

Fassaroe Recovery Facility W0269-01 Annual Environmental Report 2017



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1.0 Introduction

1.1 Facility Operation In 2017

No intake of material took place at the facility in 2017.

1.2 Scope And Objectives

This Annual Environmental Report (AER) is prepared for the Fassaroe recovery facility operated by Roadstone Limited. This AER covers the period from January 2017 to December 2017.

The Environmental Protection Agency (EPA) issued a waste licence to Roadstone Ltd., in respect of an inert waste recovery facility at Fassaroe, Bray Co. Wicklow on 3rd March 2011 (Current Licence Number: W0269-01).

This EPA licence under which the facility operates, specifies a number of environmental controls:

“in order to minimise the risk of environmental pollution and nuisance to the public arising from the activities at the facility”

Accordingly, the content of this AER complies with the requirements of the facility waste licence, and in particular the requirements presented in Schedule D of the waste licence (Schedule D requirements listed in Table 1). The report has a number of other objectives which include but are not limited to the following:

- It serves to update all stakeholders on the environmental controls, monitoring and reporting of emissions as detailed in ‘*Schedule B: Emission Limits*’ of the facility licence. These comprise the following;
 - B.1 Emissions to Air;
 - B.2 Emissions to Surface Water;
 - B.3 Emissions to Sewer;
 - B.4 Noise Emissions; and
 - B.5 Dust Deposition Limits.
 - It documents the measures taken or adopted at site in relation to the prevention of environmental damage;
 - It reaffirms the financial provisions which are in place in relation to the underwriting of costs for remedial actions following anticipated events or accidents / incidents; and
 - Finally, the report follows the recommended guidelines in the ‘*Annual Environmental Report: Standardised Reporting Guidance For All IPPC And Waste Licences*’ document published by the EPA.
-

2.0 Site Description

2.1 Site History

No planning permission was ever issued in respect of quarrying activities at the application site as it was established and operating prior to the introduction of planning controls under the Local Government (Planning and Development) Act of 1963.

Planning permission for the existing C&D waste recovery facility within the application site was granted by Bord Pleanala on appeal in July 2004 (Wicklow County Council Planning Ref. No. 03/9501). An application for renewal of the planning permission was granted by Wicklow County Council in January 2009.

Roadstone Ltd has operated a construction and demolition waste recovery facility at the application site since 2004. The facility was operated in accordance with the conditions attaching to a waste permit (Reference Number ESS/15/8/12) issued by Wicklow County Council for an initial three year period in 2004. The waste permit was subsequently renewed for a further three year period by Wicklow County Council in July 2008 (Ref. No. ESS/15/8/12-339).

A planning application to provide for the backfilling and restoration of the existing void at Fassaroe was submitted to Wicklow County Council in July 2008 (Planning Register Reference No. 08/1258). A final decision to grant planning permission for this activity was issued by Wicklow County Council on 21st January 2009.

A separate waste permit application was submitted to Wicklow County Council in May 2008 to provide for partial backfilling of the existing quarry. This waste permit was issued, with conditions, in April 2009. Both waste permits lapsed with the issue of the waste licence by the EPA in March 2011 and were superseded by it.

2.2 Facility Location And Layout

The site is located entirely within the townland of Fassaroe, Co. Wicklow approximately 1.5km west of Bray town and 2km east of Enniskerry village.

The waste licence area covers an area of approximately 25.6 hectares (61.7 acres). The licensed facility is located within a long-established construction materials production facility operated by Roadstone Ltd. The former quarry void, which has been backfilled using imported inert soil and stone is located in the eastern part of the licensed facility and covers an area of approximately 9.3ha.

C&D waste recycling activities are concentrated in the north central part of the licensed facility and cover an area of approximately 3.9ha. The remainder of the licenced area (approximately 12.4ha) holds various site infrastructure (offices, workshops, fuel storage areas, inspections shed etc.) which is shared with the co-located materials production facility. The existing site layout is shown on Figure 2.

Ground levels across the licensed site follow that of the (original) surrounding ground, falling south-eastwards from approximately 95mOD to 74mOD (Malin), toward the Cookstown and Dargle Rivers. The quarry void previously had depths from existing ground level varying from 18m at its northern end to 10m at its southern end. These levels have since been raised significantly by backfilling with imported inert soil and stone, with ground level differences between the backfilled area and the surrounding land ranging from 0m to 4m.

There are currently two large stockpiles of C&D waste (up to a maximum of 10m in height) awaiting processing and recycling at the C&D waste recovery area in the north central part of the licenced facility).

Aggregate processing (washing of sand and gravel) is no longer undertaken within the licenced site area. Intermittent production of ready-mixed concrete has been undertaken at the shared infrastructure area at the western end of the licensed facility in recent years, and is likely to continue for an extended period into the future, given the planned future development of the surrounding area for residential housing and mixed use development.

2.3 Legislative Framework

2.3.1 European Legislation

The Waste Framework Directive 98/2008/EC on waste sets out the general obligations for the collection, transport, recovery and disposal of waste. The Directive requires all member states to take necessary measures to ensure waste is recovered or disposed of without endangering human health or causing harm to the environment. This includes collection registration, permitting, registration and inspection requirements.

The directive is made up of a series of 27 Articles. Each has a different theme or topic covering environmental protection, waste definition, waste handling, waste movement etc. Article 13 addresses the protection of human health and the environment:

Member States shall take the necessary measures to ensure that waste management is carried out without endangering human health, without harming the environment and, in particular:

- a) *Without risk to water, air, soil, plants or animals;*
- b) *Without causing a nuisance through noise or odours; and*
- c) *Without adversely affecting the countryside or places of special interest.*

2.3.2 Irish Legislation

The Waste Directive is implemented in Ireland by The Waste Management Act 1996, the Waste Management (Amendment) Act 2001 and the Protection of the Environment Act 2003. Up until July 2016, the Department of the Environment, Community and Local Government had overall responsibility for waste management policy. These functions have now been transferred to the Department of Communications, Climate Action and Environment. The Waste Management Act creates a series of waste authorisations appropriate to the level of risk and complexity of the waste activity. The waste licence for Fassaroe (Ref. No. W0269-01) was issued by the Environmental Protection Agency (EPA) on 3rd March 2011.

2.4 Waste Recovery Processes

The waste licence issued to Roadstone by the Environmental Protection Agency (EPA) provides for the following licensed activities (Fourth Schedule of the Waste Management Acts 1996-2014).

- Class R5 (Principal Activity) : Recycling/reclamation of other inorganic materials, which includes soil cleaning resulting in recovery of the soil and recycling of inorganic construction materials.
- Class R3 : Recycling/reclamation of organic substances which are not used as solvents (including composting and other biological transformation processes), which includes gasification and pyrolysis using the components as chemicals.
- Class R4 : Recycling/reclamation of metals and metal compounds.
- Class R13 : Storage of waste pending any of the operations numbered R 1 to R 12 (excluding temporary storage (being preliminary storage according to the definition of 'collection' in section 5(1)), pending collection, on the site where the waste is produced).

2.4.1 Inert Waste

Inert wastes do not biologically, chemically or physically degrade. Inert waste is defined in the Waste Management Act and the Waste Framework Directive:

"Inert waste means waste that does not undergo any significant physical, chemical or biological transformations. Inert waste will not dissolve, burn or otherwise physically or chemically react, biodegrade or adversely affect other matter with which it comes into contact in a way likely to give rise to environmental pollution or harm human health. The total leachability and pollutant content of the

waste and the ecotoxicity of the leachate must be insignificant, and in particular not endanger the quality of surface water and / or groundwater.”

2.4.2 EWC Codes Accepted

A European Union wide harmonised list of wastes (LOW) and accompanying coding system was established in June 2015. The different types of waste in the list are fully defined by a six digit code which identifies the source of the waste and the waste type. This ensures that the collection, transportation, storage and treatment of waste is carried out in a manner that provides protection for the environment and human health and in compliance with legal requirements.

Material which is acceptable for recovery at the facility, along with the accompanying EWC codes are shown in Table 1.

Table 1: Fassaroe Licenced Waste Categories And Quantities

EWC Code	Waste Type	Maximum (Tonnes per annum)
17 05 04	Soil and stones other than those mentioned in 17 05 03	550,000
17 05 06	Dredging spoil	
20 02 02	Soil and stones	
17 01 01	Concrete	20,000
17 01 02	Bricks	
17 01 03	Tiles	
17 01 07	Mixtures of concrete, bricks, tiles and ceramics	
17 09 04	Mixed construction and demolition waste	
	Total	570,000

3.0 Environmental Management System (EMS)

3.1 Introduction

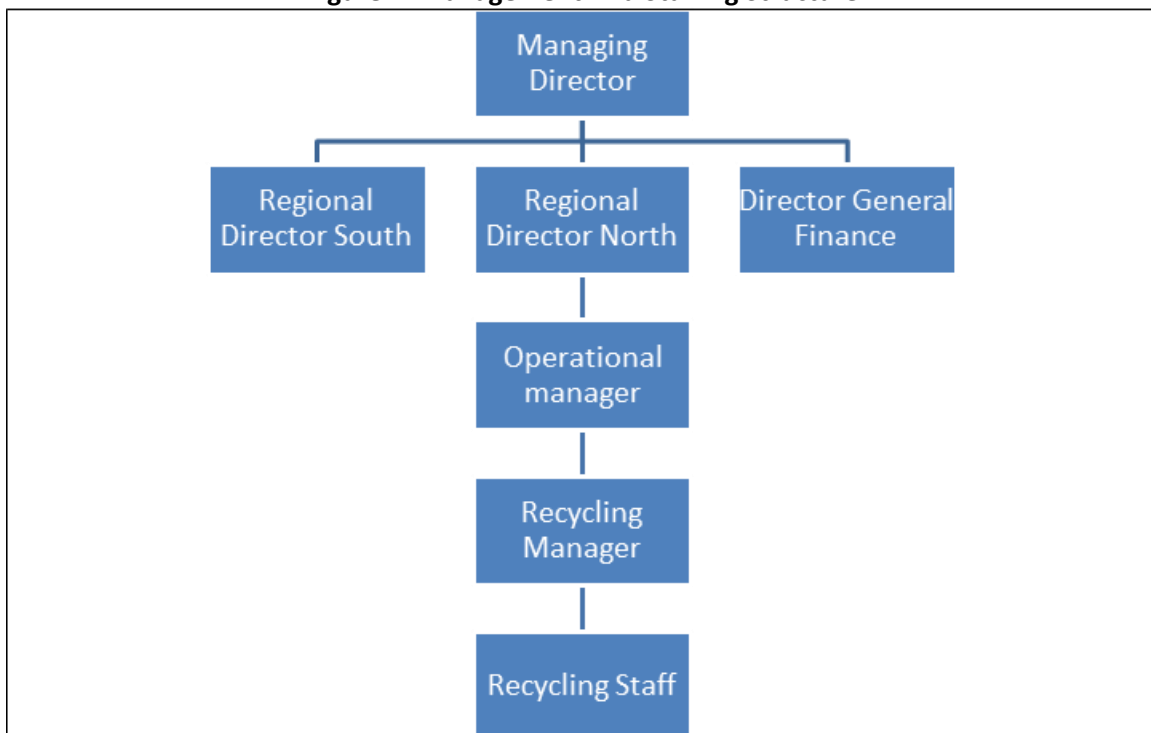
Roadstone implements a comprehensive Environmental Management System (EMS) at all of its facilities which predominantly comprise quarrying and construction material production activities. In recent years, the scope of the EMS has been expanded to include inert soil / C & D waste recovery activities. As part of its EMS, Roadstone has developed standard procedures to address waste acceptance and handling activities, as well as an emergency response plan. These are all available for at the facility.

3.2 Site Management Structure

Roadstone Ltd. currently employs 1 person at the facility on a full time basis. The organisation and management structure in the facility is provided in Figure 2. It shows a section of the overall organisation to highlight the management and reporting structure of the facility department. The staff at the facility include the following:

- Management staff;
- Technical staff; and
- Weighbridge staff.

Figure 1: Management And Staffing Structure



3.3 Staff Awareness And Training

Staff training which was carried out in 2017 is summarised in Table 2.

Table 2: Summary Of Staff Training

Personnel	Date	Training Details	Comment
Leonard Grogan	11/10/2017 to 12/10/2017	Haz-Mat Online – 1 day training course	Provided by One Touch Data Ltd.

3.4 Public Communications Programme

The public can, by appointment, call in to the weighbridge office to view information about the facility. Additional information is available on Roadstone's website.

Records which are available for public inspection at the site office include:

- EPA issued Waste Licence W0269-01;
 - Monitoring Records;
 - Complaints Register;
 - Incidents Register; and
 - EPA correspondence file.
-

4.0 Emissions From The Facility

Environmental monitoring of surface water, groundwater, noise and dust is undertaken at designated locations across the facility. The environmental monitoring requirements of the facility waste licence W0269-01 are undertaken in collaboration with the requirements set out in other site licences and permits. Only the environmental monitoring requirements detailed in the Waste Licence W0269-01, under which the recovery facility operates, are presented in this report.

4.1 Noise Monitoring

4.1.1 Requirements

Noise monitoring is undertaken at the facility at a frequency as required by the Agency. Roadstone therefore undertake noise monitoring on a bi-annual basis. Noise data collection, analysis and subsequent reporting is carried out by BHP environmental consultancy who are based in Thomondgate, Co. Limerick. The dates when the two rounds of monitoring were undertaken are shown in Table 3. The full report containing the data, analysis and conclusions undertaken by BHP is appended to this report in Appendix A.

Table 3: Noise Monitoring Dates

Monitoring Round	Daytime Measurements
First	09/11/2016
Second	30/06/2016

4.1.2 Limits And Frequency

The noise emission limits are presented in the facility licence in *Schedule B.4 Noise Emissions*. These limits are presented in Table 6 below.

Table 4: Noise Emissions

Daytime dB _{Lar,T} (30 minutes)	Night-time dB _{LAeq,T} (15 – 30 minutes)
55	45 ^{Note 1}

Note 1: There shall be no clearly audible tonal component or impulsive component in the noise emission from the activity at any noise-sensitive location.

In order to ensure compliance with the noise emission limits monitoring is undertaken in accordance with the required survey duration and periods as shown in Schedule C.6 Noise Monitoring of the facility licence. These survey durations and periods are presented in Table 5.

Table 5: Noise Monitoring Frequency

Period	Minimum Survey Duration ^{Note 1}
Daytime (07:00hrs to 19:00hrs)	A minimum of 3 sampling periods at each noise monitoring location.
Evening-time (07:00hrs to 23:00hrs)	A minimum of 1 sampling period at each noise monitoring location.
Night-time ^{Note2} (23:00hrs to 07:00hrs)	A minimum of 2 sampling periods at each noise monitoring location.

Note 1: Sampling period T will be in accordance *Schedule B.3 Emission Limits* of the facility licence. This applies to day, evening and night time periods.

Note 2: Night-time measurements shall be made between 2300hrs and 0400hrs, Sunday to Thursday, with 2300 hrs being the preferred start time.

The survey programme was undertaken in accordance with the methodology specified in the 'Guidance note for noise: Licence applications, Surveys and Assessments in Relation to Scheduled Activities (NG4)' as published by the EPA, and also in adherence of the following standards:

- International Standard (ISO 1996-1: 2003E) Acoustics - Description, measurement and assessment of Environmental Noise. Part 1. Basic quantities and assessment procedures.
- International Standard (ISO 1996-2: 2007E) Acoustics - Description, measurement and assessment of Environmental Noise. Part 2. Determination of environmental noise levels.

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.

4.1.3 Noise Monitoring Results

The results from the noise monitoring reports undertaken are presented in the reports in Appendix A.

4.2 Dust Monitoring

4.2.1 Requirements

Roadstone have implemented a number of measures onsite for the control of dust. The operations onsite do not result in any fugitive dust emissions from the facility.

In order to minimise airborne dust nuisance during periods of dry weather water sprinklers are utilised. For those site roads and other areas used by vehicles which are not serviced by water sprinklers, a water bowser is used to ensure dust suppression. The road network in the vicinity of the facility is kept free from any debris caused by vehicles entering or leaving the facility. Any such debris or deposited materials is removed without delay.

4.2.2 Limits And Monitoring Frequency

Dust monitoring is undertaken in compliance with the facility licence on a bi-annual basis.

Table 6: Dust Deposition Limits

Level (mg/m ² /day) ^{Note 1}
350

Note 1: 30 day composite sample with the results expressed as mg/m²/day.

The analysis method / technique used is the VDI 2119 (Bergerhoff method). Monitoring is undertaken by BHP laboratories. BHP are ISO 17025 INAB accredited.

4.2.3 Dust Monitoring Results

Dust monitoring at the facility was undertaken on 26th May 2017 and the 28th August 2017. The full test reports (May results – Test report no. 137330 and August results – Test Report No. 141110) are appended to this report in Appendix B.

All three sampling locations were within the EPA limits of 350mg/m²/day for both sampling events.

4.3 Emissions To Water

4.3.1 Requirements

There are no emissions to water from the facility as the facility did not take in any material in 2017.

4.4 Groundwater Monitoring

The three groundwater monitoring points at the facility which are reported in the facility licence are – BH02, BH03 and BH04.

Table 7: Groundwater Sampling Frequency

Parameter	Monitoring Frequency	Analysis Method / Techniques
Level	Quarterly	Standard Method
Visual Inspection		
pH	Biannually	pH electrode / meter
Conductivity		
Ammonia (as N)		
Total Dissolved Solids		
Sulphate		
Chloride		
Dissolved Metals	Annually	Standard Method
Total Petroleum Hydrocarbons		
Total PAH		
List I/II Organic Substances		

The results from the groundwater sampling undertaken on 20th April 2017 are presented in Figure 2 below.

Figure 2: Groundwater Sampling Results

DETERMINAND	Sample ID	BH2	BH3	BH3A	BH4	BH5	BH6	BH7
	GW level	-	21.39	>30	32.13	26.25		
Arsenic (ug/l)	++	went dry after purging	0.18	0.25	13	0.28	went dry after purging	dry
Ammonia as NH ₄	**	went dry after purging	<0.10	<0.10	<0.10	<0.10	went dry after purging	dry
Ammoniacal Nitrogen	**	went dry after purging	<0.08	<0.08	<0.08	<0.08	went dry after purging	dry
Antimony (ug/l)	++	went dry after purging	0.18	0.18	0.20	<0.17	went dry after purging	dry
Cadmium (ug/l)	++	went dry after purging	<0.03	<0.03	<0.03	<0.03	went dry after purging	dry
Chromium (ug/l)	++	went dry after purging	1.7	<0.25	<0.25	<0.25	went dry after purging	dry
Conductivity (uS/cm@20°C)	**	went dry after purging	518	494	561	520	went dry after purging	dry
Copper (ug/l)	++	went dry after purging	<0.4	<0.4	0.7	<0.4	went dry after purging	dry
Chloride	++	went dry after purging	17	25	32	18	went dry after purging	dry
Lead (ug/l)	++	went dry after purging	<0.09	<0.09	<0.09	<0.09	went dry after purging	dry
Nickel (ug/l)	++	went dry after purging	<0.5	1.3	0.5	0.5	went dry after purging	dry
Sulphate	++	went dry after purging	44	60	25	31	went dry after purging	dry
pH (ph Units)	**	went dry after purging	7.6	7.8	8.1	7.7	went dry after purging	dry
Zinc (ug/l)	++	went dry after purging	<1.3	<1.3	<1.3	<1.3	went dry after purging	dry
Visual	n/a	went dry after purging	very turbid with lots of suspended solids, clear, colourless upon settling	very turbid with lots of suspended solids, clear, colourless upon settling	turbid with suspended solids, clear, colourless upon settling	very turbid with lots of suspended solids, clear, colourless upon settling	went dry after purging	dry
TPH (C ₁₀ -C ₄₀) (ug/l)	++	went dry after purging	12	210	14	21	went dry after purging	dry
PAH(total) (ug/l)	++	went dry after purging	<0.04	<0.04	<0.04	<0.04	went dry after purging	dry

5.0 Waste Management Record

No material was accepted by the facility in 2017.

6.0 Breeding Bird Survey

6.1 Requirements

An annual breeding bird survey is carried out at the facility as specified in condition 6.14 of the facility licence:

'The licensee shall carry out an annual breeding bird survey, unless otherwise required by the Agency. The survey shall record the number of birds of conservation concern using the sit. The results of this assessment shall be reported as part of the Annual Environmental Report.'

The breeding bird survey was carried out on 26th April 2017 by SLR Consulting using the common bird census (CBC) method. This followed a transect route around the entire site covering all the suitable breeding habitats present in survey sections one to three.

The main aim of the breeding bird survey onsite comprised the following:

- To assess the number of active bird territories present in suitable habitats within the overall site margins and to map active nests where present;
- To evaluate the overall community of birds present on the overall site by recording all behavioural activity of non-territorial birds e.g. birds in flight; and
- To identify areas of the overall site that may merit special consideration should quarry activities or habitat change be planned during the breeding bird season.

6.2 Monitoring Results

The habitats within the survey area consist of arable fields, open areas of ground and concrete waste, mixed scrub and semi mature trees and two ponds. There were some earth banks where there was evidence of historic use by sand martins but these burrows are not currently active.

A summary of the birds listed as either Red or Amber birds of conservation concern in Ireland (BoCCI) are shown in Tables 1 to 3 of the breeding bird survey which is appended to this report as Appendix C.

A total of 26 species were recorded during the survey either singing or foraging within the habitats on the survey areas or flying over or passing through the site. Fourteen of these species were assessed as being territorial and nesting within the survey area.

Of the 26 species, seven were Amber listed on the BoCCI: robin, swallow, house martin, starling, linnnet, skylark, sand martin and two were Red Listed: yellowhammer and meadow pipit.

The full breeding bird survey is appended to this report in Appendix C.

7.0 Tank And Pipeline Testing And Inspection

The tank and pipeline testing and inspection report was completed by Environmental Efficiency consultancy on 2nd December 2016. Environmental Efficiency have the following ISO accreditations:

- ISO 9001; and
- ISO14001.

During the field visit by Environmental Efficiency, nine individual inspections were undertaken on bunds located onsite and within the W0269-01 licenced area. Each bund was assessed for its compliance against the following requirements:

- Adequacy of size;
- Of suitable construction;
- Protection from rain; and
- Interceptor at refuelling area.

The results of the tank and pipeline testing are presented in the report Document Number: 1880-23 v1.00. This is attached as Appendix D.

8.0 Facility Operations Summary

No intake of material occurred at the facility in 2017.

8.1 Development / Infrastructural Works Summary

No development or infrastructure works were undertaken at the facility in 2017.

8.2 Reported Incidents Summary

No incidents occurred at the facility in 2017.

8.3 Complaints Summary

No complaints were made regarding the facility in 2017.

9.0 Closure, Restoration & Aftercare Management Plan

The updated facility closure, restoration and aftercare management plan (CRAMP) was completed by SLR and is appended to this report in Appendix E. This CRAMP is reviewed annually and updated where necessary to take account of any facility or process changes, technology changes and costing changes (inflation).

The CRAMP was prepared in accordance with the EPA publication '*Guidance on Assessing and Costing Environmental Liabilities (2014)*'. The plan envisages that the licensed facility will achieve a clean closure, such that on cessation of waste recovery operations, plant and equipment are decommissioned, decontaminated and / or removed from the facility in order to ensure that the facility presents no environmental liabilities or risk of long-term environmental pollution.

The facility CRAMP has identified that the total combined cost of the facility closure, restoration and aftercare management will be €691,668 (including 15% contingency) of which €365,643 is for closure and €326,025 is for aftercare.

Roadstone Ltd. is prepared to make the required financial provision in respect of closure and aftercare costs by means of a financial bond submitted under separate cover to the Agency.

10.0 Environmental Liabilities Risk Assessment

An environmental liabilities risk assessment (ELRA) was undertaken by SLR consulting in February 2012. The ELRA was prepared in accordance with the EPA publication '*Guidance on Assessing and Costing Environmental Liabilities (2014)*'.

The environmental liability was assessed based on the worst case scenario of a major fuel leak from the existing 53,000 litre fuel storage tank. In this event, the maximum environmental liability which could be incurred is estimated to be of the order of €1,584,300 (inclusive of 20% contingency).

Roadstone Ltd. has the following insurance cover in place by way of provisioning for potential environmental liabilities in respect of the planned waste recovery facility at Huntstown:

- Employers liability insurance – indemnified for up to €22.7 million; and
- Public liability insurance – indemnified for up to €13 million.

As detailed in the ELRA report:

'Roadstone will make the financial provision necessary to cover the amount of the assessed environmental liability by lodging an insurance company bond with the Agency, coupled with an agreement which will empower it to apply such security (or part thereof as may be required) in the event that a liability event materialises at the waste recovery facility at Huntstown.'

Details of Roadstone's current employers liability insurance and public liability insurance are provided in the full ELRA Report which is appended to this AER in Appendix F.

11.0 Close

During the reporting year 2017, no material intake occurred.

The recovery facility continues to be managed, operated and controlled in accordance with all of the licence conditions in the facility licence W0269-01. Roadstone consider that as a result of facility compliance, the facility has not caused environmental pollution or breached any environmental quality or emission standard.

APPENDIX A

Noise Monitoring Reports

TEST REPORT 122299



Client:

**Roadstone Wood Ltd
Fortunestown
Tallaght
Dublin 24**

BHP Ref No.: 16/06/920

Order No.:

Date Received: 30th June 2016

Date Tested: 30th June 2016

Test Specification: Noise Monitoring

BHP

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

FAO: Colin Doyle

**Item: Noise survey at noise sensitive locations at the Roadstone facility,
Fassaroe, Bray, Co. Wicklow.**

For and on behalf of BHP Ltd.

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

Dervla Purcell

Date Issued: 4th September 2016

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

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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 Roadstone Wood Ltd, BHP undertook noise monitoring at their operation in Fassaroe, Bray, Co. Wicklow. The purpose of this survey was to provide Roadstone with the noise data and analysis required as part of their planning requirements.

This report deals with five nominated noise locations at the operation in Fassaroe, Bray, Co. Wicklow

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's (serial numbers D21298FF).

The SLM's were calibrated at the start of the survey with a CRL 511E calibrator (serial number 039592). 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:

- International Standard (ISO 1996-1: 2003E) Acoustics – Description, measurement and assessment of Environmental Noise. Part 1. Basic quantities and assessment procedures.
- International Standard (ISO 1996-2: 2007E) Acoustics – Description, measurement and assessment of Environmental Noise. Part 2. Determination of environmental noise levels.
- 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 levels were measured at each location. 30-minute night time levels were measured at one location.

Appendix A contains a site map of the quarry showing the noise monitoring locations.

Appendix B contains photographs of the noise monitoring points.

3.0 Date of survey

The survey was carried out on 30th June 2016 by Aidan Daffy.

4.0 Results

4.1 Noise levels:

Levels are presented on the following page.

Day-time Measurements - Noise Locations – Fassaroe, Bray, Co. Wicklow (30th June 2016)

Location	Sampling Interval	Duration (mins)	L_{AEQ} dB	L_{A10} dB	L_{A90} dB	Wind speed m/s	Sampling notes
N1	12.40-13.10Hrs	30	44	45	42	1-2 S	Distant traffic was at 40-45dBA. Some activity audible from the retail yard at 40-45dBA. Birdsong was frequent at 48dBA.
N2	12.55-13.25Hrs	30	50	51	48	1-2 S	Traffic from the N11 was almost constant at 46-51dBA. Some sounds audible from the retail yard at 40-45dBA.
N3	13.40-14.10Hrs	30	47	50	45	3-4 S	Activity around the cement plant was at 45-50dBA. Wind noise was frequent at 47-51dBA. Distant traffic was audible at 40-45dBA.
N4	13.20-13.50Hrs	30	46	47	43	3 S	Traffic from the M11 was at 43-48dBA. The quarry was only audible as distant reversing siren from cement plant at about 40dBA. The crusher was not operating.
N5	14.15-14.45Hrs	30	54	55	44	2 S	Frequent traffic entering and exiting the quarry at up to 66dBA. Activity audible from the quarry at 40-50dBA with traffic movement and loading/unloading of trucks. Wind noise was frequent and up to 52dBA.

5.0 Interpretation of results

5.1 Noise levels;

The noise limits for the Roadstone operation in Fassaroe, Bray, Co.Wicklow are as follows:

Daytime Limit L_{Aeq} 55dB

Night-time Limit L_{Aeq} 45dB

5.1.1 Day-time levels:

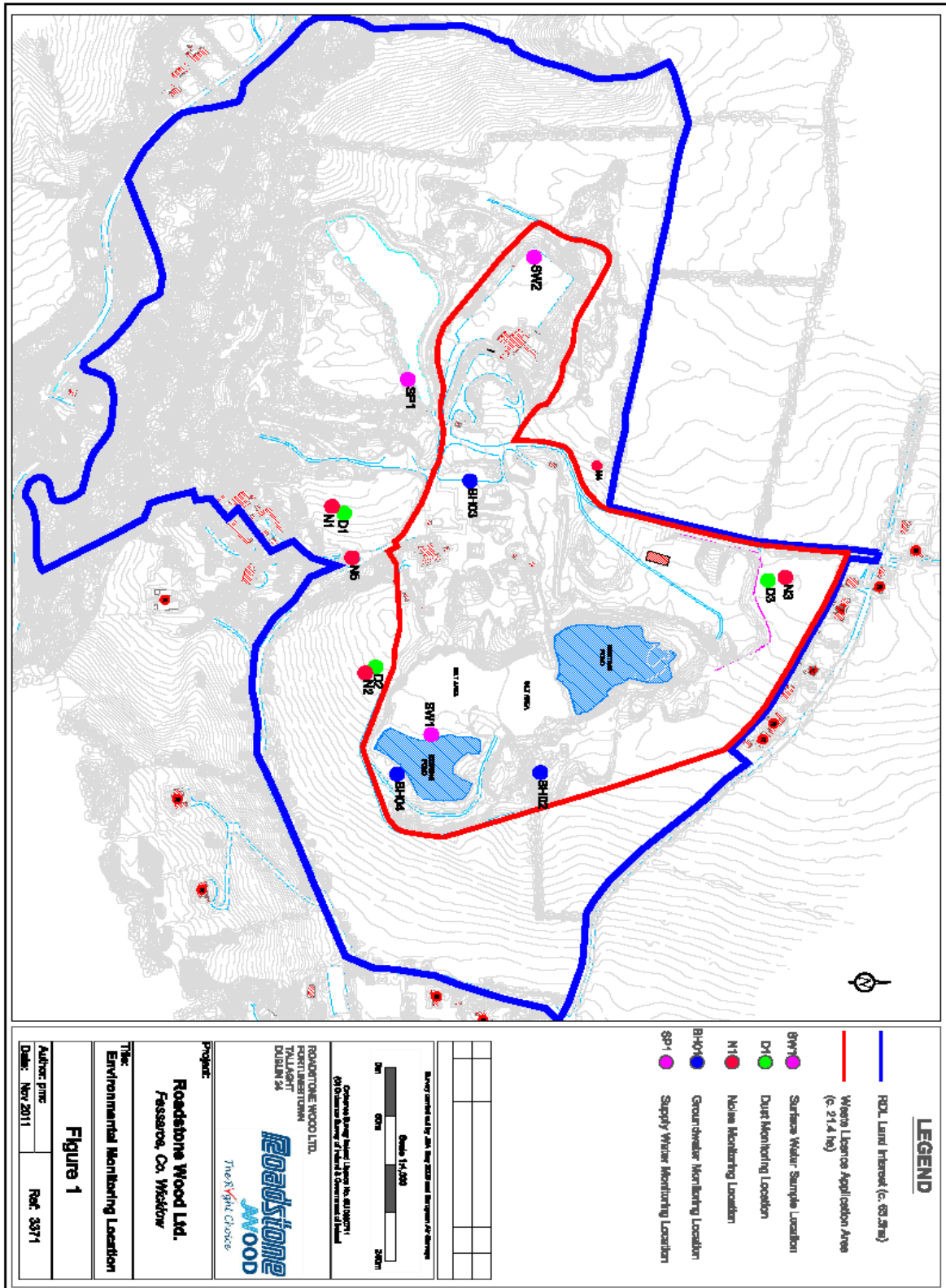
As can be seen in section 4.1, L_{Aeq} levels at the noise monitoring locations are lower than the daytime limit of 55dB at all the locations.

6.0 Conclusions

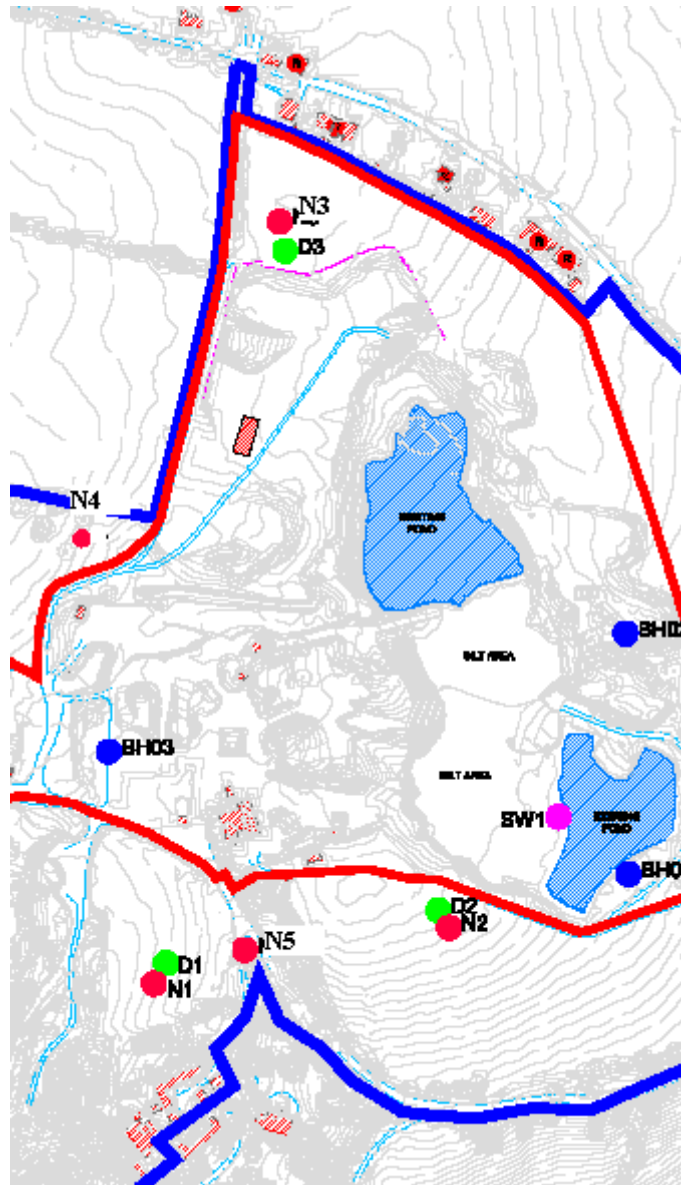
The noise contribution made by the operation does not exceed the daytime limit of 55dB at the noise monitoring locations.

Appendix A

Site map showing noise monitoring locations



Fassaroe noise monitoring locations close up



Appendix B

Photographs of noise monitoring locations

Noise monitoring location N1



Noise monitoring location N2



Noise monitoring location N3



Noise monitoring location N4



Noise monitoring location N5



TEST REPORT 131667



Client:

**Roadstone Wood Ltd
Fortunestown
Tallaght
Dublin 24**

BHP Ref No.: 16/11/0800

Order No.:

Date Received: 9th & 10th November 2016

Date Tested: 9th & 10th November 2016

Test Specification: Noise Monitoring

BHP

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

FAO: Cillian Casey

**Item: Noise survey at noise sensitive locations at the Roadstone facility,
Fassaroe, Bray, Co. Wicklow.**

For and on behalf of BHP Ltd.

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

Dervla Purcell

Date Issued: 16th November 2016

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

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 Roadstone Wood Ltd, BHP undertook noise monitoring at their operation in Fassaroe, Bray, Co. Wicklow. The purpose of this survey was to provide Roadstone with the noise data and analysis required as part of their planning requirements.

This report deals with five nominated noise locations at the operation in Fassaroe, Bray, Co. Wicklow

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's (serial numbers D21298FF).

The SLM's were calibrated at the start of the survey with a CRL 511E calibrator (serial number 039592). 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:

- International Standard (ISO 1996-1: 2003E) Acoustics – Description, measurement and assessment of Environmental Noise. Part 1. Basic quantities and assessment procedures.
- International Standard (ISO 1996-2: 2007E) Acoustics – Description, measurement and assessment of Environmental Noise. Part 2. Determination of environmental noise levels.
- 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 levels were measured at each location. 30-minute night time levels were measured at one location.

Appendix A contains a site map of the quarry showing the noise monitoring locations.

Appendix B contains photographs of the noise monitoring points.

3.0 Date of survey

The daytime survey was carried out on 10th November 2016 by Aidan Daffy while the night time monitoring was carried out on the 9th of November by Aidan Daffy.

4.0 Results

4.1 Noise levels:

Levels are presented on the following page.

Day-time Measurements - Noise Locations – Fassaroe, Bray, Co. Wicklow (10th November 2016)

Location	Sampling Interval	Duration (mins)	L_{AEQ} dB	L_{A10} dB	L_{A90} dB	Wind speed m/s	Sampling notes
N1	09.23-09.53Hrs	30	44	45	40	1-2 NW	Activity around the retail yard was audible at 43-48dBA with teleporter and bucket rattle at up to 55dBA at times. Trucks entering and leaving the concrete plant were audible at 45-50dBA while the concrete plant was audible at 38-42dBA in the absence of truck movement.
N2	09.35-10.05Hrs	30	46	48	43	2-3 NW	Traffic from the N11 was almost constant at 40-45dBA. Some sounds audible from the retail yard at 43-48dBA with reversing siren reaching 52dBA at times. Truck at recycling area was audible at 40-45dBA.
N3	10.09-10.39Hrs	30	47	47	41	2-3 NW	Wind noise was at 50dBA at times. Aircraft passing overhead at up to 60dBA. Concrete plant was audible at 40-45dBA at times.
N4	10.20-10.50Hrs	30	52	51	44	2-3 NW	Concrete plant audible at 45-50dBA. Truck horn audible three times at 70dBA. Aircraft passing overhead at up to 60dBA.
N5	10.52-11.22Hrs	30	53	54	43	2-3 NW	Frequent traffic entering and exiting the quarry at up to 72dBA. Activity audible from the retail area at 45-50dBA. Wind noise bringing levels up to 52dBA at times.

=

Night-time Measurements - Noise Locations – Fassaroe, Bray, Co. Wicklow (9th November 2016)

Location	Sampling Interval	Duration (mins)	L_{AEQ} dB	L_{A10} dB	L_{A90} dB	Wind speed m/s	Sampling notes
N5	20.05-20.35Hrs	30	38	40	34	1-2 NW	Distant traffic and wind noise keep levels at 37-43dBA. Some activity audible from the concrete plant at about 35dBA. Monitoring period was paused for 2 minutes to talk to security.

5.0 Interpretation of results

5.1 Noise levels;

The noise limits for the Roadstone operation in Fassaroe, Bray, Co.Wicklow are as follows:

Daytime Limit L_{Aeq} 55dB

Night-time Limit L_{Aeq} 45dB

5.1.1 Day-time levels:

As can be seen in section 4.1, L_{Aeq} levels at the noise monitoring locations are lower than the daytime limit of 55dB at all the locations.

5.1.2 Night-time levels:

The night time measurement was taken at N5. The location is below the limit of 45dB, this is not considered an exceedance of the site limit.

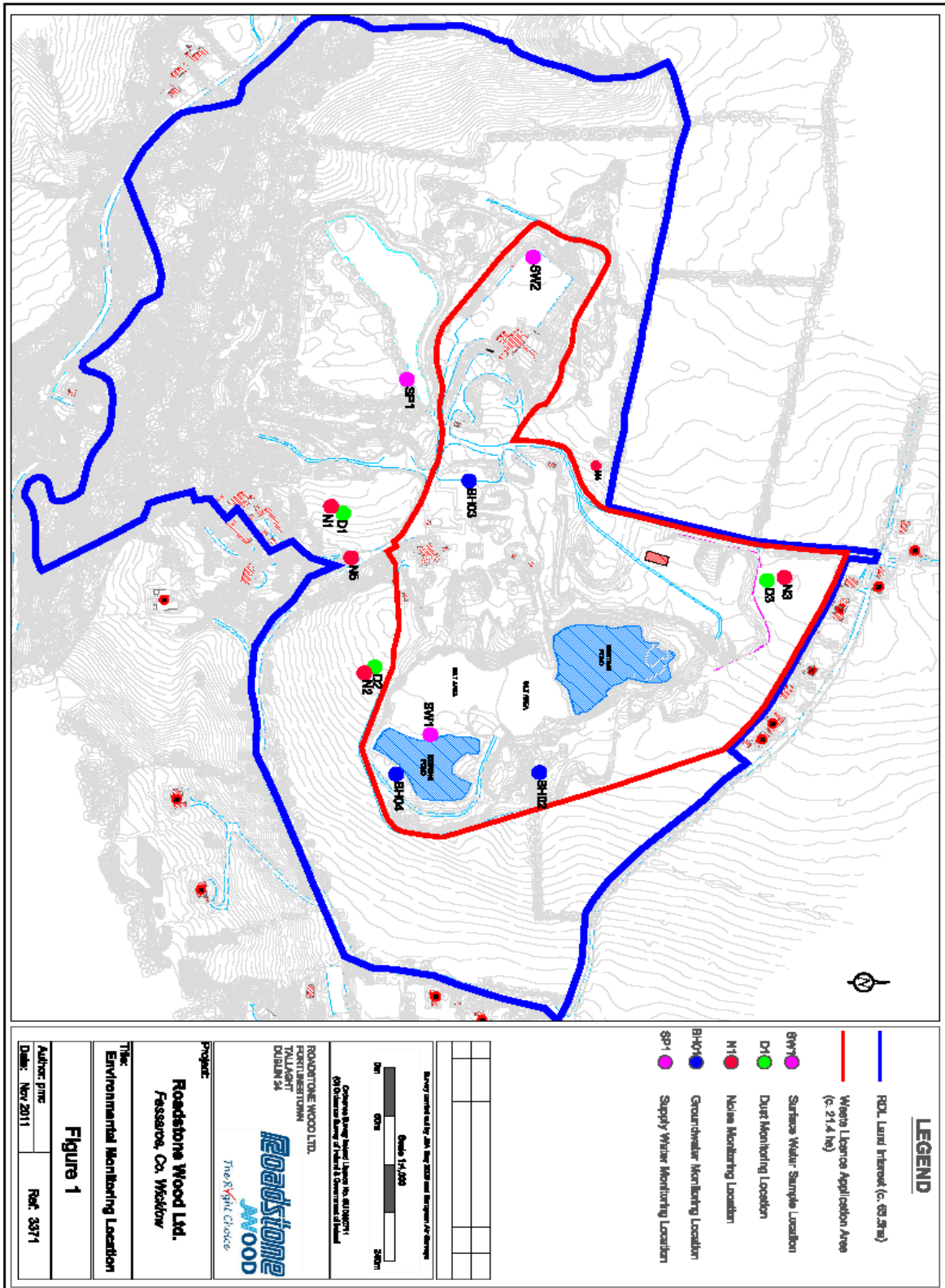
6.0 Conclusions

The noise contribution made by the operation does not exceed the daytime limit of 55dB at the noise monitoring locations.

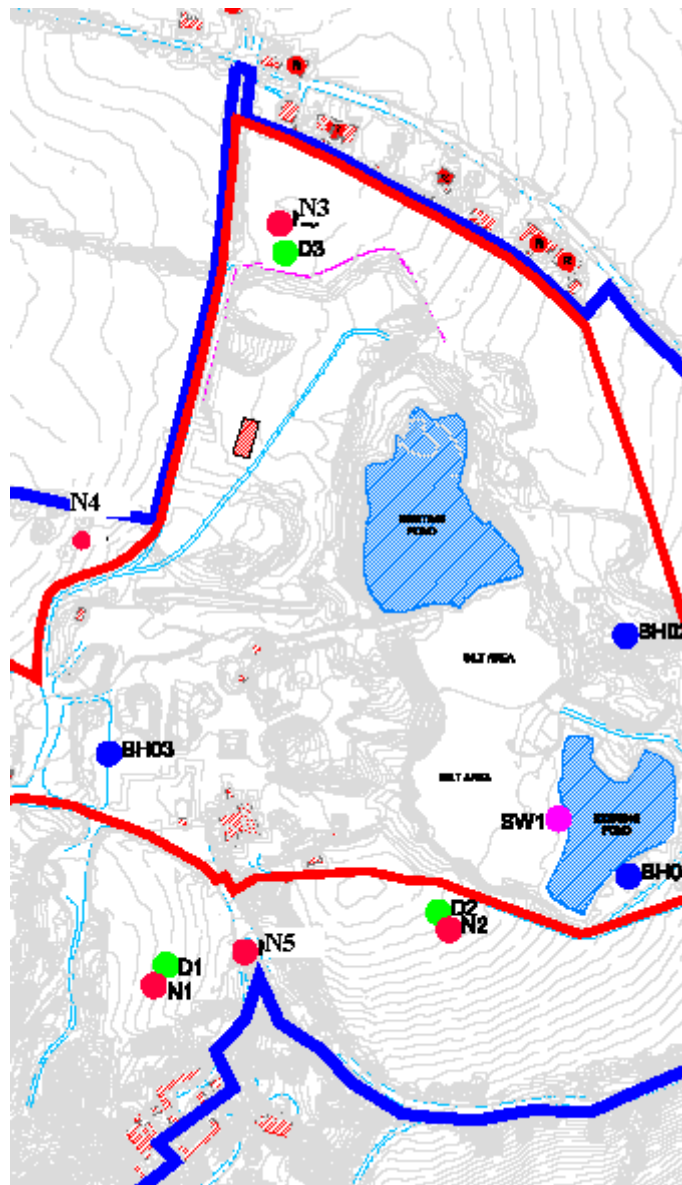
The noise contribution made by the operation does not exceed the night time limit of 45dB at the front gate.

Appendix A

Site map showing noise monitoring locations



Fassaroe noise monitoring locations close up



Appendix B

Photographs of noise monitoring locations

Noise monitoring location N1



Noise monitoring location N2



Noise monitoring location N3



Noise monitoring location N4



Noise monitoring location N5



APPENDIX B

Dust Monitoring Reports

Client: Roadstone Limited

Fortunestown
Tallaght
Dublin
Co. System.Data.Entity.DynamicProxies. County_

BHP Ref. No: 17/05/1725-1727
Quote Ref: QC001270
Order No: To Follow
26281
Date Received: 29/05/2017
Date Sampled: 26/05/2017
Date Completed: 31/05/2017
Sample Type: Environmental Dust
Sampling Period: 01/10/2016 - 26/05/2017



Testing
Analysing
Consulting



BHP Laboratories
New Road
Thomondgate
Limerick
Tel: +353 61 455399
Fax: +353 61 455447
Email: colettehannan@bhp.ie

FTAO: Cillian Casey
Site: Fassaroe Quarry
BHP Ref: Monthly_ Environmental Dust

TestName	ClientRef	Units	Results	DateAnalysed	Method
Dust Deposition Acc	D1	mg/m ² /day	68	31/05/2017	BHP AC 017
Inorganic Deposition	D1	mg/m ² /day	25	31/05/2017	BHP AC 017
Organic Deposition	D1	mg/m ² /day	43	31/05/2017	BHP AC 017
Dust Deposition Acc	D2	mg/m ² /day	54	31/05/2017	BHP AC 017
Inorganic Deposition	D2	mg/m ² /day	27	31/05/2017	BHP AC 017
Organic Deposition	D2	mg/m ² /day	27	31/05/2017	BHP AC 017
Dust Deposition Acc	D3	mg/m ² /day	67	31/05/2017	BHP AC 017
Inorganic Deposition	D3	mg/m ² /day	25	31/05/2017	BHP AC 017
Organic Deposition	D3	mg/m ² /day	42	31/05/2017	BHP AC 017

Authorised by:

Colette Hannan
Technical Manager

Date Authorised: 05/06/2017**Additional Information:** (Opinions, where stated, are not covered by accreditation)

Acc.: INAB Accredited

Notes: All sample locations were inside the EPA limit of 350 mg/m²/day.

Total dust residues were ashed at 600°C for 1 hour to determine inorganic dust deposition.
Organic deposition was determined by subtracting the inorganic dust deposition from the total dust deposition.

Sample Conditions: Sample jar at location D1 showed major discolouration and turbidity due to organic matter.
Sample jar at location D3 contained bird droppings.

Client: Roadstone Limited

Fortunestown
Tallaght
Dublin
Co. Dublin

BHP Ref. No: 17/08/2147-2149
Quote Ref: QC001270
Order No: To Follow
Sales Order: 30409
Date Received: 28/08/2017
Date Sampled: 28/08/2017
Date Completed: 31/08/2017
Sample Type: Environmental Dust
Sampling Period: 31/07/2017 - 28/08/2017



Testing
Analysing
Consulting



BHP Laboratories
New Road
Thomondgate
Limerick
Tel: +353 61 455399
Fax: +353 61 455261
Email: colettehannan@bhp.ie

FTAO: Cillian Casey
Site: Fassaroe Quarry
BHP Ref: Monthly_ Environmental Dust

TestName	ClientRef	Units	Results	DateAnalysed	Method
Dust Deposition <small>Acc</small>	D1	mg/m ² /day	149	31/08/2017	BHP AC 017
Inorganic Deposition	D1	mg/m ² /day	50	31/08/2017	BHP AC 017
Organic Deposition	D1	mg/m ² /day	99	31/08/2017	BHP AC 017
Dust Deposition <small>Acc</small>	D2	mg/m ² /day	40	31/08/2017	BHP AC 017
Inorganic Deposition	D2	mg/m ² /day	22	31/08/2017	BHP AC 017
Organic Deposition	D2	mg/m ² /day	18	31/08/2017	BHP AC 017
Dust Deposition <small>Acc</small>	D3	mg/m ² /day	57	31/08/2017	BHP AC 017
Inorganic Deposition	D3	mg/m ² /day	16	31/08/2017	BHP AC 017
Organic Deposition	D3	mg/m ² /day	41	31/08/2017	BHP AC 017

Authorised by:

Colette Hannan
Technical Manager

Date Authorised: 05/09/2017**Additional Information:**(Opinions, where stated, are not covered by accreditation)**Acc.:** INAB Accredited**Notes:** All sample locations were inside the EPA limit of 350 mg/m²/day.

Total dust residues were ashed at 600°C for 1 hour to determine inorganic dust deposition.

Organic deposition was determined by subtracting the inorganic dust deposition from the total dust deposition.

Sample Conditions: Sample jar at location D1 showed major discolouration and turbidity due to organic matter.

APPENDIX C

Breeding Bird Survey

FASSAROE WASTE RECOVERY FACILITY, BRAY, CO. WICKLOW

Breeding Bird Survey 2017
Prepared for: Roadstone Limited

SLR Ref: 4SA.02036.00496
Version No: 1
May 2017



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1.0	INTRODUCTION	2
1.1	Background	2
1.2	Aims and objectives	2
2.0	METHODOLOGY	3
3.0	RESULTS	4
3.1	Survey Section One	4
3.2	Survey Section Two	6
3.3	Survey section three	7
4.0	SUMMARY	9

APPENDICES

Appendix 01: Locations of Bird Territories and Birds in Flight in Survey Sections One to Three

1.0 Introduction

1.1 Background

SLR Consulting was commissioned by Roadstone Ltd to undertake a breeding bird survey of all suitable and accessible habitats within Fassaroe Waste Recovery Facility (the survey area). These surveys were required to satisfy Condition 6.17 of Waste Licence W0269-01 that states:

“The licensee shall carry out an annual breeding bird survey, unless otherwise required by the Agency. The survey shall record the number of birds of conservation concern utilising the site. The results of this assessment shall be reported as part of the Annual Environmental Report.”

The outcome of the survey would inform whether or not there were species of conservation concern using the site and where impacts are deemed likely, details of mitigation measures and ongoing monitoring programmes would be included to protect these species.

The surveys were undertaken by Dr Rhys Bullman a Principal Ornithologist from SLR Consulting.

1.2 Aims and objectives

The aim of the 2017 breeding bird survey at the Site is to provide information on the status of the breeding bird community with specific reference to species of conservation concern.

The objectives of the survey are as follows:

- to assess the number of active bird territories present in suitable habitats within the overall site margins and to map active nests where present;
- to evaluate the overall community of birds present on the overall site by recording all behavioural activity of non-territorial birds e.g. birds in flight; and
- to identify and areas of the overall site that may merit special consideration as part of ongoing waste recovery operations, or habitat change be planned during the bird breeding season.

2.0 Methodology

The breeding bird survey was undertaken on 26/04/17 (07:30– 12:00) the weather conditions were suitable with light winds, no rain and good visibility.

The Common Bird Census (CBC) method was used and the survey followed a transect route around the entire site covering all the suitable breeding habitats present in survey sections one to three (see Figures 1 to 4 in Appendix 1). Some areas of the site were inaccessible due to dense bramble undergrowth and it was not possible to survey around the pond located in survey section three.

All birds either seen or heard were recorded and the standard British Trust for Ornithology (BTO) behaviour codes used. Where birds were clearly territorial then this was noted and the locations of the birds recorded. As this one a single survey it is not possible to determine if these territories remained but for the sake of this report it is assumed that they were all active at the time of the survey.

Non territorial birds were also recorded i.e. birds in flight, birds not calling but foraging or loafing. Notes were also made on the habitats that the birds were using within each survey section.

For full details of the CBC method, see Gilbert *et al.* 1998¹.

¹ Common Bird Census in Gilbert, G., Gibbons, D.W. & Evans J. (1998) Bird Monitoring Methods: a manual of techniques of key UK species. RSPB, BTO, WWT, JNCC, ITE and the Seabird Group, pp 386 – 388.

3.0 Results

The habitats within the survey area consist of arable fields, open areas of ground and concrete waste, mixed scrub and semi mature trees and two ponds. There were some earth banks where there was evidence of historic use by sand martins but these burrows are not currently active.

A summary of the birds listed as either Red or Amber birds of conservation concern in Ireland (BoCCI), see Colhoun and Cummins (2013²) are shown in Tables 1 to 3. The BoCCI is the third assessment of the status of all regularly occurring birds on the island of Ireland. The criteria on which the assessment is based include international conservation status, historical breeding declines, recent population declines (numbers and range in breeding and nonbreeding seasons), European conservation status, breeding rarity, localised distribution, and the international importance of populations. The number of Red-listed species has increased by twelve and Amber-listed species by five since the previous review in 2007.

A total of 26 species were recorded during the survey either singing or foraging within the habitats on the survey areas or flying over or passing through the site. Fourteen of these species were assessed as being territorial and nesting within the survey area (see Tables 1 to 3 where territory numbers are given).

Of the 26 species, seven were Amber listed on the BoCCI: robin, swallow, house martin, starling, linnet, skylark, sand martin and two were Red listed: yellowhammer and meadow pipit.

Birds in flight over and around the site included corvids, wood pigeon and numerous foraging hirundines: swallows, house martins and sand martins.

Details of all the species recorded and notes on their activities are given in Tables 1 to 3. Figure 1 shows the whole survey area and the physical locations of each territory are shown in Figures 2 to 4 (for all Figures see Appendix 1).

3.1 Survey Section One

Fifteen species of bird were recorded in this survey section, 13 of which held territories (see Table 1). Four of the territorial species, linnet, robin, starling and skylark, are Amber listed BoCCI species. A single Red listed BoCCI species was present; meadow pipit. Habitat for meadow pipit is limited in this area but it was seen entering a nest site in thick coarse grass. Details of territory numbers and other behaviour where noted is given in Table 1 and the locations of the species recorded shown on Figure 2.

Habitats predominant in this section include a large area of open ground consisting of waste rock material with scattered scrub and emerging ruderal vegetation. Other open areas in this survey section include piles of waste concrete and bunds of waste rock and concrete material. There are also large areas of scrub with semi mature trees. The edges of the survey areas there are arable fields with hedgerows.

² Colhoun, K. & Cummins, S. (2013) Birds of Conservation Concern in Ireland 2014 – 2019. Irish Birds, 9, 523 - 544

Table1: Birds recorded in Survey Section 1 (see Figure 2)

Species recorded	Number of active territories	Notes on other activity	Conservation status
Blackbird	3	Three different singing males identified but it is possible that there were more pairs	-
Blackcap	1	-	-
Bluetit	4	Possibly more territories	-
Chaffinch	2	Other birds in flight across the site	-
Dunnock	3	-	-
Goldfinch	2	Two other birds were seen in flight	-
Linnet	1	-	BoCCI (Amber)
Meadow pipit	1	Towering and attending a nest	BoCCI (Red)
Robin	2	Two distinct territories with territorial interactions between males	BoCCI (Amber)
Starling	1	Active nest, bird carrying food material	BoCCI (Amber)
Skylark	1	Singing male towering and landing in suitable habitat	BoCCI (Amber)
Willow warbler	5	All males very active and very vocal	-
Woodpigeon	0	Five birds seen in flight, probably nesting in the dense scrub habitat	-
Wren	3	Possibly more than three territories	-
Yellowhammer	1	Singing male on the boundary of the site in a hedge next to arable field	BoCCI (Red)

3.2 Survey Section Two

Nine species in total were recorded using survey section two, only three of which were territorial: chiff chaff, dunnock and wren. The other species were either foraging or flying through the area. Two of these transient species, house martin and sand martin are Amber listed on the BoCCI.

The habitats in this survey sections consist of the quarry buildings, open areas of improved grassland, mature woodland edges, arable fields, hedgerows and a small pond at the lower end of the open area of waste rubble as noted in survey section one. The pond is small with little emergent vegetation. There is a mud bank at the edge of this section that has some old inactive sand martin burrows.

Table2: Birds recorded in Survey Section 2 (see Figure 3)

Species recorded	Number of active territories	Notes on other activity	Conservation status
Chiff chaff	1	The only territorial male recorded in any of the survey sections	-
Dunnock	1	-	-
Goldfinch	0	All the birds were seen in flight. Although no birds were obviously territorial the habitat in the survey area was very suitable	-
House martin	0	Numerous birds flying over. Possibly using some of the quarry buildings	BoCCI (Amber)
Jackdaw	0	Pair in a small sycamore	-
Mallard	0	Male and female were present on the pond but there was no nest	-
Sand martin	0	A few birds flying over so probably active somewhere in the area. The burrows in this survey section were not active	BoCCI (Amber)
Woodpigeon	0	Five birds seen in flight, probably nesting in the dense scrub habitat	-
Wren	4	Possibly more than four	-

Species recorded	Number of active territories	Notes on other activity	Conservation status
		territories	

3.3 Survey section three

Thirteen species were recorded in this survey section ten of which were territorial. Two of these species were Amber listed on the BoCCI but only robin was present on site with house martin just foraging. House martin may have been present on site but none of the buildings checked had any visible nest cups.

Habitat in this survey section include extensive areas of mature scrub, semi mature and mature trees, arable fields with hedgerow borders and a large pond fringed with dense undergrowth. Species associated with this feature included coot and reed bunting.

Table3: Birds recorded in Survey Section 3 (see Figure4)

Species recorded	Number of active territories	Notes on other activity	Conservation status
Blackbird	5	Lots of very suitable habitat for this species. Possibly more territories	-
Blackcap	1	Male and female agitated around a possible nest	-
Bullfinch	1	Singing by the pond	
Chaffinch	1	-	-
Coot	1	Nest on the large pond	-
Dunnock	1	-	-
Goldfinch	0	Seven birds were seen in flight. Although no birds were obviously territorial the habitat in the survey area was very suitable	-
House martin	0	Numerous birds flying over. Possibly using some of the quarry buildings	BoCCI (Amber)
Pheasant	0	Male calling at a field edge	-
Reed bunting	1	Calling male on the pond edge	-
Robin	3	-	BoCCI (Amber)

Species recorded	Number of active territories	Notes on other activity	Conservation status
Willow warbler	7	Very vocal throughout a lot of suitable habitat, possibly more territories.	-
Woodpigeon	2	-	-

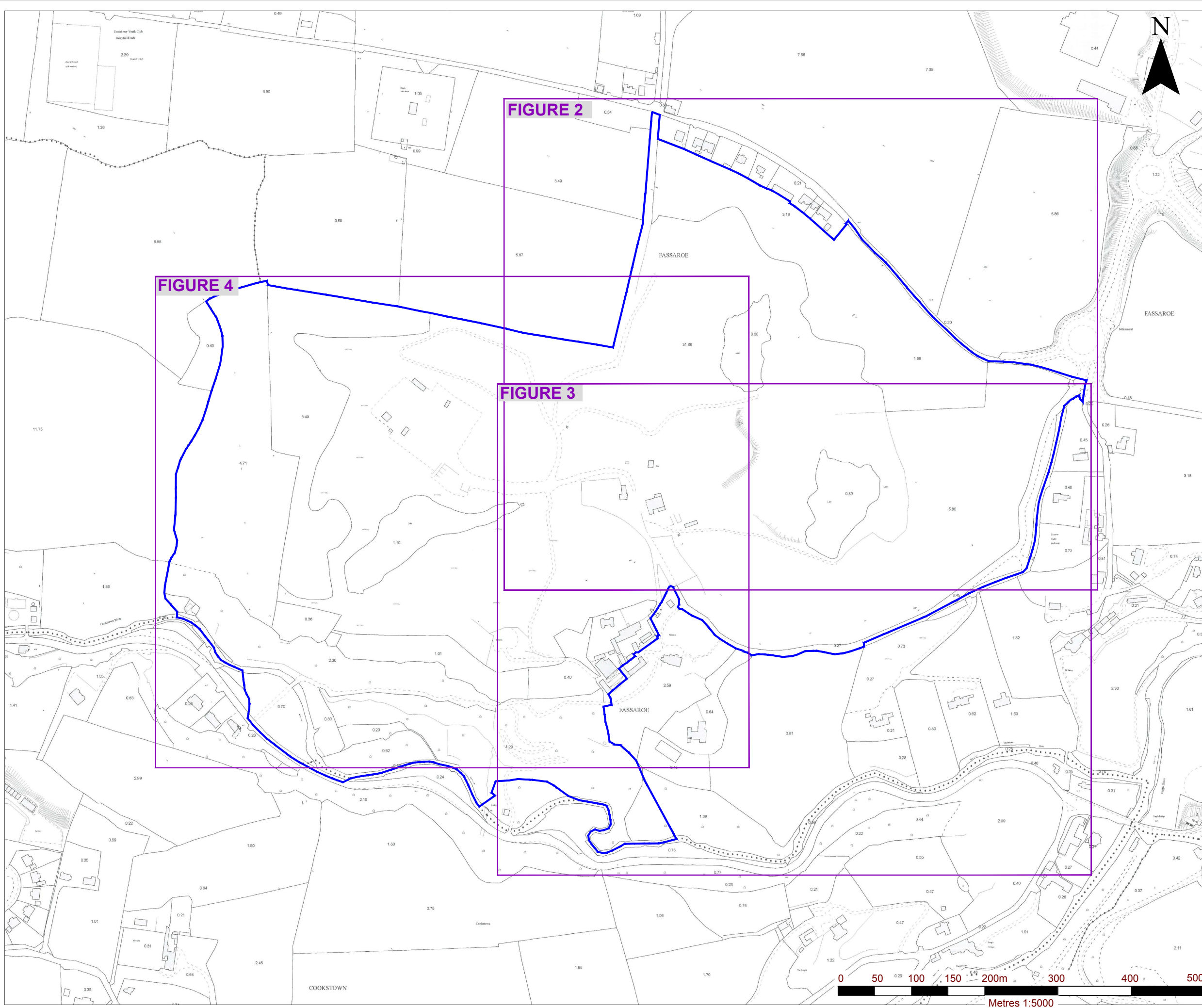
4.0 Summary

This breeding bird survey identified a total of 26 species present at and within the vicinity of the Waste Recovery Facility at Fassaroe, 14 of which were territorial.

Of the 26 species, seven were Amber listed on the BoCCI: robin, swallow, house martin, starling, linnet, skylark, sand martin and two were Red listed: yellowhammer and meadow pipit.

APPENDIX ONE: LOCATIONS OF BIRD TERRITORIES AND BIRDS IN FLIGHT IN SURVEY SECTIONS ONE TO THREE


00180.00178.0.Site Layout Plan.dwg




NOTES

1. EXTRACT FROM ORDNANCE SURVEY 6 INCH MAP NO'S. **WW003 & WW007**
2. ORDNANCE SURVEY IRELAND LICENCE NO. **SU 0000717 (C)** ORDNANCE SURVEY & GOVERNMENT OF IRELAND

LEGEND

 ROADSTONE LIMITED LAND INTEREST (c.71.3 HECTARES)

SLR  SLR CONSULTING IRELAND
7 DUNDUM BUSINESS PARK
WINDY ARBOUR
DUBLIN 14
T: +353-1-2964667
F: +353-1-2964676
www.slrconsulting.com

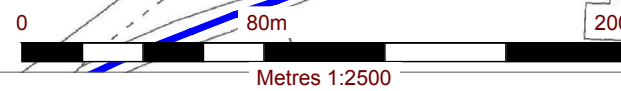
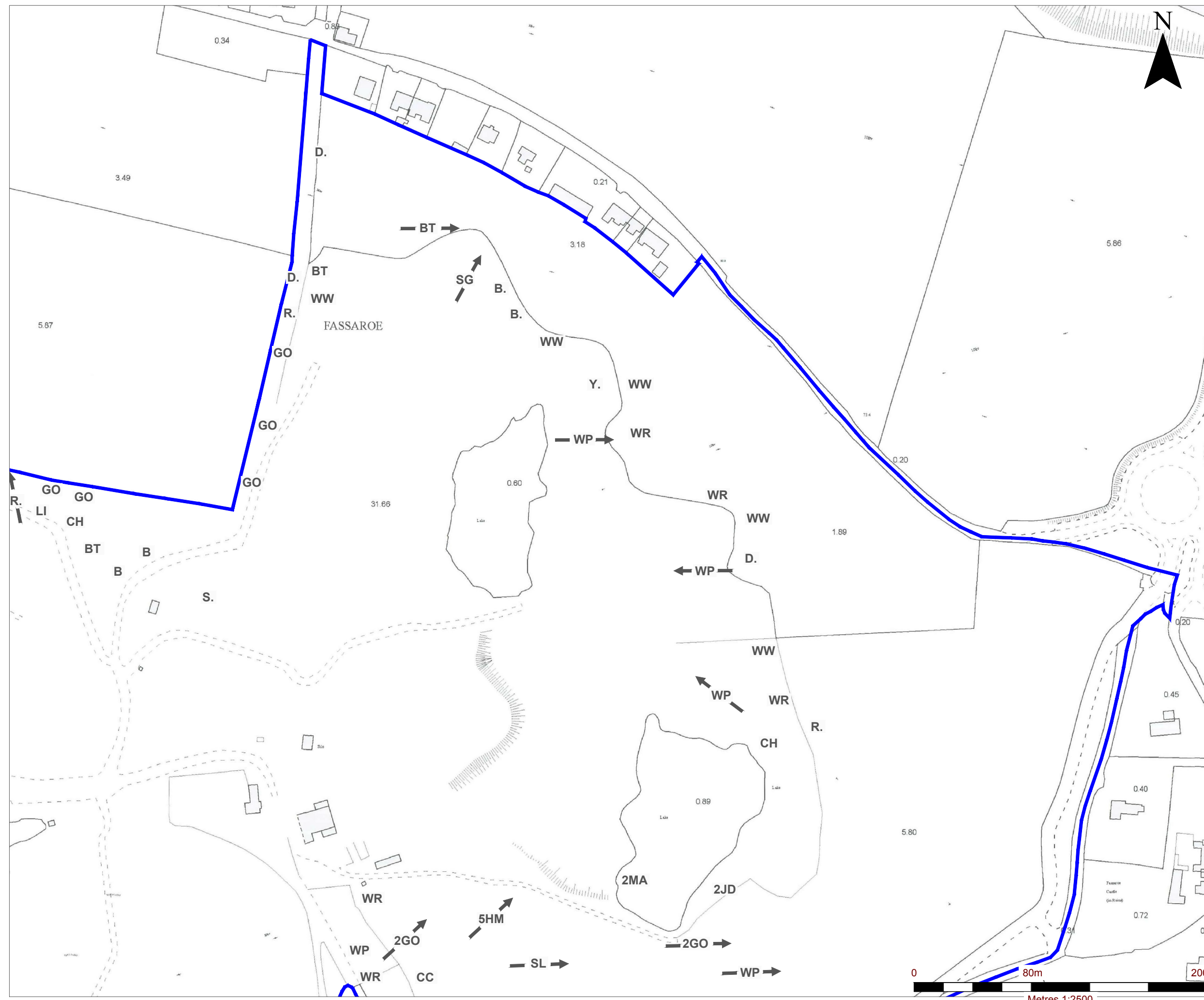
ROADSTONE LIMITED
FASSAROE QUARRY BIRD SURVEY
FASSAROE, BRAY, CO. WICKLOW
SITE LAYOUT MAP

FIGURE 1

Scale 1:5,000 @ A3 Date JUNE 2017



00:180.00178.0.Site Layout Plan.dwg



NOTES

1. EXTRACT FROM ORDNANCE SURVEY 6 INCH MAP NO'S. **WW003 & WW007**
2. ORDNANCE SURVEY IRELAND LICENCE NO. **SU 0000717 (C)** ORDNANCE SURVEY & GOVERNMENT OF IRELAND

LEGEND

	ROADSTONE LIMITED LAND INTEREST (c.71.3 HECTARES)
B.	BLACKBIRD
BT	BLUE TIT
CH	CHAFFINCH
CC	CHIFFCHAFF
D.	DUNNOCK
GO	GOLDFINCH
HM	HOUSE MARTIN
LI	LINNET
R.	ROBIN
S.	SKYLARK
SG	STARLING
WW	WILLOW WARBLER
WP	WOODPIGEON
WR	WREN
Y.	YELLOWHAMMER

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global environmental solutions

ROADSTONE LIMITED

FASSAROE QUARRY BIRD SURVEY

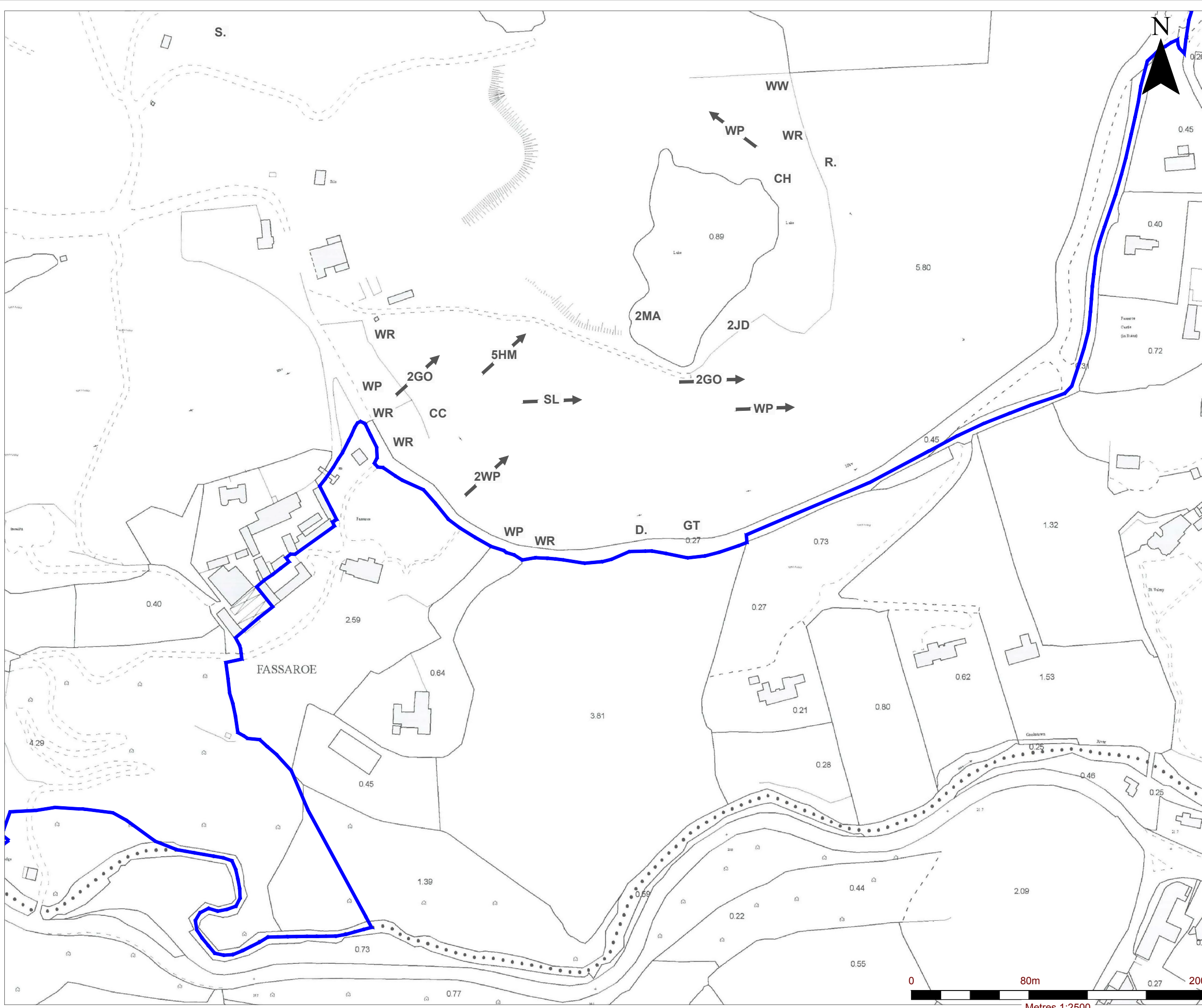
FASSAROE, BRAY, CO. WICKLOW

SITE LAYOUT MAP

FIGURE 2

Scale 1:2,500 @ A3	Date JUNE 2017
-----------------------	-------------------

00180.00178.0.Site Layout Plan.dwg



NOTES

1. EXTRACT FROM ORDNANCE SURVEY 6 INCH MAP NO'S. **WW003 & WW007**
2. ORDNANCE SURVEY IRELAND LICENCE NO. **SU 0000717 (C)** ORDNANCE SURVEY & GOVERNMENT OF IRELAND

LEGEND

	ROADSTONE LIMITED LAND INTEREST (c.71.3 HECTARES)
CH	CHAFFINCH
CC	CHIFFCHAFF
D.	DUNNOCK
GO	GOLDFINCH
HM	HOUSE MARTIN
JD	JACKDAW
MA	MALLARD
R.	ROBIN
S.	SKYLARK
SL	SWALLOW
WW	WILLOW WARBLER
WP	WOODPIGEON
WR	WREN

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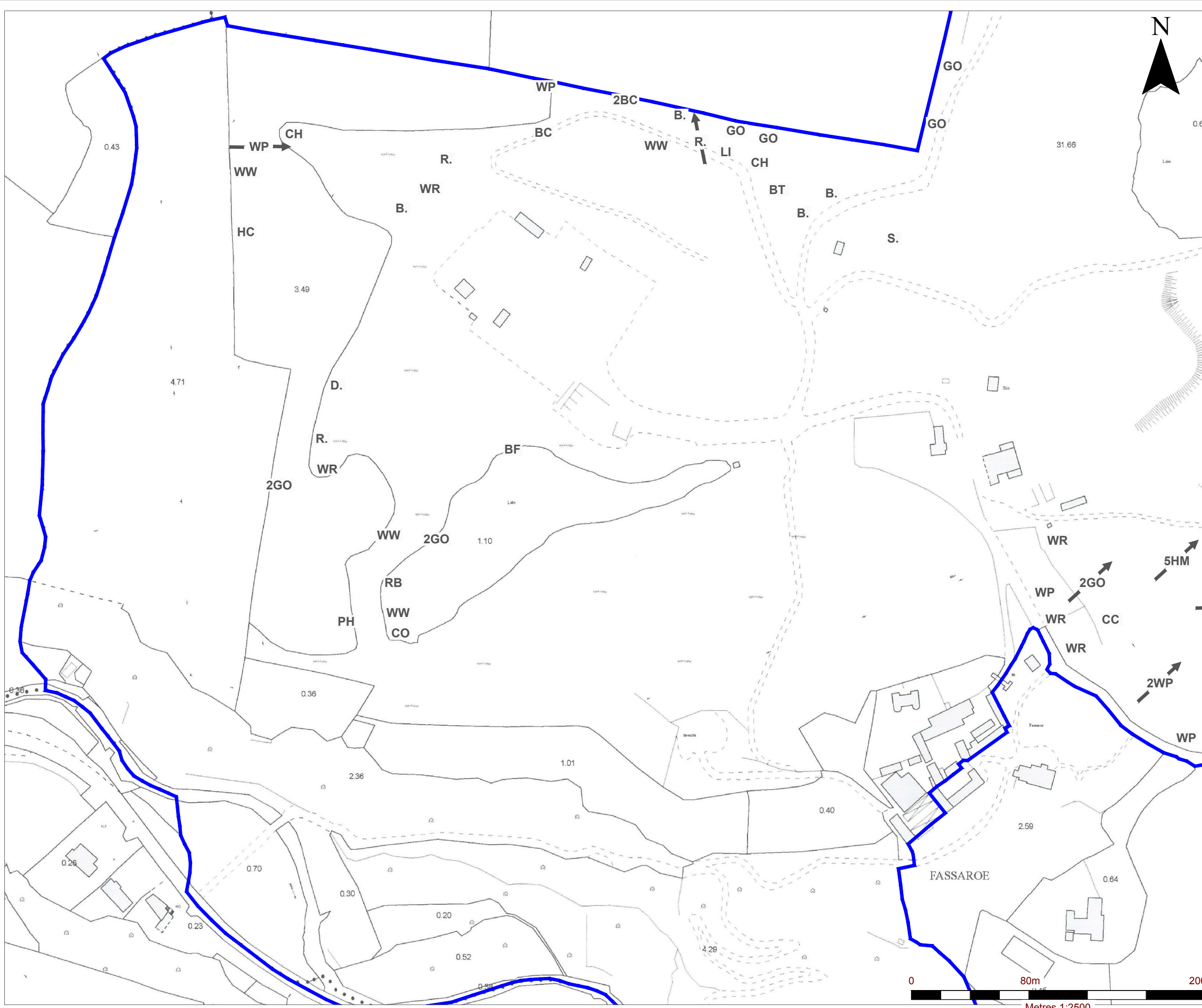
FASSAROE QUARRY BIRD SURVEY
FASSAROE, BRAY, CO. WICKLOW

SITE LAYOUT MAP

FIGURE 3

Scale: 1:2,500 @ A3 Date: JUNE 2017

00180.00178.0.Site Layout Plan.dwg



NOTES

1. EXTRACT FROM ORDNANCE SURVEY 6 INCH MAP NO'S. **WW003 & WW007**
2. ORDNANCE SURVEY IRELAND LICENCE NO. **SU 0000717 (C)** ORDNANCE SURVEY & GOVERNMENT OF IRELAND

LEGEND

	ROADSTONE LIMITED LAND INTEREST (c.71.3 HECTARES)
B.	BLACKBIRD
BC	BLACKCAP
BF	BULLFINCH
BT	BLUETIT
CH	CHAFFINCH
CC	CHIFFCHAFF
D.	DUNNOCK
GO	GOLDFINCH
HC	HOODED CROW
HM	HOUSE MARTIN
LI	LINNET
PH	PHEASANT
R.	ROBIN
S.	SKYLARK
WW	WILLOW WARBLER
WP	WOODPIGEON
WR	WREN

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FASSAROE QUARRY BIRD SURVEY
FASSAROE, BRAY, CO. WICKLOW

SITE LAYOUT MAP

FIGURE 4

Scale: 1:2,500 @ A3 Date: JUNE 2017

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APPENDIX D

Tank And Pipeline Testing And Inspection Report



Bund Integrity Assessment

Roadstone Ltd.

Site/Quarry: Fassaroe

Document Number 1880-23 v1.00

Email: energy@enviro-consult.com www.enviro-consult.com

Registered Office: Parnell House, 19 Quinsboro Road, Bray, Co. Wicklow A98 XV04. Registered Number 243 412

Directors: Robert B. Sutcliffe, Ronan T. Sutcliffe

Environmental Services for Industry Including –

- ▶ Air, Noise & Water Monitoring
- ▶ Bund Testing
- ▶ Environmental Management Systems to ISO 14001
- ▶ Air & Noise Modelling
- ▶ Energy & Water use reduction
- ▶ IPC/IED/Waste Licence Compliance
- ▶ EIS & Planning
- ▶ Occupational Dust & Noise

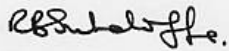
Affiliations & Accreditations

- ▶ ISO9001:2008 Registration No. 2015/2170
- ▶ ISO14001:2004 Registration No. 2012/1427
- ▶ MCERTS Certified personnel for stack testing
- ▶ Member of Royal Society for Prevention of Accidents
- ▶ Member Environmental Services Association
- ▶ EMPI Membership



QF 1. v2 Document Lead Sheet

Document Title	Bund Integrity Assessment
Project No.	1880
Document No.	1880-23
Client	Roadstone
Site	Fassaroe

Issue	Status	Date	Author	Signed for and on behalf of	
				Environmental Efficiency	Client
1.00	Approved	02/12/2016	RBS		

SR02 v1.11

EEC Document Author: Bob Sutcliffe, CEng, MIEI

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History

Issue 1.00 Issued

1. Summary

Bund ref.	Bund integrity Result	Bund adequate size	Bund suitable construct'n	Bund protected from rain	Refuelling area has interceptor	Essential Action Required	Optional Action
Auto Diesel	Fail	Yes	No	No	No	Repair bund walls. Install interceptor	Protect bund from rain or mark maximum quantity of rainwater. Protect bund walls from vehicle strikes
Yellow Self Bunded Tanks	Pass	Yes	Yes	Yes	N/A	None	Install a self-test
Drum Racks	Fail	Yes	Yes	Yes	N/A	Remove oil from sump.	None
Waste Oil Bund	Pass	Yes	Yes	Yes	N/A	None	Install a self-test
Gasoil bund	Pass	Yes	Yes	Yes	N/A	None	Repair self test

Notes

2. Bund inspection results

2.1 Marked Gasoil

Bund Integrity Assessment

Aspect	Value/Finding	Comment
Date of Assessment	28-Oct 16	
Location	yard	
Bund type	Local	
Bund construction	Block	
Wall integrity defects	Bund partly full of water, walls damaged	
Base Integrity defects	Not determined	Base could not be inspected as bund partly full of rainwater.
Assessment result	Fail	Fail due to cracks in wall

Capacity check

Aspect	Value/Finding	Comment
Bund capacity, Litres	97,526	Visual assessment shows that bund has sufficient capacity
110% largest tank, litres	Sufficient	
25% of all tanks, litres	Sufficient	
Assessment result	Pass	

Good practice

Aspect	Value/Finding	Comment
Bund protected from rain?	No (Fail)	Best practice is to protect from rain
Maximum quantity of rainwater marked?	No (Fail)	Best practice is to mark maximum quantity of allowable rainwater
Is rainwater discharged by gravity?	No (Pass)	Best practice is not for gravity discharge.
Is rainwater discharge point securely locked?	N/A as no gravity discharge or no rain water	Best practice is securely lock gravity discharge points.
Are tank filling points within bund?	Yes (Pass)	Best practice is for tank filling points to be within the bund.
Do pipes pass through bund wall?	No (Pass)	For masonry bunds, best practice is to route pipes over bund walls.
Is bund protected from vehicle strikes?	No (Fail)	Best practice is to protect block and plastic bunds from vehicle strikes.
Is bund fitted with a self-test?	Not applicable to non self-bunded tanks	Best practice is for self bunded tanks to have a self-test device.
Is self-test working?		Best practice is for self bunded tanks to have the self-test device regularly tested.
Does self-test device indicate a leak?		Where a leak is detected in a self bunded tank this may indicate a rupture of the inner skin.

Interceptor

Aspect	Value/Finding	Comment
Associated refuelling area?	Yes	
Impermeable ground?	No (Fail)	There is an impermeable area but it is insufficient as evidence of run-off to ground.
Interceptor?	Yes Class 1 Hydrocarbon interceptor in the concrete yard. The interceptor is located to the rear of the agg silos of the concrete plant, at the lowest point of the yard.	Best practice is for refuelling areas to have an interceptor
Defects/Comments		No comment

Essential action

Repair damaged walls

Install interceptor at refuelling area

Consider increasing size of impermeable area

Optional action

Protect bund from rain or mark maximum quantity of rainwater
Protect bund walls from vehicle strikes



Figure 2-1 Example of crack in bund wall



Figure 2-2 Leak from base of bund wall

2.2 Yellow Self Bunded Tanks

Bund Integrity Assessment

Aspect	Value/Finding	Comment
Date of Assessment	28-Oct 16	No comment
Location	concrete plant	
Bund type	Local (self bunded tank)	
Bund construction	Plastic	
Wall integrity defects	walls inspected - no defects	
Base Integrity defects	Base inspected - no defects	
Assessment result	Pass	

Capacity check

Aspect	Value/Finding	Comment
Bund capacity, Litres	Sufficient	No comment
110% largest tank, litres		
25% of all tanks, litres		
Assessment result		

Good practice

Aspect	Value/Finding	Comment
Bund protected from rain?	Yes (Pass)	Best practice is to protect from rain
Maximum quantity of rainwater marked?	N/A as protected from rain	N/A as bund protected from rain
Is rainwater discharged by gravity?	N/A as protected from rain	
Is rainwater discharge point securely locked?	N/A as no gravity discharge or no rain water	
Are tank filling points within bund?	N/A as self bunded	Best practice is for tank filling points to be within the bund.
Do pipes pass through bund wall?	N/A for steel or plastic construction	For masonry bunds, best practice is to route pipes over bund walls.
Is bund protected from vehicle strikes?	Yes (Pass)	Best practice is to protect block and plastic bunds from vehicle strikes.
Is bund fitted with a self-test?	No (Fail)	Best practice is for self bunded tanks to have a self-test device.
Is self-test working?	Not applicable as no self-test	
Does self-test device indicate a leak?	Not applicable as no self-test	

Interceptor

Aspect	Value/Finding	Comment
Associated refuelling area?	No	
Impermeable ground?	N/A as no refuelling area	Best practice is for refuelling areas to be impermeable
Interceptor?		
Defects/Comments		

Essential action

No essential action

Optional action

Fit a self-test for leaks in void and test at monthly intervals.



Figure 2-3 Bund identification

2.3 Drum racks

Bund Integrity Assessment

Aspect	Value/Finding	Comment
Date of Assessment	28-Oct 16	No comment
Location	garage	
Bund type	Local (prefabricated)	
Bund construction	Steel	
Wall integrity defects	walls inspected - no defects	
Base Integrity defects	Could not inspect as sump full of oil	
Assessment result	Fail	

Capacity check

Aspect	Value/Finding	Comment
Bund capacity, Litres	Not recorded	No spare capacity in sump to retain a spill as sump full of oil.
110% largest tank, litres	N/A	
25% of all tanks, litres	-	
Assessment result	Fail	

Good practice

Aspect	Value/Finding	Comment
Bund protected from rain?	Yes (Pass)	Best practice is to protect from rain
Maximum quantity of rainwater marked?	N/A as protected from rain	
Is rainwater discharged by gravity?		
Is rainwater discharge point securely locked?		
Are tank filling points within bund?	N/A as no filling takes place	Best practice is for tank filling points to be within the bund.
Do pipes pass through bund wall?	N/A for steel or plastic construction	For masonry bunds, best practice is to route pipes over bund walls.
Is bund protected from vehicle strikes?	N/A as bund of steel construction	Best practice is to protect block and plastic bunds from vehicle strikes.
Is bund fitted with a self-test?	Not applicable to non self-bunded tanks	No comment
Is self-test working?		
Does self-test device indicate a leak?		

Interceptor

Aspect	Value/Finding	Comment
Associated refuelling area?	No	No comment
Impermeable ground?	N/A as no refuelling area	
Interceptor?		
Defects/Comments		

Essential action

Remove oil from sump

Optional action

None

**Figure 2-4 Bund identification**



Figure 2-5 Sump of bund full of oil.

2.4 Waste oil bund

Bund Integrity Assessment

Aspect	Value/Finding	Comment
Date of Assessment	28-Oct 16	No comment
Location	garage	
Bund type	Local (self bunded tank)	
Bund construction	Plastic	
Wall integrity defects	walls inspected - no defects	
Base Integrity defects	walls inspected - no defects	
Assessment result	Pass	

Capacity check

Aspect	Value/Finding	Comment
Bund capacity, Litres	Sufficient	No comment
110% largest tank, litres		
25% of all tanks, litres		
Assessment result		

Good practice

Aspect	Value/Finding	Comment
Bund protected from rain?	Yes (Pass)	Best practice is to protect from rain
Maximum quantity of rainwater marked?	N/A as protected from rain	
Is rainwater discharged by gravity?		
Is rainwater discharge point securely locked?		
Are tank filling points within bund?	N/A as self bunded	Best practice is for tank filling points to be within the bund.
Do pipes pass through bund wall?	No (Pass)	For masonry bunds, best practice is to route pipes over bund walls.
Is bund protected from vehicle strikes?	No (Fail)	Best practice is to protect block and plastic bunds from vehicle strikes.
Is bund fitted with a self-test?	No (Fail)	Best practice is for self bunded tanks to have a self-test device.
Is self-test working?	Not applicable as no self-test	Best practice is for self bunded tanks to have the self-test device regularly tested.
Does self-test device indicate a leak?		

Interceptor

Aspect	Value/Finding	Comment
Associated refuelling area?	No	No comment
Impermeable ground?	N/A as no refuelling area	
Interceptor?		
Defects/Comments		

Essential action

None

Optional action

Fit a self-test for leaks in void and test at monthly intervals

**Figure 2-6 Bund identification**

2.5 Gas oil bund

Bund Integrity Assessment

Aspect	Value/Finding	Comment
Date of Assessment	28-Oct 16	No comment
Location	garage	
Bund type	Local (self bunded tank)	
Bund construction	Plastic	
Wall integrity defects	walls inspected - no defects	
Base Integrity defects	Base inspected - no defects	
Assessment result	Pass	

Capacity check

Aspect	Value/Finding	Comment
Bund capacity, Litres	Sufficient	No comment
110% largest tank, litres		
25% of all tanks, litres		
Assessment result		

Good practice

Aspect	Value/Finding	Comment
Bund protected from rain?	Yes (Pass)	Best practice is to protect from rain
Maximum quantity of rainwater marked?	N/A as protected from rain	N/A as bund protected from rain
Is rainwater discharged by gravity?		
Is rainwater discharge point securely locked?		
Are tank filling points within bund?	N/A as self bunded	Best practice is for tank filling points to be within the bund.
Do pipes pass through bund wall?	N/A for steel or plastic construction	For masonry bunds, best practice is to route pipes over bund walls.
Is bund protected from vehicle strikes?	Yes (Pass)	Best practice is to protect block and plastic bunds from vehicle strikes.
Is bund fitted with a self-test?	Yes (Pass)	Best practice is for self bunded tanks to have a self-test device.
Is self-test working?	No (Fail)	Best practice is for self bunded tanks to have the self-test device regularly tested.
Does self-test device indicate a leak?	Not determined	

Interceptor

Aspect	Value/Finding	Comment
Associated refuelling area?	No	
Impermeable ground?	N/A as no refuelling area	Best practice is for refuelling areas to be impermeable
Interceptor?	N/A as no refuelling area	Best practice is for refuelling areas to have an interceptor
Defects/Comments	N/A as no refuelling area	

Essential action

None

Optional action

Repair self-test

**Figure 2-7 Bund identification**

APPENDIX E

Closure, Restoration & Aftercare Management Plan



global environmental solutions

**Fassaroe Inert Waste Recovery Facility
Fassaroe, Bray, Co. Wicklow**

Closure, Restoration and Aftercare Management Plan (CRAMP)



**November 2011
SLR Ref: 501.00180.00028.Rev0**

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1.0 INTRODUCTION

1.1 Waste Licence – Condition 10

This Closure, Restoration and Aftercare Management Plan (CRAMP) is prepared in compliance with Condition 10 of Waste Licence No. W0269-01 issued by the Environmental Protection Agency (EPA) in April 2011 to Roadstone Wood Ltd. in respect of its soil and construction and demolition (C&D) waste recovery facility at Fassaroe, Bray, Co. Wicklow.

The waste licence principally provides for

- (i) backfilling of a worked out quarry void using imported and some existing inert soils and stones stockpiled in-situ and
- (ii) processing (crushing and screening) of waste concrete, concrete products, bricks and other inert construction and demolition waste to produce secondary aggregate for re-use as a low grade general fill in construction.

Condition 10 of the waste licence states that:

10.1 *The facility shall be restored in accordance with Figure 2.6 Phasing Plan of the EIS.*

10.2 *Final Levels/Profile*

10.2.1 *The final profile of the facility shall tie-in to the surrounding land levels and shall be as shown in Figure B2.5 Restored Cross Sections in the licence application.*

10.2.2 *Within twelve months of completion of each phase of waste deposition, that phase shall be progressively restored to agricultural grassland.*

10.2.3 *Developed areas shall be profiled so that no depression exists in which water may accumulate. Any depressions arising after profiling shall be rectified by the emplacement of suitable capping or restoration materials.*

10.2.4 *Final contours and landscaping should be such that the finished slopes of the facility are structurally stable, resistant to erosion, and protective of pollutant control and monitoring infrastructure.*

10.3 *Final Capping*

10.3.1 *Unless otherwise agreed by the Agency, filled areas shall be permanently capped within 6 months of the areas having been filled to the required level.*

10.3.2 *Unless otherwise agreed by the Agency, the final capping shall consist of the following:*

- (i) Top soil (150-300mm); and*
- (ii) Subsoils, such that total thickness of top soil and subsoils is at least 1m.*

10.4 *No material or object that is incompatible with the proposed restoration of the facility shall be present within 1m of the final soil surface levels.*

10.5 *All waste activities at the facility shall cease upon the installation of the final capping unless otherwise agreed by the Agency.*

10.6 *Following termination, or planned cessation for a period greater than six months, of use or involvement of all or part of the site in the licensed activity, the licensee shall, to the satisfaction of the Agency, decommission, render safe or remove for disposal/recovery any soil, subsoil, buildings plant or equipment, or any waste,*

materials or substances or other matter contained therein or thereon, that may result in environmental pollution.

10.7 Closure, Restoration and Aftercare Management Plan (CRAMP)

10.7.1 The licensee shall prepare, to the satisfaction of the Agency, a fully detailed and costed plan for the decommissioning or closure of the site or part thereof. This plan shall be submitted to the Agency for agreement within six months of the date of grant of the licence.

10.7.2 The plan shall be reviewed annually and proposed amendments thereto notified to the Agency for agreement as part of the AER. No amendments may be implemented without the agreement of the Agency.

10.7.3 The licensee shall have regard to the Environmental Protection Agency Guidance on Environmental Liability Risk Assessment, Decommissioning Management Plans and Financial Provision when implementing Condition 10.7.1 above.

10.8 The CRAMP shall include, as minimum, the following:

- (i) a scope statement for the plan;*
- (ii) the criteria that define the successful decommissioning of the activity or part thereof, which ensures minimum impact on the environment;*
- (iii) a programme to achieve the stated criteria;*
- (iv) where relevant, a test programme to demonstrate the successful implementation of the decommissioning plan; and*
- (v) details of the costing for the plan and the financial provisions to underwrite the cost.*

10.9 A final validation report to include a certificate of completion for the CRAMP, for all or part of the site as necessary, shall be submitted to the Agency within three months of execution of the plan. The licensee shall carry out such tests, investigations or submit certification, as requested by the Agency, to confirm that there is no continuing risk to the environment.”

1.2 Scope of CRAMP

The objective of this CRAMP is to ensure that on completion / cessation of waste recovery activities at Fassaroe, the waste recovery areas are restored to use as agricultural land, pending prospective long-term re-development for mixed-used development, as envisaged by the Bray Environs Local Area Plan 2009-2015.

The scope of this CRAMP comprises:

- a Site Evaluation, which presents details of its planning history and an inventory of existing mobile plant and fixed infrastructure;
- the Closure Considerations and Criteria for successful closure;
- an outline Closure Plan Costing and measures for the Closure Plan update, review, implementation and validation; and
- the Facility Restoration and Aftercare proposals, including a restoration and aftercare management costing.

2.0 SITE EVALUATION

2.1 Site Description

The waste facility to which this CRAMP refers is located entirely within the townland of Fassaroe, Co. Wicklow, approximately 1.5km west of Bray town and 2km east of Enniskerry village. The waste licence area and the extent of the lands owned by Roadstone Wood Ltd. are outlined on a 1:50,000 scale map of the area, on Figure 1.

The waste licence area covers an area of approximately 25.6hectares (61.7acres). The site is located within a pre-existing construction materials production facility operated by Roadstone Wood Ltd. The quarry void to be backfilled using imported inert soil and stone is located in the eastern part of the waste licence area. The existing site layout is shown on Figure 2.

Ground levels across the site follow that of the surrounding ground, falling south-eastwards from approximately 95mOD to 74mOD (Malin), toward the Cookstown and Dargle Rivers. The existing quarry void covers an area of approximately 4.5 hectares (10.8 acres) and its depth from existing ground level varies from 18m at its northern end to 10m at its southern end.

Aggregate processing and value added production activities are currently undertaken within the waste licence site boundary. The principal aggregate processing activities include the washing and screening of imported sand and gravel, while the principal value added activity is the production of ready-mixed concrete.

2.2 Planning History

No planning permission was ever required in respect of historical quarrying activity at the licensed site as it was established and operating prior to the introduction of planning controls under the Local Government (Planning and Development) Act of 1963.

2.2.1 Recovery of Construction and Demolition Waste

Planning permission for the existing construction and demolition waste recovery facility within the licensed site was granted by Bord Pleanála on appeal in July 2004 (Wicklow County Council Planning Ref. No. 03/9501). An application for renewal of planning permission was approved by Wicklow County Council in October 2009.

Roadstone Wood Ltd. has operated the construction and demolition (C&D) waste recovery facility at the licensed site since 2004. Prior to being granted a waste licence by the EPA, the C&D recovery facility was operated in accordance with a waste permit (Reference Number ESS/15/8/12) issued by Wicklow County Council for an initial three year period in 2004. The waste permit was subsequently renewed for a further three year period by Wicklow County Council in July 2008 (Ref. No. ESS/15/8/12-339).

2.2.2 Recovery of Inert Soil and Stone

A planning application to provide for the backfilling and restoration of the former quarry void at Fassaroe was submitted to Wicklow County Council in July 2008 (Planning Register Reference No. 08/1258). Planning permission for this activity was issued by Wicklow County Council in March 2009.

A separate waste permit application was submitted to Wicklow County Council in May 2008 to provide for partial backfilling of the existing quarry. This waste permit was issued, with

conditions, in March 2009. This waste permit was also superseded by the EPA's grant of the waste licence in April 2011.

2.3 Site Inventory / Infrastructure

The established site facilities, mobile plant and fixed infrastructure at the licensed site at Fassaroe are listed below. Most of the site facilities and infrastructure are shared with the adjoining / co-located construction material production facility and have been in-situ for many years, pre-dating the establishment of waste recovery facilities at the site in recent years. The principal site facilities are located on Figure 2 of this report. Many of these facilities will continue to remain in place following cessation of waste recovery activities at Fassaroe.

- Buildings: site office / retail shop, plant maintenance shed; waste quarantine shed
- Fixed Infrastructure: paved / unpaved internal road network; paved employee and visitor parking areas, outdoor retail area, paved storage yard, paved block yard, paved concrete yard, hardstanding at C&D waste recovery area, wheelwash; weighbridge, bunded fuel storage tanks
- Services: buried sewerage pipes and septic tanks, overhead / buried electricity cables, local water supply pipes, Dublin City Council watermain
- Plant and Machinery: re-fuelling plant; mobile crushing and screening plant; mechanical excavators; bulldozers, concrete production plant, pumps, flexible / rigid overground pipes (for process wastewater)

2.4 Requirement for this Plan

The waste recovery facility at Fassaroe will result in substantial landform changes and, if not properly managed, could introduce some potential risks to the long-term environment.

An initial screening and operational risk assessment was undertaken in respect of the waste recovery facility at Fassaroe in accordance with an assessment methodology prescribed by the EPA in its publication *Guidance on Environmental Liability Risk Assessment, Residuals, Management Plans and Financial Provision (2006)*.

This screening exercise indicated that the waste recovery facility at Fassaroe could be classified as a Category 1 Risk Facility. As such, the principal requirement for management of long-term land use is to prepare a site closure / restoration plan, with such minor provision for site aftercare and management as may be required.

The Category 1 risk classification is such that there is no requirement for a detailed Environmental Liability Risk Assessment (ELRA) to be prepared in respect of the waste recovery facility at Fassaroe.

3.0 FACILITY CLOSURE

3.1 Closure Considerations

This closure plan envisages that the licensed waste facility will achieve a clean closure, such that, on cessation of recovery operations and decommissioning / removal of plant and infrastructure from the facility, no remaining environmental liabilities will attach to restored areas of the site and/or areas where the principal waste recovery activities are located.

The operation of the Waste Recovery Facility at Fassaroe provides for phased backfilling and restoration of a large pre-existing void created by previous extraction of sand and gravel at the site. On completion of the final phase of backfilling, much of the work required to achieve final restoration and closure of the waste facility will already have been completed. It is expected that the final restoration of the waste recovery areas to agricultural use will be completed within a relatively short period of time. Details of the final restoration works are outlined in some detail in Section 4 of this CRAMP.

On completion of the fourth (and final) phase of the quarry backfilling works and the subsequent final site restoration works, all mobile plant and equipment associated with the backfilling, placement and compaction of soil and stones will be removed off-site.

If it is decided at that time to also cease the construction and demolition waste recovery activity at this location, no additional materials will be imported to site for recovery purposes and existing stockpiles of processed materials (secondary aggregate) will be sold off over time. All mobile processing plant and equipment will be removed off-site. Dedicated waste recovery infrastructure, principally the hardstanding area, paved surfaces and (concrete) wheelwash facility, will be progressively decommissioned, recovered and where possible, re-used within the facility or for production of engineering fill / concrete. Failing this, the excavated or decommissioned construction materials will be removed off-site.

Any dedicated buried service infrastructure, will be decommissioned and removed. Any existing or shared plant, equipment or infrastructure required for continued operation of the adjoining concrete production facility will however remain in place.

Hard-standing or paved surfaces will be broken up using a hydraulic breaker and subjected to validation testing to confirm the materials are acceptable for re-use within the Applicant's landholding for construction of haul roads and/or other hard standing areas. Any materials which are found to exceed inert waste acceptance criteria will be transferred off-site by licensed waste contractors to a suitably licensed waste disposal or recovery facility.

Provision will be made for short-term (<1year) environmental monitoring of air, surface water and groundwater. Assuming no evidence of contaminated soil or groundwater is encountered, the in-situ groundwater monitoring wells will be decommissioned in accordance with guidance published by the UK Environmental Agency in its publication *Decommissioning Redundant Wells and Boreholes*.

3.2 Criteria for Successful Closure

The principal criteria against which successful closure will be gauged are as follows:

- the principal objective is to achieve clean closure of the site following restoration and aftercare, with no residual liabilities or constraints.
- all mobile plant and equipment associated with the backfilling, placement and compaction of soil and stones and/or recovery of inert construction and demolition waste will have been removed off site;

- short-term (< 1year) environmental monitoring of air, surface water and groundwater will be carried out and no evidence of air or surface / groundwater contamination identified on site;
- the backfilled / restored areas will be returned to productive agricultural land use;
- there should be no constraints on future land use associated with soil or groundwater contamination or any structures remaining in-situ.
- the process of surrendering the waste licence to the EPA will be progressing in order to remove the legal encumbrance on title deeds to the restored land areas and the adjoining construction materials production facility.

3.3 Closure Plan Costing

The expected costs (present-day values), associated with the future closure of the waste recovery facility at Fassaroe, are outlined in Table 1 below.

Table 1
Facility Closure Costs

ITEM	COST €
Removal of all mobile plant off site	1,500.00
Decommissioning of fixed infrastructure (wheelwash) and buried services	2,000.00
Breaking up of pavement and hard-standing surfaces (using hydraulic breaker), validation testing to confirm materials may be re-used on site and transfer across landholding	6,000.00
Transfer off site of any non-inert material (allow, say)	2,500.00
Final site restoration works (site levelling and contouring, re-seeding, spraying etc.) – see Section 4	8,000.00
Short-term (< 1year) environmental monitoring of air, surface water and groundwater	3,000.00
Decommissioning of groundwater monitoring wells	3,000.00
Closure Validation Report	2,000.00
Total Site Closure Cost (excl. VAT)	€28,000.00

3.4 Closure Plan Update and Review

As required by the waste licence conditions, this Closure Plan will be reviewed and updated annually as part of the Annual Environmental Report (AER) submission to the EPA, The updated and reviewed Closure Plan will take account of any site or process changes, technology changes and costing changes.

3.5 Closure Plan Implementation

Quarry backfilling activity at the Fassaroe waste recovery facility is currently projected to be complete within 6 to 8 years time. This timeline is however very dependent on the availability of rate of inert soil and stone generated by off-site construction activity and is subject to ongoing review and potential change.

The EPA will be given 2 months notice of any proposed temporary closure and 6 months notice of the intended final closure date. Notice will be provided in accordance with prevailing guidance and it is anticipated that there will also be ongoing discussions with the EPA in respect of required closure procedures.

3.6 Closure Plan Validation

As required by Condition 10.9 of the Waste Licence, a final validation report (including a Certificate of Completion for the CRAMP) in respect of the licensed waste facility will be submitted to the Agency within 3 months of completion of the works outlined herein.

The validation audit will be undertaken by an independent, external environmental Consultant. The final validation report will include:

- an assessment of how the objectives of the Closure Plan have been achieved;
- final 'as-restored' drawings and photographs of the site;
- results of short-term environmental monitoring which follow Site Closure and Restoration and
- a Certificate of Completion for the CRAMP.

4.0 FACILITY RESTORATION AND AFTERCARE

4.1 Facility Restoration

The waste recovery activities at Fassaroë primarily provide for the backfilling of large voids created by previous extraction of sand and gravel at the site using imported inert soil and stone and some in-situ stockpiled soil. Backfilling of these voids will facilitate restoration of the former quarry area to agricultural grassland.

4.1.1 Backfilling / Earthworks / Grass Seeding

The backfilling of the former quarry area will proceed in several phases and, on completion, will merge into the surrounding undulating pastoral landscape. An indication of the proposed phasing of the works and the final ground level contours are provided in Figure 3. In addition to imported materials, soil in existing screening berms and/or stockpiles within the site area will also be used to backfill the former quarry. Cross-sections through the final landform are shown in Figure 4.

It is currently envisaged that backfilling of the existing void will proceed from the northern to the southern end of the quarry. Any temporary additional or replacement infrastructure which may be required to facilitate the proposed works (collector sumps etc.) will be constructed and/or installed at the outset of the first phase of quarry backfilling.

Final formation levels for backfilling across the former quarry and construction and demolition waste recovery area are taken to be equivalent to existing surrounding ground levels, indicated on Figure 2. On completion, final gradients across the restored ground surface will be relatively shallow, generally no greater than 1v:15h.

Following each phase of quarry backfilling, a cover layer of subsoil and topsoil will be placed and graded across the backfilled soil, in accordance with the requirements set out in Condition 10.3.2 of the waste licence (ie. 150-300mm of topsoil over subsoil such that total thickness of topsoil and subsoil is at least 1m). The restoration surface will then be seeded with grass in order to promote stability, minimise soil erosion and dust generation and restore the land to agricultural use.

On completion of the final phase of quarry backfilling and cessation of C&D waste recovery activity, the ground surface across the backfilled quarry area and C&D recycling area will be raised / lowered locally as required to achieve a uniformly sloping and stable ground surface similar to that indicated on Figure 3. The final restored landform will be inspected and re-graded locally where required (by placement of additional subsoil and topsoil) to ensure that there are no depressions in which surface water may accumulate.

The grass sward which was established on a progressive basis in the course of earlier backfilling operations will be examined and improved by additional grass seeding where bare or poorly thriving areas are identified. It is envisaged that the final restoration works across the waste recovery site will be completed within 6 months of final cessation of recovery activity.

It is envisaged that the restored grassland will be rented to a local farmer as soon as practicable following completion of site restoration works and establishment of the grass sward.

4.1.2 Proposed Hedge Planting

The planning permission in respect of the C&D Waste Recovery Facility requires additional hedge planting along parts of the western site boundary and parallel to the northern boundary of the site, as indicated by Figure 3. This will strengthen the security of these boundaries as well as provide additional screening vegetation for neighbouring properties.

The additional hedge required by the planning permission has been completed. The hedge mix consists of locally sourced native and indigenous species. Establishment maintenance will continue for a period up 24 months following initial planting and will include

- weed control (weeds within 1m of the base of the hedge will be controlled mechanically and/or chemically)
- formative pruning and/or removal of deadwood
- watering (as and if required)
- adjustment of ties and stakes and
- assessment of rate of plant failures at the end of each growing season (October) and replacement planting where necessary to ensure establishment of a continuous dense hedge.

All hedge maintenance procedures will be in line with established landscaping practice.

4.2 Aftercare Management

4.2.1 Short-Term Aftercare Management

The restoration aftercare management plan for the Fassaroë waste recovery facility will comprise three principal short-term activities:

Environmental Monitoring

As previously stated, short-term (< 1 year) environmental monitoring of air, surface water and groundwater will be undertaken by the Licensee to ensure that no surface / groundwater contamination is present / emerging following closure of the waste recovery facility and completion of the restoration works.

Maintenance of Hedge Planting

It is expected that by the time this closure plan is implemented, the 24 month aftercare maintenance period for the proposed hedge planting along the northern and western site boundaries will have long expired. In the unlikely event that some remedial hedge planting or maintenance work is required in this area, additional inspection and maintenance visits by a landscape contractor may be arranged between the months of April and October.

Maintenance of Grass Sward

The aftercare of the grass sward will be as per grass supplier's instructions, consistent with the intended use of the restored area as agricultural grassland. Initial maintenance following restoration after each phase of backfilling (principally cutting and possibly spraying), will be overseen by the waste facility manager at Fassaroë or by other designated Roadstone Wood Ltd. staff nominated by him.

After final restoration works have been completed and the aftercare period has elapsed, the land will be let to a local farmer and he/she will then assume responsibility for the general upkeep and environmental management of the land.

4.2.2 Long Term Aftercare Management

Given the inert nature of the soil and stone material used to backfill the quarry area and the proposed return of the backfilled areas to agricultural use and management, it is considered that no long-term aftercare monitoring and maintenance will be required for the waste recovery facility at Fassaroe.

4.3 Final Restoration and Aftercare Management Costs

The expected cost, associated with the site restoration and aftercare management, are outlined in Table 2 below.

Table 2
Estimated Restoration Cost
(Based on a 2 Year Aftercare Period)

ITEM	COSTS (€)
Final site contouring (land raising / lowering as required)	5,000.00
Final capping (150-300mm) topsoil and (700-850mm) subsoil	3,000.00
Surface preparation, final grass seeding, ground repair and spraying	2,000.00
Hedge Planting (Ground preparation, supply of plants and planting works)	N/A
24 months establishment maintenance for grassed area and hedge planting	N/A
Total Restoration and Aftercare Cost (excl. VAT)	€10,000.00

5.0 REPORT CLOSURE

This report has been prepared by SLR Consulting Limited with all reasonable skill, care and diligence, and taking account of the manpower and resources devoted to it by agreement with the client. Information reported herein is based on the interpretation of data collected and has been accepted in good faith as being accurate and valid.

This report is for the exclusive use of Roadstone Wood Ltd. No warranties or guarantees are expressed or should be inferred by any third parties. This report may not be relied upon by other parties without written consent from SLR.

SLR disclaims any responsibility to the client and others in respect of any matters outside the agreed scope of the work.

FIGURES

**Figure 1
Site Location Map**

**Figure 2
Existing Site Layout**

**Figure 3
Restoration Proposals**

**Figure 4
Restored Cross Sections**

APPENDIX F

Environmental Liabilities Risk Assessment



global environmental solutions

**Waste Licence Compliance
(Condition 12.2.2 of W0269-01)**

**Inert Waste Recovery Facility
Fassaroe
Bray
Co. Wicklow**



Environmental Liabilities Risk Assessment

Final Report

2nd February 2012
SLR Ref: 120229_501.00180.00028.Rev3

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1.0 INTRODUCTION AND BACKGROUND

1.1 Our Brief

SLR Consulting Ireland (SLR) was commissioned by Roadstone Wood to prepare an independent Environmental Liabilities Risk Assessment (ELRA) in relation to the company's Inert Waste Recovery Facility at Fassaroe, Bray, County Wicklow. The ELRA is required to comply with the waste licence¹ for the site granted by the EPA in April 2011. Previous correspondence between SLR and the EPA has determined that the EPA Guidance on ELRA suggests that a 'detailed ELRA' is not required for the site. However, Condition 12.2.2 of the waste licence requires an ELRA and Roadstone Wood has agreed to commission SLR to carry out this report.

1.2 About SLR Consulting

SLR CONSULTING is a major international multi-disciplinary environmental consultant, employing 900 staff in Ireland, the UK, North America, Australia and South Africa. In Ireland, the company trades as SLR Consulting Ireland, and employs around 30 environmental specialists, engineers and support staff at offices in Dublin and Hillsborough. Recent Clients of SLR include the European Union, national governments, government departments, international lending agencies, UK and Irish regional and local authorities / agencies, waste treatment technology providers and private sector waste management companies.

SLR employs the largest team of waste management experts in the UK and Europe. Around 150 staff in Ireland and the UK is employed on a full-time basis on waste management projects. Specialist staff are employed across 30 separate technical disciplines.

1.3 Site Description

The site covers an area of 21.4 hectares (51.5 acres). It is located entirely within the Townland of Fassaroe, Co. Wicklow, approximately 1.5km west of Bray town and 2km east of Enniskerry village (see Figure 1 below).

The site is located within an existing construction materials production facility operated by Roadstone Wood Ltd. The existing construction and demolition waste recovery facility is located at the northern end of the site, on lands which have been partially levelled. The quarry void currently being backfilled using inert soil and stone is located at the eastern end of the site.

Ground levels across the site follow that of the (original) surrounding ground, falling south-eastwards from approximately 95mOD to 74mOD (Malin), toward the Cookstown and Dargle Rivers. The quarry void that is currently being restored, covered an area of approximately 4.5 hectares (10.8 acres) and its depth from surrounding ground level varied from 18m at its northern / north-eastern end to 10m at its southern / south-eastern end.

Aggregate processing and value added production activities are undertaken within the site in parallel with the waste recovery activities. The principal aggregate processing activity is the washing and screening of imported sand and gravel, while the principal value added activity is the production of ready-mixed concrete.

¹ EPA licence number W0269-01, Condition 12.2.2.

**Figure 1
Site Location**

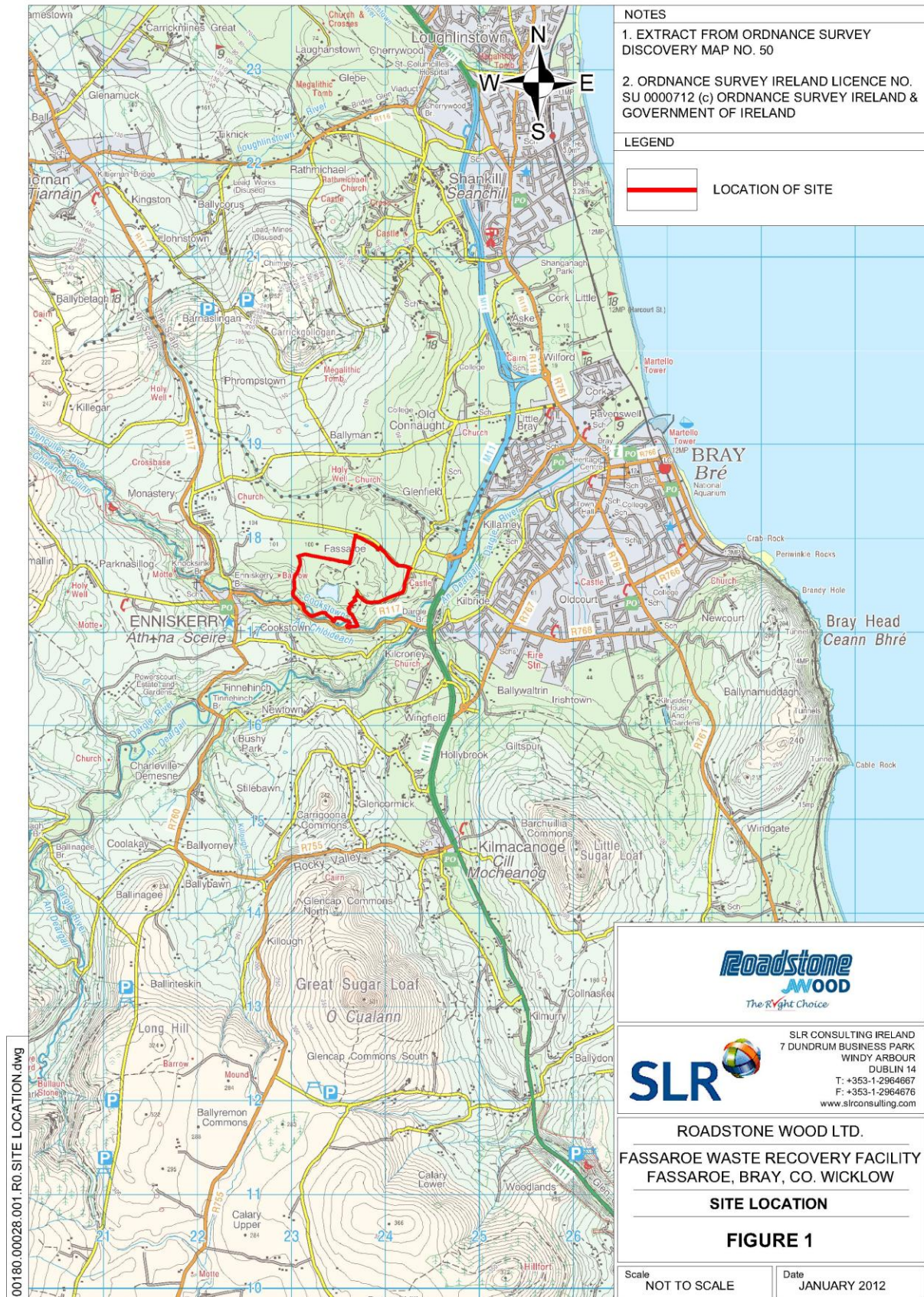


Figure 2 below shows a recent aerial view of the site as seen on Google Earth.

Figure 2
Aerial View of Site as seen on Google Earth



1.4 Surrounding Land Uses

The site, including the existing waste recovery facility, is located within a largely agricultural area.

The lands within Roadstone Wood's landholding, immediately to the north and east of the licensed site are typically used for crop growing while those to the north-west, west and south-east of the licensed site are set as grassland. The Cookstown River and R117 Regional Road between Bray and Enniskerry run some distance beyond and parallel to the southern property boundary. The ground sloping down to the Cookstown River is covered by dense tree growth.

Immediately beyond Roadstone Wood's landholding, the lands to the north-west and west are set as grassland, while there are a number of large, isolated residences located along the opposite side of Fassaroe Avenue, to the east and south-east of the landholding. There is also a cluster of residences located immediately north of the landholding, along either side of Berryfield Lane. Enniskerry FC's football pitch is located on the northern side of Berryfield Lane. Although a large tract of land to the north of Berryfield Lane has been zoned for industrial and related uses, no development has yet taken place.

Other land uses in the immediate vicinity include a materials recovery facility for household, commercial and construction and demolition waste operated by Greenstar Ltd.,

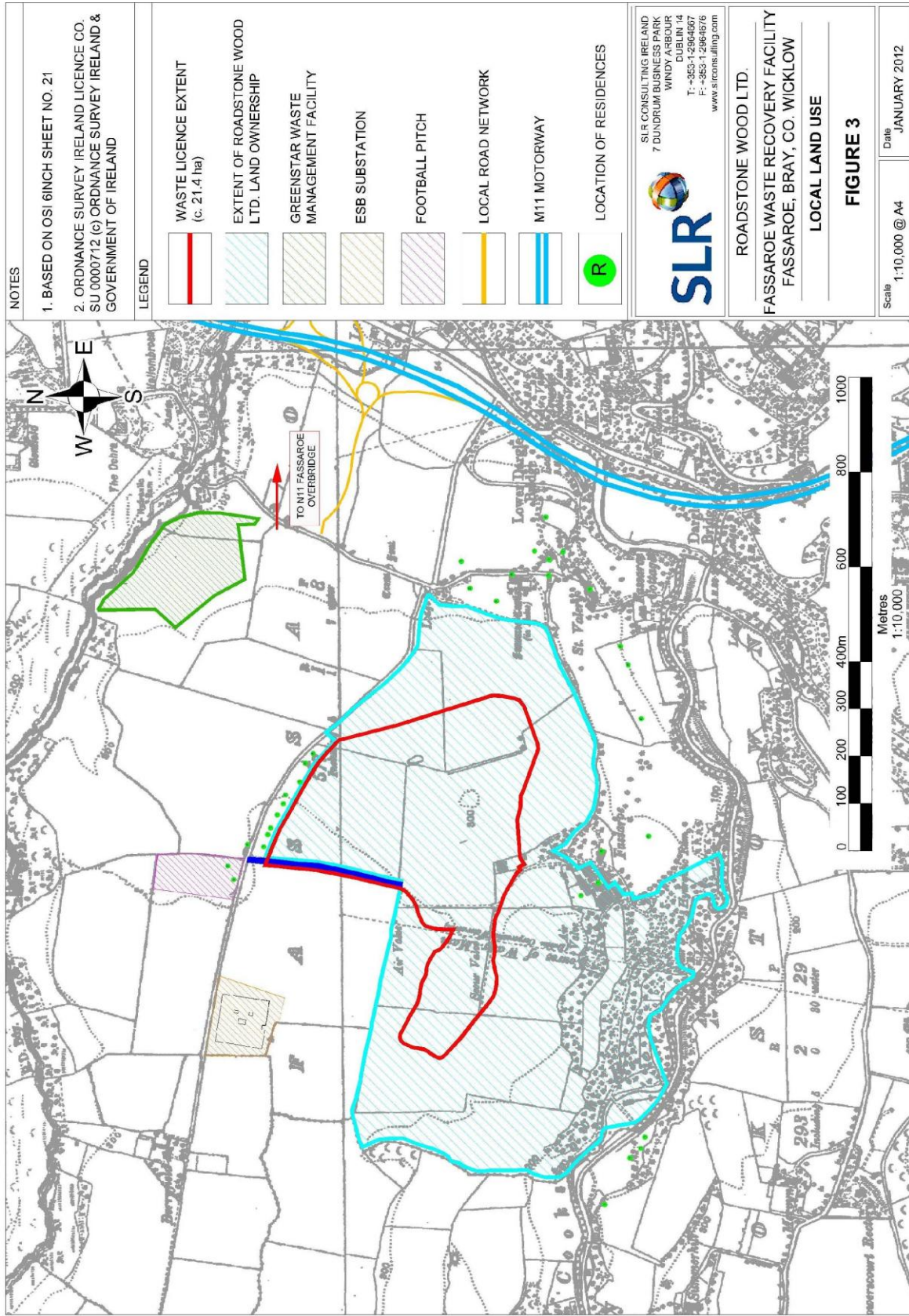
approximately 400m beyond the north-eastern boundary of Roadstone Wood's landholding (Waste Licence Ref. No. W0053-01). There is an electricity substation and a number of telecom transmission towers located approximately 350m west of the site, along Berryfield Lane.

Existing land-use in the vicinity of the site, including locations of residences, is shown on the land-use map in Figure 3 below. Roadstone Wood's land ownership is highlighted, as is the extent of the waste licence boundary.

The Dublin City Council watermain carrying drinking water from the Roundwood reservoir to the city runs through the middle of the Fassaroe site, as shown on Figure 3. The watermain, by its nature, is pressurised, so it is not considered a potential receptor of environmental pollution at the site. Any leak in the pipe is expected to emit clean water rather than absorb potentially contaminated water.

The presence of the watermain through an operational facility has an inherent risk attached, but we consider that this risk relates to the potential damage of essential infrastructure rather than relating to environmental liabilities. Roadstone Wood are advised to take all reasonable measures to continue to preserve the integrity of the watermain on site, as has been the case for many years to date.

Figure 3
Surrounding Land Uses



1.5 Waste Recovery Activities

The inert waste recovery facility at Fassaroe is co-located with an existing concrete production facility on the same landholding. It shares existing site infrastructure with it, including site offices, staff facilities, internal roads, weighbridge, environmental control / monitoring infrastructure and maintenance sheds.

The waste licence allows acceptance of up to 550,000 t/a of soil and stones and dredging spoil plus 20,000 t/a of concrete, bricks, tiles and other inert construction and demolition wastes. The licence requires ongoing characterisation, compliance testing and verification to ensure that all wastes accepted at the facility are inert.

The inert waste recovery facility at Fassaroe, Bray Co. Wicklow provides for:

- Use of approximately 750,000 tonnes of imported and/or site won inert natural materials, principally excess soil, stones and/or broken rock excavated on construction sites, to backfill and restore a large existing void created by previous extraction of sand and gravel
- Recovery of imported inert construction materials, including stones, granular fill, concrete, blocks, bricks and ceramic tile, using crushing and screening equipment to generate secondary (recycled) aggregate
- Separation of any non-inert construction and demolition waste (principally metal, timber, PVC pipes and plastic) unintentionally imported to site prior to removal off-site to appropriately licensed waste disposal or recovery facilities
- Use of secondary aggregate to construct internal haul roads within and across the application site
- Sale and export of secondary aggregate off-site for re-use by others
- Phased restoration of the backfilled void (including placement of cover soils and seeding) and return to use as agricultural grassland
- Temporary stockpiling of topsoil and subsoil pending re-use as cover material for phased restoration of the site
- Environmental monitoring of noise, dust, surface water and groundwater for the duration of the site restoration works.

The existing quarry void is only backfilled using inert materials imported from pre-approved external construction sites and secondary aggregate generated on site. No peat, contaminated soils, intermixed construction and demolition waste or non-hazardous waste is accepted at the waste recovery facility. Any non-inert construction and demolition waste will be removed off-site.

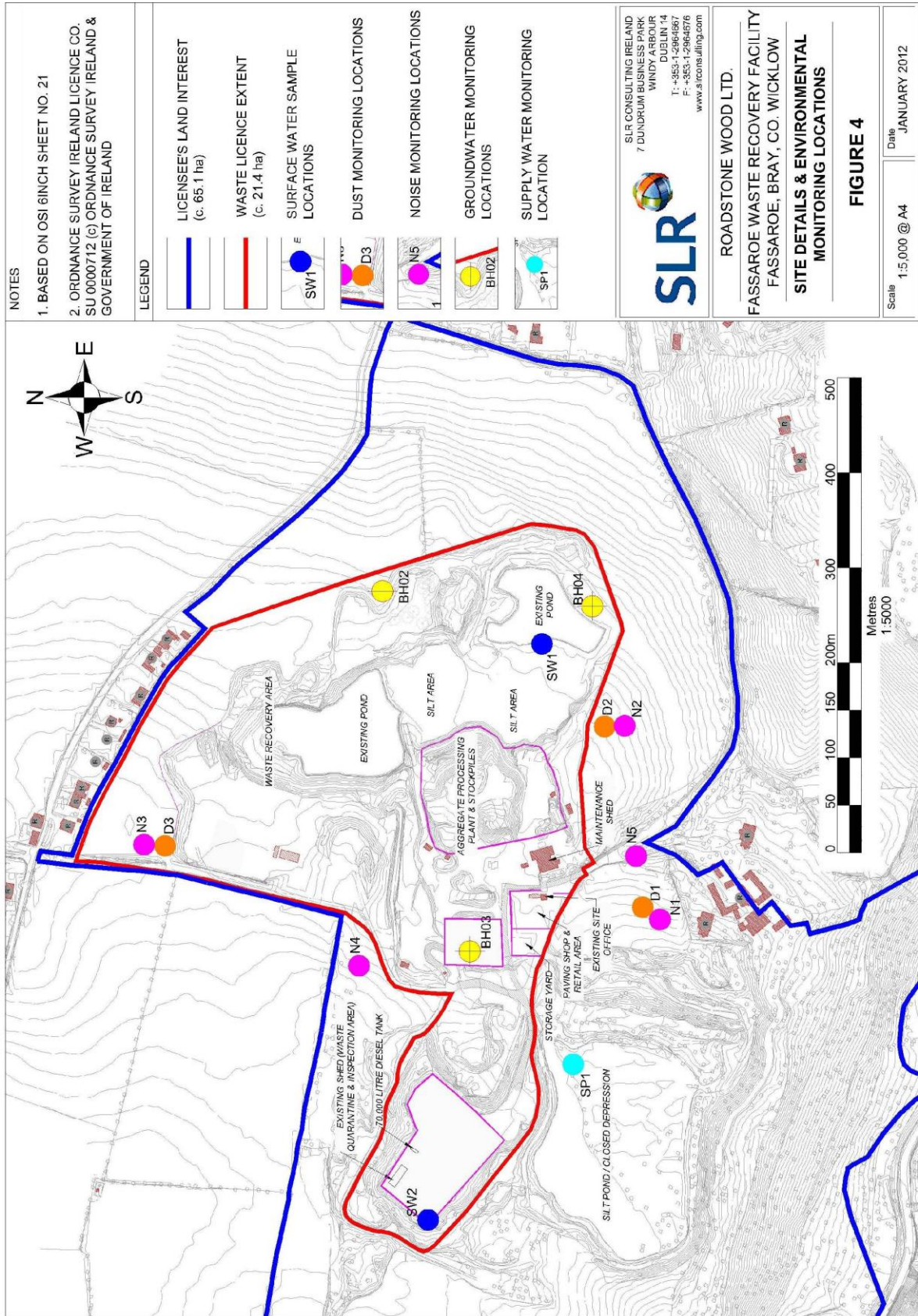
1.6 Site Monitoring

The waste licence for the site requires monitoring for dust deposition, noise, surface water and groundwater at designated monitoring points strategically located on and around the site (see Figure 4 below).

SLR has reviewed the 2011 monitoring data and found the site appears to be operating in compliance with the emission limit values set in the waste licence.

To date, the site has not been audited by the EPA.

Figure 4
Site Detail and Monitoring Locations



00180.00028.004.R0.SITE DETAILS & MONITORING LOCATIONS.dwg

2.0 INITIAL SCREENING AND OPERATIONAL RISK ASSESSMENT

2.1 Introduction

In order to determine the requirements for an Environmental Liability Risk Assessment (ELRA), a relatively simple risk assessment decision matrix is employed to classify the site into one of three risk categories. The specific requirements for an ELRA are dependent on the resultant risk classification.

The decision matrix used to determine the risk classification for the Fassarooe waste recovery facility is that set out in Chapter 2 of EPA publication *Guidelines on Environmental Liability, Risk Assessment, Residuals Management Plans and Financial Provision*.² This decision matrix essentially looks at three key factors

- (i) Complexity : a factor which takes account of the extent and magnitude of potential hazards due to the operation of the waste facility. A complexity band is assigned to the waste facility on the basis of look-up table in Appendix B of the EPA guidance document. Complexity ratings range from G1 for the least complex site to G5 for the most complex.
- (ii) Environmental Sensitivity : a factor which takes account of the receiving environment in the immediate vicinity of the waste facility, with more sensitive locations given a higher score (due to proximity of aquifers, high quality surface water features or human receptors). Environmental sensitivity is assessed on a site specific basis using a matrix presented in Table 2.2 of the EPA guidance document.
- (iii) Compliance Record : a factor which takes account of the compliance history of the waste facility and whether activities carried on are in compliance with licence requirements and emission limits.

Each of the three factors assessed above is multiplied to give the total score for the waste facility and this is used to place it into an appropriate risk category (identified as Category 1 to Category 3), as outlined in Table 2.1 below.

Table 2-1
Risk Category

Risk Category	Total Score
Category 1	< 5
Category 2	5 – 23
Category 3	> 23

Having determined the facility category, it is then possible to establish specific requirements for the ELRA and associated financial provisions.

² Guidance on Environmental Liability Risk Assessment, Residuals Management Plans and Financial Provision, EPA (OEE), 2006.

2.2 Complexity

The complexity band assigned to the Fassaroë waste recovery facility is obtained from the look-up table in Appendix B of the EPA publication *Guidelines on Environmental Liability, Risk Assessment, Residuals Management Plans and Financial Provision*.

In this look-up table, Activity R4, recycling or reclamation of other inorganic materials, is classified as a Band G2 activity. This activity is equivalent to Activity R5 in the Fourth Schedule of the *Waste Management Acts 1996-2011*, recycling / reclamation of other inorganic materials, which includes soil cleaning resulting in recovery of the soil and recycling of inorganic construction materials.³

A Band G2 activity is assigned a complexity factor of 2 by the EPA guidance document.

Complexity Factor = 2

2.3 Environmental Sensitivity

The environmental sensitivity of the waste recovery facility at Fassaroë is assessed using a matrix presented in Table 2.2 of the EPA guidance document. This matrix assigns an environmental attribute score to the facility under six separate headings

- (i) Human occupation
- (ii) Groundwater protection
- (iii) Sensitivity of receiving waters
- (iv) Air quality and topography
- (v) Protected ecological sites and species
- (vi) Sensitive agricultural receptors

Applying the criteria set out in Table 2.2 of the EPA guidance document, the environmental attribute scores for the Fassaroë facility for each of the six headings listed above are as shown underlined and bold in Table 2-2 below:

³ The Third and Fourth Schedule of the Waste Management Act were amended in 2011 by S.I. No. 126/2011 - European Communities (Waste Directive) Regulations 2011. The EPA guidance on ELRA and the Waste Licence for the Fassaroë facility were both based on the previous list of Recovery and Disposal Activities contained in the Third and Fourth Schedules to the Waste Management Act, rather than the recently amended list. For consistency with the EPA Guidance, the amended codes are not used in this report.

**Table 2-2
Environmental Sensitivity of the Fassaroe Site**

Environmental Attribute	Environmental Attribute Score
Human Occupation¹	
< 50m	5
<u>50m - 250m</u>	<u>3</u>
250m - 1000m	1
> 1km	0
Groundwater Protection^{2,3}	
Regionally Important Aquifer	2
<u>Locally Important Aquifer</u>	<u>1</u>
Poor Aquifer	0
Vulnerability Rating - Extreme	3
<u>Vulnerability Rating - High</u>	<u>2</u>
Vulnerability Rating - Moderate	1
Vulnerability Rating - Low	0
Sensitivity of Receiving Waters⁴	
<u>Class A</u>	<u>3</u>
Class B	2
Class C	1
Class D	0
Designated Coastal & Estuarine Waters ⁵	2
Potentially Eutrophic Coastal & Estuarine Waters ⁶	1
Air Quality & Topography	
Complex terrain ⁷	2
<u>Intermediate terrain⁸</u>	<u>1</u>
Simple terrain ⁹	0
Protected Ecological Sites and Species¹⁰	
Within or directly bordering species protected site	2
< 1km to protected site	1
<u>> 1km from protected site</u>	<u>0</u>
Sensitive Agricultural Receptors¹¹	
Fruit, vegetable or dairy farming < 50m from the activity footprint	2
Fruit, vegetable or dairy farming 50m - 150m from the activity footprint	1
<u>Fruit, vegetable or dairy farming > 150m from the activity footprint</u>	<u>0</u>
Total Environmental Sensitivity Score for Fassaroe Site =	10

Notes *

1. Measured from activity/footprint to public or private occupied building
2. Groundwater Classifications according to DoELG, EPA, GSI Groundwater Protection Schemes (1999)
3. Aquifer Classification Score to be added to Groundwater Vulnerability Score
4. Site located within catchment of EPA Surface Water Classification (1996) or adjacent to transitional water body
5. Designated as Sensitive Areas UWWT Regulations (2001)
6. EPA (2002) Water Quality in Ireland 1998-2000
7. Generally elevated terrain such as a mountain or the side of a valley, where receptors are at elevations above the stack tip elevation, US EPA (2000) Meteorological Monitoring Guidance for Regulatory Modelling Applications

8. Intermediate terrain where the elevations of receptors lie between the stack tip elevation and the plume rise elevation, US EPA (2000) Meteorological Monitoring Guidance for Regulatory Modelling Applications
 9. Relatively flat terrain, where receptor elevations are between stack base and the stack tip elevations, US EPA (2000) Meteorological Monitoring Guidance for Regulatory Modelling Applications
 10. Distance from activity/footprint to protected areas designated as pNHA (Irish Wildlife Acts 1976, 2000), cSAC (Habitats Directive 1992) and/or SPA (Birds Directive 1979).
 11. Distances derived from UK Department for Environment, Food and Rural Affairs (2003), Local Air Quality Management - Technical Guidance LAQM.TG(3)

** or more recent equivalent reference material*

Drawings and information supporting each of these assessments are available within the Environmental Impact Statement previously provided to the Agency in support of the waste licence application.

Adding the attribute scores identified above gives a total environmental attribute score of 10.

Applying the environmental sensitivity classification matrix set out in Table 2.3 of the EPA guidance document for a cumulative attribute score of 10, indicates that the overall environmental sensitivity of the site is 'moderate' (total score between 7 and 12) and that the corresponding environmental sensitivity factor is 2.

Environmental Sensitivity Factor = 2

2.4 Compliance Record of the Facility

The EPA guidance document indicates that the compliance factor for a newly licensed facility and those operating without non-compliance of emission limits (such as that at Fassaroe) may be classified as a Compliant / New Facility and have a compliance factor of 1.

Compliance Factor = 1

2.5 Risk Category

We multiply the scores for Complexity (2), Environmental Sensitivity (2) and Compliance Record (1) and reach a total score of 4. This falls within Category 1 in the EPA guidance Table 2.1, reproduced on Table 2-3 below:

**Table 2-3
Risk Category for Fassaroe Site**

Risk Category	Total Score
<u>Category 1</u>	<u>≤ 5</u>
Category 2	5 – 23
Category 3	> 23

Risk Category = Category 1

Figure 1.1 of the EPA guidance document indicates that sites categorised under Risk Category 1 do not require site-specific ELRAs to address unknown liabilities. However, Condition 12.2.2 of the waste licence for the Fassaroe facility requires an ELRA to be carried out, so the remainder of this report contains a site-specific ELRA in compliance with the requirements of the waste licence.

3.0 SITE SPECIFIC ELRA

3.1 Objectives and Scope

According to the EPA guidance document, the objectives of a site-specific ELRA are as follows:

- To identify and quantify environmental liabilities at the facility focusing on: unplanned, but possible and plausible events occurring during the operational phase.
- To calculate the value of financial provisions required to cover unknown liabilities
- To identify suitable financial instruments to cover each of the financial provisions; and
- To provide a mechanism to encourage continuous environmental improvement through the management of potential environmental risks.

The EPA advise that the ELRA should cover environmental risks leading to a potential or anticipated liability. Environmental risks will be deemed to cover all risks to: surface water, groundwater, atmosphere, land and human health.

3.2 Risk Classification and Identification

The EPA guidance recommends that risks are identified and classified following a '*Risk Management Workshop*' involving the facility management, environmental manager and independent environmental consultant. SLR Consulting visited the site on 7th December 2011 and on 20th January 2012 and on both occasions met with site staff to review the potential hazards for the ELRA.

SLR is very familiar with site activities and the site layout at Fassaroe, as we have provided consultancy services for the licensee at this site for the last decade or more. These services included preparation of an EIS and a Waste Licence Application in 2009.

3.2.1 Identification of Processes / Hazards

The waste handling processes carried out at the site inevitably generate noise and dust.

Normal site operations should not produce leachate or effluent as all waste materials handled at Fassaroe are inert. The licensee is obliged to regularly characterise and test the incoming wastes to confirm that only inert materials are accepted.

There is potential for discovery of non-inert or potentially hazardous materials, hidden within incoming loads of inert compliant waste.

Storage of hydrocarbons in tanks and drums on site is also identified as a potential hazard.

Each of these potential hazards is addressed individually below.

Noise

The waste licence for the site sets an emission limit value of 55dB(A) for daytime levels at five specified monitoring points in the vicinity of the site and a level of 45dB(A) for night-time levels at the same monitoring locations. The licensee is obliged to monitor at these locations periodically, 'as required' by agreement with the Agency.

The licensee is obliged to report noise monitoring results to the EPA on an annual basis in the Annual Environmental Report (AER) for the facility. The first AER to be prepared since the licence was granted is due to be submitted before 31st March 2012. Whilst this report has not been finalised, we have reviewed the noise reports from surveys conducted in March and September 2011 and find that noise measurements at all locations at the site were compliant with the emission limit values set in the waste licence.

Dust

The waste licence for the site sets an emission limit value of 350 mg/m²/day (30 day composite sample) for dust deposition levels at three specified monitoring locations on site. The licensee is obliged to monitor dust at these locations on a bi-annual basis, once during the May to September period.

Dust deposition results recorded in 2011 have not yet been submitted to the EPA. SLR has reviewed the dust deposition reports from nine surveys conducted during the period December 2010 to December 2011 and found that dust levels at all locations at the site were compliant with the emission limit values set in the waste licence.

Leachate

Inert wastes will not cause contamination, but there remains a risk that not all material received at the site is completely inert. The licensee is obliged to monitor surface water and groundwater at the site for a range of parameters agreed with the EPA.

The 2011 results of surface water monitoring suggest that the ponds on site appear uncontaminated and no contamination incidents were reported to the EPA since the licence was issued in April 2011.

Similarly, the groundwater monitoring results from 2011 suggest that the groundwater beneath the site appears uncontaminated and no contamination incidents were reported to the EPA since the licence was issued in April 2011.

Road Diesel Tank

The 70,000 litre road diesel tank, located in the Concrete Production Yard, is a potential source of contamination that must be considered in this risk assessment.

Minor spillages of diesel can usually be addressed by treatment with absorbent material contained in spill-kits that must be available on site as a licence condition.

Larger spills of diesel will enter the yard run-off drainage system and if unimpeded will be discharged to ground.

Condition 3.11 of the waste licence requires the licensee to install a hydrocarbon interceptor in the concrete production yard. The interceptor is currently on site and is due to be installed in the coming weeks.

The interceptor will contain some hydrocarbons, but discharge of a full 70,000 litre diesel tank will generate too great a volume for the interceptor to contain. In this scenario, the operator may be able to halt the discharge until such time as the diesel is collected. Failure to contain the diesel would result in contamination of the groundwater beneath the site and the licensee would be expected to be liable for the clean-up costs in this scenario.

Later in this report, we assess the risk of an occurrence of this nature.

Tank and Drum Storage

There is a requirement for storage of tanks and drums of various hydrocarbons on site. This includes gas oil, engine oil, transmission oil and hydraulic oil for maintenance and operation of machinery and mobile plant in addition to waste oil and oil filters.

These materials are stored within bunds in the maintenance shed in compliance with Condition 3.9 of the waste licence.

Minor spills of these materials can be contained locally and cleaned using spill-kits, located at a visible location in the maintenance shed. Major spills are unlikely as the volumes are relatively small (200 litre drums to 2,500 litre tank). However, if a volume is spilled and cannot be contained within the maintenance shed, the material will drain to a yard area where it is expected to percolate to ground rather than drain to the pond at the base of the quarry, approximately 200 metres downgradient. In either case, it could potentially contaminate the groundwater beneath the site.

3.2.2 Identification of Environmental Receptors

The processes and hazards described above have the potential to impact on environmental receptors such as those described below.

Employees or Other Site Users

Waste management facilities pose hazards to site operatives such as the risk of hearing injury from noise sources, respiratory issues associated with dust inhalation, exposure to hazardous chemicals or injuries from contact with vehicles, plant or machinery.

Occupied Houses

The nearest houses to site are located close to the northern site boundary on Berryfield Lane as shown on Figure 4 above. The licensee has maintained a 50 metre buffer zone between the footprint of the licensed area and the back gardens of these houses.

Emissions of dust and noise from site processes have the potential to impact on the occupants of these houses.

Local Businesses

The closest businesses to the site comprise of Cahill's Mowers and Hannon Crash Repairs located within the group of houses at Berryfield Lane to the north of the site boundary. The Greenstar licensed⁴ waste management facility is located approximately 400 metres northeast of the site.

⁴ EPA Ref: W0053

Groundwater

The Fassaroe site is located on a locally important sand/gravel aquifer (Lg) that extends 4 to 5 km southwest to the Wicklow Mountains. The lack of surface water features across the area, indicates that the sand and gravel aquifer has a high level of recharge and a high permeability. Groundwater is classified as highly vulnerable because permeable strata are located close to the ground surface and there is potential for rapid movement of water through the ground.

The deep level groundwater aquifer in the sand and gravel has not been intercepted by the former quarry workings. There are a number of surface water ponds on the floor of the former quarry. These are formed by ponding of rainfall and surface run-off (drainage) above a layer of impermeable silt on the quarry floor. The silt is essentially an unwanted by-product of sand processing and washing elsewhere on the Roadstone Wood's lands. Available groundwater well information indicates that the ponds in the quarry floor are perched approximately 5m – 7m above the groundwater table in the sand and gravel aquifer.

The bedrock underlying the site is comprised of Ordovician Metasediments. The northern part of the site is comprised of the Maulin Formation, which is categorised as a locally important aquifer, productive only in local zones (LI), whereas the southern portion of the site is comprised of the Glencullen River Formation, which is categorised as a poor aquifer, bedrock which is generally unproductive except for local zones (PI).

Recent ground investigations indicate that groundwater quality at the site is generally very good, with established site operations shown to have no significant impact on existing groundwater quality.

Surface Water

The nearest watercourse to the site is the Cookstown River, which is named as the Glencullen River upstream of Enniskerry (2km west of the site). This watercourse is a tributary of the Dargle River, and is located within the Eastern River Basin District. The Cookstown River lies 200m to the south of the site access road. Ordnance Survey mapping indicates that this watercourse is fed by waters from the Glencullen area.

In 2003 biotic sampling from the Glencullen River, 2km upstream of Enniskerry and 4km upstream of the site was reported to be of a good status (Q value of 4). Biotic sampling undertaken approximately 1km downstream of the site in the Cookstown River, just before it's confluence with the River Dargle also recorded good status (Q value of 4).

Ecological Designations

There are no designated or proposed Special Areas of Conservation (SACs), Special Protection Areas (SPAs) or proposed Natural Heritage Areas (NHA's) within or contiguous to the site or Roadstone Wood's wider landholding. The nearest SACs to the site are the woodland at Ballyman Glen, approximately 600m north of the site (at its nearest point) and Knocksink Wood, approximately 2km west of the application site. The Dargle River Valley, approximately 1km south-east and south of the site and Powerscourt Woodland, approximately 1.5km south-west of the application site (at its nearest point) are both designated as proposed NHAs.

Ballyman Glen SAC is an east-west oriented valley which is bounded by steeply sloping pasture with gorse and areas of wood and scrub. The site is designated an SAC for its alkaline fen and petrifying spring, both habitats listed on Annex 1 of the EU Habitats

Directive (92/43/EEC dated 21 May 1992 on *the Conservation of Natural Habitats and of Wild Fauna and Flora*).

Knocksink Wood SAC is situated in the valley of the Glencullen River. A number of scarce or rare plants occur within the site and it has one of the most diverse woodland invertebrate faunas in Ireland. The woodland incorporates wet woodland organisms threatened elsewhere within the EU. A notable feature of the site is the frequent and extensive springs and seepage areas within the wooded slopes. These petrifying springs are listed as a priority habitat on Annex I of the EU Habitats Directive.

The Dargle River Valley pNHA is located along a section of the River Dargle with steep wooded banks. The site is designated a pNHA as it is a fine example of a long established wooded valley, a habitat that is becoming rare in north County Wicklow. The site is also of considerable geological importance. At one point a well exposed series of Ordovician volcanic rocks are faulted against well-exposed Bray group Cambrian strata.

Powerscourt Woodland pNHA is located south-west of Enniskerry village and is largely contained within the Powerscourt and Charleville demesnes. The site includes a 4km stretch of the Dargle River. Mixed woodland covers most of the site and includes native and introduced species. The site includes many exotic plant species and habitats which support an interesting flora. The mix of semi-natural habitats and estate woodland is particularly conducive to macro-fungi.

Amenity Areas

The nearest outdoor amenity area to the site is compromised of a football pitch located just north of the site boundary on the opposite side of Berryfield Lane. This lies approximately 150 metres from the footprint of site activities.

3.3 Assessment of Risks

All potential environmental risks associated with the facility, as identified by SLR, are listed in the Project Risk Register presented on Table 3-1 below.

**Table 3-1
Project Risk Register**

Risk Ref. No.	Potential Failure Mode/Risk
1	Excessive dust emissions from site processes
2	Excessive noise emissions from site processes
3	Contamination from non-inert non-compliant waste
4	Road diesel tank leak or spillage
5	Other hydrocarbon spill (gas-oil, hydraulic oil, engine oil, transmission oil, waste oil, etc.)
6	Employee or visitor struck by vehicles or plant
7	Employee contact with hazardous materials

Table 3-2 below provides a classification of risks in terms of likely occurrence and estimated severity, as detailed in the EPA Guidance manual.

**Table 3-2
Risk Classification Table**

Rating	Occurrence		Severity
	Description	Probability (%) (in a 30 year period)	Financial Cost
1	Very Low	0-5	0 - €1,000
2	Low	5-10	€1,000 - €10,000
3	Medium	10-20	€10,000 - €50,000
4	High	20-50	€50,000 - €100,000
5	Very High	>50	>€100,000

The Risk Assessment Table provided in Table 3-3 below assigns a 'Risk Score' to the risks identified in the Project Risk Register based on the likely occurrence and severity of the event. The Risks are then ranked on that basis of the most serious to the least serious.

At this point of the report, mitigation measures such as personnel protection equipment (ppe), staff training, spill kits, bunding, etc, are not considered when assessing the risks. These are addressed in the next section of this report, where use of such mitigation reduces the likely occurrence or severity of the risks.

**Table 3-3
Risk Assessment Table for Unmitigated Risks**

Risk Ref. No.	Potential Failure Mode/Risk	Occurrence Rating	Severity Rating	Risk Score
1	Excessive dust emissions from site processes	3	3	9
2	Excessive noise emissions from site processes	3	4	12
3	Contamination from non-inert non-compliant waste	3	3	9
4	Diesel tank leak or spillage	3	5	15
5	Other hydrocarbon spill (gas-oil, hydraulic oil, engine oil, transmission oil, waste oil, etc.)	4	3	12
6	Employee or visitor struck by vehicles or plant	3	5	15
7	Employee contact with hazardous materials	2	2	4

The rationale behind the risk scores assigned above is as follows:

1. Excessive dust emissions from site processes:

The site does not appear to have a history of dust deposition problems and the nine sets of dust results from 2011 show compliance with the waste licence. However, a prolonged dry spell could cause dust nuisance, particularly for site employees. The likely future occurrence, without mitigation, is therefore considered 'medium'.

High levels of dust can impact on the health of employees, visitors and neighbours, depending on individual sensitivities. We consider that the severity of such a potential impact is 'medium'.

2. Excessive noise emissions from site processes:

The site appears to have a good compliance record in relation to the noise levels set in the waste licence. However, the data is limited, as the licence is new. It is possible that during a very busy period noise levels could be higher. The noise sources from waste management operations on site potentially include a crusher working alongside a bulldozer and HGV vehicles. The occurrence rating, without consideration of mitigation measures, is therefore considered 'medium'.

High levels of noise emissions can be a nuisance to neighbours, but more importantly can impair the hearing of site workers. Without mitigation, the severity of such an occurrence is considered 'high'.

3. Contamination from non-inert non-compliant waste

The Fassaroe facility can only accept inert wastes and the licensee is obliged to regularly characterise and test the integrity of incoming wastes. To date, this testing has found the incoming waste to be compliant. However, there remains potential for receipt of non-conforming wastes hidden within compliant wastes. The probability of contamination occurring from non-compliant material is therefore considered to be 'medium'.

Non-compliant waste could include hazardous substances, but only in small volumes, so the severity of contamination from such a source is considered 'medium'.

4. Diesel Tank Leak or Spill

The site contains a 70,000 litre road diesel tank that is used to fuel company vehicles. The tank is protected against damage and leaks by a mass concrete bund, so the likely occurrence of a major rupture to the tank is considered low. However, without mitigation, there is a 'medium' risk of spillage of diesel during re-fuelling operations. The volume and location of such spillage may depend on mitigation measures employed at the site.

Photo 1 - Bunded 70,000 litre Diesel Tank



The severity of a 70,000 litre diesel spill to the gravel aquifer at the site is considered 'very high' as the clean-up costs could run to more than €100,000.

5. Other hydrocarbon spill

There are a number of substances used on site that have the potential to cause environmental pollution if spilled. These include a 2,500 litre double-skinned tank for gas-oil (machine diesel) for fuelling mobile plant, a smaller waste oil tank and 200 litre drums filled with hydraulic oils, engine oils and transmission oils. These are all stored in the Maintenance Shed close to the site offices and are protected against leaks by bunding.

Photo 2 – Bunded Oil Drums in Maintenance Shed



The 2,500 litre gas-oil tank consists of a self-bunded tank that is supported by the walls of a block-work bund (See Photo 3 below). There is a risk that a vehicle colliding with the bund wall would cause the tank to topple outside the bund and spill on the floor of the maintenance shed. The risk of such an occurrence is considered 'high'.

Photo 3 – Bunded Gas Oil (Diesel) Tank in Maintenance Shed



A spill of up to 2,500 litres of gas oil (diesel) in the maintenance shed would be directed to the adjacent yard area. This is an unpaved yard, so we expect a spill of this size to percolate to ground rather than drain to the downgradient site pond, located approximately 200 metres away. The severity of such an event is considered 'medium' with clean-up costs between €10,000 and €50,000.

6. Employee or Visitor Struck by Vehicles or Plant

Site activity is not intensive and there is little or no need for pedestrians in the active restoration areas. However, without proper management and mitigation measures, the likely occurrence is considered 'medium'.

The severity of an employee or visitor being struck by site plant or machinery, is considered to be 'very high' as such impacts can be fatal.

7. Employee Contact with Hazardous Materials

The site is a non-hazardous facility, so hazardous materials are limited to some substances used for maintenance purposes or non-compliant wastes found within reportedly inert deliveries. The likely occurrence of employee contact with such hazardous materials is therefore considered 'low'.

Unmitigated infrequent employee contact with small volumes of paints, solvents, oils, etc is likely to be restricted to skin irritation, so the severity of this risk is considered 'low'.

3.4 Risk Matrix

The ranking of the unmitigated risks identified above can be visualised on a 'Risk Matrix' diagram, as presented on Table 3-4 below.

In line with the EPA Guidance, the risks have been colour coded in the matrix to provide a broad indication of the critical nature of each risk. The colour code is as follows:

- Red – These are considered to be high-level risks requiring priority attention. These risks have the potential to be catastrophic and as such should be addressed quickly.
- Amber – These are medium-level risks requiring action, but are not as critical as a red coded risk.
- Green - These are lowest-level risks and indicate a need for continuing awareness and monitoring on a regular basis. Whilst they are currently low or minor risks, some have the potential to increase to medium or even high-level risks and must therefore be regularly monitored and if cost effective mitigation can be carried out to reduce the risk even further this should be pursued.

Table 3-4
Risk Matrix of Unmitigated Risks

30 year Probability %		Ranking of Unmitigated Risks				
		>50%	Very High 5			
20%-50%	High 4			5		
10%-20%	Medium 3			1, 3	2	4, 6
5%-10%	Low 2		7			
<5%	Very Low 1					
Impact		Very Low 1	Low 2	Medium 3	High 4	Very High 5
Estimated Cost		<€1k	€1-10k	€10-50k	€50-100k	>€100k

Severity

The Risk Matrix shows that Risk No. 4 (Diesel Spill) and Risk No. 6 (vehicle or plant impact) require priority attention as they have the potential for a catastrophic outcome. The other risks are lower priority, but all can be improved by mitigation as described in the next section of this report. Much of this mitigation is required by the waste licence and EPA enforcement action can be expected in the event of failure to implement many of these mitigation measures.

3.5 Identification and Assessment of Mitigation Measures

The risk levels identified above can be mitigated in a number of ways as discussed below.

1. Excessive dust emissions from site processes:

Site employees that work in the vicinity of sources of dust at the site should be issued with dust masks to avoid the inhalation of dust.

Where dust deposition at the site boundaries exceeds the emission limit values set by the EPA in the waste licence, the site operator should employ mitigation in the form of sprinklers and otherwise damping down of surfaces. We understand that there are sprinklers on site that are used when necessary.

A wheelwash and vehicle wash is employed at the exit of the waste recovery area and these lead to a road with a tarmac surface. This appears effective in minimising dust emissions from vehicles exiting the site.

These mitigation measures reduce the risk of occurrence of this event from 'medium' to 'low'.

2. Excessive noise emissions from site processes:

Site employees that work in the vicinity of noise sources on site should be issued with ear protectors.

Where noise emissions from the site exceed the emission limit values set by the EPA in the waste licence, the site operator should employ further mitigation in the form of improved working practices and/or better performing plant and machinery.

These mitigation measures reduce the risk of occurrence of this event from 'medium' to 'low'.

3. Contamination from non-inert non-compliant waste

The licensee regularly tests the integrity of the incoming wastes as required by a licence condition. SLR has reviewed this data and has concluded that the incoming wastes were compliant in 2011.

The licensee must continue to ensure that all wastes accepted at the site are inert and compliant with the requirements of the waste acceptance procedures.

The licensee must continue to be aware of the activities of the companies that deliver inert wastes to the site and maintain a high level of confidence about the source of the incoming wastes. Even non-hazardous wastes can cause groundwater contamination, so the licensee must ensure that only inert wastes are accepted at the site.

The licensee has provided a waste quarantine and contamination bay that consists of a building with mass concrete floor and walls (see Photo 4 below). Non compliant wastes can be safely stored at this location prior to removal off-site for appropriate treatment or disposal to a licensed landfill.

These mitigation measures reduce the risk of occurrence of this event from 'medium' to 'low'.

Photo 4 – Quarantine and Contamination Bay



4. Diesel Tank Leak or Spillage

The 70,000 litre diesel tank is stored within a large concrete bund that is designed to contain more than the full volume of the tank. This provides mitigation against a major diesel spill at the site. An integrity test carried out in August 2011 showed that the bund is in very good condition and has capacity greater than 110% the capacity of the diesel tank.

The fuel pump located adjacent to the road diesel tank is designed to cut-out when the diesel tank of the vehicle is full, so avoiding over-spill.

Yard drainage passes through a pipe that runs beneath a concrete platform located adjacent to the concrete production plant. In the event of a major diesel spill in the yard, the licensee should have a mechanism in place to block that pipe and contain the diesel in the yard before it reaches the sump in the corner of the yard, from where surface water percolates to ground or is pumped to the water supply pond.

The licensee is currently in the process of installing a Class II By-Pass Separator that will contain minor hydrocarbon spills or leaks emanating from the concrete production yard. The interceptor must be regularly inspected and adequately maintained.

These mitigation measures, when fully installed and properly maintained reduce the risk of occurrence of this event from 'Medium' to 'Low'.

Photo 5 – Yard Drainage Impeded by Concrete Platform



Photo 6 – Hydrocarbon Interceptor Awaiting Installation



5. Other hydrocarbon spill

The gas-oil, hydraulic oils, engine oils, transmission oils, waste oils, etc. are currently stored within bunded areas in the maintenance shed. The operator must maintain adequate capacity in these bunds for them to be effective.

Spill kits comprising containment booms and absorbent materials are stored in the maintenance shed and are easily accessible in the event of a hydrocarbon spill or leak in the shed or from plant or machinery operating on the site.

The operator should improve the bunding of the 2,500 litre double-skinned gas-oil tank to reduce the risk of a spill caused by a minor vehicle collision. The frame that holds the tank in place should be supported from the ground rather than supported by the bund wall. In addition, the block-work bund should be replaced by a mass-concrete bund.

These measures would reduce the risk of occurrence from 'high' to 'low'.

6. Employee or Visitor Struck by Vehicles or Plant

No employees or visitors should be allowed in yard or outdoor working areas without wearing highly visible (hi-vis) jackets.

A low speed limit should be set and enforced on site.

Plant and machine operators must be made aware of personnel in the vicinity of the plant or machinery that they operate. They must also be fully trained in the operation of the plant and/or machinery that they are responsible for operating. We are informed by Roadstone Wood that all employees have up to date QSCS tickets for the machines they drive.

All employees should be adequately trained in Health and Safety and acquire H&S certificates, where relevant. We are informed by Roadstone Wood that their H&S Officer carries out safety audits and training for site employees, as well as safety inductions for contractors working on the site.

Mobile plant, such as front loading shovels, should be fitted with reversing alarms that give a clearly audible signal.

Adequate lighting should be employed on-site during hours of darkness.

These mitigation measures, when fully maintained, reduce the risk of occurrence of this event from 'Medium' to 'Low'.

7. Employee Contact with Hazardous Materials

Employees that are at risk of coming into contact with hazardous materials on site should be issued with PPE including gloves and where appropriate, safety glasses. These employees should also be adequately trained in handling hazardous materials.

A waste quarantine area is provided in the concrete production yard and this should be used for storage of any non-compliant or hazardous wastes prior to removal off-site for safe disposal.

These mitigation measures, when fully maintained, reduce the risk of occurrence of this event from 'Low' to 'Very Low'.

3.6 Risk Reduction

By introducing the existing and recommended mitigation measures described above, the risks posed by the site activities are reduced. This risk reduction is detailed on Table 3-5 below where the resulting mitigated risks are assessed and ranked.

It is important that the site operator introduces all recommended mitigation measures to achieve the full risk reduction outlined in Table 3-5. Failure to do so will result in a risk that falls between the unmitigated and the mitigated positions.

**Table 3-5
Risk Reduction due to Existing and Proposed Mitigation Measures**

RISK IDENTIFICATION			RISK ASSESSMENT						
No.	Risk	Impact	BEFORE CONTROL			Mitigation Measures	AFTER CONTROL		
			Occurrence	Severity	Risk Level		Occurrence	Severity	Risk Level
1	Excessive dust emissions from site processes	Potential impact on the health of employees, visitors and neighbours.	3	3	9	Site operatives should be issued with dust masks. Surfaces should be damped down during prolonged dry spells to keep yards and roads dust free. A wheelwash and vehicle wash is employed at the exit of the waste recovery area and these lead to a road with a tarmac surface.	2	3	6
2	Excessive noise emissions from site processes	Potential impact on the health of employees, visitors and neighbours.	3	4	12	Site operatives should be issued with ear protectors. Where noise emissions from the site are excessive, the site operator should employ further mitigation in the form of improved working practices and/or better performing plant and machinery.	2	4	8
3	Contamination from non-inert non-compliant waste	Potential contamination of locally important gravel aquifer.	3	3	9	The licensee must continue to ensure that all wastes accepted at the site are inert. The licensee must continue to be aware of the activities of the companies that deliver inert wastes to the site and maintain a high level of confidence about the source of the incoming wastes.	2	3	6
4	Diesel tank leak or spillage	Potential contamination of locally important gravel aquifer.	3	5	15	The 70,000 litre diesel tank is stored within a large concrete bund, which must be maintained. Spill kits comprising containment booms and absorbent materials should be stored on site and be easily accessible. The hydrocarbon interceptor currently awaiting installation should be installed and properly maintained. The licensee should have a mechanism in place to block the pipe under the concrete plinth to contain diesel spills in the concrete production yard	2	5	10

RISK IDENTIFICATION			RISK ASSESSMENT						
No.	Risk	Impact	BEFORE CONTROL			Mitigation Measures	AFTER CONTROL		
			Occurrence	Severity	Risk Level		Occurrence	Severity	Risk Level
5	Other hydrocarbon spill (hydraulic oil, engine oil, transmission oil, waste oil, etc.)	Potential contamination of locally important gravel aquifer.	4	3	12	The operator must maintain adequate capacity in the bunds beneath the oil drums, by regular servicing. Spill kits comprising containment booms and absorbent materials are stored in the maintenance shed and are easily accessible. The operator should improve the bunding of the 2,500 litre gas-oil tank to reduce the risk of a spill caused by a minor vehicle collision. The frame that holds the tank in place should be supported from the ground rather than supported by the bund wall. In addition, the block-work bund should be replaced by a mass-concrete bund.	2	3	6
6	Employee or visitor struck by vehicles or plant	Potential injury or fatality to employee or visitor.	3	5	15	Compulsory use of hi-vis jackets. A low speed limit should be set and enforced. Plant and machine operators must be made aware of other personnel on site and must be fully trained. All employees and contractors working on the site should be adequately trained in H&S. Mobile plant should be fitted with clearly audible reversing alarms. Adequate lighting should be employed, as required.	2	5	10
7	Employee contact with hazardous materials	Potential impact on health of employee.	2	2	4	Employees and contractors that are at risk of coming into contact with hazardous materials should be issued with appropriate PPE and should be adequately trained in handling hazardous materials. The waste quarantine area should be used to isolate hazardous materials found in the incoming wastes.	1	2	2

The identified risks all fall within the green zone after mitigation. The two highest risks remain as No. 4 (Diesel Tank Spill) and No.6 (Impact from vehicles or plant).

3.7 Mitigated Risks

Table 3-6 below shows the Risk Matrix for the facility after full mitigation is considered.

**Table 3-6
Risk Matrix of Mitigated Risks**

30 year Probability %		Ranking of Mitigated Risks				
		>50%	Very High 5			
20%-50%	High 4					
10%-20%	Medium 3					
5%-10%	Low 2			1, 3, 5	2	4, 6
<5%	Very Low 1		7			
Impact		Very Low 1	Low 2	Medium 3	High 4	Very High 5
Estimated Cost		<€1k	€1-10k	€10-50k	€50-100k	>€100k

Severity

Each of the identified risks has a reduced likelihood of occurrence in the mitigated scenario. Compliance with the waste licence and health and safety legislation should ensure that the identified risks stay within the Green Zone (Low Risk) in the Risk Matrix.

4.0 RISK MANAGEMENT

4.1 General

The risks identified in the previous section must be managed to ensure that they remain in the Green Zone (low risk) category. The mitigation identified in this report requires ongoing inspection and management. The site requires a Risk Management Programme, whereby risks are allocated to 'Risk Owners', who have responsibility for maintaining or improving mitigation measures that are needed to minimise the risks.

4.2 Risk Management Programme

Table 4-1 below allocates the identified mitigation measures to 'Risk Owners'. The operator of the site should maintain and update a version of this Table to inform the Risk Management Programme at the facility. The job titles may differ from those suggested below, depending on the staffing structure at the facility, but the Programme should include the names and position of the 'Risk Owners'.

**Table 4-1
Proposed Risk Mitigation Management Measures**

Risk Owner	Mitigation Measure	Relevant Risk id	Mitigation Measure Completion Date
H&S Officer	Site operatives to be issued with dust masks.	1	
H&S Officer	Site operatives to be issued with ear protectors.	2	
H&S Officer	Compulsory use of hi-vis jackets.	6	
H&S Officer	All employees to be adequately trained in H&S.	1,2,6,7	
H&S Officer	Employees that are at risk of coming into contact with hazardous materials to be issued with appropriate PPE and to be adequately trained in handling hazardous materials.	7	
Waste Facility Manager	Surfaces should be damped down during prolonged dry spells to keep yards and roads dust free.	1	
Waste Facility Manager	Wheelwash and vehicle wash facilities should be maintained in working order	1	
Waste Facility Manager	Where noise emissions from the site are excessive, the site operator should employ further mitigation in the form of improved working practices and/or better performing plant and machinery.	2	
Waste Facility Manager	Continue to ensure that all wastes accepted at the site are inert.	3	
Waste Facility Manager	Continue to be aware of the activities of the companies that deliver inert wastes to the site and maintain a high level of confidence about the source of the incoming wastes.	3	
Waste Facility Manager	The concrete bund containing the road diesel tank must be properly maintained and periodically tested (every 3 yrs).	4	
Waste Facility Manager	Spill kits comprising containment booms and absorbent materials should be maintained in good order and be	4, 5	

Risk Owner	Mitigation Measure	Relevant Risk id	Mitigation Measure Completion Date
	easily accessible.		
Waste Facility Manager	The hydrocarbon interceptor currently awaiting installation should be installed and properly maintained.	4	
Waste Facility Manager	The operator should have a mechanism in place to block the pipe under the concrete plinth to contain diesel spills in the concrete production yard	4	
Waste Facility Manager	The operator must maintain adequate capacity in the bunds beneath the oil drums, by regular servicing.	5	
Waste Facility Manager	The operator should improve the bunding of the 2,500 litre gas-oil tank to reduce the risk of a spill caused by a minor vehicle collision. The frame that holds the tank in place should be supported from the ground rather than supported by the bund wall. In addition, the block-work bund should be replaced by a mass-concrete bund.	5	
Waste Facility Manager	Low speed limit to be set and enforced on site.	6	
Waste Facility Manager	Plant and machine operators to be made aware of other personnel on site and to be fully trained.	6	
Waste Facility Manager	Ensure that mobile plant is fitted with clearly audible reversing alarms.	6	
Waste Facility Manager	Adequate lighting to be employed, as required.	6	
Waste Facility Manager	Ensure that Waste Quarantine Area is used correctly	7	

4.3 Risk Management Review

The Risk Management Programme is a dynamic process that must be updated to reflect changes that occur on site. New risks may emerge with new processes or new methods of working. Additional hazards can arise from the use of new materials for maintenance or fuelling at the site. Additional mitigation measures can become available or better techniques developed. The staff structure can change and new responsibilities allocated to the site management team.

5.0 ASSESSMENT OF POTENTIAL ENVIRONMENTAL LIABILITIES

5.1 Best Case Scenario

In the best case scenario, the mitigation measures will succeed in preventing any environmental liability, so the cost to the operator will be zero.

5.2 Worst Case Scenario

In the worst case scenario, a fatality could occur on site, most likely due to impact with a vehicle or an item of mobile plant. This is expected to incur a cost of up to €1,000,000,

depending on the estimated loss associated with the potential future earnings of the individual. With full mitigation in place, the likelihood of occurrence of such a tragic event is considered low (<10% in 30 year period).

The possibility that 2 people could be struck and killed by an item of mobile plant, such as a reversing front loading shovel cannot be ruled out. The likelihood of occurrence of this event is considered to be less than 1% in a 30 year period and would be expected to incur costs of up to €2 million. The operator must have sufficient insurance to cover this eventuality, as a minimum.

The other risk with a very high severity relates to a spill of 70,000 litres of diesel reaching the gravel aquifer and requiring a major clean-up. We estimate that such an event could cost €100,000 or more to resolve. The probability of such an event is low as the diesel tank is contained in a mass concrete bund and the site operator, if vigilant, will have the opportunity to hold the diesel within the yard, even if the wall of the bund is breached.

There is currently a high risk of a spill of the 2,500 litre gas-oil tank located in the Maintenance Shed and such an event is likely to cost in excess of €10,000 to resolve. We include recommended mitigation measures in this report, that would reduce the probability of occurrence of this event from high to low.

5.3 Most Likely Scenario

The most likely scenario is based on the median probability and severity for each risk after implementation of the Risk Management Programme as shown in Table 5-1 below.

**Table 5-1
Most Likely Scenario**

	Risk Identification	Occurrence Rating	Probability	Severity Rating	Cost Range	Median Probability	Median Severity	Most Likely Scenario Cost
1	Excessive dust emissions	2	5-10%	3	€10,000 - 50,000	7.5%	€30,000	€2,250
2	Excessive noise emissions	2	5-10%	4	€50,000 - 100,000	7.5%	€75,000	€5,625
3	Contamination from non-inert non-compliant waste	2	5-10%	3	€10,000 - 50,000	7.5%	€30,000	€2,250
4	Diesel tank leak or spillage	2	5-10%	5	€100,000 - 150,000	7.5%	€125,000	€9,375
5	Other hydrocarbon spill (maintenance shed)	2	5-10%	3	€10,000 - 50,000	7.5%	€30,000	€2,250
6	Employee or visitor struck by vehicles or plant	2	5-10%	5	€100,000 - €1m	7.5%	€550,000	€41,250
7	Employee contact with hazardous materials	1	0-5%	2	€1,000 - €10,000	2.5%	€5,000	€138

	Total	€63,138
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6.0 CONCLUSIONS

In consideration of the worst case scenario, we recommend that the site operator should have the following insurances in place as a minimum:

- Employers Liability – indemnified for at least €2 million (preferably higher).
- Public Liability – indemnified for at least €2 million (preferably higher).

In addition, the worst case scenario could incur environmental clean-up costs of c.€100,000, relating to a major uncontrolled diesel spill that reaches the gravel aquifer. However, the probability of such an occurrence is considered low (5% to 10% in a 30 year period).

The 'Most Likely Scenario', as detailed in Table 5-1 above, incurs an estimated cost of €63,138. The calculations used for this estimate, assume that all mitigation measures are in place and are maintained. The company must install the hydrocarbon interceptor in the concrete production yard, must improve the bunding and protection of the gas-oil tank in the Maintenance Shed and must properly maintain all mitigation infrastructure for this scenario to be realised. Otherwise the probability of occurrence of the identified risks are increased and the potential financial liability also increased.

Items No.6 and No.7 on Table 5-1 above should be covered by Employee Liability and Public Liability insurance.

Provision should be made by Roadstone Wood to cover the other items (No.1 to No.5 incl.) on Table 5-1 and these would incur an estimated cost of €21,750. In addition, the company should provide for any excess included in the insurance policies.

Roadstone Wood is part of the CRH Group of companies and is clearly in a strong position to offer a 'Parent Company Guarantee' to cover the risks identified above.

7.0 CLOSURE

This report has been prepared by SLR Consulting Limited with all reasonable skill, care and diligence, and taking account of the manpower and resources devoted to it by agreement with the client. Information reported herein is based on the interpretation of data collected and has been accepted in good faith as being accurate and valid.

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