Chapter 12
Biodiversity

Contents

12. Biodiversity

12.1 Introduction

This Chapter of the Environmental Impact Assessment Report (EIAR) presents the output of the biodiversity assessment and contains information regarding, *inter alia*, the biodiversity baseline scenario, the potential impacts on biodiversity, the mitigation measures and the predicted residual effects associated with the Kimmage to City Centre Core Bus Corridor Scheme (hereafter referred to as the Proposed Scheme).

The likely significant effects of the Proposed Scheme on biodiversity during both the Construction Phase and Operational Phases (including routine maintenance) have been assessed. The potential Construction Phase impacts assessed include those on air, water quality, habitats, and on flora and fauna from construction activities such as utility diversions, road resurfacing, road realignments and the provision of new / replacement structures. The assessment undertaken for the Proposed Scheme identified numerous Key Ecological Receptors (KERs) within the study area that could potentially be impacted by the Proposed Scheme. These KERs are examined in detail in this Chapter. The methodologies used to collate information on the baseline biodiversity environment and assess the likely significant impacts of the Proposed Scheme are detailed in the following sections.

The aim of the Proposed Scheme, when in operation, is to provide enhanced walking, cycling and bus infrastructure on this key access corridor in the Dublin region, which will enable and deliver efficient, safe, and integrated sustainable transport movement along the corridor. The objectives of the Proposed Scheme are described in Chapter 1 (Introduction). The Proposed Scheme, which is described in Chapter 4 (Proposed Scheme Description) has been designed to meet these objectives.

The design of the Proposed Scheme has evolved through comprehensive design iteration, with particular emphasis on minimising the potential for environmental impacts, where practicable, whilst ensuring the objectives of the Proposed Scheme are attained. In addition, feedback received from the comprehensive consultation programme undertaken throughout the option selection and design development process have been incorporated, where appropriate.

12.2 Methodology

In accordance with the requirements of Directive 2014/52/EU of the European Parliament and of the Council of 16 April 2014 amending Directive 2011/92/EU on the assessment of the effects of certain public and private projects on the environment (hereafter referred to as the EIA Directive), this Chapter of the EIAR identifies, describes and assesses the likely direct and indirect significant effects of the Proposed Scheme on biodiversity, with particular attention to species and habitats protected under both European Union (EU) and Irish law.

The EIA Directive does not provide a definition of biodiversity. However, as noted in the European Commission, Guidance on Integrating Climate Change and Biodiversity into Environmental Impact Assessment (European Commission 2013), Article 2 of the Convention on Biological Diversity, gives the following formal definition of biodiversity:

> '*biological diversity means the variability among living organisms from all sources including, inter alia, terrestrial, marine and other aquatic ecosystems and the ecological complexes of which they are part; this includes diversity within species, between species and of ecosystems*' (CBD 2006).

Alongside the term '*biodiversity*' the terms '*ecology*' and '*ecological*' are also used throughout this Chapter as a broader terms to consider the relationships of biodiversity receptors with one another and to the wider environment.

This Chapter also refers to the Appropriate Assessment Screening Report (hereafter referred to as the AA Screening Report) and the Natura Impact Statement (hereafter referred to as the NIS) which have also been prepared on behalf of the National Transport Authority (NTA) and submitted with the application for approval, so as to enable An Bord Pleanála (the Board), as competent authority, to carry out the assessments required

pursuant to Article 6(3) of Council Directive 92/43/EEC of 21 May 1992 on the conservation of natural habitats and of wild fauna and flora (hereafter referred to as 'the Habitats Directive').

A review of the Proposed Scheme was undertaken which identified numerous KERs within the study area that could potentially be impacted by the Proposed Scheme. These KERs are examined in detail in this Chapter.

The methodologies used to collate information on the baseline biodiversity environment and assess the likely significant effects of the Proposed Scheme are detailed in the following sections.

12.2.1 Ecological Survey Study Area

The Proposed Scheme extents are illustrated in the General Arrangement Drawings (BCIDD-ROT-GEO_GA-0011_XX_00-DR-CR-9001) in Volume 3 of this EIAR. Ecological surveys were carried out for each of the biodiversity receptors listed in Table 12.1, within a specific study area (as described in Table 12.1) and focused on assessing potential impacts within the Zone of Influence (ZoI) of the Proposed Scheme. The Chartered Institute of Ecology and Environmental Management (CIEEM) Guidelines for Ecological Impact Assessment in the UK and Ireland (hereafter referred to as the CIEEM Guidelines) (CIEEM 2018) define the ZoI for a development as the area over which ecological features may be subject to significant impacts as a result of the Proposed Scheme and associated activities (see Section 12.3.1 for more detail on the ZoI as it relates to the Proposed Scheme and the various ecological receptors).

The ecological surveys were designed based upon the characteristics of the Proposed Scheme and its likely significant impacts on the baseline environment during construction and / or operation. The study areas are described in Table 12.1.

Table 12.1: Ecological Survey Study Areas for Each Ecological Receptor

Ecological Receptor	Study Area Description
Habitats	The area within or immediately adjacent to the Proposed Scheme footprint where habitats could be directly or indirectly affected during construction / operation. The extent of the study area for habitats is illustrated in Figure 12.5 in Volume 3 of this EIAR.
Aquatics	Watercourses adjacent to the Proposed Scheme footprint where the aquatic ecology could be directly or indirectly affected during Construction / Operation. The extent of the study area for aquatic ecology is illustrated in Figure 12.1.3 in Volume 3 of this EIAR. In addition, the desktop information has been supplemented with survey results from the TII's Metrolink Project Aquatic and Fisheries Assessment, undertaken by Triturus Environmental Ltd., in proximity to the Proposed Scheme along the Grand Canal at Charlemont.
Rare and / or Protected Flora	The area within or immediately adjacent to the Proposed Scheme footprint where rare and / or protected flora could be directly or indirectly affected during construction / operation. The extent of the study area for rare and / or protected flora is illustrated in Figure 12.5 in Volume 3 of this EIAR.
Fauna species other than those listed below (includes badger, otter, other protected mammal species, amphibians, and reptiles)	The area within or immediately adjacent to the Proposed Scheme footprint where fauna species could be directly or indirectly affected during construction / operation. The extent of the study area for fauna species (other than bats and breeding birds) is illustrated in Figure 12.5 and Figure 12.1.2 and Figure 12.7 in Volume 3 of this EIAR.
Bats	The area suitable for roosting, foraging and / or commuting bats (e.g. bridges, hedgerows, treelines, woodland and watercourses) within or immediately adjacent to the Proposed Scheme footprint where bats could be directly or indirectly affected during construction / operation. The extent of the study area for bats is illustrated in Figure 12.1.1 in Volume 3 of this EIAR.
Nesting kingfisher suitability	The area suitable for kingfisher within or immediately adjacent to the Proposed Scheme footprint where breeding birds could be directly affected during construction. The extent of the study area for kingfisher suitability is illustrated in Figure 12.1.2 in Volume 3 of this EIAR.

12.2.2 Relevant Guidelines, Policy and Legislation

The assessment supporting this Chapter has been undertaken in accordance with the following guidance documents:

- Environmental Impact Assessment of Projects - Guidance on the preparation of the Environmental Impact Assessment Report (European Commission 2017);

- Environmental Protection Agency (EPA) Guidelines on the Information to be Contained in Environmental Impact Assessment Reports (hereafter referred to as the EPA Guidelines) (EPA 2022);
- Guidance on Integrating Climate Change and Biodiversity into Environmental Impact Assessment (European Commission 2013);
- Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater, Coastal and Marine (hereafter referred to as the CIEEM Guidelines) (CIEEM 2018);
- National Roads Authority (NRA) Guidelines for the Crossing of Watercourses During the Construction of National Road Schemes (NRA 2005a);
- Guidelines for the Treatment of Badgers Prior to the Construction of National Road Schemes (NRA 2005b);
- Best Practice Guidelines for the Conservation of Bats in the Planning of National Road Schemes. (NRA 2006a);
- Guidelines for the Treatment of Otters prior to the Construction of National Road Schemes (NRA 2006b);
- Ecological Surveying Techniques for Protected Flora and Fauna during the Planning of National Road Schemes (NRA 2008a);
- Environmental Impact Assessment of National Road Schemes – A Practical Guide (NRA 2008b);
- Guidelines for Assessment of Ecological Impacts of National Road Schemes (NRA 2009);
- 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);
- Bat Surveys for Professional Ecologists: Good Practice Guidelines 3rd edition (Collins 2016);
- The Bat Workers' Manual (Mitchell-Jones and McLeish 1999);
- Bat Mitigation Guidelines for Ireland V2. Irish Wildlife Manuals, No. 134. (Marnell *et al.* 2022);
- The Irish Bat Monitoring Programme 2015 - 2017. Irish Wildlife Manuals 103. (Aughney *et al*. 2018);
- United Kingdom Highways Agency (UKHA) Design Manual for Roads and Bridges (DMRB) (UKHA 2001a; UKHA 2001b; UKHA 2005);
- Circular Letter NPWS 2/07 Guidance on compliance with Regulation 23 of the Habitats Regulations 1997 – strict protection of certain species / applications for derogation licences (NPWS 2007a);
- Circular Letter PD 2/07 and NPWS 1/07 Compliance Conditions in respect of Developments requiring (1) Environmental Impact Assessment (EIA); or (2) having potential impacts on Natura 2000 sites (NPWS 2007b); and
- All-Ireland Pollinator Plan 2021-2025, National Biodiversity Data Centre Series No. 25, Waterford. March 2021(NBDC 2021).

It should be noted that in some instances standard survey methodology described in some of the guidance documents listed above was modified for practical reasons. Owing to the nature of the Proposed Scheme, being largely within an urban transport corridor, a practical approach was adopted to capture likely presence of protected species and or likely impacts arising as a result of the construction and operation of the Proposed Scheme. Thus, in respect of badger, the NRA 2005b guidance recommends surveys up to 150m beyond corridor boundaries. This is not feasible for much of the existing urban corridor. Similarly, the guidance in respect of bat surveys (NRA 2006b) advocates surveys up to 1km from the route corridor. For similar reasons this is not considered practical and the focus of the multidisciplinary and follow-on surveys has been on areas that could, based on evidence from the desktop study, suitable habitat and professional judgement, support the protected species. In respect of otters, accessible riparian areas along at least 150m up and downstream of any proposed watercourse crossing were searched.

Policy and Planning Documents:

- Department of Culture, Heritage and the Gaeltacht (DCHG) National Biodiversity Plan 2017 - 2021 (DCHG 2017);
- Dublin City Council (DCC) Dublin City Development Plan 2022-2028 (DCC 2022);
- Dublin City Biodiversity Action Plan 2021-2026 (DCC 2021);

- South Dublin County Council (SDCC) South Dublin County Development Plan 2022-2028 (SDCC 2022);
- South Dublin County Heritage Plan 2010-2015 (SDCC 2010); and
- Draft South Dublin County Biodiversity Action Plan 2020-2026.

Legislation:

- The Habitats Directive;
- The Birds Directive;
- Directive 2000/60/EC of the European Parliament and of the Council establishing a framework for the Community action in the field of water policy (hereafter referred to as the Water Framework Directive (WFD));
- S.I. No. 477/2011 - European Communities (Birds and Natural Habitats) Regulations 2011, as amended (hereafter referred to as the Birds and Habitats Regulations);
- The EIA Directive;
- Planning and Development Acts 2000 to 2022;
- Wildlife Acts 1976 to 2022;
- S.I. No. 235/2022 - Flora (Protection) Order, 2022 (hereafter referred to as the Flora Protection Order); and
- Fisheries Acts 1959 to 2019.

12.2.3 Data Collection and Collation

12.2.3.1 Desk Study

A desk study involved collection and review of relevant published and unpublished sources of data, collation of existing information on the ecological environment and consultation with relevant statutory bodies.

The following sources were consulted during the desk-based study to inform the scope of the ecological surveys:

- Online data available on European sites and on Natural Heritage Areas (NHAs) or proposed Natural Heritage Areas (pNHAs) as held by the NPWS (NPWS Online Database 2022);
- Online data records available on the National Biodiversity Data Centre Database (NBDC Online Database 2022);
- Ordnance Survey Ireland (OSI) orthophotography (from 1995 to 2012) for the Proposed Scheme study area;
- Bus Connects Drone Imagery, surveyed 2020 (NTA 2020);
- Records of rare and / or protected species for the 10km grid squares O03, O13 and O23, held by the NPWS;
- Habitat and species GIS datasets provided by the NPWS, including Article 12 and Article 17 data;
- Bat records from Bat Conservation Ireland's (BCI) database;
- Records from the Botanical Society of Britain and Ireland (BSBI);
- Information contained within the Flora of County Dublin (Doogue *et al.* 1998);
- Environmental information / data for the area available from the EPA website (EPA 2020);
- Information on the status of European Union (EU) protected habitats and species in Ireland (NPWS 2019a; 2019b; 2019c); and
- Information on light-bellied Brent goose inland feeding sites (Scott Cawley Ltd. 2017).

A desk study was carried out to identify suitable bat foraging and / or commuting habitat (e.g., woodland and mature treelines) that may be affected by the Proposed Scheme (e.g., areas where vegetation will, or is likely to be, directly affected by works associated with the Proposed Scheme). Following this, transect routes for bat activity surveys were designed within these areas to encompass a representative sample of the habitats present within the Proposed Scheme area.

A desk study was carried out to identify any potential suitable inland feeding and / or roosting sites for wintering birds located within or directly adjacent to the Proposed Scheme. This included a review of recent aerial photography and known inland feeding sites for the Special Conservation Interest (SCI) bird species light-bellied Brent goose *Branta bernicla hrota* (Scott Cawley Ltd. 2017). The desk study did not identify sites in which significant suitable foraging and / or roosting habitat which would be directly lost as a consequence of the Proposed Scheme, for further wintering bird surveys.

A desk study was carried out to identify all hydrological crossing points within the footprint of the Proposed Scheme. Aquatic surveys, suitability assessments for nesting birds, and otter surveys were undertaken at the proposed crossing points at modifications to banks or significant disturbance (i.e. piling techniques) are proposed.

12.2.3.2 Ecological Surveys

This Section describes the various ecological survey methodologies used to collate baseline ecological information in the preparation of this Chapter. The ecological surveys carried out are summarised in Table 12.2.

Table 12.2: Ecological Surveys and Survey Dates Between 2018 and 2022

Survey	Survey Date(s)	Surveyor Reference
Habitat survey	June to August 2018 August 2020 May 2022	Scott Cawley Ltd.
Mammal surveys (excluding bats)	June to August 2018 August 2020 October 2020 March 2022	Scott Cawley Ltd.
Bat surveys:	<u>Walked transect activity surveys</u> June to August 2018 September and October 2019 May and July 2020 July and August 2021 <u>Identification of potential roost features (PRFs)</u> June to August 2018 August 2020 March 2022 <u>Building Inspection</u> March 2021	Scott Cawley Ltd.
Aquatic surveys:	July 2022	Triturus Environmental Ltd.
Nesting bird suitability assessment (i.e. kingfisher suitability)	November 2020 March 2022	Scott Cawley Ltd.
Amphibian habitat suitability assessment	June to August 2018 August 2020	Scott Cawley Ltd.
Reptile habitat suitability assessment	June to August 2018 August 2020	Scott Cawley Ltd.

12.2.3.3 Habitat Survey

Habitat surveys were carried out by Scott Cawley Ltd. between June and August 2018, August 2020 and updated in May 2022. All habitats located within or immediately adjacent to the Proposed Scheme footprint were surveyed and mapped to level three of the Heritage Council's habitat codes, after Fossitt (Fossitt 2000) and in accordance with Best Practice Guidance for Habitat Survey and Mapping (Smith *et al.* 2011). The level of field data quality (as per Smith *et al*. 2011) was also recorded. Plant species present that were either representative of a habitat or considered to be of conservation interest (i.e., those listed on the Flora Protection Order or listed in the 'threatened' category or higher on the Ireland Red List No. 10 Vascular Plants ((Wyse Jackson *et al,*. 2016)) and the Ireland Red List No. 8 Bryophytes (Lockhart *et al*. 2012)) were recorded, along with their relative abundances. Non-native invasive plant species listed on the Third Schedule of the Birds and Habitats Regulations were also recorded. The

habitats' extent was mapped onto an aerial photograph, with Global Positioning System (GPS) points taken where a habitat's extent could not be clearly identified from the aerial photograph. Vascular plant nomenclature follows that of the New Flora of the British Isles Fourth Edition (Stace 2019).

12.2.3.4 Aquatic Surveys

A desk study was carried out to identify all hydrological crossing points within the footprint of the Proposed Scheme. Previous design iterations of the Proposed Scheme did not require any in-stream works, modifications to banks or significant disturbance, and thereby aquatic surveys were deemed not necessary. Subsequent design iterations of the Proposed Scheme included construction methodologies which involved modifications to banks or significant disturbance which were deemed to require aquatic surveys.

The desk study identified two sites where water bodies may be subject to significant disturbance as a consequence of the Proposed Scheme. Aquatic surveys were carried out at a number of locations namely: the proposed Poddle Cycleway and Stone Boat Boardwalk at Mount Argus View (CBC0011AR001) and the proposed offline footbridges at the existing Robert Emmet Bridge over the Grand Canal (CBC0011AR002) (Triturus Environmental Ltd. 2022, Appendix VI). Aquatic survey data from the TII's Metrolink Project, has also been utilised to supplement the desktop information.

Fisheries habitat assessments were undertaken to establish the fisheries importance of each site for all fish species of conservation value and were carried out utilising elements of the approaches in the River Habitat Survey Methodology (Environment Agency 2003) and Fishery Assessment Methodology (O'Grady 2006) to broadly characterise the river sites (i.e., channel profiles, substrata etc.). Surveys were carried out for salmonids using the Life Cycle Unit method (Kennedy 1984; O'Connor and Kennedy 2002) by assigning quality scores to each type of habitat. Higher scores in the Life Cycle Unit method of fisheries quantification are representative of poorer value, with lower scores being more optimal despite this appearing counter intuitive. Lamprey habitat was assessed using the novel Lamprey Habitat Quality Index (LHQI) scoring system as devised by Triturus Environmental Ltd., which loosely follows the same rationale as the Life Cycle Unit score for salmonids above (Kennedy 1984; O'Connor and Kennedy 2002). Larval lamprey habitat quality as well as the suitability of adult spawning habitat was assessed based on the information provided in Maitland (2003). Water quality assessments were undertaken using the Macro-invertebrate Q-sampling methodology (Toner *et al.* 2005). In addition, macroinvertebrate sampling via sweep netting was undertaken of the Grand Canal, and the River Poddle.

12.2.3.5 Mammals (Excluding Bats)

The footprint of the Proposed Scheme was surveyed for badger *Meles meles* and otter *Lutra lutra* activity as part of the multidisciplinary walkover survey, undertaken between June and August 2018, in August and October 2020 and updated in March 2022. The presence / absence of these species was surveyed through the detection of field signs such as tracks, markings, feeding signs, and droppings as well as by direct observation. In addition, the study area was surveyed for the presence of badger setts and otter holts. Where present, any evidence of use was recorded.

The desk study identified two sites where waterbodies may be subject to disturbance (i.e. piling) as a consequence of the Proposed Scheme. These sites are the proposed Poddle Cycleway and Stone Boat Boardwalk at Mount Argus View and the proposed cycle / pedestrian bridges on each side of the existing Robert Emmet Bridge, over the Grand Canal. A corridor of approximately 150m upstream and downstream of the crossing points was surveyed to identify the presence of otter holts. The remainder of the watercourse crossings are considered unsuitable for otter habitation and / or of such condition that food resources would not be supported. No species-specific surveys were considered necessary for other protected mammal species for which field signs are less frequent and / or less reliable than other larger mammals, such as pine marten *Martes martes*, Irish stoat *Mustela erminea hibernica* and Irish hare *Lepus timidus hibernicus*. Nevertheless, during all surveys, attention was paid to activity signs such as searching soft muds for tracks, and to look for droppings. Potential presence of these species in suitable habitat was determined based on the habitat preferences described in Exploring Irish Mammals (Hayden and Harrington 2000).

12.2.3.6 Bats

The following sections describe the methodologies employed to carry out the various bat surveys undertaken in 2018, 2019, 2020, 2021 and 2022 to inform the EIAR. The bat surveys were carried out under the following licence, issued by the NPWS to Scott Cawley Ltd.:

- DER / BAT 2019-02 (amended) – Derogation licence to disturb bat roosts throughout the State;
- DER / BAT 2020-67 (amended) – Derogation licence to disturb bat roosts throughout the State;
- DER / BAT 2021-01 (amended) – Derogation licence to disturb bat roosts throughout the State; and
- DER / BAT 2022-02 (amended) - Derogation licence to disturb bat roosts throughout the State.

12.2.3.6.1 Bats – Walked Transect Surveys

Walked bat activity transect surveys were conducted along preselected transect routes at four locations along the Proposed Scheme. Transect routes were located at Robert Emmet Bridge over the Grand Canal at Harold's Cross, referred to as CBC0011BT001, along R137 Harold's Cross Road at Harold's Cross Park, referred to as CBC0011BT002, along R817 Kimmage Road Lower at Mount Argus Park, referred to as CBC0011BT003, and along R817 Kimmage Road Lower along Poddle Park, referred to as CBC0011BT004. The walked transect routes are shown on Figure 12.1.1 in Volume 3 of this EIAR.

Walked transect surveys comprised four visits to each transect route across three seasons; autumn, spring and summer as guided by Bat Surveys for Professional Ecologists: Good Practice Guidelines (Collins 2016) (see Table 12.2 for specific dates). Surveys were conducted in June to August 2018, September and October 2019, May and July 2020 and July and August 2021. Surveys commenced approximately 30 minutes after sunset to ensure that bats had emerged from their roosts. Transect Routes along Robert Emmet Bridge on the Grand Canal (CBC0011BT001) and along Poddle Park (CBC0011BT004) were surveyed across all seasons, transect routes along Harold's Cross Park (CBC0011BT002) and along Mount Argus Park (CBC0011BT003) were surveyed in Autumn 2019, Spring 2020 and Summer 2020 to capture design changes to the Proposed Scheme. These were considered sufficient to capture bat activity levels in these areas given the minor nature of works in these areas, with no proposed removal of suitable bat foraging habitat. This limitation is incorporated into the assessment and a precautionary principle is applied. Surveys involved the surveyor walking each transect route at a slow pace using with a handheld ultrasound bat detector (Elekon Batlogger M) to record any bat species present.

All bat calls were analysed using Elekon BatExplorer software. Calls were manually identified against species descriptions provided within British Bat Calls: A Guide to Species Identification (Russ 2012).

12.2.3.6.2 Bats –Tree Surveys

Trees located within the footprint of the Proposed Scheme were assessed for their potential to support roosting bats (i.e. Potential Roost Features (PRFs)) as part of the multidisciplinary walkover surveys carried out between June and August 2018, in August 2020 and in March 2022.

A number of trees located across the Proposed Scheme were examined from ground level for their potential to support roosting bats. They were assessed based on the presence of features commonly used by bats. Examples of such features include:

- Natural holes;
- Cracks / splits in major limbs;
- Loose bark; and
- Hollows / cavities.

12.2.3.6.3 Bats – Building Surveys

The singular bungalow to be demolished as part of the Proposed Scheme, located at the entrance of Gordon's Fuels on Clanbrassil Street Upper was assessed for its potential to support roosting bats (i.e., Potential Roost Features (PRFs)) in March 2021. Given the location of the bungalow in a highly developed and exposed area, with significant light spill from the adjacent Robert Emmet Bridge and adjacent businesses, it was not considered that the building had PRFs that would warrant dedicated surveys to identify roosts.

12.2.3.7 Nesting Kingfisher Suitability Assessment

The desk study identified two sites where waterbodies may be subject to significant disturbance (i.e., piling and in-stream works) as a consequence of the Proposed Scheme. These sites are located at the proposed Poddle Cycleway and Stone Boat Boardwalk at Mount Argus View and the proposed cycle / pedestrian bridges on each side of the existing Robert Emmet Bridge, over the Grand Canal.

The suitability of water features and associated foraging, roosting, and nesting habitats, located within or directly adjacent to the Proposed Scheme, were assessed for kingfisher potential in November 2020. These areas were also assessed *ad hoc* as part of the otter surveys carried out in March 2022. Where suitable habitat existed, surveys extended 500m upstream and downstream of the proposed crossing point. Evidence of previous and current nest holes were recorded.

12.2.3.8 Wintering Birds

A desk study was carried out to identify any potential suitable inland feeding and / or roosting sites for wintering birds located within or directly adjacent to the Proposed Scheme. This included a review of recent aerial photography and known inland feeding sites for the Species of Conservation Interest (SCI) bird species light-bellied Brent goose (Scott Cawley Ltd. 2017). There were no suitable wintering bird sites which would be subject to significant habitat loss or disturbance as a result of the Proposed Scheme. As such, it was not deemed necessary to carry out wintering bird surveys. The results of the desk-based study have informed the assessment of potential impacts on wintering bird species arising from the Proposed Scheme.

12.2.3.9 Reptiles

The suitability of habitats, located within and immediately adjacent to the Proposed Scheme, were assessed for breeding and / or hibernating reptile species common lizard *Lacerta vivipara*, as part of the multidisciplinary walkover surveys undertaken between June and August 2018 and in August 2020. Habitats surveys were also undertaken in May 2022 in order to capture design iteration changes and to reassess for species suitability.

12.2.3.10 Amphibians

An assessment of the suitability of surface water features, such as watercourses, drainage ditches and ponds for amphibian species (common frog *Rana temporaria* and smooth newt *Lissotriton vulgaris*) along the footprint of the Proposed Scheme, and suitable lands immediately adjacent, was carried out as part of the multidisciplinary walkover surveys undertaken between June and August 2018 and in August 2020.

12.2.4 Appraisal Method for the Assessment of Impacts

The biodiversity and ecological impacts of the Proposed Scheme have been assessed using the following guidelines:

- Environmental Impact Assessment of Projects - Guidance on the preparation of the Environmental Impact Assessment Report (European Commission 2017);
- EPA Guidelines (EPA 2022);
- Guidance on Integrating Climate Change and Biodiversity into Environmental Impact Assessment (European Union 2013);
- CIEEM Guidelines (CIEEM 2018); and
- Guidelines for Assessment of Ecological Impacts of National Road Schemes (NRA 2009).

12.2.4.1 Valuing the Ecological Receptors

Biodiversity receptors (including identified sites of biodiversity importance) have been valued with regard to the ecological valuation examples set out in the Guidelines for Assessment of Ecological Impacts of National Road Schemes (NRA 2009). These include International Importance, National Importance, County Importance, and Local Importance.

Habitat areas within Special Areas of Conservation (SACs) and Special Protection Areas (SPAs) are considered in the context of assessing impacts on the conservation objectives and site integrity of a given European site with regard to the Appropriate Assessment (AA) tests set out in Article 6(3) of the Habitats Directive. An AA Screening Report and Natura Impact Statement have been submitted with the application for approval as to enable the Board to carry out the requisite assessments for the purposes of Article 6(3) of the Habitats Directive. For the purposes of the appraisal of likely significant effects on biodiversity arising from the Proposed Scheme, as part of this Chapter of the EIAR, all European sites are valued as Internationally Important.

In accordance with the Guidelines for Assessment of Ecological Impacts of National Road Schemes (NRA 2009), biodiversity features within the ZoI of the Proposed Scheme which are '*both of sufficient value to be material in decision making and likely to be affected significantly'* are deemed to be KERs. These are the biodiversity receptors which may be subject to likely significant impacts from the Proposed Scheme, either directly or indirectly. KERs are those biodiversity receptors with an ecological value of Local Importance (Higher Value) or greater.

12.2.4.2 Characterising and Describing the Impacts

The parameters considered in characterising and describing the magnitude or scale of the likely significant effects of the Proposed Scheme are outlined in Table 12.3.

Table 12.3: Parameters Used to Characterise and Describe the Magnitude or Scale of Potential Impacts

Parameter	Categories
Type of impact	Positive / Neutral / Negative May also include Cumulative Effects, 'Do Nothing Effects', 'Do Minimum Effects', Indeterminable Effects, Irreversible Effects, Residual Effects, Synergistic Effects, Indirect Effects and / or Secondary Effects
Extent	The size of the affected area / habitat and / or the proportion of a population affected by the effect
Duration	The period of time over which the effect will occur*.
Frequency and Timing	How often the effect will occur; particularly in the context of relevant life-stages or seasons
Reversibility	Permanent/Temporary Will an impact reverse; either spontaneously or as a result of a specific action

Note: The above terms / definitions for describing the duration of impacts are provided in the EPA guidelines (EPA 2022): Momentary Effects - effects lasting from seconds to minutes; Brief Effects - effects lasting less than a day; Temporary Effects - effects lasting less than a year; Short-term Effects - effects lasting one to seven years; Medium-term Effects - effects lasting seven to 15 years; Long-term Effects - effects lasting 15 to 60 years; Permanent Effects - effects lasting over 60 years.

The likelihood of an impact occurring, and the predicted effects, are also an important consideration in characterising impacts. The likelihood of an impact occurring is assessed as being certain, likely or unlikely and; in some cases, it may be possible to definitively conclude that an impact will not occur.

Professional judgement is used in considering the contribution of all relevant criteria in determining the overall magnitude of an impact.

12.2.4.3 Impact Significance

In determining impact significance, the Guidelines for Assessment of Ecological Impacts of National Road Schemes (NRA 2009) and CIEEM Guidelines (CIEEM 2018) were followed, which requires examination of the following two key elements:

- Impact on the integrity of the ecological feature; and
- Impact on its conservation status within a given geographical area.

12.2.4.3.1 Integrity

The term '*integrity*' should be regarded as the coherence of ecological structure and function, across the entirety of a site that enables it to sustain all of the biodiversity or ecological resources for which it has been valued (NRA 2009).

The term '*integrity*' is most often used when determining impact significance in relation to designated areas for nature conservation (e.g. SACs, SPAs or pNHA / NHAs but can often be the most appropriate method to use for non-designated areas of biodiversity value where the component habitats and / or species exist with a defined ecosystem at a given geographic scale.

An impact on the integrity of an ecological site or ecosystem is considered to be significant if it moves the condition of the ecosystem away from a favourable condition: removing or changing the processes that support the sites' habitats and / or species; affect the nature, extent, structure and functioning of component habitats; and / or affect the population size and viability of component species.

12.2.4.3.2 Conservation Status

The definitions for conservation status given in the Habitats Directive, in relation to habitats and species, are also used in the CIEEM Guidelines (CIEEM 2018) and the Guidelines for Assessment of Ecological Impacts of National Road Schemes (NRA 2009):

- For natural habitats, conservation status means the sum of the influences acting on the natural habitat and its typical species, that may affect its long-term distribution, structure and functions as well as the long-term survival of its typical species, at the appropriate geographical scale; and
- For species, conservation status means the sum of influences acting on the species concerned that may affect the long-term distribution and abundance of its populations, at the appropriate geographical scale.

An impact on the conservation status of a habitat or species is considered to be significant if it will result in a change in conservation status.

After the definitions provided in the Habitats Directive, the conservation status of a habitat is favourable when:

- Its natural range and areas 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 as defined below under species.

Moreover, the conservation status of a species is favourable 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 habitat;
- 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.

According to the CIEEM Guidelines (2018) and the Guidelines for Assessment of Ecological Impacts of National Road Schemes (NRA 2009) methodology, if it is determined that the integrity and / or conservation status of an ecological feature will be impacted on, then the level of significance of that impact is related to the geographical scale at which the impact will occur (i.e. local, county, national, international). In some cases, an impact may not be significant at the geographic scale at which the ecological feature has been valued but may be significant at a lower geographical level. For example, a particular impact may not be considered likely to have a negative effect on the overall conservation status of a species which is considered to be internationally important. However, an impact may occur at a local level on this internationally important species. In this case, the impact on an Internationally Important species is considered to be significant at only a Local Level, rather than International level.

12.3 Baseline Environment

The Proposed Scheme has an overall length of approximately 3.7km, from the R817 Kimmage Road Lower at the junction with Fortfield Road and R818 Terenure Road West, to the R137 New Street South / R110 Kevin Street Junction where it will join the Tallaght / Clondalkin Bus Connects scheme.

The majority of the Proposed Scheme route is dominated by residential and buildings and artificial surfaces habitats. There are a number of parklands (Poddle Park, Mount Argus Park and Harold's Cross Park) consisting of amenity grassland, scattered trees and parkland and treeline habitat adjacent to the roads. Habitats present at the Kimmage Cross Roads include scattered trees and parkland, amenity grassland and freshwater river habitat at Poddle Park. An offline cycle track will be provided at the Ravensdale Park / R817 Kimmage Road Lower Junction. This offline cycle track will traverse Poddle Park (a road), Bangor Road, Blarney Park, Sundrive Road, Mount Argus Way and Mount Argus View, re-joining the Proposed Scheme at the Mount Argus View / R817 Kimmage Road Lower Junction. The Proposed Scheme will then traverse residential development and buildings and artificial surfaces on the eastern bus corridor, while scattered trees and parkland and freshwater habitats will also present on the proposed cycleway. Limited freshwater habitats are present along the Proposed Scheme route as the cycle track will intersect with the River Poddle at several locations, including a proposed Stone Boat boardwalk over the River Poddle at Mount Argus View, and the Grand Canal at Robert Emmet Bridge in Harold's Cross. Residential properties will give way to commercial development when the Proposed Scheme crosses the Grand Canal, buildings and artificial surfaces will dominate accentuated by city landscaping features including treelines, amenity grassland and scattered trees and parkland (i.e. St. Patrick's Cathedral and Park).

12.3.1 Zone of Influence (ZoI)

The ZoI, or distance over which a likely significant effect may occur will differ across the KERs, depending on the predicted impacts and the potential impact pathway(s). The results of both the desk study and the suite of ecological field surveys undertaken has established the habitats and species present along the alignment of the Proposed Scheme. The ZoI is then informed and defined by the sensitivities of each of the ecological receptors present, in conjunction with the nature and potential impacts associated with the Proposed Scheme. In some instances, the ZoI extends beyond the study area as described in Table 12.1 (e.g. surface water quality effects of a sufficient magnitude can extend, and affect, receptors at significant distances downstream).

The ZoI of the Proposed Scheme in relation to terrestrial habitats is generally limited to the footprint of the Proposed Scheme, and the immediate environs (to take account of shading or other indirect impacts, such as air quality). Hydrogeological / hydrological linkages (e.g. rivers or groundwater flows) between impact sources and wetland / aquatic habitats can often result in impacts occurring at significant distances.

The unmitigated hydrogeological ZoI for the Proposed Scheme may extend further then the footprint of the Proposed Scheme and is dependent on ground conditions, design measures and construction activities. The underlying aquifer is Locally Important Bedrock Aquifer, Moderately Productive only in Local Zones. This type of aquifer is associated with low permeability which decreases with depth. An upper shallow zone of higher permeability may exist in the top few metres and is associated with relatively short flow paths. Therefore any influence on the groundwater as a result of the proposed works will be localised and will not extend to any groundwater-dependant habitats which are all located over 400m from any of the proposed work. This ZoI is determined by the professional judgement of the hydrogeology specialists. This is further discussed with reference to specific construction activities in Chapter 14 (Land, Soils, Geology & Hydrogeology).

The unmitigated ZoI of air quality effects is generally local to the Proposed Scheme and not greater than a distance of 50m from the Proposed Scheme boundary, and 500m from Construction Compounds during the Construction Phase, and up to 200m the Proposed Scheme boundary or local road networks experiencing a change in AADT (Annual Average Daily Traffic) flows greater than 1,000 during the Operational Phase (see Chapter 7 (Air Quality) for more detail).

With regards to hydrological impacts, the distances over which water-borne pollutants are likely to remain in sufficient concentrations to have a likely significant effect on receiving waters and associated wetland / terrestrial habitats is highly site-specific and related to the predicted magnitude of any potential pollution event. Evidently, it will depend on volumes of discharged waters, concentrations and types of pollutants (in this case sediment,

hydrocarbons, and heavy metals), volumes of receiving waters, and the ecological sensitivity of the receiving waters. In the case of the Proposed Scheme, this includes: all estuarine habitats downstream of where the Proposed Scheme will drain to, or will cross waterbodies listed in Table 12.4 and the marine environment of Dublin Bay (see Figure 12.1.2 in Volume 3 of this EIAR).

As such, the potential ZoI for aquatic plant and animal species includes all estuarine habitats located downstream of where the Proposed Scheme will drain to the proposed crossing points listed in Table 12.4, and the marine environment of Dublin Bay. The ZoI for impacts to aquatic fauna species, such as Atlantic salmon *Salmo salar* and lamprey species *Lampetra* spp., is limited to those watercourses that will be crossed by the Proposed Scheme or waterbodies to which runoff from the Proposed Scheme could drain to during construction and operation.

Table 12.4 Water Bodies Hydrologically Connected to the Proposed Scheme and Within its ZoI

Waterbody Name	Connectivity to the Proposed Scheme
River Poddle (Poddle_010)	Will be crossed by the Proposed Scheme at a number of locations
Grand Canal	Will be crossed by the Proposed Scheme at Robert Emmet Bridge
Liffey Estuary Upper	Approximately 700m north of the terminus of the Proposed Scheme - surface water connectivity to Proposed Scheme through the River Poddle, approximately 3.2km downstream of the Mount Argus Way Crossing
Liffey Estuary Lower	Immediately downstream of Liffey Estuary Upper - surface water connectivity to Proposed Scheme via the Liffey Estuary Upper and the Grand Canal, approximately 3.8km downstream of the Robert Emmet Bridge crossing
Dublin Bay	Surface water connectivity to Proposed Scheme. Approximately 9.8km downstream of the Robert Emmet Bridge crossing over the Grand Canal and approximately 12.2km downstream of the Mount Argus Way crossing over the River Poddle

The ZoI for small mammal species, such as the pygmy shrew, would be expected to be limited to no more than approximately 100m from the Proposed Scheme boundary due to their small territory sizes and sedentary lifecycle. The ZoI for otters, badgers, stoat, and hedgehogs may extend over greater distances than small mammal species and bird species due to their ability to disperse many kilometres from their natal / resting sites. The ZoI for significant disturbance impacts to badger and otter breeding / resting places may extend as far as approximately 150m from the Proposed Scheme boundary. This ZoI (i.e. approximately 150m from Proposed Scheme boundary) for badgers and otters has been defined in accordance with the Guidelines for the Treatment of Badgers Prior to the Construction of National Road Schemes (NRA 2005) and the Guidelines for the Treatment of Otters Prior to the Construction of National Road Schemes (NRA 2006c) and is considered to be a precautionary distance. During construction-related disturbance, the screening effect provided by surrounding vegetation and buildings would likely reduce the actual distance of the ZoI for badgers and otters.

The ZoI of potential effects to bat roosts would not be expected to exceed 200m in most cases, but as effects are dependent on many factors (such as species, roost type, surrounding habitat, commuting routes etc.), this is assessed on a case-by-case basis and the ZoI may increase / decrease from this distance accordingly. Given the large foraging ranges for some species, the ZoI of potential landscape scale impacts, such as habitat loss and severance / fragmentation, could extend for several kilometres from the Proposed Scheme but the most significant effects are likely to occur within 1km of important roost sites (e.g. maternity roosts). Leisler's bats have been recorded foraging up to 13km from maternity roost sites (Shiel *et al.* 1999).

The ZoI of the Proposed Scheme in relation to likely significant effects on most breeding bird species is generally limited to habitat loss within the footprint of the Proposed Scheme, and disturbance / displacement during construction and disruption in territorial singing due to noise during operation. Disturbance effects may extend for several hundreds of metres from the Proposed Scheme.

The ZoI in relation to disturbance to wintering birds could extend up to approximately 300m from the Proposed Scheme for general construction activities, as many species (such as waterbirds) are highly susceptible to disturbance from loud and unpredictable noise during construction. However, as many estuarine bird species use inland habitat areas at distances from the coast, the ZoI for *ex-situ* impacts could extend a considerable distance from the Proposed Scheme. In the case of the Proposed Scheme, impacts to wintering birds within this 300m band could affect the use of potential *ex-situ* sites for bird species listed as SCIs of European sites.

Current understanding of construction related noise disturbance to wintering waterbirds is based on the research presented in Construction and Waterfowl: Defining Sensitivity, Response, Impacts and Guidance (Cutts *et al.* 2009) and Exploring Behavioural Responses of Shorebirds to Impulsive Noise (Wright *et al,.* 2010). In terms of construction noise, levels below 50dB (decibels) would not be expected to result in any response from foraging or roosting birds. Noise levels between 50dB and 70dB would provoke a moderate effect / level of response from birds (i.e. birds becoming alert and some behavioural changes (e.g. reduced feeding activity)), but birds are expected to habituate to noise levels within this range. Noise levels above 70dB are likely result in birds moving out of the affected zone or leaving the site altogether. At approximately 300m, typical noise levels associated with construction activity (British Standard Institute (BSI) British Standard (BS) 5228-1:2009+A1:2014 Code of Practice for noise and vibration control of construction and open sites - Part 1: Noise (hereafter referred to as BS 5228–1) (BSI 2008)) are generally below 60dB or, in most cases, are approaching the 50dB threshold.

The ZoI in relation to amphibian species is likely to be limited to direct habitat loss and severance within the Proposed Scheme boundary and / or indirect impacts to water quality in wetland habitats hydrologically connected to the Proposed Scheme.

The ZoI in relation to the common lizard is likely to be limited to direct habitat loss and severance within and across the Proposed Scheme boundary and disturbance / displacement effects in the immediate vicinity during construction.

12.3.2 Desk Study

The results of the desk study review are provided in Appendix A12.1 in Volume 4 of this EIAR and are incorporated into the sections below under the various headings, as relevant.

12.3.3 Biodiversity Areas

The Dublin City Biodiversity Action Plan 2021 - 2025 (DCC 2021) highlights a number of areas considered to be of biodiversity value present within the DCC administrative boundary. These areas that are located within the ZoI of the Proposed Scheme are provided below:

- Dublin City's Green Infrastructure Network. Habitats within the Proposed Scheme which are considered to contribute to the Green Infrastructure Network include grassland, hedgerows, treelines and woodlands, which support a range of species and act as ecological links / corridors across the wider landscape. Dublin City's network of parks and public green spaces, such as Poddle Park, Mount Argus Park and Harold's Cross Park as well as Bushy Park, Terenure College and Sports Grounds, and support a variety of species and are considered to be valuable biodiversity resources;
- Dublin City's network of rivers, streams and riparian zones. The Proposed Scheme will cross the River Poddle (where it flows above ground). This watercourse has been known to locally support riverine bird species, such as kingfisher *Alcedo atthis*. The Liffey Estuary is downstream of the Proposed Scheme and is noted as being highly significant regional salmonid catchment for species of Atlantic salmon *Salmo salar* and brown trout *S. trutta*. It also supports, brook lamprey *Lampetra planeri*, river lamprey *L. fluviatilis* and white-clawed crayfish *Austropotamobius pallipes*; and
- The Grand Canal which is designated as a pNHA will be crossed by the Proposed Scheme at Robert Emmet Bridge. It is noted that this waterway forms an important ecological corridor for both aquatic and terrestrial species (including otter) and allow for the dispersal of a range of flora and fauna, which is particularly vital in an urban environment. It is noted as an important aspect of Dublin City's Green Infrastructure Network, linking the River Shannon to Dublin Bay. It is a pNHA which supports coarse fish species, including pike *Esox lucius*, rudd *Scardinius erythrophthalmus*, bream *Abramis brama* and tench *Tinca tinca*, and the legally-protected Flora Protection Order species opposite-leaved pondweed *Groenlandia densa* as well as the endangered Red List freshwater snail species glutinous snail *Myxas glutinosa*. Otter *Lutra lutra* activity is often found where the Grand Canal crosses with streams and rivers throughout the city.

The South Dublin County Development Plan 2022-2028 (SDCC 2022) highlights a number of areas considered to be of biodiversity value present within the SDCC administrative boundary. These areas that are located within the ZoI of the Proposed Scheme are provided below:

- Habitats considered to be of importance, such as hedgerows and woodlands, which support a range of species and act as important ecological links/corridors across the wider landscape;
- Liffey Valley is important as an interconnecting biodiversity corridor with adjacent pNHAs such as Rye River / Carton pNHA. Relevant objectives contained in the South Dublin County Development Plan 2022-2028 include to protect and enhance the outstanding natural character and amenity of the area (SDCC 2022). Tree preservation orders have also been identified for areas adjacent to Lucan Road. Liffey Valley was designated by a Special Amenity Area Order (SAAO) by the then Minister for the Environment in 1990. It traverses the county boundaries of both SDCC and Fingal County Council (FCC). The valley has tremendous ecological significance in the form of a wide variety of habitats which support diverse plant and animal species including salmon, kingfisher and otter and flora including hairy St. John's-wort *Hypericum hirsutum*, and rare Red List plant species green figwort *Scrophularia umbrosa* and yellow archangel *Lamiastrum galeobdolon*. The objective of the order is to protect these outstanding landscapes, nature and amenities. The River Liffey is an important feature in this river catchment for terrestrial and aquatic species as well as greenspaces; and
- Network of parks and public green spaces which support a variety of species and habitats and are considered to be a valuable biodiversity resource.

Local biodiversity areas listed above are considered under the relevant flora and / or fauna KERs that rely on these areas in the overall EIAR biodiversity assessment.

12.3.4 Designated Areas for Nature Conservation

12.3.4.1 European sites

The Proposed Scheme will not overlap with any European site. The nearest European site to the Proposed Scheme is South Dublin Bay and River Tolka Estuary SPA, which is located approximately 3.6km east of the Proposed Scheme (as the crow flies) and approximately 6.7km downstream of the proposed crossing point on the Grand Canal. This is followed by South Dublin Bay SAC, which is located approximately 3.9km east of the Proposed Scheme and approximately 7.5km downstream of the proposed crossing point on the Grand Canal. North Bull Island SPA is also located in Dublin Bay, approximately 6.5km from the Proposed Scheme.

There are seven European sites located in Dublin Bay that are hydrologically connected and downstream of the Proposed Scheme. These European sites are North Dublin Bay SAC, South Dublin Bay SAC, North Bull Island SPA, South Dublin Bay and River Tolka SPA, Howth Head Coast SPA, Rockabill to Dalkey Island SAC and Dalkey Island SPA. These European sites will be hydrologically connected to the Proposed Scheme via three watercourses, i.e. the Grand Canal Main Line, River Poddle (Poddle_010) and the Liffey Estuary Upper.

There are nine SPAs designated for SCI species that are known to forage and / or roost at inland sites across Dublin City and / or utilise Dublin Bay. These are Malahide Estuary SPA, Baldoyle Bay SPA, Rogerstown Estuary SPA, Skerries Islands SPA, North Bull Island SPA, South Dublin Bay and River Tolka SPA, Ireland's Eye SPA, Lambay Island SPA and The Murrough SPA.

There are two European sites containing marine mammals which are known to frequent Dublin Bay and the Liffey Estuary Lower. These are Rockabill to Dalkey Island SAC and Lambay Island SAC.

There are 27 no. European sites (SACs or SPAs) located within the vicinity of the Proposed Scheme, of which 16 no. are located within the ZoI. Each site, their distance to the Proposed Scheme and their designations (QIs / SCIs) are listed in Table 12.5, and illustrated in Figure 12.3 in Volume 3 of this EIAR. Sites within the ZoI are highlighted in blue in Table 12.5.

It is confirmed that for the purposes of the EIAR, these European sites are all valued as being of International Importance.

Table 12.5: European Sites (SACs and SPAs) Located Within the ZoI (highlighted in light blue), and Those in the Wider Area, of the Proposed Scheme Boundary.

Site Name	Distance	Designation – QIs or SCIs (*indicates a priority Habitat)
SAC		
South Dublin Bay SAC [000210]	Approximately 3.9km east of Proposed Scheme	Annex I Habitats: • 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]. S.I. No. 525/2019 - European Union Habitats (South Dublin Bay Special Area of Conservation 000210) Regulations 2019 Source: Conservation Objectives: South Dublin Bay SAC 000210. Version 1. (NPWS 2013a) and Natura 2000 – Standard Data Form (NPWS 2020a)
North Dublin Bay SAC [000206]	Approximately 6.5km north east of Proposed Scheme	Annex I Habitats: • 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 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]*; and • Humid dune slacks [2190]. Annex II Species: • Petalwort *Petalophyllum ralfsii* [1395]. S.I. No. 524/2019 – European Union Habitats (North Dublin Bay Special Area of Conservation 000206) Regulations 2019 Source: Conservation Objectives: North Dublin Bay SAC 000206. Version 1. (NPWS 2013b) and Natura 2000 – Standard Data Form (NPWS 2020b)
Glenasmole Valley SAC [001209]	Approximately 7.4km south of Proposed Scheme	Annex I Habitats: • Semi-natural dry grasslands and scrubland facies on calcareous substrates (Festuco-Brometalia) (* important orchid sites) [6210]; • *Molinia* meadows on calcareous, peaty or clayey-silt-laden soils (Molinion caeruleae) [6410]; and • Petrifying springs with tufa formation (Cratoneurion) [7220]*. S.I. No. 345/2021 - European Union Habitats (Glenasmole Valley Special Area of Conservation 001209) Regulations 2021. Source: Conservation objectives for Glenasmole Valley SAC [001209]. Version 1.0. (NPWS 2021a) and Natura 2000 – Standard Data Form (NPWS 2018be)
Wicklow Mountains SAC [002122]	Approximately 8.1 km south of Proposed Scheme	Annex I Habitats: • Oligotrophic waters containing very few minerals of sandy plains (Littorelletalia uniflorae) [3110]; • Natural dystrophic lakes and ponds [3160]; • Northern Atlantic wet heaths with *Erica tetralix* [4010]; • European dry heaths [4030]; • Alpine and Boreal heaths [4060]; • Calaminarian grasslands of the Violetalia calaminariae [6130]; • Species-rich *Nardus* grasslands, on siliceous substrates in mountain areas (and submountain areas, in Continental Europe) [6230]*; • Blanket bogs (* if active bog) [7130]; • Siliceous scree of the montane to snow levels (Androsacetalia alpinae and Galeopsietalia ladani) [8110]; • Calcareous rocky slopes with chasmophytic vegetation [8210];

Site Name	Distance	Designation – QIs or SCIs (*indicates a priority Habitat)
		• Siliceous rocky slopes with chasmophytic vegetation [8220]; and • Old sessile oak woods with *Ilex* and *Blechnum* in the British Isles [91A0]. Annex II Species: • Otter *Lutra lutra* [1355]. . Source: Conservation Objectives: Wicklow Mountains SAC 002122. Version 1. (NPWS 2017a) and Natura 2000 – Standard Data Form (NPWS 2018c)
Baldoyle Bay SAC [000199]	Approximately 11.5km north east of Proposed Scheme	Annex I Habitats: • Mudflats and sandflats not covered by seawater at low tide [1140]; • *Salicornia* and other annuals colonising mud and sand [1310]; • Atlantic salt meadows (Glauco - Puccinellietalia maritimae) [1330]; and • Mediterranean salt meadows (Juncetalia maritimi) [1410]. S.I. No. 472/2021 - European Union Habitats (Baldoyle Bay Special Area of Conservation 000199) Regulations 2021 Source: Conservation Objectives: Baldoyle Bay SAC 000199. Version 1. (NPWS 2012b) and Natura 2000 – Standard Data Form (NPWS 2019a)
Rockabill to Dalkey Island SAC [003000]	Approximately. 12.1km east of the Proposed Scheme	Annex I Habitats: • Reefs [1170]. Annex II Species: • Harbour porpoise *Phocoena phocoena* [1351]. *S.I. No. 94/2019 – European Union Habitats (Rockabill to Dalkey Island Special Area Of Conservation 003000) Regulations 2019* Source: Conservation Objectives: Rockabill to Dalkey Island SAC 003000. Version 1. (NPWS 2013c) and Natura 2000 – Standard Data Form (NPWS 2019f)
Howth Head SAC [000202]	Approximately 12.2km north east of the Proposed Scheme	Annex I Habitats: • Vegetated sea cliffs of the Atlantic and Baltic coasts [1230]; and • European dry heaths [4030]. S.I. No. 524/2021 - European Union Habitats (Howth Head Special Area of Conservation 000202) Regulations 2021 Source: Conservation Objectives: Howth Head SAC 000202. Version 1. (NPWS 2016) and Natura 2000 – Standard Data Form (NPWS 2018d)
Knocksink Wood SAC [001398]	Approximately 12.4km south-east of the Proposed Scheme	Annex I Habitats • Petrifying springs with tufa formation (Cratoneurion)* [7220] • Old sessile oak woods with Ilex and Blechnum in the British Isles [91A0] • Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (Alno-Padion, Alnion incanae, Salicion albae) [91E0] S.I. No. 93/2019 - European Union Habitats (Knocksink Wood Special Area Of Conservation 000725) Regulations 2019 NPWS (2021b) Conservation Objectives: Knocksink Wood SAC 000725. Version 1. National Parks and Wildlife Service, Department of Housing, Local Government and Heritage.
Rye Water Valley/Carton SAC [003198]	Approximately 13.8km west of Proposed Scheme	Annex I Habitats: • Petrifying springs with tufa formation (Cratoneurion) [7220]*. Annex II Species: • Narrow-mouthed Whorl Snail *Vertigo angustior* [1014]; and • Desmoulin's Whorl Snail *Vertigo moulinsiana* [1016]. S.I. No. 494/2018 – European Union Habitats (Rye Water Valley/Carton Special Area of Conservation 000206) Regulations 2018

Site Name	Distance	Designation – QIs or SCIs (*indicates a priority Habitat)
		Source: Conservation Objectives for Rye Water Valley/Carton SAC [003198]. Version 1.0 (NPWS 2021c) and Natura 2000 – Standard Data Form (NPWS 2019e)
Malahide Estuary SAC [000205]	Approximately 14.3km north of Proposed Scheme	Annex I Habitats: • Mudflats and sandflats not covered by seawater at low tide [1140]; • *Salicornia* and other annuals colonising mud and sand [1310]; • *Spartina* swards (Spartinion maritimae) [1320]**; • Atlantic salt meadows (Glauco-Puccinellietalia maritimae) [1330]; • Mediterranean salt meadows (Juncetalia maritimi) [1410]; • Shifting dunes along the shoreline with *Ammophila arenaria* (white dunes) [2120]; and • Fixed coastal dunes with herbaceous vegetation (grey dunes) [2130]*. *S.I. No. 91/2019 – European Union Habitats (Malahide Estuary Special Area of Conservation 000205) Regulations 2019* Source: Conservation Objectives: Malahide Estuary SAC 000205. Version 1. (NPWS 2013d) and Natura 2000 – Standard Data Form (NPWS 2020c)
Ballyman Glen SAC [000713]	Approximately 14.3km south of the Proposed Scheme	Annex I Habitats • Petrifying springs with tufa formation (Cratoneurion)* [7220] • Alkaline fens [7230] S.I. No. 92/2019 - European Union Habitats (Ballyman Glen Special Area Of Conservation 000713) Regulations 2019 NPWS (2019e) Conservation Objectives: Ballyman Glen SAC 000713. Version 1. National Parks and Wildlife Service, Department of Culture, Heritage and the Gaeltacht.
Ireland's Eye SAC [002193]	Approximately 15.4km north east of the Proposed Scheme	Annex I Habitats: • Perennial vegetation of stony banks [1220]; and • Vegetated sea cliffs of the Atlantic and Baltic coasts [1230]. S.I. No. 501/2017 – European Union Habitats (Ireland's Eye Special Area of Conservation 002193) Regulations 2017 Source: Conservation Objectives: Ireland's Eye SAC 002193. Version 1. (NPWS 2017b) and Natura 2000 – Standard Data Form (NPWS 2020d)
Rogerstown Estuary SAC [000208]	Approximately 18.5km north of the Proposed Scheme	Annex I Habitats: • Estuaries [1130]; • Mudflats and sandflats not covered by seawater at low tide [1140]; • *Salicornia* and other annuals colonising mud and sand [1310]; • Atlantic salt meadows (Glauco-Puccinellietalia maritimae) [1330]; • Mediterranean salt meadows (Juncetalia maritimi) [1410]; • Shifting dunes along the shoreline with *Ammophila arenaria* (white dunes) [2120]; and • Fixed coastal dunes with herbaceous vegetation (grey dunes) [2130]*. *S*.I. No. 286/2018 – European Union Habitats (Rogerstown Estuary Special Area of Conservation 000208) Regulations 2018 Source: Conservation Objectives: Rogerstown Estuary SAC 000208. Version 1. (NPWS 2013e) and Natura 2000 – Standard Data Form (NPWS 2019g)
Lambay Island SAC [000204]	Approximately 22.9km north east of Proposed Scheme	Annex I Habitats: • Reefs [1170]; and • Vegetated sea cliffs of the Atlantic and Baltic coasts [1230] Annex II Species: • Grey seal *Halichoerus grypus* [1364]; and • Harbour seal *Phoca vitulina* [1365].

Site Name	Distance	Designation – QIs or SCIs (*indicates a priority Habitat)
		S.I. No. 294/2019 - European Union Habitats (Lambay Island Special Area Of Conservation 000204) Regulations 2019 Source: Conservation Objectives: Lambay Island SAC 000204. Version 1. (NPWS 2013f) and Natura 2000 – Standard Data Form (NPWS 2019h)
SPAs		
South Dublin Bay and River Tolka Estuary SPA [004024]	Approximately 3.6km east of the Proposed Scheme	• Light-bellied Brent Goose *Branta bernicla hrota* [A046]; • Oystercatcher *Haematopus ostralegus* [A130]; • Ringed Plover *Charadrius hiaticula* [A137]; • Grey Plover *Pluvialis squatarola* [A140]; • Knot *Calidris canutus* [A143]; • Sanderling *Calidris alba* [A144]; • Dunlin *Calidris alpina* [A149]; • Bar-tailed Godwit *Limosa lapponica* [A157]; • 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 • Wetlands and Waterbirds [A999]. S.I. No. 212/2010 – European Communities (Conservation of Wild Birds (South Dublin Bay and River Tolka Estuary Special Protection Area 004024) Regulations 2010. Source: Conservation Objectives: South Dublin Bay and River Tolka Estuary SPA 004024. Version 1. (NPWS 2015a) and Natura 2000 – Standard Data Form (NPWS 2020e)
North Bull Island SPA [004006]	Approximately 6.5km north east of the Proposed Scheme	• Light-bellied Brent Goose *Branta bernicla hrota* [A046]; • Shelduck *Tadorna tadorna* [A048]; • Teal *Anas crecca* [A052]; • Pintail *Anas acuta* [A054]; • Shoveler *Anas clypeata* [A056]; • Oystercatcher *Haematopus ostralegus* [A130]; • 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 tetanus* [A162]; • Turnstone *Arenaria interpres* [A169]; • Black-headed Gull *Chroicocephalus ridibundus* [A179]; and • Wetlands and Waterbirds [A199]. S.I. No. 211/2010 – European Communities (Conservation of Wild Birds (North Bull Island Special Protection Area 004006) Regulations 2010. Source: Conservation Objectives: North Bull Island SPA 004006. Version 1. (NPWS 2015b) and Natura 2000 – Standard Data Form (NPWS 2020f)
Wicklow Mountains SPA [004040]	Approximately 8.2km south of the Proposed Scheme	• Merlin *Falco columbarius* [A098]; and • Peregrine *Falco peregrinus* [A103]. S.I. No. 586/2012 – European Communities (Conservation of Wild Birds (Wicklow Mountains Special Protection Area 004040) Regulations 2012.

Site Name	Distance	Designation – QIs or SCIs (*indicates a priority Habitat)
		Source: Conservation objectives for Wicklow Mountains SPA [004040]. First Order Site-specific Conservation Objectives Version 1.0. (NPWS 2022a and Natura 2000 – Standard Data Form (NPWS 2020h)
Baldoyle Bay SPA [004016]	Approximately 11.7km north east of	• Light-bellied Brent Goose *Branta bernicla hrota* [A046]; • Shelduck *Tadorna tadorna* [A048]; • Ringed Plover *Charadrius hiaticula* [A137]; • Golden Plover *Pluvialis apricaria* [A140]; • Grey Plover *Pluvialis squatarola* [A141]; • Bar-tailed Godwit *Limosa lapponica* [A157]; and • Wetlands and Waterbirds [A999]. S.I. No. 275/2010 – European Communities (Conservation of Wild Birds (Baldoyle Bay Special Protection Area 004016) Regulations 2010. Source: Conservation Objectives: Baldoyle Bay SPA 004016. Version 1. (NPWS 2013g) and Natura 2000 – Standard Data Form (NPWS 2020g)
Dalkey Island SPA [004172]	Approximately 13km southeast of Proposed Scheme	• Roseate Tern *Sterna dougallii* [A192]; • Common Tern *Sterna hirundo* [A193]; and • Arctic Tern *Sterna paradisaea* [A194]. S.I. No. 238/2010 – European Communities (Conservation of Wild Birds (Dalkey Islands Special Protection Area 004172)) Regulations 2010 Source: Conservation objectives for Dalkey Islands SPA [004172]. First Order Site-specific Conservation Objectives Version 1.0. (NPWS 2022b) and Natura 2000 – Standard Data Form (NPWS 2020j)
Malahide Estuary SPA [004025]	Approximately 14.3km north east of Proposed Scheme	• Great Crested Grebe *Podiceps cristatus* [A005]; • Light-bellied Brent Goose *Branta bernicla hrota* [A046]; • Shelduck *Tadorna tadorna* [A048]; • Pintail *Anas acuta* [A054]; • Goldeneye *Bucephala clangula* [A067]; • Red-breasted *Merganser Mergus serrator* [A069]; • Oystercatcher *Haematopus ostralegus* [A130]; • Golden Plover *Pluvialis apricaria* [A140]; • Grey Plover *Pluvialis squatarola* [A141]; • Knot *Calidris canutus* [A143]; • Dunlin *Calidris alpina* [A149]; • Black-tailed Godwit *Limosa limosa* [A156]; • Bar-tailed Godwit *Limosa lapponica* [A157]; • Redshank *Tringa totanus* [A162]; and • Wetland [A999]. S.I. No. 285/2011 – European Communities (Conservation of Wild Birds (Malahide Estuary Special Protection Area 004025) Regulations 2011 Source: Conservation Objectives: Malahide Estuary SPA 004025. Version 1. (NPWS 2013h) and Natura 2000 – Standard Data Form (NPWS 2020i)
Howth Head Coast SPA [004113]	Approximately 14.7km north east of the Proposed Scheme	• Kittiwake *Rissa tridactyla* [A188]. *S.I. No. 185/2012 – European Communities (Conservation of Wild Birds (Howth Head Coast Special Protection Area 004113)) Regulations 2012.* Source: Conservation objectives for Howth Head Coast SPA [004113]. First Order Site-specific Conservation Objectives Version 1.0. (NPWS 2022c) and Natura 2000 – Standard Data Form (NPWS 2020k)
Ireland's Eye SPA [004117]	Approximately 15.2km north east of Proposed Scheme	• Cormorant *Phalacrocorax carbo* [A017]; • Herring Gull *Larus argentatus* [A184]; • Kittiwake *Rissa tridactyla* [A188]; • Guillemot *Uria aalge* [A199]; and • Razorbill *Alca torda* [A200]. S.I. No. 240/2010 – European Communities (Conservation of Wild Birds (Ireland's Eye Special Protection Area 004117) Regulations 2010.

Site Name	Distance	Designation – QIs or SCIs (*indicates a priority Habitat)
		Source: Conservation objectives for Ireland's Eye SPA [004117]. First Order Site-specific Conservation Objectives Version 1.0. (NPWS 2022d) and Natura 2000 – Standard Data Form (NPWS 2020l)
Rogerstown Estuary SPA [004015]	Approximately 18.8km north of the Proposed Scheme	• Greylag Goose *Anser anser* [A043]; • Light-bellied Brent Goose *Branta bernicla hrota* [A046]; • Shelduck *Tadorna tadorna* [A048]; • Shoveler *Anas clypeata* [A056]; • Oystercatcher *Haematopus ostralegus* [A130]; • Ringed Plover *Charadrius hiaticula* [A137]; • Grey Plover *Pluvialis squatarola* [A141]; • Knot *Calidris canutus* [A143]; • Dunlin *Calidris alpina* [A149]; • Black-tailed Godwit *Limosa limosa* [A156]; • Redshank *Tringa totanus* [A162]; and • Wetland [A999]. S.I. No. 271/2010 – European Communities (Conservation of Wild Birds (Rogerstown Estuary Special Protection Area 004015) Regulations 2010. Source: Conservation Objectives: Rogerstown Estuary SPA 004015. Version 1. (NPWS 2013i) and Natura 2000 – Standard Data Form (NPWS 2020m)
Lambay Island SPA [004069]	Approximately 22.7km from the Proposed Scheme	• Fulmar *Fulmarus glacialis* [A009] • Cormorant *Phalacrocorax carbo* [A017]; • Shag *Phalacrocorax aristotelis* [A018]; • Greylag Goose *Anser anser* [A043]; • Lesser Black-backed Gull *Larus fuscus* [A183] • Herring Gull *Larus argentatus* [A184]; • Kittiwake *Rissa tridactyla* [A188]; • Guillemot *Uria aalge* [A199]; • Razorbill *Alca torda* [A200]; and • Puffin *Fratercula arctica* [A204]. S.I. No. 242/2010 – European Communities (Conservation of Wild Birds (Lambay Island Special Protection Area 004069)) Regulations 2010. Source: Conservation objectives for Lambay Island SPA [004069]. First Order Site-specific Conservation Objectives Version 1.0. (NPWS 2022e) and Natura 2000 – Standard Data Form (NPWS 2020n)
Skerries Islands SPA [004122]	Approximately 28.3km from the Proposed Scheme	• Cormorant *Phalacrocorax carbo* [A017]; • Shag *Phalacrocorax aristotelis* [A018]; • Brent Goose *Branta bernicla hrota [*A046]; • Purple Sandpiper *Calidris maritima [*A148]; • Turnstone *Arenaria interpres* [A169]; • Herring Gull *Larus argentatus* [A184]. S.I. No. 245/2010 – European Communities (Conservation of Wild Birds (Skerries Islands Special Protection Area 004122)) Regulations 2010. Source: Conservation objectives for Skerries Islands SPA [004122]. First Order Site-specific Conservation Objectives Version 1.0. (NPWS 2022f) and Natura 2000 – Standard Data Form (NPWS 2020o)
The Murrough SPA [004186]	Approximately 28.4km from the Proposed Scheme	• Red-throated Diver *Gavia stellata* [A001]; • Greylag Goose *Anser anser* [A043]; • Light-bellied Brent Goose *Branta bernicla hrota* [A046]; • Wigeon *Anas penelope* [A050]; • Teal *Anas crecca* [A052]; • Black-headed Gull *Chroicocephalus ridibundus* [A179]; • Herring Gull *Larus argentatus* [A184]; and • Little Tern *Sterna albifrons* [A195].

Site Name	Distance	Designation – QIs or SCIs (*indicates a priority Habitat)
		S.I. No. 298/2011 – European Communities (Conservation of Wild Birds (The Murrough Special Protection Area 004186)) Regulations 2011. Source: Conservation objectives for The Murrough SPA [004186]. First Order Site Specific Conservation Objectives Version 1.0. (NPWS 2022g) and Natura 2000 – Standard Data Form (NPWS 2020q)
Rockabill SPA [004014]	Approximately 28.9km of the Proposed Scheme	• *Purple Sandpiper Calidris maritima [A148;* • *Roseate Tern Sterna dougallii [A192];* • *Common Tern Sterna hirundo [A193];* and • *Arctic Tern Sterna paradisaea [A194].* *S.I. No. 94/2012 – European Communities (Conservation of Wild Birds (Rockabill Special Protection Area 004014) Regulations 2012.* Source: Conservation Objectives: Rockabill SPA [004014]. Version 1. NPWS 2013j) and Natura 2000 – Standard Data Form (NPWS 2020p)

12.3.4.2 Natural Heritage Areas (NHAs) and Proposed Natural Heritage Areas (pNHAs)

NHAs are designations under Section 18 of the Wildlife (Amendment) Act 2000 to protect habitats, species or geology of National Importance.

In addition to NHAs, pNHAs, are sites of significance for wildlife and habitats and were published on a non-statutory basis in 1995 but have not since been statutorily proposed or designated. pNHAs are offered protection in the interim period under the county or city development plans which requires that planning authorities give due regard to their protection in planning policies and decisions. The Proposed Scheme lies within the administrative boundaries of the Dublin City Development Plan 2022-2028 (DCC 2022), with a small section at Kimmage (approximately 20 metres) extending into the South Dublin County Development Plan 2022-2028 (SDCC 2022) administrative area.

Many of the pNHA sites and some of the NHAs in Ireland overlap with the boundaries of European sites.

The closest nationally designated site to the Proposed Scheme is the Grand Canal pNHA, which will be traversed by the Proposed Scheme at Robert Emmet Bridge. The Grand Canal pNHA lies within the administrative boundary of both the Dublin City Development Plan 2022-2028 (DCC 2022), and the South Dublin County Development Plan 2022-2028 (SDCC 2022).

There are six pNHAs that are located downstream of the Proposed Scheme in Dublin Bay (not including the Grand Canal which is intersected by the Proposed Scheme). These pNHAs are North Dublin Bay pNHA, Dolphins, Dublin Docks pNHA, Booterstown Marsh pNHA, Howth Head pNHA, Dalkey Coastal Zone, Killiney Hill pNHA and South Dublin Bay pNHA. These sites will be hydrologically connected to the Proposed Scheme via the Grand Canal, the River Poddle and the Liffey Estuary Upper.

There is one NHA and fifteen pNHAs containing bird species that are known to forage and / or roost at inland sites across Dublin City. These are Skerries Islands NHA, Malahide Estuary pNHA, Baldoyle Bay pNHA, Rogerstown pNHA, Portraine Shore pNHA, North Dublin Bay pNHA, South Dublin Bay pNHA, Dolphins, Dublin Docks pNHA, Booterstown Marsh pNHA, Dalkey Coastal Zone and Killiney Hill pNHA, Ireland's Eye pNHA, Lambay Island pNHA, Rockabill pNHA and The Murrough pNHA.

There are three pNHAs containing marine mammals which are known to frequent Dublin Bay and the Liffey Estuary Lower. These are Dolphins, Dublin Docks pNHA, Dalkey Coastal Zone and Killiney Hill pNHA and Lambay Island pNHA.

There is one NHA and 32 pNHAs located in the wider area of the Proposed Scheme. These are listed in Table 12.6 and illustrated in Figure 12.3 in Volume 3 of this EIAR. Table 12.6 lists these sites, their distance from the Proposed Scheme, and the ecological features for which the sites are designated / proposed. Sixteen of these are located within the ZoI of the Proposed Scheme (see Table 12.6).

These pNHAs are valued as being of National Importance.

Table 12.6: NHAs and pNHAs Located Within the ZoI of Proposed Scheme Boundary (highlighted in light blue), and Those in the Wider Area, of the Proposed Scheme Boundary

Site Name	Distance	Designation
NHAs		
Skerries Islands NHA 001218	Approximately 28.3km from the Proposed Scheme	See Table 12.5 under Skerries Islands SPA
pNHAs		
Grand Canal pNHA [002104]	Traverses the Proposed Scheme	Diversity of species canal supports and presence of a legally protected plant species, opposite-leaved pondweed *Groenlandia densa*
Royal Canal pNHA [002103]	Approximately 2.3km north of the Proposed Scheme	Diversity of species canal supports and presence of a legally protected plant species, opposite-leaved pondweed *Groenlandia densa*
Dodder Valley pNHA [000991]	Approximately 3.3km south west of Proposed Scheme	The last remaining stretch of natural riverbank vegetation on the River Dodder in the built-up Greater Dublin Area.
North Dublin Bay pNHA [000206]	Approximately 3.4km north east of Proposed Scheme	See Table 12.5 under North Dublin Bay SAC, North Bull Island SPA and South Dublin Bay and River Tolka Estuary SPA
South Dublin Bay pNHA [000210]	Approximately 3.9km south of the Proposed Scheme	See Table 12.5 under South Dublin Bay SAC and South Dublin Bay and River Tolka Estuary SPA
Dolphins, Dublin Docks pNHA [000201]	Approximately. 5km east of the Proposed Scheme	See Table 12.5 under South Dublin Bay and River Tolka Estuary SPA
Booterstown Marsh pNHA [001205]	Approximately 5.2km south east of the Proposed Scheme	See Table 12.5 under South Dublin Bay and River Tolka Estuary SPA
Liffey Valley pNHA [000128]	Approximately 5.3km north west of the Proposed Scheme	Presence of legally protected plant species, hairy St. John's-wort *Hypericum hirsutum*, rare Red List plant species green figwort *Scrophularia umbrosa* and yellow archangel *Lamiastrum galeobdolon* and the diversity of habitat present.
Fitzsimon's Wood pNHA [001753]	Approximately 6.1km south east of the Proposed Scheme	Birch woodland, which is very rare in Co. Dublin.
Santry Demesne pNHA [000178]	Approximately 6.8km north of the Proposed Scheme	Presence of legally protected plant species, hairy St. John's-wort *Hypericum hirsutum*, and woodland habitat
Glenasmole Valley pNHA [001209]	Approximately 7.4km south of the Proposed Scheme	See Table 12.5 under Glenasmole Valley SAC
Lugmore Glen pNHA [001212]	Approximately 8.4km south west of the Proposed Scheme	Presence of the rare Red Data Book species yellow archangel *Lamiastrum galeobdolon*
Dalkey Coastal Zone and Killiney Hill pNHA [001206]	Approximately 10.3km south east of the Proposed Scheme	Good example of a coastal system with habitats ranging from sub-littoral to coastal heath. Flora is well developed and includes some scare species. The islands are important bird sites. Overlaps in part with Rockabill to Dalkey Island SAC and Dalkey Islands SPA (See Table 12.5)
Dingle Glen pNHA [001207]	Approximately 10.7 km south east of the Proposed Scheme	Variety of habitats present, including woodland
Slade of Saggart and Crooksling Glen pNHA [000211]	Approximately 11km south west of Proposed Scheme	Wooded river valley and small wetland system. Presence of a rare plant species yellow archangel, a rare invertebrate *Halticoptera patellana* and a variety of wildfowl species.
Ballybetagh Bog pNHA [001202]	Approximately 11.4km south east of the Proposed Scheme	Marshland

Site Name	Distance	Designation
Baldoyle Bay pNHA [000199]	Approximately 11.5km north east of Proposed Scheme	See Table 12.5 under Baldoyle Bay SAC and Baldoyle Bay SPA
Feltrim Hill pNHA [001208]	Approximately 11.8km north of the Proposed Scheme	Good example of knoll-reef phenomenon. Previously known to contain two rare plant species, namely spring squill *Scilla verna* and long-stalked crane's-bill *Geranium columbinum*
Howth Head pNHA [000202]	Approximately 12km north east of the Proposed Scheme	See Table 12.5 under Howth Head SAC and Howth Head Coast SPA
Sluice River Marsh pNHA [001763]	Approximately 12.3km north east of the Proposed Scheme	Freshwater marsh
Loughlinstown Woods pNHA [001211]	Approximately 12.5km south east of the Proposed Scheme	Demesne-type mixed woodland
Knocksink Wood pNHA [000725]	Approximately 12.4km south east of the Proposed Scheme	See Table 12.5 under Knocksink Wood SAC
Glencree Valley pNHA [001755]	Approximately 13.8km south east of the Proposed Scheme	A good example of deciduous woodland, with an upland river and boggy flushes that add to the habitat diversity of the site
Rye Water Valley / Carton pNHA [001398]	Approximately 13.8km west of Proposed Scheme	See Table 12.5 under Rye Water Valley / Carton SAC
Malahide Estuary pNHA [000205]	Approximately 14.3km north-east of the Proposed Scheme	See Table 12.5 under Malahide Estuary SAC and Malahide Estuary SPA
Ballyman Glen pNHA [000713]	Approximately 14.3km south east of the Proposed Scheme	See Table 12.5 under Ballyman Glen SAC
Ireland's Eye pNHA [000203]	Approximately 15.4km north east of the Proposed Scheme	See Table 12.5 under Ireland's Eye SAC and Ireland's Eye SPA
Rogerstown pNHA [000208]	Approximately 18.5km north of the Proposed Scheme	See Table 12.5 under Rogerstown Estuary SAC and Rogerstown Estuary SPA
Portraine Shore pNHA [001215]	Approximately 18.6km north of the Proposed Scheme	See Table 12.5 under Rogerstown Estuary SAC and Rogerstown Estuary SPA
Lambay Island pNHA [000204]	Approximately 22.9km north of the Proposed Scheme	See Table 12.5 under Lambay Island SAC and Lambay Island SPA
The Murrough Wetlands pNHA [002249]	Approximately 26.7km south of the Proposed Scheme	See Table 12.5 under The Murrough SPA
Rockabill pNHA [000207]	Approximately 33.5km north of the Proposed Scheme	See Table 12.5 under Rockabill SPA

12.3.4.3 Other Designated Sites

Other designations recognised in the wider Greater Dublin Area (GDA) including Ramsar wetlands sites and the United Nations Education, Scientific and Cultural Organization (UNESCO) Dublin Bay Biosphere are considered in terms of the overall with European and National sites assessment. Three Special Area Amenity Order Areas (SAAO) are also local to specific Bus Connects Core Bus Corridors but are nonetheless captured in the overall EIAR biodiversity assessment and the NIS by virtue of overlapping nature designations, namely European and Nationally designated sites.

12.3.4.3.1 RAMSAR Sites

The Convention on Wetlands is an intergovernmental treaty adopted on 2 February 1971 in the Iranian city of Ramsar. The official name of the treaty The Convention on Wetlands of International Importance especially as Waterfowl Habitat reflects the emphasis on the protection of wetlands primarily as habitat for waterbirds.

There are a number of Ramsar sites within the vicinity of the Proposed Scheme, namely:

- Rogerstown Estuary Roger (site Code 412);
- Broadmeadow Estuary (Site code 833);
- Baldoyle Bay (Site code 413);
- North Bull Island (site code 406); and
- Sandymount Strand / Tolka Estuary (Site code 832).

As these Ramsar sites overlap with European sites and / or NHAs / pNHAs for which this EIAR assessment is considering, no further discussion is provided.

12.3.4.3.2 UNESCO Dublin Bay Biosphere

Dublin Bay was initially recognised by the United Nations Education, Scientific and Cultural Organisation (UNESCO) for its rare and internationally important habitats and species of wildlife. The North Bull Island supports a variety of plants and wildlife including an Internationally significant population of light-bellied Brent geese that overwinters in the bay. UNESCO's concept of a Biosphere has evolved to include not just areas of ecological value but also the areas around them and the communities that live and work within these areas. The Dublin Bay Biosphere Reserve now extends to over 300km^2 (kilometres squared) of marine and terrestrial habitat encompassing North Bull Island and ecologically significant habitats such as the Tolka and Baldoyle Estuaries, Howth Head, Dalkey Island, Killiney Hill and Booterstown Marsh. Over 300,000 people live within the newly enlarged Biosphere.

While the Biosphere designation does not strictly add any specific new legal protection, it greatly enhances the many legal protections that already exist by improving the coordination and management of its functions in a holistic and integrated way. In this respect the biodiversity assessment for the EIAR and the AA for the Proposed Scheme collectively addresses the key biodiversity elements of the Biosphere designation, and no further discussion is provided.

12.3.4.3.3 Special Amenity Area Order (SAAO)

The objective of the Special Amenity Area Order is primarily to protect outstanding landscapes, nature and amenities and were originally placed on a statutory footing under the Local Government (Planning and Development) Act 1963, as amended, and re-enacted under section 202 of the Planning and Development Act 2000.

Three such Special Amenity Area Orders have been recognised in Ireland, all of them in the GDA and can cross local authority administrative boundaries. None are directly intersected by the Proposed Scheme. They include:

- Liffey Valley;
- North Bull Island; and
- Howth Head.

The designations re-enforce protections for green belts via land plans and objectives contained therein. As such these areas have been considered in the overall EIAR biodiversity assessment and AA, respectively, by virtue of overlapping nature designations.

12.3.5 Habitats

12.3.5.1 Overview

The results of the habitat surveys along the alignment of the Proposed Scheme are described below by habitat type (Fossitt 2000). The habitats described below relate to habitat areas within or adjacent to the Proposed Scheme, as shown on Figure 12.5 in Volume 3 of this EIAR along with the full habitat survey results. The results and summary of the findings of the aquatic habitat surveys have been incorporated into the relevant habitat descriptions.

The habitat types recorded along the footprint of the Proposed Scheme, as discussed in this Section, are as follows:

- Flower beds and borders (BC4);
- Stone walls and other stonework (BL1)
- Buildings and artificial surfaces (BL3);
- Spoil and bare ground (ED2);
- Depositing/ lowland rivers (FW2);
- Canals (FW3);
- Amenity grassland (Improved) (GA2);
- Dry meadows and grassy verges (GS2);
- Residential;
- Mixed broadleaved woodland (WD1);
- Scattered trees and parkland (WD5);
- Hedgerows (WL1)
- Treelines (WL2);
- Scrub (WS1); and
- Ornamental/ non-native shrub (WS3).

None of the habitats within the Proposed Scheme boundary correspond to Annex I habitats or QI habitats. This includes Dry meadows and grassy verges habitat (GS2), which in certain situation corresponds to Lowland hay meadows (*Alopecurus pratensis, Sanguisorba officinalis*) (6510). The species and management of the habitat along the Proposed Scheme is not analogous to the Annex I hay meadow habitat.

12.3.5.2 Flower beds and borders (BC4)

This habitat type was identified in several locations across the Proposed Scheme, with the largest area of this habitat type located at R137 New Street South on a road median north of the Maldron Hotel. Two smaller areas were identified at Mount Argus View along the southern side of the River Poddle, west of Mount Argus Park and on a road median at the northern tip of Harold's Cross Park. This habitat type is also present throughout the Proposed Scheme in smaller areas associated with commercial developments or industrial complexes, planting at roundabouts and along roadsides in suburban areas.

Species recorded consist of; butterfly bush *Buddleja davidii*, cabbage-palm *Cordyline* spp., cotoneaster *Cotoneaster spp*., montbretia *Crocosmia x crocosmiiflora*, ivy-leaved toadflax *Cymbalaria muralis*, dahlia *Dahlia sp*., delphinium *Delphinium spp*., trumpet vine *Desfontainia spinosa*, wallflower *Erysimum* spp., fuchsia *Fuchsia* spp., hebe *Hebe* spp., hydrangea *Hydrangea* spp., busy Lizzy *Impatiens walleriana*, iris *Iris* spp., lavender species *Lavandula* spp., oxeye daisy *Leucanthemum vulgare*, common honeysuckle *Lonicera periclymenum*, mallow species *Malva sylvestris*, field love-in-a-mist *Nigella damascene*, common poppy *Papaver rhoeas*, rose *Rosa* spp., rosemary *Salvia rosmarinus,* marigold *Tagetes* spp., common valerian *Valeriana officinalis*, wisteria species *Wisteria* spp. and various ornamental shrubs. This habitat type was also found in mosaics with the following habitats; amenity grassland (improved) (GA2) and Treelines (WL2).

This habitat type is of Local Importance (Lower Value), due to being highly fragmented.

12.3.5.3 Stone walls and other stonework (BL1)

This habitat type describes dry stone and old mortar walls that occur on field or property boundaries and was identified in three locations. These locations included at the Kimmage Cross Roads (along the boundary of a property on R818 Terenure Road West), the perimeter of Mount Argus Court on R817 Kimmage Road Lower and along the boundary of Laurence Court on R817 Kimmage Road Lower at Harold's Cross Park. This habitat type was found to support ivy *Hedera helix*, and butterfly bush.

This habitat type is of Local Importance (Lower Value), due to low species diversity.

12.3.5.4 Buildings and artificial surfaces (BL3)

This habitat type includes all buildings (i.e. domestic, commercial and industrial), roads, car parks, artificial recreation surfaces and other concrete / hard standing areas. This habitat type was the most commonly encountered habitat type recorded and was present across the entire length of the Proposed Scheme, owing to the largely urban and suburban nature of the study area.

This habitat type was also found in association with amenity grassland (GA2).

This habitat type is of Local Importance (Lower Value), due to it comprising built / artificial surfaces and largely being devoid of vegetation.

12.3.5.5 Spoil and bare ground (ED2)

This habitat type was present throughout the Proposed Scheme in small areas, often associated with access ways, such as gravel driveways. Areas of bare ground, which have recently been sown with grass but are not yet adequately vegetated were also classified as being spoil and bare ground habitat.

Two areas of this habitat type were recorded within the Proposed Scheme and these are located at a site on the junction of New Row Street and the Coombe and on the corner of the R137 Clanbrassil Street / Lombard Street West Junction. This habitat was also identified at R137 Harold's Cross Road / Kenilworth Square where the only species recorded was the grass fescue *Festuca* spp.

This habitat type is of Local Importance (Lower Value), due to its relative lack of vegetation.

12.3.5.6 Depositing / lowland rivers (FW2)

The River Poddle is classified as a depositing / lowland river and is culverted for much of its length. The Proposed Scheme will run parallel to the River Poddle for its entirety. The River Poddle will cross the River Poddle at four existing locations including, R818 Kimmage Road West, Poddle Park road, Sundrive Road and Mount Argus Way / View.

The River Poddle rises north of Tallaght and flows into the River Liffey at Wellington Quay. It is culverted in several sections as it flows through Greenhills, Templeogue, Kimmage and Mount Jerome into Harold's Cross and is then entirely culverted as it crosses the Grand Canal and flows through the City Centre underground before discharging into the Liffey Estuary Upper. The River Poddle is at surface level as it flows through Poddle Park and Mount Argus Park and underground sections are connected to the Proposed Scheme via existing and proposed drainage systems (illustrated in Figure 12.5 in Volume 3 of this EIAR). The River Poddle is classified as 'Poor' status for the period 2016 to 2021 and is deemed 'At Risk' of failing to meet its requirements under the Water Framework Directive. The most recent Biological Q Value assessment of the River Poddle was in 2007, Q3 being the assigned Q Value. The closest monitoring station is situated at The Priory on Kimmage Road, which is approximately less than 1km upstream of the Proposed Scheme.

Habitats recorded along the banks of the River Poddle included a mix of amenity grassland (GA2) and mixed broad-leaved woodland (WD1). Species are listed under the respective habitats below.

This habitat type is of Local Importance (Higher Value), as it is not common in the surrounding area and is relatively species-rich in the context of surrounding habitats.

12.3.5.7 Canals (FW3)

The Proposed Scheme will traverse the Grand Canal at Robert Emmet Bridge in Harold's Cross.

Species recorded along the Grand Canal banks include common reed *Phragmites australis*, sort rush *Juncus effusus*, lily *Nymphaeaceae* spp., and flag iris *Iris pseudacorus*, Green algae was also recorded in places atop the water surface.

Grass and forb species recorded along the banks of the Grand Canal occurred in a mosaic, comprising of amenity grassland (GA2) and dry meadows and grassy verges (GS2). Species are listed under the habitat layer (GA2).

The Grand Canal is designated as a pNHA with records of the legally-protected (Flora Protection Order) species, opposite-leaved pondweed, as well as the endangered Red List freshwater snail species glutinous snail *Myxas glutinosa* (NBDC Online Database 2022) noted along parts, including the area that will be intersected by the Proposed Scheme.

This habitat type is therefore valued as being of National Importance.

12.3.5.8 Amenity Grassland (Improved) (GA2)

Amenity grassland was a commonly recorded habitat across the Proposed Scheme. It is present in small areas located across the entirety of the Proposed Scheme in public parks (including Poddle Park), sports pitches and road medians (illustrated in Figure 12.5 in Volume 3 of this EIAR).

The habitat comprised of a range of common grass species including perennial ryegrass *Lolium perenne*, annual meadow-grass *Poa annua,* common bentgrass *Agrostis capillaris,* Yorkshire-fog *Holcus lanatus* cock's-foot *Dactylis glomerata*, and wall barley *Hordeum murinum*. Forb species include fools water parsley *Aethusa cynapium*, silverweed *Argentina anserina*, daisy *Bellis perennis*, shepherds purse *Capsella bursa-pastoris*, pendulous sedge, common thistle *Cirsium vulgare*, hoary willowherb *Epilobium parviflorum*, willowherb *Epilobium* spp., meadowsweet *Filipendula ulmaria*, ivy, oxeye daisy, ribwort plantain *Plantago lanceolata*, greater plantain *P. major*, creeping cinquefoil *Potentilla reptans*, selfheal *Prunella vulgaris*, meadow buttercup *Ranunculus acris*, creeping buttercup *Ranunculus repens*, broad-leaved dock *Rumex obtusifolius*, alexanders *Smyrnium olusatrum*, globular thistle *Echinops* spp., smooth sow thistle *Sonchus oleraceus*, common dandelion *Taraxacum officinale* agg., red clover *Trifolium pratense*, white clover *T. repens*, common nettle *Urtica dioica,* common mouse-ear *Cerastium fontanum*, dyeflower *Coreopsis Dwarf Radiata*, field forget-me-not *Myosotis arvensis*, yarrow *Achillea millefolium*, wild angelica *sylvestris*, field bindweed *Convolvulus arvensis*, cabbage-palm, hawksbeard *Crepis* spp., horsetail species, purple loosestrife *Lythrum salicaria*, black medick *Medicago lupulina*, greater plantain, common ragwort *Jacobaea vulgaris***,** coltsfoot *Tussilago farfara* and tufted vetch *Vicia cracca*.

This habitat was recorded as occurring in a mosaic with dry meadows and grassy verges (GS2) along the banks of the Grand Canal, in areas where the grass has been left uncut and the bankside is less managed; adjacent to, and on both sides of Robert Emmet Bridge.

It is also often recorded occurring in mosaics with flower beds and borders (BC4), buildings and artificial surfaces (BL3) across the Proposed Scheme corridor.

This habitat type is of Local Importance (Lower Value), due to its relatively low species diversity at any location.

12.3.5.9 Dry Meadows and Grassy Verges (GS2)

This habitat type is comprised of a single small narrow fragment along the banks of the Grand Canal, where the where the grass has been left uncut and the bankside is less managed (illustrated in Figure 12.5 in Volume 3 of this EIAR). Elements of the habitat also occur in mosaic with managed amenity grassland verges (GA2) along both banks of the Grand Canal around the Emmet Bridge crossing point.

The diversity of this fragmentary habitat included those recorded for Amenity Grassland (GA2) to which it occurred in mosaic around the Grand Canal, and they typically differ4ed in that the grasses and flowering herbs present were taller owing to them not being regularly cut. Given the low overall species diversity present in this habitat type and the extent and management of the habitat, the fragmentary area of dry meadows and grassy verges (GS2) habitat recorded in the vicinity of the Proposed Scheme were not deemed to align with the Annex I habitat Lowland hay meadows (*Alopecurus pratensis, Sanguisorba officinalis*) [6510].

This habitat type is of Local Importance (Lower Value) due to being highly fragmented and low species diversity.

12.3.5.10 Residential

This non-Fossitt classification is used to characterise residential properties along the Proposed Scheme corridor and generally consists of a mosaic of buildings and artificial surfaces (BL3), amenity grassland (GA2), flower beds and borders (BC4), ornamental shrubs (WS3) and hedgerows (WL1).

This habitat type was commonly encountered across the entirety of the Proposed Scheme (illustrated in Figure 12.5 in Volume 3 of this EIAR).

This habitat type is of Local Importance (Lower Value).

12.3.5.11 (Mixed) broadleaved woodland (WD1)

This habitat classification describes woodland areas with stands of native and non-native tree species. One small area of mixed broadleaved woodland was recorded adjacent to the Proposed Scheme at Poddle Park (illustrated in Figure 12.5 in Volume 3 of this EIAR). Tree species recorded at these locations include sycamore *Acer pseudoplatanus*, ash *Fraxinus excelsior*, beech *Fagus sylvatica*, weeping willow *Salix babylonica*, hawthorn *Crataegus monogyna* and the non-native cherry laurel *Prunus laurocerasus.*

At Poddle Park the ground flora was comprised of common bentgrass *Agrostis capillaris* common hogweed *Heracleum sphondylium*, sweet alyssum *Lobularia maritima*, blue flax *Linum lewisii*, pendulous sedge Carex pendula, marigold species, cleavers Galium aparine, horsetail Equisetum spp., geranium *Pelargonium* spp., wild teasel *Dipsacus fullonum*, speedwell Veronica spp., butterbur *Petasites hybridus* and hard rush *Juncus inflexus*.

This habitat type is of Local Importance (Higher Value) as it is not common in the surrounding area and is relatively species-rich in the context of surrounding habitats.

12.3.5.12 Scattered trees and parkland (WD5)

This habitat classification describes areas of scattered trees, standing alone or in small clusters, which are a prominent structural or visual feature of the habitat. This habitat type was identified at seven locations across the Proposed Scheme (illustrated in Figure 12.5 in Volume 3 of this EIAR). The most significant areas of this habitat type were present adjacent to the Proposed Scheme at Poddle Park, Mount Argus Park and Harold's Cross Park. Smaller areas of this habitat type include road medians on Derravaragh Road at the junctions of Neagh Road, Aideen Drive and Mount Tallant Avenue.

Tree species identified at these locations include horse chestnut *Aesculus hippocastanum*, beech, pine species *Pinus* sp., sycamore, hazel *Corylus avellana*, Scots pine *Pinus sylvestris*, elder *Sambucus nigra*, holly *Ilex aquifolium*, holm oak *Quercus ilex*, oak *Quercus* spp., willow *Salix* spp., rowan *Sorbus aucuparia*, small-leaved lime *Tilia cordata*, elm species *Ulmus* spp., fig *Ficus* spp., walnut *Juglans* spp., and catalpa *bignonioides Walter.*

This habitat type also occurred in mosaics with dry meadows and grassy verges (GS2).

This habitat type is of Local Importance (Higher Value) as it is not common in the surrounding area and is relatively species-rich in the context of surrounding habitats.

12.3.5.13 Hedgerows (WL1)

This habitat type was identified in two locations across the Proposed Scheme (illustrated in Figure 12.5 in Volume 3 of this EIAR). A cherry laurel *Prunus laurocerasus* hedgerow was recorded within a residential garden at the junction between Kimmage Road Lower and Aideen Avenue. A second hedgerow composed of *Griselinia littoralis* was recorded at the Kimmage Cross Roads along the boundary of Londis KCR.

Owing to their non-native ornamental nature these hedgerows are valued as being of Local Importance (Lower Value).

12.3.5.14 Treelines (WL2)

This habitat type was widely recorded across the Proposed Scheme (illustrated in Figure 12.5 in Volume 3 of this EIAR). This habitat is comprised of narrow rows or single lines of trees which are typically greater than 5m in height. In the context of the Proposed Scheme, treeline habitat often characterises urban street planting along footpaths / strips of amenity grassland and road edges. This habitat type is also present within landscaped areas of residential, commercial and industrial complexes, and estates. A number of roads such as R817 Kimmage Road Lower, Hazelbrook Road, Mount Argus Road, Mount Argus Park, Mount Argus View, Mount Argus Way, R137 Harold's Cross Road and R137 Clanbrassil Street are occasionally lined with trees. A centre road median which runs along the R137 on Clanbrassil Street Lower and New Street South is lined with trees, as is the road median at St. Patrick's Close. There is also street planting along Derravaragh Road. A number of treelines were located within parks and public areas such as Poddle Park, Mount Argus Park, and along the Grand Canal. Species recorded include small-leaved lime, maple species, alder *Alnus glutinosa*, birch *Betula* spp., hornbeam *Carpinus* var. *fastigiata Lucas*, hazel, hawthorn, cypress species, beech, larch *Larix* spp., Scots pine, sycamore, cherry species *Prunus kanzan*, oak, bramble *Rubus fructicosus agg*., weeping willow, elder, whitebeam, rowan, aspen *Populus tremuloides*, ash, yew *Taxus baccata.* Cherry laurel, paperbark maple *Acer griseum*, bay laurel *Laurus nobilis*, box-leaved honeysuckle *Lonicera pileate,* bramble *Rubus fruticosus* agg., and dog rose *Rosa canina*.

The treeline identified at Mount Argus Way occurred in a mosaic of riparian ground flora vegetation due to its proximity to the River Poddle. Riparian understory vegetation recorded along the banks of the River Poddle at this location include common bentgrass, common hogweed, sweet alyssum, blue flax, pendulous sedge, marigold species, cleavers, horsetail species, geranium species, wild teasel, speedwell species, butterbur and hard rush.

This habitat type also occurred in mosaic with flower beds and borders (BC4); buildings and artificial surfaces (BL3), and ornamental / non-native shrub (WS3).

This habitat type is of Local Importance (Higher Value), as it is not common in the surrounding area and is relatively species-rich in the context of surrounding habitats.

12.3.5.15 Scrub (WS1)

Two areas of this habitat type were recorded within the Proposed Scheme (illustrated in Figure 12.5 in Volume 3 of this EIAR)., with the largest area of scrub located on the corner of New Street Gardens. A second site is situated on the corner of La Vere Terrace. Species recorded consisted of butterfly bush, common thistle and hoary willowherb.

This habitat type is of Local Importance (Lower Value), due to low species diversity.

12.3.5.16 Ornamental / non-native shrub (WS3)

Areas of ornamental / non-native shrub were generally associated with amenity and landscape planting at commercial properties. Locations of this habitat in association with buildings and artificial surfaces (BL3) habitat were identified at one location at the Circle K petrol station at Sundrive, on R817 Kimmage Road Lower. Species recorded include St. John's wort s *Hypericum* spp., hebe, cotoneaster *,* New Zealand broadleaf, cabbage palm, red robin and garden privet. This habitat type was recorded in mosaics with the following other habitat types; treelines (WL2).

This habitat type is of Local Importance (Lower Value), due to its anthropogenic nature and relative low species diversity.

12.3.6 Rare and Protected Plant Species

There were no protected plant species listed on the Flora Protection Order identified within the footprint of the Proposed Scheme during field surveys.

The desk study returned records of a total of nine species listed on the Flora Protection Order across the wider study area (i.e., Grid Square O13) and are listed in Appendix A12.1 in Volume 4 of this EIAR. Records in close proximity to the Proposed Scheme include historical records of opposite-leaved pondweed *Groenlandia densa* along the Grand Canal within the 2km grid square O13L (NBDC Online Database 2022). Results returned from a NPWS data search included 31 records of opposite-leaved pondweed clusters immediately adjacent (i.e. within approximately 50m) of Robert Emmet Bridge; three records were returned to the east of Robert Emmet Bridge in 2013. There were 28 records returned to the west of Robert Emmet Bridge; 10 in 2012, 11 in 2013 and 7 in 2014 (NPWS Consultation 2021). This species is listed as 'Near Threatened' on Ireland's Red List No. 10: Vascular Plants 2016 (Wyse Jackson *et al*. 2016). This species was not identified during the field surveys.

Where Flora Protection Order species occur, these are considered to be of National Importance.

12.3.7 Non-Native Invasive Plant Species

No non-native invasive plant species listed on the Third Schedule of the Birds and Habitats Regulations, 2011 were identified along the Proposed Scheme during field surveys.

The desk study returned records of a total of 16 species listed on the Third Schedule of the Birds and Habitats Regulations 2011, as well as the recently delisted Canadian Waterweed *Elodea canadensis,* across the wider study area (i.e., Grid Square O13) and are listed in Appendix A12.1 in Volume 4 of this EIAR. There were six listed species, and one recently delisted species returned from the desk study within 1km of the Proposed Scheme. These include several records of Nuttall's waterweed *Elodea nuttallii* and Canadian waterweed along the Grand Canal and at Robert Emmet Bridge in 2009, New Zealand pigmyweed *Crassula helmsii* at Dolphins Barn in 2010, parrot's-feather *Myriophyllum aquaticum* at Drimnagh in 2009, three-cornered garlic *Allium triquetrum* along the River Poddle at Bangor Road in 2019, Spanish bluebell *Hyacinthoides hispanica* in Eamonn Ceannt Park in 2018 and Japanese Knotweed *Reynoutria japonica* along the Grand Canal at Dolphins Barn and within a private residence on Mount Tallant Avenue in 2009 (NBDC Online Database 2022). These species were not present within the footprint of the Proposed Scheme.

12.3.8 Mammals

12.3.8.1 Bats

Bats, including their breeding and resting places, are protected under the Wildlife Acts. All bat species are also listed on Annex IV of the Habitats Directive, with the lesser horseshoe bat also listed on Annex II. Bats are also afforded strict protection under the Habitats Directive and the (Birds and Natural Habitats) Regulations.

Bat surveys were carried out across four seasons between 2018 and 2022 (as described in Section 12.2.3.6) Between 2018 and 2021, four transects were surveyed within the footprint of the Proposed Scheme, including at Robert Emmet Bridge on the Grand Canal referred to as CBC0011BT001, Harold's Cross Park referred to as CBC0011BT002, Mount Argus Park referred to as CBC0011BT003 and Poddle Park referred to as CBC0011BT004. The results of the bat surveys undertaken are described below in Section 12.3.8.1.1 to Section 12.3.8.1.8, and are also presented in Figure 12.6.1 in Volume 3 of this EIAR. The structure of this Section is such that each bat species is described in turn. The results of the various surveys are presented to allow an understanding of each species in terms of its distribution across the Proposed Scheme.

All bat species' populations in County Dublin are valued as being of Local Importance (Higher Value) given the legal protection afforded to them, and their common presence throughout the Greater Dublin Area (GDA). In an Irish context, the conservation status of these species in Ireland is designated as 'Least Concern' (Marnell *et al.* 2019).

12.3.8.1.1 Leisler's bat *Nyctalus leisleri*

Leisler's bat was recorded in all of the four locations surveyed between 2018 and 2021, including Robert Emmet Bridge referred to as CBC0011BT001, Harold's Cross Park referred to as CBC0011BT002, Mount Argus Park referred to as CBC0011BT003 and Poddle Park referred to as CBC0011BT004. There were no calls attributed to this species recorded in 2018 or 2019. A total of 11 recordings were made at these locations in the Summer of

2020, while a single call was recorded at CBC0011BT001 in 2021. Bat activity was higher at CBC0011BT002 (Harold's Cross Park) with seven recordings attributed to this species occurring here. Leisler's bat activity was lower at CBC0011BT003 (Mount Argus Park) and CBC0011BT004 (Poddle Park) with two recordings. Leisler's bat activity was lowest at CBC0011BT001 (Robert Emmet Bridge) with only a single recording in 2021. The results of the bat surveys as they relate to the Leisler's bats are shown on Figure 12.6.1 in Volume 3 of this EIAR.

No roost sites for Leisler's bat were recorded during any of the surveys for the Proposed Scheme.

The desk study returned a record of Leisler's bat within the Proposed Scheme (see Appendix A12.1 in Volume 4 of this EIAR for further details). This includes one record of a live sighting within 1km of the Proposed Scheme at Grosvenor Place in 2010 (NBDC Online Database 2022).

12.3.8.1.2 Common pipistrelle bat *Pipistrellus pipistrellus*

Common pipistrelle bat was recorded in two of the four locations surveyed between 2018 and 2021, including at Robert Emmet Bridge referred to as CBC0011BT001 and Poddle Park referred to as CBC0011BT004. A total of 24 recordings attributed to this species were made in these locations between 2018 and 2021.

Common pipistrelle bat activity was highest at CBC0011BT001 (Robert Emmet Bridge) along the Grand Canal in 2018 with 15 recordings being attributed to this species, with a further seven recordings of this species at this location in 2021. There were no recordings of common pipistrelle activity in 2019 or 2020 at this location. Two recordings attributed to this species were made at CBC0011BT004 (Poddle Park); one in 2019 and one in 2020. The results of the bat surveys as they relate to the common pipistrelle bats are shown on Figure 12.6.1 in Volume 3 of this EIAR.

No roost sites for common pipistrelle bat were recorded during any of the surveys for the Proposed Scheme.

The desk study found that common pipistrelle bat are known to occur across the Proposed Scheme (see Appendix A12.1 in Volume 4 of this EIAR for further details).

No records of common pipistrelle were returned within 2km of the Proposed Scheme (NBDC Online Database 2022).

12.3.8.1.3 Nathusius' pipistrelle bat *Pipistrellus nathusii*

Nathusius' pipistrelle bat was not recorded across the study area of the Proposed Scheme during the walked transect surveys.

No roost sites for Nathusius' pipistrelle bat were recorded during any of the surveys for the Proposed Scheme.

The desk study found that Nathusius' pipistrelle are known to occur within 2km of the Proposed Scheme (see Appendix A12.1 in Volume 4 of this EIAR for further details). This includes live records at Leeson Street in 2009 and at Mount Street Crescent in 2009 (NBDC Online Database 2022).

12.3.8.1.4 Soprano pipistrelle bat *Pipistrellus pygmaeus*

Soprano pipistrelle was recorded in two of the four transects surveyed during 2020 and 2021, including at Harold's Cross Park referred to as CBC0011BT002 and at Robert Emmet Bridge referred to as CBC0011BT001. A total of 27 recordings of this bat species can be attributed to these two locations, 13 from 2020 and 14 from 2021. This species was not recorded at any survey location in 2018 or 2019.

Twelve recordings attributed to soprano pipistrelle bats were recorded at CBC0011BT001 (Robert Emmet Bridge) in 2020 and one recording of this species was also made at CBC0011BT02 (Harold's Cross Park) in 2020. All 14 2021 records of this species were from CBC0011BT001 (Robert Emmet Bridge). The results of the bat surveys as they relate to the soprano pipistrelle bats are shown on Figure 12.6.1 in Volume 3 of this EIAR.

No roost sites for soprano pipistrelle bat were recorded during any of the surveys for the Proposed Scheme.

The desk study found that soprano pipistrelles are known to occur across the Proposed Scheme (see Appendix A12.1 in Volume 4 of this EIAR for further details). This includes a roost recorded in a building near the National Concert Hall in 2009, less than 1km from the Proposed Scheme. There are two records of live sightings within 2km of the Proposed Scheme. These include records submitted in 2007 and 2009 at Ranelagh Park, approximately 1.5km from the Proposed Scheme (NBDC Online Database 2022).

12.3.8.1.5 Unidentified Pipistrelle Species

Pipistrelle bats calls that could not be classified as either characteristic of common or soprano pipistrelle are referred to as 'unidentified' pipistrelle species. Common pipistrelle bats have their peak echolocation call strength at 45kHz (kilohertz) and soprano pipistrelle bats at 55kHz. Pipistrelle bat species that echolocate between 48kHz and 52kHz cannot be accurately identified by their calls and are described as 'unidentified' pipistrelle bat species.

Pipistrelle species bat calls that could not be classified as either characteristic of common or soprano pipistrelle were identified in only one location at Poddle Park which is referred to as CBC0011BT004 in 2018. The results of the bat surveys as they relate to the unidentified pipistrelle bats are shown on Figure 12.6.1 in Volume 3 of this EIAR.

12.3.8.1.6 Brown long-eared bat *Plecotus auritus*

Brown long-eared bat was not recorded across the study area of the Proposed Scheme during the walked transect surveys although it is recognised that the echolocation calls for this species are quiet and directional, and as such their presence within some of the woodland habitat along the River Poddle cannot be ruled out.

No roost sites for brown long-eared bat were recorded during any of the surveys for the Proposed Scheme.

The desk study found that brown long-eared bat are known to occur within 2km of the Proposed Scheme (see Appendix A12.1 in Volume 4 of this EIAR for further details). This includes one record of a live sighting at Haddington Road in 2013 and one record of a live sighting in Phoenix Park in 2007 (NBDC Online Database 2022).

12.3.8.1.7 *Myotis* Bat Species

Myotis bat species were not recorded across the study area of the Proposed Scheme during the walked transect surveys.

The desk study found that *Myotis* bat species including Daubenton's bat *Myotis daubentonii,* Natterer's bat *Myotis nattereri,* and whiskered bat *Myotis mystacinus* are known to occur within 2km of the Proposed Scheme (see Appendix A12.1 in Volume 4 of this EIAR for further details).

This includes several records of live sightings of Daubenton's bat *Myotis daubentonii* along the River Dodder at Milltown approximately2km from the Proposed Scheme (NBDC Online Database 2022).

12.3.8.1.8 Potential Roost Features (PRFs)

The trees identified as having potential to support roosting bats (containing PRFs) are listed in Table 12.7 and shown on Figure 12.6.2 in Volume 3 of this EIAR. Each tree, or grouping of homogenous trees, was classified with regard to their potential to support roosting bats after Bat Surveys for Professional Ecologists: Good Practice Guidelines (Collins (2016)). Trees with negligible suitability for roosting bats are not described or mapped as they are assessed as not having the potential to support roosting bats.

A single PRF (CBC0011PRF001) lies within the Proposed Scheme Boundary, along the boundary of the proposed Construction Compound K2 at Our Lady's Hospice. This tree is being retained. A further three trees, containing PRFs, were identified, outside of the Proposed Scheme at Poddle Park and at Mount Argus Park. These will not be impacted by the Proposed Scheme and are not further discussed.

Table 12.7: Summary of PRF's Recorded Within the Footprint of the Proposed Scheme

Reference	Species	Description
CBC0011PRF001	Bird cherry (*Prunus avium*)	Single tree with knotholes

Note: A description of each different type of PRF, as referred to in Table 12.7 is described in 'Bat Roosts in Trees: A Guide to Identification and Assessment for Tree-Care and Ecology Professionals. Bat Tree Habitat Key' (Andrews (2018).

12.3.8.2 Badger

Badger, and their breeding and resting places, are legally protected under the Wildlife Acts. No evidence of badger (e.g., setts or evidence of badger activity) were recorded during the multidisciplinary surveys carried out along the Proposed Scheme.

Despite this, badger are widely distributed throughout the GDA, often utilising public parks and residential gardens. The desk-study returned one record within 1km of the Proposed Scheme (see Appendix A12.1 in Volume 4 of this EIAR for further details). This was a live sighting in a laneway off Rathgar Avenue, approximately 250m from the Proposed Scheme in 2012 (NBDC Online Database 2022). As such, it has been assumed that badger may occur in vegetated areas adjacent to the Proposed Scheme.

The local badger population is deemed to be of Local Importance (Higher Value) due to the known presence of resident populations within the wider environment of the Proposed Scheme, which are valued as being of Local Importance (Higher Value) as they are a Wildlife Acts protected species.

12.3.8.3 Otter

Otter, and their breeding and resting places, are legally protected under the Wildlife Acts. Otter are also listed on Annex II and Annex IV of the Habitats Directive.

No evidence of otter activity (e.g. sprainting posts), holts or couch sites were recorded during the multidisciplinary surveys carried out along the Proposed Scheme nor during the aquatic survey, although there presence in the wider aquatic corridor cannot be ruled out. The aquatic surveys recorded a single otter spraint on the ledge underneath the Emmet Bridge in July 2022, and separate surveys of the Grand Canal undertaken in support of the River Poddle Flood Alleviation Scheme noted the presence of the non-native *Neovison vison* (Triturus Environmental Ltd 2021b).

The desk study found that otter are known to occur within 1km of the Proposed Scheme and across the wider study area (see Appendix A12.1 in Volume 4 of this EIAR for further details). A total of four otter records were returned from the desk study, including two along the River Poddle which comprised of activity at Willington Court Bridge, approximately 2km upstream of the Proposed Scheme and at Tymon Park, approximately 4km upstream of the Proposed Scheme (Macklin *et al*. 2019). A further two records within 1km of the Proposed Scheme were on the Grand Canal at Dolphins Barn in 2014 and at Portobello in 2016 (NBDC Online Database 2022).

In an Irish context, the conservation status of otter is 'Least Concern' (Marnell *et al.* 2019) due to population recoveries since 2009. However, otter remains 'Near Threatened' at a European and Global context (IUCN Red List) (Roos *et al*. 2021).

Wicklow Mountains SAC, which is located approximately 8.1km south of the Proposed Scheme (as the crow flies), is the closest European site designated for otter. Typically, otter territories are within the range of 7.5km for females and up to 21km for males (O'Neill *et al*. 2009). The River Dodder and Liffey Estuary provide the key pathway to Wicklow Mountains SAC. The Proposed Scheme will cross the Grand Canal and the River Poddle (via existing crossing points), both providing hydrological connectivity through the Liffey Estuary Upper and Lower. However, distances are greater than 22km along existing hydrological pathways. With significant blockages along the Grand Canal, and the considerable underground nature of the River Poddle downstream of the Proposed Scheme, any populations of otter within the ZoI are not deemed to be SAC populations.

The national population of adult breeding female otters in the Republic of Ireland was estimated at 7,800 in the National Otter Survey of Ireland 2010 / 12 (Reid *et al.* 2013), which is the most recent survey of its type undertaken.

The local otter population in relation to the Proposed Scheme is not likely to be in the region of 1% of the national population (e.g. 78 breeding female otters).

According to a recent study (Macklin *et al,.* 2019), otters are known to occur across fourteen watercourses and the coastal habitat fringe across the Dublin City Council jurisdiction. Rivers which were subject to less human disturbance, and therefore held better quality otter habitat (e.g. Rivers Dodder, Tolka River, Owenadoher River, Liffey and Whitechurch Stream), accounted for the majority of otter signs. Other watercourses, which are subject to greater anthropogenic pressures, such as the Little Dargle, Camac, Santry, Slang and Poddle appeared to support far fewer otters (Macklin *et al.* 2019). It is therefore apparent that otters are abundant in the watercourses in and around Dublin City, particularly in areas with healthier fish stocks and which are more removed from anthropogenic pressures.

The Proposed Scheme will cross two watercourses, the River Poddle and the Grand Canal Main Line, and will interact with the River Liffey via surface water discharges. Given the watercourses which the Proposed Scheme is likely to interact with, and the known abundance of otters within watercourses in and around Dublin City, the local otter populations likely to be affected by the Proposed Scheme are likely to be >1% of the County population. Therefore, the local otter population is valued as being of County Importance.

Despite the fact that otter is of “Least Concern” from an Irish perspective, considering the above, the local otter population is valued as being of County importance given that it is separate from the Wicklow Mountains SAC population, is unlikely to be in the region of 1% of the national population, is known to be abundant in watercourses in and around Dublin City, and is likely to be >1% of the County population.

12.3.8.4 Marine Mammals

The Proposed Scheme will terminate at the junction of R137 New Street South and R110 Kevin Street Upper and will be hydrologically connected to Dublin Bay via the River Poddle and Grand Canal Main Line. There were no protected marine mammals identified along the Proposed Scheme during the multidisciplinary surveys. There were no dedicated marine mammal surveys carried out as part of the assessment.

Harbour seal, grey seal, and harbour porpoise are known from Dublin Bay and these species are all protected under the Wildlife Acts and are also listed on Annex II and Annex IV of the Habitats Directive, while all cetacean species are listed on Annex IV of the Habitats Directive. Harbour porpoise is a QI-species designated as part of Rockabill to Dalkey Island SAC which is located approximately 12.1km east of the Proposed Scheme. Harbour seal and grey seal are also listed on Annex II of the Habitats Directive and are listed QI species designated as part of Lambay Island SAC, which is located approximately 22.9km north-east of the Proposed Scheme.

Harbour porpoise, harbour seal and grey seal are valued as being of International Importance as they are listed on Annex II of the Habitats Directive and are QI species designated as part of Rockabill to Dalkey Island SAC and Lambay Islands SAC. As such, all are considered to be of high conservation concern.

A number of protected marine mammals are known to occur within Dublin Bay and off the Dublin coast downstream of the Proposed Scheme, including:

- Common dolphin *Delphinus delphis*;
- Minke whale *Balaenoptera acutorostrata*;
- White-beaked dolphin *Lagenorhynchus albirostris*;
- Pygmy sperm whale *Kogia breviceps*;
- Bottle-nosed dolphin *Tursiops truncates*;
- Humpback whale *Megaptera novaeangliae;*
- Sperm whale *Physeter macrocephalus*;
- Striped dolphin *Stenella coeruleoalba*;
- Risso’s dolphin *Grampus griseus*; and
- Northern Bottle-nosed whale *Hyperoodon ampullatu*.

Common dolphin and bottle-nosed dolphin are common to Irish coastlines, particularly the west coast, throughout the year. There are no SACs designated for common dolphin in Ireland, while there are two SACs designated for bottle-nosed dolphin, the Lower River Shannon SAC and the West Connaught Coast SAC, both located along the western coast. These species are protected under the Wildlife Acts, and Annex II and Annex IV of the Habitats Directive the local population are therefore valued as County Importance.

Risso's dolphin is found both in inshore and offshore coastal waters and are occasionally sighted in Dublin Bay. Minke whales, and humpback whale species are migratory and frequent Irish coastlines each year. White-beaked dolphin, sperm whale, striped dolphin, and northern bottle-nosed whale are pelagic species and are rarely sighted in Dublin Bay, favouring the offshore waters of the continental shelf. Pygmy sperm whales are rare to the Irish coastline, with only one record identified in Dublin Bay. These species are protected under the Wildlife Acts, and Annex IV of the Habitats Directive and are valued as being of County Importance.

12.3.8.5 Other Mammal Species

No other protected mammal species were recorded during the multidisciplinary surveys carried out along the Proposed Scheme. The desk study returned records for the following terrestrial mammal species protected under the Wildlife Acts, and which are known to occur within approximately 3km of the Proposed Scheme (see Appendix A12.1 in Volume 4 of this EIAR for further details):

- Red Squirrel *Sciurus vulgaris*;
- Hedgehog *Erinaceus europaeus*; and
- Pygmy Shrew *Sorex minutus*.

The local population of these species are deemed to be of Local Importance (Higher Value) due to the known presence of resident populations within the wider environment of the Proposed Scheme, and are Wildlife Acts protected species.

Evidence of fox *Vulpes vulpes*, and rabbit *Orytolagus cuniculus* were also recorded across the study area within areas of suitable habitat. Although these species are not afforded legal protection under the Wildlife Acts, they form part of the local biodiversity resource and are noted here in that context.

12.3.9 Birds

12.3.9.1 Breeding Birds

All wild birds, and their nests and eggs, are protected under the Wildlife Acts. Some bird species are also listed on Annex I of the Birds Directive, and / or as SCIs within designated European sites.

No dedicated breeding bird surveys were carried out for the Proposed Scheme.

Kingfisher habitat suitability assessments surveys carried out in November 2020, and *ad hoc* otter surveys carried out in March 2022, did not record evidence of any nest holes within 500m upstream or downstream of the proposed Stone Boat Boardwalk at Mount Argus View and the proposed offline cycle / pedestrian bridges at the existing Robert Emmet Bridge over the Grand Canal. Kingfisher were not recorded within the footprint of the Proposed Scheme, during the multidisciplinary assessment surveys.

The full results of the desk study, including records of breeding bird species considered to be of conservation concern, are presented in Appendix A12.1 in Volume 4 of this EIAR. These species are considered to be KERs of the Proposed Scheme and include the following:

- SCIs, for a breeding population, of SPAs;
- Species listed under Annex I of the Birds Directive; and
- Red and Amber Birds of Conservation Concern in Ireland (BoCCI) species listed for their breeding populations (Gilbert *et al.* 2021).

The results of the breeding bird desk review carried out to inform this assessment are summarised below.

The desk-study returned records of a total of 63 breeding bird species across the study area (i.e., Grid Square O13). Records included 12 species listed under Annex I of the Birds Directive, 22 SCI species, and an additional 9 Red Listed and 16 Amber Listed species. This includes 21 species with breeding and wintering populations. These species are grouped into habitat preferences and are discussed below in relation to their presence within the footprint of the Proposed Scheme.

Several bird species for which records were returned in the desk study are those typically found in coastal, estuarine and intertidal habitats, such as the Liffey Estuary and Dublin Bay. Many gull, auk, shearwater and tern species breed in steep inaccessible cliffs (i.e. Howth Head), offshore islands and Dublin Port. Seabirds such as terns, guillemots and kittiwakes nest on the cliffs and crevices of Rockabill Island SPA (Birdwatch Ireland 2020). Fulmar, shag, razorbill and gannet nest in and on the cliffs of Ireland's Eye SPA, which also has numbers of large gulls, cormorant and puffin (Merne and Madden 2000). Gulls favour nesting along coasts on shingle and cliffs but may go inland to public areas for scavenging, and buildings for roof nesting (Birdwatch Ireland 2020).

The majority of records along the Proposed Scheme comprise bird species common to suburban habitats (including residential and parkland areas), such as gull and garden bird species. Residential habitats and parkland habitats were observed in several locations across the Proposed Scheme including Poddle Park, Mount Argus Park, Harold's Cross Park, Eamonn Ceannt Park and Lorcan O'Toole Park. Gulls are known to gather along the Grand Canal. These species therefore are likely to use lands surrounding the footprint of the Proposed Scheme for breeding and foraging.

Breeding species which are associated with buildings returned from the desk study including swallows, house martins and raptors (Birdwatch Ireland 2020). Swallows, starlings, swifts and house martins occurred across the larger study area (i.e. Grid Square O13) and may therefore utilise buildings adjacent to the Proposed Scheme. Kestrel, peregrine falcon and sparrowhawks occurred across the larger study area (i.e. Grid Square O13) and may therefore utilise open green spaces and trees adjacent to the Proposed Scheme. No suitable habitat was identified for merlin and desk study records were confined to coastal areas (i.e. Grid Square O13) and are therefore not deemed to breed within the footprint of the Proposed Scheme.

Several species of warblers and raptors which favour woodlands, agricultural lands and upland heathland areas were identified during the desk study (refer to Appendix A12.1 in Volume 4 of this EIAR), but due to the urban locality of the Proposed Scheme, these habitat types are not present. As such, these species are not deemed to be present across the Proposed Scheme in significant numbers. However, these species may be present in larger parks and greenspaces in the lands surrounding the Proposed Scheme (i.e. Poddle Park, Mount Argus Park, Harold's Cross Park, Eamonn Ceannt Park and Lorcan O'Toole Park). Other adjacent green spaces include Clonmacnoise Road roundabout, Harold's Cross Youth Football Club, Kenilworth Square and Portobello GAA pitch. Species that are known to frequent Poddle Park include kingfisher, grey heron, sparrowhawk, swift, kestrel and swallow.

Wetland and riverine species identified during the desk study (Appendix A12.1 in Volume 4 of this EIAR), include coots, little egret, swans, ducks, herons, kingfisher and cormorants which utilise freshwater lakes, ponds, canals, and rivers in urban habitats. Suitable habitats within close proximity to the Proposed Scheme include Mount Argus Park and lake, the River Poddle (above ground sections), and the Grand Canal. Grey heron and mute swan were observed foraging in the lake at Mount Argus Park during the multidisciplinary surveys. The Grand Canal is known for its population of swans, wagtails and coots.

Rivers are important nesting and foraging sites for species such as kingfisher within the Proposed Scheme. The Proposed Scheme will cross the Poddle River at Mount Argus Avenue and Mount Argus Park, as such these species may utilise these areas adjacent to the Proposed Scheme. The desk study returned several records of these riverine species within the greater study area (i.e. Grid Square O13) and along the Grand Canal, which is deemed as suitable foraging habitat for kingfisher. Records were returned for cormorant *Phalacrocorax carbo,* tufted duck *Aythya fuligula* and little grebe *Tachybaptus ruficollis* along the Grand Canal between Dolphins Barn and Robert Emmet Bridge in 2001, adjacent to Templeogue / Synge Street GAA pitches.

Kingfisher were not recorded during multidisciplinary surveys within the footprint of the Proposed Scheme.

Records of breeding birds relevant to the Proposed Scheme are listed in Table 12.8.

Table 12.8: Desk Study Records of Breeding Birds of Conservation Concern Adjacent to the Proposed Scheme

Common Name / Scientific Name / British Trust for Ornithology (BTO) Code	Distribution in the Study Area	Conservation Importance		
		BoCCI (B – Breeding / W – Wintering)	Annex I	Nearest SPA Designated for SCI Species
Herring gull *Larus argentatus* (HG)	Throughout Grid O13 Within Grid O13L Grand Canal Harold's Cross	Amber (B/W)	-	Ireland's Eye SPA (approximately12.5km)
Barn Owl *Tyto alba* (BO)	Within 10km of Grid O13	Red (B)	-	-
Black-headed Gull *Chroicocephalus ridibundus* (BH)	Within Grid O13L Grand Canal Harold's Cross	Amber (B/W)	-	-
Grey Wagtail *Motacilla cinerea* (GL)	Several records along The Grand Canal	Red (B)	-	-
Meadow Pipit *Anthus pratensis* (MP)	Within the 2km of Grid O13L Harold's Cross	Red (B)	-	-
Yellowhammer *Emberiza citronella* (Y)	Within the 2km Grid O13K Rathgar	Red (B)	-	-
Kingfisher *Alcedo atthis* (KF)	Within the 2km of Grid O13L Grand Canal at Harold's Cross	Amber (B)	✓	River Boyne SPA (approximately.35km)
Common coot *Fulica atra* (CO)	Grand Canal; Dolphins Barn	Amber (B/W)	-	Lough Ennell SPA (approximately 71km)
Mediterranean gull *Larus melanocephalus* (MU)	Within the 10km of Grid O13	Amber (B)	✓	-
Black guillemot *Cepphus grille* (GU)	Within the 2km Grid O13R Grand Canal Dublin Port and Quays	Amber (B)	-	-
Common Swift *Apus apus* (SI)	Throughout Grid O13; Within the 2km Grid O13F Kimmage	Red (B)	-	-
Common shelduck *Tadorna tadorna* (SU)	Within the 10km Grid of O13	Amber (B/W)	-	North Bull Island SPA (approximately 5.7km)
Lesser black-backed gull *Larus fuscus* (LB)	Within the 2km of Grid O13L Harold's Cross	Amber (B/W)	-	Lambay Island SPA (approximately 17.5km)
Common tern *Sterna hirundo* (CN)	Within the 10km of Grid O13 Dublin Docks	Amber (B)	-	South Dublin Bay and River Tolka Estuary SPA (approximately 2.8km)
Ringed plover *Charadrius hiaticula,* (RP)	Within the 10km of Grid O13 Sandymount Strand	Amber (B/W)	-	South Dublin Bay and River Tolka Estuary SPA (approximately 2.8km)
Barn Swallow *Hirundo rustica* (SL)	Within the 10km of Grid O13	Amber (B)	-	-
Kestrel *Falco tinnunculus* (K.)	Within the 10km of Grid O13	Red (B)	-	-
Linnet *Carduelis cannabina* (LI)	Within the 2km of Grid O13L Harold's Cross	Amber (B)	-	-

Common Name / Scientific Name / British Trust for Ornithology (BTO) Code	Distribution in the Study Area	Conservation Importance		
		BoCCI (B – Breeding / W – Wintering)	Annex I	Nearest SPA Designated for SCI Species
Common starling *Sturnus vulgaris* (SG)	Within the 2km of Grid O13F; the area surrounding Clonmacnoise roundabout (at Kimmage)	Amber (B)	-	-
House sparrow *Passer domesticus* (HS)	Within the 2km of Grid O13F and the area surrounding Clonmacnoise roundabout	Amber (B)	-	-
Eurasian Tree Sparrow *Passer montanus* (TS)	Within the 10km of Grid O13	Amber (B)	-	-
European Greenfinch *Carduelis chloris* (GR)	Within the 2km of Grid O13K Kenilworth Square; Grid O13L Harold's Cross	Amber (B)	-	-
Goldcrest *Regulus regulus* (GC)	Within the 2km of Grid O13K Kenilworth Square; Grid O13F the area surrounding Clonmacnoise roundabout	Amber (B)	-	-
House martin *Delichon urbicum* (HM)	Within the 2km of Grid O13L Harold's Cross	Amber (B)	-	-
Mute swan *Cygnus olor* (MS)	Several records along The Grand Canal	Amber (B/W)	-	-
Little Egret *Egretta garzetta* (ET)	The River Dodder at Dartry	Green (B)	✓	-
Peregrine falcon *Falco peregrinus* (PE)	Within the 2km of Grid O13L Harold's Cross; Grid O13F the area surrounding Clonmacnoise roundabout.	Green (B)	✓	Wicklow Mountains SPA (approximately 12km)

Due to the presence of suitable breeding and / or foraging habitat adjacent to the Proposed Scheme, the local breeding bird populations are considered to be of International Importance where they belong to SPA populations and / or are listed on the Annex I of the Birds Directive. All other breeding bird populations are considered to be of Local Importance (Higher Value).

12.3.9.2 Wintering Birds

All wild birds, and their nests and eggs, are protected under the Wildlife Acts. Some bird species are also listed on Annex I of the Birds Directive, and / or as SCIs within designated European sites. No wintering bird surveys were carried out for the Proposed Scheme, as no European sites or *ex-situ* sites supporting wintering birds will be subject to habitat loss from the Proposed Scheme (See Section 12.3.1). The Proposed Scheme lies within 60m of the known wintering bird feeding site of Eamonn Ceannt Park. However, the Proposed Scheme will not result in habitat loss and will be separated from Eamonn Ceannt Park by an existing row of 2-storey houses along Sundrive Road and by existing vegetation and trees along the perimeter of the preferred amenity grassland feeding areas (playing pitches) within the Park, which provide significant screening to the adjacent Park. The proposed works in this area of Sundrive Road are considered to be minor, including provision of a cycleway and retention of existing surfaces.

The full results of the desk study, including records of wintering bird species considered to be of conservation concern, are presented in Appendix A12.1 in Volume 4 of this EIAR. These species are considered to be KERs of the Proposed Scheme and include the following:

- SCIs, for a wintering population, of SPAs;
- Species listed under Annex I of the Birds Directive; and
- Red and Amber BoCCI species listed for their wintering populations.

The desk study returned records of a total of 41 regularly occurring wintering bird species across the study area (i.e., Grid Square O13). Records included nine species listed under Annex I of the Birds Directive, 26 SCI species, and an additional one Red Listed and two Amber Listed species. This includes 21 species with breeding and wintering populations.

Downstream of the Proposed Scheme, Dublin Bay also supports Internationally Important numbers of black-tailed godwit and bar-tailed godwit between June and September (Tierney *et al.* 2017). An additional 20 species occurred in Nationally Important numbers across the Bay in 2013 and 2016. These included shelduck, wigeon, teal, pintail and shoveler which favoured Dollymount Strand and North Bull Island, while great crested grebe and ringed plover favoured Sandymount Strand. Red-breasted merganser, red-throated diver, little egret, grey heron, oystercatcher, grey plover, knot, sanderling, dunlin, curlew, greenshank, redshank, and turnstone were recorded across all areas of Dublin Bay. Records for wintering bird species returned in the desk study are those typically found in coastal, estuarine and intertidal habitats, such as the Liffey Estuary and Dublin Bay. These largely include seabirds, waders, waterfowl, ducks, geese, and gulls. With the exception of geese, gulls and waders which utilise inland feeding sites throughout the winter months, these species are unlikely to utilise lands adjacent to the Proposed Scheme in large numbers.

The wider study area of Dublin Bay is considered of significant ornithological importance as it supports an Internationally Important population of light-bellied brent goose. This SCI species may use open parkland and grassland adjacent to the study area for foraging purposes. A review of a study into light-bellied brent goose inland feeding sites (Scott Cawley Ltd. 2017) has identified four known inland wintering bird feeding sites within approximately 1km of the Proposed Scheme, one of which is within 300m of the Proposed Scheme, are listed below. The importance of a feeding site has been categorised as follows:

- A site is considered to be of major importance if a peak count of site over 400 geese has been previously recorded at that site;
- A site is considered to be of high importance site if a peak count of between 51 to 400 geese has been previously recorded at that site; and
- A site is considered to be of moderate importance if a peak count of between 1 to 50 geese has been previously recorded at that site (Benson 2009).

Known wintering bird sites within 1km of the Proposed Scheme include:

- Eamonn Ceannt Park approximately 60m north of Sundrive Road (Major Importance);
- Clonmacnoise roundabout approximately 350m north west of Blarney Park (Major Importance);
- Templeogue / Synge Street GAA pitches approximately 1km west of Robert Emmet Bridge (Major Importance); and
- Lorcan O'Toole Park approximately 500m west of Kimmage Cross Roads (High Importance)

Desk study records of wintering bird species utilising lands adjacent to the Proposed Scheme are provided in Table 12.9.

Table 12.9: Desk Study Records of Wintering Birds of Conservation Concern Adjacent to the Proposed Scheme

Common Name / Scientific Name / BTO Code	Activity and Distribution in the Study Area	Conservation Importance		
		BoCCI (B – Breeding / W – Wintering)	Annex I	Nearest SPA Designated for SCI Species
Light-bellied Brent goose *Branta bernicla* (BG)	Templeogue/ Synge Street GAA pitches	Amber (W)	-	South Dublin Bay and River Tolka Estuary SPA (approximately 3.7km)
Eurasian Oystercatcher *Haematopus ostralegus* (OC)	Along the River Dodder	Red (B/W)		Malahide Estuary SPA (approximately 14.3km)
Common coot *Fulica atra* (CO)	Grand Canal; Dolphins Barn	Amber (B/W)	-	Lough Ennell SPA (approximately 71km)
Mute swan *Cygnus olor* (MS)	Several records along The Grand Canal	Amber (B/W)	-	-
Eurasian Curlew *Numenius arquata*	Within the 2km of Grid Square O13Q	Red (B/W)	-	North Bull Island SPA (approximately 6.5km)

Due to the presence of suitable foraging and / or roosting habitat adjacent to the Proposed Scheme, the local wintering bird populations are considered to be of International Importance where they belong to SPA populations and / or are listed on the Annex I of the Birds Directive. All other wintering bird populations are considered to be of Local Importance (Higher Value).

12.3.10 Reptiles

The common lizard are legally protected under the Wildlife Acts. Common lizard were not recorded during the multidisciplinary surveys and no suitable habitat was confirmed within the footprint of the Proposed Scheme.

The desk study did not return records of common lizard within the immediate footprint of the Proposed Scheme, although there is one historical record of common lizard at Ranelagh in 1968 approximately 2km from the Proposed Scheme (NBDC Online Database 2022). This species is strongly associated with heathland and coastal dune habitats and neither of these habitat types were identified within the Proposed Scheme boundary (Marnell 2002; Farren *et al.* 2010). However, it cannot be ruled out that this species is not in the wider study area.

Common lizard are deemed to be of Local Importance (Higher Value).

12.3.11 Amphibians

The common frog and the smooth newt are legally protected under the Wildlife Acts. The common frog is also listed under Annex V of the Habitats Directive. No evidence of common frogs or smooth newt were identified along the Proposed Scheme during the multidisciplinary surveys.

Suitable amphibian habitat (i.e. surface water / drainage features with stagnant, relatively unpolluted water) was identified within the footprint of the Proposed Scheme. This includes areas of vegetated riverbank along the River Poddle and grassy areas along the banks of the Grand Canal.

The desk study returned a number of records for common frog within 1km of the Proposed Scheme (NBDC Online Database 2022). This includes one at Rathmines and three in Rathgar). No records were returned for smooth newt within the greater study area (NPWS 2019d).

Amphibians are deemed to be of Local Importance (Higher Value).

12.3.12 Fish

Fish species are protected under the Fisheries Acts and by fishing by-laws. Atlantic salmon, river lamprey and the brook lamprey are listed on Annex II of the Habitats Directive. Fish surveys were carried out as part of the field surveys in July 2022 in support of the Proposed Scheme.

The Proposed Scheme lies within the Dodder_SC_010 WFD subcatchment. The Proposed Scheme will run close to the Poddle River for its entirety and will discharge to the River Liffey (Liffey Estuary Upper) in the southern part of the scheme and for the northern part through the existing combined sewer systems to the Ringsend WwTP.

The Proposed Scheme will be hydrologically connected to Dublin Bay via two watercourses: The River Poddle (Poddle_010) and the Grand Canal Main Line. The Proposed Scheme will also be hydrologically connected to the Liffey Estuary Upper via the River Poddle and the Liffey Estuary Lower via the Grand Canal and Ringsend WwTP.

The desk study identified two sites where waterbodies may be subject to significant disturbance as a consequence of the Proposed Scheme. Aquatic surveys were carried out in July 2022 at a number of locations namely: the proposed Poddle Cycleway and Stone Boat Boardwalk at Mount Argus View (CBC0011AR001) and the proposed offline footbridges at the existing Robert Emmet Bridge over the Grand Canal (CBC0011AR002) (Triturus Environmental Ltd. 2022, Appendix A12.2).

The River Poddle, which discharges to the Liffey Estuary Upper at Ushers Quay was assigned an Ecological status of ‘Poor’ for the period 2016-2021 and its WFD risk assessment is “At Risk” (EPA 2023).

The Grand Canal runs from Dublin port on a westerly course via Tullamore to join the River Shannon near Banagher. Due to its nature, it is classed as an artificial water body. The Grand Canal achieved Good Ecological Potential (GEP) in the 2021-2016 period and is deemed "Not at Risk” of meeting its WTD objectives (EPA 2023).

12.3.12.1 Salmonid Species

The desk study did not return any records for salmonid species.

The River Poddle is approximately 11.6km in length (much of it culverted) and its catchment covers an area of approximately 16,400ha (hectares). It flows from the north of Tallaght Village to the River Liffey at Wellington Quay (SDCC 2020). It is reported that the River Poddle has no populations of salmonids or any other fisheries interests due to extensive culverting in the lower section of the river proving impassable to any migratory species such as Atlantic salmon, European eel or sea trout (SDCC 2020). There is one historical monitoring site on the River Poddle catchment which was surveyed by Inland Fisheries Ireland (IFI) in September 2007. The monitoring location is at The Priory, Kimmage Road approximately 1km upstream of the Proposed Scheme at Kimmage Cross Roads. The River Poddle was assigned an Ecological Status for the period 2016-2021 of ‘Poor’ (EPA 2023).

As such, the River Poddle is not considered further in regard to impacts upon fish species. The Grand Canal is not considered suitable for migratory salmonid species and so salmonids are not considered further in this assessment.

12.3.12.2 Lamprey Species

The desk study did not return any records for lamprey species. It is reported that the River Poddle has no populations of salmonids or any other fisheries interests due to extensive culverting in the lower section of the river proving impassable to any migratory species such as Atlantic salmon, lamprey, European eel or sea trout (SDCC 2020). There is one historical monitoring site on the River Poddle catchment which was surveyed by Inland Fisheries Ireland (IFI) in September 2007. The monitoring location is at The Priory, Kimmage Road approximately 1km upstream of the Proposed Scheme at Kimmage Cross Roads. The River Poddle was assigned an Ecological Status for the period 2016-2021 of ‘Poor’ (EPA 2023). As such, the River Poddle is not considered further in regard to impacts upon fish species.

The Grand Canal is not considered suitable for lamprey species due to its lacustrine-like (lake-like) environment and so lamprey are not considered further in this assessment.

12.3.12.3 European Eel

The desk study returned records for European eel *Anguilla anguilla* on the Grand Canal. European eels were recorded along the Grand Canal by IFI during the eel monitoring programme conducted in 2011 (O'Leary *et al*. 2011). The Liffey Estuary serves as the natural linkage for European eel migrating between freshwater and marine environments (Central and Regional Fisheries Board 2008). The desk study returned no European eel records for the River Poddle. It is reported that the River Poddle has no populations of salmonids or any other fisheries interests (other than three spined stickleback) due to extensive culverting in the lower section of the river proving impassable to any migratory species such as Atlantic salmon, lamprey, European eel or sea trout (SDCC 2020). As such the River Poddle is not considered further in regard to impacts on European eel. European eel were not recorded during surveys undertaken by Triturus Environmental Ltd., downstream of the Proposed Scheme's Grand Canal crossing point at Robert Emmet Bridge in 2022.

This species is the most threatened fish in Irish freshwaters (King *et al.* 2011) and the alarming decline of the species in recent decades has resulted in a classification of "Critically Endangered" (Jacoby and Gollock 2014).

A re-stocking programme based in the Shannon Estuary was initiated to address declining numbers. Currently, their passage is assisted upstream and into other connected water bodies using the 'trap and transport' method which involves catching the eels and moving them past obstacles (O'Connor 2014).

European eel populations are valued as being of National Importance.

12.3.12.4 All Other Fish Species

The Grand Canal is known as a major angling destination and species present include common bream *Abramis brama*, tench *Tinca tinca*, common rudd *Scardinius erythrophthalmus*, common perch *Perca fluviatilis* and pike *Esox lucius*. It also has a population of non-native invasive roach *Rutilus rutilus*, a species listed on the Third Schedule of the Birds and Habitats Regulations (Waterways Ireland 2021). It is reported that the Grand Canal section from Dolphins Barn to Portobello has good stocks of tench particularly from the Parnell Road stretch to the 7th Lock at Portobello, whilst Pike and roach are also present (IFI 2020).

These species are valued as being of Local Importance (Higher Value).

12.3.13 Invertebrates

12.3.13.1 White-Clawed Crayfish

White-clawed crayfish *Austropotamobius pallipes* are legally protected under the Wildlife Acts and are also listed on Annex II of the Habitats Directive. Surveys for white-clawed crayfish were carried out as part of this assessment. The desk study (see Appendix A12.1 in Volume 4 of this EIAR) did not return records for white-clawed crayfish within the footprint of the Proposed Scheme. Healthy white-clawed crayfish populations are known from the River Camac and selected tributaries upstream of it (Triturus Environmental Ltd. 2022b; Sweeney Consultancy 2018). Some habitat suitability was noted at the Grand Canal and while crayfish are known from the Grand Canal they are not known in the vicinity of Dublin (Triturus Environmental Ltd. 2022b). Owing to the culverted nature of the River Poddle and a lack of suitable substrate in aboveground sections, there is no suitable habitat for white-clawed crayfish within the footprint of the Proposed Scheme.

As such, white-clawed crayfish are not considered further in the assessment.

12.3.13.2 Freshwater Molluscs

Surveys for freshwater molluscs were carried out as part of this assessment by virtue of the Proposed Scheme and lack of instream works, although it is recognised that construction methodologies may involve works in proximity to (piling) and or modification of banks. The desk study (see Appendix A12.1in Volume 4 of this EIAR)

returned three records for Red Listed freshwater molluscs. In terms of macroinvertebrates, no species of conservation value greater than 'least concern', according to national red lists were recorded from either the Grand Canal or River Poddle.

The Glutinous snail *Myxas glutinosa* and false orb pea mussel *Pisidium pseudosphaerium* were recorded at several locations on the Grand Canal between Drimnagh and Herbert Place in 2003, including a record downstream of Robert Emmet Bridge. The iridescent pea mussel *Pisidium pulchellum* was also recorded on the Grand Canal in 2003 at Herbert Place, approximately.1.5km from the Proposed Scheme. The lake orb mussel *Musculium lacustre*, listed as 'Vulnerable', was recorded at the Grand Canal at Drimnagh in 2003, approximately 1.2km from the Proposed Scheme (NBDC Online Database 2022).

Surveys undertaken by Triturus Environmental Ltd. (2021a) as part of the TII's Metrolink project recorded the glutinous snail and the false-orb pea mussel during surveys carried out at Charlemont, downstream of the Proposed Scheme's Grand Canal crossing point at Robert Emmet Bridge.

These species are valued as being of County Importance.

12.3.13.3 Marsh Fritillary

The Marsh fritillary butterfly *Euphydras aurina* are legally protected under Annex II of the Habitats Directive. Surveys for marsh fritillary were not carried out as part of this assessment. In an Irish context, the conservation status of these species is designated as 'Vulnerable' (Regan *et al*. 2010).

The desk study (see Appendix A12.1 in Volume 4 of this EIAR) did not return records for marsh fritillary within the footprint of the Proposed Scheme. Desk study records in the wider area were largely historical (pre-1980s). A recent record for marsh fritillary was identified, approximately 7.5km south of the Proposed Scheme at Killakee Rathfarnham (Grid O12).

Marsh fritillary are typically restricted to habitats containing low, open sward with abundant devil's-bit scabious *Succisa pratensis* including sand dunes, calcareous grassland, fens, raised and blanket bogs, upland heaths and grasslands. These habitats were not recorded within the footprint of the Proposed Scheme.

As such, marsh fritillary is not considered further in the assessment.

12.3.13.4 Other Invertebrates

The desk study (see Appendix A12.1 in Volume 4 of this EIAR) returned records for several invertebrates Red Listed on the Ireland Red List No. 2: Non-Marine Molluscs (Byrne *et al*. 2009), Ireland Red List No. 4: Butterflies (Regan *et al*. 2010), Ireland Red List No. 6: Damselflies and Dragonflies (Odonata) (Nelson *et al*. 2011), and the Regional Red List of Irish Bees 2006 (Fitzpatrick *et al*. 2006) (NBDC Online Database 2022). Butterflies are known to favour nectar-rich flowers, which provide larval foodplants. Preferred plant species include cock's-foot grass *Dactylis glomerata*, bird's-foot trefoil *Lotus corniculatus*, common nettle *Urtica dioica*, cuckoo flower *Cardamine pratensis*, garden nasturtium *Tropaeleum majus*, Common holly *Ilex aquifolium* and common ivy *Hedera helix* (Butterfly Conservation Ireland 2020). Corresponding habitats along the Proposed Scheme are located in parkland with scattered trees (WD5) and amenity grasslands (GA2); present within Poddle Park, Mount Argus Park and along the Grand Canal, where suitable grasses, common nettle *Urtica dioica*, common holly *Ilex aquifolium* and common ivy *Hedera helix* were recorded. These habitats were identified along the route of the Proposed Scheme in fragmented pockets of small and medium size. Species diversity was low in terms of foodplants in these habitats. Butterfly communities that are known to survive in highly fragmented landscapes are mobile species that can feed off a range of plants (Öckinger *et al.* 2010).

Damselflies and Dragonflies are typically found at slow moving or stagnant water bodies such as wetlands, river mires and flood lands, however they have adapted to artificial habitats such as ponds and canals (Fox & Cham 1994). These species are carnivorous predators throughout their life cycles and are used as bio-indicator species for water quality as they have low tolerances for pollution, with juveniles spending the entirety of their life in aquatic systems (Nelson *et al.* 2011). Suitable habitats along the Proposed Scheme, which are isolated and fragmented, include; other artificial lakes and ponds (FL8) in Mount Argus Park and the Grand Canal (FW3), at Robert Emmet Bridge.

Bees favour sites with lots of flowers in unimproved grasslands and hay meadows. These habitats were not recorded along the Proposed Scheme. The preferred foodplants for bees are native species with white, blue or yellow flowers (Fitzpatrick *et al.* 2006). Additional fragmented sites where suitable floral species were recorded along the Proposed Scheme include ornamental flower beds and borders (BC4) within residential gardens, parkland with scattered trees (WD5), and amenity grasslands (GA2); in parks adjacent to the Proposed Scheme along Kimmage Road Lower (Poddle Park and Mount Argus Park), Sundrive Road (Eamonn Ceannt Park) and Harold's Cross Road (Harold's Cross Park).

Bumblebees may have large ranges and can require large areas with varied habitats providing long flowering periods to support viable populations. Bees do not cope well with habitat fragmentation which can isolate species, ultimately reducing gene flow and genetic diversity and increasing their vulnerability to other stressors such as disease and internal parasites. Species with specialist foodplants or limited dispersal abilities can be particularly vulnerable to habitat loss and degradation (Biesmeijer *et al*. 2006), leading to increasing dominance by a smaller number of generalist species.

Loss of natural and semi-natural habitats has been a key driver in pollinators who require a balanced diet from a range of plant species throughout their active foraging season which lasts from early spring until late autumn (TCD 2017). There are small, isolated and fragmented sites along the route of the Proposed Scheme including; an area recorded as an urban pollinator garden, located at Poddle Close adjacent to the Proposed Scheme; a site recorded as a community project at Brighton Square, approximately 320m south of the Proposed Scheme and a site at Eamonn Ceannt Park, approximately 100m from the Proposed Scheme. This last site is described as an area specifically managed by DCC as part of the All Ireland Pollinator Plan (NBDC Online Database 2022). These species favour species rich semi-natural grasslands and meadows, upland heath and sand dunes. Habitats within close proximity to the Proposed Scheme which correspond to species requirements include species poor dry meadows and grassy verges, and areas of ornamental planting along roadsides, parkland, and gardens. Such habitats are fragmented and highly disturbed and are therefore deemed unsuitable for significant populations of red-listed invertebrates (Biesmeijer *et al*. 2006; Öckinger *et al*. 2010). As such, other invertebrates are not considered further in the assessment.

12.3.14 Summary of Ecological Valuation and Identification of KERs

Table 12.10 summarises the ecological evaluation of all receptors taking into consideration legal protection, conservation status and local abundance. KERs are highlighted in blue in Table 12.10. Species, habitats and features not qualifying as KERs are not subjected to impact assessment in line with current best practice of assessing the impacts on what are determined to be important ecological or biodiversity features, as per the CIEEM Guidelines (CIEEM 2018) and the Guidelines for Assessment of Ecological Impacts of National Road Schemes (NRA 2009).

All designated areas for nature conservation that lie within the ZoI of the Proposed Scheme are considered to be KERs given that they are sites selected specifically for biodiversity conservation and are potentially at risk of impacts from the Proposed Scheme. Those designated areas for nature conservation that lie beyond the ZoI of the Proposed Scheme are not considered to be at risk of impact and are therefore, not considered to be KERs.

In all cases, habitat and species valued as being of Local Importance (Higher Value), or higher, are considered to be KERs as they are important contributors to the local biodiversity resource and are of conservation concern, at least locally.

Habitats valued as being of a Local Importance (Lower Value) are not considered to be KERs in this assessment. This is not to say that they are of no biodiversity value, but that impacts on these habitat types in their local context are not likely to result in a significant effect on biodiversity. It should be noted that this relates to the impact on the habitat itself, as distinct from considering the role these habitat types play in supporting KER fauna species. The impacts of the Proposed Scheme in that sense are captured and assessed under the relevant species' headings in Section 12.3

These lower biodiversity value habitats include built or artificially created habitats, transient habitats as a result of disturbance, or those that have been highly anthropogenically modified (e.g. BL1, BL3, ED2, BC4, GA2 and WS3).

These habitat types tend to be associated with residential, commercial or industrial development, roads and highly managed amenity areas. It also includes grassland habitats that are relatively species poor and improved.

In some cases, Local Importance (Lower Value) habitat can be associated with, or develop into, Higher Value habitats and where this is the case it is captured in valuing and considering whether a particular habitat type is a KER for this assessment.

Non-native invasive plant species are not considered as KERs, as they can result in negative effects on biodiversity, and it is in that context that they are included within the impact assessment.

Table 12.10: Summary of Ecological Valuation and Identification of KERs

Ecological Receptor	Ecological Valuation	KER?
Designated Sites		
South Dublin Bay SAC [000210]	International Importance	**Yes**
North Dublin Bay SAC [000206]	International Importance	**Yes**
Rockabill to Dalkey Island SAC [003000]	International Importance	**Yes**
Lambay Island SAC [000204]	International Importance	**Yes**
South Dublin Bay and River Tolka Estuary SPA [004024]	International Importance	**Yes**
North Bull Island SPA [004006]	International Importance	**Yes**
Baldoyle Bay SPA [004016]	International Importance	**Yes**
Dalkey Island SPA [004172]	International Importance	**Yes**
Howth Head Coast SPA [004113]	International Importance	**Yes**
Malahide Estuary SPA [004025]	International Importance	**Yes**
Ireland's Eye SPA [004117]	International Importance	**Yes**
Rogerstown Estuary SPA [004015]	International Importance	**Yes**
Lambay Island SPA [004069]	International Importance	**Yes**
Skerries Islands SPA [004122]	International Importance	**Yes**
The Murrough SPA [002249]	International Importance	**Yes**
Rockabill SPA [004014]	International Importance	**Yes**
All other SAC or SPA sites	International Importance	No – beyond ZoI
Skerries Islands NHA [001218]	National Importance	**Yes**
Grand Canal pNHA [002104]	National Importance	**Yes**
North Dublin Bay pNHA [000206]	National Importance	**Yes**
South Dublin Bay pNHA [000210]	National Importance	**Yes**
Dolphins, Dublin Docks pNHA [000201]	National Importance	**Yes**
Booterstown Marsh pNHA [001205]	National Importance	**Yes**
Dalkey Coastal Zone and Killiney Hill pNHA [001206]	National Importance	**Yes**
Baldoyle Bay pNHA [000199]	National Importance	**Yes**
Howth Head pNHA [004113]	National Importance	**Yes**
Malahide Estuary pNHA [000205]	National Importance	**Yes**
Ireland's Eye pNHA [000203]	National Importance	**Yes**
Rogerstown pNHA [000208]	National Importance	**Yes**
Portraine Shore pNHA [001215]	National Importance	**Yes**
Lambay Island pNHA [000204]	National Importance	**Yes**
Rockabill pNHA [000207]	National Importance	**Yes**

Ecological Receptor	Ecological Valuation	KER?
The Murrough pNHA [002249]	National Importance	**Yes**
All other NHA or pNHA sites	National Importance	No – beyond ZoI
Habitats		
Flower beds and borders (BC4)	Local Importance (Lower Value)	No
Stone walls and other stonework (BL1)	Local Importance (Lower Value)	No
Buildings and artificial surfaces (BL3)	Local Importance (Lower Value)	No
Spoil and bare ground (ED2)	Local Importance (Lower Value)	No
Depositing/lowland rivers (FW2)	Local Importance (Higher Value)	**Yes**
Canals (FW3)	National Importance – see Grand Canal pNHA	**Yes**
Amenity grassland (improved) (GA2)	Local Importance (Lower Value)	No
Dry meadows and grassy verges (GS2)	Local Importance (Lower Value)	No
Residential	Local Importance (Lower Value)	No
(Mixed) broadleaved woodland (WD1)	Local Importance (Higher Value)	**Yes**
Scattered trees and parkland (WD5)	Local Importance (Higher Value)	**Yes**
Hedgerows (WL1)	Local Importance (Lower Value)	No
Treelines (WL2)	Local Importance (Higher Value)	**Yes**
Scrub (WS1)	Local Importance (Lower Value)	No
Ornamental/non-native shrub (WS3)	Local Importance (Lower Value)	No
Flora Species		
Flora Species listed on the Flora Protection Order	National Importance	**Yes**
All other non-Red listed flora species	Local Importance (Lower Value)	No
Non-native invasive plant species	N/A	No
Fauna Species		
Otter	County Importance	**Yes**
Bats	Local Importance (Higher Value)	**Yes**
Badger	Local Importance (Higher Value)	**Yes**
Other terrestrial mammal species protected under the Wildlife Acts	Local Importance (Higher Value)	**Yes**
All other terrestrial mammal species not listed under the wildlife acts	Local Importance (Lower Value)	No
Marine Mammals (Annex II species of nearby SACs: harbour porpoise, harbour seal and grey seal)	International Importance	**Yes**
Marine mammals (all other marine mammals)	County Importance	**Yes**
SCI / Annex I bird species	International Importance	**Yes**
All other Red listed bird species (non-SCI breeding populations)	Local Importance (Higher Value)	**Yes**
All other Amber listed bird species (non-SCI breeding populations)	Local Importance (Higher Value)	**Yes**
Any other Green listed bird species (non-SCI breeding populations)	Local Importance (Higher Value)	**Yes**
All other wintering bird species (non-SCI)	Local Importance (Higher Value)	**Yes**
Amphibians	Local Importance (Higher Value)	**Yes**

Ecological Receptor	Ecological Valuation	KER?
Reptiles	Local Importance (Higher Value)	**Yes**
Annex II Fish Species (Atlantic Salmon & Lamprey species)	National Importance	No
European Eel	National Importance	No
All other Fish species	Local Importance (Higher Value)	**Yes**
Annex II Invertebrates (White-clawed crayfish and marsh fritillary)	National Importance	No
Invertebrates and Insects on Irelands Red Lists (Vulnerable or of higher conservation concern) – Freshwater Molluscs	County Importance	**Yes**
All other non-Red listed Invertebrates and Insects	Local Importance (Lower Value)	No
Non-native invasive animal species	N/A	No
Local Biodiversity Areas (Local Biodiversity Areas not discussed under designated sites, flora and / or fauna – of which overlap in part with national designation as listed previously and / or are intersected by the Proposed Scheme)		
DCC: Grand Canal	National Importance	Yes, but covered by pNHA. Not considered as a separate KER
DCC: River Corridors	Local Importance (Higher Value)	Yes, but covered by FW2 habitat. Not considered as a separate KER
DCC: Parks	County Importance	No by virtue of avoidance
SDCC: Network of streams and rivers	Local Importance (Higher Value)	Yes, but covered by FW2 habitat. Not considered as a separate KER
SDCC: Network of Parks	County Importance	No – by virtue of avoidance.

12.4 Potential Impacts

The following Section presents the assessment of potential impacts on biodiversity within the ZoI of the Proposed Scheme. As outlined in Section 12.2.4, this is focused on the KERs identified in Section 12.3.14. This includes consideration of the 'Do-Nothing' impact scenario i.e., the existing trends with the potential to affect biodiversity in the absence of the Proposed Scheme.

12.4.1 Characteristics of the Proposed Scheme

A detailed description of the Proposed Scheme and its construction activities are provided in Chapter 4 (Proposed Scheme Description) and Chapter 5 (Construction). The main characteristics of the Proposed Scheme of relevance to the ecological assessment are outlined under the Construction and Operational Phases Section 12.4.1.1 and Section 12.4.1.2.

12.4.1.1 Construction Phase

The main characteristics of the Construction Phase of the Proposed Scheme that have potential for ecological impact are:

- Site preparation and clearance;

- Removal of existing boundaries, pavements, lighting columns, bus stops, and signage;
- Removal of trees and vegetation
- Protection and / or diversion of buried services;
- Road widening, pavement reconstruction, and kerb improvements;
- Reconfiguration of traffic lanes throughout;
- Demolition of existing retaining walls;
- Installation of new bus stops and junction / roundabout modification;
- Property boundary reinstatement, signage replacement; installation of lighting columns; and
- Landscaping and tree planting, and reinstatement of temporary land acquisitions.

12.4.1.1.1 Structural Works / Demolition Works

Full details of the main structural works that form the Proposed Scheme can be found in Chapter 4 (Proposed Scheme Description) and Chapter 5 (Construction) of this EIAR. The following are the main structural works that form part of the Proposed Scheme.

12.4.1.1.1.1 Structure No. 2: Stone Boat Boardwalk at Mount Argus

The proposed boardwalk will provide a link between Sundrive Road and Mount Argus View. The boardwalk will be approximately 40m long and 4m wide. The structure will be independently support by bored piles.

The proposed construction methodology presented here is a broad outline only, with some work sequences being dependent on the final detail of the appointed contractors preferred construction methodology:

- Installation of protective measures to prevent discharge to the watercourse;
- Foundations for the boardwalk will be constructed by the installation of continuous flight auger (CFA) bored piles into the bank of the River Poddle;
- After installation of the appropriate foundations the bridge deck will be constructed by lifting in and joining steel sections and prefabricated elements ; and
- Reinstatement of adjacent areas.

12.4.1.1.1.2 Structure No. 01A: Cycle / Pedestrian Bridge to West of Robert Emmet Bridge

The proposed cycle / pedestrian bridge will carry pedestrians and two lanes of cycle traffic displaced from Robert Emmet Bridge as a result of the provision of bus lanes. The footbridge will be approximately 24m long and 6m wide. The proposed structure will be independently supported by reinforced concrete abutments and 2 intermediate steel piers. The footbridge will overspan the piers to concrete abutments.

The proposed construction methodology presented here is a broad outline only, with some work sequences being dependent on the final detail of appointed contractors preferred construction methodology:

- Existing sections of wingwalls will be removed and temporary supports installed;
- Foundations and abutments for the footbridge will be constructed by the installation of CFA bored piles into the bank of the Royal Canal and bank seats at each end of the bridge;
- Preformed steel piers will be installed on each side of the canal;
- After installation of the appropriate foundations the bridge deck will be lifted in as a single precast unit, onto the pre-formed pier units; and
- Reinstatement of adjacent areas.

12.4.1.1.1.3 Structure No. 01B: Pedestrian Bridge to East of Robert Emmet Bridge

The proposed pedestrian bridge will carry pedestrians displaced from Robert Emmet Bridge as a result of the provision of bus lanes. The footbridge will be approximately 25m long and 3.5m wide. The structure will be independently supported by two piers atop single bored piles. The footbridge will over span the piers to concrete abutments.

The proposed construction methodology presented here is a broad outline only, with some work sequences being dependent on the final detail of appointed contractors preferred construction methodology:

- Existing sections of wingwalls will be removed and temporary supports installed;

- Foundations and abutments for the footbridge will be constructed by the installation of CFA bored piles into the bank of the Grand Canal and bank seats at each end of the bridge;
- Preformed steel piers will be installed on each side of the canal;
- After installation of the appropriate foundations the bridge deck will be lifted in as a single precast unit, onto the pre-formed pier units; and
- Reinstatement of adjacent areas.

12.4.1.1.1.4 Structure No. 03: Retaining Wall on Northern Approach to Robert Emmet Bridge

The proposed retaining wall will carry pedestrians and one lane of cycle traffic displaced from Clanbrassil Street Upper as a result of the provision of bus lanes. The retaining wall will be approximately 60m long and up to 3.5m high.

The proposed construction methodology presented here is a broad outline only, with some work sequences being dependent on the final detail of appointed contractors preferred construction methodology:

- Following demolition of existing property, partial demolition of lower retaining wall and regarding of ground to enable vehicular access;
- Excavations to construct strip foundations, including any necessary temporary supports to the existing retaining wall foundations;
- Formwork for concrete retaining wall;
- Pouring of concrete;
- Backfilling; and
- Finishes and reinstatement of adjacent areas.

12.4.1.1.1.5 Structure No. 04: Ramp on Eastern Approach to Robert Emmet Bridge

The proposed ramp will carry pedestrians from Windsor Terrace to the new footbridge on the east side of Robert Emmet Bridge. The existing ramp at the edge of the road will be widened by a cantilever over the existing retaining wall to accommodate a 2m wide footpath. It will also be lengthened a little to approximately 20m long to provide a suitable gradient and to fit with the levels of the proposed eastern footbridge over the canal. Very limited new foundations will be required as the existing wall foundations can support most of the ramp cantilever.

The proposed construction methodology presented here is a broad outline only, with some work sequences being dependent on the final detail of appointed contractors preferred construction methodology:

- Installation of protective measures to prevent discharge to the Grand Canal;
- Foundations for the extended section of the ramp will be constructed by shallow excavation to remove topsoil to expose the subsoil;
- A low reinforced earth ramp structure will be provided over a short section as far as the start of the existing ramp retaining wall;
- The existing ramp retaining wall will be extended vertically a little to suit the profile and levels of the new ramp;
- A concrete cantilever deck will be provided on top of the extended existing retaining wall with parapet railings provided on the outer edges on both the canal and road sides; and
- Reinstatement of adjacent areas.

12.4.1.1.1.6 Demolition of Existing Gordons Fuels Residence

Section 3a will encompass a length of 90m along Clanbrassil Street Upper, at the Grand Canal. Offline cycle / pedestrian bridges will be installed on each side of the existing Robert Emmet Bridge, supported by four new piled foundations. At this location, the road will be widened by 2m and a retaining wall up to 4.5m high will be constructed on piled foundations on the west side of the road. The existing bungalow to the west of the road will be demolished and the access to Gordon's Fuels / Waterways Ireland lands will be realigned through what is now the bungalow. Structural fill will be required to allow for road widening. Full pavement reconstruction is expected over the full road width. The expected construction duration will be 18 months.

12.4.1.1.2 Surface Water Drainage Infrastructure

The surface water drainage system for the Proposed Scheme will discharge to two watercourses, namely the River Poddle and Ringsend WwTP, before ultimately draining to Dublin Bay. All drainage outfall discharges to surface water represent point discharges. For the Proposed Scheme, there will be a net increase of 913m^2 (metres squared) (199m^2 in Poddle_010 and 714m^2 in combined sewer discharging to Ringsend WwTP) in the impermeable area ultimately discharging to Dublin Bay. The drainage design principles ensure that all runoff from increases in impermeable areas will be attenuated and there will be no net increase in the surface water flow discharged to these receptors.

Full details of proposed drainage infrastructure are provided in Chapter 13 (Water) and the Proposed Surface Water Drainage Works Drawings in Volume 3 of this EIAR.

12.4.1.1.3 Lighting

The majority of the Proposed Scheme is already artificially lit. However, temporary lighting may be required along the Proposed Scheme at certain locations during the Construction Phase. A number of existing / permanent lighting columns are proposed to be relocated or replaced are also proposed as part of the lighting strategy, the details of which are addressed in Chapter 4 (Proposed Scheme Description) of this EIAR.

12.4.1.1.4 Landscape and Urban Realm

It is proposed that localised replanting to compensate for loss of vegetation across the Proposed Scheme will be undertaken. Key areas of the design consideration include the village centre for Kimmage, surrounding the junction of R817 Kimmage Road Lower and Sundrive Road, and at St. Patrick's Court along the western side of the R137 Clanbrassil Street Lower, mature trees in localised areas such as New Street South, Poddle Park, Mount Argus Park and Harold's Cross Park, and in the vicinity of the Grand Canal. Existing trees in good conditions are to be kept, whenever possible, and fully protected during construction. Areas of semi-natural / reduced management vegetation in good condition are being kept. In terms of urban realm, new enlarged pedestrian areas such as the area of Kimmage Village centre immediately surrounding the junction of R817 Kimmage Road Lower and Sundrive Road will feature new green ornamental planting and urban furniture while the areas identified as focal points will also include a more differentiated design with different paving materials. Full details of the landscape and urban realm plans are addressed in Chapter 4 (Proposed Scheme Description) of this EIAR

12.4.1.1.5 Construction Compounds

Three Construction Compounds will be required along the length of the Proposed Scheme to facilitate construction. These include:

- Construction Compound K1 will be located in the public car park, located between Sundrive Road and Mount Argus Way;
- Construction Compound K2 will be located on Harold's Cross Road, in the grounds to Our Lady's Hospice; and
- Construction Compound K3 will be located to the west of Clanbrassil Street Lower at St. Patrick's Court.

These Construction Compounds will contain a site office, and welfare facilities for NTA personnel and contractor personnel. Limited car parking will be allowed at the Construction Compounds K1 and K2. 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. The Construction Compounds will be in place for the duration of the Construction Phase of the Proposed Scheme, estimated at approximately 18 months.

The Construction Compounds will be engineered with appropriate services. Water, wastewater, power, and communications connections will be organised by the appointed contractor. At work areas along the Proposed Scheme, where permanent provisions (for the duration of the construction programme) are not practicable, appropriate temporary provisions will be made including the use of generators if required. Temporary welfare facilities will need to be used, for example, portable toilets in the vicinity of works. Wastewater from temporary welfare facilities will be collected and disposed of to a suitably licenced facility.

Following completion of the Construction Phase, the Construction Compounds will be cleared and reinstated to match pre-existing conditions.

Construction Compound K1 will be located in the public car park, located between Sundrive Road and Mount Argus Way, as shown in Image 12.1. The area of Construction Compound K1 is approximately 370m^2.

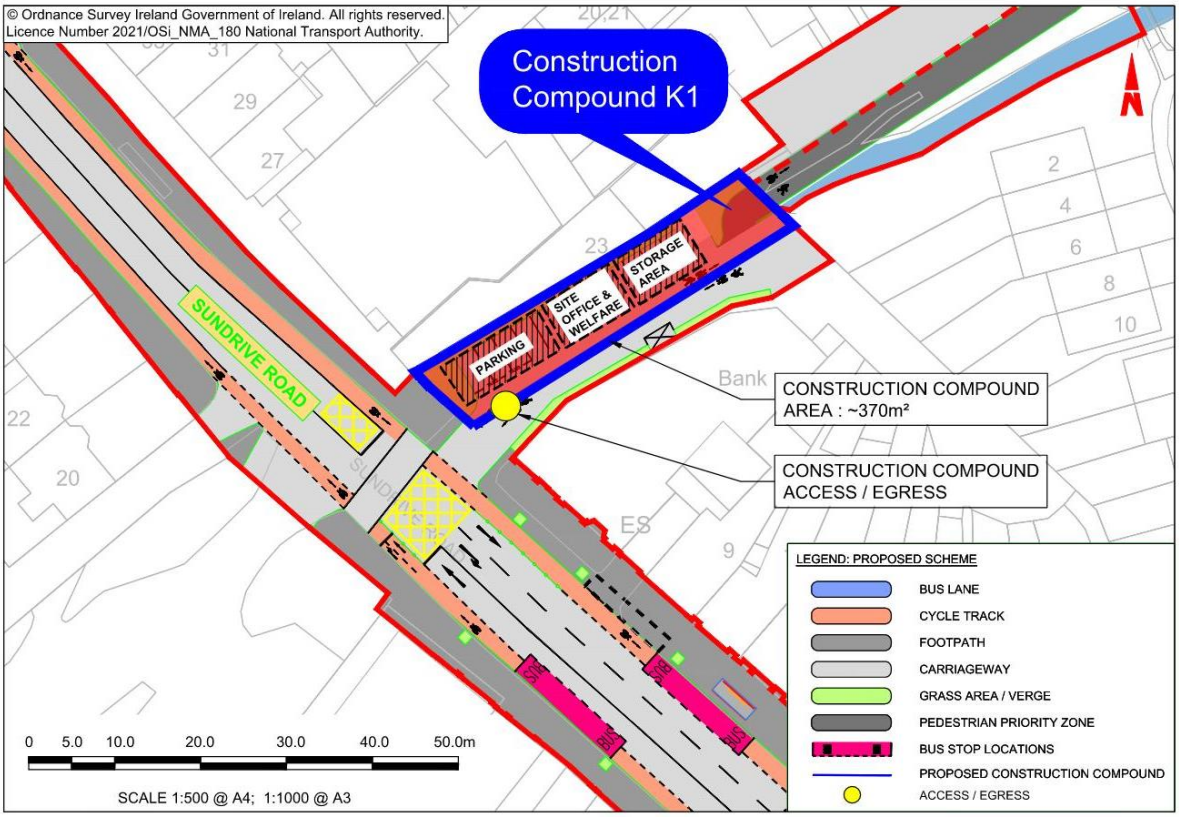

Image 12.1: Location, Extent and Layout of Construction Compound K1

Construction Compound K2 will be located on Harold's Cross Road, in the grounds to Our Lady's Hospice, as shown in Image 12.2. The area of Construction Compound K1 is approximately 680m^2.

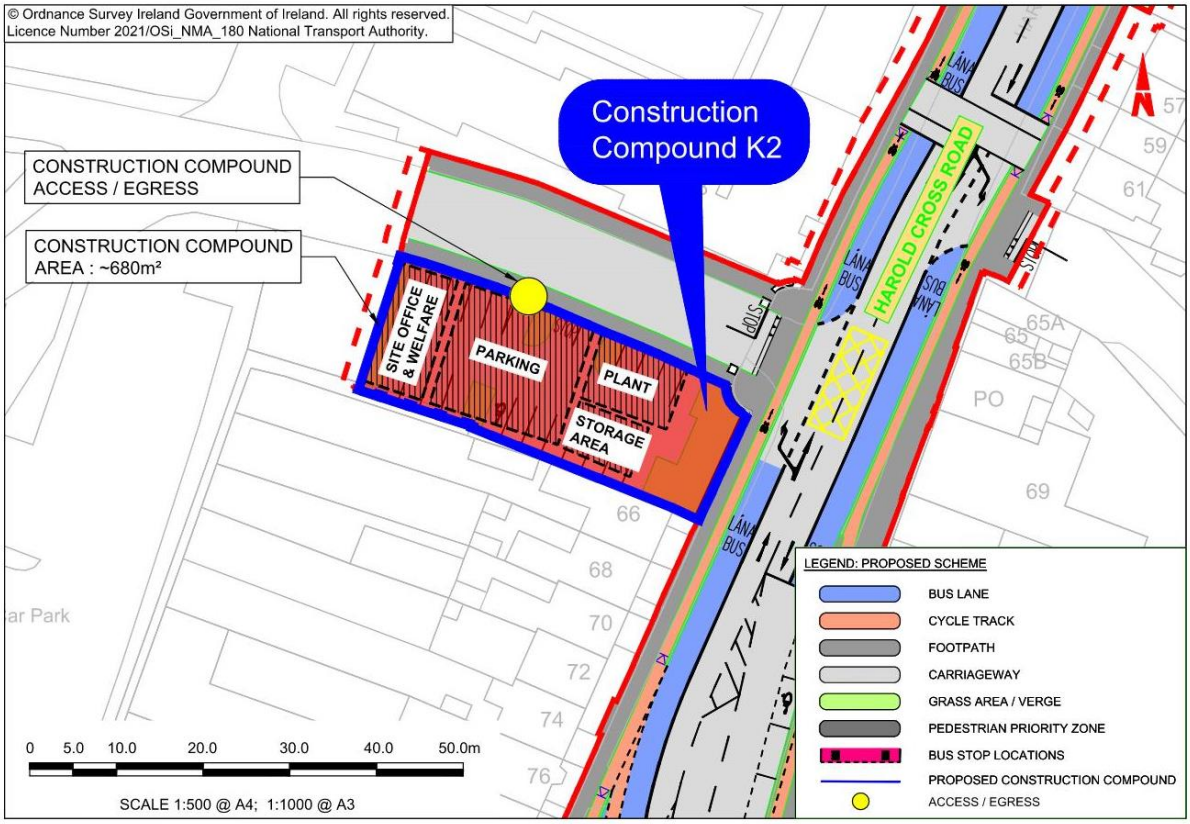

Image 12.2: Location, Extent and Layout of Construction Compound K2

Construction Compound K3 will be located to the west of Clanbrassil Street Lower at St. Patrick's Court, as shown in Image 12.3. The total area of Construction Compound K3 is approximately 170m^2.

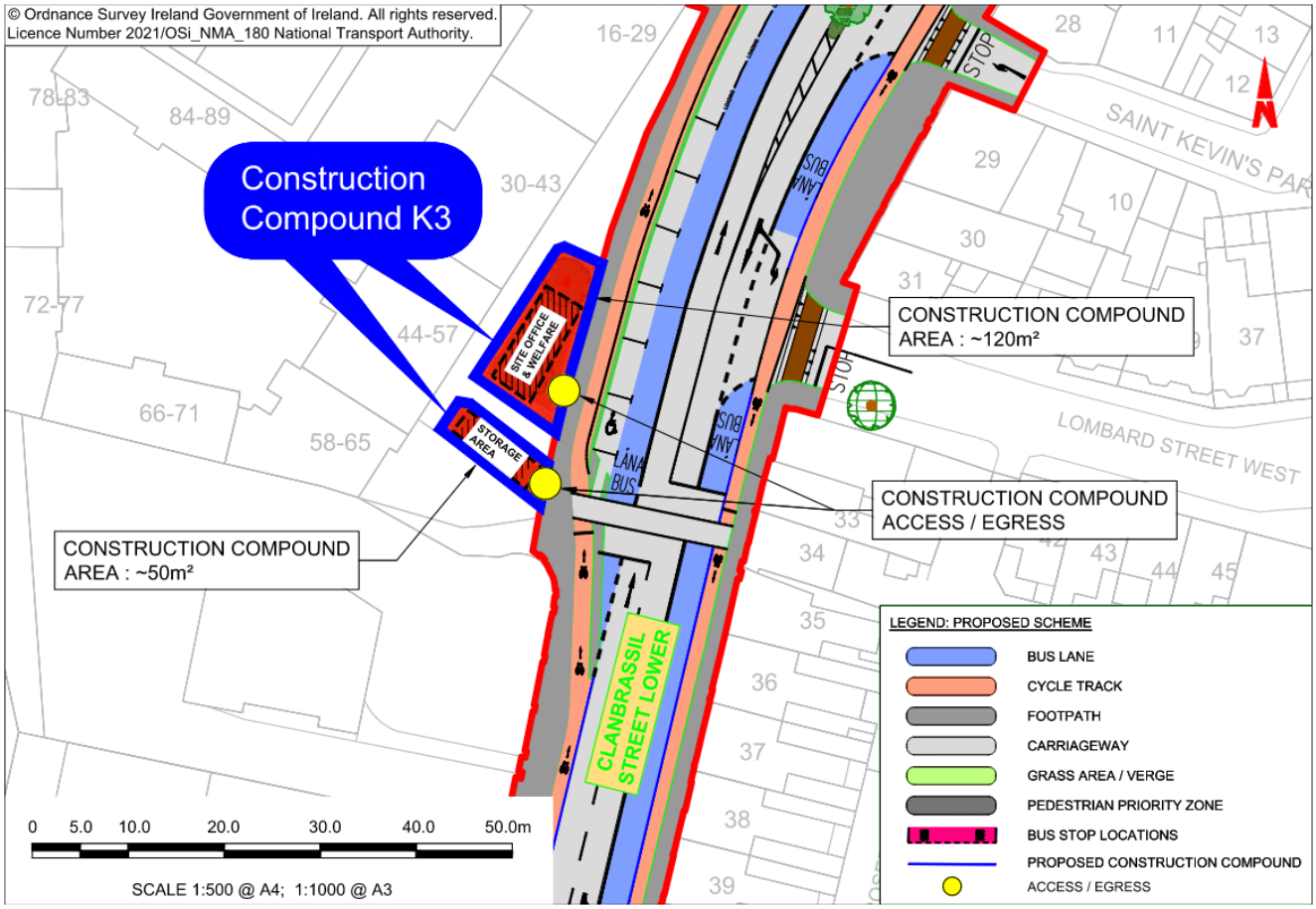

Image 12.3: Location, Extent and Layout of Construction Compound K3

12.4.1.1.6 Estimated Project Duration

The total Construction Phase for the overall Proposed Scheme is estimated at approximately 18 months. However, given the significance of this existing transport corridor, individual works areas are sufficiently independent of one another so that the traffic impact of the construction works will be minimised.

12.4.1.2 Operational Phase

The main characteristics of the Operational Phase of the Proposed Scheme that have potential for ecological impact are:

- The presence and operation (traffic) of the road;
- The presence of additional lighting; and
- Routine maintenance.

12.4.2 'Do Nothing' Scenario

In the 'Do Nothing' scenario, the Proposed Scheme would not be implemented (discussed further in Chapter 6 (Traffic & Transport). Thus, the existing corridors would remain with no immediate significant changes in the terrestrial, aquatic and marine biodiversity (flora and fauna) of the area, as there would be no significant Construction Phase impacts from the Proposed Scheme beyond roadside management of existing habitats. The impact of no construction is neutral upon biodiversity along and adjacent to the Proposed Scheme.

The baseline environment (see Section 12.3) describes the existing land use surrounding the Proposed Scheme. The GDA is highly urbanised with existing trends resulting in added pressure to water resources and habitat losses to ongoing development. As the vast majority of the Proposed Scheme will pass through lands zoned under the Dublin City Development Plan 2022 – 2028 (DCC 2022), with only a small portion (approximately 20m) of the southern extent of the Proposed Scheme passing through lands zoned under the South Dublin County Development Plan 2022 – 2028 (SDCC 2022), the current land use zonings provide the best indication of what the future short to medium-term biodiversity trends might be, as they will influence and direct development in the surrounding area. Lands surrounding the Proposed Scheme are largely zoned for residential, commercial or industrial purposes. Current biodiversity trends are likely to continue in areas zoned for development, adding to pressures on waterbodies and habitat fragmentation. It is also likely that traffic numbers will continue to remain high on a road network with variable drainage control or pollution control measures, which may have effects on biodiversity receptors in the receiving environment. However, any effects on biodiversity are likely to be moderated by the environmental protective policies in the Dublin City Development Plan 2022 – 2028, the South Dublin County Development Plan 2022 – 2028 and overarching pollution control objectives in the River Basin Management Plan (RBMP) (DHPLG 2018).

The interaction between the existing trends, future trends, and other plans or projects with the Proposed Scheme are considered and assessed further in Chapter 21 (Cumulative Impacts & Environmental Interactions).

12.4.3 Construction Phase

12.4.3.1 Designated Areas for Nature Conservation

This Section describes and assesses the potential for the Proposed Scheme to result in likely significant effects on designated areas for nature conservation at SACs, SPAs, NHAs or pNHAs. In the context of European sites this is focused on the habitats and species for which the sites are selected (i.e. QIs for SACs and SCI species for SPAs, and the conservation objectives supporting their conservation status in each site). This assessment is directly related to the assessment methodology for European sites required under the Habitats Directive, which is presented separately in the NIS prepared for the Proposed Scheme (and submitted with the application for approval).

In the case of NHAs and pNHAs the assessment considers whether the integrity of any such site would be affected. For the avoidance of doubt, it should be noted that, if the Proposed Scheme would adversely affect the integrity of a European site, then this would constitute a likely significant effect in the context of the EIA Directive.

12.4.3.1.1 European sites

In the context of assessing whether the Proposed Scheme is likely to result in an impact on the integrity of any European sites, the NIS considers whether the Proposed Scheme will affect the conservation objectives supporting the favourable conservation condition of any European sites' QIs / SCIs, and as a result presents an assessment of whether the integrity of any European sites would be affected, if the Proposed Scheme would adversely affect the integrity of a European site, then this would constitute a likely significant effect in the context of the EIA Directive).

The nature and scale of the Proposed Scheme, the identified potential impacts and their relationship to European sites were considered in order to determine which European sites were located within the ZoI of the Proposed Scheme, in view of best scientific knowledge and in view of conservation objectives, and therefore potentially at risk of the Proposed Scheme affecting their conservation objectives. The potential impacts associated with the Proposed Scheme are discussed below in relation to those European sites within its ZoI (further information can also be found in Section 6 and Section 7 of the NIS which accompanies this planning application).

The ZoI is a distance within which the Proposed Scheme could potentially affect the conservation condition of QI habitats or QI / SCI species of a European site.

The mechanism to define the ZoI is summarised as follows:

- Consider the nature, size and location of the Proposed Scheme;
- Consider the sensitivities of the ecological receptors;

- Identify impact sources and pathways; and
- Determine the ZoI based on the extent of the impact.

Considering the ZoI, in the absence of mitigation measures, the Proposed Scheme was assessed as having the potential to adversely affect the integrity of the following sixteen European sites:

- South Dublin Bay SAC [000210];
- North Dublin Bay SAC [000206];
- Rockabill to Dalkey Island SAC [003000];
- Lambay Island SAC [000204];
- North Bull Island SPA [004006];
- South Dublin Bay and River Tolka Estuary SPA [004024];
- Baldoyle Bay SPA [004016];
- Dalkey Islands SPA [004172];
- Howth Head Coast SPA [004113];
- Malahide Estuary SPA [004025];
- Ireland's Eye SPA [004117];
- Rogerstown Estuary SPA [004015];
- Lambay Island SPA [004069].
- Skerries Islands SPA [004122];
- Rockabill SPA [004014]; and
- The Murrough SPA [0041876].

The locations of these European sites relative to the Proposed Scheme are shown on Figure 12.3 in Volume 3 of this EIAR.

The following potential effects on European sites have been identified based on the existing ecological environment and the extent and characteristics of the Proposed Scheme (see information provided below for detailed description of each potential impact):

- Habitat loss and fragmentation;
- Habitat degradation/effects on QI / SCI species as a result of hydrological impacts;
- Habitat degradation as a result of introducing / spreading non-native invasive species; and
- Disturbance and displacement impacts.

Habitat degradation as a result of hydrogeological impacts and air quality impacts were scoped out from further assessment at the Stage 1 AA Screening stage. The nearest European site with groundwater dependent QI habitats / species is the Rye Water Valley / Carton SAC which is located approximately 13.8km north-west, and upstream of the Proposed Scheme. It is therefore outside the ZoI of hydrogeological impacts. Likewise, all European sites within the vicinity of the Proposed Scheme lie beyond the ZoI for air quality impacts (50m from the Proposed Scheme boundary, and 500m from Construction Compounds, and up to 200m from the Proposed Scheme boundary during the Operational Phase). Therefore, there is no potential for impacts on European sites as a result of effects on hydrogeology and air quality.

12.4.3.1.1.1 Habitat Loss and Fragmentation

The Proposed Scheme does not overlap with any European sites. The nearest European site to the Proposed Scheme is the South Dublin Bay and River Tolka Estuary SPA, which is located approximately 3.6km from the Proposed Scheme. Therefore, there is no potential for direct habitat loss and fragmentation to occur as a result of the Proposed Scheme. Habitat loss may occur indirectly as a consequence of severe habitat degradation arising from a reduction in water quality and / or a change to the hydrological regime, as described in the Section below.

Special Conservation Interest (SCI) species for which SPAs in the vicinity of the Proposed Scheme have been designated are known to utilise *ex-situ* feeding sites in the Dublin area (i.e. South Dublin Bay and River Tolka

Estuary SPA, North Bull Island SPA, Baldoyle Bay SPA, Malahide Estuary SPA, Rogerstown Estuary SPA, Ireland's Eye SPA, Lambay Island SPA, Skerries Islands SPA and the Murrough SPA).

No *ex-situ* wintering bird sites are located within or directly adjacent to the Proposed Scheme boundary. There is one known *ex-situ* wintering bird site within 300m of the Proposed Scheme; Eamonn Ceannt Park (Major Importance) (Benson 2009). Eamonn Ceannt Park is located approximately 60m from the Proposed Scheme boundary along Sundrive Road. However, as there will be no direct habitat loss of any sites suitable to support wintering bird species as a result of the Proposed Scheme, there is no potential for impacts on SCI species associated with SPAs to occur as a result of habitat loss / fragmentation.

With the exception of otter, the location of the Proposed Scheme and its construction will not result in any direct loss or fragmentation of Annex I habitats or supporting habitats to Annex II species, for which European sites are designated for within the ZoI of the Proposed Scheme. In terms of otter, while the Proposed Scheme does cross the River Poddle and the Grand Canal, it does so at existing crossing locations. As such, it will not be subject to any instream works nor significant alteration to the territory currently occupied by otter.

12.4.3.1.1.2 Habitat Degradation / Effects on QI / SCI Species as a result of Hydrological Impacts

The Proposed Scheme has the potential to result in habitat degradation / effect on QI / SCI species as a consequence of hydrological impacts during both the Construction and Operational Phases. The release of contaminated surface water runoff and / or an accidental spillage or pollution event into any surface water features during construction, or operation, has the potential to affect water quality in the receiving aquatic environment, which in turn can affect any species which utilise this aquatic environment. Otter use riparian habitats for foraging and commuting purposed and therefore would be potentially at risk of hydrological impacts. Wicklow Mountains SAC, which is located approximately 8.1km south of the Proposed Scheme, is the closest European site for which otter is the QI species. Typically, otter territories are within the range of 7.5km for females and up to 21km for males (O'Neill *et al*. 2009). The Proposed Scheme only interacts with the following watercourses: River Poddle and the Grand Canal. Whilst these watercourses lie within the typical territorial ranges of otters, none of them share any hydrological connection to the Wicklow Mountains SAC. It is the River Dodder which provides the key hydrological pathway between the Wicklow Mountains SAC and Dublin City. Given the separation which exists between the Wicklow Mountains SAC and the Proposed Scheme, the otter population in the vicinity of the Proposed Scheme is regarded to be distinct to that of the SAC. Therefore, habitat degradation / effects on the QI otter population for Wicklow Mountains SAC, as a result of hydrological impacts by the Proposed Scheme, can be excluded.

However, the Proposed Scheme is hydrologically connected to Dublin Bay via the River Poddle (Poddle_010), , Liffey Estuary Upper and Liffey Estuary Lower, as well as a network of interconnecting and established surface or combined sewer / surface water pipes which discharge via Ringsend WwTP. The release of contaminated surface water runoff and / or an accidental spillage or pollution event into any surface water features during construction, or operation, has the potential to affect water quality in the receiving aquatic environment. Such a potential pollution event may include: the release of sediment into receiving waters and the subsequent increase in mobilised suspended solids; and the accidental spillage and / or leaks of contaminants into receiving waters. This occurrence could happen at any time during construction but could potentially be exacerbated by the removal of vegetation. It should be noted that a highly substantial event / events would be required to generate such quantities, which is not deemed likely.

The construction of the proposed Stone Boat Boardwalk across the River Poddle will involve bored piles into the vegetated bank set back from the River Poddle. The area will be accessed via Sundrive Carpark and Mount Argus View involving a piling rig and a crane for a period of 6 weeks. Widening of the Robert Emmet Bridge over the Grand Canal will involve bored piles into existing made ground set back from the canal. The area will be accessed from Gordons Fuels. In addition, construction at the Grand Canal requires works near an existing high voltage (220kV (kilovolt)) oil-filled underground cable. If damaged during works, oil could enter the Grand Canal. This has the potential to result in significant negative effects on water quality and consequently affect aquatic and wetland habitats in the receiving environment. In a worst-case albeit unlikely scenario, coastal habitats downstream, in Dublin Bay, could also be affected.

In a potential worst case scenario, the release of contaminated surface water runoff and / or an accidental spillage or pollution event into any surface water features during construction, or operation, also has the potential to affect

SCI bird species and QI mammal species that commute, forage and loaf in Dublin Bay i.e. bird species associated with Skerries Islands SPA, Rockabill SPA, Lambay Island SPA, Ireland's Eye SPA, North Bull Island SPA, South Dublin Bay and River Tolka Estuary SPA, Howth Head Coast SPA, Baldoyle Bay SPA, Malahide Estuary SPA, Rogerstown SPA, Dalkey Islands SPA, Murrough SPA and marine mammals associated with Rockabill to Dalkey Island SAC and Lambay Island SAC. This reduction in water quality (either alone or in combination with other pressures on water quality) could result in the degradation of sensitive habitats present downstream, which in turn would negatively affect the SCI bird species that rely upon these habitats as foraging and / or roosting habitat. It could also negatively affect the quantity and quality of prey available to SCI and QI populations. In a worst case scenario these potential impacts could occur to such a degree that the conservation objectives of the Skerries Islands SPA, Rockabill SPA, Lambay Island SPA, Ireland's Eye SPA, North Bull Island SPA, South Dublin Bay and River Tolka Estuary SPA, Howth Head Coast SPA, Baldoyle Bay SPA, Malahide Estuary SPA, Rogerstown SPA, Dalkey Islands SPA, Murrough SPA, Rockabill to Dalkey Island SAC, Lambay Island SAC, North Dublin Bay SAC and South Dublin Bay SAC are undermined.

12.4.3.1.1.3 Habitat Degradation as a Result of Introducing / Spreading Non-Native Invasive Species

No non-native invasive plant species listed on the Third Schedule of the Birds and Habitats Regulations were recorded within, or in close proximity to, the Proposed Scheme. However, records of invasive species in the vicinity of the Proposed Scheme were returned from the desk study. Therefore, there is potential for invasive species to spread or be introduced, during construction, to terrestrial habitat areas in European sites downstream in Dublin Bay (i.e. North Dublin Bay SAC, South Dublin Bay SAC, North Bull Island SPA and South Dublin Bay and River Tolka Estuary SPA). These in turn may result in the degradation of the existing habitats, in particular those habitats not permanently or regularly inundated by seawater, potentially outcompeting other native species and affecting species compositive and physical structure of the habitat. Therefore, it is possible that the spread / introduction of invasive species could undermine the conservation objectives of these European sites.

It is not considered possible that the invasive species listed above could spread to European sites that are located a considerable distance from the outfall locations of the River Poddle, Grand Canal, Liffey Estuary Upper or Liffey Estuary Lower and separated by a large marine waterbody (i.e. Howth Head SAC, Howth Head Coast SPA, Rockabill to Dalkey Island SAC and Dalkey Islands SPA).

As the Proposed Scheme has the potential to result in habitat degradation of the QI / SCI species of European sites as the result of the spread of invasive species, there is the potential for in combination effects to occur in association with other activities / plans / projects.

12.4.3.1.1.4 Disturbance and Displacement Impacts

There are no European sites within the immediate footprint of the Proposed Scheme or within the disturbance ZoI. There are a number of QI species known to occur within the vicinity of the Proposed Scheme. Refer to Section 12.4.3.4and Section 12.4.3.8 for more details with regards to potential construction impacts on QI mammals.

There are a number of SPAs located in relatively close proximity to the Proposed Scheme, which are designated for SCI species that are known to forage and / or roost at inland sites, such as amenity grassland playing pitches (i.e. Malahide Estuary SPA, Baldoyle Bay SPA, Rogerstown Estuary SPA, North Bull Island SPA, South Dublin Bay and River Tolka SPA, Skerries Islands SPA, Ireland's Eye SPA, Lambay Island SPA and The Murrough SPA). These species include light-bellied brent goose, black-tailed godwit, lapwing, curlew, oystercatcher, blacked-headed gull, lesser black-backed gull and herring gull. Suitable inland foraging / roosting sites, which these bird species utilise, are located within the potential ZoI of the Proposed Scheme.

No *ex-situ* wintering bird sites are located within the Proposed Scheme boundary. There is one known *ex-situ* wintering bird site within 300m of the Proposed Scheme; namely Eamonn Ceannt Park (Major Importance) (Benson 2009).

Eamonn Ceannt Park is located approximately 60m from the Proposed Scheme boundary along Sundrive Road. As records of SCI bird species associated with the above listed SPAs have been returned from the desk study in the vicinity of the Proposed Scheme (i.e. light-bellied Brent goose and black-headed gull), it is possible that SCI bird species associated with these SPAs currently utilise these and other suitable lands in the wider area. However, no significant effects will occur on any SCI bird species population of North Bull Island SPA, in light of

their conservation objectives, as a consequence of the disturbance and / or displacement from inland feeding / roosting sites due to increased levels of disturbance due to the following reasons:

- The availability of large areas of suitable foraging and / or roosting habitat for these SCI bird species in the wider locality of the Proposed Scheme, including those in closer proximity to nearby SPAs. These include other similar public amenity grassland parks and sports pitches such as Synge GAA pitches, Tymon Park, Pearse Memorial Park and Lorcan O'Toole Park; and
- Impacts associated with increased levels of noise disturbance are unlikely to result in the displacement of these SCI species from Eamonn Ceannt Park, given the minor works proposed in proximity to the site (retention of existing surfaces and tie in of cycleways), the existing busy Sundrive Road (already producing similar noise levels, to which a level of habituation is to be expected) and the existing screening present (in the form of existing 2-storey residential houses and gardens along Sundrive Road and mature treelines within the Park itself) between the Proposed Scheme and the viable *ex-situ* feeding areas (playing pitches) within Eamonn Ceannt Park. The Proposed works along Sundrive Road are minimal with retention of existing surfaces and tie in with cycles lanes proposed in this section (see Landscape General Arrangement Drawings (BCIDD-ROT-ENV_LA-0011_ML_OO-DR-LL-9001) in Volume 3 of this EIAR).

Therefore, given the minor works proposed, the existing nature of the busy Sundrive Road and the existing screening present, it is considered that there is no potential for the Proposed Scheme to result in disturbance / displacement impacts on SCI populations associated with European sites.

12.4.3.1.2 Natural Heritage Areas and Proposed Natural Heritage Areas

In the case of NHAs and pNHAs the assessment considers whether the integrity of any such site would be affected by the Proposed Scheme with reference to the ecological features for which the site is designated or is proposed for designation.

Considering the ZoI of the Proposed Scheme, in the absence of mitigation measures the Proposed Scheme has the potential to have a likely significant effect upon the following one NHA and fifteen pNHAs:

- Skerries Islands NHA [000204];
- Grand Canal pNHA [002104];
- North Dublin Bay pNHA [000206];
- South Dublin Bay pNHA [000210];
- Dolphins, Dublin Docks pNHA [000201];
- Booterstown Marsh pNHA [001205];
- Howth Head pNHA [000202];
- Baldoyle Bay pNHA [000199];
- Malahide Estuary pNHA [000205];
- Dalkey Coastal Zone and Killiney Hill pNHA [001206];
- Rogerstown pNHA [000208];
- Portraine Shore pNHA [001215];
- Ireland's Eye pNHA [000203];
- Lambay Island pNHA [000204];
- Rockabill pNHA [000207]; and
- The Murrough Wetlands pNHA.

The locations of these designated areas for nature conservation relative to the Proposed Scheme are shown on Figure 12.4 in Volume 3 of the EIAR.

The potential effects on European sites arising from the Proposed Scheme, described above in Section 12.4.3.1.1, may also negatively affect the NHA and pNHA sites located within the boundaries of these European sites. These pNHAs are primarily designated for similar reasons. The Proposed Scheme also has the potential to affect biodiversity in a broader sense than just the QIs / SCIs of those European sites. Where biodiversity receptors in these NHAs and pNHAs do not form part of the QIs / SCIs in the NIS assessment, they are considered under the

other individual impact assessment headings for each KER below. Potential impacts arising from the Proposed Scheme on these pNHA sites would result in a likely significant negative effect at a national geographic scale.

The assessment of potential impacts arising from the Proposed Scheme on the Grand Canal pNHA, include habitat loss and fragmentation, habitat degradation as a result of surface water quality effects, habitat degradation as a result of air quality effects and the spread of non-native invasive species (see Section 12.4.3.2), effects on rare and protected plant species (see Section 12.4.3.3 below), and negative effects on the protected fauna species associated with these sites such as mammals, riparian birds, and fish species (see Section 12.4.3.4, Section 12.4.3.5and Section 12.4.3.8).

12.4.3.1.2.1 Grand Canal pNHA

12.4.3.1.2.1.0 Habitat Loss and Fragmentation

The habitat type canals (FW3), which the Proposed Scheme will cross at Robert Emmet Bridge in Harold's Cross, is considered to be of National Importance, given its designation as a pNHA (Grand Canal pNHA). The total length of this habitat type which overlaps with the Proposed Scheme is approximately 121m^2. Although the GIS mapping analysis indicates a small amount of habitat loss (See Table 12.11), there are no in-stream works proposed and as such the habitat loss is related to bankside habitats largely man-made or managed, which would not alter functioning or extent of the Grand Canal pNHA. The Proposed Scheme will not result in any permanent or temporary habitat loss or fragmentation effects on this habitat type and Grand Canal pNHA, therefore no significant effects, in that regard, are predicted.

12.4.3.1.2.1.1 Habitat Degradation – Surface Water Quality

During the construction of the proposed offline cycle / pedestrian bridges on each side of the existing Robert Emmet Bridge, suspended solids arising from the release of sub-surface sediment during works here have the potential to enter the Grand Canal pNHA and travel downstream, potentially into the Liffey Estuary Upper / Lower. Cement-based products used in the Construction Phase of the Proposed Scheme (e.g., concrete and / or bentonite which are highly corrosive and alkaline materials), if released into the Grand Canal pNHA or Liffey Estuary Upper / Lower may cause surface water degradation and damage to aquatic habitats.

In addition, construction adjacent to the at the Grand Canal (at Robert Emmet Bridge) will require works near an oil-filled underground high voltage (220kV (kilovolt)) Electricity Supply Board (ESB) cable. If damaged during works, oil would enter the Grand Canal. This has the potential to result in significant negative effects on water quality and consequently affect aquatic and wetland habitats in the receiving environment. In a worst-case scenario, coastal habitats downstream, in Dublin Bay, could also be affected.

Habitat degradation as a consequence of construction effects on surface water quality has the potential to affect the conservation status of the following habitats; Canal (FW3) (Grand Canal pNHA) or downstream habitats outside of the Proposed Scheme boundary including tidal rivers (CW2) / Annex I habitat Estuaries [1130] habitat (Liffey Estuary Upper / Lower) and therefore, has the potential to result in a significant negative impact at an International scale in the case of the aquatic / wetland Annex I habitats located downstream of the Proposed Scheme in Dublin Bay. Habitat degradation as a consequence of construction effects on surface water quality of the Grand Canal are expected to be significant at the National level, depending on the magnitude of the impact and considering the status of the Grand Canal as a pNHA and the connectivity it provides to downstream waterbodies.

Consequently, detailed mitigation measures are required to further minimise the risk of contaminated surface water runoff and / or an accidental spillage or pollution events having any perceptible effect on water quality during construction of the Proposed Scheme.

12.4.3.1.2.1.2 Habitat Degradation - Groundwater

It has been concluded by the hydrogeological specialist that the Grand Canal pNHA is protected from groundwater ingress or leakage by a liner and therefore not considered to be in hydraulic connectivity with the surrounding

groundwater. As such, the Grand Canal is not considered a groundwater dependent habitat and is not considered further as part of this assessment, see Chapter 14 (Land, Soils, Geology & Hydrogeology) of this EIAR).

12.4.3.1.2.1.3 Habitat Degradation – Air Quality

Dust Emissions

Dust emissions associated with construction works could, in extreme circumstances, affect adjoining habitats, potentially burying sensitive habitats or plant species. The proposed demolition of an existing residential property at Gordons Fuels will be located approximately 16m from the Grand Canal pNHA, and therefore has the potential to result in significant negative effects to the pNHA site. Best practice construction methodologies and mitigation measures have been designed to minimise construction generated dust and to contain it within the Proposed Scheme boundary. Mitigation measures in respect of managing construction dust are provided in Section 7.5.1 of Chapter 7 (Air Quality).

Vehicle Derived Emissions

During the Construction Phase of the Proposed Scheme, emissions from car exhausts, and the deposition of particulate matter (PM) and heavy metals produced by engine, brake and tyre wear of construction vehicles, can contribute to increased deposition of pollutants such as oxides of nitrogen (NO_x, NO_2) and PM in the vicinity of a road carriageway. This can affect the ecosystems and vegetation present, influencing plant growth rates and species composition, diversity, and abundance.

The current understanding of air quality impacts from roads and their interaction / effects on ecology are set out in the TII guidance document Guidelines for the Treatment of Air Quality During the Planning and Construction of National Road Schemes (NRA 2011) and three UK reports: The Ecological Effects of Diffuse Air Pollution from Road Transport (Bignal *et al.* 2004), The Ecological Effects of Air Pollution from Road Transport: An Updated Review (Natural England 2016), and Advice on Ecological Assessment of Air Quality Impacts (CIEEM 2021).

An assessment of the impact of the Proposed Scheme has been undertaken using the approach outlined in the IAQM guidance document A Guide to the Assessment of Air Quality Impacts on Designated Nature Conservation Sites (Version 1.1) (IAQM 2020). Vehicle-derived air emissions were modelled for the Construction Phase along the Proposed Scheme at the Grand Canal pNHA (Robert Emmet Bridge) (refer to Section 7.4.3.2.4 of Chapter 7 (Air Quality) for details). The worst-case predicted annual average NO_x concentrations at various distances from the Proposed Scheme exceed the 30 µg/m^3 (micrograms per metre cubed) limit value. In all cases where exceedances occur, the baseline environment is already in excess of this value. During the construction year of the Proposed Scheme, annual mean NO_x concentrations are predicted to decrease significantly at the Grand Canal pNHA (Robert Emmet Bridge, western side) (84.7µg/m^3 to 79.6µg/m^3) and at the Grand Canal pNHA (Robert Emmet Bridge, eastern side) (100.3µg/m^3 to 93.6µg/m^3), representing a percentage change (decrease) of the critical level of 17% and 22%, respectively. Therefore, harmful effects on vegetation within the Grand Canal pNHA from NO_x concentrations are not likely and mitigation is therefore not required.

The contribution of the Construction Phase of the Proposed Scheme to the NO_2 dry deposition rate was modelled at the Grand Canal pNHA (Robert Emmet Bridge, western side and Robert Emmet Bridge, eastern side). Nitrogen deposition levels have been compared to the lower and higher critical loads for habitats associated with the Grand Canal pNHA. These include canals (FW3), amenity grassland (GA2) and treelines (WL2). The Grand Canal pNHA western side is below the lower critical load of inland and surface water habitats of 5 to 10 kg(N)/ha/yr (NRA 2011), at 4.7kg(N)/ha/yr, while the Grand Canal pNHA eastern side is within the lower critical load of inland and surface water habitats of 5 to 10kg(N)/ha/yr, at 5.3kg(N)/ha/yr. There is a small change (decrease) in the NO_2 dry deposition rate at the Grand Canal pNHA site as a result of the Construction Phase of the Proposed Scheme. The rate decreases to 4.4kg(N)/ha/yr at the Grand Canal pNHA, western side and decreases to 5kg(N)/ha/yr at the Grand Canal pNHA, eastern side, as a result of construction. Therefore, harmful effects on vegetation within the Grand Canal pNHA from NO^2 are not likely, nor will there be any reduction in habitat area of the pNHA habitats, and mitigation is therefore not required.

The Proposed Scheme is located within a highly urbanised locality with significant development in the surrounding area. It is likely that barrier effects may therefore limit the geographical extent of deposition. Tong *et al*. (2016) identified the effectiveness of vegetative barriers as reducers of airborne Particulate Matter. They found that the

most effective combination to reduce the pollutant escape is wide barriers with high leaf area density combined with solid barriers. The Proposed Scheme is unlikely to significantly change from existing urban environment in terms of the annual mean particulate matter (PM_{10} and $PM_{2.5}$) concentrations at all modelled receptors (refer to Section 7.4.3.2 Chapter 7 (Air Quality) for details, therefore, impacts on vegetation within the pNHA from particulate metals or heavy metals are not likely.

12.4.3.1.2.1.4 Habitat Degradation – Non-Native Invasive Species

No non-native invasive plant species listed on the Third Schedule of the Birds and Habitats Regulations were recorded within, or in close proximity to, the Proposed Scheme. However, the desk study revealed several records for the recently delisted Canadian waterweed along the Grand Canal pNHA at Robert Emmet Bridge. In addition, three-cornered garlic is known to occur along the River Poddle at Blarney Park, Spanish bluebell *Hyacinthoides hispanica* in Eamonn Ceannt Park and records for Japanese knotweed also exist from the grounds of a private residence on Mount Tallant Avenue.

As the Proposed Scheme has the potential to result in habitat degradation in downstream pNHA sites as the result of the spread of invasive species, there is the potential for in-combination effects to occur in association with other activities / plans / projects.

Mitigation measures have been designed to avoid this potential impact (see Section 12.5.1.2.5).

12.4.3.2 Habitats

This Section assesses the potential effects of the Proposed Scheme on habitats. In terms of quantifying the magnitude of effects on habitats, the estimated percentage of the local habitat resource being affected is based upon the total area of a given habitat type that was recorded within the study area of the Proposed Scheme. This provides some local context as to the magnitude of the habitat loss and whether the impact is significant or not, and at what geographic scale.

12.4.3.2.1 Habitat Loss and Fragmentation

The construction of the Proposed Scheme will result in habitat loss across its length. This occurs in the form of permanent land take of edge habitats adjacent to the existing road network, or as temporary land take to facilitate construction activities.

The habitat type canal (FW3) is dealt with above under Section 12.4.3.1.2.1.0.

The habitat type depositing / lowland rivers (FW2) may also be affected by the Proposed Scheme and is considered to be of Local Importance (Higher Value). The River Poddle occurs within the Proposed Scheme route, running through Kimmage and Harold's Cross as it makes it way to its discharge point into the River Liffey at Wellington Quay. It is culverted in several places but appears above ground in Poddle Park and Mount Argus Park. The construction of the proposed Stone Boat Boardwalk along the River Poddle at Mount Argus View will involve bored piles into the vegetated bank set back from the River Poddle. The boardwalk will be elevated above the river level. It will be supported by a small number of piers that will be underpinned by a single bored pile in each case. The 300mm diameter piles will be inserted into the riverbank from a piling rig. The area will be accessed via Sundrive Road car park and Mount Argus View involving a piling rig and a crane for a period of approximately 2 to 4 weeks. The Proposed Scheme will not result in any permanent loss of this habitat type. Therefore, there is no potential for significant effects at any geographic scale.

The overall total area of the Local Importance (Higher Value) habitat types which overlap with the Proposed Scheme boundary is approximately 0.102m^2 on a temporary basis and 249m^2 on a permanent basis. These include treelines (WL2), depositing / lowland rivers (FW2), Canals (FW3) and scattered trees and parkland (WD5) and are listed in Table 12.11. The GIS mapping reveals a very small loss of lowland rivers (FW2), although there are no in-stream works involved.

A number of habitat types considered to be of Local Importance (Higher Value) will be lost as a result of the Proposed Scheme. These include individual trees and relatively small areas of treeline (WL2) as well as Grass

and Parkland (WD5) habitat. The overall total area of the Local Importance (Higher Value) habitat types which overlap with the Proposed Scheme boundary and will potentially be lost as a direct impact during construction of the Proposed Scheme is approximately 17 no. trees. Of which only individual trees and relatively small areas of treeline (WL2) habitat will be directly lost as part of the Proposed Scheme, as well as approximately 0.02ha of Scattered Tree and Parkland (WD5) habitat. The permanent or temporary loss of habitat types considered to be of Local Importance (Higher Value) has the potential to affect the conservation status of each of these habitat types, and although low numbers of trees /small area of habitat to be removed is considered unlikely to affect their conservation status in the sider urban landscape, nonetheless will result in a negative , significant impact at the local geographic scale.

The remaining areas within the footprint of the Proposed Scheme comprise of habitats considered to be of a Local Importance (Lower Value). These include improved amenity grasslands (GA2), residential areas, planted flowers beds (BC4), ornamental / non-native shrub (WS3), areas of disturbed ground (ED2), scrub (WS1), stonewalls (BL1) and hard standing (BL3). The overall total area of these habitat types which overlaps with the Proposed Scheme boundary and will potentially be lost as a direct impact during construction of the Proposed Scheme is approximately 0.21ha on a temporary basis and approximately 11.18ha on a permanent basis.

The various KER habitat types affected and corresponding total areas which overlap with the Proposed Scheme boundary are summarised in Table 12.11. These calculations include all KER habitat areas within the Proposed Scheme boundary, as the possibility of areas outside of the footprint of the Proposed Scheme itself, but within the Proposed Scheme boundary, being affected by construction activities cannot be ruled out. KERs highlighted in blue will be subject to direct habitat loss as a result of the Proposed Scheme.

Habitat loss may also lead to habitat fragmentation (i.e. creating new divisions of existing habitat blocks and / or contributing to an existing trend of fragmenting semi-natural habitat blocks). However, considering the habitat types to be lost, their extents and the surrounding habitats beyond the Proposed Scheme boundary, the potential impact will not result in a significant effect at any local geographic scale.

The mitigation measures that have been designed to avoid or reduce the effects of direct impacts to habitats are in Section 12.5.1.2.1.

Table 12.11: Extent of KER Habitat Types Within the Proposed Scheme

Habitat Type	Extent of Permanent Habitat Loss	Extent of Temporary Habitat Loss
National Importance		
Canals (FW3)	0.019	0.01ha
Local Importance (Higher Value)		
Depositing / Lowland Rivers (FW2)	0.018	no habitat loss (of instream habitat)
Mixed Broadleaved Woodland (WD1)	no habitat loss	no habitat loss
Scattered trees and parkland (WD5)	0.02	no habitat loss
Treelines (WL2)	17 no. trees	N/A

KERs highlighted in blue will be subject to direct habitat loss as a result of the Proposed Scheme

12.4.3.2.2 Habitat Degradation – Surface Water Quality

During construction, possible contaminated surface water runoff and / or an accidental spillage or pollution event into any surface water feature has the potential to have significant negative effects on water quality and consequently affect aquatic and wetland habitats in the receiving environment. The effects of frequent and / or prolonged pollution events have the potential to be extensive and far-reaching and could potentially have significant long-term effects. In a worst-case scenario, the downstream habitats of Dublin Bay could also be affected.

It is unlikely that a pollution event of such a magnitude would occur during construction, or in the unlikely event it did occur, it would be temporary in nature. Nevertheless, a precautionary approach has been adopted in the assessment of potential risk of impacts on water quality. Consequently, detailed mitigation measures are required

to further minimise the risk of contaminated surface water runoff and / or an accidental spillage or pollution event of the Proposed Scheme having any perceptible effect on water quality during construction.

Construction works in close proximity to the River Poddle or existing surface water drainage infrastructure, could possibly result in generated silt / sediment being released into this surface water feature and potentially being transferred downstream, potentially, into the Liffey Estuary Upper / Lower and the coastal waters of Dublin Bay. Cement-based products used in the Construction Phase of the Proposed Scheme (e.g. concrete and / or bentonite which are highly corrosive and alkaline materials), if released into the surface water network, may cause surface water degradation and damage to aquatic fauna. This has the potential to result in significant negative effects on water quality and consequently affect aquatic and wetland habitats in the receiving environment. In a worst-case scenario, coastal habitats downstream in Dublin Bay could also be affected.

The construction of the proposed Stone Boat Boardwalk along the River Poddle will involve bored piles into the vegetated bank set back from the River Poddle. The area will be accessed via Sundrive car park and Mount Argus View involving a piling rig and a crane for a period estimated to be two weeks. Provision of pedestrian bridges either side of the Robert Emmet Bridge over the Grand Canal will involve bored piles into existing made ground / canal banks, set back from the canal. The drilling / piling activity is estimated to be completed over a period of approximately 2 to 4 weeks. During the construction of the proposed Stone Boat Boardwalk at Mount Argus View and the proposed offline cycle / pedestrian bridges on each side of the existing Robert Emmet Bridge, suspended solids arising from the release of sub-surface sediment during works here have the potential to enter either the River Poddle (in the case of the Stone Boat Boardwalk) or Grand Canal pNHA (in the case of the offline cycle / pedestrian bridges) and travel downstream, potentially, into the Liffey Estuary Upper / Lower. Cement-based products used in the Construction Phase of the Proposed Scheme (e.g. concrete and / or bentonite which are highly corrosive and alkaline materials), if released into the River Poddle, Grand Canal pNHA or Liffey Estuary Upper / Lower may cause surface water degradation and damage to aquatic habitats.

In addition, construction adjacent to the at the Grand Canal (at Robert Emmet Bridge) will require works near an oil-filled underground high voltage (220kV) ESB cable. If damaged during works, oil would enter the Grand Canal. This has the potential to result in significant negative effects on water quality and consequently affect aquatic and wetland habitats in the receiving environment. In a worst-case scenario, coastal habitats downstream, in Dublin Bay, could also be affected.

Construction Compound K1 will be located at the Sundrive Road car park and will drain to the River Poddle. The River Poddle is culverted under this car park and emerges immediately into Mount Argus View north-east of the car park. Surface water drains in this area drain to the Poddle_010 and so there is the potential for impacts on water quality via contaminated surface water runoff and / or an accidental spillage or pollution event. No materials or aggregate crushing will occur at Construction Compound K1, but it will house a small set of welfare facilities which will be contained within a mobile trailer or similar. No discharges to any drains will occur here. As a result, no impacts at any geographical level are predicted to occur.

Habitat degradation as a consequence of construction effects on surface water quality has the potential to affect the conservation status of the following habitats; Canal (FW3) (Grand Canal pNHA), and tidal rivers (CW2) / Annex I habitat Estuaries [1130] habitat (Liffey Estuary Upper / Lower). Similarly, Annex I habitats contained in European sites in and around Dublin Bay could also be affected and therefore, the effects on surface water quality have the potential to result in a significant negative impact at a National scale, in the case of the aquatic / wetland Annex I habitats located within the ZoI of the Proposed Scheme. Habitat degradation as a consequence of construction effects on surface water quality of the River Poddle are likely to be significant at the Local level, while impacts on the water quality of the Grand Canal are expected to be significant at the local to National level, depending on the magnitude of the impact and considering the status of the Grand Canal as a pNHA and the connectivity it provides to downstream waterbodies.

The mitigation measures that have been designed to avoid or reduce the potential impacts of the Proposed Scheme on surface water quality are presented in Section 12.5.1.2.2.

12.4.3.2.3 Habitat Degradation – Hydrological Regime

During Construction Phase, the potential for temporary disruption to local drainage systems and hydrological regimes have been assessed in relation to the Proposed Scheme. This is not predicted to result in a likely

significant negative effect on any aquatic habitats or species through effects on the hydrological regime (for more detail refer to Chapter 13 (Water)). In addition, and as detailed in the Construction and Environmental Management Plan (CEMP) for the Proposed Scheme (Appendix A5.1 in Volume 4 of this EIAR), specific controls / mitigation measures have been identified for implementation to manage runoff and minimise pollution to receiving waterbodies during the Construction Phase.

12.4.3.2.4 Habitat Degradation – Groundwater

Any effects on the existing hydrogeological baseline supporting wetland habitats, has the potential to negatively affect habitat extent and distribution, and vegetation structure and composition. The potential effects upon the existing hydrogeological regime are not necessarily limited to habitats within the Proposed Scheme boundary but can be far-reaching, with significant negative long-term effects. As discussed in Chapter 14 (Land, Soils, Geology & Hydrogeology), the Proposed Scheme may involve the excavation of potentially contaminated ground, result in damage to the aquifer, or change the existing groundwater regime.

Groundwater dependent habitats were not identified in close proximity to the Proposed Scheme, therefore any potential impacts as a result of the Proposed Scheme arise with the interaction between groundwater and surface water.

In addition, it is predicted that while there may be no direct impact on the groundwater regime, there is potential for indirect impacts associated with the Proposed Scheme through surface water interaction (e.g. pumping). Given that pumping (if any) is expected to be limited and localised and temporary, the magnitude of this impact is considered negligible.

As detailed in the Construction Environmental Management Plan (CEMP) for the Proposed Scheme (Appendix A5.1 in Volume 4 of the EIAR), specific controls / mitigation measures have been prepared, (i.e. an SWMP including pollution control measures which will be put in place to manage runoff and minimise pollution to receiving water bodies during the Construction Phase.

12.4.3.2.5 Habitat Degradation – Air Quality

As discussed in Chapter 7 (Air Quality), the Proposed Scheme has the potential to generate dust during construction works which could affect vegetation in habitat areas adjacent to the Proposed Scheme. The proposed demolition of an existing residential property at Gordons Fuels will be located approximately 16m from the Grand Canal pNHA, and therefore has the potential to result in significant negative effects to the pNHA site.

The mitigation measures to control dust emissions during the Construction Phase are provided in Section 12.5.1.2.4 and outlined in Chapter 7 (Air Quality) and Appendix A5.1 – CEMP in Volume 4 of this EIAR. These include standard measures to control nuisance dust such as inspection and cleaning of public roads, measures for stockpiling of materials within Construction Compounds, water misting / spraying, vehicle coverings, and hoarding around the Construction Compound.

Air quality modelling of NO_x concentrations, and deposition rates, were modelled for the Construction Phase of the Proposed Scheme at distances up to 200m from the proposed road development (refer to Chapter 7 (Air Quality) for details). The results from the Air Quality modelling deem the ecological impacts of the Proposed Scheme, with regards air quality, to be overall negative, slight and Short-Term. As such harmful effects on vegetation from these emissions are not likely.

12.4.3.2.6 Habitat Degradation – Non-Native Invasive Plant Species

Planting, dispersing, or allowing / causing the dispersal, spread or growth of certain non-native plant species (and or vector material such as soil that is contaminated with these non-native plant species) is controlled under regulation 49 of the Birds and Habitats Regulations), and refers to plant or animal species listed on the Third Schedule of those regulations (see also Section 12.3.7).

The accidental spread of such non-native invasive plant species as a result of construction works has the potential to impact on terrestrial and aquatic habitats, potentially affecting plant species composition, diversity and abundance over the long-term. This is not only confined to habitats within and immediately adjacent to the footprint

of the Proposed Scheme but includes habitat areas located along the network of proposed haul routes associated with the Proposed Scheme (refer to Figure 12.5 in Volume 3 of this EIAR).

The effects of introducing such non-native invasive plant species to highly sensitive and ecologically important habitat areas (e.g. areas designated for nature conservation or areas supporting Annex I habitat) have the potential to result in a likely significant negative effect, at geographic scales ranging from local to international. No non-native invasive plant species listed on the Third Schedule of the Birds and Natural Habitats Regulations were identified during field surveys undertaken along the Proposed Scheme. However, the desk study revealed several records for Canadian waterweed along the Grand Canal at Robert Emmet Bridge. In addition, three-cornered garlic is known to occur along the River Poddle at Blarney Park and records for Japanese knotweed also exist from the grounds of a private residence on Mount Tallant Avenue.

During the interim between the original invasive species surveys and commencement of construction, it is possible that newly established Third Schedule non-native invasive species may become established within the footprint of the Proposed Scheme, including in particular the Grand Canal and River Poddle.

Mitigation measures have been designed to avoid this potential impact (see Section 12.5.1.2.5).

12.4.3.3 Rare and Protected Plant Species

12.4.3.3.1 Habitat Loss

No protected plant species listed on the Flora Protection Order were recorded within or in close proximity to the Proposed Scheme. The desk study revealed historical records for opposite-leaved pondweed within the Grand Canal, which is in the wider vicinity of the Proposed Scheme.

This species may lie dormant in sediments for many years until conditions become suitable for its regrowth. Therefore, there is potential for establishment in the footprint of the Proposed Scheme. There will be no in-stream works required to facilitate the addition of cycle / pedestrians bridges on either side of Robert Emmet Bridge and as such, there is no potential for direct habitat loss and no potential for direct impacts on this species to occur as a consequence of the Proposed Scheme.

12.4.3.3.2 Habitat Degradation – Surface Water Quality

No protected plant species listed on the Flora Protection Order were recorded within the Proposed Scheme during field surveys. However, the desk study returned records of opposite-leaved pondweed from the Grand Canal.

Opposite-leaved pondweed may lie dormant in sediments for many years until conditions become suitable for its regrowth. The Construction of the Proposed Scheme, in the absence of mitigation, has the potential to result in impacts on the surface water quality of the Grand Canal, through contamination with construction related runoff or accidental spillages (e.g. runoff of sediment / accidental spillages of harmful substances such as hydrocarbons / cementitious materials etc). Impacts on the quality of surface water within the Grand Canal could affect the possible establishment of populations of opposite-leaved pondweed present in the vicinity of the Proposed Scheme.

In the absence of mitigation, habitat degradation of the Grand Canal as a consequence of Construction Phase impacts on surface water, and the potential knock-on impacts this could have on the protected species opposite-leaved pondweed, is likely to be significant at the Local to National Level, given its potential downstream distribution.

12.4.3.4 Mammals

12.4.3.4.1 Bats

12.4.3.4.1.1 Roost Loss

There are no confirmed bat roosts located within the footprint of the Proposed Scheme. A single tree CBC0011PRF001 – bird cherry *Prunus avium*, located within the roadside boundary of green space at the front

of Our Lady's Hospice in Harold's Cross, was identified having PRFs during the multidisciplinary surveys within the footprint of the Proposed Scheme (see Figure 12.6.2 in Volume 3 of this EIAR). It is proposed to use this land as Construction Compound K2 for the duration of the works. However, it should be noted that the Proposed Scheme will not result in direct impacts to this tree. The Proposed Scheme will not result in the loss of trees with PRFs. Therefore, there is no potential for impacts on bat roosts, as a result of the construction of the Proposed Scheme.

12.4.3.4.1.2 Habitat Loss as a Result of Fragmentation of Foraging / Commuting Habitat and Commuting Routes

Bats rely on suitable semi-natural habitats which support the insect prey upon which they feed. The Proposed Scheme will result in the loss of such habitats used for foraging by all bat species recorded in the study area.

Suitable habitat for foraging and / commuting bats within the footprint of the Proposed Scheme includes hedgerows and treelines, canals, rivers, areas of parkland, woodland and open grassland. The area of the habitats which will be lost as a result of the Proposed Scheme is provided in Table 12.11 and shown in the Landscape General Arrangement Drawings (BCIDD-ROT-ENV_LA-0011_ML_00-DR-LL-9001) in Volume 3 of the EIAR. This is not deemed significant, considering the extent of habitat loss, their location (adjacent to existing artificially lit roads in a highly disturbed urban environment) and the presence and relative abundance of other similar habitats in the wider locality, which will not be impacted by the Proposed Scheme In assessing the impacts of habitat loss as a result of fragmentation of foraging / commuting habitat on bat populations, consideration was given to a species Core Sustenance Zone (CSZ). A CSZ refers to the area surrounding a communal bat roost within which habitat availability and quality will have a significant influence on the '*resilience and conservation status'* of the colony using the roost. Bat Surveys for Professional Ecologists: Good Practice Guidelines (Bat Conservation Trust 2016) states that:

> '*With reference to planning and development the core sustenance zone is: The area surrounding the roost within which development work can be assumed to impact the commuting and foraging habitat of bats using the roost, in the absence of information on local foraging behaviour. This will highlight the need for species-specific survey techniques where necessary; and; The area within which mitigation measures should ensure no net reduction in the quality and availability of foraging habitat for the colony, in addition to mitigation measures shown to be necessary following ecological survey work*.'

There is evidence of bats foraging and commuting within the study area of the Proposed Scheme, particularly along the western perimeter of Harold's Cross Park and over the Grand Canal at Robert Emmet Bridge, and that all parts of the Proposed Scheme which contain suitable habitat are likely to be within the CSZ of at least one bat roost. Considering the type of works proposed (e.g. upgrading of existing infrastructure for the most part), there is limited potential for the Proposed Scheme to act as a barrier to flight paths for bat species.

The Proposed Scheme will result in the loss and / or fragmentation of existing habitat used by commuting / foraging bats. Fragmentation of feeding habitat has the potential to disturb normal bat behavioural patterns, and thus adversely affect the ability of local bat populations to persist and reproduce, impacting on their local distribution and / or abundance. The barrier effect can manifest itself as soon as the site clearance phase commences and the barrier itself is in the form of the cleared lands. The Proposed Scheme will result in the removal / fragmentation of small areas / strips of treelines which could all be used by local bats. These habitats constitute a landscape feature which could be used by foraging / commuting bats and their loss, will result in a reduction of foraging / commuting habitat for local bats in this area.

Removal of suitable habitat for foraging and / commuting bats (e.g. scattered trees and parkland, dry meadows and grassy verges, scrub, mixed broadleaved woodland and treelines / hedgerows) within the footprint of the Proposed Scheme is calculated as 17 existing street trees. scattered along R137 Harold's Cross Road. Habitat removal is within a highly urbanised environment with low numbers of bat records, and as such, is not deemed to provide significant contributions to core sustenance zones of roosts outside of the footprint of the Proposed Scheme. The effect of habitat fragmentation and barrier effect associated with the construction of the Proposed Scheme is therefore not considered to be significant at any geographic scale.

12.4.3.4.1.3 Installation of Temporary Working and Construction Compound Lighting which may Cause Direct / Indirect Disturbance of Flight Patterns

Construction Compounds are proposed in the following three locations (See Figure 12.1 to 12.3 in Volume 3 of this EIAR):

- Construction Compound K1 to be located in the public car park off the northern side of Sundrive Road;
- Construction Compound K2 to be located in the grounds at the entrance to Our Lady's Hospice in Harold's Cross; and
- Construction Compound K3 at St. Patrick's Court on the western side of R137 Clanbrassil Street Lower.

Security lighting will potentially be installed in these Construction Compounds including K2 for the duration of construction (i.e. 18 months), thereby increasing the level of artificial lighting in these areas. Artificial lighting within suitable habitat may result in avoidance behaviour by bats, and could prevent bats from accessing adjacent foraging areas or roosts and / or result in bats taking more circuitous routes to get to foraging areas and hence potentially depleting energy reserves and abandonment of nearby roosts. Given the urban setting of these proposed Construction Compounds, bats in the area would be habituated to some level of artificial lighting. Provided security lighting does not involve high intensity lighting (e.g. floodlighting) the impact of increased artificial lighting at Construction Compounds is considered to be significant at the local level only.

The bulk of the construction works will typically be undertaken during normal daylight working hours, although it is recognized that some elements of night-time work will be required given the transport importance of this existing corridor, e.g. land closures and resurfacing. The bulk of the existing corridor is largely illuminated by regularly space lighting columns for much of its length and therefore the requirement for lighting to accommodate construction works during night-time will be limited, in area where existing light levels are low and of short duration. The effect of the additional lighting is therefore considered to be significant at the local level only and temporary.

12.4.3.4.2 Badger

Multidisciplinary surveys did not confirm any badger setts or evidence of badger within the footprint of the Proposed Scheme.

Although it cannot be predicted if badger will establish new setts within the ZoI of the Proposed Scheme before construction works commence, it is a possibility, albeit unlikely and this scenario has been taken into account in the mitigation strategy (refer to Section 12.5.1.4.2).

12.4.3.4.2.1 Loss of Foraging Habitat and Breeding / Rest Sites

There were no badger setts located within the ZoI of the Proposed Scheme as recorded during surveys of accessible lands, therefore, there is no potential for the permanent loss of any badger sett to occur.

Construction may result in the permanent loss of approximately 0.21ha of suitable foraging / commuting habitat for badgers (e.g. amenity grassland, scattered trees and parkland, dry meadows and grassy verges, scrub, mixed broadleaved woodland and treelines/ hedgerows). In addition, the provision of Construction Compounds K2 for the duration of the Construction Phase will result in the permanent loss of 0.07ha of amenity grassland which is unlikely to be used by commuting / foraging badgers due to its enclosed nature. Given the relative abundance of suitable habitat in the wider vicinity, the permanent / temporary loss of these habitats is not considered significant at any geographic scale. As the majority of these sites are already composed of hardstanding (buildings and artificial surfaces), it is not considered to be an important area for commuting / foraging badgers, and therefore its use as a Construction Compound will not have any significant effect on the local badger population.

Permanent habitat removal is proposed at lands located largely adjacent to pre-existing roads / paths and is typically limited to 2m linear sections of amenity grassland, existing hard surfaces, scattered trees and parkland (or in the case of the Construction Compound K2 at the Our Lady's Hospice, the removal of the bulk of the area for a car park) and roadside treelines, within a highly disturbed urban environment. These areas of habitat removal are not likely to provide significant foraging habitat for the local badger population. Therefore, the Proposed

Scheme could affect the conservation status of the local badger population and considered to be significant at the local level only.

12.4.3.4.2.2 Disturbance / Displacement

In conjunction with any displacement effects associated with foraging habitat loss, increased human presence and / or noise and vibration associated with the Construction Phase, the Proposed Scheme has the potential to displace badgers from both breeding / resting places and from foraging habitat located beyond the footprint of the Proposed Scheme.

As construction works in areas of suitable foraging habitat will typically be undertaken during normal daylight working hours and as badgers are nocturnal in habit, displacement of badgers from foraging areas (outside of areas where foraging habitat will be lost as a result of the Proposed Scheme) is extremely unlikely to affect the local badger population and will not result in a likely significant negative effect, at any geographic scale. In addition, badgers residing within the wider study area are likely to be habituated to disturbance within the urban environment and therefore would be less sensitive to very localised, temporary increases in disturbance.

Disturbance and displacement effects on badger may also be the result of increased artificial lighting during construction. Nocturnal mammals, such as badger, are likely to be disturbed by the introduction of artificial light into established breeding and foraging areas (Rich and Longcore 2005). Although the majority of the Proposed Scheme corridor is already lit artificially, the proposal may result in the introduction of artificial lighting to previously unlit areas, if the proposed Construction Compounds require security lighting for the duration of construction. Two of the three locations proposed for Construction Compounds are located in areas of adjacent suitable foraging habitat for badger (amenity grassland and scattered trees and parkland). If high-intensity, non-directional security lighting (e.g. floodlighting) is installed at these proposed Construction Compounds, light spill into adjacent areas could render these areas unsuitable for foraging badger. Therefore, lighting associated with the Construction Phase of the Proposed Scheme could result in a negative effect on badgers, albeit temporary in nature and significant at the local level only.

12.4.3.4.3 Otter

Multidisciplinary surveys did not confirm any otter holts or evidence of otter activity within the footprint of the Proposed Scheme, however the aquatic surveys recorded a single otter spraint on the ledge underneath the Emmet Bridge in July 2022.

Although it cannot be predicted if otter will establish new holt or couch sites within the ZoI of the Proposed Scheme before construction works commence, particularly up or downstream of the proposed offline cycle / pedestrian bridges at Robert Emmet Bridge, it is a possibility, and this scenario has been taken into account in the mitigation strategy (refer to Section 12.5.1.4.3).

12.4.3.4.3.1 Loss of Breeding / Resting Sites

Based on the findings of the field surveys carried out, there were no otter breeding or resting places, holt or couch sites present within the Proposed Scheme boundary. Therefore, there will not be any loss of holt or couch sites as a result of construction works. No suitable habitat for breeding / resting sites identified during the multidisciplinary surveys, although its presence in the wider aquatic corridor cannot be ruled out. No in-stream / bankside works are proposed along any watercourse intersected by the Proposed Scheme, with the exception of the construction of the offline cycle / pedestrian bridges alongside each side of the Robert Emmet Bridge on the Grand Canal and the Stone Boat Boardwalk at Mount Argus View. Considering the works along the Grand Canal are localised and short-term, the Proposed Scheme will not have a likely significant effect on the conservation status of otter, as there will be no loss of breeding / resting sites, and will not have a likely significant negative effect, at any geographic scale.

12.4.3.4.3.2 Loss / Fragmentation of Foraging / Commuting Habitat

Evidence of otter was not recorded within or in close proximity to the Proposed Scheme during the multidisciplinary surveys undertaken, however aquatic surveys recorded a single otter spraint on the ledge underneath the Emmet Bridge in July 2022. In addition, based on the results of the desk study, otter are known to utilise the Grand Canal

and River Poddle (although records along the River Poddle only exist on upstream stretches). In addition, otter frequently use the Lower Liffey Estuary, to which the Proposed Scheme is hydrologically connected, for commuting and foraging purposes, with holts identified at Dublin Port (Macklin *et al.* 2019).

The provision of Construction Compounds for the duration of the Construction Phase is not expected to result in the temporary loss of any habitat used by otter, owing to the fact that the Construction Compound locations are removed from waterbodies and do not provide suitable habitat for otter. Construction Compound K1 proposed at the public car park off the northern side of Sundrive Road will be adjacent to the River Poddle. The current car park is composed of hardstanding and is therefore unsuitable for use by otter for commuting / foraging purposes.

The construction of the proposed Stone Boat Boardwalk at Mount Argus View and the proposed offline cycle / pedestrian bridges on each side of the existing Robert Emmet Bridge at the Grand Canal may result in the fragmentation of foraging / commuting habitat for local otters, during the Construction Phase. The proposed Stone Boat Boardwalk will require the installation of bored piles inserted in the vegetated riverbank, which may render the area temporarily unsuitable for use by foraging / commuting otters during construction, through disturbance impacts. In the case of the proposed cycle / pedestrian bridges either side of the existing Robert Emmet Bridge, over the Grand Canal pNHA, each bridge will require piled foundations (12 bored piles in total). During construction it is likely that the disturbance associated with these works will render the Grand Canal habitat in the immediate vicinity of Robert Emmet Bridge unsuitable for foraging / commuting otter. It is important to note that the impacts on otters, as a result of habitat fragmentation during construction, are expected to be temporary in nature (approximately six weeks during construction of the Stone Boat Boardwalk over the River Poddle and approximately 12 months during construction of the cycle / pedestrian bridges over the Grand Canal).

The scale of habitat loss, through fragmentation, will be relatively small when compared to the availability of other suitable riparian habitats present in the wider environment of the surface water catchments that will be crossed by the Proposed Scheme. Otter are known to routinely use highly modified habitat within culverts and beneath bridges. Habitat fragmentation arising from the Proposed Scheme would not constitute a significant decline in the extent of available otter habitat and will not affect the local otter population's ability to maintain itself, even in the short-term.

Habitat loss associated with the construction of the Proposed Scheme will not have a likely significant effect on the conservation status of otter and will not have a likely significant negative effect, at any geographic scale.

12.4.3.4.3.3 Habitat and Food Source Degradation – Water Quality

During construction, a potential contaminated surface water runoff and / or an accidental spillage or a pollution event into any surface water feature / existing drainage infrastructure has the potential to have a significant negative impact on water quality and consequently an impact on otter; either directly (e.g. acute or sub-lethal toxicity from pollutants) or indirectly (e.g. affecting their food supply or supporting habitats). The effects of frequent and / or prolonged pollution events in a river system have the potential to be extensive and far-reaching and could potentially have significant long-term effects.

However, it is considered unlikely that a pollution event of such a magnitude would occur during construction or be any more than temporary in nature. Nevertheless, a precautionary approach is being taken in assuming a level of risk to water quality impacts and detailed mitigation measures are required to further minimise the risk of the Proposed Scheme having any perceptible effect on water quality during construction.

The construction methodology for the proposed Stone Boat Boardwalk at Mount Argus View is described in Section 12.4.3.2.1. The addition of offline cycle / pedestrian bridges on either side of Robert Emmet Bridge over the Grand Canal will involve a total of 12 bored piles into existing made ground set back from the Grand Canal. The area will be accessed from surrounding existing hardstanding, no instream works are required. During construction of the proposed Stone Boat Boardwalk over the River Poddle, sediment may be released into the river and may be transported downstream to the Liffey Estuary Lower. Likewise, during the construction of the proposed cycle / pedestrian bridges on either side of the existing Robert Emmet Bridge, sediment, or other harmful substances resulting from excavations required for foundations, may be released into the waters of the Grand Canal, and could be transferred to downstream ecologically sensitive areas.

In addition, construction at the Grand Canal will require works near an existing high voltage (220kV) oil-filled underground ESB cable. If damaged during works, oil would enter the Grand Canal. This has the potential to result in significant negative effects on water quality and consequently affect aquatic and wetland habitats in the baseline environment. In a worst-case scenario, coastal habitats downstream, in Dublin Bay, could also be affected.

Other works proposed along the Proposed Scheme (e.g. works to existing pavements and road surfaces, and proposed drainage works) also have the potential to generate silt and sediment, which could be released into the existing drainage network and transferred downstream. In the absence of mitigation, the potential increase in water turbidity, as a result of increased sedimentation in receiving watercourses, could affect the visibility of prey species for foraging otter. Cement based products used in the Construction Phase of the Proposed Scheme (e.g. concrete and / or bentonite which are highly corrosive and alkaline materials), released into either the Grand Canal or River Poddle, or transferred to the Liffey Estuary Upper / Lower, may cause surface water degradation and damage to aquatic fauna. This has the potential to result in significant negative effects on food supply.

Habitat degradation as a result of effects on surface water quality during construction has the potential to affect the species' conservation status and result in a likely significant negative effect, at a local geographic scale. This is in consideration of the temporary nature and scale of the proposed impact, the availability of suitable habitat for otter in the wider vicinity and the relative abundance of otter across the study area, as demonstrated in the results of the desk study.

Proposed mitigation measures have been designed to protect water quality during construction (see Section 12.5.1.2.2).

12.4.3.4.3.4 Habitat Severance / Barrier Effect

The proposed cycle / pedestrian bridges on either side of the existing Robert Emmet Bridge over the Grand Canal, and the proposed Stone Boat Boardwalk over the River Poddle, could result in a barrier effect to local otter populations. No in-stream works are proposed as part of the Proposed Scheme. Given that otter are generally nocturnal and works will typically be carried out during normal daylight working hours, affected otters would be expected to habituate to the altered landscape and any resulting barrier effect would be temporary in nature (see Section 12.4.3.4.3.5 on disturbance / displacement and the habituation of otters to disturbance).

The severance / barrier effect of construction works on otter is not likely to affect the local population, over even the short-term, and is not likely to affect the species conservation status and result in a significant negative effect, at any geographic scale.

12.4.3.4.3.5 Disturbance / Displacement

No otter holts were identified during the surveys undertaken. Whilst the results of the desk study did not reveal the location of any otter holts in close proximity to the Proposed Scheme, and the field surveys undertaken did not record any otter holts within the boundary of the Proposed Scheme, it is reasonable to assume that active otter holts are present along stretches of the Grand Canal, and potentially upstream overground sections of the River Poddle. Increased human presence and / or noise and vibration associated with construction works within the footprint of the Proposed Scheme is unlikely to affect these holts. However, construction works associated with the Proposed Scheme have the potential to (at least temporarily) displace commuting or foraging otter.

Construction activities at the proposed Stone Boat Boardwalk over the River Poddle will include 13 bored piles. In addition, the construction of the proposed cycle / pedestrian bridges either side of the Robert Emmet Bridge over the Grand Canal will involve 12 bored piles. Noise and vibrations associated with the construction of the proposed Stone Boat Boardwalk and proposed cycle / pedestrian bridges, as well as construction works in close proximity to the River Poddle in Mount Argus Park and Poddle Park, will have the potential to create disturbance and displacement within the vicinity of the works. Noise and disturbance levels as a result of construction of the Stone Boat Boardwalk range from approximately 80dB at 10m from the proposed works to 52dB at 250m, with the indicative predicted cumulative noise level for these works at the closest noise sensitive location in the order of 77dB in the absence of any noise mitigation. Baseline noise levels in this vicinity are approximately 49dB. Therefore, during construction of the proposed Stone Boat Boardwalk noise levels will return close to baseline levels as a distance of approximately 250m. Noise and disturbance levels as a result of the construction of the

proposed cycle / pedestrian bridges range from 70dB to 80dB at the closest noise sensitive location, in the absence of any noise mitigation. Baseline noise levels in this vicinity are approximately 69dB and therefore, during construction of the proposed cycle / pedestrian bridges noise levels will return close to baseline levels as a distance of approximately 30m. Considering the above, disturbance for mammals is estimated to reach up to 250m from the Proposed Scheme. As active otter holts are outside of this ZoI, disturbance effects from the Proposed Scheme are not deemed to cause displacement affects leading to abandonment of holts.

Otter are known to tolerate human disturbance under certain circumstances (Bailey and Rochford 2006; The Environment Agency 2010; Irish Wildlife Trust 2012). There are numerous records of otter within the urban Dublin area, which suggests a relatively high level of habituation to human disturbance and noise by otter (Macklin *et al.* 2019). As construction works will typically be undertaken during normal daylight working hours and otter are generally nocturnal in habit, and that otter can (in many circumstances) tolerate high levels of human presence and disturbance, displacement of otter from their habitat is extremely unlikely to affect the local otter population. Therefore, disturbance during construction is not likely to have a significant effect on the species' conservation status and will not result in a likely significant negative effect, at any geographic scale.

Disturbance and displacement effects on otter may also be the result of increased artificial lighting during construction. Nocturnal mammals, such as otter, are likely to be disturbed by the introduction of artificial light into established breeding and foraging areas (Rich and Longcore 2005). Although the majority of the Proposed Scheme corridor is already lit artificially, the proposal may result in the introduction of artificial lighting to previously unlit areas, if the proposed Construction Compounds require security lighting for the duration of construction. Given the fact that the locations of proposed Construction Compounds are remote from any watercourses, with the exception of Construction Compound K1 off Sundrive Road which is located directly adjacent to the River Poddle where existing street lighting will be utilised, lighting during construction is not considered likely to result in any significant effect to otter in the vicinity.

12.4.3.4.4 Marine Mammals

12.4.3.4.4.1 Habitat and Food Resource Degradation – Water Quality

As discussed in Section 12.4.3.2.2, the Construction Phase of the Proposed Scheme could result in contamination of receiving water bodies. This could result in significant negative impacts on marine mammals, either directly (e.g. acute or sub-lethal toxicity from pollutants) or indirectly (e.g. affecting their food supply or supporting habitats).

During construction of the proposed Stone Boat Boardwalk over the River Poddle, sediment may be released into the river and potentially be transported downstream to the Liffey Estuary Upper. Likewise, during the construction of the proposed cycle / pedestrian bridges on either side of the existing Robert Emmet Bridge, sediment, or other harmful substances resulting from excavations required for foundations, may be released into the waters of the Grand Canal, and could be transferred downstream to the Liffey Estuary Lower. Other works proposed along the Proposed Scheme (e.g. works to existing pavements and road surfaces, and proposed drainage works) also have the potential to generate silt and sediment, which could be released into the existing drainage network and transferred downstream to the Liffey Estuary Upper / Lower or coastal waters of Dublin Bay. Cement based products used in the Construction Phase of the Proposed Scheme (e.g. concrete and / or bentonite which are highly corrosive and alkaline materials), released into either the Grand Canal or River Poddle, or transferred to the Liffey Estuary Upper / Lower, may cause surface water degradation and damage to aquatic fauna. This has the potential to result in significant negative effects on food supply.

Habitat degradation as a result of effects on surface water quality during construction has the potential to affect the species' conservation status and result in a likely significant negative effect, at a local scale only. This is in consideration of the temporary nature and scale of the proposed effect, and the availability of suitable habitat in Dublin Bay.

Mitigation measures have been designed to protect water quality during construction (see Section 12.5.1.2.2).

12.4.3.4.5 Other Mammals

No other protected mammal species were recorded during the multidisciplinary surveys carried out along the Proposed Scheme. However, based on the results of the desk study, several mammal species protected under the Wildlife Acts, are known to occur in the wider environment, including red squirrel, hedgehog and pygmy shrew.

12.4.3.4.5.1 Habitat Loss

The construction of the Proposed Scheme will result in the permanent loss of some suitable habitat for small mammals located within the boundary of the Proposed Scheme. Given the relatively low numbers of individuals of each species that are likely to be affected (i.e. red squirrel, hedgehog, pygmy shrew), and the abundance of alternative suitable habitat available locally, the effects of habitat loss associated with construction works are unlikely to affect the long-term viability of their local populations. Therefore, habitat loss is unlikely to affect the species' conservation status or result in a significant negative effect, at any geographic scale.

12.4.3.4.5.2 Mortality Risk

Site clearance works have the potential to result in the mortality of small mammal species. The potential for this impact to occur would be expected to be greater during the breeding season (February to October inclusive, depending on species) when juveniles would be present in nests, or in the case of hedgehog impacts may be greater during their hibernation period. Furthermore, the potential for direct mortality to small mammals would be greater in more vegetated areas, as opposed to disturbed ground / urban habitats, as these areas would offer more in terms of breeding / resting habitat for small mammal species. Given the relatively low numbers of individuals of each species that are likely to be affected, that these species are highly mobile, site clearance is unlikely to result in a level of mortality that would affect the species' conservation status, and result in a significant negative effect, even at a local geographic scale.

12.4.3.4.5.3 Disturbance / Displacement

In conjunction with any displacement effects associated with habitat loss, increased human presence and / or noise and vibration associated with construction works, has the potential to displace mammals from both breeding / resting places and from foraging habitat. Mammals residing within the wider study area are likely to be habituated to disturbance within the urban environment.

As construction works in areas of suitable foraging habitat will typically be undertaken during normal daylight working hours and the relevant small mammal species are nocturnal in habit, displacement of mammal species from foraging areas (outside of areas where foraging habitat will be lost as a result of the Proposed Scheme) is extremely unlikely to affect the local mammal population and will not result in a likely significant negative effect, at any geographic scale.

12.4.3.5 Birds

12.4.3.5.1 Breeding Birds

The assessment carried out in the NIS for the Proposed Scheme (which is a standalone document provided within the planning application to enable the Board, as competent authority, to carry out an AA for the purposes of Article 6(3) of the Habitats Directive) considered the potential for the Proposed Scheme to affect the bird species listed as SCIs of European sites. That assessment is set out in the NIS and for the reasons detailed therein, it is concluded that the Proposed Scheme would not affect their breeding colonies or have any long-term effects on the local breeding populations. Therefore, for these species, the Proposed Scheme will not affect the conservation status of the breeding populations and will not have any significant adverse effect on the integrity of European sites.

12.4.3.5.1.1 Habitat Loss and Loss of Breeding / Resting Sites

The Proposed Scheme will result in the loss of breeding bird nesting and foraging habitat within the footprint of the Proposed Scheme. The areas of habitat loss within the Proposed Scheme boundary are provided in Section 12.4.3.2.1 and tabulated in Table 12.11 for all KER habitat types. The KER habitat loss suitable to support

breeding bird species comprise a total of approximately 17 no. street trees. In addition, there are areas of scrub, ornamental / non-native shrub and amenity grassland habitats (approximately 0.18ha in total area) within the footprint of the Proposed Scheme, which are not KERs in their own right due to their limited botanical value. However, these habitats may provide nesting and / or foraging habitat for birds. A small portion of these areas will be removed during construction of the Proposed Scheme resulting in an additional loss of breeding bird nesting and / or foraging habitat. In summary, the habitats that may be lost comprise:

- Bankside vegetation (grassland habitat) along the banks of the River Poddle at Mount Argus Way to accommodate the proposed Stone Boat Boardwalk;
- Canal bank vegetation (grassland) at the Robert Emmet Bridge over the Grand Canal, to accommodate the proposed footbridges and associated works;
- Construction Compound K2 (grassland habitat) at the entrance to Our Lady's Hospice in Harold's Cross;
- Construction Compound K3 (grassland / built land mosaic habitat) at St. Patrick's Court on Clanbrassil Street Lower; and
- Seventeen street trees spread across the Proposed Scheme from Harold's Cross north through to the terminus of the Proposed Scheme at Clanbrassil Street Upper / New Street South.

The primary consequence of habitat loss will be increased competition for resources (e.g. nesting habitat and / or prey / food source) both between and amongst breeding bird species. The magnitude of this effect will be largely defined by whether the local habitat resource has currently reached its carrying capacity or not in terms of breeding bird species. For species with larger home ranges during the breeding season, habitat loss at the scale of the Proposed Scheme is not likely to have any perceptible effects on breeding success or population dynamics. As the Proposed Scheme will be constructed within an already busy transport corridor, habitats suitable to support breeding birds are limited. Treelines and hedgerows are highly disturbed, and largely within the road median, therefore do not offer significant shelter for breeding bird species.

The habitat areas that will be lost as a result of the Proposed Scheme form a relatively small part of larger expanses of similar habitat types and mosaics in the wider locality. Parks and greenspaces form a vital resource for breeding birds within an urban setting. These areas of suitable breeding bird nesting and / or foraging habitat available in the wider locality of the Proposed Scheme (i.e. from approximately 300m to 2km from these existing sites located within the footprint of the Proposed Scheme) include:

- Parks and greenspaces with hedgerow, treeline and / or scrub boundaries such as St. Stephen's Green, Iveagh Gardens, St. Kevin's Park, Fitzwilliam Square, Kenilworth Square, Cathal Brugha Barracks, Poddle Park, Harold's Cross Park, Mount Argus Park, Bushy Park, Stannaway Park, Terenure College and Templeogue College;
- Wildfowl and Waterbird habitat within the Lower Liffey Estuary and wider Dublin Bay area such as Bull Island, Booterstown Marsh and Sandymount Strand;
- River habitat, including the River Poddle and nearby River Dodder; and
- Sections of the Grand Canal both upstream and downstream of the Proposed Scheme.

The proposed Stone Boat Boardwalk will require the removal of amenity grassland habitat with low potential to support nesting / foraging habitat for riparian bird species, along the River Poddle, at least in part to allow for the piled supports for the boardwalk to be inserted into the existing riverbank. In addition, the construction of the proposed cycle / pedestrian bridges either side of the existing Robert Emmet Bridge over the Grand Canal may result in the loss of bankside vegetation consisting mainly of amenity grassland, which could be used by nesting riparian bird species, although unlikely due to its proximal location to a busy intersection and pedestrian pathways. The area subject to direct habitat loss (i.e. approximately 186m^2 of GA2/GS2 and approximately 132m^2 of GA2 in total area) forms a relatively small part of larger expanses of similar habitat types found along sections of the River Poddle and Grand Canal both upstream and downstream of these proposed structures.

None of the habitat areas to be lost are unique to the locality and, either individually or collectively, are not likely to support a significant proportion, or the only population, of any given breeding bird species locally. Although a temporary decline in overall breeding bird abundance could potentially occur at a very local level (i.e. the footprint of the Proposed Scheme), this is unlikely to affect the local range of the breeding bird species present, nor is it likely to affect the ability of these breeding bird populations to maintain their local populations in the long-term.

Mitigation measures will be implemented to reduce the effects of habitat loss on breeding bird species locally (see Section 12.5.1).

12.4.3.5.1.2 Mortality Risk

If site clearance works were to be undertaken during the bird breeding season (i.e. March to August, inclusive) it is likely that nest sites holding eggs or chicks will be destroyed and birds killed.

Mortality of birds at the scale of the Proposed Scheme over a single breeding bird season in terms of completing site clearance works, will likely have a short-term effect on local breeding bird population abundance.

However, in the longer-term, this would be unlikely to affect the ranges of the breeding bird species recorded in the study area, nor would it be likely to affect the long-term viability of the local populations. Mortality of birds during site clearance works is not predicted to significantly affect the conservation status of any of the breeding bird species present within the study area at any geographic scale.

In any event, mitigation measures will be implemented to reduce the potential mortality risk presented by any clearance works (see Section 12.5.1).

12.4.3.5.1.3 Disturbance / Displacement

The noise, vibration, increased human presence and the visual deterrent of construction traffic associated with site clearance and construction will disturb breeding bird species and is likely to displace breeding birds from habitat areas adjacent to the footprint of the Proposed Scheme. Construction activities will largely involve carriageway and pavement resurfacing / reconstruction as required, readjustment of kerbs and new road layouts with, piling methodologies proposed in respect of the proposed Stone Boat Boardwalk along the River Poddle and the proposed offline cycle / pedestrian bridges over the Grand Canal on either side of Robert Emmet Bridge. However, as an important transport corridor in a heavily urbanized landscape, there is an existing relatively high level of human disturbance within the immediate environment of the Proposed Scheme (i.e. R817 Kimmage Road Lower, R137 Harold's Cross Road, R137 Clanbrassil Street and the City Centre area), and as such, it is likely that breeding species present are habituated to a certain degree of disturbance. The magnitude of the impact will be dependent on the type of construction works and their duration. General construction activities will have a less pronounced effect than piling, in terms of its ZoI, but will be locally ongoing for periods of up to 18 months and multiple breeding seasons across the entirety of the Construction Phase. However, phasing of the construction works in scheme sections will reduce the temporary nature of this impact to approximately six-month disturbances in discrete sections of the Proposed Scheme. With regards the proposed Construction Compounds, disturbance impacts will be short-term in nature, as they will be ongoing for the duration of the Construction Phase.

Table 12.6 provides a summary of the indicative construction noise calculations at varying distances, which have been modelled in the Chapter 9 (Noise & Vibration) in Volume 3 of this EIAR. Areas within the Proposed Scheme, which will be subject to construction activities which generate noise levels greater than 50dB (e.g. piling, etc.), include proposed cycle / pedestrian bridges over the Grand Canal at Robert Emmet Bridge and the construction of the proposed Stone Boat Boardwalk along the River Poddle by Mount Argus Way. These activities will result in a greater magnitude of effect on the baseline environment. As a result, noise and vibration from construction works at these locations, will have the potential to result in the reduced breeding success of breeding bird species breeding in the vicinity of the works. Breeding birds will be temporarily displaced during the construction works. The area over which disturbance / displacement effects will occur, form a relatively small part of larger expanses of similar habitat types in the wider locality of the Grand Canal (i.e. both upstream and downstream sections of the Grand Canal). As such, given the availability of suitable habitat in the wider locality of the Proposed Scheme, the construction works are therefore not likely to affect the conservation status of breeding birds and will not result in a likely significant negative effect, above the local scale. Although it is not possible to quantify the magnitude of this potential impact (or the potential effect zone) it could potentially extend for several hundred metres from the Proposed Scheme. The results of noise modelling carried out for the Proposed Scheme confirmed that at 150m, noise levels for all construction activities will be below 60dB (see Chapter 9 (Noise & Vibration). Given the temporary to short-term nature of the construction works, coupled with the existing levels of disturbance within these urban areas, disturbance or displacement effects associated with the Construction Phase of the Proposed Scheme will also be over the short-term. Therefore, these impacts will not affect the conservation status of breeding bird species and will not result in a likely significant negative effect, above the local scale.

12.4.3.5.1.4 Habitat Degradation – Surface Water Quality

The Construction Phase of the Proposed Scheme could potentially result in contamination of receiving water bodies, with a consequent effect on breeding birds either directly (e.g. acute or sub-lethal toxicity from pollutants) or indirectly (e.g. affecting their food supply or supporting habitats).

The construction of the proposed Stone Boat Boardwalk across the River Poddle has previously been described (refer to Section 12.4.1.1.1.1). During construction, there is potential for the proposed works to result in the release of sediment and other harmful substances into the local surface water network. Accidental spillages could also result in the transfer of hydrocarbons or cementitious materials to the surface water network. These harmful substances could be transferred to waterbodies that support populations of riparian bird species such as the River Poddle, the Grand Canal and the Liffey Estuary Lower. In addition, construction at the Grand Canal will require works near an existing high voltage (220kV) oil-filled underground ESB cable. If damaged during works, oil would enter the Grand Canal. This has the potential to result in significant negative effects on water quality and consequently affect aquatic and wetland habitats in the receiving environment. In a worst-case scenario, coastal habitats downstream, in Dublin Bay, could also be affected. This could affect water quality in these areas and therefore have a negative effect on riparian bird species as a result of direct contact with pollutants or a reduction / contamination of prey. Habitat degradation as a consequence of construction effects on surface water will therefore, likely be significant at the Local Level.

Other works specified along the Proposed Scheme (e.g. works to existing pavements and road surfaces, and proposed drainage works) also have the potential to generate silt and sediment, which could be released into the existing drainage network and transferred downstream to the Liffey Estuary Upper / Lower or coastal waters of Dublin Bay. Cement based products used in the Construction Phase of the Proposed Scheme (e.g. concrete and / or bentonite which are highly corrosive and alkaline materials), released into either the Grand Canal or River Poddle, or transferred to the Liffey Estuary Upper / Lower, may cause surface water degradation and damage to aquatic fauna. This has the potential to result in significant negative effects on water quality and could consequently affect aquatic habitats in the baseline environment. In a worst-case scenario, estuarine / coastal habitats downstream could also be affected.

Habitat degradation as a consequence of construction effects on surface water, if those impacts occur, is therefore, likely to be significant negative effect at the Local Level. However, as set out below, such impacts are not predicted to occur in circumstances of effective implementation of appropriate mitigation measures.

Mitigation measures have been designed to protect water quality during construction (see Section 12.5.1).

12.4.3.5.2 Wintering Birds

This section of the impact assessment deals with wintering bird species, i.e. those bird species which are SCIs of SPAs for their wintering populations or are listed on either the BoCCI Red or Amber lists for their wintering populations. The assessment carried out in the NIS for the Proposed Scheme considered the potential for the Proposed Scheme to affect the bird species listed as SCIs for their wintering populations. As set out in the NIS, that assessment concluded that the Proposed Scheme would not affect their wintering bird colonies or have any long-term effects on the local wintering populations. Therefore, for these species, the Proposed Scheme will not affect the conservation status of the wintering bird populations and will not result in an adverse effect on the integrity of the European sites.

12.4.3.5.2.1 Habitat Loss and / or Disturbance / Displacement

The Proposed Scheme will not result in direct habitat loss, either of a temporary or permanent nature, with regards feeding habitat for wintering birds. No known feeding sites occur within the footprint of the Proposed Scheme.

However, a temporary and / or permanent increase in noise, vibration and / or human activity levels during the construction of the Proposed Scheme could result in the disturbance to and / or displacement of wintering bird species present within the wider vicinity of the Proposed Scheme.

Current understanding of construction-related noise disturbance to wintering waterbirds is based on the research presented in Cutts *et al.* (2009) and Wright *et al.* (2010). In terms of construction noise, levels below 50dB would

not be expected to result in any response from foraging or roosting birds. Noise levels between 50dB and 70dB would provoke a moderate effect / level of response from birds (i.e. birds becoming alert and potentially some behavioural changes (e.g. reduced feeding activity)), but birds would be expected to habituate to noise levels within this range. Noise levels above 70dB would likely result in birds moving out of the affected zone or leaving the site altogether. At approximately 300m, typical noise levels associated with construction activity (as per BS 5228) are generally below 60dB or, in most cases, are approaching the 50dB threshold. As such, disturbance effects for general construction activities across the majority of the Proposed Scheme would not be expected to extend beyond a distance of approximately 300m, as noise levels associated with general construction activities would attenuate to close to background levels at that distance and beyond. In addition, the results of baseline noise level surveys indicate that baseline noise levels across the Proposed Scheme range from 49dB to 71dB (refer to Chapter 9 (Noise & Vibration)). Table 12.12 provides the indicative construction noise calculation associated with different construction activities of the Proposed Scheme at varying distances.

Table 12.12: Indicative Construction Noise Calculations at Varying Distances

Activity	Predicted CNL at Stated Distance from Edge of Works (dB $L_{Aeq,12hr}$ or $L_{Aeq,4hr}$)[1]								
(dB)	10m	15m	20m	30m	50m	75m	100m	150m	250m
General Road works	79	76	73	69	65	61	59	55	51
Road Widening and Utility Diversion	83	80	77	73	69	65	63	59	55
Piling	80	77	74	70	66	62	60	56	52
Construction Compounds	78	75	72	68	64	60	58	54	50
Boundary Treatments	80	77	74	70	66	62	60	56	49
Retaining walls	81	78	75	71	67	63	61	57	53
Additional Structural Works (e.g. bridge construction)	80	77	74	70	66	62	60	56	52
Urban Realm Landscaping	79	76	73	69	65	61	59	55	51

None of the construction activities (excluding the proposed cycle / pedestrian bridges over the Grand Canal at Robert Emmet Bridge or the proposed Stone Boat Boardwalk over the River Poddle) would be expected to result in any more than a moderate level of disturbance effect on wintering birds at distances beyond 300m. At 200m, noise levels are below 60dB or, in most cases, are approaching the 50dB threshold and existing baseline conditions. Low, or no, effects would be expected for those noise levels. Any landscape features, vegetation cover or buildings between the construction site and wintering bird sites would contribute to further reducing the ambient noise at any given distance. Therefore, 300m is considered to be a precautionary buffer in defining the ZoI of disturbance effects.

Construction activities at both the proposed cycle / pedestrian bridges over the Grand Canal at Robert Emmet Bridge and the construction of the proposed Stone Boat Boardwalk along the River Poddle by Mount Argus Way will include bored piles. These activities are not deemed to result in a greater magnitude of effect on the baseline environment, through vibration impacts.

As the majority of works will be carried out during normal working daylight hours, the potential for construction to disturb wintering birds at night, either foraging or roosting, will not arise. Impacts associated with increased levels of disturbance will likely result in the temporary displacement of these wintering bird species to other suitable available lands in the locality. These impacts will be associated with general construction activities (e.g. visual impact of construction workers and machinery and the associated vibration and more constant / continuous noise levels) and impulse noise disturbance from infrequent noise sources with a high noise level, such as blasting / piling.

[1] CNL = Construction Noise Levels. dB= decibels, unit of measurement. LAeq T= is the equivalent continuous sound level , with T indicating the time interval.

Following the completion of construction, disturbance levels will likely return to baseline conditions and as a result, the lands directly adjacent and within the Proposed Scheme Boundary will become available again as foraging and / or roosting habitat for these wintering bird species.

The majority of wintering birds identified in the desk study are typically found in coastal, estuarine and intertidal habitats including the Liffey Estuary and Dublin Bay, and therefore will not be impacted directly during construction. Certain species, such as light-bellied brent geese, often forage on inland sites in the Greater Dublin Bay Area. Suitable sites are usually composed of open parkland / playing pitches. There is one confirmed inland wintering bird feeding site within approximately 300m of the Proposed Scheme, the distance within which birds would be expected to be displaced – Eamonn Ceannt Park / Crumlin, which is known to be of major importance for light-bellied Brent goose.

The following three known inland wintering bird feeding sites are known to occur within approximately 300m-1km of the Proposed Scheme (i.e. beyond the ZoI), and it is likely that birds displaced from the vicinity of the Proposed Scheme, would be displaced to the following known sites:

- Clonmacnoise roundabout (Major Importance);
- Synge Street GAA pitches / Crumlin Road (Major Importance); and
- Lorcan O'Toole Park (High Importance).

There are also large areas of suitable foraging and/or roosting habitat available for these wintering bird species both adjacent to, and in the wider locality of the Proposed Scheme (i.e., beyond the 300m study area, from approximately 300m from existing sites located within the footprint of the Proposed Scheme) including:

- Parks and greenspaces such as Stannaway Park, Terenure College pitches, Terenure Sports Club pitches, Portobello GAA pitches, St Mary's College Rathmines pitches and Leinster Cricket Grounds;
- Riparian habitat associated with upstream and downstream stretches of the Grand Canal; and
- Wetland habitat associated with South Dublin Bay and River Tolka Estuary SPA, and North Dublin Bay SPA.

It is very likely that these wintering bird species currently utilise these and other suitable lands in the wider area to a similar and/or greater intensity.

The small number of wintering birds which are disturbed during construction will likely be displaced to suitable sites in the surrounding environment, such as those listed above, and therefore impacts are not considered to be significant beyond the local level. Therefore, in consideration of these factors, the loss of suitable foraging and / or roosting habitat within the Proposed Scheme boundary that is utilised by wintering birds and an increase in short-term disturbance or displacement effects will not affect the conservation status of any wintering bird species and will not result in a likely significant negative effect, at any geographic scale.

12.4.3.5.2.2 Habitat Degradation – Surface Water Quality

The Construction Phase of the Proposed Scheme could potentially result in contamination of receiving water bodies. This could result in potentially significant negative impacts on wintering birds either directly (e.g. acute or sub-lethal toxicity from pollutants) or indirectly (e.g. affecting their food supply or supporting habitats).

The construction of the proposed Stone Boat Boardwalk across the River Poddle has previously been described (refer to Section 12.4.1.1.1.1). During construction of the proposed Stone Boat Boardwalk over the River Poddle, sediment may be released into the river and be transported downstream to the Lower Liffey Estuary. Likewise, during the construction of the proposed cycle / pedestrian bridges either side of the existing Robert Emmet Bridge, sediment, or other harmful substances resulting from excavations required for foundations, may be released into the waters of the Grand Canal, and could be transferred downstream to the Lower Liffey Estuary. In addition, construction at the Grand Canal will require works near an existing high voltage (220kV) oil-filled ESB underground cable. If damaged during works, oil would enter the Grand Canal. This has the potential to result in significant negative effects on water quality and consequently affect aquatic and wetland habitats in the receiving environment. In a worst-case scenario, coastal habitats downstream, in Dublin Bay, could also be affected.

Other works proposed along the Proposed Scheme (e.g. works to existing pavements and road surfaces, and proposed drainage works) also have the potential to generate silt and sediment, which could be released into the existing drainage network and transferred downstream to the Liffey Estuary Upper / Lower or coastal waters of Dublin Bay. Cement based products used in the Construction Phase of the Proposed Scheme (e.g. concrete and / or bentonite which are highly corrosive and alkaline materials), released into either the Grand Canal or River Poddle, or transferred to the Liffey Estuary Upper / Lower, may cause surface water degradation and damage to aquatic fauna. This has the potential to result in significant negative effects on water quality and could consequently affect aquatic and wetland habitats in the receiving environment. In a worst-case scenario, estuarine / coastal foraging habitats downstream could also be affected.

Habitat degradation as a result of effects on surface water quality during construction has the potential to result in a likely significant negative effect, at a local geographic scale.

Mitigation measures have been designed to protect water quality during construction (see Section 12.5.1.2.2).

12.4.3.6 Reptiles

There were no reptile species recorded during the multidisciplinary surveys and no suitable habitat confirmed within the footprint of the Proposed Scheme. The desk study did not return recent records for reptile species protected under the Wildlife Acts within the footprint of the Proposed Scheme or wider surrounding area. However, it cannot be ruled out that these species are not in the wider area.

12.4.3.6.1 Disturbance and Mortality Risk

Site clearance works have the potential to result in disturbance to, and the direct mortality of, common lizard. Given the relatively low area of potentially suitable habitat for common lizard in the wider study area, the number of individuals that would potentially be at risk is low and would be unlikely to affect the local populations in the long-term. Therefore, disturbance or mortality risk are not likely to affect the species' conservation status or result in a likely significant negative effect, at any geographic scale.

12.4.3.6.2 Habitat Severance / Barrier Effect

The temporary to short-term physical disruption of the existing landscape during site clearance and construction will fragment habitat used by common lizard. As a temporary to short-term impact, this is unlikely to present a significant barrier to the movement of the species such that it would affect the local common lizard population in the long-term. Therefore, habitat severance during construction and any associated barrier effect are not likely to affect the species' conservation status and are not predicted to result in a likely significant negative effect to the common lizard, at any geographic scale.

12.4.3.7 Amphibians

No amphibian species were recorded during the multidisciplinary surveys carried out along the Proposed Scheme, despite the presence of suitable habitat within the footprint of the Proposed Scheme (e.g. vegetated banks of the Grand Canal and vegetated banks of the River Poddle). The desk study returned records for common frog and smooth newt within 1km of the Proposed Scheme, and therefore it cannot be ruled out that these species occur in the vicinity of the Proposed Scheme.

12.4.3.7.1 Habitat Degradation – Surface Water Quality

The Construction Phase of the Proposed Scheme could result in a contamination of receiving waterbodies. This could result in significant negative impacts on amphibians either directly (e.g. acute or sub-lethal toxicity from pollutants) or indirectly (e.g. affecting their food supply or supporting habitats).

The effects of frequent and / or prolonged pollution events in a river system have the potential to be extensive and far-reaching and could potentially have significant long-term effects. It is considered unlikely that a pollution event of such a magnitude would occur during construction or if such an event did occur, it would be temporary in nature. In respect of watercourses, a precautionary approach is being taken in assuming a level of risk of water quality impacts and detailed mitigation measures are required to further minimise the risk of the Proposed Scheme having any perceptible effect on water quality during construction. In addition, construction at the Grand Canal

requires works near an existing high voltage (220kV) oil-filled underground ESB cable. If damaged during works, oil would enter the Grand Canal. This has the potential to result in significant negative effects on water quality and consequently affect aquatic and wetland habitats in the receiving environment.

Habitat degradation as a result of effects on surface water quality during construction has the potential to affect the species' conservation status and result in a likely significant negative effect, at a local geographic scale. Mitigation measures have been designed to protect against habitat degradation during construction (see Section 12.5.1.2.2).

12.4.3.7.2 Disturbance and Mortality Risk

Site clearance works have the potential to result in disturbance to, and the direct mortality of amphibians. Given the relatively low area of potentially suitable habitat for amphibians in the wider study area, the number of individuals that would potentially be at risk is low and would be unlikely to affect the local populations in the long-term. Therefore, disturbance or mortality risk are not likely to affect the species' conservation status or result in a likely significant negative effect, at any geographic scale.

12.4.3.7.3 Habitat Severance / Barrier Effect

The temporary to short-term physical disruption of the existing landscape during site clearance and construction will fragment habitat used by amphibians. As a temporary to short-term impact, this is unlikely to present a significant barrier to the movement of the species such that it would affect the local amphibian population in the long-term. Therefore, habitat severance during construction and any associated barrier effect are not likely to affect the species' conservation status and are not predicted to result in a likely significant negative effect to amphibians, at any geographic scale.

12.4.3.8 Fish

12.4.3.8.1 Habitat Loss / Severance and Barrier Effect

The Proposed Scheme will not result in the any significant permanent loss of the Grand Canal habitat (approximately 0.019ha of riparian canal edge). The proposed addition of cycle / pedestrian bridges on either side of the Robert Emmet Bridge will involve 226m^2 of cycle / pedestrian bridges crossing the Grand Canal, with subsequent shading of the Grand Canal, albeit limited due to the permeable mesh paving proposed for both bridges.

As there are no proposed in-stream works as part of the Proposed Scheme, habitat severance during construction and any associated barrier effect are not likely to affect the species' conservation status and are not predicted to result in a likely significant negative effect to fish species, at any geographic scale.

12.4.3.8.2 Habitat Degradation – Surface Water Quality

During construction, contaminated or heavily silted surface water runoff, pump discharges and / or an accidental spillage or pollution event into any surface water feature has the potential to have a significant negative impact on water quality and consequently on aquatic habitats and fish species, and potentially also in the marine environment downstream. This could be either directly (e.g. acute or sub-lethal toxicity from pollutants or siltation events damaging spawning habitat downstream) or indirectly (e.g. affecting their food supply or supporting habitats).

The effects of frequent and / or prolonged pollution events in a river system have the potential to be extensive and far-reaching and could potentially have significant long-term effects. It is considered unlikely that a pollution event of such a magnitude would occur during construction or if such an event did occur, it would be temporary in nature. Nevertheless, a precautionary approach is being taken in assuming a level of risk of water quality impacts and detailed mitigation measures are required to further minimise the risk of the Proposed Scheme having any perceptible effect on water quality during construction.

In addition, construction at the Grand Canal require works near an existing high voltage (220kV) oil-filled underground ESB cable. If damaged during works, oil would enter the Grand Canal. This has the potential to

result in significant negative effects on water quality and consequently affect aquatic and wetland habitats in the receiving environment. In a worst-case scenario, coastal habitats downstream, in Dublin Bay, could also be affected.

Habitat degradation as a result of effects on surface water quality during construction has the potential to affect the conservation status of affected fish species and result in a likely significant negative effect, at a local to County geographic scale, as described below.

Desk study records presented in Section revealed that River Poddle does not support much aquatic life other than Three Spined stickleback, whilst the Grand Canal supports a range of coarse fish, and freshwater molluscs in its general vicinity. Results of the aquatic surveys carried out by Triturus Environmental Ltd in 2022 indicated that the River Poddle had negligible fisheries potential owing to considerable culverted stretches. The Grand Canal does not support populations of Salmon nor Lamprey, although it does support European eel upstream. Habitat degradation, as a result of effects on surface water quality during construction, has the potential to result in a significant effect at the National level on eel, given the potential for degradation of habitat through which ell migrate and declining trend of eel in Irish waters.

With regards all other fish species, the effects of habitat degradation as a result of effects on surface water quality during construction has the potential to result in a likely significant effect at the local level, given the fact that the other fish species in question are common in Irish waters and not of conservation concern.

Mitigation measures have been designed to protect water quality during construction (see Section 12.5.1.2.2, Chapter 13 (Water) and Appendix A5.1 CEMP in Volume 4 of the EIAR).

12.4.3.9 Invertebrates

12.4.3.9.1 Habitat Loss / Mortality Risk

A number of freshwater mollusc species have been recorded from the Grand Canal within approximately 1km of the Proposed Scheme (e.g. false-orb pea mussel, glutinous snail and lake orb mussel), therefore using the precautionary perspective, are also deemed to be present within the footprint of the Proposed Scheme. The addition of cycle / pedestrian bridges on either side of Robert Emmet Bridge over the Grand Canal will require works directly adjacent to the Grand Canal, although no in-stream works are proposed.

Given the lack of instream works and the aquatic nature of the invertebrates, it is considered that habitat loss during construction and any associated mortality risk are not likely to affect the species' conservation status and are not predicted to result in a likely significant negative effect to invertebrate species, at any geographic scale.

12.4.3.9.2 Habitat Degradation – Surface Water Quality

The Construction Phase of the Proposed Scheme could result in contamination of receiving waterbodies. This could result in significant negative impacts on freshwater molluscs (e.g. acute or sub-lethal toxicity from pollutants) or indirectly (e.g. affecting their food supply or supporting habitats).

Habitat degradation as a result of effects on surface water quality during construction of the cycle / pedestrian bridges on either side of Robert Emmet Bridge over the Grand Canal, has the potential to affect the conservation status of affected invertebrate species and result in a likely significant negative effect, up to a National geographic scale.

Mitigation measures have been designed to protect water quality during construction (see Section 12.5.1.2.2, Chapter 13 (Water) and Appendix A5.1 Construction Environmental Management Plan in Volume 4 of the EIAR).

12.4.3.10 Summary of Potential Construction Phase Impacts (Pre-Mitigation)

Table 12.13: Summary of Potential Construction Phase Impacts (Pre-Mitigation)

Ecological Receptor	Ecological Valuation	Potential Impacts	Potential Significance
Designated Areas for Nature Conservation			
North Dublin Bay SAC North Dublin Bay pNHA	International Importance National Importance	Habitat Degradation (hydrology; non-native invasive plant species)	Likely significant effect at the international geographic scale
South Dublin Bay SAC South Dublin Bay pNHA	International Importance National Importance	Habitat Degradation (hydrology; non-native invasive plant species)	Likely significant effect at the international geographic scale
Rockabill to Dalkey Island SAC Dalkey Coastal Zone and Killiney Hill pNHA	International Importance National Importance	Habitat Degradation (hydrology)	Likely significant effect at the international geographic scale
Lambay Island SAC Lambay Island pNHA	International Importance National Importance	Habitat Degradation (hydrology)	Likely significant effect at the international geographic scale
South Dublin Bay and River Tolka Estuary SPA Dolphins, Dublin Docks pNHA South Dublin Bay pNHA North Dublin Bay pNHA	International Importance National Importance National Importance National Importance	Habitat Degradation (hydrology; non-native invasive plant species)	Likely significant effect at the international geographic scale
Baldoyle Bay SPA Baldoyle Bay pNHA	International Importance National Importance	Habitat Degradation (hydrology)	Likely significant effect at the international geographic scale
North Bull Island SPA North Dublin Bay pNHA	International Importance National Importance	Habitat Degradation (hydrology; non-native invasive plant species)	Likely significant effect at the international geographic scale
Malahide Estuary SPA Malahide Estuary pNHA	International Importance National Importance	Habitat Degradation (hydrology)	Likely significant effect at the international geographic scale
Ireland's Eye SPA Ireland's Eye pNHA	International Importance National Importance	Habitat Degradation (hydrology)	Likely significant effect at the international geographic scale
Howth Head Coast SPA Howth Head pNHA	International Importance National Importance	Habitat Degradation (hydrology)	Likely significant effect at the international geographic scale
Rogerstown Estuary SPA Portraine Shore pNHA Rogerstown Estuary pNHA	International Importance National Importance National Importance	Habitat Degradation (hydrology)	Likely significant effect at the international geographic scale
Lambay Island SPA Lambay Island pNHA	International Importance National Importance	Habitat Degradation (hydrology)	Likely significant effect at the international geographic scale
Dalkey Island SPA Dalkey Coastal Zone and Killiney Hill pNHA	International Importance National Importance	Habitat Degradation (hydrology)	Likely significant effect at the international geographic scale
Skerries Islands SPA Skerries Islands NHA	International Importance National Importance	Habitat Degradation (hydrology)	Likely significant effect at the international geographic scale
The Murrough SPA The Murrough pNHA	International Importance National Importance	Habitat Degradation (hydrology)	Likely significant effect at the international geographic scale
Rockabill SPA Rockabill pNHA	International Importance National Importance	Habitat Degradation (hydrology)	Likely significant effect at the international geographic scale

Ecological Receptor	Ecological Valuation	Potential Impacts	Potential Significance
The Grand Canal pNHA	National Importance	Habitat Degradation (hydrology; non-native invasive plant species; Air Quality)	Likely significant effect at the national geographic scale
Habitats (outside of designated areas for nature conservation)			
Canals (FW3)	National Importance	*See Grand Canal pNHA above*	*See Grand Canal pNHA above*
Depositing/lowland rivers (FW2)	Local Importance (Higher Value)	Habitat degradation (hydrology; non-native invasive plant species)	Likely significant effect at the local geographic scale
Scattered trees and parkland (WD5)	Local Importance (Higher Value)	Habitat loss	Likely significant effect at the local geographic scale
Treelines (WL2)	Local Importance (Higher Value)	Habitat loss	Likely significant effect at the local geographic scale
Rare / Protected Plant Species			
Opposite-leaved Pondweed	National Importance	Habitat degradation (Surface water quality)	Likely significant effect at the local to National geographic scale
Fauna Species			
Bats	Local Importance (Higher Value)	Habitat loss / fragmentation; Disturbance/displacement - lighting	Not Likely to be significant at any geographic scale. Likely significant effect at the local geographic scale.
Badger	Local Importance (Higher Value)	Loss of foraging habitat and breeding / rest places Disturbance / displacement	Likely significant effect at the local geographic scale
Otter	County Importance	Loss of breeding/resting places; Loss/fragmentation of foraging/ commuting habitat; Habitat severance / barrier effect; disturbance/displacement Habitat degradation (hydrology)	Not Likely to be significant at any geographic scale. Likely significant effect at the local geographic scale
Marine mammals	County Importance	Habitat degradation (hydrology)	Likely significant effect at the local geographic scale
Other mammal species protected under the Wildlife Acts	Local Importance (Higher Value)	Habitat Loss; Mortality risk; Disturbance / displacement	Not Likely to be significant at any geographic scale
SCI bird species	International Importance	*See SPAs above*	*See SPAs above*
All other breeding bird species (non-SCI)	Local Importance (Higher Value)	Habitat Loss; Disturbance / Displacement; Habitat Degradation (hydrology) Mortality risk;	Likely significant effect at the local geographic scale Not Likely to be significant at any geographic scale
All other wintering bird species (non-SCI)	Local Importance (Higher Value)	Habitat Degradation (hydrology) Habitat Loss; Disturbance / Displacement	Likely significant effect at the local geographic scale Not Likely to be significant at any geographic scale
Reptiles	Local Importance (Higher Value)	Disturbance and Mortality Risk; Habitat severance/ barrier effect	Not Likely to be significant at any geographic scale
Amphibians	Local Importance (Higher Value)	Habitat Degradation (hydrology)	Likely significant effect at the local geographic scale Not Likely to be significant at any geographic scale

Ecological Receptor	Ecological Valuation	Potential Impacts	Potential Significance
		Disturbance and Mortality Risk; Habitat Severance /Barrier Effect	
Fish Species – European Eel	National Importance	Habitat Degradation (hydrology) Habitat Loss / Severance and Barrier Effect	Likely significant effect at the County scale Not Likely to be significant at any geographic scale
Non-Annex fish species	Local Importance (Higher Value)	Habitat Degradation (hydrology)	Likely significant effect at the local geographic scale
Freshwater molluscs	National Importance	Habitat Degradation (hydrology)	Likely significant effect at the local to national geographic scale
Local Biodiversity Areas (Local Biodiversity Areas not discussed under designated sites, flora and / or fauna – of which overlap in part with national designation as listed previously and / or are intersected by the Proposed Scheme)			
DCC: Grand Canal	National Importance	Habitat Degradation (hydrology; non-native invasive plant species)	Likely significant effect at the national geographic scale
DCC: River Corridors	Local Importance (Higher Value)	Habitat degradation (hydrology; non-native invasive plant species)	Likely significant effect at the local geographic scale
SDCC: Network of stream and Rivers	Local Importance (Higher Value)	Habitat degradation (hydrology; non-native invasive plant species)	Likely significant effect at the local geographic scale

12.4.4 Operational Phase

12.4.4.1 Designated Areas for Natura Conservation

12.4.4.1.1 European sites

12.4.4.1.1.1 Habitat Loss and Fragmentation

The potential for impacts on SCI bird populations for which SPAs are designated has been provided in the NIS (which is included as a standalone document in this planning application).

Refer to Section 12.4.4.5.2 with regards to potential operational impacts on wintering bird species, which encompass all relevant SCI bird species.

12.4.4.1.1.2 Habitat Degradation / Effects on QI / SCI Species as a Result of Hydrological Impacts

The Proposed Scheme is hydrologically connected to Dublin Bay via the River Poddle (Poddle_010) and existing drainage pipe network which will drain directly to Dublin Bay. The release of contaminated surface water runoff and / or an accidental spillage or pollution event into any surface water features during operation, has the potential to affect water quality in the receiving aquatic environment. Such a pollution event may include: the release of sediment into receiving waters and the subsequent increase in mobilised suspended solids; and, the accidental spillage and / or leaks of contaminants. The associated effects of a reduction of surface water quality could potentially extend for a considerable distance downstream of the location of the accidental pollution event or the discharge point and therefore impact the downstream environment, i.e. Dublin Bay, within which European sites are located (i.e. 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 Dalkey Islands SPA).

This reduction in water quality (either alone or in-combination with other pressures on water quality) could result in the degradation of sensitive habitats present within these European sites, which in turn would negatively affect the SCI bird species that rely upon these habitats as foraging and / or roosting habitat. It could also negatively affect the quantity and quality of prey available to SCI bird species. These potential impacts could occur to such a degree that the conservation objectives of the North Dublin Bay SAC, South Dublin Bay SAC, Howth Head SAC, Rockabill to Dalkey Island SAC, North Bull Island SPA, South Dublin Bay, River Tolka Estuary SPA and Dalkey Islands SPA, Baldoyle Bay SAC, Baldoyle Bay SPA and The Murrough SPA may be undermined.

In a worst-case scenario, the release of contaminated surface water runoff and / or an accidental spillage or pollution event into any surface water features during operation, also has the potential to affect mobile SCI bird

species and QI mammal species that commute, forage and loaf in the Lower Liffey Estuary Upper / Lower and areas of Dublin Bay and Baldoyle Bay (i.e. birds associated with Skerries Islands SPA, Rockabill SPA and Lambay Island SPA, Ireland's Eye SPA, Howth Head Coast SPA, North Dublin Bay SPA, South Dublin Bay and River Tolka Estuary SPA, Baldoyle SPA, Malahide Estuary SPA, Rogerstown SPA, Dalkey Islands SPA, Murrough SPA) and marine mammals associated with Rockabill to Dalkey Island SAC and Lambay Island SAC. This potential reduction in water quality could result in the degradation of sensitive habitats present downstream European sites, which in turn could negatively affect the SCI bird species that rely upon these habitats as foraging and / or roosting habitat. It could also negatively affect the quantity and quality of prey available to SCI and QI populations.

12.4.4.1.1.3 Habitat Degradation as a Result of Introducing / Spreading Non-Native Invasive Species

No non-native invasive plant species listed on the Third Schedule of the Birds and Habitats Regulations were recorded within, or in close proximity to the Proposed Scheme. However, there were records of non-native invasive species in the vicinity of the Proposed Scheme returned from the desk study. Therefore, there is potential for invasive species to spread or be introduced, during routine maintenance / management works, to terrestrial habitat areas in European sites downstream in Dublin Bay. (i.e. North Dublin Bay SAC, South Dublin Bay SAC, North Bull Island SPA and South Dublin Bay and River Tolka Estuary SPA). These in turn may result in the degradation of the existing habitats and therefore undermine the conservation objectives of these European sites.

It is not considered likely that invasive species could spread to European sites which are located a significant distance from the outfall locations of the watercourses intersected by the Proposed Scheme, by virtue of the habitat conditions in which the species normally occur and subject to the full implementation of the non-native Invasive Species Management Plan (ISMP) (refer to Appendix A5.1 (CEMP) in Volume 4 of the EIAR. In addition, the maintenance of the Proposed Scheme will not have the potential to result in habitat degradation of the QI / SCI species of any European site as the result of operational impacts.

12.4.4.1.1.4 Disturbance and Displacement Impacts

There are no European sites within the disturbance ZoI of the Proposed Scheme. No QI and / or SCI breeding / resting places were recorded within, or in close proximity to the Proposed Scheme during the surveys. However, non-designated Annex II species (i.e. otter) are known to occur within the vicinity of the Proposed Scheme. Refer to Section 12.4.4.4.3 for more details with regards to potential Operational Phase impacts on Annex II species.

The potential for impacts on SCI bird populations for which SPAs are designated has been provided in the NIS (which is included as a standalone document in this planning application). Refer to Section 12.4.4.5.2 with regards to potential impacts on wintering bird species, which encompass all relevant SCI bird species.

12.4.4.1.2 NHAs and pNHAs

The potential impacts on European sites arising from the Proposed Scheme, outlined above in Section 12.4.4.1.1, may also negatively affect the pNHA sites, which are located within the boundaries of European sites and designated for similar reasons: North Dublin Bay pNHA, South Dublin Bay pNHA, Dalkey Coastal Zone and Killiney Hill pNHA, Lambay Island pNHA, Dolphins, Dublin Docks pNHA, Baldoyle Bay pNHA, Malahide Estuary pNHA, Ireland's Eye pNHA, Howth Head pNHA, Portraine Shore pNHA, Rogerstown Estuary pNHA, Skerries Island NHA, The Murrough pNHA, Rockabill pNHA and the Grand Canal pNHA. The respective European sites are provided in Table 12.5. The Proposed Scheme also has the potential to affect biodiversity in a broader sense than only the QIs / SCIs of those European sites. Where biodiversity receptors in these pNHAs do not form part of the QIs / SCIs in the NIS assessment, they are considered under the other individual impact assessment headings for each KER below. Potential impacts arising from the Proposed Scheme on these pNHA sites would result in a likely significant negative effect at a national geographic scale.

The assessment of potential impacts arising from the Proposed Scheme on the Grand Canal pNHA include habitat degradation as a result of surface water quality effects and the spread of invasive species (see Section 12.4.4.2), effects on rare and protected plant species (see Section 12.4.4.3) and negative effects on the protected fauna species associated with the canal such as bats, otter, riparian birds, amphibians, fish and invertebrates (see Section 12.4.4.4 and 12.4.4.9).

12.4.4.1.2.1 Habitat Degradation – Air Quality

Air quality modelling of NO_x concentrations, and deposition rates were modelled for the Operational Phase of the Proposed Scheme at distances up to 200m from the Proposed Scheme or where significant changes to AADT flows occur. The assessment methodology for air quality impacts from roads and their interaction / effects on ecology are discussed in Section 12.4.4.1.2.1 and also within Chapter 7 (Air Quality).

Vehicle-derived air emissions were modelled during the construction phase along the proposed road development at the Grand Canal pNHA (Emmet Bridge, western and eastern side)) crossing as well as several other existing Canal crossing points outside of the Proposed Scheme, (refer to Section 7.4.2.2.4 of Chapter 7 (Air Quality) for details). The worst-case predicted annual average NO_x concentrations at various distances from the proposed road edge exceed the 30µg/m^3 limit value. All monitoring sites exceed the level for NO_x and the baseline environment is already in excess of this value. During the operational year (2028) of the Proposed Scheme, annual mean NO_x concentrations are predicted to decrease slightly at Grand Canal pNHA (Robert Emmet Bridge, Western and Eastern side) (84.8µg/m^3 to 76 .8µg/m^3) and (102.1µg/m^3 to 78.6 µg/m^3). During the Operational Phase of the Proposed Scheme, the ecological impacts associated with the Operational Phase traffic emissions are overall positive, slight and long-term. As such, no mitigation measures are required. The contribution of the Operational Phase of the Proposed Scheme to the NO_2 dry deposition rate was modelled at the Grand Canal pNHA (Emmet Bridge Western and Eastern side) Nitrogen deposition levels have been compared to the lower and higher critical loads for habitats associated with the Grand Canal pNHA. These include canals (FW3), Amenity Grassland (GA2) and minor mosaics of dry meadow / grassy verges (GS2).

The Grand Canal pNHA site is below the lower critical load of inland and surface water habitats of 5-10 Kg(N)/ha/yr (NRA 2011) at the western side of the Bridge and above it at the eastern side. There is a slight decrease in the NO_2 dry deposition rate at the Grand Canal pNHA site as a result of the operation of the Proposed Scheme. The overall deposition rate is modelled to decrease from 4.7kg(N)/ha/yr to 4.3 kg(N)/ha/yr for the Western side of Robert Emmet Bridge and decreases from 5.4kg(N)/ha/yr to 4.4 kg(N)/ha/yr along the eastern side on Robert Emmet Bridge. Therefore, significant effects on vegetation within the Grand Canal pNHA from NO_2 are not predicted likely, nor will there be any reduction in habitat area of the pNHA habitats, and mitigation is therefore not required.

12.4.4.2 Habitats

12.4.4.2.1 Habitat Degradation- Surface Water Quality

Mitigation for the Operational Phase has been built into the design of the Proposed Scheme. The drainage system for the Proposed Scheme will discharge to the Poddle_010 waterbody as well as existing combined sewers which ultimately discharge to the Liffey Estuary Lower via Ringsend WwTP, before ultimately draining to Dublin Bay. All drainage outfall discharges to surface waters represent point discharges. There will be no hydrological connection from the Proposed Scheme to the Grand Canal during operation. For the Proposed Scheme, there will be an net increase of 199m^2 in impermeable area of the River Poddle catchment and a 714m^2 increase in area ultimately discharging to Dublin Bay. This increase in impermeable area will be managed for the Proposed Scheme through a combination of attenuated using oversized pipes, permeable paving and infiltration trenches. Where no new paved areas are proposed, the existing drainage network will be retained and utilised (see Chapter 4 (Proposed Scheme Description) for more detail on drainage design).

The inclusion of sustainable drainage systems (SuDS) will reduce the volume of surface water runoff discharging to the existing drainage network. The functioning and effectiveness of both elements of the road drainage network are discussed in more detail in Chapter 13 (Water). The Proposed Scheme will not exacerbate the existing surface water quality conditions in any of the receiving surface waters, or larger waterbodies such as Liffey Estuary Lower. It will, in fact, result in a beneficial, albeit Imperceptible impact on the local surface water quality due to the implementation of SuDS, where appropriate.

Without the incorporation of the above design mitigation, then during operation, contaminated surface water runoff and / or an accidental spillage or pollution event into any surface water feature has the potential to have significant negative effects on water quality and consequently affect aquatic and wetland habitats in the receiving environment. The effects of frequent and / or prolonged pollution events have the potential to be extensive and far-reaching and could potentially have significant long-term effects. In a worst-case scenario, the downstream

habitats of the Liffey Estuary Lower and other transitional water bodies, and the Dublin Bay coastal water body could also be affected. This is deemed to be significant at a local scale.

Mitigation measures to maintain SuDS are provided in Section 12.5.2.

12.4.4.2.2 Habitat Degradation – Shading

The proposed addition of permanent cycle / pedestrian bridge structures over the River Poddle and Grand Canal will have some level of shading effect on the habitats beneath during operation. Shading effects may affect species communities, diversity and distribution. This potential impact will only arise in situations where habitats are being retained beneath the structure, as opposed to where habitats will be permanently lost as a result of construction works. Shading effects will be minimised due to the use of permeable mesh paving as part of the bridge structures.

Shading over depositing lowland rivers and canals is calculated at 184.5m^2 and 193.4m^2, respectively, and is not deemed to be significant. No likely significant effect as a consequence of habitat degradation is predicted.

12.4.4.2.3 Habitat Degradation - Non-Native Invasive Plant Species

No non-native invasive plant species, listed on the Third Schedule of the Birds and Natural Habitats Regulations, were identified within the Proposed Scheme during the field surveys. However, the desk study revealed several records for the recently delisted Canadian waterweed from along the Grand Canal at Robert Emmet Bridge, and records of three-cornered garlic, Japanese knotweed and Spanish bluebell within the vicinity of the Proposed Scheme, of which only the waterweed species is within the footprint of the Proposed Scheme. There is the potential that these species could naturally recolonise the Grand Canal within the Proposed Scheme boundary, post-construction. Routine maintenance works involving working within the channel of the Grand Canal are not required during the operation of the Proposed Scheme. Therefore, no likely significant effect as a consequence of habitat degradation through the spread of non-native invasive plant species is predicted.

12.4.4.2.4 Habitat Degradation- Air Quality

As discussed above in Section 12.4.4.1.2.1, air quality modelling of NO_x concentrations and deposition rates were modelled for the Operational Phase of the Proposed Scheme at distances up to 200m form the Proposed Scheme (refer to Chapter 7 (Air Quality) for details). The results from the air quality modelling deem the Proposed Scheme overall positive during the Operational Phase of the Proposed Scheme. As such harmful effects on vegetation from these emissions are not likely.

12.4.4.3 Rare and Protected Plant Species

12.4.4.3.1 Habitat Degradation – Shading

No protected plant species listed on the Flora Protection Order were recorded within the Proposed Scheme during field surveys. However, the desk study returned historical records of opposite-leaved pondweed within the Grand Canal. This species may lie dormant in sediments for many years until conditions become suitable for regrowth.

The proposed offline cycle / pedestrian bridge structures over the Grand Canal will have some level of shading effect on the Grand Canal during operation. Shading effects can affect species communities, diversity and distribution. As the proposed bridges are proposed to have permeable mesh paving, shading is not considered to be a significant effect, given the extent of shading and the extent of surrounding unaffected habitat.

Shading over the Grand Canal is calculated at 193.4m^2 and it not deemed to be significant. No likely significant effect as a consequence of shading is predicted.

12.4.4.3.2 Habitat Degradation – Surface Water Quality

No protected plant species listed on the Flora Protection Order were recorded within the Proposed Scheme during field surveys. However, the desk study returned historical records of opposite-leaved pondweed within the Grand Canal. This species may lie dormant in sediments for many years until conditions become suitable for regrowth.

There will be no surface water drainage connection from the Proposed Scheme to the Grand Canal during operation. Therefore, the effects of habitat degradation are not likely to be significant at any geographic scale.

12.4.4.4 Mammals

12.4.4.4.1 Bats

12.4.4.4.1.1 Indirect Disturbance of Flight Patterns Due to Operational Lighting

Additional permanent lighting features within suitable habitat may result in avoidance behaviour by bats. Such displacement (which would be a matter of metres) could prevent bats from accessing foraging area or roosts and / or result in bats taking more circuitous routes to get to foraging areas and hence potentially depleting energy reserves and abandonment of nearby roosts. Given the urban environment of the Proposed Scheme, and the fact that artificial lighting is already present along the footprint of the Proposed Scheme, and the lighting strategy involves the upgrade / relocation of existing lighting infrastructure and given that artificial lighting is already in place along the Proposed Scheme, bat species who utilise the area would already be habituated to some level of artificial lighting. The effects of operational artificial lighting is therefore not considered to be significant at any geographic scale.

12.4.4.4.1.2 Disturbance / Displacement – Increased Human Activity

The Operational Phase of the Proposed Scheme will not contribute to significant changes in human activity by virtue of it being along an existing transport corridor. The provision of the proposed Stone Boat Boardwalk along the River Poddle, and the additional cycle / pedestrian bridges the Grand Canal is likely to result in increased human presence in these areas. However, populations of bats associated with these areas in the vicinity of the Proposed Scheme are likely to be habituated to certain degree of human disturbance. Therefore, it is considered that there may be temporary significant effects on bats at a local scale, until such a time that they have habituated to the increased levels of human disturbance.

12.4.4.4.2 Badger

No evidence of badger was recorded along the Proposed Scheme during surveys undertaken. However, based on the results of the desk study, badger are known to occur within the wider vicinity and therefore potential impacts on this species cannot be excluded.

12.4.4.4.2.1 Habitat Severance / Barrier Effect

Barriers such as road infrastructure may affect foraging behaviour and dispersal corridors (e.g. the movement of species between breeding, foraging and hibernation sites), meaning that local populations can become isolated, having long-term effects on genetic diversity and gene flow, at a local geographic scale.

As the Proposed Scheme, for the most part, will consist of upgrading existing infrastructure, the effect of habitat severance / barrier effect on badger is not considered to be significant at any geographic scale. The existing infrastructure itself acts as a barrier to badger movement across the landscape and the Proposed Scheme will neither exacerbate nor improve the barrier effect already in existence.

12.4.4.4.2.2 Mortality Risk

The Proposed Scheme will not result in any increase in terms of mortality risk to badger during operation. This is because the Proposed Scheme is largely focused on upgrading existing infrastructure, the mortality risk of which already exists. The Proposed Scheme will neither exacerbate nor improve the level of mortality risk associated with this infrastructure. Therefore, the impact of mortality risk to badger, as a result of the Proposed Scheme is not regarded to be significant at any geographic scale.

12.4.4.4.2.3 Light Spill

Nocturnal mammals, such as badger, are likely to be disturbed by the introduction of artificial lighting into established breeding and foraging areas (Rich and Longcore 2005). Although the majority of the Proposed

Scheme corridor is already lit artificially, and the lighting strategy for the Proposed Scheme involves the upgrade of existing lighting infrastructure, with no introduction of new artificial lighting to previously unlit areas.

The lighting design of the Proposed Scheme will control light emissions, such that along the majority of the alignment, light spill does not extend beyond the Proposed Scheme boundary and where it does, this is at tie-ins with the existing road / footpath networks or at residential properties. There are no known badger setts within the Proposed Scheme boundary that are located within the modelled light spill zone for the Proposed Scheme.

Considering the above, lighting associated with the Proposed Scheme will not disturb or displace badgers from habitat areas located beyond the areas immediately adjacent to the Proposed Scheme boundary, it will not affect the species conservation status in that regard and will not result in a likely significant negative effect, at any geographic scale.

12.4.4.4.3 Otter

No evidence of otter was recorded along the Proposed Scheme during multidisciplinary surveys undertaken, however the aquatic surveys recorded a single otter spraint on the ledge underneath the Emmet Bridge in July 2022. In addition, based on the results of the desk study, otter are known to occur within the wider vicinity, particularly along the Grand Canal and upper sections of the River Poddle. Therefore, impacts on this species cannot be excluded.

12.4.4.4.3.1 Habitat Severance / Barrier Effect

Barriers such as road infrastructure may affect foraging behaviour and dispersal corridors, e.g. the movement of species between breeding, foraging and resting sites, meaning that local populations can become isolated, having long-term effects on genetic diversity and gene flow, at a local geographic scale.

As the Proposed Scheme, for the most part, will consist of upgrading existing infrastructure, the effect of habitat severance / barrier effect on otter is not considered to be significant at any geographic scale. The existing infrastructure itself acts as a barrier to otter movement across the landscape and the Proposed Scheme will neither exacerbate nor improve the barrier effect already in existence. The proposed additional cycle / pedestrian bridges over the Grand Canal on either side of Robert Emmet Bridge and the proposed Stone Boat Boardwalk along the River Poddle are the only proposed additional pieces of infrastructure relevant to otter, given their riparian location. Neither of these structures, will result in habitat severance or a barrier effect to populations of local otter during operation, and local otter populations will still be able to utilise the aquatic environs surrounding these structures for commuting and foraging purposes. Therefore, the impact of habitat severance / barrier effect on otter, as a result of the Proposed Scheme, is not considered to be significant at any geographic scale.

12.4.4.4.3.2 Disturbance / Displacement

The provision of the proposed Stone Boat Boardwalk along the River Poddle is likely to result in increased human presence in this area of the river. However, populations of otter associated with the River Poddle in the vicinity of the Proposed Scheme are likely to be habituated to a certain degree of human disturbance, given the urban setting of the Proposed Scheme. Therefore, it is considered that there may be temporary significant effects on otter at a local scale, until such a time that they have habituated to the increased levels of human disturbance.

Nocturnal mammals, such as the otter, would be likely to be disturbed by the introduction of artificial light into established breeding and foraging areas (Rich and Longcore 2005). Permanent lighting is proposed along all of the Proposed Scheme footprint, however, it should be noted that the majority of the Proposed Scheme corridor is already lit artificially, and so otter in the area would be habituated to some degree of artificial lighting. It is considered that there may be temporary significant effects on otter at a local scale, until such a time that they have habituated to the new levels of artificial lighting.

Disturbance or displacement associated with the operation of the Proposed Scheme is not likely to affect the conservation status of otter and therefore, will not result in a likely long-term significant negative effect, at any geographic scale.

12.4.4.4.3.3 Habitat and Food Source Degradation- Surface Water Quality

As discussed in Section 12.4.4.2.1, without the design mitigation incorporated into the design of the Proposed Scheme, the Operational Phase of the Proposed Scheme could potentially result in contamination of receiving waterbodies. This could result in significant negative impacts on otter either directly (e.g. acute or sub-lethal toxicity from pollutants) or indirectly (e.g. affecting their food supply or supporting habitats).

Habitat degradation as a result of effects on surface water quality during operation has the potential to affect the conservation status of otter and result in a likely significant negative effect, at a local geographic scale. This is in consideration of the temporary nature and scale of the proposed impact, the availability of suitable habitat for otter in the wider vicinity and the relative abundance of otter across the wider environment, as demonstrated in the results of the desk study.

12.4.4.4.3.4 Mortality Risk

The Proposed Scheme will not result in any increase in terms of mortality risk to otter during operation. This is because the Proposed Scheme is largely focused on upgrading existing infrastructure, the mortality risk of which already exists. The proposed cycle / pedestrian bridges over the Grand Canal at Robert Emmet Bridge and the proposed Stone Boat Boardwalk along the River Poddle are the only proposed additional pieces of infrastructure relevant to otter, given their riparian location. These structures may be accessible to otter. However, as they are proposed for use by cyclists / pedestrians, there is a negligible mortality risk associated with them (and otter would likely avoid use when humans are present). The Proposed Scheme will neither exacerbate nor improve the level of mortality risk associated with this infrastructure. Therefore, the impact of mortality risk to otter, as a result of the Proposed Scheme is not considered to be significant at any geographic scale.

12.4.4.4.4 Marine Mammals

12.4.4.4.4.1 Surface Water Quality Impacts and Prey Abundance

As discussed in Section 12.4.4.2.1, without the design mitigation incorporated into the design of the Proposed Scheme, the Operational Phase of the Proposed Scheme could result in contamination of receiving water bodies. This could result in significant negative impacts on marine mammals either directly (e.g. acute or sub-lethal toxicity from pollutants) or indirectly (e.g. affecting their food supply or supporting habitats).

Habitat degradation as a result of effects on surface water quality during operation has the potential to affect the conservation status of marine mammals and result in a likely significant negative effect, at a local geographic scale. This is in consideration of the temporary nature and scale of the proposed impact, the availability of suitable habitat for marine mammals in the wider vicinity and the relative abundance of marine mammals across the wider environment, as demonstrated in the results of the desk study.

12.4.4.4.5 Other Mammals

No evidence of other protected terrestrial mammals was recorded along the Proposed Scheme during surveys undertaken. However, based on the results of the desk study, other protected terrestrial mammals (See Section 12.3.8.5) are known to occur within the wider vicinity and therefore impacts on this species cannot be excluded.

12.4.4.4.5.1 Habitat Severance / Barrier Effect

Barriers such as road infrastructure may affect foraging behaviour and dispersal corridors, (e.g. the movement of species between breeding, foraging and hibernation sites), meaning that local populations can become isolated, having long-term effects on genetic diversity and gene flow, at a local geographic scale.

As the Proposed Scheme, for the most part, will consist of upgrading existing infrastructure, the effect of habitat severance / barrier effect on small mammals is not considered to be significant at any geographic scale. The existing infrastructure itself acts as a barrier to small mammal movement across the landscape and the Proposed Scheme will neither exacerbate nor improve the barrier effect already in existence.

12.4.4.4.5.2 Mortality Risk

The Proposed Scheme will not result in any increase in terms of mortality risk to small mammals during operation. This is because the Proposed Scheme is largely focused on upgrading existing infrastructure, the mortality risk of which already exists. The Proposed Scheme will neither exacerbate nor improve the level of mortality risk associated with this infrastructure. Therefore, the impact of mortality risk to small mammals, as a result of the Proposed Scheme is not regarded to be significant at any geographic scale.

12.4.4.4.5.3 Light Spill

Nocturnal mammals are likely to be disturbed by the introduction of artificial light into unlit, established breeding and foraging areas (Rich and Longcore 2005). Permanent lighting is proposed along all of the Proposed Scheme, however, it should be noted that the majority of the Proposed Scheme corridor is already lit artificially, and so small mammals in the area would be habituated to some degree of artificial lighting.

The lighting design of the Proposed Scheme controls light emission such that along the majority of the alignment light spill does not extend beyond the Proposed Scheme boundary and where it does, this is at tie-ins with the existing road / footpath networks or at residential properties.

Considering the above, lighting associated with the Proposed Scheme will not disturb or displace small mammal species from habitat areas located beyond the areas immediately adjacent to the Proposed Scheme boundary, it will not affect the species conservation status in that regard and will not result in a likely significant negative effect, at any geographic scale.

12.4.4.5 Birds

12.4.4.5.1 Breeding Birds

12.4.4.5.1.1 Disturbance / Displacement

Increases in noise levels, associated with the increased frequency of bus traffic, as well as increased human presence, owing to the provision of the proposed cycle tracks, and may also have a negative effect on bird abundance and occurrence in the locality. Increased noise levels, as well as causing disturbance to birds in the locality, may also affect the breeding success of local bird populations as bird calls would become drowned out by traffic noise.

It is important to note that the majority of the Proposed Scheme is located within a highly urbanised environment, and so traffic noise is an existing source of disturbance for breeding birds in the vicinity. Owing to this, the population of breeding birds which occur here are likely to already be habituated to some level of noise disturbance and the effect of increased noise is not likely to be significant at any geographic scale.

Localised disturbance effects on breeding birds will most likely be of greater impact at the River Poddle, than the remainder of the Proposed Scheme. The provision of the Stone Boat Boardwalk along the River Poddle has the potential to result in increased human presence in this area. Robert Emmet Bridge is located in an existing busy area, with the provision of the offline pedestrian / cycle bridges unlikely to result in increased human activity at this location. The provision of the Stone Boat Boardwalk at the River Poddle has the potential to result in the displacement of a small number of nesting riparian birds from the areas immediately surrounding the proposed boardwalk structure. The numbers of riparian birds displaced is likely to be significantly limited due to the culverted nature of the River Poddle directly upstream of the proposed boardwalk and the reinforced man-made nature of the banks at this location. The area of increased disturbance forms a relatively small part of larger expanses of similar habitat along the River Poddle. It is therefore considered that there may be temporary non-significant effects on breeding riparian birds at a local scale, until such a time that they have established new nesting sites.

The displacement of breeding birds from the Proposed Scheme boundary is likely to result in an increase in competition for resources (e.g. nesting habitat or prey / food sources) both between and amongst breeding bird species, which in turn would have negative impacts on local breeding bird populations in the long-term.

Although the Proposed Scheme is predicted to have a long-term effect on local breeding bird populations, even at a local level, this is not predicted to affect the ability of local breeding bird species to persist within their current ranges or to maintain their populations long-term. Therefore, the Proposed Scheme is not likely to affect the conservation status of breeding bird species and will not result in a likely significant negative effect, at any geographic scale.

12.4.4.5.1.2 Habitat Degradation - Surface Water

As discussed in Section 12.4.4.2.1, without the design mitigation incorporated into the design of the Proposed Scheme, the Operational Phase of the Proposed Scheme could result in contamination of receiving water bodies. In the absence of mitigation, this could potentially result in significant negative impacts on breeding birds either directly (e.g. acute or sub-lethal toxicity from pollutants) or indirectly (e.g. affecting their food supply or supporting habitats).

Habitat degradation as a result of effects on surface water quality during operation has the potential to affect the conservation status of breeding birds and result in a likely significant negative effect, at a local geographic scale. This is in consideration of the temporary nature and scale of the proposed impact, the availability of suitable habitat for breeding birds in the wider vicinity and the relative abundance of breeding birds across the wider environment, as demonstrated in the results of the desk study.

12.4.4.5.2 Wintering Birds

This section of the impact assessment deals with wintering bird species (i.e. those bird species which are SCIs of SPAs for their wintering populations or are listed on either the BoCCI Red or Amber lists for their wintering populations).

12.4.4.5.2.1 Disturbance / Displacement

During operation, the Proposed Scheme has the potential to disturb and displace wintering bird species from their habitat near the Proposed Scheme boundary due to an increase in noise, human activity and visual disturbance associated with increased human presence and increased traffic flow. Although the operational disturbance / displacement effect cannot be quantified with precision, it is expected to be much less than the 300m ZoI associated with construction works because operational disturbance will be limited to vehicular traffic and periodic maintenance works, which are also present within the existing environment. Most species of wintering birds are likely to habituate to the increased traffic flows and human presence along cycle tracks etc. Any operational noise increases are not likely to alter the existing baseline effect on wintering birds using the habitats locally.

Although there is still likely to be some level of displacement effect, a perceptible effect would be expected to be limited to inland feeding habitats immediately adjacent to the Proposed Scheme. No known major wintering bird feeding sites occur within the footprint of the Proposed Scheme or immediately adjacent to it. The nearest known wintering bird feeding site is Eamonn Ceannt Park which is approximately 60m from the Proposed Scheme at Sundrive Road. The playing pitches here are utilised by foraging wintering birds and are recognised as being of Major Importance for wintering populations of light-bellied Brent geese associated with Dublin Bay. However, substantial treelines and residential houses and gardens exist between the playing pitches of the park and Sundrive Road. These features will reduce noise disturbance effects from the Proposed Scheme on this wintering bird site, such that effects will be insignificant with respect to existing baseline noise levels. The three other known wintering bird feeding sites that occur within 1km of the Proposed Scheme (Clonmacnoise roundabout; Templeogue / Synge Street GAA pitches and Lorcan O'Toole Park) all lie in excess of 300m from the Proposed Scheme, and therefore, disturbance / displacement impacts on wintering birds as a result of the operation of the Proposed Scheme can be excluded.

Therefore, any displacement of birds from habitat areas during the Operational Phase of the Proposed Scheme is not likely to affect the conservation status of wintering bird species and will not result in a likely significant negative effect, at any geographic scale.

12.4.4.5.2.2 Habitat Degradation – Surface Water

As discussed in Section 12.4.4.2.1, without the design mitigation incorporated into the design of the Proposed Scheme, the Operational Phase of the Proposed Scheme could result in contamination of receiving water bodies. This could result in significant negative impacts on wintering birds either directly (e.g. acute or sub-lethal toxicity from pollutants) or indirectly (e.g. affecting their food supply or supporting habitats).

The drainage design for the Proposed Scheme incorporates pollution control measures in areas where the impermeable surface area is being increased (e.g. oversized piper, bioretention areas and tree pits). The inclusion of these Sustainable drainage systems (SuDS) will reduce the volume of surface water runoff discharging to the existing drainage network. The functioning and effectiveness of both elements of the road drainage network are discussed in more detail in Chapter 13 (Water). The Proposed Scheme will not exacerbate the existing surface water quality conditions in any of the receiving surface waters, or larger waterbodies such as Liffey Estuary Lower. It will, in fact, result in a beneficial, albeit imperceptible, impact on the local surface water quality due to the implementation of SuDS, where appropriate.

Sections of the Proposed Scheme that do not increase impermeable surface area will continue to discharge, directly to the receiving surface water network, as well as existing combined sewers which ultimately discharge to the Liffey Estuary Lower via Ringsend WwTP.

Habitat degradation as a result of effects on surface water quality during operation has the potential to affect the conservation status of wintering birds and result in a likely significant negative effect, at a local geographic scale. This is in consideration of the temporary nature and scale of the proposed impact, the availability of suitable habitat for wintering birds in the wider vicinity and the relative abundance of wintering birds across the wider environment, as demonstrated in the results of the desk study.

12.4.4.6 Reptiles

No evidence of any protected reptile species, such as common lizard, was identified along the Proposed Scheme during the surveys undertaken. No suitable habitat for common lizard was recorded during the surveys undertaken either. The desk review did not reveal any recent records for common lizard. Nonetheless a precautionary approach has been adopted which has not excluded the possibility of common lizard being present in the vicinity of the Proposed Scheme.

12.4.4.6.1 Habitat Severance / Barrier Effect

Barriers such as road infrastructure may affect foraging behaviour and dispersal corridors (e.g. the movement of species between breeding and hibernation sites), meaning that local populations can become isolated, having long-term effects on genetic diversity and gene flow, at a local geographic scale.

As the Proposed Scheme, for the most part, will consist of upgrading existing infrastructure, the effect of habitat severance / barrier effect on common lizard is not considered to be significant at any geographic scale. The existing infrastructure itself acts as a barrier to reptile movement across the landscape and the Proposed Scheme will neither exacerbate nor improve the barrier effect already in existence.

12.4.4.6.2 Mortality Risk

The Proposed Scheme will not result in any increase in terms of mortality risk to common lizard during operation. This is because the Proposed Scheme is largely focused on upgrading existing infrastructure, the mortality risk of which already exists. The Proposed Scheme will neither exacerbate nor improve the level of mortality risk associated with this infrastructure. Therefore, the impact of mortality risk to common lizard, as a result of the Proposed Scheme is not considered to be significant at any geographic scale.

12.4.4.7 Amphibians

No evidence of any protected amphibian species, such as common frog or smooth newt, were identified along the Proposed Scheme during the surveys undertaken. However, suitable amphibian habitat such as vegetated

river and canal banks were recorded within the Proposed Scheme boundary. The desk study returned records of amphibians in the vicinity of the Proposed Scheme, and therefore, impacts on these species cannot be excluded.

12.4.4.7.1 Habitat Severance / Barrier Effect

Barriers such as road infrastructure may affect foraging behaviour and dispersal corridors (e.g. the movement of species between breeding and hibernation sites), meaning that local populations can become isolated, having long-term effects on genetic diversity and gene flow, at a local geographic scale.

As the Proposed Scheme, for the most part, will consist of upgrading existing infrastructure, the effect of habitat severance / barrier effect on amphibian species is not considered to be significant at any geographic scale. The existing infrastructure itself acts as a barrier to amphibian movement across the landscape and the Proposed Scheme will neither exacerbate nor improve the barrier effect already in existence.

12.4.4.7.2 Mortality Risk

The Proposed Scheme will not result in any increase in terms of mortality risk to amphibians during operation. This is because the Proposed Scheme is largely focused on upgrading existing infrastructure, the mortality risk of which already exists. The Proposed Scheme will neither exacerbate nor improve the level of mortality risk associated with this infrastructure. Therefore, the impact of mortality risk to amphibians, as a result of the Proposed Scheme is not considered to be significant at any geographic scale.

12.4.4.7.3 Habitat Degradation – Surface Water

As discussed in Section 12.4.4.2.1, without the design mitigation incorporated into the design of the Proposed Scheme, the Operational Phase of the Proposed Scheme could result in contamination of receiving water bodies. This could result in significant negative impacts on amphibians either directly (e.g. acute or sub-lethal toxicity from pollutants) or indirectly (e.g. affecting their food supply or supporting habitats).

The drainage design for the Proposed Scheme incorporates pollution control measures in areas where the impermeable surface area is being increased (e.g. oversized piper, bioretention areas and tree pits). The inclusion of these Sustainable drainage systems (SuDS) will reduce the volume of surface water runoff discharging to the existing drainage network. The functioning and effectiveness of both elements of the road drainage network are discussed in more detail in Chapter 13 (Water). The Proposed Scheme will not exacerbate the existing surface water quality conditions in any of the receiving surface waters, or larger waterbodies such as Liffey Estuary Lower. It will, in fact, result in a beneficial, albeit imperceptible, impact on the local surface water quality due to the implementation of SuDS, where appropriate.

Sections of the Proposed Scheme that do not increase impermeable surface area will continue to discharge, directly to the receiving surface water network, as well as existing combined sewers which ultimately discharge to the Liffey Estuary Lower via Ringsend WwTP.

Habitat degradation as a result of effects on surface water quality during operation has the potential to affect the conservation status of amphibians and result in a likely significant negative effect, at a local geographic scale. This is in consideration of the temporary nature and scale of the proposed impact, the availability of suitable habitat for amphibians in the wider vicinity and the relative abundance of amphibians across the wider environment, as demonstrated in the results of the desk study.

12.4.4.8 Fish

12.4.4.8.1 Habitat Degradation- Surface Water

As discussed in Section 12.4.4.2.1, without the design mitigation incorporated into the design of the Proposed Scheme, the Operational Phase of the Proposed Scheme could potentially result in contamination of receiving water bodies. This could result in significant negative impacts on European eel and other fish species (all within the Grand Canal) either directly (e.g. acute or sub-lethal toxicity from pollutants) or indirectly (e.g. affecting their food supply or supporting habitats).

The drainage design for the Proposed Scheme incorporates pollution control measures in areas where the impermeable surface area is being increased (e.g. oversized piper, bioretention areas and tree pits). The inclusion of these Sustainable drainage systems (SuDS) will reduce the volume of surface water runoff discharging to the existing drainage network. The functioning and effectiveness of both elements of the road drainage network are discussed in more detail in Chapter 13 (Water). The Proposed Scheme will not exacerbate the existing surface water quality conditions in any of the receiving surface waters, or larger waterbodies such as Liffey Estuary Lower. It will, in fact, result in a beneficial, albeit imperceptible, impact on the local surface water quality due to the implementation of SuDS, where appropriate.

Sections of the Proposed Scheme that do not increase impermeable surface area will continue to discharge, directly to the receiving surface water network, as well as existing combined sewers which ultimately discharge to the Liffey Estuary Lower via Ringsend WwTP.

Habitat degradation as a result of effects on surface water quality during operation has the potential to affect the conservation status of fish species and result in a likely significant negative effect, at a Local to County geographic scale. This is in consideration of the temporary nature and scale of the potential impact.

12.4.4.8.2 Habitat Severance / Barrier Effect

The proposed cycle / pedestrian bridges over the Grand Canal at Robert Emmet Bridge have been designed in consultation with IFI and Waterways Ireland and the design criteria set out in the Guidelines for the Crossing of Watercourses during the Construction of National Road Schemes (NRA 2005a) and the Guidelines on Protection of Fisheries During Construction Works in and Adjacent to Waters (IFI 2016). This will maintain fish passage during the operation of the Proposed Scheme and therefore, will result in a Neutral impact to fish species.

12.4.4.9 Invertebrates

During operation, surface water runoff from the Proposed Scheme will discharge to the existing surface water drainage network. Watercourses located within the ZoI of the Proposed Scheme include the River Poddle and the Grand Canal. There will be no hydrological connection from the Proposed Scheme to the Grand Canal during the Operational Phase. Therefore, the effects of habitat degradation on freshwater molluscs is not likely to be significant at any geographic scale.

12.4.4.10 Summary of Potential Operational Phase Impacts (Pre-Mitigation)

Table 12.14: Summary of Potential Operational Phase Impacts (Pre-Mitigation)

Ecological Receptor	Ecological Valuation	Potential Impacts	Potential Significance
Designated Areas for Nature Conservation			
North Dublin Bay SAC; North Dublin Bay pNHA	International Importance National Importance	Habitat Degradation (hydrology; non-native invasive plant species)	Likely significant effect at the international geographic scale
South Dublin Bay SAC South Dublin Bay pNHA	International Importance National Importance	Habitat Degradation (hydrology; non-native invasive plant species)	Likely significant effect at the international geographic scale
Rockabill to Dalkey Island SAC Dalkey Coastal Zone and Killiney Hill pNHA	International Importance National Importance	Habitat Degradation (hydrology)	Likely significant effect at the international geographic scale
Lambay Island SAC Lambay Island pNHA	International Importance National Importance	Habitat Degradation (hydrology)	Likely significant effect at the international geographic scale
South Dublin Bay and River Tolka Estuary SPA Dolphins, Dublin Docks pNHA South Dublin Bay pNHA North Dublin Bay pNHA	International Importance National Importance National Importance National Importance	Habitat Degradation (hydrology; non-native invasive plant species)	Likely significant effect at the international geographic scale

Ecological Receptor	Ecological Valuation	Potential Impacts	Potential Significance
Baldoyle Bay SPA Baldoyle Bay pNHA	International Importance National Importance	Habitat Degradation (hydrology)	Likely significant effect at the international geographic scale
North Bull Island SPA North Dublin Bay pNHA	International Importance National Importance	Habitat Degradation (hydrology; non-native invasive plant species)	Likely significant effect at the international geographic scale
Malahide Estuary SPA Malahide Estuary pNHA	International Importance National Importance	Habitat Degradation (hydrology)	Likely significant effect at the international geographic scale
Ireland's Eye SPA Ireland's Eye pNHA	International Importance National Importance	Habitat Degradation (hydrology)	Likely significant effect at the international geographic scale
Howth Head Coast SPA Howth Head pNHA	International Importance National Importance	Habitat Degradation (hydrology)	Likely significant effect at the international geographic scale
Rogerstown Estuary SPA Portraine Shore pNHA Rogerstown Estuary pNHA	International Importance National Importance National Importance	Habitat Degradation (hydrology)	Likely significant effect at the international geographic scale
Lambay Island SPA Lambay Island pNHA	International Importance National Importance	Habitat Degradation (hydrology)	Likely significant effect at the international geographic scale
Dalkey Island SPA Dalkey Coastal Zone and Killiney Hill pNHA	International Importance National Importance	Habitat Degradation (hydrology)	Likely significant effect at the international geographic scale
Skerries Islands SPA Skerries Islands NHA	International Importance National Importance	Habitat Degradation (hydrology)	Likely significant effect at the international geographic scale
The Murrough SPA The Murrough pNHA	International Importance National Importance	Habitat Degradation (hydrology)	Likely significant effect at the international geographic scale
The Grand Canal pNHA	National Importance	Habitat Degradation (hydrology; non-native invasive plant species)	Likely significant effect at the national geographic scale
Habitats (outside of designated areas for nature conservation)			
Canals (FW3)	National Importance	See Grand Canal pNHA above	See Grand Canal pNHA above
Depositing/lowland rivers (FW2)	Local Importance (Higher Value)	Habitat degradation (hydrology)	Likely significant effect at the local geographic scale
Fauna Species			
Bats	Local Importance (Higher Value)	Disturbance / displacement	Likely significant effect at the local geographic scale
Otter	County Importance	Habitat degradation (hydrology)	Likely significant effect at the local geographic scale
Marine mammals	County Importance	Habitat degradation (hydrology)	Likely significant effect at the local geographic scale
SCI bird species	International Importance	*See SPAs above*	*See SPAs above*
All other breeding bird species (non-SCI)	Local Importance (Higher Value)	Habitat Degradation (hydrology)	Likely significant effect at the local geographic scale
All other wintering bird species (non-SCI)	Local Importance (Higher Value)	Habitat Degradation (hydrology)	Likely significant effect at the local geographic scale
Amphibians	Local Importance (Higher Value)	Habitat Degradation (hydrology)	Likely significant effect at the local geographic scale
Fish Species – European Eel	National Importance	Habitat Degradation (hydrology)	Likely significant effect at the County scale
Non-Annex fish species	Local Importance (Higher Value)	Habitat Degradation (hydrology)	Likely significant effect at the local geographic scale

12.5 Mitigation and Monitoring Measures

12.5.1 Construction Phase

Where deemed necessary a suitably experienced and qualified ecologist will be employed by the appointed contractor. The ecologist will advise the appointed contractor on ecological matters during construction, communicate all findings in a timely manner to the NTA and statutory authorities, acquire any licences / consents required to conduct the work, and supervise and direct ecological measures associated with the Proposed Scheme.

12.5.1.1 Designated Areas for Natura Conservation

12.5.1.1.1 European sites

The mitigation measures that are required to ensure that the Proposed Scheme will not adversely affect the integrity of the European sites within the ZoI are presented in the NIS. Following consideration and assessment of the Proposed Scheme on the identified relevant European sites, the following mitigation measures were developed to address potential impacts that were identified:

- Measures to protect surface water quality during construction; and
- Measures to prevent the spread of non-native invasive species to downstream European sites.

12.5.1.1.2 National Sites

The mitigation measures in relation to potential impacts arising from the Proposed Scheme on the NHA and pNHAs within the ZoI are as per those for European sites, as the boundaries coincide with the SACs and SPAs. Therefore, the mitigation measures outlined above in Section 12.5.1.1.1, and as detailed in the NIS, will prevent the Proposed Scheme resulting in a significant negative effect on these NHA / pNHAs at the national geographic scale. It should be noted that the full suite of mitigation measures proposed to protect surface water during the Construction Phase and to prevent the spread of invasive species to downstream European and national sites are set out in full in Appendix A5.1 CEMP in Volume 4 of this EIAR.

The mitigation measures in relation to potential impacts arising from the Proposed Scheme on the Grand Canal pNHA are outlined for habitat degradation as a result of surface water quality effects, habitat degradation as a result of air quality impacts and the spread of invasive species (see Section 12.5.1.2), effects on rare and protected plant species (see Section 12.5.1.3), and negative effects on the protected fauna species associated with the site such as mammals, riparian birds, and fish species (see Section 12.5.1.4, Section 12.5.1.5 and Section 12.5.1.8).

12.5.1.2 Habitats

12.5.1.2.1 Habitat Loss and Fragmentation

Where practicable, areas of vegetation including habitats of Local Importance (Higher Value), (i.e. mixed broadleaved woodland, scattered trees and parkland, treelines and hedgerow habitat types), which lie within the footprint, or along the boundary of the Proposed Scheme, will be retained. Proposed planting incorporated into the Proposed Scheme to be implemented by the appointed contractor is shown as design mitigation and is listed below and displayed on the Landscaping General Arrangement drawings [BCIDD-ROT-ENV_LA-0011_XX_00-DR-LL-9001] in Volume 3 of this EIAR. These areas will be protected for the duration of construction works and fenced off at an appropriate distance. Vegetation to be retained is shown in further detail on the Landscape General Arrangement Drawings [BCIDD-ROT-ENV_LA-0011_XX_00-DR-LL-9001] in Volume 3 of this EIAR.

To mitigate the loss of habitat, proposed planting incorporated into the Proposed Scheme will be implemented by the appointed contractor, as listed below and displayed on the Landscaping General Arrangement [BCIDD-ROT-ENV_LA-0011_XX_00-DR-LL-9001] in Volume 3 of this EIAR.

- 117 street trees planted;
- 165m of proposed hedgerow;

- 590m^2 of proposed ornamental planting; and
- 768m^2 of proposed amenity grassland planting.

12.5.1.2.2 Habitat Degradation – Surface Water Quality

In terms of mitigation, a Surface Water Management Plan (SWMP) has been prepared (provided in Appendix A5.1 CEMP in Volume 4 of this EIAR), 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 within the Employer's 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. At a minimum, all the control and management measures set out in the SWMP will be implemented by the appointed contractor. This includes measures relating to:

- Construction Compound management including the storage of fuels and materials;
- In-stream working and water body crossings;
- Control of sediment;
- Use of concrete;
- Management of vehicles and plant including refuelling and wheel wash facilities (if necessary); and
- Monitoring.

Following implementation of the generic mitigation measures outlined in the SWMP, the majority of impacts will not be significant. There are a few activities, however, that require additional measures to ensure that impacts are not significant:

- Construction of the new Stone Boat Boardwalk over Poddle_010 at Mount Argus View; and
- Construction of new cycle / footbridges across the Grand Canal to either side of the existing Robert Emmet Bridge.

Therefore, the following mitigation measures have been identified and will be applied to minimise and avoid these impacts:

- All necessary consents will be obtained from the relevant regulator (such as IFI, OPW, etc.), as appropriate;
- Bank stabilisation and erosion protection, if required, will be designed in consultation with the IFI and the NPWS;
- The area of disturbance of the watercourse bed and bank will be the absolute minimum required;
- Works within and adjacent to watercourses will be conducted during forecast low flow periods, where possible;
- Operation of machinery in-stream will not be permitted. All construction machinery operating near to the water body will be mechanically sound to avoid leaks of oils, hydraulic fluid, etc.;
- A suitable bund will be installed by the appointed contractor along the bank downhill of any piling in the banks (Poddle_010 and Grand Canal), for example, silt fence, sandbags or straw bales to direct silty water runoff away from the water body. Any silty water will be collected and treated through the use of a silt-buster tank or similar, to be decided upon by the appointed contractor;
- Any dewatering flows will be directed to the construction drainage system and to the settlement pond (or other) treatment system;
- Reinstatement of any banks affected during construction works near a watercourse will be reinstated back to pre-development conditions; and
- Any bank-side clearance in the immediate area of a crossing / works should be kept to a minimum and adequate measures will be put in place to control or minimise the risk of siltation. This may include such measures as:
    - Bunding and diversion of site runoff to settlement ponds / tanks;

- Stripping of topsoil will be in accordance with the soils requirements outlined in A Guide to Landscape Treatments for National Road Schemes in Ireland (NRA 2005), and where necessary, the site will be surfaced with granular material; and
- Covering of temporary stockpiles.

In addition to this, specific measures will need to be put in place to prevent the mobilisation of pollutants in potentially contaminated ground from reaching the Grand Canal. The appointed contractor, in consultation with the NTA, will engage with ESB Networks to locate their oil-filled cable in the context of the Proposed Scheme. A ground investigation, where construction works are to take place near to the ESB oil-filled cable, will be carried out prior to construction commencing and following this, an appropriate suite of mitigation measures will be confirmed and deployed, which could for example result in the removal of all contaminated material from site as outlined in Chapter 14 (Land, Soils, Geology & Hydrogeology). Any hazardous material to be removed from site will be removed in accordance with measures outlined in Chapter 18 (Waste & Resources).

12.5.1.2.3 Habitat Degradation – Groundwater

The following mitigation measures will be implemented with regard to pollution of soil and groundwater:

- The construction management of the site to be implemented by the appointed contractor will take account of the recommendations of the CIRIA Control of Water Pollution from Construction Sites – Guidance for consultants and contractors (Masters-Williams *et al*. 2001) to minimise, as far as possible, the risk of soil, groundwater and surface water contamination; and
- Measures to be implemented by the appointed contractor to minimise the risk of spills and contamination of soils and waters will include:
  - Employing only a competent and experienced workforce, and site-specific training of site managers, foremen and workforce, including all subcontractors, in pollution risks and preventative measures;
  - Ensure that all areas where liquids (including fuel) are stored, or cleaning is carried out, are in designated impermeable areas that are isolated from the surrounding area and within a secondary containment system (e.g. by a roll-over bund, raised kerb, ramps or stepped access);
  - The location of any fuel storage facilities will be considered in the design of the Construction Compounds. These are to be designed in accordance with relevant guidelines and codes of best practice and will be fully bunded;
  - Good housekeeping at the site (daily site clean-ups, use of disposal bins, etc.) during the entire Construction Phase;
  - All concrete mixing and batching activities will be located in areas away from watercourses and drains;
  - Potential pollutants will be adequately secured against vandalism;
  - Provision of proper containment of potential pollutants according to the codes of best practice;
  - Thorough control during the entire Construction Phase to ensure that any spillage is identified at an early stage and subsequently effectively contained and managed; and
  - Spill kits will be provided and will be kept close to the storage area. Staff will be trained on how to use spill kits correctly.

The mitigation measures to protect groundwater quantity and quality during the Construction Phase are outlined in Chapter 14 (Land, Soils, Geology & Hydrogeology) and Appendix A5.1 CEMP in Volume 4 of this EIAR.

12.5.1.2.4 Habitat Degradation – Air Quality

A series of mitigation measures will be implemented by the appointed contractor to minimise dust nuisance impacts:

- Public roads affected by the Proposed Scheme works will be regularly inspected for soiling associated with construction activities and cleaned, as necessary;
- Material handling systems and site stockpiling of materials will be designed and laid out to minimise exposure to wind. Water misting or sprays (or similar dust suppression methods) will be used, as

required, if particularly dusty activities associated with the construction contract are necessary during dry or windy periods;

- During movement of dust-generating materials both on-site and off-site, trucks will be covered with tarpaulin, and before entrance onto public roads, trucks will be checked to ensure the tarpaulins are properly in place;
- The appointed contractor will provide a site hoarding of 2.4m height along noise sensitive boundaries, at a minimum, at the Construction Compounds which will assist in minimising the potential for dust impacts off-site; and
- The appointed contractor will keep the effectiveness of the mitigation measures under review and revise them as necessary. In the event of dust nuisance occurring outside the works boundary associated with the Proposed Scheme, movements of materials likely to raise dust will be curtailed and satisfactory procedures implemented to rectify the problem.

12.5.1.2.5 Habitat Degradation – Non-Native Invasive Plant Species

The NTA will ensure that a confirmatory pre-construction invasive species survey will be undertaken by a suitably qualified specialist to confirm the absence and / or extent of all Third Schedule invasive species within the footprint of the Proposed Scheme. Where an infestation is confirmed / identified, this will require the implementation of a non-native Invasive Species Management Plan (ISMP) (refer to the ISMP contained in the CEMP in Appendix A5.1 of Volume 4 of this EIAR).

Following the confirmatory pre-construction survey, the following mitigation measures will be implemented, as required.

- Where a pre-construction invasive species re-survey has confirmed the presence of previously identified Third Schedule non-native invasive species, or identifies newly established non-native invasive species within the footprint of the Proposed Scheme, the ISMP produced will provide a detailed description of the infestations (e.g. approximate area of the respective colonies (m^2), where feasible; approximate total number of stems, pattern of growth and information on other vegetation present), and where necessary, will include calculations of volumes of infested soils to be excavated;
- The ISMP will be finalised following the pre-construction survey as advised by a suitably qualified specialist, with regard to the guidance on The Management of Invasive Alien Plant Species on National Roads (Technical Guidance) (TII 2020a; 2020b) and other species-specific guidance documents including those listed in the ISMP, as necessary; and
- The NTA will ensure that all control measures specified in the ISMP shall be implemented by a suitably qualified and licensed specialist prior to the construction of the Proposed Scheme to control the spread of non-native invasive species within the footprint of the Proposed Scheme. Furthermore, the appointed contractor will adhere to control measures specified within the 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 as detailed in the Proposed Scheme ISMP.

12.5.1.3 Rare and Protected Plant Species

12.5.1.3.1 Habitat Degradation- Surface Water Quality

No protected plant species listed on the Flora (Protection) Order, 2022, were recorded during the field surveys within or in close proximity to the Proposed Scheme. Therefore. No species-specific mitigation is proposed.

In terms of general mitigation, a SWMP has been prepared (provided in Appendix A5.1 CEMP in Volume 4 of this EIAR), 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.

Specific mitigation measures which the appointed contractor will implement in relation to surface water quality are described in Section 12.5.1.2.2 and in Chapter 13 (Water).

12.5.1.4 Mammals

12.5.1.4.1 Bats

12.5.1.4.1.1 Protection of Bats During Vegetation Clearance

All bat species and their roost sites are strictly protected under both European and Irish legislation including:

- Wildlife Acts;
- The Habitats Directive; and
- Birds and Habitats Regulations.

It is an offence to kill a bat or to damage or destroy the breeding or resting place of any bat species, and it is not necessary that the action should be deliberate for an offence to occur. This puts an onus of due diligence on anyone proposing to carry out works that might result in such damage or destruction. Under Section 54 of the Birds and Habitats Regulations, a derogation may be granted by the Minister where there is no satisfactory alternative, and the derogation is not detrimental to the maintenance of the populations of the species to which the Habitats Directive relates at a favourable conservation status in their natural range.

One tree was identified within the multidisciplinary surveys to contain PRFs (see Figure 12.6.2 in Volume 3 of this EIAR). This tree (CBC0011PRF001), which is along the boundary of Construction Compound K2 will not be removed during the Construction Phase of the Proposed Scheme, and the following mitigation measures will be implemented by the appointed contractor:

- Where works are required within the RPA (including the tree identified to contain PRFs), the mitigation measures as set out in the method statement within the Arboricultural Impact Assessment (refer to Appendix A17.1 in Volume 4 of this EIAR) and which follow the requirements of the British Standard Institution (BSI) British Standard (BS) 5837:2012 Trees in relation to design, demolition, construction – Recommendations (BSI 2012) will be implemented; and
- The PRF containing tree will, in advance of any works commencing in the area, be protected by the appointed contractor for the duration of construction works associated with the Proposed Scheme.

In addition to the above, the following bat specific mitigation measures (in relation to vegetation clearance) will be implemented by the appointed contractor:

- Where the qualified arborist engaged by the appointed contractor is required to assess the condition of, and advise on any repair works necessary to, any trees which are to be retained (including PRF-containing trees or category U trees), these will be notified to the appointed ecologist to be surveyed to confirm if these trees are PRFs (as done for the pre-constructions surveys outlined in Section 12.5.1.4.1.2). Where these previously identified or new PRF(s) require works including removal for example due to poor condition, they will be subject to mitigation as described in Section 12.5.1.4.1.2; and
- There will be no additional lighting within 5m of any PRF during the Construction Phase of the Proposed Scheme to avoid potential disturbance to roosting bats.

12.5.1.4.1.2 Roost Loss

One tree containing PRFs (CBC0011PRF001) was identified within the temporary land take boundary with the Construction Compound K2 at Our Lady's Hospice. While this area will not be returned to the greenspace upon completion, the tree is being retained. Additional, trees that are currently unsuitable may become roosts between the pre-planning assessment contained within this EIAR and the Construction Phase of the Proposed Scheme.

PRF Re-Appraisal (First Step of Pre-Construction Survey):

The NTA will ensure that a confirmatory pre-construction survey of all trees identified as containing PRFs or not to be removed within the boundary of the Proposed Scheme shall be rechecked for PRFs by an experienced bat specialist engaged by the NTA as part of the pre-construction surveys. The survey will:

- Confirm that previously identified PRFs which are to be retained are still standing; and

- Identify whether new PRF (if any) may have developed owing to damage or management change to trees in the intervening period between the original surveys and grant of planning.

Pre-Construction Survey

In the unlikely event that PRFs are detected during the pre-construction survey, it is recommended that:

- In advance of any clearance, all trees deemed to contain PRFs, which are subject to felling / clearance will be checked for the presence of bats by a suitably qualified / licenced bat specialist (using an endoscope under a separate licence held by that individual);
- In the unlikely event that bats are encountered during construction works, such as vegetation clearance, works will immediately cease in that area and the local NPWS Conservation Ranger will be contacted;
- An application will then be made to the NPWS for a derogation licence to permit actions affecting bats or their roosts that would normally be prohibited by law;
- After licence approval from the NPWS (which may include the necessity for additional mitigation measures to those recommended here), bats may be removed by a bat specialist licensed to handle bats and released in the area in the evening following capture; and
- Only then will trees containing PRFs be felled and this should be undertaken 'in sections' where the section can be handled to avoid sudden movements or jarring of the sections.

Installation of Bat Boxes

In addition to mitigation proposals that may arise as result of the pre-construction survey (e.g. emergence surveys and confirmation of roost), it is proposed to install generalist / self-cleaning bat boxes for each tree containing PRFs that is confirmed to be removed:

- Standard Schwegler 1FFH (2 number) and 3FF boxes (1 number) for all PRF trees to be removed;
- The boxes will be installed three months in advance of felling of any PRF and in public spaces managed by the local authority, as close as possible to areas of the PRF to be felled and which overlap with areas of bat activity confirmed during activity surveys undertaken as part of the EIAR;
- The boxes will be installed on the tree at a height of 3m to 5m and firmly fixed to the tree trunk;
- Where practicable, the bat boxes will be installed in an east, south and west orientation and protected from undue disturbance by selective placement away from light spill and at a height >3.5m;
- There will be a 1m clearance (e.g. no overhanging branches or ivy encroachment near the installed box) around each bat box opening; and
- Installed bat boxes will be labelled and data (reference number, GPS location and photographic record) will be supplied to Bat Conservation Ireland (BCI), the Local Authority Biodiversity Officer and the NPWS.

12.5.1.4.1.3 Habitat Loss and Fragmentation

Where possible, habitats of importance to bats such as scattered trees and parkland, treeline and hedgerow habitat types, which lie within the footprint, or along the boundary of the Proposed Scheme, that are not directly impacted by the Proposed Scheme, will be retained. These areas will be protected for the duration of construction works and fenced off at an appropriate distance. Vegetation to be retained is shown on the Landscaping General Arrangement drawings (BCIDD-ROT-ENV_LA-00011_XX_00-DR-LL-9001) in Volume 3 of this EIAR.

To minimise the loss of habitat associated with the Proposed Scheme, there are also areas within the Proposed Scheme footprint which are included for mitigation planting where general construction works will not be undertaken. Proposed planting incorporated into the Proposed Scheme that will be implemented, shown as design mitigation, is listed below and displayed on the Landscape General Arrangement drawings (BCIDD-ROT-ENV-LA-0011_XX_00-DR-LL-9001) in Volume 3 of this EIAR. This includes approximately:

- 117 street trees planted; and
- 165m of proposed hedgerow.

Many species may not roost near a road development due to disturbance (e.g. high levels of artificial lighting). Whilst the planting is not likely to fully offset the loss of foraging and commuting habitat, it is likely to provide additional foraging habitat after trees and hedgerows grow to a sufficient maturity.

12.5.1.4.1.4 Disturbance of Flight Patterns / Foraging Routes as a Result of Lighting Impacts

The appointed contractor, in liaison with the suitably qualified licensed ecologist(s), will ensure that lighting at the Construction Compounds, and active work areas in proximity to known bat activity, will be designed to minimise light spill and be cognisant of light-spill onto these areas.

Notwithstanding the urban / peri-urban location of the Proposed Scheme and existing public illumination, there are areas of open and linear vegetation features that provide for bats. However, during construction, the use of security lighting such as that around the Construction Compounds and / or additional lighting required for night-time works could impact on commuting / foraging territory.

Where deemed necessary, a suitably qualified licensed ecologist(s), engaged by the appointed contractor, will ensure that lighting at the Construction Compounds and in active work areas, which are in close proximity to watercourses with known bat activity, will be designed to minimise light spill and be cognisant of downward light-spill onto watercourses.

Mitigation measures to reduce light spill will include the following:

- The use of sensor / timer triggered lighting;
- LED luminaires to be used where possible due to their sharp cut-off, lower intensity, good colour rendition and dimming capability;
- Column heights to be considered to minimise light spill; and
- Accessories such as baffles, hoods or louvres can be used to reduce light spill and direct it only where needed.

Where night-time works are required, the appointed contractor will liaise with the engaged suitably experienced and qualified ecologist(s) and implement measures to mitigate the impact of such works (especially works carried out adjacent to watercourses with known bat activity).

12.5.1.4.2 Badgers

Badger, and their breeding and resting places, are protected under the Wildlife Acts and it is an offence under that legislation to intentionally kill or injure a badger or to wilfully interfere with or destroy their breeding or resting places (setts).

12.5.1.4.2.1 Disturbance / Displacement

Although there were no signs of badger recorded during field surveys, badger could potentially establish new territory within the ZoI of the Proposed Scheme. Therefore, the NTA will ensure that a confirmatory pre-construction check of all suitable badger habitat will be completed within 12 months prior to any construction works commencing.

The presence of any new setts or significant badger activity will be treated and / or protected in accordance with the Guideline for the Treatment of Badgers Prior to the Construction of National Road Schemes (NRA 2005a).

12.5.1.4.2.2 Protection of Badgers from Accidental Harm During Construction (Excavations)

Uncovered deep excavations could be potentially hazardous for badgers commuting / foraging in the area. Badgers could fall into these excavations, becoming trapped and potentially hurt and distressed.

To protect badgers from indirect harm during construction, where practicable, open excavations will be covered when not in use and backfilled as soon as practicable by the appointed contractor.

Excavations will also be covered at night, where practicable, and any deep excavations which must be left open will have appropriate egress ramps in place to allow mammals to safely exit should they fall in.

12.5.1.4.2.3 Lighting

For mitigation to reduce the impact of lighting on local badger, please refer to Section 12.5.1.4.1.4.

12.5.1.4.3 Otter

Otter are listed on Annex II and Annex IV of the Habitats Directive. Otter are strictly protected under the Birds and Habitats Regulations. Otter, and their breeding and resting places, are also protected under the Wildlife Acts and it is an offence under that legislation to intentionally kill or injure an otter or to wilfully interfere with or destroy their breeding or resting places (holts / couches). Otter are known to occur on the Grand Canal and the upper sections of the River Poddle.

12.5.1.4.3.1 Loss of Breeding / Resting Sites

Otter could potentially establish new holt or couch sites within the ZoI of the Proposed Scheme. The NTA will ensure that a confirmatory pre-construction check of all suitable otter habitat will be completed by a suitably qualified ecologist within the 12 months prior to any construction works commencing.

The presence of any new holt / couch sites will be treated and / or protected in accordance with the Guidelines for the Treatment of Otters Prior to the Construction of National Road Schemes (NRA 2006c).

12.5.1.4.3.2 Measures to Prevent Injury / Mortality Impacts

As detailed above in Section 12.5.1.4.3.1, prior to construction works commencing, the appointed contractor will engage the services of a suitably qualified ecologist to conduct a pre-construction otter survey of the Proposed Scheme, in accordance with the Guidelines for the Treatment of Otters Prior to the Construction of National Road Schemes (NRA 2006c), and to oversee and advise works at watercourse crossings:

- Where a new or reactivated holt is encountered, within 150m (up and downstream) of the watercourse crossing, the qualified ecologist(s) will consult with the NPWS in conjunction with the NTA and appointed contractor;
- The qualified ecologist will review method statements; oversee works; provide advice to the appointed contractor(s), deliver toolbox talks and temporarily halt works, if, and as, necessary, having conferred with the NTA;
- To protect otters from indirect harm during construction, where practicable, open excavations will be covered when not in use and backfilled as soon as practicable by the appointed contractor;
- Excavations will also be covered at night, where practicable, and any deep excavations which must be left open will have appropriate egress ramps in place to allow mammals to safely exit should they fall in; and
- Fencing requirements as per the Guidelines for the Treatment of Otters Prior to the Construction of National Road Schemes (NRA 2006c) will be erected around the Construction Compounds (particularly Construction Compound K1) and other working areas which are in close proximity to significant watercourses and have suitable roaming territory for otter.

12.5.1.4.3.3 Measures to Prevent Disturbance / Displacement

Where night-time works are required, the appointed contractor will liaise with the engaged suitably experienced and qualified ecologist(s) and implement measures to mitigate the impact of such works (especially works carried out adjacent to watercourses with known otter activity).

Site set up near watercourse crossings shall be undertaken in a timely manner to reduce impacts to otter. The works area will be delineated from the watercourse with hoarding by the appointed contractor to obscure the site from otter and prevent access. The construction works will commence following confirmation from the suitably qualified ecologist that no otter holt is located within 200m of either of the proposed cycle / pedestrian bridges over the Grand Canal or the proposed Stone Boat Boardwalk along the River Poddle. Should an otter holt be

found to be present, the suitably qualified ecologist will advise, in discussion with the NTA and the appointed contractor on the appropriate actions to be taken.

Where night-working adjacent to watercourses known to support otter is required, owing to practical considerations of traffic restrictions etc., the advice of a suitably qualified ecologist must be sought by the appointed contractor and a derogation licence, if necessary, may be sought from the NPWS permitting such works in close proximity to a new holt.

12.5.1.4.3.4 Habitat Degradation / Reduced Prey Availability- Water Quality

In terms of mitigation, a SWMP has been prepared (provided in Appendix A5.1 CEMP in Volume 4 of this EIAR), 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.

Specific mitigation measures which the appointed contractor will implement in relation to surface water quality are described above in Section 12.5.1.2.2 and in Chapter 13 (Water).

12.5.1.4.3.5 Lighting

Refer to Section 12.5.1.4.1.4 for lighting mitigation measures.

12.5.1.4.4 Marine Mammals

12.5.1.4.4.1 Habitat and Food Resource Degradation- Surface Water Quality

In terms of mitigation, a SWMP has been prepared (provided in Appendix A5.1 CEMP in Volume 4 of this EIAR), 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.

Specific mitigation measures which the appointed contractor will implement in relation to surface water quality are described above in Section 12.5.1.2.2 and in Chapter 13 (Water).

12.5.1.4.5 Other Mammal Species

No other mammal species were recorded during the multidisciplinary surveys carried out along the Proposed Scheme. The Construction Phase of the Proposed Scheme is not deemed to affect the local populations of other small mammal species and will not result in a likely significant negative effect, at any geographic scale.

In terms of mitigation, a SWMP has been prepared (provided in Appendix A5.1 CEMP in Volume 4 of this EIAR), 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. Specific mitigation measures which the appointed contractor will implement in relation to surface water quality are described above in Section 12.5.1.2.2 and in Chapter 13 (Water).

12.5.1.5 Birds

12.5.1.5.1 Breeding Birds

12.5.1.5.1.1 Habitat Loss and Fragmentation

Where possible, habitats of importance to breeding birds such as scattered trees and parkland, treeline and hedgerow habitat types, which lie within the footprint, or along the boundary of the Proposed Scheme, that are not directly impacted, will be retained. These areas will be protected for the duration of construction works and fenced off at an appropriate distance. Vegetation to be retained is shown on the Landscaping General Arrangement drawings (BCIDD-ROT-ENV_LA-0011_XX_00-DR-LL-9001) in Volume 3 of this EIAR.

Planting of treeline, hedgerow and grassland habitats within the Proposed Scheme footprint will be carried out by the appointed contractor, as detailed in the landscape drawings (refer to the Landscaping General Arrangement drawings (BCIDD-ROT-ENV_LA-0011_XX_00-DR-LL-9001) in Volume 3 of this EIAR for locations).

Many species may not nest near a road development due to disturbance (e.g. drowning out of bird song by traffic noise). Whilst the planting is not likely to fully offset the loss of breeding and foraging habitat (due to the proximity of road traffic disturbance on the operational road), it is likely to provide additional foraging habitat for some species.

12.5.1.5.1.2 Mortality Risk

Where practical, vegetation (e.g. hedgerows, trees, scrub, bankside vegetation and grassland) will not be removed, between 1 March and the 31 August, to avoid direct impacts on nesting birds.

Where the construction programme does not allow this seasonal restriction to be observed, these areas will be inspected by a suitably qualified ecologist, as engaged by the appointed contractor, for the presence of breeding birds prior to clearance.

Areas found not to contain nests will be cleared within three days of the nest survey, otherwise repeat surveys will be required. Vegetation clearance will not commence where nests are present, and works will resume when birds have fledged and nests are no longer in use, or an agreement is reached with the NPWS.

12.5.1.5.1.3 Habitat Degradation - Surface Water Quality

In terms of mitigation, a SWMP has been prepared (provided in Appendix A5.1 CEMP in Volume 4 of this EIAR), 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.

Specific mitigation measures which the appointed contractor will implement in relation to surface water quality are described above in Section 12.5.1.2.2 and in Chapter 13 (Water).

12.5.1.5.1.4 Disturbance / Displacement

Similar to the requirements provided above in terms of reducing mortality risk, vegetation clearance undertaken in the appropriate time should ensure that breeding birds have adequate time to identify alternative vegetation in which to establish nests.

To mitigate disturbance and / or displacement to breeding birds from noise and vibration activities, the relevant mitigation measures described in Chapter 9 (Noise & Vibration) will be implemented by the appointed contractor.

The use of noise generating equipment shall be tempered by the use of modern machinery that shall have appropriate noise restrictors for use in urban situations. Furthermore, the location of equipment that has the potential to cause long-term noise impacts, shall be sited in such a manner that noise baffling screening reduces noise spill to adjacent areas of open ground.

12.5.1.5.2 Wintering Birds

12.5.1.5.2.1 Habitat Degradation - Surface Water Quality

In terms of mitigation, a SWMP has been prepared (provided in Appendix A5.1 CEMP in Volume 4 of this EIAR), 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.

Specific mitigation measures which the appointed contractor will implement in relation to surface water quality are described above in Section 12.5.1.2.2 and in Chapter 13 (Water).

12.5.1.6 Reptiles

No reptile species were recorded during the multidisciplinary surveys carried out along the Proposed Scheme. The Construction Phase of the Proposed Scheme is not deemed to affect the local reptile population and will not result in a likely significant negative effect, at any geographic scale. As such, no mitigation is proposed.

12.5.1.7 Amphibians

12.5.1.7.1 Habitat Loss, Disturbance and Mortality Risk

No amphibian species were recorded during the multidisciplinary surveys carried out along the Proposed Scheme, despite the presence of suitable habitat within the footprint of the Proposed Scheme (e.g. Grand Canal).

If vegetation clearance works by the appointed contractor are to begin during the season where frogspawn or tadpoles may be present (i.e. February to mid-summer), or where breeding adult newts, their eggs or larvae may be present (i.e. mid-March to September), a pre-construction survey of suitable habitat will be undertaken by a suitably qualified ecologist, engaged by the appointed contractor, to determine whether breeding amphibians are present. Where amphibians are present, mitigation measures outlined below will be completed before works recommence.

- In the case of common frog, any frog spawn, tadpoles, juvenile or adult frogs present will be captured, under a licence from the NPWS and removed from affected habitat by hand net and translocated to the nearest area of available suitable habitat, beyond the ZoI of the Proposed Scheme;
- In the case of smooth newt, individuals will be captured, under a licence from NPWS, and removed from affected habitat either by hand net or by trapping and translocated to the nearest area of available suitable habitat, beyond the ZoI of the Proposed Scheme. If used, the type and design of traps shall be approved by the NPWS. This is a standard and proven method of catching and translocating smooth newt;
- If the size or depth of the habitat feature is such that it cannot be determined by a visual survey whether all amphibians have been captured, the suitably qualified ecologist, engaged by the appointed contractor, will advise on the appropriate course of action to confirm that no amphibian species remain. If drainage of the habitat feature is deemed to be the appropriate course of action, any mechanical pumps used will have a screen fitted, and will be sited, such that no amphibian species can be sucked into the pump mechanism; and
- Any capture and translocation works shall be undertaken immediately in advance of site clearance / construction works commencing.

12.5.1.7.2 Habitat Degradation- Surface Water Quality

In terms of mitigation, a SWMP has been prepared (provided in Appendix A5.1 CEMP in Volume 4 of this EIAR), 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.

Specific mitigation measures which the appointed contractor will implement in relation to surface water quality are described above in Section 12.5.1.2.2 and in Chapter 13 (Water).

12.5.1.8 Fish

12.5.1.8.1 Habitat Degradation – Surface Water Quality

In terms of mitigation, a SWMP has been prepared (provided in Appendix A5.1 CEMP in Volume 4 of this EIAR), 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.

Specific mitigation measures which the appointed contractor will implement in relation to surface water quality are described above in Section 12.5.1.2.2 and in Chapter 13 (Water).

12.5.1.9 Invertebrates – Freshwater Molluscs

12.5.1.9.1 Habitat Degradation – Surface Water Quality

In terms of mitigation, a SWMP has been prepared (provided in Appendix A5.1 CEMP in Volume 4 of this EIAR), 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.

Specific mitigation measures which the appointed contractor will implement in relation to surface water quality are described above in Section 12.5.1.2.2 and in Chapter 13 (Water).

12.5.2 Operational Phase

12.5.2.1 Designated Areas for Nature Conservation

12.5.2.1.1 European sites

The mitigation measures that are specifically required to ensure that the Proposed Scheme will not adversely affect the integrity of the European sites within the ZoI are presented in the NIS. Following consideration and assessment of the Proposed Scheme on the identified relevant European sites, the following mitigation measures were developed to address potential impacts that were identified:

- Measures to protect surface water quality during construction; and
- Measures to prevent the spread of non-native invasive species to downstream European sites.

12.5.2.1.2 National Sites

The mitigation strategy in relation to potential impacts arising from the Proposed Scheme on pNHAs within the ZoI are similar to those for European sites as the boundaries of the pNHAs often overlap those of the SACs and SPAs. Therefore, the mitigation measures outlined Section 12.5, and as detailed in the NIS (which accompanies the application for approval), will prevent the Proposed Scheme resulting in a significant negative effect on these pNHAs.

The mitigation strategy in relation to potential impacts arising from the Proposed Scheme on the Grand Canal pNHA includes habitat degradation as a result of surface water quality effects and the spread of invasive species (see Section 12.5.2.2), effects on rare and protected plant species (see Section 12.5.2.3), and negative effects on the protected fauna species associated with the canal such as bats, otter and riparian birds (see Section 12.5.2.4 and Section 12.5.2.5).

12.5.2.2 Habitats

12.5.2.2.1 Habitat Degradation - Surface Water Quality

The proposed SuDS drainage system, as shown in the Proposed Surface Water Drainage Works drawings (BCIDD-ROT-DNG_RD-0011_XX_00-DR-CD-9001 in Volume 3 of this EIAR), will be installed by the appointed contractor during the Construction Phase.

Mitigation for the Operational Phase has been built into the design of the Proposed Scheme. The increase in surface water runoff from the increase in impermeable area will be managed for the Proposed Scheme by the appointed contractor through a combination of bioretention areas and filter drains. Where no new paved areas are proposed, the existing drainage network will be retained and utilised. The effective implementation of these measures will ensure that there is no increase in existing runoff rates from newly paved areas and appropriate treatment to ensure runoff quality. The range of measures including SuDS installed during the Construction Phase will reduce both the volume and rate of surface waters discharging into the existing surface water drainage network, as well as improving the environmental quality of any such discharges during the Operational Phase of the Proposed Scheme.

These standard drainage design controls have been proven through widespread use in developments across the country. The proposed SuDS drainage system incorporated into the design of the site are common drainage systems that are used in most development types. They are proposed and designed in accordance with the Greater Dublin Strategic Drainage Study (Irish Water 2005).

Once the Proposed Scheme is in operation, the maintenance regime for these SuDS will be carried out by the local authorities and will be subject to their management procedures. No additional mitigation is required.

12.5.2.2.2 Habitat Degradation - Non-Native Invasive Plant Species

Once the Proposed Scheme is in operation, the control of non-native invasive species will be subject to the local authorities' management procedures. No additional mitigation is required.

12.5.2.2.3 Habitat Degradation - Groundwater

Given there are no significant effects on habitats owing to impacts from groundwater changes, no mitigation is required.

12.5.2.3 Rare and Protected Plant Species

There will be no surface water drainage connection to the Grand Canal where there may be the presence of Flora Protection Order species. As such, there are no significant effects on Flora Protection Order species predicted during the Operational Phase of the Proposed Scheme. Therefore, no mitigation is required.

12.5.2.4 Mammals

12.5.2.4.1 Bats

12.5.2.4.1.1 Displacement Effects Due to Operational Lighting

The Operational Phase of the Proposed Scheme is not predicted to result in any significant effects on populations of bats in the vicinity of the Proposed Scheme. Therefore, no mitigation is proposed.

12.5.2.4.2 Badgers

The Operational Phase of the Proposed Scheme is not predicted to result in any significant effects on populations of badger in the vicinity of the Proposed Scheme. Therefore, no mitigation is proposed.

12.5.2.4.3 Otter

12.5.2.4.3.1 Habitat Degradation / Reduced Prey Availability - Surface Water Quality

For mitigation to avoid the effects of habitat degradation as a result of impacts on surface water quality, please refer to Section 12.5.2.2.1.

12.5.2.4.4 Marine Mammals

12.5.2.4.4.1 Habitat Degradation/ Reduced Prey Availability - Surface Water Quality

For mitigation to avoid the effects of habitat degradation as a result of impacts on surface water quality, please refer to Section 12.5.2.2.1.

12.5.2.4.5 Other Mammals Species

The Operational Phase of the Proposed Scheme is not predicted to result in any significant effects on populations of other small mammal species in the vicinity of the Proposed Scheme. Therefore, no mitigation is proposed.

12.5.2.5 Birds

12.5.2.5.1 Breeding Birds

12.5.2.5.1.1 Habitat Degradation- Surface Water

For mitigation to avoid the effects of habitat degradation as a result of impacts on surface water quality, please refer to Section 12.5.2.2.1.

12.5.2.5.2 Wintering Birds

12.5.2.5.2.1 Habitat Degradation- Surface Water

For mitigation to avoid the effects of habitat degradation as a result of impacts on surface water quality, please refer to Section 12.5.2.2.1.

12.5.2.6 Reptiles

No significant effects on reptile species are predicted during the Operational Phase of the Proposed Scheme. Therefore, no mitigation is required.

12.5.2.7 Amphibians

12.5.2.7.1.1 Habitat Degradation- Surface Water

For mitigation to avoid the effects of habitat degradation as a result of impacts on surface water quality, please refer to Section 12.5.2.2.1.

12.5.2.8 Fish

12.5.2.8.1.1 Habitat Degradation- Surface Water

For mitigation to avoid the effects of habitat degradation as a result of impacts on surface water quality, please refer to Section 12.5.2.2.1.

12.5.2.9 Invertebrates – Freshwater Molluscs

12.5.2.9.1.1 Habitat Degradation- Surface Water

For mitigation to avoid the effects of habitat degradation as a result of impacts on surface water quality, please refer to Section 12.5.2.2.1.

12.6 Residual Impacts

12.6.1 Construction Phase

Following the implementation of the mitigation measures outlined in Section 12.5, the Proposed Scheme will not result in any significant residual effects above the local scale on the KERs identified (see Table 12.15) on its own, or cumulatively together with other proposed developments during the Construction Phase.

Table 12.15:Summary of Construction Phase Significant Residual Impacts

Ecological Receptor	Ecological Evaluation	Predicted Impact (Pre-Mitigation and Monitoring)	Potential Impacts	Significant Residual Impact (Post Mitigation and Monitoring)
Designated Areas for Nature Conservation				
North Dublin Bay SAC; North Dublin Bay pNHA	International Importance National Importance	Habitat Degradation (hydrology; non-native invasive plant species)	Likely significant effect at the international geographic scale	No significant residual effect
South Dublin Bay SAC South Dublin Bay pNHA	International Importance National Importance	Habitat Degradation (hydrology; non-native invasive plant species)	Likely significant effect at the international geographic scale	No significant residual effect
Rockabill to Dalkey Island SAC Dalkey Coastal Zone and Killiney Hill pNHA	International Importance National Importance	Habitat Degradation (hydrology)	Likely significant effect at the international geographic scale	No significant residual effect
Lambay Island SAC Lambay Island pNHA	International Importance National Importance	Habitat Degradation (hydrology)	Likely significant effect at the international geographic scale	No significant residual effect
South Dublin Bay and River Tolka Estuary SPA Dolphins, Dublin Docks pNHA South Dublin Bay pNHA Booterstown Marsh pNHA	International Importance National Importance National Importance National Importance	Habitat Degradation (hydrology; non-native invasive plant species); Disturbance and Displacement	Likely significant effect at the international geographic scale	No significant residual effect
North Bull Island SPA North Dublin Bay pNHA	International Importance National Importance	Habitat Degradation (hydrology; non-native invasive plant species); Disturbance and Displacement)	Likely significant effect at the international geographic scale	No significant residual effect
Baldoyle Bay SPA Baldoyle Bay pNHA	International Importance National Importance	Habitat Degradation (hydrology); Disturbance and Displacement	Likely significant effect at the international geographic scale	No significant residual effect
Malahide Estuary SPA Malahide Estuary pNHA	International Importance National Importance	Habitat Degradation (hydrology); Disturbance and Displacement)	Likely significant effect at the international geographic scale	No significant residual effect
Ireland's Eye SPA Ireland's Eye pNHA	International Importance National Importance	Habitat Degradation (hydrology); Disturbance and Displacement)	Likely significant effect at the international geographic scale	No significant residual effect
Howth Head Coast SPA Howth Head pNHA	International Importance National Importance	Habitat Degradation (hydrology)	Likely significant effect at the international geographic scale	No significant residual effect
Rogerstown Estuary SPA Portraine Shore pNHA Rogerstown pNHA	International Importance National Importance National Importance	Habitat Degradation (hydrology); Disturbance and Displacement)	Likely significant effect at the international geographic scale	No significant residual effect
Lambay Island SPA Lambay Island pNHA	International Importance National Importance	Habitat Degradation (hydrology); Disturbance and Displacement)	Likely significant effect at the international geographic scale	No significant residual effect

Ecological Receptor	Ecological Evaluation	Predicted Impact (Pre-Mitigation and Monitoring)	Potential Impacts	Significant Residual Impact (Post Mitigation and Monitoring)
Dalkey Island SPA Dalkey Coastal Zone and Killiney Hill pNHA	International Importance National Importance	Habitat Degradation (hydrology)	Likely significant effect at the international geographic scale	No significant residual effect
Skerries Islands SPA Skerries Islands NHA	International Importance National Importance	Habitat Degradation (hydrology) ; Disturbance and Displacement)	Likely significant effect at the international geographic scale	No significant residual effect
Rockabill SPA Rockabill Island pNHA	International Importance National Importance	Habitat Degradation (hydrology)	Likely significant effect at the international geographic scale	No significant residual effect
The Murrough SPA The Murrough pNHA	International Importance National Importance	Habitat Degradation (hydrology) ; Disturbance and Displacement)	Likely significant effect at the international geographic scale	No significant residual effect
The Grand Canal pNHA	National Importance	Habitat Degradation (hydrology; air quality; non-native invasive plant species)	Likely significant effect at the national geographic scale	No significant residual effect
Habitats (outside of designated areas for nature conservation)				
Canals (FW3)	National Importance	See Grand Canal pNHA above	See Grand Canal pNHA above	No significant residual effect
Depositing / lowland rivers (FW2)	Local Importance (Higher Value)	Habitat degradation (hydrology; non-native invasive plant species)	Likely significant effect at the local geographic scale	No significant residual effect
Scattered trees and parkland (WD5)	Local Importance (Higher Value)	Habitat loss	Likely significant effect at the local geographic scale	No significant residual effect
Treelines (WL2)	Local Importance (Higher Value)	Habitat Loss	Likely to be significant at the local geographic scale	No significant residual effect
Rare / Protected Plant Species				
Opposite-leaved pondweed	National Importance	Habitat degradation (hydrology)	Likely significant effect at the local to national geographic scale	No significant residual effect
Fauna Species				
Bats	Local Importance (Higher Value)	Habitat loss / fragmentation; Disturbance/displacement - lighting	Not Likely to be significant at any geographic scale. Likely significant effect at the local geographic scale.	No significant residual effect
Badger	Local Importance (Higher Value)	Loss of foraging habitat and breeding / rest places Disturbance / displacement	Likely significant effect at the local geographic scale	No significant residual effect
Otter	County Importance	Loss of breeding/resting places; Loss/fragmentation of foraging/ commuting habitat; Habitat severance / barrier effect; disturbance/displacement Habitat degradation (hydrology)	Not Likely to be significant at any geographic scale. Likely significant effect at the local geographic scale	No significant residual effect
Marine mammals	County importance	Habitat degradation (hydrology)	Likely significant effect at the local geographic scale	No significant residual effect

Ecological Receptor	Ecological Evaluation	Predicted Impact (Pre-Mitigation and Monitoring)	Potential Impacts	Significant Residual Impact (Post Mitigation and Monitoring)
Other mammal species protected under the Wildlife Acts	Local Importance (Higher Value)	Habitat Loss; Mortality risk; Disturbance / displacement	Not Likely to be significant at any geographic scale	No significant residual effect
SCI bird species	International Importance	*See SPAs above*	*See SPAs above*	No significant residual effect
All other breeding bird species (non-SCI)	Local Importance (Higher Value)	Habitat Loss; Disturbance / Displacement; Habitat Degradation (hydrology) Mortality Risk	Likely significant effect at the local geographic scale Not Likely to be significant at any geographic scale	No significant residual effect
All other wintering bird species (non-SCI)	Local Importance (Higher Value)	Habitat Degradation (hydrology) Habitat Loss; Disturbance / Displacement;	Likely significant effect at the local geographic scale Not Likely to be significant at any geographic scale	No significant residual effect
Reptiles	Local Importance (Higher Value)	Disturbance and Mortality Risk; Habitat severance/ barrier effect	Not Likely to be significant at any geographic scale	No significant residual effect
Amphibians	Local Importance (Higher Value)	Habitat Degradation (hydrology) Disturbance and Mortality Risk and Habitat severance / barrier effect	Likely significant effect at the local geographic scale Not Likely to be significant at any geographic scale	No significant residual effect
Non-Annex fish species	Local Importance (Higher Value)	Habitat Degradation (hydrology)	Likely significant effect at the local geographic scale	No significant residual effect
Fish Species – European eel	National Importance	Habitat Degradation (hydrology) Habitat Loss / Severance and Barrier Effect	Likely significant effect at the County scale Not Likely to be significant at any geographic scale	No significant residual effect
Non-Annex fish species	Local Importance (Higher Value)	Habitat Degradation (hydrology)	Likely significant effect at the local geographic scale	No significant residual effect
Freshwater molluscs	National Importance	Habitat Degradation (hydrology);	Likely significant effect at the local to national geographic scale	No significant residual effect
Local Biodiversity Areas (Local Biodiversity Areas not discussed under designated sites, flora and / or fauna – of which overlap in part with national designation as listed previously and / or are intersected by the Proposed Scheme)				
DCC: Grand Canal	National Importance	Habitat Degradation (hydrology; non-native invasive plant species;)	Likely significant effect at the national geographic scale	No significant residual effect
DCC: River Corridors	Local Importance (Higher Value)	Habitat degradation (hydrology; non-native invasive plant species)	Likely significant effect at the local geographic scale	No significant residual effect
SDCC: Network of stream and Rivers	Local Importance (Higher Value)	Habitat degradation (hydrology; non-native invasive plant species;)	Likely significant effect at the local geographic scale	No significant residual effect

12.6.2 Operational Phase

Following the implementation of the mitigation measures outlined in Section 12.5, the Proposed Scheme will not result for the most part in any significant residual effects the KERs identified (Table 12.16) on its own, or cumulatively together with other proposed developments during the Operational Phase.

Table 12.16: Summary of Operational Phase Significant Residual Impacts

Ecological Receptor	Ecological Evaluation	Predicted Impact (Pre-Mitigation and Monitoring)	Potential Significance	Significant Residual Impact (Post Mitigation and Monitoring)
Designated Areas for Nature Conservation				
North Dublin Bay SAC; North Dublin Bay pNHA	International Importance National Importance	Habitat Degradation (hydrology; non-native invasive plant species)	Likely significant effect at the international geographic scale	No significant residual effect
South Dublin Bay SAC South Dublin Bay pNHA	International Importance National Importance	Habitat Degradation (hydrology; non-native invasive plant species)	Likely significant effect at the international geographic scale	No significant residual effect
Rockabill to Dalkey Island SAC Dalkey Coastal Zone and Killiney Hill pNHA	International Importance National Importance	Habitat Degradation (hydrology)	Likely significant effect at the international geographic scale	No significant residual effect
Lambay Island SAC Lambay Island pNHA	International Importance National Importance	Habitat Degradation (hydrology)	Likely significant effect at the international geographic scale	No significant residual effect
South Dublin Bay and River Tolka Estuary SPA Dolphins, Dublin Docks pNHA South Dublin Bay pNHA North Dublin Bay pNHA	International Importance National Importance National Importance National Importance	Habitat Degradation (hydrology; non-native invasive plant species)	Likely significant effect at the international geographic scale	No significant residual effect
Baldoyle Bay SPA Baldoyle Bay pNHA	International Importance National Importance	Habitat Degradation (hydrology)	Likely significant effect at the international geographic scale	No significant residual effect
North Bull Island SPA North Dublin Bay pNHA	International Importance National Importance	Habitat Degradation (hydrology; non-native invasive plant species)	Likely significant effect at the international geographic scale	No significant residual effect
Malahide Estuary SPA Malahide Estuary pNHA	International Importance National Importance	Habitat Degradation (hydrology)	Likely significant effect at the international geographic scale	No significant residual effect
Ireland's Eye SPA Ireland's Eye pNHA	International Importance National Importance	Habitat Degradation (hydrology)	Likely significant effect at the international geographic scale	No significant residual effect
Howth Head Coast SPA Howth Head pNHA	International Importance National Importance	Habitat Degradation (hydrology)	Likely significant effect at the international geographic scale	No significant residual effect
Rogerstown Estuary SPA Portraine Shore pNHA Rogerstown pNHA	International Importance National Importance National Importance	Habitat Degradation (hydrology)	Likely significant effect at the international geographic scale	No significant residual effect
Lambay Island SPA Lambay Island pNHA	International Importance National Importance	Habitat Degradation (hydrology)	Likely significant effect at the international geographic scale	No significant residual effect

Ecological Receptor	Ecological Evaluation	Predicted Impact (Pre-Mitigation and Monitoring)	Potential Significance	Significant Residual Impact (Post Mitigation and Monitoring)
Dalkey Island SPA Dalkey Coastal Zone and Killiney Hill pNHA	International Importance National Importance	Habitat Degradation (hydrology)	Likely significant effect at the international geographic scale	No significant residual effect
Skerries Islands SPA Skerries Islands NHA	International Importance National Importance	Habitat Degradation (hydrology)	Likely significant effect at the international geographic scale	No significant residual effect
Rockabill SPA Rockabill Island pNHA	International Importance National Importance	Habitat Degradation (hydrology)	Likely significant effect at the international geographic scale	No significant residual effect
The Murrough SPA The Murrough pNHA	International Importance National Importance	Habitat Degradation (hydrology)	Likely significant effect at the international geographic scale	No significant residual effect
The Grand Canal pNHA	National Importance	Habitat Degradation (hydrology; non-native invasive plant species)	Likely significant effect at the national geographic scale	No significant residual effect
Habitats (outside of designated areas for nature conservation)				
Canals (FW3)	National Importance	See Grand Canal pNHA above	See Grand Canal pNHA above	No significant residual effect
Depositing/lowland rivers (FW2)	Local Importance (Higher Value)	Habitat degradation (hydrology)	Likely significant effect at the local geographic scale	No significant residual effect
Fauna Species				
Bats	Local Importance (Higher Value)	Disturbance / displacement	Likely significant effect at the local geographic scale	No significant residual effect
Otter	County Importance	Habitat degradation (hydrology)	Likely significant effect at the local geographic scale	No significant residual effect
Marine mammals	County Importance	Habitat degradation (hydrology)	Likely significant effect at the local geographic scale	No significant residual effect
SCI bird species	International Importance	*See SPAs above*	*See SPAs above*	No significant residual effect
All other breeding bird species (non-SCI)	Local Importance (Higher Value)	Habitat Degradation (hydrology)	Likely significant effect at the local geographic scale	No significant residual effect
All other wintering bird species (non-SCI)	Local Importance (Higher Value)	Habitat Degradation (hydrology)	Likely significant effect at the local geographic scale	No significant residual effect
Amphibians	Local Importance (Higher Value)	Habitat Degradation (hydrology)	Likely significant effect at the local geographic scale	No significant residual effect
Fish Species – European Eel	National Importance	Habitat Degradation (hydrology)	Likely significant effect at the County scale	No significant residual effect
Non-Annex fish species	Local Importance (Higher Value)	Habitat Degradation (hydrology)	Likely significant effect at the local geographic scale	No significant residual effect

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