Chapter 12
Biodiversity

Contents

12. Biodiversity

12.1 Introduction

This Chapter of the Environmental Impact Assessment Report (EIAR) presents the output of the biodiversity assessment and contains information regarding, *inter alia*, the biodiversity baseline scenario, the potential impacts on biodiversity, the mitigation measures and the predicted residual effects of the Blanchardstown 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 (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 2006).

Alongside the term ‘*biodiversity*’ the terms ‘*ecology*’ and ‘*ecological*’ are also used throughout this Chapter as broader terms 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 (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 (BCIDC-ARP-GEO_GA-0005_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 is the area over which ecological features may be subject to significant impacts as a result of the Proposed Scheme and associated activities (see Section 12.3.1 for more detail on the ZoI as it relates to the Proposed Scheme and the various ecological receptors).

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

Table 12.1: Ecological Survey Study Areas for each Ecological Receptor

Ecological Receptor	Study Area Description
Habitats	The area within or immediately adjacent to the Proposed Scheme footprint where habitats could be directly or indirectly affected during construction / operation. The extent of the study area for habitats is illustrated in Figure 12.5 in Volume 3 of this EIAR.
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 bat activity is illustrated in Figure 12.1.1 in Volume 3 of this EIAR.
Nesting Kingfisher Suitability	Watercourses crossed by the Proposed Scheme footprint where nesting kingfisher could be directly affected during construction. The extent of the study area for kingfisher suitability is illustrated in Figure 12.7 in Volume 3 of this EIAR
Aquatic / Riparian Ecology	Watercourses crossed by the Proposed Scheme footprint where the aquatic / riparian ecology could be directly affected during construction. The extent of the study area for aquatic ecology is illustrated in Figure 12.7 in Volume 3 of this EIAR.

12.2.2 Relevant Guidelines, Policy and Legislation

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

- Environmental Impact Assessment of Projects - Guidance on the preparation of the Environmental Impact Assessment Report (European Commission 2017);
- Environmental Protection Agency (EPA) Guidelines on the Information to be Contained in Environmental Impact Assessment Reports (hereafter referred to as the EPA Guidelines) (EPA 2022);
- Guidance on Integrating Climate Change and Biodiversity into Environmental Impact Assessment (European Commission 2013);

- Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater, Coastal and Marine (hereafter referred to as the CIEEM Guidelines) (CIEEM 2018);
- Guidelines for the Crossing of Watercourses during the Construction of National Road Schemes. National Roads Authority (NRA, 2005a);
- Guidelines for the Treatment of Badgers during the Construction of National Road Schemes. National Roads Authority (NRA, 2005b);
- Best Practice Guidelines for the Conservation of Bats in the Planning of National Road Schemes. National Roads Authority (NRA, 2006a);
- Guidelines for the Treatment of Otters prior to the Construction of National Road Schemes (NRA, 2006b);
- 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);
- Guidelines for Assessment of Ecological Impacts of National Road Schemes (NRA 2009);
- 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. National Roads Authority (2008b);
- Bat Surveys for Professional Ecologists: Good Practice Guidelines 3rd edition (Collins, J (ed.) 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);
- Fingal Biodiversity Action Plan 2010-2015 (Fingal County Council, 2010);
- Fingal Development Plan 2017-2023 (Fingal County Council, 2017);
- Dublin City Council (DCC) Dublin City Development Plan 2016 - 2022 (DCC 2016); and
- Dublin City Biodiversity Action Plan 2015 - 2020 (DCC 2015).

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 Natural Habitats Regulations);
- The EIA Directive;
- Planning and Development Acts 2000 to 2021;
- Wildlife Acts 1976 – 2021;
- S.I. No. 356/2015 - Flora (Protection) Order, 2015 (hereafter referred to as the Flora Protection Order); and
- Fisheries Acts 1959 to 2019.

12.2.3 Data Collection and Collation

12.2.3.1 **Desk Study**

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

The following sources were consulted during the desk 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 2021 and updated 2022);
- Ordnance Survey Ireland (OSI) orthophotography (from 1995 to 2012) for the Proposed Scheme study area;
- Bus Connects Drone Imagery, surveyed 2020 (NTA, 2020);
- Habitat and species GIS datasets provided by the NPWS, including Article 12 and Article 17 data;
- Bat records from Bat Conservation Ireland's (BCI) database (BCI 2022);
- 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 2021);
- Information on the status of European Union (EU) protected habitats and species in Ireland (NPWS 2019a, NPWS 2019b and NPWS 2019c); and
- Information on light-bellied brent goose inland feeding sites (Scott Cawley Ltd., 2017).

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

A desk study was carried out to identify any potential suitable inland feeding and / or roosting sites for winter 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, 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 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 December 2020	Scott Cawley Ltd.
Mammal surveys (excluding bats)	June to August 2018 August 2020 October 2020 March 2022 and April 2022	Scott Cawley Ltd.
Bat surveys:	Walked transect activity surveys June to August 2018 September and October 2019 May 2020 July 2020 August 2021 Identification of potential roost features (PRFs) June to August 2018 August 2020 March 2022	Scott Cawley Ltd.
Nesting kingfisher suitability assessment	October 2020	Scott Cawley Ltd.
Amphibian habitat suitability assessment	June to August 2018 August 2020	Scott Cawley Ltd.
Reptile habitat suitability assessment	June to August 2018 August 2020	Scott Cawley Ltd.
Fisheries / Aquatic surveys	October and November 2020	Triturus Environmental Ltd.

12.2.3.3 Habitat Survey

Habitat surveys were carried out by Scott Cawley Ltd. between June and August 2018, and in August 2020, and December 2020. Aquatic habitat surveys were conducted by Triturus Environmental Ltd. between October and November 2020 (refer to Appendix A12.2 Aquatic Baseline Report in Volume 4 of this EIAR). All habitats located within or immediately adjacent to the Proposed Scheme footprint were surveyed and mapped to level three of the Heritage Council's A Guide to Habitats in Ireland 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 (NPWS 2016) and the Ireland Red List No. 8 Bryophytes (NPWS 2012)) were recorded, along with their relative abundances. Non-native invasive plant species listed on the Third Schedule of the (Birds and Natural Habitats) Regulations were also recorded. The habitat's extent was mapped onto an aerial photograph, with Global Positioning System (GPS) points taken where a habitat's extent could not be clearly identified from the aerial photograph. Vascular plant nomenclature follows that of the New Flora of the British Isles Fourth Edition (Stace 2019).

A desk study was carried out to identify all hydrological crossing points within the footprint of the Proposed Scheme. Construction methodologies which involved potential in-stream works, modifications to banks or where significant disturbance were deemed to require in-stream aquatic habitat surveys. Previous iterations of the Proposed Scheme design identified two sites where water bodies may be subject to significant disturbance as a consequence of the Proposed Scheme, both located on the Blanchardstown Bypass N3, adjacent to Waterville

Park (see Figure 12.1.2). The Proposed Scheme does not involve modifications to watercourse banks, but will result in significant disturbance during Construction Phase at one of these sites, namely CBC0005AR001, however the results for both sites will inform the receiving environment and impact assessment. These sites were surveyed by Triturus Environmental Ltd. in October and November 2020 (refer to Appendix A12.2 Aquatic Baseline Report in Volume 4 of this EIAR). A broad habitat assessment was conducted at each site utilising elements of the methodology provided for in the Environment Agency's 'River Habitat Survey in Britain and Ireland Field Survey Guidance Manual 2003 (Environment Agency, 2003) and the Irish Heritage Council's 'A Guide to Habitats in Ireland (Fossitt, 2000)'. All sites were assessed in terms of:

- Channel width and depth and other physical characteristics;
- Substrate type, listing substrate fractions in order of dominance, i.e. bedrock, boulder, cobble, gravel, sand, silt etc.;
- Flow type, listing percentage of riffle, glide and pool in the survey area;
- In-stream macrophyte and aquatic bryophytes occurring and the prominence of each (DAFOR scale); and,
- General riparian vegetation composition.

12.2.3.4 **Mammals (Excluding Bats)**

The footprint of the Proposed Scheme was surveyed for badger *Meles meles* and otter *Lutra lutra* activity as part of the multidisciplinary walkover survey, undertaken between June and August 2018, and in August 2020. An additional otter survey was undertaken at key watercourse crossing 24 March 2022 with a follow up survey carried out 01 April 2022 to gain access across a construction site to lands along a section of the River Tolka which were not accessible in the March survey. 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.

Previous iterations of the Proposed Scheme design identified two sites along the River Tolka where water bodies may be subject to significant disturbance as a consequence of the Proposed Scheme, i.e. in-stream works, modifications to banks or significant disturbance. These sites are both located on the Blanchardstown Bypass N3 and are referred to as CBC0005AR001, and CB0005AR002. A corridor of approximately 150m upstream and downstream of the crossing point was surveyed to identify the presence of otter holts in October 2020. Areas surveyed are shown on Figure 12.1.2 in Volume 3 of this EIAR. The 2022 survey along the River Tolka noted two additional records alongside CBC0005AR001, where a single otter footprint and a degraded spraint -possibly otter were recorded. The Proposed Scheme will only involve modifications to banks or significant disturbance at one of these sites (CBC0005AR001), however the results for both sites will inform the receiving environment and impact assessment.

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*. 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).

12.2.3.5 **Bats**

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

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

12.2.3.5.1 Bats - Walked Transect Surveys

Walked bat activity transect surveys were conducted along preselected transect routes at five locations along the Proposed Scheme. Transect routes were located at Snugborough Road, referred to as CBC0005BT001, along the Mill Road at Waterville Park, referred to as CBC0005BT002, along the Navan Road at Castleknock Manor, referred to as CBC0005BT003, along the Navan Road at Phoenix Park Racecourse, referred to as CBC0005BT004 and along the Navan Road at Ashtown Road, referred to as CBC0005BT005. The locations of 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 "(Bat Conservation Trust 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. Surveys involved the surveyor walking each transect route at a slow pace using with a handheld ultrasound bat detector (Elekon Batlogger M) to record any bat species present.

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

12.2.3.5.2 Bats - Tree Surveys

Trees located within the footprint of the Proposed Scheme were assessed for their potential to support roosting bats (i.e. Potential Roost Features (PRFs)) as part of the multidisciplinary walkover survey carried out between June and August 2018 and August 2020. A resurvey in 24 March 2022 identified a further 18 number PRF's with the majority of them largely outside the Proposed Scheme , but some adjacent to or alongside its boundary. These are all newly identified trees where the confirmation of PRF arises by virtue of natural damage and decay, landscaping maintenance or conversely lack of maintenance and growth of Ivy on these trees.

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.

12.2.3.6 **Nesting Kingfisher Suitability Assessment**

Previous iterations of the Proposed Scheme design identified two areas along the River Tolka where water bodies may be subject to significant disturbance as a consequence of the Proposed Scheme, i.e. in-stream works, modifications to banks or significant disturbance. These sites are both located on the Blanchardstown Bypass N3 and are referred to as CBC0005AR001 and CB0005AR002. The Proposed Scheme will only involve modifications to banks or significant disturbance at one of these sites (CBC0005AR001), however the results for both sites will inform the receiving environment and impact assessment.

The suitability of water features and associated foraging, roosting, and nesting habitats, located within or directly adjacent to the Proposed Scheme, were assessed for kingfisher potential. Where suitable habitat existed, surveys extended 500m upstream and downstream of the proposed crossing point. Evidence of previous and current nest holes were recorded. Areas surveyed are shown on Figure 12.1.2 in Volume 3 of this EIAR.

12.2.3.7 **Wintering Birds**

A desk study was carried out to identify any potential suitable inland feeding and / or roosting sites for winter 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 (Scott Cawley Ltd., 2017). Three inland wintering feeding sites were identified in close proximity to the Proposed Scheme, namely:

- Belvedere Sports Ground Cabra (Importance Unknown) approximately 25m from the Proposed Scheme;
- Cabra / Pope John Paul II Park (High Importance) approximately 100m from the Proposed Scheme; and,
- Ashtown Playing Pitches (Major Importance) approximately 132m from the Proposed Scheme.

The Proposed Scheme will not incur any habitat loss as there were no suitable wintering bird sites identified within the boundary of the Proposed Scheme, and by virtue of their existing location near existing transport corridors but separated by buildings and / or vegetation screening. As such it was not deemed necessary to carry out wintering bird surveys. The results of the desk study have informed the assessment of potential impacts on wintering bird species arising from the Proposed Scheme.

12.2.3.8 **Reptiles**

The suitability of habitats, located within and immediately adjacent to the Proposed Scheme, were assessed for breeding and / or hibernating reptile species common lizard *Zootoca vivipara*, as part of the multi-disciplinary walkover surveys undertaken between June and August 2018 and in August 2020.

12.2.3.9 **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 multi-disciplinary walkover surveys undertaken between June and August 2018 and in August 2020.

12.2.3.10 **Fish**

Previous iterations of the Proposed Scheme design identified two areas along the River Tolka where water bodies may be subject to significant disturbance as a consequence of the Proposed Scheme, i.e. in-stream works, modifications to banks or significant disturbance. These sites are both located on the Blanchardstown Bypass N3 and are referred to as CBC0005AR001 and CB0005AR002 and were subject to fish surveys. The Proposed Scheme will only involve modifications to banks or significant disturbance at one of these sites (CBC0005AR001), however the results for both sites will inform the receiving environment and impact assessment. Areas surveyed are shown on Figure 12.1.2 in Volume 3 of this EIAR.

Aquatic surveys conducted by Triturus Environmental Ltd., during October and November 2020, comprised of a broad appraisal / overview of the upstream and downstream habitat at each site for salmonid and lamprey spawning and general fisheries habitat (refer to Appendix A12.2 Aquatic Baseline Report in Volume 4 of this EIAR). The baseline assessment considered the quality of spawning, nursery and holding habitat within the vicinity of the survey sites using Life Cycle Unit (salmonids) and Lamprey Habitat Quality Index scores (lamprey). A broad appraisal / overview of the upstream and downstream habitat at each aquatic survey site was also undertaken to evaluate the wider contribution to salmonid and lamprey spawning and general fisheries habitat.

Fisheries habitat for salmonids was assessed using the Life Cycle Unit method (Kennedy, 1984; O'Connor & Kennedy, 2002) to map survey sites as nursery, spawning and holding water, by assigning quality scores to each type of habitat. Those habitats with poor quality substrata, shallow depth and a poorly defined river profile received a higher score. Higher scores in the Life Cycle Unit method of fisheries quantification are representative of poorer value, with lower scores being more optimal, despite this appearing counterintuitive. Overall scores are calculated as a simple function of the sum of individual habitat scores. The life cycle scoring system and values are shown on Table 12.3 (Triturus Environmental Ltd, 2020).

Table 12.3: Life Cycle Unit scoring system for salmonid nursery, spawning and holding habitat value (as per Kennedy, 1984 & O'Connor & Kennedy, 2002)

Habitat Quality	Habitat Score	Total Score (three components)
Poor	4	12
Moderate	3	9-11
Good	2	6-8

Habitat Quality	Habitat Score	Total Score (three components)
Excellent	1	3-5

Lamprey habitat evaluation for each survey site was undertaken using the Lamprey Habitat Quality Index (LHQI) scoring system, as devised by Macklin *et al*., (2018). The LHQI broadly follows a similar rationale as the Life Cycle Unit score for salmonids. Those habitats with a lack of soft, largely organic sediment areas for ammocoete burrowing, a shallow sediment depth (<10cm) or of a compacted sediment nature, receive a higher score. Higher scores in this index are thus of poorer value (in a similar fashion to the salmonid Life Cycle Unit Index), with lower scores being more optimal. Overall scores are calculated as a simple function of the sum of individual habitat scores.

Larval lamprey habitat quality as well as the spawning suitability is assessed based on the information provided in Maitland (2003) and Gardiner (2003). Unlike the salmonid Life Cycle Unit index, holding habitat for adult lamprey is not assessed owing to their different migratory and life history strategies, and that electro-fishing surveys routinely only sample larval lamprey.

The LHQI scoring system provides additional information compared to the habitat classification based on the observations of Applegate (1950) and Slade *et al*., (2003), which deals specifically with larval (sea) lamprey settlement habitat. Under this scheme, habitat is classified into three different types: preferred (Type 1), acceptable (Type 2), and not acceptable for larvae (Type 3) (Slade *et al.,* 2003). Type 1 habitat is characterized by soft substrate materials usually consisting of a mixture of sand and fine organic matter, often with some cover over the top such as detritus or twigs in areas of deposition. Type 2 habitat is characterized by substrates consisting of shifting sand with little if any organic matter and may also contain some gravel and cobble (lamprey may be present but at much lower densities than Type 1). Type 3 habitat consists of materials too hard for larvae to burrow including bedrock and highly compacted sediment. This classification can also be broadly applied to other lamprey species ammocoetes, including *Lampetra* species. The Lamprey Habitat Quality Index (LHQI) scoring system and values are shown on Table 12.4 (Triturus Environmental Ltd, 2020).

Table 12.4: Lamprey Habitat Quality Index (LHQI) scoring system for lamprey spawning and nursery habitat value (Macklin et al., 2018).

Habitat Quality	Habitat Score	Total Score (three components)
Poor	4	8
Moderate	3	6-7
Good	2	3-5
Excellent	1	2

River habitat surveys and fisheries assessments were also carried out utilising elements of the approaches in the River Habitat Survey Methodology (Environment Agency, 2003) and Fishery Assessment Methodology (O'Grady, 2006) to broadly characterise the river sites (i.e. channel profiles, substrata etc.) (Triturus Environmental Ltd, 2020- refer to Appendix A12.2 Aquatic Baseline Report in Volume 4 of this EIAR).

12.2.3.11 **Invertebrates - White-Clawed Crayfish**

Previous iterations of the Proposed Scheme design identified two areas along the River Tolka where water bodies may be subject to significant disturbance as a consequence of the Proposed Scheme i.e. in-stream works, modifications to banks or significant disturbance. These sites are both located on the Blanchardstown Bypass N3 and are referred to as CBC0005AR001 and CB0005AR002 and were subject to aquatic surveys. The Proposed Scheme does not involve modifications to banks and no instream works are required. However, the results for both sites will inform the receiving environment and impact assessment. Areas surveyed are shown on Figure 12.1.2 in Volume 3 of this EIAR.

White clawed crayfish surveys were conducted by Triturus Environmental Ltd., during October 2020 under the National Parks and Wildlife (NPWS) license no. C79/2020, as prescribed by Sections 9, 23 and 34 of the Wildlife Acts to capture and release them to their site of capture under condition no. 5 of the licence. As per best practice, crayfish sampling began at the uppermost site on each watercourse/sub-catchment in the study area to prevent

the transfer of pathogens or invasive species in an upstream direction. An aquatic biosecurity protocol was also applied for equipment use in water.

Sweep netting and hand-searching (following Reynolds *et al.,* 2010) was utilised at each survey site to detect both adult and juvenile crayfish. Sweep netting involves the sampling of more stable refugia such as boulder and cobble accumulations, in addition to macrophyte beds and other potential habitat such as tree root systems. A second operator (with sweep net) was present to capture escape-swimming crayfish observed following the initial sweep or refuge search. To estimate the relative density of crayfish at each site, searches were undertaken (moving upstream) in ten objectively suitable refugia per 1-20m^2 of habitat (as per Peay, 2003). Following capture, all crayfish were held temporarily in a retaining tank containing fresh river water. Each crayfish was sexed, measured (carapace length, to nearest mm) and general condition noted before being released in-situ.

A strict biosecurity protocol following the Check-Clean-Dry approach was employed during the survey. Equipment and Personal Protective Equipment (PPE) used was disinfected with Virkon® (a wide spectrum virucidal, bactericidal and fungicidal disinfectant used for biosecurity purposes) between survey sites to prevent the transfer of pathogens and/or invasive species between survey areas. Where feasible, equipment was also be thoroughly dried (through UV exposure) between survey areas. Particular cognisance was given towards preventing the spread or introduction of crayfish plague (*Aphanomyces astaci*), given the known distribution of a particularly valuable peri-urban population of white-clawed crayfish (*Austropotamobius pallipes*) in the River Camac catchment. As per best practice, surveys were undertaken at sites in a downstream order (i.e. uppermost site surveyed first etc.) to prevent the upstream mobilisation of invasive propagules and pathogens (Triturus Environmental Ltd, 2020- refer to Appendix A12.2 Aquatic Baseline Report in Volume 4 of this EIAR).

12.2.3.12 **Aquatic Macro-Invertebrate Survey (Kick-Sampling)**

During design development of the Proposed Scheme two areas were identified along the River Tolka where waterbodies may be subject to significant disturbance as a consequence of in-stream works, modifications to banks or significant disturbance. These sites are both located on the Blanchardstown Bypass N3 and are referred to as CBC0005AR001, and CB0005AR002 and were subject to aquatic surveys. However, the Proposed Scheme does not now involve modifications to banks or instream works at either site, but the results for both sites have informed the receiving environment and impact assessment. Areas surveyed are shown on Figure 12.1.2 in Volume 3 of this EIAR.

Macro-invertebrate samples were collected by Triturus Environmental Ltd along the River Tolka at the Proposed Crossings CBC0005AR001 and CBC005AR002 between Snugborough Road and Connolly Hospital Blanchardstown (refer to Appendix A12.2 Aquatic Baseline Report in Volume 4 of this EIAR). All Q-samples were taken with a standard kick sampling net (i.e. 250mm in width and with a 500µm mesh size) from riffle/glide habitat, utilising a three minute per sample approach. Large cobble was also washed at each site where present and samples were elutriated and fixed in 70% ethanol for laboratory identification. Any rare invertebrate species were identified from the NPWS Red List publications for beetles, stoneflies, mayflies and other relevant taxa; Ireland Red List No. 1: Water beetles (Foster *et al*., 2009), Ireland Red List No. 13: Stoneflies (*Plecoptera*) (Feeley *et al*.,2020) Ireland Red List No. 7: Mayflies (*Ephemeroptera*) (Kelly-Quinn *et al*., 2012) and Ireland Red List No. 2: Non-Marine Molluscs (Byrne *et al*.,2009). Macro-invertebrate samples were converted to Q-value ratings as per Toner *et al.,* (2005). The reference classes for Q-value rating are shown in Table 12.5.

Table 12.5: Description of reference classes for each EPA Q-value Ratings (Q1 to Q5) (after Toner et al., 2005)

Q-Value	Water Framework Directive Status	Pollution Status	Condition
Q5 or 4-5	High Status	Unpolluted	Satisfactory
Q4	Good Status	Unpolluted	Satisfactory
Q3-4	Moderate Status	Slightly Polluted	Unsatisfactory
Q3 or 2-3	Poor	Moderately Polluted	Unsatisfactory
Q2, 1-2 or 1	Bad	Seriously Polluted	Unsatisfactory

12.2.4 Appraisal Method for the Assessment of Impacts

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

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

12.2.4.1 Valuing the Ecological Receptors

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

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

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

12.2.4.2 Characterising and Describing the Impacts

The parameters considered in characterising and describing the magnitude or scale of the likely significant effects of the Proposed Scheme are outlined in Table 12.6.

Table 12.6: 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 and 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 2018) were followed, which requires examination of the following two key elements:

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

12.2.4.3.1 Integrity

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

The term 'integrity' is most often used when determining impact significance in relation to designated areas for nature conservation (e.g. SACs, SPAs or pNHAs / 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.

And 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 2018) 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 Proposed Core Bus Corridor is approximately 10.9 km long, commencing at Junction 3 (Blanchardstown / Mulhuddart) eastbound off-slip from the N3 and terminating at the junction of Blackhall Place and Ellis Quay. A detailed description of the Proposed Scheme is provided in Chapter 4 (Proposed Scheme Description).

The Proposed Scheme includes a wide variety of suburban and townscape features that delineate the long-established transport corridor that is the N3 / Navan Road that leads into the City Centre. In general, habitats along the Proposed Scheme are dominated by buildings and artificial surfaces, although there are areas of semi-natural woodlands and planted boundary woodland including along the Tolka Valley and Phoenix Park, watercourses and public realm planting.

In summary, there are five key sections along the Proposed Scheme:

- Section 1: Blanchardstown Junction to Snugborough Road; Centre to M50 Junction (East);
- Section 2: Snugborough Road to N3 / M50 Junction;
- Section 3: N3 / M50 Junction to Navan Road / Ashtown Road Junction;
- Section 4: Navan Road/Ashtown Road Junction to Navan Road/Old Cabra Road Junction; and
- Section 5: Navan Road/Old Cabra Road Junction to Ellis Quay.

Habitats present within Section 1: Blanchardstown Junction to Snugborough Road are largely characterised by buildings and artificial surfaces, flower beds and borders, amenity grassland, and scattered trees along the southern part of the N3 / Blanchardstown Bypass and the surrounding commercially developed lands at Blanchardstown Centre.

Continuing in a south-easterly direction towards the City Centre, habitats present within Section 2 Snugborough Road to N3 / M50 Junction are characterised by developed lands along the southern boundary of the N3 / Blanchardstown Bypass, as well as undeveloped lands in the low-lying Tolka River valley and the important Tolka River. The northern part of the section is dominated by the largely undeveloped sylvan Tolka River Valley which comprises extensive areas of mixed broadleaved and riparian woodland habitats. Additional habitats include treelines, hedgerows, dry meadows and grassy verges, and wet willow-alder-ash woodland bordering the River Tolka, and amenity grassland extending to the M50 junction. Road landscaping features includes linear areas of amenity grassland and treelines on road verges. The Proposed Scheme passes over the Royal Canal at the M50 junction. Habitats associated with this area include immature woodland, broadleaved woodland, dry meadows and grassy verges, and amenity grassland landscaping habitats.

Section 3 of the Proposed Scheme follows the existing transport corridor between the N3 / M50 Junction to Navan Road / Ashtown Road Junction. Phoenix Park is located to the south-east of Section 3. Intermittent parts of land along Section 3 of the Proposed Scheme are developed including the Navan Parkway Railway station (including

the car park), artificial playing pitches and some residential developments. There are also large areas of undeveloped land, which is characterized by a mixture of various grassland, scrub and wooded habitats.

Habitats present within Section 4 Navan Road / Ashtown Road Junction to Navan Road / Old Cabra Road Junction are characteristic of the increasingly suburban and urban residential and commercial development. Buildings and artificial surfaces and residential development dominate, with planted treelines, hedgerows, flower beds and borders, and stone walls, intermittent pockets of amenity grassland and scattered trees and parkland associated with residential areas.

Section 5 Navan Road / Old Cabra Road Junction to Ellis Quay reflects the increasingly metropolitan fabric of Dublin City with little extensive areas of natural or semi natural habitats. Section 5 is dominated by buildings and artificial surfaces associated with city centre commercial development, and the Liffey Estuary Upper flowing perpendicular to the Proposed Scheme.

There are also a number of discrete sections of works for the Proposed Scheme, that are not attached to the main corridor. Typically, the works proposed entail localised sign installation and modifications to road junction layout.

12.3.1 Zone of Influence (ZoI)

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

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

The 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 a 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 hydrogeological ZoI for the Proposed Scheme is highly variable depending on the nature of the proposed works at specific locations and the receiving environment ground conditions, this is deemed to extend beyond the Proposed Scheme boundary and is discussed with reference to specific construction activities in Chapter 14 (Land, Soils, Geology and Hydrogeology).

The unmitigated ZoI for 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 the Construction Compound during the Construction Phase, and up to 200m from 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 is highly site-specific and related to the predicted magnitude of any potential pollution event. Evidently, it will depend on volumes of discharged waters, concentrations and types of pollutants (in this case sediment, hydrocarbons, and heavy metals), volumes of receiving waters, and the ecological sensitivity of the receiving waters. In the case of the Proposed Scheme, this includes all estuarine habitats downstream of where the

Proposed Scheme will drain to or cross water bodies listed in Table 12.7 and the marine environment of Dublin Bay (See Figure 12.2).

The ZoI for impacts to aquatic fauna species, such as Atlantic salmon *Salmo salmar* and lamprey species *Lampetra* spp. is limited to those water courses that will be crossed by the Proposed Scheme or water bodies to which runoff from the Proposed Scheme could drain to during construction.

Table 12.7: Water bodies Hydrologically Connected to the Proposed Scheme and Within its ZoI

Waterbody Name	Connectivity to the Proposed Scheme
River Tolka (Tolka_040)	Crosses the Proposed Scheme at Blanchardstown Bypass
Royal Canal	Crosses the Proposed Scheme at Junction 3 M50
Dublin Zoo Ponds	Hydrologically connected to the Proposed Scheme via existing surface water drainage.
Liffey Estuary Upper	Immediately south of the Proposed Scheme
Liffey Estuary Lower	approximately 11.4km downstream of the Proposed River Tolka crossing
Tolka Estuary	approximately 12.3km downstream of the Proposed River Tolka crossing
Dublin Bay	approximately 12km downstream of the Proposed River Tolka crossing

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

The ZoI of potential effects to bat roosts would not be expected to exceed 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 ZoI may increase / decrease from this distance accordingly. Given the large foraging ranges for some species, the ZoI of potential landscape scale impacts, such as habitat loss and severance, could extend for several kilometres from the Proposed Scheme but the most significant effects are likely to occur within 1km of important roost sites (e.g. maternity roosts). Leisler's bats have been recorded foraging up to 13km from maternity roost sites (Shiel *et al.,* 1999).

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

The ZoI in relation to disturbance 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 ZoI for *ex-situ* impacts could extend a considerable distance from the Proposed Scheme. In the case of the Proposed Scheme, impacts to wintering birds within this 300m band could affect the use of potential ex-situ sites for bird species listed as SCIs of European sites.

Current understanding of construction related noise disturbance to wintering waterbirds is based on the research presented in Cutts *et al.,* (2009) and Wright *et al.,* (2010). In terms of construction noise, levels below 50dB (decibels) are not expected to result in any response from foraging or roosting birds. Noise levels between 50dB and 70dB would provoke a moderate effect / level of response from birds (i.e. birds becoming alert and some behavioural changes (e.g. reduced feeding activity)), but birds are expected to habituate to noise levels within this

range. Noise levels above 70dB 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 as BS 5228–1) (hereafter referred to BS 5228-1) (BSI 2008)) are generally below 60dB or, in most cases, are approaching the 50dB threshold.

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

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

12.3.2 Desk Study

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

12.3.3 Biodiversity Areas

Fingal Biodiversity Action Plan 2010-2015 highlights a number of areas considered to be of biodiversity value present within the boundaries of Fingal County Council (Fingal County Council, 2010). These areas that are located within the ZoI of the Proposed Scheme are provided below:

- Habitats considered to be of importance, such as arable land, semi-natural grasslands, hedgerows and woodlands, which support a range of species and act as important ecological links / corridors across the wider landscape. Woodlands in Fingal County Council administrative territory were largely planted during the 18th century and may be part of the ancient woodland cover in Dublin;
- Hedgerows providing food, shelter and nesting sites in the agricultural landscape. They also act as ecological links or corridors across habitat types. There is about 2,660km of hedgerow in Fingal County Council administrative territory, most of which are located in the north and west of the County;
- Network of rivers and streams (Table 12.7), including the River Tolka, which is crossed by the Proposed Scheme. These watercourses support a range of riverine bird species, such as kingfisher Alcedo atthis, and fish species;
- Green spaces providing valuable wildlife habitats scattered across parkland and gardens including Corduff Park, Waterville Park, playing fields, and golf clubs; and
- The Royal Canal will be crossed by the Proposed Scheme at the M50 junction. The Fingal Biodiversity Action Plan identifies the Royal Canal as a multi-functional amenity corridor. The Royal Canal is a pNHA and supports coarse fish species, including roach *Rutilus*, pike *Esox lucius*, rudd *Scardinius erythrophthalmus*, bream *Abramis brama* and tench *Tinca tinca*, and the legally-protected Flora Protection Order 2015 species opposite-leaved pondweed *Groenlandia densa* as well as the endangered Red List freshwater snail species glutinous snail *Myxas glutinosa*. Otter *Lutra lutra* activity is often found where the canal crosses with streams and rivers throughout the City.

The Dublin City Biodiversity Action Plan 2015 – 2020 (DCC 2015) highlights a number of areas considered to be of biodiversity value present within the boundaries of DCC. These areas that are located within the ZoI of the Proposed Scheme are provided below:

- Dublin City's Green Infrastructure Network. Habitats within the Proposed Scheme which are considered to contribute to the Green Infrastructure Network include semi-natural calcareous grassland, hedgerows, treelines and woodlands, which support a range of species and act as ecological links/corridors across the wider landscape.
- Dublin City's network of parks and public green spaces, such as Phoenix Park, Maypark, Fairview Park, Clontarf Golf Club and private gardens support a variety of species and is considered to be a valuable biodiversity resource; and,

- Dublin City's network of rivers, streams and riparian zones. The Proposed Scheme will cross the River Tolka. This watercourse supports a range of riverine bird species, such as kingfisher *Alcedo atthis*, European otter and fish species. The Proposed Scheme extends to the junction with Ellis Quay and Arran Quay in close proximity of the Liffey Estuary Upper, which is noted as being a highly significant regional salmonid catchment for species of Atlantic salmon *Salmo salar* and brown trout *Salmo trutta.* It also supports an active otter *Lutra lutra* population;

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. The nearest European site is South Dublin Bay and River Tolka Estuary SPA followed by South Dublin Bay SAC, which are both located approximately 2.9km and 4.6km east of the Proposed Scheme, respectively.

There are eight European sites located in Dublin Bay that are downstream of the Proposed Scheme. These European sites are North Dublin Bay SAC, South Dublin Bay SAC, North Bull Island SPA and South Dublin Bay and River Tolka SPA, Howth Head SAC, Howth Head Coast SPA, Rockabill to Dalkey Island SAC, Dalkey Islands SPA. European sites are hydrologically connected to the Proposed Scheme via the River Tolka, the Royal Canal and the Liffey Estuary Upper.

There are ten SPAs designated for Special Conservation Interest (SCI) species that are known to forage within Dublin Bay and / or roost at inland sites across Dublin. These include Baldoyle Bay SPA, Malahide Estuary SPA, Ireland's Eye SPA, North Bull Island SPA, South Dublin Bay and River Tolka SPA, Rogerstown Estuary SPA, Skerries Islands SPA, Lambay Island SPA, Rockabill SPA, and The Murrough SPA.

There are two SACs designated for mobile Qualifying Interest (QI) species known to utilise the Liffey Estuary, Tolka Estuary and Dublin Bay. These include Rockabill to Dalkey Island SAC and Lambay Island SAC.

There are 25 no. European sites (SACs or SPAs) located within the vicinity of the Proposed Scheme. These are listed in Table 12.8 and illustrated in Figure 12.3 in Volume 3 of this EIAR. Table 12.8 lists these sites, their distance (as the crow flies) from the Proposed Scheme, and the sites' designations (QIs / SCIs). There are 17 sites located within the ZoI of the Proposed Scheme (see Table 12.8).

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

Table 12.8: European sites (SACs and SPAs) Located with the ZoI (highlighted in light blue), and those in the Wider Area, of the Proposed Scheme Boundary.

Site Name	Distance	Designation – QIs or SCIs (* = Priority Annex I Habitat)
SAC		
South Dublin Bay SAC [000210]	Approximately 4.62km east of the Proposed Scheme	Annex I Habitats: • Mudflats and sandflats not covered by seawater at low tide [1140]; • Annual vegetation of drift lines [1210]; • *Salicornia* and other annuals colonising mud and sand [1310]; and • Embryonic shifting dunes [2110]. *S.I. No. 525/2019 - European Union Habitats (South Dublin Bay Special Area of Conservation 000210) Regulations 2019* Source: Conservation Objectives: South Dublin Bay SAC 000210. Version 1. (NPWS 2013b) and Natura 2000 – Standard Data Form (NPWS 2020a)
North Dublin Bay SAC [000206]	Approximately 6.03km east of	Annex I Habitats:

Site Name	Distance	Designation – QIs or SCIs (* = Priority Annex I Habitat)
	the Proposed Scheme	• Mudflats and sandflats not covered by seawater at low tide [1140]; • Annual vegetation of drift lines [1210]; • *Salicornia* and other annuals colonising mud and sand [1310]; • Atlantic salt meadows *(*Glauco-Puccinellietalia maritimae) [1330]; • Mediterranean salt meadows (Juncetalia maritimi) [1410]; • Embryonic shifting dunes [2110]; • Shifting dunes along the shoreline with *Ammophila arenaria* ('white dunes') [2120]; • Fixed coastal dunes with herbaceous vegetation ('grey dunes') [2130]*; and • Humid dune slacks [2190]. Annex II Species: • Petalwort *Petalophyllum ralfsii* [1395]. *S.I. No. 524/2019 – European Union Habitats (North Dublin Bay Special Area of Conservation 000206) Regulations 2019* Source: Conservation Objectives: North Dublin Bay SAC 000206. Version 1. (NPWS 2013a) and Natura 2000 – Standard Data Form (NPWS 2020b)
Rye Water Valley/Carton SAC [003198]	Approximately 6.7km west of the Proposed Scheme	Annex I Habitats: • Petrifying springs with tufa formation (Cratoneurion) [7220]*. Annex II Species: • *Vertigo angustior* (Narrow-mouthed Whorl Snail) [1014]; and • *Vertigo moulinsiana* (Desmoulin's Whorl Snail) [1016]. *S.I. No. 494/2018 – European Union Habitats (Rye Water Valley/Carton Special Area of Conservation 000206) Regulations 2018* Source: Conservation Objectives for Rye Water Valley/Carton SAC [003198]. Version 1.0 (NPWS 2021h) and Natura 2000 – Standard Data Form (NPWS 2019e)
Baldoyle Bay SAC [000199]	Approximately 10.14km west of the Proposed Scheme	Annex I Habitats: • Mudflats and sandflats not covered by seawater at low tide [1140]; • *Salicornia* and other annuals colonising mud and sand [1310]; • Atlantic salt meadows (Glauco-Puccinellietalia maritimae) [1330]; and • Mediterranean salt meadows (Juncetalia maritimi) [1410]. *S.I. No. 472/2021 - European Union Habitats (Baldoyle Bay Special Area of Conservation 000199) Regulations 2021* Source: Conservation Objectives: Baldoyle Bay SAC 000199. Version 1. (NPWS 2012b) and Natura 2000 – Standard Data Form (NPWS 2019a)
Glenasmole Valley SAC [001209]	Approximately 11.33km south of the Proposed Scheme	Annex I Habitats: • Semi-natural dry grasslands and scrubland facies on calcareous substrates (Festuco-Brometalia) (* important orchid sites) [6210]; • *Molinia* meadows on calcareous, peaty or clayey-silt-laden soils (Molinion caeruleae) [6410]; and • Petrifying springs with tufa formation (Cratoneurion) [7220]*. *S.I. No. 345/2021 - European Union Habitats (Glenasmole Valley Special Area of Conservation 001209) Regulations 2021.* Source: Conservation objectives for Glenasmole Valley SAC [001209]. Version 1.0. (NPWS 2021e) and Natura 2000 – Standard Data Form (NPWS 2018be)
Wicklow Mountains SAC [002122]	Approximately 11.97km south of the Proposed Scheme	Annex I Habitats: • Oligotrophic waters containing very few minerals of sandy plains (Littorelletalia uniflorae) [3110]; • Natural dystrophic lakes and ponds [3160]; • Northern Atlantic wet heaths with *Erica tetralix* [4010]; • European dry heaths [4030]; • Alpine and Boreal heaths [4060]; • Calaminarian grasslands of the Violetalia calaminariae [6130];

Site Name	Distance	Designation – QIs or SCIs (* = Priority Annex I Habitat)
		• Species-rich *Nardus* grasslands, on siliceous substrates in mountain areas (and submountain areas, in Continental Europe) [6230]*; • Blanket bogs (* if active bog) [7130]; • Siliceous scree of the montane to snow levels (Androsacetalia alpinae and Galeopsietalia ladani) [8110]; • Calcareous rocky slopes with chasmophytic vegetation [8210]; • Siliceous rocky slopes with chasmophytic vegetation [8220]; and • Old sessile oak woods with *Ilex* and *Blechnum* in the British Isles [91A0]. Annex II Species: • Otter *Lutra lutra* [1355]. Source: Conservation Objectives: Wicklow Mountains SAC 002122. Version 1. (NPWS 2017a) and Natura 2000 – Standard Data Form (NPWS 2018c)
Howth Head SAC [000202]	Approximately 11.72km west of the Proposed Scheme	Annex I Habitats: • Vegetated sea cliffs of the Atlantic and Baltic coasts [1230]; and • European dry heaths [4030]. *S.I. No. 524/2021 - European Union Habitats (Howth Head Special Area of Conservation 000202) Regulations 2021* Source: Conservation Objectives: Howth Head SAC 000202. Version 1. (NPWS 2016a) and Natura 2000 – Standard Data Form (NPWS 2018d)
Rockabill to Dalkey Island SAC [003000]	Approximately 12.19km west of the Proposed Scheme	Annex I Habitats: • Reefs [1170]. Annex II Species: • Harbour porpoise *Phocoena phocoena* [1351]. *S.I. No. 94/2019 – European Union Habitats (Rockabill to Dalkey Island Special Area Of Conservation 003000) Regulations 2019* Source: Conservation Objectives: Rockabill to Dalkey Island SAC 003000. Version 1. (NPWS 2013c) and Natura 2000 – Standard Data Form (NPWS 2019f)
Malahide Estuary SAC [000205]	Approximately 12.2km west of the Proposed Scheme	Annex I Habitats: • Mudflats and sandflats not covered by seawater at low tide [1140]; • *Salicornia* and other annuals colonising mud and sand [1310]; • Atlantic salt meadows (Glauco-Puccinellietalia maritimae) [1330]; • Mediterranean salt meadows (Juncetalia maritimi) [1410]; • Shifting dunes along the shoreline with *Ammophila arenaria* (white dunes) [2120]; and • Fixed coastal dunes with herbaceous vegetation (grey dunes) [2130]*. *S.I. No. 91/2019 – European Union Habitats (Malahide Estuary Special Area of Conservation 000205) Regulations 2019* Source: Conservation Objectives: Malahide Estuary SAC 000205. Version 1. (NPWS 2013d) and Natura 2000 – Standard Data Form (NPWS 2020c)
Ireland's Eye SAC [000203]	Approximately 14.5km west of the Proposed Scheme	Annex I Habitats: • Perennial vegetation of stony banks [1220]; and • Vegetated sea cliffs of the Atlantic and Baltic coasts [1230]. *S.I. No. 501/2017 – European Union Habitats (Ireland's Eye Special Area of Conservation 002193) Regulations 2017* Source: Conservation Objectives: Ireland's Eye SAC 002193. Version 1. (NPWS 2017b) and Natura 2000 – Standard Data Form (NPWS 2020d)
Rogerstown Estuary SAC [000208]	Approximately 16.17km north west of the Proposed Scheme	Annex I Habitats: • Estuaries [1130]; • Mudflats and sandflats not covered by seawater at low tide [1140]; • *Salicornia* and other annuals colonising mud and sand [1310]; • Atlantic salt meadows (Glauco-Puccinellietalia maritimae) [1330]; • Mediterranean salt meadows (Juncetalia maritimi) [1410];

Site Name	Distance	Designation – QIs or SCIs (* = Priority Annex I Habitat)
		• Shifting dunes along the shoreline with *Ammophila arenaria* (white dunes) [2120]; and, • Fixed coastal dunes with herbaceous vegetation (grey dunes) [2130]*. *S.I. No. 286/2018 – European Union Habitats (Rogerstown Estuary Special Area of Conservation 000208) Regulations 2018* Source: Conservation Objectives: Rogerstown Estuary SAC 000208. Version 1. (NPWS, 2013e) and Natura 2000 – Standard Data Form (NPWS 2019g)
Lambay Island SAC [000204]	Approximately 21.28km north east of Proposed Scheme	Annex I Habitats: • Reefs [1170] • Vegetated sea cliffs of the Atlantic and Baltic coasts [1230] Annex II Species: • Grey seal *Halichoerus grypus* [1364] • Harbour seal *Phoca vitulina* [1365] *S.I. No. 294/2019 - European Union Habitats (Lambay Island Special Area Of Conservation 000204) Regulations 2019* Source: Conservation Objectives: Lambay Island SAC 000204. Version 1. (NPWS 2013f) and Natura 2000 – Standard Data Form (NPWS 2019h)
Special Protection Areas		
South Dublin Bay and River Tolka Estuary SPA [004024]	Approximately 2.89km east of the Proposed Scheme	• Light-bellied Brent Goose *Branta bernicla hrota* [A046]; • Oystercatcher *Haematopus ostralegus* [A130]; • Ringed Plover *Charadrius hiaticula* [A137]; • Grey Plover *Pluvialis squatarola* [A140]; • Knot *Calidris canutus* [A143]; • Sanderling *Calidris alba* [A144]; • Dunlin *Calidris alpina* [A149]; • Bar-tailed Godwit *Limosa lapponica* [A157]; • Redshank *Tringa totanus* [A162]; • Black-headed Gull *Chroicocephalus ridibundus* [A179]; • Roseate Tern *Sterna dougallii* [A192]; • Common Tern *Sterna hirundo* [A193]; • Arctic Tern *Sterna paradisaea* [A194]; and • Wetlands and Waterbirds [A999]. *S.I. No. 212/2010 – European Communities (Conservation of Wild Birds (South Dublin Bay and River Tolka Estuary Special Protection Area 004024) Regulations 2010.* Source: Conservation Objectives: South Dublin Bay and River Tolka Estuary SPA 004024. Version 1. (NPWS 2015a) and Natura 2000 – Standard Data Form (NPWS 2020e)
North Bull Island SPA [004006]	Approximately 6.02km east of the Proposed Scheme	• Light-bellied Brent Goose *Branta bernicla hrota* [A046]; • Shelduck *Tadorna tadorna* [A048]; • Teal *Anas crecca* [A052]; • Pintail *Anas acuta* [A054]; • Shoveler *Anas clypeata* [A056]; • Oystercatcher *Haematopus ostralegus* [A130]; • Golden Plover *Pluvialis apricaria* [A140]; • Grey Plover *Pluvialis squatarola* [A141]; • Knot *Calidris canutus* [A143]; • Sanderling *Calidris alba* [A144]; • Dunlin *Calidris alpina* [A149]; • Black-tailed Godwit *Limosa limosa* [A156]; • Bar-tailed Godwit *Limosa lapponica* [A157];

Site Name	Distance	Designation – QIs or SCIs (* = Priority Annex I Habitat)
		• Curlew *Numenius arquata* [A160]; • Redshank *Tringa tetanus* [A162]; • Turnstone *Arenaria interpres* [A169]; • Black-headed Gull *Chroicocephalus ridibundus* [A179]; and • Wetlands and Waterbirds [A199]. *S.I. No. 211/2010 – European Communities (Conservation of Wild Birds (North Bull Island Special Protection Area 004006) Regulations 2010.* Source: Conservation Objectives: North Bull Island SPA 004006. Version 1. (NPWS 2015b) and Natura 2000 – Standard Data Form (NPWS 2020f)
Baldoyle Bay SPA [004016]	Approximately 10.56km east of the Proposed Scheme	• Light-bellied Brent Goose *Branta bernicla hrota* [A046]; • Shelduck *Tadorna tadorna* [A048]; • Ringed Plover *Charadrius hiaticula* [A137]; • Golden Plover *Pluvialis apricaria* [A140]; • Grey Plover *Pluvialis squatarola* [A141]; • Bar-tailed Godwit *Limosa lapponica* [A157]; and • Wetlands and Waterbirds [A999]. *S.I. No. 275/2010 – European Communities (Conservation of Wild Birds (Baldoyle Bay Special Protection Area 004016) Regulations 2010.* Source: Conservation Objectives: Baldoyle Bay SPA 004016. Version 1. (NPWS 2013g) and Natura 2000 – Standard Data Form (NPWS 2020g)
Wicklow Mountains SPA [004040]	Approximately 12.13km south of the Proposed Scheme	• Merlin *Falco columbarius* [A098]; and • Peregrine *Falco peregrinus* [A103]. *S.I. No. 586/2012 – European Communities (Conservation of Wild Birds (Wicklow Mountains Special Protection Area 004040) Regulations 2012.* Source: Conservation Objectives: Wicklow Mountains SPA 004040. Generic Version 9.0. (NPWS 2022f) and Natura 2000 – Standard Data Form (NPWS 2020h)
Malahide Estuary SPA [004025]	Approximately 12.2km east of the Proposed Scheme	• Great Crested Grebe *Podiceps cristatus* [A005]; • Light-bellied Brent Goose *Branta bernicla hrota* [A046]; • Shelduck *Tadorna tadorna* [A048]; • Pintail *Anas acuta* [A054]; • Goldeneye *Bucephala clangula* [A067]; • Red-breasted *Merganser Mergus serrator* [A069]; • Oystercatcher *Haematopus ostralegus* [A130]; • Golden Plover *Pluvialis apricaria* [A140]; • Grey Plover *Pluvialis squatarola* [A141]; • Knot *Calidris canutus* [A143]; • Dunlin *Calidris alpina* [A149]; • Black-tailed Godwit *Limosa limosa* [A156]; • Bar-tailed Godwit *Limosa lapponica* [A157]; • Redshank *Tringa totanus* [A162]; and, • Wetland and Waterbirds [A999]. *S.I. No. 285/2011 – European Communities (Conservation of Wild Birds (Malahide Estuary Special Protection Area 004025) Regulations 2011* Source: Conservation Objectives: Malahide Estuary SPA 004025. Version 1. (NPWS 2013h) and Natura 2000 – Standard Data Form (NPWS 2020i)
Dalkey Island SPA [004172]	Approximately 14.45km south east of the Proposed Scheme	• Roseate Tern *Sterna dougallii* [A192]; • Common Tern *Sterna hirundo* [A193]; and • Arctic Tern *Sterna paradisaea* [A194]. *S.I. No. 238/2010 – European Communities (Conservation of Wild Birds (Dalkey Islands Special Protection Area 004172)) Regulations 2010*

Site Name	Distance	Designation – QIs or SCIs (* = Priority Annex I Habitat)
		Source: Conservation Objectives for Dalkey Islands SPA [004172]. Generic Version 9.0. (NPWS 2022a) and Natura 2000 – Standard Data Form (NPWS 2020j)
Howth Head Coast SPA [004113]	Approximately 14.46km east of the Proposed Scheme	• Kittiwake *Rissa tridactyla* [A188]. *S.I. No. 185/2012 – European Communities (Conservation of Wild Birds (Howth Head Coast Special Protection Area 004113)) Regulations 2012.* Source: Conservation objectives for Howth Head Coast SPA [004113]. Generic Version 9.0. (NPWS 2022b) and Natura 2000 – Standard Data Form (NPWS 2020k)
Ireland's Eye SPA [004117]	Approximately 15km east of the Proposed Scheme	• Cormorant *Phalacrocorax carbo* [A017]; • Herring Gull *Larus argentatus* [A184]; • Kittiwake *Rissa tridactyla* [A188]; • Guillemot *Uria aalge* [A199]; and • Razorbill *Alca torda* [A200]. *S.I. No. 240/2010 – European Communities (Conservation of Wild Birds (Ireland's Eye Special Protection Area 004117) Regulations 2010.* Source: Conservation objectives for Ireland's Eye SPA [004117]. Generic Version 9.0. (NPWS 2022c) and Natura 2000 – Standard Data Form (NPWS 2020l)
Rogerstown Estuary SPA [004015]	Approximately 16.54km north east of the Proposed Scheme	• Greylag Goose *Anser anser* [A043]; • Light-bellied Brent Goose *Branta bernicla hrota* [A046]; • Shelduck *Tadorna tadorna* [A048]; • Shoveler *Anas clypeata* [A056]; • Oystercatcher *Haematopus ostralegus* [A130]; • Ringed Plover *Charadrius hiaticula* [A137]; • Grey Plover *Pluvialis squatarola* [A141]; • Knot *Calidris canutus* [A143]; • Dunlin *Calidris alpina* [A149]; • Black-tailed Godwit *Limosa limosa* [A156]; • Redshank *Tringa totanus* [A162]; and, • Wetland and Waterbirds [A999]. *S.I. No. 271/2010 – European Communities (Conservation of Wild Birds (Rogerstown Estuary Special Protection Area 004015) Regulations 2010.* Source: Conservation Objectives: Rogerstown Estuary SPA 004015. Version 1. (NPWS, 2013i) and Natura 2000 – Standard Data Form (NPWS, 2020m)
Lambay Island SPA [004069]	Approximately 21.22km north east of Proposed Scheme	• Fulmar *Fulmarus glacialis* A009]; • Cormorant *Phalacrocorax carbo* A017]; • Shag *Phalacrocorax aristotelis* A018]; • Greylag Goose *Anser anser* A043]; • Lesser Black-backed Gull *Larus fuscus* A183]; • Herring Gull *Larus argentatus* A184]; • Kittiwake *Rissa tridactyl*a A188]; • Guillemot *Uria aalge* A199]; • Razorbill *Alca torda* A200]; and, • Puffin *Fratercula arctica* A204 *S.I. No. 242/2010 – European Communities (Conservation of Wild Birds (Lambay Island Special Protection Area 004069)) Regulations 2010.* Source: Conservation objectives for Lambay Island SPA [004069]. Generic Version 9.0. (NPWS 2022d) and Natura 2000 – Standard Data Form (NPWS, 2020n)
Skerries Islands SPA [004122]	Approximately 26.16km north east of the Proposed Scheme	• Cormorant Phalacrocorax carbo [A017]; • Shag *Phalacrocorax aristotelis* [A018]; • Light-bellied Brent Goose *Branta bernicla hrota* [A046]; • Purple Sandpiper *Calidris maritima* [A148]; • Turnstone *Arenaria interpres* [A169]; and,

Site Name	Distance	Designation – QIs or SCIs (* = Priority Annex I Habitat)
		• Herring Gull *Larus argentatus* [A184]. *S.I. No. 245/2010 – European Communities (Conservation of Wild Birds (Skerries Islands Special Protection Area 004122)) Regulations 2010.* Source: Conservation Objectives: Skerries Islands SPA 004122. Generic Version 9.0. (NPWS, 2022e) and Natura 2000 – Standard Data Form (NPWS, 2020o)
Rockabill SPA [004014]	Approximately 27.6km north east of the Proposed Scheme	• Purple Sandpiper *Calidris maritima* [A148; • Roseate Tern *Sterna dougallii* [A192]; • Common Tern *Sterna hirundo* [A193]; and, • Arctic Tern *Sterna paradisaea* [A194]. *S.I. No. 94/2012 – European Communities (Conservation of Wild Birds (Rockabill Special Protection Area 004014) Regulations 2012.* Source: Conservation Objectives: Rockabill SPA [004014]. Version 1. NPWS, 2013j) and Natura 2000 – Standard Data Form (NPWS, 2020p)
The Murrough SPA [004186]	Approximately 31.13km south the Proposed Scheme	• Red-throated Diver *Gavia stellata* [A001]; • Greylag Goose *Anser anser* [A043]; • Light-bellied Brent Goose *Branta bernicla hrota* [A046]; • Wigeon *Anas penelope* [A050]; • Teal *Anas crecca* [A052]; • Black-headed Gull *Chroicocephalus ridibundus* [A179]; • Herring Gull *Larus argentatus* [A184]; and, • Little Tern *Sterna albifrons* [A195] *S.I. No. 298/2011 – European Communities (Conservation of Wild Birds (The Murrough Special Protection Area 004186)) Regulations 2011.* Source: Conservation Objectives: The Murrough SPA 004186. Generic Version 9.0. (NPWS, 2022g) and Natura 2000 – Standard Data Form (NPWS 2020q)

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

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

In addition to NHAs, pNHAs are sites of significance for wildlife and habitats; and were published on a non-statutory basis in 1995 but have not since been statutorily proposed or designated. pNHAs are offered protection in the interim period under the 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 administrative boundary of Fingal County Development Plan 2017-2023 (FCC, 2017) and Dublin City County Development Plan 2016-2022 (DCC, 2016).

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

The Royal Canal pNHA is the closest pNHA to the Proposed Scheme, traversing the Proposed Scheme at the M50 junction. Following this is the Grand Canal pNHA, which is located approximately 1.7km south of the Proposed Scheme and Liffey Valley pNHA which is located approximately 1.9km south of the Proposed Scheme. It lies within the administrative boundaries of Fingal County Council Development Plan 2017-2023 and Dublin City Council 2016-2022 (and its successor 2022 to 2028 plan upon its adoption).

There are seven pNHAs that are located downstream of the Proposed Scheme. These pNHAs are North Dublin Bay pNHA, South Dublin Bay pNHA, Dolphins, Dublin Docks pNHA, Booterstown Marsh pNHA, Dalkey Coastal Zone and Killiney Hill pNHA and Howth Head pNHA. These 6 pNHAs are hydrologically connected to the Proposed Scheme via the River Tolka and the Liffey Estuary Upper. These pNHAs lie within the administrative boundaries of Fingal County Council Development Plan 2017-2023 and Dublin City Council 2016-2022 (and its successor 2022 to 2028 plan upon its adoption), as well as Dún Laoghaire Rathdown County Development Plan 2022-2028.

There is one NHA and 12 pNHAs designated for wintering bird species that are known to forage in Dublin Bay and / or roost at inland sites across Dublin. These include Skerries Islands NHA, Baldoyle Bay pNHA, Malahide Estuary pNHA, Ireland's Eye pNHA, Rogerstown Estuary pNHA, Portraine Shore pNHA, Lambay Island pNHA, North Dublin Bay pNHA, South Dublin Bay pNHA, Booterstown Marsh pNHA, Dalkey Coastal Zone and Killiney Hill pNHA, Howth Head pNHA, and the Murrough pNHA.

There is one NHAs and 28 pNHAs located in the vicinity of the Proposed Scheme. These are listed in Table 12.9 and illustrated in Figure 12.4 in Volume 3 of this EIAR. Table 12.9 lists these sites, their distance from the Proposed Scheme, and the ecological features for which the sites are designated/proposed. Fifteen of these are located within the ZoI of the Proposed Scheme (Table 12.9). These pNHAs are valued as being of National Importance.

Table 12.9: National sites located within the ZoI of the Proposed Scheme Boundary (highlighted in light blue), and those in the Wider Area of the Proposed Scheme Boundary

Site Name	Distance	Description
NHAs		
Skerries Islands NHA [000204]	approximately 26.16km north east of the Proposed Scheme	See Table 12.8 under Skerries Island SPA
pNHAs		
Royal Canal pNHA [002103]	Intersects the Proposed Scheme	Diversity of species. Canal supports and presence of legally protected plant species, opposite-leaved pondweed *Groenlandia densa*
Grand Canal pNHA [002104]	approximately 1.68km south of the Proposed Scheme	Diversity of species. Canal supports and presence of legally protected plant species, opposite-leaved pondweed *Groenlandia densa*
Liffey Valley pNHA [000128]	approximately 1.77km south of the Proposed Scheme	Presence of legally protected plant species, hairy St. John's-wort *Hypericum hirsutum*, rare Red List plant species green figwort *Scrophularia umbrosa* and yellow archangel *Lamiastrum galeobdolon* and the diversity of habitat present.
North Dublin Bay pNHA [000206]	approximately 2.89km east of the Proposed Scheme	See Table 12.8 under North Dublin Bay SAC, North Bull Island SPA and South Dublin Bay and River Tolka Estuary SPA
South Dublin Bay pNHA [000210]	approximately. 4.61km east of the Proposed Scheme	See Table 12.8 under South Dublin Bay SAC and South Dublin Bay and River Tolka Estuary SPA
Santry Demesne pNHA [000178]	approximately. 4.49km north of the Proposed Scheme	Presence of legally protected plant species, hairy St. John's-wort *Hypericum hirsutum*, and woodland
Dolphins, Dublin Docks pNHA [000201]	approximately 5.38km east of the Proposed Scheme	See Table 12.8 under South Dublin Bay and River Tolka Estuary SPA
Booterstown Marsh pNHA [001205]	approximately. 6.55km south east of the Proposed Scheme	See Table 12.8 under South Dublin Bay and River Tolka Estuary SPA
Rye Water Valley/Carton pNHA [001398]	approximately. 6.64km south west of the Proposed Scheme	See Table 12.8 under Rye Water Valley / Carton SAC
Dodder Valley pNHA [000991]	approximately. 7.2km south of the Proposed Scheme	The last remaining stretch of natural riverbank vegetation on the River Dodder in the built-up Greater Dublin Area (GDA).
Fitzsimon's Wood pNHA [001753]	approximately 9.06km south of the Proposed Scheme	Birch woodland, which is very rare in County Dublin.
Feltrim Hill pNHA [001208]	approximately 9.73km north of the Proposed Scheme	Good example of knoll-reef phenomenon. Previously known to contain two rare plant species, namely spring squill *Scilla verna* and long-stalked crane's-bill *Geranium columbinum*
Baldoyle Bay pNHA [000199]	approximately 10.14km east of the Proposed Scheme	See Table 12.8 under Baldoyle Bay SAC and Baldoyle Bay SPA
Glenasmole Valley pNHA [001209]	approximately 11.33km south of the Proposed Scheme	See Table 12.8 under Glenasmole Valley SAC
Sluice River Marsh pNHA [001763]	approximately 10.61km east of the Proposed Scheme	Freshwater marsh
Dalkey Coastal Zone and Killiney Hill pNHA [001206]	approximately 11.7km 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

Site Name	Distance	Description
		includes some scare species. The islands are important bird sites. See Table 12.8 under Rockabill Islands SAC and Dalkey Islands SPA
Lugmore Glen pNHA [001212]	approximately 11.81km south of the Proposed Scheme	Presence of the rare Red Data Book species Yellow Archangel (*Lamiastrum galeobdolon*).
Howth Head pNHA [000202]	approximately 11.45km east of the Proposed Scheme	See Table 12.8 under Howth Head SAC and Howth Head Coast SPA
Malahide Estuary pNHA [000205]	approximately 12.2km east of the Proposed Scheme	See Table 12.8 under Malahide Estuary SAC and Malahide Estuary SPA
Dingle Glen pNHA [001207]	approximately 13.39km south east of the Proposed Scheme	Variety of habitat present, including woodland
Slade Of Saggart and Crooksling Glen pNHA [000211]	approximately 13.97km south of the Proposed Scheme	Wooded river valley and small wetland system. Presence of rare plant species (yellow archangel *Lamium galeobdolon*), rare invertebrate (*Halticoptera patellana*) and a variety of wildfowl species.
Ballybetagh Bog pNHA [001202]	approximately 14.36km south east of the Proposed Scheme	Marshland
Loughlinstown Woods pNHA [001211]	approximately 14.79km south east of the Proposed Scheme	Demesne-type mixed woodland
Ireland's Eye pNHA [000203]	approximately 15km east of the Proposed Scheme	See Table 12.8 under Ireland's Eye SAC and Ireland's Eye SPA
Rogerstown Estuary pNHA [000208]	approximately 16.17km north east of the Proposed Scheme	See Table 12.8 under Rogerstown Estuary SAC and Rogerstown Estuary SPA
Portraine Shore pNHA [001215]	approximately 16.71km north of the Proposed Scheme	See Table 12.8 under Rogerstown Estuary SAC and Rogerstown Estuary SPA
Lambay Island pNHA [000204]	approximately 21.27km north east of Proposed Scheme	See Table 12.8 under Lambay Island SAC and Lambay Island SPA
The Murrough pNHA [004186]	approximately 31km south of the Proposed Scheme	See Table 12.8 under The Murrough SPA

12.3.4.3 **Other Designated Sites**

Other designations recognised in the wider Greater Dublin Area (GDA) including RAMSAR wetlands sites and UNESCO Dublin Bay Biosphere are considered in terms of the European and National sites assessment, whilst the three Special Area Amenity Order are local to specific Bus Connects corridors but are nonetheless captured in the overall EIAR biodiversity assessment and Nature Impact Statement by virtue of overlapping nature designations, namely European and nationally designated sites.

12.3.4.3.1 RAMSAR Sites

The Convention on Wetlands is an intergovernmental treaty adopted on 2 February 1971 in the Iranian city of Ramsar. The official name of the treaty "*The Convention on Wetlands of International Importance especially as Waterfowl 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).

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

12.3.4.3.2 UNESCO Dublin Bay Biosphere

Dublin Bay was initially recognised by the United Nations Education, Scientific and Cultural Organisation (UNESCO) for its rare and internationally important habitats and species. 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 Reserve now extends to over 300 km^2 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 new specific legal protection to Dublin Bay, it greatly enhances the many legal protections that already exist by improving the co-ordination and management of its functions in a holistic and integrated way. In this respect, the biodiversity assessment for the EIAR and the AA for the Proposed Scheme collectively addresses the key biodiversity elements of the Biosphere designation, and no further discussion is provided.

12.3.4.3.3 Special Amenity Area Order (SAAO)

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

Three such special amenity area orders have been recognised in Ireland, all of in which are located within the Greater Dublin Area and can cross local authority administrative boundaries. None are directly intersected by the Proposed Scheme. They include:

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

The designations re-enforces the protection of 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 respectively, by virtue of overlapping nature designations.

12.3.5 Habitats

12.3.5.1 **Overview**

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

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

- Flower beds and borders (BC4);
- Stone walls and other stonework (BL1);
- Buildings and artificial surfaces (BL3);
- Tidal rivers (CW2);
- Exposed sand, gravel or till (ED1)
- Spoil and bare ground (ED2);
- Recolonising bare ground (ED3);

- Depositing/ lowland rivers (FW2);
- Canals (FW3);
- Amenity Grassland (Improved) (GA2);
- Dry calcareous and neutral grassland (GS1);
- Dry meadows and grassy verges (GS2);
- Residential;
- (Mixed) broadleaved woodland (WD1);
- Mixed broadleaved / conifer woodland (WD2);
- Scattered trees and parkland (WD5);
- Hedgerows (WL1);
- Treelines (WL2);
- Wet willow-alder-ash woodland (WN6);
- Scrub (WS1);
- Immature woodland (WS2); and,
- Ornamental/ non-native shrub (WS3).

No Annex I habitats were recorded inside the boundary Proposed Scheme. However Tidal rivers (CW2) (corresponding to Annex I Estuaries [1130]) is in close proximity where the Proposed Scheme terminates at Ellis Quay. It is further discussed in Section 12.3.5.5. Elsewhere, small fragmentary sections of priority Annex I Alluvial woodland (corresponding to Fossitt classification category Wet willow-alder-ash woodland (WN6) were recorded along the River Tolka valley north (and outside of the Proposed Scheme boundary) of the N3 road. These are further discussed in Section 12.3.5.20.

12.3.5.2 **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 at various locations across the Proposed Scheme, the largest area of this habitat type is located around the perimeter of Blanchardstown Retail Park and at Ashtown Gate office complex and consists of planted beds lining commercial developments. This habitat type was also identified opposite Cabra Library on the Navan Road lining the roadside to the rear of residential properties.

Ornamental species present at this habitat include non-native African lily *Agapanthus* sp., palm species *Arecaceae* sp., cotoneaster species *Cotoneaster* sp., with native lavender species *Lavandula* sp., heather species *Erica* sp., common ivy *hedera helix* and mixed bedding plants.

This habitat type is also present throughout the Proposed Scheme in smaller areas associated with commercial developments or industrial complexes, planting at roundabouts and along roadsides in suburban areas. This habitat type was also found in mosaics with the following habitats: amenity grassland (improved) (GA2), scattered trees and parkland (WD5), treelines (WL2) and immature woodland (WS2).

This habitat type is of Local Importance (Lower Value) due to its low species diversity and the presence and dominance of non-native species.

12.3.5.3 **Stone walls and other stonework (BL1)**

Stone walls were present in five locations across the Proposed Scheme, comprising either property boundaries or roadside boundaries. The largest areas of this habitat were located along the Navan Road at several locations including at Millstead / Woodsend Apartments, Talbot Court, Ashtown Roundabout, and from the Darling Estate to Aura De Paul Swimming Pool. Additional discrete areas were located at Hanlon's Corner on the Old Cabra Road.

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.

This habitat type is of Local Importance (Lower Value) due to being devoid of vegetation.

12.3.5.4 **Buildings and artificial surfaces (BL3)**

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

This habitat type was also found in association with the following habitats: amenity grassland (improved) (GA2), recolonising bare ground (ED3), scattered trees and parkland (WD5), and scrub (WS1).

This habitat type is of Local Importance (Lower Value) due to being a built / artificial surface, devoid of vegetation.

12.3.5.5 **Tidal rivers (CW2)**

The Liffey Estuary Upper is considered tidal as far upstream as Irish National War Memorial Gardens and extends downstream as far as Talbot Memorial Bridge. Thereafter the Lower Liffey Estuary, continues downstream a short distance into Dublin Bay (beyond the North Bull and Poolbeg Lighthouses).

In respect of the Proposed Scheme, this habitat type consisted entirely of the Liffey Estuary Upper, located alongside the terminus of the Proposed Scheme at Arran Quay. This section of the river is approximately 40-45m wide and has an average depth of approximately 4-5m with high retaining quay walls either side of the channel.

The Liffey Estuary Upper is classified as 'Good' status for the period 2013-2018 and is not deemed at risk of failing to meet its requirements under the Water Framework Directive. However, it is classified as 'At Risk' of not achieving the WFD objective of Good Status by 2027, which means a deterioration in status is anticipated.

The Liffey Estuary Lower commences downstream of the Proposed Scheme at the Talbot Memorial Bridge where it corresponds to the Annex I Estuaries [1130] habitat and its location overlaps with the current favourable reference range and distribution of this Annex I habitat (NPWS 2019b). The current trend for this habitat at a national scale is assessed as being 'stable', with both its range and area in a 'favourable' condition. Future prospects for the habitat are deemed as 'inadequate' based on its 'poor' structure and functions. Therefore, its overall conservation status is deemed as 'inadequate' (NPWS 2019b).

This habitat type corresponds with the Annex I habitat Estuaries [1130] and is of National Ecological Importance.

12.3.5.6 **Exposed sand, gravel or till (ED1)**

This habitat type was assigned to habitats which consisted of till or boulder clay. An area of exposed sand, gravel or till was identified at three locations across the Proposed Scheme; the largest of these was at Waterville Park. Other locations include along the railway tracks at the M50 junction and at the entrance to Millennium Park at Blakestown Roundabout. This habitat consists of spoil heaps containing railway ballast and rubble, and are often temporary in nature and as such rarely support a diverse flora assemblage.

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

12.3.5.7 **Spoil and bare ground (ED2)**

This habitat type was present at six locations across the Proposed Scheme, the largest of which were identified to the west of Navan Road Parkway and Phoenix Park Racecourse. Other areas of this habitat type were identified In Waterville Park adjacent to Mill Road, along the Navan Road at Castleknock Manor, in Stoneybatter at Arbour Hill and along the railway tracks at Old Cabra Road. This habitat type is also present in small areas of bare ground, often associated with access ways, such as gravel driveways. Areas of bare ground, which have recently been sown with grass but are not yet adequately vegetated were also classified as being spoil and bare ground habitat.

Plant species recorded within this habitat include yarrow *Achillea millefolium*, butterfly bush *Buddleja davidii*, fescue species *Festuca* sp., and bramble *Rubus fructicosus* agg.

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

12.3.5.8 **Recolonising bare ground (ED3)**

This habitat type was assigned to areas of disturbed ground and/or artificial surfaces which have been recolonised by plants, and vegetation cover is now greater than 50%. This habitat type was identified in five locations including: the M50 junction, along the Royal Canal, along the Navan Road median at Snugborough Road / Mill Road, west of Navan Road Parkway and west of Phoenix Park Racecourse.

Most of the vegetation recorded were ruderal species commonly found in this habitat type. Species included yarrow, fescue species, Yorkshire-fog *Holcus lanatus*, birds-foot trefoil *Lotus corniculatus*, ribwort plantain *Plantago lanceolata*, greater plantain *P. major*, creeping cinquefoil *Potentilla reptans*, bramble, broad-leaved dock *Rumex obtusifolius*, snowberry *Symphoricarpos albus* and colt's-foot *Tussilago farfara*.

This habitat type also occurred in mosaics with the following habitat types: buildings and artificial surfaces (BL3); and scrub (WS1).

This habitat type is of Local Importance (Lower Value), due to the disturbed nature of this habitat.

12.3.5.9 **Depositing/lowland rivers (FW2)**

This habitat type refers to the River Tolka (Tolka_040) which is classified as a depositing / lowland river. The River Tolka (Tolka_040) is present at multiple locations across the Proposed Scheme and are discussed individually below. The Tolka_050 will not be crossed by the Proposed Scheme but flows parallel to it, approximately 300m north-east of the R147 Navan Road.

The Proposed Scheme crosses the River Tolka (Tolka_040) at two locations along the Navan Road between Snugborough Road and Connolly Hospital Blanchardstown referred to as CBC0005AR001 and CBC005AR002, (illustrated in Figure 12.2 in Volume 3 of this EIAR). The River Tolka is culverted under the Navan Road. The River Tolka is classified as 'Poor' WFD status for the period 2013-2018 and is deemed At Risk of failing to meet its requirements under the Water Framework Directive. Biological water quality, based on Q-sampling undertaken by Triturus Environmental Ltd., was calculated as Q3 (poor status) (Triturus Environmental Ltd, 2020).

The River Tolka at the CBC0005AR001 location is a semi-natural lowland depositing watercourse (FW2) with evident historical deepening and bank modification works. These included gabion basket scour protections and a concrete culverted bed at the N3 road crossing. The river profile mainly comprises of deep glide (i.e. 60%) and pool (30%) with more localised riffle (10%). The channel averaged approximately 5-8m wide, with a variable depth of approximately 0.3-1.5m deep. The channel bed comprised rendered concrete under the road crossing. Downstream of the culvert, the substrata were dominated by boulder and cobble with pockets of very localised medium and fine gravels. Riparian vegetation identified along the River Tolka banks at this location include nettle *Urtica dioica*, butterbur *Petasites hybridus*, thistles *Cirsium* sp., and red osier dog-wood *Cornus cericea*. Riparian trees were scattered along the banks with crack willow *Salix fragilis* and sycamore *Acer pseudoplatanus* (Triturus Environmental Ltd, 2020).

At the CBC0005AR001 location, the substrata of the River Tolka was heavily bedded with 30% cover of filamentous green algae, indicating enrichment, and was heavily silted. The macrophyte community was limited to small patches of emergent branched-bur reed *Sparganium erectum* and water-cress *Rorripa nasturtium-aquaticum* agg. The coarse substrata on the bed also supported the aquatic moss species *Cinclidotus fontinaloides* and *Platyhypnidium riparoides* locally (Triturus Environmental Ltd, 2020).

The River Tolka CBC005AR002 location is approximately 0.5km downstream of the site CBC0005AR001. At this location, the river profile was dominated by glide (50%) and riffle (40% area) with more localised pool 10%. The channel width was variable between approximately 6m and 14m in width. The depth was also variable and recorded between approximately 0.4m and 1.0m in depth. The good semi-natural character for an urban river,

however, was diminished by riverine substrata that were in poor condition due to heavy siltation. Furthermore, hydro-morphologically the river had been altered at the N3 crossing with the channel bed comprising of rendered concrete with little gravel or cobble deposition under the road crossing. Downstream of the culvert, the bed comprised bedrock, boulder and cobble with very localised pockets of medium and fine gravels. Riparian vegetation identified along the River Tolka banks at this location include winter heliotrope, nettle, bramble, bracken *Pteridium aquilinum*, butterfly-bush, hemp agrimony *Eupatorium cannabinum*, spear thistle *C. vulgare* and hogweed *Heracleum sphondylium*. Trees comprised crack willow with a more mature treeline downstream of the survey area (Triturus Environmental Ltd, 2020).

The instream vegetation of the River Tolka at the CBC005AR002 location found substrata were heavily bedded and covered by filamentous green algae indicating nutrient enrichment). While the bed was heavily silted, the swift flows reduced the visibility of deposition levels on the instream substrata (as with other areas on the River Tolka). The macrophyte community comprised locally frequent water-cress and lesser water parsnip *Berula erecta* in the margins. The coarse substrata on the bed also supported *C. fontinaloides* and *P. riparoides* locally (Triturus Environmental Ltd, 2020- refer to Appendix A12.2 Aquatic Baseline Report in Volume 4 of this EIAR).

This habitat type is of County Importance as large stretches of relatively unmodified watercourses are not common in the surrounding area and is an important biodiversity corridor with direct connectivity to downstream to European sites.

12.3.5.10 **Canals (FW3)**

The Proposed Scheme traverses the Royal Canal aqueduct at the M50 junction on the Navan Road (illustrated in Figure 12.5 in Volume 3 of this EIAR). The Royal Canal is classified as 'good' WFD status for the period 2013-2018.

Species recorded along the canal banks include pendulous sedge *Carex pendula*, reed canary-grass *Phalaris arundinaceae*, yellow Iris *pseudacorus* and hedge bindweed *Calystegia sepium*. Dry meadows and grassy verges (GS2) was identified adjacent to canal east of the M50 bridge.

A separate aquatic survey was conducted along the Royal Canal to inform the Proposed Ballymun Finglas Bus Connects Scheme during October 2020 between the 4th and 5th lock (level 4, Phibsboro) approximately 6km from the Proposed Scheme. The results of this survey found the macrophyte community was dominated by yellow lily *Nuphar lutea* (both submerged and emergent forms), with common duckweed *Lemna minor,* whorled-water milfoil *Myriophyllum verticillatum*, stonewort species *Chara* sp. and ivy-leaved duckweed *Lemna trisulca* being frequent. Amphibious bistort *Persicaria amphibia* was occasional on bank and in margins. Non-native Invasive species also identified at this location include Canadian pondweed *Elodea canadensis* and the third schedule species, Nuttall's pondweed *Elodea nuttallii* (Triturus Environmental Ltd, 2020 refer to Appendix A12.2 Aquatic Baseline Report in Volume 4 of this EIAR).

The legally-protected Flora Protection Order species opposite-leaved pondweed *Groenlandia densa* is recorded at several areas throughout the Royal Canal, the desk study returned records for this species within approximately 5.5km of the Proposed Scheme within the 2km Grid O13N at Glasnevin Cemetery.

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

12.3.5.11 **Amenity grassland (Improved) (GA2)**

Amenity grassland was a commonly recorded habitat across the Proposed Scheme; often along road medians, within public parks, schools and at Belvedere Sports Grounds. It is present in small areas located across the entirety of the Proposed Scheme (illustrated in Figure 12.5in Volume 3 of this EIAR). The largest areas of this habitat included public green space along Blanchardstown Road South, Millennium Park at Blakestown Roundabout, Corduff Park, Waterville Park, Travelodge, and west of Phoenix Park Racecourse. This habitat was also identified along the road medians at Blanchardstown Shopping Centre and Navan Road, and in the grounds of St. Joseph's School for Deaf Boys on the Navan Road.

Grass species present included red fescue *Festuca rubra*, perennial ryegrass *Lolium perenne* and annual meadow grass *Poa annua* while forb species present included silverweed *Potentilla anserina*, daisy *Bellis*

perennis, common thistle *Cirsium vulgare*, pineappleweed *Matricaria discoidea*, black medick *Medicago lupulina*, horsetail species *Equisetum* sp., ribwort plantain, greater plantain, creeping cinquefoil, meadow buttercup *Ranunculus acris*, creeping buttercup *R. repens*, broad-leaved dock ,wood dock *Rumex sanguineus*, red clover *Trifolium pratense*, white clover *T. repens* and common ragwort *Jacobaea vulgaris*.

This habitat type often occurred in mosaics with buildings and artificial surfaces (BL3), flower beds and borders (BC4), ornamental/ non-native shrub (WS3), hedgerows (WL1), treelines (WL2) and scattered trees and parkland (WD5). This habitat type is of Local Importance (Lower Value), due to low species diversity.

12.3.5.12 **Dry calcareous and neutral grassland (GS1)**

This habitat type was identified at three locations across the Proposed Scheme. Along a road median on the Navan Road at Talbot Downs, The Connolly Hospital Blanchardstown exit ramp and at the M50 junction east of Junction Six. It was not extensive in expanse nor distribution. Grass species present included cock's-foot *Dactylis glomerata*, Yorkshire-fog, red fescue, perennial rye-grass and annual meadow grass while forb species present included yarrow, red clover, hawksbeard *Crepis* sp., common centaury *Centaurium erythraea*, pyramidal orchid *Anacamptis pyramidalis*, common ragwort, common dandelion *Taraxacum officinale* agg., common hogweed *Heracleum sphondylium*, white clover, soft rush *Juncus effusus*, oxeye daisy *Leucanthemum vulgare*, bird's-foot trefoil, black medick, ribwort plantain, creeping cinquefoil, cowslip *Primula veris*, self-heal *Prunella vulgaris*, meadow buttercup and creeping buttercup. Shrub and tree species, were in low abundance where present and included goat willow *Salix caprea*, crack willow, butterfly bush and hornbeam *Carpinus betulus*. Notwithstanding its relatively diverse species assemblage, the habitat is not considered to align with the priority annex I habitat *semi-natural dry grasslands and scrubland facies on calcareous substrates* (Festuco-Brometea) (* important orchid sites) [6210], owing to the absence of orchid species recorded on this typically semi natural managed grassland habitat.

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

12.3.5.13 **Dry meadows and grassy verges (GS2)**

This habitat type is comprised of unmanaged grassland areas including areas of parkland following a low maintenance regime and roadside verges. This habitat type was recorded in nine areas of varying sizes located across the Proposed Scheme. Prominent areas of this habitat were identified along the Navan Road medians east and west of the M50 junction, at the Snugborough Road slipway and from the M50 to east of the Navan Road Parkway. Other areas of this habitat type are present at the rear of Blanchardstown Garda Station, around Junction Six, west of Navan Road Parkway, Corduff Park, Waterville Park and along the banks of the Royal Canal (illustrated in Figure 12.5 in Volume 3 of this EIAR).

Grass species present included sweet vernal grass *Anthoxanthum odoratum*, false oatgrass *Arrhenatherum elatius*, cock's-foot and Yorkshire fog. While forb species present included common knapweed *Centaurea nigra*, creeping thistle *Cirsium arvense*, hoary willowherb *Epilobium parviflorum*, pendulous sedge *Carex pendula*, lady's bedstraw *Galium verum*, common hogweed, birds-foot trefoil, black medick, winter heliotrope *Petasites pyrenaicus*, ribwort plantain, creeping cinquefoil, meadow buttercup, common dandelion, red clover, coltsfoot, bush vetch *Vicia sepium* and common poppy *Papaver rhoeas*. Planted ornamentals within this habitat type included: bird of paradise *Strelitzia reginae* and montbretia *Crocosmia x crocosmiiflora.*

Additional species identified in Waterville Park / Connolly Hospital Blanchardstown include creeping bent grass *Agrostis stolonifera* and perennial rye-grass, while forb species present included Canadian fleabane *Erigeron canadensis*, smooth sow-thistle *Sonchus oleraceus*, wild teasel *Dipsacus fullonum*, ragwort, broad-leaved dock, ivy-leaved toadflax *Cymbalaria muralis*, common mugwort *Artemisia vulgaris*, meadowsweet *Filipendula ulmaria*, red valerian *Centranthus ruber*, common nettle *Urtica dioica*, great willowherb *Epilobium hirsutum*, white clover, amphibious bistort *Persicaria amphibia*, creeping buttercup, silverweed, yarrow and hedge bindweed. The vegetation identified along the southern bank of the Royal Canal comprised of species including creeping bent-grass, perennial rye-grass, common hogweed, hedge bindweed, meadowsweet, yarrow, amphibious bistort, common nettle, ribwort plantain, creeping buttercup, silverweed and Japanese Cherry *Prunus serrulata*.

This habitat type also occurred in mosaics with scrub (WS1).

This habitat type is of Local Importance (Lower Value), due to being relatively species-poor overall and highly fragmented in high disturbance locations such as road medians.

12.3.5.14 **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 entire scheme (illustrated in Figure 12. 5 in Volume 3 of this EIAR).

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

12.3.5.15 **Mixed broadleaved woodland (WD1)**

This habitat was identified at seven locations along the Proposed Scheme (illustrated in Figure 12.5 in Volume 3 of this EIAR). The largest areas of this habitat type are located in Waterville Park, Connolly Hospital Blanchardstown, Corduff Park and along the Navan Road at Westpoint. Other areas of this habitat type were recorded at the Navan Road underpass adjacent to Snugborough Road, Castleknock Manor and at Ashtown Gate.

Tree species recorded at these locations include field maple *Acer campestre*, maple species *Acer* sp., horse chestnut *Aesculus hippocastanum*, alder *Alnus glutinosa*, silver birch *Betula pendula*, birch species *Betula* sp., hazel *Corylus avellana*, hawthorn *Crataegus monogyna*, beech *Fagus sylvatica*, copper beech *F. sylvatica* f. *purpurea*, ash *Fraxinus excelsior,* larch species *Larix* sp., bay laurel *Laurus nobilis*, Scot's pine *Pinus sylvestris*, sycamore *Acer pseudoplatanus*, Japanese cherry, cherry laurel *Prunus laurocerasus*, oak species *Quercus* sp., goat willow, willow species *Salix* sp., elder *Sambucus nigra* and yew *Taxus baccata*.

Where present understories and ground flora species include cow parsley *Anthriscus sylvestris*, lords-and-ladies *Arum maculatum*, hart's-tongue fern *Asplenium scolopendrium*, yellow-wort *Blackstonia perfoliata*, rapeseed *Brassica napus*, cornflower *Centaurea cyanus*, common knapweed, common thistle, field bindweed *Convolvulus arvensis*, broad buckler-fern *Dryopteris dilatata*, fumitory *Fumaria officinalis*, cleavers *Galium aparine*, herb Robert *Geranium robertianum*, wood avens *Geum urbanum*, common hogweed, common ragwort, deadnettle *Lamium purpureum*, oxeye daisy, restharrow, winter heliotrope, creeping buttercup, broad-leaved dock, wood dock *R. sanguineus*, common poppy, marigold species, common nettle, speedwell species *Veronica sp*., bush vetch, St. John's wort species *Hypericum* sp., rose species, bramble, snowberry and gorse *Ulex* sp.. Grass species included Yorkshire-fog and perennial rye-grass. Garden escapees such as New Zealand broadleaf *Griselinia Littoralis*, ivy, butterfly bush, cotoneaster species, garden privet and Japanese rose were also identified due to the suburban location of these habitats.

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

12.3.5.16 **Mixed broadleaved / conifer woodland (WD2)**

This habitat was identified at one location along the Proposed Scheme (illustrated in Figure 12.5 in Volume 3 of this EIAR). The habitat was identified in the grounds of Connolly Hospital Blanchardstown, north of Junction Six. Tree species recorded at this location include yew, cypress sp., and Scot's pine. This habitat is located along the banks of the River Tolka where a stand of the third schedule non-native invasive species Himalayan balsam *Impatiens glandulifera* was identified CBC0005IAPS005.

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

12.3.5.17 **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 thirteen locations across the proposed scheme associated with parks and playing pitches (illustrated in Figure 12.5 in Volume 3 of this EIAR). The most significant areas of this habitat type were present at Castlecurragh Park, Blakestown / Blanchardstown Road South, Corduff Park, Waterville Park, Millstead and Talbot Downs.

Tree species identified at these locations include maple species, horse chestnut, birch species, hornbeam, beech, ash, larch species, pines *Pinus* sp. and small-leaved lime *Tilia cordata*. Ornamental tree species such as eucalyptus *Eucalyptus gunnii* were also featured occasionally.

This habitat type also occurred in mosaics with buildings and artificial surfaces (BL3), amenity grassland (GA2) and flower beds and borders (BC4).

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

12.3.5.18 **Hedgerows (WL1)**

Hedgerows were identified across the Proposed Scheme (illustrated in Figure 12.5 in Volume 3 of this EIAR). 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 those along roadsides, within the vegetated median of larger roads and of screening vegetation at residential properties, Substantial areas of this habitat are present along the Navan Road from Snugborough Road to The Connolly Hospital Blanchardstown, east and west of Navan Road Parkway, Travelodge and Phoenix Park Racecourse. Other areas included at St. Vincent's Special National School, Assisi House and Cabra Garda Station.

The species composition varied greatly within this habitat type. Tree species consist of field maple, maple species, alder, silver birch, hornbeam, hazel, hawthorn, leyland cypress *Cupressus* X *leylandii*, cypress species *Cupressus* sp., beech, ash, bay laurel, pine species, sycamore, aspen *Populus tremuloides*, cherry, blackthorn *Prunus spinosa*, oak species, weeping willow *Salix babylonica*,, crack willow *Salix euxina*, willow species, elder, yew, small-leaved lime, elm species *Ulmus* sp., dogwood species *Cornus* sp. Shrub species include red robin *Photinia* X *fraseri*, cherry laurel, butterfly bush, cotoneaster species, snowberry, fuchsia species *Fuchsia* sp., garden privet, bramble and Japanese rose. Ground flora and forb species consist of ivy, wood sedge *Carex sylvatica*, silverweed, common thistle, field bindweed, white rosebay willowherb *Chamaenerion angustifolium*, horsetail species, cleavers, wood avens, cowslip, curled dock *Rumex crispus*, broad-leaved dock, common ragwort, common nettle, common valerian *Valeriana officinalis* and bush vetch. Grass species include perennial ryegrass, barren brome grass *Bromus sterilis* and couch grass *Elymus repens*.

This habitat type also occurred in mosaics with the following habitats; amenity grassland (GA2), scrub (WS1), and treelines (WL2).

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

12.3.5.19 **Treelines (WL2)**

This habitat is comprised of narrow rows or single lines of trees which are greater than 5m in height. This habitat type was recorded widely across the study area of the Proposed Scheme (illustrated in Figure 12.5 in Volume 3 of this EIAR). In the context of the Proposed Scheme, treeline habitat is typically urban street planting along footpaths/ strips of amenity grassland and road edges. Substantial areas of this habitat are present along the perimeter and the roads surrounding Blanchardstown Retail Parks and Shopping Centre, the central road reservations and medians along the Navan Road from Blanchardstown Road North to Snugborough Road and from Navan Road Parkway to Old Cabra Road. Tree planting is also present along footpaths and green areas at

Coolmine Cottages, Kempton residential estate, Millstead, Ashtown Gate Road, Manor Street, Prussia Street and Blackhall Street. Additional areas of this habitat type include Waterville Park and along the railway tracks at Old Cabra Road.

Species frequently recorded include common lime *Tilia* × *europaea*, elm species, small-leaved lime, rowan *Sorbus aucuparia*, field maple, horse chestnut, maple species, alder, silver birch, birch species, hornbeam, hazel, hawthorn, cypress species, beech, ash, larch, apple tree *Malus domestica*, Scot's pine, London plane *Platanus* × *acerifolia*, sycamore, cherry, cherry laurel, blackthorn, holm oak *Quercus ilex* and other oak species. The understory consists of a variety of species, mainly shrubs including dog rose *Rosa canina*, bramble, elder, cotoneaster species, ivy but also including common nettle.

This habitat type also occurred in mosaics with amenity grassland (GA2), scrub (WS1) and hedgerows (WL1).

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

12.3.5.20 **Wet willow-alder-ash woodland (WN6)**

This habitat type was identified on the alluvial floodplain of the River Tolka within Corduff Park, Waterville Park and in the grounds of Connolly Hospital Blanchardstown. Species frequently recorded include grey willow *Salix cineria*, goat willow, common alder, ash, silver birch and downy birch *Betula pubescens*. Other tree species included beech, yew, wych elm *Ulmus glabra*, sycamore, hazel, pedunculate oak *Quercus robur*, hornbeam and cherry laurel.

The understory consists of a variety of species including Irish ivy *Hedera hibernica*, pendulous sedge, common nettle, foxglove *Digitalis purpurea*, marsh-bedstraw *Galium palustre*, creeping bent-grass, reed canary-grass, lords-and-ladies, yellow iris, thistle species *Cirsium s*p., harts-tongue fern and broad buckler-fern.

This habitat type has links with the priority Annex I Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (Alno-padion, Alnion incanae, Salicion albae) (91E0) which comprises indicator species including; alder *Alnus glutinosa Betula pubescens, Crataegus monogyna, Fraxinus excelsior, Salix cinerea,* understory indicators are *Agrostis stolonifera, Angelica sylvestris, Filipendula ulmaria, Galium palustre, Iris pseudacorus, Mentha aquatica, Phalaris arundinacea, Rumex sanguineus and Urtica dioica* (Perrin *et al.,* 2008; NPWS 2019*).*

Three areas of Priority Annex I designated 91E0 Alluvial forests were mapped in accordance with NPWS Article 17 NPWS reporting were surveyed in October 2020. Two at Corduff Park and one at Waterville Park. The two stands at Corduff Park were intact and extended along the River Tolka in mosaics with scrub (WS1) and (Mixed) broadleaved woodland (WD1) at multiple sites within the park boundary. The stand at Waterville Park was degraded and fragmented, with evidence of construction at Mill Road with habitats spoil and bare ground (ED2) and scrub (WS1) recorded at this section.

Additional areas of this habitat type were present in narrow riparian strips, west of Mill Road (south of Connolly Hospital) that has links to Annex I alluvial woodland (91E0) due to the tree and forbs species composition. Owing to the lateness of the survey season, indicator species identification was difficult. The survey identified as frequent, four of the required tree species; grey willow, alder, ash and downy birch along low-lying river sections and five positive indicator species in the understory including common nettle, marsh-bedstraw, creeping bent-grass, reed canary-grass and yellow iris. Despite sub-optimal survey timing, this habitat is deemed to correspond to the priority Annex I alluvial woods (91E0), based on the ground conditions and floristic data.

An additional survey in October 2020 included wooded sections adjacent to the River Tolka such as The Grange, Waterville Park and Corduff Park. The purpose of the survey was to confirm if priority Annex I (91E0) alluvial woodlands lay adjacent to or within ZOI of the Proposed Scheme, as identified in earlier 2018 - 2020 multidisciplinary surveys. The habitat was typically fragmentary in nature and degraded in terms of floristic assemblage and hydrological conditions but is nonetheless classified as priority Annex I habitat in accordance with results described in *National Survey of Native Woodlands 2003-2008. (*Perrin *et al.* 2008). All of the alluvial woodland habitat is situated outside of the boundary of the Proposed Scheme but potentially within the hydrogeological ZOI.

Other habitats recorded around the fragments and degraded are nonetheless classified as priority Annex I habitat included: included Buildings and artificial surfaces BL3, (mixed) broadleaf woods WD1, mixed broadleaved/conifer WD2, Scattered trees and parkland WD5, Amenity grassland (improved) GA2**,** meadows and grassy verges GS2, Wet willow-alder-ash woodland WN6, and Depositing/lowland rivers FW2.

This habitat type is of International Importance as it is a priority Annex I habitat.

12.3.5.21 **Scrub (WS1)**

Scrub was identified in nine locations across the Proposed Scheme (illustrated in Figure 12.5 in Volume 3 of this EIAR). The largest areas of this habitat were located at Millennium Park Coolmine, Coolmine Cottages, Waterville Park at Mill Road, M50 Junction 6 and intermittently along the Navan Road from Travelodge to Phoenix Park Racecourse.

At each location bramble was identified as the dominant species throughout, and in areas where other species occurred, they typically in very low numbers. These species comprised common knapweed, common thistle, hawk's-beard, cock's-foot, horsetail species, wallflower species *Erysimum* sp., bedstraw species, lady's bedstraw, ash saplings, winter heliotrope, ribwort plantain, creeping cinquefoil, bramble, elder, gorse, sedge species *Carex* sp. and Yorkshire fog.

This habitat type also occurred in mosaics with buildings and artificial surfaces (BL3), dry meadows and grassy verges (GS2), immature woodland (WS2) and recolonising bare ground (ED3).

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

12.3.5.22 **Immature woodland (WS2)**

This habitat type was identified in eight locations across the Proposed Scheme. Substantial areas of this habitat type were identified along the larger road medians at the Blanchardstown Road exit, to the rear of Coolmine Cottages and the M50 junction. Other road medians include Junction Six, from Brady's at the M50 Junction to Auburn Avenue and east of Morgan Place. This habitat type was also identified to the rear of Blanchardstown Garda Station at the underpass of the Navan Road.

Species recorded consisted of ash, birch species, hazel, oak species, sycamore, bay laurel, oleander *Nerium oleander*, mixed conifer species, cotoneaster species and butterfly bush.

This habitat type also occurred in mosaics with scrub (WS1) and flower beds and borders (BC4), whilst some of the species e.g. oleander, cotoneaster and bay laurel would be indicative of ornamental / non-native shrub planting (WS3).

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

12.3.5.23 **Ornamental / non-native shrub (WS3)**

Areas of ornamental / non-native shrub were generally associated with amenity and landscape planting at commercial properties. Substantial areas of this habitat type bordered areas of buildings and artificial surfaces (BL3) at car parks and around commercial property at Westpoint, EBAY, Circle K Ashtown and Cabra Library. This habitat type was also identified at residential complexes including Morgan Place, Phoenix Park Racecourse and Earls Court on Old Cabra Road.

Species identified include hornbeam, hazel, cotoneaster species, hawthorn, ash, St. John's wort species, cherry and planted wildflowers.

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

12.3.6 Rare and Protected Plant Species

The desk study returned records of a total of seven species listed on the Flora (Protection) Order across the wider study area (i.e. Grid Squares O13 and O03) and are listed in Appendix A12.1 in Volume 4 of this EIAR. The legally-protected Flora (Protection) Order 2015 species opposite-leaved pondweed *Groenlandia densa* is recorded at several areas throughout the Royal Canal, the desk study returned records for this species within approximately 5.5km of the Proposed Scheme within the 2km Grid O13N at Glasnevin Cemetery in 1999 (NBDC Online Database 2022). This species is 'Near Threatened' on Irelands Red List No. 10: Vascular Plants 2016 (Jackson *et al.*, 2016). This species was not identified during the field surveys.

One species listed as Endangered within Ireland Red List No. 10: Vascular Plants (Jackson *et al.*, 2016) was returned from the desk study within close proximity to the Proposed Scheme. A historical record (1857) of the Many-seasoned Thread-moss *Bryum intermedium* was returned from Abbotstown within 1km of the Proposed Scheme. This species is most likely to occur on damp coastal sand or a basic rock ledge, a habitat type not identified within the footprint of the Proposed Scheme. The only recent record from the Republic of Ireland was on marl heaps at the edge of the dried Island Lake, in County Mayo in 2003 within the 2km Grid Square M48W (Holyoak 2018; NBDC Online Database 2022). Results returned from NPWS data search also included one record of meadow barley *Hordeum secalinum* in the Phoenix Park (NPWS Consultation 2021). This species is listed 'Vulnerable' within Ireland Red List No. 10: Vascular Plants (Jackson *et al.*, 2016). These species were not noted during the field surveys.

12.3.7 Non-Native Invasive Plant Species

Himalayan balsam *Impatiens glandulifera* was the singular non-native invasive plant species listed on the Third Schedule of the Birds and Natural Habitats Regulations identified adjacent to the Proposed Scheme. The five locations of this non-native invasive plant species are summarised below in Table 12.10 and their locations illustrated in Figure 12.6 in Volume 3 of this EIAR. The species was not present within the footprint of the Proposed Scheme, although one stand was upstream of structure BR01 on the River Tolka.

The desk study returned records of a total of 7 species listed on the Third Schedule of the Birds and Natural Habitats Regulations across the wider study area (i.e. Grid Squares O13 and O03) and are listed in Appendix A12.1 in Volume 4 of this EIAR. Records returned for terrestrial plant species comprised of giant knotweed *Reynoutria sachalinensis*, Himalayan balsam *Impatiens glandulifera,* and giant-rhubarb *Gunnera tinctoria* along the banks of the River Liffey. Himalayan balsam, Japanese knotweed and giant hogweed *Heracleum mantegazzianum* along the River Tolka and three-cornered leek *Allium triquetrum* along the Royal Canal at Cabra (NBDC Online Database 2022).

A separate aquatic survey conducted in October 2020, along the Royal Canal between the 4th and 5th lock (level 4, Phibsborough) in respect of another BusConnects Scheme, namely: Ballymun Finglas CBC, recorded Canadian waterweed *Elodea canadensis* and Nuttall's waterweed *Elodea nuttallii*, which were frequent approximately 6km from the Proposed Scheme, (Triturus Environmental Ltd, (2020)- refer to Appendix A12.2 Aquatic Baseline Report in Volume 4 of this EIAR). They were not recorded from the multidisciplinary surveys for the Proposed Scheme.

The desk study returned records for aquatic plant species including Nuttall's waterweed along the banks of the River Liffey, curly waterweed *Lagarosiphon major* at Islandbridge, water fern *Azolla filiculoides* in the Phoenix Park, Canadian waterweed along the Royal Canal at Navan Road Parkway within the 2km Grid O13D (NBDC Online Database 2022).

Table 12.10: Summary of Non-native Invasive Plant Species Listed in the Third Schedule of the (Birds and Natural Habitats) Regulations Recorded along or adjacent to the Proposed Scheme.

Reference	Location relative to Proposed Scheme Boundary	Distance to Proposed Scheme Boundary	Grid Reference	Species	Description
CBC0005IAPS001	Outside	129m	O 07773 39220	Himalayan balsam *Impatiens glandulifera*	Scattered stands recorded along the banks of the

Reference	Location relative to Proposed Scheme Boundary	Distance to Proposed Scheme Boundary	Grid Reference	Species	Description
CBC0005IAPS002	Outside	135m	O 07886 39091	Himalayan balsam *Impatiens glandulifera*	River Tolka, typically outside the Proposed Scheme, although CBC0005IAPS003 was recorded a short distance upstream of the Proposed Scheme Boundary.
CBC0005IAPS003	Outside	19m	O 07896 39043	Himalayan balsam *Impatiens glandulifera*	
CBC0005IAPS004	Outside	2.5m	O 08776 38503	Himalayan balsam *Impatiens glandulifera*	
CBC0005IAPS005	Outside	44m	O 08913 38537	Himalayan balsam *Impatiens glandulifera*	

12.3.8 Mammals

12.3.8.1 **Bats**

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

Bat surveys were carried out across four seasons between 2018 and 2020 (as described in Section 12.2.3.5) in the preparation of this EIAR, as well as two additional survey sessions in summer 2021. Five number of transects were surveyed within the footprint of the Proposed Scheme, these include Snugborough Road referred to as CBC0005BT001, along Mill Road at Waterville Park, referred to as CBC0005BT002, along the Navan Road at Castleknock Manor, referred to as CBC0005BT003, along the Navan Road at Phoenix Park Racecourse, referred to as CBC0005BT004 and along the Navan Road at Ashtown Road, referred to as CBC0005BT005. An additional two transects were carried out in summer 2021 along the N3 adjacent to Proposed Structure BR01 (CBC0005T1_N3 Wide) and around Mill Road adjacent to proposed structure BR02 (CBC0005T2_Mill Road), These overlapped with earlier transects, but were the transect length was amended to take into account iterative changes in the location and land take requirements for the Proposed Scheme. The results of these are described in Section 12.3.8.1. The results of these surveys are also presented in Figures 12.8.1 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 Greater Dublin Area (GDA). In an Irish context, the conservation status of these species in Ireland is designated as 'Least Concern' (Marnell *et al.,* 2019).

12.3.8.1.1 Leisler's bat *Nyctalus leisleri*

Leisler's bat was recorded along all five transects surveyed between 2018 and 2020. A total of 87 recordings of Leisler's bat were identified in these locations between 2018 and 2020. Leisler's bat activity was highest along CBC0005BT004 (Phoenix Park) with 44 recordings attributed to this species at this location. During Summer 2018 there was one recording of Leisler's bat along CBC0005BT001 (Snugborough Road), five recordings along CBC0005BT002 (Mill Road), 18 along CBC0005BT004 (Phoenix Park) and two along CBC0005BT005 (Ashtown Road). There were no recordings of Leisler's bat along CBC0005BT003 (Castleknock Manor) during 2018.

During Autumn 2019 there were a total of 7 recordings captured, four along CBC0005BT001 (Snugborough Road), one along CBC0005BT003 (Castleknock Manor) and two along CBC0005BT005 (Ashtown Road). In Spring 2020 there were a total of 45 recordings of Leisler's bat captured four each along CBC0005BT001 (Snugborough Road) and CBC0005BT002 (Mill Road), nine along CBC0005BT003 (Castleknock Manor), 21 along CBC0005BT004 (Phoenix Park) and seven along CBC0005BT005 (Ashtown Road). There were nine Leisler's bat recordings captured during Summer 2020 four along CBC0005BT001 (Snugborough Road) and five along CBC0005BT004 (Phoenix Park).

During the two summer 2021 transect surveys, Leisler's Bats were recorded along both transects, with a total of 10 recordings captured along CBC0005T1_N3 Wide and a further 21 recordings from (CBC0005T2_Mill Road), Approximately half of the recordings for this species along transect CBC0005T2_Mill Road were recorded in residential areas outside of the Proposed Scheme boundary.

The results of the bat surveys as they relate to the Leisler's bat are shown on Figure 12.8.1 in Volume 3 of this EIAR.

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

The desk study found that Leisler's bat are known to occur across the Proposed Scheme (see Appendix A12.1 in Volume 4 of this EIAR for further details). This includes 32 records of live sightings within 1km of the proposed scheme, these include 18 records at Phoenix Park, two records at Phoenix Park Racecourse (i.e. Grid Square O13D), four along the Royal Canal at Ashtown, two records at the M50 junction, two along the Royal Canal at the M50 junction, and four at Connolly Hospital Blanchardstown and Waterville Park (i.e. Grid Square O03Z) (NBDC Online Database 2022).

12.3.8.1.2 Common pipistrelle bat *Pipistrellus pipistrellis*

Common pipistrelle bat was recorded along four of the five transects surveyed between 2018 and 2020. CBC0005BT001 (Snugborough Road), CBC0005BT002 (Mill Road), CBC0005BT004 (Phoenix Park) and CBC0005BT005 (Ashtown Road).

A total of 48 recordings of common pipistrelle bat were identified in these locations between 2018 and 2020. Common pipistrelle bat activity was highest at CBC0005BT002 (Mill Road) with 30 recordings attributed to this species at this location. There were no recordings of common pipistrelle bat in Summer 2018 or Autumn 2019.

In Spring 2020 there were a total of 48 recordings of common pipistrelle bat: 16 along CBC0005BT001 (Snugborough Road); 30 along CBC0005BT002 (Mill Road); and one along both CBC0005BT004 (Phoenix Park) and CBC0005BT005 (Ashtown Road).

During the two summer 2021 transect surveys, Common pipistrelle bats were recorded along both transects, with a total of 33 recordings captured along CBC0005T1_N3 Wide and a further 31 recordings from (CBC0005T2_Mill Road),

The results of the bat surveys as they relate to the common pipistrelle bats are shown on Figure 12.8.1 Volume 3 of this EIAR.

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

The desk study found that common pipistrelle bat are known to occur across the Proposed Scheme (see Appendix A12.1 in Volume 4 of this EIAR for further details). This includes 29 records of live sightings within 1km of the Proposed Scheme, these include: seven records at Phoenix Park; two records at Phoenix Park Racecourse; four records along the Royal Canal at Ashtown; three records at the M50 junction; eight records along the Royal Canal at the M50 junction; five records within the grounds of Connolly Hospital Blanchardstown and at along the river at Waterville Park (i.e. Grid Square O03Z) (NBDC Online Database 2022).

12.3.8.1.3 Nathusius' pipistrelle bat *Pipistrellus nathusii*

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

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

The desk study found that Nathusius' pipistrelle Bat are known to occur within 1km of the Proposed Scheme (see Appendix A12.1 in Volume 4 of this EIAR for further details). This includes four records of live sightings within

1km of the proposed scheme: one record at Connolly Station in 2010; two records in the Phoenix Park; and one record along the Royal Canal at the M50 Junction in 2007 (NBDC Online Database 2022).

12.3.8.1.4 Soprano pipistrelle bat *Pipistrellus pygmaeus*

Soprano pipistrelle bat was recorded in four of the five transects surveyed between 2018 and 2020: CBC0005BT001 (Snugborough Road), CBC0005BT002 (Mill Road), CBC0005BT004 (Phoenix Park), and CBC0005BT005 (Ashtown Road). A total of 122 recordings of soprano pipistrelle bat were identified in these locations between 2018 and 2020. Soprano bat activity was highest at CBC0005BT001 (Snugborough Road), with 71 recordings. During Summer 2018 there were a total of 52 soprano bats recordings, 39 along CBC0005BT001 (Snugborough Road), ten along CBC0005BT002 (Mill Road), and three along CBC0005BT005 (Ashtown Road). There were three recordings captured during Autumn 2019, two along CBC0005BT004 (Phoenix Park) and one along CBC0005BT005 (Ashtown Road). During Spring 2020 a total of 32 soprano pipistrelle bat recordings were captured, 10 along CBC0005BT001 (Snugborough Road), 21 along CBC0005BT002 (Mill Road) and one along CBC0005BT004 (Phoenix Park). During Summer 2020 there were a total of 34 soprano pipistrelle bat recordings, 21 along CBC0005BT001 (Snugborough Road) and 13 along CBC0005BT002 (Mill Road). The results of the bat surveys as they relate to the soprano pipistrelle bats are shown on Figure 12.8.1 in Volume 3 of this EIAR.

During the two summer 2021 transect surveys, Soprano pipistrelle bats were recorded along both transects, with a total of 61 recordings captured along CBC0005T1_N3 Wide and a further 304 recordings from (CBC0005T2_Mill Road). This was the largest number of bat recordings, many of which were centred along the wooded northern perimeter of the Proposed Scheme boundary adjacent to the western side of Mill Road, as well as upstream along the Tolka River outside of the Proposed Scheme boundary as well as

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

The desk study found that soprano pipistrelle bats are known to occur across the Proposed Scheme (see Appendix A12.1 in Volume 4 of this EIAR for further details). This includes 32 records of live sightings within 1km of the Proposed Scheme, including eight records at Phoenix Park, four along the Royal Canal at Ashtown, three records at Phoenix Park Racecourse, two records at the M50 junction, eight records along the Royal Canal at the M50 junction, seven records at Connolly Hospital Blanchardstown and along the river at Waterville Park (i.e. Grid Square O03Z) (NBDC Online Database 2022). The BCI database (BCI 2022) returned a record of a large soprano pipistrelle roost in the grounds of Connolly Hospital within a building. The roost is outside of the boundary of the Proposed Scheme but given the woodland assemblages along the River Tolka valley, and the numbers from activity surveys undertaken in respect of the Proposed Scheme, it is likely that bats from this roost forage in and around the Proposed Scheme.

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 and soprano pipistrelle bats at 55kHz. As such, pipistrelle bat species that echolocate between 48 and 52kHz cannot be accurately identified by their calls and are described as ‘unidentified’ pipistrelle bat species.

Unidentified pipistrelle species were identified in one location surveyed in Spring 2020 along CBC0005BT002 (Mill Road) A total of three recordings of unidentified pipistrelle species were identified at this location in Spring 2020. The results of the bat surveys as they relate to the unidentified pipistrelle bats are shown on Figure 12.8.1 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, although it is recognised that the echolocation calls for this species are quiet and directional, and as such their presence within some of the woodland habitat along the River Tolka cannot be ruled out.

No roost sites for Brown Long-Eared bat were recorded during any of the surveys for the Proposed Scheme.

The desk study found that Brown Long-Eared Bat are known to occur within 1.5km of the Proposed Scheme (see Appendix A12.1 in Volume 4 of this EIAR for further details). This includes seven records from the Phoenix Park (three in 2007, three in 2008, and one in 2020) and one at the M50 junction in 2007 (NBDC Online Database 2022).

12.3.8.1.7 *Myotis* bat species

Myotis bat species were identified in three of the five locations surveyed between 2018 and 2020: CBC0005BT001 (Snugborough Road), CBC0005BT002 (Mill Road), and CBC0005BT004 (Phoenix Park). A total of six recordings of unidentified *Myotis* species were identified in these locations between 2018 and 2020. Five of the recordings were captured during Summer 2018, one along CBC0005BT001(Snugborough Road) and four along CBC0005BT002 (Mill Road). There was one recording of *Myotis* bat species captured during Spring 2020 along CBC0005BT004 (Phoenix Park). A single *Myotis* recording was captured along transect CBC0005T1_N3 Wide during summer 2021 surveys.

The results of the bat surveys as they relate to *Myotis* bats are shown on Figure 12.8.1 in Volume 3 of this EIAR.

The desk study found that *Myotis* bat species including Daubenton's bat *Myotis daubentonii,* Natterer's Bat *M. nattereri,* and Whiskered bat *M. mystacinus* are known to occur within 1km of the Proposed Scheme (see Appendix A12.1 in Volume 4 of this EIAR for further details). This includes 15 records of live sightings of Daubenton's bat, these include six records at Phoenix Park, four records along the Royal Canal at Ashtown, three at the M50 junction and two records at Connolly Hospital Blanchardstown and along the river at Waterville Park (i.e. Grid Square O03Z). There was one record returned of *Myotis* bat species at Phoenix Park in 2020. There were four records returned for Natterer's Bat, all within the Phoenix Park. There were five records returned for Whiskered bat. All within the Phoenix Park (NBDC Online Database 2022).

12.3.8.1.8 Potential Roost Features

During the multidisciplinary surveys, each tree, or grouping of homogenous trees, was classified with regard to their potential to support roosting bats (known as Potential Roost Features (PRFs)) after Collins (2016). Consideration in respect of identifying trees with PRF was also given to the landscape context of the tree. Trees with negligible suitability for roosting bats are not described or mapped as they are assessed as not having potential to support roosting bats. Two trees were originally identified as having potential to support roosting bats (PRFs). One ash tree (CBC0005PRF001) was recorded along a treeline which forms the boundary of the Junction 6 Castleknock Health and Leisure Village; and the other (CBC0005PRF002) is a beech tree in an area of mixed broadleaved woodland to the south of Mill Road on the western side of the Navan Road (N3). In the context of the surrounding landscape, CBC0005PRF002 would be considered more likely to support roosting bats, given its wooded location away from direct road illumination and the greater foraging resource of the surrounding wooded area.

A further 18 PRF's in nine separate trees, largely outside the Proposed Scheme were identified in the March 2022 survey. The details of all PRF's are listed in Table 12.8 and shown on Figure 12.8.2 in Volume 3 of this EIAR. None of the trees containing PRFs that were noted inside the Proposed Scheme boundary will be removed to facilitate the construction of the Proposed Scheme.

Notwithstanding this fact, a review of the Tree Protection Plans (BCIDC-ZZZ-ENV_LA-0005_XX_00-SK-ES-9001) and Landscaping General Arrangement (BCIDC-ARP-PRW_PC-005_XX_00-DR-CR-0010) indicates that none of these trees containing PRF's will be removed as a result of the Proposed Scheme.

The desk survey returned data on another large Soprano Pipistrelle roost within a building associated with James Connolly Hospital. The location of this roost is well outside the any direct impacts associated with the construction and operation of the Proposed Scheme in terms of direct disturbance, but as noted in Section 12.3.8.1.4 of this chapter, bats from this roost are likely foraging along the woodland areas alongside the River Tolka.

Table 12.8: Summary of Potential Roost Features (PRFs) recorded within / adjacent to the footprint of the Proposed Scheme

Reference	Grid Reference	Location relative to Proposed Scheme Boundary & Indication of removal	Species	Description
CBC0005PRF001	708798.1687, 738298.0601	Inside Retained	Ash *Fraxinus excelsior* (mature)	Extensive damage- no crown, multiple lost limbs, tear outs, dense ivy
CBC0005PRF002	708315.1693, 738679.3511	Outside Retained	Beech *Fagus sylvatica*	Cracks
CBC0005PRF003	708265, 738717	Outside Retained	Ash *Fraxinus excelsior*	Knot-holes, Wounds
CBC0005PRF004	708275, 738719	Outside Retained	Sycamore *Acer pseudoplatanus*	Knotholes, Sharign Cracks, Lifting Bark
CBC0005PRF005	707447, 739268	Inside Retained	Alder *Alnus glutiinosa*	Knot-holes
CBC0005PRF006	708267, 738728	Outside Retained	Sycamore *Acer pseudoplatanus*	Weld, Tranverse snaps, Wounds, Knot holes
CBC0005PRF007	708280, 738722	Outside Retained	Sycamore *Acer pseudoplatanus*	Knot holes, tearouts, wounds
CBC0005PRF008	710605, 737261	Inside Retained	Not noted owing to dense Ivy growth	Ivy
CBC0005PRF009	710510, 737305	Inside Retained	Ash *Fraxinus excelsior*	Tear outs, wounds
CBC0005PRF010	710447, 737333	Outside Retained	Ash *Fraxinus excelsior*	Ivy
CBC0005PRF011	710434, 737339	Outside Retained	Not noted owing to dense Ivy growth	Wounds

Note: A description of each different type of PRF is provided for in Andrews (2018)

12.3.8.2 **Badger**

Badger, and their breeding and resting places, are legally protected under the Wildlife Acts.

Evidence of mammal tracks were identified in woodland and scrub habitats either side of the N3 road near Blanchardstown hospital. No specific badger evidence was identified during the multidisciplinary walkover surveys badger along the footprint of the Proposed Scheme. Badger are widely distributed throughout the Greater Dublin Area, often utilising public gardens and residential gardens. The desk study returned several records found within 1km of the Proposed Scheme (see Appendix A12.1 in Volume 4 of this EIAR for further details). This includes one record at Phoenix Park Racecourse in 2012 and a record at Castleknock Manor in 2016 (NBDC Online Database 2022). As such, it has been assumed that badger may occur in vegetated areas adjacent to the Proposed Scheme.

The local badger population is deemed to be of Local Importance (Higher Value) due to the documented presence of resident populations within the wider environment of the Proposed Scheme, which are valued as being of local importance 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.

Evidence of otter was identified at two locations along the footprint of the Proposed Scheme. Several spraints and evidence of disturbance was identified on the banks of the River Tolka (Tolka_040) at site CBC0005AR001 to the rear of Blanchardstown Garda Station during aquatic and riparian surveys in 2020. The survey undertaken in 2022 noted a mustelid footprint probably otter, as well as a degraded spraint in similar locations as the previous evidence at CBC005AR001. At site CBC0005AR002 two otter spraints were identified on the banks of the River Tolka during the aquatic surveys conducted by Triturus Environmental Ltd. The results of the field surveys as they relate to otter are shown on Figure 12.7 in Volume 3 of this EIAR.

The desk study found that otter are known to occur within 1km of the Proposed Scheme and across the wider study area (see Appendix A12.1 in Volume 4 of this EIAR for further details). Records include sightings in the River Liffey at Ushers Quay in 2018 and at Sean Heuston Bridge in 2017 (NBDC Online Database 2022). The findings of a city-wide otter survey along watercourses (Macklin *et al.*, 2019) noted that the River Tolka had the second highest number of otter signs in that study. A cluster of otter activity was observed downstream of the Navan Road / M50 Junction 6, adjacent to Elmgreen Golf Club, north of the Proposed Scheme in 2018 / 2019. Three holts and several spraints were observed, with latrine, couches and prints also recorded. The holts referenced as TOL1 and TOL3 were outside of the direct ZoI of the Proposed Scheme, which is typically 150m upstream and downstream of a watercourse crossing (NRA 2008) as shown in Table 12.9.

Table 12.9: Otter Holt location and estimated distance from the Proposed Scheme (after Macklin *et al*., 2019)

Otter Holt*	Estimated Downstream Distance (as the crow flies) from N3 / M50 Junction	Estimated distance (Closest to Proposed Works and Location)	Natural Barriers	Inside / Outside Proposed Scheme ZoI
Tol 1	267m	Approximately 197m	R102 River Road and Royal Canal, as well as large open space separate the Proposed Scheme on Navan Road and River Tolka near floodplain adjacent to Elm Green golf course	Outside
Tol 3	1.08km	Approximately 350m	R102 River Road and Royal Canal, as well as the grounds of Ashtown Lodge separate the Proposed Scheme on Navan Road and River Tolka near floodplain adjacent to Elm Green golf course	Outside

*NB the report does not label the 2 holts illustrated in the report, and notes that 3 holts were recorded.

The Proposed Scheme terminates at Arran Quay at the Liffey Estuary Upper. Otter frequently use the estuary for commuting and foraging, with holts identified at Dublin Port (Macklin *et al.,* 2019). None of these holts would be intercepted by the Proposed Scheme.

In an Irish context, the conservation concern of otter is 'Least Concern' (Marnell *et. al* 2019) due to population recoveries since 2009, however remains 'Near Threatened' at a European and Global context "The IUCN Red list of Threatened Species" (Roos *et al.,* 2015).

Wicklow mountains SAC is the closest European site designated for otter and is located within a different sub-catchment (Dodder_SC_010) to the Proposed Scheme which falls within (Tolka_SC_10 and Tolka_SC_020). As such, populations of otter within the footprint of the Proposed Scheme are not deemed to be connected to the SAC population.

The local otter population is therefore valued as being of County importance as it is listed on Annex II and IV of the Habitats Directive and as such, it is considered under the Fingal Biodiversity Action Plan 2010-2015 (the plan currently in operation until superseded) and Dublin City Biodiversity Action Plan to be a species of high conservation concern across Fingal and Dublin City.

12.3.8.4 **Marine Mammals**

The Proposed Scheme terminates at Arran Quay at the Liffey Estuary Upper. There were no protected marine mammals identified along the Proposed Scheme during the multidisciplinary surveys. There were no dedicated marine mammal surveys carried out as part of the assessment.

Harbour seal, grey seal, and Harbour porpoise are known from Dublin Bay and these species are all protected under the Wildlife Acts and are also listed on Annex II of the habitats directive, while all cetacean species are listed on Annex IV of the Habitats Directive. Harbour porpoise is a QI species designated as part of Rockabill to Dalkey Island SAC located approximately 12.6km east of the Proposed Scheme. Harbour seal and grey seal are also listed on Annex II of the Habitats Directive and are listed QI species designated as part of Lambay Island SAC which is located approximately 21.2km from of the Proposed Scheme.

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

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

- Common Dolphin *Delphinus delphis*;
- Common Porpoise *Phocoena phocoena;*
- Minke Whale *Balaenoptera acutorostrata;*
- White-beaked Dolphin *Lagenorhynchus albirostris;*
- Pygmy Sperm whale *Kogia breviceps;*
- Bottle-nosed Dolphin *Tursiops truncates;*
- Humpback Whale *Megaptera novaeangliae*;
- Sperm Whale *Physeter macrocephalus*;
- Striped Dolphin *Stenella coeruleoalba*;
- Risso's Dolphin *Grampus griseus*; and,
- Northern Bottle-nosed Whale *Hyperodoan ampullatu*

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

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

12.3.8.5 **Other Mammal Species**

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

- Hedgehog *Erinaceus europaeus*;
- Irish Stoat *Mustela erminea* subsp*. hibernica*;
- Pygmy Shrew *Sorex minutus*; and,
- Irish Hare *Lepus timidus* subsp. *hibernicus.*

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

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

12.3.9 Birds

12.3.9.1 **Breeding Birds**

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

A habitat suitability assessment for nesting kingfisher, an Annex I Bird Directive species, was conducted along the River Tolka in September 2020. Suitable habitat was identified at multiple locations in this area along the banks of the River Tolka, although no nesting habitat was located at the proposed watercourse crossings in Section 2 of the Proposed Scheme. An individual kingfisher was sighted in flight along the river section west of Snugborough Road at Corduff Park, approximately 35m from the Proposed Scheme. Potential nesting banks were identified approximately 90m and approximately 50m north (upstream) of the Proposed Scheme, with evidence of potential nesting holes noted (no activity recorded at the holes during survey in September 2020).

The desk study found that kingfisher are known to occur within 1km of the Proposed Scheme and across the wider study area. In particular, a population of kingfisher are reported to be present along the River Tolka in the vicinity of Tolka Valley Park, approximately 1km from the Proposed Scheme at Ashtown. The nearest European site for which this species is designated is River Boyne and River Blackwater SPA, which is located approximately 28.5km north of the Proposed Scheme.

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

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

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

The desk study returned records of a total of 48 breeding bird species across the study area (i.e. Grid Squares O03, O13 and partly within O04) and 1 wintering birds. Records included 5 species listed under Annex I of the Birds Directive, 54 SCI species, and an additional 13 Red Listed and 16 Amber Listed species. This includes 32 species with breeding and wintering populations. These species are grouped into habitat preferences and are discussed below in relation to their presence within the footprint of the Proposed Scheme.

Several bird species for which records were returned in the desk study are those typically found in coastal, estuarine, and intertidal habitats, such as the Liffey Estuary and Dublin Bay. Many gull, auk, shearwater and tern species breed in steep inaccessible cliffs i.e. Howth Head, offshore islands, Dublin port. Seabirds such as terns, guillemots and kittiwakes nest on the cliffs and crevices of Rockabill Island in Dublin Bay SPA (Birdwatch Ireland, 2020). Fulmar, shag razorbill and gannet nest in the cliffs of Ireland's Eye SPA, which also has numbers of large 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 within the footprint of the Proposed Scheme for nesting; however, most other species are not deemed likely to breed within the footprint of the Proposed Scheme.

Most records along the Proposed Scheme comprise bird species common to suburban habitats (including residential and parkland areas), such as gull and garden bird species. Residential habitats, green space and parkland habitats were observed in several locations across the Proposed Scheme including Millennium Park, Blanchardstown Road South, Castlecurragh Park, Corduff Park, Tolka Valley Park, Waterville Park, Millstead, Travelodge, Phoenix Park, Belvedere Sports Ground, St. Joseph's School for Deaf Boys, Pope John Paul II Park

Cabra, Ashtown Playing Pitches and Grangegorman Campus. These species therefore are likely to use lands within the footprint of the Proposed Scheme for breeding.

Breeding species which are associated with buildings were returned from the desk study include swallows and house martins (Birdwatch Ireland, 2020). Swallows, starlings, swift and martins occurred across the larger study area (i.e. Grid Squares O13 and O03) and may therefore utilise buildings adjacent to the Proposed Scheme. There are records of buzzards, peregrine falcon, kestrel and sparrowhawk across the larger study area (i.e. Grid Squares O13 and O03) and these species may therefore utilise open green spaces and trees adjacent to the Proposed Scheme. No suitable habitat was identified for merlin within the footprint of the Proposed Scheme and desk study records of this species were confined to coastal areas (i.e. Grid Squares (O13) and therefore this species is not deemed likely to breed within the footprint of the Proposed Scheme.

Several species of warblers and raptors which favour woodlands, agricultural lands and upland heathland areas were identified during the desk study (Appendix A12.1. in Volume 4 of this EIAR). Agricultural lands and open areas were identified at locations west of the Proposed Scheme. As such, some of these species may utilise the lands at these locations. Due to the urban locality of the Proposed Scheme, these habitat types are not present or are highly fragmented. Suitable agricultural habitat is located approximately 3.5km to the west of the Proposed Scheme. As such, these species are not deemed to be present in significant numbers, however they may be present in larger woodland areas surrounding the Proposed Scheme i.e. Corduff Park, Tolka Valley Park, Waterville Park and the Phoenix Park (NPWS Online Database 2022).

Species that are known to utilise freshwater lakes, ponds, canals, and rivers in urban habitats include coots, moorhen, swans, ducks, herons, kingfisher and cormorants (Appendix A12.1. in Volume 4 of this EIAR). Suitable habitats located within close proximity to the Proposed Scheme include: the River Tolka with known populations of mute swan, wagtails and kingfisher; the Royal Canal with known populations of mute swan, wagtails and ducks. Phoenix Park ponds with moorhen, common coot, mallard, grey heron and little grebe, and the Liffey Estuary Upper with cormorant, ducks, kingfisher and mute swan (NPWS Online Database 2022).

The Proposed Scheme will cross the River Tolka at two points on Section 2 of the Proposed Scheme at the N3 Dual Carriageway. The presence of Grey wagtail and kingfisher were identified during the habitat suitability assessment for nesting birds conducted along the River Tolka, although no nest features were confirmed at watercourse intersections with the Proposed Scheme.

Records of breeding birds relevant to the Proposed Scheme are listed in Table 12.10.

Table 12.10: Desk Study Records of Breeding Birds of Conservation Concern Adjacent to the Proposed Scheme

Common Name / Scientific Name / BTO Code	Distribution in the Study Area	Conservation Importance		
		BoCCI (B – Breeding / W - Wintering)	Annex I	Nearest SPA Designated for SCI Species
Barn Swallow *Hirundo rustica* (SL)	Across the Proposed Scheme	Amber (B)	-	-
Barn Owl *Tyto alba* (BO)	Phoenix Park	Red (B)	-	-
Common coot *Fulica atra* (CO)	Mulhuddart; Cabra; Castleknock;	Amber (B/W)	-	Lough Derravaragh SPA approximately 63.9km
Common kestrel *Falco tinnunculus* (K.)	Ashtown	Red (B)	-	-
Common kingfisher *Alcedo atthis* (KF)	Blanchardstown	Amber (B)	✓	River Boyne and River Blackwater SPA approximately 28.5km
Common linnet *Carduelis cannabina* (L.)	Across the Proposed Scheme	Amber (B)	-	-
Common starling *Sturnus vulgaris* (SG)	Across the Proposed Scheme	Amber (B)	-	-
Common swift *Apus apus* (SI)	Blanchardstown; Cabra	Red (B)	-	-
European greenfinch *Carduelis chloris* (GR)	Across the Proposed Scheme	Amber (B)	-	-

Common Name / Scientific Name / BTO Code	Distribution in the Study Area	Conservation Importance		
		BoCCI (B – Breeding / W - Wintering)	Annex I	Nearest SPA Designated for SCI Species
Goldcrest *Regulus regulus* (GC)	Across the Proposed Scheme	Amber (B)	-	-
Grey heron *Ardea cinerea* (H.)	Blanchardstown; Castleknock; Phoenix Park	Green (B)	-	Wexford Harbour and Slobs SPA approximately 97km
Grey wagtail *Motacilla cinerea* (GL)	Tolka River, Blanchardstown; Ashtown	Red (B)	-	-
House martin *Delichon urbicum* (HM)	Castleknock; Cabra	Amber (B)	-	-
House sparrow *Passer domesticus* (HS)	Castleknock; Annamoe Road	Amber (B)	-	-
Little egret *Egretta garzetta* (ET)	Within 10km squares O03 & O13	Green (B)	✓	-
Mallard *Anas platyrhynchos* (MA)	Blanchardstown; Phoenix Park; Royal Canal	Amber (B/W)	-	Dundalk Bay SPA approximately 52.3km
Meadow pipit *Anthus pratensis* (MP)	Phoenix Park; Liffey Valley Park	Red (B)	-	-
Mute swan *Cygnus olo*r (MS)	Blanchardstown; Mulhuddart; Royal Canal	Amber (B/W)	-	-
Peregrine falcon *Falco peregrinus* (PE)	Blanchardstown; Phoenix Park/ Stoneybatter	Green (B)	✓	Wicklow Mountains SPA approximately12.1km
Sand martin *Riparia riparia* (SM)	Cabra	Amber (B)	-	-
Skylark *Alauda arvensis* (S.)	Castleknock	Amber (B)	-	-
Spotted flycatcher *Musciapa striata* (SF)	Castleknock	Amber (B)	-	-
Tree sparrow *Passer montanus* (TS)	Castleknock	Amber (B)	-	-
Tufted duck *Aythya fuligula* (TU)	Castleknock; Royal Canal	Amber (B/W)	-	Lough Derravaragh SPA approximately63.9km
Yellowhammer *Emberiza citrinella* (Y.)	Phoenix Park; Mulhuddart	Red (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. No wintering bird surveys were undertaken in respect of the Proposed Scheme, as the bulk of the lands required (both permanent and temporary) do not afford suitable territory to wintering birds.

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

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

The desk study returned records of a total of 17 wintering bird species across the study area (i.e. Grid Squares O03, O13) with a further 32 recorded as wintering and breeding bird populations. Records included 5 species listed under Annex I of the Birds Directive, 54 SCI species, and an additional 13 Red Listed and 16 Amber Listed species. These species are grouped into habitat preferences and are discussed below in relation to their presence within the footprint of the Proposed Scheme.

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

The wider study area of Dublin Bay, located approximately 3.5km east of the Proposed Scheme, 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 three known inland wintering bird feeding sites within approximately 300m of the Proposed Scheme and are listed below. The importance of these sites is given relative to flock sizes of geese (major importance site 401+ geese; high importance site 51-400 geese; and moderate importance site 1-50 geese (Benson, 2009).

- Belvedere Sports Ground Cabra, (unknown importance) approximately 25m (open feeding ground) from the Proposed Scheme;
- Pope John Paul II Park Cabra (high importance) approximately 100m from the Proposed Scheme; and
- Ashtown Playing Pitches (major importance) approximately 132m from the Proposed Scheme.

The inland wintering bird feeding site at Belvedere Sports Ground on the R147 Navan Road is of unknown importance due to a lack of survey data relating to flock size (Scott Cawley Ltd 2017). The Proposed Scheme encroaches slightly onto ground at the front of these grounds, which are not considered suitable as feeding habitat for wintering birds. The area of works and the larger open sports grounds (which are considered suitable feeding habitat) are separated by approximately 25m by buildings and carparks.

Desk study records of wintering bird species utilising lands adjacent to the Proposed Scheme are provided in Table 12.11.

Table 12.11: Desk Study Records of Wintering Birds of Conservation Concern Adjacent to the Proposed Scheme

Common Name / Scientific Name / BTO Code	Activity and Distribution in the Study Area	Conservation Importance		
		BoCCI (B – Breeding / W - Wintering)	Annex I	Nearest SPA designated for SCI species
Black-headed gull *Chroicocephalus ridibundus* (BH)	Cabra; Blanchardstown; Castleknock	Amber (B/W)	-	South Dublin Bay and River Tolka Estuary SPA approximately 2.9km
Light-bellied brent goose *Branta bernicla* (BG)	Cabra/Pope John Paul II Park; Ashtown Playing Pitches	Amber (W)	-	South Dublin Bay and River Tolka Estuary SPA approximately 2.9km
Common coot *Fulica atra* (CO)	Mulhuddart; Cabra; Castleknock	Amber (B/W)	-	Lough Derravaragh SPA approximately 63.9km
Common Pochard *Aythya ferina* (PO)	Phoenix Park	Red (B/W)	-	Lough Derravaragh SPA approximately 63.9km

Common Name / Scientific Name / BTO Code	Activity and Distribution in the Study Area	Conservation Importance		
		BoCCI (B – Breeding / W - Wintering)	Annex I	Nearest SPA designated for SCI species
Herring Gull *Larus argentatus* (HG)	Cabra	Amber (B/W)	-	Ireland's Eye SPA approximately 14.2km
Lesser Black-backed Gull *Larus fuscus* (LB)	Phoenix Park	Amber (B/W)	-	Lambay Island SPA approximately 21.1km
Little egret *Egretta garzetta* (ET)	Within 10km squares O03 & O13	Green (B)	✓	-
Mew gull *Larus canus* (CM)	Cabra; Ashtown; Castleknock	Amber (B)	-	Dundalk Bay SPA approximately 52.3km
Mute swan *Cygnus olor* (MS)	Blanchardstown; Mulhuddart; Royal Canal	Amber (B/W)	-	-
Oystercatcher *Haematopus ostralegus* (OC)	Cabra	Red (B/W)	-	South Dublin Bay and River Tolka Estuary SPA approximately 2.9km
Northern Pintail *Anas actua* (PT)	Blanchardstown	Amber (W)	-	North Bull Island SPA approximately 6km
Northern Shoveler *Anas clypeata* (SV)	Phoenix Park	Red (B/W)	-	North Bull Island SPA approximately 6km
Tufted duck *Aythya fuligula* (TU)	Castleknock; Royal Canal	Amber (B/W)	-	Lough Derravaragh SPA approximately 63.9km

12.3.10 Reptiles

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

The desk study did not return records of common lizard within the wider study area. This species is strongly associated with heathland and coastal dune habitats; neither habitat types were identified within the Proposed Scheme boundary (Marnell, 2002; Farren *et al.,* 2010). However, it cannot be ruled out that these species are not in the wider study area.

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

12.3.11 Amphibians

The Common Frog and the Smooth Newt are legally protected under the Wildlife Acts. The common frog is also listed under Annex V of the Habitats Directive. No evidence of Common Frogs or Smooth Newt were identified along the Proposed Scheme during the multi-disciplinary surveys.

Suitable amphibian habitat (i.e. vegetated river banks and surface water/drainage features with stagnant, relatively unpolluted water) was identified within or adjacent to the boundary of the Proposed Scheme. This includes scattered areas of vegetated riverbank along the River Tolka.

The desk study returned records for common frog and smooth newt within 1km of the Proposed Scheme. This includes records of common frog across the length of the Proposed Scheme including one record at Tolka Valley

Park in 2007 and records of smooth newt at a disused railway at Broadstone in 2010 and in the Phoenix Park in 2012 and at Clonsilla in 2018.

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 EU Habitats Directive. Electro-fishing surveys were not carried out as part of the field surveys as there will be no instream works. However, the River Tolka was evaluated for the presence of suitable salmonid and lamprey spawning habitat and other general fisheries habitat. A copy of the survey data in respect of the aquatic survey and data is included in Appendix A12.2 in Volume 4 of this EIAR and are incorporated into the sections below under the various headings, as relevant.

The Proposed Scheme lies within the Tolka_SC_020 sub catchment. The River Tolka Catchment covers an area of approximately 148km^2 from Dunshaughlin, Co. Meath to Dublin Bay. The River Tolka Catchment was surveyed by Inland Fisheries Ireland in September 2017. The closest monitoring location, relative to the Proposed Scheme was at Mill Road at Connolly Hospital Blanchardstown, located immediately adjacent to the Proposed Scheme. This site was assigned an Ecological Fish Status of Poor (Matson *et al.*, 2018).

The Liffey Estuary Upper was assigned an overall WFD Ecological Fish Status of Good for the period 2013-2018. A survey conducted on individual sub-catchments assigned the area Tolka_050 as 'Poor' for the Liffey Catchment Assessment 2010-2015 (EPA, 2018).

12.3.12.1 **Salmonid Species**

The results of the aquatic surveys conducted at CBC0005AR001 and CB0005AR002 indicate that the River Tolka contains good to moderate quality brown trout nursery habitat, with some localised deeper pools located immediately downstream of the Proposed Crossing providing good holding habitat for this species. At the proposed crossing points CBC0005AR001 and CBC0005AR002, the Proposed Scheme will only cross the watercourse at CBC0005AR001, the second comprises an established concrete culvert that will not be altered where it crosses the watercourse. The channel beds under the existing structures comprised of modified substrate (CBC0005AR001) and rendered concrete of the culvert (CBC0005AR002).

Spawning habitat for salmonids at CBC0005AR001 was deemed 'locally good' approximately 110m downstream of the Proposed Scheme crossing point, in the tailing of a pool where mobile gravel was identified. The habitat downstream of CB0005AR002 was less suited with only very localised pockets of medium and fine gravels, heavily bedded and covered by filamentous green algae (Triturus Environmental Ltd, (2020) - refer to Appendix A12.2 Aquatic Baseline Report in Volume 4 of this EIAR).

The desk study returned records for Atlantic salmon on the River Tolka and the Lower Liffey Estuary (Kelly *et al.*, 2012). The River Liffey is a highly significant regional salmonid catchment for Atlantic salmon. The Liffey system supports a regionally significant population of Atlantic salmon and the Liffey estuary serves as the natural linkage for salmon populations migrating between freshwater and marine environments (IFI Consultation, 2020).

The River Tolka supports Atlantic salmon and Brown trout populations in addition to other fish species and provides a particularly important nursery function for salmonid species throughout its course. Atlantic salmon were recorded downstream of the Proposed Scheme, in the Glasnevin area during 2011 (IFI Consultation, 2020).

Atlantic salmon are valued as being of National Importance.

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

12.3.12.2 **Lamprey Species**

The results of the aquatic surveys conducted at CBC0005AR001 and CB0005AR002 identified 'locally good' spawning habitat for lamprey located approximately 110m downstream of the Proposed Crossing CBC0005AR001, in the tailing of a pool where mobile gravel was identified at the Proposed Crossing points

CBC0005AR001 and CB0005AR002 the channel bed comprised of rendered concrete. The survey sites offered poor lamprey ammocoete habitat given the high flow rates and predominance of hard substrata. Hydromorphologically the river had been altered at the survey sites with the channel bed comprising of rendered concrete with little gravel or cobble deposition under the road crossing. Downstream of the culvert, the bed comprised bedrock, boulder and cobble with very localised pockets of medium and fine gravels (Triturus Environmental Ltd, (2020) - refer to Appendix A12.2 Aquatic Baseline Report in Volume 4 of this EIAR).

The desk study returned records for lamprey species on the River Tolka and River Liffey (in the case of river Lamprey *Lampetra fluviatilis* only) (Kelly *et al.*, 2012 and IFI, 2010). Inland Fisheries Ireland surveys carried out along the River Tolka in 2017 found Lamprey approximately 1.3km upstream of the Proposed Scheme at Damastown in low numbers (Matson *et al.*, 2018). The River Tolka is reported to contain lamprey and previous surveys in the River Liffey have recorded lamprey species (IFI Consultation, 2020).

Lamprey species are valued as being of National Importance.

12.3.12.3 **European Eel**

The results of the aquatic surveys conducted at CBC0005AR001 and CB0005AR002 identified European eel *Anguilla anguilla* habitat of 'moderate' suitability at CBC0005AR001. The deeper pool areas immediately downstream of the Proposed crossings are likely to support European eel as they provide greater frequency of instream refugia, better prey resources and greater proportion of deeper glide/pools (Triturus Environmental Ltd, 2020). The desk study returned records for European eel on the River Tolka, which is historically reported to have eels in its lower reaches (Greater Dublin Drainage, 2012). The Liffey Estuary serves as the natural linkage for European Eel migrating between freshwater and marine environments. During a fish stock survey carried out in the Tolka Estuary in 2008, 12 European eels were recorded (Central and Regional Fisheries Board, 2008). The Tolka Estuary is located approximately 3.5km downstream of the Proposed Scheme. European Eel were also recorded in 2017 in the River Tolka at Violet Hill, within approximately 6km of the Proposed Scheme (Matson *et al.*, 2018). Previous surveys in the River Liffey have recorded European eel (IFI Consultation, 2020).

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).

European eel populations are valued as being of National Importance.

12.3.12.4 **All Other Fish Species**

The Royal Canal is known to support coarse fish species, including roach *Rutilus rutilus*, pike *Esox lucius*, rudd *Scardinius erythrophthalmus*, bream *Abramis brama* and tench *Tinca tinca* (DCC, 2015)

Fish species recorded in the Lower Liffey Estuary in 2008 under WFD monitoring include sprat *Sprattus sprattus*, sand goby *Pomatoschistus minutus*, sand smelt *Atherina presbyter*, three-spined stickleback *Gasterosteus aculeatus,* cod *Gadus morhua*, and pollack species *Pollachius* sp. (CFB, 2009).

Water sampling undertaken along the River Tolka by Inland Fisheries Ireland during 2017 resulted very low fish diversity, with only minnow *Phoxinus phoxinus*, stone loach *Barbatula barbatula* and three-spined stickleback (Matson *et al*., 2018).

These other species are valued as being of Local Importance (Higher Value) despite the low species diversity and the modified nature of the watercourses at Proposed crossing points.

12.3.13 Invertebrates

12.3.13.1 **White Clawed Crayfish**

White-clawed crayfish are legally protected under the Wildlife Acts and are also listed on Annex II of the Habitats Directive. Ireland remains the only part of the EU with no introduced species of crayfish, as such is of key conservation concern.

White-clawed crayfish were not recorded during the aquatic surveys conducted at either CBC0005AR001 or CB0005AR002 (Triturus Environmental Ltd, 2020 - refer to Appendix A12.2 Aquatic Baseline Report in Volume 4 of this EIAR). No records of white-clawed crayfish from along the River Tolka were returned in the desk study. A low Q Value and 'Poor' WFD status does not present a suitable habitat for this species. The presence of three-spined stickleback indicates a moderate level of pollution along the River Tolka. As such this watercourse presents no suitable habitat for these Annex II invertebrates.

The desk study found that white-clawed crayfish are known to occur approximately 17.3 km upstream of the Proposed Scheme, with a live record identified along the River Liffey at Leixlip Bridge. As a freshwater species white-clawed crayfish are not known in estuarine locations. As such this species is not deemed to occur within the footprint of the Proposed Scheme and are not considered further in the assessment.

12.3.13.2 **Freshwater Molluscs**

No red-listed freshwater mollusc species were recorded during the aquatic surveys conducted along the River Tolka at CBC0005AR001 and CB0005AR002.

The desk study returned records of glutinous snail *Myxas glutinosa* from along the Royal Canal approximately 7km west of the Proposed Scheme, with a live record identified at Collins Bridge, Lucan in 2003. Lesser bulin *Merdigera obscura* and plated snail *Spermodea lamellata* were also recorded along the River Liffey approximately 12km upstream of the Proposed Scheme at Lutterelstown, in 2008 and 1981 respectively. Records were returned for *Pisidium pseudosphaerium* along the Royal Canal approximately 17.5km west of the Proposed Scheme at Leixlip Station, Confey in 2003 (see Appendix A12.1 in Volume 4 of this EIAR). These species are listed as "endangered" on the *Ireland Red List No. 2 Non-Marine Molluscs* (Byrne *et al.*, 2009).

Records were returned for brown snail *Zenobiella subrufescens* and point snail *Acicula fusca* along the River Liffey approximately 12km upstream of the Proposed Scheme at Lutterelstown, in 2008 and 1981 respectively. Duck mussel *Anodonta (Anodonta) anatina* and ear pond snail *Radix Auricularia* were recorded approximately 7km upstream of the Proposed Scheme along the River Liffey at Waterstown Park in 2011 and 2012 respectively and a record was returned of swan mussel *Anodonta (Anodonta) cygnea* located along the Royal Canal approximately 17.5km west of the Proposed Scheme at Leixlip Station, Confey, 2003 (see Appendix A12.1 in Volume 4 of this EIAR). These species are listed as "vulnerable" on the *Ireland Red List No. 2 Non-Marine Molluscs* (Byrne *et al.*, 2009).

As freshwater mollusc species, these are not known in estuarine locations and all records returned from the desk study are from the River Liffey, upstream of the estuary. The records of glutinous snail, *P. pseudosphaerium* and swan mussel on the Royal Canal are all located west of the Talbot Bridge and the (double) 12th Lock at Blanchardstown with a 18ft (5.6 mt) rise, which is located approximately 100m west of the Proposed Scheme (Canals of Dublin, 2016). As such these species are not deemed to occur within the footprint of the Proposed Scheme and are not considered further in the assessment.

12.3.13.3 **Marsh Fritillary**

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

The desk study (see Appendix A12.1 in Volume 4 of this EIAR) did not return records for marsh fritillary within the footprint of the Proposed Scheme. Desk study records in the wider area were largely historical (pre-1980s). Recent records for marsh fritillary were identified approximately 6.6km east of the Proposed Scheme at North Bull Island in 2019.

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

12.3.13.4 **Other Invertebrates**

The desk study (see Appendix A12.1 in Volume 4 of this EIAR) returned records for several invertebrates red listed on Ireland Red List No. 2: 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) and Ireland Red List No. 7: Mayflies (Ephemeroptera) (Kelly-Quinn *et al*., 2012) (NBDC Online Database 2022).

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 *Tropaeleum majus*, Common holly *Ilex aquifolium* and common ivy *Hedera helix* (Butterfly Conservation Ireland, 2020). Corresponding habitats along the Proposed Scheme are located in parkland with scattered trees (WD5), dry meadows and grassy verges (GS2) and amenity grasslands (GA2); present within Corduff Park, Waterville Park, Phoenix Park Racecourse, Castlecurragh Park, Corduff Park, and along the Royal Canal, where suitable grasses, common nettle *Urtica dioica* and common ivy *Hedera helix* were recorded. These habitats were identified along the route of the Proposed Scheme in fragmented pockets of small and medium size. Species diversity was low in terms of foodplants in these habitats. Butterfly communities that are known to survive in highly fragmented landscapes are mobile species that can feed off a range of plants (Öckinger *et al.,* 2010).

Bees favour sites with lots of flowers in unimproved grasslands and hay meadows. These habitats were not recorded along the Proposed Scheme. The preferred foodplants for bees are native species with white, blue or yellow flowers (Fitzpatrick, 2006). Small, fragmented sites where suitable floral species were recorded along the Proposed Scheme include areas of dry calcareous neutral grassland present along highly disturbed road medians along the Navan Road and M50, ornamental flower beds (BC4) within residential gardens, parkland with scattered trees (WD5), and amenity grasslands (GA2); in parks and along the banks of the River Tolka and the Royal Canal. Wildflower planting is present in areas along the Navan Road. Bumblebees may have large ranges and require large areas with varied habitats providing long flowering periods to support viable populations. Bees do not cope well with habitat fragmentation which can isolate species, ultimately reducing gene flow and genetic diversity, 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 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 dry calcareous and neutral grassland, species poor dry meadows and grassy verges, and areas of ornamental planting along roadsides, parkland, and gardens. Such habitats are fragmented and highly disturbed and are therefore deemed unsuitable for significant populations of red-listed invertebrates (Biesmeijer *et al*., 2006; Öckinger *et al.,* 2010). As such, other invertebrates are not considered further in the assessment.

12.3.14 Summary Ecological Valuation and Identification of KERs

Table 12.12 summarises the ecological evaluation of all receptors taking into consideration legal protection, conservation status and local abundance. KERs are highlighted in blue in Table 12.12. Species, habitats and features not qualifying as KERs are not subjected to impact assessment in line with current best practice of assessing the impacts on what are determined to be important ecological or biodiversity features, as per the CIEEM Guidelines (CIEEM 2018) and the Guidelines for Assessment of Ecological Impacts of National Road Schemes (NRA 2009).

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

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

Habitats valued as being of a Local Importance (Lower Value) are not considered to be KERs in this assessment. This is not to say that they are of no biodiversity value, but that impacts on these habitat types in their local context are not likely to result in a significant effect on biodiversity. It should be noted that this relates to the impact on the habitat itself as distinct from considering the role these habitat types play in supporting KER fauna species. The impacts of the Proposed Scheme in that sense are captured and assessed under the relevant species' headings in Section 12.4.

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 12.12: Summary of Ecological Valuation and Identification of KERs

Ecological Receptor	Ecological Valuation	KER?
Designated Sites		
South Dublin Bay SAC [000210]	International	Yes
North Dublin Bay SAC [000206]	International	Yes
Howth Head SAC [004113]	International	Yes
Rockabill to Dalkey Island SAC [003000]	International	Yes
Lambay Island SAC [000204]	International	Yes
South Dublin Bay and River Tolka Estuary SPA [004024]	International	Yes
North Bull Island SPA [004006]	International	Yes
Baldoyle Bay SPA [004016]	International	Yes
Malahide Estuary SPA [000205]	International	Yes
Dalkey Island SPA [004172]	International	Yes
Howth Head Coast SPA [004113]	International	Yes
Irelands Eye SPA [004117]	International	Yes
Rogerstown Estuary SPA [004015]	International	Yes
Skerries Islands SPA [004122]	International	Yes
Lambay Island SPA [004069]	International	Yes
Rockabill SPA [004014]	International	Yes
The Murrough SPA [004186]	International	Yes
All other SAC or SPA sites	International	No – beyond ZoI
Skerries Islands NHA [001218]	National	Yes
Royal Canal pNHA [002103]	National	Yes
Liffey Valley pNHA [000128]	National	Yes
North Dublin Bay pNHA [000206]	National	Yes
South Dublin Bay pNHA [000210]	National	Yes
Dolphins, Dublin Docks pNHA [000201]	National	Yes
Booterstown Marsh pNHA [001205]	National	Yes
Baldoyle Bay pNHA [000199]	National	Yes

Ecological Receptor	Ecological Valuation	KER?
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 Murrough pNHA [004186]	National	Yes
All other NHA or pNHA sites	National	No – beyond ZoI
Habitats		
Flower beds and borders (BC4)	Local Importance (Lower Value)	No
Stone walls and other stonework (BL1)	Local Importance (Lower Value)	No
Buildings and artificial surfaces (BL3)	Local Importance (Lower Value)	No
Tidal Rivers (CW2) (corresponding to Annex I Estuaries [1130])	National Importance	Yes
Exposed sand, gravel or till (ED1)	Local Importance (Lower Value)	No
Spoil and bare ground (ED2)	Local Importance (Lower Value)	No
Recolonising bare ground (ED3)	Local Importance (Lower Value)	No
Depositing/ lowland rivers (FW2)	Local Importance (Higher Value)	Yes
Canals (FW3)	National Importance	Yes
Amenity grassland (improved) (GA2)	Local Importance (Lower Value)	No
Dry calcareous and neutral grassland (GS1);	Local Importance (Higher Value)	Yes
Dry meadows and grassy verges (GS2)	Local Importance (Higher Value)	Yes
Residential	Local Importance (Lower Value)	No
(Mixed) broadleaved woodland (WD1)	Local Importance (Higher Value)	Yes
Mixed broadleaved / conifer woodland (WD2)	Local Importance (Higher Value)	Yes
Scattered trees and parkland (WD5)	Local Importance (Higher Value)	Yes
Hedgerows (WL1)	Local Importance (Higher Value)	Yes
Treelines (WL2)	Local Importance (Higher Value)	Yes
Wet willow-alder-ash woodland (WN6) links with Annex I Alluvial forests	International Importance	Yes
Scrub (WS1)	Local Importance (Lower Value)	No
Immature woodland (WS2)	Local Importance (Higher Value)	Yes
Ornamental / non-native shrub (WS3)	Local Importance (Lower Value)	No
Flora Species		
All non-FPO and non-Red listed flora species	Local Importance (Lower Value)	No
Non-native invasive plant species	N/A	No
Fauna Species		
Otter	County Importance	Yes
Bats	Local Importance (Higher Value)	Yes
Badger	Local Importance (Higher Value)	Yes
Other mammal species protected under the Wildlife Acts	Local Importance (Higher Value)	Yes
SCI / Annex I bird species	International Importance	Yes
All other Red listed bird species (non-SCI breeding populations)	Local Importance (Higher Value)	Yes

Ecological Receptor	Ecological Valuation	KER?
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
Atlantic salmon, lamprey species, and European Eel	National Importance	Yes
All other fish species	Local Importance (Higher Value)	Yes
Marine mammals (Annex I species of nearby SAC's: harbour porpoise, harbour seal and grey seal	International Importance	Yes
Marine Mammals	County Importance	Yes
Amphibians	Local Importance (Higher Value)	Yes
Reptiles	Local Importance (Higher Value)	Yes
All other non-Red listed Invertebrates and Insects	Local Importance (Lower Value)	No
Non-native invasive animal species	N/A	No

12.4 Potential Impacts

The following section presents the assessment of potential impacts on biodiversity within the ZoI of the Proposed Scheme. As outlined in Section 12.2.4, this is focused on the KERs identified in Section 12.3.14 and Table 12.12. This includes consideration of the "*Do-Nothing impact*" scenario – i.e. the existing trends with the potential to affect biodiversity in the absence of the Proposed Scheme.

12.4.1 Characteristics of the Proposed Scheme

A detailed description of the Proposed Scheme and its construction activities are provided in Chapter 4 – (Proposed Scheme Description) and Chapter 5 (Construction). The main characteristics of the Proposed Scheme of relevance to the ecological assessment are outlined under the Construction and Operation phases as follows.

12.4.1.1 Construction Phase

The Proposed Scheme has been divided into five principal sections as described in Section 12.3. Across the five sections, the main characteristics of the construction stage of the Proposed Scheme that have potential for ecological impact are:

- Site preparation and clearance;
- Removal of existing boundaries, pavement, lighting columns, bus stops, and signage;
- Protection and / or diversion of buried services;
- Reconnection of existing and new drainage infrastructure into the existing surface water drainage infrastructure;
- Road widening, pavement reconstruction, and kerb improvements;
- Temporary and permanent land take;
- Installation of new bus stops and junction / roundabout modification;
- Property boundary reinstatement, signage replacement; relocation of lighting columns; and
- Landscaping and tree planting, and reinstatement of temporary land acquisitions.

12.4.1.2 Structural Works

The principal structures which form part of the Proposed Scheme are identified in Table 12.13.

Table 12.13: Principal Structures

Structure Name	Structure Reference	Section Reference
Tolka River Bridge	BR01	Section 2a
Mill Road Bridge (including Pedestrian Ramps)	BR02 (including RW07-A and RW07-B)	Section 2c, 2d, 2e
Principal Retaining Walls	RW01	Section 1c, 1i
	RW07-A	Section 3d
	RW07-B	Section 2e
	RW09	Section 2f
	RW03	Section 3a
Sign Gantries	GY01	Section 2b
	GY02	Section 2b
	GY03	Section 3a
	GY04	Section 2a
	GY05	Section 3a
	GY06	Section 3a
	GY07	Section 2b
	GY08	Section 2b
	GY09	Section 3b

12.4.1.2.1 Tolka River Bridge (BR01)

The southern end of the Tolka River Bridge will be widened in order to facilitate the additional lanes proposed for the N3 dual carriageway. The existing Tolka River Bridge comprises a single 13m span bridge. There is an existing maintenance access path under the bridge, however no works to this access path are proposed. The original corrugated steel arch culvert was previously widened at the southern end, using precast reinforced concrete (RC) beams.

The bridge will be widened using a similar approach of precast concrete beams, supported on a new abutment. For the duration of the works, the N3 dual carriageway westbound slip road will be reduced to a single lane. Access to the temporary working area around the bridge structure will be from the N3 dual carriageway westbound slip road.

Initially vegetation and site clearance will be carried out. Once the access from N3 dual carriageway westbound slip road to the temporary working area is provided, demolition of the southern section of the existing Tolka River Bridge, and the existing wingwall will be undertaken. The demolition will be carried out by mechanical means including the use of cutting, hydraulic breakers and potentially hydro-demolition. Demolition will be carried out in accordance with the measures set out in Chapter 5 Construction of this EIAR. Material generated from the demolition will be managed in accordance with the measures identified in Chapter 18 (Waste & Resources) of this EIAR.

Sheet piling will be installed on the land side of the existing gabion baskets to minimise the risk of any construction materials washing into the river and to retain the existing bank during excavation works for the bridge foundations. The sheet piles will be driven and installed in accordance with Inland Fisheries Ireland (IFI) Guidelines on

Protection of Fisheries During Construction Works Adjacent to Waters (IFI 2016). Consultation was undertaken (in June of 2021) with IFI and they have confirmed that the works are deemed out-of-channel. Environmental mitigation measures including netting beneath bridge deck adjacent to widening works, and silt curtains and silt busters will be installed within the temporary working area, to mitigate potential impacts associated with surface water runoff on the River Tolka. The appointed contractor will provide site hoarding of 2.4m height between the sheet piles and the watercourse to mitigate potential impacts associated with protected species (Otter and Kingfisher). The hoarding will be installed to retain the existing maintenance access path under the bridge.

After the sheet piling is installed, the excavation works will commence for the abutment foundations. Excavations will be completed to the required level and will be upfilled with imported aggregate to the underside of the foundation. The foundation and abutment walls will be constructed and backfilled in accordance with the design. Foundations for the bridge widening will be supported on piles. Percussive and driven piling techniques will be avoided to mitigate impacts on the surrounding environment. In situ rotary bored piles will be installed to support the bridge foundations. A drill rig will be used for boring lined holes to a predetermined depth as per the design, with the holes filled with reinforced concrete. A reinforced concrete foundation pad will be constructed on top of the piles This will be undertaken by placing formwork, then steel reinforcement followed by the concrete pour. After the concrete has cured, the formwork will be removed.

Following completion of the foundations, the sheet piling will be removed. Once the foundations have been constructed, the remaining elements will be completed as follows:

- Break out area of existing bridge (to allow for structurally tying in of existing bridge deck to new bridge deck);
- Construct abutments – as with the foundations, these will be reinforced concrete, and will be constructed by placing formwork, then steel reinforcement followed by the concrete pour;
- Install bridge beams – precast reinforced concrete beams which will be delivered to site on lorries, and lifted into place (probably out-of-hours) using a large mobile crane;
- Construct reinforced concrete bridge deck;
- Construct reinforced concrete wingwalls and masonry cladding;
- Construct reinforced concrete retaining wall and masonry cladding on new widened section of the bridge;
- Waterproof and backfill abutments, wingwalls and retaining walls;
- Construct parapet edge beams and install steel parapet;
- Complete bridge deck waterproofing;
- Place backfill to structure; and
- Construct pavement, footpaths and finishes.

Once the structure is completed, the access will be removed from the adjacent slip road and the temporary working area will be reinstated to the existing profile and in accordance with working within the Streamside Zone by IFI in the Planning for Watercourses in the Urban Environment Guidelines (IFI 2020).

With the N3 dual carriageway westbound slip road reduced to a single lane, the majority of works will be carried out during normal working hours as stated in Chapter 5 Construction of this EIAR. Some works will be carried out at night-time under full slip road closure, including works to remove the existing bridge deck at the tie-in to the widened section, and bridge beam lifts.

12.4.1.2.2 Mill Road Bridge (BR02) and Pedestrian Ramps (RW07-A and RW07-B)

The existing Mill Road Bridge will be widened to the north and south, in order to facilitate the additional lanes proposed for the N3 dual carriageway. The existing Mill Road Bridge consists of twin bridges of single 14m span RC, integral with portal abutment walls.

The widening will be completed to both ends of the bridges, with the abutment walls, foundations and bridge decks being extended, widening the existing structure. Pedestrian access ramps will also be constructed on both sides of the Mill Road Bridge. The sequencing of works for this structure will be undertaken as follows:

- Central Reservation Works;

- Mill Road South and Mill Road North Works; and
- Pedestrian Ramp Works.

Prior to all demolition and construction works at this location, environmental mitigation measures including silt curtains and silt busters will be installed within the temporary working area, to mitigate potential impacts associated with surface water runoff on the River Tolka. Given that Mill Road will be closed, all works will be undertaken during normal working hours as stated in Chapter 5 Construction of this EIAR.

Mill Road will be closed to vehicular traffic for the duration of the construction works, between Herbert Road and Edmund Rice College. For the majority duration of the works pedestrian access will be maintained through Mill Road however, for specific works such as bridge beam lifts, pedestrian access will be closed. These works will be undertaken at night. Further information on traffic management measures at Mill Road is provided in Chapter 5 Construction of this EIAR.

12.4.1.2.2.1 Central Reservation Works

Traffic on the N3 dual carriageway will be reduced to two lanes in each direction, with traffic realigned to the verges, maximising the working area in the central reservation. This traffic management arrangement will provide sufficient room in the N3 central reservation for structural works.

Works will commence with demolition of the central sections of the existing bridge. These will be removed by mechanical means including the use of cutting, hydraulic breakers and potentially hydro-demolition. Demolition will be carried out in accordance with the measures set out in Chapter 5 Construction of this EIAR. Once the demolition works are completed, the deck construction works will commence. Falsework will be installed over the Mill Road, for construction of the in-situ RC deck.

12.4.1.2.2.2 Mill Road South and Mill Road North Works

During this element of work, traffic on the N3 dual carriageway will be reduced to two lanes in each direction, with traffic realigned to run tightly along the newly constructed central reservation. This traffic management arrangement will provide sufficient room in the N3 verges for structural widening works.

Works will commence with the demolition of the existing parapet and edge beam on the northern and southern edges of the bridge. These will be removed by mechanical means including the use of cutting, hydraulic breakers and potentially hydro-demolition. Demolition will be carried out in accordance with the measures set out in Chapter 5 Construction. Once the demolition works are completed, the widening works will be constructed in the following sequence:

- Abutments;
    - Diversion / temporary protection of services;
    - Excavation for foundation construction;
    - Construction of in-situ RC spread pad footing. As rock is approximately 1m below existing ground level, no piling of foundations will be required;
    - Construction of in-situ RC abutment stem;
- Deck Construction;
    - Construction of in-situ RC deck with falsework over Mill Road;
- Wingwalls;
    - Construction of in-situ wingwalls with sculptured finish;
- Finishes;
    - Backfill of abutment and wingwalls;
    - Construction of RC parapet edge beam and installation of parapet;
    - Waterproofing of bridge deck;
    - Kerbing, footpaths, pavement on deck; and
    - Cobble / paving underneath bridge widening.

12.4.1.2.2.3 Pedestrian Ramp Works (RW07-A and RW07-B)

To the south of the N3 dual carriageway, a pedestrian ramp will be constructed to the east of Mill Road (RW07-A). These works will be carried out simultaneously with the Mill Road Bridge (BR02) widening. The southern access works will be divided into three sections:

- Southern approach ramp: The southern access will involve underpinning or temporary supporting of the adjacent wall during excavation and construction of the new approach ramp. Extensive surveys of the existing wall will be required in advance of construction works commencing to inform the construction method. Access for these works will be from Mill Road with lane closures required for tie-in works.
- Pedestrian ramp adjacent to N3: The pedestrian ramp will be constructed with access from the N3 dual carriageway. Initially the area will be excavated to formation level. The retaining walls will then be constructed with the areas backfilled to finished level as the walls are being constructed.
- Stepped access: The stepped access will be constructed from the bottom, up, with access to the works from both Mill Road and the N3.

To the north of the N3 dual carriageway, a pedestrian ramp will be constructed to the west of Mill Road (RW07-B). These works will be carried out simultaneously with the Mill Road Bridge (BR02) widening. The pedestrian access ramp will be constructed in close proximity to an existing foul sewer pumping station which is being retained as part of the works. Any services connecting to the pumping station, in the line of the proposed works will be diverted by the appointed contractor prior to commencement of the works. Due to the position of the pumping station, a construction access lane will be constructed to the north of the pumping station. The access ramp will be constructed from the bottom up, completing the retaining walls in sequence as the works progress. The works will be completed with plant and equipment positioned at the bottom of the slope for the lower walls and on the N3 dual carriageway for the walls higher up the slope. Once the access ramp is completed, the area at the bottom of the slope will be reinstated to its existing profile.

12.4.1.2.3 Retaining Walls

Retaining walls with a retained height greater than 1.5m are classed as principal structures. There are five principal retaining walls along the Proposed Scheme, as detailed in Table 12.14.

Table 12.14: (Principal) Retaining Walls along the Proposed Scheme

Structure Reference	Structure Type	Details	Chainage (m)	Length (m)	Max Retained Height (m)	Section Reference
RW01	Spreadfoot Cantilever Wall	Retains vegetated berm adjacent Blanchardstown Road South.	Blanchardstown Road South 453 to A0040	270	3.0	Section 1c, 1i
RW07-A	Spreadfoot Cantilever Wall	To service bus stop on southern side of N3. Includes ramp and stair access.	A1604 to A1653	100	1.5	Section 2d
RW07-B	Spreadfoot Cantilever Wall	To service bus stop on northern side of N3. Includes ramp and stair access.	A1540 to A1609	250	3.0	Section 2e
RW09	Spreadfoot Cantilever Wall	Retains N3 embankment adjacent Junction 6 Castleknock health and leisure centre.	A2219 to A2305	90	4.0	Section 2f
RW03	Soil Nail Wall	Retains cut slope to accommodate widening for bus stop.	A2926 to A3027	100	4.0	Section 3a

Retaining walls are typically installed to cater for level differences between the road and adjoining lands. RW07-A and RW07-B are the pedestrian ramps at Mill Road and these ramp structures include principal retaining walls.

Retaining walls will generally be constructed of reinforced concrete, with railing and clad as required, with suitable materials depending on the local environs. Retaining walls will generally be constructed by first isolating the site of the retaining wall using fencing, as appropriate, to the location. The existing ground will then be stripped to formation level. Existing services will be diverted as required to enable wall construction. A side slope will be battered back to enable construction. Blinding will be installed at formation level. Formwork and reinforcing steel for the wall will be fixed in place. Then concrete will be poured in sections and formwork removed after initial curing of concrete. After a sufficient curing period the area behind the wall will be backfilled.

12.4.1.2.4 Miscellaneous Retaining Walls

Retaining walls with a retained height less than 1.5m are classed as miscellaneous retaining walls. There are 15 miscellaneous retaining walls along the Proposed Scheme, as detailed in Table 12.15. Retaining walls are typically installed to cater for level differences between the road and adjoining lands. Retaining walls will be constructed as described in Chapter 5 Construction of this EIAR.

Table 12.15: (Miscellaneous) Retaining Walls along the Proposed Scheme

Structure Reference	Chainage (m)	Length (m)	Max Retained Height (m)	Section Reference
RW10	Blanchardstown Road South 305 to 543	241	0.3	Section 1c
RW11	A140 to A156	16	0.3	Section 1c
RW12-1	A229 to A255	27	0.5	Section 1i
RW12-2	A269 to A293	24	0.6	Section 1j
RW12-3	A302 to A326	25	0.6	Section 1j
RW12-4	A339 to A375	36	0.4	Section 1j
RW13	A703 to A741	36	0.9	Section 1l
RW14	A1475 to A1545	66	0.7	Section 2b
RW15	A1793 to A1801	8	0.5	Section 2b
RW16	A1854 to A1880	26	0.4	Section 2b
RW17	A2205 to A2310	107	0.9	Section 2f
RW18	A2308 to A2342	34	1.3	Section 2f
RW19	A3939 to A3979	41	1.3	Section 3b
RW20	A5542 to A5548	6	0.3	Section 4a
RW21	A6658 to A6693	35	0.5m	Section 4b

12.4.1.2.5 Sign Gantries

There are nine sign gantries along the Proposed Scheme; one gantry to be retained without modifications, four gantries to be modified, two gantries to be replaced and two new gantries to be constructed, as detailed in Table 12.16.

Prior to construction works commencing the appointed contractor will inspect the position and condition of the gantry foundations and evaluate whether new foundations need to be constructed and / or relocated. Gantry foundations will be constructed during the verge and central reservation phases of construction and the steelwork and signage will be installed during out-of-hours works under a carriageway closure.

Table 12.16: Sign Gantries along the Proposed Scheme

Structure Reference	Structure Type	Existing / New	Chainage (m)	Section Reference
GY01	Overhead Sign Gantry	Modify / Replace Existing	A1439	Section 2b
GY02	Overhead Sign Gantry	Replace Existing	A1745 to A1799	Section 2b
GY03	Overhead Sign Gantry	Modify / Replace Existing	A2988	Section 3a
GY04	Variable Message Sign	Replace Existing	A1316	Section 2a
GY05	Overhead Sign Gantry	Retain Existing	A2818	Section 3a
GY06	Overhead Sign Gantry	Modify / Replace Existing	A3316	Section 3a
GY07	Overhead Sign Gantry	New	A1765	Section 2b
GY08	Overhead Sign Gantry	New	A1311	Section 2b

Structure Reference	Structure Type	Existing / New	Chainage (m)	Section Reference
GY09	Overhead Sign Gantry	Modify/Replace Existing	A3916	Section 3b

12.4.1.2.6 Surface Water Drainage Infrastructure

The surface water drainage system is managed by the local authority, whilst combined sewer systems are managed by Irish Water. Surface water flows are typically collected in standard gully grates and routed via a gravity network to outfall points. The drainage design of the Proposed Scheme assumes that there are generally no SuDS/attenuation measures on the existing drainage networks to treat or attenuate run-off from the existing carriageway.

The drainage design aims to sustain flow levels within the existing pipe network after a rainfall event by controlling the discharge rate within each catchment. Flows will be controlled by the implementation of SuDS techniques, where practicable. During the Operation Phase, the overall net increase in impermeable area for the Proposed Scheme will be 27,737m^2 which equates to a 6.6% net increase. It is proposed to connect the drainage infrastructure for the Proposed Scheme into existing surface water infrastructure which is assumed to discharge to the following waterbodies: Tolka _040 (via surface water drainage), Royal Canal (Mainline (Liffey and Dublin Bay)) (via surface water drainage), Liffey Estuary Upper (via combined sewer) and Dublin Zoo Ponds (via surface water drainage). Full details of the proposed drainage infrastructure are provided in Chapter 4 (Proposed Scheme Description), Chapter 13 (Water) and the drainage drawings (BCIDC-ARP-DNG_RD-0005_XX_OO-DR-CD-9001) in Volume 3 of this EIAR.

12.4.1.2.7 Lighting

The majority of the Proposed Scheme is already artificially lit. During Construction, temporary lighting will be required at times along the Proposed Scheme at certain locations, as necessary. Where it is necessary to disconnect public lighting during the construction works or to undertake works outside of daylight hours where existing lighting is low, appropriate temporary lighting will be provided. Temporary lighting will also be installed at the Construction Compounds for the duration of the Construction Phase. The standard of temporary lighting installed during the Construction Phase will meet the standard of the existing carriageway and will be appropriate to the speed and volume of traffic during construction. Temporary construction lighting will generally be provided by tower mounted floodlights, which will be cowled and angled downwards to minimise spillage of light from the site. Details of the lighting design are provided in Chapter 5 Construction of this EIAR.

A review of the existing lighting provision along the extent of the route has been carried out to understand the impact of the Proposed Scheme on lighting columns and associated infrastructure. Where existing lighting columns conflict with the Proposed Scheme, they will be relocated. In some areas which are currently artificially lit, there are approximately 21 additional new lighting columns provided as part of the Proposed Scheme. All relocated and new lighting columns are identified as proposed lighting columns as shown on the Street Lighting drawings (BCIDC-ARP-LHT_RL-0005_XX_00-DR-EO-9001) in Volume 3 of this EIAR. Light Emitting Diode (LED) lanterns will be the light source for all lighting columns provided. All lighting columns will aim to minimise the effects of obtrusive light at night and reduce visual impact during daylight. Lighting schemes will comply with the 'Guidance notes for the Reduction of Light Pollution' issued by the Institution of Lighting Professionals (ILP). Details of the lighting design are provided in Chapter 4 (Proposed Scheme Description) of this EIAR.

New low-level lighting is proposed at BR02 Mill Road Bridge, as well as at RW07A & B Pedestrian Ramps which will provide pedestrian access between Mill Road and the N3 Dual Carriageway. It is anticipated that the new low level lighting either integrated into the handrails or another part of the structure. Due to the nature of this approach the lighting levels will be under 3 lux within a short distance of the structure which will result in extremely limited light spill.

12.4.1.2.1 Landscape and Public Realm

The Proposed Scheme includes a planting strategy which includes replacement of street trees and groups of trees that may be impacted by the Proposed Scheme, but also the introduction of new tree planting and street trees within other spaces and along streets. Full details of the Public Realm and the planting strategy are included

in Chapter 4 (Proposed Scheme Description) and the Landscape General Arrangement Drawings (BCIDC-ARP-ENV_LA-05_XX_00-DR-LL-001) in Volume 3 of this EIAR.

The Proposed Scheme includes a new Bus Interchange at Blanchardstown Shopping Centre. The Bus Interchange will be a covered area where various transport routes will connect and allow for efficient change to other services. Reinforcement of green infrastructure along the route will improve the overall amenity, character and appeal of the route corridor and localities along it, as well as enhancing biodiversity.

The Bus Interchange at Blanchardstown Shopping Centre will require roof canopies of two heights. Up-lighting on the canopies will be provided to create a safe environment for members of the public. The canopies comprise of a concrete clad steel frame supported on circular columns. Drainage off each roof will be directed through the columns to a below ground rainwater drainage system, eased by the presence of green roofs incorporated into the roof of each canopy.

12.4.1.2.2 Construction Compounds

The location of the Construction Compounds in relation to the Proposed Scheme are shown in Figure 5.1 in Volume 3 of this EIAR. The Construction Compound locations have been selected due to the amount of available space, its location near the majority of the Proposed Scheme major works and its access to the National and Regional Road network. Refer to Chapter 6 (Traffic & Transport) of this EIAR for an assessment of the construction traffic. The Construction compounds will be located at the following sites:

- Construction Compound BL1: Old Navan Road Car Park;
- Construction Compound BL2: Junction 6, Castleknock, west of M50; and
- Construction Compound BL3: R147 East of the M50. It is divided into two sections by the Navan Slip Road.

As shown in Image 12.1, Image 12.2 and Image 12.3, the Construction Compounds will contain a site office, and welfare facilities for NTA personnel and contractor personnel. Limited car parking will be allowed at the Construction Compounds. Materials such as topsoil, subsoil, concrete, rock etc., will be stored at the Construction Compounds for reuse as necessary. Items of plant and equipment will also be stored within the Construction Compounds. The Construction Compounds will be in place for the duration of the Construction Phase of the Proposed Scheme, estimated at approximately 24 months. The compounds will be dismantled, and the site returned to its existing condition on completion of the Construction Phase.

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

Appropriate environmental management measures will be implemented at the Construction Compounds for example, to minimise the risk of fuel spillage, and to ensure that the Construction Compounds and the approaches to it are appropriately maintained. Further information on the air quality, noise and vibration, and water related mitigation measures that will be implemented are described in Chapter 7 (Air Quality), Chapter 9 (Noise & Vibration) and Chapter 13 (Water) of this EIAR.

Following completion of the construction works, the Construction Compound areas will be cleared and reinstated to match pre-existing conditions.

The Construction Compound BL1 will be located in Corduff Park, in an existing car park along the Old Navan Road, as shown in Image 12.1. The area of Construction Compound BL1 is approximately 1,200m^2.

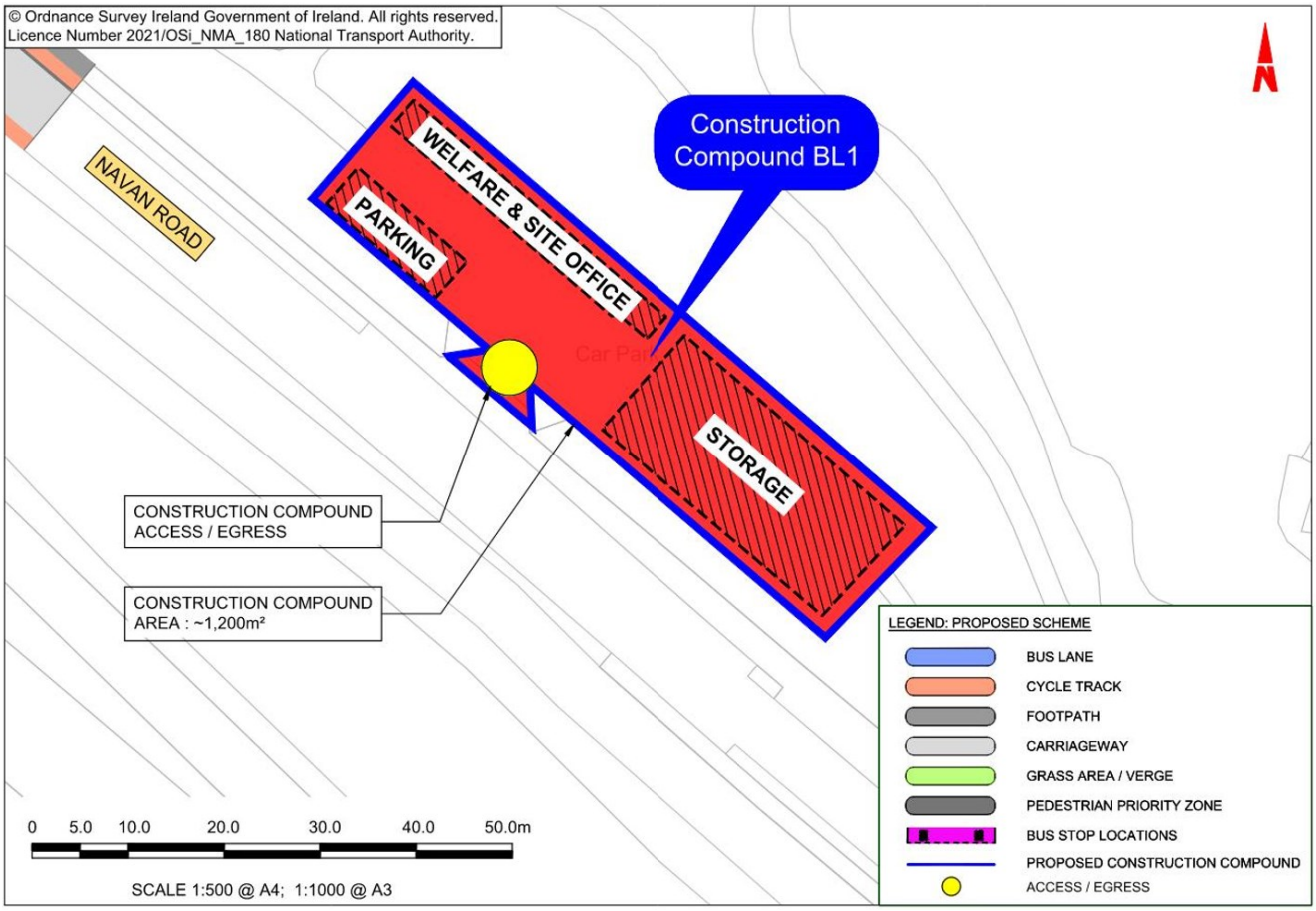

Image 12.1: Location, Extent and Layout of Construction Compound BL1

The Construction Compound BL2 will be located at Junction 6, Castleknock, west of the M50, as shown in Image 12.2. The area of Construction Compound BL2 is approximately 1,400m^2.

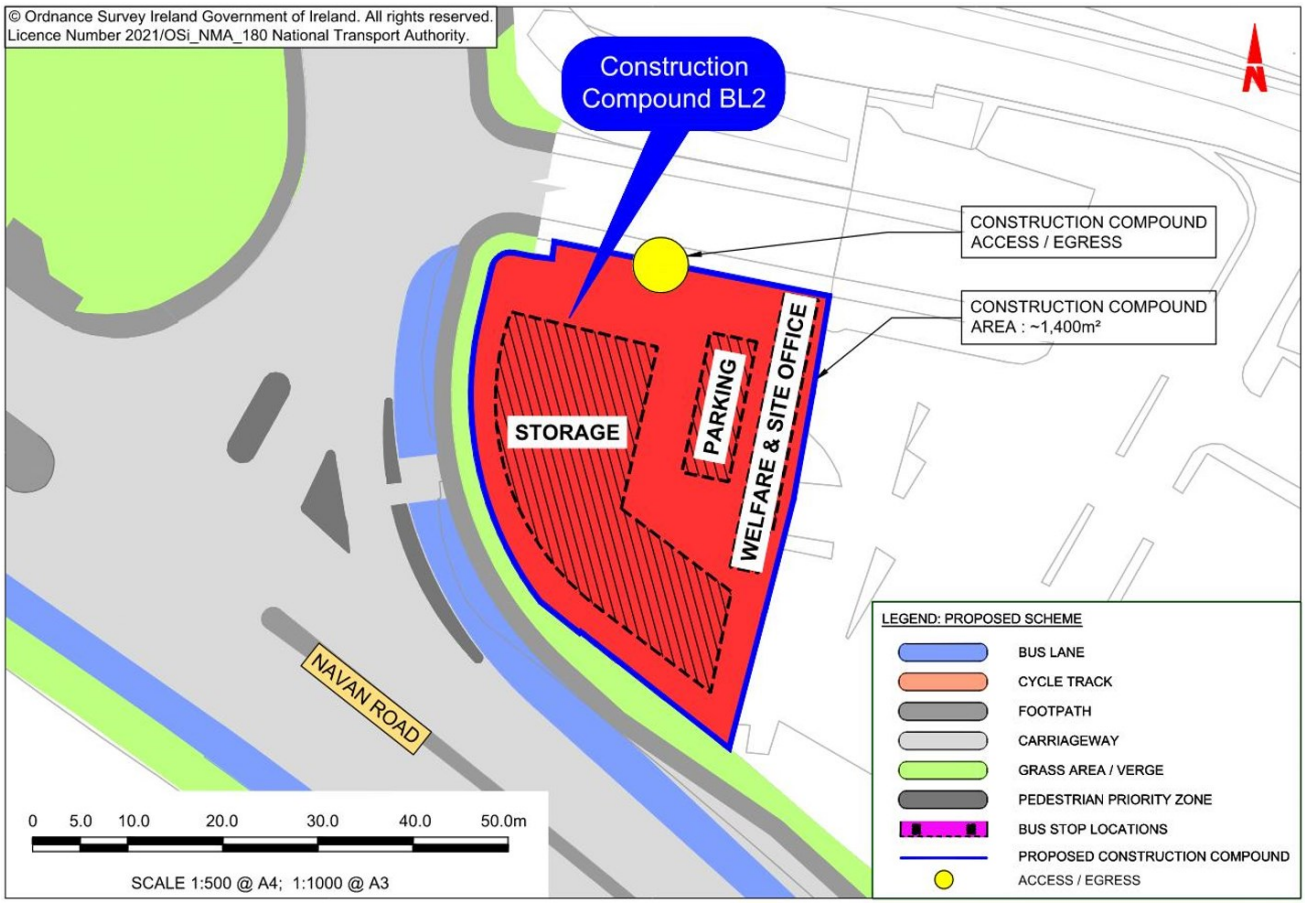

Image 12.2: Location, Extent and Layout of Construction Compound BL2

The Construction Compound BL3 will be located along the R147, east of the M50, as shown in Image 12.3. The Construction Compound will be divided by the Navan Road slip road, and a proposed road as part of the Proposed Scheme. The area of Construction Compound BL3 is approximately 5,200m^2.

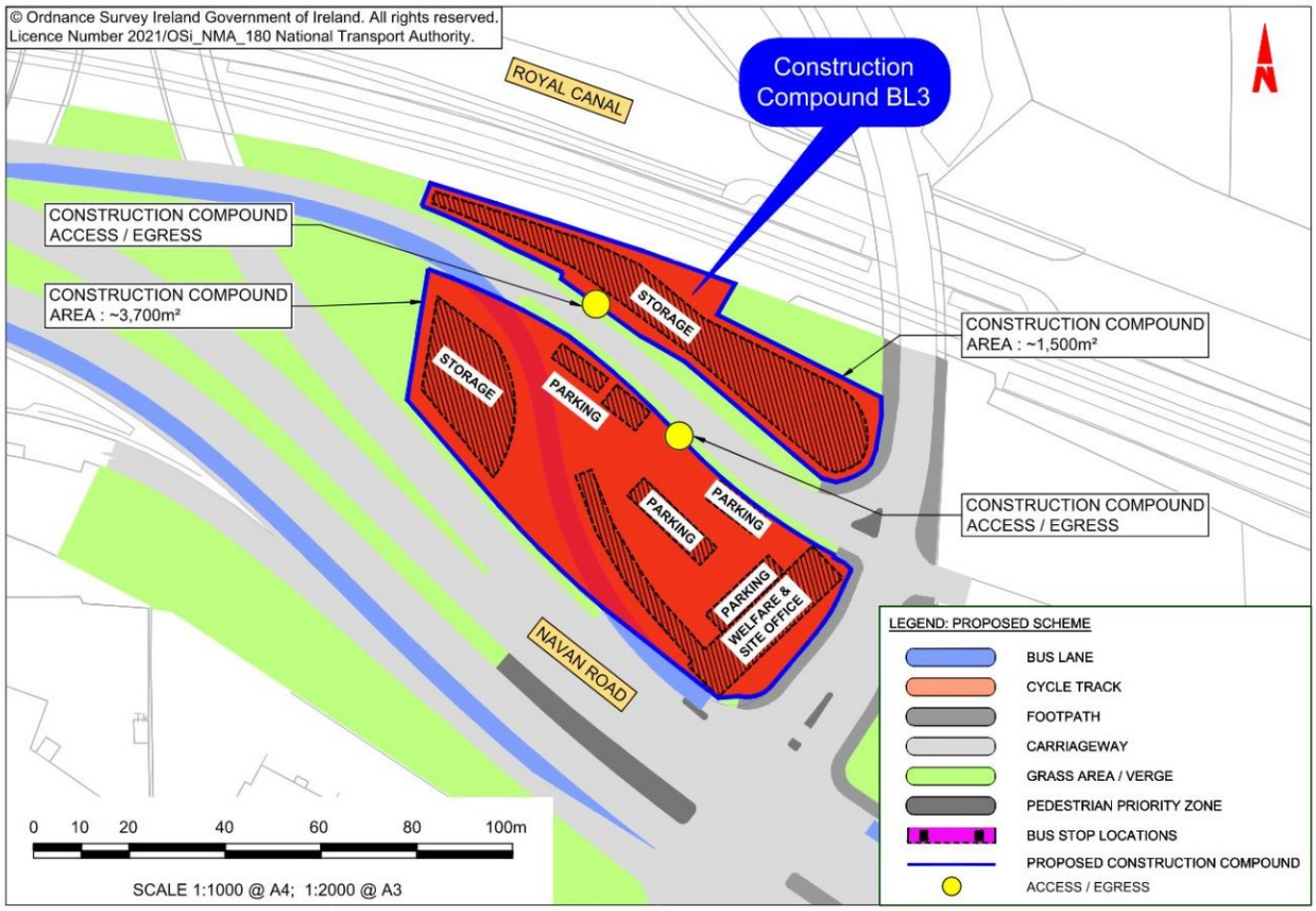

Image 12.3: Location, Extent and Layout of Construction Compound BL3

12.4.1.2.3 Offline Works

A number of isolated or offline sections of work, not attached to the main corridor are proposed. Typically works entail works, sign installation and the provision of a new road layout in discrete areas for example along the Cabra Road / North Circular Road junction and R147 / R805 / R804. The locations of these works are included in the General Arrangement drawings (BCIDC-ARP-GEO-GA-0005_XX_00-DR-CR-9001) in Volume 3 of this EIAR.

12.4.1.2.4 Estimated Project Duration

The duration of the Construction Phase is estimated to be 24 months.

12.4.1.3 **Operational Phase**

The main characteristics of the operational stage of the Proposed Scheme that have potential for ecological impact are:

- The presence and operation (traffic) of the road; and
- The presence of relocated lighting and some new low-level lighting associated with structures; and,
- Routine maintenance.

12.4.2 'Do Nothing' Scenario

In the Do Nothing scenario, the Proposed Scheme would not be implemented (discussed further in Chapter 6 *(*Traffic and Transport)). Thus, 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. The impact of no construction is neutral upon biodiversity along and adjacent to the Proposed Scheme.

The baseline environment (see Section 12.3) describes the existing land use surrounding the Proposed Scheme. The Greater Dublin Area is highly urbanised with existing trends resulting in added pressure to water resources and habitat losses to ongoing development. As the full extent of the Proposed Scheme passes through lands zoned under the Fingal County Development Plan 2017-2023 and Dublin City Council 2016-2022. The current land use zonings provide the best indication of what the future short to medium-term biodiversity trends might be as they will influence and direct development in the surrounding area. Lands surrounding the Proposed Scheme are largely zoned for residential, commercial or industrial purposes. Current biodiversity trends are likely to continue in areas zoned for development, adding to pressures on waterbodies and habitat fragmentation. It is also likely that traffic numbers will continue to remain high on a road network with variable drainage control or pollution control measures, which may have effects on biodiversity receptors in the baseline environment.

However, any effects on biodiversity are likely to be moderated by the environmental protective policies contained in both the Fingal County Development Plan 2017-2023 (FCC 2017) and Dublin City County Development Plan 2016-2022 (DCC 2016)), as well as the overarching pollution control objectives in the River Basin Management Plan (RBMP) (DHPLG 2018).

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

12.4.3 Construction Phase

12.4.3.1 **Designated Areas for Nature Conservation**

This Section describes and assesses the potential for the Proposed Scheme to result in likely significant effects on designated areas for nature conservation at SACs, SPAs, NHAs or pNHAs. In the context of European sites this is focused on the habitats and species for which the sites are selected (i.e. QIs for SACs and SCI species (and supporting wetland habitat where identified) 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 standalone NIS prepared for the Proposed Scheme (and submitted with the application for approval).

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

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. 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.

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

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

The mechanism to define the ZoI is summarised as follows:

- Consider the nature, size and location of the Proposed Scheme;
- Consider the sensitivities of the ecological receptors;
- Identify impact sources and pathways; and
- Determine the ZoI based on the extent of the impact

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

- South Dublin Bay SAC [000210];
- North Dublin Bay SAC [000206];
- Howth Head SAC [000202];
- Rockabill to Dalkey Island SAC [003000];
- Lambay Island SAC [000204]
- North Bull Island SPA [004006];
- South Dublin Bay and River Tolka Estuary SPA [004024];
- Baldoyle Bay SPA [004016];
- Malahide Estuary SPA [004025];
- Dalkey Island SPA [004172];
- Howth Head Coast SPA [004113];
- Ireland's Eye SPA [004117];
- Rogerstown Estuary SPA [004015];
- Lambay Island SPA [000204];
- Rockabill SPA [004014];
- Skerries Islands SPA [004122]; and
- The Murrough SPA [004186].

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

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

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

12.4.3.1.1.1 Habitat Loss and Fragmentation

The Proposed Scheme does not overlap with any European site. Therefore, there is no potential for direct habitat loss and fragmentation to occur.

The nearest European site with a hydrological connection to the Proposed Scheme is South Dublin Bay and River Tolka Estuary SPA which is located approximately 6km downstream of the Proposed Scheme, via the Liffey Estuary Upper. This is followed by South Dublin Bay SAC which is located approximately 6.8km downstream of the Proposed Scheme, via the Liffey Estuary Upper. The Rye Water Valley/Carton SAC is located approximately 6.7km east (upstream, along the Rye Water Valley River upstream of the River Liffey at Leixlip) of the Proposed Scheme. Habitat loss may occur indirectly as a consequence of severe habitat degradation arising from a reduction in water quality and / or a change to the hydrological regime, as described in the Section below.

Special Conservation Interest (SCI) species for which SPAs in the vicinity of the Proposed Scheme have been designated are known to utilise *ex situ* feeding sites in the Dublin area (i.e. Malahide Estuary SPA, Baldoyle Bay SPA, North Bull Island SPA, South Dublin Bay and River Tolka SPA and Rogerstown Estuary SPA, Skerries Islands SPA, Ireland's Eye SPA Lambay Island SPA, Rockabill SPA and the Murrough SPA). The Proposed Scheme will not result in the loss of sites suitable to support breeding gull and wintering bird species. This includes the landtake along the roadside frontage at Belvedere Sports Grounds (see General Arrangement Drawings BCIDC-ARP-GEO_GA-0005_XX_00-DR-CR-9001 Sheet 24 and 25). There will be no loss of suitable forage territory as a result of the Proposed Scheme. Furthermore, the forage territory identified at Belvedere is separated from the Proposed Scheme by existing buildings.

In summary, there is no potential for impacts on SCI species associated with SPAs to occur as a result of habitat loss / fragmentation.

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 River Tolka, Liffey Estuary Upper and the Royal Canal via a network of interconnecting and established surface or combined sewer / surface drainage infrastructure. The potential release of contaminated surface water runoff and / or an accidental spillage or pollution event into any surface water features during construction, has the potential to affect water quality in the receiving aquatic environment. Such a potential pollution event may include: the release of sediment into receiving waters and the subsequent increase in mobilised suspended solids; and the accidental spillage and / or leaks of contaminants into receiving waters. The associated effects of a reduction of surface water quality could potentially extend for a considerable distance downstream of the location of the accidental pollution event or the discharge point and therefore impact the downstream environment, i.e. Dublin Bay, within which European sites are located: North Dublin Bay SAC, South Dublin Bay SAC, Howth Head SAC, Rockabill to Dalkey Island SAC, Lambay 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 potentially 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 potentially negatively affect the quantity and quality of prey available to SCI bird species. These potential impacts could occur to such a degree that the conservation objectives of the North Dublin Bay SAC, South Dublin Bay SAC, Howth Head SAC, Rockabill to Dalkey Island SAC, North Bull Island SPA, South Dublin Bay 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 a possible accidental spillage or pollution event into any surface water features during construction, also has the potential to affect mobile SCI bird species and QI mammal species that commute, forage and loaf in Dublin Bay i.e. birds associated with 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 Estuary SPA, Dalkey Islands SPA, The Murrough SPA and, marine mammals associated with Rockabill to Dalkey Island SAC and Lambay Island SAC. This reduction in 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.

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

No non-native invasive plant species listed on the Third Schedule of the Birds and Natural Habitats Regulations, were recorded within the Proposed Scheme. However, there were five records of invasive species in the vicinity of the Proposed Scheme returned from the desk study and survey, including Himalayan balsam which is at one point a distance of 2.5m (see Table 12.10) upstream of the Proposed Scheme along the banks of the River Tolka. Therefore, there is potential for invasive species to spread or be introduced, during construction to terrestrial habitat areas in European sites downstream in Dublin Bay via the Tolka _040 (via surface water drainage), Royal Canal (Mainline (Liffey and Dublin Bay) (via surface water drainage), Liffey Estuary Upper (via combined sewer and Dublin Zoo Ponds (via surface water drainage (i.e. North Dublin Bay SAC, South Dublin Bay SAC, North Bull Island SPA and South Dublin Bay and River Tolka Estuary SPA). The introduction and/or spread of these invasive

species to downstream European sites could potentially result in the degradation of existing habitats present, in particular coastal habitats not permanently or regularly inundated by seawater. These species may outcompete other native species present, negatively impacting the species composition, diversity and abundance and the physical structural integrity of the habitat. This in turn could undermine the conservation objectives of these European sites.

It is not considered possible that invasive species could spread to European sites which are located a significant distance from the outfall locations and pipes that drain directly to Dublin Bay (i.e. Howth Head SAC, Howth Head Coast SPA, Rockabill to Dalkey Island SAC, Dalkey Islands SPA).

12.4.3.1.1.4 Habitat Degradation as a result of Air Quality Impacts

A reduction in air quality within the immediate vicinity of the road, involving emissions from car exhausts, and the deposition of particulate matter and heavy metals produced by engine, brake and tyre wear during the Construction Phase year, can possibly contribute to increased deposition of pollutants such as oxides of nitrogen (NOx, NOs), volatile organic compounds (VOCs), particulate matter (PM), heavy metals (HM) and ammonia (NH4) in the vicinity of a road carriageway. This can potentially affect the ecosystems and vegetation present, influencing plant growth rates and species composition, diversity, and abundance.

The unmitigated ZoI for air quality effects arising from the Proposed Scheme has the potential to extend 50m from the Proposed Scheme boundary, and 500m from construction compounds during the Construction Phase, and up to 200m the Proposed Scheme boundary during the Operational Phase. There are no European sites present within these distances.

As the Proposed Scheme does not have the potential to result in habitat degradation of the qualifying / special conservation interest species of any European site as the result of air quality impacts, either during the Construction Phase or the Operational Phase, there is no potential for in combination effects to occur in that regard.

12.4.3.1.1.5 Disturbance and Displacement Impacts

There are no European sites within the disturbance ZoI of the Proposed Scheme however, several QI species are known to occur within the vicinity of the Proposed Scheme. Refer to Section 12.4.4.3 and Section 12.4.4.7 for more details with regards to potential construction impacts on QI species.

There are a number of SPAs located in relatively close proximity to the Proposed Scheme which are designated for SCI species that are known to forage and/or roost at inland sites, such as amenity grassland playing pitches (i.e. Malahide Estuary SPA, Baldoyle Bay SPA, Rogerstown Estuary SPA, North Bull Island SPA, South Dublin Bay and River Tolka SPA, Skerries Islands SPA, Ireland's Eye SPA and Lambay Island SPA). These species include light-bellied brent goose, lapwing, oystercatcher, blacked-headed gull, herring gull and lesser black-backed gull. Suitable inland foraging/roosting sites, which these bird species utilise, are located within the potential ZoI of the Proposed Scheme. Therefore, there is potential, albeit limited in duration (within phases during the Construction Phase) for the Proposed Scheme to result in disturbance / displacement impacts on SCI populations associated with European sites.

Refer to Section 12.4.3.5.2 for more details with regards to potential impacts on wintering bird species, which encompass all relevant SCI bird species.

12.4.3.1.2 Natural Heritage Areas and Proposed Natural Heritage Areas

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

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

- Skerries Islands NHA [001218].
- Royal Canal pNHA [002103];
- Liffey Valley pNHA [000128]
- 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 [000205];
- Ireland's Eye pNHA [000203];
- Rogerstown Estuary pNHA [000208];
- Lambay Island pNHA [000204]; and;

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

The potential effects on European sites arising from the Proposed Scheme, described above in Section 12.4.4.1.2, may also negatively affect the pNHA and NHA sites located within the boundaries of these European sites. These sites comprise of North Dublin Bay pNHA, South Dublin Bay pNHA, Dolphins, Dublin Docks pNHA, Booterstown Marsh pNHA, Baldoyle Bay pNHA, Dalkey Coastal Zone and Killiney Hill pNHA, Howth Head pNHA, Malahide Estuary pNHA, Ireland's Eye pNHA, Rogerstown Estuary pNHA, Lambay Island pNHA and Skerries Islands NHA, and are primarily designated for similar reasons. The Proposed Scheme also has the potential to affect biodiversity in a broader sense than just the QIs / SCIs of those European sites. With the exception of the Royal Canal pNHA, where biodiversity receptors in these pNHAs do not form part of the QIs / SCIs in the Natura Impact Statement (NIS) assessment, they are considered under the other individual impact assessment headings for each KER below.

12.4.3.1.2.1 Habitat Loss - Royal Canal pNHA

Although the Proposed Scheme intersects with culverted section crossing over the M50 interchange and runs alongside the Royal Canal, there is no direct impact on the designated site, which shall not be interfered with during the Construction Phase. As such there will be no habitat loss.

12.4.3.1.2.2 Habitat Degradation – Air Quality

The Royal Canal pNHA is the closest pNHA to the Proposed Scheme, traversing the Proposed Scheme at the M50 Junction 6. This portion of the pNHA consists of a culverted section of canal crossing under the M50.

12.4.3.1.2.3 Habitat Degradation – 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 Scheme boundary. Mitigation measures in respect of construction dust are provided in Chapter 7 (Air Quality) of Volume 3 of this EIAR.

12.4.3.1.2.4 Habitat Degradation – 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 (NOx, NO_2) 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 advice for assessing 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 CO_2, CO, SO_2, 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 during the Construction Phase were modelled at three receptors along the Proposed Scheme where it crosses the Royal Canal pNHA at the M50 Junction 6 (eastern side, western side and slip road), (refer to Chapter 7, Air Quality for details).

The worst-case predicted annual average NOx concentrations at various distances from the Proposed Scheme exceed the 30µg/m^3 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 NOx concentrations at the three receptors where the Proposed Scheme crosses the Royal Canal pNHA are predicted to decrease.

The contribution of the Construction Phase of the Proposed Scheme to the NO_2 dry deposition rate was modelled at the Royal Canal pNHA. Nitrogen deposition levels have 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), and wetland habitats associated with North Dublin Bay pNHA. 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 are three modelled locations where the lower critical load of 5 Kg(N)/ha/yr is exceeded (at the eastern and western sides of M50 junction 6 and Navan Road N3, eastern side). NO_2 dry deposition rates are modelled to be in excess of this value without the construction of the Proposed Scheme, the construction of the Proposed Scheme is not deemed to increase this value significantly and will be temporary, and therefore, harmful effects on vegetation within the Royal Canal pNHA from NO_2 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 Construction Phase impacts 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 permanent habitat loss across its length, totalling approximately 45.22ha which includes man-made habitats i.e. Buildings and artificial Habitats (BL3) which accounts for approximately 34.6ha including mosaics of the Proposed Scheme, and temporary loss as a result of installation of Construction Compounds or temporary landtake of approximately 4.54ha. Some of the habitat types indirectly affected are considered to be of National importance, given their Annex I status under the Habitats Directive.

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 located at the immediately east of the Proposed Scheme on Ellis Quay and Arran Quay. The habitat will not be directly affected by the Proposed Scheme and therefore there is no potential for significant negative effects at any geographic scale.

The habitat type canals (FW3) may also be impacted 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 crosses, but does not interact with, the Royal Canal at the junction between the Navan Road (N3) and the M50 motorway (i.e. at Junction 6). Hence, there will be no loss of this habitat type. The total length of this habitat type which overlaps with the Proposed Scheme is approximately 198m.

Land acquisition is required along the wooded areas along the western side of the N3 adjacent to Mill Road. The extent of the area required (temporary and permanent land take) is outside of the area where WN6 woodland,

ascribable to priority Annex I Alluvial Woodland, was recorded. While there will be no direct loss of this groundwater dependent habitat by virtue of removal, there remains potential for hydrogeological impact owing to the proximity of the Proposed Scheme. This is discussed further in Section 12.4.3.2.4.

The habitat type depositing/lowland rivers (FW2) may be affected by the Proposed Scheme and is considered to be of Local Importance (Higher Value). The River Tolka occurs in close proximity to the Proposed Scheme and is crossed twice by the Navan Road (N3) where the river is culverted under the road. Based on the mapping, two small areas of freshwater habitat equating to 0.2ha in area occur within the mapped temporary works boundary. However, there will be no instream works involved and no loss of habitat within the temporary landtake at these two locations. The Proposed Scheme will not result in any permanent loss of this habitat type. Therefore, there is no potential for significant effects at any geographic scale.

Habitat types considered to be of Local Importance (Higher Value) will be lost as a result of the Proposed Scheme. These include areas of (mixed) broadleaved woodland (WD1), immature woodland (WS2), scattered trees and parkland (WD5), hedgerow (WL1), treeline (WL2), dry meadows and grassy verges (GS2) and dry calcareous and neutral grassland (GS1) habitats. The overall total area of the habitat types which overlaps with the Proposed Scheme boundary and be directly lost as a result of the construction of the Proposed Scheme is approximately 45.22ha. 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), planted flowers beds (BC4) and ornamental/non-native shrub (WS3), areas of disturbed ground (ED1, ED2 and ED3) and scrub (WS1), stonewalls (BL1) and hard standing (BL3). The overall total area of these habitat types which overlaps with the Proposed Scheme boundary and will potentially be lost as a direct impact during construction of the Proposed Scheme is approximately 39.49ha and 3.39ha of temporary land take.

The various KER habitat types affected and corresponding total areas which overlap with the Proposed Scheme boundary are summarised below in Table 12.17. 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 12.17: Extent of Habitat Loss within the Proposed Scheme

Habitat Type	Extent of permanent habitat loss	Extent of temporary habitat loss (temporary Construction Landtake and Construction Compounds)
International Importance		
Wet willow-alder-ash woodland (WN6) (corresponding to Annex I Alluvial woodland [91E0])	0ha	0ha
National Importance		
Tidal rivers (CW2) (corresponding to Annex I Estuaries [1130])	0m of Liffey Estuary Upper	0m
Canals (FW3)	0m of Royal Canal	0m
Local Importance (Higher Value)		
Scattered trees and parkland (WD5)	approximately 0.28ha	0.07ha
Hedgerows (WL1)	1.45ha	0.01ha
Treelines (WL2)	0.53ha	0.14ha
Depositing/ lowland rivers (FW2)	0.00ha	0.02ha**
Mixed broadleaved woodland (WD1)	approximately 1.02ha	0.01ha

Habitat Type	Extent of permanent habitat loss	Extent of temporary habitat loss (temporary Construction Landtake and Construction Compounds)
Mixed broadleaved/ conifer woodland (WD2)	approximately 0ha	0ha
Immature woodland (WS2)	approximately 0.73ha	0.05ha
Dry calcareous and neutral grassland (GS1)	approximately 0.08ha	0ha
Dry meadows and grassy verges (GS2)	approximately 2.36ha	0.92ha

*KERs highlighted in blue will be subject to direct habitat loss as a result of the Proposed Scheme
** Although habitat loss is shown by virtue of location inside temporary construction land take, no instream works are proposed and no interference with or loss of habitat will occur.

The overall calculation of vegetation loss from within the boundary of the Proposed Scheme is based on the Landscape General Arrangement Drawings (BCIDC-ARP-ENV_LA-0005_XX_00-DR-LL-9001) in Volume 3 of this EIAR) and is shown in Table 12.18. In terms of trees and hedges in particular, the overall design focus has been to minimise negative impact on trees as far as is practical. In areas, where this cannot be accommodated, the removal has largely been on linear features. In terms of tree loss, only 3 class A (Trees of High quality) trees (Arboricultural Classification – BS5837:2012) across the Proposed Scheme are being removed. The bulk of the tree loss, estimated at approximately 82% are B rated trees (trees of good quality) comprising mostly discrete individuals and often streetscape or landscape planting, but also some partial and full woodland copses.

Table 12.18: Landscape Calculations based on Landscape General Arrangement

Habitat	Area (m2)	Linear Metre (m)	Number
Proposed Species Rich Grassland	6373		
Proposed Ornamental Planting	5485		
Proposed Native Planting	1358		
Proposed Amenity Grass Area	36753		
Retained Amenity Grassland	26423		
Retained Vegetation	11421		
Removed Vegetation	24434		
Proposed Hedgerows		1119	
Retained Trees			597
Woodland Trees Retained	13526		
Removed trees			413
Woodland Trees Removed	9330		
Proposed Trees			793
Woodland Trees Proposed	9661		

12.4.3.2.2 Habitat Degradation – Surface Water Quality

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

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

During construction, suspended solids, silt and other harmful materials generated as a result of the construction activities could be released into the local drainage infrastructure and travel downstream, including, potentially, into the River Tolka, Royal Canal, Lower Liffey Estuary, Tolka Estuary or wider Dublin Bay area (via Ringsend WWTP). Cement based products used in the Construction Phase of the Proposed Scheme (e.g. concrete and/or bentonite which are highly corrosive and alkaline materials), if released into the River Tolka, Royal Canal, Lower Liffey Estuary, Tolka Estuary or wider Dublin Bay area, may cause surface water degradation and damage to aquatic fauna. This has the potential to result in significant negative effects on water quality and consequently affect aquatic and wetland habitats in the receiving environment. In a worst-case scenario, coastal habitats downstream, in Dublin Bay, could also be affected.

In addition, the proposed widening of BR01 Tolka River Bridge will have the abutments set back from the water body. Notwithstanding the installation of sheet piling the existing rock filled gabions that line banks of the River Tolka (Tolka_040) at this section, potential impacts include silty water runoff, high sediment loads in dewatering of excavations and disruption to the riverbanks. Machinery on the banks of the river also bring increased risk of oil and fuel leaks or spills. These activities combined have the potential to have an adverse impact of large magnitude of on the River Tolka, albeit temporary during the construction of the bridge. This would result in a potentially profound significance of effect on the ecologically sensitive water body.

At Mill Road, RW07 Pedestrian Ramps will provide pedestrian access between Mill Road and the N3 Dual Carriageway. There is approximately 15m between the temporary works and the Tolka River at this location. There is potential, albeit limited potential for direct release of sediment and harmful substances into the River Tolka or increased sediment loads in dewatering of excavations were to occur. However, no dewatering of the temporary excavations is proposed. Surface water systems drain to the water body in this area. This could result in temporary, adverse impacts of moderate magnitude, leading to a Significant impact on the River Tolka.

Habitat degradation as a consequence of construction effects on surface water quality has the potential to affect the conservation status of tidal rivers (CW2) / Annex I habitat Estuaries [1130] habitat and wet willow-alder-ash woodland (WN6) / Annex I habitat Alluvial woodland [91E0] and therefore, has the potential to result in a significant negative impact at a county scale in the case of the aquatic / wetland Annex I habitats located within the Zone of Influence of the Proposed Scheme. The Liffey Estuary Lower is hydrologically connected to downstream habitats including tidal mudflats and sandflats [1140] in South Dublin Bay SAC which may also be at risk of habitat degradation as a consequence of construction effects on surface water quality. Likewise, the Tolka Estuary is hydrologically connected to the Proposed Scheme via the River Tolka, and therefore habitats located within the estuary such as tidal mudflats and sandflats [1140] and Atlantic salt meadows [1330] may also be at risk of habitat degradation as a consequence of construction effects on surface water quality.

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.

12.4.3.2.3 Habitat Degradation – Hydrological Regime

During construction, the potential for temporary disruption to local drainage systems and hydrological regimes have been assessed in relation to the Proposed Scheme. These are not predicted to result any long-term effects that would give rise to a likely significant negative effect on any aquatic habitats (or species contained therein) through effects on the hydrological regime (for more detail refer to Chapter 13 Water, which includes site specific mitigation measures in respect of watercourse crossing and the Construction Compounds. In addition, and as detailed in the Construction and Environmental Management Plan (CEMP) for the Proposed Scheme (Appendix A5.1 in Volume 4 of this EIAR), specific controls / mitigation measures have been identified for implementation to manage runoff and minimise pollution to receiving waterbodies during the Construction Phase.

12.4.3.2.4 Habitat Degradation – Groundwater

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 ZoI of the Proposed Scheme is not considered to extend to any groundwater dependent terrestrial ecosystems linked to European sites, nor is it predicted to extend to priority Annex I Alluvial woodland, west of Mill Road (which is itself not associated with any European site. This ZoI follows the professional judgement of the design team hydrogeology specialists identified in Chapter 14 (Land, Soils, Geology & Hydrogeology).

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. Groundwater levels in groundwater dependant habitats may be impacted by the removal of a proportion of an aquifer or dewatering activities associated with excavations which can lead to a temporary change in groundwater levels and flow within the aquifer. Likewise, the mobilisation of contaminants into the aquifer either through accidental spillage or disturbance of contaminated ground during excavation may reduce the quality of the groundwater within the aquifer, also resulting in the degradation of groundwater dependent terrestrial ecosystem and any species that they may support. While there will be no direct loss of any designated site nor of territory supporting groundwater dependant habitat, the ecological surveys recorded the presence of ground-water dependant habitat assemblage (priority Annex I Alluvial Woodland) along parts of the River Tolka upstream of the Proposed Scheme. Any drawdown from the excavation is expected to be limited, localised, not extending into the boundary of the site, and temporary. There is a risk, albeit small, of pollutants entering the groundwater as a result of spillages or accidents where mitigation measures are not implemented. Therefore, the magnitude of this impact is considered small adverse. As the importance of the *ex-situ* alluvial woodland is very high the resulting significance of the impact is moderate (for more detail refer to Chapter 14 (Lands, Soils, Geology and Hydrogeology).

As detailed in the Construction and Environmental Management Plan (CEMP) for the Proposed Scheme (Appendix A5.1 in Volume 4 of this EIAR), specific controls / mitigation measures have been identified for implementation to manage runoff and minimise pollution to receiving waterbodies during the Construction Phase.

12.4.3.2.5 Habitat Degradation – Air Quality

As discussed in Chapter 7 (Air Quality), the Proposed Scheme has the potential to generate dust during construction works which could affect vegetation in habitat areas adjacent to the Proposed Scheme.

The 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 12.4.4.1.2, Air quality modelling of NOx concentrations, deposition rates, and particulate matter (PM_{10} and $PM_{2.5}$) were modelled for the Construction 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, slight, and short term in terms of the annual mean NO_2, PM_{10} and $PM_{2.5}$ concentrations at all modelled receptors. As such harmful effects on vegetation from these emissions are not likely.

12.4.3.2.6 Habitat Degradation – Non-native Invasive Plant Species

The accidental spread of 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 haul routes associated with the Proposed Scheme.

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 significant negative effect, at geographic scales ranging from local to international. Five areas of non-native invasive plant species (Himalayan balsam) listed on the Third Schedule of the Birds and Natural Habitats Regulations 2011, were identified along the Proposed Scheme during field surveys undertaken. The desk study revealed records for the following additional species in close proximity to the Proposed Scheme; giant knotweed, giant-rhubarb, Curly waterweed three-cornered garlic, Japanese knotweed, giant hogweed, Nuttall's waterweed, and water fern.

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. 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 Proposed Scheme. The desk study revealed historical records for opposite-leaved pondweed *Groenlandia densa* in two locations approximately 5.5km from the Proposed Scheme; the Royal Canal near Glasnevin Cemetery and to the south of the River Liffey. This 'Near Threatened' species is also known to occur throughout the Royal Canal, which is crossed by the Proposed Scheme at the junction between the Navan Road (N3) and the M50 motorway. There is no potential for direct impacts on this species to occur as a consequence of the Proposed Scheme as there are no work planned within the Royal Canal. A historical record for the 'Endangered' Many-seasoned Thread-moss *Bryum intermedium* was also returned within 1km of the Proposed Scheme at Abbotstown. This species was not found within the Proposed Scheme footprint and is unlikely to occur in the immediate vicinity due to an absence of suitable habitat.

Therefore, there is no potential for impacts on rare / protected species as a result of the construction of the Proposed Scheme.

12.4.3.3.2 Habitat Degradation – Hydrological Regime

During construction, the potential for temporary disruption to local drainage systems and hydrological regimes have been assessed in relation to the Proposed Scheme. These are not predicted to result any long-term effects that would give rise to a likely significant negative effect on any aquatic habitats (or species contained therein) through effects on the hydrological regime (for more detail refer to Chapter 13 Water, which includes site specific mitigation measures in respect of watercourse crossing and the Construction Compounds. In addition, and as detailed in the Construction and Environmental Management Plan (CEMP) for the Proposed Scheme (Appendix A5.1 in Volume 4 of this EIAR), specific controls / mitigation measures have been identified for implementation to manage runoff and minimise pollution to receiving waterbodies during the Construction Phase.

12.4.3.4 **Mammals**

12.4.3.4.1 Bats

12.4.3.4.1.1 <u>Roost Loss</u>

There are no confirmed bat roosts located within the footprint of the Proposed Scheme. In total eleven trees with 20 Potential Roost Features (PRFs) were identified across the original multidisciplinary surveys for the Proposed Scheme and the 2022 update survey. Of the 11 trees, four trees with PRFs are located within the footprint of the Proposed Scheme. During the original multidisciplinary surveys a single ash tree in the treeline was recorded inside the boundary of the Proposed Scheme near Junction 6 Castleknock Health and Leisure Village. A further three separate trees were noted in 2022 resurvey inside the Proposed Scheme boundary. The first is an Alder which is located in screening vegetation separating commercial premises from the link road, parallel to the N3, that connects the Snugborough Road crossover with the Blanchardstown road network opposite at the Navan Road Roundabout. The second comprises an Ivy-covered tree along the southern side of the N3 Navan road near Phoenix Park Avenue. The third tree is located along the N3 Navan road, approximately 105m west north west of the previous PRF tree. None of the four PRF's located within the footprint of the Proposed Scheme will be removed during the Construction Phase.

The remainder of the trees with PRF's which were recorded during the surveys occur as singletons, are located outside the of the boundary of the Proposed Scheme and will not be removed as part of the Construction Phase.

Landscaping proposals for the Proposed Scheme indicate that none of these trees will be removed. Therefore, the Proposed Scheme will not result in the loss of any breeding / resting sites for any bat species and as such,

there is no potential for likely significant effects on the conservation status of bats to occur at any geographic scale.

12.4.3.4.1.2 Habitat Loss as a result of fragmentation of Foraging / Commuting Habitat and Commuting Routes

Bats rely on suitable semi-natural habitats which support the insect prey upon which they feed. The Proposed Scheme will result in the loss of such habitats used for 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, treelines, mixed woodland, immature woodland, canal, rivers, 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 12.18 and the Landscaping General Arrangement Drawings (BCIDC-ARP-ENV_LA-05_XX_00-DR-LL-0001) in Volume 3 of this EIAR The area of the habitats which will be lost as a result of the Proposed Scheme is not deemed significant, considering the extent of habitat loss (See Table 12.18), their location (adjacent to existing artificially lit roads in a generally highly disturbed urban environment) and the presence and relative abundance of other suitable habitats in the wider locality, which will not be impacted by the Proposed Scheme.

In assessing the impacts of habitat loss as a result of fragmentation of foraging/ commuting habitat on bat populations, consideration was given to a species Core Sustenance Zone. A Core Sustenance Zone (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 Conservation Trust Guidance (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.”*

Notwithstanding the fact that there is evidence of bats foraging and communising within the study area of the Proposed Scheme, particularly along Snugborough Road (CBC0005BT001), Mill Road at Mill Road Park (CBC0005BT002), Navan Road at Castleknock Manor (CBC0005BT003), Navan Road at Phoenix Park Racecourse (CBC0005BT004) and Navan Road at Ashtown Road (CBC0005BT005), and that 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.

The loss and / or fragmentation of existing habitat used by commuting / foraging bats could also result in impacts to local bats. Fragmentation of feeding habitat has the potential to disturb normal bat behavioural patterns, and thus adversely affect the ability of local bat populations to persist and reproduce, impacting on their local distribution and/or abundance. The barrier effect can manifest itself as soon as the site clearance phase commences and the barrier itself is in the form of the cleared lands. The Proposed Scheme will result in the removal / fragmentation of small areas scattered trees and parkland, treelines and hedgerows which could all be used by local bats. In addition, significant vegetation removal is proposed in three areas which are known to be areas of high bat activity (i.e. along Snugborough Road (CBC0005BT001), Mill Road at Mill Road Park (CBC0005BT002) and Navan Road at Phoenix Park Racecourse (CBC0005BT004)). In these areas, and Mill Road in particular, it is proposed to remove existing trees / areas of woodland to accommodate infrastructure such as footpaths and allow widening of existing infrastructure. These habitats constitute a landscape feature which could be used by foraging / commuting bats and their loss or reduction in extent, will result in a reduction of foraging / commuting habitat for local bats in this area.

Removal of suitable linear habitat for foraging and / commuting bats within the footprint of the Proposed Scheme is calculated as equating to 1.45ha of WL1 hedgerow and 0.53ha of WL2 treeline habitat across the Proposed Scheme. Habitat removal is within a highly disturbed urban environment with low numbers of species records, and, as such is not deemed to provide significant contributions to core sustenance zones of roosts outside of the footprint of the Proposed Scheme. The majority of trees and / or hedgerows to be removed consist of landscaping vegetation at road medians. In areas where it has not been possible to reduce loss of trees, these are typically at

boundary elements. in areas where substantial numbers of trees are proposed to be removed the landscaping proposals include for the provision of native planting in their place. Where areas of woodland are to be removed to accommodate widening of existing infrastructure (e.g. Mill Road at Mill Road Park (CBC0005BT002)) the quantity of woodland to be removed relative to the overall amount of woodland in the area is not considered to result in a significant impact on local bats due to the fact that the area of woodland proposed for removal is located adjacent to the existing overpass of the Navan Road (N3), which would be subject to more disturbance (i.e. light and noise disturbance from adjacent road) than areas of the woodland set further back from the Navan Road (N3). However, the overall effect of habitat fragmentation and barrier effect associated with the construction of the Proposed Scheme, in this particular area, is considered to be significant at the local level only.

12.4.3.4.1.3 Installation of temporary working and site compound lighting which may cause indirect disturbance of flight patterns

The location of the Construction Compounds is identified in Section 12.4.1.1.12. Temporary security lighting will be installed in the Construction Compounds for the duration of construction, thereby increasing the level of artificial lighting in these areas. Artificial lighting within suitable habitat may result in avoidance behaviour by bats and could prevent bats from accessing foraging areas or roosts and/or result in bats taking more circuitous routes to get to foraging areas and hence potentially depleting energy reserves and abandonment of nearby roosts. Given the urban setting of these proposed site compounds, bats in the area would be habituated to some level of artificial lighting. Provided security lighting does not involve high intensity lighting (e.g. floodlighting), the impact of increased artificial lighting at Construction Compounds is considered to be significant at the local level.

The bulk of the Construction Phase will typically be undertaken during normal daylight working hours, and therefore the requirement for lighting to accommodate construction works during night-time, in areas where existing light levels are low, will be limited. It is however recognized that some elements of night-time work will be required given the transport importance of this existing corridor e.g., lane closures and resurfacing and installation of some structural elements associated with BR01 Tolka River Bridge and BR02 Mill Road Bridge. The bulk of the existing road corridor is largely illuminated by regularly spaced lighting columns for much of its length and therefore the requirement for lighting to accommodate construction works during night-time will be limited, in areas where existing light levels are low. The effect of temporary lighting effects associated with the Construction Phase of the Proposed Scheme is therefore considered to be significant at the local level only.

12.4.3.4.2 Badger

Multi-disciplinary surveys recorded evidence of badger along the perimeter fence of Belvedere Rugby Grounds on the Navan Road, which is located within the footprint of the Proposed Scheme. Based on the results of the desk study badger are also known to occur within 1km of the Proposed Scheme and therefore impacts on this species cannot be excluded. Although it cannot be predicted if badger will establish new setts within the ZoI of the Proposed Scheme before construction works commence, it is a possibility 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 ZoI 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 peripheral sections of suitable foraging / commuting habitat for badgers (i.e. amenity grassland, scattered trees and parkland, dry meadows and grassy verges, scrub, mixed woodland, immature woodland and treelines/ hedgerows) within the Proposed Scheme corridor. In addition, the provision of Construction Compounds for the duration of the Construction Phase will result in the temporary loss of 0.77ha of dry meadows and grassy verges as well as Scrub WS1 (0.01ha) and buildings BL3 (0.12ha), which could be used by commuting/ foraging badgers. These habitats occur alongside the main transport corridor, which are not considered to be ideal as badger territory owing to level of disturbance from busy transport corridor and level of humans disturbance in surrounding areas.

Permanent habitat removal is largely adjacent to pre-existing roads / paths and is limited to 2m linear sections of amenity grassland, existing hard surfaces, scattered trees and parkland and roadside treelines/ hedgerows, within a highly disturbed urban environment. These areas of habitat removal are not likely to provide significant foraging

habitat for the local badger population. Therefore, the Proposed Scheme 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.

As construction works in areas of suitable foraging habitat will typically be undertaken during normal daylight working hours 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 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 temporary 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 & Longcore, 2005). Although the majority of the Proposed Scheme corridor is already lit artificially, the proposal may result in the introduction of artificial lighting to previously unlit areas, if the proposed Construction Compounds require security lighting for the duration of construction. Many of the locations proposed for Construction Compounds are composed of suitable foraging or commuting habitat for badger (amenity grassland and dry meadows and grassy verges). If high-intensity, non-directional security lighting (e.g. floodlighting) is installed in these proposed compounds, light spill into adjacent areas could render these areas unsuitable for foraging badger. Therefore, lighting associated with the Construction Phase of the Proposed Scheme could result in a negative effect on badgers, albeit temporary in nature and significant at the local level.

12.4.3.4.2.3 Mortality Risk

Site clearance works have the potential to result in the mortality of badger species. The potential for this impact to occur would be expected to be greater during the breeding season when juveniles venture out of maternal sett or indeed when males leave the sett earlier on. Furthermore, the potential for direct mortality to badger 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 / foraging habitat for badger. Although no setts were located during the surveys and the potential for the establishment of new setts is limited by virtue of the existing transport corridors, there remains the risk that commuting / foraging badger might become entrapped in deep excavations, particularly in areas open and wooded territory bordering the River Tolka valley. Given the relatively low numbers that might be expected to be affected, and that these species are highly mobile, the risk of mortality due to site clearance and or excavation 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.

12.4.3.4.3 Otter

The River Tolka is known to support otter populations, and the desk study notes a number of holts downstream of the N3 / M50 Interchange. Multi-disciplinary surveys in respect of the Proposed Scheme did not confirm any otter holts within its footprint, and the territory beneath the proposed River Tolka crossing points is not considered ideal in terms of habitation features owing to the nature of the riverbank. However, evidence of otter activity (sprainting etc) was recorded under existing structures, in particular BR01 associated with the River Tolka.

Although it cannot be predicted if otter will establish new holt or couch sites within the ZoI of the Proposed Scheme before construction works commence, it is a possibility, and this scenario has been taken into account in the mitigation strategy (refer to Section 12.5.1).

12.4.3.4.3.1 Loss of Breeding / Resting Sites

Based on the findings of the field surveys carried out, there were no otter breeding or resting places, holt or couch sites, present within the boundary of the Proposed Scheme at any of the watercourses intersected by the

Proposed Scheme, there will not be any loss of holt or couch sites as a result of construction works. No instream works are proposed but works will be proximal to the bankside at the site of the proposed BR01 Tolka River Bridge. The bankside habitat here is characterised by rock-filled gabion baskets on either side of the bank which do not ordinarily offer suitable permanent holting opportunities. The works associated with BR02 Mill Road Bridge widening further downstream are typically at road level in built habitat that is not suitable as breeding/resting given its location alongside an existing busy national road. Therefore, the Proposed Scheme will not have a likely significant effect on the conservation status of otter, as there will be no loss of breeding / resting sites, and will not have a likely significant negative effect, at any geographic scale.

12.4.3.4.3.2 Loss / Fragmentation of Foraging / Commuting Habitat

Evidence of otter was recorded within or in close proximity to the Proposed Scheme during the field surveys undertaken, in particular in the vicinity of culverts on the River Tolka under the N3 Dual Carriageway. It should be noted that no otter holts were recorded during the surveys undertaken. In addition, based on the results of the desk study, otter are known to occur within 1km of the Proposed Scheme. Furthermore, otter frequently use the Lower Liffey Estuary for commuting and foraging purposes, with holts identified at Dublin Port (Macklin *et al.,* 2019). Otter holts are also known to occur at Elmgreen Golf Club, within approximately 1km of the Proposed Scheme.

The provision of Construction Compounds for the duration of the Construction Phase is not expected to result in the any significant loss of any habitat used by otter, owing to the fact that the Construction Compounds are typically set back from watercourses and the open / exposed territory subject to human presence does not ordinarily offer suitable habitat for otter to venture away from nor establish habitation features.

The proposed works at BR01 Tolka River Bridge to the south of the N3 Dual Carriageway could result in the fragmentation of otter habitat (i.e. River Tolka and surrounding riparian vegetation) during construction.

The construction of BR01 Tolka River Bridge will require the installation of sheet piling behind the existing rock gabions that line both sides of the watercourse. Once installed the extent of available riparian territory for otter commute, outside of swimming under the existing bridge will reduce, for the duration of the Construction Phase to the riparian lands on either side of the watercourse to the watercourse. Asides form the watercourse there will be no impediment to the existing concrete walkway that exists under the current bridge and the rock-filled gabions will sit in front of the proposed sheet piling. Thus, although locally reduced in width, a narrow corridor will be retained for the duration of the construction works.

There is another culvert to the east of BR01 and west of Mill Road which carries the Tolka River north under the N3 Dual Carriageway. There are no works proposed to this culvert and no change to the headwalls which extend to the north and south of the N3 Dual Carriageway. A minor retaining wall (RW13) is proposed to the north of the N3 Dual Carriageway. The works at this location will be confined to the top of the culvert and do not interfere with the watercourse. It is predicted that there will be no direct loss nor fragmentation of otter habitat at this location.

The scale of habitat loss, through fragmentation, is relatively small when compared to the availability of other suitable riparian habitats present in the wider environment of the surface water catchments crossed by the Proposed Scheme. 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.

While there will be some permanent loss of undeveloped habitat set back from the watercourse during construction works and widening at BR01 Tolka River Bridge, there will be no loss of watercourse habitat associated with the construction of the Proposed Scheme. There will be a localised reduction in the extent of width of riparian foraging activity, but no impediment or barrier to movement. Thus, habitat loss and fragmentation associated with the construction of the Proposed Scheme will not have a likely significant effect on the conservation status of otter and will not have a likely significant negative effect, at any geographic scale.

12.4.3.4.3.3 Habitat and Food Source Degradation – Water Quality

During construction, contaminated surface water runoff and / or an accidental spillage or pollution event into any surface water feature has the potential to have a significant negative impact on water quality and consequently

an impact on otter; either directly (e.g. acute or sub-lethal toxicity from pollutants) or indirectly (e.g. affecting their food supply or supporting habitats). The effects of frequent and/or prolonged pollution events in a river system have the potential to be extensive and far-reaching and could potentially have significant long-term effects.

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

During construction suspended solids, silt and other harmful materials generated as a result of proposed works could be released into the local drainage infrastructure and travel downstream including, potentially, into Tolka _040 (via surface water drainage), Royal Canal (Mainline (Liffey and Dublin Bay) (via surface water drainage), Liffey Estuary Upper (via combined sewer and Dublin Zoo Ponds (via surface water drainage. 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 any of the above mentioned waterbodies, may cause surface water degradation and damage to aquatic fauna. This has the potential to result in significant negative effects on food supply.

Furthermore, the locations and drainage connectivity of the Construction Compounds must be considered owing to the potential of accidental spillages or runoff from stored materials and topsoil. All are set back from watercourses to varying degrees but have hydrological connectivity via topography and or drainage infrastructure. Construction Compound BL1 and BL3 to impact on the Tolka_040 and Tolka _050 respectively by virtue of slope and surface drain outfalls. Compound BL2 has distal hydrological connectivity via drainage gullies. Habitat degradation as a result of effects on surface water quality during construction has the potential to affect the species' conservation status and result in a likely significant negative effect, at a local geographic scale. This is in consideration of the temporary nature and scale of the proposed impact, the availability of suitable habitat for otter in the wider vicinity and the relative abundance of otter across the study area, as revealed in the results of the desk study.

Proposed 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

Works proposed in the vicinity of surface water features (e.g. BR01 Tolka River Bridge widening and BR02 Mill Road Bridge widening) could result in a localised impediment effect to local otters, if present, at least temporarily. As there are no instream works proposed and a narrow manmade concrete walkway and *in-situ* rock gabion bankside will be retained, in addition to maintaining the passage through the river itself. Thus there will be no severance of otter territory along the watercourse, although the vegetated riparian zone behind the gabion baskets will be impacted for the duration of the Construction Phase at structure BR01. Given that otter are generally nocturnal in habitat and works will typically be carried out during normal daylight working hours, affected otters would be expected to habituate to the altered landscape and any resulting barrier effect would be temporary in nature (see discussion on disturbance / displacement and the habituation of otters to disturbance).

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

12.4.3.4.3.5 Disturbance / Displacement

No otter holts were identified during the surveys undertaken. The results of the desk study reveal that active otter holts are known to occur within the vicinity of the Proposed Scheme in the Liffey Estuary Lower (in Dublin Port) and at Elmgreen Golf Club in Dunsink. Given the suitable habitat present, it is also reasonable to assume that active otter holts are present along other stretches of the River Tolka and Royal Canal. Increased human presence and / or noise and vibration associated with construction works within the footprint of the Proposed Scheme is unlikely to affect these holts. However, construction works associated with the Proposed Scheme have the potential to (at least temporarily) displace commuting or foraging otter.

Construction activities in the vicinity of watercourses near the Proposed Scheme will include major structure works in Section 2 of the Proposed Scheme between Snugborough and the M50 at Junction 6.

BR01 Tolka River Bridge widening will require partial demolition of the existing bridge and the installation of sheet piling behind the existing gabion baskets which form the banks of the River Tolka at this location (see 12.4.1.2.1).

The level and duration of disturbance arising from the BR01 Tolka River Bridge is primarily dependent on the method of construction for the bridge foundations. In addition, until commencement of Construction Phase when the site can be secured, there is the potential for local otter population to continue to use and commute along the River Tolka along Section 2 of the Proposed Scheme.

Noise and vibrations associated with major structures along Section 2 of the Proposed Scheme have the potential to create disturbance and displacement within the vicinity of the works. Noise and disturbance levels associated with these works are quantified and given the nature of the works it is predicted that there will be significant disturbance for mammals up to 300m from the Proposed Scheme. Active otter holts are currently outside of this Zol, disturbance effects from the Proposed Scheme are not deemed to cause displacement affects leading to abandonment of holts. The overall duration for works for Section 2a are estimated at approximately 5 months and are programmed to occur between Year 1 Q2 and Q3.

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

Disturbance and displacement effects on otter may also be the result of increased artificial lighting during construction. Nocturnal mammals, such as otter, are likely to be disturbed by the introduction of artificial light into established breeding and foraging areas (Rich & Longcore, 2005). Although the majority of the Proposed Scheme corridor is already lit artificially, the construction works may result in the introduction of temporary artificial lighting to previously unlit areas, e.g. for discrete elements of the construction along the River Tolka. Given the fact that the locations of proposed Construction Compounds are set back from any watercourses, lighting during construction is not considered likely to result in any significant effect to otters in the vicinity. However, construction works in the vicinity of known otter locations (e.g. River Tolka) could require additional lighting for night working. Any exceedance above street illumination levels, particularly if light spill onto watercourse were to occur could result in temporary significant negative effect, likely at a local geographical scale.

A new minor retaining wall (RW13 Retaining Wall) is required to the northern side of the N3 Dual Carriageway. There is an existing culvert at this location and the headwalls of the existing culvert itself are set back from the N3 Dual Carriageway. Therefore, no direct impact on otter movement is predicted at this location. It is considered that otter avoid newly built watercourse structures, at least until they may become habituated to them and in particular longer structures where daylight cannot be made out at the other end. It is for that reason that otter often venture onto walkways under bridges rather than swimming along the main channel. Ledges or other dry tunnels are often installed at such watercourse crossings to reduce severance of otter territory. It is unknown if any ledges or separate dry pipe tunnels (NRA, 2006) are included within the existing culvert located west of Mill Road. As no changes to the existing culvert are proposed it is predicted that no significant impact to local otter population at this location.

12.4.3.4.4 Marine Mammals

12.4.3.4.4.1 Habitat and Food Resource Degradation – Water Quality

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

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 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

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

12.4.3.4.5.1 Habitat Loss

The construction of the Proposed Scheme will result in the permanent (as well as some temporary loss during Construction Phase) loss of some suitable habitat for small mammals located within the boundary of the Proposed Scheme, particularly around the wooded area at Mill Road. Given the relatively low numbers of individuals of each species that are likely to be affected (i.e. hedgehog, pygmy shrew and Irish hare), 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 mammal species. The potential for impact 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 they are highly mobile species, site clearance is unlikely to result in a level of mortality that would affect the species' conservation status, and result in a significant negative effect, even at a local geographic scale.

12.4.3.4.5.3 Disturbance / Displacement

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

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

12.4.3.5 **Birds**

12.4.3.5.1 Breeding Birds

The assessment carried out in the NIS for the Proposed Scheme (which is a standalone document provided within the planning application to enable the Board, as competent authority to carry out an Appropriate Assessment for the purposes of Article 6(3) of the Habitats Directive) considered the potential for the Proposed Scheme to affect the bird species listed as SCIs of European sites and in particular South Dublin Bay and River Tolka Estuary SPA, by virtue of hydrological connectivity. That assessment concluded that the Proposed Scheme would not affect their breeding colonies or have any long-term effects on the local breeding populations. Therefore, for these species, the Proposed Scheme will not affect the conservation status of the breeding populations and will not have any adverse effect on the integrity of the European site.

12.4.3.5.1.1 Habitat Loss and Loss of Breeding / Resting Sites

The Proposed Scheme will result in the loss of breeding bird nesting and foraging habitat within the footprint of the Proposed Scheme. The areas of habitat loss within the Proposed Scheme boundary are discussed in Section 12.4.3.2.1 and tabulated in Table 12.17 for all KER habitat types. These areas include hedgerows, treelines,

mixed broadleaved woodland, mixed broadleaved conifer woodland and 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, may provide nesting and / or foraging habitat for birds. These areas will be removed during construction of the Proposed Scheme resulting in an additional loss of breeding bird nesting and / or foraging habitat. In summary, the habitats that may be lost comprise:

- Mixed broadleaved woodland habitat along the northern side of the L3020 road;
- Mixed broadleaved woodland habitat and treeline habitat to the north and south of the N3 Dual Carriageway along Section 2 of the Proposed Scheme;
- Treeline habitat at various locations along the Navan Road (N3);
- Dry meadows and grassy verges habitat at the entrance to Junction 6 Castleknock Health and Leisure Village to accommodate the proposed Construction Compound BL2; and
- Dry meadows and grassy verges habitat at the junction between the Navan Road (N3) and Dunsink Road (R102) to accommodate the proposed split Construction Compound BL3.

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 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 many species with larger home ranges during the breeding season habitat loss at the scale of the Proposed Scheme is not likely to have any perceptible effects on breeding success or population dynamics.

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

- Parks and greenspaces with hedgerow, treeline and/or scrub boundaries such as Hartstown Park; Tolka Valley Park; Corduff Park; Millenium Park; Sports Ireland lands; Elmgreen Golf Club; Phoenix Park; National Botanic Gardens; Belvedere Rugby Grounds; TU Dublin Grangegorman playing pitches and The Royal Hospital Kilmainham;
- Wildfowl and Waterbird habitat within the Lower Liffey Estuary and wider Dublin Bay area such as Tolka Estuary, Bull Island, Booterstown Marsh and Sandymount Strand; and
- Sections of the Royal Canal both upstream and downstream of the Proposed Scheme.

Kingfisher habitat suitability assessment surveys carried out in September 2020 recorded suitable habitat at multiple locations along the banks of the River Tolka (Tolka _040) valley, south-west of Corduff Park. The riverbanks at this location, which were located approximately 70m east of the Proposed Scheme or approximately 350m upstream of the N3 bridge over the River Tolka, were considered to be suitable for nesting kingfisher and potential nesting holes were also identified. An individual kingfisher was observed along the River Tolka (by sight and sound) during these field surveys, approximately 70m from the Proposed Scheme. It is therefore likely that kingfisher forage, nest and roost in this section of the River Tolka.

If the proposed works to BR01 Tolka River Bridge were to take place during the kingfisher breeding season (February – July), the works may result in the temporary loss of foraging and breeding habitat for local kingfisher, as a result of disturbance/ displacement impacts associated with the proposed works (see disturbance/ displacement section below for more details).

One of the most limiting factors to with respect to kingfisher distribution in Ireland is the availability of suitable nesting banks – typically tall, vertical facing banks which provide protection from predation by predators such as mink. Where suitable nesting territories are found and resource availability and suitable cover / perching territory are present, territories between breeding pairs can decrease thereby increasing the numbers that occupy a watercourse (Cummins *et al*., 2010). Territories for breeding pairs tend to cover at least 1km of river, but may extend over 3 to 5 km. No nesting habitat was recorded in close proximity to proposed works at any watercourse crossing, the survey results recorded a number of suitable bank faces approximately 350m upstream.

There will be no loss of kingfisher breeding / resting sites during to Construction Phase of the Proposed Scheme by virtue of the existing manmade habitat noted alongside both existing structures and the adjacent lack of natural bank or vegetation providing unexposed perching potential. Similarly, there will be no loss of commuting territory.,

The existing culvert located west of Mill Road, whilst providing suitable commuting territory along the watercourse, is less than favourable in terms of a barrier to commuting by virtue of its dimensions – it is long and narrow and could represent a natural barrier or territorial divide between kingfisher populations.

None of the habitat areas to be lost are unique to the locality and, either individually or collectively, are not likely to support a significant proportion, or the only population, of any given breeding bird species locally. Although a temporary decline in overall breeding bird abundance could potentially occur at a very local level (i.e. the footprint of the Proposed Scheme), this is unlikely to affect the local range of the breeding bird species, with the exception of kingfisher, 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 general breeding bird species locally (see Section 12.5.1).

12.4.3.5.1.2 Mortality Risk

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

Mortality of birds at the scale of the Proposed Scheme, over what is likely to be 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. However, there are no areas of significant vegetation clearance associated with the River Tolka that could support nesting Kingfisher. At Structure BR01 Tolka River Bridge, the ground in the area of the proposed structure is characterised by exposed low grass dominated vegetation behind rockfilled gabions lining the river edge, none of which is considered suitable for breeding kingfisher, given its exposure to potential disturbance and predation.

Similarly, as no instream work are proposed nor are temporary structures required, it is predicted that commuting Kingfisher will not be subject to risk of impact resulting from construction equipment nor installation of the bridge components. Kingfisher are low flying birds, typically flying at less than 2 metres over slow-moving watercourses. At this height they avoid the existing structure River Tolka Structure and would avoid the construction works associated with the proposed structure (BR01) and proposed structure BR02.

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

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

12.4.3.5.1.3 Disturbance / Displacement

The noise, vibration, increased human presence and the visual deterrent of construction traffic, associated with site clearance and construction will temporarily disturb breeding bird species and is likely to displace breeding birds from habitat areas adjacent to the footprint of the Proposed Scheme. However, there is an existing relatively high level of human disturbance within the immediate environment of the Proposed Scheme (e.g. N3 Dual Carriageway and inner city areas such as Stoneybatter) 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 blasting, in terms of its ZoI, but will be on-going from periods of up to 24 months and multiple breeding seasons across the entirety of the Construction Phase. However, the likely phasing of the construction works in scheme sections will mean that this impact will be temporary in nature.

The Construction Phase of the Proposed Scheme will be completed on a phased basis, over a period of 2 years.

Areas within the Proposed Scheme, which will be subject to construction activities which generate noise levels greater than 50dB (e.g. piling, rock-breaking *etc.*), have been predicted and based on the results (Table 12.19) suggests that much of the Construction Phase across the Proposed Scheme will eb subject to noise levels of up to 75db out to a distance of 75metres. 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. This is supported by the findings of Wright *et al*. (2010) which found that noise levels above 60dB resulted in behavioural responses, with birds abandoning the site in response to noise levels above 70dB. Thus, in respect of many areas along the Proposed Scheme corridor, background levels would already by elevated by virtue of the existing transport corridors.

Key sensitive areas include 300m at Structures 1 (Tolka Bridge (BR01)) and 2 (Road widening of the N3 with an extension of the existing Mill Road Bridge (BR02), and the construction of pedestrian ramps accessing the N3 from Mill Road (RW07)), where activities will result in a greater magnitude of effect on the receiving environment with noise levels potentially extending out in all directions from edge of works to 300 m.

Table 12.19: Indicative Construction Noise Calculations Varying Distances

Activity	Predicted CNL at Stated Distance from Edge of Works (dB LAeq,12hr or LAeq,4hr)								
(dB)	10m	15m	20m	30m	50m	75m	100m	150m	250m
General Road works	79	76	73	69	65	61	59	55	51
Road Widening and Utility Diversion	84	81	78	74	70	66	64	60	56
Bus Gate Construction	80	77	74	70	66	62	60	56	52
Quiet street treatment	80	77	74	70	66	62	60	56	52
Urban realm & landscaping	79	76	73	69	65	61	59	55	51
Site compounds	78	75	72	68	64	60	58	54	50
Boundary wall construction	80	77	74	70	66	62	60	56	49
Bored / Auger piling works	80	77	74	70	66	62	60	56	52
Retaining walls	81	78	75	71	67	63	61	57	53

Kingfisher are present on the River Tolka and the BR01 Tolka River Bridge widening has the potential to result in significant effects on local populations of kingfisher, through disturbance impacts. Kingfisher are listed on Annex I of the Birds Directive and breed from February to mid-July. During surveys undertaken, the riverbanks of the River Tolka were deemed to be suitable for nesting kingfisher and potential nesting holes were identified in close proximity of but not directly at the Proposed works. Works in the vicinity of the River Tolka could impact nesting kingfisher, reducing their breeding success, which could have short-term effects on the local population. These effects would be significant at the local geographic scale. Mitigation to avoid such impacts is presented in Section 12.5.1.5.

Although it is not possible to quantify the magnitude of this potential impact (or the potential effect zone) it could potentially extend for three hundred metres from the Proposed Scheme. The results of noise modelling carried out for the Proposed Scheme confirmed that at 150m, noise levels for all construction activities will be below 60dB (Table 12.19), which is summarised from Chapter 9 (Noise & Vibration)). Given the temporary to short-term nature of the construction works at discrete locations, such as at BR01 Tolka River Bridge, the potential for disturbance or displacement effects will also be over the short-term with suitable habitat available in the wider locality of the Proposed Scheme. As such, the construction works are therefore not likely to affect the conservation status of affected breeding bird species, with the exception of kingfisher, and will not result in a likely significant negative effect, at any geographic scale.

12.4.3.5.1.4 Habitat Degradation – Surface Water Quality

During the Construction Phase, contaminated surface water runoff and / or an accidental spillage or pollution event into any surface water feature has the potential to have a significant negative impact on water quality and consequently an impact on breeding birds; either directly (e.g., bird species coming into direct contact with pollutants) or indirectly (e.g. acute or sub-lethal toxicity from pollutants affecting their food supply or supporting habitats). The effects of frequent and / or prolonged pollution events in a waterbody have the potential to be extensive and far-reaching and could potentially have significant long-term effects.

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

During the Construction Phase suspended solids, silt and other harmful materials generated as a result of proposed works could be released into the local drainage infrastructure and travel downstream, including, potentially, into the River Tolka, Royal Canal, Tolka Estuary or Lower Liffey Estuary. 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 any of the above-mentioned waterbodies, may cause surface water degradation and damage to aquatic fauna. This has the potential to result in significant negative effects on water quality and could consequently affect aquatic and wetland habitats in the receiving environment. In a worst-case scenario, estuarine/ coastal foraging habitats downstream could also be affected.

Habitat degradation as a consequence of construction effects on surface water is therefore likely to be significant at the local level. Mitigation measures have been designed to protect water quality during construction (see Section 12.5.1).

12.4.3.5.2 Wintering Birds

This section of the impact assessment deals with wintering bird species, i.e. those bird species which are SCIs of SPAs for their wintering populations or are listed on either the BoCCI Red or Amber lists for their wintering populations. The assessment carried out in the NIS for the Proposed Scheme considered the potential for the Proposed Scheme to affect the bird species listed as SCIs of European sites for their wintering populations. 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 a significant adverse effect on the integrity of the European sites.

12.4.3.5.2.1 Habitat Loss and / or Disturbance / Displacement

No direct habitat loss impacts are predicted as a result of the Proposed Scheme in respect of Wintering Birds. However, a temporary and / or permanent increases in noise, vibration and / or human activity levels during the Construction Phase of the Proposed Scheme could result in the disturbance to and/or displacement of wintering bird species present within footprint and / or the vicinity of the Proposed Scheme.

Current understanding of construction related noise disturbance to wintering waterbirds is based on the research presented in Cutts *et al.,* (2009) and Wright *et al*., (2010). In terms of construction noise, levels below 50dB would not be expected to result in any response from foraging or roosting birds. Noise levels between 50dB and 70dB would provoke a moderate effect/level of response from birds, i.e. birds becoming alert and 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 (BS 5228) are generally below 60dB or, in most cases, are approaching the 50dB threshold. As such, disturbance effects for general construction activities across the majority of the Proposed Scheme would not be expected to extend beyond a distance of approximately 300m, as noise levels associated with general construction activities would attenuate to close to background levels at that distance and beyond.

None of the construction activities would be expected to result in any more than a moderate level of disturbance effect on wintering birds at distances beyond approximately 75m. At 75m, noise levels are below 60dB or, in most

cases, are approaching the 50dB threshold. Low, or no, effects would be expected for those noise levels. Any landscape features, vegetation cover or buildings between the construction site and winter bird sites would contribute to further reducing the ambient noise at any given distance

12.4.3.5.2.2 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 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 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 Chapter 13 (Water), the CEMP (Appendix A5.1 in Volume 3 of this EIAR).

12.4.3.6 **Reptiles**

There were no reptile species recorded during the multi-disciplinary 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 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.

12.4.3.6.1.1 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**

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

12.4.3.7.1 Disturbance & Mortality Risk

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

12.4.3.7.2 Habitat Severance / Barrier Effect

The temporary to short-term physical disruption of the existing landscape during site clearance and construction will fragment habitat used by 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 populations 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.

12.4.3.7.3 Habitat Degradation – Surface Water Quality

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

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

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 Chapter 13 (Water) and the CEMP (Appendix A5.1 in Volume 3 of this EIAR).

12.4.3.8 **Fish**

12.4.3.8.1 Habitat Loss

The River Tolka is known to support populations of brown trout and provides a particularly important nursery function for salmonid species. Aquatic surveys, conducted by Triturus Environmental Ltd. in 2020 to inform this assessment, identified good / moderate quality brown trout nursery habitat and locally good spawning habitat for salmonids on the River Tolka downstream of both crossing points surveyed. Refer to Appendix A12.2 Aquatic Baseline Report in Volume 4 of this EIAR.

River lamprey are known to occur in the River Tolka and River Liffey, as outlined in the desk study. Aquatic surveys undertaken in 2020 identified locally good lamprey spawning habitat downstream of the two crossing points surveyed (See figure 12.7 in Volume 3 of this EIAR).

The results of the desk study revealed that eel is known to occur in the River Tolka, particularly in its lower reaches, and the Liffey estuary serves as a natural linkage for eel migrating between freshwater and marine environments. The results of aquatic surveys conducted in 2020, identified moderate quality eel habitat at both crossing points surveyed on the River Tolka.

It has been estimated that a small section of FW2 watercourse (comprising two separate parcels totalling 0.02ha) are within the temporary landtake boundary for the Proposed Scheme. However, no instream works are proposed, and as such there will be no loss of aquatic habitat and hence the Proposed Scheme will not affect the conservation status of any watercourse and will not result in a likely significant negative effect, at any geographic scale.

12.4.3.8.2 Habitat Degradation – Surface Water Quality

As discussed in Section 12.4.3.2.2 under Habitat Degradation – Surface Water Quality, the Construction Phase of the Proposed Scheme could result in contamination of receiving water bodies. This could result in significant negative impacts on European eel and other fish species either directly (e.g. acute or sub-lethal toxicity from pollutants) or indirectly (e.g. affecting their food supply or supporting habitats).

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

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

The desk study records, as presented in Section 12.3.12, revealed that the River Tolka and Lower Liffey Estuary 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. Habitat degradation as a result of effects on surface water quality on the River Tolka or Liffey system during construction, has the potential to result in a temporary likely significant effect at the County level for populations of Atlantic salmon in these watercourses. The effect on surface water quality would occur in the immediate vicinity of the pollution source and downstream reaches of the watercourse, the scale of which would be dependent on the magnitude of the pollution event.

The River Tolka is also known to support populations of brown trout and provides a particularly important nursery function for salmonid species. Habitat degradation as a result of effects on surface water quality on the River Tolka or Liffey system during construction, has the potential to result in a temporary likely significant effect at the local level for populations of brown trout in these watercourses. The effect on surface water quality would occur in the immediate vicinity of the pollution source and downstream reaches of the watercourse, the scale of which would be dependent on the magnitude of the pollution event.

River lamprey are known to occur in the River Tolka and River Liffey, as outlined in the desk study. Lamprey are known to occur in upstream reaches of the River Tolka, with the nearest record being located 1.3km 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 temporary likely significant effect at the County level on populations of lamprey species in these watercourses. The effect on surface water quality would occur in the immediate vicinity of the pollution source and downstream reaches of the watercourse, the scale of which would be dependent on the magnitude of the pollution event.

The results of the desk study revealed that eel *Anguilla anguilla* are known to occur in the River Tolka, particularly in its lower reaches, and the Liffey estuary serves as a natural linkage for eel migrating between freshwater and marine environments. Habitat degradation, as a result of effects on surface water quality during construction, has the potential to result in a temporary likely significant effect at the County level on populations of eel in these watercourses. The effect on surface water quality would occur in the immediate vicinity of the pollution source and downstream reaches of the watercourse, the scale of which would be dependent on the magnitude of the pollution event.

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 affect the conservation status of affected fish species and result in a likely significant negative effect, at a local to national geographic scale.

Table 12.20: 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; non-native invasive plant species	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

Ecological Receptor	Ecological Valuation	Potential Impacts	Potential Significance
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 National Importance	Habitat Degradation (hydrology; non-native invasive plant species); Disturbance and Displacement	Likely significant effect at the international to national geographic scale
Baldoyle Bay SPA Baldoyle Bay pNHA	International Importance National Importance	Habitat Degradation (hydrology); Disturbance and Displacement	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); Disturbance and Displacement	Likely significant effect at the international to national geographic scale
Malahide Estuary SPA Malahide Estuary pNHA	International Importance National Importance	Habitat Degradation (hydrology; non-native invasive plant species); Disturbance and Displacement	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); Disturbance and Displacement	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; non-native invasive plant species); Disturbance and Displacement	Likely significant effect at the international to national geographic scale
Lambay Island SPA Lambay Island pNHA	International Importance National Importance	Habitat Degradation (hydrology;); Disturbance and Displacement	Likely significant effect at the international to national geographic scale
Rockabill SPA Rockabill 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); Disturbance and Displacement	Likely significant effect at the international to national geographic scale
The Murrough SPA The Murrough pNHA	International Importance National Importance	Habitat Degradation (hydrology); Disturbance and Displacement	Likely significant effect at the international to national geographic scale
The Royal Canal pNHA	National Importance	Habitat Degradation (hydrology)	Likely significant effect at the national geographic scale
Rockabill SPA Rockabill Island pNHA	International Importance National Importance	Habitat Degradation (hydrology)	Likely significant effect at the international to national geographic scale
Habitats (outside of designated areas for nature conservation)			
Tidal Rivers (CW2) (corresponding to Annex I Estuaries [1130])	National Importance	Habitat Degradation (hydrology;)	Likely significant effect at the Local geographic scale
Depositing / lowland rivers (FW2)	National Importance	Habitat Loss, Habitat Degradation (hydrology; non-native invasive plant species)	Likely significant effect at the local geographic scale

Ecological Receptor	Ecological Valuation	Potential Impacts	Potential Significance
Canals (FW3)	National Importance	Habitat Degradation (hydrology)	Likely significant effect at the national geographic scale
Dry calcareous and neutral grassland (GS1);	Local Importance (Higher Value)	Habitat Loss; Habitat Degradation (non-native invasive plant species)	Likely significant effect at the local geographic scale
Dry meadows and grassy verges (GS2)	Local Importance (Higher Value)	**Construction:** Habitat Loss; Habitat Degradation	Likely significant effect at the local geographic scale
(Mixed) broadleaved woodland (WD1)	Local Importance (Higher Value)	Habitat Loss, Habitat Degradation (hydrology; non-native invasive plant species)	Likely significant effect at the local geographic scale
Mixed broadleaf/conifer woodland (WD2	Local Importance (Higher Value)	Habitat Loss, Habitat Degradation (hydrology; non-native invasive plant species)	Likely significant effect at the local geographic scale
Scattered trees and parkland (WD5)	Local Importance (Higher Value)	Habitat Degradation (hydrology; non-native invasive plant species)	Likely significant effect at the local geographic scale
Hedgerows (WL1)	Local Importance (Higher Value)	Habitat Loss, Habitat Degradation (hydrology; non-native invasive plant species)	Likely significant effect at the local geographic scale
Treelines (WL2)	Local Importance (Higher Value)	Habitat Loss, Habitat Degradation (hydrology; non-native invasive plant species)	Likely significant effect at the local geographic scale
Wet willow-alder-ash woodland (WN6) links with Annex I Alluvial forests	International Importance	Habitat Degradation (hydrology; non-native invasive plant species)	Likely significant effect at the local geographic scale
Immature Woodland (WS2)	Local Importance (Higher Value)	Habitat Loss, Habitat Degradation (hydrology; non-native invasive plant species)	Likely significant effect at the local geographic scale
Rare / Protected Plant Species			
Opposite-leaved Pondweed	National Importance	Habitat Degradation (hydrology)	Likely significant effect at the local to national geographic scale
Non-native Invasive Plant Species			
Non-native invasive plant species	N/A	Spread at expense of other Habitats, Habitat Degradation (hydrology)	Likely significant effect at the local to International scale 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	County Importance	Habitat degradation (hydrology; disturbance/displacement)	Likely significant effect at the local geographic scale
Marine mammals (Annex I species of nearby SACs: harbour porpoise, harbour seal and grey seal)	International Importance	Habitat Degradation (hydrology)	Likely significant effect at the local to national geographic scale
Marine mammals (all other marine mammals)	County Importance	Habitat Degradation (hydrology)	Likely significant effect at the local to national geographic scale
Other mammal species protected under the Wildlife Acts	Local Importance (Higher Value)	Disturbance / Displacement	Likely significant effect at the local geographic scale
SCI bird species	International Importance	See SPAs above	See SPAs above
Kingfisher (Non-SCI population	National Importance	Habitat degradation (hydrology; disturbance/displacement)	Likely significant effect at the local geographic scale

Ecological Receptor	Ecological Valuation	Potential Impacts	Potential Significance
All other breeding bird species (non-SCI)	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-SCI)	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)	Habitat loss; Mortality Risk; Disturbance / Displacement and Habitat Degradation (hydrology)	Likely significant effect at the local geographic scale
Fish Species	Local Importance (Higher Value) – International Importance	Habitat Degradation (hydrology)	Likely significant effect at the local geographic scale
Non-Annex fish species	Local importance (Higher Value)	Habitat Degradation (hydrology)	Likely significant effect at the local geographic scale

12.4.4 Operational Phase

12.4.4.1 **Designated Areas for Nature 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 12.4.4.5.2 with regards to potential operational impacts on wintering bird species, which encompass all relevant SCI bird species.

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

The Proposed Scheme is hydrologically connected to Dublin Bay via the Tolka _040 (via surface water drainage), Royal Canal (Mainline (Liffey and Dublin Bay) (via surface water drainage), Liffey Estuary Upper (via combined sewer and Dublin Zoo Ponds (via surface water drainage to Ringsend WwTP) and existing pipes which drain directly to Dublin Bay.

The release of contaminated surface water runoff and/or an accidental spillage or pollution event into any surface water features during operation has the potential to affect water quality in the receiving aquatic environment. Such a pollution event may include: the release of sediment into receiving waters and the subsequent increase in mobilised suspended solids; and, the accidental spillage and / or leaks of contaminants The associated effects of a reduction of surface water quality could potentially extend for a considerable distance downstream of the location of the accidental pollution event or the discharge including the following European sites: North Dublin Bay SAC, South Dublin Bay SAC, Howth Head SAC, Lambay Island SAC, Rockabill to Dalkey Island SAC, Baldoyle Bay SPA, North Bull Island SPA, South Dublin Bay and River Tolka Estuary SPA and Dalkey Islands SPA.

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

Rockabill to Dalkey Island SAC, North Bull Island SPA, Lambay SAC, 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 mobile SCI bird species and QI mammal species that commute, forage and loaf in Dublin Bay i.e., birds associated with 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 Estuary SPA, Dalkey Islands SPA, The Murrough SPA and, marine mammals associated with Rockabill to Dalkey Island SAC and Lambay Island SAC. This reduction in 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 Introducing / Spreading Non-native Invasive Species

There are five areas of Himalayan balsam, a species listed on the Third Schedule of the (Birds and Natural Habitats) Regulations present in close proximity to, the Proposed Scheme. The desktop review returned records of seven species listed on the Third Schedule of the (Birds and Natural Habitats) Regulations in the vicinity of the Proposed Scheme. 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 not considered likely that invasive species could spread to European sites which are located a significant distance from the outfall locations of the Royal Canal, River Tolka, Liffey Estuary Upper and Ringsend Wastewater Treatment Plant (i.e. Howth Head SAC, Howth Head Coast SPA, Rockabill to Dalkey Island SAC and Dalkey Islands SPA).

12.4.4.1.1.4 Habitat Degradation as a result of Air Quality Impacts

A reduction in air quality within the immediate vicinity of the road, involving emissions from car exhausts, and the deposition of particulate matter and heavy metals produced by engine, brake and tyre wear during the Operational Phase, can contribute to increased deposition of pollutants such as oxides of nitrogen (NOx, NOs), volatile organic compounds (VOCs), particulate matter (PM), heavy metals (HM) and ammonia (NH4) 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 unmitigated ZoI for air quality effects arising from the Proposed Scheme has the potential to extend up to 200m the Proposed Scheme boundary during the Operational Phase. There are no European sites present within this distance.

12.4.4.1.1.5 Disturbance and Displacement

There are no European sites within the disturbance ZoI of the Proposed Scheme, however, several QI species are known to occur within the vicinity of the Proposed Scheme. Refer to Section 12.4.4.4.4 and Section 12.4.4.4.5 for more details with regards to potential construction impacts QI species.

The potential for impacts on SCI bird populations for which SPAs are designated has been provided in the NIS. Refer to Section 12.4.4.5.2 with regards to potential impacts on wintering bird species, which encompass all relevant SCI bird species.

12.4.4.1.2 Natural Heritage Areas and Proposed Natural Heritage Areas

The potential impacts on European sites arising from the Proposed Scheme, outlined in Section 12.4.4.1.1 may also negatively affect the National sites, which are located within the boundaries of European sites and designated for similar reasons. The respective European sites are provided in Table 12.8. The Proposed Scheme also has

the potential to affect biodiversity in a broader sense than only the QIs / SCIs of those European sites. Where biodiversity receptors in these pNHAs do not form part of the QIs / SCIs in the NIS assessment, they are considered under the other individual impact assessment headings for each KER below with the exception of Air Quality impacts to the Royal Canal pNHA. Potential impacts arising from the Proposed Scheme on the Royal Canal pNHA would result in a likely significant negative effect at a national geographic scale in respect of air quality and surface water quality draining into the pNHA.

12.4.4.1.2.1 Habitat Degradation as a result of Air Quality impacts

Air quality modelling of NOx concentrations, and nitrogen 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 is provided in the Chapter 7 (Air Quality).

Vehicle-derived air emissions were modelled during the Operation Phase of the Proposed Scheme at three locations where the Proposed Scheme crosses the Royal Canal pNHA at M50 Junction 6 (refer to Section 7.4.3.4 of Chapter 7 (Air Quality) for details). The worst-case predicted annual average NOx 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. At three locations where the Proposed Scheme crosses the Royal Canal pNHA at M50 Junction 6 (eastern side, western side and slip road), vehicle emissions exceed the critical level for NO_X in both the Do Minimum (DM) and the Do Something (DS) scenarios. However, the NO_X concentration is predicted to decrease at these three receptors during operation of the Proposed Scheme and therefore the Royal Canal pNHA experiences an overall reduction in Operational Phase emissions as a result of the Proposed Scheme.

The contribution of the Operation Phase of the Proposed Scheme to the nitrogen deposition (NO_2) rate was modelled at Royal Canal pNHA. Nitrogen deposition levels have been compared to the lower and higher critical loads for habitats associated with the Royal Canal pNHA, including Canals (FW3), Woodland (WD5), Dry Meadow / Grassy Verges (GS2), and built or disturbed habitats associated with the man-made M50 Junction 6. Nitrogen deposition will be below the lower critical load of inland and surface water habitats of 5-10 Kg(N)/ha/yr (National Road Authority, 2011) across the majority of modelled locations. At the western and eastern sides of the M50 near the Royal Canal pNHA, the lower critical load is exceeded in both the DM and DS however there is a decrease in nitrogen deposition in the DS. At the Navan Road N3 eastern site, the lower critical load is exceeded in the DM, but nitrogen depositions decrease below the lower critical load in the DS. At the majority of modelled locations, the Proposed Scheme will decrease nitrogen deposition. Given the existing baseline urban environment, the Proposed Scheme is not considered to greatly increase the level of impact than already exists on the Royal Canal pNHA.

While harmful air quality effects on the Royal Canal pNHA as a result of the Proposed Scheme are considered to be unlikely, in a worst-case scenario, this could result in a likely significant negative effect at a local geographic scale. The prediction is based on conservative assumptions regarding background pollutant concentrations 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. During the Operation Phase the overall net increase in impermeable area for the road corridor will be 27,737m^2. In areas, where an increase in impermeable area is proposed, attenuation is generally provided in the form of SuDS such as permeable paving, bio retention areas, rain gardens, green roofs, filter drains (FD) and tree pits. SuDS provide the dual benefits of controlling flows and treating water quality. In areas where the catchment is proposed to remain unchanged (as no additional impermeable areas are proposed), the design generally consists of relocating

existing gullies (where possible) to new locations. See Chapter 4 (Proposed Scheme Description) for more detail on drainage design.

The drainage design principles have informed the drainage design (see Chapter 4 (Proposed Scheme Description) and Appendix A4.1 in Volume 4 of this EIAR) which will ensure no net increase in the surface water flow discharged to water bodies hydrologically connected to the Proposed Scheme. The functioning and effectiveness 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 Tolka_040, Tolka_050, the Royal Canal and Liffey Estuary Upper. It should in fact, result in some improvement on the local surface water quality due to the implementation of SuDS, where appropriate.

Mitigation for the Operational Phase has been built into the drainage design of the Proposed Scheme. Without the incorporation of the drainage design, then during Operational Phase, 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 Tolka Estuary and North Bull Island transitional water bodies, and Dublin Bay coastal water body could also be affected. This is deemed to be significant at a local scale.

Mitigation measures to maintain SuDS are provided in Section 12.5.2.

12.4.4.2.2 Habitat Degradation- Groundwater

During the Operational Phase of the Proposed Scheme there is potential for occasional accidental leakage of oil, petrol or diesel, resulting in contamination of the surrounding environment and potentially resulting in impacts to groundwater regime. However, the magnitude of the impact is considered imperceptible on any of the land, soils, geology and hydrogeology important features such the topsoil and underlying aquifers, given that the road surface is largely in place and the surface water drainage infrastructure includes SuDS and attenuation measures ensuring minimal groundwater penetration and hence no perceptible impacts on adjacent groundwater dependent terrestrial ecosystem and any species that they may support.

With the implementation of the proposed drainage design, no additional mitigation measures are considered necessary in respect of the groundwater dependant habitats for the operation of the Proposed Scheme (see Chapter 14 Land, Soils and Geology).

12.4.4.2.3 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. None of these are predicted to have any long-term effects that would give rise to a likely significant negative impact on any aquatic habitats or species through effects on the hydrological regime as the drainage design principles ensure that there will be no net increase in the surface water flow discharged to these receptors and will result in some improvement on the local surface water quality due to the implementation of SuDS (for more detail refer to Chapter 13 (Water).

12.4.4.2.4 Habitat Degradation - Non-Native Invasive Plant Species

Five areas of a single invasive plant species, listed on the Third Schedule of the (Birds and Natural Habitats) Regulations 2011 were recorded within / adjacent to the Proposed Scheme during the field surveys (Table 12.10). The desk 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 Scheme boundary post-construction. As such, there is a risk that routine maintenance road works could inadvertently spread contaminated vegetation cuttings both within the Proposed Scheme boundary, and within the immediate vicinity. 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 into the Construction Phase which carry into the Operation Phase to avoid this potential impact (see Section 12.5.1).

12.4.4.2.5 Habitat Degradation – Air Quality

As discussed above in Section 12.4.4.1.1.4, air quality modelling of NOx concentrations and nitrogen deposition (NO2) 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 or in close proximity to the Proposed Scheme. The desktop study did not reveal any records for rare and / or protected species in close proximity to the Proposed Scheme. Therefore, there is no potential for impacts on rare / protected species, as a result of the operation of the Proposed Scheme.

The desk study returned historical records of opposite-leaved pondweed *Groenlandia densa* within the Royal Canal pNHA. This species may lie dormant in sediments for many years until conditions become suitable for regrowth. Surface water runoff containing harmful compounds from the Proposed Scheme could affect the water quality of the Royal Canal and affect populations of opposite-leaved pondweed which are present in the vicinity of the Proposed Scheme.

The drainage design principles have informed the drainage design (see Chapter 4 (Proposed Scheme Description) and Appendix A4.1 in Volume 4 of this EIAR) which will ensure no net increase in the surface water flow discharged to water bodies hydrologically connected to the Proposed Scheme. The functioning and effectiveness 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 Tolka_040, Tolka_050, the Royal Canal and Liffey Estuary Upper. It should in fact, result in some improvement in water quality- due to the implementation of SuDS, where appropriate.

Mitigation for the Operational Phase has been built into the drainage design of the Proposed Scheme. Without the incorporation of the drainage design, then during Operational Phase, The Proposed Scheme could result in contamination of receiving water bodies. This could result in significant negative impacts on water quality and protected plant species therein, 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 protected plant species 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.

Mitigation measures to maintain SuDS are provided in Section 12.5.2.

12.4.4.4 **Mammals**

12.4.4.4.1 Bats

12.4.4.4.1.1 <u>Indirect Disturbance of Light Patterns Due to Operational Lighting</u>

The installation of new lighting columns (21 number) relocation of lighting columns within suitable habitat may result in localised avoidance behaviour by bats. Such displacement (which would likely be a matter of metres, given that lighting is already present along the existing transport corridor) 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 artificial lighting is already present along the footprint of the Proposed Scheme, therefore the effects of displacement as a result of relocated artificial lighting are not considered to be significant at any geographic scale. This is because the lighting strategy only involves the upgrading / slight relocation of existing lighting columns 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.

As part of the iterative design process, the loss of boundary vegetation or extensive areas of woodland / linear vegetation loss has been minimised as far as is practical. The localised removal of vegetation to enable construction, particularly along Section 2 of the Proposed Scheme could result in additional light spill into areas where bats potentially forage. The design has minimised as far as is possible tree loss, particularly alongside the Tolka River Valley alongside the existing N3. The removal of discrete areas of vegetation is not predicted to impact bats in the wider areas, given the sylvan nature of this area. Over time in the period estimated as up to 10-15 years, the establishment and maturation of landscape planting would be expected to negate much of the tree loss and hence any additional light spill.

There are a total of two proximal areas where new low-level lighting is proposed in previously dark / low lighting areas i.e. BR02 Mill Road Bridge and RW07A&B Pedestrian Ramps. There may be disruption to potential commuting foraging routes across existing woodland habitats adjacent to the Tolka_040. However, considering that the N3 is already artificially lit, bats are more likely to be foraging at a greater distance from the road as woodland habitat (free from lighting) is plentiful to the north-east of the Proposed Scheme at this location. Furthermore, it is expected that bats utilizing this edge habitat would be habituated to some degree of artificial lighting.

Therefore, the overall effect of artificial lighting on bats during operation is considered to be significant at the local level only.

Mitigation measures to avoid light spill are included in the design and detailed in Section 12.5.

12.4.4.4.1.1 Disturbance / Displacement – Increased Human Activity

For the most part, the Operational Phase of the Proposed Scheme will not contribute to significant changes in increased human activity by virtue of it being along the bulk of the existing transport corridor and populations of bats associated with the Proposed Scheme are likely to be habituated to a certain degree of human disturbance. However, vegetation clearance on Section 2 of the Proposed Scheme along the N3 and Mill Road is required during Construction Phase. This linear boundary territory along the existing N3 will not be nor re-established through future planting. Considerable bat activity has been recorded in the wooded area alongside the River Tolka adjacent to the Proposed Works (see Section 12.3.8.1). Connectivity for bats within retained wooded area along the River Tolka at this point will ensure no likely significant change in distribution or movement. Thus, in general, no likely significant effect as a consequence of increased human activity to bats are predicted for the majority of the Proposed Scheme. However, in respect of the area around Mill Road, it is considered that there may be temporary significant effect on bats at a local scale, until such a time that they have habituated to the increased levels of human disturbance.

12.4.4.4.2 Badger

Multi-disciplinary surveys recorded evidence of badger along the perimeter fence of Belvedere Rugby Grounds on the Navan Road, which is located within the footprint of the Proposed Scheme. Based on the results of the desk study badger are also known to occur within 1km of the Proposed Scheme.

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 & Longcore, 2005). It should be noted that the majority of the Proposed Scheme corridor is already lit artificially and lighting proposals, for the most part, simply intend to upgrade existing lighting infrastructure.

The lighting design for the Proposed Scheme controls light emissions such that along the majority of the alignment light spill does not extend beyond the Proposed Scheme boundary and where it does, this is at tie-ins with the existing road network or at residential properties. There are no badger setts, or areas of high badger activity, within or in beyond the Proposed Scheme boundary that are located within the modelled light spill zone for the Proposed Scheme.

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

12.4.4.4.3 Otter

Evidence of otter was recorded within or in close proximity to the Proposed Scheme during the field surveys undertaken, in particular in the vicinity of the River Tolka along Section 2 of the Proposed Scheme. It should be noted, however, that no otter holts were identified during surveys undertaken. However, based on the results of the desktop study, otter are known to occur within 1km of the Proposed Scheme. Furthermore, otter frequently use the Lower Liffey Estuary for commuting and foraging purposes, with holts identified at Dublin Port (Macklin *et al.*, 2019). Otter holts are also known to occur downstream of the N3 / M50 interchange near Elmgreen Golf Club, which is located within 1km of the Proposed Scheme.

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 effect on otter is not considered to be significant at any geographic scale. The existing road infrastructure itself acts as a barrier to otter movement across the landscape, although connectivity along the watercourses is being maintained and the Proposed Scheme will neither exacerbate nor improve the barrier effect already in existence. Therefore, the impact of habitat severance/ barrier effect on otter, as a result of the Proposed Scheme, is not considered to be significant at any geographic scale.

12.4.4.4.3.2 Disturbance / Displacement

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 & Longcore, 2005). No new permanent lighting columns are proposed along the Proposed Scheme Corridor (See Section 12.4.1.2.7) and 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. Furthermore, the Proposed Scheme will not result in the introduction of artificial lighting

into previously unlit areas, but rather the lighting strategy involves the upgrading / slight relocation of existing lighting columns.

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

12.4.4.4.3.3 Habitat and Food Source Degradation – Surface Water Quality

As discussed in Section 12.4.3.2.2 under Habitat Degradation – Surface Water Quality, without the drainage 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.

The drainage design principles have informed the drainage design (see Chapter 4 (Proposed Scheme Description) and Appendix A4.1 in Volume 4 of this EIAR) which will ensure no net increase in the surface water flow discharged to water bodies hydrologically connected to the Proposed Scheme.

The Proposed Scheme will not exacerbate the existing surface water quality conditions in the Tolka_040, Tolka_050, the Royal Canal and Liffey Estuary Upper. It should in fact, result in some improvement on the local surface water quality due to the implementation of SuDS.

Mitigation for the Operational Phase has been built into the drainage design of the Proposed Scheme. Without the incorporation of the drainage design, surface water runoff and / or an accidental spillage or pollution event into any surface water feature during Operation Phase has the potential to have significant negative effects on water quality and consequently impact otter habitat and its food resource 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. This is deemed to be significant at a local scale.

Mitigation measures to maintain SuDS are provided in Section 12.5.2.

12.4.4.4.3.4 Mortality Risk

The Proposed Scheme will not result in any increase in terms of mortality risk to otter during Operation Phase. 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 otter, as a result of the Proposed Scheme is not considered to be significant at any geographic scale.

12.4.4.4.4 Marine Mammals

12.4.4.4.4.1 Surface Water Quality Impacts and Prey Abundance

As discussed in Section 12.4.3.2.2 under Habitat Degradation – Surface Water Quality, without the drainage design mitigation incorporated into the design of the Proposed Scheme, the Operational Phase of the Proposed Scheme could result in contamination of receiving water bodies. This could potentially result in significant negative impacts on marine mammals either directly (e.g. acute or sub-lethal toxicity from pollutants) or indirectly (e.g. affecting their food supply or supporting habitats).

Habitat degradation as a result of effects on surface water quality during operation has the potential to affect the conservation status of marine mammals and result in a likely significant negative effect, at a local geographic

scale. This is in consideration of the temporary nature and scale of the proposed impact, the availability of suitable habitat for marine mammals in the wider vicinity and the relative abundance of marine mammals across the wider environment, as demonstrated in the results of the desk study.

12.4.4.4.5 Other Mammals

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

12.4.4.4.5.1 Habitat Severance / Barrier Effect

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

As the Proposed Scheme, for the most part, consists of upgrading existing infrastructure, the effect of habitat severance / barrier effect 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 other mammals during operation. This is because the Proposed Scheme is largely focused on upgrading existing infrastructure, the mortality risk of which already exists. The Proposed Scheme will neither exacerbate nor improve the level of mortality risk associated with this infrastructure. Therefore, the impact of mortality risk to mammals, as a result of the Operational Phase of the Proposed Scheme is not regarded to be significant at any geographic scale.

12.4.4.4.5.3 Light Spill

Nocturnal mammals, including other mammals, would be likely to be disturbed by the introduction of artificial light into established breeding and foraging areas (Rich & Longcore, 2005). No new permanent lighting columns are proposed along the Proposed Scheme (See Section 12.4.1.1.8), merely relocation of some and, 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. Furthermore, the Proposed Scheme will not result in the introduction of artificial lighting into previously unlit areas, but rather the lighting strategy involves the upgrading / slight relocation of existing lighting columns.

Therefore, the effect of artificial lighting on other mammals, as a result of the Operational Phase of the Proposed Scheme, is not considered to be significant at any geographic scale.

12.4.4.5 **Birds**

12.4.4.5.1 Breeding Birds

12.4.4.5.1.1 Disturbance / Displacement

Increases in noise levels, associated with the increased frequency of bus traffic, as well as increased human presence, owing to the provision of the proposed cycle tracks, could 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, could also affect the breeding success of local bird populations as bird calls could become drowned out by traffic noise. Predictions from the noise and vibration modelling (see Chapter 9 (Noise & Vibration) for full assessment) highlight that several areas may also experience reductions in noise during the Operational Phase.

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 could 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 could have negative impacts on local breeding bird populations in the long-term.

Although the Proposed Scheme is predicted to have some effect on local breeding bird populations, 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.

In respect of kingfisher, which are known to utilise the River Tolka corridor, the Operational Phase of the Proposed Scheme will not, act as a barrier to Kingfisher movement across the landscape and the Proposed Scheme will neither exacerbate nor improve the barrier effect already in existence.

The Proposed Scheme is not likely to affect the conservation status of breeding bird species and will not result in a likely significant effect at any geographic scale.

12.4.4.5.1.1 Habitat Degradation – Surface Water

As discussed in Section 12.4.3.2.2 under Habitat Degradation – Surface Water Quality, without the drainage 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. In the absence of mitigation, this could potentially result in significant negative impacts on breeding birds either directly (e.g. acute or sub-lethal toxicity from pollutants) or indirectly (e.g. affecting their food supply or supporting habitats).

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

The drainage design principles have informed the drainage design (see Chapter 4 (Proposed Scheme Description) and Appendix A4.1 in Volume 4 of this EIAR) which will ensure no net increase in the surface water flow discharged to water bodies hydrologically connected to the Proposed Scheme. The functioning and effectiveness 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 Tolka_040, Tolka_050, the Royal Canal and Liffey Estuary Upper. It should in fact result in some improvement on the local surface water quality due to the implementation of SuDS.

Mitigation for the Operational Phase has been built into the drainage design of the Proposed Scheme. Without the incorporation of the drainage design, 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 otter habitat and its food resource 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. This is deemed to be significant at a local scale.

Mitigation measures to maintain SuDS are provided in Section 12.5.2.

12.4.4.5.2 Wintering Birds

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

12.4.4.5.2.1 Disturbance / Displacement

During operation, the Proposed Scheme has the potential to disturb and displace wintering bird species from habitat adjacent the Proposed Scheme boundary due to an increase in noise, human activity and visual disturbance associated with increased human presence and increased bus 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.

Although there is still likely to be some level of displacement effect, a perceptible effect would be expected to be limited to habitats immediately adjacent to the Proposed Scheme. No known wintering bird feeding sites occur within the footprint of the Proposed Scheme. However, Belvedere Sports Ground Cabra, an identified winter bird site, lies adjacent to the Proposed Scheme, although it should be noted that these sports pitches are separated from the Proposed Scheme by areas of amenity grassland, existing buildings and scrubby boundary vegetation. The amenity grassland at this location may be used by foraging winter birds. Similarly for the other identified inland wintering bird sites (Pope John Paul II Cabra and Ashtown Playing Pitches) they are set back from the existing transport corridor and would be expected to be habituated to disturbance to current and future traffic noise.

The Proposed Scheme does not require the removal of existing buildings (including low boundary wall) and boundary vegetation which currently provide visual screening to wintering birds using these pitches for foraging purposes. As any operational noise increases are not likely to alter the existing baseline noise effect on wintering birds in the locality, effects of noise disturbance can also be excluded.

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

12.4.4.5.2.1 Habitat Degradation – Surface Water

As discussed in Section 12.4.3.2.2 under Habitat Degradation – Surface Water Quality, without the drainage 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 wintering birds across the wider environment, as demonstrated in the results of the desk study.

The drainage design principles have informed the drainage design (see Chapter 4 (Proposed Scheme Description) and Appendix A4.1 in Volume 4 of this EIAR) which will ensure no net increase in the surface water flow discharged to water bodies hydrologically connected to the Proposed Scheme.

The Proposed Scheme will not exacerbate the existing surface water quality conditions in the Tolka_040, Tolka_050, the Royal Canal and Liffey Estuary Upper. It should in fact, result in some improvement in water quality due to the implementation of SuDS.

Mitigation for the Operational Phase has been built into the drainage design of the Proposed Scheme. Without the incorporation of the drainage design, 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 downstream wintering bird and aquatic habitat and its food resource 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 to downstream site supporting wintering birds. This is deemed to be significant at a local scale.

Mitigation measures to maintain SuDS are provided in Section 12.5.2.

12.4.4.6 **Reptiles**

No evidence of any protected reptile species, such as common lizard, was identified along the Proposed Scheme during surveys undertaken. No suitable breeding or hibernating habitat for common lizard was identified within the study area. However, impacts on this protected species cannot be excluded and have therefore been assessed on a precautionary basis.

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 effect on common lizard is not considered to be significant at any geographic scale. The existing infrastructure itself acts as a barrier to reptile movement across the landscape and the Proposed Scheme will neither exacerbate nor improve the barrier effect already in existence.

12.4.4.6.2 Mortality Risk

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

12.4.4.7 **Amphibians**

No evidence of any protected amphibian species, such as common frog or smooth newt, were identified along the Proposed Schemed during surveys undertaken. However, suitable amphibian habitat such as vegetated riverbanks were recorded within the Proposed Scheme. The desk study returned records of amphibians in the vicinity of the Proposed Scheme and, therefore, impacts on these species cannot be excluded.

12.4.4.7.1 Habitat Severance / Barrier Effect

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

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

12.4.4.7.2 Mortality Risk

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

12.4.4.7.3 Habitat Degradation – Surface Water

As discussed in Section 12.4.3.2.2 under Habitat Degradation – Surface Water Quality, without the drainage 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 amphibians 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 amphibians and result in a likely significant negative effect, at a local geographic scale. This is in consideration of the temporary nature and scale of the proposed impact, the availability of suitable habitat for amphibians in the wider vicinity and the relative abundance of amphibians across the wider environment, as demonstrated in the results of the desk study.

The drainage design principles have informed the drainage design (see Chapter 4 (Proposed Scheme Description) and Appendix A4.1 in Volume 4 of this EIAR) which will ensure no net increase in the surface water flow discharged to water bodies hydrologically connected to the Proposed Scheme.

The Proposed Scheme will not exacerbate the existing surface water quality conditions in the Tolka_040, Tolka_050, the Royal Canal and Liffey Estuary Upper. It should in fact, result in some improvement in water quality due to the implementation of SuDS.

Mitigation for the Operational Phase has been built into the drainage design of the Proposed Scheme. Without the incorporation of the drainage design, 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 amphibian habitat and its food resource 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. This is deemed to be significant at a local scale.

Mitigation measures to maintain SuDS are provided in Section 12.5.2.

12.4.4.8 **Fish**

12.4.4.8.1 Habitat Degradation - Surface Water

As discussed in Section 12.4.3.2.2 under Habitat Degradation – Surface Water Quality, without the drainage design mitigation incorporated into the design of the Proposed Scheme, the Operational Phase of the Proposed Scheme could potentially result in contamination of receiving water bodies. This could result in significant negative impacts on European eel and other fish species 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 potential impact.

The drainage design principles have informed the drainage design (see Chapter 4 (Proposed Scheme Description) and Appendix A4.1 in Volume 4 of this EIAR) which will ensure no net increase in the surface water flow discharged to water bodies hydrologically connected to the Proposed Scheme. The functioning and effectiveness 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 Tolka_040, Tolka_050, the Royal Canal and Liffey Estuary Upper. It should in fact, result some improvement in water quality due to the implementation of SuDS.

Mitigation for the Operational Phase has been built into the drainage design of the Proposed Scheme. Without the incorporation of the drainage design, 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 otter habitat and its food resource 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. This is deemed to be significant at a local scale.

Mitigation measures to maintain SuDS are provided in Section 12.5.2.

Table 12.21: 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
South Dublin Bay and River Tolka Estuary SPA Dolphins, Dublin Docks pNHA South Dublin Bay pNHA North Dublin Bay pNHA Booterstown Marsh	International Importance National 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
Rockabill SPA Rockabill Island 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

Ecological Receptor	Ecological Valuation	Potential Impacts	Potential Significance
The Murrough SPA The Murrough pNHA	International Importance National Importance	Habitat Degradation (hydrology)	Likely significant effect at the international to national geographic scale
The Royal Canal pNHA	National Importance	Habitat Degradation (hydrology)	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 Degradation (hydrology)	Likely significant effect at the local geographic scale
Depositing / lowland rivers (FW2)	County Importance	Habitat Degradation (hydrology; non-native invasive plant species)	Likely significant effect at the local geographic scale
Canals (FW3)	National Importance	Habitat Degradation (hydrology)	Likely significant effect at the local geographic scale
Scattered trees and parkland (WD5)	Local Importance (Higher Value)	Habitat Loss	Likely significant effect at the local geographic scale
(Mixed) broadleaved woodland (WD1)	Local Importance (Higher Value)	Habitat Loss	Likely significant effect at the local geographic scale
(Mixed) broadleaved woodland (WD1)	Local Importance (Higher Value)	Habitat Loss	Likely significant effect at the local geographic scale
Immature Woodland (WS2)	Local Importance (Higher Value)	Habitat Loss	Likely significant effect at the local geographic scale
Wet willow-alder-ash woodland (WN6) links with Annex I Alluvial forests	International Importance	Habitat Degradation (hydrology; non-native invasive plant species)	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
Dry calcareous and neutral grassland (GS1);	Local Importance (Higher Value)	Habitat Loss	Likely significant effect at the local geographic scale
Dry meadows and grassy verges (GS2)	Local Importance (Higher Value)	Habitat Loss	Likely significant effect at the local geographic scale
Rare / Protected Plants			
Opposite-leaved pondweed	National Importance	Habitat Degradation (hydrology)	Likely significant effect at the local to national geographic scale
Non-native Invasive Plant Species			
Non-native invasive plant species	N/A	Spread at expense of other Habitats, Habitat Degradation	Likely significant effect at the local to International scale geographic scale
Fauna Species			
Bats	Local Importance (Higher Value)	Disturbance / Displacement (until habituated)	Likely significant effect at the local geographic scale (until habituated)
Otter	County Importance	Habitat Degradation (hydrology)	Likely significant effect at the local geographic scale
Marine mammals (Annex I species of nearby SACs: harbour porpoise, harbour seal and grey seal)	International Importance	Habitat Degradation (hydrology)	Likely significant effect at the local geographic scale
Marine mammals (all other marine mammals)	County Importance	Habitat Degradation (hydrology)	Likely significant effect at the local geographic scale
SCI bird species	International Importance	See SPAs above	See SPAs above

Ecological Receptor	Ecological Valuation	Potential Impacts	Potential Significance
Kingfisher (non-SCI population)	National Importance	Habitat Degradation (hydrology)	Likely significant effect at the local geographic scale
All other breeding bird species (non-SCI)	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 Nature Conservation**

12.5.1.1.1 European sites

The mitigation measures that are required to ensure that the Proposed Scheme will not adversely affect the integrity of the European sites within the ZoI are presented in the Natura Impact Statement (NIS) (i.e. South Dublin Bay SAC, North Dublin Bay SAC, Howth Head SAC, Rockabill to Dalkey Island SAC, Lambay Island SAC, North Bull Island SPA, South Dublin Bay and River Tolka Estuary SPA, Howth Head Coast SPA, Dalkey Island SPA). 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 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 ZoI are as per those for European sites as the boundaries of the NHA and pNHAs follow those of 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 pNHAs at the national geographic scale.

12.5.1.2 **Habitats**

12.5.1.2.1 Habitat Loss & Fragmentation

Where practicable, areas of vegetation, including habitats of Local Importance (Higher Value), mixed broadleaved woodland, mixed broadleaved conifer woodland, scattered trees and parkland, immature woodland, 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. 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 in Volume 3 of this EIAR. These areas will be protected for the duration of construction works and fenced off at an appropriate distance.

To mitigate the loss of 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.

The extent of habitat loss and the landscaping data as presented in Table 12.17 and Table 12.18 demonstrate that there will be a loss of habitat as a result of the Proposed Scheme. In particular, there will be a loss of woodland

trees and planted linear woodland features as well as some boundary copses. Overall the landscape design has reduced the loss of mature tree loss, and increased the area of tree planting relative to what is being lost:

- 413 trees proposed to be removed and 793 trees will be planted;
- 9330m^2 of woodland trees to be removed and 9661m^2 woodland trees will be planted.
- 1119m of proposed hedgerow;
- 6373m^2 of proposed species rich grassland;
- 5485m^2 of proposed ornamental Planting;
- 1358m^2 of Proposed native Planting; and
- 36753m^2 of Proposed amenity grass area.

There will be a localised residual impact as newly planted trees will take time to mature, extending into the Operational Phase of the Proposed Scheme. In other areas along the Proposed Scheme, other habitats such as Species Rich Grassland are proposed which will increase floral diversity to benefit biodiversity.

The extent of habitat loss and the landscaping data as presented in Table 12.17 and Table 12.18 demonstrate that there will be a loss of habitats as a result of the Proposed Scheme and in particular, there will be a loss of and some woodland trees and planted linear woodland features as well as some boundary copses. Overall, the landscape design has reduced the loss of mature trees, and increased the area of tree planting relative to what is being lost.

There will be a localised residual impact as newly planted trees will take time to mature, extending into the Operational Phase of the Proposed Scheme. In other areas along the Proposed Scheme, other habitats such as Species Rich Grassland are proposed which will increase floral diversity to benefit biodiversity.

12.5.1.2.2 Habitat Degradation – Surface Water Quality

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.

Scheme Specific Measures which the appointed contractor will implement in relation to surface water quality at the following four areas namely:

- Construction Compounds;
- BR01 Tolka River Bridge widening; and
- BR02 Mill Road Bridge widening and RW07A and RW07B Pedestrian Ramps at Mill Road;

12.5.1.2.2.1 Construction Compounds

Construction Compound BL1 at Old Navan Road is in close proximity to River Tolka (Tolka_040). Whilst there is an existing line of trees which would act as a buffer and provide some protection to the water body from contaminated surface water runoff during the set up and operation of the Construction Compound, the close

proximity presents a risk for potential impacts from storage of materials and runoff. Silt curtains / bunding or infiltration trenches will be installed by the appointed contractor on the northern boundary of Construction Compound BL1 to prevent any silty water or spillages from reaching the water body. The appointed contractor will store fuels as close as possible to the southern boundary of Construction Compound BL1, where an existing low wall will be retained and act as a bund to protect surface water drains on the Old Navan Road to the south. Other construction activities that could be a potential risk to waterbodies or the storage of materials will similarly be located at the southern boundary of the site by the appointed contractor.

At Construction Compound BL2 at Junction 6 to the west of the M50, the existing boundary wall will provide some measure of protection to any surface water connections within the car park although it should be noted that a section of the wall will be removed and replaced with a new retaining wall. To the north of the Construction Compound site, the surface water system will be protected through the use of filter drains or silt curtains by the appointed contractor at locations where there is potential for silty water runoff to those drains (the grassed area slopes towards the drains for a short distance). In addition, the surface water manhole in the grassed area will be clearly marked and protected by the appointed contractor from any possible contamination through the use of bunding or temporary sealing.

At Construction Compound BL3 to the east of the M50, the only potential pathway to the Royal Canal is via surface water drains which may be present in the road which bisects the two sites. Surface water drains on the road will be identified clearly and bunded on the side of the Construction Compounds by the appointed contractor, allowing the road to still drain freely.

All other measures relating to the set up and management of Construction Compounds, the storage of soil, materials and fuel as set out in Section 5.4.5.1 of the Appendix A5.1 in Volume 4 of this EIAR will be implemented by the appointed contractor.

12.5.1.2.2.2 BR01 Tolka Bridge Extension

Considering the works to the lands directly adjacent to the banks of the River Tolka (Tolka_040), the following mitigation measures below, which are in line with the IFI Guidelines on Protection of Fisheries During Construction Works in and Adjacent to Waters (IFI 2016) on works adjacent to watercourses, will be implemented by the appointed contractor to minimise and avoid impacts:

- All construction machinery operating near to the water body will be mechanically sound to avoid leaks of oils, hydraulic fluid, etc.;
- Reinstatement of any banks affected during construction works near a watercourse will be reinstated back to pre-development conditions;
- Any bank-side clearance in the immediate area of the crossing will be kept to a minimum and adequate measures will be put in place to control or minimize the risk of siltation. This may include such measures as:
    - Bunding and diversion of site runoff to settlement ponds;
    - Stripping of topsoil. See Soils in A Guide to Landscape Treatments for National Road Schemes in Ireland (TII (previously National Roads Authority) 2005), and where necessary, surfacing of site with granular material; and,
    - Covering of temporary stockpiles.

Further details are provided in Chapter 5 (Construction), which states that sheet piling will be installed by the appointed contractor on the land side of the existing gabion baskets to protect the River Tolka (Tolka_040) from the construction works and to retain the existing bank during excavation works for the bridge foundations. The sheet piles will be driven and installed in accordance with the IFI Guidelines on Protection of Fisheries During Construction Works Adjacent to Waters (IFI 2016). Consultation was undertaken in June 2021 with IFI, and the works are deemed out of channel. Environmental mitigation measures including silt curtains and silt busters will be installed within the temporary working area by the appointed contractor, to mitigate potential impacts associated with surface water runoff on the River Tolka.

12.5.1.2.2.3 BR02 Mill Road Bridge and RW07A and RW07B Pedestrian Ramps at Mill Road

The structures to the northern side of N3 dual carriageway and the temporary working areas are in close proximity to the River Tolka (Tolka_040) and so there is increased risk of silty water or concrete washings reaching the Tolka_040 across surfaces or via local surface water drains.

In order to avoid or minimise impacts, the appointed contractor will bund local surface water drains on the construction activity side and erect silt fences around the extent of the works to prevent accumulated silty water from leaving the site in the event of rainfall. All other measures relating to the storage of soil, materials and fuel as set out in Section 5.4.4 of the Appendix A5.1 in Volume 4 of this EIAR will be implemented by the appointed contractor.

12.5.1.2.3 Habitat Degradation – Hydrological Regime

No instream works are proposed. Any impacts to habitat degradation due to changes in hydrological regime of the River Tolka, River Liffey, Royal Canal or Liffey Estuary Lower would be temporary in nature and imperceptible during the Construction Phase of the Proposed Scheme. Therefore, no additional mitigation is proposed other than good site practices as outlined in CEMP, Appendix A5.1 in Volume 4 of this EIAR.

12.5.1.2.4 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 minimise as far as possible the risk of soil, groundwater and surface water contamination; and
- Measures to be implemented by the appointed contractor to minimise the risk of spills and contamination of soils and waters 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 roll-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 early 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 during construction are outlined in Chapter 14 (Land, Soils, Geology & Hydrogeology) and Appendix A5.1 – CEMP in Volume 4 of this EIAR.

12.5.1.2.5 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.

The appointed contractor will keep the effectiveness of the mitigation measures under review and revise them as necessary. In the event of dust nuisance associated with the Proposed Scheme occurring outside the works

boundary, movements of materials likely to raise dust will be curtailed and satisfactory procedures implemented to rectify the problem. These procedures may include (but are not limited to):

- Public roads affected by the Proposed Scheme works will be regularly inspected for soiling associated with the construction activities and cleaned as necessary;
- Material handling systems and stockpiling of materials will be designed and laid out to minimise exposure to wind. Water misting or sprays (or similar dust suppression methods) will be used as required if particularly dusty activities associated with the construction contract are necessary during dry or windy periods;
- During movement of dust generating materials both on and off-site, trucks will be covered with tarpaulin, and before entrance onto public roads, trucks will be checked to ensure the tarpaulins are properly in place;
- The appointed contractor will provide a site hoarding of 2.4m height along noise sensitive boundaries, at a minimum, at the Construction Compound, which will assist in minimising the potential for dust impacts off-site. and
- The appointed contractor will keep the effectiveness of the mitigation measures under review and revise them as necessary. In the event of dust nuisance occurring outside the works boundary associated with the Proposed Scheme occurring outside the works boundary, movements of materials likely to raise dust will be curtailed and satisfactory procedures implemented to rectify the problem.

12.5.1.2.6 Habitat Degradation – Non-Native Invasive Plant Species

The NTA will ensure that a confirmatory pre-construction invasive species survey will be undertaken by a suitably qualified specialist to confirm the absence and/or extent of all Third Schedule invasive species within the footprint of the Proposed Scheme. Where an infestation is confirmed/identified, this will require the implementation of a non-native Invasive Species Management Plan (ISMP) (refer to the 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 non-native ISMP produced will provide a detailed description of the infestations (e.g., approximate area of the respective colonies (m^2), where feasible; approximate total number of stems, pattern of growth and information on other vegetation present), and where necessary, include calculations of volumes of infested soils to be excavated.
- The ISMP will be finalised following the pre-construction survey as advised by a suitably qualified specialist, with regard to the 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.
- 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 Non-Native 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**

No protected plant species listed on the Flora (Protection) Order 2015 were recorded during the field surveys within or in close proximity to the Proposed Scheme. Therefore, no species-specific mitigation is proposed.

Nonetheless, the mitigation measures relating to the protection of water quality in receiving watercourses during construction are outlined in Chapter 13, (Water) and detailed in Appendix A5.1 – CEMP in Volume 4 of this EIAR. This includes details on guidance documents and control measures for site clearance, compounds, silty water

runoff, storage of materials, working in-stream or in close proximity to watercourses including additional mitigation, fuel storage, use of concrete and monitoring.

12.5.1.4 **Mammals**

12.5.1.4.1 Bats

12.5.1.4.1.1 Protection of Bats during Vegetation Clearance

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

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

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

In total four trees were identified as PRF's within the footprint of the Proposed Scheme (permanent and temporary land-take) during the multidisciplinary surveys (see Figure 12.8.2 in Volume 4 of this EIAR). These trees will not be removed during the Construction Phase of the Proposed Scheme, and the following mitigation measures will be implemented by the appointed contractor:

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

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

- Where the qualified arborist engaged by the appointed contractor is required to assess the condition of, and advise on any repair works necessary to any trees which are to be retained (including PRF-containing trees or category U trees – refer to Arboricultural Impact Assessment (refer to Appendix A17.1 in Volume 4 of this EIAR)), these will be notified to the appointed ecologist to be surveyed to confirm if these trees are PRF's (as done for the pre-construction surveys outlined in Section 12.5.1.4.1.2). Where these previously identified or new PRF(s) require works including removal for example due to poor condition, they will be subject to mitigation as described in Section 12.5.1.4.1.2; and
- There will be no additional lighting within 5m of any PRF during the Construction Phase of the Proposed Scheme to avoid potential disturbance to roosting bats.

12.5.1.4.1.2 Roost Loss

As previously mentioned no trees with Potential Roost Features (PRFs) will be removed during the Construction Phase, however trees that are currently unsuitable may become roosts between the pre-planning assessment contained within this EIAR and the Construction Phase of the Proposed Scheme.

The NTA will ensure that a confirmatory pre-construction survey of all trees identified as containing PRFs or not to be removed within the boundary of the Proposed Scheme will be rechecked for Potential Roost Features (PRFs) by suitably qualified ecologist engaged by the NTA as part of the pre-construction surveys. The survey will:

- Confirm that previously identified PRF's which are to be retained are still standing; and

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

In the unlikely event that PRF's are detected during the pre-construction survey it is recommended that:

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

Installation of Bat Boxes

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

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

12.5.1.4.1.3 Habitat Loss & Fragmentation

Where practicable, habitats of importance to bats such as scattered trees and parkland, treeline and hedgerow habitat types, which lie within the footprint, or along the boundary of the Proposed Scheme, that are not directly impacted by the Proposed Scheme will be retained. These areas will be protected for the duration of construction works and fenced off at an appropriate distance. Vegetation to be retained is shown on the Landscaping General Arrangement Drawings (BCIDC-ARP-ENV_LA-0005_XX_00-DR-LL-9001) in Volume 3 of this EIAR. Refer to Section 12.5.1.2.1 for details of the proposed landscape planting.

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

12.5.1.4.1.4 Disturbance of Flight Patterns as a Result of Lighting during Construction

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

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

Mitigation measures to reduce light spill may include the following:

- The use of sensor / timer triggered lighting;
- LED luminaires to be used where practicable;
- Column heights to be considered to minimise light spill; and,
- Accessories such as baffles, hoods or louvres can be used to reduce light spill and direct it only where needed.

Where night time works are required the appointed contractor will liaise with the engaged suitably experienced and qualified ecologist(s) and implement measures to mitigate the impact of such works (especially works carried 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 the 12 month period 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).

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

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

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

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

12.5.1.4.2.1 Lighting

Refer to Section 12.5.1.4.1.3 for lighting mitigation measures.

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 Natural Habitats) Regulations. Otter, and their breeding and resting places, are also protected under the Wildlife Acts and it is an offence under that legislation to intentionally kill or injure an Otter or to wilfully interfere with or destroy their breeding or resting places (holts/couches). Otter are known to occur on the River Tolka, in the vicinity of the Proposed Scheme.

12.5.1.4.3.1 Loss of Breeding / Resting Sites.

The NTA will ensure that a confirmatory pre-construction check of all suitable otter habitat will be completed by a suitably qualified ecologist within the 12 month period prior to any construction works commencing.

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

12.5.1.4.3.2 Measures to Prevent Injury / Mortality Impacts

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

- The appointed contractor will engage a suitably qualified and/or licensed ecologist(s) to oversee and advise works at watercourse crossings during construction and to communicate all findings in a timely manner to the NTA and statutory authorities, to acquire any licenses / consents required to conduct the work, and to supervise and direct the ecological measures associated with the Proposed Scheme;
- Where a new or reactivated holt is encountered, within 150m (up and downstream) of the watercourse crossing, the qualified ecologist(s) will consult with the NPWS in conjunction with the NTA and appointed contractor.
- The qualified ecologist will review method statements; oversee works; provide instruction 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.
- Fencing requirements as per the Guidelines for the Treatment of Otters Prior to the Construction of National Road Schemes (NRA 2006b) will be erected around the Construction Compound and other working areas which are in close proximity to significant watercourses and have suitable roaming territory for otter.

12.5.1.4.3.1 Measures to Prevent Disturbance / Displacement

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

Site set up near watercourse crossings shall be undertaken in a timely manner to reduce impacts to otter. The works area will be delineated from the watercourse with hoarding by the appointed contractor to obscure the site from otter and prevent access. The construction works will commence following confirmation from the suitably qualified ecologist that no otter holt is located within 200m of BR01 Tolka River Bridge. Should an otter holt be found to be present, the suitably qualified ecologist will advise, in discussion with the NTA and the appointed contractor on the appropriate actions to be taken.

Once sheet piling is installed behind the existing basket gabions, the appointed contractor will provide site hoarding of 2.4m height between the sheet piles and the watercourse to mitigate potential impacts associated with protected species (Otter and Kingfisher). The hoarding will be installed to retain the existing maintenance access path under the bridge. This will ensure that dry otter commuting territory can be retained on the downstream side of the watercourse and minimise severance.

12.5.1.4.3.1 Habitat Degradation / Reduced Prey Availability – Water Quality

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 Section 12.5.1.2.2 and Chapter 13 (Water).

12.5.1.4.3.1 Lighting

Refer to Section 12.5.1.4.3.1 for lighting mitigation measures.

12.5.1.4.4 Marine Mammals

12.5.1.4.4.1 Habitat and Food Source Degradation – Water Quality

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 Section 12.5.1.2.2 and Chapter 13 (Water).

No additional mitigation is required.

12.5.1.4.5 Other Mammal Species

No other protected mammal species were recorded during the multi-disciplinary 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.

However, in respect of water quality, 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 Section 12.5.1.2.2 and Chapter 13 (Water).

No additional mitigation is required.

12.5.1.5 **Birds**

12.5.1.5.1 Breeding Birds

12.5.1.5.1.1 Habitat Loss & Fragmentation

Where practicable, habitats of importance to birds such as scattered trees and parkland, treeline and hedgerow and scrub - 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 appropriately. Vegetation to be retained is shown on the Landscaping General Arrangement Drawings (BCIDC-ARP-ENV_LA-0005_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 (BCIDC-ARP-ENV_LA-0005_XX_00-DR-LL-9001) in Volume 3 of this EIAR for locations. In terms of replanting, see Section 12.5.1.2.1 for proposed landscape planting numbers for various habitat categories

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

12.5.1.5.1.2 Mortality Risk

Where practicable, 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.

12.5.1.5.1.3 Disturbance / Displacement

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

In respect of Kingfisher, there is no suitable bankface within approximately 350m upstream of BR01 Tolka River Bridge and none that could be identified along the River Tolka at BR02 Mill Road Bridge. Hence there will be no direct impact on breeding pairs. However, given the duration (inside the breeding season) and proximity of the Proposed Scheme to the River Tolka, a number of potential construction-related impacts could result in disturbance to and displacement of kingfisher commuting. Kingfisher, as shy birds could avoid the immediate vicinity of the construction works or reduce their territorial commute where noise and human activity is greatest.

The indicative construction programme described in Chapter 5 (Construction Methodology) indicates that construction of BR01 Tolka River Bridge will be undertaken during the kingfisher breeding season (generally taken as March-early July inclusive). Thus, the preparatory site works alongside the River Tolka at BR01 Tolka River Bridge will commence in Year 1 Q2. Following the installation of sheet piling, the appointed contractor will provide site hoarding of 2.4m height between the sheet piles and the watercourse to mitigate potential impacts associated with protected species (Otter and Kingfisher). The hoarding will be installed to retain the existing maintenance access path under the bridge.

In this way, as kingfisher activity increases along the watercourse, they will be isolated, as far as is practical from the works area, although significant noise disturbance from machinery working in close proximity to the watercourse is anticipated to be temporary in nature.

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

The use of noise generating equipment across the entire site including alongside rivers, open ground adjacent to Construction Compounds and alongside wooded areas should be tempered by the use of modern machinery that will have appropriate noise restrictors for use in urban situations. Furthermore, the location of equipment that has the potential to cause long-term noise impacts, shall be sited in such a manner so that noise baffling screening reduces noise spill to adjacent areas of open ground and watercourses.

12.5.1.5.1.4 Habitat Degradation – Water Quality

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 Section 12.5.1.2.2 and Chapter 13 (Water).

12.5.1.6 **Wintering Birds**

12.5.1.6.1.1 Habitat Degradation – Water Quality

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 Section 12.5.1.2.2 and Chapter 13 (Water).

12.5.1.7 **Reptiles**

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

12.5.1.8 **Amphibians**

12.5.1.8.1 Habitat Loss, Disturbance & 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 ZoI of the Proposed Scheme
- In the case of smooth newt, individuals will be captured, under a licence from NPWS, and removed from affected habitat either by hand net or by trapping and translocated to the nearest area of available suitable habitat, beyond the ZoI of the Proposed Scheme. If used, the type and design of traps shall be approved by the NPWS. This is a standard and proven method of catching and translocating smooth newt.
- If the size or depth of the habitat feature is such that it cannot be determined by a visual survey whether all amphibians have been captured, the suitably qualified ecologist engaged by the appointed contractor will advise on the appropriate course of action to confirm that no amphibian species remain. If drainage of the habitat feature is deemed to be the appropriate course of action, any mechanical pumps used will have a screen fitted, and be sited, such that no amphibian species can be sucked into the pump mechanism.
- Any capture and translocation works shall be undertaken immediately in advance of site clearance / construction works commencing.

12.5.1.8.2 Habitat Degradation - Water Quality

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 Section 12.5.1.2.2 and Chapter 13 (Water).

12.5.1.9 **Fish**

12.5.1.9.1 Habitat Loss and Fragmentation

It is estimated from mapping that an area of 0.0017ha of watercourse territory will be permanently lost as a result of the Proposed Scheme. However, there will not be any loss of actual habitat, merely over shadowing of the watercourse by partial expansion of existing structure over the watercourse. Given the extent of the estimated habitat loss area and the nature of the proposed works, there will be no direct interference / alteration of the watercourse at this location including hydromorphology and spawning grounds

Inland Fisheries Ireland (IFI) have confirmed in a consultation response (dated June 2021) that the construction works at BR01 Tolka River Bridge including the installation of sheet piling behind existing basket gabions does not constitute in-channel works. Therefore, no seasonal restriction in respect of works at BR01 are applicable. There will be no direct interference / alteration of the watercourse at this location including hydromorphology and spawning grounds. No further mitigation is proposed in respect of the physical alteration of watercourses.

12.5.1.9.2 Habitat Degradation – Surface Water Quality

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 Section 12.5.1.2.2 and Chapter 13 (Water).

12.5.2 Operational Phase

12.5.2.1 **Designated Areas for Nature Conservation**

12.5.2.1.1 European sites

The mitigation measures that are specifically required to ensure that the Proposed Scheme will not adversely affect the integrity of the European sites within the ZoI are presented in the NIS. (Following 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 measures in relation to potential impacts arising from the Proposed Scheme on pNHAs within the ZoI are as set out for European sites as the boundaries of the pNHAs follow those of the SACs and SPAs. Therefore, the mitigation measures outlined in Section 12.5, and as detailed in the NIS (which accompanies the application for approval), will prevent the Proposed Scheme resulting in a significant negative effect on these pNHAs.

However, in respect of the Royal Canal pNHA, this site is not aligned with any European sites and as such there is potential impacts owing to operational air quality impacts.

12.5.2.1.2.1 Habitat Degradation – Surface Water Quality

The proposed SuDS drainage system, as shown in Surface Water Drainage Works drawings (BCIDC-ARP-DNG_RD-1415_XX_00-DR-CD-9001 in Volume 3 of this EIAR), will be installed by the appointed contractor during the Construction Phase.

The range of measures including SuDS systems 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).

In the Operational Phase the maintenance regime for these SuDS will be carried out by the local authorities and will be subject to their management procedures. No additional mitigation is required.

12.5.2.2 **Habitats**

12.5.2.2.1 Habitat Loss and Fragmentation

Replanting may commence during the Construction Phase (See Section 12.5.1.2) but may continue into Operational Phase for later sections of the scheme as necessary. No further mitigation is required.

12.5.2.2.2 Habitat Degradation – Surface Water Quality

Once the Proposed Scheme is in operation, the local authorities will implement a maintenance and inspection regime (and / or emergency repairs if necessary) for the surface water drainage network, subject to their management procedures. Refer to Section 12.5.2.1.2.1. No additional mitigation is required.

12.5.2.2.3 Habitat Degradation – Groundwater

Given the existing corridor and implementation of surface water measures, no significant effects on habitats owing to impacts from groundwater changes are predicted during the Operational Phase of the Proposed Scheme. Therefore, no additional mitigation is required.

12.5.2.2.4 Habitat Degradation- Non-Native Invasive Plant Species

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

12.5.2.2.5 Habitat Degradation- Air Quality

Habitat Degradation - Air Quality

As discussed in Chapter 7 (Air Quality) the Proposed Scheme will have a generally neutral impact on air quality and no specific Operational Phase mitigation measures are required in respect of Biodiversity and general habitats.

12.5.2.3 **Rare and Protected Flora Species**

12.5.2.3.1 Habitat Degradation- Surface Water Quality

Refer to Section 12.5.2.1.2.1.

12.5.2.4 **Mammals**

12.5.2.4.1 Bats

The operation of the Proposed Scheme is not in itself predicted to result in any significant effects to populations of bats in the vicinity of the Proposed Scheme particularly given that the bulk of sylvan areas are directly avoided by retaining them and their connectivity to the wider landscape such as along the River Tolka valley is largely maintained. Notwithstanding this, mitigation which has been proposed as part of the bat mitigation strategy and may be implemented dependant on the outcome of survey and / or licenced compensatory requirements will continue into Operational Phase of the Proposed Scheme for some time.

12.5.2.4.1.1 Monitoring of Bat Boxes

- Where bat boxes are installed as part of the Construction Phase of the Proposed Scheme, monitoring is required under best practice guidance (e.g. Marnell et al. 2022 (Bat mitigation guidelines for Ireland, NPWS, 2022)). The level of post-installation monitoring will be dependent on the roost type and the number of bats present. A precautionary approach will be assumed on the basis that bats using these PRFs reflect species that were typically noted during the activity surveys and are occasionally identified from urban transport corridors.
- The NTA will ensure that annual inspections of installed bat boxes will be undertaken for 2 years or as advised by a suitably qualified ecologist, to confirm occupancy.
- Where no occupancy is noted in year 1, the boxes will be relocated to another mature tree and details communicated with the BCT, Local Authority Biodiversity Officer and NPWS.

12.5.2.4.1.2 Habitat Loss and Loss of Breeding / Resting Sites

The operation of the Proposed Scheme is not predicted to result in any significant effects to bats in the vicinity of the Proposed Scheme, particularly given that the bulk of the corridor is characterised by streetscape planting which offer limited roosting potential. There are a number of areas characterised by mixed age / mature planting adjacent to the Proposed Scheme and with the exception of peripheral woodland around Mill Road to support the new pedestrian ramps, there remains considerable sylvan territory for which local bat populations can commute and forage along the River Tolka Valley corridor.

Replanting by the appointed contractor will as per detailed in Section 12.5.1.2.1

In line with the maintenance contract, the appointed contractor will carry out annual post construction monitoring, over a two-year period to ensure the successful re-establishment of vegetation within the Proposed Scheme.

12.5.2.4.1.3 Indirect Disturbance of Flight Patterns Due to Operational Lighting

The operation of the Proposed Scheme is not predicted to result in any significant effects to bats in the vicinity of the Proposed Scheme. Therefore, no mitigation is required.

There are no significant effects on bats predicted during the Operational Phase of the Proposed Scheme. It is recognised that installed or relocated lighting may in certain areas and owing to the removal of vegetation result in changes to lighting dispersal, potentially into areas previously where no significant light spill was present. However, the lighting design is such that there are no areas where considerable new lighting required. Therefore, no mitigation is required.

12.5.2.4.2 Badgers

The operation of the Proposed Scheme is not predicted to result in any significant effects to populations of badger in the vicinity of the Proposed Scheme. Therefore, no mitigation is required.

12.5.2.4.3 Otter

12.5.2.4.3.1 Habitat Degradation - Surface Water

Refer to Section 12.5.2.1.2.1.

12.5.2.4.4 Marine Mammals

12.5.2.4.4.1 Habitat Degradation - Surface Water

Refer to Section 12.5.2.1.2.1.

12.5.2.4.5 Other Mammal Species

No significant effects on other mammal species predicted during the Operational Phase of the Proposed Scheme. Therefore, no mitigation is required.

12.5.2.5 **Birds**

12.5.2.5.1 Breeding Birds

12.5.2.5.1.1 Habitat Loss and Loss of Breeding / Resting Sites

As discussed in Section 12.5.1.5.1.1, planting of treeline, hedgerow and grassland habitats within the Proposed Scheme boundary as detailed in the landscape drawings will provide suitable habitat for the breeding bird species recorded within the study area.

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.

In terms of kingfisher, as there will be no loss of habitat, nor of breeding sites during construction, the same applies to the Operational Phase of the Proposed Scheme. Any temporary displacement or avoidance of commuting along the watercourse near the Proposed Scheme during Construction is predicted to dissipate during Operational Phase as the river corridor is returned to its original secluded corridor. No further mitigation is required.

The appointed contractor will carry out annual post construction monitoring, over a two year period to ensure the successful re-establishment of vegetation within the Proposed Scheme.

12.5.2.5.1.2 Habitat Degradation - Surface Water

Refer to Section 12.5.2.1.2.1.

12.5.2.6 **Wintering Birds**

12.5.2.6.1.1 Habitat Degradation - Surface Water

Refer to Section 12.5.2.1.2.1.

12.5.2.7 **Reptiles**

No significant effects on reptile species are predicted during the Operational Phase of the Proposed Scheme. Therefore, no mitigation is required.

12.5.2.8 **Amphibians**

12.5.2.8.1.1 Habitat Degradation - Surface Water

Refer to Section 12.5.2.1.2.1.

12.5.2.9 **Fish**

12.5.2.9.1.1 Habitat Degradation - Surface Water

Refer to Section 12.5.2.1.2.1.

12.6 Residual Impacts

Following the implementation of the mitigation measures outlined in Section 12.5, the Proposed Scheme will not result for the most part in any significant residual effects above the local scale on the KERs identified (see Table 12.21) on its own, or cumulatively together with other proposed developments during the Construction Phase or Operation Phase (Table 12.22).

12.6.1 Construction Phase

Following the implementation of the mitigation measures outlined in Section 12.5, the Proposed Scheme will not result in any significant residual effects above the local scale on the KERs identified (see Table 12.22) on its own, or cumulatively together with other proposed developments during the Construction Phase.

Table 12.22: Summary of Construction Phase Significant Residual Impacts

Ecological Receptor	Ecological Valuation	Potential Impact (Pre-Mitigation and Monitoring)	Potential Significance	Significant Residual Impact (Post Mitigation and Monitoring)
Designated Areas for Nature Conservation				
North Dublin Bay SAC; North Dublin Bay pNHA	International Importance National Importance	Habitat Degradation (hydrology; non-native invasive plant species)	Likely significant effect at the international geographic scale	No significant residual effect
South Dublin Bay SAC South Dublin Bay pNHA	International Importance National Importance	Habitat Degradation (hydrology; non-native invasive plant species)	Likely significant effect at the international geographic scale	No significant residual effect
Howth Head SAC Howth Head pNHA	International Importance National Importance	Habitat Degradation (hydrology)	Likely significant effect at the international geographic scale	No significant residual effect
Rockabill to Dalkey Island SAC Dalkey Coastal Zone and Killiney Hill pNHA	International Importance National Importance	Habitat Degradation (hydrology)	Likely significant effect at the international geographic scale	No significant residual effect
Lambay Island SAC Lambay Island pNHA	International Importance National Importance	Habitat Degradation (hydrology)	Likely significant effect at the international geographic scale	No significant residual effect
South Dublin Bay and River Tolka Estuary SPA Dolphins, Dublin Docks pNHA South Dublin Bay pNHA Booterstown Marsh pNHA	International Importance National Importance National Importance National Importance	Habitat Degradation (hydrology; non-native invasive plant species); Disturbance and Displacement	Likely significant effect at the international geographic scale	No significant residual effect
North Bull Island SPA North Dublin Bay pNHA	International Importance National Importance	Habitat Degradation (hydrology; non-native invasive plant species); Disturbance and Displacement)	Likely significant effect at the international geographic scale	No significant residual effect

Ecological Receptor	Ecological Valuation	Potential Impact (Pre-Mitigation and Monitoring)	Potential Significance	Significant Residual Impact (Post Mitigation and Monitoring)
Baldoyle Bay SPA Baldoyle Bay pNHA	International Importance National Importance	Habitat Degradation (hydrology); Disturbance and Displacement	Likely significant effect at the international geographic scale	No significant residual effect
Malahide Estuary SPA Malahide Estuary pNHA	International Importance National Importance	Habitat Degradation (hydrology); Disturbance and Displacement)	Likely significant effect at the international geographic scale	No significant residual effect
Ireland's Eye SPA Ireland's Eye pNHA	International Importance National Importance	Habitat Degradation (hydrology); Disturbance and Displacement)	Likely significant effect at the international geographic scale	No significant residual effect
Howth Head Coast SPA Howth Head pNHA	International Importance National Importance	Habitat Degradation (hydrology)	Likely significant effect at the international geographic scale	No significant residual effect
Rogerstown Estuary SPA Portraine Shore pNHA Rogerstown pNHA	International Importance National Importance National Importance	Habitat Degradation (hydrology); Disturbance and Displacement)	Likely significant effect at the international geographic scale	No significant residual effect
Lambay Island SPA Lambay Island pNHA	International Importance National Importance	Habitat Degradation (hydrology); Disturbance and Displacement)	Likely significant effect at the international geographic scale	No significant residual effect
Dalkey Island SPA Dalkey Coastal Zone and Killiney Hill pNHA	International Importance National Importance	Habitat Degradation (hydrology)	Likely significant effect at the international geographic scale	No significant residual effect
Skerries Islands SPA Skerries Islands NHA	International Importance National Importance	Habitat Degradation (hydrology); Disturbance and Displacement)	Likely significant effect at the international geographic scale	No significant residual effect
Rockabill SPA Rockabill Island pNHA	International Importance National Importance	Habitat Degradation (hydrology)	Likely significant effect at the international geographic scale	No significant residual effect
The Murrough SPA The Murrough pNHA	International Importance National Importance	Habitat Degradation (hydrology); Disturbance and Displacement)	Likely significant effect at the international geographic scale	No significant residual effect
The Royal Canal pNHA	National Importance	Habitat Degradation (hydrology), Air quality (dust)	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 Degradation (hydrology)	Likely significant effect at the local geographic scale	No significant residual effect
Depositing / lowland rivers (FW2)	County Importance	Habitat Degradation (hydrology; non-native invasive plant species)	Likely significant effect at the local geographic scale	No significant residual effect
Canals (FW3)	National Importance	See Royal Canal pNHA	See Royal Canal pNHA	No significant residual effect
Dry calcareous and neutral grassland (GS1)	Local Importance (Higher Value)	Habitat Loss, Habitat Degradation (non-native invasive plant species)	Likely significant effect at the local geographic scale	No significant residual effect
Mixed) broadleaved woodland (WD1)	Local Importance (Higher Value)	Habitat Loss, Habitat Degradation (non-native invasive plant species)	Likely significant effect at the local geographic scale	Likely significant effect at the local geographic scale
Mixed broadleaved / conifer woodland (WD2)	Local Importance (Higher Value)	Habitat Loss, Habitat Degradation (non-native invasive plant species)	Likely significant effect at the local geographic scale	Likely significant effect at the local geographic scale
Scattered trees and parkland (WD5)	Local Importance (Higher Value)	Habitat Degradation (non-native invasive plant species)	Likely significant effect at the local geographic scale	Likely significant effect at the local geographic scale
Wet willow-alder-ash woodland (WN6) links with Annex I Alluvial forests	International Importance	Habitat Degradation (hydrology; non-native invasive plant species)	Likely significant effect at the local geographic scale	No significant residual effect

Ecological Receptor	Ecological Valuation	Potential Impact (Pre-Mitigation and Monitoring)	Potential Significance	Significant Residual Impact (Post Mitigation and Monitoring)
Hedgerows (WL1)	Local Importance (Higher Value)	Habitat Loss, Habitat Degradation (non-native invasive plant species)	Likely significant effect at the local geographic scale	Likely significant effect at the local geographic scale
Treelines (WL2)	Local Importance (Higher Value)	Habitat Loss, Habitat Degradation (non-native invasive plant species)	Likely significant effect at the local geographic scale	Likely significant effect at the local geographic scale
Immature Woodland (WS2)	Local Importance (Higher Value)	Habitat Loss, Habitat Degradation (non-native invasive plant species)	Likely significant effect at the local geographic scale	No significant residual effect
Rare and Protected Plant Species				
Opposite-leaved pondweed	National Importance	Habitat Degradation (hydrology)	Likely significant effect at the local to national geographic scale	No significant residual effect
Non-native Invasive Species				
Himalayan balsam (in particular)	N/A	Spread at expense of other Habitats, Habitat Degradation (hydrology)	Likely significant effect at the local to international scale 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	Likely significant effect at the local geographic scale
Badger	Local Importance (Higher Value)	Disturbance / displacement	Likely significant effect at the local geographic scale	No significant residual effect
Otter	County Importance	Habitat degradation (hydrology; disturbance / displacement)	Likely significant effect at the local geographic scale	Likely significant effect at the local geographic scale
Marine mammals	Local Importance (Higher Value) – International Importance	Habitat degradation (hydrology)	Likely significant effect at the local to national geographic scale	No significant residual effect
SCI bird species (except Kingfisher)	International Importance	See SPAs above	See SPAs above	See SPAs above
Kingfisher	National Importance	Habitat degradation (hydrology); ; disturbance / displacement	Likely significant effect at the local geographic scale	Likely significant effect at the local geographic scale
All other breeding bird species (non-SCI)	Local Importance (Higher Value)	Habitat Loss; Mortality risk; Disturbance / Displacement; Habitat Degradation (hydrology)	Likely significant effect at the local geographic scale	No significant residual effect
All other wintering bird species (non-SCI)	Local Importance (Higher Value)	Habitat Loss; Mortality risk; Disturbance / Displacement; Habitat Degradation (hydrology)	Likely significant effect at the local geographic scale	No significant residual effect
Amphibians	Local Importance (Higher Value)	Habitat Degradation (hydrology); Mortality Risk	Likely significant effect at the local geographic scale	No significant residual effect
Fish	Local Importance (Higher Value) – County Importance	Habitat Degradation (hydrology);	Likely significant effect at the local to national geographic scale	No significant residual effect

12.6.2 Operational Phase

Following the implementation of the mitigation measures outlined in Section 12.5, the Proposed Scheme will not result for the most part in any significant residual effects during the Operational Phase above the local scale on the KERs identified. Table 12.23 provides a summary of Operational Phase Significant Residual Impacts.

Table 12.23 Summary of Operational Phase Significant Residual Impacts

Ecological Receptor	Ecological Valuation	Potential Impacts (Pre-Mitigation and Monitoring)	Potential Significance	Significant Residual Impact (Post Mitigation and Monitoring)
Designated Areas for Nature Conservation				
North Dublin Bay SAC; North Dublin Bay pNHA	International Importance National Importance	Habitat Degradation (hydrology; non-native invasive plant species)	Likely significant effect at the international geographic scale	No significant residual effect
South Dublin Bay SAC South Dublin Bay pNHA	International Importance National Importance	Habitat Degradation (hydrology; non-native invasive plant species)	Likely significant effect at the international geographic scale	No significant residual effect
Howth Head SAC Howth Head pNHA	International Importance National Importance	Habitat Degradation (hydrology)	Likely significant effect at the international geographic scale	No significant residual effect
Rockabill to Dalkey Island SAC Dalkey Coastal Zone and Killiney Hill pNHA	International Importance National Importance	Habitat Degradation (hydrology)	Likely significant effect at the international geographic scale	No significant residual effect
Lambay Island SAC Lambay Island pNHA	International Importance National Importance	Habitat Degradation (hydrology)	Likely significant effect at the international geographic scale	No significant residual effect
South Dublin Bay and River Tolka Estuary SPA Dolphins, Dublin Docks pNHA South Dublin Bay pNHA Booterstown Marsh pNHA	International Importance National Importance National Importance National Importance	Habitat Degradation (hydrology; non-native invasive plant species)	Likely significant effect at the international geographic scale	No significant residual effect
North Bull Island SPA North Dublin Bay pNHA	International Importance National Importance	Habitat Degradation (hydrology)	Likely significant effect at the international geographic scale	No significant residual effect
Baldoyle Bay SPA Baldoyle Bay pNHA	International Importance National Importance	Habitat Degradation (hydrology)	Likely significant effect at the international geographic scale	No significant residual effect
Malahide Estuary SPA Malahide Estuary pNHA	International Importance National Importance	Habitat Degradation (hydrology)	Likely significant effect at the international geographic scale	No significant residual effect
Ireland's Eye SPA Ireland's Eye pNHA	International Importance National Importance	Habitat Degradation (hydrology)	Likely significant effect at the international geographic scale	No significant residual effect
Howth Head Coast SPA Howth Head pNHA	International Importance National Importance	Habitat Degradation (hydrology)	Likely significant effect at the international geographic scale	No significant residual effect
Rogerstown Estuary SPA Portraine Shore pNHA Rogerstown pNHA	International Importance National Importance National Importance	Habitat Degradation (hydrology)	Likely significant effect at the international geographic scale	No significant residual effect
Lambay Island SPA Lambay Island pNHA	International Importance National Importance	Habitat Degradation (hydrology)	Likely significant effect at the international geographic scale	No significant residual effect
Dalkey Island SPA Dalkey Coastal Zone and Killiney Hill pNHA	International Importance National Importance	Habitat Degradation (hydrology)	Likely significant effect at the international geographic scale	No significant residual effect
Skerries Islands SPA Skerries Islands NHA	International Importance National Importance	Habitat Degradation (hydrology)	Likely significant effect at the international geographic scale	No significant residual effect
Rockabill SPA Rockabill Island pNHA	International Importance National Importance	Habitat Degradation (hydrology)	Likely significant effect at the international geographic scale	No significant residual effect

Ecological Receptor	Ecological Valuation	Potential Impacts (Pre-Mitigation and Monitoring)	Potential Significance	Significant Residual Impact (Post Mitigation and Monitoring)
The Murrough SPA The Murrough pNHA	International Importance National Importance	Habitat Degradation (hydrology)	Likely significant effect at the international geographic scale	No significant residual effect
The Royal Canal pNHA	National Importance	Habitat Degradation (hydrology; Air quality)	Likely significant effect at the national geographic scale	Likely significant effect at the local geographic scale for air quality; No significant residual effect arising from other potential impacts.
Habitats (outside of designated areas for nature conservation)				
Tidal Rivers (CW2) (corresponding to Annex I Estuaries [1130])	International Importance	Habitat Degradation (hydrology)	Likely significant effect at the local geographic scale	No significant residual effect
Depositing / lowland rivers (FW2)	County Importance	Habitat Degradation (hydrology; non-native invasive plant species)	Likely significant effect at the local geographic scale	No significant residual effect
Canal (FW3)	National Importance	See Royal Canal pNHA	See Royal Canal pNHA	Likely significant effect at the local geographic scale for air quality (traffic emissions). No significant residual effect arising from other potential impacts.
Mixed) broadleaved woodland (WD1)	Local Importance (Higher Value)	Habitat Loss	Likely significant effect at the local geographic scale	No significant residual effect
Mixed broadleaved / conifer woodland (WD2)	Local Importance (Higher Value)	Habitat Loss	Likely significant effect at the local geographic scale	No significant residual effect
Scattered trees and parkland (WD5)	Local Importance (Higher Value)	Habitat Loss	Likely significant effect at the local geographic scale	No significant residual effect
Wet willow-alder-ash woodland (WN6) links with Annex I Alluvial forests	International Importance	Habitat Degradation (hydrology; non-native invasive plant species)	Likely significant effect at the local geographic scale	No significant residual effect
Hedgerows (WL1)	Local Importance (Higher Value)	Habitat Loss	Likely significant effect at the local geographic scale	No significant residual effect
Treelines (WL2)	Local Importance (Higher Value)	Habitat Loss	Likely significant effect at the local geographic scale	No significant residual effect
Rare / Protected Plant Species				
Opposite-leaved pondweed	National Importance	Habitat Degradation (hydrology)	Likely significant effect at the local to national geographic scale	No significant residual effect
Non-native Invasive Species				
Himalayan balsam (in particular)	N/A	Spread at expense of other Habitats, Habitat Degradation (hydrology)	Likely significant effect at the local to International scale geographic scale	No significant residual effect
Fauna Species				
Bats	Local Importance (Higher Value)	Disturbance / displacement	Likely significant effect at the local geographic scale	No significant residual effect
Badger	Local Importance (Higher Value)	Disturbance / displacement	Likely significant effect at the local geographic scale	No significant residual effect

Ecological Receptor	Ecological Valuation	Potential Impacts (Pre-Mitigation and Monitoring)	Potential Significance	Significant Residual Impact (Post Mitigation and Monitoring)
Otter	County Importance	Habitat degradation (hydrology)	Likely significant effect at the local geographic scale	No significant residual effect
Marine mammals	Local Importance (Higher Value) – International Importance	Habitat degradation (hydrology)	Likely significant effect at the local to national geographic scale	No significant residual effect
SCI bird species (except Kingfisher)	International Importance	See SPAs above	See SPAs above	No significant residual effect
Kingfisher	National Importance	Habitat degradation (hydrology)	Likely significant effect at the local geographic scale	No significant residual effect
All other breeding bird species (non-SCI)	Local Importance (Higher Value)	Habitat Degradation (hydrology)	Likely significant effect at the local geographic scale	No significant residual effect
All other wintering bird species (non-SCI)	Local Importance (Higher Value)	Habitat Degradation (hydrology)	Likely significant effect at the local geographic scale	No significant residual effect
Amphibians	Local Importance (Higher Value)	Habitat Degradation (hydrology);	Likely significant effect at the local geographic scale	No significant residual effect
Fish	Local Importance (Higher Value) – County Importance	Habitat Degradation (hydrology);	Likely significant effect at the local to national geographic scale	No significant residual effect

While unlikely, in a worst-case scenario, where the Proposed Scheme crosses the Royal Canal pNHA at M50 Junction 6, a potential air quality effect could occur as result of the Operation Phase of the Proposed Scheme. However, it is expected that by 2043 the existing background pollution concentrations will reduce to negligible levels, due to a significant reduction in emissions between 2028 and 2043 from advancement in engine technology and the addition of a higher percentage of electric vehicles to the fleet. Therefore, localised impacts Royal Canal pNHA, are therefore considered to be significant at a local scale only.

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