

Chapter 12
Biodiversity

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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 of the Ringsend 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 Phase (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, and road realignments. 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 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” (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 2005).

Alongside the term ‘*biodiversity*’ the terms ‘*ecology*’ and ‘*ecological*’ are also used throughout this Chapter as a broader term to consider the relationships of biodiversity receptors to one another and to their 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 NTA and submitted with the application for approval, so as to enable 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-0016_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.

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 Figure 12.5 in Volume 3 of this EIAR.
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 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 suitable habitat is illustrated in Figure 12.5 in Volume 3 of this EIAR. The extent of the study area for bat activity surveys is illustrated in Figure 12.1.1 in Volume 3 of this EIAR.
Breeding Birds	The area suitable for breeding birds / terns (quay walls, bridges, Grand Canal Docks and surrounding structures) within or immediately adjacent to the Proposed Scheme footprint where breeding birds could be directly or indirectly affected during construction / operation. The extent of the study area for breeding birds is illustrated in Figure 12.1.2 in Volume 3 of this EIAR.
Wintering Birds	The area suitable for wintering birds within or immediately adjacent to the Proposed Scheme footprint where wintering birds could be directly or indirectly affected during construction / operation. The extent of the study area for wintering birds is illustrated in Figure 12.1.3 in Volume 3 of this EIAR.
Aquatic Ecology	Watercourses crossed by 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 12.1.4 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);
- Guidelines on the Information to be Contained in Environmental Impact Statements (EPA 2002);
- Guidance on Integrating Climate Change and Biodiversity into Environmental Impact Assessment (European Commission 2013);
- CIEEM Guidelines (CIEEM 2019); Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater, Coastal and Marine (hereafter referred to as the CIEEM Guidelines) (CIEEM 2019);
- 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, 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 the Treatment of Otters Prior to the Construction of National Road Schemes (NRA, 2006c);
- 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. Irish Wildlife Manuals No. 25 (Kelleher and Marnell 2006);
- 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); 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 corridor. 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 150metres 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); and
- Dublin City Biodiversity Action Plan 2021 - 2025 (DCC 2021).

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 2021;
- S.I. No. 356/2015 - Flora (Protection) Order, 2015 (hereafter referred to as the Flora Protection Order); and
- Fisheries Acts 1959 to 2017.

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 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 National Biodiversity Data Centre Database (NBDC Online Database, Accessed 2022);
- Ordnance Survey Ireland (OSI) orthophotography (from 1995 to 2012) for the Proposed Scheme study area;
- Records of rare and / or protected species for the 10km (kilometre) grid squares O13 and O23, held by the NPWS;
- Habitat and species Geographic Information System (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 2020a);
- Information on the status of European Union (EU) protected habitats and species in Ireland (NPWS 2019a, NPWS 2019b and NPWS 2019c);
- Information on light-bellied brent goose inland feeding sites (Scott Cawley Ltd. 2017); and
- Alexandra Basin Redevelopment Environmental Reports (RPS 2019).

A desk study was carried out to identify suitable bat foraging and / or commuting habitat (e.g., woodland, and mature tree lines) 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 selected 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 identified sites 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, habitat suitability assessments for nesting birds, and otter surveys were undertaken at the proposed crossing points at which in-stream works, modifications to banks or significant disturbance (i.e., piling / rock breaking 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 February 2021	Scott Cawley Ltd.
Mammal surveys (excluding bats)	June to August 2018 August 2020 February 2021	Scott Cawley Ltd. Roughan & O'Donovan Consulting Engineers (hereafter referred to as ROD)
Bat surveys:	<u>Walked transect activity surveys</u> June to August 2018 August to October 2019 May 2020	Scott Cawley Ltd. ROD

Survey	Survey Date(s)	Surveyor Reference
	July 2020 <u>Identification of potential bat tree roosts</u> June to August 2018 August 2020 February 2021	
Breeding Bird Surveys	<u>Nesting Bird / Kingfisher Suitability</u> September 2020 February 2021	Scott Cawley Ltd.
	<u>Common Tern Nest Search</u> April to July 2018	ROD
	<u>Vantage Point (VP) Surveys</u> May to June 2018 May to July 2019 May to August 2021 April to August 2022	ROD Scott Cawley Ltd.
Wintering bird survey	<u>Walked transect activity surveys</u> February to March 2020 October 2020 to March 2021 October 2022 to March 2023	Scott Cawley Ltd.
	<u>Proposed DPTOB vantage point surveys</u> March to April 2018 March to April 2019 October 2020 to April 2021 October 2021 to April 2022 October 2022 to March 2023	ROD Scott Cawley Ltd.
Amphibian habitat suitability assessment	June to August 2018 August 2020 February 2021	Scott Cawley Ltd.
Reptile habitat suitability assessment	June to August 2018 August 2020 February 2021	Scott Cawley Ltd.
Fisheries / aquatic surveys	April 2020 November 2020	Aquafact International Services Ltd.

12.2.3.2.1 Habitat Survey

Habitat surveys were carried out by Scott Cawley Ltd. between June and August 2018, and August 2020 along the Proposed Scheme alignment. Confirmatory surveys were subsequently undertaken on the Proposed Scheme in August 2020 to check and update the presence and extent of habitats found in the 2018 habitat surveys. Additional habitat surveys were carried out in February 2021 along new route sections added since 2018. 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 habitat's extent was mapped onto an aerial photograph, with 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).

The subtidal and intertidal habitats in the vicinity of the Proposed Scheme were surveyed by Aquafact International Services Ltd., in 2019, 2020 and again in 2022 (See Appendix 12.1 in Volume 4 of this EIAR). Marine habitats were classified according to their JNCC biotope (<https://mhc.jncc.gov.uk/>) and EUNIS code (<https://www.eea.europa.eu/data-and-maps/data/eunis-habitat-classification>) (JNCC 2015).

12.2.3.2.2 Mammals (Excluding Bats)

The footprint of the Proposed Scheme and suitable lands (e.g., sites immediately adjacent to the Proposed Scheme) were surveyed for badger *Meles meles* and otter *Lutra lutra* activity as part of the multidisciplinary walkover survey, undertaken between June and August 2018, and in August 2020. Additional surveys were carried out in February 2021 to capture design changes to the Proposed Scheme. 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 sett and otter holts. Where present, any evidence of use was recorded.

A desk study was carried out to identify all hydrological crossing points within the footprint of the Proposed Scheme. Construction methodologies which involved in-stream works, modifications to banks or significant disturbance to a waterbody were deemed to require otter surveys. Where the quay walls surrounding the Liffey Estuary Lower may be subject to significant disturbance (i.e. piling and / or in-stream works within the Liffey Estuary Lower as a consequence of the Proposed Scheme, namely the proposed Dodder Public Transportation Opening Bridge (DPTOB) which is to connect Sir John Rogerson's Quay with the R131 on the southern side of the Tom Clarke East Link Bridge (referred to as CBC0016AR001) (see Chapter 4 (Proposed Scheme Description) for more information), and two proposed boardwalk structures at North Wall Quay and Custom House Quay (referred to as CBC0016AR002 and CBC0016AR003 respectively). A corridor of approximately 150m upstream and downstream of these sites were surveyed to identify the presence of otter holts / resting places. The DPTOB surveys were carried out in September 2020, and the boardwalk surveys were carried out in February 2021.

Records of otter were also returned from a recent otter survey (Macklin et al., 2019) where a holt was recorded behind a floating pontoon serving the MV Cill Airne along North Wall Quay. This holt is within the study area for the Proposed Scheme and has been revisited on a fortnightly basis by surveyors from November 2020 to April 2021 to identify signs of otter (coinciding with wintering bird surveys carried out for the Proposed Scheme).

A watching brief was maintained between November 2020 and April 2021 for otter and marine mammals during vantage point surveys for wintering birds at the proposed DPTOB, referred to as CBC0016WB003.

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 search for 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).

12.2.3.2.3 Bats

The following sections describe the methodologies employed to carry out the various bat surveys undertaken in 2019 and 2020 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; and
- DER/BAT 2021-01 (amended) – Derogation licence to disturb bat roosts throughout the State.

The existing St. Patrick's Rowing Club (SPRC) building is proposed for demolition as part of the Proposed Scheme. A bat suitability assessment of the building was carried out during ecological surveys by ROD in 2018/2019. It was not considered that the building had potential roosting features that would warrant dedicated surveys to identify roosts.

12.2.3.2.3.1 Bats - Walked Transect Surveys

Walked bat activity transect surveys were conducted at three locations situated along preselected transect routes along the Proposed Scheme. Transect routes were located at Tom Clarke East Link Bridge to Sir John Rogerson's Quay referred to as CBC0016BT001; Ringsend Park referred to as CBC0016BT002, and along R131 Pigeon

House Road at Poolbeg Yacht Club referred to as CBC0016BT003. 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 2020, and July 2020. Surveys commenced approximately 30 minutes after sunset to ensure that bats had emerged from their roosts. Transect route CBC0016BT002 located at Ringsend Park was subject to one summer season in 2020 to accommodate changes to the Proposed Scheme design. 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).

Bat activity surveys were also carried out separately by ROD for the proposed DPTOB and these have been incorporated into this assessment accordingly. ROD carried out bat activity surveys on 25 June 2018, and 15 and 29 August 2019. The bat activity surveys were undertaken between sunset and two hours after sunset. During these surveys, the site was slowly walked using an Anabat Walkabout bat detector. The recordings were then analysed using Kaleidoscope Pro Analysis software.

12.2.3.2.3.2 Bats - Tree Surveys

Trees located within the footprint of the Proposed Scheme were assessed for their potential to support roosting bats (i.e., Potential Tree Roosts (PTRs)) as part of the multidisciplinary walkover survey carried out between June and August 2018, August 2020, and February 2021.

A number of trees located across the Proposed Scheme were examined from ground level for the 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.

12.2.3.2.4 Breeding Bird Surveys

The desk study identified three sites where the quay walls surrounding the Liffey Estuary Lower may be subject to significant disturbance (i.e., piling and / or in-stream works within the Liffey Estuary Lower) as a consequence of the Proposed Scheme directly affecting the nesting sites of riparian birds. These sites include the proposed DPTOB, referred to as CBC0016AR001, and two proposed boardwalk structures at North Wall Quay and DCC Docklands Offices at Custom House Quay (referred to as CBC0016AR002 and CBC0016AR003 respectively). Vantage point surveys for breeding birds (including kingfisher) were undertaken in 2018, 2019, 2020, 2021 (kingfisher suitability assessment only) and 2022 to establish bird presence and flight lines in relation to the proposed DPTOB. The surveys were undertaken according to methodology in Bird Monitoring Methods (Gilbert et al. 1998). The surveys were timed to cover a range of tidal conditions. During each survey, birds present in the area of the proposed DPTOB were recorded. In each instance the species, maximum count, activity / behaviour, breeding status and habitat of the flight relative to the proposed bridge was noted.

12.2.3.2.4.1 Nesting Bird Suitability Assessments

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 and guillemot potential in September 2020 and February 2021. Where suitable habitat existed, surveys extended approximately 500m upstream and downstream of the sites where waterbodies may be subject to significant disturbance. Evidence of activity at any potential nest sites were recorded.

12.2.3.2.4.2 Common Tern Surveys

Vantage point surveys for common tern were undertaken by ROD on a weekly / fortnightly basis between May and June 2018 and May and July 2019, and between May and August 2021 and April and August 2022 by Scott Cawley Ltd., to establish bird flight lines and the presence of breeding pairs / apparently occupied nests (AONs) in relation to the proposed DPTOB. The surveys were undertaken according to methodology in Bird Monitoring Methods (Gilbert et al. 1998). Surveys were timed to cover a range of tidal conditions. During each survey, birds present in the area of the proposed DPTOB were recorded. In each instance the species, maximum count, activity / behaviour, breeding status and habitat of the flight relative to the proposed DPTOB was recorded. The data collected in 2019 was merged with the 2018 data to take account of changes in bird movements from year to year. 2021 breeding bird vantage point survey locations are shown in Figure 12.1.2 in Volume 3 of this EIAR.

The location and size of the breeding tern colony at Grand Canal Docks was monitored in early July 2019 by ROD, who followed the methodology for monitoring tern productivity outlined in Bird Monitoring Methods (Gilbert et al. 1998). On each visit the approach taken was to count apparent incubating adults (or active nests) and count large chicks (10 to 14 days old), including any nearby fledglings which were associated with the colony.

Productivity was estimated as the number of large chicks plus fledged young divided by the maximum count of apparent incubating adults.

12.2.3.2.4.3 Black Guillemot Surveys

Vantage point surveys for black guillemot were undertaken by Scott Cawley Ltd. on a weekly / fortnightly basis between May and August 2021 and between April and June 2022, as part of and following the same methodology for the vantage point surveys for common tern, discussed above in Section 12.2.3.2.4.2. 2021 breeding bird vantage point survey locations are shown in Figure 12.1.2 in Volume 3 of this EIAR.

12.2.3.2.5 Wintering Birds

A desk study was carried out to identify any potential suitable 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 SCI bird species light-bellied brent goose *Branta bernicla hrota* (Scott Cawley Ltd. 2017). A habitat suitability assessment was carried out in October 2020 to verify the suitability of potential inland feeding / roosting sites identified during the desk study.

The desk study identified three sites along or adjacent to the Proposed Scheme with potential for wintering birds that will be subject to direct habitat loss. Each site was surveyed over seven consecutive weeks across February and March 2020, and fortnightly between October 2020 and April 2021. The sites were surveyed fortnightly again between October 2021 and April 2022. The results of the desk study and field surveys have informed the assessment of potential impacts on wintering bird species arising from the Proposed Scheme.

In general, the approach was a 'look-see' methodology (based on Gilbert et al. 1998). All birds present within a site were identified with reference to Collins Bird Guide (Svensson et al. 2010) to confirm identification (where necessary) and were recorded using the British Trust for Ornithology (BTO) species codes. The total flock size of birds present, their general location within the site and any activity exhibited were also recorded. Evidence of bird droppings were recorded at pre-defined transect lines. The length of the transect line varied per site. Transect lines were only completed at sites where no bird species were present, to avoid any potential disturbance. Wintering birds transect surveys were carried out for the Proposed Scheme at three no. sites identified through the desk study. These sites included the following:

- CBC0016WB001: Small amenity grassland area next to St. Patricks Rowing Club and Tom Clarke East Link Bridge. The site is not maintained for cutting and a path entrance by Tom Clarke East Link Bridge has been fenced off in recent years. Disturbance on site includes members of the public using this spot as a sit-down area and dog walkers;
- CBC0016WB002: Gaelic pitch and grass area within Ringsend park. Site is maintained with cutting by the local authority. Disturbance on site is moderate-high and includes use of the pitches for sporting events and unleashed dogs; and

- CBC0016WB003: Grassy verge within Irishtown Stadium and grass area with scattered trees between the stadium and Bremen Avenue. The grassy verge within Irishtown Stadium is fenced off from the public and considered low disturbance. The unfenced grass area between has a high level of disturbance as it frequently walked over by the public and dogs not on a leash.

Vantage point surveys for wintering birds was undertaken on a weekly / fortnightly basis between March and April 2018, March and April 2019 by ROD, and fortnightly, by Scott Cawley Ltd, between November 2020 and April 2021 and between October 2021 and April 2022, and again fortnightly between October 2022 and March 2023 to establish bird flight lines in relation to the proposed DPTOB. The surveys were undertaken according to methodology in Bird Monitoring Methods (Gilbert et al. 1998). Surveys were timed to cover a range of tidal conditions. During each survey, bird flight lines across and presence in the area of the proposed bridge were recorded. In each instance the species, flight path and height of the flight relative to the proposed DPTOB was recorded.

12.2.3.2.6 Reptiles

The suitability of habitats located within and immediately adjacent to the Proposed Scheme, were assessed for use by common lizard *Lacerta vivipara* including for breeding and / or hibernating, as part of the multidisciplinary walkover surveys undertaken between June and August 2018, August 2020 and additionally in February 2021 to capture design changes.

12.2.3.2.7 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, August 2020 additionally in February 2021 to capture design changes.

12.2.3.2.8 Fish

The desk study identified three sites where the Liffey Estuary Lower, or surrounding quay walls, may be subject to significant disturbance (i.e., piling and / or in-stream works within the Liffey Estuary Lower) may be subject to disturbance as a consequence of the Proposed Scheme. These sites include the proposed DPTOB, referred to as CBC0016AR001, and two proposed boardwalk structures at North Wall Quay and DCC Docklands Offices at Custom House Quay (referred to as CBC0016AR002 and CBC0016AR003 respectively). The fish study for the Proposed Scheme was carried out by Aquafact International Services Ltd, was designed to assess the diversity and abundance of fish species within the Liffey Estuary Lower, and took place at the site of the proposed DPTOB, Appendix 12.1 in Volume 4 of this EIAR provides full survey details. The methodology used to sample the fish population followed the approach outlined for transitional waters under the Common Implementation Strategy for the Water Framework Directive (European Commission 2003). The fish were sampled using a combination of seine netting, beam trawling, and fyke netting (details of survey locations and timings are available in Appendix 12.1 in Volume 4 of this EIAR). Fish species recovered from each of the fishing methods were identified, counted, and measured directly after capture and were then released. Water quality parameters were also recorded during this fish study as a profile of the water column by means of a Hydrolab DS5x sonde. Parameters recorded included temperature, salinity, conductivity, dissolved oxygen, and pH.

12.2.3.2.9 Benthic Infauna Survey.

Subtidal grab surveys were carried out by Aquafact International Services Ltd. in 2019, 2020 and 2022 at the proposed DPTOB, referred to as CBC0016AR001 (Aquafact 2020, 2022). Taxonomic identification of benthic infauna was undertaken following the survey and results used to assess seabed conditions of the area.

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);
- EPA Advice Notes (EPA 2015);
- Guidance on Integrating Climate Change and Biodiversity into Environmental Impact Assessment (European Commission 2013);
- Guidelines on the Information to be Contained in Environmental Impact Statements (EPA 2002);
- CIEEM Guidelines (CIEEM 2019); 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 Statements 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 Zol 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 the CIEEM Guidelines (CIEEM 2019) 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 Proposed Natural Heritage Areas (pNHAs) / Natural Heritage Areas (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 habitats;

- The natural range of the species is neither being reduced nor is likely to be reduced for the foreseeable future; and
- There is, and will probably continue to be, a sufficiently large habitat to maintain its populations on a long-term basis.

According to the CIEEM Guidelines (CIEEM 2019) and the Guidelines for Assessment of Ecological Impacts of National Road Schemes methodology (NRA 2009), 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, rather than international level.

12.3 Baseline Environment

The Ringsend to City Centre Core Bus Corridor (hereafter referred to as the Proposed Scheme) will commence at Talbot Memorial Bridge beside the Custom House at the eastern side of the city centre. The route encompasses bus lane and cycle infrastructure on both north and south quays connecting the city centre with the Docklands and onto Ringsend and Irishtown. Priority for buses is provided along the entire length of the north quays, from the Custom House to the 3 Arena at Tom Clarke East Link Bridge, consisting of dedicated bus lanes in each direction. Segregated two-way cycle tracks will be provided on the campshires on both sides of the River Liffey. A cycle route will extend through Ringsend and Irishtown towards Poolbeg Peninsula. Habitats present at either side of Talbot Memorial Bridge and along each side of the north and south quays include buildings and artificial surfaces, with linear stretches of tree lines associated with urban landscaping. As the Proposed Scheme extends across the Liffey Estuary Lower, residential and buildings and artificial surfaces habitats continue to dominate with discrete patches of amenity grassland, tree lines, and scattered trees and parkland present along road sides. This is present along the entirety of the R131 (East Link Toll Bridge Road). Urban habitats are similarly dominant along the southern section of the route encapsulating the proposed cycle way through York Road, Pigeon House Road, Pembroke Cottages and Cambridge Park), with the exception of scattered trees and parkland habitat traversed by the Proposed Scheme in Ringsend 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 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 underlying aquifers are either Locally Important Bedrock Aquifer, Moderately Productive only in Local Zones or Poor Bedrock Aquifer, Moderately Productive only in Local Zones. These types of aquifers are associated with low permeability which decreases with depth. An upper shallow zone of higher permeability may exist in the top few meters 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 dependent habitats which are all located over 400m from any proposed work. This Zoi follows 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 Zol 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 (refer to 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 habitat and species are 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 cross water bodies listed in, and the marine environment of Dublin Bay (see Figure 12.2 in Volume 3 of this EIAR).

As such, the potential Zol 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 Zol for impacts to aquatic fauna species, such as Atlantic salmon *Salmo salmar* 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 Zol

Waterbody Name	Connectivity to the Proposed Scheme
Liffey Estuary Lower	Crosses the Proposed Scheme at the existing Tom Clarke East Link Bridge
Liffey Estuary Upper	Approximately 40m upstream of the Proposed Scheme
River Dodder (Dodder_50)	Upstream of the Proposed Scheme but lower sections of the Dodder_050 are tidal and included within the proposed crossing point at the confluence with the Liffey Estuary Lower at York Road and Sir John Rogerson's Quay
Grand Canal	Approximately 200m upstream of the Proposed Scheme
Royal Canal	Crosses the Proposed Scheme at the Scherzer Bridges at Spencer Dock.
Dublin Bay	Approximately 430m downstream of the Proposed Scheme

The Zol 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 Zol for otters, badgers, stoat, and hedgehogs may extend over greater distances than small mammal and bird species due to their ability to disperse many kilometres from their natal / resting sites. The Zol of impacts for significant disturbance impacts to badger and otter breeding / resting places may extend as far as approximately 150m from the Proposed Scheme boundary. This Zol (i.e., approximately 150m from Proposed Scheme boundary) for badgers and otters has been defined in accordance with the Guidelines for the Crossing of Watercourses during the Construction of National Road Schemes (NRA 2005a) and the Guidelines for the Treatment of Badgers Prior to the Construction of National Road Schemes (NRA 2005b) 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 Zol for badgers and otters.

The Zol of potential effects to bat roosts would not be expected to exceed approximately 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 Zol may increase / decrease from this distance accordingly. Given the large foraging ranges for some species, the Zol 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 Zol 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 hundred metres from the Proposed Scheme.

The Zol in relation to impacts 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 Zol 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 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 (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 BS 5228-1) (BSI 2008) are generally below 60dB or, in most cases, are approaching the 50dB threshold.

The Zol 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 Zol 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 are provided in Appendix A12.2 in Volume 4 of this EIAR and are incorporated into the sections below under the various headings, as relevant.

12.3.3 Local 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 Zol 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 semi-natural calcareous grassland, hedgerows, tree lines 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 Ringsend Park, Sean Moore Park, and private gardens, support a variety of species and is considered to be a valuable biodiversity resource;
- Dublin City's network of rivers, streams, and riparian zones. The Proposed Scheme will cross the Liffey Estuary Lower which is noted as being highly significant regional salmonid catchment for species of Atlantic salmon *Salmo salar* and brown trout *Salmo trutta*. It also supports, brook lamprey *Lampetra planeri*, river lamprey *Lampetra fluviatilis* and white-clawed crayfish *Austropotamobius pallipes*. It also supports an active otter *Lutra lutra* population. The Proposed Scheme is hydrologically connected to the River Dodder, Dublin's third largest river. The River Dodder supports populations of otter and kingfisher, and is an also a highly significant regional salmonid catchment; and
- The Proposed Scheme will cross the Royal Canal at its terminus at the Liffey Estuary Lower. The Royal Canal is noted as an important aspect of Dublin City's Green Infrastructure Network, linking

the River Shannon to Dublin Bay. As a pNHA it also 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* and populations of otter.

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 does not overlap with any European site, although it is located in close proximity to Dublin Bay which is variously designated for a number of overlapping European sites. The nearest European sites to the Proposed Scheme are South Dublin Bay and River Tolka Estuary SPA and South Dublin Bay SAC, which are both located approximately 0.5km, terrestrially, south-east of the Proposed Scheme.

There are eight European Sites located in Dublin Bay that are hydrologically connected to the Proposed Scheme, via three watercourses i.e., the Liffey Estuary Lower, the River Dodder_050 and the Royal Canal. 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 SAC, Howth Head Coast SPA, Rockabill to Dalkey Island SAC and Dalkey Island SPA.

There are 13 SPAs designated for SCI bird species that are known to forage and / or roost 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, Rockabill SPA, Dalkey Islands SPA, Wicklow Mountains SPA, Howth Head Coast SPA and The Murrrough 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 is one European site located upstream of the Proposed Scheme that is within the ZoI, this is Wicklow Mountains SAC, and is designated for otter.

There are 25 European sites (SACs or SPAs) located within the vicinity of the Proposed Scheme, listed in Table 12.5 and illustrated in Figure 12.3 in Volume 3 of this EIAR. There are 19 European sites within the ZoI of the Proposed Scheme, Table 12.5 lists these sites, their distance from the Proposed Scheme, and the sites Qualifying Interests (QIs) / Special Conservation Interests (SCIs).

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

Table 12.5: European sites (SACs and SPAs) Located with the Zol (highlighted in light blue), and those in the Wider Area of the Proposed Scheme Boundary.

Site Name	Distance	Reasons for Designation – QIs or SCIs
Special Areas of Conservation (SACs)		
South Dublin Bay SAC [000210]	approximately 0.5km south-east of Proposed Scheme	<p>Annex I Habitats:</p> <ul style="list-style-type: none"> Mudflats and sandflats not covered by seawater at low tide [1140]; Annual vegetation of drift lines [1210]; <i>Salicornia</i> and other annuals colonising mud and sand [1310]; and Embryonic shifting dunes [2110]. <p>Source: Conservation Objectives: South Dublin Bay SAC 000210. Version 1. (NPWS 2013a) S.I. No. 525/2019 - European Union Habitats (South Dublin Bay Special Area of Conservation 000210) Regulations 2019</p>
North Dublin Bay SAC [000206]	approximately 3km east of Proposed Scheme	<p>Annex I Habitats:</p> <ul style="list-style-type: none"> Mudflats and sandflats not covered by seawater at low tide [1140]; Annual vegetation of drift lines [1210]; <i>Salicornia</i> and other annuals colonising mud and sand [1310]; Atlantic salt meadows (<i>Glaucis - Puccinellietalia maritima</i>) [1330]; Mediterranean salt meadows (<i>Juncetalia maritimi</i>) [1410]; Embryonic shifting dunes [2110]; Shifting dunes along the shoreline with <i>Ammophila arenaria</i> ('white dunes') [2120]; * Fixed coastal dunes with herbaceous vegetation ('grey dunes') [2130]; and Humid dune slacks [2190]. <p>Annex II Species:</p> <ul style="list-style-type: none"> Petalwort <i>Petalophyllum ralfsii</i> [1395]. <p>Source: Conservation Objectives: North Dublin Bay SAC 000206. Version 1. (NPWS 2013b) S.I. No. 524/2019 – European Union Habitats (North Dublin Bay Special Area of Conservation 000206) Regulations 2019</p>
Baldoyle Bay SAC [000199]	approximately 8.4km east of Proposed Scheme	<p>Annex I Habitats:</p> <ul style="list-style-type: none"> Mudflats and sandflats not covered by seawater at low tide [1140]; <i>Salicornia</i> and other annuals colonising mud and sand [1310]; Atlantic salt meadows (<i>Glaucis - Puccinellietalia maritima</i>) [1330]; and Mediterranean salt meadows (<i>Juncetalia maritimi</i>) [1410]. <p>Source: Conservation Objectives: Baldoyle Bay SAC 000199. Version 1. (NPWS 2012b) S.I. No. 472/2021 - European Union Habitats (Baldoyle Bay Special Area of Conservation 000199) Regulations 2021</p>
Howth Head SAC [000202]	approximately 8.4km east of the Proposed Scheme	<p>Annex I Habitats:</p> <ul style="list-style-type: none"> Vegetated sea cliffs of the Atlantic and Baltic coasts [1230]; and European dry heaths [4030]. <p>Source: Conservation Objectives: Howth Head SAC 000202. Version 1. (NPWS 2016) S.I. No. 524/2021 - European Union Habitats (Howth Head Special Area of Conservation 000202) Regulations 2021</p>
Rockabill to Dalkey Island SAC [003000]	approximately 8.2km east of the Proposed Scheme	<p>Annex I Habitats:</p> <ul style="list-style-type: none"> Reefs [1170]. <p>Annex II Species:</p> <ul style="list-style-type: none"> Harbour porpoise <i>Phocoena phocoena</i> [1351]. <p>Source: Conservation Objectives: Rockabill to Dalkey Island SAC 003000. Version 1. (NPWS 2013c) S.I. No. 94/2019 – European Union Habitats (Rockabill To Dalkey Island Special Area Of Conservation 003000) Regulations 2019</p>
Malahide Estuary SAC [000205]	approximately 11.8km north of Proposed Scheme	<p>Annex I Habitats:</p> <ul style="list-style-type: none"> Mudflats and sandflats not covered by seawater at low tide [1140]; <i>Salicornia</i> and other annuals colonising mud and sand [1310];

Site Name	Distance	Reasons for Designation – QIs or SCIs
		<ul style="list-style-type: none"> • <i>Spartina</i> swards (<i>Spartinion maritimae</i>) [1320]; • Atlantic salt meadows (<i>Glauco-Puccinellietalia maritimae</i>) [1330]; • Mediterranean salt meadows (<i>Juncetalia maritimi</i>) [1410]; • Shifting dunes along the shoreline with <i>Ammophila arenaria</i> (white dunes) [2120]; and • Fixed coastal dunes with herbaceous vegetation (grey dunes) [2130]. <p>Source: Conservation Objectives: Malahide Estuary SAC 000205. Version 1. (NPWS 2013d) S.I. No. 525/2019 – European Union Habitats (South Dublin Bay Special Area of Conservation 000210) Regulations 2019</p>
Wicklow Mountains SAC [002122]	approximately 11.8km south of Proposed Scheme	<p>Annex I Habitats:</p> <ul style="list-style-type: none"> • Oligotrophic waters containing very few minerals of sandy plains (<i>Littorelletalia uniflorae</i>) [3110]; • Natural dystrophic lakes and ponds [3160]; • Northern Atlantic wet heaths with <i>Erica tetralix</i> [4010]; • European dry heaths [4030]; • Alpine and Boreal heaths [4060]; • Calaminarian grasslands of the <i>Violetalia calaminariae</i> [6130]; • Species-rich <i>Nardus</i> 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 (<i>Androsacetalia alpinae</i> and <i>Galeopsietalia ladani</i>) [8110]; • Calcareous rocky slopes with chasmophytic vegetation [8210]; • Siliceous rocky slopes with chasmophytic vegetation [8220]; and • <i>Old sessile oak woods with Ilex and Blechnum in the British Isles</i> [91A0]. <p>Annex II Species:</p> <ul style="list-style-type: none"> • Otter <i>Lutra lutra</i> [1355]. <p>Source: Conservation Objectives: Wicklow Mountains SAC 002122. Version 1. (NPWS 2017a)</p>
Ireland's Eye SAC [000203]	approximately 11.9km east of the Proposed Scheme	<p>Annex I Habitats:</p> <ul style="list-style-type: none"> • Perennial vegetation of stony banks [1220]; and • Vegetated sea cliffs of the Atlantic and Baltic coasts [1230]. <p>Source: Conservation Objectives: Ireland's Eye SAC 002193. Version 1. (NPWS 2017b) S.I. No. 501/2017 – European Union Habitats (Ireland's Eye Special Area of Conservation 002193) Regulations 2017</p>
Glenasmole Valley SAC [001209]	approximately 12.5km south of Proposed Scheme	<p>Annex I Habitats:</p> <ul style="list-style-type: none"> • Semi-natural dry grasslands and scrubland facies on calcareous substrates (<i>Festuco-Brometalia</i>) (* important orchid sites) [6210]; • <i>Molinia</i> meadows on calcareous, peaty, or clayey-silt-laden soils (<i>Molinion caeruleae</i>) [6410]; and • Petrifying springs with tufa formation (<i>Cratoneurion</i>) [7220]. <p>Source: Conservation objectives for Glenasmole Valley SAC [001209]. Version 1. DHLGH (NPWS 2021a) S.I. No. 345/2021 – European Union Habitats (Glenasmole Valley Special Area of Conservation 001209) Regulations 2021</p>
Knocksink Wood SAC [000725]	approximately 14km of Proposed Scheme	<p>Annex I Habitats:</p> <ul style="list-style-type: none"> • Petrifying springs with tufa formation (<i>Cratoneurion</i>) [7220]; • <i>Old sessile oak woods with Ilex and Blechnum in the British Isles</i> [91A0]; and • Alluvial forests with <i>Alnus glutinosa</i> and <i>Fraxinus excelsior</i> (Alno-Padion, Alnion incanae, Salicion albae). <p>Source: Conservation Objectives for Knocksink Wood SAC [000725]. Version 1. DHLGH (NPWS 2021b) S.I. No. 93/2019 - European Union Habitats (Knocksink Wood Special Area Of Conservation 000725) Regulations 2019</p>
Ballyman Glen SAC [000713]	Approximately 14.8km from	<p>Annex I Habitats:</p> <ul style="list-style-type: none"> • Petrifying springs with tufa formation (<i>Cratoneurion</i>) [7220];

Site Name	Distance	Reasons for Designation – QIs or SCIs
	the Proposed Scheme	<ul style="list-style-type: none"> Alkaline fens [7230] <p>Source: Conservation Objectives for Ballyman Glen SAC 000713. Version 1. National Parks and Wildlife Service, Department of Culture, Heritage and the Gaeltacht NPWS (2019e) S.I. No. 92/2019 – European Union Habitats (Ballyman Glen Special Area Of Conservation 000713) Regulations 2019</p>
Lambay Island SAC [000204]	approximately 20km north east of Proposed Scheme	<p>Annex I Habitats:</p> <ul style="list-style-type: none"> Reefs [1170] Vegetated sea cliffs of the Atlantic and Baltic coasts [1230] <p>Annex II Species:</p> <ul style="list-style-type: none"> Grey seal <i>Halichoerus grypus</i> [1364] Harbour seal <i>Phoca vitulina</i> [1365] <p>Source: Conservation Objectives: Lambay Island SAC 000204. Version 1. (NPWS 2013e) S.I. No. 294/2019 - European Union Habitats (Lambay Island Special Area Of Conservation 000204) Regulations 2019</p>
Special Protection Areas (SPAs)		
South Dublin Bay and River Tolka Estuary SPA [004024]	approximately 0.5km east of the Proposed Scheme	<ul style="list-style-type: none"> Light-bellied Brent Goose <i>Branta bernicla hrota</i> [A046]; Oystercatcher <i>Haematopus ostralegus</i> [A130]; Ringed Plover <i>Charadrius hiaticula</i> [A137]; Grey Plover <i>Pluvialis squatarola</i> [A140]; Knot <i>Calidris canutus</i> [A143]; Sanderling <i>Calidris alba</i> [A144]; Dunlin <i>Calidris alpina</i> [A149]; Bar-tailed Godwit <i>Limosa lapponica</i> [A157]; Redshank <i>Tringa totanus</i> [A162]; Black-headed Gull <i>Croicocephalus ridibundus</i> [A179]; Roseate Tern <i>Sterna dougallii</i> [A192]; Common Tern <i>Sterna hirundo</i> [A193]; Arctic Tern <i>Sterna paradisaea</i> [A194]; and Wetlands and Waterbirds [A999]. <p>Source: Conservation Objectives: South Dublin Bay and River Tolka Estuary SPA 004024. Version 1. (NPWS 2015a) and Natura 2000 – Standard Data Form (NPWS 2020b) S.I. No. 212/2010 – European Communities (Conservation of Wild Birds (South Dublin Bay and River Tolka Estuary Special Protection Area 004024) Regulations 2010.</p>
North Bull Island SPA [004006]	approximately 3km east of the Proposed Scheme	<ul style="list-style-type: none"> Light-bellied Brent Goose <i>Branta bernicla hrota</i> [A046]; Shelduck <i>Tadorna tadorna</i> [A048]; Teal <i>Anas crecca</i> [A052]; Pintail <i>Anas acuta</i> [A054]; Shoveler <i>Anas clypeata</i> [A056]; Oystercatcher <i>Haematopus ostralegus</i> [A130]; Golden Plover <i>Pluvialis apricaria</i> [A140]; Grey Plover <i>Pluvialis squatarola</i> [A141]; Knot <i>Calidris canutus</i> [A143]; Sanderling <i>Calidris alba</i> [A144]; Dunlin <i>Calidris alpina</i> [A149]; Black-tailed Godwit <i>Limosa limosa</i> [A156]; Bar-tailed Godwit <i>Limosa lapponica</i> [A157]; Curlew <i>Numenius arquata</i> [A160]; Redshank <i>Tringa tetanus</i> [A162]; Turnstone <i>Arenaria interpres</i> [A169]; Black-headed Gull <i>Croicocephalus ridibundus</i> [A179]; and Wetlands and Waterbirds [A199].

Site Name	Distance	Reasons for Designation – QIs or SCIs
		<p>Source: Conservation Objectives: North Bull Island SPA 004006. Version 1. (NPWS 2015b) and Natura 2000 – Standard Data Form (NPWS 2020c)</p> <p><i>S.I. No. 211/2010 – European Communities (Conservation of Wild Birds (North Bull Island Special Protection Area 004006) Regulations 2010.</i></p>
Baldoyle Bay SPA [004016]	approximately 8.4km north-east of Proposed Scheme	<ul style="list-style-type: none"> • Light-bellied Brent Goose <i>Branta bernicla hrota</i> [A046] [wintering]; • Shelduck <i>Tadorna tadorna</i> [A048] [wintering]; • Ringed Plover <i>Charadrius hiaticula</i> [A137] [wintering]; • Golden Plover <i>Pluvialis apricaria</i> [A140] [wintering]; • Grey Plover <i>Pluvialis squatarola</i> [A141] [wintering]; • Bar-tailed Godwit <i>Limosa lapponica</i> [A157] [wintering]; and • Wetlands and Waterbirds [A999]. <p>Sources: Conservation Objectives: Baldoyle Bay SPA 004016. Version 1. (NPWS 2013f) and Natura 2000 – Standard Data Form (NPWS 2020d)</p> <p><i>S.I. No. 275/2010 – European Communities (Conservation of Wild Birds (Baldoyle Bay Special Protection Area 004016) Regulations 2010.</i></p>
Dalkey Island SPA [004172]	approximately 10.5km south-east of Proposed Scheme	<ul style="list-style-type: none"> • Roseate Tern <i>Sterna dougallii</i> [A192] [breeding]; • Common Tern <i>Sterna hirundo</i> [A193] [breeding]; and • Arctic Tern <i>Sterna paradisaea</i> [A194] [breeding]. <p>Source: Conservation objectives for Dalkey Islands SPA [004172]. First Order Site-specific Conservation Objectives. Version 1. Department of Housing, Local Government and Heritage NPWS (2022a) and Natura 2000 – Standard Data Form (NPWS 2020e)</p> <p><i>S.I. No. 238/2010 – European Communities (Conservation of Wild Birds (Dalkey Islands Special Protection Area 004172)) Regulations 2010.</i></p>
Howth Head Coast SPA [004113]	approximately 10.9km east of the Proposed Scheme	<ul style="list-style-type: none"> • Kittiwake <i>Rissa tridactyla</i> [A188] [breeding]. <p>Source: Conservation objectives for Howth Head Coast SPA [004113]. First Order Site-specific Conservation Objectives. Version 1. Department of Housing, Local Government and Heritage NPWS (2022b) and Natura 2000 – Standard Data Form (NPWS 2020f)</p> <p><i>S.I. No. 185/2012 – European Communities (Conservation of Wild Birds (Howth Head Coast Special Protection Area 004113)) Regulations 2012.</i></p>
Ireland's Eye SPA [004117]	approximately 11.7km east of Proposed Scheme	<ul style="list-style-type: none"> • Cormorant <i>Phalacrocorax carbo</i> [A017] [breeding]; • Herring Gull <i>Larus argentatus</i> [A184]; • Kittiwake <i>Rissa tridactyla</i> [A188] [wintering]; • Guillemot <i>Uria aalge</i> [A199] [breeding] / [wintering]; and • Razorbill <i>Alca torda</i> [A200] [breeding] / [wintering]. <p>Source: Conservation objectives for Ireland's Eye SPA [004117]. First Order Site-specific Conservation Objectives. Version 1. Department of Housing, Local Government and Heritage NPWS (2022c) and Natura 2000 – Standard Data Form (NPWS 2020g)</p> <p><i>S.I. No. 240/2010 – European Communities (Conservation of Wild Birds (Ireland's Eye Special Protection Area 004117) Regulations 2010.</i></p>
Malahide Estuary SPA [004025]	approximately 12.3km north of Proposed Scheme	<ul style="list-style-type: none"> • Great Crested Grebe <i>Podiceps cristatus</i> [A005] [wintering]; • Light-bellied Brent Goose <i>Branta bernicla hrota</i> [A046] [wintering]; • Shelduck <i>Tadorna tadorna</i> [A048] [wintering]; • Pintail <i>Anas acuta</i> [A054] [wintering]; • Goldeneye <i>Bucephala clangula</i> [A067] [wintering]; • Red-breasted Merganser <i>Mergus serrator</i> [A069] [wintering]; • Oystercatcher <i>Haematopus ostralegus</i> [A130] [wintering]; • Golden Plover <i>Pluvialis apricaria</i> [A140] [wintering]; • Grey Plover <i>Pluvialis squatarola</i> [A141] [wintering]; • Knot <i>Calidris canutus</i> [A143] [wintering]; • Dunlin <i>Calidris alpina</i> [A149] [wintering]; • Black-tailed Godwit <i>Limosa</i> [A156] [wintering]; • Bar-tailed Godwit <i>Limosa lapponica</i> [A157] [wintering]; • Redshank <i>Tringa totanus</i> [A162] [wintering]; and • Wetland and Waterbirds [A999].

Site Name	Distance	Reasons for Designation – QIs or SCIs
		<p>Sources: Conservation Objectives for Malahide Estuary SPA 004025. Version 1. (NPWS 2013g) and Natura 2000 – Standard Data Form (NPWS 2020h)</p> <p><i>S.I. No. 285/2011 – European Communities (Conservation of Wild Birds (Malahide Estuary Special Protection Area 004025) Regulations 2011</i></p>
Wicklow Mountains SPA [004040]	approximately 12.1km south of the Proposed Scheme	<ul style="list-style-type: none"> Merlin <i>Falco columbarius</i> [A098]; and Peregrine <i>Falco peregrinus</i> [A103]. <p>Source: Conservation objectives for Wicklow Mountains SPA [004040]. First Order Site-specific Conservation Objectives. Version 1. Department of Housing, Local Government and Heritage NPWS (2022d) and Natura 2000 – Standard Data Form (NPWS 2020i)</p> <p><i>S.I. No. 586/2012 - European Communities (Conservation of Wild Birds (Wicklow Mountains Special Protection Area 004040)) Regulations 2012</i></p>
Lambay Island SPA [000204]	approximately 19.8km north east of Proposed Scheme	<ul style="list-style-type: none"> Fulmar <i>Fulmarus glacialis</i> [A009]; Cormorant <i>Phalacrocorax carbo</i> [A017]; Shag <i>Phalacrocorax aristotelis</i> [A018]; Greylag Goose <i>Anser</i> [A043]; Lesser Black-backed Gull <i>Larus fuscus</i> [A183]; Herring Gull <i>Larus argentatus</i> [A184]; Kittiwake <i>Rissa tridactyla</i> [A188]; Guillemot <i>Uria aalge</i> [A199]; Razorbill <i>Alca torda</i> [A200]; and, Puffin <i>Fratercula arctica</i> [A204]; <p>Source: Conservation objectives for Lambay Island SPA [004069]. First Order Site-specific Conservation Objectives. Version 1. Department of Housing, Local Government and Heritage NPWS (2022e) and Natura 2000 – Standard Data Form (NPWS 2020j)</p> <p><i>S.I. No. 242/2010 – European Communities (Conservation of Wild Birds (Lambay Island Special Protection Area 004069)) Regulations 2010.</i></p>
Rockabill SPA [004014]	approximately 26.8km north east of the Proposed Scheme	<ul style="list-style-type: none"> Purple Sandpiper <i>Calidris maritima</i> [A148]; Roseate Tern <i>Sterna dougallii</i> [A192]; Common Tern <i>Sterna hirundo</i> [A193]; and, Arctic Tern <i>Sterna paradisaea</i> [A194]. <p>Source: Conservation Objectives: Rockabill SPA [004014]. Version 1. (NPWS 2013h) and Natura 2000 – Standard Data Form (NPWS 2020k)</p> <p><i>S.I. No. 94/2012 – European Communities (Conservation of Wild Birds (Rockabill Special Protection Area 004014) Regulations 2012.</i></p>
Skerries Islands SPA [004122]	Approximately 26.3km northwest of the Proposed Scheme	<ul style="list-style-type: none"> Cormorant <i>Phalacrocorax carbo</i> [A017]; Shag <i>Phalacrocorax aristotelis</i> [A018]; Light-bellied Brent Goose <i>Branta bernicla hrota</i> [A046]; Purple Sandpiper <i>Calidris maritima</i> [A148]; Turnstone <i>Arenaria interpres</i> [A169]; Herring Gull <i>Larus argentatus</i> [A184]. <p>Source: Conservation objectives for Skerries Islands SPA [004122]. First Order Site-specific Conservation Objectives. Version 1. Department of Housing, Local Government and Heritage NPWS (2022f) and Natura 2000 – Standard Data Form (NPWS 2020l)</p> <p><i>S.I. No. 245/2010 – European Communities (Conservation of Wild Birds (Skerries Islands Special Protection Area 004122)) Regulations 2010.</i></p>
Rogerstown Estuary SPA [004015]	Approximately 17.1km northeast of the Proposed Scheme	<ul style="list-style-type: none"> Greylag Goose <i>Anser anser</i> [A043]; Light-bellied Brent Goose <i>Branta bernicla hrota</i> [A046]; Shelduck <i>Tadorna tadorna</i> [A048]; Shoveler <i>Anas clypeata</i> [A056]; Oystercatcher <i>Haematopus ostralegus</i> [A130]; Ringed Plover <i>Charadrius hiaticula</i> [A137]; Grey Plover <i>Pluvialis squatarola</i> [A141]; Knot <i>Calidris canutus</i> [A143];

Site Name	Distance	Reasons for Designation – QIs or SCIs
		<ul style="list-style-type: none"> • Dunlin <i>Calidris alpina</i> [A149]; • Black-tailed Godwit <i>Limosa limosa</i> [A156]; • Redshank <i>Tringa totanus</i> [A162]; and, • Wetland and Waterbirds [A999]. <p>Source: Conservation Objectives: Rogerstown Estuary SPA 004015. Version 1. (NPWS 2013i) and Natura 2000 – Standard Data Form (NPWS 2020m)</p> <p>S.I. No. 271/2010 – European Communities (Conservation of Wild Birds (Rogerstown Estuary Special Protection Area 004015) Regulations 2010.</p>
The Murrough SPA [004186]	approximately 28.3km south east of the Proposed Scheme	<ul style="list-style-type: none"> • Red-throated Diver <i>Gavia stellata</i> [A001]; • Greylag Goose <i>Anser anser</i> [A043]; • Light-bellied Brent Goose <i>Branta bernicla hrota</i> [A046]; • Wigeon <i>Anas penelope</i> [A050]; • Teal <i>Anas crecca</i> [A052]; • Black-headed Gull <i>Chroicocephalus ridibundus</i> [A179]; • Herring Gull <i>Larus argentatus</i> [A184]; and, • Little Tern <i>Sterna albifrons</i> [A195]. <p>Source: Conservation objectives for The Murrough SPA [004186]. First Order Site-specific Conservation Objectives. Version 1. Department of Housing, Local Government and Heritage NPWS (2022g) and Natura 2000 – Standard Data Form (NPWS 2020n)</p> <p>S.I. No. 298/2011 – European Communities (Conservation of Wild Birds (The Murrough Special Protection Area 004186)) Regulations 2011.</p>

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

NHAs are designations under Section 18 of the Wildlife Acts 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 development plans in circumstances where planning authorities must give due regard to their protection in planning policies and decisions. The Proposed Scheme lies within the administrative boundary of Dublin City County Development Plan 2022 – 2028 (DCC 2022).

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

The Royal Canal pNHA will overlap the Proposed Scheme at Spenser Dock. Grand Canal pNHA, is located approximately 0.2km south of the Proposed Scheme, followed by the North Dublin Bay pNHA, which is located 0.5km south-east of the Proposed Scheme.

There are six pNHAs that are located downstream of the Proposed Scheme in Dublin Bay. These pNHAs are North Dublin Bay pNHA, Dolphins, Dublin Docks pNHA, Booterstown Marsh pNHA, Howth Head pNHA, Dalkey Coastal Zone and Killiney Hill pNHA, and South Dublin Bay pNHA. These sites will be hydrologically connected to the Proposed Scheme via the Liffey Estuary Lower.

There is one NHA and 14 pNHAs designated for bird species that are known to forage / loaf and / or roost in suitable habitat across Dublin City and / or Dublin Bay. These are Rockabill pNHA, Skerries Islands NHA, Malahide Estuary pNHA, Baldoyle Bay pNHA, Rogerstown pNHA, Portrane Shore pNHA, North Dublin Bay pNHA, Howth Head 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 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 28 pNHAs located in the wider area of the Proposed Scheme. These are listed in Table 12.6 and illustrated in Figure 12.4 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 Zol 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 Zol of the Proposed Scheme Boundary (highlighted in light blue), and those in the Wider Area of the Proposed Scheme Boundary

Site Name	Distance	Description
NHA		
Skerries Islands NHA [000204]	approximately 26.3km north east of the Proposed Scheme	See Table 12.5 under Skerries Islands SPA
pNHAs		
Royal Canal pNHA [002103]	Overlaps the Proposed Scheme	Diversity of species canal supports and presence of legally protected plant species, opposite-leaved pondweed <i>Groenlandia densa</i>
Grand Canal pNHA [002104]	approximately 0.2km south of the Proposed Scheme	Diversity of species canal supports and presence of legally protected plant species, opposite-leaved pondweed <i>Groenlandia densa</i>
North Dublin Bay pNHA [000206]	approximately 1.0km south east of the 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 0.4km south-east 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 1.1km east of the Proposed Scheme	See Table 12.5 under South Dublin Bay and River Tolka Estuary SPA
Boosterstown Marsh pNHA [001205]	approximately 3.1km south-east of the Proposed Scheme	See Table 12.5 under South Dublin Bay and River Tolka Estuary SPA
Santry Demesne pNHA [000178]	approximately 5.4km north of the Proposed Scheme	Presence of legally protected plant species, hairy St. John's-wort <i>Hypericum hirsutum</i> , and woodland
Liffey Valley pNHA [000128]	approximately 6.6km west of the Proposed Scheme	Presence of legally protected plant species, hairy St. John's-wort <i>Hypericum hirsutum</i> , rare Red List plant species green figwort <i>Scrophularia umbrosa</i> and yellow archangel <i>Lamiastrum galeobdolon</i> and the diversity of habitat present.
Dodder Valley pNHA [000991]	approximately 8.3km south-west of the Proposed Scheme	The last remaining stretch of natural river bank vegetation on the River Dodder in the built-up Greater Dublin Area (GDA).
Fitzsimon's Wood pNHA [001753]	approximately 7.6km south-west of the Proposed Scheme	Birch woodland, which is very rare in County Dublin.
Baldoyle Bay pNHA [000199]	approximately 8.4km north-east of the	See Table 12.5 under Baldoyle Bay SAC and Baldoyle Bay SPA

Site Name	Distance	Description
	Proposed Scheme	
Dalkey Coastal Zone and Killiney Hill pNHA [001206]	approximately 7.8km 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 scarce species. The islands are important bird sites. See Table 12.5 under Rockabill to Dalkey Island SAC and Dalkey Islands SPA
Howth Head pNHA [000202]	approximately 8.3km east of the Proposed Scheme	See Table 12.5 under Howth Head SAC and Howth Head Coast SPA
Sluice River Marsh pNHA [001763]	approximately 9.8km north of the Proposed Scheme	Freshwater marsh
Feltrim Hill pNHA [001208]	approximately 9.8km north of the Proposed Scheme	Good example of knoll-reef phenomenon. Previously known to contain two rare plant species, namely spring squill <i>Scilla verna</i> and long-stalked crane's-bill <i>Geranium columbinum</i>
Dingle Glen pNHA [001207]	approximately 10.9km south of the Proposed Scheme	Variety of habitat present, including woodland
Malahide Estuary pNHA [000205]	approximately 11.8km north-east of the Proposed Scheme	See Table 12.5 under Malahide Estuary SAC and Malahide Estuary SPA
Ireland's Eye pNHA [000203]	approximately 11.9km north-east of the Proposed Scheme	See Table 12.5 under Ireland's Eye SPA
Glenasmole Valley pNHA [001209]	approximately 12.5km south of the Proposed Scheme	See Table 12.5 under Glenasmole Valley SAC
Loughlinstown Woods pNHA [001211]	approximately 11.6km south of the Proposed Scheme	Demesne-type mixed woodland
Lugmore Glen pNHA [001212]	approximately 13.3km south-west of the Proposed Scheme	Presence of the rare Red Data Book species Yellow Archangel (<i>Lamiastrum galeobdolon</i>).
Ballybetagh Bog pNHA [001202]	approximately 12.5km south of the Proposed Scheme	Marshland
Knocksink Wood pNHA [000725]	approximately 14km south-west of the Proposed Scheme	See Table 12.5 under Knocksink Wood SAC
Rogerstown Estuary pNHA [00208]	Approximately 16.8km northwest of the Proposed Scheme	A variety of Annex I coastal habitats and Annex I wintering bird species (See Table 12.5 under Rogerstown Estuary SPA)
Portraine Shore pNHA [001215]	Approximately 16.3km	See Table 12.5 under Rogerstown Estuary SPA

Site Name	Distance	Description
	northwest of the Proposed Scheme	
Lambay Island pNHA [000204]	<i>Approximately</i> 20.1km north east of the Proposed Scheme	See Table 12.5 under Lambay Island SAC and Lambay Island SPA
The Murrough pNHA [004186]	<i>Approximately</i> 26.5km south east of the Proposed Scheme	See Table 12.5 under The Murrough SPA
Rockabill Island pNHA [000207]	<i>Approximately</i> 31km north-west of the Proposed Scheme	See Table 12.5 under Rockabill to Dalkey Island SAC and Rockabill SPA

12.3.4.3 Other Designated Sites

Other designations recognised in the Greater Dublin Area, include Ramsar wetland sites, the UNESCO Dublin Bay Biosphere and three Special Amenity Area Orders. Biodiversity receptors in these other designated sites are assessed with the European sites where they overlap, and the other individual impact assessment headings, as relevant.

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 is 'The Convention on Wetlands of International Importance, Especially as Waterfowl Habitats' 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 (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).

The assessment of these Ramsar sites, which are encompassed within European sites and / or NHAs / pNHAs, is captured in full under the assessment of European sites, NHAs and pNHAs in Section 12.4; therefore, 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. The North Bull Island supports a variety of plants and wildlife including an internationally significant population of light-bellied brent goose 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 now extends to over 300 km² 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 to Dublin Bay, it does contribute to improving the co-ordination and management of its functions in a holistic and integrated way. The assessment of the UNESCO Dublin Bay Biosphere, which overlaps with European sites and / or NHAs / pNHAs, is captured in full under the assessment of European sites, NHAs and pNHAs in Section 12.4.

Special Amenity Area Order

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. The three areas that have been designated are owing to the outstanding beauty needing nature conservation.

Two such SAAO areas have been recognised in Ireland, all of them in the Greater Dublin Area. They include:

- North Bull Island; and
- Howth Head.

The designations re-enforce protection for green belts via land plans and objectives contained therein. As such these areas have been considered in the overall EIAR biodiversity assessment and Appropriate Assessment 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:

- Horticultural land (BC2);
- Flower beds and borders (BC4);
- Stone walls and other stonework (BL1);
- Buildings and artificial surfaces (BL3);
- Sea walls, piers and jetties (CC1);
- Tidal rivers (CW2);
- Muddy sand shores (LS3) / Mud shores (LS4)
- Canals (FW3);
- Spoil and bare ground (ED2);
- Amenity Grassland (Improved) (GA2);
- Dry meadows and grassy verges (GS2);
- Residential;
- Scattered trees and parkland (WD5);
- Hedgerows (WL1);
- Treelines (WL2);
- Scrub (WS1); and
- Ornamental / non-native shrub (WS3).

12.3.5.2 Horticultural land (BC2)

This habitat type was identified in two locations across the Proposed Scheme, in the north-east corner of Ringsend Park and on the junction between York Road and Cambridge Road. It was associated with allotments in the residential area of Ringsend.

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

12.3.5.3 Flower beds and borders (BC4)

This habitat includes ornamental planting associated with commercial developments or industrial complexes and planting at roundabouts and along roadsides in suburban areas. This habitat type was identified in six locations across the Proposed Scheme.

The largest area was identified in Elizabeth O'Farrell Park off R814 / Lombard Street East, and a purpose-built green wall on the west side of the Hub Spot Building on Sir John Rogerson's Quay. Several areas of bedding were recorded on the grounds of commercial buildings across the Proposed Scheme including Prince's Street South off R813 City Quay, the International Financial Services Centre (IFSC), Sir John Rogerson's Quay, R801 North Wall Quay and along Thorncastle Street.

Species present included; butterfly bush *Buddleja davidii*, tree ferns *Dicksonia sp.*, horsetail *Equisetum sp.*, wallflowers *Erysimum*, geranium *Geranium sp.*, poppy *Papaver rhoeas*, valerian *Valeriana officinalis* and various shrub species.

This habitat type was also found in mosaics with the following habitats; amenity grassland (improved) (GA2) and buildings and artificial surfaces (BL3).

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

12.3.5.4 Stone walls and other stonework (BL1)

Stone walls were present across the Proposed Scheme corridor, comprising either property boundaries or roadside boundaries. The largest area of this habitat was located along the rear of the green space which runs the length of Pigeon House Road, from Poolbeg Yacht Club to the R131 (East Link Toll Bridge Road). Other stone walls were observed along the northern and eastern perimeter of Ringsend Park.

The majority of the stone walls recorded along the Proposed Scheme were well maintained and free from vegetation. This habitat category was also used to describe stone bridges, steps and stone buildings. Where vegetation was present it included ivy *Hedera helix*, ivy-leaved toadflax *Cymbalaria muralis* and wall barley *Hordeum murinum*.

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

12.3.5.5 Buildings and artificial surfaces (BL3)

This habitat type includes buildings (i.e. domestic, commercial and industrial), roads, car parks, artificial recreation surfaces and other concrete / hardstanding areas. This habitat type was the most commonly encountered habitat and was present across the length of the majority 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 the following habitats; flower beds and borders (BC4), ornamental / non-native shrub (WS3), amenity grassland (GA2), recolonising bare ground (ED3), hedgerows (WL1), treelines (WL2) and scrub (WS1).

This habitat type is of Negligible Ecological Value due to being a built / artificial surface and devoid of vegetation.

12.3.5.6 Sea walls, piers, and jetties (CC1)

This habitat type includes all coastal constructions such as sea walls, piers, jetties, slipways, causeways and other structures that that are partially or totally inundated by sea water at high tide, or subject to wetting by sea spray or wave splash. This habitat is associated with ports and docks and was identified along the northern boundary of the R131 East Link Toll Bridge Road.

Vegetation was observed along the upper sections of rock armour. Species present in this habitat are barren brome grass *Bromus sterilis*, butterfly bush *Buddleja davidii*, traveler's joy *Clematis vitalba*, hawksbeard *Crepis capillaris*, cocksfoot *Dactylis glomerata*, willowherb *Epilobium sp.*, wallflower *Erysimum sp.*, beech saplings *Fagus*

sylvatica, red fescue *Festuca rubra*, herb-Robert *Geranium robertianum*, ivy *Hedera helix*, common hogweed *Heracleum sphondylium*, Yorkshire fog *Holcus lanatus*, wall barley *Hordeum murinum*, tutsan *Hypericum sp.*, toadflax *Linaria vulgaris*, perennial ryegrass *Lolium perenne*, common poppy *Papaver rhoeas*, ribwort plantain *Plantago lanceolata*, annual meadow grass *Poa annua*, bramble *Rubus fruticosus agg.*, ragwort *Jacobaea vulgaris*, bitter-sweet nightshade *Solanum dulcamara*, dandelion *Taraxacum officinale agg.*, wheat *Triticum sp.*, and red valerian *Valeriana officinalis*.

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

12.3.5.7 Tidal rivers (CW2)

This habitat type consisted entirely of the Liffey Estuary Lower, located adjacent to the Proposed Scheme along the majority of its length. The Proposed Scheme will overlap with this habitat type in three locations: the proposed DPTOB, the two no. proposed boardwalks at DCC Docklands Offices at Custom House Quay and North Wall Quay. There are high retaining quay walls either side of the channel, with rock armour extending along the south retaining wall at R131 East Link Toll Bridge Road. This habitat is also associated with sea walls, piers, and jetties (CC1).

The Liffey Estuary Lower is classified as 'Good' status for the period 2013 to 2018 and is not deemed 'At Risk' of failing to meet its requirements under Directive 2000/60/EC of the European Parliament and of the Council of 23 October 2000 establishing a framework for Community action in the field of water policy (hereafter referred to as the Water Framework Directive or WFD).

The Liffey Estuary Lower overlaps with the favourable reference range and mapped area of the Annex I Habitat Estuaries [1130] as presented in the Article 17 report (NPWS 2019d). The 2019 Article 17 Report has assessed the status of the Annex I Habitat Estuaries [1130] in Ireland. In terms of range and area, Estuaries [1130] habitat is considered to be of 'favourable' status with a stable trend. The structure and function of Estuaries [1130] habitat is considered to be of 'inadequate' status with a declining status. The future prospects of this habitat in Ireland were considered to be 'inadequate'.

As this habitat corresponds with the Annex I habitat Estuaries (1130), it is considered to be of National Importance.

12.3.5.8 Muddy sand shores (LS3) / Mud shores (LS4)

The Proposed Scheme will overlap with this habitat type at the proposed DPTOB crossing point. There are high retaining quay walls either side of the channel, with rock armour extending along the south retaining wall at R131 East Link Toll Bridge Road. This habitat is also associated with Annex I habitat Estuaries [1130].

This habitat type overlaps with the favourable reference range and mapped area of the Annex I Habitat Tidal Mudflats and Sandflats [1130] as presented in the Article 17 report (NPWS 2019d). The 2019 Article 17 Report has assessed the status of the Annex I Habitat Tidal Mudflats and Sandflats [1130] in Ireland. In terms of range and area, Tidal Mudflats and Sandflats [1130] habitat is considered to be of 'favourable' status with a stable trend. The structure and function of the habitat is considered to be of 'inadequate' status with a declining status. The future prospects of this habitat in Ireland were considered to be 'good' for its range and area, however 'poor' for its structure and functions, overall, this is deemed 'inadequate'.

As this habitat corresponds with the Annex I habitat Tidal Mudflats and Sandflats [1130], it is considered to be of National Importance.

12.3.5.9 Canals (FW3)

The Proposed Scheme crosses the Royal Canal entry channel at the Scherzer Bridges (illustrated in Figure 12.5 in Volume 3 of this EIAR). The Royal Canal is an artificial waterbody, primarily used for navigational purposes, and discharges into the Liffey Estuary Lower. In-stream vegetation was not recorded at the proposed crossing point, however the legally-protected Flora Protection Order species opposite-leaved pondweed *Groenlandia densa* is known throughout the Royal Canal.

The Royal Canal is designated as a pNHA. This habitat type is therefore valued as being of National Importance.

12.3.5.10 Spoil and bare ground (ED2)

This habitat type consisted of areas of bare ground located opposite the Famine Memorial / west of the CHQ Building on R801 Custom House Quay. This habitat was in a mosaic with areas of recolonising bare ground (ED3) habitat. Species present at this location included orache *Atriplex sp.*, alder *Alnus glutinosa*, sow thistle *Sonchus sp.*, and butterfly bush *Buddleja davidii*.

This habitat type is valued as being of Local Importance (Lower Value) as it is transient habitat artificially created as a result of disturbance and has been highly anthropogenically modified.

12.3.5.11 Amenity Grassland (Improved) (GA2)

Amenity grassland was a commonly recorded habitat across the study area. It is present in small areas located across the entirety of the Proposed Scheme. The largest areas of improved amenity grassland sites were identified in Ringsend Park, Sean Moore Park, south of the R131 Sean Moore Road and on R802 Beach Road.

Grass species recorded included; perennial ryegrass *Lolium perenne*, Yorkshire fog *Holcus lanatus*, wall barley *Hordeum murinum* and annual meadow grass *Poa annua*. Forb species present included creeping cinquefoil *Potentilla reptans*, creeping buttercup *Ranunculus repens*, common groundsel *Senecio vulgaris*, smooth sow-thistle *Sonchus oleraceus*, dandelion *Taraxacum agg.*, red clover *Trifolium pratense*, white clover *Trifolium repens*, cranesbill *Geranium sp.*, yarrow *Achillea millefolium*, butterfly bush, shepherd's purse *Capsella bursa-pastoris*, black medic *Medicago lupulina*, redshank *Persicaria maculosa*, ribwort plantain *Plantago lanceolata* and broadleaf plantain *Plantago major*.

This habitat type often occurred in mosaics with buildings and artificial surfaces (BL3), and ornamental / non-native shrub (WS3).

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

12.3.5.12 Dry meadows and grassy verges (GS2)

This habitat type included unmanaged grassland areas, areas of parkland following a low maintenance regime and roadside verges. This habitat type was recorded in two areas across the Proposed Scheme, north of Deke's Diner on R131 Sean Moore Road surrounding the Sea Scouts building and at Clanna Gael Fontenoy GAA Club also on R131 / Sean Moore Road.

Common species present included cock's-foot *Dactylis glomerata*, false oat-grass *Arrhenatherum elatius*, perennial rye-grass *Lolium perenne*, annual meadow grass *Poa annua*, sweet vernal-grass *Anthoxanthum odoratum* and Yorkshire-fog *Holcus lanatus*, dock species *Rumex sp.*, bush vetch *Vicia sepium*, colt's-foot *Tussilago farfara*, common chickweed *Stellaria media*, common knapweed *Centaurea nigra*, common nettle *Urtica dioica*, creeping buttercup *Ranunculus repens*, creeping cinquefoil *Potentilla reptans*, creeping thistle *Cirsium arvense*, dandelion species *Taraxacum agg.*,a, goat's-beard *Tragopogon pratensis*, meadow buttercup *Ranunculus acris*, meadow vetchling *Lathyrus pratensis*, nipplewort *Lapsana communis*, prickly sow-thistle *Sonchus asper*, red clover, ribwort plantain, rosebay willowherb *Chamaenerion angustifolium*, silverweed *Potentilla anserina*, and white clover *Trifolium repens*.

This habitat type also occurred in mosaics with amenity grassland (GA2) and tree lines (WL2).

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

12.3.5.13 Residential

This non-Fossitt classification is used to represent 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 and was present across the entirety of the Proposed Scheme.

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

12.3.5.14 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 17 locations across the Proposed Scheme. The majority of this habitat was identified across several locations in Ringsend Park and surrounding green areas adjacent to St. Brendan's Cottages, R131 Sean Moore Road, Bremen Road and Kerlogue Road.

The most common tree species recorded were small-leaved lime *Tilia cordata*, London plane *Platanus x acerifolia*, sycamore *Acer pseudoplatanus* and birch species *Betula sp.* Other species present include hornbeam *Carpinus fastigiata* Lucas, cypress species *Cupressus sp.*, beech *Fagus sylvatica*, maple species *Acer sp.*, alder *Alnus glutinosa*, downy birch *Betula pubescens*, ash *Fraxinus excelsior*, larch species *Larix sp.*, pine species *Pinophyta sp.*, poplar species *Populus sp.*, holm oak *Quercus ilex*, oak species *Quercus sp.*, crack-willow *Salix fragilis* and weeping willow *Salix babylonica*. Grass species present are applicable to a GA2 habitat.

This habitat type also occurred in mosaics with tree lines (WL2).

This habitat type is of Local Importance (Higher Value) as it is not common in the surrounding area.

12.3.5.15 Hedgerows (WL1)

Hedgerows were present in four isolated areas along the R801 North Quays and the northern section of Ringsend Park. These consisted of linear strips of shrubby vegetation, often containing trees, which frequently demarcated property / field boundaries. Most of the hedgerows which were recorded along the Proposed Scheme consisted of screening vegetation at commercial and residential properties, along roadsides and within the vegetated median of larger roads. Substantial areas of this habitat along green spaces included the borders of general amenity areas around the R801 Custom House Quay, R801 North Wall Quay at the Royal Canal and along Cambridge Road.

Species composition varied greatly within this habitat. Species most prevalent included; butterfly bush, cherry laurel *Prunus laurocerasus*, beech *Fagus Sylvatica*, copper beech *Fagus sylvatica f. purpurea*, sycamore *Acer pseudoplatanus*, ash *Fraxinus excelsior* and hedge bindweed *Calystegia sepium*. Other species present include weeping willow *Salix babylonica* and elm species *Ulmus sp.*

This habitat type is of Local Importance (Higher Value) as it is not common in the surrounding area.

12.3.5.16 Tree lines (WL2)

Tree lines are narrow rows or single lines of trees which are greater than 5m in height. They typically occur along field or property boundaries but are also found along tree-lined roads / avenues. Tree lines were widespread across the study area. Substantial areas of this habitat were observed along the R131 East Link Toll Bridge Road, Ringsend Park, Irishtown Stadium and along the verges of Pigeon House Road and the R131 Sean Moore Road.

Urban street planting recorded consisting of young to mature trees planted at regular intervals along footpaths / strips of amenity grassland and road edges, were classified as this habitat type. Tree species frequently recorded in urban tree lines (street planting) included lime species *Tilia sp.*, London plane *Platanus x acerifolia*, maple species *Acer sp.*, sycamore *Acer pseudoplatanus*, rowan *Sorbus aucuparia*, hornbeam *Carpinus betulus*, beech *Fagus sylvatica* and silver birch *Betula pendula*. Additional tree species, recorded in more substantial treelines, included birch species *Betula sp.*, cypress species *Cupressus sp.*, hawthorn *Crataegus monogyna*, downy oak *Quercus pubescens*, hazel *Corylus avellana*, holm oak *Quercus ilex*, purple maple *Acer palmatum 'Atropurpureum'*, cherry *Prunus Kanzan*, oak species *Quercus sp.*, elder *Sambucus nigra*, and elm *Ulmus sp.* The treelines often incorporated areas of bramble *Rubus fruticosus* and / or alexanders *Smyrniololus atratum*.

A tree line of Scot's pine *Pinus sylvestris* was noted as a feature along the eastern side of the NAMA building of R801 North Wall Quay.

This habitat type also occurred in mosaics with buildings and artificial surfaces (BL3).

This habitat type is of Local Importance (Higher Value) as it is not common in the surrounding area.

12.3.5.17 Scrub (WS1)

This habitat consists of areas that are dominated by shrubs, stunted trees, or brambles, with at least 50% coverage.

Several patches of scrub were identified along the Proposed Scheme, the largest area identified is north of Sean Moore Park, along the R131 / Sean Moore Road between Clanna Gael Fontenoy GAA Club and the roundabout. This habitat was also recorded along the boundary of Marine Terminals Ltd at the end of R131 / Sean Moore Road and also inside the perimeter of the same site. The verge which runs from the east of the roundabout also along the Marine Terminals Ltd boundary. Smaller sections of this habitat were observed at R131 / Sean Moore Road north of the Sea Scouts building and adjacent to the rock armour north of the Dodder Buoy south-west of R131 / Tom Clarke East Link Bridge.

The most common species recorded were yarrow *Achillea millefolium*, butterfly bush *Buddleja davidii*, teasel *Dipsacus fullonum*, horsetail species *Equisetum* sp. Yorkshire fog *Holcus lanatus*, common poppy *Papaver rhoeas*, bramble *Rubus fruticosus*, common valerian *Valeriana officinalis* and other ruderal species.

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

12.3.5.18 Ornamental / non-native shrub (WS3)

Areas of ornamental / non-native shrub were generally associated with amenity and landscape planting at commercial properties. This habitat was recorded at 13 locations across the footprint of the Proposed Scheme. Substantial areas of this habitat type bordered Pigeon House Road north of the Sea Scouts building and at the junction of R801 Custom House Quay and R802 Memorial Road. Smaller areas of ornamental shrubs are located outside several buildings along R801 North Wall Quay, R801 Custom House Quay and on Thorncastle Street.

Species identified in these areas included butterfly bush *Buddleja davidii*, dogwood *Cornus* sp., tutsan *Hypericum* sp., cherry laurel *Prunus laurocerasus* and dwarf conifers in ornamental planters.

This habitat type was recorded in mosaics with the following other habitat types; amenity grassland (GA2), and buildings and artificial surfaces (BL3).

This habitat type is of Local Importance (Lower Value) due to 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 six species listed on the Flora Protection Order across the wider study area (i.e. Grid Square O13) and are listed in Appendix A12.2 in Volume 4 of this EIAR. Records within close proximity to the Proposed Scheme include small cudweed *Filago minima*, observed on recolonising bare ground (ED3) / waste ground (WS1) in 2012, identified at various locations within the 1km grid square O1933, and historical records of opposite-leaved pondweed *Groenlandia densa* identified along the Grand Canal and the Royal Canal (NBDC online database). Both species are 'Near Threatened' on the Ireland Red List No. 10 Vascular Plants (Wyse-Jackson et al. 2016).

Plant species listed on the Flora Protection Order are considered to be of National Importance.

One aquatic plant species (i.e. whorled water-milfoil *Myriophyllum verticillatum*) contained within the Ireland Red List No. 10 Vascular Plants was recorded on the Royal Canal 2km north-west of the Proposed Scheme (Scott Cawley Ltd. unpublished). This Red List species is considered to be of 'Least Concern'.

Plant species listed on Ireland's Red List as "Least Concern" are considered to be of Local Importance (Higher Value).

12.3.7 Non-Native Invasive Plant Species

There were no non-native invasive plant species listed on the Third Schedule of the Birds and Habitats Regulations identified along the Proposed Scheme during the habitat surveys.

The desk study returned several records of Himalayan balsam *Impatiens glandulifera* along the River Dodder at Irishtown and Japanese knotweed *Reynoutria japonica* within the 1km grid square O1933 at Irishtown Nature Park. Additional records of Canadian waterweed *Elodea canadensis*, sea-buckthorn *Hippophae rhamnoides*, and three-cornered garlic *Allium triquetrum* were returned within 1km of the Proposed Scheme (NBDC online database).

Additional non-native invasive plant species listed on the Third Schedule of the Birds and Habitats Regulations recorded within the wider study area comprise of; giant-rhubarb *Gunnera tinctorial*, American skunk-cabbage *Lysichiton americanus*, giant hogweed *Heracleum mantegazzianum*, parrot's-feather *Myriophyllum aquaticum*, curly waterweed *Lagarosiphon major*, water fern *Azolla filiculoides*, giant knotweed *Fallopia sachalinensis*, New Zealand pigmyweed *Crassula helmsii*, *Rhododendron ponticum* and Spanish bluebell *Hyacinthoides hispanica* (NBDC online database). These species were not identified within the footprint of the Proposed Scheme during habitat surveys.

12.3.8 Mammals

12.3.8.1 Bats

Bats, and their breeding and resting places, are protected under the Wildlife Act. 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 Habitats Regulations.

Bat surveys were carried out across three seasons between 2018 and 2020 in the preparation of this EIAR. Three transects were surveyed within the footprint of the Proposed Scheme, including located from Tom Clarke East Link Bridge, (via Thorncastle Street, Ringsend Bridge and Hanover Quay) to Sir John Rogerson's Quay referred to as CBC0016BT001, along Ringsend Park referred to as CBC0016BT002, and along R131 Pigeon House Road at Poolbeg Yacht Club referred to as CBC0016BT003. The results of these surveys are described in Section 12.3.8.1.1 to Section 12.3.8.1.7.

The results of these surveys 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 these species and their common presence throughout the 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 two of the three bat transect locations surveyed between 2018 and 2020; CBC0016BT003 (Pigeon House Road) and CBC0016BT001 (Tom Clarke East Link Bridge). High levels of activity were recorded along the eastern boundary of Ringsend Park, horticultural lands adjacent to Pigeon House Road, the Grand Canal Basin, and the confluence between the River Dodder and the Liffey Estuary Lower. A total of 81 bat passes attributed to Leisler's bat were recorded between 2018 and 2020.

During 2018 and 2019 there were 21 and eight bat passes, respectively, attributed to Leisler's bat along CBC0016BT003 (Pigeon House Road). During Spring 2020, there were 14 bat passes along CBC0016BT003 (Pigeon House Road) and three bat passes along CBC0016BT001 (Tom Clarke East Link Bridge) attributed to Leisler's bat. During Summer 2020, there were 35 bat passes along CBC0016BT001 (Tom Clarke East Link

Bridge) attributed to Leisler's bat. The results of the bat surveys as they relate to the Leisler's bat are shown on Figure 12.6.1 in Volume 3 of this EIAR.

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

The desk study found that Leisler's bat are known to occur across the Proposed Scheme (see Appendix A12.2 in Volume 4 of this EIAR for further details). This includes eight records of live sightings within 1km of the Proposed Scheme, including records at Irishtown Garda Station from 2004, Barrow Street in 2006, Aviva Stadium in 2010 to 2011 and Grand Canal Dock in 2005 to 2006 (NBDC Online Database).

12.3.8.1.2 Common Pipistrelle Bat *Pipistrellus pipistrellus*

Common pipistrelle bat was recorded in two of the three bat transect locations surveyed between 2018 and 2020, CBC0016BT003 (Pigeon House Road) and CBC0016BT001 (Tom Clarke East Link Bridge). High levels of activity were recorded along the eastern boundary of Ringsend Park and horticultural lands adjacent to Pigeon House Road, the Grand Canal Basin, and the confluence between the River Dodder and the Liffey Estuary Lower. A total of 43 bat passes attributed to common pipistrelle bat were recorded between 2018 and 2020.

During 2018, there were 13 bat passes attributed to common pipistrelle bat along CBC0016BT003 (Pigeon House Road). During 2019 there was one bat pass attributed to common pipistrelle bat along CBC0016BT003 (Pigeon House Road). During Summer 2020 there were 29 bat passes along CBC0016BT001 (Tom Clarke East Link Bridge) attributed to common pipistrelle bat. The results of the bat surveys as they relate to the common pipistrelle bat are shown on Figure 12.6.1 in Volume 3 of this EIAR.

There were no roost sites for common pipistrelle bat 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 A12.2 in Volume 4 of this EIAR for further details). This includes nine records of live sightings within 1km of the Proposed Scheme, including records at Samuel Beckett Bridge in 2006, the Aviva Stadium in 2004 to 2011, Lansdowne Village in 2004 and Grand Canal Dock in 2005 to 2006 (NBDC Online Database).

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 review found that Nathusius' pipistrelle bat are known to occur within 1km of the Proposed Scheme (see Appendix A12.2 in Volume 4 of this EIAR for further details). This includes one live record at St. Stephens Church on Mount Street in 2009 (NBDC Online Database).

12.3.8.1.4 Soprano Pipistrelle Bat *Pipistrellus pygmaeus*

Soprano pipistrelle bat was recorded in one of the three bat transect locations surveyed between 2018 and 2020, CBC0016BT001 (Tom Clarke East Link Bridge). Highest levels of activity were recorded at Ringsend Bridge and at the confluence between the River Dodder and the Liffey Estuary Lower. A total of nine bat passes attributed to soprano pipistrelle bat were recorded between 2018 and 2020, all of which occurred during Summer 2020. The results of the bat surveys as they relate to the soprano pipistrelle bat are shown on Figure 12.6.1 Volume 3 of this EIAR.

The desk study review found that soprano pipistrelle bat are known to occur across the Proposed Scheme (see Appendix A12.2 in Volume 4 of this EIAR for further details). This includes six records of live sightings within 1km of the Proposed Scheme, these include St. Stephen's Church on Mount Street in 2009, Grand Canal Dock in 2005 to 2006, Aviva Stadium in 2010 to 2011 and Lansdowne Village in 2004 (NBDC Online Database).

12.3.8.1.5 Unidentified Pipistrelle Species

Pipistrelle species bat 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. As such, pipistrelle bat species that echolocate between 48kHz and 52kHz cannot be accurately identified by their calls and are described as 'unidentified' pipistrelle bat species.

There was one unidentified pipistrelle bat pass recorded along CBC0016BT003 (Pigeon House Road) during Summer 2020. This was recorded at the eastern boundary tree line of Ringsend Park. The results of the bat surveys as they relate to the unidentified pipistrelle bat are shown on Figure 12.6.1 in Volume 3 of this EIAR.

12.3.8.1.6 Brown Long-Eared Bat *Plecotus auratus*

Brown long-eared bat was not recorded across the study area of the Proposed Scheme during the walked transect surveys.

The desk study found that Brown Long-Eared Bat are known to occur within 1km of the Proposed Scheme (see Appendix A12.2 in Volume 4 of this EIAR for further details). This includes a record of one live sighting on R111 Haddington Road in 2013 (NBDC Online Database).

12.3.8.1.7 *Myotis* Bat Species

Myotis bat species bat was 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* are known to occur within 1km of the Proposed Scheme (see Appendix A12.2 in Volume 4 of this EIAR for further details). This includes one record of a live sighting Aviva Stadium in 2011 (NBDC Online Database). Records of Natterer's Bat *M. nattereri* were not returned from the desk study.

12.3.8.1.8 Potential Roosting Features

There were no trees identified as having potential roosting features (PRFs) suitable to support roosting bats. Each tree, or grouping of homogenous trees, was classified with regard to their potential to support roosting bats following the Bat Conservation Trust - 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 potential to support roosting bats.

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 gardens and residential gardens. The desk study returned records found within 2km of the Proposed Scheme (see Appendix A12.2 in Volume 4 of this EIAR for further details). This includes a live sighting in Herbert Park (NBDC Online Database). 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 Act 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.

A dedicated survey in respect of the proposed DPTOB did not record any otter activity, however incidental sightings (in August 2019) by ROD surveyors noted an otter running under a gate next to the Waterways Ireland building on the South Dock Road, as well as an otter swimming adjacent to Tom Clarke East link.

Two incidental sightings of otter during vantage point wintering bird surveys carried out by Scott Cawley Ltd. in the 2020 / 2021 season. The first sighting was of an otter diving, north-east of Grand Canal Street Upper on 19th November 2020, outside of the Proposed Scheme boundary. The second sighting was of an otter swimming at the slipway west of Thorncastle Street (within the Proposed Scheme boundary), on 6th January 2021.

The desk study found that otter are known to occur within 1km of the Proposed Scheme (see Appendix A12.2 in Volume 4 of this EIAR for further details). This includes a record of a live sighting of two individuals along the River Liffey at Tom Clarke East Link Bridge in 2015 and further records of a live sightings at Grand Canal Dock in 2015 and 2016 (NBDC Online Database). In 2019, otter activity was recorded at the MV Cill Airne Boat Restaurant, Poolbeg Lighthouse, and Pidgeon House, and active holts were identified at Dublin Port adjacent to the Tolka Estuary 1.3km north-east of the Proposed Scheme and at the pontoon servicing the MV Cill Airne Boat Restaurant immediately adjacent to the Proposed Scheme (Macklin et al. 2019).

The holt at the MV Cill Airne is immediately adjacent to the study area for the Proposed Scheme and has been monitored on a fortnightly basis by surveyors from October 2020 to April 2021 (coinciding with bird surveys carried out for the Proposed Scheme). No evidence of otters was recorded within the holt during these surveys and the holt is therefore considered to be inactive. Otter spraints have been recorded on the pontoon associated with the MV Cill Airne.

It is considered likely that otter continue to utilise the Liffey Estuary Lower and various watercourses within the catchments for breeding, foraging and commuting activities.

In an Irish context, the conservation concern 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, as per the International Union for Conservation of Nature (IUCN) Red List of Threatened Species (Roos et al. 2021).

The Wicklow Mountains SAC is the closest European Site designated for otter, located approximately 16km upstream of the Proposed Scheme. Research carried out by Ó'Néill et al. (2009) on ranging behaviours of otter on river systems in Ireland found that female otter ranges averaged 7.5km while male otter home ranges varied between 7-19km. As the Proposed Scheme is located in the same sub-catchment (Dodder_SC_010) to the Wicklow Mountains SAC and the hydrological connection between the Proposed Scheme and the European site is approximately 16km in length, it is considered that the Proposed Scheme is within the potential home range of male otter associated with the Wicklow Mountains SAC. The otter population is therefore valued as being of International Importance as it is listed on Annex II of the Habitats Directive and is considered to be a species of high conservation concern.

12.3.8.4 Marine Mammals

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 however, a watching brief was maintained during all vantage point breeding and wintering bird surveys. The Irish Whale and Dolphin Group (hereafter referred to as IWDG) undertook a Marine Mammal Risk Assessment (Appendix 12.3 in Volume 4 of this EIAR), which included data from the ongoing Alexandra Basin Redevelopment Project (Russell et al. 2020). This project has over a period of years from 2017 to present returned considerable records of Annex II marine mammals further downstream of the Tom Clarke East Link Bridge, including alongside parts of the R131 East Link Toll Bridge Road towards Ringsend, which is alongside the Proposed Scheme.

Harbour seal *Phoca vitulina* and grey seal *Halichoerus grypus* have been recorded in the vicinity of the Proposed Scheme and harbour porpoise *Phocoena phocoena* has been recorded further afield in Dublin Bay. Two sightings of marine mammals were recorded during vantage point surveys carried out by Scott Cawley Ltd. in the 2020 / 2021 wintering bird season. The first sighting was of an unidentified marine mammal next to Grand Canal Dock on 04 December 2020. The second sighting was of a grey seal within the Proposed Scheme boundary at the site of the proposed DPTOB on 04 March 2021. The 2021 breeding bird vantage point surveys carried out between May and August 2021 recorded 2 sightings of marine mammals. The first sighting was of a grey seal in the Liffey

Estuary Lower opposite the Convention Centre Dublin on 14 July 2021. The second sighting was of an unidentified seal species swimming upstream along the River Liffey to the west of the East Link Bridge on 20 July 2021. The 2022 breeding bird surveys recorded grey seal on one occasion within the Liffey Estuary Lower on the 26 May 2022. The 2022 / 2023 wintering bird surveys recorded a grey seal on one occasion directly adjacent to the north of the proposed DPTOB on the 26 October 2022. Previous surveys for the proposed DPTOB (ROD 2019) recorded marine mammals adjacent to the Proposed Scheme. Grey seal was recorded in the Liffey Estuary Lower at St. Patricks Rowing Club returning frequently for a period of 25 minutes in May 2019.

Harbour seal, grey seal, and harbour porpoise are known to be present in Dublin Bay and these species are all protected under the Wildlife Acts. Both seal species and the harbour porpoise are also listed on Annex II of the Habitats Directive while all cetacean species are also listed on Annex IV of the Habitats Directive. The nearest European site for which harbour seal and grey seal have been designated is Lambay Island SAC located approximately 20km from the Proposed Scheme. Harbour porpoise is a QI species designated as part of Rockabill to Dalkey Island SAC located approximately 8km east of the Proposed Scheme.

Harbour seal, grey seal and harbour porpoise are therefore valued as being of International Importance.

A number of additional 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 truncatus*;
- Humpback Whale *Megaptera novaeangliae*;
- Sperm Whale *Physeter macrocephalus*;
- Striped Dolphin *Stenella coeruleoalba*;
- Risso's Dolphin *Grampus griseus*; and
- Northern Bottle-nosed Whale *Hyperoodon ampullatus*.

These cetacean species are all protected under the Wildlife Acts and Habitats Directive (see Appendix A12.2 in Volume 4 of this EIAR). Bottle-nosed dolphin is common to Irish coastlines, particularly the west coast, throughout the year and are infrequently recorded within Dublin Bay. 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. this species is protected under Annex II; Annex IV of the Habitats Directive and the Wildlife Acts and as such the local population is valued as Nationally Important.

Common dolphin and Risso's dolphin, 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 Annex IV of the Habitats Directive and the Wildlife Acts and as such are valued as Nationally Important.

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 did not return records for any other terrestrial mammal species protected under the Wildlife Acts in the vicinity of the Proposed Scheme (Grid Squares O13 and O23). Although no other protected mammal species are known to be present within 1km of the Proposed Scheme, it is considered possible that populations of small mammals such as pygmy shrew *Sorex minutus* and hedgehog *Erinaceus europaeus* could be present in the vicinity. The ecological value of other mammal species is valued as Local Importance (Higher Value) as they are Wildlife Acts protected species.

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.

Vantage Point breeding bird surveys conducted during 2018, 2019, 2021 and 2022 recorded several breeding bird species of conservation concern. These results are presented in the following Section separated into bird species groups, with the bird species of highest conservation concern dealt with individually. A summary of the peak count recordings for each year are illustrated in Table 12.7, with full results presented in Appendix A12.4 in Volume 4 of this EIAR.

Table 12.7: Vantage Point Records of Breeding Birds of Conservation Concern at the proposed DPTOB

Common name/Scientific name/BTO Code	Activity and Distribution in the study area (Peak count)				Conservation Importance		
	May – June 2018	May – July 2019	May – August 2021	April – August 2022	BoCCI* (B – Breeding / W - Wintering)	Annex I	SPA designated for SCI species within Zol
Common Tern <i>Sterna hirundo</i>	3 individuals circling at proposed DPTOB (27/06/2018)	4 individuals flying over proposed DPTOB (08/05/2019)	9 Individuals roosting at Grand Canal lock gates (19/05/2021) (consisting of 4 pairs and a single individual)	5 individuals circling proposed DPTOB and then landing in nesting area at the Grand Canal lock gates. (16/06/2022)	Amber (B)	✓	South Dublin Bay and River Tolka Estuary SPA approximately 0.5km
Common Guillemot <i>Uria aalge</i>	-	-	Singular individuals flying (3 heading downstream, 1 upstream with food) (14/07/2021)	Singular individuals, flying over proposed DPTOB occasionally resting on pontoon east of Tom Clarke bridge. (27/04/2022)	Amber (B)	-	Ireland's Eye SPA approximately 11.7km
Black Guillemot <i>Cephus grylle</i>	2 individuals swimming at proposed DPTOB (12/06/2018) Other date of 2 individuals: 27/06/2018	2 individuals swimming at proposed DPTOB (01/07/2019)	3 individuals flying along Liffey Estuary Lower (25/06/2021)	6 individuals swimming on Lower Liffey Estuary, with at least one pair. (27/04/2022)	Amber (B)	-	-
Cormorant <i>Phalacrocorax carbo</i>	1 individual at proposed DPTOB (5 dates)	3 individuals flying over proposed DPTOB (08/05/2019)	3 individuals flying south-west through the proposed DPTOB (28/07/2021).	3 individuals flying along the Liffey Estuary Lower (upstream) (26/05/2022)	Amber (B/W)	-	Ireland's Eye SPA approximately 12km Lambay Island SPA approximately 20km Skerries Islands SPA

Common name/Scientific name/BTO Code	Activity and Distribution in the study area (Peak count)				Conservation Importance		
	May – June 2018	May – July 2019	May – August 2021	April – August 2022	BoCCI* (B – Breeding / W - Wintering)	Annex I	SPA designated for SCI species within Zol
							approximately 26km
Kingfisher <i>Alcedo atthis</i>	-	-	Singular individuals flying around Grand Canal Docks (25/06/2021 and 14/07/2021)	-	Amber (B)	✓	Not in Zol
Little egret <i>Egretta garzetta</i>	-	-	Singular individuals flying or foraging along River Dodder and the Dodder-Liffey confluence (19/05/2021 and 27/08/2021)	1 individual foraging at Dodder-Liffey confluence. (26/08/2022)	Green (B/W)	✓	-
Oystercatcher <i>Haematopus ostralegus</i>	-	-	Singular individuals flying at Grand Canal Docks and River Liffey (20th August and 27th August 2021)	-	Red (B/W)	-	South Dublin Bay and River Tolka SPA approximately 0.5km North Bull Island SPA approximately 3km Malahide Estuary SPA approximately 12.3km Rogerstown Estuary SPA approximately 17.1km
Coot <i>Fulica atra</i>	-	-	2 individuals flying high heading upstream (20/08/ 2021)	-	Amber (B/W)	-	Not in Zol
Grey Heron <i>Ardea cinerea</i>	1 individual at proposed DPTOB (30/05/2018) Other date of 1 individual: 27/06/2018	1 individual at proposed DPTOB (25/06/2019)	Singular individuals flying or foraging at Grand Canal Docks and Liffey Estuary Lower (downstream of Dodder_050) (19/05/2021, 25/05/2021, 20/06/2021, 28/07/2021,	Singular individuals flying and feeding along the Liffey Estuary Lower (downstream of Dodder_050) or feeding west of the Tom Clarke East Link Bridge.	Green (B/W)	-	Not in Zol

Common name/Scientific name/BTO Code	Activity and Distribution in the study area (Peak count)				Conservation Importance		
	May – June 2018	May – July 2019	May – August 2021	April – August 2022	BoCCI* (B – Breeding / W - Wintering)	Annex I	SPA designated for SCI species within Zol
			06/08/2021, 27/08/2021)	(27/04/2022, 29/06/2022, 15/07/2022, and 22/07/2022)			
Mute Swan <i>Cygnus olor</i>	1 individual landing at proposed DPTOB (12/06/2018)	4 individuals at proposed DPTOB (08/05/2019)	15 individuals foraging at Liffey Estuary Lower (downstream of Dodder_050) (20/07/2021)	10 individuals resting on jetty at end of Thorncastle Street. (13/04/2022)	Amber (B/W)	-	-
Mallard <i>Anas platyrhynchos</i>	3 individuals at proposed DPTOB (19/04/2018)	3 individuals circling at proposed DPTOB (11/06/2019)	4 birds (2x pairs) flying or swimming at Liffey Estuary Lower (downstream of Dodder_050) (27/08/2021)	3 individuals flying over Liffey Estuary Lower (26/05/2022) 3 individuals on water in adjacent to proposed DPTOB. (14/04/2022)	Green (B/W)	-	Not in Zol
Sand martin <i>Riparia riparia</i>	-	-	24 birds flying and foraging over Convention Centre, Dublin (6 th August 2021)	12 individuals, flying and foraging over River Liffey south of Convention Centre (26/05/2022)	Amber (B)	-	-
Herring gull <i>Larus argentatus</i>	-	-	65 individuals on banks of the River Dodder (20/07/2021)	89 individuals swimming in Grand Canal Dock area (26/05/2022)	Amber (B/W)	-	Ireland's Eye SPA approximately 11.7km Lambay Island SPA approximately 20km Skerries Islands SPA approximately 26km
Black-headed gull <i>Chroicocephalus ridibundus</i>	-	-	32 Individuals flying through the proposed DPTOB during Low Tide (27/08/2021)	5 individuals on water of Liffey Estuary Lower. (15/07/2022)	Amber (B/W)	-	South Dublin Bay and River Tolka SPA approximately 0.5km North Bull Island SPA approximately 3km
Common gull <i>Larus canus</i>	-	-	Singular individual in full breeding	-	Amber (B/W)	-	Not in Zol

Common name/Scientific name/BTO Code	Activity and Distribution in the study area (Peak count)				Conservation Importance		
	May – June 2018	May – July 2019	May – August 2021	April – August 2022	BoCCI* (B – Breeding / W - Wintering)	Annex I	SPA designated for SCI species within Zol
			plumage perched within Grand Canal Docks (28/07/2021)				
Lesser black-backed gull <i>Larus fuscus</i>	-	-	2 individuals flying within Grand Canal Docks (25/06/2021)	2 individuals loafing on Liffey Estuary Lower. (16/06/2022)	Amber (B/W)	-	Lambay Island SPA approximately 20km
Greater black-backed gull <i>Larus marinus</i>	-	-	Singular individuals flying or foraging within proposed DPTOB and Grand Canal Docks (19/05/2021, 27/08/2021)	2 individuals flying over Liffey Estuary Lower. (15/07/2022)	Amber (B/W)	-	-
Mediterranean gull <i>Larus melanocephalus</i>	-	-	1 individual adjacent to slipway within the proposed DPTOB (27/08/2021)	-	Amber (B/W)	✓	-
Brent goose (Light bellied) <i>Branta bernicla hrota</i> (Note: Not considered to be a breeding bird in Ireland)	-	-		10 individuals swimming along Liffey Estuary Lower (13/04/2022)	Amber (W)	-	South Dublin Bay and River Tolka SPA approximately 0.5km Rogerstown Estuary SPA approximately 17.1km Malahide Estuary SPA approximately 12.3km Skerries Islands SPA approximately 26km The Murrrough SPA approximately 29.5km North Bull Island SPA approximately 3km Baldoye Bay SPA approximately 9.2km
Common sandpiper	-	-	-	1 individual, on rocky area west of Tom Clarke	Amber (B)	-	-

Common name/Scientific name/BTO Code	Activity and Distribution in the study area (Peak count)				Conservation Importance		
	May – June 2018	May – July 2019	May – August 2021	April – August 2022	BoCCI* (B – Breeding / W - Wintering)	Annex I	SPA designated for SCI species within Zol
<i>Actitis hypoleucos</i>				East Link Bridge feeding and roosting. (14/04/2022, 27/04/2022)			
Grey wagtail <i>Motacilla cinerea</i>	-	--	-	2 individuals flying over Grand Canal Dock area (22/07/2022)	Red (B/W)	-	-
Little grebe <i>Tachybaptus ruficollis</i>	-	--	-	1 individual on Liffey Estuary Lower. (29/06/2022)	Amber (B/W)	-	-
Redshank <i>Tringa totanus</i>	-	-	-	1 individual flying over Liffey (13/04/2022)	Red (B/W)	-	North Bull Island SPA approximately 3km Rogerstown Estuary SPA approximately 17.1km South Dublin Bay and River Tolka Estuary SPA approximately 0.5km Malahide Estuary SPA approximately 12.3km
Swift <i>Apus apus</i>	-	-	-	1 individual flying over Grand Canal area (15/07/2022, 22/07/2022)	Red (B)	-	-

*Birds of Conservation Concern in Ireland

A summary of the results of the breeding bird desk study carried out to inform this assessment are outlined below.

Species that are KERs of the Proposed Scheme 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.

The desk study returned records of a total of 69 breeding bird species across the study area (i.e. Grid Squares O13). Records included 35 SCI species, 15 species listed under Annex I of the Birds Directive, and an additional 16 Red Listed and 47 Amber Listed species. Of the 69 species recorded, 22 were both breeding and wintering

birds. These species are grouped into habitat preferences and are discussed below in relation to their presence within the footprint of the Proposed Scheme.

The majority of 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 Lower and Dublin Bay. Many gull, auk and tern species breed in steep inaccessible cliffs i.e. Howth Head, offshore islands, Dublin Port. Seabirds such as terns, guillemots and kittiwakes nest on the cliffs and crevices of Rockabill Island SPA in Dublin Bay (Birdwatch Ireland, 2020). Fulmar, shag razorbill and gannet nest in the cliffs of Irelands Eye SPA, which also has numbers of large *Larus* gulls, cormorant and puffin (Merne & Madden 2000). Gulls favour nesting along coasts on shingle and cliffs but may utilise inland public areas for scavenging and buildings for roof nesting (Birdwatch Ireland 2020). As such, some gull species may utilise buildings adjacent to the Proposed Scheme for nesting; however, the majority of other species are not deemed likely to breed within proximity of the Proposed Scheme. Several of these species breed within the wider study and are listed in Table 12.9.

12.3.9.1.1 Peregrine Falcon

Peregrine falcon were not recorded during breeding the bird surveys however they were observed on one occasion during the 2021 wintering bird surveys. The individual was observed in transit within the vicinity of the proposed DPTOB.

Peregrine are known to nest in the Pidgeon Towers of the Poolbeg Generating Station, which is approximately 2.5km from the Proposed Scheme. Peregrine falcons have a maximum foraging range of 18km during the breeding season (Scottish National Heritage, 2016) and the nearest European site which has been designated is Wicklow Mountains SPA, approximately 12.1km from the Proposed Scheme. Therefore, it is considered possible that peregrine falcon present in the vicinity of the Proposed Scheme are associated with the Wicklow Mountains SPA population. This species is known to overwinter on the coast and feed on the high concentrations of waterbirds present on the estuaries, and pigeons in the city centre (Birdwatch Ireland, undated webpage).

The desk study returned records for other raptors (i.e Buzzards and sparrowhawks) across the larger study area (i.e. Grid Squares O13 and O23) and these species may therefore utilise open green spaces and trees adjacent to the Proposed Scheme. No suitable breeding habitat was identified for merlin and records returned from the desk study were pre 2012 and therefore this species is not deemed to breed within the footprint of the Proposed Scheme.

12.3.9.1.2 Common Tern

Common tern were recorded in 2018, 2019 and 2022, breeding at the lock gates at Grand Canal Dock approximately 120m upstream of the Proposed Scheme. Within the vicinity of the proposed DPTOB, there was a total of 56 observations of common tern, with a peak count of 3 individuals, between May and June 2018. Between May and July 2019, there were 129 observations, with a peak count of 4 individuals. Between May and August 2021, there were a total of 253 observed, with a peak count of 9 individuals. Between April and August 2022 there was 229 observations and a peak count of 5 common terns recorded.

Four apparently occupied nests (AONs) were recorded at the site in 2018. Three AONs were recorded at the site in July 2019 before it was reported that the nests were intentionally destroyed (pers. comm. Shay Connelly). No AONs were recorded throughout the 2021 surveys although nesting behaviours were observed, including food sharing between pairs and copulation (25 June 2021). There was one AON observed during the 2022 season, with 2 chicks recorded on the 29 June 2022. The nest was recorded at the lock gates at Grand Canal Dock (same location to previous AONs recorded in 2018 and 2019). Chicks were observed to be fed consistently by adults on this occasion. The results of 2021 and 2022 breeding bird surveys are shown in Figure 12.8 in Volume 3 of this EIAR.

It is unknown whether chick rearing was successful at this location in 2018 or 2019 and is considered unlikely for the 2021 season due to the lack of AONs. As mentioned previously, chicks were observed on one occasion during the 2022 survey period (2 chicks observed on the 29 June 2022). As chicks were not sighted at subsequent surveys, successful fledging of the nest cannot be confirmed, however for the purposes of this assessment using the precautionary principle, chick rearing is considered to be successful during the 2022 period.

It should be noted that due to the likely level of interchange of common tern between nesting sites year to year (BWI 2020), SPAs designated for terns in the wider Dublin Bay area (e.g. Dalkey Islands SPA, South Dublin Bay and River Tolka Estuary SPA and Rockabill Island SPA) are considered to overlap. As such, it is unclear which SPA the Grand Canal Dock colony is associated with, however terns utilising the Grand Canal Dock are most likely associated with the adjacent South Dublin Bay and River Tolka Estuary SPA, owing to its proximity.

The Dublin Bay tern colony nest across four platforms: ESB (SPA) dolphin, the CDL dolphin, the Tolka pontoon, and the GSW pontoon (See Image 12.1 for locations). The Proposed Scheme will be closest to the CDL dolphin, located 2km downstream of the proposed DPTOB. The ESB (SPA) dolphin is specifically designated under the South Dublin Bay and River Tolka Estuary SPA, located 2.4km downstream of the Proposed Scheme. As stated above, there is considerable interchange between nesting sites for tern populations (BWI 2021). Furthermore, due to the close proximity of the four platforms associated with the Dublin Port tern colony, there is likely interchange between these platforms. As such, all terns from these platforms are considered as one colony and are monitored as such by Bird Watch Ireland (BWI 2021). Common tern nesting at the Grand Canal Dock are considered to be connected to the Dublin Port colony and SPA population, utilising the Grand Canal Dock lock gates as an overflow or satellite nesting platform.

The Dublin Bay Birds Project recorded 538 tern nests in 2021 across the four platforms (528 attributed to common tern, 10 attributed to Arctic tern). The tern colony has been experiencing a pattern of decline in recent years (6% decline compared to 2020), considered to be as a result of low productivity possibly due to predation events particularly impacting the CDL dolphin and Tolka pontoon in recent years (BWI 2021). Predation events are considered to have resulted in very limited productivity specifically at the CDL dolphin (the only structure where Arctic tern are recorded to nest at) between 2019 and 2020 and complete failure in 2021. Other than at the CDL dolphin, common tern productivity shows improvement compared to previous years and appears stable at 1.06 (productivity is defined as chicks raised to fledglings per nesting pair per year) (BWI, 2021). The 2022 Dublin Bay Birds Project report was not published at the time of writing, however consultation with Bird Watch Ireland (pers comm 2022) confirmed that mortality due to avian influenza was not recorded at the Dublin Port tern colony in 2022.

The Dublin Port tern colony conservation work is carried out as part of the Dublin Bay Birds Project, managed by BirdWatch Ireland and supported by Dublin Port Company.

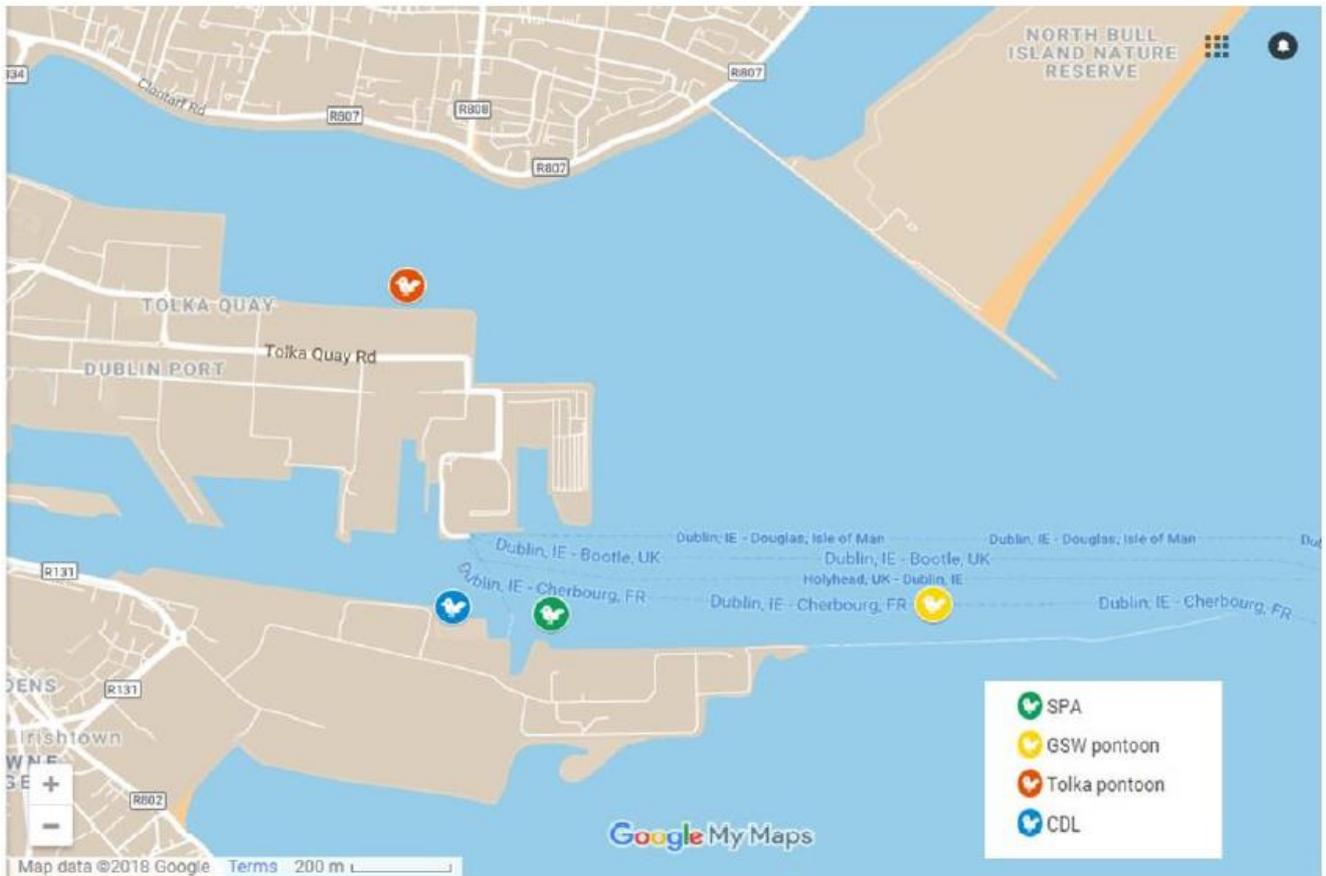


Image 12.1: Location of Nesting Structures in Dublin Port (BWI 2021)

The highest recorded number of AONs recorded at the Grand Canal Dock during field surveys undertaken was in 2018, totalling 4 AONs. As such tern pairs nesting at this site are estimated to represent 2.2% of the current SPA platform colony or 0.7% of the overall Dublin Port common tern colony. As stated above, the Grand Canal Dock nesting site is considered as a satellite nesting structure for the overall Dublin Port colony.

Table 9 Number of nests (Common and Arctic combined) per season since the Dublin Bay Birds Project began.

Structure	2013	2014	2015	2016	2017	2018	2019	2020	2021
CDL	25	76	58	0	24	105	97	58	43
SPA Platform	418	427	416	382 ¹	n/a ²	156	261	204	182
Tolka Pontoon	1	38	73	7	84	132	83	74	103
GSW Pontoon ³	n/a	n/a	1	114	308	203	204	238	210
Total	444	541	548	503	416²	596	645	574	538

¹ Estimated due to partial access

² Platform replaced in 2017: no data gathered

³ Pontoon 2 was deployed as follows:

2015: base of GSW

2016 & 2017: adjacent to SPA Platform

2018, 2019, 2020, 2021: south of buoyed channel, 120m north of GSW

Surveyor observations during breeding bird surveys indicated that there were three main territorial areas utilised by common tern across the survey period, this included an area encompassing the Grand Canal Docks; an area encompassing the River Dodder – River Liffey Confluence (including the footprint of the proposed DPTOB) and an area to the east of the East Link Bridge extending downstream towards Dublin Port.

12.3.9.1.3 Auks

Both common guillemot *Uria aalga* and black guillemot *Cephus grille* were recorded during the 2021 breeding bird surveys. Common guillemot were recorded on a single survey date (14th July 2021), foraging within the Liffey Estuary Lower at the Convention Centre Dublin and within the footprint of the proposed DPTOB. No breeding behaviour was recorded. There were two recordings of common guillemot during the 2022 season, both on the 27 of April. The individuals were flying over and resting on a pontoon west of the Tom Clarke East Link Bridge. There was no breeding behaviour recorded for this species.

Black Guillemot were recorded frequently across all survey seasons, often sighted as individuals flying upstream and downstream above the Liffey Estuary Lower, immediately north of the proposed DPTOB. Breeding behaviour was observed on 41 occasions throughout the 2021 and 2022 survey seasons, commonly sighted flying to and from a probable nest site, a hole within the quay wall of North Wall Quay opposite the Three Arena, west of the Tom Clarke East Link Bridge. Adults were also recorded carrying food upstream, last witnessed flying past the Custom House on 20 July 2021 and a juvenile observed on the north quay by the Tom Clarke East Link Bridge, also on 20 July 2021. Individuals were also observed perching on a pontoon near this hole. Breeding bird survey results are shown in Figure 12.8 in Volume 3 of this EIAR and Appendix A12.4.

Black guillemot populations are known to nest in crevices within sea walls along the north and south quays between Dublin Port and Butt Bridge (RPS 2019). Populations across Dublin Port have been monitored annually since 2013 as part of ongoing works at Dublin Port, most recently the MP2 Project (RPS 2019). The majority of nest sites within the area are in disused drainage pipes and other crevices. Survey results from ongoing monitoring is listed in Table 12.8. The Talbot Memorial Bridge to Tom Clarke East Link Bridge survey area overlaps the footprint of the Proposed Scheme. Black guillemot is an Amber Listed species (Gilbert *et al.*, 2021) and is considered to be of conservation concern. Current trends in breeding populations across Dublin Port have declined since 2013, likely due to mortality at sea, affecting recruitment numbers in the following breeding season (RPS 2019).

Table 12.8: Estimated Numbers of Individual Black Guillemots in Study Area Recorded Between April and May 2013 and April and May 2019 (RPS 2019)

Site	2013	2014	2015	2016	2017	2018	2019	Mean	Peak
Talbot Memorial Bridge to Tom Clarke East Link Bridge	9	14	12	5	7	4	3	8	14

12.3.9.1.4 Kingfisher

Kingfisher habitat suitability assessment surveys carried out in September 2020 and February 2021 confirmed there was no suitable nesting habitat present within the Proposed Scheme and did not record evidence of any nest holes across the Proposed Scheme. No records of kingfisher were noted during surveys for the proposed DPTOB in 2018 or 2019. However, kingfisher were occasionally recorded during vantage point surveys for the Proposed Scheme in the 2021 breeding bird survey season (Table 12.7) and in the 2020-2021 wintering bird survey season (Table 12.11). Kingfisher were recorded perching on structures in the vicinity of Camden Lock on the Grand Canal. Kingfisher were also recorded flying along the River Dodder, the Grand Canal and the Liffey Estuary Lower, across the footprint of the proposed DPTOB. Kingfisher were not recorded during surveys carried out in 2018 or 2019. Kingfisher were recorded during the 2022 / 2023 wintering bird season Breeding bird survey results for kingfisher are shown in Figure 12.8 in Volume 3 of this EIAR and Appendix A12.4.

The common trend observed from surveys was that of kingfisher going to / from the Grand canal docks area. Flight paths were typically concentrated along the western quay or from the direction of the slipway.

12.3.9.1.5 Gulls

Gulls were less frequently recorded across the breeding bird surveys in comparison to the wintering bird surveys. Some gull species have adapted to breeding on inaccessible areas atop buildings in urban and city areas. No gull nesting sites were recorded within the survey area, although breeding behaviours were observed including (e.g. fledged young still dependant on adults for food). Full survey results are provided in Appendix 12.4 of Volume 4 of this EIAR with the single evidence of breeding behaviour shown on Figure 12.8 in Volume 3 of this EIAR.

Herring Gull were recorded on five out of eight survey dates, with a peak count of 65 individuals on 20th July 2021. The birds were generally observed to be flying and loafing within the footprint of the proposed DPTOB, in the middle of the Liffey Estuary Lower, and at the confluence of the River Dodder and the Grand Canal docks. No active nesting behaviour of herring gull was recorded, although a single recently fledged juvenile still dependant on adults for food was recorded within the footprint of the proposed DPTOB. During the 2022 breeding season, herring gulls were recorded throughout the study area, with a peak count of 89 individuals recorded on 26 of May 2022. Two individuals were recorded flying, carrying nesting materials on 27 April 2022 and 12 May 2022.

Black-headed gull were recorded on four out of eight survey dates flying, swimming or foraging within the survey area, with a peak count of 32 individuals recorded adjacent to the eastern slipway at low tide on 27th August 2021. No nesting or breeding behaviour was recorded across the survey period. Common gull (singular individual) was observed perching within the Grand Canal Docks on 28 July 2021 in full breeding plumage, although no nesting or breeding behaviour was recorded. During the 2022 surveys, black-headed gulls were commonly recorded and became more numerous from June onward, with a peak count of five on 15 July 2022. No breeding behaviours were observed for this species. Common gull was not recorded during the 2022 season.

Lesser black-back gull were recorded on three out of eight surveys, with a peak count of two individuals on 25th June 2021. No nesting or breeding behaviour was recorded. In 2022 there was a peak count of 2 individuals on 16 June 2022 with no nesting or breeding behaviours observed.

Greater black-back gull were recorded on two of the eight surveys, on both occasions only singular individuals were recorded (19 May 2021 and 27 August 2021). The birds were observed flying or foraging within the survey area, although no nesting or breeding behaviours were recorded. In 2022 there was a peak count of two individuals on 15 July 2022 with no nesting or breeding behaviours recorded.

A single Mediterranean gull was recorded on a single occasion on the 27 August 2021. The bird was observed associating with a flock of black-headed gulls adjacent to the eastern slipway within the footprint of the proposed DPTOB. No nesting or breeding behaviours were recorded. There were no Mediterranean gulls recorded in 2022.

12.3.9.1.6 Sand Martin

Sand martin nesting activity was confirmed at the Convention Centre Dublin near to the proposed North Wall Quay boardwalk, shown in Figure 12.8 in Volume 3 of this EIAR. Breeding behavior was observed on 17 occasions within the vicinity of this area. A total of nine individuals were recorded entering the nest site, located within a gap in the quay wall. A peak count of 24 individuals was recorded flying and foraging over the Liffey Estuary Lower at the Convention Centre Dublin on 06 August 2021. Similar results were recorded for the 2022 season with a peak count of 12 recorded. Sand martins were observed in the same location, entering gaps in the north quay wall during every survey.

12.3.9.1.7 Other Birds

A number of other bird species were recorded across the breeding bird surveys including cormorant, little egret, oystercatcher, grey heron, coot, mute swan, mallard, linnet, common sandpiper, light-bellied brent goose, grey wagtail, redshank, swift, and yellow wagtail. No nesting or breeding activity was recorded for any of these species.

Light bellied brent goose do not currently breed within Ireland. These species were recorded in April prior to their summer migration to high-Arctic breeding grounds in late April. Therefore, they are assessed in Section 12.3.9.2.

Breeding species which are associated with buildings, as informed by the desk study, include swallows, starlings, and house martins (Birdwatch Ireland 2020). Swallows, starlings and house martin occurred across the larger study area (i.e. Grid Squares O13 and O23) and may therefore utilise buildings adjacent to the Proposed Scheme.

Records along the Proposed Scheme also comprise of 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 Ringsend Park, Sean Moore Park and along Sean Moore Road. Several of these species breed within the wider study area and are listed in Table 12.9.

Several species of warblers and raptors which favour woodlands, agricultural lands and upland heathland areas were identified during the desk study (Appendix A12.2 in Volume 4 of this EIAR). Agricultural lands and open areas were not identified in the vicinity of the Proposed Scheme. As such, these species are not deemed to be present in significant numbers; however, they may be present in larger parks and greenspaces in the lands surrounding the Proposed Scheme i.e. Ringsend Park, Sean Moore Park and along Sean Moore Road (NPWS online database).

Species that are known to utilise freshwater lakes, ponds, canals, and rivers in urban habitats include coot, moorhen, mute swan, duck, heron, kingfisher and cormorant (Appendix A12.2 in Volume 4 of this EIAR). Suitable breeding habitat for these species located within close proximity to the Proposed Scheme include Liffey Estuary, River Dodder, Grand Canal and Royal Canal. Records were returned for grey wagtail and ducks at Sean Moore Park, kingfisher at Irishtown Nature Reserve, and cormorant, swan, mallard, and grey heron along the River Dodder (NPWS online database). Rivers crossing the Proposed Scheme provide important nesting and foraging sites for riparian and wetland species such as kingfisher and grey wagtail. Two ad-hoc observations of cormorant *Phalacrocorax carbo* were recorded within the footprint of the Proposed Scheme during the multidisciplinary surveys.

Records of breeding birds relevant to the Proposed Scheme are listed in Table 12.9.

Breeding SCI species are deemed to be of International Importance. Non-SCI Annex I bird species are considered to be of County Importance. Black guillemot, an Amber-listed species which is confirmed to be breeding in the vicinity of the Proposed Scheme, are considered to be of County Importance. All other non-SCI breeding bird populations (including Green, Amber, and Red-listed species) are considered to be of Local Importance (Higher Value).

Table 12.9: Desk Study Records of Breeding Birds of Conservation Concern Nesting Within the Wider Study Area

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 <i>Larus argentatus</i> (HG)	Sandymount Strand in 2012	Amber (B)	-	Ireland's Eye SPA-
Grey wagtail <i>Motacilla cinerea</i> (GL)	Sean Moore Park	Red (B)	-	-
Meadow pipit <i>Anthus pratensis</i> (MP)	waste area north of Sean Moore Park.	Red (B)	-	-
Woodcock <i>Scolopax rusticola</i> , (WK)	South of Sean Moore Park, within 1km of the Proposed Scheme in 2011. (NBDC 2022).	Red (B)	✓	-
Arctic tern <i>Sterna paradisaea</i> (AE)	Pigeon House Power Station Dublin Docks	Amber (B)	✓	South Dublin Bay and River Tolka Estuary SPA
Black Guillemot <i>Cephus grille</i> (TY)	North and South Quays between Dublin Port and Butt Bridge	Amber (B)	-	-
Kingfisher <i>Alcedo atthis</i> (KF)	Irish town Nature Park	Amber (B)	✓	River Boyne and River Blackwater SPA
European shag <i>Phalacrocorax aristotelis</i> (SA)	West of Poolbeg	Amber (B)	✓	Lambay Island SPA
Red-throated diver <i>Gavia stellata</i> (RH)	Dublin Docks and Sandymount Strand	Amber (B)	✓	The Murrough SPA
Mediterranean gull <i>Larus melanocephalus</i> (MU)	Sandymount Strand	Amber (B)	✓	-
Ringed plover <i>Charadrius hiaticula</i> (RP)	Sandymount Strand	Amber (B)	-	South Dublin Bay and River Tolka Estuary SPA
Lesser black-backed gull <i>Larus fuscus</i> (LB)	Sandymount Strand	Amber (B)	-	-
Black-legged kittiwake <i>Rissa tridactyla</i> (KI)	Howth Head	Red (B)	-	Howth Head Coast SPA
Common shelduck <i>Tadorna tadorna</i> (SU)	Waste ground area north of Sean Moore Park	Amber (B)	-	North Bull Island SPA
Common tern <i>Sterna hirundo</i> (CN)	Dublin Docks	Amber (B)	✓	South Dublin Bay and River Tolka Estuary SPA
Common coot <i>Fulica atra</i> (CO)	Sandymount Strand	Amber (B)	-	-
Black guillemot <i>Cephus grylle</i> (TY)	Sandymount Strand	Amber (B)	-	-
Common starling <i>Sturnus vulgaris</i> (SG)	Sandymount Strand	Amber (B)	-	-
Linnet <i>Carduelis cannabina</i> (LI)	Sandymount Strand	Amber (B)	-	-
Sparrowhawk <i>Accipiter nisus</i> (SH)	Various	Green (B)	-	-
European robin <i>Erithacus rubecula</i> (R.)	Sandymount Strand	Green (B)	-	-
House sparrow <i>Passer domesticus</i> (HS)	Sandymount Strand	Amber (B)	-	-
Kestrel <i>Falco tinnunculus</i> (K.)	East of Irish town Nature Park	Red (B)	-	-
House martin <i>Delichon urbicum</i> (HM)	Sean Moore Park	Amber (B)	-	-
Stonechat <i>Saxicola torquatus</i> (SC)	Sean Moore Park	Green (B)	-	-
Mistle thrush <i>Turdus viscivorus</i> (M.)	Bremen Road, Ringsend	Green (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
Peregrine Falcon <i>Falco peregrinus</i> (PE)	Poolbeg Lighthouse	Green (B)	✓	Wicklow Mountains SPA
Sand Martin <i>Riparia riparia</i>	Quay Walls – River Liffey	Amber (B)	-	-

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.

Wintering bird transect surveys were carried out at three no. sites identified through the desk study. These sites included the following:

- CBC0016WB001: Small amenity grassland area next to St. Patrick’s Rowing Club and Tom Clarke East Link Bridge. The site is not maintained for cutting and a path entrance by Tom Clarke East Link Bridge has been fenced off in recent years. Disturbance on site is moderate-high, and historically known for use by resting mute swan, in addition to public use. Through observations of swan droppings, the eastern transect has been less used by the swans over time. The western transect is still in use by swans for resting and outside the transect beside the small area of tree line;
- CBC0016WB002: Gaelic pitch and amenity grassland area within Ringsend park. Site is maintained with cutting by the local authority. Disturbance on site is very high mainly due to the use of the park by dogs off the leash, but also includes frequent recreation use (sports activities) by the public. No droppings were observed within the transect by the light-bellied brent geese, anecdotal observations witnessed a flock of light-bellied brent geese looking to land on the pitch but circled a number of times before abandoning to a different site. Oystercatchers have been witnessed using the pitches to feed and next to the transect; and
- CBC0016WB003: Grassy verge within Irishtown Stadium and amenity grassland area with trees between the stadium and Bremen Avenue. Site is maintained with cutting by the local authority. The grassy verge within Irishtown Stadium is fenced off from the public and considered low disturbance. The amenity grassland area between has a high level of disturbance as it frequently walked over by the public. Light-bellied brent geese or waders were not observed using areas. However, the central grassland area within Irishtown Stadium has been observed hosting large numbers of light-bellied Brent geese, oystercatchers, and gulls on the ground/feeding on the grass.

Transect surveys were carried out at the above sites weekly in February-March 2020 (a total of seven visits were carried out in this period) and fortnightly between October 2020 and April 2021, fortnightly between October 2021 and April 2022 and fortnightly between October 2022 and March 2023. SCI wintering bird species identified during the wintering bird transect surveys included whooper swan, herring gull, common gull, black-headed gull, lesser black-backed gull, oystercatcher and light-bellied brent geese. A single whooper swan was recorded at CBC0016WB001 regularly during the transect surveys carried out in the 2019-2020 winter bird season. This individual was associated with a group of mute swans. Table 12.10 provides a summary of the findings of the winter bird surveys with respect to those species which are of highest conservation concern and were recorded within winter bird survey sites.

Table 12.10: Wintering Birds of Conservation Concern Recorded during Wintering Bird Transect Surveys

Common name/Scientific name/BTO Code	Activity and Distribution in the study area (Peak count)				Conservation Importance			Surveyor Observations outside of transect	Threshold of International Population	Threshold of National Population
	February – March 2020	October 2020 – March 2021	October 2021 – March 2022	October 2022 – March 2023	BoCCI (B – Breeding / W – Wintering)	Annex I	Nearest SPA designated for SCI species			
Herring gull <i>Larus argentatus</i> (HG)	CBC0016WB0 01: 2 individuals resting within transect (14/02/2020) CBC0016WB0 02: No records CBC0016WB0 03: 1 individual feeding grass area within transect (14/02/2020)	CBC0016WB0 01: No records CBC0016WB0 02: 4 individuals feeding on pitches (30/11/2020) CBC0016WB0 03: 15 individuals feeding in transect (14/02/2020)	CBC0016WB0 01: No Records CBC0016WB0 02: 22 individuals adjacent to transect on pitches (30/03/2022) CBC0016WB0 03: 3 individuals loafing within transect area (24/11/2021)	CBC0016WB0 01: No Records CBC0016WB0 02: 8 individuals flying over (26/10/2022) CBC0016WB0 03: 2 individuals perched within transect area (07/03/2023)	Amber (B/W)	-	Ireland's Eye SPA approximately 12km Lambay Island SPA approximately 20km Skerries Islands SPA approximately 26km The Murrough SPA approximately 28km	44 individuals feeding within center of Irishtown stadium outside survey area next to CBC0016WB003 (09/02/2021) 31 individuals feeding within Irishtown stadium outside survey area next to CBC0016WB003 (22/12/2021)	14,400	n/a
Light-bellied brent goose <i>Branta bernicla</i> (BG)	CBC0016WB0 01: No records CBC0016WB0 02: 51 individuals feeding at Ringsend Park at (09/03/2020) CBC0016WB0 03: No records	CBC0016WB0 01: No records CBC0016WB0 02: No records CBC0016WB0 03: One dropping within transect (06/01/2021)	CBC0016WB0 01: No records CBC0016WB0 02: No records CBC0016WB0 03: no records	CBC0016WB0 01: No Records CBC0016WB0 02: No Records CBC0016WB0 03: 97 individuals landed in Irishtown Stadium (08/02/2023)	Amber (W)	-	South Dublin Bay and River Tolka Estuary SPA approximately <1km North Bull Island SPA approximately 2.9km Baldoyle SPA approximately 8km Malahide Estuary SPA approximately 12km Rogerstown Estuary SPA approximately 17km Skerries Islands SPA approximately 26km The Murrough SPA approximately 28km	120 individuals flying over and resting Lower Liffey Estuary outside survey area next to CBC0016WB001 (21/02/2020) 48 individuals swimming in Lower Liffey Estuary (03/02/2021) 25 individuals flying over Ringsend Park, not landing in CBC0016WB002 (24/11/2021) 459 individuals feeding	400	350

Common name/Scientific name/BTO Code	Activity and Distribution in the study area (Peak count)				Conservation Importance			Surveyor Observations outside of transect	Threshold of International Population	Threshold of National Population
	February – March 2020	October 2020 – March 2021	October 2021 – March 2022	October 2022 – March 2023	BoCCI (B – Breeding / W – Wintering)	Annex I	Nearest SPA designated for SCI species			
								within center of Irishtown stadium outside survey area next to CBC0016WB003 (03/02/2021)		
Mute swan <i>Cygnus olor</i> (MS)	CBC0016WB001: 7 individuals resting on site (21/02/2020) CBC0016WB002: No records CBC0016WB003: No records	CBC0016WB001: 4 individuals resting on site (18/02/2021) CBC0016WB002: No records CBC0016WB003: No records	CBC0016WB001: No records CBC0016WB002: No records CBC0016WB003: No records	CBC0016WB001: No records CBC0016WB002: No records CBC0016WB003: No records	Amber (B/W)	-	-		90	90
Whooper Swan <i>Cygnus cygnus</i> (WS)	CBC0016WB001: 1 individual feeding in site (14/02/2020) CBC0016WB002: No records CBC0016WB003: No records	CBC0016WB001: No records CBC0016WB002: No records CBC0016WB003: No records	CBC0016WB001: No records CBC0016WB002: No records CBC0016WB003: No records	CBC0016WB001: No records CBC0016WB002: No records CBC0016WB003: No records	Amber (B/W)	✓	Lough Derravarragh SPA (outside of Zol)		340	150
Oystercatcher <i>Haematopus ostralegus</i>	CBC0016WB001: No records CBC0016WB002: No records CBC0016WB003: No records	CBC0016WB001: No records CBC0016WB002: 2 individuals feeding on pitches (27/01/2021) CBC0016WB003: No records	CBC0016WB001: No records CBC0016WB002: No records CBC0016WB003: No records	CBC0016WB001: No records CBC0016WB002: No records CBC0016WB003: 216 individuals on ground within Irishtown Stadium (02/12/2022)	Red (B/W)	-	South Dublin Bay and River Tolka Estuary SPA approximately <1km North Bull Island SPA approximately 2.9km Malahide Estuary SPA approximately 12km Rogerstown Estuary SPA approximately 17km	24 individuals feeding within centre of Irishtown stadium outside survey area next to CBC0016WB003 (27/01/2021)	8,200	610
Black-headed gull <i>Chroicocephalus ridibundus</i>	CBC0016WB001: No records CBC0016WB002: No records CBC0016WB003: No records	CBC0016WB001: No records CBC0016WB002: 34 individuals feeding on pitches (09/02/2021)	CBC0016WB001: No records CBC0016WB002: 132 individuals feeding in transect (09/03/2022)	CBC0016WB001: One individual flying over (26/10/2022) CBC0016WB002: 5 individuals (13/01/2023)	Amber (B/W)	-	South Dublin Bay and River Tolka Estuary SPA approximately <1km North Bull Island SPA	130 individuals feeding within centre of Irishtown stadium outside survey area next	31,000	n/a

Common name/Scientific name/BTO Code	Activity and Distribution in the study area (Peak count)				Conservation Importance			Surveyor Observations outside of transect	Threshold of International Population	Threshold of National Population
	February – March 2020	October 2020 – March 2021	October 2021 – March 2022	October 2022 – March 2023	BoCCI (B – Breeding / W – Wintering)	Annex I	Nearest SPA designated for SCI species			
		CBC0016WB003: 2 individuals feeding in transect (27/01/2021)	CBC0016WB003: No records	CBC0016WB003: 12 individuals (13/01/2023)			approximately 2.9km The Murrough SPA c.28km	to CBC0016WB003 (09/02/2021)		
Common gull <i>Larus canus</i> (CM)	CBC0016WB001: No records CBC0016WB002: No records CBC0016WB003: No records	Amber (B/W)	-	Dundalk Bay SPA approximately 57km (outside of Zol)	1 individual on ground within centre of Irishtown stadium outside survey area next to CBC0016WB003 (23/03/2021)	16,400	n/a			
Lesser black-back gull <i>Larus fuscus</i> (LB)	CBC0016WB001: No records CBC0016WB002: No records CBC0016WB003: No records	Amber (B/W)	-	Lambay Island SPA approximately 20km	2 individuals on ground within center of Irishtown stadium outside survey area next to CBC0016WB003 (23/03/2021)	5,500 (Western Europe) / 6,300 (Southern Scandinavia)	n/a			

Seven wintering bird vantage point surveys were undertaken at the proposed DPTOB crossing point by ROD point referred to as CBC0016VP001 in 2018 and 2019. A summary is presented in Table 12.11 with respect to those species which are of highest conservation concern recorded from vantage points and full results are included in Appendix 12.5 in Volume 4 of this EIAR.

A further 15 Vantage point surveys were carried out fortnightly during October 2020-April 2021, 13 additional Vantage point surveys were also carried out between October 2021-April 2022 and a further 12 Vantage point surveys were carried out between October 2022-March 2023. Table 12.12 provides a summary of the findings of the wintering bird surveys with respect to SCI species for which European sites are designated. Activity summaries are provided below, and preferred flight paths are presented in Figure 12.9.2 to Figure 12.9.6. These figures show surveyor view only and do not show flight paths for the entire scheme extent. Full results are included in Appendix 12.5 in Volume 4 of this EIAR.

In respect of the wintering birds recorded across the various surveys, Table 12.12 also provides a comparison to the recorded threshold of International and National populations.

12.3.9.2.1 Light-bellied Brent Goose *Branta bernicla hrota* [A046]

Light-bellied brent geese were observed either swimming and / or on mudflats within the footprint of the proposed DPTOB on 10, out of 15 survey dates in the 2020-2021 period. The light-bellied brent geese favoured landing within the Liffey Estuary Lower between the eastern quay and the slipway. The light-bellied brent geese rarely utilized the mudflats during low tide and were generally sighted in the water at the edge of the mudflats.

During the 2021-2022 season, the behaviour exhibited by the geese was similar, with the majority of geese observed rafting on the water either within the footprint of the proposed DPTOB or in the Lower Liffey Estuary just north of it. A maximum count of 240 individuals was recorded rafting within the footprint of the proposed DPTOB on the 19 of January 2022, having flown in from the east.

During the 2022-2023 season, the behaviour exhibited by the geese was similar to previous years, with the majority of geese observed rafting on the water either within the footprint of the proposed DPTOB or in the Lower Liffey Estuary just north of it. A maximum count of 532 individuals was recorded rafting within the footprint of the proposed DPTOB on the 13 of January 2023, having flown in from the east.

Flocks of light-bellied brent geese were observed flying either across the footprint of the proposed DPTOB or neighbouring buildings adjacent to the vantage point on 11, out of 15 survey dates in the 2020-2021 period. A peak count of 80 birds flew east at a height c.50m recorded on 06 January 2021. Light-bellied brent geese flocks were observed using the Liffey Estuary Lower as a guide for flying to feeding areas east and west of the Proposed Scheme. Additional light-bellied brent geese flocks were observed flying over the buildings of Thorncastle street and the vantage point, via Grand Canal Docks & Dodder_050 toward nearby feeding areas within Ringsend. Flight path heights were variable. Flocks were observed to fly c.<10m over the Grand canal docks, upstream & downstream of the Dodder_050 and River Liffey, or c.20-50m over the buildings.

Light-bellied brent geese were also regularly observed flying across the footprint of the proposed DPTOB during the 2021-2022 season or through areas within the Liffey Estuary Lower adjacent to the survey area. A peak count of 80 birds was observed flying in and landing on the site within the footprint of proposed DPTOB before taking off again a short time later. Similarly to the previous season, most birds observed flying over the water did so generally at a height between 0 and 10m, or if over land were observed to fly mostly between 20-50m over the buildings.

Flocks of light-bellied brent geese were observed flying either across the footprint of the proposed DPTOB or neighbouring buildings adjacent to the vantage point on 7 of 12 survey dates in the 2022-2023 period. A peak count of 89 birds flew east at a height c.20-100m recorded on 07 March 2023. Similar to the previous season, most birds observed flying over the water did so generally at a height between 0 and 10m, or if over land were observed to fly mostly between 20-50m over the buildings.

Light-bellied brent geese were also observed at CBC0016WB002 at the playing pitches and amenity grassland area within Ringsend Park. A peak flock of 500 was observed feeding on the pitch on 10 of December 2021.

Light-bellied brent geese were also observed in proximity to CBC0016WB003 at Irishtown Stadium. A peak flock of 97 was observed feeding on the pitch on 8 of February 2023.

12.3.9.2.2 Waders

Redshank *Tringa totanus* [A162] was observed during nine, out of 15, survey dates during the 2020-2021 period and five, out of 13, survey dates during the 2021-2022 period. Peak counts of birds during the vantage point surveys were recorded feeding next to the slipway, within the footprint of the proposed DPTOB. Redshank were commonly observed feeding during low tide along mudflat habitat, outside the proposed DPTOB footprint. There were few sightings of redshank flying across the Proposed Scheme during the 2020-2021 period.

Redshank were occasionally observed flying across the footprint of the proposed DPTOB during the 2021-2022 survey period, from an area to the right of the vantage point across the footprint of the proposed DPTOB and then east over the Lower Liffey Estuary. They appeared to follow a similar path back to the same area.

Similar to the previous season, redshank were mostly observed foraging at low tide in the mudflats next to the slipway within the footprint of the proposed DPTOB and in the mudflats immediately south of the proposed DPTOB.

Redshank were rarely recorded during the 2022-2023 survey season, with 2 no. individuals recorded flying across the proposed DPTOB on the 24 October 2022, while also being recorded to the south of the proposed DPTOB on 2 no. dates 13 January and 27 February 2023.

Curlew *Numenius arquata* [A160] were observed during three, out of 15, survey dates during the 2020-2021 period. No curlew were observed within the footprint of the proposed DPTOB during the 2021-2022 period. Curlew were commonly observed feeding during low tide along mudflat habitat, outside the proposed DPTOB footprint.

Whimbrel *Numenius phaeopus* was observed on one occasion feeding adjacent to the slipway, on the mudflats, during low tide on 30th April 2021. Whimbrels are rarely found in Ireland during the winter months and normally found in coastal areas during migration from wintering grounds in southern Spain / Africa to breeding grounds in Greenland / Iceland. No whimbrels were observed during the 2021-2022 period.

12.3.9.2.3 Waterfowl

Tufted duck *Aythya fuligula* [A061] was observed flying across the footprint of the proposed DPTOB on one, out of 15, survey dates during the 2020-2021 survey season. One individual was observed flying at height of c.2m upstream towards the Liffey Estuary Upper, and this individual was not observed landing. No tufted duck were observed during the 2021-2022 period.

Mallard *Anas platyrhynchos* were observed swimming across the footprint of the proposed DPTOB on five, out of 15, survey dates: 03 February 2021, 04 and 19 March 2021, and 1st and 30th April 2021. Mallard were generally observed flying through the survey area between the Liffey Estuary Lower and around the Grand canal dock or the confluence of the Dodder_050 and Liffey Estuary Lower. This was also the case for the 2021-2022 period. A peak count of nine birds was observed flying across the footprint of the proposed DPTOB, at c.4m in height heading upstream of the Liffey Estuary Lower on 06 January 2021. A peak count of nine birds were observed foraging during low tide on the 09 of March 2022.

Mallard were recorded on 8 of the 12 survey dates during the 2022-2023 season, with a peak count of 4 individuals recorded within the River Dodder on 24 October 2022.

12.3.9.2.4 Gulls

Herring gull *Larus argentatus* [A184] were commonly observed flying and feeding within the footprint of the Proposed Scheme. The peak count of Herring gull was 54 foraging on the banks of the River Dodder on the 12 December 2022. The peak count of Herring gulls feeding within the proposed DPTOB area was 33 birds on 16

April 2021 during low tide. Herring gull were abundant within the proposed DPTOB footprint. The peak count of birds flying across the footprint of the proposed DPTOB was 431 on 19 November 2020. The birds were observed at various heights from c.10-40m heading east, downstream of the Tom Clarke East Link Bridge towards Dublin Bay. Flight paths were not limited to one direction and could be observed circling the survey area frequently. They were observed flying at various heights (i.e., as low as c.1m to as high as c.40m) over the proposed DPTOB area and perching on built up areas (i.e., buildings, slipway, quays). Herring gull were the dominant gull species recorded.

Black-headed gull *Chroicocephalus ridibundus* [A179] were commonly observed feeding within the footprint of the Proposed Scheme. The peak count of black-headed-gull within the footprint of the proposed DPTOB was 42 on 14 March 2023. The peak count of black-headed gulls within the footprint of the proposed DPTOB during the 2020-2021 period was 225 birds on the ground / swimming on 03 February 2021 during low tide. The peak count during the 2021-2022 period was 28 birds, rafting within the footprint of the proposed DPTOB area. Black-headed gulls were frequently observed flying within the proposed DPTOB area in all survey seasons.

Common gull *Larus canus* were observed on the ground within the footprint of the proposed DPTOB on two, out of 15, survey dates during the 2020-2021 survey season: 6th January 2021 and 19th March 2021. During the 2021-2022 survey season, common gull were observed on five, out of 13, survey dates. During the 2022-2023 survey season, common gull were recorded on 3 of the 12 survey dates. The peak count of common gull within the footprint of the DPTOB during the 2022-2023 season was 3 no. individuals on 13 January 2023. The peak count of common gull within the footprint of the proposed DPTOB during the 2020-2021 period was eight birds roosting next to the slipway on 6th January 2021. The peak count during the 2021-2022 period was 11 birds, observed being fed by pedestrians. Common gulls were occasionally observed flying within the proposed DPTOB area.

Lesser black-backed gull *Larus fuscus* [A183] were observed feeding within the footprint of the proposed DPTOB on three, out of 15, survey dates: 5 November 2020 and 1st and 16th April 2021. The peak count of birds within the proposed DPTOB footprint was two birds on the ground next to the slipway on 5 November 2020. Lesser black-backed gulls were not observed within the footprint of the proposed DPTOB during the 2021-2022 period. Lesser black-backed gull were recorded on 2 of the 12 survey dates during the 2022-2023 survey season with a peak count of 2 no. individuals on 13 January 2023.

Greater black-backed gull were observed flying within the proposed DPTOB area, but on a rare basis during the 2020-2021 survey period. The peak count of birds flying was one individual over three separate dates including: 5th November 2020, 19th March 2021, and 30th April 2021. The lower flight height recorded was c.2m heading north-east via the slipway, and heights of up to c.30m were recorded heading west upstream of the Liffey Estuary Lower. During the 2021-2022 period, Greater black-backed gulls were observed within the proposed DPTOB area on three, out of 13, survey dates. Greater black-backed gull were recorded on 5 of the 12 survey dates during the 2022-2023 survey season, with a peak count of 2 no. individuals on 22 December 2022.

The peak count of gulls flying through the Proposed Scheme was recorded as 350 on 20th January 2021 flying east downstream of the Liffey Estuary Lower heading toward Dublin Bay. These birds consisted of a mixed flock of black-headed gull and herring gull at heights ranging c.20-40m.

12.3.9.2.5 Other bird species

Little egret *Egretta garzetta* was observed flying across the footprint of the proposed DPTOB on one, out of 15 survey dates during the 2020-2021 period (16th April 2021). During this observation little egret was recorded flying at a height of c.10m upstream, and not observed landing in the Liffey Estuary Lower. Little egret was observed flying across the footprint of the proposed DPTOB on three, out of 13, survey dates during the 2021-2022 period. A single little egret was recorded on a single occasion during the 2022-2023 survey season, on the 24 October 2022.

Grey heron *Ardea cinerea* was observed during six, out of 15, survey dates: 5th November 2020, 18th December 2020, 20th January 2021, 19th March 2021, and 16th and 30th April 2021. The peak count was two birds feeding adjacent to the slipway on 18th December 2020. However, grey heron were largely observed as individuals flying across the study area at various heights. Heights were recorded as low as c.5m or as high as c.30m. Grey heron was also observed foraging within the footprint of the proposed DPTOB on two, out of 13, survey dates for the

2021-2022 period at low tide both times. A peak count of one bird was recorded on each of these dates. Grey heron was recorded on 3 of the 12 survey dates during the 2022-2023 survey season (the 24 October 2022, 02 December 2022 and 07 March 2023), all being single individuals.

Grey wagtail *Motacilla cinerea* was observed during two, out of 15, survey dates during the 2020-2021 survey period: 18th February 2021 and 30th April 2021. Grey wagtail was observed flying south at a height of c.1m, along the eastern quay toward the Grand canal docks and feeding on the Liffey Estuary Lower. Grey wagtail was not observed within the footprint of the proposed DPTOB area during the 2021-2022 season but were observed flying over the water immediately south of the area.

Cormorant *Phalacrocorax carbo* [A017] were present throughout all 15 survey dates during the 2020-2021 period, and on eleven, out of 13, survey dates during the 2021-2022 period. A peak count of four birds was observed flying across the footprint of the proposed DPTOB, at c.2m in height heading upstream of the Liffey Estuary Lower on 3rd February 2021. A peak count of eight birds was recorded on the 27th of October 2021. The common trend of cormorant flying was either to / from Grand canal docks area via the Liffey Estuary Lower or upstream / downstream of the Liffey Estuary Lower at various heights. Majority of flight heights were near the water (i.e., c.1m) or level with buildings (i.e., c.20m to c.40m). This was largely true of the 2021-2022 and 2022-2023 periods as well. Cormorant was recorded on 8 of the 12 survey dates during the 2022-2023 survey season, with a peak count of 2 individuals on the 24 January 2023.

A single European shag *Phalacrocorax aristotelis* was recorded on one of the 12 survey dates during the 2022-2023 survey season on 13 January 2023, foraging at the confluence of the Liffey Estuary Lower and the River Dodder. European shag was also recorded flying through the proposed DPTOB and also from the Liffey Estuary Lower upstream along the River Dodder on 3 of the 12 survey dates (26 October 2022, 13 January and 24 January 2023)

A single Eurasian coot *Fulica atra* was recorded foraging in front of the Grand canal lock gates on 22 December 2022.

Black guillemots *Cephus grylle* were observed swimming / hunting within the footprint of the the proposed DPTOB on four, out of 15, survey dates in the 2020-2021 period: 6th January 2021, 19th March 2021, and 16th and 30th April 2021. Black guillemots were not observed flying during the 2020-2021 survey period. Black guillemots were observed flying across footprint of the the proposed DPTOB on three, out of 13, survey dates in the 2021-2022 period, and rafting within it on three out of thirteen surveys during the 2021-2022 period. Black guillemot were recorded on two of the 12 survey dates during the 2022-2023 survey season, both being of single individuals recorded on the 24 January and 27 February 2023. Black guillemot was also recorded flying from the River Dodder upstream along the River Liffey on the 22 December 2022.

Kingfisher was recorded on 7 of the 12 survey dates during the 2022-2023 survey season. All of these records consisted of single individuals either flying from the River Liffey through the proposed DPTOB and upstream along the River Dodder, or to and from the Liffey Estuary Lower and the Grand canal docks.

Buzzard *Buteo buteo* was observed flying over the proposed DPTOB footprint on one, out of 15, survey dates (18th February 2021). This was a single bird flying at a height c.50m from Dublin port toward the direction of Ringsend. No buzzard was observed during the 2021-2022 period.

Little grebe *Tachybaptus ruficollis* was observed outside of the footprint of the proposed DPTOB between the Grand Canal docks and the Dodder_050 upstream of the Proposed Scheme. Observation of these birds was on six, out of 15, survey dates: 19th November 2020, 18th December 2020, 6th and 20th January 2021, 3rd February 2021, and 4th March 2021. A peak count of three birds was observed swimming south of the Proposed Scheme within the Liffey Estuary Lower, immediately north of the Grand canal docks, on 6th January 2021. During the 2021-2022 season a single little grebe was observed foraging within the footprint of the proposed DPTOB on the 10th of November 2021. Little grebe was recorded on a single occasion during the 2022-2023 survey season, being of a single individual on 27 February 2023.

Table 12.11: Vantage Point Records of Wintering Birds of Conservation Concern at the Proposed DPTOB 2018 & 2019

Common name/Scientific name/BTO Code	Activity and Distribution in the study area (Peak count)		Conservation Importance		
	March – April 2018	March – April 2019	BoCCI (B – Breeding / W - Wintering)	Annex I	SPA designated for SCI species within Zol
Black guillemot <i>Cephus grille</i> (TY)	2 individuals (29/03/2018)	2 individuals swimming in River Liffey (28/03/2019)	Amber (B)	-	-
Black-headed gull <i>Chroicocephalus ridibundus</i> (BH)	3 individuals over Bridge (04/04/2018) Other date of 3 individuals: 29/03/2018	1 individual flying west over Bridge at height 0m (28/03/2019)	Red (B/W)	-	South Dublin Bay and River Tolka Estuary SPA approximately <1km North Bull Island SPA approximately 2.9km The Murrough SPA approximately 28km
Light-bellied brent goose <i>Branta bernicla</i> (BG)	67 individuals at VP flying north at height 0m (11/04/2018)	25 individuals flying south-west over Bridge at height 30m (28/03/2019)	Amber (W)	-	South Dublin Bay and River Tolka Estuary SPA approximately <1km North Bull Island SPA approximately 2.9km Baldoyle SPA c.8km Malahide Estuary SPA approximately 12km Rogerstown Estuary SPA approximately 17km Skerries Islands SPA approximately 26km The Murrough SPA approximately 28km
Common gull <i>Larus canus</i> (CM)	4 individuals flying at height 25m (04/04/2018)	1 individual flying north over Bridge at height 15m (02/04/2019)	Amber (B/W)	-	No SPA in Zol of Proposed Scheme
Common tern <i>Sterna hirundo</i> (CN)	No individuals were recorded during March – April 2018 vantage point surveys	2 individuals flying south over Bridge at height 10m (02/04/2019) Other date of 2 individuals: 25/04/2019	Amber (B)	✓	South Dublin Bay and River Tolka Estuary SPA c.<1km Dalkey Islands SPA approximately 10.5km Rockabill SPA approximately 26km
Cormorant <i>Phalacrocorax carbo</i> (CA)	1 individual flying east over Bridge at height 15m (04/04/2018) Other date of 1 individual: 29/03/2018	1 individual flying south of Bridge at height -2m (08/04/2019) Other dates of 1 individual: 02/04/2019 25/04/2019	Amber (B/W)	-	Ireland's Eye SPA approximately 12km Lambay Island SPA approximately 20km Skerries Islands SPA approximately 26km
Great black-backed gull <i>Larus marinus</i> (GB)	2 individuals flying at height 10m (29/03/2018)	12 individuals flying south over Bridge at height 10m (02/04/2019)	Amber (B)	-	-
Grey heron <i>Ardea cinerea</i> (H.)	No individuals were recorded during March – April 2018 vantage point surveys	1 individual flying north-east at Bridge at height -2m (28/03/2019)	-	-	No SPA in Zol of Proposed Scheme
Grey wagtail <i>Motacilla cinerea</i> (GL)	1 individual flying north at Bridge (04/04/2018)	No individuals were recorded during March – April 2019 vantage point surveys	Red (B)	-	-

Common name/Scientific name/BTO Code	Activity and Distribution in the study area (Peak count)		Conservation Importance		
	March – April 2018	March – April 2019	BoCCI (B – Breeding / W - Wintering)	Annex I	SPA designated for SCI species within Zol
Herring gull <i>Larus argentatus</i> (HG)	15 individuals (29/03/2018)	28 individuals swimming at mouth of River Dodder (28/03/2019)	Red (B)	-	Ireland's Eye SPA approximately 12km Lambay Island SPA approximately 20km The Murrough SPA approximately 28km Skerries Islands SPA approximately .26km
Lesser black-backed gull <i>Larus fuscus</i> (LB)	15 individuals flying north-east over Bridge at height 10m (04/04/2018) Other date of 5 individuals: 29/03/2018	No individuals were recorded during March – April 2019 vantage point surveys	Amber (B)	-	Lambay Island SPA approximately 20km
Mallard <i>Anas platyrhynchos</i> (MA)	2 individuals flying north-west over Bridge at height 50m (11/04/2018)	2 individuals swimming at River Dodder (02/04/2019)	-	-	No SPA in Zol of Proposed Scheme
Mute swan <i>Cygnus olor</i> (MS)	2 individuals flying at height 20m (29/03/2018)	4 individuals swimming at River Dodder (08/04/2019)	Amber (B/W)	-	-
Redshank <i>Tringa tetanus</i> (RK)	1 individual flying north-east at VP at height -1m (04/04/2018)	1 individual wading at River Dodder (08/04/2019) Other date of 1 individual: 28/03/2019	Red (B/W)	-	South Dublin Bay and River Tolka Estuary SPA approximately <1km North Bull Island SPA approximately .2.9km Malahide Estuary SPA approximately 12km Rogerstown Estuary SPA approximately 17km

Twelve wintering bird vantage point surveys were undertaken at the proposed DPTOB crossing point by Scott Cawley Ltd. between October 2020 and April 2021 and an additional twelve between October 2021 and April 2022. Table 12.12 provides a summary of the findings of the winter bird surveys with respect to those species which are of highest conservation concern recorded from vantage points.

Table 12.12: Vantage Point Records of Wintering Birds of Conservation Concern at the Proposed DPTOB October 2020 – April 2021, October 2021 – April 2022 and October 2022 – March 2023.

Common name/Scientific name/BTO Code	Activity and Distribution in the study area (Peak count)						Conservation Importance			Threshol d of International Population	Threshol d of National Population
	Oct 2020 – Apr 2021		Oct 2021 – Apr 2022		Oct 2022 – April 2023		BoCCI (B – Breeding / W - Wintering)	An nex I	SPA designated for SCI species within Zol		
	Low Tide	Hide Tide	Low Tide	Hide Tide	Low Tide	Hide Tide					
Black guillemot <i>Cepphus grille</i> (TY)	1 individual swimming and feeding at northern quay in River Liffey (06/01/2021)	2 individuals swimming within footprint in middle of River Liffey (16/04/2021)	1 individual flying through middle of boundary (02/02/2022)	1 individual rafting at north end of boundary near quay wall (24/11/2021)	1 individual foraging directly adjacent to the proposed DPTOB (24/01/2023 and 27/02/2023)		Amber (B)	-	-	N/A	N/A

Common name/Scientific name/BTO Code	Activity and Distribution in the study area (Peak count)						Conservation Importance			Threshold of International Population	Threshold of National Population
	Oct 2020 – Apr 2021		Oct 2021 – Apr 2022		Oct 2022 – April 2023		BoCC I (B – Breeding / W - Wintering)	Amber	SPA designated for SCI species within ZoI		
	Low Tide	High Tide	Low Tide	High Tide	Low Tide	High Tide					
Black-headed gull <i>Chroicocephalus ridibundus</i> (BH)	225 individuals feeding middle of boundary (03/02/2021)	49 individuals swimming next to slipway (18/02/2021)	123 individuals foraging at mouth of Dodder (23/02/2022)	15 individuals loafing by boardwalk at north end of boundary (10/12/2021)	42 Individuals foraging at the slipway within the proposed DPTOB (14/03/2023)		Red (B/W)	-	South Dublin Bay and River Tolka Estuary SPA approximately 1km North Bull Island SPA approximately 2.9km The Murrrough SPA approximately 28km	31,000	n/a
Light-bellied brent goose <i>Branta bernicla</i> (BG)	157 individuals swimming within boundary in middle of River Liffey (03/02/2021)	270 individuals swimming within boundary in middle of River Liffey (19/03/2021)	500 Individuals flying over from Shelbourne park (10/12/2021)	240 individuals rafting in middle of the Liffey. Flew in from the east (19/01/2022)	532 individuals rafting in the center of the Liffey Estuary Lower north of the proposed DPTOB (24/02/2023)		Amber (W)	-	South Dublin Bay and River Tolka Estuary SPA approximately 1km North Bull Island SPA approximately 2.9km Baldoyle SPA c.8km Malahide Estuary SPA approximately 12km Rogerstown Estuary SPA approximately 17km Skerries Islands SPA approximately 26km The Murrrough SPA approximately 28km	400	350
Common gull <i>Larus canus</i> (CM)	1 individual swimming at mouth of River Dodder (18/12/2020)	5 individuals swimming at mouth of Grand canal (18/02/2021)	3 individuals foraging in mouth of Dodder river (06/01/2022)	11 individuals foraging (being fed by pedestrians) in mouth of Dodder river (22/12/2021)	3 individuals foraging on exposed mud to the south of the slipway within the proposed DPTOB (13/01/2023)		Amber (B/W)	-	Dundalk Bay SPA approximately 57km	16,400	n/a
Cormorant <i>Phalacrocorax carbo</i> (CA)	4 individuals flying west through middle of boundary	4 individuals flying west through middle of boundary	8 individuals Foraging in Middle of Liffey river (27/10/2021)	20 individuals flying over middle of Liffey river (10/11/2021)	2 individuals foraging within Grand canal docks (24/01/2023)		Amber (B/W)	-	Ireland's Eye SPA approximately 12km Lambay Island SPA	1,200	110

Common name/Scientific name/BTO Code	Activity and Distribution in the study area (Peak count)						Conservation Importance			Threshold of International Population	Threshold of National Population
	Oct 2020 – Apr 2021		Oct 2021 – Apr 2022		Oct 2022 – April 2023		BoCC I (B – Breeding / W – Wintering)	Annex I	SPA designated for SCI species within 20km		
	Low Tide	High Tide	Low Tide	High Tide	Low Tide	High Tide					
	(03/02/2021)	(07/10/2020)							approximately 20km Skerries Islands SPA approximately 26km		
Great black-backed gull <i>Larus marinus</i> (GB)	2 individuals swimming and preening next to slipway (18/02/2021)	2 individuals on ground next to slipway (18/02/2021)	1 individual foraging close to slipway (10/12/2021)	2 individuals soaring directly over VP (22/10/2021)	2 individuals rafting in the center on the Liffey Estuary Lower to the north of the proposed DPTOB (24/10/2022)		Amber (B/W)	-	-	3,600	n/a
Grey heron <i>Ardea cinerea</i> (H.)	2 individuals feeding next to slipway (18/12/2020)	1 individual flying through proposed DPTOB (30/04/2021)	1 individual foraging close to slipway (24/11/2021)	No individuals recorded at high tide	1 individual foraging at the mouth of the Dodder river (07/03/2023)		-	-	Wexford Harbour and Slob SPA approximately 97.5km	5,000	25
Grey wagtail <i>Motacilla cinerea</i> (GL)	1 individual flying through middle of boundary along western quay (30/04/2021)	No individuals were recorded during high tide 2020/2021 vantage point surveys	No individuals recorded at low tide	1 individual perched on lock to the west of VP (06/01/2022)	No individuals recorded		Red (B)	-	-	N/A	N/A
Herring gull <i>Larus argentatus</i> (HG)	33 individuals swimming and on ground at southern part of boundary (16/04/2021)	431 individuals flying east at various heights over River Liffey for a period of 20 minutes (19/11/2020)	44 individuals foraging in area of slipway (23/02/2022)	65 Individuals flying over from North to South (22/12/2021)	54 individuals foraging at the mouth of the Dodder river (22/12/2022)		Red (B/W)	-	Ireland's Eye SPA approximately 12km Lambay Island SPA approximately 20km The Murrrough SPA approximately 28km Skerries Islands SPA approximately 26km	14,400	n/a
Lesser black-backed gull <i>Larus fuscus</i> (LB)	2 individuals on ground next to slipway (05/11/2020)	1 individual flying over eastern quay next to slipway (19/03/2021)	1 individual flying in circles above VP (19/01/2022)	2 individuals flying over area south of proposed DPTOB (09/03/2022)	2 individuals foraging to the south of the slipway within the proposed DPTOB (13/01/2023)		Amber (B/W)	-	Lambay Island SPA approximately 20km	5,500 (Western Europe)/ 6,300 (Southern Scandinavia)	n/a

Common name/Scientific name/BTO Code	Activity and Distribution in the study area (Peak count)						Conservation Importance			Threshold of International Population	Threshold of National Population
	Oct 2020 – Apr 2021		Oct 2021 – Apr 2022		Oct 2022 – April 2023		BoCC I (B – Breeding / W - Wintering)	Annel	SPA designated for SCI species within ZoI		
	Low Tide	Hide Tide	Low Tide	Hide Tide	Low Tide	Hide Tide					
		Other dates of 1 individual: 30/04/2021									
Mallard <i>Anas platyrhynchos</i> (MA)	9 individuals flying north west through middle of boundary (06/01/2021)	14 individuals swimming at eastern quay (06/01/2021)	2 individuals flying over from north to south over proposed DPTOB (02/02/2022)	18 individuals rafting in Dodder to the east of VP area (06/01/2022)	4 individuals foraging at the mouth of the Dodder river (24/10/2022)		Amber (B/W)	-	Dundalk Bay SPA approximately 57km	53,000	280
Mute swan <i>Cygnus olor</i> (MS)	12 individuals swimming within proposed DPTOB (03/02/2021)	13 individuals swimming along western quay (19/03/2021)	5 individuals Loafing to the west of Slipway (19/01/2022)	9 individuals rafting within proposed DPTOB (06/01/2022)	9 individuals rafting at the Grand canal lock gates (09/02/2023)		Amber (B/W)	-	-	90	90
Redshank <i>Tringa tetanus</i> (RK)	2 individuals feeding next to slipway (06/01/2021)	1 individual flying northeast through proposed DPTOB (19/03/2021)	2 individuals flying over area directly in front of VP (24/11/2021)	2 individuals flying over Proposed DPTOB (23/02/2022)	2 individuals foraging at the slipway on the southern edge of the proposed DPTOB (27/02/2023)		Red (B/W)	-	South Dublin Bay and River Tolka Estuary SPA approximately <1km North Bull Island SPA approximately 2.9km Malahide Estuary SPA approximately 12km Rogerstown Estuary SPA approximately 17km	2,400 (Iceland & Faeroe Islands)/760 (Britain & Ireland)	240
Curlew <i>Numenius arquata</i> (CU)	1 individual feeding at mouth of River Dodder and flying north-west (05/11/2020) Other dates of 1 individual : 19/11/2020 04/12/2020	No individuals recorded at high tide	1 individual foraging in the dodder to the east of VP (22/10/2021)	No individuals recorded at high tide	No individuals recorded		Red (W)	-	North Bull Island SPA approximately 2.9km	7,600	350

Common name/Scientific name/BTO Code	Activity and Distribution in the study area (Peak count)						Conservation Importance			Threshold of International Population	Threshold of National Population
	Oct 2020 – Apr 2021		Oct 2021 – Apr 2022		Oct 2022 – April 2023		BoCC I (B – Breeding / W - Wintering)	Annel	SPA designated for SCI species within Zol		
	Low Tide	Hide Tide	Low Tide	Hide Tide	Low Tide	Hide Tide					
Kingfisher <i>Alcedo atthis</i> (KF)	2 individuals flying north then west along western quay (07/10/2020)	1 individual flying north-east next to slipway at c.1m in height above water (07/10/2020) Other dates of 1 individual: 15/10/2020 19/11/2020 04/12/2020 18/12/2020 06/01/2021 03/02/2021	1 individual flying along dock wall to the west of VP (23/02/2022)	1 individual flying over proposed DPTOB and to the west (10/12/2021)	1 individuals flying over the proposed DPTOB (14/03/2023)		Amber (B)	✓	River Boyne and River Blackwater SPA approximately 38.9km	N/A	N/A
Little grebe <i>Tachybaptus ruficollis</i> (LG)	3 individuals feeding and swimming at Liffey Estuary Lower and Grand Canal dock gates (06/01/2021)	2 individuals feeding and swimming at western quay (06/01/2021)	1 individual rafting in Liffey Estuary Lower directly in front of VP (10/11/2021)	No individuals recorded at high tide	1 individual foraging at the Grand canal lock gates (27/02/2023)		Amber (B/W)	-	Wexford Harbour and Slob SPA approximately 96.9km	4,700	20
Buzzard <i>Buteo buteo</i> (BZ)	No individuals recorded during high tide	1 individual flying south over River Liffey (18/02/2021)	No individuals recorded at low tide	No individuals recorded at high tide	No individuals recorded		-	-	-	N/A	N/A
Tufted duck <i>Aythya fuligula</i> (TU)	1 individual flying south towards River Dodder (19/03/2021)	No individuals recorded at high tide	No individuals recorded at low tide	No individuals recorded at high tide	No individuals recorded		Amber (B/W)	-	-	8,900	270
Little egret <i>Egretta</i>	1 individual flying	No individuals	1 individual foraging in the Liffey	No individuals	1 individual perched on mud at the mouth of the		-	✓	-	1,100	20

Common name/Scientific name/BTO Code	Activity and Distribution in the study area (Peak count)						Conservation Importance			Threshold of International Population	Threshold of National Population
	Oct 2020 – Apr 2021		Oct 2021 – Apr 2022		Oct 2022 – April 2023		BoCCI (Breeding / W - Wintering)	Annex I	SPA designated for SCI species within ZOI		
	Low Tide	High Tide	Low Tide	High Tide	Low Tide	High Tide					
<i>garzetta</i> (ET)	south towards River Dodder (16/04/2021)	recorded at high tide	Estuary Lower east of VP (22/10/2021)	recorded at high tide	Dodder river (24/10/2022)						
Whimbrel <i>Numenius phaeopus</i> (WM)	1 individual feeding on ground in proposed DPTOB (30/04/2021)	No individuals recorded at high tide	No individuals recorded at low tide	No individuals recorded at high tide	No individuals recorded		-	-	-	6,700	n/a
European shag <i>Phalacrocorax aristotelis</i>	No individuals recorded	No individuals recorded	No individuals recorded	No individuals recorded	1 individual foraging at the mouth of the Dodder river (13/01/2023)		Amber	-	Lambay Island SPA approximately 20km	N/A	N/A

The full results of the desk study, including records of wintering bird species considered to be of conservation concern, are presented in Appendix A12.2 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 Birds of Conservation Concern in Ireland (BoCCI) species listed for their breeding populations

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

The desk study returned records of a total of 31 wintering bird species across the study area (i.e. Grid Squares O13). Records included nine species listed under Annex I of the Birds Directive, 25 SCI species, and an additional 18 Amber Listed species. Of the 31 species recorded, 22 were both breeding and 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 Lower and Dublin Bay. 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, the 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 five known inland wintering bird feeding sites within approximately 300m of the Proposed Scheme and these are listed below. The importance of these sites is given relative to flock sizes of geese (major importance site 401+ geese; high importance site 51 to 400 geese; and, moderate importance site one to 50 geese (Benson 2009). One of these sites, Ringsend Park overlaps with the Proposed Scheme.

- Ringsend Park overlaps with the Proposed Scheme (major importance);
- Irishtown Stadium approximately 20m from the Proposed Scheme (high importance);
- Shelbourne Park Dog Track approximately 77m from the Proposed Scheme (high importance); and
- Irishtown / Sean Moore Park approximately 285m from the Proposed Scheme (high importance).

Wintering SCI species are deemed to be of International Importance. Non-SCI Annex I bird species are considered to be of National Importance. All other non-SCI wintering bird populations (including Green, Amber, and Red-listed species) are considered to be of Local Importance (Higher Value).

12.3.10 Reptiles

Common lizards are legally protected under the Wildlife Acts. No common lizards were encountered during the multidisciplinary surveys undertaken along the Proposed Scheme. Some suitable breeding and hibernating habitat for this species was identified within the study area of the Proposed Scheme (i.e., grassland, scrub, hedgerows, and areas of spoil and bare ground / recolonising bare ground, which may provide suitable basking habitat).

The desk study did not return records of common lizard within the wider study area. This species is strongly associated with heathland and coastal dune habitats; neither habitat types were identified within the Proposed Scheme study area (Marnell 2002; Farren et al. 2010).

Common lizards 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.

No suitable amphibian habitat (i.e., vegetated river banks, surface water / drainage features with stagnant, relatively unpolluted water) was identified within the footprint of the Proposed Scheme. The desk study returned records for common frog within 2km of the Proposed Scheme. This includes records at Wellington Road, 1.7km south of the Proposed Scheme in 2017 (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 by Aquafact International Services Ltd. at the location of the proposed DPTOB, downstream of the confluence of the Dodder_050 and the Liffey Estuary Lower.

The Proposed Scheme will lie within the Dodder_SC_010 sub-catchment. The River Dodder catchment is located in the Eastern River Basin District and covers an area of approximately 113km². The River Dodder flows in a north easterly direction through south Co. Dublin, discharging to the Liffey Estuary Lower at Grand Canal Dock in Dublin city (Matson et al. 2019). The WFD sub-catchment Dodder_SC_010 was assigned an Ecological fish status of 'Good' in 2018 in the upper reaches and deemed 'Not at Risk' of failing to meet the WFD objectives. At Dodder Valley Park the River Dodder [Dodder_40] was assigned an ecological fish status of 'Poor' and deemed to be 'At Risk' of failing to meet its WFD objectives (EPA 2018a). A range of significant pressures have been identified, such as, anthropogenic pressures, diffuse urban sources of pollution and storm water overflows (SWOs) (EPA 2018a; EPA 2018b).

The Proposed Scheme is hydrologically connected to the Liffey Estuary Lower as it is tidally connected to the Liffey Estuary Upper (See Table 12.4). The Liffey Estuary Upper has a Good WFD status and is At Risk of not achieving the WFD objective of Good Status by 2027. The main risk is urban wastewater from SWOs at Ringsend Wastewater Treatment Plant (WwTP). The key impacts are considered to be nutrient pollution and alterations to habitats due to morphological changes (EPA 2018a; EPA 2020b; EPA 2020c).

The Proposed Scheme will run parallel to Liffey Estuary Lower on both banks of the waterbody, crossing it twice at the existing Samuel Beckett Bridge, and Tom Clarke East Link Bridge, and at the proposed DPTOB location. Liffey Estuary Lower has a Good WFD status and is At Risk of not achieving the WFD objective of Good Status by 2027. The main risk is urban wastewater from CSOs at Ringsend WwTP. The key impacts are considered to be nutrient pollution and alterations to habitats due to morphological changes (EPA 2018a; EPA 2020a; EPA 2020b).

Dublin Bay coastal waterbody has Good Status and is Not At Risk of failing to meet the WFD objectives by 2027 (EPA 2020b). However, it does receive nutrient input from the WwTP at Ringsend through the Liffey Estuary. Bathing Waters within Dublin Bay comprise of Merrion Strand, Sandymount Strand, Dollymount Strand and Seapoint (EPA 2018a).

The Proposed Scheme will cross the Royal Canal entry channel into the Liffey Estuary Lower at the Scherzer Bridges at Spencer Dock. Waterways Ireland are responsible for the monitoring of this waterbody, which has good ecological potential WFD status, and is under review regarding whether it is At Risk of not maintaining this to 2027 and beyond.

The Grand Canal will not be crossed by the Proposed Scheme, but it is located approximately 200m south of the Proposed Scheme, where it discharges to the Liffey Estuary Lower. As stated in the EPA Water Quality in Ireland 2013 - 2018 report (EPA 2019), assessments of the canals using macroinvertebrates and macrophytes indicate generally good biological conditions. The Grand Canal achieved good ecological potential in the period from 2013 to 2015.

Surveys carried out by Aquafact International Services Ltd. recorded high levels of leaf litter, discarded cans, and other anthropogenic derived litter incorporated into the sediment at the location of the proposed DPTOB.

12.3.12.1 Salmonid Species

Fish surveys carried out by Aquafact International Services Ltd. in 2020 within the Liffey Estuary Lower at the proposed DPTOB location did not record any salmonid species (See Appendix 12.1 in Volume 4 of this EIAR).

Three salmonid species are known to occur in the River Dodder and Liffey Estuary Lower, including brown trout *Salmo trutta*, sea trout *S. trutta morpha trutta* and Atlantic salmon *S. salar* (See Appendix 12.2 in Volume 4 of this EIAR). Indeed, it is considered exceptional among most urban rivers in the area, having resident salmon and sea trout populations, as such the river is regarded as a very important fishery (IFI Consultation 2020). The River Liffey is a highly significant regional salmonid catchment for Atlantic salmon.

Atlantic salmon are valued as being of County Importance due to their 'Vulnerable' conservation status and an Annex II and Annex V species covered by the EU Habitats Directive (92/43/EEC).

Brown trout and sea trout are valued as being of Local Importance (Higher Value).

12.3.12.2 Lamprey Species

Fish surveys carried out by Aquafact International Services Ltd. in 2020 within the Liffey Estuary Lower at the proposed DPTOB crossing point did not record any lamprey species (See Appendix 12.1 in Volume 4 of this EIAR).

Brook lamprey *Lampetra planeri* and river lamprey *L. fluviatilis* are both known to occur within the River Dodder (IFI 2010). The River Dodder is reported to contain juvenile lamprey, with suitable habitat located approximately 15km upstream of the Proposed Scheme at Lower Reservoir (Matson et al. 2019). Inland Fisheries Ireland surveys carried out during 2017 found lamprey upstream of the Proposed Scheme in low numbers (Matson, et al. 2018).

Lamprey populations are valued as being of County Importance, as an Annex II Protected Species covered by the EU Habitats Directive (92/43/EEC).

12.3.12.3 European Eel

Fish surveys carried out by Aquafact International Services Ltd. in 2020 within the Liffey Estuary Lower at the proposed DPTOB crossing point did not record European eel *Anguilla Anguilla* (See Appendix 12.1 in Volume 4 of this EIAR).

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 & Gollock 2014). The

Liffey Estuary Lower serves as the natural linkage for European eel migrating between freshwater and marine environments. European eel are not known to occur within the River Dodder.

The desk study returned records for European eel in the Grand Canal. A re-stocking programme based in Shannon Estuary was initiated in 2013 to address declining numbers, currently their passage is assisted upstream and into other connected water bodies using the method “trap and transport”; catching the eels and moving them past obstacles. European eels were recorded along the Grand Canal by IFI during the eel monitoring programme conducted in 2011 (O’Leary et al. 2011).

European eel populations are valued as being of County Importance.

12.3.12.4 All Other Fish Species

Fish surveys carried out by Aquafact International Services Ltd. in 2020 within the Liffey Estuary Lower at the proposed DPTOB crossing point recorded six fish species, including common goby *Pomatoschistus microps*, plaice *Pleuronectes platessa*, stickleback *Gasterosteus aculeatus*, flounder *Platichthys flesus*, grey mullet *Mugilidae*, and roach *Rutilus*.

Results of water sampling undertaken at several locations along the River Dodder during 2018 surveys included minnow *Phoxinus phoxinus*, stone loach *Barbatula barbatula* and stickleback *Gasterosteus aculeatus* (Matson et al. 2019).

The Grand Canal is known as a major angling destination and species present include common bream, tench, common rudd, roach roach *Rutilus rutilus*, and common perch *Perca fluviatilis* and pike. The Royal Canal is also known to support coarse fish species for angling, including roach, pike *Esox lucius*, rudd *Scardinius erythrophthalmus*, bream *Abramis brama* and tench *Tinca tinca* (DCC 2015)

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

12.3.13 Invertebrates

12.3.13.1 Aquatic Macro-Invertebrates

Subtidal grab surveys were carried out by Aquafact International Services Ltd. in 2019, 2020 and 2022 (See Appendix 12.1 in Volume 4 of this EIAR for full results). Thirteen taxa were recovered from the samples collected during the survey in 2019, these included nematodes, polychaete taxa, oligochaete taxa, bivalve genera. A total of 32 taxa were recovered from samples collected during 2020 surveys, and 33 taxa were recorded in 2022 surveys, with univariate community analysis showing no significant difference between 2020 and 2022. Of the species recorded, none of these were identified as protected or threatened taxa on Irish Red Lists.

The subtidal grab surveys indicate that the seabed conditions from this area are in very poor condition. The anoxic conditions of the sediments, evidenced by the strong odour of hydrogen sulphide, make it an inhospitable habitat for most infaunal taxa to exist in, which is reflected in the low number of species and equally low number of specimens.

Given the low level of diversity and number of specimens, aquatic macro-invertebrates are valued as being of Local Importance (Lower Value).

12.3.13.2 White-Clawed Crayfish *Austropotamobius pallipes*

White-clawed crayfish are legally protected under the Wildlife Acts and are also listed on Annex II of the Habitats Directive.

The study area was not suitable for white-clawed crayfish due to its estuarine locality. Surveys for white-clawed crayfish were not carried out as part of this assessment. The desk study (see Appendix A12.2 in Volume 4 of this EIAR) did not return records for white-clawed crayfish within the footprint of the Proposed Scheme. As such, white-clawed crayfish are not considered further in the assessment.

12.3.13.3 Other Invertebrates

The desk study (see Appendix A12.2 in Volume 4 of this EIAR) returned records for several invertebrates on Ireland Red List No. 2: Non-marine Molluscs, Ireland Red List No. 4: Butterflies (Regan *et al.* 2010), Ireland Red List No. 6: Damselflies and Dragonflies (Odonata) (Nelson *et al.* 2011), Ireland Red and Regional Red List of Irish Bees 2006 (Fitzpatrick, *et al.* 2006), Ireland Red List No. 1: Water beetles (Foster *et al.* 2009) and Ireland Red List No. 7: Mayflies (Ephemeroptera) (Kelly-Quinn & Regan 2012)(NBDC online database).

Butterfly are known to favour nectar-rich flowers which provide larval foodplants, preferred species include cock's-foot grass *Dactylis glomerata*, bird's-foot trefoil *Lotus corniculatus*, common nettle *Urtica dioica*, cuckoo flower *Cardamine pratensis*, garden nasturtium *Tropaeolum majus*, common holly *Ilex aquifolium* and common ivy *Hedera helix* (Butterfly Conservation Ireland 2020). Corresponding habitats along the Proposed Scheme that may contain such species include parkland with scattered trees (WD5), dry meadows and grassy verges (GS2) and amenity grasslands (GA2). Scattered trees and parkland is present within Ringsend Park and in the surrounding green areas adjacent to St. Brendan's Cottages, R131 Sean Moore Road, Bremen Road and Kerlogue Road. Areas of dry meadows and grassy verges are present north of Deke's Diner on R131 Sean Moore Road surrounding the Sea Scouts building and at Clanna Gael Fontenoy GAA Club on R131 Sean Moore Road. Areas of amenity grassland are located at Ringsend Park, Sean Moore Park, south of the R131 Sean Moore Road and on R802 Beach Road. These habitats were identified in fragmented pockets and were relatively small in extent across the Proposed Scheme. The abundance of foodplants in these habitats was low. Butterfly species that are known to survive in highly fragmented landscapes are typically those that can feed off a range of plants (Öckinger, *et al.*, 2010).

Bee species favour habitats containing an abundance of flowering plants in typically unimproved grasslands and hay meadows, or species rich gardens. The preferred foodplants for bee species are native species typically with white, blue or yellow flowers (Fitzpatrick *et al.* 2006). Small, fragmented sites where suitable flowering plant species were recorded along the Proposed Scheme include areas ornamental flower beds (BC4) within residential gardens; and, parkland with scattered trees (WD5). Bees do not cope well with habitat fragmentation which can isolate species, ultimately reducing gene flow and genetic diversity, 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.

These invertebrate 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).

12.3.14 Summary Ecological Valuation and Identification of KERs

Table 12.13 summarises the ecological evaluation of all receptors taking into consideration legal protection, conservation status and local abundance. KERs are highlighted in blue in Table 12.13. 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 2019) 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 12.4.

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, BL2, BL3, 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 they are included within the impact assessment.

Table 12.13: Summary of Ecological Valuation and Identification of KERs (KERs highlighted in blue)

Ecological Receptor	Ecological Valuation	KER?
Designated Sites		
North Dublin Bay SAC [000206]	International	Yes
South Dublin Bay SAC [000210]	International	Yes
Howth Head SAC [000202]	International	Yes
Rockabill to Dalkey Island SAC [003000]	International	Yes
Wicklow Mountains SAC [002122]	International	Yes
Lambay Island SAC [000204]	International	Yes
South Dublin Bay and River Tolka Estuary SPA [004024]	International	Yes
Howth Head Coast SPA [004113]	International	Yes
North Bull Island SPA [004006]	International	Yes
Baldoyle Bay SPA [004016]	International	Yes
Dalkey Island SPA [004172]	International	Yes
Malahide Estuary SPA [004025]	International	Yes
Rogerstown Estuary SPA [004015]	International	Yes
Skerries Islands SPA [004122]	International	Yes
Ireland's Eye SPA [004117]	International	Yes
Lambay Island SPA [004069]	International	Yes
Rockabill SPA [004014]	International	Yes
The Murrrough SPA [004186]	International	Yes
Wicklow Mountains SPA [004040]	International	Yes
All other SAC or SPA sites	International	No – beyond Zol
Skerries Island NHA [001218]	National	Yes
Royal Canal pNHA [002103]	National	Yes
Grand Canal pNHA [002104]	National	Yes
North Dublin Bay pNHA [000206]	National	Yes
South Dublin Bay pNHA [000210]	National	Yes
Dolphins, Dublin Docks pNHA [000201]	National	Yes
Boosterstown Marsh pNHA [001205]	National	Yes
Baldoyle Bay pNHA [000199]	National	Yes
Dalkey Coastal Zone and Killiney Hill pNHA [001206]	National	Yes
Howth Head pNHA [000202]	National	Yes
Malahide Estuary pNHA [000205]	National	Yes
Ireland's Eye pNHA [000203]	National	Yes
Rogerstown Estuary pNHA [000208]	National	Yes
Portraine Shore pNHA [001215]	National	Yes
Lambay Island pNHA [000204]	National	Yes
The Murrrough pNHA [004186]	National	Yes
Rockabill Island pNHA [000207]	National Importance	Yes
All other NHA or pNHA sites	National	No – beyond Zol
Habitats		
Horticultural land (BC2)	Local Importance (Lower Value)	No
Flower beds and borders (BC4)	Local Importance (Lower Value)	No

Ecological Receptor	Ecological Valuation	KER?
Stone walls and other stonework (BL1)	Local Importance (Lower Value)	No
Buildings and artificial surfaces (BL3)	Negligible Value	No
Sea walls, piers and jetties (CC1)	Local Importance (Lower Value)	No
Tidal Rivers (CW2) (corresponding to Annex I Estuaries [1130])	National Importance	Yes
Canals (FW3)	National Importance	Yes
Spoil and Bare Ground (ED2)	Local Importance (Lower Value)	No
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
Scattered trees and parkland (WD5)	Local Importance (Higher Value)	Yes
Hedgerows (WL1)	Local Importance (Higher Value)	Yes
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	Yes
Flora Species on Irelands Red Lists (Least concern)	Local Importance (Lower Value)	No
All other non-Red listed flora species	Local Importance (Lower Value)	No
Non-native invasive plant species	N/A	No
Fauna Species		
Bats	Local Importance (Higher Value)	Yes
Badger	Local Importance (Higher Value)	Yes
Otter	International Importance	Yes
Marine Mammals (QI species of European sites within the Zol of the Proposed Scheme)	International Importance	Yes
Marine Mammals (Non-SAC population species)	County Importance	Yes
Other mammal species protected under the Wildlife Acts	Local Importance (Higher Value)	Yes
SCI bird species	International Importance	Yes
Kingfisher (non-SPA population)	County Importance	Yes
Black guillemot	County 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
Reptiles	Local Importance (Higher Value)	Yes
Amphibians	Local Importance (Higher Value)	Yes
Atlantic salmon / Lamprey / European eel	County Importance	Yes
All other fish species	Local Importance (Higher Value)	Yes

Ecological Receptor	Ecological Valuation	KER?
Non-red list aquatic macro-Invertebrates	Local Importance (Lower Value)	No

12.4 Potential Impacts

The following Section presents the assessment of 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

12.4.1.1 Construction Phase

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, as follows.

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;
- Protection and / or diversion of buried services;
- Road widening, pavement reconstruction, and kerb improvements;
- Construction of Custom House Quay Boardwalk;
- Construction of North Wall Quay Boardwalk;
- Deconstruction, relocation and reconstruction of the Scherzer Bridges at George's Dock and the Royal Canal;
- Construction of the DPTOB;
- Demolition and reconstruction of the SPRC Building;
- 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.

The following are the main structural works to form part of the Proposed Scheme:

- Georges Dock Bridges (01);
- DCC Docklands Boardwalk (02);
- North Wall Quay Boardwalk (03);
- Spencer Dock Bridges (04); and
- Dodder Public Transport Opening Bridge (DPTOB) (05).

Construction Compounds (CC) to facilitate construction works are proposed. These include:

- **Construction Compound R1:** George's Dock Scherzer Bridges;
- **Construction Compound R2:** Spencer Dock Scherzer Bridges;
- **Construction Compound R3a/R3b:** West of the DPTOB; and
- **Construction Compound R4:** East of the DPTOB.

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;
- Routine maintenance; and
- Lifting of a section of the deck of the proposed DPTOB.

12.4.2 'Do Nothing' Scenario

In this EIAR, the 'evolution of the baseline without the development' is described as the 'Do Nothing' scenario. Under this 'Do Nothing' scenario, the lands within the Zol of the Proposed Scheme would continue to be maintained as they currently are and as such their current state would persist. The existing corridors would remain with no immediate significant changes to the terrestrial, aquatic and marine biodiversity (flora and fauna) of the area, as there would be no construction impacts from the Proposed Scheme. This would therefore result in a neutral effect on biodiversity along and adjacent to the Proposed Scheme.

The baseline environment (see Section 12.3) describes the existing land use within and surrounding the Proposed Scheme. The GDA is highly urbanised with existing trends resulting in added pressure to water resources and habitats due to ongoing development. The full extent of the Proposed Scheme will pass through lands zoned under the Dublin City Development Plan 2022 - 2028 (DCC 2022). The current land use zonings provide an indication of what the future short to medium-term biodiversity trends may be as they influence and enable direct development in the surrounding area. Lands within and 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 existing pressures on waterbodies and habitats. It is also likely that traffic numbers will continue to remain high on the existing road network, which contains a varying degree of adequate drainage control or pollution control measures. This in turn may have effects on the biodiversity receptors of the baseline environment.

However, any such effects on biodiversity are likely to be managed to some degree by the environmental protective policies and objectives contained in the Dublin City Development Plan 2022 - 2028 and overarching pollution control objectives in the River Basin Management Plan 2018 – 2021 (RBMP) (DoHPLG 2018).

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 in the NIS prepared for the Proposed Scheme as provided within the planning application package.

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 as to whether the integrity of any European sites would be affected – i.e. if the Proposed Scheme would adversely affect the integrity of a European site, 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 Zol 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 Zol (further information can also be found in Section 6 and Section 7 of the NIS).

The Zol 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 Zol 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 Zol based on the extent of the impact.

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

- South Dublin Bay SAC [000210];
- North Dublin Bay SAC [000206];
- Rockabill to Dalkey Island SAC [003000];
- Howth Head SAC [000202];
- Wicklow Mountains SAC [002122];
- Lambay Island SAC [000204];
- North Bull Island SPA [004006];
- South Dublin Bay and River Tolka Estuary SPA [004024];
- Baldoyle Bay SPA [004016];
- Dalkey Island 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];
- The Murrough SPA [0041876]; and,
- Wicklow Mountains SPA [004040].

The locations of these European Sites relative to the Proposed Scheme, and the predicted Zol, are shown on Figure 12.3 Volume 3 of this EIAR.

The following potential effects on European sites have been identified based on the existing baseline 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 Hydrogeological Impacts;
- Habitat Degradation as a result of Introducing / Spreading Non-Native Invasive Species;
- Habitat Degradation as a result of Air Quality Impacts;
- Disturbance and Displacement Impacts; and,
- Direct Injury / Mortality Impacts.

12.4.3.1.1.1 Habitat Loss and Fragmentation

The Proposed Scheme will not overlap with any European site. It is located in close proximity to Dublin Bay which is designated for a number of European sites. The nearest European sites to the Proposed Scheme are South Dublin Bay and River Tolka Estuary SPA and South Dublin Bay SAC, which are both located approximately 0.5km south-east of the Proposed Scheme (as the crow flies). These European sites are hydrologically connected to the Proposed Scheme via the Liffey Estuary Lower. South Dublin Bay and River Tolka Estuary SPA is approximately 2.4km downstream of the Tom Clark East Link Bridge and South Dublin Bay SAC is located approximately 3.2km downstream to the east. Therefore, there is no potential for direct habitat loss or fragmentation during the Construction Phase. There is however potential for direct ex-situ habitat loss and fragmentation to occur, as a result of land reclamation adjacent to the Tom Clarke East Link Bridge. Habitat loss may also occur indirectly as a consequence of severe habitat degradation arising from a possible reduction in water quality and / or a change to the hydrological regime, as described in the Section 12.4.3.1.1.2, below.

Otter populations are known to utilise the Liffey Estuary Lower for breeding and foraging purposes. It is considered that the Proposed Scheme is within the potential home range of male otter associated with the Wicklow Mountains SAC. The reclamation of land to facilitate the Proposed Scheme will not result in the loss of any breeding sites, however, will result in the removal of 3950m² estuarine habitat suitable to support this species.

Peregrine falcon, an Annex I bird species was recorded flying in the vicinity of the Proposed Scheme. No suitable breeding habitat for peregrine falcon will be lost as a result of the Proposed Scheme.

SCI species for which SPAs in the vicinity of the Proposed Scheme have been designated are known to utilise ex-situ inland feeding sites in the Dublin area (i.e., South Dublin Bay and River Tolka SPA, North Bull Island SPA, Malahide Estuary SPA, Baldoyle Bay SPA, Rogerstown Estuary SPA, Skerries Islands SPA, Ireland's Eye SPA, Lambay Island SPA and The Murrough SPA). Three potential inland feeding sites within the footprint of the Proposed Scheme were surveyed to inform this assessment, namely CBC0016WB001 (Small amenity grassland area next to St. Patrick's Rowing Club and Tom Clarke East Link Bridge), CBC0016WB002 (Gaelic pitch and amenity grassland area within Ringsend Park) and CBC0016WB003 (Grassy verge within Irishtown Stadium and amenity grassland area with scattered trees between the stadium and Bremen Avenue). Wintering SCI bird species were recorded at all three sites. It is proposed to remove approx. 10m² CBC0016WB001 to facilitate the proposed Dodder Bridge and associated land reclamation.

To facilitate a shared user path through Ringsend Park the existing path will require widening by approx. 2 m for its length and therefore a approx. 43m² strip of amenity grassland habitat within CBC0016WB002 will be removed. Similarly, to facilitate the widening of an existing path connecting Strand Street to Irishtown Stadium at CBC0016WB003 it is proposed to widen the path by approx. 2 m for its length and therefore remove approx. 153m² area of suitable wintering bird habitat.

SCI species for which SPAs in the vicinity of the Proposed Scheme have been designated have been recorded loafing and foraging in the vicinity of the proposed DPTOB, during vantage point surveys. These species include herring gull, black-headed gull, lesser black-backed gull, cormorant, light-bellied brent goose, curlew, redshank, and common tern (i.e., North Bull Island SPA, South Dublin Bay and River Tolka Estuary SPA, Malahide Estuary SPA, Baldoyle Bay SPA, Rogerstown Estuary SPA, Skerries Islands SPA, Ireland's Eye SPA, Lambay Island SPA, Rockabill SPA, Dalkey Islands SPA and The Murrough SPA). The reclamation of land to facilitate the Proposed Scheme will result in the removal of 3950m² estuarine habitat suitable to support these species.

However, the NIS assessment concluded that no significant effects will occur on any SCI bird species populations associated with any SPA sites within the Zol of the Proposed Scheme, in light of their conservation objectives, as a consequence of loss or fragmentation of habitat due to the following reasons:

- The availability of large areas of suitable marine foraging and/or loafing habitat for SCI bird species / QI mammals in the wider locality of the Proposed Scheme, including those in closer proximity to the relevant European sites.
- Relatively low peak flocks of SCI birds recorded on lands within the footprint of the Proposed Scheme (terrestrial and marine), suggesting that sites are not significantly important to the overall SPA population of each respective SCI bird species, and are likely to use other suitable sites available in the wider area on a similar or more regular basis.

- There are extensive areas of suitable foraging and loafing habitat for terns in the Liffey Estuary Lower and wider Dublin Bay area. The area of proposed land reclamation (3,950m²) will result in the loss of a small area of suitable foraging/loafing habitat relative to the surrounding environment and is not considered to significantly reduce the habitat available SCI species.
- The availability of large areas of suitable terrestrial 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.

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

The Proposed Scheme is hydrologically connected to Dublin Bay via the Liffey Estuary Lower, and Ringsend WWTP. There is additional hydrological connectivity to the Royal Canal and Dodder_050.

The release of contaminated surface water runoff and / or an accidental spillage or pollution event into any surface water features during the Construction Phase 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 mobilized suspended solids; and
- The accidental spillage and / or leaks of containments into receiving waters.

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 of Dublin Bay containing the following European sites: North Dublin Bay SAC, South Dublin Bay SAC, Howth Head SAC, Rockabill to Dalkey Island SAC, North Bull Island SPA, South Dublin Bay and River Tolka Estuary SPA and Dalkey Islands SPA. This possible 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 North Dublin Bay SAC, South Dublin Bay SAC, Howth Head SAC, Rockabill to Dalkey Island SAC, North Bull Island SPA, South Dublin Bay and River Tolka Estuary SPA and Dalkey Islands SPA are undermined.

In a worst case scenario, in the absence of mitigation measures, 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 in respect of SCI birds loaf in Dublin Port i.e. birds associated with Howth Head SPA, Skerries Islands SPA, Rockabill SPA and Lambay Island SPA, Ireland's Eye SPA, North Dublin Bay SPA, South Dublin Bay and River Tolka Estuary SPA, Malahide Estuary SPA, Rogerstown SPA, Dalkey Islands SPA, Murrough SPA, marine mammals associated with Rockabill to Dalkey Island SAC and Lambay Island SAC and the otter population associated with the Wicklow Mountains SAC. This possible reduction in water quality (either alone or in combination with other pressures on water quality) could however result in the degradation of sensitive habitats present within downstream 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 and QI populations. These potential impacts could occur to such a degree that the conservation objectives of the Howth Head SPA, Skerries Islands SPA, Rockabill SPA and Lambay Island SPA, Ireland's Eye SPA, North Dublin Bay SPA, South Dublin Bay and River Tolka Estuary SPA, Malahide Estuary SPA, Rogerstown SPA, Dalkey Islands SPA, Murrough SPA, Rockabill to Dalkey Island SAC, Lambay Island SAC and Wicklow Mountains SAC are undermined.

12.4.3.1.1.3 Habitat Degradation as a result of Hydrogeological Impacts

Groundwater effects could arise as a consequence of an accidental pollution event potentially causing a reduction in groundwater quality and/or dewatering activity potentially causing a reduction in groundwater levels in the locality. Long-term discharge of surface water runoff to groundwater during operation of the Proposed Scheme may result in a possible reduction in groundwater quality and/or quantity in the receiving environment, also resulting in the degradation of groundwater dependent terrestrial ecosystem and any species that they may support.

The potential for hydrogeological impacts are highly variable depending on the nature of the proposed works at specific locations and the receiving environment ground conditions. The unmitigated hydrogeological Zol of the Proposed Scheme is not considered to extend to any groundwater dependent terrestrial ecosystems linked to European sites. This Zol follows the professional judgement of the design team hydrogeology specialists.

There is potential for contaminated land and groundwater to be discharged to surface water during excavation works associated with the Proposed Scheme. This potential impact is addressed in Section 12.4.3.1.1.2 above.

Groundwater effects could arise as a consequence of an accidental pollution event potentially causing a reduction in groundwater quality and / or dewatering activity potentially causing a reduction in groundwater levels in the locality. However, there are no groundwater dependent terrestrial ecosystems located within the hydrogeological Zol of the Proposed Scheme, which are linked to European sites.

12.4.3.1.1.4 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 European Communities (Birds and Natural Habitats) Regulations, 2011 were recorded within, or in close proximity to, the Proposed Scheme. However, the desk study returned records of species listed on the Third Schedule of the European Communities (Birds and Natural Habitats) Regulations, 2011 in the vicinity of the Proposed Scheme. In the absence of mitigation, there is potential for these species to spread or be introduced, during the Construction Phase, 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). This in turn could result in the degradation of the existing habitats and therefore undermine the conservation objectives of these European sites.

It is considered unlikely that invasive species could spread to European sites which are located a significant distance from the outfall locations of the Liffey Estuary Lower (i.e. Howth Head SAC, Howth Head Coast SPA, Rockabill to Dalkey Island SAC and Dalkey Islands SPA).

In summary therefore, the Proposed Scheme has the potential to result in habitat degradation of the qualifying / special conservation interest species of North Dublin Bay SAC, South Dublin Bay SAC, North Bull Island SPA and South Dublin Bay and River Tolka Estuary SPA as the result of the spread of invasive species.

12.4.3.1.1.5 Habitat Degradation as a result of Air Quality Impacts

A reduction in air quality within the immediate vicinity of the construction works may occur as a consequence of dust deposition associated with these construction activities. The nearest European site is South Dublin Bay and River Tolka Estuary SPA located approximately 486m from the Proposed Scheme, whilst South Dublin Bay SAC is located approximately 455m away and therefore not located within the Zol of this potential impact, which is a considered to be a maximum of 200m from the proposed works (NRA 2011). Therefore there is no potential for the Proposed Scheme to result in habitat degradation of the qualifying/ special conservation interest species of any European site as a result of air quality impacts and there is therefore no potential for in-combination effects to occur in that regard.

12.4.3.1.1.6 Disturbance and Displacement Impacts

A temporary and / or permanent increase in noise, vibration and / or human activity levels during the construction and / or operation of the Proposed Scheme could result in the disturbance to and/or displacement of fauna species present within the vicinity of the Proposed Scheme.

For mammal species such as otter, disturbance effects would not be expected to extend beyond 250m. For birds, disturbance effects 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. There are no European sites within the disturbance Zol of the Proposed Scheme (the nearest European site(s) are the South Dublin Bay and River Tolka Estuary SPA and South Dublin Bay SAC located 0.5km south-east of the Proposed Scheme), however, ex situ populations of SCI and QI species associated with European sites have been recorded in the vicinity of the Proposed Scheme.

Noisy works associated with the construction of the Proposed Scheme include piling associated with the proposed pedestrian boardwalks and the proposed DPTOB, deconstruction, relocation and reconstruction of the Scherzer

Bridges (at George's Dock and the Royal Canal), and the demolition and reconstruction of the existing SPRC building.

It is considered that the Proposed Scheme is within the potential home range of male otter associated with the Wicklow Mountains SAC. Otter are documented from along the Royal Canal, Grand Canal, Dodder_050 and the Liffey Estuary Lower. Although otter is present in the vicinity of the Liffey Estuary Lower are likely to be habituated to a degree of human related disturbance; noise and vibration associated with the construction works involved in the construction of the Proposed Scheme (i.e. piling and building demolition) have the potential to disturb or displace otter during this period. Therefore, there is potential for the construction phase of the Proposed Scheme to result in disturbance / displacement impacts on QI otter populations associated with the Wicklow Mountains SAC.

Marine mammals associated with European sites have been recorded commuting and foraging within the Liffey Estuary Lower, in the vicinity of the Proposed Scheme. The construction methodology for the proposed structural and demolition works of the DPTOB, proposed pedestrian boardwalks and Scherzer bridges involves noisy activities in or adjacent to the aquatic environment such as piling and noise from additional support / delivery vessels associated with the construction period. The Marine Mammal Risk Assessment (IWDG 2020) prepared for the Proposed Scheme states that in the absence of mitigation, prolonged exposure to pile installation could lead to Temporary Threshold Shift (TTS) (i.e. temporary hearing loss as a result of exposure to noise, and changes in the behaviour of marine mammals) (IWDG 2020). Therefore, there is potential for the construction of the Proposed Scheme to result in the disturbance / displacement of QI marine mammal populations associated with Rockabill to Dalkey Island SAC and Lambay Island SAC during the Construction Phase.

It is considered possible that peregrine falcon in the vicinity of the Proposed Scheme are associated with the SPA population of Wicklow Mountains SPA. This species is known to overwinter on the coast and feed on the high concentrations of waterbirds present on the estuaries, and pigeons in the city centre. Therefore, there is potential that peregrine falcons associated with the Wicklow Mountains SPA may hunt in the vicinity of the Proposed Scheme. Therefore, there is potential for the Proposed Scheme to result in disturbance / displacement impacts on SCI populations of peregrine falcon associated with the Wicklow Mountains SPA. However, as concluded in the NIS, no significant effects will occur on the SCI bird species populations associated with Wicklow Mountains SPA, in light of their conservation objectives, as a consequence of disturbance/ displacement as a result of the construction of the Proposed Scheme, for the following reasons:

- Research on the effects of aircraft noise on nesting peregrine carried out by Palmer et al., (2003) found no evidence to suggest that noise events arising from aircraft overflights significantly altered their behaviour. Nestling provisioning rates were not found to be affected by increased noise disturbance which implies that noisy events do not inhibit peregrine falcons from hunting or delivering prey to young. It is possible that noise associated with the construction of the Proposed Scheme could temporarily reduce the availability of prey in the vicinity, however, peregrine are documented to have a foraging range of up to 18km (SNH, 2016). Therefore, disturbance associated with the Proposed Scheme will not have a significant effect on prey availability; and
- Construction of the Proposed Scheme will result in short-term disturbance impacts only. During the Construction Phase, individual sections will be completed within nine to 30 month periods. Peregrine falcon present in the vicinity of the Proposed Scheme are habituated to existing disturbance levels, including a level of construction related disturbance, associated with Dublin City Centre.

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, Murrough SPA, Skerries Islands SPA, Ireland's Eye SPA and Lambay Island SPA). These species include light-bellied brent goose, lapwing, oystercatcher, black-headed gull, herring gull and lesser black-backed gull. Species recorded using inland feeding sites in the vicinity of the Proposed Scheme include black-headed gull, herring gull, light-bellied brent goose, and oystercatcher. Suitable inland foraging/roosting sites, which these bird species utilise, are located within the potential ZOI of the Proposed Scheme. Therefore, there is potential for the Proposed Scheme to result in disturbance/displacement impacts on SCI populations associated with European Sites. However, as concluded in the NIS, no significant effects will occur on SCI bird species populations that are known to forage and/or roost at inland sites, in light of their conservation objectives,

as a consequence of disturbance/ displacement as a result of the construction of the Proposed Scheme, for the following reasons:

- Relatively low frequency of occurrence of these SCI bird species on lands located within the footprint of the Proposed Scheme, suggesting that these species do not regularly use or rely upon these lands as foraging and / or roosting habitat, and are likely to use other suitable sites available in the wider area on a similar or more regular basis;
- Relatively low peak flocks recorded on lands located within the footprint of the Proposed Scheme, especially when compared to 1% of both their international flyway and national populations and the mean peak flock of each respective SCI species recorded in the nearest SPA, suggesting that these sites are not significantly important to the overall SPA population of each respective SCI bird species, and are likely to use other suitable sites available in the wider area on a similar or more regular basis;
- Construction of the Proposed Scheme will result in short-term disturbance impacts only. During the Construction Phase, individual sections will be completed within nine to 30 month periods. Birds present in the vicinity of the Proposed Scheme are habituated to existing disturbance levels associated with Dublin City Centre; and
- 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.

Special Conservation Interest (SCI) species for which SPAs in the vicinity of the Proposed Scheme have been designated have been recorded loafing and foraging in the vicinity of the proposed DPTOB, during vantage point surveys. These species include herring gull, black-headed gull, lesser black-backed gull, cormorant, light-bellied brent goose, curlew, redshank and common tern (i.e. North Bull Island SPA, South Dublin Bay and River Tolka Estuary SPA, Malahide Estuary SPA, Baldoyle Bay SPA, Rogerstown Estuary SPA, Skerries Islands SPA, Ireland's Eye SPA, Lambay Island SPA, Rockabill SPA, Dalkey Islands SPA and The Murrough SPA). Therefore, there is potential for the Proposed Scheme to result in disturbance / displacement impacts on SCI populations associated with these European sites. However, as concluded in the NIS, no significant effects will occur on SCI bird species populations that are known to forage and/or loaf in the vicinity of the proposed DPTOB, excluding tern species, in light of their conservation objectives, as a consequence of disturbance/ displacement as a result of the construction of the Proposed Scheme, for the following reasons:

- Construction of the Proposed Scheme will result in short-term disturbance impacts only. During the Construction Phase, individual sections will be completed within nine to 30 month periods. SCI bird species present in the vicinity of the Proposed Scheme are habituated to existing disturbance levels associated with Dublin City Centre;
- Relatively low peak flocks recorded foraging and loafing within the footprint of the Proposed Scheme, when compared to 1% of both their international flyway and national populations, suggesting that these sites are not significantly important to the overall SPA population of each respective SCI bird species, and are likely to use other suitable sites available in the wider area on a similar or more regular basis; and
- There are extensive areas of suitable foraging and loafing habitat for light-bellied brent goose, black-headed gull and redshank in the Liffey Estuary Lower and wider Dublin Bay area, including areas in closer proximity to the relevant SPA.

SCI common tern, for which SPAs in the vicinity of the Proposed Scheme have been designated (i.e. South Dublin and River Tolka Estuary SPA, Dalkey Islands SPA, and Rockabill SPA), have been observed nesting at the Grand Canal lock gates, located 120m upstream of the proposed DPTOB. There is potential that noise and vibration from piling, demolition, rock breaking and any dredging works to reclaim the Liffey Estuary Lower and construct the proposed DPTOB, will have the potential to result in the reduced breeding success of birds breeding in the vicinity of the works and abandonment of any existing current nesting sites. A maximum peak count of 4 AONs (apparently occupied nests) was recorded during field surveys in 2018. As such tern pairs nesting at this site are estimated to represent 2.2% of the current SPA platform colony or 0.7% of the overall Dublin Port common tern colony. Despite the ESB dolphin being the only platform designated under the SPA, the CDL dolphin, the Tolka pontoon, and the GSW pontoon are all considered to contribute to the South Dublin Bay and River Tolka SPA tern colony. The area over which the temporary, short term, disturbance effects during the Construction Phase of the Proposed Scheme would be felt forms a relatively small part of larger expanses of similar, and more

preferable, suitable, habitat types in the wider locality of Dublin Port. As such, the potential loss of this breeding site for the duration for the Construction Phase of the proposed DPTOB is not considered to significantly affect the conservation objective attributes and targets supporting the conservation condition of SCI species of the South Dublin Bay and River Tolka Estuary SPA. Mitigation measures to reduce the effects of construction related disturbance on SCI breeding bird species are provided within the NIS.

In summary, the Proposed Scheme has the potential to result in the disturbance / displacement of the qualifying / special conservation interest species of the following European sites; Wicklow Mountains SAC, Rockabill to Dalkey Island SAC, and Lambay Island SAC.

12.4.3.1.1.7 Direct Injury / Mortality Impacts

Considering the location of the Proposed Scheme on the Liffey Estuary Lower, in close proximity to a number of SPAs present in Dublin Bay, there is potential for the proposed DPTOB to present a collision risk to mobile SCI species which are present in the area, during the construction and operational phases. SCI bird species for which SPAs in the Dublin area have been designated have been recorded in the vicinity of the proposed DPTOB, on amenity grassland areas and loafing / feeding at the proposed DPTOB location on the Liffey Estuary Lower / Dodder_050 confluence. These species include herring gull, black-headed gull, lesser black-backed gull, cormorant, light-bellied brent goose, curlew, redshank, and common tern (i.e., North Bull Island SPA, South Dublin Bay and River Tolka Estuary SPA, Malahide Estuary SPA, Baldoyle Bay SPA, Rogerstown Estuary SPA, Skerries Islands SPA, Ireland's Eye SPA, Lambay Island SPA, Rockabill SPA, Dalkey Islands SPA and The Murrough SPA). Therefore, there is potential for the Proposed Scheme to result in mortality of SCI bird species associated with European sites, via the collision risk associated with the construction of the Proposed Scheme.

It is considered possible that peregrine falcon in the vicinity of the Proposed Scheme are associated with the SPA population of Wicklow Mountains SPA. Therefore, there is potential that peregrine falcons associated with the Wicklow Mountains SPA may hunt in the vicinity of the Proposed Scheme. There is potential for the proposed DPTOB to present a collision risk to hunting peregrine falcon, during the construction phase. Therefore, there is potential for the Proposed Scheme to result in direct injury/mortality impacts on SCI populations of peregrine falcon associated with the Wicklow Mountains SPA.

Marine mammals associated with European sites have been recorded commuting and foraging within the Liffey Estuary Lower, in the vicinity of the Proposed Scheme. During the construction phase of the proposed DPTOB, there will be an increase of vessels in the vicinity. According to the Marine Mammal Risk Assessment¹ prepared for the Proposed Scheme, the risk of injury and mortality is considered extremely low as marine mammals in Dublin Harbour are exposed to considerable vessel traffic on a daily basis and would be aware of their presence. There will be no increase in vessels associated with the operational phase of the Proposed Scheme. Therefore, it is not likely that the Proposed Scheme will pose a significant collision / mortality risk for marine mammals in Dublin Bay.

Otter which may be associated with the QI population of the Wicklow Mountains SAC have been recorded in the vicinity of the Proposed Scheme. Vehicular and vessel traffic associated with the operational phase of the Proposed Scheme is not likely to result in significant injury/mortality risk to QI otter populations as otter present in the vicinity of the Proposed Scheme are habituated to existing traffic and shipping levels in the vicinity of the Proposed Scheme. During the construction phase of the proposed DPTOB, there will be an increase of vessels in the vicinity as well as human and construction disturbance for a period of approximately 30 months. The risk of injury or mortality arising from the construction phase of the Proposed Scheme as a result of vessel collision is considered to be extremely low as otter present in this area are exposed to considerable vessel traffic on a daily basis and would be aware of their presence. As otter in the vicinity of the Proposed Scheme are habituated to normal traffic levels associated with Dublin City Centre it is unlikely that an increase in construction related vehicles and machinery during construction would present a significant injury/mortality risk. However, given that proposed Construction Compounds will be located adjacent to the River Dodder and Liffey Estuary Lower, and that there will be in-stream disturbance associated with the construction of the proposed DPTOB, there is potential for injury / mortality of otter during the construction phase of the Proposed Scheme.

¹ IWDG (2020). *Marine Mammal Risk Assessment of Proposed Dodder Public Transportation Opening Bridge. Report prepared in support of Environmental assessment for Planning application.*

12.4.3.1.2 NHAs and pNHAs

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.

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 for which a designation is proposed.

Considering the Zol 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 NHAs / pNHAs:

- Skerries Islands NHA;
- Royal Canal pNHA [002103];
- Grand Canal pNHA [002104];
- North Dublin Bay pNHA [000206];
- South Dublin Bay pNHA [000210];
- Dolphins, Dublin Docks pNHA [000201];
- Booterstown Marsh pNHA [001205];
- Baldoyle Bay pNHA [000199];
- Dalkey Coastal Zone and Killiney Hill pNHA [001206];
- Howth Head pNHA [000202];
- Malahide Estuary pNHA;
- Rogerstown pNHA;
- Portrane Shore pNHA;
- Ireland's Eye pNHA;
- Lambay Island pNHA;
- The Murrough pNHA; and
- Rockabill 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 this EIAR.

The potential effects arising from the Proposed Scheme on European Sites as described above in Section 12.4.3.1.1 may also negatively affect the pNHA and NHA sites located within the boundaries of these European Sites and 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. With the exception of the Royal Canal pNHA and the Grand Canal pNHA, 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 with the exception of Air Quality impacts to the Grand Canal pNHA. Potential impacts arising from the Proposed Scheme on these pNHA sites could result in a likely significant negative effect at a national geographic scale.

12.4.3.1.2.1 Habitat Degradation - Air Quality

The Proposed Scheme will overlap with the Royal Canal pNHA entry channel into the Liffey Estuary Lower, and the Grand Canal pNHA is location 200m south of the proposed DPTOB.

Dust Emissions

Dust emissions associated with Construction Phase could, in extreme circumstances, affect adjoining habitats, potentially burying sensitive habitats or plant species. Best practice construction methodologies and mitigation measures have been designed to minimise construction generated dust and to contain it within the proposed development boundary. Mitigation measures in respect of construction dust are provided in 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 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, NO₂) and particulate matter (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* (National Roads Authority 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). Further guidance can also be found in the IAQM document “*A Guide To The Assessment Of Air Quality Impacts On Designated Nature Conservation Sites*” (IAQM 2020) and in the DMRB guidance LA105 Air Quality (UKHA 2019), both of which describe NO_x emissions as the most likely source of significant impacts from road traffic. Pollutants such as PM, CO₂, CO, SO₂, ammonia and volatile organic compounds are not considered in this guidance and have been scoped out of detailed assessment. Refer to Chapter 7 (Air Quality) for full methodology.

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 during the Construction Phase along the North Wall Quay crossing of the Royal Canal pNHA, and at the Grand Canal pNHA south of the proposed DPTOB, in addition to crossing points outside of the Proposed Scheme, part of the extended road network as a result of traffic redistribution effects in the case of the Grand Canal pNHA (refer to 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/m³ 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 either stay the same or decrease at the Royal Canal pNHA and the Grand Canal pNHA.

The contribution of the Construction Phase of the Proposed Scheme to the NO₂ dry deposition rate was modelled at the Royal Canal pNHA and the Grand Canal pNHA. Nitrogen deposition levels have been compared to the lower and higher critical loads for habitats associated with these pNHAs, including Canals (FW3), Dry Meadow / Grassy Verges (GS2), Reed and Large Sedge Swamps (FS1) and Tall-herb Swamps (FS2), and wetland habitats associated with canal habitats. The majority modelling sites are below the lower critical load of inland and surface water habitats of 5-10 Kg(N)/ha/yr (National Road Authority 2011), modelling sites which will be in excess of the lower critical load value include MacMahon Bridge (the Grand Canal pNHA) and the North Wall Quay Royal Canal crossing point. NO₂ dry deposition rates are modelled to be in excess of this value during the future baseline, during the construction of the Proposed Scheme these values are modelled to decrease at both sites. At the remaining modelling locations, contributions to the NO₂ dry deposition rate will either stay the same or decrease in levels during the Construction Phase. Therefore, harmful effects on vegetation within the Royal Canal pNHA and the Grand Canal pNHA from NO₂ are not likely, nor will there be any reduction in habitat area of the pNHA habitats.

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 part of the scheme. 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. Some of the habitat types directly affected are considered to be of National importance, given their Annex I status under the Habitats Directive.

Loss of National Importance Habitats

The habitat type, tidal rivers (CW2), which is considered to be of National Importance given its Annex I status under the Habitats Directive (i.e. Estuaries [1130]) refers to the Liffey Estuary Lower which is traversed by the Proposed Scheme at the Sean O'Casey Bridge, Samuel Beckett Bridge, the proposed DPTOB, and the proposed pedestrian boardwalks at DCC Docklands Offices at Custom House Quay and at North Wall Quay. The habitat will be directly affected by the construction of the proposed DPTOB by reclamation of land and construction of the cofferdams, and the proposed boardwalk at DCC Docklands Offices, which requires the installation of 3 no. piles. The overall total area of this habitat which will permanently be lost as a direct impact during construction of the Proposed Scheme is approximately 3950m². The range and area of this habitat is currently favourable at a national level however, the overall national conservation status trend for this habitat is deteriorating due to its inadequate structure and functions (NPWS 2019a, NPWS 2019b). The methodology for determining effects on the conservation status on Annex I habitats at a national level is assessed under the headings of range, area, structure & function, and future prospects. Under the area criterion, any loss of habitat area with respect to the Favourable Reference Range (FRA) results in the habitat moving from Favourable conservation status (if that is the baseline condition) to either Inadequate or Bad. If the baseline condition is either Inadequate or Bad, then additional habitat loss is adding to an existing decline and potentially inhibiting efforts to maintain or restore Annex I habitats at favourable conservation status at a national level. As discussed in Section 12.4.3.2.2 mitigation is provided to protect against indirect habitat loss by way of surface water degradation affecting the structure and functions of this habitat type, therefore impacts on this habitat type are restricted to direct habitat loss. The national area of this habitat is documented as being 761km², as such the Proposed Scheme will reduce the national area of this habitat by a negligible percentage (0.0005%). This habitat is valued as National Importance, therefore any loss that cannot be mitigated is considered significant. The permanent loss of this habitat type has the potential to affect the conservation status of this habitat type. However, as the loss is a negligible percentage of the total national area of this habitat and due to the fact that the national range of the habitat will not be reduced by this minor loss of area, the national conservation status of this habitat type will not be altered by this minor loss of area. Nonetheless it is recognised that there will be a small loss of an Annex I habitat type and this is considered to be significant at the county geographic scale.

The habitat type muddy sand shores (LS3) / mud shores (LS4), which is considered to be of National Importance given its Annex I status under the Habitats Directive (i.e. Tidal Mudflats and Sandflats [1130]) refers to the Liffey Estuary Lower area uncovered at low tide which is traversed by the Proposed Scheme at the proposed DPTOB. The habitat will be directly affected by the construction of the proposed DPTOB by reclamation of land and construction of the cofferdams the overall total area of this habitat which will permanently be lost as a direct impact during construction of the Proposed Scheme is approximately 3950m². The range and area of this habitat is currently favourable at a national level however, the overall national conservation status trend for this habitat is deteriorating due to its inadequate structure and functions (NPWS 2019a, NPWS 2019b). As discussed in Section 12.4.3.2.2 mitigation is provided to protect against indirect habitat loss by way of surface water degradation affecting the structure and functions of this habitat type, therefore impacts on this habitat type are restricted to direct habitat loss. The national area of this habitat is documented as being 646km², as such the Proposed Scheme will reduce the national area of this habitat by a negligible percentage (0.0006%). This habitat is valued as National Importance, therefore any loss that cannot be mitigated is considered significant. The permanent loss of this habitat type has the potential to affect the conservation status of this habitat type. However as the loss is a negligible percentage of the total national area of this habitat and due to the fact that the national range of the habitat will not be reduced by this minor loss of area, the national conservation status of this habitat type will not be altered by this minor loss of area. Nonetheless it is recognised that there will be a small loss of an Annex I habitat type and this is considered to be significant at the county geographic scale.

The habitat type canals (FW3) may also be affected by the Proposed Scheme and is also considered to be of National Importance as it is contained within the boundaries of the Royal Canal pNHA. The Proposed Scheme will cross the entry channel to the Royal Canal at R801 North Wall Quay, where it is proposed to relocate the Scherzer Bridges. There will be no permanent loss of the FW3 habitat type as the Scherzer Bridge supports will be inserted into the existing quay walls, however there will be increased shading due to the structure at this location. The total length of this habitat type which overlap with the Proposed Scheme is approximately 40m². This is not considered significant at any geographical scale.

Loss of Local Importance Habitats

Habitat types considered to be of a Local Importance (Higher Value) will be lost as a result of the Proposed Scheme. These include relatively small areas of parkland (WD5), hedgerows (WL1) and tree lines (WL2). The overall total area of the habitat types which overlaps with the Proposed Scheme boundary and will be directly lost as a result of the construction of the Proposed Scheme is provided in Table 12.14. It should be noted that the extent of tree loss is calculated across the length of the Proposed Scheme and is captured under tree lines (WL2) as the majority of habitat loss affects this habitat type. However small numbers of these trees may be lost from the habitat classification scattered trees and parkland (WD5). This distinction is considered in the habitat loss impact assessment. The permanent 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, therefore, result in a significant negative effect 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), horticultural land (BC2), planted flowers beds (BC4) and ornamental / non-native shrub (WS3), spoil and bare ground, (ED2) and scrub (WS1), stonewalls (BL1), buildings and artificial surfaces (BL3), and seawalls (CC1). These habitats are located next to existing urban development, and as such are highly disturbed. With the exception of the temporary loss of 0.13ha of GA2 habitat for the Construction Compounds, habitat loss will consist of small, isolated sections adjacent to the existing road network. 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 not considered to be significant at any geographical scale.

The various KER habitat types affected and their corresponding total areas which overlap with the Proposed Scheme boundary are summarised in Table 12.14. These calculations include all KER habitat areas within the Proposed Scheme boundary, as the possibility of areas within the Proposed Scheme boundary but outside of the footprint of the Proposed Scheme itself 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, this 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.

Table 12.14: Extent of KER Habitat Types Within the Proposed Scheme

Habitat Type	Extent of permanent habitat loss	Extent of temporary habitat loss
National Importance		
Tidal rivers (CW2) (corresponding to Annex I Estuaries [1130])	c. 3950m ² of Liffey Estuary Lower	N/a
Muddy sand shores (LS3) / mud shores (LS4) (corresponding to Annex I Tidal Mudflats and Sandflats [1130])	c. 3950m ² of Liffey Estuary Lower	N/a
Canals (FW3)	c. 0m of Royal Canal. Approximately 38.5m ² will be shaded	c. 0m of Royal Canal.
Local Importance (Higher Value)		
Scattered trees and parkland (WD5)*	c. 0.46ha**	c. 0ha
Hedgerow (WL1)	c. 5m	N/A
Treelines (WL2)	134 trees removed	N/A

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

*Extent of habitat removal refers to parkland only, tree loss is captured under Treeline (WL2) habitat code

**total area of habitat within Proposed Scheme boundary not all habitats will be lost

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 baseline 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 habitats of the Liffey Estuary Lower and the Dublin Bay coastal water body could also be affected.

It is considered unlikely that a pollution event of such a magnitude would occur during construction or if 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, for the purposes of the EIA to be conducted by the Board (but not the screening for Appropriate Assessment), detailed mitigation measures are proposed and considered to further minimise the risk 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 Liffey Estuary lower, and the Royal Canal pNHA, or existing surface water drainage infrastructure hydrologically connected to these water bodies, could possibly result in generated silt / sediment / contaminants being released into these surface water features. 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. Structural works involves with the demolition of the Poolbeg Rowing Club, construction of the proposed DPTOB the installation of pedestrian boardwalk at DCC Docklands Offices at Custom House Quay and the Scherzer Bridges adjacent to the Royal Canal are located adjacent to water bodies. This has the potential to result in significant negative effects on water quality at a local geographical scale and consequently affect aquatic and wetland habitats in the receiving environment. In a worst case scenario, contaminants could be transferred to hydrologically connected water bodies including the Liffey Estuary Upper, the Grand Canal pNHA, and to the downstream coastal environment of Dublin Bay.

Habitat degradation as a consequence of construction effects on surface water quality has the potential to affect the conservation status of the Grand Canal pNHA, the Royal Canal pNHA, tidal rivers (CW2) / Annex I habitat Estuaries [1130], and therefore, has 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 Zol of the Proposed Scheme.

The Liffey Estuary Lower is hydrologically connected to downstream habitats in Dublin Bay which may also be at risk of habitat degradation as a consequence of construction effects on surface water quality. Impacts on these habitats are assessed above in Section 12.4.3.1.1.

The mitigation measures that have been designed to avoid or reduce the potential impacts of the Proposed Scheme on surface water quality during construction are presented in Section 12.5.1

12.4.3.2.3 Habitat Degradation – Groundwater

Any effects on the existing hydrogeological baseline supporting wetlands, in the surrounding environment has the potential to negatively impact upon habitat extent and distribution, and vegetation structure and composition. The potential effects of impacting 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. However, it is predicted that while there may be no direct impact on the groundwater regime, there is potential indirect impacts associated with the Proposed Scheme through surface water interaction. As above in relation to surface water features, impacts on the groundwater could potentially have a significant negative effect on biodiversity at the local scale.

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, i.e. pollution control plan will be put in place to manage runoff and minimise pollution to receiving waterbodies during the Construction Phase. There are no predicted impacts that could give rise to a likely significant negative impact on any aquatic habitats or species at any time scale (for more detail refer to Chapter 13 (Water)).

12.4.3.2.4 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 mitigation measures to control dust emissions during the Construction Phase are 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 Compounds.

As discussed above in Section 12.4.3.1.2.1, 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 conclude that any impacts arising from the Proposed Scheme will be overall neutral, and short term. As such harmful effects on vegetation from these emissions are not likely.

12.4.3.2.5 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 species) is controlled under regulation 49 of the Birds and Natural 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 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 along the network of proposed construction access routes associated with the Proposed Scheme.

No non-native invasive plant species listed on the Third Schedule of the Birds and Habitats Regulations were identified during field surveys undertaken along the Proposed Scheme. However, the desk study returned records of Himalayan balsam *Impatiens glandulifera* and Japanese knotweed *Reynoutria japonica* within 1km of the Proposed Scheme in Irishtown and the Irishtown Nature Park. Additional records of invasive plant species located within 1km of the Proposed Scheme included Canadian waterweed *Elodea canadensis*, sea-buckthorn *Hippophae rhamnoides*, and three-cornered garlic *Allium triquetrum*.

The effects of introducing such non-native invasive plant species to highly sensitive and ecologically important habitat areas (e.g. designated area for nature conservation or areas of Annex I habitat) have the potential to result in a likely significant negative effect, at geographic scales ranging from local to international.

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. Mitigation measures have been designed to avoid this potential impact (see Section 12.5.1 and Appendix A5.1 (CEMP) in Volume 4 of the EIAR).

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 2015 were recorded within the footprint of the Proposed Scheme. However, desk study records identified the presence of opposite-leaved pondweed within the

Grand Canal pNHA and the Royal Canal pNHA. The Proposed Scheme does not overlap with the Grand Canal, therefore there will be no habitat loss within the Grand Canal. The Proposed Scheme crosses the Royal Canal entry channel to the Liffey Estuary Lower however the proposed bridge widening in this area will tie into existing quay walls and will be suspended above the canal rather than within it. Therefore, the Proposed Scheme will not result in any habitat loss of canal habitat. The proposed bridge widening over the Royal Canal will result in a small additional amount of shading. However, no significant impacts are predicted on rare and protected plant species as a result of habitat loss are predicted.

12.4.3.3.2 Habitat Degradation – Surface Water Quality

Opposite-leaved pondweed may lie dormant in sediments for many years until conditions become suitable for its regrowth. As outlined in Section 12.4.3.2.2, 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 and the Royal Canal entry channel into the Liffey Estuary Lower, which 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 Royal Canal and Grand Canal as a consequence of Construction Phase impacts on surface water, and the potential indirect impacts this could have on the protected species opposite-leaved pondweed, may be significant at the National Level. 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.

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 or trees with potential bat roost features (PRFs) located within the footprint of the Proposed Scheme. The Proposed Scheme will not result in the loss of any breeding / resting sites for any bat species and therefore, there is no potential for likely significant effects on the conservation status of bats to occur at any geographic scale as a result of this potential direct impact. However, to minimise any potential impacts, mitigation measures have been proposed within Section 12.5.1.4 to avoid any potential bat mortality risk as a result of the SPRC building demolition.

12.4.3.4.1.2 Habitat Loss as Fragmentation of Foraging and / or Commuting Habitats

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 feeding 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 tree lines, areas of parkland, and open grassland. The area of the habitats which will be lost as a result of the Proposed Scheme is provided in Table 12.14 and shown in the Landscape General Arrangement drawings (BCIDD-ROT-ENV_LA-0016_XX_00-DR-LL-9001) in Volume 3 of the EIAR. This is not significant, considering the extent of habitat loss, their location (adjacent to existing artificially lit roads in a generally 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. The Proposed Scheme will not result in any loss of supporting habitat along water bodies.

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 (Collins 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 and that all parts of the Proposed Scheme. All parts of the Proposed Scheme which contain suitable habitat are likely to be within the core sustenance zone (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 as there will be no major changes to pre-existing habitats along most of the route of the Proposed Scheme.

The Proposed Scheme will result in the removal / fragmentation of small areas / strips of habitats including, scattered trees and parkland, treelines and hedgerows 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. 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. Permanent removal of suitable habitat for foraging and / or commuting bats within the footprint of the Proposed Scheme is provided in Table 12.14, this included the removal of 0.46ha of scattered trees and parkland, 5m of hedgerow, and the removal of 134 trees. Habitat removal is within a highly disturbed urban environment with low numbers of species records, and, as such is not considered to provide significant contributions to CSZs 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 considered to be significant at the local level only.

12.4.3.4.1.3 Installation of Temporary Working and Construction Compound Lighting Which May Cause Indirect Disturbance of Flight Patterns

There are four Construction Compounds associated with the Construction Phase of the Proposed Scheme, in addition to potential rolling/moving construction works locations. Security lighting will be installed in Construction Compounds for the duration of the Construction Phase, thereby increasing the level of artificial lighting in these areas. Artificial lighting within suitable habitats may result in avoidance behaviour by bats and could potentially 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 the abandonment of nearby roosts. Given the suburban setting of the proposed Construction Compounds, and limited foraging resources in the existing environment, bats in the area are not deemed to be present in high numbers and would be habituated to some level of artificial lighting. In the event additional lighting at the Construction Compounds is required, it will be cowed and positioned to reduce over spill. Considering the Construction Compounds will be in place for the duration of the Construction Phase, any potential impact will be short-term, and therefore the effect of the additional lighting is considered to be significant at a local level only.

Construction works will generally be undertaken during normal daylight working hours where practicable and therefore the requirement for lighting to accommodate construction works during the night-time, in areas where existing light levels are low, will be limited and short term. As such, in a worst case scenario, disturbance impacts are considered to be significant at the local level only.

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 Zol of the Proposed Scheme before construction works commence, it is a possibility, and this scenario has been taken into account in the mitigation strategy (refer to Section 12.5.1)

12.4.3.4.2.1 Loss of Foraging Habitat and Breeding / Rest Sites

There are no badger setts located within the Zol of the Proposed Scheme. Therefore, there is no potential for the permanent loss of any badger sett to occur.

Construction may result in the permanent loss of minor and disturbed sections of suitable foraging / commuting habitat for badgers (e.g., amenity grassland, scattered trees and parkland, and treelines / hedgerows). These areas of habitat removal are not likely to provide significant foraging habitat for the local badger population. The loss of suitable habitat at Ringsend Park during construction could result in a temporary impact to commuting/ foraging badgers, although given the relative abundance of suitable habitat in the wider vicinity, the temporary loss of this habitat is not considered significant at any geographic scale. Therefore, the Proposed Scheme is unlikely to affect the conservation status of the local badger population and will not result in a likely significant negative effect, at any geographic scale.

12.4.3.4.2.2 Disturbance / Displacement

In conjunction with any displacement effects associated with habitat loss, increased human presence and / or noise and vibration associated with construction works, 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.

Given badgers are nocturnal in habit, their displacement 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 additional artificial lighting to previously unlit or poorly lit areas.

It is likely the proposed Construction Compounds will require security lighting for the duration of construction. There are no compounds proposed within Ringsend Park, however if for any reason high-intensity, non-directional security lighting (e.g., floodlighting) is required in the park area during construction, 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.

12.4.3.4.3 Otter

Surveys have confirmed that foraging and commuting otter are present in the vicinity of the Proposed Scheme.

It is possible that otter will establish new holt or couch sites or return to previously active holts within the ZoI of the Proposed Scheme before construction works commence, 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

There were no otter breeding or resting places within the footprint of the Proposed Scheme which would be removed during the Construction Phase. Therefore, there will be no loss of breeding / resting sites which could have a likely significant negative effect on the conservation status of otter, at any geographic scale.

12.4.3.4.3.2 Habitat Loss / Fragmentation of Foraging / Commuting Habitat

The Proposed Scheme will result in the direct loss of foraging habitat as a result of estuary reclamation to facilitate the proposed DPTOB. In addition, there is the potential for otter to utilise disused drainage pipes within the vicinity of the Proposed Schemes. The Proposed Scheme will result in the reclamation of 3,950m² of land adjacent to the Tom Clarke East Link Bridge during construction. The area of land reclamation is relatively small in comparison to the area of suitable habitat present in the vicinity of the Proposed Scheme. Therefore, it is not likely that the reclamation of land to facilitate the Proposed Scheme will result in significant foraging habitat loss for otter.

The proposed DPTOB will have two piers in the waterbody (constructed within a cofferdam) but should not result in loss or indeed fragmentation of otter territory as otter will still be able to use the majority of the aquatic environment around the bridge for commuting and foraging purposes. Otter are known to routinely use highly modified habitat within culverts and beneath bridges. Habitat loss 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, at any geographic scale.

12.4.3.4.3.3 Habitat and Food Source Degradation – Water Quality

As outlined in Section 12.4.3.2.2, the construction of the Proposed Scheme, in the absence of mitigation, has the potential to result in contamination of receiving water bodies. 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 construction has the potential to affect the conservation status of otter (which are linked to QI populations of Wicklow Mountains SAC) and result in a likely significant negative effect, at the 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.

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

12.4.3.4.3.4 Habitat Severance / Barrier Effect

The physical disturbance to the Liffey Estuary Lower at the proposed DPTOB, will result in the partial severance of river habitat, during construction. The proposed DPTOB will have two piers in the waterbody, which will be constructed within a cofferdam, and will have a partial opening section for vessel movements. The reclamation of 3,950m² of land adjacent to the Tom Clarke East Link Bridge will not sever habitat suitable for otter, however. These works will not result in loss or indeed fragmentation of otter territory as otter will still be able to use the majority of the aquatic environment around the bridge for commuting and foraging purposes.

Given that otter are generally nocturnal in nature and works will generally be carried out during normal daylight working hours where practicable, affected otters would be expected to habituate to the altered landscape and any resulting barrier effect would be short-term in nature (see below in 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 active holts were recorded within the study area for the Proposed Scheme. Otter holts are known to be present in the Tolka Estuary at Dublin Port approximately 1.5km directly northeast of the Proposed Scheme. An inactive otter holt is present within the quay wall near MV Cill Airne Boat Restaurant immediately adjacent to the Proposed Scheme. Increased human presence and / or noise and vibration associated with construction works may affect the MV Cill Airne holt and temporarily displace commuting or foraging otter. Construction activities in the vicinity of the Liffey Estuary Lower will include general road works, site compounds and piling works and retaining walls. Noise levels produced by these general construction works will be a maximum of 81dB (for hydraulic hammer piling works and retaining walls) at 10m away (Chapter 9 (Noise & Vibration)).

Chapter 9 Noise and Vibration provide the indicative construction noise calculation associated with different construction activities of the Proposed Scheme at varying distances. The results of the noise assessment carried out for the Proposed Scheme confirmed that at 150m, noise levels for general construction activities will be 60dB or less. Therefore, construction activities would not be expected to result in any more than a moderate disturbance

at distances beyond 150m. Therefore, 150m is considered to be a precautionary buffer in defining the ZoI of disturbance effects arising from construction activities.

Construction activities at the proposed DPTOB will include noisy activities such as piling. These activities will result in a greater magnitude of effect on the baseline environment. At 100m from the Proposed Scheme, the majority of noise produced as a result of the construction of the proposed DPTOB Bridge will be below the 70dB threshold (see Chapter 9 (Noise & Vibration) for indicative construction noise calculations). At 250m, all predicted noise levels will be below the 60dB threshold, with the exception of sheet piling rigs and breakers during demolition and approach structure works, which will be 62dB. As such, the majority of disturbance is predicted to occur within 150m of the Proposed Scheme, and moderate disturbance is estimated to reach 250m from the Proposed Scheme.

Construction activities associated with the Scherzer bridges are within 150m of the known holt. Although currently inactive, there is potential for otter populations to re-establish territory here prior to the Construction Phase of the Proposed Scheme. Abandonment of otter holts as a result of displacement effects arising from the Proposed Scheme has the potential to result in a significant effect at the international geographic scale as populations are linked to Wicklow Mountains SAC.

Excluding the proposed works as the Scherzer bridges, otter are known to tolerate human disturbance under certain circumstances (Bailey & Rochford 2006; 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). In addition, construction works will generally be undertaken during normal daylight working hours where practicable and otter are generally nocturnal in habit, displacement of otter from their commuting and foraging habitat is extremely unlikely to affect the local otter population, at any geographic scale. However, mitigation measures have been designed to avoid disturbance and displacement of otter during construction (see Section 12.5.1).

12.4.3.4.3.6 Direct Injury / Mortality

During the construction phase of the proposed DPTOB, there will be an increase of vessels in the vicinity of the Proposed Scheme. The risk of injury or mortality arising from the construction phase of the Proposed Scheme as a result of vessel collision is considered to be extremely low as otter present in this area are exposed to considerable vessel traffic on a daily basis and would be aware of their presence. As otter in the vicinity of the Proposed Scheme are habituated to normal vessel/traffic levels associated with Dublin City Centre it is unlikely that an increase in construction related vehicles and machinery during construction would present a significant injury/mortality risk. However, given that two proposed Construction Compounds will be located adjacent to the Liffey Estuary Lower, and that there will be in-stream disturbance associated with the construction of the proposed DPTOB, there is potential for injury/mortality of otter during the construction phase of the Proposed Scheme. Injury / mortality impacts have the potential to result in significant effects at the international geographic scale are linked to Wicklow Mountains SAC.

Mitigation measures have been designed to direct injury / mortality of otter during construction (see Section 12.5.1).

12.4.3.4.4 Marine Mammals

12.4.3.4.4.1 Habitat Loss

The proposed DPTOB will require the construction of piers across the tidal confluence of the River Dodder with the Liffey Estuary Lower, and the reclamation of approximately 3,950m² of land adjacent to the Tom Clarke East Link Bridge. The bulk of the marine mammal data available (IWDG 2020) corresponds to areas downstream of the Tom Clarke East Link Bridge. Therefore, it is not likely that the reclamation of a relatively small section of land to facilitate the Proposed Scheme will result in significant effects on marine mammals at any geographic scale.

12.4.3.4.4.2 Direct Injury / Mortality

Marine mammals have been recorded commuting and foraging within the Liffey Estuary Lower, in the vicinity of the Proposed Scheme. During the construction phase of the proposed DPTOB, there will be an increase of vessels

in the vicinity. According to the Marine Mammal Risk Assessment (IWDG 2020) prepared for the Proposed Scheme, the risk of injury and mortality is considered extremely low as marine mammals in Dublin Harbour are exposed to considerable vessel traffic on a daily basis and would be aware of their presence. Therefore, it is not likely that the Proposed Scheme will result in pose a significant collision risk for marine mammals in Dublin Bay. Therefore, there will not be a significant effect on marine mammals, at any geographic scale.

12.4.3.4.4.3 Disturbance / Displacement

Marine mammals have been recorded commuting and foraging within the Liffey Estuary Lower, in the vicinity of the Proposed Scheme. The construction methodology for the proposed DPTOB and the proposed boardwalks involves noisy activities in the aquatic environment such as piling, and noise from additional vessels associated with the construction period. The Marine Mammal Risk Assessment (IWDG 2020) prepared for the Proposed Scheme states that in the absence of mitigation, prolonged exposure to pile installation could lead to TTS and behavioural disturbance in marine mammals. Therefore, there is potential for the Proposed Scheme to result in a significant negative impact on marine mammal populations at a local to international geographic scale during the Construction Phase.

Mitigation measures have been designed to prevent disturbance / displacement of marine mammals during construction (see Section 12.5.1)

12.4.3.4.4.4 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).

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 effect, the availability of suitable habitat in the Liffey Estuary Lower and Dublin Bay.

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

12.4.3.4.5 Other Mammals

The field surveys and desk study did not return records for any other terrestrial mammal species protected under the Wildlife Acts in the vicinity of the Proposed Scheme. However, it is considered possible that populations of small mammals such as pygmy shrew *Sorex minutus* and hedgehog *Erinaceus europaeus* could be present in the vicinity.

12.4.3.4.5.1 Habitat Loss

The construction of the Proposed Scheme will result in the permanent loss of 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, 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 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, and 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 generally be undertaken during normal daylight working hours where practicable and 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 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 Appropriate Assessment for the purposes of Article 6(3) of the Habitats Directive) considered the potential for the Proposed Scheme to affect the breeding bird species listed as SCIs of a range of SPAs discussed in Section 12.4.3.1.1. That assessment concluded that the Proposed Scheme would not significantly 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 adverse effect on the integrity of the 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 potential breeding bird nesting and foraging habitat across the footprint of the Proposed Scheme (in the form of tree and habitat loss and quay wall obstruction). The areas of habitat loss within the Proposed Scheme boundary are provided in Section 12.4.3.2 and tabulated in Table 12.14 for all KER habitat types. These areas include hedgerows, tree lines scattered trees and parkland habitats. In addition, there are areas of scrub, ornamental / non-native shrub, amenity grassland and dry meadows and grassy verges habitats within the footprint of the Proposed Scheme, which are not KERs in their own right due to their limited botanical value. However, these may provide nesting and / or foraging habitat for birds. There will also be habitat loss / obstruction of suitable quay wall habitat at the proposed DPTOB and the proposed boardwalk locations. These areas will be obscured during construction of the Proposed Scheme resulting in an additional temporary loss of breeding bird nesting and / or foraging habitat. In summary, the habitats that may be lost comprise:

- Tree line habitat located along the North and South Quays;
- Scattered trees and parkland, and amenity grassland located along the proposed cycle lane adjacent to Ringsend Park and Irishtown Stadium;
- Amenity grassland and scattered trees and parkland habitat located at the proposed DPTOB;
- Suitable loafing and foraging habitat for waterbirds at the proposed DPTOB; and
- Potential black guillemot and sand martin habitat at the proposed DPTOB and the proposed pedestrian boardwalk locations.

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 many unquantifiable factors such as future land use changes and 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 (such as peregrine falcon, which hunt within 2km of the nest site) habitat loss at the scale of the Proposed Scheme is not likely to have any perceptible effects on breeding success or population dynamics, at any geographic scale.

The habitat areas that will be lost as a result of the Proposed Scheme, in particular those areas located from the proposed cycle lane at Ringsend Park and extending southwards near Irishtown Stadium and connecting green spaces, form a relatively small part of larger expanses of similar habitat types and mosaics in the wider locality. Parks and green spaces 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 0.3km to 2km from these existing sites located within the footprint of the Proposed Scheme) include:

- Parks and green spaces with hedgerow, tree line and / or scrub boundaries such as Ringsend Park, Sean Moore Park, and Irishtown Nature Reserve;
- Wildfowl and waterbird habitat within the wider Dublin Bay area such as Tolka Estuary, Bull Island, Booterstown Marsh and Sandymount Strand; and,
- Sea walls, piers, and jetties across the wider Dublin Port.

Several waterbird species were recorded loafing and foraging in the vicinity of the proposed DPTOB, during vantage point surveys. The reclamation of 3,950m² of land adjacent to the Tom Clarke East Link Bridge during construction will result in the removal of habitat suitable to support breeding waterbird species. The area of land reclamation is relatively small in comparison to the area of suitable habitat present in the vicinity of the Proposed Scheme. Therefore, it is not likely that the reclamation of land to facilitate the Proposed Scheme will result in significant habitat loss for breeding waterbird species. The proposed DPTOB will have two piers in the waterbody (constructed within a cofferdam) and will have a partial opening section for vessel movements but should not result in habitat loss or fragmentation as waterbirds will still be able to use the majority of the aquatic environment around the bridge. Waterbirds present in the vicinity of the Proposed Scheme successfully navigate around bridges, cranes, and other structures in the Liffey Estuary Lower daily. Habitat loss arising from the Proposed Scheme is not considered to constitute a significant decline in the extent of available habitat or result in significant habitat fragmentation.

The proposed DPTOB and boardwalk structures will permanently remove potential habitat for birds that nest within crevices in the quay walls (i.e. black guillemot and sand martin). Black guillemots are known to breed within the study area of the Proposed Scheme and the wider area of Dublin Port (RPS, 2019). The area subject to direct habitat loss forms a relatively small part of larger expanses of similar habitat types in the wider locality of Dublin Port (i.e., Alexandra Basin (East and West), oil and ferry berths, North Quay extension, and Poolbeg Marina).

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 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 Habitat and Food Source 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 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 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 water quality during construction (see Section 12.5.1)

12.4.3.5.1.3 Direct Injury / Mortality

If site clearance works were to be undertaken during the breeding bird season (i.e. March to August, inclusive) it is likely that nest sites holding eggs or chicks would be destroyed or abandoned 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 probably have a short-term effect on local breeding bird population abundance. If the Construction Phase for the proposed Dodder Bridge section of the Proposed Scheme were to be undertaken during the breeding bird season it is likely that nest sites holding eggs or chicks would be destroyed and birds killed. Mortality of birds may result in a short to medium term impact on black guillemot and kingfisher, as construction of the bridge is likely to last more than one breeding bird season.

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, other than for black guillemots for which there would be a likely significant negative effect, at a County geographic scale.

Breeding bird species have been recorded foraging and loafing in the vicinity of the proposed DPTOB during surveys. Considering the location of the Proposed Scheme on the Liffey Estuary Lower and the presence of bird species in the vicinity of the Proposed Scheme, there is potential for injury / mortality of small numbers of bird species as a result of collision arising from the construction of the proposed DPTOB. The main causes of bird collisions with man-made structures are considered to be invisibility, particularly at night; deception caused by glazing in buildings; and confusion, caused by light refracted or reflected by mist (Jaroslow 1979).

During the Construction Phase a collision risk may arise from the presence of construction machinery required for the construction of the bridge such as mobile cranes and cherry pickers. Machinery will be operated over the water from the Construction Compounds present at Sir John Rogerson's Quay/Britain Quay and Thorncastle Street, representing a new obstacle for bird species which forage and loaf in this area. Breeding bird species present are likely to be habituated to navigating Dublin City Centre. However, given the lattice structures and mobility of cranes and cherry pickers, it is considered that they may pose a collision risk to birds, particularly at night and in adverse weather conditions. Given that these species are habituated to the urban environment, it is not considered that the collision risk associated with construction machinery will cause a significant effect on bird populations in the vicinity of the Proposed Scheme. However, to minimise any potential impacts, mitigation measures during periods of low visibility have been proposed to avoid any potential collision risk of birds with construction machinery.

12.4.3.5.1.4 Disturbance / Displacement

The noise, vibration, increased human presence and the visual deterrent of construction traffic associated with site clearance and construction will temporarily 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 in addition to the construction of the proposed DPTOB and demolition of the existing SPRC building, boardwalks, and removal and reinstallation of Scherzer bridges. Areas of suitable habitat for breeding birds in the vicinity include the quay walls, Ringsend Park, Sean Moore Park, and roadside planting. However, there is an existing relatively high level of human disturbance within the immediate environment of the Proposed Scheme (i.e., the Quays, R131 (Toll Bridge Road), and Ringsend residential 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 affect than piling, in terms of its Zol, but will be on-going for the duration of the Construction Phase, including breeding seasons.

Although it is not possible to quantify the magnitude of this potential impact (or the potential effect zone) with precision, it could potentially extend for several hundred metres from the Proposed Scheme. The results of noise assessment carried out for the Proposed Scheme confirmed that at 150m, noise levels for general 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 negative effect, above the local geographic scale.

Noisy works associated with the construction of the Proposed Scheme include piling associated with the proposed DPTOB, construction of proposed boardwalks, removal and reinstallation of the Scherzer Bridges, and the demolition of the existing SPRC building. Noise and disturbance levels as a result of bridge construction are predicted to be a maximum of 90dB at 10m from the Proposed Scheme. At 100m from the Proposed Scheme, the majority of noise produced as a result of the construction of the proposed DPTOB Bridge will be below the 70dB threshold. At 250m, all predicted noise levels will be below the 60dB threshold, with the exception of Sheet Piling Rigs and Breakers During Demolition and Approach Structure Works, which will be 62dB. As such, the majority of disturbance is predicted to occur within 150m of the Proposed Scheme, and moderate disturbance for breeding bird species is estimated to reach 250m from the Proposed Scheme (See Chapter 9 (Noise & Vibration)). The temporary, short-term, disturbance within this area forms a relatively small part of larger expanses of similar habitat types in the wider locality of Dublin Port (i.e. Alexandra Basin (East and West), oil and ferry berths, North Quay extension, and Poolbeg Marina). Disturbance effects associated with the construction of the Proposed Scheme at these locations is influenced by piling construction methodologies due to noise and vibration impacts, piling is estimated to occur intermittently over a 6 month period (See Chapter 5 (Construction)). As such, associated disturbance / displacement impacts are short term, and are unlikely result in a likely significant negative effect, higher than a local geographic scale.

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 of European sites for their wintering populations. As set out in the NIS, that assessment concluded that 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 any European sites.

12.4.3.5.2.1 Habitat Loss

The Proposed Scheme will result in the temporary loss of GA2 and WD5 habitat (see Table 12.14) habitat suitable to support breeding gull and wintering bird species at wintering bird sites (referred to as CBC0016WB001; CBC0016WB002; CBC0016WB003).

The loss of suitable GA2 and WD5 habitat is not considered to have a significant impact on the wintering bird population at any geographical scale due to the following reasons:

- The absence or low frequency of occurrence of these SCI bird species recorded on lands located within the footprint of the Proposed Scheme, signifying that these species do not regularly use or rely upon these lands as foraging and/or roosting habitat, and are likely to use other suitable sites available in the wider area on a similar or more regular basis; and
- The existing pedestrian footpath at Ringsend Park will be extended to facilitate the proposed cycleway resulting in permanent habitat loss. This habitat loss is not deemed to be significant as it is removing a minor section at the edge of the existing path.

Wintering bird species in the vicinity of the Proposed Scheme have been designated have been recorded loafing and foraging in the vicinity of the proposed Dodder Public Transportation Opening Bridge, during vantage point surveys. The reclamation of land to facilitate the Proposed Scheme will result in the removal of 3,950m² of aquatic habitat suitable to support these species. However, no significant effects will occur on any wintering bird species populations, in light of their conservation objectives, as a consequence of loss or fragmentation of foraging / loafing aquatic habitat due to the following reasons:

- There are extensive areas of suitable foraging and loafing habitat in the Liffey Estuary Lower and wider Dublin Bay area. The area of proposed land reclamation (3,950m²) will only result in the loss of a small area of suitable foraging/loafing habitat relative to the surrounding environment and is not anticipated to significantly reduce the habitat available to wintering bird species; and
- The availability of large areas of suitable marine foraging and / or loafing habitat for these SCI bird species in the wider locality of the Proposed Scheme, including areas in closer proximity to the relevant SPAs.

12.4.3.5.2.2 Habitat and Food Source 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 wintering 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 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 water quality during construction (see Section 12.5.1)

12.4.3.5.2.3 Disturbance / Displacement

A temporary 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 footprint and/or the vicinity of the Proposed Scheme.

Assessment of construction related noise disturbance to wintering waterbirds is based on the research presented in *Construction and Waterfowl: Defining Sensitivity, Response, Impacts and Guidance* by Cutts *et al.* (2009) and *Exploring Behavioural Responses of Shorebirds to Impulsive Noise* by 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 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 (BSI 2008) are generally below 60dB or, in most cases, are approaching the 50dB threshold.

As discussed in Section 12.4.3.5.1.4, the results of the noise assessment 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)). At 250m, all predicted noise levels from construction works at the proposed DPTOB, boardwalks, Scherzer Bridges, and the demolition of the existing SPRC building will be below the 60dB threshold, with the exception of Sheet Piling Rigs and Breakers During Demolition and Approach Structure Works, which will be 62dB. As such, the majority of disturbance is predicted to occur within 150m of the Proposed Scheme, and moderate disturbance for breeding bird species is estimated to reach 250m from the Proposed Scheme (See Chapter 9 (Noise & Vibration)). 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.

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 be minimal. 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). Following the completion of construction, disturbance levels will likely return to baseline conditions and as a result these lands will become available again as foraging and / or roosting habitat for these wintering bird species.

There are 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 0.3km to 2km from these existing sites located within the footprint of the Proposed Scheme) including:

- Parks and green spaces such as the Shelbourne Park Dog Track, Fairview Park, Irishtown Nature Park and Portmarnock playing pitches; 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.

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, above the local level.

12.4.3.5.2.4 Mortality Risk

Wintering bird species have been recorded foraging and loafing in the vicinity of the proposed DPTOB during surveys. Considering the location of the Proposed Scheme on the Liffey Estuary Lower and the presence of wintering bird species in the vicinity of the Proposed Scheme, there is potential for injury / mortality of small numbers of bird species as a result of collision arising from the construction of the proposed DPTOB. The main causes of bird collisions with man-made structures are considered to be invisibility, particularly at night; deception caused by glazing in buildings; and confusion, caused by light refracted or reflected by mist (Jaroslaw 1979).

During the Construction Phase a collision risk may arise from the presence of construction machinery required for the construction of the bridge such as mobile cranes and cherry pickers. Machinery will be operated over the water from the site compounds present at Sir John Rogerson's Quay / Britain Quay and Thorncastle Street, representing a new obstacle for bird species which forage and loaf in this area. Wintering bird species present are likely to be habituated to navigating Dublin City Centre. However, given the lattice structures and mobility of cranes and cherry pickers, it is considered that they may pose a collision risk to birds, particularly at night and in adverse weather conditions. Given that these species are habituated to the urban environment, it is not considered that the collision risk associated with construction machinery will cause a significant effect on bird populations in the vicinity of the Proposed Scheme. However, to minimise any potential impacts, mitigation measures have been proposed to avoid any potential collision risk of birds with construction machinery.

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 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 study 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

There is no potential for habitat severance / barrier effect as a result of the Proposed Scheme as there is no suitable habitat for reptile species within the footprint of the Proposed Scheme.

12.4.3.7 Amphibians

There were no amphibian species recorded during the multidisciplinary surveys carried out along the Proposed Scheme. However, the desk study returned records for common frog within 2km of the Proposed Scheme. Therefore, it cannot be ruled out that these species are not in the wider study area.

12.4.3.7.1 Disturbance and Mortality Risk

Site clearance and / or construction works in areas within, or adjacent to, suitable amphibian habitat, have the potential to result in disturbance to, and the direct mortality of amphibians. Given the relatively small area of

potentially suitable habitat for amphibians in the study area and its immediate locality, the number of individuals that would potentially be at risk is considered to be low. Therefore, potential impacts arising from increased disturbance or mortality risk are not likely to affect the local populations of any amphibian species in the long-term nor their conservation status and as such there is no potential for a likely significant negative effect, above the local geographic scale.

12.4.3.7.2 Habitat Severance / Barrier Effect

The temporary to short-term physical disruption of the existing landscape during site clearance and construction will fragment the 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

The Proposed Scheme will result in the permanent loss of instream fisheries habitat as a result of the construction of the proposed DPTOB and the proposed pedestrian boardwalk at DCC Docklands Offices at Custom House Quay. A cofferdam will be temporarily present during the construction phase of the proposed DPTOB which will reduce the area of tidal rivers habitat (CW2). Additionally, the reclamation of 3,950m² and the construction of two columns/piers in the waterbody will result in the permanent loss of fisheries habitat. However, fisheries surveys carried out for the Proposed Scheme (see Appendix 12.1 in Volume 4 of this EIAR) found that fish were present in low species numbers and low numbers of specimens. The site of the proposed DPTOB has been classified as being at the lower end of moderate or low fisheries value due to high levels of leaf litter incorporated into the sediment along with discarded cans and other anthropogenic derived litter and anoxic sediments. The proposed pedestrian boardwalk at Custom House Quay will involve the installation of three no. steel piles which will not result in significant loss of fisheries habitat.

As this site is limited in terms of its fisheries value, the loss of instream habitat within this water body is not considered to result in a likely significant effect above the local geographic scale.

12.4.3.8.2 Habitat Degradation – Surface 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 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 River Dodder, Liffey Estuary Upper and Liffey Estuary Lower are known to support populations of Atlantic salmon. Furthermore, the River Liffey is recognised as a highly significant regional salmonid catchment for species of Atlantic salmon. As such, habitat degradation, as a result of effects on surface water quality on the Liffey Estuary Lower during construction, has the potential to result in a likely significant effect at the County level on salmonid species.

River lampreys are known to occur in the River Dodder, Liffey Estuary Upper and Liffey Estuary Lower, as outlined in the desk study. Suitable lamprey habitat occurs in upstream sections of the River Dodder, approximately 15km upstream of the Proposed Scheme. 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 County level on lamprey species, given the habitat value present and their protection under the Habitats Directive.

The results of the desk study revealed that European eel is known to occur in the River Dodder. 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 County level on eel, given the presence of suitable habitat and declining trend of European 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).

12.4.3.8.3 Disturbance / Displacement

Fish can be sensitive to noise and vibration, and noisy construction activities in the water could cause avoidance reactions and possibly delay fish migration. These works include the construction of the proposed DPTOB, and the installation of the boardwalks at North Wall Quay and DCC Docklands Offices at Custom House Quay. There have been very few studies on the effects of anthropogenic sounds on the behaviour of wild fish although a number of studies have investigated the response of caged fish to noise output, particularly relating to pile driving. As outlined in the Aquafact reports in Appendix 12.1 in Volume 4 of this EIAR, it has been demonstrated that Atlantic salmon and eel species are not sensitive to noise due to their mechanism of hearing, and it has been demonstrated that these species do not display avoidance behaviour in response to noise produced by piling. It has also been demonstrated that river lamprey are not a sensitive species to noise.

Although wild fish may respond differently to noise compared to captured fish, it is probable that the construction phase of the proposed Dodder Bridge and the proposed boardwalks will have a minimal impact on the resident or migratory fish entering the Liffey Estuary Lower and the River Dodder. Additionally, the construction phase of the proposed DPTOB (approximately 30 months) and proposed boardwalks will be a short-term operation and any increase in noise levels will also be short-term.

The construction of the proposed DPTOB and the boardwalks will likely result in the displacement of other non-migratory fish species from the area. Long-term disturbance / displacement effects on the local fish populations are not likely given the short-term nature of construction works (approximately 30 months for the proposed DPTOB) (which if carried out during normal working hours, would be of a limited duration each day) and that no confirmed or potential spawning grounds are present at any of proposed watercourse crossing points. Disturbance/displacement during construction is not predicted to affect the conservation status of the local non-migratory fish populations and therefore, will not result in a likely significant negative effect, at any geographic scale.

12.4.3.8.4 Habitat Severance / Barrier Effect

The Proposed Scheme will result in the direct loss of suitable habitat as a result of estuary reclamation to facilitate the proposed Dodder Bridge. The Proposed Scheme will result in the reclamation of 3,950m² of land adjacent to the Tom Clarke East Link Bridge during construction. The area of land reclamation is relatively small in comparison to the area of suitable habitat present in the vicinity of the Proposed Scheme. Therefore, it is not likely that the reclamation of land to facilitate the Proposed Scheme will result in significant habitat loss for fish. The proposed Dodder Public Transportation Bridge will have two piers in the waterbody (constructed within a cofferdam) and will have a partial opening section for vessel movements but should not result in loss or fragmentation of habitat as fish will still be able to use the majority of the aquatic environs around the bridge. Fish species present in the vicinity of the Proposed Scheme are likely habituated to navigating around existing bridges and structures. Habitat loss arising from the Proposed Scheme would not constitute a significant decline in the extent of available habitat and will not affect the local fish population's ability to maintain itself, even in the short-term.

12.4.3.8.5 Direct Injury / Mortality

During the construction phase of the proposed Dodder Public Transportation Bridge, and the proposed boardwalks there will be an increase of vessels in the vicinity. The risk of injury and mortality is considered extremely low as fish in the Liffey Estuary Lower and the confluence of the River Dodder are exposed to considerable vessel traffic on a daily basis and are therefore considered to be habituated to it. Therefore, it is not likely that vessels present during the construction phase of the Proposed Scheme will result in pose a significant injury / mortality risk to fish species.

During the erection of the cofferdam there is a risk that fish may become trapped within. Therefore, there is potential for the construction of the cofferdam to result in significant injury / mortality effects at an international geographic scale for Atlantic salmon, a national geographic scale for lamprey species and European eel, and at

a local geographic scale for all other fish species, including brown trout. Mitigation measures have been designed to reduce the risk of injury / mortality of fish. (see Section 12.5.1).

12.4.3.9 Summary of Construction Impacts

Table 12.15: 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 to national 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 to national geographic scale
Howth Head SAC Howth Head pNHA	International Importance National Importance	Habitat Degradation (hydrology)	Likely significant effect at the international to national geographic scale
Rockabill to Dalkey Island SAC Dalkey Coastal Zone and Killiney Hill pNHA	International Importance National Importance	Habitat Degradation (hydrology); Disturbance and Displacement	Likely significant effect at the international to national geographic scale
Lambay Island SAC Lambay Island pNHA	International Importance National Importance	Habitat Degradation (hydrology); Disturbance and Displacement	Likely significant effect at the international to national geographic scale
Wicklow Mountains SAC	International Importance	Habitat Degradation (hydrology); Disturbance and Displacement	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 Boosterstown Marsh pNHA	International Importance National Importance National Importance National Importance National Importance	Habitat Degradation (hydrology non-native invasive plant species); Disturbance and Displacement; Injury and Mortality	Likely significant effect at the international to national geographic scale
Baldoyle Bay SPA Baldoyle Bay pNHA	International Importance National Importance	Habitat Degradation (hydrology); Injury and Mortality	Likely significant effect at the international to national geographic scale
North Bull Island SPA North Dublin Bay pNHA	International Importance National Importance	Habitat Degradation (hydrology; non-native species); Injury and Mortality	Likely significant effect at the international to national geographic scale
Malahide Estuary SPA Malahide Estuary pNHA	International Importance National Importance	Habitat Degradation (hydrology); Injury and Mortality	Likely significant effect at the international to national geographic scale
Ireland's Eye SPA Ireland's Eye pNHA	International Importance National Importance	Habitat Degradation (hydrology); Injury and Mortality	Likely significant effect at the international to national geographic scale
Howth Head Coast SPA Howth Head pNHA	International Importance National Importance	Habitat Degradation (hydrology); Injury and Mortality	Likely significant effect at the international to national geographic scale
Rogerstown Estuary SPA Portraine Shore pNHA Rogerstown pNHA	International Importance National Importance National Importance	Habitat Degradation (hydrology); Injury and Mortality	Likely significant effect at the international to national geographic scale
Lambay Island SPA Lambay Island pNHA	International Importance National Importance	Habitat Degradation (hydrology); Injury and Mortality	Likely significant effect at the international to national geographic scale
Dalkey Island SPA Dalkey Coastal Zone and Killiney Hill pNHA	International Importance National Importance	Habitat Degradation (hydrology); Disturbance and Displacement; Injury and Mortality	Likely significant effect at the international to national geographic scale

Ecological Receptor	Ecological Valuation	Potential Impacts	Potential Significance
Skerries Islands SPA Skerries Islands NHA	International Importance National Importance	Habitat Degradation (hydrology); Disturbance and Displacement; Injury and Mortality	Likely significant effect at the international to national geographic scale
The Murrough SPA The Murrough pNHA	International Importance National Importance	Habitat Degradation (hydrology); Injury and Mortality	Likely significant effect at the international to national geographic scale
Rockabill SPA Rockabill Island pNHA	International Importance National Importance	Habitat Degradation (hydrology); Injury and Mortality	Likely significant effect at the international to national geographic scale
Wicklow Mountains SPA	International Importance	Injury and Mortality	Likely significant effect at the international geographic scale
The Grand Canal pNHA	National Importance	Habitat Degradation (hydrology; non-native invasive plant species; air quality)	Likely significant effect at the national geographic scale
Royal 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)			
Tidal Rivers (CW2) (corresponding to Annex I Estuaries [1130])	National Importance	Habitat Loss; Habitat Degradation (hydrology)	Likely significant effect at the county geographic scale
Mud sand shores (LS4) (corresponding to Annex I habitat mudflats and sandflats not covered by sea water at low tide (1140))	National Importance	Habitat Loss; Habitat Degradation (hydrology; non-native invasive plant species)	Likely significant effect at the county geographic scale
Canals (FW3)	National Importance	<i>See Grand Canal pNHA and Royal Canal pNHA above</i>	<i>See Grand Canal pNHA and Royal Canal pNHA above</i>
Scattered trees and parkland (WD5)	Local Importance (Higher Value)	Habitat loss	Likely significant effect at the local geographic scale
Hedgerows (WL1)	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
Non-native invasive plant species	N/A	Spread at expense of other Habitats, Habitat Degradation (hydrology)	Likely significant effect at the local to International geographic scale
Rare / Protected Plant Species			
Flora Species listed on the Flora Protection Order	Local Importance (Higher Value)	Habitat Degradation (hydrology)	Likely significant effect at the national geographic scale
Flora Species on Irelands Red Lists (Vulnerable or of higher concern concern)	Local Importance (Higher Value)	Habitat Degradation (hydrology)	Likely significant effect at the local geographic scale
Fauna Species			
Bats	Local Importance (Higher Value)	Habitat Loss / Fragmentation; Disturbance / Displacement	Likely significant effect at the local geographic scale
Badger	Local Importance (Higher Value)	Disturbance / Displacement	Likely significant effect at the local geographic scale
Otter	International Importance	<i>See Wicklow Mountains SAC above</i>	<i>See Wicklow Mountains SAC above</i>
Other mammal species protected under the Wildlife Acts	Local Importance (Higher Value)	Disturbance / Displacement; Habitat degradation (hydrology)	Likely significant effect at the local geographic scale

Ecological Receptor	Ecological Valuation	Potential Impacts	Potential Significance
Marine mammals (Annex I species of nearby SACs)	International Importance	<i>See Rockabill to Dalkey Island SAC and Lambay Island SAC above</i>	<i>See Rockabill to Dalkey Island SAC and Lambay Island SAC above</i>
Marine mammals (Non-SAC population species))	County Importance	Habitat Degradation (hydrology); Disturbance / Displacement;	Likely significant effect at the local geographic scale
SCI bird species	International Importance	<i>See SPAs above</i>	<i>See SPAs above</i>
Kingfisher	County Importance	Mortality risk; Disturbance / Displacement; Habitat Degradation (hydrology)	Likely significant effect at the local to county geographic scale
Black Guillemot	County Importance	Habitat Loss; Mortality risk; Disturbance / Displacement; Habitat Degradation (hydrology)	Likely significant effect at the local to county geographic scale
All other breeding bird species (non-SPA populations)	Local Importance (Higher Value)	Habitat Loss; Mortality risk; Disturbance / Displacement; Habitat Degradation (hydrology)	Likely significant effect at the local geographic scale
All other wintering bird species (non-SPA populations)	Local Importance (Higher Value)	Habitat Loss; Mortality risk; Disturbance / Displacement; Habitat Degradation (hydrology)	Likely significant effect at the local geographic scale
Amphibians	Local Importance (Higher Value)	Disturbance / Mortality Risk	Likely significant effect at the local geographic scale
European eel / Lamprey / Atlantic Salmon	County Importance	Habitat Degradation (hydrology); Direct injury / Mortality	Likely significant effect at the local to county geographic scale
All other fish	Local importance (Higher Value)	Habitat Degradation (hydrology); Direct injury / Mortality	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 Natura Impact Statement (NIS).

Refer to Section 12.4.3.1.1 with regards to potential operational impacts on QI mammals and SCI wintering bird species.

12.4.4.1.1.2 Habitat degradation / effects on QI / SCI species as a result of hydrological impacts

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 localized suspended solids; and
- The accidental spillage and/or leaks of containments into receiving waters.

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, i.e., Dublin Bay, within which European sites are located: North Dublin Bay SAC, South Dublin Bay SAC, Howth Head SAC, Rockabill to Dalkey Island SAC, North Bull Island SPA, South Dublin Bay and River Tolka Estuary SPA and Dalkey Islands SPA. 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 and River Tolka Estuary SPA and Dalkey Islands SPA are 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 SCI bird species and QI mammal species that commute, forage and loaf in Dublin Port i.e. birds associated with Howth Head SPA, Skerries Islands SPA, Rockabill SPA and Lambay Island SPA, Ireland's Eye SPA, North Dublin Bay SPA, South Dublin Bay and River Tolka Estuary SPA, Malahide Estuary SPA, Rogerstown SPA, Dalkey Islands SPA, Murrough SPA, marine mammals associated with Rockabill to Dalkey Island SAC and Lambay Island SAC and the otter population associated with the Wicklow Mountains 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 within downstream 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 and QI populations.

12.4.4.1.1.3 Habitat degradation as a result of hydrogeological impacts

Long-term discharge of surface water runoff to groundwater during operation of the Proposed Scheme may result in a reduction in groundwater quality and / or quantity in the receiving environment, also resulting in the degradation of groundwater dependent terrestrial ecosystem and any species that they may support.

The potential for hydrogeological impacts are highly variable depending on the nature of the proposed works at specific locations and the receiving environment ground conditions. The unmitigated hydrogeological Zol of the Proposed Scheme is not considered to extend to any groundwater dependent terrestrial ecosystems linked to European sites. This Zol follows the professional judgement of the design team hydrogeology specialists. Given that there are no groundwater dependent terrestrial ecosystems associated with European sites within the hydrogeological Zol, there is no potential for the Proposed Scheme to result in habitat degradation of the qualifying/ special conservation interest species of any European site as a result of hydrogeological impacts and there is therefore no potential for in-combination effects to occur in that regard.

12.4.4.1.1.4 Habitat degradation as a result of introducing / spreading non-native invasive species

In the absence of mitigation, there is potential for these 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 considered unlikely that invasive species could spread to European sites which are located a significant distance from the outfall locations of the Liffey Estuary Lower (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 qualifying / special conservation interest species of European sites located in Dublin Bay 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.

12.4.4.1.1.5 Habitat degradation as a result of air quality impacts

The nearest European site is South Dublin Bay and River Tolka Estuary SPA located approximately 486m from the Proposed Scheme, whilst South Dublin Bay SAC is located approximately 455m away and therefore not

located within the Zol of this potential impact, which is a considered to be a maximum of 200m from the proposed works (NRA 2011). Therefore there is no potential for the Proposed Scheme to result in habitat degradation of the qualifying/ special conservation interest species of any European site as a result of air quality impacts and there is therefore no potential for in-combination effects to occur in that regard.

12.4.4.1.1.6 Disturbance and displacement impacts

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 may have a negative effect on SCI / QI species in the locality including marine mammals, otter, and breeding and wintering birds. However, the Operational Phase is not considered to result in significant changes to existing noise levels due to the urban locality of the Proposed Scheme as an existing transport route.

Additionally, the proposed DPTOB will not result in any increase in shipping traffic during the Operational Phase. Owing to this, QI / SCI fauna populations 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.

12.4.4.1.1.7 Direct injury / mortality impacts

Considering the location of the Proposed Scheme on the Liffey Estuary Lower, in close proximity to the SPAs present in Dublin Bay, there is potential for the proposed Dodder Public Transportation Bridge to present a collision risk to mobile SCI species which are present in the area, during the operational phase.

SCI bird species for which SPAs in the Dublin area have been designated have been recorded in the vicinity of the proposed Dodder Public Transportation Bridge, on amenity grassland areas and loafing / feeding at the River Dodder confluence. Additionally, the proposed DPTOB has been designed to be highly visible and avoid the use of features that are a potential hazard to birds. The main crossing spans and the handrails will be horizontal and comprised of steel. No structures generally considered hazardous to birds, such as pylons and cables, are included in the design of this bridge. Therefore, there will be no significant injury / mortality risk to SCI tern species as a result of the Proposed Scheme.

Otter which may be associated with the QI population of the Wicklow Mountains SAC have been recorded in the vicinity of the Proposed Scheme. Vehicular and vessel traffic associated with the operational phase of the Proposed Scheme is not likely to result in significant injury/mortality risk to QI otter populations as otter present in the vicinity of the Proposed Scheme are habituated to existing traffic and shipping levels in the vicinity of the Proposed Scheme.

12.4.4.1.2 NHAs and pNHAs

The potential impacts on European sites arising from the Proposed Scheme, outlined in Section 12.4.3.1.1, may also negatively affect the NHA and pNHA sites, which are located within the boundaries of European sites and designated for similar reasons. 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. With the exception of Air Quality impacts to the Grand Canal pNHA and the Royal Canal pNHA that are discussed below, where biodiversity receptors in these NHA 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 NHA and pNHA sites would result in a likely negligible to minor negative effect at a national geographic scale.

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 12.4.3.1.2.1 and also within Chapter 7 (Air Quality).

Vehicle-derived air emissions were modelled during the Operation Phase of the Proposed Scheme at Booterstown Marsh and the Grand Canal pNHA proposed crossing points (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 30µg/m³ limit value. In all cases where exceedances occur, the baseline environment is already in excess of this value. In the case of the Royal Canal pNHA crossing point (North Wall Quay), the modelled future baseline environment is already in excess of this value and emissions stay in excess reduce of this critical level at >200m from the Proposed Scheme, the pNHA experiences an overall increase in Operational Phase emissions by 23% as a result of the Proposed Scheme. The contribution of the Proposed Scheme to nitrogen deposition levels has been compared to the lower and higher critical loads for habitats associated with the Royal Canal pNHA, including Canals (FW3), Dry Meadow / Grassy Verges (GS2), Reed and Large Sedge Swamps (FS1) and Tall-herb Swamps (FS2). Dry deposition rates will be above the lower critical load of inland and surface water habitats of 5-10 Kg(N)/ha/yr (National Road Authority 2011) however will already in excess of this value in the future baseline. The contribution to the NO₂ dry deposition rate at this site will decrease by 6% during the Operation Phase of the Proposed Scheme. As such, significant effects on the Royal Canal pNHA as a result of the Operational Phase of the Proposed Scheme are not considered likely.

At the Proposed Dodder Bridge modelling site at the Grand Canal pNHA, emissions are modelled reduce during the Operational Phase of the Proposed Scheme, in addition to MacMahon Bridge. Increases in NO_x due to traffic redistribution effects are modelled at Handover Quay, the pNHA experiences an overall increase in Operational Phase emissions by 23% as a result of the Proposed Scheme. The contribution of the Operation Phase of the Proposed Scheme to the NO₂ dry deposition rate was modelled at the Grand Canal pNHA. Nitrogen deposition levels have been compared to the lower and higher critical loads for habitats associated with the Grand Canal pNHA, including Canals (FW3), Dry Meadow / Grassy Verges (GS2), Reed and Large Sedge Swamps (FS1) and Tall-herb Swamps (FS2). The majority of sites are below the lower critical load of inland and surface water habitats of 5-10 Kg(N)/ha/yr (National Road Authority, 2011). There is one modelled locations where the lower critical load of 5 Kg(N)/ha/yr is exceeded (MacMahon Bridge). NO₂ dry deposition rates are modelled to be in excess of this value without the construction of the Proposed Scheme. The Operation Phase of the Proposed Scheme is modelled to decrease this value by a 3%. As such, significant effects on the Grand Canal pNHA as a result of the Operational Phase of the Proposed Scheme are not considered likely.

The prediction is based on conservative assumptions regarding background pollutant concentrations and the improvement in vehicle emission rates. 2019 background pollutant concentrations have been used to represent the 2028 baseline, although those concentrations are likely to be lower by the opening year than in 2019. To ensure a robust assessment, older fleet projections were used in the absence of a future fleet that incorporates the effects of 2021 Climate Action Plan measures – a larger proportion of electric vehicles is planned by the opening year than has been modelled. In reality, total concentrations (and magnitude of change) are likely to be lower than those reported here. (refer to Section 7.4.5 of Chapter 7 (Air Quality) for further details).

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 Liffey Estuary Lower and Ringsend WWTP, before ultimately draining to Dublin Bay. All drainage outfall discharges to surface waters represent point discharges. For the Proposed Scheme, there will be a net increase of 9038m² in the impermeable area ultimately discharging to Dublin Bay. This increase in impermeable area will be being managed for the Proposed Scheme through a combination of, permeable paving, and oversized pipes. Where no new paved areas are proposed, the existing drainage network will be retained and utilised (see Chapter 4 (Proposed Scheme Description) and Chapter 13 (Water) for more detail on drainage design).

The inclusion of Sustainable drainage systems (SuDS) will attenuate the 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 the Dodder_050, Liffey Estuary Lower, Liffey Estuary Upper, Grand Canal or Royal Canal, 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 Dublin Bay coastal water body could also be affected. This is considered 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 – Hydrological Regime

Changes in the flow regime due to increased surface water runoff or discharges, in new locations, could result in changes to sedimentation processes and the structure of riverbanks. Hydro Environmental Ltd. Were commissioned by ROD to carry out a hydrodynamic modelling study of the proposed DPTOB (Hydro Environmental Ltd. 2021). The purpose of this study was to predict the potential change in flow velocities within the River Liffey and to assess the impact of the proposed bridge on bed morphology due to changes to the sediment transport regime.

The hydrodynamic modelling shows that the proposed bridge will have very localized effects on the tidal velocities immediately adjacent to the proposed bridge and in the immediate vicinity of the Tom Clarke East Link Bridge with slightly increased velocities though the opening of the bridges on the ebbing tide and flooding tides. These velocity increases will result in local increases in potential silt localized on in the vicinity of the bridges; however, they will not result in any significant change in the potential silt mobility factor downstream towards Dublin Port. This is likely to give rise to some potential local scouring along the eastern bank of the Dodder_050 as a result of deflection of flow by the proposed bascule pier. The effect of this is restricted to the immediate vicinity of the proposed bridge and western and northern side of the Rowing Club Site. These flood events are rare and short lived and will result in only localized changes to the potential scouring pattern with no significant morphological impacts identified downstream.

The overall conclusion reached is that the proposed DPTOB will not give rise to significant hydrodynamic or morphological changes in the Liffey reach downstream of the Tom Clarke East Link Bridge (See Appendix A13.3 in Volume 4 of this EIAR for the full assessment).

12.4.4.2.3 Habitat Degradation – Groundwater

The operation of the Proposed Scheme could lead to the occasional accidental leakage of oil, petrol, or diesel, from vehicles allowing for the possible contamination of hydrogeological features. However, there is a low likelihood of a significant spillage associated with the operation of the Proposed Scheme when compared to the 'Do Nothing' scenario (see Chapter 14 (Land, Soils, Geology & Hydrogeology)). As such, no significant effects are predicted.

12.4.4.2.4 Habitat Degradation – Shading

The addition of the proposed Dodder Bridge and proposed boardwalks at North Wall Quay and DCC Docklands Offices at Custom House Quay will have some level of shading effect on the habitats beneath during operation. Shading effects 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 over tidal rivers and canals is minor and is not considered to be significant. No likely significant effect as a consequence of habitat degradation is predicted.

Habitat Degradation – Non-Native Invasive Plant Species

No non-native invasive plant species listed on the Third Schedule of the European Communities (Birds and Natural Habitats) Regulations, 2011 were identified along the Proposed Scheme, during field surveys undertaken. However, the desktop study revealed records for several non-native invasive species within 1km of the Proposed Scheme. Given the presence of non-native invasive plant species in the vicinity of the Proposed Scheme, there is the potential that these species will recolonize vegetated areas within the proposed development boundary

post-construction. As such, there is a risk that routine maintenance works may inadvertently spread contaminated vegetation cuttings. The effects of introducing such non-native invasive plant species to highly sensitive and ecologically important habitat areas (e.g., designated areas for nature conservation or areas of Annex I habitat) have the potential to result in a significant negative effect, at geographic scales ranging from local to international.

Mitigation measures have been designed to avoid this potential impact (see Section 12.5.2)

12.4.4.2.5 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 from the Proposed Scheme (refer to Chapter 7 (Air Quality) for details). The results from the Air Quality modelling deem the Proposed Scheme overall neutral 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 – Surface Water Quality

No protected plant species listed on the Flora Protection Order 2015 were recorded within the footprint of the Proposed Scheme. There will be no discharges to the Royal Canal or Grand Canal during the Operational Phase of the Proposed Scheme and therefore there is no potential for negative effects on opposite-leaved pondweed or whorled water-milfoil to occur.

There will be no permanent loss of this habitat and therefore there is no potential for direct impacts on this species to occur as a consequence of the Proposed Scheme.

12.4.4.4 Mammals

12.4.4.4.1 Bats

12.4.4.4.1.1 Barrier / Severance Effects

Barrier / Severance effects are restricted to the proposed DPTOB as the remainder of the Proposed Scheme related to the upgrade of existing infrastructure. The proposed DPTOB, during operation, will not result in habitat severance or a barrier effect to populations of bat species, which will still be able to utilise the aquatic environs surrounding the bridge for commuting and foraging purposes. Therefore, the impact of habitat severance / barrier effects on otter, as a result of the Proposed Scheme, are not considered to be significant at any geographic scale

12.4.4.4.1.2 Indirect Disturbance of Flight Patterns Due to Operational Lighting

Bat activity was recorded during field surveys. 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 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 environment of the Proposed Scheme, and the fact that artificial lighting is already present along the footprint of the Proposed Scheme, the effects of displacement as a result of increased artificial lighting along existing road networks are not considered to be significant at any geographic scale. This is because the lighting strategy involves the use and upgrade 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.

In areas where new lighting is proposed in previously dark / low lighting areas, e.g., at the proposed DPTOB, and the cycle track along the western boundary of Ringsend Park), there may be disruption to potential commuting foraging routes for bat species. Examination of light spill modelling has identified potential light spill impacts on bats. As outlined in Chapter 5 of this EIAR, lighting design at the proposed DPTOB will need to allow for permanent navigational lighting requirements, therefore disrupting foraging and / commuting routes along the Lower Liffey

Estuary and Dodder_050. These will not be present along the entire length of the bridge, however is likely to disrupt flight paths where present.

However, considering that surrounding roads are already artificially lit, it is expected that bats utilising these areas would be habituated to some degree of artificial lighting. Bat species encountered during surveys undertaken included Leisler's bat, common pipistrelle, soprano pipistrelle, and unidentified pipistrelle species. Leisler's bat and pipistrelle species are more tolerant of artificial light than other slow flying species (including *Myotis* species) (ILP 2018). The increase in artificial light levels within the corridor of the Proposed Scheme, and its immediate surroundings, could potentially result in a reduction in the quality of foraging habitat available to local populations of bats. Therefore, the overall effect of artificial lighting on bats during operation is considered to be significant at the local level only.

There are no roosts that will be directly illuminated by the proposed operational lighting to the extent that any likely significant effects are predicted.

Mitigation to avoid light spill are detailed in Section 12.5.2.

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 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, consists 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 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 will result in the introduction of artificial lighting to previously unlit areas at the proposed Dodder Bridge, the proposed cycle track along the southern boundary of Ringsend Park and the proposed cycle track to the south of Irishtown Stadium.

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. Previously unlit areas which provide suitable habitat, which will be artificially lit as a result of the Proposed Scheme, include the proposed cycle track along the western boundary of Ringsend Park and the proposed cycle track to the south of Irishtown Stadium.

Disturbance or displacement associated with the operation of the Proposed Scheme is not likely to result in a likely significant negative effect, at any geographic scale.

12.4.4.4.3 Otter

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, consists of upgrading existing infrastructure, the effect of habitat severance /barrier effects 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 DPTOB is the only proposed additional infrastructure relevant to otter, given its location downstream of the confluence of the Dodder_050, and Liffey Estuary Lower. The proposed DPTOB, during the Operation Phase, will not result in habitat severance or a barrier effect to populations of local otter, which will still be able to utilise the aquatic environs surrounding the bridge for commuting and foraging purposes. Therefore, the impact of habitat severance / barrier effects on otter, as a result of the Proposed Scheme, are not considered to be significant at any geographic scale.

12.4.4.4.3.2 Disturbance / Displacement

Any increased level of disturbance associated with the operation of the Proposed Scheme is extremely unlikely to result in any perceptible disturbance / displacement of otter from their habitat.

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 corridor, including along the North and South Quays and the proposed Dodder Bridge crossing. 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. Previously unlit areas, which will be artificially lit as a result of the Proposed Scheme include the proposed Dodder Bridge, the proposed cycle track along the western boundary of Ringsend Park and the proposed cycle track to the south of Irishtown Stadium. Of these, the proposed DPTOB crossing is the only area, which is likely to be used by otter, given its location downstream of the confluence between the Dodder_050 and the Liffey Estuary Lower.

Disturbance or displacement associated with the Operational Phase of the Proposed Scheme is not likely to affect the conservation status of otter and therefore, will not result in a likely 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 under Habitat Degradation – Surface Water Quality, 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 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 the Operation Phase. This is because the Proposed Scheme is largely focused on upgrading existing infrastructure, for which mortality risk already exists. The proposed DPTOB is not considered to pose a risk to the mortality of the local otter

population. 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 Habitat Loss

The Proposed Scheme will result in the loss of estuarine habitat, which will be reclaimed in order to accommodate the construction of the proposed Dodder Bridge. During operation this will result in a decrease in foraging / commuting habitat for marine mammals who frequent the Liffey Estuary Lower. However, given the abundance of estuarine habitat locally, the impact on marine mammals is not considered significant at any geographic scale.

12.4.4.4.4.2 Surface Water Quality Impacts and Prey Abundance

As discussed in Section 12.4.4.2.1 under Habitat Degradation – Surface Water Quality, 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 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 otter across the wider environment, as demonstrated in the results of the desk study.

12.4.4.4.5 Other Mammals

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, consists of upgrading existing infrastructure, the effect of habitat severance / barrier effects on mammals is not considered to be significant at any geographic scale. The existing infrastructure itself acts as a barrier to 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 mammals during operation. This is because the Proposed Scheme is largely focused on upgrading existing infrastructure, for which mortality risk 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 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 established breeding and foraging areas (Rich and Longcore 2005). Although the majority of the Proposed Scheme corridor is already lit artificially, the proposal will result in the introduction of artificial lighting to previously unlit areas at the proposed DPTOB, the proposed cycle track along the southern boundary of Ringsend Park and the proposed cycle track to the south of Irishtown Stadium.

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. Previously unlit areas which provide

suitable habitat, which will be artificially lit as a result of the Proposed Scheme, include the proposed cycle track / pedestrian walkway along the southern boundary of Ringsend Park and to the south of Irishtown Stadium.

Disturbance or displacement associated with the Operation Phase of the Proposed Scheme is not likely to result in a likely significant negative effect, at any geographic scale.

12.4.4.5 Birds

12.4.4.5.1 Breeding Birds

The assessment carried out in the NIS for the Proposed Scheme (standalone document provided within the planning application) considered the potential for the Proposed Scheme to affect the bird species listed as SCIs of European sites, and in particular South Dublin Bay and Rive Tolka Estuary SPA which in places occurs along the Proposed Scheme. The 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 any adverse effects on the integrity of European sites.

12.4.4.5.1.1 Surface Water Quality Impacts and Prey Abundance

As discussed in Section 12.4.4.2.1 under Habitat Degradation – Surface Water Quality, 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 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 otter across the wider environment, as demonstrated in the results of the desk study.

12.4.4.5.1.2 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 is 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.

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.

Disturbance effects on breeding birds will most likely be of greater impact at Ringsend Park and in the vicinity of the new structures including the proposed Dodder Bridge and the proposed boardwalks than the remainder of the Proposed Scheme. The provision of new infrastructure is likely to result in increased human presence in these

areas. This is likely to result in the displacement of nesting birds in Ringsend Park and black guillemot and sand martin from the quay walls immediately surrounding the proposed structures. The area of increased disturbance forms a relatively small part of larger expanses of similar habitat in parks in Dublin City Centre and along the Liffey Estuary Upper, Liffey Estuary Lower, River Dodder, the Royal Canal, and the Grand Canal. It is therefore considered that there may be significant effects at a local geographic scale, until such a time that they have established new nesting sites.

12.4.4.5.1.3 Direct Injury / Mortality

Breeding bird species have been recorded foraging and loafing in the vicinity of the proposed Dodder Public Transportation Bridge during surveys. Considering the location of the Proposed Scheme on the Liffey Estuary Lower and the presence of breeding bird species in the vicinity of the Proposed Scheme, there is potential for injury / mortality of small numbers of breeding bird species as a result of collision arising from the positioning of the proposed DPTOB. The main causes of bird collisions with man-made structures are considered to be invisibility, particularly at night; deception caused by glazing in buildings; and confusion, caused by light refracted or reflected by mist (Jaroslow 1979).

Literature available on bridges over wetlands (Oresund Bridge and Sabo Bridge cable-stay and bowstring structures, respectively) suggest that such bridges present a relatively low collision risk to waterbirds and that in these studies mortality occurred at such low numbers that it did not represent more than a minor effect on bird populations (FEBI 2013; Godinho *et al.* 2017). To put these studies into context, approximately 10 million migrant birds pass the Oresund Bridge during autumn migration and 27,000 bird movements (approximately 83% aquatic birds) were recorded crossing the Sabo Bridge during 400 hours of observation, suggesting that bridges over wetlands present a relatively low collision risk to waterbirds. In addition, both of the Oresund Bridge and Sabo Bridge are cable-stay and bowstring structures and pose a greater collision risk than the proposed clear span bridge over the River Dodder / River Liffey confluence in Dublin City Centre.

Birds present in the vicinity of the Proposed Scheme successfully navigate around cranes / container lifting machinery present in Dublin Port and bridges present in the Liffey Estuary Lower daily. There have been no known reports of bird species colliding with the Tom Clarke East Link Bridge, an opening bridge which is adjacent to the Proposed Scheme, or machinery associated with Dublin Port. Additionally, the proposed DPTOB has been designed to be highly visible and avoid the use of features that are a potential hazard to birds. The main crossing spans and the handrails will be horizontal and comprised of steel. No structures generally considered hazardous to birds, such as pylons and cables, are included in the design of this bridge. Therefore, there will be no significant injury/mortality risk to breeding bird species as a result of the Proposed Scheme.

12.4.4.5.2 Wintering Birds

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 of European sites for their wintering populations. As set out in the NIS, that assessment concluded that 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 any European sites

12.4.4.5.2.1 Disturbance / Displacement

During the Operation Phase, the Proposed Scheme has the potential to disturb and displace wintering bird species from habitats 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 is 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.

The lifting of the proposed DPTOB is not likely to cause significant disturbance effects as it will not be lifted regularly and any noise / visual disturbance produced will be brief. The bridge has been designed for an average of 70 operations (an operation being defined as one open-and-close cycle) per year, a maximum of four operations per day, with availability every day of the year, and a maximum short-term frequency of two operations per hour. Additionally, wintering birds present in the vicinity of the Proposed Scheme will be habituated to disturbance arising from the lifting of the adjacent Tom Clarke East Link Bridge. Most species of wintering birds are likely to habituate to the increased traffic flows and human presence along cycle tracks etc. Any displacement of birds from habitat areas during the operation of the Proposed Scheme could be expected to be temporary during these incidents.

12.4.4.5.2.2 Direct Injury / Mortality

Wintering bird species have been recorded foraging and loafing in the vicinity of the proposed Dodder Public Transportation Bridge during surveys. Considering the location of the Proposed Scheme on the Liffey Estuary Lower and the presence of wintering bird species in the vicinity of the Proposed Scheme, there is potential for injury / mortality of small numbers of wintering bird species as a result of collision arising from the positioning of the proposed DPTOB. The main causes of bird collisions with man-made structures are considered to be invisibility, particularly at night; deception caused by glazing in buildings; and confusion, caused by light refracted or reflected by mist (Jaroslow 1979).

Literature available on bridges over wetlands (Oresund Bridge and Sabo Bridge cable-stay and bowstring structures, respectively) suggest that such bridges present a relatively low collision risk to waterbirds and that in these studies mortality occurred at such low numbers that it did not represent more than a minor effect on bird populations (FEBI, 2013; Godinho *et al.* 2017). To put these studies into context, approximately 10 million migrant birds pass the Oresund Bridge during autumn migration and 27,000 bird movements (approximately 83% aquatic birds) were recorded crossing the Sabo Bridge during 400 hours of observation, suggesting that bridges over wetlands present a relatively low collision risk to waterbirds. In addition, both of the Oresund Bridge and Sabo Bridge are cable-stay and bowstring structures and pose a greater collision risk than the proposed clear span bridge over the Liffey Estuary Lower in Dublin City Centre.

Birds present in the vicinity of the Proposed Scheme successfully navigate around cranes/container lifting machinery present in Dublin Port and bridges present in the Liffey Estuary Lower daily. There have been no known reports of bird species colliding with the Tom Clarke East Link Bridge, an opening bridge which is adjacent to the Proposed Scheme or machinery associated with Dublin Port. Additionally, the proposed Dodder Public Transportation Bridge has been designed to avoid the use of features that are a potential hazard to birds. The bridge parapets will be transparent however, they will be broken up at regular intervals by steel posts which increases the visibility of the bridge to birds. The main crossing spans and the handrails will be horizontal and comprised of steel. No structures generally considered hazardous to birds, such as pylons and cables, are included in the design of this bridge. Therefore, there will be no significant injury/mortality risk to wintering bird species as a result of the Proposed Scheme.

12.4.4.5.2.3 Surface Water Quality Impacts and Prey Abundance

As discussed in Section 12.4.4.2.1 under Habitat Degradation – Surface Water Quality, 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 wintering 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 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 otter across the wider environment, as demonstrated in the results of the desk study.

12.4.4.6 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 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 study area.

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, consists of upgrading existing infrastructure, the effect of habitat severance / barrier effects on Common Lizard 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.

12.4.4.6.2 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, for which mortality risk 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

There were no amphibian species recorded during the multidisciplinary surveys carried out along the Proposed Scheme. The desk study did not return records for amphibian species protected under the Wildlife Acts within the footprint of the Proposed Scheme. However, it cannot be ruled out that these species are not in the wider study area. There is potential for suitable habitats to develop within the footprint of the Proposed Scheme, for example during periods of heavy rain.

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, consists of upgrading existing infrastructure, the effect of habitat severance / barrier effects 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, for which mortality risk 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

It is possible that during operation, particularly in times of heavy precipitation, runoff at the local scale could simply discharge to the nearest watercourse / drainage ditch, which may support populations of amphibian species.

Therefore, there is a risk that discharges from the Proposed Scheme, including harmful compounds such as hydrocarbons, heavy metals and particulate matter, could affect water quality in the receiving waters, potentially over the long-term, and consequently impact upon the aquatic habitats and amphibian species in the vicinity, if present. As discharge to nearby watercourses / drainage ditches is only likely to happen during periods of heavy precipitation, this is likely to result in a temporary impact at the local geographic scale.

Habitat degradation because of effects on surface water during operation are not predicted to affect the conservation status of amphibian species and will therefore, not result in a likely significant negative effect, at any geographic scale.

12.4.4.8 Fish

12.4.4.8.1 Habitat Degradation – Surface Water

As discussed in Section 12.4.4.2.1 under Habitat Degradation – Surface Water Quality, 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 fish 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 fish 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 fish in the wider vicinity and the relative abundance of otter across the wider environment, as demonstrated in the results of the desk study.

12.4.4.8.2 Habitat Severance / Barrier Effect

The proposed Dodder Bridge has been designed in consultation with Inland Fisheries Ireland (IFI) and the design criteria set out in Guidelines for the Crossing of Watercourses during the Construction of National Road Schemes (NRA 2008c) 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 Summary of Operational Impacts

Table 12.16: 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 to national 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 to national geographic scale
Howth Head SAC Howth Head pNHA	International Importance National Importance	Habitat Degradation (hydrology)	Likely significant effect at the international to national 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 to national geographic scale
Lambay Island SAC Lambay Island pNHA	International Importance National Importance	Habitat Degradation (hydrology)	Likely significant effect at the international to national geographic scale
Wicklow Mountains SAC	International 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 Booterstown Marsh pNHA	International Importance National Importance National Importance National Importance	Habitat Degradation (hydrology; non-native invasive plant species)	Likely significant effect at the international to national geographic scale
Baldoyle Bay SPA Baldoyle Bay pNHA	International Importance National Importance	Habitat Degradation (hydrology)	Likely significant effect at the international to national 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 to national geographic scale
Malahide Estuary SPA Malahide Estuary pNHA	International Importance National Importance	Habitat Degradation (hydrology)	Likely significant effect at the international to national geographic scale
Ireland's Eye SPA Ireland's Eye pNHA	International Importance National Importance	Habitat Degradation (hydrology)	Likely significant effect at the international to national geographic scale
Howth Head Coast SPA Howth Head pNHA	International Importance National Importance	Habitat Degradation (hydrology)	Likely significant effect at the international to national geographic scale
Rogerstown Estuary SPA Portraine Shore pNHA Rogerstown pNHA	International Importance National Importance National Importance	Habitat Degradation (hydrology)	Likely significant effect at the international to national geographic scale
Lambay Island SPA Lambay Island pNHA	International Importance National Importance	Habitat Degradation (hydrology)	Likely significant effect at the international to national 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 to national geographic scale
Skerries Islands SPA Skerries Islands NHA	International Importance National Importance	Habitat Degradation (hydrology)	Likely significant effect at the international to national geographic scale
The Murrrough SPA The Murrrough pNHA	International Importance National Importance	Habitat Degradation (hydrology)	Likely significant effect at the international to national geographic scale

Ecological Receptor	Ecological Valuation	Potential Impacts	Potential Significance
Rockabill SPA Rockabill Island pNHA	International Importance National Importance	Habitat Degradation (hydrology)	Likely significant effect at the international to national geographic scale
Wicklow Mountains SPA	International Importance	N/A	N/A
The Grand Canal pNHA	National Importance	Habitat Degradation (hydrology; non-native invasive plant species; air quality)	Likely significant effect at the national geographic scale
Royal 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)			
Tidal Rivers (CW2) (corresponding to Annex I Estuaries [1130])	National Importance	Habitat Loss (see detail under construction impacts); Habitat Degradation (hydrology)	Likely significant effect at the county geographic scale
Mud sand shores (LS4) (corresponding to Annex I habitat mudflats and sandflats not covered by sea water at low tide (1140))	National Importance	Habitat Loss (see detail under construction impacts); Habitat Degradation (hydrology)	Likely significant effect at the county geographic scale
Canals (FW3)	National Importance	<i>See Grand Canal pNHA and Royal Canal pNHA above</i>	<i>See Grand Canal pNHA and Royal Canal pNHA above</i>
Scattered trees and parkland (WD5)	Local Importance (Higher Value)	Habitat loss (see detail under construction impacts)	Likely significant effect at the local geographic scale
Hedgerows (WL1)	Local Importance (Higher Value)	Habitat loss (see detail under construction impacts)	Likely significant effect at the local geographic scale
Treelines (WL2)	Local Importance (Higher Value)	Habitat loss (see detail under construction impacts)	Likely significant effect at the local geographic scale
Non-native invasive plant species	N/A	Spread at expense of other Habitats, Habitat Degradation (hydrology)	Likely significant effect at the local to International geographic scale
Rare / Protected Plant Species			
Flora Species listed on the Flora Protection Order	Local Importance (Higher Value)	Habitat Degradation (hydrology)	Likely significant effect at the national geographic scale
Flora Species on Irelands Red Lists (Vulnerable or of higher concern concern)	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	International Importance	<i>See Wicklow Mountains SAC above</i>	<i>See Wicklow Mountains SAC above</i>
Marine mammals (Annex I species of nearby SACs)	International Importance	<i>See Rockabill to Dalkey Island SAC and Lambay Island SAC above</i>	<i>See Rockabill to Dalkey Island SAC and Lambay Island SAC above</i>
Marine mammals (all other marine mammals)	County Importance	Habitat Degradation (hydrology)	Likely significant effect at the local geographic scale
SCI bird species	International Importance	<i>See SPAs above</i>	<i>See SPAs above</i>
Kingfisher	County Importance	Habitat Degradation (hydrology);	Likely significant effect at the local geographic scale

Ecological Receptor	Ecological Valuation	Potential Impacts	Potential Significance
		Disturbance	
Black Guillemot	County Importance	Habitat Degradation (hydrology); Disturbance	Likely significant effect at the local geographic scale
All other breeding bird species (non-SPA populations)	Local Importance (Higher Value)	Habitat Degradation (hydrology)	Likely significant effect at the local geographic scale
All other wintering bird species (non-SPA populations)	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
European eel / Lamprey / Atlantic Salmon	County Importance	Habitat Degradation (hydrology)	Likely significant effect at the local to county geographic scale
All other fish	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 licenses / consents required to conduct the work, and supervise and direct the 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 Zol are presented in the Natura Impacts Statement (NIS). Following a 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 reduce direct injury / mortality impacts during construction;
- Measures to reduce disturbance / displacement during construction;
- Measures to protect surface water quality during construction; and
- Measures to prevent the spread of 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 NHA and pNHAs within the Zol 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 and pNHAs at the national geographic scale.

The mitigation measures in relation to potential impacts arising from the Proposed Scheme on the Grand Canal pNHA and Royal Canal pNHA includes mitigation measures to address potential habitat degradation as a result of surface water quality effects and the spread of non-native invasive species, effects on rare and protected plant species, and negative effects on the protected fauna species associated with the sites such as mammals, riparian birds, and fish species.

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. scattered trees and parkland, tree line 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 will be implemented by the appointed contractor, shown as design mitigation, is listed below and displayed on the Landscaping General Arrangement drawings (BCIDC-ROD-ENV_LA-0016_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.

Excluding the loss of habitat within the Liffey Estuary Lower (tidal rivers (CW2) corresponding to Annex I estuaries [1130] and Mud sand shores (LS4) corresponding to Annex I habitat mudflats and sandflats not covered by sea water at low tide [1140]) which is not mitigated, in order to minimise the loss of local importance habitat, proposed planting incorporated into the Proposed Scheme will be implemented by the appointed contractor listed below and displayed on the Landscaping General Arrangement drawings in Volume 3 of this EIAR:

- 133 street trees planted;
- Approximately 211m² of proposed ornamental planting; and
- Approximately 1709m² of proposed amenity grassland planting.

12.5.1.2.2 Habitat Degradation – Groundwater

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

- The construction management of the site by the appointed contractor will take account of the recommendations of the CIRIA Guidance Control of Water Pollution from Construction Sites – Guidance for consultants and contractors (Masters Williams et al., 2001) to minimize as far as possible the risk of soil groundwater and surface water contamination; and,
- Measures to be implemented by the appointment contractor to minimise the risk of spills and contamination of soil and waters include:
 - Employing only competent and experienced workforce, and site specific training of site managers, foremen, and workforce, including all sub-contractors, 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 rill-over bund, raised kerb ramps or stepped access;
 - The location of any fuel storage facilities shall 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;
 - Potential pollutants to be adequately secured against vandalism;
 - Provision of proper containment of potential pollutants according to codes of best practice;
 - Thorough control during the entire Construction Phase to ensure that any spillage is identified at the earliest stage and subsequently effectively contained and managed; and,
 - Spill kits will be provided and kept close to the storage area. Staff to be trained on how to use spill kits correctly.

The mitigation measures to protect groundwater quantity and quality during the Construction Phase are also outlined in Chapter 14 (Land, Soils, Geology & Hydrogeology) and Appendix A5.1 in Volume 4 of this EIAR. This includes control measures for the excavation of potentially contaminated ground and the pollution of soil and groundwater.

12.5.1.2.3 Habitat Degradation – Surface Water Quality

In terms of mitigation, a Surface Water Management Plan (SWMP) has been prepared (provided in the CEMP, Appendix A5.1 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 of 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;
- Control of sediment;
- Use of concrete;
- Management of vehicles and plant including refuelling and wheel wash facilities (if necessary); and,
- Monitoring.

Specific mitigation measures which the appointed contractor will implement in relation to surface water quality at the Proposed DCC Docklands Offices boardwalk, Scherzer Bridges, and proposed DPTOB, are described in Chapter 13 (Water). These relate to the requirement of sheeting, installed prior to commencing works, to catch debris whilst working adjacent to water bodies, installation of silt fencing, and installation and dewatering methodologies around the use coffer dams during the construction of the proposed DPTOB.

Excavation material will be generated as a result of the construction of the proposed DPTOB, see Chapter 18 Waste for mitigation in relation to this.

12.5.1.2.4 Habitat Degradation – Air Quality

The mitigation measures to control dust emissions during the Construction Phase are 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 the Construction Compounds, water misting / spraying, vehicle coverings, and hoarding around the Construction Compounds.

12.5.1.2.5 Habitat Degradation – Non-Native Invasive Plant Species

During the interim between the original non-native invasive species surveys and commencement of construction, it is possible that newly established Third Schedule non-native invasive species may have become established within the footprint of the Proposed Scheme.

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 Plan 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 identifies newly established non-native invasive species within the footprint of the Proposed Scheme, the final non-native invasive species management plan produced will provide a detailed description of the infestations (e.g., approximate area of the respective colonies (m²), where feasible; approximate total number of stems, pattern of growth and information on other vegetation present), and where necessary, 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 Transport Infrastructure Ireland (2020a and 2020b) The management of

- Invasive Alien Plant species on National Roads – technical guidance; and standard, and other species-specific guidance documents including those listed in the draft ISMP, as necessary; and,
- The NTA will ensure that all control measures specified in the Proposed Scheme non-native ISMP shall be implemented by a suitably qualified and licenced specialist prior to the construction of the Proposed Scheme to control the spread of newly established 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 non-native ISMP.

12.5.1.3 Rare and Protected Plant Species

12.5.1.3.1 Habitat Degradation – Surface Water Quality

As discussed above in Section 12.5.1.2.3, in terms of mitigation, a Surface Water Management Plan (SWMP) has been prepared (provided in the CEMP, Appendix A5.1 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 Chapter 13 (Water).

12.5.1.4 Mammals

12.5.1.4.1 Bats

Bats are listed on Annex IV of the Habitats Directive and are therefore strictly protected under the Birds and Habitats Regulations. Bats, 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 bats or to wilfully interfere with or destroy their breeding or resting places.

12.5.1.4.1.1 Roost Loss

Although it is not considered that the SPRC building is suitable for roosting bats, mitigation is proposed as a precautionary measure that the structure will be surveyed immediately prior to demolition by a suitably qualified ecologist engaged by the appointed contractor to assess whether bats are present. A dusk and dawn survey will be completed on the night and morning immediately prior to the demolition of the structure. Where a bat roost is encountered as part of the pre-demolition survey, all relevant works will cease and an application for a derogation licence must be completed by the suitably qualified ecologist in liaison with the appointed contractor and submitted to the NPWS to permit removal of the roost.

12.5.1.4.1.2 Habitat Loss & 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 Landscaping General Arrangement drawings (BCIDD-ROT-ENV_LA-0016_XX_00-DR-LL-9001) in Volume 3 of this EIAR.

Planting of treeline and grassland habitats within the Proposed Scheme footprint will be carried out by the appointed contractor, as detailed in the landscape drawings which will provide suitable habitat for the bat species recorded within the study area (refer to the Landscaping General Arrangement drawings (BCIDD-ROT-ENV_LA-0016_XX_00-DR-LL-9001) in Volume 3 of this EIAR.

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.

12.5.1.4.1.3 Disturbance of Flight Patterns / Foraging Routes as a result of Lighting Impacts

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 and other areas 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;
- Accessories such as baffles, hoods or louvres can be used to reduce light spill and direct it only where needed; and
- 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 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 Guidelines for the Treatment of Badgers prior to the Construction of National Road Schemes (NRA, 2005b).

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 within the Liffey Estuary Lower, Dodder_050, Royal Canal, and Grand Canal, in the vicinity of the Proposed Scheme.

This section presents the mitigation measures that will be implemented during construction to avoid the potential impacts of the Proposed Scheme on QI otter populations associated with the Wicklow Mountains SAC. All of the mitigation measures will be implemented in full. They are in accordance with best practice, and tried and tested, effective control measures to protect otter.

12.5.1.4.3.1 Habitat Loss

The NTA will ensure that a confirmatory pre-construction check of all suitable otter habitat will be completed within 12 months prior to any construction works commencing. The presence of any new holt/couch or activity at the previously established holt site at MV Cill Airne 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 2006b).

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 2008c).

12.5.1.4.3.2 Habitat Degradation / Reduced Prey Availability- Water Quality

As discussed above in Section 12.5.1.2.3 a Surface Water Management Plan (SWMP) has been prepared (provided in the CEMP, Appendix A5.1 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 Chapter 13 (Water).

12.5.1.4.3.3 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 Guidelines for the Treatment of Otters Prior to the Construction of National Road Schemes (NRA 2008c).

The appointed contractor will engage a suitably qualified and/or licensed ecologist(s) to oversee and advise works at watercourse crossings/works.

- Where a new or reactivated holt is encountered, within 150 metres (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 2008) will be erected around the Construction Compounds and other working areas which are in close proximity to significant watercourses and have suitable roaming territory for otter.

12.5.1.4.3.4 Measures to Prevent Disturbance / Displacement

Where night time works are required adjacent to the Liffey Estuary Lower appointed contractor will liaise with the engaged suitably experienced and qualified ecologist(s) and implement measures to mitigate the impact of such works.

The Construction Compounds proposed to be established at Sir John Rogerson's Quay and Thorncastle Street will be surrounded by suitable fencing / hoarding fencing to exclude as far as is practical otter ingress into these areas. Where necessary, consideration of mammal-proof fencing as outlined in Guidelines for the Treatment of Otters Prior to the Construction of National Road Schemes (NRA 2008c) should be made and as advised by the ECoW after the pre-construction survey.

Mitigation for security lighting at Construction Compounds is discussed in Section 12.5.1.4.

12.5.1.5 Marine Mammals

Marine mammals have been recorded commuting and foraging within the Liffey Estuary Lower, in the vicinity of the Proposed Scheme.

12.5.1.5.1 Measures to manage the risk to marine mammals from man-made sound sources in Irish waters

Potentially, direct impacts on marine mammals may occur during piling and estuary reclamation if marine mammals are very close to the proposed construction site. This section presents the mitigation measures that will be implemented during construction and operation to avoid the potential impacts of the Proposed Scheme on marine mammals, as adapted from the Marine Mammal Risk Assessment (IWDG 2020) prepared for the Proposed Scheme (refer to Appendix 12.3 in Volume 4 of the EIAR). All of the mitigation measures will be implemented in full. They are in accordance with best practice, and tried and tested, effective control measures to protect marine mammals.

- A qualified and experienced marine mammal observer (MMO) (DAHG 2014) shall be appointed by the appointed contractor to monitor for marine mammals and to log all relevant events using standardised data forms (NPWS undated);
- Pile driving activity shall not commence if marine mammals are detected within a 1,000m radial distance of the pile driving sound source, i.e. within the Monitored Zone;
- Pile driving activities shall only commence in daylight hours where effective visual monitoring, as determined by the MMO, has been achieved. Where effective visual monitoring, as determined by the MMO, is not possible the sound-producing activities shall be postponed until effective visual monitoring is possible;
- An agreed and clear on-site communication signal must be used between the MMO and the appointed contractor as to whether the relevant activity may or may not proceed, or resume following a break. It shall only proceed on positive confirmation with the MMO;
- The MMO shall conduct pre-start-up constant effort monitoring at least 30 minutes before the sound-producing activity is due to commence. Sound-producing activity shall not commence until at least 30 minutes have elapsed with no marine mammals detected within the Monitored Zone by the MMO;
- The prescribed Pre-Start Monitoring shall subsequently be followed by an appropriate Ramp-Up Procedure which should include continued monitoring by the MMO;
- In commencing a pile driving or other noise generating operation where the output peak sound pressure level (in water) from any source including equipment testing exceeds 170 dB re: 1µPa @1m an appropriate Ramp-up Procedure (i.e. “soft-start”) must be used. The procedure for use should be informed by the risk assessment undertaken giving due consideration to the pile specification, the driving mechanism, the receiving substrate, the duration of the activity, the receiving environment and species therein, and other information;
- Where it is possible according to the operational parameters of the equipment and materials concerned, the underwater acoustic energy output shall commence from a lower energy start-up (i.e. a peak sound pressure level not exceeding 170 dB re: 1µPa @1m) and thereafter be allowed to gradually build up to the necessary maximum output over a period of 20-40 minutes;
- The controlled build-up of acoustic energy output shall occur in consistent stages to provide a steady and gradual increase over the ramp-up period;
- Where the measures outlined in steps above are not possible, alternatives must be examined whereby the underwater output of acoustic energy is introduced in a consistent, sequential and gradual manner over a period of 20-40 minutes prior to commencement of the full necessary output;
- In all cases where a Ramp-Up Procedure is employed the delay between the end of the ramp-up and the necessary full output must be minimised to prevent unnecessary high-level sound introduction into the environment;
- Once an appropriate and full Ramp-Up Procedure commences, there is no requirement to halt or discontinue the procedure at night-time (if permitted), nor if weather or visibility conditions deteriorate nor if marine mammals occur within a 1,000m radial distance of the sound source, i.e., within the Monitored Zone;
- If there is a break in pile driving sound output for a period greater than 30 minutes (e.g. due to equipment failure, shut-down or location change) then all Pre-Start Monitoring and a subsequent Ramp-up Procedure (where appropriate following Pre-Start Monitoring) must be undertaken; and
- For higher output pile driving operations which have the potential to produce injurious levels of underwater sound as informed by the associated risk assessment, there is likely to be a regulatory requirement to adopt shorter 5-10 minute break limit after which period all Pre-Start Monitoring and a subsequent Ramp-up Procedure (where appropriate following Pre-Start Monitoring) shall recommence as for start-up.

12.5.1.5.2 Habitat and Food Resource Degradation – Water Quality

As discussed above in Section 12.5.1.2.3, in terms of mitigation, a Surface Water Management Plan (SWMP) has been prepared (provided in the CEMP, Appendix A5.1 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 Chapter 13 (Water).

12.5.1.6 Other Mammals Species

No other protected 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 mammal 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 Breeding Birds

12.5.1.7.1 Habitat Loss, Loss of Breeding / Resting Sites

Protection of Vegetation

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-0016_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-0016_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.

Nesting Bird Checks

Where the proposed DPTOB and proposed boardwalk construction works are undertaken within the breeding bird season (March to June inclusive), a pre-construction check of suitable habitat for nesting birds will be carried out by a suitably qualified ecologist in advance of the breeding season (before 1st March) at the DCC Docklands Offices at Custom House Quay Boardwalk, the North Wall Quay Boardwalk, Royal Canal Scherzer Bridge, and the quay walls surrounding the proposed DPTOB.

Where it can be confirmed that there are no nesting birds present, the appointed contractor in liaison with the suitably qualified ecologist will securely attach a protective screening material (in the form of heavy duty closely woven mesh or equivalent) as necessary to areas of the quay walls that may be suitable for nesting sites, prior to the breeding bird season. The protective screening will remain in place until the construction works are completed after which it will be carefully removed by the contractor.

Only areas of suitable nesting habitat (e.g. the quay walls above the high water mark) where direct impacts will occur will need to be covered with the screening material. These areas have been identified as:

- Proposed North Wall Quay Boardwalk;
- Royal Canal Scherzer Bridge; and
- Suitable habitat of the quay walls at the proposed DPTOB site.

The area along Custom House Quay at which the proposed DCC Docklands Offices boardwalk is proposed is not considered to contain suitable nesting habitat due to the high levels of disturbance which are likely to be present there and the narrow body of water between the quay wall and the pontoon associated with The Jeanie Johnston. Therefore, no mitigation is required in relation to the works for this proposed boardwalk.

The mesh should be attached from the uppermost area of the quay wall such that it hangs down over the necessary sections. The mesh should be secured at the base to prevent it from blowing up during windy weather.

Should it not be feasible to install the protective screening material the following alternative mitigation measure will be implemented by the appointed contractor. The suitably qualified ecologist engaged by the contractor will undertake daily monitoring (3 hour surveys each morning) to confirm that no nests are present and to watch for signs of breeding birds in areas where direct impacts are likely to occur (e.g. quay walls at the locations of proposed new boardwalks and the immediate vicinity of the proposed Dodder Bridge), for the duration of works in these areas. Should any signs of breeding birds be detected within the works area, works in that area will have to cease immediately and will not be able to recommence until either the end of the breeding bird season or until all breeding birds are no longer using the area for breeding purposes (e.g. the young have fledged and have left the nest). Once works are completed the constant watch can be terminated.

Monitoring for Nesting Birds Prior to Construction

Sand martin have been recorded nesting in crevice's within the quay wall at the Convention Centre Dublin near to the proposed North Wall Quay boardwalk, which may be temporarily displaced during the Construction Phase of the Proposed Scheme. Similarly black guillemot have been recorded nesting within the north quay wall, approximately 100m north of the proposed DPTOB.

No observations of birds nesting within the quay walls at the proposed DPTOB, or proposed boardwalks have been recorded during breeding bird surveys. However, breeding behaviour of black guillemot and sand martin (i.e. adults carrying nesting material/food for juveniles) has been observed within the disturbance ZoI of the Proposed Scheme. As such, mitigation measures are required.

The NTA will ensure that a three year monitoring programme prior to the works is undertaken within breeding bird season to confirm if the quay walls at the proposed DPTOB and proposed boardwalks are used for breeding. Two years of these breeding bird surveys which form part of the three-year monitoring programme have already been completed at the time of EIAR data collection. These surveys have been recording breeding bird behaviour within the Proposed Scheme and its immediate vicinity.

A minimum of 10 temporary black guillemot and / or sand martin nesting boxes (unless otherwise advised by the suitably qualified ecologist based on the results of the 3-year monitoring programme) will be installed in the vicinity of the Tom Clarke East Link Bridge to provide alternative nesting sites for displaced birds during the Construction Phase – refer to Image 12.1 which shows examples of the type of nesting boxes that can be installed.

If breeding is recorded at the proposed boardwalks or proposed DPTOB, where there will be permanent habitat loss. 10 permanent nest boxes (such as Schwegler sand martin nest tunnel or Genesis black guillemot nest box), constructed from durable materials to ensure their longevity, will be installed in suitable locations, in order to allow birds to return to the area post construction. The appointed contractor in liaison with the suitably qualified ecologist will confirm suitable locations. Nest boxes must be located 2m above the high water mark. Examples of suitable locations may include appropriate areas of the quay walls, proposed boardwalks and / proposed DPTOB, and the Tom Clarke East Link Bridge, but ultimately the locations will be determined by the project ecologist in collaboration with the appointed contractor.

Monitoring of use of the prescribed bird boxes will take place annually, to check for nesting activity, and for three years post-completion of the Proposed Scheme. Monitoring will consist of visual checks by means of vantage point surveys to identify any breeding activity. Three monitoring surveys will be undertaken each year; the first survey will be undertaken in early April, the second in early May and the final survey in early June.

Plate 12-1 Example of Black Guillemot nest boxes successfully installed within Dublin Port



Photo Source: Richard Naim 2017

12.5.1.7.2 Direct Injury / Mortality

Prior to the Construction Phase of the Proposed Scheme, where practical, vegetation (e.g., hedgerows, trees, scrub, bankside vegetation and grassland) will not be removed, between the 01 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, then 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, works will resume when birds have fledged and nests are no longer in use, or an agreement is reached with NPWS.

During the Construction Phase of the Proposed Scheme, construction machinery, when not in use, such as cranes and cherry pickers will not overhang the aquatic environment. Where this measure cannot be implemented fully (i.e., due to health and safety issues), UV lighting or UV paint will be used on construction machinery to illuminate extendable parts (such as the arm of cranes) which may overhang the aquatic environment. The objective of this is to make these lattice structures more detectable for birds that may fly at dusk or at night. The UV decoys will be installed prior to the erection of construction machinery at night.

12.5.1.7.3 Habitat Degradation - Water Quality

As discussed above in Section 12.5.1.2.3, a Surface Water Management Plan (SWMP) has been prepared (provided in the CEMP, Appendix A5.1 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 Chapter 13 (Water).

12.5.1.8 Wintering Birds

12.5.1.8.1 Direct Injury / Mortality

As outlined in Section 12.5.1.7.2, construction machinery, when not in use, such as cranes and cherry pickers will not overhang the aquatic environment. Where this measure cannot be implemented fully (i.e., due to health and safety issues), UV lighting or UV paint will be used on construction machinery to illuminate extendable parts (such as the arm of cranes) which may overhang the aquatic environment. The objective of this is to make these lattice structures more detectable for birds that may fly at dusk or at night. The UV decoys will be installed prior to the erection of construction machinery at night.

12.5.1.8.2 Habitat Degradation - Water Quality

As discussed above in Section 12.5.1.2.3, a Surface Water Management Plan (SWMP) has been prepared (provided in the CEMP, Appendix A5.1 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 Chapter 13 (Water).

12.5.1.9 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 likely 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.

12.5.1.10 Amphibians

12.5.1.10.1 Habitat Loss, Disturbance and Mortality Risk

No amphibian species were recorded during the multi-disciplinary surveys carried out along the Proposed Scheme; however, some suitable amphibian breeding habitats were noted.

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 in 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 NPWS and removed from affected habitat by hand net and translocated to the nearest area of available suitable habitat, beyond the Zol 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 Zol 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 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.

12.5.1.11 Fish

12.5.1.11.1 Habitat Degradation – Surface Water Quality

As discussed above in Section 12.5.1.2.3, a Surface Water Management Plan (SWMP) has been prepared (provided in the CEMP, Appendix A5.1 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 Chapter 13 (Water).

12.5.1.11.2 Direct Injury / Mortality

There is a risk that fish may become trapped within cofferdams during their construction. In order to prevent the death of fish, they should be removed from the cofferdam during dewatering.

Where necessary, any fish that are present behind the coffer dam/sheet piles will be removed by the appointed contractor by the appropriate means in liaison with the suitably qualified ecologist before dewatering is complete. It is assumed any rescuing of fish would be done prior to this and that removal of any fish could be undertaken using, for example, a 'fish-friendly' pump would be used to ensure any that any fish that remain are not harmed. A suitably qualified licensed ecologist(s), engaged by the appointed contractor will ensure that this activity is undertaken in accordance with IFI requirements.

12.5.2 Operational Phase

12.5.2.1 Designated Areas for Natura 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 Zol are presented in the NIS. Following a 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 operation; and
- Measures to prevent the spread of 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 Zol 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 above in Section 12.5.1.2.1, and as detailed in the NIS (provided within planning application package), will prevent the Proposed Scheme resulting in a significant negative effect on these pNHAs at the national geographic scale.

The mitigation strategy in relation to potential impacts arising from the Proposed Scheme on the Royal Canal pNHA and the Grand Canal pNHA includes the spread of invasive species, and negative effects on the protected fauna species associated with the canal such as bats, otter and riparian birds.

12.5.2.2 Habitats

12.5.2.2.1 Habitat Degradation - Surface Water Quality

The proposed SuDS drainage system, as shown in Proposed Surface Water Drainage Works drawings (BCIDD-ROT-DNG_RD-0016_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 run-off from the increase in impermeable area will be managed for the Proposed Scheme by the appointed contractor through a combination of infiltration trenches, and oversized pipes. 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 (GDSDS 2005).

Once the Proposed Scheme is in operation, the Local Authorities will be required to implement a maintenance and inspection regime for SuDS which 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 local authorities will implement a maintenance and management regime subject to their management procedures, where any introduction of non-native invasive plant species will be managed. No additional mitigation is required.

12.5.2.3 Rare and Protected Plant Species

SuDS mitigation measures for the protection of surface water quality are detailed in Section 12.5.2.2.1.

12.5.2.4 Bats

12.5.2.4.1 Indirect Disturbance of Flight Patterns Due to Operational Lighting

Excess light spill from the Proposed Scheme may result in avoidance behaviour from bats within the vicinity of the Proposed Scheme. Where practical, operational lighting will be kept to a minimum and light spill avoided.

A total of two areas were identified within the footprint of the Proposed Scheme to involve the installation of additional lighting in previously dark / poor lighting areas i.e. Ringsend Park and at the proposed DPTOB.

Lighting mitigation has been built into the lighting design under the guidelines outlined in Section 4.1.1 of Chapter 4 in Volume 4 of the EIAR. The lighting design at Ringsend Park will ensure that light spill on the surrounding tree lines will be kept below one lux, with lux levels rising temporarily to a maximum of 5 where lighting sensors are triggered by human activity.

The proposed DPTOB lighting design will be developed at the detailed design stage the guidelines outlined in Section 4.1.1 of Chapter 4 in Volume 4 of the EIAR and in consultation with DCC. It will be ensured that where practical lighting is not focused onto areas of ecological sensitivity including onto the Liffey Estuary Lower and the lighting design provides for low levels of lateral light spillage to avoid unwanted areas of illumination. This will not fully mitigate the disruption to foraging / commuting due to additional navigation lighting requirements illuminating sections of the water level.

12.5.2.5 Badgers

There are no significant effects on badger predicted during the Operational Phase of the Proposed Scheme, therefore, no mitigation is required.

12.5.2.6 Otter

12.5.2.6.1 Habitat Degradation / Reduced Prey Availability – Water Quality

SuDS mitigation measures for the protection of surface water quality are detailed in Section 12.5.2.2.1.

12.5.2.7 Marine Mammals

12.5.2.7.1 Habitat Degradation / Reduced Prey Availability – Water Quality

SuDS mitigation measures for the protection of surface water quality are detailed in Section 12.5.2.2.1.

12.5.2.8 Other Mammals Species

There are no significant effects on other mammals predicted during the Operational Phase of the Proposed Scheme, therefore, no mitigation is required.

12.5.2.9 Breeding Birds

12.5.2.9.1 Habitat Degradation- Surface Water

SuDS mitigation measures for the protection of surface water quality are detailed in Section 12.5.2.2.1.

12.5.2.10 Wintering Birds

12.5.2.10.1 Habitat Degradation- Surface Water

SuDS mitigation measures for the protection of surface water quality are detailed in Section 12.5.2.2.1.

12.5.2.11 Reptiles

There are no significant effects on reptiles predicted during the Operational Phase of the Proposed Scheme, therefore, no mitigation is required.

12.5.2.12 Amphibians

There are no significant effects on amphibians predicted during the Operational Phase of the Proposed Scheme, therefore, no mitigation is required.

12.5.2.13 Fish

12.5.2.13.1 Habitat Degradation- Surface Water

SuDS mitigation measures for the protection of surface water quality are detailed in 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 result in a significant residual effect at the county scale on two KERs as identified in Table 12.13. However, with mitigation the majority of the remaining residual impacts are either not significant or significant at a local scale for

the Proposed Scheme on its own, or cumulatively together with other proposed developments during the Construction Phase. Table 12.17 summarises the Construction Phase residual impacts. Impacts on European sites are discussed fully in the accompanying NIS.

Table 12.17: Summary of Construction Phase Significant Residual Impacts

Ecological Receptor	Ecological Valuation	Potential Impacts	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 to national 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 to national geographic scale	No significant residual effect
Howth Head SAC Howth Head pNHA	International Importance National Importance	Habitat Degradation (hydrology)	Likely significant effect at the international to national 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); Disturbance and Displacement	Likely significant effect at the international to national geographic scale	No significant residual effect
Lambay Island SAC Lambay Island pNHA	International Importance National Importance	Habitat Degradation (hydrology); Disturbance and Displacement	Likely significant effect at the international to national geographic scale	No significant residual effect
Wicklow Mountains SAC	International Importance	Habitat Degradation (hydrology); Disturbance and Displacement	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 Boosterstown Marsh pNHA	International Importance National Importance National Importance National Importance	Habitat Degradation (hydrology); Disturbance and Displacement; Injury and Mortality	Likely significant effect at the international to national geographic scale	No significant residual effect
Baldoye Bay SPA Baldoye Bay pNHA	International Importance National Importance	Habitat Degradation (hydrology); Disturbance and Displacement; Injury and Mortality	Likely significant effect at the international to national geographic scale	No significant residual effect
North Bull Island SPA North Dublin Bay pNHA	International Importance National Importance	Habitat Degradation (hydrology; non-native species); Disturbance and Displacement; Injury and Mortality	Likely significant effect at the international to national geographic scale	No significant residual effect
Malahide Estuary SPA Malahide Estuary pNHA	International Importance National Importance	Habitat Degradation (hydrology); Disturbance and Displacement; Injury and Mortality	Likely significant effect at the international to national geographic scale	No significant residual effect
Ireland's Eye SPA Ireland's Eye pNHA	International Importance National Importance	Habitat Degradation (hydrology); Disturbance and Displacement; Injury and Mortality	Likely significant effect at the international to national geographic scale	No significant residual effect
Howth Head Coast SPA Howth Head pNHA	International Importance National Importance	Habitat Degradation (hydrology); Disturbance	Likely significant effect at the international to	No significant residual effect

Ecological Receptor	Ecological Valuation	Potential Impacts	Potential Significance	Significant Residual Impact (Post Mitigation and Monitoring)
		and Displacement; Injury and Mortality	national geographic scale	
Rogerstown Estuary SPA Portraine Shore pNHA Rogerstown pNHA	International Importance National Importance National Importance	Habitat Degradation (hydrology); Disturbance and Displacement; Injury and Mortality	Likely significant effect at the international to national geographic scale	No significant residual effect
Lambay Island SPA Lambay Island pNHA	International Importance National Importance	Habitat Degradation (hydrology); Disturbance and Displacement; Injury and Mortality	Likely significant effect at the international to national geographic scale	No significant residual effect
Dalkey Island SPA Dalkey Coastal Zone and Killiney Hill pNHA	International Importance National Importance	Habitat Degradation (hydrology); Disturbance and Displacement; Injury and Mortality	Likely significant effect at the international to national geographic scale	No significant residual effect
Skerries Islands SPA Skerries Islands NHA	International Importance National Importance	Habitat Degradation (hydrology); Disturbance and Displacement; Injury and Mortality	Likely significant effect at the international to national geographic scale	No significant residual effect
The Murrough SPA The Murrough pNHA	International Importance National Importance	Habitat Degradation (hydrology); Disturbance and Displacement; Injury and Mortality	Likely significant effect at the international to national geographic scale	No significant residual effect
Rockabill SPA Rockabill Island pNHA	International Importance National Importance	Habitat Degradation (hydrology); Disturbance and Displacement; Injury and Mortality	Likely significant effect at the international to national geographic scale	No significant residual effect
Wicklow Mountains SPA	International Importance	Injury and Mortality	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; air quality)	Likely significant effect at the national geographic scale	No significant residual effect
Royal Canal pNHA	National Importance	Habitat Degradation (hydrology; non-native invasive plant species; air quality)	Likely significant effect at the national geographic scale	No significant residual effect
Habitats (outside of designated areas for nature conservation)				
Tidal Rivers (CW2) (corresponding to Annex I Estuaries [1130])	National Importance	Habitat Loss; Habitat Degradation (hydrology)	Likely significant effect at the county geographic scale	Likely significant effect at the county geographic scale
Mud sand shores (LS4) (corresponding to Annex I habitat mudflats and sandflats not covered by sea water at low tide (1140))	National Importance	Habitat Loss; Habitat Degradation (hydrology; non-native invasive plant species)	Likely significant effect at the county geographic scale	Likely significant effect at the county geographic scale
Canals (FW3)	National Importance	<i>See Grand Canal pNHA and Royal Canal pNHA above</i>		
Scattered trees and parkland (WD5)	Local Importance (Higher Value)	Habitat loss	Likely significant effect at the local geographic scale	Likely significant effect at the local geographic scale
Hedgerows (WL1)	Local Importance (Higher Value)	Habitat loss	Likely significant effect at the local geographic scale	Likely significant effect at the local geographic scale
Treelines (WL2)	Local Importance (Higher Value)	Habitat loss	Likely significant effect at the local geographic scale	Likely significant effect at the local geographic scale

Ecological Receptor	Ecological Valuation	Potential Impacts	Potential Significance	Significant Residual Impact (Post Mitigation and Monitoring)
Rare / Protected Plant Species				
Flora Species listed on the Flora Protection Order	Local Importance (Higher Value)	Habitat Degradation (hydrology)	Likely significant effect at the national geographic scale	No significant residual effect
Flora Species on Irelands Red Lists (Vulnerable or of higher concern concern)	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)	Habitat Loss / Fragmentation; Disturbance / Displacement	Likely significant effect at the local geographic scale	No significant residual effect
Badger	Local Importance (Higher Value)	Disturbance / Displacement	Likely significant effect at the local geographic scale	No significant residual effect
Otter	International Importance	<i>See Wicklow Mountains SAC above</i>		
Other mammal species protected under the Wildlife Acts	Local Importance (Higher Value)	Disturbance / Displacement; Habitat Degradation (hydrology)	Likely significant effect at the local geographic scale	No significant residual effect
Marine mammals (Annex II species of nearby SACs)	International Importance	<i>See Rockabill to Dalkey Island SAC and Lambay Island SAC above</i>		
Marine mammals (Non-SAC population)	County Importance	Habitat Degradation (hydrology); Disturbance / Displacement;	Likely significant effect at the local geographic scale	No significant residual effect
SCI bird species	International Importance	<i>See SPAs above</i>		
Kingfisher	County Importance	Mortality risk; Disturbance / Displacement; Habitat Degradation (hydrology)	Likely significant effect at the local to county geographic scale	Likely significant effect at the local geographic scale
Black Guillemot	County Importance	Habitat Loss; Mortality risk; Disturbance / Displacement; Habitat Degradation (hydrology)	Likely significant effect at the local to county geographic scale	Likely significant effect at the local geographic scale
All other breeding bird species (non-SPA populations)	Local Importance (Higher Value)	Habitat Loss; Mortality risk; Disturbance / Displacement; Habitat Degradation (hydrology)	Likely significant effect at the local geographic scale	Likely significant effect at the local geographic scale
All other wintering bird species (non-SPA populations)	Local Importance (Higher Value)	Habitat Loss; Mortality risk; Disturbance / Displacement; Habitat Degradation (hydrology)	Likely significant effect at the local geographic scale	Likely significant effect at the local geographic scale
Amphibians	Local Importance (Higher Value)	Disturbance / Mortality Risk	Likely significant effect at the local geographic scale	No significant residual effect
European eel / Lamprey / Atlantic Salmon	County Importance	Habitat Degradation (hydrology)	Likely significant effect at the local to county geographic scale	No significant residual effect
All other fish	Local importance (Higher Value)	Habitat Degradation (hydrology)	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 result in a significant residual effect at the county scale on two KERs as identified in Table 12.13. However, with mitigation the majority of the remaining residual impacts are either not significant or significant at a local scale for the Proposed Scheme on its own, or cumulatively together with other proposed developments during the Operational Phase. Table 12.18 summarises the Operational Phase significant residual impacts. Impacts on European sites are discussed fully in the accompanying NIS.

Table 12.18: Summary of Operational Phase Significant Residual Impacts

Ecological Receptor	Ecological Valuation	Potential Impacts	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 to national 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 to national geographic scale	No significant residual effect
Howth Head SAC Howth Head pNHA	International Importance National Importance	Habitat Degradation (hydrology)	Likely significant effect at the international to national 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 to national 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 to national geographic scale	No significant residual effect
Wicklow Mountains SAC	International 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 Boosterstown Marsh pNHA	International Importance National Importance National Importance National Importance	Habitat Degradation (hydrology; non-native invasive plant species)	Likely significant effect at the international to national 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 to national geographic scale	No significant residual effect
North Bull Island SPA North Dublin Bay pNHA	International Importance National Importance	Habitat Degradation (hydrology)	Likely significant effect at the international to national 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 to national geographic scale	No significant residual effect

Ecological Receptor	Ecological Valuation	Potential Impacts	Potential Significance	Significant Residual Impact (Post Mitigation and Monitoring)
Ireland's Eye SPA Ireland's Eye pNHA	International Importance National Importance	Habitat Degradation (hydrology)	Likely significant effect at the international to national 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 to national 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 to national 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 to national geographic scale	No significant residual effect
Dalkey Island SPA Dalkey Coastal Zone and Killiney Hill pNHA	International Importance National Importance	Habitat Degradation (hydrology)	Likely significant effect at the international to national 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 to national 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 to national geographic scale	No significant residual effect
Rockabill SPA Rockabill Island pNHA	International Importance National Importance	Habitat Degradation (hydrology)	Likely significant effect at the international to national geographic scale	No significant residual effect
Wicklow Mountains SPA	International Importance	N/A	N/A	No significant residual effect
The Grand Canal pNHA	National Importance	Habitat Degradation (hydrology; non-native invasive plant species; air quality)	Likely significant effect at the national geographic scale	No significant residual effect
Royal Canal pNHA	National Importance	Habitat Degradation (hydrology; non-native invasive plant species; air quality)	Likely significant effect at the national geographic scale	No significant residual effect
Habitats (outside of designated areas for nature conservation)				
Tidal Rivers (CW2) (corresponding to Annex I Estuaries [1130])	National Importance	Habitat Loss; Habitat Degradation (hydrology)	Likely significant effect at the local geographic scale	Likely significant effect at the county geographic scale
Mud sand shores (LS4) (corresponding to Annex I habitat mudflats and sandflats not covered by sea water at low tide (1140))	National Importance	Habitat Loss; Habitat Degradation (hydrology)	Likely significant effect at the local geographic scale	Likely significant effect at the county geographic scale
Canals (FW3)	National Importance	<i>See Grand Canal pNHA and Royal Canal pNHA above</i>		
Scattered trees and parkland (WD5)	Local Importance (Higher Value)	Habitat loss	Likely significant effect at the local geographic scale	No significant residual effect

Ecological Receptor	Ecological Valuation	Potential Impacts	Potential Significance	Significant Residual Impact (Post Mitigation and Monitoring)
Hedgerows (WL1)	Local Importance (Higher Value)	Habitat loss	Likely significant effect at the local geographic scale	Likely significant effect at the local geographic scale
Treelines (WL2)	Local Importance (Higher Value)	Habitat loss	Likely significant effect at the local geographic scale	No significant residual effect
Non-native invasive plant species	N/A	Spread at expense of other Habitats, Habitat Degradation (hydrology)	Likely significant effect at the local to International geographic scale	No significant residual effect
Rare / Protected Plant Species				
Flora Species listed on the Flora Protection Order	Local Importance (Higher Value)	Habitat Degradation (hydrology)	Likely significant effect at the national geographic scale	No significant residual effect
Flora Species on Irelands Red Lists (Vulnerable or of higher concern concern)	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	Likely significant effect at the local geographic scale
Otter	International Importance	<i>See Wicklow Mountains SAC above</i>		
Marine mammals (Annex II species of nearby SACs)	International Importance	<i>See Rockabill to Dalkey Island SAC and Lambay Island SAC above</i>		
Marine mammals (all other marine mammals)	County Importance	Habitat Degradation (hydrology)	Likely significant effect at the local geographic scale	No significant residual effect
SCI bird species	International Importance	<i>See SPAs above</i>		
Kingfisher	County Importance	Habitat Degradation (hydrology); Disturbance	Likely significant effect at the local geographic scale	No significant residual effect
Black Guillemot	County Importance	Habitat Degradation (hydrology); Disturbance	Likely significant effect at the local geographic scale	No significant residual effect
All other breeding bird species (non-SPA populations)	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-SPA populations)	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
European eel / Lamprey / Atlantic Salmon	County Importance	Habitat Degradation (hydrology)	Likely significant effect at the local to county geographic scale	No significant residual effect
All other fish	Local importance (Higher Value)	Habitat Degradation (hydrology)	Likely significant effect at the local geographic scale	No significant residual effect

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