



Certificate of Authorisation Application Form

Waste Management (Certification of Historic Unlicensed Waste
Disposal and Recovery Activity) Regulations, 2008

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EPA Ref. N^o: <i>(Office use only)</i>	<input type="text"/>
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APPLICATION GUIDANCE NOTES

This application must be completed in accordance the guidance notes below and the instructions accompanying each section of the application form.

This form is for the purpose of making an application for a Certificate of Authorisation in accordance with Regulation 7 (1) of the Waste Management (Certification of Historic Unlicensed Waste Disposal and Recovery Activity) Regulations, 2008 (hereinafter referred to as 'the Regulations'). A valid application must, as a minimum, contain the information prescribed in Regulation 7(2) of the Regulations.

The applicant must conform to the format set out in this application form and accompanying instructions. Each page of the completed application form must be numbered, e.g. *page 5 of 20*, etc. The basic information should be supplied in the spaces given in the application form, with supporting documentation supplied as attachments, as specified. All sections of the form must be completed. Where a section is not relevant to the application, the words "not applicable" should be clearly written. The abbreviation "N/A" should not be used.

The Risk Assessment (required under Regulation 6(1) of the Regulations) shall be submitted in full as Attachment D.1 to this application form. Risk Assessments are to be carried out in accordance with the '*Code of Practice - Environmental Risk Assessment for Unregulated Waste Disposal Sites*' (hereinafter referred to as the Code of Practice).

All maps/drawings/plans must be no larger than A3 size and scaled appropriately such that they are clearly legible. In exceptional circumstances, where A3 is considered inadequate, a larger size may be requested by the Agency.

All drawings should

- be titled and dated;
- have a unique reference number and be signed by a clearly identifiable person; and
- indicate a scale and the direction of north.

Information supplied on this application, including supporting documentation, will be put on public display and open to inspection by any person. Should the applicant consider information to be confidential, this information should be submitted in a separate enclosure bearing the legend "In the event that this information is deemed not to be held as confidential, it must be returned to.....". In the event that information is considered to be of a confidential nature, then the nature of this information, and the reasons why it is considered confidential (with reference to the "Access to Information on the Environment" Regulations) should be stated in the Application Form, where relevant.

An original signed application form shall be submitted together with 1 copy, including (Risk Assessment, Screening for Appropriate Assessment (or a Natura Impact Statement if required)). The application shall also be provided on 2 CD-ROMs in searchable PDF format (individual files should be no larger than 50MB in size).

It should be noted that it will not be possible to process or determine the application until the required documents have been provided in sufficient detail and to a satisfactory standard.

This document does not purport to be and should not be considered a legal interpretation of the provisions and requirements of the Waste Management (Certification of Historic Unlicensed Waste Disposal and Recovery Activity) Regulations 2008 (S.I. No. 524 of 2008).

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CHECKLIST

Regulation 7(2) of the Waste Management (Certification of Historic Unlicensed Waste Disposal and Recovery Activity) Regulations 2008 sets out the information which must, in all cases, accompany an application for a Certificate of Authorisation. In order to ensure that the application fully complies with the legal requirements of Regulation 7(2) of the 2008 Regulations and the Code of Practice, all applicants should use the following checklist.

In each case, refer to the section or attachment number of your application which contains the information requested.

The following checklist will be applied to the application as detailed below:

Requirement of Regulations	Location in application form or attachment no.	Applicant	EPA
Article 7(2) (a)	Section C.1	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Article 7(2) (b)	Section B.1	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Article 7(2) (c)	Section C.4 and attachment C.4	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Article 7(2) (d)	Section C.2	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Article 7(2) (e)	Attachment C.1	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Article 7(2) (f)	Section D and attachment D.1	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Article 7(2) (g)	Section C.5	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Article 7(2) (h)	Section D and attachment D.1	<input checked="" type="checkbox"/>	<input type="checkbox"/>

Regulation 7(2) (h) outlines the requirement for a risk assessment and the following checklists will be applied to the risk assessment, appropriate assessment screening or Natural Impact Statement and remediation strategy:

Tier 1 Risk Assessment:

Requirement	Section or attachment no.	Applicant	EPA
Conceptual site model.	Sections 2.5 and 3.17.9 of the ERA report	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Identification of conservation areas, foreshore areas or other relevant designations.	Section 4 pages - 23 - 22 , Figure 4.1 and Table 4.1 of the screening report	<input checked="" type="checkbox"/>	<input type="checkbox"/>
SPRs ¹ and SPR linkages: justified and scored.	Section 2.5- Tier 1 Conceptual Site Model, Pages 27-36 of the ERA	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Tier 1 risk classification. Risk: _____	Section 2.6 ; pages 33-36	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Tier 2 Risk Assessment	Section 3: pages 37-73 of ERA	<input checked="" type="checkbox"/>	<input type="checkbox"/>

¹ SPR = Source/Hazard – Pathway – Receptor.

Tier 2 Risk Assessment:

Requirement	Section or attachment no.	Applicant	EPA
Walk over survey checklist.	Appendix C of ERA	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Justification for chosen site investigations (SI), SI methods and sampling strategies.	Sections 3.6 and 3.7 , pages 40-45	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Justification for any SPR linkage not investigated as part of the SI.	Sections 3.17.10 and 4 of ERA	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Description of how the matrix was used.	Section 1.5 page 5 of ERA	<input checked="" type="checkbox"/>	<input type="checkbox"/>
SI result comparison against the requirements of the EC Environmental Objectives (Surface Waters) Regulations 2009.	Section 3.14.:page 64-66	<input checked="" type="checkbox"/>	<input type="checkbox"/>
SI result comparison against the requirements of the EC Environmental Objectives (Groundwater) Regulations 2010.	Section 3.15 pages 66-68	<input checked="" type="checkbox"/>	<input type="checkbox"/>
SI result comparison against the guidance document ' <i>Guidance on the Authorisation of Discharges to Groundwater</i> ', EPA 2011.	Comparison was made against EPA Groundwater Interim Guidelines values and Groundwater Regulations in section 3.7.3	<input checked="" type="checkbox"/>	<input type="checkbox"/>
SI result comparison against the Department of the Environment publication on the ' <i>Protection of New Buildings and Occupants from Landfill Gas</i> ' (1994).	Section 4.4.4 and 5.41 of ERA	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Justification for any conclusions drawn from the comparison of SI results to current standards.	Section 5.1 of ERA	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Comparison of SI results against each SPR linkage and justification for any conclusions drawn.	Sections 4.8and 4.9; Table 4.1 and 4.2	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Justification for the risk ranking of each SPR linkage.	Sections 4.8and 4.9; Table 4.1 and 4.2	<input checked="" type="checkbox"/>	<input type="checkbox"/>

Appropriate Assessment (AA):

Requirement	Section or attachment no.	Applicant	EPA
AA Stage 1 - Screening for Appropriate Assessment.	Appendix D	<input checked="" type="checkbox"/>	<input type="checkbox"/>

Requirement	Section or attachment no.	Applicant	EPA
Statement confirming the result of Stage 1 Screening, e.g. <i>"The screening assessment (Stage 1) undertaken demonstrated that the project is/is not likely to have significant effects on the European site(s) having regard to its conservation objectives"</i> .	Section 4- Screening Assessment of AA Screening report.	<input checked="" type="checkbox"/>	<input type="checkbox"/>
AA Stage 2 - Natura Impact Statement.	Section 5 of Screening report concluded that it is not required.	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Statement confirming the result of Stage 2 of the Appropriate Assessment, e.g. <i>"The assessment (Stage 2) demonstrates that the project will/will not adversely affect the integrity of the European site(s) having regard to its conservation objectives"</i> .	Section 5 of Screening report concluded that it is not required.	<input checked="" type="checkbox"/>	<input type="checkbox"/>

Tier 3 Risk Assessment:

Requirement	Section or attachment no.	Applicant	EPA
Refined conceptual site model.	Section 4.8 and Figure 4.1 of ERA	<input checked="" type="checkbox"/>	<input type="checkbox"/>
SPRs and SPR linkages: justified and scored.	Section 4.8, Table 4.1 and Table 4.2	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Tier 3 risk classification and justification. Risk: _____	Section 4 of ERA	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Generic Quantitative Risk Assessment (QRA)	Section 4 of ERA	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Detailed QRA.	Section 4 of ERA	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Justification for generic QRA/detailed QRA.	Section 4 of ERA	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Overall site risk evaluation.	Sections 4 and 5	<input checked="" type="checkbox"/>	<input type="checkbox"/>

Remediation Strategy:

Requirement	Section or attachment no.	Applicant	EPA
Description of remediation works.	Section 5.2	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Comparison of the proposed remediation works against the 'Landfill Restoration and Aftercare	Section 5.3	<input checked="" type="checkbox"/>	<input type="checkbox"/>

Requirement	Section or attachment no.	Applicant	EPA
<i>Manual</i> , EPA 1999 and justification for any departure from the manual.			
Comparison of the proposed remediation works against the <i>'Landfill Site Design Manual'</i> , EPA 2000 and justification for any departure from the manual.	Section 5.3	<input checked="" type="checkbox"/>	
Comparison of the proposed remediation works against the report on the <i>'Management of Low Levels of Landfill Gas'</i> , EPA 2011 and justification for any departure from the report.	Section 5.4.1	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Demonstration of how the remediation works will allow for the completion of a validation report and the breakage of each SPR linkage.	Section 5.2	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Date on which the proposed remediation works are due to be completed: _____	To be confirmed after EPA has approved our application		
Demonstration of how SPR linkages which have no remediation measures proposed will meet the requirements of a validation report.	Section 4 of ERA	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Date on which a completed validation report is proposed to be submitted to the Agency: _____	To be confirmed when EPA has approved our application.		

Monitoring Programme:

Requirement	Section or attachment no.	Applicant	EPA
Identification of the parameters which require analysis and the related sampling plan for any on-going or long-term monitoring or assessment programme required to ensure the effectiveness of completed remediation measures.	Section 3.7 of ERA	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Comparison of the proposed monitoring or assessment programme against the <i>'Landfill Monitoring Manual'</i> , EPA 2003 and justification for any departure from the manual.	Section 3.7 of ERA	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Demonstration of how the proposed monitoring or assessment programme will confirm that the	Sections 3.7 and 5.3	<input checked="" type="checkbox"/>	<input type="checkbox"/>

Requirement	Section or attachment no.	Applicant	EPA
objectives of the remediation measures have been met.			

SECTION A: NON-TECHNICAL SUMMARY

A non-technical summary of the application is to be included here. The summary should identify all environmental impacts of significance associated with the site.

The following information must be included in the non-technical summary:

A description of:

- The site location.
- A brief history of the site, types and volumes of waste deposited, duration of disposal activities and date of cessation.
- The hydrogeology and ecology of the site and surrounding area, to include protected areas.
- Risk category of the site
- Actual and potential environmental impacts.
- Proposed remediation including timescale.

Supporting information should form **Attachment A.1**.

The above information is provided as shown below:

1.0 Site Setting:

1.1 The site location. The site is located on the Bohernabreena Road, Tallaght, South County Dublin within the townland of Friarstown Upper in a predominantly agricultural area. The site is approximately 2.7 hectares and is used for pastoral grazing.

The site is bounded to the east by the Ballinascorney Road, with the Friarstown Landfill on the opposite side of the road. The River Dodder flows in a northerly directly adjacent to the western boundary, to the south is the Font Bridge. Directly north of the site is the Bohernabreena landfill (Ref B 216) this land is currently used for agricultural purposes.

1.2 A brief history of the site, types and volumes of waste deposited, duration of disposal activities and date of cessation.

There is limited public information available on the landfill site. Historic maps indicate that there were several gravel pits within the vicinity of the site. Local knowledge indicated that there was a gravel quarry onsite which was active in the

1970s, once gravel extraction had ceased the site was used as a landfill for domestic refuse by Dublin County Council and was closed in 1974.

The source of the waste is mixed municipal which extends across the majority of the site. The depth of the waste is very shallow and varies across the site. The landfill is unlined and waste is in direct contact with underlying gravels and clays. The estimated volume of waste deposited at the site is 151,200 tonnes.

2.0 The hydrogeology and ecology of the site and surrounding area, to include protected areas.

Aquifer Characteristics

According to the GSI the aquifer beneath the site and the surrounding vicinity is designated as a Poor Aquifer (PI) which is described as bedrock which is generally unproductive except for local zones (Error! Reference source not found.) of the main report.

The aquifer is assigned to the Kilcullen Groundwater Body (GWB) (IE_EA_G_003) which is characterised predominantly by a poorly productive flow regime. Most groundwater flow occurs mostly in a shallow upper weathered zone, deeper groundwater flow is possible along fractures, joints and major faults. Recharge occurs diffusely through the subsoils and via outcrops. Typical groundwater flow paths are likely to be in the order of a couple of hundred metres and discharging to the closest surface water features which in this case is the River Dodder which runs along the western boundary of the site.

The majority of groundwater flow will occur in the top couple of metres. In some instances, a greater degree of structural deformation may provide a fracture network, which will allow groundwater movement at greater depths. Only flow in isolated fractures is expected below 30 metres.

According to the GSI there are no gravel aquifers within the vicinity of the site. However, according to historical maps there are several gravel pits within the vicinity of the site and along the River Dodder.

Aquifer Vulnerability

According to the GSI the aquifer vulnerability at the majority of the site is classified as High, with a small portion of the site at the south classified as Extreme (Error! Reference source not found.). Assuming a moderate permeability of the subsoil due to the presence of sand and gravels, the depth to bedrock, based on the GSI classification is expected to be between 3 to 5 metres.

Groundwater Quality

According to the EPA the status of the groundwater within the Kilcullen GWB located beneath the site and the surrounding area is classified as “Good Status” (EPA, catchments.ie, 2018). The Water Framework Directive (WFD) groundwater risk of the groundwater is projected as “Not at Risk”.

The hydro-chemical signature of the GWB is slightly hard water (100-150 mg/l (CaCO₃)) and electrical conductivity values of 300-500 µS/cm. the groundwater has very low alkalinity (generally less than 50 mg/l).

Groundwater Use and Protection

There are no groundwater wells on the site. The closest wells according to GSI are 2921NEW001 located approximately 3km northwest of the site, GSI well 2921NEW006 located approximately 2.3km south of the site and GSI well

2921NEW011 located approximately 4km southeast of the site (Error! Reference source not found.). A summary of well use and yields are presented in **Table 0.1**.

Table 0.1 GSI Wells

GSI Wells	Drill Date	Well Use	Yield Class
2921NEW006	1899	Agricultural & domestic use	Poor (32.7m ³ /d)
2921NEW011	1986	Unknown	Poor (19.6m ³ /d)
2921NEW001	1976	Industrial use	Excellent (513m ³ /d)*

*Note this well is located within the Lucan Formation.

There are no Public Supply Source Protection Areas within the site or proximity of the site, the nearest is located at Kiltel approximately 8.5km southwest of the site.

Surface Water Protection

According to the NPWS website, there is a Special Area of Conservation (SAC), the Glenasmole Valley SAC (Site Code: 001209) immediately upstream of the site. The site is a SAC selected for the following habitats and species listed on Annex I/II of the E.U. Habitats Directive:

- [6210] Orchid-rich Calcareous Grassland*
- [6410] Molinia Meadows
- [7220] Petrifying Springs*

Asterisk denotes priority habitats and/or species and numbers in brackets are Natura 2000 codes.

The Glenasmole Valley is also a proposed Natural Heritage Area (pNHA) (Site Code: 001209).

According to the NPWS there are deep drifts along the River Dodder, with groundwater seepages through the deposits which are rich in bases adjacent site of the site in the riparian zone along the Dodder River. These springs feed the alkaline fen and tufa deposits.

The Appropriate Assessment Screening and Appropriate Assessment (**Appendix D**) assesses the ecological aspects of the site in more detail.

3.0 Risk category of the site

Based on the methodology of the EPA “*Code of Practice: Environmental Risk Assessment for Unregulated Waste Disposal Sites*” (April 2007) the site is considered as **Low Risk (Class C)**, however, there is evidence that the site is having a direct adverse impact on the River Dodder. Therefore, it is recommended that the remedial measure of installing a capping layer over the waste is completed to mitigate leachate generation and subsequent impact.

4.0 Actual and potential environmental impacts.

Elevated concentrations of landfill gas (methane and carbon dioxide) were observed across the site with the highest concentrations observed within the centre of the waste

body. Low or no flow gas flows observed indicates that the waste is not actively producing gas and the risk from landfill gas is considered low.

No significant volumes of leachate were observed on site, partly due to the dry summer and the lack of a basal liner allowing free drainage of any leachate to the underlying gravels or via direct discharge to the River Dodder. Leachate contained exceedances of statutory limits for levels of Iron, Manganese, Ammonium, microbial indicators and Benzene.

The groundwater levels across the site are high and in contact with the gravel layer and overlying waste. Groundwater monitoring wells indicated exceedances of levels Arsenic, Manganese and Chloride. Water seepages on the site which emerged along the River Dodder bank indicated exceedances of Ammonia and Arsenic suggesting leachate breakout

Surface water samples taken from the adjoining Friarstown Landfill leachate overflow pipe indicate very high levels of ammonium impacting the River Dodder.

5.0 Proposed remediation including timescale.

Based on the methodology of the EPA “Code of Practice: Environmental Risk Assessment for Unregulated Waste Disposal Sites” (April 2007) the site is considered as **Low Risk (Class C)**, however, there is evidence that the site is having a direct adverse impact on the River Dodder. Therefore, it is recommended that the remedial measure of installing a capping layer over the waste is completed to mitigate leachate generation and subsequent impact.

It is also recommended that the Friarstown landfill overflow pipe is removed from flowing into the River Dodder.

The above information is provided in the main report of the Environmental Risk Assessment (ERA) which is attached as Attachment A.1

SECTION B: GENERAL

B.1. Applicant's Details

Only application documentation submitted by the applicant and by the nominated person will be deemed to have come from the applicant.

Name*:	South Dublin County Council
Address:	County Hall
	Tallaght
	Dublin 24
	D24YNN5
Tel:	014149000
Fax:	Not Applicable: We are no longer using faxes.
e-mail:	info@sdblincoco.ie

*Full name and address of the local authority making the application.

Name and Address for Correspondence

Name*:	Joseph Bockarie
--------	-----------------

Address:	Department of Environment, Water and Climate Change
	South Dublin County Council
Tel:	4149021
Fax:	Not Applicable: We are no longer using faxes.
e-mail:	jbockarie@sdblincoco.ie

*This should be the name of the person nominated by the local authority for the purposes of this application.

Co-Applicant's Details

Name*:	Not Applicable
Address:	Not applicable
Tel:	Not Applicable
Fax:	Not Applicable
e-mail:	Not Applicable

*This should be the name of a local authority, other than the lead authority, where a site lies in more than one local authority functional area.

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Name of Qualified Person

Site investigations must be supervised by a suitably qualified, trained and experienced person. Section 2.3 of the Code of Practice sets out the requirements in this regard, which should be observed by local authorities. The Code of Practice states that, notwithstanding the fact that a local authority will be in position to carry out much of the risk assessment using in-house resources, "a suitably qualified, trained and experienced person, who is a registered professional with chartered status (or equivalent) awarded by a relevant professional body, and who has successfully conducted risk assessments at other sites, should supervise the Site Investigations ... and be used to carry out the risk assessment." Please provide the name of the qualified person, in-house or external, used for this risk assessment.

RPS consulting firm was engaged to carry out the Environmental Risk Assessment on behalf of South Dublin County Council. The name of qualified person is stated below.

Name:	Gareth McElhinney
Qualification:	BE(Hons)CENG MIEI, RConsIE
Professional Body:	Engineers Ireland
Address:	RPS Consulting Engineers Ltd
	West Pier Business Campus
	Dun Laoghaire
Tel:	014882900
Fax:	Not Applicable
e-mail:	ireland@rpsgroup.com

Interest in Site

State whether the applicant(s) is the registered owner of the land (please check):

Landowner	<input type="checkbox"/>
Landowner (part)	<input type="checkbox"/>
Not Landowner	<input checked="" type="checkbox"/>

Provide the name and address of the current owner(s) and lessees of the land. An appropriately scaled drawing ($\leq A3$) outlining the land ownership should be included in **Attachment B.1**.

Name:	Mrs Mary Doyle
Address:	White House
	Ballinascorney
	County Dublin
Tel:	0868693535
Fax:	Not Applicable
e-mail:	Andrew Doyle <doyleandrew89@gmail.com>

Name:	Not Applicable
Address:	Not Applicable
Tel:	Not Applicable
Fax:	Not Applicable
e-mail:	Not Applicable

Name:	Not Applicable
Address:	Not Applicable
Tel:	Not Applicable
Fax:	Not Applicable
e-mail:	Not Applicable

Name:	Not Applicable
Address:	Not Applicable
Tel:	Not Applicable
Fax:	Not Applicable
e-mail:	Not Applicable

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B.2. Fees

Appropriate Fee (€5,000) Included	Yes	No
	Our Finance dept has remitted the fees to EPA and the reference No is indicated.	

SECTION C: SITE DETAILS

C.1. Site Location

Name:	Bohernabreena Landfill
Address*:	Bohernabreena Road, Tallaght
	Bohernabreena Town land
Tel:	Not Applicable
Fax:	Not Applicable
e-mail:	Not Applicable

* Include any townland

Attachment C.1. should contain appropriately scaled drawings or maps ($\leq A3$) showing the site location in the context of its surroundings and clearly highlighting the site boundary.

C.2. Unauthorised Waste Sites Register (Section 22) – Site Boundary and Site Code

The site was registered on the online section 22 Register on 20th Dec 2010. The site Code is S22-02632. The boundary drawn of the site represent the full estate of the site.

Following the Tier 2 and Tier 3 site investigations, if the extent of the site is determined to be greater or less than that initially recorded in the Section 22 Register, then the boundary must be amended accordingly.

Please note that the extent of the site is the same as it was initially recorded in the section 22 register.

Finalised boundary entered in Section 22 Register?	<input checked="" type="checkbox"/>
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Provide the unique code assigned to the site in the Section 22 Register

Site Code	S22-02632
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Provide a six-digit National Grid Reference for the site location

Grid Reference	309106	E	224746	N
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Confirm the following waste details entered on the Section 22 Register:

- State which type of waste activity was carried out at the site (please check):

Disposal	<input checked="" type="checkbox"/>
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Recovery	<input type="checkbox"/>
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- State the principal waste type at the site (please check):

C&D	<input type="checkbox"/>
Industrial	<input type="checkbox"/>
Municipal	<input checked="" type="checkbox"/>
Pre 1977	<input checked="" type="checkbox"/>
Unknown	<input type="checkbox"/>

- State any additional waste types at the site (please check):

Agriculture	<input type="checkbox"/>
C&D	<input type="checkbox"/>
Dredged Soil	<input type="checkbox"/>
ELV/Scrap Metal	<input type="checkbox"/>
Hazardous	<input type="checkbox"/>
Industrial	<input type="checkbox"/>
Mining	<input type="checkbox"/>
Municipal	<input checked="" type="checkbox"/>
Municipal Sludge	<input type="checkbox"/>
Other	<input type="checkbox"/>

- State whether or not hazardous waste is present at the site (please check):

Present on site	<input type="checkbox"/>
Not present on site	<input checked="" type="checkbox"/>

- Estimate the total quantity of waste at the site (tonnes):

Total waste quantity at the site:	<u>151,200</u> tonnes
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- Provide the start date and end date of waste activities at the site:

Start date	01/01/1970
End date	01/12/1974

C.3. Risk Category

State which Risk Category* the site belongs to (please check):

Class A (High)	<input type="checkbox"/>
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Class B (Moderate)	<input type="checkbox"/>
Class C (Low)	<input checked="" type="checkbox"/>

*See Chapter 4, Code of Practice (as required under Section 6(2) of the Regulations)

C.4. Land Use

Provide details of the current use of the land on which the closed landfill is situate.

The land is currently used for pastoral grazing as stated on page 13 of the main Risk Assessment report.

Attachment C.4. should detail this information or refer to the specific section of the risk assessment documentation where this information is contained.

C.5. Types and quantities of waste deposited

Provide details of the types and estimated quantities of waste deposited at the site.

Intrusive site investigations (trial pitting and borehole installations) identified the waste as black clay with varying amounts of decayed organic matter, ash, plastics, fabrics, wire, brick as stated on page 77 of the main Environmental Risk Assessment report. Based on the site investigation logs and the geophysical survey the volumes of waste calculated using the extents and thicknesses was calculated at a volume of 151,200 tonnes. The amount of waste calculated during the intrusive site investigation is greater than what was originally recorded in the section 22 register.

Attachment C.5. should detail this information or refer to the specific section of the risk assessment documentation where this information is contained.

In addition, state whether the types and quantities of waste which have been recorded on the online Section 22 Register at www.epa.ie/uwsr represent the final estimated quantities at the site.

Following the Tier 2 and Tier 3 site investigations, if the type and quantities of waste are determined to be greater or less than that initially recorded in the Section 22 Register, then these quantities must be amended accordingly.

Finalised estimate of waste types and quantities entered in Section 22 Register	<input checked="" type="checkbox"/>
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SECTION D: RISK ASSESSMENT

For sites which have been assigned risk category Class A (High Risk) or Class B (Moderate Risk) during the Tier 1 assessment, a full risk assessment (Tier 1, 2 and 3) must be carried out. Class C (Low Risk) sites must have, as a minimum, Tier 1 and exploratory Tier 2 assessments. All sections of the risk assessment must be included as part of this application, including any part of the Tier 1 assessment carried out using the EPA Section 22 Register risk assessment tool at www.epa.ie/uwsr.

The following Risk Assessment methodology was undertaken at the site.

Tier I – Risk Screening and Classification

As stated on page 40 of the main Environmental Risk Assessment, the EPA CoP identifies eleven SPR linkages that should be considered within the conceptual model and assessed as part of the Tier I risk assessment. Each of these linkages can be scored using the scheme provided in the CoP in order to provide an overall risk categorisation for the site.

An initial model was developed based on the information available with consideration given to the eleven SPR linkages identified in the CoP. During Tier 1, each aspect of each SPR linkage can be assessed according to particular criteria as defined within the CoP. The CoP uses a separate scoring matrix for each aspect of an SPR linkage, which are defined within Tables 1a to 3f of the CoP. Where an individual aspect is not present or not relevant within the context of the conceptual model it is given a score of 0.

The risk prioritisation and classification are summarised in Error! Reference source not found. of Environmental Risk Assessment (ERA) report. The risk category bands relating to the site scores as defined in the CoP are presented in Error! Reference source not found. of ERA report and the risk classification and prioritisation of the Bohernabreena site are shown in **Table 2.11** of the main Environmental Risk Assessment Report.

Tier I – Risk Summary

According to the EPA CoP risk prioritisation and methodology the site is classified as a Low Risk (Class C).

However, direct impact on the River Dodder has been observed from leachate discharging from the site into the river. Available chemical data indicates the leachate contains high levels of Ammonium.

The potential risk from leachate to the River Dodder was investigated further.

Tier II exploratory and Main phase investigation

The Tier II Exploratory and Main Phase Site Investigations were carried out in a phase manner with the results presented together. The objectives of the Tier II Site Investigations were to confirm the initial CSM and risk classification of the site by characterising the extent of the waste body and determine if the current condition of the site is causing a risk to the environment and human health.

For the purpose of this Tier II Site Investigations the consultants (RPS) undertook the following scope of works:

- Excavation of 8 No. trial pits to characterise the extent and composition of any waste and assess the ground conditions of the site;
- Installation of 6 No. gas/leachate monitoring boreholes to investigate for the presence, volume and composition of leachate;
- Installation of 2 No. groundwater monitoring boreholes to assess groundwater quality of the aquifer within the vicinity of the site;
- Gas monitoring to determine the presence and concentration of landfill gas;
- Groundwater, leachate and surface water sampling and analytical testing to determine any environmental risk;
- Soil sampling and analytical testing to determine the risk to human health;
- Geophysical survey to determine the extent of the waste across the site;
- Topographical survey of the site and to survey site investigation locations; and
- Interpretation and report of findings in a comprehensive report.

The investigations were carried out in accordance with EPA CoP and the accompanying Matrix I: Guidance for Preliminary and Exploratory Investigations for all Unregulated Waste Disposal Sites. The methodology and results of Tier II Exploration and Main site investigations are fully described in the main report.

Tier III Refinement of CSM and Quantitative Risk Assessment

The Environmental Risk Assessment was completed in a phased approach. RPS completed a Tier I: Preliminary Site Investigation which classified the site as a Low Risk (Class C) site. However, direct impact on the River Dodder has been observed from leachate discharging from the site into the river.

Subsequently the Tier II: Exploratory Site Investigation was completed confirmed the presence of these risks. Therefore, the site required additional site investigations to investigate these risks and confirm the risk assessment. Tier II Main Site Investigation was completed in late 2018 to assess these risks and generate a more robust dataset which was used in this Tier III assessment to assess the overall risk of the site.

Following the completion of the Tier II Investigation and Testing, a refined CSM was prepared for the site and is summarised in the cross sections provided in **Figure 4.1** of the Main Environmental Risk Assessment Report. The refined CSM is based on the Tier 1 information (i.e. regional geological and hydrogeological data from the GSI) and results of the site investigation and associated environmental monitoring (i.e. dataset for trial pits, boreholes, geophysical survey, quality data and groundwater levels).

For the purpose of this report the consultant (RPS) undertook the following scope of work:

- Review all the available desk based and site specific information presented in the Tier I and Tier II reports;
- Reassess the Source-Pathway-Receptors (SPR) identified in Tier I and Tier II and assess if there are significant linkages present on the site specifically in relation to the presence of landfill gas and leachate;
- Refine the CSM;
- Final risk screening to classify the final risk of the site;
- Determine what level of QRA (if any) is required at the site; and
- Determine any remedial measure (if required).

Refinement of Conceptual Site Model

A CSM was developed during the Tier I process and refined after the Tier II process. The potential for direct impact on the River Dodder had been observed from leachate discharging from the site into the river and the process concluded that the potential risk from leachate to the River Dodder needs to be investigated further. The CSM identified and classified the risk scoring of the SPR linkage shown in **Figure 0.1**.

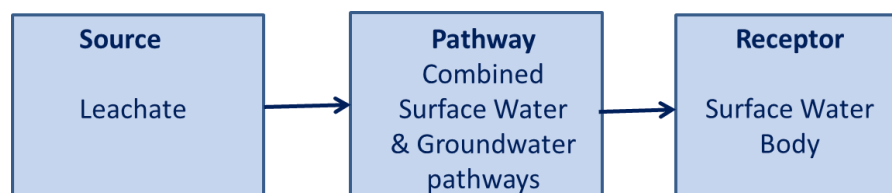


Figure 0.1 Network Diagram for SPR 1 – Low Risk

Following the completion of the Tier II Main Site Investigation, the CSM was refined incorporating the desk based information on the geology and hydrogeology of the site and local area detailed within the Tier I assessment with the site-specific data obtained from the site investigations. The refinement of the CSM included updating the SPR linkages. A schematic diagram of the revised CSM is shown in **Figure 4.2** in the main Environmental Risk Assessment Report (ERA). The full description of the source, Pathway , Receptors, refinement of Risk Screening and Classification, Revised Risk Model, and Revised Screening Assessment are on pages 75- 82 of the main Environmental Risk Assessment Report.

Conclusion :

The following conclusions have been derived from this assessment of Bohernabreena Landfill:

- The source of the waste was located across the entire site and at shallow depths, with the exception of the southern boundary which was free from waste. The waste was mixed municipal with the putrescible waste having decayed over time.
- The waste was hazardous with elevated levels of metals and ammonium.
- The waste was relatively dry, due to the lack of a basal membrane allowing free drainage to the underlying gravels and direct discharge to the River Dodder.
- The lack of an engineered cap allowed infiltration of rainwater and surface water, however the site investigation was completed during a very dry period which also accounts of the lack of leachate.
- Leachate was only found in one leachate well with some exceedance of vales but generally dilute. This is as a result of the groundwater being in contact with the waste body.
- Elevated levels of landfill gas generation were observed across the site, with the highest concentrations localised to within the centre of the landfill waste body. Gas flow rates are used to predict surface emissions and can refer to either the volume of gas being emitted from a monitoring well per unit time or the rate of movement of gas through permeable strata. Given the age of the landfill, the composition and the levels of landfill gas with no measurable flow, it would be considered that the landfill is within Phase IV, anaerobic. The risk from landfill gas is considered low.
- Based on the EPA methodology the Environmental Risk Assessment methodology the site is Low Risk, which is described by the EPA as “*not considered to pose a significant risk to environmental or human health*”.
- While the EPA CoP indicates the site is low risk there is evidence of the site having a direct impact on the River Dodder.
- The groundwater baseflow is contact with the waste body therefore groundwater beneath the site appears to be directly impacted which is flowing into the River Dodder.
- A leachate tank overflow pipe from the Friarstown landfill which is adjacent to the Bohernabreena landfill is having a negative impact on the river, as ammonium levels far exceed the statutory limit.
- An additional unconfirmed landfill immediately north of the site may also have a cumulative effect on the River Dodder.
- It is recommended that remediation options are considered.

Any future development on the site will require an updated Environmental Risk Assessment in relation to the proposed development.

For all sites, a proposal detailing necessary measures for remediation, risk attenuation and site restoration must be provided, and must as a minimum contain the following information:

- *Details of all necessary measures proposed, including a statement of the impact of the remediation measures. Proposed measures must clearly address all risks identified in the revised Conceptual Site Model for the site. This should also include details of alternative measures considered and reasons for rejection of same, where applicable.*
- *Schedule for completion of the proposed necessary measures, including a timeframe for the submission of a validation report.*
- *Details of any ongoing or long-term monitoring or assessment programme which may be required to evaluate and ensure the effectiveness of the necessary measures as carried out.*

The above aspect is discussed below.

Remediation Options:

A remediation strategy examines ways of breaking SPR linkages and thereby ensuring a contaminated site no longer poses a risk of environmental pollution. Based on the risk screening and the final CSM of the site the pollutant linkages resulting from the landfill are all low risk. However, there is a direct impact from leachate and groundwater beneath the site on the River Dodder. Based on this pollutant linkage the following options are most suitable for the site in the current condition:

1. Waste Removal;
2. Leachate Treatment; and
3. Engineered Low Permeability Landfill Cap.

Waste Removal

Complete removal of the waste mass would remove the contamination source hence sever all pollutant linkages. However, there would be significant issues associated with this approach.

Excavation - The volume of waste present across the site is estimated to be 151,200 tonnes. Excavation and replacement of the waste would lead to the removal of the source of environmental pollution and thereby eliminate the potential for future environmental liabilities. However, the practicalities of excavating this volume of waste, lying directly adjacent to a steep densely wooded river valley would be extremely difficult and could result in significant impacts on the River Dodder considering the short pathway to the river. Excavating aged waste can cause the release of noxious odours and gases, the potential to attract pests (birds, flies, rodents), and the generation of dust and other nuisances including wind-blown litter.

In addition, any excavated waste would need to be replaced with clean soil material in order to reinstate the areas. Significant traffic movements would be required in order to excavate/ replace the required volume of material from/ to the site with the potential to significantly impact on local communities over several years.

Disposal - The disposal of 151,200 of waste would present major difficulties particularly given the current waste management challenges in Ireland with regard to suitably licenced facilities and their remaining landfill capacity. It is likely that the excavated waste would have to be hauled considerable distances for landfill, pre-treatment or to be exported. The EPA reported residual waste capacity in Irish landfills to be “critically low” in ‘Ireland’s Environment 2016 - An Assessment’ (EPA, November 2016).

Cost - The cost of excavating 151,200 tonnes of waste and disposal would be considerable. On top of this the costs of excavation, haulage and environmental management of the sites during the excavation and replacement with clean material would run into further multi-millions.

Leachate Treatment

Site constraints including the steep bank along the River Dodder mean it is not feasible to construct a barrier at this interface. Consideration of the slope stability at the site would likely rule out any potential engineered solution to collect and treat the leachate discharges. Furthermore, given the low volumes of leachate expected, the cost benefit of such a solution is open to question. The engineering and economic feasibility of such a system would need further consideration and design prior to any implementation.

Engineering Low Permeability Landfill Cap

The capping of a landfill with a low permeability barrier is an accepted method for reducing leachate generation on landfill sites. The capping system will comprise engineering and restoration layers. The main objectives of the capping system are to:

- Minimise infiltration of water; and
- Promote surface drainage and maximise run off.

The capping system would reduce the infiltration of rainwater through the waste and reduce the volume of leachate entering the underlying aquifer and the River Dodder.

Recommendations

Installation of a Landfill Cap

It is recommended that SDCC install a cap on the waste body with a low permeability barrier. The cap should be designed and constructed in line with the EPA Landfills Manuals – Landfill Site Design. The capping system should consist of at a minimum the following:

- Top soil (150 – 300mm) and subsoil of at least 1m total thickness;

- Drainage layer of 0.5m thickness having a minimum hydraulic conductivity of $1 \times 10^{-4} \text{m/s}$
 - Compacted mineral layer of a minimum 0.6m thickness having a hydraulic conductivity of less than or equal to $1 \times 10^{-9} \text{m/s}$ or a geosynthetic material (e.g. GCL) or similar that provides equivalent protection; and
 - A gas collection layer of natural material (minimum 0.3m) or a geosynthetic layer.
- An engineered low permeability capping solution allied with controlled water and ecological monitoring would represent the preferred strategy for managing the risks associated with the site, assuming a net betterment approach be acceptable to the regulator.

Friarstown Outlet Pipe

The Friarstown Landfill leachate tank overflow pipe which is discharging to the Dodder River urgently requires redirecting to the foul drainage network to control the impact of this discharge.

Samples for the overflow pipe indicated that this discharge is adversely impacting the River Dodder. Based on historic maps, there appears to be pipes upgradient from the site which flow into the SAC. These pipes were not identified during this risk assessment. This is in breach of the Water Framework Directive.

It is recommended an Environmental Risk Assessment is completed on the Friarstown Landfill in order to fully assess the impact on the River Dodder.

Additional Landfill Gas Monitoring

While landfill gas is considered a low risk on the site, this was based on monitoring within a limited time frame. It is recommended to take a conservative approach and carry out additional gas monitoring in accordance with industry best practice (CIRIA C665) over a longer period to fully assess seasonal trends.

Future Developments at the Site

Any future development or construction works proposed at the site require a revised environmental risk assessment to be completed prior to the commencement of any works. The current risk assessment is based on the site in its current use and condition. A revised risk assessment should take into account additional receptors and contaminant pathways.

Landfill Gas

While the current risk posed by landfill gas is low, this is based on the site in its current state. Any future developments will require a landfill gas quantitative risk assessment as outlined in the CIRIA C665 “Assessing Risks Posed by Hazardous ground Gases to Buildings” 2007, which represents the current best practice guidance in relation to ground gas assessment. The purpose of the risk assessment-based approach is to determine the appropriate mitigation measures to appropriately deal with the risk posed by the gas.

CIRIA Report C665 proposes a holistic approach to gas risk assessment, taking account of the following factors:

- Nature of source and migration pathway;
- Borehole flow rate and surface emission rate;
- Frequency and distribution of elevated gas concentrations;
- Nature of the proposed development; and
- Confidence and reliability of results.

Two copies of the risk assessment shall be submitted. The risk assessment shall also be provided on two CD-ROMs in searchable PDF format.

The Risk Assessment should be submitted as **Attachment D.1**.

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SECTION E: APPROPRIATE ASSESSMENT

In addition to the foregoing, all sites (whether low, moderate or high risk) should be subject to screening for Appropriate Assessment in accordance with the European Communities (Birds and Natural Habitats) Regulations 2011 (S.I. No. 477 of 2011). The results of any such screening should be submitted as part of this application. The screening should demonstrate whether the project is/is not likely, whether individually or in combination with other plans or projects, to have significant effects on any European Site or sites as defined in Regulation 2(1) of the Habitats Regulations (S.I. No. 477 of 2011) having regard to best scientific knowledge and its conservation objectives. Where, based on the Stage 1 screening, it is considered that an appropriate assessment *is not* required, a reasoned response should be provided.

Where screening has determined that an appropriate assessment *is* required, an appropriate assessment in accordance with Article 6(3) of the Habitats Directive (92/43/EEC) should be completed and a copy of the Natura Impact Statement submitted as part of this application. The assessment should consider the following impacts on any European Site(s):

1. The impact of the existing landfill on European sites;
2. The cumulative effects of the project combined with other plans or projects that might impact on the European site or sites;
3. An assessment of the implications of the project for the European site in view of the European site's conservation objectives;
4. The objectives of proposed remediation measures with regard to existing impacts identified in item 1;
5. The impact on the European site of any physical works carried out at the closed landfill as part of the remediation plan;
6. Details of any mitigation measures proposed at or in relation to the European site, including timeframes for the implementation and monitoring of the measures; and
7. Natura Impact Statement conclusion statement. The statement should conclude whether the project will or will not adversely affect the integrity of the European site(s) having regard to its conservation objectives.

While the appropriate assessment is subject to a separate report (the Natura Impact Statement), it should be carried out in tandem with the overall risk assessment. This is to ensure that a holistic approach is undertaken, whereby all relevant appropriate assessment and risk assessment parameters are addressed and to ensure that the remediation measures proposed address all risks identified.

Please refer to the guidance document '*Appropriate Assessment of Plans and Projects in Ireland – Guidance for Planning Authorities*', issued in 2009 by the Department of the Environment, Heritage and Local Government, and revised in 2010 with regard to this assessment. This document is available at: http://www.npws.ie/publications/archive/NPWS_2009_AA_Guidance.pdf.

Three copies of the screening report and, where relevant, the Natura Impact Statement shall be submitted. The screening report/Natura Impact Statement shall also be provided on two CD-ROMs in searchable PDF format (no larger than 50MB for each electronic file).

The Appropriate Assessment (screening and, where relevant, Natura Impact Statement) should be submitted as **Attachment E.1.**

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SECTION F: DECLARATION

Declaration

I hereby make application for a Certificate of Authorisation pursuant to the provisions of the Waste Management (Certification of Historic Unlicensed Waste Disposal and Recovery Activity) Regulations, 2008 (S.I. No. 524 of 2008).

I certify that the information given in this application is truthful, accurate and complete and the enclosed Risk Assessment is a full and complete representation of all relevant work carried out in relation to the site in question.

I give consent to the EPA to copy this application for its own use and to make it available for inspection and copying by the public, both in the form of paper files available for inspection at EPA offices and via the EPA's website.

This consent relates to this application itself and to any further information or submission, whether provided by me as Applicant, any person acting on the Applicant's behalf, or any other person.

Signed by : Joseph Bockarie

Date : 12/11/2019

(on behalf of the organisation)

Print signature name: Joseph Bockarie

Position in organisation: Senior Executive Engineer

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SECTION G: JOINT DECLARATION

Joint Declaration ^{Note1}

I hereby make application for a Certificate of Authorisation pursuant to the provisions of the Waste Management (Certification of Historic Unlicensed Waste Disposal and Recovery Activity) Regulations, 2008 (S.I. No. 524 of 2008).

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This consent relates to this application itself and to any further information or submission whether provided by me as Applicant, any person acting on the Applicant's behalf, or any other person.

Lead Authority Not Applicable

Signed by : _____ **Date :** _____
(on behalf of the organisation)

Print signature name: _____

Position in organisation: _____

Co-Applicants Not Applicable

Signed by : _____ **Date :** _____
(on behalf of the organisation)

Print signature name: _____

Position in organisation: _____

Signed by : _____ **Date :** _____
(on behalf of the organisation)

Print signature name: _____

Position in organisation: _____

Note 1: In the case of an application being lodged on behalf of more than one local authority the above declaration must be signed by all applicants.