

Luas Finglas

Natura Impact Statement 2024

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GLOSSARY OF FREQUENTLY USED TERMS

Term	Definition
AA	Appropriate Assessment
ABP	An Bord Pleanála
CEMP	Construction Environmental Management Plan
CIEEM	Chartered Institute of Ecology and Environmental Management
CIRIA	Construction Industry Research and Information Association
CJEU	Court of Justice of the European Union
CMS	Construction Method Statement
DoEHLG	Department of Environment, Heritage and Local Government
DCC	Dublin City Council
DoHLGH	Department of Housing, Local Government and Heritage
EC	European Communities
ECJ	European Court Judgment
ECoW	Ecological Clerk of Works
EIAR	Environmental Impact Assessment Report
EPA	Environmental Protection Agency
EPR	Emerging Preferred Route
FCC	Fingal County Council
GIS	Geographic Information Systems
GSI	Geological Survey Ireland
IAQM	Institute of Air Quality Management
ICW	Integrated Construction Wetland
IFI	Inland Fisheries Ireland
INNS	Invasive Non-Native Species
IROPI	Imperative Reasons of Over-riding Public Interest
ISI	Invasive Species Ireland
KDE	Kernel Density Estimates
LRV	Light Rail Vehicle
NBDC	National Biodiversity Data Centre
NIS	Natura Impact Statement
NPWS	National Parks and Wildlife Services
NRA	National Roads Authority
OCS	Overhead Contact System
OPW	Office of Public Works
OSM	Open Street Map
PR	Preferred Route
QI	Qualifying Interest

Term	Definition
RBMP	River Basin Management Plan
SAC	Special Area of Conservation
SCI	Special Conservation Interest
SPA	Special Protection Area
SuDS	Sustainable Drainage Systems
TII	Transport Infrastructure Ireland
WFD	Water Framework Directive
WWTP	Waste Water Treatment Plant
Zoi	Zone of Influence

SECTION 1: INTRODUCTION

1.1 Background

This Natura Impact Statement (NIS) in relation to Luas Finglas (hereafter referred to as 'proposed Scheme'), which contains information required for the competent authority in undertaking Appropriate Assessment, has been prepared by JBA Consulting Ireland Ltd. (hereafter referred to as JBA) on behalf of the applicant Transport Infrastructure Ireland. It has been prepared in accordance with Article 6(3) of the Habitats Directive (Council Directive 92/43/EEC on the conservation of natural habitats and of wild fauna and flora).

A Screening for Appropriate Assessment (AA) for the proposed Scheme has been carried out (JBA, 2024). The assessment concluded that potential likely significant effects from the proposed Scheme may negatively affect local Natura 2000 sites, Special Areas of Conservation (SAC) and Special Protection Areas (SPA), within the proposed Scheme's Zone of Influence (Zoi), namely:

- North Dublin Bay SAC;
- South Dublin Bay SAC;
- Rockabill to Dalkey Island SAC;
- North Bull Island SPA;
- South Dublin Bay and River Tolka Estuary SPA; and
- North-west Irish Sea SPA.

Likely significant effects on the Qualifying Interests (QIs) and Special Conservation Interests (SCIs) of the Natura 2000 sites were identified in the screening stage.

The Zone of Influence (Zoi), within which potential impacts from any proposed Scheme must be considered for significance, depends on a variety of factors. This includes the nature, location and extent of the proposed works, the ecological receptors present within the Natura 2000 sites within the area and the potential for in combination impacts (DoEHLG, 2009).

1.2 Legislative Context for Appropriate Assessment

The Habitats Directive (Council Directive 92/43/EEC on the conservation of natural habitats and of wild fauna and flora) aims to maintain or restore the favourable conservation status of habitats and species of community interest across Europe.

The requirements of Articles 6(3) and 6(4) of the Habitats Directive have been transposed into Irish legislation by means of inter alia the European Communities (Birds and Natural Habitats) Regulations 2011 (S.I. No. 477 / 2011).

Under the Directive, a network of sites of nature conservation importance have been identified by each Member State as containing specified habitats or species requiring to be maintained or returned to favourable conservation status. In Ireland the network consists of Special Areas of Conservation (SACs) and Special Protection Areas (SPAs), and also candidate sites, which form the Natura 2000 network.

Article 6(3) of the Habitats Directive requires that, in relation to European designated sites (i.e. SACs and SPAs that form the Natura 2000 network):

'any plan or project not directly connected with or necessary to the management of the site but likely to have a significant effect thereon, either individually or in combination with other plans or projects, shall be subject to appropriate assessment of its implications for the site in view of the site's conservation objectives. In the 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.'

Therefore, a competent authority (e.g. An Bord Pleanála) can only grant approval for a plan or project after having determined that it will not adversely affect the integrity of any European site, in light of the sites' conservation objectives and best scientific evidence, either alone or in combination with other plans or projects.

Under article 6(4) of the Directive, if in spite of a negative assessment of the implications for the site (i.e. if adverse impacts on the integrity of a European site cannot be ruled out), and in the absence of alternative solutions, a plan or project must nevertheless be carried out for imperative reasons of overriding public interest (IROPI), including those of a social or economic nature, a Member State is required to take all compensatory measures necessary to ensure that the overall coherence of the Natura 2000 site is protected and to inform the Commission of the compensatory measures adopted.

1.3 Appropriate Assessment Process

Guidance on the Appropriate Assessment (AA) process was produced by the European Commission in 2002, which was subsequently developed into guidance specifically for Ireland by the Department of Environment, Heritage and Local Government (DEHLG) (2009, rev 2010). Office of the Planning Regulator (OPR) produced a Practice Note in 2021, PN01 - Appropriate Assessment Screening for Development Management (OPR, 2021). Additionally, the European Commission's Assessment of plans and projects in relation to Natura 2000 sites – Methodological guidance on the provisions of Article 6(3) and (4) of the Habitats Directive 92/43/EEC 2021/C 437/01 (EC, 2021) provides guidance on the process. These guidance documents identify a staged approach to conducting an AA, as shown in Figure 1-1.



Figure 1-1: The Appropriate Assessment Process (DoEHLG, 2009 rev 2010)

1.3.1 Stage 1 - Screening for AA

The initial, screening stage of the Appropriate Assessment is to determine:

- whether the proposed plan or project is directly connected with or necessary for the management of the European designated site for nature conservation; and
- if it is likely to have a significant effect on the European designated site, either individually or in combination with other plans or projects.

For those sites where potential likely significant effects are identified, either alone or in combination with other plans or projects, further assessment is necessary to determine if the proposals will have a likely significant effect on the integrity of a European designated site, in view of the site's conservation objectives (i.e., the process proceeds to Stage 2).

1.3.2 Stage 2 - AA

This stage requires a more in-depth evaluation of the plan or project, and the potential direct and indirect adverse impacts of them on the integrity and interest features of the European designated site(s), alone and in-combination with other plans and projects, taking into account the site's conservation objectives. Where required, mitigation or avoidance measures will be suggested.

The competent authority can only agree to the plan or project after having ascertained that it will not adversely affect the integrity of any European site, in light of its conservation objectives and best scientific evidence, either alone or in combination with other plans or projects, after mitigation measures have been applied, and the mitigation measures are certain and capable of being successfully implemented. If this

cannot be determined, then alternative solutions will need to be considered (i.e., the process proceeds to Stage 3).

1.3.3 Stage 3 - Alternative Solutions

Where adverse impacts on the integrity of *European* sites are identified, after mitigation measures have been applied, or the mitigation measures are not certain / capable of being successfully implemented, alternative ways of achieving the objectives of the plan or project that avoid adverse impacts need to be considered. If none can be found, the process proceeds to Stage 4.

1.3.4 Stage 4 - IROPI

Where adverse impacts of a plan or project on the integrity of *European* sites are identified and no alternative solutions exist, the plan will only be allowed to progress if imperative reasons of overriding public interest (IROPI) can be demonstrated. In such a case compensatory measures will be required.

The process only proceeds through each of the four stages for certain plans or projects. For example, for a plan or project, not connected with management of a site, but where no likely significant impacts are identified, the process stops at stage 1. Throughout the process, the precautionary principle must be applied, so that any uncertainties do not result in adverse impacts on a site.

1.3.5 Recent judgments of the Court of Justice of the European Union (CJEU) relevant to Appropriate Assessment process

The CJEU has been asked to issue rulings on development plans, which are used to inform this assessment.

The CJEU issued a ruling on the consideration of avoidance and reduction measures as a result of the case known as *People over Wind, Peter Sweetman v Coillte Teoranta* (Case C-323/17). This judgement stated that measures intended to reduce or avoid effects on a European site should only be considered within the framework of an AA, and it is not permissible to take into account such measures at the screening stage.

More recently, the decision of the CJEU in case C-721/21 (*Eco Advocacy CLG v An Bord Pleanála*), delivered in June 2023, found that Article 6(3) of the Habitats Directive must be interpreted as meaning that:

‘in order to determine whether it is necessary to carry out an appropriate assessment of the implications of a plan or project for a site, account may be taken of the features of that plan or project which involve the removal of contaminants and which therefore may have the effect of reducing the harmful effects of the plan or project on that site, where those features have been incorporated into that plan or project as standard features, inherent in such a plan or project, irrespective of any effect on the site.’ (Para. 53(3) of the Judgement).

This recent judgement therefore clarifies that features which have been incorporated into a project as standard features, inherent in that project, and irrespective of any effect on any European site may be taken into account for the purposes of a Stage 1 Screening for Appropriate Assessment under Article 6(3) of the directive.

The CJEU ruling in the case of *Holohan v An Bord Pleanála* (C-461/17) [2018] also clarified the importance in Appropriate Assessment of taking into account habitat types and species outside the boundary of the Natura 2000 site where implications of the impacts on those habitat and species may impact the conservation objectives of the Natura 2000 site. In this assessment functionally linked and supporting habitat for species outside of Natura 2000 sites are assessed where they could potentially impact the conservation objectives of any Natura 2000 sites within the Zone of Influence (Zoi).

1.4 Methodology

The following documents have also been used to provide guidance for the assessment:

- DoEHLG (2009, 2010 revision) Appropriate Assessment of Plans and Projects in Ireland Guidance for Planning Authorities. Department of the Environment, Heritage and Local Government;
- European Communities (EC) (2019) Managing Natura 2000 Sites: the provisions of Article 6 of the 'Habitats' Directive 92/43/EEC, Office for Official Publications of the European Communities, Luxembourg. European Commission;
- EC (2021) Assessment of Plans and Projects Significantly Affecting Natura 2000 Sites: Methodological guidance on the provisions of Article 6(3) and (4) of the Habitats Directive 92/43/EEC, Office for Official Publications of the European Communities, Luxembourg. European Commission;
- EC (2022) Guidance document on assessment of plans and projects in relation to Natura 2000 sites - A summary (European Commission. Directorate General for Environment); and
- CIEEM (2018). Guidelines for Ecological Impact Assessment in the UK and Ireland - Terrestrial, Freshwater and Coastal, Second Ed. (Chartered Institute of Ecology and Environmental), updated 2022.

1.4.1 Desktop study

A desktop study was conducted of available published and unpublished information, along with a review of data available on the National Parks and Wildlife Service (NPWS) and National Biodiversity Data Centre (NBDC) web-based databases, in order to identify key habitats and species (including legally protected and species of conservation concern) that may be present within ecologically relevant distances from the project as explained below. A baseline habitat assessment was performed using satellite imagery of the site. The data sources below (accessed August 2024) were consulted for the desktop study:

- EC (2013) Interpretation Manual of European Union Habitats. Version EUR 28. European Commission;
- NPWS, 2019a. The Status of EU Protected Habitats and Species in Ireland. Volume 1: Summary Overview. Unpublished NPWS report. Edited by: Deirdre Lynn and Fionnuala O'Neill;
- NPWS, 2019b. The Status of EU Protected Habitats and Species in Ireland. Volume 2: Habitats Assessments. Unpublished NPWS report. Edited by: Deirdre Lynn and Fionnuala O'Neill;
- NPWS, 2019c. The Status of EU Protected Habitats and Species in Ireland. Volume 3: Species Assessments. Unpublished NPWS report. Edited by: Deirdre Lynn and Fionnuala O'Neill;
- Aerial photography available from www.osi.ie and ESRI World Imagery;
- NPWS website (www.npws.ie) where Natura 2000 site synopses, data forms and conservation objectives were obtained along with Annex I habitat distribution data and status reports;
- River Basin Management Plans (www.wfdireland.ie);
- NBDC Biodiversity Maps (maps.biodiversityireland.ie);
- Catchments (www.catchments.ie);
- Environmental Protection Agency Maps (<https://gis.epa.ie/EPAMaps>);
- Geological Survey Ireland (GSI) website (www.gsi.ie);
- GSI - Groundwater data viewer (<https://dcenr.maps.arcgis.com>); and
- Planning Applications (myplan.ie).

1.4.2 Ecological Site Surveys

To inform this NIS, the initial ecological walkover survey was carried out on 26th May 2021 by the Luas Team Ecologists. Updated habitat and invasive species surveys were also conducted on 20th June 2023. Additionally, SCI-species focused wintering bird surveys (eight per season) were conducted by proposed Scheme ecology team during the optimum survey months (December, January and February) for the 2021-2022, 2022-2023 and 2023-2024 winter periods. The survey dates are displayed in Table 1-1.

Table 1-1: Wintering bird survey dates across a three-year wintering period

2021-2022 Winter Survey Period	2022-2023 Winter Survey Period	2023-2024 Winter Survey Period
01/12/2021	07/12/2022	15/12/2023
15/12/2021	16/12/2022	04/01/2024
05/01/2022	05/01/2023	12/01/2024
18/01/2022	13/01/2023	19/01/2024
27/01/2022	25/01/2023	02/02/2024
02/02/2022	02/02/2023	09/02/2024
10/02/2022	17/02/2023	23/02/2024
25/02/2022	28/02/2023	27/02/2024

Additionally, an aquatic botanical survey was conducted along the Royal Canal by Denyer Ecology on 5th May 2022 and 6th June 2022.

The ecological walkover surveys recorded habitats and protected species, following the methods outlined in the documents below:

- Heritage Council (2011). Best Practice Guidance for Habitat Survey and Mapping (Smith et al., 2011).
- Ecological Surveying Techniques for Protected Flora and Fauna during the Planning of National Road Developments (NRA, 2009).

Aerial photographs and site maps assisted the survey. Habitats have been named and described following Fossitt (2000). Nomenclature for higher plants follows that given in The New Flora of the British Isles 4th Edition (Stace, 2019). Identification of Irish plants generally follow Webb’s An Irish Flora (Parnell and Curtis, 2012).

1.5 Assessment criteria

The overall aim of the Habitats Directive is to maintain or restore the favourable conservation status of habitats and species of qualifying interest. The maintenance of habitats and species within Natura 2000 sites at favourable conservation condition will contribute to the overall maintenance of favourable conservation status of those habitats and species at a national level. Upon the conclusion of the AA, the competent authority may grant consent to the plan or project only after having ascertained that it will not adversely affect the integrity of the Natura 2000 site(s) concerned.

1.5.1 The Adverse Effect on Site Integrity Test

An assessment of whether there could be an adverse effect on site integrity is done using the source-pathway-receptor model which is used to determine the risk of impact to a site or Qualifying Interests (OPR, 2021). Risk is the likelihood or expected frequency of a specified adverse consequence or impact.

Applied to the proposed Scheme, it expresses the likelihood of an adverse impact arising because of the Scheme activities. A hazard presents a risk when it is likely to affect something of value (i.e. the Natura 2000 sites and their QIs / SCIs). It is the combination of the probability of the hazard occurring and its consequences that is the basis of a risk assessment which an NIS essentially is:

Risk = probability of an event x consequential damage

The source-pathway-receptor model is a useful tool to determine if a risk is present, and to help quantify the risk to see if the threshold of an adverse effect on site integrity is reached. For a risk to be present, all three elements must be present.

Source: The source considered in this NIS is the proposed works or activity that will occur as a result of the proposed Scheme. Key considerations in assessing the source are the nature and scale of the potential impacts that may arise, e.g. type of contaminants that may arise, the contaminant loading and other physical attributes. The point of occurrence is a critical reference point for assessing the attributes of the source of any potential adverse impacts.

Pathway: Pathways are established by surface water, ground water, and land and air connections. The pathway includes everything between the source and the receptor; from point of release of potential adverse impacts, such as contaminants, to the receptor. The location, nature, connectivity and extent of wells, groundwater dependent ecosystems, aquifers and faults can all influence the nature of a pathway. Rivers, streams and drainage ditches could all act as potential pathways for potential waterborne impacts. The pathway includes assessment of surface and groundwater bodies, and WFD status may be reviewed as relevant. Land and air pathways to be considered include those that may transfer direct physical impacts, noise and visual disturbance (vibrations) and dust or other airborne particles.

Receptor: The receptor is the QI / SCI features of the relevant Natura 2000 sites, their Site-Specific Conservation Objectives (SSCOs) and the overall integrity of the Natura 2000 sites. To determine the significance of potential adverse impacts on the integrity of the Natura 2000 site, the SSCO of each site are assessed relative to the potential impacts that may occur because of the proposed works. The conservation objectives are the fundamental unit on which the assessment is based. If the project were to undermine or make these objectives more difficult to achieve, the conservation status of the QI / SCI features becomes harder to achieve, and the quality and condition of the site will be reduced, reducing the 'integrity' of the Natura 2000 site. Each Natura 2000 site will either have specific or generic conservation objectives.

The overall aim of SSCO is to maintain or restore the favourable conservation conditions of the Annex I habitats and/or the Annex II species for which a Natura 2000 site has been selected, under which the site-specific objectives contain more detailed attributes, measures and targets.

Favourable conservation status of a habitat is achieved when:

- its natural range, and area it covers within that range, are stable or increasing;
- the specific structure and functions which are necessary for its long-term maintenance exist and are likely to continue to exist for the foreseeable future; and
- the conservation status of its typical species is favourable.

The favourable conservation status of a species is achieved when:

- population dynamics data on the species concerned indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats;
- the natural range of the species is neither being reduced nor is likely to be reduced for the foreseeable future; and
- there is, and will probably continue to be, a sufficiently large habitat to maintain its populations on a long-term basis.

The conservation objectives for SPAs are also to maintain or restore the favourable conservation condition of the bird species listed as SCIs for SPAs, which are defined by the following list of attributes and targets:

- Population trend: Measure of percentage change and whether the long-term population trend is stable or increasing; and
- Distribution: Number, range, timing and intensity of use of areas. There is to be no significant decrease in the range, timing or intensity of use of areas by specific or generic bird species, other than that occurring from natural patterns of variation.

The conservation objectives for non-breeding birds SCIs for SPAs are as follows:

- To maintain the favourable conservation condition of the non-breeding water bird Special Conservation Interest species listed for a SPA; and
- To maintain the favourable conservation condition of the wetland habitat for a SPA as a resource for the regularly occurring migratory water birds that utilise it.

Site integrity is assessed on the basis of each conservation objective of each qualifying interest feature. Should any conservation objective be undermined by the proposed Scheme, the site integrity will therefore be adversely affected. Low-impact effects that are too small or short-lived to undermine the achievements of the conservation objectives are therefore not likely to adversely affect the site integrity.

1.5.2 In-combination Assessment

The in-combination impacts are considered only after the assessment of the project alone. Where there is no adverse effect on site integrity, but some adverse effect locally an assessment of this adverse effect in-combination with other plans or projects is carried out. Other plans or projects within this report are in line with those detailed within the accompanying EIAR.

Where other plans or projects are identified then initially a review is made of its AA Screening, or AA, and if the Competent Authority for the plan or project has made a final determination of no effect on the integrity of any European site, either alone or in-combination, this determination is used in this assessment. Where there is not a full AA, or the findings are unclear or out of date, the plan or project documentation is checked for credible evidence of real (not hypothetical) risk to a European site. Where these are identified then a detailed assessment is carried out. Each of these plans or projects are examined in a pairwise basis first to assess whether there is the potential for cumulative or in-combination effects between the proposed Scheme and the plan or project under examination. Following this an assessment of proposed Scheme and all of the identified plans and projects as a whole are examined, in order to assess whether they all have the capacity to act in a cumulative or in-combination manner.

Potential sources of cumulative impacts were identified based on plans and projects respective Zols and the ecology of valued ecological features that are physically linked with Natura 2000 sites, as well as ex-situ supporting habitats, as identified in Section 3.

1.6 Competent Persons

The assessment was prepared by William Mulville BSc (Hons) Zoology, MSc in Biodiversity and Conservation. William is a Senior Ecologist with JBA and has over 6 years' experience in ecological consultancy. William is an Associate Member of the Chartered Institute of Ecological and Environmental Management (CIEEM).

The assessment has been reviewed by Patricia Byrne BSc (Hons) Zoology, PhD, MCIEEM. Patricia is Principal Ecologist with JBA, with over 20 years' experience in environmental and ecological research, teaching and reporting; and with seven years in ecological consultancy. Patricia is a full Member of the Chartered Institute of Ecological and Environmental Management (CIEEM).

1.7 Consultations

Consultation was made with a number of key stakeholders in relation to EU Natura 2000 sites which includes, but is not limited to the following:

- National Parks and Wildlife Service (NPWS);
 - An initial meeting with National Parks and Wildlife Services officials took place on 6th June 2023, where the proposed Scheme's ecological sensitivities and survey efforts were discussed at length. Following the meeting, additional baseline and update surveys were conducted at the suggestion

of the NPWS to ensure full coverage of sensitive ecological features within the Zol of the proposed Scheme. Overall, the meeting was viewed as positive by all attending parties (NPWS, TII and BTEG) given the extent and detail of the ecological surveys completed to date and that all additional ecological survey efforts would be addressed over the following year before the planning submission.

- A follow-up meeting with National Parks and Wildlife Services officials was held on 17th April 2024. At this follow-up meeting, the NPWS staff were presented with an update on the most recent ecological findings recorded since 2023 meeting, including the expanded baseline surveys suggested by NPWS at the previous meeting. Additionally, the impact of land-use changes on migrant wintering bird species, particularly Light-bellied Brent Goose, was discussed at length, highlighting to the Luas Team the necessity to ensure the continued existence / reinstatement of natural amenity grassland areas within the boundaries of the proposed Scheme during its Operational Phase. The meeting was viewed as positive by all attending parties (NPWS, TII and BTEG), with a clear outcome detailing the final steps required from the Luas Team before the EIAR planning submission.

- Dublin City Council (DCC);
- Fingal County Council (FCC);
- Iarnród Éireann;
- Inland Fisheries Ireland; and
- Waterways Ireland.

1.8 Limitations and Constraints

The NIS assessment necessarily relies on some assumptions, and it was inevitably subject to some limitations. These would not affect the conclusion, but the following points are recorded in order to ensure the basis of the assessment is clear:

- Information on the works and conditions on site are based on current knowledge at the time of writing. The site surveys have followed the Chartered Institute of Ecology and Environmental Management (CIEEM) guidance provided on suitable lifespan for surveys (CIEEM (2019) Advice note on the lifespan of ecological reports and surveys);
- The precautionary principle is utilised when determining potential ecological sensitivities within the proposed Scheme's Zol; and
- The NIS addresses issues around European designated sites and does not exempt works from responsibilities related to habitats and species covered under separate national legislation (addressed within Volume 3 - Chapter 9 Biodiversity of the EIAR).

SECTION 2: PROPOSED SCHEME DESCRIPTION

2.1 The Proposed Scheme

Luas Finglas (hereafter referred to as “proposed Scheme”) is not directly connected with, or necessary to the management of any Natura 2000 site. Therefore, the proposed Scheme is subject to the requirements of the AA process.

2.2 Site Location

The location of the proposed Scheme extends from Broombridge Luas Stop in the south, to the Charlestown area in the north (Figure 2-1). The proposed Scheme passes through Tolka Valley Park; St Helena’s and Farnham green areas; and Mellows Park within the greater Finglas area. This route also passes over the Royal Canal at Broombridge and the River Tolka within the Tolka Valley Park.

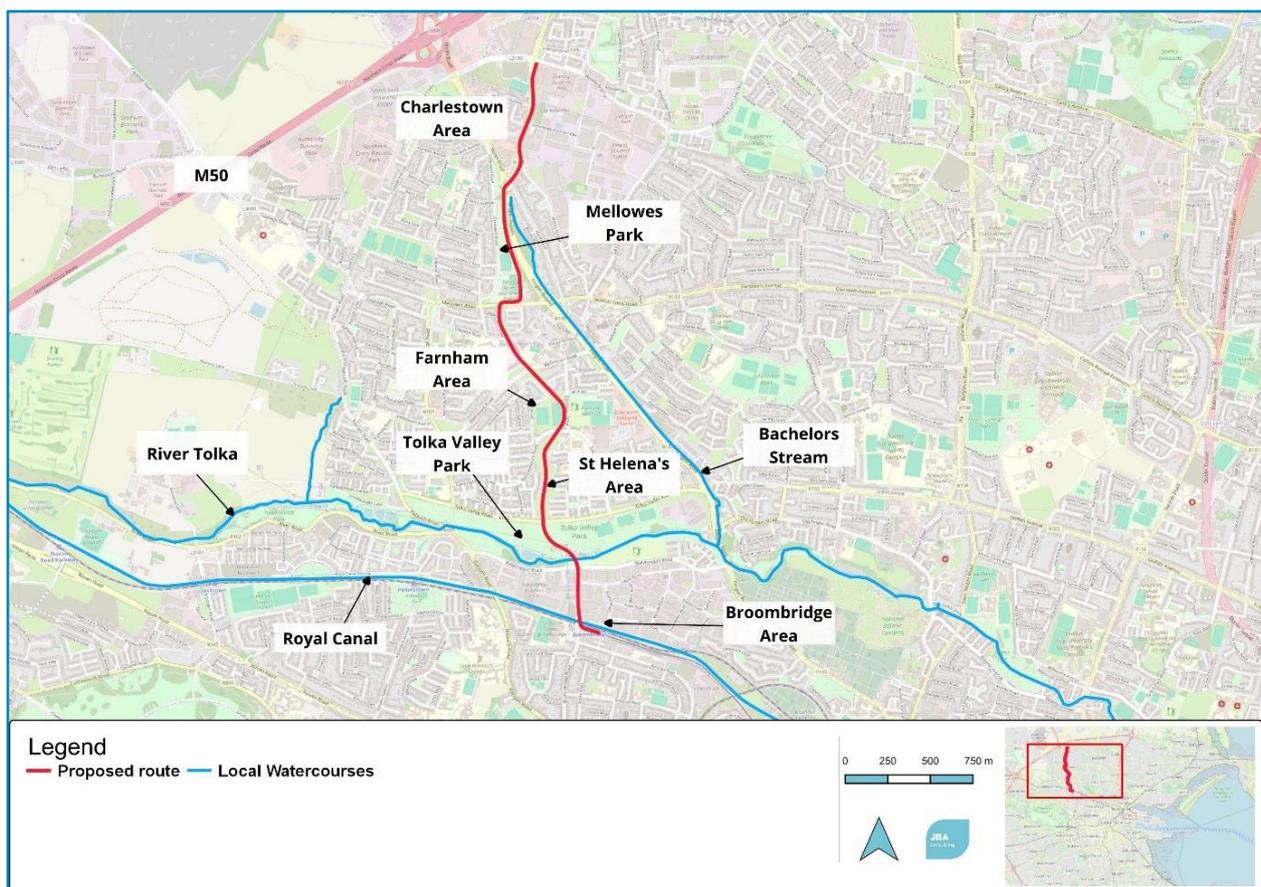


Figure 2-1: Proposed Scheme Location (Open Street Map (OSM), 2024)

2.2.1 Outline Scheme Description

The proposed Scheme comprises a high-capacity, high-frequency light rail running from Broombridge to Charlestown, connecting Finglas and the surrounding areas with Dublin’s wider public transport network by providing a reliable, and efficient public transport service to the city centre via Broombridge.

As shown in Volume 4 - Map Figure 1-1, starting from Broombridge, the proposed Scheme travels northwards, crossing the Royal Canal and the Maynooth railway line adjacent to Broome Bridge. It then runs adjacent to the east of Broombridge Road and the Dublin Industrial Estate. It then crosses the Tolka Valley Park before reaching the proposed St Helena’s Stop and then proceeds northwards towards the proposed Luas Finglas Village Stop. From here, the route passes through a new corridor created within the Finglas

Garda Station car park, making its eastern turn onto Mellows Road. The route then proceeds through Mellows Park, crossing Finglas Road, towards the proposed St Margaret's Road Stop. Thereafter, the proposed line continues along St Margaret's Road before reaching the terminus Stop proposed at Charlestown.

The proposed Scheme has been designed to integrate with the existing and future transport network, providing connections with bus services at all new Stops, mainline rail services at Broombridge, and a Park & Ride facility to intercept traffic on the N/M2. In addition, the proposed Scheme through the inclusion of integrated cycle lanes and cycling infrastructure sets out to facilitate multimodal "cycle-light rail transit (LRT) trips" as a key aspect of the Luas Finglas scheme.

The proposed Scheme will comprise a number of principal elements as outlined in Table 2-1 and Table 2-2. A full description of the proposed Scheme is provided in the following chapters of this EIAR:

- Chapter 1 (Introduction);
- Chapter 5 (Description of the proposed Scheme); and
- Chapter 6 (Construction Activities).

Table 2-1: Overview of the Key Features of the proposed Scheme

Scheme Key Features	Outline Description
Permanent Scheme Elements	
Light Rail track	3.9km extension to the Luas Green Line track from Broombridge to Finglas (2.8km of grass track, 700m of embedded track and 360m of structure track)
Depot Stabling facility	A new stabling facility (with stabling for eight additional LRVs) will be located just south of the existing Broombridge terminus, as an extension of the Hamilton depot area.
Luas Stops	Four Stops located at: St Helena's, Finglas Village, St Margaret's Road and Charlestown to maximise access from the catchment area including the recently re-zoned Jamestown Industrial Estate.
Main structures	Two new Light Rail Transit (LRT) bridges will be constructed as part of the proposed Scheme: a bridge over the River Tolka within the Tolka Valley Park and a bridge over the Royal Canal and the Iarnród Éireann (IÉ) railway line at Broombridge. A number of existing non-residential buildings shall be demolished to facilitate the proposed Scheme. In addition, the existing overbridge at Mellows Park will be demolished.
At grade signalised junctions	10 at grade signalised junctions will be created at: Lagan Road, Ballyboggan Road, Tolka Valley Road, St. Helena's Road, Wellmount Road, Cappagh Road, Mellows Road, North Road (N2), McKee Avenue, Jamestown Business Park entrance. Note: The junction at Charlestown will be reconfigured but does not have a LRT crossing.
Uncontrolled crossings	13 at grade uncontrolled crossings (11 pedestrian / cycle crossings and two local accesses located at: Tolka Valley Park, St Helena's, Farnham pitches, Patrickswell Place, Cardiff Castle Road, Mellows Park, St Margarets Road, and ESB Networks.
Cycle facilities	Cycle lanes are a core part of the proposed Scheme in order to facilitate multimodal "cycle-LRT trips". Approximately 3km of segregated cycle lanes and 100m of non-segregated cycle lanes are proposed along the route. Covered cycle storage facilities will be provided at Broombridge Terminus, Finglas Village Stop and St Margaret's Road Stop and within the Park & Ride facility. "Sheffield" type cycle stands will be provided at all stop locations.
Power substations	Two new traction power substations for the proposed Scheme will be located near Finglas Village Stop behind the existing Fire Station, and near the N2 junction before St Margaret's Road Stop where the current spiral access ramp to the pedestrian overbridge is located. A third substation is required for the Park & Ride facility.

Scheme Key Features	Outline Description
Park & Ride facility	<p>A new Park & Ride facility, with e-charging substation, located just off the M50 at St Margaret's Road Stop will be provided with provision for 350 parking spaces and secure cycle storage to facilitate multimodal "cycle-LRT trips". The building will feature photovoltaic (PV) panel roofing and is the location for an additional radio antenna.</p> <p>This strategic Park and Ride facility will intercept traffic on the N/M2, before congestion begins to form.</p>
Temporary Scheme Elements	
Construction compounds	<p>There will be three principal construction compounds, two located west of Broombridge Road and one located at the northern extents of Mellows Park. In addition, there are other secondary site compound locations for small works/storage. Details can be found in Volume 2 - Chapter 6 (Construction Activities) of this EIAR.</p>

Table 2-2: Summary of New Bridges of the proposed Scheme

Identity	Location	Description
Royal Canal and Rail Bridge	Approximately 10m east of the existing Broome Bridge and then continuing north, parallel with Broombridge Road on its east side	The proposed bridge is an eight-span structure consisting of two main parts: a variable depth weathering steel composite box girder followed by a constant depth solid concrete slab. The bridge has the following span arrangement: 35 + 47.5 + 30 + 17 + 3x22 + 17m. Steel superstructure extends over the first three spans. The bridge deck is continuous over the full length of 212.5m and has solid approach ramps at both ends.
Tolka Valley Park Bridge	Approximately 30m west of the existing Finglaswood Bridge	A three-span structure with buried end spans, thus appearing as a single span bridge. End spans as well as part of the main span consist of post-tensioned concrete variable depth girder, the central section of the main span is a suspended weathering steel composite box girder. The overall length of the bridge is 65m with spans 10m, 45m, 10m.

2.2.2 Proposed Site Drainage Details

The drainage design is based on a number of principles, as set out the accompanying EIAR Volume 5 - Appendix A10.5 (Drainage Design Basis), and summarised below:

- Where possible SuDS based systems have been used to dispose of surface water runoff generated by the proposed Scheme;
- To alleviate pressure on the existing drainage networks in the vicinity of the scheme through the use of attenuation systems, SuDS systems and changing of hardstanding areas to grassed areas;
- Outfall rates from the attenuation areas were based on greenfield and brownfield assessments;
- It was a design objective to minimise health and safety risks of construction and maintenance personnel wherever possible in accordance with the Principles of Prevention; and
- The design has taken into the consideration the sensitive habitats which are impacted by the proposed route, the River Tolka, the Royal Canal, and Integrated Constructed Wetland (ICW).

Where feasible, drainage features incorporating SuDS have been used. The design of these SuDS features is in accordance with the principles and details outlined in the CIRIA SuDS manual and in the Dublin City Council produced document 'Sustainable Drainage Design and Evaluation Guide 2021'. SuDS provides the dual benefits of controlling flows and treating water quality.

In areas where the catchment is proposed to remain unchanged as no additional impermeable areas are proposed, the design consists of relocating existing gullies (where possible) to new locations.

Attenuation will be provided in the form of filter drains, tree pits and bioretention systems. These SuDS measures allow a level of treatment and/or attenuation to be provided before discharge to the network, reducing the impact on water quality as well as preventing an increase in runoff rates.

The aim of the design has been to reduce the surface water loading on the existing surface water drainage networks in the regions. This has been achieved by adoption of the following techniques:

- Replacement of hardstanding areas with grassed areas: In keeping with the principles of the circular economy, where possible paved areas have been converted to grass. The absorptive capacities of the grass and subsoil cause a reduction in the volume of surface water reaching the existing piped surface water sewers. The grass and subsoil also provide a measure of treatment to the surface water runoff, reducing the quantity of silt and contaminants that enter the piped surface water sewers;
- Provision of bioretention areas: These are SuDS features incorporating grass and planting, and provide attenuation and treatment to surface water runoff;
- Tree Pits: These are SuDS features which provide attenuation and treatment to surface water runoff. The tree pits incorporate soil pits, which promote attenuation and treatment;
- Online Storage: Where necessary, online storage is provided in the form of oversized attenuation pipes which incorporate flow control devices; and
- Attenuation Pond: An attenuation pond has been proposed adjacent to the ICW. This will provide attenuation and treatment to the surface water from the Luas trackbed drainage system and connecting filter drains.

2.2.3 Construction Activities

The overview of the construction activities listed in Figure 2-2 are divided into two categories, Enabling Works and Main Works activities.

Enabling Works Activities	Main Works Activities	Site Finalisation Works	Systems Testing & Commissioning
<ul style="list-style-type: none"> • Demolitions; • Utility Diversion; • Archaeological & Heritage Works (likely to be progressed as a component of other Enabling Works packages mentioned in this list); • Modification of integrated constructed wetland (ICW) at Tolka Valley Park; • Road modifications; • Farnham Playing Pitch Modifications; • An Garda Síochána PEM building demolition & internal/boundary reconfiguration works; and • Tree Relocations 	<ul style="list-style-type: none"> • Tracks [trackbed and rails]; • Luas Stops at St Helena's, Finglas Village, St Margaret's Road and Charlestown; • Broombridge Stabling Site Works; • Archaeological and Heritage Works; • Site Clearance and Demolitions required to progress during main works; • Fencing; • Earthworks; • Removal of contaminated spoil at Tolka Valley Park; • Royal Canal and Rail Overbridge; • Tolka Valley Park Bridge; • Cycle storage buildings; • Temporary Traffic Management arrangements; • Haul roads and Works Compounds; Park & Ride facilities at St Margaret's Road; • Utility Diversions required to progress during main works; • Retaining walls and boundary treatments; • Road realignments and modifications; • Road furniture and equipment; • Pedestrian and Cycling facilities; • Track and road traffic signalling; • Public lighting; • Accommodation Works; • Soft and Hard landscaping; • Reinstatement Works; • Overhead Contact System (OCS); • Power and Systems infrastructure; and • Stops furniture and equipment 	<ul style="list-style-type: none"> • Removing construction compounds; • Reinstatements including parks; • Planting, landscaping & finalising boundaries 	<ul style="list-style-type: none"> • Testing the track systems; • Commissioning the track; • Trial running

Figure 2-2: Proposed Construction Activities

2.2.4 Proposed Earthworks / Excavations

The proposed Scheme has been divided in large-scale construction areas as well as smaller-scale sections. These divisions along with their respective local area descriptions can be viewed in Table 2-3 below.

Table 2-3: Areas, sections and their respective local area descriptions

Area	Section No.	Section Description
30	S30.1	Broombridge Stabling Site
31	S31.1	Broombridge to Tolka Valley Park
	S31.2	Tolka Valley Park Bridge
	S31.3	Tolka Valley Park to Tolka Valley Road [overlapping Section 31.2]
32	S32.1	Tolka Valley Road to St Helana's Road and St Helena's Stop
	S32.2	St Helena's Road to Cardiff Castle Road
	S32.3	Finglas Village and Finglas Village Stop
33	S33.1	Mellowes Park
	S33.2	R135 / R104 junction
	S33.3	St Margaret's Stop
	S33.4	St Margaret's Road and Charlestown Terminus

An overview of the earthwork activities within each construction area, including excavation depths are displayed in Table 2-4 below.

Table 2-4: Overview of earthwork activities within construction areas

Area	Overview of Earthwork Activities
30	Area 30 generally follows the existing site area, however there is a localised depression of up to 2m located towards the rear (northern end) of the former industrial building (now demolished) to be filled and levelled. The fill material will be sourced from the valley areas of the site in Area 32. Local roads will be used to transfer this material.
31	In Area 31, the elevations follow the proposed structure levels and the existing Broombridge Road tie-in levels. Further north, within Tolka Valley Park, the proposed alignment navigates between two of the mounded landforms associated with the historic landfills once operated within the park with cut and fill operations required. The two plateaus situated either side are approximately 4-5m above the proposed alignment. Unsuitable materials will be disposed directly to a suitably licenced landfill.
32	In Area 32, the track alignment closely follows the existing ground levels with maximum cut and fill ranges up to 1m. The earthworks activities to comprise excavation of a box section for the track form and reinstatement with aggregate materials.
33	In Area 33, the track alignment closely follows the existing ground levels with maximum cut and fill ranges up to 1m. The earthworks activities to comprise excavation of a box section for the track form and reinstatement with aggregate materials.

2.2.5 Construction Duration

The construction programme for the proposed Scheme is approximately 1 year of Enabling Works contracts, with the Main Works of the proposed Scheme including testing and commissioning anticipated to take approximately 3.5 years to complete. The total construction timeline for the proposed Scheme is expected to take approximately 4.5 years to complete.

2.3 Zone of Influence

The Zone of Influence (Zol) is based on a judgement of the likely extent of the ecological impacts on identify Natura 2000 sites. For each of these sites, the QIs and SCIs and their associated SSCOs were identified, and the possibility of likely significant effects assessed via the surface water, groundwater, land and air source-receptor-impact pathways (OPR, 2021).

In relation to terrestrial habitats, impacts will be limited to the lands within the site boundary of the proposed Scheme, as well as the immediate surrounding environs (e.g., overshading and soil; root compaction and changes to local hydrological regimes).

Surface water hydrological connections (e.g. canals, wetlands and rivers) are often the most far-reaching impacts due to their lotic or semi-lotic nature. It becomes increasingly difficult to precisely predict the likely significance of adverse water-borne pollutants as they travel downstream from the pollution point source, given potential dilution and retention factors along the course of the impacted watercourse. Under the precautionary principle any designated sites (South Dublin Bay and Tolka Estuary SPA; North Dublin Bay SAC; North Bull Island SPA; South Dublin Bay SAC; Rockabill to Dalkey Island SAC; and North-West Irish Sea SPA), QI habitats or QI / SCI species (flora and fauna) located downstream of the watercourses which pass through the footprint of the proposed Scheme, namely the River Tolka and Royal Canal, will be considered to be within the hydrological Zol of this scheme.

In regard to groundwater and groundwater-to-surface water connections, the Zol is largely determined by the site's underlying bedrock, the soil / sub-soil permeability, and the characteristics of the underlying aquifer(s). The underlying bedrock of the proposed Scheme is comprised of dark grey to black, fine-grained, occasionally cherty, micritic limestones that weather paler, usually to pale grey. There are rare dark coarser grained calcarenitic limestones, sometimes graded, and interbedded dark-grey calcar. This bedrock is largely overlain with limestone till, with smaller linear pockets of limestone gravels and alluvial sediments (particularly within the Tolka Valley Park). There is generally a low sub-soil permeability throughout the boundary of the proposed Scheme (GSI, 2024). As result of the above characteristics the site's aquifer vulnerability status ranges from 'Moderate' to 'Rock at or near Surface or Karst', with the more vulnerable areas located within historic and existing river / stream valleys. The aquifer within the underlying bedrock is considered to be locally important, with moderate productivity, though only in local zones. Therefore, the aquifer has a limited and relatively poorly connected network of fractures, fissures and joints, giving a low fissure permeability which tends to decrease further with depth. Generally, the lack of connection between the limited fissures results in relatively poor aquifer storage and flow paths that may only extend a few hundred metres (GSI, 2024). Therefore, the groundwater Zol will be set to 300m given the characteristics of underlying aquifer.

Regarding the groundwater-to-surface water impact pathway, the characteristic of the underlying aquifer means it is likely to rapidly discharge to the nearby watercourses, i.e., the River Tolka and Bachelors Stream (GSI, 2024). Additionally, while earthworks within Tolka Valley Park may lead to the disruption of potentially toxic materials within the historic landfill, which may go enter the ground-to-surface water pathway. Therefore, the groundwater-to-surface water Zol will also be set to 300m, with the addition of downstream surface water hydrological connections.

In respect to Zol for air pollution (emissions and dust), KERs within a 250m buffer zone of the proposed Scheme were considered as per the Institute of Air Quality Management (IAQM) Guidance on the Assessment of Dust from Demolition and Construction (IAQM, 2024), including ex-situ foraging habitats utilised by QI and SCI faunal species associated with local Natura 2000 sites.

In relation to physical (vibration and clearance works); audible and visual disturbance, SCI wintering bird species will be considered on a species-by-species basis. A 400m Zol disturbance buffer accounts for the most sensitive SCI migrant wintering bird species (e.g., Curlew and Light-bellied Brent Goose) which visit the suitable foraging habitats within and adjacent to the proposed Scheme, which may be subject to habitat loss or degradation, as well as disturbance (Cutts et al, 2013).

2.4 Proposed Scheme AA Screening Summary and Conclusion

Table 2-5 presents a summary of the elements of the proposed Scheme that are relevant for ecology (derived from the Screening for Appropriate Assessment report [JBA, 2024]).

Table 2-5: Summary of proposed Scheme elements relevant to ecology of the Natura 2000 sites

Proposed Scheme Elements	Comment
Size and scale	The proposed route is 3.9km in length and will extend the Luas Green Line northwards from its current Terminus at Broombridge to a new proposed Terminus at Charlestown, including 4 new stops and a stabling area. It is largely an at-grade scheme, primarily located within the administrative area of Dublin City Council, with the exception of the proposed Charlestown Terminus, which is in the administrative area of Fingal County Council.
Land-take	There will be no direct land take from any of Natura 2000 sites.
Distance from Natura 2000 site or key features of the site	<p>Natura 2000 sites within the ZoI of the proposed Scheme:</p> <p>North Dublin Bay SAC = 7.8km / 9.0km (hydrological)</p> <p>South Dublin Bay SAC = 7.0km / 12.4km (hydrological)</p> <p>Howth Head SAC = 13.3km</p> <p>Rockabill to Dalkey Island SAC = 13.8km / 15.2km (hydrological)</p> <p>South Dublin Bay and River Tolka Estuary SPA = 4.8km / 5.7km (hydrological)</p> <p>North Bull Island SPA = 7.8km / 9.0km (hydrological)</p> <p>North-west Irish Sea SPA = 10.2km / 11.2km (hydrological)</p>
Resource requirements (water abstraction etc.)	There will be no surface water nor groundwater abstraction on-site during the Operational Phase.
Emissions (disposal to land, water or air)	<p>Construction Phase:</p> <p>Water</p> <p>The proposed Scheme will use existing surface water drainage infrastructure within the urbanised environment wherever possible. However, within the green amenity / parkland areas the surface water run-off has the potential to enter the local watercourses, e.g., the River Tolka, where potential contaminants and sediment-loading may degrade the quality of the water, which will ultimately flow into the South Dublin Bay and Tolka Estuary SPA; North Dublin Bay SAC; North Bull Island SPA; South Dublin Bay SAC; Rockabill to Dalkey Island SAC; and North-West Irish Sea SPA. Additionally, the local groundwater-to-surface water system will also have the potential to introduce deleterious substances into the local watercourses given the presence of the historic landfill site within the Tolka Valley Park.</p> <p>Air (Visual)</p> <p>Likely significant effects are predicted for protected SCI bird species during the proposed Scheme's Construction phase as a result of the visual disturbance from construction activities, whilst attempting to forage within supporting ex-situ habitats located within and adjacent to the proposed Scheme. The operations of the proposed Scheme, i.e., the operation of the LRVs along their route, have been deemed negligible, while the increased visual disturbance from increased pedestrian foot-traffic along the new pedestrian routes within the Farnham area have the potential to slightly increase the vigilance behaviour in SCI birds, limiting their foraging times.</p> <p>Air (Audible)</p> <p>Likely significant effects are predicted for protected SCI bird species during the proposed Scheme's Construction phase as a result of the audible disturbance from construction activities, whilst attempting to forage within supporting ex-situ habitats located within and adjacent to the proposed Scheme. Operational impacts from the proposed Scheme (LRT noise) have been assessed as negligible.</p>

Proposed Scheme Elements	Comment
	<p style="text-align: center;">Air (Chemical Emissions)</p> <p>There will be a moderate increase in local traffic attending the site of the proposed Scheme during construction, resulting in an increase in local NOx emissions, however, vehicular emissions are not predicted to significantly impact the any of Natura 2000 sites within the ZoI due to the distance between proposed Scheme and Natura 2000 sites during sites Construction and Operational phases. Furthermore, these increase emissions are not predicted result in likely significant effects for the SCI bird species which utilise the green areas within this 250m buffer, given that these birds are only seasonal visitors to these areas. Moreover, the diurnal movement patterns of these bird species means that even when seasonally present, they only spend several hours per day on average within this 250m buffer.</p> <p style="text-align: center;">Air (Dust)</p> <p>During construction cement-based pollutants have the potential to settle in the foraging grounds (supporting ex-situ habitats) of the SCI bird species, leading to the degradation of the flora and fauna consumed by these protected species. Furthermore, cement-based pollutants have the potential to settle within the local watercourses within the ZoI, transporting these contaminants downstream to the South Dublin Bay and Tolka Estuary SPA; North Dublin Bay SAC; North Bull Island SPA; South Dublin Bay SAC; Rockabill to Dalkey Island SAC; and North-West Irish Sea SPA. Therefore, there is the potential for likely significant effects on the above Natura 2000 sites via air (dust) pathway.</p> <p style="text-align: center;">Operational Phase:</p> <p style="text-align: center;">Water</p> <p>During the Operational Phase, the proposed operations (and associated emissions such as surface water run-off) of the Scheme are not predicted to result in likely significant to any of the Natura 2000 sites within the ZoI (i.e., South Dublin Bay and Tolka Estuary SPA; North Dublin Bay SAC; North Bull Island SPA; South Dublin Bay SAC; Rockabill to Dalkey Island SAC; and North-West Irish Sea SPA), due to the distance between the Scheme and Natura 2000 sites; the SuDS design ensuring that contaminated water does not flow off the site and downstream into the above Natura 2000 sites.</p> <p style="text-align: center;">Air (Visual and Audible)</p> <p>There will be a minute increase in visual and audible disturbance to SCI bird species which frequent the West Farnham area in the winter months, as a result of the increased pedestrian infrastructure and associated users in lands adjacent to their foraging grounds (playing pitches). The East Farnham SCI bird foraging area, i.e., Erin's Isle GAA, will not be affected by this impact given the existing wall screening the pitches from road and pathway. Therefore, there is potential for likely significant effects for SCI birds foraging in West Farnham during the Operational Phase of the proposed Scheme.</p>
Excavation requirements	<p>Area 30 generally follows the existing site area, however there is a localised depression of up to 2m located towards the rear (northern end) of the former industrial building (now demolished) to be filled and levelled. The fill material will be sourced from the valley areas of the site in Area 32. Local roads will be used to transfer this material.</p> <p>In Area 31, the elevations follow the proposed structure levels and the existing Broombridge Road tie-in levels. Further north, within Tolka Valley Park, the proposed alignment navigates between two of the mounded landforms associated with the historic landfills once operated within the park with cut and fill operations required. The two plateaus situated either side are approximately 4-5m above the proposed alignment. Unsuitable materials will be disposed directly to a suitably licenced landfill.</p> <p>In Areas 32 the track alignment closely follows the existing ground levels with maximum cut and fill ranges up to 1m. The earthworks activities to comprise excavation of a box section for the track form and reinstatement with aggregate materials.</p> <p>In Area 33 the track alignment closely follows the existing ground levels with maximum cut and fill ranges up to 1m. The earthworks activities to comprise excavation of a box section for the track form and reinstatement with aggregate materials.</p>

Proposed Scheme Elements	Comment
Transportation requirements	<p>Temporary Impacts: Levels of traffic to the site during the Construction phase will increase traffic to the area but will be temporary in nature. All access to the site will be on pre-existing roads and transportation requirements will not negatively impact the Natura 2000 sites identified within the Zol (South Dublin Bay and Tolka Estuary SPA; North Dublin Bay SAC; North Bull Island SPA; South Dublin Bay SAC; Rockabill to Dalkey Island SAC; and North-West Irish Sea SPA). Therefore, likely significant effects are not predicted as a result of the Construction phase associated traffic.</p> <p>Permanent Impacts: Given the scale, nature and location of the proposed Scheme, transportation requirements will not result in likely significant effects for the Natura 2000 sites identified within the Zol.</p>
Duration of Construction, Operation, Decommissioning etc.	The Construction duration of the proposed Scheme is predicted to be 5 years and 9 months. Operation of the proposed Scheme is permanent.
Other	None.

2.4.1 Concluding Statement

In carrying out this AA Screening, mitigation measures have not been taken into account. Standard best practice construction measures which could have the effect of mitigating any effects on any European Sites have similarly not been taken into account.

On the basis of the screening exercise carried out above, it can be concluded that in the absence of mitigation, that there is possibility of likely significant effects on North Dublin Bay SAC, South Dublin SAC, North Bull Island SPA, South Dublin Bay and River Tolka Estuary SPA, Rockabill to Dalkey Island SAC and North-West Irish Sea SPA, and their respective QIs / SCIs, by the proposed Scheme during the Construction and Operational Phases of the proposed Scheme through the surface water, groundwater-to-surface water, air, and air-to-surface water pathways.

On the basis of objective information and in light of best scientific knowledge and applying the precautionary principle, it can be concluded that the proposed Scheme, either individually or in combination with other plans and projects, and in the absence of mitigation, is not likely to have a significant effect on Howth Head SAC and Baldoyle Bay SPA, in view of the sites conservation objectives, and that there is no reasonable scientific doubt in relation to this conclusion. As Howth Head SAC QIs are located above the coastal waters, there is no hydrological connection from the proposed Scheme to the SAC. The waters of the Baldoyle Bay SPA are located beyond the reasonable surface water impact pathway (distance) and as such, no likely significant effects are predicted. Furthermore, the SCI bird species of Baldoyle Bay SPA do not frequent lands within the disturbance buffer of the proposed Scheme and therefore, will not result in any likely significant effects for these SCI bird species.

Therefore, it is the professional opinion of the authors of this report that the application for approval for the proposed Scheme does require a Stage Two Appropriate Assessment in respect of North Dublin Bay SAC, South Dublin SAC, North Bull Island SPA and South Dublin Bay and River Tolka Estuary SPA, Rockabill to Dalkey Island SAC and North-West Irish Sea SPA, and, consequently, the preparation of a Natura Impact Statement.

SECTION 3: NATURA 2000 SITES

This section provides baseline information on the Natura 2000 sites within the Zone of Influence of the proposed works using source-receptor pathway. A short description of the Natura 2000 sites is provided, along with details of the QIs and SCIs, their respective site-specific conservation objectives, and the attributes used to define favourable conservation status and site vulnerabilities.

The Natura 2000 sites identified as occurring within the Zone of Influence of the proposed Scheme displayed in Figure 3-1 and are listed below in Table 3-1. Site briefs of the Qualifying Interests; their relevant threats / pressures and their impacts and sources to the Natura 2000 sites within the ZOI are provided in detail within the following sub-sections.

Table 3-1: Distances to Natura 2000 sites within the proposed Scheme's Zoi

Site Name	Designation	Direct distance from site	Hydrological distance from site
North Dublin Bay [000206]	SAC	7.8km	9.0km (direct)
South Dublin Bay [000210]	SAC	7.0km	12.4km (direct)
Rockabill to Dalkey Island [003000]	SAC	13.8km	15.2km (direct)
South Dublin Bay and River Tolka Estuary [004024]	SPA	4.8km	5.7km (direct)
North Bull Island [004006]	SPA	7.8km	9.0km (direct)
North-west Irish Sea [004236]	SPA	10.2km	11.2km (direct)

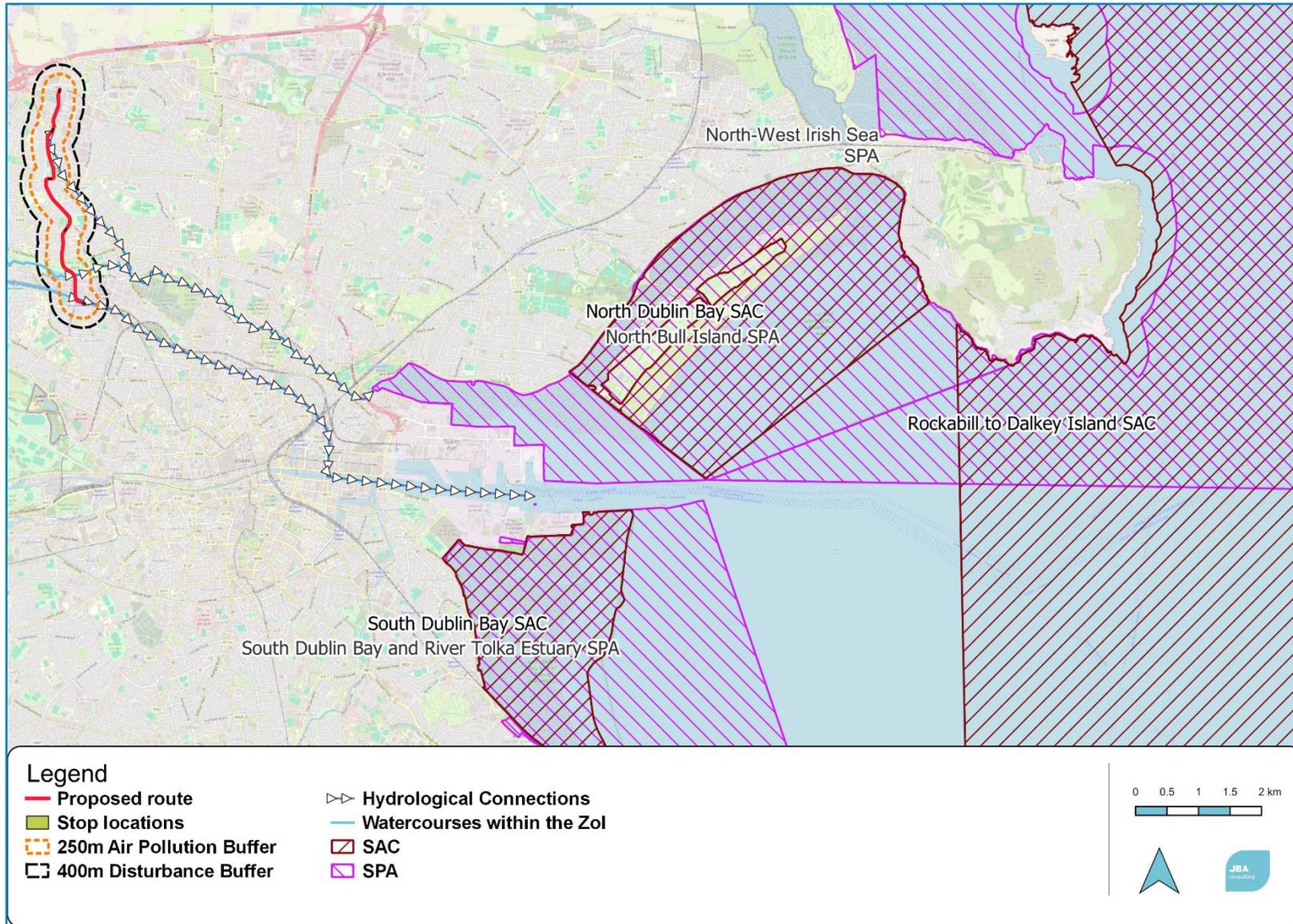


Figure 3-1: Natura 2000 sites and their proximity to the proposed Scheme (OSM, 2024)

3.1 North Dublin Bay SAC [000206]

The North Bull Island sand spit is a relatively recent depositional feature, formed as a result of improvements to Dublin Port during the 18th and 19th centuries. The seaward side of the island has a fine sandy beach. A substantial area of shallow marine water is included in the site. The interior of the island is excluded from the site as it has been converted to golf courses. Nature conservation is a main land use within the site. The North Bull Island dune system is one of the most important systems on the east coast and is one of the few in Ireland that is actively accreting. It possesses extensive and mostly good quality examples of embryonic, shifting marram and fixed dunes, as well as excellent examples of humid dune slacks. Both Atlantic and Mediterranean salt marshes are well represented, and a particularly good marsh zonation is shown. The salt marshes grade into mudflats and sandflats, some of which are dominated by annual *Salicornia* species. Petalwort *Petalophyllum ralfsii* occurs at its only known station away from the western seaboard (NPWS, 2023a).

3.1.1 Qualifying Interests

The QIs of North Dublin Bay SAC are listed below. These include the habitats and species listed on Annex I / II of the E.U. Habitats Directive (* = priority habitat; numbers in brackets are Natura 2000 codes) that will be assessed further in regard to potential impacts:

- Mudflats and sandflats not covered by seawater at low tide [1140];
- Annual vegetation of drift lines [1210];
- *Salicornia* and other annuals colonising mud and sand [1310];
- Atlantic salt meadows (*Glauco-Puccinellietalia maritima*) [1330];
- Mediterranean salt meadows (*Juncetalia maritimi*) [1410];
- Embryonic shifting dunes [2110];
- Shifting dunes along the shoreline with *Ammophila arenaria* (white dunes) [2120];
- Fixed coastal dunes with herbaceous vegetation (grey dunes) [2130];
- Humid dune slacks [2190]; and
- Petalwort *Petalophyllum ralfsii* [1395].

Further site-specific details are available in NPWS (2013a).

3.1.2 Site-Specific Conservation Objectives

The site-specific conservation objectives for North Dublin Bay SAC below are taken from the NPWS Conservation Objectives Document (NPWS, 2013a).

‘To maintain or restore the favourable conservation condition of the Annex I habitat(s) and/or the Annex II species for which the SAC has been selected’.

The conservation objectives document outlines specific objectives (Table 3-2) for the individual QIs and their respective attributes, measure and target aspects.

Table 3-2: SSCOs for North Dublin Bay SAC's QIs

Attribute	Measure	Target
Mudflats and sandflats not covered by seawater at low tide [1140]		
To maintain the favourable conservation condition of Mudflats and sandflats not covered by seawater at low tide in North Dublin Bay SAC, which is defined by the following list of attributes and targets:		
Habitat area	Hectares	The permanent habitat area is stable or increasing, subject to natural processes.
Community extent	Hectares	Maintain the extent of the <i>Mytilus edulis</i> -dominated community, subject to natural processes.

Attribute	Measure	Target
Community structure: <i>Mytilus edulis</i> density	Individuals/m ²	Conserve the high quality of the <i>Mytilus edulis</i> dominated community, subject to natural processes.
Community distribution	Hectares	Conserve the following community types in a natural condition: Fine sand to sandy mud with <i>Pygospio elegans</i> and Crangon crangon community complex; Fine sand with <i>Spio martinensis</i> community complex.
Annual vegetation of drift lines [1210]		
To restore the favourable conservation condition of Annual vegetation of drift lines in North Dublin Bay SAC, which is defined by the following list of attributes and targets:		
Habitat area	Hectares	Area increasing, subject to natural processes, including erosion and succession. Total area mapped: South Bull - 0.11ha.
Habitat distribution	Occurrence	No decline, or change in habitat distribution, subject to natural processes.
Physical structure: sediment supply	Presence/ absence of physical barriers	Maintain the natural circulation of sediment and organic matter, without any physical obstructions.
Vegetation structure: zonation	Occurrence	Maintain the range of coastal habitats including transitional zones, subject to natural processes including erosion and succession.
Vegetation composition: typical species and subcommunities	Percentage cover at a representative number of monitoring stops	Maintain the presence of species-poor communities with typical species: sea rocket <i>Cakile maritima</i> , sea sandwort <i>Honckenya peploides</i> , prickly saltwort <i>Salsola kali</i> and oraches <i>Atriplex</i> spp..
Vegetation composition: negative indicator species	Percentage cover	Negative indicator species (including non-natives) to represent less than 5% cover.
Salicornia and other annuals colonising mud and sand [1310]		
To restore the favourable conservation condition of Salicornia and other annuals colonizing mud and sand in North Dublin Bay SAC, which is defined by the following list of attributes and targets:		
Habitat area	Hectares	Area stable or increasing, subject to natural processes, including erosion and succession. For sub-site mapped: North Bull Island - 29.10ha.
Habitat distribution	Occurrence	No decline, or change in habitat distribution, subject to natural processes.
Physical structure: sediment supply	Presence / absence of physical barriers	Maintain, or where necessary restore, natural circulation of sediments and organic matter, without any physical obstructions.
Physical structure: creeks and pans	Occurrence	Maintain creek and pan structure, subject to natural processes, including erosion and succession.
Physical structure: flooding regime	Hectares flooded; frequency	Maintain natural tidal regime.
Vegetation structure: zonation	Occurrence	Maintain the range of coastal habitats including transitional zones, subject to natural processes including erosion and succession.
Vegetation structure: vegetation height	Centimetres	Maintain structural variation within sward.
Vegetation structure: vegetation cover	Percentage cover at a representative sample of monitoring stops	Maintain more than 90% of area outside creeks vegetated.

Attribute	Measure	Target
Vegetation composition: typical species and subcommunities	Percentage cover	Maintain the presence of species-poor communities listed in SMP (McCorry and Ryle, 2009).
Vegetation structure: negative indicator species - <i>Spartina anglica</i>	Hectares	No significant expansion of common cordgrass <i>Spartina anglica</i> , with an annual spread of less than 1%.
Atlantic salt meadows (<i>Glauco-Puccinellietalia maritimae</i>) [1330]		
To maintain the favourable conservation condition of Atlantic salt meadows (<i>Glauco-Puccinellietalia maritimae</i>) in North Dublin Bay SAC, which is defined by the following list of attributes and targets:		
Habitat area	Hectares	Area stable or increasing, subject to natural processes, including erosion and succession. For sub-site mapped: North Bull Island - 81.84ha.
Habitat distribution	Occurrence	No decline or change in habitat distribution, subject to natural processes.
Physical structure: sediment supply	Presence/ absence of physical barriers	Maintain natural circulation of sediments and organic matter, without any physical obstructions.
Physical structure: creeks and pans	Occurrence	Maintain creek and pan structure, subject to natural processes, including erosion and succession.
Physical structure: flooding regime	Hectares flooded; frequency	Maintain natural tidal regime.
Vegetation structure: zonation	Occurrence	Maintain range of coastal habitats including transitional zones, subject to natural processes including erosion and succession.
Vegetation structure: vegetation height	Centimetres	Maintain structural variation within sward.
Vegetation structure: vegetation cover	Percentage cover at a representative sample of monitoring stops	Maintain more than 90% area outside creeks vegetated.
Vegetation composition: typical species and subcommunities	Percentage cover	Maintain range of sub- communities with typical species listed in Saltmarsh Monitoring Project (McCorry and Ryle, 2009).
Vegetation structure: negative indicator species - <i>Spartina anglica</i>	Hectares	No significant expansion of Common Cordgrass <i>Spartina anglica</i> , with an annual spread of less than 1%.
Mediterranean salt meadows (<i>Juncetalia maritimi</i>) [1410]		
To maintain the favourable conservation condition of Mediterranean salt meadows (<i>Juncetalia maritimi</i>) in North Dublin Bay SAC, which is defined by the following list of attributes and targets:		
Habitat area	Hectares	Area stable or increasing, subject to natural processes, including erosion and succession. For sub-site mapped: North Bull Island - 7.98ha.
Habitat distribution	Occurrence	No decline or change in habitat distribution, subject to natural processes.
Physical structure: sediment supply	Presence/absence of physical barriers	Maintain/restore natural circulation of sediments and organic matter, without any physical obstructions.
Physical structure: creeks and pans	Occurrence	Maintain creek and pan structure, subject to natural processes, including erosion and succession.
Physical structure: flooding regime	Hectares flooded; frequency	Maintain natural tidal regime.

Attribute	Measure	Target
Vegetation structure: zonation	Occurrence	Maintain range of coastal habitats including transitional zones, subject to natural processes including erosion and succession.
Vegetation structure: vegetation height	Centimetres	Maintain structural variation in the sward.
Vegetation structure: vegetation cover	Percentage cover at a representative sample of monitoring stops	Maintain more than 90% of area outside creeks vegetated.
Vegetation composition: typical species and subcommunities	Percentage cover at a representative number of monitoring stops	Maintain range of subcommunities with characteristic species listed in SMP (McCorry and Ryle, 2009).
Vegetation structure: negative indicator species - <i>Spartina anglica</i>	Hectares	No significant expansion of Common Cordgrass <i>Spartina anglica</i> , with an annual spread of less than 1%.
Embryonic shifting dunes [2110]		
To restore the favourable conservation condition of Embryonic shifting dunes in North Dublin Bay SAC, which is defined by the following list of attributes and targets:		
Habitat area	Hectares	Area stable or increasing, subject to natural processes, including erosion and succession. For sub-sites mapped: North Bull - 2.64ha; South Bull - 3.43ha.
Habitat distribution	Occurrence	No decline or change in habitat distribution, subject to natural processes.
Physical structure: sediment supply	Presence/absence of physical barriers	Maintain the natural circulation of sediment and organic matter, without any physical obstructions.
Vegetation structure: zonation	Occurrence	Maintain the range of coastal habitats including transitional zones, subject to natural processes including erosion and succession.
Vegetation composition: plant health of foredune grasses	Percentage cover	More than 95% of sand couch <i>Elytrigia juncea</i> and/or lyme-grass <i>Leymus arenarius</i> should be healthy (i.e. green plant parts above ground and flowering heads present).
Vegetation composition: typical species and subcommunities	Percentage cover at a representative number of monitoring stops	Maintain the presence of species-poor communities with typical species: sand couch <i>Elytrigia juncea</i> and/or lyme-grass <i>Leymus arenarius</i> .
Vegetation composition: negative indicator species	Percentage cover	Negative indicator species (including non-native species) to represent less than 5% cover.
Shifting dunes along the shoreline with <i>Ammophila arenaria</i> (white dunes) [2120]		
To restore the favourable conservation condition Shifting dunes along the shoreline with <i>Ammophila arenaria</i> (white dunes) in North Dublin Bay SAC, which is defined by the following list of attributes and targets:		
Habitat area	Hectares	Area stable or increasing, subject to natural processes including erosion and succession. North Bull - 2.20ha; South Bull - 0.97ha.
Habitat distribution	Occurrence	No decline, or change in habitat distribution, subject to natural processes.
Physical structure: sediment supply	Presence/absence of physical barriers	Maintain the natural circulation of sediment and organic matter, without any physical obstructions.
Vegetation structure: zonation	Occurrence	Maintain the range of coastal habitats including transitional zones, subject to natural processes including erosion and succession.

Attribute	Measure	Target
Vegetation composition: plant health of dune grasses	Percentage cover	95% of Marram Grass <i>Ammophila arenaria</i> and/or lyme-grass <i>Leymus arenarius</i> should be healthy (i.e. green plant parts above ground and flowering heads present).
Vegetation composition: typical species and subcommunities	Percentage cover at a representative number of monitoring stops	Maintain the presence of species-poor communities dominated by marram grass <i>Ammophila arenaria</i> and/or lymegrass <i>Leymus arenarius</i> .
Vegetation composition: negative indicator species	Percentage cover	Negative indicator species (including non-native species) to represent less than 5% cover.
Fixed coastal dunes with herbaceous vegetation (grey dunes) [2130]		
To restore the favourable conservation condition of Fixed coastal dunes with herbaceous vegetation (grey dunes) in North Dublin Bay SAC, which is defined by the following list of attributes and targets:		
Habitat area	Hectares	Area stable or increasing, subject to natural processes including erosion and succession. For subsites mapped: North Bull - 40.29ha; South Bull - 64.56ha.
Habitat distribution	Occurrence	No decline, or change in habitat distribution, subject to natural processes.
Physical structure: sediment supply	Presence/absence of physical barriers	Maintain the natural circulation of sediment and organic matter, without any physical obstructions.
Vegetation structure: zonation	Occurrence	Maintain the range of coastal habitats including transitional zones, subject to natural processes including erosion and succession.
Vegetation structure: bare ground	Percentage cover	Bare ground should not exceed 10% of fixed dune habitat, subject to natural processes.
Vegetation structure: sward height	Centimetres	Maintain structural variation within sward.
Vegetation composition: typical species and subcommunities	Percentage cover at a representative number of monitoring stops	Maintain range of subcommunities with typical species listed in Delaney et al. (2013).
Vegetation composition: negative indicator species (including <i>Hippophae rhamnoides</i>)	Percentage cover	Negative indicator species (including non-natives) to represent less than 5% cover.
Vegetation composition: scrub/trees	Percentage cover	No more than 5% cover or under control.
Humid dune slacks [2190]		
To restore the favourable conservation condition of Humid dune slacks in North Dublin Bay SAC, which is defined by the following list of attributes and targets:		
Habitat area	Hectares	Area increasing, subject to natural processes including erosion and succession. For sub-sites mapped: North Bull - 2.96ha; South Bull - 9.15ha.
Habitat distribution	Occurrence	No decline or change in habitat distribution, subject to natural processes.
Physical structure: sediment supply	Presence/absence of physical barriers	Maintain the natural circulation of sediment and organic matter, without any physical obstructions.
Physical structure: hydrological and flooding regime	Water table levels; groundwater fluctuations (metres)	Maintain natural hydrological regime.

Attribute	Measure	Target
Vegetation structure: zonation	Occurrence	Maintain the range of coastal habitats including transitional zones, subject to natural processes including erosion and succession.
Vegetation structure: bare ground	Percentage cover	Bare ground should not exceed 5% of dune slack habitat, with the exception of pioneer slacks which can have up to 20% bare ground.
Vegetation structure: vegetation height	Centimetres	Maintain structural variation within sward.
Vegetation composition: typical species and subcommunities	Percentage cover at a representative number of monitoring stops	Maintain range of subcommunities with typical species listed in Delaney et al. (2013).
Vegetation composition: cover of <i>Salix repens</i>	Percentage cover; centimetres	Maintain less than 40% cover of creeping willow <i>Salix repens</i> .
Vegetation composition: negative indicator species	Percentage cover	Negative indicator species (including non-natives) to represent less than 5% cover.
Vegetation composition: scrub/trees	Percentage cover	No more than 5% cover or under control.
Petalwort [1395]		
To maintain the favourable conservation condition of Petalwort in North Dublin Bay SAC, which is defined by the following list of attributes and targets:		
Distribution of populations	Number and geographical spread of populations	No decline.
Population size	Number of individuals	No decline. Population at Bull Island estimated at a maximum of 5,824 thalli. Actual population is more likely to be 5% of this, or c. 300 thalli.
Area of suitable habitat	Hectares	No decline. Area of suitable habitat at Bull Island is estimated at c. 0.04ha.
Hydrological conditions: soil moisture	Occurrence	Maintain hydrological conditions so that substrate is kept moist and damp throughout the year, but not subject to prolonged inundation by flooding in winter.
Vegetation structure: height and cover	Centimetres and percentage	Maintain open, low vegetation with a high percentage of bryophytes (small acrocarps and liverwort turf) and bare ground.

3.1.3 Site Vulnerability (Threats and Pressures)

Threats, pressures and activities with negative impacts on the QIs of North Dublin Bay SAC are listed in Table 3-3 below, along with their respective impact rank and source (EEA, 2020a).

Table 3-3: Threats and Pressures posed to North Dublin Bay SAC

Threats and Pressures	Rank	Source
Industrial or commercial areas	High	Outside
Discharges	High	Inside
Diffuse pollution to surface waters due to other sources not listed	Medium	Inside
Urbanised areas, human habitation	High	Outside
Invasive non-native species	Medium	Inside

Threats and Pressures	Rank	Source
Other point source pollution to surface water	High	Inside
Burning down	Medium	Inside
Golf course	Medium	Outside
Bait digging / collection	Medium	Inside
Walking, horse-riding and non-motorised vehicles	High	Inside
Nautical sports	Medium	Inside
Leisure fishing	Low	Inside
Grazing	Medium	Inside
Antagonism with domestic animals	High	Inside
Intensive maintenance of public parks /cleaning of beaches	Low	Inside

Taking into account the Construction and Operational Phases' impact receptor pathways (surface water; groundwater to surface water; air (dust) to surface water) connecting the proposed Scheme with the North Dublin Bay SAC, the following threats and pressures are considered to be relevant to the proposed Scheme:

- Industrial or commercial areas - High Impact (Outside);
- Discharges - High Impact (Inside);
- Diffuse pollution to surface waters due to other sources not listed – Medium Impact (Inside);
- Urbanised areas, human habitation - High Impact (Outside);
- Invasive non-native species - Medium Impact (Inside); and
- Other point source pollution to surface water - High Impact (Inside).

3.2 South Dublin Bay SAC [000210]

This intertidal site extends from the South Wall at Dublin Port to the West Pier at Dun Laoghaire, a distance of c. 5km. Several permanent channels exist, the largest being Cockle Lake. A small sandy beach occurs at Merrion Gates, while some bedrock shore occurs near Dun Laoghaire. A number of small streams and drains flow into the site. The designated site possesses a fine and fairly extensive example of intertidal flats. Sediment type is predominantly sand, with muddy sands in the more sheltered areas. A typical macro-invertebrate faunal assemblage exists within the SAC. The SAC has the largest stand of Dwarf Eelgrass *Zostera noltii* on the east coast (NPWS, 2020b).

3.2.1 Qualifying Interests

The QIs of South Dublin Bay SAC are listed below. These include the habitats and species listed on Annex I / II of the E.U. Habitats Directive (* = priority habitat; numbers in brackets are Natura 2000 codes) that will be assessed further in regard to potential impacts:

- Mudflats and sandflats not covered by seawater at low tide [1140];
- Annual vegetation of drift lines [1210];
- Salicornia and other annuals colonising mud and sand [1310]; and
- Embryonic shifting dunes [2110].

Further site-specific details are available in NPWS (2013b).

3.2.2 Site-Specific Conservation Objectives

The site-specific conservation objectives for South Dublin Bay SAC below are taken from the NPWS Conservation Objectives Document (NPWS, 2013b).

‘To maintain the favourable conservation condition of the Annex I habitat(s) and/or the Annex II species for which the SAC has been selected’.

The conservation objectives document outlines specific objectives (Table 3-4) for the individual QIs and their respective attributes, measure and target aspects. The conservation objectives Annual vegetation of drift lines [1210]; Salicornia and other annuals colonising mud and sand [1310]; and Embryonic shifting dunes [2110] of the South Dublin Bay SAC currently do not have detailed conservation objectives. In-lieu of official conservation objectives for these QI habitats, this report will co-opt the conservation objectives of the neighbouring North Dublin Bay SAC.

Table 3-4: SSCOs for the South Dublin Bay SAC QIs

Attribute	Measure	Target
Mudflats and sandflats not covered by seawater at low tide [1140]		
To maintain the favourable conservation condition of Mudflats and sandflats not covered by seawater at low tide in South Dublin Bay SAC, which is defined by the following list of attributes and targets:		
Habitat area	Hectares	The permanent habitat area is stable or increasing, subject to natural processes.
Community extent	Hectares	Maintain the extent of the Zostera-dominated community, subject to natural processes
Community structure: Zostera density	Individuals/m ²	Conserve the high quality of the Zostera-dominated community, subject to natural processes.
Community distribution	Hectares	Conserve the following community type in a natural condition: Fine sands with Angulus tenuis community complex.
Annual vegetation of drift lines [1210]		
To maintain the favourable conservation condition of Annual vegetation of drift lines in South Dublin Bay SAC, which is defined by the following list of attributes and targets:		
Habitat area	Hectares	Area increasing, subject to natural processes, including erosion and succession.
Habitat distribution	Occurrence	No decline, or change in habitat distribution, subject to natural processes.
Physical structure: sediment supply	Presence / absence of physical barriers	Maintain the natural circulation of sediment and organic matter, without any physical obstructions.
Vegetation structure: zonation	Occurrence	Maintain the range of coastal habitats including transitional zones, subject to natural processes including erosion and succession.
Vegetation composition: typical species and subcommunities	Percentage cover at a representative number of monitoring stops	Maintain the presence of species-poor communities with typical species: sea rocket <i>Cakile maritima</i> , sea sandwort <i>Honckenya peploides</i> , prickly saltwort <i>Salsola kali</i> and oraches <i>Atriplex</i> spp.
Vegetation composition: negative indicator species	Percentage cover	Negative indicator species (including non-natives) to represent less than 5% cover.
Salicornia and other annuals colonising mud and sand [1310]		
To maintain the favourable conservation condition of Salicornia and other annuals colonizing mud and sand in South Dublin Bay SAC, which is defined by the following list of attributes and targets:		
Habitat area	Hectares	Area stable or increasing, subject to natural processes, including erosion and succession.
Habitat distribution	Occurrence	No decline, or change in habitat distribution, subject to natural processes.

Attribute	Measure	Target
Physical structure: sediment supply	Presence/ absence of physical barriers	Maintain, or where necessary restore, natural circulation of sediments and organic matter, without any physical obstructions.
Physical structure: creeks and pans	Occurrence	Maintain creek and pan structure, subject to natural processes, including erosion and succession.
Physical structure: flooding regime	Hectares flooded; frequency	Maintain natural tidal regime.
Vegetation structure: zonation	Occurrence	Maintain the range of coastal habitats including transitional zones, subject to natural processes including erosion and succession.
Vegetation structure: vegetation height	Centimetres	Maintain structural variation within sward.
Vegetation structure: vegetation cover	Percentage cover at a representative sample of monitoring stops	Maintain more than 90% of area outside creeks vegetated.
Vegetation composition: typical species and subcommunities	Percentage cover	Maintain the presence of species-poor communities listed in SMP (McCorry and Ryle, 2009).
Vegetation structure: negative indicator species - <i>Spartina anglica</i>	Hectares	No significant expansion of common cordgrass <i>Spartina anglica</i> , with an annual spread of less than 1%.
Embryonic shifting dunes [2110]		
To maintain the favourable conservation condition of Embryonic shifting dunes in South Dublin Bay SAC, which is defined by the following list of attributes and targets:		
Habitat area	Hectares	Area stable or increasing, subject to natural processes, including erosion and succession.
Habitat distribution	Occurrence	No decline or change in habitat distribution, subject to natural processes.
Physical structure: sediment supply	Presence/absence of physical barriers	Maintain the natural circulation of sediment and organic matter, without any physical obstructions.
Vegetation structure: zonation	Occurrence	Maintain the range of coastal habitats including transitional zones, subject to natural processes including erosion and succession.
Vegetation composition: plant health of foredune grasses	Percentage cover	More than 95% of sand couch <i>Elytrigia juncea</i> and/or lyme-grass <i>Leymus arenarius</i> should be healthy (i.e. green plant parts above ground and flowering heads present).
Vegetation composition: typical species and subcommunities	Percentage cover at a representative number of monitoring stops	Maintain the presence of species-poor communities with typical species: sand couch <i>Elytrigia juncea</i> and/or lyme-grass <i>Leymus arenarius</i> .
Vegetation composition: negative indicator species	Percentage cover	Negative indicator species (including non-native species) to represent less than 5% cover.

3.2.3 Site Vulnerability (Threats and Pressures)

Threats, pressures and activities with negative impacts on the QIs of South Dublin Bay SAC are listed in Table 3-5 below, along with their respective impact rank and source (EEA, 2020b).

Table 3-5: Threats and Pressures posed to South Dublin Bay SAC

Threats and Pressures	Rank	Source
Urbanised areas, human habitation	High	Outside
Roads, motorways	Low	Outside
Discharges	Medium	Inside and Outside
Marine water pollution	Medium	Inside and Outside
Industrial or commercial areas	High	Outside
Accumulation of organic material	High	Inside
Paths, tracks, cycling tracks	Medium	Inside
Reclamation of land from sea, estuary or marsh	High	Outside
Nautical sports	Medium	Inside
Non-motorized nautical sports	Medium	Inside
Walking, horse-riding and non-motorised vehicles	High	Inside
Bait digging / collection	Medium	Inside

Taking into account the Construction and Operational Phases' impact receptor pathways (surface water; groundwater to surface water; air (dust) to surface water) connecting the proposed Scheme with the South Dublin Bay SAC, the following threats and pressures are considered to be relevant to the proposed Scheme:

- Urbanised areas, human habitation - High Impact (Outside);
- Discharges - Medium Impact (Inside and Outside);
- Marine water pollution - Medium Impact (Inside and Outside); and
- Industrial or commercial areas - High Impact (Outside).

3.3 Rockabill to Dalkey Island SAC [003000]

This site includes a range of dynamic inshore and coastal waters in the western Irish Sea. Reef habitat is uncommon along the eastern seaboard of Ireland due to prevailing geology and hydrographical conditions. Expansive surveys of the Irish coast have indicated that the greatest resource of this habitat within the Irish Sea is found fringing offshore islands which are concentrated along the Dublin coast. The area selected for designation represents a key habitat for the Annex II species Harbour Porpoise within the Irish Sea. Population survey data show that porpoise occurrence within the site boundary meets suitable reference values for other designated sites in Ireland. The species occurs year-round within the site and comparatively high group sizes have been recorded. The site also contains two Annex II seal species – Harbour Seal *Phoca vitulina* and Grey Seal *Halichoerus grypus* (NPWS, 2014a).

3.3.1 Qualifying Interests

The QIs of Rockabill to Dalkey Island SAC are listed below. These include the habitats and species listed on Annex I / II of the E.U. Habitats Directive (* = priority habitat; numbers in brackets are Natura 2000 codes) that will be assessed further in regard to potential impacts:

- Reefs [1170]; and
- Harbour Porpoise *Phocoena phocoena* [1351].

Further site-specific details are available in NPWS (2013c).

3.3.2 Site-Specific Conservation Objectives

The site-specific conservation objectives for Rockabill to Dalkey Island SAC below are taken from the NPWS Conservation Objectives Document (NPWS, 2013c).

‘To maintain the favourable conservation condition of the Annex I habitat(s) and/or the Annex II species for which the SAC has been selected’.

The conservation objectives document outlines specific objectives (Table 3-6) for the individual QIs within the Zol and their respective attributes, measure and target aspects.

Table 3-6: SSCOs for the Rockabill to Dalkey Island SAC QIs

Attribute	Measure	Target
Reefs [1170]		
To maintain the favourable conservation condition of Reefs in Rockabill to Dalkey Island SAC, which is defined by the following list of attributes and targets:		
Habitat area	Hectares	The permanent area is stable or increasing, subject to natural processes.
Habitat distribution	Occurrence	Distribution is stable or increasing, subject to natural processes.
Community structure	Biological composition	Conserve the following community types in a natural condition: Intertidal reef community complex; and Subtidal reef community complex.
Harbour Porpoise [1351]		
To maintain the favourable conservation condition of Harbour Porpoise in Rockabill to Dalkey Island SAC, which is defined by the following list of attributes and targets:		
Access to suitable habitat	Number of artificial barriers	Species range within the site should not be restricted by artificial barriers to site use.
Disturbance	Level of impact	Human activities should occur at levels that do not adversely affect the harbour porpoise community at the site.

3.3.3 Site Vulnerability (Threats and Pressures)

Threats, pressures and activities with negative impacts on the QIs of Rockabill to Dalkey Island SAC are listed in Table 3-7 below, along with their respective impact rank and source (EEA, 2019).

Table 3-7: Threats and Pressures posed to Rockabill to Dalkey Island SAC

Threats and Pressures	Rank	Source
Utility and service lines	Medium	Outside
Professional active fishing	High	Inside and Outside
Discharges	High	Outside
Removal of sediments	Low	Outside
Siltation rate changes, dumping, depositing of dredged deposits	Low	Outside
Noise nuisance, noise pollution	High	Inside and Outside
Shipping lanes	High	Inside and Outside

Taking into account the Construction and Operational Phases' impact receptor pathways (surface water; groundwater to surface water; air (dust) to surface water) connecting the proposed Scheme with the Rockabill to Dalkey Island SAC, the following threats and pressures are considered to be relevant to the proposed Scheme:

- Discharges - High Impact (Outside).

3.4 North Bull Island SPA (004006)

The North Bull Island sand spit is a relatively recent depositional feature, formed as a result of improvements to Dublin Port. The site is among the top ten sites for wintering waterfowl in the country. It supports internationally important populations of Light-bellied Brent Goose and Bar-tailed Godwit and is the top site in the country for both of these species. A further 14 species have populations of national importance, with particular notable numbers of Shelduck, Pintail, Grey Plover, and Knot. The SPA is a regular site for passage waders such as Ruff, Curlew, Sandpiper and Spotted Redshank. The site supports Short-eared Owl in winter (NPWS, 2014).

3.4.1 Special Conservation Interests

The SCIs of North Bull Island SPA are listed below. These include the habitats and species listed on Annexes of the E.U. Birds Directive (bracketed numbers are Natura 2000 codes) that will be assessed further in regard to potential impacts:

- Light-bellied Brent Goose *Branta bernicla hrota* [A046];
- Common Shelduck *Tadorna tadorna* [A048];
- Teal *Anas crecca* [A052];
- Northern Pintail *Anas acuta* [A054];
- Shoveler *Anas clypeata* [A056];
- Eurasian Oystercatcher *Haematopus ostralegus* [A130];
- European Golden Plover *Pluvialis apricaria* [A140];
- Grey Plover *Pluvialis squatarola* [A141];
- Knot *Calidris canutus* [A143];
- Sanderling *Calidris alba* [A144];
- Dunlin *Calidris alpina* [A149];
- Black-tailed Godwit *Limosa limosa* [A156];
- Bar-tailed Godwit *Limosa lapponica* [A157];
- Eurasian Curlew *Numenius arquata* [A160];
- Common Redshank *Tringa totanus* [A162];
- Turnstone *Arenaria interpres* [A169];
- Black-headed Gull *Chroicocephalus ridibundus* [A179]; and
- Wetland and Waterbirds [A999].

3.4.2 Site-Specific Conservation Objectives

The site-specific conservation objectives for North Bull Island SPA below are taken from the NPWS Conservation Objectives Document (NPWS, 2015a).

‘To maintain the favourable conservation condition of the Annex species for which the SPA has been selected’.

The site-specific conservation objectives document outlines specific objectives (Table 3-8) for the individual SCIs within the Zol and their respective attributes, measure and target aspects.

Table 3-8: SSCOs for the North Bull Island SPA SCIs

Attribute	Measure	Target
Light-bellied Brent Goose [A046] Common Shelduck [A048] Teal [A052] Pintail [A054] Shoveler [A056] Eurasian Oystercatcher [A130]		Dunlin [A149] Black-tailed Godwit [A156] Bar-tailed Godwit [A157] Eurasian Curlew [A160] Common Redshank [A162] Turnstone [A169]

Attribute	Measure	Target
European Golden Plover [A140] Grey Plover [A141] Knot [A143] Sanderling [A144]		Black-headed Gull [A179]
To maintain the favourable conservation condition of SCI bird species in North Bull Island SPA, which is defined by the following list of attributes and targets:		
Population trend	Percentage change	Long term population trend stable or increasing.
Distribution	Range, timing and intensity of use of areas	No significant decrease in the range, timing or intensity of use of areas by the above SCI bird species, other than that occurring from natural patterns of variation.
Wetlands [A999]		
To maintain the favourable conservation condition of the wetland habitat in North Bull Island SPA as a resource for the regularly occurring migratory waterbirds that utilise it. This is defined by the following attribute and target:		
Habitat area	Hectares	The permanent area occupied by the wetland habitat should be stable and not significantly less than the area of 1,713 hectares, other than that occurring from natural patterns of variation.

3.4.3 Site Vulnerability (Threats and Pressures)

Threats, pressures and activities with negative impacts on the SCIs of North Bull Island SPA are listed in Table 3-9 below, along with their respective impact rank and source (EEA, 2020c).

Table 3-9: Threats and Pressures posed to North Bull Island SPA

Threats and Pressures	Rank	Source
Continuous urbanisation	Medium	Outside
Industrial or commercial areas	Medium	Outside
Discharges	Medium	Inside and Outside
Roads, motorways	Medium	Outside
Bridge, viaduct	High	Inside
Shipping lanes	Medium	Outside
Nautical sports	Medium	Inside
Other patterns of habitation	Low	Inside
Golf course	Medium	Inside
Bait digging / collection	Medium	Inside
Walking, horse-riding and non-motorised vehicles	High	Inside

Taking into account the Construction and Operational Phases' impact receptor pathways (surface water; groundwater to surface water; air (dust) to surface water) connecting the proposed Scheme with the North Bull Island SPA, the following threats and pressures are considered to be relevant to the proposed Scheme:

- Continuous urbanisation - Medium Impact (Outside);
- Industrial or commercial areas - Medium Impact (Outside); and
- Discharges - Medium Impact (Inside and Outside).

3.5 South Dublin Bay and River Tolka Estuary SPA (004024)

The South Dublin Bay and River Tolka Estuary SPA, located on the east coast of Ireland, spans approximately 2,500 hectares and includes the southern portion of Dublin Bay and the River Tolka estuary. This protected area is crucial for its rich biodiversity, especially as a habitat for numerous ecologically important bird species. The intertidal flats, shallow waters, and salt marshes provide vital feeding and roosting grounds for internationally significant populations of Light-bellied Brent Geese, Ringed Plover, and Bar-tailed Godwit, alongside species like the Oystercatcher and Redshank, which rely on the site during migration. The mudflats are particularly important for supporting these bird species, many of which are either threatened or dependent on such coastal habitats. In addition to birdlife, the SPA supports various marine invertebrates and salt-tolerant plant species, playing a key role in maintaining regional biodiversity while also serving as a recreational space near Dublin city.

3.5.1 Special Conservation Interests

The SCIs of South Dublin Bay and River Tolka Estuary SPA are listed below:

- Light-bellied Brent Goose *Branta bernicla hrota* [A046];
- Eurasian Oystercatcher *Haematopus ostralegus* [A130];
- Ringed Plover *Charadrius hiaticula* [A137];
- Grey Plover *Pluvialis squatarola* [A141];
- Knot *Calidris canutus* [A143];
- Sanderling *Calidris alba* [A144];
- Dunlin *Calidris alpina* [A149];
- Bar-tailed Godwit *Limosa lapponica* [A157];
- Common Redshank *Tringa totanus* [A162];
- Black-headed Gull *Chroicocephalus ridibundus* [A179];
- Roseate Tern *Sterna dougallii* [A192];
- Common Tern *Sterna hirundo* [A193];
- Arctic Tern *Sterna paradisaea* [A194]; and
- Wetland and Waterbirds [A999].

3.5.2 Site-Specific Conservation Objectives

The site-specific conservation objectives for South Dublin Bay and River Tolka Estuary SPA below are taken from the NPWS Conservation Objectives Document (NPWS, 2015b).

‘To maintain the favourable conservation condition of the Annex species for which the SPA has been selected’.

The conservation objectives document outlines specific objectives (Table 3-10) for the individual SCIs within the Zol and their respective attributes, measure and target aspects.

Table 3-10: SSCOs for the South Dublin Bay and River Tolka Estuary SPA

Attribute	Measure	Target
Light-bellied Brent Goose [A046] Eurasian Oystercatcher [A130] Grey Plover [A141] Knot [A143] Sanderling [A144]		Dunlin [A149] Bar-tailed Godwit [A157] Common Redshank [A162] Black-headed Gull [A179]
To maintain the favourable conservation condition of SCI bird species in South Dublin Bay and River Tolka Estuary SPA, which is defined by the following list of attributes and targets:		
Population trend	Percentage change	Long term population trend stable or increasing.

Attribute	Measure	Target
Distribution	Range, timing and intensity of use of areas	No significant decrease in the range, timing or intensity of use of areas by the above SCI bird species, other than that occurring from natural patterns of variation.
Roseate Tern [A192]		
To maintain the favourable conservation condition of Roseate Tern in South Dublin Bay and River Tolka Estuary SPA, which is defined by the following list of attributes and targets:		
Passage population: individuals	Number	No significant decline.
Distribution: roosting areas	Number; location; area (hectares)	No significant decline.
Prey biomass available	Kilogrammes	No significant decline.
Barriers to connectivity	Number; location; shape; area (hectares)	No significant increase.
Disturbance at roosting site	Level of impact	Human activities should occur at levels that do not adversely affect the numbers of Roseate Tern among the post-breeding aggregation of terns.
Common Tern [A192]		
To maintain the favourable conservation condition of Common Tern in South Dublin Bay and River Tolka Estuary SPA, which is defined by the following list of attributes and targets:		
Breeding population abundance: apparently occupied nests (AONs)	Number	No significant decline.
Productivity rate: fledged young per breeding pair	Mean number	No significant decline.
Passage population: individuals	Number	No significant decline.
Distribution: breeding colonies	Number; location; area (Hectares)	No significant decline.
Distribution: roosting areas	Number; location; area (Hectares)	No significant decline.
Prey biomass available	Kilogrammes	No significant decline.
Barriers to connectivity	Number; location; shape; area (hectares)	No significant increase.
Disturbance at breeding site	Level of impact	Human activities should occur at levels that do not adversely affect the breeding Common Tern population.
Disturbance at roosting site	Level of impact	Human activities should occur at levels that do not adversely affect the numbers of Common Tern among the post-breeding aggregation of terns.
Arctic Tern [A192]		
To maintain the favourable conservation condition of Arctic Tern in South Dublin Bay and River Tolka Estuary SPA, which is defined by the following list of attributes and targets:		
Distribution: breeding colonies	Number; location; area (Hectares)	No significant decline.
Distribution: roosting areas	Number; location; area (Hectares)	No significant decline.
Prey biomass available	Kilogrammes	No significant decline.

Attribute	Measure	Target
Barriers to connectivity	Number; location; shape; area (hectares)	No significant increase.
Disturbance at roosting site	Level of impact	Human activities should occur at levels that do not adversely affect the numbers of Arctic Tern among the post-breeding aggregation of terns
Wetlands [A999]		
To maintain the favourable conservation condition of the wetland habitat in South Dublin Bay and River Tolka Estuary SPA as a resource for the regularly occurring migratory waterbirds that utilise it. This is defined by the following attribute and target:		
Habitat area	Hectares	The permanent area occupied by the wetland habitat should be stable and not significantly less than the area of 2,192 hectares, other than that occurring from natural patterns of variation.

3.5.3 Site Vulnerability (Threats and Pressures)

Threats, pressures and activities with negative impacts on the SCIs of South Dublin Bay and River Tolka Estuary SPA are listed in Table 3-11 below, along with their respective impact rank and source (EEA, 2021).

Table 3-11: Threats and Pressures posed to South Dublin Bay and River Tolka Estuary SPA

Threats and Pressures	Rank	Source
Urbanised areas, human habitation	High	Outside
Industrial or commercial areas	High	Outside
Discharges	High	Inside
Reclamation of land from sea, estuary or marsh	High	Outside
Roads, motorways	Medium	Outside
Eutrophication (natural)	Medium	Inside
Nautical sports	Medium	Inside
Bait digging / collection	Medium	Inside
Walking, horse-riding and non-motorised vehicles	High	Inside
Leisure fishing	Medium	Inside

Taking into account the Construction and Operational Phases' impact receptor pathways (surface water; groundwater to surface water; air (dust) to surface water) connecting the proposed Scheme with the South Dublin Bay and River Tolka Estuary SPA, the following threats and pressures are considered to be relevant to the proposed Scheme:

- Urbanised areas, human habitation - High Impact (Outside);
- Industrial or commercial areas - High Impact (Outside); and
- Discharges - High Impact (Inside).

3.6 North-west Irish Sea SPA (004236)

3.6.1 Special Conservation Interests

The SCIs of North-west Irish Sea SPA are listed below:

- Red-throated Diver *Gavia stellata* [A001];
- Great Northern Diver *Gavia immer* [A003];

- Fulmar *Fulmarus glacialis* [A009];
- Manx Shearwater *Puffinus puffinus* [A013];
- Cormorant *Phalacrocorax carbo* [A017];
- Shag *Phalacrocorax aristotelis* [A018];
- Common Scoter *Melanitta nigra* [A065];
- Little Gull *Larus minutus* [A177];
- Black-headed Gull *Chroicocephalus ridibundus* [A179];
- Common Gull *Larus canus* [A182];
- Lesser Black-backed Gull *Larus fuscus* [A183];
- Herring Gull *Larus argentatus* [A184];
- Great Black-backed Gull *Larus marinus* [A187];
- Kittiwake *Rissa tridactyla* [A188];
- Roseate Tern *Sterna dougallii* [A192];
- Common Tern *Sterna hirundo* [A193];
- Arctic Tern *Sterna paradisaea* [A194];
- Little Tern *Sterna albifrons* [A195];
- Guillemot *Uria aalge* [A199];
- Razorbill *Alca torda* [A200]; and
- Puffin *Fratercula arctica* [A204].

3.6.2 Site-Specific Conservation Objectives

The site-specific conservation objectives for the Northwest Irish Sea SPA below are taken from the NPWS Conservation Objectives Document (NPWS, 2023b).

‘To restore or maintain the favourable conservation condition of the Annex species for which the SPA has been selected’.

The conservation objectives document outlines specific objectives (Table 3-12) for the individual SCIs within the Zol and their respective attributes, measure and target aspects.

Table 3-12: SSCOs for the Northwest Irish Sea SPA's SCIs

Attribute	Measure	Target
Red-throated Diver [A001] Great Northern Diver [A003] Manx Shearwater [A013] Common Scoter [A065] Little Gull [A177]		Black-headed Gull [A179] Common Gull [A182] Great Black-backed Gull [A187] Guillemot [A199]
To maintain the favourable conservation condition of the above SCI bird species in North-west Irish Sea SPA, which is defined by the following list of attributes and targets:		
Non-breeding population size	Number	No significant decline.
Spatial distribution	Hectares, time and intensity of use	Sufficient number of locations, area, and availability (in terms of timing and intensity of use) of suitable habitat to support the population
Forage spatial distribution, extent and abundance	Location and hectares, and forage biomass	Sufficient number of locations, area of suitable habitat and available forage biomass to support the population target
Disturbance across the site	Intensity, frequency, timing and duration	The intensity, frequency, timing and duration of disturbance occurs at levels that do not significantly impact the achievement of targets for population size and spatial distribution
Barriers to connectivity and site use	Number; location; shape; area (hectares)	The number, location, shape and area of barriers do not significantly impact the site population's access to the

Attribute	Measure	Target
		SPA or other ecologically important sites outside the SPA
Fulmar [A009], Herring Gull [A184], Kittiwake [A188]		
To restore the favourable conservation condition of the above SCI bird species in North-west Irish Sea SPA, which is defined by the following list of attributes and targets:		
Population Size	Number	Long term SPA population trend is stable or increasing
Spatial distribution	Hectares, time and intensity of use	Sufficient number of locations, area, and availability (in terms of timing and intensity of use) of suitable habitat to support the population
Forage spatial distribution, extent and abundance	Location and hectares, and forage biomass	Sufficient number of locations, area of suitable habitat and available forage biomass to support the population target
Disturbance across the site	Intensity, frequency, timing and duration	The intensity, frequency, timing and duration of disturbance occurs at levels that do not significantly impact the achievement of targets for population size and spatial distribution
Barriers to connectivity and site use	Number; location; shape; area (hectares)	The number, location, shape and area of barriers do not significantly impact the site population's access to the SPA or other ecologically important sites outside the SPA
Cormorant [A017], Shag [A018], Puffin [A204]		
To restore the favourable conservation condition of the above SCI bird species in North-west Irish Sea SPA, which is defined by the following list of attributes and targets:		
Breeding Population Size	Number	Long term population trend within the SPA is stable or increasing
Spatial distribution	Hectares, time and intensity of use	Sufficient number of locations, area, and availability (in terms of timing and intensity of use) of suitable habitat to support the population
Forage spatial distribution, extent and abundance	Location and hectares, and forage biomass	Sufficient number of locations, area of suitable habitat and available forage biomass to support the population target
Disturbance across the site	Intensity, frequency, timing and duration	The intensity, frequency, timing and duration of disturbance occurs at levels that do not significantly impact the achievement of targets for population size and spatial distribution
Barriers to connectivity and site use	Number; location; shape; area (hectares)	The number, location, shape and area of barriers do not significantly impact the site population's access to the SPA or other ecologically important sites outside the SPA
Lesser Black-backed Gull [A183] Roseate Tern [A192] Common Tern [A193]		Arctic Tern [A194] Little Tern [A195]
To maintain the favourable conservation condition of the above SCI bird species in North-west Irish Sea SPA, which is defined by the following list of attributes and target		
Breeding Population Size	Number	No significant decline
Spatial distribution	Hectares, time and intensity of use	Sufficient number of locations, area, and availability (in terms of timing and intensity of use) of suitable habitat to support the population

Attribute	Measure	Target
Forage spatial distribution, extent and abundance	Location and hectares, and forage biomass	Sufficient number of locations, area of suitable habitat and available forage biomass to support the population target
Disturbance across the site	Intensity, frequency, timing and duration	The intensity, frequency, timing and duration of disturbance occurs at levels that do not significantly impact the achievement of targets for population size and spatial distribution
Barriers to connectivity and site use	Number; location; shape; area (hectares)	The number, location, shape and area of barriers do not significantly impact the site population's access to the SPA or other ecologically important sites outside the SPA
Razorbill [A200]		
To maintain the favourable conservation condition of razorbill in North-west Irish Sea SPA, which is defined by the following list of attributes and targets:		
Population Size	Number	No significant decline
Spatial distribution	Hectares, time and intensity of use	Sufficient number of locations, area, and availability (in terms of timing and intensity of use) of suitable habitat to support the population
Forage spatial distribution, extent and abundance	Location and hectares, and forage biomass	Sufficient number of locations, area of suitable habitat and available forage biomass to support the population target
Disturbance across the site	Intensity, frequency, timing and duration	The intensity, frequency, timing and duration of disturbance occurs at levels that do not significantly impact the achievement of targets for population size and spatial distribution
Barriers to connectivity and site use	Number; location; shape; area (hectares)	The number, location, shape and area of barriers do not significantly impact the site population's access to the SPA or other ecologically important sites outside the SPA

3.6.3 Site Vulnerabilities (Threats and Pressures)

Threats and pressures are not yet available for this site as it was only recently adopted (September 2023) as a fully recognised Natura 2000 site, following a brief period of candidacy. There is as yet no Standard Data Form, (containing the site related threats and pressures, their impacts and sources), listed on the European Environment Agency website (2024).

3.7 Summary of Natura 2000 sites QIs and SCIs within the Zone of Influence

The following list contains all the QIs and SCIs from the North Dublin Bay SAC; South Dublin Bay SAC; Rockabill to Dalkey Island SAC; North Bull Island SPA; South Dublin Bay and River Tolka Estuary SPA; and North-west Irish Sea SPA. These six sites that are considered to be within the ZoI of the proposed Scheme, via surface water; groundwater-to-surface water; land (including visual and audible disturbance); air (dust); and air (dust) to surface water pathways:

- Mudflats and sandflats not covered by seawater at low tide [1140];
- Reefs [1170];
- Annual vegetation of drift lines [1210];
- Salicornia and other annuals colonising mud and sand [1310];
- Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*) [1330];
- Mediterranean salt meadows (*Juncetalia maritimi*) [1410];

- Embryonic shifting dunes [2110];
- Shifting dunes along the shoreline with *Ammophila arenaria* (white dunes) [2120];
- Fixed coastal dunes with herbaceous vegetation (grey dunes) [2130];
- Humid dune slacks [2190];
- Harbour Porpoise *Phocoena phocoena* [1351];
- Petalwort *Petalophyllum ralfsii* [1395];
- Red-throated Diver *Gavia stellata* [A001];
- Great Northern Diver *Gavia immer* [A003];
- Fulmar *Fulmarus glacialis* [A009];
- Manx Shearwater *Puffinus puffinus* [A013];
- Cormorant *Phalacrocorax carbo* [A017];
- Shag *Phalacrocorax aristotelis* [A018];
- Light-bellied Brent Goose *Branta bernicla hrota* [A046];
- Common Shelduck *Tadorna tadorna* [A048];
- Teal *Anas crecca* [A052];
- Pintail *Anas acuta* [A054];
- Shoveler *Anas clypeata* [A056];
- Common Scoter *Melanitta nigra* [A065];
- Eurasian Oystercatcher *Haematopus ostralegus* [A130];
- Ringed Plover *Charadrius hiaticula* [A137];
- Golden Plover *Pluvialis apricaria* [A140];
- Grey Plover *Pluvialis squatarola* [A141];
- Knot *Calidris canutus* [A143];
- Sanderling *Calidris alba* [A144];
- Dunlin *Calidris alpina* [A149];
- Black-tailed Godwit *Limosa limosa* [A156];
- Bar-tailed Godwit *Limosa lapponica* [A157];
- Eurasian Curlew *Numenius arquata* [A160];
- Redshank *Tringa totanus* [A162];
- Turnstone *Arenaria interpres* [A169];
- Little Gull *Larus minutus* [A177];
- Black-headed Gull *Chroicocephalus ridibundus* [A179];
- Common Gull *Larus canus* [A182];
- Lesser Black-backed Gull *Larus fuscus* [A183];
- Herring Gull *Larus argentatus* [A184];
- Great Black-backed Gull *Larus marinus* [A187];
- Kittiwake *Rissa tridactyla* [A188];
- Roseate Tern *Sterna dougallii* [A192];
- Common Tern *Sterna hirundo* [A193];
- Arctic Tern *Sterna paradisaea* [A194];
- Little Tern *Sterna albifrons* [A195];
- Guillemot *Uria aalge* [A199];
- Razorbill *Alca torda* [A200];
- Puffin *Fratercula arctica* [A204]; and
- Wetland and Waterbirds [A999].

SECTION 4: ENVIRONMENTAL BASELINE

4.1 General Baseline Conditions

The proposed Scheme area is comprised of a wide range of habitats, including artificial urban landscapes, amenity grasslands, dry meadows, scattered tree and parkland, mixed broadleaved and riparian woodlands, swamps, marsh, hedgerows, treelines and scrub; as well as the Royal Canal and River Tolka. Updates to the habitat mapping noted during subsequent ecological survey have been incorporated into the sub-section below. Descriptions of habitats and associated species are provided in the sub-sections below.

4.2 Habitats

A list of habitats recorded during the ecological habitat survey are listed in Table 4-1 below and are presented in detail in the following sections. Habitat Maps are provided in Appendix B. The table below also contains a heading section for Natura 2000 sites; Annex I habitats and QI / SCI species which are linked with specific Fossitt habitats through their habitat utilisation in the case of faunal QIs / SCIs; and hydrological linkages downstream (designated site, Annex I habitats, and QI / SCI species). These linkages have been identified from desktop data and/or field survey observations.

Table 4-1: List of habitats (Fossitt Classification) recorded within and adjacent to the proposed Scheme, with linked Annex I habitats and QI / SCI species

Fossitt Habitat	Fossitt Code	Linked Annex I Habitats & QI / SCI Species
Stone walls and other stonework	BL1	-
Buildings and artificial surfaces	BL3	-
Other artificial lakes and ponds	FL8	Cormorant (Utilisation) Black-headed Gull (Utilisation) Herring Gull (Utilisation)
Reed and large sedge swamps	FS1	-
Tall-herb swamps	FS2	Hydrophilous tall herb fringe communities of plains and of the montane to alpine levels [6430] (Potential)
Depositing / lowland rivers	FW2	South Dublin Bay and River Tolka Estuary SPA - SCI bird species (Hydrological) North Bull Island SPA - SCI bird species (Hydrological) South Dublin Bay SAC – QI Habitats (Hydrological) North Dublin Bay SAC – QI Habitats and Flora (Hydrological) Rockabill to Dalkey Island SAC - QI Habitat and Fauna (Hydrological) North-West Irish Sea SPA - SCI bird species (Hydrological)
Canals	FW3	South Dublin Bay and River Tolka Estuary SPA - SCI bird species (Hydrological) North Bull Island SPA - SCI bird species (Hydrological) South Dublin Bay SAC – QI Habitats (Hydrological) North Dublin Bay SAC – QI Habitats and Flora (Hydrological) Rockabill to Dalkey Island SAC - QI Habitat and Fauna (Hydrological)

Fossitt Habitat	Fossitt Code	Linked Annex I Habitats & QI / SCI Species
		North-West Irish Sea SPA - SCI bird species (Hydrological) Black-headed Gull (Utilisation)
Amenity grassland (improved)	GA2	Light-bellied Brent Goose (Utilisation) Curlew (Utilisation) Black-headed Gull (Utilisation) Common Gull (Utilisation) Lesser Black-backed Gull (Utilisation) Herring Gull (Utilisation)
Marsh	GM1	-
Dry calcareous and neutral grassland	GS1	Herring Gull (Utilisation)
Dry meadows and grassy verges	GS2	-
(Mixed) broadleaved woodland	WD1	-
Scattered trees and parkland	WD5	Black-headed Gull (Utilisation) Herring Gull (Utilisation)
Treelines	WL2	-
Wet willow-alder-ash woodland	WN6	-
Scrub	WS1	-
Ornamental/non-native shrub	WS3	-

4.2.1 Stone walls and other stonework (BL1)

Linear stonewall habitats are present as part of the stone bridge within Tolka Valley Park. These habitats have a limited floral diversity, only supporting Ivy *Hedera hibernica*; Herb-Robert *Geranium robertianum* and the invasive non-native Butterfly-bush *Buddleja davidii*.

4.2.2 Buildings and artificial surfaces (BL3)

This habitat refers to the human-made structures and surfaces which occur throughout the proposed Scheme area, such as footpaths and bridges, cycle lanes, roads, car parks, buildings and the Broombridge Luas Stop area.

Feral Pigeon *Columba livia domestica*; Rook *Corvus frugilegus* and House Sparrow *Passer domesticus* were recorded by ecological surveyors utilising structure / buildings for roosting purposes.

4.2.3 Other artificial lakes and ponds (FL8)

This aquatic habitat refers to the pond within Tolka Valley Park (see Figure 4-1), located 40m southwest of the proposed Scheme's site boundary. Located within this pond is a small, wooded islet, which supports nesting waterfowl such as Mute Swan *Cygnus olor*. The pond supports White Water-lily *Nymphaea alba*, as well as some fringing but fragmented reedbeds. The species of the fringing reedbeds and wooded islet are listed in their respective sub-sections (4.2.4 and 4.2.15).

Ecological surveyors noted the following fauna utilising this aquatic habitat - Mute Swan; Cormorant *Phalacrocorax carbo*; Black-headed Gull *Chroicocephalus ridibundus* (SCI species of Natura 2000 SPA); Herring Gull *Larus argentatus* (SCI species of Natura 2000 SPA); Tufted Duck *Aythya fuligula*; Mallard *Anas platyrhynchos*; Little Grebe *Tachybaptus ruficollis*; Grey Heron *Ardea cinerea*; Moorhen *Gallinula chloropus*; and Common Frog *Rana temporaria*.



Figure 4-1: Resident Mute Swans - Tolka Valley Park pond (40m southwest of the site boundary)

4.2.4 Reed and large sedge swamps (FS1)

The reed and large sedge swamp habitat within the Tolka Valley Park was largely dominated by Common Reed *Phragmites australis*; with occasional Bulrush *Scirpoides holoschoenus*; Greater Pond Sedge *Carex riparia*; Club Rush; Yellow Iris *Iris pseudacorus*; Branched Bur-reed *Sparganium erectum*; Wild Angelica *Angelica sylvestris*; Soft Rush *Juncus effusus*; Purple Loosestrife *Lythrum salicaria*; Great Willowherb *Epilobium hirsutum*; and Hedge Bindweed *Calystegia sepium*. This habitat also fringes sections of the Tolka Valley Park pond.

Chaffinch *Fringilla coelebs*; Reed Bunting *Emberiza schoeniclus* and Bullfinch *Pyrrhula pyrrhula*; and Brown Hawker dragonfly *Aeshna grandis* were also recorded utilising this wetland habitat.

4.2.5 Tall herb swamps (FS2)

The northern bank of the Royal Canal supports a strip of high-quality, tall herb swamp habitat (Figure 4-2). The floral community of this habitat was typically comprised of Meadowsweet *Filipendula ulmaria*; Yellow Iris; Hedge Bindweed; Nettle *Urtica dioica*; Creeping Bent *Agrostis stolonifera*; Cow Parsley *Anthriscus sylvestris*; False Oat-grass *Arrhenatherum elatius*; Cuckooflower *Cardamine pratensis*; Remote Sedge *Carex remota*; Cock's-foot *Dactylis glomerata*; Great Willowherb *Epilobium hirsutum*; Field Horsetail *Equisetum arvense*; Red Fescue *Festuca rubra*; Hard Rush *Juncus inflexus*; Water Forget-me-not *Myosotis scorpioides*; Hemlock Water-dropwort *Oenanthe crocata*; Amphibious Bistort *Persicaria amphibia*; Ribwort Plantain *Plantago lanceolata*; Meadow Buttercup *Ranunculus acris*; Creeping Buttercup *Ranunculus repens*; Broad-leaved Dock *Rumex obtusifolius*; Rusty Willow *Salix cinerea* subsp. *oleifolia*; Alexanders *Smyrnium olusatrum*; Common Valerian *Valeriana officinalis*; and Bush Vetch *Vicia sepium*.

Ecological surveyors noted the following fauna utilising this habitat - House Sparrow; Moorhen; Goldfinch *Carduelis carduelis*; Wren *Troglodytes troglodytes*; Brown Hawker; Common Hawker *Aeshna juncea*; Common Darter *Sympetrum striolatum*; Emperor Dragonfly *Anax imperator*; Small White *Pieris rapae*; Speckled Wood *Pararge aegeria*; Small Tortoiseshell *Aglais urticae*; Honeybee *Apis mellifera*; Peacock *Aglais io*; and Large White *Pieris brassicae*.

The quality of this wetland habitat potentially links it with the Annex I habitat 'Hydrophilous tall herb fringe communities of plains and of the montane to alpine levels' (6430).



Figure 4-2: Tall-herb swamp along the northern bank of the Royal Canal at Broombridge

4.2.6 Depositing / lowland rivers (FW2)

This habitat classification refers to the River Tolka as it flows through the Tolka Valley Park and a cross-section of the proposed Scheme (see Figure 4-3). The river does not support a particularly wide range of emergent flora, with Common Reed appearing infrequently in small, bankside stands; while Branched Bur-reed individuals are rare. There is no instream flora present. The lower banks of the River Tolka are dominated by Bramble *Rubus fruticosus agg.*; Hedge Bindweed; Yorkshire Fog *Holcus lanatus*; and Nettle. Additionally, the high-impact invasive non-native Himalayan Balsam *Impatiens glandulifera* and Japanese Knotweed *Reynoutria japonica* are present on the riverbanks adjacent to the existing and proposed bridge.

The Luas Team Ecologists recorded (directly or indirectly - e.g., Otter spraint) a range of fauna utilising this aquatic habitat including Otter *Lutra lutra*; Mallard; House Martin *Delichon urbicum*; Grey Wagtail *Motacilla cinerea*; Grey Heron; Kingfisher *Alcedo atthis*; Blackbird *Turdus merula*; Dipper *Cinclus cinclus*; Brown Trout *Salmo trutta*; European Eel *Anguilla anguilla*; Three-spined Stickleback *Gasterosteus aculeatus*; Minnow *Phoxinus phoxinus*; and Stone Loach *Barbatula barbatula*; and Brown Hawker.

Additionally, sampling of this habitat revealed the presence of numerous freshwater invertebrates including families / genera of mayfly, caddisfly, amphipod, gastropod, bivalve, beetles, true flies, true worms, and leeches.



Figure 4-3: River Tolka and bridge within the Tolka Valley Park

4.2.7 Canals (FW3)

This aquatic habitat refers to the Royal Canal along the Broombridge section of the proposed Scheme (see Figure 4-4). The following aquatic / emergent floral species were recorded within the canal - Greater Water-moss *Fontinalis antipyretica* (on stonework at edge of canal); Reed Sweet-grass *Glyceria maxima*; Mare's-tail *Hippuris vulgaris*; Ivy-leaved Duckweed *Lemna trisulca*; Spiked Watermilfoil *Myriophyllum spicatum*; Yellow Waterlily *Nuphar lutea*; Amphibious Bistort *Persicaria amphibia*; and Bur-reed (not flowering) *Sparganium* spp. The aquatic invasive non-native species, Canadian Waterweed *Elodea canadensis* and Nuttall's Waterweed *Elodea nuttallii*, were also recorded within the Royal Canal at Broombridge.

Additionally, the red-listed (Vulnerable status) Tassel Stonewort *Tolypella intricata* was recorded (by Denyer Ecology) 180m upstream of the Broombridge road bridge. In this area there was shallow water near the edge of the canal of less than 0.5m deep. In the May 2022 survey, there was abundant Tassel Stonewort within a section of c. 10m length and 1m width of the canal. Other vegetation cover was low at this time. The plant was still present in the June 2022 survey but there was slightly higher cover of filamentous algae. A small sample was removed and checked microscopically.

In regard to fauna, Otter (spraint / latrine and holt); Moorhen (breeding pair with chicks); Grey Wagtail; Mallard; Mute Swan; Black-headed Gull (SCI species of Natura 2000 SPA); and Tufted Duck were recorded utilising this stretch of the Royal Canal.



Figure 4-4: Royal Canal - Broombridge Section

4.2.8 Amenity (improved) grassland (GA2)

This habitat refers to the small (e.g. maintained roadside grass verges) to large (e.g. playing pitches) amenity grassland areas present throughout much of the proposed Scheme's site boundary. The floral communities in these improved grassland habitats were typically comprised of Perennial Ryegrass *Lolium perenne*; Daisy *Bellis perennis*; Ribwort Plantain; Greater Plantain *Plantago major*; Nettle; Meadow Buttercup; Creeping Buttercup; Red Clover *Trifolium pratense*; White Clover *Trifolium repens*; Lesser Trefoil *Trifolium dubium*; Dandelion *Taraxacum* spp.; Ragwort *Jacobaea vulgaris*; Yorkshire Fog; Smooth Hawk's-beard *Crepis capillaris*; Daffodil *Narcissus* spp.; Dock *Rumex* spp.

Additionally, ecological surveyors recorded the following fauna utilising this grassland habitat - Rook; Feral Pigeon; Wood Pigeon *Columba palumbus*; House Martin; Starling *Sturnus vulgaris*; Wren; Robin *Erithacus rubecula*; Black-headed Gull (SCI species of Natura 2000 SPA); Lesser Black-backed Gull *Larus fuscus* (SCI species of Natura 2000 SPA); Herring Gull (SCI species of Natura 2000 SPA); Common Gull *Larus canus* (SCI species of Natura 2000 SPA); Barnacle Goose *Branta leucopsis*; Light-bellied Brent Goose *Branta bernicla hrota* (SCI species of Natura 2000 SPA) and Curlew *Numenius arquata* (SCI species of Natura 2000 SPA); Large White; Small White; and Red-tailed Bumblebee *Bombus lapidarius*.

4.2.9 Marsh (GM1)

The marsh habitat, located within the northeast corner of the Tolka Valley wetland (see Figure 4-5), was largely dominated by Yellow Iris *Iris pseudacorus*; with frequent Nettle; and occasional Bulrush; Cow Parsley; Hogweed *Heracleum sphondylium*; Cleavers *Galium aparine*; Great Willowherb; Common Reed; and Butterbur *Petasites hybridus*.

The Luas Team Ecologists also recorded Goldfinch; Wren; White-tailed Bumblebee *Bombus lucorum*; Banded Demoiselle *Calopteryx splendens*; and Honeybee utilising this wetland habitat.



Figure 4-5: Marsh habitat within Tolka Valley Park

4.2.10 Dry calcareous and neutral grassland (GS1)

This habitat classification refers to the dry calcareous / neutral meadow habitat present within the St Helena's green area (see Figure 4-6). This grassland boasts a diverse flora range, including species such as Red Fescue; Yorkshire Fog; Cock's-foot; Common Bent *Agrostis capillaris*; Sweet Vernal-grass *Anthoxanthum odoratum*; Soft Brome *Bromus hordeaceus*; Common Sedge *Carex nigra*; Perennial Ryegrass; Germander Speedwell *Veronica chamaedrys*; Red Clover; White Clover; Daisy; Ribwort Plantain; Common Plantain *Plantago major*; Yarrow *Achillea millefolium*; Curly Dock *Rumex crispus*; Clustered Dock *Rumex conglomeratus*; Common Sorrel *Rumex acetosa*; Meadow Buttercup; Rough Hawkbit *Leontodon hispidus*; Chicory *Cichorium intybus*; Lesser Trefoil; Dandelion spp.; Ragwort; Hedgerow Crane's-bill *Geranium pyrenaicum*; Creeping Buttercup; Common Bird's-foot Trefoil *Lotus corniculatus*; Greater Bird's-foot Trefoil *Lotus pedunculatus*; Lady's Bedstraw *Galium verum*; Pignut *Conopodium majus*; Lesser Knapweed *Centaurea nigra*; Common Poppy *Papaver rhoeas*; Red Bartsia *Odontites vernus*; Cornflower *Centaurea cyanus*; Creeping Thistle *Cirsium arvense*; Scarlet Pimpernel *Anagallis arvensis*; Self-heal *Prunella vulgaris*; and Pyramidal Orchid *Anacamptis pyramidalis*.

Ecological surveyors also recorded the following fauna utilising this dry meadow habitat - House Sparrow; Feral Pigeon; Magpie *Pica pica*; Wood Pigeon; Herring Gull (SCI species of Natura 2000 SPA); Starling; Brown Hawker; Honeybee; Cranefly *Tipula paludosa*; Common Grasshopper *Omocestus viridulus*; Small Tortoiseshell; Meadow Brown *Maniola jurtina*; Small White; Honeybee; Common Carder-bee *Bombus pascuorum*; Moss Carder-bee *Bombus muscorum*; Red-tailed Bumblebee and White-tailed Bumblebee.



Figure 4-6: St Helena's dry meadow habitat

4.2.11 Dry meadow and grassy verges (GS2)

This habitat classification refers to the dry meadows and grassy verge/meadow strips, which are present in the northern and southern sections of the proposed Scheme (see Figure 4-7). These dry grassland habitats typically contained flora species such as Yorkshire Fog; Perennial Rye-grass; Red Fescue; Crested Dog's-tail *Cynosurus cristatus*; Common Bent; Soft Brome; Ribwort Plantain; Common Poppy; Meadow Foxtail *Alopecurus pratensis*; White Clover; Common Plantain; Self-heal; Red Clover; Lesser Trefoil; Cornflower; Lavender *Lavandula* spp.; False Oat-grass; Yarrow; Ox-eye Daisy *Leucanthemum vulgare*; Meadow Buttercup; Silverweed *Potentilla anserina*; Creeping Buttercup; Bush Vetch; Curly Dock; Broad-leaved Dock *Rumex obtusifolius*; Wild Teasel *Dipsacus fullonum*; Lesser Stitchwort *Stellaria holostea*; Dandelion spp.; Hogweed; Cleavers; Creeping Thistle; Spear Thistle *Cirsium vulgare*; Cock's-foot; Daisy; Smooth Sowthistle *Sonchus oleraceus*; Cut-leaved Crane's-bill *Geranium dissectum*; and Creeping Cinquefoil *Potentilla reptans*.

Ecological surveyors recorded the following faunal species utilising these dry meadow and grass verge habitats - Goldfinch; House Sparrow; Magpie; Wood Pigeon; Small Tortoiseshell, Meadow Brown and Peacock butterflies; Wasp *Vespula* spp.; Common Carder-bee; and Common Blue Damselfly *Enallagma cyathigerum*.



Figure 4-7: Dry meadow grassland strips within the Tolka Valley Park

4.2.12 (Mixed) broadleaved woodland (WD1)

This habitat classification refers to woodland strip east of Mellows Park and the small sub-section of mixed deciduous woodland at the southern extent of the Tolka Valley Park section, by the proposed bridge crossing (see Figure 4-8). These mixed woodland habitats comprised of the following canopy and understorey flora - Sycamore *Acer pseudoplatanus*; Hawthorn *Crataegus monogyna*; Hornbeam *Carpinus betulu*; Purple Sycamore *Acer pseudoplatanus f. purpureum*; Field Maple *Acer campestre*; Scots Pine *Pinus sylvestris*; Silver Birch *Betula pendula*; Black Poplar *Populus nigra*; Alder *Alnus glutinosa*; Goat Willow *Salix caprea*; Bramble; Nettle; Cleavers; Ivy; Yorkshire Fog; and Cow Parsley; and the invasive non-native Cherry Laurel *Prunus laurocerasus*.

Jackdaw *Corvus monedula*; Wood Pigeon; Speckled Wood and Orange Tip butterflies *Anthocharis cardamines* were all noted by surveyors to be utilising this woodland habitat.



Figure 4-8: A small mixed broad-leaved woodland patch adjacent to the Tolka Valley Park bridge

4.2.13 Treelines

A number of urban street and parkland boundary trees are present throughout the boundaries of the proposed Scheme (see Figure 4-9). Small-leaved Lime *Tilia cordata*; Wild Cherry *Prunus avium*; Hornbeam; Purple Sycamore; Hawthorn; Pedunculate Oak *Quercus robur*; Ash *Fraxinus excelsior*; Beech *Fagus sylvatica*; Black Poplar *Populus nigra*; Grey Willow *Salix cinerea*; White Willow *Salix alba*; Cottonwood *Populus* spp.; and Hazel *Corylus avellana*; while the understorey species (where present) mirror those listed in the amenity grassland sub-section above.

The following fauna were recorded within these linear habitats - Wood Pigeon; Collared Dove *Streptopelia decaocto*; Hooded Crow *Corvus cornix*; and Blue Tit *Cyanistes caeruleus*.



Figure 4-9: Treeline habitat running along Patrickswell Place

4.2.14 Scattered trees and parkland (WD5)

This habitat refers to the areas with scattered tree / canopy cover within the green amenity areas present within the proposed Scheme (see Figure 4-10). Juvenile and mature tree species recorded in this habitat included Small-leaved Lime *Tilia cordata*; Ash; Purple Sycamore; Sycamore; Goat Willow; Rowan *Sorbus aucuparia*; Silver Birch; Field Maple; Hazel; Whitebeam *Sorbus aria*; Hawthorn; Wild Cherry; Beech; Horse Chestnut *Aesculus hippocastanum*; and the invasive non-native Cherry Laurel. The ground flora typically comprised Perennial Ryegrass; Daisy; White Clover; Red Clover; Shepherd's Purse *Capsella bursa-pastoris*; Cock's-foot; Dandelion spp.; Ragwort; Creeping Buttercup; Groundsel *Senecio vulgaris*; Common Mouse-ear *Cerastium fontanum*; Silverweed; Ribwort Plantain; Bush Vetch; Cut-leaved Crane's-bill; Yarrow and Germander Speedwell.

Ecological surveyors also recorded Herring Gull (SCI species of Natura 2000 SPA); Black-headed Gull (SCI species of Natura 2000 SPA); Wood Pigeon; Magpie; Jackdaw; Collared Dove; Greenfinch *Chloris chloris*; Chiffchaff *Phylloscopus collybita*; Blue Tit; Blackcap *Sylvia atricapilla*; Blackbird; Treecreeper *Certhia familiaris*; and Hooded Crow; Large White; Small White; Speckled Wood; and Wasp spp. inhabiting this mixed tree and grassland habitat.



Figure 4-10: Scattered trees and parkland within Mellows Park

4.2.15 Wet willow-alder-ash woodland (WN6)

A small strip of wet willow-alder-ash woodland lines sections of the northern and southern banks of the River Tolka within and adjacent to the proposed site boundaries (see Figure 4-11). Additionally, a short section of the south bank woodland strip is also maturing into a wet willow-alder-ash woodland. This wet woodland habitat is comprised of the following canopy and understorey flora - Alder; Ash; Grey Willow; Osier *Salix viminalis*; Silver Birch; Cow Parsley; Bramble; Yorkshire Fog; Creeping Buttercup; Hogweed; Cleavers; Nettle; Ivy; Dock spp.; Hedge Bindweed; and Butterbur. A small stand of the high-impact invasive non-native species, Himalayan Balsam *Impatiens glandulifera*, was recorded within this habitat.

Ecological surveyors noted Dunnock *Prunella modularis*; Long-tailed Tit *Aegithalos caudatus*; Blackcap; Song Thrush *Turdus philomelos*; Spotted Flycatcher *Muscicapa striata*; Bullfinch; Speckled Wood; and Common Hawker dragonfly utilising this wet woodland habitat.

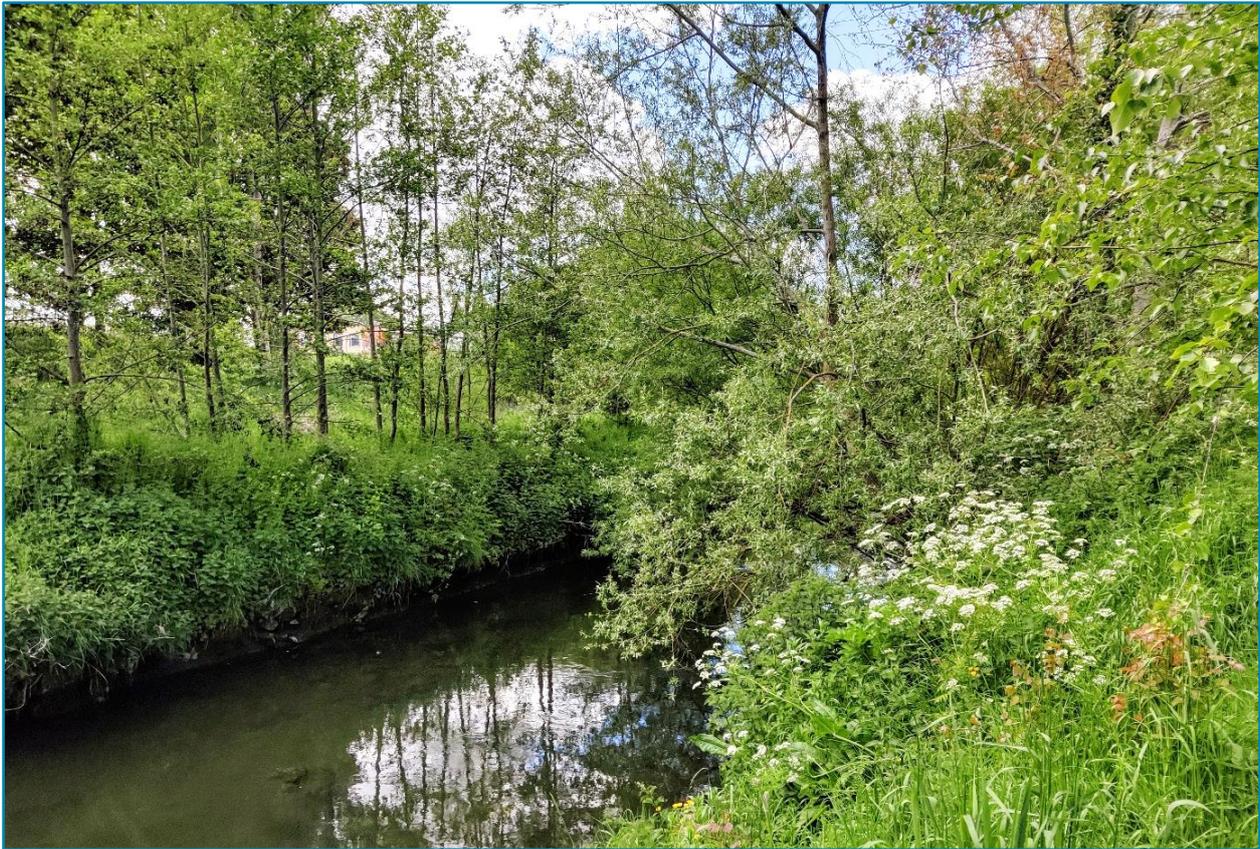


Figure 4-11: Semi-established wet willow-alder-ash woodland strips line the River Tolka's banks

4.2.16 Scrub (WS1)

Scrub habitat mainly exists in sporadic strips and patches within the Broombridge and Tolka Valley Park areas of the proposed Scheme. The flora community of this habitat is comprised of Bramble; Hawthorn; Dock spp.; Dandelion spp.; Bush Vetch; Nettle; Hedge Bindweed; Dogwood *Cornus* spp.; Ribwort Plantain; False Oatgrass; Cock's-foot; Field Mustard *Brassica rapa*; Yorkshire Fog; and the invasive non-native Butterfly-bush *Buddleja davidii*; as well as Willow spp., Silver Birch, Ash, and Alder saplings.

Ecological surveyors recorded Dunnock; Wren; and House Sparrow utilising this habitat type.

4.2.17 Ornamental / non-native shrub (WS3)

This habitat classification refers to a small, roadside section dominated by non-native ornamental shrub planting along the western pedestrian of St Margaret's Road, which contains invasive Cherry Laurel; Sycamore saplings and *Cotoneaster* spp. and other non-native ornamental flora; as well as Dogwood; Perforate St. John's-wort *Hypericum perforatum*; immature Elder *Sambucus nigra* and Rowan.

4.2.18 Protected Habitats

As mentioned in sub-section 3.2.3, the majority of the tall-herb swamp habitat potentially grades as a good example of the protected Annex I habitat 'Hydrophilous tall herb fringe communities of plains and of the montane to alpine levels' (6430). However, as this potential Annex I habitat is not a QI of the Natura 2000 sites within the proposed Scheme's ZoI, nor any other any other Natura 2000 sits within the greater Dublin area, the potential impacts and mitigations measures for this protected habitat will be addressed within the accompanying Environmental Impact Assessment Report's (EIAR) Biodiversity Chapter (Volume 3 – Chapter 9).

4.3 Protected Flora

The red-listed (Vulnerable status) Tassel Stonewort was recorded by Denyer Ecology (5th May 2022) approximately 180m upstream of the Broombridge Road bridge, i.e., the boundary of the proposed Scheme. Additionally, Opposite-leaved Pondweed and Pointed Stonewort were recorded, by Triturus Environmental Ltd, downstream between the first and third locks of the Royal Canal in the summer of 2023 (Triturus, 2024). However, these species are not a QI species of the Natura 2000 sites within the proposed Scheme's Zol. The accompanying EIAR's Biodiversity Chapter (Volume 3 – Chapter 9) will address the potential impacts and mitigation measures for these red-listed species.

4.4 Protected Fauna

During the ecological surveys, a range of protected fauna were recorded via visual sighting of individuals or observation of scat / spraint / prey remains. These species are protected under the Wildlife Act, 1976 and its amendments, and/or Annexes of the EU Habitats Directive and EU Birds Directive. However, only seven of these species, namely Light-bellied Brent Goose, Black-headed Gull, Curlew; Herring Gull; Lesser Black-backed Gull; Common Gull; and Cormorant, are SCIs of the Natura 2000 sites within the Scheme's Zol (refer to Appendix C and Appendix D of this NIS for further detail). These seven species will be examined in greater detail in the sub-section below. The remaining protected species will be addressed in the accompanying EIAR's Biodiversity Chapter (Volume 3 – Chapter 9); and will be examined with regard to potential impacts and mitigation measures.

4.4.1 SCI Bird species

Desktop data and initial site visits revealed that seven SCI bird species, namely Light-bellied Brent Goose, Black-headed Gull, Curlew; Herring Gull; Lesser Black-backed Gull; Common Gull; and Cormorant frequented the Tolka Valley Park pond and/or the maintained amenity grassland areas within and adjacent to the boundaries of the proposed Scheme (refer to Appendix C and Appendix D of this NIS for further detail).

As a part of the desktop study, the Luas Team Ecologists liaised with PhD researcher Tess Handby (University of Exeter), who was monitoring the Light-bellied Brent Goose flocks of the wider area of Dublin city across two winter seasons (2018/19 and 2019/20). The data produced from the study highlighted the occurrence of a Light-bellied Brent Goose population associated with the green amenity areas within and adjacent to the proposed Scheme (see Figure 4-12 overleaf). This sub-population of the Light-bellied Brent Goose within the North Bull Island SPA is referred to as the southern population or south-end population in her thesis. This data allowed for the refinement of wintering bird survey efforts to green areas relevant to the proposed Scheme.

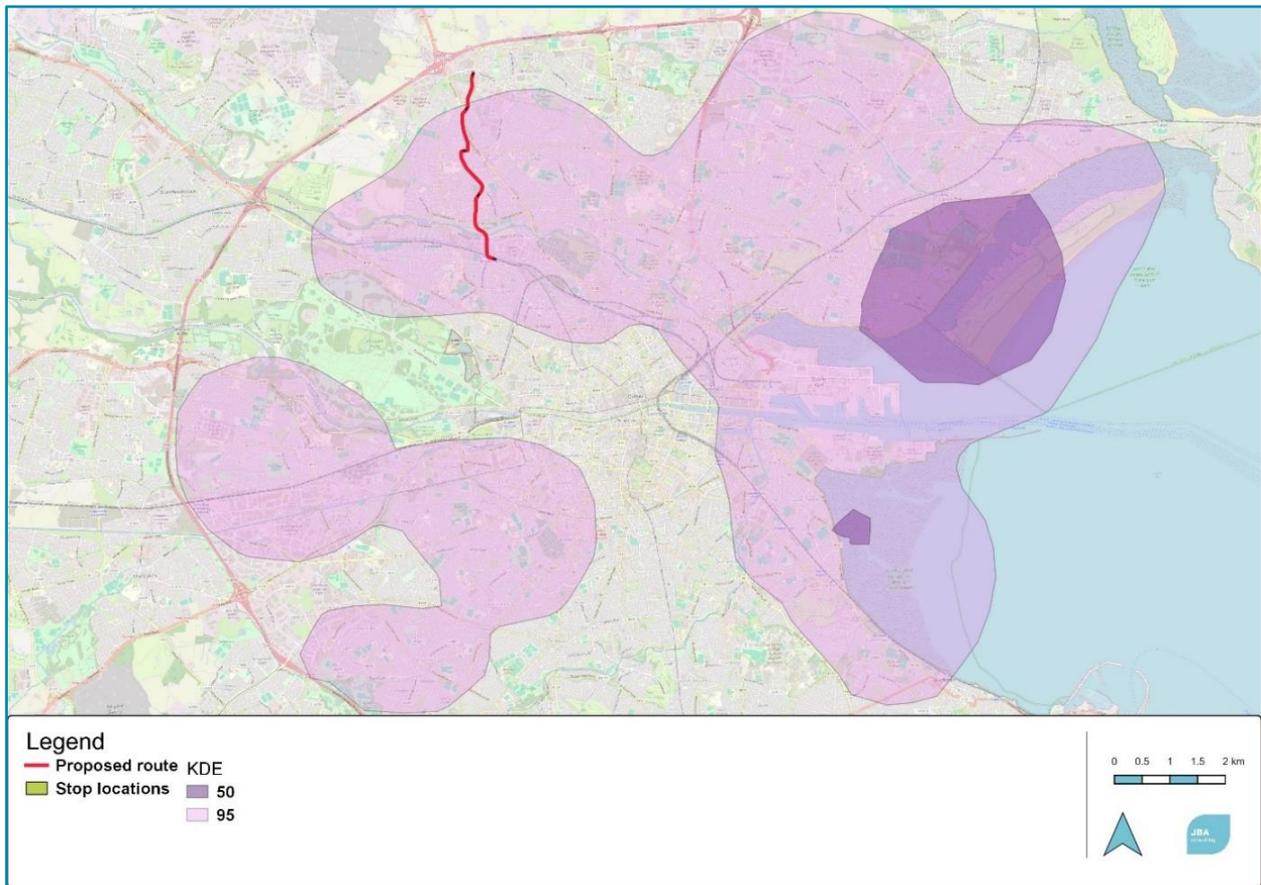


Figure 4-12: Kernel density estimates (KDE) for home range of North Bull Island's southern Light-bellied Brent Goose population. Larger transparent layer is the 95% KDE and smaller, darker layer represents 50% KDE (roosting area) of brent geese (abstracted from Tess Handby PhD - University of Exeter, 2021). (OSM, 2024)

Subsequently, wintering bird surveys (8 per season) were conducted during the optimum survey months (December, January and February) for the 2021-2022; 2022-2023 and 2023-2024 winter periods (totalling 24 surveys / 96 hours of observation). The focused survey areas for these surveys are displayed in Figure 4-13. The resulting data for the SCI birds species is displayed in Table 4-2; Table 4-3; Table 4-4; Table 4-5; Table 4-6; and Table 4-7.

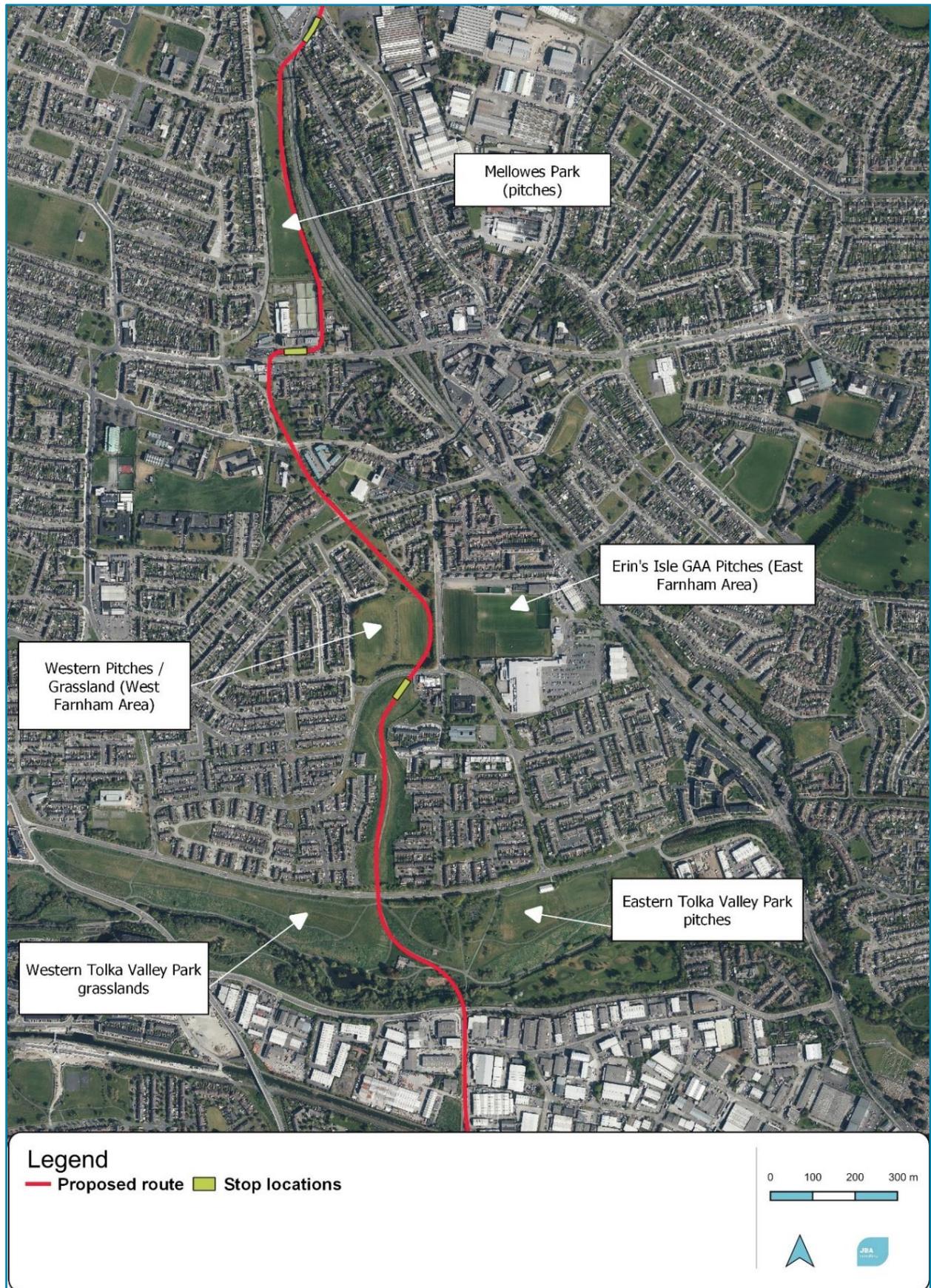


Figure 4-13: Focused survey areas during the wintering bird survey seasons (Bluesky, 2024)

Table 4-2: Flock size and location data for Light-bellied Brent Geese during winter 2021-2022

Date	Time	Flock Size	Percentage of North Bull Island / National population (approx.)	Location
01/12/2021	09:20	86	5.55% / 0.24%	Erin's Isle GAA Pitches (East Farnham area)
	<i>Light-bellied Brent Goose flocks absent during afternoon survey period</i>			
15/12/2021	09:01	107	6.91% / 0.30%	Erin's Isle GAA Pitches (Farnham area)
	<i>Light-bellied Brent Goose flocks absent during afternoon survey period</i>			
05/01/2022	09:10	~600	38.75% / 1.71%	Erin's Isle GAA Pitches (East Farnham area)
	15:30	~1,000	64.59% / 2.85%	Erin's Isle GAA Pitches (East Farnham area)
18/01/2022	09:09	~300	19.37% / 0.85%	Erin's Isle GAA Pitches (East Farnham area)
	15:36	~300	19.37% / 0.85%	Erin's Isle GAA Pitches (East Farnham area)
27/01/2022	10:08	~325	20.99% / 0.92%	Erin's Isle GAA Pitches (East Farnham area)
	<i>Light-bellied Brent Goose flocks absent during afternoon survey period</i>			
02/02/2022	09:06	~700	45.21% / 2.00%	Erin's Isle GAA Pitches (East Farnham area)
	10:01	+80 (~780)	50.38% / 2.22%	Erin's Isle GAA Pitches (East Farnham area)
	<i>Light-bellied Brent Goose flocks absent during afternoon survey period</i>			
10/02/2022	09:43	41	2.64% / 0.11%	Western pitch / grassland (West Farnham area)
	<i>Light-bellied Brent Goose flocks absent during afternoon survey period</i>			
25/02/2022	09:23	171	11.04% / 0.48%	Western pitch / grassland (West Farnham area)
	<i>Light-bellied Brent Goose flocks absent during afternoon survey period</i>			

Table 4-3: Flock size and location data for Light-bellied Brent Geese during winter 2022-2023

Date	Time	Flock Size	Percentage of North Bull Island / National population (approx.)	Location
07/12/2022	08:48	163	10.52% / 0.46%	Erin's Isle GAA Pitches (East Farnham area)
	<i>Light-bellied Brent Goose flocks absent during afternoon survey period</i>			
16/12/2022	08:54	~340	21.96% / 0.97%	Erin's Isle GAA Pitches (East Farnham area)
	14:32	~280	18.08% / 0.80%	Erin's Isle GAA Pitches (East Farnham area)
	14:40	186	12.01% / 0.53%	Western pitch / grassland (West Farnham area)

Date	Time	Flock Size	Percentage of North Bull Island / National population (approx.)	Location
05/01/2023	09:01	118	7.62% / 0.33%	Erin's Isle GAA Pitches (East Farnham area)
	09:04	92	5.94% / 0.26%	Western pitch / grassland (West Farnham area)
	<i>Light-bellied Brent Goose flocks absent during afternoon survey period</i>			
13/01/2023	08:49	124	8.01% / 0.35%	Erin's Isle GAA Pitches (East Farnham area)
	<i>Light-bellied Brent Goose flocks absent during afternoon survey period</i>			
25/01/2023	09:34	75	4.84% / 0.21%	Erin's Isle GAA Pitches (East Farnham area)
	<i>Light-bellied Brent Goose flocks absent during afternoon survey period</i>			
02/02/2023	09:28	~355	22.93% / 1.01%	Erin's Isle GAA Pitches (East Farnham area)
	<i>Light-bellied Brent Goose flocks absent during afternoon survey period</i>			
17/02/2023	08:56	155	10.01% / 0.44%	Erin's Isle GAA Pitches (East Farnham area)
	<i>Light-bellied Brent Goose flocks absent during afternoon survey period</i>			
28/02/2023	09:00	86	5.55% / 0.24%	Erin's Isle GAA Pitches (East Farnham area)
	<i>Light-bellied Brent Goose flocks absent during afternoon survey period</i>			

Table 4-4: Flock size and location data for Light-bellied Brent Geese during winter 2023-2024

Date	Time	Flock Size	Percentage of North Bull Island / National population (approx.)	Location
15/12/2023	09:19	~207	13.37% / 0.59%	Erin's Isle GAA Pitches (East Farnham area)
	10:35	~345	22.28% / 0.98%	Erin's Isle GAA Pitches (East Farnham area)
	14:47	121	7.81% / 0.34%	Erin's Isle GAA Pitches (East Farnham area)
04/01/2024	09:24	5	0.32% / 0.01%	Erin's Isle GAA Pitches (East Farnham area)
	09:35	37	2.39% / 0.10%	Erin's Isle GAA Pitches (East Farnham area)
	09:38	49	3.16% / 0.14%	Erin's Isle GAA Pitches (East Farnham area)
	<i>Light-bellied Brent Goose flocks absent during afternoon survey period</i>			
12/01/2024	09:27	71	4.58% / 0.20%	Erin's Isle GAA Pitches (East Farnham area)
	15:10	147	9.49% / 0.42%	Erin's Isle GAA Pitches (East Farnham area)

Date	Time	Flock Size	Percentage of North Bull Island / National population (approx.)	Location
19/01/2024	09:13	35	2.26% / 0.10%	Erin's Isle GAA Pitches (East Farnham area)
	09:19	28	1.80% / 0.08%	Western pitch / grassland (West Farnham area)
	09:33	155	10.01% / 0.44%	Erin's Isle GAA Pitches (East Farnham area)
	10:40	~255	16.47% / 0.72%	Erin's Isle GAA Pitches (East Farnham area)
	10:55	~255	16.47% / 0.72%	Western pitch / grassland (West Farnham area) [*Flock at Erin's Isle GAA Pitches moved to this location after disturbance]
	Light-bellied Brent Goose flocks absent during afternoon survey period			
02/02/2024	09:04	24	1.55% / 0.06%	Erin's Isle GAA Pitches (East Farnham area)
	10:34	42	2.71% / 0.12%	Erin's Isle GAA Pitches (East Farnham area)
	14:51	48	3.10% / 0.13%	Western pitch / grassland (West Farnham area)
09/02/2024	08:57	107	6.91% / 0.30%	Erin's Isle GAA Pitches (East Farnham area)
	14:36	12	0.77% / 0.03%	Eastern pitch / grassland (West Farnham area)
23/02/2024	08:45	~250	16.14% / 0.71%	Erin's Isle GAA Pitches (East Farnham area)
	09:00	~300	19.37% / 0.85%	Erin's Isle GAA Pitches (East Farnham area)
	09:05	~392	25.32% / 1.12%	Erin's Isle GAA Pitches (East Farnham area)
	10:32	~446	28.81% / 1.27%	Eastern pitch / grassland (West Farnham area)
	Light-bellied Brent Goose flocks absent during afternoon survey period			
27/02/2024	09:01	~238	15.37% / 0.68%	Western pitch / grassland (West Farnham area)
	10:38	~275	17.76% / 0.78%	Erin's Isle GAA Pitches (East Farnham area)
	Light-bellied Brent Goose flocks absent during afternoon survey period			

Table 4-5: Flock size and location data for Black-headed Gull during winter 2021-2022

Date	Time	Flock Size	Percentage of North Bull Island / National population (approx.)	Location
01/12/2021	09:00	14	0.63% / 0.08%	Western Tolka Valley Park grasslands (within disturbance buffer)
	09:22	11	0.50% / 0.07%	Western pitches / grassland (West Farnham area)
	15:31	56	2.55% / 0.35%	Erin's Isle GAA Pitches (East Farnham area)
15/12/2021	08:50	15	0.68% / 0.09%	Eastern pitches- Tolka Valley Park (within disturbance buffer)
	08:52	10	0.45% / 0.06%	Western Tolka Valley Park grasslands (within disturbance buffer)
	08:54	4	0.18% / 0.02%	Western Tolka Valley Park grasslands (within disturbance buffer)
	15:25	14	0.63% / 0.08%	Eastern Tolka Valley Park grasslands (within disturbance buffer)
05/01/2022	08:51	20	0.91% / 0.12%	Tolka Valley Park eastern pitches
	09:07	43	1.95% / 0.27%	Erin's Isle GAA Pitches (East Farnham area)
	09:11	10	0.45% / 0.06%	Western pitches / grassland (West Farnham area)
	09:14	10	0.45% / 0.06%	Patrickswell Place / Wellmount Parade green area
	09:22	4	0.18% / 0.02%	Northern section of Mellowes Park
	<i>Black-headed Gull flocks absent during afternoon survey period</i>			
18/01/2022	<i>Black-headed Gull flocks absent during morning survey period</i>			
	15:26	29	1.32% / 0.18%	Tolka Valley Park Pond
27/01/2022	09:39	9	0.40% / 0.05%	Eastern Tolka Valley Park grasslands (beyond disturbance buffer)
	09:51	41	1.86% / 0.26%	Western Tolka Valley Park grasslands (within disturbance buffer)
	09:54	10	0.45% / 0.06%	Western Tolka Valley Park grasslands (within disturbance buffer)
	09:55	22	1.00% / 0.14%	Western Tolka Valley Park grasslands (beyond disturbance buffer)
	09:56	9	0.40% / 0.05%	Tolka Valley Park Pond

Date	Time	Flock Size	Percentage of North Bull Island / National population (approx.)	Location
	10:09	7	0.31% / 0.04%	Western pitches / grassland (West Farnham area)
	10:10	4	0.18% / 0.02%	Amenity grassland adjacent to Casement Road
	14:41	16	0.72% / 0.10%	Eastern pitches- Tolka Valley Park
	14:47	11	0.50% / 0.07%	Tolka Valley Pitch and Putt
	14:56	24	1.09% / 0.15%	Tolka Valley Park Pond
02/02/2022	09:13	37	1.68% / 0.23%	Erin's Isle GAA Pitches (East Farnham area)
	09:14	11	0.50% / 0.07%	Western pitches / grassland (West Farnham area)
	09:28	131	5.96% / 0.83%	Eastern pitches - Tolka Valley Park
	09:40	32	1.45% / 0.20%	Western Tolka Valley Park grasslands (beyond disturbance buffer)
	14:50	19	0.86% / 0.12%	Eastern pitches - Tolka Valley Park
	15:04	31	1.41% / 0.19%	Tolka Valley Park Pond
10/02/2022	09:32	33	1.50% / 0.21%	Eastern pitches - Tolka Valley Park
	09:54	7	0.31% / 0.04%	Southern section of Mellowes Park
	<i>Black-headed Gull flocks absent during afternoon survey period</i>			
25/02/2022	09:10	14	0.63% / 0.08%	Eastern pitches - Tolka Valley Park
	09:24	21	0.95% / 0.13%	Western pitches / grassland (West Farnham area)
	09:48	8	0.36% / 0.05%	Northern section of Mellowes Park
	<i>Black-headed Gull flocks absent during afternoon survey period</i>			

Table 4-6: Flock size and location data for Black-headed Gull during winter 2022-2023

Date	Time	Flock Size	Percentage of North Bull Island / National population (approx.)	Location
07/12/2022	08:49	9	0.40% / 0.05%	Western pitches / grassland (West Farnham area)
	08:51	32	1.45% / 0.20%	Eastern Tolka Valley Park grasslands (within disturbance buffer)
	09:57	7	0.31% / 0.04%	Southern section of Mellowes Park
	14:52	4	0.18% / 0.02%	Eastern Tolka Valley Park grasslands (beyond disturbance buffer)
	15:10	13	0.59% / 0.08%	Tolka Valley Park Pond
	15:17	12	0.54% / 0.07%	Eastern Tolka Valley Park grasslands

Date	Time	Flock Size	Percentage of North Bull Island / National population (approx.)	Location
				(within disturbance buffer)
16/12/2022	09:28	18	0.81% / 0.11%	Tolka Valley Park Pond
	09:55	7	0.31% / 0.04%	Western pitches / grassland (West Farnham area)
	15:11	14	0.63% / 0.08%	Western Tolka Valley Park grasslands (within disturbance buffer)
05/01/2023	09:53	5	0.22% / 0.03%	Tolka Valley Park Pond
	10:12	23	1.04% / 0.14%	Erin's Isle GAA Pitches (East Farnham area)
	10:15	5	0.22% / 0.03%	Amenity grassland adjacent to Casement Road
	14:38	41	1.86% / 0.26%	Eastern Tolka Valley Park grasslands (beyond disturbance buffer)
	15:35	8	0.36% / 0.05%	Western pitches / grassland (West Farnham area)
13/01/2023	08:58	32	1.45% / 0.20%	Western pitches / grassland (West Farnham area)
	09:21	64	2.91% / 0.40%	Eastern Tolka Valley Park grasslands (within disturbance buffer)
	09:49	5	0.22% / 0.03%	Tolka Valley Park Pond
	09:50	26	1.18% / 0.16%	Western Tolka Valley Park grasslands (within disturbance buffer)
	10:15	12	0.54% / 0.07%	Southern section of Mellowes Park
	15:08	61	2.77% / 0.39%	Erin's Isle GAA Pitches (East Farnham area)
	15:13	5	0.22% / 0.03%	Western pitches / grassland (West Farnham area)
	15:18	12	0.54% / 0.07%	Eastern Tolka Valley Park grasslands (within disturbance buffer)
	15:39	5	0.22% / 0.03%	Tolka Valley Park Pond
	15:45	10	0.45% / 0.06%	Western Tolka Valley Park grasslands (within disturbance buffer)
25/01/2023	08:46	49	2.23% / 0.31%	Erin's Isle GAA Pitches (East Farnham area)
	08:49	26	1.18% / 0.16%	Western pitches / grassland (West Farnham area)
	09:04	91	4.14% / 0.58%	Eastern Tolka Valley Park grasslands

Date	Time	Flock Size	Percentage of North Bull Island / National population (approx.)	Location
				(within disturbance buffer)
	09:13	7	0.31% / 0.04%	Western Tolka Valley Park grasslands (within disturbance buffer)
	09:18	5	0.22% / 0.03%	Tolka Valley Park Pond
	09:45	5	0.22% / 0.03%	Southern section of Mellowes Park
	14:57	30	1.36% / 0.19%	Western pitches / grassland (West Farnham area)
	15:22	25	1.13% / 0.16%	Tolka Valley Park Pond
02/02/2023	09:28	82	3.73% / 0.52%	Erin's Isle GAA Pitches (East Farnham area)
	09:43	43	1.95% / 0.27%	Western pitches / grassland (West Farnham area)
	09:53	90	4.09% / 0.57%	Eastern Tolka Valley Park grasslands (within disturbance buffer)
	10:05	7	0.31% / 0.04%	Tolka Valley Park Pond
	15:10	10	0.45% / 0.06%	Tolka Valley Park Pond
	15:56	5	0.22% / 0.03%	Southern section of Mellowes Park
17/02/2023	08:56	74	3.36% / 0.47%	Erin's Isle GAA Pitches (East Farnham area)
	09:16	35	1.59% / 0.22%	Western pitches / grassland (West Farnham area)
	09:56	51	2.32% / 0.32%	Eastern Tolka Valley Park grasslands (within disturbance buffer)
	10:00	26	1.18% / 0.16%	Eastern Tolka Valley Park grasslands (beyond disturbance buffer)
	15:20	6	0.27% / 0.03%	Southern section of Mellowes Park
	15:28	18	0.81% / 0.11%	Eastern Tolka Valley Park grasslands (within disturbance buffer)
	15:50	5	0.22% / 0.03%	Tolka Valley Park Pond
	15:59	12	0.54% / 0.07%	Western Tolka Valley Park grasslands (within disturbance buffer)
28/02/2023	09:06	62	2.82% / 0.39%	Erin's Isle GAA Pitches (East Farnham area)
	09:10	14	0.63% / 0.08%	Western pitches / grassland (West Farnham area)
	10:19	17	0.77% / 0.10%	Western Tolka Valley Park grasslands

Date	Time	Flock Size	Percentage of North Bull Island / National population (approx.)	Location
				(within disturbance buffer)
	15:06	7	0.31% / 0.04%	Western pitches / grassland (West Farnham area)
	15:15	4	0.18% / 0.02%	Southern section of Mellowes Park
	15:30	22	1.00% / 0.14%	Eastern Tolka Valley Park grasslands (within disturbance buffer)
	15:39	3	0.13% / 0.01%	Tolka Valley Park Pond
	15:43	13	0.59% / 0.08%	Western Tolka Valley Park grasslands (within disturbance buffer)

Table 4-7: Flock size and location data for Black-headed Gull during winter 2023-2024

Date	Time	Flock Size	Percentage of North Bull Island / National population (approx.)	Location
15/12/2023	09:02	27	1.22% / 0.17%	Eastern Tolka Valley Park grasslands (within disturbance buffer)
	15:17	3	0.13% / 0.01%	Tolka Valley Park Pond
	15:50	5	0.22% / 0.03%	Southern section of Mellowes Park
04/01/2024	09:14	57	2.59% / 0.36%	Eastern Tolka Valley Park grasslands (within disturbance buffer)
	09:25	15	0.68% / 0.09%	Erin's Isle GAA Pitches (East Farnham area)
	09:26	6	0.27% / 0.03%	Eastern pitch / grassland (West Farnham area)
	09:54	6	0.27% / 0.03%	Tolka Valley Park Pond
	14:52	4	0.18% / 0.02%	Erin's Isle GAA Pitches (East Farnham area)
	15:05	3	0.13% / 0.01%	Southern section of Mellowes Park
12/01/2024	09:28	12	0.54% / 0.07%	Erin's Isle GAA Pitches (East Farnham area)
	09:29	9	0.40% / 0.05%	Western pitches / grassland (West Farnham area)
	10:02	22	1.00% / 0.14%	Eastern Tolka Valley Park grasslands (within disturbance buffer)
19/01/2024	09:14	42	1.91% / 0.26%	Erin's Isle GAA Pitches (East Farnham area)
	09:17	3	0.13% / 0.01%	Western pitches / grassland

Date	Time	Flock Size	Percentage of North Bull Island / National population (approx.)	Location
				(West Farnham area)
	09:47	10	0.45% / 0.06%	Tolka Valley Park Pond
	15:49	7	0.31% / 0.04%	Northern section of Mellows Park
02/02/2024	09:10	11	0.50% / 0.07%	Erin's Isle GAA Pitches (East Farnham area)
	09:14	22	1.00% / 0.14%	<i>Eastern pitch / grassland</i> (West Farnham area)
	09:50	6	0.27% / 0.03%	Tolka Valley Park Pond
	10:23	25	1.13% / 0.15%	Eastern Tolka Valley Park grasslands (within disturbance buffer)
	10:35	17	0.77% / 0.10%	Erin's Isle GAA Pitches (East Farnham area)
	15:34	9	0.40% / 0.05%	Southern section of Mellows Park
09/02/2024	09:01	29	1.32% / 0.18%	Erin's Isle GAA Pitches (East Farnham area)
	09:20	31	1.41% / 0.19%	<i>Eastern pitch / grassland</i> (West Farnham area)
	15:43	23	1.04% / 0.14%	Western pitches / grassland (West Farnham area)
23/02/2024	09:02	33	1.50% / 0.21%	Western pitches / grassland (West Farnham area)
	15:27	6	0.27% / 0.03%	Tolka Valley Park Pond
	15:35	8	0.36% / 0.05%	Erin's Isle GAA Pitches (East Farnham area)
	15:40	14	0.63% / 0.08%	Tolka Valley Park Pond
27/02/2024	09:30	49	2.23% / 0.31%	Western pitches / grassland (West Farnham area)
	09:32	4	0.18% / 0.02%	Erin's Isle GAA Pitches (East Farnham area)
	09:55	3	0.13% / 0.01%	Tolka Valley Park Pond
	10:08	15	0.68% / 0.09%	Eastern Tolka Valley Park grasslands (within disturbance buffer)
	15:01	3	0.13% / 0.01%	<i>Eastern pitch / grassland</i> (West Farnham area)
	15:15	4	0.18% / 0.02%	Tolka Valley Park Pond

4.4.1.1 Light-bellied Brent Goose

During the 2021-2022 winter period, Light-bellied Brent Goose flocks were most frequently recorded at the Erin's Isle GAA pitches (Table 4-2). Flock sizes at this location approximately ranged from approximately 86 - 1000 (5.55% - 64.59% of the North Bull Island SPA population), peaking in early January 2022. The other less frequently utilised green amenity area, the playing pitches west of Farnham Drive (Table 4-3), was only used for foraging purposes by smaller flocks (41 - 171 individuals / 2.64% - 11.04% of the North Bull Island SPA population) of Light-bellied Brent Goose during the month of February 2022.

During the 2022-2023 winter period, Light-bellied Brent Goose flocks were once again most frequently recorded at the Erin's Isle GAA pitches. Flock sizes at this location approximately ranged from 75 - 355 (4.84% - 22.93% of the North Bull Island SPA population), peaking in mid-December and early February, with peak flock sizes notably down from the 2021-2022 flocks. The other less frequently utilised green amenity area, the playing pitches west of Farnham Drive was utilised by smaller flocks comprising of 92 - 186 (5.94% - 12.01% of the North Bull Island SPA population) individuals. The peak total numbers for Light-bellied Brent Goose present within the disturbance buffer of the Scheme at any one time was approximately 486 (31.39% of the North Bull Island SPA population) on 16th December 2022, with two flocks present, one at Erin's Isle GAA and another at the western playing pitches.

The 2023-2024 winter period data specified that the Light-bellied Brent Goose flocks most frequently utilised the Erin's Isle GAA pitches. Flock sizes at this location approximately ranged from 5 - 392 (0.32% - 25.32% of the North Bull Island SPA population), peaking in late February 2024, with peak flock sizes notably down again from the 2021-2022 flocks. Following the Erin's Isle grounds (Figure 4-14), their next preferred grassland to forage was the western pitch (Figure 4-15) within the west Farnham area, which was then followed by the eastern pitch (Figure 4-16) in the same area. The western pitch hosted flocks of approximately 28 – 255 Light-bellied Brent Goose (1.80% - 16.47% of the North Bull Island SPA population), with flock size peaking in mid-January 2024. The eastern pitch hosted two Light-bellied Brent Goose flocks, one flock of 12 individuals and another totalling approximately 446 (0.77% - 28.81% of the North Bull Island SPA population), with flock size peaking in late February 2024.

The 2023-2024 winter period was the first recorded instance of the Light-bellied Brent Goose flocks utilising the eastern pitch in the west Farnham area. The flocks were present on this pitch on two occasions, the first of which was a small flock of 12 geese foraging after being disturbed on the adjacent western pitch (09/02/2024). The second occasion also involved the disturbance of their initial foraging area (Erin's Isle GAA), which saw the largest of flock of the winter 2023-2024 period (~446) forage on the eastern pitch within the west Farnham area, which had been freshly mown (23/02/2024 -Figure 4-16). Given that there were no disturbance sources at the western pitch within the west Farnham area at this time, it would appear that the flock tolerated higher levels of disturbance from vehicle and pedestrian traffic in order to gain access to a higher quality foraging area. This highlights the urban disturbance tolerance of the Light-bellied Brent Goose flocks which frequent this area, an observation which is in line with the findings presented within Handby (2022) PhD thesis, which examined patterns of urban habitat use in Light-bellied Brent Goose populations within Co. Dublin.

Regarding the Tolka Valley Park and Mellows Park survey areas, Light-bellied Brent Goose flocks were only ever recorded flying over Tolka Valley Park enroute to other grazing sites; while surveyors did not record any Light-bellied Brent Goose flocks foraging or commuting over Mellows Park.



Figure 4-14: Light-bellied Brent Goose and Black-headed Gull flocks grazing / foraging at Erin's Isle GAA pitch (East Farnham area)



Figure 4-15: Light-bellied Brent Goose and Black-headed Gull flocks grazing / foraging at the western



Figure 4-16: Light-bellied Brent Goose flock grazing on the freshly mown eastern pitch / amenity grassland (West Farnham area)

4.4.1.2 Black-headed Gull

During the 2021-2022 winter period, Black-headed Gull flocks were most commonly recorded within the Tolka Valley Park's amenity grasslands / playing pitches, though were also present at the Farnham and Mellowes amenity grasslands / playing pitches, as well as small grassland areas at Casement Road, Patrickswell Place and the Tolka Valley Park pond. Individual flock sizes peaked at 131 (5.96% of the North Bull Island SPA population) individuals in Tolka Valley Park (eastern playing pitches), though flock sizes were recorded most regularly between 10 - 41 individuals (0.45% - 1.86% of the North Bull Island SPA population). Combined flock sizes within an area peaked at 163 individuals (7.42% of the North Bull Island SPA population) in Tolka Valley Park on 2nd February 2022. Barring the single record of a 131 Black-headed Gull flock, flock sizes did not vary notably in size throughout the 2021-2022 winter period.

During the 2022-2023 winter period, Black-headed Gull flocks were most commonly recorded within the Erin's Isle GAA pitches and the Tolka Valley Park's eastern amenity grasslands / playing pitches. Small flocks were also noted in the Farnham and Mellowes amenity grasslands / playing pitches, as well as the grassland areas at Casement Road and Tolka Valley Park pond. Black-headed Gull flock sizes ranged from 3 - 91 (0.13% - 4.14% of the North Bull Island SPA population), and were not particularly variable across locations, nor were there notable monthly variations across the winter period. Combined Black-headed Gull flock sizes within an area peaked at 140 individuals (6.37% of the North Bull Island SPA population) in Tolka Valley Park on 2nd February 2023.

The 2023-2024 winter period saw Black-headed Gull flocks most commonly sighted within the Erin's Isle GAA pitches (East Farnham) and the two pitches within the Farnham green area (West Farnham). Other locations where flocks were noted included Mellowes Park and Tolka Valley Park (pond, and the eastern and western grasslands). Black-headed Gull flock sizes ranged from 3 - 57 (0.13% - 2.59% of the North Bull Island SPA population), and were not notably variable across locations, nor were there notable monthly variations across the 2023-2024 winter period. Combined Black-headed Gull flock sizes within an area peaked at 60 individuals (2.73% of the North Bull Island SPA population) in Farnham area on 9th February 2024.

4.4.1.3 Curlew

Curlew were recorded during the 2022-2023 winter period; three individuals were noted foraging within the Erin's Isle GAA pitches on 16th December 2023. It is important to note that other desktop study data (Irish Birding, 2023) shows that flocks up to 20 individuals (2.16% of the wintering North Bull Island SPA population) have been recorded within the Erin's Isle GAA pitches, with flocks of up to 50 seen flying within the general vicinity of the pitches as well.

4.4.1.4 Herring Gulls

Herring Gull flocks were most commonly recorded within Erin's Isle GAA pitches during the 2021-2022, 2022-2023 and 2023-2024 winter periods. Herring Gull flock sizes were generally small, most commonly occurring between 2-8 individuals, with an occurrence peak of 18 individuals.

4.4.1.5 Common Gull, Lesser Black-backed Gull and Cormorant (isolated / incidental recordings)

Furthermore, small numbers of the SCI species, Common Gull (six, December 2021; three, December 2023; three, January 2024), Lesser Black-backed Gull (two, July 2023 - incidental recording outside of winter period), Cormorant (one, May 2021 - incidental recording outside of winter period) were recorded in Mellows Park and the pitches west of Farnham Drive, and Tolka Valley Park pond, respectively. These individual observations were the only recording of these species.

4.4.1.6 Disturbance buffer zone

Figure 4-17 highlights the disturbance buffer zone in relation to the key wintering bird locations within and adjacent to the proposed Scheme.

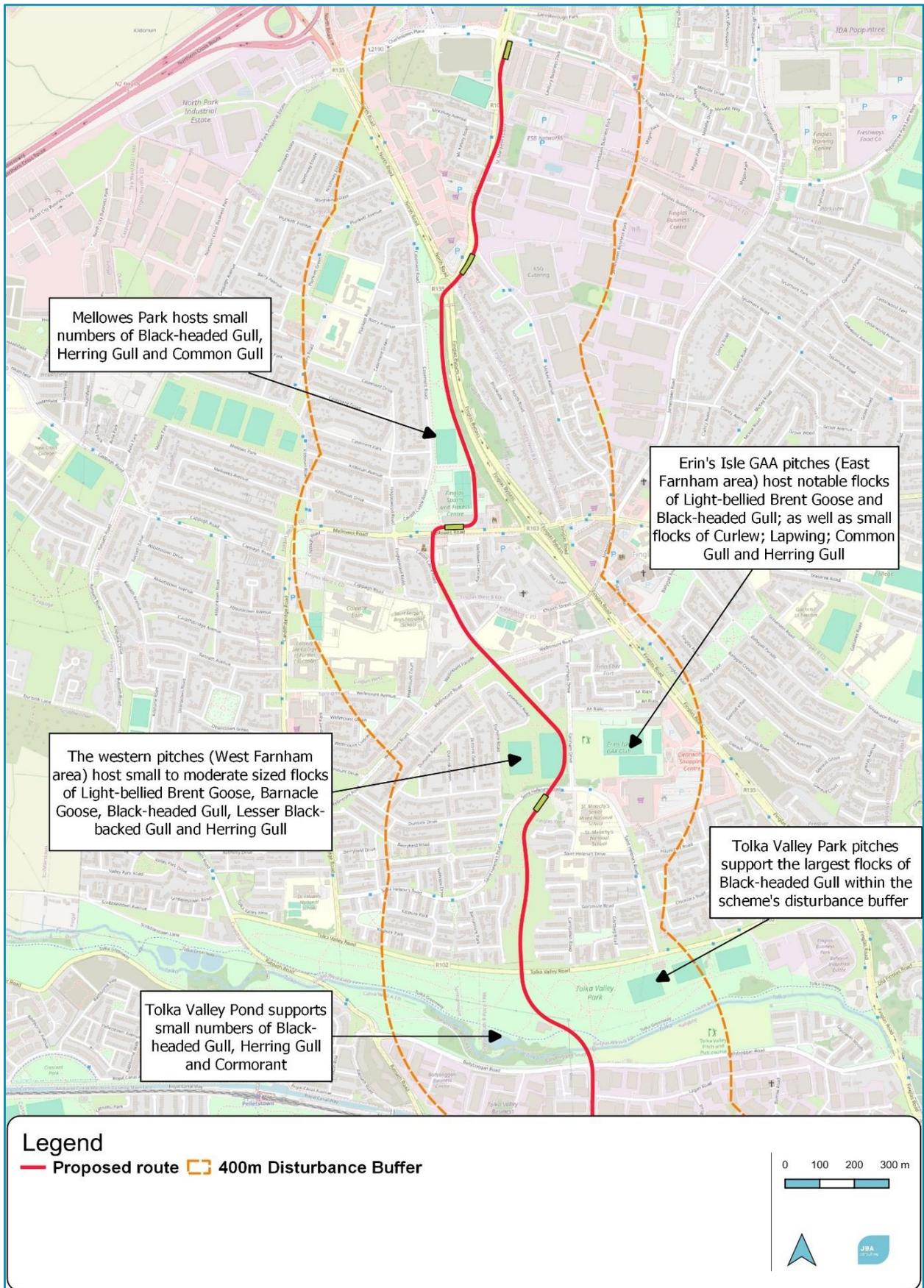


Figure 4-17: The proposed Scheme's route / stop locations and its corresponding disturbance buffer, with key wintering bird areas (OSM, 2024)

4.4.2 Non-SCI Annex Bird Species (Lapwing and Barnacle Goose)

A small flock of Northern Lapwing *Vanellus vanellus*, 15 in total, were recorded utilising the Erin's Isle GAA pitches on 14th December 2023 (Irish Birding, 2024). Additionally, a pair of Barnacle Goose were recorded amongst a flock of Light-bellied Brent Goose in February 2022.

While Northern Lapwing and Barnacle Goose are not SCI species of any of the Natura 2000 sites within the Zol, nor SCIs of any of the Natura 2000 SPAs within Co. Dublin, they are Annex species, Annex II (Section II) and Annex I, respectively; and are therefore afforded protection under the EU Birds Directive.

4.5 Invasive Non-Native Species

Table 4-8 below provides a list of invasive non-native species (INNS) recorded during the ecological surveys. It includes species, their level of impact, and whether they are listed on the third schedule of the EC (Birds and Natural Habitats) Regulations 2011 S.I. No. 477/2011. Their locations of these invasive species are also displayed in Figure 4-18, Figure 4-19, Figure 4-20 and Figure 4-21.

Table 4-8: INNS recorded within or immediately adjacent to the proposed Scheme's boundary

Invasive Non-Native Species	Impact	Regulation S.I. 477/2011
Canadian Waterweed <i>Elodea canadensis</i>	High	Yes
Nuttall's Waterweed <i>Elodea nuttallii</i>	High	Yes
Himalayan Balsam <i>Impatiens glandulifera</i>	High	Yes
Japanese Knotweed <i>Reynoutria japonica</i>	High	Yes
Giant Hogweed <i>Heracleum mantegazzianum</i> (Located upstream of Tolka Valley bridge, seeds deposited within the riverbanks by the bridge must be considered)	High	Yes
Sycamore <i>Acer pseudoplatanus</i>	Medium	No
Cherry Laurel <i>Prunus laurocerasus</i>	High	No
Butterfly-bush <i>Buddleja davidii</i>	Medium	No

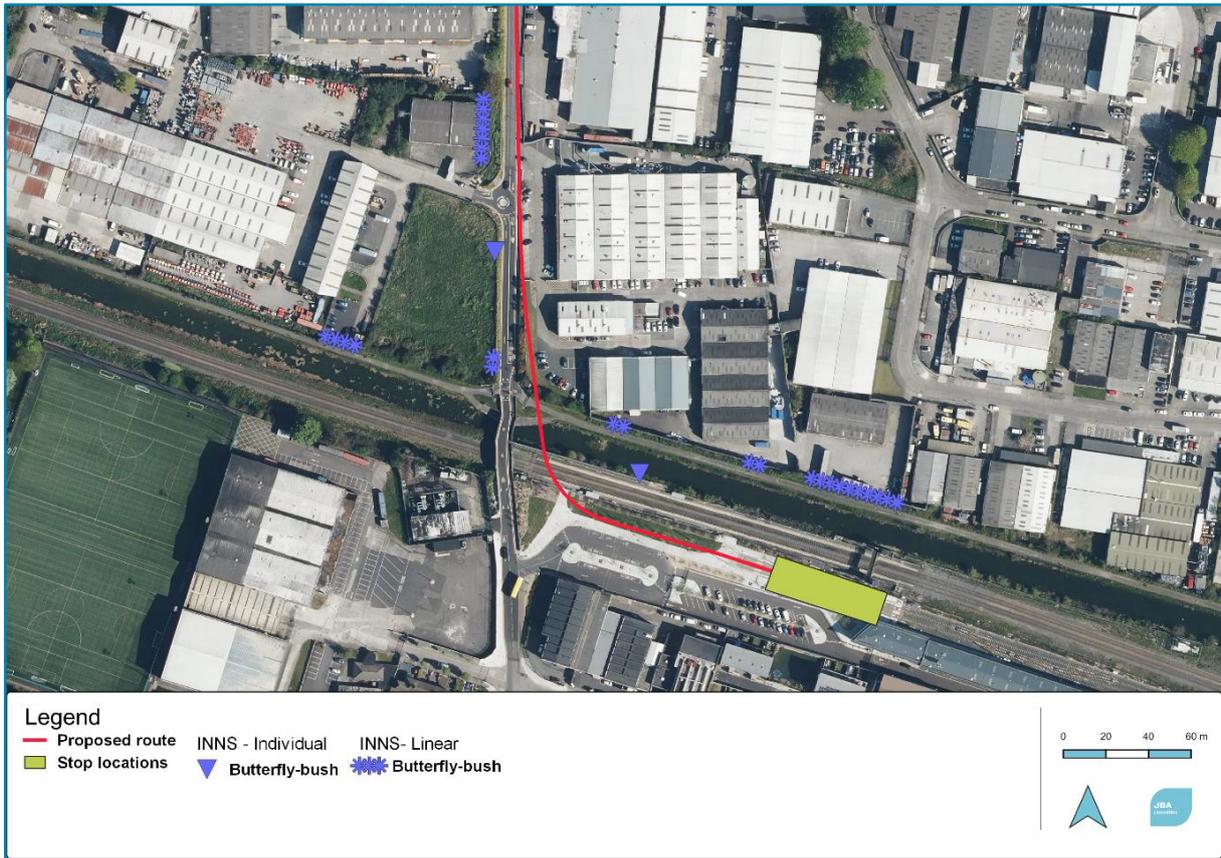


Figure 4-18: Invasives species within the locality of the Royal Canal (Bluesky, 2024)



Figure 4-19: Invasive species along the River Tolka, within Tolka Valley Park (Bluesky, 2024)



Figure 4-20: Invasive species within Mellows Park (Bluesky, 2024)

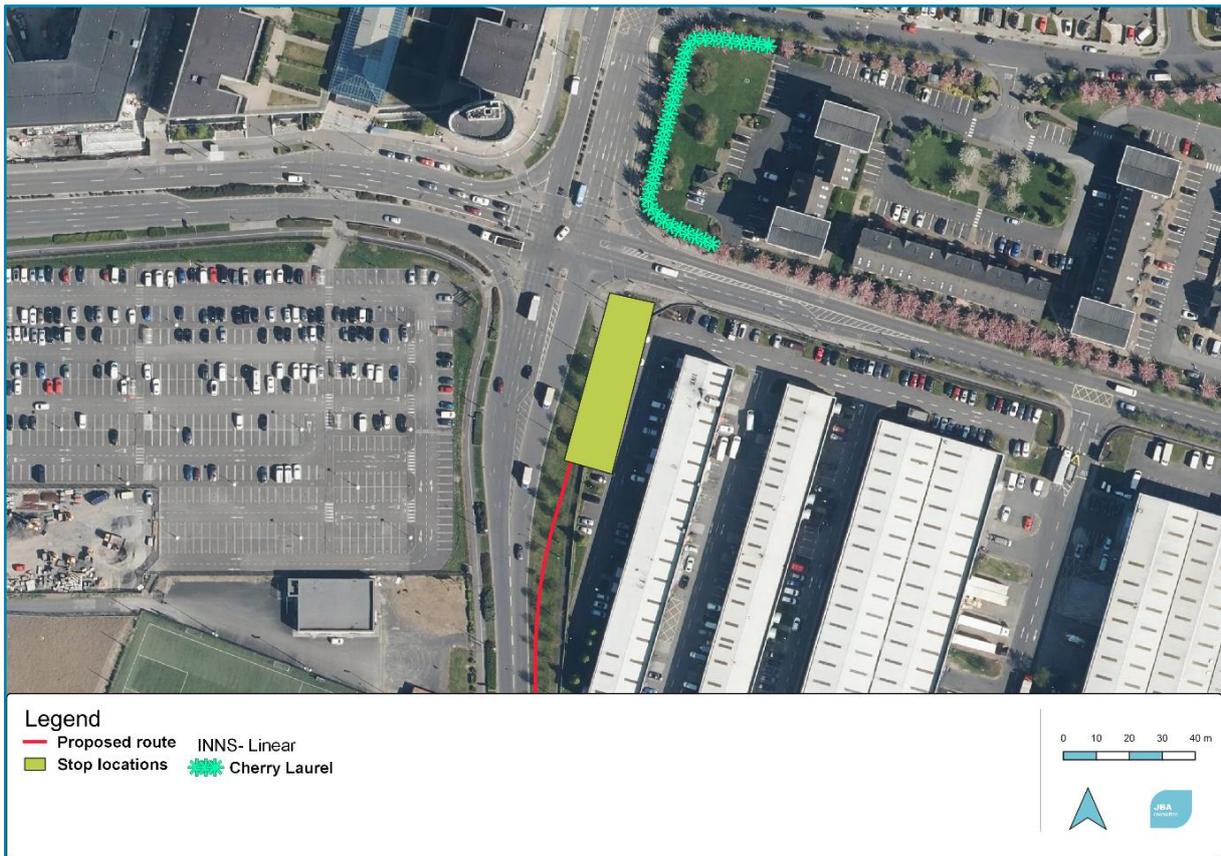


Figure 4-21: Invasive species within the Charlestown area (Bluesky, 2024)

Of the above INNS, two species (and potentially a third), namely Himalayan Balsam, Japanese Knotweed and potentially Giant Hogweed, are located in a sensitive location by the proposed Tolka Valley Park Luas bridge. These species have the potential to be carried in surface water downstream to Dublin Bay. Invasive species will be the focus of biosecurity measures within the accompanying EIAR Biodiversity Chapter (Volume 3 – Chapter 9). Of these species, the Japanese Knotweed and Giant Hogweed boast salinity tolerances which may allow them to colonise saltmarsh habitats, and therefore pose a threat to the saltmarsh habitats of North Dublin Bay SAC and South Dublin Bay SAC. As the Japanese Knotweed along the River Tolka will need to be removed to allow for the installation of the new bridge in this area, it is the most likely invasive species to be accidentally spread downstream into North Dublin Bay SAC and South Dublin Bay SAC.

4.6 Local Waterbodies and Water Quality

The entire site of the proposed Scheme lies within the Water Framework Directive (WFD) Liffey and Dublin Bay catchment, and within the Tolka_SC_020 sub-catchment (EPA, 2024). There are three identified watercourses within the area of the proposed Scheme, namely the River Tolka (Tolka_050), Bachelors Stream (Tolka_050) and the Royal Canal (Royal Canal Main Line - Liffey and Dublin Bay) – see Figure 4-22). Downstream of these natural and artificial watercourses lie the Tolka Estuary and the Liffey Estuary (Lower), which both flow out into Dublin Bay. The WFD status and current risk levels of these waterbodies, are listed in Table 4-9 below. The Tolka Valley Park pond does not have a WFD status or risk condition obligation given that the pond’s surface area is less than 0.5km².

Table 4-9: The WFD waterbodies within the Zol of the Scheme

WFD Waterbody	WFD Status (2016-2021)	Risk Status
River Tolka (Tolka_050/Tolka_060)	Poor	At risk
Bachelors Stream (Tolka_050)	Poor	At risk
Royal Canal (Royal Canal Main Line - Liffey and Dublin Bay)	Good	Under review
Tolka Estuary	Poor	At risk
Liffey Estuary Lower	Moderate	At risk
Dublin Bay	Good	Not at risk

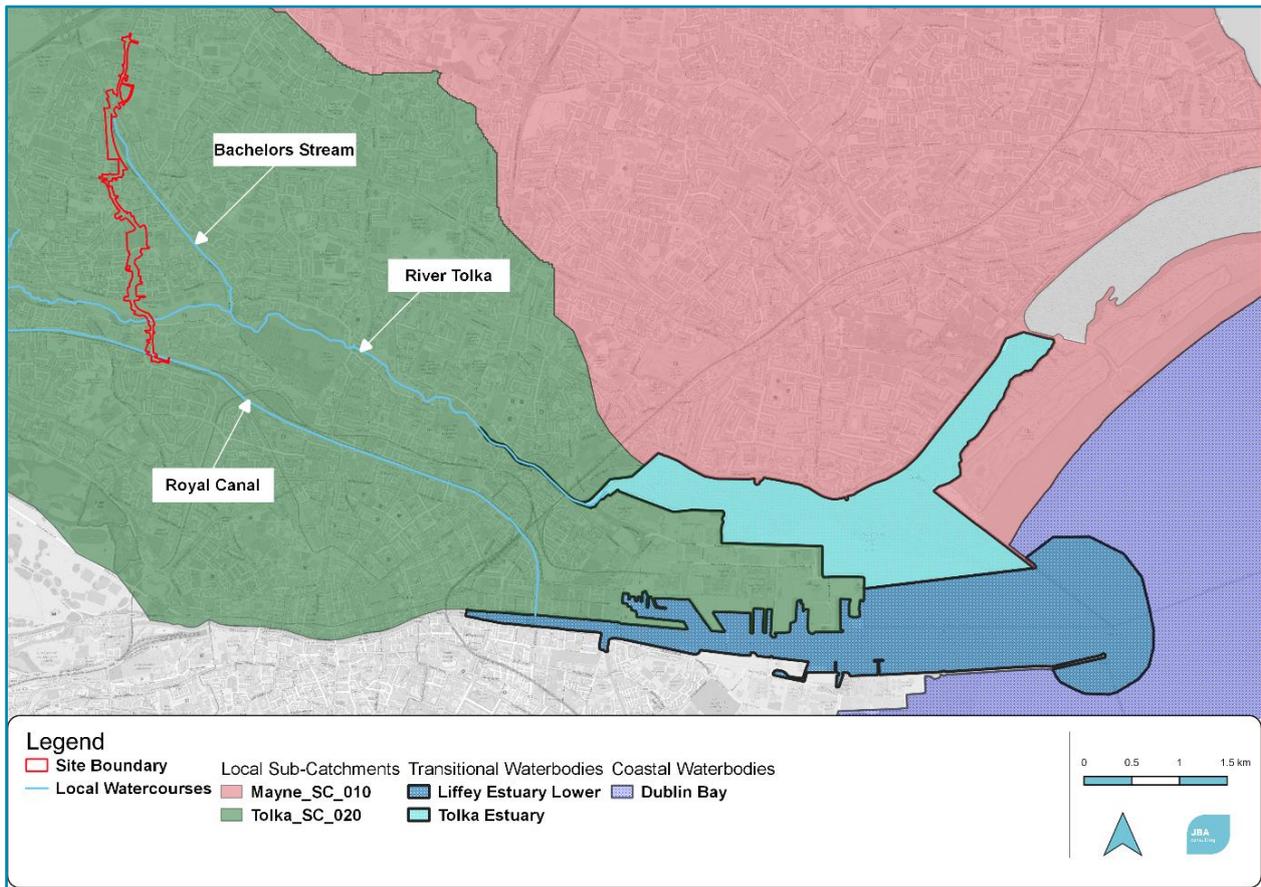


Figure 4-22: Local surface water network (OSM, 2024)

4.7 Groundwater

The proposed Scheme is located within the Dublin (IE_EA_G_008) groundwater body. The Dublin groundwater bodies currently have a "Good" WFD status (2016-2021), while its risk status is currently under review.

4.7.1 Underlying Geology & Aquifer

The underlying bedrock of the proposed Scheme is comprised of dark grey to black, fine-grained, occasionally cherty, micritic limestones that weather paler, usually to pale grey. There are rare dark coarser grained calcarenitic limestones, sometimes graded, and interbedded dark-grey calcar. This bedrock is largely overlain with limestone till, with smaller linear pockets of limestone gravels and alluvial sediments (particularly within the Tolka Valley Park). There is generally a low sub-soil permeability throughout the boundary of the proposed Scheme (GSI, 2024). As result of the above characteristics the site's aquifer vulnerability status ranges from 'Moderate' to 'Rock at or near Surface or Karst', with the more vulnerable areas located within historic and existing river / stream valleys.

The aquifer within the underlying bedrock is considered to be locally important, with moderate productivity, though only in local zones. Therefore, the aquifer has a limited and relatively poorly connected network of fractures, fissures and joints, giving a low fissure permeability which tends to decrease further with depth. Generally, the lack of connection between the limited fissures results in relatively poor aquifer storage and flow paths that may only extend a few hundred metres; therefore, surface water which percolates into the groundwater recharging the aquifer won't travel more than several hundred metres from its point of percolation (GSI, 2024). These characteristics result in the underlying aquifer rapidly discharging to the nearby watercourses (GSI, 2024).

4.7.2 Historic Land-use (Tolka Valley Park)

A historic landfill is understood to have operated within Tolka Valley Park but was decommissioned and capped by Dublin City Council (DCC) during the 1970s. Information detailing the specific nature of the waste or the spatial extent of the landfill within the park is limited. A technical report (Ref: 95907), commissioned by DCC Parks and Landscape Services and prepared by BHP in 2010, referenced 'an old landfill site' and confirmed inert landfill waste to be present in six trial pit excavations undertaken in the park. The report does not include any location plans or coordinates for trial pits undertaken so the exact relevance to the proposed Scheme cannot be established. Historical mapping indicates a quarry site was once present within the Tolka Valley Park, which is likely to have been subsequently backfilled with waste and/or uncontrolled fill. Testing of the area has revealed that the leachate does not contain notably hazardous levels of contaminants, however, under the precautionary principle the potential for low-level contamination from the leachate will be considered within the potential impact assessment.

SECTION 5: OTHER RELEVANT PLANS AND PROJECTS

5.1 Cumulative Impacts

As part of the Appropriate Assessment, in addition to the proposed works, other relevant projects and plans in the region that may induce cumulative impacts must also be considered at this stage. The list of plans and projects is reflective of those identified in Volume 3 - Chapter 9 (Biodiversity) of the EIAR that accompanies the planning application for the proposed Scheme.

The following projects or plans were identified as potential sources of cumulative impacts:

- Dublin City Development Plan 2022 – 2028;
- Fingal County Development Plan 2023-2029;
- Greater Dublin Drainage Strategy 2005;
- Transport Strategy for Greater Dublin Area 2022-2042;
- Third Cycle River Basin Management Plan for Ireland 2022-2027; and
- Planning Applications (retrieved from Data.gov.ie - Planning Application Sites).

5.2 Plans

5.2.1 Dublin City Development Plan 2022 - 2028 - Natura Impact Report Conclusion (Scott Cawley, 2022)

It has been objectively concluded by Scott Cawley Ltd., following an examination, analysis and evaluation of the relevant information, including in particular the nature of the predicted impacts associated with the Plan, and that the implementation of mitigatory measures identified in Section 8 of the Natura Impact Report (and included as objectives and policies of the Plan), that the Plan will not adversely affect (either directly or indirectly) the integrity of any European site, either alone or in combination with other plans or projects. Furthermore, the elected members of Dublin City Council, as the competent authority, formally recorded their determination at the end of the special council meetings held on November 1st and 2nd 2022 that the Plan would not adversely affect (either directly or in directly) the integrity of any European site, either alone or in combination with other plans or projects.

5.2.2 Fingal Development Plan 2023 - 2029 - Natura Impact Report (FCC, 2023)

The Natura Impact Report for the Fingal Development Plan 2023-2029 presents the examination and analysis, in light of the best scientific knowledge, with respect to those Natura 2000 sites within the Zol of the Plan the potential impact sources and pathways, how these could impact on the sites' QI species and whether the predicted impacts would adversely affect the integrity of those Natura 2000 sites.

It has been objectively concluded, following an examination, analysis and evaluation of the relevant information, including in particular the nature of the predicted impacts associated with the Plan and that the implementation of protective policies and objectives listed in Section 8 of the Natura Impact Report that the Plan will not adversely affect (either directly or indirectly) the integrity of any Natura 2000 site, either alone or in combination with other plans or projects.

Following this, the competent authority, which is composed of the Elected Members of Fingal County Council formally recorded their determination that the Plan would not adversely affect (either directly or in directly) the integrity of any European site, either alone or in combination with other plans of projects.

5.2.3 Greater Dublin Drainage Strategy 2005

The Greater Dublin Drainage Strategy sets out the strategic planning for the development of waste water treatment in the Greater Dublin area in relation to the Ringsend WWTP Upgrade, Greater Dublin Drainage Project and associated wastewater network drainage projects (Irish Water, 2018). The Ringsend WWTP Upgrade includes plans to expand the WWTP to its ultimate capacity, together with associated network

upgrades required. The Greater Dublin Drainage Project is planned to relieve both the Ringsend WWTP and network loading by construction of a new WWTP at Clonshaugh, an orbital sewer and provision of an outfall pipe discharging 1km northeast of Ireland's Eye.

The Ringsend WWTP upgrade is in progress and carried out in stages, with increased capacity targets of 400,000 population equivalent (PE) by Q1 2021 and the ultimate capacity of 2.4 million PE to be in operation by 2024 (Irish Water, 2018).

The Greater Dublin Drainage Project is strategically important to the Dublin Region in that it will provide capacity for residential and commercial growth (Irish Water, 2018).

5.2.4 Transport Strategy for Greater Dublin Area 2022-2042 - Natura Impact Statement (CAAS, 2021)

A Stage 2 Appropriate Assessment of the Transport Strategy for the Greater Dublin Area has identified that the implementation of the Strategy has the potential to result in effects to the integrity of 66 Natura 2000 sites, if unmitigated.

The risks to the safeguarding and integrity of the qualifying interests, special conservation interests and conservation objectives of the Natura 2000 sites have been addressed by the inclusion of mitigation measures that will prioritise the avoidance of effects in the first place and mitigate effects where these cannot be avoided. In addition, all lower-level plans and projects arising through the implementation of the Strategy will be subject to the Appropriate Assessment process when further details of design and location are known.

In-combination effects from interactions with other plans and projects were considered in the assessment and the mitigation measures incorporated into the Strategy are seen to be suitably robust to ensure there will be no significant adverse effects as a result of the implementation of the Strategy either alone or in-combination with other plans/projects.

5.2.5 Third Cycle River Basin Management Plan for Ireland 2022-2027 (DoHLGH, 2022)

The first cycle of River Basin Management Plans included the Eastern River Basin District - River Basin Management Plan (ERBDMP) 2009 – 2015 (WFD (2010)). The plans summarised the waterbodies that may not meet the environmental objectives of the WFD by 2015 and identified which pressures are contributing to the environmental objectives not being achieved. The plans described the classification results and identified measures that can be introduced in order to safeguard waters and meet the environmental objectives of the WFD.

- Prevent deterioration of water body status;
- Restore good status to water bodies;
- Achieve protected areas objectives; and
- Reduce chemical pollution of water bodies.

The 2nd cycle River Basin Management Plan (RBMP) for Ireland 2018-2021 sets out the actions that Ireland will take to improve water quality and achieve 'good' ecological status in water bodies (rivers, lakes, estuaries and coastal waters) by 2021 (DoHLGH, 2018). Changes from previous River Basin Management Plans is that all River Basin Districts are merged as one national River Basin District. The Plan provides a more coordinated framework for improving the quality of our waters — to protect public health, the environment, water amenities and to sustain water-intensive industries, including agri-food and tourism, particularly in rural Ireland.

The 3rd and current cycle aim to build on the initiatives of the second cycle, particularly the governance and implementation structures, and to improve the establishment of Uisce Éireann, An Fóram Uisce, the Local Authority Waters Programme and the Agricultural Sustainability Support and Advisory Programme.

The third cycle draft Catchment Report for Liffey and Dublin Bay Catchment (EPA, 2021) identified that between Cycles 2 and 3 there has been an overall small improvement in the catchment's status. The overall

change in quality between Cycles 2 and 3 include 2 waterbodies that have achieved High Status, which is an increase of one, 56 which achieve Good Status has been increased by four, 23 achieving a Moderate Status which is a decrease in four waterbodies, and 24 achieving a Poor Status an increase of 1 between cycles. There are no Bad Status waterbodies as of Cycle 3, which is a decrease of one from Cycle 2. The main significant pressures are aquaculture, anthropogenic, atmospheric, historically polluted sites and waste pressures followed by agriculture, urban run-off and forestry.

5.3 Other Projects

Other recently approved and pending application projects are listed overleaf (Table 5-1), which are not retention applications, home extensions and/or internal alterations, have been granted planning permission within the locality of the proposed Scheme.

Table 5-1: Projects granted planning permission since 2019, as well as pending projects within the shared Zol of the proposed Scheme

Planning Reference	Address	Application Status	Decision date	Summary of development	Assessment of Zol Overlap
DCC - 3329/20	Former Georgia Pacific facility, at McKee Avenue, Finglas, Dublin 11	Grant Permission	21/01/2021	Permission for development at a c. 2.83-hectare site at former Georgia Pacific Facility at McKee Avenue, Finglas, Dublin 11. The proposed development will consist of the demolition of a c. 1,732m ² . part single storey part two storey office building facing McKee Avenue which was formally part of the Georgia Pacific facility. The proposed development will also provide for a reconfiguration of car parking spaces at the entire former Georgia Pacific facility resulting in a revised provision of 44 car parking spaces overall. Permission is also sought for all ancillary site services and landscape works necessary to facilitate the proposed development.	Shares the same surface water sub-catchment with the proposed Scheme but lacks direct connection to the local surface water network to act in a cumulative or in-combination manner. Both air (dust) and disturbance Zol buffers overlap with the proposed Scheme but not in locations which contain SCI bird species foraging areas, and therefore lacks the capacity to act in a cumulative or in-combination manner.
FCC - 310350	Charlestown Place, St. Margaret's Road, Charlestown, Co. Dublin	Grant Permission	16/09/2021	590 apartments, a creche and all associated site works.	Shares the same surface water sub-catchment with the proposed Scheme but lacks direct connection to the local surface water network to act in a cumulative or in-combination manner. Both air (dust) and disturbance Zol buffers overlap with the proposed Scheme but not in locations which contain SCI bird species foraging areas, and therefore lacks the capacity to act in a cumulative or in-combination manner.
ABP-302010-18	Metrolink– Estuary to Charlemont via Dublin Airport	Under Review	21/12/2023	The Railway Order, if granted, will authorise the National Roads Authority (operating as Transport Infrastructure Ireland) to carry out railway works, and all works necessary to enable the construction, operation, maintenance and improvement of a railway designated as a metro including inter alia the construction of a fully segregated and automated railway and metro mostly underground approximately 18.8 kilometres in length with 16 stations running from north of Swords at Estuary through Swords, Dublin Airport, Ballymun, Glasnevin and the City Centre to Charlemont in the south of Dublin City Centre. It will also	The Metrolink has the potential to disturb SCI bird species connected with North Bull Island SPA, therefore this project has the capacity to act in a cumulative impact for these SCI bird species. Shares the same surface water sub-catchment with the proposed Scheme and the site possess direct connections to the local surface water

Planning Reference	Address	Application Status	Decision date	Summary of development	Assessment of Zol Overlap
				<p>authorise TII, with the subsequent consent of the Minister for Transport, to make arrangements with other parties to construct, maintain, improve or operate the said railway works and railway. The construction period provided for in the draft Railway Order is ten years from the date it comes into effect. The works will generally comprise but are not limited to the construction of a Railway approximately 18.8 kilometres in length which is mostly underground. It includes a 9.4km section of single bore tunnel running beneath Dublin City Centre running from Charlemont to Northwood Station and a 2.3km section of single bore tunnel running beneath Dublin Airport. Tunnel sections include intervention access facilities for emergency services at Dublin Airport, Albert College Park and just south of Charlemont Station.</p> <p>Tunnel Portal structures will be provided at Northwood, Dardistown and Dublin Airport. North of Dublin Airport the railway will emerge from tunnel and will run at surface level and in cut and cover structures to Estuary Station. Surface running sections and cut and cover sections will include earthworks, the use of retained cut and cover structures, elevated sections plus miscellaneous drainage and accommodation works. A new 99m bridge will be constructed over the M50 and a 261m long multi-span Viaduct over the Broadmeadow and Ward River. There will be a total of 16 stations, including 11 underground stations at Dublin Airport, Northwood, Ballymun, Collins Avenue, Griffith Park, Glasnevin, Mater, O'Connell Street, Tara, St. Stephen's Green and Charlemont; 4 retained cut stations at Seatown, Swords Central, Fosterstown and Dardistown and 1 at grade station at Estuary. A multi-storey 3000 space park and ride close to the M1 Motorway will be provided at Estuary Station, a maintenance depot is located near Dardistown Station which will house all the facilities required for the maintenance and operation of the MetroLink and its rolling stock and the Operational Control Centre. The works will also include railway signalling, command and control and communications systems; provision of electrical substations; establishment of temporary construction compounds; establishment of temporary traffic management and road diversions; new and realigned access routes and road junction improvements; diversion of existing utilities; provision of new</p>	<p>network, and therefore has the capacity to act in a cumulative or in-combination manner in respect surface water impacts on the downstream Natura 2000 sites.</p> <p>This project will be examined in further detail within sub-section 7.4.</p>

Planning Reference	Address	Application Status	Decision date	Summary of development	Assessment of ZoI Overlap
				<p>drainage infrastructure; provision of environmental mitigation measures; and other infrastructural modifications to facilitate the overall project. The Railway Order, if granted, also includes powers for the National Roads Authority (operating as Transport Infrastructure Ireland) to acquire compulsorily land or rights in, under or over land or any substratum of land specified in the order; to temporarily acquire and occupy land specified in the order; to acquire easements and other rights over land specified in the order; to extinguish public and/or private rights including rights of way specified in the order; and provides for other rights over land.</p>	
<p>ABP-306587</p>	<p>Railway Line - Maynooth to Dublin City Centre</p>	<p>Under Review</p>	<p>29/07/2022 (submitted)</p>	<p>The principal infrastructure components of the proposed development are as follows:</p> <ul style="list-style-type: none"> • Electrification and re-signalling of the Maynooth and M3 Parkway lines (approximately 40km in length). <ul style="list-style-type: none"> • Capacity enhancements at Connolly Station (to include modifications to junctions and the station) to facilitate increased train and passenger numbers. • Construction of a new Spencer Dock Station, which will better serve the north Docklands area and improve interchange with the Luas and support sustainability mobility. • Closure of six level crossings (Ashtown, Coolmine, Porterstown, Clonsilla, Barberstown and Blakestown) and provision of replacement access infrastructure (road bridges and/or pedestrian and cycle bridges, as required). There is no replacement access infrastructure proposed at Blakestown level crossing. • Construction of a new DART depot facility west of Maynooth to facilitate the maintenance and parking (stabling) of trains. • Interventions at existing bridges along the rail line where there are insufficient clearances for the overhead electrification equipment. (Interventions may include track lowering, bridge modifications and/ or a combination of both) and 	<p>This railway development has the potential to disturb SCI bird species connected with North Bull Island SPA, therefore this project has the capacity to act in a cumulative impact for these SCI bird species.</p> <p>Shares the same surface water sub-catchment with the proposed Scheme and the site possess direct connections to the local surface water network, and therefore has the capacity to act in a cumulative or in-combination manner in respect surface water impacts on the downstream Natura 2000 sites.</p> <p>This project will be examined in further detail within sub-section 7.4.</p>

Planning Reference	Address	Application Status	Decision date	Summary of development	Assessment of ZoI Overlap
				<ul style="list-style-type: none"> Construction of substations, electrical buildings, and all other civil and ancillary works as necessary to accommodate the project. 	
ABP-308826-20	Cork Mainline from Hazelhatch & Celbridge Station to Heuston Station, and to Glasnevin Junction via the Phoenix Park Tunnel Branch Line	Under Review	22/03/2023 (submitted)	The proposed DART+ Southwest Project will consist of the electrification of the existing Cork Mainline from Hazelhatch & Celbridge Station to Heuston Station, and to Glasnevin Junction via the Phoenix Park Tunnel Branch Line (Great Southern and Western Rail Line - GSWR). The works extend across three administrative areas/local authority areas, including Kildare, South Dublin and Dublin City. The total length of the proposed development is approximately 20 kilometres.	<p>This railway development has the potential to disturb SCI bird species connected with North Bull Island SPA, therefore this project has the capacity to act in a cumulative impact for these SCI bird species.</p> <p>Shares the same surface water sub-catchment with the proposed Scheme and the site possess direct connections to the local surface water network, and therefore has the capacity to act in a cumulative or in-combination manner in respect surface water impacts on the downstream Natura 2000 sites.</p> <p>This project will be examined in further detail within sub-section 7.4.</p>
DCC - MP04	DART+ Tunnel Element (Kildare Line to Northern Line)	TBC	TBC	The DART+ Coastal North project, as part of the DART+ Programme, will deliver an improved and extended electrified rail network and will enable increased passenger capacity and an enhanced train service between Dublin City Centre and Drogheda, including the Howth Branch railway line. This increased rail capacity will be achieved by implementing an extended electrified railway network with high-capacity DART trains and an increased frequency of rail services. In addition, the DART+ Coastal North project requires that some track modifications be implemented, including the provision of turnback facilities at Malahide, Clongriffin and Howth Junction & Donaghmede Stations. These modifications are essential to facilitate the increase in train services by improving operational flexibility, allowing trains to be turned back clear of continuing services and to allow for a higher frequency and a more reliable service. The majority of proposed	<p>This railway development has the potential to disturb SCI bird species connected with North Bull Island SPA, therefore this project has the capacity to act in a cumulative impact for these SCI bird species.</p> <p>Shares the same surface water sub-catchment with the proposed Scheme and the site possess direct connections to the local surface water network, and therefore has the capacity to act in a cumulative or in-combination manner in respect</p>

Planning Reference	Address	Application Status	Decision date	Summary of development	Assessment of Zol Overlap
				works and interventions are expected to be carried out within the existing railway corridor boundary. Some works and interventions, however, will be required outside of Iarnród Éireann (IÉ) / Córas Iompair Éireann (CIÉ) land such as: bridge modifications/improvements to facilitate extended electrification; construction of substations (to facilitate the provision of power to the line); and use of land for temporary construction/storage compounds.	<p>surface water impacts on the downstream Natura 2000 sites.</p> <p>This project will be examined in further detail within sub-section 7.4.</p>
ABP - 317121	Swords to Dublin City Centre	Under Review	Case is due to be decided by 22/03/2024	The proposed project submitted under this application will comprise the construction of the Swords to City Centre Bus Corridor which has an overall length of approximately 12km and is routed along the R132 Swords Road. The proposed project travels in a southerly direction along the R132 Swords Road past Airside Retail Park, Dublin Airport and Santry Park. The route continues on the R132 past Santry Demesne, where the Swords Road joins the R104 at Coolock Lane. The route continues on the R132 in a southerly direction through Santry Village. It continues along the Swords Road past Whitehall to Griffith Avenue. The route follows Drumcondra Road Upper past the DCU St Patrick's Campus to the River Tolka. It continues through Drumcondra, on Drumcondra Road Lower, to Binns Bridge on the Royal Canal. From there it continues on Dorset Street Lower as far as Eccles Street, from where it continues on Dorset Street Upper to North Frederick Street and Granby Row.	Shares the same surface water sub-catchment with the proposed Scheme but lacks direct connection to local network to act in a cumulative or in-combination manner.
ABP - 314610	Ballymun - Finglas	Under Review	09/09/2022 Lodged Requires Further Consideration	The proposed project will be approximately 11km in length and will be comprised of two main alignments in terms of the route it will follow, from Ballymun to the City Centre (the Ballymun Section) and from Finglas to Phibsborough (the Finglas Section). The Ballymun Section of the proposed project will commence on R108 Ballymun Road at its junction with St. Margaret's Road, just south of M50 Motorway Junction 4, and will be routed along the R108 on Ballymun Road, St. Mobhi Road, Botanic Road, Prospect Road, Phibsborough Road, Constitution Hill and R132 Church Street as far as R148 Arran Quay at the River Liffey on the western edge of Dublin City Centre. Priority for buses will be provided along the entire route, consisting primarily of dedicated bus lanes in both	<p>Shares the same surface water sub-catchment with the proposed Scheme but lacks direct connection to local watercourses to act in a cumulative or in-combination manner.</p> <p>Both air (dust) and disturbance Zol buffers overlap with the proposed Scheme but not in locations which contain SCI bird species foraging areas, and therefore lacks the capacity to act in a cumulative or in-combination manner.</p>

Planning Reference	Address	Application Status	Decision date	Summary of development	Assessment of Zol Overlap
				<p>directions, where feasible, with alternative measures proposed at particularly constrained locations such as at R108 St. Mobhi Road. A complementary cycle route along quiet streets is proposed along Royal Canal Bank in Phibsborough, which will extend southwards from the Royal Canal to Western Way, parallel a short distance to the east of R108 Phibsborough Road, and also through the Markets Area at the southern end of the proposed project The Finglas Section of the proposed project will commence on the R135 Finglas Road at the junction with R104 St. Margaret's Road and will be routed along the R135 Finglas Road as far as Hart's Corner in Phibsborough, where it will join the Ballymun Section of the proposed project Priority for buses will be provided along the entire route, consisting of dedicated bus lanes in both directions. Continuous segregated cycle lanes will be provided from the Church Street Junction in Finglas to Hart's Corner. No cycle lanes are proposed along the Finglas Bypass at the northern end of the proposed project, as more suitable routes are available along local streets.</p>	
ABP - 313892	Blanchardstown to Dublin City Centre	Under Review	24/06/2022 Lodged Case is due to be decided by 11/01/2023	<p>The proposed development will provide bus priority measures and segregated cycle infrastructure as follows: The number of pedestrian signal crossings will increase by 62% from 77 to 125 as a result of the proposed project; the proportion of segregated cycle facilities will increase from 9% on the existing corridor to 78% on the proposed project; and the proportion of the route having bus priority measures will increase from 25% on the existing corridor to 97% on the proposed project.</p>	Shares the same surface water sub-catchment with the proposed Scheme but lacks direct connection to local network to act in a cumulative or in-combination manner.
ABP - 313182	Clongriffin to Dublin City Centre	Grant Permission	08/01/2024	<p>The proposed development is essentially an upgrade to the existing bus priority, cycle facilities and pedestrian infrastructure associated with the Malahide Road Quality Bus Corridor (QBC), which has been in place since 1999. Specific works proposed within the development include the following: 5.7 km (two-way) of bus priority infrastructure and traffic management; 11.9km (total both directions) of cycling infrastructure and facilities; Provision of new / refurbished pedestrian facilities and footpaths along the scheme and associated ancillary works; Provision of 15 junction upgrades including conversion of two existing large roundabouts</p>	Shares the same surface water sub-catchment with the proposed Scheme but lacks direct connection to local network to act in a cumulative or in-combination manner.

Planning Reference	Address	Application Status	Decision date	Summary of development	Assessment of Zol Overlap
				to signalised junctions and associated ancillary works; Provision of 31 new / refurbished raised table side entry facilities; Reconfiguration of existing bus stops resulting in 30 number new bus stop facilities; Public Realm works including landscaping, planting, street furniture, street lighting, retaining walls, boundary walls, and sustainable urban drainage measures; Roads associated earthworks including excavation of unacceptable material, importation of material, temporary storage of materials; Provision of road pavement, signing, lining and ancillary works; Provision of gates, fencing and boundary treatment works; Construction of accommodation works including boundary treatment and ancillary grading and landscaping works together with all ancillary and consequential works associated there with.	
ABP - 314942	Lucan to Dublin City Centre	Under Review	10/2022 Lodged Case is due to be decided by 05/2023	The proposed project commences at Junction 3 on the N4 where the C-Spine route terminates before splitting to branch routes, and it is routed via the N4 as far as Junction 7 (M50), and via the R148 along the Palmerstown Bypass, Chapelizod Bypass, Con Colbert Road and St John's Road West as far as Frank Sherwin Bridge, where it will join the prevailing traffic management regime on the South Quays.	Shares the same surface water sub-catchment with the proposed Scheme but lacks direct connection to local network to act in a cumulative or in-combination manner.
ABP - 314091	Liffey Valley to Dublin City Centre	Grant Permission	19/12/2023	The proposed project runs along the Fonthill Road, R833 Coldcut Road, R833 Ballyfermot Road through Ballyfermot Village and continues onto the Sarsfield Road, Grattan Crescent, Emmet Road, Old Kilmainham, Mount Brown and James's Street. From here the proposed project continues along Thomas Street, Cornmarket and along High Street. The proposed project will join the prevailing City Centre traffic management regime at the junction with Nicholas Street and Winetavern Street.	No direct or indirect overlapping Zol buffers with the proposed Scheme, therefore this project lacks the capacity to act in cumulative or in-combination manner.
ABP - 317070	Tallaght / Clondalkin to Dublin City Centre	Under Review	05/05/2023 (lodged) Case is due to be decided by 08/02/2024	The proposed project has an overall length of approximately 15.5km with an additional offline cycling facility of approximately 3.9 km. It will be comprised of two main alignments in terms of the route it follows; namely the Tallaght to City Centre section and the Clondalkin to Drimnagh section. The first section, the Tallaght to City Centre section, begins at the junction of Old Blessington Road / Cookstown Way and is routed along Belgard Square West, Belgard Square North, Belgard Square East and Blessington	No direct or indirect overlapping Zol buffers with the proposed Scheme, therefore this project lacks the capacity to act in cumulative or in-combination manner.

Planning Reference	Address	Application Status	Decision date	Summary of development	Assessment of Zol Overlap
				<p>Road to the junction of R819 Greenhills Road and Bancroft Park. From here, the proposed project is routed along the R819 Greenhills Road to Walkinstown Roundabout via new transport link roads; in the green area to the east of Birchview Avenue / Treepark Road; in the green area to the south of Ballymount Avenue, and in the green area to the east of Calmount Road. From Walkinstown Roundabout, the proposed project is routed along the R819 Walkinstown Road to the junction with R110 Long Mile Road and Drimnagh Road. The shared spine with the Clondalkin section commences at this junction and the proposed project is routed along the R110 to the junction of Dean Street and Patrick Street via Drimnagh Road, Crumlin Road, Dolphins Barn, Cork Street, St. Luke's Avenue and Dean Street. From here the proposed project is routed along the R137 via Patrick Street to the junction at Winetavern Street and Christchurch Place where the proposed project terminates within the City Centre. An offline cycle provision is proposed to facilitate cycling between Walkinstown Roundabout and Parnell Road (Grand Canal) where end to end cycle facilities are not feasible along the main corridor and provides a more direct route towards the City Centre. This offline section of the proposed project is routed via Bunting Road, Kildare Road and Clogher Road. The second section, the Clondalkin to Drimnagh section, begins at the junction of New Nangor Road and Woodford Walk and is routed along the R134 New Nangor Road, R810 Naas Road, R112 Walkinstown Avenue and the R110 Long Mile Road to the junction of Walkinstown Road and Drimnagh Road where it is routed towards the City Centre along the shared spine section as described above.</p>	
ABP - 316272	Templeogue / Rathfarnham to Dublin City Centre	Under Review	14/04/2023 (Lodged) Case is due to be decided by 23/10/2023	<p>The proposed project has an overall length of approximately 10km from end to end online with additional offline upgrades and quiet street treatment of approx. 2km and 1.5km respectively. The proposed project will be comprised of two main alignments, namely from Templeogue to Terenure (3.7km), and from Rathfarnham to the City Centre (6.3km). The Templeogue to Terenure section will commence on the R137 Tallaght Road, east of the M50 junction 11 interchange. From here, the proposed project is routed via the R137 along Tallaght Road and</p>	No direct or indirect overlapping Zol buffers with the proposed Scheme, therefore this project lacks the capacity to act in cumulative or in-combination manner.

Planning Reference	Address	Application Status	Decision date	Summary of development	Assessment of Zol Overlap
				<p>Templeogue Road, through Templeogue Village, to Terenure Cross, where it joins the Rathfarnham to City Centre section. The Rathfarnham to City Centre section will commence on the R821 Grange Road at the junction with Nutgrove Avenue, and is routed along the R821 Grange Road, the R115 Rathfarnham Road, the R114 Rathfarnham Road, Terenure Road East, Rathgar Road, Rathmines Road Lower, Richmond Street South, Camden Street Upper and Lower and Wexford Street as far as the junction with the R110 at Kevin Street Lower and Cuffe Street where priority bus lanes end. From Cuffe Street to Dame Street along Redmond's Hill, Aungier Street, and South Great George's Street the route will involve a traffic lane and a cycle lane in both directions where it will join the prevailing traffic management regime in the city centre. In addition to the above, an alternative cycle facility will be provided along Harold's Cross Road / Terenure Road North between Terenure Cross and Parkview Avenue, as well as along Bushy Park Road, Wasdale Park, Wasdale Grove, Zion Road and Orwell Road. The route of the proposed project is shown in Image 1.1 in Chapter 1 (Introduction). The proposed project includes an upgrade of the existing bus priority and cycle facilities. The scheme includes a substantial increase in the level of bus priority provided along the corridor, including the provision of additional lengths of bus lane resulting in improved journey time reliability. Throughout the proposed project bus stops will be enhanced to improve the overall journey experience for bus passengers and cycle facilities will be substantially improved with segregated cycle lanes provided along the links and protected junctions with enhanced signalling for cyclists provided at junctions. Moreover, pedestrian facilities will be upgraded, and additional signalised crossings will be provided. In addition, urban realm works will be undertaken at key locations with higher quality materials, planting and street furniture provided to enhance the pedestrians experience, an example of this can be seen in Terenure, particularly at Terenure Cross.</p>	

Planning Reference	Address	Application Status	Decision date	Summary of development	Assessment of Zol Overlap
ABP - 317660	Kimmage to Dublin City Centre	Under Review	Cased lodged 25/07/2023 (Lodged) Case is due to be decided by 11/04/2024	The proposed project will be approximately 3.7km in length and will commence on R817 Kimmage Road Lower at the junction with the R818 on Terenure Road West and Kimmage Road West, and R817 Fortfield Road. The proposed project will continue along R817 Kimmage Road Lower towards the City Centre, via the R137 on Harold's Cross Road, Clanbrassil Street Upper and Lower and New Street South. Priority for buses will be provided along the entire route, consisting primarily of dedicated bus lanes in both directions, where feasible, with alternative measures proposed at particularly constrained locations such as much of R817 Kimmage Road Lower, Harold's Cross Park West and short sections of R137 Clanbrassil Street Upper and Lower in alternate directions. A complementary cycle route is also proposed to the west of the proposed project via quiet streets at the southern end of the proposed project. Moreover, pedestrian facilities will be upgraded, and additional signalised crossings will be provided. In addition, urban realm works will be undertaken at key locations with higher quality materials, planting and street furniture provided to enhance the pedestrian experience. Examples of this include the proposed works at R817 Kimmage Road Lower and Sundrive Road, and at St. Patrick's Court.	No direct or indirect overlapping Zol buffers with the proposed Scheme, therefore this project lacks the capacity to act in cumulative or in-combination manner.
ABP - 317742	Bray to Dublin City Centre	Under Review	04/08/2023 (Lodged) Case is due to be decided by 21/02/2024	The proposed project will commence at the junction of Leeson Street Lower and St Stephen's Green. The proposed project will run along Leeson Street Lower and Upper including the existing one-way system on Sussex Road. It will continue on Morehampton Road and Donnybrook Road through Donnybrook Village, and on to the Stillorgan Road. It will intersect with the Belfield / Blackrock to City Centre CBC Scheme at Nutley Lane and include the University College Dublin (UCD) Bus Interchange at the entrance to UCD. It will continue south on Stillorgan / Bray Road as far as the Loughlinstown Roundabout. The route will then proceed along the Dublin Road through Shankill and on to Bray through the Wilford Roundabout (M11 Access Roundabout), Dublin Road, and Castle Street. The proposed project will terminate at the Dargle River Crossing (Fran O'Toole Bridge). The proposed project includes an upgrade of the existing bus priority and cycle facilities. The proposed project includes a substantial	No direct or indirect overlapping Zol buffers with the proposed Scheme, therefore this project lacks the capacity to act in cumulative or in-combination manner.

Planning Reference	Address	Application Status	Decision date	Summary of development	Assessment of Zol Overlap
				<p>increase in the level of bus priority provided along the corridor, including the provision of additional lengths of bus lane resulting in improved journey time reliability. Throughout the proposed project bus stops will be enhanced to improve the overall journey experience for bus passengers and cycle facilities will be substantially improved with segregated cycle lanes provided along the links and protected junctions with enhanced signalling for cyclists provided at junctions. Moreover, pedestrian facilities will be upgraded, and additional signalised crossings be provided. In addition, urban realm works will be undertaken at key locations with higher quality materials, planting and street furniture provided to enhance the pedestrians experience, an example of this can be seen in Donnybrook at Mulberry Lane.</p>	
<p>ABP - 313509</p>	<p>Belfield / Blackrock to Dublin City Centre</p>	<p>Under Review</p>	<p>05/2022 (Lodged) Case is due to be decided by 04/2023.</p>	<p>The proposed project has an overall length of approximately 8.3km and will be comprised of two main alignments in terms of the route it follows, from Blackrock to the City Centre and along Nutley Lane. The Blackrock to City Centre section will commence on the R113 at Temple Hill, approximately 80m to the north of the R827 Stradbroom Road, travel along the N31 Frascati Road, the R118 Rock Road / Merrion Road / Pembroke Road, the R816 Pembroke Road / Baggot Street Upper / Baggot Street Lower, turn onto Fitzwilliam Street Lower and terminate at the junction of Mount Street Upper / Merrion Square South / Merrion Square East. The Nutley Lane section of the proposed project will commence at the tie-in with the signalised junction on the R138 Stillorgan Road on the southern end of Nutley Lane, travel along Nutley Lane and terminate at the junction with the R118 Merrion Road. The route of the proposed project is shown in Image 1.1 in Chapter 1 (Introduction). The proposed project includes an upgrade of the existing bus priority and cycle facilities. The scheme includes a substantial increase in the level of bus priority provided along the corridor, including the provision of additional lengths of bus lane resulting in improved journey time reliability. Throughout the proposed project bus stops will be enhanced to improve the overall journey experience for bus passengers and cycle facilities will be substantially improved with segregated cycle lanes provided along the links and protected junctions with</p>	<p>No direct or indirect overlapping Zol buffers with the proposed Scheme, therefore this project lacks the capacity to act in cumulative or in-combination manner.</p>

Planning Reference	Address	Application Status	Decision date	Summary of development	Assessment of ZoI Overlap
				enhanced signalling for cyclists provided at junctions. Moreover, pedestrian facilities will be upgraded, and additional signalised crossings will be provided. In addition, urban realm works will be undertaken at key locations with higher quality materials, planting and street furniture provided to enhance the pedestrians experience, an example of this can be seen in Ballsbridge, particularly at the Herbert Park / Pembroke Road junction.	
ABP - 317679	Ringsend to Dublin City Centre	Under Review	28/07/2023 (Lodged) Case is due to be decided by 14/02/2024	<p>The proposed project has an overall length of approximately 4.3km (2 x 1.6km along the River Liffey Quays and 1.1km cycle route through Ringsend and Irishtown to Sean Moore Road) and is routed along the north and south quays of the River Liffey, linking the city centre with the Docklands and an onward cycling connection to Ringsend and Irishtown, all within the County of Dublin and within the Dublin City Council (DCC) administrative area. The proposed project includes priority for buses along the entire length of the north quays from Talbot Memorial Bridge to the 3Arena at the Tom Clarke East Link Bridge, consisting of dedicated bus lanes in both directions, which will require the relocation of both pairs of Scherzer Bridges along the north quays. Bus priority will also be achieved on the south quays through the provision a new opening bridge across the River Dodder (via the Dodder Public Transport Opening Bridge (DPTOB)) as well as the provision of intermittent sections of bus lane to ensure bus priority on the approach to all major junctions. Full bus lane provision on the south quays is not considered necessary in the context of the layout of the traffic cells and existing one-way restrictions, which prevent congestion developing. Eastbound buses will use the north quays only between the Customs House and the Samuel Becket Bridge, with eastbound buses proceeding on both quays from this point to the Tom Clarke East Link Bridge. Westbound buses will use the full length of both quays. Segregated two-way cycle lanes will be provided along the quaysides (camphires) on both sides of the River Liffey. A continuation of the two-way cycle route on the south quays will extent through Ringsend and Irishtown towards Sandymount Strand and the Poolbeg peninsula. The route will run via quiet streets at Pembroke Cottages, across Cambridge Road, then through Ringsend Park as a shared path</p>	<p>Shares the same surface water sub-catchment with the proposed Scheme and the site possess direct connections to the local surface water network, and therefore has the capacity to act in a cumulative or in-combination manner in respect surface water impacts on the downstream Natura 2000 sites.</p> <p>This project will be examined in further detail within sub-section 7.4</p>

Planning Reference	Address	Application Status	Decision date	Summary of development	Assessment of ZoI Overlap
				with pedestrian priority, and a cycle lane along the northern side of Strand Street and Pembroke Street in Irishtown to the junction of Sean Moore Road and Beach Road. A spur cycle route will be provided towards the Poolbeg Strategic Development Zone (SDZ) lands via Irishtown Stadium and Bremen Road. Shared use symbols will also be installed along York Road and Pigeon House Road to provide a second alternative route towards the Poolbeg SDZ lands. This road has recently been closed to through traffic and is suitable for shared use. Pedestrian facilities will be upgraded, and additional controlled and uncontrolled crossings will be provided at side roads, road crossings, and at junctions. In addition, urban realm works will be undertaken at key locations with higher quality materials, planting and street furniture provided to enhance the pedestrian experience. Examples of such works can be seen at the pair of Scherzer Bridges at Custom House Quay and North Wall Quay as well as the junction of North Wall Quay and Excise Walk. Pedestrian Boardwalks are proposed at Excise Walk and also at the former DCC Dublin Docklands offices at Custom House Quay to enhance the pedestrian environment.	
APB - 311027	N3 between the M50 and Clonee	Under Review	29/07/2021 (Lodged) Consultation has yet to be concluded	Proposed development of a multi-modal transport scheme along a section of the N3 between the M50 and Clonee.	Shares the same surface water catchment with the proposed Scheme but lacks direct connection to local watercourses to act in a cumulative or in-combination manner.
FCC - 312131	Townlands of Clonshagh, Dubber and Newtown, County Fingal and Dublin City	Under Review	07/12/2021 (Lodged)	Greater Dublin Drainage (GDD) consisting of a new wastewater treatment plant, sludge hub centre, orbital sewer, outfall pipeline and regional biosolids storage facility.	No direct or indirect overlapping ZoI buffers with the proposed Scheme, therefore this project lacks the capacity to act in cumulative or in-combination manner.
DCC - 2870/17	Royal Canal, Phibsborough to Ashtown	Grant Permission	2018	The proposed works shall comprise the construction of c. 4.3 km of cycle and pedestrian route from Phibsborough Road, Dublin 7 - Cross Guns Bridge to Ashtown, Dublin 15 along the northern towpath. The works traverse past Broome Bridge (Protected Structure) and H.S. Reilly's Bridge (Protected Structure). A	The Royal Canal Greenway has the potential to disturb SCI bird species connected with North Bull Island SPA, therefore this project has the capacity

Planning Reference	Address	Application Status	Decision date	Summary of development	Assessment of Zol Overlap
				Toucan (pedestrian and cycle) crossing is proposed at Broombridge Road/ Broome Bridge.	<p>to act in a cumulative impact for these SCI bird species.</p> <p>Shares the same surface water sub-catchment with the proposed Scheme and the site possess direct connections to the local surface water network, and therefore has the capacity to act in a cumulative or in-combination manner in respect surface water impacts on the downstream Natura 2000 sites.</p> <p>This project will be examined in further detail within sub-section 7.4.</p>
DCC	Lands at Jamestown Road, St Margaret's Road / McKee Avenue, Finglas, Dublin 11	Masterplan Approved	07/2023	Jamestown Master Plan. Development Plan for 43 hectares of Jamestown Industrial Estate lands at Jamestown Road, St Margaret's Road / McKee Avenue, Finglas, Dublin 11. The Masterplan sets out the following detail to inform the sustainable and sequential regeneration and development of the lands: Urban Structure; Green infrastructure and open space; Built form and design; Land use and activity; and Phasing and sequencing	<p>Shares the same surface water sub-catchment with the proposed Scheme but lacks direct connection to local watercourses to act in a cumulative or in-combination manner.</p> <p>Both air (dust) and disturbance Zol buffers overlap with the proposed Scheme but not in locations which contain SCI bird species foraging areas, and therefore lacks the capacity to act in a cumulative or in-combination manner.</p>
DCC	Lands at Ballyboggan	Consultation yet to be concluded	n/a	Dublin City Council's Ballyboggan Local Action Plan. It is proposed that the draft LAP boundary encompass the various business parks and industrial estates at this location, as well as the Royal Canal corridor and lands to the south on Bannow Road, including Broombridge Station / Luas Depot, TU Dublin's Broombridge Sports Complex and the City Council's maintenance depots. This will provide an important context for the LAP and will help ensure that new development is well integrated into the	The Ballyboggan Local Action Plan shares the same surface water sub-catchment with the proposed Scheme and the site possess direct connections to the local surface water network, and therefore has the capacity to act in a cumulative or in-combination manner in respect

Planning Reference	Address	Application Status	Decision date	Summary of development	Assessment of Zol Overlap
				existing area so that established communities can also benefit from the delivery of new infrastructure.	<p>surface water impacts on the downstream Natura 2000 sites.</p> <p>This project will be examined in further detail within sub-section 7.4.</p>
FCC - 3364/23	Manhattan Peanuts Ltd, McKee Avenue, Finglas, Dublin 11, D11 F654	Grant Permission	10/11/2023	<p>The proposed development will consist of an extension to the existing food production and warehouse building at Manhattan Peanuts Ltd comprising an additional floor area of 1,913m². and associated external amendments. Works to facilitate the proposed extension include the removal of the existing bin store on site and the removal of the existing sunken ramp and loading bay located to the south-east of the existing warehouse building. The proposed extension will provide for:</p> <ul style="list-style-type: none"> (i) 1,252m². of additional floor area at ground floor level, comprising warehouse space, a packing room, reception area, storage space, a charging room, plan room and new lift and stair cores; (ii) 26m²of additional floor space at mezzanine level, comprising a clean room; (iii) 321m². of additional floor space at first floor level, comprising a canteen room, toilet facilities, storage space, office space and a meeting room; (iv) 314m². of additional floor space at second floor level, comprising storage space, office space with access to a balcony area and a boardroom. Other works proposed onsite include: (v) provision of a new sunken loading bay, loading area and access ramp at ground floor level, to the south-east of the proposed extension; (vi) the provision of an additional 23 car parking spaces (including 2 accessible parking spaces and 3 EV charging spaces) and 5 new truck parking spaces at surface level; (vii) provision of a new secure bicycle shelter located adjacent to the southern site boundary; 	<p>Shares the same surface water sub-catchment with the proposed Scheme but lacks direct connection to local watercourses to act in a cumulative or in-combination manner.</p> <p>Both air (dust) and disturbance Zol buffers overlap with the proposed Scheme but not in locations which contain SCI bird species foraging areas, and therefore lacks the capacity to act in a cumulative or in-combination manner.</p>

Planning Reference	Address	Application Status	Decision date	Summary of development	Assessment of Zol Overlap
				<p>(ix) provision of new permeable asphalt and grasscrete surfaces surrounding the proposed new extension;</p> <p>(x) provision of a staff courtyard area to the south of the proposed extension;</p> <p>(xi) partial recladding of existing warehouses and the provision of new solar panels to the roof level of the proposed extension;</p> <p>(xii) boundary treatments, hard and soft landscaping, foul and surface water drainage and all associated site development works necessary to facilitate the development.</p>	
<p>ABP-310350-21 RP06F.317218</p>	<p>Charlestown Place, St. Margaret's Road, Charlestown, Dublin 11</p>	<p>Under Review</p>	<p>02/10/2023</p>	<p>The development will consist of a total of 55,523m² (gross floor area – GFA) in 4 blocks (Blocks 1 – 4) including: 590 residential units comprising 234 one-bed units, 316 two-bed units and 40 three-bed units (totalling 53,881m²), non-residential floorspace including 2. retail/ commercial units (350m²), 4. offices suites (224m²), a health/ medical centre (526m²) and a creche (542m²) all totalling 1,642m² and all associated roads, streets, public spaces and services infrastructure. Blocks 1 and 2 are located above a shared single level basement with Block 4 also above above a single level basement. The development is described as follows on a block-by-block basis: - Block 1 (19,821m² GFA): 211 apartment units (comprising 91 one-bed units, 106 two-bed units and 14 three-bed units) with ancillary accommodation, terraces, balconies and a roof garden in a 2 to 10 storey block. Block 1 ground floor level includes 1 retail/ commercial unit (170m²), 3 offices suites (160m²) and a creche (542m²) with external play area at ground and first floor levels all fronting onto a proposed pedestrian boulevard. Block 2 (18,209m² GFA): 184. apartment units (comprising 57 one-bed units, 123 two-bed units and four three-bed units) with ancillary accommodation, terraces, balconies and a roof garden in a 2 to 7 storey block. Block 2 ground floor level includes 1 retail/ commercial unit (180m²), 1 office suite (64m²) and a health/ medical centre (526m²) all at ground floor level fronting onto the proposed pedestrian boulevard. Block 3 (8,021m² GFA): 95 apartment units (comprising 54 one-bed units, 34 two-bed units and 7 three-bed units) with ancillary accommodation, terraces and balconies in an 8-storey block.</p>	<p>Shares the same surface water sub-catchment with the proposed Scheme but lacks direct connection to local watercourses to act in a cumulative or in-combination manner.</p> <p>Both air (dust) and disturbance Zol buffers overlap with the proposed Scheme but not in locations which contain SCI bird species foraging areas, and therefore lacks the capacity to act in a cumulative or in-combination manner.</p>

Planning Reference	Address	Application Status	Decision date	Summary of development	Assessment of Zol Overlap
				<p>Block 4 (9,472 GFA): 100 apartment units (comprising 32 one-bed units, 53 two-bed units and 15 three-bed units) with ancillary accommodation, terraces, balconies and a roof garden in a 2 to 6 storey block. Vehicular access to serve the proposed development will be provided from Charlestown Place via the southern arm of the existing signalised junction which is proposed to be upgraded. The existing pedestrian access from the Charlestown Shopping Centre across Charlestown Place is proposed to be relocated to the west to align with the proposed internal pedestrian boulevard within the current application site and the existing internal street within the Charlestown Centre. Permission is also sought for associated reconfiguration of the central median on Charlestown Place and the existing footpaths, cycle lanes, bus stops, taxi rank and hard and soft landscaping on the northern and southern edges of Charlestown Place and south of the Charlestown Shopping Centre. Pedestrian and cycle access is also proposed via a new entrance on St. Margaret's Road. Provision is also made for vehicular access from Charlestown Place through the site to McKelvey Celtic AFC playing pitch at the southeastern corner of the site including relocation of the existing gated entrance to McKelvey Celtic AFC playing pitch and a future access to the undeveloped greenfield site to the west. Permission is also sought for 515. car parking spaces and 1068 cycle parking spaces at basement and surface levels, bin storage areas, ESB substations, plant and public lighting, boundary treatments, surface water drainage infrastructure including connection to the attenuation tank permitted by Reg. Ref. F19A/0146 and located beneath a proposed central landscaped public open space of c.4,737m², a linear public open space of c.1,848m² and all associated site development and infrastructure works including demolition of the existing temporary surface car park.</p>	
APB - 318677	Townlands of Fieldstown, Clonmethan Electoral District, Co. Dublin	Under Review	12/12/2023 Lodged	110kV Air Insulated Switchgear (AIS) tail-fed substation compound, combined with a 110kV underground cable connection to Finglas.	Shares the same surface water sub-catchment with the proposed Scheme but lacks direct connection to local watercourses to act in a cumulative or in-combination manner.

Planning Reference	Address	Application Status	Decision date	Summary of development	Assessment of Zol Overlap
					Both air (dust) and disturbance Zol buffers overlap with the proposed Scheme but not in locations which contain SCI bird species foraging areas, and therefore lacks the capacity to act in a cumulative or in-combination manner.
APB - 318454	52 & 54 Quarry Road, Cabra, Dublin 7	Under Review	Case is due to be decided by 27/03/2024	Demolition of existing structures and construction of a mixed commercial / residential development of 64 units in 3 blocks.	Shares the same surface water sub-catchment with the proposed Scheme but lacks direct connection to local watercourses to act in a cumulative or in-combination manner.
APB - 318316	43 to 60A O'Connell Street Upper, rear of 59 - 60 O'Connell Street Upper, 13 & 14 and 14 - 15 Moore Lane, the public realm associated with O'Rahilly Parade, Moore Lane, Henry Place and a portion of O'Connell Street Upper, Dublin 1.	Under Review	Case is due to be decided by 05/03/2024	Protected Structures: A mixed-use development and associated site works at a site, 'Dublin Central - Site 2' (c. 1.33 Ha). An Environmental Impact Assessment Report (EIAR) accompanies this application. See planning authority website for full description and full site address.	Shares the same surface water sub-catchment with the proposed Scheme but lacks direct connection to local watercourses to act in a cumulative or in-combination manner.
ABP - 318268	61, O'Connell Street Upper, Dublin 1	Under Review	Case is due to be decided by 29/02/2024	Protected Structure: Refurbishment and reuse of commercial building to include restaurant, apartments, gym, pedestrian link and associated site works.	Shares the same surface water sub-catchment with the proposed Scheme but lacks direct connection to local watercourses to act in a cumulative or in-combination manner.

Planning Reference	Address	Application Status	Decision date	Summary of development	Assessment of Zol Overlap
ABP - 318180	Cruiserath Road, Dublin 15	Under Review	Case is due to be decided by 15/02/2024	Construction of data centre and associated site works. An Environmental Impact Assessment Report (EIAR) has been submitted to the planning authority with the planning application.	Shares the same surface water sub-catchment with the proposed Scheme but lacks direct connection to local watercourses to act in a cumulative or in-combination manner.
ABP - 317818	Parkview, Ballymun, Dublin 11	Grant Permission	21/05/2024	Construction of 32 houses, 2 sheltered housing units, single storey creche and all associated site works.	Shares the same surface water sub-catchment with the proposed Scheme but lacks direct connection to local watercourses to act in a cumulative or in-combination manner.
ABP - 317687	Lands north of Meakstown Cottages access road, Dubber, Co. Dublin	Under Review	Case is due to be decided by 04/12/2023	Construction of an eco-self-storage facility comprising 300 storage containers and all associated site works.	No direct or indirect overlapping Zol buffers with the proposed Scheme, therefore this project lacks the capacity to act in cumulative or in-combination manner.
ABP - 317480	Kilshane Road, Kilshane, Finglas, Dublin 11	Grant Permission	16/05/2024	Demolition of buildings, road improvement works and construction of gas turbine power generation station with all associated site works. An Environmental Impact Assessment Report has been prepared. EPA licence is required.	Shares the same surface water sub-catchment with the proposed Scheme but lacks direct connection to local watercourses to act in a cumulative or in-combination manner.
ABP - 316138	Townlands of Collinstown, Coultury, and Huntstown Co. Dublin and in the townlands of Pickardstown and Portmellick, Co. Dublin	Grant Permission	17/04/2024	Development on 4 sites located entirely within lands in the ownership of Dublin Airport, including 2 sites at the airfield in the townlands of Collinstown, Coultury, and Huntstown, Co. Dublin. The proposed development will consist of the construction of a subterranean underpass of runway 16/34 and all associated and ancillary works. The planning application is accompanied by an EIAR and an NIS.	No direct or indirect overlapping Zol buffers with the proposed Scheme, therefore this project lacks the capacity to act in cumulative or in-combination manner.
ABP	Finglas, Co. Dublin	Currently in Step 4. Step 4 determines the best	n/a	Powering Up Dublin programme: installing over 50km of electrical cables across the city to strengthen key electricity infrastructure in Finglas Co. Dublin.	Shares the same surface water sub-catchment with the proposed Scheme but lacks direct connection to local

Planning Reference	Address	Application Status	Decision date	Summary of development	Assessment of Zol Overlap
		performing option and the precise route where the project will be built. Next Step will be to Apply for planning permission			watercourses to act in a cumulative or in-combination manner. Both air (dust) and disturbance Zol buffers overlap with the proposed Scheme but not in locations which contain SCI bird species foraging areas, and therefore lacks the capacity to act in a cumulative or in-combination manner.
3674/19	St. Finian's National School, Glenties Park, Rivermount, Finglas, Dublin 11	Grant Permission	26/09/2019	Planning permission is sought for the construction of a single storey 154m ² classroom extension to the east of existing school to accommodate 1 classroom with en-suite w.c.'s, 1 accessible w.c./shower and 2 resource rooms, internal alterations and associated site works.	Shares the same surface water sub-catchment with the proposed Scheme but lacks direct connection to local watercourses to act in a cumulative or in-combination manner. Both air (dust) and disturbance Zol buffers overlap with the proposed Scheme but not in locations which contain SCI bird species foraging areas, and therefore lacks the capacity to act in a cumulative or in-combination manner.
2056/19	Educate Together, Rathborne Vale, Ashtown, Dublin 15	Grant Permission	24/05/2019	The development will consist of the construction of a three storey, split level school building, Pelletstown ETNS (RN 20392I). It will facilitate a 16-classroom primary school with a two classroom Special Needs unit. The design also includes a general-purpose hall, support teaching spaces and ancillary accommodation. The proposed school will be three storeys with a single storey element and a roof top play space. The school also incorporates a rooftop play space, ground floor external play areas and special needs unit play-spaces and an external ball court. There will also be associated car parking, bicycle shed, access road, landscaping, connection to public services and all associated siteworks.	Shares the same surface water sub-catchment with the proposed Scheme but lacks direct connection to local watercourses to act in a cumulative or in-combination manner.

Planning Reference	Address	Application Status	Decision date	Summary of development	Assessment of Zol Overlap
2595/20	Rathborne Vale, Ashtown, Dublin 15	Grant Permission	17/07/2020	The development will consist of the construction of a part 2-storey, part single-storey prefabricated temporary school comprising of 12 classrooms and an administration block. The works will include a temporary carpark, bike parking, landscaping and associated boundary treatments. The Temporary School is for a maximum period of 2 years while the permanent Educate Together National School (RN203921) (granted under P0354) is constructed.	Shares the same surface water sub-catchment with the proposed Scheme but lacks direct connection to local watercourses to act in a cumulative or in-combination manner.
2874/20	Site adjacent 37, 38 Barnamore Park, and 41, 42 Barnamore Grove, Finglas, Dublin 11	Grant Permission	10/08/2020	Planning permission for development which will consist of the removal of the existing road and footpaths, the construction of 2 detached two storeys three-bedroom house (2 houses) and ancillary site development works including new site boundaries and on-site parking for dwellings with new vehicular access to each house from Barnamore Grove and Barnamore Park respectively, rerouting/modifying existing services including sewers crossing the site.	Shares the same surface water sub-catchment with the proposed Scheme but lacks direct connection to local watercourses to act in a cumulative or in-combination manner. Both air (dust) and disturbance Zol buffers overlap with the proposed Scheme but not in locations which contain SCI bird species foraging areas, and therefore lacks the capacity to act in a cumulative or in-combination manner.
2477/20	Erin's Isle GAA Club, Farnham Drive, Finglas, Dublin 11	Grant Permission (Construction started December 2022)	01/07/2020	Planning permission for new GAA pitch with 6 18m high floodlights and new 2.5m high boundary wall to western boundary at Farnham Drive circa 180m with 5m high safety netting and ancillary works including new kit store, generator and car parking 22 spaces and associated site works.	The Erin's Isle Development has the potential to disturb SCI bird species connected with North Bull Island SPA, therefore this project has the capacity to act in a cumulative impact for these SCI bird species. This project will be examined in further detail within sub-section 7.4.
4764/19	St. Michael's Holy Faith Secondary School, Wellmount Road, Finglas, Dublin 11	Grant Permission	21/02/2020	The development will consist of construction of two storey standalone extension of approx. total 395m ² , to the rear (North) of the existing school to provide 2 technical rooms at ground floor and 2 classrooms at first floor together with ancillary spaces and all associated works.	Shares the same surface water sub-catchment with the proposed Scheme but lacks direct connection to local watercourses to act in a cumulative or in-combination manner. Both air (dust) and disturbance Zol buffers overlap with the proposed Scheme but not in locations which

Planning Reference	Address	Application Status	Decision date	Summary of development	Assessment of Zol Overlap
					contain SCI bird species foraging areas, and therefore lacks the capacity to act in a cumulative or in-combination manner.
4503/19	103, North Road, Finglas, Dublin 11	Grant Permission	19/01/2020	Planning permission is sought at the rear of 103 North Road, Finglas, Dublin 11 for the construction of two two-storey dwellings to consist of at ground level; kitchen/dining & living area at first floor level two bedrooms & office, vehicular access to North Road & associated site works.	Shares the same surface water sub-catchment with the proposed Scheme but lacks direct connection to local watercourses to act in a cumulative or in-combination manner. Both air (dust) and disturbance Zol buffers overlap with the proposed Scheme but not in locations which contain SCI bird species foraging areas, and therefore lacks the capacity to act in a cumulative or in-combination manner.
2683/21	Glenavon House, 46 Ballymun Road, Glasnevin, Dublin 9	Grant Permission	09/03/2022	Permission for development at a site (c.039Ha) at Glenavon House, 46 Ballymun Road, Glasnevin, Dublin 9. The subject site is generally bounded to the west by Ballymun Road and Clonmore Court apartments, to the north by Glenavon Court and Hillcrest Court apartments, to the east by the rear gardens of houses on St. Mobhi Road, and to the south by Mobhi Court apartments and houses at The Haven. The development will consist of the construction of a 5 to 6 storey apartment building (total GFA c.5,330m ² excluding car park), partially over basement, accommodating 52 residential units (13 1-bed apartments, 9 2-bed apartments, 17 2-bed duplex apartments, 8 3-bed apartments and 5 3-bed duplex apartments), all with private balconies on the east or west elevation. And, all associated and ancillary site development, landscaping and boundary treatment works, including Demolition of existing habitable house and ancillary outbuildings. Modification of existing vehicular and pedestrian site entrance to Ballymun Road. 1 car share space at surface level. 37 car parking spaces at basement. 80 bicycle parking spaces. ESB substation and switch room. Solar panels and green roof.	Shares the same surface water sub-catchment with the proposed Scheme but lacks direct connection to local watercourses to act in a cumulative or in-combination manner.

Planning Reference	Address	Application Status	Decision date	Summary of development	Assessment of Zol Overlap
2944/21	Scoil Chiarain Special School, St Canices Road, Glasnevin, Dublin 11, D11 VK64	Grant Permission	03/08/2021	The development consists of the construction of a new two-storey school for pupils with special educational needs with a gross floor area of approx. 4,226m ² and the phased demolition of the existing single storey school building (approx. 1,764m ²). Proposed accommodation consists of 24 classrooms, a general-purpose room, a library/resource room, communal teaching spaces, specialist teaching spaces and ancillary accommodation. The existing site entrance off St. Canice's Road is to be altered with a new one-way access system serving 50 on site car parking spaces, 6 bus parking spaces and 11 bus set down spaces, pedestrian pathways and a new gated vehicular exit and pedestrian entrance also to St. Canice's Road. Provision of a ball court, play areas, a bin store & heat pump enclosure, roof-mounted solar photovoltaic panels, a bicycle shelter with 24 bicycle spaces, foul drainage connection, surface water attenuation, signage, landscaping, boundary treatments, and all associated site works on overall site area of approx. 1.6 hectares.	This development has the potential to disturb SCI bird species connected with North Bull Island SPA, therefore this project has the capacity to act in a cumulative impact for these SCI bird species. This project will be examined in further detail within sub-section 7.4
F18A/0718	Charlestown Centre, Charlestown Place & St Margaret's Road, Charlestown, Dublin 11	Grant Permission	15/02/2019	Development on this site (3.89ha.) (lands comprising existing podium area north of Charlestown Place, west of the Charlestown Centre and east of McDonalds). Modifications to the Phase 2B application (Reg. Ref. F18A/0025) to provide an additional 72 apartment units bringing the overall number of apartment units on the Phase 2B site 319 units. The modified Phase 2B will comprise a total of 34.363 gross floor area incorporating 319 apartments (29,492m ²), retail floorspace (4,544m ²) and ancillary areas (327m ²) in 6 blocks ranging in height from two to six storeys with seven storey elements. A 5-year permission is sought. The accommodation provided in the modified Phase 2B development is described on a block-by-block basis as follows: Building 100: 6 storey building (9,871m ²) incorporating 123 apartments (11 studios, 71 one-bed units, 41 two-bed units) with associated private balconies, roof terrace with stair lift/stair core access, ground floor bicycle storage (156 spaces) and all associated ancillary areas. Building 200: 6 storey building (4,981m ² .) incorporating 46 apartments (6 one-bed units, 17 two-bed units and 23 three-bed	Shares the same surface water sub-catchment with the proposed Scheme but lacks direct connection to local watercourses to act in a cumulative or in-combination manner. Both air (dust) and disturbance Zol buffers overlap with the proposed Scheme but not in locations which contain SCI bird species foraging areas, and therefore lacks the capacity to act in a cumulative or in-combination manner.

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				<p>units) with associated private balconies, roof terrace with lift/stair core access and all associated ancillary areas.</p> <p>Building 300: 6 storey building (4,792m²) incorporating 44 apartments (6 one-bed units, 17m² two-bed units and 21 three-bed units) with associated private balconies, roof terrace with lift/stair core access and all associated ancillary areas.</p> <p>Building 400: 3 to 6 storey building (4,450m²) incorporating 48 apartments (18 one-bed units and 30 two-bed units) with associated private balconies, roof terrace with lift/stair core access and all associated ancillary and plant areas.</p> <p>Building 500: 2 to 6 storey building (5,367m².) incorporating 58 apartments (25 one-bed units, 33 two-bed units) with associated private balconies, roof terrace with lift/stair core access, a ground floor retail/commercial unit (194m².) and all associated ancillary areas.</p> <p>Building 550: 2 storey building (4,471m².) incorporating 3 retail commercial units (4,544m².), residents' communal room (121m²), ground floor bicycle storage (194 spaces) and all associated ancillary areas.</p> <p>As per Reg. Ref. F18A/0025, buildings 500 and 550 form the southern and western edges of a new public plaza (Charlestown Square) which will be bound to the east by the existing Charlestown shopping Centre and to the north by the existing cinema and leisure centre block. Hard and soft landscaping at podium and roof levels have been revised and upgraded. Revisions to the permitted basement car park and services area at Basement Levels -1 and -2 comprise alterations to the lift/stair cores, car parking and circulation routes to facilitate the modifications to buildings above and addition of apartment storage areas. The new car and cycle parking arrangement for Phase 1 and Phase 2 provides a total of 1,358 basement and 112 surface car parking spaces. A total of 630 bicycle parking spaces are provide comprising 350 spaces in buildings 100 and 550, 198 external podium level spaces and 82 spaces at basement level -2. connections to public services, signage and all ancillary site and development works including access from the existing</p>	

Planning Reference	Address	Application Status	Decision date	Summary of development	Assessment of Zol Overlap
				connections to Charlestown Place and St. Margaret's Road will be as permitted under Reg. Ref. F18A/0025.	
F19A/0033	Site D8, Horizon Logistics Park, Harristown, St. Margarets, Swords, Co. Dublin.	Permission Granted	03/05/2019	The erection of a warehouse/logistics unit (D8 14,933m ²) on its own self-contained site with dedicated service yard, loading docks, perimeter fencing, 2 storey ancillary offices, 150 car parking spaces and associated site development works to include an ESB substation with switch room (38m ²). All of the above on a site of 3.395ha.	No direct or indirect overlapping Zol buffers with the proposed Scheme, therefore this project lacks the capacity to act in cumulative or in-combination manner.
FW20A/0021	Dublin Inland Port, South of Dublin Airport Logistics Park, Off Maple Avenue, Coldwinters, St Margarets, Co Dublin	Permission Granted	07/04/2020	<p>The development will consist of storage and logistic facilities comprising yards, warehouses, workshops and ancillary offices at Plots 1, 3, 4, 5, 6, 7, and 9 and amendment to permitted development (Reg. Ref. FW19A/0101 and F18A/0139) at Plot 8 and internal road network at Dublin Inland Port.</p> <p>Planning permission is sought for the following development:</p> <p>Plot 1 (c.1.54ha) comprising a warehouse building including an ancillary office of c.2433m² and c.10m in height with 1 sign on building and c.280m² photovoltaic panels on roof and storage yard with approx. 50 lorry spaces.</p> <p>Plot 3 (c.0.87ha) comprising an office building of c.144m² and c. 4.6m in height with 1 sign on building and c.60m² photovoltaic panels on roof and storage yard with approx. 24 lorry spaces and approx. 205 car storage spaces.</p> <p>Plot 4 (c.2.99ha) comprising a warehouse building including workshop, store, substation and ancillary office of c.8,061 m² and c.15m in height and c.680m² photovoltaic panels on roof and storage yard with approx. 70 lorry spaces and approx. 96 car storage spaces.</p> <p>Plot 5 (c.1.16ha) comprising a warehouse building including workshop and ancillary office of c.735m² and 10.2m and an office building of c.300m² and c.5.8m in height with 1 sign on building, and storage yard with approx. 28 lorry spaces and including vehicle washing area and fuel storage area.</p> <p>Plot 6 (c.0.31ha) comprising a warehouse and store building including ancillary office of c.569m² and 10.2m in height with 1</p>	No direct or indirect overlapping Zol buffers with the proposed Scheme, therefore this project lacks the capacity to act in cumulative or in-combination manner.

Planning Reference	Address	Application Status	Decision date	Summary of development	Assessment of Zol Overlap
				<p>sign on building and c.92m² photovoltaic panels on roof and storage yard with approx. 7 lorry spaces.</p> <p>Plot 7 (c1.2ha) comprising a warehouse building including ancillary office of c.1,293m² and c.10m in height with 1 sign on building and c.220m² photovoltaic panels on roof and storage yard with approx. 42 lorry spaces.</p> <p>Plot 9 (c.0.47ha) comprising a warehouse building including ancillary office of c.569m² and 10.2m in height with 1 sign on building and c.92m² photovoltaic panels on roof and storage yard with c.8 lorry spaces.</p> <p>The proposed development across the 7 plots will also include: 134 car staff parking space and 112 bicycle parking spaces; high strength surface treatment including underground drainage, attenuation, water services and electricity infrastructure including 2 substations of c. 14m² and c.26m² respectively; 3m high wall and internal 4.5m electrified fence along the boundary of Plot 4 and 2.4m high fences along other internal plot boundaries; gated vehicle and pedestrian accesses to each plot; 3m high fencing along the external site boundaries; CCTV poles (approx. 7.5m) and new lighting (including 8 lighting towers (approx. 30m)); and all associated landscaping, plant, site and construction works.</p> <p>The application seeks to amend Plot 8 as permitted under Reg. Ref. FW19A/0101. The yard within Plot 8 will be extended to the north and east and the plot will increase in area from 3.1 to 3.5ha.</p> <p>The application also seeks to amend the internal road network as permitted under Reg. Ref. FW19A/0101 and Reg. Ref. FW18A/0139. The permitted (Reg. Ref. FW18A/0139) Plot 1 entrance has been moved further south and the permitted (Reg. Ref. FW18A/0139) entrance to Plot 4 to the west is now removed. The permitted (Reg. Ref. FW19A/0101) Plot 4 entrance to the east has been widened.</p> <p>All development to take place on a site of c. 10.4 ha.</p> <p>The application is for a 10-year planning permission.</p> <p>An Environmental Impact Assessment Report has been prepared in respect of the proposed development.</p>	

Planning Reference	Address	Application Status	Decision date	Summary of development	Assessment of Zol Overlap
FW20A/0211	Lands between the N2 and R135 (north of the N2-R135 link road), at Coldwinters, St. Margarets, Co. Dublin	Permission Granted	13/04/2021	The development will consist of 3 buildings for industrial/warehouse/logistics use (Units 3,4 and 5) with gross floor area of 24,356m ² . Each building will measure 18.1m high (at parapet level) and have 2 storey ancillary offices. Elevational signage will be provided. The units will form Phase 2 of the Vantage Business Park, with Phase 1 to the south (units 1 and 2) under construction. The proposed development includes 39 HGV parking spaces, 224 car parking spaces, 134 cycle parking spaces, 29 dock levellers and 7 grade loading bays. All associated site works including diversion of existing foul rising main, boundary treatments, landscaping, service yards, internal road and footpaths, swales, lighting, 3 free standing signs, signage at entrance, refuse storage, substation, foul pumping station, extension of foul infrastructure from Phase 1, modified vehicular entrance off the R135 (including new entrance gate and pillars) and dedicated new footpath and cycle lane along the east side of the R135.	No direct or indirect overlapping Zol buffers with the proposed Scheme, therefore this project lacks the capacity to act in cumulative or in-combination manner.
FW20A/0187	Horizon Logistics Park (Site N), Off the R108, Harristown, St. Margarets, Swords, Co. Dublin.	Permission Granted	23/06/2021	<p>The proposed development consists of the following:</p> <p>The construction of 8 light industrial/warehouse (including wholesale use) / logistics units including ancillary office use and entrance/reception areas over two levels, with maximum height of c. 15.5 m and combined total gross floor area (GFA) of 39,732m². (units N1-N8);</p> <p>The demolition of 2 existing agricultural sheds and the construction of a link road (Estate Road 4), extending south from the proposed development to connect with existing road infrastructure (Sillogue Green);</p> <p>The implementation of a new internal road network with all access points, internal access roads and footpaths, service yards and access roads, cycle paths and landscaping;</p> <p>The construction of 2 new roundabouts on Estate Road 4, the construction of Estate Road 3 branching west and the extension of Estate Road which currently serves Horizon Logistics Park;</p> <p>The development includes 2 ESB substation buildings and switchrooms (with a combined GFA of 68m²) service yards</p>	No direct or indirect overlapping Zol buffers with the proposed Scheme, therefore this project lacks the capacity to act in cumulative or in-combination manner.

Planning Reference	Address	Application Status	Decision date	Summary of development	Assessment of Zol Overlap
				<p>including loading bays, bin storage areas and a total of 395 car parking spaces, 8 motorcycle parking spaces and 202 cycle parking spaces;</p> <p>The proposal includes landscaping and planting, boundary treatment, lighting, security fencing and all associated site services and development works including underground foul and storm water drainage network and sustainable urban drainage systems, all on a site of 14.64 hectares.</p>	
FW20A/0097	Plot 2 Dublin Inland Port South of Dublin Airport Logistics Park, Off Maple Avenue, Coldwinters, St Margaret's, Co. Dublin	Permission Granted	18/08/2020	<p>Fingal County Council. Dublin Port Company intends to apply for planning permission for development and amendments to development permitted under Reg. Ref. F18A/0139 /, ABP Ref. 302361 – 18 as amended, at Plot 2, Dublin Inland Port, south of Dublin Airport Logistics Park, off Maple Avenue, Coldwinters, St. Margaret's, County Dublin. The development and amendments will consist of: omission of permitted warehouse and maintenance building (c.1,050m², c.16m in height), relocation and reconfiguration of permitted office building (c.177m², 4.9m in height) including photovoltaic panels (c.19.2 m²) and signage (2m²), relocation and reconfiguration of permitted bunded fuel storage, relocation and reconfiguration of staff car park to provide 21 spaces, relocation and reconfiguration of staff bicycle parking to provide 6 spaces, relocation of permitted vehicle washdown facility, provision of worker's building (c.127.6m², c 4.9m in height) including photovoltaic panels (c.14.4m²) and signage (1 m²), provision of toilet block (c.20m², 4.5m in height) including photovoltaic panels (c.2m²), relocation and reconfiguration of refrigerated gantry (c.304m² and c.13m in height), provision of truck off-loading area including footpaths, minor amendments to the hard surfacing, lighting (to provide in total 3 30m high masts and 8 10m lighting columns), cctv (to provide in total 4 7.5m cctv poles), foul drainage, surface drainage and potable water infrastructure and all associated works. All development to take place on a site of c. 1.79 ha. The Planning Application may be inspected or purchased at a fee not exceeding the reasonable cost of making a copy at the offices of the Planning Authority during its public opening hours and a submission or observation may be made to the Planning Authority in writing on payment of</p>	<p>Shares the same surface water sub-catchment with the proposed Scheme but lacks direct connection to local watercourses to act in a cumulative or in-combination manner.</p>

Planning Reference	Address	Application Status	Decision date	Summary of development	Assessment of Zol Overlap
				<p>the prescribed fee within the period of 5 weeks beginning on the date of receipt by the authority of the application.</p>	
FW21A/0180	<p>Lands at Horizon Logistics Park (known as Site P1), Off the R108, Townlands of Merryfalls, St. Margarets, Swords, Co. Dublin.</p>	Permission Granted	22/02/2022	<p>The proposed development consists of the following:</p> <p>The construction of 1 light industrial/warehouse (including wholesale use) / logistics building (Unit P1) with a gross floor area (GFA) of 6,593m² (including 1,064m² ancillary office space and reception areas over two levels). The proposed building will have a maximum height of 11 metres.</p> <p>Provision of 66 car parking spaces, 2 motorbike parking spaces, 33 bicycle parking spaces, 26 van parking spaces, and 30 HGV parking spaces.</p> <p>Provision of an ESB substation and switchroom (36m²), security hut (18m²) 3 cycle shelter structures, 2 smoking shelters, bin store (10m²), recycling store (17m²), a standalone maintenance/services building (67m²).</p> <p>Provision of service yard and HGV and van loading/unloading areas with associated loading bays to the north, south and west of the proposed warehouse/logistics building.</p> <p>Provision of access arrangements to the proposed development including an extension of permitted Estate Road Number 2, connecting to the road infrastructure permitted under Reg Ref FW20A/0187, along with pedestrian/cycle infrastructure to Estate Roads Number 2 and 3.</p> <p>Provision of signage zones and stand-alone totem sign associate with the proposed unit.</p> <p>The proposal includes landscaping and planting, boundary treatments, site lighting, 3 flag poles, security fencing and gates, and all associated site services and development works including underground foul and storm water drainage network and sustainable urban drainage systems.</p> <p>The proposed development is located to the south of the development permitted under Reg. Ref. FW20A/0187 (known as Site N development).</p>	<p>No direct or indirect overlapping Zol buffers with the proposed Scheme, therefore this project lacks the capacity to act in cumulative or in-combination manner.</p>

Planning Reference	Address	Application Status	Decision date	Summary of development	Assessment of ZoI Overlap
				A Natura Impact Statement (NIS) will be submitted to the Planning Authority with this planning application.	
FW21A/0144	Townlands of Johnstown, Huntstown, Coldwinters & Baleskin, at Blanchardstown and Finglas, Co. Dublin, (Southeast of Huntstown Power Station, Johnstown, Dublin to Finglas 220kV Substation, Baleskin).	Permission Granted	5/10/2021	The development will consist of the installation of electrical infrastructure between Finglas substation and Huntstown Power Station to facilitate the retirement of existing Electricity Supply Board overhead powerlines and facilitate site clearance for the future development of a data centre and substation (subject to separate planning applications). This will include (i) the installation of approximately three underground cable circuits of 1.2km length (110kV) and one circuit 1.2km length (38kV) and associated underground ducting, joint bays and infrastructure between the existing ESB Finglas substation and an agreed location within Huntstown Power Station (ii) installation of one c.28m double circuit 110 kV cable end tower and one c.17 single circuit 110kV angle mast (iii) removal of 10 existing 110kV timber polesets, 9 existing 38kV timber polesets, 3 38kV lattice steel tower & associated overhead line electrical infrastructure; all associated and ancillary site development, landscaping and construction works, all within the townlands of Johnstown, Huntstown, Coldwinters & Baleskin at Blanchardstown & Finglas, County Dublin	Shares the same surface water sub-catchment with the proposed Scheme but lacks direct connection to local watercourses to act in a cumulative or in-combination manner.
FW21A/0151	Lands adjacent to Huntstown Power Station, North Road, Finglas, Dublin	Permission Granted (Currently undergoing an appeal)	Original decision granted on 20/4/2022 Project under appeal as of 16/5/2022	Demolition of 2 existing residential dwellings and ancillary structures to the east of the site (c.344qm total floor area); Construction of 2 data hall buildings (Buildings A and B) comprising data hall rooms, mechanical and electrical galleries, ancillary offices including meeting rooms, workshop spaces, staff areas including break rooms, toilets, shower/changing facilities, storage areas, lobbies, outdoor staff areas, loading bays and docks, associated plant throughout, photovoltaic panels and screened plant areas at roof levels, circulation areas and stair and lift cores throughout; External plant and 58 emergency generators located within a generator yard to the east and west of Buildings A and B at ground level. The area is enclosed by a c.6.5m high louvred screen wall;	Shares the same surface water sub-catchment with the proposed Scheme but lacks direct connection to local watercourses to act in a cumulative or in-combination manner.

Planning Reference	Address	Application Status	Decision date	Summary of development	Assessment of Zol Overlap
				<p>The proposed data halls (Buildings A and B) are arranged over 3 storeys with a gross floor area of C.37,647 m² each;</p> <p>The overall height of the data hall buildings is c28m to roof parapet level and c32m including roof plant, roof vents and flues. The total height of Buildings A and B does not exceed 112m OD (above sea level);</p> <p>The proposed development includes the provision of a temporary substation (c.32m²), water treatment building (c. 369m² and c.7.7m high), 7 water storage tanks (2,800m³ in total and c.6.4m high each), 2 sprinkler tanks (c.670m³ each and c.7.9m high each) with 2 pump houses each (c.40m² and c. 6m high each); The total gross floor area of the data halls and ancillary structures is c.75,775m²;</p> <p>All associated site development works, services provision, drainage upgrade works, 2 attenuation basins, landscaping and berming (c.6m high), boundary treatment works and security fencing up to c.2.4m high, new vehicular entrance from the North Road, secondary access to the south west of the site from the existing private road, all internal access roads, security gates, pedestrian/cyclist routes, lighting, 2 bin stores, 2 bicycle stores serving 48 bicycle spaces, 208 parking spaces including 10 accessible spaces, 20 electric vehicle charging spaces and 8 motorcycle spaces;</p> <p>Existing electricity overhead lines traversing the site will be undergrounded under concurrent application Ref. FW21A/0144; A proposed 220kv substation located to the southwest of this site will be subject of a separate Strategic Infrastructure Development application to An Bord Pleanála under section 182A of the Planning and Development Act 2000 (as amended);</p>	
FW22A/0061	Site Nos. 12 & 13, Stadium Business Park, Ballycoolin Road, Dublin 11	Permission Granted	26/05/2022	<p>For a development comprising: (i) construction of 5 industrial / warehouse / logistics units contained within 3 blocks consisting of: (a) Block A, containing Unit 1 and Unit 2, warehousing / distribution / logistics units comprising 2,011.m each; (b) Block B, containing Unit 3 and 4, industrial / warehousing units comprising 1,381m²each; and Block C, containing Unit 5, a warehousing / distribution / logistics unit comprising 1,635m² Each unit will be</p>	Shares the same surface water sub-catchment with the proposed Scheme but lacks direct connection to local watercourses to act in a cumulative or in-combination manner.

Planning Reference	Address	Application Status	Decision date	Summary of development	Assessment of Zol Overlap
				provided with ancillary office space and staff facilities; (ii) Creation of vehicular access point to the west of the site to provide for public access, repositioning of 2 existing vehicular access points & the provision of 1 new vehicular access point, all 3 access points to the north for servicing and deliveries; (iii) 135 car parking spaces (including 6 EV spaces and 5 reduced mobility spaces) and 80 bicycle parking spaces will serve the development; and (iv) The development will also include all associated SuDS drainage, landscaping, boundary treatments, lighting, CCTV, signage and site development works necessary to facilitate the development.	
ABP - 319083	284 Glasnevin Avenue, at the corner of Glasnevin Avenue and Grove Road, Finglas, Dublin 11, D11 CK25	Under Review	Case is due to be decided by 20/06/2024	4.8-metre-high slim shrouded pole concealing telecommunications antennas fixed to the northern apex wall, replacement of existing cabinets and dishes and with other associated works.	Shares the same surface water sub-catchment with the proposed Scheme but lacks direct connection to local watercourses to act in a cumulative or in-combination manner.
ABP - 319103	Site to the north of Hangar 6 and North Apron, west of Castlemoate Road and south of Gatepost 1B, in the townlands of Cloghran and Corballis, Dublin Airport, Co. Dublin.	Under Review	Case is due to be decided by 28/05/2024	Construction of a single storey, part two-storey hangar for 4 aircrafts, associated facilities and office area. Demolition of internal airport roadway on site access arrangements and site development works. The proposed development does not propose any increase in passenger or operational capacity at Dublin Airport. A Natura Impact Statement has been prepared.	No direct or indirect overlapping Zol buffers with the proposed Scheme, therefore this project lacks the capacity to act in cumulative or in-combination manner.
ABP - 319282	Lands at Huntstown Townland and Coldwinters	Under Review	Case is due to be decided by 16/07/2024	Construction of a materials recovery facility along with a food container cleaning plant and all associated site works. The materials recovery facility will require an EPA Industrial Emissions Licence. An Environmental Impact Assessment Report (EIAR) has been submitted with this application.	Shares the same surface water sub-catchment with the proposed Scheme but lacks direct connection to local watercourses to act in a cumulative or in-combination manner.

Planning Reference	Address	Application Status	Decision date	Summary of development	Assessment of Zol Overlap
	Townland, County Dublin				
ABP - 319440	31 Dunsoghly Avenue, Finglas, Dublin 11	Under Review	Case is due to be decided by 06/08/2024	Construction of a single storey flat roof link extension between main house and outbuilding in rear garden and retention of single storey pitched roof outbuilding as a living room, WC & bedroom extension to main house.	Shares the same surface water sub-catchment with the proposed Scheme but lacks direct connection to local watercourses to act in a cumulative or in-combination manner. Both air (dust) and disturbance Zol buffers overlap with the proposed Scheme but not in locations which contain SCI bird species foraging areas, and therefore lacks the capacity to act in a cumulative or in-combination manner.
ABP - 319753	Adjacent to 18 Kilkieran Court, Cabra West, Dublin 7, D07 C9T3	Under Review	Case is due to be decided by 19/09/2024	Construction of a dwelling and all associated site works.	Shares the same surface water sub-catchment with the proposed Scheme but lacks direct connection to local watercourses to act in a cumulative or in-combination manner. Both air (dust) and disturbance Zol buffers overlap with the proposed Scheme but not in locations which contain SCI bird species foraging areas, and therefore lacks the capacity to act in a cumulative or in-combination manner.
ABP - 319923	Lands at 'St. Joseph's House' and adjoining properties at Brewery Road and Leopardstown	Under Review	Case is due to be decided by 03/10/2024	Demolition of properties and associated outbuildings, change of use of St. Joseph's House, construction of 463 apartments, childcare facility and associated site works.	No direct or indirect overlapping Zol buffers with the proposed Scheme, therefore this project lacks the capacity to act in cumulative or in-combination manner.

Planning Reference	Address	Application Status	Decision date	Summary of development	Assessment of ZoI Overlap
	Road, Dublin 18				

5.4 Summary

The developments permitted and those that are pending have the potential to have overlapping Construction Phase with the proposed Scheme and therefore, in the absence of mitigation measures, may result in potential in-combination effects on Natura 2000 sites.

The City and County Development Plans; Greater Dublin Drainage Strategy, Transport Strategy for Greater Dublin Area and River Basin Management Plan and permitted projects and pending planning applications within the locality of the proposed project are considered in combination with the currently proposed project in the Appropriate Assessment section below.

SECTION 6: APPROPRIATE ASSESSMENT

6.1 Introduction

This section of the NIS assesses the direct and indirect impacts of the proposed Scheme on the Natura 2000 sites which fall within its Zone of Influence, namely:

- North Dublin Bay SAC;
- South Dublin Bay SAC;
- Rockabill to Dalkey Island SAC;
- North Bull Island SPA;
- South Dublin Bay and River Tolka Estuary SPA; and
- North-west Irish Sea SPA.

The screening report identified surface water; groundwater-to-surface water; air (disturbance); and air (dust)-to-surface water pathways as the potential pathways that may result in likely significant effects the Natura 2000 sites within the Zol.

Section 6.2 assesses the screened-in Natura 2000 sites and their respective pathways, while Section 6.3 will examine in detail where potentially likely significant adverse impacts may arise from the sources of impact identified (i.e., surface water, groundwater to surface water; air (disturbance); air (dust); and/or air to surface water pathways). Where potentially adverse impacts are identified, avoidance and mitigation measures are proposed. These are discussed in SECTION 7: Mitigation.

6.2 Potential Sources of Impact via existing Pathways

The AA Screening produced by JBA (2024) determined that pathways of impact existed between the proposed Scheme and the relevant Natura 2000 sites, and likely significant effects were predicted in the absence of mitigation measures. This section further examines the source > pathway > receptor chains that could potentially result in likely significant adverse effects arising within the following Natura 2000 sites listed above in sub-section 6.1.

6.2.1 Surface Water Impact Pathway

During the Construction and Operational Phase of the proposed Scheme, surface water run-off has the potential to enter the local watercourses, e.g., the River Tolka, where potential contaminants and sediment-loading may degrade the quality of the water, which will ultimately flow into the Dublin Bay, and subsequently the North Dublin Bay SAC; North Bull Island SPA; South Dublin SAC; South Dublin Bay and River Tolka Estuary SPA; Rockabill to Dalkey Island SAC; and North-west Irish Sea SPA Natura 2000 sites.

6.2.2 Groundwater to Surface Water Impact Pathway

Regarding the groundwater-to-surface water impact pathway, given the characteristics of the underlying aquifer, pollutants spilled on site and entering the groundwater will likely rapidly discharge to the nearby watercourses, i.e., the River Tolka and Bachelors Stream (GSI, 2024). Additionally, earthworks within Tolka Valley Park may lead to the increased low-level contamination leachate from the historic landfill, which may enter the ground-to-surface water pathway. Therefore, there is a potential groundwater-to-surface water pathway which can link with the downstream Natura 2000 sites (North Dublin Bay SAC; North Bull Island SPA; South Dublin SAC; South Dublin Bay and River Tolka Estuary SPA; Rockabill to Dalkey Island SAC; and Northwest Irish Sea SPA).

6.2.3 Air Impact Pathway (Disturbance)

Given the regular presence of flocks of local SCI bird species from the SPA sites (Light-bellied Brent Goose, Black-headed Gull, Cormorant, Herring Gull, Common Gull, Lesser Black-backed Gull and Curlew), as well as non-SCI Annex bird species (Lapwing and Barnacle Goose), within the proposed Scheme's 400m

disturbance buffer (Cutts et al., 2013) during the 2021-2022, 2022-2023 and 2023-2024 winter periods, significant likely effects are predicted (in the absence of mitigation) for these protected bird species during the proposed Scheme's Construction Phase via the visual and auditory disturbance pathways.

6.2.4 Air Impact Pathway (Dust)

During the Construction Phase of the proposed Scheme, cement-based dust has the potential to settle in the foraging grounds (supporting ex-situ habitats) of the SCI bird species associated with the local SPAs, as well as other Annex bird species, leading to the degradation of the flora and fauna consumed by these protected species when they are periodically present. Furthermore, cement-based dust has the potential to settle within the local watercourses within the Zol, transporting these contaminants downstream to the North Dublin Bay SAC; North Bull Island SPA; South Dublin SAC; South Dublin Bay and River Tolka Estuary SPA; Rockabill to Dalkey Island SAC; and North-west Irish Sea SPA Natura 2000 sites.

6.3 Potential Impacts

Habitats and species, and their attributes, likely to be negatively impacted resulting likely significant adverse effects, are listed in Table 6-1 (North Dublin Bay SAC); Table 6-2 (South Dublin Bay SAC); Table 6-3 (Rockabill to Dalkey Island SAC); Table 6-4 (North Bull Island SPA); Table 6-5 (South Dublin Bay and River Tolka Estuary SPA); and Table 6-6 (North-west Irish Sea SPA) for each Natura 2000 site.

6.3.1 Construction Phase - Direct and Indirect Impacts

The proposed Scheme's construction activities may lead to the introduction of pollutants, such as hydrocarbons, to the local surface water and groundwater networks. The natural (River Tolka) and artificial (Royal Canal) watercourses have the potential to transport these pollutants downstream to North Dublin Bay SAC; South Dublin Bay SAC; Rockabill to Dalkey Island SAC; North Bull Island SPA; South Dublin Bay and River Tolka Estuary SPA; and North-west Irish Sea SPA. Potential direct impacts include the degradation of the vegetation of Annex I habitats via hydrocarbon pollution. Additionally, hydrocarbon pollutants can degrade the plumage and fur of SCI bird and QI mammal species, respectively. Furthermore, these hydrocarbons can be potential ingested by SCI bird species as they preen their affected feathers. Additionally, temporary, or permanent reductions in area and/or overall health may be experienced by Annex habitats within the Zol as a result of deleterious substances entering the habitat via surface water and groundwater-to-surface water pathways.

The construction works also have the potential to visually and audibly disturb SCI bird species, such as Light-bellied Brent Goose, Black-headed Gull; Curlew; Herring Gull; Lesser Black-backed Gull; Common Gull; and Cormorant, which may be engaging in foraging, commuting and roosting (daytime/short-term) activities in ex-situ habitats within or adjacent to the proposed Scheme site.

The unintended disruption and spread of invasive species, such as Himalayan Balsam, Japanese Knotweed and Giant Hogweed, from the proposed Scheme site into the North Dublin Bay SAC and South Dublin Bay SAC may lead to a series of adverse effects on the Annex habitats within these two Natura 2000 sites. Their potential establishment within the saltmarsh or dune habitats would result in the displacement of native species via shading impacts and higher rates of colonisation in areas of open and/or disturbed ground.

Surface water, groundwater-to-surface water and air (dust)-to-surface water pollution impacts to the Natura 2000 sites (and the supporting habitats in close proximity) could indirectly impact the food chain for QI mammals and SCI birds e.g., floral, estuarine/marine invertebrate and fish species, which the QI and SCI species of Rockabill to Dalkey Island SAC; North Bull Island SPA; South Dublin Bay and River Tolka Estuary SPA; and North-west Irish Sea SPA depend upon. Additionally, the consumption of food items containing polluting elements may impact the health of QI mammal and SCI bird populations.

6.3.1.1 North Dublin Bay SAC

The potential impacts from the construction activities of the proposed Scheme on the QIs of the North Dublin Bay SAC are outlined in Table 6-1. (Note: N/A within the potential impacts column signifies that the QI or SCI attribute cannot be impacted via Construction Phase impacts generated by the proposed Scheme, as the potential pollution, disturbance and INNS-spread impacts are physically incapable of negatively modifying the attribute given its nature).

Table 6-1: Potential direct and indirect impacts on the attributes of the designated QIs of the North Dublin Bay SAC

Qualifying Interest	Attribute	Measure	Potential Impacts
Mudflats and sandflats not covered by seawater at low tide [1140]	Habitat area	Hectares	N/A (Construction impacts incapable of affecting attribute)
	Community extent	Hectares	A temporary or permanent reduction in <i>Zostera</i> -dominated community extent as a result of deleterious substances entering the habitat via surface water and groundwater-to-surface water pathways.
	Community structure: <i>Zostera</i> density	Shoots per m ²	A temporary or permanent reduction in <i>Zostera</i> density as a result of deleterious substances entering the habitat via surface water and groundwater-to-surface water pathways.
	Community distribution	Hectares	A temporary or permanent reduction in the distribution of Muddy sand to fine sand dominated by <i>Hydrobia ulvae</i> , <i>Pygospio elegans</i> and <i>Tubificoides benedii</i> community complexes; Estuarine muddy sand dominated by <i>Hediste diversicolor</i> and <i>Heterochaeta costata</i> community complexes; and Fine sand dominated by <i>Nephtys cirrosa</i> community complexes, as a result of deleterious substances entering the habitat via surface water and groundwater-to-surface water pathways.
Annual vegetation of drift lines [1210]	Habitat area	Hectares	A temporary or permanent reduction in the habitat area as a result of deleterious substances entering the habitat via surface water and groundwater-to-surface water pathways.
	Habitat distribution	Occurrence	A temporary or permanent decline in habitat distribution as a result of deleterious substances entering the habitat via surface water and groundwater-to-surface water pathways.
	Physical structure: sediment supply	Presence/absence of physical barriers	N/A (Construction impacts incapable of affecting attribute)
	Vegetation structure: zonation	Occurrence	N/A (Construction impacts incapable of affecting attribute)
	Vegetation composition: typical species and subcommunities	Percentage cover at a representative number of monitoring stops	A temporary or permanent reduction of species-poor communities with typical species: Sea Rocket <i>Cakile maritima</i> , Sea Sandwort <i>Honckenya peploides</i> , Prickly Saltwort <i>Salsola kali</i> and oraches <i>Atriplex</i> spp., as a result of deleterious substances entering the habitat via surface water and groundwater-to-surface water pathways.

Qualifying Interest	Attribute	Measure	Potential Impacts
	Vegetation composition: negative indicator species	Percentage cover	A temporary or permanent reduction of positive indicator species as a result of deleterious substances entering the habitat via surface water and groundwater-to-surface water pathways may lead to the establishment and higher percentage cover of negative indicator species (above attribute target threshold) within the habitat.
Salicornia and other annuals colonising mud and sand [1310]	Habitat distribution	Occurrence	A temporary or permanent reduction in distribution as a result of deleterious substances entering the habitat via surface water and groundwater-to-surface water pathways.
	Physical structure: sediment supply	Presence/absence of physical barriers	N/A (Construction impacts incapable of affecting attribute)
	Physical structure: creeks and pans	Occurrence	N/A (Construction impacts incapable of affecting attribute)
	Physical structure: flooding regime	Hectares flooded; frequency	N/A (Construction impacts incapable of affecting attribute)
	Vegetation structure: zonation	Occurrence	N/A (Construction impacts incapable of affecting attribute)
	Vegetation structure: vegetation height	Centimetres	A temporary or permanent impact on the structural variation of sward as a result of deleterious substances entering the habitat via surface water and groundwater-to-surface water pathways.
	Vegetation structure: vegetation cover	Percentage cover at a representative sample of monitoring stops	A temporary or permanent impact on vegetation cover as a result of deleterious substances entering the habitat via surface water and groundwater-to-surface water pathways.
	Vegetation composition: typical species and subcommunities	Percentage cover	A temporary or permanent impact on the listed species-poor communities as a result of deleterious substances entering the habitat via surface water and groundwater-to-surface water pathways. Additionally, the spread of invasive species (e.g., Japanese Knotweed and Himalayan Balsam) into the floral community, as a result of the proposed Scheme, may temporarily or permanently impact the floral species composition within this Annex habitat.
	Vegetation structure: negative indicator species - <i>Spartina anglica</i>	Hectares	A temporary or permanent increase in <i>Spartina anglica</i> cover (above attribute target threshold) as result of a reduction in native vegetation caused by deleterious substances entering the habitat via surface water and groundwater-to-surface water pathways.
Atlantic salt meadows (Glauco-Puccinellietalia)	Habitat area	Hectares	A temporary or permanent reduction in habitat area as a result of deleterious substances entering the habitat via surface water and groundwater-to-surface water pathways.

Qualifying Interest	Attribute	Measure	Potential Impacts
maritimae) [1330]	Habitat distribution	Occurrence	A temporary or permanent reduction in distribution as a result of deleterious substances entering the habitat via surface water and groundwater-to-surface water pathways.
	Physical structure: sediment supply	Presence/absence of physical barriers	N/A (Construction impacts incapable of affecting attribute)
	Physical structure: creeks and pans	Occurrence	N/A (Construction impacts incapable of affecting attribute)
	Physical structure: flooding regime	Hectares flooded; frequency	N/A (Construction impacts incapable of affecting attribute)
	Vegetation structure: zonation	Occurrence	N/A (Construction impacts incapable of affecting attribute)
	Vegetation structure: vegetation height	Centimetres	A temporary or permanent impact on the structural variation of sward as a result of deleterious substances entering the habitat via surface water and groundwater-to-surface water pathways.
	Vegetation structure: vegetation cover	Percentage cover at a representative sample of monitoring stops	A temporary or permanent impact on vegetation cover as a result of deleterious substances entering the habitat via surface water and groundwater-to-surface water pathways.
	Vegetation composition: typical species and subcommunities	Percentage cover	A temporary or permanent impact on the listed species communities as a result of deleterious substances entering the habitat via surface water and groundwater-to-surface water pathways. Additionally, the spread of invasive species (e.g., Japanese Knotweed and Himalayan Balsam) into the floral community, as a result of the Scheme, may temporarily or permanently impact the floral species composition within this Annex habitat.
	Vegetation structure: negative indicator species - <i>Spartina anglica</i>	Hectares	A temporary or permanent increase in <i>Spartina anglica</i> cover (above attribute target threshold) as result of a reduction in native vegetation caused by deleterious substances entering the habitat via surface water and groundwater-to-surface water pathways.
Mediterranean salt meadows (Juncetalia maritimi) [1410]	Habitat area	Hectares	A temporary or permanent reduction in habitat area as a result of deleterious substances entering the habitat via surface water and groundwater-to-surface water pathways.
	Habitat distribution	Occurrence	A temporary or permanent reduction in distribution as a result of deleterious substances entering the habitat via surface water and groundwater-to-surface water pathways.
	Physical structure: sediment supply	Presence/absence of physical barriers	N/A (Construction impacts incapable of affecting attribute)

Qualifying Interest	Attribute	Measure	Potential Impacts
	Physical structure: creeks and pans	Occurrence	N/A (Construction impacts incapable of affecting attribute)
	Physical structure: flooding regime	Hectares flooded; frequency	N/A (Construction impacts incapable of affecting attribute)
	Vegetation structure: zonation	Occurrence	N/A (Construction impacts incapable of affecting attribute)
	Vegetation structure: vegetation height	Centimetres	A temporary or permanent impact on the structural variation of sward as a result of deleterious substances entering the habitat via surface water and groundwater-to-surface water pathways.
	Vegetation structure: vegetation cover	Percentage cover at a representative sample of monitoring stops	A temporary or permanent impact on vegetation cover as a result of deleterious substances entering the habitat via surface water and groundwater-to-surface water pathways.
	Vegetation composition: typical species and subcommunities	Percentage cover	A temporary or permanent impact on the listed species communities as a result of deleterious substances entering the habitat via surface water and groundwater-to-surface water pathways. Additionally, the spread of invasive species (e.g., Japanese Knotweed and Himalayan Balsam) into the floral community, as a result of the Scheme, may temporarily or permanently impact the floral species composition within this Annex habitat.
	Vegetation structure: negative indicator species - <i>Spartina anglica</i>	Hectares	A temporary or permanent increase in <i>Spartina anglica</i> cover (above attribute target threshold) as result of a reduction in native vegetation caused by deleterious substances entering the habitat via surface water and groundwater-to-surface water pathways.
Embryonic shifting dunes [2110]	Habitat area	Hectares	A temporary or permanent reduction in habitat area as a result of deleterious substances entering the habitat via surface water and groundwater-to-surface water pathways.
	Habitat distribution	Occurrence	A temporary or permanent reduction in distribution as a result of deleterious substances entering the habitat via surface water and groundwater-to-surface water pathways.
	Physical structure: sediment supply	Presence/absence of physical barriers	N/A (Construction impacts incapable of affecting attribute)
	Vegetation structure: zonation	Occurrence	N/A (Construction impacts incapable of affecting attribute)
	Vegetation composition: plant health of foredune grasses	Percentage cover	A reduction to less than 95% (attribute target threshold) of Sand Couch <i>Elytrigia juncea</i> and/or Lyme-grass <i>Leymus arenarius</i> achieving a healthy status as result of deleterious substances entering the habitat via surface water and groundwater-to-surface water pathways.

Qualifying Interest	Attribute	Measure	Potential Impacts
	Vegetation composition: typical species and subcommunities	Percentage cover at a representative number of monitoring stops	A temporary or permanent reduction of species-poor communities with typical species: Sand Couch <i>Elytrigia juncea</i> and/or Lyme-grass <i>Leymus arenarius</i> , as a result of deleterious substances entering the habitat via surface water and groundwater-to-surface water pathways. Additionally, the spread of invasive species (e.g., Giant Hogweed) into the floral community, as a result of the proposed Scheme, may temporarily or permanently impact the floral species composition within this Annex habitat.
	Vegetation composition: negative indicator species	Percentage cover	A temporary or permanent reduction of positive indicator species as a result of deleterious substances entering the habitat via surface water and groundwater-to-surface water pathways may lead to the establishment and higher percentage cover (above attribute target threshold) of negative indicator species within the habitat. Additionally, the spread of invasive species (e.g., Giant Hogweed) into the floral community, as a result of the proposed Scheme, may temporarily or permanently increase the percentage cover of negative indicator species within this Annex I habitat.
Shifting dunes along the shoreline with <i>Ammophila arenaria</i> (white dunes) [2120]	Habitat area	Hectares	N/A (Construction impacts incapable of affecting attribute)
	Habitat distribution	Occurrence	N/A (Construction impacts incapable of affecting attribute)
	Physical structure: sediment supply	Presence/absence of physical barriers	N/A (Construction impacts incapable of affecting attribute)
	Vegetation structure: zonation	Occurrence	N/A (Construction impacts incapable of affecting attribute)
	Vegetation composition: plant health of dune grasses	Percentage cover	N/A (Construction impacts incapable of affecting attribute)
	Vegetation composition: typical species and subcommunities	Percentage cover at a representative number of monitoring stops	Construction activities may lead to the dispersal of invasive species (e.g., Giant Hogweed) which have the potential to become established within the Annex habitat; and in turn disrupt / change the composition of the species-poor communities dominated by Marram grass <i>Ammophila arenaria</i> and/or Lyme-grass <i>Leymus arenarius</i> .
	Vegetation composition: negative indicator species	Percentage cover	Construction activities may lead to the dispersal of invasive species (e.g., Giant Hogweed) which have the potential to become established within the Annex habitat; and in turn increase negative indicator species cover to over 5% (attribute target threshold).
Fixed coastal dunes with	Habitat area	Hectares	N/A (Construction impacts incapable of affecting attribute)

Qualifying Interest	Attribute	Measure	Potential Impacts
herbaceous vegetation (grey dunes) [2130]	Habitat distribution	Occurrence	N/A (Construction impacts incapable of affecting attribute)
	Physical structure: sediment supply	Presence/absence of physical barriers	N/A (Construction impacts incapable of affecting attribute)
	Vegetation structure: zonation	Occurrence	N/A (Construction impacts incapable of affecting attribute)
	Vegetation structure: bare ground	Percentage cover	N/A (Construction impacts incapable of affecting attribute)
	Vegetation structure: sward height	Centimetres	N/A (Construction impacts incapable of affecting attribute)
	Vegetation composition: typical species and subcommunities	Percentage cover at a representative number of monitoring stops	Construction activities may lead to the dispersal of invasive species (e.g., Giant Hogweed) which have the potential to become established within the Annex habitat; and in turn disrupt / change the composition of the subcommunities with typical species as listed in Delaney et al. (2013).
	Vegetation composition: negative indicator species (including <i>Hippophae rhamnoides</i>)	Percentage cover	Construction activities may lead to the dispersal of invasive species (e.g., Giant Hogweed) which have the potential to become established within the Annex habitat; and in turn increase negative indicator species cover to over 5% (attribute target threshold).
	Vegetation composition: scrub/trees	Percentage cover	Construction activities may lead to the dispersal of invasive species (e.g., Giant Hogweed) which have the potential to become established within the Annex habitat; and in turn increase scrub/shrub species cover to over 5% (attribute target threshold).
Humid dune slacks [2190]	Habitat area	Hectares	N/A (Construction impacts incapable of affecting attribute)
	Habitat distribution	Occurrence	N/A (Construction impacts incapable of affecting attribute)
	Physical structure: sediment supply	Presence/absence of physical barriers	N/A (Construction impacts incapable of affecting attribute)
	Physical structure: hydrological and flooding regime	Water table levels; groundwater fluctuations (metres)	N/A (Construction impacts incapable of affecting attribute)
	Vegetation structure: zonation	Occurrence	N/A (Construction impacts incapable of affecting attribute)
	Vegetation structure: bare ground	Percentage cover	N/A (Construction impacts incapable of affecting attribute)

Qualifying Interest	Attribute	Measure	Potential Impacts
	Vegetation structure: vegetation height	Centimetres	N/A (Construction impacts incapable of affecting attribute)
	Vegetation composition: typical species and subcommunities	Percentage cover at a representative number of monitoring stops	Construction activities may lead to the dispersal of invasive species (e.g., Giant Hogweed) which have the potential to become established within the Annex habitat; and in turn disrupt / change the composition of the subcommunities with typical species as listed in Delaney et al. (2013).
	Vegetation composition: cover of <i>Salix repens</i>	Percentage cover; centimetres	N/A (Construction impacts incapable of affecting attribute)
	Vegetation composition: negative indicator species	Percentage cover	Construction activities may lead to the dispersal of invasive species (e.g., Giant Hogweed) which have the potential to become established within the Annex habitat; and in turn increase negative indicator species cover to over 5% (attribute target threshold).
	Vegetation composition: scrub/trees	Percentage cover	Construction activities may lead to the dispersal of invasive species (e.g., Giant Hogweed) which have the potential to become established within the Annex habitat; and in turn increase scrub/shrub species cover to over 5% (attribute target threshold).
Petalwort [1395]	Distribution of populations	Number and geographical spread of populations	Construction activities may lead to the dispersal of invasive species (e.g., Giant Hogweed) which have the potential to become established within the Annex habitat; and in turn significantly shade the areas containing Petalwort and ultimately affecting population spread.
	Population size	Number of individuals	Construction activities may lead to the dispersal of invasive species (e.g., Giant Hogweed) which have the potential to become established within the Annex habitat; and in turn significantly shade the areas containing Petalwort, resulting in population decline.
	Area of suitable habitat	Hectares	N/A (Construction impacts incapable of affecting attribute)
	Hydrological conditions: soil moisture	Occurrence	N/A (Construction impacts incapable of affecting attribute)
	Vegetation structure: height and cover	Centimetres and percentage	Construction activities may lead to the dispersal of invasive species (e.g., Giant Hogweed) which have the potential to become established within the Annex habitat; and in turn significantly change height and cover of vegetation within the vicinity of the Petalwort population.

6.3.1.2 South Dublin Bay SAC

The potential impacts from the construction activities of the proposed Scheme on the QIs of the South Dublin Bay SAC are outlined in Table 6-2. (Note: N/A within the potential impacts column signifies that the QI or SCI attribute cannot be impacted via Construction Phase impacts generated by the proposed Scheme, as the potential pollution, disturbance and INNS-spread impacts are physically incapable of negatively modifying the attribute given its nature).

Table 6-2: Potential direct and indirect impacts on the attributes of the designated QIs of the South Dublin Bay SAC

Qualifying Interest	Attribute	Measure	Potential Impacts
Mudflats and sandflats not covered by seawater at low tide [1140]	Habitat area	Hectares	N/A (Construction impacts incapable of affecting attribute)
	Community extent	Hectares	A temporary or permanent reduction in <i>Zostera</i> -dominated community extent as a result of deleterious substances entering the habitat via surface water and groundwater-to-surface water pathways.
	Community structure: <i>Zostera</i> density	Shoots per m ²	A temporary or permanent reduction in <i>Zostera</i> density as a result of deleterious substances entering the habitat via surface water and groundwater-to-surface water pathways.
	Community distribution	Hectares	A temporary or permanent reduction in the distribution of Muddy sand to fine sand dominated by Fine sands with <i>Angulus tenuis</i> community complex, as a result of deleterious substances entering the habitat via surface water and groundwater-to-surface water pathways.
Annual vegetation of drift lines [1210]	Habitat area	Hectares	A temporary or permanent reduction in the habitat area as a result of deleterious substances entering the habitat via surface water and groundwater-to-surface water pathways.
	Habitat distribution	Occurrence	A temporary or permanent decline in habitat distribution as a result of deleterious substances entering the habitat via surface water and groundwater-to-surface water pathways.
	Physical structure: sediment supply	Presence/absence of physical barriers	N/A (Construction impacts incapable of affecting attribute)
	Vegetation structure: zonation	Occurrence	N/A (Construction impacts incapable of affecting attribute)
	Vegetation composition: typical species and subcommunities	Percentage cover at a representative number of monitoring stops	A temporary or permanent reduction of species-poor communities with typical species: Sea Rocket <i>Cakile maritima</i> , Sea Sandwort <i>Honckenya peploides</i> , Prickly Saltwort <i>Salsola kali</i> and oraches <i>Atriplex</i> spp., as a result of deleterious substances entering the habitat via surface water and groundwater-to-surface water pathways.
Vegetation composition: negative indicator species	Percentage cover	A temporary or permanent reduction of positive indicator species as a result of deleterious substances entering the habitat via surface water and groundwater-to-surface water pathways may lead to the establishment and higher percentage cover of negative indicator species (above attribute target threshold) within the habitat.	
Salicornia and other annuals colonising mud and sand [1310]	Habitat distribution	Occurrence	A temporary or permanent reduction in distribution as a result of deleterious substances entering the habitat via surface water and groundwater-to-surface water pathways.
	Physical structure: sediment supply	Presence/absence of physical barriers	N/A (Construction impacts incapable of affecting attribute)

Qualifying Interest	Attribute	Measure	Potential Impacts
	Physical structure: creeks and pans	Occurrence	N/A (Construction impacts incapable of affecting attribute)
	Physical structure: flooding regime	Hectares flooded; frequency	N/A (Construction impacts incapable of affecting attribute)
	Vegetation structure: zonation	Occurrence	N/A (Construction impacts incapable of affecting attribute)
	Vegetation structure: vegetation height	Centimetres	A temporary or permanent impact on the structural variation of sward as a result of deleterious substances entering the habitat via surface water and groundwater-to-surface water pathways.
	Vegetation structure: vegetation cover	Percentage cover at a representative sample of monitoring stops	A temporary or permanent impact on vegetation cover as a result of deleterious substances entering the habitat via surface water and groundwater-to-surface water pathways.
	Vegetation composition: typical species and subcommunities	Percentage cover	A temporary or permanent impact on the listed species-poor communities as a result of deleterious substances entering the habitat via surface water and groundwater-to-surface water pathways. Additionally, the spread of invasive species (e.g., Japanese Knotweed and Himalayan Balsam) into the floral community, as a result of the Scheme, may temporarily or permanently impact the floral species composition within this Annex habitat.
	Vegetation structure: negative indicator species - <i>Spartina anglica</i>	Hectares	A temporary or permanent increase in <i>Spartina anglica</i> cover (above attribute target threshold) as result of a reduction in native vegetation caused by deleterious substances entering the habitat via surface water and groundwater-to-surface water pathways.
Embryonic shifting dunes [2110]	Habitat area	Hectares	A temporary or permanent reduction in habitat area as a result of deleterious substances entering the habitat via surface water and groundwater-to-surface water pathways.
	Habitat distribution	Occurrence	A temporary or permanent reduction in distribution as a result of deleterious substances entering the habitat via surface water and groundwater-to-surface water pathways.
	Physical structure: sediment supply	Presence/absence of physical barriers	N/A (Construction impacts incapable of affecting attribute)
	Vegetation structure: zonation	Occurrence	N/A (Construction impacts incapable of affecting attribute)
	Vegetation composition: plant health of foredune grasses	Percentage cover	A reduction to less than 95% (attribute target threshold) of Sand Couch <i>Elytrigia juncea</i> and/or Lyme-grass <i>Leymus arenarius</i> achieving a healthy status as result of deleterious substances entering the habitat via surface water and groundwater-to-surface water pathways.
	Vegetation composition: typical species	Percentage cover at a representative	A temporary or permanent reduction of species-poor communities with typical species: Sand Couch <i>Elytrigia juncea</i> and/or Lyme-grass <i>Leymus arenarius</i> ,

Qualifying Interest	Attribute	Measure	Potential Impacts
	and subcommunities	number of monitoring stops	as a result of deleterious substances entering the habitat via surface water and groundwater-to-surface water pathways. Additionally, the spread of invasive species (e.g., Giant Hogweed) into the floral community, as a result of the Scheme, may temporarily or permanently impact the floral species composition within this Annex habitat.
	Vegetation composition: negative indicator species	Percentage cover	A temporary or permanent reduction of positive indicator species as a result of deleterious substances entering the habitat via surface water and groundwater-to-surface water pathways may lead to the establishment and higher percentage cover (above attribute target threshold) of negative indicator species within the habitat. Additionally, the spread of invasive species (e.g., Giant Hogweed) into the floral community, as a result of the Scheme, may temporarily or permanently increase the percentage cover (above attribute target threshold) of negative indicator species within this Annex I habitat.

6.3.1.3 Rockabill to Dalkey Island SAC

The potential impacts from the construction activities of the proposed Scheme on the QIs of the Rockabill to Dalkey Island SAC are outlined in Table 6-3. (Note: N/A within the potential impacts column signifies that the QI or SCI attribute cannot be impacted via Construction Phase impacts generated by the proposed Scheme, as the potential pollution, disturbance and INNS-spread impacts are physically incapable of negatively modifying the attribute given its nature).

Table 6-3: Potential direct and indirect impacts on the attributes of the designated QIs of the Rockabill to Dalkey Island SAC

Qualifying Interest	Attribute	Measure	Potential Impacts
Reefs [1170]	Habitat area	Hectares	N/A (Construction impacts incapable of affecting attribute)
	Habitat distribution	Occurrence	N/A (Construction impacts incapable of affecting attribute)
	Community structure	Biological composition	A temporary or permanent reduction of the following community types: Intertidal reef community complex; and Subtidal reef community complex, as a result of deleterious substances entering the habitat via surface water and groundwater-to-surface water pathways.
Harbour Porpoise [1351]	Access to suitable habitat	Number of artificial barriers	N/A (Construction impacts incapable of affecting attribute)
	Disturbance	Level of impact	While the proposed Scheme's construction and operational emissions will not result in direct disturbance to the Harbour Porpoise population, the loss of foraging resources as result of pollution events or the consumption of food items containing polluting elements may impact the health of the

Qualifying Interest	Attribute	Measure	Potential Impacts
			Harbour Porpoise population that inhabits Dublin Bay, including the River Tolka Estuary.

6.3.1.4 North Bull Island SPA

The potential impacts from the construction activities of the proposed Scheme on the SCIs of the North Bull Island SPA are outlined in Table 6-4. (Note: N/A within the potential impacts column signifies that the QI or SCI attribute cannot be impacted via Construction Phase impacts generated by the proposed Scheme, as the potential pollution, disturbance and INNS-spread impacts are physically incapable of negatively modifying the attribute given its nature).

Table 6-4: Potential direct and indirect impacts on the attributes of the designated SCIs of the North Bull Island SPA

Special Conservation Interest	Attribute	Measure	Potential Impacts
Light-bellied Brent Goose [A046] Shelduck [A048] Pintail [A054] Oystercatcher [A130] Golden Plover [A140] Grey Plover [A141] Knot [A143] Sanderling [A144] Dunlin [A149] Black-tailed Godwit [A156] Bar-tailed Godwit [A157] Curlew [A160] Redshank [A162] Turnstone [A169] Black-headed Gull [A179]	Population trend	Percentage change	<p>The temporary and permanent habitat loss associated within the Construction Phase, as well as the potential deterioration of retained habitats through surface water, groundwater or air-based pollutants have the potential to reduce and/or degrade the foraging grounds of SCI bird species. The degradation of floral species in these habitats has the potential to negatively impact insectivorous bird species of conservation concern (i.e. Black-headed Gull and Curlew), who are reliant on healthy host flora supporting a range of invertebrate species, which feed on or frequent these flora for foraging purposes. Additionally, Light-bellied Brent Goose will also be negatively impacted by the reduction in quantity and quality of their preferred grazing flora species.</p> <p>In the event that hydrocarbon pollutants are accidentally introduced into the local surface water and groundwater (surface water recharge) networks, SCI bird species may come in contact with the substance whilst navigating, drinking from, foraging in or washing within a waterbody or wetland, resulting in degraded feathers, which will notably impact their feathers' insulative qualities, resulting in physiological stress for any affected individuals. Furthermore, these hydrocarbons can potentially be ingested by SCI bird species as they preen their affected feathers, leading to further physiological stress.</p> <p>SCI species are at risk of potentially being adversely impacted through the direct ingestion of contaminated water during the Construction phase of the proposed Scheme. If a SCI bird were to drink from a waterbody which had been accidentally contaminated with polluting substance, (in particular a pollutant which floats on top of the water's surface e.g. hydrocarbons), the bird will consume water from the upper (polluted) layers of the water column. The consumption of such water can potentially result in reduced egg production and hatching; increased</p>

Special Conservation Interest	Attribute	Measure	Potential Impacts
			<p>clutch or brood abandonment; reduced growth and increased organ weights (Albers, 2006).</p> <p>Moreover, surface water, groundwater, and air (dust)-based pollution impacts could indirectly impact wintering bird species via the deterioration of food / prey items. This impact also has a knock-on effect as the consumption of prey items containing polluting elements may lead to bioaccumulation of toxic substances within the insectivorous and omnivorous wintering bird populations, such as Black-headed Gull and Curlew (Costa et al., 2013; Idan and Jazza, 2022; and Ding et al., 2023).</p> <p>Additionally, wintering bird species that utilise the amenity grasslands within and adjacent to the site (i.e., Tolka Valley Park, Farnham, Mellows Park and Erin’s Isle playing pitches) for foraging purposes may be visually and/or audibly disturbed by the construction works, causing wintering bird species such as Black-headed Gull; Curlew; and Light-bellied Brent Goose, to vacate these foraging / grazing habitats during active work periods. This impact is particularly problematic for long-distance migrant species, which are heavily reliant on inland foraging (i.e. the Dublin Bay wintering population of Light-bellied Brent Goose), as regular disturbance whilst foraging may adversely affect energy reserves of these wintering species, which will in turn, negatively impact nesting success, fecundity, and survival of individuals (Ankney and MacInnes 1978; Krapu 1981; Havera et al.1992; and Pease et al. 2005).</p> <p>All of the above impacts have the potential to negatively impact the health of SCI bird populations (Black-headed Gull; Curlew; and Light-bellied Brent Goose), with a potential future impact on each species fecundity.</p>
	Distribution	Range, timing and intensity of use of areas	<p>Impacts on water quality from accidental pollutant discharges may temporarily affect the population distribution of SCI bird species, with pollution events driving individuals away from the affected area.</p> <p>Additionally, the construction works also have the potential to visually and audibly disturb SCI bird species, which may be engaging in foraging, commuting and roosting (daytime / short-term) activities within supporting ex-situ areas located within or adjacent to the proposed Scheme site.</p> <p>Impacts on water quality from accidental pollutant discharges may cause a temporary collapse in food item availability in affected areas of the site, limiting the range of optimum foraging areas within the SPA, which will in turn reduce distribution of SCI bird species within the Natura 2000 site.</p>
Wetlands [A999]	Habitat area	Hectares	Impacts on surface water quality from accidental pollutant discharges may temporarily reduce the

Special Conservation Interest	Attribute	Measure	Potential Impacts
			total functional habitat area through degradation of flora and local ecological food chains.

6.3.1.5 South Dublin Bay and River Tolka Estuary SPA

The potential impacts from the construction activities of the proposed Scheme on the SCIs of the South Dublin Bay and River Tolka Estuary SPA are outlined in Table 6-5. (Note: N/A within the potential impacts column signifies that the QI or SCI attribute cannot be impacted via Construction Phase impacts generated by the proposed Scheme, as the potential pollution, disturbance and INNS-spread impacts are physically incapable of negatively modifying the attribute given its nature).

Table 6-5: Potential direct and indirect impacts on the attributes of the designated SCIs of the South Dublin Bay and River Tolka Estuary SPA

Special Conservation Interest	Attribute	Measure	Potential Impacts
Light-bellied Brent Goose [A046] Oystercatcher [A130] Grey Plover [A141] Knot [A143] Sanderling [A144] Dunlin [A149] Bar-tailed Godwit [A157] Redshank [A162] Black-headed Gull [A179]	Population trend	Percentage change	<p>The temporary and permanent habitat loss associated within the Construction Phase, as well as the potential deterioration of retained habitats through surface water, groundwater or air-based pollutants have the potential to reduce and/or degrade the foraging grounds of SCI bird species. The degradation of floral species in these habitats has the potential to negatively impact insectivorous bird species of conservation concern (i.e., Black-headed Gull), who are reliant on healthy host flora supporting a range of invertebrate species, which feed on or frequent these flora for foraging purposes. Additionally, Light-bellied Brent Goose will also be negatively impacted by the reduction in quantity and quality of their preferred grazing flora species.</p> <p>In the event that hydrocarbon pollutants are accidentally introduced into the local surface water and groundwater (surface water recharge) networks, SCI bird species may come in contact with the substance whilst navigating, drinking from, foraging in or washing within a waterbody or wetland, resulting in degraded feathers, which will notably impact their feathers' insulative qualities, resulting in physiological stress for any affected individuals. Furthermore, these hydrocarbons can potentially be ingested by SCI bird species as they preen their affected feathers, leading to further physiological stress.</p> <p>SCI species are at risk of potentially being adversely impacted through the direct ingestion of contaminated water during the Construction Phase of the proposed Scheme. If a SCI bird were to drink from a waterbody which had been accidentally contaminated with polluting substance, (in particular a pollutant which floats on top of the water's surface e.g., hydrocarbons), the bird will consume water from</p>

Special Conservation Interest	Attribute	Measure	Potential Impacts
			<p>the upper (polluted) layers of the water column. The consumption of such water can potentially result in reduced egg production and hatching; increased clutch or brood abandonment; reduced growth and increased organ weights (Albers, 2006).</p> <p>Moreover, surface water, groundwater, and air (dust)-based pollution impacts could indirectly impact SCI bird species via the deterioration of food / prey items. This impact also has a knock-on effect as the consumption of prey items containing polluting elements may lead to bioaccumulation of toxic substances within the omnivorous SCI bird populations, such as Black-headed Gull (Costa et al., 2013; Idan and Jazza, 2022; and Ding et al., 2023).</p> <p>Additionally, SCI bird species that utilise the amenity grasslands within and adjacent to the site (i.e., Tolka Valley Park, Farnham, Mellowes Park and Erin's Isle playing pitches) for foraging purposes may be visually and/or audibly disturbed by the construction works, causing wintering bird species such as Black-headed Gull and Light-bellied Brent Goose, to vacate these foraging / grazing habitats during active work periods. This impact is particularly problematic for long-distance migrant species, which are heavily reliant on inland foraging (i.e., the Dublin Bay wintering population of Light-bellied Brent Goose), as regular disturbance whilst foraging may adversely affect energy reserves of these wintering species, which will in turn, negatively impact nesting success, fecundity, and survival of individuals (Ankney and MacInnes 1978; Krapu 1981; Havera et al.1992; and Pease et al. 2005).</p> <p>All of the above impacts have the potential to negatively impact the health of SCI bird populations (Black-headed Gull and Light-bellied Brent Goose), with a potential future impact on each species fecundity.</p>
	Distribution	Range, timing and intensity of use of areas	<p>Impacts on water quality from accidental pollutant discharges may temporarily affect the population distribution of SCI bird species, with pollution events driving individuals away from the affected area.</p> <p>Additionally, the construction works also have the potential to visually and audibly disturb SCI bird species, which may be engaging in foraging, commuting and roosting (daytime / short-term) activities within supporting ex-situ areas located within or adjacent to the proposed Scheme site.</p>

Special Conservation Interest	Attribute	Measure	Potential Impacts
			Impacts on water quality from accidental pollutant discharges may cause a temporary collapse in food item availability in affected areas of the site, limiting the range of optimum foraging areas within the SPA, which will in turn reduce distribution of SCI bird species within the Natura 2000 site.
Roseate Tern [A192]	Passage population: individuals	Number	<p>In the event that hydrocarbon pollutants are accidentally introduced into the local surface water and groundwater (surface water recharge) networks, Roseate Tern may come in contact with the substance whilst navigating, drinking from, foraging in or washing within a waterbody or wetland, resulting in degraded feathers, which will notably impact their feathers' insulative qualities, resulting in physiological stress for any affected individuals. Furthermore, these hydrocarbons can potentially be ingested by Roseate Tern as they preen their affected feathers, leading to further physiological stress.</p> <p>Roseate Tern are at risk of potentially being adversely impacted through the direct ingestion of contaminated water during the Construction Phase of the proposed Scheme. If a Roseate Tern were to drink from a waterbody which had been accidentally contaminated with polluting substance, (in particular a pollutant which floats on top of the water's surface e.g., hydrocarbons), the bird will consume water from the upper (polluted) layers of the water column. The consumption of such water can potentially result in reduced egg production and hatching; increased clutch or brood abandonment; reduced growth and increased organ weights (Albers, 2006).</p> <p>All of the above impacts have the potential to negatively impact the health of Roseate Tern population, with a potential future impact on the species fecundity.</p>
	Distribution: roosting areas	Number; location; area (hectares)	N/A
	Prey biomass available	Kilogrammes	Moreover, surface water, groundwater, and air (dust)-based pollution impacts could indirectly impact Roseate Tern via the deterioration of food / prey items. This impact also has a knock-on effect as the consumption of prey items containing polluting elements may lead to bioaccumulation of toxic substances within the Roseate Tern population.
	Barriers to connectivity	Number; location; shape; area (hectares)	N/A (Construction impacts incapable of affecting attribute)

Special Conservation Interest	Attribute	Measure	Potential Impacts
	Disturbance at roosting site	Level of impact	N/A (Construction impacts incapable of affecting attribute)
Common Tern [A193]	Breeding population abundance: apparently occupied nests (AONs)	Number	N/A (Construction impacts incapable of affecting attribute)
	Productivity rate: fledged young per breeding pair	Mean number	<p>In the event that hydrocarbon pollutants are accidentally introduced into the local surface water and groundwater (surface water recharge) networks, Common Tern may come in contact with the substance whilst navigating, drinking from, foraging in or washing within a waterbody or wetland, resulting in degraded feathers, which will notably impact their feathers' insulative qualities, resulting in physiological stress for any affected individuals. Furthermore, these hydrocarbons can potentially be ingested by Common Tern as they preen their affected feathers, leading to further physiological stress.</p> <p>Common Tern are at risk of potentially being adversely impacted through the direct ingestion of contaminated water during the Construction Phase of the proposed Scheme. If a Common Tern were to drink from a waterbody which had been accidentally contaminated with polluting substance, (in particular a pollutant which floats on top of the water's surface e.g., hydrocarbons), the bird will consume water from the upper (polluted) layers of the water column. The consumption of such water can potentially result in reduced egg production and hatching; increased clutch or brood abandonment; reduced growth and increased organ weights (Albers, 2006).</p> <p>All of the above impacts have the potential to negatively impact the health of Common Tern population, with a potential future impact on the species fecundity and fledgling success.</p>
	Passage population: individuals	Number	<p>In the event that hydrocarbon pollutants are accidentally introduced into the local surface water and groundwater (surface water recharge) networks, Common Tern may come in contact with the substance whilst navigating, drinking from, foraging in or washing within a waterbody or wetland, resulting in degraded feathers, which will notably impact their feathers' insulative qualities, resulting in physiological stress for any affected individuals. Furthermore, these hydrocarbons can potentially be ingested by Common Tern as they preen their affected feathers, leading to further physiological stress.</p>

Special Conservation Interest	Attribute	Measure	Potential Impacts
			<p>Common Tern are at risk of potentially being adversely impacted through the direct ingestion of contaminated water during the Construction Phase of the proposed Scheme. If a Common Tern were to drink from a waterbody which had been accidentally contaminated with polluting substance, (in particular a pollutant which floats on top of the water's surface e.g., hydrocarbons), the bird will consume water from the upper (polluted) layers of the water column. The consumption of such water can potentially result in reduced egg production and hatching; increased clutch or brood abandonment; reduced growth and increased organ weights (Albers, 2006).</p> <p>All of the above impacts have the potential to negatively impact the health of the Common Tern passage population.</p>
	Distribution: breeding colonies	Number; location; area (Hectares)	N/A (Construction impacts incapable of affecting attribute)
	Distribution: roosting areas	Number; location; area (Hectares)	N/A (Construction impacts incapable of affecting attribute)
	Prey biomass available	Kilogrammes	The loss of foraging resources as result of pollution events or the consumption of food items containing polluting elements may impact the health of the passage Common Tern population, with a potential future impact on species fecundity.
	Barriers to connectivity	Number; location; shape; area (hectares)	N/A (Construction impacts incapable of affecting attribute)
	Disturbance at breeding site	Level of impact	N/A (Construction impacts incapable of affecting attribute)
	Disturbance at roosting site	Level of impact	N/A (Construction impacts incapable of affecting attribute)
Arctic Tern [A194]	Distribution: breeding colonies	Number; location; area (Hectares)	N/A (Construction impacts incapable of affecting attribute)
	Distribution: roosting areas	Number; location; area (Hectares)	N/A (Construction impacts incapable of affecting attribute)
	Prey biomass available	Kilogrammes	Moreover, surface water, groundwater, and air (dust)-based pollution impacts could indirectly impact Arctic Tern via the deterioration of food / prey items. This impact also has a knock-on effect as the consumption of prey items containing polluting elements may lead to bioaccumulation of toxic substances within the Arctic Tern population.
	Barriers to connectivity	Number; location; shape; area (hectares)	N/A (Construction impacts incapable of affecting attribute)

Special Conservation Interest	Attribute	Measure	Potential Impacts
	Disturbance at roosting site	Level of impact	N/A (Construction impacts incapable of affecting attribute)
Wetlands [A999]	Habitat area	Hectares	Impacts on surface water quality from accidental pollutant discharges may temporarily reduce to the total functional habitat area through degradation of flora and local ecological food chains.

6.3.1.6 Northwest Irish Sea SPA

The potential impacts from the construction activities of the proposed Scheme on the SCIs of the Northwest Irish Sea SPA are outlined in Table 6-6. (Note: N/A within the potential impacts column signifies that the QI or SCI attribute cannot be impacted via Construction Phase impacts generated by the proposed Scheme, as the potential pollution, disturbance and INNS-spread impacts are physically incapable of negatively modifying the attribute given its nature).

Table 6-6: Potential direct and indirect impacts on the attributes of the designated SCIs of the North-west Irish Sea SPA

Special Conservation Interest	Attribute	Measure	Potential Impacts
Red-throated Diver [A001] Great Northern Diver [A003] Manx Shearwater [A013] Common Scoter [A065] Little Gull [A177] Black-headed Gull [A179] Common Gull [A182] Great Black-backed Gull [A187] Guillemot [A199]	Non-breeding population size	Number	<p>The temporary and permanent habitat loss associated within the Construction Phase, as well as the potential deterioration of retained habitats through surface water, groundwater or air-based pollutants have the potential to reduce and/or degrade the foraging grounds of SCI bird species (e.g., Black-headed Gull and Common Gull).</p> <p>The degradation of floral species in these habitats has the potential to negatively impact insectivorous SCI bird species (i.e., Black-headed Gull and Common Gull), who are reliant on healthy host flora supporting a range of invertebrate species, which feed on or frequent these flora for foraging purposes.</p> <p>In the event that hydrocarbon pollutants are accidentally introduced into the local surface water and groundwater (surface water recharge) networks, SCI bird species may come in contact with the substance whilst navigating, drinking from, foraging in or washing within a waterbody or wetland, resulting in degraded feathers, which will notably impact their feathers' insulative qualities, resulting in physiological stress for any affected individuals. Furthermore, these hydrocarbons can potentially be ingested by SCI bird species as they preen their affected feathers, leading to further physiological stress. SCI bird species are at risk of potentially being adversely impacted through the direct ingestion of contaminated water during the Construction Phase of the proposed Scheme. If a SCI bird were to drink from a waterbody which had been</p>

Special Conservation Interest	Attribute	Measure	Potential Impacts
			<p>accidentally contaminated with polluting substance, (in particular a pollutant which floats on top of the water's surface e.g., hydrocarbons), the bird will consume water from the upper (polluted) layers of the water column. The consumption of such water can potentially result in reduced egg production and hatching; increased clutch or brood abandonment; reduced growth and increased organ weights.</p> <p>Additionally, SCI bird species that utilise the amenity grasslands within and adjacent to the site (i.e., Tolka Valley Park, Farnham, Mellows Park and Erin's Isle playing pitches) for foraging purposes may be visually and/or audibly disturbed by the construction works, causing wintering bird species such as Black-headed Gull and Common Gull, to vacate these foraging habitats during active work periods.</p> <p>All of the above impacts have the potential to negatively impact the health of SCI bird populations.</p>
	Spatial distribution	Hectares, time and intensity of use	N/A (Construction and Operational impacts incapable of affecting attribute)
	Forage spatial distribution, extent and abundance	Location and hectares, and forage biomass	Surface water, groundwater, and air (dust)-based pollution impacts could indirectly impact SCI bird species via the deterioration of food / prey items. This impact also has a knock-on effect as the consumption of prey items containing polluting elements may lead to bioaccumulation of toxic substances within the insectivorous SCI bird populations, such as Black-headed Gull and Common Gull.
	Disturbance across the site	Intensity, frequency, timing and duration	N/A (Construction and Operational impacts incapable of affecting attribute)
	Barriers to connectivity and site use	Number; location; shape; area (hectares)	N/A (Construction and Operational impacts incapable of affecting attribute)
<p>Fulmar [A009] Herring Gull [A184] Kittiwake [A188]</p>	Population Size	Number	<p>The temporary and permanent habitat loss associated within the Construction Phase, as well as the potential deterioration of retained habitats through surface water, groundwater or air-based pollutants have the potential to reduce and/or degrade the foraging grounds of SCI bird species (e.g., Herring Gull).</p> <p>The degradation of floral species in these habitats has the potential to negatively impact insectivorous SCI bird species (i.e., Herring Gull), who are reliant on healthy host flora</p>

Special Conservation Interest	Attribute	Measure	Potential Impacts
			<p>supporting a range of invertebrate species, which feed on or frequent these flora for foraging purposes.</p> <p>In the event that hydrocarbon pollutants are accidentally introduced into the local surface water and groundwater (surface water recharge) networks, SCI bird species may come in contact with the substance whilst navigating, drinking from, foraging in or washing within a waterbody or wetland, resulting in degraded feathers, which will notably impact their feathers' insulative qualities, resulting in physiological stress for any affected individuals. Furthermore, these hydrocarbons can potentially be ingested by SCI bird species as they preen their affected feathers, leading to further physiological stress.</p> <p>SCI bird species are at risk of potentially being adversely impacted through the direct ingestion of contaminated water during the Construction Phase of the proposed Scheme. If a SCI bird were to drink from a waterbody which had been accidentally contaminated with polluting substance, (in particular a pollutant which floats on top of the water's surface e.g., hydrocarbons), the bird will consume water from the upper (polluted) layers of the water column. The consumption of such water can potentially result in reduced egg production and hatching; increased clutch or brood abandonment; reduced growth and increased organ weights.</p> <p>Additionally, SCI bird species that utilise the amenity grasslands within and adjacent to the site (i.e., Tolka Valley Park, Farnham, Mellows Park and Erin's Isle playing pitches) for foraging purposes may be visually and/or audibly disturbed by the construction works, causing SCI bird species such as Herring Gull, to vacate these foraging habitats during active work periods.</p> <p>All of the above impacts have the potential to negatively impact the health of SCI bird populations.</p>
	Spatial distribution	Hectares, time and intensity of use	N/A (Construction and Operational impacts incapable of affecting attribute)
	Forage spatial distribution, extent and abundance	Location and hectares, and forage biomass	Surface water, groundwater, and air (dust)-based pollution impacts could indirectly impact SCI bird species via the deterioration of food / prey items. This impact also has a knock-on effect as the consumption of prey items containing polluting elements may lead to bioaccumulation of toxic substances within the

Special Conservation Interest	Attribute	Measure	Potential Impacts
			insectivorous SCI bird populations, such as Herring Gull.
	Disturbance across the site	Intensity, frequency, timing and duration	N/A (Construction and Operational impacts incapable of affecting attribute)
	Barriers to connectivity and site use	Number; location; shape; area (hectares)	N/A (Construction and Operational impacts incapable of affecting attribute)
Cormorant [A017] Shag [A018] Puffin [A204]	Breeding Population Size	Number	<p>The temporary and permanent habitat loss associated within the Construction Phase, as well as the potential deterioration of retained habitats through surface water, groundwater or air-based pollutants have the potential to reduce and/or degrade the foraging grounds of SCI bird species (e.g., Cormorant).</p> <p>In the event that hydrocarbon pollutants are accidentally introduced into the local surface water and groundwater (surface water recharge) networks, SCI bird species may come in contact with the substance whilst navigating, drinking from, foraging in or washing within a waterbody or wetland, resulting in degraded feathers, which will notably impact their feathers' insulative qualities, resulting in physiological stress for any affected individuals. Furthermore, these hydrocarbons can potentially be ingested by SCI bird species as they preen their affected feathers, leading to further physiological stress.</p> <p>SCI bird species are at risk of potentially being adversely impacted through the direct ingestion of contaminated water during the Construction Phase of the proposed Scheme. If a SCI bird were to drink from a waterbody which had been accidentally contaminated with polluting substance, (in particular a pollutant which floats on top of the water's surface e.g., hydrocarbons), the bird will consume water from the upper (polluted) layers of the water column. The consumption of such water can potentially result in reduced egg production and hatching; increased clutch or brood abandonment; reduced growth and increased organ weights.</p> <p>All of the above impacts have the potential to negatively impact the health of SCI bird populations.</p>
	Spatial distribution	Hectares, time and intensity of use	N/A (Construction and Operational impacts incapable of affecting attribute)

Special Conservation Interest	Attribute	Measure	Potential Impacts
	Forage spatial distribution, extent and abundance	Location and hectares, and forage biomass	Surface water, groundwater, and air (dust)-based pollution impacts could indirectly impact SCI bird species via the deterioration of food / prey items. This impact also has a knock-on effect as the consumption of prey items containing polluting elements may lead to bioaccumulation of toxic substances within the piscivorous SCI bird populations, such as Cormorant.
	Disturbance across the site	Intensity, frequency, timing and duration	N/A (Construction and Operational impacts incapable of affecting attribute)
	Barriers to connectivity and site use	Number; location; shape; area (hectares)	N/A (Construction and Operational impacts incapable of affecting attribute)
<p>Lesser Black-backed Gull [A183] Roseate Tern [A192] Common Tern [A193] Arctic Tern [A194]</p>	Breeding Population Size	Number	<p>The temporary and permanent habitat loss associated within the Construction Phase, as well as the potential deterioration of retained habitats through surface water, groundwater or air-based pollutants have the potential to reduce and/or degrade the foraging grounds of SCI bird species (e.g., Lesser Black-backed Gull).</p> <p>The degradation of floral species in these habitats has the potential to negatively impact insectivorous SCI bird species (i.e., Lesser Black-backed Gull), who are reliant on healthy host flora supporting a range of invertebrate species, which feed on or frequent these flora for foraging purposes.</p> <p>In the event that hydrocarbon pollutants are accidentally introduced into the local surface water and groundwater (surface water recharge) networks, SCI bird species may come in contact with the substance whilst navigating, drinking from, foraging in or washing within a waterbody or wetland, resulting in degraded feathers, which will notably impact their feathers' insulative qualities, resulting in physiological stress for any affected individuals. Furthermore, these hydrocarbons can potentially be ingested by SCI bird species as they preen their affected feathers, leading to further physiological stress.</p> <p>SCI bird species are at risk of potentially being adversely impacted through the direct ingestion of contaminated water during the Construction Phase of the proposed Scheme. If a SCI bird were to drink from a waterbody which had been accidentally contaminated with polluting substance, (in particular a pollutant which floats on top of the water's surface e.g., hydrocarbons), the bird will consume water from</p>

Special Conservation Interest	Attribute	Measure	Potential Impacts
			<p>the upper (polluted) layers of the water column. The consumption of such water can potentially result in reduced egg production and hatching; increased clutch or brood abandonment; reduced growth and increased organ weights.</p> <p>Additionally, SCI bird species that utilise the amenity grasslands within and adjacent to the site (i.e., Tolka Valley Park, Farnham, Mellows Park and Erin's Isle playing pitches) for foraging purposes may be visually and/or audibly disturbed by the construction works, causing wintering bird species such as Lesser Black-backed Gull, to vacate these foraging habitats during active work periods.</p> <p>All of the above impacts have the potential to negatively impact the health of SCI bird populations.</p>
	Spatial distribution	Hectares, time and intensity of use	N/A (Construction and Operational impacts incapable of affecting attribute)
	Forage spatial distribution, extent and abundance	Location and hectares, and forage biomass	Surface water, groundwater, and air (dust)-based pollution impacts could indirectly impact SCI bird species via the deterioration of food / prey items. This impact also has a knock-on effect as the consumption of prey items containing polluting elements may lead to bioaccumulation of toxic substances within the insectivorous / piscivorous SCI bird populations, such as Lesser Black-backed Gull.
	Disturbance across the site	Intensity, frequency, timing and duration	N/A (Construction and Operational impacts incapable of affecting attribute)
	Barriers to connectivity and site use	Number; location; shape; area (hectares)	N/A (Construction and Operational impacts incapable of affecting attribute)
Razorbill [A200]	Population Size	Number	<p>In the event that hydrocarbon pollutants are accidentally introduced into the local surface water and groundwater (surface water recharge) networks, Razorbill may come in contact with the substance whilst navigating, drinking from, foraging in or washing within a waterbody or wetland, resulting in degraded feathers, which will notably impact their feathers' insulative qualities, resulting in physiological stress for any affected individuals. Furthermore, these hydrocarbons can potentially be ingested by Razorbill as they preen their affected feathers, leading to further physiological stress.</p> <p>Razorbills are at risk of potentially being adversely impacted through the direct ingestion of contaminated water during the Construction</p>

Special Conservation Interest	Attribute	Measure	Potential Impacts
			<p>Phase of the proposed Scheme. If a Razorbill were to drink from a waterbody which had been accidentally contaminated with polluting substance, (in particular a pollutant which floats on top of the water's surface e.g., hydrocarbons), the bird will consume water from the upper (polluted) layers of the water column. The consumption of such water can potentially result in reduced egg production and hatching; increased clutch or brood abandonment; reduced growth and increased organ weights.</p> <p>All of the above impacts have the potential to negatively impact the health of Razorbill population.</p>
	Spatial distribution	Hectares, time and intensity of use	N/A (Construction and Operational impacts incapable of affecting attribute)
	Forage spatial distribution, extent and abundance	Location and hectares, and forage biomass	Surface water, groundwater, and air (dust)-based pollution impacts could indirectly impact Razorbill via the deterioration of food / prey items. This impact also has a knock-on effect as the consumption of prey items containing polluting elements may lead to bioaccumulation of toxic substances within the Razorbill population.
	Disturbance across the site	Intensity, frequency, timing and duration	N/A (Construction and Operational impacts incapable of affecting attribute)
	Barriers to connectivity and site use	Number; location; shape; area (hectares)	N/A (Construction and Operational impacts incapable of affecting attribute)

6.3.2 Operational Impacts

6.3.2.1 Annex I Habitats / Flora

Surface water, groundwater and air (dust and emissions)-based Operational impacts are not predicted for Annex I habitats and flora of South Dublin Bay SAC; North Dublin Bay SAC; Rockabill to Dalkey Island SAC, given the operational nature and emission of the proposed Scheme.

As surface water run-off from hardstanding areas will be the main operational emission from the proposed Scheme, in relation to downstream Natura 2000 sites, a series of SuDS are proposed throughout the Scheme's drainage / landscape operational designs, including grass tracks; rain gardens; permeable paving; tree pits; roadside beds; roadside directional beds; and green roofs. These SuDS features will collectively provide surface water run-off attenuation, infiltration, and in-situ retention of sediments (and associated nutrients), metals, and hydrocarbons (Jurries, 2003; Anderson et al., 2016). Therefore, the surface waterbodies, which hydrologically connect the proposed Scheme with the designated sites, will not experience any operational contamination from surface water run-off of hardstanding surfaces within the boundaries of the proposed Scheme.

6.3.2.2 QI Marine Mammals

Given that the above SuDS features will safeguard the downstream waterbodies within Dublin Bay from operational contamination, the marine mammal QI species, Harbour Porpoise, will not experience any direct

adverse impacts through contact with pollutants, nor will its foraging resources be reduced or contaminated during the Operational Phase of the proposed Scheme.

6.3.2.3 SCI Birds

As the proposed Scheme's active light railway line is located within or immediately adjacent to existing roadways (Farnham area) and vehicular access routes (Tolka Valley Park), increases to operational disturbance from the light-rail activity will be negligible, given that the SCI bird species, which periodically utilise these areas are already habituated to a regularised baseline noise levels of 54dB at distances as close as 50m, which is supported by the observations made throughout the wintering bird surveys (96 hours total) [Daytime LAeq,16-hr value of 54dB - EIAR Volume 3 – Chapter 15 - Noise - Section 15.3.1: Baseline Noise Survey, Table 15-21: Unattended Location UT3 at St Helena's Childcare Centre].

As operational noise in this area will peak at 55dB noise level during the Operational Phase [Daytime LAeq,16hr value of 54dB - EIAR Noise Chapter Section 15.6.3.1: Rail Noise, Table 15-39: U Calculated Mitigated Rail Noise Levels for Each NSL], this noise level will be unlikely to elicit any form vigilance behaviour from the foraging wintering bird species (Cutts et al, 2013) recorded within this area, namely Light-bellied Brent Goose, Black-headed Gull, Common Gull, Herring Gull, Lesser Black-backed Gull and Curlew. Curlew were observed only utilising green areas over 100m away from the St Helena's Childcare Centre; and while Light-bellied Brent Goose, Black-headed Gull, Common Gull and Herring Gull were also most commonly recorded beyond this 100m range, occasional flocks of these three species would be present within 50m of the St Helena's Childcare Centre. However, given the small size of these flocks and the ample foraging opportunities in areas immediately adjacent, the potential disturbance impact on overall foraging activities for these three species within 100m of St Helena's Childcare Centre is deemed to be negligible. Given the rise of 1dB in operational noise there is the potential for a low-level behavioural response (occasional vigilance behaviour), which will lessen as the SCI bird species become habituated to this new low-level disturbance element, as birds often habituate to regular noise levels between 55-72dB in urban environments (Cutts et al, 2013).

Visual disturbance from increased pedestrian traffic, with associated activities such as dog-walking, will prove to be more disruptive than the operation of the LRT, as species such as Light-bellied Brent Goose will begin to engage in vigilance behaviour within 105m of the disturbance source, or Curlew at 120m (Cutts et al, 2013). The above statement is also supported by observation recorded during the 96 hours of wintering bird surveys. It is also important to note that both these species are sheltered from visual disturbance when foraging within Erin's Isle GAA due to the presence approx. 1.5m wall along Erin's Isle boundary, as well as the additional partial screening from the semi-mature trees lining the western extent of Farnham Drive. For birds of their height (Curlew 30cm and 60cm Light-bellied Brent Goose on average), individuals will have to be a notable distance back from (east of) the wall to be able achieve an angle that would allow to observe the LRVs as they navigate through the Farnham area. Other SCI bird species, which frequent this area such as Black-headed Gull, Herring Gull, Common Gull and Lesser Black-backed Gull are less sensitive to such visual disturbances.

As surface water run-off from hardstanding areas will be the main operational emission from the proposed Scheme, in relation to habitats, a series of SuDS are proposed throughout the Scheme's drainage / landscape operational designs, including grass tracks; rain gardens; permeable paving; tree pits; roadside beds; roadside directional beds; and green roofs. These SuDS features will collectively provide surface water run-off attenuation, infiltration, and in-situ retention of sediments (and associated nutrients), metals, and hydrocarbons (Jurries, 2003; Anderson et al., 2016). Therefore, the terrestrial habitats within and directly adjacent to the proposed Scheme will not experience any operational contamination, protecting the terrestrial habitats and the foraging resources of SCI bird species therewithin. Additionally, the River Tolka and Royal Canal will not experience any operational contamination from surface water run-off of hardstanding surfaces, which in turn safeguards the downstream habitats / waterbodies within Dublin Bay. The protection of downstream habitats helps ensure that SCI bird foraging resources within Dublin Bay maintain healthy populations / distribution and remain uncontaminated, preventing any damaging physiological effects from toxic bioaccumulation.

A number of larger waterfowl species, have poor front-facing vision when in flight; and as a result, are vulnerable to collisions with overhead cables. For this reason, the design included deflectors that will be installed on wires parallel to the overhead lines at a number of strategic locations, including the Broombridge rail over the Royal Canal; and Tolka Valley Park bridge; and along the tracks within the Tolka Valley Park and Farnham areas.

Therefore, the only operational impacts predicted for the SCI bird species within supporting ex-situ habitats located within and adjacent to the proposed Scheme, are those of the minor increase in visual disturbance as a result of the increased pedestrian foot-traffic, associated with the new pedestrian infrastructure in the west Farnham area.

6.3.3 Do Nothing Impact

If the proposed Scheme does not proceed there will be no impact on the North Dublin Bay SAC; South Dublin Bay SAC; Rockabill to Dalkey Island SAC; North Bull Island SPA; South Dublin Bay and River Tolka Estuary SPA; and North-west Irish Sea SPA Natura 2000 sites, and their respective QIs / SCIs.

6.3.4 Significance of In-combination Effects

Given the proximity of the other relevant plans and project developments as described in Section 5.3 SECTION 5: to the proposed site, their connectivity in terms of surface water, groundwater and land and air pathways to the Natura 2000 sites is likely to be similar to the proposed site. With this in consideration and the fact that that the proposed Scheme will potentially impact the QIs and SCIs of North Dublin Bay SAC; South Dublin Bay SAC; Rockabill to Dalkey Island SAC; North Bull Island SPA; South Dublin Bay and River Tolka Estuary SPA; and North-west Irish Sea SPA Natura 2000 sites, it can be stated that in the absence of mitigation for this proposed Scheme, there is potential for in-combination effects to occur with other local plans and projects.

SECTION 7: MITIGATION

This section describes the avoidance and mitigation measures required to prevent or reduce impacts generated during the Construction and Operation of the proposed Scheme on the following Natura 2000 sites, and their respective QIs and SCIs:

- North Dublin Bay SAC;
- South Dublin Bay SAC;
- Rockabill to Dalkey Island SAC;
- North Bull Island SPA;
- South Dublin Bay and River Tolka Estuary SPA; and
- Northwest Irish Sea SPA

All prescribed mitigation measures will be strictly adhered to throughout the length of the Construction and Operational Phases.

A Construction and Environment Management Plan (CEMP) has been prepared and is included in Appendix E of this NIS, which will be updated and finalised by the appointed contractor prior to construction commencing. The CEMP contains all of the mitigation measures set out in this NIS. The proposed Scheme's Contractor, as well as all other construction contractors, will comply with all the mitigation measures set out in this NIS and included in the CEMP. The CEMP is a working document and will be finalised by the contractor following appointment and prior to commencing works on site. All of the content provided in this CEMP will be implemented in full by the appointed contractor and its finalisation by the appointed contractor will not affect the robustness and adequacy of the information presented and relied upon in this NIS.

The mitigation measures set out in this NIS and that are included in the CEMP are measures that can be implemented with a high degree of confidence. The oversight of the specified measures by an ecologist provides a high degree of confidence that they can be implemented successfully.

7.1 Construction Phase Mitigations

The Construction Phase mitigation sub-sections below will be divided into:

- Standard environmental best practice;
- Compound environmental management;
- Mitigation management plans ensuring the protection of surface water, groundwater and air quality and prevention of invasive species spread throughout the proposed Scheme's site;
- Specific SCI mitigation measures; and
- Specific area-based mitigations measures which address localised sensitive ecological elements.

7.1.1 Standard Environmental Best Practice

The activities required for the proposed Scheme's Construction Phase shall remain within the boundary of the proposed site. The CEMP (contained in Appendix E of the NIS) also strictly adheres to best practice environmental guidance including but not limited to the following:

- BS (2012) – Trees in Relation to Design, Demolition and Construction. British Standard 5837;
- NRA (2006e): Guidelines for the Protection and Preservation of Trees, Hedgerows and Scrub Prior to, During and Post-Construction of National Road Schemes. Dublin: National Roads Authority;
- CIRIA Guidance C532: Control of water pollution from construction sites. Guidance for consultants and contractors. (CIRIA 2019a);
- CIRIA Guidance C741: Environmental good practice on site guide (Charles & Edwards 2015; CIRIA 2023);
- CIRIA Guidance C750D: Groundwater control: design and practice (Preene et al. 2016; CIRIA 2019b);
- CIRIA (C512): Environmental Handbook for Building and Civil Engineering Projects (CIRIA 2000);
- CIRIA (C697): The SuDS Manual (CIRIA 2015);

- CIRIA (C649) Control of water pollution from linear construction projects: Site guide (CIRIA 2006a);
- CIRIA (C848): Control of water pollution from linear construction projects: Technical guidance (CIRIA, 2006b);
- Inland Fisheries Ireland: Guidance on Protection of Fisheries During Construction Works In and Adjacent to Waters (IFI 2016); and
- Inland Fisheries Ireland: A Guide to the Protection of Watercourses through the use of Buffer Zones, Sustainable Drainage Systems, Instream Rehabilitation, Climate / Flood Risk and Recreational Planning (IFI 2020).

7.1.2 Protection of Surface Water, Groundwater and Air Quality

In order to protect surface water, groundwater and air quality throughout the proposed Scheme site, the Contractor will be required implement the prepared Surface Water Management Plan (SWMP), Pollution Control Plan and Dust Management Plan. The minimally required list of mitigations measures outlined below will be incorporated into these plans. The full version of these plans can be viewed in Appendices G, H and I, respectively.

7.1.2.1 Surface Water Management Plan

The SWMP and the control and management measures relating to surface water management have been prepared (Appendix F of this NIS) with regard to the following guidance documents, where relevant:

- Control of Water Pollution from Construction Sites. Guidance for Consultants and Contractors (C532) (Construction Industry Research and Information Association) (CIRIA)2001);
- Best Practice Guide BPGCS005 – Oil Storage Guidelines (Enterprise Ireland 2003);
- PUB C811 Environmental Good Practice on Site, 5th Edition (CIRIA 2023);
- Control of Water Pollution from Linear Construction Projects. Technical Guide (C648) (CIRIA 2006a);
- Control of Water Pollution from Linear Construction Projects. Site Guide (C649) (CIRIA 2006b);
- Guidelines for the Crossing of Watercourses During the Construction of National Road Schemes (NRA 2006a);
- Safety, Health and Welfare at Work (Construction) Regulations 2013 – S.I. No. 291 of 2013;
- Design Manual for Roads and Bridges Part 3 DN-DNG-03022 (NRA HD 33/15) (Including Amendment No. 1) (TII 2015a);
- Road Drainage and the Water Environment DN-DNG-03065 (TII 2015b);
- Guidelines on Protection of Fisheries During Construction Works in and Adjacent to Waters (Inland Fisheries Board (IFI 2016); and
- Planning for Watercourses in the Urban Environment, A Guide to the Protection of Watercourses through the use of Buffer Zones, Sustainable Drainage Systems, Instream Rehabilitation, Climate / Flood Risk and Recreational Planning (IFI 2020).

In order to safeguard the local surface water network, and in turn the local groundwater network, from surface water-based pollution events, the following must be strictly adhered to:

- The contractor will ensure compliance with environmental quality standards specified in the relevant legislation, namely European Communities (Environmental Objectives (Surface Waters)) Regulations, 2009 (S.I. No. 272 of 2009 and amendments), and the European Communities (Quality of Salmonid Waters) Regulations, 1988 (S.I. No. 293 of 1988);
- Management of silt-laden water on-site, including procedures for accidental leaks / spills to ground, as well as water quality monitoring to ensure compliance with environmental quality standards specified above;
- At no point during the Construction Phase will treated- or untreated-water be discharged to local surface water network without the water quality meeting the statutory limits as set under the environmental quality standards specified above, or limits imposed by a relevant authority such as An Bord Pleanála.
- Fail-safe site drainage and bunding, e.g., drip trays on plant and machinery will be provided to prevent discharge of chemical spillage from the sites to surface water;

- To prevent the spread of any accidental discharge into the surface water network, oil retention booms will be on hand when construction activities are located beside aquatic habitats in order to control and minimise the spread of the spill;
- Washout of concrete plant will occur at a designated impermeable area with waste control facilities (C649 - CIRIA 2006b);
- Wherever reasonably possible, pre-cast concrete bridge features will be utilised to minimise the risk of a concrete-based pollution event;
- Concrete delivery, concrete pours and related construction methodologies will be part of the procedure agreed with the contractor to mitigate any possibility of spillage or contamination of the local environment. Particular attention will be paid during the pouring process in order to avoid leakages or spills of concrete;
- Temporary stockpiles will be monitored for leachate generation. These stockpiles will be placed within designated areas (C649 - CIRIA 2006b) and not located within 20m of any watercourses and wetlands or within 10m artificial surface water drainage features;
- Excavated contaminated soils (most likely present Tolka Valley Park) will be segregated and securely stored in a designated area where the possibility of runoff generation or infiltration to ground or surface water drainage has been eliminated through bunding and imperviable geotextile linings. The contaminated soils will then be classified as clean, inert, non-hazardous or hazardous in accordance with the EC Council Decision 2003/33/EC. Furthermore, the contractor will ensure that no cross-contamination with clean soils happens elsewhere throughout the proposed Scheme site;
- Silt fencing will be installed prior to the commencement of any construction works in order to enhance the protection of identified water features (River Tolka, Tolka Valley Park wetlands and Royal Canal). Shallow interceptor trenches will be installed in front of these silt fences where possible, as there are space and depth constraints within certain areas of Tolka Valley Park. An Ecological Clerks of Works (ECoW) will be present during the installation of these protective measures to ensure that they are installed to best practice standard and correctly located in their assigned areas. The following sections will provide greater detail on specific locations of these silt fence / trench sections (see Volume 4 - Map Figure 9-21 and Map Figure 9-22); and
- Silt fences will be repaired and/or replaced as necessary by the Contractor as part of the on-going environmental monitoring programme.

Construction Compound

- There will be a number of construction compounds and working areas of various scales along the whole proposed Scheme. These will include areas along track areas, construction areas at bridge locations and for other surface features. The construction compound will include installation of the necessary facilities including the site office, welfare facilities, etc.; and
- Further details on the construction compound, including the construction compound layout, are provided in section 6.8 of Chapter 6 (Construction Activities) of the accompanying EIAR.

Site Establishment

- As some of the construction compounds are located on a greenfield site, the appointed contractor will be required to provide a temporary geogrid mattress overlain in stone for trafficking within the construction compound. All surface water runoff will be intercepted and directed to appropriate treatment systems (settlement facilities and oil trap) for the removal of pollutants prior to discharge.

Security

- Controlled access to the construction compound will be implemented, fencing will be erected, and lighting will be installed. The construction compound will be monitored by Closed-Circuit Television (CCTV) with security contractors on standby, to ensure safe storage of all material, plant and equipment.

Welfare and Sanitary Facilities

- The construction compound will be engineered with appropriate services as discussed in section 6.8 of Chapter 6 (Construction Activities) of the accompanying EIAR. Water and wastewater disposal etc. will be organized by the appointed contractor. In work areas of the proposed Scheme, where permanent provisions (for the duration of the construction programme) are not practicable, appropriate temporary

provisions will be made. Temporary welfare facilities will need to be used: for example, portable toilets in the vicinity of works. Welfare facilities will discharge wastewater either to an existing sewer, with the permission of the sewerage undertaker, or wastewater will be collected and disposed of in an appropriate manner to a suitably licensed facility offsite to prevent water pollution and in accordance with the relevant statutory requirements.

Fuel Storage

- All hydrocarbons used during the Construction Phase will be appropriately handled, stored, and disposed of in accordance with recognised standards as laid out by the EPA within the Guidance Note on Storage and Transfer of Materials for Scheduled Activities (EPA 2004);
- All chemical and fuel filling locations will be contained within signposted, designated bunded areas, a minimum of 10m from any surface water drain;
- At the construction compound, where the site is pervious, an area of hard standing will be installed in a demarcated area for refuelling, and vehicle / plant cleaning and service areas. This area will be drained via a hydrocarbon interceptor trap to a soakaway if possible, or to local surface water drains, with the permission of the asset owner, under a permit or licence authorised by the relevant authority;
- The retained contents of the separators will be collected for disposal by a licensed operator to a licensed waste disposal / recovery facility;
- Suitable precautions will be taken to prevent spillages from equipment containing small quantities of hazardous substances (for example, chainsaws and jerry cans) including:
 - Each container or piece of equipment will be stored in its own drip tray made of a material suitable for the substance being handled;
 - Spill kits and drip trays will be provided for all equipment and at locations where any liquids are stored and dispensed, and staff will be trained on the procedures to be followed; and
 - Containers and equipment will be stored on a firm, level surface.
- Procedures and contingency plans will be in place at each work area to address cleaning up small spillages as well as dealing with an emergency incident. A stock of absorbent materials such as sand, spill granules, absorbent pads and booms will be kept at each work site, on plant working near water and particularly at refuelling areas and where fuel or oil is stored;
- The storage of fuels, other hydrocarbons and other chemicals within the construction compound shall be in accordance with relevant legislation and with best practice. In particular:
 - Fuel tanks, drums, and mobile bowsers (and any other equipment that contains oil and other fuels) will be housed within a bund of at least 110% capacity of the fuel tank itself or at least 25% of the total volume of the containers, whichever is greatest. The fuel tank will be double skinned. There will be no passive drainage from the bund; any water collected within it will be pumped out and removed off site for disposal; and
 - Any designated area or areas for oils, fuel, chemicals, hydraulic fluids, etc. storage and refuelling will be set up at least 10m from any surface water drains (C649 - CIRIA 2006b) and the storage location within the construction compound shall be organised so as to be as far away from surface water drains as is practicable to minimise risks from leaks and spills.
- Storage areas will be covered, wherever possible, to prevent rainwater filling the bunded areas;
- Fuel fill pipes will not extend beyond the bund wall and will have a lockable cap secured with a chain;
- Where fuel is delivered through a pipe permanently attached to a tank or bowser:
 - The pipe will be fitted with a manually operated pump or a valve at the delivery end which closes automatically when not in use;
 - The pump or valve will be fitted with a lock;
 - The pipe will be fitted with a lockable valve at the end where it leaves the tank or bowser;
 - The pipework will pass over and not through bund walls;
 - Tanks and bunds will be protected from vehicle impact damage;
 - Tanks will be labelled with contents; capacity information and hazard warnings; and

- All valves, pumps and trigger guns will be turned off and locked when not in use. All caps on fill pipes will be locked when not in use.

Construction Phase Haul Road Mitigations

- Through grassed areas, shallow land drains will be provided adjacent to haulage roads. The land drains will be provided with check dams which will allow infiltration of the collected surface water to ground. These will not be provided in the vicinity of the historical landfill in Tolka Valley Park, where runoff from haulage roads, will be allowed to runoff onto adjacent lands;
- Silt screens will be provided running alongside the haulage roads through grassed areas to prevent silt and fines from impacting on the adjacent habitats and drainage features; and
- Procedures and contingency plans will be in place at each haul road to address cleaning up small spillages, as well as dealing with an emergency incident.

Control of Sediment

- There are a number of sources of sedimentary or silt-laden water on a construction site, including silty 'runoff' from stripped soils; and the stockpiling of soils. Control measures for each of these are to be provided. Area specific measures are identified below in section 9.5.2.7 Area Specific Mitigation Measures.

7.1.2.2 Fuel and Chemical Spillages

For pollution prevention measures, including area specific measures, refer to the SWMP in the CEMP of the accompanying EIAR. Emergency procedures will be further developed by the contractor with either scheme-specific works, area-specific or activity-specific measures, and all personnel will be required to know these procedures.

An effective pollution SWMP relies on the following elements, with regards to fuel, and chemical spillages:

- Identification of receptors / pathways (e.g. water body/surface water paths);
- Identification and clear marking of surface water drain locations within the construction compound and other work areas;
- Having designated re-fuelling areas;
- All hydrocarbons used during the Construction Phase will be appropriately handled, stored, and disposed of in accordance with recognised standards as laid out by the EPA;
- Identification of all possible emergency scenarios;
- Effective planning, e.g. oil booms and oil soakage pads will be maintained at appropriate locations on site to enable a rapid and effective response to any accidental spillage or discharge. These shall be disposed of correctly and records will be maintained by the environmental manager of the used booms and pads taken off site for disposal;
- Identification and dissemination of contact numbers;
- Definition of personnel responsibilities;
- Assurance that all appropriate personnel are aware of the emergency procedure(s) (e.g. spillage, leakage, fire, explosion, and flooding), that drain covers and spill kits are available, and personnel know how to use them;
- Knowledge of incident scenarios, such as spill drills; and
- Implementation of lessons learnt from previous incidents.

In terms of pollution spill response procedures, these will vary depending on the sensitive receptor and nature of construction activities. However, the following information will be included as a minimum and displayed at appropriate locations along the proposed Scheme, at river crossings, near outfalls, re-fuelling locations, fuel storage areas etc.:

- Instructions on how to stop work and switch off sources of ignition;
- Instructions on how to contain the spill;
- Location of spill clean-up material;

- Name and contact details of responsible personnel (these personnel will assess the scale of the incident to determine whether the environmental regulator needs to be called); and
- Measures particular to that location or activity (for example, close to a settlement pond).

More detailed plans may be location-specific, or specific to a particular activity depending on the nature of the work. They will identify the potential sources of pollution and pathways to receptors so that containment measures can be put in place at these locations. Suitable equipment, such as spill kits, oil booms and absorbent material, will be held at appropriate locations along the proposed Scheme and personnel will be trained in the use of the equipment.

Emergency equipment will be obtained from a reputable supplier, and personnel will be trained in its correct use. Material Safety Data Sheets (MSDS) and best practice assessments will be used for advice on appropriate spill measures. The type of equipment required will depend on the activity taking place. The Construction Industry Research and Information Association, 'Control of Water Pollution from Linear Construction Projects' (C648), Technical Guidance document (CIRIA 2006a), hereafter referred to as the CIRIA Technical Guidance Document, provides details on the types and applications of emergency equipment. Refer to Table 15.2 of the CIRIA Technical Guidance Document for further information.

Every effort will be made to prevent an environmental incident during the Construction Phase of the proposed Scheme. The objective of the measures in the SWMP is to prevent an incident arising in the first place. Oil / fuel spillages are one of the main environmental risks that will exist during the Construction Phase of the proposed Scheme which will require an emergency response procedure. An example of the steps that will be followed in the event of a spillage to ensure that the environmental risk is reduced to as low as reasonably practical is provided in this section. This procedure can be tailored to be location / activity specific as required:

- Stop the source of the spill and raise the alarm to alert people working in the vicinity of any potential dangers;
- Notify the Environmental Manager immediately giving information on the location, type, and extent of the spill so that they can take appropriate action;
- If necessary, the Environmental Manager will inform the appropriate regulatory authority, including the Fire Services, depending on the size and nature of the spill - the appropriate regulatory authority will vary depending on the nature of the incident;
- If applicable, eliminate any sources of ignition in the immediate vicinity of the incident; and
- Contain the spill using the spill control materials, track mats or other material as required. Do not use detergent or hoses to disperse spilled fuel;

If possible, cover or bund off any vulnerable areas where appropriate such as drains, watercourses or sensitive habitats;

- Clean up as much as possible using the spill control materials;
- Contain any used spill control material and dispose of used materials appropriately using a fully licensed waste contractor with the appropriate permits so that further contamination is limited;
- The details of the incident will be recorded on an Environmental Incident Form (identified by the appointed contractor), which will provide information such as the cause, extent, actions, and remedial measures used following the incident. The form will also include any recommendations made to avoid the reoccurrence of the incident.
- A record of all environmental incidents will be kept on file by the Environmental Manager and the appointed contractor;
- These records will be made available to the relevant authorities if required; and
- The Environmental Manager will be responsible for any corrective actions required as a result of the incident e.g. an investigative report, formulation of alternative construction methods or environmental sampling, and will advise the appointed contractor as appropriate.

By carrying out the above steps, a proper system will be in place to investigate, record and report any potential fuel or chemical spillages.

7.1.2.3 Surface Water Monitoring

The appointed contractor shall carry out visual inspection of surface water control measures (settlement tanks, silt fences, fuel storage areas etc.) on a daily basis for any damage and correct functioning. In addition, daily visual inspections of the Royal Canal and the River Tolka will be carried out.

Furthermore, surface water quality sampling will be undertaken at four locations: at stream outlets of the Finglaswood Stream, Bachelors Stream, and at the River Tolka (upstream and downstream), and Royal Canal (upstream and downstream).

Surface water sampling will be undertaken throughout the length of the Construction Phase, with the first round to align with the commencement of the Geotechnical Ground Investigation works, and at intervals of 2 / 3 months thereafter. Indicators that water pollution may have occurred include the following:

- Change in water colour;
- Change in water transparency;
- Increases in the level of silt in the water;
- Oily sheen to water surface; and
- Floating detritus, or scums and foams.

If hydrocarbons are observed or other water quality parameters are suspected to have been exceeded, relevant regulatory authorities will be informed immediately so that they can contribute to any investigations conducted to determine whether any element of the construction of the proposed Scheme may be causing the contamination. If any potential sources of contamination are observed, appropriate actions will be taken (depending on the source and nature) to prevent further contamination and the incident shall be recorded and investigated in more detail to prevent a recurrence. If required, the relevant regulatory authorities will be informed.

Other Environmental Incidents

Environmental incidents are not limited to just fuel spillages. For example, other environmental incidents could include:

- Accidental stripping of a protected habitat;
- Accidental excavation of protected archaeological structure (without archaeologist present);
- Accidental release from settlement pond / tank etc.; and
- Unplanned utility strikes, resulting in foul water releases, temporary loss of services etc.

Therefore, any environmental incident will be investigated in accordance with the following steps:

- Immediately notify the EM, giving information on the location, type, and extent of the incident so that they can take appropriate action;
- In the very unlikely event of an incident occurring which may impact on a sensitive receptor, the EM will inform the appropriate persons / regulatory authority. The appropriate persons / regulatory authority will vary depending on the nature of the incident;
- The details of the incident will be recorded on an Environmental Incident Form (such as that provided in Section 1.3.6, or equivalent, identified by the appointed contractor) which will provide information such as the cause, extent, actions, and remedial measures used following the incident. The form will also include any recommendations made to avoid the reoccurrence of the incident. This form will be appended to the Pollution Control Plan;
- A record of all environmental incidents will be kept on file by the EM and the appointed contractor. These records will be made available to the relevant authorities if required; and
- The EM will be responsible for any corrective actions required as a result of the incident e.g. an investigative report, formulation of alternative construction methods or environmental sampling, and will advise the appointed contractor as appropriate.

By carrying out the above steps, a proper system will be in place to investigate, record and report any potential accidents or incidents.

7.1.3 Dust Management Plan

The following Dust Management Plan (DMP) has been prepared as part of the accompanying EIAR which provides the strategy to be adopted in order to manage dust during construction. This will be incorporated by each contractor into their Plans and implemented as part of their works. This plan and mitigation measures are in accordance with the IAQM (Institute of Air Quality Management) Guidance, with the mitigation measures proposed in accordance with the determination that the highest risk category should be applied to the Construction Phase of the proposed Scheme.

7.1.3.1 Construction Phase Mitigation Measures

Communications

- Develop and implement a stakeholder communications plan that includes community engagement before work commences on site;
- Display the name and contact details of person(s) accountable for air quality and dust issues on the site boundary. This may be the environment manager/engineer or the site manager; and
- Display the head or regional office contact information.

Dust Management

- Construction dust will be controlled and managed in accordance with the DMP contained within the CEMP (Appendix E of this NIS). The DMP within the CEMP will be updated by the construction contractor prior to the commencement of the Construction Phase, so as to include any additional measures required pursuant to conditions attached to any decision to grant approval. The DMP may include measures to control other emissions, approved by the Local Authority. The level of detail will depend on the risk and will include as a minimum the recommended dust mitigation measures outlined below. The recommended construction dust mitigation measures will be implemented as appropriate for the site. The DMP will include monitoring of dust deposition, dust flux, real-time PM₁₀ continuous monitoring and visual inspections.

Site Management

- Record all dust and air quality complaints, identify cause(s), take appropriate measures to reduce emissions in a timely manner, and record the measures taken;
- Make the complaints log available to the local authority when asked;
- Record any exceptional incidents that cause dust and/or air emissions, either on or offsite, and the action taken to resolve the situation in the logbook; and
- Hold regular liaison meetings with other high risk construction sites within 500m of the site boundary if applicable, to ensure plans are co-ordinated and dust and particulate matter emissions are minimised. It is important to understand the interactions of the off-site transport/ deliveries which might be using the same strategic road network routes.

Monitoring

- Undertake daily on-site and off-site inspection, where receptors (including roads) are nearby, to monitor dust, record inspection results, and make the log available to the local authority when asked. This should include regular dust soiling checks of surfaces such as street furniture, cars and windowsills within 100 m of site boundary, with cleaning to be provided if necessary;
- Carry out regular site inspections to monitor compliance with the DMP, record inspection results, and make an inspection log available to the local authority when asked; and
- Increase the frequency of site inspections by the person accountable for air quality and dust issues on site when activities with a high potential to produce dust are being carried out and during prolonged dry or windy conditions.

Preparing and maintaining the site

- Plan site layout so that machinery and dust causing activities are located away from receptors, as far as possible;
- Erect solid screens or barriers around dusty activities or the site boundary that are at least as high as any stockpiles on site;

- Fully enclose site or specific operations where there is a high potential for dust production and the site is active for an extensive period;
- Avoid site runoff of water or mud;
- Keep site fencing, barriers and scaffolding clean using wet methods;
- Remove materials that have a potential to produce dust from site as soon as possible, unless being re-used on site. If they are being re-used on-site cover as described below; and
- Cover, seed or fence stockpiles to prevent wind whipping.

Operating vehicle/machinery and sustainable travel

- Ensure all vehicles switch off engines when stationary - no idling vehicles;
- Avoid the use of diesel- or petrol-powered generators and use mains electricity or battery powered equipment where practicable;
- Impose and signpost a maximum-speed-limit of 15 mph on surfaced and 10 mph on unsurfaced haul roads and work areas; and
- Produce a Construction Logistics Plan to manage the sustainable delivery of goods and materials.

Operations

- Only use cutting, grinding or sawing equipment fitted or in conjunction with suitable dust suppression techniques such as water sprays or local extraction, e.g. suitable local exhaust ventilation systems;
- Ensure an adequate water supply on the site for effective dust/particulate matter suppression/mitigation, using non-potable water where possible and appropriate;
- Use enclosed chutes and conveyors and covered skips;
- Minimise drop heights from conveyors, loading shovels, hoppers and other loading or handling equipment and use fine water sprays on such equipment wherever appropriate; and
- Ensure equipment is readily available on site to clean any dry spillages and clean up spillages as soon as reasonably practicable after the event using wet cleaning methods.

Waste Management

- Avoid bonfires and burning of waste materials.

The IAQM Guidance (IAQM, 2024) Mitigation Measures applicable to the specific works to be undertaken as part of the proposed Scheme are as follows:

Measures specific to demolition

- Soft strip inside buildings before demolition (retaining walls and windows in the rest of the building where possible, to provide a screen against dust);
- Ensure effective water suppression is used during demolition operations. Handheld sprays are more effective than hoses attached to equipment as the water can be directed to where it is needed. In addition, high volume water suppression systems, manually controlled, can produce fine water droplets that effectively bring the dust particles to the ground;
- Avoid explosive blasting, using appropriate manual or mechanical alternatives; and
- Bag and remove any biological debris or damp down such material before demolition.

Measures specific to earthworks

- Re-vegetate earthworks and exposed areas/soil stockpiles to stabilise surfaces as soon as practicable;
- Use Hessian, mulches or trackifiers where it is not possible to re-vegetate or cover with topsoil, as soon as practicable; and
- Only remove the cover in small areas during work and not all at once.

Measures specific to construction

- Avoid scabbling (roughening of concrete surfaces) if possible;
- Ensure sand and other aggregates are stored in bunded areas and are not allowed to dry out, unless this is required for a particular process, in which case ensure that appropriate additional control measures are in place;

- Ensure bulk cement and other fine powder materials are delivered in enclosed tankers and stored in silos with suitable emission control systems to prevent escape of material and overfilling during delivery; and
- For smaller supplies of fine power materials ensure bags are sealed after use and stored appropriately to prevent dust.

Measures specific to trackout

- Use water-assisted dust sweeper(s) on the access and local roads, to remove, as necessary, any material tracked out of the site. This may require the sweeper being continuously in use;
- Avoid dry sweeping of large areas;
- Ensure vehicles entering and leaving sites are covered to prevent escape of materials during transport;
- Inspect on-site haul routes for integrity and instigate necessary repairs to the surface as soon as reasonably practicable;
- Record all inspections of haul routes and any subsequent action in a site logbook;
- Install hard surfaced haul routes, which are regularly damped down with fixed or mobile sprinkler systems, or mobile water bowsers and regularly cleaned;
- Implement a wheel washing system (with rumble grids to dislodge accumulated dust and mud prior to leaving the site where reasonably practicable);
- Ensure there is an adequate area of hard surfaced road between the wheel wash facility and the site exit, wherever site size and layout permits; and
- Access gates to be located at least 10m from receptors where possible.

7.1.3.2 Construction Phase *Aspergillus* Mitigation Measures

As stated above, *Aspergillus* is a fungus that is found in soil and has the potential to be made airborne during demolition or excavation. *Aspergillus* is of particular concern near hospitals or health clinics where immune suppressed patients are accommodated. While no such sensitive receptors were identified within the proposed Scheme construction area, a competent contractor will be appointed to prepare an *Aspergillus* Prevention Plan taking into account the National Guidelines for the Prevention of Nosocomial Aspergillosis (HSE 2018) which provides a risk assessment for aspergillus and preventative dust mitigation measures. Survey and prevention works with respect to *Aspergillus* will take place before construction commences by a competent contractor at sensitive buildings and hospitals or health clinics. If pre-construction surveys indicate that *Aspergillus* is a risk, the prevention works will include sealing the windows at relevant façades of the sensitive buildings and hospitals or health clinics to prevent fugitive dust entering through windows. These works will form part of an *Aspergillus* Prevention Plan to be completed by a specialist and will ensure the prevention of *Aspergillus* spores spreading. Research has found that dust suppression techniques, such as proposed also prevent the suspension of aspergillus successfully (Fournel et al. 2010).

7.1.3.3 Construction Phase Asbestos Mitigation Measures

Asbestos is the name for a group of natural occurring mineral fibres which are strong and both heat and chemically resistant. Due to these properties, asbestos was commonly used in the past as insulation and fireproofing. It was also used as a component in other building materials. Asbestos can be found in any industrial, commercial, public or residential building built or refurbished before the year 2000. There are three main types of asbestos found in Ireland – chrysotile (white asbestos), amosite (brown asbestos) and crocidolite (blue asbestos). The risk associated with exposure to asbestos relates to the possibility that the fibres within the asbestos containing material can become released into the air and are then inhaled. Breathing in air containing asbestos fibres can lead to asbestos-related diseases (mainly cancers of the chest and lungs). These diseases will not occur immediately and can take from 15 – 60 years to develop.

A Demolition Survey of all buildings to be demolished will be required prior to commencement of any such demolition works. This will include an intrusive asbestos-containing materials survey, which will involve destructive inspection. Prior to commencement of the demolition works, all asbestos containing materials identified by the Management Asbestos Survey and Refurbishment and Demolition Survey, will be removed by a suitably trained and competent person. Asbestos-containing materials will only be removed from site by a suitably permitted/licensed waste contractor and will be brought to a suitably licensed facility. The Health and Safety Authority will be contacted where needed in relation to the handling of asbestos and

material will be dealt with in accordance with the Safety, Health and Welfare at Work (Exposure to Asbestos) Regulations 2006, as amended and associated approved Codes of Practice.

7.1.3.4 Monitoring

As part of the Construction Dust Management Plan, monitoring of Construction Phase dust deposition levels, PM₁₀, PM_{2.5} and NO₂ will be undertaken in order to ensure on-site mitigation measures are being successfully implemented.

The monitoring of Construction Phase dust deposition levels, PM₁₀, PM_{2.5} and NO₂ will be developed and implemented as part of the DMP. Monthly monitoring of Construction Phase dust deposition levels, PM₁₀, PM_{2.5} and NO₂ levels shall be undertaken by the Contractor for the duration of Construction Phase.

The results of the Construction Phase dust deposition levels shall be compared with the guideline of 350mg/m²/day (for non-hazardous dusts). The results of the Construction Phase PM₁₀, PM_{2.5} and NO₂ concentrations shall be compared with the relevant Ambient Air Quality Standard limit values.

This monitoring shall be carried out at a minimum of three locations at each construction compound and further monitoring locations shall be designated at sensitive receptors along the proposed Scheme alignment. The monitoring locations will be chosen with consideration of the prevailing wind direction and proximity of sensitive receptors.

If dust deposition levels are measured to be above the relevant guideline of 350 mg/m²/day and/or PM₁₀, PM_{2.5} and NO₂ concentrations are measured to be above the relevant Ambient Air Quality Standard limit values, the mitigation measures in the area shall be reviewed and improved to ensure that dust deposition levels and/or PM₁₀, PM_{2.5} and NO₂ concentrations are reduced.

Should high dust deposition levels and/or PM₁₀, PM_{2.5} and NO₂ concentrations continue to occur following these improvements, the Contractor shall provide alternative mitigation measures and/or will modify the construction works taking place.

Six months of pre-construction dust monitoring will be undertaken at all sites to establish a baseline prior to construction works. The data will assist in confirming if the construction of the proposed Scheme has the potential for any air quality impacts which contribute to the risk of the respective limit values, or target values or alert thresholds being exceeded. During construction, trigger levels will be used to alert TII and the Contractor to a potential peak in particulate concentrations. These trigger levels were successfully used at Rotunda Hospital during Luas Cross City works. Any updates to the trigger levels can be agreed with DCC and FCC prior to construction. In the event that a trigger level is breached SMS text messages and/ or emails will be sent to the Employer's Representative and the Contractor from monitoring equipment. In such an event:

- The Employer's Representative and the Contractor will review the construction activities in the vicinity to determine the cause;
- The Employer's Representative will be entitled to stop the Works. Where activities outside the control of the Contractor may have had an influence on a trigger level being breached, these will be identified, and works can recommence following agreement with the Employer's Representative;
- The Contractor will review the monitoring data, including the most recent air quality data; and
- The Contractor will identify and agree with the Employer's Representative appropriate engineering controls and management procedures to reduce dust levels resulting from the works activities identified as the cause of the trigger level being reached.

The Contractor will confirm to the Employer's Representative that controls and management procedures have been implemented.

7.1.4 Invasive Species Management Plan (ISMP)

The prepared ISMP (Appendix I of this NIS) includes mitigation measures that utilises the below best practice management guidance documents, where relevant:

- The Management of Invasive Alien Plant Species on National Roads – Technical Guidance (TII 2020a);
- The Management of Invasive Alien Plant Species on National Roads – Standard (TII 2020b);
- Invasive Species Ireland Invasive Species Ireland - Best Practice Management Guidelines for Giant Hogweed (ISI 2008c); and - Best Practice Management Guidelines for Himalayan Balsam (ISI, 2008b);
- Inland Fisheries Ireland - Biosecurity Protocol for Field Survey Work (IFI 2010)
- Managing Invasive Non-Native Plants in or near Freshwater (EA 2010);
- Invasive Species Ireland (ISI) Best Practice Management Guidelines for Japanese Knotweed (ISI 2008a);
- Best Practice Management Guidelines for Himalayan Balsam (ISI 2008b);
- Best Practice Management Guidelines for Giant Hogweed (ISI 2008c); and
- *The Environment Agency (EA) Managing Japanese Knotweed on development sites - the Knotweed Code of Practice* (Version 3, amended in 2013, withdrawn from online publication in 2016) (EA 2013). (This document, although no longer supported by the EA, is nonetheless a practical document in determining the approach and control mechanisms for Japanese Knotweed).

7.1.4.1 General Measures to Control and Prevent the Spread of Non-native Invasive Species

Pre-construction Survey

- An updated invasive species baseline survey as outlined in Volume 3 – Chapter 9 (Biodiversity) of the accompanying EIAR, shall be conducted prior to the commencement of the proposed Scheme's enabling works. This updated baseline is required as invasive species may have continued to spread within and adjacent to the proposed Scheme since the last invasive species or habitat survey was conducted on-site;
- As per TII guidance (TII 2020a), this additional invasive species survey will include detailed maps of the precise location of each individual invasive species plant, as well as photos of these specific locations; and
- During the interim between the original non-native invasive species surveys and the commencement of construction following grant of planning permission, it is possible that the existing stands of Third Schedule non-native invasive species may have expanded (if unmanaged) or decreased (if there is an active management regime in place), or that newly established Third Schedule non-native invasive species may have become established within the footprint of the proposed Scheme. A confirmatory pre-construction invasive species survey will be undertaken by a suitably qualified specialist, arranged by the contractor(s), to confirm the absence, presence and / or extent of all Third Schedule non-native invasive species within the footprint of the proposed Scheme. Where an infestation is confirmed / identified within the footprint of the proposed Scheme, this will require the implementation of the final ISMP.

Final Invasive Species Management Plan (ISMP)

- Following appointment, the contractor(s) will be required to develop more specific Method Statements and submit an updated ISMP that is cognisant of the proposed construction activities, equipment and plant usage and environmental monitoring plan for the proposed Scheme. The updated ISMP is referred to as the 'final ISMP' in this document. The appointed contractor(s) may only propose modifications to the ISMP which will not give rise to any impacts which are more significant than those already identified and assessed in the EIAR or NIS;
- All of the measures set out in this ISMP will be implemented in full by the appointed contractor(s) and its finalisation will not affect the robustness and adequacy of the information presented and relied upon in the EIAR and NIS;
- The ISMP will be updated following the pre-construction invasive species survey to detail the exact measures for any non-native invasive species population present within the footprint of the proposed Scheme. Depending on the extent and nature of the works, a number of approaches / treatments may be approved, all following the measures in the ISMP; and

- All control measures specified in the final ISMP shall be implemented by a suitably qualified and licenced specialist prior to the Construction Phase of the proposed Scheme to control the spread of any newly established INNS within the footprint of the proposed Scheme. Furthermore, the appointed contractor will adhere to control measures specified within the final ISMP throughout the Construction Phase of the proposed Scheme. The site will be monitored by the appointed contractor after control measures have been implemented. Any re-growth will be subsequently treated by the contractor. All measures that are prescribed in the final ISMP shall be equally applicable to advance works as to construction works. The contractor will be required to update the Final Invasive Species Management Plan (ISMP) with a detailed Monitoring Plan and Programme which will require approval by NPWS.

General Measures to Avoid the Spread of INNS

The unintentional spread of INNS during construction works (within the proposed Scheme, originating from outside the proposed Scheme, such as through the importation of materials, poor biosecurity practices regarding plant and machinery or natural processes) can be a significant issue, and if not managed properly, can result in the spread of non-native invasive species to non-infested areas (within or adjacent to works areas). This will potentially increase the future cost and effort required to control the species and has the potential to pose further public health and safety risks (Japanese Knotweed can cause damage to weaknesses in built environment, whilst Giant Hogweed is an environmental public health hazard).

Listed below is a brief detailing of necessary measures to be undertaken to ensure biosecurity within this section of the proposed Scheme, all of which will need to be included within the proposed Scheme ISMP:

- The adherence to a set of biosecurity measures, including;
 - the fencing off / demarcating of the individual invasive species;
 - communicating the location, risk and hazards associated with invasive species to construction personnel (e.g., Giant Hogweed);
 - identifying dedicated access points into and out of fenced-off areas;
 - the installation of designated decontamination facilities (where appropriate);
 - protocols around the removal of contaminated soils; and
 - seed and fragment checks on boot, tyres and tracks entering and leaving the work site.
- Best practice measures for the treatment of soils contaminated with invasive species (including potential seeds and fragments of mature plants) to prevent the accidental spread of INNS;
- As required by law, licences for the disposal of contaminated materials will be obtained, as well as the utilisation of licensed facilities;
- In regard to the importation of soil and other materials, the Contractor will only utilise traceable topsoil for landscaping that has been cleared of any invasive species material;
- Measures to be implemented during the application of herbicides – Commitment to the appointment of a suitably qualified/registered/licensed pesticides advisor for any works requiring the use of pesticides, and safety precautions for consideration in the use of pesticides near watercourses; and
- Areas which contained invasives species, where invasives were treated on-site or removed, prior to the enabling and construction works will require an on-going post-construction monitoring programme to ensure that there is no reestablishment of any invasive species within these areas. The appointed INNS contractor will provide this detailed Monitoring Plan and Programme within the final Invasive Species Management Plan.

Biosecurity Mitigations

Prior to commencement of the enabling works in the Tolka Valley Park area, a series of biosecurity measures will have to be undertaken to prevent spread of invasive species, namely Japanese Knotweed, Himalayan Balsam and potentially undiscovered Giant hogweed. Japanese Knotweed is present along the southern bank of the River Tolka, within immediate vicinity of the proposed bridge's southern abutment. Himalayan balsam is present on both banks but closer to the water's edge and not in the immediate vicinity of the works. There is the potential for Giant Hogweed seeds to be present in both banks. While not listed on Third Schedule list of the European Communities (Birds and Natural Habitats) Regulations 2011

[S.I.477/2011], the invasive Butterfly-bush present in this area will also be removed in the interest of the site's native floral composition.

Unwashed construction equipment, plant and vehicles, and footwear can provide a vector for the spread of non-native invasive species within the proposed Scheme and from areas outside the scheme where INNS are present or where vector material potentially containing seed / root material is attached to plant or personnel. The following hygiene measures shall be undertaken for the proposed Scheme:

- Known or potentially infested areas within the working area of the proposed Scheme shall be clearly demarcated and fenced off in advance of works and access restricted until such time that treatment has commenced and / or construction works are monitored in accordance with the ISMP in the area. In relation to Japanese Knotweed, the guidance recommends an exclusion buffer of 7m (metres) in all directions (within the works area and 3m vertically underground);
- The implementation of clear signage in accordance with TII IAPS standards will be erected at compounds, and at the boundary of the exclusion fencing. These signs will be briefed out at toolbox talks specific to each INNS to personnel on site and particular attention will be given to INNS that have the potential to cause injuries such as Giant Hogweed;
- Identify and create access points into exclusion areas for INNS. These are only to be used by specialist personnel for the removal of INNS and are not to be used by general site workers until such a time as all contaminated material has been removed from site and it is safe to enter;
- Where it is practicable, a wheel wash and footwear washing facilities will be provided to ensure biosecurity measure are preventing the further potential spread of INNS. These locations are to be provided by the contractor. Where a dedicated / bespoke wheel wash cannot be installed owing to space limitations, the appointed contractor will ensure that no excavated loose material is allowed off site from within an exclusion zone;
- Where plant that is used to excavate soils, it shall be visually checked for loose soil before movement to another part of site (where possible, the movements of tracked machinery will be restricted within the non-native invasive species exclusion zone). Loose soil shall be scraped off and disposed of, and a solution of Virkon© (or similar approved disinfectant) applied to machinery to ensure that no obscured seed / root material remains viable. Vehicular movements within the exclusion area shall be minimised as far as is practical;
- Unless in the exceptional circumstance that direction is given from a suitably qualified ecologist, no storage of contaminated soil on site. Instead, being disposed of in a licenced soil waste facility; and
- Where small volumes (e.g. volumes capable of being double bagged in quarantine bags such as cut plants, bulbs or loose soil occur), it may be practical to bag the material and bring it to a clearly demarcated and dedicated quarantine area within the construction compounds until such time that the material is disposed of to an authorised facility, similar to the process of disposing of bulk excavated infected soil.

Soil Excavation

- No excavation or removal of soil within areas demarcated as having INNS present is to be permitted unless under strict supervision by a suitably qualified ecologist or INNS specialist. Buffer zones to be installed by the contractor(s) will be advised by a suitably qualified ecologist or INNS specialist and strictly adhered to. Guidance regarding Japanese Knotweed recommends a buffer of 7m from the plant due to its expansive rhizomes.
- Where mechanical means of removal are required to dispose of INNS (treated or un-treated by chemicals) a suitably qualified ecologist or INNS specialist will be present to supervise and provide support to the contractor(s) for the duration of the operation;
- There will be no temporary storage on-site of bulk excavated infected material. Where the final ISMP calls for shallow / deep burial, this material shall be removed from the excavated area and transported immediately to approved receptor area on-site. Furthermore, the temporary storage of uninfected material will not occur within a European or National designated site nor within 20m of any watercourse / wetland and any land within an identified flood zone;
- Plant and machinery used in the control, excavation and transport of infected material shall also be subject to the recommendations described in the above Biosecurity Mitigations sub-section;

- The installation of industry-rated non-native invasive species-proof membrane before infilling construction of road / paths surface may be required. All waste arising out of this process which has been in contact with the excavated ground shall be treated as infected waste and disposed of at a facility that is authorised to accept such waste; and
- Where the movement of any Third Schedule non-native invasive species is required off site, a licence will be required from NPWS in advance of any movement to a site / facility licensed to accept such waste, as per the Birds and Natural Habitats Regulation. This licence is separate to and does not negate the need for licences / permits / authorisations required under waste legislation.

Disposal of Material

- Where any INNS related material is collected and is required to be disposed of, it is essential to dispose of said material in a manner that does not afford it the potential to spread further either within the proposed Scheme or in the nearby vicinity of Site;
- The movement of invasive plant material, off site, requires a licence from the NPWS, as per the Birds and Natural Habitats Regulations. Invasive species (particularly roots, flower heads or seeds) must be disposed of at licensed waste facilities or composting sites, appropriately buried, or incinerated having regard to relevant legislation (e.g. Waste Management Act, as amended, Section 4 of Number 6 of 1987 - Air Pollution Act, 1987, relevant local authority bylaws and any other relevant legislation). All disposals must be carried out in accordance with the relevant waste management legislation, as per guidance Guidelines for the Management of Waste from National Road Construction Projects (TII 2017); and
- It is important to note that some invasive species plant material or soil (vector material) containing residual herbicides may be classified as either 'hazardous waste' or 'non-hazardous waste' under the terms of the Waste Management Act, as amended, and both categories may require special disposal procedures or permissions. Advice will be sought from a suitably qualified waste expert regarding the classification of waste and the suitability of different disposal measures.

Measures to be Implemented During the Application of Herbicides

- If the application of herbicides is the expert advice given and then implemented during the lifespan of the proposed Scheme then a suitably qualified pesticides advisor, registered with the Department of Agriculture, Food and the Marine must be employed;
- The appointed contractor is required to refer to the appropriate guidance documents, including but not limited to those listed at the beginning of sub-section 0, which provide detailed recommendations for the control of invasive species and noxious weeds. The appointed contractor (or specialist license holder) will update the final ISMP in accordance with current and relevant guidelines before commencing works; and
- It is important to note that where a chemical treatment is to be used, there is a risk of contaminating a watercourse. The choice of herbicide is typically limited to formulations of Glyphosate or 2,4-D amine that are approved for use near water. Full details of any chemical used, where required and as advised by a registered pesticides advisor, will be included in the final ISMP prepared in advance of construction of the proposed Scheme.

Post-construction Monitoring

- Following the construction of the proposed Scheme, there may be ongoing treatment programmes which extend for a number of years (length of programme is dependent on the effectiveness of treatment) into the Operational Phase. In the Operational Phase, the management of the infrastructure will be the responsibility of the local authority, and the control of invasive species will be as per their plans and procedures, and responsibilities under The Birds and Natural Habitats Regulations;
- The above measures are important for all Third Schedule non-native invasive species, and in particular Japanese Knotweed, where it occurs, as maintenance works associated with landscaping, such as mowing and hedge cutting have the potential to spread this plant via the dispersal of very small amounts of shredded plant material;
- If invasive plants are found, then they shall be treated as per the measures outlined in the ISMP and any species-specific guidelines; and
- The appointed INNS contractor will provide a detailed post-construction section within the Monitoring Plan and Programme within the final Invasive Species Management Plan.

Assessment of Management Options for Third Schedule Non-native Invasive Species

- The general measures included in the sections above are required to ensure good on-site practices in respect of known or potential Third Schedule non-native invasive species as per Regulations 2011 [S.I.477/2011];
- The following sections further identify practical management controls. It is acknowledged that more than one potential control measure exists and that a single or combination of measures may be required;
- The recommendations presented in this ISMP provide the minimum requirements for the likely control measures and the measures outlined in this ISMP shall be developed (with further detail on methodology used at each location, timing, practical management etc.) by the appointed contractor(s) (or the specialist as appropriate) by way of producing and implementing the final ISMP; and
- The use of chemical treatments is recognised as a potential treatment option. However, the services of a registered herbicide advisor must be employed in the specifying named chemicals including those rated for use adjacent to aquatic environments where required, treatment type, dosage, and timing etc., and / or use of pesticides in the management of potential Third Schedule non-native invasive species within the proposed Scheme.

Selected management controls

The selected management control to be defined for each non-native invasive species stand within the proposed Scheme will depend on:

- Results of the pre-construction survey;
- Construction requirements – timing of works at specific locations, level of infestation and practical considerations such as reducing disturbance to road users / homeowners; and
- Feasibility of control measure, where possible the most practicable method (with regards to the environmental impact and human health) will be used e.g.; if mechanical methods of removal are not feasible due to access. Then a step back and assess approach will be employed to remove INNS.

The ISMP, which will be updated (in the form of the final ISMP) following on from the pre-construction surveys, may require the utilisation of a number of controls that are described below.

Japanese Knotweed *Reynoutria japonica*

Japanese Knotweed is a high impact non-native invasive species that is particularly effective at colonising disturbed ground (e.g. construction sites) and can spread by the re-growth of cut fragments or root material. Therefore, if it is broken up during site clearance or other earthworks, it can readily re-grow in new areas to which contaminated soil is moved. Japanese Knotweed reproduces asexually (in Ireland insofar as only Female plants have been recorded) and regrowth can occur from plant material weighing as little as 0.7g (grams) of viable material. It is acknowledged to be very difficult to effectively control and an even more difficult to fully eradicate.

Given the nature of Japanese Knotweed, chemical treatments are often preferred over physical methods as they can, if implemented properly, reduce the disturbance of the plant / population, thus reducing the chances of its spread. If herbicide is applied as the treatment option, it will need to be reapplied for up to five years after the first application to ensure the plant control measures have been effective or monitored for a minimum of two years during which no regrowth is recorded. However, physical removal may be necessitated when timely interventions are required.

Table 7-1 shows the assessment of the potential management methods for Japanese Knotweed with colour coding of the potential to implement on the proposed Scheme. The methods to be used will be fully detailed in the Contractors ISMP after the recommended pre-construction survey of the proposed Scheme have been undertaken.

Table 7-1: Assessment of Management Methods for Japanese Knotweed

Approach	Treatment Options	Comment	Potential for Implementation on the proposed Scheme
Physical	Dig and dispose offsite, under licence	This option requires that all plant material (above and below ground) is excavated along with soil and disposed of to a facility authorized to accept it. In addition to waste permits / authorizations, a wildlife licence issued by NPWS is required for the transport of Third Schedule non-native invasive species offsite. Depending on the nature of the excavation the proximity of services etc, the use of root barrier membrane may be required.	Likely – given the nature of the scheme, there may be a need to excavate soil and plant material to enable construction works to go ahead in timely manner.
	Dig and dispose onsite. - Shallow burial - Deep burial	wildlife licence from NPWS is not ordinarily required if the burial of collected material is proposed for within the consented proposed Scheme. Shallow burial in a constructed pit such as a dedicated sealed cell within a constructed berm will allow for periodic monitoring and of easy chemical treatment of any regrowth. Deep burial entails a dedicated sealed cell within a constructed excavation, that is at least 2m below the surface of the ground. The landscaping regime will not specify trees or scrub to be planted above. Either shallow or deep options may require the use of root barrier membrane. The use of chemical pretreatment of deep / shallow cells may also be required	Unlikely – given the lack of suitable lands within the largely developed metropolitan area.
	Screen on site – remove fragments offsite and reuse soil.	A control option that can be used to reduce the volume of soil / sediment to be moved elsewhere for burial, this option requires suitable plant, adequate space and volumes of soil to make the operation at a location cost effective. This option often requires the use of root barrier membrane owing to reuse of screened soil. The use of chemical pre-treatment of deep / shallow cells may also be required.	Possible but unlikely given the space requirements for a screener (unless a bespoke small-scale screener is available).
	Cutting and / or strimming	Not recommended and does not apparently diminish vigour of plants over time. Largely cosmetic and can result in considerable spread of viable vegetative material that can readily regenerate on suitable conditions.	Not Recommended
Chemical	Spot	Used for isolated plants – knapsack or weep sprayers. Chemical treatments for infestations near water will be rated for use near aquatic locations.	Chemical treatments are often a preferred option for treating Japanese knotweed, but the process can take between 3 to 5 years before eradication can be guaranteed and requires at least 2-year post implementation monitoring. However, given the nature of the proposed Scheme, the use of chemical treatment alone is unlikely to be adequate unless treatment regime begins a number
	Spray / Stem injections	Used for isolated plants or large populations using knapsack or weep sprayers. In accessible areas including along riverbanks, lance sprayers can be used. Chemical treatments for infestations near water will be rated for use at or near aquatic locations. Can result in chemical drift. Stem Injection is considered very effective, if the injection is timed appropriately for growth phase. However, it is labour-intensive (sometimes) requiring some cutting and is usually only carried out on small / isolated populations. Chemical	

Approach	Treatment Options	Comment	Potential for Implementation on the proposed Scheme
		treatments for infestations near water will be rated for use at or near aquatic locations.	of years before construction commencement.

Root Barrier Membrane

- Following the excavation of Japanese knotweed, there may be a need to install a root barrier membrane. These are specialised products that can provide protection to structures / services etc. from regrowth from within or outside a site, if suitably rated and properly installed. Thereafter, any small adjacent infestation can be more readily treated with chemical treatment for example. This durable material can be used to line spoil pits and prevent rhizome lateral root spread or effective growth in the plant and can keep it contained to an area where suitable chemical treatment can be undertaken.

Reseeding Following Eradication

- This is not strictly a control method. However, where treated ground is not being built upon, planting or resowing mixtures of native grass species helps to restore the original vegetation and aids post-control management of affected sites. A grass sward established in autumn will compete with germinating Japanese knotweed seedlings in the following spring.

Giant Hogweed *Heracleum mantegazzianum*

- This is a high-risk invasive species, that is also a biohazard in that it can pose a threat to humans. The chemistry of its sap is such that exposure to it on skin can result in prolonged photosensitizing reactions with blistering.
- Thus, a clearly demarcated exclusion buffer, in excess of 4m, is recommend for any individual / populations of this species before commencing works.
- It spreads via heavy seeds which can easily be transported by water. Hence, it is often found along river corridors. While the plant favours riverbanks, it is known to be found on waste / derelict ground as well as railway lines for instance. Its presence can impact local biodiversity and undermine bankside integrity. The seedling stage is the most vulnerable. Mortality of seedlings is comparable to many other plants and its seed bank is considered to be persistent for a short number of years only. Since Giant hogweed can only reproduce via seed, control measures applied before flowering and fruit set will limit subsequent generations (and even then, only with favourable conditions). The ideal time to control Giant hogweed via chemical treatment is April, with follow on monthly applications targeting regrowth, although for this treatment options, it can require up to five years before successful eradication.

Table 7-2 shows the assessment of the potential management methods for Giant Hogweed with colour coding of the potential to implement on the proposed Scheme. The potential treatment option is to be fully detailed in the contractor's ISMP for the treatment of Giant hogweed.

Table 7-2: Assessment of Management Methods for Giant hogweed

Approach	Treatment Options	Comment	Potential for Implementation on the proposed Scheme
Physical	Dig and dispose offsite, under licence	This option requires that all plant material (above and below ground) is excavated along with soil and disposed of to a facility authorized to accept it. Given the phytotoxic nature of the plant, it will not be buried onsite nor disposed of with general Construction and Demolition waste. In addition to waste permits / authorisations, a wildlife licence issued by NPWS is required for the transport of	Possible and may be required.

Approach	Treatment Options	Comment	Potential for Implementation on the proposed Scheme
		Third Schedule non-native invasive species offsite.	
	Above ground cutting	Not recommended. Largely cosmetic and prolongs flowering until such time that control halted. However, if digging is used, it is recommended that the removal be attempted in April / early May when the plant is usually less than 30cm tall. However, the root must be captured also.	Unlikely - requires specialist equipment to enable working alongside the biohazardous plant
	Root cutting	Individual plants may be killed by cutting at a 45-degree angle 15cm below ground level with a spade in April or May. Can be laborious unless small/isolated stands. Can be effective if combined with chemical treatment over 4-5 years repeat treatment.	Given the nature of the proposed Scheme, root cutting may be used to remove biohazard plant and thereafter allow for chemical control against any regrowth. Requires specialist equipment to enable working alongside the biohazardous plant.
	Pulling	Hand pulling is only suitable for small / immature plants (and with suitable PPE to protect exposure of bare skin). Potential remains for tap root to remain underground and regenerate. Recommended in April - May	Unlikely for mature plants. Requires specialist equipment to enable working alongside the biohazardous small / immature plants.
	Strimming / Grazing	Not recommended owing to spread of sap.	Not recommended or practical given the nature of the river and metropolitan landscape and nature of the proposed Scheme.
Chemical	Spot	Used for isolated plants – knapsack or weep sprayers. Chemical treatments for infestations near water will be rated for use near aquatic locations.	Most widely used method, but to be wholly effective, requires total control over ~5 years of treatments within a river catchment or the isolated location. Is weather dependent and can result in chemical drift to adjacent vegetation or watercourses.
	Spray / Stem injections	More suitable for large stands, where machine-mounted blanket sprays are used. Chemical treatments for infestations near water will be rated for use near aquatic locations. Stem Injection can only be carried out on young stems. Due to difficulties with the timing of application and the potential safety risk of contact with the large leaves this method requires specialist safety equipment.	Possible but unlikely owing to nature and size of population recorded on proposed Scheme.

Temporary Storage of Collected Material

Given the phytotoxic nature of Giant Hogweed, cut material will not be discarded. It will be disposed of immediately with similar non-native invasive species waste to a facility authorised to accept such waste. However, given the nature and relative sizes of Giant Hogweed infestations, it may be suitable to collect cut biomass (where not disposed of immediately to a facility authorised to accept such waste), and to double bag it for transport to a dedicated quarantine area (location to be approved as part of the ISMP) to decompose before disposal with similar non-native invasive species waste in a facility authorised to accept such waste. The locations of areas for which Giant Hogweed has been eradicated will be notified to the local authority, so that any future public health issue involving similar symptoms can be tracked.

Reseeding Following Eradication

This is not strictly a control method. However, where treated ground is not being built upon, planting or resowing mixtures of native grass species helps to restore the original vegetation and aids post-control management of affected sites. A grass sward established in autumn will compete with germinating Giant hogweed seedlings in the following spring and retard its establishment.

Himalayan Balsam *Impatiens glandulifera*

This high-risk invasive species is easily disturbed, particularly if in flower and readily becomes re-established along riparian corridors, which are annually subject to alluvial flooding. Unlike Japanese Knotweed though, it does not reproduce asexually. Plants can produce in excess of 6,000 seeds, and it aggressively colonises bare ground along riverbanks, including wet woodlands, as well as waste ground where suitable conditions exist. Due to its rapid growth, it can outcompete most native species. While its seedbanks are viable for up to 18 months, the resupply of seed is often achieved through annual river flooding and riparian inundation with freshly deposited soil-laden alluvium.

Table 7-3 shows the assessment of the potential management methods for Himalayan Balsam with colour coding of the potential to implement on the proposed Scheme. The potential treatment options available for the treatment of Himalayan Balsam will aim to prevent flowering and are therefore shall be undertaken before June. However, eradication may take up to five years. It is important to note that successful localised management of Himalayan Balsam is difficult along watercourses, as the spread of this non-native invasive species from upstream areas (e.g. outside of the proposed Scheme) onto bare ground often occurs after winter flooding.

Table 7-3: Assessment of Management Methods for Himalayan Balsam

Approach	Treatment Options	Comment	Potential for Implementation on the proposed Scheme
Physical	Dig and dispose offsite, under licence	This option requires that all plant material (above and below ground) is excavated along with soil and disposed of to a facility authorized to accept it. In addition to waste permits / authorisations, a wildlife licence issued by NPWS is required for the transport of Third Schedule non-native invasive species offsite.	Possible given the nature of the proposed Scheme, this may be an optimal control measure.
	Hand Pulling	Not recommended. Largely cosmetic and prolongs flowering until such time that control halted. However, if digging is used, it is recommended that the removal be attempted in April / early May when the plant is usually less than 30cm tall. However, the root must be captured also.	Possible, ideal for smaller areas adjacent to the proposed Scheme boundary.
	Mechanical	Repeated cutting or mowing is effective for larger stands, but plants can regrow if the lower parts (above lowest node) are left intact. Regeneration	Possible but unlikely main option given the nature of works along existing river.

Approach	Treatment Options	Comment	Potential for Implementation on the proposed Scheme
		can be further halted by ensuring full ground vegetative layer through reseeded.	
	Grazing	Regular grazing is said to suppress the plant over time.	Not practical given the nature of the river and metropolitan landscape and nature of the proposed Scheme.
Chemical	Spot / weed wiper	Can be used for smaller infestations in spring before flowering occurs, but as late as to allow germinating seedlings to have become established and thus be able to uptake the chemical treatment. Adjacent to the works boundary, chemical treatments for infestations near water will be rated for use near aquatic locations.	Possible, within the proposed Scheme boundary, where ground is to be excavated, may require physical control also.
	Foilar spray	Can be applied to larger infestations via knapsack spray / lance spray etc. in spring before flowering occurs, but as late as to allow germinating seedlings to have become established and thus be able to uptake the chemical treatment. Chemical treatments for infestations near water will be rated for use near aquatic locations.	

Temporary Storage of Collected Material

Given the nature and relative extent of Himalayan Balsam infestations in some urban situations, collected biomass (pulled stems / roots and bagged flower heads), where not disposed of immediately to a facility authorised to accept such waste, will be double bagged and put in dedicated quarantine areas (locations to be approved as part of the final ISMP). Here, the material will be left to decompose before disposal with similar Non-native Invasive Species waste at an authorised facility.

Reseeding Following Eradication

Areas devoid of or cleared of vegetative cover near watercourses will be reseeded with appropriate riparian ground cover species in summer months to ensure that bare banks do not provide favourable conditions for Himalayan Balsam to become re-established and to protect banks from accelerated erosion.

For any area of ground that is cleared of this non-native invasive species, and which is not subsequently constructed upon, follow-on mechanical cutting regimes and / or chemical treatments may be required to ensure the seed bank is fully exhausted.

7.1.5 SCI Bird Construction Mitigations

7.1.5.1 Pre-Construction and Construction Phase Monitoring

Migrant wintering bird populations have the potential to establish new foraging areas within the ZoI of the proposed Scheme after the time of writing of this NIS. In order to address this potential scenario, pre-construction wintering bird surveys will be continued during the winter periods up until the commencement of the enabling works / Construction Phase of the proposed Scheme, ensuring that mitigation measures can be adjusted accordingly in the event that wintering bird species establish new foraging areas within the ZoI of the Scheme. All data from the pre-construction surveys will be provided to the appointed ECoW (and extended survey team in this instance), who will continue to monitor these wintering bird populations during the Construction Phase.

7.1.5.2 Seasonal Restrictions

Seasonal construction constraints are required in order to mitigate for the risk of disturbance to disturbance-sensitive wintering bird species during the winter period within the amenity grasslands (West Farnham area - Western playing pitches and East Farnham area - Erin Isle GAA pitches), located within and adjacent to the proposed Scheme. Up to 64.59% of North Bull Island SPA's Light-bellied Brent Goose population, as well as smaller flocks of other wintering species (Black-headed Gull, Herring Gull and Curlew), can be present within the Farnham area during the high frequency utilisation months (November to March inclusive) a minimum disturbance buffer of 400m from the identified core foraging areas will be in place throughout these months (see Volume 4 – Map Figure 9-24). This will mean that no enabling or construction works will be conducted within this 400m buffer for these months.

7.1.5.3 ECoW Toolbox Talk

There will also be a toolbox talk is given to the site personnel by the appointed ECoW about the wintering bird species known to frequent the works area; with a particular focus on their sensitivity to audible and visual disturbance.

7.1.6 Area Specific Mitigations Measures for Construction Phase

For the purposes of providing clearly defined mitigations measures, the more precise mitigations to take place within the specific areas and sections of the proposed Scheme have been outlined in individual mitigation sub-sections below. The areas and sections of the proposed Scheme are displayed in Figure 7-1 and Figure 7-2 overleaf.

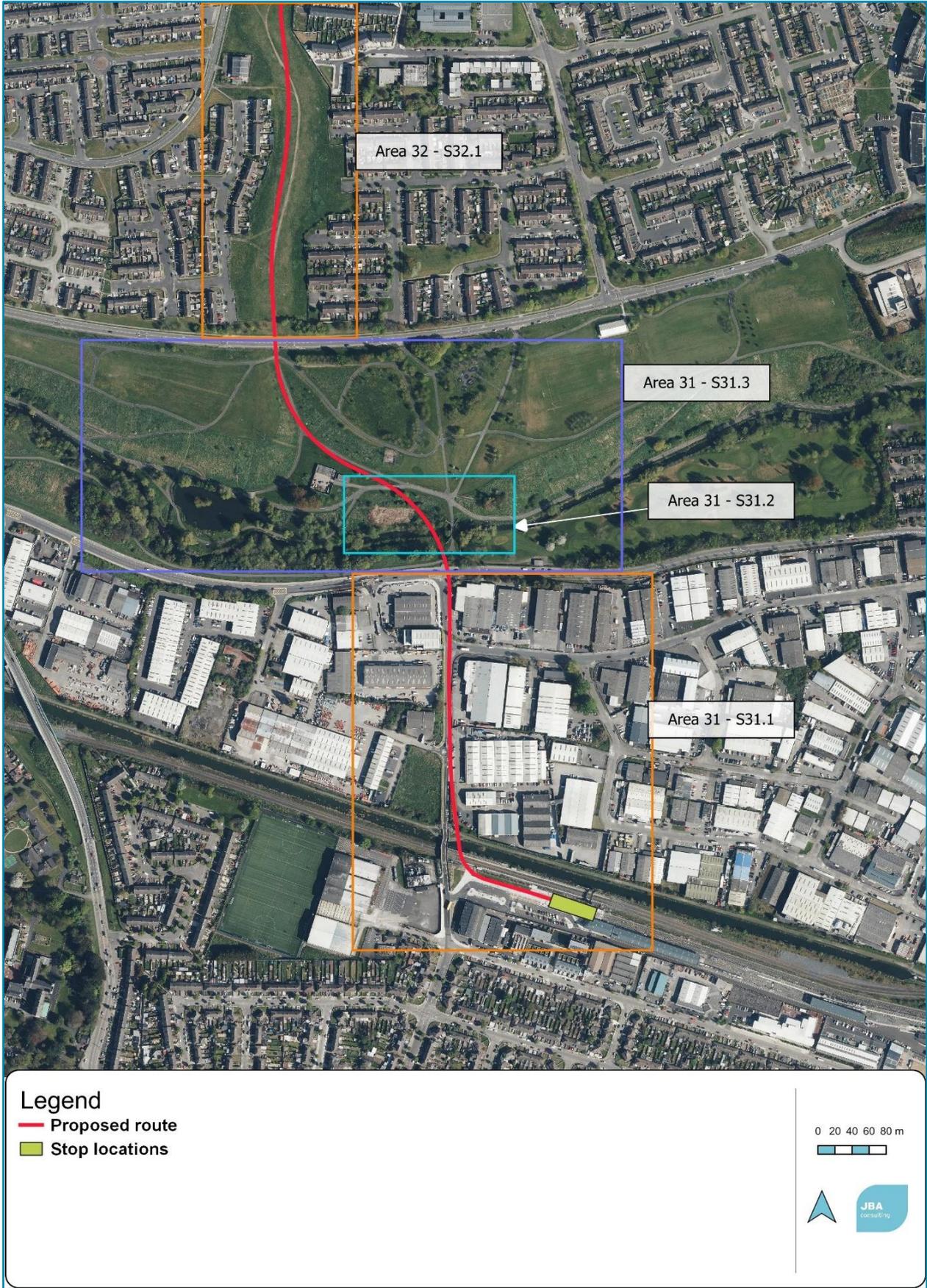


Figure 7-1: Map of proposed Scheme southern areas (Bluesky, 2024)

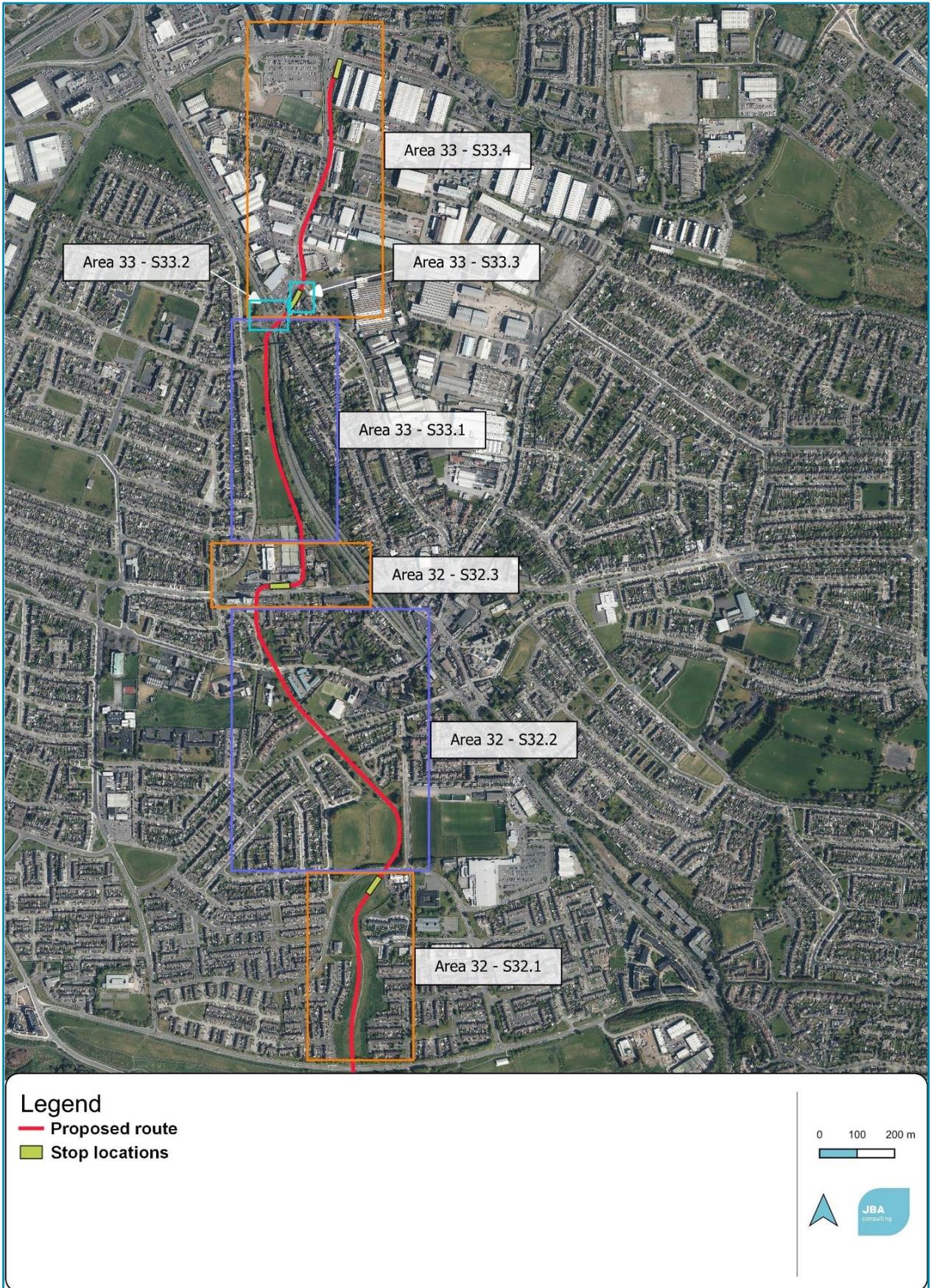


Figure 7-2: Map of proposed Scheme northern areas (Bluesky, 2024)

7.1.6.1 Area 30 - S30.1: Broombridge Stabling Site

Area specific mitigation measures are not required for Area 30 - S30.1: Broombridge Stabling Site during the Construction Phase, given its lack of surface water connection to local watercourses and its unsuitability for utilisation by flocks of SCI bird species. The standard guidance and plans listed in sub-sections, 7.1.1, 7.1.2, 7.1.3, 7.1.4 and 7.1.5 will prove sufficient to address the required level mitigation need in this area.

7.1.6.2 Area 31 - S31.1: Broombridge to Tolka Valley Park

In addition to the standard guidance and plans listed in sub-sections ,7.1.1, 7.1.2, 7.1.3, 7.1.4 and 7.1.5 the Broombridge to Tolka Valley Park, (including Rail Overbridge), section requires specific surface water run-off control measures to ensure that pollutants do not enter the surface water pathway connecting the site to the Natura 2000 sites during site enabling and bridge construction works.

This section will require the installation of geotextile sandbag barriers to protect the Royal Canal and its bankside vegetation. See Figure 7-3 below for the indicative locations of these proposed geotextiles sandbag barriers, the locations of which may be relocated provide there is acceptable rationale backing the relocation, as well as assurance that the functional integrity of the mitigation measures is not compromised. Figure 7-3 also highlights the indicative location of this section's site compound away from the canal. The local topography will help ensure no surface water from the compound reaches the canal.

An ECoW will be present throughout the enabling and construction works in this section given the sensitivity of the habitats in this location, and the Royal Canal's status as surface water pathway to the following Natura 2000 sites: North Dublin Bay SAC; South Dublin Bay SAC; Rockabill to Dalkey Island SAC; North Bull Island SPA; South Dublin Bay and River Tolka Estuary SPA; and North-west Irish Sea SPA.

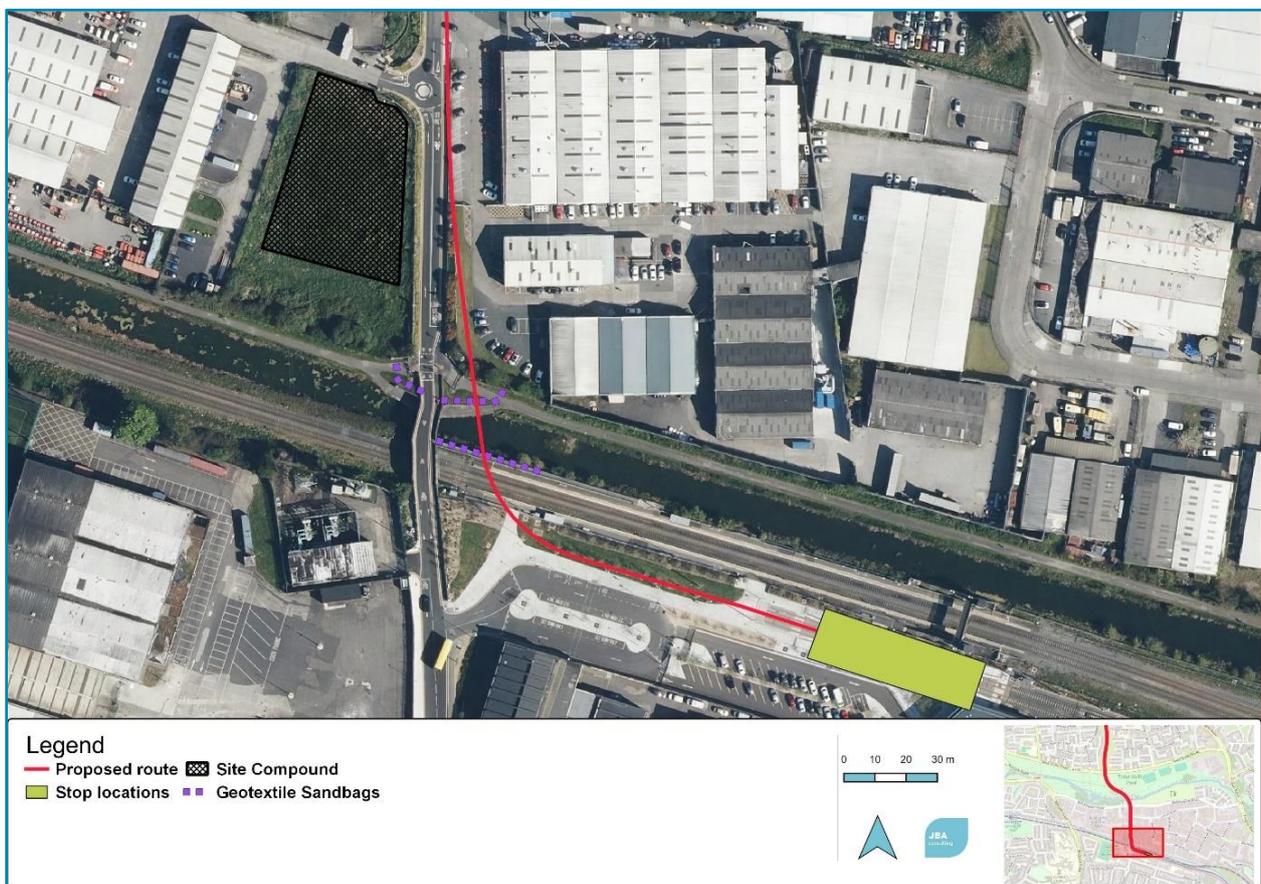


Figure 7-3: Indicative locations geotextile sandbag barriers and site compound (Royal Canal) (Bluesky, 2024)

7.1.6.3 Area 31 - S31.2: Tolka Valley Park Bridge

Biosecurity Mitigations

Prior to commencement of the enabling works in this area, a series of biosecurity measures will be undertaken to prevent spread of invasive species, namely Japanese Knotweed, Himalayan Balsam and potentially Giant Hogweed as well. Japanese Knotweed is present along the right (South) bank of the River Tolka, in location which will place it within the immediate vicinity of the proposed bridge's southern abutment. Himalayan Balsam is present on both banks but closer to the water's edge and not in the immediate vicinity of the works. There is the potential for Giant Hogweed seeds to be present in both banks. While not listed on Third Schedule list of the European Communities (Birds and Natural Habitats) Regulations 2011 [S.I.477/2011], the invasive Butterfly-bush present in this area should also be removed in the interest of the site's native floral composition.

The mitigation measures for invasive species will utilise the below best practice management guidance documents, where relevant; and are to be reference within the project's Invasive Species Management Plan:

- The Management of Invasive Alien Plant Species on National Roads – Technical Guidance (TII, 2020a);
- The Management of Invasive Alien Plant Species on National Roads – Standard (TII, 2020b);
- Invasive Species Ireland (ISI) - Best Practice Management Guidelines for Japanese Knotweed (ISI, 2008a);
- Invasive Species Ireland - Best Practice Management Guidelines for Himalayan Balsam (ISI, 2008b);
- Invasive Species Ireland - Best Practice Management Guidelines for Giant Hogweed (ISI, 2008c); and
- Inland Fisheries Ireland - Biosecurity Protocol for Field Survey Work (IFI, 2010).

Listed below are the necessary measures that will be undertaken to ensure biosecurity within this section of the proposed Scheme, all of which will be included within the proposed Schemes Invasive Species Management Plan (contained in Appendix I of this NIS):

- An updated invasive species baseline survey, conducted prior to the commencement of the proposed Scheme's enabling works. This updated baseline is required as invasive species may have continued to spread within and adjacent to the proposed Scheme site since the last invasive species or habitat survey was conducted on-site;
- As per TII guidance (TII, 2020a), this additional invasive species survey will include detailed maps of the precise location of each individual invasive species plant, as well as photos of these specific locations;
- The pre-construction surveys will be undertaken by suitable experts with competence in identifying the species concerned;
- The adherence to a set of biosecurity measures, including:
 - the fencing off / demarcating of the individual invasive species;
 - communicating the location, risk and hazards associated with invasive species to construction personnel (e.g., Giant Hogweed);
 - identifying dedicated access points into and out of fenced-off areas;
 - the installation of designated decontamination facilities (where appropriate),
 - protocols around the storage of infested soils; and
 - seed and fragment checks on boot, tyres and tracks entering and leaving the work site.
- Best practice measures for the treatment of soils contaminated with invasive species (including potential seeds and fragments of mature plants) to prevent the accidental spread of said invasive species;
- As required by law, licences for the disposal of contaminated materials will be obtained, as well as the utilisation of licensed facilities;
- In regard to the importation of soil and other materials, the Contractor will only utilise traceable topsoil for landscaping that has been cleared of any invasive species material;
- Measures to be implemented during the application of herbicides – commitment to the appointment of a suitably qualified/registered/licensed pesticides advisor for any works requiring the use of pesticides, and safety precautions for consideration in the use of pesticides near watercourses; and

- Areas which contained invasive species, where invasives were treated on-site or removed, prior to the enabling and construction works will require an on-going post-construction monitoring programme to ensure that there is no reestablishment of any invasive species within these areas.

The Invasive Species Management Plan (ISMP) is contained in Appendix I of this NIS. The ISMP contains all of the mitigation measures for effective management of invasive species as set out in this NIS. The proposed Scheme's Contractor, as well as all other construction contractors, will comply with all the mitigation measures included in the ISMP. These are effective measures that can be implemented with a high degree of confidence. The oversight of the specified measures by an invasive species expert provides a high degree of confidence that they can be implemented successfully.

Surface Water Mitigations

In addition to the standard guidance and plans listed in sub-sections 7.1.1, 7.1.2, 7.1.3, 7.1.4 and 7.1.5 the Tolka Valley Park Bridge section requires specific surface water run-off control measures to ensure that pollutants do not enter the surface water pathway connecting the site to the Natura 2000 sites.

Following the treatment and removal of the invasive species from this Section of the works, this Section will require the installation of silt fences and geotextile sandbag barriers to protect the Tolka Valley Park ICWs and Pond, and the River Tolka. See Figure 7-4 below for the indicative locations of these proposed silt fences and geotextiles sandbag barriers, the locations of which may be relocated provide there is acceptable rationale backing the relocation as well as assurance that the functional integrity of the mitigation measures is not compromised.

An ECoW will be present throughout the enabling and construction works in this section given the sensitivity of the habitats in this location, and the River Tolka's status as a surface water pathway to the Dublin Bay Natura 2000 sites. The ECoW will be key overseer for when the surface water barriers (silt fences and geotextile sandbag barriers) are adjusted for the works on the creation of the bridge abutments; and the construction of the bridge's temporary falseworks.

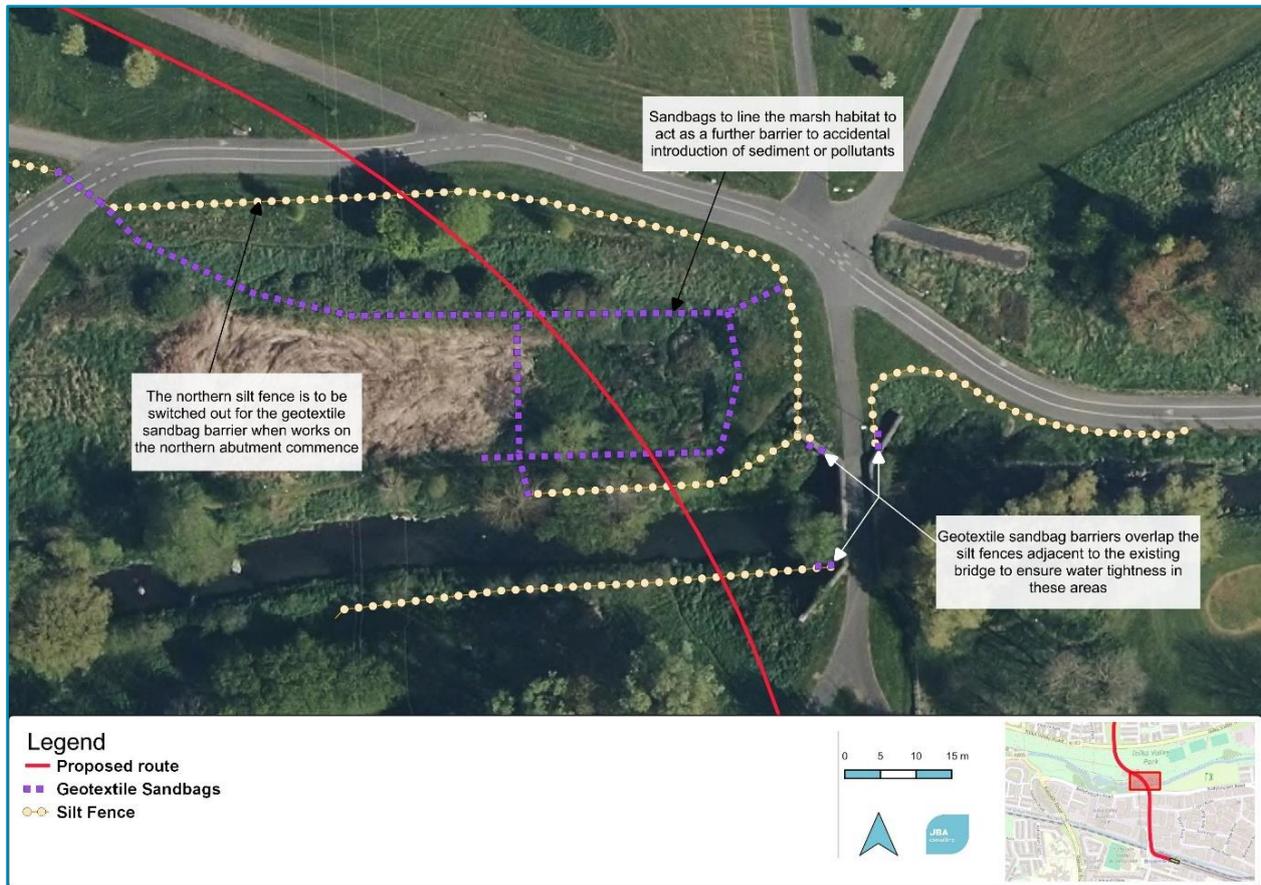


Figure 7-4: Indicative installation locations of silt fences and geotextile sandbag barriers (Tolka Valley Park Bridge) (Bluesky, 2024)

7.1.6.4 Area 31 - S31.3: Tolka Valley Park to Tolka Valley Road

The remainder of the Tolka Valley Park area / section will require the installation of silt fences and geotextile sandbag barriers to safeguard the Tolka Valley Park ICWs and Pond, and the River Tolka. See Figure 7-5 below for the indicative locations of these proposed silt fences and geotextiles sandbag barriers, the locations of which may be relocated provide there is acceptable rationale backing the relocation as well as assurance that the functional integrity of the mitigation measures is not compromised. Figure 7-5 also displays the location of this section's site compound.

The standard guidance and plans listed in sub-sections 7.1.1, 7.1.2, 7.1.3, 7.1.4 and 7.1.5 will also be required in order to protect the surface water and groundwater networks, as well as the health of amenity grassland habitats utilised by the SCI bird species.

An ECoW will be regularly present on-site during the works to ensure that all the prescribed mitigation measures are being strictly adhered to.



Figure 7-5: Indicative installation locations of silt fences and geotextile sandbag barriers (Tolka Valley Park) (Bluesky, 2024)

7.1.6.5 Area 32 - S32.1: Tolka Valley Road to St Helena's Road

Seasonal construction constraints are required in order to mitigate for the risk of disturbance to SCI bird species during the winter period within the amenity grasslands (West Farnham area - Western playing pitches and East Farnham area - Erin's Isle GAA pitches), located within and adjacent to the proposed Scheme. Given that up to 64.59% of North Bull Island SPA's Light-bellied Brent Goose population, as well as smaller flocks of other SCI species (Black-headed Gull, Herring and Curlew), can be present within the Farnham area during the high frequency utilisation months (December to February inclusive) a minimum disturbance buffer of 400m from the identified core foraging areas will be in place throughout these months (see Figure 7-6 below). This will mean that no enabling or construction works will be conducted within this 400m buffer for these months. Works north of Wellmount Road can be conducted without any seasonal restrictions.

The standard guidance and plans listed in sub-sections 7.1.1, 7.1.2, 7.1.3, 7.1.4 and 7.1.5 will also be required in order to protect the health of amenity grassland habitats utilised by the SCI bird species.



Figure 7-6: SCI disturbance buffers in the Farnham area for key foraging months (400m / December to March inclusive) (Bluesky, 2024)

7.1.6.6 Area 32 - S32.2: St Helena's Road to Cardiff Castle Road

Similarly, to the Tolka Valley Road to St Helena's Road section, Area 32 - S32.2 will also be required to follow the seasonal restrictions on enabling and construction works within the Farnham area (see Figure 7-6 above). This will mean that no enabling or construction works will be conducted within this 400m buffer between the months of November to March inclusive. Works south of St Helena's Drive can be conducted without any seasonal restrictions.

The standard guidance and plans listed in sub-sections 7.1.1, 7.1.2, 7.1.3, 7.1.4 and 7.1.5 will also be required in order to protect the health of amenity grassland habitats utilised by the SCI bird species.

7.1.6.7 Area 32 - S32.3: Finglas Village and Finglas Village Stop

Area specific mitigation measures are not required for Area 32 - S32.3: Finglas Village and Finglas Village Stop during the Construction Phase, given its lack of surface water connection to local watercourses and its unsuitability for utilisation by flocks of SCI bird species. The standard guidance and plans listed in sub-sections 7.1.1, 7.1.2, 7.1.3, 7.1.4 and 7.1.5 will prove sufficient to address the required level mitigation needed in this area.

7.1.6.8 Area 33 - S33.1: Mellowes Park

While Mellowes Park supports Black-headed Gull, Herring Gull and Common Gull, these species were only observed occasionally and in low numbers, as result the park has not been deemed a core wintering bird foraging area. Therefore, it has been deemed that Area 33 - S33.1 Mellowes Park will not require specific mitigations during the Construction Phase, given its lack of surface water connection to local watercourses and its limited capacity to support three of the SCI bird species. The standard guidance and plans listed in sub-sections 7.1.1, 7.1.2, 7.1.3, 7.1.4 and 7.1.5 will prove sufficient to address the required level mitigation needed in this area.

7.1.6.9 Area 33 - S33.2: R135 / R104 junction

Area specific mitigation measures are not required for Area 33 - S33.2: R135 / R104 junction during the Construction Phase, given its lack of surface water connection to local watercourses and its unsuitability for utilisation by flocks of SCI bird species. The standard guidance and plans listed in sub-sections 7.1.1, 7.1.2, 7.1.3, 7.1.4 and 7.1.5 will prove sufficient to address the required level mitigation needed in this area.

7.1.6.10 Area 33 - S33.3: St Margaret's Stop

Area specific mitigation measures are not required for Area 33 - S33.3: St Margaret's Stop during the Construction Phase, given its lack of surface water connection to local watercourses and its unsuitability for utilisation by flocks of SCI bird species. The standard guidance and plans listed in sub-sections 7.1.1, 7.1.2, 7.1.3, 7.1.4 and 7.1.5 will prove sufficient to address the required level mitigation needed in this area.

7.1.6.11 Area 33 - S33.4: St Margaret's Road and Charlestown Terminus

Area specific mitigation measures are not required for Area 33 - S33.4: St Margaret's Road and Charlestown Terminus during the Construction Phase, given its lack of surface water connection to local watercourses and its unsuitability for utilisation by flocks of SCI bird species. The standard guidance and plans listed in sub-sections 7.1.1, 7.1.2, 7.1.3, 7.1.4 and 7.1.5 will prove sufficient to address the required level mitigation needed in this area.

7.2 Operational Phase Mitigations

The Operational Phase mitigation sections below will address bird collision mitigation measures and operational surface water run-off management. Operational Phase mitigations are limited to these two subjects, as much of the potential operational impacts and associated mitigations were pre-emptively accounted for (avoidance through design) and planned into the bridge (and overhead cables), drainage, landscape designs. This helps ensure that the Natura 2000 sites and their respective QIs / SCIs will be safeguarded during the proposed Scheme's Operational Phase.

7.2.1 Bird Collision Mitigation

The new bridges over the railway line / Royal Canal and River Tolka have been designed without cables in order to reduce the risk of SCI bird collision. Furthermore, to mitigate for the risk of collision with overhead lines during the Operational Phase of the proposed Scheme, deflectors will be installed on wires parallel to the overhead lines at a number of strategic locations, including the Broombridge rail bridge over the Royal Canal; and Tolka Valley Park bridge; and along the tracks within the Tolka Valley Park and Farnham areas. The use of flight deflectors on overhead lines has been shown to be highly effective in reducing waterfowl collision mortalities (Frost, 2008).

7.2.2 Operational SuDS Design

As surface water run-off from hardstanding areas will be the main operational emission from the proposed Scheme, a series of SuDS are proposed throughout the Scheme's drainage / landscape operational designs, including grass tracks; rain gardens; permeable paving; tree pits; roadside beds; and roadside directional beds. These SuDS features will collectively provide surface water run-off attenuation, infiltration, and in-situ retention of sediments (and associated nutrients), metals, and hydrocarbons (Jurries, 2003; Anderson et al., 2016). Therefore, the terrestrial habitats within and directly adjacent to the proposed Scheme will not experience any operational contamination, protecting the terrestrial and aquatic habitats, and the SCI species that they support. Additionally, the River Tolka and Royal Canal will not experience any operational contamination from surface water run-off of hardstanding surfaces, which in turn safeguards the downstream habitats / waterbodies within Dublin Bay.

Additionally, one of SuDS features connected to the ICW within the Tolka Valley Park will be pre-emptively constructed before the construction works in order to sustain the performance and protection of the Tolka Valley Park ICWs. In order to facilitate the early commencement of works in this area, it is programmed that the ICW will be progressed as part of the proposed Scheme's enabling works.

7.2.3 Post-construction Monitoring of SCI Bird Species

A 24-month post-construction monitoring period will be conducted by a suitably qualified wintering bird ecology team on the migrant wintering bird species, in particular the Light-bellied Brent Goose, given their prevalence within the boundaries of the proposed Scheme during the winter period. The wintering bird data collected during this monitoring period will be compared with that of the existing baseline, the pre-construction surveys, and the Construction-Phase monitoring data, in order to establish whether there has been changes to frequency of occurrence and flock numbers within the proposed Scheme's area, which amenity grasslands they utilised for foraging; as well as the level of vigilance behaviour they display. The subsequent survey report will be disseminated to relevant bodies, i.e., NPWS and DCC Parks, Biodiversity and Landscape Services Division.

7.3 Residual Impacts

Residual ecological impacts are those that remain once the development proposals have been implemented. The main aim of ecological mitigation and enhancement is to minimise or eliminate residual impacts.

7.3.1 Construction Phase

The enabling and construction works will potentially result in the disturbance to the non-essential foraging habitat for SCI bird species, as well as impacts on local surface water and groundwater networks.

Implementation of mitigation measures during the Construction Phase, along with good site management and construction practices will help to minimise any significant and/or permanent impact on the environment. This will be included in a These mitigation measures, as detailed in Section 7.1 above, are set out in the CEMP (contained in Appendix E of this NIS). Included in this will be, all of the mitigation measures set out in this NIS for visual and audible disturbance, as well as control of surface water, groundwater, and dust which will negate any residual impacts on the local surface water and groundwater networks, and the associated QI / SCI habitats and species. No residual Construction Phase impacts are predicted.

7.3.2 Operational Phase

The proposed Scheme, will not generate any residual impacts as a result of its operation, given the appropriated designed SuDS features within the Scheme; and the suitable operational noise levels of the light-rail network within the disturbance buffers of the SCI bird species within the Farnham area.

7.4 In-Combination Effects

The high-level strategic plans outlined in section 5.2, and listed below, including their policies and objectives were examined for potential in-combination effects with respect to the proposed Scheme.

- Dublin City Development Plan 2022 – 2028;
- Fingal County Development Plan 2023-2029;
- Greater Dublin Drainage Strategy 2005;
- Transport Strategy for Greater Dublin Area 2022-2042; and
- Third Cycle River Basin Management Plan for Ireland 2022-2027.

Of the local permitted (and pending) plans and projects, and those for which an application for approval has been made but not yet determined, nine projects are presented as the most likely to act in cumulative manner towards the disturbance of SCI bird species within the Zol of the proposed Scheme. These nine projects have been highlighted given their scale and disturbance buffers, which either share surface water connections with Dublin Bay and/or overlap with the SCI foraging areas (Farnham area) within the vicinity of the proposed Scheme and/or include other areas known to support the inland foraging of SCI bird species. These projects are the proposed DART+ West; DART+ South West; DART+ Coastal North; MetroLink; Phase 4B of the Royal Canal Greenway; facility upgrades to the existing Erin's Isle GAA; Ballyboggan LAP; redevelopment of Scoil Chiarain Special School; and Bus Connects Dublin: Ringsend to City Centre.

The work for Erin's Isle GAA facility upgrades commenced in December 2022, and given the scale of the upgrade works, they will be completed before the commencement of enabling works for the proposed Scheme, and therefore will not have the capacity to add to any cumulative or in-combination impacts with other local projects.

Given that MetroLink construction activities will mostly be subterranean within the Dublin City area, this largely negates its impact disturbance potential on SCI bird species within supporting ex-situ amenity grasslands in the Glasnevin and DCU Sports Campus areas. Furthermore, through examination of the MetroLink's NIS report, it is clear that the prescribed mitigations within will safeguard the local vector pathways to the Dublin Bay Natura 2000 sites. Therefore, the MetroLink project does not have the capacity to act in-combination with the proposed Scheme to generate cumulative impacts on the Dublin Bay Natura 2000 sites, and their respective QIs and SCIs.

The proposed Dart+ West project is located within disturbance zones of known Light-bellied Brent Goose foraging areas (Glasnevin and Ashtown amenity grassland areas). However, given that the project's NIS report outlines that works will not be conducted during October to November, this will safeguard the Light-bellied Goose foraging activities. Additionally, through further examination of the project's NIS, it is apparent that the prescribed mitigations will safeguard the local vector pathways to the North Dublin Bay SAC, South Dublin Bay SAC, Rockabill to Dalkey Island SAC, North Bull Island SPA, South Dublin Bay and River Tolka Estuary SPA, and North-west Irish Sea SPA. Moreover, there are mitigation measure that outline the requirement to liaise with other overlapping large-scale project teams, including the DART+ West, in order to ensure that construction times within these overlapping areas do not coincide, thus preventing the potential for cumulative or in-combination impacts. Therefore, the Dart+ West project does not have the capacity to act in-combination with the proposed Scheme to generate cumulative impacts on the Dublin Bay Natura 2000 sites, and their respective QIs and SCIs.

The proposed Dart+ South West project is also located within disturbance zones of known Light-bellied Brent Goose foraging areas (Glasnevin and Cabra East amenity grassland areas). While the project's NIS addresses bird collision risk, impact, and mitigation, it does not examine, nor mitigate for the potential

disturbance to Light-bellied Brent Goose foraging activities within the locality of the works. Therefore, this project does have the capacity to generate a cumulative disturbance impact on the Light-bellied Brent Goose southern sub-population of North Bull Island SPA. However, given the mitigation measures outlined within this NIS document (sub-section 7.1.6), the proposed Scheme will not result in the disturbance of Light-bellied Brent Goose, or any other SCI bird species, during the winter months, and thus prevent the occurrence of any cumulative or in-combination impacts.

As the DART+ Coastal North project is still within its design phase, there are no AA Screening or NIS reports to reference for future mitigation measures to assess in respect to potential cumulative and in-combination impacts, though we can still examine this project in regard to its potential unmitigated Construction and Operational impacts. The location of this project (railway route) places it within 400m (disturbance buffer ZoI) of a habitats (Fairview and Tolka Estuary area) utilised by the southern sub-population of Light-bellied Brent Goose (SCI species) associated with the North Bull Island SPA. However, given the mitigation measures outlined within this NIS document (sub-section 7.1.6), the proposed Scheme will not result in the disturbance of Light-bellied Brent Goose, or any other SCI bird species, during the winter months, and thus prevent the occurrence of any cumulative or in-combination impacts.

The proposed Phase 4B of the Royal Canal Greenway is located within disturbance zones of known Light-bellied Brent Goose foraging areas (Glasnevin, Cabra East and Ashtown amenity grassland areas). The project's Ecological Impact Assessment does not mitigate for the potential disturbance to Light-bellied Brent Goose foraging activities within the locality of the works. Therefore, this project does have the capacity to generate a cumulative disturbance impact on the Light-bellied Brent Goose southern sub-population of North Bull Island SPA. However, given the mitigation measures outlined within this NIS document (sub-section 7.1.6), the proposed Scheme will not result in the disturbance of Light-bellied Brent Goose, or any other SCI bird species, during the winter months, and thus prevent the occurrence of any cumulative or in-combination impacts. Moreover, in respect to the other impact pathways, the mitigation measures within section 7.1.6 that outlines the requirement to liaise with other overlapping large-scale project teams, including the Phase 4B of the Royal Canal Greenway, in order to ensure that construction times within this overlapping areas do not coincide, thus preventing the potential for cumulative or in-combination impacts.

Additionally, the pending Ballyboggan LAP has a ZoI which will notably overlap with all of the proposed Scheme's ZoI buffers. If the construction of the Broombridge, Ballyboggan and Tolka Valley Park sections of the proposed Scheme overlap with any of developmental elements of the Ballyboggan LAP, there will be the potential for cumulative or in-combination impacts (subject to the proposed development types and respective mitigation measures included within the NIS reports). However, the mitigation measures within section 7.1.6 that outlines the requirement to liaise with other overlapping large-scale project teams, including the Ballyboggan LAP, in order to ensure that construction times within these overlapping areas do not coincide, thus preventing the potential for cumulative or in-combination impacts.

The permitted redevelopment of Scoil Chiarain Special School's application contains within it a submitted AA Screening document. This screening document fails to identify that the SCI wintering birds (e.g., Light-bellied Brent Goose and Curlew) associated with the North Bull Island SPA, forage in the immediately adjacent DCU Sports Campus pitches which border the school to the east and south, therefore, there is the potential for this development to result in disturbance impacts for these SCI species. However, given the mitigation measures outlined within this NIS document (sub-section 7.1.6), the proposed Scheme will not result in the disturbance of Light-bellied Brent Goose, or any other SCI bird species, during the winter months, and thus prevent the occurrence of any cumulative or in-combination impacts with school project.

The Bus Connects Ringsend to City Centre's ZoI for impacts overlaps with the proposed Scheme in respect to hydrological connections to the North Dublin Bay SAC, North Bull Island SPA, South Dublin Bay SAC and South Dublin Bay and Tolka Estuary SPA. From review of the project application's NIS, it is clear that the prescribed mitigations within will safeguard the local vector pathways to the above Dublin Bay Natura 2000 sites. Therefore, the Bus Connects Ringsend to City Centre project does not have the capacity to act in combination with the proposed Scheme to generate cumulative impacts and in-combination impacts.

The remainder of the permitted projects and their respective ecological reports have been examined in respect to their overlapping Zol buffers with the proposed Scheme, as well as their residual impacts; and have been deemed incapable of creating a cumulative or in-combination impact of significance via their respective impact-receptor pathways with the proposed Scheme. Therefore, it is predicted that there will be no adverse cumulative and in-combination impacts on the Natura 2000 sites within the Zol, and respective QIs / SCIs.

7.5 Impact and Mitigations Summary

Table 7-4 overleaf summarises the potential impacts on the attributes of the designated QIs and SCIs of the North Dublin Bay SAC; South Dublin Bay SAC; Rockabill to Dalkey Island SAC; North Bull Island SPA; South Dublin Bay and River Tolka Estuary SPA; and North-west Irish Sea SPA along with the mitigation measures, in combination effects and residual impacts.

Table 7-4: Pathways of impact on the attributes of the designated QIs and SCIs of the Natura 2000 sites, along with mitigation measures, in combination effects and residual impacts

Qualifying Interest / Special Conservation Interest	Attribute	Measure	Potential Impacts	In combination effects	Mitigation Measures	Residual Impact
North Dublin Bay SAC						
Mudflats and sandflats not covered by seawater at low tide [1140]	Habitat area	Hectares	N/A (Construction and Operational impacts incapable of affecting attribute)	In combination effects with other plans and projects are not predicted.	None required.	No adverse effects
	Community extent	Hectares	A temporary or permanent reduction in <i>Zostera</i> -dominated community extent as a result of deleterious substances entering the habitat via surface water and groundwater-to-surface water pathways.	In-combination effects with other plans and projects are not predicted.	Strict adherence to: The mitigations outlined in Sub-sections 7.1.1, 7.1.2, 7.1.3, 7.1.4, 7.1.5 and 7.1.6 pertaining to the best practice guidance; surface water management, pollution control, waste and dust management plans; biosecurity measures within the invasive species management plans; and area / section specific mitigations, respectively.	No adverse effects
	Community structure: <i>Zostera</i> density	Shoots per m ²	A temporary or permanent reduction in <i>Zostera</i> density as a result of deleterious substances entering the habitat via surface water and groundwater-to-surface water pathways.	In-combination effects with other plans and projects are not predicted.	Strict adherence to: The mitigations outlined in Sub-sections 7.1.1, 7.1.2, 7.1.3, 7.1.4, 7.1.5 and 7.1.6 pertaining to the best practice guidance; surface water management, pollution control, waste and dust management plans; biosecurity measures within the invasive	No adverse effects

Qualifying Interest / Special Conservation Interest	Attribute	Measure	Potential Impacts	In combination effects	Mitigation Measures	Residual Impact
					species management plans; and area / section specific mitigations, respectively.	
	Community distribution	Hectares	A temporary or permanent reduction in the distribution of Muddy sand to fine sand dominated by <i>Hydrobia ulvae</i> , <i>Pygospio elegans</i> and <i>Tubificoides benedii</i> community complexes; Estuarine muddy sand dominated by <i>Hediste diversicolor</i> and <i>Heterochaeta costata</i> community complexes; and Fine sand dominated by <i>Nephtys cirrosa</i> community complexes, as a result of deleterious substances entering the habitat via surface water and groundwater-to-surface water pathways.	Cumulative impacts or in-combination effects with other plans and projects are not predicted.	<p>Strict adherence to:</p> <p>The mitigations outlined in Sub-sections 7.1.1, 7.1.2, 7.1.3, 7.1.4, 7.1.5 and 7.1.6 pertaining to the best practice guidance; surface water management, pollution control, waste and dust management plans; biosecurity measures within the invasive species management plans; and area / section specific mitigations, respectively.</p>	No adverse effects
Annual vegetation of drift lines [1210]	Habitat area	Hectares	A temporary or permanent reduction in the habitat area as a result of deleterious substances entering the habitat via surface water and groundwater-to-surface water pathways.	Cumulative impacts or in-combination effects with other plans and projects are not predicted.	<p>Strict adherence to:</p> <p>The mitigations outlined in Sub-sections 7.1.1, 7.1.2, 7.1.3, 7.1.4, 7.1.5 and 7.1.6 pertaining to the best practice guidance; surface water management, pollution control, waste and dust management plans; biosecurity measures within the invasive species management plans; and area / section specific mitigations, respectively.</p>	No adverse effects

Qualifying Interest / Special Conservation Interest	Attribute	Measure	Potential Impacts	In combination effects	Mitigation Measures	Residual Impact
	Habitat distribution	Occurrence	A temporary or permanent decline in habitat distribution as a result of deleterious substances entering the habitat via surface water and groundwater-to-surface water pathways.	In combination effects with other plans and projects are not predicted.	<p>Strict adherence to:</p> <p>The mitigations outlined in Sub-sections 7.1.1, 7.1.2, 7.1.3, 7.1.4, 7.1.5 and 7.1.6 pertaining to the best practice guidance; surface water management, pollution control, waste and dust management plans; biosecurity measures within the invasive species management plans; and area / section specific mitigations, respectively.</p>	No adverse effects
	Physical structure: sediment supply	Presence/absence of physical barriers	N/A (Construction and Operational impacts incapable of affecting attribute)	In combination effects with other plans and projects are not predicted.	None required.	No adverse effects
	Vegetation structure: zonation	Occurrence	N/A (Construction and Operational impacts incapable of affecting attribute)	In combination effects with other plans and projects are not predicted.	None required.	No adverse effects
	Vegetation composition: typical species and subcommunities	Percentage cover at a representative number of monitoring stops	A temporary or permanent reduction of species-poor communities with typical species: Sea Rocket <i>Cakile maritima</i> , Sea Sandwort <i>Honckenia peploides</i> , Prickly Saltwort <i>Salsola kali</i> and oraches <i>Atriplex</i> spp., as a result of deleterious substances entering the habitat via surface water and groundwater-to-surface water pathways.	In combination effects with other plans and projects are not predicted.	<p>Strict adherence to:</p> <p>The mitigations outlined in Sub-sections 7.1.1, 7.1.2, 7.1.3, 7.1.4, 7.1.5 and 7.1.6 pertaining to the best practice guidance; surface water management, pollution control, waste and dust management plans; biosecurity measures within the invasive</p>	No adverse effects

Qualifying Interest / Special Conservation Interest	Attribute	Measure	Potential Impacts	In combination effects	Mitigation Measures	Residual Impact
					species management plans; and area / section specific mitigations, respectively.	
	Vegetation composition: negative indicator species	Percentage cover	A temporary or permanent reduction of positive indicator species as a result of deleterious substances entering the habitat via surface water and groundwater-to-surface water pathways may lead to the establishment and higher percentage cover of negative indicator species within the habitat.	In combination effects with other plans and projects are not predicted.	<p>Strict adherence to:</p> <p>The mitigations outlined in Sub-sections 7.1.1, 7.1.2, 7.1.3, 7.1.4, 7.1.5 and 7.1.6 pertaining to the best practice guidance; surface water management, pollution control, waste and dust management plans; biosecurity measures within the invasive species management plans; and area / section specific mitigations, respectively.</p>	No adverse effects
Salicornia and other annuals colonising mud and sand [1310]	Habitat distribution	Occurrence	A temporary or permanent reduction in distribution as a result of deleterious substances entering the habitat via surface water and groundwater-to-surface water pathways.	In combination effects with other plans and projects are not predicted.	<p>Strict adherence to:</p> <p>The mitigations outlined in Sub-sections 7.1.1, 7.1.2, 7.1.3, 7.1.4, 7.1.5 and 7.1.6 pertaining to the best practice guidance; surface water management, pollution control, waste and dust management plans; biosecurity measures within the invasive species management plans; and area / section specific mitigations, respectively.</p>	No adverse effects

Qualifying Interest / Special Conservation Interest	Attribute	Measure	Potential Impacts	In combination effects	Mitigation Measures	Residual Impact
	Physical structure: sediment supply	Presence/ absence of physical barriers	N/A (Construction and Operational impacts incapable of affecting attribute)	In combination effects with other plans and projects are not predicted.	None required.	No adverse effects
	Physical structure: creeks and pans	Occurrence	N/A (Construction and Operational impacts incapable of affecting attribute)	In combination effects with other plans and projects are not predicted.	None required.	No adverse effects
	Physical structure: flooding regime	Hectares flooded; frequency	N/A (Construction and Operational impacts incapable of affecting attribute)	In combination effects with other plans and projects are not predicted.	None required.	No adverse effects
	Vegetation structure: zonation	Occurrence	N/A (Construction and Operational impacts incapable of affecting attribute)	In combination effects with other plans and projects are not predicted.	None required.	No adverse effects
	Vegetation structure: vegetation height	Centimetres	A temporary or permanent impact on the structural variation of sward as a result of deleterious substances entering the habitat via surface water and groundwater-to-surface water pathways.	In combination effects with other plans and projects are not predicted.	<p>Strict adherence to:</p> <p>The mitigations outlined in Sub-sections 7.1.1, 7.1.2, 7.1.3, 7.1.4, 7.1.5 and 7.1.6 pertaining to the best practice guidance; surface water management, pollution control, waste and dust management plans; biosecurity measures within the invasive species management plans; and area / section specific mitigations, respectively.</p>	No adverse effects

Qualifying Interest / Special Conservation Interest	Attribute	Measure	Potential Impacts	In combination effects	Mitigation Measures	Residual Impact
	Vegetation structure: vegetation cover	Percentage cover at a representative sample of monitoring stops	A temporary or permanent impact on vegetation cover as a result of deleterious substances entering the habitat via surface water and groundwater-to-surface water pathways.	In combination effects with other plans and projects are not predicted.	<p>Strict adherence to:</p> <p>The mitigations outlined in Sub-sections 7.1.1, 7.1.2, 7.1.3, 7.1.4, 7.1.5 and 7.1.6 pertaining to the best practice guidance; surface water management, pollution control, waste and dust management plans; biosecurity measures within the invasive species management plans; and area / section specific mitigations, respectively.</p>	No adverse effects
	Vegetation composition: typical species and subcommunities	Percentage cover	<p>A temporary or permanent impact on the listed species-poor communities as a result of deleterious substances entering the habitat via surface water and groundwater-to-surface water pathways.</p> <p>Additionally, the spread of invasive species (e.g., Japanese Knotweed and Himalayan Balsam) into the floral community, as a result of the Scheme, may temporarily or permanently impact the floral species composition within this Annex habitat.</p>	In combination effects with other plans and projects are not predicted.	<p>Strict adherence to:</p> <p>The mitigations outlined in Sub-sections 7.1.1, 7.1.2, 7.1.3, 7.1.4, 7.1.5 and 7.1.6 pertaining to the best practice guidance; surface water management, pollution control, waste and dust management plans; biosecurity measures within the invasive species management plans; and area / section specific mitigations, respectively.</p>	No adverse effects
	Vegetation structure: negative indicator	Hectares	A temporary or permanent increase in <i>Spartina anglica</i> cover as result of a reduction in native vegetation caused by deleterious substances entering the habitat via surface	In combination effects with other plans and projects are not predicted.	<p>Strict adherence to:</p> <p>The mitigations outlined in Sub-sections 7.1.1, 7.1.2, 7.1.3, 7.1.4, 7.1.5 and 7.1.6 pertaining to the</p>	No adverse effects

Qualifying Interest / Special Conservation Interest	Attribute	Measure	Potential Impacts	In combination effects	Mitigation Measures	Residual Impact
	species - <i>Spartina anglica</i>		water and groundwater-to-surface water pathways.		best practice guidance; surface water management, pollution control, waste and dust management plans; biosecurity measures within the invasive species management plans; and area / section specific mitigations, respectively.	
Atlantic salt meadows (Glauco-Puccinellietalia maritimae) [1330]	Habitat area	Hectares	A temporary or permanent reduction in habitat area as a result of deleterious substances entering the habitat via surface water and groundwater-to-surface water pathways.	In combination effects with other plans and projects are not predicted.	Strict adherence to: The mitigations outlined in Sub-sections 7.1.1, 7.1.2, 7.1.3, 7.1.4, 7.1.5 and 7.1.6 pertaining to the best practice guidance; surface water management, pollution control, waste and dust management plans; biosecurity measures within the invasive species management plans; and area / section specific mitigations, respectively.	No adverse effects
	Habitat distribution	Occurrence	A temporary or permanent reduction in distribution as a result of deleterious substances entering the habitat via surface water and groundwater-to-surface water pathways.	In combination effects with other plans and projects are not predicted.	Strict adherence to: The mitigations outlined in Sub-sections 7.1.1, 7.1.2, 7.1.3, 7.1.4, 7.1.5 and 7.1.6 pertaining to the best practice guidance; surface water management, pollution control, waste and dust management plans; biosecurity measures within the invasive species management plans; and	No adverse effects

Qualifying Interest / Special Conservation Interest	Attribute	Measure	Potential Impacts	In combination effects	Mitigation Measures	Residual Impact
					area / section specific mitigations, respectively.	
	Physical structure: sediment supply	Presence/ absence of physical barriers	N/A (Construction and Operational impacts incapable of affecting attribute)	In combination effects with other plans and projects are not predicted.	None required.	No adverse effects
	Physical structure: creeks and pans	Occurrence	N/A (Construction and Operational impacts incapable of affecting attribute)	In combination effects with other plans and projects are not predicted.	None required.	No adverse effects
	Physical structure: flooding regime	Hectares flooded; frequency	N/A (Construction and Operational impacts incapable of affecting attribute)	In combination effects with other plans and projects are not predicted.	None required.	No adverse effects
	Vegetation structure: zonation	Occurrence	N/A (Construction and Operational impacts incapable of affecting attribute)	In combination effects with other plans and projects are not predicted.	None required.	No adverse effects
	Vegetation structure: vegetation height	Centimetres	A temporary or permanent impact on the structural variation of sward as a result of deleterious substances entering the habitat via surface water and groundwater-to-surface water pathways.	In combination effects with other plans and projects are not predicted.	<p>Strict adherence to:</p> <p>The mitigations outlined in Sub-sections 7.1.1, 7.1.2, 7.1.3, 7.1.4, 7.1.5 and 7.1.6 pertaining to the best practice guidance; surface water management, pollution control, waste and dust management plans; biosecurity measures within the invasive species management plans; and area / section specific mitigations, respectively.</p>	No adverse effects

Qualifying Interest / Special Conservation Interest	Attribute	Measure	Potential Impacts	In combination effects	Mitigation Measures	Residual Impact
	Vegetation structure: vegetation cover	Percentage cover at a representative sample of monitoring stops	A temporary or permanent impact on vegetation cover as a result of deleterious substances entering the habitat via surface water and groundwater-to-surface water pathways.	In combination effects with other plans and projects are not predicted.	<p>Strict adherence to:</p> <p>The mitigations outlined in Sub-sections 7.1.1, 7.1.2, 7.1.3, 7.1.4, 7.1.5 and 7.1.6 pertaining to the best practice guidance; surface water management, pollution control, waste and dust management plans; biosecurity measures within the invasive species management plans; and area / section specific mitigations, respectively.</p>	No adverse effects
	Vegetation composition: typical species and subcommunities	Percentage cover	<p>A temporary or permanent impact on the listed species communities as a result of deleterious substances entering the habitat via surface water and groundwater-to-surface water pathways.</p> <p>Additionally, the spread of invasive species (e.g., Japanese Knotweed and Himalayan Balsam) into the floral community, as a result of the Scheme, may temporarily or permanently impact the floral species composition within this Annex habitat.</p>	In combination effects with other plans and projects are not predicted.	<p>Strict adherence to:</p> <p>The mitigations outlined in Sub-sections 7.1.1, 7.1.2, 7.1.3, 7.1.4, 7.1.5 and 7.1.6 pertaining to the best practice guidance; surface water management, pollution control, waste and dust management plans; biosecurity measures within the invasive species management plans; and area / section specific mitigations, respectively.</p>	No adverse effects
	Vegetation structure: negative indicator	Hectares	A temporary or permanent increase in <i>Spartina anglica</i> cover as result of a reduction in native vegetation caused by deleterious substances entering the habitat via surface	In combination effects with other plans and projects are not predicted.	<p>Strict adherence to:</p> <p>The mitigations outlined in Sub-sections 7.1.1, 7.1.2, 7.1.3, 7.1.4, 7.1.5 and 7.1.6 pertaining to the</p>	No adverse effects

Qualifying Interest / Special Conservation Interest	Attribute	Measure	Potential Impacts	In combination effects	Mitigation Measures	Residual Impact
	species - <i>Spartina anglica</i>		water and groundwater-to-surface water pathways.		best practice guidance; surface water management, pollution control, waste and dust management plans; biosecurity measures within the invasive species management plans; and area / section specific mitigations, respectively.	
Mediterranean salt meadows (<i>Juncetalia maritimi</i>) [1410]	Habitat area	Hectares	A temporary or permanent reduction in habitat area as a result of deleterious substances entering the habitat via surface water and groundwater-to-surface water pathways.	In combination effects with other plans and projects are not predicted.	Strict adherence to: The mitigations outlined in Sub-sections 7.1.1, 7.1.2, 7.1.3, 7.1.4, 7.1.5 and 7.1.6 pertaining to the best practice guidance; surface water management, pollution control, waste and dust management plans; biosecurity measures within the invasive species management plans; and area / section specific mitigations, respectively.	No adverse effects
	Habitat distribution	Occurrence	A temporary or permanent reduction in distribution as a result of deleterious substances entering the habitat via surface water and groundwater-to-surface water pathways.	In combination effects with other plans and projects are not predicted.	Strict adherence to: The mitigations outlined in Sub-sections 7.1.1, 7.1.2, 7.1.3, 7.1.4, 7.1.5 and 7.1.6 pertaining to the best practice guidance; surface water management, pollution control, waste and dust management plans; biosecurity measures within the invasive species management plans; and	No adverse effects

Qualifying Interest / Special Conservation Interest	Attribute	Measure	Potential Impacts	In combination effects	Mitigation Measures	Residual Impact
					area / section specific mitigations, respectively.	
	Physical structure: sediment supply	Presence/ absence of physical barriers	N/A (Construction and Operational impacts incapable of affecting attribute)	In combination effects with other plans and projects are not predicted.	None required.	No adverse effects
	Physical structure: creeks and pans	Occurrence	N/A (Construction and Operational impacts incapable of affecting attribute)	In combination effects with other plans and projects are not predicted.	None required.	No adverse effects
	Physical structure: flooding regime	Hectares flooded; frequency	N/A (Construction and Operational impacts incapable of affecting attribute)	In combination effects with other plans and projects are not predicted.	None required.	No adverse effects
	Vegetation structure: zonation	Occurrence	N/A (Construction and Operational impacts incapable of affecting attribute)	In combination effects with other plans and projects are not predicted.	None required.	No adverse effects
	Vegetation structure: vegetation height	Centimetres	A temporary or permanent impact on the structural variation of sward as a result of deleterious substances entering the habitat via surface water and groundwater-to-surface water pathways.	In combination effects with other plans and projects are not predicted.	<p>Strict adherence to:</p> <p>The mitigations outlined in Sub-sections 7.1.1, 7.1.2, 7.1.3, 7.1.4, 7.1.5 and 7.1.6 pertaining to the best practice guidance; surface water management, pollution control, waste and dust management plans; biosecurity measures within the invasive species management plans; and area / section specific mitigations, respectively.</p>	No adverse effects

Qualifying Interest / Special Conservation Interest	Attribute	Measure	Potential Impacts	In combination effects	Mitigation Measures	Residual Impact
	Vegetation structure: vegetation cover	Percentage cover at a representative sample of monitoring stops	A temporary or permanent impact on vegetation cover as a result of deleterious substances entering the habitat via surface water and groundwater-to-surface water pathways.	In combination effects with other plans and projects are not predicted.	<p>Strict adherence to:</p> <p>The mitigations outlined in Sub-sections 7.1.1, 7.1.2, 7.1.3, 7.1.4, 7.1.5 and 7.1.6 pertaining to the best practice guidance; surface water management, pollution control, waste and dust management plans; biosecurity measures within the invasive species management plans; and area / section specific mitigations, respectively.</p>	No adverse effects
	Vegetation composition: typical species and subcommunities	Percentage cover	<p>A temporary or permanent impact on the listed species communities as a result of deleterious substances entering the habitat via surface water and groundwater-to-surface water pathways.</p> <p>Additionally, the spread of invasive species (e.g., Japanese Knotweed and Himalayan Balsam) into the floral community, as a result of the Scheme, may temporarily or permanently impact the floral species composition within this Annex habitat.</p>	In combination effects with other plans and projects are not predicted.	<p>Strict adherence to:</p> <p>The mitigations outlined in Sub-sections 7.1.1, 7.1.2, 7.1.3, 7.1.4, 7.1.5 and 7.1.6 pertaining to the best practice guidance; surface water management, pollution control, waste and dust management plans; biosecurity measures within the invasive species management plans; and area / section specific mitigations, respectively.</p>	No adverse effects
	Vegetation structure: negative indicator	Hectares	A temporary or permanent increase in <i>Spartina anglica</i> cover as result of a reduction in native vegetation caused by deleterious substances entering the habitat via surface	In combination effects with other plans and projects are not predicted.	<p>Strict adherence to:</p> <p>The mitigations outlined in Sub-sections 7.1.1, 7.1.2, 7.1.3, 7.1.4, 7.1.5 and 7.1.6 pertaining to the</p>	No adverse effects

Qualifying Interest / Special Conservation Interest	Attribute	Measure	Potential Impacts	In combination effects	Mitigation Measures	Residual Impact
	species - <i>Spartina anglica</i>		water and groundwater-to-surface water pathways.		best practice guidance; surface water management, pollution control, waste and dust management plans; biosecurity measures within the invasive species management plans; and area / section specific mitigations, respectively.	
Embryonic shifting dunes [2110]	Habitat area	Hectares	A temporary or permanent reduction in habitat area as a result of deleterious substances entering the habitat via surface water and groundwater-to-surface water pathways.	In combination effects with other plans and projects are not predicted.	Strict adherence to: The mitigations outlined in Sub-sections 7.1.1, 7.1.2, 7.1.3, 7.1.4, 7.1.5 and 7.1.6 pertaining to the best practice guidance; surface water management, pollution control, waste and dust management plans; biosecurity measures within the invasive species management plans; and area / section specific mitigations, respectively.	No adverse effects
	Habitat distribution	Occurrence	A temporary or permanent reduction in distribution as a result of deleterious substances entering the habitat via surface water and groundwater-to-surface water pathways.	In combination effects with other plans and projects are not predicted.	Strict adherence to: The mitigations outlined in Sub-sections 7.1.1, 7.1.2, 7.1.3, 7.1.4, 7.1.5 and 7.1.6 pertaining to the best practice guidance; surface water management, pollution control, waste and dust management plans; biosecurity measures within the invasive species management plans; and	No adverse effects

Qualifying Interest / Special Conservation Interest	Attribute	Measure	Potential Impacts	In combination effects	Mitigation Measures	Residual Impact
					area / section specific mitigations, respectively.	
	Physical structure: sediment supply	Presence/absence of physical barriers	N/A (Construction and Operational impacts incapable of affecting attribute)	In combination effects with other plans and projects are not predicted.	None required.	No adverse effects
	Vegetation structure: zonation	Occurrence	N/A (Construction and Operational impacts incapable of affecting attribute)	In combination effects with other plans and projects are not predicted.	None required.	No adverse effects
	Vegetation composition: plant health of foredune grasses	Percentage cover	A reduction to less than 95% of Sand Couch <i>Elytrigia juncea</i> and/or Lyme-grass <i>Leymus arenarius</i> achieving a healthy status as result of deleterious substances entering the habitat via surface water and groundwater-to-surface water pathways.	In combination effects with other plans and projects are not predicted.	Strict adherence to: The mitigations outlined in Sub-sections 7.1.1, 7.1.2, 7.1.3, 7.1.4, 7.1.5 and 7.1.6 pertaining to the best practice guidance; surface water management, pollution control, waste and dust management plans; biosecurity measures within the invasive species management plans; and area / section specific mitigations, respectively.	No adverse effects
	Vegetation composition: typical species and subcommunities	Percentage cover at a representative number of monitoring stops	A temporary or permanent reduction of species-poor communities with typical species: Sand Couch <i>Elytrigia juncea</i> and/or Lyme-grass <i>Leymus arenarius</i> , as a result of deleterious substances entering the habitat via surface water and groundwater-to-surface water pathways.	In combination effects with other plans and projects are not predicted.	Strict adherence to: The mitigations outlined in Sub-sections 7.1.1, 7.1.2, 7.1.3, 7.1.4, 7.1.5 and 7.1.6 pertaining to the best practice guidance; surface water management, pollution control, waste and dust	No adverse effects

Qualifying Interest / Special Conservation Interest	Attribute	Measure	Potential Impacts	In combination effects	Mitigation Measures	Residual Impact
			Additionally, the spread of invasive species (e.g., Giant Hogweed) into the floral community, as a result of the Scheme, may temporarily or permanently impact the floral species composition within this Annex habitat.		management plans; biosecurity measures within the invasive species management plans; and area / section specific mitigations, respectively.	
	Vegetation composition: negative indicator species	Percentage cover	A temporary or permanent reduction of positive indicator species as a result of deleterious substances entering the habitat via surface water and groundwater-to-surface water pathways may lead to the establishment and higher percentage cover of negative indicator species within the habitat. Additionally, the spread of invasive species (e.g., Giant Hogweed) into the floral community, as a result of the Scheme, may temporarily or permanently increase the percentage cover of negative indicator species within this Annex I habitat.	In combination effects with other plans and projects are not predicted.	Strict adherence to: The mitigations outlined in Sub-sections 7.1.1, 7.1.2, 7.1.3, 7.1.4, 7.1.5 and 7.1.6 pertaining to the best practice guidance; surface water management, pollution control, waste and dust management plans; biosecurity measures within the invasive species management plans; and area / section specific mitigations, respectively.	No adverse effects
Shifting dunes along the shoreline with <i>Ammophila arenaria</i> (white dunes) [2120]	Habitat area	Hectares	N/A (Construction and Operational impacts incapable of affecting attribute)	In combination effects with other plans and projects are not predicted.	None required.	No adverse effects
	Habitat distribution	Occurrence	N/A (Construction and Operational impacts incapable of affecting attribute)	In combination effects with other plans and projects are not predicted.	None required.	No adverse effects
	Physical structure: sediment supply	Presence/absence of physical barriers	N/A (Construction and Operational impacts incapable of affecting attribute)	In combination effects with other plans and projects are not predicted.	None required.	No adverse effects

Qualifying Interest / Special Conservation Interest	Attribute	Measure	Potential Impacts	In combination effects	Mitigation Measures	Residual Impact
	Vegetation structure: zonation	Occurrence	N/A (Construction and Operational impacts incapable of affecting attribute)	In combination effects with other plans and projects are not predicted.	None required.	No adverse effects
	Vegetation composition: plant health of dune grasses	Percentage cover	N/A (Construction and Operational impacts incapable of affecting attribute)	In combination effects with other plans and projects are not predicted.	None required.	No adverse effects
	Vegetation composition: typical species and subcommunities	Percentage cover at a representative number of monitoring stops	Construction activities may lead to the dispersal of invasive species (e.g., Giant Hogweed) which have the potential to become established within the Annex habitat; and in turn disrupt / change the composition of the species-poor communities dominated by Marram grass <i>Ammophila arenaria</i> and/or Lyme-grass <i>Leymus arenarius</i> .	In combination effects with other plans and projects are not predicted.	Strict adherence to: The mitigations outlined in Sub-sections 7.1.1, 7.1.2, 7.1.3, 7.1.4, 7.1.5 and 7.1.6 pertaining to the best practice guidance; surface water management, pollution control, waste and dust management plans; biosecurity measures within the invasive species management plans; and area / section specific mitigations, respectively.	No adverse effects
	Vegetation composition: negative indicator species	Percentage cover	Construction activities may lead to the dispersal of invasive species (e.g., Giant Hogweed) which have the potential to become established within the Annex habitat; and in turn increase negative indicator species cover to over 5%.	In combination effects with other plans and projects are not predicted.	Strict adherence to: The mitigations outlined in Sub-sections 7.1.1, 7.1.2, 7.1.3, 7.1.4, 7.1.5 and 7.1.6 pertaining to the best practice guidance; surface water management, pollution control, waste and dust management plans; biosecurity measures within the invasive	No adverse effects

Qualifying Interest / Special Conservation Interest	Attribute	Measure	Potential Impacts	In combination effects	Mitigation Measures	Residual Impact
					species management plans; and area / section specific mitigations, respectively.	
Fixed coastal dunes with herbaceous vegetation (grey dunes) [2130]	Habitat area	Hectares	N/A (Construction and Operational impacts incapable of affecting attribute)	In combination effects with other plans and projects are not predicted.	None required.	No adverse effects
	Habitat distribution	Occurrence	N/A (Construction and Operational impacts incapable of affecting attribute)	In combination effects with other plans and projects are not predicted.	None required.	No adverse effects
	Physical structure: sediment supply	Presence/absence of physical barriers	N/A (Construction and Operational impacts incapable of affecting attribute)	In combination effects with other plans and projects are not predicted.	None required.	No adverse effects
	Vegetation structure: zonation	Occurrence	N/A (Construction and Operational impacts incapable of affecting attribute)	In combination effects with other plans and projects are not predicted.	None required.	No adverse effects
	Vegetation structure: bare ground	Percentage cover	N/A (Construction and Operational impacts incapable of affecting attribute)	In combination effects with other plans and projects are not predicted.	None required.	No adverse effects
	Vegetation structure: sward height	Centimetres	N/A (Construction and Operational impacts incapable of affecting attribute)	In combination effects with other plans and projects are not predicted.	None required.	No adverse effects
	Vegetation composition: typical species	Percentage cover at a representative	Construction activities may lead to the dispersal of invasive species (e.g., Giant Hogweed) which have the potential to	In combination effects with other	Strict adherence to:	No adverse effects

Qualifying Interest / Special Conservation Interest	Attribute	Measure	Potential Impacts	In combination effects	Mitigation Measures	Residual Impact
	and subcommunities	number of monitoring stops	become established within the Annex habitat; and in turn disrupt / change the composition of the subcommunities with typical species as listed in Delaney et al. (2013).	plans and projects are not predicted.	The mitigations outlined in Sub-sections 7.1.1, 7.1.2, 7.1.3, 7.1.4, 7.1.5 and 7.1.6 pertaining to the best practice guidance; surface water management, pollution control, waste and dust management plans; biosecurity measures within the invasive species management plans; and area / section specific mitigations, respectively.	
	Vegetation composition: negative indicator species (including <i>Hippophae rhamnoides</i>)	Percentage cover	Construction activities may lead to the dispersal of invasive species (e.g., Giant Hogweed) which have the potential to become established within the Annex habitat; and in turn increase negative indicator species cover to over 5%.	In combination effects with other plans and projects are not predicted.	Strict adherence to: The mitigations outlined in Sub-sections 7.1.1, 7.1.2, 7.1.3, 7.1.4, 7.1.5 and 7.1.6 pertaining to the best practice guidance; surface water management, pollution control, waste and dust management plans; biosecurity measures within the invasive species management plans; and area / section specific mitigations, respectively.	No adverse effects
	Vegetation composition: scrub/trees	Percentage cover	Construction activities may lead to the dispersal of invasive species (e.g., Giant Hogweed) which have the potential to become established within the Annex habitat; and in turn increase scrub/shrub species cover to over 5%.	In combination effects with other plans and projects are not predicted.	Strict adherence to: The mitigations outlined in Sub-sections 7.1.1, 7.1.2, 7.1.3, 7.1.4, 7.1.5 and 7.1.6 pertaining to the best practice guidance; surface water management, pollution control, waste and dust	No adverse effects

Qualifying Interest / Special Conservation Interest	Attribute	Measure	Potential Impacts	In combination effects	Mitigation Measures	Residual Impact
					management plans; biosecurity measures within the invasive species management plans; and area / section specific mitigations, respectively.	
Humid dune slacks [2190]	Habitat area	Hectares	N/A (Construction and Operational impacts incapable of affecting attribute)	In combination effects with other plans and projects are not predicted.	None required.	No adverse effects
	Habitat distribution	Occurrence	N/A (Construction and Operational impacts incapable of affecting attribute)	In combination effects with other plans and projects are not predicted.	None required.	No adverse effects
	Physical structure: sediment supply	Presence/absence of physical barriers	N/A (Construction and Operational impacts incapable of affecting attribute)	In combination effects with other plans and projects are not predicted.	None required.	No adverse effects
	Physical structure: hydrological and flooding regime	Water table levels; groundwater fluctuations (metres)	N/A (Construction and Operational impacts incapable of affecting attribute)	In combination effects with other plans and projects are not predicted.	None required.	No adverse effects
	Vegetation structure: zonation	Occurrence	N/A (Construction and Operational impacts incapable of affecting attribute)	In combination effects with other plans and projects are not predicted.	None required.	No adverse effects
	Vegetation structure: bare ground	Percentage cover	N/A (Construction and Operational impacts incapable of affecting attribute)	In combination effects with other plans and projects are not predicted.	None required.	No adverse effects

Qualifying Interest / Special Conservation Interest	Attribute	Measure	Potential Impacts	In combination effects	Mitigation Measures	Residual Impact
	Vegetation structure: vegetation height	Centimetres	N/A (Construction and Operational impacts incapable of affecting attribute)	In combination effects with other plans and projects are not predicted.	None required.	No adverse effects
	Vegetation composition: typical species and subcommunities	Percentage cover at a representative number of monitoring stops	Construction activities may lead to the dispersal of invasive species (e.g., Giant Hogweed) which have the potential to become established within the Annex habitat; and in turn disrupt / change the composition of the subcommunities with typical species as listed in Delaney et al. (2013).	In combination effects with other plans and projects are not predicted.	Strict adherence to: The mitigations outlined in Sub-sections 7.1.1, 7.1.2, 7.1.3, 7.1.4, 7.1.5 and 7.1.6 pertaining to the best practice guidance; surface water management, pollution control, waste and dust management plans; biosecurity measures within the invasive species management plans; and area / section specific mitigations, respectively.	No adverse effects
	Vegetation composition: cover of <i>Salix repens</i>	Percentage cover; centimetres	N/A (Construction and Operational impacts incapable of affecting attribute)	In combination effects with other plans and projects are not predicted.	None required.	No adverse effects
	Vegetation composition: negative indicator species	Percentage cover	Construction activities may lead to the dispersal of invasive species (e.g., Giant Hogweed) which have the potential to become established within the Annex habitat; and in turn increase negative indicator species cover to over 5%.	In combination effects with other plans and projects are not predicted.	Strict adherence to: The mitigations outlined in Sub-sections 7.1.1, 7.1.2, 7.1.3, 7.1.4, 7.1.5 and 7.1.6 pertaining to the best practice guidance; surface water management, pollution control, waste and dust management plans; biosecurity measures within the invasive	No adverse effects

Qualifying Interest / Special Conservation Interest	Attribute	Measure	Potential Impacts	In combination effects	Mitigation Measures	Residual Impact
					species management plans; and area / section specific mitigations, respectively.	
	Vegetation composition: scrub/trees	Percentage cover	Construction activities may lead to the dispersal of invasive species (e.g., Giant Hogweed) which have the potential to become established within the Annex habitat; and in turn increase scrub/shrub species cover to over 5%.	In combination effects with other plans and projects are not predicted.	<p>Strict adherence to:</p> <p>The mitigations outlined in Sub-sections 7.1.1, 7.1.2, 7.1.3, 7.1.4, 7.1.5 and 7.1.6 pertaining to the best practice guidance; surface water management, pollution control, waste and dust management plans; biosecurity measures within the invasive species management plans; and area / section specific mitigations, respectively.</p>	No adverse effects
Petalwort [1395]	Distribution of populations	Number and geographical spread of populations	Construction activities may lead to the dispersal of invasive species (e.g., Giant Hogweed) which have the potential to become established within the Annex habitat; and in turn significantly shade the areas containing Petalwort and ultimately affecting population spread.	In combination effects with other plans and projects are not predicted.	<p>Strict adherence to:</p> <p>The mitigations outlined in Sub-sections 7.1.1, 7.1.2, 7.1.3, 7.1.4, 7.1.5 and 7.1.6 pertaining to the best practice guidance; surface water management, pollution control, waste and dust management plans; biosecurity measures within the invasive species management plans; and area / section specific mitigations, respectively.</p>	No adverse effects

Qualifying Interest / Special Conservation Interest	Attribute	Measure	Potential Impacts	In combination effects	Mitigation Measures	Residual Impact
	Population size	Number of individuals	Construction activities may lead to the dispersal of invasive species (e.g., Giant Hogweed) which have the potential to become established within the Annex habitat; and in turn significantly shade the areas containing Petalwort, resulting in population decline.	In combination effects with other plans and projects are not predicted.	<p>Strict adherence to:</p> <p>The mitigations outlined in Sub-sections 7.1.1, 7.1.2, 7.1.3, 7.1.4, 7.1.5 and 7.1.6 pertaining to the best practice guidance; surface water management, pollution control, waste and dust management plans; biosecurity measures within the invasive species management plans; and area / section specific mitigations, respectively.</p>	No adverse effects
	Area of suitable habitat	Hectares	N/A (Construction and Operational impacts incapable of affecting attribute)	In combination effects with other plans and projects are not predicted.	None required.	No adverse effects
	Hydrological conditions: soil moisture	Occurrence	N/A (Construction and Operational impacts incapable of affecting attribute)	In combination effects with other plans and projects are not predicted.	None required.	No adverse effects
	Vegetation structure: height and cover	Centimetres and percentage	Construction activities may lead to the dispersal of invasive species (e.g., Giant Hogweed) which have the potential to become established within the Annex habitat; and in turn significantly change height and cover of vegetation within the vicinity of the Petalwort population.	In combination effects with other plans and projects are not predicted.	<p>Strict adherence to:</p> <p>The mitigations outlined in Sub-sections 7.1.1, 7.1.2, 7.1.3, 7.1.4, 7.1.5 and 7.1.6 pertaining to the best practice guidance; surface water management, pollution control, waste and dust management plans; biosecurity measures within the invasive</p>	No adverse effects

Qualifying Interest / Special Conservation Interest	Attribute	Measure	Potential Impacts	In combination effects	Mitigation Measures	Residual Impact
					species management plans; and area / section specific mitigations, respectively.	
South Dublin Bay SAC						
Mudflats and sandflats not covered by seawater at low tide [1140]	Habitat area	Hectares	N/A (Construction and Operational impacts incapable of affecting attribute)	In combination effects with other plans and projects are not predicted.	None required.	No adverse effects
	Community extent	Hectares	A temporary or permanent reduction in <i>Zostera</i> -dominated community extent as a result of deleterious substances entering the habitat via surface water and groundwater-to-surface water pathways.	In combination effects with other plans and projects are not predicted.	Strict adherence to: The mitigations outlined in Sub-sections 7.1.1, 7.1.2, 7.1.3, 7.1.4, 7.1.5 and 7.1.6 pertaining to the best practice guidance; surface water management, pollution control, waste and dust management plans; biosecurity measures within the invasive species management plans; and area / section specific mitigations, respectively.	No adverse effects
	Community structure: <i>Zostera</i> density	Shoots per m ²	A temporary or permanent reduction in <i>Zostera</i> density as a result of deleterious substances entering the habitat via surface water and groundwater-to-surface water pathways.	In combination effects with other plans and projects are not predicted.	Strict adherence to: The mitigations outlined in Sub-sections 7.1.1, 7.1.2, 7.1.3, 7.1.4, 7.1.5 and 7.1.6 pertaining to the best practice guidance; surface water management, pollution control, waste and dust management plans; biosecurity measures within the invasive	No adverse effects

Qualifying Interest / Special Conservation Interest	Attribute	Measure	Potential Impacts	In combination effects	Mitigation Measures	Residual Impact
					species management plans; and area / section specific mitigations, respectively.	
	Community distribution	Hectares	A temporary or permanent reduction in the distribution of Muddy sand to fine sand dominated by Fine sands with <i>Angulus tenuis</i> community complex, as a result of deleterious substances entering the habitat via surface water and groundwater-to-surface water pathways.	In combination effects with other plans and projects are not predicted.	<p>Strict adherence to:</p> <p>The mitigations outlined in Sub-sections 7.1.1, 7.1.2, 7.1.3, 7.1.4, 7.1.5 and 7.1.6 pertaining to the best practice guidance; surface water management, pollution control, waste and dust management plans; biosecurity measures within the invasive species management plans; and area / section specific mitigations, respectively.</p>	No adverse effects
Annual vegetation of drift lines [1210]	Habitat area	Hectares	A temporary or permanent reduction in the habitat area as a result of deleterious substances entering the habitat via surface water and groundwater-to-surface water pathways.	In combination effects with other plans and projects are not predicted.	<p>Strict adherence to:</p> <p>The mitigations outlined in Sub-sections 7.1.1, 7.1.2, 7.1.3, 7.1.4, 7.1.5 and 7.1.6 pertaining to the best practice guidance; surface water management, pollution control, waste and dust management plans; biosecurity measures within the invasive species management plans; and area / section specific mitigations, respectively.</p>	No adverse effects

Qualifying Interest / Special Conservation Interest	Attribute	Measure	Potential Impacts	In combination effects	Mitigation Measures	Residual Impact
	Habitat distribution	Occurrence	A temporary or permanent decline in habitat distribution as a result of deleterious substances entering the habitat via surface water and groundwater-to-surface water pathways.	In combination effects with other plans and projects are not predicted.	<p>Strict adherence to:</p> <p>The mitigations outlined in Sub-sections 7.1.1, 7.1.2, 7.1.3, 7.1.4, 7.1.5 and 7.1.6 pertaining to the best practice guidance; surface water management, pollution control, waste and dust management plans; biosecurity measures within the invasive species management plans; and area / section specific mitigations, respectively.</p>	No adverse effects
	Physical structure: sediment supply	Presence/absence of physical barriers	N/A (Construction and Operational impacts incapable of affecting attribute)	In combination effects with other plans and projects are not predicted.	None required.	No adverse effects
	Vegetation structure: zonation	Occurrence	N/A (Construction and Operational impacts incapable of affecting attribute)	In combination effects with other plans and projects are not predicted.	None required.	No adverse effects
	Vegetation composition: typical species and subcommunities	Percentage cover at a representative number of monitoring stops	A temporary or permanent reduction of species-poor communities with typical species: Sea Rocket <i>Cakile maritima</i> , Sea Sandwort <i>Honckenya peploides</i> , Prickly Saltwort <i>Salsola kali</i> and oraches <i>Atriplex</i> spp., as a result of deleterious substances entering the habitat via surface water and groundwater-to-surface water pathways.	In combination effects with other plans and projects are not predicted.	<p>Strict adherence to:</p> <p>The mitigations outlined in Sub-sections 7.1.1, 7.1.2, 7.1.3, 7.1.4, 7.1.5 and 7.1.6 pertaining to the best practice guidance; surface water management, pollution control, waste and dust management plans; biosecurity measures within the invasive</p>	No adverse effects

Qualifying Interest / Special Conservation Interest	Attribute	Measure	Potential Impacts	In combination effects	Mitigation Measures	Residual Impact
					species management plans; and area / section specific mitigations, respectively.	
	Vegetation composition: negative indicator species	Percentage cover	A temporary or permanent reduction of positive indicator species as a result of deleterious substances entering the habitat via surface water and groundwater-to-surface water pathways may lead to the establishment and higher percentage cover of negative indicator species within the habitat.	In combination effects with other plans and projects are not predicted.	<p>Strict adherence to:</p> <p>The mitigations outlined in Sub-sections 7.1.1, 7.1.2, 7.1.3, 7.1.4, 7.1.5 and 7.1.6 pertaining to the best practice guidance; surface water management, pollution control, waste and dust management plans; biosecurity measures within the invasive species management plans; and area / section specific mitigations, respectively.</p>	No adverse effects
Salicornia and other annuals colonising mud and sand [1310]	Habitat distribution	Occurrence	A temporary or permanent reduction in distribution as a result of deleterious substances entering the habitat via surface water and groundwater-to-surface water pathways.	In combination effects with other plans and projects are not predicted.	<p>Strict adherence to:</p> <p>The mitigations outlined in Sub-sections 7.1.1, 7.1.2, 7.1.3, 7.1.4, 7.1.5 and 7.1.6 pertaining to the best practice guidance; surface water management, pollution control, waste and dust management plans; biosecurity measures within the invasive species management plans; and area / section specific mitigations, respectively.</p>	No adverse effects

Qualifying Interest / Special Conservation Interest	Attribute	Measure	Potential Impacts	In combination effects	Mitigation Measures	Residual Impact
	Physical structure: sediment supply	Presence/ absence of physical barriers	N/A (Construction and Operational impacts incapable of affecting attribute)	In combination effects with other plans and projects are not predicted.	None required.	No adverse effects
	Physical structure: creeks and pans	Occurrence	N/A (Construction and Operational impacts incapable of affecting attribute)	In combination effects with other plans and projects are not predicted.	None required.	No adverse effects
	Physical structure: flooding regime	Hectares flooded; frequency	N/A (Construction and Operational impacts incapable of affecting attribute)	In combination effects with other plans and projects are not predicted.	None required.	No adverse effects
	Vegetation structure: zonation	Occurrence	N/A (Construction and Operational impacts incapable of affecting attribute)	In combination effects with other plans and projects are not predicted.	None required.	No adverse effects
	Vegetation structure: vegetation height	Centimetres	A temporary or permanent impact on the structural variation of sward as a result of deleterious substances entering the habitat via surface water and groundwater-to-surface water pathways.	In combination effects with other plans and projects are not predicted.	<p>Strict adherence to:</p> <p>The mitigations outlined in Sub-sections 7.1.1, 7.1.2, 7.1.3, 7.1.4, 7.1.5 and 7.1.6 pertaining to the best practice guidance; surface water management, pollution control, waste and dust management plans; biosecurity measures within the invasive species management plans; and area / section specific mitigations, respectively.</p>	No adverse effects

Qualifying Interest / Special Conservation Interest	Attribute	Measure	Potential Impacts	In combination effects	Mitigation Measures	Residual Impact
	Vegetation structure: vegetation cover	Percentage cover at a representative sample of monitoring stops	A temporary or permanent impact on vegetation cover as a result of deleterious substances entering the habitat via surface water and groundwater-to-surface water pathways.	In combination effects with other plans and projects are not predicted.	<p>Strict adherence to:</p> <p>The mitigations outlined in Sub-sections 7.1.1, 7.1.2, 7.1.3, 7.1.4, 7.1.5 and 7.1.6 pertaining to the best practice guidance; surface water management, pollution control, waste and dust management plans; biosecurity measures within the invasive species management plans; and area / section specific mitigations, respectively.</p>	No adverse effects
	Vegetation composition: typical species and subcommunities	Percentage cover	<p>A temporary or permanent impact on the listed species-poor communities as a result of deleterious substances entering the habitat via surface water and groundwater-to-surface water pathways.</p> <p>Additionally, the spread of invasive species (e.g., Japanese Knotweed and Himalayan Balsam) into the floral community, as a result of the proposed Scheme, may temporarily or permanently impact the floral species composition within this Annex habitat.</p>	In combination effects with other plans and projects are not predicted.	<p>Strict adherence to:</p> <p>The mitigations outlined in Sub-sections 7.1.1, 7.1.2, 7.1.3, 7.1.4, 7.1.5 and 7.1.6 pertaining to the best practice guidance; surface water management, pollution control, waste and dust management plans; biosecurity measures within the invasive species management plans; and area / section specific mitigations, respectively.</p>	No adverse effects
	Vegetation structure: negative indicator	Hectares	A temporary or permanent increase in <i>Spartina anglica</i> cover as result of a reduction in native vegetation caused by deleterious substances entering the habitat via surface	In combination effects with other plans and projects are not predicted.	<p>Strict adherence to:</p> <p>The mitigations outlined in Sub-sections 7.1.1, 7.1.2, 7.1.3, 7.1.4, 7.1.5 and 7.1.6 pertaining to the</p>	No adverse effects

Qualifying Interest / Special Conservation Interest	Attribute	Measure	Potential Impacts	In combination effects	Mitigation Measures	Residual Impact
	species - <i>Spartina anglica</i>		water and groundwater-to-surface water pathways.		best practice guidance; surface water management, pollution control, waste and dust management plans; biosecurity measures within the invasive species management plans; and area / section specific mitigations, respectively.	
Embryonic shifting dunes [2110]	Habitat area	Hectares	A temporary or permanent reduction in habitat area as a result of deleterious substances entering the habitat via surface water and groundwater-to-surface water pathways.	In combination effects with other plans and projects are not predicted.	Strict adherence to: The mitigations outlined in Sub-sections 7.1.1, 7.1.2, 7.1.3, 7.1.4, 7.1.5 and 7.1.6 pertaining to the best practice guidance; surface water management, pollution control, waste and dust management plans; biosecurity measures within the invasive species management plans; and area / section specific mitigations, respectively.	No adverse effects
	Habitat distribution	Occurrence	A temporary or permanent reduction in distribution as a result of deleterious substances entering the habitat via surface water and groundwater-to-surface water pathways.	In combination effects with other plans and projects are not predicted.	Strict adherence to: The mitigations outlined in Sub-sections 7.1.1, 7.1.2, 7.1.3, 7.1.4, 7.1.5 and 7.1.6 pertaining to the best practice guidance; surface water management, pollution control, waste and dust management plans; biosecurity measures within the invasive species management plans; and	No adverse effects

Qualifying Interest / Special Conservation Interest	Attribute	Measure	Potential Impacts	In combination effects	Mitigation Measures	Residual Impact
					area / section specific mitigations, respectively.	
	Physical structure: sediment supply	Presence/absence of physical barriers	N/A (Construction and Operational impacts incapable of affecting attribute)	In combination effects with other plans and projects are not predicted.	None required.	No adverse effects
	Vegetation structure: zonation	Occurrence	N/A (Construction and Operational impacts incapable of affecting attribute)	In combination effects with other plans and projects are not predicted.	None required.	No adverse effects
	Vegetation composition: plant health of foredune grasses	Percentage cover	A reduction to less than 95% of Sand Couch <i>Elytrigia juncea</i> and/or Lyme-grass <i>Leymus arenarius</i> achieving a healthy status as result of deleterious substances entering the habitat via surface water and groundwater-to-surface water pathways.	In combination effects with other plans and projects are not predicted.	Strict adherence to: The mitigations outlined in Sub-sections 7.1.1, 7.1.2, 7.1.3, 7.1.4, 7.1.5 and 7.1.6 pertaining to the best practice guidance; surface water management, pollution control, waste and dust management plans; biosecurity measures within the invasive species management plans; and area / section specific mitigations, respectively.	No adverse effects
	Vegetation composition: typical species and subcommunities	Percentage cover at a representative number of monitoring stops	A temporary or permanent reduction of species-poor communities with typical species: Sand Couch <i>Elytrigia juncea</i> and/or Lyme-grass <i>Leymus arenarius</i> , as a result of deleterious substances entering the habitat via surface water and groundwater-to-surface water pathways.	In combination effects with other plans and projects are not predicted.	Strict adherence to: The mitigations outlined in Sub-sections 7.1.1, 7.1.2, 7.1.3, 7.1.4, 7.1.5 and 7.1.6 pertaining to the best practice guidance; surface water management, pollution control, waste and dust	No adverse effects

Qualifying Interest / Special Conservation Interest	Attribute	Measure	Potential Impacts	In combination effects	Mitigation Measures	Residual Impact
			Additionally, the spread of invasive species (e.g., Giant Hogweed) into the floral community, as a result of the Scheme, may temporarily or permanently impact the floral species composition within this Annex habitat.		management plans; biosecurity measures within the invasive species management plans; and area / section specific mitigations, respectively.	
	Vegetation composition: negative indicator species	Percentage cover	A temporary or permanent reduction of positive indicator species as a result of deleterious substances entering the habitat via surface water and groundwater-to-surface water pathways may lead to the establishment and higher percentage cover of negative indicator species within the habitat. Additionally, the spread of invasive species (e.g., Giant Hogweed) into the floral community, as a result of the Scheme, may temporarily or permanently increase the percentage cover of negative indicator species within this Annex I habitat.	In combination effects with other plans and projects are not predicted.	Strict adherence to: The mitigations outlined in Sub-sections 7.1.1, 7.1.2, 7.1.3, 7.1.4, 7.1.5 and 7.1.6 pertaining to the best practice guidance; surface water management, pollution control, waste and dust management plans; biosecurity measures within the invasive species management plans; and area / section specific mitigations, respectively.	No adverse effects
Rockabill to Dalkey Island SAC						
Reefs [1170]	Habitat area	Hectares	N/A (Construction and Operational impacts incapable of affecting attribute)	In combination effects with other plans and projects are not predicted.	None required.	No adverse effects
	Habitat distribution	Occurrence	N/A (Construction and Operational impacts incapable of affecting attribute)	In combination effects with other plans and projects are not predicted.	None required.	No adverse effects
	Community structure	Biological composition	A temporary or permanent reduction of the following community types: Intertidal reef community complex; and Subtidal reef community complex, as a result of deleterious	In combination effects with other plans and projects are not predicted.	Strict adherence to:	No adverse effects

Qualifying Interest / Special Conservation Interest	Attribute	Measure	Potential Impacts	In combination effects	Mitigation Measures	Residual Impact
			substances entering the habitat via surface water and groundwater-to-surface water pathways.		The mitigations outlined in Sub-sections 7.1.1, 7.1.2, 7.1.3, 7.1.4, 7.1.5 and 7.1.6 pertaining to the best practice guidance; surface water management, pollution control, waste and dust management plans; biosecurity measures within the invasive species management plans; and area / section specific mitigations, respectively.	
Harbour Porpoise [1351]	Access to suitable habitat	Number of artificial barriers	N/A (Construction and Operational impacts incapable of affecting attribute)	In combination effects with other plans and projects are not predicted.	None required.	No adverse effects
	Disturbance	Level of impact	The loss of foraging resources as result of pollution events or the consumption of food items containing polluting elements may impact the health of Harbour Porpoise population that inhabits Dublin Bay and has been recorded within the Tolka Estuary.	In combination effects with other plans and projects are not predicted.	Strict adherence to: The mitigations outlined in Sub-sections 7.1.1, 7.1.2, 7.1.3, 7.1.4, 7.1.5 and 7.1.6 pertaining to the best practice guidance; surface water management, pollution control, waste and dust management plans; biosecurity measures within the invasive species management plans; and area / section specific mitigations, respectively.	No adverse effects
North Bull Island SPA						

Qualifying Interest / Special Conservation Interest	Attribute	Measure	Potential Impacts	In combination effects	Mitigation Measures	Residual Impact
<p>Light-bellied Brent Goose [A046] Shelduck [A048] Pintail [A054] Oystercatcher [A130] Golden Plover [A140] Grey Plover [A141] Knot [A143] Sanderling [A144] Dunlin [A149] Black-tailed Godwit [A156] Bar-tailed Godwit [A157] Curlew [A160] Redshank [A162] Turnstone [A169] Black-headed Gull [A179]</p>	<p>Population trend</p>	<p>Percentage change</p>	<p>The temporary and permanent habitat loss, as well as the potential deterioration of retained habitats through surface water, groundwater or air-based pollutants have the potential to reduce and/or degrade the foraging grounds of SCI bird species.</p> <p>The degradation of floral species in these habitats has the potential to negatively impact insectivorous SCI bird species who are reliant on healthy host flora supporting a range of invertebrate species, which feed on or frequent these flora for foraging purposes.</p> <p>Hydrocarbon pollutants introduced into the surface water and groundwater networks may come in contact with the SCI birds, resulting in degraded feathers, which will notably impact their feathers' insulative qualities, resulting in physiological stress for any affected individuals. Furthermore, these hydrocarbons can potentially be ingested by SCI birds as they preen their feathers, leading to further physiological stress.</p> <p>SCI bird species are at risk of potentially being adversely impacted through the direct ingestion of contaminated water during the Construction Phase of the proposed Scheme. If a SCI bird were to drink from a waterbody which had been accidentally contaminated with polluting substance, the bird will</p>	<p>In combination effects with other plans and projects are not predicted.</p>	<p>Strict adherence to:</p> <p>The mitigations outlined in Sub-sections 7.1.1, 7.1.2, 7.1.3, 7.1.4, 7.1.5 and 7.1.6 pertaining to the best practice guidance; surface water management, pollution control, waste and dust management plans; biosecurity measures within the invasive species management plans; Pre-Construction and Construction Phase monitoring of SCI bird species; and area / section specific mitigations, in particular those that relate to disturbance buffers.</p> <p>Furthermore, the mitigations for Operational Phase, outlined in Sub-section 7.2.1 pertaining to bird collision mitigation measures; and to 7.2.3 relating to the post-construction monitoring of SCI bird species.</p>	<p>No adverse effects</p>

Qualifying Interest / Special Conservation Interest	Attribute	Measure	Potential Impacts	In combination effects	Mitigation Measures	Residual Impact
			<p>consume water from the upper (polluted) layers of the water column. The consumption of such water can potentially result in reduced egg production and hatching; increased clutch or brood abandonment; reduced growth and increased organ weights.</p> <p>Additionally, SCI bird species that utilise the amenity grasslands within and adjacent to the site for foraging purposes may be visually and/or audibly disturbed by the construction works, causing SCI bird species to vacate these foraging habitats during active work periods.</p>			
	Distribution	Range, timing and intensity of use of areas	<p>The temporary and permanent habitat loss, as well as the potential deterioration of retained habitats through surface water, groundwater or air-based pollutants have the potential to reduce and/or degrade the foraging grounds of SCI bird species.</p> <p>The degradation of floral species in these habitats has the potential to negatively impact SCI bird species who are reliant on healthy host flora supporting a range of invertebrate species, which feed on or frequent these flora for foraging purposes.</p> <p>Additionally, SCI bird species that utilise the amenity grasslands within and adjacent to the site for foraging purposes may be visually and/or audibly disturbed by the construction</p>	In combination effects with other plans and projects are not predicted.	<p>Strict adherence to:</p> <p>The mitigations outlined in Sub-sections 7.1.1, 7.1.2, 7.1.3, 7.1.4, 7.1.5 and 7.1.6 pertaining to the best practice guidance; surface water management, pollution control, waste and dust management plans; biosecurity measures within the invasive species management plans; Pre-Construction and Construction Phase monitoring of SCI bird species; and area / section specific mitigations, in particular those that to relate to disturbance buffers.</p>	No adverse effects

Qualifying Interest / Special Conservation Interest	Attribute	Measure	Potential Impacts	In combination effects	Mitigation Measures	Residual Impact
			works, causing SCI bird species to vacate these foraging habitats during active work periods.		Furthermore, the mitigations for Operational Phase, outlined in Sub-section 7.2.1 pertaining to bird collision mitigation measures; and to 7.2.3 relating to the post-construction monitoring of SCI bird species.	
Wetlands [A999]	Habitat area	Hectares	Impacts on surface water quality from accidental pollutant discharges may temporarily reduce to the total functional habitat area through degradation of flora and local ecological food chains.	In combination effects with other plans and projects are not predicted.	<p>Strict adherence to:</p> <p>The mitigations outlined in Sub-sections 7.1.1, 7.1.2, 7.1.3, 7.1.4, 7.1.5 and 7.1.6 pertaining to the best practice guidance; surface water management, pollution control, waste and dust management plans; biosecurity measures within the invasive species management plans; Pre-Construction and Construction Phase monitoring of SCI bird species; and area / section specific mitigations, in particular those that to relate to disturbance buffers.</p> <p>Furthermore, the mitigations for Operational Phase, outlined in Sub-section 7.2.1 pertaining to bird collision mitigation measures; and to 7.2.3 relating to the post-construction monitoring of SCI bird species.</p>	No adverse effects

Qualifying Interest / Special Conservation Interest	Attribute	Measure	Potential Impacts	In combination effects	Mitigation Measures	Residual Impact
South Dublin Bay and River Tolka Estuary SPA						
<p>Light-bellied Brent Goose [A046] Oystercatcher [A130] Grey Plover [A141] Knot [A143] Sanderling [A144] Dunlin [A149] Bar-tailed Godwit [A157] Redshank [A162] Black-headed Gull [A179]</p>	<p>Population trend</p>	<p>Percentage change</p>	<p>The temporary and permanent habitat loss, as well as the potential deterioration of retained habitats through surface water, groundwater or air-based pollutants have the potential to reduce and/or degrade the foraging grounds of SCI bird species.</p> <p>The degradation of floral species in these habitats has the potential to negatively impact insectivorous SCI bird species who are reliant on healthy host flora supporting a range of invertebrate species, which feed on or frequent these flora for foraging purposes.</p> <p>Hydrocarbon pollutants introduced into the surface water and groundwater networks may come in contact with the SCI birds, resulting in degraded feathers, which will notably impact their feathers' insulative qualities, resulting in physiological stress for any affected individuals. Furthermore, these hydrocarbons can potentially be ingested by SCI birds as they preen their feathers, leading to further physiological stress.</p> <p>SCI bird species are at risk of potentially being adversely impacted through the direct ingestion of contaminated water during the Construction Phase of the proposed Scheme. If a SCI bird were to drink from a waterbody which had been accidentally contaminated</p>	<p>In combination effects with other plans and projects are not predicted.</p>	<p style="text-align: center;">Strict adherence to:</p> <p>The mitigations outlined in Sub-sections 7.1.1, 7.1.2, 7.1.3, 7.1.4, 7.1.5 and 7.1.6 pertaining to the best practice guidance; surface water management, pollution control, waste and dust management plans; biosecurity measures within the invasive species management plans; Pre-Construction and Construction Phase monitoring of SCI bird species; and area / section specific mitigations, in particular those that relate to disturbance buffers.</p> <p>Furthermore, the mitigations for Operational Phase, outlined in Sub-section 7.2.1 pertaining to bird collision mitigation measures; and to 7.2.3 relating to the post-construction monitoring of SCI bird species.</p>	<p>No adverse effects</p>

Qualifying Interest / Special Conservation Interest	Attribute	Measure	Potential Impacts	In combination effects	Mitigation Measures	Residual Impact
			<p>with polluting substance, the bird will consume water from the upper (polluted) layers of the water column. The consumption of such water can potentially result in reduced egg production and hatching; increased clutch or brood abandonment; reduced growth and increased organ weights.</p> <p>Additionally, SCI bird species that utilise the amenity grasslands within and adjacent to the site for foraging purposes may be visually and/or audibly disturbed by the construction works, causing SCI bird species to vacate these foraging habitats during active work periods.</p>			
	Distribution	Range, timing and intensity of use of areas	<p>The temporary and permanent habitat loss, as well as the potential deterioration of retained habitats through surface water, groundwater or air-based pollutants have the potential to reduce and/or degrade the foraging grounds of SCI bird species.</p> <p>The degradation of floral species in these habitats has the potential to negatively impact SCI bird species who are reliant on healthy host flora supporting a range of invertebrate species, which feed on or frequent these flora for foraging purposes.</p> <p>Additionally, SCI bird species that utilise the amenity grasslands within and adjacent to the site for foraging purposes may be visually</p>	In combination effects with other plans and projects are not predicted.	<p>Strict adherence to:</p> <p>The mitigations outlined in Sub-sections 7.1.1, 7.1.2, 7.1.3, 7.1.4, 7.1.5 and 7.1.6 pertaining to the best practice guidance; surface water management, pollution control, waste and dust management plans; biosecurity measures within the invasive species management plans; Pre-Construction and Construction Phase monitoring of SCI bird species; and area / section specific mitigations, in particular those that to relate to disturbance buffers.</p>	No adverse effects

Qualifying Interest / Special Conservation Interest	Attribute	Measure	Potential Impacts	In combination effects	Mitigation Measures	Residual Impact
			<p>and/or audibly disturbed by the construction works, causing SCI bird species to vacate these foraging habitats during active work periods.</p>		<p>Furthermore, the mitigations for Operational Phase, outlined in Sub-section 7.2.1 pertaining to bird collision mitigation measures; and to 7.2.3 relating to the post-construction monitoring of SCI bird species.</p>	
<p>Roseate Tern [A192]</p>	<p>Passage population: individuals</p>	<p>Number</p>	<p>Hydrocarbon pollutants introduced into the surface water and groundwater networks may come in contact with the SCI birds, resulting in degraded feathers, which will notably impact their feathers' insulative qualities, resulting in physiological stress for any affected individuals. Furthermore, these hydrocarbons can potentially be ingested by SCI birds as they preen their feathers, leading to further physiological stress.</p> <p>SCI bird species are at risk of potentially being adversely impacted through the direct ingestion of contaminated water during the Construction Phase of the proposed Scheme. If a SCI bird were to drink from a waterbody which had been accidentally contaminated with polluting substance, the bird will consume water from the upper (polluted) layers of the water column. The consumption of such water can potentially result in reduced egg production and hatching; increased clutch or brood abandonment; reduced growth and increased organ weights.</p>	<p>In combination effects with other plans and projects are not predicted.</p>	<p>Strict adherence to:</p> <p>The mitigations outlined in Sub-sections 7.1.1, 7.1.2, 7.1.3, 7.1.4, 7.1.5 and 7.1.6 pertaining to the best practice guidance; surface water management, pollution control, waste and dust management plans; biosecurity measures within the invasive species management plans; Pre-Construction and Construction Phase monitoring of SCI bird species; and area / section specific mitigations, in particular those that to relate to disturbance buffers.</p> <p>Furthermore, the mitigations for Operational Phase, outlined in Sub-section 7.2.1 pertaining to bird collision mitigation measures; and to 7.2.3 relating to the post-</p>	<p>No adverse effects</p>

Qualifying Interest / Special Conservation Interest	Attribute	Measure	Potential Impacts	In combination effects	Mitigation Measures	Residual Impact
					construction monitoring of SCI bird species.	
	Distribution: roosting areas	Number; location; area (hectares)	N/A (Construction and Operational impacts incapable of affecting attribute)	In combination effects with other plans and projects are not predicted.	None required.	No adverse effects
	Prey biomass available	Kilogrammes	Surface water, groundwater, and air (dust)-based pollution impacts could indirectly impact SCI bird species via the deterioration of food / prey items. This impact also has a knock-on effect as the consumption of prey items containing polluting elements may lead to bioaccumulation of toxic substances within the SCI bird population.	In combination effects with other plans and projects are not predicted.	<p>Strict adherence to:</p> <p>The mitigations outlined in Sub-sections 7.1.1, 7.1.2, 7.1.3, 7.1.4, 7.1.5 and 7.1.6 pertaining to the best practice guidance; surface water management, pollution control, waste and dust management plans; biosecurity measures within the invasive species management plans; Pre-Construction and Construction Phase monitoring of SCI bird species; and area / section specific mitigations, in particular those that relate to disturbance buffers.</p> <p>Furthermore, the mitigations for Operational Phase, outlined in Sub-section 7.2.1 pertaining to bird collision mitigation measures; and to 7.2.3 relating to the post-construction monitoring of SCI bird species.</p>	No adverse effects

Qualifying Interest / Special Conservation Interest	Attribute	Measure	Potential Impacts	In combination effects	Mitigation Measures	Residual Impact
	Barriers to connectivity	Number; location; shape; area (hectares)	N/A (Construction and Operational impacts incapable of affecting attribute)	In combination effects with other plans and projects are not predicted.	None required.	No adverse effects
	Disturbance at roosting site	Level of impact	N/A (Construction and Operational impacts incapable of affecting attribute)	In combination effects with other plans and projects are not predicted.	None required.	No adverse effects
Common Tern [A193]	Breeding population abundance: apparently occupied nests (AONs)	Number	N/A (Construction and Operational impacts incapable of affecting attribute)	In combination effects with other plans and projects are not predicted.	None required.	No adverse effects
	Productivity rate: fledged young per breeding pair	Mean number	<p>Hydrocarbon pollutants introduced into the surface water and groundwater networks may come in contact with the SCI birds, resulting in degraded feathers, which will notably impact their feathers' insulative qualities, resulting in physiological stress for any affected individuals. Furthermore, these hydrocarbons can potentially be ingested by SCI birds as they preen their feathers, leading to further physiological stress.</p> <p>SCI bird species are at risk of potentially being adversely impacted through the direct ingestion of contaminated water during the Construction Phase of the proposed Scheme. If a SCI bird were to drink from a waterbody which had been accidentally contaminated with polluting substance, the bird will</p>	In combination effects with other plans and projects are not predicted.	<p>Strict adherence to:</p> <p>The mitigations outlined in Sub-sections 7.1.1, 7.1.2, 7.1.3, 7.1.4, 7.1.5 and 7.1.6 pertaining to the best practice guidance; surface water management, pollution control, waste and dust management plans; biosecurity measures within the invasive species management plans; Pre-Construction and Construction Phase monitoring of SCI bird species; and area / section specific mitigations, in particular those that relate to disturbance buffers.</p>	No adverse effects

Qualifying Interest / Special Conservation Interest	Attribute	Measure	Potential Impacts	In combination effects	Mitigation Measures	Residual Impact
			<p>consume water from the upper (polluted) layers of the water column. The consumption of such water can potentially result in reduced egg production and hatching; increased clutch or brood abandonment; reduced growth and increased organ weights.</p>		<p>Furthermore, the mitigations for Operational Phase, outlined in Sub-section 7.2.1 pertaining to bird collision mitigation measures; and to 7.2.3 relating to the post-construction monitoring of SCI bird species.</p>	
	<p>Passage population: individuals</p>	<p>Number</p>	<p>Hydrocarbon pollutants introduced into the surface water and groundwater networks may come in contact with the SCI birds, resulting in degraded feathers, which will notably impact their feathers' insulative qualities, resulting in physiological stress for any affected individuals. Furthermore, these hydrocarbons can potentially be ingested by SCI birds as they preen their feathers, leading to further physiological stress.</p> <p>SCI bird species are at risk of potentially being adversely impacted through the direct ingestion of contaminated water during the Construction Phase of the proposed Scheme. If a SCI bird were to drink from a waterbody which had been accidentally contaminated with polluting substance, the bird will consume water from the upper (polluted) layers of the water column. The consumption of such water can potentially result in reduced egg production and hatching; increased clutch or brood abandonment; reduced growth and increased organ weights.</p>	<p>In combination effects with other plans and projects are not predicted.</p>	<p>Strict adherence to:</p> <p>The mitigations outlined in Sub-sections 7.1.1, 7.1.2, 7.1.3, 7.1.4, 7.1.5 and 7.1.6 pertaining to the best practice guidance; surface water management, pollution control, waste and dust management plans; biosecurity measures within the invasive species management plans; Pre-Construction and Construction Phase monitoring of SCI bird species; and area / section specific mitigations, in particular those that to relate to disturbance buffers.</p> <p>Furthermore, the mitigations for Operational Phase, outlined in Sub-section 7.2.1 pertaining to bird collision mitigation measures; and to 7.2.3 relating to the post-</p>	<p>No adverse effects</p>

Qualifying Interest / Special Conservation Interest	Attribute	Measure	Potential Impacts	In combination effects	Mitigation Measures	Residual Impact
					construction monitoring of SCI bird species.	
	Distribution: breeding colonies	Number; location; area (Hectares)	N/A (Construction and Operational impacts incapable of affecting attribute)	In combination effects with other plans and projects are not predicted.	None required.	No adverse effects
	Distribution: roosting areas	Number; location; area (Hectares)	N/A (Construction and Operational impacts incapable of affecting attribute)	In combination effects with other plans and projects are not predicted.	None required.	No adverse effects
	Prey biomass available	Kilogrammes	Surface water, groundwater, and air (dust)-based pollution impacts could indirectly impact SCI bird species via the deterioration of food / prey items. This impact also has a knock-on effect as the consumption of prey items containing polluting elements may lead to bioaccumulation of toxic substances within the SCI bird populations.	In combination effects with other plans and projects are not predicted.	<p>Strict adherence to:</p> <p>The mitigations outlined in Sub-sections 7.1.1, 7.1.2, 7.1.3, 7.1.4, 7.1.5 and 7.1.6 pertaining to the best practice guidance; surface water management, pollution control, waste and dust management plans; biosecurity measures within the invasive species management plans; Pre-Construction and Construction Phase monitoring of SCI bird species; and area / section specific mitigations, in particular those that to relate to disturbance buffers.</p> <p>Furthermore, the mitigations for Operational Phase, outlined in Sub-section 7.2.1 pertaining to</p>	No adverse effects

Qualifying Interest / Special Conservation Interest	Attribute	Measure	Potential Impacts	In combination effects	Mitigation Measures	Residual Impact
					bird collision mitigation measures; and to 7.2.3 relating to the post-construction monitoring of SCI bird species.	
	Barriers to connectivity	Number; location; shape; area (hectares)	N/A (Construction and Operational impacts incapable of affecting attribute)	In combination effects with other plans and projects are not predicted.	None required.	No adverse effects
	Disturbance at breeding site	Level of impact	N/A (Construction and Operational impacts incapable of affecting attribute)	In combination effects with other plans and projects are not predicted.	None required.	No adverse effects
	Disturbance at roosting site	Level of impact	N/A (Construction and Operational impacts incapable of affecting attribute)	In combination effects with other plans and projects are not predicted.	None required.	No adverse effects
Arctic Tern [A194]	Distribution: breeding colonies	Number; location; area (Hectares)	N/A (Construction and Operational impacts incapable of affecting attribute)	In combination effects with other plans and projects are not predicted.	None required.	No adverse effects
	Distribution: roosting areas	Number; location; area (Hectares)	N/A (Construction and Operational impacts incapable of affecting attribute)	In combination effects with other plans and projects are not predicted.	None required.	No adverse effects
	Prey biomass available	Kilogrammes	Surface water, groundwater, and air (dust)-based pollution impacts could indirectly impact SCI bird species via the deterioration of food / prey items. This impact also has a knock-on effect as the consumption of prey items containing polluting elements may lead	In combination effects with other plans and projects are not predicted.	Strict adherence to: The mitigations outlined in Sub-sections 7.1.1, 7.1.2, 7.1.3, 7.1.4, 7.1.5 and 7.1.6 pertaining to the best practice guidance; surface	No adverse effects

Qualifying Interest / Special Conservation Interest	Attribute	Measure	Potential Impacts	In combination effects	Mitigation Measures	Residual Impact
			to bioaccumulation of toxic substances within the SCI bird population.		<p>water management, pollution control, waste and dust management plans; biosecurity measures within the invasive species management plans; Pre-Construction and Construction Phase monitoring of SCI bird species; and area / section specific mitigations, in particular those that to relate to disturbance buffers.</p> <p>Furthermore, the mitigations for Operational Phase, outlined in Sub-section 7.2.1 pertaining to bird collision mitigation measures; and to 7.2.3 relating to the post-construction monitoring of SCI bird species.</p>	
	Barriers to connectivity	Number; location; shape; area (hectares)	N/A (Construction and Operational impacts incapable of affecting attribute)	In combination effects with other plans and projects are not predicted.	None required.	No adverse effects
	Disturbance at roosting site	Level of impact	N/A (Construction and Operational impacts incapable of affecting attribute)	In combination effects with other plans and projects are not predicted.	None required.	No adverse effects
Wetlands [A999]	Habitat area	Hectares	Impacts on surface water quality from accidental pollutant discharges may temporarily reduce to the total functional habitat area through degradation of flora and local ecological food chains.	In combination effects with other plans and projects are not predicted.	<p>Strict adherence to:</p> <p>The mitigations outlined in Sub-sections 7.1.1, 7.1.2, 7.1.3, 7.1.4,</p>	No adverse effects

Qualifying Interest / Special Conservation Interest	Attribute	Measure	Potential Impacts	In combination effects	Mitigation Measures	Residual Impact
<p>North-west Irish Sea SPA</p>						
<p>Red-throated Diver [A001] Great Northern Diver [A003] Manx Shearwater [A013] Common Scoter [A065]</p>	<p>Non-breeding population size</p>	<p>Number</p>	<p>The temporary and permanent habitat loss, as well as the potential deterioration of retained habitats through surface water, groundwater or air-based pollutants have the potential to reduce and/or degrade the foraging grounds of SCI bird species.</p> <p>The degradation of floral species in these habitats has the potential to negatively impact insectivorous SCI bird species who are reliant</p>	<p>In combination effects with other plans and projects are not predicted.</p>	<p>Strict adherence to:</p> <p>The mitigations outlined in Sub-sections 7.1.1, 7.1.2, 7.1.3, 7.1.4, 7.1.5 and 7.1.6 pertaining to the best practice guidance; surface water management, pollution control, waste and dust management plans; biosecurity measures within the invasive</p>	<p>No adverse effects</p>

Qualifying Interest / Special Conservation Interest	Attribute	Measure	Potential Impacts	In combination effects	Mitigation Measures	Residual Impact
<p>Little Gull [A177] Black-headed Gull [A179] Common Gull [A182] Great Black-backed Gull [A187] Guillemot [A199]</p>			<p>on healthy host flora supporting a range of invertebrate species, which feed on or frequent these flora for foraging purposes.</p> <p>Hydrocarbon pollutants introduced into the surface water and groundwater networks may come in contact with the SCI birds, resulting in degraded feathers, which will notably impact their feathers' insulative qualities, resulting in physiological stress for any affected individuals. Furthermore, these hydrocarbons can potentially be ingested by SCI birds as they preen their feathers, leading to further physiological stress.</p> <p>SCI bird species are at risk of potentially being adversely impacted through the direct ingestion of contaminated water during the Construction Phase of the proposed Scheme. If a SCI bird were to drink from a waterbody which had been accidentally contaminated with polluting substance, the bird will consume water from the upper (polluted) layers of the water column. The consumption of such water can potentially result in reduced egg production and hatching; increased clutch or brood abandonment; reduced growth and increased organ weights.</p> <p>Additionally, SCI bird species that utilise the amenity grasslands within and adjacent to the site for foraging purposes may be visually and/or audibly disturbed by the construction</p>		<p>species management plans; Pre-Construction and Construction Phase monitoring of SCI bird species; and area / section specific mitigations, in particular those that to relate to disturbance buffers.</p> <p>Furthermore, the mitigations for Operational Phase, outlined in Sub-section 7.2.1 pertaining to bird collision mitigation measures; and to 7.2.3 relating to the post-construction monitoring of SCI bird species.</p>	

Qualifying Interest / Special Conservation Interest	Attribute	Measure	Potential Impacts	In combination effects	Mitigation Measures	Residual Impact
			works, causing SCI bird species to vacate these foraging habitats during active work periods.			
	Spatial distribution	Hectares, time and intensity of use	N/A (Construction and Operational impacts incapable of affecting attribute)	In combination effects with other plans and projects are not predicted.	None required.	No adverse effects
	Forage spatial distribution, extent and abundance	Location and hectares, and forage biomass	Surface water, groundwater, and air (dust)-based pollution impacts could indirectly impact SCI bird species via the deterioration of food / prey items. This impact also has a knock-on effect as the consumption of prey items containing polluting elements may lead to bioaccumulation of toxic substances within the insectivorous SCI bird populations, such as Black-headed Gull and Common Gull.	In combination effects with other plans and projects are not predicted.	<p>Strict adherence to:</p> <p>The mitigations outlined in Sub-sections 7.1.1, 7.1.2, 7.1.3, 7.1.4, 7.1.5 and 7.1.6 pertaining to the best practice guidance; surface water management, pollution control, waste and dust management plans; biosecurity measures within the invasive species management plans; Pre-Construction and Construction Phase monitoring of SCI bird species; and area / section specific mitigations, in particular those that relate to disturbance buffers.</p> <p>Furthermore, the mitigations for Operational Phase, outlined in Sub-section 7.2.1 pertaining to bird collision mitigation measures; and to 7.2.3 relating to the post-construction monitoring of SCI bird species.</p>	No adverse effects

Qualifying Interest / Special Conservation Interest	Attribute	Measure	Potential Impacts	In combination effects	Mitigation Measures	Residual Impact
	Disturbance across the site	Intensity, frequency, timing and duration	N/A (Construction and Operational impacts incapable of affecting attribute)	In combination effects with other plans and projects are not predicted.	None required.	No adverse effects
	Barriers to connectivity and site use	Number; location; shape; area (hectares)	N/A (Construction and Operational impacts incapable of affecting attribute)	In combination effects with other plans and projects are not predicted.	None required.	No adverse effects
Fulmar [A009] Herring Gull [A184] Kittiwake [A188]	Population Size	Number	<p>The temporary and permanent habitat loss, as well as the potential deterioration of retained habitats through surface water, groundwater or air-based pollutants have the potential to reduce and/or degrade the foraging grounds of SCI bird species.</p> <p>The degradation of floral species in these habitats has the potential to negatively impact insectivorous SCI bird species who are reliant on healthy host flora supporting a range of invertebrate species, which feed on or frequent these flora for foraging purposes.</p> <p>Hydrocarbon pollutants introduced into the surface water and groundwater networks may come in contact with the SCI birds, resulting in degraded feathers, which will notably impact their feathers' insulative qualities, resulting in physiological stress for any affected individuals. Furthermore, these hydrocarbons can potentially be ingested by</p>	In combination effects with other plans and projects are not predicted.	<p>Strict adherence to:</p> <p>The mitigations outlined in Sub-sections 7.1.1, 7.1.2, 7.1.3, 7.1.4, 7.1.5 and 7.1.6 pertaining to the best practice guidance; surface water management, pollution control, waste and dust management plans; biosecurity measures within the invasive species management plans; Pre-Construction and Construction Phase monitoring of SCI bird species; and area / section specific mitigations, in particular those that to relate to disturbance buffers.</p> <p>Furthermore, the mitigations for Operational Phase, outlined in Sub-section 7.2.1 pertaining to bird collision mitigation measures; and to 7.2.3 relating to the post-</p>	No adverse effects

Qualifying Interest / Special Conservation Interest	Attribute	Measure	Potential Impacts	In combination effects	Mitigation Measures	Residual Impact
			<p>SCI birds as they preen their feathers, leading to further physiological stress.</p> <p>SCI bird species are at risk of potentially being adversely impacted through the direct ingestion of contaminated water during the Construction Phase of the proposed Scheme. If a SCI bird were to drink from a waterbody which had been accidentally contaminated with polluting substance, the bird will consume water from the upper (polluted) layers of the water column. The consumption of such water can potentially result in reduced egg production and hatching; increased clutch or brood abandonment; reduced growth and increased organ weights.</p> <p>Additionally, SCI bird species that utilise the amenity grasslands within and adjacent to the site for foraging purposes may be visually and/or audibly disturbed by the construction works, causing SCI bird species to vacate these foraging habitats during active work periods.</p>		construction monitoring of SCI bird species.	
	Spatial distribution	Hectares, time and intensity of use	N/A (Construction and Operational impacts incapable of affecting attribute)	In combination effects with other plans and projects are not predicted.	None required.	No adverse effects
	Forage spatial distribution, extent and abundance	Location and hectares, and forage biomass	Surface water, groundwater, and air (dust)-based pollution impacts could indirectly impact SCI bird species via the deterioration of food / prey items. This impact also has a	In combination effects with other plans and projects are not predicted.	Strict adherence to:	No adverse effects

Qualifying Interest / Special Conservation Interest	Attribute	Measure	Potential Impacts	In combination effects	Mitigation Measures	Residual Impact
			knock-on effect as the consumption of prey items containing polluting elements may lead to bioaccumulation of toxic substances within the insectivorous SCI bird populations, such as Herring Gull.		<p>The mitigations outlined in Sub-sections 7.1.1, 7.1.2, 7.1.3, 7.1.4, 7.1.5 and 7.1.6 pertaining to the best practice guidance; surface water management, pollution control, waste and dust management plans; biosecurity measures within the invasive species management plans; Pre-Construction and Construction Phase monitoring of SCI bird species; and area / section specific mitigations, in particular those that relate to disturbance buffers.</p> <p>Furthermore, the mitigations for Operational Phase, outlined in Sub-section 7.2.1 pertaining to bird collision mitigation measures; and to 7.2.3 relating to the post-construction monitoring of SCI bird species.</p>	
	Disturbance across the site	Intensity, frequency, timing and duration	N/A (Construction and Operational impacts incapable of affecting attribute)	In combination effects with other plans and projects are not predicted.	None required.	No adverse effects
	Barriers to connectivity and site use	Number; location; shape; area (hectares)	N/A (Construction and Operational impacts incapable of affecting attribute)	In combination effects with other plans and projects are not predicted.	None required.	No adverse effects

Qualifying Interest / Special Conservation Interest	Attribute	Measure	Potential Impacts	In combination effects	Mitigation Measures	Residual Impact
<p>Cormorant [A017] Shag [A018] Puffin [A204]</p>	<p>Breeding Population Size</p>	<p>Number</p>	<p>The temporary and permanent habitat loss, as well as the potential deterioration of retained habitats through surface water, groundwater or air-based pollutants have the potential to reduce and/or degrade the foraging grounds of SCI bird species.</p> <p>Hydrocarbon pollutants introduced into the surface water and groundwater networks may come in contact with the SCI birds, resulting in degraded feathers, which will notably impact their feathers' insulative qualities, resulting in physiological stress for any affected individuals. Furthermore, these hydrocarbons can potentially be ingested by SCI birds as they preen their feathers, leading to further physiological stress.</p> <p>SCI bird species are at risk of potentially being adversely impacted through the direct ingestion of contaminated water during the Construction Phase of the proposed Scheme. If a SCI bird were to drink from a waterbody which had been accidentally contaminated with polluting substance, the bird will consume water from the upper (polluted) layers of the water column. The consumption of such water can potentially result in reduced egg production and hatching; increased clutch or brood abandonment; reduced growth and increased organ weights.</p>	<p>In combination effects with other plans and projects are not predicted.</p>	<p>Strict adherence to:</p> <p>The mitigations outlined in Sub-sections 7.1.1, 7.1.2, 7.1.3, 7.1.4, 7.1.5 and 7.1.6 pertaining to the best practice guidance; surface water management, pollution control, waste and dust management plans; biosecurity measures within the invasive species management plans; Pre-Construction and Construction Phase monitoring of SCI bird species; and area / section specific mitigations, in particular those that relate to disturbance buffers.</p> <p>Furthermore, the mitigations for Operational Phase, outlined in Sub-section 7.2.1 pertaining to bird collision mitigation measures; and to 7.2.3 relating to the post-construction monitoring of SCI bird species.</p>	<p>No adverse effects</p>

Qualifying Interest / Special Conservation Interest	Attribute	Measure	Potential Impacts	In combination effects	Mitigation Measures	Residual Impact
			Additionally, SCI bird species that utilise the amenity grasslands within and adjacent to the site for foraging purposes may be visually and/or audibly disturbed by the construction works, causing SCI bird species to vacate these foraging habitats during active work periods.			
	Spatial distribution	Hectares, time and intensity of use	N/A (Construction and Operational impacts incapable of affecting attribute)	In combination effects with other plans and projects are not predicted.	None required.	No adverse effects
	Forage spatial distribution, extent and abundance	Location and hectares, and forage biomass	Surface water, groundwater, and air (dust)-based pollution impacts could indirectly impact SCI bird species via the deterioration of food / prey items. This impact also has a knock-on effect as the consumption of prey items containing polluting elements may lead to bioaccumulation of toxic substances within the piscivorous SCI bird populations, such as Cormorant.	In combination effects with other plans and projects are not predicted.	<p>Strict adherence to:</p> <p>The mitigations outlined in Sub-sections 7.1.1, 7.1.2, 7.1.3, 7.1.4, 7.1.5 and 7.1.6 pertaining to the best practice guidance; surface water management, pollution control, waste and dust management plans; biosecurity measures within the invasive species management plans; Pre-Construction and Construction Phase monitoring of SCI bird species; and area / section specific mitigations, in particular those that relate to disturbance buffers.</p> <p>Furthermore, the mitigations for Operational Phase, outlined in Sub-section 7.2.1 pertaining to</p>	No adverse effects

Qualifying Interest / Special Conservation Interest	Attribute	Measure	Potential Impacts	In combination effects	Mitigation Measures	Residual Impact
					bird collision mitigation measures; and to 7.2.3 relating to the post-construction monitoring of SCI bird species.	
	Disturbance across the site	Intensity, frequency, timing and duration	N/A (Construction and Operational impacts incapable of affecting attribute)	In combination effects with other plans and projects are not predicted.	None required.	No adverse effects
	Barriers to connectivity and site use	Number; location; shape; area (hectares)	N/A (Construction and Operational impacts incapable of affecting attribute)	In combination effects with other plans and projects are not predicted.	None required.	No adverse effects
Lesser Black-backed Gull [A183] Roseate Tern [A192] Common Tern [A193] Arctic Tern [A194] Little Tern [A195]	Breeding Population Size	Number	<p>The temporary and permanent habitat loss, as well as the potential deterioration of retained habitats through surface water, groundwater or air-based pollutants have the potential to reduce and/or degrade the foraging grounds of SCI bird species.</p> <p>The degradation of floral species in these habitats has the potential to negatively impact insectivorous SCI bird species who are reliant on healthy host flora supporting a range of invertebrate species, which feed on or frequent these flora for foraging purposes.</p> <p>Hydrocarbon pollutants introduced into the surface water and groundwater networks may come in contact with the SCI birds, resulting in degraded feathers, which will notably impact their feathers' insulative qualities,</p>	In combination effects with other plans and projects are not predicted.	Strict adherence to: The mitigations outlined in Sub-sections 7.1.1, 7.1.2, 7.1.3, 7.1.4, 7.1.5 and 7.1.6 pertaining to the best practice guidance; surface water management, pollution control, waste and dust management plans; biosecurity measures within the invasive species management plans; Pre-Construction and Construction Phase monitoring of SCI bird species; and area / section specific mitigations, in particular those that relate to disturbance buffers.	No adverse effects

Qualifying Interest / Special Conservation Interest	Attribute	Measure	Potential Impacts	In combination effects	Mitigation Measures	Residual Impact
			<p>resulting in physiological stress for any affected individuals. Furthermore, these hydrocarbons can potentially be ingested by SCI birds as they preen their feathers, leading to further physiological stress.</p> <p>SCI bird species are at risk of potentially being adversely impacted through the direct ingestion of contaminated water during the Construction Phase of the proposed Scheme. If a SCI bird were to drink from a waterbody which had been accidentally contaminated with polluting substance, the bird will consume water from the upper (polluted) layers of the water column. The consumption of such water can potentially result in reduced egg production and hatching; increased clutch or brood abandonment; reduced growth and increased organ weights.</p> <p>Additionally, SCI bird species that utilise the amenity grasslands within and adjacent to the site for foraging purposes may be visually and/or audibly disturbed by the construction works, causing SCI bird species to vacate these foraging habitats during active work periods.</p>		<p>Furthermore, the mitigations for Operational Phase, outlined in Sub-section 7.2.1 pertaining to bird collision mitigation measures; and to 7.2.3 relating to the post-construction monitoring of SCI bird species.</p>	
	Spatial distribution	Hectares, time and intensity of use	N/A (Construction and Operational impacts incapable of affecting attribute)	In combination effects with other plans and projects are not predicted.	None required.	No adverse effects

Qualifying Interest / Special Conservation Interest	Attribute	Measure	Potential Impacts	In combination effects	Mitigation Measures	Residual Impact
	Forage spatial distribution, extent and abundance	Location and hectares, and forage biomass	Surface water, groundwater, and air (dust)-based pollution impacts could indirectly impact SCI bird species via the deterioration of food / prey items. This impact also has a knock-on effect as the consumption of prey items containing polluting elements may lead to bioaccumulation of toxic substances within the insectivorous / piscivorous SCI bird populations, such as Lesser Black-backed Gull.	In combination effects with other plans and projects are not predicted.	<p>Strict adherence to:</p> <p>The mitigations outlined in Sub-sections 7.1.1, 7.1.2, 7.1.3, 7.1.4, 7.1.5 and 7.1.6 pertaining to the best practice guidance; surface water management, pollution control, waste and dust management plans; biosecurity measures within the invasive species management plans; Pre-Construction and Construction Phase monitoring of SCI bird species; and area / section specific mitigations, in particular those that to relate to disturbance buffers.</p> <p>Furthermore, the mitigations for Operational Phase, outlined in Sub-section 7.2.1 pertaining to bird collision mitigation measures; and to 7.2.3 relating to the post-construction monitoring of SCI bird species.</p>	No adverse effects
	Disturbance across the site	Intensity, frequency, timing and duration	N/A (Construction and Operational impacts incapable of affecting attribute)	In combination effects with other plans and projects are not predicted.	None required.	No adverse effects

Qualifying Interest / Special Conservation Interest	Attribute	Measure	Potential Impacts	In combination effects	Mitigation Measures	Residual Impact
	Barriers to connectivity and site use	Number; location; shape; area (hectares)	N/A (Construction and Operational impacts incapable of affecting attribute)	In combination effects with other plans and projects are not predicted.	None required.	No adverse effects
Razorbill [A200]	Population Size	Number	<p>Hydrocarbon pollutants introduced into the surface water and groundwater networks may come in contact with the SCI birds, resulting in degraded feathers, which will notably impact their feathers' insulative qualities, resulting in physiological stress for any affected individuals. Furthermore, these hydrocarbons can potentially be ingested by SCI birds as they preen their feathers, leading to further physiological stress.</p> <p>SCI bird species are at risk of potentially being adversely impacted through the direct ingestion of contaminated water during the Construction Phase of the proposed Scheme. If a SCI bird were to drink from a waterbody which had been accidentally contaminated with polluting substance, the bird will consume water from the upper (polluted) layers of the water column. The consumption of such water can potentially result in reduced egg production and hatching; increased clutch or brood abandonment; reduced growth and increased organ weights.</p>	In combination effects with other plans and projects are not predicted.	<p>Strict adherence to:</p> <p>The mitigations outlined in Sub-sections 7.1.1, 7.1.2, 7.1.3, 7.1.4, 7.1.5 and 7.1.6 pertaining to the best practice guidance; surface water management, pollution control, waste and dust management plans; biosecurity measures within the invasive species management plans; Pre-Construction and Construction Phase monitoring of SCI bird species; and area / section specific mitigations, in particular those that to relate to disturbance buffers.</p> <p>Furthermore, the mitigations for Operational Phase, outlined in Sub-section 7.2.1 pertaining to bird collision mitigation measures; and to 7.2.3 relating to the post-construction monitoring of SCI bird species.</p>	No adverse effects

Qualifying Interest / Special Conservation Interest	Attribute	Measure	Potential Impacts	In combination effects	Mitigation Measures	Residual Impact
	Spatial distribution	Hectares, time and intensity of use	N/A (Construction and Operational impacts incapable of affecting attribute)	In combination effects with other plans and projects are not predicted.	None required.	No adverse effects
	Forage spatial distribution, extent and abundance	Location and hectares, and forage biomass	Surface water, groundwater, and air (dust)-based pollution impacts could indirectly impact Razorbill via the deterioration of food / prey items. This impact also has a knock-on effect as the consumption of prey items containing polluting elements may lead to bioaccumulation of toxic substances within the Razorbill population.	In combination effects with other plans and projects are not predicted.	<p>Strict adherence to:</p> <p>The mitigations outlined in Sub-sections 7.1.1, 7.1.2, 7.1.3, 7.1.4, 7.1.5 and 7.1.6 pertaining to the best practice guidance; surface water management, pollution control, waste and dust management plans; biosecurity measures within the invasive species management plans; Pre-Construction and Construction Phase monitoring of SCI bird species; and area / section specific mitigations, in particular those that relate to disturbance buffers.</p> <p>Furthermore, the mitigations for Operational Phase, outlined in Sub-section 7.2.1 pertaining to bird collision mitigation measures; and to 7.2.3 relating to the post-construction monitoring of SCI bird species.</p>	No adverse effects

Qualifying Interest / Special Conservation Interest	Attribute	Measure	Potential Impacts	In combination effects	Mitigation Measures	Residual Impact
	Disturbance across the site	Intensity, frequency, timing and duration	N/A (Construction and Operational impacts incapable of affecting attribute)	In combination effects with other plans and projects are not predicted.	None required.	No adverse effects
	Barriers to connectivity and site use	Number; location; shape; area (hectares)	N/A (Construction and Operational impacts incapable of affecting attribute)	In combination effects with other plans and projects are not predicted.	None required.	No adverse effects

SECTION 8: CONCLUSION

JBA undertook a NIS in relation to a proposed Scheme between Broombridge and Charlestown, within the greater Finglas area, Co. Dublin. The following Natura 2000 sites are identified as occurring within the ZoI of the proposed Scheme:

- North Dublin Bay SAC;
- South Dublin Bay SAC;
- Rockabill to Dalkey Island SAC;
- North Bull Island SPA;
- South Dublin Bay and River Tolka Estuary SPA; and
- North-west Irish Sea SPA.

The proposed light rail Scheme is located along the Royal Canal and River Tolka (surface water and groundwater-to-surface water pathways), upstream of North Dublin Bay SAC; South Dublin Bay SAC; Rockabill to Dalkey Island SAC, North Bull Island SPA; South Dublin Bay and River Tolka Estuary SPA and North-west Irish Sea SPA. The site of the proposed Scheme contains supporting ex-situ grassland habitats, which are utilised by SCI bird species associated within the North Bull Island SPA; South Dublin Bay and River Tolka Estuary SPA; and North-west Irish Sea SPA.

All the QIs / SCIs of the six sites listed above and screened into this assessment are:

- Mudflats and sandflats not covered by seawater at low tide [1140];
- Reefs [1170];
- Annual vegetation of drift lines [1210];
- Salicornia and other annuals colonising mud and sand [1310];
- Atlantic salt meadows (*Glauco-Puccinellietalia maritima*) [1330];
- Mediterranean salt meadows (*Juncetalia maritimi*) [1410];
- Embryonic shifting dunes [2110];
- Shifting dunes along the shoreline with *Ammophila arenaria* (white dunes) [2120];
- Fixed coastal dunes with herbaceous vegetation (grey dunes) [2130];
- Humid dune slacks [2190];
- Harbour Porpoise *Phocoena phocoena* [1351];
- Petalwort *Petalophyllum ralfsii* [1395];
- Red-throated Diver *Gavia stellata* [A001];
- Great Northern Diver *Gavia immer* [A003];
- Fulmar *Fulmarus glacialis* [A009];
- Manx Shearwater *Puffinus puffinus* [A013];
- Cormorant *Phalacrocorax carbo* [A017];
- Shag *Phalacrocorax aristotelis* [A018];
- Light-bellied Brent Goose *Branta bernicla hrota* [A046];
- Common Shelduck *Tadorna tadorna* [A048];
- Teal *Anas crecca* [A052];
- Pintail *Anas acuta* [A054];
- Shoveler *Anas clypeata* [A056];
- Common Scoter *Melanitta nigra* [A065];
- Oystercatcher *Haematopus ostralegus* [A130];
- Ringed Plover *Charadrius hiaticula* [A137];
- Golden Plover *Pluvialis apricaria* [A140];
- Grey Plover *Pluvialis squatarola* [A141];
- Knot *Calidris canutus* [A143];
- Sanderling *Calidris alba* [A144];
- Dunlin *Calidris alpina* [A149];
- Black-tailed Godwit *Limosa limosa* [A156];
- Bar-tailed Godwit *Limosa lapponica* [A157];

- Curlew *Numenius arquata* [A160];
- Redshank *Tringa totanus* [A162];
- Turnstone *Arenaria interpres* [A169];
- Little Gull *Larus minutus* [A177];
- Black-headed Gull *Chroicocephalus ridibundus* [A179];
- Common Gull *Larus canus* [A182];
- Lesser Black-backed Gull *Larus fuscus* [A183];
- Herring Gull *Larus argentatus* [A184];
- Great Black-backed Gull *Larus marinus* [A187];
- Kittiwake *Rissa tridactyla* [A188];
- Roseate Tern *Sterna dougallii* [A192];
- Common Tern *Sterna hirundo* [A193];
- Arctic Tern *Sterna paradisaea* [A194];
- Little Tern *Sterna albifrons* [A195];
- Guillemot *Uria aalge* [A199];
- Razorbill *Alca torda* [A200];
- Puffin *Fratercula arctica* [A204]; and
- Wetland and Waterbirds [A999].

This NIS has examined and analysed, in light of the best scientific knowledge, with respect to those European sites within the zone of influence of Luas Finglas, the potential impact sources and pathways, the manner in which these could potentially impact on the European sites' qualifying interest habitats and species and special conservation interest species, and whether the predicted impacts would adversely affect the integrity of North Dublin Bay SAC; South Dublin Bay SAC; Rockabill to Dalkey Island SAC; North Bull Island SPA; South Dublin Bay and River Tolka Estuary SPA; and North-west Irish Sea SPA. The possibility of significant effects on any other European site can be excluded.

Avoidance, design requirements and mitigation measures are set out within this NIS (and its appendices) and the effective implementation of these mitigation measures will ensure that any impacts on the conservation objectives of European sites will be avoided during the Construction and Operation of Luas Finglas such that there will be no adverse effects on any European sites.

It has been objectively concluded, following an examination, analysis and evaluation of the relevant information, including in particular the nature of the predicted impacts from Luas Finglas and the effective implementation of the mitigation measures proposed, that Luas Finglas will not adversely affect (either directly or indirectly) the integrity of any European site in view of the site's conservation objectives, either alone or in combination with other plans or projects, and there is no reasonable scientific doubt in relation to this conclusion.

To confirm this conclusion, a checklist from (DoEHLG, 2009) has been completed in Table 8-1 below.

Table 8-1: Integrity of Natura 2000 site checklist (DoEHLG, 2009)

Conservation objectives: does the project or plan have the potential to:	Yes / No
Cause delays in progress towards achieving the conservation objectives of the site?	No - Following mitigation, no significant adverse residual impacts have been identified that will prevent achievement of the conservation objectives of the assessed site.
Interrupt progress towards achieving the conservation objectives of the site?	No - Following mitigation, no significant adverse residual impacts have been identified that will prevent achievement of the conservation objectives of the assessed site.
Disrupt those factors that help to maintain the favourable conditions of the site?	No - Potential adverse impacts via surface water; land and air; and groundwater pathways identified during the screening process can be mitigated against.

Conservation objectives: does the project or plan have the potential to:	Yes / No
Interfere with the balance, distribution and density of key species that are the indicators of the favourable condition of the site?	No - Potential adverse impacts on the species of North Dublin Bay SAC; South Dublin Bay SAC; Rockabill to Dalkey Island SAC; North Bull Island SPA; South Dublin Bay and River Tolka Estuary SPA; and North-west Irish Sea SPA are not predicted, as impacts will be avoided by implementing the mitigation and avoidance measures detailed in this report.
Other objectives: does the project or plan have the potential to:	
Cause changes to the vital defining aspects (e.g. nutrient balance) that determine how the site functions as a habitat or ecosystem?	No - Potential adverse impacts from suspended solid and nutrient release are not predicted, as measures will be included within working protocols to ensure potential impacts are effectively mitigated.
Change the dynamics of the relationships (between, for example, soil and water or plants and animals) that define the structure and/or function of the site?	No - Potential adverse impacts relating to water quality have been identified, which have the capacity to impact the functioning and dynamics of the site; however, these impacts will be avoided through the implantation of prescribed mitigation measures.
Interfere with predicted or expected natural changes to the site (such as water dynamics or chemical composition)?	No - Potential adverse impacts from changes to the hydrological regime and suspended solid/nutrient/pollutant release are not expected as measures are included within working protocols to ensure potential impacts are effectively mitigated.
Reduce the area of key habitats?	No - Potential adverse impacts on the habitats of North Dublin Bay SAC; South Dublin Bay SAC; Rockabill to Dalkey Island SAC; North Bull Island SPA; South Dublin Bay and River Tolka Estuary SPA; and North-west Irish Sea SPA are not predicted given that the mitigation measures detailed within the NIS will safeguard these Natura 2000 sites.
Reduce the population of key species?	No - Potential impacts to key species of the North Dublin Bay SAC; South Dublin Bay SAC; Rockabill to Dalkey Island SAC; North Bull Island SPA; South Dublin Bay and River Tolka Estuary SPA; and North-west Irish Sea SPA are not predicted, as impacts will be avoided by implementing the mitigation measures detailed.
Change the balance between key species?	No - Potential impacts to key species for which the North Dublin Bay SAC; South Dublin Bay SAC; Rockabill to Dalkey Island SAC; North Bull Island SPA; South Dublin Bay and River Tolka Estuary SPA; and North-west Irish Sea SPA are designated are not predicted, as impacts will be avoided by implementing the mitigation measures detailed.
Reduce diversity of the site?	No - The identified mitigation measures will ensure that the current diversity of the site is maintained.
Result in disturbance that could affect population size or density or the balance between key species?	No - Potential impacts to the population size, density or balance of key species are not predicted, as impacts will be avoided by implementing the mitigation measures detailed.
Result in fragmentation	No – Potential impacts resulting in fragmentation of species or habitats are not predicted as impacts will be avoided by implementing the mitigation measures detailed.
Result in loss or reduction of key features (e.g. tree cover, tidal exposure, annual flooding etc.)?	No - Potential adverse impacts on key features of North Dublin Bay SAC; South Dublin Bay SAC; Rockabill to Dalkey Island SAC; North Bull Island SPA; South Dublin Bay and River Tolka Estuary SPA; and North-west Irish Sea SPA are not predicted, as impacts will be avoided by implementing the mitigation measures detailed.

SECTION 9: REFERENCES

- Albers, P. H., 2006. Birds and polycyclic aromatic hydrocarbons. *Avian and Poultry Biology Reviews*. 125-140
- Anderson, B. S., Phillips, B. M., Voorhees, J. P., Siegler, K., & Tjeerdema, R., 2016. Bioswales reduce contaminants associated with toxicity in urban storm water. *Environmental toxicology and chemistry*, 35(12), 3124-3134.
- Ankney, C.D., and C. D. Macinnes., 1978. Nutrient reserves and reproductive performance of female lesser snow geese. *The Auk* 95: 459–471.
- CAAS, 2021. Transport Strategy for Greater Dublin Area 2022-2042 - Natura Impact Statement.
- Catchments.ie, 2024. Catchments Map and Data. Available online at: <https://www.catchments.ie/>
- Charles, P., Edwards, P. (Eds.), 2015. Environmental Good Practice on Site Guide, Fourth edition. ed, CIRIA C, CIRIA: London.
- Construction Industry Research and Information Association (CIRIA), 2006a, Control of Water Pollution from Linear Construction Projects. Technical Guide (C648).
- Construction Industry Research and Information Association (CIRIA), 2006b, Control of Water Pollution from Linear Construction Projects. Site Guide (C649).
- Construction Industry Research and Information Association (CIRIA), 2005. PUB C650 Environmental Good Practice on Site, 2nd Edition
- Construction Industry Research and Information Association (CIRIA), 2001. Control of Water Pollution from Construction Sites. Guidance for Consultants and Contractors (C532).
- Costa, R. A., Eeva, T., Eira, C., Vaqueiro, J., & Vingada, J. V. (2013). Assessing heavy metal pollution using Great Tits (*Parus major*): feathers and excrements from nestlings and adults. *Environmental monitoring and assessment*, 185, 5339-5344.
- Cutts, K. Hemingway, & J. Spencer, 2013. Waterbird Disturbance Mitigation Toolkit Informing Estuarine Planning & Construction Projects, Version 3.2. Copyright University of Hull.
- Ding, J., Wang, S., Yang, W., Zhang, H., Yu, F., & Zhang, Y., 2023. Tissue distribution and association of heavy metal accumulation in a free-living resident passerine bird tree sparrow *Passer montanus*. *Environmental Pollution*, 316, 120547.
- DoEHLG, 2009 (2010 revision). Appropriate Assessment of Plans and Projects in Ireland Guidance for Planning Authorities., Department of the Environment, Heritage and Local Government, available: <http://www.wicklow.ie/sites/default/files/Manager's%20report%20on%20submissions%20to%20the%20Proposed%20Amendments.pdf>
- DoHLGH, 2018. 'River Basin Management Plan for Ireland 2018-2021', available: <https://www.gov.ie/pdf/?file=https://assets.gov.ie/131981/dea37730-1ef0-4106-875b-5c433e823ad6.pdf#page=null>.
- DoHLGH, 2022. 'Draft River Basin Management Plan for Ireland 2022-2027', available: <https://www.gov.ie/en/consultation/2bda0-public-consultation-on-the-draft-river-basin-management-plan-for-ireland-2022-2027/EPA>, 2023a. EPA Catchments.ie [online], Catchments.ie, Available online at: <https://www.catchments.ie/maps/>

EA, 2013. The Environment Agency (EA) Managing Japanese Knotweed on development sites - the Knotweed Code of Practice (Version 3, amended in 2013, withdrawn from online publication in 2016)

EA, 2010. Managing Invasive Non-Native Plants in or near Freshwater

EC, 2021. Assessment of Plans and Projects Significantly Affecting Natura 2000 Sites: Methodological guidance on the provisions of Article 6(3) and (4) of the Habitats Directive 92/43/EEC, Office for Official Publications of the European Communities, Luxembourg. European Commission.

EC, 2021. Assessment of plans and projects in relation to Natura 2000 sites - Methodological guidance on Article 6(3) and (4) of the Habitats Directive 92/43/EEC (European Commission 2018).

EC (Ed.), 2018. Managing Natura 2000 Sites: The Provisions of Article 6 of the 'Habitats' Directive 92/43/EEC, Office for Official Publications of the European Communities: Luxembourg.

EC, 2013. Interpretation Manual of European Union Habitats. Version EUR 28. European Commission.

EC, 2007. '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.'

European Commission, Directorate-General for the Environment, Oxford Brookes University, Impacts Assessment Unit (Eds.), 2002. Assessment of Plans and Projects Significantly Affecting Natura 2000 Sites: Methodological Guidance on the Provisions of Article 6(3) and (4) of the Habitats Directive 92/43/EEC, EUR-OP: Luxembourg.

EEA, 2020a. Natura 2000 - Standard Data Form: North Dublin Bay SAC IE0000206, available: <https://natura2000.eea.europa.eu/Natura2000/SDF.aspx?site=IE0000206>

EEA, 2020b. Natura 2000 - Standard Data Form: South Dublin Bay SAC IE0000210, available: <https://natura2000.eea.europa.eu/Natura2000/SDF.aspx?site=IE0000210>

EEA, 2020c. Natura 2000 - Standard Data Form: North Bull Island SPA IE0004006, available: <https://natura2000.eea.europa.eu/Natura2000/SDF.aspx?site=IE0004006>

EEA, 2020d. Natura 2000 - Standard Data Form: South Dublin Bay and River Tolka Estuary SPA IE0004024, available: <https://natura2000.eea.europa.eu/Natura2000/SDF.aspx?site=IE0004024>

EEA, 2019. Standard Data Form: Rockabill to Dalkey Island SAC IE0003000, available: <https://natura2000.eea.europa.eu/Natura2000/SDF.aspx?site=IE0003000>

Enterprise Ireland, 2003. Best Practice Guide BPGCS005 – Oil Storage Guidelines.

EPA, 2024. EPA Maps [online], Next Generation EPA Maps, Available online at: <https://gis.epa.ie/EPAMaps/>

EPA, 2021. 3rd Cycle Draft Liffey and Dublin Bay Catchment Report (HA 09), available <https://catchments.ie/wp-content/files/catchmentassessments/09%20Liffey%20and%20Dublin%20Bay%20Catchment%20Summary%20WFD%20Cycle%203.pdf>

FCC, 2023. Fingal Development Plan 2023 - 2029 - Natura Impact Report. Fingal County Council.

Fossitt, J.A., 2000. A Guide to Habitats in Ireland, Heritage Council of Ireland series, Heritage Council / Chomhairle Oidhreachta: Kilkenny.

Fournel I, Sautour M, Lafon I, Sixt N, L'ollivier C, Dalle F, Chavanet P, Couillaud G, Caillot D, Astruc K, Bonnin A, Aho-Glele L-S (2010) Airborne Aspergillus contamination during hospital construction works: efficacy of protective measures. *Am J Infect Control* 38(3):189–194. <https://doi.org/10.1016/j.ajic.2009.07.011> - DOI

Frost, D. 2008. The use of 'flight diverters' reduces mute swan *Cygnus olor* collision with power lines at Abberton Reservoir, Essex, England. *Conservation Evidence*, 5, 83-91.

GSI, 2024. Geological Survey Ireland Spatial Resources: Map Viewer. Geological Survey Ireland. Available online at: <https://dcenr.maps.arcgis.com/apps/MapSeries/index.html?appid=a30af518e87a4c0ab2fbde2aaac3c228>

Hanby, T., 2022. PhD Thesis: Social associations, patterns of urban habitat use and their implications for fitness in an avian long-distance migrant - Understanding patterns of urban habitat use in overwintering Ligh-bellied Brent Geese in Dublin, Ireland. University of Exeter.

Havera, S. P., Boens, L. R., Georgi, M. M., & Shealy, R. T., 1992. Human disturbance of waterfowl on Keokuk pool, Mississippi River. *Wildlife Society Bulletin (1973-2006)*, 20(3), 290-298.

Health Services Executive (HSE), 2018., National Guidelines for the Prevention of Nosocomial Aspergillosis. ISBN: 978-0-9565622-6-5.

IAQM, 2014. Guidance on the Assessment of Dust from Demolition and Construction. Institute of Air Quality Management.

Idan, F. S., & Jazza, S. H., 2022. Bioaccumulation of hydrocarbon compounds in the muscle of three aquatic birds in Um Alnaaj Marsh, Iraq. *International Journal of Aquatic Biology*, 10(3), 234-241.

IFI, 2020. Planning for Watercourses in the Urban Environment. A Guide to the Protection of Watercourses through the use of Buffer Zones, Sustainable Drainage Systems, Instream Rehabilitation, Climate / Flood Risk and Recreational Planning. Inland Fisheries Ireland.

IFI, 2016. *Guidance on Protection of Fisheries During Construction Works In and Adjacent to Waters. Inland Fisheries Ireland.*

IFI, 2010. Biosecurity Protocol for Field Survey Work. *Inland Fisheries Ireland.*

Irish Water, 2018. Greater Dublin Drainage Strategy: Overview & Future Strategic Needs Asset Planning. Irish Water.

ISI, 2008a. Best Practice Management Guidelines for Japanese Knotweed. Invasive Species Ireland.

ISI, 2008b. Best Practice Management Guidelines for Himalayan Balsam. Invasive Species Ireland.

ISI, 2008c. Best Practice Management Guidelines for Giant Hogweed. Invasive Species Ireland.

JBA, 2024. Finglas Luas - Screening for Appropriate Assessment Report, JBA Consulting Ireland Ltd.

Jurries D., 2003. BIOFILTERS (Bioswales, Vegetative Buffers, & Constructed Wetlands) for stormwater discharge pollution removal: Guidance for using bioswales, vegetative buffers, and constructed wetlands for reducing, minimizing, or eliminating pollutant discharges to surface waters. State of Oregon, Department of Environmental Quality.

Krapu, G. L. (1981). The role of nutrient reserves in mallard reproduction. *The Auk* 98: 28–38.

McCorry, M. and Ryle, T., 2009. Saltmarsh Monitoring Project: Final Report, s.l.: Department of Environment, Heritage, and Local Government.

NBDC, 2024. National Biodiversity Data Centre. Available online at: <https://maps.biodiversityireland.ie>

NPWS, 2023a. Site Synopsis. North-west Irish Sea SPA 004236. Available: [SITE SYNOPSIS \(npws.ie\)](https://www.npws.ie)

NPWS, 2023b. Conservation Objectives: North-west Irish Sea SPA 004236. Version 1. National Parks and Wildlife Service, Department of Housing, Local Government and Heritage. Available: [CO004236.pdf \(npws.ie\)](https://www.npws.ie)

NPWS, 2019a. The Status of EU Protected Habitats and Species in Ireland. Volume 1: Summary Overview. Unpublished NPWS report. Edited by: Deirdre Lynn and Fionnuala O'Neill.

NPWS, 2019b. The Status of EU Protected Habitats and Species in Ireland. Volume 2: Habitats Assessments. Unpublished NPWS report. Edited by: Deirdre Lynn and Fionnuala O'Neill.

NPWS, 2019c. The Status of EU Protected Habitats and Species in Ireland. Volume 3: Species Assessments. Unpublished NPWS report. Edited by: Deirdre Lynn and Fionnuala O'Neill.

NPWS, 2015a. Conservation Objectives: North Bull Island SPA 004006. Version 1. National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht.

NPWS, 2015b. Conservation Objectives: South Dublin Bay and River Tolka Estuary SPA 004024. Version 1. National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht.

NPWS, 2014. Site Synopsis: North Bull Island SPA 004006. Department of Housing, Local Government and Heritage.

NPWS, 2013a. Conservation Objectives: North Dublin Bay SAC 000206. Version 1. National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht.

NPWS, 2013b. Conservation Objectives: South Dublin Bay SAC 000210. Version 1. National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht.

NPWS, 2013c., Rockabill to Dalkey Island SAC (site code: 3000): Conservation Objectives Supporting Document-, s.l.: Department of Housing, Local Government and Heritage.

NRA, 2009. Ecological Surveying Techniques for Protected Flora and Fauna during the Planning of National Road Schemes. National Roads Authority. Available at: <https://www.tii.ie/technical-services/environment/planning/Ecological-Surveying-Techniques-for-Protected-Flora-and-Fauna-during-the-Planning-of-National-Road-Schemes.pdf>

NRA, 2006., Guidelines for the Crossing of Watercourses During the Construction of National Road Schemes.

OPW, 2009. 'Planning System and Flood Risk Management Guidelines'. Office of Public Works.

Parnell, J. & Curtis, T., 2012. Webb's An Irish Flora [online], 8th ed, Trinity College Dublin. Available: <http://www.corkuniversitypress.com/product-p/9781859184783.htm>.

Pease, M. L., Rose, R. K., & Butler, M. J. (2005). Effects of human disturbances on the behavior of wintering ducks. *Wildlife Society Bulletin*, 33(1), 103-112.

Preene, M, Roberts, T. O. L., and Powrie, W., 2016. Groundwater control: design and practice, second edition, C750, CIRIA, London, UK (ISBN: 978-0-86017-755-5).

Scott Cawley, 2022. Dublin City Development Plan 2022 - 2028 - Natura Impact Report Conclusion.

Smith, G., O'Donoghue, P., O'Hora, K., Delaney, E., 2011. 'Best Practice Guidance for Habitat Survey and Mapping, 2011'. Available:

http://www.heritagecouncil.ie/fileadmin/user_upload/Publications/Wildlife/Habitat_Survey_Guidance/Habitat_Survey_Guidance_Hyperlinked_2.pdf.

Stace, C., 2019. The New Flora of the British Isles 4th Edition. C&M Floristics.

TII, 2020a., The Management of Invasive Alien Plant Species on National Roads – Technical Guidance.

TII, 2020b., The Management of Invasive Alien Plant Species on National Roads – Standard.

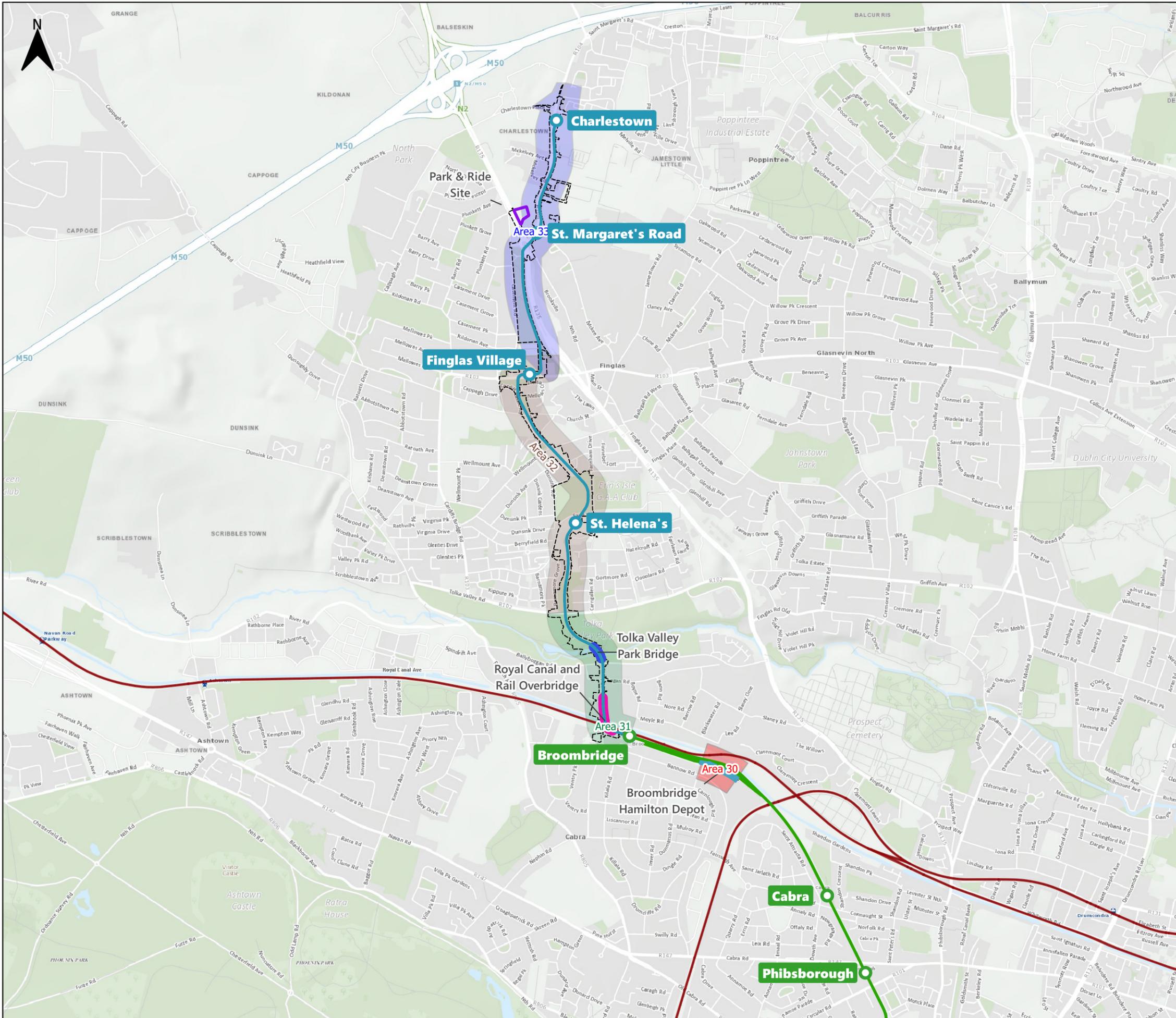
TII, 2017., The Management of Waste from National Road Construction Projects GE-ENV-01101

TII, 2015a., Design Manual for Roads and Bridges Part 3 DN-DNG-03022 (NRA HD 33/15) (Including Amendment No. 1).

TII, 2015b., Road Drainage and the Water Environment DN-DNG-03065.

Tyldesley, D. and Chapman C., 2013 The Habitats Regulations Assessment handbook. edition UK: DTA Publications Ltd.

A. Site Layout Plan



Legend

Luas Finglas

- Proposed Scheme Alignment
- Proposed New Luas Stops
- Broombridge Hamilton Depot (existing)
- Extent of Proposed Works Boundary
- Proposed Park & Ride Site

Proposed Bridges

- Royal Canal and Rail Overbridge
- Tolka Valley Park Bridge

Existing Luas

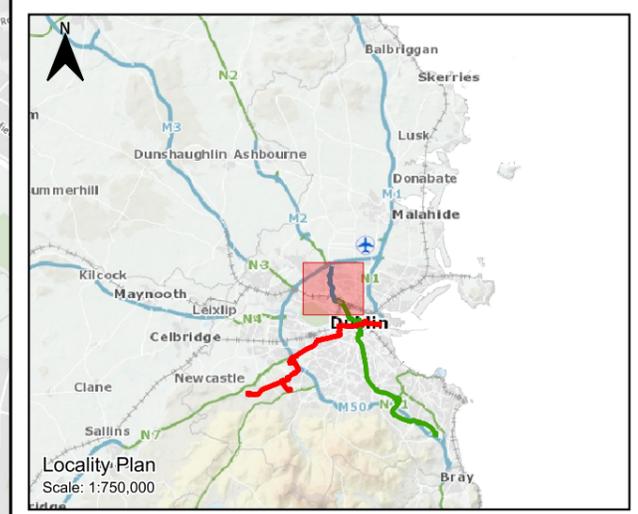
- Red Line
- Green Line
- Existing Luas Stops

Alignment Areas

- Area 30
- Area 31
- Area 32
- Area 33

Existing Rail Network

- Irish Rail



P02	08/008/24	S3 - Review & Comment	SM	AC	AC	ED
P01	21/03/24	S3 - Review & Comment	MC	MC	AC	ED
Rev.	Date	Suitability / Purpose	Drawn	Check'd	Rev'd	Appr'd

Consultant

Client

Project

LUAS

FINGLAS

Drawing Title

Map Figure 1-1. Map of Luas Finglas

Sheet 1 of 1

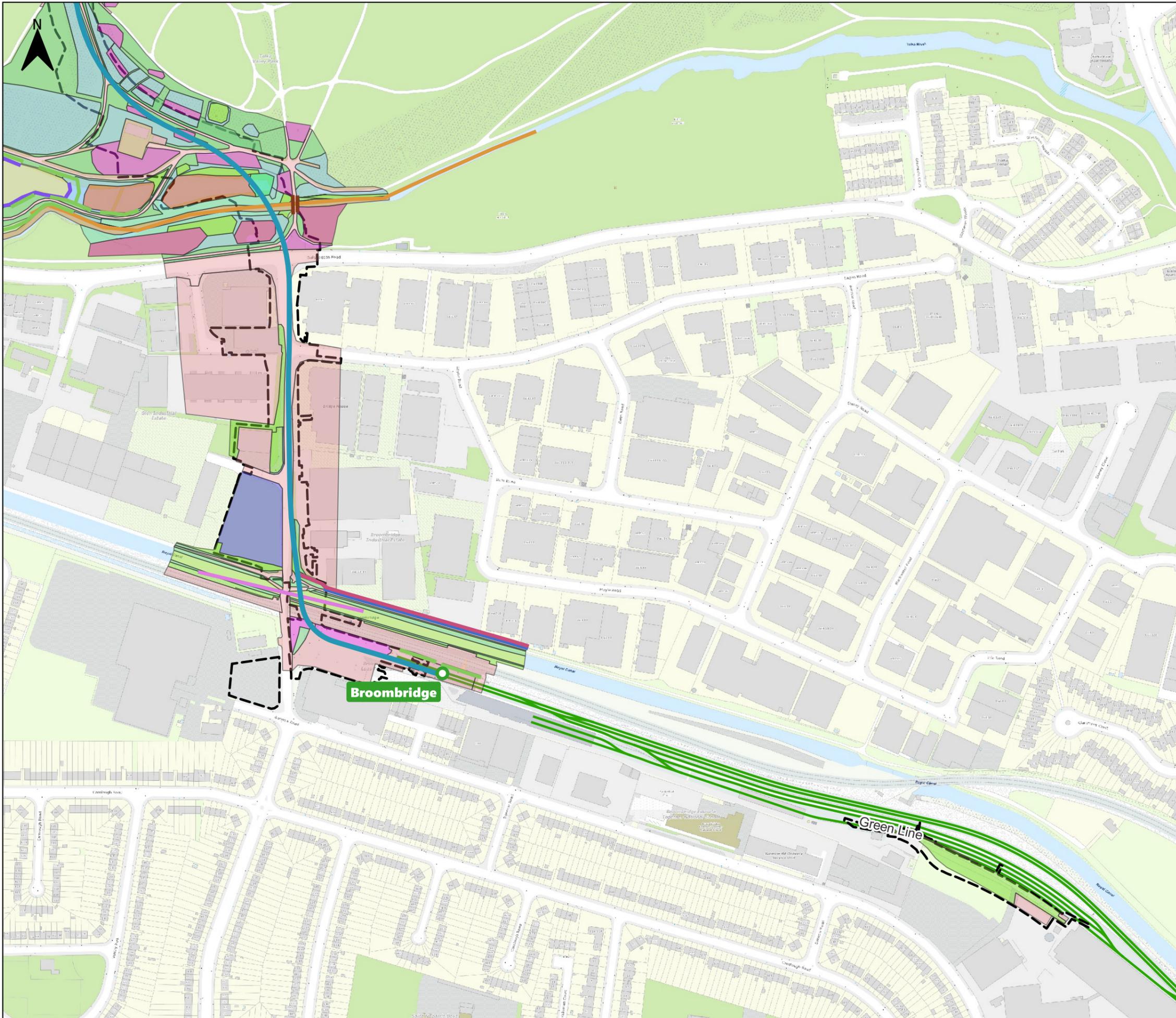
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Client Project No.	LDD101
Drawing No.	LDD101-BEV-GA-ROUT-XX-DR-LE-00001
Rev.	P02

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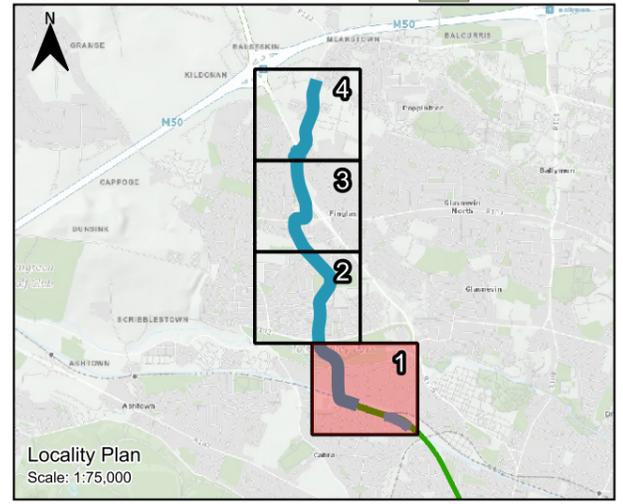
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B. Habitat Maps



Legend

Luas Finglas	Area Habitat
Proposed Scheme Alignment	BL3
Proposed New Luas Stops	FL8
Extent of Proposed Works Boundary	FS1
Existing Luas	FS2
Green Line	FW2
Existing Luas Stops	FW3
Linear Habitat	GA2
BL1	GM1
FS1	GS2
FW2	GS2, WS1
FW3	WD1
GS2	WD5
WL1	WN6
WL2	WS1



P02	26/09/24	Issued for Information	SM	AP	AP	ED
P01	08/07/24	S3 - Review & Comment	WM	PB	PB	BOC
Rev.	Date	Suitability / Purpose	Drawn	Check'd	Rev'd	Appr'd

Consultant

Client

Project

LUAS

FINGLAS

Drawing Title

Map Figure 9-3. Habitat Maps

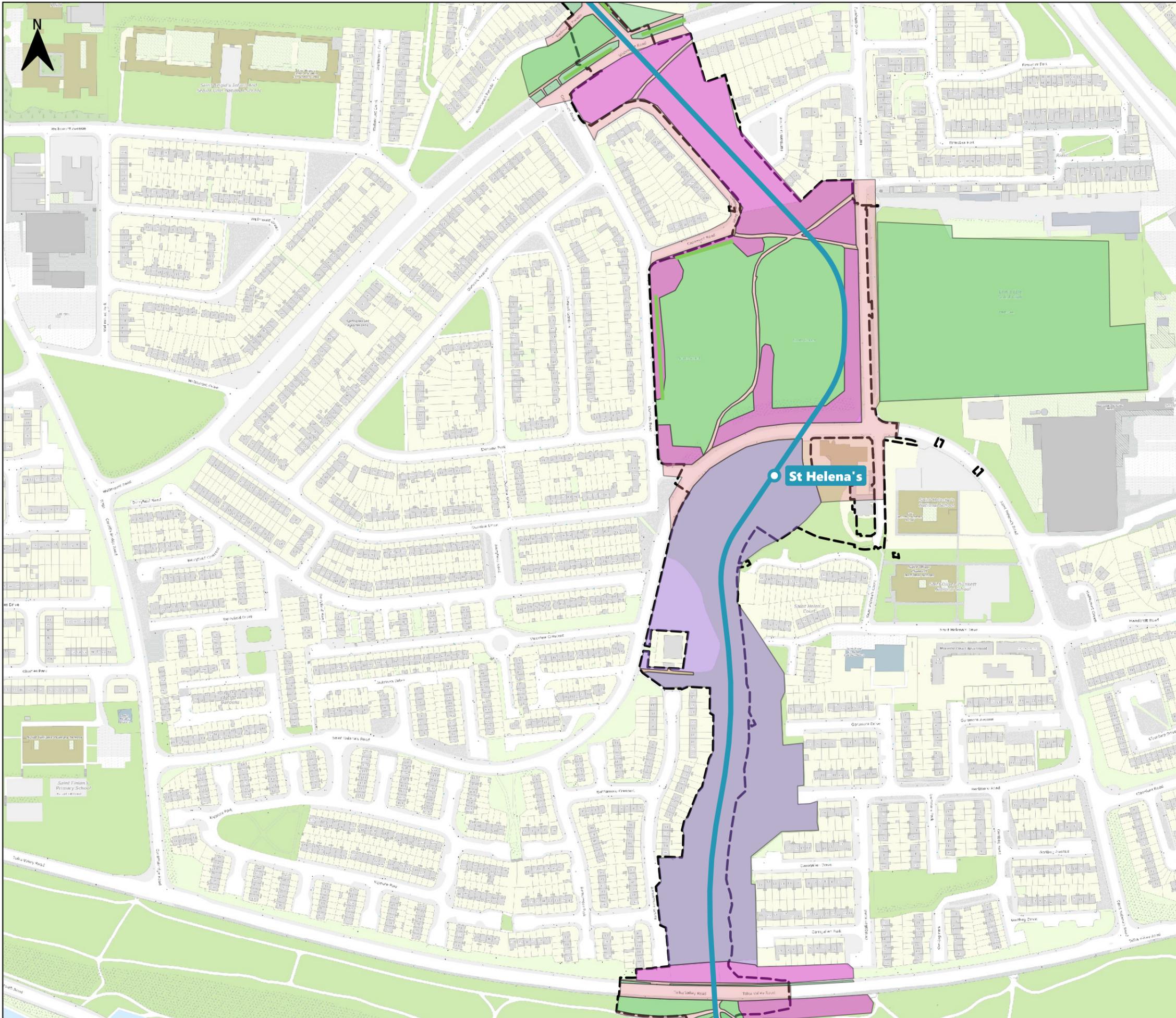
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Client Project No.	LDD101
Drawing No.	LDD101-BEV-GE-ROUT-XX-DR-LE-00040
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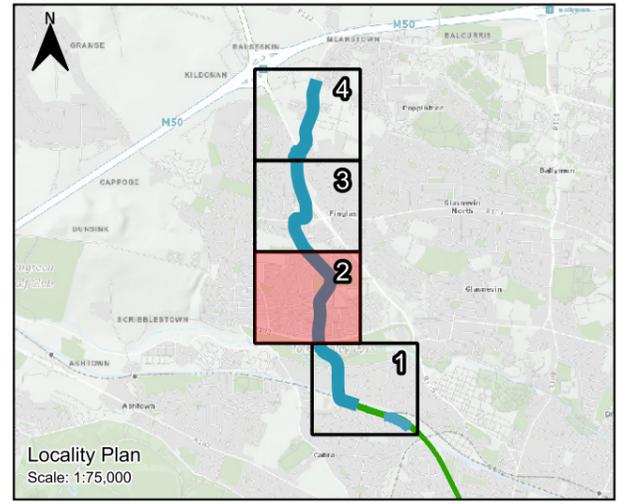
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Legend

- | | |
|-----------------------------------|-----------------------|
| Luas Finglas | Area Habitat |
| Proposed Scheme Alignment | BL3 |
| Proposed New Luas Stops | GA2 |
| Extent of Proposed Works Boundary | GS1 |
| Existing Luas | GS2 |
| Green Line | WD5 |
| Existing Luas Stops | Linear Habitat |
| | WL2 |



P02	26/09/24	Issued for Information	SM	AP	AP	ED
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Consultant

Client

Project

LUAS
FINGLAS

Drawing Title

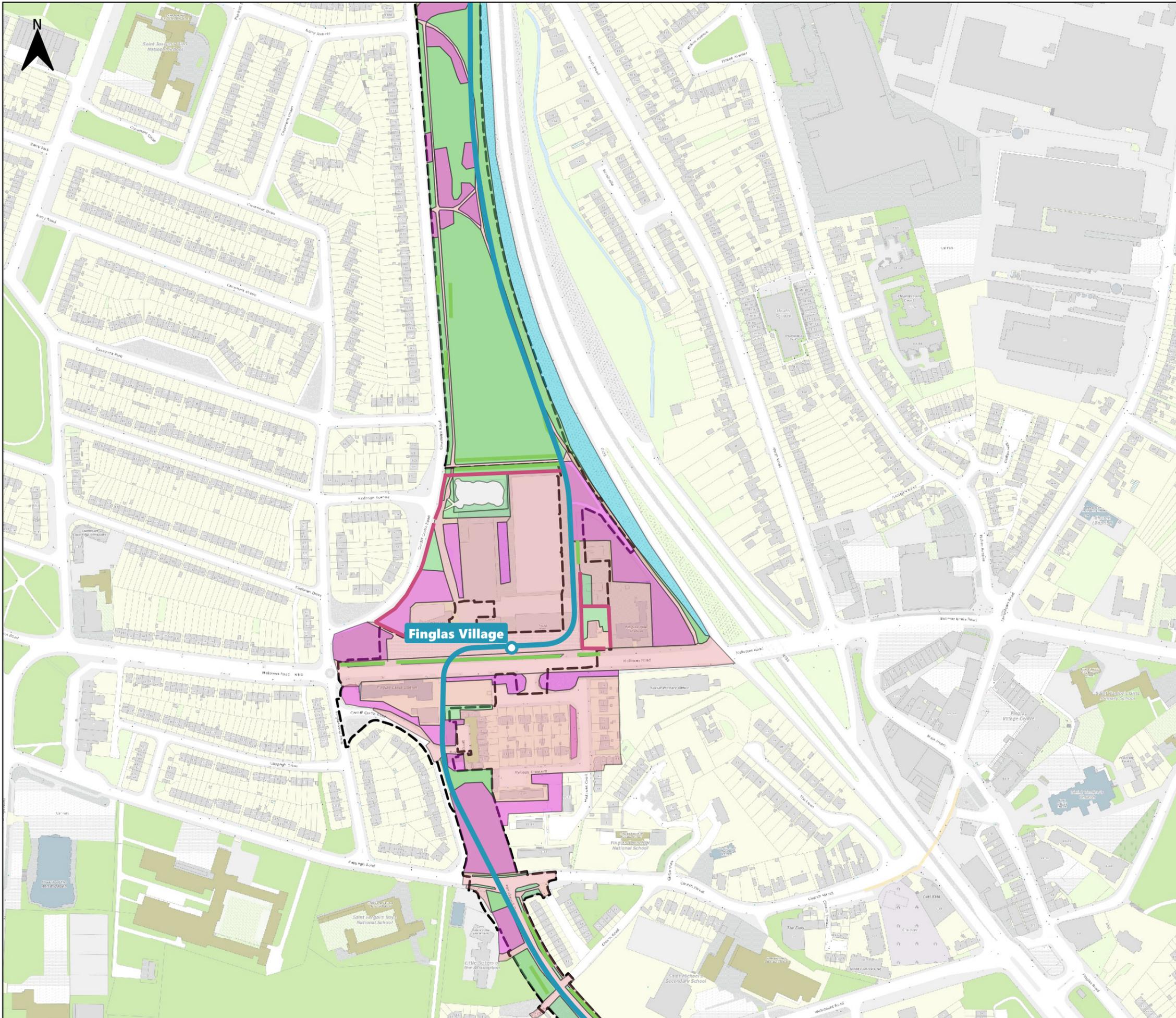
Map Figure 9-3. Habitat Maps
Sheet 2 of 4

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Rev.	P02

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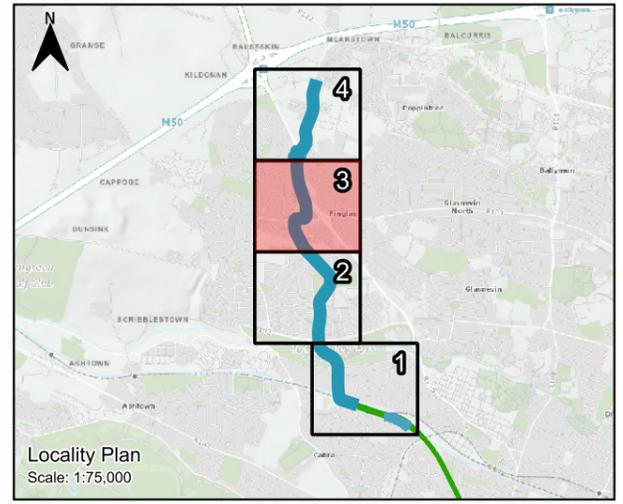
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Legend

- | | |
|-----------------------------------|-----------------------|
| Luas Finglas | Area Habitat |
| Proposed Scheme Alignment | BL3 |
| Proposed New Luas Stops | GA2 |
| Extent of Proposed Works Boundary | WD2 |
| | WD5 |
| Existing Luas | Linear Habitat |
| Green Line | WL1 |
| Existing Luas Stops | WL2 |



P02	26/09/24	Issued for Information	SM	AP	AP	ED
P01	08/07/24	S3 - Review & Comment	WM	PB	PB	BOC
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Consultant

Client

Project

LUAS
FINGLAS

Drawing Title

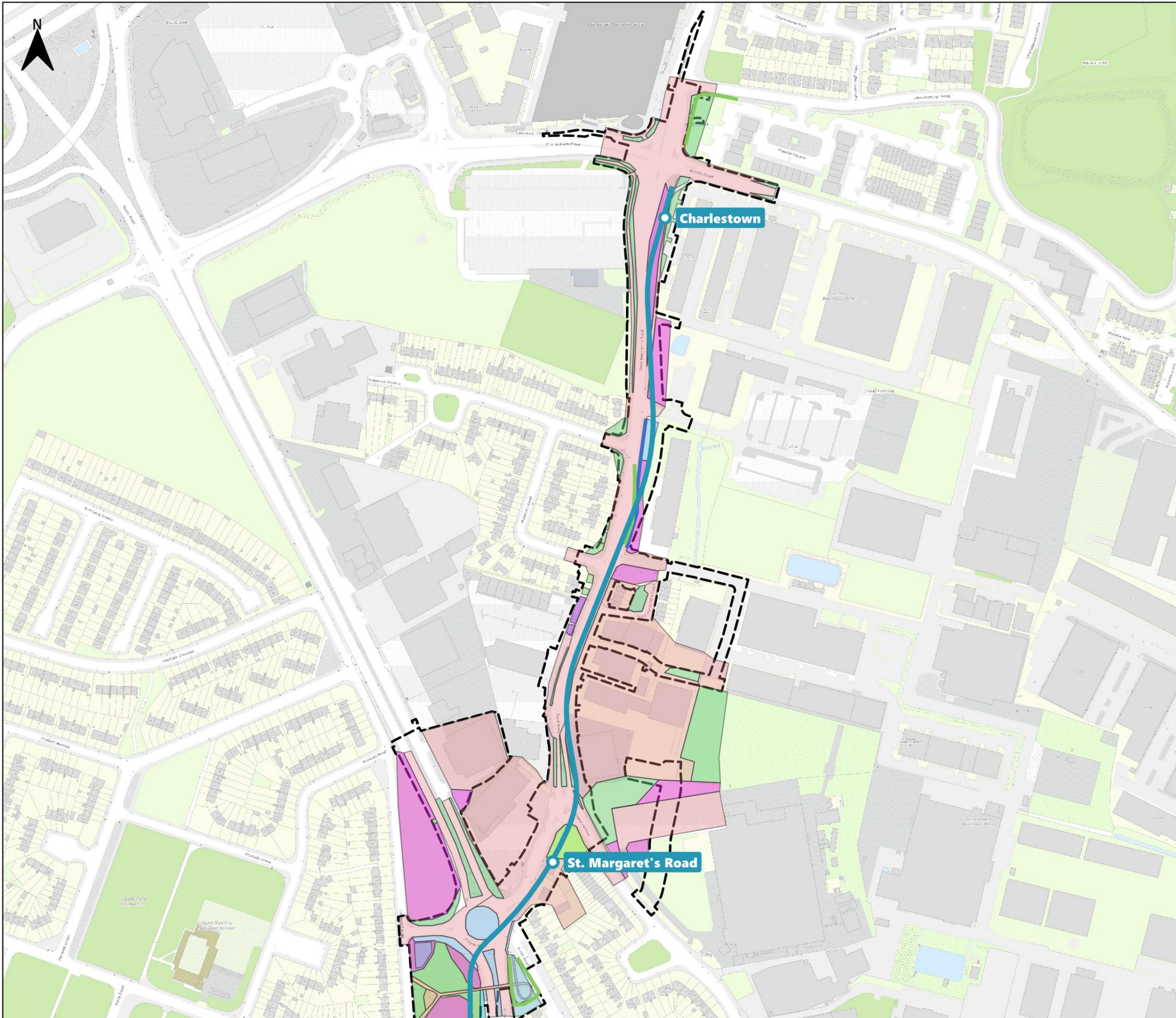
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Sheet 3 of 4

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Rev.	P02

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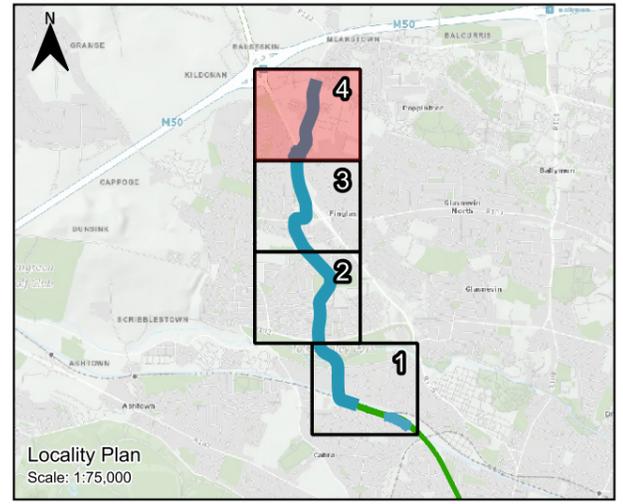
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Legend

- Luas Finglas**
- Proposed Scheme Alignment
 - Proposed New Luas Stops
 - Extent of Proposed Works Boundary
- Existing Luas**
- Green Line
 - Existing Luas Stops
- Area Habitat**
- BL3
 - GA2
 - GS2
 - WD2
 - WD5
 - WS1
 - WS3
- Linear Habitat**
- GA2
 - GS2
 - WL2



P02	26/09/24	Issued for Information	SM	AP	AP	ED
P01	08/07/24	S3 - Review & Comment	WM	PB	PB	BOC
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Consultant

Client

Project

LUAS
FINGLAS

Drawing Title

Map Figure 9-3. Habitat Maps
Sheet 4 of 4

Scale @ A3	1:3,500
BT Project No.	21401
Client Project No.	LDD101
Drawing No.	LDD101-BEV-GE-ROUT-XX-DR-LE-00043
Rev.	P02

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C. Wintering Bird Survey Data Summary

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SECTION 1: Wintering Bird Survey Data 1

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SECTION 1: WINTERING BIRD SURVEY DATA

The wintering bird survey data used to form the baseline for the EIAR was collected through on-site observations of wintering bird species of conservation concern by the Luas Ecology Team over the 2021 – 2022, 2022 - 2023 and 2023 - 2024 winter periods; the result of which are displayed below.

Table A9 4.1: Wintering Bird Field Survey Data (December 2021 – February 2022)

Date	Location	Species (Max. Number recorded)
01/12/2021	Erin Isle GAA Pitches (East Farnham area)	Light-bellied Brent Goose (86)
01/12/2021	Erin Isle GAA Pitches (East Farnham area)	Black-headed Gull (56)
01/12/2021	Western Tolka Valley Park grasslands (within disturbance buffer)	Black-headed Gull (14)
01/12/2021	Western pitches / grassland (West Farnham area)	Black-headed Gull (11)
01/12/2021	Western Tolka Valley Park grasslands (within disturbance buffer)	Herring Gull (6)
01/12/2021	Eastern Tolka Valley Park grasslands (within disturbance buffer)	Herring Gull (2)
01/12/2021	Western pitches / grassland (West Farnham area)	Herring Gull (4)
01/12/2021	Erin Isle GAA Pitches (East Farnham area)	Herring Gull (6)
01/12/2021	Tolka Valley Park Pond	Mute Swan (2)
01/12/2021	Tolka Valley Park Pond	Mallard (16)
01/12/2021	Southern section of Mellows Park	Herring Gull (3)
15/12/2021	Erin Isle GAA Pitches (East Farnham area)	Light-bellied Brent Goose (86)
15/12/2021	Eastern pitches- Tolka Valley Park (within disturbance buffer)	Black-headed Gull (15)
15/12/2021	Western Tolka Valley Park grasslands (within disturbance buffer)	Black-headed Gull (10)
15/12/2021	Western Tolka Valley Park grasslands (beyond disturbance buffer)	Herring Gull (2)
15/12/2021	Western Tolka Valley Park grasslands (within disturbance buffer)	Herring Gull (3)
15/12/2021	Eastern Tolka Valley Park grasslands (within disturbance buffer)	Herring Gull (2)
15/12/2021	Casement Road	Herring Gull (3)
15/12/2021	Southern section of Mellows Park	Herring Gull (2)
15/12/2021	Western pitches / grassland (West Farnham area)	Herring Gull (7)
15/12/2021	Erin Isle GAA Pitches (East Farnham area)	Herring Gull (4)
15/12/2021	Tolka Valley Park Pond	Mute Swan (2)
15/12/2021	Tolka Valley Park Pond	Mallard (18)
05/01/2022	Erin Isle GAA Pitches (East Farnham area)	Light-bellied Brent Goose (~1000)
05/01/2022	Tolka Valley Park eastern pitches	Black-headed Gull (20)

Date	Location	Species (Max. Number recorded)
05/01/2022	Erin Isle GAA Pitches (East Farnham area)	Black-headed Gull (43)
05/01/2022	Western pitches / grassland (West Farnham area)	Black-headed Gull (10)
05/01/2022	Patrickswell Place / Wellmount Parade green area	Black-headed Gull (10)
05/01/2022	Northern section of Mellows Park	Black-headed Gull (4)
05/01/2022	Tolka Valley Park Pond	Mute Swan (2)
05/01/2022	Tolka Valley Park Pond	Mallard (32)
18/01/2022	Erin Isle GAA Pitches (East Farnham area)	Light-bellied Brent Goose (~300)
18/01/2022	Tolka Valley Park Pond	Black-headed Gull (29)
18/01/2022	Eastern Tolka Valley Park grasslands (within disturbance buffer)	Herring Gull (2)
18/01/2022	Tolka Valley Park Pond	Mute Swan (2)
18/01/2022	Tolka Valley Park Pond	Mallard (27)
18/01/2022	Southern section of Mellows Park	Herring Gull (4)
27/01/2022	Erin Isle GAA Pitches (East Farnham area)	Light-bellied Brent Goose (~325)
27/01/2022	Eastern Tolka Valley Park grasslands (beyond disturbance buffer)	Black-headed Gull (9)
27/01/2022	Western Tolka Valley Park grasslands (within disturbance buffer)	Black-headed Gull (41)
27/01/2022	Tolka Valley Park Pond	Black-headed Gull (24)
27/01/2022	Western pitches / grassland (West Farnham area)	Black-headed Gull (7)
27/01/2022	Casement Road	Black-headed Gull (4)
27/01/2022	Southern section of Mellows Park	Black-headed Gull (6)
27/01/2022	Eastern pitches - Tolka Valley Park	Black-headed Gull (16)
27/01/2022	Tolka Valley Pitch and Putt	Black-headed Gull (11)
27/01/2022	Erin Isle GAA Pitches (East Farnham area)	Herring Gull (4)
27/01/2022	Tolka Valley Park Pond	Mute Swan (2)
27/01/2022	Tolka Valley Park Pond	Mallard (18)
02/02/2022	Erin Isle GAA Pitches (East Farnham area)	Light-bellied Brent Goose (~780)
02/02/2022	Erin Isle GAA Pitches (East Farnham area)	Black-headed Gull (37)
02/02/2022	Western pitches / grassland (West Farnham area)	Black-headed Gull (11)
02/02/2022	Eastern pitches - Tolka Valley Park	Black-headed Gull (131)
02/02/2022	Western Tolka Valley Park grasslands (beyond disturbance buffer)	Black-headed Gull (32)
02/02/2022	Tolka Valley Park Pond	Black-headed Gull (31)
02/02/2022	Eastern Tolka Valley Park grasslands (within disturbance buffer)	Herring Gull (4)
02/02/2022	Eastern pitch / grassland (West Farnham area)	Herring Gull (2)
02/02/2022	Casement Road	Herring Gull (3)

Date	Location	Species (Max. Number recorded)
02/02/2022	Southern section of Mellowes Park	Herring Gull (1)
02/02/2022	Tolka Valley Park Pond	Mute Swan (2)
02/02/2022	Tolka Valley Park Pond	Mallard (12)
10/02/2022	Western pitch / grassland (West Farnham area)	Light-bellied Brent Goose (41)
10/02/2022	Southern section of Mellowes Park	Black-headed Gull (7)
10/02/2022	Eastern pitches - Tolka Valley Park	Black-headed Gull (33)
10/02/2022	Tolka Valley Park Pond	Mute Swan (2)
10/02/2022	Tolka Valley Park Pond	Mallard (15)
25/02/2022	Western pitch / grassland (West Farnham area)	Light-bellied Brent Goose (171)
25/02/2022	Western pitch / grassland (West Farnham area)	Barnacle Goose (2)
25/02/2022	Eastern pitches - Tolka Valley Park	Black-headed Gull (14)
25/02/2022	Western pitches / grassland (West Farnham area)	Black-headed Gull (21)
25/02/2022	Northern section of Mellowes Park	Black-headed Gull (8)
25/02/2022	Tolka Valley Park Pond	Mute Swan (2)
25/02/2022	Tolka Valley Park Pond	Mallard (12)

Table A9 4.2: Wintering Bird Field Survey Data (December 2022 – February 2023)

Date	Location	Species (Max. Number recorded)
07/12/2022	Erin Isle GAA Pitches (East Farnham area)	Light-bellied Brent Goose (163)
07/12/2022	Western pitches / grassland (West Farnham area)	Black-headed Gull (9)
07/12/2022	Eastern Tolka Valley Park grasslands (within disturbance buffer)	Black-headed Gull (32)
07/12/2022	Southern section of Mellowes Park	Black-headed Gull (7)
07/12/2022	Tolka Valley Park Pond	Black-headed Gull (13)
07/12/2022	Tolka Valley Park Pond	Mute Swan (2)
07/12/2022	Tolka Valley Park Pond	Mallard (14)
16/12/2022	Erin Isle GAA Pitches (East Farnham area)	Light-bellied Brent Goose (~340)
16/12/2022	Western pitch / grassland (West Farnham area)	Light-bellied Brent Goose (186)
16/12/2022	Erin Isle GAA Pitches (East Farnham area)	Curlew (3)
16/12/2022	Tolka Valley Park Pond	Black-headed Gull (18)
16/12/2022	Western pitches / grassland (West Farnham area)	Black-headed Gull (7)
16/12/2022	Western Tolka Valley Park grasslands (within disturbance buffer)	Black-headed Gull (14)
16/12/2022	Southern section of Mellowes Park	Black-headed Gull (4)
16/12/2022	Tolka Valley Park Pond	Mute Swan (2)
16/12/2022	Tolka Valley Park Pond	Mallard (10)
05/01/2023	Erin Isle GAA Pitches (East Farnham area)	Light-bellied Brent Goose (118)
05/01/2023	Western pitch / grassland (West Farnham area)	Light-bellied Brent Goose (92)

Date	Location	Species (Max. Number recorded)
05/01/2023	Tolka Valley Park Pond	Black-headed Gull (5)
05/01/2023	Erin Isle GAA Pitches (East Farnham area)	Black-headed Gull (23)
05/01/2023	Casement Road	Black-headed Gull (5)
05/01/2023	Eastern Tolka Valley Park grasslands (beyond disturbance buffer)	Black-headed Gull (41)
05/01/2023	Western pitches / grassland (West Farnham area)	Black-headed Gull (8)
05/01/2023	Northern section of Mellowes Park	Herring Gull (2)
05/01/2023	Tolka Valley Park Pond	Mute Swan (2)
05/01/2023	Tolka Valley Park Pond	Mallard (13)
13/01/2023	Erin Isle GAA Pitches (East Farnham area)	Light-bellied Brent Goose (124)
13/01/2023	Eastern Tolka Valley Park grasslands (within disturbance buffer)	Black-headed Gull (64)
13/01/2023	Tolka Valley Park Pond	Black-headed Gull (5)
13/01/2023	Western Tolka Valley Park grasslands (within disturbance buffer)	Black-headed Gull (26)
13/01/2023	Southern section of Mellowes Park	Black-headed Gull (12)
13/01/2023	Erin Isle GAA Pitches (East Farnham area)	Black-headed Gull (61)
13/01/2023	Western pitches / grassland (West Farnham area)	Black-headed Gull (32)
13/01/2023	Tolka Valley Park Pond	Mute Swan (2)
13/01/2023	Tolka Valley Park Pond	Mallard (19)
25/01/2023	Erin Isle GAA Pitches (East Farnham area)	Light-bellied Brent Goose (75)
25/01/2023	Erin Isle GAA Pitches (East Farnham area)	Black-headed Gull (49)
25/01/2023	Western pitches / grassland (West Farnham area)	Black-headed Gull (30)
25/01/2023	Eastern Tolka Valley Park grasslands (within disturbance buffer)	Black-headed Gull (91)
25/01/2023	Western Tolka Valley Park grasslands (within disturbance buffer)	Black-headed Gull (7)
25/01/2023	Tolka Valley Park Pond	Black-headed Gull (25)
25/01/2023	Southern section of Mellowes Park	Black-headed Gull (5)
25/01/2023	Tolka Valley Park Pond	Mute Swan (2)
25/01/2023	Tolka Valley Park Pond	Mallard (18)
02/02/2023	Erin Isle GAA Pitches (East Farnham area)	Light-bellied Brent Goose (~355)
02/02/2023	Erin Isle GAA Pitches (East Farnham area)	Black-headed Gull (82)
02/02/2023	Western pitches / grassland (West Farnham area)	Black-headed Gull (43)
02/02/2023	Eastern Tolka Valley Park grasslands (within disturbance buffer)	Black-headed Gull (90)
02/02/2023	Tolka Valley Park Pond	Black-headed Gull (10)
02/02/2023	Southern section of Mellowes Park	Black-headed Gull (5)
02/02/2023	Tolka Valley Park Pond	Tufted Duck (2)

Date	Location	Species (Max. Number recorded)
02/02/2023	Tolka Valley Park Pond	Mute Swan (2)
02/02/2023	Tolka Valley Park Pond	Mallard (15)
17/02/2023	Erin Isle GAA Pitches (East Farnham area)	Light-bellied Brent Goose (155)
17/02/2023	Erin Isle GAA Pitches (East Farnham area)	Black-headed Gull (74)
17/02/2023	Western pitches / grassland (West Farnham area)	Black-headed Gull (35)
17/02/2023	Eastern Tolka Valley Park grasslands (beyond disturbance buffer)	Black-headed Gull (51)
17/02/2023	Southern section of Mellows Park	Black-headed Gull (6)
17/02/2023	Tolka Valley Park Pond	Black-headed Gull (5)
17/02/2023	Western Tolka Valley Park grasslands (within disturbance buffer)	Black-headed Gull (12)
17/02/2023	Tolka Valley Park Pond	Tufted Duck (2)
17/02/2023	Tolka Valley Park Pond	Mute Swan (2)
17/02/2023	Tolka Valley Park Pond	Mallard (11)
28/02/2023	Erin Isle GAA Pitches (East Farnham area)	Light-bellied Brent Goose (86)
28/02/2023	Erin Isle GAA Pitches (East Farnham area)	Black-headed Gull (62)
28/02/2023	Western pitches / grassland (West Farnham area)	Black-headed Gull (14)
28/02/2023	Western Tolka Valley Park grasslands (within disturbance buffer)	Black-headed Gull (17)
28/02/2023	Southern section of Mellows Park	Black-headed Gull (4)
28/02/2023	Eastern Tolka Valley Park grasslands (within disturbance buffer)	Black-headed Gull (22)
28/02/2023	Tolka Valley Park Pond	Black-headed Gull (3)
28/02/2023	Tolka Valley Park Pond	Tufted Duck (2)
28/02/2023	Tolka Valley Park Pond	Mute Swan (2)
28/02/2023	Tolka Valley Park Pond	Mallard (14)

Table A9 4.3: Wintering Bird Field Survey Data (December 2023 – February 2024)

Date	Location	Species (Max. Number recorded)
15/12/2023	Erin Isle GAA Pitches (East Farnham area)	Light-bellied Brent Geese (~345)
15/12/2023	Eastern Tolka Valley Park grasslands (within disturbance buffer)	Black-headed Gull (27)
15/12/2023	Tolka Valley Park Pond	Black-headed Gull (3)
15/12/2023	Southern section of Mellows Park	Black-headed Gull (5)
15/12/2023	Western Tolka Valley Park grasslands (within disturbance buffer)	Lesser Black-backed Gull (2)
15/12/2023	Tolka Valley Park Pond	Mallard (13)
15/12/2023	River Tolka (upstream of bridge)	Cormorant (1)

Date	Location	Species (Max. Number recorded)
15/12/2023	Eastern Tolka Valley Park grasslands (within disturbance buffer)	Herring Gull (2)
15/12/2023	Eastern pitch / grassland (West Farnham area)	Herring Gull (3)
15/12/2023	Erin Isle GAA Pitches (East Farnham area)	Herring Gull (4)
15/12/2023	Erin Isle GAA Pitches (East Farnham area)	Lesser Black-backed Gull (7)
15/12/2023	Erin Isle GAA Pitches (East Farnham area)	Common Gull (3)
15/12/2023	Royal Canal (downstream of bridge)	Cormorant (1)
04/01/2024	Erin Isle GAA Pitches (East Farnham area)	Light-bellied Brent Geese (49)
04/01/2024	Eastern Tolka Valley Park grasslands (within disturbance buffer)	Black-headed Gull (57)
04/01/2024	Erin Isle GAA Pitches (East Farnham area)	Black-headed Gull (15)
04/01/2024	Eastern pitch / grassland (West Farnham area)	Black-headed Gull (6)
04/01/2024	Tolka Valley Park Pond	Black-headed Gull (6)
04/01/2024	Southern section of Mellowes Park	Black-headed Gull (3)
04/01/2024	Tolka Valley Park Pond	Herring Gull (1)
04/01/2024	Tolka Valley Park Pond	Mallard (15)
04/01/2024	Tolka Valley Park Pond	Mute Swan (2)
04/01/2024	Eastern Tolka Valley Park grasslands (within disturbance buffer)	Herring Gull (2)
04/01/2024	Eastern pitch / grassland (West Farnham area)	Herring Gull (7)
04/01/2024	Erin Isle GAA Pitches (East Farnham area)	Herring Gull (7)
12/01/2024	Erin Isle GAA Pitches (East Farnham area)	Light-bellied Brent Geese (147)
12/01/2024	Erin Isle GAA Pitches (East Farnham area)	Black-headed Gull (12)
12/01/2024	Western pitches / grassland (West Farnham area)	Black-headed Gull (9)
12/01/2024	Eastern Tolka Valley Park grasslands (within disturbance buffer)	Black-headed Gull (22)
12/01/2024	Eastern pitch / grassland (West Farnham area)	Herring Gull (3)
12/01/2024	Southern section of Mellowes Park	Lesser Black-backed Gull (3)
19/01/2024	Erin Isle GAA Pitches (East Farnham area)	Light-bellied Brent Geese (~255)
19/01/2024	Western pitch / grassland (West Farnham area) [*Flock at Erin Isle GAA Pitches moved to this location after disturbance]	Light-bellied Brent Geese (~255)
19/01/2024	Erin Isle GAA Pitches (East Farnham area)	Black-headed Gull (42)
19/01/2024	Western pitches / grassland (West Farnham area)	Black-headed Gull (3)
19/01/2024	Tolka Valley Park Pond	Black-headed Gull (10)
19/01/2024	Northern section of Mellowes Park	Black-headed Gull (7)
19/01/2024	Tolka Valley Park Pond	Herring Gull (1)
19/01/2024	Tolka Valley Park Pond	Mallard (15)
19/01/2024	Tolka Valley Park Pond	Mute Swan (2)
19/01/2024	Western pitches / grassland (West Farnham area)	Herring Gull (4)

Date	Location	Species (Max. Number recorded)
02/02/2024	Erin Isle GAA Pitches (East Farnham area)	Light-bellied Brent Geese (42)
02/02/2024	Western pitch / grassland (West Farnham area)	Light-bellied Brent Geese (48)
02/02/2024	Erin Isle GAA Pitches (East Farnham area)	Black-headed Gull (17)
02/02/2024	Eastern pitch / grassland (West Farnham area)	Black-headed Gull (22)
02/02/2024	Tolka Valley Park Pond	Black-headed Gull (6)
02/02/2024	Eastern Tolka Valley Park grasslands (within disturbance buffer)	Black-headed Gull (17)
02/02/2024	Southern section of Mellowes Park	Black-headed Gull (9)
02/02/2024	Tolka Valley Park Pond	Mallard (12)
02/02/2024	Tolka Valley Park Pond	Mute Swan (2)
02/02/2024	Tolka Valley Park Pond	Tufted Duck (2)
02/02/2024	Tolka Valley Pitch & Putt	Herring Gull (6)
02/02/2024	Eastern pitch / grassland (West Farnham area)	Herring Gull (2)
02/02/2024	Erin Isle GAA Pitches (East Farnham area)	Herring Gull (12)
09/02/2024	Erin Isle GAA Pitches (East Farnham area)	Light-bellied Brent Geese (107)
09/02/2024	Eastern pitch / grassland (West Farnham area)	Light-bellied Brent Geese (12)
09/02/2024	Erin Isle GAA Pitches (East Farnham area)	Black-headed Gull (29)
09/02/2024	Eastern pitch / grassland (West Farnham area)	Black-headed Gull (31)
09/02/2024	Western pitches / grassland (West Farnham area)	Black-headed Gull (23)
09/02/2024	Eastern pitch / grassland (West Farnham area)	Herring Gull (5)
09/02/2024	Eastern pitch / grassland (West Farnham area)	Common Gull (8)
09/02/2024	Erin Isle GAA Pitches (East Farnham area)	Herring Gull (7)
09/02/2024	Tolka Valley Park Pond	Mallard (12)
09/02/2024	Tolka Valley Park Pond	Mute Swan (2)
09/02/2024	Southern section of Mellowes Park	Herring Gull (4)
23/02/2024	Erin Isle GAA Pitches (East Farnham area)	Light-bellied Brent Geese (~392)
23/02/2024	Eastern pitch / grassland (West Farnham area)	Light-bellied Brent Geese (~446)
23/02/2024	Erin Isle GAA Pitches (East Farnham area)	Black-headed Gull (8)
23/02/2024	Tolka Valley Park Pond	Black-headed Gull (14)
23/02/2024	Western pitches / grassland (West Farnham area)	Black-headed Gull (33)
23/02/2024	Tolka Valley Park Pond	Mallard (15)
23/02/2024	Tolka Valley Park Pond	Mute Swan (2)
23/02/2024	Southern section of Mellowes Park	Herring Gull (2)
27/02/2024	Western pitches / grassland (West Farnham area)	Light-bellied Brent Geese (~238)
27/02/2024	Erin Isle GAA Pitches (East Farnham area)	Light-bellied Brent Geese (~275)
27/02/2024	Western pitches / grassland (West Farnham area)	Black-headed Gull (49)
27/02/2024	Erin Isle GAA Pitches (East Farnham area)	Black-headed Gull (4)
27/02/2024	Tolka Valley Park Pond	Black-headed Gull (4)

Date	Location	Species (Max. Number recorded)
27/02/2024	Eastern Tolka Valley Park grasslands (within disturbance buffer)	Black-headed Gull (15)
27/02/2024	Eastern pitch / grassland (West Farnham area)	Black-headed Gull (3)
27/02/2024	Tolka Valley Park Pond	Mallard (16)
27/02/2024	Tolka Valley Park Pond	Mute Swan (2)
27/02/2024	Southern section of Mellowes Park	Herring Gull (3)

D. Desktop Study Wintering Bird Data Summary

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SECTION 1: NATIONAL BIODIVERSITY DATA CENTRE WINTERING BIRD DESKTOP DATA

The below table outlines recent records, obtained from the National Biodiversity Data Centre (NBDC), of wintering bird species of conservation concern (and their respective designations), that have previously frequented the areas within the proposed Scheme's Zone of Influence (ZoI).

Table A9 5.1: Recent NBDC Data Records (10 years) of Wintering Bird Species within the ZoI

Species name	Date of last record	Designation
Black-headed Gull <i>Larus ridibundus</i>	27/03/2023	Wildlife Act Birds of Conservation Concern - Amber List
Bar-tailed Godwit <i>Limosa lapponica</i>	23/03/2023	Wildlife Act EU Birds Directive >> Annex I Birds of Conservation Concern - Red List
Black-tailed Godwit <i>Limosa limosa</i>	05/03/2023	Wildlife Act Birds of Conservation Concern - Red List
Common Redshank <i>Tringa totanus</i>	16/04/2023	Wildlife Act Birds of Conservation Concern - Red List
Common Shelduck <i>Tadorna tadorna</i>	14/05/2023	Wildlife Act Birds of Conservation Concern - Amber List
Dunlin <i>Calidris alpina</i>	15/01/2023	Wildlife Act EU Birds Directive >> Annex I Birds of Conservation Concern - Red List
Curlew <i>Numenius arquata</i>	06/02/2023	Wildlife Act EU Birds Directive >> Annex II Birds of Conservation Concern - Red List
Oystercatcher <i>Haematopus ostralegus</i>	22/04/2023	Wildlife Act Birds of Conservation Concern - Red List
Teal <i>Anas crecca</i>	27/03/2023	Wildlife Act EU Birds Directive >> Annex II, III Birds of Conservation Concern - Amber List
Eurasian Wigeon <i>Anas penelope</i>	16/02/2023	Wildlife Act EU Birds Directive >> Annex II, III Birds of Conservation Concern - Amber List
Golden Plover <i>Pluvialis apricaria</i>	16/03/2021	Wildlife Act EU Birds Directive >> Annex I, II, III Birds of Conservation Concern - Red List
Great-crested Grebe <i>Podiceps cristatus</i>	25/03/2020	Wildlife Act Birds of Conservation Concern - Amber List
Great Northern Diver <i>Gavia immer</i>	01/05/2021	Wildlife Act EU Birds Directive >> Annex I
Grey Plover <i>Pluvialis squatarola</i>	05/02/2023	Wildlife Act Birds of Conservation Concern - Red List

Species name	Date of last record	Designation
Herring Gull <i>Larus argentatus</i>	08/05/2023	Wildlife Act Birds of Conservation Concern - Amber List
Lesser Black-backed Gull <i>Larus fuscus</i>	08/04/2023	Wildlife Act Birds of Conservation Concern - Amber List
Light-bellied Brent Goose <i>Branta bernicla hrota</i>	15/04/2023	Wildlife Act Birds of Conservation Concern - Amber List
Mallard <i>Anas platyrhynchos</i>	16/04/2023	Wildlife Act EU Birds Directive >> Annex II, III Birds of Conservation Concern - Amber List
Common Gull <i>Larus canus</i>	01/05/2023	Wildlife Act Birds of Conservation Concern - Amber List
Mute Swan <i>Cygnus olor</i>	24/03/2023	Wildlife Act Birds of Conservation Concern - Amber List
Northern Lapwing <i>Vanellus vanellus</i>	14/01/2023	Wildlife Act EU Birds Directive >> Annex II Birds of Conservation Concern - Red List
Northern Pintail <i>Anas acuta</i>	05/02/2023	Wildlife Act EU Birds Directive >> Annex II, III Birds of Conservation Concern - Red List
Northern Shoveler <i>Anas clypeata</i>	05/02/2023	Wildlife Act EU Birds Directive >> Annex II, III Birds of Conservation Concern - Red List
Red Knot <i>Calidris canutus</i>	23/03/2023	Wildlife Act Birds of Conservation Concern - Red List
Red-breasted Merganser <i>Mergus serrator</i>	14/01/2023	Wildlife Act EU Birds Directive >> Annex II Birds of Conservation Concern - Amber List
Red-throated Diver <i>Gavia stellata</i>	14/02/2016	Wildlife Act EU Birds Directive >> Annex I Birds of Conservation Concern - Amber List
Ringed Plover <i>Charadrius hiaticula</i>	07/01/2023	Wildlife Act Birds of Conservation Concern - Amber List
Tufted Duck <i>Aythya fuligula</i>	27/03/2023	Wildlife Act EU Birds Directive >> Annex II, III Birds of Conservation Concern - Amber List

SECTION 2: IRISH BIRDING WEBSITE DATA

The below table outlines recent records, obtained from the IrishBirding.com, of wintering bird species of conservation concern (and their respective designations), that have previously frequented the areas within the proposed Scheme's Zone of Influence (Zoi).

Table A9 5.2: Recent Irish Birding Data Records (10 years) of Wintering Bird Species within the Zoi

Species name	Date of last record	Designation
Light-bellied Brent Goose Branta bernicla hrota	30/12/2022	Wildlife Act Birds of Conservation Concern - Amber List
Barnacle Goose Branta leucopsis	31/01/2022	Wildlife Act EU Birds Directive >> Annex I Birds of Conservation Concern - Amber List
Northern Lapwing Vanellus vanellus	14/12/2022	Wildlife Act EU Birds Directive >> Annex II Birds of Conservation Concern - Red List
Curlew Numenius arquata	14/12/2022	Wildlife Act EU Birds Directive >> Annex II Birds of Conservation Concern - Red List
Redwing Turdus iliacus	14/12/2022	Wildlife Act Birds of Conservation Concern - Red List

E. Construction Environmental Management Plan

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SECTION 1: CONSTRUCTION ENVIRONMENTAL MANAGEMENT PLAN

1.1 Introduction

This document is the Construction Environmental Management Plan (CEMP) for the Luas Finglas Scheme, hereafter referred to as the proposed Scheme.

The CEMP will be updated by the Transport Infrastructure Ireland (TII) (the Employer for the construction works) prior to the commencement of the Construction Phase, so as to ensure any additional measures required pursuant to conditions attached to any decision to grant approval are included in the plan. The TII shall set out the Employer's Requirements in the construction contract, including all applicable mitigation measures identified in this EIAR, as well as additional measures required pursuant to conditions attached to any decision to grant approval.

The CEMP comprises the construction mitigation measures, which are set out in the Environmental Impact Assessment Report (EIAR) and the Natura Impact Statement (NIS), and which will be updated to include any additional measures required pursuant to conditions attached to An Bord Pleanála's decision.

The CEMP will need to be altered during the lifecycle of the Construction Phase to take account of monitoring results, permits, legislative changes, outcomes of third-party consultations etc. The appointed contractors will ensure that the CEMP remains up to date for the duration of the Construction Phase.

Following appointment of the contractors for the Main Works and Enabling Works contracts they will be required to develop more specific Method Statements and submit an updated CEMP that is cognisant of the proposed construction activities, equipment and plant usage and environmental monitoring plan for the proposed Scheme. The appointed contractors may only propose modifications to the CEMP which will not give rise to any impacts which are more significant than those already identified and assessed in the EIAR or NIS.

All of the measures set out in this CEMP will be implemented in full by the appointed contractors and its finalisation will not affect the robustness and adequacy of the information presented and relied upon in the EIAR and NIS.

1.1.1 Purpose

The purpose of the CEMP is to set out the management framework for the delivery of the proposed construction works and to illustrate how the proposed Scheme could be delivered in a logical, sensible, and safe sequence with the incorporation of specific environmental commitments, as set out in Section 1.9.

The CEMP will be used by the appointed contractors and their personnel as a guidance document for the Construction Phase of the proposed Scheme outlining procedures for the delivery of environmental mitigation measures and for addressing general day-to-day environmental issues that could arise during the Construction Phase of the proposed Scheme.

1.1.2 Reference Documents

The CEMP has been prepared as part of the EIAR and the NIS, and should be read in conjunction with the following proposed Scheme specific documents:

- The EIAR, with particular reference to Chapter 6 (Construction Activities);
- The NIS;
- The construction contract; and
- Copies of An Bord Pleanála's Order, Inspector's Report and associated documentation.

The appointed contractors will need to comply with all relevant environmental legislation and take into account published standards, accepted industry practices, national guidelines, and codes of best practice appropriate to the proposed Scheme. The CEMP has been prepared in accordance with the following industry best practice guidance:

- TII’s Guidelines for the Creation, Implementation and Maintenance of an Environmental Operating Plan (TII 2007), hereafter referred to as the TII Guidelines; and
- Construction Industry Research and Information Association (CIRIA) in the UK, Environmental Good Practice on Site Guide, 4th Edition (CIRIA 2015).

1.1.3 Scope

This CEMP defines the approach to environmental management implementation. Compliance with the CEMP, the procedures, work practices and controls will be adhered to by all personnel employed during the Construction Phase of the proposed Scheme.

Table A6 1-1 provides the contents of the CEMP, and where details can be found in this document.

Table A6 1-1: CEMP Contents

Content	Section of CEMP
Introduction	1.1
Proposed Scheme Details	1.2
Planning Consent	1.3
Contact Sheets	1.4
Roles and Responsibilities	1.5
Communications	1.6
Environmental Management Procedures	1.7
Environmental Management	1.8

1.2 Proposed Scheme Details

1.2.1 Proposed Scheme Overview

The proposed Scheme is 3.9 km long and entails the new northern extension of the Luas Green Line from its current terminus in Broombridge to a new terminus in Charlestown, near the N2-M50 interchange, with four new stops, two major bridges, one new Park & Ride (P&R), an extension of the Broombridge Stabling Site and associated works. The route of the proposed Scheme is as indicated in Figure A1 1-1.

The proposed Scheme will comprise a number of key features as outlined in Table A6 1-2. A full description of the proposed Scheme is provided in Chapter 5 (Description of the proposed Scheme).

Table A6 1-2: Overview of the Key Features of the proposed Scheme

Scheme Key Features	Outline Description
Permanent Scheme Elements	
Light Rail track	3.9 km extension to the Luas Green Line track from Broombridge to Finglas (2.8km of grass track, 700m of embedded track and 360m of structure track)
Depot Stabling facility	A new stabling facility (with stabling for 8 additional LRVs) will be located just south of the existing Broombridge terminus, as an extension of the Hamilton depot area.

Scheme Key Features	Outline Description
Luas Stops	Four Stops located at: St Helena's, Finglas Village; St Margaret's Road and Charlestown to maximise access from the catchment area including the recently re-zoned Jamestown Industrial Estate.
Main structures	<p>Two new LRT bridges will be constructed as part of the proposed Scheme: a bridge over the River Tolka within the Tolka Valley Park and a bridge over the Royal Canal and the Iarnród Éireann (IÉ) railway line at Broombridge.</p> <p>A number of existing non-residential buildings shall be demolished to facilitate the scheme. In addition, the existing overbridge at Mellowes Park will be demolished.</p>
At grade signalised junctions	10 at grade signalised junctions will be created at: Lagan Road, Ballyboggin Road, Tolka Valley Road, St. Helena's Road, Wellmount Road, Cappagh Road, Mellowes Road, North Road (N2), McKee Avenue, Jamestown Business Park entrance. Note: The junction at Charlestown will be reconfigured but does not have a LRT crossing.
Uncontrolled crossings	13 at grade uncontrolled crossings (11 pedestrian / cycle crossings and 2 local accesses located at: Tolka Valley Park, St Helena's, Farnham pitches, Patrickswell Place, Cardiff Castle Road, Mellowes Park, St Margarets Road, and ESB Networks.
Cycle facilities	Approximately 4.4km of segregated cycle lanes and 0.3km non-segregated cycle lanes along the route. Covered cycle storage facilities will be provided at Broombridge Terminus, Finglas Stop and St. Margaret's Stop and within the Park & Ride structure. "Sheffield" type cycle stands will be provided at all stop locations.
Power substations	<p>Two new traction power substations for the proposed Scheme will be located near Finglas Village Stop behind the existing Fire Station and near the N2 junction before St Margaret's Road Stop where the current spiral access ramp to the pedestrian overbridge is located.</p> <p>A third substation is required for the Park & Ride facility.</p>
Park & Ride facility	<p>A new Park & Ride facility, with e-charging substation, located just off the M50 at St Margaret's Stop will be provided with provision for 350 parking spaces and secure cycle storage. The building will feature photovoltaic (PV) panel roofing and is the location for an additional radio antenna.</p> <p>This strategic Park & Ride connecting the N2/M50 to the city centre will increase the catchment area of the proposed Scheme.</p>
Temporary Scheme Elements	
Construction compounds	There will be three principal construction compounds, two located west of Broombridge Road and One located at the northern extents of Mellowes Park. In addition, there are other secondary site compound locations for small works/storage. Details can be found in Chapter 6 (Construction Activities) of this EIAR.

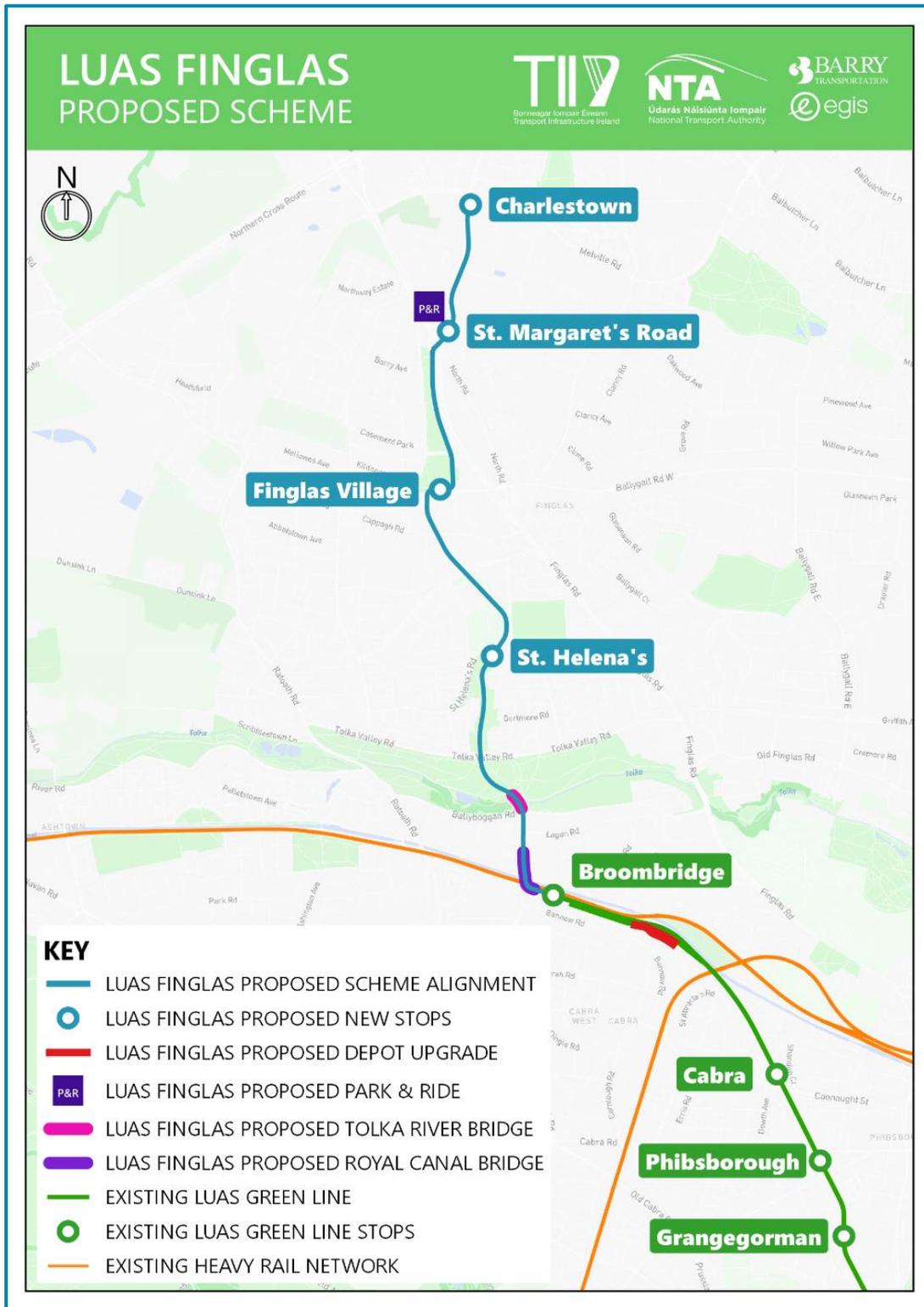


Figure A1 1-1: Proposed Luas Finglas Alignment Map

See Chapter 6 (Construction Activities) Volume 2 of this EIAR for a full description of the construction activities of the proposed Scheme.

1.2.2 Construction Programme and Phasing

The programme for the construction of the proposed Scheme will allow for the shortest Construction Phase practicable in order to minimise the duration of potential environmental impacts, while ensuring that the areas surrounding the works sites remain operational and functional.

An indicative programme showing the duration and phasing for construction of the proposed Scheme is included in Chapter 6 of this EIAR. The expected construction programme for the Main Works including testing and commissioning is approximately 3.5 years. The achievement of the programme is based on some core assumptions which are as follows:

- Key Enabling Works contracts can be advanced prior to two Main Works contracts;
- Multiple work fronts will be progressed concurrently during the Main Works in order to achieve this overall programme; and
- A Main Works: Power and Systems contract can be advanced in tandem with the latter part of the Main Works Contract.

1.3 Planning Consent

The entire contents of the planning consent of Planning permission granted for the proposed Scheme will be inserted at this location by Transport Infrastructure Ireland (TII) (the Employer for the construction works) prior to the commencement of the Construction Phase, so as to ensure all measures required pursuant to conditions attached to any decision to grant approval are included.

1.4 Contact Sheets

A project Contacts Sheet will provide a list of relevant Employer and contractor contacts (refer to examples provided in Table A6 1-3 and Table A6 1-4. A similar Contact Sheet for all relevant third-party contact details shall also be developed. The contractors will update these sheets and keep them current for the duration of the Contract.

Contact details of relevant personnel are required to ensure the efficient reporting of environmental incidents. It is essential that these contact details be frequently reviewed to ensure they are up to date. Contact details will include the organisation, position title, name, mobile phone number and email address of relevant personnel.

Table A6 1-3: Employer Contact Sheet (Example)

Position	Name	Tel / Mobile No.	Email Address
TII's Project Manager			
Employers Representative			
Other, as appropriate			

Table A6 1-4: Contractor Contacts Sheet (Example)

Position	Name	Tel / Mobile No.	Email Address
Contractor's Representative			
Construction Manager			
Environmental Manager			
Project Ecologist			
Community Liaison Officer			
Safety Officer			

Position	Name	Tel / Mobile No.	Email Address
Site Agents			
Forepersons			
Other, as appropriate			

[TII / appointed contractors shall insert contact details for the relevant personnel].

1.5 Roles and Responsibilities

1.5.1 Employer

TII will be the Employer for the Construction Works and will be responsible for ensuring that the appointed contractors is(are) competent to carry out the works, including the effective implementation of the mitigation measures.

1.5.2 Employer's Representative

TII will employ an Employer's Representative team with appropriate competence to administer and monitor each construction contract for compliance with the Employer's Requirements.

1.5.3 The Contractor

The appointed contractors will be required to plan and construct the proposed Scheme construction works in accordance with the Employer's Requirements and planning consents.

The appointed Contractor's CEMP will define the roles and responsibilities of its project team. The contractor is responsible for ensuring that all members of the project team, including Subcontractors comply with the procedures set out in the CEMP. The contractor will ensure that all persons working on site are provided with sufficient training, supervision and instruction to fulfil this requirement.

Key staff will be notified of their appointment and confirm that their responsibilities are clearly understood. The principal environmental responsibilities for key staff can be identified in the following sections.

Information on the appointed contractor's organisational structure / duties and responsibilities will be provided in this section of the CEMP. The assignment and communication of duties and responsibilities to individually-named members will help ensure the successful implementation of the CEMP.

The TII Guidelines outline a typical organisational structure / roles that may be adopted. It is recognised that the actual titles used by the appointed contractors may vary. However, they should assign relevant duties and responsibilities to the appropriate equivalent person.

To fulfil its obligations under the CEMP and to support its Environmental Manager, the contractor(s) will engage suitably qualified and experienced professionals, including where necessary the following (i.e. depending on the scope of the contract) competent experts:

- Project Ecologist;
- Project Archaeologist (in consultation with TII's Project Archaeologist);
- Noise and Vibration Specialist;
- Air Quality and Dust Specialist;
- Land, Soils and Contamination Specialist(s); and
- Water Specialist.

The specialists' roles and responsibilities will be included in the CEMP as per the EIAR.

1.5.4 Environmental Manager

One of the roles identified in the TII Guidelines is that of an Environmental Manager (EM). The EM, or equivalent, will be suitably qualified, with sufficient training, experience and knowledge appropriate to the nature of the task to be undertaken. The EM will be responsible for co-ordinating the day-to-day management of environmental impacts during the Construction Phase and for assisting and advising the appointed contractors when programming construction activities and devising methodologies, taking cognisance of the Environmental Commitments. The EM will be responsible for performing inspections as deemed necessary. In addition, the EM will deal with licencing and permit issues, keep up to date with relevant environmental best practices and legislative changes, engage in personnel training, manage responses to environmental incidents and engage environmental contractors as and when required.

[The TII / appointed contractors shall insert the appointed contractors' organisational structure / duties and responsibilities].

1.6 Communications

The procedures adopted for internal and external communication of information regarding the specific elements of the proposed Scheme will be agreed between the TII and the appointed contractors prior to construction as set out in each construction contract.

1.6.1 External Communication with the Public and Key Stakeholders

The appointed contractors will put in place a Communications Plan in accordance with the Employer's Requirements and the Employer's Stakeholder Management Plan. The Plan will provide a mechanism for members of the public to communicate with the TII and the appointed contractors, and for the TII and the appointed contractors to communicate important information on various aspects of the proposed Scheme to the public. The Plan will include procedures to inform members of the community directly affected by the Construction Phase on schedules for any activity of a particularly disruptive nature which is likely to impinge on their property such as boundary works, road closures and diversions, and any mitigating actions that are being taken to minimise such disruption.

1.6.2 Internal Communications

The site management meeting(s) and weekly site safety meetings will include environmental issues (such as monitoring, complaints, incidents) on the agenda. The Environmental Manager will report on environmental issues to the site management meetings and attend weekly meetings. On-site communications, such as daily shift and activity briefings, will be used to advise the site workforce of health, safety, environmental and community matters. This will include information obtained from liaising with the community regarding matters, such as noise generation and access issues, together with constraints detailed in the contracts (e.g. working hours) and other documents, such as the CEMP, regulating the proposed Scheme. This communication will be addressed to all relevant members of the workforce, including new starters and Subcontractors, before they commence work. Further information can be found in the project's health and safety documentation. Toolbox talks will be used as a means to disseminate information to the workforce on a routine basis.

1.7 Environmental Management Procedures

1.7.1 Environmental Awareness Training

Copies of the CEMP will be made available to all personnel. All appointed contractors' personnel will receive relevant and appropriate training to ensure that they have the appropriate knowledge to successfully implement the CEMP.

Where a specific management plan has been devised for a works activity (e.g., working in an area where invasive species are present), all the appointed contractors' personnel involved in that activity will be given a toolbox talk outlining the relevant Environmental Commitments.

1.7.2 Compliance and Review

The EM, or equivalent, will carry out environmental inspections at appropriate intervals throughout the Construction Phase. The environmental inspections will ensure that the works are undertaken in compliance with the CEMP and all other planning application documents. Where appropriate and if required, the EM may arrange to be accompanied on these environmental inspections by suitably qualified professionals (e.g., arborist, ecologist, archaeologist). The CEMP will be developed further by the appointed contractors to include additional details of inspection procedures.

The inspections will address the following questions:

- Have all site personnel been inducted?;
- Are site personal adhering to the relevant Environmental Control Measures outlined in the CEMP and performing all work activities with the relevant site-specific Method Statements?;
- Are hazardous substances being stored appropriately?; and
- Is waste being disposed of appropriately?

The results of the inspections will be discussed at the weekly site safety and environmental meetings.

1.7.3 Monitoring

Mitigation and monitoring will be carried out in accordance with the requirements of the EIAR and NIS so that construction activities are undertaken in a manner that does not give rise to significant negative effects. Suitable monitoring programmes will need to be developed, implemented, documented and assessed in accordance with the specification outline in the detailed CEMP for each Main and Enabling Works contract.

The results of all environmental monitoring activities will be reviewed by the EM on an ongoing basis to enable trends or exceedance of criteria to be identified and corrective actions to be implemented as necessary. The contractors will be required to inform the TII of any continuous exceedances of criteria.

1.7.4 Audits

The construction contract documents will require the appointed contractors to further develop the CEMP within 28 days after receiving notice of Commencement of Works from the TII. The EM, and the TII will carry out audits of the CEMP at designated intervals, to determine whether the CEMP is effective in ensuring that the appointed contractors meets all the Environmental Commitments. All changes to the CEMP will be made by the EM and approved by the TII.

The EM, in conjunction with the Construction Manager, will carry out an annual audit of the CEMP to determine whether the CEMP is effective in ensuring that the contractors are meeting all Environmental Commitments/requirements or legislation changes. Where required as a result of such audits, the Environmental Manager will make all necessary changes to the plan, with the approval of the ER, and bring them to the attention of all contractors.

1.8 Environmental Management

1.8.1 Environmental Commitments

The Schedule of Environmental Commitments will comprise the following:

- The Construction Phase mitigation and monitoring measures as outlined in Chapter 7 (Human Health) to Chapter 22 (Risk of Major Accidents and / or Disasters) of this EIAR, summarised in Chapter 25 (Summary of Mitigation & Monitoring Measures) of this EIAR, and in Table A6 1-5 below;
- The Construction Phase mitigation and monitoring measures as outlined in the NIS, summarised in Table A6 1-6 which identifies the relevant section of the NIS;
- Any commitments arising during the statutory planning process up to and including the Oral Hearing;
- Any conditions and / or modifications imposed by An Bord Pleanála, should they grant approval for the proposed Scheme; and

- Any commitments set out in the construction contract documents.

The finalised CEMP will include the Schedule of Environmental Commitments together with the relative specification, evidence, and responsibilities of how each commitment will be met where necessary. The appointed contractors will be required to comply with all Environmental Commitments, and all applicable legislation, including relevant standards, codes of best practice and guidelines.

1.8.1.1 Mitigation and Monitoring Schedule

Table A6 1-5 summarises the Construction Phase mitigation (i.e., which the appointed will implement), outlined in the relevant EIAR technical assessment chapters. Table A6 1-5- should be read in conjunction with the relevant technical assessment chapter. Where appropriate, the specific location to which the mitigation relates to is to be identified and where the mitigation measure may be applicable along the extent of the proposed Scheme, the location is given as 'Throughout (as required)'. Note that in certain instances, a mitigation measure may be relevant to more than one environmental aspect.

Table A6.1-5 provides the Construction Phase mitigation and monitoring measures as outlined in the Natura Impact Statement. The table describes the avoidance and mitigation measures required to prevent or reduce impacts generated during the construction and operation of the proposed Scheme on the following Natura 2000 sites, and their respective Qualifying Interests (QIs):

- North Dublin Bay SAC;
- South Dublin Bay SAC;
- Rockabill to Dalkey Island SAC;
- North Bull Island SPA;
- South Dublin Bay and River Tolka Estuary SPA; and
- North-west Irish Sea SPA.

The stages of implementation are shown as "PC" for pre-construction, "C" for the Construction Phase and "O" for the Operational Phase.

Table A6 1-5: Mitigation and Monitoring Measures (Construction Phase)

Mitigation Number	EIAR Section Reference	Location	Impacts	Description of Mitigation or Monitoring Measure / Environmental Commitment	Implementation Stage
GM-1	EIAR Appendix A6.1 Construction Environmental Management Plan section 1.1	Throughout (as required)	General Impacts	<p>A Construction Environmental Management Plan (CEMP) has been prepared and will be updated by Transport Infrastructure Ireland (TII) (the Employer for the construction works) prior to the commencement of the Construction Phase, so as to ensure any additional measures required pursuant to conditions attached to any decision to grant approval are included in the plan.</p> <p>The CEMP comprises the construction mitigation measures, which are set out in the Environmental Impact Assessment Report (EIAR) and the Natura Impact Statement (NIS), and which will be updated to include any additional measures required pursuant to conditions attached to An Bord Pleanála's decision.</p> <p>Following appointment of the Contractors for the Main Works and Enabling Works contracts they will be required to develop more specific Method Statements and submit an updated CEMP that is cognisant of the proposed construction activities, equipment and plant usage and environmental monitoring plan for the proposed Scheme.</p> <p>Copies of the CEMP will be made available to all personnel. All appointed Contractors' personnel will receive relevant and appropriate training to ensure that they have the appropriate knowledge to successfully implement the CEMP.</p> <p>Environmental inspections will be carried out throughout the construction phase by the Environmental Manager appointed by the Contractor to ensure that the works are undertaken in compliance with the CEMP and all other planning application documents. The CEMP will be developed further by the appointed Contractor to include additional details of inspection procedures.</p> <p>Mitigation and monitoring will be carried out in accordance with the requirements of the EIAR and NIS so that construction activities are undertaken in a manner that does not give rise to significant negative effects. Suitable monitoring programmes will need to be developed, implemented, documented and assessed in accordance with the specification outline in the detailed CEMP for each Main and Enabling Works contract.</p>	PC / C

Mitigation Number	EIAR Section Reference	Location	Impacts	Description of Mitigation or Monitoring Measure / Environmental Commitment	Implementation Stage
GM-2	EIAR Appendix A6.6 Environmental Incident Response Plan	Throughout (as required)	General Impacts	The Environmental Incident Response Plan (EIRP) has been prepared as part of EIAR to ensure that in the unlikely event of an incident (environmental, or non-environmental), response efforts are prompt, efficient, and suitable for the particular circumstances. The EIRP details the procedures to be undertaken in the event of a significant release of sediment into a watercourse, or a significant spillage of chemical, fuel or other hazardous substances (e.g., concrete), non-compliance incident with any permit or license, or other such risks that could lead to a pollution incident, including flood risks. It will be a condition of the Employers Requirements that the successful Contractor, immediately following appointment must detail in the EIRP, the manner in which it is intended to effectively implement all the applicable mitigation measures identified in this EIAR and any additional measures required pursuant to conditions imposed by An Bord Pleanála to any grant of approval.	PC
GM-3	Natura Impact Statement section 7.1.2	Throughout (as required)	General Impacts	<p>The appointed Contractor will be required to ensure good environmental management within the site compounds set up along the length of the proposed Scheme. The below list of measures will be incorporated into site compound environmental management:</p> <ul style="list-style-type: none"> ▪ Site compounds will not be set up within Flood Zone A or B lands in accordance with the Office of Public Works (OPW) 'Planning System and Flood Risk Management Guidelines' (2009); ▪ Site compounds will not be located within core foraging areas utilised by protected wintering bird species; ▪ Only plant and materials necessary for the construction of the works will be permitted to be stored at the compound location; ▪ All sub-Contractors will be given induction toolbox talk so that they are aware of material storage arrangements; ▪ Construction materials within the compound will be stored in a designated area in an organised manner so as to protect them from accidental damage and deterioration as a result of exposure; 	PC / C

Mitigation Number	EIAR Section Reference	Location	Impacts	Description of Mitigation or Monitoring Measure / Environmental Commitment	Implementation Stage
				<ul style="list-style-type: none"> ▪ Bunded storage of fuels and refuelling area. Bunds shall be 110% capacity of the largest vessel contained within the bunded area; ▪ A separate container will be located in the Contractors compound to store absorbents used to contain spillages of hazardous materials. The container will be clearly labelled, and the contents of the container will be disposed of by a licenced waste Contractor at a licenced site. Records will be maintained of material taken off site for disposal; ▪ Suitable precautions will be taken to prevent spillages from equipment containing small quantities of hazardous substances (for example, chainsaws and jerry cans) including: <ul style="list-style-type: none"> – Each container or piece of equipment will be stored in its own drip tray made of a material suitable for the substance being handled; – Spill kits and drip trays will be provided for all equipment and at locations where any liquids are stored and dispensed, and staff will be trained on the procedures to be followed; and – Containers and equipment will be stored on a firm, level surface; ▪ A maintenance programme for the bunded areas will be managed by the site environmental manager. The removal of rainwater from the bunded areas will be their responsibility. Records will be maintained of materials taken off site for disposal; ▪ The site environmental manger will be responsible for maintaining all training records and weekly environmental inspections; ▪ Drainage collection system for washing area will be provided to prevent run-off into surface water system; ▪ Stockpiling of spoil and spoil-like materials will be appropriately located within the compounds to minimise exposure to prevailing winds; and ▪ All refuelling of vehicles will be carried out at the fuel stores within the main site compound and only alternative dispute 	

Mitigation Number	EIAR Section Reference	Location	Impacts	Description of Mitigation or Monitoring Measure / Environmental Commitment	Implementation Stage
				resolution (ADR) trained personnel will be permitted to operate fuel bowsers.	
GM-4	EIAR Appendix A6.1 Construction Environmental Management Plan section 1.8.4	Throughout (as required)	General Impacts	<p>A Dust Management Plan (DMP) within the CEMP (Volume 5 - Appendix A6.1) has been prepared as part of the EIAR, which includes measures to control emissions, which includes a strategy to be adopted in order to manage dust during construction. This will be incorporated by each contractor into their Plans and implemented as part of their works. The DMP will include plans for monitoring of dust deposition, dust flux, real-time PM10 continuous monitoring and/or visual inspections.</p> <ul style="list-style-type: none"> Record any exceptional incidents that cause dust and/or air emissions, either on or offsite, and the action taken to resolve the situation in the logbook. 	PC / C
GM-5	EIAR Appendix A6.1 Construction Environmental Management Plan section 1.8.5	Throughout (as required)	General Impacts	<p>A Noise and Vibration Management Plan within the CEMP (Volume 5 - Appendix A6.1) has been prepared as part of the EIAR which provides the strategy to be adopted in order to manage noise and vibration during construction. This will be incorporated by each contractor into their Plans and implemented as part of their works.</p>	PC / C
PM-1	Chapter 8: Population section 8.5.2	Tolka Valley Park and Mellows Park	Moderate physical and social severance where hoarding erected.	<p>Secure hoarding will be needed during construction across Tolka Valley Park along with barriers to where the tracks enter or leave the park from Ballyboggan Road or Tolka Valley Road to prevent entry for vehicles or motorbike incursions into the park.</p> <ul style="list-style-type: none"> There will need to be breaks in the hoarding, at least during daytime hours, to permit access across the works and avoid severance of the park. Signage should indicate to park users the reason for the works and the partial severance and the expected duration that will be in place. 	C
PM-2	Chapter 8: Population section 8.5.2	Throughout (as required)	Accessibility for people with disabilities	<p>The accessibility needs and safety of people with disabilities will need to be addressed, along with those of people with wheelchairs or buggies, at points where they will need to cross works.</p>	C

Mitigation Number	EIAR Section Reference	Location	Impacts	Description of Mitigation or Monitoring Measure / Environmental Commitment	Implementation Stage
				<ul style="list-style-type: none"> Access signage will be needed (of appropriate height and size to meet all users' communication needs), smooth hard surfacing and lightly angled ramps where necessary. 	
PM-3	Chapter 8: Population section 8.5.2	Royal Canal	Any temporary closure of the Royal Canal	If any temporary closure of the canal is required, this should be timed to between October and mid-March when the canal is habitually closed for boating.	C
PM-4	Chapter 8: Population section 8.5.2	Throughout (as required)	Any temporary closure of greenway and towpath. No simple route alternative.	Advance warning will be given of the time and duration of any temporary closure of the towpath and greenway.	C
PM-5	Chapter 8: Population section 8.5.2	St Helena's Resource Centre and St Malachy's National School	Potential impact on access by sensitive subsets. Noise impact	Provide clear and advance signage for new access arrangements for St Helena's Resource Centre and St Malachy's National School with managed space for school drop-offs that does not conflict with the access needs for both community facilities.	C
PM-6	Chapter 8: Population section 8.5.2	Farnham Crescent Park and pitches	Realignment of pitch	Local sports clubs will be supported in their search for alternative facilities during the realignment of the pitch at Farnham Crescent. Alternatively works will be undertaken outside of the football season.	C
PM-7	Chapter 8: Population section 8.5.2	Wellmount Road/Patrickswell Place	Slight severance of access and green space.	Provide for visible and safe access across works at Wellmount Road/Patrickswell Place, noting morning and afternoon use of the route by school children.	C
PM-8	Chapter 8: Population section 8.5.2	St Helena and Mellows Road	Annoyance, severance and noise impact.	<p>The Contractor will minimise the duration of works in neighbourhoods in the vicinity of St Helena's and Mellows Road, acknowledging issues of localised sensitivity and higher than average deprivation.</p> <ul style="list-style-type: none"> Works in close proximity to residential properties or at points where roads need to be crossed to access community facilities will be completed within as short a timeframe as possible and, along with barriers such as hoarding, must not be allowed to persist longer than is necessary. 	C

Mitigation Number	EIAR Section Reference	Location	Impacts	Description of Mitigation or Monitoring Measure / Environmental Commitment	Implementation Stage
				<ul style="list-style-type: none"> In practice, noting the stated progression of works across the study area, in these specific areas the works must be completed with more urgency than at other locations. 	
PM-9	Chapter 8: Population section 8.5.2	Raven's Court	<p>Proximity to works, noise and annoyance.</p> <p>Loss of green space and garden space.</p> <p>Impacts on access on entrance.</p>	<p>Works at the entrance to Raven's Court will be undertaken as quickly as possible to avoid inconvenience for residents. Signalisation or a flag person will be provided for a short period of time.</p> <ul style="list-style-type: none"> If necessary, an alternative temporary entrance will be provided. The boundary of the estate will be rebuilt with a comparable or enhanced façade compared with that at present. 	C
PM-10	Chapter 8: Population section 8.5.2	Finglas Garda Station	<p>Demolition of one building.</p> <p>Impact on functions and employees</p>	<p>Works at the Garda station will be undertaken as quickly as possible to avoid impacts on the amenity of people working in the building, security issues and any inconvenience for Gardai in accessing premises or vehicles.</p> <ul style="list-style-type: none"> The same considerations apply to the Luas crossing of Mellows Road given the roads use in times of emergency by either the Gardai or the nearby fire service. 	C
PM-11	Chapter 8: Population section 8.5.2	Mellows Road	General Impacts	<p>Arrangements for emergency services will be provided to quickly bypass works and traffic queues on Mellows Road.</p> <ul style="list-style-type: none"> The appointed Contractor will ensure maximum safety of accessibility to community facilities on Mellows Road during construction given their use by vulnerable population subsets. 	C
PM-12	Chapter 8: Population section 8.5.2	Finglas Childcare / Mellow Spring Childcare Centre	<p>Proximity to works.</p> <p>Loss of parking space</p>	<p>The appointed Contractor will provide temporary alternative, nearby and convenient temporary parking and appropriately timed parking for people with disabilities and parents delivering children to Finglas Childcare / Mellow Spring Childcare Centre to compensate for existing spaces lost during construction.</p> <ul style="list-style-type: none"> Consideration will be given to the car parking needs of employees of the Finglas Resource Centre to avoid competition for remaining places. 	C

Mitigation Number	EIAR Section Reference	Location	Impacts	Description of Mitigation or Monitoring Measure / Environmental Commitment	Implementation Stage
PM-13	Chapter 8: Population section 8.5.2	Tolka Valley Park, Mellowes Park	Diversion of the path. Tracks follow eastern boundary	<p>The appointed Contractor will provide hard surfaced temporary paths for diversions in Tolka Valley Park, Mellowes Park and other green spaces where there are existing paths which cross the line of the proposed Scheme.</p> <ul style="list-style-type: none"> Maintain access between two halves of Tolka Valley Park. Maintain access to Mellowes Park from Mellowes Road, unless very temporary restrictions are needed. Allow for continuity and safety of the weekly park runs in both Tolka Valley Park and Mellowes Park. 	C
PM-14	Chapter 8: Population section 8.5.2	R135 Finglas Road	Cyclist and pedestrian paths diversion could cause confusion	<p>Construction of crossing facilities at the R135 Finglas Road will be ready for use prior to the demolition of the pedestrian overbridge.</p> <ul style="list-style-type: none"> Pedestrian and cyclist crossings at the new crossing at Finglas Road are to be safe and well-signposted given that works, traffic volumes and changes to existing crossing habits could raise some confusion among pedestrians and cyclists, and particularly for people with disabilities. 	C
PM-15	Chapter 8: Population section 8.5.2	St Margaret's Road	<p>Effect of works on residential amenity, access and crossing of works</p> <p>Effect of works on attractiveness of shopping and on direct access to businesses</p>	<p>The appointed Contractor will implement the following mitigation measures:</p> <ul style="list-style-type: none"> Provide temporary crossing facilities at St Margaret's Road in the vicinity of the proposed stop to permit access to bus stop and nearby supermarkets or places of employment; Facilitate, where possible, new vehicle parking or reconfiguration of parking for businesses where spaces have been lost on the east side of St Margaret's Road; Ensure continuity of electricity supply for businesses on the east side of St Margaret's Road or otherwise minimum interruptions flagged in advance; Ensure continuity of access for businesses on the east side of St Margaret's Road; and Provide alternative car parking, where possible, during construction and operation for residents of McKelvey estate located beside St Margaret's Road. 	C
PM-16	Chapter 8: Population section 8.5.2	St Margaret's Court	Proximity to properties.	The appointed Contractor will ensure new uninterrupted access arrangements are in place for businesses and for residents of St	C

Mitigation Number	EIAR Section Reference	Location	Impacts	Description of Mitigation or Monitoring Measure / Environmental Commitment	Implementation Stage
			Severance prior to installation of new crossing. Minor works inside estate.	Margaret's Court where existing access will be directed impacted by construction of the proposed Scheme. <ul style="list-style-type: none"> They will provide highly visible signage to direct customers and suppliers to this new access. 	
PM-17	Chapter 8: Population section 8.5.2	McKelvey Celtic AFC	Impact on primary access	The appointed Contractor will agree times of any temporary disruption to access with businesses on west side of St Margaret's Road and McKelvey AFC due to works on footpath and cycle lane.	C
PM-18	Chapter 8: Population section 8.5.3	Luas Stop	Parking restrictions	During Operational Phase, drop off space or limited timed car parking will be provided at Luas Stops where space allows combined with parking restrictions on roads in nearby residential estates.	O
PM-19	Chapter 8: Population section 8.5.3	Throughout (as required)	Safety during road crossings	Extend integration of the scheme with the bus network by facilitating access from LRT Stops to nearby bus stops with associated signalised crossing facilities or good lines of sight for road crossings.	O
PM-20	Chapter 8: Population section 8.5.3	St Malachys School	Changes to car parking. Improved public transport access. Slight severance as some children may need to cross tracks unaccompanied.	The proposed Scheme will provide sufficient drop-off and collection space for parents at St Malachys School to reduce the risk that access to the St Helena's Resource Centre will be blocked	C / O
PM-21	Chapter 8: Population section 8.5.3	St Helena's Stop	Access to parking	The proposed Scheme will provide disabled parking, timed and permitted parking spaces at St Helena's Stop to provide assurance and safety for vulnerable passengers	C / O
PM-22	Chapter 8: Population section 8.5.3	All four new stops	Safety of Stops	During Operational Phase TII will ensure that all stops, and nearby access routes to Stops, are open, brightly lit and monitored by CCTV, that emergency assistance buttons are provided at all Stops, and that details on how to promptly contact control centres are included on all LRVs.	O

Mitigation Number	EIAR Section Reference	Location	Impacts	Description of Mitigation or Monitoring Measure / Environmental Commitment	Implementation Stage
PM-23	Chapter 8: Population section 8.5.3	St Margaret's Road / St Margaret's Court	Proximity to properties. Adjacent signalised pedestrian crossing, but also physical presence of LRT	TII will ensure new access arrangements are in place for businesses on St Margaret's Road, and for residents of St Margaret's Court, consistent with the Jamestown Masterplan, where existing access will be directed impacted by the proposed Scheme. Provide highly visible signage to direct customers and suppliers to this new access	
PM-24	Chapter 8: Population section 8.5.3	Throughout (as required)	Safety of pedestrian and cyclist crossing the road	Signalised pedestrian and cycle crossing facilities will be provided where the proposed Scheme interacts with local roads. <ul style="list-style-type: none"> These will introduce minor delays and inconvenience when a LRV is approaching but will also often provide net relief from severance in comparison with the current need to cross busy roads without the benefit of crossing facilities. 	O
BD-1	Chapter 9: Biodiversity section 9.5.2.2	Throughout (as required)	Impacts on habitat due to site compounds establishment	The Contractor will be required to ensure good environmental management within the site compounds set up along the length of the proposed Scheme. A suitably qualified Ecological Clerk of Works (ECoW) will be required to regularly conduct site compound checks to ensure they are adhering to ecological safeguarding protocols. As some of the construction compounds are located on a greenfield site, the appointed Contractor will be required to provide a temporary geogrid mattress overlain in stone for trafficking within the construction compound. All surface water runoff will be intercepted and directed to appropriate treatment systems (settlement facilities and oil trap) for the removal of pollutants prior to discharge.	C
BD-2	Chapter 9: Biodiversity section 9.5.2.5	Throughout (as required)	Impacts on invasive species	An Invasive Species Management Plan (Volume 5 - Appendix A6.3) has been prepared and will be implemented on site. The ISMP will be updated by the appointed Contractor prior to the commencement of the Construction Phase, so as to ensure that any additional measures required pursuant to conditions attached to any decision to grant approval are included in the plan. The mitigation measures for invasive species will utilise the below best practice management guidance documents, where relevant;	PC

Mitigation Number	EIAR Section Reference	Location	Impacts	Description of Mitigation or Monitoring Measure / Environmental Commitment	Implementation Stage
				<p>and are to be reference within the project's Invasive Species Management Plan:</p> <ul style="list-style-type: none"> The Management of Invasive Alien Plant Species on National Roads – Technical Guidance (TII, 2020a); The Management of Invasive Alien Plant Species on National Roads – Standard (TII, 2020b); Invasive Species Ireland (ISI) - Best Practice Management Guidelines for Japanese Knotweed (ISI, 2008a); Invasive Species Ireland Invasive Species Ireland - Best Practice Management Guidelines for Giant Hogweed (ISI, 2008c); and - Best Practice Management Guidelines for Himalayan Balsam (ISI, 2008b); Inland Fisheries Ireland - Biosecurity Protocol for Field Survey Work (IFI, 2010). 	
BD-3	Chapter 9: Biodiversity section 9.5.2.5	Throughout (as required)	The spread/expand of non-native invasive species	<p>The Contractor will appoint a suitably qualified specialist conducting Works to monitor any vegetation clearance, and treatment of non-native invasive species.</p> <ul style="list-style-type: none"> Prior to construction, confirmatory invasive species surveys will be undertaken by the qualified specialist, arranged by the Contractor, to re-confirm the absence, presence and / or extent of all Third Schedule non-native invasive species within the footprint of the proposed Scheme. <p>Where an infestation is confirmed / identified within the footprint of the proposed Scheme, this will require the implementation of the final ISMP.</p>	PC
BD-4	Chapter 9: Biodiversity section 9.5.2.5	Throughout (as required)	Presence of non-native invasive species	<p>Following appointment, the Contractor(s) will be required to develop more specific Method Statements and submit an updated ISMP (Volume 5 - Appendix A6.3) that is cognisant of the proposed construction activities, equipment and plant usage and environmental monitoring plan for the proposed Scheme.</p> <ul style="list-style-type: none"> All of the measures set out in this ISMP will be implemented in full by the appointed Contractor(s) and its finalisation will not affect the robustness and adequacy of the information presented and relied upon in the EIAR and NIS. 	PC / C

Mitigation Number	EIAR Section Reference	Location	Impacts	Description of Mitigation or Monitoring Measure / Environmental Commitment	Implementation Stage
				<ul style="list-style-type: none"> The ISMP will be updated following the pre-construction invasive species survey to detail the exact measures for any non-native invasive species population present within the footprint of the proposed Scheme. Depending on the extent and nature of the works, a number of approaches / treatments may be approved, all following the measures in the ISMP. <p>All control measures specified in the final ISMP shall be implemented by a suitably qualified and licenced specialist prior to the Construction Phase of the proposed Scheme to control the spread of any newly established INNS within the footprint of the proposed Scheme. Furthermore, the appointed Contractor will adhere to control measures specified within the final ISMP throughout the Construction Phase of the proposed Scheme. The Site will be monitored by the appointed Contractor after control measures have been implemented. Any re-growth will be subsequently treated by the Contractor. All measures that are prescribed in the final ISMP shall be equally applicable to advance works as to construction works.</p>	
BD-5	Chapter 9: Biodiversity section 9.5.2.5	Throughout (as required)	Spread of INNS could pose public health and safety risks	<p>The adherence to a set of biosecurity measures, including:</p> <ul style="list-style-type: none"> the fencing off / demarcating of the individual invasive species; communicating the location, risk and hazards associated with invasive species to construction personnel (e.g., Giant hogweed); identifying dedicated access points into and out of fenced-off areas; the installation of designated decontamination facilities (where appropriate); protocols around the removal of contaminated soils; and seed and fragment checks on boot, tyres and tracks entering and leaving the work site. <p>As required by law, licences for the disposal of contaminated materials will be obtained, as well as the utilisation of licensed facilities:</p>	PC / C

Mitigation Number	EIAR Section Reference	Location	Impacts	Description of Mitigation or Monitoring Measure / Environmental Commitment	Implementation Stage
				<ul style="list-style-type: none"> In regard to the importation of soil and other materials, the Contractor will only utilise traceable topsoil for landscaping that has been cleared of any invasive species material; Measures to be implemented during the application of herbicides – Commitment to the appointment of a suitably qualified / registered / licensed pesticides advisor for any works requiring the use of pesticides, and safety precautions for consideration in the use of pesticides near watercourses; and <p>Areas which contained invasives species, where invasives were treated on-site or removed, prior to the enabling and construction works will require an on-going post-construction monitoring programme to ensure that there is no reestablishment of any invasive species within these areas.</p>	
BD-6	Chapter 9: Biodiversity section 9.5.2.5	Tolka Valley Park Bridge	Spread of invasive species	<p>Prior to commencement of the enabling works in this area, a series of biosecurity measures will have to be undertaken to prevent spread of invasive species, namely Japanese Knotweed, Himalayan Balsam and potentially Giant Hogweed as well.</p> <p>The following hygiene measures shall be undertaken for the proposed Scheme:</p> <ul style="list-style-type: none"> Known or potentially infested areas within the working area of the proposed Scheme shall be clearly demarcated and fenced off in advance of works and access restricted until such time that treatment has commenced and / or construction works are monitored in accordance with the ISMP in the area. In relation to Japanese knotweed, the guidance recommends an exclusion buffer of 7m (metres) in all directions (within the works area and 3m vertically underground); The implementation of clear signage in accordance with TII IAPS standards will be erected at compounds, and at the boundary of the exclusion fencing. These signs will be briefed out at toolbox talks specific to each INNS to personnel on site and particular attention will be given to INNS that have the potential to cause injuries such as Giant hogweed; 	C

Mitigation Number	EIAR Section Reference	Location	Impacts	Description of Mitigation or Monitoring Measure / Environmental Commitment	Implementation Stage
				<ul style="list-style-type: none"> ▪ Identify and create access points into exclusion areas for INNS. These are only to be used by specialist personnel for the removal of INNS and are not to be used by general site workers until such a time as all contaminated material has been removed from site and it is safe to enter; ▪ Where it is practicable, wheel wash and footwear washing facilities will be provided to ensure biosecurity measure are preventing the further potential spread of INNS. These locations are to be provided by the Contractor. Where a dedicated / bespoke wheel wash cannot be installed owing to space limitations, the appointed Contractor will ensure that no excavated loose material is allowed off site from within an exclusion zone; ▪ Where plant that is used to excavate soils, it shall be visually checked for loose soil before movement to another part of site (the movements of tracked machinery should be restricted within the non-native invasive species exclusion zone). Loose soil shall be scraped off and disposed of, and a solution of Virkon© (or similar approved disinfectant) applied to machinery to ensure that no obscured seed / root material remains viable. Vehicular movements within the exclusion area shall be minimised as far as is practical; ▪ Unless in the exceptional circumstance that direction is given from a suitably qualified ecologist, no storage of contaminated soil on site. Instead, being disposed of in a licenced soil waste facility; and <p>Where small volumes (e.g. volumes capable of being double bagged in quarantine bags such as cut plants, bulbs or loose soil occur), it may be practical to bag the material and bring it to a clearly demarcated and dedicated quarantine area within the Construction Compounds until such time that the material is disposed of to an authorised facility, similar to the process of disposing of bulk excavated contaminated soil.</p>	
BD-7	Chapter 9: Biodiversity section 9.5.2.5	Throughout (as required)	Impacts from soil excavation	The following mitigation measures will be implemented during excavation works:	C

Mitigation Number	EIAR Section Reference	Location	Impacts	Description of Mitigation or Monitoring Measure / Environmental Commitment	Implementation Stage
				<ul style="list-style-type: none"> ▪ No excavation or removal of soil within areas demarcated as having INNS present is to be permitted unless under strict supervision by a suitably qualified ecologist or INNS specialist. Buffer zones to be installed by the Contractor(s) will be advised by a suitably qualified ecologist or INNS specialist and strictly adhered to. Guidance regarding Japanese knotweed recommends a buffer of 7m from the plant due to its expansive rhizomes; ▪ Where mechanical means of removal are required to dispose of INNS (treated or un-treated by chemicals) a suitably qualified ecologist or INNS specialist will be present to supervise and provide support to the Contractor(s) for the duration of the operation; ▪ There should be no temporary storage on-site of bulk excavated contaminated material. Where the final ISMP calls for shallow / deep burial, this material shall be removed from the excavated area and transported immediately to approved receptor area on-site. Furthermore, the temporary storage of non contaminated material should not occur within a European or National designated site nor within 10m of any watercourse and any land within an identified flood zone; ▪ The installation of industry-rated non-native invasive species-proof membrane before infilling construction of road / paths surface may be required. All waste arising out of this process which has been in contact with the excavated ground shall be treated as contaminated waste and disposed of at a facility that is authorised to accept such waste; and <p>Where the movement of any Third Schedule non-native invasive species is required off site, a licence will be required from NPWS in advance of any movement to a site / facility licensed to accept such waste, as per the Birds and Natural Habitats Regulation. This licence is separate to and does not negate the need for licences / permits / authorisations required under waste legislation.</p>	

Mitigation Number	EIAR Section Reference	Location	Impacts	Description of Mitigation or Monitoring Measure / Environmental Commitment	Implementation Stage
BD-8	Chapter 9: Biodiversity section 9.5.2.5	Throughout (as required)	Impacts from disposal of INNS material	<p>Where any INNS related material is collected and is required to be disposed of, it is essential to dispose of said material in a manner that does not afford it the potential to spread further either within the proposed Scheme or in the nearby vicinity of Site;</p> <ul style="list-style-type: none"> The movement of invasive plant material, off site, requires a licence from the NPWS, as per the Birds and Natural Habitats Regulations. Invasive species (particularly roots, flower heads or seeds) must be disposed of at licensed waste facilities or composting sites, appropriately buried, or incinerated having regard to relevant legislation (e.g. Waste Management Act, as amended, Section 4 of Number 6 of 1987 - Air Pollution Act, 1987, relevant local authority bylaws and any other relevant legislation). All disposals must be carried out in accordance with the relevant waste management legislation, as per guidance Guidelines for the Management of Waste from National Road Construction Projects (TII 2017); <p>It should be noted that some invasive species plant material or soil (vector material) containing residual herbicides may be classified as either 'hazardous waste' or 'non-hazardous waste' under the terms of the Waste Management Act, as amended, and both categories may require special disposal procedures or permissions. Advice should be sought from a suitably qualified waste expert regarding the classification of waste and the suitability of different disposal measures.</p>	C
BD-9	Chapter 9: Biodiversity section 9.5.2.5	Throughout (as required)	Risk of water contamination from application of Herbicides	<p>Measures to be implemented during the application of Herbicides:</p> <ul style="list-style-type: none"> If the application of herbicides is the expert advice given and then implemented during the lifespan of the proposed Scheme then a suitably qualified pesticides advisor, registered with the Department of Agriculture, Food and the Marine will be employed. It should be noted that where a chemical treatment is to be used, there is a risk of contaminating a watercourse. 	C / O

Mitigation Number	EIAR Section Reference	Location	Impacts	Description of Mitigation or Monitoring Measure / Environmental Commitment	Implementation Stage
				The choice of herbicide is typically limited to formulations of Glyphosate or 2,4-D amine that are approved for use near water. Full details of any chemical used, where required and as advised by a registered pesticides advisor, will be included in the final ISMP prepared in advance of construction of the proposed Scheme.	
BD-10	Chapter 9: Biodiversity section 9.5.2.5	Throughout (as required)	Presence of non-native invasive species during maintenance of the proposed Scheme	<ul style="list-style-type: none"> Following the construction of the proposed Scheme, there may be ongoing treatment programmes which extend for a number of years into the Operational Phase. In the Operational Phase, the management of the infrastructure will be the responsibility of the Luas Operator and the control of invasive species will be as per their plans and procedures, and responsibilities under The Birds and Natural Habitats Regulations. The above measures are important for all Third Schedule non-native invasive species, and in particular Japanese knotweed, where it occurs, as maintenance works associated with landscaping, such as mowing and hedge cutting have the potential to spread this plant via the dispersal of very small amounts of shredded plant material. <p>If invasive plants are found, then they will be treated as per the measures outlined in the ISMP and any species-specific guidelines.</p>	O
BD-11	Chapter 9: Biodiversity section 9.5.2.6	Throughout (as required)	Impact on fauna	<p>Scheme-wide fauna mitigation:</p> <ul style="list-style-type: none"> All excavations will be covered to prevent accidental trapping, mammal ramps will be used in larger excavations to allow for escape, and exclusionary fencing will be used where appropriate to prevent mammals from entering any potentially dangerous areas; Cowling of lights should be used wherever possible to direct light towards target features and away from dark zones and corridors to retain commuting and foraging areas; 	C

Mitigation Number	EIAR Section Reference	Location	Impacts	Description of Mitigation or Monitoring Measure / Environmental Commitment	Implementation Stage
				<ul style="list-style-type: none"> Trees should be retained wherever possible to ensure commuting and foraging routes remain intact. This should include the trees north-west of the Soccer field; and <p>Work should be carried out in daylight hours wherever possible and lighting on site should be kept to a minimum.</p>	
BD-12	Chapter 9: Biodiversity section 9.5.2.7	Tolka Valley Road to St Helena's Road	Disturbance to qualifying interest (QI) bird species	<p>Seasonal construction constraints are required in order to mitigate for the risk of disturbance to qualifying interest (QI) bird species during the winter period within the amenity grasslands (West Farnham area - Western playing pitches and East Farnham area - Erin Isle GAA pitches), located within and adjacent to the proposed Scheme.</p> <ul style="list-style-type: none"> Given that up to 64.59% of North Bull Island Special Protected Area's (SPA) Light-bellied Brent Goose population, as well as smaller flocks of other QI species (Black-headed Gull, Herring and Curlew), can be present within the Farnham area during the high frequency utilisation months (November to March inclusive) a minimum disturbance buffer of 400m from the identified core foraging areas will be in place throughout these months. This will mean that no enabling or construction works will be conducted within this 200m buffer for these months. <p>This disturbance buffer (enabling construction work exclusion buffer) is reduced to minimum of 100m during the low frequency foraging months, namely October to November, and March to April. Works north of Wellmount Road can be conducted without any seasonal restrictions.</p>	C
BD-13	Chapter 9: Biodiversity section 9.5.2.7	St Helena's Road to Cardiff Castle Road	Impacts on winter bird species	<p>This area will also be required to follow the seasonal restrictions on enabling and construction works within the Farnham area. This will mean that no enabling or construction works will be conducted within this 400m buffer between the months of November to March inclusive.</p> <p>The standard guidance and plans listed in Chapter 9 (Biodiversity) will also be required in order to protect the health of</p>	C

Mitigation Number	EIAR Section Reference	Location	Impacts	Description of Mitigation or Monitoring Measure / Environmental Commitment	Implementation Stage
				amenity grassland habitats utilised by protected wintering bird species.	
BD-14	Chapter 9: Biodiversity section 9.5.3.1	Throughout (as required)	Bird collision	<p>The new bridges over the railway line / Royal Canal and River Tolka have been designed without cables in order to reduce the risk of bird collision.</p> <p>Furthermore, to mitigate for the risk of collision with overhead lines, deflectors will be installed on wires parallel to the overhead lines at a number of strategic locations, including the Broombridge rail and pedestrian bridges over the Royal Canal; and Tolka Valley Park bridge; and along the tracks within the Tolka Valley Park and Farnham areas.</p>	O
BD-15	Chapter 9: Biodiversity Table 9-34	River Tolka, Royal Canal	<p>The degradation of overall water quality and the vegetation of Annex I habitats as a result of pollutants such as hydrocarbon.</p> <p>Air (dust) pollution generated during the construction phase could negatively impact habitats, adversely impacting photosynthesis and the biological functions of valued flora.</p> <p>The spread of invasive species such as Japanese Knotweed, from the construction site into this Natura 2000 site via the</p>	<p>Strict adherence to:</p> <ul style="list-style-type: none"> Management plans and mitigation measures detailed in Biodiversity chapter, including Surface Water (Volume 5 - Appendix A6.4), Dust (Volume 5 - Appendix A6.1), Pollution Control (Volume 5 - Appendix A6.6) and Invasive Species Management Plans (Volume 5 - Appendix A6.3) . <p>Relevant Area Specific Mitigation Measures outline in the Biodiversity chapter.</p>	C / O

Mitigation Number	EIAR Section Reference	Location	Impacts	Description of Mitigation or Monitoring Measure / Environmental Commitment	Implementation Stage
			River Tolka may have serious adverse impacts on present Annex habitats, displacing native species.		
W-1	Chapter 10: Water section 10.5.1.1	Throughout (as required)	Pollution of surface water	<p>The appointed Contractor will be required to operate in compliance with the CEMP (Appendix A6.1) and to implement the Surface Water Management Plan (SWMP) (Volume 5 – Appendix A6.4).</p> <ul style="list-style-type: none"> The Surface Water Management Plan (SWMP) has been prepared which details control and management measures for avoiding, preventing or reducing any significant adverse impacts on the surface water environment during the Construction Phase of the proposed Scheme. <p>At a minimum, all the control and management measures set out in the CEMP and SWMP will be implemented. This includes measures relating to:</p> <ul style="list-style-type: none"> A requirement for a Pollution Incident Response Plan; Construction compound management including the storage of fuels and materials; Control of sediment; Use of concrete; Management of vehicles and plant including refuelling and wheel wash facilities (if necessary); and <p>Monitoring. The appointed Contractor shall carry out visual monitoring of surface water (settlement tanks, silt fences, fuel storage areas etc.) on a daily basis. In addition, weekly visual inspections of the Royal Canal and the River Tolka will be carried out.</p>	PC / C
W-2	EIAR Appendix A6.6 Environmental Incident Response Plan	Throughout (as required)	Contamination of surface water	All construction staff will be suitably trained to respond to accidental discharge/ leaks and appropriate spill management kits will be in place to allow rapid response on site.	PC / C

Mitigation Number	EIAR Section Reference	Location	Impacts	Description of Mitigation or Monitoring Measure / Environmental Commitment	Implementation Stage
				<ul style="list-style-type: none"> ▪ An Emergency Incident Response Plan has been prepared and will be in place detailing the procedures to be undertaken in the event of spillage of chemical, fuel or other hazardous substances or wastes, logging of non-compliance incidents and any such risks that could lead to a pollution incident at any point along the proposed Scheme. ▪ Spill kits containing absorbent pads, granules and booms will be stored in the site compound with easy access for delivery to site in the case of an emergency. A minimum stock of spill kits will be maintained at all times and site foremen's vehicles will carry large spill kits at all times. ▪ Absorbent material will be used with pumps and generators at all times and used material disposed of in accordance with the Waste Management Plan. ▪ All used spill materials e.g., absorbent pads, will be placed in a bunded container in the Contractor's compound. The material will be disposed of by a licenced waste Contractor at a licenced facility. Records will be maintained by the environmental site manager. <p>Regular inspections and maintenance of plant and machinery checking for leaks, damage or vandalism will be made on all plant and equipment.</p> <p>In the event of a spill the appointed Contractor will ensure that the following procedure are in place:</p> <ul style="list-style-type: none"> ▪ Emergency response awareness training for all personnel on-site works; ▪ Appropriate and sufficient spill control materials will be installed at strategic locations within the site. Spills kits for immediate use will be kept in the cab of mobile equipment; ▪ Spill kits must include suitable spill control materials to deal with the type of spillage that may occur and where it may occur. Typical contents of an on-site spill kit will include the following as a minimum: <ul style="list-style-type: none"> ▪ Absorbent granules; ▪ Absorbent mats/cushions; ▪ Absorbent booms; and ▪ Track-mats, geotextile material and drain covers. 	

Mitigation Number	EIAR Section Reference	Location	Impacts	Description of Mitigation or Monitoring Measure / Environmental Commitment	Implementation Stage
				<ul style="list-style-type: none"> ▪ All potentially polluting substances such as oils and chemicals used during construction will be stored in containers clearly labelled and stored with suitable precautionary measures such as bunding within the site compound. ▪ All tank and drum storage areas on the site will, as a minimum, be bunded to a volume not less than the following: <ul style="list-style-type: none"> – 110% of the capacity of the largest tank or drum within the bunded area, or – 25% of the total volume of substances which could be stored within the bunded area. ▪ All hydrocarbons to be utilised during construction are to be appropriately handled, stored and disposed of in accordance with the Transport Infrastructure Ireland (TII) document 'Guidelines for the crossing of watercourses during the construction of National Road Schemes' (NRA, 2008); ▪ The site compound fuel storage areas and cleaning areas will be rendered impervious and will be constructed to ensure no discharges will cause pollution to surface or ground waters; ▪ Designated locations for refuelling are within site compound; ▪ Potentially contaminated run off from plant and machinery maintenance areas will be managed within the site compound surface water collection system; and <p>Damaged or leaking containers will be removed from use and replaced immediately.</p>	
W-3	Chapter 10: Water section 10.5.1.2	Finglaswood Stream	Increased sediment loading as a result of silty water runoff.	Surface water run-off collected in excavations will be diverted to settlement tanks / bags and will not be allowed to discharge directly to the existing drainage system.	C
W-4	Chapter 10: Water section 10.5.1.3	River Tolka	Disruption to the hydromorphology of the River Tolka.	<p>The mitigation measures during the Construction of the Tolka Bridge will be as follows:</p> <ul style="list-style-type: none"> ▪ During excavation of the abutments, pumped groundwater shall not discharge directly to the River Tolka; ▪ Excavation of the abutments shall only be carried out during the summer months (April to September); 	C

Mitigation Number	EIAR Section Reference	Location	Impacts	Description of Mitigation or Monitoring Measure / Environmental Commitment	Implementation Stage
			<p>River Tolka polluted by construction activities.</p> <p>Increase surface water runoff.</p> <p>Increased flood risk.</p> <p>Section of watercourse in shadow.</p>	<ul style="list-style-type: none"> Following the treatment and removal of the invasive species from this section of the works, this section will require the installation of silt fences and geotextile sandbag barriers to protect the Tolka Valley Park, the ICW and the River Tolka; The pile cap and abutment stem construction will utilize sheet pile protection with top of sheet piles set above the 1 in 5-Year Flood level; abutment construction will take approx. 8 – 10 weeks, a short enough period to lower the risk of flooding; For the construction of the Tolka Valley Park Bridge, there are no piers proposed within the river channel and both abutments are offset a minimum of 5m from the riverbank to minimise risk to waters during abutment construction; and <p>The Contractor will maintain awareness of rainfall event and weather forecasts by Dublin City Council (DCC) and Met Éireann</p>	
W-5	Chapter 10: Water section 10.5.1.4	Royal Canal Luas Bridge	<p>Increased sediment loading as a result of silty water runoff.</p> <p>Increased flood risk.</p> <p>Section of watercourse in shadow.</p>	<p>The mitigation measures of the Royal Canal and Rail Overbridge will be as follows:</p> <ul style="list-style-type: none"> An Ecological Clerks of Works (ECoW) will be present and surface water run-off control measures will be implemented throughout the enabling and construction works in this area given the sensitivity of the habitats at this location, and the Royal Canal's status as a surface water pathway connecting the site to the Natura 2000 sites downstream; This section will require the installation of geotextile sandbag barriers to protect the Royal Canal and its bankside vegetation; Topsoil stripping and storage of topsoil and other excavated material will be carefully managed and stored correctly, to ensure fines and debris are not washed into the Royal Canal; and Groundwater pumping will not be discharged directly to the Royal Canal. 	C
W-6	Chapter 10: Water section 10.5.1.5	Bachelors Stream	<p>Increased sediment in runoff.</p>	<p>The mitigation measures for Bachelors Stream will be as follows:</p>	C

Mitigation Number	EIAR Section Reference	Location	Impacts	Description of Mitigation or Monitoring Measure / Environmental Commitment	Implementation Stage
			Increased surface water runoff.	<ul style="list-style-type: none"> In addition to the measures in the SWMP, silt screens will be provided on the open sections of Bachelors Stream; and <p>Fine screens or grilles to be placed across gullies to ensure that silt is caught before becoming washed into piped networks.</p>	
W-7	Chapter 10: Water section 10.5.1.6	Integrated Constructed Wetland (ICW)	<p>Loss of habitat and functionality of ICW due to bridge construction.</p> <p>Section of ICW in shadow.</p> <p>Increased surface water runoff.</p> <p>Increased sediment in runoff.</p>	<p>Mitigation works consist of expanding Cell 1, together with removing trees, silt and unsuitable plant species from the pond. These works will form part of an advance works contract which will be completed prior to the main works commencing on the proposed Scheme and will include:</p> <ul style="list-style-type: none"> Location and repositioning of surface water connection between the Finglaswood Stream and the ICW; Overpumping of feed waters from ICW inlet. Waters to be pumped from inlet to open water section of pond which is downstream of ICW cell 2B; Expansion of Cell 1 to the North and South, with associated extension of clay liner; Removal of unsuitable plant species within the ICW and replanting with appropriate species; Removal of accumulated silt within three cells of ICW; Clearing of pipes connecting Cells 1 to 2A and 2A to 2B, and 2B to open water pond; Removal of trees and root networks within cell 2B, together with associated repair of clay liner; Reconstruction of embankment and pipe connection between Cell 2B and open water pond; Reinstatement of minimal flows to ensure vegetation success. The majority of the flows coming from the Finglaswood Stream will continue to be overpumped, meaning only a minimal flow will pass through the ICW; and Monitoring of ICW establishment. <p>In addition, silt fences and geotextile sandbags will be established adjacent to the ICW:</p> <ul style="list-style-type: none"> Silt screens to be provided adjacent to the section of the ICW which is to be impacted by the construction of the abutments; 	PC

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				<ul style="list-style-type: none"> Sheet piling will be used during the construction of the abutments. This will limit the excavation extents, and hence impacts on the ICW; and Prior to works commencing on the ICW, the inlet pipe into the ICW is to be relocated away from the location of the abutment 	
W-8	Chapter 10: Water section 10.5.1.7	Construction Compound	Contamination of surface water. Water quality.	<p>Mitigation measures for the construction compounds will be as listed below:</p> <ul style="list-style-type: none"> All chemical and fuel filling locations will be contained within signposted, designated bunded areas, a minimum of 10m from any surface water drain; At the construction compound, where the site is pervious, an area of hardstanding will be installed in a demarcated area for refuelling, and vehicle / plant cleaning and service areas. This area will be drained via a hydrocarbon interceptor trap to a soakaway if possible, or to local surface water drains, with the permission of the asset owner; Procedures and contingency plans will be in place at each work area to address cleaning up small spillages as well as dealing with an emergency incident. An Environmental Incident Response Plan (EIRP) has been prepared as part of EIAR is set out in Appendix A6.6; The storage of fuels, other hydrocarbons and other chemicals within the construction compound shall be in accordance with relevant legislation and with best practice; and Storage areas will be covered, wherever possible, to prevent rainwater filling the bunded areas. 	C
W-9	Chapter 10: Water section 10.5.1.8	Haul Road	Re-exposure of historically settled contaminants within or near the waterbodies. Adjacent landscape will be impacted.	<p>Mitigations for the haul roads include the following:</p> <ul style="list-style-type: none"> Through grassed areas, shallow land drains will be provided adjacent to haulage roads. The land drains will be provided with check dams which will allow infiltration of the collected surface water to ground. These will not be provided in the vicinity of the historical landfill in Tolka Valley Park to avoid re-exposure of historically settled contaminants. Surface water runoff from haulage roads will be allowed to runoff onto 	C

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				<p>adjacent parklands. Overland flow, when properly managed, can reduce the likelihood of contaminants spreading beyond the immediate vicinity of the haul roads and containing the potential exposure. Overall, overland flow is a safer and more environmentally sound method for managing haul road drainage in contaminated areas;</p> <ul style="list-style-type: none"> Silt screens will be provided running alongside the haulage roads through grassed areas to prevent silt and fines from impacting on the adjacent landscape; and Procedures and contingency plans will be in place at each work area to address cleaning up small spillages as well as dealing with an emergency incident. An Environmental Incident Response Plan is set out in Appendix A6.6. 	
W-10	Chapter 10: Water section 10.5.1.9	Park & Ride	Surface water quality	<p>Mitigation for the construction of the Park & Ride includes the following:</p> <p>During the Construction Phase of the Park & Ride, surface water will be collected and controlled on site. At no point during the Construction Phase treated water will be discharged to local surface water networks without the water quality meeting the statutory limits as set under the environmental quality standards referenced in the Surface Water Management Plan (SWMP) Appendix A6.4.</p>	C
W-11	Chapter 10: Water section 10.5.1.10	Tolka Valley Park Historical Landfill	Contamination with leachate from the historical landfill	<p>The appointed Contractor will be responsible for the compliant management of all waste generated by construction activities and will be responsible for implementing the mitigation measures outlined in CEMP, where modifications to the prepared CEMP will not give rise to any impacts more significant than those already identified and assessed in this EIAR or the NIS.</p> <ul style="list-style-type: none"> The updated CEMP will identify construction methodologies for the proposed Scheme and standard operating procedures that will be implemented to minimise the impact. The appointed Contractor will implement in full all of the measures set out in the CEMP; and the Contractor will be responsible for regular testing of excavated soils to monitor the suitability of the soil for re-use. 	C

Mitigation Number	EIAR Section Reference	Location	Impacts	Description of Mitigation or Monitoring Measure / Environmental Commitment	Implementation Stage
				Samples of ground suspected of contamination will be tested for contamination by the Contractor and ground excavated from these areas will be disposed of to a suitably licensed or permitted site, in accordance with the current Irish waste management legislation.	
W-12	EIAR Appendix A6.4 - Surface Water Management Plan	Throughout (as required)	Increased sediment in runoff	<p>In order to safeguard the local surface water network, and in turn the local groundwater network, from surface water-based pollution events, the following will be strictly adhered to:</p> <ul style="list-style-type: none"> ▪ The Contractor will ensure compliance with environmental quality standards specified in the relevant legislation, namely European Communities (Environmental Objectives (Surface Waters)) Regulations, 2009 (S.I. No. 272 of 2009 and amendments), and the European Communities (Quality of Salmonid Waters) Regulations, 1988 (S.I. No. 293 of 1988). ▪ Oil booms and oil soakage pads should be maintained on-site to enable a rapid and effective response to any accidental spillage or discharge. These shall be disposed of correctly and records will be maintained by the environmental manager of the used booms and pads taken off site for disposal. ▪ Management of silt-laden water on-site, including procedures for accidental leaks / spills to ground, as well as water quality monitoring to ensure compliance with environmental quality standards specified above. ▪ At no point during the construction phase will treated - water be discharged to local surface water network without the water quality meeting the statutory limits as set under the environmental quality standards specified above. ▪ Fail-safe site drainage and bunding through drip trays on plant and machinery will be provided to prevent discharge of chemical spillage from the sites to surface water. ▪ To prevent the spread of any accidental discharge into the surface water network, oil booms will be on hand when construction activities are located beside aquatic habitats in order to control and minimise the spread of the spill. ▪ Washout of concrete plant will occur at a designated impermeable area with waste control facilities. 	C

Mitigation Number	EIAR Section Reference	Location	Impacts	Description of Mitigation or Monitoring Measure / Environmental Commitment	Implementation Stage
				<ul style="list-style-type: none"> ▪ Wherever reasonably possible, pre-cast concrete bridge features should be utilised to minimise the risk of a concrete-based pollution event. ▪ Concrete delivery, concrete pours and related construction methodologies will be part of the procedure agreed with the Contractor to mitigate any possibility of spillage or contamination of the local environment. Particular attention will be paid during the pouring process in order to avoid leakages or spills of concrete. ▪ Temporary stockpiles will be monitored for leachate generation. These stockpiles will be placed within designated areas and not located within the vicinity of watercourses, wetlands or artificial surface water drainage features. ▪ Excavated contaminated soils (most likely present Tolka Valley Park) will be segregated and securely stored in a designated area where the possibility of runoff generation or infiltration to ground or surface water drainage has been eliminated through bunding and imperviable geotextile linings. The contaminated soils will then be classified as clean, inert, non-hazardous or hazardous in accordance with the EC Council Decision 2003/33/EC. Furthermore, the Contractor will ensure that no cross-contamination with clean soils happens elsewhere throughout the proposed Scheme site. ▪ Silt fencing will be installed prior to the commencement of any construction works in order to enhance the protection of identified water features (River Tolka, Tolka Valley Park wetlands and Royal Canal). Shallow interceptor trenches will be installed in front of these silt fences, as there are space and depth constraints within certain areas of Tolka Valley Park. An Ecological Clerks of Works (ECoW) will be present during the installation of these protective measures to ensure that they are installed to best practice standard and correctly located in their assigned areas. 	

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				Silt fences will be repaired and/or replaced as necessary by the Contractor as part of the on-going environmental monitoring programme.	
W-13	Chapter 10: Water section 10.4.7.2	Throughout (as required)	Drainage system	<p>The following measures are incorporated into design of the scheme. The following criteria are applicable to all sections of the drainage design along the scheme:</p> <ul style="list-style-type: none"> ▪ Sealed Carrier pipes are designed so as not to generate surcharge out of the pipes during the 1 in 2-year Critical Storm Condition (This Critical Storm Condition will incorporate a 20% Climate Change Allowance); ▪ Filter Drains are designed so as not to generate surcharge out of the pipe during the 1 in 5-year Critical Storm condition; ▪ The new elements of the drainage systems have been assessed for the critical storm 1 in 100-year flood condition (the critical storm will incorporate a 20% margin for climate change). Whilst out-of-chamber flooding will be allowable during the critical 1 in 100-year condition (the critical storm will incorporate a 20% margin for climate change), the flood volume and how it will affect the adjacent infrastructure has informed provision of necessary mitigation measures; ▪ New attenuation storage units in the form of ponds, swales, tanks, pipes and similar methods will accommodate the critical 1 in 100-year storm (the critical storm will incorporate a 20% margin for climate change). Outfall rates from attenuation areas are based on greenfield and brownfield estimates; and <p>Where roads are to be realigned, at the very least, a gully will be provided for every 200 square metres of pavement. This will be an improvement on the predevelopment condition and will provide additional silt trapping and containment measures on the scheme.</p>	O
W-14	Chapter 10: Water section 10.4.7.2	Throughout (as required)	Increased run-off rates to waterbodies	Throughout the scheme hardstand areas have been replaced with SuDS features such as, Bio-Retention Areas and Rain Gardens. These will act as new attenuation for surface water falling on the scheme. The mitigation, which is by design, will	O

Mitigation Number	EIAR Section Reference	Location	Impacts	Description of Mitigation or Monitoring Measure / Environmental Commitment	Implementation Stage
				result in subsurface attenuation volumes which will be utilised in the event of storm events. The SuDS features also act as traps for sediment, meaning there will be a smaller amount of sediment getting washed into downstream pipework, and potentially causing blockage.	
W-15	Chapter 10: Water section 10.4.7.2	Tolka/ICW	Change to water quality	To mitigate against the effect the scheme may have in causing polluted overland flow from the abandoned landfill reach the ICW and the Tolka at a faster rate, post development, an attenuation pond is to be provided on the ground to the North of the ICW. This pond will intercept overland flow and provide an additional level of treatment before outfalling into the ICW.	O
W-16	Chapter 10: Water section 10.4.7.2	Throughout (as required)	Surface water baseflow affected due to alteration of groundwater regime	<p>The design has taken into consideration the future maintenance regime of the scheme. A number of elements have been incorporated into the design to make maintenance operations simpler:</p> <ul style="list-style-type: none"> ▪ Infiltration trenches, bioretention areas and trees pits, all incorporate drainage pipes towards the base of the filter medium. These drainage pipes will help to encourage the migration of silt from between the filter medium, reducing the likelihood that the filter medium will become silted up during the lifespan of the infiltration trench, bioretention area or tree pit. ▪ Catchpit manholes which incorporate a 300mm deep sump have been provided on drainage lines. Gully pots and collection gullies for the track drainage systems also incorporate sumps. Silt and gravel will accumulate in these sumps, which can be cleaned out by maintenance crews. The sumps help to prevent the accumulation of silt within the drainage pipes, the removal of which requires more complex maintenance operations. ▪ Access chambers have been provided at all changes in direction of drainage pipe runs. Access has also been provided at all pipe junctions. These measures will make the clearance of any blockages within the pipes easier. 	O

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				SuDS features in the form of tree pits, bioretention areas, rain gardens, infiltration trenches and an attenuation pond have been incorporated into the design of the scheme. The grass and planting incorporated into these features will trap silts and gravels and prevent them becoming washed into the piped drainage infrastructure where they can cause siltation which will require clearance by maintenance operatives.	
W-17	Chapter 10: Water section 10.4.7.2	ICW	Decreased sediment in runoff. Surface or subsurface runoff from historical landfill flowing into the ICW.	Monitoring of ICW (Integrated Constructed Wetland) establishment during the Operational Phase.	O
W-18	Chapter 10: Water section 10.4.7.2	Tolka Bridge	Increase in flood risk	<p>The following mitigation measures during Operational Phase will be implemented:</p> <ul style="list-style-type: none"> For the River Tolka Bridge, the abutments have been set back 5 meters from the edge of the river to provide adequate space for flood flow. The proposed drainage system through Tolka Park incorporates bioretention areas, infiltration trenches, filter trenches and an attenuation pond. Whilst testing has revealed that the landfill material is inert, the design measures will provide a level of treatment to any surface or subsurface runoff from the landfill material. The Park & Ride will accommodate an attenuation storage tank so that surface water from the roof and parking area attached to the facility will be attenuated before discharging to the existing drainage network at greenfield runoff rates; and <p>Where nature-based SuDS features are not considered adequate for attenuating surface water runoff from hardstanding areas, attenuation in the form of tanks or pipes has been provided, i.e. adjacent to the existing Broombridge Luas Stop and along Broombridge Road.</p>	O

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W-19	Chapter 10: Water section 10.5.2	Throughout (as required)	Drainage systems	During the Operational Phase of the proposed Scheme, a number of different agencies will carry out maintenance of SuDS features in accordance with their respective management procedures. No additional mitigation measures are required. Pre-emptive mitigation measures are to be implemented for the sustained performance of the ICW in advance of the bridge construction. It is programmed that works on the ICW will be progressed as part of the proposed Scheme enabling works.	O
LSGH-1	EIAR Appendix A6.1 – Construction Environmental Management Plan	Throughout (as required)	General Management	Prior to and during construction localised confirmatory ground investigations/sampling will be undertaken to verify the results of the assessments, undertaken and reported in this EIAR.	PC / C
LSGH-2	Chapter 11: Land & Soils section 11.5.2.1	Throughout (as required)	Surplus soil arising from earthworks	Where unidentified contamination (such as potential asbestos containing material or free phase hydrocarbon product) is encountered, material shall be segregated and stockpiled on a low permeability surface with bunding and shall be covered to allow further testing of the impacted soils to enable specification of treatment and re-use, or disposal.	C
LSGH-3	Chapter 11: Land & Soils section 11.5.2.1	Throughout (as required)	Surplus soil arising from earthworks	Notwithstanding the results of geo-environmental testing and associated assessment data included in the GQRA (Volume 5 - Appendix A11.2), it remains the responsibility of the Construction Contractor(s) to ensure that material is appropriately managed during the Construction Phase. In particular, the Contractor(s) will be responsible for the appropriate segregation of excavated materials. The Contractor(s) will retain a competent person to manage and supervise soil excavation and removal from the site. This person will ensure correct procedures are followed and that waste soils are appropriately logged and tracked using appropriate docketing system.	C
LSGH-4	Chapter 11: Land & Soils section 11.5.2.1	Throughout (as required)	Surplus soil arising from earthworks	The appointed Construction Contractor(s) for future groundworks will be expected to retain the services of an experienced environmental engineer or scientist during bulk excavation works, primarily to identify any previously unidentified contamination.	C

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LSGH-5	Chapter 11: Land & Soils section 11.5.2.1	Throughout (as required)	Surplus soil arising from earthworks	In recognition of national policy and sustainability, where material cannot be re-used as part of the on-site works and requires transfer off site, consideration will be given to the transfer of this material as a by-product under Article 27 of the European Communities (Waste Directive) Regulations 2011.	C
LSGH-6	Chapter 11: Land & Soils section 11.5.2.1	Throughout (as required)	Surplus soil arising from earthworks	Material that is not suitable for re-use, will be removed off site for treatment, recycling or disposal at an authorised waste management facility. The Construction and Demolition Resource and Waste Management Plan (C&D RWMP) will address the analysis of waste arisings, methods proposed for the prevention, re-use and recycling of wastes, and material handling procedures.	C
LSGH-7	Chapter 11: Land & Soils section 11.5.2.2	Throughout (as required)	Potentially contaminated soil Posing risk to human health	The appointed Construction Contractor(s) will be responsible for the compliant management of all waste generated by construction activities and will be responsible for updating and implementing the CEMP, where modifications to the prepared CEMP will not give rise to any impacts more significant than those already identified and assessed in this EIAR or the Natura Impact Statement (NIS). The updated CEMP will identify construction methodologies for the proposed Scheme and standard operating procedures that will be implemented to minimise the impact. The appointed Contractor(s) will implement in full all of the measures set out in the CEMP.	C
LSGH -8	Chapter 11: Land & Soils section 11.5.2.2	Throughout (as required)	Potentially contaminated soil	The Contractor(s) will be responsible for regular testing of excavated soils to monitor the suitability of the soil for re-use. Samples of ground suspected of contamination will be tested for contamination by the Contractor(s) and ground excavated from these areas will be disposed of to a suitably licensed or permitted sites in accordance with the current Irish waste management legislation.	C
LSGH-9	Chapter 11: Land & Soils section 11.5.2.2	Throughout (as required)	Potentially contaminated soil	While the risk of asbestos containing materials is exceptionally low, construction workers will be briefed on the possible presence of localised asbestos. Dermal contact with soils (particularly	C

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				Made Ground) will be avoided wherever possible and appropriate training and Personal Protective Equipment (PPE) and Respiratory Protective Equipment (RPE) will be provided to mitigate the risk of inhalation of asbestos	
LSGH-10	Chapter 11: Land & Soils section 11.5.2.3	Throughout (as required)	Importation of fill	In order to minimise the impacts of importation of construction materials, where possible, a proportion of site-won materials generated during the works will be re-used within the proposed Scheme. Where importation of fill is necessary, imported materials will be sourced from reputable quarries as listed on the registers maintained by Fingal County Council, Dún Laoghaire-Rathdown County Council, and South Dublin County Council	C
LSGH-11	Chapter 11: Land & Soils section 11.5.2.4	Throughout (as required)	Loss of soil cover, soil erosion	Subsoil removal is an unavoidable consequence of the construction works. The earthworks balance has been designed to minimise residual surplus soil.	C
LSGH-12	Chapter 11: Land & Soils section 11.5.2.4	Throughout (as required)	Loss of soil cover, soil erosion	Topsoil stripping and earthworks removal will not be carried out over large areas in advance, which will limit soil erosion by limiting the time during which these areas are exposed. Control measures will involve the immediate use of topsoil wherever practicable after its stripping.	C
LSGH-13	Chapter 11: Land & Soils section 11.5.2.4	Throughout (as required)	Loss of soil cover, soil erosion	The principal avoidance measures regarding compaction of topsoil include the following; topsoil and overburden shall not be unnecessarily trafficked either before stripping or when in a stockpile. When the construction cut level has been achieved, the underlying overburden shall not be left exposed for extended periods of time before construction and refilling of the excavations.	C
LSGH-14	Chapter 11: Land & Soils section 11.5.2.5	Throughout (as required)	Contamination of existing soil	Excavation in areas of historic waste will be carried out as per requirements outlined specified in the CEMP to minimise exposure to surface run-off and to have the appropriate temporary surface drainage in place to minimise the risk of uncontrolled discharge.	C
LSGH-15	Chapter 11: Land & Soils section 11.5.2.5	Throughout (as required)	Contamination of existing soil	In the event of accidental soil pollution, excavation / remediation of a small proportion of contamination may be required.	C

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				Mitigation measures proposed for soil pollution are consistent with the design mitigation measures for the protection of groundwater, as potential contaminants could travel through soil before entering the groundwater system. As such, measures to protect the groundwater from contamination will also protect the soils.	
LSGH-16	Chapter 11: Land & Soils section 11.5.2.5	Throughout (as required)	Contamination of groundwater	<p>Topsoil stripping and earthworks removal will not be carried out over large areas in advance, which will limit the time for which groundwater vulnerability in these areas is increased during construction.</p> <p>During piling activities, an appropriate piling method will be selected that will reduce the risk of cross-contamination from made ground into the underlying groundwater.</p> <p>Construction activities will be undertaken in compliance with guidance set out in CIRIA's Control of water pollution from linear construction projects (CIRIA, 2006). All potentially harmful substances (e.g. oils, diesel, herbicides, pesticides, concrete etc.) will be stored in accordance with the manufacturer's guidelines regarding safe and secure buildings/compounds and hardstanding areas. Adequate means to absorb or contain any spillages of these chemicals shall be made available at all times.</p>	C
LSGH-17	Chapter 11: Land & Soils section 11.5.2.6	Finglas East	Disruption to an existing well	<p>In the unlikely event the identified well (Ref: 2923SEW003) is intercepted by the proposed Scheme, it will be duly recorded by an experienced Hydrogeologist and tested to confirm existing yield rates in advance of being decommissioned.</p> <p>If required, either a replacement supply well will be sited accordingly, designed, drilled, installed, and tested prior to follow-on commissioning or the supply will be replaced by a connection to public supply, subject to local constraints.</p>	C
LSGH-18	Chapter 11: Land & Soils section 11.5.3	Throughout (as required)	Risk of accidental spillages	In the Operational Phase the infrastructure will be maintained by TII, or local authority, and will be subject to their management procedures to ensure that the correct measures are taken in the event of any accidental spillages.	O

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LT-1	Chapter 12: Land Take section 12.5.2	Throughout (as required)	Compensation for Compulsory Purchase	TII is authorised to serve a notice to treat pursuant to the provisions of the Housing Act, 1966 (as amended), including Section 79 thereof. The acquisition of the various specified rights and interests in land and property, is necessary in order to ensure the delivery of the proposed Scheme in its entirety. In the event that the RO is approved and TII exercises its powers of acquisition pursuant to the enforceable RO, the owners, lessees and occupiers of those acquired lands and interests in lands will be entitled to submit a claim for compensation which, in default of agreement, will be determined by a Property Arbitrator in accordance with the relevant statutory provisions.	C
LT-2	Chapter 12: Land Take section 12.5.2	Throughout (as required)	Acquisition of land and property interests	Some temporarily acquired lands, for example portions of grounds, yards and front gardens, will be handed back in a slightly different state with a changed gradient to a garden or driveway or a boundary wall/entrance.	C
LT-3	Chapter 12: Land Take section 12.4.2.2	Throughout (as required)	Temporary restriction to property access	The appointed Contractor will implement the following measures: <ul style="list-style-type: none"> ▪ Temporary traffic management and access controls will be put in place as required and all impacted owner/occupiers will be notified and consulted so as to minimise any temporary impacts and ensure maximum safety for the public and the construction team at all times. ▪ Alternative designated safe crossing points will be provided. ▪ Reinstatement of landscape areas. ▪ New landscaping and provision of new maintenance access to canal bank and footpaths. New access and Parking arrangements at resource centre and school will be provided.	C
LT-4	Chapter 12: Land Take Table 12-9	Tolka River	Air rights for bridge decks over Tolka river. Tree removal and modifications to integrated constructed wetlands.	Reinstatement of landscape area and replanting will be provided.	C

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LT-5	Chapter 12: Land Take sections 12.4.2.2 and 12.6.1	Throughout (as required)	Demolition of structures, including boundary walls/fences	There will be minor demolition requirements associated with utility structures and boundary walls and fencing along the alignment. Existing demolition materials will be recycled and reused, matching materials to existing or new sympathetic materials shall be used otherwise.	C
LT-6	Chapter 12: Land Take Table 12-8	Area 30	Reduction in residual land area. Impacting future development potential due to reduced area	Provision of new boundary treatment.	C
AQ-1	Chapter 13: Air Quality section 13.5.1.3	Throughout (as required)	Risk from asbestos-containing materials	<p>A Demolition Survey of all buildings to be demolished will be required prior to commencement of any such demolition works.</p> <ul style="list-style-type: none"> This will include an intrusive asbestos-containing materials survey, which will involve destructive inspection. Prior to commencement of the demolition works, all asbestos containing materials identified by the Management Asbestos Survey and Refurbishment and Demolition Survey, will be removed by a suitably trained and competent person. <p>Asbestos-containing materials will only be removed from site by a suitably permitted/licensed waste Contractor and will be brought to a suitably licensed facility. The Health and Safety Authority will be contacted where needed in relation to the handling of asbestos and material will be dealt with in accordance with the Safety, Health and Welfare at Work (Exposure to Asbestos) Regulations 2006, as amended and associated approved Codes of Practice.</p>	PC
AQ-2	Chapter 13: Air Quality section 13.5.1.1 And EIAR Appendix A6.6 Construction Environmental	Throughout (as required)	Dust emission, increase level of PM10	<p>Dust Management Plan contained within the CEMP (Volume 5 - Appendix A6.1) has been prepared as part of the EIAR and will be incorporated by the appointed Contractor in his plan. DMP will be implemented and updated by the Contractor.</p> <p>The DMP include monitoring of dust deposition, dust flux, real-time PM10 continuous monitoring and/or visual inspections.</p>	PC

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	Management Plan section 1.8.4.1				
AQ-3	Chapter 13: Air Quality section 13.5.1.1	Throughout (as required)	Dust emission on site	<p>The following measures will be implemented by the site Environmental Manager (EM) to avoid dust emission on site:</p> <ul style="list-style-type: none"> Record any exceptional incidents that cause dust and/or air emissions, either on or offsite, and the action taken to resolve the situation in the logbook; Record any exceptional incidents that cause dust and/or air emissions, either on or offsite, and the action taken to resolve the situation in the logbook Make the complaints log available to the local authority when asked <p>Hold regular liaison meetings with other high risk construction sites within 500 m of the site boundary if applicable, to ensure plans are co-ordinated and dust and particulate matter emissions are minimised. It is important to understand the interactions of the off-site transport/ deliveries which might be using the same strategic road network routes.</p>	C
AQ-4	Chapter 13: Air Quality section 13.5.1.1	Throughout (as required)	Dust emission	<p>The appointed Contractor will:</p> <ul style="list-style-type: none"> Plan site layout so that machinery and dust causing activities are located away from receptors, as far as is possible; Erect solid screens or barriers around dusty activities or the site boundary that are at least as high as any stockpiles on site; Fully enclose site or specific operations where there is a high potential for dust production and the site is active for an extensive period; Avoid site runoff of water or mud; Keep site fencing, barriers and scaffolding clean using wet methods; Remove materials that have a potential to produce dust from site as soon as possible, unless being re-used on site; and Cover, seed or fence stockpiles to prevent wind whipping. 	C

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AQ-5	Chapter 13: Air Quality section 13.5.1.1	Throughout (as required)	Traffic emissions	<p>The appointed Contractor will:</p> <ul style="list-style-type: none"> Ensure all vehicles switch off engines when stationary.. Minimise and prevent idling of construction vehicles and plant and equipment both on-site and in construction compounds; Avoid the use of diesel- or petrol-powered generators and use mains electricity or battery powered equipment where practicable; Impose and signpost a maximum-speed-limit of 15 mph on surfaced and 10 mph on unsurfaced haul roads and work areas; Produce a Construction Logistics Plan to manage the sustainable delivery of goods and materials; and Efficiently schedule deliveries undertaken to minimise emissions. 	C
AQ-6	Chapter 13: Air Quality section 13.5.1.1	Throughout (as required)	Dust emissions from construction	<p>The following mitigation measures will be implemented by the Contractor:</p> <ul style="list-style-type: none"> Only use cutting, grinding or sawing equipment fitted or in conjunction with suitable dust suppression techniques such as water sprays or local extraction, e.g. suitable local exhaust ventilation systems; Ensure an adequate water supply on the site for effective dust/particulate matter suppression/mitigation, using non-potable water; Use enclosed chutes and conveyors and covered skips; Minimise drop heights from conveyors, loading shovels, hoppers and other loading or handling equipment and use fine water sprays on such equipment wherever appropriate; Ensure equipment is readily available on site to clean any dry spillages, and clean up spillages after the event using wet cleaning methods; Avoid scabbling (roughening of concrete surfaces) if possible; Ensure sand and other aggregates are stored in bunded areas and are not allowed to dry out, unless this is required 	C

Mitigation Number	EIAR Section Reference	Location	Impacts	Description of Mitigation or Monitoring Measure / Environmental Commitment	Implementation Stage
				<p>for a particular process, in which case ensure that appropriate additional control measures are in place;</p> <ul style="list-style-type: none"> Ensure bulk cement and other fine powder materials are delivered in enclosed tankers and stored in silos with suitable emission control systems to prevent escape of material and overflowing during delivery; and For smaller supplies of fine power materials ensure bags are sealed after use and stored appropriately to prevent dust. 	
AQ-7	Chapter 13: Air Quality section 13.5.1.1	Throughout (as required)	Dus emission from demolition activity	<p>The following mitigation measures will be implemented:</p> <ul style="list-style-type: none"> Soft strip inside buildings before demolition of retaining walls and windows in the rest of the building to provide a screen against dust; Ensure effective water suppression is used during demolition operations. Handheld sprays are more effective than hoses attached to equipment as the water can be directed to where it is needed. In addition, high volume water suppression systems, manually controlled, can produce fine water droplets that effectively bring the dust particles to the ground; Avoid explosive blasting, using appropriate manual or mechanical alternatives; and Bag and remove any biological debris or damp down such material before demolition. 	C
AQ-8	Chapter 13: Air Quality section 13.5.1.1	Throughout (as required)	Dust emission from earthworks	<p>The appointed Contractor will undertake the following works:</p> <ul style="list-style-type: none"> Re-vegetate earthworks and exposed areas/soil stockpiles to stabilise surfaces; Use Hessian, mulches or tackifiers where it is not possible to re-vegetate or cover with topsoil; and Only remove the cover in small areas during work and not all at once. 	C
AQ-9	Chapter 13: Air Quality section 13.5.1.1	Throughout (as required)	Dust emission on trackout	<p>The appointed Contractor will:</p> <ul style="list-style-type: none"> Use water-assisted dust sweeper(s) on the access and local roads, to remove, as necessary, any material tracked out of the site. This may require the sweeper being continuously in use; Avoid dry sweeping of large areas; 	C

Mitigation Number	EIAR Section Reference	Location	Impacts	Description of Mitigation or Monitoring Measure / Environmental Commitment	Implementation Stage
				<ul style="list-style-type: none"> ▪ Ensure vehicles entering and leaving sites are covered to prevent escape of materials during transport; ▪ Inspect on-site haul routes for integrity and instigate necessary repairs to the surface; ▪ Record all inspections of haul routes and any subsequent action in a site logbook; ▪ Install hard surfaced haul routes, which are regularly damped down with fixed or mobile sprinkler systems, or mobile water bowsers and regularly cleaned; ▪ Implement a wheel washing system (with rumble grids to dislodge accumulated dust and mud prior to leaving the site); ▪ Ensure there is an adequate area of hard surfaced road between the wheel wash facility and the site exit, wherever site size and layout permits; and ▪ Access gates to be located at least 10m from receptors. 	
AQ-10	Chapter 13: Air Quality section 13.5.1.2	Throughout (as required)	Potential for Aspergillus airborne during demolition and earthworks	<p>Survey and prevention works with respect to <i>Aspergillus</i> will take place before construction commences by a competent Contractor in proximity to any sensitive buildings and hospitals or health clinics.</p> <ul style="list-style-type: none"> ▪ If pre-construction surveys indicate that Aspergillus is a risk, the prevention works will include sealing the windows to the façades that are in close proximity to the hospital to prevent fugitive dust entering the hospital through windows. <p>These works will form part of an Aspergillus Prevention Plan to be completed by a specialist and will ensure the prevention of Aspergillus spores spreading.</p>	PC / C
AQ-11	Chapter 13: Air Quality section 13.5.1.1	Throughout (as required)	Dust soiling.	<p>Monitoring measures that will be implemented by the EM include:</p> <ul style="list-style-type: none"> ▪ Undertake daily on-site and off-site inspection, where receptors (including roads) are nearby, to monitor dust, record inspection results, and make the log available to the local authority when asked. This should include regular dust soiling checks of surfaces such as street furniture, cars and windowsills within 100m of site boundary, with cleaning to be provided if necessary; 	C

Mitigation Number	EIAR Section Reference	Location	Impacts	Description of Mitigation or Monitoring Measure / Environmental Commitment	Implementation Stage
				<ul style="list-style-type: none"> Carry out regular site inspections to monitor compliance with the DMP, record inspection results, and make an inspection log available to the local authority when asked; Increase the frequency of site inspections by the person accountable for air quality and dust issues on site when activities with a high potential to produce dust are being carried out and during prolonged dry or windy conditions; Monthly monitoring of dust deposition levels shall be undertaken for the duration of construction for comparison with the guideline of 350mg/m²/day (for non-hazardous dusts). This monitoring shall be carried out at a minimum of three locations in proximity to each construction compound and further monitoring locations shall be designated at sensitive receptors along the proposed Scheme alignment. <p>If dust levels are measured to be above the guideline of 350mg/m²/day, the mitigation measures in the area shall be reviewed and improved to ensure that dust deposition is reduced to below 350 mg/m²/day.</p> <p>Should high dust levels continue to occur following these improvements, the Contractor shall provide alternative mitigation measures and/or will modify the construction works taking place.</p>	
CM-1	Chapter 14: Climate section 14.5.1	Throughout (as required)	General Management	<ul style="list-style-type: none"> Maintaining existing tree corridors to minimise tree clearance. Carbon storage associated with existing trees. Landscape design strategy to be implemented to address carbon and climate adaptation. 	PC
CM-2	Chapter 14: Climate section 14.5.1	Throughout (as required)	Emission of GHG	<p>The following mitigation measures will be put in place to minimise emissions:</p> <ul style="list-style-type: none"> Construction machinery engines will be turned off when machinery is not in use; A regular maintenance schedule for all construction plant machinery shall be undertaken to maintain optimum machinery efficiency; 	C

Mitigation Number	EIAR Section Reference	Location	Impacts	Description of Mitigation or Monitoring Measure / Environmental Commitment	Implementation Stage
				<ul style="list-style-type: none"> ▪ Minimise and prevent idling of construction vehicles and plant and equipment both on-site and in construction compounds; ▪ Efficiently schedule deliveries undertaken to minimise emissions; ▪ Ensure conformity of construction vehicles with the latest EU emissions standards and where reasonably practicable, their emissions should meet upcoming standards prior to the legal requirement date for the new standard; ▪ Sustainable timber post fencing will be specified over steel in boundary treatments; and ▪ The use of private vehicles by construction staff to access the site will be minimised through the encouragement of use of public transport, encouragement of car sharing, and maximising use of local labour to reduce transport emissions. To implement this, the Contractor shall prepare a Mobility Management Plan for site staff. 	
CM-3	Chapter 14: Climate section 14.5.1	Throughout (as required)	Embodied Carbon	<p>Elements that will mitigate construction carbon include:</p> <ul style="list-style-type: none"> ▪ Incorporation of concrete with 25% or 50% ground granulated blast furnace slag (GGBS) to reduce the carbon footprint. Lower carbon footprint than other cements produced in Ireland; ▪ The design is based on the use of a grass track which reduces concrete requirements; ▪ Facilitating sustainable material use, such as Green Cement and recyclable material; ▪ Divert waste materials from landfill / incineration to re-use onsite or offsite or recycling material; ▪ The use of non-concrete assets shall be optimised in the design e.g. grass track, grassed drains etc. to minimise the need for concrete; ▪ Aggregates required for pavement materials shall be secondary aggregates. Virgin aggregates shall only be employed where it is demonstrated that secondary aggregates are unsuitable for structural reasons and/or they are unavailable; 	C

Mitigation Number	EIAR Section Reference	Location	Impacts	Description of Mitigation or Monitoring Measure / Environmental Commitment	Implementation Stage
				<ul style="list-style-type: none"> ▪ Wherever available, the Contractor shall secure construction materials from local/regional sources or sources within the State to minimise material transport emissions and reduce life cycle carbon emissions associated with the construction materials; ▪ For electricity generation at the construction compounds, hydrogen generators or electrified plant shall be utilised over traditional diesel generators. This shall also apply to lower powered mobile plant, as appropriate; ▪ Implement a Waste Management Plan for Construction and Demolition Waste as part of the CEMP; ▪ Issue a notification under Article 27 of the European Communities (Waste Directive) Regulations 2011 (S.I. No. 126 of 2011), as amended (Waste Directive Regulations (2011)) (referred to as Article 27) to the Environmental Protection Agency on behalf of TII to classify much of the construction phase generated inert waste material as a by-product and not a waste. This will allow the material to be re-used in the construction of the proposed Scheme; ▪ Reuse materials as much as possible within the extent of the sites. In addition, materials will be sourced locally to reduce the embodied carbon emissions associated with transport; and ▪ Require operations to achieve high recycling rates with an aspiration to achieve zero waste directly to landfill. This will also include audits prior to any demolition/excavation to review for material that can be reused on site. 	
CM-4	Chapter 14: Climate section 14.5.1	Throughout (as required)	Climate change	<ul style="list-style-type: none"> ▪ The appointed Contractor will undertake updated Climate Change Risk Assessments for all aspects of the proposed Scheme and implement measures to mitigate identified impacts during detailed design and prior to the commencement of operation. ▪ the appointed Contractor will implement a whole-life Carbon Management Plan aligned to PAS 2080:2023 Carbon management in buildings and infrastructure which has been used to inform the detailed design, build and operation of the proposed Scheme. 	C

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				<ul style="list-style-type: none"> The construction Contractor will pay due consideration to the impacts of extreme weather events during the Construction Phase and will utilise available meteorological forecast data from Met Éireann to inform short to medium-term programme management, environmental control, and impact mitigation measures. A Severe Weather Management Plan (to be prepared by the Contractor having regard to the CEMP and the Water and Energy Management Plan) will be considered in order to ensure mechanisms are in place should this impact arise. The documents should contain plans and mitigation measures to prevent future impacts due to increasingly severe weather events. Integrate and maintain measures to manage construction and operational surface water and stormwater runoff. Achieve a reduction in mains water use during construction through the use of rainwater harvesting, water re-use and efficiency systems and devices at all work sites, stations, and buildings. Reuse rainwater and pumped water from excavations collected on site. This will account for at least 25% of the water required during the Construction Phase. 	
CM-5	Chapter 14: Climate section 14.4.1.3	Throughout (as required)	GHG Climate change	<p>The following additional Operational Phase mitigation measures will be implemented:</p> <ul style="list-style-type: none"> Installation of a Solar PV panel array on the Park & Ride facility roof. The proposed Scheme includes a multi-storey car park and the roof is proposed to be a green or blue roof with PV panels. Approximately 350 car parking spaces will be provided. The facility is designed to facilitate 100% EV parking, with approximately 20% of EV spaces provided from opening year. The electricity generated by the operation of the Solar PV panel array on the park and ride facility will equate to a saving of approx. 96 tCO_{2eq} per annum or 5,760 tCO_{2eq} over the lifetime of the proposed Scheme; The power supply for the proposed Scheme will be delivered from electrical sub-stations via an Overhead Catenary System (OCS). Power will be supplied to the sub-stations from the national grid. 	O

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				<ul style="list-style-type: none"> The proposed design maximises the use of green track, for landscaping, infiltration, visual amenity and reducing of urban heat intensity. Extensive planting proposals aim to create connected green spaces along the route; Use SuDS systems for surface water collection and attenuation. A SuDS system offers environmental benefits, as it requires less maintenance over traditional closed surface water collection and attenuation systems. A reduced maintenance regime over the lifetime of the proposed Scheme will be one of the drainage design objectives. The proposed design maximises the use of green track, for landscaping, infiltration, visual amenity and reducing of urban heat intensity. Extensive planting proposals aim to create connected green spaces along the route. The carbon emission savings from this design approach is estimated at approx. 194 tCO₂eq per annum or 11,640 tCO₂eq over the 60-year lifetime of the proposed Scheme; Achieve Net Zero for operational energy by the design year through energy efficiency, innovation, green power purchases and offsetting residual emissions; and Provision for cyclists including routes and cycle parking to be maintained throughout quantifiable GHG mitigation measures such as the use of 80% - 100% renewable electricity, can be implemented and detailed. This carbon emission mitigation measure will be very significant in terms of GHG emission reductions due to the proposed Scheme. 	
NV-1	Chapter 15: Noise & Vibration section 15.5.1.1	Throughout (as required)	Impacts on stakeholders	<p>The main principles and standards required for noise mitigation are outlined as follows:</p> <ul style="list-style-type: none"> The Contractor undertaking the construction of the works will be required to take specific noise abatement measures to the extent required and comply with the recommendations of BS 5228-1; The Contractor will undertake a reassessment of noise levels once further information is available as part of the identification of mitigation measures. This will include details of all anticipated out of core hours work; 	C

Mitigation Number	EIAR Section Reference	Location	Impacts	Description of Mitigation or Monitoring Measure / Environmental Commitment	Implementation Stage
				<ul style="list-style-type: none"> The selection of plant items will be required to comply and European Communities Noise Emissions by Equipment for Use Outdoors (Amendment) Regulations 2006; The Contractor will prepare a Noise and Vibration Management Plan (CNVMP) which will be formulated for the construction phase and used by all Contractors based on the mitigation measures outlined in this chapter, and the CEMP. The CNVMP will be a live document. As part of the CNVMP, a baseline noise study will be undertaken prior to the commencement of construction works in order to characterise the prevailing noise environment at impacted NSLs. This information will be used to inform the relevant CNTs. <p>The key principles relating to noise mitigation will be applied across all construction activities for the proposed Scheme:</p> <ul style="list-style-type: none"> Noise control at Source: Selection of quiet plant, site layout, attenuation at source, operational control (hours and periods); and Noise Control along Pathway: Localised screening to plant items on site, enclosures, site buildings, site hoarding and noise barriers. 	
NV-2	Chapter 15: Noise & Vibration section 15.5.1.1	Throughout (as required)	Impacts on stakeholders	<p>Selection of quiet plant:</p> <ul style="list-style-type: none"> The Contractor(s) will evaluate the choice of piling, excavation, breaking or other working method considering various ground conditions and site constraints. Where alternative lower noise generating equipment that would economically achieve, in the given ground conditions, equivalent structural / excavation / breaking results, these will be selected to control noise emissions. <p>The use of non-percussive piling methodologies will be used across the proposed Scheme to control noise and vibration impacts.</p>	C
NV-3	Chapter 15: Noise & Vibration section 15.5.1.1	Throughout (as required)	Impacts on stakeholders	<p>If replacing a noisy item of plant is not a viable or practical option, noise control “at source” will be followed:</p> <ul style="list-style-type: none"> For static plant such as compressors, generators, motors and pumps within each construction compound, the units will 	C

Mitigation Number	EIAR Section Reference	Location	Impacts	Description of Mitigation or Monitoring Measure / Environmental Commitment	Implementation Stage
				<p>be surrounded by acoustic lagging or have acoustic enclosures providing air ventilation, as required, to ensure CNTs are not exceeded, particularly if required at night;</p> <ul style="list-style-type: none"> ▪ Equipment powered by mains electricity shall be used in preference to equipment powered by internal combustion engines or locally generated electricity; ▪ For mobile plant items such as dump trucks, cranes, excavators and loaders, the installation of an acoustic exhaust, utilizing an acoustic canopy to replace the normal engine cover and/or maintaining enclosure panels closed during operation can be used to reduce noise levels by up to 10dB; ▪ Reverse alarms from mobile plant within construction compounds, will be broadband to reduce tonal elements from this source; ▪ For piling plant, noise reduction can be achieved by enclosing the driving system in an acoustic shroud. For steady continuous noise, such as that generated by diesel engines, it is possible to reduce the noise emitted by fitting a more effective exhaust silencer system or utilising an acoustic canopy to replace the normal engine cover; ▪ Mobile and stationary plant will be switched off or throttled back to a minimum when not in use (engines, motors and generators). Lorries, trucks and concrete vehicles will not be permitted to queue outside site compounds with engines left idling; ▪ For percussive tools such as pneumatic concrete breakers and tools used for utility diversion works and surface level ground breaking for track construction, a number of noise control measures include fitting a muffler or sound reducing equipment to the breaker 'tool', and ensuring any leaks in the air lines are sealed; ▪ For all materials handling within compounds, the Contractor will ensure that best practice site noise control measures are implemented including ensuring that materials are not dropped from excessive heights and drop chutes/dump trucks are lined with resilient materials. This is an important 	

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				<p>consideration for site compounds where materials are loaded and unloaded;</p> <ul style="list-style-type: none"> Resonance effects in panel work or cover plates can be reduced through stiffening or application of damping compounds; rattling and grinding noises can be controlled by fixing resilient materials in between the surfaces in contact; All items of plant will be subject to regular maintenance. All vehicles and mechanical plant will be maintained in good working order for the duration of the contract. Such maintenance can prevent unnecessary increases in plant noise and can serve to prolong the effectiveness of noise control measures; and The impact from works will be controlled using the best practicable means set out above and restricting significant noise and vibration generating activities to daytime hours. 	
NV-4	Chapter 15: Noise & Vibration section 15.5.1.1	Throughout	Construction working hours	<p>From a consideration of construction working hours, a number of mitigation measures will be implemented:</p> <ul style="list-style-type: none"> The proposed construction working hours are mostly limited to daytime hours only from Monday to Friday and to Saturday morning periods. This approach assists with limiting the duration over which NSLs are exposed to construction noise impacts; It will be necessary to work overtime (including weekends) and night shifts at certain critical stages during the Construction Phase e.g. during works adjacent to live rail lines at Broombridge and some road works; Activities will be scheduled in a manner that reflects the location of the site and the nature of NSLs. Construction activities/plant items will be considered with respect to their potential to exceed CNTs at NSLs and will be scheduled according to their noise level, proximity to sensitive locations and possible options for noise control; and For work areas where night-time activities will be required, as far as practicable, activities with highest noise emissions will be scheduled during daytime periods and/or daytime shifts will set up the relevant sites for night-time periods to 	C

Mitigation Number	EIAR Section Reference	Location	Impacts	Description of Mitigation or Monitoring Measure / Environmental Commitment	Implementation Stage
				<p>avoid unnecessary use of mobile plant, cranes, and material handling to occur during night-time periods.</p> <p>Typically, screening is an effective method of reducing the noise level from construction work areas and can be used successfully as an additional measure to other forms of noise control. In practice screens constructed with materials with per units of surface area greater than 10kg/m² will give adequate sound insulation performance.</p>	
NV-5	Chapter 15: Noise & Vibration section 15.5.1	Throughout (as required)	Impacts on stakeholders	<p>Consultation with stakeholders:</p> <ul style="list-style-type: none"> ▪ The project team including Client, Contractor and Local Authorities will engage in regular meetings to discuss the approach to noise management; ▪ A particular emphasis should be placed on the risk of noise impacts during any out of hours work; ▪ The Contractor will provide proactive community relations and will notify the public and vibration sensitive premises before the commencement of any works forecast to generate appreciable levels of noise or vibration, explaining the nature and duration of the works; ▪ The Contractor will distribute information circulars informing people of the progress of works and any likely periods of significant noise and vibration; and ▪ A Public Liaison Officer will be appointed to site during construction works. All noise complaints will be logged and followed up in a prompt fashion by the liaison officer. 	C
NV-6	Chapter 15: Noise & Vibration section 15.5.1	Throughout (as required)	Impacts on stakeholders	<p>A full monitoring and auditing programme will form part of the CNVMP which will be agreed with the Local Authorities prior to the commencement of the Construction Phase.</p> <p>As a minimum the monitoring programme will include an alert system for threshold exceedances, remote access and a platform for sharing monitoring results between the Contractor, TII and DCC.</p>	C
NV-7	Chapter 15: Noise & Vibration section 15.5.1.2	Throughout (as required)	Impacts on stakeholders	<p>Construction traffic noise will be limited by restricting speed limits, maintaining road surfaces and ensuring that all vehicles are properly maintained. In addition, any coverings on construction</p>	C

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				vehicles will be securely fastened before leaving site to avoid excessive 'rattling'	
NV-8	Chapter 15: Noise & Vibration section 15.5.1.3	Throughout (as required)	Construction Vibration impacts Human discomfort	<p>It is understood that bored piling is to be used and this is a piling method which generates relatively low levels of vibration. Notwithstanding this, consideration should be given to the following methods to further mitigate the vibration levels:</p> <ul style="list-style-type: none"> ▪ Minimise obstructions between the vibration source and the sensitive receiver, e.g. old basement floors, old foundations etc., which exacerbate the transmission of vibration; and ▪ Reduce the resistance to bored piles by "mudding in". This technique involves lubricating the borehole with a small amount of bentonite slurry. <p>In the case of vibration levels giving rise to human discomfort, and in order to minimise such impacts, the following measures shall be implemented during the construction period:</p> <ul style="list-style-type: none"> ▪ A clear communication programme will be established by TII to inform adjacent building occupants in advance of any potential intrusive works which may give rise to vibration levels likely to result in significant effects. The nature and duration of the works will be clearly set out in all communication circulars as necessary; ▪ Activities capable of generating significant vibration effects with respect to human response will be restricted to daytime hours only; and ▪ Appropriate vibration isolation shall be applied to plant (such as resilient mounts to pumps and generators), where required and where feasible. 	C
NV-9	Chapter 15: Noise & Vibration section 15.5.2.1	St Helena's Childcare Centre	Increased airborne noise	<p>A new solid boundary treatment is to be installed, with a minimum height of 2.25m and at the western edge of the St Helena's Childcare Centre.</p> <p>The boundary treatment will be constructed from a suitable dense material such as masonry or solid timber fencing, offering suitable sound attenuation.</p>	O

Mitigation Number	EIAR Section Reference	Location	Impacts	Description of Mitigation or Monitoring Measure / Environmental Commitment	Implementation Stage
NV-10	Chapter 15: Noise & Vibration section 15.5.2.2	Throughout (as required)	Noise from rail corrugation and squeal	Grinding rail surfaces will be carried out to reduce rail generated noise from rail and wheel roughness. As part of the rail maintenance programme conduct rail lubrication at these locations to minimise the risk and magnitude of any squeal noise generated as provided by on-board lubrication systems aboard all LUAS fleet, both existing and proposed.	O
NV-11	Chapter 15: Noise & Vibration section 15.5.2.2	Finglas Village Stop	Higher levels of vibration	A floating slab track detail will be provided in the area approaching the Finglas Village Stop to mitigate the risk of higher levels of vibration being generated by the curvature of the track. The floating slab track reduces the transmission of vibration by incorporating a floating slab mat between the track slab and the surrounding structural slab.	O
NV-12	Chapter 15: Noise & Vibration section 15.5.2.3	Throughout (as required)	Impacts on stakeholders	Schedule rail maintenance activities over night-time periods along the proposed Scheme alignment, advance notice will be provided to affected residents providing notification of the dates and durations of the planned works.	O
ECI-3	Chapter 16: Electromagnetic Compatibility and Interference section 16.6.1	Throughout (as required)	Impact on LRT crossing under the ESB HV overhead lines	Carry out an assessment to determine the separation between the two systems and if there are any EMF risks to passengers or staff	O
ECI-4	Chapter 16: Electromagnetic Compatibility and Interference section 16.6.1	Throughout (as required)	Impacts on Garda and Fire station Rado systems radio systems	Review the radiated emission data for the LRVs to ensure emissions are low at the radio operating frequency. Review the OHL design to ensure it minimises arcing (e.g. no gaps) in the area near the Garda station Calculate the field strength from the radio systems at the LRV and wayside equipment. Review immunity levels for LRV and wayside equipment.	O
ECI-5	Chapter 16: Electromagnetic Compatibility and	Throughout (as required)	Impacts from interference of nearby emitters on	Ensure LRV equipment meets EN 50121-3-2 immunity levels. Ensure wayside equipment and LRV stop equipment meets appropriate immunity standard.	C / O

Mitigation Number	EIAR Section Reference	Location	Impacts	Description of Mitigation or Monitoring Measure / Environmental Commitment	Implementation Stage
	Interference section 16.6.1		wayside equipment, LRVs, etc	Ensure substation equipment meets immunity levels in EN 50121-5 or other appropriate immunity standard	
ECI-6	Chapter 16: Electromagnetic Compatibility and Interference section 16.6.1	Throughout (as required)	Impacts of stray current in structures and utilities	Liaise with utility companies to determine potential assets that may be affected. Produce stray current management strategy in line with EN 50122-2 and best practice and addresses any identified utilities assets. Review design to ensure it is aligned with strategy and minimises stray current. Inspect installation to ensure stray current mitigates are implemented.	PC / C
ECI-7	Chapter 16: Electromagnetic Compatibility and Interference section 16.6.1	Substations	Impacts on LRV line and associated power supply (substations) exceeding EMF limits	Ensure cable routing and substation design minimise EMF levels Ensure LRT meets the limits in the 'Low Action Levels' of the EMF Directive	C / O
ECI-8	Chapter 16: Electromagnetic Compatibility and Interference section 16.6.1	St Margarets Substation	Impacts on soil resistivity	The measure to be implemented is to not bury spoil or contaminate the ground during the removal of the pedestrian fly-over.	C
ECI-9	Chapter 16: Electromagnetic Compatibility and Interference section 16.6.1	Throughout (as required)	Impacts of EMC	The following plans/reports will be developed and Implemented throughout the lifecycle of the proposed Scheme: <ul style="list-style-type: none"> ▪ EMC Control Plan ▪ EMC Hazard Analysis & Risk Assessment ▪ Stray Current Strategy Management Plan ▪ EMC Simulation Studies EMC Test Plans	PC / C / O
MAM-1	Chapter 6: Construction Activities section 6.5.6	Throughout (as required)	Impacts on Stakeholders	Prior to beginning of any demolition or construction activities, the Contractor will identify the locations of all utilities within the proposed work area.	PC

Mitigation Number	EIAR Section Reference	Location	Impacts	Description of Mitigation or Monitoring Measure / Environmental Commitment	Implementation Stage
				All electrical relocations, isolations and de-energizations will be performed by a licensed electrical Subcontractor in advance of demolition.	
MAM-2	Chapter 17: Material Assets: Infrastructure and Utilities section 17.5.1.1	Throughout (as required)	Impacts on Stakeholders	Major utility infrastructure will be avoided. Where there are interfaces with existing utility infrastructure, and protection in place is not viable, diversion measures have been proposed to prevent long-term interruption to the provision of the affected services. The proposals will ensure that efforts are made during construction so as to ensure disruption to any utility service is minimised and where necessary, subject to service level agreement, will take alternative measures to ensure continuity of the service whilst diverted.	C
MAM-3	Chapter 17: Material Assets: Infrastructure and Utilities section 17.5.1.1	Throughout (as required)	Stakeholders (Utility companies)	Consultations have been undertaken with all major utility companies regarding project designs. Consultations will continue through the design development.	C
MAM-3	Chapter 17: Material Assets: Infrastructure and Utilities section 17.5.1.1	Throughout (as required)	Impacts on Stakeholders	Protection measures during construction will include warning signs and markings indicating the location of utility infrastructure, safe digging techniques in the vicinity of known utilities, and in certain circumstances isolation of the section of infrastructure during works in the immediate vicinity.	C
MAM-4	Chapter 17: Material Assets: Infrastructure and Utilities section 17.5.1.1	Throughout (as required)	Impacts on Stakeholders	Prior notification will be given to all impacted properties for service disruptions and disturbance around residential commercial and or community property	C
MAM-5	Chapter 17: Material Assets: Infrastructure and Utilities section 17.5.1.1	Throughout (as required)	Impacts on Stakeholders	Interruptions will be planned such that electrical works will be preferred during summer to avoid summer works involving water supply	C
MAM-6	Chapter 17: Material Assets: Infrastructure and Utilities section 17.5.2	Throughout (as required)	Impacts on Stakeholders	In accordance with service level agreements utility infrastructure modifications during Construction will ensure reliable provision of power (electricity/gas), water and other services are provided across the live LRT during maintenance works	O

Mitigation Number	EIAR Section Reference	Location	Impacts	Description of Mitigation or Monitoring Measure / Environmental Commitment	Implementation Stage
TT-1	Chapter 18: Material Assets: Traffic and Transport section 18.5.1	Throughout (as required)	Impacts on traffic	The appointed Contractor will implement and update measures in the CEMP prior to construction commencing (Appendix A6.1).	C
TT-2	Chapter 18: Material Assets: Traffic and Transport section 18.5.1	Throughout (as required)	Impacts on traffic	<p>All temporary traffic measures required during the Construction Phase are outlined in the PTMP (Appendix A6.2) which will be developed by the Contractor into a Construction Stage Traffic Management Plan.</p> <p>All content provided in the CTMP will be implemented in full by the appointed Contractor and its finalisation will not affect the robustness and adequacy of the information presented and relied upon in this EIAR. In preparing the CTMP for the proposed works, the appointed Contractor will be required to give consideration where practicable to facilitate and identify opportunities for the maximum movement of people during the construction period through implementing the following hierarchy of transport mode users:</p> <ul style="list-style-type: none"> ▪ Pedestrians and Cyclists; ▪ Public Transport; ▪ General Traffic; and ▪ Parking and Access 	C
TT-3	Chapter 18: Material Assets: Traffic and Transport section 18.5.1	Throughout (as required)	Impacts on traffic	Phasing will be considered as a requirement of the proposed Scheme to ensure safe construction and minimise the impact on traffic on NMUs along the route of the proposed Scheme and maintaining flow of all modes of transport wherever practicable.	C
WR-1	Chapter 19: Material Assets: Resource & Waste Management section 19.5.1	Throughout (as required)	Designing for circular economy	<p>The proposed Scheme will use circular economy principles in construction to minimize the use of materials, energy and other resources. These include:</p> <ul style="list-style-type: none"> ▪ Minimise resource consumption and waste generation ▪ Design for re-use and recovery ▪ Design for materials optimisation: simplifying layout and form to minimise material use ▪ Design for off-site construction 	PC

Mitigation Number	EIAR Section Reference	Location	Impacts	Description of Mitigation or Monitoring Measure / Environmental Commitment	Implementation Stage
				Design for the future (deconstruction and flexibility): identifying how materials can be designed to be more easily adapted over an asset lifetime	
WR-2	Chapter 19: Material Assets: Resource & Waste Management section 19.5.2	Throughout (as required)	Impacts on the environment	Standard sizes for most items will be used to avoid cutting on-site and prevent wastage	C
WR-3	Chapter 19: Material Assets: Resource & Waste Management section 19.5.2	Throughout (as required)	Impacts on the environment	Off-site construction, prefabricated products / modules and pre-cast units will be used to prevent waste	C
WR-4	Chapter 19: Material Assets: Resource & Waste Management section 19.5.2	Throughout (as required)	Impacts on soil and land	All excavated materials will be re-used on site if appropriate	C
WR-5	Chapter 19: Material Assets: Resource & Waste Management section 19.5.2	Throughout (as required)	Impacts on traffic and transportation	To minimise the impacts of importation of construction materials, a proportion of site-won materials generated during the works will be re-used within the project area. Where importation of fill is necessary, imported materials will be sourced from reputable quarries within the EMWR.	C
WR-6	Chapter 19: Material Assets: Resource & Waste Management section 19.5.2	Throughout (as required)	Impacts on the environment	The appointed Construction Contractor will be responsible for the update and implementation of the Construction Environmental Management Plan. compliant management of all waste generated by construction activities.	C
WR-7	Chapter 19: Material Assets: Resource & Waste Management section 19.5.2.2	Throughout (as required)	Impacts on the environment	The Contractor will update and implement the Construction & Demolition Resource and Waste Management Plan (C&D RWMP) with site specific information on how waste arisings will be controlled and managed.	PC
WR-8	Chapter 19: Material Assets: Resource & Waste Management section 19.5.2.3	Throughout (as required)	Impacts on soil	Excavated material will be properly managed and stored to reduce impacts associated with storage of soil and stone. Different types of excavated material will be stored separately, i.e., where applicable, made ground will be stockpiled separate to soils and subsoils, which will be stockpiled separate to rock.	C

Mitigation Number	EIAR Section Reference	Location	Impacts	Description of Mitigation or Monitoring Measure / Environmental Commitment	Implementation Stage
WR-9	Chapter 19: Material Assets: Resource & Waste Management section 19.5.2.3	Throughout (as required)	Impacts on soil	Contaminated soil will be stockpiled separately to minimize the risk of cross contamination	C
WR-10	Chapter 19: Material Assets: Resource & Waste Management section 19.5.2.3	Throughout (as required)	Impacts on soil	Waste to be removed from site will be transported by vehicles with a valid Waste Collection Permit. All waste removed will be sent to a suitably licensed, permitted or registered waste facility for compliant handling and recovery or disposal.	C
WR-11	Chapter 19: Material Assets: Resource & Waste Management section 19.5.2.3	Throughout (as required)	Impacts on soil	Material that cannot be re-used as part of the on-site works and require transfer off site, will be considered a by-product under Article 27 of the European Communities (Waste Directive) Regulations 2011.	C
WR-12	Chapter 19: Material Assets: Resource & Waste Management section 19.5.3	Throughout (as required)	Impacts on the environment	The assessment of any environmental impacts and effects associated with materials and waste during maintenance or any large-scale future renewal or improvement works, will be undertaken by the future Operator in accordance with all legal and other necessary requirements. The future Operator will be required to be accredited to ISO 14001 Environmental Management Systems (or similar) for the operation and maintenance of the proposed Scheme.	O
WR-13	Chapter 19: Material Assets: Resource & Waste Management section 19.5.3	Throughout (as required)	Impacts on the environment	The Operator will prepare Operational waste plans to ensure that the aims of the Sustainability Plans are met. The Operator will be required to have a Sustainability Plan which will be linked to the ISO 14001 accreditation (or similar).	O
ACHM-1	Chapter 20: Cultural Heritage section 20.5.1	Throughout (as required)	Impacts on archaeological elements	In accordance with the TII Code of Practice for Archaeology, a TII Project Archaeologist has been appointed to oversee and manage the archaeological elements of the proposed Scheme. All archaeological consultants appointed to the proposed Scheme shall comply with the TII Code of Practice and shall liaise directly with the TII Project Archaeologist in relation to all archaeological requirements.	PC

Mitigation Number	EIAR Section Reference	Location	Impacts	Description of Mitigation or Monitoring Measure / Environmental Commitment	Implementation Stage
ACHM-2	Chapter 20: Cultural Heritage section 20.5.1	Throughout (as required)	Impacts on archaeological elements	All Contractors and Cultural Heritage consultants appointed to the proposed Scheme shall comply with the TII Luas Finglas Cultural Heritage Strategy which will be prepared and agreed with the MHLGH in advance of receipt of an ERO	PC
ACHM-3	Chapter 20: Cultural Heritage section 20.5.2.2	Throughout (as required)	Impacts on archaeological elements	All archaeological investigations, including test excavations, preservation by record (excavation) and archaeological monitoring, will be undertaken by a suitably qualified archaeologist in accordance with a Section 26 (2) Excavation Licence	C
ACHM-4	Chapter 20: Cultural Heritage section 20.5.2.3	Throughout (as required)	Impacts on archaeological elements	Preliminary and final report on findings must be developed to fulfil licence conditions. Reporting requirements will be included in the Cultural Heritage Strategy and contract documents as produced by the TII Project Archaeologist.	C
ACHM-5	Chapter 20: Cultural Heritage section 20.6.2	Throughout (as required)	Impacts on archaeological elements	Mitigation measures which may be undertaken prior to and during the Construction Phase include: <ul style="list-style-type: none"> ▪ Full measured, written, drawn and photographic surveys; ▪ Detailed construction methodology (demolition, removal, storage, relocation/reinstatement, rebuilding, repair and rehabilitation of archaeological and cultural heritage monuments; appropriate screening; monitoring of vibration); ▪ Dive, underwater and wade surveys (including metal detecting); ▪ Geophysical surveys; ▪ Archaeological test excavations (including metal detecting); ▪ Archaeological monitoring (including metal detecting); and ▪ Preservation by record (Archaeological excavation). 	C
ACHM-6	Chapter 20: Cultural Heritage section 20.6.2	River Tolka	Impacts on archaeological elements	Archaeological monitoring will be carried out during enabling and construction works. Should archaeological remains be confirmed, further archaeological mitigation such as preservation in situ or full archaeological excavation will be required.	C
ACHM-7	Chapter 20: Cultural Heritage section 20.6.2	Tolka valley Park	Impacts on heritage constraints	Archaeological monitoring will be carried out during enabling and construction works at the locations of cultural heritage constraints within this area.	C

Mitigation Number	EIAR Section Reference	Location	Impacts	Description of Mitigation or Monitoring Measure / Environmental Commitment	Implementation Stage
				Should archaeological remains be confirmed, further archaeological mitigation such as preservation in situ or full archaeological excavation will be required.	
ACHM-8	Chapter 20: Cultural Heritage section 20.6.2	Broome Bridge, Finglaswood Bridge, Royal Canal and towpath, St. Helena House and King Williams Rampart South Section	Impacts on heritage constraints	The visual impact on the settings of Broome Bridge (CHC 6), Finglaswood Bridge (CHC 13), Royal Canal and towpath (CHC 8 and CHC 9), St. Helena House (CHC 20) and King Williams Rampart South Section (CHC 24) will be mitigated by the preparation of a full written and photographic record of the existing setting of these constraints prior to the commencement of construction.	C
ACHM-9	Chapter 20: Cultural Heritage section 20.6.2	Broome Bridge, Finglaswood Bridge, Royal Canal and towpath, St. Helena House and King Williams Rampart South Section	Impacts on heritage constraints	The visual impact on the settings of Broome Bridge (CHC 6), Finglaswood Bridge (CHC 13), Royal Canal and towpath (CHC 8 and CHC 9), St. Helena House (CHC 20) and King Williams Rampart South Section (CHC 24) will be mitigated by the preparation of a full written and photographic record of the existing setting of these constraints prior to the commencement of construction.	PC
ACHM-10	Chapter 20: Cultural Heritage section 20.6.2	Canal and Railway Bridge: Broome Bridge, Canal: Royal Canal towpath, Bridge: Finglaswood Bridge	Impacts on heritage constraints	The indirect impact on the setting of this constraint will be mitigated by pre-works recording and the sensitive design of the proposed Scheme	O
LVA-1	Chapter 21: Landscape and Visual Amenity section 21.5.1.4	Royal canal	Impacts on Landscape	Public Realm measures include a new bus set down area, tree planting and seating within the footpath area, a new covered bike parking area, retention of existing tree and screen planting bordering the track and ramps either side of the Canal Ecological mitigation will include reinstatement of canal side vegetation, Primary Design Mitigation Measure H-Vegetation Reinstatement.	C
			Visual Impacts	<ul style="list-style-type: none"> Fast growing, evergreen, columnar tree planting will be planted either in the northwest corner of the Broombridge Luas Stop within the amenity grass, or directly in front of the residential properties on the footpath at the corner of Broombridge Road and Bannow Road. 	PC / C

Mitigation Number	EIAR Section Reference	Location	Impacts	Description of Mitigation or Monitoring Measure / Environmental Commitment	Implementation Stage
				<ul style="list-style-type: none"> Further liaison with the residents of R003 Bannow Road will be carried out to determine if this screening measure is preferred. 	
LVA-2	Chapter 21: Landscape and Visual Amenity section 21.5.1.5	Broombridge Road/Industrial Estate	Impacts on landscape	<p>Along the Broombridge Road corridor, there will be a cycle lane and a separate tree-lined footpath on the western side, this is included as Primary Design Mitigation Measure J- Streetscape Planting and Measure Q- Public Realm. These measures will act as a planted buffer between road, cycle path and footpath, to aid traffic calming and to highlight safe crossing points and improve the streetscape quality.</p> <ul style="list-style-type: none"> The proposed roadside avenue trees are Mitigation Measure L-Tree Strategy, will reinforce the Key Landscape Feature of this character area Primary Design Mitigation M-Biodiversity with pollinator friendly plant mixes. The Primary Design includes over two thirds of the track as green track in this character area as Primary Design Mitigation I-Track Vegetation. <p>The detailing of abutment walls of the proposed Luas bridge adjacent to footpaths is included as Primary Design Mitigation Q-Public Realm enhancements to create improvements at a pedestrian scale.</p>	C
			Visual Impacts	<p>Measures incorporated within the proposed Scheme to reduce visual impacts for people working in Broombridge Road / Industrial Estate R006-R016 include Primary Design Mitigation Measure U-Boundary Treatment Typologies; the typologies have been agreed with local commercial stakeholders.</p> <p>These measures combined with the streetscape proposals Q-Public Realm enhancements to create improvements at a pedestrian scale maintain the channelled view towards the Tolka Valley Park in a northerly direction will mitigate visual obstruction for workers in this location</p>	C
LVA-3	Chapter 21: Landscape and	Tolka valley park	Impacts on landscape	Mitigation G-Vegetation Removal to minimise the removal of healthy trees, there will be Mitigation Measure H-Vegetation Reinstatement of the Integrated Constructed Wetlands after	PC / C / O

Mitigation Number	EIAR Section Reference	Location	Impacts	Description of Mitigation or Monitoring Measure / Environmental Commitment	Implementation Stage
	Visual Amenity section 21.5.1.6			<p>construction of the proposed bridge and replacement of amenity grassland.</p> <ul style="list-style-type: none"> Primary Design Mitigation I–Track Vegetation and Mitigation J–Streetscape Planting to create a planted buffer between track, pedestrian and bicycle within the park and safety will be reinforced by the inclusion of Mitigation R–Trackside Safety Lighting and using LRT timber bollards to further delineate the green track perimeter and the LRV swept path Mitigation T–SuDS drainage methods will be implemented through the park to promote sustainable drainage methods Mitigation Measure V–Barrier Boundary Treatment and the inclusion of anti-trespass measures and wheel traps at park entrances to prevent anti-social wheeled access There will be minimal lighting within the park (Measure W–Light Mitigation for Wildlife) in accordance with DCC lighting policy, to avoid disturbance to nocturnal species. The proposed Scheme alignment within the park will be maintained as per Mitigation Measure Z in accordance with maintenance strategies aligned with DCC Parks management objectives including monitoring of reinstatement works in public areas Ecological Mitigation - will include reinstatement of the Integrated Constructed Wetlands under the proposed Luas bridge. <p>Refer to Chapter 8 (Biodiversity) for mitigation measures.</p>	
			Visual Impacts	<p>Primary Mitigation Measures incorporated within the proposed Scheme to reduce visual impacts at this location for people using the park R017 includes green track Mitigation Measure I–Track Vegetation</p> <ul style="list-style-type: none"> Mitigation Measure Y–Lighting for Passenger Safety (Otherwise, lights will be restricted to along cycle lanes where night-time activity is required for cyclist safety and Measure W–Light Mitigation for Wildlife, to minimise light emission in locations where sensitive habitats and nocturnal 	C

Mitigation Number	EIAR Section Reference	Location	Impacts	Description of Mitigation or Monitoring Measure / Environmental Commitment	Implementation Stage
				<p>species are present to avoid disturbance i.e. no lights to be facing River Tolka where bats are present.</p> <ul style="list-style-type: none"> Mitigation Measure U-Boundary Treatment Typologies have been agreed with local stakeholders will maintain the low levels of visual impacts for industrial property owners R013-R016 on Ballyboggan Road and R019 staff of the DCC Park Depot Residents in R020- R021 will also notice Measure U-Boundary Treatment Typologies and Measure X-Light Mitigation for Residents, which avoids pollution. Local residents will still have visibility the proposed Luas bridge and OCS causing a degree of visual clutter reducing the visual amenity towards the park. <p>Refer to Chapter 8 (Biodiversity) for mitigation measures.</p>	
LVA-4	Chapter 21: Landscape and Visual Amenity section 21.5.1.7	St Helenas	Landscape Impacts	<p>Measure G-Vegetation Removal will minimise removal of existing trees in the northern part of the open space and close to St Helena's House and Measure I-Track Vegetation will maintain the soft character of the space</p> <ul style="list-style-type: none"> Mitigation Measure K-Woodland Vegetation, includes the use of native woodland to along eastern perimeter which will create visual screening for the residential area and enhance the space as an ecological corridor. Mitigation Q-Public Realm proposal at the northern end of the space will include trackside seating and resting areas to consider the site's topography (high point of the area) and take advantage of the views to the Tolka Valley Park, the urban skyline and the Wicklow mountains as well as towards the western façade of St Helena's House (Key landscape Features). Tree and shrub planting plus street furniture will create a sense of enclosure and enhance streetscape value in this character area and complement the historical setting of St Helena's Resource Centre and the adjacent Childcare Centre 	C / O

Mitigation Number	EIAR Section Reference	Location	Impacts	Description of Mitigation or Monitoring Measure / Environmental Commitment	Implementation Stage
				<ul style="list-style-type: none"> Mitigation R-Trackside Safety and the use of LRT timber bollards, will delineate the green track perimeter and the LRV swept path to increase trackside safety Measure W-Light Mitigation for Wildlife will ensure the eastern side of the open space remains unlit and dark to facilitate bat commuting routes. The LRT corridor within the park will be maintained as per Mitigation Measure Z in accordance with maintenance strategies aligned with DCC Parks management objectives including monitoring of reinstatement works in public areas <p>Refer to Chapter 8 (Biodiversity) for mitigation measures.</p>	
			Visual Impacts	<p>Primary Mitigation K-Woodland Vegetation includes the use of native woodland to along eastern perimeter will create visual screening for the residential area (R020, R025, R026, R033, R034, R035, R036, R021, R022, R023, R027, R028, R029, R030, R031, R032, R038, R039, R040 and R043).</p> <ul style="list-style-type: none"> Mitigation X- Light Mitigation for Residents, will reduce light pollution for local people. For people passing through the linear open space (R018) Mitigation L-Tree Strategy will maintain channelled views to the south and in addition to the improved visual amenity from Mitigation Q-Public Realm the visual impact For Staff and visitors in the St Helena's Childcare Centre (R042), Mitigation U -Boundary Treatment Typologies, will be applied to the 2.25m high noise barrier on the northern side of the Childcare Centre and will improve local privacy for users of this resource Secondary Mitigation AA is required at this location to soften the appearance of the wall/noise barrier and to assimilate the wall into the area. Fast growing, evergreen, flowering climbing plants will be grown against the internal and external surface of the wall. <p>Refer to Chapter 8 (Biodiversity) for mitigation measures.</p>	C / O

Mitigation Number	EIAR Section Reference	Location	Impacts	Description of Mitigation or Monitoring Measure / Environmental Commitment	Implementation Stage
LVA-5	Chapter 21: Landscape and Visual Amenity section 21.5.1.8	Farnham Park	Impacts on landscape	<p>Within Farnham Park Mitigation Measure G-Vegetation Removal will minimise the loss of healthy trees around the perimeter of the park which is a Key Landscape Feature.</p> <ul style="list-style-type: none"> The Primary Design includes green track in this character area as Primary Design Mitigation I-Track Vegetation and Mitigation J-Streetscape Planting to create a planted buffer between track, pedestrian and bicycle within the park and safety will be reinforced by the inclusion of Mitigation R-Trackside Safety Lighting and through the use of LRT timber bollards to further delineate the green track perimeter and the LRV swept path Secondary Mitigation Measures CC-Ecological Mitigation will include replacement of amenity grassland utilised by protected wintering bird species Mitigation Measure P-Open Space will ensure relocation of the established sports pitches as opposed to removal and Mitigation Measure S-Trackside Safety Fencing will provide ball stop fencing beside the LRT and the east of the sport pitches to protect LRT passage Mitigation Measure O- Connectivity between Spaces will improve movement between local spaces by provision of new footpaths and removal of fencing. Footpaths will be constructed in between the sports pitches and the trackside infrastructure <p>A cycle lane and footpath will also be constructed on the eastern side of the park. Earth mounding will create a spectator view for the sports pitches</p> <p>The LRT corridor within the park will be maintained as per Mitigation Measure Z in accordance with maintenance strategies aligned with DCC Parks management objectives including monitoring of reinstatement works in public areas</p>	PC / C / O
			Visual Impacts	<p>Mitigation G-Vegetation Removal will minimise the removal of existing trees, will maintain the screening effect of the perimeter planting for residents in R046-R049, R050, and R054</p> <p>Mitigation W-Light Mitigation for Wildlife will ensure lighting is located at pedestrian track crossing points on eastern boundary</p>	C

Mitigation Number	EIAR Section Reference	Location	Impacts	Description of Mitigation or Monitoring Measure / Environmental Commitment	Implementation Stage
				<p>to reduce light emission for sensitive habitats and nocturnal species (bats).</p> <p>Mitigation I-Track Vegetation, the use of Green Track bed treatment rather than a hard track design will minimise impacts on the visual amenity of the park for people using the open space (R044).</p> <p>Refer to Chapter 8 (Biodiversity) for mitigation measures.</p>	
LVA-6	Chapter 21: Landscape and Visual Amenity section 21.5.1.9	Wellmount Road	Impacts on Landscape	<p>Mitigation Measure G-Vegetation Removal, there will be minimal removal of existing trees along Casement Road at the southern end of this character area, and additional tree planting will be concentrated on the eastern side of the proposed track to reinforce existing planting.</p> <p>Measure X-Light Mitigation for Residents and Measure W-Light Mitigation for Wildlife will ensure that proposed lighting will be restricted to one side of the track to minimise nighttime glare to maintain the dark corridors for bats.</p> <p>Measure I-Track Vegetation, will help maintain the green soft character of this linear space.</p> <p>Mitigation J-Streetscape Planting will create a planted buffer between track, pedestrian and bicycle within the linear space and safety will be reinforced by the inclusion of Mitigation R-Trackside Safety Lighting.</p> <p>Mitigation O-Connectivity between Spaces, will improve movement between local open space by provision of new footpaths and removal of fencing.</p> <p>Refer to Chapter 8 (Biodiversity) for mitigation measures.</p>	C
			Visual Impacts	<p>Mitigation Measure X-Light Mitigation for Residents, will be applied and will reduce light pollution for these residents (R051-R053, R054-R056, R057, R059, R061, R062, R069-R075) plus Mitigation I-Track Vegetation will avoid changes to visual amenity of this linear space</p>	PC / C

Mitigation Number	EIAR Section Reference	Location	Impacts	Description of Mitigation or Monitoring Measure / Environmental Commitment	Implementation Stage
				<ul style="list-style-type: none"> ▪ Mitigation U-Boundary Treatment Typologies, these have been agreed with local residents in Ravens Court (R076) and from the overlooking properties of R073-R075 on Cardiff Castle Road. ▪ Secondary Mitigation AA is required at this location to soften the appearance of the wall and to assimilate the wall into the linear park. Fast growing, evergreen, flowering climbing plants will be grown against the external surface of the wall. ▪ Further liaison with the residents of Ravens Court (R076) will be carried out to determine if planting is preferred for the internal wall finish inside the cul de sac. ▪ Mitigation I-Track Vegetation will be applied, and the use of Green Track bed treatment rather than a hard track design will minimise impacts on the visual amenity of the park for people using the open space (R060 and R063). ▪ Mitigation G-Vegetation Removal will be applied to minimise the loss of existing trees at this location. This will maintain the screening effect of the perimeter planting for receptors working in R058, R064, and R081 in combination with Mitigation J-Streetscape Planting. These measures will reduce visibility towards the proposed Scheme. <p>Refer to Chapter 8 (Biodiversity) for mitigation measures.</p>	
LVA-7	Chapter 21: Landscape and Visual Amenity section 21.5.1.10	Finglas Main Street West	Impacts on Landscape	<p>Mitigation Measures G-Vegetation Removal, this will minimise loss of existing trees along Mellows Road and will preserve the channelled view towards the prominent buildings of the Civic Offices on the northern side and the Garda station on the southern side (Key Landscape Feature).</p> <p>Mitigation Q-Public Realm will be applied and will provide streetscape enhancements, proposed street furniture including seating areas, shelters, bicycle storage and signage. Paving will comprise granite paving either side of the proposed stop and a separate tree-lined footpath. The track will be granite paved (Embedded Track) in this character area directly in front of the civic buildings, but green track elsewhere (Mitigation I-Track Vegetation).</p>	C

Mitigation Number	EIAR Section Reference	Location	Impacts	Description of Mitigation or Monitoring Measure / Environmental Commitment	Implementation Stage
				Refer to Chapter 8 (Biodiversity) for mitigation measures.	
			Visual Impacts	<ul style="list-style-type: none"> Mitigation G-Vegetation Removal will be applied in this location to minimise the loss of existing trees and will maintain the screening effect of the perimeter planting for residential receptors R077, in combination with Mitigation J-Streetscape Planting. These measures will allow visibility of the public realm improvements For receptors R082, R084, R085, R086, R083 and R086 the implementation of J-Streetscape Planting will provide a planted buffer between track, road, cycle path and footpath, to aid traffic calming and to highlight safe crossing points and allow visibility of the public realm improvements Mitigation Q-Public Realm 	C
LVA-8	Chapter 21: Landscape and Visual Amenity section 21.5.1.11	Mellowes Park	Impacts on Landscape	<p>Mitigation Measures G-Vegetation Removal, to minimise the loss of existing trees except where necessary for the track alignment and for the proposed substation access.</p> <p>Mitigation Measure P-Open Space, will be implemented to relocate open space areas and sports pitches as opposed to removal of these facilities; this will maintain a circular walk / jogging trail within the park</p> <p>Measures X-Light Mitigation for Residents, and W-Light Mitigation for Wildlife, will ensure that light emissions will be restricted to one side of the track to minimise nighttime glare and allow for dark corridors for bats</p> <p>Measure R-Trackside Safety Lighting will provide safe, lit, crossing points of Luas tracks for pedestrians and cyclists and LRT timber bollards (in park areas) to further delineate the green track perimeter and the LRV swept path. Mitigation I-Track Vegetation will help maintain the green, planted character of this linear space.</p>	C / O

Mitigation Number	EIAR Section Reference	Location	Impacts	Description of Mitigation or Monitoring Measure / Environmental Commitment	Implementation Stage
				<p>Measure S-Trackside Safety Fencing (ball stop fencing), will be implemented beside LRT along eastern boundary of park and will protect the LRT passage</p> <p>Measure T-Drainage will include SuDS attenuation areas will be incorporated along the eastern side of the park.</p> <p>The LRT corridor within the park will be maintained as per Mitigation Measure Z in accordance with maintenance strategies aligned with DCC Parks management objectives including monitoring of reinstatement works in public areas.</p> <p>Refer to Chapter 8 (Biodiversity) for mitigation measures.</p>	
			Visual Impacts	<p>Primary Mitigation L-Tree Strategy, will be applied to this park including the implementation of avenue trees, and linear planted areas which will reduce visibility of the LRT for Residents in R094-R117</p> <p>Mitigation X-Light Mitigation for Residents, will also be applied to minimise light emissions and reduce light pollution</p> <p>Primary Mitigation L-Tree Strategy, will be applied to this park including the implementation of avenue trees, and linear planted areas which will reduce visibility of the LRT for Residents in R125-127</p> <p>Mitigation X-Light Mitigation for Residents, will also be applied to minimise light emissions and reduce light pollution</p> <p>People using the open space (R065) Mitigation Measure I-Track Vegetation, will be implemented, the Green Track bed treatment rather than a hard track design, will reduce visibility of the LRT.</p> <p>Refer to Chapter 8 (Biodiversity) for mitigation measures.</p>	C
LVA-9	Chapter 21: Landscape and Visual Amenity section 21.5.1.12	Finglas Road Corridor	Impacts on landscape	<p>Mitigation Measures G-Vegetation Removal to minimise the removal of existing trees, in particular those along Casement Road that visually separate the residential area from the road corridor.</p>	C

Mitigation Number	EIAR Section Reference	Location	Impacts	Description of Mitigation or Monitoring Measure / Environmental Commitment	Implementation Stage
				<p>Measure J-Streetscape Planting will be applied in this area including the provision of Street trees and soft landscape areas along North Road to act as a planted buffer, to aid traffic calming and to highlight safe crossing points for pedestrians and cyclist.</p> <p>Refer to Chapter 8 (Biodiversity) for mitigation measures.</p>	
			Visual Impacts	<p>For residents in Casement Road R128-R130 the implementation of Mitigation G-Vegetation Removal will minimise the loss of existing trees, in combination with Mitigation J-Streetscape Planting along North Road, will help create visual screening for residents towards the proposed Park & Ride facility.</p> <p>Mitigation I-Track Vegetation and the use of Green Track bed treatment over a portion of the track at the road junction will reduce visible of the proposed Scheme for residents in North Road R131-R135</p> <p>Mitigation Q-Public Realm enhancements including planting, street furniture and seating areas, in combination with the removal of the roundabout and the pedestrian footbridge will create an improvement to the visual amenity of this area.</p> <p>Refer to Chapter 8 (Biodiversity) for mitigation measures.</p>	C
LVA-10	Chapter 21: Landscape and Visual Amenity section 21.5.1.13	Charlestown/St Margarets	Impacts on landscape	<p>Measure J-Streetscape Planting, the provision of street trees and soft landscape areas which will create a planted buffer between track, road, cycle path and footpath, to aid traffic calming and to highlight safe crossing points</p> <p>Measure J in combination with Measures I-Track Vegetation, Green Track bed treatment, will create streetscape improvements along the road corridor.</p> <p>Mitigation Measure Q-Public Realm will provide enhancements and street furniture including seating areas, combined with Measure U- Boundary Treatment Typologies will mitigate impacts on visual amenity by the proposed Scheme and will further improve the character of the road corridor</p>	C

Mitigation Number	EIAR Section Reference	Location	Impacts	Description of Mitigation or Monitoring Measure / Environmental Commitment	Implementation Stage
			Visual Impacts	<ul style="list-style-type: none"> ▪ Residents in R135, R138, R150, R153 -R155, R157, R159, R160-R162, R170- R171 will have their visual impacts of the proposed Scheme reduced by the implementation of Mitigation I-Track Vegetation, Green Track bed treatment, which will replace 50% of the road surface ▪ Mitigation Q-Public Realm enhancements including planting, street furniture and seating areas will also create an improvement to the visual amenity of this area ▪ Mitigation Measure U-Boundary Treatment Typologies will delineate the proposed Scheme from front gardens, but high levels of visual intrusion will remain due to the proximity of the proposed Scheme ▪ Secondary Mitigation BB is required at this location to screen the proposed Scheme and maintain privacy into the residential properties. Fast growing, evergreen, columnar tree planting will be planted either inside the front garden or in the footpath to screen visibility of the proposed Scheme. Further liaison with the residents of St Margaret's Court (R151) will be carried out to determine if this screening measure is preferred ▪ Mitigation Measure J-Streetscape Planting will provide a planted buffer between track, road, cycle path and footpath, to aid traffic calming and to highlight safe crossing points. This will benefit people using the sports pitches (R165) and reduce visibility towards the proposed Scheme ▪ Receptors working in R141-R149, R152, R156, R158, R163, R164, R166 will have reduced visual impacts from the proposed Scheme by the implementation Mitigation J-Streetscape Planting. The planted buffer between track, road, cycle path and footpath, will aid traffic calming and highlight safe crossing points and will allow visibility of the public realm improvements (Measure Q). <p>Refer to Chapter 8 (Biodiversity) for mitigation measures.</p>	C
MMM-1	Chapter 22: Risk of Major Accidents and	Throughout (as required)	Impact on critical infrastructure due to	Best practice measures for the protection of third-party assets will be specified by TII and implemented by the Contractor on site.	PC / C

Mitigation Number	EIAR Section Reference	Location	Impacts	Description of Mitigation or Monitoring Measure / Environmental Commitment	Implementation Stage
	Disasters section 22.6.2		construction works, including settlement	<p>Where the works would directly impact on an asset, diversion strategies have been developed and agreed with asset owners.</p> <p>Where the works could potentially impact on assets through ground movements associated with the works, ground movement assessments have been prepared and will be developed further by the Contractors prior to construction as agreed with the asset owner.</p> <p>Protective measures will be undertaken to keep the risk of utilities settlement to a minimum. Prior to excavation works being commenced, the latest service records will be sought, and localised confirmatory surveys will be undertaken to verify the locations of services. Where diversions, or modifications, are required to utility infrastructure, service interruptions and disturbance to the surrounding residential, commercial and/or community property may be unavoidable. Any disruption will be minimised and planned in advance by the appointed Contractor.</p> <p>Emergency accesses along the route of the proposed Scheme will be retained insofar as is possible throughout the Construction Phase. Where construction works for the proposed Scheme will interface with emergency access arrangements, the appointed Contractor will consult with the affected landowners / site operators and the emergency services to agree, where required, alternative emergency access arrangements and changes to response plans for the duration of the works</p>	
MMM-2	Chapter 22: Risk of Major Accidents and Disasters section 22.6.2	Throughout (as required)	Impacts on traffic	<p>All temporary traffic measures required during the Construction Phase are outlined in the CTMP and will be updated and implemented by the appointed Contractor.</p> <p>Designated haul routes defined in the CTMP will be followed. All HGV loads will be covered or tied securely before leaving and coming to site. Refer to the CTMP (Appendix A6.2 of EIAR).</p>	PC / C
MMM-3	Chapter 22: Risk of Major Accidents and Disasters section 22.6.2	Throughout (as required)	Impacts on water resources	<p>The CEMP and SWMP have been prepared and will be updated and implemented by the Contractor, having regard to best practice guidance.</p>	PC / C

Mitigation Number	EIAR Section Reference	Location	Impacts	Description of Mitigation or Monitoring Measure / Environmental Commitment	Implementation Stage
MMM-4	Chapter 22: Risk of Major Accidents and Disasters section 22.6.2	Throughout (as required)	Impacts on infrastructure/assets	<p>Compliance with design standards that include, but is not limited to, the following: EN 1990 Eurocode - Basis of structural design, EN 1993 Eurocode 3. Design of steel structures, EN 1993-1 Design of steel structures. General rules and rules for buildings, Degree of impact protection.</p> <p>Compliance with material standards to include, but is not limited to, the following: I.S. EN 1992-1-1:2005 (Eurocode 2, Part 1-1) – Design of concrete structures – General rules and rules for buildings.; I.S. EN 1993-1-1:2005 (Eurocode 3, Part 1-1) – Design of steel structures General Rules and rules for buildings.; I.S. EN 1996-1-1:2005 (Eurocode 6, Part 1-1) – Design of masonry structures. General Rules for reinforced and unreinforced masonry structures</p>	C
MMM-5	Chapter 22: Risk of Major Accidents and Disasters section 22.6.2	Throughout (as required)	Impacts on Luas derailment	<p>Design measures accepted by the regulator (CRR) to manage risks in order for licence to be granted including. These include CRR; CRR-G-016-C Guideline for Application for Acceptance of New Light Rail Rolling Stock; and CRR-G-032-B Guideline for Application for Acceptance of New Light Rail Works or New Light Rail Rolling Stock.</p> <p>All equipment will be compliant with Electromagnetic Compatibility and Interference (EMC and EMI) standards as required under the relevant EU standards.</p> <p>Implement design and periodic inspections and maintenance as part of the Operational Strategy. Operation and maintenance manuals communicated early, robustly completed and maintained.</p> <p>Training to be provided, sufficient resources to be in place and compliance with best practice guidelines and procedures including compliance with EN 1991-1-7:2006: General Actions: Accidental Action and Road Drainage and the Water Environment (TII, 2015). Safe system of working.</p> <p>Design to appropriate environmental parameters (i.e., wind and water), including designed-in consideration of climate change including compliance with EN 1991-1-4:2005: General Actions:</p>	PC / O

Mitigation Number	EIAR Section Reference	Location	Impacts	Description of Mitigation or Monitoring Measure / Environmental Commitment	Implementation Stage
				<p>Wind Actions and International and National guidance and best practice.</p> <p>Equipment failure will be corrected as quickly as possible, and the action taken dependent on the nature of the failure.</p> <p>CCTV installation at Stops monitoring open section lines, for real-time monitoring. High integrity of safety critical functions required in reference and detailed design.</p> <p>Reinforcement of the passenger visual signalling and the security in the fencing surrounding the LRV access and the operational line.</p>	
MMM-6	Chapter 22: Risk of Major Accidents and Disasters section 22.6.2	Throughout (as required)	Fire/explosion impacts	<p>All construction materials used will be required to meet the requirements of BS EN 13501-1 Fire Classification of Construction Products and Building Elements. The constructed elements will be subject to fire testing in line with the requirements of Fire Resistance Test – General Requirements (BS EN 1363-1:2020 and EN 1992-1-2:2004 General Rules. Structural Fire Design.</p> <p>Safety features at Stops to minimise the risk of fire.</p> <p>Proposed emergency evacuation protocols will be adopted for emergency events along the railway line and at Stops.</p>	C / O
MMM-7	Chapter 22: Risk of Major Accidents and Disasters section 22.6.2	Throughout (as required)	Impacts from infectious diseases	<p>An Environmental Incident Response Plan (EIRP) has been prepared as part of CEMP and will be finalised and updated by the appointed Contractor.</p> <p>All guidance, standard operating procedures and control measures issued by the Government will be strictly adhered to</p>	C / O
MMM-8	Chapter 22: Risk of Major Accidents and Disasters section 22.6.2	Throughout (as required)	Impacts from hydrological events	<p>EIRP to detail the procedures to be taken in the event of a flood. Site staff will maintain awareness of flood and weather forecasts on an ongoing basis as well as receiving warnings from Dublin City Council, Fingal County Council and Met Éireann as appropriate so advance measures can be put in place.</p> <p>Drainage design includes allowances for climate change ensuring that the proposed Scheme is protected from significant flood events. Refer to the Chapter 10 (Water).</p>	O

Mitigation Number	EIAR Section Reference	Location	Impacts	Description of Mitigation or Monitoring Measure / Environmental Commitment	Implementation Stage
				Cooperation with the relevant authorities, such as the local authorities and the OPW will be undertaken. Regular inspections and maintenance of drainage system and attenuation ponds will be undertaken.	
CIEI-1	Chapter 24: Cumulative Impacts section 24.6	Throughout (as required)	Impacts on stakeholders	The appointed Contractor will ensure appropriate construction planning of the proposed Scheme and other nearby developments to prevent potential cumulative impacts of general construction developments on communities, infrastructure and the environment	PC
CIEI-2	Chapter 24: Cumulative Impacts section 24.6	Throughout (as required)	Impacts on stakeholders	The appointed Contractor will adhere to the details of the CEMP, Traffic Management Plan as well as mitigation and monitoring measures outlined in Chapter 25 (this chapter) to ensure that potential negative impacts are avoided or reduced.	C / O

Table A6 1-6: NIS Mitigations (Construction Stage)

NIS Reference	Sub-Section	Location	Description of Mitigation or Monitoring Measure/ Environmental Commitment	Implementation Stage
7.1.1	Standard environmental best practice	Throughout (as required)	<p>The activities required for the proposed Scheme's Construction Phase shall remain within the boundary of the proposed site, bar select compound areas, which will be located in adjacent lands for mitigation control reasons. The CEMP will also strictly adhere to best practice environmental guidance including but not limited to the following:</p> <ul style="list-style-type: none"> ▪ CIRIA Guidance C532: Control of water pollution from construction sites. Guidance for consultants and contractors. (CIRIA, 2019 - www.ciria.org); ▪ CIRIA Guidance C741: Environmental good practice on site guide (Charles & Edwards, 2015; CIRIA, 2019 - www.ciria.org); ▪ CIRIA Guidance C750D: Groundwater control: design and practice (Preene et al., 2016; CIRIA, 2019 - www.ciria.org); ▪ CIRIA (C512): Environmental Handbook for Building and Civil Engineering Projects (CIRIA, 2000); ▪ CIRIA (C697): The SUDS Manual (CIRIA, 2015); ▪ CIRIA (C649) Control of water pollution from linear construction projects: Site guide (CIRIA 2006a); ▪ CIRIA (C848): Control of water pollution from linear construction projects: Technical guidance (CIRIA, 2006b); 	C

NIS Reference	Sub-Section	Location	Description of Mitigation or Monitoring Measure/ Environmental Commitment	Implementation Stage
			<ul style="list-style-type: none"> ▪ Inland Fisheries Ireland: Guidance on Protection of Fisheries During Construction Works In and Adjacent to Waters (IFI, 2016); and ▪ Inland Fisheries Ireland: A Guide to the Protection of Watercourses through the use of Buffer Zones, Sustainable Drainage Systems, Instream Rehabilitation, Climate / Flood Risk and Recreational Planning (IFI, 2020) 	
7.1.2	Compound environmental management	Throughout (as required)	<p>The construction contractor will be required to ensure good environmental management within the site compounds set up along the length of the proposed Scheme. The below list of measures will be incorporated into site compound environmental management:</p> <p>Site compounds will not be set up within Flood Zone A or B lands in accordance with the Office of Public Works (OPW) 'Planning System and Flood Risk Management Guidelines' (2009);</p> <p>Site compounds will not be located within core foraging areas utilised by wintering QI bird species;</p> <p>Only plant and materials necessary for the construction of the works will be permitted to be stored at the compound location;</p> <p>Site establishment by the contractor will include the following:</p> <ul style="list-style-type: none"> ▪ Site offices; ▪ Site facilities (canteen, toilets, drying rooms, etc.); ▪ Office for construction management team; ▪ Secure compound for the storage of all on-site machinery and materials; ▪ Temporary car parking facilities; ▪ Temporary fencing; ▪ Site Security to restrict unauthorized entry; <p>All sub-contractors will be given induction toolbox talk so that they are aware of material storage arrangements;</p> <p>Construction materials within the compound will be stored in a designated area in an organised manner so as to protect them from accidental damage and deterioration as a result of exposure;</p> <p>Bunded storage of fuels and refuelling area. Bunds shall be 110% capacity of the largest vessel contained within the bunded area;</p> <p>A separate container will be located in the contractor's compound to store absorbents used to contain spillages of hazardous materials. The container will be clearly labelled, and the contents of the container will be disposed of by a licenced waste contractor at a licenced site. Records will be maintained of material taken off site for disposal;</p>	C

NIS Reference	Sub-Section	Location	Description of Mitigation or Monitoring Measure/ Environmental Commitment	Implementation Stage
			<p>A maintenance programme for the bunded areas will be managed by the site environmental manager. The removal of rainwater from the bunded areas will be their responsibility. Records will be maintained of materials taken off site for disposal;</p> <p>The site environmental manger will be responsible for maintaining all training records and weekly environmental inspections;</p> <p>Drainage collection system for washing area to prevent run-off into surface water system;</p> <p>Stockpiling of spoil and spoil-like materials will be appropriately located within the compounds to minimise exposure to prevailing winds; and</p> <p>All refuelling of vehicles will be carried out at the fuel stores within the main site compound and only ADR-trained personnel will be permitted to operate fuel bowsers.</p>	
7.1.3	General mitigation measures ensuring the protection of surface water, groundwater and air quality throughout the proposed Scheme site	Throughout (as required)	<p>Surface Water Management Plan, in order to safeguard the local surface water network, and in turn the local groundwater network, from surface water-based pollution events, the following must be strictly adhered to:</p> <p>The construction contractor will ensure compliance with environmental quality standards specified in the relevant legislation, namely European Communities (Environmental Objectives (Surface Waters)) Regulations, 2009 (S.I. No. 272 of 2009 and amendments), and the European Communities (Quality of Salmonid Waters) Regulations, 1988 (S.I. No. 293 of 1988);</p> <p>Oil booms and oil soakage pads should be maintained on-site to enable a rapid and effective response to any accidental spillage or discharge. These shall be disposed of correctly and records will be maintained by the environmental manager of the used booms and pads taken off site for disposal;</p> <p>Management of silt-laden water on-site, including procedures for accidental leaks / spills to ground, as well as water quality monitoring to ensure compliance with environmental quality standards specified above;</p> <p>At no point during the construction phase will treat water be discharged to local surface water network without the water quality meeting the statutory limits as set under the environmental quality standards specified above;</p> <p>Fail-safe site drainage and bunding through drip trays on plant and machinery will be provided to prevent discharge of chemical spillage from the sites to surface water;</p> <p>To prevent the spread of any accidental discharge into the surface water network, oil booms will be on hand when construction activities are located beside aquatic habitats in order to control and minimise the spread of the spill;</p> <p>Washout of concrete plant will occur at a designated impermeable area with waste control facilities;</p>	C

NIS Reference	Sub-Section	Location	Description of Mitigation or Monitoring Measure/ Environmental Commitment	Implementation Stage
			<p>Wherever reasonably possible, pre-cast concrete bridge features should be utilised to minimise the risk of a concrete-based pollution event;</p> <p>Concrete delivery, concrete pours and related construction methodologies will be part of the procedure agreed with the contractor to mitigate any possibility of spillage or contamination of the local environment. Particular attention will be paid during the pouring process in order to avoid leakages or spills of concrete;</p> <p>Temporary stockpiles will be monitored for leachate generation. These stockpiles will be placed within designated areas and not located within the vicinity of watercourses, wetlands or artificial surface water drainage features;</p> <p>Excavated contaminated soils (most likely present Tolka Valley Park) will be segregated and securely stored in a designated area where the possibility of runoff generation or infiltration to ground or surface water drainage has been eliminated through bunding and imperviable geotextile linings. The contaminated soils will then be classified as clean, inert, non-hazardous or hazardous in accordance with the EC Council Decision 2003/33/EC. Furthermore, the contractor will ensure that no cross-contamination with clean soils happens elsewhere throughout the proposed Scheme site;</p> <p>Silt fencing will be installed prior to the commencement of any construction works in order to enhance the protection of identified water features (River Tolka, Tolka Valley Park wetlands and Royal Canal). Shallow interceptor trenches will be installed in front of these silt fences where possible, as there are space and depth constraints within certain areas of Tolka Valley Park. An Ecological Clerks of Works (ECoW) will be present during the installation of these protective measures to ensure that they are installed to best practice standard and correctly located in their assigned areas. The following sub-section (7.1.4) will provide greater detail on specific locations of these silt fence / trench sections; and</p> <p>Silt fences will be repaired and/or replaced as necessary by the contractor as part of the on-going environmental monitoring programme.</p>	
7.1.3	General mitigation measures (as above)	Throughout (as required)	<p>Protection of Surface Water, Groundwater and Air Quality</p> <p>In order to protect surface water, groundwater and air quality throughout the proposed Scheme site, the contractor will be required to develop and implement a Surface Water Management Plan, Pollution Control Plan and Dust Management Plan. The minimally required list of mitigations measures outlined below will be incorporated into these plans.</p>	C
7.1.3	General mitigation measures (as above)	Throughout (as required)	<p>Pollution Control Plan</p> <p>Spill kits containing absorbent pads, granules and booms will be stored in the site compound with easy access for delivery to site in the case of an emergency. A minimum stock of spill kits will be maintained at all times and site forepersons' vehicles will carry large spill kits at all times.</p>	C

NIS Reference	Sub-Section	Location	Description of Mitigation or Monitoring Measure/ Environmental Commitment	Implementation Stage
			<p>Absorbent material will be used with pumps and generators at all times and used material disposed of in accordance with the Waste Management Plan. All used spill materials e.g., Absorbent pads, will be placed in a bunded container in the contractor's compound. The material will be disposed of by a licenced waste contractor at a licenced facility. Records will be maintained by the environmental site manager.</p> <p>Regular inspections and maintenance of plant and machinery checking for leaks, damage or vandalism will be made on all plant and equipment.</p> <p>In the event of a spill the contractor will ensure that the following procedure are in place:</p> <p>Emergency response awareness training for all personnel on-site works.</p> <p>Appropriate and sufficient spill control materials will be installed at strategic locations within the site. Spills kits for immediate use will be kept in the cab of mobile equipment.</p> <p>Spill kits must include suitable spill control materials to deal with the type of spillage that may occur and where it may occur. Typical contents of an on-site spill kit will include the following as a minimum:</p> <ul style="list-style-type: none"> ▪ Absorbent granules; ▪ Absorbent mats/cushions; ▪ Absorbent booms ▪ Track-mats, geotextile material and drain covers. <p>All potentially polluting substances such as oils and chemicals used during construction will be stored in containers clearly labelled and stored with suitable precautionary measures such as bunding within the site compound;</p> <p>All tank and drum storage areas on the site will, as a minimum, be bunded to a volume not less than the following:</p> <p>110% of the capacity of the largest tank or drum within the bunded area, or 25% of the total volume of substances which could be stored within the bunded area.</p> <p>All hydrocarbons to be utilised during construction are to be appropriately handled, stored and disposed of in accordance with the TII document 'Guidelines for the crossing of watercourses during the construction of National Road Schemes' (NRA, 2008);</p> <p>The site compound fuel storage areas and cleaning areas will be rendered impervious and will be constructed to ensure no discharges will cause pollution to surface or ground waters;</p> <p>Designated locations for refuelling are within site compound;</p> <p>Potentially contaminated run off from plant and machinery maintenance areas will be managed within the site compound surface water collection system;</p>	

NIS Reference	Sub-Section	Location	Description of Mitigation or Monitoring Measure/ Environmental Commitment	Implementation Stage
			Damaged or leaking containers will be removed from use and replaced immediately.	
7.1.3	General mitigation measures (as above)	Throughout (as required)	<p>Dust Management Plan</p> <p>The following measures will be implemented to prevent excavation- and cement-based dusts entering the local surface water network and QI supporting ex-situ habitats:</p> <p>Limit the breaking of the topsoil or earth stripping from occurring during dry and windy weather;</p> <p>Wheel washing of vehicles leaving the site, covering of fine dry loads or spraying of loads prior to exiting the site, and if necessary regular cleaning of public roads in the vicinity of the entrance;</p> <p>The utilisation of pre-cast concrete features will minimise the generation of the concrete-based dusts throughout the proposed Scheme site; and</p> <p>Stockpiling of spoil and spoil-like materials will be appropriately located and covered and/or sprayed where possible to minimise exposure to prevailing winds, which will in turn minimise the generation of dust within the site.</p>	C
7.1.4	Area 30	S30.1: Broombridge Stabling Site	Area specific mitigation measures are not required for Area 30 - S30.1: Broombridge Stabling Site during the Construction Phase, given its lack of surface water connection to local watercourses and its unsuitability for utilisation by flocks of QI bird species. The standard guidance and plans listed in sub sections 7.1.1, 7.1.2 and 7.1.3 will prove sufficient to address the required level mitigation need in this area.	
7.1.4	Area 31	S31.1: Broombridge to Tolka Valley Park (including Rail Overbridge)	<p>In addition to the standard guidance and plans listed in sub sections 7.1.1, 7.1.2 and 7.1.3, the Broombridge to Tolka Valley Park (including Rail Overbridge) section requires specific surface water run-off control measures to ensure that pollutants do not enter the surface water pathway connecting the site to the Natura 2000 sites during site enabling and bridge construction works.</p> <p>This section will require the installation of geotextile sandbag barriers to protect the Royal Canal and its bankside vegetation. See Chapter 9 of this EIAR for the indicative locations of these proposed geotextiles sandbag barriers, the locations of which may be relocated provide there is acceptable rationale backing the relocation, as well as assurance that the functional integrity of the mitigation measures is not compromised. Figure 7-2 also highlights the indicative location of this section's site compound away from the canal. The local topography will help ensure no surface water from the compound reaches the canal.</p> <p>An ECoW will be present throughout the enabling and construction works in this section given the sensitivity of the habitats in this location, and the Royal Canal's status as surface water pathway to the Dublin Bay Natura 2000 sites</p>	C

NIS Reference	Sub-Section	Location	Description of Mitigation or Monitoring Measure/ Environmental Commitment	Implementation Stage
7.1.4	Area 31	S31.2: Tolka Valley Park Bridge	<p>Prior to commencement of the enabling works in this area, a series of biosecurity measures will have to be undertaken to prevent spread of invasive species, namely Japanese Knotweed, Himalayan Balsam and potentially Giant Hogweed as well. Japanese Knotweed is present along the right (South) bank of the River Tolka, in location which will place it within the immediate vicinity of the proposed bridge's southern abutment. Himalayan Balsam is present on both banks but closer to the water's edge and not in the immediate vicinity of the works. There is the potential for Giant Hogweed seeds to be present in both banks. While not listed on Third Schedule list of the European Communities (Birds and Natural Habitats) Regulations 2011 [S.I.477/2011], the invasive Butterfly-bush present in this area should also be removed in the interest of the site's native floral composition.</p> <p>The mitigation measures for invasive species will utilise the below best practice management guidance documents, where relevant; and are to be reference within the project's Invasive Species Management Plan:</p> <p>The Management of Invasive Alien Plant Species on National Roads – Technical Guidance (TII, 2020a);</p> <p>The Management of Invasive Alien Plant Species on National Roads – Standard (TII, 2020b);</p> <p>Invasive Species Ireland (ISI) - Best Practice Management Guidelines for Japanese Knotweed (ISI, 2008a);</p> <p>Invasive Species Ireland - Best Practice Management Guidelines for Himalayan Balsam (ISI, 2008b);</p> <p>Invasive Species Ireland - Best Practice Management Guidelines for Giant Hogweed (ISI, 2008c); and</p> <p>Inland Fisheries Ireland - Biosecurity Protocol for Field Survey Work (IFI, 2010).</p> <p>Listed below is a brief detailing of necessary measures to be undertaken to ensure biosecurity within this section of the proposed Scheme, all of which will need to be included within the proposed Scheme's Invasive Species Management Plan:</p> <p>An updated invasive species baseline survey, conducted prior to the commencement of the proposed Scheme's enabling works. This updated baseline is required as invasive species may have continued to spread within and adjacent to the proposed Scheme's site since the last invasive species or habitat survey was conducted on-site;</p> <p>As per TII guidance (TII, 2020a), this additional invasive species survey will include detailed maps of the precise location of each individual invasive species plant, as well as photos of these specific locations;</p>	C

NIS Reference	Sub-Section	Location	Description of Mitigation or Monitoring Measure/ Environmental Commitment	Implementation Stage
			<p>The pre-construction surveys will be undertaken by suitable experts with competence in identifying the species concerned;</p> <p>The adherence to a set of biosecurity measures, including:</p> <ul style="list-style-type: none"> the fencing off / demarcating of the individual invasive species; communicating the location, risk and hazards associated with invasive species to construction personnel (e.g., Giant Hogweed); identifying dedicated access points into and out of fenced-off areas; the installation of designated decontamination facilities (where appropriate), protocols around the storage of infested soils; and seed and fragment checks on boot, tyres and tracks entering and leaving the work site. <p>Best practice measures for the treatment of soils contaminated with invasive species (including potential seeds and fragments of mature plants) to prevent the accidental spread of said invasive species;</p> <p>As required by law, licences for the disposal of contaminated materials will be obtained, as well as the utilisation of licensed facilities;</p> <p>In regard to the importation of soil and other materials, the CAontractor will only utilise traceable topsoil for landscaping that has been cleared of any invasive species material;</p> <p>Measures to be implemented during the application of herbicides – Commitment to the appointment of a suitably qualified/registered/licensed pesticides advisor for any works requiring the use of pesticides, and safety precautions for consideration in the use of pesticides near watercourses.</p> <p>Areas which contained invasives species, where invasives were treated on-site or removed, prior to the enabling and construction works will require an on-going post-construction monitoring programme to ensure that there is no reestablishment of any invasive species within these areas.</p>	
7.1.4	Area 31	S31.2: Tolka Valley Park Bridge	<p>Surface Water Mitigations</p> <p>In addition to the standard guidance and plans listed in sub sections 7.1.1, 7.1.2 and 7.1.3, the Tolka Valley Bridge section requires specific surface water run-off control measures to ensure that pollutants do not enter the surface water pathway connecting the site to the Natura 2000 sites.</p> <p>Following the treatment and removal of the invasive species from this section of the works, this section will require the installation of silt fences and geotextile sandbag barriers to protect the Tolka Valley Park ICWs and Pond, and the River Tolka. See Chapter 9 of this EIAR for the indicative locations of these proposed silt fences and geotextiles sandbag barriers, the locations</p>	C

NIS Reference	Sub-Section	Location	Description of Mitigation or Monitoring Measure/ Environmental Commitment	Implementation Stage
			<p>of which may be relocated provide there is acceptable rationale backing the relocation as well as assurance that the functional integrity of the mitigation measures is not compromised.</p> <p>An ECoW will be present throughout the enabling and construction works in this section given the sensitivity of the habitats in this location, and the River Tolka's status as a surface water pathway to the Dublin Bay Natura 2000 sites. The ECoW will be key overseer for when the surface water barriers (silt fences and geotextile sandbag barriers) are adjusted for the works on the creation of the bridge abutments; and the construction of the bridge's temporary falsework.</p>	
7.1.4	Area 31	S31.3: Tolka Valley Park to Tolka Valley Road	<p>The remainder of the Tolka Valley Park area / section will require the installation of silt fences and geotextile sandbag barriers to safeguard the Tolka Valley Park ICWs and Pond, and the River Tolka. See Chapter 9 of this EIAR for the indicative locations of these proposed silt fences and geotextiles sandbag barriers, the locations of which may be relocated provide there is acceptable rationale backing the location as well as assurance that the functional integrity of the mitigation measures is not compromised. Figure 7-4 in Chapter 9 of this EIAR also displays the location of this section's site compound.</p> <p>The standard guidance and plans listed in sub sections 7.1.1, 7.1.2 and 7.1.3 will also be required in order to protect the surface water and groundwater networks, as well as the health of amenity grassland habitats utilised by the QI bird species.</p> <p>An ECoW will be regularly present on-site during the works to ensure that all the prescribed mitigation measures are being strictly adhered to.</p>	C
7.1.4	Area 32	S32.1: Tolka Valley Road to St Helena's Road	<p>Seasonal construction constraints are required in order to mitigate for the risk of disturbance to QI bird species during the winter period within the amenity grasslands (West Farnham area - Western playing pitches and East Farnham area - Erin Isle GAA pitches), located within and adjacent to the proposed Scheme. Given that up to 64.59% of North Bull Island SPA's Light-bellied Brent Goose population, as well as smaller flocks of other QI species (Black-headed Gull, Herring and Curlew), can be present within the Farnham area during the high frequency utilisation months (December to February inclusive), a minimum disturbance buffer of 200m from the identified core foraging areas will be in place throughout these months (see Figure 7-5 bin Chapter 9 of this EIAR). This will mean that no enabling or construction works will be conducted within this 200m buffer for these months. This disturbance buffer (enabling construction work exclusion buffer) is reduced to minimum of 100m during the low frequency foraging months, namely October to November, and March to April. Works north of Wellmount Road can be conducted without any seasonal restrictions.</p> <p>The standard guidance and plans listed in sub sections 7.1.1, 7.1.2 and 7.1.3 will also be required in order to protect the health of amenity grassland habitats utilised by the QI bird species.</p>	C

NIS Reference	Sub-Section	Location	Description of Mitigation or Monitoring Measure/ Environmental Commitment	Implementation Stage
7.1.4	Area 32	S32.2: St Helena's Road to Cardiff Castle Road	Similarly, to the Tolka Valley Road to St Helena's Road section, Area 32 - S32.2 will also be required to follow the seasonal restrictions on enabling and construction works within the Farnham area (see Figure 7-5 in Chapter 9 of this EIAR). This will mean that no enabling or construction works will be conducted within this 200m buffer between the months of December to February inclusive. This disturbance buffer (enabling construction work exclusion buffer) is reduced to minimum of 100m during the low frequency foraging months, namely October to November, and March to April. Works south of St Helena's Drive can be conducted without any seasonal restrictions. The standard guidance and plans listed in sub sections 7.1.1, 7.1.2 and 7.1.3 will also be required in order to protected the health of amenity grassland habitats utilised by the QI bird species	C
7.1.4	Area 32	S32.3: Finglas Village and Finglas Village Stop	Area specific mitigation measures are not required for Area 32 - S32.3: Finglas Village and Finglas Village Stop during the Construction Phase, given its lack of surface water connection to local watercourses and its unsuitability for utilisation by flocks of QI bird species. The standard guidance and plans listed in sub sections 7.1.1, 7.1.2 and 7.1.3 will prove sufficient to address the required level mitigation needed in this area.	C
7.1.4	Area 33	S33.1: Mellowes Park	While Mellowes Park supports Black-headed Gull, Herring Gull and Common Gull, these species were only observed occasionally and in low numbers, as result the park has not been deemed a core wintering bird foraging area. Therefore, it has been deemed that Area 33 - S33.1 Mellowes Park will not require specific mitigations during the Construction Phase, given its lack of surface water connection to local watercourses and its limited capacity to support three of the QI bird species. The standard guidance and plans listed in sub sections 7.1.1, 7.1.2 and 7.1.3 will prove sufficient to address the required level mitigation needed in this area.	C
7.1.4	Area 33	S33.2: R135/R104 junction	Area specific mitigation measures are not required for Area 33 - S33.2: R135/R104 junction during the Construction Phase, given its lack of surface water connection to local watercourses and its unsuitability for utilisation by flocks of QI bird species. The standard guidance and plans listed in sub-sections 7.1.1, 7.1.2 and 7.1.3 will prove sufficient to address the required level mitigation needed in this area.	C
7.1.4	Area 33	S33.3: St Margaret's Stop	Area specific mitigation measures are not required for Area 33 - S33.3: St Margaret's Stop during the Construction Phase, given its lack of surface water connection to local watercourses and its unsuitability for utilisation by flocks of QI bird species. The standard guidance and plans listed in sub sections 7.1.1, 7.1.2 and 7.1.3 will prove sufficient to address the required level mitigation needed in this area.	C
7.1.4	Area 33	S33.4: St Margaret's Road	Area specific mitigation measures are not required for Area 33 - S33.4: St Margaret's Road and Charlestown Terminus during the Construction Phase, given its lack of surface water connection	C

NIS Reference	Sub-Section	Location	Description of Mitigation or Monitoring Measure/ Environmental Commitment	Implementation Stage
		and Charlestown Terminus	to local watercourses and its unsuitability for utilisation by flocks of QI bird species. The standard guidance and plans listed in sub sections 7.1.1, 7.1.2 and 7.1.3 will prove sufficient to address the required level mitigation needed in this area.	

1.8.2 General Site Management

1.8.2.1 Construction Process

The proposed Scheme is a major construction project, and it will include many types of construction activities such as utility works, demolition, site clearance, earthworks, bridge works and railway works. The following sections outline the general construction site operations.

1.8.2.2 Working Hours

The timing of construction activities, standard working hours and the rate of progress of construction works are a balance between efficiency of construction and minimising nuisance and significant effects. The contractors will require their staff and Subcontractors to adhere to the standard construction working hours.

Standard working hours, as set out in Volume 2 – Chapter 6 (Construction Activities) section 6.6, are from 07:00hrs to 19:00hrs on weekdays (excluding Bank and Public Holidays) and from 07:00hrs to 13:00hrs on Saturdays. This includes standard delivery hours to the construction sites.

Table A6 1-7: Standard Working Times

Days	Hours
Monday to Friday	07:00 hrs to 19:00 hrs (this includes a half hour to prepare site at each end, giving 11 hours working: 07:30 hrs to 18:30 hrs)
Saturday	07:00 hrs to 13:00 hrs (this includes a half hour to prepare site at each end, giving 5 hours working: 07:30 hrs to 12:30 hrs)
Sunday/Public Holidays, including annual and extraordinary events	None (only by exception, with those activities listed below under additional working hours)

The Standard working times will be included in the Works Requirements and construction will take consideration of sensitive receptors, in particular any nearby residential areas. Working hours on roads requiring lane closures will be restricted so as to minimise impact on traffic during peak traffic hours. These traffic management restrictions will be included in the Works Requirements.

Most construction activities will be undertaken during the proposed standard working hours, as outlined above, however there will be a number of activities that require working outside of these standard hours. These will include:

- Utilities, roadworks and other works affecting traffic may be extended to working outside of standard hours;
- Large structure works and concrete pours and may require working outside of standard hours.
- Track bed and track laying and associated concrete batching;
- Dewatering excavations, the pumping of groundwater will be continuous (24 hours a day, seven days a week) for the duration required for construction at each location; and
- ‘Special/abnormal’ deliveries: may require extended hours or overnight deliveries.

1.8.2.3 Construction Compounds and Access

As part of preparatory works, the construction compounds will be set up, which will include installation of the necessary facilities including the site office, welfare facilities, etc. Controlled access to the construction compounds will be implemented, fencing will be erected, and lighting will be installed. The construction compounds will be secured with Closed-Circuit Television (CCTV), to ensure safe storage of all material, plant and equipment. The construction compounds are described in Chapter 6 (Construction Activities) of the EIAR.

Temporary working areas located along the proposed alignment will be provided to aid the construction of the Works. These strips of land will be located either side of the alignment and will be used for logistics and access along the route. Temporary and permanent land-take boundaries for the proposed Scheme are detailed in Chapter 12 (Land Take) of the EIAR and in the property drawings and schedules.

Haul roads will be required to connect the Works to the public road network. These roads will be the main route for vehicles entering the site, including deliveries and arrival and departure of the workforce. The haul roads are described in Chapter 6 (Construction Activities) of the EIAR.

1.8.2.4 Good Housekeeping

The contractors will always ensure good housekeeping practices on site to prevent negative visual impacts, accidents and/or complaints from the public. This will include, but not be limited to, the following requirements:

- General maintenance of working areas and cleanliness of welfare facilities and storage areas; All contractors will be made aware of material storage arrangements at induction and through toolbox talks. Materials will be stored in a designated area in an organised manner so as to protect them from damage, deterioration and loss;
- Provision of a site layout map showing key areas such as first aid posts, material storage, spill kits, material and waste storage and welfare facilities;
- Weekly environmental inspections to identify any evidence of poor housekeeping practices;
- Maintenance of all construction plant, material and equipment and ensure these are in good order, clean and tidy;
- Keep construction compounds, access routes and designated parking areas free and clear of excess dirt, scrap wood, rubbish piles at all times;
- Details of site managers contact numbers and public information signs (including warning signs) will be provided at the boundaries of the working areas. Any complaints from the public regarding waste and housekeeping will be entered in the complaints register and actioned as required;
- Provision of appropriate welfare facilities for site personnel at all main compounds. The facilities will include canteens, toilets, showers, locker rooms and first aid posts. The facilities will be connected to the mains services and drainage, where reasonably practicable;
- Installation of appropriate security, lighting, fencing and hoarding at each working area;
- Keep hoarding and fencing free of graffiti or posters;
- Effective prevention of oil, grease or other objectionable matter being discharged from any working area;
- Provision of appropriate waste management facilities at each working area and regular collections to be arranged;
- Maintenance of wheel washing facilities and other contaminant measures as required in each working area;
- Effective prevention of infestation from pests and vermin, including arrangements for regular disposal of food and material attractive to pests;
- No discharge of site runoff or water discharge without agreements of the relevant authorities;
- Installation of fencing and signage around any known invasive species;
- Protection of any historical heritage on site;
- Maintenance of public rights of way, diversions and entry/exit areas around working areas for pedestrians and cyclists where practicable; and
- Material handling and/or stockpiling of materials/spoil, where permitted, will be appropriately located to minimise exposure to wind. Water misting or sprays will be used as required if particularly dusty activities are necessary during dry or windy periods.

1.8.3 Water and Energy Management Plan

The contractor will complete a Water and Energy Management Plan with consideration of associated impacts on the natural and built environment.

It will describe how water supply, usage and wastewater arisings will be managed during the construction stages of the proposed Scheme. Specifically, it will detail:

- Management of water supply at offices and welfare units, for wheel washing, for surface washing, for dust suppression and for concrete batching;
- Detail where water for each site will be sourced from;
- Identify strategies for minimising water use and for conserving water; and

- Identify treatment and means of disposal of wastewater at site compounds.

The plan will also consider and make commitments with regard to emissions to the atmosphere, resource usage and energy consumption during construction.

1.8.4 Dust Management Plan

The following Dust Management Plan has been prepared as part of the EIAR which provides the strategy to be adopted in order to manage dust during construction. This will be incorporated by each contractor into their Plans and implemented as part of their works. This plan and mitigation measures are in accordance with the IAQM (Institute of Air Quality Management) Guidance, with the mitigation measures proposed in accordance with the determination that the highest risk category should be applied to the Construction Phase of the proposed Scheme.

1.8.4.1 Construction Phase Mitigation Measures

Communications

- As part of stakeholder communications display the name and contact details of person(s) accountable for air quality and dust issues on the site boundary. This may be the environment manager/engineer or the site manager; and
- Display the head or regional office contact information.

Dust Management

- Dust Management to include monitoring of dust deposition, dust flux, real-time PM10 continuous monitoring and/or visual inspections.

Site Management

- Record all dust and air quality complaints, identify cause(s), take appropriate measures to reduce emissions in a timely manner, and record the measures taken;
- Make the complaints log available to the local authority when asked;
- Record any exceptional incidents that cause dust and/or air emissions, either on or offsite, and the action taken to resolve the situation in the logbook; and
- Hold regular liaison meetings with other high risk construction sites within 500 m of the site boundary if applicable, to ensure plans are co-ordinated and dust and particulate matter emissions are minimised. It is important to understand the interactions of the off-site transport/ deliveries which might be using the same strategic road network routes.

Monitoring

- Undertake daily on-site and off-site inspection, where receptors (including roads) are nearby, to monitor dust, record inspection results, and make the log available to the local authority when asked. This should include regular dust soiling checks of surfaces such as street furniture, cars and window sills within 100 m of site boundary, with cleaning to be provided if necessary;
- Carry out regular site inspections to monitor compliance with the DMP, record inspection results, and make an inspection log available to the local authority when asked; and
- Increase the frequency of site inspections by the person accountable for air quality and dust issues on site when activities with a high potential to produce dust are being carried out and during prolonged dry or windy conditions.

Preparing and maintaining the site

- Plan site layout so that machinery and dust causing activities are located away from receptors, as far as is possible;
- Erect solid screens or barriers around dusty activities or the site boundary that are at least as high as any stockpiles on site;
- Fully enclose site or specific operations where there is a high potential for dust production and the site is active for an extensive period;
- Avoid site runoff of water or mud;

- Keep site fencing, barriers and scaffolding clean using wet methods;
- Remove materials that have a potential to produce dust from site as soon as possible, unless being re-used on site. If they are being re-used on-site cover as described below; and
- Cover, seed or fence stockpiles to prevent wind whipping.

Operating vehicle/machinery and sustainable travel

- Ensure all vehicles switch off engines when stationary - no idling vehicles;
- Avoid the use of diesel- or petrol-powered generators and use mains electricity or battery powered equipment where practicable;
- Impose and signpost a maximum-speed-limit of 15 mph on surfaced and 10 mph on unsurfaced haul roads and work areas; and
- Produce a Construction Logistics Plan to manage the sustainable delivery of goods and materials.

Operations

- Only use cutting, grinding or sawing equipment fitted or in conjunction with suitable dust suppression techniques such as water sprays or local extraction, e.g. suitable local exhaust ventilation systems;
- Ensure an adequate water supply on the site for effective dust/particulate matter suppression/mitigation, using non-potable water where possible and appropriate;
- Use enclosed chutes and conveyors and covered skips;
- Minimise drop heights from conveyors, loading shovels, hoppers and other loading or handling equipment and use fine water sprays on such equipment wherever appropriate; and
- Ensure equipment is readily available on site to clean any dry spillages and clean up spillages as soon as reasonably practicable after the event using wet cleaning methods.

Waste Management

- Avoid bonfires and burning of waste materials.

The IAQM Guidance Mitigation Measures applicable to the specific works undertaken are as follows:

Measures specific to demolition

- Soft strip inside buildings before demolition (retaining walls and windows in the rest of the building where possible, to provide a screen against dust;
- Ensure effective water suppression is used during demolition operations. Handheld sprays are more effective than hoses attached to equipment as the water can be directed to where it is needed. In addition, high volume water suppression systems, manually controlled, can produce fine water droplets that effectively bring the dust particles to the ground;
- Avoid explosive blasting, using appropriate manual or mechanical alternatives; and
- Bag and remove any biological debris or damp down such material before demolition.

Measures specific to earthworks

- Re-vegetate earthworks and exposed areas/soil stockpiles to stabilise surfaces as soon as practicable;
- Use Hessian, mulches or trackifiers where it is not possible to re-vegetate or cover with topsoil, as soon as practicable; and
- Only remove the cover in small areas during work and not all at once.

Measures specific to construction

- Avoid scabbling (roughening of concrete surfaces) if possible;
- Ensure sand and other aggregates are stored in bunded areas and are not allowed to dry out, unless this is required for a particular process, in which case ensure that appropriate additional control measures are in place;
- Ensure bulk cement and other fine powder materials are delivered in enclosed tankers and stored in silos with suitable emission control systems to prevent escape of material and overflowing during delivery; and
- For smaller supplies of fine power materials ensure bags are sealed after use and stored appropriately to prevent dust.

Measures specific to trackout

- Use water-assisted dust sweeper(s) on the access and local roads, to remove, as necessary, any material tracked out of the site. This may require the sweeper being continuously in use;
- Avoid dry sweeping of large areas;
- Ensure vehicles entering and leaving sites are covered to prevent escape of materials during transport;
- Inspect on-site haul routes for integrity and instigate necessary repairs to the surface as soon as reasonably practicable;
- Record all inspections of haul routes and any subsequent action in a site logbook;
- Install hard surfaced haul routes, which are regularly damped down with fixed or mobile sprinkler systems, or mobile water bowsers and regularly cleaned;
- Implement a wheel washing system (with rumble grids to dislodge accumulated dust and mud prior to leaving the site where reasonably practicable);
- Ensure there is an adequate area of hard surfaced road between the wheel wash facility and the site exit, wherever site size and layout permits; and
- Access gates to be located at least 10m from receptors where possible.

Construction Phase *Aspergillus* Mitigation Measures

Aspergillus is a fungus that is found in soil and has the potential to be made airborne during demolition or excavation. *Aspergillus* is of particular concern near hospitals or health clinics where immune suppressed patients are accommodated. While no such sensitive receptors were identified within the proposed Scheme construction area, a competent contractor will be appointed to prepare an *Aspergillus* Prevention Plan taking into account the National Guidelines for the Prevention of Nosocomial Aspergillosis (HSE 2018) which provides a risk assessment for aspergillus and preventative dust mitigation measures and in Appendix B of the document pre-project planning and contractor advice. Survey and prevention works with respect to *Aspergillus* will take place before construction commences by a competent contractor in proximity to any sensitive buildings and hospitals or health clinics. If pre-construction surveys indicate that *Aspergillus* is a risk, the prevention works will include sealing the windows to the façades that are in close proximity to the hospital to prevent fugitive dust entering the hospital through windows. These works will form part of an *Aspergillus* Prevention Plan to be completed by a specialist and will ensure the prevention of *Aspergillus* spores spreading. Research has found that dust suppression techniques, such as proposed also prevent the suspension of aspergillus successfully (Fournel et al. 2010).

Construction Phase Asbestos Mitigation Measures

Asbestos is the name for a group of natural occurring mineral fibres which are strong and both heat and chemically resistant. Due to these properties, asbestos was commonly used in the past as insulation and fireproofing. It was also used as a component in other building materials. Asbestos can be found in any industrial, commercial, public or residential building built or refurbished before the year 2000. There are three main types of asbestos found in Ireland – chrysotile (white asbestos), amosite (brown asbestos) and crocidolite (blue asbestos). The risk associated with exposure to asbestos relates to the possibility that the fibres within the asbestos containing material can become released into the air and are then inhaled. Breathing in air containing asbestos fibres can lead to asbestos-related diseases (mainly cancers of the chest and lungs). These diseases will not occur immediately and can take from 15 – 60 years to develop.

A Demolition Survey of all buildings to be demolished will be required prior to commencement of any such demolition works. This will include an intrusive asbestos-containing materials survey, which will involve destructive inspection. Prior to commencement of the demolition works, all asbestos containing materials identified by the Management Asbestos Survey and Refurbishment and Demolition Survey, will be removed by a suitably trained and competent person. Asbestos-containing materials will only be removed from site by a suitably permitted/licensed waste contractor and will be brought to a suitably licensed facility. The Health and Safety Authority will be contacted where needed in relation to the handling of asbestos and material will be dealt with in accordance with the Safety, Health and Welfare at Work (Exposure to Asbestos) Regulations 2006, as amended and associated approved Codes of Practice.

1.8.5 Carbon Management Plan

Subject to planning approval, the appointed Contractor will implement a whole-life Carbon Management Plan aligned to PAS 2080:2023 Carbon management in buildings and infrastructure which has been used to inform the detailed design, build and operation of the proposed Scheme. The TII Carbon Assessment Tool for the calculation of emissions arising from the Construction Phase (e.g., embodied carbon in construction materials, energy, and fuel use) and maintenance emissions is aligned with PAS 2080.

1.8.6 Noise and Vibration Management Plan

The following Noise and Vibration Management Plan has been prepared as part of the EIAR which provides the strategy to be adopted in order to manage noise and vibration during construction. This will be incorporated by each contractor into their Plans and implemented as part of their works. This plan and mitigation measures are in accordance with the mitigation and monitoring measures identified in Chapter 15 (Noise and Vibration) of this EIAR.

1.8.6.1 Noise

The main principles and standards required for noise mitigation are outlined as follows:

- The contractor undertaking the construction of the works will be required to take specific noise abatement measures to the extent required and comply with the recommendations of BS 5228-1 (BS 5228-1, 2014);
- The contractor will undertake a reassessment of noise levels once further information is available as part of the identification of mitigation measures. This will include details of all anticipated out of core hours work;
- The selection of plant items will be required to comply and European Communities Noise Emissions by Equipment for Use Outdoors (Amendment) Regulations 2006 (EC, 2006);
- The contractor will prepare a Noise and Vibration Management Plan (CNVMP) which will be formulated for the Construction Phase and used by all contractors based on the mitigation measures outlined in this chapter, and the CEMP. The CNVMP will be a live document; and
- As part of the CNVMP, a baseline noise study will be undertaken prior to the commencement of construction works in order to characterise the prevailing noise environment at impacted NSLs. This information will be used to inform the relevant CNTs.

The key principles relating to noise mitigation will be applied across all construction activities for the proposed Scheme:

- Noise control at Source: Selection of quiet plant, site layout, attenuation at source, operational control (hours and periods); and
- Noise Control along Pathway: Localised screening to plant items on site, enclosures, site buildings, site hoarding and noise barriers

The impact assessment has identified that mitigation measures are required across the proposed Scheme to control construction noise impacts. The approach for mitigation will follow the construction noise control hierarchy as above. BS 5228-1 (BS 5228-1, 2014) includes guidance on these measures which are set out briefly in the following paragraphs.

Note that the mitigation measures specified here are also part of the CEMP.

Selection of Quiet Plant

The potential for any item of plant to result in exceedance of construction noise thresholds will be assessed prior to the item being brought onto the site. The least noisy item of plant will be selected wherever practicable (e.g. plant items with sound attenuation incorporated). Should a particular item of plant already on the site be found to exceed the construction noise thresholds, the first action will be to identify whether the item can be replaced with a quieter alternative.

The contractor(s) will evaluate the choice of piling, excavation, breaking or other working method taking into account various ground conditions and site constraints. Where alternative lower noise generating equipment that would economically achieve, in the given ground conditions, equivalent structural/excavation/breaking results, these will be selected to control noise emissions, where deemed feasible.

The use of non-percussive piling methodologies will be used where possible across the proposed Scheme to control noise and vibration impacts.

Noise Control at Source

If replacing a noisy item of plant is not a viable or practical option, noise control “at source” will be followed. This refers to the modification of an item of plant, or the application of improved sound reduction methods in consultation with the supplier or the best practice use of equipment and materials handling to reduce noise. Proposed techniques will also be evaluated considering their potential effect on occupational health and safety. The following guidance relates to practical noise control at source techniques which relate to specific site considerations:

- For static plant such as compressors, generators, motors and pumps within each construction compound, the units will be surrounded by acoustic lagging or have acoustic enclosures providing air ventilation, as required, to ensure CNTs are not exceeded, particularly if required at night;
- Where practicable, equipment powered by mains electricity shall be used in preference to equipment powered by internal combustion engines or locally generated electricity;
- For mobile plant items such as dump trucks, cranes, excavators and loaders, the installation of an acoustic exhaust, utilizing an acoustic canopy to replace the normal engine cover and/or maintaining enclosure panels closed during operation can be used to reduce noise levels by up to 10dB;
- Reverse alarms from mobile plant within construction compounds, will be broadband to reduce tonal elements from this source;
- For piling plant, noise reduction can be achieved by enclosing the driving system in an acoustic shroud. For steady continuous noise, such as that generated by diesel engines, it is possible to reduce the noise emitted by fitting a more effective exhaust silencer system or utilising an acoustic canopy to replace the normal engine cover;
- Mobile and stationary plant will be switched off or throttled back to a minimum when not in use (engines, motors and generators). Lorries, trucks and concrete vehicles will not be permitted to queue outside site compounds with engines left idling;
- For percussive tools such as pneumatic concrete breakers and tools used for utility diversion works and surface level ground breaking for track construction, a number of noise control measures include fitting a muffler or sound reducing equipment to the breaker ‘tool’, and ensuring any leaks in the air lines are sealed;
- For all materials handling within compounds, the contractor will ensure that best practice site noise control measures are implemented including ensuring that materials are not dropped from excessive heights and drop chutes/dump trucks are lined with resilient materials. This is an important consideration for site compounds where materials are loaded and unloaded;
- Resonance effects in panel work or cover plates can be reduced through stiffening or application of damping compounds; rattling and grinding noises can be controlled by fixing resilient materials in between the surfaces in contact;
- All items of plant will be subject to regular maintenance. All vehicles and mechanical plant will be maintained in good working order for the duration of the contract. Such maintenance can prevent unnecessary increases in plant noise and can serve to prolong the effectiveness of noise control measures; and
- The impact from works will be controlled using the best practicable means set out above and restricting significant noise and vibration generating activities to daytime hours where possible.

Construction Working - Hours of Work

From a consideration of construction working hours, a number of points arise:

- One of the key principles relating to control of noise impacts from construction relates to the periods and hours during which the construction works will take place. The construction working hours for the proposed Scheme are set out previously;
- The proposed construction working hours are mostly limited to daytime hours only from Monday to Friday and to Saturday morning periods. This approach assists with limiting the duration over which NSLs are exposed to construction noise impacts;
- It will be necessary to work overtime (including weekends) and night shifts at certain critical stages during the Construction Phase e.g. during works adjacent to live rail lines at Broombridge and some road works;
- Activities will be scheduled in a manner that reflects the location of the site and the nature of NSLs. Construction activities/plant items will be considered with respect to their potential to exceed CNTs at NSLs and will be scheduled according to their noise level, proximity to sensitive locations and possible options for noise control; and
- For work areas where night-time activities will be required, as far as practicable, activities with highest noise emissions will be scheduled during daytime periods and/or daytime shifts will set up the relevant sites for night-time periods to avoid unnecessary use of mobile plant, cranes, and material handling to occur during night-time periods.

Screening

Typically, screening is an effective method of reducing the noise level from construction work areas and can be used successfully as an additional measure to other forms of noise control. The effectiveness of a noise screen will depend on the height and length of the screen, its mass, and its position relative to both the source and receiver.

Given the linear nature of the works, it is likely that a standard construction hoarding will not be practical for many locations. Previously on Luas Green Line the use of temporary mobile noise screens was a successful measure to screen the works. It is proposed that a similar strategy be adopted for the proposed Scheme.

BS 5228–1 (BS 5228-1, 2014) states that on level sites the screen should be placed as close as possible to either the source or the receiver. The construction of the barrier will be such that there are no gaps or openings at joints in the screen material. In most practical situations the effectiveness of the screen is limited by the sound transmission over the top of the barrier rather than the transmission through the barrier itself. In practice, screens constructed of materials with a mass per unit of surface area greater than 10kg/m² will give adequate sound insulation performance.

Consultation with Stakeholders

The following measures should be adopted:

- The proposed Scheme team including Client, contractor and Local Authorities will engage in regular meetings to discuss the approach to noise management during construction;
- A particular emphasis should be placed on the risk of noise impacts during any out of hours work;
- The contractor will provide proactive community relations and will notify the public and vibration sensitive premises before the commencement of any works forecast to generate appreciable levels of noise or vibration, explaining the nature and duration of the works;
- The contractor will distribute information circulars informing people of the progress of works and any likely periods of significant noise and vibration; and
- A designated noise liaison officer will be appointed to site during construction works. All noise complaints will be logged and followed up in a prompt fashion by the liaison officer.

Monitoring

During the Construction Phase, the contractor will be required to carry out noise and vibration monitoring at representative NSLs to evaluate and inform the requirement and/or implementation of noise and or vibration management measures.

A full monitoring and auditing programme will form part of the CNVMP which will be agreed with the Local Authorities prior to the commencement of the Construction Phase. As a minimum the monitoring programme will include an alert system for threshold exceedances, remote access and a platform for sharing monitoring results between the contractor, TII and DCC.

Note that it will be important to ensure that the monitoring regime accurately captures the baseline environment prior to construction beginning. Once construction work begins the monitoring will capture total noise from both construction and other environmental noise sources, e.g. traffic. It will therefore be necessary to use the baseline noise measurements to accurately assess the contribution of construction to the total noise.

1.8.6.2 Construction Traffic

Mitigation measures to reduce noise from construction traffic are limited to restricting speed limits, maintaining road surfaces and ensuring that all vehicles are properly maintained. In addition, any coverings on construction vehicles will be securely fastened before leaving site to avoid excessive 'rattling'.

1.8.6.3 Construction Vibration

The vibration from construction activities will be limited to the values. Limit values have been provided for the following building types:

- Residential and commercial properties of sound construction; and
- Protected structures and sensitive buildings such as those with no or minimal foundations.

It is understood that bored piling is to be used and this is a piling method which generates relatively low levels of vibration. Notwithstanding this, consideration should be given to the following methods to further mitigate the vibration levels:

- Minimise obstructions between the vibration source and the sensitive receiver, e.g. old basement floors, old foundations etc., which exacerbate the transmission of vibration; and
- Reduce the resistance to bored piles by "mudding in". This technique involves lubricating the borehole with a small amount of bentonite slurry.

In the case of vibration levels giving rise to human discomfort, and in order to minimise such impacts, the following measures shall be implemented during the construction period:

- A clear communication programme will be established by TII to inform adjacent building occupants in advance of any potential intrusive works which may give rise to vibration levels likely to result in significant effects. The nature and duration of the works will be clearly set out in all communication circulars as necessary;
- Activities capable of generating significant vibration effects with respect to human response be restricted to daytime hours only; and
- Appropriate vibration isolation shall be applied to plant (such as resilient mounts to pumps and generators), where required and where feasible.

1.8.7 Traffic Management Plan - Appendix A6.2

A Construction Traffic Management Plan (CTMP) has been prepared to demonstrate the manner in which the interface between the public and construction-related traffic will be managed and how vehicular movement will be controlled. The purpose of this CTMP is to demonstrate that the residual impacts to public road network during the Construction Phase of the proposed Scheme, which have been identified in the application documentation, can be minimised and that transport related activities are carried out as safely as possible and with the minimum disruption to other road users. This plan must be finalised by the Project Supervisor for the Construction Stage (PSCS)/Contractor prior to commencing the works and should not be implemented until it has been assessed and developed by the PSCS. The PSCS shall co-ordinate the implementation of the developed Traffic Management Plan during construction of the works. The Works

Requirements will require the implementation of all the applicable mitigation measures identified in the EIAR and any additional measures required pursuant to conditions imposed by An Bord Pleanála in the CTMP.

The CTMP will take consideration of the Phasing requirements of the proposed Scheme which will ensure safe construction and minimise the impact on traffic on NMUs along the route of the proposed Scheme and maintaining flow of all modes of transport wherever practicable.

1.8.8 Invasive Species Management Plan - Appendix A6.3

The Invasive Species Management Plan (ISMP) has been prepared as part of the EIAR which provides the strategy to be adopted in order to manage and prevent the spread of non-native invasive plant species. This will be incorporated by each contractor into the Plans. Further details on the assessment of non-native invasive species, and associated mitigation measures are provided in Chapter 9 (Biodiversity) of this EIAR.

Of the INNS identified, two species (and potentially a third), namely Himalayan Balsam, Japanese Knotweed and Giant Hogweed, are located in a sensitive location by the proposed Tolka Valley Park Luas bridge; as such, these species will be the focus of biosecurity measures going forward. Of these, the Japanese Knotweed and Giant Hogweed boast salinity tolerances which may allow them to colonise saltmarsh habitats, and therefore pose a threat to the Dublin Bay Natura 2000 sites. As the Japanese Knotweed along the River Tolka will need to be removed to allow for the installation of the new bridge in this area, it is the most likely invasive species to be accidentally spread downstream into the Natura 2000 sites.

Listed below is a brief detailing of necessary measures to be undertaken to ensure biosecurity within this section of the LRT, all of which will need to be included within the proposed Schemes Invasive Species Management Plan:

- An updated invasive species baseline survey, conducted prior to the commencement of the proposed Scheme's enabling works. This updated baseline is required as invasive species may have continued to spread within and adjacent to the proposed Scheme's site since the last invasive species or habitat survey was conducted on-site;
- As per the TII guidance (TII, 2020a), this additional invasive species survey will include detailed maps of the precise location of each individual invasive species plant, as well as photos of these specific locations;
- The pre-construction surveys will be undertaken by suitable experts with competence in identifying the species concerned;
- The adherence to a set of biosecurity measures as set out in the ISMP in this EIAR, including:
 - Known or potentially infested areas within the working area of the proposed Scheme shall be clearly demarcated and fenced off in advance of works and access restricted until such time that treatment has commenced and / or construction works are monitored in accordance with the ISMP in the area. In relation to Japanese knotweed, the guidance recommends an exclusion buffer of 7m (metres) in all directions (within the works area and 3m vertically underground);
 - The implementation of clear signage in accordance with the TII IAPS standards will be erected at compounds, and at the boundary of the exclusion fencing. These signs will be briefed out at toolbox talks specific to each INNS to personnel on site and particular attention will be given to INNS that have the potential to cause injuries such as Giant hogweed.
 - Identify and create access points into exclusion areas for INNS. These are only to be used by specialist personnel for the removal of INNS and are not to be used by general site workers until such a time as all contaminated material has been removed from site and it is safe to enter.
 - Where it is practicable, a wheel wash and footwear washing facilities will be provided to ensure biosecurity measure are preventing the further potential spread of INNS. These locations are to be provided by the contractor. Where a dedicated / bespoke wheel wash cannot be installed owing to space limitations, the appointed contractor will ensure that no excavated loose material is allowed off site from within an exclusion zone.
 - Where plant that is used to excavate soils, it shall be visually checked for loose soil before movement to another part of site (where possible, the movements of tracked machinery should be restricted within the non-native invasive species exclusion zone). Loose soil shall be scraped off

and disposed of, and a solution of Virkon® (or similar approved disinfectant) applied to machinery to ensure that no obscured seed / root material remains viable. Vehicular movements within the exclusion area shall be minimised as far as is practical;

- Unless in the exceptional circumstance that direction is given from a suitably qualified ecologist, no storage of contaminated soil on site. Instead, being disposed of in a licenced soil waste facility.
- Where small volumes (e.g. volumes capable of being double bagged in quarantine bags such as cut plants, bulbs or loose soil occur), it may be practical to bag the material and bring it to a clearly demarcated and dedicated quarantine area within the Construction Compounds until such time that the material is disposed of to an authorised facility, similar to the process of disposing of bulk excavated contaminated soil. Best practice measures for the treatment of soils contaminated with invasive species (including potential seeds and fragments of mature plants) to prevent the accidental spread of said invasive species.
- As required by law, licences for the disposal of contaminated materials will be obtained, as well as the utilisation of licensed facilities;
- In regard to the importation of soil and other materials, the construction contractor will only utilise traceable topsoil for landscaping that has been cleared of any invasive species material;
- Measures to be implemented during the application of herbicides – commitment to the appointment of a suitably qualified/registered/licensed pesticides advisor for any works requiring the use of pesticides, and safety precautions for consideration in the use of pesticides near watercourses; and
- Areas which contained invasives species, where invasives were treated on-site or removed, prior to the enabling and construction works will require an on-going post-construction monitoring programme to ensure that there is no reestablishment of any invasive species within these areas.

1.8.9 Surface Water Management Plan - Appendix A6.4

The Surface Water Management Plan (SWMP) has been prepared which details control and management measures for avoiding, preventing, or reducing any significant adverse impacts on the surface water environment during the Construction Phase of the proposed Scheme. It will be a condition of the Works Requirements that the successful contractor, immediately following appointment, must detail in the SWMP how it is intended to effectively implement all the applicable measures identified in this EIAR and any additional measures required pursuant to conditions imposed by An Bord Pleanála to any grant of approval.

As identified in Chapter 9 (Biodiversity) of this EIAR and the SWMP, and in order to protect surface water, groundwater and air quality throughout the proposed Scheme's site, the construction contractor will be required to develop and implement a Surface Water Management Plan with the minimally required list of mitigations measures outlined below to be incorporated into this plan.

In order to safeguard the local surface water network, and in turn the local groundwater network, from surface water-based pollution events, the following must be strictly adhered to:

- The construction contractor will ensure compliance with environmental quality standards specified in the relevant legislation, namely European Communities (Environmental Objectives (Surface Waters)) Regulations, 2009 (S.I. No. 272 of 2009 and amendments), and the European Communities (Quality of Salmonid Waters) Regulations, 1988 (S.I. No. 293 of 1988);
- Oil booms and oil soakage pads should be maintained on-site to enable a rapid and effective response to any accidental spillage or discharge. These shall be disposed of correctly and records will be maintained by the environmental manager of the used booms and pads taken off site for disposal;
- Management of silt-laden water on-site, including procedures for accidental leaks / spills to ground, as well as water quality monitoring to ensure compliance with environmental quality standards specified above;
- At no point during the Construction Phase will treated water be discharged to local surface water network without the water quality meeting the statutory limits as set under the environmental quality standards specified above;
- Fail-safe site drainage and bunding through drip trays on plant and machinery will be provided to prevent discharge of chemical spillage from the sites to surface water;

- To prevent the spread of any accidental discharge into the surface water network, oil booms will be on hand when construction activities are located beside aquatic habitats in order to control and minimise the spread of the spill;
- Washout of concrete plant will occur at a designated impermeable area with waste control facilities.
- Wherever reasonably possible, pre-cast concrete bridge features should be utilised to minimise the risk of a concrete-based pollution event;
- Concrete delivery, concrete pours and related construction methodologies will be part of the procedure agreed with the contractor to mitigate any possibility of spillage or contamination of the local environment. Particular attention will be paid during the pouring process in order to avoid leakages or spills of concrete;
- Temporary stockpiles will be monitored for leachate generation. These stockpiles will be placed within designated areas and not located within the vicinity of watercourses, wetlands or artificial surface water drainage features;
- Excavated contaminated soils (most likely present Tolka Valley Park) will be segregated and securely stored in a designated area where the possibility of runoff generation or infiltration to ground or surface water drainage has been eliminated through bunding and imperviable geotextile linings. The contaminated soils will then be classified as clean, inert, non-hazardous or hazardous in accordance with the EC Council Decision 2003/33/EC. Furthermore, the contractor will ensure that no cross-contamination with clean soils happens elsewhere throughout the proposed Scheme's site;
- Silt fencing will be installed prior to the commencement of any construction works in order to enhance the protection of identified water features (River Tolka, Tolka Valley Park wetlands and Royal Canal). Shallow interceptor trenches will be installed in front of these silt fences where possible, as there are space and depth constraints within certain areas of Tolka Valley Park. An Ecological Clerks of Works (ECoW) will be present during the installation of these protective measures to ensure that they are installed to best practice standard and correctly located in their assigned areas. The following sub-sections will provide greater detail on specific locations of these silt fence / trench sections;
- Silt fences will be repaired and/or replaced as necessary by the construction contractor as part of the on-going environmental monitoring programme; and
- The contractor shall ensure access and egress for emergency vehicles to drainage and suds features is not restricted during the works. Site staff will maintain awareness of flood and weather forecasts on an ongoing basis as well as receiving warnings from Dublin City Council, Fingal County Council and Met Eireann as appropriate so advance measures can be put in place.

1.8.10 Construction and Demolition Resource and Waste Management - Appendix A6.5

The contractor will be required to develop a Construction and Demolition Resource and Waste Management Plan (C&D RWMP), which incorporates all of the measures outlined in this Chapter, Chapter 11 (Land and Soils) and Chapter 19 (Material Assets: Waste Management). The C&D WMP will identify how waste arisings are to be controlled and managed during the course of the proposed Scheme, in particular how waste prevention principles will be applied and how on-site waste will be minimised.

The Plan shall be produced by the contractor in accordance with the 'Best Practice Guidelines on the Preparation of Resource and Waste Management Plans for Construction and Demolition Projects' (EPA, 2021) which clearly sets out the contractor's proposals regarding the treatment, storage and disposal of waste. Any Class U2 material is to be disposed of at a suitably licensed waste facility.

1.8.11 Environmental Incident Response - Appendix A6.6

An Environmental Incident Response Plan (EIRP) has been prepared to ensure that in the unlikely event of an incident (environmental, or non-environmental), response efforts are prompt, efficient, and suitable for the particular circumstances. The EIRP details the procedures to be undertaken in the event of a significant release of sediment into a watercourse, or a significant spillage of chemical, fuel or other hazardous substances (e.g., concrete), non-compliance incident with any permit or license, or other such risks that could lead to a pollution incident, including flood risks. It will be a condition of the Employer's Requirements that the successful contractor, immediately following appointment must detail in the EIRP, the manner in which it is intended to effectively implement all the applicable mitigation measures identified in this EIAR

and any additional measures required pursuant to conditions imposed by An Bord Pleanála to any grant of approval.

The EIRP will identify the onsite risks and appropriate responses. The focus of the measures in the EIRP is prevention of the incident arising in the first place. The EIRP will be reviewed and updated regularly so that it continues to apply to construction activities and is amended when applicable regulations are revised or when amendments are required by a regulatory authority. It will be the responsibility of the EM, or equivalent, as stipulated by the appointed contractor to maintain and change the EIRP as required. The EIRP may also require amendments from the various stakeholders or suppliers as the proposed Scheme progresses.

When an incident happens, it is important to learn from it and ensure that such an incident does not occur again. This may involve changing the method of work for a particular activity, providing containment or treatment materials, or simply training personnel so they are aware of the correct method of work. Similarly, if an audit of planned arrangements indicates that measures are not in place, or those in place need to be improved, action will be taken immediately.

A record of corrective actions and lessons learned will be kept and communicated to all relevant persons, teams, sub-contractors etc. across the proposed Scheme.

1.8.11.1 Storage of Materials and Waste

Storage of Materials and Waste on site will be in accordance with the measures outlined in this Chapter, Chapter 11 (Land and Soils) and Chapter 19 (Material Assets: Waste Management)

Waste may be stored at the Construction Compounds for a limited amount of time to help to limit the number of vehicle movements to and from site as far as possible to minimise effects on the local roads.

A register of all hazardous substances, which will either be used on site or expected to be present (in the form of soil and / or groundwater contamination) will be established and maintained. Hazardous wastes will be stored and handled in accordance with Hazardous Wastes Regulations.

1.9 References

Best Practice Guidelines on the Preparation of Resource and Waste Management Plans for Construction and Demolition Projects' (EPA, 2021)

British Standard Institution (BSI) British Standard (BS)5837:2012 'Trees in relation to in relation to design, demolition and construction -Recommendations' (BSI 2012)

BS 3998:2010 Tree Work –Recommendations' (BSI 2010)

CIRIA (C512): Environmental Handbook for Building and Civil Engineering Projects (CIRIA, 2000)

CIRIA Guidance C532: Control of water pollution from construction sites. Guidance for consultants and contractors. (CIRIA, 2019 - www.ciria.org)

CIRIA Guidance C741: Environmental good practice on site guide (Charles & Edwards, 2015; CIRIA, 2019 - www.ciria.org)

CIRIA Guidance C750D: Groundwater control: design and practice (Preene et al., 2016; CIRIA, 2019 - www.ciria.org)

CIRIA (C649) Control of water pollution from linear construction projects: Site guide (CIRIA 2006a)

CIRIA (C697): The SUDS Manual (CIRIA, 2015)

CIRIA (C848): Control of water pollution from linear construction projects: Technical guidance (CIRIA 2006b)

Construction Industry Research and Information Association (CIRIA) in the UK, Environmental Good Practice on Site Guide, 4th Edition (CIRIA 2015)

Inland Fisheries Ireland: A Guide to the Protection of Watercourses through the use of Buffer Zones, Sustainable Drainage Systems, Instream Rehabilitation, Climate / Flood Risk and Recreational Planning (IFI, 2020).

Inland Fisheries Ireland: Guidance on Protection of Fisheries During Construction Works In and Adjacent to Waters (IFI, 2016)

Invasive Species Ireland (ISI) - Best Practice Management Guidelines for Japanese Knotweed (ISI, 2008a)

Invasive Species Ireland - Best Practice Management Guidelines for Himalayan Balsam (ISI, 2008b)

Invasive Species Ireland - Best Practice Management Guidelines for Giant Hogweed (ISI, 2008c)

Inland Fisheries Ireland - Biosecurity Protocol for Field Survey Work (IFI, 2010)

National Guidelines for the Prevention of Nosocomial Aspergillosis (HSE 2018)

Section 26 (2) Excavation Licence. Section 2 of the National Monuments Act 1987 (as amended)

Sustainable Drainage Systems, Instream Rehabilitation, Climate / Flood Risk and Recreational Planning (IFI, 2020)

The handbook published by Construction Industry Research and Information Association (CIRIA) in the UK, Environmental Good Practice on Site Guide, 4th Edition (CIRIA 2015)

The Management of Invasive Alien Plant Species on National Roads – Technical Guidance (TII, 2020a)

The Management of Invasive Alien Plant Species on National Roads – Standard (TII, 2020b)

TII's Guidelines for the Creation, Implementation and Maintenance of an Environmental Operating Plan (TII 2007)

TII guidance (TII, 2020a),

TII document 'Guidelines for the crossing of watercourses during the construction of National Road Schemes' (NRA, 2008).

UK, Environmental Good Practice on Site Guide, 4th Edition (CIRIA 2015)

Directives and Legislation

Article 27 of the European Communities (Waste Directive) Regulations 2011 (S.I. No. 126 of 2011), as amended (Waste Directive Regulations (2011)) (referred to as Article 27) to the Environmental Protection Agency

EC Council Decision 2003/33/EC

European Communities (Birds and Natural Habitats) Regulations 2011 [S.I.477/2011],

European Communities (Environmental Objectives (Surface Waters)) Regulations, 2009 (S.I. No. 272 of 2009 and amendments), and the European Communities (Quality of Salmonid Waters) Regulations, 1988 (S.I. No. 293 of 1988).

European Communities (Environmental Objectives (Surface Waters)) Regulations

European Communities (Quality of Salmonid Waters) Regulations, 1988 (S.I. No. 293 of 1988)

Safety, Health and Welfare at Work (Exposure to Asbestos) Regulations 2006, as amended and associated approved Codes of Practice.

Section 26 of the National Monuments Act 1930

F. Surface Water Management Plan

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GLOSSARY OF FREQUENTLY USED TERMS

Term	Definition
DCC	Dublin City Council
DEHLG	Department of the Environment, Heritage and Local Government (now the Department of Housing, Local Government and Heritage)
FCC	Fingal County Council
ICW	Integrated Constructed Wetland
NHA	Natural heritage Area
pNHA	Proposed NHA
RBMP	River Basin Management Plan
SAC	Special Area of Conservation
SPA	Special protection Area
SuDS	Sustainable Urban Drainage Systems
TII	Transport Infrastructure Ireland
WFD	Water Framework Directive

SECTION 1: SURFACE WATER MANAGEMENT PLAN

1.1 Introduction

1.1.1 Objectives

This Surface Water Management Plan (hereafter referred to as the SWMP) for the proposed Scheme details the control and management measures for avoiding, preventing, or reducing any significant adverse impacts on the surface water environment during the Construction Phase.

The control and management measures are best practice approaches that can be used to protect surface water during the Construction Phase of the proposed Scheme.

1.1.2 Guidance

The SWMP and the control and management measures relating to surface water management have been prepared with regard to the following guidance documents, where relevant:

- Control of Water Pollution from Construction Sites. Guidance for Consultants and Contractors (C532) (Construction Industry Research and Information Association) (CIRIA)2001);
- Best Practice Guide BPGCS005 – Oil Storage Guidelines (Enterprise Ireland 2003);
- PUB C650 Environmental Good Practice on Site, 2nd Edition (CIRIA 2005);
- Control of Water Pollution from Linear Construction Projects. Technical Guide (C648) (CIRIA 2006a);
- Control of Water Pollution from Linear Construction Projects. Site Guide (C649) (CIRIA 2006b);
- Guidelines for the Crossing of Watercourses During the Construction of National Road Schemes (NRA 2006a);
- Safety, Health and Welfare at Work (Construction) Regulations 2013 – S.I. No. 291 of 2013;
- Design Manual for Roads and Bridges Part 3 DN-DNG-03022 (NRA HD 33/15) (Including Amendment No. 1) (TII 2015a);
- Road Drainage and the Water Environment DN-DNG-03065 (TII 2015b);
- Guidelines on Protection of Fisheries During Construction Works in and Adjacent to Waters (Inland Fisheries Board (IFB) 2016); and
- Planning for watercourses in the urban environment, IFI.

1.1.3 Scope

Table 1 provides the content of the SWMP, and where details can be found in this document.

Table A6 4.1: SWMP Contents

Content	Section of SWMP
Introduction	1.1
Roles and Responsibilities	1.2
Environmental Incident Response Plan	1.3
Control and Management Measures	1.4
General Control measures	1.4.1
Construction Compounds	1.4.2
Control of Sediment	1.4.3
Use of Concrete	1.4.4
Vehicles and Plants	1.4.5
Monitoring of Water Bodies	1.5

1.1.4 Potential Sources of Water Pollution

The main activities / areas where sediment and surface water runoff and pollution generation have the potential to arise include the following:

- Earthworks – including planing, excavation and processing, transportation of materials (within and outside of the proposed Scheme), and deposition of materials and temporary stockpiling (if required). The most significant area of concern regarding sediment control for the proposed Scheme is when existing low porosity surfaces (existing roads and footpaths) are removed, and the underlying granular layers are disturbed and exposed. Typically, these surfaces are likely to be exposed during the following activities associated with the proposed Scheme:
 - The preparatory and site clearance works, particularly topsoil stripping;
 - Tracking of machinery; and
 - Location of historic landfills (e.g. Tolka Valley Park).
- Concrete activities – concrete, grout and other cement-based products which would typically be used in the carriageway and pavement works are highly alkaline and can generate very fine, highly alkaline silt (11.5 pH);
- Watercourse crossings – there is a higher likelihood of impacts on water quality when construction is taking place over or near surface waters (e.g., at Royal Canal, River Tolka, Bachelors Stream, Finglaswood Stream);
- Drainage Systems – There is a potential for disrupting local drainage systems due to diversions required to accommodate the construction works; and
- Construction compound and machinery re-fuelling areas.

Section 1.4 details mitigation measures which will be implemented where practicable to reduce the likelihood of the pollution events occurring during the Construction Phase.

1.2 Roles and Responsibilities

The roles and responsibilities of key stakeholders are discussed in Section 1. The Environmental manager (EM), or equivalent, will ensure the successful development, implementation, and maintenance of the SWMP.

1.3 Environment Incident Response Plan

An Environmental Incident Response Plan (EIRP) has been prepared as Appendix 6.6 for the CEMP to ensure that, in the unlikely event of an incident, response efforts are prompt, efficient, and suitable for the particular circumstances. The EIRP includes measures to address surface water related incidents such as accidental spillages of noxious substances e.g., oil and significant releases of sediment or concrete washings. The EIRP details are not repeated in this section of the CEMP; however, it should be read in conjunction with the general measures set out in the SWMP.

1.4 Control and Management Measures

1.4.1 General

As identified in Chapter 9 (Biodiversity) of this EIAR and the SWMP, and in order to protect surface water, groundwater and air quality throughout the proposed Scheme site, the construction contractor will be required to develop and implement a Surface Water Management Plan with the minimally required list of mitigations measures outlined below to be incorporated into this plan.

In order to safeguard the local surface water network, and in turn the local groundwater network, from surface water-based pollution events, the following must be strictly adhered to:

- The contractor will ensure compliance with environmental quality standards specified in the relevant legislation, namely European Communities (Environmental Objectives (Surface Waters)) Regulations, 2009 (S.I. No. 272 of 2009 and amendments), and the European Communities (Quality of Salmonid Waters) Regulations, 1988 (S.I. No. 293 of 1988);
- Oil booms and oil soakage pads should be maintained on-site to enable a rapid and effective response to any accidental spillage or discharge. These shall be disposed of correctly and records will be maintained by the environmental manager of the used booms and pads taken off site for disposal;
- Management of silt-laden water on-site, including procedures for accidental leaks / spills to ground, as well as water quality monitoring to ensure compliance with environmental quality standards specified above;
- At no point during the Construction Phase will treated water be discharged to local surface water network without the water quality meeting the statutory limits as set under the environmental quality standards specified above;
- Fail-safe site drainage and bunding through drip trays on plant and machinery will be provided to prevent discharge of chemical spillage from the sites to surface water;
- To prevent the spread of any accidental discharge into the surface water network, oil booms will be on hand when construction activities are located beside aquatic habitats in order to control and minimise the spread of the spill;
- Washout of concrete plant will occur at a designated impermeable area with waste control facilities;
- Wherever reasonably possible, pre-cast concrete bridge features should be utilised to minimise the risk of a concrete-based pollution event;
- Concrete delivery, concrete pours and related construction methodologies will be part of the procedure agreed with the contractor to mitigate any possibility of spillage or contamination of the local environment. Particular attention will be paid during the pouring process in order to avoid leakages or spills of concrete;
- Temporary stockpiles will be monitored for leachate generation. These stockpiles will be placed within designated areas and not located within the vicinity of watercourses, wetlands or artificial surface water drainage features;
- Excavated contaminated soils (most likely present in Tolka Valley Park) will be segregated and securely stored in a designated area where the possibility of runoff generation or infiltration to ground or surface water drainage has been eliminated through bunding and imperviable geotextile linings. The contaminated soils will then be classified as clean, inert, non-hazardous or hazardous in accordance with the EC Council Decision 2003/33/EC. Furthermore, the contractor will ensure that no cross-contamination with clean soils happens elsewhere throughout the development site;
- Silt fencing will be installed prior to the commencement of any construction works in order to enhance the protection of identified water features (River Tolka, Tolka Valley Park wetlands and Royal Canal). Shallow interceptor trenches will be installed in front of these silt fences where possible, as there are space and depth constraints within certain areas of Tolka Valley Park. An Ecological Clerks of Works (ECoW) will be present during the installation of these protective measures to ensure that they are installed to best practice standard and correctly located in their assigned areas. The following sub-sections will provide greater detail on specific locations of these silt fence / trench sections; and
- Silt fences will be repaired and/or replaced as necessary by the principal contractor as part of the on-going environmental monitoring programme.

1.4.2 Construction Compound

There will be a number of construction compounds and working areas of various scales along the whole proposed Scheme. These will include areas along track areas, construction areas at bridge locations and for other surface features. The construction compound will include installation of the necessary facilities including the site office, welfare facilities, etc.

Further details on the construction compound, including the construction compound layout, are provided in section 6.8 of Chapter 6 (Construction Activities) of this E.I.A.R.

1.4.2.1 Site Establishment

As some of the construction compounds are located on a greenfield site, the appointed contractor will be required to provide a temporary geogrid mattress overlain in stone for trafficking within the construction compound. All surface water runoff will be intercepted and directed to appropriate treatment systems (settlement facilities and oil trap) for the removal of pollutants prior to discharge.

1.4.2.2 Security

Controlled access to the construction compound will be implemented, fencing will be erected, and lighting will be installed. The construction compound will be secured with Closed-Circuit Television (CCTV), to ensure safe storage of all material, plant and equipment.

1.4.2.3 Welfare and Sanitary Facilities

The construction compound will be engineered with appropriate services as discussed in section 6.8 of Chapter 6 (Construction Activities) of this E.I.A.R. Water and wastewater disposal etc. will be organized by the appointed contractor. In work areas of the proposed Scheme, where permanent provisions (for the duration of the construction programme) are not practicable, appropriate temporary provisions will be made. Temporary welfare facilities will need to be used: for example, portable toilets in the vicinity of works. Welfare facilities will discharge wastewater either to an existing sewer, with the permission of the sewerage undertaker, or wastewater will be collected and disposed of in an appropriate manner to a suitably-licensed facility offsite to prevent water pollution and in accordance with the relevant statutory requirements.

1.4.2.4 Fuel Storage

- All hydrocarbons used during the Construction Phase will be appropriately handled, stored, and disposed of in accordance with recognised standards as laid out by the EPA;
- All chemical and fuel filling locations will be contained within signposted, designated bunded areas, a minimum of 10m from any surface water drain;
- At the construction compound, where the site is pervious, an area of hard standing will be installed in a demarcated area for refuelling, and vehicle / plant cleaning and service areas. This area will be drained via a hydrocarbon interceptor trap to a soakaway if possible, or to local surface water drains, with the permission of the asset owner;
- The retained contents of the separators will be collected for disposal by a licensed operator to a licensed waste disposal / recovery facility;
- Suitable precautions will be taken to prevent spillages from equipment containing small quantities of hazardous substances (for example, chainsaws and jerry cans) including:
 - Each container or piece of equipment will be stored in its own drip tray made of a material suitable for the substance being handled;
 - Spill kits and drip trays will be provided for all equipment and at locations where any liquids are stored and dispensed, and staff will be trained on the procedures to be followed; and
 - Containers and equipment will be stored on a firm, level surface.
- Procedures and contingency plans will be in place at each work area to address cleaning up small spillages as well as dealing with an emergency incident. See Volume 2 - Chapter 5 (Description of the Scheme) of this E.I.A.R. A stock of absorbent materials such as sand, spill granules, absorbent pads and booms will be kept at each work site, on plant working near water and particularly at refuelling areas and where fuel or oil is stored;
- The storage of fuels, other hydrocarbons and other chemicals within the construction compound shall be in accordance with relevant legislation and with best practice. In particular:
 - Fuel tanks, drums, and mobile bowsers (and any other equipment that contains oil and other fuels) will be housed within a bund of at least 110% capacity of the fuel tank itself or at least 25% of the total volume of the containers, whichever is greatest. The fuel tank will be double skinned. There will be no passive drainage from the bund; any water collected within it will be pumped out and removed off site for disposal; and

- Any designated area or areas for oils, fuel, chemicals, hydraulic fluids, etc. storage and refuelling will be set up at least 10m from any surface water drains (as per CIRIA guidance listed in Section 1.1.2) and the storage location within the Construction Compound shall be organised so as to be as far away from surface water drains as is practicable to minimise risks from leaks and spills.
- Storage areas will be covered, wherever possible, to prevent rainwater filling the bunded areas;
- Fuel fill pipes will not extend beyond the bund wall and will have a lockable cap secured with a chain;
- Where fuel is delivered through a pipe permanently attached to a tank or bowser:
 - The pipe will be fitted with a manually operated pump or a valve at the delivery end which closes automatically when not in use;
 - The pump or valve will be fitted with a lock;
 - The pipe will be fitted with a lockable valve at the end where it leaves the tank or bowser;
 - The pipework will pass over and not through bund walls;
 - Tanks and bunds will be protected from vehicle impact damage;
 - Tanks will be labelled with contents; capacity information and hazard warnings; and
 - All valves, pumps and trigger guns will be turned off and locked when not in use. All caps on fill pipes will be locked when not in use.

1.4.3 Construction Phase Haul Road Mitigations

Through grassed areas, shallow land drains will be provided adjacent to haulage roads. The land drains will be provided with check dams which will allow infiltration of the collected surface water to ground. These will not be provided in the vicinity of the historical landfill in Tolka Valley Park, where runoff from haulage roads, will be allowed to runoff onto adjacent lands.

Silt screens will be provided running alongside the haulage roads through grassed areas to prevent silt and fines from impacting on the adjacent landscape.

Procedures and contingency plans will be in place at each work area to address cleaning up small spillages as well as dealing with an emergency incident.

1.4.4 Control of Sediment

There are a number of sources of sedimentary or silt-laden water on a construction site, including silty 'runoff' from stripped soils; and the stockpiling of soils. Control measures for each of these are to be provided. Area specific measures are identified below.

1.4.4.1 Area 31 - S31.1: Broombridge to Tolka Valley Park (including Rail Overbridge)

In addition to the standard guidance the Broombridge to Tolka Valley Park (including Rail Overbridge), section requires specific surface water run-off control measures to ensure that pollutants do not enter the surface water pathway connecting the site to the Natura 2000 sites during site enabling and bridge construction works.

This section will require the installation of geotextile sandbag barriers to protect the Royal Canal and its bankside vegetation. See Figure A6 4.1 and Figure A6 4.2 below for the indicative locations of these proposed geotextiles sandbag barriers, the locations of which may be relocated provide there is acceptable rationale backing the relocation, as well as assurance that the functional integrity of the mitigation measures is not compromised.

The indicative location of this section's site compound north of the canal is indicated away from the canal. The local topography will help ensure no surface water from the compound reaches the canal.

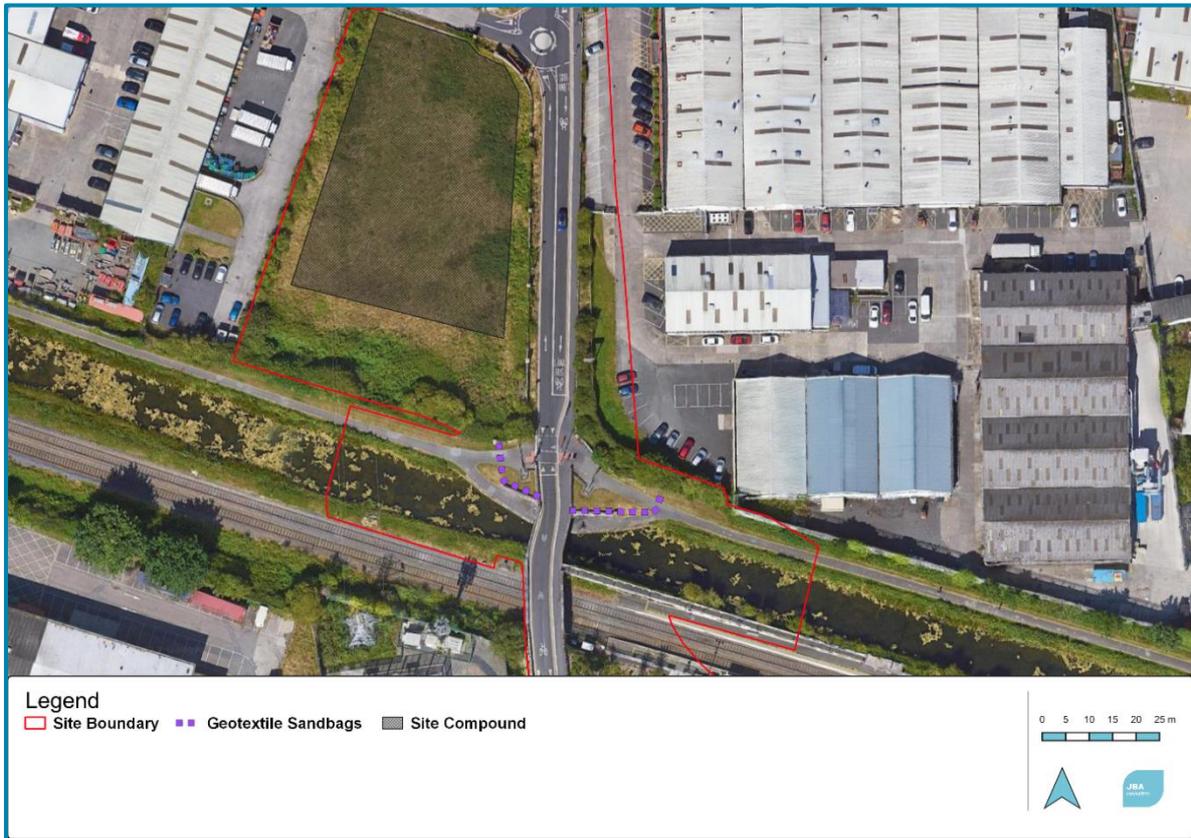


Figure A6 4.1: Indicative locations sandbag barriers and site compound (Royal Canal)

1.4.4.2 Area 31 - S31.2: Tolka Valley Park Bridge

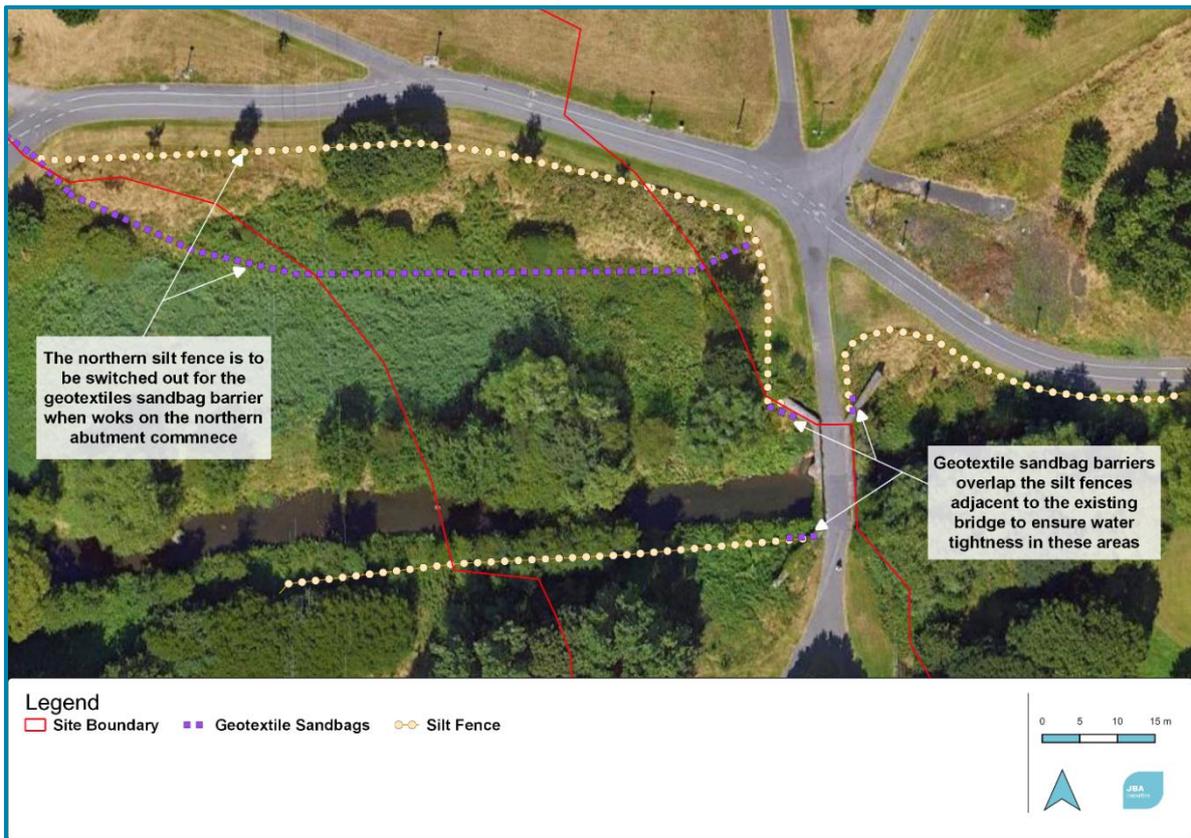


Figure A6 4.2: Indicative locations of silt fences and sandbag barrier (Tolka Valley Park Bridge)

1.4.4.3 Area 31 – S31.3: Tolka Valley Park to Tolka Valley Road

Following the treatment and removal of the invasive species from this section of the works, this section will require the installation of silt fences and geotextile sandbag barriers to protect the Tolka Valley Park ICWs and Pond, and the River Tolka. See Figure A6 4.3 below for the indicative locations of these proposed silt fences and geotextiles sandbag barriers, the locations of which may be relocated provide there is acceptable rationale backing the relocation as well as assurance that the functional integrity of the mitigation measures is not compromised.

An ECoW will be present throughout the enabling and construction works in this section given the sensitivity of the habitats and species in this location, and the River Tolka's status as a surface water pathway to the Dublin Bay-based designated sites. The ECoW will be key overseer for when the surface water barriers (silt fences and geotextile sandbag barriers) are adjusted for the works on the creation of the bridge abutments; and the construction of the bridge's temporary falseworks.



Figure A6 4.3: Indicative locations of silt fences and sandbag barriers (Tolka Valley Park)

1.4.5 Use of Concrete

- Weather conditions will be taken into account when planning construction activities which require the use of wet concrete to minimise the risk of the runoff of concrete ‘washout’ from site;
- Where on-site batching is proposed by the appointed contractor this activity will be carried out at least 10m from surface water drains. Washout from such mixing plant will be carried out only in a designated contained impermeable area;
- Batching and mixing activities and material storage areas will be located at least 10m (as per CIRIA guidance listed in Section 5.4.1.2) away from surface water drains;
- Chute washout will be carried out at designated locations only, at least 10m from surface water drains. These locations will be signposted throughout the construction works areas. Chute washout locations will be provided with appropriate designated, contained impermeable area and treatment facilities including adequately sized settlement tanks;
- The clear water from the settlement tanks shall be pH-corrected prior to discharge to any surface water drains;

- There will be no hosing of concrete, cement, grout, or similar material spills into surface water drains. Such spills shall be contained immediately, and runoff prevented from entering the watercourse; and
- Discharge of washout water to wastewater (foul) sewer will only be carried out with the express permission of the sewerage undertaker and will be treated to the standard required; for example, because of its high pH (alkalinity), washout water may need treatment before disposal to the foul sewer.

1.4.6 Vehicles and Plants

- Vehicles and plant provided for use on the proposed Scheme will be in good working order to ensure optimum fuel efficiency, and will be regularly inspected to ensure they are free from leaks and are promptly repaired when not in good working order;
- Spill kits will be carried on all vehicles;
- Vehicles and plant will not park near or over drains;
- Refuelling of vehicles and plant will be carried out on hard standing surfaces, using drip trays to ensure no fuel can contaminate the ground outside of the bunded areas;
- For deliveries and dispensing activities, the appointed contractor will ensure that:
 - Site-specific procedures are in place for bulk deliveries;
 - Delivery points and vehicle routes are clearly marked; and
 - Emergency procedures are displayed, and a suitably sized spill kit is available at all delivery points, and staff are trained in these procedures and the use of spill kits.
- The appointed contractor will provide wheel washing facilities, and any other necessary measures to remove mud and organic material from vehicles, at the Construction Compound, where necessary. These will be located at least 10m away from any surface water drains;
- The cleaning of delivery trucks shall be carried out at the Construction Compound and shall not be undertaken at the works areas;
- The surface run-off from vehicle washing areas will be directed to an on-site treatment system where possible; this also increases the potential for reusing the water. Such a treatment system would typically include:
 - A settlement lagoon to remove suspended solids such as mud and silt;
 - Catchpits or silt traps on drains and ensure that they are in place during cleaning. Empty them at regular intervals; and
 - Removal of oil, grease, petrol, and diesel from wash water by passing it slowly through an appropriately sized oil separator.
- The use of detergents in the cleaning process will be minimised; where required, biodegradable and phosphate-free detergents will be used;
- If detergents are used in the washing process, the wash water will not be directed through the oil separator as this will prevent it from working. It will be contained and disposed of off-site using a suitable licensed waste disposal operator, or if a foul or combined sewer is nearby, the surface runoff could be directed to it, with the permission of the sewerage undertaker; and
- To further minimise water used for washing vehicles, trigger-operated spray guns will be used, with an automatic water supply cut-off.

1.5 Monitoring of Water Bodies

The appointed contractor shall carry out visual monitoring of surface water control measures (settlement tanks, silt fences, fuel storage areas etc.) on a daily basis. In addition, weekly visual inspections of the Royal Canal and the River Tolka will be carried out.

Furthermore, Surface water quality sampling will be undertaken at four locations: at stream outlets of the Finglaswood Stream, St. Margaret's Stream, and at the River Tolka, and Royal Canal. Four rounds of sampling will be undertaken – 1st round on commencement of the Geotechnical Ground Investigation works,

and at intervals of 2/ 3 months thereafter. Indicators that water pollution may have occurred include the following:

- Change in water colour;
- Change in water transparency;
- Increases in the level of silt in the water;
- Oily sheen to water surface; and
- Floating detritus, or scums and foams.

If hydrocarbons are observed or other water quality parameters are suspected to have been exceeded, an investigation will be carried out to determine whether any element of the construction of the pScheme could be causing the contamination. If any potential sources of contamination are observed, appropriate actions will be taken (depending on the source and nature) to prevent further contamination and the incident shall be recorded and investigated in more detail to prevent a recurrence. If required, the relevant regulatory authorities will be informed.

1.6 References

Best Practice Guide BPGCS005 – Oil Storage Guidelines (Enterprise Ireland 2003)

Control of Water Pollution from Construction Sites. Guidance for Consultants and Contractors (C532) (Construction Industry Research and Information Association) (CIRIA)2001)

Control of Water Pollution from Linear Construction Projects. Technical Guide (C648) (CIRIA 2006a)

Control of Water Pollution from Linear Construction Projects. Site Guide (C649) (CIRIA 2006b);

Design Manual for Roads and Bridges Part 3 DN-DNG-03022 (NRA HD 33/15) (Including Amendment No. 1) (TII 2015a)

Guidelines for the Crossing of Watercourses During the Construction of National Road Schemes (NRA 2006a)

Guidelines on Protection of Fisheries During Construction Works in and Adjacent to Waters (Inland Fisheries Board (IFP) 2016)

Planning for watercourses in the urban environment, IFI

PUB C650 Environmental Good Practice on Site, 2nd Edition (CIRIA 2005)

Road Drainage and the Water Environment DN-DNG-03065 (TII 2015b);

Safety, Health and Welfare at Work (Construction) Regulations 2013 – S.I. No. 291 of 2013

Directives and Legislation

EC Council Decision 2003/33/EC

European Communities (Environmental Objectives (Surface Waters)) Regulations, 2009 (S.I. No. 272 of 2009 and amendments), and the European Communities (Quality of Salmonid Waters) Regulations, 1988 (S.I. No. 293 of 1988)

H. Construction & Demolition Resource and Waste Management Plan

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GLOSSARY OF FREQUENTLY USED TERMS

Acronym	Term
CEMP	Construction Environmental Management Plan
CDRWMP	Construction & Demolition Resource and Waste Management Plan
DCC	Dublin City Council
DCCAE	Department of Communications, Climate Action and Environment
DECC	Department of the Environment, Climate and Communications
EIA	Environmental Impact Assessment
EIAR	Environmental Impact Assessment Report
EIRP	Environmental Incident Response Plan
EWC	European Waste Catalogue
FCC	Fingal County Council
HGV	heavy goods vehicles
ICW	Integrated Construction Wetland
IÉ	Iarnród Éireann
NTA	National Transport Authority
OCS	Overhead Contact System
OPW	Office of Public Works
PSCS	Project Supervisor for the Construction Stage
PSDP	Project Supervisor Design Process
PTMP	Preliminary Traffic Management Plan
P&R	Park & Ride
RAP	Reclaimed asphalt materials
SUDs	Sustainable Drainage Systems
SWMP	Surface Water Management Plan
TII	Transport Infrastructure Ireland

Section 1: CONSTRUCTION & DEMOLITION RESOURCE AND WASTE MANAGEMENT PLAN

1.1 Introduction

Construction & Demolition Resource and Waste Management Plan (CDRWMP) has been prepared by the Luas team to ensure that waste arising during the Construction Phase and Demolition phase of the proposed Scheme, will be managed in accordance with applicable legislation, local authority plans and policies and regional waste management targets. The purpose of this CDRWMP is to facilitate re-use and recycling and divert waste from landfill.

It should be noted that this CDWMP, as outlined in this document, is equivalent to a Resource & Waste Management Plan (RWMP) as described in the EPA document '*Best Practice Guidelines for the Preparation of Resource Management Plans for Construction and Demolition Projects*'. These Guidelines outline the issues that need to be addressed at the pre-planning stage of a development all the way through to its completion and have been followed in the preparation of this report. The Guidelines reflect the shift of European waste policy from the established linear economic model to a circular economic model. These interventions focus on increasing recycling, reducing the use of virgin resources, retaining materials in the economy as long as possible, maintaining their intrinsic value/quality as high as possible and, reducing hazardous substances in products and waste.

This plan also includes information on the legislative framework and policy framework for construction and demolition waste management in Ireland.

This plan is intended to be a working document and has been prepared to be developed and implemented by the contractor and will form an integral part of the CEMP for the proposed Scheme. This plan should be read in conjunction with the relevant chapters of the EIAR, which outline the design approach and site management requirements and procedures.

This document is preliminary in nature as it has been prepared at a stage when quantities are based on the design developed to a sufficient level of detail to inform the environmental impacts to be assessed in the Environmental Impact Assessment Report (EIAR) and Natura Impact Statement (NIS). However, changes may occur during detailed design stages which may alter the volumes of waste. Engagements with regional/national waste management officers will be held prior to commencement to identify the most optimum approach to management of resources and avoidance of waste.

1.2 Legislation, Plans and Policy

Resource and waste management takes place in a legislative and policy framework. Applicable legislation, policy and best practice guidance was reviewed during preparation of the CDRWMP.

1.2.1 Legislative Context

The main legislation pertaining to waste management in Ireland and of potential relevance to the proposed Scheme includes the following:

1.2.1.1 EU legislation

- Waste Framework Directive 2008/98/EC;
- Landfill Directive Council Directive 1999/31/EC on the Landfilling of Waste;
- European List of Waste, Commission Decision 2000/532/EC;
- Council Directive 2003/33/EC establishing criteria and procedures for the acceptance of waste at landfills pursuant to Article 16 of and Annex II to Directive 1999/31/EC;
- WEEE Directive 2012/19/EU; and
- European Communities (Waste Directive) Regulations, 2011 (as amended)

1.2.1.2 Irish legislation

- Waste Management Act 1996 (No. 10 of 1996) as amended. Subordinate and associated legislation includes:
 - Waste Management (Facility Permit and Registration) Regulations 2007 (S.I. 821 of 2007), as amended;
 - Waste Management (Collection Permit) Regulations 2007 (S.I. 820 of 2007), as amended;
 - Waste management (Licensing) Regulations 2000 (S.I. No. 185 of 2000)as amended;
 - European Union (Packaging) Regulations 2014 (S.I. No. 282 of 2014);
 - Waste Management (Planning) Regulations 1997 (S.I. 137 of 1997);
 - Waste Management (Hazardous Waste) Regulations 1998 (S.I. 163 of 1998);
 - Waste Management (Food Waste) Regulations 2009 (S.I. 508 of 2009);
 - European Union (Waste Electrical and Electronic Equipment) Regulations 2014; (WEEE) (S.I. 149 of 2014);
 - European Union (Batteries and Accumulators) Regulations 2014 (S.I. 283 of 2014);
 - Waste Management (Landfill Levy) Regulations 2015 (S.I. 189 of 2015);
 - European Communities (Transfrontier Shipment of Waste) Regulations 1994 (S.I. 121 of 1994);
 - Waste Management (Shipment of Waste) Regulations 2007 (S.I. 419 of 2007);
 - European Communities (Shipments of Hazardous Waste exclusively within Ireland) Regulations 2011 (S.I. 324 of 2011); and
 - National Waste Management Plan for a Circular Economy 2024-2030.
- Litter Pollution Act 1997, Litter Pollution Regulations 1999 (S.I. 359 of 1999) and Litter Pollution (Increased Notice Payment) Order 2007 (S.I. 558 of 2007);
- Environmental Protection Agency Act 1992 (S.I. 7 OF 1992), as amended; and
- Planning and Development Act 2000 (S.I. No. 30 of 2000), as amended.

1.2.1.3 Guidance

An overview of relevant legislation, policy and best practice guidance related to waste management is presented in Appendix A18.1 Legislation and Policy in Volume 5 of this EIAR. However, the main guidance documents used in the preparation of the CDRWMP were:

- The Eastern Midlands Region Waste Management Plan 2015-2021 (Eastern Midlands Waste Region 2015);
- EU Construction & Demolition Waste Management Protocol (European Commission 2018) ;
- C&D Waste Soil and Stone Recovery / Disposal Capacity Update Report 2020 (Regional Waste Management Offices 2020);
- A Waste Action Plan for a Circular Economy, Ireland’s National Waste Policy 2020-2025 (Department of Communications, Climate Action and Environment (DCCA) 2020);
- Circular Economy Action Plan, For a Cleaner and More Competitive Europe (European Commission 2020);
- Best Practice Guidelines for the Preparation of Resource Management Plans for Construction and Demolition Projects - Draft for Public Consultation (EPA 2021);
- Whole of Government Circular Economy Strategy 2021-2022, Pre-Consultation Draft (Department of Environment, Climate and Communications (DECC 2021); and
- Circular Economy Act 2021.

1.2.2 National Plans and Policy

1.2.2.1 A Waste Action Plan for a Circular Economy 2020 – 2025

In September 2020, the Department of Communications, Climate Action and Environment published ‘Ireland’s National Waste Policy 2020-2025’ (A Waste Action Plan for a Circular Economy). It is a new roadmap for waste planning and management.

This new national waste policy will inform and give direction to waste planning and management in Ireland over the coming years. The Waste Action Plan for a Circular Economy sets out a range of aims and targets for the State and the measures by which these will be achieved, including increased regulation and measures across various waste areas.

The policy document contains over 200 measures across various waste areas including C&D. Furthermore, the policy outlines the significant projected contributions that soils and stones make to overall C&D wastes between 2020 and 2022. These projections can be seen in Table A6 5.1 (Based on projections produced by Regional Waste Management Planning Offices December 2019).

Table A6 5.1: Construction and Demolition Projections

	2020	2021	2022
Total C&D waste	6,410,000 tonnes	6,570,000 tonnes	6,930,00 tonnes
Of which soil & stone	5,000,000 tonnes	5,130,000 tonnes	5,410,000 tonnes

The policy identifies the need to promote waste prevention in the first instance and the need to plan for C&D wastes at the earliest possible stage in a construction project.

1.2.2.2 Resource Opportunity 2012

The Department of the Environment, Community and Local Government published ‘A Resource Opportunity, Waste Management Policy in Ireland’ in July 2012. It sets out how the higher tiers can reduce reliance on finite resources, virtually eliminate reliance on landfill and minimise the impact on the environment. The policy recognises the importance of waste as an energy resource opportunity in terms of recovery, and the need to develop efficient ways to harness that resource.

1.2.3 Regional Plans and Policy

1.2.3.1 Eastern-Midlands Region Waste Management Plan 2015-2021

The proposed Scheme is located within the Eastern-Midlands Region (EMR).

The Eastern-Midlands Region comprises Dublin City Council, Dún Laoghaire-Rathdown, Fingal, South Dublin, Kildare, Louth, Laois, Longford, Meath, Offaly, Westmeath and Wicklow County Councils.

The EMR ‘Waste Management Plan (2015)’ provides a framework for the prevention and management of waste in a sustained manner. The plan was developed originally in consultation with the Department of the Environment, Community & Local Government (DECLG), the Environmental Protection Agency (EPA), the Irish Waste Management Association (IWMA) and other stakeholders.

The three key objectives of the Eastern-Midlands Region Waste Management Plan are:

- Prevent waste: a reduction of one per cent per annum in the amount of household waste generated over the period of the plan;
- More recycling: increase the recycle rate of domestic and commercial waste from 40 to 50 per cent by 2020; and
- Further reduce landfill: eliminate all unprocessed waste going to landfill from 2016.

1.2.3.2 Dublin City County Development Plan 2022 - 2028 & Fingal County Development Plan 2023 – 2029

Dublin City Council & Fingal County Council will continue to facilitate the implementation of national legislation and national and regional waste management policy having regard to the waste hierarchy, including the Eastern Midlands Region Waste Management Plan 2015–2021 (EMRWMP). The implementation of the EMRWMP must ensure that European and national mandatory targets are achieved and, in doing so, that the health of communities in the region, its people and the environment are not compromised.

1.3 Description of the Proposed Scheme

Information on the proposed Scheme will be included in this section of the CDRWMP. This information will assist those without detailed knowledge of the proposed Scheme in quickly familiarising themselves with its key elements and will also assist those who have a need to examine, review or audit the CDRWMP.

1.3.1 Project Description and Location

The proposed Luas Finglas project, referred to hereafter as the proposed Scheme, is the proposed new northern extension of the Luas Green Line from its current terminus in Broombridge to a new terminus in Charlestown. The proposed Scheme is approximately 3.9km long and has four proposed stops and a stabling area (refer to Figure A6 5.1). The existing Luas stabling area just south of the current Broombridge stop and Hamilton Depot will be enlarged with the addition of four new lanes in order to accommodate an increase in LRT vehicle storage. A modified points connection will facilitate access to the line and depot itself. The proposed Scheme runs from Broombridge to Charlestown through Tolka Valley and Finglas village and is described from south to north in the following geographical sections:

- Area 30 Broombridge Depot;
- Area 31 Broombridge to Tolka Valley Road;
- Area 32 Tolka Valley Road to Finglas Village Stop; and
- Area 33 North of Finglas Village Stop to the terminus (Charlestown Stop).

A full description of all proposed construction and demolition works is provided in Chapter 5 (Description of Proposed Scheme) in Volume 2 of the EIAR.

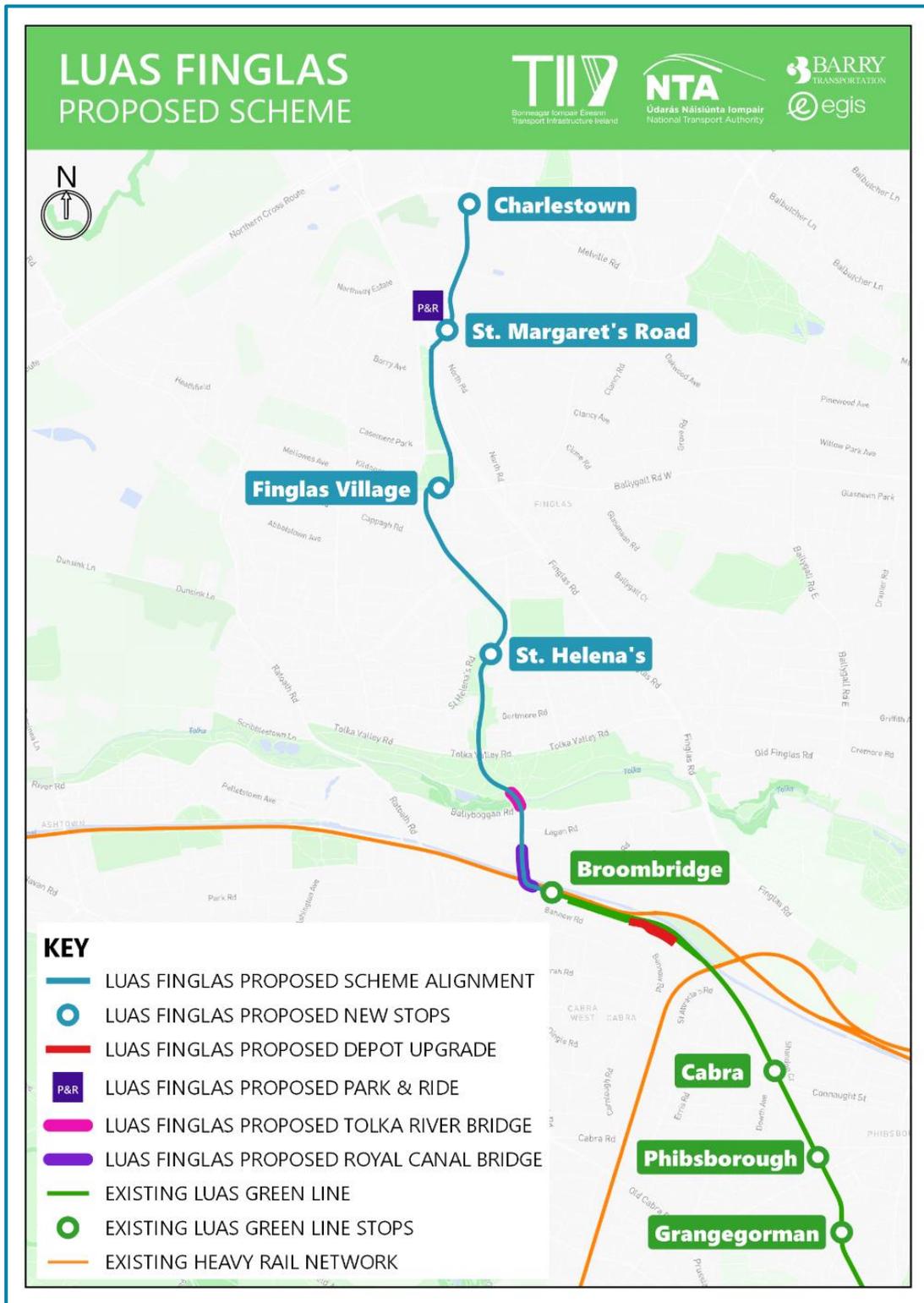


Figure A6 5.1: Luas Finglas Preferred Route

1.3.2 Construction Programme

The expected Construction Programme for the Main Infrastructure Works is approximately 3 to 3.5 years, including testing and commissioning. Multiple work areas will be progressed at the same time in order to achieve this overall programme. A programme for the proposed Scheme is provided in Figure A6 5.2 below which identifies the overall proposed duration and the approximate duration of works in each section.

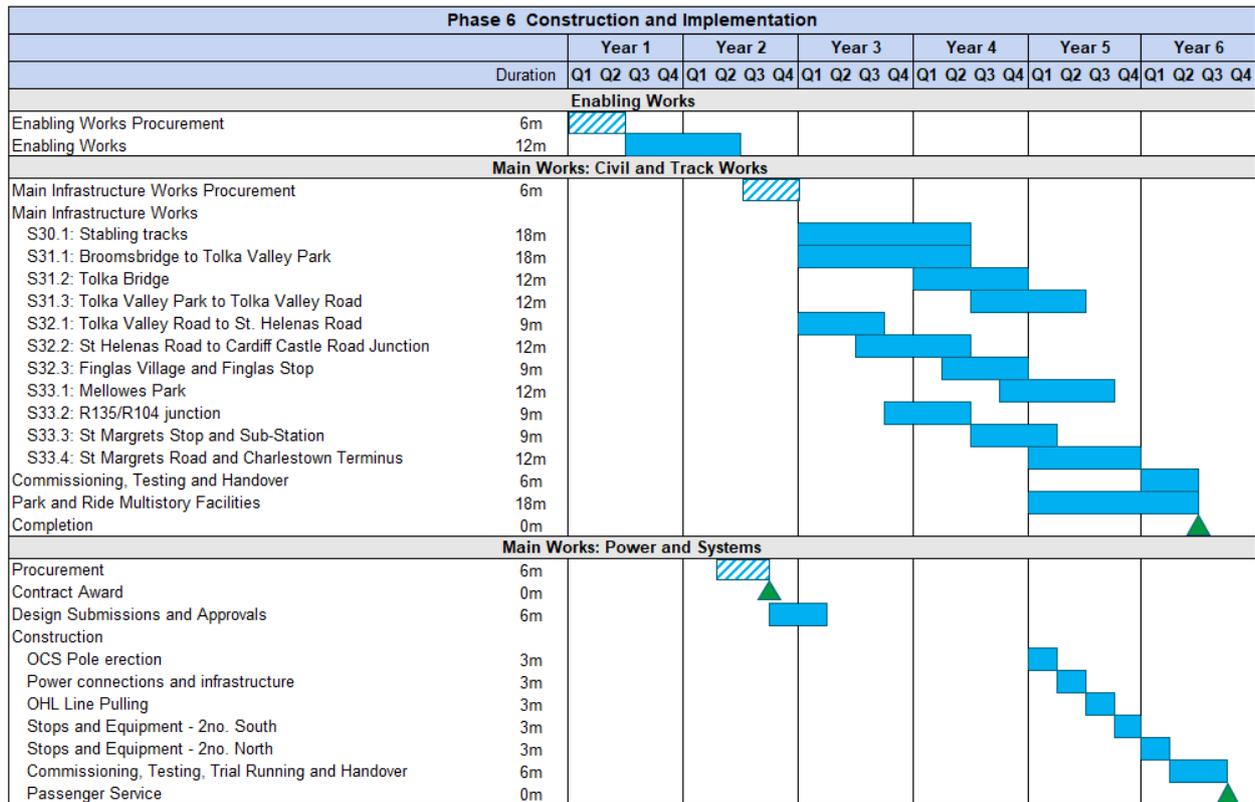


Figure A6 5.2: Construction Programme

The detail of this proposed construction programme is provided in Chapter 6 (Construction Activities) of the EIAR.

1.3.3 Construction Activities/Elements

The Construction activities and elements are described further Chapter 5 (Description of Proposed Scheme) and Chapter 6 (Construction Activities) of this EIAR. A summary is included in the Table A6 5.2.

Table A6 5.2: Construction Activities for the proposed Scheme

Enabling Works Activities	Main Works Activities	
<ul style="list-style-type: none"> Demolitions; Utility Diversions; Archaeological and Heritage Works (likely to be progressed as a component of other Enabling Works packages); Modification of integrated constructed wetlands (ICW) at Tolka Valley Park; Farnham Playing Pitch Modifications; An Garda Síochána PEM building Relocation and internal/boundary reconfiguration works – subject to agreement with OPW; and Tree Relocations. 	<ul style="list-style-type: none"> Tracks [trackbed and rails]; Luas Stops at St Helena’s, Finglas Village, St Margaret’s Road and Charlestown; Broombridge Stabling Site Works; Archaeological and Heritage Works; Site Clearance and Demolitions required to progress during main works; Fencing; Earthworks; Removal of contaminated spoil at Tolka Valley Park; Royal Canal and Rail Overbridge; Tolka Valley Park Bridge ; Cycle storage buildings; 	<ul style="list-style-type: none"> Park & Ride facilities at St Margaret’s Road; Utility Diversions required to progress during main works; Retaining walls and boundary treatments; Road realignments and modifications; Road furniture and equipment; Pedestrian and Cycling facilities; Track and road traffic signalling; Public lighting; Accommodation Works; Soft and Hard landscaping; Reinstatement Works; Overhead Contact System (OCS); Power and Systems infrastructure;

Enabling Works Activities	Main Works Activities	
	<ul style="list-style-type: none"> ▪ Temporary Traffic Management arrangements; and ▪ Haul roads and Works Compounds. 	<ul style="list-style-type: none"> ▪ Stops furniture and equipment; and ▪ Testing and Commissioning.

1.4 Roles and Responsibilities

The main contractor will appoint a suitably qualified person as C&D Waste Manager to ensure commitment, operational efficiency and accountability during the C&D phases of the project.

The Waste Manager would have overall responsibility for waste management at the site, by setting up and maintaining a waste records system for the waste generated onsite as well as the records for waste transferred offsite. The waste manager will be responsible for maintaining and implementing the CDRWMP throughout the demolition, excavation, and Construction Phase of the proposed Scheme. It would be the responsibility of Waste Manager to conducting a waste audit at the site during the C&D phases of the development. They will also be trained in the best methods for segregation and storage of recyclable materials, have information on the materials that can be reused on site and be knowledgeable in how to implement this CDRWMP.

The role of the Waste Manager would ensure that the opportunity is taken to educate all colleagues, site staff, including external contractors and suppliers, about alternatives to conventional construction waste disposal.

The appointed contractor and all personnel handling wastes must be in a position to:

- Distinguish reusable materials from material suitable for recycling;
- Ensure maximum segregation of waste and recyclables at source;
- Co-operate with the appointed contractor on best locations for stockpiling reusable material;
- Separate material for recovery; and
- Identify and liaise with operators of recovery outlets as appropriate.

Copies of CDRWMP will be made available to all relevant personnel.

1.4.1 Auditing

A waste audit will be carried out by the C&D Waste Manager to identify any problems with the site's waste procedures and also benefits of prevention and minimisation that is in place. The waste audit will document details of raw material inputs and the quantity, type, and composition of all waste removed from the site. The name, address and authorisation details of all facilities and locations to which waste and materials are delivered will be recorded along with the quantity to each facility. Records will show material, which is recovered, which is recycled, and which is disposed of.

The audit process will identify appropriate performance and waste output or re-use targets. The results of the audits will be documented in a periodic summary report which will outline the types, quantities of waste arisings and their final treatment method.

Waste management costs would also be reviewed as part of the Waste Audit.

1.4.2 Tracking and tracing

The appointed contractor is required to maintain records for all resource material which is used on site and leaves the proposed Scheme, either for reuse, recycling, energy recovery, backfilling or other recovery or disposal on third party sites.

A recording system must be put in place to record residual waste and resources generated on the proposed Scheme.

It is the obligation of the appointed contractor or their appointed person to ensure that all resources taken off site are in line with the relevant legislation and the key area relates to ensuring that hauliers and collection sites have the appropriate authorisations.

The Waste Manager will maintain a system whereby quantities, descriptions and relevant codes of all waste arising (whether reused and recycled or exported off-site) and if applicable, Article 27 declarations made.

The tracking system employed will enable the contractors to effectively measure and record the quantity of waste being generated, which allows wastage to be more readily identified. The most significant areas where waste products arise can be identified along with the percentage of new material which may be wasted.

1.4.3 Training

The CDWMP shall also be included in site induction training and toolbox talks, where required. All site personnel and Subcontractors will be instructed about the objectives of the plan and informed of the responsibilities that fall upon them as a consequence of its provisions. This is traditionally carried out during the induction process for new staff members. Where source segregation and material re-use techniques apply, each member of staff will be given instructions on how to comply with the CDWMP. Site notices will be designed to reinforce the key messages within the plan and will be displayed prominently for the benefit of staff.

1.5 Key Materials, Quantities and Cost

1.5.1 Excavated Waste Generation

1.5.1.1 Earthworks Materials

Excavation works will be required for the proposed development. Earthworks will be undertaken to achieve the required formation levels for the various track systems and supporting structures. Material generated during the construction of the proposed Scheme will be managed to maximise the opportunities for reuse and recycling where practicable and will also aid to minimise the potential effects of material management on the receiving environment. Circular Economy principles are to be adopted through all stages of the project to optimise the use of natural resources and recycled materials and minimising waste.

Whilst excavated material will be reused where possible along the scheme a portion will be required to be exported. There is an estimated volume of 30,600 tonnes surplus soil material on the project due to earthworks activities.

In so far as is possible, options for beneficial reuse of the clean, suitable soil and stone material in accordance with Article 27 of the European Communities (Waste Directive) Regulations 2011 will be sought. This will prevent the need to classify all of the excavated material as a waste. Article 27 allows an operator to classify, under certain conditions, that material is a by-product and not a waste. Classification of material as a by-product means that the material is approved for a use that is not regulated by waste management legislation, and therefore is not required to be managed as per that legislation. For construction projects, excavated soil and stone can be categorised under this exemption provided the material adheres to the conditions stipulated under Article 27. The management of excavated materials is described in Chapter 19 (Material Assets: Waste Management) of this EIAR.

Where short-term temporary storage is unavoidable, the method of storage of material will be key to its potential use as certain types of materials/mud are likely to degrade if left uncovered in wet weather due to its low plasticity and silty nature.

For more details on earthwork activities refer to Chapter 5 (Description of Proposed Scheme) and Chapter 6 (Construction Activities) in Volume 2 of the EIAR. Further information on waste and resource management,

including estimated quantities of materials produced and lists of waste permitted and licenced facilities in the counties surrounding the project, is available in Chapter 19 (Material Assets: Waste Management) in Volume 2 of the EIAR. This chapter also identifies significant scope for re-use and recycling of materials and materials optimisation, however, the true potential for this cannot be accurately quantified until a contractor has been chosen and appointed.

Surplus Soil Arising from Shallow Earthworks

The measures identified below are proposed to mitigate the potential impact of the proposed Scheme.

- It is recommended that a Soil and Material Management Plan (SMMP) is produced by the appointed construction contractor, in order to detail procedures to manage the excavation and removal of soil during construction works;
- Where unidentified contamination (such as potential asbestos containing material or free phase hydrocarbon product) is encountered, material shall be segregated and stockpiled on a low permeability surface with bunding and shall be covered to allow further testing of the impacted soils to enable specification of treatment and re-use, or disposal;
- It remains the responsibility of the construction contractor to ensure that material is appropriately managed during the development. In particular, the Contractor will be responsible for the appropriate segregation of excavated materials. The Contractor will retain a competent person to manage and supervise soil excavation and removal from the site. This person will ensure correct procedures are followed and that waste soils are appropriately logged and tracked using appropriate docketing system;
- The appointed construction contractor for future groundworks will retain the services of an experienced environmental engineer or scientist during bulk excavation works, primarily to identify any previously unidentified contamination; and
- In recognition of national policy and sustainability, where material cannot be reused as part of the on-site development works and requires transfer off site, consideration will be given to the transfer of this material as a by-product under Article 27 of the European Communities (Waste Directive) Regulations 2011.

Representative samples of in-situ materials have undergone testing to assess their suitability for re-use. These materials are largely considered suitable for re-use, though in some instances may require mechanical screening e.g. to remove oversize or isolated anthropogenic material.

Material that is not suitable for re-use, will be removed off site for treatment, recycling or disposal at an authorised waste management facility. The Resource and Waste Management Plan (RWMP) included in the Construction Environmental Management Plan (CEMP) addresses the analysis of waste arisings, methods proposed for the prevention, re-use and recycling of wastes, and material handling procedures. Refer to Chapter 19 (Material Assets: Resource and Waste Management).

Potentially Contaminated Soils Arising from Earthworks during Construction

The appointed construction contractor will be responsible for the compliant management of all waste generated by construction activities and will be responsible for updating and implementing the CEMP, where modifications to the prepared CEMP will not give rise to any impacts more significant than those already identified and assessed in this EIAR or the NIS. The updated CEMP will identify construction methodologies for the proposed Scheme and standard operating procedures that will be implemented to minimise the impact. The appointed contractor(s) will implement in full all of the measures set out in the CEMP.

The Contractor will be responsible for regular testing of excavated soils to monitor the suitability of the soil for re-use. Samples of ground suspected of contamination will be tested for contamination by the Contractor and ground excavated from these areas will be disposed of to a suitably licensed or permitted sites in accordance with the current Irish waste management legislation.

While the risk of asbestos containing materials is very low, construction workers will be briefed on the possible presence of localised asbestos. Dermal contact with soils (particularly Made Ground) will be

avoided wherever possible and appropriate training and Personal Protective Equipment (PPE) and Respiratory Protective Equipment (RPE) will be provided to mitigate the risk of inhalation of asbestos.

1.5.1.2 Other Excavation Waste Generation

Other excavation waste will arise from such activities as:

- Excavation of existing carriageways, footpath etc. (e.g. road narrowing, removal of islands);
- Excavation for utility diversions and / or protections.

The waste types likely to be generated during the Construction Phase are set out in Table A6 5.3. The total forecast of surplus excavation material from the proposed Scheme will be 28,259 tonnes and is equivalent to 0.40% of the C&D waste management baseline for the EMWR set out in Table A6 5.1.

Table A6 5.3: Estimated Excavation Waste Types and Quantities

Waste Type	Approximate Waste and Material Quantities (tonne)
Asphalt	18,498
Concrete, bricks, tiles and similar	8,428
Steel	657
Segregated wood, glass and plastic	676
Total	28,259

1.5.2 Demolition Waste Generation

As described in Chapter 6 (Construction Activities) in Volume 2 of the EIAR, the main structures to be demolished along the proposed Scheme are as follows:

- S31.1 Irish rail ramp from Broombridge Road to Northern Road;
- S31.1 Unit 124 Broombridge Close, Glen Industrial Estate to East of Broombridge Road;
- S31.1 Vacant Layertite building to East of Broombridge Road;
- S31.2 Park Building in Tolka Valley Park at a proposed compound location;
- S32.3 Finglas Garda Station demolitions (OPW);
- S33.1 Three DCC-owned buildings along proposed alignment just to north of Mellows Road including abandoned Parks Superintendent Building;
- S33.1 Pedestrian footbridge at southern end of St Margaret’s Road over N2;
- S33.3 North Road Motor Company and associated buildings at southern end of St Margaret’s Road;
- S32.3 Pizza Hut building at southern end and to the east of St Margaret’s Road;
- S32.3 Shed at 234 McKee Avenue along boundary with Pizza Hut;
- S32.3 Outbuilding at Kylemore’e plot adjacent to 234 McKee Avenue;
- S33.3 Discount DIY North Road for Park & Ride at southern end and to the east of St Margaret’s Road (assumed to be in a main works contract);
- S33.4 Manhattan Peanuts Ltd. Substation Building at southern end and to the east of St Margaret’s Road;
- S33.4 Four outbuildings/extensions at Jamestown Business Park: Side extension to south of Finglas Auto Building; Outbuilding to rear of Envision Health and Fitness; Outbuilding in green area to rear of Dunns Seafare Ltd.; Lean-to extension at loading bay of Sail Installations and Logistics; and
- Various Existing boundaries being altered/replaced along route [mainly in the Broombridge Road, Finglas Village and St Margaret’s Road areas].

Pre-demolition surveys will be undertaken to confirm the proposed methodology to be undertaken and provide sufficient detail to allow the full management of the demolition and resulting materials. Pre-demolition surveys will include appropriate hazardous materials surveys to identify all asbestos containing materials and other hazardous materials that may be present. Demolition survey mitigation measures to limit dust, noise, vibration and air pollution (e.g., through dust and fumes) will be implemented. It is predicted

that high overall recycling/recovery rates can be achieved for all inert and non-hazardous construction and demolition (C&D) wastes (excluding soils and stones).

A large portion of demolition waste is expected to be inert waste such as concrete, brick and tiles etc. Metal waste will also be generated from demolition. Segregated wood, glass and plastic will also be generated.

1.5.2.1 Demolition Plan

A demolition plan must be prepared by the Contractor in advance for each structure to be demolished. The plan will be developed by the construction contractor and will include the following:

- Details of ground removal and/or backfilling;
- Details of the principal materials of construction and the building condition and plan for handling such materials both non-hazardous or hazardous such as asbestos and plan for disposing by licenced contractor to a licenced waste facility as required under the Waste Management Act 2006 (as amended);
- The procedures for the demolition of the building, with a detailed sequence of demolition;
- Protection and control measures; and
- Methods for the handling and disposal of waste such as the means of transport of waste material from the site, time and frequency of waste material movement offsite and a methodology for recording the materials generated and disposed of.

The plan will also set out requirements for the handling of debris and method of waste disposal to a licensed facility as required under the Waste Management Act 2006 (as amended).

1.5.2.2 General Construction and Demolition Works

General construction and demolition wastes are made up of waste such as wood, packaging, metals, plastics, bricks, blocks, canteen waste, some hazardous waste, e.g. oils, paints and adhesives. Site clearance and residual waste will be generated during the Construction Phase, primarily from the construction of the proposed Scheme.

An overview of the methods to manage the primary waste streams expected is presented below. The main types of construction waste produced will be:

1.5.2.3 Demolition Waste Generation

All material generated from the proposed Scheme will be considered for re-use for construction within the proposed Scheme or in other construction projects in accordance with Article 27 of the Waste Directive Regulations 2020 (S.I. 323 of 2020), (hereafter referred to as the Waste Directive Regulations). It will be the responsibility of the appointed contractor to review feasibility of reuse of materials and ensure that the necessary testing is undertaken to demonstrate compliance with Article 27, as appropriate.

Materials will require on-site segregation by waste classification, where practicable and appropriate, and if in reusable condition, street and roadside infrastructure such as bus stops, lighting poles, traffic signals, manhole access covers, and signs will be reused within the proposed Scheme. If not reused, they will be delivered to appropriately recycling or recovery facilities.

Table A6 5.4: Estimated Demolition Waste Types and Quantities

Waste Type	Approximate Waste and Material Quantities (Tonnes)
Concrete, bricks, tiles and similar	8500
Metals	700
Segregated wood, glass and plastic	750
Total	9,950

1.5.2.4 Construction Waste Generation

Construction works, site offices and temporary works facilities are also likely to generate waste. General construction waste can vary significantly from site to site but typically will include the following non-hazardous materials:

- Soil and stone;
- Concrete, brick, tiles and ceramics;
- Bituminous mixtures;
- Metals;
- Wood;
- Municipal type wastes generated by construction employees; and
- Other.

The hazardous waste streams which could arise from construction activities include the following:

- Waste electrical and electronic equipment (WEEE) components;
- Batteries;
- Asbestos;
- Wood preservatives;
- Liquid fuels; and
- Contaminated soil.

Also included within this definition are surplus and damaged products and materials arising in the course of construction work or used temporarily during the course of on-site activities. In the case of the proposed Scheme, the most likely type and quantity of general construction waste will be surplus concrete and unusable or damaged pipe segments which may arise on-site. Quantities of these materials are estimated to be small and recoverable; assumed to be approximately between 5% to 15% of construction material delivered to site, as stated in the Waste and Resources Action Programme (WRAP) Builders: Estimating Waste (WRAP 2014). There is adequate capacity for the management of such wastes. Segregation facilities will be provided to ensure that recovery and recycling of such wastes are maximised.

1.5.2.5 Municipal Waste Generation

It is anticipated that there will be approximately 180 construction staff employed directly over the Construction Phase of the proposed Scheme. Small volumes of general municipal waste will be generated by construction staff during the Construction Phase (e.g. from offices and welfare facilities). In addition, it is anticipated that there will be significant indirect employment supported by the proposed Scheme, for example; in logistical support companies, material and plant suppliers, traffic management companies and in the local service industry. Segregation facilities will be provided on the construction site to ensure that recovery and recycling of such wastes is maximised.

1.5.2.6 Concrete

Waste concrete is likely to arise during the Construction Phase of the Luas Finglas. It is proposed that waste concrete generated will be returned to the supplier for re-use. For every tonne of concrete waste that is recycled for aggregate in new concrete, significant savings are made in energy and carbon dioxide emissions. It also saves money by avoiding disposal costs, which continue to increase. Residual concrete waste will be source segregated and stored in designated containers at the waste storage area for subsequent separation and recovery at a remote facility.

1.5.2.7 Metals

Metal waste has a significant scrap value. Although it is now common practice for sites to segregate metals for reuse and recycling, there are still sites where metal is thrown away with general rubbish. One of the primary sources of metal waste is steel reinforcement. Wastage of steel reinforcement will be reduced by ordering made-to-measure steel from the manufacturer and detailed scheduling of all reinforced concrete structural elements.

Skip hire companies may provide free skips for the storage of scrap metal on sites, and this will be investigated prior to construction commencing. When metal storage containers are full, they will be removed by the waste storage contractor and sent to a metals recycling facility.

1.5.2.8 Timber

Timber waste will be stored separately as it is readily contaminated by other wastes and if it is allowed to rot will reduce the recyclability of other stored wastes. Any pallets will be returned to the supplier for re-use. Off-cuts and trimmings will be used in formwork where possible. A container for waste wood will be covered where possible and will be placed in the waste storage area. The waste wood will be collected by a waste contractor who will forward it to a wood recycling facility for chipping.

Treatment of timber with chemicals and the overuse of nails will be minimised and avoided as this will make it difficult to reuse/recycle the timber afterwards. The utilisation of reclaimed timber products will also be investigated.

1.5.2.9 Packing and plastic

Double handling will be avoided by segregating packaging wastes immediately after unwrapping. Many suppliers are now prepared to collect their own packaging for recycling, and this will also be investigated prior to works commencing. It is intended that, where possible, materials with recycled packaging will be purchased. Waste packaging will be segregated and stored in separate containers, preferably covered, in the waste storage area for collection by the waste management contractor and distribution to packaging recycling facilities.

1.5.2.10 Blocks, bricks and tiles

The careful storage of these raw materials will significantly reduce the volume of these wastes arising on site. The most likely wastes produced will be off-cuts, trimmings and waste arising from breakages. Every effort will be made to use broken bricks and off-cuts.

1.5.2.11 Hazardous wastes

Prior to removal from the site, any hazardous waste identified will undergo a comprehensive waste assessment and classification by a suitably qualified person in accordance with the European Waste Catalogue and Hazardous Waste List. It should be noted that if non-hazardous waste becomes contaminated with hazardous waste, the entire load will be considered hazardous. It is, therefore, critical to ensure that waste segregation areas are provided and are used properly to separate out hazardous, non-hazardous and inert waste arising. Hazardous wastes will be identified, removed and kept separate from other construction and demolition waste materials in order to avoid cross-contamination. Specific method statements detailing the necessary mitigation measures required during excavation, handling transportation and disposal of hazardous wastes encountered on the site will be prepared as required.

The likely disposal/treatment for any hazardous wastes available to the Contractor will depend on the nature of the hazardous material and the concentration of parameters of concern. The costs associated with treatment and disposal will similarly vary depending on the concentration of parameters of concern and on the tonnage involved. There are several operators/facilities in operation within Ireland that could potentially accept the contaminated material depending upon the results of the Waste Acceptance Criteria testing or assist in the export of the material abroad for special treatment where required. Full details of the disposal route for hazardous wastes will be provided in the detailed CDRWMP following the appointment of the contractor and completion of the further investigations required.

1.5.2.12 Hazardous liquids (oils, paints, chemicals)

Hazardous liquid waste arising from the construction process will require careful handling. Oils, paints, bitumen, adhesives and chemicals will be kept in a separate contained storage area which will be locked when not in use. Hazardous liquids will be stored at least 10m from any watercourses. Lids will be kept on containers in order to avoid spillage or waste by evaporation. Waste oils, paints and chemicals, including

the containers, will require careful handling and disposal. These will be stored in a containment tray with a capacity to contain 110% of the volume of the largest container.

Fuels and chemical will be stored in double-skinned containers or within a bund, i.e. an impervious structure with the capacity to contain 110% of the volume of the largest tank stored within it. All containers will be carefully labelled.

1.5.2.13 Food wastes

Site staff generate food waste and packaging waste. Designated receptacles will be provided to allow for the segregation and storage of individual waste streams. These will include receptacles for food waste, e.g. brown bin for waste foods and peelings, dry recyclables; e.g. green bin for packaging, plastics, metals, wood, paper, cardboard and tetrapack; and residual bin, e.g. black bin for mixed food and packaging waste. Separate receptacles for the recyclable fractions may be provided such as plastics, metals, glass and this will be designed and detailed by the waste management co-ordinator in consultation with the selected waste management contractor.

1.5.2.14 Other wastes (residual)

Waste material other than those outlined above can constitute a significant proportion of the total waste generated by a construction site. This waste is normally made up of residual, non-recyclable waste such as soiled paper, cloth, cardboard or plastics, as well as food waste and general waste found on the site, including plastic bottles, bags, cans etc. Given the heterogeneous nature of this material, it is most important that residual waste is kept separate from the other waste streams to avoid contamination. This material will be stored in a dedicated container in the waste storage area. Container size and collection frequency will be assessed with waste management contractors as works proceed. All residual wastes will be dispatched to a suitably licensed facility for disposal. Other construction and demolition waste material will be collected in receptacles with mixed construction and demolition waste materials for subsequent separation and disposal at a segregation facility.

1.5.2.15 Costs of Waste Management

While landfill disposal has been the most commonly used method for waste management in Ireland in the past, waste to energy incinerators are also now in operation at Poolbeg, Dublin 4 and in Carranstown, County Meath.

Typically, the current cost of disposal of waste to landfill in Ireland exceeds €170 per tonne. From 1 July 2013, in accordance with S.I. No. 194/2013 - Waste Management (Landfill Levy) (Amendment) Regulations 2013, the '*landfill levy*' increased to €75 per tonne for waste disposed to landfill. Disposal of hazardous waste can cost from €350 per tonne.

In addition to landfill operator fees and landfill levies, there are additional costs included in the '*true cost of waste management*' including:

- The purchase cost of waste materials (including imported soil);
- Handling costs;
- Storage and transportation costs; and
- Revenue generated from sales.

Therefore, in order to reduce costs associated with waste management, surplus materials should be reused and recycled where possible, and materials should be carefully stored and handled to minimise risk of damage.

1.6 Site and Waste Management

1.6.1 Introduction

The Employer is committed to implementing the principles of sustainable resource and waste management. Waste from the proposed Scheme will be managed in accordance with the principles of a circular economy and the waste hierarchy. Waste disposal will be minimised, in so far as is reasonably practicable, and opportunities for re-use of materials, by-products and wastes will be sought throughout the Construction Phase of the proposed Scheme.

Following appointment, the contractor will be responsible for maintaining the CDRWMP. It will be at the discretion of the appointed contractor to determine how material from the proposed Scheme will be managed. It is assumed, as a worst-case scenario, that all excavated soil will be managed or disposed of at an authorised facility, either in Ireland or abroad. However, all of the described below options may also be used.

1.6.2 Waste Management

The management of construction and demolition waste will reflect the waste management hierarchy, with waste prevention and minimisation being the first priority, followed by reuse and recycling. During site clearance and construction works, there are numerous opportunities for the beneficial re-use and recycling of materials. The subsequent use of recycled materials in reconstruction works also reduces the quantities of waste which ultimately needs to be consigned to landfill sites.

The Contractor will develop and implement a plan and manage all waste with a goal of achieving the waste hierarchy in accordance with the relevant statutory provisions. This hierarchy is echoed in the EPA's best practice guidelines for RWMPs.

1.6.2.1 Source Segregation

Wastes generated on the construction site will be identified and segregated according to their respective categories, as described by the European Waste Catalogue (EWC). Where possible, metal, timber, glass, and other recyclable material will be segregated and removed off-site to a permitted/licensed facility for recycling.

In order to achieve this, designated waste storage areas will be created at the construction compounds or other suitable locations for the storage of segregated wastes prior to transport for recovery/disposal at suitably licensed/permitted facilities. Suitably-sized containers for each waste stream will be provided within the waste storage area and will be supervised by the waste management co-ordinator, who will be appointed by the Contractor. This will be the person responsible for the management of waste during the construction of the Luas Finglas project. The number and sizing of containers will be agreed with Waste Contractors in advance of construction works commencing. Source segregation of waste will result in cost savings to the project as well as providing an environmentally sound route for the management of all construction and demolition wastes.

1.6.2.2 Re-use

Possibilities for re-use of clean, non-hazardous excavation material as fill on the site or in landscaping works will be considered following appropriate testing to ensure material is suitable for its proposed end use. Where excavated material is not to be reused within the works, the Contractor will endeavour to send material for recovery or recycling so far as is reasonably practicable. The Contractor will ensure that, if required, any offsite interim storage facilities for excavated material have the appropriate waste licences or waste facility permits in place.

1.6.2.3 Material Management

In order to prevent and minimise the generation of waste, the Contractor will be required to ensure that raw materials are ordered so that the timing of delivery, the quantity delivered, and the storage is not conducive to the creation of unnecessary waste. The Contractor, in conjunction with the material suppliers, will be

required to develop a programme showing the estimated delivery dates and quantities for each specific material associated with each element of construction and demolition works. Following a 'just-in-time' approach improves cash flow, better utilises storage space, reduces risk of environmental pollution events and reduces potential loss to theft and accidental damage as well as making the site safer.

It is essential that the planning, construction and demolition works are undertaken in close collaboration with waste management contractors, in order to determine the best techniques for managing waste and to ensure a high level of recovery of materials for recycling. The Contractor will be required to continuously seek to improve the waste management process on site during all stages of construction and maximise opportunities for re-use and recycling where they exist. For example, in relation to waste packaging, the Contractor will seek to negotiate take-back of as much packaging waste as possible at source to ensure maximum recycling. The CDWMP will be included as an agenda item at the weekly construction meetings. In addition, the plan will be communicated to the whole team (including the Employer) at the monthly meetings. This will include any updates to earlier versions of the document.

1.6.2.4 Site Preparation

The construction of the Luas Finglas project will require site clearance as part of the development. Site preparation will include certain diversion works of services and utilities, such as public lighting, power services, water mains, rising main, storm water, electricity, telecommunications, gas mains and traffic light services. Due to the nature of some of the diversions, a number of these service diversions will only be possible during the main construction works.

The Contractor's CDWMP will take the following into account:

- The extent of the areas to be cleared and the potential types and volumes of arisings;
- The location of any structures to be demolished;
- Statutory requirements; and
- Specific environmental requirements and seasonal requirements.

1.6.3 Waste and Recycling Targets

The Contractor's CDWMP, waste handling and proposed construction methods should endeavour to achieve the following targets.

- The re-use of earthworks materials generated on site where possible;
- 100% recycling of surplus reinforcement and other metals, where possible; and
- No contamination of skips.

1.6.4 Waste and Recycling Opportunities

The Contractor will seek opportunities, wherever possible, to reduce the amount of waste generated on site and maximise the potential for recycling materials in accordance with the waste hierarchy through the following:

- Storing materials in designated areas and separate from wastes to minimise damage;
- Returning packaging to the producer where possible;
- Segregating construction and demolition wastes into reusable, recyclable and non-recyclable materials;
- Reusing and recycling materials on site during construction where practicable;
- Recycling other recyclable materials through appropriately permitted/licensed contractors and facilities; and
- Disposing of non-recyclable wastes to licensed landfills.

1.7 Scheme Infrastructure

1.7.1 Site Offices, Construction Compounds

Location of construction compounds are indicated on Table A6 5.5 and are detailed in Chapter 6 (Construction Activities) in Volume 2 of the EIAR.

Table A6 5.5: Location of Site Compounds

No.	Area/Section	Location	Use (Primary/Secondary)	Approximate Size
C-31A	S31.1	West of Broombridge Road – on southern side of rail and canal crossing adjacent depot entrance	S	2036m ²
C-31B	S31.1	West of Broombridge Road – use of green area to north of railway	P	3427m ²
C-31C	S31.1	West of Broombridge Road – use of unit in the Glen Industrial estate prior to demolition	P	1522m ²
C-31D	S31.3	Tolka Park – The Parks Building	S	2519m ²
C-32A	S32.1	Adjacent to St Helena's Stop	S	5448m ²
C-32B	S32.2	Northwest corner of Wellmount road crossing	S	1034m ²
C-33A	S33.1	Old Park superintendent's cottage and land to north next to Finglas Fire station	S	1829m ²
C-33B	S33.3	Northern extents of Mellows Park	P	2017m ²
C-33C	S33.3	St Margaret's/Mckee Ave Junction	S	948m ²

Temporary construction compounds are generally located adjacent to the site of individual elements of infrastructure to be constructed. Construction compounds will only be in place during the Construction Phase of the project.

The construction compounds will contain a site office, and welfare facilities for employer personnel and appointed contractor personnel. Limited car parking will be allowed at the construction compounds. Materials such as topsoil, subsoil, concrete, rock etc., will be stored at the construction compounds for reuse as necessary. Items of plant and equipment will also be stored within the construction compounds. All necessary authorisations, under the Waste Management Act, as amended, will be obtained prior to undertaking temporary storage.

1.7.2 Waste Collection and Transportation

Waste from the proposed Scheme will be transported by authorised waste collectors in accordance with S.I. No. 820 of 2007 - Waste Management (Collection Permit) Regulations 2007, as amended.

A list of currently authorised waste collectors used to transport waste during the proposed Scheme will be maintained at the construction compounds and updated by the appointed contractor. Copies of valid appropriate waste collection permits will also be held at the construction compounds by the appointed contractor. A list of the currently authorised waste collectors is available on the following website (<https://www.nwcpo.ie/permitsearch.aspx>.)

1.7.2.1 Hazardous Wastes

The following steps must be taken where hazardous waste is being transported from the proposed Scheme to a hazardous waste recovery or disposal facility within Ireland:

- Waste transfer forms shall be obtained by the waste producer from the local authority website, and completed online before the waste is collected;
- A copy shall be downloaded, printed and signed, accompanying the consignment of hazardous waste when it is in transit; and
- On the load's arrival, the operator of the recipient disposal or recovery facility shall log-in and complete the relevant details documenting the receipt of the waste.

Export of hazardous waste from the proposed Scheme outside of Ireland is subject to a Europe-wide control system founded on Regulation (EC) No 1013/2006 of the European Parliament and of the Council of 14 June 2006 on shipments of waste (known as the Transfrontier Shipment Regulations), as amended. This legislation is supplemented by S.I. No. 419/2007 - Waste Management (Shipments of Waste) Regulations 2007, as amended, which makes DCC responsible for the enforcement of this regulatory system throughout Ireland. Export of hazardous waste from the proposed Scheme outside Ireland should comply with the procedures set out in this legislation.

1.7.2.2 Waste Recovery and Disposal

Wastes will be delivered to authorised waste facilities in accordance with the Waste Management Act, as amended. The following authorisations are applicable:

- CoR from the local authority (issued to private sector);
- CoR from the EPA (issued to local authority);
- WFP from the local authority; and
- Waste Licence from the EPA.

A list of currently authorised (CoR or WFP) waste sites in each local authority is available on the following website (<http://facilityregister.nwcpo.ie/>). A list of sites currently licensed by the EPA (Waste Licence) is available on the following website (<http://www.epa.ie/terminalfour/waste/>).

An up-to-date list of all waste facilities to which waste from the site will be delivered will be maintained on-site and updated by the appointed contractor. Copies of valid facility CoR, WFP, and EPA Waste Licences will be held onsite by the appointed contractor.

1.8 References

A Waste Action Plan for a Circular Economy, Ireland's National Waste Policy 2020-2025 (Department of Communications, Climate Action and Environment (DCCAE 2020)

Best Practice Guidelines for the Preparation of Resource Management Plans for Construction and Demolition Projects – Draft for Public Consultation (EPA 2021)

Circular Economy Action Plan, For a Cleaner and More Competitive Europe (European Commission 2020)

C&D Waste Soil and Stone Recovery / Disposal Capacity Update Report 2020 (Regional Waste Management Offices 2020)

EU Construction & Demolition Waste Management Protocol (European Commission 2018)

The Department of the Environment, Community and Local Government publication, 'A Resource Opportunity, Waste Management Policy in Ireland' (July 2012)

The Eastern Midlands Region Waste Management Plan 2015-2021 (Eastern Midlands Waste Region 2015)

Whole of Government Circular Economy Strategy 2021-2022, Pre-Consultation Draft (Department of Environment, Climate and Communications (DECC 2021); and Circular Economy Act 2021

Directives and Legislation

Article 27 of the Waste Directive Regulations 2020 (S.I. 323 of 2020)

Environmental Protection Agency Act 1992 (S.I. 7 OF 1992) as amended

European Communities (Waste Directive) Regulations, 2011 (as amended)

European Communities (Shipments of Hazardous Waste exclusively within Ireland) Regulations 2011 (S.I. 324 of 2011)

European Communities (Transfrontier Shipment of Waste) Regulations 1994 (S.I. 121 of 1994)

European List of Waste, Commission Decision 2000/532/EC

European Union (Batteries and Accumulators) Regulations 2014 (S.I. 283 of 2014)

European Union (Packaging) Regulations 2014 (S.I. No. 282 of 2014)

European Union (Waste Electrical and Electronic Equipment) Regulations 2014 (WEEE) (S.I. 149 of 2014)

Landfill Directive Council Directive 1999/31/EC on the Landfilling of Waste Council Directive 2003/33/EC establishing criteria and procedures for the acceptance of waste at landfills pursuant to Article 16 of and Annex II to Directive 1999/31/EC

Litter Pollution Act 1997, Litter Pollution Regulations 1999 (S.I. 359 of 1999) and Litter Pollution (Increased Notice Payment) Order 2007 (S.I. 558 of 2007)

Local Government Ireland National Waste Management Plan for a Circular Economy 2024-2030

Planning and Development Act 2000 (S.I. No. 30 of 2000) as amended

Waste Framework Directive 2008/98/EC

Waste Management Act 1996 (No. 10 of 1996) as amended. Subordinate and associated legislation include:

Waste Management (Collection Permit) Regulations 2007 (S.I. 820 of 2007) as amended

Waste Management (Facility Permit and Registration) Regulations 2007 (S.I. 821 of 2007) as amended

Waste Management (Food Waste) Regulations 2009 (S.I. 508 of 2009)

Waste Management (Hazardous Waste) Regulations 1998 (S.I. 163 of 1998)

Waste Management (Landfill Levy) Regulations 2015 (S.I. 189 of 2015)

Waste management (Licensing) Regulations 2000 (S.I. No. 185 of 2000) as amended

Waste Management (Planning) Regulations 1997 (S.I. 137 of 1997)

Waste Management (Shipment of Waste) Regulations 2007 (S.I. 419 of 2007)

WEEE Directive 2012/19/EU

I. Invasive Species Management Plan

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GLOSSARY OF FREQUENTLY USED TERMS

Acronym	Term
BCI	Bat Conservation Ireland
BCT	Bat Conservation Trust
BoCCI	Birds of Conservation Concern in Ireland
BWI	BirdWatch Ireland
BSBI	Botanical Society of Britain & Ireland
CIEEM	Chartered Institute of Ecology and Environmental Management
CSZ	Core Sustenance Zone
DCC	Dublin City Council
ECoW	Ecological Clerks of Works
EEA	European Economic Area
EIA	Environmental Impact Assessment
EIAR	Environmental Impact Assessment Report
FCC	Fingal County Council
IAS	Invasive alien species
INNS	Invasive non-native species
IUCN	International Union for Conservation of Nature
KER	Key ecological receptor
NBDC	National Biodiversity Data Centre
NHA	Natural Heritage Area
NPWS	National Parks and Wildlife Service
NTA	National Transport Authority
OCS	Overhead Catenary System
OPR	Office of Planning Regulator
pNHA	Proposed Natural Heritage Areas
QI	Qualifying Interest
RO	Railway Order
SAAO	Special Amenity Area Order
SAC	Special Area of Conservation
SPA	Special Protection Area
SSRS	Small Steam Risk Score
TII	Transport Infrastructure Ireland
WFD	Water Framework Directive
ZoI	Zone of Influence

Section 1: INVASIVE SPECIES MANAGEMENT PLAN

1.1 Introduction

This document is the Invasive Species Management Plan (ISMP) for the Luas Finglas Scheme, hereafter referred to as the proposed Scheme.

The ISMP will be updated by Transport Infrastructure Ireland (TII) (the Employer for the construction works) prior to the commencement of the Construction Phase, so as to ensure that any additional measures required pursuant to conditions attached to any decision to grant approval are included in the plan. The TII shall set out the Employer's Requirements in the construction contracts including all applicable mitigation measures identified in this EIAR, as well as additional measures required pursuant to conditions attached to any decision to grant approval.

The ISMP comprises the construction mitigation measures, which are set out in the Environmental Impact Assessment Report (EIAR) and the Natura Impact Statement (NIS) and will be updated to include any additional measures required pursuant to conditions attached to An Bord Pleanála's decision.

Following appointment, the contractor(s) will be required to develop more specific Method Statements and submit an updated ISMP that is cognisant of the proposed construction activities, equipment and plant usage and environmental monitoring plan for the proposed Scheme. The appointed contractor(s) may only propose modifications to the ISMP which will not give rise to any impacts which are more significant than those already identified and assessed in the EIAR or NIS.

All of the measures set out in this ISMP will be implemented in full by the appointed contractor(s) and its finalisation will not affect the robustness and adequacy of the information presented and relied upon in the EIAR and NIS.

1.1.1 Legislative Context

The Birds and Natural Habitats Regulations 2011 (S.I No. 447/2011) contain specific provisions that govern control of listed invasive species. It is an offence to release or allow to disperse or escape, to breed, propagate, import, transport, sell or advertise species listed on the Third Schedule of the Birds and Natural Habitats Regulations without a Licence.

The two regulations that deal specifically with this scheduled list of species are:

- Regulation 49: Prohibition of introduction and dispersal of certain species; and
- Regulation 50: Prohibition on dealing in and keeping certain species.

Following on from that, the following are strictly prohibited:

- Dumping invasive species cuttings anywhere other than in facilities licensed to accept them;
- Planting or otherwise causing to grow in the wild - hence the landowner (in respect of the proposed Scheme, this being the NTA and the appointed contractor) should be careful not to cause further spread;
- Disposing of invasive species at a landfill site without first informing the landfill site (that is licensed under Number 10 of 1996 - Waste Management Act, 1996 (as amended) (hereafter referred to as the Waste Management Act, as amended) to take such Third Schedule material (plant or soil) that the waste contains invasive species material (this action requires an appropriate licence);
- Moving soil which contains Third Schedule-specific non-native invasive species in the Republic of Ireland, unless under licence from the National Parks and Wildlife Service (NPWS) (this licence is separate from and does not discharge any person being in receipt of other necessary waste permits/licences etc.); and
- Regulation (EU) No. 1143/2014 of the European Parliament and of the Council of 22 October 2014 on the prevention and management of the introduction and spread of invasive alien species (hereafter

referred to as the IAS Regulation) lists specific Species of Union Concern, some of which overlap with the Third Schedule species.

The IAS Regulation conveys the rules to prevent, minimise and mitigate the adverse impacts of the introduction and spread (both with and without intention) of IAS on biodiversity and the related ecosystem services, as well as other adverse impacts on human health or the economy. Target 4.4 of Ireland's third National Biodiversity Action Plan 2017-2021 (Department of Culture, Heritage and the Gaeltacht, 2017) requires that '*harmful invasive alien species are controlled and there is reduced risk of introduction and / or spread of new species*'.

1.1.2 Limitations

It should be noted that any decision on efficacy of chemical treatments can only be provided by a registered pesticides advisor. A suitably-qualified specialist will be engaged by the appointed contractor to monitor the treatment of non-native invasive species. This ISMP shall be updated as necessary by the specialist.

1.2 Methodology

1.2.1 Guidance

The mitigation measures for invasive non-native species (INNS) will utilise the below best practice management guidance documents, where relevant:

- The Management of Invasive Alien Plant Species on National Roads – Technical Guidance (TII, 2020a);
- The Management of Invasive Alien Plant Species on National Roads – Standard (TII, 2020b);
- Invasive Species Ireland (ISI) - Best Practice Management Guidelines for Japanese Knotweed (ISI, 2008a);
- Invasive Species Ireland Invasive Species Ireland - Best Practice Management Guidelines for Giant Hogweed (ISI, 2008c); and - Best Practice Management Guidelines for Himalayan Balsam (ISI, 2008b);
- Inland Fisheries Ireland - Biosecurity Protocol for Field Survey Work (IFI, 2010)
- Managing Invasive Non-Native Plants in or near Freshwater (EA 2010);
- Invasive Species Ireland (ISI) Best Practice Management Guidelines for Japanese knotweed (ISI 2008a);
- Best Practice Management Guidelines for Himalayan balsam (ISI 2008b);
- Best Practice Management Guidelines for Giant hogweed (ISI 2008c); and
- *The Environment Agency (EA) Managing Japanese knotweed on development sites - the Knotweed Code of Practice* (Version 3, amended in 2013, withdrawn from online publication in 2016) (EA 2013) (This document, although no longer supported by the EA, is nonetheless a practical document in determining the approach and control mechanisms for Japanese knotweed).

1.2.2 Surveys

Three invasive species surveys have been undertaken to date between 2021 and 2023 to determine and record coverage within the study area of the proposed Scheme. Refer to Chapter 9 (Biodiversity) in relation to the surveys undertaken.

1.3 Results

In summary, the surveys included the identification of species listed in Table A6.3-1 below.

Table A6 3.1: INNS Recorded Within or Adjacent to the proposed Scheme's Boundary

Invasive Non-Native Species	Impact	Regulation S.I. 477/2011
Canadian Waterweed <i>Elodea canadensis</i>	High	Yes
Nuttall's Waterweed <i>Elodea nuttallii</i>	High	Yes
Himalayan Balsam <i>Impatiens glandulifera</i>	High	Yes
Japanese Knotweed <i>Reynoutria japonica</i>	High	Yes
Giant Hogweed <i>Heracleum mantegazzianum</i> (Located upstream of Tolka Valley Park bridge, the presence of seeds deposited within the riverbanks by the bridge must be considered)	High	Yes
Sycamore <i>Acer pseudoplatanus</i>	Medium	No
Cherry Laurel <i>Prunus laurocerasus</i>	High	No
Butterfly-bush <i>Buddleja davidii</i>	Medium	No

Two species of INNS recorded inside the boundary during the INNS survey of the proposed Scheme, namely Himalayan Balsam and Japanese knotweed. The onsite presence of potentially undiscovered Giant hogweed cannot be ruled out due to observation of the INNS upstream Tolka Valley Park Luas bridge; as such, these species will be the focus of biosecurity measures going forward.

Of these species, the Japanese knotweed and Giant hogweed boast salinity tolerances which may allow them to colonise saltmarsh habitats, and therefore pose a threat to the Dublin Bay Natura 2000 sites. As the Japanese Knotweed along the River Tolka will need to be removed to allow for the installation of the new bridge in this area, it is the most likely invasive species to be accidentally spread downstream into the Natura 2000 sites.

It is recognised that other non-native invasive species, not listed in the Third Schedule, can and do occur within the footprint of the proposed Scheme and the wider metropolitan surrounds of Dublin. These are not ordinarily dealt within an ISMP, and there is separate legislation and guidance for the control of noxious weeds e.g., Noxious Weeds Act 1936 – No. 38 of 1936 and Noxious Weeds (Thistle, Ragwort and Dock) Order 1937 – S.I. No. 103 of 1937. Species such as Butterfly bush *Buddleia davidii* can quickly become established and spread in suitable urban areas, including gaps in the built environment such as the sides of old buildings, pavements, and on derelict ground. Where large populations occur, it may be a requirement of some local authorities within the Greater Dublin Area that they be managed to ensure no excessive spread e.g., Dublin City Council (DCC). The implementation of the general measures provided in Section 1.4 will minimise the risk of any spread of these species as a result of the construction of the proposed Scheme.

1.4 General Measures to Control and Prevent the Spread of Non-Native Invasive Plan Species

1.4.1 Pre-construction Survey

An updated invasive species baseline survey as outlined in the Biodiversity chapter of the accompanying EIAR, shall be conducted prior to the commencement of the development's enabling works. This updated baseline is required as invasive species may have continued to spread within and adjacent to the proposed Scheme since the last invasive species or habitat survey was conducted on-site.

As per TII guidance (TII, 2020a), this additional invasive species survey will include detailed maps of the precise location of each individual invasive species plant, as well as photos of these specific locations.

During the interim between the original non-native invasive species surveys and the commencement of construction following grant of planning permission, it is possible that the existing stands of Third Schedule non-native invasive species may have expanded (if unmanaged) or decreased (if there is an active management regime in place), or that newly established Third Schedule non-native invasive species may have become established within the footprint of the proposed Scheme. A confirmatory pre-construction invasive species survey will be undertaken by a suitably qualified specialist, arranged by the contractor(s), to confirm the absence, presence and / or extent of all Third Schedule non-native invasive species within the footprint of the proposed Scheme. Where an infestation is confirmed / identified within the footprint of the proposed Scheme, this will require the implementation of the final ISMP.

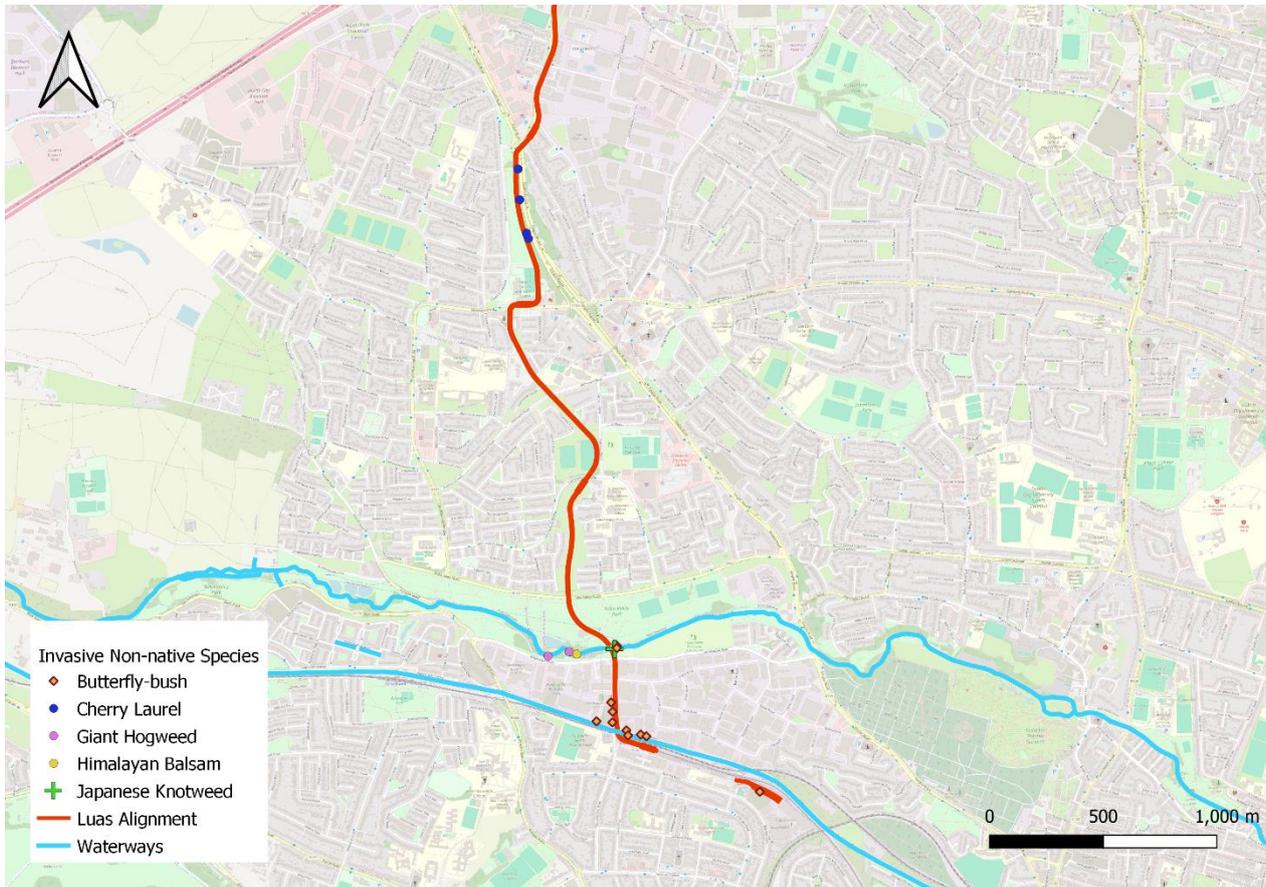


Figure 1-1: INNS Recorded from Surveys

Figure 1-1 shows the recorded INNS found on or around the site through several surveys conducted in lead up to the start of the project.

1.4.1.1 Final Invasive Species Management Plan (ISMP)

Following appointment, the contractor(s) will be required to develop more specific Method Statements and submit an updated ISMP that is cognisant of the proposed construction activities, equipment and plant usage and environmental monitoring plan for the proposed Scheme. The updated ISMP is referred to as the 'final ISMP' in this document. The appointed contractor(s) may only propose modifications to the ISMP which will not give rise to any impacts which are more significant than those already identified and assessed in the EIAR or NIS.

All of the measures set out in this ISMP will be implemented in full by the appointed contractor(s) and its finalisation will not affect the robustness and adequacy of the information presented and relied upon in the EIAR and NIS.

The ISMP will be updated following the pre-construction invasive species survey to detail the exact measures for any non-native invasive species population present within the footprint of the proposed Scheme. Depending on the extent and nature of the works, a number of approaches / treatments may be approved, all following the measures in the ISMP.

All control measures specified in the final ISMP shall be implemented by a suitably qualified and licenced specialist prior to the Construction Phase of the proposed Scheme to control the spread of any newly established INNS within the footprint of the proposed Scheme. Furthermore, the appointed contractor will adhere to control measures specified within the final ISMP throughout the Construction Phase of the proposed Scheme. The Site will be monitored by the appointed contractor after control measures have been implemented. Any re-growth will be subsequently treated by the contractor. All measures that are prescribed in the final ISMP shall be equally applicable to advance works as to construction works.

1.4.2 General Measures to Avoid the Spread of INNS

The unintentional spread of INNS during construction works (within the proposed Scheme, originating from outside the proposed Scheme, such as through the importation of materials, poor biosecurity practices regarding plant and machinery or natural processes) can be a significant issue, and if not managed properly, can result in the spread of non-native invasive species to uninfested areas (within or adjacent to works areas). This would increase the future cost and effort required to control the species and could pose further public health and safety risks (Japanese knotweed can cause damage to weaknesses in built environment, whilst Giant hogweed is an environmental public health hazard).

Listed below is a brief detailing of necessary measures to be undertaken to ensure biosecurity within this section of the development, all of which will need to be included within the proposed Scheme ISMP:

- The adherence to a set of biosecurity measures, including:
 - the fencing off / demarcating of the individual invasive species;
 - communicating the location, risk and hazards associated with invasive species to construction personnel (e.g., Giant hogweed);
 - identifying dedicated access points into and out of fenced-off areas;
 - the installation of designated decontamination facilities (where appropriate);
 - protocols around the removal of contaminated soils; and
 - seed and fragment checks on boot, tyres and tracks entering and leaving the work site.
- Best practice measures for the treatment of soils contaminated with invasive species (including potential seeds and fragments of mature plants) to prevent the accidental spread of INNS;
- As required by law, licences for the disposal of contaminated materials will be obtained, as well as the utilisation of licensed facilities;
- In regard to the importation of soil and other materials, the principal contractor will only utilise traceable topsoil for landscaping that has been cleared of any invasive species material; and
- Measures to be implemented during the application of herbicides – Commitment to the appointment of a suitably qualified/registered/licensed pesticides advisor for any works requiring the use of pesticides, and safety precautions for consideration in the use of pesticides near watercourses.

Areas which contained invasives species, where invasives were treated on-site or removed, prior to the enabling and construction works will require an on-going post-construction monitoring programme to ensure that there is no reestablishment of any invasive species within these areas.

1.4.2.1 Biosecurity Mitigations

Prior to commencement of the enabling works in the Tolka valley Park area, a series of biosecurity measures will have to be undertaken to prevent spread of invasive species, namely Japanese knotweed, Himalayan Balsam and potentially undiscovered Giant hogweed. Japanese knotweed is present along the southern bank of the River Tolka, within immediate vicinity of the proposed bridge's southern abutment. Himalayan balsam is present on both banks but closer to the water's edge and not in the immediate vicinity of the works.

There is the potential for Giant hogweed seeds to be present in both banks. While not listed on Third Schedule list of the European Communities (Birds and Natural Habitats) Regulations 2011 [S.I.477/2011], the invasive Butterfly-bush present in this area should also be removed in the interest of the site's native floral composition.

Unwashed construction equipment, plant and vehicles, and footwear can provide a vector for the spread of non-native invasive species within the proposed Scheme and from areas outside the scheme where INNS are present or where vector material potentially containing seed / root material is attached to plant or personnel. The following hygiene measures shall be undertaken for the proposed Scheme.

- Known or potentially infested areas within the working area of the proposed Scheme shall be clearly demarcated and fenced off in advance of works and access restricted until such time that treatment has commenced and / or construction works are monitored in accordance with the ISMP in the area. In relation to Japanese knotweed, the guidance recommends an exclusion buffer of 7m (metres) in all directions (within the works area and 3m vertically underground);
- The implementation of clear signage in accordance with TII IAPS standards will be erected at compounds, and at the boundary of the exclusion fencing. These signs will be briefed out at toolbox talks specific to each INNS to personnel on site and particular attention will be given to INNS that have the potential to cause injuries such as Giant hogweed.
- Identify and create access points into exclusion areas for INNS. These are only to be used by specialist personnel for the removal of INNS and are not to be used by general site workers until such a time as all contaminated material has been removed from site and it is safe to enter.
- Where it is practicable, a wheel wash and footwear washing facilities will be provided to ensure biosecurity measure are preventing the further potential spread of INNS. These locations are to be provided by the contractor. Where a dedicated / bespoke wheel wash cannot be installed owing to space limitations, the appointed contractor will ensure that no excavated loose material is allowed off site from within an exclusion zone.
- Where plant that is used to excavate soils, it shall be visually checked for loose soil before movement to another part of site (where possible, the movements of tracked machinery should be restricted within the non-native invasive species exclusion zone). Loose soil shall be scraped off and disposed of, and a solution of Virkon© (or similar approved disinfectant) applied to machinery to ensure that no obscured seed / root material remains viable. Vehicular movements within the exclusion area shall be minimised as far as is practical;
- Unless in the exceptional circumstance that direction is given from a suitably qualified ecologist, no storage of contaminated soil on site. Instead, being disposed of in a licenced soil waste facility.
- Where small volumes (e.g. volumes capable of being double bagged in quarantine bags such as cut plants, bulbs or loose soil occur), it may be practical to bag the material and bring it to a clearly demarcated and dedicated quarantine area within the Construction Compounds until such time that the material is disposed of to an authorised facility, similar to the process of disposing of bulk excavated infected soil.

1.4.2.2 Soil Excavation

No excavation or removal of soil within areas demarcated as having INNS present is to be permitted unless under strict supervision by a suitably qualified ecologist or INNS specialist. Buffer zones to be installed by the contractor(s) will be advised by a suitably qualified ecologist or INNS specialist and strictly adhered to. Guidance regarding Japanese knotweed recommends a buffer of 7m from the plant due to its expansive rhizomes.

Where mechanical means of removal are required to dispose of INNS (treated or un-treated by chemicals) a suitably qualified ecologist or INNS specialist will be present to supervise and provide support to the contractor(s) for the duration of the operation.

There should be no temporary storage on-site of bulk excavated infected material. Where the final ISMP calls for shallow / deep burial, this material shall be removed from the excavated area and transported

immediately to approved receptor area on-site. Furthermore, the temporary storage of uninfected material should not occur within a European or National designated site nor within 10m of any watercourse and any land within an identified flood zone.

Plant and machinery used in the control, excavation and transport of infected material shall also be subject to the recommendations described in Section 1.4.2.2.

The installation of industry-rated non-native invasive species-proof membrane before infilling construction of road / paths surface may be required. All waste arising out of this process which has been in contact with the excavated ground shall be treated as infected waste and disposed of at a facility that is authorised to accept such waste (See Section 1.4.2.3).

Where the movement of any Third Schedule non-native invasive species is required off site, a licence will be required from NPWS in advance of any movement to a site / facility licensed to accept such waste, as per the Birds and Natural Habitats Regulation. This licence is separate to and does not negate the need for licences / permits / authorisations required under waste legislation.

1.4.2.3 Disposal of Material

Where any INNS related material is collected and is required to be disposed of, it is essential to dispose of said material in a manner that does not afford it the potential to spread further either within the proposed Scheme or in the nearby vicinity of Site.

The movement of invasive plant material, off site, requires a licence from the NPWS, as per the Birds and Natural Habitats Regulations. Invasive species (particularly roots, flower heads or seeds) must be disposed of at licensed waste facilities or composting sites, appropriately buried, or incinerated having regard to relevant legislation (e.g. Waste Management Act, as amended, Section 4 of Number 6 of 1987 - Air Pollution Act, 1987, relevant local authority bylaws and any other relevant legislation). All disposals must be carried out in accordance with the relevant waste management legislation, as per guidance Guidelines for the Management of Waste from National Road Construction Projects (TII 2017).

It should be noted that some invasive species plant material or soil (vector material) containing residual herbicides may be classified as either 'hazardous waste' or 'non-hazardous waste' under the terms of the Waste Management Act, as amended, and both categories may require special disposal procedures or permissions. Advice should be sought from a suitably qualified waste expert regarding the classification of waste and the suitability of different disposal measures.

1.4.2.4 Measures to be Implemented During the Application of Herbicides

If the application of herbicides is the expert advice given and then implemented during the lifespan of the proposed Scheme then a suitably qualified pesticides advisor, registered with the Department of Agriculture, Food and the Marine must be employed.

The appointed contractor is required to refer to the appropriate guidance documents, including but not limited to those listed in Section 1.4.2.1 & 1.4.2, which provide detailed recommendations for the control of invasive species and noxious weeds. The appointed contractor (or specialist license holder) will update the final ISMP in accordance with current and relevant guidelines before commencing works.

It should be noted that where a chemical treatment is to be used, there is a risk of contaminating a watercourse. The choice of herbicide is typically limited to formulations of Glyphosate or 2,4-D amine that are approved for use near water. Full details of any chemical used, where required and as advised by a registered pesticides advisor, will be included in the final ISMP prepared in advance of construction of the proposed Scheme.

1.4.3 Post-construction Monitoring

Following the construction of the proposed Scheme, there may be ongoing treatment programmes which extend for a number of years into the Operational Phase. In the Operational Phase, the management of the infrastructure will be the responsibility of the local authority and the control of invasive species will be as per their plans and procedures, and responsibilities under The Birds and Natural Habitats Regulations.

The above measures are important for all Third Schedule non-native invasive species, and in particular Japanese knotweed, where it occurs, as maintenance works associated with landscaping, such as mowing and hedge cutting have the potential to spread this plant via the dispersal of very small amounts of shredded plant material.

If invasive plants are found, then they shall be treated as per the measures outlined in the ISMP and any species-specific guidelines.

1.5 Assessment of Management Options for Third Schedule Non-native Invasive Species

The general measures included in the sections above are required to ensure good on-site practices in respect of known or potential Third Schedule non-native invasive species as per Regulations 2011 [S.I.477/2011],

The following sections further identify practical management controls. It is acknowledged that more than one potential control measure exists and that a single or combination of measures may be required.

The recommendations presented in this ISMP provide the minimum requirements for the likely control measures and the measures outlined in this ISMP shall be developed (with further detail on methodology used at each location, timing, practical management etc.) by the appointed contractor(s) (or the specialist as appropriate) by way of producing and implementing the final ISMP.

The use of chemical treatments is recognised as a potential treatment option. However, the services of a registered herbicide advisor must be employed in the specifying named chemicals including those rated for use adjacent to aquatic environments where required, treatment type, dosage, and timing etc., and / or use of pesticides in the management of potential Third Schedule non-native invasive species within the proposed Scheme.

1.5.1 Selected Management Controls

The selected management control to be defined for each non-native invasive species stand within the proposed Scheme will depend on:

- Results of the pre-construction survey;
- Construction requirements – timing of works at specific locations, level of infestation and practical considerations such as reducing disturbance to road users / homeowners; and
- Feasibility of control measure, where possible the most practicable method (with regards to the environmental impact and human health) will be used eg; if mechanical methods of removal are not feasible due to access. Then a step back and assess approach will be employed to remove INNS.

The ISMP, which will be updated (in the form of the final ISMP) following on from the pre-construction surveys, may require the utilisation of a number of controls that are described below.

1.5.2 Japanese knotweed (*Reynoutria japonica*).

Japanese knotweed is a high impact non-native invasive species that is particularly effective at colonising disturbed ground (e.g. construction sites) and can spread by the re-growth of cut fragments or root material. Therefore, if it is broken up during site clearance or other earthworks, it can readily re-grow in new areas to which contaminated soil is moved. Japanese knotweed reproduces asexually (in Ireland insofar as only

Female plants have been recorded) and regrowth can occur from plant material weighing as little as 0.7g (grams) of viable material. It is acknowledged to be very difficult to effectively control and an even more difficult to fully eradicate.

Given the nature of Japanese knotweed, chemical treatments are often preferred over physical methods as they can, if implemented properly, reduce the disturbance of the plant / population, thus reducing the chances of its spread. If herbicide is applied as the treatment option, it will need to be reapplied for up to five years after the first application to ensure the plant control measures have been effective or monitored for a minimum of two years during which no regrowth is recorded. However physical removal may be necessitated when timely interventions are required.

Table A6 3.2 assessed the potential management methods for Japanese Knotweed with colour coding of the potential to implement on the proposed Scheme. The methods to be used will be fully detailed in the Contractors ISMP after the recommended pre-construction survey of the proposed Scheme have been undertaken.

Table A6 3.2: Assessment of Management Methods for Japanese Knotweed

Approach	Treatment options	Comment	Potential for Implementation on the proposed Scheme
Physical	Dig and dispose offsite, under licence	This option requires that all plant material (above and below ground) is excavated along with soil and disposed of to a facility authorized to accept it. In addition to waste permits / authorizations, a wildlife licence issued by NPWS is required for the transport of Third Schedule non-native invasive species offsite. Depending on the nature of the excavation the proximity of services etc, the use of root barrier membrane could be required.	Likely – given the nature of the scheme, there may be a need to excavate soil and plant material to enable construction works to go ahead in timely manner.
	Dig and dispose onsite. - Shallow burial - Deep burial	A wildlife licence from NPWS is not ordinarily required if the burial of collected material is proposed for within the consented proposed Scheme. Shallow burial in a constructed pit such as a dedicated sealed cell within a constructed berm will allow for periodic monitoring and of easy chemical treatment of any regrowth. Deep burial entails a dedicated sealed cell within a constructed excavation, that is at least 2m below the surface of the ground. The landscaping regime should not specify trees or scrub to be planted above. Either shallow or deep option could require the use of root barrier membrane. The use of chemical pretreatment of deep / shallow cells could also be required.	Unlikely – given the lack of suitable lands within the largely developed metropolitan area.
	Screen on site – remove fragments offsite and reuse soil.	A control option that can be used to reduce the volume of soil / sediment to be moved elsewhere for burial, this option requires suitable plant, adequate space and volumes of soil to make the operation at a location cost effective. This option often requires the use of root barrier membrane owing to reuse of screened soil. The use of chemical pre-treatment of deep / shallow cells could also be required.	Possible but unlikely given the space requirements for a screener (unless a bespoke small-scale screener is available).
	Cutting and / or strimming	Not recommended and does not apparently diminish vigour of plants over time. Largely cosmetic and can result in considerable spread of	Not Recommended.

Approach	Treatment options	Comment	Potential for Implementation on the proposed Scheme
		viable vegetative material that can readily regenerate on suitable conditions.	
Chemical	Spot	Used for isolated plants – knapsack or weep sprayers. Chemical treatments for infestations near water should be rated for use near aquatic locations.	Chemical treatments are often a preferred option for treating Japanese knotweed, but the process can take between 3 to 5 years before eradication can be guaranteed and requires at least 2-year post implementation monitoring. However, given the nature of the proposed Scheme, the use of chemical treatment alone is unlikely to be adequate unless treatment regime begins a number of years before construction commencement.
	Spray/Stem Injection	Used for isolated plants or large populations using knapsack or weep sprayers. In accessible areas including along riverbanks, lance sprayers can be used. Chemical treatments for infestations near water should be rated for use at or near aquatic locations. Can result in chemical drift. Stem Injection is considered very effective, if the injection is timed appropriately for growth phase. However, it is labour-intensive (sometimes) requiring some cutting and is usually only carried out on small / isolated populations. Chemical treatments for infestations near water should be rated for use at or near aquatic locations.	

1.5.2.1 Root Barrier Membrane

Following the excavation of Japanese knotweed, there may be a need to install a root barrier membrane. These are specialised products that can provide protection to structures / services etc. from regrowth from within or outside a site, if suitably rated and properly installed. Thereafter, any small adjacent infestation can be more readily treated with chemical treatment for example. This durable material can be used to line spoil pits and prevent rhizome lateral root spread or effective growth in the plant and can keep it contained to an area where suitable chemical treatment can be undertaken.

1.5.2.2 Reseeding Following Eradication

This is not strictly a control method. However, where treated ground is not being built upon, planting or resowing mixtures of native grass species helps to restore the original vegetation and aids post-control management of affected sites. A grass sward established in autumn will compete with germinating Japanese knotweed seedlings in the following spring.

1.5.3 Giant hogweed (*Heracleum mantegazzianum*)

This is a high-risk invasive species, that is also a biohazard in that it can pose a threat to humans. The chemistry of its sap is such that exposure to it on skin can result in prolonged photosensitizing reactions with blistering.

Thus, a clearly demarcated exclusion buffer, in excess of 4m, is recommend for any individual / populations of this species before commencing works.

It spreads via heavy seeds which can easily be transported by water. Hence, it is often found along river corridors. While the plant favours riverbanks, it is known to be found on waste / derelict ground as well as railway lines for instance. Its presence can impact local biodiversity and undermine bankside integrity. The seedling stage is the most vulnerable. Mortality of seedlings is comparable to many other plants and its seed bank is considered to be persistent for a short number of years only. Since Giant hogweed can only reproduce via seed, control measures applied before flowering and fruit set will limit subsequent generations (and even then, only with favourable conditions). The ideal time to control Giant hogweed via chemical treatment is April, with follow on monthly applications targeting regrowth, although for this treatment options, it can require up to five years before successful eradication.

Table A6 3.3 assessed the potential management methods for Giant Hogweed with colour coding of the potential to implement on the proposed Scheme. The potential treatment option is to be fully detailed in the contractor’s ISMP for the treatment of Giant hogweed.

Table A6 3.3: Assessment of Management Methods for Giant hogweed

Approach	Treatment options	Comment	Potential for Implementation on the proposed Scheme
Physical	Dig and dispose offsite, under licence	This option requires that all plant material (above and below ground) is excavated along with soil and disposed of to a facility authorized to accept it. Given the phytotoxic nature of the plant, it should not be buried onsite nor disposed of with general Construction and Demolition waste. In addition to waste permits / authorisations, a wildlife licence issued by NPWS is required for the transport of Third Schedule non-native invasive species offsite.	Possible and may be required.
	Above ground cutting	Not recommended. Largely cosmetic and prolongs flowering until such time that control halted. However, if digging is used, it is recommended that the removal be attempted in April / early May when the plant is usually less than 30cm tall. However, the root must be captured also.	Unlikely - requires specialist equipment to enable working alongside the biohazardous plant
	Root Cutting	Individual plants may be killed by cutting at a 45-degree angle 15cm below ground level with a spade in April or May. Can be laborious unless small/isolated stands. Can be effective if combined with chemical treatment over 4-5 years repeat treatment.	Given the nature of the proposed Scheme, could be used to remove biohazard plant and thereafter allow for chemical control against any regrowth. Requires specialist equipment to enable working alongside the biohazardous plant.
	Pulling	Hand pulling is only suitable for small / immature plants (and with suitable PPE to protect exposure of bare skin). Potential remains for tap root to remain underground and regenerate. Recommended in April - May	Unlikely for mature plants. Requires specialist equipment to enable working alongside the biohazardous small / immature plants.
	Strimming/Grazing	Not recommended owing to spread of sap.	Not recommended or practical given the nature of the river and metropolitan landscape and nature of the proposed Scheme.
Chemical	Spot	Used for isolated plants – knapsack or weep sprayers. Chemical treatments for infestations near water should be rated for use near aquatic locations.	Most widely used method, but to be wholly effective, requires total control over ~5 years of treatments within a river catchment or the isolated location. Is weather dependent and can result in chemical drift to adjacent vegetation or watercourses.
	Spray/Stem Injection	More suitable for large stands, where machine-mounted blanket sprays are used. Chemical	Possible but unlikely owing to nature and size of population

Approach	Treatment options	Comment	Potential for Implementation on the proposed Scheme
		treatments for infestations near water should be rated for use near aquatic locations. Stem Injection can only be carried out on young stems. Due to difficulties with the timing of application and the potential safety risk of contact with the large leaves this method requires specialist safety equipment.	recorded on proposed Scheme.

1.5.3.1 Temporary Storage of Collected Material

Given the phytotoxic nature of Giant hogweed, cut material should not be discarded. Ideally it should be disposed of immediately with similar non-native invasive species waste to a facility authorised to accept such waste. However, given the nature and relative sizes of Giant hogweed infestations, it may be suitable to collect cut biomass (where not disposed of immediately to a facility authorised to accept such waste), and to double bag it for transport to a dedicated quarantine area (location to be approved as part of the ISMP) to decompose before disposal with similar non-native invasive species waste in a facility authorised to accept such waste. The locations of areas for which Giant hogweed has been eradicated should be notified to the local authority, so that any future public health issue involving similar symptoms can be tracked.

1.5.3.2 Reseeding Following Eradication

This is not strictly a control method. However, where treated ground is not being built upon, planting or resowing mixtures of native grass species helps to restore the original vegetation and aids post-control management of affected sites. A grass sward established in autumn will compete with germinating Giant hogweed seedlings in the following spring and retard its establishment.

1.5.4 Himalayan balsam (*Impatiens glandulifera*)

This high-risk invasive species is easily disturbed, particularly if in flower and readily becomes re-established along riparian corridors, which are annually subject to alluvial flooding. Unlike Japanese knotweed though, it does not reproduce asexually. Plants can produce in excess of 6,000 seeds, and it aggressively colonises bare ground along riverbanks, including wet woodlands, as well as waste ground where suitable conditions exist. Due to its rapid growth, it can outcompete most native species. While its seedbanks are viable for up to 18 months, the resupply of seed is often achieved through annual river flooding and riparian inundation with freshly deposited soil-laden alluvium.

Table A6 3.4 assessed the potential management methods for Himalayan Balsam with colour coding of the potential to implement on the proposed Scheme. The potential treatment options available for the treatment of Himalayan balsam should aim to prevent flowering and are therefore shall be undertaken before June. However, eradication may take up to five years. It should be noted that successful localised management of Himalayan balsam is difficult along watercourses, as the spread of this non-native invasive species from upstream areas (e.g. outside of the proposed Scheme) onto bare ground often occurs after winter flooding.

Table A6 3.4: Assessment of Management Methods for Himalayan Balsam

Approach	Treatment options	Comment	Potential for Implementation on the proposed Scheme
Physical	Dig and dispose offsite, under licence	This option requires that all plant material (above and below ground) is excavated along with soil and disposed of to a facility authorized to accept it. In addition to waste permits / authorisations, a wildlife licence issued by NPWS is required for the transport of Third Schedule non-native invasive species offsite.	Possible given the nature of the proposed Scheme, this may be an optimal control measure.

Approach	Treatment options	Comment	Potential for Implementation on the proposed Scheme
	Hand Pulling	Small isolated and immature infestations, such as in gardens or roadsides can usually be readily pulled prior to flowering e.g., care must be taken not to leave lower plant sections as these can regrow rapidly. Additionally, any flower heads (if present) should be covered by a tied bag before pulling to ensure no seed drop.	Possible, ideal for smaller areas adjacent to the proposed Scheme boundary.
	Mechanical	Repeated cutting or mowing is effective for larger stands, but plants can regrow if the lower parts (above lowest node) are left intact. Regeneration can be further halted by ensuring full ground vegetative layer through reseeded.	Possible but unlikely main option given the nature of works along existing river.
	Grazing	Regular grazing is said to suppress the plant over time.	Not practical given the nature of the river and metropolitan landscape and nature of the proposed Scheme.
Chemical	Spot / weed wiper	Can be used for smaller infestations in spring before flowering occurs, but as late as to allow germinating seedlings to have become established and thus be able to uptake the chemical treatment. Adjacent to the works boundary, chemical treatments for infestations near water should be rated for use near aquatic locations.	Possible, within the proposed Scheme boundary, where ground is to be excavated, may require physical control also.
	Foliar spray	Can be applied to larger infestations via knapsack spray / lance spray etc. in spring before flowering occurs, but as late as to allow germinating seedlings to have become established and thus be able to uptake the chemical treatment. Chemical treatments for infestations near water should be rated for use near aquatic locations.	

1.5.4.1 Temporary Storage of Collected Material

Given the nature and relative extent of Himalayan balsam infestations in some urban situations, collected biomass (pulled stems / roots and bagged flower heads), where not disposed of immediately to a facility authorised to accept such waste, could be double bagged and put in dedicated quarantine areas (locations to be approved as part of the final ISMP). Here, the material could be left to decompose before disposal with similar Non-native Invasive Species waste at an authorised facility.

1.5.4.2 Reseeding Following Eradication

Areas devoid of or cleared of vegetative cover near watercourses should be reseeded with appropriate riparian ground cover species in summer months to ensure that bare banks do not provide favourable conditions for Himalayan balsam to become re-established and to protect banks from accelerated erosion.

For any area of ground that is cleared of this non-native invasive species, and which is not subsequently constructed upon, follow-on mechanical cutting regimes and / or chemical treatments may be required to ensure the seed bank is fully exhausted.

1.6 References

Inland Fisheries Ireland: A Guide to the Protection of Watercourses through the use of Buffer Zones, Sustainable Drainage Systems, Instream Rehabilitation, Climate / Flood Risk and Recreational Planning (IFI, 2020)

Inland Fisheries Ireland - Biosecurity Protocol for Field Survey Work (IFI, 2010)

Invasive Species Ireland (ISI) - Best Practice Management Guidelines for Japanese Knotweed (ISI, 2008a)

Invasive Species Ireland - Best Practice Management Guidelines for Himalayan Balsam (ISI, 2008b)

Invasive Species Ireland - Best Practice Management Guidelines for Giant Hogweed (ISI, 2008c)

Managing Invasive Non-Native Plants in or near Freshwater (EA 2010)

Managing Japanese knotweed on development sites (Version 3, amended in 2013)

The Management of Invasive Alien Plant Species on National Roads – Technical Guidance (TII, 2020a)

The Management of Invasive Alien Plant Species on National Roads – Standard (TII, 2020b)

The Management of Waste from National Road Construction Projects - GE-ENV-01101 December 2017

Directives and Legislation

Birds and Natural Habitats Regulations S.I. No. 477/2011 - European Communities (Birds and Natural Habitats) Regulations 2011.

Ireland's third National Biodiversity Action Plan 2017-2021 (Department of Culture, Heritage and the Gaeltacht 2017)

Noxious Weeds Act, Order 1937 – S.I. No. 103 of 1937

Regulation (EU) No. 1143/2014 of the European Parliament and of the Council of 22 October 2014 on the prevention and management of the introduction and spread of invasive alien species

Waste Management Act, 1996 (as amended)

