



Annual Environmental Report 2016 for Crystalhill Inns Ltd T/A CHI  
Environmental Grannagh, Kilmacow, Co. Kilkenny licence number  
W0260-01

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## INTRODUCTION

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This Annual Environmental Report provides information on environmental compliance at the CHI Environmental Soil Recovery Facility, Grannagh, Kilmacow, Co. Kilkenny.

The Environmental Protection Agency issued licence number W0260-01 to Crystalhill Inns Ltd T/A CHI Environmental on the 25<sup>th</sup> of May 2016. This report covers the partial year from the 25<sup>th</sup> of May to the 31<sup>st</sup> of December 2016. An Annual Return Report was compiled for the period from the 1<sup>st</sup> of January to the 24<sup>th</sup> of May 2016 and in accordance with its conditions returned through the NWCPO Waste Facility return portal.

In accordance with Schedule E of the Waste Licence (W0260-01) an Annual Environmental Report (AER) is to be prepared and submitted yearly.

## 1. ENVIRONMENTAL MONITORING AT THE FACILITY

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### 1.1 Environmental Monitoring at CHI Environmental Soil Recovery Facility.

During the year 2016 environmental monitoring was undertaken at the site in accordance with conditions of waste licence W0260-01.

The following environmental parameters were monitored in accordance with conditions Schedule C:

- Dust (2 Monitoring Points – D1, D2- twice annually)
- Ground Water (3 Monitoring Points – GW1, GW2, GW3 annually)
- Noise ( 3 Monitoring Points – N1, N2, N3 annually)
- Surface Water Monitoring

See drawing appendix 1 for site layout.

#### 1.1.2 Dust Monitoring

Dust Deposition Monitoring was undertaken twice annually in 2016 as per the WFP W023E/2007 and Schedule C of the Licence W0260-01.

Dust monitoring taken in relation to the Licence from the 1<sup>st</sup> of September to the 30<sup>th</sup> of September.

Dust deposition monitoring was based on the modified version of the Bergerhoff Method VDI2119 – “Measurement of Dustfall using the Bergerhoff Instrument” (Standard Method). A 30 day composite sample with results expressed as mg/ m2/day.

Dust Deposition Limits – 350mg/m2/day.

### 2016 - Dust Deposition Results Summary

Sampling Date	Location	Dust Deposition (mg/m2/day)	Result Limit (mg/m2/day)
30/09/15	DS1	83.6	350
	DS2	134.2	

#### 1.1.3 Ground Water Monitoring

In accordance with Schedule C of the Waste Licence, Ground water sampling was carried out at 3 points across the site.

See Appendix 2 containing S.M. Bennett consulting report on ground water analysis.

#### 1.1.4 Noise Monitoring

Noise Monitoring was undertaken at the facility during 2016 at 3 points as required as part of schedule C.2 Noise Monitoring.

See Appendix 3 containing BHP Laboratories report on noise monitoring analysis.

#### 1.1.5 Surface Water Monitoring

Surface water monitoring was not undertaken in the period. No surface water is currently discharged from any permeable surface on the site. A report has been submitted to the Agency for review with proposal to change this and once agreed surface water sampling can be carried out.

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## 2. WASTE MANAGEMENT AT THE FACILITY

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### 2.1 Waste Management and Recovery at the facility

Only waste fill conforming to European Waste Catalogue Codes granted to the facility was accepted at the facility during 2016. All waste to the facility was recorded and once agreed with our inspector weighed over the certified weighbridge at the site entrance. The majority of waste fill accepted at the facility emanated from construction works within the south Kilkenny and Waterford city area.

The following table shows the sites permitted intake:

EW CODE	WASTE TYPE <small>Notes 1 &amp; 2</small>	MAXIMUM (TONNES PER ANNUM)
17 05 04	Soils and stones other than those mentioned in 17 05 03	125,000
17 05 06	Dredge spoil other than those mentioned in 17 05 05	
17 05 08	Track Ballast other than those mentioned in 17 05 07	
17 01 01	Concrete	45,000
17 01 02	Bricks	
17 01 07	Mixtures of concrete, bricks, tiles and ceramics (other than those mentioned in 17 01 06)	
17 03 02	Bituminous mixtures other than those mentioned in 17 03 01*	
17 09 04	Mixed construction and demolition wastes	
<b>Total</b>		170,000

*W026-01 Permitted EWC and Tons*

The site uses the waste soil to recover the fill area while the concrete, bituminous mixtures and Mixed C&D is recycled on site. Currently there is an article 28 application with the agency with regard to the recycling of concrete material on site to produce an aggregate product. The recycling material is currently either stockpiled on site or sent to further waste licence or permitted facilities.

**Total Waste Handled in 2016- CHI Environmental (W0260-01)**

<b>TOTAL WASTE HANDLED in 2016:</b>	<b>39198 Tonnes</b>
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### Breakdown EWC category Tonnage to CHI Environmental

EWC Code	Tonnes
17 05 04	12866
17 01 01	14950
17 03 02	1855
17 09 04	9527
<b>Total 2015</b>	<b>39198</b>

### Wastes removed from Site

Date	Waste Description	EWC Code	Tonnes	Destination / Authorisation No.
09/11/2016	Mixed Waste from Waste Storage Area	17 09 04	9.2	Starrus Eco Holdings Ltd Six Cross Rd Waterford W0166-01

### 2.2 Waste Recovery

All waste soil fill taken to the site was recovered at the facility. The careful placement of fill and the subsequent reseeded, rolling etc. ensured that the resultant ground was agriculturally viable.

No waste loads were rejected from the facility during 2016. All waste accepted at the site was in compliance with conditions of the Waste Licence.

Some extraneous individual items of non-complaint materials were extracted from loads during offloading at the Recycling Area. These items included pieces of plastic piping / ducting, geo-textiles, reinforcing steel bars, waste timber etc. These wastes were segregated and items were placed in 30 cu y skip located in the on-site Waste Quarantine Area. The material was collected by and brought to the Greenstar Waste facility in Waterford city (W0166-01) for recovery as per table.

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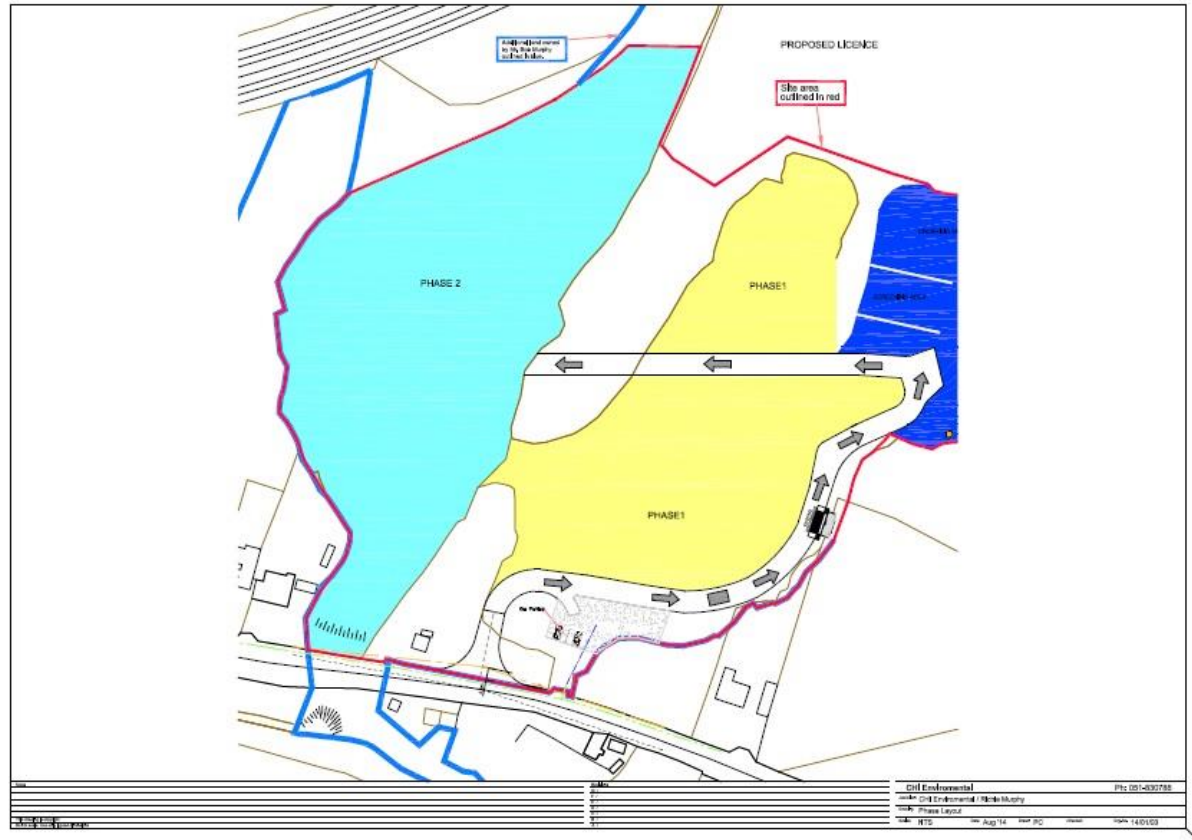
## 3. SITE WORKS

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### 3.1 Progress of Waste Deposition Works

The site was approximately 60% by volume filled by end of 2016. All wastes taken to the site have been deposited in accordance with the phased filling plan. Phase 1 (the eastern

section of the site) is nearing completion. Reseeding and the rendering of filled areas as suitable for agriculture have been undertaken in sub-phases of Phase 1. This ensured that the amount of exposed bare earth was limited to only fresh fill and it also reduced the impact from dust to the atmosphere and suspended solids to the drainage system and freshwaters.



Phase layout

### 3.2 Expected Project Completion Date

The expected completion date for the project is unknown at this date as it is dependent on the upcoming availability of suitable volumes of fill in the catchment area.

### 3.3 Topographical Survey

A topographical survey was undertaken in December 2016 by Byrne & McCabe engineers. See attached appendix 4 for the report and the accompanying drawing.

### 3.4 Stability Assessment

A stability assessment was undertaken in December 2016 by Byrne & McCabe engineers. See attached appendix 4 for the report.

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## 4. RESOURCE MANAGEMENT AT THE FACILITY

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### 4.1 Resource Consumption, Use and Energy Efficiency Report

All items of plant used at the facility are powered by diesel combustion engines. A tracked bulldozer was utilised to place and level incoming fill material at the facility. A Tracked excavator, crusher and screener as well as a wheel loader is used in the recycling area. Electricity and water is used only in the office and canteen on site, these are very low usage.

#### Total Fuel Usage in 2016

<b>TOTAL FUEL USED in 2015:</b>	28,250 Litres

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## 5. COMPLAINTS SUMMARY

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### 5.1 Complaints

Details of all complaints made by the public are recorded in a Complaints Register. Complaints can be registered by contacting management or staff at the site. The register includes the name of the complainant, the nature of the complaint, the date of the complaint and the actions taken to remedy the complaint. The Managing Director / Facility Manager must sign off all completed forms.

There were no complaints received during the reporting period.

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## 6. ENVIRONMENTAL MANAGEMENT AT THE FACILITY

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## 6.1 Schedule of Environmental Objectives and Targets

- To comply fully with the conditions of EPA Waste Licence W0260-01
- To comply with applicable environmental legislation and best industry practice
- To be a good neighbour
- To achieve continuous improvement in environmental performance
- Conserve resources by making efficient use of energy and raw materials
- Be committed to good environmental management

## 6.2 Environmental Management Programme – Report for 2016

As the licence only began in 2016 the EMP has only recently been developed. In 2016 sound berm was added along the north side of the recycling area so as to reduce visual impact to some neighbours. This has been grass seeded and this is now established.

## 6.3 Environmental Management Programme – Proposal for 2017

As this is the first full year of the licence it is proposed to undertake a review of the EMP and to undertake any steps developed through that review on site.

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# 7. TANK AND PIPELINE TESTING AND INSPECTION REPORT

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## 7.1 Tank and Pipeline Testing / Inspection

There are no items requiring testing or inspection at the facility. No oils or fuels are stored on the site. No chemicals are stored at the facility. Re-fueling is undertaken using mobile fuel bowser (self-bunded).

There are a number of weekly inspections undertaken at the site in relation to plant maintenance and other items. These are kept on file at the site office.

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# 8. REPORTED INCIDENTS SUMMARY

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## 8.1. Reported Incidents Summary

There were no reportable incidents at the facility during 2016.

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## 9. FACILITY MANAGEMENT

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### 9.1 Management and Staffing Structure at the Facility

CHI Environmental currently employs 4 full time and 4 part time staff. Bob Murphy is managing director of the company. The facility is managed by Mr. Richard Murphy with Mr. Nicky Murphy as Assistant Manager.

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## 10. REVIEW OF CLOSURE, RESTORATION AND AFTERCARE MANAGEMENT PLAN (CRAMP)

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### 10.1 CRAMP Review

A comprehensive Closure, Aftercare and Management Plan (CRAMP) is in place for the facility having been developed by Kingfisher Environmental Consultants. The plan was developed once the Licence was granted in 2016 and this has been submitted to the Agency for review. It is deemed at this time to need no alterations.

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## 11. ENVIRONMENTAL LIABILITIES RISK ASSESSMENT REVIEW

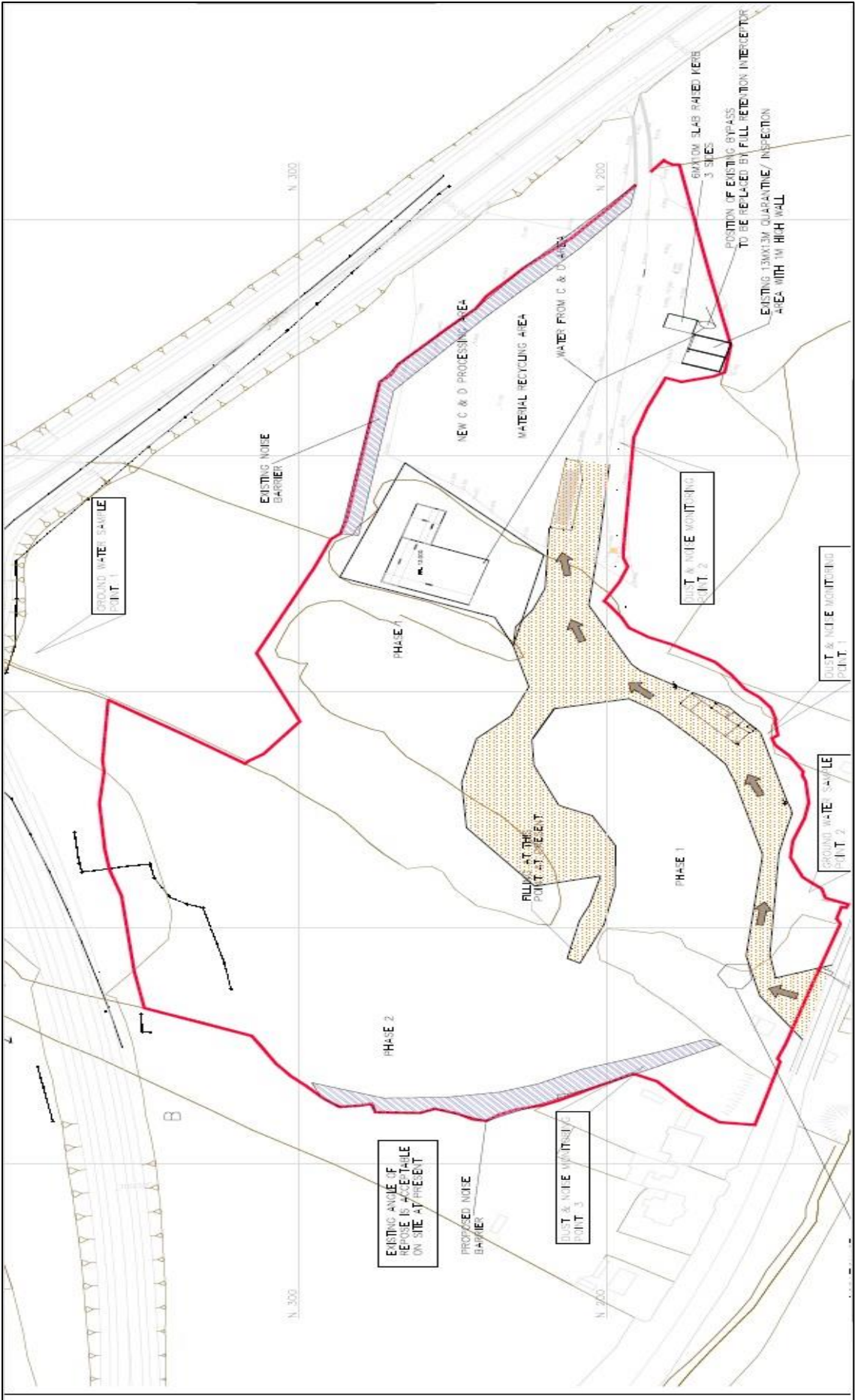
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### 11.1 ELRA Review

An Environmental Liabilities Risk Assessment ELRA has been carried out by Kingfisher Environmental Consultants. The assessment was carried once the Licence was granted in 2016 and this has been submitted to the Agency for review. It is deemed at this time to need no alterations.

## Appendix 1 Site Layout Drawing







## Appendix 2 S.M. Bennet Ground Water Report

# GROUNDWATER MONITORING REPORT

Date of Issue: 31<sup>st</sup> March, 2017

FAO Mr. Pat Murphy,  
CHI Environmental,  
Grannagh,  
Kilmacow  
County Kilkenny.

Our Ref: rt310317chigran2.15  
Your Ref: (GW Report)

## 1 SUMMARY

This report reviews groundwater quality in respect of a former rock quarry at Grannagh, Co. Kilkenny. The results are compared with the EPA Threshold Values or equivalent groundwater quality indicators.

## 2 DESCRIPTION OF SAMPLING POINTS & METHODOLOGY

A description of the sampling points, their location and the reported methodology are presented in this section of the report.

### 2.1 Groundwater Sampling Points

The groundwater data under review has been collected and analysed from the three sampling boreholes listed in Table 2 / §2.2.

Table 1 / §2.1  
Groundwater Monitoring Boreholes

ID	Location	Grid Reference
PT-1	Northern Site Boundary (Midpoint)	S57736 15008
PT-2	Southern Site Boundary (Adj. Car Park)	S57682 14713
PT-3	Southern Site Boundary (Adj. Residence)	S57992 14798

It has been reported that PT-1 and PT-2 are 30m and 40m in depth respectively. The depth of PT-3 has not been ascertained but is estimated as being commensurate with that of a PT-1. No static water levels are available.

PT-1 and PT-2 are purpose-installed groundwater monitoring boreholes bored into limestone rock. PT-3 is a drilled domestic well likely to be of similar construction. Well diameters are expected to be ca. 150mm and capable of accommodating a standard submersible pump.

### 2.2 Sampling Methodology

Pre-sampling preparation of PT-1 and PT-2 has been reported to consist of purging using a submersible pump. The water sample is collected directly from the discharge after a prescribed period of time.



PT-3 is in constant use as a domestic supply. Treatment is absent and water samples are collected from a direct water feed taken from the well.

### 3 HYDROGEOLOGY

This section on site hydrogeology a summary taken from the S.M. Bennet & Co Ltd. report issued 28/April/2015.

The area of Grannagh is hydraulically bounded to the SE by the River Suir and to the NE by the River Blackwater. Land surface elevations are ca. 20m OD and the base of the original quarry is reported to have been below the adjacent water level in the River Suir which is estimated at ca. 2m OD and tidally-influenced.

Whilst there is no doubt that, generally speaking, regional groundwater is moving from NNW to SSE and towards the Suir, tidal influences, floods and low water table may cause temporal flow reversal in the immediate vicinity of the river.

Nonetheless, in an overall sense, if there were any leachate presence in groundwater either from the old dump adjacent to the east or from the quarry infill programme, one would expect to see a higher level of associated chemical indicators in PT2 when compared with PT1.

### 4 GROUNDWATER MONITORING REQUIREMENTS

The EPA's Groundwater Pollution Indicators with respect to this type of site and the applicable Threshold Values are discussed in this section.

#### 4.1 EPA Groundwater Pollution Indicators

In respect of point source indicators arising from landfill and similar sites such as the quarry reinstatement at Grannagh, specific groundwater pollution identifiers have been defined by the Environmental Protection Agency (Daly, D. & Craig, M., 2010, P5. *Methodology for Establishing Groundwater Threshold Values & the Assessment of Chemical & Quantitative Status of Groundwater, including an Assessment of Pollution Trends and Trend Reversal*. Johnstown: EPA. Such identifiers are listed below in Table 2 / §4.1.

Table 2 / §4.1  
EPA Groundwater Pollution Identifiers (EPA 2010)

Aluminium	Cyanide
Ammonia	Lead
Arsenic	Mercury
Boron	Nitrate
Cadmium	Nitrite
Chloride	Organics (selected)
Chromium	Sodium
Conductivity, Electrical	Sulphate
Copper	

Additional landfill-associated identifiers in water and included in the recent analysis are listed in Table 2 / §4.1 as follows:

**Table 3 / §4.1  
Supplementary Groundwater Pollution Identifiers**

BOD	pH
COD	Phosphorus
TOC	TDS
Iron	Zinc
Magnesium	Coliforms
Manganese	E. coli.
Nickel	DROs
Nitrite	PROs
Total Nitrogen	Mineral Oils
Orthophosphate	TPHs

#### 4.2 Threshold Values

The following description is taken from the S.M. Bennet & Co. Ltd. report issued 28/April/2015.

This is an unlined site and natural recharge percolation is the mechanism by which infiltration reaches the water table. The underlying bedrock beneath the immediate area is Dinantian Lower Impure Limestone (DLIL), a limestone/shale overlying the Kiltorcan Old Red Sandstone which lies to the south. The aquifer classification is as stated in the EIS: LI, a Locally Important Aquifer – moderately productive only in Local zones. Since the water body recharged by infiltration is the aquifer and its most sensitive use is for drinking water supply, the TVs (Threshold Values) to be applied to the receiving body for the pollutant identifiers are, in effect, the drinking water quality standards as listed in Schedule 5 of the Groundwater Regulations.

## 5 GROUNDWATER QUALITY REVIEW

The laboratory analytical results for the EPA Groundwater Pollutant Identifiers (GPIs) and a number of supplementary parameters that were reported for the samples collected in this most recent round of sampling undertaken on 15/December/2016 are presented in summary form in Table 4 / §5.1.

### 5.1 GPIs including Metals & Standard Chemicals

Without exception, none of the Threshold Values have been exceeded in the December 2016 round of sampling. All of the supplementary parameters introduced have tested either below detection or well below their respective TVs.

It was noted in the 2015 groundwater monitoring report that a number of volatile organic compounds (VOCs) were detected by ALcontrol in their analysis for SVOCS and VOCs. These compounds are trihalomethanes linked to sodium hypochlorite formerly used as a sterilising agent prior to purging and sampling.

Table 4 / §5.1  
Groundwater Monitoring Results at Grannagh (CHI Environmental) 15/December/2016

Parameter	Units	Groundwater Sampling Points												TVs
		PT-1			PT-2			PT-3						
		9.10.12	12.3.14	3.2.15	15.12.16	12.10.12	12.3.14	23.1.15	15.12.16	26.1.15	15.12.16	15.12.16		
Aluminium (total as AL)	mg/l	<0.2	<0.2	<0.2	<100	0.344	<0.2	0.203	<100	<0.2	<100	<0.1	<0.1	200
Ammonia (as N)	mg/l	0.322	0.308	0.399	<0.1	0.466	0.686	535	<0.1	0.218	<0.1	<1	<1	0.23
Arsenic (total as As)	µg/l	68.1	37.3	32.3	<230	98.7	105	107	<230	28.5	<230	<230	<230	1,000
Boron (total as B)	µg/l	-	-	-	<2	-	-	-	<2	-	<2	<2	<2	2.0
BOD	mg/l	<0.1	<0.1	<0.1	<0.6	0.551	0.432	0.485	<0.6	<0.1	<0.6	<0.6	<0.6	5.0
Cadmium (dissolved as Cd)	µg/l	-	-	-	8.6	-	-	-	7.2	-	7.2	2.5	2.5	-
Carbon, Total Organic	mg/l	47.9	41.8	26.7	51	69.6	102	82.9	123	19.2	123	23	23	250
Chloride	mg/l	2.15	10.6	2.02	3.4	2.22	<3	2.58	2.0	0.961	2.0	2.0	2.0	50
Chromium (total as Cr)	µg/l	-	-	-	<15	-	-	-	<15	-	<15	<15	<15	40
COD	mg/l	-	-	-	895	1,004	1,320	1,050	1,218	353	527	527	527	1,500
Conductivity	µS/cm@20°	646	629	674	895	1,004	1,320	1,050	1,218	353	527	527	527	2,000
Copper (dissolved as Cu)	µg/l	<0.85	0.99	35.4	<9	1.69	2.71	0.971	<9	7.05	<9	<9	<9	50
Cyanide	µg/l	<50	<50	<50	<9	<50	<50	<50	<9	<50	<9	<9	<9	50
Iron (dissolved as Fe)	mg/l	<0.02	0.102	1.09	<0.23	0.063	0.198	0.118	<0.23	-	<0.23	<0.23	<0.23	2.0
Lead (dissolved as Pb)	µg/l	-	-	-	<6	0.063	0.198	0.118	<6	0.092	<6	<6	<6	10
Magnesium (diss. as Mg)	mg/l	-	-	-	25.1	-	-	-	18.8	-	18.8	<0.6	<0.6	10
Manganese (diss. as Mn)	µg/l	-	-	-	<7	-	-	-	18.8	-	18.8	<7	<7	50
Mercury (dissolved as Hg)	µg/l	0.0404	0.0526	<0.01	<0.1	<0.01	0.0131	<0.01	<0.1	<0.01	<0.1	<0.1	<0.1	1.0
Nickel (dissolved as Ni)	µg/l	-	-	-	3.1	-	-	-	5.3	-	5.3	<3	<3	20
Nitrate (as N)	mg/l	3.58	2.96	11.2	3.59	5.68	2.69	4.13	2.7	3.9	2.7	3.5	3.5	11.3
Nitrite (NO <sub>2</sub> )	mg/l	-	-	-	-	-	-	-	-	-	-	-	-	0.15
Nitrogen, Total (as N)	mg/l	-	-	-	3.4	-	-	-	2.5	-	2.5	<0.01	<0.01	0.01
Orthophosphate (tot as P)	mg/l	-	-	-	<0.01	-	-	-	<0.01	-	<0.01	<0.01	<0.01	0.01
pH	mg/l	-	-	-	7.28	-	-	-	7.11	-	7.11	7.76	7.76	-
Phosphorus (total as P)	mg/l	-	-	-	<0.075	-	-	-	<0.075	-	<0.075	<0.075	<0.075	2.2
Sodium (total as Na)	mg/l	26.6	19.4	13.6	22.8	41.4	62.7	49.7	49.5	98.6	100	100	100	150
Sulphate (as SO <sub>4</sub> )	mg/l	81.6	19.3	16.1	65	144	287	139	141	60.3	57	57	57	250
Solids, Total Dissolved	mg/l	-	-	-	550	-	-	-	746	-	746	338	338	-
Zinc (dissolved as Zn)	µg/l	-	-	-	<18	-	-	-	<18	-	<18	<18	<18	1,000
Coliforms, Total	MPN/100ml	-	-	-	3	-	-	-	166	-	166	4	4	-
E. Coli	MPN/100ml	-	-	-	ND	-	-	-	8	-	8	ND	ND	-
Diesel Range Organics (C <sub>10</sub> -	mg/l	-	-	-	<0.01	-	-	-	<0.01	-	<0.01	<0.01	<0.01	0.01
Petrol Range Organics (C <sub>6</sub> -	mg/l	-	-	-	<0.01	-	-	-	<0.01	-	<0.01	<0.01	<0.01	0.01
Mineral Oils (C <sub>10</sub> -C <sub>40</sub> )	mg/l	-	-	-	<0.01	-	-	-	<0.01	-	<0.01	<0.01	<0.01	0.01
Total Petroleum	mg/l	-	-	-	<0.01	-	-	-	<0.01	-	<0.01	<0.01	<0.01	0.01

Results printed in bold and underlined represent an exceedance of the Threshold Value.

## 6 OBSERVATIONS & RECOMMENDATIONS

### 6.1 Microfiltration

Microfiltration of all water samples prior to preservation is recommended. For a more comprehensive review of microfiltration, please see §6.1 in the 2015 sampling report.

### 6.2 Hydrometric Data

Static water levels, purge volumes and other relevant sampling details should be recorded for each monitoring point prior to purging has been recommended.

### 6.3 Sterilisation

The practice of sterilisation of boreholes with 11% sodium hypochlorite has been discontinued.

### 6.4 Electrical Conductivity

Although the TV of 1,500  $\mu\text{S}/\text{cm}$  has not been exceeded, consistent with the 2015 sampling report, Electrical Conductivity values remain significantly elevated. This is particularly the case in PT-2 where brackish conditions are suspected. The high TDS content is undoubtedly linked to conductivity and there may also be a significant suspended solids content. A specific conductivity investigation is recommended which may result in a change of sampling practice.

### 6.5 Sampling Span

It is recommended that sample collection take place within not more than few hours.

### 6.6 Sample-Analysis Time Lag

Samples were collected on 15/December/2016 and delivered to the laboratory on the same day. However the date of completion of analysis is recorded as 6/Jan/2016, an interval of 22 days. On this occasion the samples were collected on a Thursday in the lead up to the Christmas holidays. It is recommended that the laboratory be consulted before future sample collection so as to ensure a two-week turnaround.

### 6.7 Ammonia & Sulphate

Concentrations of ammonia and sulphate in 12/2016 were less than 50% of the TV for 250 mg/l.

### 6.8 Nitrate

Nitrate was at background concentrations in all three samples. It should be noted that analytical reporting of nitrate as  $\text{NO}_3$  must be converted to nitrate as N to facilitate appropriate comparison with the TV and former results.

### 6.9 Nitrite & Aluminium

Although Total Nitrogen, Nitrate and Ammonia were all comfortably within their TVs, it is requested that nitrite be included in future monitoring. Aluminium was not detected above 100mg/l or 50% of the TV.

### 6.10 Cyanide

Following a recommendation made in 2015, the detection limit for cyanide was reduced to 9  $\mu\text{g}/\text{l}$ . Cyanide was not detected.

### 6.11 Organic Compounds

Analysis of the full range of petroleum-related hydrocarbon compounds was undertaken. Hydrocarbons were not detected. A detection level of 0.01mg/l was used by the laboratory which is equivalent to the TV. It is recommended that a lower detection level be employed in future monitoring.

### 6.12 Supplementary Quality Indicators

In addition to TDS, Hydrocarbons, Total nitrogen, and Nitrite, the following supplementary water quality indicators were analysed: BOD; COD; TOC; Iron, Manganese; Magnesium; Nickel; Orthophosphate; pH, Phosphorus, and Zinc. In no case were such parameters either elevated above background or in excess of the respective TV.

### 6.13 Bacteriological Analyses

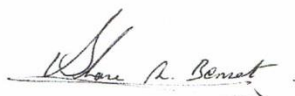
Analyses for Total Coliforms and E. coli were performed on the borehole samples. PT-1 was similar to PT-3 and was of potable quality in respect of bacteriological content. PT-2 contained 8 no. counts of E. coli and an elevated total coliform count of 188 no. This represents inferior quality non-potable groundwater and may indicate a local source of faecal contamination. Sampling procedure must be carefully reviewed before bacteria are re-sampled.

## 7 CONCLUSIONS

Notwithstanding the bacteriological results, groundwater quality as represented in the three boreholes sampled on 15/December/2016 as part of the monitoring programme does not indicate any negative impact from either the former quarry restoration or the adjoining historic landfill. Threshold Values were not exceeded for either the EPA's pollution indicators or the extensive suite of supplementary parameters analysed during this round of sampling. The excessive bacterial content detected in PT-2 appears to be from a faecal source and requires a specific investigation to determine its source. As an initial step in the investigation, it is recommended that presence of faecal matter and the high coliform counts be confirmed by repeat sampling. The sampler must be cognisant of wind directions and air quality. Samples must be maintained at <4° Celsius and analysed within 24 hours.

This concludes this report.

On behalf of S.M. Bennet & Co. Ltd, *Hydrogeological & Contaminant Consulting*



---

PGeo Shane Bennet *EurGeol, MSc., MEd.,*  
**Principal Hydrogeologist**

## Appendix 3 BHP Laboratories Noise Report

BHP/CEM/23/A

Analysing  
Testing  
Consulting  
Calibrating

**TEST REPORT 135364**

**Client:**  
CHI Environmental Ltd  
Grannagh  
Kilmacow  
Co. Waterford

**BHP Ref No.:** 17/03/1274  
**Order No.:**  
**Date Received:**  
**Date Tested:** 14<sup>th</sup> & 15<sup>th</sup> December 2017  
**Test Specification:** Noise Monitoring



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dervlapurcell@bhp.ie

**FAO:** Richie Murphy

*Item: Noise survey at noise sensitive locations at CHI Environmental Ltd,  
Kilmacow, Co Waterford*

**For and on behalf of BHP Ltd.**

A handwritten signature in black ink, appearing to read 'Dervla Purcell'.

**Dervla Purcell**  
**Date Issued:** 29<sup>th</sup> March 2017  
*Supplement to report No. N/A*

Test results relate only to this item. This test report shall not be duplicated except in full and with the permission of the test laboratory

BHP CEM Laboratory

## Contents

- 1.0 Scope
- 2.0 Survey Approach
- 3.0 Date of Survey
- 4.0 Results
  - 4.1 Noise levels
- 5.0 Interpretation of results
  - 5.1 Noise Levels
- 6.0 Conclusions

Appendix A: Map showing noise monitoring locations

Appendix B: Photographs indicating noise monitoring locations



## **1.0 Scope of survey**

At the request of CHI Environmental Ltd BHP undertook noise monitoring at their operation in Kilmacow, Co. Waterford. The purpose of this survey was to provide CHI Environmental with the noise data and analysis required as part of their planning requirements.

This report deals with three nominated noise locations at the operation in Kilmacow, Co. Waterford for 2016.

## **2.0 Survey approach**

Two sound level meters (SLM's) were used in the survey, a Cirrus 171C type 1 (serial number G068852) and a Cirrus 831C type 1 (serial number D21298FF). The SLM's were calibrated at the start of the survey with a CRL 515 calibrator (serial number 74767). The same calibrator was used to check the SLM at the end of the survey, to inspect the microphone drift.

Monitoring and the interpretation of acquired data is to the following standards:

- British Standard: BS 7445 Part 1: 1991 (ISO 1996-1: 1982) Description and measurement of Environmental Noise. Part 1. Guide to quantities and procedures.
- British Standard: BS 7445 Part 2: 1991 (ISO 1996-2: 1987) Description and measurement of Environmental Noise. Part 2. Guide to the acquisition of data pertinent to land use.
- British Standard: BS 7445 Part 3: 1991 (ISO 1996-3: 1987) Description and measurement of Environmental Noise. Part 3. Guide to application to noise limits.

30 minute daytime and evening levels were measured at 3 locations. 15 minute night time levels were measured at the same 3 locations. The locations were labelled as 1-3 and are identified on the map included in Appendix A.

Appendix B contains photographs of the monitoring points.

## **3.0 Date of Survey**

The survey was carried out on the 14<sup>th</sup> and 15<sup>th</sup> of December 2016 for the daytime, evening and night-time monitoring (30 minutes & 15minutes monitoring times) by Aidan Daffy

## **4.0 Results**

### **4.1 Noise levels:**

Levels are presented on the following pages.

**Day-time Measurements - Noise Locations – (15<sup>th</sup> December 2016)**

Location	Sampling Interval	Duration (mins)	L <sub>AEO</sub> dB	L <sub>A10</sub> dB	L <sub>A90</sub> dB	Wind speed m/s	Sampling notes
NSL1	09:26-09:56Hrs	30	54	57	47	1-2m/s SW	Traffic from surrounding roads audible at 48-58dB and up to 62dB at times. Trucks entering & leaving the facility could be heard at up to 58dB. Track machine working nearby for a 10 minutes period during the first reading at 50-60dB. Truck unloading nearby during reading 3 at 48-53dB. Crusher operated for 10minutes during reading 3 at 45dB approx.
	10:12-10:42Hrs	30	54	57	47		
	10:42-11:12Hrs	30	53	56	47		
NSL2	11:25-11:55Hrs	30	51	53	46	Wind speed m/s	Traffic from surrounding roads at 45-55dB. General activity from the facility, such as plant movements, track machine operating at 45-50dB. Trucks passing the facility audible at 50-55dB and up to 58dB at times. Crusher operated for 10minutes during reading 1 at 48-50dB. Some wind noise in nearby trees at 45-50dB.
	12:26-12:56Hrs	30	51	54	47	1-2m/s SW	
	12:56-13:26Hrs	30	51	54	47		
	13:26Hrs	30	51	54	47		
NSL3	10:32-11:02Hrs	30	55	58	52	Wind speed m/s	Traffic from surrounding roads audible at 50-60dB and up to 65dB at times. General activity around site was audible in the range of 45-50dB with crusher off. Crusher operated during reading 1 & 2 and audible at 50-55dB. Noise levels are very similar with crusher on or off.
	11:02-11:32Hrs	30	56	59	53	2-3m/s SW	
	11:32-12:02hrs	30	56	57	54		
	12:02hrs	30	56	57	54		

**Evening-time Measurements - Noise Locations - 14<sup>th</sup> December 2016**

<b>Location</b>	<b>Sampling Interval</b>	<b>Duration (mins)</b>	<b>L<sub>AEO</sub> dB</b>	<b>L<sub>A10</sub> dB</b>	<b>L<sub>A90</sub> dB</b>	<b>Wind speed m/s</b>	<b>Sampling notes</b>
<b>NSL1</b>	21:47-22:17Hrs	30	48	51	44	0	No Activity from CHI facility. Passing road traffic audible at 46-53dBA.
<b>Location</b>	<b>Sampling Interval</b>	<b>Duration (mins)</b>	<b>L<sub>AEO</sub> dB</b>	<b>L<sub>A10</sub> dB</b>	<b>L<sub>A90</sub> dB</b>	<b>Wind speed m/s</b>	<b>Sampling notes</b>
<b>NSL2</b>	21:42-22:12Hrs	30	44	46	40	0	No Activity from CHI facility. Passing road traffic audible at 43-48dBA.
<b>Location</b>	<b>Sampling Interval</b>	<b>Duration (mins)</b>	<b>L<sub>AEO</sub> dB</b>	<b>L<sub>A10</sub> dB</b>	<b>L<sub>A90</sub> dB</b>	<b>Wind speed m/s</b>	<b>Sampling notes</b>
<b>NSL3</b>	20:18-20:48Hrs	30	46	48	41	0	No Activity from CHI facility. Passing road traffic audible at 45-50dBA.

**Night-time Measurements - Noise Locations – 14<sup>th</sup> December 2016**

Location	Sampling Interval	Duration (mins)	L <sub>AEO</sub> dB	L <sub>A10</sub> dB	L <sub>A90</sub> dB	Wind speed m/s	Sampling notes
NSL1	23:04-23:19Hrs	15	45	47	41	0	No Quarry Activity. Distant road traffic audible at 35-45dBA.
	23:19-23:34Hrs	15	46	50	40		
NSL2	23:02-23:17Hrs	15	44	47	39	0	No Quarry Activity. Distant road traffic audible at 35-45dBA
	23:17-23:32Hrs	15	43	45	38		
NSL3	23:38-23:53Hrs	15	43	45	38	0	No Quarry Activity. Distant road traffic audible at 35-45dBA
	23:53-00:08Hrs	15	41	42	37		

## 5.0 Interpretation of results

### 5.1 Noise levels;

The daytime noise limits for CHI Environmental Ltd, Co Waterford are as follows:

Daytime Limit	$L_{Aeq}$ 55dBA
Evening time Limit	$L_{Aeq}$ 50dBA
Night time Limit	$L_{Aeq}$ 45dBA

#### 5.1.1 Day-time levels :

As can be seen in section 4.1,  $L_{Aeq}$  levels at the noise monitoring locations are less than the day time limit of 55dB at all locations except NSL3 for reading two and three. The crusher was operating during this monitoring period and was audible at 50-55dBA. It was noted that there was very little difference in reading one compared to reading two and three. In reading one, the crusher was not operational. The main noise source at this location as traffic noise in the range of 50-60dBA and up to 65dBA at times.

#### 5.1.1 Evening-time levels :

As can be seen in section 4.1,  $L_{Aeq}$  levels at the noise monitoring locations are less than the evening time limit of 50dB at all locations.

#### 5.1.1 Night-time levels :

As can be seen in section 4.1,  $L_{Aeq}$  levels at the noise monitoring locations are less than the day time limit of 45dB at location NSL2 and NSL3. At NSL1 the readings were 45dBA and 46dBA. The quarry was not operational or audible and the main noise source at this location was traffic noise coming from the public roads.

## 6.0 Conclusions

The noise contribution made by the operation did not exceed the daytime, evening or night limits at any of the noise monitoring locations.

## Appendix A

Site map showing noise monitoring locations



**Appendix B  
Photographs of  
Monitoring Locations**

**Noise monitoring location NSL1**



**Noise monitoring location NSL2**



Noise monitoring location NSL3





## Appendix 4 Byrne & McCabe Engineering Report

**BYRNE & McCABE DESIGN**  
**ARCHITECTURE & ENGINEERING SERVICES**

CHI Environmental,  
Dunbrinn,  
Grannagh,  
Co. Kilkenny

Re:-Site survey December 2016 annual report.

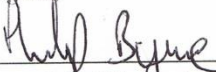
Dear Richard,

This report is based on our survey on the 18<sup>th</sup> of April 2014 updated 20<sup>th</sup> December 2016.

- We confirm we have checked the slope of the ground on site and can confirm it is acceptable at present.
- The approximate amount of fill between the dates above is 56,486m<sup>3</sup>.

We confirm we carried out a survey on site on the 20<sup>th</sup> December 2016

Regards,

  
Byrne & McCabe Design

---

UPPER MAIN STREET, GRAIGUENAMANAGH, CO. KILKENNY

**PARTNERS:**

PHILIP BYRNE NCEA DIPLOMA.CIVIL ENGINEERING. M I.E.I

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