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 BusConnects Galway: Cross-City Link (University Road to Dublin Road) Scheme (hereafter referred to as the Proposed Scheme).

The likely significant effects of the Proposed Scheme on biodiversity is addressed during both the Construction Phase, including impacts on air and water quality, on habitats, and on flora and fauna from construction activities such as utility diversions, road resurfacing, and road realignments in addition to impacts associated with the operation of the Proposed Scheme and routine maintenance. The assessment undertaken for the Proposed Scheme identified numerous key ecological receptors within the study area that could potentially be impacted by the Proposed Scheme.

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 in Galway City, which will enable and deliver efficient, safe, and integrated sustainable transport movement along the city. The objectives of the Proposed Scheme are described in Chapter 1 (Introduction) of this EIAR. The Proposed Scheme, which is described in Chapter 4 (Proposed Scheme Description) of this EIAR has been designed to meet these objectives.

The aspects of the Proposed Scheme that are of particular relevance to biodiversity are:

- Potential effects on water quality in terms of direct association with the adjacent River Corrib and aquatic habitats leading to the river and the aquatic adjacent habitats of Galway and also connectivity with the European sites located in the potential zone of influence;
- Potential effects on species associated with the aquatic ecology of the River Corrib and Galway Bay, particularly on Annexed species including Sea Lamprey, Salmonids, Otters and Birds;
- Potential effects on bats and birds in the existing buildings to be demolished and/or mature trees to be removed.

The Appropriate Assessment (AA) process was commenced by Moore Group for the Proposed Scheme and a Report for AA Screening and Natura Impact

Statement (NIS) are presented as separate documents as part of the Planning application.

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 (see Section 1.6 in Chapter 1 (Introduction) of this EIAR) undertaken throughout the option selection and design development process have been incorporated, where appropriate.

12.2 Assessment Methodology

12.2.1 General

In accordance with the requirements of Directive 2014/52/EU amending Directive 2011/92/EU (hereafter referred to as the EIA Directive), this Chapter of the EIAR identifies, describes and assesses the likely direct and indirect significant effects of the Proposed Scheme on biodiversity, with particular attention to species and habitats protected under Council Directive 92/43/EEC of 21 May 1992 on the conservation of natural habitats and of wild fauna and flora (hereafter referred to as the Habitats Directive) and Council Directive 2009/147/EC of the European Parliament and of the Council of 30 November 2009 on the conservation of wild birds (hereafter referred to as the Birds Directives).

In addition, this Chapter of the EIAR also identifies, describes and assesses the likely direct and indirect significant - impacts of the Proposed Scheme on species protected pursuant to the Wildlife Acts 1976 to 2021 (hereafter referred to as the Wildlife Acts).

This assessment concentrates on ecological features within the development area of particular significance, primarily designated habitats and species. This includes habitats/species listed in Annex I, II and IV of the Habitats Directive, birds listed in Annex 1 of the Birds Directive, rare plants listed in the Flora Protection Order and other semi-natural habitats of conservation value.

The European Habitats Directive 92/43/EEC[1] (Article 6) indicates the need for plans and projects to be subject to Habitats Directive Assessment (also known as Appropriate Assessment) if the plan or project is not directly connected with or necessary to the management of a Natura 2000 site, which includes but which has the potential to have implications on a site's conservation objectives. These implications can be significant effects, either individually or in combination with other plans or projects.

To this end, this Chapter also refers to the AA Screening Report and the NIS which were prepared as stand-alone documents to accompany this application in

[1] European Council (1992) Council Directive 92/43/EEC of 21 May 1992 on the conservation of natural habitats and of wild fauna and flora

relation to Natura 2000 network of sites (hereafter referred to as European sites), in accordance with Article 6(3) of the Habitats Directive.

12.2.2 Guidance and Legislation

12.2.2.1 Habitats Directive

The Habitats Directive) is the main legislative instrument for the protection and conservation of biodiversity within the European Union. The Habitats Directive provides for the designation, conservation and protection of sites comprising Special Areas of Conservation (SACs) and Special Protection Areas (SPAs), collectively forming the Natura 2000 network of 'European sites'. Article 3 of the Habitats Directive obliges Member States to designate as SACs sites hosting the natural habitat types listed in Annex I and habitats of the species listed in Annex II of the Habitats Directive. Article 10 of the Habitats Directive requires that Member States endeavour to improve the ecological coherence of the Natura 2000 network to manage and conserve features of the landscape which are of major importance for wild fauna and flora, for example ecological corridors or stepping-stones which are important for the migration, dispersal and genetic exchange of species.

Article 6(2) obliges Member States to take the necessary measures to avoid the deterioration of an SAC, or disturbance of a species for which the site is designated. Article 6(3) sets out the requirement for an "Appropriate Assessment", to ensure that a proposed plan or project will not have an adverse effect on the integrity of a SAC. Article 7 applies the requirements of Article 6(2) and 6(3) of the Habitats Directive to SPAs designated under the Birds Directive.

In addition, and separate to the Appropriate Assessment requirements, Article 12 of the Habitats Directive obliges Member States to establish a regime of strict protection for certain species listed in Annex IV of the Directive, wherever they occur within their natural range. The protection for species under Article 12 of the Habitats Directive is not confined to the boundary of SACs. Species listed in Annex IV include the otter and certain species of bat.

12.2.2.2 Birds Directive

The *Birds Directive*[2]) confers legal protection to all naturally occurring wild birds within the EU territory. Member States are obliged to adopt the necessary measures to maintain the population of bird species, and that includes, in accordance with Article 3, an obligation to create, maintain and manage habitats for birds, and specifically for the species of Bird listed in Annex I of the Directive, Article 4 requires Member States to create SPAs which, by virtue of Article 7 of the Habitats Directive, form part of the Natura 2000 network of European sites and are subject to the Appropriate Assessment requirements under Article 6(3) of the Habitats Directive.

[2] European Council (2009) Directive 2009/147/EC of the European Parliament and of the Council of 30 November 2009 on the conservation of wild birds

Additionally, Article 5 of the Birds Directive requires that Member States establish a general system of protection for all naturally occurring wild birds within the EU territory, similar to the system of strict protection required for Annex IV species under the Habitats Directive.

12.2.2.3 Wildlife Acts (1976 - 2021)[3]

The primary domestic legislation providing for the protection of wildlife in general, and wild birds in particular, and the control of some activities adversely impacting upon wildlife is the *Wildlife Act of 1976, as amended*. The aims of the Wildlife Act, according to the National Parks and Wildlife Service (NPWS) are *"... to provide for the protection and conservation of wild fauna and flora, to conserve a representative sample of important ecosystems, to provide for the development and protection of game resources and to regulate their exploitation, and to provide the services necessary to accomplish such aims."* All wild bird species are protected under the Act. The European Communities (Birds and Natural Habitats) Regulations 2011 (S.I. No. 477 of 2011) made significant amendments to the Wildlife Acts to ensure consistency with the Habitats and Birds Directives.

12.2.3 Study Area

A habitat survey was carried out, in three stages, firstly through desktop research to determine existing records in relation to habitats and species present in the study areas. This included research on the National Parks and Wildlife Services (NPWS) metadata website, the National Biodiversity Data Centre (NBDC) database and a literature review of published information on flora and fauna occurring in the Proposed Scheme study areas.

Other environmental information for the area was reviewed, e.g. in relation to soils, geology, hydrogeology and hydrology. Interactions in terms of the chapters on these topics presented in this EIAR were important in the determination of source vector pathways and links with potentially hydrologically or ecologically connected areas outside the Proposed Scheme site.

While the main focus of biodiversity was on the Proposed Scheme site within the red line boundary, the surrounding environment was taken into account in terms of biological and hydrological connectivity, particularly in relation to European sites. Guidance on Appropriate Assessment (2009) recommends an assessment of European sites within a potential Zone of Influence, the precise extent of which will depend on the nature of the proposed project and the receiving environment.

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 as follows:

Habitats

[3] Wildlife Act 1976, as amended. Administrative consolidation of the Wildlife Act 1976, Law Reform Commission (2021)

The area within or immediately adjacent to the Proposed Scheme footprint where habitats could be directly or indirectly affected during construction/operation.

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.

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.

Bats

The area suitable for roosting, foraging and/or commuting bats (e.g. bridges, hedgerows, treelines, woodland and/or watercourses) within or immediately adjacent to the Proposed Scheme footprint where bats could be directly or indirectly affected during construction/operation.

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 a Site of Community Importance (SCIs) within designated European sites.

Species considered to be Key Ecological Receptors of the Proposed Scheme include the following:

- SCIs for a breeding population, of SPAs;
- Species listed under Annex I of the Birds Directive; and
- Red and Amber Birds of Conservation Concern in Ireland (BoCCI) (Gilbert *et al.* 2021)[4] species listed for their breeding populations.

Wintering Birds

The area suitable for wintering birds within or immediately adjacent to the Proposed Scheme footprint where wintering birds could be directly affected during construction/operation.

The study area of this assessment included the footprint of the existing urban and suburban areas of Galway City in three main Sections as detailed below and shown on Diagram 12.1:

- Section A – University Road to Eyre Square, Woodquay and Headford Road;
- Section B – Eyre Square, Forster St, Dock Road, Bothar na Mban, Bothar Ui hEithir and Fairgreen Road;
- Section C – College Road to Dublin Road.

[4] Gilbert, G., Stanbury, A., Lewis, L. (2021). Birds of Conservation Concern in Ireland 4: 2020–2026. Irish Birds 9: 523-544.

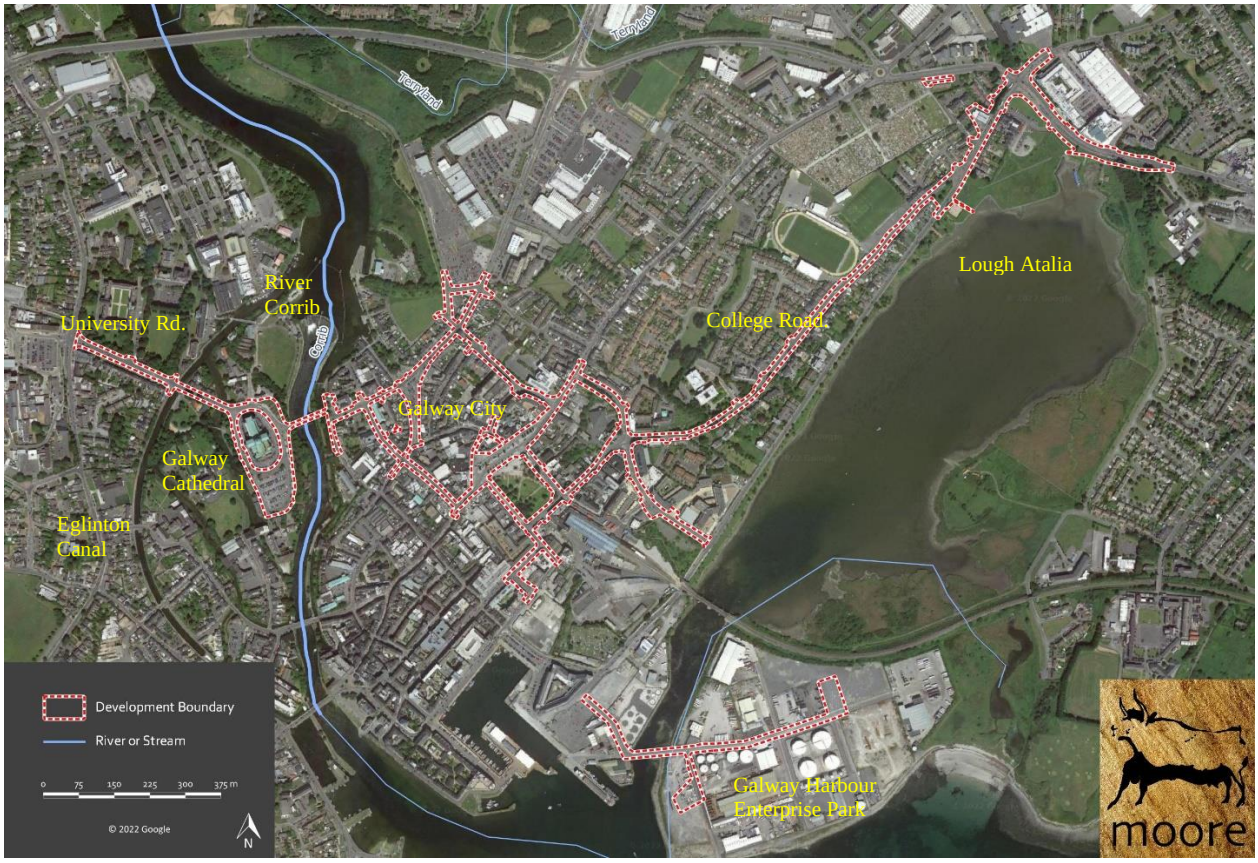

Diagram 12.1: Showing the Project Location and General Survey Areas in Galway City.

12.2.4 Ecology Surveys

12.2.4.1 Habitat Surveys

Habitat surveys including targeted breeding birds and otter surveys were carried out on repeated dates per the following Table 12.1.

Table 12.1: Habitat Surveys Dates

Survey Date	Description
17 July 2019	Habitats and breeding birds including a nighttime bat detector survey of buildings to be removed and city centre habitats.
8 August 2019	Focusing on habitats at Lough Atalia
6 March 2020	Habitats at the Eglinton Canal
7 April 2020	Habitats and breeding birds

13 May 2020	Habitats and breeding birds
13 September 2020	Habitats at the Dublin Rd and Lough Atalia
10 & 26 October 2020	Repeating targeted site visits at the Eglinton Canal and Lough Atalia
1 May & 12 July 2021	Habitats at the Eglinton Canal at Lough Atalia
30 September 2021 & 28 October 2021	Habitats at Lough Atalia and Galway Harbour Enterprise Park
24 November 2021, 20-24 January 2022, 1 March 2022, 20 May 2022 and 8 August 2022	Additional surveys at the point of discharge of a proposed outfall at Lough Atalia adjacent to Lough Atalia Playground including Ground Level Surveys of trees to be removed for Potential Roost Features (PRFs) and Trail Cam survey of discharge point. Detailed surveys of the mud dock/bay area if inner Lough Atalia opposite the Eye Cinema were surveyed in August 2022.

Surveys were undertaken by conducting study area walkover covering the main ecological areas identified in the desktop assessment and by targeting specific areas where connectivity to European sites occurs, e.g. in proximity to the River Corrib and at Lough Atalia. The survey dates are within the optimal botanical survey period where applicable. A photographic record was made of features of interest.

12.2.4.2 Mammals (Excluding Bats)

Signs of mammals such as otters were searched for while surveying the study area noting any sights, signs or any activity in the vicinity especially along adjacent boundaries. Water levels in the Eglinton Canal and the Claddagh Basin were coincidentally lowered by the City Council in October 2020 which provided an opportunity to survey these areas for otters and suspected holts below the normal waterline.

A Trailcam survey of the proposed outfall at Lough Atalia Playground was undertaken on 20-24 January 2022 by erecting a ‘Bushnell E3 HD Trophy Cam’ opposite the proposed outfall location set to auto trigger.

12.2.4.3 Bats

Walked Transects

There are two buildings to be removed to facilitate widening the junction of the Headford Road and St. Brendan’s Avenue; 20 St. Brendan’s Avenue. is an end of terrace 2 storey with a modern rear extension which backs on to a shared lane

with the rear of 'San Antonio' 5/6 Headford Road, a well maintained recently reroofed 2 storey fronting onto the Headford Road. Both have limited potential for bat roosting and it was determined that a preliminary exterior examination and dusk survey would be adequate to assess the potential for bat activity in this well-lit urban area of Galway City.

A preliminary dusk mobile detector survey was carried out on 17 July 2019 completing walked transects of the site of the two buildings to be removed during the dusk period to survey for commuting, feeding and potential roost sites. The survey commenced at 20:00 and continued for four hours ceasing when no bats were recorded.

The survey undertaken followed the Bat Conservation Ireland 'Bat Survey Guidelines' (Aughney *et al*., 2008)[5] and was in line with recommendations of the Bat Conservation Trust 'Good Practice Guidelines, 3rd edition, 2016' (BCT Guidelines 2016)[6] and the Irish Wildlife Manual No. 25 (Kelleher, C. & Marnell, F. 2006)[7]. These guidelines allow discretion on behalf of the surveyor to tailor the survey to the environment/habitat to be surveyed which was employed in this case being an urban setting with low bat commuting or roosting potential (*Section 5.7 – 'It is for the person planning the survey to decide what level of effort is required, according to the objective of the survey and local conditions'*).

The bat detector used during the walked surveys was a Pettersson D230 bat detector.

A contact describes a bat observed by the surveyor. This contact can range from a commuter passing quickly to a foraging bat circling a feature lasting for several minutes. Some observations contain multiple bats. When several bats of the same species are encountered together, they are recorded under the one contact. A separate contact is recorded for each species. A contact finishes when the recorder assumes the bat is no longer present. It is likely that the same bat is recorded in several contacts throughout the night. This survey type cannot estimate abundance of bats, rather activity; the amount of use bats make of an area/feature.

Sunset on the 17 July 2019 occurred at 21:54. Cloud cover ranged from 40% to 60%. The air temperature varied during the evening of the survey between 18.0 degrees at 20:00 to 16.0 degrees Celsius at 24:00. No rain occurred during the surveys with overall conditions being good for bat survey work.

Tree Surveys

A comprehensive assessment of trees was undertaken by the project Arborist and detailed in that report which is attached as Appendix 16.1 in Volume 4 of this EIAR.

[5] Aughney, T., Kelleher, C. & Mullen, D. (2008) Bat Survey Guidelines: Traditional Farm Buildings Scheme. The Heritage Council, Áras na hOidhreachta, Church Lane, Kilkenny.
[6] Collins, J. (Ed.) (2016) Bat Surveys for Professional Ecologists: Good Practice Guidelines (3rd edition). The Bat Conservation Trust, London.
[7] Kelleher, C. & Marnell, F. (2006) Bat Mitigation Guidelines for Ireland. Irish Wildlife Manuals, No. 25. National Parks and Wildlife Service, Department of Environment, Heritage and Local Government, Dublin, Ireland.

The report records that there are 59 trees to be removed and 153 trees that were surveyed are to be retained. Scattered trees in the urban areas of the City include a Poplar (*Populus* spp.) adjacent to the Gaol River and the Cathedral car park, an immature Hornbeam (*Carpinus* spp.) and an immature Small-leaved lime (*Tilia cordata*) in the car park.

Three additional trees are either compromised; a leaning Rowan (*Sorbus domestica*) at Walsh's Terrace, Woodquay, a Cypress oak (*Quercus rubor fastigiate*) beside the Liam Mellows Statue in Eyre Square and a dead Ash on the eastern side of the Square. There are two Maple (*Acer plantoides*) and one Plum (*Prunus* spp.) on College Road opposite the entrance to City Hall.

The locations where trees are proposed to be removed where the Scheme overlaps with designated areas and seminatural areas are presented in Diagrams 12.6 to 12.9. These include:

- A Sycamore adjacent to the old Clifden Railway embankment on the Dyke Road;
- At the green area at the junction of Lough Atalia Road and College Road where one Maple and five semi-mature Rowan trees are to be removed;
- Further along this road leading to Moneenageisha Junction at the entrance to Gleann Nóinín where four semi-mature Sycamore (*A. pseudoplatanus*) and one semi-mature Japanese cherry (*Prunus serrulata*) are to be removed; within the grounds of Moneenageisha Court adjacent to the Project where a line of 27 Poplar along the road and four at the corner adjacent to the Circle K site are to be removed. These trees were pruned in 2009 and the regrowth since has produce a new upper/crown section. Inside this treeline, there is a semi-mature Crab Apple (*Malus sylvestris*) and a juvenile Japanese Cherry to be removed. Additionally, at the northern entrance to this estate where one semi-mature Sycamore and one semi-mature Japanese cherry are to be removed;
- At the verge to the front of the G Hotel where a mix of remaining semi-mature and juvenile trees from previous clearance are to be removed, including six semi-mature Alder (*Alnus glutinosa*), five immature Birch (*Betula pendula*)and two immature Holly (*Ilex aquifolium*);
- At the north-western corner of the Brothers of Charity Woodlands Campus adjacent to the Dublin Road Where two Sycamore are to be removed.

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

These trees 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.

The categorisation of trees for bat roost potential was carried out according to the Bat Conservation Trust (2ed.) methodology (Hundt *et al.*, 2012)[8] per the following Table 12.2.

Table 12.2: Categorisation of trees

Tree Category	Description
1	Trees with multiple, highly suitable features capable of supporting larger roosts.
2	Trees with definite bat potential but supporting features suitable for use by singleton bats.
3	Trees have no obvious potential although the tree is of a size and age that elevated surveys may result in cracks or crevices being found or the tree supports some features that have limited potential to support bats.
4	Trees have no potential.

12.2.4.4 Birds

Breeding Birds were surveyed using standard transect methodology and signs were recorded where encountered during the field walkover surveys.

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 areas.

The approach for wintering bird surveys was a 'look-see' methodology (based on Gilbert et al. 1998)[9]. All birds present within a site were identified with reference to the Collins Bird Guide (Svensson *et al.*, 2021)[10] to confirm identification (where necessary). The estimated flock size of birds present, their general location within the site and any activity exhibited were also recorded.

Field surveys carried out in the urban and suburban areas of the Proposed Scheme deemed the lands to be unsuitable feeding and/or roosting sites for wintering birds, due to habitat conditions being dominated by mosaics of bare ground and/or subject to high levels of disturbance. As such it was not deemed necessary to carry out detailed wintering bird surveys in these areas. The results of the desk-based study have informed the assessment of potential impacts on wintering bird species arising from the Proposed Scheme.

The footprint area of a proposed outfall to Lough Atalia at Lough Atalia Playground was deemed suitable for wintering birds and surveyed in November 2021, January 2022 and March 2022.

[8] Hundt , L. (2012) Bat Surveys: Good Practice Guidelines, 2nd edition. Bat Conservation Trust ISBN-13: 9781872745985.
[9] Gilbert, G., Gibbons, D. W. & Evans, J. (1998). Bird Monitoring Methods. RSPB, Sandy.
[10] Svensson, L., Mullarney, K. and D. Zetterstrom (2021) Collins Bird Guide, App edition.

12.2.5 Consultation

Consultation with the Development Applications Unit of the Department of Housing (NPWS) and Inland Fisheries Ireland was commenced by Galway City Council.

12.2.6 Categorisation of the Baseline Environment

The habitat survey was carried out firstly through desktop research to determine existing records in relation to habitats and species present in the study areas. This included research on the National Parks and Wildlife Services (NPWS) metadata website, and the National Biodiversity Data Centre (NBDC) database.

The following resources assisted in the production of this chapter of the report:

- The following mapping and Geographical Information Systems (GIS) data sources, as required:
  - National Parks & Wildlife (NPWS) protected site boundary data;
  - Ordnance Survey of Ireland (OSI) mapping and aerial photography;
  - OSI/Environmental Protection Agency (EPA) rivers and streams, and catchments;
  - Open Street Maps;
  - Digital Elevation Model over Europe (EU-DEM);
  - Google Earth and Bing aerial photography 1995-2022;
- Online data available on Natura 2000 sites as held by the National Parks and Wildlife Service (NPWS) from www.npws.ie including:
  - Natura 2000 – Standard Data Form;
  - Conservation Objectives;
  - Site Synopses;
- National Biodiversity Data Centre records:
  - Online database of rare, threatened and protected species;
  - Publicly accessible biodiversity datasets.
- Status of EU Protected Habitats in Ireland. (National Parks & Wildlife Service, 2019)[11]; and
- Relevant Development Plans in neighbouring areas:
  - Galway City Development Plan 2017-2023[12]
  - Galway County Development Plan 2022-2028[13].

The second phase of the survey involved a site visit to establish the existing environment in the footprint of the Proposed Scheme area. Areas which were highlighted during desktop assessment were investigated in closer detail

[11] NPWS (2019) The Status of EU Protected Habitats and Species in Ireland. National Parks and Wildlife Service, Department of the Environment, Heritage and Local Government, Dublin
[12] Galway City Council (2017) Galway City Development Plan 2017-2023.
[13] Galway County Council (2022) Galway City Development Plan 2022-2028.

according to the *Heritage Council Best Practice Guidance for Habitat Survey and Mapping* (Smith et al., 2011)[14].

Habitats in the Proposed Scheme area were classified according to the Heritage Council publication *A Guide to Habitats in Ireland* (Fossitt, 2000)[15]. This publication sets out a standard scheme for identifying, describing and classifying wildlife habitats in Ireland. This form of classification uses codes to classify different habitats based on the plant species present. Species recorded in this report are given in both their Latin and English names. Latin names for plant species follow the nomenclature of *An Irish Flora* (Parnell & Curtis, 2012)[16].

The key ecological receptors were determined from desktop review of draft plans to be potential effects on roosting bats, and potential effects on the water quality of the River Corrib and associated Annexed species including sea lamprey, otters and salmon. The consideration of Lough Atalia as a priority habitat listed as a Coastal Lagoon and implications for water quality and previously recorded sign of otters were noted as key ecological receptors.

12.2.7 Assessment Methodology

Following desktop assessment and fieldwork, an evaluation of the development area and determination of the potential effects on the flora and fauna of the area is based on the following guidelines and publications:

- Assessment of plans and projects significantly affecting Natura 2000 sites (EC, 2002)[17];
- Guidance document on Article 6(4) of the Habitats Directive 92/43/EEC (EC, 2007)[18];
- Appropriate Assessment of Plans and Projects in Ireland - Guidance for Planning Authorities (DEHLG, December 2009, Rev 2010)[19];
- Managing Natura 2000 Sites: The Provisions of Article 6 of the Habitat's Directive 92/43/EEC (EC, 2018)[20];
- Guidance document on the strict protection of animal species of Community interest under the Habitats Directive (EC, 2021)[21];

[14] Smith, G.F., O'Donoghue, P., O'Hora, K. and E. Delaney (2011) Best Practice Guidance for Habitat Survey and Mapping. The Heritage Council
[15] Fossitt, J. (2000) A Guide to Habitats in Ireland. The Heritage Council
[16] Parnell, J. and T. Curtis (2012) Webb's An Irish Flora. Cork University Press
[17] EC (2002) Assessment of plans and projects significantly affecting Natura 2000 sites: Methodological guidance on the provisions of Article 6(3) and (4) of the Habitats Directive 92/43EEC. European Commission, Brussels
[18] EC (2007) Guidance document on Article 6(4) of the 'Habitats Directive '92/43/EEC: Clarification of the concepts of: alternative solutions, imperative reasons of overriding public interests, compensatory measures, overall coherence and opinion of the Commission. European Commission, Brussels
[19] Department of the Environment, Heritage and Local Government (2009) Guidance on Appropriate Assessment of Plans and Projects in Ireland (as amended February 2010)
[20] EC (2018) Managing Natura 2000 sites: the provisions of Article 6 of the 'Habitats' Directive 92/43/EEC
[21] European Commission (2021) Guidance document on the strict protection of animal species of Community interest under the Habitats Directive, Brussels 12.10.21

- Assessment of plans and projects in relation to Natura 2000 sites - Methodological guidance on Article 6(3) and (4) of the Habitats Directive 92/43/EEC (EC, 2021)[22];
- Best Practice Guidance for Habitat Survey and Mapping (Heritage Council, 2011);
- Ecological Surveying Techniques for Protected Flora & Fauna (NRA, 2008)[23]
- Guidelines for Assessment of Ecological Impacts of National Road Schemes (NRA, 2009)[24]
- Guidelines for Ecological Impact Assessment in the UK and Ireland (CIEEM, 2019)[25].
- EPA Guidelines on Information to be contained in an EIAR (EPA, 2022)[26];

12.3 Baseline Conditions

12.3.1 Zone of Influence (ZoI)

The ZoI, or distance over which a likely significant effect may occur will differ across the subject ecological receptors, 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 have established the habitats and species present along the Proposed Scheme. The ZoI is then informed and defined by the sensitivities of each of the ecological receptors present, in conjunction with the nature and potential impacts associated with the Proposed Scheme. In some instances, the ZoI extends beyond the study area (e.g. surface water quality effects of a sufficient magnitude can extend, and affect, receptors at significant distances downstream).

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

The unmitigated hydrogeological ZoI for the Proposed Scheme is 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

[22] European Commission (2021) Assessment of plans and projects in relation to Natura 2000 sites - Methodological guidance on Article 6(3) and (4) of the Habitats Directive 92/43/EEC, Brussels 28.9.21
[23] NRA (2008) Ecological Surveying Techniques for Protected Flora & Fauna. Available at: http://www.nra.ie/Environment/
[24] NRA (2009) Guidelines for Assessment of Ecological Impacts of National Road Schemes. Dublin: National Roads Authority. Available at: http://www.nra.ie/Environment/
[25] CIEEM (2019) Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater, Coastal and Marine version 1.1. Chartered Institute of Ecology and Environmental Management, Winchester.
[26] EPA (2022) EPA Guidelines on Information to be contained in an EIAR; EPA, May 2022

construction activities in Chapter 14 (Land, Soils, Geology & Hydrogeology) of this EIAR.

The ZoI of air quality effects is generally local to the Proposed Scheme and not greater than a distance of 50m from the Proposed Scheme boundary, and 500m from Construction Compound during the Construction Phase, and up to 200m the Proposed Scheme boundary during the Operational Phase (refer to Chapter 7 (Air Quality) of this EIAR 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 and/or hydrocarbons), volumes of receiving waters, and the ecological sensitivity of the receiving waters. In the case of the Proposed Scheme, this includes: all coastal habitats downstream of where the Proposed Scheme will drain to or cross water bodies listed and the marine environment of Galway Bay including the Coastal Lagoon of Lough Atalia.

The ZoI for impacts to aquatic fauna species, such as Sea Lamprey and Salmonids, 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, refer to Section 12.3.2.

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).

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[27] and Wright *et al.* 2010[28]. In terms of construction noise, levels below 50dB (decibels) would not be expected to result in any response from foraging or roosting birds. Noise levels between 50dB and 70dB would provoke a moderate effect / level of response from birds (i.e. birds becoming alert and some behavioural changes (e.g. reduced feeding activity)), but birds would be expected to habituate to noise levels within this range. Noise levels above 70dB would likely result in birds moving out of the affected zone or leaving the site altogether. At approximately 300m, typical noise levels associated with construction activity (British Standard Institute (BSI) British Standard (BS) 5228-1:2009 +A1:2014 Code of Practice for noise and vibration control of construction and open sites - Part 1: Noise (hereafter referred to as BS 5228–1) (BSI 2014)) are generally below 60dB or, in most cases, are approaching the 50dB threshold.

There will be no significant removal of hedgerow or scrub and therefore no significant environmental effect on other naturally occurring wild birds.

12.3.2 Designated Conservation Areas

The Zone of Influence (ZoI) may be determined by considering the Proposed Scheme's potential connectivity with European sites, in terms of:

- Nature, scale, timing and duration of all aspects of the proposed works and possible impacts, including the nature and size of excavations, storage of materials, flat/sloping sites;
- Distance and nature of potential pathways (dilution and dispersion; intervening 'buffer' lands, roads etc.); and

Location of ecological features and their sensitivity to the possible impacts.

The potential for source pathway receptor connectivity is firstly identified through GIS interrogation and detailed information is then provided on sites with connectivity. European sites that are located within a potential Zone of Influence of the Proposed Scheme, due to a potential for connectivity, are listed in Table 12.3 and presented in Diagrams 12.2 to 12.5, below.

Table 12.3: European Sites Located within the Potential Zone of Influence[29] of the Proposed Scheme.

Site Code	Site name	Distance (km)[30]	Pathway/Connectivity
000268	Galway Bay Complex SAC	0.00	Adjacent

[27] Cutts, N., Phelps,A., Burdon, D. (2009). Construction and Waterfowl: Defining Sensitivity, Response, Impact and Guidance. Report prepared by the Institute of Estuarine and Coastal Studies University of Hull and Humber INCA.
[28] Wright, M., Goodman, P., Cameron, T. (2010). Exploring Behavioural Responses of Shorebirds to Impulse Noise. Wildfowl (2010) 60: 150-167.
[29] All European sites potentially connected irrespective of the nature or scale of the Proposed Scheme.
[30] Distances indicated are the closest geographical distance between the Proposed Scheme and the European site boundary, as made available by the NPWS.

000297	Lough Corrib SAC	0.00	Adjacent
004031	Inner Galway Bay SPA	0.00	Adjacent
004042	Lough Corrib SPA	2.82	No Pathway/Connectivity
004142	Cregganna Marsh SPA	7.12	No Pathway/Connectivity
002034	Connemara Bog Complex SAC	12.11	No Pathway/Connectivity
000606	Lough Fingall Complex SAC	13.20	No Pathway/Connectivity
001312	Ross Lake and Woods SAC	13.29	No Pathway/Connectivity
001926	East Burren Complex SAC	13.64	No Pathway/Connectivity

Spatial boundary data on the Natura 2000 network was extracted from the NPWS website (www.npws.ie) on the 11 July 2022. This data was interrogated using GIS analysis to provide mapping, distances, locations and pathways to all sites of conservation concern including pNHAs, NHA and European sites.

The Proposed Scheme is located predominantly on existing roads and footpaths in the urban environment of Galway City.

In view of the nature, scale and location of the Proposed Scheme, the distance of the Proposed Scheme from the European sites concerned, it is considered that there is no pathway and therefore no potential for any likely significant effect on the following European sites:

- Lough Fingall Complex SAC;
- Ross Lake and Woods SAC;
- East Burren Complex SAC;
- Connemara Bog Complex SAC;
- Lough Corrib SPA;
- Cregganna Marsh SPA.

In light of this, it is considered that there will be no potential for significant effects on these European sites.

There are five watercourses adjacent the proposed works area travelling from west to east along University Road to Newtownsmith: the Eglinton Canal, the Gaol River, Persse's Distillery River (formerly called Mill Race), the Lower River Corrib and Friar's River (formerly called Waterside canal).

The Eglinton Canal and Gaol River are not designated for nature conservation but both discharge to the River Corrib downstream of the Project area.

Works in the vicinity of the Salmon Weir Bridge are considered in terms of proximity to the Lower River Corrib. On the western side, the Lower River Corrib is separated from Persse's Distillery River by an existing embankment.

Similarly, on the east, the Lower River Corrib is separated from Friar's River by an existing embankment. The watercourses are linked upstream and downstream.

The main channel of the Lower River Corrib is designated as part of the Lough Corrib SAC (Site Code 000297) and circa 600m downstream of the Salmon Weir

Bridge, on the south side of Wolfe Tone Bridge, the river is designated as part of Galway Bay Complex SAC (Site Code 000268).

Neither Persse's Distillery River or Friar's River are designated for nature conservation, but both discharge to the Lower River Corrib and thus the Lough Corrib SAC and the Galway Bay Complex SAC downstream of the proposed works locations.

There are no points of connectivity or no pathways to European sites for the majority of works in the city centre sections of the proposed works areas.

The proposed works include the diversion of surface water drainage to Lough Atalia at the junction of College Road and Lough Atalia Road with the placement of a new drainage pipe and non-return valve to be installed at discharge point into Lough Atalia. Additionally, a new attenuation tank and petrol interceptor will be installed. The discharge point comprises an artificial rock armour habitat but is also the boundary of the Galway Bay Complex SAC and the Inner Galway Bay SPA.

The Proposed Scheme includes proposed new inbound bus lane with a 2m raised adjacent cycle track at the eastern extent of Lough Atalia opposite the G Hotel, refer to Diagrams 12.2 to 12.5 below. The Proposed Scheme boundary overlaps the boundary of the Galway Bay Complex SAC and is adjacent to but outside the boundary of the Inner Galway Bay SPA at this point at Lough Atalia

NHAs are designations under Section 16 of the Wildlife Acts to protect habitats, species or geology of national importance.

In addition to NHAs, there are pNHAs which are also sites of significance for wildlife and habitats and were published on a non-statutory basis in 1995 but have not since been statutorily proposed or designated. pNHAs are offered protection in the interim period under the county or city development plans which requires that planning authorities give due regard to their protection in planning policies and decisions.

The NHAs and pNHAs identified in Diagram 12.2 are located outside the Zone of Influence, with the exception of those which share the boundaries of the Galway Bay Complex SAC and Inner Galway Bay SPA. Accordingly, the Galway Bay Complex pNHA is considered under its higher conservation status as a European site.

The River Corrib is not designated as a pNHA for the stretch of river from the Quincentenary Bridge to Wolfe Tone Bridge to the north and south of the Proposed Scheme respectively. However, it is included in the Lough Corrib SAC.

These areas are considered in more detail in the habitat descriptions below.

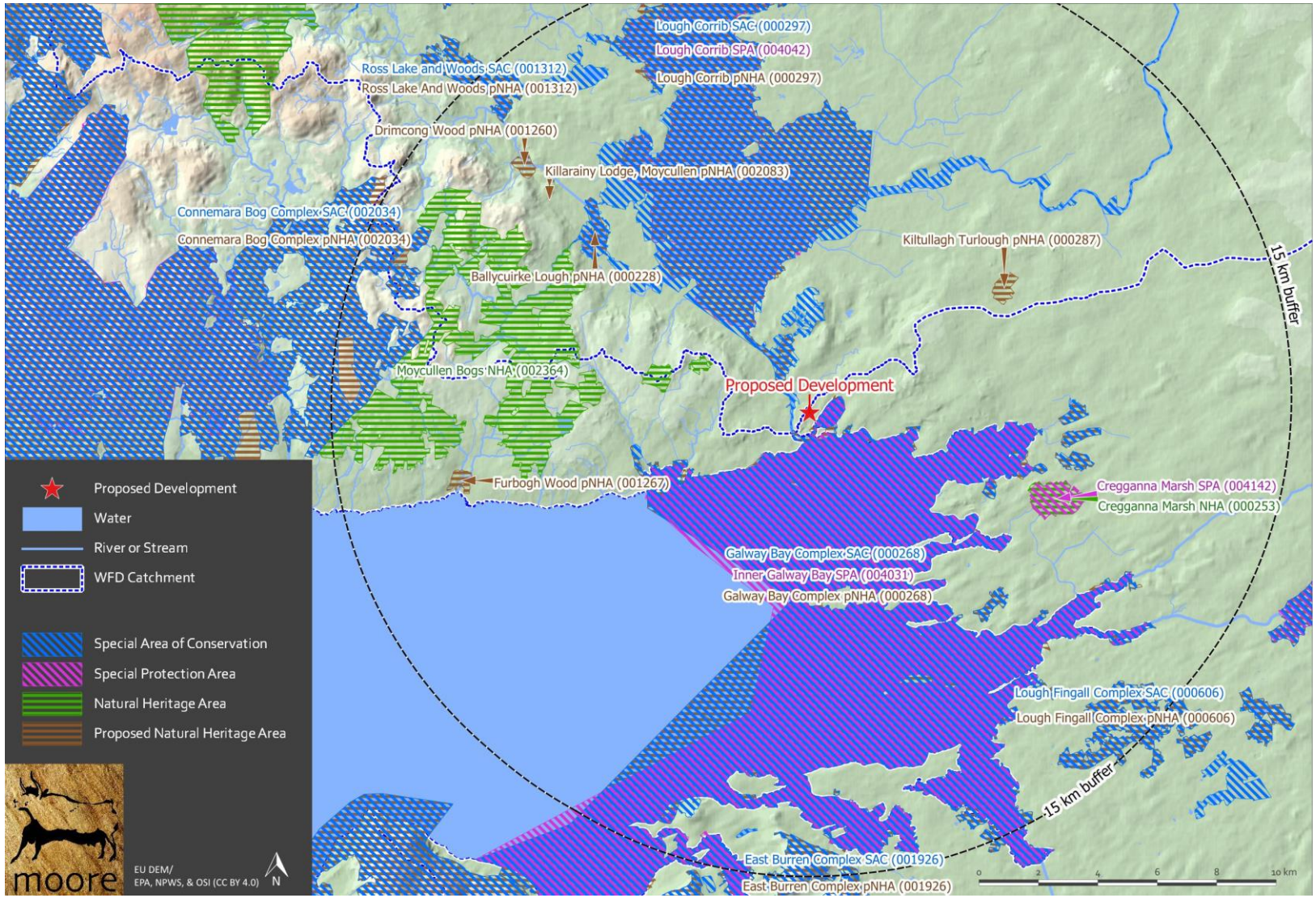

Diagram 22.2: European Sites and NHAs/pNHAs in the wider Vicinity of the Proposed Scheme.

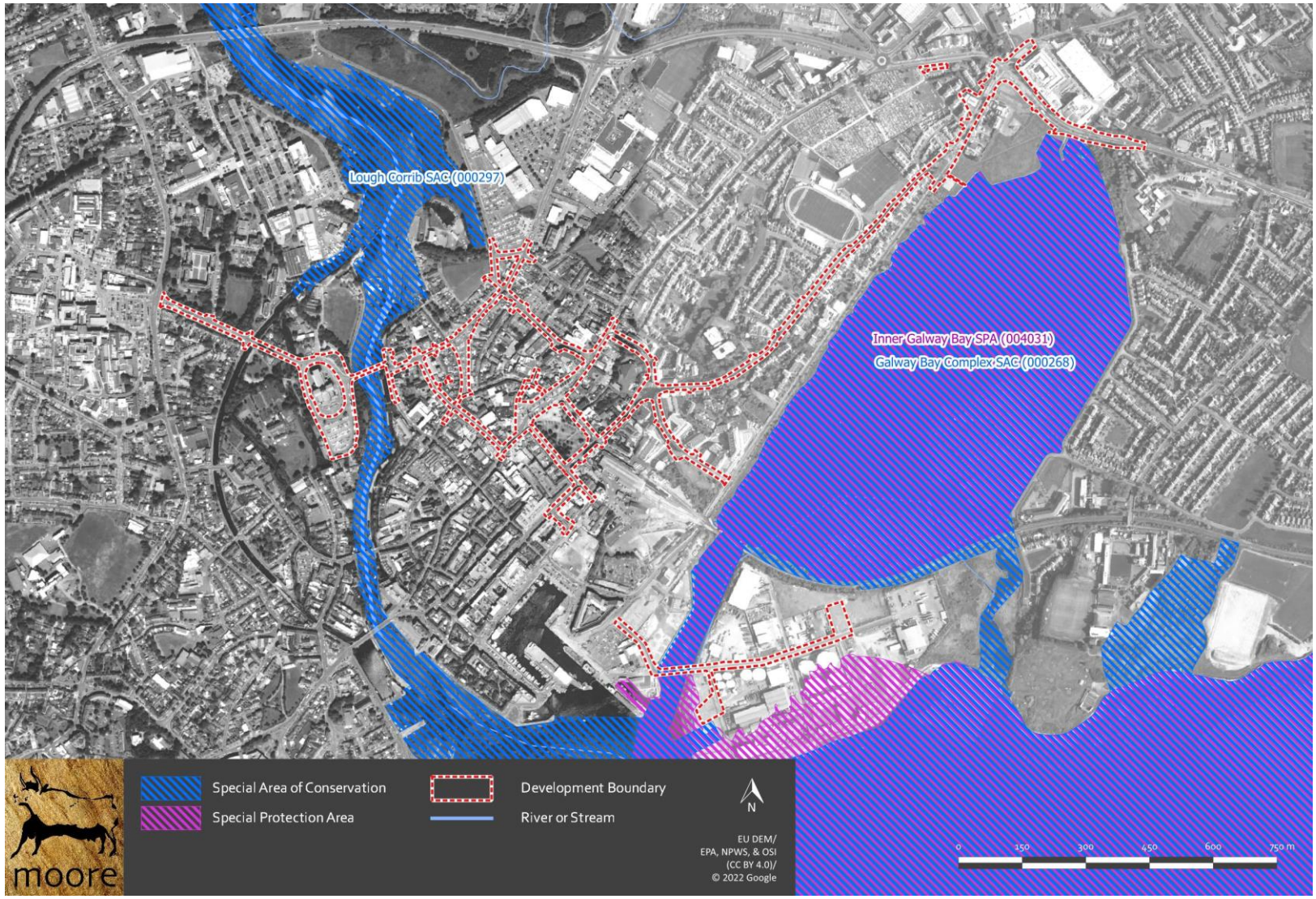

Diagram 13.3: Detailed view of European sites in the nearer Potential Zone of Influence of the Proposed Scheme.

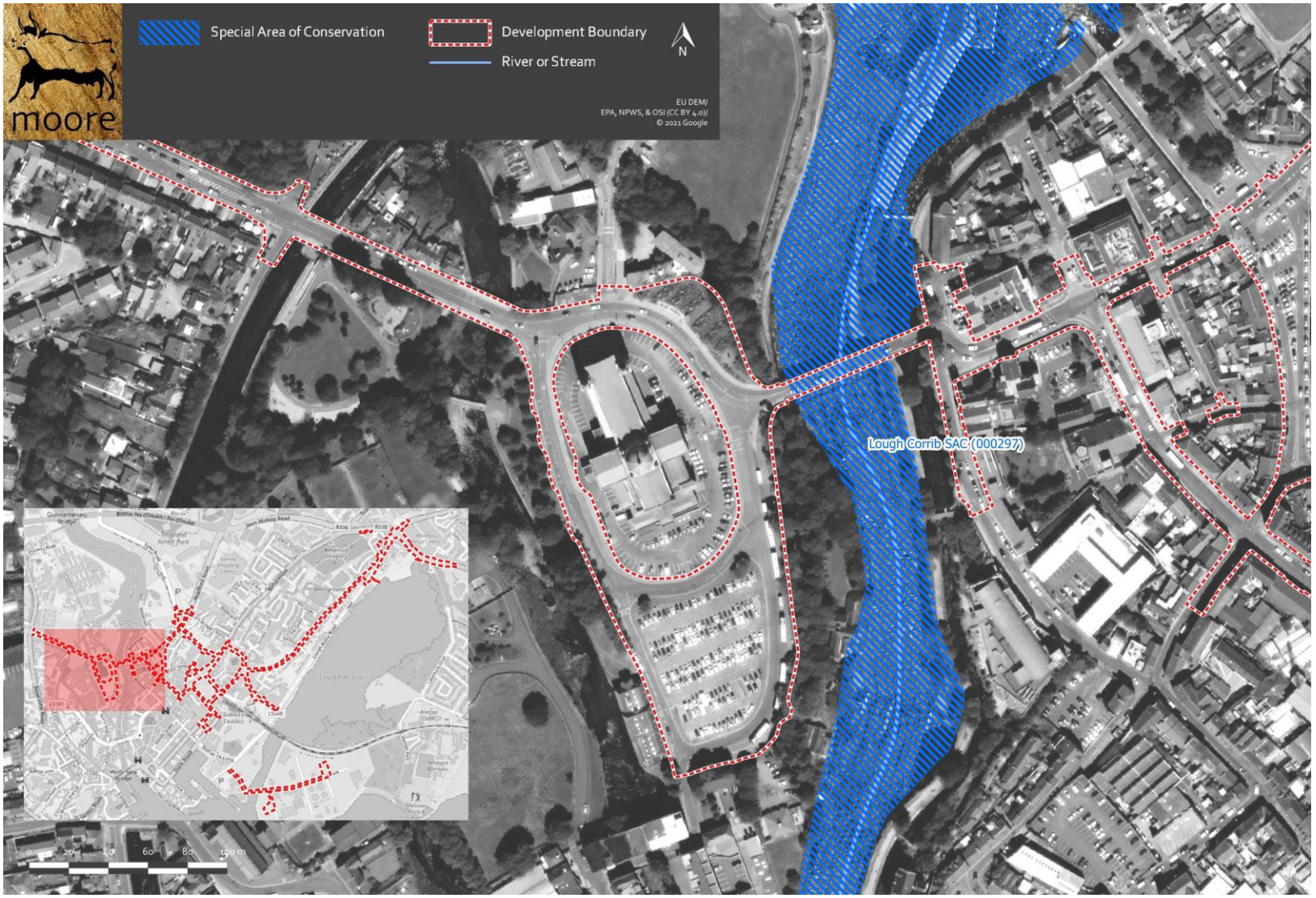

Diagram 12.4: Detail of the Locations of nearby European sites within the Potential Zone of Influence of the River Corrib.

Diagram 12.5: Detail of the Locations of nearby European Sites within the Potential Zone of Influence of Lough Atalia.

12.3.3 Habitats, Flora & Fauna

In general, there are few natural habitats in the majority of the Proposed Scheme area. They have either been modified or are artificial in nature the urban context of Galway City. The main natural habitats of conservation concern are the River Corrib and Lough Atalia. Habitats are classified under the Fossitt codes (Fossitt, 2000).

The following is an overview of the main habitat types present in proposed works areas. Detailed habitat descriptions are provided in areas that either intersect or have hydrological connectivity with European sites, see Diagrams 12.4 and 12.5.

12.3.3.1 Habitats & Flora

The Proposed Scheme would be constructed in the existing urban areas of Galway City which is predominantly comprised of the existing buildings and hardstanding areas 'Buildings and artificial surfaces' (BL3) which comprise the roads, paths, cycle lanes, laybys, parking areas and artificial surfaces of the city.

There were no rare or protected flora recorded in the Project area.

Specific detailed surveys of areas of the Eglinton Canal, the Galway Harbour Enterprise Park and amenity grassland at Lough Atalia are presented in detailed habitat maps below.

University Road

Along University Road (from the junction with Newcastle Road to the Salmon Weir Bridge), the proposed scheme works will involve footpath widening, provision of an entry treatment at the entrance to NUIG, provision of two raised tables along the route at Canal Road Upper and Fisheries Field and the provision of two new signalised pedestrian crossings. Between the entrance to Fisheries Field and the Salmon Weir Bridge, it is proposed to install a bus gate and to designate the carriageway as a time-regulated bus lane in both directions.

The predominant habitat present is Buildings and artificial surfaces (BL3). Adjoining lands in NUIG comprise Amenity grassland (GA2), Mixed broadleaved woodland (WD1) and Flower beds and borders (BC4). These latter habitats will not be affected, see Photo 12.1.

The immediate aquatic environment in the Eglinton Canal adjacent to the Proposed Scheme site does not contain any designated habitats but is important in terms of water quality as a habitat for salmonids and otters.

Photo 12.1: View of University Road (07/04/20) from the Eglinton Canal Bridge at Ward's Shop looking West.

University Road crosses the Eglinton Canal (FW3) at the intersection of Canal Road Upper and the entrance to NUIG. It has been established that while the canal is not designated as part of the Lough Corrib SAC, it discharges to the River Corrib downstream at Wolfe Tone Bridge and at the Claddagh Basin over 800m downstream. There are records for otters at the rear of the Ryan Institute building in NUIG upstream of the bridge at Ward's Shop.

Excavation and removal of the existing footpath is proposed over the bridge and replacement with a new concrete footpath. Excavation of the existing footpath and part of the existing road carriageway surface, to a depth of 100mm – 150mm approximately is expected. The existing road surface will be removed using a mechanical planer. Immediately adjacent to the bridge, a new raised table is to be constructed from bituminous products. This will require the removal of a maximum of 100mm of existing road surface and replacement with approximately 200-250mm of new bituminous material.

No trenching is anticipated to be required cross the bridge or in close proximity to the bridge or watercourse.

There are no planned discharges to surface water. However, there are openings from the road to the Eglinton Canal particularly at Ward's Corner with connectivity to the River Corrib downstream and the potential for contaminated surface water runoff to the canal is uncertain. The Eglinton Canal is not monitored by the EPA for water quality.

However, the main channel of the River Corrib at the Salmon Weir Bridge sampling point returned a Q4 value for the most recent sampling period, 2021, indicating Good water quality status.

Gaol Road and Galway Cathedral

To the west of Galway Cathedral, on Gaol Road, the works involve footpath widening at the junction with University Road and to the south on Gaol Road the works involve re-development of the car and coach parking area to the south of Galway Cathedral. To the east of Galway Cathedral, the works involve the closure of the existing carriageway and creation of a pedestrianised public space.

The area to the east of Galway Cathedral is to be closed to vehicular traffic and designated as a public pedestrian space, and the carriageway and footpaths that will ultimately become part of the public space will be removed and/or regraded, with a new paved area installed to connect with the existing walls both to the east (adjacent to Persse's Distillery River) and to the west (adjacent to the boundary wall of Galway Cathedral). This will require the removal of the existing bituminous layers on the road and replacement with new materials.

University Road crosses the Gaol River which is a branch of the Eglinton Canal (FW3), Photo 12.2. The predominant habitat present around the Cathedral is Buildings and artificial surfaces (BL3). Adjoining lands in NUIG comprise Amenity grassland (GA2) of the Fisheries Field, Mixed broadleaved woodland (WD1) along the Persse's Distillery River and Flower beds and borders (BC4). These latter habitats will not be affected.

Photo 12.2: View of Gaol River looking North toward the Ryan Institute NUIG from Beggars Bridge (07/04/20).

Salmon Weir Bridge

On the Salmon Weir Bridge, the works include widening the existing footpath on the northern side of the bridge and the removal of the footpath on the southern side of the bridge and replacing it with a rubbing strip. Footpath widening works will require the existing footpaths to be broken out, and the bituminous layers of the road carriageway where widening is proposed to be removed, and the new widened footpath installed. This will require excavations of approximately 300mm of the existing road and footpaths.

The main channel of the river is comprised of bedrock, boulders and cobbles which can be seen during the summer months. During the winter months, the powerful flow and substantially increased volume of the river prevents the establishment of Annexed habitats. As mentioned above, the main channel of the River Corrib at the Salmon Weir Bridge sampling point returned a Q4 value for the most recent sampling period, 2021, indicating Good water quality status. There are no planned discharges to surface water and it is unlikely that the minor works proposed would generate any significant emissions to water or air.

At the time of writing (May 2022) preparation construction work had commenced on the Salmon Weir Pedestrian Bridge at the Cathedral side of the river and several trees visible in the aerial photo (Diagram 12.6) had been removed as part of that approved Project.

Newtownsmith/Waterside

The works at this location will involve the permanent closure of Waterside as it approaches St. Vincent's Avenue from the north (with the resultant space used to create a public space), and the narrowing of Newtownsmith as it approaches St. Vincent's Avenue from the south (reduced to a single northbound traffic lane, with resultant wider footpaths). The project boundary takes in a small area of Amenity Grassland (GA2) adjacent to the river at Waterside, see Diagram 12.6 below. The adjacent area of the River Corrib is part of the Lough Corrib SAC. However, there will be no direct or indirect impacts here.

The predominant habitat present Newtownsmith is Buildings and artificial surfaces (BL3) and a small patch of Amenity Grassland (GA2) adjacent to the river at Waterside, see Photo 12.3 below. One newly sprouting London Plane (*Platanus x hispanica*) (c.f. photo insert from 07/04/20) and a compromised Rowan (*Sorbus aucuparia*) are the only trees in this area which will be removed.

A single Lime tree at the northern end of a line of semi-mature Lime trees has been removed as part of the Salmon Weir Pedestrian Bridge Project. There are no plans to remove the remaining trees for the Proposed Scheme.

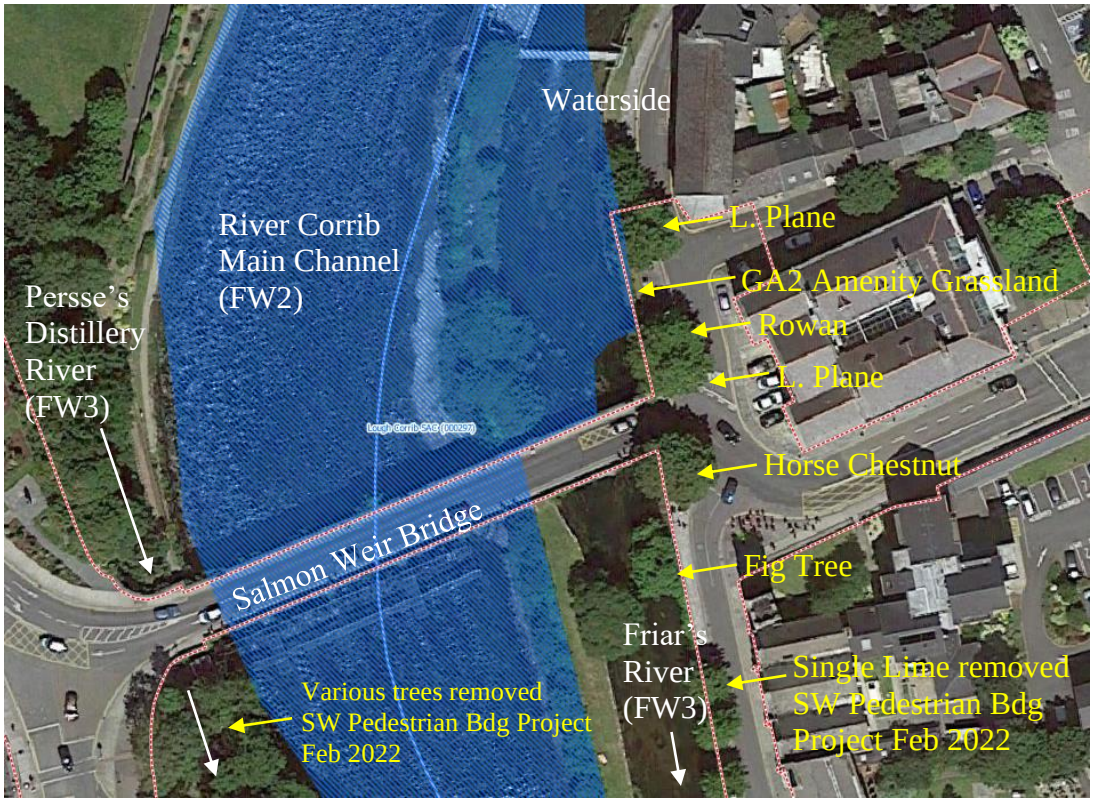

Diagram 12.6: Showing the Project Boundary in detail and Habitats at Waterside with Lough Corrib SAC hatched in Blue.

Photo 12.3: View of Amenity Grassland at Waterside on 18/10/21 (inset 07/04/20).

Dyke Road/Headford Road

The project boundary extends for a short distance north along the Dyke Road past the former Clifden Railway Line embankment. The works proposed are pavement improvement and there will be no direct impacts on the section of Lough Corrib SAC which encompasses the reedbed to the east of the Commercial Boat Club, circa 9m from the Dyke Road, see Diagram 12.7 and Photo 12.4 below.

Diagram 12.7: Showing the Project Boundary in detail and Habitats at the Dyke Road with Lough Corrib SAC hatched in Blue Corresponding to Reedbed and Trees marked for removal (S = Sycamore).

The locations of two residences to be demolished are indicated at the Headford Road and St. Brendan's Avenue.

Photo 12.4: View of Amenity Grassland at the Dyke Road adjacent to the SAC Area (07/04/20).

City Centre

The predominant habitat present in the following areas is Buildings and artificial surfaces (BL3). There are no natural habitats and there are no predicted impacts on ecology in these areas:

- St. Vincent's Avenue/Walsh's Terrace;
- St. Francis Street/Eglinton Street/Williamsgate Street;
- Woodquay/Daly's Place/Mary Street;
- Bóthar na mBan/St. Brendan's Avenue;
- Prospect Hill;
- Eyre Square North/Eyre Square East/Eyre Square South;
- Victoria Place/Merchant's Road/Queen Street;
- Forster Street;
- College Road/Forster Street/Fairgreen Road/Bóthar Uí hEithir junction;
- Bóthar Uí hEithir;
- Fairgreen Road.

The project boundary extends to the eastern end of Fairgreen Road at the junction of Lough Atalia Road. The Galway Bay Complex SAC and Inner Galway Bay SPA extend into Lough Atalia in this area but the SAC/SPA site boundaries are circa 30m from the project boundary in this area and there will be no direct or indirect effects in this area.

College Road/Lough Atalia Road Junction;

The junction of College Road/Lough Atalia Road is to be realigned into a standard, signal controlled, T-junction arrangement, with a reduced junction footprint. The College Road (from City Hall) arm of the junction will be the minor arm of the 'T' arrangement. Existing traffic islands within the existing junction are to be removed, and the College Road approach to the junction realigned to route through the existing grassed area between College Road and Lough Atalia Road. The new T-junction will be signalised. The existing junction area that becomes redundant will be used to provide new or widened footpaths and provision of new landscaped areas. The existing entrance to Loyola Park will be retained in its current location, but altered to a priority controlled access with a new entry treatment and kerblines.

Footpath widening works will require the existing footpaths to be broken out, and the bituminous layers of the road carriageway where widening is proposed to be removed, and the new widened footpath installed. This will require excavations of approximately 300mm of the existing road and footpaths. Drainage gullies will be relocated to the new kerb edge and will connect back to the new drainage network.

A new drainage pipe and non-return valve to be installed at discharge point into Lough Atalia at this location adjacent to the eastern perimeter of Lough Atalia Playground. The maximum depth of trench excavation required to install the new pipe, gully post and new connection pipes is 2.2m. Additionally, a new attenuation tank and petrol interceptor will need to be installed, which will require excavation of approximately 3.5m -3.75m for installation.

The ecological boundary of this SAC may be considered to be co-aligned with the Inner Galway Bay SPA boundary in this area which in coastal areas corresponds to the Mean High Water Mark.

Lough Atalia is included in the Galway Bay Complex SAC as a Coastal Lagoon [1150]. Coastal lagoons are priority habitats under the Habitats Directive.

The existing habitat on the western perimeter of Lough Atalia Playground, surveyed on 20-21 January 2022, is Amenity grassland (GA2) which surrounds the Playground area (BL3). The shoreline curves around to a bend in the rock armour corresponding to the end of the propriety garden or plot at the eastern end of Lough Atalia Road where the existing outfall is located. As mentioned, the shoreline is comprised of rock armour, an artificial shoreline placed in the late 1990s, see Diagram 12.8 and Photo 12.5.

Lough Atalia is considered in terms of water quality under as a Transitional Water Body and is assigned an EPA status for the period 2018-2020 of 'Unpolluted'.

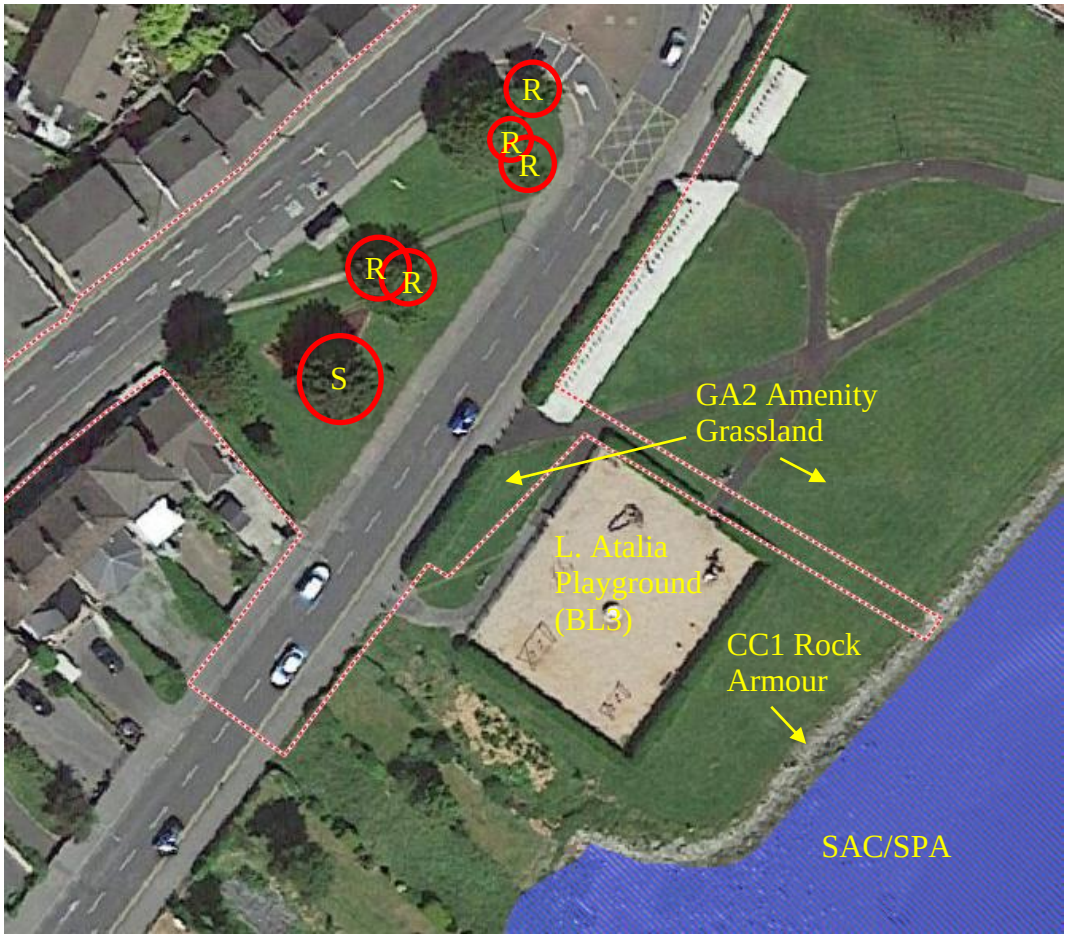

Diagram 12.8: Showing the Project Boundary in detail and Habitats at the Proposed Surface Water Discharge Point at Lough Atalia Playground and Trees marked for removal (S = Sycamore, R = Rowan/Mtn. Ash).

Photo 12.5: Showing the Habitat types at Lough Atalia Playground and adjacent Amenity Grassland adjacent to Lough Atalia.

The lower shore is covered by seawater at hightide and at low tide presents as soft mud with occasional weed covered rocks corresponding to Mixed sediment shore (LS5). The rock armour was searched for possible otter holt or resting habitat during surveys in March 2022 but found to be based on poured concrete with no potential in this regard. The proposed works refer to the removal of the upper sections of the rock armour to facilitate the placement of a new outfall after interception.

R338 Dublin Road

The works on the R338 Dublin Road comprise the installation of inbound and outbound bus lanes, raised adjacent cycle lanes and footpaths on both sides of the road, extending for approximately 350m east of the Moneenageisha Road. This is to be achieved via a combination of carriageway widening, re-purposing of existing traffic lanes and setting back the existing footpath. An entry treatment is proposed at the entrance to the Huntsman Inn.

Approaching the junction at Moneenageisha, footpath widening is proposed as part of the tightening of the entrance to the junction (removal of the left-slip to College Road, etc.).

Footpath widening works will require the existing footpaths to be broken out, and the bituminous layers of the road carriageway where widening is proposed to be removed, and the new widened footpath installed. This will require excavations of approximately 300mm of the existing road and footpaths. Drainage gullies will be relocated to the new kerb edge and will connect back to the existing drainage network. The maximum depth of trench excavation required to install gully post and new connection pipes is 1.2m. Other utilities, where present will be retained within the new footpath.

The predominant habitat present on the R338 Dublin Road is Buildings and artificial surfaces (BL3). Lough Atalia is included in the Galway Bay Complex SAC as a Coastal Lagoon [1150]. Coastal lagoons are priority habitats under the Habitats Directive. It is also included in the Inner Galway Bay SPA. The SPA, in the vicinity of the widening, is a dry bay, with a grassed surface and is bounded by a cut stone dock wall which runs perpendicular to the Dublin Road, which degrades to a loose stone embankment as it wraps around the bay, running parallel to the Dublin Road. The section parallel to the proposed works is heavily vegetated. It is assumed that the section through this area comprises of a degraded loose stone wall beneath the vegetation.

The proposed works comprises a new 4.0m wide footway/cycleway offset approximately 0.9m from the SPA boundary. Due to the uncertainty of the existing wall, it is proposed to install a new retaining wall through here to support the footway/cycleway, which is approximately 1.3m above the depressed bay level. To avoid encroachment into the SPA boundary, it is proposed to retain the existing stone wall/embankment by constructing a mass concrete gravity wall in behind it. This requires the material in behind the wall to be excavated out and then backfilled with mass concrete. Due to the potential instability of the stone wall, care is required during construction to protect the existing stone wall/embankment. The area behind the wall is designated as an SPA. In order to avoid the collapse of the existing wall/slope, the installation of a

temporary/sacrificial support to maintain the integrity of the slope and contain the concrete from seeping through the stone wall and into the SPA will be provided in a worst-case construction scenario. Protection from construction run-off into the SPA will be implemented during construction along this section, refer to measures included in the CEMP (Appendix 5.1 of this EIAR), see Diagram 12.9.

The boundary of the SAC is adjacent to the southern side of the road and the artificial surfaces of the road and footpath in this area. The overlapping section of the Proposed Scheme and the SAC comprises bramble scrub over a retaining wall. The seaward side of this scrub boundary is located within the Inner Galway Bay SPA and comprises components of upper salt marsh. However, the salt marsh does not correspond with any of the Annexed Qualifying Interests of the SAC; (1310 Salicornia and other annuals colonising mud and sand; 1330 Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*) or 1410 Mediterranean salt meadows (*Juncetalia maritimi*).

Species present includes frequent Common bent grass (*Agrostis stolonifera*), frequent Sea mayweed (*Tripleurospermum maritimum*), occasional Sea Aster (*Aster tripolium*)(closer to the low water mark) and abundant Spear-leaved Orache (*Atriplex patula*). Sea rush (*Juncus maritimus*) was present in a few tufts confined to the low water tide line.

The Proposed Scheme boundary is located adjacent to and outside the boundary of the Inner Galway Bay SPA at this point at Lough Atalia.

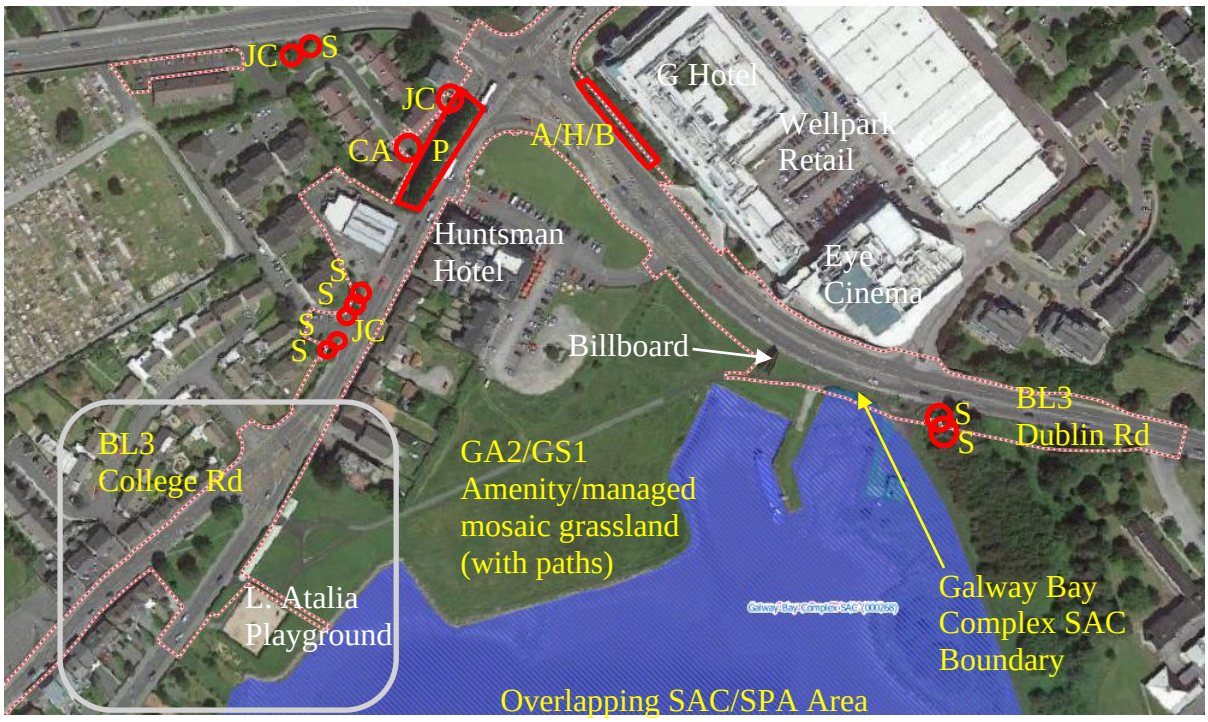

Diagram 12.9: Showing the Project Boundary in detail and Habitats at the Dublin Road and Trees marked for removal (S = Sycamore, P = Poplar Treeline, A/H/B = Alder/Holly/Birch mix, JC = Japanese cherry, CA = Crab Apple).

The site was surveyed in August 2019, April 2020,September and October 2020, September 2021 and in August 2022 by the author and ground truthing showed

that there are no Annexed habitats or no qualifying habitats under the footprint of the intersecting areas.

The upper area of intersecting SAC habitat at the inner extent of Lough Atalia adjacent to the Dublin Road comprises bramble scrub with Lilac bushes (*Syringa vulgaris*) and large patches of Winter heliotrope (*Petasites pyrenaicus*) along the roadside boundary wall (see Photo 12.6 below), under the billboard and surrounding the Huntsman car park.

Many of the fringing habitats around this section of Lough Atalia have been modified by modern development such as private gardens lining the lough, the Playground area to the west of the Huntsman Inn, and amenity grassland which is managed by Galway City Council. To this end, they are of reduced value to Wintering birds which prefer the intertidal and aquatic habitats of the lagoon itself.

Unmanaged areas recorded in July and August 2019 correspond to rough neutral grassland (GS1) managed for biodiversity. Thus the grassland at this area presents a transitional mosaic of amenity and rough neutral grassland depending on the time of year and management.

Species recorded in unmanaged areas in site visits in July includes abundant False oat grass (*Arrhenatherum elatius*), Common knapweed (*Centaurea nigra*), Tufted vetch (*Vicia cracca*), Red clover (*Trifolium pratense*), Creeping cinquefoil (*Potentilla reptans*), Black medick (*Medicago lupulina*), Ribwort plantain (*Plantago lanceolata*), Broad dock (Rumex obtusifolius), Thistles (*Cirsium arvense & C. vulgare*), Common sorrel (*Rumex acetosa*) with Meadowsweet (*Ulmaria filipendula*), Hard rush (*Juncus inflexus*) in wetter patches along with abundant Great willowherb (*Epilobium hirsutum*). Silverweed (*Potentilla anserina*) was common in the areas closer to the Huntsman along with frequent Red Bartsia (*Odontites verna*).

These areas were mown by the time the site visit was undertaken in April 2020 and again in Autumn 2020. Additionally, some repairs had been made to the boundary wall in the vicinity of the proposed path side works outside the SAC area, see Photo 12.6.

Photo 12.6: Showing the approach to Moneenageisha junction on the Dublin Road. Note the disturbed ground and wall repairs.

Galway Harbour Enterprise Park

It is proposed to use two sections of the Galway Harbour Enterprise Park as Construction Compounds see Diagram 12.10 and Photo 12.7 below. The areas comprise existing rough ground compounds with Recolonising bare ground (ED3) being the predominant habitat. Species present include typical ruderals such as Nipplewort (*Lapsana communis*), Dandelion (*Taraxacum* agg.), Ragwort (*Senecio jacobaea*), Bucks-horn plantain (*Plantago coronopus*) and Daisy (*Bellis perennis*). Sea radish (*Raphanus raphanistrum ssp.maritimus*) is also common throughout the area with Broad dock (*Rumex obtusifolius*), Coltsfoot (*Tussilago farfara*), Nettle (*Urtica diocia*) and Red valerian (*Centranthus ruber*). Two plants of Japanese Knotweed (*Reynoutria japonica*)(JKW) are located circa 32m from the site boundary in this area (ITM 530713 725014).

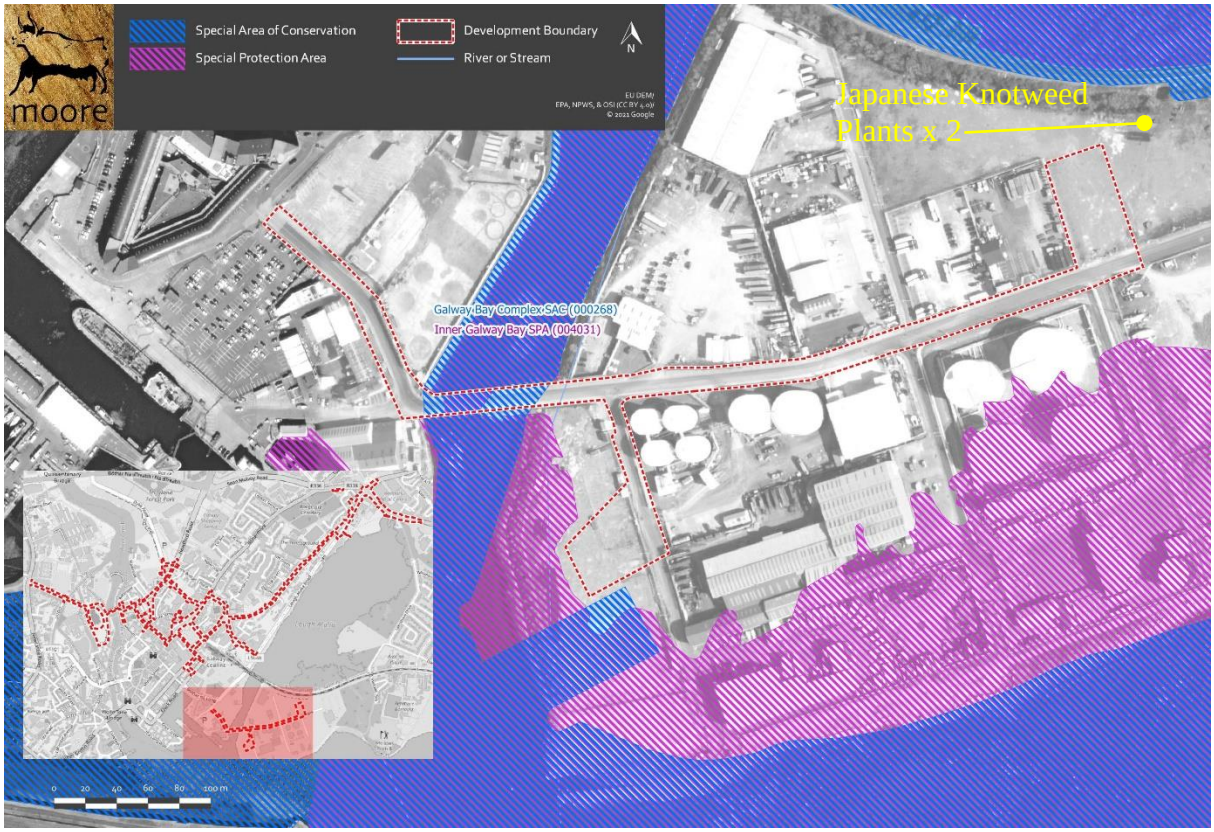

Diagram 12.10: Showing the project boundary in the Galway Harbour Enterprise Park area.

Invasive Species

There are no records of Third Schedule[31] invasive species within in the Project redline boundary.

One record of two relatively small bushes of Japanese Knotweed were recorded during habitat surveys located circa 32m to the east of a proposed Construction Compound at Galway Harbour Enterprise Park, see Photo 12.7 below.

There are two known records of Japanese Knotweed currently undergoing treatment by GCC in close proximity to the Scheme.

A record at Beggars Bridge, University Road, on the south side adjacent to the Millennium Children's Park appears to have been successfully treated with no signs of regrowth in March 2022.

A record at Lough Atalia Playground, adjacent to the bike park appears to have been successfully treated with no signs of regrowth in March 2022.

[31] The European Communities (Birds and Natural Habitats) Regulations 2011 contain provisions to address the problem of invasive species. These are listed in the Third Schedule of the Regulations.

Photo 12.7: Showing two Japanese Knotweed plants in the Galway Harbour Enterprise Park.

12.3.3.2 Fauna

Otters

Otters are well known to occur in the River Corrib both upstream of the Salmon Weir, in the Eglinton Canal and in the lower estuarine section of the river along Nimmo's Pier and signs have been record in Lough Atalia.

There is low potential for otter holts in the mill races or main river channel in the survey area given the solid bedrock and artificial surfaces historically placed as foundation for the main river channel and adjacent mill races. The rock armour of sections of Lough Atalia provides more opportunities in this respect.

Otters have been recorded upstream of the Salmon Weir and this author observed one swimming in the upper river circa 500m upstream of the weir to the rear of the NUIG campus in November 2015. There is an undocumented record from February 2020 by Dr. P. Gargan, IFI (pers. comm.) from the area below the Salmon Weir.

There are several sightings of otter on the NBDC website from 2015 – 2016 in the upper river and along the Eglinton Canal, which is directly connected to the upper river, and at the Claddagh Quay, see Diagram 12.11 below.

The closest records are of sightings of live animals with records from the Eglinton Canal in the vicinity of the Ryan Institute at NUIG from April and June 2016, from the splitting point from the Eglinton Canal of St. Clare's River at Canal

Road Upper from 2013, 2014 and 2016, and one record from the location of the 'Bish Weir' downstream on St. Clare's River from 2016.

There are also records from the Eglinton Canal where it meets the Claddagh Basin and also from the estuarine section of the river around Nimmo's Pier and Claddagh Beach and in Lough Atalia.

Anecdotal information suggests that there is a possible holt or resting place at the base of the Atlantic Apartment Building adjacent to the Fisheries Tower near Wolfe Tone Bridge (pers. comm. Ross Macklin having surveyed the city waterways for otters). However, this was not evident during the survey of this area during cleaning works in October 2020 when the water level was dropped.

There were no observations of otters using the Persse's Distillery River or the Friar's River channels during current surveys. It is likely that these channels are restricted by barriers such as weirs and culverting.

It is clear from the records that otters are commuting from the lower River near the Claddagh Basin along the mill races at Parkavara and Nuns Island to the Eglinton Canal and the upper River Corrib. This was confirmed during a walk by the author on 3 April 2022 when a single otter was observed swimming in the lower reaches of St. Clare's River at Mill Street opposite the Garda Station. The otter continued under the road leaving Nun's Island and was observed disappearing into the sluice under the Bridge Mills Building. A notable record given it was mid-afternoon in bright daylight.

It is likely that the salmon weir and side weirs are limiting factors in terms of movement on the main river channel in this regard.

Records of otters from the NBDC database downloaded on 2 March 2022 are presented in Diagram 12.11 below.

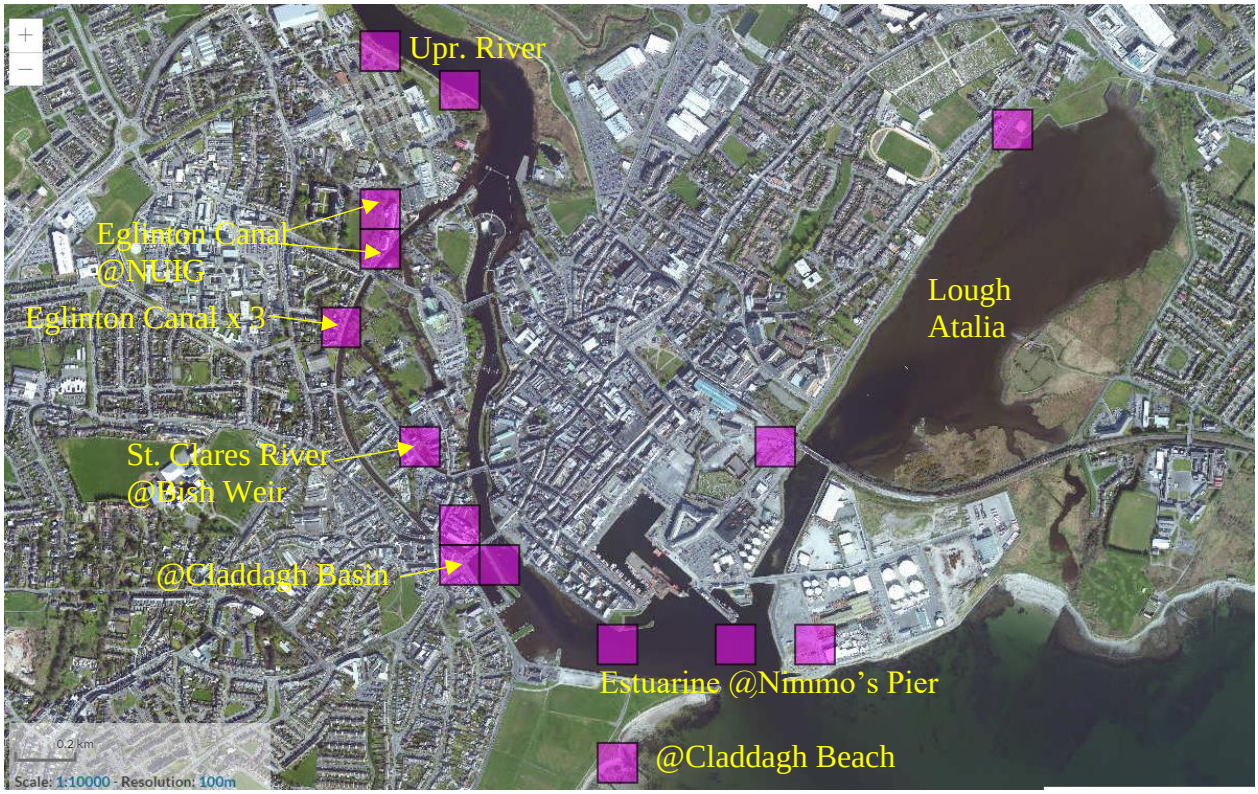

Diagram 12.11: Showing the NBDC records for otters in the study area (02/03/22).

Bats

Walked Transects

The dusk mobile detector survey was carried out on 17 July 2019 completing walked transects of the site of two buildings to be removed the junction of the Headford Road and St. Brendan's Avenue to survey for commuting, feeding and potential roost sites. The survey commenced at 20:00 and continued for four hours in line with recommendations in Chapter 10 of the Bat Conservation Trust 'Good Practice Guidelines, 3rd Edition, 2016' (Collins, J. (ed) 2016[32]) and The Irish Wildlife Manual No. 25' (Kelleher, C. & Marnell, F. 2006[33]).

There were no recorded calls or passing bats on the night of 17 July 2019. There were no signs of emergence from either building during the survey.

Tree Surveys

All trees within the project boundary were assessed for bat roost potential – there were no trees of the appropriate size and with sufficient gaps, cracks, crevices or holes to be used by bats.

[32] Collins, J. (ed.) (2016) *Bat Surveys for Professional Ecologists: Good Practice Guidelines* (3rd edn). The Bat Conservation Trust, London

[33] Kelleher, C. &. F. Marnell (2006). *Bat Mitigation Guidelines.* Dublin: National Parks and Wildlife Service, Department of Environment, Heritage

Lesser horseshoe bat (*Rhinolophus hipposideros*)

There were no records of calls from Lesser horseshoe bats recorded in the survey and no cavity found within any tree was suitable for this species.

The results of bat surveys for the N6 Ring Road Project have shown that this species does not occur in the project area and will not be affected. This is supported by the results of radio tracking surveys for the N6 Project which have shown that this species did not forage in the urban area of Galway City to the south of the Quincentenary Bridge (Rush, T., Billington, G., 2015).[34].

Seals

Harbour/Common seal (*Phoca vitulina*) are regularly seen in the estuarine waters downstream of Wolfe Tone Bridge.

Salmonids

The Galway Fishery starts from just below the weir and extends the short distance of 250m down to the Salmon Weir Bridge. It is one of the most prolific salmon fisheries in Ireland as the fish queue up to navigate the weir.

The River Corrib is registered as a Salmonid Water under the Salmonid Regulations. Salmonid waters are included within the Register as areas protected for water dependent species and habitats. The protected areas for Salmonid species are comprised of the 34 Salmonid rivers, tributaries and lakes listed in the Salmonid Regulations (S.I. 293 / 1988).

Lamprey

The River Corrib is noted as an important river for Sea Lamprey (*Petromyzon marinus*) (Igoe *et al.*, 2004[35]) whereas no River Lamprey have been recorded from the system. The Project Ecologist has observed cormorants feeding on sea lamprey both on the riverbank at the Fisheries Tower and from the river downstream of Wolfe Tone Bridge.

During a qualitative survey of lampreys present in the Corrib catchment, only one species of lamprey was confirmed from the Corrib catchment: Brook lamprey (*Lampetra planeri*)[36]. Sea lampreys are present in the catchment but seem to be confined to below the Galway regulating weir.

Although there are records of sea lampreys in some of the tributaries of Lough Corrib, these records pre-date the construction of the existing weir. The success of sea lamprey spawning below the regulating weir in Galway is unknown.

[34] Rush, T., Billington, G. (2015). Galway bat radio-tracking project. Radio tracking studies of lesser horseshoe bat species, May 2015. Greena Ecological Consultancy. Witham Friary, Frome 2015.

[35] Igoe, Fran & Quigley, Declan & Marnell, Ferdia & Meskell, E. & O'Connor, W. & Byrne, C. (2004). The Sea Lamprey Petromyzon marinus (L.), River Lamprey Lampetra fluviatilis (L.) and Brook Lamprey Lampetra planeri (Bloch) in Ireland: General Biology, Ecology, Distribution and Status with Recommendations for Conservation. Biology and Environment-proceedings of The Royal Irish Academy.

[36] O'Connor, W. (2007) A Survey of Juvenile Lamprey Populations in the Corrib and Suir Catchments. Irish Wildlife Manuals No. 26. National Parks and Wildlife Service, Department of Environment, Heritage and Local Government, Dublin, Ireland.

Birds

Breeding birds

Breeding bird species recorded included regular passerines such as Chaffinch (*Fringilla coelebs*), Blackbird (*Turdus merula*), Wren (*Troglodytes troglodytes*). A list of bird species recorded during fieldwork is presented in Table 12.4.

Gulls flying overhead included Herring gulls (*Larus argentatus*) and Black-headed gulls (*Larus ridibundus*). Herons (*Ardea cinerea*) have been observed perched on dryer banksides during periods of low water during the summer and observed downstream of the shopping centre in the channel of the Friar's River at Newtownsmith and along the shore at Lough Atalia.

A single Dipper (*Cinclus cinclus*) was recorded in October 2019 in the Persse's Distillery River circa 20m downstream of the Salmon Weir Bridge feeding from a discarded bicycle. Dippers were also observed on St. Claires' River and the Parkavera River near Mill Street along with Grey wagtails (*Motacilla cinerea*). Mute swans feed in the main channel of the lower River Corrib during the lower water level seasons and shelter in the inner reaches of Lough Atalia near Lakeshore Drive. There is one well recorded faithful nesting place near the Proposed Scheme in the canal opposite the Cathedral under the footbridge leading to the Millennium Children's Park. The nest site has been repeatedly used successfully over the past number of years and future use is unlikely to be affected by the Proposed Scheme.

Table 12.4: Breeding Birds Recorded during Site Surveys.

Birds	Scientific name	BWI	Habitat Type
Blackbird	*Turdus merula*	Green	Dense woodland to open moorland, common in gardens
Chaffinch	*Fringilla coelebs*	Green	Hedgerows, gardens and farmland
Goldfinch	*Carduelis*	Green	Open woodland, gardens and farmland
Woodpigeon	*Columba palumbus*	Green	Gardens, woods, hedges
Wren	*Troglodytes*	Green	Low cover anywhere, especially woodlands
Swallow	*Hirundo rustica*	Amber	Hedgerows, gardens and farmland.
Mute Swan	*Cygnus olor*	Green	Rivers, lakes, ponds, canals
Mallard Duck	*Anas platyrhynchos*	Green	Rivers, lakes, ponds, canals
Heron	*Ardea cinerea*	Green	Rivers, lakes, ponds, canals
Dipper	*Cinclus hibernicus*	Green	Rocky streams and rivers

In addition to summer breeding birds, the presence of Common tern (*Sterna hirundo*) in Lough Atalia is notable as is the presence of a nesting raft placed in 2019 at the western end of the lough opposite the Galmont Hotel. The raft is monitored by Conservation Volunteers Galway and has recorded regular breeding pairs since then. The nearest raft is located circa 570m from the work area at Lough Atalia Playground.

Wintering birds

Inner Galway Bay is a key site supporting numbers of waterbirds of international and national importance. Based on counts between 2013/14 and 2017/18[37], the mean peak annual count is 13,294 and includes the following species; Great Northern Diver, Light-bellied Brent Goose, Bar-tailed Godwit, Black-tailed Godwit, Cormorant, Curlew, Dunlin, Little Egret, Great Crested Grebe, Greenshank, Golden Plover, Grey Plover, Grey Heron, Lapwing, Little Grebe, Redshank, Red-breasted Merganser, Ringed Plover, Shelduck, Shoveler, Teal, Turnstone and Wigeon.

Birdwatch Galway note that during Winter Little Grebe and duck like Wigeon, Teal, Shelduck, Goldeneye and Red-breasted Merganser can be seen at close range. Of special note is the winter Scaup flock, which may number 50 birds[38].

Wintering bird species recorded at low tide at Lough Atalia in the vicinity of the proposed outfall at Lough Atalia Playground includes Mute swan (*Cygnus olor*)(12) and Wigeon (*Anas penelope*)(12) in January 2022, flocks of Black-headed gulls (*Chroicocephalus ridibundus*) +70 on 2 March 2022, small numbers of Teal (*Anas crecca*)(8) and Oystercatcher (*Haematopus ostralegus*)(12), Redshank (*Tringa totanus*)(4) and occasional single Little Egret (*Egretta garzetta*).

As mentioned in the chapter Methodology, while these surveys do not constitute a full Winter bird survey, they are representative of the birdlife present at the location of the proposed outfall at the shoreline at Lough Atalia Playground. It may also be noted that the bird population in the area are mobile and present in varying numbers depending on the state of the tide with much reduced habitat availability at high water when rocks and mudflats are covered.

Additionally, repeated fieldwork particularly in the vicinity of the eastern extent of Lough Atalia and specifically in relation to the areas of amenity grassland, has determined that these areas are of reduced value to Wintering birds due to the existing levels of human activity and preference for the intertidal and aquatic habitats of the lagoon itself.

12.4 Characteristics of the Proposed Scheme

The Proposed Scheme refers to the BusConnects Galway: Cross-City Link (University Road to Dublin Road) Project consisting of the alteration of existing road layouts, including junction layouts, footpaths, signalling, pedestrian crossings, drainage and other associated works.

An overview of the likely scheme construction phasing and the necessary construction works associated with each phase is outlined in Chapter 5 (Construction) of this EIAR.

[37] Fitzgerald, N., Burke, B. & Lewis, L.J. (2021) Irish Wetland Bird Survey: Results of waterbird monitoring in Ireland in 2016/17 and 2017/18. BirdWatch Ireland, Wicklow.
[38] http://www.birdwatchgalway.org/whereto1.htm#atalia

For the majority of the works associated with the scheme, it is envisaged that normal working hours will be followed. In specific circumstances, such as road crossings or road resurfacing, the works will be carried out at night.

Existing signage will be retained or relocated within widened footpaths. Additional new signage will also be required at locations throughout the scheme. Typical excavation depths for installation of new signage will be approximately 1m.

Existing road markings will be retained where still valid within the carriageway. New road markings will be applied at locations throughout the scheme either via removal and replacement of existing markings or application of new road markings following resurfacing works.

Utility covers will be raised to match new ground heights where applicable.

A new drainage pipe and non-return valve to be installed at discharge point into Lough Atalia. The maximum depth of trench excavation required to install the new pipe, gully post and new connection pipes is 2.2m. Additionally, a new attenuation tank and petrol interceptor will be installed, which will require excavation of approximately 3.5m -3.75m for installation.

12.5 Potential Impacts

12.5.1 'Do-Nothing' Scenario

The do-nothing scenario would involve the Proposed Scheme not taking place. The baseline environment would not change. The do-nothing scenario would have a neutral impact on biodiversity.

12.5.2 Construction Phase

12.5.2.1 Habitats & Flora

The predominant habitats under the majority of the footprint of the Proposed Scheme are artificial and include road and paved surfaces. There are no potential effects on the terrestrial habitats of the Proposed Scheme. There are no rare or protected flora under the footprint of the Proposed Scheme.

Habitats at University Road

The predominant habitats at University Road are artificial and include road and paved surfaces. However, the scheme crosses the Eglinton Canal and at Ward's Shop there are openings in the roadside wall to the canal where surface water could potentially enter the canal.

The possibility of this occurring is unlikely but cannot be ruled out and any discharge of contaminated surface water either from an event of sustained elevated suspended solids or a Hydrocarbon spill has the potential to have a negative moderate effect on the immediate receiving environment of the canal. The effect will be temporary and unlikely to reach the main channel of the River

Corrib. However, construction management will be employed to avoid the possibility.

Habitats at Salmon Weir Bridge

The predominant habitats at Salmon Weir are artificial and include road and paved surfaces. However, the scheme crosses the main channel of the river which is designated as part of the Lough Corrib SAC. It is unlikely that surface water will enter river as there are no pathways. It is not predicted that significant levels of dust will be generated from the proposed works.

The possibility of elevated suspended solids from dust occurring is unlikely but cannot be ruled out and the contamination of surface water either from an event of sustained elevated suspended solids has the potential to have a negative moderate effect on the immediate receiving environment of the river. The effect will be temporary and not significant. However, construction management will be employed to avoid the possibility.

Habitats at Lough Atalia

At the College Road Service Station (CRSS), the works will include the removal of two underground tanks and the removal of two pumping stations also requiring the removal and relocation of a number of underground fuel pipes within the site along with excavation of up to approximately 200m^3 of contaminated soil and stone.

This aspect of the Proposed Scheme is considered in Chapter 14 (Land, Soils, Geology and Hydrogeology) of this EIAR which address the potential for contaminated land. The chapter includes a Land Contamination Remedial Strategy for the CRSS.

A new drainage pipe and non-return valve to be installed at discharge point into Lough Atalia. Additionally, a new attenuation tank and petrol interceptor will need to be installed, which will require excavation of approximately 3.5m -3.75m for installation.

The habitats present at Lough Atalia Playground are artificial and include adjacent Amenity grassland (GA2) through which the pipeline to the outfall would be placed. The discharge point is comprised of an artificial rock armour shoreline (CC1) and there are no Annexed habitats under the footprint of the works.

However, uncontrolled surface water could potentially enter the receiving environment of Lough Atalia. The possibility of this occurring is unlikely but cannot be ruled out and any discharge of contaminated surface water either from an event of sustained elevated suspended solids or a Hydrocarbon spill could have a Negative, Moderate effect on the immediate receiving environment of the Lough. The effect would be temporary and construction management will be required to avoid the possibility.

The proposed works at the Dublin Road proximal to Lough Atalia include upgrading of the footpath at the eastern extent of Lough Atalia opposite the G Hotel/Eye Cinema.

Uncontrolled surface water could potentially enter the receiving environment of Lough Atalia. The possibility of this occurring is unlikely but cannot be excluded and any discharge of contaminated surface water either from an event of sustained elevated suspended solids or a Hydrocarbon spill could have a negative moderate effect on the immediate receiving environment of the lough. The effect would be temporary and construction management will be employed to avoid the possibility.

Invasive Species

The record of Japanese Knotweed at Galway Harbour Enterprise Park is located over 32m from the compound boundary and may be noted for avoidance only. It does not require specific management for this Scheme.

The presence of two treated locations at Beggars Bridge and Lough Atalia Playground are also included for reference only and appear to have been successfully treated.

The presence of Winter heliotrope in the Amenity grassland along the Dublin Road from the Huntsman Inn to the corner of the Brothers of Charity Woodlands Campus is of moderate concern.

While not a Third Schedule species, it spreads, if uncontrolled, in contaminated soil. It could have an indeterminate negative effect on the receiving environment in terms of crowding out native species of flora.

12.5.2.2 Water Quality

The primary concern with regard to this project stem from the potential for negative effects from the uncontrolled discharge of contaminated surface water at three key locations:

- University Road at Ward's Shop;
- Lough Atalia Playground at the proposed site of a new outfall; and
- Lough Atalia adjacent to the Dublin Road opposite the Eye Cinema.

Considering that the Proposed Scheme will pass though the forecourt of the College Road Service Station and because it is located in the vicinity of Lough Atalia SAC a detailed assessment of the contamination in the soil has been carried out in that area. The assessment has followed the methodology presented in the Environmental Protection Agency's "Guidance on the management of Contaminated Land and Groundwater at EPA licensed sites". The assessment is presented in the Appendix 14.3 of Volume 4 of this EIAR.

The results of this assessment show:

- The site has been previously a print works and a filling station has been operated on the site since the 1960's. A detailed ground investigation was carried out which did not prove any significant soil or groundwater contamination from the storage of fuels on the site.
- Based on the results of the ground investigation cadmium and hydrocarbons are present in groundwater under the CRSS that is likely to originate from

made ground under the CRSS. It is possible that cadmium and hydrocarbons originating from the made ground under CRSS is the source of elevated cadmium and hydrocarbons in the seepages on the banks of Lough Atalia.

Any deterioration of water quality from the established Good quality status of the River Corrib and Unpolluted status of Lough Atalia could potentially have a negative indeterminable temporary effect on either the food sources in the aquatic habitats or on aquatic species outlined in the section on fauna below. It would also be contrary to the obligations of the Water Framework Directive 2000/60/EC[39].

12.5.2.3 Fauna

Otters

There were no signs of otters at Lough Atalia Playground along the shore from the vicinity of the Dublin Road to the site of the proposed outfall. The rock armour is embedded in concrete and does not present opportunities for holt construction.

Any previous signs, such as spraints would have been from occasional passing otters.

There will be no direct effects on otters. It is unlikely that the construction phase would generate significant disturbance to otters and there will be no permanent barriers to otter movement during the construction phase.

A worst-case scenario may be considered where a pollution event would indirectly affect food availability to otters. However, a Construction Environmental Management Plan (CEMP, refer to Appendix 5.1 of Volume 4 of this EIAR) which includes specific management measures for the prevention of the pollution of water courses from suspended solids or chemicals will be implemented.

Bats

Both residences at St. Brendan's Avenue and Headford Road Junction were determined to have low potential for bat roosting given the status of their roofs and recent maintenance resulting in reduced potential.

No bats were recorded during a sample survey at the appropriate season time and good weather conditions.

All trees to be impacted are assigned a Category 4 (refer to Table 12.2) status according to Bat Conservation Guidance indicating no roost potential.

There will be no loss of potential bat roosts and there will be no significant adverse effect on bats.

Seals

There will be no direct effect on Common seals; potential impacts are indirectly related to water quality and food sources.

[39] Directive 2000/60/EC of the European Parliament and of the Council of 23 October 2000 establishing a framework for Community action in the field of water policy

In the absence of mitigation, potential indirect negative effects could be indeterminable but would be unlikely and temporary.

The CEMP (refer to Appendix 5.1 of Volume 4 of this EIAR) includes specific management measures for the prevention of the pollution of water courses from suspended solids or chemicals.

Salmonids

There will be no direct impact on salmonids; potential impacts are indirectly related to water quality and food sources.

Elevated suspended solids may be harmful to salmonids resulting in reduced oxygenation of surface waters due to settlement and the formation of deposits on the riverbed which in turn can give rise to septic and offensive conditions. Elevated suspended solids can clog salmonid gills and potentially cause mortality.

Chemical spills can result in fish mortality and could affect feeding habitats for bird species that rely on the sand and mudflats downstream in Galway Bay for food sources.

Wet concrete and cement are very alkaline and corrosive and, in the absence of mitigation, can cause serious pollution to watercourses.

In the absence of mitigation, potential indirect negative effects are considered to be moderate but would be unlikely and temporary.

Lamprey

There will be no direct impact on Lamprey species; potential impacts are indirectly related to water quality and food sources.

In the absence of mitigation, potential indirect negative effects are considered to be indeterminable but would be unlikely and temporary.

Birds

Breeding Birds

All birds are protected under the Wildlife Acts. There will be no direct effects on birds and there will be no significant loss of bird habitats.

Nesting swans in the canal opposite the Cathedral are highly unlikely to be affected by the Proposed Scheme given the repeated use of the nesting site with existing levels of traffic and uncontrolled human activity.

Nesting terns in Galway Bay are highly unlikely to be affected by the Proposed Scheme given the distance of the proposed works from the nearest raft at Fairgreen Road circa 320m and over 500m to the proposed outfall works at Lough Atalia.

Chemical spills can result in fish mortality and could affect feeding habitats for bird species that rely on the sand and mudflats downstream in Galway Bay for food sources.

In the absence of mitigation potential indirect negative effects are considered to be indeterminable but would be unlikely and temporary.

Wintering Birds

The proposed works at the intertidal site of the proposed outfall at Lough Atalia Playground have the potential to disturb wintering birds in these areas. Given, the quieter more secluded location of the proposed outfall, Wintering birds are less likely to be acclimatised to disturbance. The potential impact in the absence of mitigation would be negative, moderate and temporary and can be avoided.

Given the proximity of the adjacent Dublin Road opposite the Eye Cinema and the existing level of urban disturbance on a busy national road and walkers on the Lough Atalia pathways, the potential effects from disturbance on birds in this section of the SPA are unlikely in an area up to 150m from the works area. In this area, birds are accustomed to the existing levels of disturbance and the effect will be imperceptible and short term and will not require timing restriction.

12.5.3 Operation Phase

12.5.3.1 Habitats & Flora

The Proposed Scheme will not have any operational effects on Habitats or Flora. Standard SuDS features such as gully traps and interception will control surface water runoff.

The Proposed Scheme includes measures particularly at Lough Atalia to redirect uncontrolled surface water runoff to the Lough and redirect it to settlement and interception to improve the water quality of surface water entering Lough Atalia. This is considered a Positive, Long-term effect.

12.5.3.2 Air Quality

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)’. An assessment of the ecologically sensitive sites listed in Section 7.2.5.5 of Chapter 7 (Air Quality) of this EIAR has been carried out. The detailed results are not repeated in this chapter. However, the assessment of air quality during the operational phase are pertinent.

There are three ecologically designated sites which are within 2km of the boundary of the Proposed Scheme, namely Galway Bay Complex SAC and pNHA (Site Code 000268), Lough Corrib SAC (Site Code 000297) and Inner Galway Bay SPA (Site Code 004031).

Potential maximum deposition of nitrogen (including background) is in compliance with the worst-case critical load at the worst-case receptor. The IAQM guidance states that where the proposed contribution (PC) is less than 70% of the long-term critical level / load, the PC is likely to be insignificant. There will therefore be no impact on ecologically sensitive sites. In accordance with the EPA

Guidelines (EPA 2022) the ecological effects associated with the operational phase traffic emissions are overall Neutral and Long-term.

12.5.3.3 Fauna

Otters

The Proposed Scheme will not result in any barriers to movement to otters once the project becomes operational.

Bats

Having regard to the Urban Development and Building Heights: Guidelines for Planning Authorities (DoHLG, 2018)[40], in development locations in proximity to sensitive bird and/or bat areas, proposed schemes need to consider the potential interaction of the building location, building materials and artificial lighting to impact flight lines and/or collision.

Any new lighting will be LED type which is directional and reduces light spill to the surrounding environment. The replacement of older sodium lamps with new LED directional lights such as those erected in the vicinity of the Millennium Children's Park at University Road has not affected bat commuting activity recorded regularly during repeated Galway Bat Group walks in this area by the author.

To this end, the Proposed Scheme does not include any significant changes in lighting or streetscape that would have a significant effect on bat commuting in Galway City.

Seals

The Proposed Scheme will not result in any barriers to movement to seals once the project becomes operational and Common seals will not be affected during the operational phase.

Salmonids

The Proposed Scheme will not result in any barriers to movement to Salmon or fish once the project becomes operational and Salmonids will not be affected during the operational phase.

Lamprey

The Proposed Scheme will not result in any barriers to movement to Lamprey once the project becomes operational and Lamprey will not be affected during the operational phase.

Birds

There will be no direct effects on birds and there will be no significant loss of bird habitats.

[40] Department of Housing, Planning and Local Government (2018) Urban Development and Building Heights: Guidelines for Planning Authorities

12.6 Mitigation Measures & Monitoring

12.6.1 Construction Phase

A Construction Environmental Management Plan 'CEMP' (refer to Appendix 5.1 of Volume 4 of this EIAR) establishes the potential connectivity of the proposed project to the Galway Bay Complex SAC, the Lough Corrib SAC and the Inner Galway Bay SPA, and the requirement for avoidance of adverse effects from construction activity as well as specific mitigation for local biodiversity, e.g. tree removal.

The Contractor will be required to enforce the CEMP which will include the following construction management measures. An Ecological Clerk of Works (EcOW) will be employed to maintain a watching brief on the proposed mitigation measures included for the protection of European sites.

12.6.1.1 Environmental Incident Response Plan

In the event of an environmental emergency, all personnel will react quickly and adhere to the Environmental Incident Response Plan procedure, refer to Section 5.6 of the CEMP included in Appendix 5.1 of Volume 4 of this EIAR (to be updated by the Contractor). The following outlines the information on the types of emergency which must be communicated to site staff:

- Release of hazardous substance – fuel or oil spill.
- Concrete spill or release of concrete.
- Flood event – extreme rainfall or rising river level event.
- Environmental buffers and exclusion zones breach.
- Housekeeping of materials and waste storage areas breach.
- Stop work orders due to environmental issue or concern (e.g. threat to ecological feature).

12.6.1.2 Invasive Species Management Plan

Refer to the CEMP (Appendix 5.1 of Volume 4 this EIAR) for full details on the management of the potential for invasive species.

12.6.1.3 Habitats & Flora

With regard to biodiversity any felling of trees will take place outside the Bird nesting season March 1st to August 31st.

12.6.1.4 Water Quality

The primary concern with regard to this project stem from the potential for negative effects from the uncontrolled discharge of contaminated surface water at four key locations:

- University Road at Ward's Shop;

- River Corrib at the Salmon Weir Bridge;
- Lough Atalia Playground at the proposed site of a new outfall; and
- Lough Atalia adjacent to the Dublin Road opposite the Eye Cinema.

The CEMP includes specific management measures for the prevention of the pollution of water courses from dust, suspended solids or chemicals.

These measures accord with the principles set out in industry guidelines including CIRIA's report 'C532: Control of water pollution from construction sites'.

The following site specific mitigation measures will be employed:

River Corrib at Salmon Weir Bridge

- As a precaution, the control of dust emissions will be enforced by providing a suitable barrier to prevent dust entering the River Corrib at the Salmon Weir Bridge for the length of the Scheme required to prevent emissions to Persse's Distillery river, the main channel of the river and Friar's River at Newtownsmith from the proposed disturbance area. The barrier will be inspected on a weekly basis for gaps or displacement and reinstated when required.
- A record of inspection and efficacy of the barrier will be noted in the printed version of the CEMP as an inspection sheet. The record of inspections will be maintained on site and will be available upon request by relevant authorities.
- Details of the dust minimisation measures are included in a Construction and Demolition Resource and Waste Management Plan, as described in the CEMP.

Eglinton Canal at University Road/Ward's Shop

- The control of surface water discharge will be enforced by providing a suitable barrier to prevent surface water entering the Eglinton Canal at gaps in the boundary wall leading to the canal and for the length of canal required to prevent drainage to the canal from the proposed disturbance area. The barrier will comprise a silt curtain placed with sand bags or a suitable supporting frame. The silt curtain will be inspected on a weekly basis for gaps or displacement and reinstated when required.
- A record of inspection and efficacy of the barrier will be noted in the printed version of the CEMP as an inspection sheet. The record of inspections will be maintained on site and will be available upon request by relevant authorities.

Lough Atalia Playground Outfall

- The works at Lough Atalia Playground will avoid potential disturbance to wintering birds by undertaking the works outside the Winter bird period October to March.
- The works at Lough Atalia Playground will be timed to avoid 'spring' high water times and inclement weather (southerly/south-westerly winds) in order to avoid washing of surface water to the sea. Tide times are available from several websites. The delay time for the ebb and flow time to Lough Atalia will be determined by the Contractor or representative Resident Engineer.

- The control of surface water discharge will be enforced by firstly providing a temporary sandbag dam at the headwall of the proposed outfall prior to work commencing in this area at low tide. The temporary dam will comprise 1 tonne bags (or similar suitable size) placed at low tide at the foot of the rock armour berm in this area. A silt curtain or suitable geotextile barrier will be placed inside the dam and secured using smaller sandbags as required to form an impermeable barrier to prevent hydrocarbon and contaminated surface water runoff to Lough Atalia.
- The control of surface water discharge will be enforced by providing a suitable barrier to prevent surface water entering Lough Atalia in the proposed trench leading to the outfall. The barrier will comprise a silt fence placed with sand bags or a suitable supporting frame. A typical silt fence consists of a piece of synthetic filter fabric (also called a geotextile) stretched between a series of wooden or metal fence stakes along a horizontal contour level, see Diagram 12.12 below for sample details. The stakes will be installed on the downhill side of the fence, and the bottom edge of the fabric will be trenched into the soil and backfilled on the uphill side. The fence will be installed on a site before soil disturbance begins and is placed down-slope from the disturbance area. The design/placement of the silt fence will create a pooling of runoff, which then allows sedimentation to occur. The silt fence fabric becomes "blocked off" with fine soil particles and clean water can seep through the fabric. The silt fence will be inspected on a weekly basis for gaps or displacement and reinstated when required.
- A record of inspection and efficacy will be noted in the printed version of the CEMP as an inspection sheet. The record of inspections will be maintained on site and will be available upon request by relevant authorities.

Lough Atalia Adjacent to the Dublin Road

- The works at the Lough Atalia Dublin Road area will be timed to avoid ‘spring’ high water times and inclement weather (southerly/south-westerly winds) in order to avoid washing of surface water to the sea. Tide times are available from several websites. The delay time for the ebb and flow time to Lough Atalia will be determined by the Contractor or representative Resident Engineer.
- The control of surface water discharge will be enforced by providing a suitable barrier to prevent surface water entering Lough Atalia. The barrier will comprise a silt fence placed with sand bags or a suitable supporting frame such as a staked fence. A typical silt fence consists of a piece of synthetic filter fabric (also called a geotextile) stretched between a series of wooden or metal fence stakes along a horizontal contour level, see Diagram 12.12 below for sample details. The stakes will be installed on the downhill side of the fence, and the bottom edge of the fabric can be trenched into the soil and backfilled on the uphill side. The fence will be installed on a site before soil disturbance begins and is placed down-slope from the disturbance area. The design/placement of the silt fence should create a pooling of runoff, which then allows sedimentation to occur. The silt fence fabric becomes "blocked off" with fine soil particles and clean water can seep through the fabric.
- The silt fence will be inspected on a weekly basis for gaps or displacement and reinstated when required.

- A record of inspection and efficacy will be noted in the printed version of the CEMP as an inspection sheet. The record of inspections will be maintained on site and will be available upon request by relevant authorities.

All Working Areas Adjacent to Water Courses/Water Bodies

- Tools and equipment will not be cleaned in grassland or aquatic areas.
- Chemicals used will be stored in sealed containers.
- Chemicals shall be applied in such a way as to avoid any spillage or leakage.
- All refuelling, oiling and greasing will take place above drip trays or on an impermeable surface which provides protection to underground strata and away from grassland as far as reasonably practicable. Vehicles will not be left unattended during refuelling.
- All plant will be well maintained with any fuel or oil drips attended to on an ongoing basis.
- Any minor spillage during this process will be cleaned up immediately.
- Best practice in bulk-liquid concrete management addressing pouring and handling, secure shuttering / form-work, adequate curing times will be implemented.
- Wash water from cleaning ready mix concrete lorries and mixers may be contaminated with cement and is therefore highly alkaline, therefore, washing will not be permitted on site.
- Disposal of raw or uncured waste concrete will be controlled to ensure that the aquatic environment will not be impacted.

For the management of excavation and spoil, the Contractor will:

- Ensure all spoil and excavated materials will be stored in the construction compound or removed to an appropriate waste facility;
- Ensure stockpiles and adjacent features of drainage infrastructure will be monitored and maintained appropriately;
- The Construction and Demolition Resource and Waste Management Plan as described in the CEMP identifies any material such as dust, sand, rubble, concrete that may be generated during demolition works and address its storage and appropriate removal from the site to avoid pathways identified as having connectivity with the River Corrib or Lough Atalia;
- Erect all protective fencing; and
- Implement the Surface Water Management Plan (including the installation of drainage infrastructure) as detailed in the CEMP (Appendix 5.1 in Volume 4 of this EIAR) prior to excavation and include areas dedicated to spoil storage with the drainage infrastructure.

Site personnel will be trained in the importance of preventing pollution and the mitigation measures described here to ensure same. A record of this training will be maintained.

The Construction Environmental Management Plan will be read and signed by the Contractor/Site Foreman and made available to the EcOW.

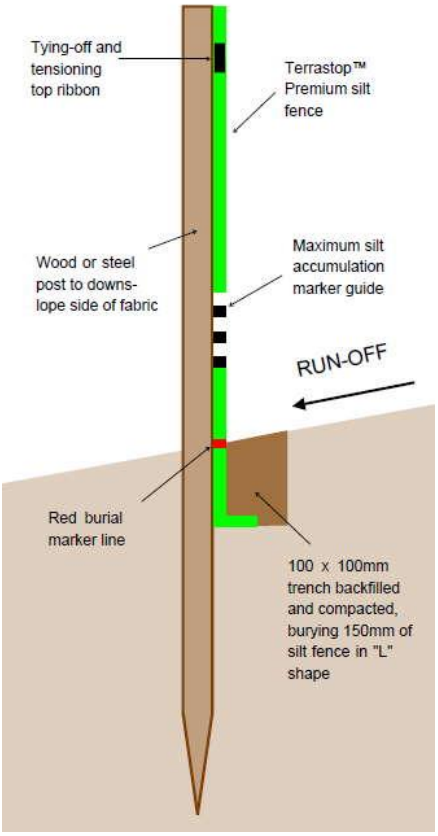

Diagram 12.12: Silt fence

12.6.1.5 Fauna

Otters

There will be no direct impact on Otters and potential impacts are indirectly related to water quality and food sources.

A worst-case scenario may be considered where a pollution event would indirectly affect otters or food availability to otters. The Construction Environmental Management Plan (refer to Appendix 5.1 of Volume 4 of this EIAR) which includes specific management measures for the prevention of the pollution of water courses from suspended solids or chemicals.

Bats

No records of Lesser horseshoe bat were detected during the survey and no cavity found within any tree was suitable for this species.

Ground level potential roost feature surveys conducted on trees within the study did not reveal any roosting bats. There are no further requirements for mitigation for bats.

The roofs of buildings at the Headford Road and St. Brendan's Avenue are relatively recently upgraded and well-sealed with limited access for bats. However, as a precaution, an internal inspection of the attic spaces will be undertaken at an appropriate time prior to demolition in order to rule out the

presence of bats. If any are recorded, specific mitigation measures which may require a derogation licence from the NPWS will be implemented.

Seals

There will be no direct impact on Seals and potential impacts are indirectly related to water quality and food sources.

A worst-case scenario may be considered where a pollution event would indirectly affect otters of food availability to seals. The Construction Environmental Management Plan (refer to Appendix 5.1 of Volume 4 of this EIAR) includes specific management measures for the prevention of the pollution of water courses from suspended solids or chemicals.

Salmonids

There will be no direct impact on these Salmonids and potential impacts are indirectly related to water quality and food sources.

A worst-case scenario may be considered where a pollution event would affect water quality and threaten salmonids. The Construction Environmental Management Plan (refer to Appendix 5.1 of Volume 4 of this EIAR) includes specific management measures for the prevention of the pollution of water courses from suspended solids or chemicals.

Lamprey

There will be no direct impact on Lamprey species and potential impacts are indirectly related to water quality and food sources.

A worst-case scenario may be considered where a pollution event would indirectly affect lampreys. The Construction Environmental Management Plan (refer to Appendix 5.1 of Volume 4 of this EIAR) includes specific management measures for the prevention of the pollution of water courses from suspended solids or chemicals.

Birds

Any felling, clearing or pruning of vegetation will take place outside the Bird nesting season March 1st to August 31st.

The proposed works at the outfall at Lough Atalia Playground have the potential to disturb wintering birds in these areas. Potential impacts be avoided by undertaking the works at Lough Atalia Playground outside the Winter bird period October to March.

Given the proximity of the adjacent Dublin Road opposite the Eye Cinema and the existing level of urban disturbance on a busy national road and walkers on the Lough Atalia pathways, the potential effects from disturbance on birds in this section of the Proposed Scheme will not generate a disturbance level over or above the existing background levels of disturbance and will not require timing restriction.

12.6.2 Operation Phase

Bats

The Proposed Scheme does not include any significant changes in lighting or streetscape that would have a significant effect on bat commuting in Galway City.

Aquatic Environment

The Proposed Scheme will incorporate SuDS features in order to improve water quality and reduce the quantity of surface water discharging into the receiving system.

12.6.3 Monitoring

12.6.3.1 Monitoring During Construction

An Ecological Clerk of Works (EcOW) will be employed to maintain a watching brief on the proposed mitigation measures included for the protection of European sites.

An initial site environmental induction and ongoing training will be provided to communicate the main provisions of this environmental plan to all site personnel.

Two-way communication will be encouraged to promote a culture of environmental protection.

The following outlines the information which must be communicated to site staff:

- Environmental procedures of the CEMP.
- Environmental buffers and exclusion zones.
- Housekeeping of materials and waste storage areas.
- Environmental emergency response plan.

Prior to any works, all personnel will receive an on-site induction relating to operations adjacent to watercourses and the environmentally sensitive nature of the River Corrib and to re-emphasise the precautions that are required as well as the construction management measures to be implemented.

Galway City Council will also ensure that the engineer setting out the works is fully aware of the ecological constraints and construction management requirements.

12.6.3.2 Monitoring During Operation

In the Operational Phase the maintenance regime for these SuDS will be carried out by local authorities and will be subject to their management procedure. No monitoring has been proposed with respect to effects from operation of the Proposed Scheme.

12.7 Residual Effects

12.7.1 Residual Effects during Construction

Given, the inclusion of avoidance measures for bats and birds and given the inclusion of best practice construction management measures to be employed as per a site specific CEMP with regard to the protection of water courses and maintenance of good water quality for Salmonids, Lamprey, Otters and Seals, there will be no predicted residual effects after the construction phase is completed, whilst meeting the scheme objectives set out in Chapter 1 (Introduction) of this EIAR.

12.7.2 Residual Effects during Operation

Given, the inclusion of appropriate design of lighting for the avoidance of potential impacts on feeding and commuting bats, there will be no predicted residual effects once the project becomes operational, whilst meeting the scheme objectives set out in Chapter 1 (Introduction) of this EIAR.

The Proposed Scheme will incorporate SuDS features in accordance with the Development Plan requirements to reduce the quantity of surface water discharging into the receiving system particularly at Lough Atalia. This is predicted to be a positive long term residual effect.

12.8 References

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