP AC 012
Temperature		°C	9.5	14/12/2015	BHP AC 067

Additional information :

For and on behalf of BHP laboratories :

John O' Halloran
Issue Date: 06/01/16

This Test Report shall not be duplicated except in full and then only with the permission of the test laboratory

TEST REPORT 119960.5

Analysing
Testing
Consulting
Calibrating



BHP
New Road
Thomondgate
Limerick
Ireland
Tel +353 61 455399
Fax + 353 61 455447

Client: Environmental Department
Limerick City Council
Dooradoyle
Co. Limerick

FTAO: Tara Flanagan

BHP Ref. No.: 15/12/369
Order No.:
Date Received: 14/12/15
Date Completed: 22/12/15
Test Specification: Nil
Item: Q4 Surface Water 2015

Test	Client Reference	Units	Results	Date Analysed	Test Method
Odour	SW 05	-	No Odour	14/12/2015	BHP AC 046
Visual Inspection		-	Clear/Yellow	14/12/2015	BHP AC 046
Ammoniacal Nitrogen (as NH ₃ -N)		mg/L	0.88	15/12/2015	BHP AC 095
B.O.D.		mg/L	2.0	16/12/2015	BHP AC 005
C.O.D.		mg/L	28	15/12/2015	BHP AC 006
Chloride		mg/L	19	22/12/2015	BHP AC 095
Dissolved Oxygen		%	67	14/12/2015	BHP AC 067
Electrical Conductivity		µS/cm (25 °C)	405	14/12/2015	BHP AC 067
pH		-	7.57	14/12/2015	BHP AC 067
Total Suspended Solids		mg/L	<10	18/12/2015	BHP AC 012
Temperature		°C	8.7	14/12/2015	BHP AC 067

Additional information :

For and on behalf of BHP laboratories :

John O' Halloran
Issue Date: 06/01/16

This Test Report shall not be duplicated except in full and then only with the permission of the test laboratory

TEST REPORT 119960.6

Analysing
Testing
Consulting
Calibrating



BHP
New Road
Thomondgate
Limerick
Ireland
Tel +353 61 455399
Fax + 353 61 455447

Client: Environmental Department
Limerick City Council
Dooradoyle
Co. Limerick

BHP Ref. No.: 15/12/370
Order No.:
Date Received: 14/12/15
Date Completed: 22/12/15
Test Specification: Nil
Item: Q4 Surface Water 2015

FTAO: Tara Flanagan

Test	Client Reference	Units	Results	Date Analysed	Test Method
Odour	SW 06	-	No Odour	14/12/2015	BHP AC 046
Visual Inspection		-	Clear/Pale Yellow	14/12/2015	BHP AC 046
Ammoniacal Nitrogen (as NH ₃ -N)		mg/L	0.35	15/12/2015	BHP AC 095
B.O.D.		mg/L	2.0	16/12/2015	BHP AC 005
C.O.D.		mg/L	28	15/12/2015	BHP AC 006
Chloride		mg/L	18	22/12/2015	BHP AC 095
Dissolved Oxygen		%	76	14/12/2015	BHP AC 067
Electrical Conductivity		µS/cm (25 °C)	381	14/12/2015	BHP AC 067
pH		-	7.90	14/12/2015	BHP AC 067
Total Suspended Solids		mg/L	<10	18/12/2015	BHP AC 012
Temperature		°C	9.1	14/12/2015	BHP AC 067

Additional information :

For and on behalf of BHP laboratories :

John O' Halloran
Issue Date: 06/01/16

This Test Report shall not be duplicated except in full and then only with the permission of the test laboratory

TEST REPORT 119960.7

Analysing
Testing
Consulting
Calibrating



BHP
New Road
Thomondgate
Limerick
Ireland
Tel +353 61 455399
Fax + 353 61 455447

Client: Environmental Department
Limerick City Council
Dooradoyle
Co. Limerick

BHP Ref. No.: 15/12/371
Order No.:
Date Received: 14/12/15
Date Completed: 22/12/15
Test Specification: Nil
Item: Q4 Surface Water 2015

FTAO: Tara Flanagan

Test	Client Reference	Units	Results	Date Analysed	Test Method
Odour	SW 07	-	No Odour	14/12/2015	BHP AC 046
Visual Inspection		-	Clear/No Colour	14/12/2015	BHP AC 046
Ammoniacal Nitrogen (as NH ₃ -N)		mg/L	1.3	15/12/2015	BHP AC 095
B.O.D.		mg/L	2.0	16/12/2015	BHP AC 005
C.O.D.		mg/L	18	15/12/2015	BHP AC 006
Chloride		mg/L	20	22/12/2015	BHP AC 095
Dissolved Oxygen		%	50	14/12/2015	BHP AC 067
Electrical Conductivity		µS/cm (25 °C)	560	14/12/2015	BHP AC 067
pH		-	7.75	14/12/2015	BHP AC 067
Total Suspended Solids		mg/L	<10	18/12/2015	BHP AC 012
Temperature		°C	9.7	14/12/2015	BHP AC 067

Additional information :

For and on behalf of BHP laboratories :

John O' Halloran
Issue Date: 06/01/16

This Test Report shall not be duplicated except in full and then only with the permission of the test laboratory

TEST REPORT NO.: 119984

Analysing
Testing
Consulting
Calibrating



Client: Environmental Department
Limerick City Council
Dooradoyle
Co. Limerick

BHP Ref. No.: 15/12/430-442
Order No.:
Date Received: 16/12/15
Date Completed: 16/12/15
Test Specification: Nil
Item: Q4 Leachate 2015

BHP
New Road
Thomondgate
Limerick
Ireland
Tel +353 61 455399
Fax + 353 61 455447

FTAO: Tara Flanagan

Test	Client Reference	Units	Results	Test Method
Odour	L 01	-	Leachate Odour	BHP AC 046
Visual Inspection		-	Black/Turbid	BHP AC 046
Temperature		°C	14.3	BHP AC 067
Odour	L 02	-	Leachate Odour	BHP AC 046
Visual Inspection		-	Black/Turbid	BHP AC 046
Temperature		°C	14.0	BHP AC 067
Odour	L 03	-	Leachate Odour	BHP AC 046
Visual Inspection		-	Black/Very Turbid	BHP AC 046
Temperature		°C	14.1	BHP AC 067
Odour	L 04	-	Leachate Odour	BHP AC 046
Visual Inspection		-	Light Brown/Slightly Turbid	BHP AC 046
Temperature		°C	12.0	BHP AC 067
Odour	L 05	-	Slight Leachate Odour	BHP AC 046
Visual Inspection		-	Grey/Turbid	BHP AC 046
Temperature		°C	11.1	BHP AC 067

Additional information :

For and on behalf of BHP laboratories :

John O'Halloran
Issue Date : 11/01/16

This Test Report shall not be duplicated except in full and then only with the permission of the test laboratory

TEST REPORT NO.: 119984Analysing
Testing
Consulting
Calibrating**Client: Environmental Department
Limerick City Council
Dooradoyle
Co. Limerick****BHP Ref. No.: 15/12/430-442
Order No.:
Date Received: 16/12/15
Date Completed: 16/12/15
Test Specification: Nil
Item: Q4 Leachate 2015**BHP
New Road
Thomondgate
Limerick
Ireland
Tel +353 61 455399
Fax + 353 61 455447**FTAO: Tara Flanagan**

Test	Client Reference	Units	Results	Test Method
Odour	L 06	-	No Odour	BHP AC 046
Visual Inspection		-	Clear/Not Turbid	BHP AC 046
Temperature		°C	11.6	BHP AC 067
Odour	L 07	-	Slight Leachate Odour	BHP AC 046
Visual Inspection		-	Light Brown/Slightly Turbid	BHP AC 046
Temperature		°C	11.6	BHP AC 067
Odour	L 08	-	Leachate Odour	BHP AC 046
Visual Inspection		-	Grey/Turbid	BHP AC 046
Temperature		°C	13.3	BHP AC 067
Odour	L 09	-	Leachate Odour	BHP AC 046
Visual Inspection		-	Black/Very Turbid	BHP AC 046
Temperature		°C	13.3	BHP AC 067
Odour	L 10	-	Leachate Odour	BHP AC 046
Visual Inspection		-	Black/Very Turbid	BHP AC 046
Temperature		°C	13.9	BHP AC 067

Additional information :**For and on behalf of BHP laboratories :****John O'Halloran
Issue Date : 11/01/16**

This Test Report shall not be duplicated except in full and then only with the permission of the test laboratory

TEST REPORT NO.: 119984

Analysing
Testing
Consulting
Calibrating



BHP
New Road
Thomondgate
Limerick
Ireland
Tel +353 61 455399
Fax + 353 61 455447

Client: Environmental Department
Limerick City Council
Dooradoyle
Co. Limerick

BHP Ref. No.: 15/12/430-442
Order No.:
Date Received: 16/12/15
Date Completed: 16/12/15
Test Specification: Nil
Item: Q4 Leachate 2015

FTAO: Tara Flanagan

Test	Client Reference	Units	Results	Test Method
Odour	L 11	-	Leachate Odour	BHP AC 046
Visual Inspection		-	Black/Very Turbid	BHP AC 046
Temperature		°C	14.6	BHP AC 067
Odour	Tank	-	No Odour	BHP AC 046
Visual Inspection		-	Light Brown/Turbid	BHP AC 046
Temperature		°C	11.2	BHP AC 067
Odour	Sump	-	No odour	BHP AC 046
Visual Inspection		-	Orange/Turbid	BHP AC 046
Temperature		°C	11.3	BHP AC 067

Additional information :

For and on behalf of BHP laboratories :

John O'Halloran
Issue Date : 11/01/16

This Test Report shall not be duplicated except in full and then only with the permission of the test laboratory

Appendix G:

**Annual report covering groundwater, surfacewater and
leachate monitoring at Longpavement Landfill (Monitoring
Period 2015)**

TEST REPORT NO: 119961.1Analysing
Testing
Consulting
CalibratingClient: **Environmental Department
Limerick City Council
Dooradoyle
Co. Limerick**BHP Ref. No.: **15/12/372**
Order No.:
Date Received: **14/12/15**
Date Completed: **11/01/16**
Test Specification: **Nil**
Item: **Annual Ground Water 2015**BHP
New Road
Thomondgate
Limerick
Ireland
Tel +353 61 455399
Fax + 353 61 455447FTAO: **Tara Flanagan**

TEST	Client Reference	Units	Results	Date Analysed	Test Method
	Annual Monitoring Groundwater 3 Shallow				
Boron		mg/L	<0.23	22/12/2015	WAS049*
Cadmium		mg/L	<0.0006	22/12/2015	WAS049*
Calcium		mg/L	184	22/12/2015	WAS049*
Chromium		mg/L	0.0023	22/12/2015	WAS049*
Copper		mg/L	<0.009	22/12/2015	WAS049*
Iron		mg/L	3.3	22/12/2015	WAS049*
Lead		mg/L	<0.006	22/12/2015	WAS049*
Magnesium		mg/L	11	22/12/2015	WAS049*
Manganese		mg/L	0.291	22/12/2015	WAS049*
Nickel		mg/L	0.0203	22/12/2015	WAS049*
Potassium		mg/L	0.559	22/12/2015	WAS049*
Sodium		mg/L	7.94	22/12/2015	WAS049*
Zinc		mg/L	0.0364	22/12/2015	WAS049*
Mercury		mg/L	<0.0001	18/12/2015	WAS013*
Fluoride		mg/L	0.09	14/12/2015	BHP AC 019
Sulphate (as SO ₄)		mg/L	29.1	22/12/2015	BHP AC 095
Orthophosphate (as P)		mg/L	<0.01	15/12/2015	BHP AC 095

Additional information : *Subcontracted to an approved accredited supplier

For and on behalf of BHP laboratories :

John O'HalloranIssue Date : **26/02/16**

This Test Report shall not be duplicated except in full and then only with the permission of the test laboratory

TEST REPORT NO: 119961.1Analysing
Testing
Consulting
Calibrating**Client: Environmental Department
Limerick City Council
Dooradoyle
Co. Limerick****BHP Ref. No.: 15/12/372
Order No.:
Date Received: 14/12/15
Date Completed: 11/01/16
Test Specification: Nil
Item: Annual Ground Water 2015**BHP
New Road
Thomondgate
Limerick
Ireland
Tel +353 61 455399
Fax + 353 61 455447**FTAO: Tara Flanagan**

TEST	Client Reference	Units	Results	Date Analysed	Test Method
	Annual Monitoring Groundwater 3 Shallow				
Nitrate (as NO ₃)		mg/L	<0.5	14/12/2015	BHP AC 019
Nitrite (as NO ₂)		mg/L	<0.05	14/12/2015	BHP AC 019
Total Oxidised Nitrogen (as N)		mg/L	<0.14	14/12/2015	BHP AC 065
Cyanide		mg/L	<0.05	21/12/2015	BHP AC 095
Alkalinity (as CaCO ₃)		mg/L	496	15/12/2015	BHP AC 095
Residue on Evaporation		mg/L	600	17/12/2015	BHP AC 040
Volatile Organic Compounds					
Dichlorodifluoromethane		mg/L	<0.001	08/01/2016	GEO32*
Chloromethane		mg/L	<0.001	08/01/2016	GEO32*
Chloroethane		mg/L	<0.001	08/01/2016	GEO32*
Bromomethane		mg/L	<0.001	08/01/2016	GEO32*
Trichlorofluoromethane		mg/L	<0.001	08/01/2016	GEO32*
1,1-Dichloroethene		mg/L	<0.001	08/01/2016	GEO32*
Dichloromethane		mg/L	<0.001	08/01/2016	GEO32*
1,1-Dichloroethane		mg/L	<0.001	08/01/2016	GEO32*
cis-1,2-Dichloroethene		mg/L	<0.001	08/01/2016	GEO32*
2,2-Dichloropropane		mg/L	<0.001	08/01/2016	GEO32*

Additional information : *Subcontracted to an approved accredited supplier**For and on behalf of BHP laboratories :****John O'Halloran****Issue Date : 26/02/16**

This Test Report shall not be duplicated except in full and then only with the permission of the test laboratory

TEST REPORT NO: 119961.1Analysing
Testing
Consulting
Calibrating**Client: Environmental Department
Limerick City Council
Dooradoyle
Co. Limerick****BHP Ref. No.: 15/12/372
Order No.:
Date Received: 14/12/15
Date Completed: 11/01/16
Test Specification: Nil
Item: Annual Ground Water 2015**BHP
New Road
Thomondgate
Limerick
Ireland
Tel +353 61 455399
Fax + 353 61 455447**FTAO: Tara Flanagan**

TEST	Client Reference	Units	Results	Date Analysed	Test Method
	Annual Monitoring Groundwater 3 Shallow				
Chloroform		mg/L	<0.001	08/01/2016	GEO32*
Bromochloromethane		mg/L	<0.001	08/01/2016	GEO32*
1,1,1-Trichloroethane		mg/L	<0.001	08/01/2016	GEO32*
1,1-Dichloropropene		mg/L	<0.001	08/01/2016	GEO32*
1,2-Dichloroethane		mg/L	<0.001	08/01/2016	GEO32*
Benzene		mg/L	N/A**	11/01/2016	GEO32*
1,2-Dichloropropane		mg/L	<0.001	08/01/2016	GEO32*
Trichloroethene		mg/L	<0.001	08/01/2016	GEO32*
Bromodichloromethane		mg/L	<0.001	08/01/2016	GEO32*
Dibromomethane		mg/L	<0.001	08/01/2016	GEO32*
cis-1,3-Dichloropropene		mg/L	<0.001	08/01/2016	GEO32*
Toluene		mg/L	<0.001	08/01/2016	GEO32*
trans-1,3-Dichloropropene		mg/L	<0.001	08/01/2016	GEO32*
1,1,2-Trichloroethane		mg/L	<0.001	08/01/2016	GEO32*
Carbon Tetrachloride		mg/L	<0.001	08/01/2016	GEO32*
Vinyl Chloride		mg/L	<0.0005	08/01/2016	GEO32*
1,3-Dichloropropane		mg/L	<0.001	08/01/2016	GEO32*

Additional information :

*Subcontracted to an approved accredited supplier

**Unable to report due to QC failure and insufficient sample for re-test

For and on behalf of BHP laboratories :**John O'Halloran****Issue Date : 26/02/16**

This Test Report shall not be duplicated except in full and then only with the permission of the test laboratory

TEST REPORT NO: 119961.1Analysing
Testing
Consulting
Calibrating**Client: Environmental Department
Limerick City Council
Dooradoyle
Co. Limerick****BHP Ref. No.: 15/12/372
Order No.:
Date Received: 14/12/15
Date Completed: 11/01/16
Test Specification: Nil
Item: Annual Ground Water 2015**BHP
New Road
Thomondgate
Limerick
Ireland
Tel +353 61 455399
Fax + 353 61 455447**FTAO: Tara Flanagan**

TEST	Client Reference	Units	Results	Date Analysed	Test Method
	Annual Monitoring Groundwater 3 Shallow				
Tetrachloroethene		mg/L	<0.001	08/01/2016	GEO32*
Dibromochloromethane		mg/L	<0.001	08/01/2016	GEO32*
1,2-Dibromoethane		mg/L	<0.001	08/01/2016	GEO32*
Chlorobenzene		mg/L	<0.001	08/01/2016	GEO32*
1,1,1,2-Tetrachloroethane		mg/L	<0.001	08/01/2016	GEO32*
Ethyl Benzene		mg/L	N/A**	11/01/2016	GEO32*
m&p-Xylene		mg/L	<0.001	08/01/2016	GEO32*
o-Xylene		mg/L	<0.001	08/01/2016	GEO32*
Styrene		mg/L	<0.001	08/01/2016	GEO32*
Bromoform		mg/L	<0.001	08/01/2016	GEO32*
trans-1,2-Dichloroethene		mg/L	<0.001	08/01/2016	GEO32*
Isopropylbenzene		mg/L	<0.001	08/01/2016	GEO32*
1,1,2,2-Tetrachloroethane		mg/L	<0.001	08/01/2016	GEO32*
1,2,3-Trichloropropane		mg/L	<0.001	08/01/2016	GEO32*
n-Propylbenzene		mg/L	<0.001	08/01/2016	GEO32*
Bromobenzene		mg/L	<0.001	08/01/2016	GEO32*
2-Chlorotoluene		mg/L	<0.001	08/01/2016	GEO32*

Additional information :

*Subcontracted to an approved accredited supplier

**Unable to report due to QC failure and insufficient sample for re-test

For and on behalf of BHP laboratories :**John O'Halloran****Issue Date : 26/02/16**

This Test Report shall not be duplicated except in full and then only with the permission of the test laboratory

TEST REPORT NO: 119961.1Analysing
Testing
Consulting
Calibrating**Client: Environmental Department
Limerick City Council
Dooradoyle
Co. Limerick****BHP Ref. No.: 15/12/372
Order No.:
Date Received: 14/12/15
Date Completed: 11/01/16
Test Specification: Nil
Item: Annual Ground Water 2015**BHP
New Road
Thomondgate
Limerick
Ireland
Tel +353 61 455399
Fax + 353 61 455447**FTAO: Tara Flanagan**

TEST	Client Reference	Units	Results	Date Analysed	Test Method
	Annual Monitoring Groundwater 3 Shallow				
1,3,5-Trimethylbenzene		mg/L	N/A**	11/01/2016	GEO32*
4-Chlorotoluene		mg/L	<0.001	08/01/2016	GEO32*
tert-Butylbenzene		mg/L	<0.001	08/01/2016	GEO32*
1,2,4-Trimethylbenzene		mg/L	<0.001	08/01/2016	GEO32*
sec-Butylbenzene		mg/L	<0.001	08/01/2016	GEO32*
p-Isopropyltoluene		mg/L	N/A**	11/01/2016	GEO32*
1,3-Dichlorobenzene		mg/L	<0.001	08/01/2016	GEO32*
1,4-Dichlorobenzene		mg/L	<0.001	08/01/2016	GEO32*
n-Butylbenzene		mg/L	N/A**	11/01/2016	GEO32*
1,2-Dichlorobenzene		mg/L	<0.001	08/01/2016	GEO32*
1,2-Dibromo-3-chloropropane		mg/L	<0.002	08/01/2016	GEO32*
1,2,4-Trichlorobenzene		mg/L	0.001	08/01/2016	GEO32*
Hexachlorobutadiene		mg/L	<0.001	08/01/2016	GEO32*
Naphthalene		mg/L	N/A**	11/01/2016	GEO32*
1,2,3-Trichlorobenzene		mg/L	0.0012	08/01/2016	GEO32*
MTBE		mg/L	<0.001	08/01/2016	GEO32*

Additional information :

*Subcontracted to an approved accredited supplier

**Unable to report due to QC failure and insufficient sample for re-test

For and on behalf of BHP laboratories :**John O'Halloran****Issue Date : 26/02/16**

This Test Report shall not be duplicated except in full and then only with the permission of the test laboratory

TEST REPORT NO: 119961.1Analysing
Testing
Consulting
Calibrating**Client: Environmental Department
Limerick City Council
Dooradoyle
Co. Limerick****BHP Ref. No.: 15/12/372
Order No.:
Date Received: 14/12/15
Date Completed: 11/01/16
Test Specification: Nil
Item: Annual Ground Water 2015**BHP
New Road
Thomondgate
Limerick
Ireland
Tel +353 61 455399
Fax + 353 61 455447**FTAO: Tara Flanagan**

TEST	Client Reference	Units	Results	Date Analysed	Test Method
	Annual Monitoring Groundwater 3 Shallow				
Semi Volatile Organic Compounds					
Phenol		mg/L	<0.001	06/01/2016	GEO40*
Bis(2-chloroethyl)ether		mg/L	<0.001	06/01/2016	GEO40*
2-Chlorophenol		mg/L	<0.001	06/01/2016	GEO40*
1,3-Dichlorobenzene		mg/L	<0.001	06/01/2016	GEO40*
1,4-Dichlorobenzene		mg/L	<0.001	06/01/2016	GEO40*
2-Methylphenol		mg/L	<0.001	06/01/2016	GEO40*
3&4-Methylphenol		mg/L	<0.001	06/01/2016	GEO40*
Dibenzofuran		mg/L	<0.001	06/01/2016	GEO40*
1,2-Dichlorobenzene		mg/L	<0.001	06/01/2016	GEO40*
Bis(2-chloroisopropyl)ether		mg/L	<0.001	06/01/2016	GEO40*
n-Nitrosodi-n-propylamine		mg/L	<0.001	06/01/2016	GEO40*
Hexachloroethane		mg/L	<0.001	06/01/2016	GEO40*
Nitrobenzene		mg/L	<0.001	06/01/2016	GEO40*
Isophorone		mg/L	<0.001	06/01/2016	GEO40*
2,4-Dimethylphenol		mg/L	<0.001	06/01/2016	GEO40*
2-Nitrophenol		mg/L	<0.001	06/01/2016	GEO40*

Additional information : *Subcontracted to an approved accredited supplier**For and on behalf of BHP laboratories :****John O'Halloran****Issue Date : 26/02/16**

This Test Report shall not be duplicated except in full and then only with the permission of the test laboratory

TEST REPORT NO: 119961.1Analysing
Testing
Consulting
Calibrating**Client:** Environmental Department
Limerick City Council
Dooradoyle
Co. Limerick**BHP Ref. No.:** 15/12/372
Order No.:
Date Received: 14/12/15
Date Completed: 11/01/16
Test Specification: Nil
Item: Annual Ground Water 2015BHP
New Road
Thomondgate
Limerick
Ireland
Tel +353 61 455399
Fax + 353 61 455447**FTAO:** Tara Flanagan

TEST	Client Reference	Units	Results	Date Analysed	Test Method
	Annual Monitoring Groundwater 3 Shallow				
Bis(2-chloroethoxy)methane		mg/L	<0.001	06/01/2016	GEO40*
2,4-Dichlorophenol		mg/L	<0.001	06/01/2016	GEO40*
1,2,4-Trichlorobenzene		mg/L	<0.001	06/01/2016	GEO40*
Naphthalene		mg/L	<0.002	06/01/2016	GEO40*
Hexachlorobutadiene		mg/L	<0.001	06/01/2016	GEO40*
4-Chloro-3-methylphenol		mg/L	<0.001	06/01/2016	GEO40*
2-Methylnaphthalene		mg/L	<0.001	06/01/2016	GEO40*
2,4,6-Trichlorophenol		mg/L	<0.001	06/01/2016	GEO40*
2,4,5-Trichlorophenol		mg/L	<0.001	06/01/2016	GEO40*
2-Chloronaphthalene		mg/L	<0.001	06/01/2016	GEO40*
Dimethylphthalate		mg/L	<0.001	06/01/2016	GEO40*
2,6-Dinitrotoluene		mg/L	<0.001	06/01/2016	GEO40*
Acenaphthylene		mg/L	<0.001	06/01/2016	GEO40*
Acenaphthene		mg/L	<0.001	06/01/2016	GEO40*
2,4-Dinitrotoluene		mg/L	<0.001	06/01/2016	GEO40*
Diethylphthalate		mg/L	<0.001	06/01/2016	GEO40*
4-Nitrophenol		mg/L	<0.005	06/01/2016	GEO40*

Additional information : *Subcontracted to an approved accredited supplier**For and on behalf of BHP laboratories :****John O'Halloran****Issue Date : 26/02/16**

This Test Report shall not be duplicated except in full and then only with the permission of the test laboratory

TEST REPORT NO: 119961.1Analysing
Testing
Consulting
Calibrating**Client: Environmental Department
Limerick City Council
Dooradoyle
Co. Limerick****BHP Ref. No.: 15/12/372
Order No.:
Date Received: 14/12/15
Date Completed: 11/01/16
Test Specification: Nil
Item: Annual Ground Water 2015**BHP
New Road
Thomondgate
Limerick
Ireland
Tel +353 61 455399
Fax + 353 61 455447**FTAO: Tara Flanagan**

TEST	Client Reference	Units	Results	Date Analysed	Test Method
	Annual Monitoring Groundwater 3 Shallow				
4-Chlorophenyl phenyl ether		mg/L	<0.001	06/01/2016	GEO40*
Fluorene		mg/L	<0.001	06/01/2016	GEO40*
Diphenylamine		mg/L	<0.001	06/01/2016	GEO40*
4-Bromophenyl Phenyl Ether		mg/L	<0.001	06/01/2016	GEO40*
Hexachlorobenzene		mg/L	<0.001	06/01/2016	GEO40*
Pentachlorophenol		mg/L	<0.001	06/01/2016	GEO40*
Phenanthrene		mg/L	<0.001	06/01/2016	GEO40*
Anthracene		mg/L	<0.001	06/01/2016	GEO40*
di-n-Butylphthalate		mg/L	<0.001	06/01/2016	GEO40*
Fluoranthene		mg/L	<0.001	06/01/2016	GEO40*
Pyrene		mg/L	<0.001	06/01/2016	GEO40*
Benzyl Butyl Phthalate		mg/L	<0.001	06/01/2016	GEO40*
Benzo(a)anthracene		mg/L	<0.001	06/01/2016	GEO40*
Chrysene		mg/L	<0.001	06/01/2016	GEO40*
Bis(2-ethylhexyl)phthalate		mg/L	<0.005	06/01/2016	GEO40*
Di-n-octylphthalate		mg/L	<0.001	06/01/2016	GEO40*
Benzo(b)fluoranthene		mg/L	<0.001	06/01/2016	GEO40*

Additional information : *Subcontracted to an approved accredited supplier**For and on behalf of BHP laboratories :****John O'Halloran****Issue Date : 26/02/16**

This Test Report shall not be duplicated except in full and then only with the permission of the test laboratory

TEST REPORT NO: 119961.1

Analysing
Testing
Consulting
Calibrating



Client: Environmental Department
Limerick City Council
Dooradoyle
Co. Limerick

BHP Ref. No.: 15/12/372
Order No.:
Date Received: 14/12/15
Date Completed: 11/01/16
Test Specification: Nil
Item: Annual Ground Water 2015

FTAO: Tara Flanagan

BHP
New Road
Thomondgate
Limerick
Ireland
Tel +353 61 455399
Fax + 353 61 455447

TEST	Client Reference	Units	Results	Date Analysed	Test Method
	Annual Monitoring Groundwater 3 Shallow				
Benzo(k)fluoranthene		mg/L	<0.001	06/01/2016	GEO40*
Benzo(a)pyrene		mg/L	<0.001	06/01/2016	GEO40*
Indeno(1,2,3-c,d)pyrene		mg/L	<0.001	06/01/2016	GEO40*
Dibenz(a,h)anthracene		mg/L	<0.001	06/01/2016	GEO40*
Benzo(g,h,i)perylene		mg/L	<0.001	06/01/2016	GEO40*

Additional information : *Subcontracted to an approved accredited supplier

For and on behalf of BHP laboratories :

John O'Halloran
Issue Date : 26/02/16

This Test Report shall not be duplicated except in full and then only with the permission of the test laboratory

TEST REPORT NO: 119961.2

Analysing
Testing
Consulting
Calibrating



Client: Environmental Department
Limerick City Council
Dooradoyle
Co. Limerick

BHP Ref. No.: 15/12/373
Order No.:
Date Received: 14/12/15
Date Completed: 11/01/16
Test Specification: Nil
Item: Annual Ground Water 2015

BHP
New Road
Thomondgate
Limerick
Ireland
Tel +353 61 455399
Fax + 353 61 455447

FTAO: Tara Flanagan

TEST	Client Reference	Units	Results	Date Analysed	Test Method
	Annual Monitoring Groundwater 3 Deep				
Boron		mg/L	<0.23	22/12/2015	WAS049*
Cadmium		mg/L	<0.0006	22/12/2015	WAS049*
Calcium		mg/L	180	22/12/2015	WAS049*
Chromium		mg/L	0.0051	22/12/2015	WAS049*
Copper		mg/L	<0.009	22/12/2015	WAS049*
Iron		mg/L	10.2	22/12/2015	WAS049*
Lead		mg/L	0.012	22/12/2015	WAS049*
Magnesium		mg/L	11.2	22/12/2015	WAS049*
Manganese		mg/L	0.835	22/12/2015	WAS049*
Nickel		mg/L	0.0164	22/12/2015	WAS049*
Potassium		mg/L	1.02	22/12/2015	WAS049*
Sodium		mg/L	6.98	22/12/2015	WAS049*
Zinc		mg/L	0.0374	22/12/2015	WAS049*
Mercury		mg/L	<0.0001	18/12/2015	WAS013*
Fluoride		mg/L	0.08	14/12/2015	BHP AC 019
Sulphate (as SO ₄)		mg/L	15.9	22/12/2015	BHP AC 095
Orthophosphate (as P)		mg/L	0.08	23/12/2015	BHP AC 095

Additional information : *Subcontracted to an approved accredited supplier

For and on behalf of BHP laboratories :

John O'Halloran

Issue Date : 26/02/16

This Test Report shall not be duplicated except in full and then only with the permission of the test laboratory

TEST REPORT NO: 119961.2Analysing
Testing
Consulting
Calibrating**Client: Environmental Department
Limerick City Council
Dooradoyle
Co. Limerick****BHP Ref. No.: 15/12/373
Order No.:
Date Received: 14/12/15
Date Completed: 11/01/16
Test Specification: Nil
Item: Annual Ground Water 2015**BHP
New Road
Thomondgate
Limerick
Ireland
Tel +353 61 455399
Fax + 353 61 455447**FTAO: Tara Flanagan**

TEST	Client Reference	Units	Results	Date Analysed	Test Method
	Annual Monitoring Groundwater 3 Deep				
Nitrate (as NO ₃)		mg/L	<0.5	14/12/2015	BHP AC 019
Nitrite (as NO ₂)		mg/L	<0.05	14/12/2015	BHP AC 019
Total Oxidised Nitrogen (as N)		mg/L	<0.14	14/12/2015	BHP AC 065
Cyanide		mg/L	<0.05	21/12/2015	BHP AC 095
Alkalinity (as CaCO ₃)		mg/L	500	15/12/2015	BHP AC 095
Residue on Evaporation		mg/L	866	17/12/2015	BHP AC 040
Volatile Organic Compounds					
Dichlorodifluoromethane		mg/L	<0.001	08/01/2016	GEO32*
Chloromethane		mg/L	<0.001	08/01/2016	GEO32*
Chloroethane		mg/L	<0.001	08/01/2016	GEO32*
Bromomethane		mg/L	<0.001	08/01/2016	GEO32*
Trichlorofluoromethane		mg/L	<0.001	08/01/2016	GEO32*
1,1-Dichloroethene		mg/L	<0.001	08/01/2016	GEO32*
Dichloromethane		mg/L	<0.001	08/01/2016	GEO32*
1,1-Dichloroethane		mg/L	<0.001	08/01/2016	GEO32*
cis-1,2-Dichloroethene		mg/L	<0.001	08/01/2016	GEO32*
2,2-Dichloropropane		mg/L	<0.001	08/01/2016	GEO32*

Additional information : *Subcontracted to an approved accredited supplier**For and on behalf of BHP laboratories :****John O'Halloran****Issue Date : 26/02/16**

This Test Report shall not be duplicated except in full and then only with the permission of the test laboratory

TEST REPORT NO: 119961.2Analysing
Testing
Consulting
Calibrating**Client: Environmental Department
Limerick City Council
Dooradoyle
Co. Limerick****BHP Ref. No.: 15/12/373
Order No.:
Date Received: 14/12/15
Date Completed: 11/01/16
Test Specification: Nil
Item: Annual Ground Water 2015**BHP
New Road
Thomondgate
Limerick
Ireland
Tel +353 61 455399
Fax + 353 61 455447**FTAO: Tara Flanagan**

TEST	Client Reference	Units	Results	Date Analysed	Test Method
	Annual Monitoring Groundwater 3 Deep				
Chloroform		mg/L	<0.001	08/01/2016	GEO32*
Bromochloromethane		mg/L	<0.001	08/01/2016	GEO32*
1,1,1-Trichloroethane		mg/L	<0.001	08/01/2016	GEO32*
1,1-Dichloropropene		mg/L	<0.001	08/01/2016	GEO32*
1,2-Dichloroethane		mg/L	<0.001	08/01/2016	GEO32*
Benzene		mg/L	N/A**	11/01/2016	GEO32*
1,2-Dichloropropane		mg/L	<0.001	08/01/2016	GEO32*
Trichloroethene		mg/L	<0.001	08/01/2016	GEO32*
Bromodichloromethane		mg/L	<0.001	08/01/2016	GEO32*
Dibromomethane		mg/L	<0.001	08/01/2016	GEO32*
cis-1,3-Dichloropropene		mg/L	<0.001	08/01/2016	GEO32*
Toluene		mg/L	<0.001	08/01/2016	GEO32*
trans-1,3-Dichloropropene		mg/L	<0.001	08/01/2016	GEO32*
1,1,2-Trichloroethane		mg/L	<0.001	08/01/2016	GEO32*
Carbon Tetrachloride		mg/L	<0.001	08/01/2016	GEO32*
Vinyl Chloride		mg/L	<0.0005	08/01/2016	GEO32*
1,3-Dichloropropane		mg/L	<0.001	08/01/2016	GEO32*

Additional information :

*Subcontracted to an approved accredited supplier

**Unable to report due to QC failure and insufficient sample for re-test

For and on behalf of BHP laboratories :**John O'Halloran****Issue Date : 26/02/16**

This Test Report shall not be duplicated except in full and then only with the permission of the test laboratory

TEST REPORT NO: 119961.2Analysing
Testing
Consulting
Calibrating**Client: Environmental Department
Limerick City Council
Dooradoyle
Co. Limerick****BHP Ref. No.: 15/12/373
Order No.:
Date Received: 14/12/15
Date Completed: 11/01/16
Test Specification: Nil
Item: Annual Ground Water 2015**BHP
New Road
Thomondgate
Limerick
Ireland
Tel +353 61 455399
Fax + 353 61 455447**FTAO: Tara Flanagan**

TEST	Client Reference	Units	Results	Date Analysed	Test Method
	Annual Monitoring Groundwater 3 Deep				
Tetrachloroethene		mg/L	<0.001	08/01/2016	GEO32*
Dibromochloromethane		mg/L	<0.001	08/01/2016	GEO32*
1,2-Dibromoethane		mg/L	<0.001	08/01/2016	GEO32*
Chlorobenzene		mg/L	<0.001	08/01/2016	GEO32*
1,1,1,2-Tetrachloroethane		mg/L	<0.001	08/01/2016	GEO32*
Ethyl Benzene		mg/L	N/A**	11/01/2016	GEO32*
m&p-Xylene		mg/L	<0.001	08/01/2016	GEO32*
o-Xylene		mg/L	<0.001	08/01/2016	GEO32*
Styrene		mg/L	<0.001	08/01/2016	GEO32*
Bromoform		mg/L	<0.001	08/01/2016	GEO32*
trans-1,2-Dichloroethene		mg/L	<0.001	08/01/2016	GEO32*
Isopropylbenzene		mg/L	<0.001	08/01/2016	GEO32*
1,1,2,2-Tetrachloroethane		mg/L	<0.001	08/01/2016	GEO32*
1,2,3-Trichloropropane		mg/L	<0.001	08/01/2016	GEO32*
n-Propylbenzene		mg/L	<0.001	08/01/2016	GEO32*
Bromobenzene		mg/L	<0.001	08/01/2016	GEO32*
2-Chlorotoluene		mg/L	<0.001	08/01/2016	GEO32*

Additional information :

*Subcontracted to an approved accredited supplier

**Unable to report due to QC failure and insufficient sample for re-test

For and on behalf of BHP laboratories :**John O'Halloran****Issue Date : 26/02/16**

This Test Report shall not be duplicated except in full and then only with the permission of the test laboratory

TEST REPORT NO: 119961.2Analysing
Testing
Consulting
CalibratingClient: Environmental Department
Limerick City Council
Dooradoyle
Co. LimerickBHP Ref. No.: 15/12/373
Order No.:
Date Received: 14/12/15
Date Completed: 11/01/16
Test Specification: Nil
Item: Annual Ground Water 2015BHP
New Road
Thomondgate
Limerick
Ireland
Tel +353 61 455399
Fax + 353 61 455447

FTAO: Tara Flanagan

TEST	Client Reference	Units	Results	Date Analysed	Test Method
	Annual Monitoring Groundwater 3 Deep				
1,3,5-Trimethylbenzene		mg/L	N/A**	11/01/2016	GEO32*
4-Chlorotoluene		mg/L	<0.001	08/01/2016	GEO32*
tert-Butylbenzene		mg/L	<0.001	08/01/2016	GEO32*
1,2,4-Trimethylbenzene		mg/L	<0.001	08/01/2016	GEO32*
sec-Butylbenzene		mg/L	<0.001	08/01/2016	GEO32*
p-Isopropyltoluene		mg/L	N/A**	11/01/2016	GEO32*
1,3-Dichlorobenzene		mg/L	<0.001	08/01/2016	GEO32*
1,4-Dichlorobenzene		mg/L	<0.001	08/01/2016	GEO32*
n-Butylbenzene		mg/L	N/A**	11/01/2016	GEO32*
1,2-Dichlorobenzene		mg/L	<0.001	08/01/2016	GEO32*
1,2-Dibromo-3-chloropropane		mg/L	<0.002	08/01/2016	GEO32*
1,2,4-Trichlorobenzene		mg/L	<0.001	08/01/2016	GEO32*
Hexachlorobutadiene		mg/L	<0.001	08/01/2016	GEO32*
Naphthalene		mg/L	N/A**	11/01/2016	GEO32*
1,2,3-Trichlorobenzene		mg/L	<0.001	08/01/2016	GEO32*
MTBE		mg/L	<0.001	08/01/2016	GEO32*

Additional information :

*Subcontracted to an approved accredited supplier

**Unable to report due to QC failure and insufficient sample for re-test

For and on behalf of BHP laboratories :

John O'Halloran

Issue Date : 26/02/16

This Test Report shall not be duplicated except in full and then only with the permission of the test laboratory

TEST REPORT NO: 119961.2Analysing
Testing
Consulting
Calibrating**Client: Environmental Department
Limerick City Council
Dooradoyle
Co. Limerick****BHP Ref. No.: 15/12/373
Order No.:
Date Received: 14/12/15
Date Completed: 11/01/16
Test Specification: Nil
Item: Annual Ground Water 2015**BHP
New Road
Thomondgate
Limerick
Ireland
Tel +353 61 455399
Fax + 353 61 455447**FTAO: Tara Flanagan**

TEST	Client Reference	Units	Results	Date Analysed	Test Method
	Annual Monitoring Groundwater 3 Deep				
Semi Volatile Organic Compounds					
Phenol		mg/L	<0.001	06/01/2016	GEO40*
Bis(2-chloroethyl)ether		mg/L	<0.001	06/01/2016	GEO40*
2-Chlorophenol		mg/L	<0.001	06/01/2016	GEO40*
1,3-Dichlorobenzene		mg/L	<0.001	06/01/2016	GEO40*
1,4-Dichlorobenzene		mg/L	<0.001	06/01/2016	GEO40*
2-Methylphenol		mg/L	<0.001	06/01/2016	GEO40*
3&4-Methylphenol		mg/L	<0.001	06/01/2016	GEO40*
Dibenzofuran		mg/L	<0.001	06/01/2016	GEO40*
1,2-Dichlorobenzene		mg/L	<0.001	06/01/2016	GEO40*
Bis(2-chloroisopropyl)ether		mg/L	<0.001	06/01/2016	GEO40*
n-Nitrosodi-n-propylamine		mg/L	<0.001	06/01/2016	GEO40*
Hexachloroethane		mg/L	<0.001	06/01/2016	GEO40*
Nitrobenzene		mg/L	<0.001	06/01/2016	GEO40*
Isophorone		mg/L	<0.001	06/01/2016	GEO40*
2,4-Dimethylphenol		mg/L	<0.001	06/01/2016	GEO40*
2-Nitrophenol		mg/L	<0.001	06/01/2016	GEO40*

Additional information : *Subcontracted to an approved accredited supplier**For and on behalf of BHP laboratories :****John O'Halloran****Issue Date : 26/02/16**

This Test Report shall not be duplicated except in full and then only with the permission of the test laboratory

TEST REPORT NO: 119961.2Analysing
Testing
Consulting
Calibrating

Client: Environmental Department
Limerick City Council
Dooradoyle
Co. Limerick

BHP Ref. No.: 15/12/373
Order No.:
Date Received: 14/12/15
Date Completed: 11/01/16
Test Specification: Nil
Item: Annual Ground Water 2015

FTAO: Tara Flanagan

BHP
New Road
Thomondgate
Limerick
Ireland
Tel +353 61 455399
Fax + 353 61 455447

TEST	Client Reference	Units	Results	Date Analysed	Test Method
	Annual Monitoring Groundwater 3 Deep				
Bis(2-chloroethoxy)methane		mg/L	<0.001	06/01/2016	GEO40*
2,4-Dichlorophenol		mg/L	<0.001	06/01/2016	GEO40*
1,2,4-Trichlorobenzene		mg/L	<0.001	06/01/2016	GEO40*
Naphthalene		mg/L	<0.002	06/01/2016	GEO40*
Hexachlorobutadiene		mg/L	<0.001	06/01/2016	GEO40*
4-Chloro-3-methylphenol		mg/L	<0.001	06/01/2016	GEO40*
2-Methylnaphthalene		mg/L	<0.001	06/01/2016	GEO40*
2,4,6-Trichlorophenol		mg/L	<0.001	06/01/2016	GEO40*
2,4,5-Trichlorophenol		mg/L	<0.001	06/01/2016	GEO40*
2-Chloronaphthalene		mg/L	<0.001	06/01/2016	GEO40*
Dimethylphthalate		mg/L	<0.001	06/01/2016	GEO40*
2,6-Dinitrotoluene		mg/L	<0.001	06/01/2016	GEO40*
Acenaphthylene		mg/L	<0.001	06/01/2016	GEO40*
Acenaphthene		mg/L	<0.001	06/01/2016	GEO40*
2,4-Dinitrotoluene		mg/L	<0.001	06/01/2016	GEO40*
Diethylphthalate		mg/L	<0.001	06/01/2016	GEO40*
4-Nitrophenol		mg/L	<0.005	06/01/2016	GEO40*

Additional information : *Subcontracted to an approved accredited supplier**For and on behalf of BHP laboratories :****John O'Halloran****Issue Date : 26/02/16**

This Test Report shall not be duplicated except in full and then only with the permission of the test laboratory

TEST REPORT NO: 119961.2Analysing
Testing
Consulting
CalibratingClient: Environmental Department
Limerick City Council
Dooradoyle
Co. LimerickBHP Ref. No.: 15/12/373
Order No.:
Date Received: 14/12/15
Date Completed: 11/01/16
Test Specification: Nil
Item: Annual Ground Water 2015BHP
New Road
Thomondgate
Limerick
Ireland
Tel +353 61 455399
Fax + 353 61 455447

FTAO: Tara Flanagan

TEST	Client Reference	Units	Results	Date Analysed	Test Method
	Annual Monitoring Groundwater 3 Deep				
4-Chlorophenyl phenyl ether		mg/L	<0.001	06/01/2016	GEO40*
Fluorene		mg/L	<0.001	06/01/2016	GEO40*
Diphenylamine		mg/L	<0.001	06/01/2016	GEO40*
4-Bromophenyl Phenyl Ether		mg/L	<0.001	06/01/2016	GEO40*
Hexachlorobenzene		mg/L	<0.001	06/01/2016	GEO40*
Pentachlorophenol		mg/L	<0.001	06/01/2016	GEO40*
Phenanthrene		mg/L	<0.001	06/01/2016	GEO40*
Anthracene		mg/L	<0.001	06/01/2016	GEO40*
di-n-Butylphthalate		mg/L	<0.001	06/01/2016	GEO40*
Fluoranthene		mg/L	<0.001	06/01/2016	GEO40*
Pyrene		mg/L	<0.001	06/01/2016	GEO40*
Benzyl Butyl Phthalate		mg/L	<0.001	06/01/2016	GEO40*
Benzo(a)anthracene		mg/L	<0.001	06/01/2016	GEO40*
Chrysene		mg/L	<0.001	06/01/2016	GEO40*
Bis(2-ethylhexyl)phthalate		mg/L	<0.005	06/01/2016	GEO40*
Di-n-octylphthalate		mg/L	<0.001	06/01/2016	GEO40*
Benzo(b)fluoranthene		mg/L	<0.001	06/01/2016	GEO40*

Additional information : *Subcontracted to an approved accredited supplier

For and on behalf of BHP laboratories :

John O'Halloran

Issue Date : 26/02/16

This Test Report shall not be duplicated except in full and then only with the permission of the test laboratory

TEST REPORT NO: 119961.2

Analysing
Testing
Consulting
Calibrating



Client: Environmental Department
Limerick City Council
Dooradoyle
Co. Limerick

BHP Ref. No.: 15/12/373
Order No.:
Date Received: 14/12/15
Date Completed: 11/01/16
Test Specification: Nil
Item: Annual Ground Water 2015

FTAO: Tara Flanagan

BHP
New Road
Thomondgate
Limerick
Ireland
Tel +353 61 455399
Fax + 353 61 455447

TEST	Client Reference	Units	Results	Date Analysed	Test Method
	Annual Monitoring Groundwater 3 Deep				
Benzo(k)fluoranthene		mg/L	<0.001	06/01/2016	GEO40*
Benzo(a)pyrene		mg/L	<0.001	06/01/2016	GEO40*
Indeno(1,2,3-c,d)pyrene		mg/L	<0.001	06/01/2016	GEO40*
Dibenz(a,h)anthracene		mg/L	<0.001	06/01/2016	GEO40*
Benzo(g,h,i)perylene		mg/L	<0.001	06/01/2016	GEO40*

Additional information : *Subcontracted to an approved accredited supplier

For and on behalf of BHP laboratories :

John O'Halloran
Issue Date : 26/02/16

This Test Report shall not be duplicated except in full and then only with the permission of the test laboratory

TEST REPORT NO: 119961.3

Analysing
Testing
Consulting
Calibrating



Client: Environmental Department
Limerick City Council
Dooradoyle
Co. Limerick

BHP Ref. No.: N/A**
Order No.:
Date Received: 14/12/15
Date Completed: N/A**
Test Specification: Nil
Item: Annual Ground Water 2015

BHP
New Road
Thomondgate
Limerick
Ireland
Tel +353 61 455399
Fax + 353 61 455447

FTAO: Tara Flanagan

TEST	Client Reference	Units	Results	Date Analysed	Test Method
	Annual Monitoring				
Boron	Groundwater 4 Shallow	mg/L	N/A**	N/A**	WAS049*
Cadmium		mg/L	N/A**	N/A**	WAS049*
Calcium		mg/L	N/A**	N/A**	WAS049*
Chromium		mg/L	N/A**	N/A**	WAS049*
Copper		mg/L	N/A**	N/A**	WAS049*
Iron		mg/L	N/A**	N/A**	WAS049*
Lead		mg/L	N/A**	N/A**	WAS049*
Magnesium		mg/L	N/A**	N/A**	WAS049*
Manganese		mg/L	N/A**	N/A**	WAS049*
Nickel		mg/L	N/A**	N/A**	WAS049*
Potassium		mg/L	N/A**	N/A**	WAS049*
Sodium		mg/L	N/A**	N/A**	WAS049*
Zinc		mg/L	N/A**	N/A**	WAS049*
Mercury		mg/L	N/A**	N/A**	WAS013*
Fluoride		mg/L	N/A**	N/A**	BHP AC 019
Sulphate (as SO ₄)		mg/L	N/A**	N/A**	BHP AC 095
Orthophosphate (as P)	mg/L	N/A**	N/A**	BHP AC 095	

Additional information : *Subcontracted to an approved accredited supplier
**Sample location dry

For and on behalf of BHP laboratories :

John O'Halloran
Issue Date : 26/02/16

This Test Report shall not be duplicated except in full and then only with the permission of the test laboratory

TEST REPORT NO: 119961.3Analysing
Testing
Consulting
Calibrating**Client: Environmental Department
Limerick City Council
Dooradoyle
Co. Limerick****BHP Ref. No.: N/A**
Order No.:
Date Received: 14/12/15
Date Completed: N/A**
Test Specification: Nil
Item: Annual Ground Water 2015**BHP
New Road
Thomondgate
Limerick
Ireland
Tel +353 61 455399
Fax + 353 61 455447**FTAO: Tara Flanagan**

TEST	Client Reference	Units	Results	Date Analysed	Test Method
	Annual Monitoring				
Nitrate (as NO ₃)	Groundwater 4 Shallow	mg/L	N/A**	N/A**	BHP AC 019
Nitrite (as NO ₂)		mg/L	N/A**	N/A**	BHP AC 019
Total Oxidised Nitrogen (as N)		mg/L	N/A**	N/A**	BHP AC 065
Cyanide		mg/L	N/A**	N/A**	BHP AC 095
Alkalinity (as CaCO ₃)		mg/L	N/A**	N/A**	BHP AC 095
Residue on Evaporation		mg/L	N/A**	N/A**	BHP AC 040
	Volatile Organic Compounds				
Dichlorodifluoromethane		mg/L	N/A**	N/A**	GEO32*
Chloromethane		mg/L	N/A**	N/A**	GEO32*
Chloroethane		mg/L	N/A**	N/A**	GEO32*
Bromomethane		mg/L	N/A**	N/A**	GEO32*
Trichlorofluoromethane		mg/L	N/A**	N/A**	GEO32*
1,1-Dichloroethene		mg/L	N/A**	N/A**	GEO32*
Dichloromethane		mg/L	N/A**	N/A**	GEO32*
1,1-Dichloroethane		mg/L	N/A**	N/A**	GEO32*
cis-1,2-Dichloroethene		mg/L	N/A**	N/A**	GEO32*
2,2-Dichloropropane		mg/L	N/A**	N/A**	GEO32*

Additional information :

*Subcontracted to an approved accredited supplier

**Sample location dry

For and on behalf of BHP laboratories :**John O'Halloran****Issue Date : 26/02/16**

This Test Report shall not be duplicated except in full and then only with the permission of the test laboratory

TEST REPORT NO: 119961.3Analysing
Testing
Consulting
Calibrating**Client:** Environmental Department
Limerick City Council
Dooradoyle
Co. Limerick**BHP Ref. No.:** N/A**
Order No.:
Date Received: 14/12/15
Date Completed: N/A**
Test Specification: Nil
Item: Annual Ground Water 2015BHP
New Road
Thomondgate
Limerick
Ireland
Tel +353 61 455399
Fax + 353 61 455447**FTAO:** Tara Flanagan

TEST	Client Reference	Units	Results	Date Analysed	Test Method
	Annual Monitoring Groundwater 4 Shallow				
Chloroform		mg/L	N/A**	N/A**	GEO32*
Bromochloromethane		mg/L	N/A**	N/A**	GEO32*
1,1,1-Trichloroethane		mg/L	N/A**	N/A**	GEO32*
1,1-Dichloropropene		mg/L	N/A**	N/A**	GEO32*
1,2-Dichloroethane		mg/L	N/A**	N/A**	GEO32*
Benzene		mg/L	N/A**	N/A**	GEO32*
1,2-Dichloropropane		mg/L	N/A**	N/A**	GEO32*
Trichloroethene		mg/L	N/A**	N/A**	GEO32*
Bromodichloromethane		mg/L	N/A**	N/A**	GEO32*
Dibromomethane		mg/L	N/A**	N/A**	GEO32*
cis-1,3-Dichloropropene		mg/L	N/A**	N/A**	GEO32*
Toluene		mg/L	N/A**	N/A**	GEO32*
trans-1,3-Dichloropropene		mg/L	N/A**	N/A**	GEO32*
1,1,2-Trichloroethane		mg/L	N/A**	N/A**	GEO32*
Carbon Tetrachloride		mg/L	N/A**	N/A**	GEO32*
Vinyl Chloride		mg/L	N/A**	N/A**	GEO32*
1,3-Dichloropropane		mg/L	N/A**	N/A**	GEO32*

Additional information :

*Subcontracted to an approved accredited supplier

**Sample location dry

For and on behalf of BHP laboratories :**John O'Halloran****Issue Date : 26/02/16**

This Test Report shall not be duplicated except in full and then only with the permission of the test laboratory

TEST REPORT NO: 119961.3Analysing
Testing
Consulting
CalibratingClient: Environmental Department
Limerick City Council
Dooradoyle
Co. LimerickBHP Ref. No.: N/A**
Order No.:
Date Received: 14/12/15
Date Completed: N/A**
Test Specification: Nil
Item: Annual Ground Water 2015BHP
New Road
Thomondgate
Limerick
Ireland
Tel +353 61 455399
Fax + 353 61 455447

FTAO: Tara Flanagan

TEST	Client Reference	Units	Results	Date Analysed	Test Method
	Annual Monitoring Groundwater 4 Shallow				
Tetrachloroethene		mg/L	N/A**	N/A**	GEO32*
Dibromochloromethane		mg/L	N/A**	N/A**	GEO32*
1,2-Dibromoethane		mg/L	N/A**	N/A**	GEO32*
Chlorobenzene		mg/L	N/A**	N/A**	GEO32*
1,1,1,2-Tetrachloroethane		mg/L	N/A**	N/A**	GEO32*
Ethyl Benzene		mg/L	N/A**	N/A**	GEO32*
m&p-Xylene		mg/L	N/A**	N/A**	GEO32*
o-Xylene		mg/L	N/A**	N/A**	GEO32*
Styrene		mg/L	N/A**	N/A**	GEO32*
Bromoform		mg/L	N/A**	N/A**	GEO32*
trans-1,2-Dichloroethene		mg/L	N/A**	N/A**	GEO32*
Isopropylbenzene		mg/L	N/A**	N/A**	GEO32*
1,1,2,2-Tetrachloroethane		mg/L	N/A**	N/A**	GEO32*
1,2,3-Trichloropropane		mg/L	N/A**	N/A**	GEO32*
n-Propylbenzene		mg/L	N/A**	N/A**	GEO32*
Bromobenzene		mg/L	N/A**	N/A**	GEO32*
2-Chlorotoluene		mg/L	N/A**	N/A**	GEO32*

Additional information : *Subcontracted to an approved accredited supplier
**Sample location dry

For and on behalf of BHP laboratories :

John O'Halloran

Issue Date : 26/02/16

This Test Report shall not be duplicated except in full and then only with the permission of the test laboratory

TEST REPORT NO: 119961.3Analysing
Testing
Consulting
Calibrating**Client: Environmental Department
Limerick City Council
Dooradoyle
Co. Limerick****BHP Ref. No.: N/A**
Order No.:
Date Received: 14/12/15
Date Completed: N/A**
Test Specification: Nil
Item: Annual Ground Water 2015**BHP
New Road
Thomondgate
Limerick
Ireland
Tel +353 61 455399
Fax + 353 61 455447**FTAO: Tara Flanagan**

TEST	Client Reference	Units	Results	Date Analysed	Test Method
	Annual Monitoring Groundwater 4 Shallow				
1,3,5-Trimethylbenzene		mg/L	N/A**	N/A**	GEO32*
4-Chlorotoluene		mg/L	N/A**	N/A**	GEO32*
tert-Butylbenzene		mg/L	N/A**	N/A**	GEO32*
1,2,4-Trimethylbenzene		mg/L	N/A**	N/A**	GEO32*
sec-Butylbenzene		mg/L	N/A**	N/A**	GEO32*
p-Isopropyltoluene		mg/L	N/A**	N/A**	GEO32*
1,3-Dichlorobenzene		mg/L	N/A**	N/A**	GEO32*
1,4-Dichlorobenzene		mg/L	N/A**	N/A**	GEO32*
n-Butylbenzene		mg/L	N/A**	N/A**	GEO32*
1,2-Dichlorobenzene		mg/L	N/A**	N/A**	GEO32*
1,2-Dibromo-3-chloropropane		mg/L	N/A**	N/A**	GEO32*
1,2,4-Trichlorobenzene		mg/L	N/A**	N/A**	GEO32*
Hexachlorobutadiene		mg/L	N/A**	N/A**	GEO32*
Naphthalene		mg/L	N/A**	N/A**	GEO32*
1,2,3-Trichlorobenzene		mg/L	N/A**	N/A**	GEO32*
MTBE		mg/L	N/A**	N/A**	GEO32*

Additional information : *Subcontracted to an approved accredited supplier
Sample location dryFor and on behalf of BHP laboratories :****John O'Halloran****Issue Date : 26/02/16**

This Test Report shall not be duplicated except in full and then only with the permission of the test laboratory

TEST REPORT NO: 119961.3Analysing
Testing
Consulting
Calibrating**Client:** Environmental Department
Limerick City Council
Dooradoyle
Co. Limerick**BHP Ref. No.:** N/A**
Order No.:
Date Received: 14/12/15
Date Completed: N/A**
Test Specification: Nil
Item: Annual Ground Water 2015BHP
New Road
Thomondgate
Limerick
Ireland
Tel +353 61 455399
Fax + 353 61 455447**FTAO:** Tara Flanagan

TEST	Client Reference	Units	Results	Date Analysed	Test Method
	Annual Monitoring Groundwater 4 Shallow				
Semi Volatile Organic Compounds					
Phenol		mg/L	N/A**	N/A**	GEO40*
Bis(2-chloroethyl)ether		mg/L	N/A**	N/A**	GEO40*
2-Chlorophenol		mg/L	N/A**	N/A**	GEO40*
1,3-Dichlorobenzene		mg/L	N/A**	N/A**	GEO40*
1,4-Dichlorobenzene		mg/L	N/A**	N/A**	GEO40*
2-Methylphenol		mg/L	N/A**	N/A**	GEO40*
3&4-Methylphenol		mg/L	N/A**	N/A**	GEO40*
Dibenzofuran		mg/L	N/A**	N/A**	GEO40*
1,2-Dichlorobenzene		mg/L	N/A**	N/A**	GEO40*
Bis(2-chloroisopropyl)ether		mg/L	N/A**	N/A**	GEO40*
n-Nitrosodi-n-propylamine		mg/L	N/A**	N/A**	GEO40*
Hexachloroethane		mg/L	N/A**	N/A**	GEO40*
Nitrobenzene		mg/L	N/A**	N/A**	GEO40*
Isophorone		mg/L	N/A**	N/A**	GEO40*
2,4-Dimethylphenol		mg/L	N/A**	N/A**	GEO40*
2-Nitrophenol		mg/L	N/A**	N/A**	GEO40*

Additional information : *Subcontracted to an approved accredited supplier
Sample location dryFor and on behalf of BHP laboratories :****John O'Halloran**
Issue Date : 26/02/16

This Test Report shall not be duplicated except in full and then only with the permission of the test laboratory

TEST REPORT NO: 119961.3Analysing
Testing
Consulting
CalibratingClient: **Environmental Department
Limerick City Council
Dooradoyle
Co. Limerick**BHP Ref. No.: N/A**
Order No.:
Date Received: 14/12/15
Date Completed: N/A**
Test Specification: Nil
Item: Annual Ground Water 2015BHP
New Road
Thomondgate
Limerick
Ireland
Tel +353 61 455399
Fax + 353 61 455447

FTAO: Tara Flanagan

TEST	Client Reference	Units	Results	Date Analysed	Test Method
	Annual Monitoring Groundwater 4 Shallow				
Bis(2-chloroethoxy)methane		mg/L	N/A**	N/A**	GEO40*
2,4-Dichlorophenol		mg/L	N/A**	N/A**	GEO40*
1,2,4-Trichlorobenzene		mg/L	N/A**	N/A**	GEO40*
Naphthalene		mg/L	N/A**	N/A**	GEO40*
Hexachlorobutadiene		mg/L	N/A**	N/A**	GEO40*
4-Chloro-3-methylphenol		mg/L	N/A**	N/A**	GEO40*
2-Methylnaphthalene		mg/L	N/A**	N/A**	GEO40*
2,4,6-Trichlorophenol		mg/L	N/A**	N/A**	GEO40*
2,4,5-Trichlorophenol		mg/L	N/A**	N/A**	GEO40*
2-Chloronaphthalene		mg/L	N/A**	N/A**	GEO40*
Dimethylphthalate		mg/L	N/A**	N/A**	GEO40*
2,6-Dinitrotoluene		mg/L	N/A**	N/A**	GEO40*
Acenaphthylene		mg/L	N/A**	N/A**	GEO40*
Acenaphthene		mg/L	N/A**	N/A**	GEO40*
2,4-Dinitrotoluene		mg/L	N/A**	N/A**	GEO40*
Diethylphthalate		mg/L	N/A**	N/A**	GEO40*
4-Nitrophenol		mg/L	N/A**	N/A**	GEO40*

Additional information : *Subcontracted to an approved accredited supplier
**Sample location dry

For and on behalf of BHP laboratories :

John O'Halloran

Issue Date : 26/02/16

This Test Report shall not be duplicated except in full and then only with the permission of the test laboratory

TEST REPORT NO: 119961.3Analysing
Testing
Consulting
Calibrating**Client: Environmental Department
Limerick City Council
Dooradoyle
Co. Limerick****BHP Ref. No.: N/A**
Order No.:
Date Received: 14/12/15
Date Completed: N/A**
Test Specification: Nil
Item: Annual Ground Water 2015**BHP
New Road
Thomondgate
Limerick
Ireland
Tel +353 61 455399
Fax + 353 61 455447**FTAO: Tara Flanagan**

TEST	Client Reference	Units	Results	Date Analysed	Test Method
	Annual Monitoring Groundwater 4 Shallow				
4-Chlorophenyl phenyl ether		mg/L	N/A**	N/A**	GEO40*
Fluorene		mg/L	N/A**	N/A**	GEO40*
Diphenylamine		mg/L	N/A**	N/A**	GEO40*
4-Bromophenyl Phenyl Ether		mg/L	N/A**	N/A**	GEO40*
Hexachlorobenzene		mg/L	N/A**	N/A**	GEO40*
Pentachlorophenol		mg/L	N/A**	N/A**	GEO40*
Phenanthrene		mg/L	N/A**	N/A**	GEO40*
Anthracene		mg/L	N/A**	N/A**	GEO40*
di-n-Butylphthalate		mg/L	N/A**	N/A**	GEO40*
Fluoranthene		mg/L	N/A**	N/A**	GEO40*
Pyrene		mg/L	N/A**	N/A**	GEO40*
Benzyl Butyl Phthalate		mg/L	N/A**	N/A**	GEO40*
Benzo(a)anthracene		mg/L	N/A**	N/A**	GEO40*
Chrysene		mg/L	N/A**	N/A**	GEO40*
Bis(2-ethylhexyl)phthalate		mg/L	N/A**	N/A**	GEO40*
Di-n-octylphthalate		mg/L	N/A**	N/A**	GEO40*
Benzo(b)fluoranthene		mg/L	N/A**	N/A**	GEO40*

Additional information : *Subcontracted to an approved accredited supplier
Sample location dryFor and on behalf of BHP laboratories :****John O'Halloran
Issue Date : 26/02/16**

This Test Report shall not be duplicated except in full and then only with the permission of the test laboratory

TEST REPORT NO: 119961.3

Analysing
Testing
Consulting
Calibrating



Client: Environmental Department
Limerick City Council
Dooradoyle
Co. Limerick

BHP Ref. No.: N/A**
Order No.:
Date Received: 14/12/15
Date Completed: N/A**
Test Specification: Nil
Item: Annual Ground Water 2015

FTAO: Tara Flanagan

BHP
New Road
Thomondgate
Limerick
Ireland
Tel +353 61 455399
Fax + 353 61 455447

TEST	Client Reference	Units	Results	Date Analysed	Test Method
	Annual Monitoring Groundwater 4 Shallow				
Benzo(k)fluoranthene		mg/L	N/A**	N/A**	GEO40*
Benzo(a)pyrene		mg/L	N/A**	N/A**	GEO40*
Indeno(1,2,3-c,d)pyrene		mg/L	N/A**	N/A**	GEO40*
Dibenz(a,h)anthracene		mg/L	N/A**	N/A**	GEO40*
Benzo(g,h,i)perylene		mg/L	N/A**	N/A**	GEO40*

Additional information : *Subcontracted to an approved accredited supplier
**Sample location dry

For and on behalf of BHP laboratories :

John O'Halloran
Issue Date : 26/02/16

This Test Report shall not be duplicated except in full and then only with the permission of the test laboratory

TEST REPORT NO: 119961.4Analysing
Testing
Consulting
CalibratingClient: **Environmental Department
Limerick City Council
Dooradoyle
Co. Limerick**BHP Ref. No.: **15/12/374**
Order No.:
Date Received: **14/12/15**
Date Completed: **11/01/16**
Test Specification: **Nil**
Item: **Annual Ground Water 2015**BHP
New Road
Thomondgate
Limerick
Ireland
Tel +353 61 455399
Fax + 353 61 455447

FTAO: Tara Flanagan

TEST	Client Reference	Units	Results	Date Analysed	Test Method
	Annual Monitoring Groundwater 4 Deep				
Boron		mg/L	<0.23	22/12/2015	WAS049*
Cadmium		mg/L	<0.0006	22/12/2015	WAS049*
Calcium		mg/L	103	22/12/2015	WAS049*
Chromium		mg/L	0.0022	22/12/2015	WAS049*
Copper		mg/L	<0.009	22/12/2015	WAS049*
Iron		mg/L	4.3	22/12/2015	WAS049*
Lead		mg/L	<0.006	22/12/2015	WAS049*
Magnesium		mg/L	7.15	22/12/2015	WAS049*
Manganese		mg/L	0.983	22/12/2015	WAS049*
Nickel		mg/L	0.0078	22/12/2015	WAS049*
Potassium		mg/L	1.71	22/12/2015	WAS049*
Sodium		mg/L	15.6	22/12/2015	WAS049*
Zinc		mg/L	0.0348	22/12/2015	WAS049*
Mercury		mg/L	<0.0001	21/12/2015	WAS013*
Fluoride		mg/L	0.23	14/12/2015	BHP AC 019
Sulphate (as SO ₄)		mg/L	17.2	22/12/2015	BHP AC 095
Orthophosphate (as P)		mg/L	<0.01	15/12/2015	BHP AC 095

Additional information : *Subcontracted to an approved accredited supplier

For and on behalf of BHP laboratories :

John O'Halloran

Issue Date : 26/02/16

This Test Report shall not be duplicated except in full and then only with the permission of the test laboratory

TEST REPORT NO: 119961.4Analysing
Testing
Consulting
Calibrating**Client:** Environmental Department
Limerick City Council
Dooradoyle
Co. Limerick**BHP Ref. No.:** 15/12/374
Order No.:
Date Received: 14/12/15
Date Completed: 11/01/16
Test Specification: Nil
Item: Annual Ground Water 2015BHP
New Road
Thomondgate
Limerick
Ireland
Tel +353 61 455399
Fax + 353 61 455447**FTAO:** Tara Flanagan

TEST	Client Reference	Units	Results	Date Analysed	Test Method
	Annual Monitoring Groundwater 4 Deep				
Nitrate (as NO ₃)		mg/L	<0.5	14/12/2015	BHP AC 019
Nitrite (as NO ₂)		mg/L	<0.05	14/12/2015	BHP AC 019
Total Oxidised Nitrogen (as N)		mg/L	<0.14	14/12/2015	BHP AC 065
Cyanide		mg/L	<0.05	21/12/2015	BHP AC 095
Alkalinity (as CaCO ₃)		mg/L	279	15/12/2015	BHP AC 095
Residue on Evaporation		mg/L	435	17/12/2015	BHP AC 040
Volatile Organic Compounds					
Dichlorodifluoromethane		mg/L	<0.001	08/01/2016	GEO32*
Chloromethane		mg/L	<0.001	08/01/2016	GEO32*
Chloroethane		mg/L	<0.001	08/01/2016	GEO32*
Bromomethane		mg/L	<0.001	08/01/2016	GEO32*
Trichlorofluoromethane		mg/L	<0.001	08/01/2016	GEO32*
1,1-Dichloroethene		mg/L	<0.001	08/01/2016	GEO32*
Dichloromethane		mg/L	<0.001	08/01/2016	GEO32*
1,1-Dichloroethane		mg/L	<0.001	08/01/2016	GEO32*
cis-1,2-Dichloroethene		mg/L	<0.001	08/01/2016	GEO32*
2,2-Dichloropropane		mg/L	<0.001	08/01/2016	GEO32*

Additional information : *Subcontracted to an approved accredited supplier**For and on behalf of BHP laboratories :****John O'Halloran****Issue Date : 26/02/16**

This Test Report shall not be duplicated except in full and then only with the permission of the test laboratory

TEST REPORT NO: 119961.4Analysing
Testing
Consulting
Calibrating

Client: Environmental Department
Limerick City Council
Dooradoyle
Co. Limerick

BHP Ref. No.: 15/12/374
Order No.:
Date Received: 14/12/15
Date Completed: 11/01/16
Test Specification: Nil
Item: Annual Ground Water 2015

FTAO: Tara Flanagan

BHP
New Road
Thomondgate
Limerick
Ireland
Tel +353 61 455399
Fax + 353 61 455447

TEST	Client Reference	Units	Results	Date Analysed	Test Method
	Annual Monitoring Groundwater 4 Deep				
Chloroform		mg/L	<0.001	08/01/2016	GEO32*
Bromochloromethane		mg/L	<0.001	08/01/2016	GEO32*
1,1,1-Trichloroethane		mg/L	<0.001	08/01/2016	GEO32*
1,1-Dichloropropene		mg/L	<0.001	08/01/2016	GEO32*
1,2-Dichloroethane		mg/L	<0.001	08/01/2016	GEO32*
Benzene		mg/L	N/A**	11/01/2016	GEO32*
1,2-Dichloropropane		mg/L	<0.001	08/01/2016	GEO32*
Trichloroethene		mg/L	<0.001	08/01/2016	GEO32*
Bromodichloromethane		mg/L	<0.001	08/01/2016	GEO32*
Dibromomethane		mg/L	<0.001	08/01/2016	GEO32*
cis-1,3-Dichloropropene		mg/L	<0.001	08/01/2016	GEO32*
Toluene		mg/L	<0.001	08/01/2016	GEO32*
trans-1,3-Dichloropropene		mg/L	<0.001	08/01/2016	GEO32*
1,1,2-Trichloroethane		mg/L	<0.001	08/01/2016	GEO32*
Carbon Tetrachloride		mg/L	<0.001	08/01/2016	GEO32*
Vinyl Chloride		mg/L	<0.0005	08/01/2016	GEO32*
1,3-Dichloropropane		mg/L	<0.001	08/01/2016	GEO32*

Additional information :

*Subcontracted to an approved accredited supplier

**Unable to report due to QC failure and insufficient sample for re-test

For and on behalf of BHP laboratories :**John O'Halloran****Issue Date : 26/02/16**

This Test Report shall not be duplicated except in full and then only with the permission of the test laboratory

TEST REPORT NO: 119961.4Analysing
Testing
Consulting
CalibratingClient: Environmental Department
Limerick City Council
Dooradoyle
Co. LimerickBHP Ref. No.: 15/12/374
Order No.:
Date Received: 14/12/15
Date Completed: 11/01/16
Test Specification: Nil
Item: Annual Ground Water 2015BHP
New Road
Thomondgate
Limerick
Ireland
Tel +353 61 455399
Fax + 353 61 455447

FTAO: Tara Flanagan

TEST	Client Reference	Units	Results	Date Analysed	Test Method
	Annual Monitoring Groundwater 4 Deep				
Tetrachloroethene		mg/L	<0.001	08/01/2016	GEO32*
Dibromochloromethane		mg/L	<0.001	08/01/2016	GEO32*
1,2-Dibromoethane		mg/L	<0.001	08/01/2016	GEO32*
Chlorobenzene		mg/L	<0.001	08/01/2016	GEO32*
1,1,1,2-Tetrachloroethane		mg/L	<0.001	08/01/2016	GEO32*
Ethyl Benzene		mg/L	N/A**	11/01/2016	GEO32*
m&p-Xylene		mg/L	<0.001	08/01/2016	GEO32*
o-Xylene		mg/L	<0.001	08/01/2016	GEO32*
Styrene		mg/L	<0.001	08/01/2016	GEO32*
Bromoform		mg/L	<0.001	08/01/2016	GEO32*
trans-1,2-Dichloroethene		mg/L	<0.001	08/01/2016	GEO32*
Isopropylbenzene		mg/L	<0.001	08/01/2016	GEO32*
1,1,2,2-Tetrachloroethane		mg/L	<0.001	08/01/2016	GEO32*
1,2,3-Trichloropropane		mg/L	<0.001	08/01/2016	GEO32*
n-Propylbenzene		mg/L	<0.001	08/01/2016	GEO32*
Bromobenzene		mg/L	<0.001	08/01/2016	GEO32*
2-Chlorotoluene		mg/L	<0.001	08/01/2016	GEO32*

Additional information :

*Subcontracted to an approved accredited supplier

**Unable to report due to QC failure and insufficient sample for re-test

For and on behalf of BHP laboratories :**John O'Halloran****Issue Date : 26/02/16**

This Test Report shall not be duplicated except in full and then only with the permission of the test laboratory

TEST REPORT NO: 119961.4Analysing
Testing
Consulting
CalibratingBHP
New Road
Thomondgate
Limerick
Ireland
Tel +353 61 455399
Fax + 353 61 455447

Client: Environmental Department **BHP Ref. No.:** 15/12/374
 Limerick City Council **Order No.:**
 Dooradoyle **Date Received:** 14/12/15
 Co. Limerick **Date Completed:** 11/01/16
 Test Specification: Nil
 Item: Annual Ground Water 2015

FTAO: Tara Flanagan

TEST	Client Reference	Units	Results	Date Analysed	Test Method
	Annual Monitoring Groundwater 4 Deep				
1,3,5-Trimethylbenzene		mg/L	N/A**	11/01/2016	GEO32*
4-Chlorotoluene		mg/L	<0.001	08/01/2016	GEO32*
tert-Butylbenzene		mg/L	<0.001	08/01/2016	GEO32*
1,2,4-Trimethylbenzene		mg/L	<0.001	08/01/2016	GEO32*
sec-Butylbenzene		mg/L	<0.001	08/01/2016	GEO32*
p-Isopropyltoluene		mg/L	N/A**	11/01/2016	GEO32*
1,3-Dichlorobenzene		mg/L	<0.001	08/01/2016	GEO32*
1,4-Dichlorobenzene		mg/L	<0.001	08/01/2016	GEO32*
n-Butylbenzene		mg/L	N/A**	11/01/2016	GEO32*
1,2-Dichlorobenzene		mg/L	<0.001	08/01/2016	GEO32*
1,2-Dibromo-3-chloropropane		mg/L	<0.002	08/01/2016	GEO32*
1,2,4-Trichlorobenzene		mg/L	<0.001	08/01/2016	GEO32*
Hexachlorobutadiene		mg/L	<0.001	08/01/2016	GEO32*
Naphthalene		mg/L	N/A**	11/01/2016	GEO32*
1,2,3-Trichlorobenzene		mg/L	<0.001	08/01/2016	GEO32*
MTBE		mg/L	<0.001	08/01/2016	GEO32*

Additional information :

*Subcontracted to an approved accredited supplier

**Unable to report due to QC failure and insufficient sample for re-test

For and on behalf of BHP laboratories :**John O'Halloran****Issue Date : 26/02/16**

This Test Report shall not be duplicated except in full and then only with the permission of the test laboratory

TEST REPORT NO: 119961.4Analysing
Testing
Consulting
Calibrating**Client:** Environmental Department
Limerick City Council
Dooradoyle
Co. Limerick**BHP Ref. No.:** 15/12/374
Order No.:
Date Received: 14/12/15
Date Completed: 11/01/16
Test Specification: Nil
Item: Annual Ground Water 2015BHP
New Road
Thomondgate
Limerick
Ireland
Tel +353 61 455399
Fax + 353 61 455447**FTAO:** Tara Flanagan

TEST	Client Reference	Units	Results	Date Analysed	Test Method
	Annual Monitoring Groundwater 4 Deep				
Semi Volatile Organic Compounds					
Phenol		mg/L	<0.001	06/01/2016	GEO40*
Bis(2-chloroethyl)ether		mg/L	<0.001	06/01/2016	GEO40*
2-Chlorophenol		mg/L	<0.001	06/01/2016	GEO40*
1,3-Dichlorobenzene		mg/L	<0.001	06/01/2016	GEO40*
1,4-Dichlorobenzene		mg/L	<0.001	06/01/2016	GEO40*
2-Methylphenol		mg/L	<0.001	06/01/2016	GEO40*
3&4-Methylphenol		mg/L	<0.001	06/01/2016	GEO40*
Dibenzofuran		mg/L	<0.001	06/01/2016	GEO40*
1,2-Dichlorobenzene		mg/L	<0.001	06/01/2016	GEO40*
Bis(2-chloroisopropyl)ether		mg/L	<0.001	06/01/2016	GEO40*
n-Nitrosodi-n-propylamine		mg/L	<0.001	06/01/2016	GEO40*
Hexachloroethane		mg/L	<0.001	06/01/2016	GEO40*
Nitrobenzene		mg/L	<0.001	06/01/2016	GEO40*
Isophorone		mg/L	<0.001	06/01/2016	GEO40*
2,4-Dimethylphenol		mg/L	<0.001	06/01/2016	GEO40*
2-Nitrophenol		mg/L	<0.001	06/01/2016	GEO40*

Additional information : *Subcontracted to an approved accredited supplier**For and on behalf of BHP laboratories :****John O'Halloran****Issue Date : 26/02/16**

This Test Report shall not be duplicated except in full and then only with the permission of the test laboratory

TEST REPORT NO: 119961.4Analysing
Testing
Consulting
Calibrating

Client: Environmental Department
Limerick City Council
Dooradoyle
Co. Limerick

BHP Ref. No.: 15/12/374
Order No.:
Date Received: 14/12/15
Date Completed: 11/01/16
Test Specification: Nil
Item: Annual Ground Water 2015

FTAO: Tara Flanagan

BHP
New Road
Thomondgate
Limerick
Ireland
Tel +353 61 455399
Fax + 353 61 455447

TEST	Client Reference	Units	Results	Date Analysed	Test Method
	Annual Monitoring Groundwater 4 Deep				
Bis(2-chloroethoxy)methane		mg/L	<0.001	06/01/2016	GEO40*
2,4-Dichlorophenol		mg/L	<0.001	06/01/2016	GEO40*
1,2,4-Trichlorobenzene		mg/L	<0.001	06/01/2016	GEO40*
Naphthalene		mg/L	<0.002	06/01/2016	GEO40*
Hexachlorobutadiene		mg/L	<0.001	06/01/2016	GEO40*
4-Chloro-3-methylphenol		mg/L	<0.001	06/01/2016	GEO40*
2-Methylnaphthalene		mg/L	<0.001	06/01/2016	GEO40*
2,4,6-Trichlorophenol		mg/L	<0.001	06/01/2016	GEO40*
2,4,5-Trichlorophenol		mg/L	<0.001	06/01/2016	GEO40*
2-Chloronaphthalene		mg/L	<0.001	06/01/2016	GEO40*
Dimethylphthalate		mg/L	<0.001	06/01/2016	GEO40*
2,6-Dinitrotoluene		mg/L	<0.001	06/01/2016	GEO40*
Acenaphthylene		mg/L	<0.001	06/01/2016	GEO40*
Acenaphthene		mg/L	<0.001	06/01/2016	GEO40*
2,4-Dinitrotoluene		mg/L	<0.001	06/01/2016	GEO40*
Diethylphthalate		mg/L	<0.001	06/01/2016	GEO40*
4-Nitrophenol		mg/L	<0.005	06/01/2016	GEO40*

Additional information : *Subcontracted to an approved accredited supplier**For and on behalf of BHP laboratories :****John O'Halloran****Issue Date : 26/02/16**

This Test Report shall not be duplicated except in full and then only with the permission of the test laboratory

TEST REPORT NO: 119961.4Analysing
Testing
Consulting
Calibrating**Client: Environmental Department
Limerick City Council
Dooradoyle
Co. Limerick****BHP Ref. No.: 15/12/374
Order No.:
Date Received: 14/12/15
Date Completed: 11/01/16
Test Specification: Nil
Item: Annual Ground Water 2015**BHP
New Road
Thomondgate
Limerick
Ireland
Tel +353 61 455399
Fax + 353 61 455447**FTAO: Tara Flanagan**

TEST	Client Reference	Units	Results	Date Analysed	Test Method
	Annual Monitoring Groundwater 4 Deep				
4-Chlorophenyl phenyl ether		mg/L	<0.001	06/01/2016	GEO40*
Fluorene		mg/L	<0.001	06/01/2016	GEO40*
Diphenylamine		mg/L	<0.001	06/01/2016	GEO40*
4-Bromophenyl Phenyl Ether		mg/L	<0.001	06/01/2016	GEO40*
Hexachlorobenzene		mg/L	<0.001	06/01/2016	GEO40*
Pentachlorophenol		mg/L	<0.001	06/01/2016	GEO40*
Phenanthrene		mg/L	<0.001	06/01/2016	GEO40*
Anthracene		mg/L	<0.001	06/01/2016	GEO40*
di-n-Butylphthalate		mg/L	<0.001	06/01/2016	GEO40*
Fluoranthene		mg/L	<0.001	06/01/2016	GEO40*
Pyrene		mg/L	<0.001	06/01/2016	GEO40*
Benzyl Butyl Phthalate		mg/L	<0.001	06/01/2016	GEO40*
Benzo(a)anthracene		mg/L	<0.001	06/01/2016	GEO40*
Chrysene		mg/L	<0.001	06/01/2016	GEO40*
Bis(2-ethylhexyl)phthalate		mg/L	<0.005	06/01/2016	GEO40*
Di-n-octylphthalate		mg/L	<0.001	06/01/2016	GEO40*
Benzo(b)fluoranthene		mg/L	<0.001	06/01/2016	GEO40*

Additional information : *Subcontracted to an approved accredited supplier**For and on behalf of BHP laboratories :****John O'Halloran****Issue Date : 26/02/16**

This Test Report shall not be duplicated except in full and then only with the permission of the test laboratory

TEST REPORT NO: 119961.4

Analysing
Testing
Consulting
Calibrating



Client: Environmental Department
Limerick City Council
Dooradoyle
Co. Limerick

BHP Ref. No.: 15/12/374
Order No.:
Date Received: 14/12/15
Date Completed: 11/01/16
Test Specification: Nil
Item: Annual Ground Water 2015

FTAO: Tara Flanagan

BHP
New Road
Thomondgate
Limerick
Ireland
Tel +353 61 455399
Fax + 353 61 455447

TEST	Client Reference	Units	Results	Date Analysed	Test Method
	Annual Monitoring Groundwater 4 Deep				
Benzo(k)fluoranthene		mg/L	<0.001	06/01/2016	GEO40*
Benzo(a)pyrene		mg/L	<0.001	06/01/2016	GEO40*
Indeno(1,2,3-c,d)pyrene		mg/L	<0.001	06/01/2016	GEO40*
Dibenz(a,h)anthracene		mg/L	<0.001	06/01/2016	GEO40*
Benzo(g,h,i)perylene		mg/L	<0.001	06/01/2016	GEO40*

Additional information : *Subcontracted to an approved accredited supplier

For and on behalf of BHP laboratories :

John O'Halloran

Issue Date : 26/02/16

This Test Report shall not be duplicated except in full and then only with the permission of the test laboratory

TEST REPORT NO: 119961.5

Analysing
Testing
Consulting
Calibrating



Client: Environmental Department
Limerick City Council
Dooradoyle
Co. Limerick

BHP Ref. No.: N/A**
Order No.:
Date Received: 14/12/15
Date Completed: N/A**
Test Specification: Nil
Item: Annual Ground Water 2015

BHP
New Road
Thomondgate
Limerick
Ireland
Tel +353 61 455399
Fax + 353 61 455447

FTAO: Tara Flanagan

TEST	Client Reference	Units	Results	Date Analysed	Test Method
	Annual Monitoring				
Boron	Groundwater 5 Shallow	mg/L	N/A**	N/A**	WAS049*
Cadmium		mg/L	N/A**	N/A**	WAS049*
Calcium		mg/L	N/A**	N/A**	WAS049*
Chromium		mg/L	N/A**	N/A**	WAS049*
Copper		mg/L	N/A**	N/A**	WAS049*
Iron		mg/L	N/A**	N/A**	WAS049*
Lead		mg/L	N/A**	N/A**	WAS049*
Magnesium		mg/L	N/A**	N/A**	WAS049*
Manganese		mg/L	N/A**	N/A**	WAS049*
Nickel		mg/L	N/A**	N/A**	WAS049*
Potassium		mg/L	N/A**	N/A**	WAS049*
Sodium		mg/L	N/A**	N/A**	WAS049*
Zinc		mg/L	N/A**	N/A**	WAS049*
Mercury		mg/L	N/A**	N/A**	WAS013*
Fluoride		mg/L	N/A**	N/A**	BHP AC 019
Sulphate (as SO ₄)		mg/L	N/A**	N/A**	BHP AC 095
Orthophosphate (as P)	mg/L	N/A**	N/A**	BHP AC 095	

Additional information : *Subcontracted to an approved accredited supplier
**Sample location dry

For and on behalf of BHP laboratories :

John O'Halloran
Issue Date : 26/02/16

This Test Report shall not be duplicated except in full and then only with the permission of the test laboratory

TEST REPORT NO: 119961.5Analysing
Testing
Consulting
Calibrating**Client: Environmental Department
Limerick City Council
Dooradoyle
Co. Limerick****BHP Ref. No.: N/A**
Order No.:
Date Received: 14/12/15
Date Completed: N/A**
Test Specification: Nil
Item: Annual Ground Water 2015****FTAO: Tara Flanagan**BHP
New Road
Thomondgate
Limerick
Ireland
Tel +353 61 455399
Fax + 353 61 455447

TEST	Client Reference	Units	Results	Date Analysed	Test Method
	Annual Monitoring				
Nitrate (as NO ₃)	Groundwater 5 Shallow	mg/L	N/A**	N/A**	BHP AC 019
Nitrite (as NO ₂)		mg/L	N/A**	N/A**	BHP AC 019
Total Oxidised Nitrogen (as N)		mg/L	N/A**	N/A**	BHP AC 065
Cyanide		mg/L	N/A**	N/A**	BHP AC 095
Alkalinity (as CaCO ₃)		mg/L	N/A**	N/A**	BHP AC 095
Residue on Evaporation		mg/L	N/A**	N/A**	BHP AC 040
	Volatile Organic Compounds				
Dichlorodifluoromethane		mg/L	N/A**	N/A**	GEO32*
Chloromethane		mg/L	N/A**	N/A**	GEO32*
Chloroethane		mg/L	N/A**	N/A**	GEO32*
Bromomethane		mg/L	N/A**	N/A**	GEO32*
Trichlorofluoromethane		mg/L	N/A**	N/A**	GEO32*
1,1-Dichloroethene		mg/L	N/A**	N/A**	GEO32*
Dichloromethane		mg/L	N/A**	N/A**	GEO32*
1,1-Dichloroethane		mg/L	N/A**	N/A**	GEO32*
cis-1,2-Dichloroethene		mg/L	N/A**	N/A**	GEO32*
2,2-Dichloropropane		mg/L	N/A**	N/A**	GEO32*

Additional information :

*Subcontracted to an approved accredited supplier

**Sample location dry

For and on behalf of BHP laboratories :**John O'Halloran****Issue Date : 26/02/16**

This Test Report shall not be duplicated except in full and then only with the permission of the test laboratory

TEST REPORT NO: 119961.5Analysing
Testing
Consulting
Calibrating**Client:** Environmental Department
Limerick City Council
Dooradoyle
Co. Limerick**BHP Ref. No.:** N/A**
Order No.:
Date Received: 14/12/15
Date Completed: N/A**
Test Specification: Nil
Item: Annual Ground Water 2015BHP
New Road
Thomondgate
Limerick
Ireland
Tel +353 61 455399
Fax + 353 61 455447**FTAO:** Tara Flanagan

TEST	Client Reference	Units	Results	Date Analysed	Test Method
	Annual Monitoring Groundwater 5 Shallow				
Chloroform		mg/L	N/A**	N/A**	GEO32*
Bromochloromethane		mg/L	N/A**	N/A**	GEO32*
1,1,1-Trichloroethane		mg/L	N/A**	N/A**	GEO32*
1,1-Dichloropropene		mg/L	N/A**	N/A**	GEO32*
1,2-Dichloroethane		mg/L	N/A**	N/A**	GEO32*
Benzene		mg/L	N/A**	N/A**	GEO32*
1,2-Dichloropropane		mg/L	N/A**	N/A**	GEO32*
Trichloroethene		mg/L	N/A**	N/A**	GEO32*
Bromodichloromethane		mg/L	N/A**	N/A**	GEO32*
Dibromomethane		mg/L	N/A**	N/A**	GEO32*
cis-1,3-Dichloropropene		mg/L	N/A**	N/A**	GEO32*
Toluene		mg/L	N/A**	N/A**	GEO32*
trans-1,3-Dichloropropene		mg/L	N/A**	N/A**	GEO32*
1,1,2-Trichloroethane		mg/L	N/A**	N/A**	GEO32*
Carbon Tetrachloride		mg/L	N/A**	N/A**	GEO32*
Vinyl Chloride		mg/L	N/A**	N/A**	GEO32*
1,3-Dichloropropane		mg/L	N/A**	N/A**	GEO32*

Additional information : *Subcontracted to an approved accredited supplier
Sample location dryFor and on behalf of BHP laboratories :****John O'Halloran****Issue Date : 26/02/16**

This Test Report shall not be duplicated except in full and then only with the permission of the test laboratory

TEST REPORT NO: 119961.5Analysing
Testing
Consulting
Calibrating**Client:** Environmental Department
Limerick City Council
Dooradoyle
Co. Limerick**BHP Ref. No.:** N/A**
Order No.:
Date Received: 14/12/15
Date Completed: N/A**
Test Specification: Nil
Item: Annual Ground Water 2015BHP
New Road
Thomondgate
Limerick
Ireland
Tel +353 61 455399
Fax + 353 61 455447**FTAO:** Tara Flanagan

TEST	Client Reference	Units	Results	Date Analysed	Test Method
	Annual Monitoring Groundwater 5 Shallow				
Tetrachloroethene		mg/L	N/A**	N/A**	GEO32*
Dibromochloromethane		mg/L	N/A**	N/A**	GEO32*
1,2-Dibromoethane		mg/L	N/A**	N/A**	GEO32*
Chlorobenzene		mg/L	N/A**	N/A**	GEO32*
1,1,1,2-Tetrachloroethane		mg/L	N/A**	N/A**	GEO32*
Ethyl Benzene		mg/L	N/A**	N/A**	GEO32*
m&p-Xylene		mg/L	N/A**	N/A**	GEO32*
o-Xylene		mg/L	N/A**	N/A**	GEO32*
Styrene		mg/L	N/A**	N/A**	GEO32*
Bromoform		mg/L	N/A**	N/A**	GEO32*
trans-1,2-Dichloroethene		mg/L	N/A**	N/A**	GEO32*
Isopropylbenzene		mg/L	N/A**	N/A**	GEO32*
1,1,2,2-Tetrachloroethane		mg/L	N/A**	N/A**	GEO32*
1,2,3-Trichloropropane		mg/L	N/A**	N/A**	GEO32*
n-Propylbenzene		mg/L	N/A**	N/A**	GEO32*
Bromobenzene		mg/L	N/A**	N/A**	GEO32*
2-Chlorotoluene		mg/L	N/A**	N/A**	GEO32*

Additional information : *Subcontracted to an approved accredited supplier
Sample location dryFor and on behalf of BHP laboratories :****John O'Halloran****Issue Date : 26/02/16**

This Test Report shall not be duplicated except in full and then only with the permission of the test laboratory

TEST REPORT NO: 119961.5Analysing
Testing
Consulting
Calibrating**Client: Environmental Department
Limerick City Council
Dooradoyle
Co. Limerick****BHP Ref. No.: N/A**
Order No.:
Date Received: 14/12/15
Date Completed: N/A**
Test Specification: Nil
Item: Annual Ground Water 2015**BHP
New Road
Thomondgate
Limerick
Ireland
Tel +353 61 455399
Fax + 353 61 455447**FTAO: Tara Flanagan**

TEST	Client Reference	Units	Results	Date Analysed	Test Method
	Annual Monitoring Groundwater 5 Shallow				
1,3,5-Trimethylbenzene		mg/L	N/A**	N/A**	GEO32*
4-Chlorotoluene		mg/L	N/A**	N/A**	GEO32*
tert-Butylbenzene		mg/L	N/A**	N/A**	GEO32*
1,2,4-Trimethylbenzene		mg/L	N/A**	N/A**	GEO32*
sec-Butylbenzene		mg/L	N/A**	N/A**	GEO32*
p-Isopropyltoluene		mg/L	N/A**	N/A**	GEO32*
1,3-Dichlorobenzene		mg/L	N/A**	N/A**	GEO32*
1,4-Dichlorobenzene		mg/L	N/A**	N/A**	GEO32*
n-Butylbenzene		mg/L	N/A**	N/A**	GEO32*
1,2-Dichlorobenzene		mg/L	N/A**	N/A**	GEO32*
1,2-Dibromo-3-chloropropane		mg/L	N/A**	N/A**	GEO32*
1,2,4-Trichlorobenzene		mg/L	N/A**	N/A**	GEO32*
Hexachlorobutadiene		mg/L	N/A**	N/A**	GEO32*
Naphthalene		mg/L	N/A**	N/A**	GEO32*
1,2,3-Trichlorobenzene		mg/L	N/A**	N/A**	GEO32*
MTBE		mg/L	N/A**	N/A**	GEO32*

Additional information : *Subcontracted to an approved accredited supplier
Sample location dryFor and on behalf of BHP laboratories :****John O'Halloran
Issue Date : 26/02/16**

This Test Report shall not be duplicated except in full and then only with the permission of the test laboratory

TEST REPORT NO: 119961.5Analysing
Testing
Consulting
Calibrating**Client:** Environmental Department
Limerick City Council
Dooradoyle
Co. Limerick**BHP Ref. No.:** N/A**
Order No.:
Date Received: 14/12/15
Date Completed: N/A**
Test Specification: Nil
Item: Annual Ground Water 2015BHP
New Road
Thomondgate
Limerick
Ireland
Tel +353 61 455399
Fax + 353 61 455447**FTAO:** Tara Flanagan

TEST	Client Reference	Units	Results	Date Analysed	Test Method
	Annual Monitoring Groundwater 5 Shallow				
Semi Volatile Organic Compounds					
Phenol		mg/L	N/A**	N/A**	GEO40*
Bis(2-chloroethyl)ether		mg/L	N/A**	N/A**	GEO40*
2-Chlorophenol		mg/L	N/A**	N/A**	GEO40*
1,3-Dichlorobenzene		mg/L	N/A**	N/A**	GEO40*
1,4-Dichlorobenzene		mg/L	N/A**	N/A**	GEO40*
2-Methylphenol		mg/L	N/A**	N/A**	GEO40*
3&4-Methylphenol		mg/L	N/A**	N/A**	GEO40*
Dibenzofuran		mg/L	N/A**	N/A**	GEO40*
1,2-Dichlorobenzene		mg/L	N/A**	N/A**	GEO40*
Bis(2-chloroisopropyl)ether		mg/L	N/A**	N/A**	GEO40*
n-Nitrosodi-n-propylamine		mg/L	N/A**	N/A**	GEO40*
Hexachloroethane		mg/L	N/A**	N/A**	GEO40*
Nitrobenzene		mg/L	N/A**	N/A**	GEO40*
Isophorone		mg/L	N/A**	N/A**	GEO40*
2,4-Dimethylphenol		mg/L	N/A**	N/A**	GEO40*
2-Nitrophenol		mg/L	N/A**	N/A**	GEO40*

Additional information : *Subcontracted to an approved accredited supplier
Sample location dryFor and on behalf of BHP laboratories :****John O'Halloran**
Issue Date : 26/02/16

This Test Report shall not be duplicated except in full and then only with the permission of the test laboratory

TEST REPORT NO: 119961.5Analysing
Testing
Consulting
Calibrating**Client:** Environmental Department
Limerick City Council
Dooradoyle
Co. Limerick**BHP Ref. No.:** N/A**
Order No.:
Date Received: 14/12/15
Date Completed: N/A**
Test Specification: Nil
Item: Annual Ground Water 2015BHP
New Road
Thomondgate
Limerick
Ireland
Tel +353 61 455399
Fax + 353 61 455447**FTAO:** Tara Flanagan

TEST	Client Reference	Units	Results	Date Analysed	Test Method
	Annual Monitoring Groundwater 5 Shallow				
Bis(2-chloroethoxy)methane		mg/L	N/A**	N/A**	GEO40*
2,4-Dichlorophenol		mg/L	N/A**	N/A**	GEO40*
1,2,4-Trichlorobenzene		mg/L	N/A**	N/A**	GEO40*
Naphthalene		mg/L	N/A**	N/A**	GEO40*
Hexachlorobutadiene		mg/L	N/A**	N/A**	GEO40*
4-Chloro-3-methylphenol		mg/L	N/A**	N/A**	GEO40*
2-Methylnaphthalene		mg/L	N/A**	N/A**	GEO40*
2,4,6-Trichlorophenol		mg/L	N/A**	N/A**	GEO40*
2,4,5-Trichlorophenol		mg/L	N/A**	N/A**	GEO40*
2-Chloronaphthalene		mg/L	N/A**	N/A**	GEO40*
Dimethylphthalate		mg/L	N/A**	N/A**	GEO40*
2,6-Dinitrotoluene		mg/L	N/A**	N/A**	GEO40*
Acenaphthylene		mg/L	N/A**	N/A**	GEO40*
Acenaphthene		mg/L	N/A**	N/A**	GEO40*
2,4-Dinitrotoluene		mg/L	N/A**	N/A**	GEO40*
Diethylphthalate		mg/L	N/A**	N/A**	GEO40*
4-Nitrophenol		mg/L	N/A**	N/A**	GEO40*

Additional information : *Subcontracted to an approved accredited supplier
Sample location dryFor and on behalf of BHP laboratories :****John O'Halloran****Issue Date : 26/02/16**

This Test Report shall not be duplicated except in full and then only with the permission of the test laboratory

TEST REPORT NO: 119961.5Analysing
Testing
Consulting
Calibrating**Client: Environmental Department
Limerick City Council
Dooradoyle
Co. Limerick****BHP Ref. No.: N/A**
Order No.:
Date Received: 14/12/15
Date Completed: N/A**
Test Specification: Nil
Item: Annual Ground Water 2015**BHP
New Road
Thomondgate
Limerick
Ireland
Tel +353 61 455399
Fax + 353 61 455447**FTAO: Tara Flanagan**

TEST	Client Reference	Units	Results	Date Analysed	Test Method
	Annual Monitoring Groundwater 5 Shallow				
4-Chlorophenyl phenyl ether		mg/L	N/A**	N/A**	GEO40*
Fluorene		mg/L	N/A**	N/A**	GEO40*
Diphenylamine		mg/L	N/A**	N/A**	GEO40*
4-Bromophenyl Phenyl Ether		mg/L	N/A**	N/A**	GEO40*
Hexachlorobenzene		mg/L	N/A**	N/A**	GEO40*
Pentachlorophenol		mg/L	N/A**	N/A**	GEO40*
Phenanthrene		mg/L	N/A**	N/A**	GEO40*
Anthracene		mg/L	N/A**	N/A**	GEO40*
di-n-Butylphthalate		mg/L	N/A**	N/A**	GEO40*
Fluoranthene		mg/L	N/A**	N/A**	GEO40*
Pyrene		mg/L	N/A**	N/A**	GEO40*
Benzyl Butyl Phthalate		mg/L	N/A**	N/A**	GEO40*
Benzo(a)anthracene		mg/L	N/A**	N/A**	GEO40*
Chrysene		mg/L	N/A**	N/A**	GEO40*
Bis(2-ethylhexyl)phthalate		mg/L	N/A**	N/A**	GEO40*
Di-n-octylphthalate		mg/L	N/A**	N/A**	GEO40*
Benzo(b)fluoranthene		mg/L	N/A**	N/A**	GEO40*

Additional information : *Subcontracted to an approved accredited supplier
Sample location dryFor and on behalf of BHP laboratories :****John O'Halloran
Issue Date : 26/02/16**

This Test Report shall not be duplicated except in full and then only with the permission of the test laboratory

TEST REPORT NO: 119961.5

Analysing
Testing
Consulting
Calibrating



Client: Environmental Department
Limerick City Council
Dooradoyle
Co. Limerick

BHP Ref. No.: N/A**
Order No.:
Date Received: 14/12/15
Date Completed: N/A**
Test Specification: Nil
Item: Annual Ground Water 2015

BHP
New Road
Thomondgate
Limerick
Ireland
Tel +353 61 455399
Fax + 353 61 455447

FTAO: Tara Flanagan

TEST	Client Reference	Units	Results	Date Analysed	Test Method
	Annual Monitoring Groundwater 5 Shallow				
Benzo(k)fluoranthene		mg/L	N/A**	N/A**	GEO40*
Benzo(a)pyrene		mg/L	N/A**	N/A**	GEO40*
Indeno(1,2,3-c,d)pyrene		mg/L	N/A**	N/A**	GEO40*
Dibenz(a,h)anthracene		mg/L	N/A**	N/A**	GEO40*
Benzo(g,h,i)perylene		mg/L	N/A**	N/A**	GEO40*

Additional information : *Subcontracted to an approved accredited supplier
**Sample location dry

For and on behalf of BHP laboratories :

John O'Halloran
Issue Date : 26/02/16

This Test Report shall not be duplicated except in full and then only with the permission of the test laboratory

TEST REPORT NO: 119961.6Analysing
Testing
Consulting
CalibratingClient: **Environmental Department
Limerick City Council
Dooradoyle
Co. Limerick**BHP Ref. No.: **15/12/375**
Order No.:
Date Received: **14/12/15**
Date Completed: **11/01/16**
Test Specification: **Nil**
Item: **Annual Ground Water 2015**BHP
New Road
Thomondgate
Limerick
Ireland
Tel +353 61 455399
Fax + 353 61 455447FTAO: **Tara Flanagan**

TEST	Client Reference	Units	Results	Date Analysed	Test Method
	Annual Monitoring Groundwater 5 Deep				
Boron		mg/L	<0.23	22/12/2015	WAS049*
Cadmium		mg/L	<0.0006	22/12/2015	WAS049*
Calcium		mg/L	273	22/12/2015	WAS049*
Chromium		mg/L	0.0048	22/12/2015	WAS049*
Copper		mg/L	<0.009	22/12/2015	WAS049*
Iron		mg/L	113	22/12/2015	WAS049*
Lead		mg/L	0.0182	22/12/2015	WAS049*
Magnesium		mg/L	22.1	22/12/2015	WAS049*
Manganese		mg/L	3.14	22/12/2015	WAS049*
Nickel		mg/L	0.0159	22/12/2015	WAS049*
Potassium		mg/L	0.643	22/12/2015	WAS049*
Sodium		mg/L	122	22/12/2015	WAS049*
Zinc		mg/L	0.0618	22/12/2015	WAS049*
Mercury		mg/L	<0.0001	21/12/2015	WAS013*
Fluoride		mg/L	0.21	14/12/2015	BHP AC 019
Sulphate (as SO ₄)		mg/L	<10	22/12/2015	BHP AC 095
Orthophosphate (as P)		mg/L	<0.01	15/12/2015	BHP AC 095

Additional information : *Subcontracted to an approved accredited supplier**For and on behalf of BHP laboratories :****John O'Halloran****Issue Date : 26/02/16**

This Test Report shall not be duplicated except in full and then only with the permission of the test laboratory

TEST REPORT NO: 119961.6

Analysing
Testing
Consulting
Calibrating



Client: Environmental Department
Limerick City Council
Dooradoyle
Co. Limerick

BHP Ref. No.: 15/12/375
Order No.:
Date Received: 14/12/15
Date Completed: 11/01/16
Test Specification: Nil
Item: Annual Ground Water 2015

BHP
New Road
Thomondgate
Limerick
Ireland
Tel +353 61 455399
Fax + 353 61 455447

FTAO: Tara Flanagan

TEST	Client Reference	Units	Results	Date Analysed	Test Method
	Annual Monitoring Groundwater 5 Deep				
Nitrate (as NO ₃)		mg/L	<0.5	14/12/2015	BHP AC 019
Nitrite (as NO ₂)		mg/L	<0.05	14/12/2015	BHP AC 019
Total Oxidised Nitrogen (as N)		mg/L	<0.14	14/12/2015	BHP AC 065
Cyanide		mg/L	<0.05	21/12/2015	BHP AC 095
Alkalinity (as CaCO ₃)		mg/L	723	15/12/2015	BHP AC 095
Residue on Evaporation		mg/L	1970	17/12/2015	BHP AC 040
Volatile Organic Compounds					
Dichlorodifluoromethane		mg/L	<0.001	08/01/2016	GEO32*
Chloromethane		mg/L	<0.001	08/01/2016	GEO32*
Chloroethane		mg/L	<0.001	08/01/2016	GEO32*
Bromomethane		mg/L	<0.001	08/01/2016	GEO32*
Trichlorofluoromethane		mg/L	<0.001	08/01/2016	GEO32*
1,1-Dichloroethene		mg/L	<0.001	08/01/2016	GEO32*
Dichloromethane		mg/L	<0.001	08/01/2016	GEO32*
1,1-Dichloroethane		mg/L	<0.001	08/01/2016	GEO32*
cis-1,2-Dichloroethene		mg/L	<0.001	08/01/2016	GEO32*
2,2-Dichloropropane		mg/L	<0.001	08/01/2016	GEO32*

Additional information : *Subcontracted to an approved accredited supplier

For and on behalf of BHP laboratories :

John O'Halloran

Issue Date : 26/02/16

This Test Report shall not be duplicated except in full and then only with the permission of the test laboratory

TEST REPORT NO: 119961.6Analysing
Testing
Consulting
Calibrating**Client:** Environmental Department
Limerick City Council
Dooradoyle
Co. Limerick**BHP Ref. No.:** 15/12/375
Order No.:
Date Received: 14/12/15
Date Completed: 11/01/16
Test Specification: Nil
Item: Annual Ground Water 2015BHP
New Road
Thomondgate
Limerick
Ireland
Tel +353 61 455399
Fax + 353 61 455447**FTAO:** Tara Flanagan

TEST	Client Reference	Units	Results	Date Analysed	Test Method
	Annual Monitoring Groundwater 5 Deep				
Chloroform		mg/L	<0.001	08/01/2016	GEO32*
Bromochloromethane		mg/L	<0.001	08/01/2016	GEO32*
1,1,1-Trichloroethane		mg/L	<0.001	08/01/2016	GEO32*
1,1-Dichloropropene		mg/L	<0.001	08/01/2016	GEO32*
1,2-Dichloroethane		mg/L	<0.001	08/01/2016	GEO32*
Benzene		mg/L	N/A**	11/01/2016	GEO32*
1,2-Dichloropropane		mg/L	<0.001	08/01/2016	GEO32*
Trichloroethene		mg/L	<0.001	08/01/2016	GEO32*
Bromodichloromethane		mg/L	<0.001	08/01/2016	GEO32*
Dibromomethane		mg/L	<0.001	08/01/2016	GEO32*
cis-1,3-Dichloropropene		mg/L	<0.001	08/01/2016	GEO32*
Toluene		mg/L	<0.001	08/01/2016	GEO32*
trans-1,3-Dichloropropene		mg/L	<0.001	08/01/2016	GEO32*
1,1,2-Trichloroethane		mg/L	<0.001	08/01/2016	GEO32*
Carbon Tetrachloride		mg/L	<0.001	08/01/2016	GEO32*
Vinyl Chloride		mg/L	<0.0005	08/01/2016	GEO32*
1,3-Dichloropropane		mg/L	<0.001	08/01/2016	GEO32*

Additional information :

*Subcontracted to an approved accredited supplier

**Unable to report due to QC failure and insufficient sample for re-test

For and on behalf of BHP laboratories :**John O'Halloran****Issue Date : 26/02/16**

This Test Report shall not be duplicated except in full and then only with the permission of the test laboratory

TEST REPORT NO: 119961.6Analysing
Testing
Consulting
Calibrating**Client: Environmental Department
Limerick City Council
Dooradoyle
Co. Limerick****BHP Ref. No.: 15/12/375
Order No.:
Date Received: 14/12/15
Date Completed: 11/01/16
Test Specification: Nil
Item: Annual Ground Water 2015**BHP
New Road
Thomondgate
Limerick
Ireland
Tel +353 61 455399
Fax + 353 61 455447**FTAO: Tara Flanagan**

TEST	Client Reference	Units	Results	Date Analysed	Test Method
	Annual Monitoring Groundwater 5 Deep				
Tetrachloroethene		mg/L	<0.001	08/01/2016	GEO32*
Dibromochloromethane		mg/L	<0.001	08/01/2016	GEO32*
1,2-Dibromoethane		mg/L	<0.001	08/01/2016	GEO32*
Chlorobenzene		mg/L	<0.001	08/01/2016	GEO32*
1,1,1,2-Tetrachloroethane		mg/L	<0.001	08/01/2016	GEO32*
Ethyl Benzene		mg/L	N/A**	11/01/2016	GEO32*
m&p-Xylene		mg/L	<0.001	08/01/2016	GEO32*
o-Xylene		mg/L	<0.001	08/01/2016	GEO32*
Styrene		mg/L	<0.001	08/01/2016	GEO32*
Bromoform		mg/L	<0.001	08/01/2016	GEO32*
trans-1,2-Dichloroethene		mg/L	<0.001	08/01/2016	GEO32*
Isopropylbenzene		mg/L	<0.001	08/01/2016	GEO32*
1,1,2,2-Tetrachloroethane		mg/L	<0.001	08/01/2016	GEO32*
1,2,3-Trichloropropane		mg/L	<0.001	08/01/2016	GEO32*
n-Propylbenzene		mg/L	<0.001	08/01/2016	GEO32*
Bromobenzene		mg/L	<0.001	08/01/2016	GEO32*
2-Chlorotoluene		mg/L	<0.001	08/01/2016	GEO32*

Additional information :

*Subcontracted to an approved accredited supplier

**Unable to report due to QC failure and insufficient sample for re-test

For and on behalf of BHP laboratories :**John O'Halloran****Issue Date : 26/02/16**

This Test Report shall not be duplicated except in full and then only with the permission of the test laboratory

TEST REPORT NO: 119961.6Analysing
Testing
Consulting
CalibratingClient: **Environmental Department
Limerick City Council
Dooradoyle
Co. Limerick****BHP Ref. No.: 15/12/375
Order No.:
Date Received: 14/12/15
Date Completed: 11/01/16
Test Specification: Nil
Item: Annual Ground Water 2015**BHP
New Road
Thomondgate
Limerick
Ireland
Tel +353 61 455399
Fax + 353 61 455447

FTAO: Tara Flanagan

TEST	Client Reference	Units	Results	Date Analysed	Test Method
	Annual Monitoring Groundwater 5 Deep				
1,3,5-Trimethylbenzene		mg/L	N/A**	11/01/2016	GEO32*
4-Chlorotoluene		mg/L	<0.001	08/01/2016	GEO32*
tert-Butylbenzene		mg/L	<0.001	08/01/2016	GEO32*
1,2,4-Trimethylbenzene		mg/L	<0.001	08/01/2016	GEO32*
sec-Butylbenzene		mg/L	<0.001	08/01/2016	GEO32*
p-Isopropyltoluene		mg/L	N/A**	11/01/2016	GEO32*
1,3-Dichlorobenzene		mg/L	<0.001	08/01/2016	GEO32*
1,4-Dichlorobenzene		mg/L	<0.001	08/01/2016	GEO32*
n-Butylbenzene		mg/L	N/A**	11/01/2016	GEO32*
1,2-Dichlorobenzene		mg/L	<0.001	08/01/2016	GEO32*
1,2-Dibromo-3-chloropropane		mg/L	<0.002	08/01/2016	GEO32*
1,2,4-Trichlorobenzene		mg/L	<0.001	08/01/2016	GEO32*
Hexachlorobutadiene		mg/L	<0.001	08/01/2016	GEO32*
Naphthalene		mg/L	N/A**	11/01/2016	GEO32*
1,2,3-Trichlorobenzene		mg/L	<0.001	08/01/2016	GEO32*
MTBE		mg/L	<0.001	08/01/2016	GEO32*

Additional information :

*Subcontracted to an approved accredited supplier

**Unable to report due to QC failure and insufficient sample for re-test

For and on behalf of BHP laboratories :**John O'Halloran****Issue Date : 26/02/16**

This Test Report shall not be duplicated except in full and then only with the permission of the test laboratory

TEST REPORT NO: 119961.6Analysing
Testing
Consulting
CalibratingClient: Environmental Department
Limerick City Council
Dooradoyle
Co. LimerickBHP Ref. No.: 15/12/375
Order No.:
Date Received: 14/12/15
Date Completed: 11/01/16
Test Specification: Nil
Item: Annual Ground Water 2015BHP
New Road
Thomondgate
Limerick
Ireland
Tel +353 61 455399
Fax + 353 61 455447

FTAO: Tara Flanagan

TEST	Client Reference	Units	Results	Date Analysed	Test Method
	Annual Monitoring Groundwater 5 Deep				
Semi Volatile Organic Compounds					
Phenol		mg/L	<0.004	11/01/2016	GEO40*
Bis(2-chloroethyl)ether		mg/L	<0.004	11/01/2016	GEO40*
2-Chlorophenol		mg/L	<0.004	11/01/2016	GEO40*
1,3-Dichlorobenzene		mg/L	<0.004	11/01/2016	GEO40*
1,4-Dichlorobenzene		mg/L	<0.004	11/01/2016	GEO40*
2-Methylphenol		mg/L	<0.004	11/01/2016	GEO40*
3&4-Methylphenol		mg/L	<0.004	11/01/2016	GEO40*
Dibenzofuran		mg/L	<0.004	11/01/2016	GEO40*
1,2-Dichlorobenzene		mg/L	<0.004	11/01/2016	GEO40*
Bis(2-chloroisopropyl)ether		mg/L	<0.004	11/01/2016	GEO40*
n-Nitrosodi-n-propylamine		mg/L	<0.004	11/01/2016	GEO40*
Hexachloroethane		mg/L	<0.004	11/01/2016	GEO40*
Nitrobenzene		mg/L	<0.004	11/01/2016	GEO40*
Isophorone		mg/L	<0.004	11/01/2016	GEO40*
2,4-Dimethylphenol		mg/L	<0.004	11/01/2016	GEO40*
2-Nitrophenol		mg/L	<0.004	11/01/2016	GEO40*

Additional information : *Subcontracted to an approved accredited supplier**For and on behalf of BHP laboratories :****John O'Halloran****Issue Date : 26/02/16**

This Test Report shall not be duplicated except in full and then only with the permission of the test laboratory

TEST REPORT NO: 119961.6Analysing
Testing
Consulting
Calibrating**Client: Environmental Department
Limerick City Council
Dooradoyle
Co. Limerick****BHP Ref. No.: 15/12/375
Order No.:
Date Received: 14/12/15
Date Completed: 11/01/16
Test Specification: Nil
Item: Annual Ground Water 2015**BHP
New Road
Thomondgate
Limerick
Ireland
Tel +353 61 455399
Fax + 353 61 455447**FTAO: Tara Flanagan**

TEST	Client Reference	Units	Results	Date Analysed	Test Method
	Annual Monitoring Groundwater 5 Deep				
Bis(2-chloroethoxy)methane		mg/L	<0.004	11/01/2016	GEO40*
2,4-Dichlorophenol		mg/L	<0.004	11/01/2016	GEO40*
1,2,4-Trichlorobenzene		mg/L	<0.004	11/01/2016	GEO40*
Naphthalene		mg/L	<0.008	11/01/2016	GEO40*
Hexachlorobutadiene		mg/L	<0.004	11/01/2016	GEO40*
4-Chloro-3-methylphenol		mg/L	<0.004	11/01/2016	GEO40*
2-Methylnaphthalene		mg/L	<0.004	11/01/2016	GEO40*
2,4,6-Trichlorophenol		mg/L	<0.004	11/01/2016	GEO40*
2,4,5-Trichlorophenol		mg/L	<0.004	11/01/2016	GEO40*
2-Chloronaphthalene		mg/L	<0.004	11/01/2016	GEO40*
Dimethylphthalate		mg/L	<0.004	11/01/2016	GEO40*
2,6-Dinitrotoluene		mg/L	<0.004	11/01/2016	GEO40*
Acenaphthylene		mg/L	<0.004	11/01/2016	GEO40*
Acenaphthene		mg/L	<0.004	11/01/2016	GEO40*
2,4-Dinitrotoluene		mg/L	<0.004	11/01/2016	GEO40*
Diethylphthalate		mg/L	<0.004	11/01/2016	GEO40*
4-Nitrophenol		mg/L	<0.02	11/01/2016	GEO40*

Additional information : *Subcontracted to an approved accredited supplier**For and on behalf of BHP laboratories :****John O'Halloran****Issue Date : 26/02/16**

This Test Report shall not be duplicated except in full and then only with the permission of the test laboratory

TEST REPORT NO: 119961.6Analysing
Testing
Consulting
Calibrating**Client: Environmental Department
Limerick City Council
Dooradoyle
Co. Limerick****BHP Ref. No.: 15/12/375
Order No.:
Date Received: 14/12/15
Date Completed: 11/01/16
Test Specification: Nil
Item: Annual Ground Water 2015**BHP
New Road
Thomondgate
Limerick
Ireland
Tel +353 61 455399
Fax + 353 61 455447**FTAO: Tara Flanagan**

TEST	Client Reference	Units	Results	Date Analysed	Test Method
	Annual Monitoring Groundwater 5 Deep				
4-Chlorophenyl phenyl ether		mg/L	<0.004	11/01/2016	GEO40*
Fluorene		mg/L	<0.004	11/01/2016	GEO40*
Diphenylamine		mg/L	<0.004	11/01/2016	GEO40*
4-Bromophenyl Phenyl Ether		mg/L	<0.004	11/01/2016	GEO40*
Hexachlorobenzene		mg/L	<0.004	11/01/2016	GEO40*
Pentachlorophenol		mg/L	<0.004	11/01/2016	GEO40*
Phenanthrene		mg/L	<0.004	11/01/2016	GEO40*
Anthracene		mg/L	<0.004	11/01/2016	GEO40*
di-n-Butylphthalate		mg/L	<0.004	11/01/2016	GEO40*
Fluoranthene		mg/L	<0.004	11/01/2016	GEO40*
Pyrene		mg/L	<0.004	11/01/2016	GEO40*
Benzyl Butyl Phthalate		mg/L	<0.004	11/01/2016	GEO40*
Benzo(a)anthracene		mg/L	<0.004	11/01/2016	GEO40*
Chrysene		mg/L	<0.004	11/01/2016	GEO40*
Bis(2-ethylhexyl)phthalate		mg/L	<0.02	11/01/2016	GEO40*
Di-n-octylphthalate		mg/L	<0.004	11/01/2016	GEO40*
Benzo(b)fluoranthene		mg/L	<0.004	11/01/2016	GEO40*

Additional information : *Subcontracted to an approved accredited supplier**For and on behalf of BHP laboratories :****John O'Halloran****Issue Date : 26/02/16**

This Test Report shall not be duplicated except in full and then only with the permission of the test laboratory

TEST REPORT NO: 119961.6

Analysing
Testing
Consulting
Calibrating



Client: Environmental Department
Limerick City Council
Dooradoyle
Co. Limerick

BHP Ref. No.: 15/12/375
Order No.:
Date Received: 14/12/15
Date Completed: 11/01/16
Test Specification: Nil
Item: Annual Ground Water 2015

FTAO: Tara Flanagan

BHP
New Road
Thomondgate
Limerick
Ireland
Tel +353 61 455399
Fax + 353 61 455447

TEST	Client Reference	Units	Results	Date Analysed	Test Method
	Annual Monitoring Groundwater 5 Deep				
Benzo(k)fluoranthene		mg/L	<0.004	11/01/2016	GEO40*
Benzo(a)pyrene		mg/L	<0.004	11/01/2016	GEO40*
Indeno(1,2,3-c,d)pyrene		mg/L	<0.004	11/01/2016	GEO40*
Dibenz(a,h)anthracene		mg/L	<0.004	11/01/2016	GEO40*
Benzo(g,h,i)perylene		mg/L	<0.004	11/01/2016	GEO40*

Additional information : *Subcontracted to an approved accredited supplier

For and on behalf of BHP laboratories :

John O'Halloran
Issue Date : 26/02/16

This Test Report shall not be duplicated except in full and then only with the permission of the test laboratory

TEST REPORT NO: 119983.1Analysing
Testing
Consulting
CalibratingClient: **Environmental Department
Limerick City Council
Dooradoyle
Co. Limerick**BHP Ref. No.: **15/12/426**
Order No.:
Date Received: **16/12/15**
Date Completed: **15/01/16**
Test Specification: **Nil**
Item: **Annual Ground Water 2015**BHP
New Road
Thomondgate
Limerick
Ireland
Tel +353 61 455399
Fax + 353 61 455447

FTAO: Tara Flanagan

TEST	Client Reference	Units	Results	Date Analysed	Test Method
	Annual Monitoring Groundwater 1 Deep				
Boron		mg/L	0.473	23/12/2015	WAS049*
Cadmium		mg/L	<0.0006	23/12/2015	WAS049*
Calcium		mg/L	174	23/12/2015	WAS049*
Chromium		mg/L	0.0041	23/12/2015	WAS049*
Copper		mg/L	<0.009	23/12/2015	WAS049*
Iron		mg/L	8.1	23/12/2015	WAS049*
Lead		mg/L	0.0088	23/12/2015	WAS049*
Magnesium		mg/L	43.2	23/12/2015	WAS049*
Manganese		mg/L	0.825	23/12/2015	WAS049*
Nickel		mg/L	0.0098	23/12/2015	WAS049*
Potassium		mg/L	44.5	23/12/2015	WAS049*
Sodium		mg/L	172	23/12/2015	WAS049*
Zinc		mg/L	0.0427	23/12/2015	WAS049*
Mercury		mg/L	<0.0001	21/12/2015	WAS013*
Fluoride		mg/L	0.16	18/12/2015	BHP AC 019
Sulphate (as SO ₄)		mg/L	11.9	22/12/2015	BHP AC 095
Orthophosphate (as P)		mg/L	0.03	17/12/2015	BHP AC 095

Additional information : *Subcontracted to an approved accredited supplier

For and on behalf of BHP laboratories :

John O'Halloran

Issue Date : 26/02/16

This Test Report shall not be duplicated except in full and then only with the permission of the test laboratory

TEST REPORT NO: 119983.1Analysing
Testing
Consulting
Calibrating**Client: Environmental Department
Limerick City Council
Dooradoyle
Co. Limerick****BHP Ref. No.: 15/12/426
Order No.:
Date Received: 16/12/15
Date Completed: 15/01/16
Test Specification: Nil
Item: Annual Ground Water 2015**BHP
New Road
Thomondgate
Limerick
Ireland
Tel +353 61 455399
Fax + 353 61 455447**FTAO: Tara Flanagan**

TEST	Client Reference	Units	Results	Date Analysed	Test Method
	Annual Monitoring Groundwater 1 Deep				
Nitrate (as NO ₃)		mg/L	<0.5	18/12/2015	BHP AC 019
Nitrite (as NO ₂)		mg/L	<0.05	18/12/2015	BHP AC 019
Total Oxidised Nitrogen (as N)		mg/L	<0.14	18/12/2015	BHP AC 065
Cyanide		mg/L	<0.05	21/12/2015	BHP AC 095
Alkalinity (as CaCO ₃)		mg/L	745	17/12/2015	BHP AC 095
Residue on Evaporation		mg/L	1444	17/12/2015	BHP AC 040
Volatile Organic Compounds					
Dichlorodifluoromethane		mg/L	<0.002	15/01/2016	GEO32*
Chloromethane		mg/L	<0.002	15/01/2016	GEO32*
Chloroethane		mg/L	<0.002	15/01/2016	GEO32*
Bromomethane		mg/L	<0.002	15/01/2016	GEO32*
Trichlorofluoromethane		mg/L	<0.002	15/01/2016	GEO32*
1,1-Dichloroethene		mg/L	<0.002	15/01/2016	GEO32*
Dichloromethane		mg/L	<0.002	15/01/2016	GEO32*
1,1-Dichloroethane		mg/L	<0.002	15/01/2016	GEO32*
cis-1,2-Dichloroethene		mg/L	<0.002	15/01/2016	GEO32*
2,2-Dichloropropane		mg/L	<0.002	15/01/2016	GEO32*

Additional information : *Subcontracted to an approved accredited supplier**For and on behalf of BHP laboratories :****John O'Halloran****Issue Date : 26/02/16**

This Test Report shall not be duplicated except in full and then only with the permission of the test laboratory

TEST REPORT NO: 119983.1Analysing
Testing
Consulting
CalibratingClient: Environmental Department
Limerick City Council
Dooradoyle
Co. LimerickBHP Ref. No.: 15/12/426
Order No.:
Date Received: 16/12/15
Date Completed: 15/01/16
Test Specification: Nil
Item: Annual Ground Water 2015BHP
New Road
Thomondgate
Limerick
Ireland
Tel +353 61 455399
Fax + 353 61 455447

FTAO: Tara Flanagan

TEST	Client Reference	Units	Results	Date Analysed	Test Method
	Annual Monitoring Groundwater 1 Deep				
Chloroform		mg/L	<0.002	15/01/2016	GEO32*
Bromochloromethane		mg/L	<0.002	15/01/2016	GEO32*
1,1,1-Trichloroethane		mg/L	<0.002	15/01/2016	GEO32*
1,1-Dichloropropene		mg/L	<0.002	15/01/2016	GEO32*
1,2-Dichloroethane		mg/L	<0.002	15/01/2016	GEO32*
Benzene		mg/L	<0.002	15/01/2016	GEO32*
1,2-Dichloropropane		mg/L	<0.002	15/01/2016	GEO32*
Trichloroethene		mg/L	<0.002	15/01/2016	GEO32*
Bromodichloromethane		mg/L	<0.002	15/01/2016	GEO32*
Dibromomethane		mg/L	<0.002	15/01/2016	GEO32*
cis-1,3-Dichloropropene		mg/L	<0.002	15/01/2016	GEO32*
Toluene		mg/L	<0.002	15/01/2016	GEO32*
trans-1,3-Dichloropropene		mg/L	<0.002	15/01/2016	GEO32*
1,1,2-Trichloroethane		mg/L	<0.002	15/01/2016	GEO32*
Carbon Tetrachloride		mg/L	<0.002	15/01/2016	GEO32*
Vinyl Chloride		mg/L	<0.001	15/01/2016	GEO32*
1,3-Dichloropropane		mg/L	<0.002	15/01/2016	GEO32*

Additional information : *Subcontracted to an approved accredited supplier

For and on behalf of BHP laboratories :

John O'Halloran

Issue Date : 26/02/16

This Test Report shall not be duplicated except in full and then only with the permission of the test laboratory

TEST REPORT NO: 119983.1Analysing
Testing
Consulting
Calibrating**Client: Environmental Department
Limerick City Council
Dooradoyle
Co. Limerick****BHP Ref. No.: 15/12/426
Order No.:
Date Received: 16/12/15
Date Completed: 15/01/16
Test Specification: Nil
Item: Annual Ground Water 2015**BHP
New Road
Thomondgate
Limerick
Ireland
Tel +353 61 455399
Fax + 353 61 455447**FTAO: Tara Flanagan**

TEST	Client Reference	Units	Results	Date Analysed	Test Method
	Annual Monitoring Groundwater 1 Deep				
Tetrachloroethene		mg/L	<0.002	15/01/2016	GEO32*
Dibromochloromethane		mg/L	<0.002	15/01/2016	GEO32*
1,2-Dibromoethane		mg/L	<0.002	15/01/2016	GEO32*
Chlorobenzene		mg/L	<0.002	15/01/2016	GEO32*
1,1,1,2-Tetrachloroethane		mg/L	<0.002	15/01/2016	GEO32*
Ethyl Benzene		mg/L	<0.002	15/01/2016	GEO32*
m&p-Xylene		mg/L	<0.002	15/01/2016	GEO32*
o-Xylene		mg/L	<0.002	15/01/2016	GEO32*
Styrene		mg/L	<0.002	15/01/2016	GEO32*
Bromoform		mg/L	<0.002	15/01/2016	GEO32*
trans-1,2-Dichloroethene		mg/L	<0.002	15/01/2016	GEO32*
Isopropylbenzene		mg/L	<0.002	15/01/2016	GEO32*
1,1,2,2-Tetrachloroethane		mg/L	<0.002	15/01/2016	GEO32*
1,2,3-Trichloropropane		mg/L	<0.002	15/01/2016	GEO32*
n-Propylbenzene		mg/L	<0.002	15/01/2016	GEO32*
Bromobenzene		mg/L	<0.002	15/01/2016	GEO32*
2-Chlorotoluene		mg/L	<0.002	15/01/2016	GEO32*

Additional information : *Subcontracted to an approved accredited supplier**For and on behalf of BHP laboratories :****John O'Halloran****Issue Date : 26/02/16**

This Test Report shall not be duplicated except in full and then only with the permission of the test laboratory

TEST REPORT NO: 119983.1Analysing
Testing
Consulting
Calibrating**Client: Environmental Department
Limerick City Council
Dooradoyle
Co. Limerick****BHP Ref. No.: 15/12/426
Order No.:
Date Received: 16/12/15
Date Completed: 15/01/16
Test Specification: Nil
Item: Annual Ground Water 2015**BHP
New Road
Thomondgate
Limerick
Ireland
Tel +353 61 455399
Fax + 353 61 455447**FTAO: Tara Flanagan**

TEST	Client Reference	Units	Results	Date Analysed	Test Method
	Annual Monitoring Groundwater 1 Deep				
1,3,5-Trimethylbenzene		mg/L	<0.002	15/01/2016	GEO32*
4-Chlorotoluene		mg/L	<0.002	15/01/2016	GEO32*
tert-Butylbenzene		mg/L	<0.002	15/01/2016	GEO32*
1,2,4-Trimethylbenzene		mg/L	<0.002	15/01/2016	GEO32*
sec-Butylbenzene		mg/L	<0.002	15/01/2016	GEO32*
p-Isopropyltoluene		mg/L	<0.002	15/01/2016	GEO32*
1,3-Dichlorobenzene		mg/L	<0.002	15/01/2016	GEO32*
1,4-Dichlorobenzene		mg/L	<0.002	15/01/2016	GEO32*
n-Butylbenzene		mg/L	<0.002	15/01/2016	GEO32*
1,2-Dichlorobenzene		mg/L	<0.002	15/01/2016	GEO32*
1,2-Dibromo-3-chloropropane		mg/L	<0.004	15/01/2016	GEO32*
1,2,4-Trichlorobenzene		mg/L	<0.002	15/01/2016	GEO32*
Hexachlorobutadiene		mg/L	<0.002	15/01/2016	GEO32*
Naphthalene		mg/L	<0.002	15/01/2016	GEO32*
1,2,3-Trichlorobenzene		mg/L	<0.002	15/01/2016	GEO32*
MTBE		mg/L	<0.002	15/01/2016	GEO32*

Additional information : *Subcontracted to an approved accredited supplier**For and on behalf of BHP laboratories :****John O'Halloran****Issue Date : 26/02/16**

This Test Report shall not be duplicated except in full and then only with the permission of the test laboratory

TEST REPORT NO: 119983.1Analysing
Testing
Consulting
Calibrating**Client:** Environmental Department
Limerick City Council
Dooradoyle
Co. Limerick**BHP Ref. No.:** 15/12/426
Order No.:
Date Received: 16/12/15
Date Completed: 15/01/16
Test Specification: Nil
Item: Annual Ground Water 2015BHP
New Road
Thomondgate
Limerick
Ireland
Tel +353 61 455399
Fax + 353 61 455447**FTAO:** Tara Flanagan

TEST	Client Reference	Units	Results	Date Analysed	Test Method
	Annual Monitoring Groundwater 1 Deep				
Semi Volatile Organic Compounds					
Phenol		mg/L	<0.001	06/01/2016	GEO40*
Bis(2-chloroethyl)ether		mg/L	<0.001	06/01/2016	GEO40*
2-Chlorophenol		mg/L	<0.001	06/01/2016	GEO40*
1,3-Dichlorobenzene		mg/L	<0.001	06/01/2016	GEO40*
1,4-Dichlorobenzene		mg/L	<0.001	06/01/2016	GEO40*
2-Methylphenol		mg/L	<0.001	06/01/2016	GEO40*
3&4-Methylphenol		mg/L	<0.001	06/01/2016	GEO40*
Dibenzofuran		mg/L	<0.001	06/01/2016	GEO40*
1,2-Dichlorobenzene		mg/L	<0.001	06/01/2016	GEO40*
Bis(2-chloroisopropyl)ether		mg/L	<0.001	06/01/2016	GEO40*
n-Nitrosodi-n-propylamine		mg/L	<0.001	06/01/2016	GEO40*
Hexachloroethane		mg/L	<0.001	06/01/2016	GEO40*
Nitrobenzene		mg/L	<0.001	06/01/2016	GEO40*
Isophorone		mg/L	<0.001	06/01/2016	GEO40*
2,4-Dimethylphenol		mg/L	<0.001	06/01/2016	GEO40*
2-Nitrophenol		mg/L	<0.001	06/01/2016	GEO40*

Additional information : *Subcontracted to an approved accredited supplier**For and on behalf of BHP laboratories :****John O'Halloran****Issue Date : 26/02/16**

This Test Report shall not be duplicated except in full and then only with the permission of the test laboratory

TEST REPORT NO: 119983.1Analysing
Testing
Consulting
Calibrating

Client: Environmental Department
Limerick City Council
Dooradoyle
Co. Limerick

BHP Ref. No.: 15/12/426
Order No.:
Date Received: 16/12/15
Date Completed: 15/01/16
Test Specification: Nil
Item: Annual Ground Water 2015

FTAO: Tara Flanagan

BHP
New Road
Thomondgate
Limerick
Ireland
Tel +353 61 455399
Fax + 353 61 455447

TEST	Client Reference	Units	Results	Date Analysed	Test Method
	Annual Monitoring Groundwater 1 Deep				
Bis(2-chloroethoxy)methane		mg/L	<0.001	06/01/2016	GEO40*
2,4-Dichlorophenol		mg/L	<0.001	06/01/2016	GEO40*
1,2,4-Trichlorobenzene		mg/L	<0.001	06/01/2016	GEO40*
Naphthalene		mg/L	<0.002	06/01/2016	GEO40*
Hexachlorobutadiene		mg/L	<0.001	06/01/2016	GEO40*
4-Chloro-3-methylphenol		mg/L	<0.001	06/01/2016	GEO40*
2-Methylnaphthalene		mg/L	<0.001	06/01/2016	GEO40*
2,4,6-Trichlorophenol		mg/L	<0.001	06/01/2016	GEO40*
2,4,5-Trichlorophenol		mg/L	<0.001	06/01/2016	GEO40*
2-Chloronaphthalene		mg/L	<0.001	06/01/2016	GEO40*
Dimethylphthalate		mg/L	<0.001	06/01/2016	GEO40*
2,6-Dinitrotoluene		mg/L	<0.001	06/01/2016	GEO40*
Acenaphthylene		mg/L	<0.001	06/01/2016	GEO40*
Acenaphthene		mg/L	<0.001	06/01/2016	GEO40*
2,4-Dinitrotoluene		mg/L	<0.001	06/01/2016	GEO40*
Diethylphthalate		mg/L	<0.001	06/01/2016	GEO40*
4-Nitrophenol		mg/L	<0.005	06/01/2016	GEO40*

Additional information : *Subcontracted to an approved accredited supplier**For and on behalf of BHP laboratories :****John O'Halloran****Issue Date : 26/02/16**

This Test Report shall not be duplicated except in full and then only with the permission of the test laboratory

TEST REPORT NO: 119983.1Analysing
Testing
Consulting
Calibrating

Client: Environmental Department
Limerick City Council
Dooradoyle
Co. Limerick

BHP Ref. No.: 15/12/426
Order No.:
Date Received: 16/12/15
Date Completed: 15/01/16
Test Specification: Nil
Item: Annual Ground Water 2015

FTAO: Tara Flanagan

BHP
New Road
Thomondgate
Limerick
Ireland
Tel +353 61 455399
Fax + 353 61 455447

TEST	Client Reference	Units	Results	Date Analysed	Test Method
	Annual Monitoring Groundwater 1 Deep				
4-Chlorophenyl phenyl ether		mg/L	<0.001	06/01/2016	GEO40*
Fluorene		mg/L	<0.001	06/01/2016	GEO40*
Diphenylamine		mg/L	<0.001	06/01/2016	GEO40*
4-Bromophenyl Phenyl Ether		mg/L	<0.001	06/01/2016	GEO40*
Hexachlorobenzene		mg/L	<0.001	06/01/2016	GEO40*
Pentachlorophenol		mg/L	<0.001	06/01/2016	GEO40*
Phenanthrene		mg/L	<0.001	06/01/2016	GEO40*
Anthracene		mg/L	<0.001	06/01/2016	GEO40*
di-n-Butylphthalate		mg/L	<0.001	06/01/2016	GEO40*
Fluoranthene		mg/L	<0.001	06/01/2016	GEO40*
Pyrene		mg/L	<0.001	06/01/2016	GEO40*
Benzyl Butyl Phthalate		mg/L	<0.001	06/01/2016	GEO40*
Benzo(a)anthracene		mg/L	<0.001	06/01/2016	GEO40*
Chrysene		mg/L	<0.001	06/01/2016	GEO40*
Bis(2-ethylhexyl)phthalate		mg/L	<0.005	06/01/2016	GEO40*
Di-n-octylphthalate		mg/L	<0.001	06/01/2016	GEO40*
Benzo(b)fluoranthene		mg/L	<0.001	06/01/2016	GEO40*

Additional information : *Subcontracted to an approved accredited supplier**For and on behalf of BHP laboratories :****John O'Halloran****Issue Date : 26/02/16**

This Test Report shall not be duplicated except in full and then only with the permission of the test laboratory

TEST REPORT NO: 119983.1

Analysing
Testing
Consulting
Calibrating



Client: Environmental Department
Limerick City Council
Dooradoyle
Co. Limerick

BHP Ref. No.: 15/12/426
Order No.:
Date Received: 16/12/15
Date Completed: 15/01/16
Test Specification: Nil
Item: Annual Ground Water 2015

FTAO: Tara Flanagan

BHP
New Road
Thomondgate
Limerick
Ireland
Tel +353 61 455399
Fax + 353 61 455447

TEST	Client Reference	Units	Results	Date Analysed	Test Method
	Annual Monitoring Groundwater 1 Deep				
Benzo(k)fluoranthene		mg/L	<0.001	06/01/2016	GEO40*
Benzo(a)pyrene		mg/L	<0.001	06/01/2016	GEO40*
Indeno(1,2,3-c,d)pyrene		mg/L	<0.001	06/01/2016	GEO40*
Dibenz(a,h)anthracene		mg/L	<0.001	06/01/2016	GEO40*
Benzo(g,h,i)perylene		mg/L	<0.001	06/01/2016	GEO40*

Additional information : *Subcontracted to an approved accredited supplier

For and on behalf of BHP laboratories :

John O'Halloran
Issue Date : 26/02/16

This Test Report shall not be duplicated except in full and then only with the permission of the test laboratory

TEST REPORT NO: 119983.2Analysing
Testing
Consulting
CalibratingClient: **Environmental Department
Limerick City Council
Dooradoyle
Co. Limerick**BHP Ref. No.: **15/12/427**
Order No.:
Date Received: **16/12/15**
Date Completed: **12/01/16**
Test Specification: **Nil**
Item: **Annual Ground Water 2015**BHP
New Road
Thomondgate
Limerick
Ireland
Tel +353 61 455399
Fax + 353 61 455447FTAO: **Tara Flanagan**

TEST	Client Reference	Units	Results	Date Analysed	Test Method
	Annual Monitoring Groundwater 1 Shallow				
Boron		mg/L	<0.23	23/12/2015	WAS049*
Cadmium		mg/L	<0.0006	23/12/2015	WAS049*
Calcium		mg/L	279	23/12/2015	WAS049*
Chromium		mg/L	0.0037	23/12/2015	WAS049*
Copper		mg/L	0.0112	23/12/2015	WAS049*
Iron		mg/L	12.8	23/12/2015	WAS049*
Lead		mg/L	0.0261	23/12/2015	WAS049*
Magnesium		mg/L	92.9	23/12/2015	WAS049*
Manganese		mg/L	3.61	23/12/2015	WAS049*
Nickel		mg/L	0.0566	23/12/2015	WAS049*
Potassium		mg/L	40.3	23/12/2015	WAS049*
Sodium		mg/L	520	23/12/2015	WAS049*
Zinc		mg/L	0.0337	23/12/2015	WAS049*
Mercury		mg/L	<0.0001	21/12/2015	WAS013*
Fluoride		mg/L	0.11	18/12/2015	BHP AC 019
Sulphate (as SO ₄)		mg/L	2839	22/12/2015	BHP AC 095
Orthophosphate (as P)		mg/L	<0.01	17/12/2015	BHP AC 095

Additional information : *Subcontracted to an approved accredited supplier**For and on behalf of BHP laboratories :****John O'Halloran****Issue Date : 26/02/16**

This Test Report shall not be duplicated except in full and then only with the permission of the test laboratory

TEST REPORT NO: 119983.2Analysing
Testing
Consulting
Calibrating**Client: Environmental Department
Limerick City Council
Dooradoyle
Co. Limerick****BHP Ref. No.: 15/12/427
Order No.:
Date Received: 16/12/15
Date Completed: 12/01/16
Test Specification: Nil
Item: Annual Ground Water 2015**BHP
New Road
Thomondgate
Limerick
Ireland
Tel +353 61 455399
Fax + 353 61 455447**FTAO: Tara Flanagan**

TEST	Client Reference	Units	Results	Date Analysed	Test Method
	Annual Monitoring Groundwater 1 Shallow				
Nitrate (as NO ₃)		mg/L	3.1	18/12/2015	BHP AC 019
Nitrite (as NO ₂)		mg/L	<0.05	18/12/2015	BHP AC 019
Total Oxidised Nitrogen (as N)		mg/L	0.70	18/12/2015	BHP AC 065
Cyanide		mg/L	<0.05	21/12/2015	BHP AC 095
Alkalinity (as CaCO ₃)		mg/L	532	17/12/2015	BHP AC 095
Residue on Evaporation		mg/L	10537	17/12/2015	BHP AC 040
Volatile Organic Compounds					
Dichlorodifluoromethane		mg/L	<0.001	12/01/2016	GEO32*
Chloromethane		mg/L	<0.001	12/01/2016	GEO32*
Chloroethane		mg/L	<0.001	12/01/2016	GEO32*
Bromomethane		mg/L	<0.001	12/01/2016	GEO32*
Trichlorofluoromethane		mg/L	<0.001	12/01/2016	GEO32*
1,1-Dichloroethene		mg/L	<0.001	12/01/2016	GEO32*
Dichloromethane		mg/L	<0.001	12/01/2016	GEO32*
1,1-Dichloroethane		mg/L	<0.001	12/01/2016	GEO32*
cis-1,2-Dichloroethene		mg/L	<0.001	12/01/2016	GEO32*
2,2-Dichloropropane		mg/L	<0.001	12/01/2016	GEO32*

Additional information : *Subcontracted to an approved accredited supplier**For and on behalf of BHP laboratories :****John O'Halloran****Issue Date : 26/02/16**

This Test Report shall not be duplicated except in full and then only with the permission of the test laboratory

TEST REPORT NO: 119983.2Analysing
Testing
Consulting
Calibrating**Client:** Environmental Department
Limerick City Council
Dooradoyle
Co. Limerick**BHP Ref. No.:** 15/12/427
Order No.:
Date Received: 16/12/15
Date Completed: 12/01/16
Test Specification: Nil
Item: Annual Ground Water 2015BHP
New Road
Thomondgate
Limerick
Ireland
Tel +353 61 455399
Fax + 353 61 455447**FTAO:** Tara Flanagan

TEST	Client Reference	Units	Results	Date Analysed	Test Method
	Annual Monitoring Groundwater 1 Shallow				
Chloroform		mg/L	<0.001	12/01/2016	GEO32*
Bromochloromethane		mg/L	<0.001	12/01/2016	GEO32*
1,1,1-Trichloroethane		mg/L	<0.001	12/01/2016	GEO32*
1,1-Dichloropropene		mg/L	<0.001	12/01/2016	GEO32*
1,2-Dichloroethane		mg/L	<0.001	12/01/2016	GEO32*
Benzene		mg/L	<0.001	12/01/2016	GEO32*
1,2-Dichloropropane		mg/L	<0.001	12/01/2016	GEO32*
Trichloroethene		mg/L	<0.001	12/01/2016	GEO32*
Bromodichloromethane		mg/L	<0.001	12/01/2016	GEO32*
Dibromomethane		mg/L	<0.001	12/01/2016	GEO32*
cis-1,3-Dichloropropene		mg/L	<0.001	12/01/2016	GEO32*
Toluene		mg/L	<0.001	12/01/2016	GEO32*
trans-1,3-Dichloropropene		mg/L	<0.001	12/01/2016	GEO32*
1,1,2-Trichloroethane		mg/L	<0.001	12/01/2016	GEO32*
Carbon Tetrachloride		mg/L	<0.001	12/01/2016	GEO32*
Vinyl Chloride		mg/L	<0.0005	12/01/2016	GEO32*
1,3-Dichloropropane		mg/L	<0.001	12/01/2016	GEO32*

Additional information : *Subcontracted to an approved accredited supplier**For and on behalf of BHP laboratories :****John O'Halloran****Issue Date : 26/02/16**

This Test Report shall not be duplicated except in full and then only with the permission of the test laboratory

TEST REPORT NO: 119983.2Analysing
Testing
Consulting
Calibrating**Client:** Environmental Department
Limerick City Council
Dooradoyle
Co. Limerick**BHP Ref. No.:** 15/12/427
Order No.:
Date Received: 16/12/15
Date Completed: 12/01/16
Test Specification: Nil
Item: Annual Ground Water 2015BHP
New Road
Thomondgate
Limerick
Ireland
Tel +353 61 455399
Fax + 353 61 455447**FTAO:** Tara Flanagan

TEST	Client Reference	Units	Results	Date Analysed	Test Method
	Annual Monitoring Groundwater 1 Shallow				
Tetrachloroethene		mg/L	<0.001	12/01/2016	GEO32*
Dibromochloromethane		mg/L	<0.001	12/01/2016	GEO32*
1,2-Dibromoethane		mg/L	<0.001	12/01/2016	GEO32*
Chlorobenzene		mg/L	<0.001	12/01/2016	GEO32*
1,1,1,2-Tetrachloroethane		mg/L	<0.001	12/01/2016	GEO32*
Ethyl Benzene		mg/L	<0.001	12/01/2016	GEO32*
m&p-Xylene		mg/L	<0.001	12/01/2016	GEO32*
o-Xylene		mg/L	<0.001	12/01/2016	GEO32*
Styrene		mg/L	<0.001	12/01/2016	GEO32*
Bromoform		mg/L	<0.001	12/01/2016	GEO32*
trans-1,2-Dichloroethene		mg/L	<0.001	12/01/2016	GEO32*
Isopropylbenzene		mg/L	<0.001	12/01/2016	GEO32*
1,1,2,2-Tetrachloroethane		mg/L	<0.001	12/01/2016	GEO32*
1,2,3-Trichloropropane		mg/L	<0.001	12/01/2016	GEO32*
n-Propylbenzene		mg/L	<0.001	12/01/2016	GEO32*
Bromobenzene		mg/L	<0.001	12/01/2016	GEO32*
2-Chlorotoluene		mg/L	<0.001	12/01/2016	GEO32*

Additional information : *Subcontracted to an approved accredited supplier**For and on behalf of BHP laboratories :****John O'Halloran****Issue Date : 26/02/16**

This Test Report shall not be duplicated except in full and then only with the permission of the test laboratory

TEST REPORT NO: 119983.2Analysing
Testing
Consulting
Calibrating**Client: Environmental Department
Limerick City Council
Dooradoyle
Co. Limerick****BHP Ref. No.: 15/12/427
Order No.:
Date Received: 16/12/15
Date Completed: 12/01/16
Test Specification: Nil
Item: Annual Ground Water 2015**BHP
New Road
Thomondgate
Limerick
Ireland
Tel +353 61 455399
Fax + 353 61 455447**FTAO: Tara Flanagan**

TEST	Client Reference	Units	Results	Date Analysed	Test Method
	Annual Monitoring Groundwater 1 Shallow				
1,3,5-Trimethylbenzene		mg/L	<0.001	12/01/2016	GEO32*
4-Chlorotoluene		mg/L	<0.001	12/01/2016	GEO32*
tert-Butylbenzene		mg/L	<0.001	12/01/2016	GEO32*
1,2,4-Trimethylbenzene		mg/L	<0.001	12/01/2016	GEO32*
sec-Butylbenzene		mg/L	<0.001	12/01/2016	GEO32*
p-Isopropyltoluene		mg/L	<0.001	12/01/2016	GEO32*
1,3-Dichlorobenzene		mg/L	<0.001	12/01/2016	GEO32*
1,4-Dichlorobenzene		mg/L	<0.001	12/01/2016	GEO32*
n-Butylbenzene		mg/L	<0.001	12/01/2016	GEO32*
1,2-Dichlorobenzene		mg/L	<0.001	12/01/2016	GEO32*
1,2-Dibromo-3-chloropropane		mg/L	<0.002	12/01/2016	GEO32*
1,2,4-Trichlorobenzene		mg/L	<0.001	12/01/2016	GEO32*
Hexachlorobutadiene		mg/L	<0.001	12/01/2016	GEO32*
Naphthalene		mg/L	<0.001	12/01/2016	GEO32*
1,2,3-Trichlorobenzene		mg/L	<0.001	12/01/2016	GEO32*
MTBE		mg/L	<0.001	12/01/2016	GEO32*

Additional information : *Subcontracted to an approved accredited supplier**For and on behalf of BHP laboratories :****John O'Halloran****Issue Date : 26/02/16**

This Test Report shall not be duplicated except in full and then only with the permission of the test laboratory

TEST REPORT NO: 119983.2Analysing
Testing
Consulting
Calibrating**Client: Environmental Department
Limerick City Council
Dooradoyle
Co. Limerick****BHP Ref. No.: 15/12/427
Order No.:
Date Received: 16/12/15
Date Completed: 12/01/16
Test Specification: Nil
Item: Annual Ground Water 2015**BHP
New Road
Thomondgate
Limerick
Ireland
Tel +353 61 455399
Fax + 353 61 455447**FTAO: Tara Flanagan**

TEST	Client Reference	Units	Results	Date Analysed	Test Method
	Annual Monitoring Groundwater 1 Shallow				
Semi Volatile Organic Compounds					
Phenol		mg/L	<0.001	06/01/2016	GEO40*
Bis(2-chloroethyl)ether		mg/L	<0.001	06/01/2016	GEO40*
2-Chlorophenol		mg/L	<0.001	06/01/2016	GEO40*
1,3-Dichlorobenzene		mg/L	<0.001	06/01/2016	GEO40*
1,4-Dichlorobenzene		mg/L	<0.001	06/01/2016	GEO40*
2-Methylphenol		mg/L	<0.001	06/01/2016	GEO40*
3&4-Methylphenol		mg/L	<0.001	06/01/2016	GEO40*
Dibenzofuran		mg/L	<0.001	06/01/2016	GEO40*
1,2-Dichlorobenzene		mg/L	<0.001	06/01/2016	GEO40*
Bis(2-chloroisopropyl)ether		mg/L	<0.001	06/01/2016	GEO40*
n-Nitrosodi-n-propylamine		mg/L	<0.001	06/01/2016	GEO40*
Hexachloroethane		mg/L	<0.001	06/01/2016	GEO40*
Nitrobenzene		mg/L	<0.001	06/01/2016	GEO40*
Isophorone		mg/L	<0.001	06/01/2016	GEO40*
2,4-Dimethylphenol		mg/L	<0.001	06/01/2016	GEO40*
2-Nitrophenol		mg/L	<0.001	06/01/2016	GEO40*

Additional information : *Subcontracted to an approved accredited supplier**For and on behalf of BHP laboratories :****John O'Halloran****Issue Date : 26/02/16**

This Test Report shall not be duplicated except in full and then only with the permission of the test laboratory

TEST REPORT NO: 119983.2Analysing
Testing
Consulting
Calibrating

Client: Environmental Department
Limerick City Council
Dooradoyle
Co. Limerick

BHP Ref. No.: 15/12/427
Order No.:
Date Received: 16/12/15
Date Completed: 12/01/16
Test Specification: Nil
Item: Annual Ground Water 2015

FTAO: Tara Flanagan

BHP
New Road
Thomondgate
Limerick
Ireland
Tel +353 61 455399
Fax + 353 61 455447

TEST	Client Reference	Units	Results	Date Analysed	Test Method
	Annual Monitoring Groundwater 1 Shallow				
Bis(2-chloroethoxy)methane		mg/L	<0.001	06/01/2016	GEO40*
2,4-Dichlorophenol		mg/L	<0.001	06/01/2016	GEO40*
1,2,4-Trichlorobenzene		mg/L	<0.001	06/01/2016	GEO40*
Naphthalene		mg/L	<0.002	06/01/2016	GEO40*
Hexachlorobutadiene		mg/L	<0.001	06/01/2016	GEO40*
4-Chloro-3-methylphenol		mg/L	<0.001	06/01/2016	GEO40*
2-Methylnaphthalene		mg/L	<0.001	06/01/2016	GEO40*
2,4,6-Trichlorophenol		mg/L	<0.001	06/01/2016	GEO40*
2,4,5-Trichlorophenol		mg/L	<0.001	06/01/2016	GEO40*
2-Chloronaphthalene		mg/L	<0.001	06/01/2016	GEO40*
Dimethylphthalate		mg/L	<0.001	06/01/2016	GEO40*
2,6-Dinitrotoluene		mg/L	<0.001	06/01/2016	GEO40*
Acenaphthylene		mg/L	<0.001	06/01/2016	GEO40*
Acenaphthene		mg/L	<0.001	06/01/2016	GEO40*
2,4-Dinitrotoluene		mg/L	<0.001	06/01/2016	GEO40*
Diethylphthalate		mg/L	<0.001	06/01/2016	GEO40*
4-Nitrophenol		mg/L	<0.005	06/01/2016	GEO40*

Additional information : *Subcontracted to an approved accredited supplier**For and on behalf of BHP laboratories :****John O'Halloran****Issue Date : 26/02/16**

This Test Report shall not be duplicated except in full and then only with the permission of the test laboratory

TEST REPORT NO: 119983.2Analysing
Testing
Consulting
Calibrating**Client: Environmental Department
Limerick City Council
Dooradoyle
Co. Limerick****BHP Ref. No.: 15/12/427
Order No.:
Date Received: 16/12/15
Date Completed: 12/01/16
Test Specification: Nil
Item: Annual Ground Water 2015**BHP
New Road
Thomondgate
Limerick
Ireland
Tel +353 61 455399
Fax + 353 61 455447**FTAO: Tara Flanagan**

TEST	Client Reference	Units	Results	Date Analysed	Test Method
	Annual Monitoring Groundwater 1 Shallow				
4-Chlorophenyl phenyl ether		mg/L	<0.001	06/01/2016	GEO40*
Fluorene		mg/L	<0.001	06/01/2016	GEO40*
Diphenylamine		mg/L	<0.001	06/01/2016	GEO40*
4-Bromophenyl Phenyl Ether		mg/L	<0.001	06/01/2016	GEO40*
Hexachlorobenzene		mg/L	<0.001	06/01/2016	GEO40*
Pentachlorophenol		mg/L	<0.001	06/01/2016	GEO40*
Phenanthrene		mg/L	<0.001	06/01/2016	GEO40*
Anthracene		mg/L	<0.001	06/01/2016	GEO40*
di-n-Butylphthalate		mg/L	<0.001	06/01/2016	GEO40*
Fluoranthene		mg/L	<0.001	06/01/2016	GEO40*
Pyrene		mg/L	<0.001	06/01/2016	GEO40*
Benzyl Butyl Phthalate		mg/L	<0.001	06/01/2016	GEO40*
Benzo(a)anthracene		mg/L	<0.001	06/01/2016	GEO40*
Chrysene		mg/L	<0.001	06/01/2016	GEO40*
Bis(2-ethylhexyl)phthalate		mg/L	<0.005	06/01/2016	GEO40*
Di-n-octylphthalate		mg/L	<0.001	06/01/2016	GEO40*
Benzo(b)fluoranthene		mg/L	<0.001	06/01/2016	GEO40*

Additional information : *Subcontracted to an approved accredited supplier**For and on behalf of BHP laboratories :****John O'Halloran****Issue Date : 26/02/16**

This Test Report shall not be duplicated except in full and then only with the permission of the test laboratory

TEST REPORT NO: 119983.2

Analysing
Testing
Consulting
Calibrating



Client: Environmental Department
Limerick City Council
Dooradoyle
Co. Limerick

BHP Ref. No.: 15/12/427
Order No.:
Date Received: 16/12/15
Date Completed: 12/01/16
Test Specification: Nil
Item: Annual Ground Water 2015

FTAO: Tara Flanagan

BHP
New Road
Thomondgate
Limerick
Ireland
Tel +353 61 455399
Fax + 353 61 455447

TEST	Client Reference	Units	Results	Date Analysed	Test Method
	Annual Monitoring Groundwater 1 Shallow				
Benzo(k)fluoranthene		mg/L	<0.001	06/01/2016	GEO40*
Benzo(a)pyrene		mg/L	<0.001	06/01/2016	GEO40*
Indeno(1,2,3-c,d)pyrene		mg/L	<0.001	06/01/2016	GEO40*
Dibenz(a,h)anthracene		mg/L	<0.001	06/01/2016	GEO40*
Benzo(g,h,i)perylene		mg/L	<0.001	06/01/2016	GEO40*

Additional information : *Subcontracted to an approved accredited supplier

For and on behalf of BHP laboratories :

John O'Halloran
Issue Date : 26/02/16

This Test Report shall not be duplicated except in full and then only with the permission of the test laboratory

TEST REPORT NO: 119983.3

Analysing
Testing
Consulting
Calibrating



Client: Environmental Department
Limerick City Council
Dooradoyle
Co. Limerick

BHP Ref. No.: 15/12/428
Order No.:
Date Received: 16/12/15
Date Completed: 12/01/16
Test Specification: Nil
Item: Annual Ground Water 2015

BHP
New Road
Thomondgate
Limerick
Ireland
Tel +353 61 455399
Fax + 353 61 455447

FTAO: Tara Flanagan

TEST	Client Reference	Units	Results	Date Analysed	Test Method
	Annual Monitoring Groundwater 2 Deep				
Boron		mg/L	<0.23	23/12/2015	WAS049*
Cadmium		mg/L	<0.0006	23/12/2015	WAS049*
Calcium		mg/L	464	23/12/2015	WAS049*
Chromium		mg/L	0.0026	23/12/2015	WAS049*
Copper		mg/L	<0.009	23/12/2015	WAS049*
Iron		mg/L	27.8	23/12/2015	WAS049*
Lead		mg/L	0.0073	23/12/2015	WAS049*
Magnesium		mg/L	29.7	23/12/2015	WAS049*
Manganese		mg/L	2.3	23/12/2015	WAS049*
Nickel		mg/L	0.0066	23/12/2015	WAS049*
Potassium		mg/L	21.6	23/12/2015	WAS049*
Sodium		mg/L	79.8	23/12/2015	WAS049*
Zinc		mg/L	<0.018	23/12/2015	WAS049*
Mercury		mg/L	<0.0001	21/12/2015	WAS013*
Fluoride		mg/L	0.14	18/12/2015	BHP AC 019
Sulphate (as SO ₄)		mg/L	<10	22/12/2015	BHP AC 095
Orthophosphate (as P)		mg/L	<0.01	17/12/2015	BHP AC 095

Additional information : *Subcontracted to an approved accredited supplier

For and on behalf of BHP laboratories :

John O'Halloran

Issue Date : 26/02/16

This Test Report shall not be duplicated except in full and then only with the permission of the test laboratory

TEST REPORT NO: 119983.3Analysing
Testing
Consulting
Calibrating**Client: Environmental Department
Limerick City Council
Dooradoyle
Co. Limerick****BHP Ref. No.: 15/12/428
Order No.:
Date Received: 16/12/15
Date Completed: 12/01/16
Test Specification: Nil
Item: Annual Ground Water 2015**BHP
New Road
Thomondgate
Limerick
Ireland
Tel +353 61 455399
Fax + 353 61 455447**FTAO: Tara Flanagan**

TEST	Client Reference	Units	Results	Date Analysed	Test Method
	Annual Monitoring Groundwater 2 Deep				
Nitrate (as NO ₃)		mg/L	<0.5	18/12/2015	BHP AC 019
Nitrite (as NO ₂)		mg/L	<0.05	18/12/2015	BHP AC 019
Total Oxidised Nitrogen (as N)		mg/L	<0.14	18/12/2015	BHP AC 065
Cyanide		mg/L	0.21	21/12/2015	BHP AC 095
Alkalinity (as CaCO ₃)		mg/L	810	17/12/2015	BHP AC 095
Residue on Evaporation		mg/L	2132	17/12/2015	BHP AC 040
Volatile Organic Compounds					
Dichlorodifluoromethane		mg/L	<0.001	12/01/2016	GEO32*
Chloromethane		mg/L	<0.001	12/01/2016	GEO32*
Chloroethane		mg/L	<0.001	12/01/2016	GEO32*
Bromomethane		mg/L	<0.001	12/01/2016	GEO32*
Trichlorofluoromethane		mg/L	<0.001	12/01/2016	GEO32*
1,1-Dichloroethene		mg/L	<0.001	12/01/2016	GEO32*
Dichloromethane		mg/L	<0.001	12/01/2016	GEO32*
1,1-Dichloroethane		mg/L	<0.001	12/01/2016	GEO32*
cis-1,2-Dichloroethene		mg/L	<0.001	12/01/2016	GEO32*
2,2-Dichloropropane		mg/L	<0.001	12/01/2016	GEO32*

Additional information : *Subcontracted to an approved accredited supplier**For and on behalf of BHP laboratories :****John O'Halloran****Issue Date : 26/02/16**

This Test Report shall not be duplicated except in full and then only with the permission of the test laboratory

TEST REPORT NO: 119983.3Analysing
Testing
Consulting
Calibrating**Client: Environmental Department
Limerick City Council
Dooradoyle
Co. Limerick****BHP Ref. No.: 15/12/428
Order No.:
Date Received: 16/12/15
Date Completed: 12/01/16
Test Specification: Nil
Item: Annual Ground Water 2015**BHP
New Road
Thomondgate
Limerick
Ireland
Tel +353 61 455399
Fax + 353 61 455447**FTAO: Tara Flanagan**

TEST	Client Reference	Units	Results	Date Analysed	Test Method
	Annual Monitoring Groundwater 2 Deep				
Chloroform		mg/L	<0.001	12/01/2016	GEO32*
Bromochloromethane		mg/L	<0.001	12/01/2016	GEO32*
1,1,1-Trichloroethane		mg/L	<0.001	12/01/2016	GEO32*
1,1-Dichloropropene		mg/L	<0.001	12/01/2016	GEO32*
1,2-Dichloroethane		mg/L	<0.001	12/01/2016	GEO32*
Benzene		mg/L	<0.001	12/01/2016	GEO32*
1,2-Dichloropropane		mg/L	<0.001	12/01/2016	GEO32*
Trichloroethene		mg/L	<0.001	12/01/2016	GEO32*
Bromodichloromethane		mg/L	<0.001	12/01/2016	GEO32*
Dibromomethane		mg/L	<0.001	12/01/2016	GEO32*
cis-1,3-Dichloropropene		mg/L	<0.001	12/01/2016	GEO32*
Toluene		mg/L	<0.001	12/01/2016	GEO32*
trans-1,3-Dichloropropene		mg/L	<0.001	12/01/2016	GEO32*
1,1,2-Trichloroethane		mg/L	<0.001	12/01/2016	GEO32*
Carbon Tetrachloride		mg/L	<0.001	12/01/2016	GEO32*
Vinyl Chloride		mg/L	<0.0005	12/01/2016	GEO32*
1,3-Dichloropropane		mg/L	<0.001	12/01/2016	GEO32*

Additional information : *Subcontracted to an approved accredited supplier**For and on behalf of BHP laboratories :****John O'Halloran****Issue Date : 26/02/16**

This Test Report shall not be duplicated except in full and then only with the permission of the test laboratory

TEST REPORT NO: 119983.3Analysing
Testing
Consulting
Calibrating**Client: Environmental Department
Limerick City Council
Dooradoyle
Co. Limerick****BHP Ref. No.: 15/12/428
Order No.:
Date Received: 16/12/15
Date Completed: 12/01/16
Test Specification: Nil
Item: Annual Ground Water 2015**BHP
New Road
Thomondgate
Limerick
Ireland
Tel +353 61 455399
Fax + 353 61 455447**FTAO: Tara Flanagan**

TEST	Client Reference	Units	Results	Date Analysed	Test Method
	Annual Monitoring Groundwater 2 Deep				
Tetrachloroethene		mg/L	<0.001	12/01/2016	GEO32*
Dibromochloromethane		mg/L	<0.001	12/01/2016	GEO32*
1,2-Dibromoethane		mg/L	<0.001	12/01/2016	GEO32*
Chlorobenzene		mg/L	<0.001	12/01/2016	GEO32*
1,1,1,2-Tetrachloroethane		mg/L	<0.001	12/01/2016	GEO32*
Ethyl Benzene		mg/L	<0.001	12/01/2016	GEO32*
m&p-Xylene		mg/L	<0.001	12/01/2016	GEO32*
o-Xylene		mg/L	<0.001	12/01/2016	GEO32*
Styrene		mg/L	<0.001	12/01/2016	GEO32*
Bromoform		mg/L	<0.001	12/01/2016	GEO32*
trans-1,2-Dichloroethene		mg/L	<0.001	12/01/2016	GEO32*
Isopropylbenzene		mg/L	<0.001	12/01/2016	GEO32*
1,1,2,2-Tetrachloroethane		mg/L	<0.001	12/01/2016	GEO32*
1,2,3-Trichloropropane		mg/L	<0.001	12/01/2016	GEO32*
n-Propylbenzene		mg/L	<0.001	12/01/2016	GEO32*
Bromobenzene		mg/L	<0.001	12/01/2016	GEO32*
2-Chlorotoluene		mg/L	<0.001	12/01/2016	GEO32*

Additional information : *Subcontracted to an approved accredited supplier**For and on behalf of BHP laboratories :****John O'Halloran****Issue Date : 26/02/16**

This Test Report shall not be duplicated except in full and then only with the permission of the test laboratory

TEST REPORT NO: 119983.3Analysing
Testing
Consulting
Calibrating**Client: Environmental Department
Limerick City Council
Dooradoyle
Co. Limerick****BHP Ref. No.: 15/12/428
Order No.:
Date Received: 16/12/15
Date Completed: 12/01/16
Test Specification: Nil
Item: Annual Ground Water 2015**BHP
New Road
Thomondgate
Limerick
Ireland
Tel +353 61 455399
Fax + 353 61 455447**FTAO: Tara Flanagan**

TEST	Client Reference	Units	Results	Date Analysed	Test Method
	Annual Monitoring Groundwater 2 Deep				
1,3,5-Trimethylbenzene		mg/L	<0.001	12/01/2016	GEO32*
4-Chlorotoluene		mg/L	<0.001	12/01/2016	GEO32*
tert-Butylbenzene		mg/L	<0.001	12/01/2016	GEO32*
1,2,4-Trimethylbenzene		mg/L	<0.001	12/01/2016	GEO32*
sec-Butylbenzene		mg/L	<0.001	12/01/2016	GEO32*
p-Isopropyltoluene		mg/L	<0.001	12/01/2016	GEO32*
1,3-Dichlorobenzene		mg/L	<0.001	12/01/2016	GEO32*
1,4-Dichlorobenzene		mg/L	<0.001	12/01/2016	GEO32*
n-Butylbenzene		mg/L	<0.001	12/01/2016	GEO32*
1,2-Dichlorobenzene		mg/L	<0.001	12/01/2016	GEO32*
1,2-Dibromo-3-chloropropane		mg/L	<0.002	12/01/2016	GEO32*
1,2,4-Trichlorobenzene		mg/L	<0.001	12/01/2016	GEO32*
Hexachlorobutadiene		mg/L	<0.001	12/01/2016	GEO32*
Naphthalene		mg/L	<0.001	12/01/2016	GEO32*
1,2,3-Trichlorobenzene		mg/L	<0.001	12/01/2016	GEO32*
MTBE		mg/L	<0.001	12/01/2016	GEO32*

Additional information : *Subcontracted to an approved accredited supplier**For and on behalf of BHP laboratories :****John O'Halloran****Issue Date : 26/02/16**

This Test Report shall not be duplicated except in full and then only with the permission of the test laboratory

TEST REPORT NO: 119983.3Analysing
Testing
Consulting
Calibrating

Client: Environmental Department
Limerick City Council
Dooradoyle
Co. Limerick

BHP Ref. No.: 15/12/428
Order No.:
Date Received: 16/12/15
Date Completed: 12/01/16
Test Specification: Nil
Item: Annual Ground Water 2015

FTAO: Tara Flanagan

BHP
New Road
Thomondgate
Limerick
Ireland
Tel +353 61 455399
Fax + 353 61 455447

TEST	Client Reference	Units	Results	Date Analysed	Test Method
	Annual Monitoring Groundwater 2 Deep				
Semi Volatile Organic Compounds					
Phenol		mg/L	<0.001	06/01/2016	GEO40*
Bis(2-chloroethyl)ether		mg/L	<0.001	06/01/2016	GEO40*
2-Chlorophenol		mg/L	<0.001	06/01/2016	GEO40*
1,3-Dichlorobenzene		mg/L	<0.001	06/01/2016	GEO40*
1,4-Dichlorobenzene		mg/L	<0.001	06/01/2016	GEO40*
2-Methylphenol		mg/L	<0.001	06/01/2016	GEO40*
3&4-Methylphenol		mg/L	<0.001	06/01/2016	GEO40*
Dibenzofuran		mg/L	<0.001	06/01/2016	GEO40*
1,2-Dichlorobenzene		mg/L	<0.001	06/01/2016	GEO40*
Bis(2-chloroisopropyl)ether		mg/L	<0.001	06/01/2016	GEO40*
n-Nitrosodi-n-propylamine		mg/L	<0.001	06/01/2016	GEO40*
Hexachloroethane		mg/L	<0.001	06/01/2016	GEO40*
Nitrobenzene		mg/L	<0.001	06/01/2016	GEO40*
Isophorone		mg/L	<0.001	06/01/2016	GEO40*
2,4-Dimethylphenol		mg/L	<0.001	06/01/2016	GEO40*
2-Nitrophenol		mg/L	<0.001	06/01/2016	GEO40*

Additional information : *Subcontracted to an approved accredited supplier**For and on behalf of BHP laboratories :****John O'Halloran****Issue Date : 26/02/16**

This Test Report shall not be duplicated except in full and then only with the permission of the test laboratory

TEST REPORT NO: 119983.3

Analysing
Testing
Consulting
Calibrating



Client: Environmental Department
Limerick City Council
Dooradoyle
Co. Limerick

BHP Ref. No.: 15/12/428
Order No.:
Date Received: 16/12/15
Date Completed: 12/01/16
Test Specification: Nil
Item: Annual Ground Water 2015

BHP
New Road
Thomondgate
Limerick
Ireland
Tel +353 61 455399
Fax + 353 61 455447

FTAO: Tara Flanagan

TEST	Client Reference	Units	Results	Date Analysed	Test Method
	Annual Monitoring Groundwater 2 Deep				
Bis(2-chloroethoxy)methane		mg/L	<0.001	06/01/2016	GEO40*
2,4-Dichlorophenol		mg/L	<0.001	06/01/2016	GEO40*
1,2,4-Trichlorobenzene		mg/L	<0.001	06/01/2016	GEO40*
Naphthalene		mg/L	<0.002	06/01/2016	GEO40*
Hexachlorobutadiene		mg/L	<0.001	06/01/2016	GEO40*
4-Chloro-3-methylphenol		mg/L	<0.001	06/01/2016	GEO40*
2-Methylnaphthalene		mg/L	<0.001	06/01/2016	GEO40*
2,4,6-Trichlorophenol		mg/L	<0.001	06/01/2016	GEO40*
2,4,5-Trichlorophenol		mg/L	<0.001	06/01/2016	GEO40*
2-Chloronaphthalene		mg/L	<0.001	06/01/2016	GEO40*
Dimethylphthalate		mg/L	<0.001	06/01/2016	GEO40*
2,6-Dinitrotoluene		mg/L	<0.001	06/01/2016	GEO40*
Acenaphthylene		mg/L	<0.001	06/01/2016	GEO40*
Acenaphthene		mg/L	<0.001	06/01/2016	GEO40*
2,4-Dinitrotoluene		mg/L	<0.001	06/01/2016	GEO40*
Diethylphthalate		mg/L	<0.001	06/01/2016	GEO40*
4-Nitrophenol		mg/L	<0.005	06/01/2016	GEO40*

Additional information : *Subcontracted to an approved accredited supplier

For and on behalf of BHP laboratories :

John O'Halloran

Issue Date : 26/02/16

This Test Report shall not be duplicated except in full and then only with the permission of the test laboratory

TEST REPORT NO: 119983.3Analysing
Testing
Consulting
Calibrating

Client: Environmental Department
Limerick City Council
Dooradoyle
Co. Limerick

BHP Ref. No.: 15/12/428
Order No.:
Date Received: 16/12/15
Date Completed: 12/01/16
Test Specification: Nil
Item: Annual Ground Water 2015

FTAO: Tara Flanagan

BHP
New Road
Thomondgate
Limerick
Ireland
Tel +353 61 455399
Fax + 353 61 455447

TEST	Client Reference	Units	Results	Date Analysed	Test Method
	Annual Monitoring Groundwater 2 Deep				
4-Chlorophenyl phenyl ether		mg/L	<0.001	06/01/2016	GEO40*
Fluorene		mg/L	<0.001	06/01/2016	GEO40*
Diphenylamine		mg/L	<0.001	06/01/2016	GEO40*
4-Bromophenyl Phenyl Ether		mg/L	<0.001	06/01/2016	GEO40*
Hexachlorobenzene		mg/L	<0.001	06/01/2016	GEO40*
Pentachlorophenol		mg/L	<0.001	06/01/2016	GEO40*
Phenanthrene		mg/L	<0.001	06/01/2016	GEO40*
Anthracene		mg/L	<0.001	06/01/2016	GEO40*
di-n-Butylphthalate		mg/L	<0.001	06/01/2016	GEO40*
Fluoranthene		mg/L	<0.001	06/01/2016	GEO40*
Pyrene		mg/L	<0.001	06/01/2016	GEO40*
Benzyl Butyl Phthalate		mg/L	<0.001	06/01/2016	GEO40*
Benzo(a)anthracene		mg/L	<0.001	06/01/2016	GEO40*
Chrysene		mg/L	<0.001	06/01/2016	GEO40*
Bis(2-ethylhexyl)phthalate		mg/L	<0.005	06/01/2016	GEO40*
Di-n-octylphthalate		mg/L	<0.001	06/01/2016	GEO40*
Benzo(b)fluoranthene		mg/L	<0.001	06/01/2016	GEO40*

Additional information : *Subcontracted to an approved accredited supplier**For and on behalf of BHP laboratories :****John O'Halloran****Issue Date : 26/02/16**

This Test Report shall not be duplicated except in full and then only with the permission of the test laboratory

TEST REPORT NO: 119983.3

Analysing
Testing
Consulting
Calibrating



Client: Environmental Department
Limerick City Council
Dooradoyle
Co. Limerick

BHP Ref. No.: 15/12/428
Order No.:
Date Received: 16/12/15
Date Completed: 12/01/16
Test Specification: Nil
Item: Annual Ground Water 2015

FTAO: Tara Flanagan

BHP
New Road
Thomondgate
Limerick
Ireland
Tel +353 61 455399
Fax + 353 61 455447

TEST	Client Reference	Units	Results	Date Analysed	Test Method
	Annual Monitoring Groundwater 2 Deep				
Benzo(k)fluoranthene		mg/L	<0.001	06/01/2016	GEO40*
Benzo(a)pyrene		mg/L	<0.001	06/01/2016	GEO40*
Indeno(1,2,3-c,d)pyrene		mg/L	<0.001	06/01/2016	GEO40*
Dibenz(a,h)anthracene		mg/L	<0.001	06/01/2016	GEO40*
Benzo(g,h,i)perylene		mg/L	<0.001	06/01/2016	GEO40*

Additional information : *Subcontracted to an approved accredited supplier

For and on behalf of BHP laboratories :

John O'Halloran
Issue Date : 26/02/16

This Test Report shall not be duplicated except in full and then only with the permission of the test laboratory

TEST REPORT NO: 119983.4Analysing
Testing
Consulting
CalibratingClient: **Environmental Department
Limerick City Council
Dooradoyle
Co. Limerick**BHP Ref. No.: **15/12/429**
Order No.:
Date Received: **16/12/15**
Date Completed: **15/01/16**
Test Specification: **Nil**
Item: **Annual Ground Water 2015**BHP
New Road
Thomondgate
Limerick
Ireland
Tel +353 61 455399
Fax + 353 61 455447

FTAO: Tara Flanagan

TEST	Client Reference	Units	Results	Date Analysed	Test Method
	Annual Monitoring Groundwater 2 Shallow				
Boron		mg/L	<0.23	23/12/2015	WAS049*
Cadmium		mg/L	<0.0006	23/12/2015	WAS049*
Calcium		mg/L	81.5	23/12/2015	WAS049*
Chromium		mg/L	0.0092	23/12/2015	WAS049*
Copper		mg/L	0.0731	23/12/2015	WAS049*
Iron		mg/L	13.1	23/12/2015	WAS049*
Lead		mg/L	0.0416	23/12/2015	WAS049*
Magnesium		mg/L	20.1	23/12/2015	WAS049*
Manganese		mg/L	2.13	23/12/2015	WAS049*
Nickel		mg/L	0.0788	23/12/2015	WAS049*
Potassium		mg/L	19	23/12/2015	WAS049*
Sodium		mg/L	112	23/12/2015	WAS049*
Zinc		mg/L	0.0924	23/12/2015	WAS049*
Mercury		mg/L	N/A**	N/A**	WAS013*
Fluoride		mg/L	0.29	18/12/2015	BHP AC 019
Sulphate (as SO ₄)		mg/L	409	22/12/2015	BHP AC 095
Orthophosphate (as P)		mg/L	<0.01	17/12/2015	BHP AC 095

Additional information :

*Subcontracted to an approved accredited supplier

**Sample bottle broke and insufficient sample for re-test

For and on behalf of BHP laboratories :

John O'Halloran

Issue Date : 26/02/16

This Test Report shall not be duplicated except in full and then only with the permission of the test laboratory

TEST REPORT NO: 119983.4Analysing
Testing
Consulting
Calibrating**Client: Environmental Department
Limerick City Council
Dooradoyle
Co. Limerick****BHP Ref. No.: 15/12/429
Order No.:
Date Received: 16/12/15
Date Completed: 15/01/16
Test Specification: Nil
Item: Annual Ground Water 2015**BHP
New Road
Thomondgate
Limerick
Ireland
Tel +353 61 455399
Fax + 353 61 455447**FTAO: Tara Flanagan**

TEST	Client Reference	Units	Results	Date Analysed	Test Method
	Annual Monitoring Groundwater 2 Shallow				
Nitrate (as NO ₃)		mg/L	0.9	18/12/2015	BHP AC 019
Nitrite (as NO ₂)		mg/L	<0.05	18/12/2015	BHP AC 019
Total Oxidised Nitrogen (as N)		mg/L	0.21	18/12/2015	BHP AC 065
Cyanide		mg/L	<0.05	21/12/2015	BHP AC 095
Alkalinity (as CaCO ₃)		mg/L	188	17/12/2015	BHP AC 095
Residue on Evaporation		mg/L	4621	23/12/2015	BHP AC 040
Volatile Organic Compounds					
Dichlorodifluoromethane		mg/L	<0.004	15/01/2016	GEO32*
Chloromethane		mg/L	<0.004	15/01/2016	GEO32*
Chloroethane		mg/L	<0.004	15/01/2016	GEO32*
Bromomethane		mg/L	<0.004	15/01/2016	GEO32*
Trichlorofluoromethane		mg/L	<0.004	15/01/2016	GEO32*
1,1-Dichloroethene		mg/L	<0.004	15/01/2016	GEO32*
Dichloromethane		mg/L	<0.004	15/01/2016	GEO32*
1,1-Dichloroethane		mg/L	<0.004	15/01/2016	GEO32*
cis-1,2-Dichloroethene		mg/L	<0.004	15/01/2016	GEO32*
2,2-Dichloropropane		mg/L	<0.004	15/01/2016	GEO32*

Additional information : *Subcontracted to an approved accredited supplier**For and on behalf of BHP laboratories :****John O'Halloran****Issue Date : 26/02/16**

This Test Report shall not be duplicated except in full and then only with the permission of the test laboratory

TEST REPORT NO: 119983.4Analysing
Testing
Consulting
Calibrating

Client: Environmental Department
Limerick City Council
Dooradoyle
Co. Limerick

BHP Ref. No.: 15/12/429
Order No.:
Date Received: 16/12/15
Date Completed: 15/01/16
Test Specification: Nil
Item: Annual Ground Water 2015

FTAO: Tara Flanagan

BHP
New Road
Thomondgate
Limerick
Ireland
Tel +353 61 455399
Fax + 353 61 455447

TEST	Client Reference	Units	Results	Date Analysed	Test Method
	Annual Monitoring Groundwater 2 Shallow				
Chloroform		mg/L	<0.004	15/01/2016	GEO32*
Bromochloromethane		mg/L	<0.004	15/01/2016	GEO32*
1,1,1-Trichloroethane		mg/L	<0.004	15/01/2016	GEO32*
1,1-Dichloropropene		mg/L	<0.004	15/01/2016	GEO32*
1,2-Dichloroethane		mg/L	<0.004	15/01/2016	GEO32*
Benzene		mg/L	<0.004	15/01/2016	GEO32*
1,2-Dichloropropane		mg/L	<0.004	15/01/2016	GEO32*
Trichloroethene		mg/L	<0.004	15/01/2016	GEO32*
Bromodichloromethane		mg/L	<0.004	15/01/2016	GEO32*
Dibromomethane		mg/L	<0.004	15/01/2016	GEO32*
cis-1,3-Dichloropropene		mg/L	<0.004	15/01/2016	GEO32*
Toluene		mg/L	<0.004	15/01/2016	GEO32*
trans-1,3-Dichloropropene		mg/L	<0.004	15/01/2016	GEO32*
1,1,2-Trichloroethane		mg/L	<0.004	15/01/2016	GEO32*
Carbon Tetrachloride		mg/L	<0.004	15/01/2016	GEO32*
Vinyl Chloride		mg/L	<0.002	15/01/2016	GEO32*
1,3-Dichloropropane		mg/L	<0.004	15/01/2016	GEO32*

Additional information : *Subcontracted to an approved accredited supplier**For and on behalf of BHP laboratories :****John O'Halloran****Issue Date : 26/02/16**

This Test Report shall not be duplicated except in full and then only with the permission of the test laboratory

TEST REPORT NO: 119983.4Analysing
Testing
Consulting
Calibrating**Client: Environmental Department
Limerick City Council
Dooradoyle
Co. Limerick****BHP Ref. No.: 15/12/429
Order No.:
Date Received: 16/12/15
Date Completed: 15/01/16
Test Specification: Nil
Item: Annual Ground Water 2015**BHP
New Road
Thomondgate
Limerick
Ireland
Tel +353 61 455399
Fax + 353 61 455447**FTAO: Tara Flanagan**

TEST	Client Reference	Units	Results	Date Analysed	Test Method
	Annual Monitoring Groundwater 2 Shallow				
Tetrachloroethene		mg/L	<0.004	15/01/2016	GEO32*
Dibromochloromethane		mg/L	<0.004	15/01/2016	GEO32*
1,2-Dibromoethane		mg/L	<0.004	15/01/2016	GEO32*
Chlorobenzene		mg/L	<0.004	15/01/2016	GEO32*
1,1,1,2-Tetrachloroethane		mg/L	<0.004	15/01/2016	GEO32*
Ethyl Benzene		mg/L	<0.004	15/01/2016	GEO32*
m&p-Xylene		mg/L	<0.004	15/01/2016	GEO32*
o-Xylene		mg/L	<0.004	15/01/2016	GEO32*
Styrene		mg/L	<0.004	15/01/2016	GEO32*
Bromoform		mg/L	<0.004	15/01/2016	GEO32*
trans-1,2-Dichloroethene		mg/L	<0.004	15/01/2016	GEO32*
Isopropylbenzene		mg/L	<0.004	15/01/2016	GEO32*
1,1,2,2-Tetrachloroethane		mg/L	<0.004	15/01/2016	GEO32*
1,2,3-Trichloropropane		mg/L	<0.004	15/01/2016	GEO32*
n-Propylbenzene		mg/L	<0.004	15/01/2016	GEO32*
Bromobenzene		mg/L	<0.004	15/01/2016	GEO32*
2-Chlorotoluene		mg/L	<0.004	15/01/2016	GEO32*

Additional information : *Subcontracted to an approved accredited supplier**For and on behalf of BHP laboratories :****John O'Halloran****Issue Date : 26/02/16**

This Test Report shall not be duplicated except in full and then only with the permission of the test laboratory

TEST REPORT NO: 119983.4Analysing
Testing
Consulting
Calibrating**Client: Environmental Department
Limerick City Council
Dooradoyle
Co. Limerick****BHP Ref. No.: 15/12/429
Order No.:
Date Received: 16/12/15
Date Completed: 15/01/16
Test Specification: Nil
Item: Annual Ground Water 2015**BHP
New Road
Thomondgate
Limerick
Ireland
Tel +353 61 455399
Fax + 353 61 455447**FTAO: Tara Flanagan**

TEST	Client Reference	Units	Results	Date Analysed	Test Method
	Annual Monitoring Groundwater 2 Shallow				
1,3,5-Trimethylbenzene		mg/L	<0.004	15/01/2016	GEO32*
4-Chlorotoluene		mg/L	<0.004	15/01/2016	GEO32*
tert-Butylbenzene		mg/L	<0.004	15/01/2016	GEO32*
1,2,4-Trimethylbenzene		mg/L	<0.004	15/01/2016	GEO32*
sec-Butylbenzene		mg/L	<0.004	15/01/2016	GEO32*
p-Isopropyltoluene		mg/L	<0.004	15/01/2016	GEO32*
1,3-Dichlorobenzene		mg/L	<0.004	15/01/2016	GEO32*
1,4-Dichlorobenzene		mg/L	<0.004	15/01/2016	GEO32*
n-Butylbenzene		mg/L	<0.004	15/01/2016	GEO32*
1,2-Dichlorobenzene		mg/L	<0.004	15/01/2016	GEO32*
1,2-Dibromo-3-chloropropane		mg/L	<0.008	15/01/2016	GEO32*
1,2,4-Trichlorobenzene		mg/L	<0.004	15/01/2016	GEO32*
Hexachlorobutadiene		mg/L	<0.004	15/01/2016	GEO32*
Naphthalene		mg/L	<0.004	15/01/2016	GEO32*
1,2,3-Trichlorobenzene		mg/L	<0.004	15/01/2016	GEO32*
MTBE		mg/L	<0.004	15/01/2016	GEO32*

Additional information : *Subcontracted to an approved accredited supplier**For and on behalf of BHP laboratories :****John O'Halloran****Issue Date : 26/02/16**

This Test Report shall not be duplicated except in full and then only with the permission of the test laboratory

TEST REPORT NO: 119983.4Analysing
Testing
Consulting
CalibratingClient: Environmental Department
Limerick City Council
Dooradoyle
Co. LimerickBHP Ref. No.: 15/12/429
Order No.:
Date Received: 16/12/15
Date Completed: 15/01/16
Test Specification: Nil
Item: Annual Ground Water 2015BHP
New Road
Thomondgate
Limerick
Ireland
Tel +353 61 455399
Fax + 353 61 455447

FTAO: Tara Flanagan

TEST	Client Reference	Units	Results	Date Analysed	Test Method
	Annual Monitoring Groundwater 2 Shallow				
Semi Volatile Organic Compounds					
Phenol		mg/L	<0.001	06/01/2016	GEO40*
Bis(2-chloroethyl)ether		mg/L	<0.001	06/01/2016	GEO40*
2-Chlorophenol		mg/L	<0.001	06/01/2016	GEO40*
1,3-Dichlorobenzene		mg/L	<0.001	06/01/2016	GEO40*
1,4-Dichlorobenzene		mg/L	<0.001	06/01/2016	GEO40*
2-Methylphenol		mg/L	<0.001	06/01/2016	GEO40*
3&4-Methylphenol		mg/L	<0.001	06/01/2016	GEO40*
Dibenzofuran		mg/L	<0.001	06/01/2016	GEO40*
1,2-Dichlorobenzene		mg/L	<0.001	06/01/2016	GEO40*
Bis(2-chloroisopropyl)ether		mg/L	<0.001	06/01/2016	GEO40*
n-Nitrosodi-n-propylamine		mg/L	<0.001	06/01/2016	GEO40*
Hexachloroethane		mg/L	<0.001	06/01/2016	GEO40*
Nitrobenzene		mg/L	<0.001	06/01/2016	GEO40*
Isophorone		mg/L	<0.001	06/01/2016	GEO40*
2,4-Dimethylphenol		mg/L	<0.001	06/01/2016	GEO40*
2-Nitrophenol		mg/L	<0.001	06/01/2016	GEO40*

Additional information : *Subcontracted to an approved accredited supplier

For and on behalf of BHP laboratories :

John O'Halloran

Issue Date : 26/02/16

This Test Report shall not be duplicated except in full and then only with the permission of the test laboratory

TEST REPORT NO: 119983.4Analysing
Testing
Consulting
Calibrating

Client: Environmental Department BHP Ref. No.: 15/12/429
 Limerick City Council Order No.:
 Dooradoyle Date Received: 16/12/15
 Co. Limerick Date Completed: 15/01/16
 Test Specification: Nil
 Item: Annual Ground Water 2015

FTAO: Tara Flanagan

BHP
 New Road
 Thomondgate
 Limerick
 Ireland
 Tel +353 61 455399
 Fax + 353 61 455447

TEST	Client Reference	Units	Results	Date Analysed	Test Method
	Annual Monitoring Groundwater 2 Shallow				
Bis(2-chloroethoxy)methane		mg/L	<0.001	06/01/2016	GEO40*
2,4-Dichlorophenol		mg/L	<0.001	06/01/2016	GEO40*
1,2,4-Trichlorobenzene		mg/L	<0.001	06/01/2016	GEO40*
Naphthalene		mg/L	<0.002	06/01/2016	GEO40*
Hexachlorobutadiene		mg/L	<0.001	06/01/2016	GEO40*
4-Chloro-3-methylphenol		mg/L	<0.001	06/01/2016	GEO40*
2-Methylnaphthalene		mg/L	<0.001	06/01/2016	GEO40*
2,4,6-Trichlorophenol		mg/L	<0.001	06/01/2016	GEO40*
2,4,5-Trichlorophenol		mg/L	<0.001	06/01/2016	GEO40*
2-Chloronaphthalene		mg/L	<0.001	06/01/2016	GEO40*
Dimethylphthalate		mg/L	<0.001	06/01/2016	GEO40*
2,6-Dinitrotoluene		mg/L	<0.001	06/01/2016	GEO40*
Acenaphthylene		mg/L	<0.001	06/01/2016	GEO40*
Acenaphthene		mg/L	<0.001	06/01/2016	GEO40*
2,4-Dinitrotoluene		mg/L	<0.001	06/01/2016	GEO40*
Diethylphthalate		mg/L	<0.001	06/01/2016	GEO40*
4-Nitrophenol		mg/L	<0.005	06/01/2016	GEO40*

Additional information : *Subcontracted to an approved accredited supplier

For and on behalf of BHP laboratories :

John O'Halloran

Issue Date : 26/02/16

This Test Report shall not be duplicated except in full and then only with the permission of the test laboratory

TEST REPORT NO: 119983.4Analysing
Testing
Consulting
Calibrating**Client: Environmental Department
Limerick City Council
Dooradoyle
Co. Limerick****BHP Ref. No.: 15/12/429
Order No.:
Date Received: 16/12/15
Date Completed: 15/01/16
Test Specification: Nil
Item: Annual Ground Water 2015**BHP
New Road
Thomondgate
Limerick
Ireland
Tel +353 61 455399
Fax + 353 61 455447**FTAO: Tara Flanagan**

TEST	Client Reference	Units	Results	Date Analysed	Test Method
	Annual Monitoring Groundwater 2 Shallow				
4-Chlorophenyl phenyl ether		mg/L	<0.001	06/01/2016	GEO40*
Fluorene		mg/L	<0.001	06/01/2016	GEO40*
Diphenylamine		mg/L	<0.001	06/01/2016	GEO40*
4-Bromophenyl Phenyl Ether		mg/L	<0.001	06/01/2016	GEO40*
Hexachlorobenzene		mg/L	<0.001	06/01/2016	GEO40*
Pentachlorophenol		mg/L	<0.001	06/01/2016	GEO40*
Phenanthrene		mg/L	<0.001	06/01/2016	GEO40*
Anthracene		mg/L	<0.001	06/01/2016	GEO40*
di-n-Butylphthalate		mg/L	<0.001	06/01/2016	GEO40*
Fluoranthene		mg/L	<0.001	06/01/2016	GEO40*
Pyrene		mg/L	<0.001	06/01/2016	GEO40*
Benzyl Butyl Phthalate		mg/L	<0.001	06/01/2016	GEO40*
Benzo(a)anthracene		mg/L	<0.001	06/01/2016	GEO40*
Chrysene		mg/L	<0.001	06/01/2016	GEO40*
Bis(2-ethylhexyl)phthalate		mg/L	<0.005	06/01/2016	GEO40*
Di-n-octylphthalate		mg/L	<0.001	06/01/2016	GEO40*
Benzo(b)fluoranthene		mg/L	<0.001	06/01/2016	GEO40*

Additional information : *Subcontracted to an approved accredited supplier**For and on behalf of BHP laboratories :****John O'Halloran****Issue Date : 26/02/16**

This Test Report shall not be duplicated except in full and then only with the permission of the test laboratory

TEST REPORT NO: 119983.4

Analysing
Testing
Consulting
Calibrating



Client: Environmental Department
Limerick City Council
Dooradoyle
Co. Limerick

BHP Ref. No.: 15/12/429
Order No.:
Date Received: 16/12/15
Date Completed: 15/01/16
Test Specification: Nil
Item: Annual Ground Water 2015

FTAO: Tara Flanagan

BHP
New Road
Thomondgate
Limerick
Ireland
Tel +353 61 455399
Fax + 353 61 455447

TEST	Client Reference	Units	Results	Date Analysed	Test Method
	Annual Monitoring Groundwater 2 Shallow				
Benzo(k)fluoranthene		mg/L	<0.001	06/01/2016	GEO40*
Benzo(a)pyrene		mg/L	<0.001	06/01/2016	GEO40*
Indeno(1,2,3-c,d)pyrene		mg/L	<0.001	06/01/2016	GEO40*
Dibenz(a,h)anthracene		mg/L	<0.001	06/01/2016	GEO40*
Benzo(g,h,i)perylene		mg/L	<0.001	06/01/2016	GEO40*

Additional information : *Subcontracted to an approved accredited supplier

For and on behalf of BHP laboratories :

John O'Halloran
Issue Date : 26/02/16

This Test Report shall not be duplicated except in full and then only with the permission of the test laboratory

TEST REPORT 119960.1Analysing
Testing
Consulting
Calibrating**Client: Environmental Department
Limerick City Council
Dooradoyle
Co. Limerick****BHP Ref. No.: 15/12/365
Order No.:
Date Received: 14/12/15
Date Completed: 22/12/15
Test Specification: Nil
Item: Annual SW 2015****BHP
New Road
Thomondgate
Limerick
Ireland
Tel +353 61 455399
Fax + 353 61 455447****FTAO: Tara Flanagan**

Test	Client Reference	Units	Results	Date Analysed	Test Method
Boron	SW01	mg/L	<0.23	22/12/2015	WAS049*
Cadmium		mg/L	<0.0006	22/12/2015	WAS049*
Calcium		mg/L	65.6	22/12/2015	WAS049*
Chromium		mg/L	<0.002	22/12/2015	WAS049*
Copper		mg/L	<0.009	22/12/2015	WAS049*
Iron		mg/L	0.507	22/12/2015	WAS049*
Lead		mg/L	<0.006	22/12/2015	WAS049*
Magnesium		mg/L	4.69	22/12/2015	WAS049*
Manganese		mg/L	0.496	22/12/2015	WAS049*
Nickel		mg/L	<0.003	22/12/2015	WAS049*
Potassium		mg/L	3.78	22/12/2015	WAS049*
Sodium		mg/L	8.23	22/12/2015	WAS049*
Zinc		mg/L	<0.018	22/12/2015	WAS049*
Mercury		mg/L	<0.0001	18/12/2015	WAS013*
Sulphate (as SO ₄)			mg/L	11	22/12/2015
Orthophosphate (as P)		mg/L	0.02	15/12/2015	BHP AC 095
Nitrate (as NO ₃)		mg/L	1.9	14/12/2015	BHP AC 019
Nitrite (as NO ₂)		mg/L	<0.05	14/12/2015	BHP AC 019
Total Oxidised Nitrogen (as N)		mg/L	0.43	14/12/2015	BHP AC 065
Alkalinity (as CaCO ₃)		mg/L	183	15/12/2015	BHP AC 095

Additional Information: *Subcontracted to an approved accredited supplier**For and on behalf of BHP laboratories :****John O' Halloran
Issue Date : 06/01/16**

This Test Report shall not be duplicated except in full and then only with the permission of the test laboratory

TEST REPORT 119960.2Analysing
Testing
Consulting
CalibratingBHP
New Road
Thomondgate
Limerick
Ireland
Tel +353 61 455399
Fax + 353 61 455447**Client: Environmental Department
Limerick City Council
Dooradoyle
Co. Limerick****BHP Ref. No.: 15/12/366
Order No.:
Date Received: 14/12/15
Date Completed: 22/12/15
Test Specification: Nil
Item: Annual SW 2015****FTAO: Tara Flanagan**

Test	Client Reference	Units	Results	Date Analysed	Test Method	
Boron	SW02	mg/L	<0.23	22/12/2015	WAS049*	
Cadmium		mg/L	<0.0006	22/12/2015	WAS049*	
Calcium		mg/L	99.5	22/12/2015	WAS049*	
Chromium		mg/L	<0.002	22/12/2015	WAS049*	
Copper		mg/L	<0.009	22/12/2015	WAS049*	
Iron		mg/L	0.907	22/12/2015	WAS049*	
Lead		mg/L	<0.006	22/12/2015	WAS049*	
Magnesium		mg/L	7.58	22/12/2015	WAS049*	
Manganese		mg/L	0.128	22/12/2015	WAS049*	
Nickel		mg/L	<0.003	22/12/2015	WAS049*	
Potassium		mg/L	4.07	22/12/2015	WAS049*	
Sodium		mg/L	9.7	22/12/2015	WAS049*	
Zinc		mg/L	<0.018	22/12/2015	WAS049*	
Mercury		mg/L	<0.0001	18/12/2015	WAS013*	
Sulphate (as SO ₄)			mg/L	44	22/12/2015	BHP AC 095
Orthophosphate (as P)			mg/L	<0.01	22/12/2015	BHP AC 095
Nitrate (as NO ₃)		mg/L	8.0	14/12/2015	BHP AC 019	
Nitrite (as NO ₂)		mg/L	<0.05	14/12/2015	BHP AC 019	
Total Oxidised Nitrogen (as N)		mg/L	1.80	14/12/2015	BHP AC 065	
Alkalinity (as CaCO ₃)		mg/L	246	15/12/2015	BHP AC 095	

Additional Information: *Subcontracted to an approved accredited supplier**For and on behalf of BHP laboratories :****John O' Halloran
Issue Date : 06/01/16**

This Test Report shall not be duplicated except in full and then only with the permission of the test laboratory

TEST REPORT 119960.3Analysing
Testing
Consulting
Calibrating**Client: Environmental Department
Limerick City Council
Dooradoyle
Co. Limerick****BHP Ref. No.: 15/12/367
Order No.:
Date Received: 14/12/15
Date Completed: 22/12/15
Test Specification: Nil
Item: Annual SW 2015**BHP
New Road
Thomondgate
Limerick
Ireland
Tel +353 61 455399
Fax + 353 61 455447**FTAO: Tara Flanagan**

Test	Client Reference	Units	Results	Date Analysed	Test Method
Boron	SW03	mg/L	<0.23	22/12/2015	WAS049*
Cadmium		mg/L	<0.0006	22/12/2015	WAS049*
Calcium		mg/L	62	22/12/2015	WAS049*
Chromium		mg/L	0.0029	22/12/2015	WAS049*
Copper		mg/L	<0.009	22/12/2015	WAS049*
Iron		mg/L	0.351	22/12/2015	WAS049*
Lead		mg/L	<0.006	22/12/2015	WAS049*
Magnesium		mg/L	4.27	22/12/2015	WAS049*
Manganese		mg/L	0.0404	22/12/2015	WAS049*
Nickel		mg/L	0.0081	22/12/2015	WAS049*
Potassium		mg/L	2.01	22/12/2015	WAS049*
Sodium		mg/L	7.73	22/12/2015	WAS049*
Zinc		mg/L	0.0183	22/12/2015	WAS049*
Mercury		mg/L	<0.0001	22/12/2015	WAS013*
Sulphate (as SO ₄)			mg/L	12	22/12/2015
Orthophosphate (as P)		mg/L	0.02	15/12/2015	BHP AC 095
Nitrate (as NO ₃)		mg/L	3.5	14/12/2015	BHP AC 019
Nitrite (as NO ₂)		mg/L	<0.05	14/12/2015	BHP AC 019
Total Oxidised Nitrogen (as N)		mg/L	0.79	14/12/2015	BHP AC 065
Alkalinity (as CaCO ₃)		mg/L	158	15/12/2015	BHP AC 095

Additional Information: *Subcontracted to an approved accredited supplier**For and on behalf of BHP laboratories :****John O' Halloran
Issue Date : 06/01/16**

This Test Report shall not be duplicated except in full and then only with the permission of the test laboratory

TEST REPORT 119960.4Analysing
Testing
Consulting
Calibrating**Client: Environmental Department
Limerick City Council
Dooradoyle
Co. Limerick****BHP Ref. No.: 15/12/368
Order No.:
Date Received: 14/12/15
Date Completed: 22/12/15
Test Specification: Nil
Item: Annual SW 2015****BHP
New Road
Thomondgate
Limerick
Ireland
Tel +353 61 455399
Fax + 353 61 455447****FTAO: Tara Flanagan**

Test	Client Reference	Units	Results	Date Analysed	Test Method	
Boron	SW04	mg/L	<0.23	22/12/2015	WAS049*	
Cadmium		mg/L	<0.0006	22/12/2015	WAS049*	
Calcium		mg/L	60.2	22/12/2015	WAS049*	
Chromium		mg/L	<0.002	22/12/2015	WAS049*	
Copper		mg/L	<0.009	22/12/2015	WAS049*	
Iron		mg/L	<0.23	22/12/2015	WAS049*	
Lead		mg/L	<0.006	22/12/2015	WAS049*	
Magnesium		mg/L	4.3	22/12/2015	WAS049*	
Manganese		mg/L	0.0177	22/12/2015	WAS049*	
Nickel		mg/L	<0.003	22/12/2015	WAS049*	
Potassium		mg/L	2.13	22/12/2015	WAS049*	
Sodium		mg/L	7.32	22/12/2015	WAS049*	
Zinc		mg/L	0.0243	22/12/2015	WAS049*	
Mercury		mg/L	<0.0001	18/12/2015	WAS013*	
Sulphate (as SO ₄)			mg/L	12	22/12/2015	BHP AC 095
Orthophosphate (as P)			mg/L	0.01	15/12/2015	BHP AC 095
Nitrate (as NO ₃)		mg/L	2.9	14/12/2015	BHP AC 019	
Nitrite (as NO ₂)		mg/L	<0.05	14/12/2015	BHP AC 019	
Total Oxidised Nitrogen (as N)		mg/L	0.65	14/12/2015	BHP AC 065	
Alkalinity (as CaCO ₃)		mg/L	151	15/12/2015	BHP AC 095	

Additional Information: *Subcontracted to an approved accredited supplier**For and on behalf of BHP laboratories :****John O' Halloran
Issue Date : 06/01/16**

This Test Report shall not be duplicated except in full and then only with the permission of the test laboratory

TEST REPORT 119960.5Analysing
Testing
Consulting
Calibrating**Client: Environmental Department
Limerick City Council
Dooradoyle
Co. Limerick****BHP Ref. No.: 15/12/369
Order No.:
Date Received: 14/12/15
Date Completed: 22/12/15
Test Specification: Nil
Item: Annual SW 2015****BHP
New Road
Thomondgate
Limerick
Ireland
Tel +353 61 455399
Fax + 353 61 455447****FTAO: Tara Flanagan**

Test	Client Reference	Units	Results	Date Analysed	Test Method
Boron	SW05	mg/L	<0.23	22/12/2015	WAS049*
Cadmium		mg/L	<0.0006	22/12/2015	WAS049*
Calcium		mg/L	67.5	22/12/2015	WAS049*
Chromium		mg/L	<0.002	22/12/2015	WAS049*
Copper		mg/L	<0.009	22/12/2015	WAS049*
Iron		mg/L	0.289	22/12/2015	WAS049*
Lead		mg/L	<0.006	22/12/2015	WAS049*
Magnesium		mg/L	5.16	22/12/2015	WAS049*
Manganese		mg/L	0.0535	22/12/2015	WAS049*
Nickel		mg/L	<0.003	22/12/2015	WAS049*
Potassium		mg/L	2.62	22/12/2015	WAS049*
Sodium		mg/L	8.73	22/12/2015	WAS049*
Zinc		mg/L	<0.018	22/12/2015	WAS049*
Mercury		mg/L	<0.0001	22/12/2015	WAS013*
Sulphate (as SO ₄)			mg/L	16	22/12/2015
Orthophosphate (as P)		mg/L	0.02	15/12/2015	BHP AC 095
Nitrate (as NO ₃)		mg/L	2.8	14/12/2015	BHP AC 019
Nitrite (as NO ₂)		mg/L	<0.05	14/12/2015	BHP AC 019
Total Oxidised Nitrogen (as N)		mg/L	0.64	14/12/2015	BHP AC 065
Alkalinity (as CaCO ₃)		mg/L	169	15/12/2015	BHP AC 095

Additional Information: *Subcontracted to an approved accredited supplier**For and on behalf of BHP laboratories :****John O' Halloran
Issue Date : 06/01/16**

This Test Report shall not be duplicated except in full and then only with the permission of the test laboratory

TEST REPORT 119960.6Analysing
Testing
Consulting
Calibrating**Client: Environmental Department
Limerick City Council
Dooradoyle
Co. Limerick****BHP Ref. No.: 15/12/370
Order No.:
Date Received: 14/12/15
Date Completed: 22/12/15
Test Specification: Nil
Item: Annual SW 2015****BHP
New Road
Thomondgate
Limerick
Ireland
Tel +353 61 455399
Fax + 353 61 455447****FTAO: Tara Flanagan**

Test	Client Reference	Units	Results	Date Analysed	Test Method
Boron	SW06	mg/L	<0.23	22/12/2015	WAS049*
Cadmium		mg/L	<0.0006	22/12/2015	WAS049*
Calcium		mg/L	61.8	22/12/2015	WAS049*
Chromium		mg/L	<0.002	22/12/2015	WAS049*
Copper		mg/L	<0.009	22/12/2015	WAS049*
Iron		mg/L	2.3	22/12/2015	WAS049*
Lead		mg/L	<0.006	22/12/2015	WAS049*
Magnesium		mg/L	4.35	22/12/2015	WAS049*
Manganese		mg/L	0.034	22/12/2015	WAS049*
Nickel		mg/L	<0.003	22/12/2015	WAS049*
Potassium		mg/L	2.13	22/12/2015	WAS049*
Sodium		mg/L	7.26	22/12/2015	WAS049*
Zinc		mg/L	<0.018	22/12/2015	WAS049*
Mercury		mg/L	<0.0001	22/12/2015	WAS013*
Sulphate (as SO ₄)			mg/L	11	22/12/2015
Orthophosphate (as P)		mg/L	0.02	15/12/2015	BHP AC 095
Nitrate (as NO ₃)		mg/L	3.5	14/12/2015	BHP AC 019
Nitrite (as NO ₂)		mg/L	<0.05	14/12/2015	BHP AC 019
Total Oxidised Nitrogen (as N)		mg/L	0.79	14/12/2015	BHP AC 065
Alkalinity (as CaCO ₃)		mg/L	169	15/12/2015	BHP AC 095

Additional Information: *Subcontracted to an approved accredited supplier**For and on behalf of BHP laboratories :****John O' Halloran
Issue Date : 06/01/16**

This Test Report shall not be duplicated except in full and then only with the permission of the test laboratory

TEST REPORT 119960.7Analysing
Testing
Consulting
Calibrating**Client: Environmental Department
Limerick City Council
Dooradoyle
Co. Limerick****BHP Ref. No.: 15/12/371
Order No.:
Date Received: 14/12/15
Date Completed: 22/12/15
Test Specification: Nil
Item: Annual SW 2015****BHP
New Road
Thomondgate
Limerick
Ireland
Tel +353 61 455399
Fax + 353 61 455447****FTAO: Tara Flanagan**

Test	Client Reference	Units	Results	Date Analysed	Test Method
Boron	SW07	mg/L	<0.23	22/12/2015	WAS049*
Cadmium		mg/L	<0.0006	22/12/2015	WAS049*
Calcium		mg/L	86.7	22/12/2015	WAS049*
Chromium		mg/L	<0.002	22/12/2015	WAS049*
Copper		mg/L	<0.009	22/12/2015	WAS049*
Iron		mg/L	0.408	22/12/2015	WAS049*
Lead		mg/L	<0.006	22/12/2015	WAS049*
Magnesium		mg/L	11.2	22/12/2015	WAS049*
Manganese		mg/L	0.139	22/12/2015	WAS049*
Nickel		mg/L	<0.003	22/12/2015	WAS049*
Potassium		mg/L	4.15	22/12/2015	WAS049*
Sodium		mg/L	12.2	22/12/2015	WAS049*
Zinc		mg/L	<0.018	22/12/2015	WAS049*
Mercury		mg/L	<0.0001	21/12/2015	WAS013*
Sulphate (as SO ₄)			mg/L	36	22/12/2015
Orthophosphate (as P)		mg/L	<0.01	15/12/2015	BHP AC 095
Nitrate (as NO ₃)		mg/L	2.7	14/12/2015	BHP AC 019
Nitrite (as NO ₂)		mg/L	<0.05	14/12/2015	BHP AC 019
Total Oxidised Nitrogen (as N)		mg/L	0.61	14/12/2015	BHP AC 065
Alkalinity (as CaCO ₃)		mg/L	231	15/12/2015	BHP AC 095

Additional Information: *Subcontracted to an approved accredited supplier**For and on behalf of BHP laboratories :****John O' Halloran
Issue Date : 06/01/16**

This Test Report shall not be duplicated except in full and then only with the permission of the test laboratory

TEST REPORT 119984.1

Analysing
Testing
Consulting
Calibrating



Client: Environmental Department
Limerick City Council
Dooradoyle
Co. Limerick

FTAO: Tara Flanagan

BHP Ref. No.: 15/12/430
Order No.:
Date Received: 16/12/15
Date Completed: 28/12/15
Test Specification: Nil
Item: Annual Leachate 2015

BHP
New Road
Thomondgate
Limerick
Ireland
Tel +353 61 455399
Fax + 353 61 455447

Test	Client Reference	Units	Results	Date Analysed	Test Method
Boron	L01	mg/L	0.664	23/12/2015	WAS049*
Cadmium		mg/L	0.0062	23/12/2015	WAS049*
Calcium		mg/L	217	23/12/2015	WAS049*
Chromium		mg/L	0.0282	23/12/2015	WAS049*
Copper		mg/L	<0.009	23/12/2015	WAS049*
Iron		mg/L	343	23/12/2015	WAS049*
Lead		mg/L	0.095	23/12/2015	WAS049*
Magnesium		mg/L	33.6	23/12/2015	WAS049*
Manganese		mg/L	3.38	23/12/2015	WAS049*
Nickel		mg/L	0.0848	23/12/2015	WAS049*
Potassium		mg/L	55.1	23/12/2015	WAS049*
Sodium		mg/L	162	23/12/2015	WAS049*
Zinc		mg/L	1.66	23/12/2015	WAS049*
Mercury		mg/L	<0.0001	21/12/2015	WAS013*
Fluoride		mg/L	0.13	18/12/2015	BHP AC 019
Sulphate (as SO ₄)		mg/L	82	22/12/2015	BHP AC 095
Orthophosphate (as P)		mg/L	0.12	17/12/2015	BHP AC 095
Nitrate (as NO ₃)		mg/L	<0.5	18/12/2015	BHP AC 019
Nitrite (as NO ₂)		mg/L	<0.05	18/12/2015	BHP AC 019
Total Oxidised Nitrogen (as N)		mg/L	<0.14	18/12/2015	BHP AC 065
Cyanide		mg/L	<0.05	21/12/2015	BHP AC 095
Ammonia (as N)		mg/L	167	17/12/2015	BHP AC 095
B.O.D.		mg/L	1263	23/12/2015	BHP AC 005
C.O.D.		mg/L	2770	17/12/2015	BHP AC 006
pH		-	6.79	16/12/2015	BHP AC 067
Conductivity		µS/cm	3420	16/12/2015	BHP AC 067

Additional information: *Subcontracted to an approved accredited supplier

For and on behalf of BHP laboratories :

John O' Halloran

Issue Date : 11/01/16

Test results relate only to this/these items. This test report shall not be duplicated in full without the permission of the test laboratory.

TEST REPORT 119984.2

Analysing
Testing
Consulting
Calibrating



Client: Environmental Department
Limerick City Council
Dooradoyle
Co. Limerick

FTAO: Tara Flanagan

BHP Ref. No.: 15/12/431
Order No.:
Date Received: 16/12/15
Date Completed: 23/12/15
Test Specification: Nil
Item: Annual Leachate 2015

BHP
New Road
Thomondgate
Limerick
Ireland
Tel +353 61 455399
Fax + 353 61 455447

Test	Client Reference	Units	Results	Date Analysed	Test Method
Boron	L02	mg/L	2.4	23/12/2015	WAS049*
Cadmium		mg/L	0.0028	23/12/2015	WAS049*
Calcium		mg/L	190	23/12/2015	WAS049*
Chromium		mg/L	0.0821	23/12/2015	WAS049*
Copper		mg/L	0.194	23/12/2015	WAS049*
Iron		mg/L	63.8	23/12/2015	WAS049*
Lead		mg/L	0.338	23/12/2015	WAS049*
Magnesium		mg/L	90.7	23/12/2015	WAS049*
Manganese		mg/L	1.62	23/12/2015	WAS049*
Nickel		mg/L	0.18	23/12/2015	WAS049*
Potassium		mg/L	251	23/12/2015	WAS049*
Sodium		mg/L	703	23/12/2015	WAS049*
Zinc		mg/L	1.94	23/12/2015	WAS049*
Mercury		mg/L	<0.0001	21/12/2015	WAS013*
Fluoride		mg/L	0.18	18/12/2015	BHP AC 019
Sulphate (as SO ₄)		mg/L	89	22/12/2015	BHP AC 095
Orthophosphate (as P)		mg/L	0.38	17/12/2015	BHP AC 095
Nitrate (as NO ₃)		mg/L	<0.5	18/12/2015	BHP AC 019
Nitrite (as NO ₂)		mg/L	<0.05	18/12/2015	BHP AC 019
Total Oxidised Nitrogen (as N)		mg/L	<0.14	18/12/2015	BHP AC 065
Cyanide		mg/L	<0.05	21/12/2015	BHP AC 095
Ammonia (as N)		mg/L	713	17/12/2015	BHP AC 095
B.O.D.		mg/L	622	18/12/2015	BHP AC 005
C.O.D.		mg/L	3450	17/12/2015	BHP AC 006
pH		-	7.10	16/12/2015	BHP AC 067
Conductivity		µS/cm	10730	16/12/2015	BHP AC 067

Additional information: *Subcontracted to an approved accredited supplier

For and on behalf of BHP laboratories :

John O' Halloran

Issue Date : 11/01/16

Test results relate only to this/these items. This test report shall not be duplicated in full without the permission of the test laboratory.

TEST REPORT 119984.3

Analysing
Testing
Consulting
Calibrating



Client: Environmental Department
Limerick City Council
Dooradoyle
Co. Limerick

FTAO: Tara Flanagan

BHP Ref. No.: 15/12/432
Order No.:
Date Received: 16/12/15
Date Completed: 23/12/15
Test Specification: Nil
Item: Annual Leachate 2015

BHP
New Road
Thomondgate
Limerick
Ireland
Tel +353 61 455399
Fax + 353 61 455447

Test	Client Reference	Units	Results	Date Analysed	Test Method
Boron	L03	mg/L	1.93	23/12/2015	WAS049*
Cadmium		mg/L	0.0028	23/12/2015	WAS049*
Calcium		mg/L	211	23/12/2015	WAS049*
Chromium		mg/L	0.0278	23/12/2015	WAS049*
Copper		mg/L	0.0937	23/12/2015	WAS049*
Iron		mg/L	37.6	23/12/2015	WAS049*
Lead		mg/L	0.202	23/12/2015	WAS049*
Magnesium		mg/L	103	23/12/2015	WAS049*
Manganese		mg/L	1.17	23/12/2015	WAS049*
Nickel		mg/L	0.0704	23/12/2015	WAS049*
Potassium		mg/L	178	23/12/2015	WAS049*
Sodium		mg/L	335	23/12/2015	WAS049*
Zinc		mg/L	0.491	23/12/2015	WAS049*
Mercury		mg/L	<0.0001	21/12/2015	WAS013*
Fluoride		mg/L	0.09	18/12/2015	BHP AC 019
Sulphate (as SO ₄)		mg/L	28	22/12/2015	BHP AC 095
Orthophosphate (as P)		mg/L	0.79	17/12/2015	BHP AC 095
Nitrate (as NO ₃)		mg/L	<0.5	18/12/2015	BHP AC 019
Nitrite (as NO ₂)		mg/L	<0.05	18/12/2015	BHP AC 019
Total Oxidised Nitrogen (as N)		mg/L	<0.14	18/12/2015	BHP AC 065
Cyanide		mg/L	<0.05	21/12/2015	BHP AC 095
Ammonia (as N)		mg/L	457	17/12/2015	BHP AC 095
B.O.D.		mg/L	61	18/12/2015	BHP AC 005
C.O.D.		mg/L	750	17/12/2015	BHP AC 006
pH		-	7.00	16/12/2015	BHP AC 067
Conductivity		µS/cm	6530	16/12/2015	BHP AC 067

Additional information: *Subcontracted to an approved accredited supplier

For and on behalf of BHP laboratories :

John O' Halloran

Issue Date : 11/01/16

Test results relate only to this/these items. This test report shall not be duplicated in full without the permission of the test laboratory.

TEST REPORT 119984.4

Analysing
Testing
Consulting
Calibrating



Client: Environmental Department
Limerick City Council
Dooradoyle
Co. Limerick

FTAO: Tara Flanagan

BHP Ref. No.: 15/12/433
Order No.:
Date Received: 16/12/15
Date Completed: 23/12/15
Test Specification: Nil
Item: Annual Leachate 2015

BHP
New Road
Thomondgate
Limerick
Ireland
Tel +353 61 455399
Fax + 353 61 455447

Test	Client Reference	Units	Results	Date Analysed	Test Method
Boron	L04	mg/L	0.84	23/12/2015	WAS049*
Cadmium		mg/L	0.0009	23/12/2015	WAS049*
Calcium		mg/L	169	23/12/2015	WAS049*
Chromium		mg/L	0.0041	23/12/2015	WAS049*
Copper		mg/L	0.0331	23/12/2015	WAS049*
Iron		mg/L	31.9	23/12/2015	WAS049*
Lead		mg/L	0.0344	23/12/2015	WAS049*
Magnesium		mg/L	23.6	23/12/2015	WAS049*
Manganese		mg/L	0.869	23/12/2015	WAS049*
Nickel		mg/L	0.0066	23/12/2015	WAS049*
Potassium		mg/L	14.9	23/12/2015	WAS049*
Sodium		mg/L	20	23/12/2015	WAS049*
Zinc		mg/L	0.0846	23/12/2015	WAS049*
Mercury		mg/L	<0.0001	21/12/2015	WAS013*
Fluoride		mg/L	0.05	18/12/2015	BHP AC 019
Sulphate (as SO ₄)		mg/L	6.1	22/12/2015	BHP AC 095
Orthophosphate (as P)		mg/L	<0.01	17/12/2015	BHP AC 095
Nitrate (as NO ₃)		mg/L	<0.5	18/12/2015	BHP AC 019
Nitrite (as NO ₂)		mg/L	<0.05	18/12/2015	BHP AC 019
Total Oxidised Nitrogen (as N)		mg/L	<0.14	18/12/2015	BHP AC 065
Cyanide		mg/L	<0.05	21/12/2015	BHP AC 095
Ammonia (as N)		mg/L	35	17/12/2015	BHP AC 095
B.O.D.		mg/L	10.0	18/12/2015	BHP AC 005
C.O.D.		mg/L	90	17/12/2015	BHP AC 006
pH		-	6.85	16/12/2015	BHP AC 067
Conductivity		µS/cm	1240	16/12/2015	BHP AC 067

Additional information: *Subcontracted to an approved accredited supplier

For and on behalf of BHP laboratories :

John O' Halloran

Issue Date : 11/01/16

Test results relate only to this/these items. This test report shall not be duplicated in full without the permission of the test laboratory.

TEST REPORT 119984.5

Analysing
Testing
Consulting
Calibrating



Client: Environmental Department
Limerick City Council
Dooradoyle
Co. Limerick

FTAO: Tara Flanagan

BHP Ref. No.: 15/12/434
Order No.:
Date Received: 16/12/15
Date Completed: 23/12/15
Test Specification: Nil
Item: Annual Leachate 2015

BHP
New Road
Thomondgate
Limerick
Ireland
Tel +353 61 455399
Fax + 353 61 455447

Test	Client Reference	Units	Results	Date Analysed	Test Method
Boron	L05	mg/L	<0.23	23/12/2015	WAS049*
Cadmium		mg/L	0.0008	23/12/2015	WAS049*
Calcium		mg/L	151	23/12/2015	WAS049*
Chromium		mg/L	0.0066	23/12/2015	WAS049*
Copper		mg/L	0.083	23/12/2015	WAS049*
Iron		mg/L	7.2	23/12/2015	WAS049*
Lead		mg/L	0.0812	23/12/2015	WAS049*
Magnesium		mg/L	9.52	23/12/2015	WAS049*
Manganese		mg/L	0.738	23/12/2015	WAS049*
Nickel		mg/L	0.0284	23/12/2015	WAS049*
Potassium		mg/L	1.76	23/12/2015	WAS049*
Sodium		mg/L	4.97	23/12/2015	WAS049*
Zinc		mg/L	0.188	23/12/2015	WAS049*
Mercury		mg/L	<0.0001	21/12/2015	WAS013*
Fluoride		mg/L	0.09	18/12/2015	BHP AC 019
Sulphate (as SO ₄)		mg/L	12	22/12/2015	BHP AC 095
Orthophosphate (as P)		mg/L	<0.01	17/12/2015	BHP AC 095
Nitrate (as NO ₃)		mg/L	0.9	18/12/2015	BHP AC 019
Nitrite (as NO ₂)		mg/L	<0.05	18/12/2015	BHP AC 019
Total Oxidised Nitrogen (as N)		mg/L	0.20	18/12/2015	BHP AC 065
Cyanide		mg/L	<0.05	21/12/2015	BHP AC 095
Ammonia (as N)		mg/L	1.8	17/12/2015	BHP AC 095
B.O.D.		mg/L	5.0	18/12/2015	BHP AC 005
C.O.D.		mg/L	180	17/12/2015	BHP AC 006
pH		-	7.24	16/12/2015	BHP AC 067
Conductivity		µS/cm	497	16/12/2015	BHP AC 067

Additional information: *Subcontracted to an approved accredited supplier

For and on behalf of BHP laboratories :

John O' Halloran

Issue Date : 11/01/16

Test results relate only to this/these items. This test report shall not be duplicated in full without the permission of the test laboratory.

TEST REPORT 119984.6

Analysing
Testing
Consulting
Calibrating



Client: Environmental Department
Limerick City Council
Dooradoyle
Co. Limerick

FTAO: Tara Flanagan

BHP Ref. No.: 15/12/435
Order No.:
Date Received: 16/12/15
Date Completed: 23/12/15
Test Specification: Nil
Item: Annual Leachate 2015

BHP
New Road
Thomondgate
Limerick
Ireland
Tel +353 61 455399
Fax + 353 61 455447

Test	Client Reference	Units	Results	Date Analysed	Test Method
Boron	L06	mg/L	<0.23	23/12/2015	WAS049*
Cadmium		mg/L	<0.0006	23/12/2015	WAS049*
Calcium		mg/L	147	23/12/2015	WAS049*
Chromium		mg/L	<0.002	23/12/2015	WAS049*
Copper		mg/L	0.0114	23/12/2015	WAS049*
Iron		mg/L	3.4	23/12/2015	WAS049*
Lead		mg/L	<0.006	23/12/2015	WAS049*
Magnesium		mg/L	8.91	23/12/2015	WAS049*
Manganese		mg/L	0.375	23/12/2015	WAS049*
Nickel		mg/L	0.0065	23/12/2015	WAS049*
Potassium		mg/L	0.889	23/12/2015	WAS049*
Sodium		mg/L	7.45	23/12/2015	WAS049*
Zinc		mg/L	0.0288	23/12/2015	WAS049*
Mercury		mg/L	<0.0001	21/12/2015	WAS013*
Fluoride		mg/L	0.10	18/12/2015	BHP AC 019
Sulphate (as SO ₄)		mg/L	9.1	22/12/2015	BHP AC 095
Orthophosphate (as P)		mg/L	<0.01	17/12/2015	BHP AC 095
Nitrate (as NO ₃)		mg/L	<0.5	18/12/2015	BHP AC 019
Nitrite (as NO ₂)		mg/L	<0.05	18/12/2015	BHP AC 019
Total Oxidised Nitrogen (as N)		mg/L	<0.14	18/12/2015	BHP AC 065
Cyanide		mg/L	<0.05	21/12/2015	BHP AC 095
Ammonia (as N)		mg/L	0.93	17/12/2015	BHP AC 095
B.O.D.		mg/L	<2	18/12/2015	BHP AC 005
C.O.D.		mg/L	17	17/12/2015	BHP AC 006
pH		-	6.96	16/12/2015	BHP AC 067
Conductivity		µS/cm	689	16/12/2015	BHP AC 067

Additional information: *Subcontracted to an approved accredited supplier

For and on behalf of BHP laboratories :

John O' Halloran

Issue Date : 11/01/16

Test results relate only to this/these items. This test report shall not be duplicated in full without the permission of the test laboratory.

TEST REPORT 119984.7

Analysing
Testing
Consulting
Calibrating



Client: Environmental Department
Limerick City Council
Dooradoyle
Co. Limerick

FTAO: Tara Flanagan

BHP Ref. No.: 15/12/436
Order No.:
Date Received: 16/12/15
Date Completed: 23/12/15
Test Specification: Nil
Item: Annual Leachate 2015

BHP
New Road
Thomondgate
Limerick
Ireland
Tel +353 61 455399
Fax + 353 61 455447

Test	Client Reference	Units	Results	Date Analysed	Test Method
Boron	L07	mg/L	<0.23	23/12/2015	WAS049*
Cadmium		mg/L	<0.0006	23/12/2015	WAS049*
Calcium		mg/L	139	23/12/2015	WAS049*
Chromium		mg/L	0.0031	23/12/2015	WAS049*
Copper		mg/L	0.0426	23/12/2015	WAS049*
Iron		mg/L	18.6	23/12/2015	WAS049*
Lead		mg/L	0.0202	23/12/2015	WAS049*
Magnesium		mg/L	7.31	23/12/2015	WAS049*
Manganese		mg/L	0.314	23/12/2015	WAS049*
Nickel		mg/L	0.0305	23/12/2015	WAS049*
Potassium		mg/L	2.45	23/12/2015	WAS049*
Sodium		mg/L	8.36	23/12/2015	WAS049*
Zinc		mg/L	0.133	23/12/2015	WAS049*
Mercury		mg/L	<0.0001	21/12/2015	WAS013*
Fluoride		mg/L	0.13	18/12/2015	BHP AC 019
Sulphate (as SO ₄)		mg/L	7.1	22/12/2015	BHP AC 095
Orthophosphate (as P)		mg/L	0.02	17/12/2015	BHP AC 095
Nitrate (as NO ₃)		mg/L	<0.5	18/12/2015	BHP AC 019
Nitrite (as NO ₂)		mg/L	<0.05	18/12/2015	BHP AC 019
Total Oxidised Nitrogen (as N)		mg/L	<0.14	18/12/2015	BHP AC 065
Cyanide		mg/L	<0.05	21/12/2015	BHP AC 095
Ammonia (as N)		mg/L	1.9	17/12/2015	BHP AC 095
B.O.D.		mg/L	3.0	18/12/2015	BHP AC 005
C.O.D.		mg/L	41	17/12/2015	BHP AC 006
pH		-	7.12	16/12/2015	BHP AC 067
Conductivity		µS/cm	610	16/12/2015	BHP AC 067

Additional information: *Subcontracted to an approved accredited supplier

For and on behalf of BHP laboratories :

John O' Halloran

Issue Date : 11/01/16

Test results relate only to this/these items. This test report shall not be duplicated in full without the permission of the test laboratory.

TEST REPORT 119984.8

Analysing
Testing
Consulting
Calibrating



Client: Environmental Department
Limerick City Council
Dooradoyle
Co. Limerick

FTAO: Tara Flanagan

BHP Ref. No.: 15/12/437
Order No.:
Date Received: 16/12/15
Date Completed: 23/12/15
Test Specification: Nil
Item: Annual Leachate 2015

BHP
New Road
Thomondgate
Limerick
Ireland
Tel +353 61 455399
Fax + 353 61 455447

Test	Client Reference	Units	Results	Date Analysed	Test Method
Boron	L08	mg/L	2.23	23/12/2015	WAS049*
Cadmium		mg/L	<0.0006	23/12/2015	WAS049*
Calcium		mg/L	237	23/12/2015	WAS049*
Chromium		mg/L	0.088	23/12/2015	WAS049*
Copper		mg/L	0.0102	23/12/2015	WAS049*
Iron		mg/L	7.6	23/12/2015	WAS049*
Lead		mg/L	0.0061	23/12/2015	WAS049*
Magnesium		mg/L	110	23/12/2015	WAS049*
Manganese		mg/L	1.12	23/12/2015	WAS049*
Nickel		mg/L	0.111	23/12/2015	WAS049*
Potassium		mg/L	285	23/12/2015	WAS049*
Sodium		mg/L	629	23/12/2015	WAS049*
Zinc		mg/L	0.0501	23/12/2015	WAS049*
Mercury		mg/L	<0.0001	21/12/2015	WAS013*
Fluoride		mg/L	0.13	18/12/2015	BHP AC 019
Sulphate (as SO ₄)		mg/L	4.6	22/12/2015	BHP AC 095
Orthophosphate (as P)		mg/L	0.91	17/12/2015	BHP AC 095
Nitrate (as NO ₃)		mg/L	<0.5	18/12/2015	BHP AC 019
Nitrite (as NO ₂)		mg/L	<0.05	18/12/2015	BHP AC 019
Total Oxidised Nitrogen (as N)		mg/L	<0.14	18/12/2015	BHP AC 065
Cyanide		mg/L	<0.05	21/12/2015	BHP AC 095
Ammonia (as N)		mg/L	564	17/12/2015	BHP AC 095
B.O.D.		mg/L	35	18/12/2015	BHP AC 005
C.O.D.		mg/L	440	17/12/2015	BHP AC 006
pH		-	6.99	16/12/2015	BHP AC 067
Conductivity		µS/cm	8240	16/12/2015	BHP AC 067

Additional information: *Subcontracted to an approved accredited supplier

For and on behalf of BHP laboratories :

John O' Halloran

Issue Date : 11/01/16

Test results relate only to this/these items. This test report shall not be duplicated in full without the permission of the test laboratory.

TEST REPORT 119984.9

Analysing
Testing
Consulting
Calibrating



Client: Environmental Department
Limerick City Council
Dooradoyle
Co. Limerick

FTAO: Tara Flanagan

BHP Ref. No.: 15/12/438
Order No.:
Date Received: 16/12/15
Date Completed: 28/12/15
Test Specification: Nil
Item: Annual Leachate 2015

BHP
New Road
Thomondgate
Limerick
Ireland
Tel +353 61 455399
Fax + 353 61 455447

Test	Client Reference	Units	Results	Date Analysed	Test Method
Boron	L09	mg/L	0.663	23/12/2015	WAS049*
Cadmium		mg/L	0.0018	23/12/2015	WAS049*
Calcium		mg/L	179	23/12/2015	WAS049*
Chromium		mg/L	0.0423	23/12/2015	WAS049*
Copper		mg/L	0.509	23/12/2015	WAS049*
Iron		mg/L	49.2	23/12/2015	WAS049*
Lead		mg/L	0.197	23/12/2015	WAS049*
Magnesium		mg/L	37.3	23/12/2015	WAS049*
Manganese		mg/L	1.18	23/12/2015	WAS049*
Nickel		mg/L	0.0975	23/12/2015	WAS049*
Potassium		mg/L	69.5	23/12/2015	WAS049*
Sodium		mg/L	93	23/12/2015	WAS049*
Zinc		mg/L	0.747	23/12/2015	WAS049*
Mercury		mg/L	<0.0001	21/12/2015	WAS013*
Fluoride		mg/L	0.17	18/12/2015	BHP AC 019
Sulphate (as SO ₄)		mg/L	24	22/12/2015	BHP AC 095
Orthophosphate (as P)		mg/L	<0.01	17/12/2015	BHP AC 095
Nitrate (as NO ₃)		mg/L	<0.5	18/12/2015	BHP AC 019
Nitrite (as NO ₂)		mg/L	0.10	18/12/2015	BHP AC 019
Total Oxidised Nitrogen (as N)		mg/L	<0.14	18/12/2015	BHP AC 065
Cyanide		mg/L	<0.05	21/12/2015	BHP AC 095
Ammonia (as N)		mg/L	181	17/12/2015	BHP AC 095
B.O.D.		mg/L	528	23/12/2015	BHP AC 005
C.O.D.		mg/L	810	17/12/2015	BHP AC 006
pH		-	6.83	16/12/2015	BHP AC 067
Conductivity		µS/cm	2840	16/12/2015	BHP AC 067

Additional information: *Subcontracted to an approved accredited supplier

For and on behalf of BHP laboratories :

John O' Halloran

Issue Date : 11/01/16

Test results relate only to this/these items. This test report shall not be duplicated in full without the permission of the test laboratory.

TEST REPORT 119984.10

Analysing
Testing
Consulting
Calibrating



Client: Environmental Department
Limerick City Council
Dooradoyle
Co. Limerick

FTAO: Tara Flanagan

BHP Ref. No.: 15/12/439
Order No.:
Date Received: 16/12/15
Date Completed: 30/12/15
Test Specification: Nil
Item: Annual Leachate 2015

BHP
New Road
Thomondgate
Limerick
Ireland
Tel +353 61 455399
Fax + 353 61 455447

Test	Client Reference	Units	Results	Date Analysed	Test Method
Boron	L10	mg/L	2.68	30/12/2015	WAS049*
Cadmium		mg/L	<0.006	30/12/2015	WAS049*
Calcium		mg/L	400	30/12/2015	WAS049*
Chromium		mg/L	6.33	30/12/2015	WAS049*
Copper		mg/L	0.799	30/12/2015	WAS049*
Iron		mg/L	116	30/12/2015	WAS049*
Lead		mg/L	0.373	30/12/2015	WAS049*
Magnesium		mg/L	68.3	30/12/2015	WAS049*
Manganese		mg/L	4.68	30/12/2015	WAS049*
Nickel		mg/L	1.72	30/12/2015	WAS049*
Potassium		mg/L	103	30/12/2015	WAS049*
Sodium		mg/L	226	30/12/2015	WAS049*
Zinc		mg/L	1.24	30/12/2015	WAS049*
Mercury		mg/L	<0.0001	21/12/2015	WAS013*
Fluoride		mg/L	0.15	18/12/2015	BHP AC 019
Sulphate (as SO ₄)		mg/L	107	22/12/2015	BHP AC 095
Orthophosphate (as P)		mg/L	<0.01	17/12/2015	BHP AC 095
Nitrate (as NO ₃)		mg/L	<0.5	18/12/2015	BHP AC 019
Nitrite (as NO ₂)		mg/L	<0.05	18/12/2015	BHP AC 019
Total Oxidised Nitrogen (as N)		mg/L	<0.14	18/12/2015	BHP AC 065
Cyanide		mg/L	<0.05	21/12/2015	BHP AC 095
Ammonia (as N)		mg/L	343	17/12/2015	BHP AC 095
B.O.D.		mg/L	230	18/12/2015	BHP AC 005
C.O.D.		mg/L	1405	17/12/2015	BHP AC 006
pH		-	7.04	16/12/2015	BHP AC 067
Conductivity		µS/cm	5060	16/12/2015	BHP AC 067

Additional information: *Subcontracted to an approved accredited supplier

For and on behalf of BHP laboratories :

John O' Halloran

Issue Date : 11/01/16

Test results relate only to this/these items. This test report shall not be duplicated in full without the permission of the test laboratory.

TEST REPORT 119984.11

Analysing
Testing
Consulting
Calibrating



Client: Environmental Department
Limerick City Council
Dooradoyle
Co. Limerick

FTAO: Tara Flanagan

BHP Ref. No.: 15/12/440
Order No.:
Date Received: 16/12/15
Date Completed: 23/12/15
Test Specification: Nil
Item: Annual Leachate 2015

BHP
New Road
Thomondgate
Limerick
Ireland
Tel +353 61 455399
Fax + 353 61 455447

Test	Client Reference	Units	Results	Date Analysed	Test Method
Boron	L11	mg/L	1.57	23/12/2015	WAS049*
Cadmium		mg/L	0.0033	23/12/2015	WAS049*
Calcium		mg/L	170	23/12/2015	WAS049*
Chromium		mg/L	0.179	23/12/2015	WAS049*
Copper		mg/L	0.0922	23/12/2015	WAS049*
Iron		mg/L	39.6	23/12/2015	WAS049*
Lead		mg/L	0.387	23/12/2015	WAS049*
Magnesium		mg/L	52	23/12/2015	WAS049*
Manganese		mg/L	1.49	23/12/2015	WAS049*
Nickel		mg/L	0.122	23/12/2015	WAS049*
Potassium		mg/L	178	23/12/2015	WAS049*
Sodium		mg/L	321	23/12/2015	WAS049*
Zinc		mg/L	0.648	23/12/2015	WAS049*
Mercury		mg/L	<0.0001	21/12/2015	WAS013*
Fluoride		mg/L	0.38	21/12/2015	BHP AC 019
Sulphate (as SO ₄)		mg/L	50	22/12/2015	BHP AC 095
Orthophosphate (as P)		mg/L	1.3	17/12/2015	BHP AC 095
Nitrate (as NO ₃)		mg/L	<0.5	21/12/2015	BHP AC 019
Nitrite (as NO ₂)		mg/L	<0.05	21/12/2015	BHP AC 019
Total Oxidised Nitrogen (as N)		mg/L	<0.14	21/12/2015	BHP AC 065
Cyanide		mg/L	<0.05	21/12/2015	BHP AC 095
Ammonia (as N)		mg/L	614	17/12/2015	BHP AC 095
B.O.D.		mg/L	77	18/12/2015	BHP AC 005
C.O.D.		mg/L	840	17/12/2015	BHP AC 006
pH		-	7.11	16/12/2015	BHP AC 067
Conductivity		µS/cm	7880	16/12/2015	BHP AC 067

Additional information: *Subcontracted to an approved accredited supplier

For and on behalf of BHP laboratories :

John O' Halloran

Issue Date : 11/01/16

Test results relate only to this/these items. This test report shall not be duplicated in full without the permission of the test laboratory.

TEST REPORT 119984.12

Analysing
Testing
Consulting
Calibrating



Client: Environmental Department
Limerick City Council
Dooradoyle
Co. Limerick

FTAO: Tara Flanagan

BHP Ref. No.: 15/12/441
Order No.:
Date Received: 16/12/15
Date Completed: 23/12/15
Test Specification: Nil
Item: Annual Leachate 2015

BHP
New Road
Thomondgate
Limerick
Ireland
Tel +353 61 455399
Fax + 353 61 455447

Test	Client Reference	Units	Results	Date Analysed	Test Method
Boron	Tank	mg/L	1.46	23/12/2015	WAS049*
Cadmium		mg/L	<0.0006	23/12/2015	WAS049*
Calcium		mg/L	208	23/12/2015	WAS049*
Chromium		mg/L	0.0063	23/12/2015	WAS049*
Copper		mg/L	0.104	23/12/2015	WAS049*
Iron		mg/L	3.3	23/12/2015	WAS049*
Lead		mg/L	<0.006	23/12/2015	WAS049*
Magnesium		mg/L	52.9	23/12/2015	WAS049*
Manganese		mg/L	1.13	23/12/2015	WAS049*
Nickel		mg/L	0.0208	23/12/2015	WAS049*
Potassium		mg/L	100	23/12/2015	WAS049*
Sodium		mg/L	269	23/12/2015	WAS049*
Zinc		mg/L	0.0826	23/12/2015	WAS049*
Mercury		mg/L	<0.0001	21/12/2015	WAS013*
Fluoride		mg/L	0.08	21/12/2015	BHP AC 019
Sulphate (as SO ₄)		mg/L	87	22/12/2015	BHP AC 095
Orthophosphate (as P)		mg/L	0.20	17/12/2015	BHP AC 095
Nitrate (as NO ₃)		mg/L	56.5	21/12/2015	BHP AC 019
Nitrite (as NO ₂)		mg/L	<0.05	21/12/2015	BHP AC 019
Total Oxidised Nitrogen (as N)		mg/L	12.75	21/12/2015	BHP AC 065
Cyanide		mg/L	<0.05	21/12/2015	BHP AC 095
Ammonia (as N)		mg/L	204	17/12/2015	BHP AC 095
B.O.D.		mg/L	30	18/12/2015	BHP AC 005
C.O.D.		mg/L	140	17/12/2015	BHP AC 006
pH		-	7.70	16/12/2015	BHP AC 067
Conductivity		µS/cm	3880	16/12/2015	BHP AC 067

Additional information: *Subcontracted to an approved accredited supplier

For and on behalf of BHP laboratories :

John O' Halloran

Issue Date : 11/01/16

Test results relate only to this/these items. This test report shall not be duplicated in full without the permission of the test laboratory.

TEST REPORT 119984.13

Analysing
Testing
Consulting
Calibrating



Client: Environmental Department
Limerick City Council
Dooradoyle
Co. Limerick

FTAO: Tara Flanagan

BHP Ref. No.: 15/12/442
Order No.:
Date Received: 16/12/15
Date Completed: 23/12/15
Test Specification: Nil
Item: Annual Leachate 2015

BHP
New Road
Thomondgate
Limerick
Ireland
Tel +353 61 455399
Fax + 353 61 455447

Test	Client Reference	Units	Results	Date Analysed	Test Method
Boron	Sump	mg/L	0.263	23/12/2015	WAS049*
Cadmium		mg/L	0.0015	23/12/2015	WAS049*
Calcium		mg/L	222	23/12/2015	WAS049*
Chromium		mg/L	0.0178	23/12/2015	WAS049*
Copper		mg/L	0.0601	23/12/2015	WAS049*
Iron		mg/L	103	23/12/2015	WAS049*
Lead		mg/L	0.0297	23/12/2015	WAS049*
Magnesium		mg/L	21.4	23/12/2015	WAS049*
Manganese		mg/L	1.28	23/12/2015	WAS049*
Nickel		mg/L	0.0136	23/12/2015	WAS049*
Potassium		mg/L	22	23/12/2015	WAS049*
Sodium		mg/L	33.4	23/12/2015	WAS049*
Zinc		mg/L	0.175	23/12/2015	WAS049*
Mercury		mg/L	<0.0001	21/12/2015	WAS013*
Fluoride		mg/L	0.1	18/12/2015	BHP AC 019
Sulphate (as SO ₄)		mg/L	32	22/12/2015	BHP AC 095
Orthophosphate (as P)		mg/L	0.10	17/12/2015	BHP AC 095
Nitrate (as NO ₃)		mg/L	28.4	18/12/2015	BHP AC 019
Nitrite (as NO ₂)		mg/L	0.07	18/12/2015	BHP AC 019
Total Oxidised Nitrogen (as N)		mg/L	6.44	18/12/2015	BHP AC 065
Cyanide	mg/L	<0.05	21/12/2015	BHP AC 095	
Ammonia (as N)	mg/L	16	17/12/2015	BHP AC 095	
B.O.D.	mg/L	29	18/12/2015	BHP AC 005	
C.O.D.	mg/L	100	17/12/2015	BHP AC 006	
pH	-	8.03	16/12/2015	BHP AC 067	
Conductivity	µS/cm	979	16/12/2015	BHP AC 067	

Additional information: *Subcontracted to an approved accredited supplier

For and on behalf of BHP laboratories :

John O' Halloran

Issue Date : 11/01/16

Test results relate only to this/these items. This test report shall not be duplicated in full without the permission of the test laboratory.

Appendix H:

Tables 4.1 to 4.8 indicating the parameters and frequencies to be monitored in accordance with the EPA licence 76-1.

Table 4.1 Landfill Gas Monitoring and Parameters

Parameter	Monitoring Frequency			Analysis Method ^{Note 1} / Technique ^{Note 2}
	Perimeter Boreholes <small>Note 3</small>	Other Boreholes/ Vents/Wells	Site Office	
Methane (CH ₄) % v/v	Weekly	Monthly	Weekly	Infrared analyser/flame ionisation detector
Carbon dioxide (CO ₂)%v/v	Weekly	Monthly	Weekly	Infrared analyser/ flame ionisation detector
Oxygen(O ₂) %v/v	Weekly	Monthly	Weekly	Electrochemical cell
Atmospheric Pressure	Weekly	Monthly	Weekly	Standard
Temperature	Weekly	Monthly	Weekly	Standard

Note 1: All monitoring equipment used should be intrinsically safe.

Note 2: Or other methods agreed in advance with the Agency.

Note 3: Weekly for first two months upon installation and monthly thereafter.

Table 4.2 Dust/ PM₁₀ Monitoring Frequency

Parameter (mg/m ² /day)	Monitoring Frequency	Analysis Method/Technique
Dust	Three times a year ^{Note 2}	Standard Method ^{Note 1}
PM ₁₀	Quarterly	See ^{Note 3}

Note 1: Standard method VDI2119 (Measurement of Dustfall, Determination of Dustfall using Bergerhoff Instrument (Standard Method) German Engineering Institute). Any modifications to eliminate interference due to algae growth in the gauge should be reported to the Agency.

Note 2: Twice during the period May to September.

Note 3: As described in prEN12341 or an equivalent agreed with the Agency.

Table 4.3 Noise Monitoring Frequency

Parameter	Monitoring Frequency	Analysis Method/Technique
L(A) _{EQ} [30 minutes]	Bi-Annual	Standard ^{Note 1}
L(A) ₁₀ [30 minutes]	Bi-Annual	Standard ^{Note 1}
L(A) ₉₀ [30 minutes]	Bi-Annual	Standard ^{Note 1}
Frequency Analysis(1/3 Octave band analysis)	Bi-Annual	Standard ^{Note 1}

Note 1: "International Standards Organisation. ISO 1996. Acoustics - description and Measurement of Environmental noise. Parts 1, 2 and 3."

Table 4.4 Surface Water, Groundwater & Leachate – Parameters/Frequency

Parameter ^{Note 1}	SURFACE WATER ^{Note 2}	GROUNDWATER	LEACHATE ^{Note 3}
	Monitoring Frequency	Monitoring Frequency	Monitoring Frequency
Visual Inspection/Odour ^{Note 2}	Weekly	Quarterly	Quarterly
Groundwater Level	Not Applicable	Monthly	Not Applicable
Leachate Level	Not Applicable	Not Applicable	Continuous
Ammoniacal Nitrogen	Quarterly	Quarterly	Annually
BOD	Quarterly	Not Applicable	Annually
COD	Quarterly	Not Applicable	Annually
Chloride	Quarterly	Quarterly	Annually
Dissolved Oxygen	Quarterly	Quarterly	Not Applicable
Electrical Conductivity	Quarterly	Quarterly	Annually
pH	Quarterly	Quarterly	Annually
Total Suspended Solids	Quarterly	Not Applicable	Not Applicable
Temperature	Quarterly	Quarterly	Quarterly
Metals / Non Metals ^{Note 3}	Annually	Annually	Annually
Cyanide (Total)	Not Applicable	Annually	Annually
Fluoride	Not Applicable	Annually	Annually
List I/II Organic Substances ^{Note 4}	Once off ^{Note 5}	Annually ^{Note 5}	Once off ^{Note 5}
Mercury	Annually	Annually	Annually
Sulphate	Annually	Annually	Annually
Total Alkalinity	Annually	Annually	Not applicable
Total P/Orthophosphate	Annually	Annually	Annually
Total Oxidised Nitrogen	Annually	Annually	Annually
Total Organic Carbon	Not Applicable	Quarterly	Not Applicable
Residue on evaporation	Not Applicable	Annually	Not Applicable
Biological Assessment	Annually ^{Note 6}	Not Applicable	Not Applicable

Note 1: All the analysis shall be carried out by a competent laboratory using standard and internationally accepted procedures.

Note 2: Where there is evident gross contamination of leachate, additional samples should be analysed.

Note 3: Metals and elements to be analysed by AA/ICP should include as a minimum: boron, cadmium, calcium, chromium (total), copper, iron, lead, magnesium, manganese, nickel, potassium, sodium and zinc.

Note 4: Samples screened for the presence of organic compounds using Gas Chromatography / Mass Spectrometry (GC/MS) or other appropriate techniques and using the list I/II Substances from EU Directive 76/464/EEC and 80/68/EEC as a guideline. Recommended analytical techniques include: volatiles (US Environmental Protection Agency method 524 or equivalent), semi-volatiles (USEPA method 525 or equivalent, and pesticides (USEPA method 608 or equivalent).

Note 5: 2 surface water locations, 3 groundwater locations and 2 leachate locations to be agreed with the Agency for these parameters.

Note 6: Appropriate biological methods (such as EPA Q-Rating System) to be used for the assessment of rivers and streams.

Table 4.5 Meteorological Monitoring

To be obtained from Shannon Airport or an agreed location.

Parameter	Monitoring Frequency	Analysis Method/Technique
Precipitation Volume	Daily	Standard
Temperature (min/max.)	Daily	Standard
Wind Force and Direction	Daily	Standard
Evaporation	Daily	Standard
Evapotranspiration ^{Note 1}	Daily	Standard
Humidity	Daily	Standard
Atmospheric Pressure ^{Note 1}	Daily	Standard

Note 1: Monitoring frequency for these parameters may be decreased with the agreement of the Agency.**Table 4.6 Landfill Gas Combustion Plant/ Enclosed Flare Parameters**

Parameter	Flare (enclosed) Monitoring Frequency	Utilisation Plant Monitoring Frequency	Analysis Method ^{Note1} /Technique ^{Note2}
Inlet			
Methane (CH ₄) % v/v	Continuous	Weekly	Infrared analyser/flame ionisation detector/thermal conductivity
Carbon dioxide (CO ₂)%v/v	Continuous	Weekly	Infrared analyser/ thermal conductivity
Oxygen (O ₂) %v/v	Continuous	Weekly	Electrochemical/thermal conductivity
Total Sulphur	Annually	Annually	Ion chromatography
Total Chlorine	Annually	Annually	Ion chromatography
Total Fluorine	Annually	Annually	Ion Selective Electrode
Process Parameters			
Combustion Temperature	Continuous	Quarterly	Temperature Probe/datalogger
Outlet			
CO	Continuous	Continuous	Flue gas analyser/datalogger
NOx	Annually	Annually	Flue gas analyser
SO ₂	Annually	Annually	Flue gas analyser

Parameter	Flare (enclosed) Monitoring Frequency	Utilisation Plant Monitoring Frequency	Analysis Method ^{Note1} /Technique ^{Note2}
Particulates	Not applicable	Annually	Isokinetic/Gravimetric
TA Luft Class I, II, III organics	Not applicable	Annually	Adsorption/Desorption /GC/GCMS ^{Note 3}
TOC	Annually	Not applicable	Flame ionisation
Hydrochloric acid	Annually	Annually	Impinger / Ion Chromatography
Hydrogen fluoride	Annually	Annually	Impinger / Ion Chromatography

Note 1: All monitoring equipment used should be intrinsically safe.

Note 2: Or other methods agreed in advance with the Agency.

Note 3: Test methods should be capable of detecting acetonitrile, dichloromethane, tetrachlorethylene and vinyl chloride as a minimum.

Table 4.7 Monitoring of Emissions to Sewer

Parameter	Monitoring Frequency	Analysis Method/Technique ^{Note 1}
Methane	Continuous	Dissolved Methane Probe /Headspace methane monitor

Note 1: To be agreed in advance with the Agency.

Table 4.8 Monitoring of Emissions from On-Site Leachate Treatment Plant

Parameter	Monitoring Frequency	Analysis Method/Technique ^{Note 1}
Flow	Continuous	Flow meter / recorder
pH	Continuous	pH meter / recorder
Biochemical Oxygen Demand	Twice Weekly	Standard Method ^{Note 2}
Chemical Oxygen Demand	Weekly	Standard Method ^{Note 2}
Total Nitrogen	Twice Weekly	Standard Method ^{Note 2}
Total P (as P)	Monthly	Standard Method ^{Note 2}
Suspended Solids	Weekly	Gravimetric



Environmental Protection Agency

[Guidance to completing the PRTR workbook](#)

PRTR Returns Workbook

Version 1.1.19

REFERENCE YEAR	2015
-----------------------	------

1. FACILITY IDENTIFICATION

Parent Company Name	Limerick City & County Council
Facility Name	Longpavement landfill site
PRTR Identification Number	W0076
Licence Number	W0076-01

Classes of Activity

No.	class_name
-	Refer to PRTR class activities below

Address 1	Monabraher
Address 2	
Address 3	
Address 4	
	Limerick
Country	Ireland
Coordinates of Location	-8.6335 52.6832
River Basin District	IEGBNISH
NACE Code	3832
Main Economic Activity	Recovery of sorted materials
AER Returns Contact Name	Ursula Ahern
AER Returns Contact Email Address	ursula.ahern@limerick.ie
AER Returns Contact Position	Assistant Scientist
AER Returns Contact Telephone Number	061 496592
AER Returns Contact Mobile Phone Number	087 9795576
AER Returns Contact Fax Number	
Production Volume	0.0
Production Volume Units	
Number of Installations	0
Number of Operating Hours in Year	0
Number of Employees	1
User Feedback/Comments	
Web Address	

2. PRTR CLASS ACTIVITIES

Activity Number	Activity Name
50.1	General
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](#)

4.1 RELEASES TO AIR

[Link to previous years emissions data](#)

SECTION A : SECTOR SPECIFIC PTRR POLLUTANTS

POLLUTANT		RELEASES TO AIR		METHOD		Please enter all quantities in this section in KGS		QUANTITY	
No. Annex II	Name	M/C/E	Method Code	Method Used Designation or Description	Emission Point 1	T (Total) KG/Year	A (Accidental) KG/Year	F (Fugitive) KG/Year	
01	Methane (CH4)	C	OTH	US EPA Land gem	439983.0	439983.0	0.0	0.0	0.0
03	Carbon dioxide (CO2)	E	OTH	US EPA Land gem	137478.66	137478.66	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 PTRR POLLUTANTS

POLLUTANT		RELEASES TO AIR		METHOD		Please enter all quantities in this section in KGS		QUANTITY	
No. Annex II	Name	M/C/E	Method Code	Method Used 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)

POLLUTANT		RELEASES TO AIR		METHOD		Please enter all quantities in this section in KGS		QUANTITY	
Pollutant No.	Name	M/C/E	Method Code	Method Used 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 purpose 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 according the figure for total methane generated. Operators should only report their Net methane (CH4) emission to the environment under 'Total' (Kg/y) for Section A; Sector specific PTRR pollutants above. Please complete the table below.

Landfill: Longgravesment landfill site	Please enter summary data on the quantities of methane flared and / or utilised		Method Used		Facility Total Capacity m3 per hour
	T (Total) kg/Year	M/C/E	Method Code	Designation or Description	
Total estimated methane generation (as per site model)	536112.0	C	OTH	US EPA Land gem	N/A
Methane flared	961291.0	C	OTH	enclosed flare	150.0 (Total Flaring Capacity)
Methane utilised in engines/Net methane emission (as reported in Section A above)	439983.0	C	OTH	US EPA Land gem	0.0 (Total Utilising Capacity)

5. ONSITE TREATMENT & OFFSITE TRANSFERS OF WASTE

Please enter all quantities on this sheet in Tonnes

3

Transfer Destination	European Waste Code	Hazardous	Quantity (Tonnes per Year)	Description of Waste	Waste Treatment Operation	Method Used		Location of Treatment	Hazard Waste Name and Licence/Permit No of Next Destination Facility		Hazard Waste Name and Licence/Permit No 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		Haz Waste Name and Licence/Permit No of Next Destination Facility	Haz Waste Name and Licence/Permit No of Recover/Disposer				
Within the Country	19 07 03	No	1118.0 in 19 07 02	landfill/leachate other than those mentioned	D8	C	Volume Calculation	Onsite in Ireland	01	Limerick City Council, D0013, Treatment Plant, Limerick, Ireland	Bunklekey Waste Water			

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