

**APPENDIX C**  
**APPROPRIATE ASSESSMENT**

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# Appropriate Assessment Screening and Natura Impact Statement Bohernabreena Landfill

November 2019

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# Bohernabreena Landfill

## Appropriate Assessment Screening and Natura Impact Statement

### Document Control Sheet

Client:	South Dublin County Council	
Project Title:	Bohernabreena Landfill	
Document Title:	Appropriate Assessment Screening and Natura Impact Statement	
Document No:	MDR1489Rp0006	
Text Pages:	63	Appendices: -

Rev.	Status	Date	Author(s)		Reviewed By		Approved By	
F01	Final	18 <sup>th</sup> November 2019	TR	Tim Doyle	BMP	BMP	PC	Paul O'Connell

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# 1 INTRODUCTION

## 1.1 SCOPE OF REPORT

RPS was commissioned by South Dublin County Council (SDCC) to undertake an Environmental Risk Assessment of the unlicensed Bohernabreena landfill, located on the Bohernabreena Road, Tallaght, Dublin 24 adjacent to the River Dodder. The landfill site is approximately 2.7 hectares and was used to deposit domestic refuse by Dublin County Council. The landfill was closed in 1974 and is currently unlicensed.

SDCC intends to apply for a Certificate of Authorisation (CoA) from the Environmental Protection Agency (EPA) for the landfill under Part II of the Third Schedule of the Waste Management (Facility Permit and Registration) Regulations 2007, S.I. No. 821 of 2007 as amended by S.I. No. 86 of 2008.

As part of the CoA application process, the EPA requires all sites to be subject to screening for Appropriate Assessment (AA) in accordance with the European Communities (Birds and Natural Habitats) Regulations 2011 (S.I. No. 477 of 2011). The screening will 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 screening has determined that an AA is required, an AA 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 the CoA application. The EPA require that 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.

This report comprises information in support of the AA in line with the requirements of Article 6(3) of the EU Habitats Directive (EC 92/43/EEC) on the Conservation of Natural Habitats and of Wild Fauna and Flora; the Planning and Development (Amendment) Act 2010; and the European Union (Birds and Natural Habitats) Regulations 2011 as amended.

## 1.2 LEGISLATIVE BACKGROUND FOR APPROPRIATE ASSESSMENT

### 1.2.1 European Sites

The Council Directive 92/43/EEC on the Conservation of Natural Habitats and of Wild Fauna and Flora, better known as 'The Habitats Directive', provides legal protection for habitats and species of European importance. Articles 3 to 9 provide the legislative means to protect habitats and species of Community interest through the establishment and conservation of a European Union (EU)-wide network of sites known as Natura 2000 (hereafter referred to as 'European sites'). In the Republic of Ireland, European sites comprise:

- Special Areas of Conservation (SACs) designated for habitats, plants, and non-bird species, under the Habitats Directive (92/43/EEC);
- Special Protection Areas (SPAs) designated for bird species and their habitats, under the Birds Directive (79/409/ECC as codified by Directive 2009/147/EC); and
- 'Candidate' sites including 'cSACs'. The process of designating cSACs as SACs is ongoing in Ireland. The term SAC is used throughout this report for both SACs and cSACs, given they are subject to equal protection.

### 1.2.2 Appropriate Assessment- European Context

Articles 6(3) and 6(4) of the Habitats Directive set out the decision-making tests for plans and projects likely to have a significant effect on or to adversely affect the integrity of European sites (Annex 1.1). Article 6(3) establishes the requirement for Appropriate Assessment (AA):

*'Any plan or project not directly connected with or necessary to the management of the [European] site but likely to have a significant effect thereon, either individually or in combination with other plans or projects, shall be subjected to appropriate assessment of its implications for the site in view of the site's conservation objectives. In light of the conclusions of the assessment of the implications for the site and subject to the provisions of paragraph 4, the competent national authorities shall agree to the plan or project only after having ascertained that it will not adversely affect the integrity of the site concerned and, if appropriate, after having obtained the opinion of the general public.'*

Article 6(4) states:

*'If, in spite of a negative assessment of the implications for the [European] site and in the absence of alternative solutions, a plan or project must nevertheless be carried out for imperative reasons of overriding public interest, including those of a social or economic nature, Member States shall take all compensatory measures necessary to ensure that the overall coherence of Natura 2000 is protected. It shall inform the Commission of the compensatory measures adopted.'*

### 1.2.3 Appropriate Assessment- National Context

AA is not a specific requirement of the CoA application under Regulation 7 of the Waste Management (Certification of Historic Unlicensed Waste Disposal and Recovery Activity) Regulations 2008 (S.I. No. 524/2008). However, SDCC is obliged to examine the likely significant effects

individually or in combination, of the application, on European sites in light of their specific qualifying interests (QIs; i.e. non-bird species and habitats), Special Conservation Interests (SCIs; i.e. bird species and associated wetland habitats) and Conservation Objectives (COs). If Screening for AA determines that there is likely to be significant effects on any European site, then full AA must be carried out for the proposed development, including the compilation of a Natura Impact Statement (NIS) to inform the application.

### 1.3 STAGES OF APPROPRIATE ASSESSMENT

The AA process progresses through four stages. If at any stage in the process it is determined that there will be no adverse effect on the integrity of a European site in view of the sites conservation objectives, the process is effectively completed. The four stages are as follows:

- Stage 1 – Screening of the proposed plan or project for AA;
- Stage 2 – An AA of the proposed plan or project;
- Stage 3 – Assessment of alternative solutions; and
- Stage 4 – Imperative Reasons of Overriding Public Interest (IROPI) Derogation.

Stages 1 and 2 relate to Article 6(3) of the Habitats Directive; and Stages 3 and 4 relate to Article 6(4).

#### Stage 1: Screening for AA

The aim of screening is to assess firstly if the plan or project is directly connected with or necessary to the management of European site(s); or in view of best scientific knowledge, if the plan or project, individually or in combination with other plans or projects, is likely to have a significant effect on a European site. This is done by examining the proposed plan or project and the conservation objectives of any European sites that might potentially be affected. If screening determines that there is potential for significant effects or there is uncertainty regarding the significance of effects then it will be recommended that the plan or project is brought forward to the next stage of the AA process.

#### Stage 2: Appropriate Assessment

The aim of Stage 2 of the AA process is to identify any adverse impacts that the plan or project might have on the integrity of relevant European sites. As part of the assessment, a key consideration is 'in combination' effects with other plans or projects. Where adverse impacts are identified, mitigation measures can be proposed that would avoid, reduce or remedy any such negative impacts and the plan or project should then be amended accordingly, thereby avoiding the need to progress to Stage 3.

#### Stage 3: Assessment of Alternative Solutions

If it is not possible during Stage 2 of the AA process to conclude that there will be no adverse effects on site integrity, Stage 3 of the process must be undertaken which is to objectively assess whether alternative solutions exist by which the objectives of the plan or project can be achieved. Explicitly,



this means alternative solutions that do not have adverse impacts on the integrity of a European site. It should also be noted that EU guidance on this stage of the process states that, '*other assessment criteria, such as economic criteria, cannot be seen as overriding ecological criteria*' (EC, 2002). In other words, if alternative solutions exist that do not have adverse impacts on European sites; they should be adopted regardless of economic considerations. This stage of the AA process should result in the identification of the least damaging options for the plan or project.

#### **Stage 4: Imperative Reasons of Overriding Public Interest (IROPI)/Derogation**

This stage of the AA process is undertaken when it has been determined that a plan or project will have adverse effects on the integrity of a European site, but that no alternatives exist. At this stage of the AA process, it is the characteristics of the plan or project itself that will determine whether or not the competent authority can allow it to progress. This is the determination of 'over-riding public interest'.

It is important to note that in the case of European sites that include in their qualifying features 'priority' habitats or species, as defined in Annex I and II of the Directive, the demonstration of 'over-riding public interest' is not sufficient and it must be demonstrated that the plan or project is necessary for 'human health or safety considerations'. Where plans or projects meet these criteria, they can be allowed, provided adequate compensatory measures are proposed. Stage 4 of the process defines and describes these compensation measures.

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## 2 METHODOLOGY

### 2.1 GUIDANCE DOCUMENTS ON APPROPRIATE ASSESSMENT

EU and national guidance exists in relation to Member States' fulfilling their requirements under the EU Habitats Directive, with particular reference to Article 6(3) and 6(4) of that Directive. The methodology followed in relation to this AA has had regard to the following guidance:

- Appropriate Assessment of Plans and Projects in Ireland: Guidance for Planning Authorities. Department of Environment, Heritage and Local Government (DoEHLG, 2010);
- Communication from the Commission on the Precautionary Principle (EC, 2000);
- Managing Natura 2000 Sites: the provisions of Article 6 of the 'Habitats' Directive 92/43/EEC (known as MN2000), Office for Official Publications of the European Communities, Luxembourg (EC, 2018);
- Assessment of plans and projects significantly affecting Natura 2000 sites: Methodological guidance on the provisions of Articles 6(3) and (4) of the Habitats Directive 92/43/EEC. Office for Official Publications of the European Communities, Brussels (EC, 2001);
- Guidance document on Article 6(4) of the 'Habitats Directive' 92/43/EEC – Clarification of the concepts of: alternative solutions, imperative reasons of overriding public interest, compensatory measures, overall coherence, opinion of the Commission (EC, 2007);
- Nature and biodiversity cases: Ruling of the European Court of Justice (EC, 2006);
- Interpretation Manual of European Union Habitats. Version EUR 28. European Commission (EC, 2013); and
- Article 6 of the Habitats Directive: Rulings of the European Court of Justice (EC, 2014).

There have been significant changes to AA practice since both the EC (2001) and the DoEHLG guidance (2010), arising from practice and rulings in European, UK and Irish courts. The following issues have been addressed in the preparation of this report:

- When considering whether a European site can be screened out, the competent authority cannot take into account any measures intended to avoid or reduce the harmful effects of the proposed development (i.e. mitigation measures)<sup>1</sup>; however, a 2019 Irish High Court consideration<sup>2</sup> concluded that Sustainable Drainage Systems (SuDS) are '*as a matter of fact and law... not mitigation measures which a competent authority is precluded from considering at the stage 1 screening stage*';
- The screening must consider the cumulative impacts of any development: that already exists; for which a planning application has been made; which the applicant for permission intends to make an application in the future; and, which is a matter of public record and which is planned to be implemented in the future;
- Consideration of the cumulative effects of plans, including local area plans;

<sup>1</sup> *People Over Wind v Coillte Teoranta* (Court of Justice of the EU, case C-323/17)

<sup>2</sup> *Kelly v An Bord Pleanála & anor* [2019] IEHC 84 (High Court)

- Where an element of the proposed development is missing design detail or subsequent agreements, the assessment should assume the worst-case scenario (i.e. the design with the greatest environmental impact); and
- Making of findings explicit<sup>3</sup>.

## 2.2 INFORMATION CONSULTED

A desk study was completed to assess the potential for all QIs and SCIs of European sites to occur, given their ecological requirements identified by Balmer *et al.* (2013) for SCIs, and the National Parks and Wildlife Service (NPWS) for QIs (NPWS, 2013a,b,c).

SCI Birds and mobile QI species can travel many kilometres from core areas, and desktop surveys assessed the potential presence of such species beyond the European sites for which these species are QIs/SCIs. Desktop studies had particular regard for the following sources:

- Department of Environment, Community and Local Government – online land use mapping [www.myplan.ie/en/index.html](http://www.myplan.ie/en/index.html);
- National Parks and Wildlife Service – Online European Site information [www.npws.ie](http://www.npws.ie);
- National Parks and Wildlife Service – Information on the status of EU protected habitats and species in Ireland (NPWS 2013a & 2013b);
- National Biodiversity Data Centre – [www.biodiversityireland.ie](http://www.biodiversityireland.ie);
- Ordnance Survey of Ireland – Mapping and aerial photography [www.osi.ie](http://www.osi.ie);
- GeoHive – Online mapping <http://map.geohive.ie/mapviewer.html>;
- Environmental Protection Agency – Epsilon online mapping [www.epa.ie](http://www.epa.ie);
- Geological Survey of Ireland – Geology, soils and hydrogeology [www.gsi.ie](http://www.gsi.ie);
- Information on the conservation status of birds in Ireland (Colhoun & Cummins 2013);
- Information on the Eastern Region River Basin ; and
- South Dublin County Development Plan 2016-2022. [www.southdublindevplan.ie/adopted-plan](http://www.southdublindevplan.ie/adopted-plan)

## 2.3 LIMITATIONS

Sources of desk study information are neither exhaustive nor necessarily easily available, and a reasoned effort was made to obtain ecological data in the public domain to inform the description of the receiving environment and its assessment. Additional information, not in the public domain, is likely to exist. This limitation is acknowledged and incorporated into the assessment.

## 2.4 SCREENING APPROACH

A four-step process is applied in the screening to establish potential for Likely Significant Effect (LSE) as follows:

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<sup>3</sup> *Connelly v An Bord Pleanála* [2018] IESC 31 (Supreme Court)

- Identification of European sites within the Zol;
- Identification of impact pathways;
- Conformation of connectivity; and
- Assessment of LSE.

The identification of relevant European sites to be included in this report was based on the identification of the Zol of the proposed development, a source-pathway-receptor model of effects and the likely significance of any identified effects.

#### 2.4.1 Zone of Influence

The proximity of the proposed development to European sites, and more importantly QIs/SCIs of the European sites, is of importance when identifying potentially likely significant effects. During the initial scoping of this report, a 15 km Zol was applied for impact assessment. A conservative approach has been used, which minimises the risk of overlooking distant or obscure effect pathways, while also avoiding reliance on buffer zones (e.g. 15 km), within which all European sites should be considered. This approach assesses the complete list of all QIs/SCIs of European sites in Ireland (i.e. potential receptors), instead of listing European sites within buffer zones. This follows Irish departmental guidance on AA:

*'For projects, the distance could be much less than 15 km, and in some cases less than 100m, but this must be evaluated on a case-by-case basis with reference to the nature, size and location of the project, and the sensitivities of the ecological receptors, and the potential for in combination effects'* (DoEHLG, 2010; p.32, para 1).

Following the guidance set out by the NRA (2009), the landfill site (both current status and proposed remediation) has been evaluated based on an identified Zol with regard to the potential impact pathways to ecological feature (e.g. mobile and static). The Zol of a proposed development on mobile species (e.g. birds, mammals, and fish), and static species and habitats (e.g. saltmarshes, woodlands, and flora) is considered differently. Mobile species have 'range' outside of the European site in which they are QI/SCI. The range of mobile QI/SCI species varies considerably, from several metres (e.g. in the case of whorl snails *Vertigo* spp.), to hundreds of kilometres (in the case of migratory wetland birds). Whilst static species and habitats are generally considered to have Zols within close proximity of a proposed development, they can be significantly affected at considerable distances from an effect source; for example, where an aquatic QI habitat or plant is located many kilometres downstream from a pollution source.

Hydrological linkages between the proposed development and European site (and their QIs/SCIs) can occur over significant distances; however, any effect will be site specific depending on the receiving water environment and nature of the potential impact. As a precautionary measure, a reasonable worst-case Zol for water pollution from the proposed development site is considered to be the surface water catchment. In this report, the surface water catchment is defined at the scale of Catchment Management Unit (CMU), as adopted in the River Basin Management Plan (RBMP) for Ireland 2018-2021 (DoHPLG, 2018).

## 2.4.2 Source-Pathway-Receptor Model

The likely effects of the proposed development on any European site from has been assessed using a source-pathway-receptor model, where:

- A 'source' is defined as the individual element of the proposed works that has the potential to impact on a European site, its qualifying features and its conservation objectives.
- A 'pathway' is defined as the means or route by which a source can affect the ecological receptor.
- A 'receptor' is defined as the Special Conservation Interests (SCI) of SPAs or Qualifying Interests (QI) of SACs for which conservation objectives have been set for the European sites being screened.

A source-pathway-receptor model is a standard tool used in environmental assessment. In order for an effect to be likely, all three elements of this mechanism must be in place. The absence or removal of one of the elements of the mechanism results in no likelihood for the effect to occur. The source-pathway-receptor model was used to identify a list of European sites, and their QIs/SCIs, with potentially links to European site. These are termed as 'relevant' European sites/QIs/SCIs throughout this report.

## 2.4.3 Likely Significant Effect

The threshold for a Likely Significant Effect (LSE) is treated in the screening exercise as being above a *de minimis* level<sup>4</sup>. The opinion of the Advocate General in CJEU case C-258/11 outlines:

*'the requirement that the effect in question be 'significant' exists in order to lay down a de minimis threshold. Plans or projects that have no appreciable effect on a European site are thereby excluded. If all plans or projects capable of having any effect whatsoever on the site were to be caught by Article 6(3), activities on or near the site would risk being impossible by reason of legislative overkill.'*

In this report, therefore, 'relevant' European sites are those within the potential Zol of activities associated with both the existing landfill and the proposed capping works, where LSE pathways to European sites were identified through the source-pathway-receptor model.

## 2.4.4 Consideration of Mitigation Measures

In determining the likelihood of significant impacts, and hence the need for an appropriate assessment, mitigation measures (i.e. measures that are intended to avoid or reduce harmful effects) cannot be taken into account. Accordingly, mitigation measures have not been taken into account in the screening stage appraisal.

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<sup>4</sup>*Sweetman v. An Bord Pleanála* (Court of Justice of the EU, case C-285/11). A *de minimis* effect is a level of risk that is too small to be concerned with when considering ecological requirements of an Annex I habitat or a population of Annex II species present on a European site necessary to ensure their favourable conservation condition. If low level effects on habitats or individuals of species are judged to be in this order of magnitude and that judgment has been made in the absence of reasonable scientific doubt, then those effects are not considered to be likely significant effects

### 2.4.5 In-combination Effects

Article 6(3) of the Habitats Directive requires that in-combination effects with other plans or projects are also considered. As set out in the Commissions 2018 Notice (EC, 2019), significance will vary depending on factors such as magnitude of impact, type, extent, duration, intensity, timing, probability, cumulative effects and the vulnerability of the habitats and species concerned. In that context, plans or projects which are completed, approved but uncompleted, or proposed have been considered. The EC guidance (2019) specifically advises that as regards other proposed plans or projects, on grounds of legal certainty it would seem appropriate to restrict the in-combination provision to those which have been actually proposed, i.e. for which an application for approval or consent has been introduced.

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### 3 APPLICATION DETAILS

#### 3.1 PROJECT BACKGROUND

Historic maps indicate that there were several gravel pits within the vicinity of the Bohernabreena site. Local knowledge indicated that there was a gravel quarry onsite which was active in the 1970s and once gravel extraction had ceased the site was used as a landfill for domestic refuse by Dublin County Council and was closed in 1974. There is no information on the volume of waste or type of waste.

From a review of the register compiled in accordance with the Waste Management Act 1996 as amended (the Act) and presented in the Eastern Midlands Region Waste Management Plan 2015-2021, the site was previously classified as a Class C (Low Risk) site as noted in **Table 3.1**.

**Table 3.1: Previous Risk Rating of the Site**

Site ID	Local Authority	Site Name	Risk Rating
S22-02632	South Dublin County Council	Bohernabreena Ref B 215	Class C (Low Risk)

Source: Eastern Midlands Region Waste Management Plan 2015-2021

Section 22 of the EPA Register of historic landfill sites classifies the site as 'pre 1977'. The EPA CoP does not specially address these sites as these were in existence before the relevant legislation and historically considered low risk due to the age of waste and likely high levels of decomposition. Classifying a site as 'pre 1977' affects the landfill score during the risk prioritisation.

#### 3.2 SITE DESCRIPTION

##### 3.2.1 Site Setting

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 location is shown in **Figure 3.1**.

The site is bounded to the east by the Ballinascorney Road, with the Friarstown Landfill further east. The River Dodder forms the western boundary of the site and flows in a northerly directly. To the south of the site is the Font Bridge which carried the R114 regional road over the Dodder, The site is bounded to the north by agricultural fields.

##### 3.2.2 Regional Topography

The site is located within a river valley with the Dodder terraces either side of the river valley. The site rises from 111mAOD at the north of the site to 118mAOD at the southern boundary. To the eastern boundary there is a steep slope to the River Dodder level (approximately 100mAOD).

### 3.2.3 Geology

According to the GSI the soils beneath the site area are classified as Alluvium undifferentiated. The area immediately surrounding the river alluvium consists predominantly of coarse loamy drift with siliceous stones.

The subsoils beneath the site area are classified as Alluvium (Carboniferous Limestone sands and gravels) and tills derived from Lower Palaeozoic sandstones and shales (TLPSS) in the immediate surrounding area.

### 3.2.4 Bedrock Geology

According to the GSI, the entire site is underlain by the Aghfarrell Formation which consists of thinly-bedded greywacke siltstone, slate and quartzite deposited by turbidity currents in the Palaeozoic. The Lower Paleozoic rocks represent a complex geological history, the rocks are highly folded and faulted representing polyphase deformation. Bedrock permeability is influenced by this deformation.

### 3.2.5 Geological Heritage

The site is surrounded to the east and west by the Irish Geological Heritage Site ID: SD004 also known as the Dodder Terraces. The Dodder Terraces comprise a series of flat-topped, elevated terraces above the river and record the deglacial retreat of the ice sheet through South Dublin. The site importance is noted as a location with good potential as a reaching site on glacial meltwater deposition, as the feature is accessible and easily viewed from the R114 at Bohernabreena and the N81 at Templeogue-Tallaght.

### 3.2.6 Hydrogeology

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.

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 three to five 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.

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. 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 three to five metres.

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 (CaCO<sub>3</sub>)) and electrical conductivity values of 300-500 µS/cm. the groundwater has very low alkalinity (generally less than 50 mg/l).

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

### 3.2.7 Hydrology

The site is within the Eastern River Basin District, the River Dodder which originates in the Wicklow Mountains runs along the western perimeter of the site, flowing north-easterly towards the Liffey Estuary Lower, approximately 12.5km north east of the site.

The River Dodder is considered a heavily modified water body (Eastern River Basin District, 2009) and the river has been impounded upstream to form two reservoirs which supply water to south Dublin. There is a bridge apron at Font Bridge at the southern boundary of the site and SDCC has constructed rock armour as flood defences at locations along the boundary of the site. Under the River Basin Management Plan for Ireland 2018 – 2021 the River Dodder is listed as a Prioritised Area for Action.

According to the EPA the surface water quality at the nearest monitoring point immediately south of the site upstream (Dodder- Fort Bridge [ID:RS09D010200]) in 2017 reports a linear value of Q4-Q5 which indicates a High Status. No chemical information is available for this station.

Approximately 1.4km downstream north east of the site at the Old Bawn Bridge (RS09D010300) in 2017 indicated linear value of Q3-Q4 which indicates a Moderate Status. Surface water levels of ammonium for 2010 – 2015 exceed the statutory threshold in the river.

The Water Framework Directive (WFD) status 2010-2015 of the River Dodder is assigned as 'Good', and the WFD risk is still under review.

### 3.2.8 Adjacent Landfill

Friarstown landfill is located adjacent to the eastern boundary of the Bohernbreena landfill site. The Friarstown landfill is classified as a Class A (High Risk) (Site ID S22-02166) according to the Eastern Midlands Region Waste Management Plan 2015-2021. The Friarstown landfill is a former waste disposal site operated by SDCC for 22 years which was closed in 1997 and capped in 2003. Currently there is onsite emission monitoring and a weather station and has been used for energy recovery and electricity generation since its closure. An Environmental Risk Assessment has not been completed at the site, however environmental monitoring has been completed at this site on surface water, groundwater and gas. No groundwater wells are located directly downgradient of the landfill. Leachate tanks for the Friarstown landfill are located opposite and the Bohernabreena Landfill site and are monitored regularly by SDCC. The Friarstown landfill leachate overflow pipes run across the Bohernbreena landfill site and discharge into the River Dodder along the boundary of the Bohernbreena landfill site.

The offsite leachate source from the adjacent Friarstown landfill leachate holding tank is having a potential significant adverse impact on the Dodder. Leachate overflow from this landfill is discharging directly to the river and has been observed to show exceedances for Ammonium and BOD.

## 3.3 DESCRIPTION OF THE LANDFILL

### 3.3.1 Composition and Quantity of Waste

Intrusive site investigations (trial pitting and borehole installations at a series of locations as shown in **Figure 3.2**) identified the waste as black clay with varying amounts of decayed organic matter, ash, plastics, fabrics, wire, brick. The majority of the biodegradable organic portion of the waste had degraded, however some fragments of paper had not degraded. The waste was relatively dry as the organic fraction of the waste has decomposed and the lack of a basal liner allowed rain infiltration to pass directly through the waste before discharging to the River Dodder.

The waste (estimated at 151,200 tonnes deposited at the site) was found across the majority of the site, with the exception of the southern portion. The waste was encountered at shallow depths (0.2m – 0.5m) with an overlying layer of slightly sandy silty clay which did not meet with the requirements of an engineered landfill cap. The depth to waste varied across the site and could not be ascertained in one location (TP06 where depth to waste greater than 3.8m). Trial pit excavations indicated the waste had been deposited directly onto gravels or natural clays with no basal liner allowing for free drainage of any leachate.

### 3.3.2 Extent and Area of the Waste

The intrusive site investigation, in conjunction with the geophysical survey, identified that the waste extended across the entire site to edges of the site boundary with the exception of the southern boundary which was free from waste. The waste was encountered at shallow depths (0.2m – 0.5m) with an overlying layer of slightly sandy silty clay which did not meet with the requirements of an engineering cap. The depth to waste varied across the site and could not be ascertained in one location (TP06 where depth to waste greater than 3.8m). Trial pit excavations indicated the waste

had been deposited directly onto gravels or natural clays with no basal liner allowing for free drainage of any leachate.

### 3.3.3 Presence of Leachate

No significant volumes of leachate and seepages were encountered within the subsurface during the intrusive site investigations. All the leachate wells were dry with the exception of LW4. Lab analysis from LW4 indicated exceedances of iron, manganese, ammonia and microbial indicators. Organic contaminants were below the level of detection with the exception of a slight exceedance of benzene, however the leachate was of low strength in comparison with typical leachate concentrations. Sweet smells were noted while drilling LW4 which most likely originates from the anaerobic decomposition which releases volatile organic acids, esters, and thioesters. The lack of a basal liner allows for free drainage of any leachate generated, to the underlying gravels or directly to the River Dodder, which accounted for the dry composition of the waste along with a very dry summer (2018 when the investigations were undertaken).

### 3.3.4 Presence of Landfill Gas

Landfill gas monitoring indicated that there was little or no measurable flow rate recorded indicating low surface emission rates. There is no evidence of vegetation die back. Elevated concentrations of landfill gas (methane and carbon dioxide) were detected within the gas/leachate wells, the higher concentrations were detected within the middle of the site where the waste was thickest. Wells at the periphery of the site indicated lower concentrations of methane and carbon dioxide.

Based on the low flow and the ratio of methane to carbon dioxide concentrations monitored within the wells it would suggest that gas production is in the later stages of degradation. The lack of an engineered cap has resulted in gas being able to migrate to the atmosphere. Little or no flow indicates that the waste body is not actively producing landfill gas. This is due to the biodegradable component of the waste having been degraded. Therefore, there is not an active source of landfill gas.

### 3.3.5 Depth to Water Table

The presence of waste across the majority of the site restricted groundwater well installation. Monitoring well MW2 was installed offsite immediately north of the site and represents an upgradient monitoring location. Depth to water was recorded at 105.8mAOD. Monitoring well MW1 was installed at the southern boundary of the site, depth to groundwater was 109.7mAOD, the groundwater flow direction follows the regional topology in a northern direction. Seepages noted along the banks of the River Dodder represent groundwater baseflow. The leachate well, LW4, was installed within the waste and had a leachate level of 110.6mAOD, indicating potential connectivity of the groundwater with the waste body.

### 3.3.6 Presence of Aquifer

According to the EPA, the aquifer beneath the site is designated as a Poor Aquifer (PI). While the GSI indicates there are no designated gravel aquifers beneath the site, site investigations identified an intermittent gravel layer which was in contact with groundwater.

### 3.3.7 Geology of the Area

The site is located within a River Valley and there is variable local geology across the site. The waste body was overlain by a clay cap of approximately 0.5m. Site investigations indicate glaciofluvial gravels and sands underlying silty, sandy clay overlying gravel, which considerably varied in thickness across the site. The gravel layer was found to be intermittent across the site which can be partially attributed to the past quarrying activity on site. Greywacke Sandstone bedrock outcrops located along river bank were noted, however bedrock was not encountered during groundwater installation.

### 3.3.8 Current Impact of the Landfill

As part of the Environmental Risk Assessment a series of surface water samples were taken at several locations as shown in **Figure 3.3**. Samples (SW1) taken from the River Dodder, directly upstream from the site indicate a slight exceedance of nickel, with no other exceedances observed. SW3 sampled from the River Dodder at the midpoint along the site boundary indicated an exceedance of ammonium. Further downstream and at the site boundary, samples (SW2) exceeded ammonium and fluoranthene.

Springs sampled which represent groundwater indicated exceedances of arsenic. This represents the baseflow in contact with the waste. An arsenic exceedance was not observed at the downstream sampling point (SW2).

It is considered that there is direct connectivity of leachate to the underlying gravel aquifer and the mixing of leachate with laterally flow groundwater in the saturated aquifer dilutes the leachate concentrations. Notwithstanding this dilution, there are slight exceedances of the groundwater threshold value for arsenic at GW2. The arsenic mobilisation would be accelerated by the reducing condition generated from the decomposition of organics or from the groundwater from the bedrock from the oxidation of naturally occurring sulphides.

Small seepages/springs were noted that had emerged along the bank at the western perimeter as discreet seepages. These seepages then discharge directly to the River Dodder. The seepages are the point of emergence from the groundwater baseflow. Ochre staining was noted around the seepages.

The results indicates that the Bohernabreena landfill is currently having a minor impact on the River Dodder while the Friarstown landfill is having a much more significant impact on the river.

## 3.4 PROPOSED REMEDIATION SOLUTION

### 3.4.1 Installation of a Landfill Cap

The findings of the Environmental Risk Assessment recommends the installation of an engineered cap on the waste body with a low permeability barrier. The cap will 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  $1 \times 10^{-4}$  m/s
- Compacted mineral layer of a minimum 0.6m thickness having a hydraulic conductivity of less than or equal to  $1 \times 10^{-9}$  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. This layer may be unnecessary given the gas generating potential of the waste body.

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.

The cap will create a barrier between the source (the waste body and associated leachate) and pathway (rainfall ingress to the waste body) to reduce the potential for the generation and transport of leachate from the site to the adjoining River Dodder.

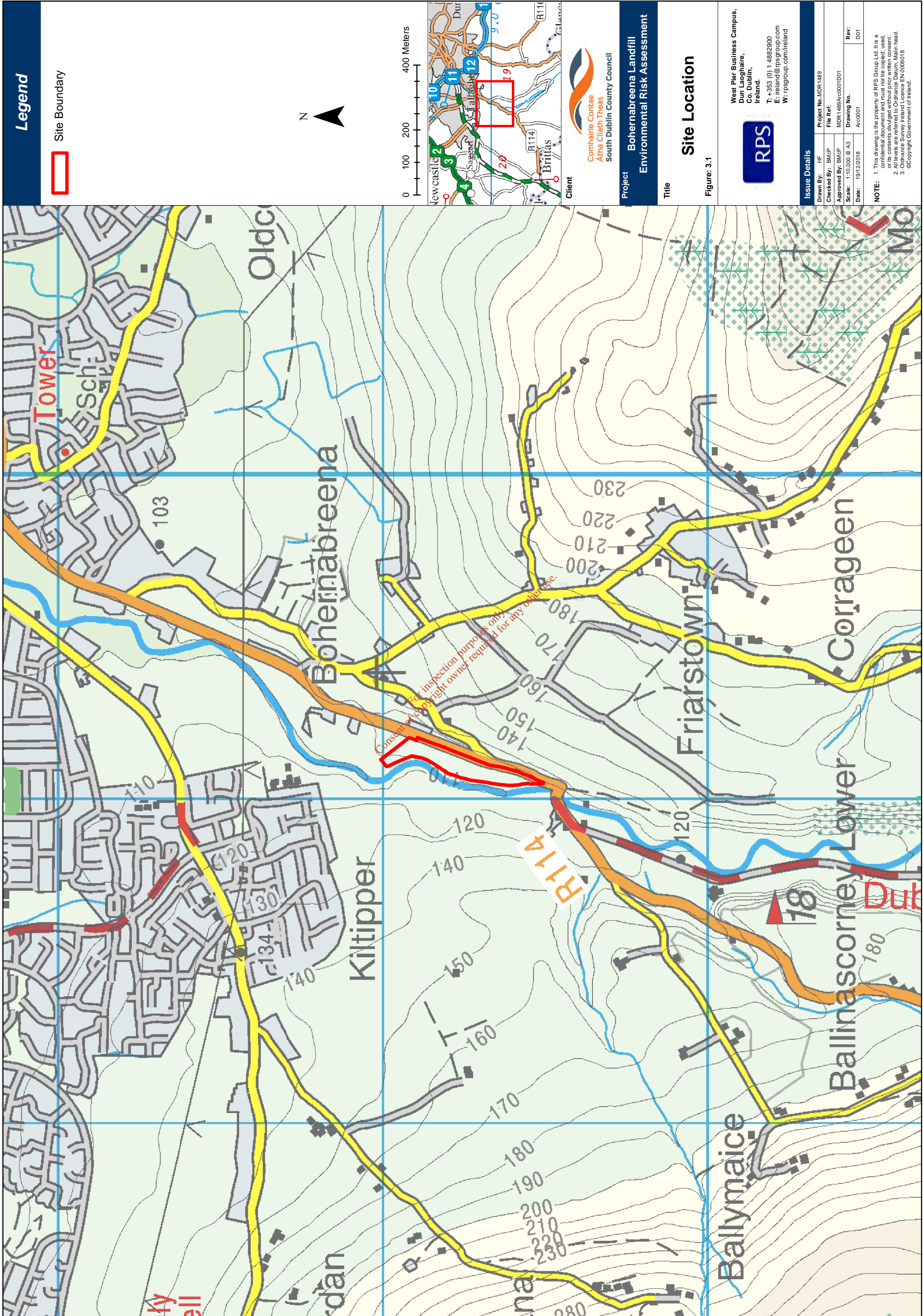
### 3.4.2 Aftercare Monitoring

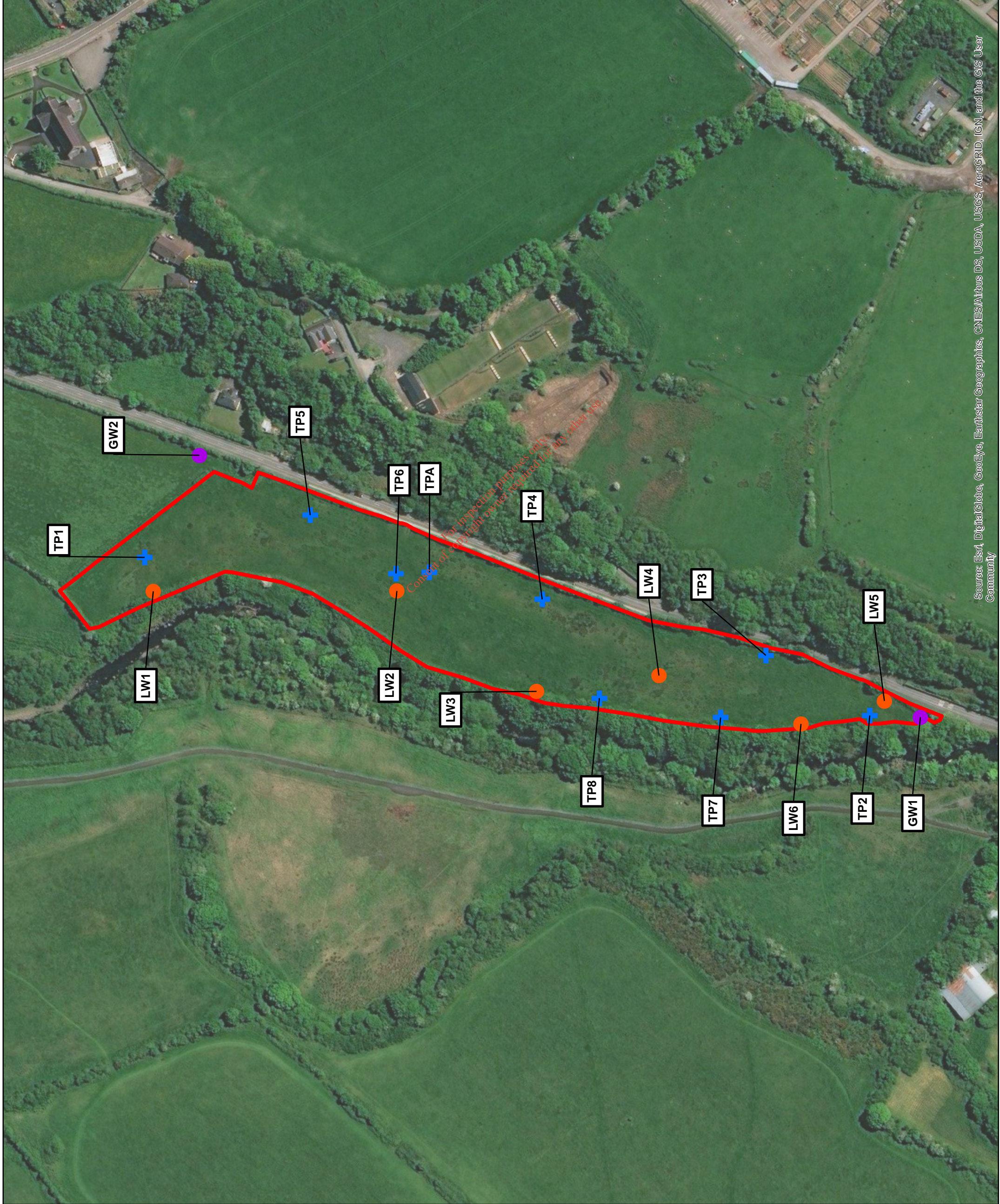
To support the capping, the following environmental monitoring is proposed at the site:

- Surface water monitoring at the locations shown in **Figure 3.3** should be undertaken monthly during the capping works and quarterly thereafter for a period of five years.
- Groundwater monitoring at the locations shown in **Figure 3.2** should be undertaken annually for a period of five years.
- 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.
- An invasive alien plant species (IAPS) survey should be undertaken prior to and following the proposed capping works.

### 3.4.3 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.



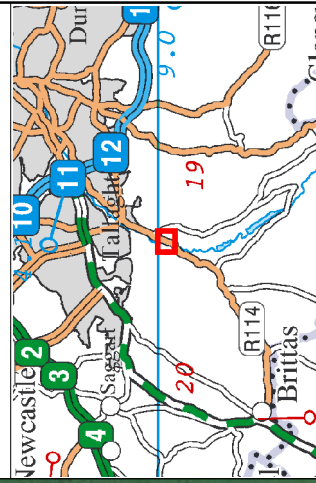


# Legend

- Site Boundary
- Site Investigation Locations**
- Groundwater Borehole Locations
- Gas/Leachate Monitoring Well Locations
- + Trial Pit Locations



0 20 40 80 Meters



Client

**Comhairle Contae  
Atha Cliath Theas**  
South Dublin County Council

**Project** Bohernabreena Landfill  
**Environmental Risk Assessment**

**Title** Site Investigation Locations  
**Figure:** 3.2



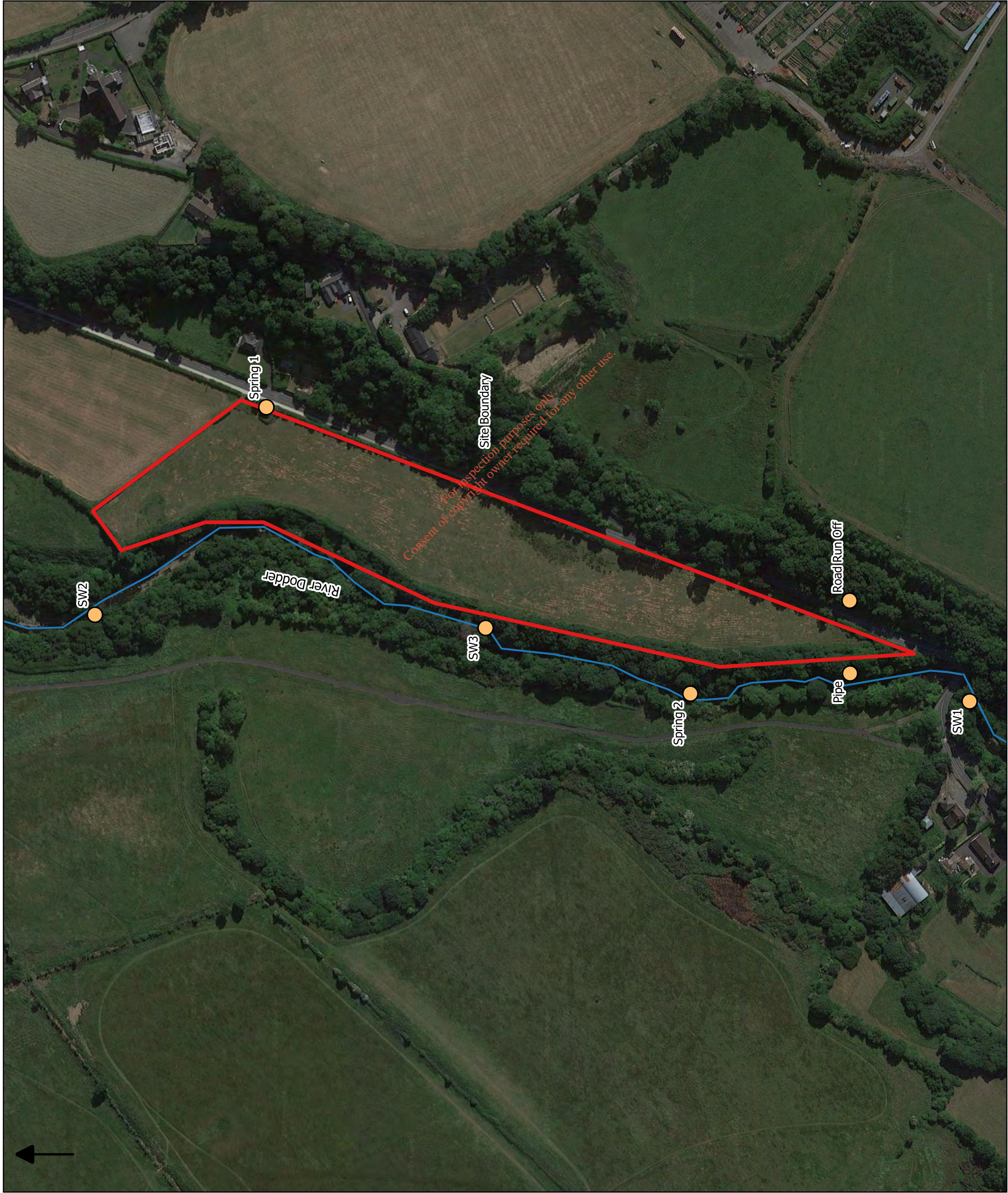
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Drawn By:	HF	Project No.:	MDR1489
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Approved By:	BM/CP	Scale:	1:2,000 @ A3
Date:	19/12/2018	Drawing No.:	Arco009
		Rev.:	D01

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### Legend

	RPS_Sample Leachate Location
	River Dodder
	Site Boundary
	Sea_Background
	County Boundary_NoDetails

**Google Map**  
Map shows the locations for leachate sampling

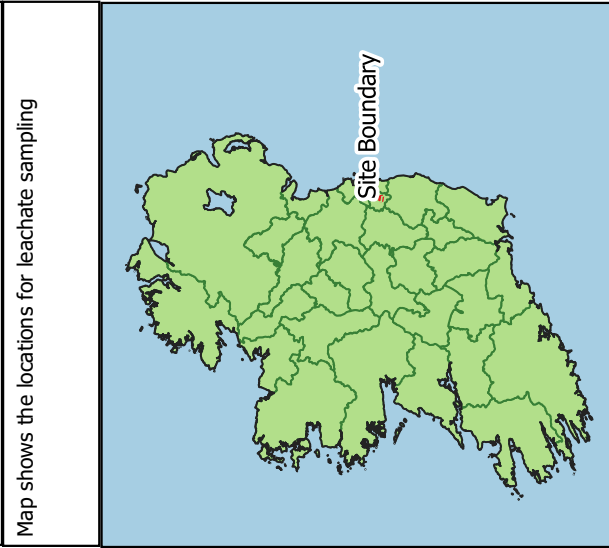


Figure 3.3

### Environmental Monitoring Location

**Project:** Bohernabreena Landfill

**Client:** South Dublin County Council

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Date: 24/06/2019	QGIS0001

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## 4 RECEIVING ENVIRONMENT

This section details the desktop and field survey results, in order to describe the relevant receiving environment of the proposed development. The relevant receiving environment relates to anything that may be directly or indirectly related to the QIs/SCIs of relevant European sites.

### 4.1 EUROPEAN SITES

The European sites identified within the ZoI of the development are shown in **Figure 4.1** and listed in **Table 4.1**. Note that while **Figure 4.1** shows the 15km ZoI, in line with good practice all European sites that may be impacted are assessed and this includes downstream sites outside the 15km area such as the North Dublin Bay SAC.

**Table 4.1: European Sites**

Site Code	Site Name	Qualifying Interest Habitats and Species (* = Priority Habitat) <sup>5</sup>	Distance from Study Area (km) <sup>6</sup>
<b>Special Area of Conservations (SACs)</b>			
001209	Glenasmole Valley SAC	<p><b>Conservation Objectives Generic Version 6.0 (21/02/18)</b></p> <p><b>Annex I Habitats</b></p> <ul style="list-style-type: none"> <li>▪ Semi-natural dry grasslands and scrubland facies on calcareous substrates (Festuco-Brometalia) (* important orchid sites)* [6210]</li> <li>▪ <i>Molinia</i> meadows on calcareous, peaty or clayey-silt-laden soils (Molinion caeruleae) [6410]</li> <li>▪ Petrifying springs with tufa formation (Cratoneurion) [7220]*</li> </ul>	c. 0.11km
002122	Wicklow Mountains SAC	<p><b>Conservation Objectives Specific Version 1.0 (31/07/17)</b></p> <p><b>Annex I Habitats</b></p> <ul style="list-style-type: none"> <li>▪ Oligotrophic water containing very few minerals of sandy plains (Littorelletea uniflorae) [3110]</li> <li>▪ Oligotrophic to mesotrophic standing waters with vegetation of the Littorelletea uniflorae and/or Isoetoneurion [3130]</li> <li>▪ Natural dystrophic lakes and ponds [3160]</li> <li>▪ Northern Atlantic wet heaths with <i>Erica tetralix</i> [4010]</li> <li>▪ European dry heaths [4030]</li> <li>▪ Alpine and Boreal heaths [4060]</li> <li>▪ Calaminarina grasslands of the Violetalia calaminariae [6130]</li> <li>▪ Species-rich <i>Nardus</i> grasslands, on siliceous substrates in mountain areas (and submountain areas, in Continental Europe) * [6230]</li> <li>▪ Blanket Bogs (* if Active) [7130]</li> <li>▪ Siliceous scree of the montane to snow levels (Androsacetalia alpinae and Galeopsietalia ladani) [8110]</li> <li>▪ Calcareous rocky slopes with chasmophytic vegetation</li> </ul>	c. 2.52km

<sup>5</sup> NPWS website, accessed 11<sup>th</sup> November 2019.

<sup>6</sup> Distance measured 'as the crow flies'.

Site Code	Site Name	Qualifying Interest Habitats and Species (*Priority Habitat) <sup>5</sup>	Distance from Study Area (km) <sup>6</sup>
		[8210] <ul style="list-style-type: none"> <li>▪ Siliceous rocky slopes with chasmophytic vegetation [8220]</li> <li>▪ Old Sessile oak woods with <i>Ilex</i> and <i>Blechnum</i> in the British Isles [91A0]</li> </ul> <b>Annex II Species</b> <ul style="list-style-type: none"> <li>▪ Otter (<i>Lutra lutra</i>) [1355]</li> </ul>	
000210	South Dublin Bay SAC	<b>Conservation Objectives Specific Version 1.0 (22/08/13)</b> <b>Annex I Habitats</b> <ul style="list-style-type: none"> <li>▪ Mudflats and sandflats not covered by seawater at low tide [1140]</li> </ul>	c. 12.48km
000725	Knocksink Wood SAC	<b>Conservation Objectives Generic Version 5.0 (21/02/18)</b> <b>Annex I Habitats</b> <ul style="list-style-type: none"> <li>▪ Petrifying springs with tufa formation (Cratoneurion) [7220]*</li> <li>▪ Alluvial forests with <i>Alnus glutinosa</i> and <i>Fraxinus excelsior</i> (Alno-Padion, Alnion incanae, Salicion albae) [91E0]*</li> </ul>	c. 11.78km
001398	Rye Water Valley/Carlton SAC	<b>Conservation Objectives Generic Version 5.0 (15/08/16)</b> <b>Annex I Habitats</b> <ul style="list-style-type: none"> <li>▪ Petrifying springs with tufa formation (Cratoneurion) [7220]*</li> </ul> <b>Annex II Species</b> <ul style="list-style-type: none"> <li>▪ Narrow-mouthed Whorl Snail (<i>Vertigo angustior</i>) [1014]</li> <li>▪ Desmoulin's Whorl Snail (<i>Vertigo moulinsiana</i>) [1016]</li> </ul>	c. 13.71km
000397	Red Bog Kildare SAC	<b>Conservation Objectives Specific Version 1.0 (17/07/19)</b> <b>Annex I Habitats</b> <ul style="list-style-type: none"> <li>▪ Transition mires and quaking bogs [7140]</li> </ul>	c. 13.72km
000713	Ballyman Glen SAC	<b>Conservation Objectives Specific Version 1.0 (17/07/19)</b> <b>Annex I Habitats</b> <ul style="list-style-type: none"> <li>▪ Petrifying springs with tufa formation (Cratoneurion) [7220]*</li> <li>▪ Alkaline fens [7230]</li> </ul>	c. 14.63km
000206	North Dublin Bay SAC	<b>Conservation Objectives Specific Version 1.0 (06/11/13)</b> <b>Annex I Habitats</b> <ul style="list-style-type: none"> <li>▪ Mudflats and sandflats not covered by seawater at low tide [1140]</li> <li>▪ Annual vegetation of drift lines [1210]</li> <li>▪ <i>Salicornia</i> and other annuals colonising mud and sand [1310]</li> <li>▪ Atlantic salt meadows (Glauco-Puccinellietalia maritima) [1330]</li> <li>▪ Mediterranean salt meadows (Juncetalia maritimi) [1410]</li> <li>▪ Embryonic shifting dunes [2110]</li> <li>▪ Shifting dunes along the shoreline with <i>Ammophila arenaria</i> (white dunes) [2120]</li> <li>▪ Fixed coastal dunes with herbaceous vegetation (grey dunes) [2130]*</li> <li>▪ Humid dune slacks [2190]</li> </ul>	c. 15.5km

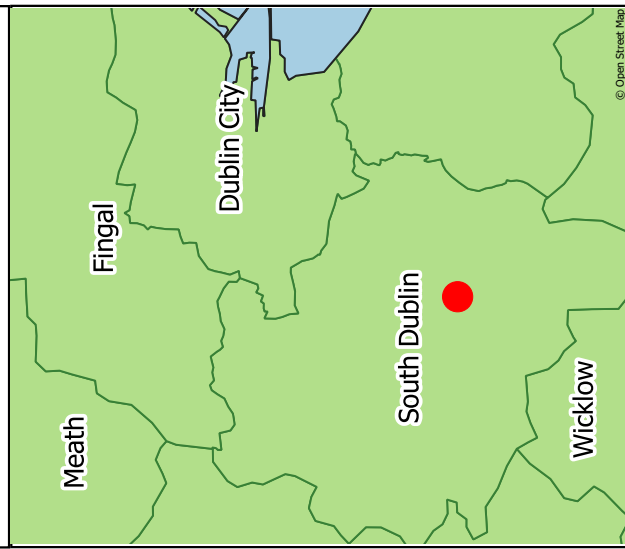
Site Code	Site Name	Qualifying Interest Habitats and Species (*=Priority Habitat) <sup>5</sup>	Distance from Study Area (km) <sup>6</sup>
		<b>Annex II Species</b> <ul style="list-style-type: none"> <li>Petalwort (<i>Petalophyllum ralfsii</i>) [1395]</li> </ul>	
<b>Special Protection Areas (SPAs)</b>			
004040	Wicklow Mountains SPA	<b>Conservation Objectives Generic Version 5.0 (15/08/16)</b> <ul style="list-style-type: none"> <li>Merlin (<i>Falco columbarius</i>) [A098]</li> <li>Peregrine (<i>Falco peregrinus</i>) [A103]</li> </ul>	c. 5.02km
004063	Poulaphouca Reservoir SPA	<b>Conservation Objectives Generic (21/02/18)</b> <ul style="list-style-type: none"> <li>Greylag Goose (<i>Anser anser</i>) [A043]</li> <li>Lesser Black-backed Gull (<i>Larus fuscus</i>) [A183]</li> </ul>	c. 11.97km
004024	South Dublin Bay and River Tolka SPA	<b>Conservation Objectives Specific Version 1.0 (09/03/15)</b> <ul style="list-style-type: none"> <li>Light Bellied Brent Goose (<i>Branta bernicla hrota</i>) [A046]</li> <li>Oytsercatcher (<i>Haematopus ostralegus</i>) [A130]</li> <li>Ringed plover (<i>Charadrius hiaticula</i>) [A137]</li> <li>Grey Plover (<i>Pluvialis squatarola</i>) [A141]</li> <li>Knot (<i>Calidris canutus</i>) [A143]</li> <li>Sanderling (<i>Calidris alba</i>) [A144]</li> <li>Dunlin (<i>Calidris alpina alpina</i>) [A149]</li> <li>Bar-tailed Godwit (<i>Limosa lapponica</i>) [A157]</li> <li>Redshank (<i>Tringa totanus</i>) [A162]</li> <li>Black-headed Gull (<i>Chroicocephalus ridibundus</i>) [A179]</li> <li>Roseate Tern (<i>Sterna dougalli</i>) [A192]</li> <li>Common Tern (<i>Sterna hirundo</i>) [A193]</li> <li>Arctic Tern (<i>Sterna paradisaea</i>) [A194]</li> <li>Wetlands [A999]</li> </ul>	c. 12.35km

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# Legend

- Site Boundary
- ZoI 15km
- SPA 2019
- SAC 2019

Map identifies all special protected areas (SPA) and special areas of conservation (SAC) within a 15 km zone of influence (ZoI) from the site location.



Title: **Figure 4.1**

## SPA & SAC Locations

Bohernabreena Landfill  
Environmental Risk Assessment

Client: South Dublin County Council



West Pier Business  
Campus,  
Dun Laoghaire,  
Co. Dublin, Ireland

## Issue Details

Drawn by: SG

Date: 24/10/2019

Checked by: PC

Project No: MDR1489

Approved by: PC

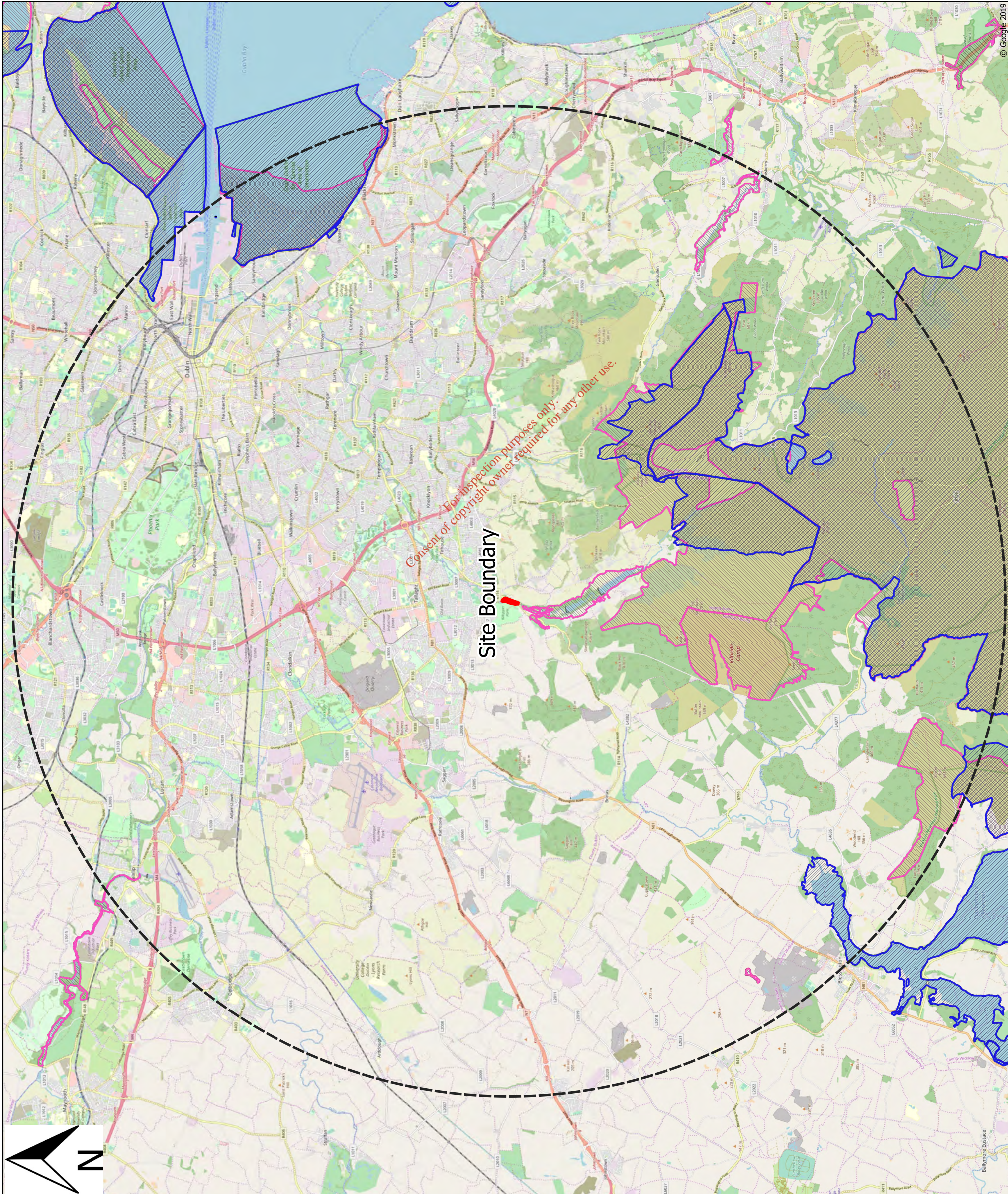
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## 4.2 HABITATS

### 4.2.1 Terrestrial

There are no terrestrial habitats within the footprint of the proposed development which have affinities to QI habitats or offer any significant supporting value to QIs or SCIs of any European sites.

The nearest 'terrestrial' QI habitats to the site are likely to be those in Glenasmole Valley SAC which is immediately south of the site and separated by circa 110 metres (boundary to boundary). This site contains Orchid-rich Calcareous Grassland and Molinia meadows. While this habitat is hydrologically connected to the site via the Dodder, it is upstream of the site and therefore not considered connected to the site.

The nearest downstream terrestrial QI habitat to the proposed development are all coastal habitats - intertidal mudflats, sand-dunes and saltmarsh habitats. These are all located in excess of 12-15km downstream of the landfill.

### 4.2.2 Aquatic

There are no water courses on the site with the exception of a diverted spring which has been utilised as a cattle water feeding at the north of the site. The site is within the Eastern River Basin District and the River Dodder which originates in the Wicklow Mountains runs along the western perimeter of the site, flowing north-easterly towards the Liffey Estuary Lower, approximately 12.5km north east of the site.

The River Dodder is not a European site; however, it does discharge into Dublin Bay downstream of the site to which it is therefore hydrologically connected.

### 4.2.3 Flora and Invasive Alien Plants

No invasive alien plant species, scheduled to the European Communities (Bird and Natural Habitat Regulations) 2011-2015, were recorded during the field surveys.

## 5 STAGE 1: APPROPRIATE ASSESSMENT SCREENING

### 5.1 IS THE PROJECT NECESSARY TO THE MANAGEMENT OF EUROPEAN SITES?

The existing landfill and the proposed remediation solution are not directly connected with or necessary to the management of any European site. As such, the first test of AA screening can be definitively concluded.

### 5.2 LIKELY SIGNIFICANT EFFECTS (LSE)

To establish the potential for LSE, a number of issues must be explored. In the first instance, connectivity between the source and the receptor must be established.

**Source** can be considered both the existing landfill and the elements of the proposed remediation works that have the potential to affect the identified ecological receptors. In this instance, the source of impacts has been identified under two themes summarized below:

- Water quality; and
- Spread of invasive species.

**Pathway** can be considered the means or route by which a source can affect the ecological receptor. In this instance, the pathways considered are summarised below:

- Surface water; and
- Groundwater (through leachate)

Ecological **Receptors** can be considered both the European sites and the SCIs (for SPAs) or QI (of SACs/cSACs) for which conservation objectives have been set. Each element can exist independently however a potential effect is created only when there is a linkage between the source, pathway and receptor. A four-step process is applied in the screening to establish potential for LSE.

#### 5.2.1 Step 1: Identification of European Sites with Connectivity

**Table 5.1** lists the European Sites within 15km of the proposed works. In total eight SAC and three SPA were identified within the defined Zol.

**Table 5.1: European Sites within 15km of the preliminary SI Works Study Area\*\***

Site Code	Site Name	Qualifying Interest Habitats and Species (*=Priority Habitat) <sup>7</sup>	Distance from Study Area (km) <sup>8</sup>	Connectivity
<b>Special Area of Conservations (SACs)</b>				
001209	Glenasmole Valley SAC	<p><b>Conservation Objectives Generic Version 6.0 (21/02/18)</b></p> <p><b>Annex I Habitats</b></p> <ul style="list-style-type: none"> <li>▪ Semi-natural dry grasslands and scrubland facies on calcareous substrates (Festuco Brometalia) (* important orchid sites)* [6210]</li> <li>▪ <i>Molinia</i> meadows on calcareous, peaty or clayey-silt-laden soils (Molinion caeruleae) [6410]</li> <li>▪ Petrifying springs with tufa formation (Cratoneurion) [7220]*</li> </ul>	c. 0.11km	Yes. Given the relative proximity of the site and hydrological connection between the landfill and the European Site via the Dodder, the potential for impact cannot be excluded. It is noted that the European site is upstream of the proposed works.
002122	Wicklow Mountains SAC	<p><b>Conservation Objectives Specific Version 1.0 (31/07/17)</b></p> <p><b>Annex I Habitats</b></p> <ul style="list-style-type: none"> <li>▪ Oligotrophic water containing very few minerals of sandy plains (Littorelletea uniflorae) [3110]</li> <li>▪ Oligotrophic to mesotrophic standing waters with vegetation of the Littorelletea uniflorae and/or Isoetes-nanojuncea [3130]</li> <li>▪ Natural dystrophic lakes and ponds [3160]</li> <li>▪ Northern Atlantic wet heaths with <i>Erica tetralix</i> [4010]</li> <li>▪ European dry heaths [4030]</li> <li>▪ Alpine and Boreal heaths [4060]</li> <li>▪ Calaminarina grasslands of the <i>Violetalia calaminariae</i> [6130]</li> <li>▪ Species-rich <i>Nardus</i> grasslands, on siliceous substrates in mountain areas (and submountain areas, in Continental Europe) * [6230]</li> <li>▪ Blanket Bogs (* if Active) [7130]</li> </ul>	c. 2.52km	No. There is no connectivity between the landfill and the European Site due to the distance between the two sites and lack of hydrological connection between them.

<sup>7</sup> NPWS website, accessed 13<sup>th</sup> November 2019.

<sup>8</sup> Distance measured "as the crow flies".

Site Code	Site Name	Qualifying Interest Habitats and Species (*=Priority Habitat) <sup>7</sup>	Distance from Study Area (km) <sup>8</sup>	Connectivity
000210	South Dublin Bay SAC	<ul style="list-style-type: none"> <li>▪ Siliceous scree of the montane to snow levels (<i>Androsacetalia alpinae</i> and <i>Galeopsietalia ladani</i>) [8110]</li> <li>▪ Calcareous rocky slopes with chasmophytic vegetation [8210]</li> <li>▪ Siliceous rocky slopes with chasmophytic vegetation [8220]</li> <li>▪ Old Sessile oak woods with <i>Ilex</i> and <i>Blechnum</i> in the British Isles [91A0]</li> </ul> <p><b>Annex II Species</b></p> <ul style="list-style-type: none"> <li>▪ Otter (<i>Lutra lutra</i>) [1355]</li> </ul> <p><b>Conservation Objectives Specific Version 1.0 (22/08/13)</b></p> <p><b>Annex I Habitats</b></p> <ul style="list-style-type: none"> <li>▪ Mudflats and sandflats not covered by seawater at low tide [1140]</li> </ul>	c. 12.48km	Yes There is a potential indirect hydrogeological connectivity with this European Site. This is via the Dodder River which bounds the subject site and flows into the River Liffey before entering Dublin Bay.
000725	Knocksink Wood SAC	<p><b>Conservation Objectives Generic Version 5.0 (21/02/18)</b></p> <p><b>Annex I Habitats</b></p> <ul style="list-style-type: none"> <li>▪ Petrifying springs with tufa formation (Cratoneurion) [7220]*</li> <li>▪ Alluvial forests with <i>Alnus glutinosa</i> and <i>Fraxinus excelsior</i> (Alno-Padion, <i>Alnion incanae</i>, <i>Salicion albae</i>) [91E0]*</li> </ul>	c. 11.78km	No. There is no connectivity between the landfill and the European Site due to the distance between the two sites and lack of hydrological connection between them.
001398	Rye Water Valley/Cartron SAC	<p><b>Conservation Objectives Generic Version 5.0 (15/08/16)</b></p> <p><b>Annex I Habitats</b></p> <ul style="list-style-type: none"> <li>▪ Petrifying springs with tufa formation (Cratoneurion) [7220]*</li> </ul> <p><b>Annex II Species</b></p> <ul style="list-style-type: none"> <li>▪ Narrow-mouthed Whorl Snail (<i>Vertigo angustior</i>) [1014]</li> <li>▪ Desmoulin's Whorl Snail (<i>Vertigo moulinsiana</i>) [1016]</li> </ul>	c. 13.71km	No. There is no connectivity between the landfill and the European Site due to the distance between the two sites and lack of hydrological connection between them.
000397	Red Bog Kildare SAC	<p><b>Conservation Objectives Specific Version 1.0 (17/07/19)</b></p> <p><b>Annex I Habitats</b></p> <ul style="list-style-type: none"> <li>▪ Transition mires and quaking bogs [7140]</li> </ul>	c. 13.72km	No. There is no connectivity between the landfill and the European Site due to the distance between the two sites and lack of hydrological connection



Site Code	Site Name	Qualifying Interest Habitats and Species (*=Priority Habitat) <sup>7</sup>	Distance from Study Area (km) <sup>8</sup>	Connectivity
000713	Ballyman Glen SAC	<p><b>Conservation Objectives Specific Version 1.0 (17/07/19)</b></p> <p><b>Annex I Habitats</b></p> <ul style="list-style-type: none"> <li>▪ Petrifying springs with tufa formation (Cratoneurion) [7220]*</li> <li>▪ Alkaline fens [7230]</li> </ul>	c. 14.63km	<p>between them.</p> <p>No.</p> <p>There is no connectivity between the landfill and the European Site due to the distance between the two sites and lack of hydrological connection between them.</p>
000206	North Dublin Bay SAC	<p><b>Conservation Objectives Specific Version 1.0 (06/11/13)</b></p> <p><b>Annex I Habitats</b></p> <ul style="list-style-type: none"> <li>▪ Mudflats and sandflats not covered by seawater at low tide [1140]</li> <li>▪ Annual vegetation of drift lines [1210]</li> <li>▪ <i>Salicornia</i> and other annuals colonising mud and sand [1310]</li> <li>▪ Atlantic salt meadows (<i>Glauco-Puccinellietalia maritima</i>) [1330]</li> <li>▪ Mediterranean salt meadows (<i>Juncetalia maritimi</i>) [1410]</li> <li>▪ Embryonic shifting dunes [2110]</li> <li>▪ Shifting dunes along the shoreline with <i>Ammophila arenaria</i> (white dunes) [2120]</li> <li>▪ Fixed coastal dunes with herbaceous vegetation (grey dunes) [2130]*</li> <li>▪ Humid dune slacks [2190]</li> </ul> <p><b>Annex II Species</b></p> <ul style="list-style-type: none"> <li>▪ Petalwort (<i>Petalophyllum ralfsii</i>) [1395]</li> </ul>	c. 15.5km	<p>Yes.</p> <p>There is a potential indirect hydrogeological connectivity with this European Site. This is via the Dodder River which bounds the subject site and flows into the River Liffey before entering Dublin Bay.</p>
<b>Special Protection Areas (SPAs)</b>				
004040	Wicklow Mountains SPA	<p><b>Conservation Objectives Generic Version 5.0 (15/08/16)</b></p> <ul style="list-style-type: none"> <li>▪ Merlin (<i>Falco columbarius</i>) [A098]</li> <li>▪ Peregrine (<i>Falco peregrinus</i>) [A103]</li> </ul>	c. 5.02km	<p>No.</p> <p>There is no connectivity between the landfill and the European Site due to the distance between the two sites and lack of disturbance to qualifying interest species within the European Site.</p>
004063	Poulaphouca	<p><b>Conservation Objectives Generic (21/02/18)</b></p>	c. 11.97km	<p>No.</p>

Site Code	Site Name	Qualifying Interest Habitats and Species (*=Priority Habitat) <sup>7</sup>	Distance from Study Area (km) <sup>8</sup>	Connectivity
	Reservoir SPA	<ul style="list-style-type: none"> <li>▪ Greylag Goose (<i>Anser anser</i>) [A043]</li> <li>▪ Lesser Black-backed Gull (<i>Larus fuscus</i>) [A183]</li> </ul>		There is no connectivity between the landfill and the European Site due to the distance between the two sites and lack of disturbance to qualifying interest species within the European Site.
004024	South Dublin Bay and River Tolka SPA	<p><b>Conservation Objectives Specific Version 1.0 (09/03/15)</b></p> <ul style="list-style-type: none"> <li>▪ Light Bellied Brent Goose (<i>Branta bernicla hrota</i>) [A046]</li> <li>▪ Oystercatcher (<i>Haematopus ostralegus</i>) [A130]</li> <li>▪ Ringed plover (<i>Charadrius hiaticula</i>) [A137]</li> <li>▪ Grey Plover (Pluvialis squatarola) [A141]</li> <li>▪ Knot (Calidris canutus) [A143]</li> <li>▪ Sanderling (<i>Calidris alba</i>) [A144]</li> <li>▪ Dunlin (<i>Calidris alpina alpina</i>) [A149]</li> <li>▪ Bar-tailed Godwit (<i>Limosa lapponica</i>) [A157]</li> <li>▪ Redshank (<i>Tringa totanus</i>) [A162]</li> <li>▪ Black-headed Gull (<i>Chroicocephalus ridibundus</i>) [A179]</li> <li>▪ Roseate Tern (<i>Sterna dougallii</i>) [A192]</li> <li>▪ Common Tern (<i>Sterna hirundo</i>) [A193]</li> <li>▪ Arctic Tern (<i>Sterna paradisaea</i>) [A194]</li> <li>▪ Wetlands [A999]</li> </ul>	c. 12.35km	<p>Yes.</p> <p>There is a potential indirect hydrogeological connectivity with this European Site. This is via the Dodder River which bounds the subject site and flows into the River Liffey before entering Dublin Bay.</p>

\*\* It is recognised that a number of other European Sites extend beyond the 15km Zone of Influence in Dublin Bay. However, given the distance from the study area, the temporary nature of the works and the dilution factor of coastal waters, it is considered that these would not be subject to any significant effect.

Full details of the Conservation Objectives (COs) are available on the NPWS website at [www.npws.ie/sites/default/files/protecte-sites](http://www.npws.ie/sites/default/files/protecte-sites).

## 5.2.2 Step 2: Potential Impact Pathways

The landfill does not lie within the boundaries of any European site (refer **Figure 4.1**) and therefore no direct impacts are likely to occur. Based on the site description and proposed remediation works, the following key impact themes are brought forward for consideration in the screening of the project and the European sites:

### Water quality and habitat deterioration

The existing landfill, in its current form, is known to have an adverse impact on the Dodder (refer **Section 3.3.8**), in particular levels of ammonium impacting on the water quality. During the proposed capping, sediment and/or other contaminants (oils, fuels, etc.) may enter the Dodder through surface water run-off for the short term duration of the works. However, it is noted that the residual impact would be positive through a breaking of the pathway for the existing impact from the landfill to the Dodder (as per the ERA recommendations).

The Zol of effects from contaminated surface water is difficult to accurately estimate as it will depend on numerous factors including the type and concentration of pollutants, assimilative capacity of receiving waters, and time of year (related to water levels). As a precautionary measure, a reasonable worst-case Zol for water pollution from the proposed development site is considered to be the downstream surface water catchment but also the upstream Glensamole Valley SAC given the proximity to the landfill. In this report the surface water catchment is defined at the scale of Catchment Management Unit (CMU) as adopted in the River Basin Management Plan (RBMP) for Ireland 2018-2021 (DoHPLG, 2018). Open coastlines, where Coastal Waterbodies begin, are considered to fall outside the potential Zol of significant effects.

### Changes to groundwater yield or quality

At present, the landfill is potentially having an adverse impact on groundwater with a pathway to surface water (refer **Section 3.3.8**). Small seepages/springs were noted that had emerged along the bank at the western perimeter as discreet seepages which discharge directly to the River Dodder. These seepages are the point of emergence from the groundwater baseflow and were sampled and indicated exceedances of arsenic. It is considered that there is direct connectivity of leachate to the underlying gravel aquifer and the mixing of leachate with laterally flow groundwater in the saturated aquifer dilutes the leachate concentrations. The potential Zol of effects from groundwater arising to the Dodder is considered to be the downstream surface water catchment as above.

The proposed capping may interfere with groundwater quality, yields and/or flow paths, potentially affecting the water quality or habitats dependent on groundwater supply. These impacts are likely to be positive given that the cap will break the pathway from rainwater ingress to the waste body and the formation of leachate. As above, the potential Zol of effects from groundwater arising to the Dodder is considered to be the downstream surface water catchment.

### Spread of invasive species

Given the nature of the proposed remediation solution through capping and the need to import capping material, there is potential for invasive alien plants, scheduled to the European Communities (Bird and Natural Habitat Regulations) 2011-2015 to be spread within the footprint or

ZoI of the landfill. However, these would not ordinarily result in a likely significant effect to European sites. Capping activities could lead to the dispersal of scheduled invasive species either via machinery, materials, clothing or wild animals. The ZoI of effects for spread of terrestrial invasive species is difficult to accurately estimate, as plant fragments may be spread on tyre treads to distant unrelated sites. In relation to water-borne spread of vegetation, the ZoI generally is restricted to the surface water Catchment Management Unit.

### 5.2.3 Step 3: Connectivity

Potential connectivity of the works to the European sites and any mobile QI / SCI species has been considered in **Section 5.2.1**. Impact pathways considered included via surface water and groundwater. Four European sites have been identified with direct surface water connectivity and the conservation objectives for these sites is presented in **Table 5.2** (SAC) and **Table 5.3** (SPA).

The closest relevant European site to the proposed development is the Glenasmole Valley SAC (site code 001209), which is located c. 110 m to the south of the proposed development, separated by a woodland and wet grassland. The Glenasmole Valley SAC is within the same Catchment Management Unit as the proposed development but is located upstream of the proposed works within the Dodder catchment.

The South Dublin Bay SAC (site code 000210), North Dublin Bay SAC (site code 000206) and South Dublin Bay and River Tolka SPA (site code 004024) have a potential indirect hydrogeological connectivity to the site. This is via the Dodder River which bounds the subject site and flows into the River Liffey before entering Dublin Bay.

There are no other European sites within the ZoI of the proposed development site.

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Table 5.2: Conservation Objectives of relevant SACs

Site and Conservation Objectives Version	Qualifying Interest(s) (*Priority Habitat) and Special Conservation Interest(s)	Conservation Objective(s)
Glenasmole Valley SAC Conservation Objectives Generic Version 6.0 (21/02/18)	<b>Annex I Habitats</b> <ul style="list-style-type: none"> <li>▪ Semi-natural dry grasslands and scrubland facies on calcareous substrates (<i>Festuco Brometalia</i>) (* important orchid sites)* [6210]</li> <li>▪ <i>Molinia</i> meadows on calcareous, peaty or clayey-silt-laden soils (<i>Molinion caeruleae</i>) [6410]</li> <li>▪ Petrifying springs with tufa formation (<i>Cratoneurion</i>) [7220]*</li> </ul>	To maintain or restore the favourable conservation condition of the Annex I habitat(s) for which the SAC has been selected.
South Dublin Bay SAC Conservation Objectives Specific Version 1.0 (22/08/13)	<b>Annex I Habitats</b> <ul style="list-style-type: none"> <li>▪ Mudflats and sandflats not covered by seawater at low tide [1140]</li> </ul>	To maintain the favourable conservation condition of the Annex I habitat in South Dublin Bay SAC (1140) for which are defined by a list of attributes and targets.
North Dublin Bay SAC Conservation Objectives Specific Version 1.0 (06/11/13)	<b>Annex I Habitats</b> <ul style="list-style-type: none"> <li>▪ Mudflats and sandflats not covered by seawater at low tide [1140]</li> <li>▪ Annual vegetation of drift lines [1210]</li> <li>▪ <i>Salicornia</i> and other annuals colonising mud and sand [1310]</li> <li>▪ Atlantic salt meadows (<i>Glauco-Puccinellietalia maritima</i>) [1330]</li> <li>▪ Mediterranean salt meadows (<i>Juncetalia maritimi</i>) [1410]</li> <li>▪ Embryonic shifting dunes [2110]</li> <li>▪ Shifting dunes along the shoreline with <i>Ammophila arenaria</i> (white dunes) [2120]</li> <li>▪ Fixed coastal dunes with herbaceous vegetation (grey dunes) [2130]*</li> <li>▪ Humid dune slacks [2190]</li> </ul> <b>Annex II Species</b> <ul style="list-style-type: none"> <li>▪ Petalwort (<i>Petalophyllum ralfsii</i>) [1395]</li> </ul>	<p>To maintain the favourable conservation condition of Annex I habitats in North Dublin Bay SAC (1140, 1330, 1410) for which are defined by a list of attributes and targets.</p> <p>To restore the favourable conservation condition of Annex I habitats in North Dublin Bay SAC (1210, 1310, 2110, 2120, 2130, 2190) which are defined by a list of attributes and targets.</p> <p>To maintain the favourable conservation condition of Petalwort in North Dublin Bay SAC which is defined by a list of attributes and targets.</p>

**Table 5.3: Conservation Objectives of relevant SPA**

Site and Conservation Objectives Version	Qualifying Interest(s) and Special Conservation Interest(s)	Conservation Objective(s)
South Dublin Bay and River Tolka SPA Conservation Objectives Specific Version 1.0 (09/03/15)	<ul style="list-style-type: none"> <li>▪ Light Bellied Brent Goose (<i>Branta bernicla hrota</i>) [A046]</li> <li>▪ Oytsercatcher (<i>Haematopus ostralegus</i>) [A130]</li> <li>▪ Ringed plover (<i>Charadrius hiaticula</i>) [A137]</li> <li>▪ Grey Plover (<i>Pluvialis squatarola</i>) [A141]</li> <li>▪ Knot (<i>Calidris canutus</i>) [A143]</li> <li>▪ Sanderling (<i>Calidris alba</i>) [A144]</li> <li>▪ Dunlin (<i>Calidris alpina alpina</i>) [A149]</li> <li>▪ Bar-tailed Godwit (<i>Limosa lapponica</i>) [A157]</li> <li>▪ Redshank (<i>Tringa totanus</i>) [A162]</li> <li>▪ Black-headed Gull (<i>Chroicocephalus ridibundus</i>) [A179]</li> <li>▪ Roseate Tern (<i>Sterna dougallii</i>) [A192]</li> <li>▪ Common Tern (<i>Sterna hirundo</i>) [A193]</li> <li>▪ Arctic Tern (<i>Sterna paradisaea</i>) [A194]</li> <li>▪ Wetlands [A999]</li> </ul>	To maintain or restore the favourable conservation condition of the bird species listed as Special Conservation Interests for this SPA.

#### 5.2.4 Step 4: Assessment of Likely Significance

The sites and species listed have been demonstrated as having all three elements of the SPR model in place and therefore potential for LSE are explored in more detail below. In considering LSE, the nature, scale, duration and magnitude of potential impacts is considered. In light of the April 2018<sup>9</sup> judgement of the Court of Justice of the European Union, mitigation measures, including pollution control measures proposed during construction and operation, may not be considered when deciding whether to 'Screen in' a project plan to the requirement for AA.

Elevated levels of ammonium have been observed within the Dodder adjacent to the site during the site investigation stage and this is considered to be from the leachate associated with the existing landfill using a groundwater pathway to impact the surface water quality. As such, the landfill in its current form is potentially having a direct adverse impact on the Dodder and there is a potential indirect link to the European sites in Dublin Bay and the upstream Glenasmole Valley.

Similarly, the Dodder lies circa 10-20 metres from the nearest proposed capping works and there is a potential indirect link between the proposed capping works and associated sediment risk and the European sites in Dublin Bay and the upstream Glenasmole Valley.

A site walkover of the study area found no evidence of high impact IAPS. However, during the proposed capping works, machinery and equipment used has the potential to lead to the

<sup>9</sup> Case C 323/17, REQUEST for a preliminary ruling under Article 267 TFEU from the High Court (Ireland), made by decision of 10 May 2017, received at the Court on 30 May 2017, in the proceedings People Over Wind, Peter Sweetman v Coillte.

introduction of IAPS if the machinery/equipment was previously used in another area containing IAPS. It could also lead to the spread of IAPS both within and outside of the proposed works area if IAPS within the area are not identified. This could potentially lead to the unwitting introduction of IAPS to European Sites if the machinery/equipment used for the proposed works lead to the spread of IAPS outside of the proposed works area following completion of works.

## 5.3 CUMULATIVE IMPACTS

A review of potential plans and projects in the area with potential for cumulative impact has been undertaken and is documented within this section.

### 5.3.1 South Dublin County Development Plan (CDP) 2016-2022

The County Development Plan has a number of infrastructure development policies along the Dodder Valley that have potential for both positive and adverse impact to the river as follows:

- Core Strategy Policy 5: It is the policy of the Council to restrict the spread of dwellings in the Rural 'RU', Dublin Mountain 'HA-DM', Liffey Valley 'HA-LV' and Dodder Valley 'HA-DV' zones based on the criteria set out in the Rural Settlement Strategy contained in Chapter 2 Housing.
- Housing Policy 20: It is the policy of the Council to restrict the spread of dwellings in the rural 'RU', Dublin Mountain 'HA-DM', Liffey Valley 'HA-LV' and Dodder Valley 'HA-DV' zones and to focus such housing into existing settlements.
- Housing Policy 24: It is the policy of the Council that within areas designated with Zoning Objective 'HA -LV' (to protect and enhance the outstanding character and amenity of the Liffey Valley) and 'HA-DV' (to protect and enhance the outstanding character and amenity of the Dodder Valley) residential development will only be permitted in exceptional circumstances.
- Economic and Tourism Policy 6, Objective 1: To support and facilitate the development of an integrated network of Greenways and Trails, including blueways/water trails, along suitable corridors, including the River Liffey, Dublin Mountains Way, Grand Canal, River Dodder and Slade Valley.

While the restriction in residential development will protect the Dodder with no potential for cumulative impact, the development of a greenway has potential for in-combination impacts to European sites as a result of the proposed works. These potential adverse cumulative impacts relate to water quality if both the proposed SI works and greenway infrastructure project resulted in impacts to same. The detailed design of the greenway has been completed but the construction works are yet to commence on the new infrastructural elements (car parking facilities at Kiltipper Road, new surfacing, etc.). As such, there is potential for overlap between the works on the greenway (expected in 2020) and the proposed capping at the Bohernabreena site.

Furthermore, the Heritage, Conservation and Landscapes (HCL) section of the plan sets out several relevant objectives for the protection of biodiversity along the Dodder Valley and more generally as follows:

HCL6 Objective 2: To protect, preserve and maintain industrial heritage features including weirs, millraces, and mills along the River Dodder and River Liffey.

HCL10 Objective 1: To restrict development within areas designated with Zoning Objective 'HA – LV' (To protect and enhance the outstanding character and amenity of the Liffey Valley) and 'HA – DV' (To protect and enhance the outstanding character and amenity of the Dodder Valley) and ensure that new development is related to the area's amenity potential and is designed and sited to minimise environmental and visual impacts.

HCL10 Objective 2: To ensure that development within the Liffey Valley and Dodder Valley will not prejudice the future creation and development of uninterrupted and coherent parklands including local and regional networks of walking and cycling routes.

HCL10 Objective 3: To ensure that development proposals within the Liffey Valley and Dodder Valley, including local and regional networks of walking and cycling routes, maximise the opportunities for enhancement of existing ecological features and protects and incorporates high value natural heritage features including watercourses, wetlands, grasslands, woodlands, mature trees, hedgerows and ditches, as part of the County's Green Infrastructure network.

HCL10 Objective 6: To recognise the key role the Dodder River plays in the County's Green Infrastructure network by facilitating and supporting the continued development of the Dodder Valley (Zoning Objective 'HA – DV') as a linear park, greenway and an area of special amenity, recreational, heritage, geology, biodiversity and conservation value to include for the completion of the Dodder Green Route along the full length of the Dodder River.

HCL10 Objective 7: Within areas designated 'High Amenity – Liffey Valley' and 'High Amenity – Dodder Valley' non-residential development will only be permitted where it:

- Relates to the area's amenity potential or to its use for agriculture or recreational purposes, including recreational buildings; or
- Comprises the redevelopment of or extensions to existing commercial or civic uses or development of new commercial or civic uses within an existing established area of commercial or civic activity; and
- Preserves the amenity value of the river valley including its landscape value, views or vistas of the river valley and its biodiversity value.

HCL10 Objective 10: To promote and support the development of a tourist amenity and educational/interpretive centre, such as a working mill, within the Dodder Valley.

More generally the objectives relating to the protection of the Natura 2000 network include the following:

HCL12 Objective 1: To prevent development that would adversely affect the integrity of any Natura 2000 site located within and immediately adjacent to the County and promote favourable conservation status of habitats and protected species including those listed under the Birds Directives, the Wildlife Acts and the Habitats Directive.

HCL12 Objective 2: To ensure that project that give rise to significant direct, indirect or secondary impacts on Natura 2000 sites, either individually or in combination with other plans or projects, will not be permitted unless the following is robustly demonstrated in accordance with Article 6(4) of the



Habitats Directive and S177AA of the Planning and Development Act (2000-2010) or any superseding legislation:

- There are no less damaging alternative solutions available; and
- There are imperative reasons of overriding public interest (as defined in the Habitats Directive) requiring the project to proceed; and
- Adequate compensatory measures have been identified that can be put in place.

HCL15 Objective 1: To ensure that development does not have a significant adverse impact on rare and threatened species, including those protected under the Wildlife Acts 1976 and 2000, the Birds Directive 1979 and the Habitats Directive 1992.

HCL15 Objective 2: To ensure that, where evidence of species that are protected under the Wildlife Acts 1976 and 2000, the Birds Directive 1979 and the Habitats Directive 1992 exists, appropriate avoidance and mitigation measures are incorporated into development proposals as part of any ecological impact assessment.

IE2 Objective 8: To protect salmonid water courses, such as the Liffey and Dodder Rivers catchments (including Bohernabreena Reservoir), which are recognised to be exceptional in supporting salmonid fish species.

G2 Objective 13: To seek to prevent the loss of woodlands, hedgerows, aquatic habitats and wetlands wherever possible including requiring a programme to monitor and restrict the spread of invasive species such as those located along the River Dodder.

With such high levels of protection built into the local planning policy, it is not anticipated that development under the plan will result in any in-combination impacts on European sites.

### 5.3.2 Ballycullen - Oldcourt Local Area Plan (2014)

The approximate 90 Ha of undeveloped lands along the Ballycullen-Oldcourt fringe is zoned for residential development and the western section of this area is within the catchment of the River Dodder. This section of the plan is governed by Specific Local Objective 87 of the CDP (2010-2016, now replaced by the 2016-2022 plan above) which, amongst other criteria, seeks to protect and preserve the biodiversity value and landscape character of the Dodder Valley.

Given the restrictions on development within the Dodder Valley, it is not anticipated that the development under the LAP would result in any in-combination impacts on European sites.

### 5.3.3 Glenmasole-Bohernabreena Design Guidelines (March 2005)

This document presents the siting and design advice prepared by South Dublin County Council to give guidance on locating, siting and designing a cluster housing scheme in the Glenasmole/Bohernabreena area. The guidelines followed the housing need criteria as set out in the Glenasmole/Bohernabreena Housing and Planning Study 2002. The guidelines restrict any development within 100 metres of existing streams and limited development appears to have been undertaken in the area since publication of the guidelines.

Given the restrictions imposed in these guidelines, it is not anticipated that the development in the area under the guidelines would result in any in-combination impacts on European sites.

### 5.3.4 River Basin Management Plan for Ireland 2018-2021

The River Basin Management Plan (RBMP) for Ireland 2018 – 2021 (DoHPLG, 2018) sets out the condition of Irish waters and a summary of status for all monitored waters in the 2013 – 2015 period, including a description of the changes since 2007 – 2009. The objectives of the RBMP are to undertake the following:

- Prevent deterioration;
- Restore good status;
- Reduce chemical pollution; and
- Achieve water related protected areas objectives.

Nationally, both monitored river water bodies and lakes at high or good ecological status, appear to have declined by 3% since 2007 – 2009; nevertheless, this figure does not reflect a significant number of improvements and dis-improvements across these waters since 2009. Provisional figures from the EPA suggest that approximately 900 river water bodies and lakes have either improved or dis-improved. In addition, the previously observed long term trend of decline in the number of high-status river sites has continued. Chapter 5 of the RBMP presents results of the catchment characterisation process, which identifies the significant pressures on each water body that is *At Risk* of not meeting the environmental objectives of the WFD. Importantly, the assessment includes a review of trends over time to see if conditions were likely to remain stable, improve or deteriorate by 2021. This work was presented in the RBMP for 81% of water bodies nationally, which had been characterised at the time. 1,517 water bodies were classed *At Risk* out of a total of 4,775, or 32%. An assessment of significant environmental pressures found that agriculture was the most significant pressure in 729 river and lake water bodies that are *At Risk*. Urban waste water, hydromorphology and forestry were also significant pressures amongst others.

### 5.3.5 Water Quality

The Water Framework Directive (WFD) 2000/60/EC provides a framework for the protection and improvement of rivers, lakes, marine and ground waters in addition to water-dependent habitats. The aim of the WFD is to prevent any deterioration in the existing status of water quality, including the protection of good and high-water quality status where it exists. The second cycle River Basin Management Plan, covering the period 2018 – 2021, was published in April 2018. The Plan sets out a proposed framework for the protection and improvement of Ireland's water environment in line with Water Framework Directive objectives. It was determined that the multiple River Basin District approach used in the 2009-2015 Management Plan was not as effective as expected so the 2018-2021 Management Plan has defined a single River Basin District (DoHPLG, 2018). This national strategy outlined all the actions required to improve the water quality, with county councils and Irish Water playing an important role in the implementation of the plan. There are binding obligations on all Irish local authorities including South Dublin County Council to achieve good status of surface waters, under the terms of the EU Water Framework Directive 2000/60/EC, and in related policies in the SDCC County Development Plans, e.g. Surface and Groundwater Objectives such as IE2 Objectives 1- 11 which reinforces the Council Policy as follows:

'It is the policy of the Council to manage surface water and to protect and enhance ground and surface water quality to meet the requirements of the EU Water Framework Directive'.

### 5.3.6 Flooding

The Dodder CFRAMS study was a pilot study that covered all of the Dodder catchment. It was subject to Strategic Environmental Assessment (RPS, 2014)<sup>10</sup>. The study arose out of a number of flooding incidents, most notably during the 1986 'Hurricane Charlie' fluvial event, in 2002 in conjunction with a tidal event, and in 2011 during widespread flooding resulting from heavy rainfall. During these events, extensive damage was caused in the lower reaches of the catchment where the river flows through south Dublin to the confluence with the Liffey Estuary, a nutrient sensitive area under the Urban Waste Water Treatment Directive (91/271/EEC). The Dodder CFRAMS made a number of recommendations and the SEA statement identified that these proposed flood risk management options could give rise to a number of positive environmental effects, but also negative environmental effects that could not be avoided. It further noted that the effects were likely to be limited in their scope and duration and a project specific Appropriate Assessment at a scheme level was also recommended.

The mapping of flood risk along the Dodder indicates that the section of the river that bounds the site to the west is not subject to flooding. The section to the south of the site and south of the road crossing shows a risk of 1% AEP and 0.1% AEP of a flood event on the section of the river between the reservoir and the road crossing. Similarly, to the north of the site, the section of the river directly east of the Kiltipper Woods Care Centre is subject to a 10% AEP flood event.

Any flood alleviation works undertaken on the river will be the subject of Appropriate Assessment and no cumulative impacts are predicted.

### 5.3.7 Planning Register

There are a number of planning consents identified on the South Dublin County Council planning system in which the proposed investigative works are proposed and these are listed in **Table 5.4**. Only applications granted in the last five years have been included in the search.

Outside of the greenway (which is noted earlier) the only development is for residential upgrade and would be minor construction works. All would have been subject to the requirements of the planning process and given the low level of construction involved, it is not anticipated that the development in the area under the guidelines would result in any in-combination impacts on European sites.

**Table 5.4: Planning Register in the Area**

Reference	Description	Lodged	Status
SD178/0003	Dodder Greenway Route Scheme - 14km in length of a shared 3-4m wide bound surface on the off road sections from Orwell to the Bohernabreena reservoirs at Glenasmole	22/06/2017	Application Under Part VIII
SD18A/0256	Fort Bridge, Bohernabreena, Co. Dublin - Modifications to existing dwelling and shop.	17/07/2018	Granted
SD16B/0319	The White House, Bohernabreena - demolition of structures and construction of a new single storey extension	28/09/2016	Granted

<sup>10</sup> RPS (2014) Dodder Catchment Flood Risk Management Plan – SEA Statement.

Similarly, a review of the EIA portal illustrates that the only major development in the area is the Dublin Mountain Visitors Centre in the townlands of Mountpelier, Killakee and Jamestown located circa 3km east of the site. This application was lodged with ABP in July 2017 for a visitor centre which will comprise an exhibition and educational facility, a café and shop, a rambler's lounge and toilets. There will be enhanced access to the site with increased car parking and public transport, road improvements and the construction of a new footpath to the site. No decision on this development has been made to date.

No other pathways have been identified by which the project could have a likely significant in-combination effect on any European site(s). There is therefore no potential for cumulative or in-combination impacts.

### 5.3.8 Friarstown Landfill

As noted in **Section 3.2.8**, Friarstown landfill is located adjacent to the southern boundary of the Bohernabreena landfill site. The Friarstown landfill leachate overflow pipes run across the Bohernabreena landfill site and discharge into the river Dodder along the boundary of the Bohernabreena landfill site. As such, there is potential for cumulative adverse impact from the Friarstown landfill and the Bohernabreena landfill on the Dodder and the hydrologically linked European sites.

## 5.4 SCREENING FOR APPROPRIATE ASSESSMENT CONCLUSION

On completion of the AA Screening process, it was concluded that the potential for likely significant effects on three SACs and one SPA from the landfill (in both its existing form and the proposed remediation) was present, therefore, the AA process should proceed to the preparation of a Natura Impact Statement (NIS). Following NPWS technical advice that AA Screening should 'Screen in' a project or plan, and not 'Screen in' specific European sites, this AA Screening considered the potential effect pathways to all European sites within the identified Zol.

The European sites to be brought forward to Stage 2 AA were:

- Glensamole Valley SAC;
- South Dublin Bay SAC;
- North Dublin Bay SAC; and
- South Dublin Bay and River Tolka Estuary SPA.

Through an assessment of the source-pathway-receptor model, which considered the Zol of effects from the landfill and the potential in-combination effects with other plans or projects, the following findings were reported:

- The absence of any existing controls to manage the generation and transport of leachate from the landfill in its current form is potentially facilitating the dispersion of leachate pollutants (such as ammonium) entering the river and being transported to the affected habitats (QI habitats and habitat supporting QI and SCI species). This has the potential for LSEs to European sites in Glensamole Valley and Dublin Bay.

- The absence of comprehensive mitigation measures to control surface water pollution during the proposed capping works, it is anticipated that sediment and/or other contaminants (oils, fuels, concrete etc.) entering the river and being transported to the habitats (QI habitats and habitat supporting QI and SCI species). This has the potential for LSEs to European sites in Glensamole Valley and Dublin Bay.
- The absence of comprehensive mitigation measures to control IAPS during the capping operation, there is potential for IAPS to have potential for LSEs to European sites in Glensamole Valley and Dublin Bay.

While the above potential impacts principally relate to the three downstream European sites in Dublin Bay, the upstream site in Glensamole Valley is also included under the precautionary principle given the proximity to the landfill.

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## 6 STAGE 2: NATURA IMPACT STATEMENT

The requirement to carry out a NIS followed on from the conclusion arrived at during the Screening process (refer **Section 5.4**). In order to determine if the identified source-pathway-receptor linkages could give rise to Likely Significant Effects (LSEs), the following steps are taken:

- Identification of the information required, including the proposed development, linkages to European sites, and description of relevant European sites;
- Examination of the site-specific conservation objectives and attributes of QIs/SCIs of relevant European sites; and
- Prediction of any LSEs of the proposed development, including in-combination effects.

Each of the above steps is addressed within the section of the report.

### 6.1 REQUIRED INFORMATION

#### 6.1.1 Proposed Development

The landfill and the proposed works have been described in detail in **Section 3** of this report.

#### 6.1.2 Linkages to European Sites

The connectivity between the landfill and all European sites has been assessed. The three SAC's (Glensmole Valley, South Dublin Bay and North Dublin Bay) and the SPA (South Dublin Bay and River Tolka Estuary) have been identified as relevant European sites for this NIS. The source-pathway-receptor model for the proposed development is detailed in **Table 6.1**. Only relevant QIs/SCIs identified are brought forward to the next part of the NIS assessment.

The QIs and SCIs of the four European sites are described, with regard to source-pathway-receptor link(s) within the ZoI of LSE of the landfill in **Tables 6.2** and **6.3**. QIs and SCIs with identified source-pathway-receptor link(s) are carried forward for further assessment; while QIs and SCIs with no identified source-pathway-receptor link(s) are not assessed further in this NIS.

**Table 6.1: Source Pathway Receptor Model**

Phase	Source of Potential Effect	Description of Effect Pathway	Potential Zol of Effect	Potential Relevance of Effect to AA
Existing Landfill	Leachate levels within the waste body that are known to have direct contact with the groundwater.	Seepages and springs at the boundary of the landfill and river carrying contaminated groundwater/leachate mix into the Dodder and to the European Sites within the CMU.	The Zol of effects from contaminated groundwater/leachate mix impacting surface water is difficult to accurately estimate as it will depend on numerous factors including the type and concentration of pollutants, assimilative capacity of receiving waters, and time of year (related to water levels). As a precautionary measure, a reasonable worst-case Zol for water pollution from the landfill site is considered to be both the downstream surface water catchment and the upstream Glensamole SAC, given the proximity of this site to the landfill. In this NIS the surface water catchment is defined at the scale of Catchment Management Unit (CMU) as adopted in the River Basin Management Plan (RBMP) for Ireland 2018-2021 (DoHPLG, 2018).	<b>Relevant.</b> There is potential for pollution from the leachate groundwater mix to effect QI(s)/SCI(s) of relevant European sites from the landfill in it's existing condition.
Capping Works	Surface water run-off carrying suspended silt or contaminants into local watercourses, i.e. the Dodder.	Silt, hydrocarbons, and/or other contaminants (oils, fuels, etc.) may enter nearby watercourses through surface water run-off during capping works.	The Zol of effects from contaminated surface water is difficult to accurately estimate as it will depend on numerous factors including the type and concentration of pollutants, assimilative capacity of receiving waters, and time of year (related to water levels). As a precautionary measure, a reasonable worst-case Zol for water pollution from the proposed development site is considered to be both the downstream surface water catchment and the upstream Glensamole SAC, given the proximity of this site to the landfill. In this NIS the surface water catchment is defined at the scale of Catchment Management Unit (CMU) as adopted in the River Basin Management Plan (RBMP) for Ireland 2018-2021 (DoHPLG, 2018).	<b>Relevant.</b> There is potential for pollution from surface water run-off to effect QI(s)/SCI(s) of relevant European sites during the proposed capping works. These would be short term effects and would reduce on completion of capping and vegetation of the cap.
	Disturbance of invasive species during the proposed capping works.	Capping activities such as material importation could lead to the dispersal of scheduled invasive species	The Zol of effects for spread of terrestrial invasive species is difficult to accurately estimate, as plant fragments may be spread on tyre treads to distant unrelated sites. In relation to water-borne spread of vegetation, the Zol generally is restricted	<b>Relevant.</b> While no third scheduled invasive plants are known to occur within the Zol, there is potential for their spread

		either via machinery, materials, clothing or wild animals.	to the surface water Catchment Management Unit.	and establishment downstream as a result of the capping works.
Changes of groundwater quality, yield and/or flow paths associated with maintenance during operation.	Capping activities (e.g. earthworks) could interfere with groundwater flow paths, potentially affecting the quality or distribution of habitats dependent on groundwater supply.	The potential Zol of effects from earthworks to ground water quality, flow or/ or yield is difficult to accurately estimate as it will depend on factors including the depth and intrusion of excavations, and time of year (related to water levels). As a precautionary measure, a reasonable worst-case spatial Zol is considered to be 500 m from the point of excavation; which is a precautionary doubling of the 250 m stated as the potential Zol from intrusive excavations to sensitive upland peatland sites (SEPA, 2014).	<b>Relevant.</b> There is potential for pollution from groundwater to effect QI(s)/SCI(s) of relevant European sites during the proposed capping works.	
<b>Capped Landfill</b>	Leachate levels within the waste body that are known to have direct contact with the groundwater.	Seepages and springs at the boundary of the landfill and river carrying contaminated groundwater/leachate mix into the Dodder and to the European Sites within the CMU.	The Zol of effects from contaminated groundwater/leachate mix impacting surface water is difficult to accurately estimate as it will depend on numerous factors including the type and concentration of pollutants, assimilative capacity of receiving waters, and time of year (related to water levels). As a precautionary measure, a reasonable worst-case Zol for water pollution from the landfill site is considered to be both the downstream surface water catchment and the upstream Glensmole SAC, given the proximity of this site to the landfill. In this NIS the surface water catchment is defined at the scale of Catchment Management Unit (CMU) as adopted in the River Basin Management Plan (RBMPL) for Ireland 2018-2021 (DOHPLG, 2018).	<b>Relevant.</b> The capping system will reduce the infiltration of rainwater through the waste and reduce the volume of leachate entering the underlying aquifer and the River Dodder. However, there remains a potential for pollution (albeit reduced potential) from the leachate groundwater mix to effect QI(s)/SCI(s) of relevant European sites from the capped landfill.



Table 6.2: Links with the Identified SAC

QI (priority habitat indicated with asterisk)	Relevance to the ZoI of Likely Significant Effects of the Proposed Development	Source-Pathway-Receptor Link(s)
<b>Glensamole Valley SAC</b>		
Semi-natural dry grasslands and scrubland facies on calcareous substrates ( <i>Festuco-Brometalia</i> ) (*important orchid sites) [6210]	Orchid-rich grassland occurs in the drier parts of the SAC and in places grades into Molinia meadow. Given the significant flow of the Dodder the upstream nature of this habitat, this habitat would not be subject to hydrological impact from the landfill site.	No links identified
Molinia meadows on calcareous, peaty or clayey-silt-laden soils ( <i>Molinion caeruleae</i> ) [6410]	The areas of Molinia meadows are associated with the grasslands on the valley sides, and in particular in seepage and flushed areas. Given the significant flow of the Dodder the upstream nature of this habitat, this habitat would not be subject to hydrological impact from the landfill site.	No links identified
Petrifying springs with tufa formation ( <i>Cratoneurion</i> ) [7220]	Tufa depositing springs are long-known from the site, along the valley sides, and some have substantial tufa mounds and banks. Tufa formation is also known from small streams within the woodland at the site. Given the significant flow of the Dodder the upstream nature of this habitat, this habitat would not be subject to hydrological impact from the landfill site.	No links identified
<b>South Dublin Bay SAC</b>		
Mudflats and sandflats not covered by seawater at low tide [1140]	Mudflats and sandflats not covered by seawater at low tide has been mapped and were identified as being in the southern part of Dublin Bay, sheltered behind Great south wall (NPWS 2013a). Furthermore, this is a highly dynamic habitat subject to considerable tidal disturbance. As such, it would not be possible to distinguish a sedimentation impact from the proposed development from those associated with tidal cycles.	No links identified
<b>North Dublin Bay SAC</b>		
Mudflats and sandflats not covered by seawater at low tide [1140]	Mudflats and sandflats not covered by seawater at low tide has been mapped and were identified as located to the front and rear of Bull Island (NPWS 2013b). This is a highly dynamic habitat subject to considerable tidal disturbance. As such, it would not be possible to distinguish a sedimentation impact from the proposed development from those associated with tidal cycles.	No links identified.
Annual vegetation of drift lines [1210]	Annual vegetation of drift lines has been mapped and was identified as being discontinuously located to the seaward side of Bull Island (NPWS 2013b).	Links Identified. There is potential for strandline vegetation to be affected by contamination generated by the existing landfill and

		during the proposed capping operation.
<i>Salicornia</i> and other annuals colonising mud and sand [1310]	<i>Salicornia</i> and other annuals colonising mud and sand has been mapped and was identified as being located to the landward side of Bull Island (NPWS 2013b). This is a highly dynamic habitat subject to considerable tidal disturbance. As such, it would not be possible to distinguish a sedimentation impact from the proposed development from those associated with tidal cycles.	No links identified.
Atlantic salt meadows ( <i>Glauco-Puccinellietila maritima</i> ) [1330]	Atlantic salt meadows ( <i>Glauco-Puccinellietila maritima</i> ) has been mapped and was identified as being located to the landward side of Bull Island (NPWS 2013b).	Links Identified. There is potential for Atlantic salt meadows to be affected by contamination generated by the existing landfill and during the proposed capping operation.
Mediterranean salt meadows ( <i>Juncetalia maritima</i> ) [1410]	Mediterranean salt meadows ( <i>Juncetalia maritima</i> ) has been mapped and was identified as being located to the landward side of Bull Island (NPWS 2013b).	Links Identified. There is potential for Mediterranean salt meadows to be affected by contamination generated by the existing landfill and during the proposed capping operation.
Embryonic shifting dunes [2110]	Embryonic shifting dunes has been mapped and was identified as being located to the seaward side of Bull Island (NPWS 2013b).	Links Identified. There is potential for embryonic dunes to be affected by contamination generated by the existing landfill and during the proposed capping operation.
Shifting dunes along the shoreline with <i>Ammophila arenaria</i> (white dunes) [2120]	Shifting dunes along the shoreline with <i>Ammophila arenaria</i> (white dunes) has been mapped and was identified as being located to the seaward side of Bull Island (NPWS 2013b).	Links Identified. There is potential for shifting dunes to be affected by contamination generated by the existing landfill and during the proposed capping operation.
Fixed coastal dunes with herbaceous vegetation (grey dunes)* [2130]	Fixed coastal dunes with herbaceous vegetation (grey dunes)* has been mapped and was identified as being located to the central parts of Bull Island (NPWS 2013b). Owing to the terrestrial nature of the habitat, it is unlikely that it would be impacted by the site.	No links identified
Humid dune slacks [2190]	Humid dune slacks has been mapped and was identified as being located to the central parts of Bull Island (NPWS 2013b). Owing to the terrestrial nature of the habitat, it is unlikely that it would be impacted	No links identified

	by the site.	
Petalwort ( <i>Petalophyllum ralfsii</i> ) [1395]	The petalwort, by virtue of its preference for disturbed ground within dune hollows and slacks (NPWS 2013b) is unlikely that it would be impacted by the site	No links identified

**Table 6.3: Links with the Identified South Dublin Bay and River Tolka Estuary SPA**

SCI	Relevance to the ZoI of Likely Significant Effects of the Proposed Development	Key Source-Pathway-Receptor Link(s)
Light Bellied Brent Goose ( <i>Branta bernicla hrota</i> ) [A046]	Roosting locations for the SCI species have been mapped in 2012 (NPWS 2014). No roosting habitat not likely usage of proximal habitats within the ZoI of the proposed development have been identified.	No links identified
Knot ( <i>Calidris canutus</i> ) [A143]	Roosting locations for the SCI species have been mapped in 2011 (NPWS 2014). No roosting habitat not likely usage of proximal habitats within the ZoI of the proposed development have been identified.	No links identified
Sanderling ( <i>Calidris alba</i> ) [A144]	Roosting locations for the SCI species have been mapped in 2011 (NPWS 2014). No roosting habitat not likely usage of proximal habitats within the ZoI of the proposed development have been identified.	No links identified
Bar-tailed Godwit ( <i>Limosa lapponica</i> ) [A157]	Roosting locations for the SCI species have been mapped in 2011 (NPWS 2014). No roosting habitat not likely usage of proximal habitats within the ZoI of the proposed development have been identified.	No links identified
Redshank ( <i>Tringa totanus</i> ) [A162]	Roosting locations for the SCI species have been mapped in 2011 (NPWS 2014). No roosting habitat not likely usage of proximal habitats within the ZoI of the proposed development have been identified.	No links identified
Roseate Tern ( <i>Sterna Dougallii</i> ) [A192]	Roosting locations for the SCI species have been mapped in 2011 (NPWS 2014). No roosting habitat not likely usage of proximal habitats within the ZoI of the proposed development have been identified.	No links identified
Roseate Tern ( <i>Sterna Dougallii</i> ) [A192]	Roosting locations for the SCI species have been mapped in 2011 (NPWS 2014). No roosting habitat not likely usage of proximal habitats within the ZoI of the proposed development have been identified.	No links identified
CommonTern ( <i>Sterna hirundo</i> ) [A193]	Roosting locations for the SCI species have been mapped in 2011 (NPWS 2014). No roosting habitat not likely usage of proximal habitats within the ZoI of the proposed development have been identified.	No links identified
Arctic Tern ( <i>Sterna paradisaea</i> ) [A194]	Roosting locations for the SCI species have been mapped in 2011 (NPWS 2014). No roosting habitat not likely usage of proximal habitats within the ZoI of the proposed development have been identified.	No links identified
Oystercatcher ( <i>Haematopus ostralegus</i> ) [A130]	Roosting locations for the SCI species have been mapped in 2011 (NPWS 2014). No roosting habitat not likely usage of proximal habitats within the ZoI of the proposed development have been identified.	No links identified

Ringed Plover ( <i>Charadrius hiaticulaa</i> ) [A137]	Roosting locations for the SCI species have been mapped in 2011 (NPWS 2014). No roosting habitat not likely usage of proximal habitats within the Zol of the proposed development have been identified.	No links identified
Golden Plover ( <i>Pluvialis apricaria</i> ) [A140]	Roosting locations for the SCI species have been mapped in 2011 (NPWS 2014). No roosting habitat not likely usage of proximal habitats within the Zol of the proposed development have been identified.	No links identified
Grey Plover ( <i>Pluvialis squatarola</i> ) [A141]	Roosting locations for the SCI species have been mapped in 2011 (NPWS 2014). No roosting habitat not likely usage of proximal habitats within the Zol of the proposed development have been identified.	No links identified
Dunlin ( <i>Calidris alpina</i> ) [A149]	Roosting locations for the SCI species have been mapped in 2011 (NPWS 2014). No roosting habitat not likely usage of proximal habitats within the Zol of the proposed development have been identified.	No links identified
Black-headed Gull ( <i>Chroicocephalus ridibinus</i> ) [A179]	Roosting locations for the SCI species have been mapped in 2011 (NPWS 2014). No roosting habitat not likely usage of proximal habitats within the Zol of the proposed development have been identified.	No links identified
Wetlands & Waterbirds {A999}	No specific wetland habitat is mapped. The NPWS have mapped the SPA territory and do identify subsites within the 2012 roosting surveys. There is potential for contaminants generated by the existing landfill or during the proposed capping or IAPS to be carried into local surface waters, and enter the SPA, thereby potentially reducing habitat quality.	Link Identified

Based on the findings in **Tables 6.2** and **6.3**, Glensamole Valley SAC and South Dublin Bay SAC are not considered further in the NIS process as it can be shown that there is no link between the proposed development and the QI for these SAC. Furthermore, a number of QI habitats and the single species from North Dublin Bay SAC are likewise removed from further consideration as no link exists between the proposed development and the QI for the SAC.

In respect of South Dublin Bay and River Tolka Estuary SPA, there is no linkage between the proposed development and the SCI species of both of these coastal SPA's by virtue of their habitat requirements, and their absence from the Zol of the proposed development.

The NPWS Natura 2000 data form, dated September 2017, provides status assessments for QIs of the North Dublin Bay SAC (NPWS 2017b). For each relevant QI of the identified SAC, the site-level and national conservation status, and the site-level and national threats are detailed in **Table 6.4**.

The NPWS Natura 2000 data form, dated September 2017, provides status assessments for QIs of the South Dublin Bay and River Tolka Estuary SPA (NPWS, 2017d). For each relevant SCI of the identified SPA, the site-level conservation status, short and long-term population trends, and the site-level and international treats are detailed in **Table 6.5**.

**Table 6.4: Conservation Status and Threats to Relevant QI's of North Dublin Bay SAC**

Relevant QI	Site-Level Conservation Status (NPWS, 2017b)	National Conservation Status (and Trend) (NPWS, 2013b)	Primary Site-level Threats from the Proposed Development (Professional Judgement Applied to NPWS, 2017b)	Other National Threats from NPWS (2013a,b)
Annual vegetation of drift lines [1210]	B	Unfavourable Inadequate - Declining	Species Composition change (Succession) K02.01 Invasive non-native species (I01)	Reduction or loss of specific habitat features (J03.01) Changes in Abiotic conditions (M01)
Atlantic salt meadows (Glauco-Puccinellietil a maritima) [1330]	B	Unfavourable Inadequate - Stable	Species Composition change (Succession) K02.01	Changes in Abiotic conditions (M01)
Mediterranean salt meadows (Juncetalia maritima) [1410]	B	Unfavourable Inadequate - Stable	Species Composition change (Succession) K02.01	Changes in Abiotic conditions (M01)
Embryonic shifting dunes [2110]	A	Unfavourable Inadequate - Stable (negligible loss of national area)	Species Composition change (Succession) K02.01 Invasive non-native species (I01)	Reduction or loss of specific habitat features (J03.01) Changes in Abiotic conditions (M01)
Shifting dunes along the shoreline with <i>Ammophila arenaria</i> (white dunes) [2120]	B	Unfavourable Inadequate - Stable	Species Composition change (Succession) K02.01 Invasive non-native species (I01)	Reduction or loss of specific habitat features (J03.01) Changes in Abiotic conditions (M01)

**Table 6.5: Conservation Status and Threats to Relevant SCIs of South Dublin Bay and River Tolka Estuary SPA**

Relevant SCI	Site-Level Conservation Status (NPWS, 2013a)	Long term site population trend (NPWS, 2013b) BoCCI 2014-2019 (Colhoun and Cummins 2013)	Primary Site-level Threats from the Proposed Development (Professional Judgement Applied to NPWS, 2017b)	Other threats identified by Birdlife International <sup>11</sup>
Wetlands & Waterbirds {A999}	N/A	N/A	Loss/Degradation of habitat and Spread of IAPS	Agricultural intensification, wetland drainage, flood control, afforestation, land reclamation, industrial development, encroachment of <i>Spartina</i> spp. on mudflats, improvement of marginal grasslands, disturbance on intertidal mudflats from construction work.

### 6.1.3 Brief Description of European Sites within the Zol that are further assessed

There are two European sites within the Zol of the landfill, namely North Dublin Bay SAC and South Dublin Bay and River Tolka Estuary SPA. A pollution effect pathway was identified between the landfill and these European sites. No effect pathways have been identified between the proposed development and distant European sites, based on the Zol's identified and the known or potential distribution of mobile QI/SCI features identified.

#### 6.1.3.1 North Dublin Bay SAC

The SAC is centred on the inner part of Dublin Bay, extending northwards from the Bull wall and includes Bull Island. The island is a sandy spit that formed after engineering works in Dublin port and has over time seen increased. The site holds good examples of nine coastal habitats both sand-dune and saltmarsh that are listed on Annex I of the E.U. Habitats Directive; one of which is a priority habitat. The terrestrial part of the SAC supports a number of rare and scarce plants including some which are legally protected (e.g. *Petallophyllum ralfsii*), as well as some of the invertebrates are of national importance. Given the range of habitats, the SAC which overlaps with SPA and supports internationally important numbers of some wintering bird species.

#### 6.1.3.2 South Dublin Bay and River Tolka Estuary SPA

This is an extensive estuarine complex that covers much of Dublin Bay, both the southern sections of the bay along with Booterstown marsh and the discharge of the Tolka River to the immediate south of Bull Islands (North Bull Islands SPA). The SPA includes extensive areas of intertidal flats. For this reason, the site is of considerable ornithological importance given its extent, diversity of habitat and availability of feeding resource. It supports an internationally important population of Light-bellied Brent Goose and nationally important populations of a further nine wintering species. Furthermore,

<sup>11</sup> BirdLife International Data Zone. Available online at <http://datazone.birdlife.org/species/search>. Accessed April 2019.

the site supports a nationally important colony of breeding Common Tern and is an internationally important passage/staging site for three tern species.

## 6.2 CONSERVATION OBJECTIVES

### 6.2.1 North Dublin Bay SAC

Site specific Conservation Objectives for North Dublin Bay SAC are available (NPWS, 2013b). **Table 6.6** identifies the Conservation Objective attributes which could be adversely affected by the proposed development, for 'relevant' QIs scoped into the assessment.

**Table 6.6: Conservation Objective Attributes for North Dublin Bay SAC**

Relevant QI	Site Specific Conservation Objective (NPWS)	Site Specific Attributes Potentially affected by the Landfill
Annual vegetation of drift lines [1210]	To restore the favourable conservation condition	Habitat area Vegetation composition – negative indicator species
Atlantic salt meadows ( <i>Glauco-Puccinellietila maritima</i> ) [1330]	To maintain the favourable conservation condition	Habitat area Vegetation composition – negative indicator species
Mediterranean salt meadows ( <i>Juncetalia maritima</i> ) [1410]	To maintain the favourable conservation condition	Habitat area Vegetation composition – negative indicator species
Embryonic shifting dunes [2110]	To restore the favourable conservation condition	Habitat area Vegetation composition – negative indicator species
Shifting dunes along the shoreline with <i>Ammophila arenaria</i> (white dunes) [2120]	To restore the favourable conservation condition	Habitat area Vegetation composition – negative indicator species

### 6.2.2 South Dublin Bay and River Tolka Estuary SPA

Site specific Conservation Objectives for South Dublin Bay and River Tolka Estuary SPA are available (NPWS, 2015b). **Table 6.7** identifies the Conservation Objective attribute which could be adversely affected by the proposed development, for 'relevant' SCIs scoped into the assessment.

**Table 6.7: Conservation Objective Attributes for Relevant SPA**

Relevant SCI	Site Specific Conservation Objective (NPWS, 2015b)	Site-Specific Attributes Potentially affected by the Proposed Development
Wetlands & Waterbirds {A999}	To maintain the favourable conservation condition of the wetland habitat in South Dublin Bay and River Tolka Estuary SPA as a resource for regularly occurring migratory waterbirds that utilise it.	Habitat Area

## 6.3 PREDICTED EFFECTS

The prediction of potential effects from the proposed development (alone) to the integrity of European sites is presented in this Section. Cumulative effects from the proposed development in combination with other plans or projects are presented in **Section 6.3.5**.

### 6.3.1 North Dublin Bay SAC

The prediction of effects from the proposed development to the integrity (based on QIs) of the North Dublin Bay SAC is set out in **Table 6.8**.

**Table 6.8: Prediction of Effects on Site Integrity (QIs) in North Dublin Bay SAC**

Relevant QI	Effect Pathway	Relevant Site-Level Threat	Predicted Adverse Effect(s) Triggers to relevant QI
Annual vegetation of drift lines [1210]	Surface water pollution. Dispersal of scheduled invasive Species	Species composition change (succession) (K02.01) and invasive non-native species (I01)	<b>Habitat area:</b> None predicted as landfill avoids activity within the habitat. <b>Vegetation composition:</b> Predicted impacts resulting from surface water pollution.
Atlantic saltmeadows (Glauco Puccinellia) [1330]	Surface water pollution. Dispersal of scheduled invasive Species	Species composition change (succession) (K02.01) and invasive non-native species (I01)	<b>Habitat area:</b> None predicted as landfill avoids activity within the habitat. <b>Vegetation composition:</b> Predicted impacts resulting from surface water pollution.
Mediterranean salt meadows (Juncetalia maritimi) [1410]	Surface water pollution. Dispersal of scheduled invasive Species	Species composition change (succession) (K02.01) and invasive non-native species (I01)	<b>Habitat area:</b> None predicted as landfill avoids activity within the habitat. <b>Vegetation composition:</b> Predicted impacts resulting from surface water pollution.
Embryonic shifting dunes [2110]	Surface water pollution. Dispersal of scheduled invasive Species	Species composition change (succession) (K02.01) and invasive non-native species (I01)	<b>Habitat area:</b> None predicted as landfill avoids activity within the habitat. <b>Vegetation composition:</b> Predicted impacts resulting from surface water pollution.
Shifting dunes along the shoreline with <i>Ammophila arenaria</i> (white dunes) [2120]	Surface water pollution. Dispersal of scheduled invasive Species	Species composition change (succession) (K02.01) and invasive non-native species (I01)	<b>Habitat area:</b> None predicted as landfill avoids activity within the habitat. <b>Vegetation composition:</b> Predicted impacts resulting from surface water pollution.



### 6.3.2 South Dublin Bay and River Tolka Estuary SPA

The prediction of effects from the proposed development to the integrity (based on SCIs) of the South Dublin Bay and River Tolka Estuary SPA is set out in **Table 6.9**.

**Table 6.9: Prediction of Effects on Site Integrity (QIs) in South Dublin Bay and River Tolka Estuary SPA**

Relevant SCI	Effect Pathway	Relevant Site-Level Threat	Predicted Adverse Effect(s) Triggers to relevant SCI
Wetlands & Waterbirds {A999}	Surface water pollution. Dispersal of scheduled invasive Species	Discharges and Loss/change to habitat invasive non-native species	<b>Extent:</b> No direct impact predicted as landfill avoids activity within the habitat. However, predicted impacts resulting from surface water pollution and potential invasive species spread.

### 6.3.3 In Combination Effects

Legislation, guidance and case law requires that in-combination effects with other plans or projects are considered. On this basis, a range of other plans and projects were considered in terms of their potential to have in-combination effects with the landfill and these have been previously listed (**Section 5.3**). The assessment of in-combination effects has regard for developments potentially affecting the downstream European sites, with which a potential pathway has been identified. The Natura Standard Data Form (NPWS Website) for the two sites identify the most important impacts (high and medium) and activities with high effect on the various European sites as:

#### North Dublin Bay SAC<sup>12</sup>

- E03 - Discharges
- E01 - Urbanised areas, human habitation
- E02 - Industrial or commercial areas
- G01.02 - walking, horseriding and non-motorised vehicles
- K03.06 - antagonism with domestic animals
- H01.09 - diffuse pollution to surface waters due to other sources not listed
- J01.01 - burning down
- A04 - grazing
- G01.01 - nautical sports
- H01.03 - other point source pollution to surface water
- F02.03 - Leisure fishing
- G02.01 - golf course
- I01 - invasive non-native species

#### South Dublin Bay and River Tolka Estuary SPA<sup>13</sup>

<sup>12</sup> <https://www.npws.ie/sites/default/files/protected-sites/natura2000/NF000206.pdf>

- E02 - Industrial or commercial areas
- E01 - Urbanised areas, human habitation
- J02.01.02 - reclamation of land from sea, estuary or marsh
- E03 - Discharges
- G01.02 - walking, horseriding and non-motorised vehicles
- D01.02 - roads, motorways
- F02.03 - Leisure fishing
- K02.03 - eutrophication (natural)
- G01.01 - nautical sports
- F02.03.01 - bait digging / collection

While the Dodder is generally well protected under local land use policy, there are two existing or committed developments highlighted in **Section 5.3** which have potential for cumulative impact with the Bohernbreena landfill as follows:

- The detailed design of the Dodder Greenway has been completed but the construction works are yet to commence on the new infrastructural elements (car parking facilities at Kiltipper Road, new surfacing, etc.). There is potential for overlap between the works on the greenway (expected in 2020) and the proposed capping at the Bohernabreena site with potential for cumulative sedimentation and IAPS impact to the Dodder and associated European sites.
- The Friarstown Landfill leachate tank overflow pipe is discharging directly to the Dodder River potentially having a cumulative adverse impact from controlled and uncontrolled discharges of leachate constituents (e.g. ammonium) to the Dodder.

These projects have the potential for a likely significant in-combination effect on the European sites. Residual effects of the Bohernabreena landfill, following mitigation measures, are discussed in **Section 7.7**.

<sup>13</sup> <https://www.npws.ie/sites/default/files/protected-sites/natura2000/NF004024.pdf>

## 7 MITIGATION MEASURES

For the purposes of this assessment the term ‘mitigation measures’ refers to ‘those measures which aim to minimise, or even cancel, the negative impacts on a site that are likely to arise as a result of the implementation of a plan or project. These measures are an integral part of the specifications of a plan or project’ (Guidance document on Article 6(4) of the Habitats Directive 92/43/EEC, January 2007).

Based on the Appropriate Assessment carried out in **Section 6**, the mitigation will focus on the following potential pathways:

- Surface water pollution; and
- Biosecurity measures for IAPS

The mitigation is set out in three themes as follows:

- **The Need for a Remediation Solution** – As shown in Section 6, the landfill in its current form is potentially having an adverse impact on surface water (i.e. the Dodder) and potentially the downstream European sites through the migration of leachate from the site. As such, the existing landfill must be mitigated to reduce any potential adverse impact as determined by the Environmental Risk Assessment (ERA). The ERA recommends the installation of an engineered cap on the waste body with a low permeability barrier as described in **Section 7.1**.
- **Mitigation of the Proposed Capping Works** – As shown in Section 6, the proposed capping works have the potential for adverse impact on European sites and hence a series of management/mitigation measures must be implemented during the works. Any capping contractor appointed by SDCG shall be required to comply with, and implement, the requirements and mitigation measures as set out in **Section 7.2, Section 7.3, Section 7.4 and Section 7.5**.
- **Aftercare Monitoring** – A proposed set of aftercare monitoring is included to track the success of the proposed capping works relative to baseline (**Section 7.6**).

Residual effects of the proposed development, following mitigation measures outlined in this section, are discussed in **Section 7.7**.

### 7.1 CAPPING OF THE LANDFILL

The findings of the Environmental Risk Assessment recommends the installation of an engineered cap on the waste body with a low permeability barrier. The cap will 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  $1 \times 10^{-4}$  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. This layer may be unnecessary given the gas generating potential of the waste body.

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.

The cap will create a barrier between the source (the waste body and associated leachate) and pathway (rainfall ingress to the waste body) to reduce the potential for the generation and transport of leachate from the site to the adjoining River Dodder.

## 7.2 BEST PRACTICE DESIGN AND CONSTRUCTION METHODOLOGY

The proposed capping works will be carried out by contractors, suitably appointed, who will meet the requirements of the standard best practice measures outlined below. The appointed contractor will be obliged to submit a detailed method statement or similar outlining how the proposed best practice measures will be implemented and how these methods will avoid all potential impacts to proximal European sites. The measures required for inclusion in the Contractor's Method Statements are provided in greater detail below.

The appointed contractor will be required to develop and implement Method Statements (MS)/ Environmental Operating Plan (EOP) to be informed by those guidance documents and best practice measures provided below. These documents will detail control measures with respect to minimising impacts upon ecology in the area. These will be submitted to the Employers Representative for review and agreement prior to the commencement of proposed works. The method statement will be strictly adhered to by the contractors involved in the works and will be overseen by the project representative/foreman.

The following documents will form the backbone of the method statement supplemented by specific additional measures proposed below:

- NRA (2010). Guidelines for the Management of Noxious Weeds and Non-Native Invasive Plant Species on National Roads. National Roads Authority, Dublin;
- NRA (2008). Guidelines for the Crossing of Watercourses during the Construction of National Road Schemes. National Roads Authority, Dublin;
- Murnane, E., Heap, A. and Swain, A. (2006). Control of water pollution from linear construction projects. Technical guidance (C648). CIRIA;
- Murnane, E., et al., (2006). Control of water pollution from linear construction projects. Site guide (C649). CIRIA;
- Masters-Williams, H., et al., (2001). Control of water pollution from construction sites. Guidance for consultants and contractors (C532);
- IFI (2016). Guidelines on Protection of Fisheries during construction works in and adjacent to waters. Inland Fisheries Ireland, Dublin; and

- Enterprise Ireland (Anon.) Best Practice Guide (BPGCS005) Oil Storage Guidelines.

The proposed works will be carried out in accordance with the following best practice construction measures:

- During the course of the works, all materials shall be stored at a secure contractor compound and transported to the works zone immediately prior to construction;
- Fuels, lubricants and hydraulic fluids for equipment used on the site, as well as any solvents, oils, and paints will be carefully handled to avoid spillage, properly secured against unauthorised access or vandalism, and provided with spill containment according to codes of practice;
- Any spillage of fuels, lubricants or hydraulic oils will be immediately contained and the contaminated soil removed from the site and disposed of properly;
- Waste oils and hydraulic fluids will be collected in leak-proof containers and removed from the site for disposal or re-cycling;
- Any bulk or fuel storage tank should be properly bunded with a bund capacity of at least 110% of that fuel tank;
- Prior to construction works a Waste Management Plan (WMP) should be prepared to outline the methodology for dealing with generated spoil and in particular Invasive Alien plant material and vector soil, during excavation, handling and disposal of any such material;
- Contaminated spoil (including spoil contaminated with invasive species) shall only be disposed of at an appropriately licenced facility. The necessary licences, permits and permissions will be required for this activity; and
- The contractor shall ensure that no harmful materials shall be deposited into nearby watercourses, including drainage pipes, on or adjacent to the site.

### 7.3 SURFACE WATER MANAGEMENT

The capping works shall be undertaken within a framework of environmental protection practices defined and co-ordinated as outlined in **Section 7.2**. In addition, there are specific mitigation requirements relating to sediment control and the protection of water through good working practices, most notably the CIRIA guidance for the 'Control of Water Pollution from Construction Sites' (CIRIA, 2001). The following mitigation will be applied as a minimum:

- Existing surface water drainage infrastructure (e.g. gullies) will not be interfered with or blocked during the proposed works. Neither will they be used for the unattenuated discharge of silt-laden waters from the works;
- Stockpiling of construction materials shall be strictly prohibited within 10 metres of the boundary with the Dodder, any existing surface water drainage, ditch or water-laden channel;
- Excavations, where necessary shall be left open for minimal periods to avoid acting as a conduit for surface water flows;
- Waste materials shall be stored in designated areas that are isolated from surface water drains. Skips, where used, will be closed or covered to prevent materials being blown or washed away and to reduce the likelihood of contaminated water leakage;

- Temporary construction compounds shall not be located within the boundary of the landfill;
- No harmful materials shall be deposited into any watercourses, including drainage ditches/pipes on or adjacent to the site; and
- A series of silt curtains will be installed at the western boundary of the capping works adjacent to the Dodder to mitigate the potential for sedimentation impact from the capping works. These silt curtains will provide an effective barrier between the imported material and the water course for the duration of works. The silt curtains will be inspected as part of routine maintenance to ensure the efficiency in the operation is maintained.

Protection measures shall be put in place to ensure that all hydrocarbons used during the construction works are appropriately handled, stored and disposed of in accordance with recognised standards. These measures will include:

- Hazardous materials including diesel, fuel oils, solvents, paints and/or lubricants stored on site will be stored within suitably designed bunded areas with a bund volume of 110% of the capacity of the largest tank/container.
- Re-fuelling of plant will not ordinarily occur within 50 metres of any watercourse or surface water/groundwater feature. Drip trays will be used and appropriate spill kits will be kept available;
- Machinery used on site will be regularly inspected to ensure there is no leakage from them and to ensure the machinery will not cause contamination of watercourses;
- Where required, fuel will be transported in a mobile, double skinned tank and a spill tray will be used when refuelling (if taking place outside a compound area);
- Waste oils and hydraulic fluids will be collected in leak-proof containers and removed from the site for disposal or recycling;
- Only emergency breakdown maintenance will be carried out on site. Emergency procedures and spillage kits will be readily available at strategic site locations and construction staff will be familiar with emergency procedures; and
- Any spillage of fuels, lubricants or hydraulic oils will be immediately contained, with an appropriate emergency response put in place (**Section 7.4**). Any contaminated soil will be removed from the site and properly disposed of to a suitably licenced facility.

Protection measures shall be put in place to ensure that all contaminated soil and water disturbed/generated during the construction are appropriately handled, stored and disposed of in accordance with recognised standards. These measures will include:

- Any excavations shall be supervised by a suitably qualified person if contamination is encountered this should be appropriately segregated to prevent cross contamination;
- Any material to be deposited offsite are required to be Waste Acceptance Criteria (WAC) tested to classify the material as either inert, non-hazardous, or hazardous. The waste shall be disposed of at the appropriate licenced or permitted waste facility.
- The excavation and handling of any potentially contaminated material could increase the mobilisation of any contaminants present. This presents a risk from leaching, surface run-off, migration through the subsurface, and direct contact (human health);

- Should contamination be encountered during construction, further site investigations are required to delineate any potential contamination within the subsurface;
- Excavated contaminated material (including IAPS material or infected soil) should be appropriately stockpiled on plastic liners (if not taken offsite immediately). The stockpile should be covered with plastic to prevent the ingress of rainwater. The stockpile should be bunded to collect any contaminated surface water run-off. The excavated material should be WAC tested for appropriate disposal or reuse on site;
- During piling any contaminated arisings should be stockpiled as previously described and WAC tested for appropriate disposal or reuse on site; and
- Any contaminated water generated from contaminated material shall be containerised in an Intermediate Bulk Container (IBC)/tank, tested and disposed of at an appropriate facility.

## 7.4 EMERGENCY RESPONSE & ENVIRONMENTAL TRAINING

SDCC, or any contractor appointed by SDCC, shall prepare an Emergency Response Plan (ERP) which will include the following as a minimum:

- Details of proposed training of relevant staff, including cover staff, in the implementation of the ERP and the use of spill kits;
- A method for which all staff will ensure that all personnel working on site are trained in pollution incident control response. A regular review of weather forecasts of heavy rainfall is required, and the contractor is required to prepare a contingency plan for before and after such events;
- The details of procedures to be undertaken in the event of the release of any sediment into a watercourse, or any spillage of chemicals, fuel or other hazardous wastes or other such risks that could lead to a pollution incident, including flood risks;
- A confirmation of the number and specification of spill kits which shall be carried at the site as a minimum; and
- Information on clean-up procedures to include the following:
  - The contractor will immediately initiate appropriate clean-up operations and notify the Local Authority and Inland Fisheries Ireland of any sediment releases, hydrocarbon leakages or spillages during the construction activities;
  - The contractor will contain the bulk of the spill immediately using a spill kit (on terrestrial land) before placing the contaminated absorbent material and the contaminated soil in a stockpile at least 50 m from, and downslope of any watercourses; and
  - All contaminated material will be underlain and covered by plastic to prevent leachate generation, until such time as it can be removed off-site by an appropriately licensed waste management company.

## 7.5 INVASIVE SPECIES BEST PRACTICE MEASURES

Invasive Alien Plant Species (IAPS) can be introduced into a location or spread from a location by means of contaminated vehicles and equipment, in particular tracked vehicles which have been

previously used in locations that contained IAPS and for which no biosecurity measures have been put in place.

In the event that high impact IAPS were noted on any part of the site, the contractor will be required to produce an Invasive Species Management Plan and /or refine test locations, access points as necessary, prior to continuation of the proposed works. This will be submitted to SDCC for review and written agreement prior to the proposed works recommencing. It will include best practice measures pertinent to the specific IAPS identified. Best practice measures must include but not be limited to the following:

- All plant and equipment employed on the proposed works (e.g. diggers, tracked machines, footwear etc.) must be thoroughly inspected and where necessary cleaned down using a power washer unit, and washed into a dedicated and contained area prior to arrival on site and on leaving site to prevent the spread of high impact invasive plant species such as Japanese Knotweed *Fallopia japonica* and Himalayan Balsam *Impatiens glandulifera*. A sign off sheet must be maintained by the contractor to confirm cleaning;
- For any material entering the site including backfill material, the supplier must provide an assurance that it is free of non-native invasive species;
- Should any invasive plant species be encountered, the infested areas will be clearly demarcated accounting for potential underground rhizome spread, creating an exclusion zone. Dedicated exclusion zone entry and exit points will be created for operators on foot and for small mobile equipment. A delineated access track to be maintained free of invasive species should be established through the site to minimise the spread of invasive species by permitted vehicles accessing the site. Dedicated footwear and vehicular clean down facility should be installed in the exclusion zone;
- All vehicles leaving the site should be inspected for any plant material and cleaned down in a secure and contained area;
- Spoil or other material contaminated with IAPS shall only be disposed of at an appropriately licenced waste facility. The necessary licences, permits and permissions for this activity will be required to be put in place by the contractor;
- Vehicles used in the transport of contaminated material will need to be visually checked and cleaned down into a contained area before being used for any other work, either on the same site or at a different site;
- Any material gathered in a dedicated/contained clean down area will need to be appropriately treated as contaminated material;
- The contractor must ensure all site users are aware of the invasive species management plan and treatment methodologies. This can be achieved through 'toolbox talks' before works begin on the site; and
- Adequate site hygiene signage should be erected in relation to the management of non-native invasive material.

## 7.6 AFTERCARE MONITORING

To support the capping, the following environmental monitoring is proposed at the site:



- Surface water monitoring at the locations shown in **Figure 3.3** should be undertaken monthly during the capping works and quarterly thereafter for a period of five years.
- Groundwater monitoring at the locations shown in **Figure 3.2** should be undertaken annually for a period of five years.
- 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.
- An invasive alien plant species (IAPS) survey should be undertaken prior to and following the proposed capping works.

## 7.7 RESIDUAL IMPACTS

Guidance provided by the Irish Government (DoEHLG, 2010) states that:

*'If the competent authority considers that residual adverse effects remain, then the plan or project may not proceed without continuing to stage 3 of the AA process: Alternative Solutions'*

Taking into account the mitigation measures identified and set out in this NIS, no residual adverse effects within the ZOI of the proposed development have been identified (**Table 7.1**).

**Table 7.1: Identification of Residual Adverse Effects within the ZOI**

Relevant QI/SCI	Potential Impacts Identified	Potential Cumulative Impacts Identified	Mitigation Proposed	Residual Adverse Effects Identified
Annual vegetation of drift lines [1210]	Surface water pollution. Dispersal of scheduled invasive Species	Yes	Yes	None
Atlantic saltmeadows (Glauco Puccinelliatia) [1330]	Surface water pollution. Dispersal of scheduled invasive Species	Yes	Yes	None
Mediterranean salt meadows (Juncetalia maritimi) [1410]	Surface water pollution. Dispersal of scheduled invasive Species	Yes	Yes	None
Embryonic shifting dunes [2110]	Surface water pollution. Dispersal of scheduled invasive Species	Yes	Yes	None
Shifting dunes along the shoreline with <i>Ammophila arenaria</i> (white dunes) [2120]	Surface water pollution. Dispersal of scheduled invasive Species	Yes	Yes	None
Wetlands & Waterbirds {A999}	Surface water pollution. Dispersal of scheduled invasive Species	Yes	Yes	None

## 8 CONCLUSION OF THE APPROPRIATE ASSESSMENT

This NIS has been prepared following the Department of the Environment, Heritage and Local Government guidance 'Appropriate Assessment of Plans and Projects in Ireland - Guidance for Planning Authorities' (DoEHLG, 2010). As stated in that guidance document, the requirement of the AA is not to prove what the impacts and effects will be, but rather to establish beyond reasonable scientific doubt that adverse effects on site integrity will not result.

RPS has prepared this NIS to document the analysis and evaluation seeking to establish whether or not, in view of best scientific knowledge and applying the precautionary principle, and in light of the conservation objectives of relevant European sites, the landfill and/or proposed capping, either individually or in combination with other plans or projects, will adversely affect the integrity of European sites.

The landfill in its current form and the proposed remediation works have been detailed (**Section 3**), and the receiving environment has been described (**Section 4**). A number of European sites have been identified within the Zol of the site via the following effect pathways (**Section 6**):

- Surface water pollution; and
- Spread of IAPS.

To minimise, or even cancel, the negative impacts on a European site that are likely to arise as a result of the existing landfill and/or the proposed capping, mitigation measures were recommended (**Section 7**). These mitigation measures provide recommendations for surface water management, invasive species management, emergency responses and environmental training, and site management during capping. Provided the full implementation of mitigation measures are carried out, it is envisaged that there will be no significant residual effects on the integrity of any European sites.

In conclusion, it is the opinion of RPS that in view of best scientific knowledge and applying the precautionary principle, and in light of the conservation objectives of the relevant European sites, the proposed capping, either individually or in combination with other plans or projects, will not have an adverse effect on the integrity of any European site(s), given the implementation of mitigation measures outlined.

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