

AtkinsRéalis



Ecological Impact Assessment

Cork County Council

23 October 2024

0085669DG0004

Passage West Pedestrian and Cycle Route

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1. Introduction

1.1 Scope

AtkinsRéalis was commissioned by Cork County Council to undertake, on its behalf, an Ecological Impact Assessment (EclA) of the proposed upgrade to the Passage West Pedestrian and Cycle Route (hereafter “the proposed development”), which comprises upgrading of the existing shared pedestrian and cycle facility over a length of c. 2km from the Cork City-Cork County boundary to Mariners Quay. The proposed development is part of a larger programme of improvements along this route from Cork City to Crosshaven.

The purpose of the Passage West Pedestrian and Cycle Route project is to increase the width of the existing pedestrian and cycle path between the Cork County and City boundary and Mariners Quay from 2.5m to 4m. This portion of the Cork Harbour Greenway is an important component of the strategic inter-urban cycleway connecting Carrigaline with Cork City. The proposed route shall offer a connection to the ferry terminal facilitating access to Carrigaloe, Rushbrook and Cobh.

In line with Government proposals to encourage modal shift in transport, coupled with connection of the Passage Greenway into a wider network of pedestrian and cycling facilities around Cork Harbour, levels of usage are likely to increase.

This report comprises the EclA in respect of the proposed development. It describes the biodiversity present within the footprint of the proposed development, evaluates the importance of ecological features on a geographic scale, assesses the likely effects of the proposed development on key ecological features and proposes appropriate measures to avoid or reduce those effects.

This report should be read in conjunction with the Natura Impact Statement (NIS) for the proposed development (AtkinsRéalis doc. ref. 0085669DG0003), which assesses the implications of the proposed development for Natura 2000 sites, pursuant to Article 6(3) of the Habitats Directive (92/43/EEC).

1.2 Background

As per the Cork County Development Plan 2022-2028, Passage West forms part of the County Metropolitan Cork Strategic Planning Area. The strategic aim for Passage West is to: -

- Increase the population and employment of this area so that it can compete effectively for Investment and jobs in line with the key enablers identified in the Regional Spatial and Economic Strategy (RSES) for the Southern Region and the Cork Metropolitan Area Strategic Plan (MASP),
- Consolidate employment at existing employment locations with improved supporting infrastructure, and public transport improvements including those identified in the Cork Metropolitan Area Transport Strategy (CMATS), and
- Consolidate critical population growth, service, and employment centres within the Cork Metropolitan Area, providing high levels of community facilities and amenities with infrastructure capacity high quality and integrated public transport connections should be the location of choice for most people especially those with an urban employment focus.

To that end, the proposed development seeks to improve the existing walking and cycling connectivity between Rochestown and Passage West, which involves the proposed widening of the existing greenway from 2.5m up to 4m, in line with National Transport Authority (NTA) guidance for shared use (in some areas localised



reductions from 4m will be adopted to protect trees). The proposed development follows directly on from corresponding improvements to the existing greenway from the N40, through Rochestown, which is being progressed by Cork City Council¹.

The development is being proposed by Cork County Council, with funding being provided by NTA. All lands in question are under the ownership of Cork County Council.

1.3 Project Description

1.3.1 Shared Pedestrian and Cycle Facility

The purpose of this project is to widen the existing path of Cork Harbour Greenway between the Cork City/Cork County Boundary to Mariners Quay. The intention is to increase the width from an average of 2.5m wide to an average of 4m wide (however, in some areas localised reductions from 4m will be adopted to protect trees).

Starting at the Cork City/Cork County Boundary, the width of the existing path will be increased from 2.8m to 3.7m for the first 220m. The works will take place on both sides of the path, the existing exercise infrastructure will remain untouched. Once the path reaches the Cork Harbour Greenway Car Park, the existing path will be widened to 4m. There is no intrusive work within the Cork Harbour Greenway Car Park or to Roberts Bridge (RPS² 01474), but new landscaping (to include native species and other pollinator-friendly species) will be planted between the proposed path and the existing car parking area to supplement the existing landscaping in the area (refer to landscaping proposals which accompany this Application; CSR, 2024a). One existing tree on Roberts Bridge (RPS 01474) will be cut down because it will damage the bridge structure if it is allowed to mature (however, this intervention will be required irrespective of the proposed development in order to prevent damage to Roberts Bridge). Where any possible interaction with tree roots is anticipated, the following works will take place. Deep excavation is not proposed; the existing path surface will be planed off and replaced. Cell Web tree root protection will be used wherever the proposed path is extended close to existing and proposed trees, it is not proposed to dig down into the root zone, but to protect any roots encountered during construction. Furthermore, as noted the alignment of the path and its width will be amended locally to minimise damage to trees. There are new bollards proposed at access points to the existing path. Lighting is discussed in Section 1.2.1.1, below.

For approximately 800m, between the Cork Harbour Greenway Car Park and the start of the retaining wall approximately 80m east of Abbotts bridge (RPS 01476), the path will be widened from 3.0m to 4m on both the landward and seaward side. Due to space constraints, the existing benches located along this section will be relocated to accommodate the widening on both sides of the path. The benches will be placed on a new reinforced concrete plinth suitable for the marine environment. It is not proposed to remove the line of oak trees growing along the seaward side of the pathway in this area.

Once the path reaches the existing retaining wall (for the decommissioned railway line), and where it passes over the bridge (un-named) (RPS 01475), the path widening will be on the landside of the existing path. For the next 300m south-east the proposed path will vary between 3.7 to 4m in width, so the majority of the existing trees and native hedgerows will remain untouched. There are 4 no. trees that are proposed for removal in this location. These trees have been surveyed by an arborist to determine their retention quality, and a bat expert to confirm there are no bat roosts in the trees. For every tree that will be removed, there will be three new native Irish trees planted. There will also be new native Irish hedgerows planted to supplement the new and existing trees along

¹ <https://www.corkcity.ie/corkcityco/en/council-services/news-room/public-notice/passag-railway-greenway-improvement-scheme-phase-ii-planning-and-development-act-2000-as-amended-planning-development-regulations-2001-as-amended-.html>

² Record of Protected Structures (Cork County Development Plan 2022-2028).

this section of the path. (Full details of trees which would be impacted by the proposed development and where these are located is included in the accompanying Arborist's Report; CSR, 2024b).

As the path extends south-east towards the Wooden Bridge (not on the RPS list), a short section of the existing path will remain untouched so two existing trees can remain in place. Planting around the Wooden Bridge will be undertaken to introduce a shallow taper to the existing path. This low-level planting at the taper will provide pedestrians and cyclists with adequate sight distances to oncoming path users as they approach the Wooden Bridge.

The existing car park adjacent to the existing path located 170m east of the Wooden Bridge will be converted to parallel on-street parking. There is currently no segregation between path users and vehicles at this location. The proposed infrastructure changes will increase safety for vulnerable path users. This proposed on-street parking will be segregated from the pedestrian and cycle path by a proposed 1.8m wide foot path and a proposed low height stone wall (approximately 600mm). New benches and picnic tables are envisaged for this area, along with new native Irish hedgerows and trees.

There is a pinch point on the existing path located outside the Passage West Maritime Museum. There is a 90° bend between the Museum boundary wall and stone wall beside the boat slip for the Passage West Rowing Club. The path is approximately 2m wide at this pinch point. The preliminary design for this project proposes to chamfer the boundary wall of the Museum building and provide a new path with a 35° bend so that pedestrians and cyclists have sufficient sight distances from either direction as they approach this point. In addition to this, minor repairs to the dilapidated stairs down to the local beach will be made within the footprint of the existing structure in order to improve safety for pedestrians moving to and from the beach.

There are no plans to do any works on the foreshore. We are only repairing and making good the existing steps, at this location, that are in dis-repair.

1.3.1.1 Public Lighting

As shown on the drawings submitted as part of this application, there are 55 no. existing lighting poles along the route. The treatment of these as part of the proposed development is as follows:

- from Ch. 0 to Ch. 1150, 31 no. to be retained in their existing positions,
- from Ch. 1150 to 1650, 16 no. to be moved back slightly,
- from Ch. 1650 to 1750, 4 no. to be retained in their existing positions,
- from Ch. 1750 to 1800, 2 no. to be moved back slightly, and
- from Ch. 1800 to 1900, 2 no. to be retained in their existing positions.

Thus, 37 no. lighting poles (approx. two thirds of the total number) are to be retained in their existing positions, 18 no. (approx. one third of the total number) are to be moved back slightly, and none are to be added or taken away. As such, there will be no change to quantity or quality of light.

1.3.1.2 Invasive Plant Species

JKI Environmental Ltd. has been contracted to monitor and treat a number of Japanese Knotweed (*Reynoutria (Fallopia) japonica*) sites within the scheme. Treatments consist of herbicide application using a Glyphosate based herbicide. Application methods vary from foliar spray application, or leaf wiping (in sensitive areas and/or to avoid non target species). Treatments consist of two applications between July and September. Monitoring of the sites and the scheme extents is conducted in May/June the following year to check for any regrowth or change

in conditions to a given site that may affect future works. Treatments are undertaken by competent and qualified person(s) and records of herbicide usage logged in accordance with relevant legislation. This work is ongoing.

The ecology surveys also recorded Three-corner leek (garlic) (*Allium triquetrum*). The location of these plants is known and will be clearly marked on the ground in order to prevent incidental disturbance to those plants outside the works area. JKI Environmental Ltd. have been requested to prepare management proposals for any plants overlapping with the works area as well as those elsewhere along the Greenway. JKI Environmental Ltd. will also be treating the Three-corner leek (*Allium triquetrum*) located along the scheme.

With respect to species not legally restricted, such as winter heliotrope (*Petasites pyrenaicus*) the Contractor will be required to prevent spread of this species. It is not however proposed to remove heliotrope from along the pathway in areas where it is not dominant. This is for a number of reasons, including i) avoidance of excessive use of herbicides along the path and ii) avoidance of digging it out in areas where it co-occurs with Ivy Broomrape (*Orobanche hederæ*) alongside the path. It is also noted that heliotrope flowers from November to March (over winter) and thus is an important plant, in particular for early emerging bumblebees. In a similar way, the value of Butterfly-bush (*Buddleja davidii*) to pollinators is noted. In all cases the priority will be to prevent spread of any of these species within the site or off-site.

1.3.2 Pathway Construction Methods

The following detail of proposed construction works methods was prepared by Ryan Hanley on behalf of Cork County Council (Ryan Hanley, 2024). While it was initially intended to plane off the existing tarmac path surface, following consultation with the Council's ecology team, it is now intended to build up from the existing surface in order to minimise the potential for negative impacts to adjoining vegetation. In particular the technical note explains how the existing path will be widened to prevent impacting on trees adjacent to the path by using a Cellweb® confinement system. The Cellweb® system is a lightweight permeable system that allows free flow of water and gases through layers. Each cell can be filled with granular material or so and the cell design ensures loads can be evenly distributed across a path. This approach will be used where the area to be widened is close to existing tree roots.

The following construction details describe how the path is to be constructed near trees, so as to protect against any potential damage, to tree roots.



Plate 1-1 - Typical cellular soil confinement system.

1.3.2.1 Ground Preparation at tree locations

- **Step 1a:** The existing tarmacadam layer is to be removed from site to a licenced waste management facility.
- **Step 1b:** In areas adjoining existing tarmacadam, excavate top soil and sub-soil and store the soil on site for reuse.
- **Step 2:** Set up temporary Heras fencing around trees to protect them during the adjacent path preparation works. Refer to Plate 1-4 and
- **Step 3:** Install wooden boards to define the edge of the path. Carefully insert stakes. Refer to Plate 1-2.



Plate 1-2 - Prepare the proposed pedestrian and cycle path for the cellular confinement system.

1.3.2.2 Installation

- **Step 4:** Where appropriate roll out geotextile Cellweb® confinement system to protect tree roots. Refer to Plate1-3.
- **Step 5:** Overlay the existing path & fill areas of Cellweb® confinement system with construction material, i.e., Type UGM A for the proposed pedestrian and cycle path. Refer to Plate 1-3.



Plate 1-3 - Fill cellular material confinement system to evenly distribute loads across the proposed pedestrian and cycle path.

- **Step 6:** Use excavated sub soil and top soil to create a slope from the path to existing ground level.



Plate1-4 - Reuse excavated soil to build slope off path.

1.3.2.3 Surfacing and Reinstating area

- **Step 7:** Run a roller/compactor over the path and add a layer of porous tarmacadam to seal the path. Reinststate the slope/filled in soil area with riparian grass. Refer to Plate 1-5.



Plate 1-5 - Finish path and reinstate area alongside.

1.3.3 Overview of Works

The proposed programme is for a 12-month contract.

While Section 1.2.2 outlines the approach to works where there is interaction near trees on the pathway, the following outlines the sequence of associated construction related activities: -

1. Mobilisation and established of site compound. This is likely to be located in the public car park at Roberts Bridge, which will be closed to the public for the duration of works. The compound will host the site office (prefabricated building, if required), welfare facilities and staff car parking.
2. It may also be necessary to have a secondary site compound at Patrick Murphy Park at the Southern end of the scheme. The appointed contractor will make the final decision in this regard.
3. The site compound will also be used for storage of materials as they come on site. The site will be operated as an *On-Time Delivery* site in order to minimise the need for storage of excessive quantities of material on site.
4. The site compound will also allow for the sorting and temporary storage of waste packing prior to removal off site to an appropriately licenced recycling facility.
5. The welfare facilities will be a closed system, with wastes pumped out from any toilets and removed from site for disposal at an appropriately licenced facility. There will be no waste emissions from site permitted.
6. As part of the mobilisation, the appointed Contractor will be required to put a Traffic Management Plan in place. Particular attention will be paid to safe access / egress from the site compound.
7. Safety fencing will also be erected as will Signage outlining the nature of the proposed works and why the pathway is being temporarily closed.

8. Site Clearance. This is to be done in co-operation with an Arborist and appointed Environmental Clerk of Works in order to avoid negative impacts to trees and clearance of only those trees identified in the Design Drawings prepared by Ryan Hanley.
9. Construction of the pathway will proceed in short sections of ca. 200m as per the methodology outlined in Section 1.3.2, above. This is in order to keep the path open during the proposed works. [It is not permitted to clear vegetation in order to create a parallel path for pedestrians and cyclists alongside the works area.]
10. Works will include the relocation of a small number of lighting stanchions (see Section 1.2) and park benches.
11. No drainage works are required. All drainage will be over-the-edge drainage and natural infiltration, with the path surface also selected in order to be permeable.
12. No bridge replacement works are required.
13. Treatment of invasive plant species is addressed in Section 1.3.1.2 with respect to Japanese Knotweed and in Section X.Y, with respect to species not listed on the 3rd Schedule of the Natural Habitats Regulations, SI 477 of 2011.
14. Completion of any path marking and placement of Signage as required.
15. Landscaping (as set out in Section 1.2.4).
16. De-mobilisation and restoration of any damage.

1.3.3.1 Materials and equipment

Materials for construction of the works will be imported and stockpiled within the proposed site compounds (i.e. Roberts Bridge & Patrick Murphy Park). The materials to be employed will principally consist of: -

- Geotextile membrane
- Granular sub-base material
- 6mm crushed limestone
- Dense bitumen macadam
- Hot rolled asphalt
- Topsoil / grass seed, landscaping including tree planting
- Signage and miscellaneous furniture

The following equipment will be used on site: -

- Dumpers or trucks
- Mini diggers
- Excavator
- Pedestrian roller



- Mini paving machine

Equipment to be used on site must be suitable for use within the footprint of the existing path. [It is not permitted to clear vegetation in order to create a parallel path for pedestrians and cyclists alongside the works area.]

1.3.3.2 Advanced Works

As part of Construction Projects, Accommodation works are often carried out by the contractor to mitigate the impacts that may be experienced by any landowner as a direct result of the construction and operation of the scheme. No such works are required for this scheme.

1.3.3.3 Main Works

Site clearance includes a range of vegetation clearing, topsoil stripping, and removal of existing infrastructure items which are obstacles to the proposed path. When possible, any materials removed as part of site clearing will be reused onsite during the works.

Temporary working areas (site compounds) will be erected during the construction period to accommodate workforce and vehicle movements, stockpiling of excavated material, and the erection and removal of temporary site compounds. As noted, it is proposed to form a compound (which will include stockpiling materials) at either end of the scheme, at Robert's Bridge Car Park to the North and the car park next to Patrick Murphy Park at the Southern end of the scheme. The appointed contractor will make the final decision in this regard.

Temporary haul roads will not be required to facilitate the extension of the proposed path, nor will a temporary path be constructed to facilitate pedestrians and cyclists during works.

The path composition will be in accordance with TII specification DN-GEO-030471³. There are four existing bridges along this route, these bridges will remain in place and will not be modified. New landscaping will include native Irish trees, hawthorn hedgerows and low-level planting (this is discussed in detail in the accompanying Ecological Impact Assessment). For surface water drainage, construction of the path will maintain existing slopes so that surface water can maintain its natural drainage path.

Energy efficient lighting will provide a suitable level of light for use by cyclists and pedestrians whilst creating minimal light spillage onto adjacent environmentally sensitive locations.

The proposed path will be segregated from the R610 Regional Road along the length of this route. The access points to the path include two car parks and 2-3m wide footpaths linking directly from the R610 Regional Road.

Ancillary and amenity elements are included as part of the proposed development which include fencing, signage, cycle track markings, information boards, bike racks, picnic tables and park benches.

The reinstatement of temporary working areas will be done following the completion of the construction phase of the scheme. Planting of new native Irish trees is proposed on the landside of the existing path. During the operational phase, general cleaning and upkeep of the new pathway is proposed. An electric sweeper will be used to maintain the path.

It will be the responsibility of the contractor to appoint an Environmental Clerk of Works (ECoW) (with ecological experience) to monitor and advise on all environmental matters during the construction phase of the proposed upgrade works.

³ TII (2022) *Rural Cycleway Design (Offline & Greenway)*. DN-GEO-03047. August 2022. Transport Infrastructure Ireland, Dublin.
<https://www.tiipublications.ie/advanced-search/results/document/?id=3207>

Installing Cellweb® tree root protection (TRP) directly onto the gravel path and build up the path on it. The system allows continued water permeation and gas exchange (see Plate 1-1). It is also extremely effective at spreading point loads and reducing the load that is applied to the soils beneath. This in turn minimises soil compaction, maintaining an open soil structure which allows continued gas exchange, water permeation and migration. It is not possible to use a permeable surfacing, as in order to minimise impacts existing tarmac surfaces are not to be planed off.

Sediment control measures are not required. Where possible materials will be reused on site. However, excess excavated material from excavations, will be removed off site by a licensed waste handler and disposed of in an appropriately licensed waste facility.

The preparation of a Construction Environmental Operating Plan, will be required. This will consider measures required to construct the project (including construction compounds, drainage measures required during construction, e.g. silt control, dust or noise control, etc) and outline design and mitigation measures identified during project development.

1.3.3.4 Defects Period

12 months defects period would normally apply to the pathway. However, due to the inclusion of landscaping along the scheme and invasive species monitoring a defects period of 24 months is allowed for.

1.3.4 Landscaping

A landscape design and planting mixes has been incorporated into Design Drawings prepared by Ryan Hanley on behalf of Cork County Council (included in full in the accompanying Ecological Impact Assessment). The design was informed by the findings of the ecology surveys, as well as the Tree Survey report prepared by Cunnane Stratton Reynolds on behalf of Cork County Council (CSR, 2024b).

The approach to landscaping has followed the mitigation hierarchy – i.e. avoid, minimise and restore. Works have been designed in the first instance to minimise the amount of semi-natural vegetation and the number of trees to be removed. Furthermore, excavation has been limited and Cellweb® tree root protection will be employed to minimise disturbance to tree roots. The location of where path is to be widened will also shift from side to side to minimise impacts on vegetation (with on-site guidance to be provided by an ecologist and arborist).

Mitigation in the form of landscape planting is then proposed for the scheme. Native plants have been prioritised, though in line with TII Guidance⁴ in the urban fringe close to Patrick Murphy Park non-native trees are proposed as are species appropriate for use in flower beds (the Park at this location in many respects resembles a garden space opposite a road side (R610) terrace of houses. It was further informed by the All-Ireland Pollinator Plan⁵.

1.3.5 Maintenance and Renewal

Details of likely maintenance and renewal during the operational phase of the project will be limited to landscaping, localised repairs to any damage to pathways, greenway markings, lighting and or signage. It is anticipated that the lifespan of surfacing works undertaken will be 20 years.

⁴ TII (n.a.). A Guide to Landscape Treatments for National Road Schemes in Ireland.

⁵ <https://pollinators.ie/>

2. Methodology

2.1 Guidance

This report was prepared with due regard to the relevant guidance, including but not limited to: -

- All-Ireland Pollinator Plan 2021-2025. *National Biodiversity Data Centre Series 25*. National Biodiversity Data Centre, Waterford. March 2021.
- *Biodiversity and the Planning Process: Guidance for developers on the management of biodiversity issues during the planning process*. Planning Department, Cork County Council, Cork.
- CIEEM (2018). *Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater, Coastal and Marine. Version 1.2 - Updated April 2022*. Chartered Institute of Ecology and Environmental Management, Winchester.
- Collins, J. (ed.) (2023). *Bat Surveys for Professional Ecologists: Good Practice Guidelines (4th edition)*. Bat Conservation Trust, London.
- *Cork County Council Recommended List of Native Tree and Shrub Species for Residential & Industrial Developments, Version 2*. Ecology Office, Cork County Council, Cork. June 2022.
- *Cork County Development Plan 2022-2028*. Cork County Council, Cork. June 2022.
- EPA (2022). *Guidelines on the information to be contained in Environmental Impact Assessment Reports. May 2022*. Environmental Protection Agency, Wexford.
- NRA (2006). *Guidelines for the Treatment of Bats during the Construction of National Roads Schemes*. National Roads Authority, Dublin.
- NRA (2008a). *Guidelines for the Treatment of Otters prior to the Construction of National Road Schemes*. National Roads Authority, Dublin.
- NRA (2009a). *Guidelines for Assessment of Ecological Impacts of National Roads Schemes. Revision 2*. National Roads Authority, Dublin.
- NRA (2009b). *Ecological Surveying Techniques for Protected Flora and Fauna during the Planning of National Road Schemes*. National Roads Authority, Dublin.
- Smith, G.F., O'Donoghue, P., O'Hora, K. and Delaney, E. (2011). *Best Practice Guidance for Habitat Survey and Mapping*. The Heritage Council, Kilkenny.
- TII (2006). *A Guide to Landscape Treatments for National Road Schemes in Ireland. GE-ENV-01102. February 2006*. Transport Infrastructure Ireland, Dublin.
- TII (2012). *Guidelines on the Implementation of Landscape Treatment on National Road Schemes in Ireland. GE-ENV-01103. July 2012*. Transport Infrastructure Ireland, Dublin.
- TII (2020a). *The Management of Invasive Alien Plant Species on National Roads – Standard. GE-ENV-01104. December 2020*. Transport Infrastructure Ireland, Dublin.



- TII (2020b). *The Management of Invasive Alien Plant Species on National Roads – Technical Guidance*. GE-ENV-01105. December 2020. Transport Infrastructure Ireland, Dublin.

2.2 Desk Study

Baseline data regarding the receiving environment, including Natura 2000 sites, was gathered through a thorough desk study.

The boundaries of Natura 2000 sites were downloaded from *NPWS: Maps and Data* (<https://www.npws.ie/maps-and-data>). Information on sites, including their overall structures and functions, qualifying interests, conservation objectives and threats/pressures and activities therein, was found in the Site Synopsis, Natura 2000 Standard Data Form, Conservation Objectives and supporting documents for each site. Spatial data for site-specific conservation objectives of Natura 2000 sites, and boundary data for other designated sites, such as Natural Heritage Areas, was also retrieved from *NPWS: Maps and Data*. Reporting under Article 17 of the Habitats Directive (NPWS, 2019a-c; *Article 17 web tool*) and Article 12 of the Birds Directive (NPWS, 2024c; *Article 12 web tool*) provided further information on the habitats and species concerned at the national level.

Information relating to recent and historical records of species was obtained from the National Biodiversity Data Centre (NBDC) *Biodiversity Maps* (<https://maps.biodiversityireland.ie/Map>), while data for other features of the natural environment, e.g. known occurrences of non-qualifying interest Annex I habitats, were viewed on the *Environmental Sensitivity Mapping (ESM) Webtool* (<https://airomaps.geohive.ie/ESM/>).

The Environmental Protection Agency (EPA) map viewer *EPA Maps (Water)* (<https://gis.epa.ie/EPAMaps/Water>) and spatial data for river, lake, canal, transitional and coastal waterbodies downloaded from the *EPA Geoportal* (<https://gis.epa.ie/GetData/Download>) was used to identify any hydrological connection between the proposed development and Natura 2000 sites or connected features. Satellite and aerial imagery from Google Earth, Bing Maps and Ordnance Survey Ireland (OSi) was reviewed to identify hedgerows, treelines and other potential ecological features.

In addition, reports from ecological surveys and site visits previously undertaken at the location of the proposed development were also reviewed, having due regard to the *Advice note on the lifespan of ecological reports and surveys* (CIEEM, 2019). In particular, these included survey reports provided to Cork County Council by Ryan Hanley in relation to the proposed development. These reports formed part of the desk study and helped to inform the scope of further desk study work and field surveys undertaken to inform this EclA.

In order to inform the assessment of potential in-combination effects, planning applications from the surrounding area were reviewed using the *National Planning Application Database* (<https://housinggov.ie/maps.arcgis.com/apps/webappviewer>), An Bord Pleanála's *Map Search* (<https://www.pleanala.ie/en-ie/map-search>) and the *EIA Portal* (<https://www.gov.ie/en/publication/9f9e7-eia-portal/>). In addition, aquaculture activities and designated shellfish areas were identified using *Ireland's Marine Atlas* (<https://atlas.marine.ie/>) and *EPA Maps (Water)*.

2.3 Field Surveys

An initial site visit and walkover was carried out on 2nd April 2024 by AtkinsRéalis Associate Director (Ecology) Paul O'Donoghue and AtkinsRéalis Senior Ecologist Owen O'Keefe with a representative of Cork County Council. The purpose of this site visit was to become familiarised with the site and receiving environment and identify any features of concern which might require further specialist surveys.

An ecological walkover of the full extent of the proposed development was carried out by AtkinsRéalis Ecologists Owen O'Keefe and Caroline Downey on 1st May 2024. Habitats were classified according to *A Guide to Habitats in Ireland* (Fossitt, 2000) and mapped following *Best Practice Guidance for Habitat Survey and Mapping* (Smith

et al., 2011). Habitats with potential links with types listed on Annex I to the Habitats Directive were evaluated against the *Interpretation Manual of European Union Habitats* (DG Env, 2013) and the relevant national monitoring guidelines for the habitats in question. This survey also included compilation of a botanical species list, searches for invasive alien plant species, e.g. Japanese Knotweed (*Fallopia japonica*), and recording of any incidental observations or evidence of presence of fauna, including an assessment of the suitability of trees and structures to support roosting bats. The site was surveyed for Common Toadflax (*Linaria vulgaris*) on the 27th June 2024. This included a survey of neighbouring areas of the Greenway from Harty's Quay to beyond the Black Bridge where it has also been recorded in the past. The eastern part of the pathway was again visited in again with the Local Authority in 29th August 2024.

A bat study was undertaken by O'Donnell Environmental. The study included desktop studies and field surveys. Daytime visual assessments were undertaken by Tom O'Donnell MSc CEnv MCIEEM and Claire McCarthy MSc QCIEEM on 4th and 15th May and 19th June 2023, following *Bat Surveys for Professional Ecologists: Good Practice Guidelines (3rd ed.)* (Collins (ed.), 2016).⁶ A passive bat detector was also deployed along the route for the 12 nights from 4th to 15th May 2023. Dusk activity transects were also undertaken in good conditions on 6th and 19th June 2023. The methodology and results of these surveys are detailed in the Bat Survey Report which is presented in Appendix C to this EclA.

Surveys for Otter (*Lutra lutra*) were undertaken on 2nd and 3rd February 2024 by ecologist Ross Macklin BSc (Hons) MCIEEM of Triturus Environmental Ltd, following the 'total corridor otter survey' (TCOS) technique. This survey covered the shoreline and adjoining areas along the full length of the route, and further seaward sections as far as the Glenbrook ferry slipway. The methodology and results of these surveys are detailed in the Otter Survey Report which is presented in Appendix D to this EclA.

Surveys for waterbirds were undertaken from December 2023 to March 2024 by independent ecologist Tom Gittings PhD MCIEEM. These surveys covered Lough Mahon from the shore to the northern/eastern edge of the navigation channel from Hop Island to Marino Point (including bays/inlets/lagoons) and the full width of the West Passage from Marino Point to the Glenbrook ferry slipway, as well as the fields to the south of the proposed development at its western/northern end, as shown in Figure 3-1 below. The methodology and results of these surveys are detailed in the Waterbird Survey Report which is presented in Appendix E to this EclA.

⁶ These surveys were carried out prior to the 4th edition of these guidelines being published in September 2023.

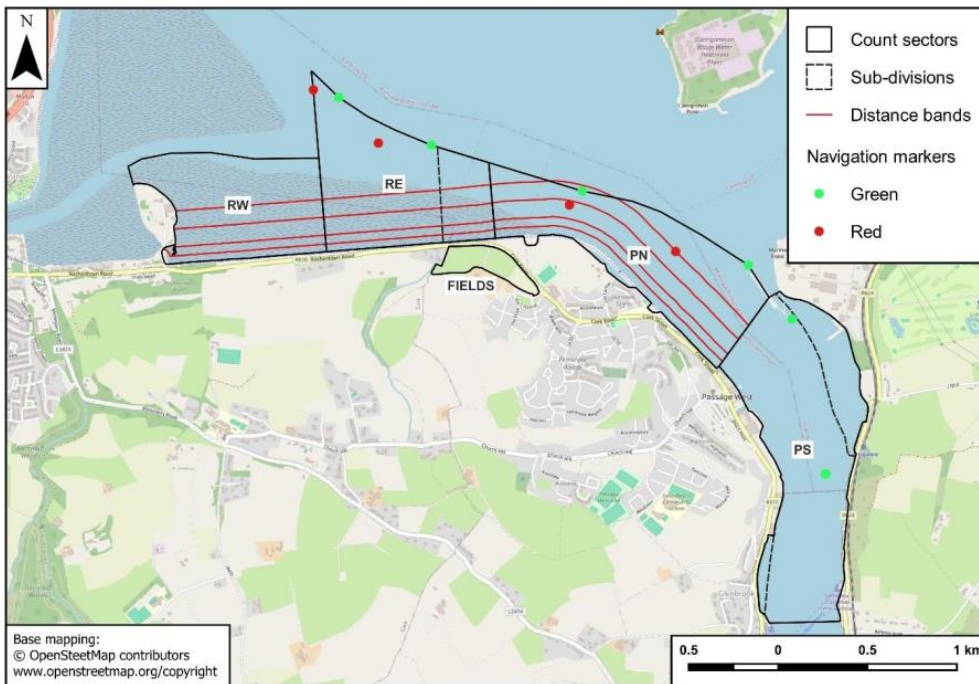


Figure 2-1 - Survey area and count sectors (taken from Map 2.1 in the Waterbird Survey Report which is presented in Appendix E to this EclA).

Breeding bird surveys were carried out by Ryan Hanley Ecologist, Breda Quinn in early April and late May 2023 (i.e. within the bird breeding season), following the Countryside Bird Survey (CBS) methodology. The surveyor recorded all birds seen and heard along a transect (i.e. the route of the proposed development) which was walked early in the morning on two occasions, one in early summer and one about a month later. The ecological walkover surveys carried out by AtkinsRéalis in May and June 2024 also recorded incidental observations of birds.

2.4 Ecological Impact Assessment

The overall methodology followed in the preparation of this report was informed by the most recent guidelines for EclA in the UK and Ireland, i.e. the CIEEM (2018) guidelines, as updated in April 2022. In addition, the methods for specific aspects of the assessment, e.g. evaluation of receptors, assessment of impacts and effects, and development of mitigation and enhancement measures, had regard to appropriate guidelines from the National Roads Authority (now Transport Infrastructure Ireland) and the EPA. These methods are described below.

2.4.1 Evaluation of Ecological Receptors

The evaluation of the importance of ecological features present within the footprint of the proposed development, the Carrigtwohill UEA and the Zone of Influence followed *Ecological Surveying Techniques for Protected Flora and Fauna during the Planning of National Road Schemes* (NRA, 2009a). The geographic frame of reference summarised in Table 2-1 below was used.

Table 2-1 - Geographic frame of reference for evaluating the importance of ecological features. Following: NRA (2009a).

Level	Examples (non-exhaustive)
International Importance	<ul style="list-style-type: none"> ▪ European (Natura 2000) sites or sites which fulfil the criteria for such a designation. ▪ Features essential to the coherence of the Natura 2000 network.

Level	Examples (non-exhaustive)
National Importance	<ul style="list-style-type: none"> ▪ Best examples of natural habitat types listed on Annex I to the Habitats Directive (“Annex I habitats”). ▪ Resident of regularly occurring populations of bird species listed on Annex I to the Birds Directive or animal or plant species listed on Annex II or IV to the Habitats Directive (“Annex II/IV species”) (in numbers of national importance). ▪ Wetlands of International Importance (under the Ramsar Convention). ▪ UNESCO World Heritage Sites or Biosphere Reserves.
County Importance	<ul style="list-style-type: none"> ▪ Designated or proposed Natural Heritage Areas (NHA/pNHA), statutory Nature Reserves or sites fulfilling the criteria for such a designation. ▪ Resident or regularly occurring populations of species protected under the Wildlife Act, 1976 (as amended) or listed on the relevant national Red List (in numbers of national importance). ▪ Viable examples of Annex I habitats.
Local Importance (Higher Value)	<ul style="list-style-type: none"> ▪ Areas of Special Amenity, areas subject to a Tree Preservation Order and Areas of High Amenity. ▪ Resident or regularly occurring populations of protected or threatened species (in numbers significant at the county level, e.g. >1% of the county population). ▪ Examples (not of National or International Importance) of Annex I habitats. ▪ Other features of ecological interest identified in relevant local or national biodiversity action plans. ▪ Sites or habitats of high biodiversity value or degree of naturalness in a county context or species which are uncommon in the county. ▪ Sites containing habitats or species which are in decline nationally.
Local Importance (Lower Value)	<ul style="list-style-type: none"> ▪ Ecological features identified in the relevant local biodiversity action plan. ▪ Resident or regularly occurring populations of protected or threatened species (in numbers significant at the local level). ▪ Sites habitats of high biodiversity value or degree of naturalness in a local context or species which are uncommon locally. ▪ Sites or features containing common or lower value habitats which provide connectivity between features of higher ecological value. ▪ Sites containing small areas of semi-natural habitat that are of some local importance for wildlife. ▪ Sites or features containing non-native species that are of some importance in maintaining habitat links.

Accordingly, factors which were taken into account when evaluating importance included the following: -

- National or international designations on sites, or identification of sites in local plans.
- Level (if any) of statutory protection of the habitats and species concerned.
- Conservation status and trends in habitats and species in a local, national and international context.
- Quality and extent of habitats and numbers of individuals of species within the study area.
- Likely future prospects of habitats and species in the study area in the ‘do-nothing’ scenario.



- Inter-relationships between habitats, species and other ecological features in the study area and wider landscape.

2.4.2 Assessment of Impacts & Effects

Once the importance of ecological features in the study area had been evaluated, the assessment of the potential impacts focussed on key ecological receptors (KERs), i.e. ecological features of at least Local Importance (Higher Value), in accordance with *Guidelines on the information to be contained in Environmental Impact Assessment Reports* (EPA, 2022). The assessment of impacts is carried out in three stages, as follows: -

17. First, potential impacts are identified by the examination of possible source-pathway-receptor chains.
18. Then, impacts and their effects are characterised in terms of the following: -
 - a. Nature (type) and quality (whether positive, neutral or negative).
 - b. Probability of occurrence.
 - c. Intensity, magnitude and/or spatial extent
 - d. Timing, duration and frequency.
 - e. Reversibility or potential for recovery.
19. Finally, the significance of effects are evaluated by considering their characteristics in the context of the particular sensitivities of the relevant KERs.

With regard to the duration of effects, EPA (2022) specifies the following definitions for what may be considered as “temporary”, “short-term”, “long-term” etc.: -

- ‘Momentary’ – Seconds to minutes.
- ‘Brief’ – Less than a day.
- ‘Temporary’ – Less than 1 year.
- ‘Short-term’ – 1 to 7 years.
- ‘Medium-term’ – 7 to 15 years.
- ‘Long-term’ – 15 to 60 years.
- ‘Permanent’ – Over 60 years.

EPA (2022) also provides definitions for other relevant terms which might otherwise be subjective.

With regard to defining levels of significance, EPA (2022) provides for the following scale: -

- ‘Imperceptible’ – Capable of measurement but without significant consequences.
- ‘Not significant’ – Causes noticeable changes in the character of the environment but without significant consequences.
- ‘Slight’ – Causes noticeable changes in the character of the environment without affecting its sensitivities.



- ‘Moderate’ – Alters the character of the environment in a manner that is consistent with existing and emerging baseline trends.
- ‘Significant’ – Alters a sensitive aspect of the environment.
- ‘Very significant’ – Significantly alters most of a sensitive aspect of the environment.
- ‘Profound’ – Obliterates sensitive characteristics.

The significance of an impact or effect may also be evaluated on the same geographical scale as the importance of ecological features. However, as noted in NRA (2009a), “*significance [...] is determined empirically, on the basis of an analysis of the factors which characterise it, irrespective of the value of the receptor. [...] If impacts are not found to be significant at the highest geographical level at which the resource has been valued, they may be significant at a lower level.*”

2.4.3 Mitigation & Enhancement

The development of the mitigation measures followed the “mitigation hierarchy”, which prioritises avoidance over reduction, and actions at source over pathway over receptor, as follows: -

1. Eliminate the source of the impact.
2. Minimise or reduce the impact at its source.
3. Block or weaken the pathway for effects.
4. Abate effects at the receptor.

This approach assists with more complete removal of negative effects, minimises the risk of effects occurring by less obvious pathways, protects non-target receptors, and minimises the risks of unintended harm associated with measures focussed at or near receptors.

The enhancements outlined in this report have been developed with due regard to the policies and objectives of the Cork County Development Plan 2022-2028, particularly in relation to green and blue infrastructure, biodiversity on Council lands, and Biodiversity Net Gain, as well as the following action plans and guidance: -

- All-Ireland Pollinator Plan 2021-2025. *National Biodiversity Data Centre Series 25*. National Biodiversity Data Centre, Waterford. March 2021.
- *Cork County Council Recommended List of Native Tree and Shrub Species for Residential & Industrial Developments, Version 2*. Ecology Office, Cork County Council, Cork. June 2022.
- TII (2006) *A Guide to Landscape Treatments for National Road Schemes in Ireland. GE-ENV-01102*. February 2006. Transport Infrastructure Ireland, Dublin.
- TII (2012) *Guidelines on the Implementation of Landscape Treatment on National Road Schemes in Ireland. GE-ENV-01103*. July 2012. Transport Infrastructure Ireland, Dublin.

In accordance with NRA (2009a), it is recognised that ecological mitigation and enhancement measures “*may have a significant beneficial impact, but at a higher or lower geographic scale than the value of the receptor to which they have been applied.*”

2.5 Statement of Authority

This report has been prepared by Owen O'Keefe and peer-reviewed by Paul O'Donoghue.

Owen O'Keefe is a Senior Ecologist at Atkins. Owen holds a BSc (Hons) in Ecology from University College Cork (2015) and is a Full Member of the Chartered Institute of Ecology and Environmental Management (MCIEEM). He has 8 years' professional experience in ecological consultancy, has carried out a wide range of habitat and species surveys for both large and small infrastructure projects, and has prepared numerous reports for Appropriate Assessment and Ecological Impact Assessment. Owen prepared this report.

Paul O'Donoghue is an Associate Director (Ecology) at Atkins. Paul holds a BSc (Zoology), MSc (Behavioural Ecology) and a PhD in avian ecology and genetics. Paul is a Chartered member of the Society for the Environment (CEnv) and a full member of the Chartered Institute of Ecology and Environmental Management (MCIEEM). Paul has over 20 years' experience in ecology; including extensive experience in the preparation of Habitat Directive Assessments/Natura Impact Statements (i.e. Appropriate Assessment under the Habitats Directive). Paul carried out the technical review of this report.



3. Baseline Ecology

3.1 Zone of Influence

The “*Zone of Influence*” of a plan or project is the area which may experience ecological effects as a result of its implementation, including any ancillary activities. The various impacts of a plan or project will each have their own characteristics, e.g. nature, extent, magnitude, duration etc. Accordingly, the area subject to each impact (“zone of impact”) will vary depending on characteristics of the impact and the presence of pathways for its propagation. Ecological features within or connected to one or more zones of impact could, depending on their sensitivities, be affected by the plan or project under consideration. The area containing such features may be regarded as the Zone of Influence. As such, in establishing the Zone of Influence for a plan or project, regard must be had to the characteristics of its potential impacts, potential pathways for impacts and the sensitivities of ecological features in the receiving environment.

Box 10 of *Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater, Coastal and Marine* (CIEEM, 2018) lists useful questions which should be asked in order to assist in establishing the Zone of Influence for a proposal under consideration. This is reproduced in Figure 3-1 below. Consideration must be given to all phases, e.g. ground investigations, site preparation, construction, operation, decommissioning, of proposal under consideration (NRA, 2009a; CIEEM, 2018).

Box 10: Ecological considerations for establishing the zone(s) of influence

The following questions will help to determine the zone(s) of influence on ecological features:

- What ‘important’ ecological features (see Chapter 4) are known to occur within the project site and the surrounding area?
- What other ‘important’ ecological features could occur within the project site and surrounding area based on knowledge of the local distribution of relevant habitats and species?
- What activities may generate ecological impacts and which of these might have an influence on ecological features beyond the site boundaries? (see Box 9)
- Is the project likely to affect migratory species?
- Is the area used by mobile species that make regular movements to, from, or across the site?
- What are the key ecological processes or species activity periods? Are there seasonal variations in distribution, abundance and activity?
- What are the key hydrodynamic processes at the site (e.g. tidal currents, wave activity)? Are there seasonal or cyclic variations in these?
- Does the project affect any sites, directly or indirectly, that are designated or likely to be designated in the foreseeable future? What are the reasons for designation?
- What is required for the maintenance of particular ecosystems, networks, habitats or species populations? How would these be affected by project activities?
 - What are their distribution and status elsewhere for comparison?
 - What were their historical distributions, status and management compared with present?
 - Is anything known about the key factors influencing distribution and abundance of the feature(s)?
 - What are their scales of variation, vulnerability and likely exposure to the project?
- Are there any features whose disappearance would have significant consequences for other features?
- Are there any other projects planned within the same area or time-frame that may contribute to cumulative effects? (see 5.19 - 5.22)

Figure 3-1 - Factors in establishing the Zone of Influence. Source: CIEEM (2018).

Following the guidance in NRA (2009a) and CIEEM (2018), and on the basis of the description of the proposed development and an examination of potential pathways for ecological impacts in the receiving environment, the likely zones of impact from the proposed development were defined as follows: -

- For direct impacts, all areas within and immediately adjoining the red-line boundary.
- For temporary disturbance to birds and other fauna, as well as effects associated with the spread of invasive alien species, all areas within a precautionary buffer of 500m from the red-line boundary.
- For water quality impacts, drains and inlets crossed by the proposed development, adjoining lagoons and the Lough Mahon transitional waterbody.
- For indirect effects, all other areas with potential ecological connectivity to the above zones of impact, i.e. the wider Cork Harbour system and adjoining lands.

Using QGIS3, spatial data for waterbodies and catchments from *EPA Geoportal* were viewed in conjunction with aerial imagery from *Google Earth* to identify pathways and zones of impact from the proposed development, and other potential ecological connections to the wider landscape. These were then mapped in relation to designated sites using spatial data from *NPWS: Maps and Data* (see Figure 3-2). In addition, the Zone of Influence was examined to identify any other sites, habitats, species or sensitive ecological features with potential ecological connections to these zones of impact.

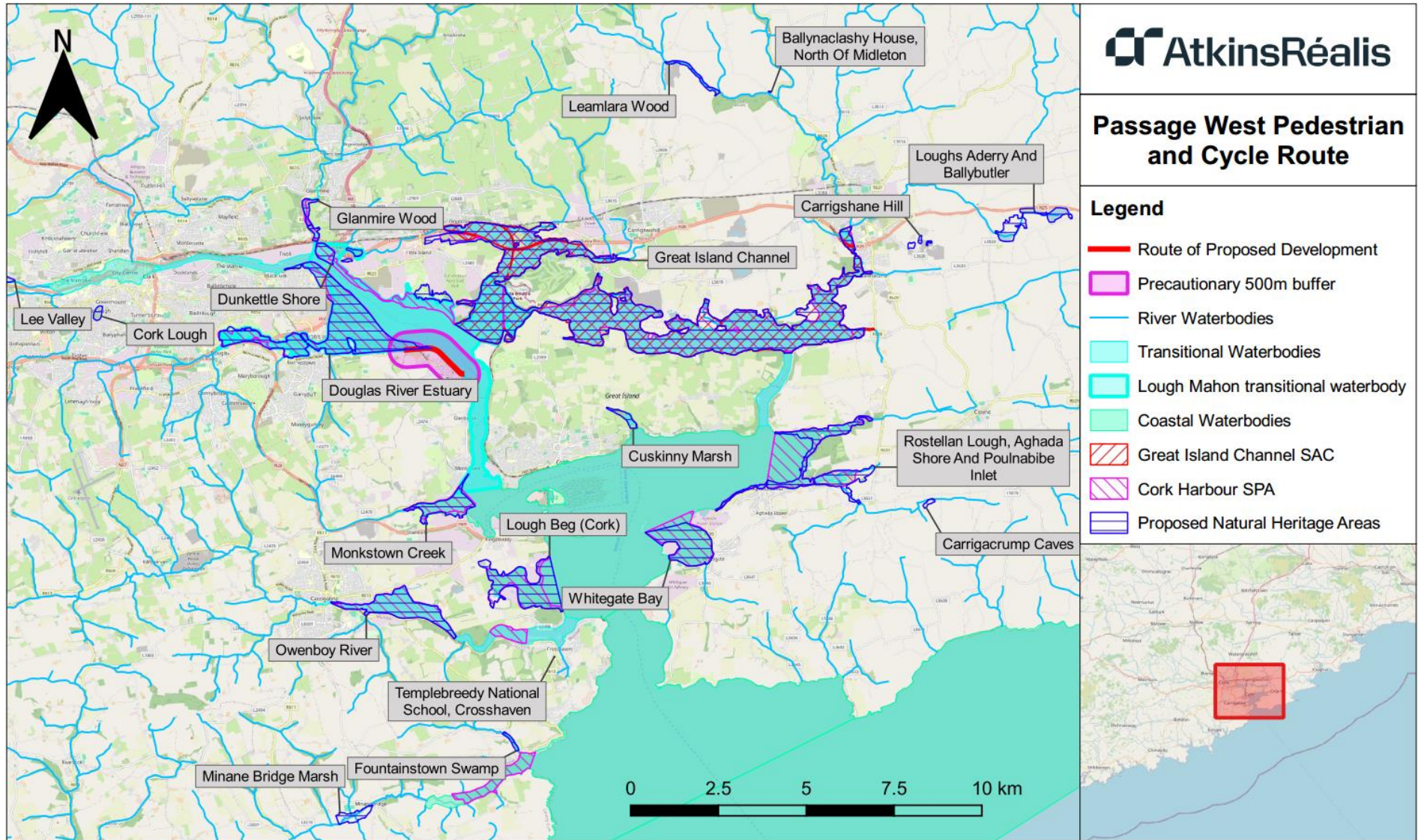


Figure 3-2 - The proposed development and its Zone of Influence in relation to designated sites.



3.2 Designated Sites

3.2.1 International

Cork Harbour is listed as Wetland of International Importance (site no. 837) under the Convention on Wetlands of International Importance especially as Waterfowl Habitat (“the Ramsar Convention”). Cork Harbour is also recognised as an Important Bird Area (site code: IE088) by BirdLife International. These designations are based on the significant examples of estuarine habitats occurring within and adjoining the harbour, particularly mudflats and saltmarshes, as well as the importance of the harbour for both wintering and breeding waterbirds, with numbers of wintering waterfowl regularly exceeding 20,000 individuals from 22 different species. These international sites are immediately adjacent to the proposed development.

There are no UNESCO World Heritage or UNESCO Biosphere Reserve sites, or sites designated under the Convention for the Protection of the Marine Environment of the North-East Atlantic (the OSPAR Convention), in close proximity to the proposed development or within its Zone of Influence.

3.2.2 European

The Habitats Directive (92/43/EEC) is primary legislation of the European Union which provides legal protection for habitats and species of Community interest. Article 2 requires the maintenance or restoration of such habitats and species at a favourable conservation status, while Articles 3 to 9, inclusive, provide for the establishment and conservation of a Community-wide network of special areas of conservation (SACs), known as Natura 2000, which also includes special protection areas (SPAs) designated under the Birds Directive (2009/147/EC). Both SACs and SPAs are commonly referred to as “European sites” or “Natura 2000 sites”.

SACs are selected for natural habitat types listed on Annex I to the Habitats Directive and the habitats of species listed on Annex II to the Habitats Directive. SPAs are selected for species listed on Annex I to the Birds Directive, other regularly occurring migratory species and other species of special conservation interest. The habitats and species for which a Natura 2000 site is selected are referred to as the “qualifying interests” of that site and each is assigned a “conservation objective” aimed at maintaining or restoring its “favourable conservation condition” at the site, which contributes to the maintenance or restoration of its “favourable conservation status” at national and European levels.

There are 2 no. European sites within the Zone of Influence of the proposed development, namely the Great Island Channel SAC (site code: 001058) and Cork Harbour SPA (site code: 004030). The Great Island Channel SAC (site code: 001058) is c. 0.9km from the proposed development (across Lough Mahon), while the Cork Harbour SPA (site code: 004030) is immediately adjacent to the proposed development.

The Great Island Channel SAC was selected for the following qualifying interests: -

- Mudflats and sandflats not covered by seawater at low tide (1140)
- Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*) (1330)

The Cork Harbour SPA was selected for the following qualifying interests: -

- Little Grebe (*Tachybaptus ruficollis*) (A004)
- Great Crested Grebe (*Podiceps cristatus*) (A005)
- Cormorant (*Phalacrocorax carbo*) (A017)

- Grey Heron (*Ardea cinerea*) (A028)
- Shelduck (*Tadorna tadorna*) (A048)
- Wigeon (*Anas penelope*) (A050)
- Teal (*Anas crecca*) (A052)
- Pintail (*Anas acuta*) (A054)
- Shoveler (*Anas clypeata*) (A056)
- Red-breasted Merganser (*Mergus serrator*) (A069)
- Oystercatcher (*Haematopus ostralegus*) (A130)
- Golden Plover (*Pluvialis apricaria*) (A140)
- Grey Plover (*Pluvialis squatarola*) (A141)
- Lapwing (*Vanellus vanellus*) (A142)
- Dunlin (*Calidris alpina alpina*) (A149)
- Black-tailed Godwit (*Limosa limosa*) (A156)
- Bar-tailed Godwit (*Limosa lapponica*) (A157)
- Curlew (*Numenius arquata*) (A160)
- Redshank (*Tringa totanus*) (A162)
- Black-headed Gull (*Chroicocephalus ridibundus*) (A179)
- Common Gull (*Larus canus*) (A182)
- Lesser Black-backed Gull (*Larus fuscus*) (A183)
- Common Tern (*Sterna hirundo*) (A193)
- Wetlands (A999)

The NIS (AtkinsRéalis doc. ref. 0085669DG0003) submitted as part of the Section 177AE application for the proposed development provides more detailed descriptions of these European sites and assesses the potential for adverse effects thereon, in view of their conservation objectives.

3.2.3 National

Natural Heritage Areas (NHAs) are designated under the Wildlife Act, 1976 (as amended) due to their importance for the habitats present or which support species of plants and animals whose habitat requires protection. In addition, there are 630 No. proposed Natural Heritage Areas (pNHAs) nationally; these sites were published on a non-statutory basis in 1995 and, although they have not yet been formally designated, their ecological value is recognised by planning and licensing authorities.

There are no Natural Heritage Areas (NHA) designated in close proximity to the proposed development or its Zone of Influence. However, there is a large number of proposed Natural Heritage Areas (pNHA). The Douglas River Estuary



pNHA is immediately adjacent to the proposed development (and is encompassed within the boundaries of the Cork Harbour SPA), while the Glanmire Wood pNHA, Dunkettle Shore pNHA, Rockfarm Quarry, Little Island pNHA, Great Island Channel pNHA, Monkstown Creek pNHA, Owenboy River pNHA, Lough Beg (Cork) pNHA, Whitegate Bay pNHA, and Rostellan Lough, Aghada Shore and Poul nabibe Inlet pNHA are all within the wider Cork Harbour system and are largely encompassed by the Cork Harbour SPA. Additional sites in the wider area include the Cork Lough pNHA, Cuskinny Marsh pNHA, Carrigshane Hill pNHA, and Loughs Aderry and Ballybutler pNHA. Table 3-1 below details the locations of these sites and their connectivity to the proposed development.

Table 3-1 - Proposed Natural Heritage Areas in the Zone of Influence of the proposed development (highlighted sites have some degree of connectivity to the proposed development).

Site code	Name	Location (relative to the proposed development) and connectivity
000446	Loughs Aderry and Ballybutler	c. 15.7km east, on the opposite side of Midleton, no connectivity
001042	Carrigshane Hill	c. 13.2km east, on the opposite side of Midleton, no connectivity
001046	Douglas River Estuary	Immediately adjacent to the proposed development
001054	Glanmire Wood	c. 4.5km north-west, near Glanmire, weak hydrological connectivity
001058	Great Island Channel	c. 0.9km north-east, hydrological connectivity
001066	Lough Beg (Cork)	c. 5.3km south, weak hydrological connectivity
001074	Rockfarm Quarry, Little Island	c. 1.3km north, no connectivity
001076	Rostellan Lough, Aghada Shore and Poul nabibe Inlet	c. 8.2km south-east, very weak hydrological connectivity
001081	Cork Lough	c. 8.7km west, weak connectivity via waterbirds
001082	Dunkettle Shore	c. 3.0km north-west, hydrological connectivity
001084	Whitegate Bay	c. 6.9km south-east, very weak hydrological connectivity
001979	Monkstown Creek	c. 2.9km south, hydrological connectivity
001987	Cuskinny Marsh	c. 4.2km south-east, very weak hydrological connectivity and exchange of waterbirds
001990	Owenboy River	c. 6.3km south, very weak hydrological connectivity and exchange of waterbirds

Wildfowl Sanctuaries are areas that have been excluded from the Wildlife (Wild Birds) (Open Seasons) Order, 1979-2012 so that game birds can rest and feed undisturbed from shooting. One such area, namely the Douglas Estuary (site code: WFS-67), is immediately adjacent to the proposed development. Lough Aderry (WFS-10) and The Lough, Cork (WFS-12) are also within the wider Zone of Influence of the proposed development.

There are no statutory Nature Reserves or any National Parks designated in close proximity to the proposed development or within its Zone of Influence.

3.3 Habitats

As detailed in Section 2.3, habitat surveys and mapping of the proposed development footprint were carried out in May 2024, following the Fossitt (2000) classification and Smith *et al.* (2011) guidelines. Correspondence to Annex I habitats was checked using *Interpretation Manual of European Union Habitats* (DG Env, 2013) and with reference to the relevant national habitat monitoring programmes.

3.3.1 Fossitt (2000) Classification

The proposed development is located along the existing Cork Harbour Greenway, which follows the route of the former Cork, Blackrock and Passage Railway in the townlands of Ardmore and Pembroke. The existing greenway is a shared cyclist and pedestrian facility with a tarmac surface, generally c. 2.5m to 3m wide with a rough grassy verge and trees/shrubs of varied ages. The route is along the shore of Lough Mahon and the West Passage maritime areas of Cork Harbour, where there is a relatively narrow intertidal band of soft sediments. Inland from the route is a mixture of mostly residential buildings and landscaped areas of a mature suburban setting, with the southern end in the Passage West village centre. Habitats identified in the study area are listed in and described in Table 3-2 below and illustrated in the habitat maps presented in Appendix A.

Table 3-2 - Fossitt (2000) habitat types identified in the study area.

Habitat	Description
Linear Habitats	
BL1 - Stone walls and other stonework	A number of old stone walls are present immediately adjoining the proposed development. These are generally of limestone or sandstone masonry construction with lime mortar. These walls support a typical range of calcicolous and other plant species, including Thyme-leaved Sandwort (<i>Arenaria serpyllifolia</i>), Rustyback (<i>Asplenium ceterach</i>), Wall-rue (<i>Asplenium ruta-muraria</i>), Hart's-tongue (<i>Asplenium scolopendrium</i>), Maidenhair Spleenwort (<i>Asplenium trichomanes</i>), Red Valerian (<i>Centranthus ruber</i>), Ivy-leaved Toadflax (<i>Cymbalaria muralis</i>), Willowherbs (<i>Epilobium</i> spp.), Mexican Fleabane (<i>Erigeron karvinskianus</i>), Herb-Robert (<i>Geranium robertianum</i>), Ivy (<i>Hedera helix</i>), Pellitory-of-the-Wall (<i>Parietaria judaica</i>), Mouse-ear Hawkweed (<i>Pilosella officinarum</i>), Common Polypody (<i>Polypodium vulgare</i>), Navelwort (<i>Umbilicus rupestris</i>) and Cornsalad (<i>Valerianella</i> sp.).
CC1 - Sea walls, piers and jetties	This category includes vertical or near vertical coastal constructions adjacent to the proposed development. Given the age of the structures, they are generally of masonry construction. Their upper sections (above the splash zone) support species many of those listed for BL1, but also more coastal species such as Sea Radish (<i>Raphanus raphanistrum</i> subsp. <i>maritimus</i>), White Stonecrop (<i>Sedum album</i>) and Lesser Sea-spurrey (<i>Spergularia marina</i>). Lower sections of these structures show the typical zonation from splash zone to upper, middle and lower intertidal, with typical communities of these zones, i.e. from lichens to wracks and encrusting organisms.
FW4 - Drainage ditch	Given the nature of the area surrounding the proposed development, there are relatively few drainage ditches compared with more greenfield sites. One drainage ditch was noted dividing two areas of GA1 south of the Rochestown Road from the city end of the proposed development. This area could not be accessed, but is remote from the proposed development and unlikely to support habitats or species of conservation interest.
WL2 - Treelines	Treelines of varying length, height and composition occur throughout the survey area. Some are mapped discretely, while others occur as part of the *GW greenway mosaic described below. Tree species recorded included Field Maple (<i>Acer campestre</i>),

Habitat

Description

Norway Maple (*A. platanoides*), Sycamore (*A. pseudoplatanus*), Sugar Maple (*A. saccharum*), Beech (*Fagus sylvatica*), cypresses (*Cupressaceae*), Ash (*Fraxinus excelsior*), Bay Laurel (*Laurus nobilis*), pines (ornamental) (*Pinus*), Turkey Oak (*Quercus cerris*), Sessile Oak (*Q. petraea*), Pedunculate Oak (*Q. robur*), willows (*Salix* spp.), Small-leaved Lime (*Tilia cordata*) and Elm (*Ulmus* sp.). Lower-growing trees, shrubs and large herbs growing underneath or associated with treelines adjacent to the proposed development included Japanese Laurel (*Aucuba japonica*), Traveller's-joy (*Clematis vitalba*), Dogwoods (*Cornus* cultivars), Hawthorn (*Crataegus monogyna*), Holly (*Ilex aquifolium*), Japanese Knotweed (*Fallopia japonica*), Cherry Laurel (*Prunus laurocerasus*), Flowering Currant (*Ribes sanguineum*), Elder (*Sambucus nigra*), Alexanders (*Smyrniolus satrum*) and Gorse (*Ulex europaeus*). Treelines adjacent to the proposed development are considerably fragmented.

Non-linear Habitats

*GW - Greenway corridor mosaic

This non-Fossitt category covers the existing greenway surface and adjoining areas on top of the old railway embankment, i.e. the existing greenway verges. It is characterised as a mosaic of a number of Fossitt classes generally occurring as parallel, narrow or linear habitats. Following Smith et al. (2011), these are mapped as a mosaic as the component habitats occur in areas or bands that are smaller/narrower than the mapping tolerance at this scale. The main constant feature is the existing greenway itself, classed as BL3 (described below). Immediately adjoining the greenway along most of its length is GA2 (described below). Smaller areas or elements of treelines (WL2), flower beds (BC4), recolonising bare ground (ED3), scrub (WS1) and non-native shrubs (WS3) also occur scattered throughout. A number of individual trees such as Chilean Myrtle (*Luma apiculata*), Apple (*Malus* sp.) and Chatham Island Tree Daisy (*Olearia traversiorum*) also occur in this corridor. Butterfly-bush (*Buddleja davidii*) is also frequent, while some long stands of Three-cornered Leek (*Allium triquetrum*) also occur, alongside Winter Heliotrope (*Petasites pyrenaicus*) and Bluebell (*Hyacinthoides non-scripta*). See typical cross-section below.



Habitat	Description
BC4 - Flower beds and borders	A number of both public and private ornamental landscaped areas occur throughout the study area. Common planted species in these areas include Montbretia (<i>Crocsmia x crocosmiiflora</i>), Wallflower (<i>Erysimum</i> cultivar), Spurge (<i>Euphorbia</i> sp.), Strawberry (domestic) (<i>Fragaria x ananassa</i>), Coral Bells (<i>Heuchera</i>), Daffodil (ornamental) (<i>Narcissus</i> var.), African Daisy (<i>Osteospermum</i> likely 'Cannington Roy'), New Zealand Flax (<i>Phormium tenax</i>) and ornamental grasses. Shrubs planted in and bordering these areas include Japanese Laurel (<i>Aucuba japonica</i>), Dogwoods (<i>Cornus</i> cultivars), Kapuka (<i>Griselinia littoralis</i> cultivar), Hydrangea (<i>Hydrangea</i>), Rose of Sharon (<i>Hypericum calycinum</i>), Bay Laurel (<i>Laurus nobilis</i>), Himalayan Honeysuckle (<i>Leycesteria formosa</i>), Portuguese Laurel (<i>Prunus lusitanica</i> cultivar), Roses (<i>Rosa</i> spp., hybrids and cultivars) and Hebe 'Wiri Charm' (<i>Veronica speciosa</i> cultivar).
BL3 - Buildings and artificial surfaces	Buildings and other artificial surfaces, e.g. roads and walls of modern construction, generally support very little or no vegetation or other species. However, within the study area, gaps and cracks in such surfaces are quickly colonised by species such as Scarlet Pimpernel (<i>Anagallis arvensis</i>), Smooth Hawk's-beard (<i>Crepis capillaris</i>), Willowherbs (<i>Epilobium</i> spp.), Mexican Fleabane (<i>Erigeron karvinskianus</i>), Guernsey Fleabane (<i>E. sumatrensis</i>), Cleavers (<i>Galium aparine</i>), Ragwort (<i>Jacobaea vulgaris</i>), Black Medick (<i>Medicago lupulina</i>), Mints (<i>Mentha</i> spp.), Ribwort Plantain (<i>Plantago lanceolata</i>), Greater Plantain (<i>P. major</i>), Common Figwort (<i>Scrophularia nodosa</i>), Perennial Sowthistle (<i>Sonchus arvensis</i>), Smooth Sowthistle (<i>S. oleraceus</i>), Wood Sage (<i>Teucrium scorodonia</i>), Lesser Trefoil (<i>Trifolium dubium</i>) and Germander Speedwell (<i>Veronica chamaedrys</i>).
BL3/GA2 - Buildings and gardens	Buildings such as domestic dwellings and their associated landscaped areas or gardens are mapped as a mosaic of primarily BL3 and GA2. These also frequently contain areas of 'Ornamental/non-native shrub' (WS3), 'Horticultural land' (BC2), 'Flower beds and borders' (BC4) and 'Stone walls and other stonework' (BL1). Many species, particularly shrubs, from gardens and landscaping have escaped into the surrounding area and become established.
CC1 - Sea walls, piers and jetties	This category covers more gently sloped or flat areas than those described under CC1 (linear) above, e.g. the slipways and steps at the southern end of the proposed development and the rocky embankments along the northern section. The vegetation supported in these areas is largely similar to that described above, with the addition of species such as Thrift (<i>Armeria maritima</i>) and Sea Beet (<i>Beta vulgaris</i> subsp. <i>maritima</i>), particularly where there are crevices between rocks for larger plants to gain a foothold.
CW1 - Lagoons and saline lakes	There are two bodies of water on the landward side of the northern half of the existing greenway. The smaller and westernmost of these appears to be natural in origin, while the much larger and easternmost of these was created by it being cut off from the adjoining Lough Mahon transitional waterbody when the railway embankment was constructed. Both of these are tidal but their tidal range is significantly smaller than the adjoining estuary and they both retain water at low tide. These waterbodies likely provide nursery areas for fish and other aquatic fauna as well as foraging habitats for birds and bats.
GA1 - Improved agricultural grassland	There are two large fields of improved agricultural grassland to the south of the Rochestown Road along the northern section of the proposed development. These are of low biodiversity value and remote from the proposed development.
GA2 - Amenity grassland (improved)	Both public and private landscaped areas adjacent to the greenway are managed as amenity grassland. These are dominated by common, commercial grass species and

Habitat	Description
	<p>support a range of herbs. In the shorter, more intensively managed areas, herbs present include Yarrow (<i>Achillea millefolium</i>), Common Mouse-ear (<i>Cerastium fontanum</i>), Danish Scurvy-grass (<i>Cochlearia danica</i>), Common Bird's-foot-trefoil (<i>Lotus corniculatus</i>), Black Medick (<i>Medicago lupulina</i>), Buck's-horn Plantain (<i>Plantago coronopus</i>), Ribwort Plantain (<i>P. lanceolata</i>), Greater Plantain (<i>P. major</i>), Common Sorrel (<i>Rumex acetosa</i>), Dandelion (<i>Taraxacum vulgaria</i> agg.), Lesser Trefoil (<i>Trifolium dubium</i>), Red Clover (<i>Trifolium pratense</i>), White Clover (<i>Trifolium repens</i>) and Common Field-speedwell (<i>Veronica persica</i>). In the longer, less frequently mowed areas, herbs present include Red Dead-nettle (<i>Lamium purpureum</i>), Meadow Buttercup (<i>Ranunculus acris</i>), Creeping Buttercup (<i>Ranunculus repens</i>), Woundworts (<i>Stachys</i> spp.), Hedge Woundwort (<i>Stachys sylvatica</i>), Common Chickweed (<i>Stellaria media</i>), Nettle (<i>Urtica dioica</i>) and Germander Speedwell (<i>Veronica chamaedrys</i>).</p>
<p>LS1 - Shingle and gravel shores</p>	<p>This category covers the areas of coarse, mobile sediments of the upper shore of Lough Mahon. The most prominent species noted in these areas during the surveys were Common Orache (<i>Atriplex patula</i>), Spear-leaved Orache (<i>A. prostrata</i>), Sea Beet (<i>Beta vulgaris</i> subsp. <i>maritima</i>) and Curled Dock (<i>Rumex crispus</i>). There was also a high volume of litter. As highlighted in the desk study, these areas also likely support Common Toadflax (<i>Linaria vulgaris</i>) and Sea-kale (<i>Crambe maritima</i>) (see Section 3.4.1 below).</p>
<p>MW4 - Estuaries</p>	<p>This category covers the open waters of Lough Mahon and the West Passage. The fish and other aquatic fauna of these waters are described in the desk study (Section 3.4.4 below).</p>
<p>SS3 - Infralittoral muds</p>	<p>This category covers the sandy and soft mud substrate of the intertidal zone of Lough Mahon. The nature of these sediments and their benthic invertebrate communities are described in the desk study (Section 3.4.4 below). These areas provide foraging habitat for a range of waterbird species.</p>
<p>WD1 - Mixed broadleaved woodland</p>	<p>South of the existing greenway between the Ardmore car park and the larger lagoon, there is a woodland whose canopy is dominated by a mixture of both native and non-native, predominantly broadleaved trees, including Sycamore (<i>A. pseudoplatanus</i>), Beech (<i>Fagus sylvatica</i>), Ash (<i>Fraxinus excelsior</i>), Sessile Oak (<i>Quercus petraea</i>), Pedunculate Oak (<i>Q. robur</i>) and Turkey Oak (<i>Q. cerris</i>). The shrub layer also has a mixture of native and non-native species, including Traveller's-joy (<i>Clematis vitalba</i>), Hawthorn (<i>Crataegus monogyna</i>), Holly (<i>Ilex aquifolium</i>), Cherry Laurel (<i>Prunus laurocerasus</i>) and Elder (<i>Sambucus nigra</i>).</p>
<p>WD2/WS1 - Mixed broadleaved/conifer woodland/Scrub</p>	<p>South of the Rochestown Road at the city end of the proposed development there is an area characterised as a mosaic of mixed broadleaved/conifer woodland and scrub. This area was not accessed during the surveys but is remote from the proposed development.</p>
<p>WS1 - Scrub</p>	<p>Scrub is present in a number of locations in the vicinity of the proposed development, mostly as part of the greenway mosaic (*GW) described above. Scrub in the study area occurs in various compositions and stages of maturity/succession, but as with many of the other habitats, there is a high number of non-native species, including the invasive Japanese Knotweed (<i>Fallopia japonica</i>), alongside typical native species such as Bramble (<i>Rubus fruticosus</i> agg.). Species such as bindweeds (Convolvulaceae) and Bittersweet (<i>Solanum dulcamara</i>) frequently grow through these areas. Other species frequently found at the edges of these areas include Ground-elder (<i>Aegopodium podagraria</i>), Cow Parsley (<i>Anthriscus sylvestris</i>), Common Knapweed (<i>Centaurea nigra</i>), Creeping Thistle (<i>Cirsium arvense</i>), Spear Thistle (<i>Cirsium vulgare</i>), Wild Strawberry (<i>Fragaria vesca</i>), Cleavers (<i>Galium aparine</i>), Cut-leaved Crane's-bill</p>

Habitat	Description
	(<i>Geranium dissectum</i>), Dove's-foot Crane's-bill (<i>Geranium molle</i>), Herb-Robert (<i>Geranium robertianum</i>), St John's-worts (<i>Hypericum</i> spp.) and mints (<i>Mentha</i> spp.).
WS3 - Ornamental/non-native shrub	This category is used for areas dominated by ornamental or non-native shrubs, particularly where they occur in dense stands or formal settings, such as the large entrance to a private property opposite the Robert's Bridge car park. This category also occurs as part of the greenway mosaic (*GW).

3.3.2 Habitats Directive: Annex I

Lough Mahon and the West Passage adjoining the proposed development (from the top of the shoreline to the middle of these waterbodies) correspond to the Annex I habitat type 'Estuaries' (1130), while the soft-sediment intertidal areas represent the Annex I habitat type 'Mudflats and sandflats not covered by seawater at low tide' (1140). These areas are of Natura 2000 interest as wetland habitat for waterbirds in the Cork Harbour SPA. Some of the vegetation of the LS1 shingle around the high-tide mark may also correspond to the Annex I type 'Annual vegetation of drift lines' (1210), which is not a qualifying interest of any of the Natura 2000 sites connected to the proposed development.

The two CW1 lagoons adjoining the proposed development may also show some affinity to the Annex I priority⁷ habitat type '*Coastal lagoons' (1150), which includes both natural and artificial lagoons, with or without vegetation. Lagoons are not a qualifying interest of any of the Natura 2000 sites connected to the proposed development. However, they remain to be of some value to biodiversity as nursery areas for fish and other aquatic fauna as well as foraging habitats for birds and bats.

None of the other habitats in the vicinity of the proposed development correspond to types listed on Annex I to the Habitats Directive.

The Annex I habitats 'Mudflats and sandflats not covered by seawater at low tide' (1140) and 'Atlantic salt meadows (*Glauco-Puccinellietalia maritima*)' (1330) are listed as qualifying interests of the Great Island Channel SAC. These specific areas are, however, remote from the proposed development. Atlantic salt meadows or other saltmarsh types do not occur in the vicinity of the proposed development.

3.4 Protected and Threatened Species

3.4.1 Flora

The NBDC *Biodiversity Maps* shows records for a number of vascular plant taxa in the study area. Two notable species are Meadow Barley (*Hordeum secalinum*), which is protected under the Flora (Protection) Order, 2022 ("the FPO") and listed as Vulnerable in *Ireland Red List No. 10: Vascular Plants* (Wyse Jackson *et al.*, 2016), and Common Toadflax (*Linaria vulgaris*), which is listed as Near Threatened. The record for Meadow Barley dates from 1845 (and suitable habitat does not occur within the works footprint) while that for Common Toadflax is from 2021 and is within or immediately adjacent to the proposed development. A number of invasive alien plant species are also included in these records, as detailed in Section 4.4 below.

Vascular plant taxa included in the NPWS records received included Pennyroyal (*Mentha pulegium*), which is protected under the FPO and listed as Endangered in Wyse Jackson *et al.* (2016), Red Hemp-nettle (*Galeopsis angustifolia*) and Meadow Barley (*Hordeum secalinum*), which are protected under the FPO and listed as Vulnerable,

⁷ Annex I habitat types marked with an asterisk (*) are "priority habitat types", i.e., natural habitat types in danger of disappearing and for the conservation of which the EU has a particular responsibility given the proportion of their natural ranges falling within the European territory of Member States.

Rough Poppy (*Papaver hybridum*), listed as Regionally Extinct, Broad-fruited Cornsalad (*Valerianella rimosa*), listed as Critically Endangered, Weasel's-snout/Lesser Snapdragon (*Misopates orontium*), listed as Endangered, and Seakale (*Crambe maritima*) and Yellow Horned-poppy (*Glaucium flavum*), both listed as Near Threatened. All of these records are over 120 years old.

Bryophytes recorded in the study area on the NBDC *Biodiversity Maps* include Glass-wort Feather-moss (*Scleropodium tourettii*), which is protected under the FPO and listed as Endangered in *Ireland Red List No. 8: Bryophytes* (Lockhart *et al.*, 2012), as well as Orobush-seed Liverwort (*Targionia hypophylla*), Oval-leaved Pottia (*Pterygoneurum ovatum*) and Wilson's Pottia (*Tortula wilsonii*), which are listed as Regionally Extinct, Lance-leaved Pottia (*Tortula lanceola*), which is Critically Endangered, Round-fruited Grimmia (*Grimmia orbicularis*), which is Vulnerable, and Red-neck Forklet-moss (*Dicranella cerviculata*) and Common Extinguisher-moss (*Encalypta vulgaris*), which are Near Threatened. However, the most recent record for any of these species is from 1880. There were no bryophytes reported in the study area in the NPWS records received.

Apart from Common Toadflax, none of the flora recorded during the field surveys (a total of 130 no. taxa, as presented in Appendix B to this EclA) are protected under the FPO or listed as greater than Least Concern in Wyse Jackson *et al.* (2016) or Lockhart *et al.* (2012). A single, small stand of Common Toadflax was recorded c. 1-2m west of the light pole at Ch. 950 (immediately west of the Gorse and in front of a tree, c 0.75m from the landward edge of the path).

3.4.2 Birds

3.4.2.1 Wintering Birds

During the waterbird surveys, Tom Gittings recorded 31 no. waterbird species within the survey area, including 16 no. species listed as qualifying interests of the Cork Harbour SPA. Dunlin (*Calidris alpina*) and Black-headed Gull (*Chroicocephalus ridibundus*) were the most abundant species. Numbers of Teal (*Anas crecca*), Black-tailed Godwit (*Limosa limosa*) and Herring Gull (*Larus argentatus*) were also high in a Cork Harbour context.

The proposed development is alongside the eastern part of the southern shore of Lough Mahon, where the mudflats narrow, and the northern part of the West Passage, where the intertidal zone is very narrow. These areas did not support significant numbers of any waterbirds during the surveys and the birds using these mudflats appeared to be habituated to disturbance from pedestrians and cyclists on the existing greenway.

Most of the waterbirds which feed in Lough Mahon are known to roost in the Douglas River Estuary at high tide. The only waterbird roosts recorded during the surveys was a Cormorant (*Phalacrocorax corax*) day roost on a platform south of Marino Point and a large Herring Gull night roost in the West Passage.

Detailed results of the waterbird surveys are presented in Appendix E.

3.4.2.2 Summer Birds

3.4.2.2.1 Ryan Hanley Surveys

Bird species recorded during the breeding bird surveys carried out by Ryan Hanley in early summer 2023 included Magpie (*Pica pica*), Rook (*Corvus frugilegus*), Hooded Crow (*C. cornix*), Jackdaw (*Coloeus monedula*), Jay (*Garrulus glandarius*), Starling (*Sturnus vulgaris*), Blackbird (*Turdus merula*), Song Thrush (*Turdus philomelos*), Mistle Thrush (*T. viscivorus*), Robin (*Erithacus rubecula*), Wren (*Troglodytes troglodytes*), Woodpigeon (*Columba palumbus*), Collared Dove (*Streptopelia decaocto*), Dunnock (*Prunella modularis*), Goldfinch (*Carduelis carduelis*), Chaffinch (*Fringilla coelebs*), Bullfinch (*Pyrrhula pyrrhula*), House Sparrow (*Passer domesticus*), Blackcap (*Sylvia atricapilla*), Chiffchaff (*Phylloscopus collybita*), Willow Warbler (*Phylloscopus trochilus*), Grasshopper Warbler (*Locustella naevia*), Blue Tit (*Cyanistes caeruleus*), Great Tit (*Parus major*), Long-tailed Tit (*Aegithalus caudatus*), Grey Wagtail (*Motacilla cinerea*), House Martin (*Delichon urbicum*), Teal (*Anas crecca*), Turnstone (*Arenaria interpres*), Herring Gull (*Larus argentatus*), Cormorant (*Phalacrocorax carbo*) and Common Tern (*Sterna hirundo*).



The field and summary tables from Ryan Hanley's breeding bird surveys are included in Appendix F to this EclA.

3.4.2.2.2 AtkinsRéalís Surveys

During the ecological walkover on 1st May 2024, small numbers of Common Tern (*Sterna hirundo*) were observed feeding short distances offshore along the greenway route. Cork Harbour SPA is designated for a breeding population of Common Tern. Historically, terns nested primarily on disused barges near Marino Point (Wilson *et al.*, 2000). Following the barges' deterioration, terns nested at a number of locations in Cork Harbour, such as the port facilities at Ringaskiddy, the roof of the Martello Tower adjoining the Cork to Cobh railway line south of Fota Island, and a small island in the lagoon at Pfizer's Golf Course, Shanbally (RPS, 2014). In recent years a nesting platform/raft has been anchored on the eastern side of Little Island. There is no nesting habitat in close proximity to the proposed development suitable for nesting by Common Tern.

While no suitable habitat for nesting by Kingfisher (*Alcedo atthis*) was observed in close proximity to the proposed development, some branches overhanging the larger, partially-tidal lagoon/inlet adjoining the northern section of the greenway may provide suitable feeding perches for this species.

Bird species incidentally observed during the walkover survey included widespread and common species such as Barn Swallow (*Hirundo rustica*), Chiffchaff, Blackbird, Jackdaw, Rook, Jay and Woodpigeon, as well as small numbers of waterbirds including Turnstone, Little Egret (*Egretta garzetta*), Whimbrel (*Numenius phaeopus*) and Common Tern. Overall, bird activity during the survey was considered to be low, despite being during the breeding season and good weather conditions.

3.4.3 Mammals

3.4.3.1 Otter

Otter (*Lutra lutra*) is listed on Annex II to the Habitats Directive. However, it is not a qualifying interest of any of the SACs in the vicinity of the proposed development. Otter is also listed on Annex IV to the Habitats Directive, affording strict protection to otters and their breeding and resting places (whether inside or outside Natura 2000) under Article 12, as transposed into Irish law by Article 51 of the Habitats Regulations. Otter is also protected under the Wildlife Act, 1976 (as amended) ("the Wildlife Act"). An examination of the records for Otter on the National Biodiversity Data Centre's *Biodiversity Maps*, as well as data received from the NPWS, showed that this species or evidence of its presence have been recorded on numerous occasions around the shores of Cork Harbour, including adjacent to or in close proximity to the proposed development.

An otter survey was carried out by Ross Macklin of Triturus Environmental Ltd and the full details of this survey are provided in the Otter Survey Report presented in Appendix D to this EclA. This survey recorded a total of 14 no. otter signs, mostly spraint and jelly. A single couch identified in the otter survey was located >1km from the proposed development. A single holt in a boulder revetment was identified immediately adjacent to the proposed development (the precise location is redacted from the survey report in Appendix D as this is considered to be sensitive data). This holt was close to a source of fresh water and heavily marked with mixed-age spraint. This potential breeding holt was secluded from the existing walkway by dense scrub and was only accessible via the intertidal area, minimising disturbance from humans and dogs. While there are no works on the shoreline, it is proposed to apply to the NPWS for a derogation licence under Regulation 54 of the European Communities (Birds and Natural Habitats) Regulations, 2011 (as amended)⁸. This application is being submitted to NPWS in parallel to this application.

During the ecological walkover carried out by AtkinsRéalís on 1st May 2024, one adult otter was observed feeding c. 40m offshore from Patrick Murphy Park. No additional evidence of otters was observed during that survey.

⁸ As per NPWS Guidance set out at - <https://www.npws.ie/licensesandconsents/disturbance/application-for-derogation-licence>

3.4.3.2 Bats

All bat species present in Ireland are listed on Annex IV to the Habitats Directive, affording strict protection to bats and their roosts (whether inside or outside Natura 2000) under Article 12, as transposed into Irish law by Article 51 of the Habitats Regulations. Bats are also protected under the Wildlife Act. One species, namely Lesser Horseshoe Bat (*Rhinolophus hipposideros*) is listed on Annex II to the Habitats Directive, but is not a qualifying interest of any of the SACs in the vicinity of the proposed development.

The only record for any bat species from the study area in the NBDC *Biodiversity Maps* or NPWS database was a single record for Soprano Pipistrelle (*Pipistrellus pygmaeus*). However, given the nature of the habitats present in the vicinity of the proposed development, that other bat species likely to commute and forage in the study area include Common Pipistrelle (*Pipistrellus pipistrellus*), Leisler's Bat (*Nyctalus leisleri*) and Brown Long-eared Bat (*Plecotus auritus*), and potentially, Daubenton's Bat (*M. daubentonii*) and Whiskered Bat (*Myotis mystacinus*). Given the distance from any known roosts of Lesser Horseshoe Bat, this species is considered unlikely to occur in close proximity to the proposed development.

Overall, the habitats in the vicinity of the proposed development are considered to be of Moderate-High suitability⁹ for commuting and foraging bats as they include continuous linear habitats (treelines and scrub) connected to the wider landscape, which includes hedgerows, treelines, grazed grasslands, broadleaved woodlands and open water, but which are also relatively exposed due to their estuarine location and subject to high levels of human disturbance, including artificial lighting.

Visual assessments by O'Donnell Environmental (see detailed in Appendix C) found that none of the 4 no. bridges, 1 no. set of stone pillars or 200 no. trees in the study area had more than Low suitability for roosting bats, and none of the trees or structures had potential to support a maternity roost. The passive detector recorded a total of 719 bat passes over the 12 nights. Soprano Pipistrelle accounted for 49.5% of passes, Common Pipistrelle for 31.7%, Leisler's Bat for 18.5%, and Daubenton's Bat accounted for 0.3%. These species are all common and widespread in Ireland and, apart from Daubenton's Bat, are relatively light-tolerant. The activity transects recorded only Common Pipistrelle, Soprano Pipistrelle and Leisler's Bat, with the timing and behaviour of bats recorded indicating that roost locations were distant from the greenway. Overall, the levels of activity were low-moderate, likely due to high levels of artificial lighting and disturbance.

3.4.3.3 Marine Mammals

All marine mammals, including all whales, dolphins, porpoises and seals, are protected under the Wildlife Act. In addition, all cetaceans are listed on Annex IV to the Habitats Directive, affording them strict protection under Article 12, as transposed by Article 51 of the Habitats Regulations, while both Grey Seal (*Halichoerus grypus*) and Harbour Seal (*Phoca vitulina*) are listed on Annexes II and V to the Directive, though none of these species are qualifying interests of the Natura 2000 sites in Cork Harbour. Information on the presence of marine mammals in the study area was gathered through the NBDC Biodiversity Maps, the Irish Whale and Dolphin Group (IWDG) website (<https://www.iwdg.ie>) and literature available online.

Two pinniped species, namely Grey Seal and Harbour Seal are regularly observed in Cork Harbour, both seaward and inland from the proposed development. Records for both species have a similar distribution, with most records in the Lower Harbour and several in Cork City, but very few in Lough Mahon. It is likely that Lough Mahon does not provide the same feeding opportunities as these other parts of the Cork Harbour system. The levels of disturbance and nature of the habitats on the southern shore of Lough Mahon are also unsuitable for pinniped haul-out sites. As such, the habitats in the vicinity of the proposed development are not considered to be of importance for pinnipeds.

Three cetacean species, name Common Dolphin (*Delphinus delphis*), Harbour Porpoise (*Phocoena phocoena*) and Bottlenose Dolphin (*Tursiops truncatus*), are also regularly recorded in Cork Harbour. While records for Common

⁹ Evaluation following guidelines from the Bat Conservation Trust Collins (ed.) (2023).

Dolphin are distributed throughout Cork Harbour (including relatively frequent observations in Cork City), Harbour Porpoise and Bottlenose Dolphin are generally restricted to the Lower Harbour. However, it is considered likely that Harbour Porpoise and Bottlenose Dolphin may enter Lough Mahon at least occasionally. Another cetacean species which has previously been recorded in Cork Harbour is Orca (*Orcinus orca*). Three individuals were observed in Cork Harbour in August 1974, arriving and departing on the same day, while in June and July 2001, another three individuals spent six weeks in Cork Harbour, including entering Lough Mahon and spending a full day in Cork City centre (Wilson, 2001; Ryan & Wilson, 2003). One of those individuals died while in Cork Harbour. These events are considered to be exceptionally rare. Observations of other cetaceans such as Minke Whale (*Balaenoptera acutorostrata*) are limited to the mouth of the Harbour (around Roches Point) and further out to sea, i.e. remote from the proposed development.

No marine mammals were observed during the surveys which informed this EclA.

3.4.3.4 Other Mammals

Other terrestrial mammal species which have been recorded in the study area include Badger (*Meles meles*), Irish Stoat (*Mustela erminea hibernica*), Red Squirrel (*Sciurus vulgaris*), Hedgehog (*Erinaceus europaeus*), Pygmy Shrew (*Sorex minutus*) and Irish Hare (*Lepus timidus hibernicus*), all of which are listed as Least Concern in *Ireland Red List No. 12: Terrestrial Mammals* (Marnell *et al.*, 2019) and are protected under the Wildlife Act. Irish Hare is also listed on Annex V to the Habitats Directive. Red Fox (*Vulpes vulpes*) and Wood Mouse (*Apodemus sylvaticus*) all of which are listed as Least Concern in Marnell *et al.* (2019) and do not benefit from any protection, have also been recorded. There are no records for Pine Marten (*Martes martes*) in the study area.

During the surveys which informed this EclA, no evidence of mammals other than otters and bats was observed. While the habitats in the vicinity of the proposed development could be used by species such as Red Fox, Badger, Hedgehog, Irish Stoat, Wood Mouse and Pygmy Shrew, the high levels of disturbance from walkers, cyclists and dogs along the greenway and vehicular traffic along the road are likely to limit the opportunities for these species.

3.4.4 Fish and Other Aquatic Fauna

Fisheries and benthic surveys of Lough Mahon have been undertaken by IFI as part of its Water Framework Directive (WFD) ecological monitoring of transitional waterbodies (Kelly *et al.*, 2011) and also by the Aquatic Services Unit at University College Cork to inform an assessment of the ecological impacts of the Port of Cork's maintenance dredging (ASU, 2021). The fish and benthic fauna assemblages found in the Kelly *et al.* (2011) and ASU (2021) surveys is typical of most estuaries throughout north-western Europe and included several common fish species of significant commercial importance. These are described in more detail below.¹⁰

3.4.4.1 IFI Fish Sampling for Water Framework Directive

In October 2010, IFI undertook fish sampling in Lough Mahon as part of its WFD ecological monitoring of transitional waterbodies (Kelly *et al.*, 2011). The sampling included beach seining, fyke netting and beam trawling. The fish species recorded were, in order of decreasing abundance, Sprat (*Sprattus sprattus*), Sand Goby (*Pomatoschistus minutus*), Two-spotted Goby (*Gobiusculus flavescens*), Sand Smelt (*Atherina presbyter*), Cod (*Gadus morhua*), Flounder (*Platichthys flesus*), Plaice (*Pleuronectes platessa*), Scad (*Trachurus trachurus*), European Eel (*Anguilla anguilla*), Thick-lipped Grey Mullet (*Chelon labrosus*), Common Goby (*Pomatoschistus microps*), Dragonet (*Callionymus lyra*), Five-bearded Rockling (*Ciliata mustela*), Gunnel/Butterfish (*Pholis gunnellus*), Fifteen-spined Stickleback (*Spinachia spinachia*) and Greater Pipefish (*Syngnathus acus*). Another notable species recorded during IFI's sampling of more sheltered parts of Greater Cork Harbour was European Seabass (*Dicentrarchus labrax*).

¹⁰ Passive sampling techniques such as fyke netting and crab potting can show significant bias towards crabs and larger predatory fishes due to predation which occurs within the nets/traps when left in place for extended periods.

3.4.4.2 Benthic and Fish Sampling for Dredging Assessment

In August 2020, the Aquatic Services Unit at University College Cork undertook benthic and fisheries surveys to inform an assessment of the ecological impacts of the Port of Cork's proposed maintenance dredging programme in the navigation channel in Lough Mahon and the Lower River Lee (ASU, 2021). Benthic surveys included a combination of intertidal core sampling and subtidal grab sampling, while the fisheries surveys were conducted by beam trawling and crab potting.

Benthic fauna recorded in samples included Brown Shrimp (*Crangon crangon*), the isopod *Cyathura carinata*, the gastropod mollusc Laver Spire Shell (*Peringia ulvae*), the bivalve molluscs Peppery Furrow Shell (*Scrobicularia plana*), Sand Gaper/Soft-shell Clam (*Mya arenaria*) and Common Cockle (*Cerastoderma edule*), the polychaetes Ragworm (*Hediste diversicolor*), Catworm (*Nephtys hombergii*), Blow Lugworm (*Arenicola marina*), *Capitella capitata*, *Streblospio* sp., *Tharyx* sp., *Polydora* sp., *Heteromastus* sp. and Ampharetidae, as well as oligochaetes. This faunal assemblage is typical of sandy mud intertidal systems, dominated by polychaete worms and bivalve molluscs (ASU, 2021) and also likely represents the community complex 'Mixed sediment to sandy mud with polychaetes and oligochaetes' which characterises both the intertidal and subtidal benthos of the Great Island Channel SAC.

Fauna recorded in the beam trawls and crab pots included: -

- Invertebrates: Green/Shore Crab (*Carcinus maenas*), Brown Shrimp, Hermit Crab (*Pagurus bernhardus*), a harbour swimming crab (*Liocarcinus* sp.), small spider crabs (Majidae), prawns (mainly *Palaemon serratus*), Common Starfish (*Asterias rubens*), Peacock Worm (*Sabella pavonine*), a sponge (*Suberites* sp.), hydroids, ascidians, sea slugs, Feather Star (*Antedon* sp.), Common Whelk (*Buccinum undatum*) and anemones, as well as,
- Fish: Flounder, Dab (*Limanda limanda*), Plaice, Sole (*Solea solea*), Pollack (*Pollachius pollachius*), Whiting (*Merlangius merlangus*), Cod, Poor Cod (*Trisopterus minutus*), Pouting (*Trisopterus luscus*), Five-bearded Rockling, Sand Goby, Black Goby (*Gobius niger*), Gunnel, Pogge/Hooknose (*Agonus cataphractus*), Dragonet, Grey Gurnard (*Eutrigla gurnardus*), Greater Pipefish, Nilsson's Pipefish (*Syngnathus rostellatus*) and European Eel.

Shore Crab and Brown Shrimp were the most abundant mobile invertebrates, with Shore Crab being recorded in very high densities. Both species are important species in the food webs of estuaries, where they are both key predators of juvenile fish and prey for adult fish (ASU, 2021). Other species recorded in significant numbers included prawns and the polychaete Peacock Fan Worm (*Sabella pavonina*). These species, as well as many of the other benthic fauna recorded, are also important prey for the waterbirds occurring in Cork Harbour, including qualifying interests of the Cork Harbour SPA.

ASU (2021) found that Cork Harbour is an important nursery area for flatfish, including Dab, Sole and Plaice, and gadoids, especially Whiting. Most fish caught in the beam trawls were in the 0+ age class, with few older fish. Adults of these species spawn in marine waters and larvae drift into Lough Mahon where the juveniles grow on before migrating out to the replenish the adult stocks in the Lower Harbour and coastal waters.

3.4.4.3 Other Species

Three anadromous fish species not mentioned in the Kelly *et al.* (2011) or ASU (2021) reports (possibly due to seasonality of surveys and sampling techniques), but likely present in Lough Mahon on their migrations between coastal and marine waters and their spawning ground in the River Lee and its tributaries, are Atlantic Salmon (*Salmo salar*), Sea Lamprey (*Petromyzon marinus*) and River Lamprey (*Lampetra fluviatilis*). These species are all listed on Annex II to the Habitats Directive, but are not qualifying interests of the Great Island Channel SAC. Sea/Slob Trout, the migratory form of Brown Trout (*S. trutta*), could potentially be present in Lough Mahon also, although the only record found in the desk study was from the Upper Lee Estuary in Kelly *et al.* (2011).

The catadromous species European Eel, which is listed as Critically Endangered on both the Irish and Global Red Lists, but not listed on any annex to the Habitats Directive, was recorded in both Kelly *et al.* (2011) and ASU (2021). Juveniles (“glass eels”) enter Lough Mahon from marine waters and possibly spend up to a year or more in the estuary before continuing upstream as “elvers”. It is possible that some eels may stay and mature into adults in Lough Mahon/the Lee Estuary, but this is not known for certain. Adult “silver eels” depart from Cork Harbour on their outward migration to their spawning sites in the Sargasso Sea.

The NBDC *Biodiversity Maps* shows records for a single fish species in the study area, namely Thornback Ray (*Raja clavata*). This species is not protected under Irish or EU law.

3.4.5 Reptiles and Amphibians

The NBDC *Biodiversity Maps* shows records for two amphibian species in the study area, namely Smooth Newt (*Lissotriton vulgaris*) and Common Frog (*Rana temporaria*), both of which are protected under the Wildlife Act and listed as Least Concern in *Ireland Red List No. 5: Amphibians, Reptiles & Freshwater Fish* (King *et al.*, 2011). Common Frog is also listed on Annex V to the Habitats Directive. In addition, the NPWS has one record for Viviparous Lizard (*Zootoca vivipara*) in the hectad W77. This species is protected under the Wildlife Act and listed as Least Concern in King *et al.* (2011).

No reptiles or amphibians were observed during the walkover surveys. While the combination of old quay walls and rank grassland provides suitable cover and basking habitats for lizards, the very high levels of disturbance due to humans, dogs etc. likely prevent the survival of a population in the study area. Given the lack of freshwater habitats in the study area, Common Frog and Smooth Newt are unlikely to occur in significant numbers.

3.4.6 Invertebrates

The NBDC *Biodiversity Maps* shows records for a large number of butterflies and moths in the study area, including Marsh Fritillary (*Euphydryas aurinia*), which is listed on Annex II to the Habitats Directive and as Vulnerable in *Ireland Red List No. 4: Butterflies* (Regan *et al.*, 2010), Wall (*Lasiommata megera*), which is listed as Endangered, and Sprawler (*Asteroscopus sphinx*), which is listed as Near Threatened. There is also a record for Red-tailed Bumblebee (*Bombus lapidarius*), which is listed as Near Threatened in the *Regional Red List of Irish Bees* (Fitzpatrick *et al.*, 2006).

The NBDC *Biodiversity Maps* also shows records for a large number of molluscs, particularly gastropods, including the following: Prickly Snail (*Acanthinula aculeata*), Silky Snail (*Ashfordia granulata*), Common Whorl Snail (*Vertigo pygmaea*) and Striated Whorl Snail (*Vertigo substriata*), all of which are listed as Near Threatened in *Ireland Red List No. 2: Non-Marine Molluscs* (Byrne *et al.*, 2009), Point Snail (*Acicula fusca*), Moss Bladder Snail (*Aplexa hypnorum*), Tree Snail (*Balea perversa*), Heath Snail (*Helicella itala*), English Chrysalis Snail (*Leiostryla anglica*), Smooth Grass Snail (*Vallonia pulchella*) and Brown Snail (*Zenobiella subrufescens*), all of which are listed as Vulnerable, and Plaited Snail (*Spermodea lamellata*), which is listed as Endangered.

3.5 Invasive Alien Species

Invasive alien species are species which are caused to spread outside their natural range due to human activities and become problematic in their new habitats. Such species can have significant negative effects on biodiversity and related ecosystem services, human health and safety, and the economy. *Ireland's invasive and non-native species – trends in introductions* (O’Flynn *et al.*, 2014) presented a risk assessment of 377 recorded non-native species and 342 non-native potential invaders and categorised them as ‘High-impact’, ‘Medium-impact’ and ‘Low-impact’ species, according to their environmental, social and economic impacts.

Part 1 of the Third Schedule to the Habitats Regulations lists invasive alien plants requiring legal restrictions to prevent their spread. Regulation 49(2) and (3) of the Habitats Regulations make it an offence to cause or allow the spread the



of any of these species (or their hybrids, cultivars etc.), except where all reasonable steps have been taken and due diligence exercised to avoid committing the offence. As such, these species are of particular concern with regard to site development and construction works.

In addition, the EU Invasive Alien Species (IAS) Regulation (No. 1143/2014) (as amended) establishes rules to prevent, minimise and mitigate the negative effects of IAS within the EU. The species to which this Regulation applies are included in the official *List of Invasive Alien Species of Union concern* (DG Env, 2022b). Given the environmental, social and economic effects of these species and the legal restrictions on them at an EU level, they are also of concern for planning and development.

The NBDC *Biodiversity Maps* shows records for a large number of non-native species in the study area. These include the following records for species subject to legal restrictions (all of the following are restricted under Regulation 49 of the Habitats Regulations):

- 2 no. plant species:
 - Japanese Knotweed (*Fallopia japonica*), evaluated as High-impact in O’Flynn *et al.* (2014), and
 - Three-cornered Leek (*Allium triquetrum*), evaluated as Medium-impact in O’Flynn *et al.* (2014),
- 3 no. bird species:
 - Greylag Goose (*Anser anser*), not evaluated in O’Flynn *et al.* (2014),
 - House Crow (*Corvus splendens*), not evaluated in O’Flynn *et al.* (2014), restricted under the EU IAS Regulation, and
 - Ruddy Duck (*Oxyura jamaicensis*), evaluated as High-impact in O’Flynn *et al.* (2014), restricted under the EU IAS Regulation,
- 3 no. mammals: Fallow Deer (*Dama dama*), Sika Deer (*Cervus nippon*) and American Mink (*Neovison vison*), all of which were evaluated as High-impact in O’Flynn *et al.* (2014), and
- 1 no. invertebrate species: Harlequin Ladybird (*Harmonia axyridis*), evaluated as High-impact in O’Flynn *et al.* (2014).

NPWS records for the study area include one record for the non-native Brown Hare (*Lepus europaeus*), which was evaluated as High-impact in O’Flynn *et al.* (2014) and is restricted under Regulation 49 of the Habitats Regulations.

During the surveys which informed this EclA, a total of 37 no. different non-native plant taxa were identified. Only 8 no. of these are species evaluated in O’Flynn *et al.* (2014) or subject to legal restrictions, the remainder being naturalised species or common/widespread garden escapes. Notable non-native/invasive alien species observed during the surveys are detailed in Table 3-3 below.

Table 3-3 - Invasive alien species recorded during the field surveys.

Species	O’Flynn <i>et al.</i> (2014)	Habitats Regulations	Union concern
Japanese Knotweed (<i>Fallopia japonica</i>)	High-impact	Yes	No
Three-cornered Leek (<i>Allium triquetrum</i>)	Medium-impact	Yes	No
Cherry Laurel (<i>Prunus laurocerasus</i>)	High-impact	No	No
Sycamore (<i>Acer pseudoplatanus</i>)	Medium-impact	No	No

Species	O'Flynn <i>et al.</i> (2014)	Habitats Regulations	Union concern
Butterfly-bush (<i>Buddleja davidii</i>)	Medium-impact	No	No
Traveller's-joy (<i>Clematis vitalba</i>)	Medium-impact	No	No
Himalayan Honeysuckle (<i>Leycesteria formosa</i>)	Medium-impact	No	No
Turkey Oak (<i>Quercus cerris</i>)	Medium-impact	No	No

In addition, the invasive marine brown seaweed Japanese Wireweed (*Sargassum muticum*), which is evaluated as High-impact in O'Flynn *et al.* (2014) and restricted under Regulation 49 of the Habitats Regulations, was recorded during the field survey. This species was observed in the opening from the largest inlet/lagoon to Lough Mahon, i.e. under the greenway bridge at this location. As the works are restricted to the top of the embankment, there is no risk of any interaction with this infestation.

4. Key Ecological Receptors

Based on the description given in the preceding section of the biodiversity and baseline ecological conditions in the receiving environment of the proposed development, Key Ecological Receptors (KERs) have been defined as set out in Table 4-1 below. These KERs have been selected on the basis that they are all of Local Importance (Higher Value) or above and that there are pathways for potential impacts from the proposed development to those receptors. All of the other receptors described in Section 3 are either of Local Importance (Lower Value) or below or they are not sufficiently connected the proposed development to be at any risk of negative impacts.

Table 4-1 - Key Ecological Receptors (KERs) for the proposed development.

No.	Description and connectivity	Evaluation
KER 1	<p>Lough Mahon and the West Passage</p> <p>This KER includes the waters and the intertidal and subtidal soft sediments of Lough Mahon and the West Passage. These areas include the Douglas Estuary sector of the Cork Harbour Ramsar site, Important Bird Area and Special Protection Area, and the Douglas Estuary pNHA and WFS. These areas are classed as Annex I 'Estuaries', while the intertidal soft sediments are classed as Annex I 'Mudflats and sandflats not covered by seawater at low tide'. These areas also support bird species which are qualifying interests of the Cork Harbour SPA, as well as a range of estuarine and marine fauna, including many protected and threatened species.</p> <p>This KER is adjacent to the proposed development.</p>	<p>International Importance, on the basis of presence of internationally designated sites within this KER and the presence of some of the species of interest from those sites.</p>
KER 2	<p>Shingle shores</p> <p>This KER includes the areas of coarse, mobile sediments of the upper shore of Lough Mahon, and associated vegetation. These areas may correspond to the Annex I habitat type 'Annual vegetation of drift lines' and likely support the Near Threatened species Common Toadflax and Sea-kale.</p> <p>This KER is adjacent to the proposed development.</p>	<p>Local Importance (Higher Value), on the basis of the potential presence of small examples of an Annex I habitat (outside of an SAC) and likely presence (in low numbers) of two species on an Irish Red List.</p>
KER 3	<p>Lagoons</p> <p>This KER includes the two bodies of water on the landward side of the northern half of the existing greenway (mapped as CW1) which may correspond to the Annex I priority habitat type '*Coastal lagoons' and likely provide nursery areas for fish and other aquatic fauna as well as foraging habitats for birds and bats.</p> <p>This KER is immediately adjacent to the proposed development.</p>	<p>Local Importance (Higher Value), on the basis of the potential presence of a small example of an Annex I habitat (outside of an SAC) and that it likely provides nursery habitats for fish and foraging for birds and bats in numbers likely important in a local context.</p>
KER 4	<p>Coastal constructions</p> <p>This KER includes the sea walls, rocky embankments, slipways steps along the seaward side of the existing greenway. These are of interest for the different vascular plant, lichen, seaweed and faunal communities which occur across different zones of tide, exposure and substrate. These areas represent hard-substrate coastal habitats otherwise absent along this stretch of the estuary.</p>	<p>Local Importance (Higher Value), on the basis that these areas provide additional habitat heterogeneity, supporting increased species richness and abundance, indirectly providing additional food sources for fish and other fauna in the estuary.</p>

No.	Description and connectivity	Evaluation
	This KER is immediately adjacent to the proposed development.	
KER 5	<p>Woodland, treelines and scrub</p> <p>This KER covers the mixed broadleaved woodland south of the existing greenway between the Ardmore car park and the larger lagoon, as well as the treelines and scrub present in a number of locations in the vicinity of the proposed development, mostly as part of the greenway mosaic (mapped as *GW). These areas are not part of any designated site, do not represent any Annex I habitat types and contain a high proportion of non-native and invasive plant species. However, they still provide forage, cover and nesting habitats for birds, some foraging and commuting corridors for bats and habitats for other fauna, as well providing a degree of connectivity between areas of higher ecological value in the wider landscape. These habitats also provide partial screening between human activity and wildlife in the estuary.</p> <p>Parts of this KER are within the footprint of construction works for the proposed development.</p>	<p>Local Importance (Higher Value), on the basis that these habitats provide habitats for a range of fauna, support ecological connectivity in the wider landscape and screening of noise and visual impacts.</p>
KER 6	<p>Otter</p> <p>Otter is strictly protected species which occurs immediately adjacent to the proposed development. A single holt in a boulder revetment was identified immediately adjacent to the proposed development (the precise location is redacted from the survey report in Appendix D as this is considered to be sensitive data). This potential breeding holt was secluded from the existing walkway by dense scrub and was only accessible via the intertidal area, minimising disturbance from humans and dogs. Notwithstanding this, it is proposed to apply for a Regulation 54 derogation licence in relation to this holt in parallel with the planning application.</p>	<p>Local Importance (Higher Value), on the basis that a single breeding or resting place of this strictly protected species occurs in close proximity to the proposed development.</p>
KER 7	<p>Invasive alien plant species (IAPS)</p> <p>Several IAPS listed as 'High-impact' in O'Flynn <i>et al.</i> (2014) and legally restricted under the Habitats Regulations occur within or adjoining the proposed development. In particular, Japanese Knotweed and Three-cornered Leek are present within the development footprint. Cherry Laurel also occurs. Given the risks associated with construction works near these species, they are selected as a KER.</p> <p>Several IAPS, including High-impact and restricted species, occur within the footprint of construction works for the proposed development.</p>	<p>n/a, on the basis that these species themselves negatively impact on biodiversity in the study area.</p>

5. Impact Assessment

This section examines and analyses the likely impacts of the construction and operation of the proposed development (in the absence of any mitigation or enhancement measures) and evaluates their effects on the KERs. In accordance with NRA (2009a), the significance of these effects is assessed empirically, without reference to the importance of the KERs in question.

Mitigation for these impacts is provided subsequently (in Section 6) and the significance of any impacts remaining after the inclusion of mitigation is assessed at the end of that section.

5.1 Types of Impacts

This section describes the types of impacts likely to arise during the construction and operation of the proposed development, their sources and general pathways and effects. More detailed analysis of the impacts and effects specific to each KER is provided in Section 5.2.

5.1.1 Habitat Loss and Fragmentation

During construction of the proposed development, linear strips of vegetation of existing vegetation at the greenway edge (mostly GA2, maximum 1.5m wide over c. 2km length, so an absolute maximum of 0.3ha), and 17 no. trees, will be lost (see Table 5-1 below), except where marked for retention. This also represents fragmentation or loss of connectivity between habitats on either side, which is of particular concern for linear habitats, such as treelines.

The effects of these impacts include reductions in the area and distribution of the habitats concerned, as well as reduced habitat connectivity and quality in the wider area. These can also lead to indirect negative impacts on fauna, such as loss of forage, cover or breeding places and reduced feeding ranges due to loss of commuting corridors. The significance of the effects of these impacts depends on their extent, duration and availability of alternative habitats. This is assessed with regard to each KER in Section 5.2 below.

5.1.2 Water Quality

5.1.2.1 Construction Phase

Potential water quality impacts arising from construction activities (including site preparation) could include pollution of surface waters and groundwater by sediment, cementitious materials (e.g. concrete), hydrocarbons (e.g. diesel, hydraulic oils and lubricating oils) and other deleterious matter. In the case of the proposed development, these include fine sediment from excavations, fuels and other hydrocarbons from vehicles, plant and machinery, concrete and other construction materials, and waste from on-site welfare facilities.

Given the relatively shallow depth of excavations, absence of any known contaminated soil, absence of significant earthworks, and type of construction, the quantities of potentially polluting material to be used during construction are limited. As such, the overall risk of significant water quality impacts is very low.

Given the nature and scale of the proposed development, and the overall works sequence and methodology, the magnitude of any negative water quality impacts from the construction phase will be low, their extent limited to waterbodies in the immediate vicinity, and their duration brief or temporary. The probability of any significant pollution event occurring is very low.

5.1.2.2 Operational Phase

Potential water quality impacts from the operation of the proposed development relate to run-off from the cycleway. The impermeability of the bituminous pavement can result in increased run-off rates. Run-off from cycleways can be contaminated by hydrocarbons such as greases and micro-plastics such as tyre dust, as well as general litter and fine sediments. Increased run-off rates and contaminants from can negatively impact on water quality and hydrological regime in receiving waterbodies.

As new artificial surfaces for the proposed development are limited to widening of the existing greenway, there will be no significant increase in run-off rates or associated contaminants. Thus, it is concluded that any negative impacts on surface waters due to the quantity or quality of run-off from the new cycleway will be imperceptible and limited to the immediate vicinity.

5.1.3 Invasive Alien Species

Given the nature and extent of the proposed development, activities associated with its construction, particularly the excavation, storage and movement of soil, stone and other materials, as well as the movement of vehicles, pose a risk of importing IAPS to the site, spreading IAPS already present locally, or exporting IAPS from the site.

Species of particular concern in this case include the following, all of which are restricted under Regulation 49 of the Habitats Directive:

- Japanese Knotweed and Three-cornered Leek - both present within the construction footprint, so these plants or their propagules will arise in excavations and need to be disposed of as contaminated material.

These species can have negative impacts on native habitats and species, most notably through competition with and displacement of native species, as well as by altering the physical and chemical properties of the soil. Furthermore, they also represent a project risk as negligence with regard to biosecurity during construction could constitute an offence under Regulation 49 of the Habitats Regulations.

The High-impact Cherry Laurel is also present at numerous locations in the vicinity of the proposed development. While this species is not legally restricted, it still represents a risk to the integrity of the other KERs of the proposed development.

Overall, the effects of any spread of IAPS associated with the construction of the proposed development would likely be moderate to significant, localised in extent and persist long-term. Owing to the nature of the proposed development, there is not considered to be any significant risk of the introduction or spread of IAPS arising from its operation.

5.1.4 Disturbance to Fauna

Disturbance can stimulate a number of different responses from individuals, ranging from heightened vigilance (refocussing energy from feeding or breeding-related activities to active awareness of threats) to avoidance (physically moving away from the stimulus or source of disturbance). These responses cause physiological stress which impacts the energy budgets of the species concerned. At the upper end of the scale, avoidance responses can lead to the displacement of species from the area, which reduces their access to feeding and/or breeding and resting habitats. This can also represent an effective barrier to connectivity where the affected area extends across a commuting corridor, e.g. a hedgerow. When the impacts occur over a longer period, survival and breeding success may be negatively affected. As such, the degree to which a receptor is affected depends on the intensity of the disturbance at its source, the duration of the disturbance, the sensitivities of the receptors and availability of suitable alternative habitats and commuting corridors.

5.1.4.1 Construction Phase

During the construction phase, the physical presence, movement, sound and vibration from vehicles, machinery and personnel will give rise to some disturbance to fauna, particularly mammals and birds. Given the nature of the construction activities, the impacts are likely to be moderate-intensity but very localised, with any noise and vibration unlikely to affect fauna beyond c. 100m from active works. The affected area for visual disturbance to fauna is very variable depending on the sensitivities of the species concerned and presence of existing screening in the form of vegetation or structures to be retained during construction.

The overall duration of the construction phase is expected to be c. 12 months, which will avoid impacts on more than 2 no. breeding seasons of any sensitive receptors. Furthermore, the duration of high-intensity works at any one location will likely be significantly less than this. Therefore, it is very unlikely that there would be any effects at the population level. In addition, as works will be undertaken during normal working hours, disturbance will be focussed outside of the hours of greatest sensitivities of mammals in the study area, which are predominantly nocturnal.

5.1.4.2 Operational Phase

Disturbance during the operational phase will be limited to use of the cycleway by cyclists and pedestrians and periodic maintenance of the facility. Disturbance from these activities is considered to be low-intensity and also very localised (to within c. 50m). Any disturbance from the operation of the proposed development is likely to be imperceptible above the baseline levels of disturbance in the areas concerned.

5.1.5 Artificial Lighting

As detailed in Section 1.3.1.1 above, the proposed development provides for the very slight relocation of approx. one third of the existing lighting columns along the route, and retention of the remaining two thirds in their existing positions. There is no addition of any new lighting or any proposed change to the type or timing of the existing lights. As such, there will be no change to the baseline conditions with regard to artificial lighting and, therefore, no impacts or effects arising from any such change.

5.2 Assessment by Key Ecological Receptor

Table 5-1 below analyses the likely impacts of the construction and operation of the proposed development on each of the KERs and evaluates the significance of their effects.

Table 5-1 - Assessment of the ecological impacts of the proposed development on the Key Ecological Receptors (KERs).

No.	Analysis of impacts and their effects	Evaluation
KER 1	<p>Lough Mahon and the West Passage</p> <p>There will be no loss or fragmentation of habitat in Lough Mahon or the West Passage as a result of the proposed development.</p> <p>During the construction stage, there is potential for accidental pollution to negatively impact on water quality in these waterbodies. As explained in Section 5.1.2, any such impacts would be very limited in their magnitude, extent and duration.</p> <p>Noise and visual disturbance from the construction of the proposed development and, to a lesser extent, has the potential to impact on the waterbirds which are included in this KER. However, as the numbers of these birds in the affected area are small and as they are for the most part habituated to such levels of disturbance, as well as the short duration of the construction works, no significant effects are anticipated.</p>	<p>Potential brief or temporary, slight to imperceptible impacts on water quality in the immediate vicinity of the works.</p> <p>Slight disturbance impacts to birds during construction, imperceptible during operation, limited to within 50m of the proposed development.</p>
KER 2	<p>Shingle shores</p> <p>There will be no loss or fragmentation of shingle shore habitat as a result of the proposed development, nor will there be any effect of water quality impacts on these habitats.</p> <p>The proposed development will not lead to significantly more access to shingle shores by greenway users. As such, there will be no measurable increase in disturbance.</p>	<p>No measurable impact.</p>
KER 3	<p>Lagoons</p> <p>There will be no loss or fragmentation of lagoon habitat as a result of the proposed development, nor will there be any loss of trees overhanging lagoons, which may provide feeding perches for species such as Kingfisher.</p> <p>During the construction stage, there is potential for accidental pollution to negatively impact on water quality in these waterbodies. As explained in Section 5.1.2, any such impacts would be very limited in their magnitude, extent and duration.</p> <p>Noise and visual disturbance from the construction of the proposed development and, to a lesser extent, has the potential to impact on the waterbirds which are included in this KER. However, as the numbers of these birds in the affected area are small and as they are for the most part habituated to such levels of disturbance, as well as the short duration of the construction works, no significant effects are anticipated.</p>	<p>Potential brief or temporary, slight to imperceptible impacts on water quality in the immediate vicinity of the works.</p> <p>Slight disturbance impacts to birds during construction, imperceptible during operation, limited to within 50m of the proposed development.</p>
KER 4	<p>Coastal constructions</p> <p>There will be no loss or fragmentation of habitat in Lough Mahon or the West Passage as a result of the proposed development.</p>	<p>Potential brief or temporary, slight to imperceptible impacts on water</p>

No.	Analysis of impacts and their effects	Evaluation
	The impacts of accidental pollution incidents for this KER are as per KERs 1 and 3 above.	quality in the immediate vicinity of the works.
KER 5	<p data-bbox="252 293 647 331">Woodland, treelines and scrub</p> <p data-bbox="252 338 1007 472">There will be no clearance of woodland or scrub to facilitate the proposed development. As indicated in the drawings submitted as part of the planning application, trees proposed to be felled are limited to the following:</p> <ul data-bbox="252 479 1031 891" style="list-style-type: none"> <li data-bbox="252 479 975 517">▪ 1 no. Pedunculate Oak at Ch. 260 (growing on a bridge), <li data-bbox="252 524 1031 591">▪ 2 no. stems of a 3-stem Turkey Oak at Ch. 635 (stem closest to the water to be retained), <li data-bbox="252 598 730 636">▪ 1 no. Pedunculate Oak at Ch. 1125, <li data-bbox="252 642 647 680">▪ 1 no. Sycamore at Ch. 1130, <li data-bbox="252 687 695 725">▪ 1 no. Norway Maple at Ch. 1135, <li data-bbox="252 732 679 770">▪ 1 no. Sugar Maple at Ch. 1165, <li data-bbox="252 777 647 815">▪ 1 no. Sycamore at Ch. 1175, <li data-bbox="252 822 943 860">▪ 3 no. Sycamore between Ch. 1295 and Ch. 1330, and <li data-bbox="252 866 823 904">▪ 7 no. Hornbeam from Ch. 1600 to Ch. 1650. <p data-bbox="252 911 1031 1106">Of these, only the Pedunculate Oak is a native species, while Turkey Oak and Sycamore as listed as Medium-impact invasives in O'Flynn et al. (2014). The other maples are also non-native. At the time of survey, none of these trees had potential bat roost features. Only the loss of the 7 no. Hornbeam represents a significant loss of habitat or connectivity in a local context.</p> <p data-bbox="252 1113 1023 1182">Tree felling, if carried out during the bird nesting season, has the potential to cause significant disturbance to breeding birds.</p>	<p data-bbox="1054 293 1477 501">Slight to imperceptible impacts at the local level from the removal of oaks and sycamore, moderate impacts at the local level from the removal of the line of hornbeams in Patrick Murphy Park.</p> <p data-bbox="1054 508 1477 645">Potential significant disturbance to breeding birds from tree felling if carried out during the nesting season.</p>
KER 6	<p data-bbox="252 1198 320 1236">Otter</p> <p data-bbox="252 1243 959 1346">There will be no direct loss or fragmentation of estuarine or terrestrial habitat for otters as a result of the proposed development, nor any loss of freshwater sources.</p> <p data-bbox="252 1352 1023 1456">Given the nature, magnitude, short duration and very localised extent of any potential water quality impacts, they will not lead to any indirect impacts on otters via prey availability.</p> <p data-bbox="252 1462 1023 1608">Owing to the proximity of the otter holt to the proposed development, negative impacts on this holt from noise and other disturbance, particularly during the construction phase, cannot be ruled out.</p>	<p data-bbox="1054 1198 1485 1473">Potential significant impacts to otter at the local level, principally in relation to disturbance to a known holt during construction. It is proposed to apply for a Regulation 54 derogation licence in relation to this holt in parallel with the planning application.</p>
KER 7	<p data-bbox="252 1624 695 1662">Invasive alien plant species (IAPS)</p> <p data-bbox="252 1668 1031 1904">In the absence of appropriate biosecurity protocols, construction of the proposed development poses a risk of the spread of IAPS already existing on the site, most notably Japanese Knotweed, or introduction of new IAPS. This poses a threat to the integrity of native habitats and species populations within and adjoining the works footprint, as well as a risk of committing an offence under Regulation 49 of the Habitats Regulations.</p>	<p data-bbox="1054 1624 1485 1727">Potentially significant long-term impacts at the local level, as well as project liability risk.</p>

6. Mitigation and Enhancement

6.1 Landscape Plan and Specification

A detailed landscape specification will be developed by a Landscape Architect to maximise the biodiversity value of the final design. In particular, the landscape plan/specification will maximise the quantity, quality, diversity and connectivity of habitats within the finished cycleway corridor. To that end, the development of the landscape specification will be overseen by a suitably qualified and experienced ecologist and have regard to the following guidance documents: -

- All-Ireland Pollinator Plan 2021-2025. *National Biodiversity Data Centre Series 25*. National Biodiversity Data Centre, Waterford. March 2021.
- *Cork County Council Recommended List of Native Tree and Shrub Species for Residential & Industrial Developments, Version 2*. CCC Ecology Office, Cork County Council, Cork. June 2022.
- NBDC (2019) Pollinator-friendly management of: Transport Corridors. *National Biodiversity Data Centre Series 19*. National Biodiversity Data Centre, Waterford.
- NTA (2023) *Active Travel Advice Note: Greening and Nature-based SuDS for Active Travel Schemes. ATAN-2023-04*. National Transport Authority, Dublin.
- TII (2006) *A Guide to Landscape Treatments for National Road Schemes in Ireland. GE-ENV-01102. February 2006*. Transport Infrastructure Ireland, Dublin.
- TII (2022) *Rural Cycleway Design (Offline & Greenway). DN-GEO-03047. August 2022*. Transport Infrastructure Ireland, Dublin.

6.1.1 Preservation In-situ

The extent of vegetation clearance will be limited to the area required to facilitate construction. All vegetation, including hedgerows/treelines and other semi-natural habitats, not required to be cleared will be fenced off as part of site preparations and protected/managed as per the landscape specification during construction.

In particular, trees shall be retained and protected, with felling limited to those trees which are marked for removal as per the design and landscape drawings submitted as part of the planning application. This will minimise the risk to roosting bats and nesting birds and retain important habitat for a wide range of invertebrates.

In order to protect semi-natural grassland and other habitats bordering the greenway, the limits of the new path will be precisely marked out prior to commencement of works and all excavations (other than for new and relocated street furniture) shall be limited to within the area marked out. As these are shallow excavations, the sides may be vertical and supported by timber boards, so there will be no necessity to step back the excavation beyond the edge of the new greenway.

As noted in Section 3.4.1, the Near Threatened plant species Common Toadflax was recorded at 1 no. location in the immediate vicinity of the proposed works during the surveys which informed this EclA. The habitat where these plants were found are not proposed to be affected by the proposed works as they are behind a light pole which is proposed to remain in place. However, in order to ensure that they are protected an exclusion zone incorporating an appropriate buffer shall be established and fenced off prior to works commencing. The Contractor's ECoW shall advise on the location and extent of the exclusion zone and carry out regular inspections of the exclusion fencing and observance of the same. The exclusion zone shall remain in place for the full duration of the works and the only access which



shall be permitted during this time shall be to Cork County Council or an agent acting on its behalf as part of the regular maintenance of the greenway verges.

6.1.2 Salvage and Temporary Removal

Topsoil arising on site from areas of different grassland habitats shall be stockpiled separately for re-use on site as part of the landscaping. The locations, heights etc. of stockpiles for topsoils will be detailed in the landscape specification. The objective of this measure is to minimise the export and import of soil and to preserve as much as possible the local seedbank and soil conditions on site. Soils contaminated with IAPS or hazardous materials shall not be re-used.

Topsoil reused on site will be from appropriate habitat types. For example, topsoil from semi-natural grasslands should be used in areas to be returned to such areas. Generally, topsoil should be reused in the nearest appropriate area to the area from which it was excavated.

6.1.3 Habitat Replacement and Creation

6.1.3.1 General

The methodology for establishing all new or replacement landscaping, including topsoils, grasslands, hedgerows, treeline and swales/SuDS feature, will be established in the landscape specification, following the principles set out below.

6.1.3.2 Grasslands

Priority shall be given to re-use of topsoil generated on site, with importation of new topsoil kept to a minimum. Where it is necessary to import new topsoil, this shall be carefully selected to ensure that it is appropriate to the receiving lands in terms of its structure, organic content, pH, nutrient status etc., as advised by the Landscape Architect.

Priority shall also be given to natural colonisation of new topsoil by soil biota and flora from adjoining habitats, minimising the use of imported seed. Where new seeding is required, e.g. due to the time of year of landscaping works, the Contractor shall ensure that it is of local provenance and that the species mix is appropriate to each specific location, as per the landscape specification.

6.1.3.3 Trees and shrubs

The species mix, establishment and ongoing management of each new and replacement hedgerow and the new treelines will be as per the landscape specification, which shall take into account the following guidance:

- *Cork County Council Recommended List of Native Tree and Shrub Species for Residential & Industrial Developments, Version 2.* Ecology Office, Cork County Council, Cork. June 2022.

All planting shall utilise specimens of local provenance.

6.1.4 Post-construction

The implementation of the landscape specification will continue into the operational phase with the establishment and ongoing management of landscaping. Ongoing management will focus in particular on preserving and, where possible, enhancing the quality and diversity of habitats present in the cycleway corridor. This will have regard to the following guidance and example: -

- *All-Ireland Pollinator Plan 2021-2025. National Biodiversity Data Centre Series 25.* National Biodiversity Data Centre, Waterford. March 2021.



- NBDC (2019) Pollinator-friendly management of: Transport Corridors. *National Biodiversity Data Centre Series* 19. National Biodiversity Data Centre, Waterford.

As explained in more detail in Section 6.4 below, the IAPS Management Plan will continue to be implemented for at least 2 years post-construction to ensure complete removal of high-impact and legally restricted IAPS from the greenway corridor and adjoining areas.

6.2 Protection of Fauna

6.2.1 Mammals

Based on the results of the desk studies and field surveys undertaken to inform this EclA, there are no bat roosts within or immediately adjacent to the proposed development and, therefore, there is no requirement for any licences under Regulation 54 of the Habitats Regulations for these species. However, one Otter holt was recorded in close proximity to the proposed development, which will likely require a derogation licence under Regulation 54 before works can proceed. It is proposed to apply for this licence in parallel with the planning application.

However, due to the mobility of such species and consequent potential for changes in their distribution in the time between the surveys which informed this EclA, the granting of any planning permission and commencement of construction, the following pre-construction surveys will be undertaken in advance of any works commencing on site (including preparatory works):

- Identification of any breeding or resting places of protected non-volant mammals, e.g. otters; and,
- Inspections for roosting bats at trees with potential bat roost features.

These surveys will be undertaken by a suitably qualified and experienced ecologist (appointed by the Contractor) and in the appropriate survey seasons. Inspections of potential bat roost features must be undertaken no more than 1-2 days prior to proposed felling.

The results of these surveys will determine the need or otherwise for any additional licences to disturb these species. Where present, the treatment of these species during construction will be in accordance with the terms and conditions of any licence granted.

The Contractor will be responsible for applying for and executing any licences required, and will be assisted by their own suitably qualified and experienced ecologist.

In order to minimise the impact of disturbance and artificial lighting on mammals, construction activities should be limited to normal working hours (07:00 to 18:00), with the site being secured and lighting being switched off outside of these hours. More detail on artificial lighting is provided below.

Mammal-proof fencing is not required for the proposed development and will not be specified.

6.2.2 Artificial Lighting

6.2.2.1 Construction Phase

To minimise impacts on bats and other nocturnal fauna, works during hours of darkness will be kept to a minimum. If construction lighting is required during the bat activity period (April to September), lighting shall be directed away from waterbodies and all woodland/scrub to be retained. This can be achieved by using directional lighting to avoid light spill or trespass, which requires the use of an appropriate luminaire and/or accessories such as hoods, cowls, louvres and shields.



6.2.2.2 Operational Phase

As detailed in Section 1.3.1.1 above, the only proposed change to the existing lighting is a very slight relocation of approx. one third of the existing lighting columns. As outlined in Section 5.1.5, given the absence of any perceptible change to the existing lighting, there will be no ecological effects.

Should any upgrading or improvement of the existing lighting along the route be contemplated in the future, it is recommended that the following principles be followed to improve the wildlife-friendliness of this lighting: -

- Lighting design will be flexible and fully take into account the presence of protected species. Appropriate lighting shall be used, with more sensitive lighting regimes deployed in wildlife-sensitive areas.
- Dark zones will be used to separate habitats or features such as waterbodies, hedgerows, treelines and scrub from lighting by forming a dark perimeter around them.
- Buffers will be used to protect dark zones and rely on ensuring light levels within a certain distance of a feature do not exceed defined limits.

The following, which is taken from ILP (2023) guidelines, should be considered if choosing new luminaires: -

- All luminaires should lack UV elements when manufactured. Metal halide, compact fluorescent sources should not be used.
- LED luminaires should be used where possible due to their sharp cut-off, lower intensity, good colour rendition and dimming capability.
- A warm white light source (2700 Kelvin or lower) should be adopted to reduce blue light component.
- Luminaires should feature peak wavelengths higher than 550nm.
- Column heights should be carefully considered to minimise light spill and glare visibility. This should be balanced with the potential for increased numbers of columns and upward light reflectance as with bollards.
- The use of bollard or low-level downward-directional luminaires is strongly discouraged. This is due to a considerable range of issues, such as unacceptable glare, poor illumination efficiency, unacceptable upward light output, increased upward light scatter from surfaces and poor facial recognition which makes them unsuitable for most sites. Therefore, they should only be considered in specific cases where the lighting professional and project manager are able to resolve these issues.
- Only luminaires with an upward light ratio of 0% and with good optical control will be used.
- Luminaires must always be mounted on horizontally with no light output above 90° and/or no upward tilt.
- As a last resort, accessories such as baffles, hoods or louvres may be used to reduce light spill and direct it only to where it is needed.

6.2.3 Birds

In order to protect nesting birds and other wildlife, Section 40 of the Wildlife Act makes it an offence to “*cut, grub, burn or otherwise destroy, during the period beginning on the 1st day of March and ending on the 31st day of August in any year, any vegetation growing on any land not then cultivated*”. However, this does not apply to “*the clearance of vegetation in the course of road or other construction works or in the development or preparation of sites on which any building or other structure is intended to be provided*”. Notwithstanding this, every effort shall be made to avoid cutting/felling trees or clearing vegetation during this period.



Where tree felling or vegetation clearance is necessary between 1st March and 31st August, a suitably qualified and experienced ecologist will inspect the trees/vegetation and identify any active bird nests present. Any active nests will be protected and surrounding cover not cleared until such time as the nest is no longer active, as advised by the Contractor's ecologist.

6.3 Aquatic Habitats

6.3.1 General Construction Measures

The following measures shall apply to prevent water quality impacts generally: -

1. During all stages of construction, site management shall ensure that good housekeeping is maintained at all times and that all site personnel are made aware of the importance of the estuarine environments and the requirement to avoid pollution.
2. Safe handling of all potentially hazardous materials will be emphasised to all site personnel.
3. Tools and equipment shall not be cleaned in any waterbody and wash water shall not be discharged directly into any waterbody or drain without appropriate treatment.
4. Prior to commencement of works, the appointed Contractor, with the assistance of the Contractor's ecologist, shall elaborate detailed, project-specific Emergency Response Plan (ERP). The ERP shall be consistent with the mitigation measures in the NIS and EclA, and approved by Cork County Council, and shall be adhered to in order to address any pollution incidents on site.
5. The Contractor shall make daily checks for elevated water levels in Lough Mahon and other waterbodies adjoining the construction site, as well as weather warnings or flood alerts from Met Éireann, Cork County Council and/or Cork City Council.
 - a. Should water levels in Lough Mahon or overland flows pose a risk of overwhelming water quality control measures, or a weather warning for extreme rainfall or a flood alert covering the construction site be in place,
 - i. All areas of exposed soil shall be securely covered with hessian matting,
 - ii. All stockpiles shall also be securely covered, and
 - iii. Works carrying the greatest risk of pollution, i.e. works within the flood zone, shall be suspended and all vehicles, plant, equipment, construction materials and personnel shall be removed from the flood zone.
 - b. Works may resume once any flood waters have receded and any warning/alert been lifted.

In addition, the measures in the following sub-sections shall apply to control the risk of water quality impacts from specific sources.

Surface Water Run-off

The following measures shall be implemented to minimise the quantity of surface water run-off from the works area¹¹, and to minimise any potential contamination of such run-off by fine sediment or other deleterious matter: -

1. At the beginning of site set-up, silt fences shall be erected along both sides of the around the perimeter of the active works areas and the Contractor's compound.

¹¹ In this section, the "works area" includes the site compound, stockpiles and temporary settlement pond.



- a. The silt fences shall be formed using timber stakes and hessian fabric.
 - b. All silt fences shall be inspected by the Contractor and their ecologist on set-up and, thereafter, on a daily basis by the Contractor and weekly by their ecologist. Silt fences shall be maintained in good condition and any defects shall be rectified as soon as they are identified.
 - c. Records shall be kept of the installation, checks, maintenance and removal of all silt fences.
2. Run-off from the site compound and material stockpiles will be collected by a shallow toe drain or other means of collection, which will discharge to a shallow settlement pond.
 - a. The collection system and settlement pond shall be installed before the site compound and stockpiles.
 - b. A silt fence (as described above) shall be installed around the settlement pond. These silt fences shall also be subject to regular checks and maintenance, as described above.
 - c. Settlement ponds from the compound and stockpiling shall be checked on a daily basis by the Contractor and weekly by the Contractor's ecologist.
 - d. Sediment build-up shall be removed from the settlement pond at regular intervals and removed off-site.
 - e. Records shall be kept of checks and sediment removal from settlement ponds.
 3. Stockpiles shall be located as far as possible from any waterbody and any stockpiles left overnight shall be covered.

Hydrocarbons

The following measures shall be implemented to control the risk of pollution from hydrocarbons, including fuels, hydraulic oils etc. on site: -

1. Storage of any fuels, oils and other hydrocarbons on site shall be in secure tanks/containers banded to 110% capacity.
2. Refuelling shall not be permitted within 50m of any waterbody.
3. All vehicles, plant, equipment etc. shall: -
 - a. Be free of any mechanical defects, and be well maintained so as to prevent fuel or oil leaks,
 - b. Be mechanically sound and checked before arriving on site,
 - c. Not be left idling when not in use, and
 - d. Be parked/stored on drip trays overnight.
4. Driving on site and shall be kept to a minimum.
5. All site personnel shall be familiar with their responsibilities under the ERP. In particular: -
 - a. All construction personnel shall be trained in the use of the spill containment/pollution control kits which will be kept on site.
 - b. Any spillage of fuels, lubricants or hydraulic oils shall be immediately contained and a pollution control kit used. The contaminated soil shall be removed off site and properly disposed of.
 - c. Any spillage of fuels, lubricants or hydraulic oils, shall be reported immediately to the Contractor and Contractor's ecologist.



6. Additional drip trays and spill kits shall be accessible from the storage container.

6.4 Invasive Alien Plant Species

The following relates to the preparation and implementation of an IAPS Management Plan for the construction phase and shall be put into effect prior to mobilisation and before any works commence on site: -

1. The Contractor's ecologist shall carry out a detailed survey to map the distribution and extents of all IAPS within and adjoining the red-line boundary.
2. Any IAPS identified during the pre-construction survey shall be clearly demarcated. The areas of infestation and appropriate buffer zones shall be isolated with fencing or warning tape and 'Biosecure Zone' signs.
3. The Contractor's ecologist shall update the IAPS Management Plan, as appropriate, taking into account:
 - a. The specific IAPS present and the scale and extent of infestation,
 - b. The sensitivity of the local environment, particularly Cork Harbour,
 - c. The growth stage/season of the plants, and
 - d. The construction sequence/programme.
4. The IAPS Management Plan shall be prepared in agreement with the Contractor and Cork County Council or Employer's Representative and in accordance with the following: -
 - TII (2006) *A Guide to Landscape Treatments for National Road Schemes in Ireland*. GE-ENV-01102. February 2006. Transport Infrastructure Ireland, Dublin.
 - TII (2012) *Guidelines on the Implementation of Landscape Treatment on National Road Schemes in Ireland*. GE-ENV-01103. July 2012. Transport Infrastructure Ireland, Dublin.
 - TII (2017) *The Management of Waste from National Road Construction Projects*. GE-ENV-01101. December 2017. Transport Infrastructure Ireland, Dublin.
 - TII (2020a) *The Management of Invasive Alien Plant Species on National Roads – Standard*. GE-ENV-01104. December 2020. Transport Infrastructure Ireland, Dublin.
 - TII (2020b) *The Management of Invasive Alien Plant Species on National Roads – Technical Guidance*. GE-ENV-01105. December 2020. Transport Infrastructure Ireland, Dublin.
5. The following measures form the basis of the IAPS Management Plan.

The following shall be implemented during the construction stage (including advance works): -

6. The IAPS Management Plan shall be implemented by the Contractor with the advice and assistance of the Contractor's ecologist.
7. The 'toolbox talk' for all persons entering the site shall include an overview of the IAPS present on site, their identification, the importance of controlling them/preventing their spread, and the responsibilities of site staff in avoiding any spread of IAPS.
8. The Contractor shall ensure that all vehicles, plant, equipment and PPE intended for use on site are dry, clean and free from debris and plant material prior to being brought to site.



9. A dedicated and clearly marked cleaning facility/wash-down area shall be strategically placed in a contained area on site for use by staff, vehicles and machinery.
 - a. All vehicles and equipment that have been used in a contaminated zone shall be thoroughly pressure-washed in the wash-down area each time they leave site and once work in that zone is complete. This includes footwear, personal protective equipment (PPE), tools, and other light equipment.
 - b. This facility shall be located as far as possible from any waterbody and shall be appropriately bunded to prevent run-off.
 - c. Material gathered in this facility shall be appropriately stockpiled and treated along with other contaminated material.
10. Soil management during the works shall be in accordance with Section 5.5 of TII (2006).
11. Any imported materials (e.g. fill and topsoil) shall be sourced from licensed suppliers who shall certify that in advance of delivery that any such materials are free from IAPS material, especially propagules such as seeds or rhizome fragments.
12. The Contractor shall implement appropriate controls on the movement of machinery and materials in IAPS-contaminated zones.
 - a. Where it is necessary to work in contaminated zones, every effort shall be made not to use vehicles with caterpillar tracks.
 - b. Vehicles leaving contaminated zones shall be confined to marked haulage routes protected by root barrier membranes or be pressure-washed before leaving the zone.
13. Any further measures required in relation to any additional species which may be identified on site during the Contractor's ecologist's pre-construction survey shall be included in the IAPS Management Plan.
14. Any Ash trees or fallen Ash branches or leaf litter to be removed shall be assumed to be infected with *Hymenoscyphus fraxineus*, the causal agent of 'Ash dieback disease'. Any Ash material arising that is suspected to have ash-dieback disease shall be dealt with in line with published best practice – such as e.g. Scottish Environmental Protection Agency (SEPA) advice on Disposal of trees and plants infected with specific plant diseases.¹²
15. The removal of IAPS shall not be undertaken without the water quality protection measures described above being fully in place.
16. In relation to stockpiling of IAPS-contaminated material: -
 - a. Any such material shall be stockpiled separately from other material and clearly marked as contaminated.
 - b. The length of time for which such material is stored on site shall be kept to a minimum.
 - c. Measures shall be implemented to prevent any run-off from stockpiles of contaminated material which could convey IAPS propagules to watercourses.
17. Only vehicles that are deemed to be biosecure (i.e. sealed so that no soil can escape) shall be used to transport IAPS-contaminated material and be thoroughly pressure-washed in the wash-down area before leaving site.

¹² https://www.sepa.org.uk/media/154389/wst-q-037-disposal_of_trees_plants_with_specific_diseases.pdf

18. Following completion of works in a given area of the site, bare soil shall be planted (as per the Landscape Plan and Specification) at the earliest opportunity, i.e. vegetation shall be established as quickly as possible to stabilise the soil and minimise opportunities for re-colonisation by IAPS.
19. The Contractor's ecologist shall oversee and record the implementation of the IAPS Management Plan and all works relating to IAPS, as per TII (2020a,b). In particular, the Contractor's ecologist shall: -
 - a. Inspect the demarcation and signage of contaminated zones, the cleaning/wash-down facility and IAPS material stockpiling area prior to their use,
 - b. Directly supervise and document all IAPS removal works,
 - c. Carry out weekly inspections of the site for compliance with the biosecurity measures detailed in the IAPS Management Plan, and
 - d. Provide monthly updates to Cork County Council or the Employer's Representative regarding the implementation of the IAPS Management Plan.

The following shall be implemented after completion of construction and during the establishment of new planting as per the Landscape Plan and Specification.

20. The works area shall be monitored for regrowth of IAPS over a minimum of 2 years. Any regrowth of treated IAPS on site shall be accurately mapped and reported to Cork County Council. The removal of IAPS may be considered successful after two consecutive growing seasons with no sign of regrowth from the removed stands.

6.5 Residual Impacts

Table 6-1 below evaluates the residual effects of the construction and operation of the proposed development on each of the KERs following the inclusion of the mitigation and enhancement measures in this section.

Table 6-1 - Evaluation of residual effects following the inclusion of mitigation and enhancement.

No.	Analysis of impacts and their effects	Evaluation
KER 1	Lough Mahon and the West Passage	No measurable effects.
KER 2	Shingle shores	No measurable effects.
KER 3	Lagoons	No measurable effects.
KER 4	Coastal constructions	No measurable effects.
KER 5	Woodland, treelines and scrub	Localised short-term effects, eventually becoming moderate positive once new landscaping is established.
KER 6	Otter	No measurable effects.
KER 7	Invasive alien plant species (IAPS)	Ecological and project risks effectively controlled.

7. Conclusion

This EclA has examined the biodiversity and baseline ecological conditions of the receiving environment within the site of the proposed Passage West Pedestrian and Cycle Route and its Zone of Influence, assessed the likely effects of the proposed development, individually and in combination with other plans and projects, on the sites, habitats, species and other ecological features of Local Importance (Higher Value) or above which were identified within the footprint of the proposed development and its Zone of Influence. This report has also proposed suitable measures to avoid or reduce the likely effects on those features and evaluated any residual effects.

On the basis of that assessment, it is concluded that the Passage West Pedestrian and Cycle Route, provided that it is implemented in accordance with the measures proposed in this EclA, will not give rise to any significant negative effects on the biodiversity or ecology of the receiving environment.



8. References

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APPENDICES

Appendix A. Habitat Maps



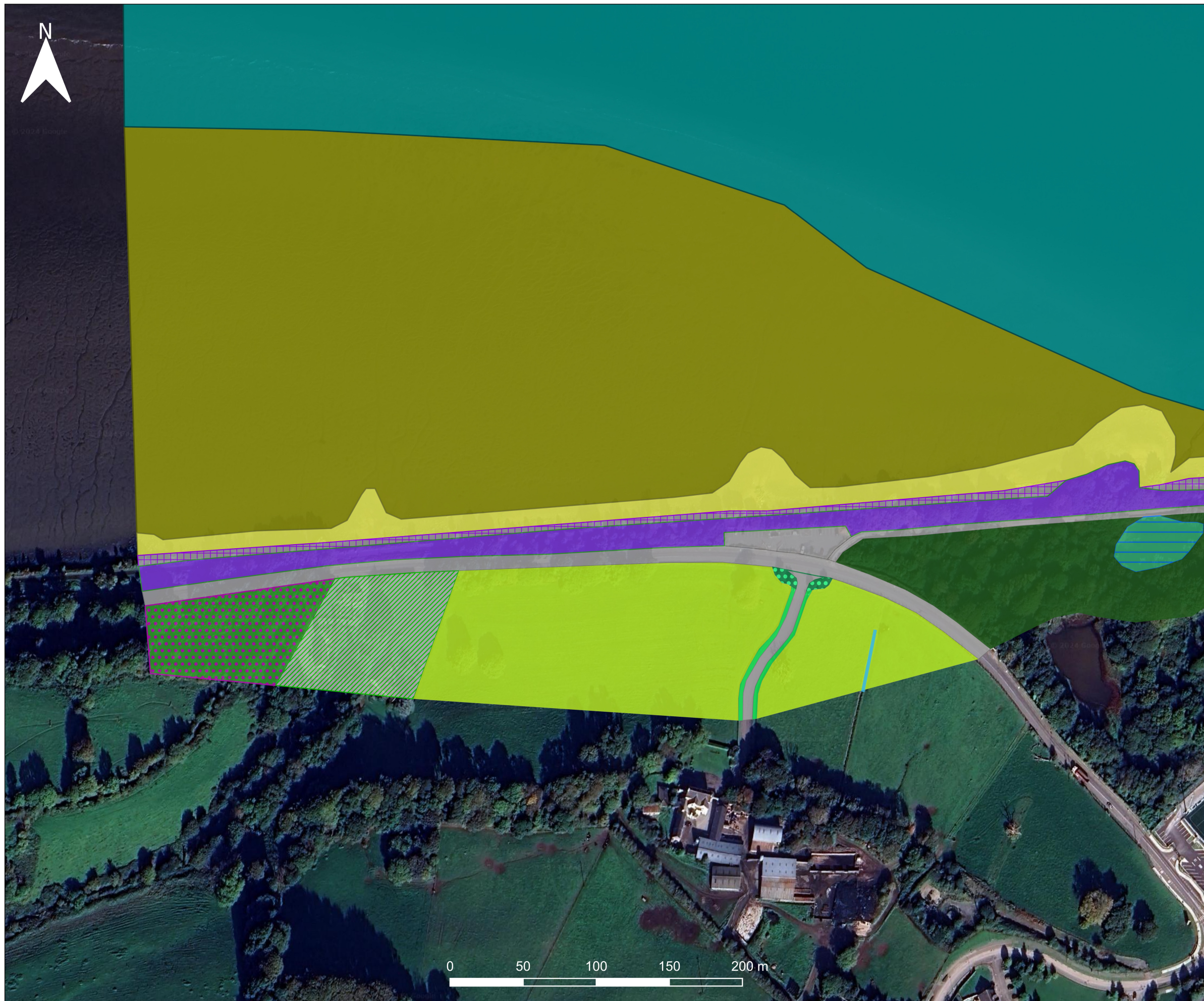


Habitat Map

Legend

Linear Habitats		GA2
FW4		LS1
Non-linear Habitats		MW4
*GW		SS3
BL3		WD1
BL3/GA2		WD2/WS1
CC1		WS3
CW1		
GA1		









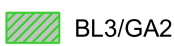

1. Habitat classifications follow 'A Guide to Habitats In Ireland' (Fossitt, 2000), except where marked by an asterisk (*).
2. Site-specific descriptions of habitats are provided in the Ecological Impact Assessment (AtkinsRéalis doc. ref. 0085669DG0004).





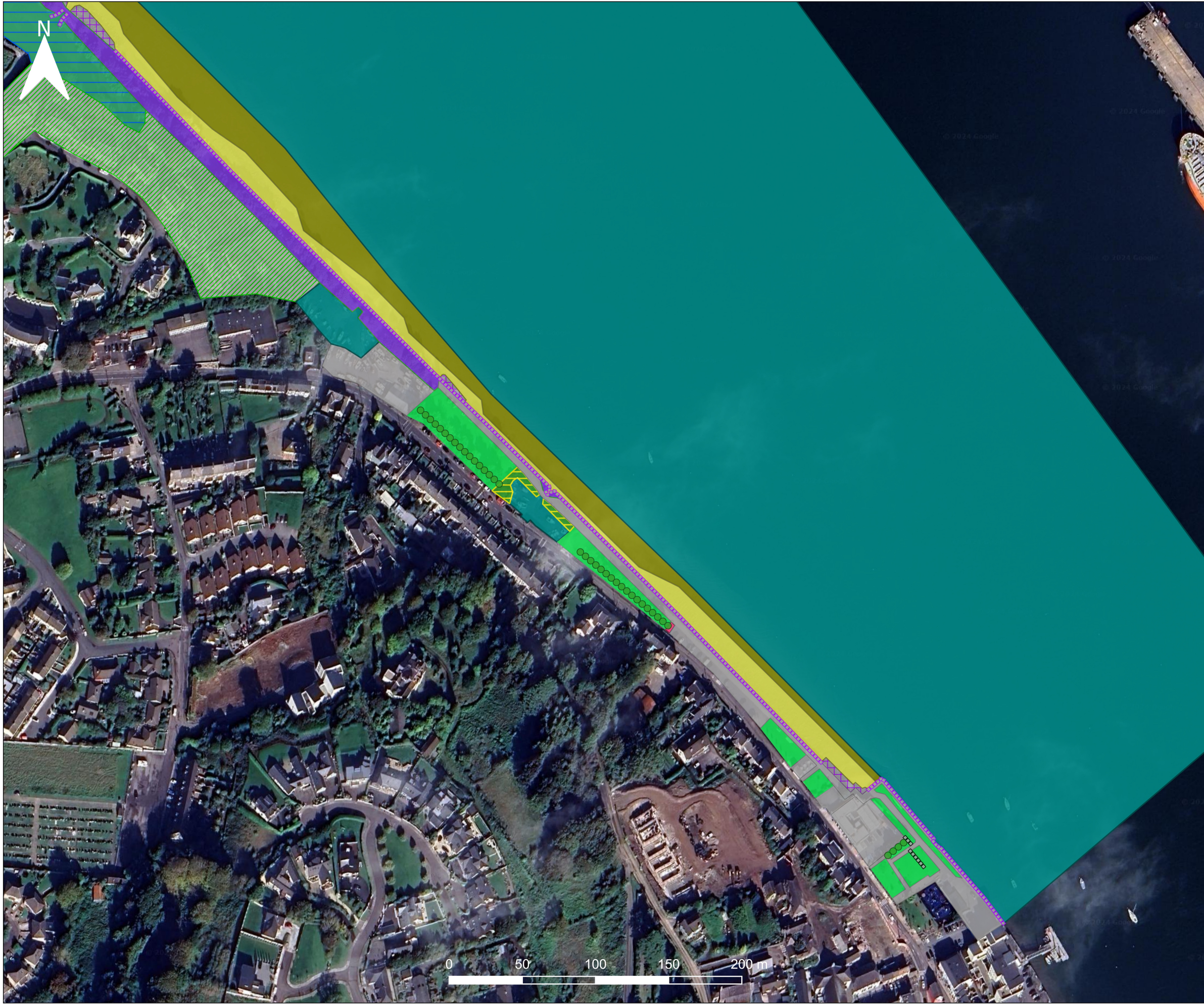
Habitat Map

Legend

Linear Habitats	 CW1
 CC1	 LS1
Non-linear Habitats	 MW4
 *GW	 SS3
 BL3	 WD1
 BL3/GA2	
 CC1	

1. Habitat classifications follow 'A Guide to Habitats In Ireland' (Fossitt, 2000), except where marked by an asterisk (*).
2. Site-specific descriptions of habitats are provided in the Ecological Impact Assessment (AtkinsRéalis doc. ref. 0085669DG0004).





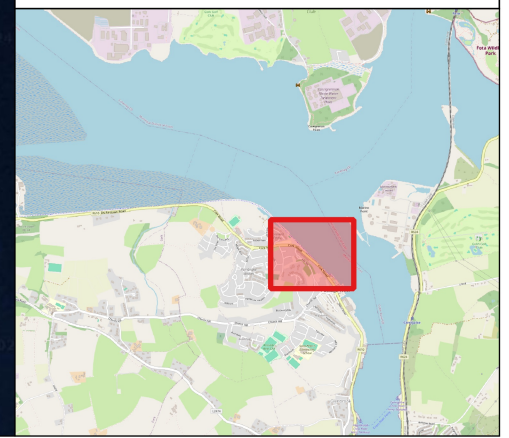
Habitat Map

Legend

Linear Habitats	
BL1	CC1
CC1	CW1
WL2	GA2
	LS1
Non-linear Habitats	
*GW	MW4
BC4	SS3
BL3	WS1
BL3/GA2	

1. Habitat classifications follow 'A Guide to Habitats In Ireland' (Fossitt, 2000), except where marked by an asterisk (*).

2. Site-specific descriptions of habitats are provided in the Ecological Impact Assessment (AtkinsRéalis doc. ref. 0085669DG0004).



Appendix B. Botanical Species List

Common Name	Scientific Name
Field Maple	<i>Acer campestre</i>
Norway Maple	<i>Acer platanoides</i>
Sycamore	<i>Acer pseudoplatanus</i>
Sugar Maple	<i>Acer saccharum</i>
Yarrow	<i>Achillea millefolium</i>
Ground-elder	<i>Aegopodium podagraria</i>
Garlic Mustard	<i>Alliaria petiolata</i>
Three-cornered Leek	<i>Allium triquetrum</i>
Scarlet Pimpernel	<i>Anagallis arvensis</i>
Cow Parsley	<i>Anthriscus sylvestris</i>
Wild Celery	<i>Apium graveolens</i>
Thyme-leaved Sandwort	<i>Arenaria serpyllifolia</i>
Thrift	<i>Armeria maritima</i>
Rustyback	<i>Asplenium ceterach</i>
Wall-rue	<i>Asplenium ruta-muraria</i>
Hart's-tongue	<i>Asplenium scolopendrium</i>
Maidenhair Spleenwort	<i>Asplenium trichomanes</i>
Common Orache	<i>Atriplex patula</i>
Spear-leaved Orache	<i>Atriplex prostrata</i>
Japanese Laurel	<i>Aucuba japonica</i>
Sea Beet	<i>Beta vulgaris</i> subsp. <i>maritima</i>
Butterfly-bush	<i>Buddleja davidii</i>
Remote Sedge	<i>Carex remota</i>
Hornbeam	<i>Carpinus betulus</i>
Common Knapweed	<i>Centaurea nigra</i>
Red Valerian	<i>Centranthus ruber</i>
Common Mouse-ear	<i>Cerastium fontanum</i>
Creeping Thistle	<i>Cirsium arvense</i>
Spear Thistle	<i>Cirsium vulgare</i>
Traveller's-joy	<i>Clematis vitalba</i>
Danish Scurvy-grass	<i>Cochlearia danica</i>
Bindweeds	Convolvulaceae

Common Name	Scientific Name
Dogwoods	<i>Cornus cultivars</i>
Hawthorn	<i>Crataegus monogyna</i>
Smooth Hawk's-beard	<i>Crepis capillaris</i>
Montbretia	<i>Crocsmia x crocosmiiflora</i>
Cypress	Cupressaceae
Ivy-leaved Toadflax	<i>Cymbalaria muralis</i>
Teasel	<i>Dipsacus fullonum</i>
Willowherbs	<i>Epilobium spp.</i>
Mexican Fleabane	<i>Erigeron karvinskianus</i>
Guernsey Fleabane	<i>Erigeron sumatrensis</i>
Wallflower	<i>Erysimum cultivar</i>
Spurge	<i>Euphorbia sp.</i>
Beech	<i>Fagus sylvatica</i>
Japanese Knotweed	<i>Fallopia japonica</i>
Strawberry (domestic)	<i>Fragaria x ananassa</i>
Wild Strawberry	<i>Fragaria vesca</i>
Ash	<i>Fraxinus excelsior</i>
Cleavers	<i>Galium aparine</i>
Cut-leaved Crane's-bill	<i>Geranium dissectum</i>
Dove's-foot Crane's-bill	<i>Geranium molle</i>
Herb-Robert	<i>Geranium robertianum</i>
Kapuka	<i>Griselinia littoralis cultivar</i>
Ivy	<i>Hedera helix</i>
Hogweed	<i>Heracleum sphondylium</i>
Coral Bells	<i>Heuchera</i>
Bluebell	<i>Hyacinthoides non-scripta</i>
Hydrangea	<i>Hydrangea</i>
Rose of Sharon	<i>Hypericum calycinum</i>
St John's-worts	<i>Hypericum spp.</i>
Holly	<i>Ilex aquifolium</i>
Ragwort	<i>Jacobaea vulgaris</i>
Red Dead-nettle	<i>Lamium purpureum</i>
Bay Laurel	<i>Laurus nobilis</i>
Himalayan Honeysuckle	<i>Leycesteria formosa</i>
Common Toadflax	<i>Linaria vulgaris</i>



Common Name	Scientific Name
Common Bird's-foot-trefoil	<i>Lotus corniculatus</i>
Chilean Myrtle	<i>Luma apiculata</i>
Apple	<i>Malus</i> sp.
Black Medick	<i>Medicago lupulina</i>
Mints	<i>Mentha</i> spp.
Daffodil (ornamental)	<i>Narcissus</i> var.
Chatham Island Tree Daisy	<i>Olearia traversiorum</i>
African Daisy	<i>Osteospermum</i> likely 'Cannington Roy'
Pellitory-of-the-Wall	<i>Parietaria judaica</i>
Winter Heliotrope	<i>Petasites pyrenaicus</i>
New Zealand Flax	<i>Phormium tenax</i>
Mouse-ear Hawkweed	<i>Pilosella officinarum</i>
Pine (ornamental)	<i>Pinus</i>
Buck's-horn Plantain	<i>Plantago coronopus</i>
Ribwort Plantain	<i>Plantago lanceolata</i>
Greater Plantain	<i>Plantago major</i>
Grasses (including ornamentals)	Poaceae
Common Polypody	<i>Polypodium vulgare</i>
Cherry Laurel	<i>Prunus laurocerasus</i>
Portuguese Laurel	<i>Prunus lusitanica</i> cultivar
Bracken	<i>Pteridium aquilinum</i>
Turkey Oak	<i>Quercus cerris</i>
Sessile Oak	<i>Quercus petraea</i>
Pedunculate Oak	<i>Quercus robur</i>
Meadow Buttercup	<i>Ranunculus acris</i>
Creeping Buttercup	<i>Ranunculus repens</i>
Sea Radish	<i>Raphanus raphanistrum</i> subsp. <i>maritimus</i>
Flowering Currant	<i>Ribes sanguineum</i>
Roses	<i>Rosa</i> spp., hybrids and cultivars
Bramble	<i>Rubus fruticosus</i> agg.
Common Sorrel	<i>Rumex acetosa</i>
Curled Dock	<i>Rumex crispus</i>
Water Dock	<i>Rumex hydrolapathum</i>
Broad-leaved Dock	<i>Rumex obtusifolius</i>
Willow	<i>Salix</i> spp.

Common Name	Scientific Name
Elder	<i>Sambucus nigra</i>
Japanese Wireweed	<i>Sargassum muticum</i>
Common Figwort	<i>Scrophularia nodosa</i>
White Stonecrop	<i>Sedum album</i>
Groundsel	<i>Senecio vulgaris</i>
White Mustard	<i>Sinapis alba</i>
Alexanders	<i>Smyrniolum olusatrum</i>
Bittersweet	<i>Solanum dulcamara</i>
Perennial Sowthistle	<i>Sonchus arvensis</i>
Smooth Sowthistle	<i>Sonchus oleraceus</i>
Lesser Sea-spurrey	<i>Spergularia marina</i>
Woundworts	<i>Stachys</i> spp.
Hedge Woundwort	<i>Stachys sylvatica</i>
Common Chickweed	<i>Stellaria media</i>
Dandelion	<i>Taraxacum vulgaria</i> agg.
Wood Sage	<i>Teucrium scorodonia</i>
Small-leaved Lime	<i>Tilia cordata</i>
Lesser Trefoil	<i>Trifolium dubium</i>
Red Clover	<i>Trifolium pratense</i>
White Clover	<i>Trifolium repens</i>
Gorse	<i>Ulex europaeus</i>
Elm	<i>Ulmus</i> sp.
Navelwort	<i>Umbilicus rupestris</i>
Nettle	<i>Urtica dioica</i>
Cornsalad	<i>Valerianella</i> sp.
Germander Speedwell	<i>Veronica chamaedrys</i>
Common Field-speedwell	<i>Veronica persica</i>
Hebe 'Wiri Charm'	<i>Veronica speciosa</i> cultivar
Vetches	<i>Vicia</i> spp.

Appendix C. Bat Survey Report



Bat Survey Report

Passage West Greenway

July 2023

Prepared for:



Comhairle Contae Chorcaí
Cork County Council



O'DONNELL 
ENVIRONMENTAL

Summary

Project: Bat survey in relation to the upgrade of an existing greenway at Passage West, Co Cork.

Report by: Tom O'Donnell BSc (Hons) MSc CEnv MCIEEM.

Company Profile: O'Donnell Environmental is an independent environmental consultancy established by Tom O'Donnell in 2019. O'Donnell Environmental is a Chartered Institute of Ecology and Environmental Management (CIEEM) 'Registered Practice' which demonstrates our commitment to high professional standards, accountability and the delivery of the best outcomes for biodiversity and our clients.

Project Reference: 2023/20

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Appendices

Appendix A – Photographic Record

1 Introduction

O'Donnell Environmental were commissioned by Ryan Hanley on behalf of Cork County Council to undertake a baseline assessment of the importance of a site in relation to bat conservation. The proposed project involves the upgrading of a section of the existing Passage West Greenway along the former Cork-Blackrock and Passage railway line. A site location map is presented in **Figure 1.1**.

The purpose of the proposed project is to provide enhanced walking and cycling connectivity between Glenbrook and Rochestown, through the town of Passage West.

The aim of the current study was to determine and evaluate the likely importance of the study area and its immediate environs to bats.

1.1 PROPOSED WORKS

Key aspects of the project design which may be of relevance to the current assessment are outlined below. Design information is provided in 'General Arrangement' drawings produced by Ryan Hanley, which accompany the current application.

The proposal involves the upgrading of an existing 1.5km long path between the Cork City/County boundary and the Passage West Rowing Club from a 2.5-3m wide path to a 3.5-4.0m wide path.

Starting at the Cork City/Cork County Boundary, the width of the existing path will be increased to 3.7m for the first 220m. The works will primarily take place on the seaward side of the path so the existing landscaping and exercise infrastructure would remain untouched. Once the path reaches the Cork Harbour Greenway Car Park, the existing path will be widened to 4m. There is no intrusive work within the Cork Harbour Greenway Car Park or on Roberts Bridge (RPS 01474), but a native Irish hedgerow will be planted between the proposed path and the existing car parking area to supplement the existing landscaping in the area. Cell Web tree root protection will be used wherever the proposed path is extended close to existing and proposed trees. There are new bollards proposed along access points to the existing path along with solar powered inground lighting to delineate the extents of the path.

From Cork Harbour Greenway Car Park to the retaining wall that starts approximately 80m east of Abbots Bridge (RPS 01476), the path will primarily be widened to 4m to the seaward side. Due to space constraints, the existing benches located along this section will require relocation from the seaward side of the path to the opposite of the path. The benches will be placed on a new reinforced concrete plinth suitable for the marine environment.

Once the path reaches the existing retaining wall, the path widening will switch to the landside of the existing path. For the next 300m the proposed path will vary between 3.7-4m in width, and the patch width will vary so the majority of the existing trees and native hedgerows would remain untouched. There are trees proposed for removal in this location, but these have been surveyed by an arborist and a bat expert to confirm there are no roosts in the trees. For every tree that will be removed, there will be three times that number of new native Irish trees planted to supplement the trees in this area.

As the path extends towards the Wooden Bridge, a short section of the existing path will not be widened so two Hornbeam trees (*Carpinus betulus*) can remain in place. Native Irish hedgerows will be planted around the Wooden Bridge to introduce a shallow taper to the existing path. This taper will provide pedestrians and cyclists with adequate sight distances to oncoming path users as they approach the bridge.

The existing car park adjacent to the existing path located 170m east of the Wooden Bridge will be converted to parallel on-street parking. This on-street parking will be segregated from the pedestrian and cycle path by a proposed 1.8m wide foot path and a proposed low height stone wall. New benches and picnic tables are envisaged for this area, along with new native Irish hedgerows and trees. There is currently no segregation between path users and vehicles at this location. The proposed infrastructure changes will increase safety for vulnerable path users.

There is a pinch point on the existing path located outside the Passage West Maritime Museum. There is a 90° bend between the Museum boundary wall and stone wall beside the boat slip for the Passage West Rowing Club. The path is approximately 2m wide at this pinch point. The preliminary design for this project proposes to chamfer the boundary wall of the Museum building and remove part of the boundary wall beside the boat slip to provide a new path that will be 3.5m wide with a 35° bend so that pedestrians and cyclist have sufficient sight distances from either direction as they approach this point. In addition to this, the dilapidated stairs down to the local beach will be rebuilt to accommodate safe passage of pedestrians to and from the beach.

In accordance with the recommendations in the Flood Risk Assessment (FRA) for the project, the existing ground level of the path is proposed to be raised to 3.15m (Malin Head datum) to hold back river water during flooding events. This raised path will extend from a point 30m northwest of the Passage West Maritime Museum until the Passage West Playground where it will taper back down to existing ground level. In addition to this, it is proposed that a parapet wall be constructed along the harbour wall edge to provide a minimum level of 3.15m. In the area along the quay, there will be new benching, picnic tables, and landscaping.

The stairs leading down to the beach located opposite the North-West corner of the Passage West Rowing Club will be reoriented and rebuilt to widen the existing narrow pedestrian and cycle path at this location. A portion of the North-West corner boundary wall of the Passage West Maritime Museum boundary will be taken down and rebuilt to widen the path.

Energy efficient lighting will provide a suitable level of light for use by cyclists and pedestrians whilst creating minimal light spillage onto adjacent environmentally sensitive locations.

Site clearance includes a range of vegetation clearing, topsoil stripping, and removal of existing infrastructure items which are obstacles to the proposed path. Temporary working areas will be erected during the construction period to accommodate workforce and vehicle movements, stockpiling of excavated material, and the erection and removal of temporary site compounds.

There are four existing bridges along this route, these bridges will remain in place and will not be modified. Temporary haul roads will not be required to facilitate the extension of the proposed path.

New landscaping will include native Irish trees, hawthorn hedgerows, low level planting, and riparian grasses. The reinstatement of temporary working areas will be done following the completion of the construction phase of the scheme. Planting of new native Irish trees is proposed on the landside of the existing path to compensate for tree felling along the route. The ratio of new to felled trees will be 3:1.

Elements of the proposed works which have potential to impact bats include the following:

- Loss of trees and disturbance of trees with potential for bat roosting.
- Loss of potential foraging or commuting habitat for bats.
- Disturbance to bats from increased lighting fixtures.
- Anthropogenic disturbance proximal to potential bat roosts.

1.2 LEGAL STATUS OF BATS

All bat species and their roosting sites are protected under both national and international law. The purpose of this legislation is to maintain and restore bat populations within their natural range. Where human activities have the potential to compromise bat populations, measures are required to be put in place to avoid impacts or compensate and mitigate for those impacts. A grant of planning permission does not constitute a licence or permit to disturb bats or interfere with their breeding or resting places.

The key legislation which provides protection to bats is as follows:

- Wildlife Act (1976) and subsequent amendments which makes it unlawful to intentionally disturb, injure or kill a bat or disturb its resting place without a licence to derogate from Regulation 23 of the Habitats Regulations 1997, issued by National Parks & Wildlife Service (NPWS).
- The EU Habitats Directive (which has been transposed into Irish law with the European Communities (Birds and Natural Habitats) Regulations 2011) which seeks to protect rare species, including bats, and their habitats and requires that appropriate monitoring of populations be undertaken. All Irish bat species are listed in Annex IV, while Annex II provides additional protection for the Lesser Horseshoe Bat.

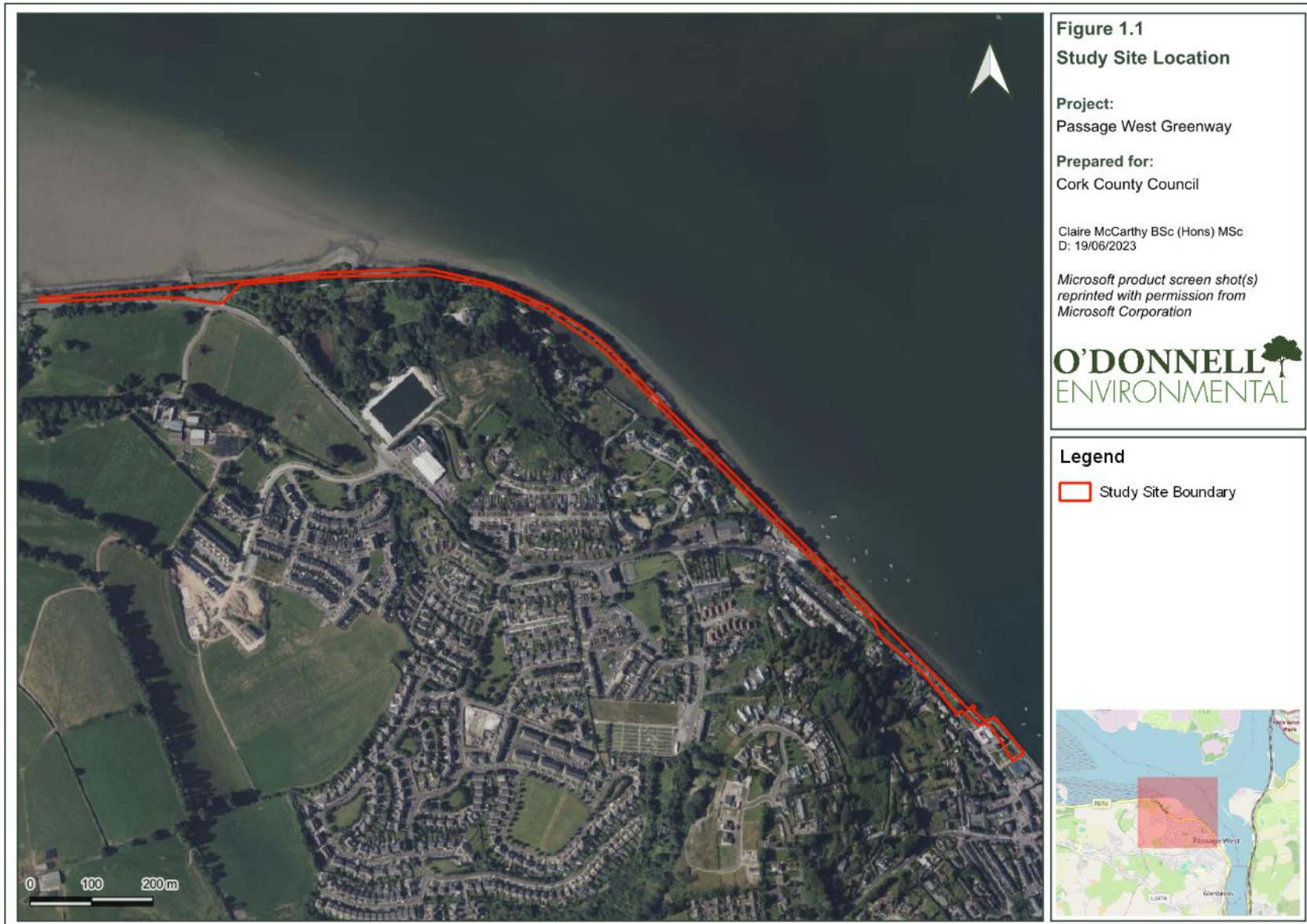
1.3 STATEMENT OF COMPETENCE

O'Donnell Environmental is an independent environmental consultancy established by Tom O'Donnell in 2019. O'Donnell Environmental is a Chartered Institute of Ecology and Environmental Management (CIEEM) 'Registered Practice' which demonstrates our commitment to high professional standards, accountability and the delivery of the best outcomes for biodiversity and our Clients.

Tom O'Donnell is a Chartered Environmentalist and a full member of the Chartered Institute of Ecology and Environmental Management. He was awarded a BSc in Environmental and Earth System Science [Applied Ecology] in 2007 and an MSc in Ecological Assessment in 2009, both from UCC. Tom has 15 years professional experience in the environmental industry, including working on projects such as windfarms, overhead power lines, roads, cycleways and residential

developments. Tom is licensed by NPWS for roost disturbance (Ref: DER/BAT 2023-16) and to capture bats (C25/2023).

Claire McCarthy BSc (Hons) MSc is a Qualifying member of the Chartered Institute of Ecology and Environmental Management. She was awarded a BSc in Biological, Earth and Environmental Sciences [Zoology] in 2018 and an MSc in Marine Biology in 2022, both from UCC.



2 Methodology

This assessment was carried for a study area which considered of the area within and immediately adjoining the scheme boundary. The assessment was carried out through desk study, daytime visual inspection of potential bat roosting features, passive detector survey and two bat activity surveys (dusk). Each of these elements are described below.

2.1 DESKTOP REVIEW

A desktop review of publicly available relevant data was undertaken on the National Biodiversity Data Centre (NBDC)¹ and National Parks & Wildlife Service (NPWS)² websites. The National Biodiversity Data Centre was reviewed for relevant data, specifically i) existing species records for the 10km square in which the study site is located (W76) and ii) an indication of the relative importance of the wider landscape in which the study site is located, based on Model of Bat Landscapes for Ireland (Lundy et al., 2011). In the latter, the index ranges from 0 to 100, with 0 being least favourable and 100 most favourable for bats.

2.2 VISUAL ROOST SURVEYS

Daytime visual assessments of structures and trees were carried out by Tom O'Donnell BSc (Hons) MSc CEnv MCIEEM and Claire McCarthy BSc (Hons) MSc on the 4th May, 15th May and 19th June 2023 to describe the potential bat roosting suitability of the trees within the area of interest. Daytime assessments on 4th May 2023 were timed to coincide with low tide, to facilitate access to underside of structures as much as safely possible.

A detailed visual assessment of relevant structures and trees was carried out following guidance set out in 'Bat Surveys for Professional Ecologists: Good Practice Guidelines', Collins (2016). The structures surveyed included stone bridges and stone pillars.

A ground level assessment of suitability of trees within the site boundary was carried out following Collins (2016), and utilised information and an identification scheme (tags 567-600) provided in the accompanying tree survey report (Cunnane Stratton Reynolds, 2023). Trees contained within and bordering the proposed route were surveyed from ground level using binoculars and torches. The survey was non-destructive, and relevant Potential Roost Features (PRFs) were visually inspected to identify any evidence of bat roosting. Signs of bat use include bat droppings, feeding remains, potential bat access points identified by characteristic staining and scratches, noise made by bats etc.

While ground-level tree surveys can confirm the presence of roosting bats, they often cannot conclusively confirm the absence of roosting bats (Collins, 2016). In trees evidence of recent bat occupation can rapidly disappear. For example, droppings can persist in buildings for many years while they generally do not persist for long in tree roosts. Tree roosts have been shown to be used in a more transient manner than buildings with many species exhibiting roost switching behaviour

¹ <https://maps.biodiversityireland.ie/Map>. Accessed 19/06/2023.

² <https://www.npws.ie/protected-sites>. Accessed 19/06/2023.

(Collins, 2016). For example, Waters et al. (1999) observed roost switching in Leisler's Bats every 2 to 10 days during the active season. For the above reasons, and in line with Collins (2016), this report takes a conservative approach when considering bat roosting potential of trees. This approach reflects the fact that any tree with bat potential may be used at some point or another and the conservation importance of multiple roosting opportunities is poorly understood.

Trees and man-made structures were classified according to the guidelines in Collins (2016), see **Table 2.1**. Photographs of the study area are shown in **Appendix A**.

Table 2.1. Scheme for describing the potential suitability of features for bats.

Suitability	Description
Negligible	Negligible features which are likely to be used by roosting bats.
Low	A feature with one or more potential roost sites that could be used by individual bats opportunistically. Potential roost sites which do not provide appropriate conditions and / or suitable surrounding habitat to be used on a regular basis or by larger numbers of bats (i.e. unlikely to be suitable for maternity or hibernation). A tree of sufficient size and age to contain PRFs but with none seen from the ground or features seen with only very limited roosting potential.
Moderate	A structure or tree with one or more potential roost sites that could be used by bats due to characteristics and surrounding habitat but unlikely to support a roost of high conservation status.
High	A structure or tree with one or more potential roost sites that are obviously suitable for use by larger numbers of bats on a more regular basis and potentially for longer periods of time due to their size, shelter, protection, conditions and surrounding habitat.

After 'Bat Surveys for Professional Ecologists: Good Practice Guidelines (3rd Edition)', Collins (2016).

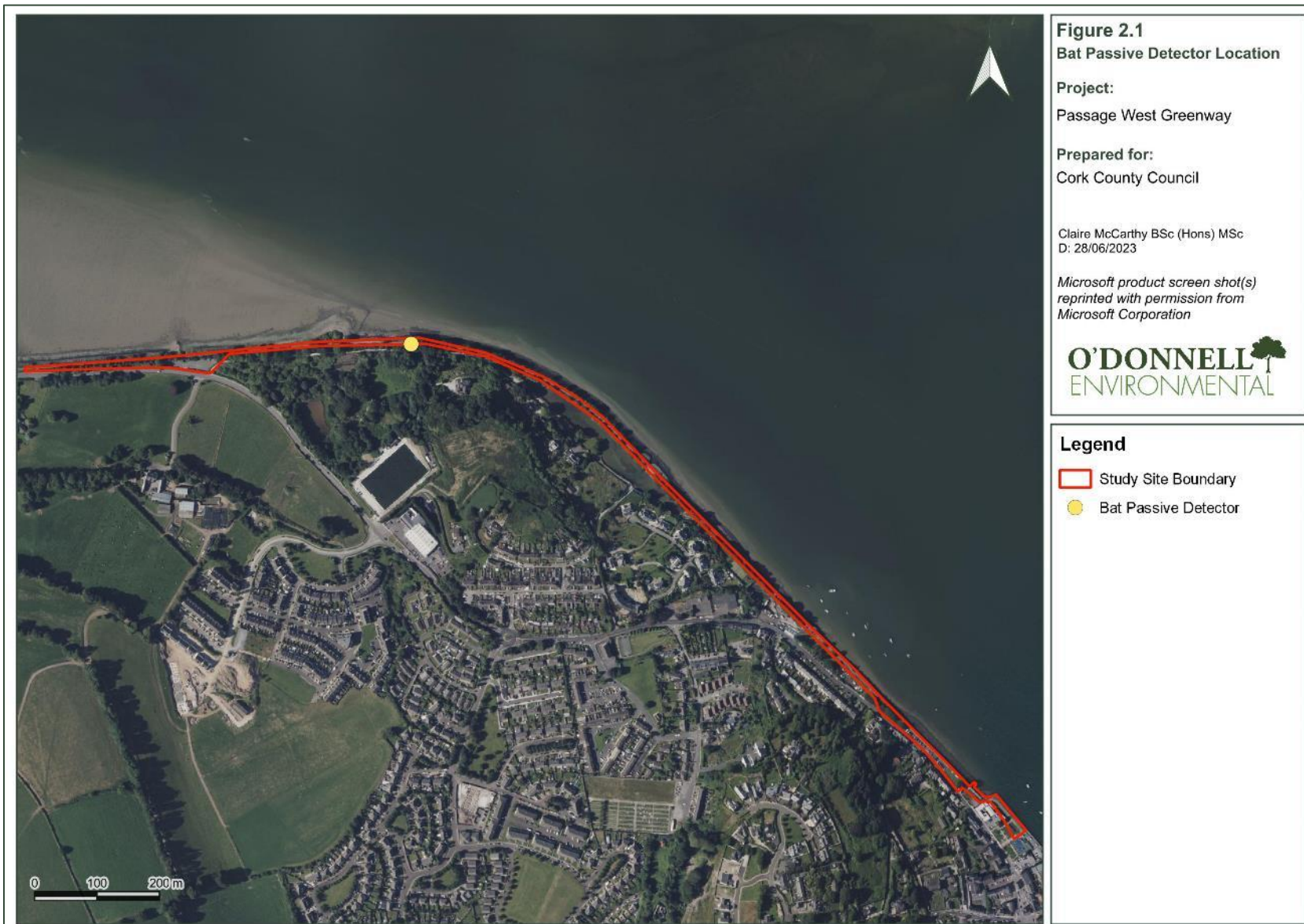
Survey of residential properties proximal to the scheme was outside the scope of the current assessment and not considered warranted. However, visual survey of roosting potential was carried out in relation to two structures which appeared to have relatively high potential for bat roosting in a local context, and were accessible for survey. A derelict cottage which is located approximately 50 meters from the proposed scheme was considered, as was Rockenham House. Thermal cameras were used to investigate possible bat emergence from Rockenham House on 19th June 2023.

2.3 BAT SURVEYS

Bat activity at the proposed site was investigated through the use of passive bat detection and active (dusk) transect surveys.

2.3.1 Passive Bat Survey

Bat activity was assessed through passive bat monitoring at a chosen location along the existing greenway (see **Figure 2.1**) for 12 nights, from 4th May to 15th May 2023 inclusive, using a Wildlife Acoustics 'song Meter Mini' full spectrum detector. This is within the optimal period for bat activity surveys, weather conditions were generally suitable for the survey of bats during the recording period.



2.3.2 Active Transect Surveys

Two active transect surveys were carried out for approximately 1.5 hours from sunset on the 6th and 19th June 2023 along the relevant section of the existing Passage West Greenway. The surveys were carried out by two surveyors, Tom O'Donnell BSc (Hons) MSc CEnv MCIEEM and Claire McCarthy BSc (Hons) MSc.

Active bat surveys were used to complement the information gained from passive bat monitoring. The aim of the surveys was to assess the level of activity, species diversity and to identify any areas of relatively high activity which may be apparent.

On the night of the 6th June 2023 the active bat survey commenced at 21:45 and concluded at 23:20. The survey was carried out in optimal weather conditions. No rain was encountered, winds were light (F1) and the temperature was approx. 15°C. Aerial insect activity was observed to be good.

On the night of the 19th June 2023 the active bat survey commenced at 21:55 and concluded at 23:22. The survey was carried out in optimal weather conditions. No rain was encountered, winds were light (F2) and temperature was 18°C. Aerial insect activity was observed to be good.

2.4 DATA ANALYSIS

Bioacoustic analysis of bat sonograms was carried out according to the parameters set out in Russ (2012) and Middleton et al. (2014). Kaleidoscope Pro software was used to aid analysis and all calls were manually verified.

2.5 EVALUATION & IMPACT ASSESSMENT

Evaluation of ecological features follows the NRA (now TII) publication 'Guidelines for Assessment of Ecological Impacts of National Roads Schemes' (2009). Impact assessment follows 'Guidelines on The Information to be Contained in Environmental Impact Assessment Reports' published by the EPA (2022). Reporting generally follows Chartered Institute of Ecology and Environmental Management (2018) 'Guidelines for Ecological Impact Assessment in the UK and Ireland - Terrestrial, Freshwater, Coastal and Marine'.

2.6 SURVEY LIMITATIONS

Weather conditions were optimal during surveys, and the proposed site and environs were fully accessible. The seaward side of structured and the sea wall were not safely accessible and boat-based survey was not considered warranted. These areas are highly exposed and subject to occasional inundation of seawater and are not considered likely to support roosting bats.

Is it considered that the study was not limited in any significant way.

3 Results

The study area and its immediate environs contain man-made structures and semi-natural habitats in the form of woodland, treelines and coastal waters. The proposed walkway route occurs along the coastal edge of Passage West town from the Passage West Library to towards the Rochestown Road. The adjoining land uses along this segment of the greenway include residential, recreational, and parking facilities.

3.1 DESKTOP SURVEY

3.1.1 Sites of International Importance

Special Areas of Conservation (SAC) and Special Protection Areas for birds (SPA) are those sites that are deemed to be of European (i.e. international) importance. The legal basis on which SACs are selected and designated is the EU Habitats Directive, transposed into Irish law by the European Communities (Birds and Natural Habitats) Regulations 2011 (S.I. No. 477 of 2011), as amended. SACs and SPAs form part of a network of sites to be designated across Europe in order to protect biodiversity within the community, known as Natura 2000 sites.

The study area is not located within an internationally designated site and two internationally designated sites are located within 15km of the proposed site and are listed in **Table 3.1**. below. These sites do not include bats in its conservation interests, and therefore are not relevant to the current assessment. It is important to note that this arbitrary distance of 15km is used for illustrative purposes only and all potential pathways for impact on designated sites have been included for both within and outside the 15km zone.

Table 3.1 Natura 2000 sites within 15 km of the proposed site.

Site Name	Site Code
Cork Harbour SPA	004030
Great Island Channel SAC	001058

3.1.2 Sites of National Importance

At a national level, the basic unit of conservation is the Natural Heritage Area or proposed National Heritage Area (NHA/pNHA). NHAs are designated to protect habitats, flora, fauna and geological sites of national importance. There are no NHAs within 5km of the proposed site. Seven pNHAs occur within 5km of the proposed site (**Table 3.2**).

Table 3.2 Nationally designated sites within 5 km of the proposed site

Site Name	Site Code
Douglas River Estuary	001046
Glanmire Wood	001054
Great Island Channel	001058
Rockfarm Quarry, Little Island	001074

Dunkettle Shore	001082
Monkstown Creek	001979
Cuskinny Marsh	001987

These sites do not include bats in their conservation interests, and therefore are not relevant to the current assessment. The designated sites present within 15km of the proposed study site are shown in **Figure 3.1**.

3.2 DATA SEARCH

National Biodiversity Data Centre (NBDC) holds previous records of bat presence from within the 10km square (W76) in which the proposed site is located. These records are for the following bat species:

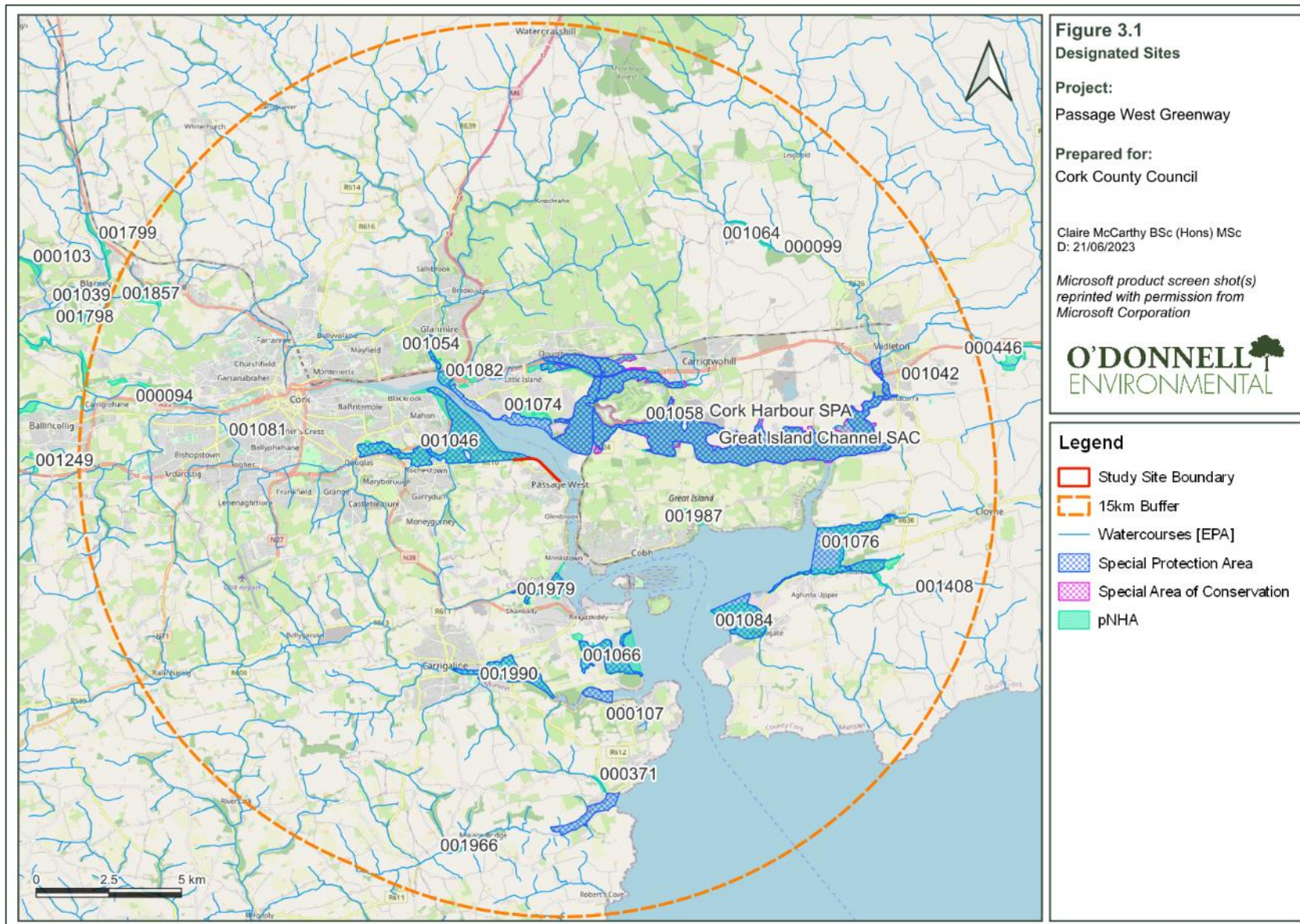
- Brown Long-eared Bat *Plecotus auritus*
- Leisler's Bat *Nyctalus leisleri*
- Daubenton's Bat *Myotis daubentonii*
- Common Pipistrelle *Pipistrellus pipistrellus*
- Soprano Pipistrelle *Pipistrellus pygmaeus*
- Natterer's Bat *Myotis nattereri*

It is important to note that an absence of other bat species records is reflective of a lack of surveys undertaken to date rather than absence of bat species.

The overall bat suitability index value (29.33) according to 'Model of Bat Landscapes for Ireland' (Lundy et al., 2011) suggests the landscape in which the proposed site is located is of moderate to high suitability for bats in general. Species specific scores are provided in **Table 3.3**. The Annex II (EU Habitats Directive) listed bat species, Lesser Horseshoe Bat, is assigned a score of zero as this site is located outside of their known range.

Table 3.3 - Suitability of the study area for the bat species according to 'Model of Bat Landscapes for Ireland' (Lundy et al., 2011).

Common name	Scientific name	Suitability index
All bats	-	29.33
Soprano pipistrelle	<i>Pipistrellus pygmaeus</i>	47
Brown long-eared bat	<i>Plecotus auritus</i>	38
Common pipistrelle	<i>Pipistrellus pipistrellus</i>	40
Lesser horseshoe bat	<i>Rhinolophus hipposideros</i>	0
Leisler's bat	<i>Nyctalus leisleri</i>	43
Whiskered bat	<i>Myotis mystacinus</i>	30
Daubenton's bat	<i>Myotis daubentonii</i>	25
Nathusius pipistrelle	<i>Pipistrellus nathusii</i>	8
Natterer's bat	<i>Myotis nattereri</i>	33



3.3 VISUAL ROOST SURVEYS

Visual assessment was carried out from ground level to identify the potential suitability for roosting bats of trees and structures adjoining the proposed scheme. These are discussed separately below.

3.3.1 Bat Potential of Structures

A detailed visual assessment of relevant structures was carried out following guidance set out in 'Bat Surveys for Professional Ecologists: Good Practice Guidelines', Collins (2016). The structures surveyed included stone bridges and stone pillars as shown in **Figure 3.2**.

Four bridges (deck and parapet) are present within the proposed site boundary. Three of the four bridges were surveyed apart from Bridge 3 which has been conservatively assigned 'low' suitability for roosting bats as safe access to survey from beneath the bridge was not possible and thus it was surveyed from deck level only. None of the bridge structures showed signs of roosting bats. Similarly, two stone pillars (**Appendix A3**) were visually inspected for potential signs of roosting bats but none were recorded at the time of the survey.

Survey of residential properties proximal to the scheme was outside the scope of the current assessment and not considered warranted. However, visual survey of roosting potential was carried out in relation to two structures which appeared to have relatively high potential for bat roosting in a local context and were accessible for survey. A derelict cottage which is located approximately 50 meters from the proposed scheme was considered, and no evidence of any significant or regular bat roosting was apparent. The building has suffered fire damage which reduces its potential for roosting bats. Some feeding remains (moth wings) were present within which suggests the structure may be used to some extent as a 'night-roost'.

Rockenham House was considered, and no evidence of bat roosting was apparent during a day-time survey, but a variety of potential roosting features were identified. Two thermal imaging cameras were used to investigate possible bat emergence from Rockenham House on 19th June 2023. No evidence of bat emergence was found. Confidence in this negative result is low, as the structure is complicated and not completely covered within the field of view of the cameras (see **Appendix A**). Also, the survey was carried out on one occasion only. However, the thermal footage obtained as well as results of passive monitors placed within the view of the cameras suggest that the building may not host a large or significant bat roost.

The locations of structures assessed are shown in **Table 3.4**. The locations of both structures are shown in shown in **Figure 3.2**.

Table 3.4 – Results of ground level assessment of suitability of structures for bats.

Suitability	Description	Latitude	Longitude
Low	Roberts Bridge (Bridge 1). Minor crevices visible.	51.87877	-8.35501
Negligible	Bridge deck and parapet (Bridge 2). No suitable PRFs visible.	51.87735	-8.34423
Low	Bridge deck and parapet (Bridge 3). Only surveyed from bridge deck as not safely accessible for complete survey.	51.87551	-8.34126
Low	Bridge deck and parapet (Bridge 4). Minor crevices but likely underwater at high tide.	51.87433	-8.3395
Negligible	Stone pillars. No crevices visible.	51.87503	-8.34056

3.3.2 Bat Potential of Trees

A number of bat species, including Leisler's Bats and Soprano and Common Pipistrelles, roost in trees all year round. During the spring and summer period maternity colonies form and these roosts are of greatest conservation importance. Some bat species can roost in trees where suitable roosts are present. Leisler's Bats occasionally form maternity roosts in trees, but are normally found in buildings (Collins, 2016).

Trees within the study area were surveyed from ground level for the presence of potential roosting features for bats. No roosting bats were encountered during the tree surveys, and no unoccupied roosts which contained signs of bats were encountered within the trees during the surveys.

In Ireland potential bat roosting features are often associated with decay in trees. While trees of any age can contain suitable bat roosting features, typically roosts are found in mature and veteran trees. Decay in trees often begins with damage, where a limb tears off for example or where damage is caused by an external factor such as badly executed limb removal. Where trees are well maintained, from an arboricultural perspective, they often do not contain these features, and therefore typically do not present many optimal roosting opportunities for bats. Equally, young and vigorously growing trees often do not contain decay associated with rot holes, tear-outs etc. and when damage occurs the trees are generally capable of self-healing.

Trees present within the study area that were recorded in the arborist survey (Cunnane Stratton Reynolds, 2023) largely consist of *Quercus spp.*, *Acer spp.*, European Hornbeam and appear generally healthy, varying in age from juvenile to mature. A total of 200 trees were assessed for bat roosting suitability, including those recorded in arborist survey, and of these, 67 were considered to have 'low' suitability for roosting bats while the remainder had 'negligible' suitability.

A number of potential roosting features (described in **Table 3.5**) were identified, and these potential roosting features were considered to be of sub-optimal quality in general. It is highly likely that some of these features will be used at least occasionally by bats. Most of Irelands bat species are known to exploit a wide variety of roosting opportunities with some being used infrequently. Over time, the value of many of these roosting features to bats may increase. Potential roosting features may be present but not visible during a ground level survey, particularly in ivy covered trees and larger specimens. None of the PRFs identified in trees had potential as a bat maternity roost for any

species. Given that no trees of above 'low' suitability are present, following Collins (2016) no further surveys are warranted in relation to trees.

The locations of trees identified are presented in **Table 3.5**. The locations of trees are shown in shown in **Figure 3.3**.

Table 3.5 – Results of ground level assessment of suitability of trees for bats.

Tag No.	Suitability	Description	To be Retained?	Latitude	Longitude
T567	Low	Mature Oak. View of PRFs restricted at height. Evidence of historic tree surgery.	Yes	51.87888	-8.35418
T568	Negligible	Mature Crabapple. No suitable PRFs visible.	Yes	51.87902	-8.35311
T569	Negligible	Mature tree. No suitable PRFs visible.	Yes	51.87908	-8.34893
T570	Negligible	Mature tree. No suitable PRFs visible.	Yes	51.87907	-8.34888
T571	Negligible	Mature tree. No suitable PRFs visible.	Yes	51.87907	-8.34885
T572	Negligible	Semi-mature Oak, low ivy cover, evidence of historic tree surgery. No suitable PRFs visible.	Yes	51.87907	-8.3488
T573	Negligible	Semi-mature Oak. No suitable PRFs visible.	Yes	51.8772	-8.34407
T574	Negligible	Semi-mature Oak. No suitable PRFs visible.	Yes	51.87717	-8.34402
T575	Negligible	Juvenile Oak. No suitable PRFs visible.	Yes	51.87695	-8.34366
T576	Negligible	Juvenile Sycamore. No suitable PRFs visible.	Yes	51.87691	-8.34359
T577	Negligible	Juvenile Sycamore. No suitable PRFs visible.	Yes	51.87685	-8.3435
T578	Negligible	Juvenile Oak. No suitable PRFs visible.	Yes	51.8768	-8.34343
T579	Low	Semi-mature Silver Maple with dense Ivy cover, which made it difficult to view possible PRFs present.	Yes	51.87668	-8.34322
T580	Low	Semi-mature Sycamore. Low ivy cover. View of PRFs at height restricted. Proposed for removal.	No	51.8766	-8.34308
T581	Negligible	Semi-mature Silver Maple. Multi-stem, dense ivy cover and no suitable PRFs visible.	Yes	51.87648	-8.34288
T582	Negligible	Semi-mature Sycamore. Large shallow tear-out approx. 1 meter from ground level. Too shallow and not suitable as a roosting feature. Proposed for removal.	No	51.87584	-8.34184
T583	Low	Semi-mature Sycamore proposed for removal. Minor shallow PRFs present on east facing side.	No	51.87575	-8.34167
T584	Low	Semi-mature Sycamore. Proposed for removal. Large tear-out east-facing approx. 1 meter from ground level.	No	51.87566	-8.34154
T585	Low	Matur Sycamore. Multi-stem, evidence of historic tree surgery.	Yes	51.87518	-8.34079
T586	Low	Mature Sycamore. Multi-stem, view of PRFs at height restricted.	Yes	51.87513	-8.34072

T587	Low	Semi-mature Sycamore. Evidence of historic tree surgery. Fissure facing east.	Yes	51.87509	-8.34065
T588	Negligible	Semi-mature European Hornbeam. Proposed for removal.	No	51.87477	-8.34008
T589	Low	Semi-mature European Hornbeam. Minor PRFs e.g. rot hole. Proposed for removal.	No	51.87464	-8.33988
T590	Negligible	Mature European Hornbeam. Shallow rot hole not suitable for bat roosting.	Yes	51.874	-8.33909
T591	Negligible	Mature European Hornbeam. No suitable PRFs visible.	Yes	51.87397	-8.339
T592	Negligible	Mature European Hornbeam. No suitable PRFs visible.	Yes	51.87393	-8.33894
T593	Negligible	Semi-mature European Hornbeam. No suitable PRFs visible.	Yes	51.87389	-8.33884
T594	Negligible	Mature European Hornbeam. No suitable PRFs visible.	Yes	51.87385	-8.33876
T595	Low	Semi-mature European Hornbeam. Evidence of historic tree surgery, minor PRFs visible e.g. rot holes. Weld present provide low suitability PRF. Proposed for removal.	No	51.87379	-8.33864
T596	Low	Semi-mature European Hornbeam. Proposed for removal.	No	51.87374	-8.33856
T597	Low	Semi-mature European Hornbeam. Proposed for removal.	No	51.8737	-8.33848
T598	Low	Semi-mature European Hornbeam. Proposed for removal.	No	51.87366	-8.3384
T599	Low	Semi-mature European Hornbeam. Proposed for removal.	No	51.87362	-8.33835
T600	Low	Semi-mature European Hornbeam. Proposed for removal.	No	51.87359	-8.33828
TG1	Negligible	Juvenile. No suitable PRFs visible.	Yes	51.87889	-8.35525
TG1	Negligible	Juvenile. No suitable PRFs visible.	Yes	51.87891	-8.35494
TG1	Negligible	Juvenile. No suitable PRFs visible.	Yes	51.87893	-8.35471
TG1	Negligible	Juvenile. No suitable PRFs visible.	Yes	51.87894	-8.35447
TG2	Negligible	Semi-mature Oak. No suitable PRFs visible.	Yes	51.87884	-8.35537
TG2	Negligible	Semi-mature multistem Sycamore. No suitable PRFs visible.	Yes	51.87884	-8.35515
TG2	Negligible	Juvenile Oak. No suitable PRFs visible.	Yes	51.87884	-8.35476
TG2	Negligible	Juvenile Oak. No suitable PRFs visible.	Yes	51.87885	-8.35522
TG2	Negligible	Juvenile Sycamore. No suitable PRFs visible.	Yes	51.87885	-8.35522
TG2	Negligible	Juvenile Oak. No suitable PRFs visible.	Yes	51.87885	-8.35484
TG2	Negligible	Semi-mature Oak. No suitable PRFs visible.	Yes	51.87885	-8.35494
TG2	Negligible	Juvenile Oak. No suitable PRFs visible. Proposed for removal.	No	51.87885	-8.35501

TG2	Negligible	Juvenile Oak. No suitable PRFs visible.	Yes	51.87887	-8.3544
TG2	Negligible	Juvenile Oak. No suitable PRFs visible.	Yes	51.87887	-8.35462
TG2	Negligible	Juvenile Oak. No suitable PRFs visible.	Yes	51.87887	-8.35447
TG2	Negligible	Juvenile Oak. No suitable PRFs visible.	Yes	51.87888	-8.35423
-	Negligible	Semi-mature Sycamore. Lights wrapped around the tree.	Yes	51.87036	-8.33472
-	Low	Mature tree. Minor PRFs visible e.g. rot holes. Shallow PRF present on south-east facing side approx. 1 meter from ground-level. Lights on tree.	Yes	51.87185	-8.3359
-	Low	Evidence of historic tree surgery, view of PRFs at height restricted., minor PRFs visible e.g. rot holes. Lights wrapped around the tree.	Yes	51.8719	-8.33581
-	Negligible	Juvenile. No visible PRFs.	Yes	51.87194	-8.33597
-	Negligible	Juvenile. No visible PRFs.	Yes	51.87198	-8.33589
-	Low	Semi-mature. Evidence of historic tree surgery, view of PRFs at height restricted., minor PRFs visible e.g. rot holes.	Yes	51.87205	-8.33606
-	Negligible	Juvenile. No visible PRFs.	Yes	51.87212	-8.33606
-	Low	Semi-mature. Evidence of historic tree surgery.	Yes	51.87219	-8.33599
-	Negligible	Semi-mature Sycamore. No suitable PRFs visible.	Yes	51.87253	-8.33645
-	Negligible	Juvenile. No suitable PRFs visible.	Yes	51.87258	-8.33672
-	Negligible	Juvenile. No suitable PRFs visible.	Yes	51.87262	-8.33663
-	Negligible	Juvenile. No suitable PRFs visible.	Yes	51.87263	-8.33671
-	Negligible	Juvenile Maple. No suitable PRFs visible.	Yes	51.87277	-8.33703
-	Negligible	Juvenile Maple. Proposed for removal.	No	51.8728	-8.33708
-	Negligible	Juvenile Maple. Proposed for removal. No suitable PRFs visible.	No	51.87284	-8.33713
-	Negligible	Juvenile Maple. Proposed for removal. No suitable PRFs visible.	No	51.87288	-8.33718
-	Negligible	Juvenile Maple. Proposed for removal. No suitable PRFs visible.	No	51.87291	-8.33722
-	Negligible	Semi-mature Oak. Low ivy cover. Evidence of historic tree surgery.	Yes	51.87444	-8.33998
-	Negligible	Juvenile Ash. No suitable PRFs visible.	Yes	51.87452	-8.34012
-	Negligible	Semi-mature. One minor shallow rot hole pointing north with no internal cavity.	Yes	51.87458	-8.3402
-	Negligible	Mature Crabapple. Dead.	Yes	51.87464	-8.34029
-	Low	Semi-mature. Evidence of historic tree surgery, minor PRFs visible e.g. rot holes.	Yes	51.87472	-8.34042
-	Negligible	Semi-mature Oak. Evidence of historic tree surgery.	Yes	51.87475	-8.34049
-	Negligible	Juvenile. No suitable PRFs visible.	Yes	51.8748	-8.34056

-	Low	Mature Oak. View of PRFs restricted at height. Minor shallow rot hole visible.	Yes	51.87487	-8.3407
-	Low	Mature Sycamore. Minor PRFs visible e.g. rot holes.	Yes	51.87526	-8.34093
-	Low	Mature Sycamore. Evidence of historic tree surgery. View of PRFs restricted at height.	Yes	51.8753	-8.34101
-	Negligible	Semi-mature multistem Sycamore. No suitable PRFs visible.	Yes	51.87542	-8.34112
-	Negligible	Semi-mature multistem Sycamore. No suitable PRFs visible.	Yes	51.87545	-8.3412
-	Negligible	Semi-mature multistem Sycamore. No suitable PRFs visible.	Yes	51.8756	-8.3414
-	Low	Semi-mature Sycamore. Moderate vegetation cover. Torn bark presenting possible minor PRF.	Yes	51.87576	-8.34176
-	Low	Semi-mature Sycamore. Low ivy cover. Minor PRFs visible e.g. rot holes.	Yes	51.8758	-8.34182
-	Negligible	Juvenile Sycamore. No suitable PRFs visible.	Yes	51.8759	-8.34198
-	Low	Mature Oak. Minor PRFs visible e.g. rot holes. Dense Ivy cover.	Yes	51.87605	-8.34211
-	Low	Semi-mature Oak. Moderate Ivy cover. View of PRFs restricted at height.	Yes	51.87617	-8.34232
-	Low	Semi-mature Oak. Moderate Ivy cover. View of PRFs restricted at height.	Yes	51.87617	-8.34232
-	Low	Semi-mature Oak. Moderate Ivy cover. View of PRFs restricted at height.	Yes	51.87617	-8.34232
-	Low	Semi-mature Oak. Moderate Ivy cover. View of PRFs restricted at height.	Yes	51.87617	-8.34232
-	Negligible	Juvenile. No suitable PRFs visible.	Yes	51.87632	-8.34266
-	Negligible	Juvenile. No suitable PRFs visible.	Yes	51.87637	-8.34273
-	Negligible	Juvenile. No suitable PRFs visible.	Yes	51.87642	-8.34281
-	Low	Semi-mature Sycamore. Multi-stem, low ivy cover, evidence of historic tree surgery, minor PRFs visible e.g. rot holes.	Yes	51.87778	-8.34486
-	Negligible	Semi-mature multistem Sycamore. No suitable PRFs visible.	Yes	51.8781	-8.34545
-	Negligible	Semi-mature Oak. Along water edge. Low Ivy cover.	Yes	51.87815	-8.34553
-	Negligible	Juvenile multistem Sycamore. No suitable PRFs visible.	Yes	51.87816	-8.34565
-	Low	Semi-mature Ash. Dense ivy cover. View of PRFs restricted at height.	Yes	51.87825	-8.34582
-	Negligible	Semi-mature Ash along water edge. No suitable PRFs visible.	Yes	51.87827	-8.34571

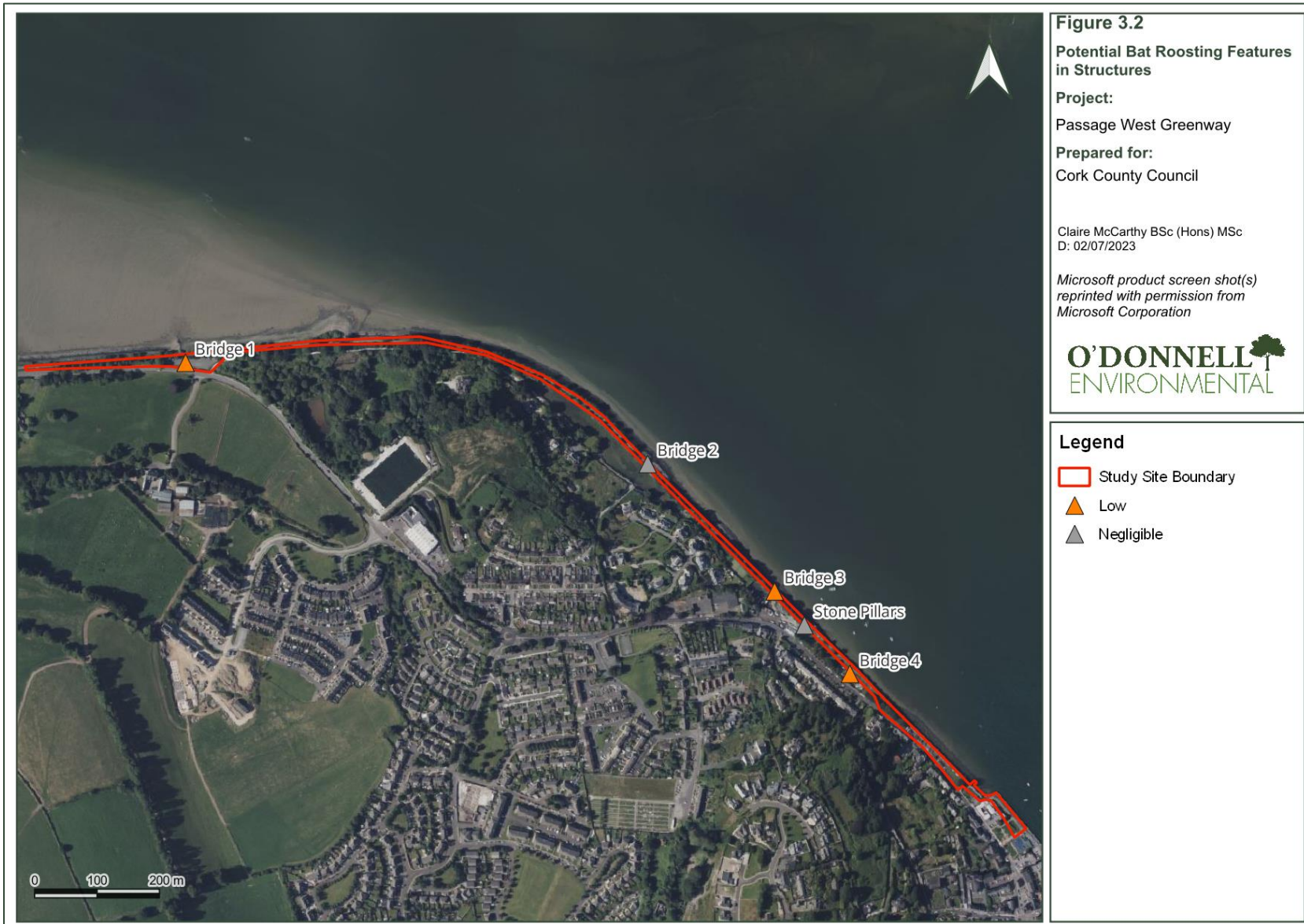
-	Negligible	Semi-mature multistem. Low Ivy cover. No suitable PRFs visible.	Yes	51.87835	-8.34598
-	Negligible	Semi-mature Sycamore. Low Ivy cover. No suitable PRFs visible.	Yes	51.87842	-8.34614
-	Low	Semi-mature Oak. View of PRFs restricted at height. Dense ivy cover.	Yes	51.87843	-8.34643
-	Negligible	Semi-mature Birch. Along roadside at the entrance to a private property. Unsuitable location and not of an appropriate size, with no visible PRFs.	Yes	51.87847	-8.35464
-	Negligible	Semi-mature Birch. Along roadside at the entrance to a private property. Unsuitable location and not of an appropriate size, with no visible PRFs.	Yes	51.8785	-8.35484
-	Negligible	Semi-mature Birch. Along roadside at the entrance to a private property. Unsuitable location and not of an appropriate size, with no visible PRFs.	Yes	51.8785	-8.3545
-	Negligible	Juvenile. No suitable PRFs visible.	Yes	51.87855	-8.3603
-	Negligible	Semi-mature Birch. Along roadside at the entrance to a private property. Unsuitable location and not of an appropriate size, with no visible PRFs.	Yes	51.87855	-8.35493
-	Low	Semi-mature multistem Ash. Low ivy cover. View of PRFs restricted at height.	Yes	51.87859	-8.34659
-	Negligible	Semi-mature multistem Sycamore. Low ivy cover. No suitable PRFs visible.	Yes	51.87862	-8.34679
-	Negligible	Juvenile. No suitable PRFs visible.	Yes	51.87866	-8.35856
-	Low	Mature Ash. Low ivy cover. View of PRFs restricted at height.	Yes	51.87867	-8.35795
-	Negligible	Smi-mature Ash. No suitable PRFs visible.	Yes	51.87867	-8.35828
-	Negligible	Juvenile Ash. No suitable PRFs.	Yes	51.87867	-8.35804
-	Low	Mature Ash. Low ivy cover. View of PRFs restricted at height.	Yes	51.87868	-8.35784
-	Negligible	Juvenile Ash. Low ivy cover. No suitable PRFs.	Yes	51.87869	-8.35769
-	Negligible	Juvenile Ash. Low ivy cover. No suitable PRFs.	Yes	51.8787	-8.35746
-	Negligible	Juvenile. Low ivy cover. No suitable PRFs.	Yes	51.87872	-8.35864
-	Negligible	Juvenile. Low ivy cover. No suitable PRFs.	Yes	51.87872	-8.35864
-	Low	Mature Oak. Evidence of historic tree surgery. Minor PRFs visible e.g. rot holes.	Yes	51.87872	-8.35555
-	Negligible	Semi-mature Ash. Low ivy cover. No suitable PRFs.	Yes	51.87873	-8.3586
-	Negligible	Juvenile . Low ivy cover. View of PRFs restricted at height.	Yes	51.87873	-8.3583
-	Negligible	Semi-mature Ash. No suitable PRFs visible.	Yes	51.87874	-8.35729

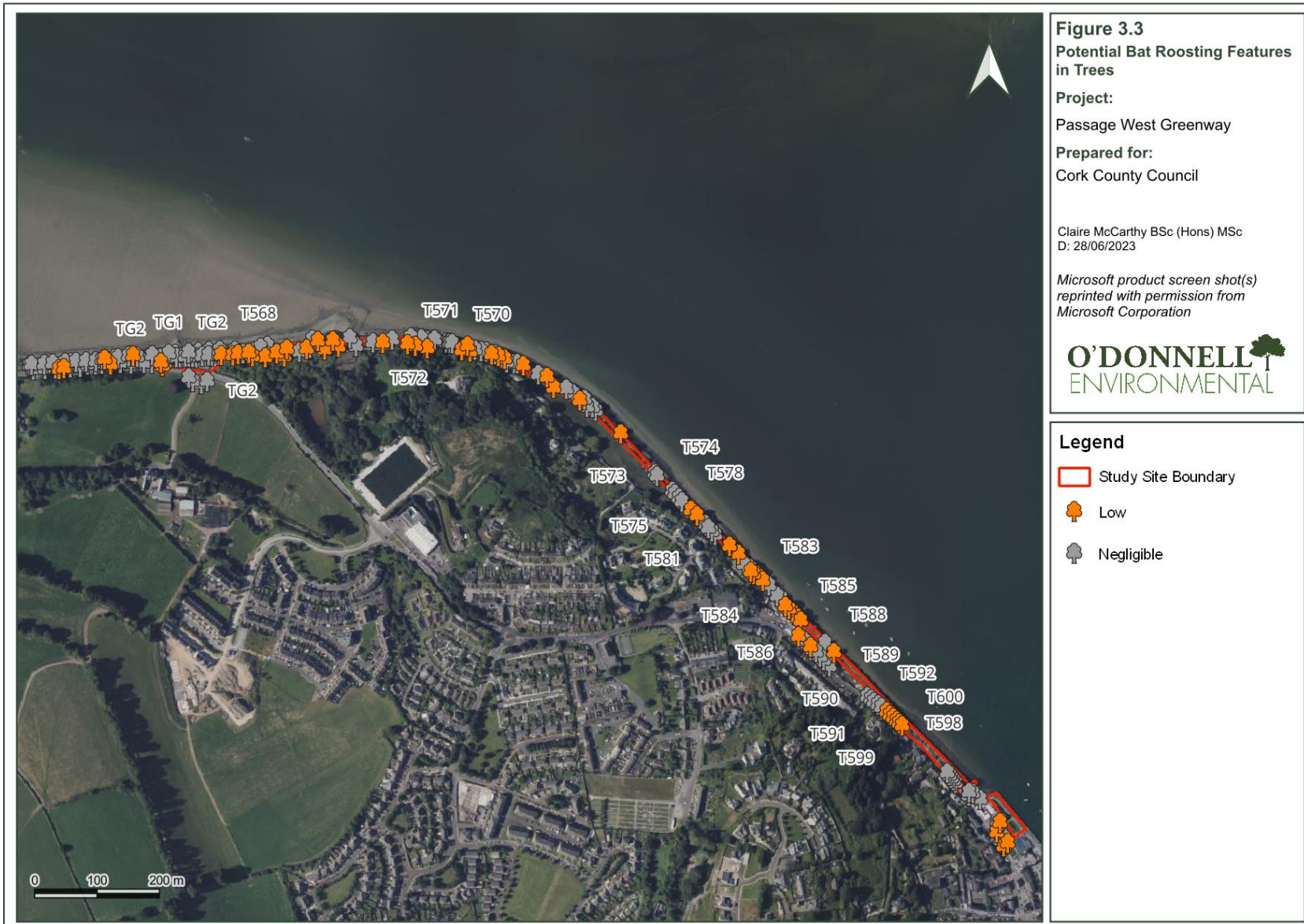
-	Negligible	Semi mature Ash. No suitable PRFs visible.	Yes	51.87874	-8.35711
-	Low	Mature Ash. Low ivy cover. Minor PRFs present e.g. rot holes.	Yes	51.87874	-8.35676
-	Negligible	Semi-mature Ash. Low ivy cover. No suitable PRFs.	Yes	51.87875	-8.3581
-	Negligible	Semi-mature Ash. No suitable PRFs visible.	Yes	51.87875	-8.35696
-	Low	Semi-mature Ash. Evidence of historic tree surgery. Minor PRFs visible e.g. rot holes. Moderate ivy cover.	Yes	51.87875	-8.34714
-	Negligible	Semi-mature Ash. No suitable PRFs visible.	Yes	51.87875	-8.35628
-	Negligible	Semi-mature Ash. No suitable PRFs visible.	Yes	51.87876	-8.35652
-	Negligible	Semi-mature Ash. No suitable PRFs visible.	Yes	51.87876	-8.35652
-	Negligible	Semi-mature Ash. No suitable PRFs visible.	Yes	51.87876	-8.35579
-	Negligible	Juvenile Ash. Low ivy cover. View of PRFs restricted at height.	Yes	51.87876	-8.35768
-	Negligible	Juvenile. Low ivy cover. View of PRFs restricted at height.	Yes	51.87876	-8.35781
-	Negligible	Semi-mature Ash. No suitable PRFs visible.	Yes	51.87876	-8.35598
-	Low	Mature Ash. Moderate ivy cover. No suitable PRFs visible.	Yes	51.87877	-8.35558
-	Negligible	Juvenile. Low ivy cover. View of PRFs restricted at height.	Yes	51.87877	-8.35756
-	Negligible	Juvenile. Low ivy cover. View of PRFs restricted at height.	Yes	51.87878	-8.35733
-	Negligible	Semi-mature multistem Sycamore. Low ivy cover. No suitable PRFs.	Yes	51.87878	-8.34735
-	Negligible	Juvenile Ash. Low ivy cover. No suitable PRFs.	Yes	51.87878	-8.35673
-	Negligible	Semi-mature multistem Ash. Low ivy cover. No suitable PRFs.	Yes	51.87878	-8.34728
-	Negligible	Juvenile. Low ivy cover. No suitable PRFs visible.	Yes	51.87878	-8.3571
-	Negligible	Semi-mature multistem Sycamore. Low ivy cover. No suitable PRFs visible.	Yes	51.8788	-8.34753
-	Negligible	Juvenile. Low ivy cover. No suitable PRFs visible.	Yes	51.87881	-8.35695
-	Low	Mature Crabapple. Shallow PRF visible.	Yes	51.87881	-8.35689
-	Negligible	Semi-mature Crabapple. Low ivy cover. No suitable PRFs.	Yes	51.87881	-8.35689
-	Negligible	Juvenile. Low ivy cover. No suitable PRFs visible.	Yes	51.87882	-8.35667
-	Negligible	Semi-mature Crabapple. Low ivy cover. No suitable PRFs.	Yes	51.87883	-8.35658
-	Negligible	Juvenile. No suitable PRFs visible.	Yes	51.87884	-8.35559
-	Low	Semi-mature Oak. Minor shallow PRFs. Evidence of historic tree surgery.	Yes	51.87885	-8.34758
-	Negligible	Juvenile. No suitable PRFs visible.	Yes	51.87885	-8.35614

-	Low	Mature Oak. View of PRFs restricted at height.	Yes	51.87885	-8.35315
-	Negligible	Juvenile. No suitable PRFs visible.	Yes	51.87886	-8.35633
-	Negligible	Juvenile multistem Sycamore. No suitable PRFs visible.	Yes	51.87886	-8.34765
-	Low	Mature Oak. View of PRFs restricted at height. Low ivy cover.	Yes	51.87887	-8.35345
-	Low	Mature Ash. Moderate Ivy cover. View of PRFs restricted at height.	Yes	51.87887	-8.35623
-	Low	Mature Oak. Evidence of historic tree surgery. View of PRFs restricted at height.	Yes	51.87887	-8.35271
-	Negligible	Juvenile. No suitable PRFs.	Yes	51.87887	-8.35579
-	Low	Mature. Moderate Ivy cover. View of PRFs restricted at height.	Yes	51.87888	-8.35391
-	Low	Group of semi-mature multistem Oak. Low ivy cover. View of PRFs restricted at height.	Yes	51.87889	-8.34772
-	Low	Mature multistem Sycamore. Low ivy cover. View of PRFs restricted at height.	Yes	51.8789	-8.35379
-	Negligible	Semi-mature multistem Sycamore. No suitable PRFs visible.	Yes	51.8789	-8.3554
-	Negligible	Semi-mature. Low Ivy cover. No suitable PRFs visible.	Yes	51.87891	-8.35367
-	Low	Mature Willow. Dense ivy cover. View of PRFs restricted at height.	Yes	51.87891	-8.34788
-	Low	Semi-mature Oak. Moderate ivy cover. View of PRFs restricted at height.	Yes	51.87891	-8.35288
-	Negligible	Semimature multistem sycamore. Evidence of historic tree surgery. No suitable PRFs recorded.	Yes	51.87891	-8.34779
-	Low	Mature. Moderate Ivy cover. View of PRFs restricted at height.	Yes	51.87891	-8.35354
-	Negligible	Juvenile. No suitable PRFs.	Yes	51.87891	-8.35494
-	Negligible	Semi-mature Ash. Low ivy cover. No suitable PRFs.	Yes	51.87891	-8.35318
-	Negligible	Semi-mature Oak. No suitable PRFs visible.	Yes	51.87893	-8.35236
-	Negligible	Semi-mature Hawthorn. No suitable PRFs visible.	Yes	51.87894	-8.3534
-	Negligible	Semi-mature Ash. Low ivy cover. No suitable PRFs.	Yes	51.87894	-8.35386
-	Low	Group of semi-mature Oak . Low Ivy cover. Evidence of historic tree surgery.	Yes	51.87895	-8.34839
-	Negligible	Juvenile. No suitable PRFs.	Yes	51.87895	-8.35422
-	Negligible	Mature Hawthorn. Low ivy cover. No suitable PRFs.	Yes	51.87895	-8.34801
-	Negligible	Group of semi-mature Sycamore. Evidence of historic tree surgery. No suitable PRFs visible.	Yes	51.87895	-8.34813

-	Low	Semi-Mature Oak. Dense Ivy cover. View of PRFs restricted at height.	Yes	51.87897	-8.34858
-	Low	Mature Oak. Low ivy cover. View of PRFs restricted at height. Minor PRFs visible e.g. rot holes.	Yes	51.87897	-8.35177
-	Low	Mature Oak. Thick interweaving ivy stems. Moderate Ivy cover. View of PRFs restricted at height.	Yes	51.87897	-8.35265
-	Negligible	Semi-mature Sycamore. Low Ivy cover. No suitable PRFs visible.	Yes	51.87897	-8.34827
-	Low	Mature multistem Sycamore. Low ivy cover. Evidence of historic tree surgery. View of PRFs restricted at height.	Yes	51.87898	-8.35219
-	Negligible	Semi-mature Ash. No suitable PRFs visible.	Yes	51.87899	-8.35326
-	Negligible	Semi-mature Oak. Evidence of historic tree surgery. No suitable PRFS.	Yes	51.87899	-8.35211
-	Low	Group of two mature Oaks. Evidence of historic tree surgery. View of PRFs restricted at height.	Yes	51.87899	-8.34938
-	Low	Group of 3 mature multistem Oak. Evidence of historic tree surgery . View of PRFs restricted at height. Low ivy cover.	Yes	51.87901	-8.35145
-	Negligible	Semi-mature multistem Sycamore. Moderate Ivy cover. Evidence of historic tree surgery. No suitable PRFs.	Yes	51.87902	-8.35191
-	Negligible	Mature Blackthorn. No suitable PRFs.	Yes	51.87902	-8.35104
-	Low	Mature Oak. Low ivy cover. Evidence of historic tree surgery. View of PRFs restricted at height.	Yes	51.87903	-8.34966
-	Low	Semi-mature Oak. View of PRFs restricted at height. Evidence of historic tree surgery.	Yes	51.87903	-8.34966
-	Low	Semi-mature Oak. Minor shallow PRFs visible e.g. rot holes.	Yes	51.87903	-8.34844
-	Low	Group of 4 mature multistem Sycamore. Moderate Ivy cover. View of PRFs restricted at height.	Yes	51.87905	-8.34984
-	Low	Mature Ash. Dense ivy cover. View of PRFs restricted at height.	Yes	51.87907	-8.35042
-	Negligible	Mature Blackthorn. Moderate ivy cover. No suitable PRFs.	Yes	51.87907	-8.35065
-	Low	Multistem. Evidence of historic tree surgery. View of PRFs restricted at height.	Yes	51.87909	-8.35193
-	Low	Mature Oak. Evidence of historic tree surgery. View of PRFs restricted at height. Low Ivy cover.	Yes	51.87909	-8.35193
-	Low	Mature Ash. Dense Ivy cover. Evidence of historic tree surgery. View of PRFs restricted at height.	Yes	51.8791	-8.35158
-	Negligible	Semi-mature multistem Ash. Low ivy cover. No suitable PRFs.	Yes	51.87911	-8.34939

-	Negligible	Semi-mature multistem Sycamore. Low ivy cover. Evidence of minor tree surgery. No suitable PRFs.	Yes	51.87911	-8.35206
-	Negligible	Juvenile Sycamore. Low Ivy cover. No suitable PRFs.	Yes	51.87911	-8.3502
-	Negligible	Semi-mature multistem Sycamore. No suitable PRFs visible.	Yes	51.87912	-8.34921
-	Negligible	Semi-mature Oak. Evidence of historic tree surgery. Low ivy cover. No suitable PRFs visible.	Yes	51.87913	-8.34952
-	Negligible	Semi-mature Oak along water edge. No suitable PRFs.	Yes	51.87913	-8.35119
-	Negligible	Semi-mature Oak. No suitable PRFs visible.	Yes	51.87915	-8.34976





3.4 PASSIVE BAT ACTIVITY SURVEYS

A passive bat detector was located within the adjoining woodland immediately adjoining the proposed route (see **Figure 2.1**) for 11 nights, from 4th May to 15th May 2023. A total of 719 registrations were recorded during the passive recording session. Soprano Pipistrelle accounted for 49.5% of all registrations, Common Pipistrelle for 31.7% of registrations, Leisler's Bat for 18.5% of registrations, and Daubenton's Bat accounted for 0.3% of registrations.

The level of bat activity recorded overall was low to moderate and consisted of a low diversity of species. Species recorded are common and widespread in an Irish context and with the exception of Daubenton's Bat are considered to be relatively light tolerant. While suitable foraging habitat for bats is present within the study area, light and noise disturbances may limit the value of habitat in the study area for bats.

The presence of three species represents a low level of bat species diversity at the study area. The Annex II listed Lesser Horseshoe Bat was not recorded and the site is outside their known range.

The distribution of registrations overall according to 10-minute time intervals is shown in **Figure 3.4**. The median sunset and sunrise times of the survey were 21:10 and 05:50 respectively. The distribution of registrations does not indicate the presence of a significant roost proximal to the monitoring location.

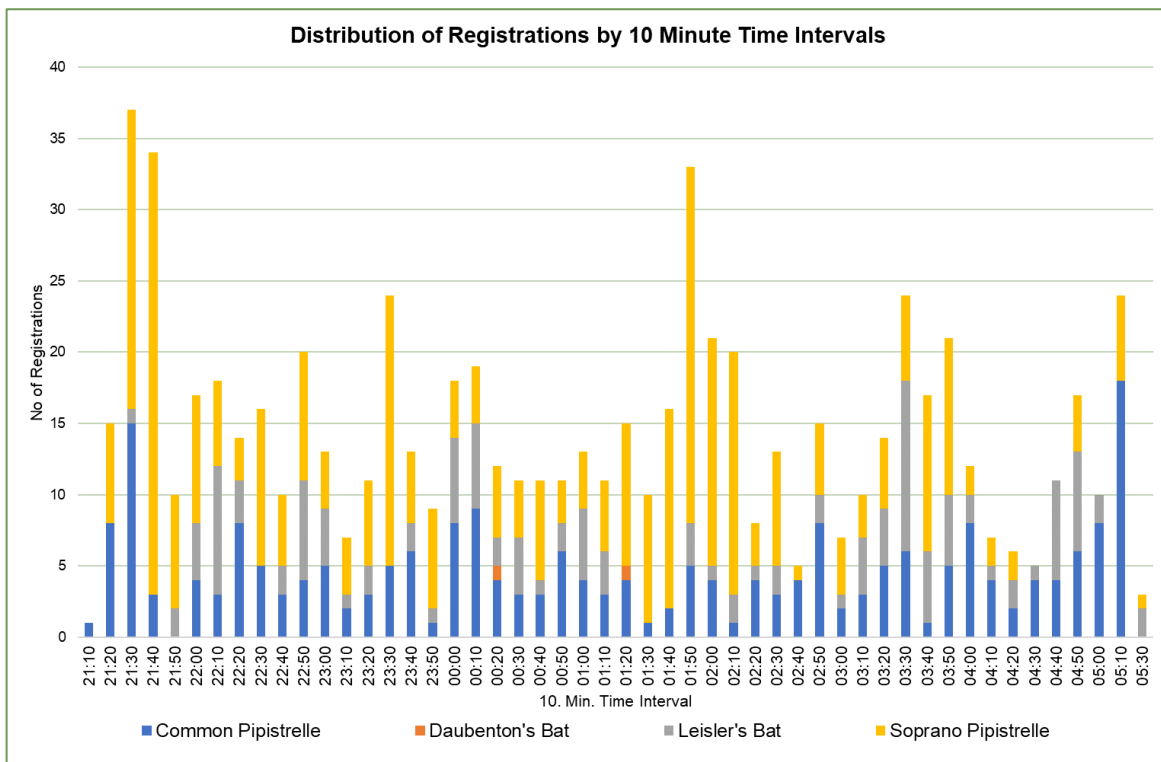


Figure 3.4 - Distribution of all bat registrations recorded by 10-minute time interval and species.

3.4.1 Active Transect Surveys

Two active transect surveys were carried out for approximately 1.5 hours from dusk on the 6th and 19th June 2023 along the relevant section of the existing Passage West Greenway.

Three species of bat were recorded across the two survey nights: Common pipistrelles (*Pipistrellus pipistrellus*), Soprano Pipistrelle (*Pipistrellus pygmaeus*) and Leisler's Bat (*Nyctalus leisleri*). Little early night activity was noted during the surveys, with species typically being recorded along the walkway approx. 1 hour after sunset and thereafter. Activity, where observed, consisted of foraging and no behaviour was noted which was indicative of proximity to a roosting location.

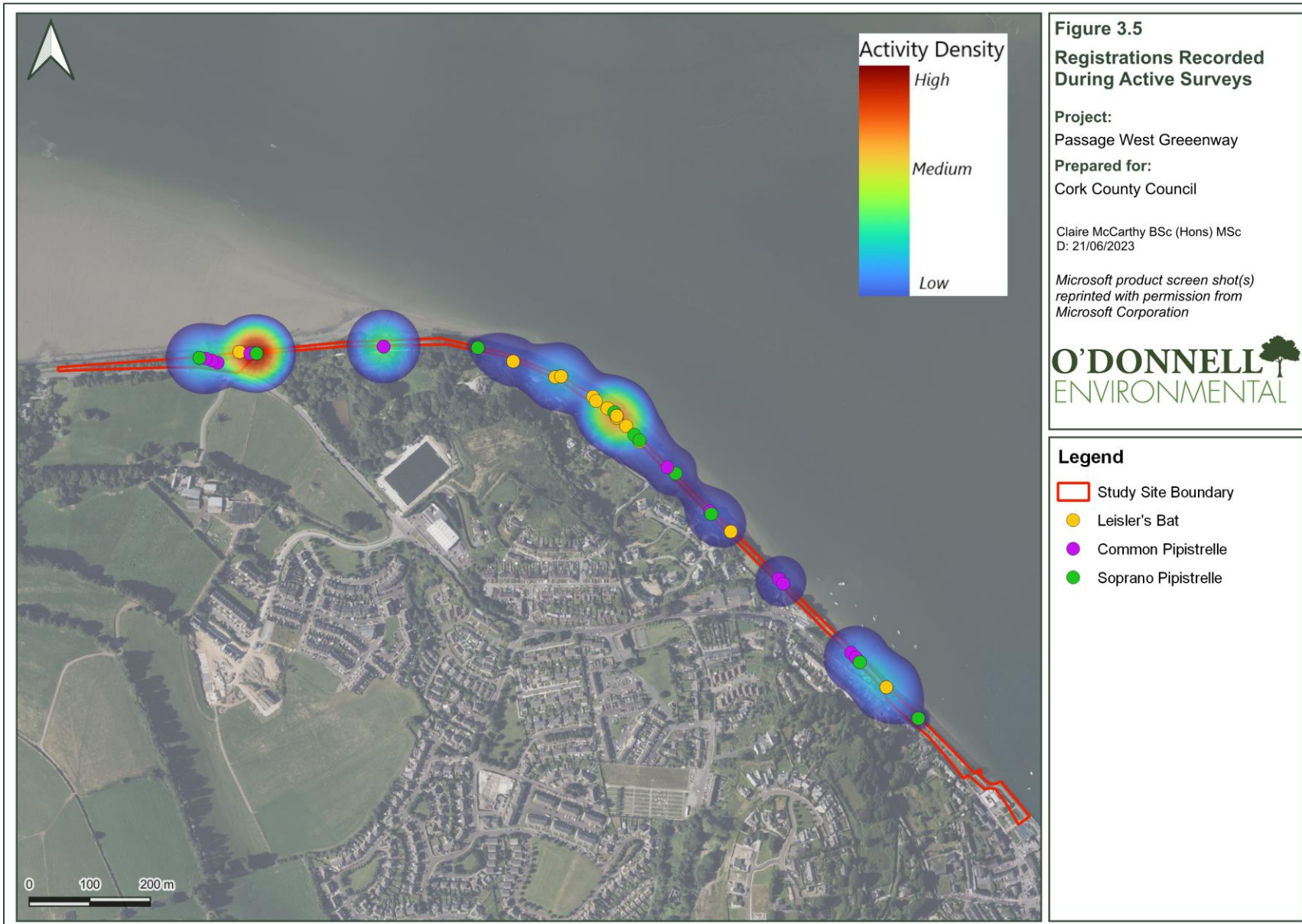
In comparing the active data to the passive data collected it is noted that the level of activity recorded within the adjoining treelines was much higher than that which was recorded while walking the existing path.

The level of activity recorded during the active surveys is considered to be low and this is likely attributable to the high levels of light pollution (see **Appendix A7 & A8**) and anthropogenic disturbance that currently exists at the site. No specific areas of high activity were apparent during the survey or analysis of the data nor do the survey results indicate the presence of any significant roost locally.

Active survey results are visually represented in **Figure 3.5** below.

3.4.2 Overall Site Evaluation

Taking the above into consideration, the proposed development site is currently of **Local Importance (Lower Value)** to bats.



4 Conclusion

The current report describes the proposed study area in terms of roosting and foraging suitability for bats. A comprehensive and appropriate survey effort was employed, and no evidence of bat roosting in either structures or trees present within and immediately adjoining the proposed site could be found. While suitable foraging habitat exists within the proposed site and aerial insect activity was observed to be good, bat activity levels were considered relatively low throughout the area of the proposed scheme as a whole. It is likely that bat activity in the area is currently suppressed as a result of the significant levels of light pollution from the existing artificial lighting fixtures along the exiting cycleway and other unrelated light sources includes those across the harbour.

Based upon the results of surveys described in this baseline report, and considering the local context of the proposed site, the study site is considered to be of **Local Importance (Lower Value)** for bats.

Based on current information, a derogation license issued under Regulation 54 of the European Communities (Birds and Natural Habitats) Regulations 2011 is not required to facilitate the proposed works.

Opportunities exist to improve the existing lighting design along the greenway to the benefit of bats (and other wildlife) as part of the current project, in addition to other habitat enhancements. The provision of artificial bat roosting spaces should be considered also.

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Appendix A – Photographic Record



A1. Showing a section of the Passage West Greenway taken from the Carpark at the eastern extent of the proposed walkway, including European Hornbeam trees proposed for removal (T600- T595).



A2. Showing two European Hornbeam trees (T588 and T589) to be removed as part of the proposed project.



A3. Showing artificial stone pillars inspected for potential roosting features for crevice-dwelling bats.



A4. Showing artificial bridge deck (No. 4) and parapet to be replaced with a 300mm wide bridge deck and railing. This deck and parapet were inspected at low tide to aid accessibility for surveyors. Minor crevices were recorded that have low potential as roosting features for crevice-dwelling bats.



A5. Showing a weld presenting a PRF for crevice-dwelling bats at T595.



A6. Showing a long fissure facing east presenting a PRF for crevice-dwelling bats at T587.



A7. Showing significant levels of light pollution currently present along the Passage West Greenway.



A8. Showing artificial LED lighting fixtures as a source of significant light pollution along the Existing Passage West Greenway.



A9. Thermal image from a limited survey of Rockenham House on 19th July 2023.



A10. Thermal image from a limited survey of Rockenham House on 19th July 2023.

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Appendix D. Otter Survey Report



Otter Survey for the Passage West Pedestrian and Cycle Route Scheme, Co. Cork



Prepared by Triturus Environmental Ltd. for Atkins

March 2024

Please cite as:

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1. Introduction

1.1 Background

In light of proposals for the Passage West Pedestrian and Cycle Route scheme between Glenbrook and the Cork Harbour Greenway, Passage West, Co. Cork an otter survey was required to inform the species utilisation of the adjoining intertidal and saline lagoon habitats bordering the study area. In particular the current report would identify areas used for breeding and resting (holts and couches respectively), given these areas of otter habitat are protected under the Wildlife Acts 1976-2021 and are included in a system of Strict Protection pursuant to the requirements of Articles 12, 13 and 16 of the Habitats Directive (92/43/EEC) (NPWS, 2021). The findings of the survey would also inform mitigation to protect otter populations in the vicinity of the study area in light of Cork Harbour being an important habitat for the species (Dalton et al. 2021).

The proposed pedestrian and cycle scheme commences at Mariner's Quay, Passage West and finishes at Glenbrook Ferry Terminal (approximately 1.5km). It also includes a public realm interface for Passage West. After exiting Passage West tunnel at Glenbrook wharf, the proposed pedestrian and cycle route will follow the eastern footpath, next to the water, to Glenbrook Ferry Terminal. This scheme will join to a proposed scheme at Mariner's Quay and link to another at Glenbrook Ferry Terminal. It will form a vital part in connecting Passage West, Monkstown, Carrigaline and Crosshaven with Rochestown in Cork City, through pedestrian and cycling infrastructure.

1.2 Otter legislative protection

The Eurasian otter (*Lutra lutra*) is a species of conservation concern and high priority having suffered major declines in its range and population throughout Europe since the 1950s. It is classified as 'near threatened' by the IUCN Red List with a decreasing population trend and, as such, is listed in Appendix I of CITES, Appendix II of the Bern Convention (Council of Europe, 1979) and Annexes II and IV of the EU Habitats Directive (92/43/EEC).

Otters, along with their breeding and resting places, are also protected under provisions of the Irish Wildlife Acts 1976-2021. Otters have additional protection because of their inclusion in Annex II and Annex IV of the Habitats Directive 92/43/EEC, which is transposed into Irish law by the European Union (Birds and Natural Habitats) Regulations 2011-2021.

The protection of otters is outlined in Article 51(1) and (2):

Protection of fauna referred to in the First Schedule;

51.(1) *The Minister shall take the requisite measures to establish a system of strict protection for the fauna consisting of the species referred to in Part 1 of the First Schedule.*

51.(2) *Notwithstanding any consent, statutory or otherwise, given to a person by a public authority or held by a person, except in accordance with a license granted by the Minister under Regulation 54, a person who in respect of the species referred to in Part 1 of the First Schedule (listed below). Items (b) and (d) may be considered most relevant to developments.*

(a) *deliberately captures or kills any specimen of these species in the wild,*

- (b) deliberately disturbs these species particularly during the period of breeding, rearing, hibernation and migration,*
- (c) deliberately takes or destroys eggs of those species from the wild,*
- (d) damages or destroys a breeding site or resting place of such an animal, or*
- (e) keeps, transports, sells, exchanges, offers for sale or offers for exchange any specimen of these species taken in the wild, other than those taken legally as referred to in Article 12(2) of the Habitats Directive, shall be guilty of an offence.*

In an Irish context, according to the most recent Article 17 reporting (NPWS, 2019), otter conservation status has improved, with the species now evaluated as being of 'Favourable' conservation status. Otters were considered to be previously 'Near Threatened' (Marnell, 2009) based on a 20-25% decline between 1980 and 2005 (Bailey & Rochford, 2006). However, the current conservation status is now of 'Least Concern' (Marnell et al., 2019).

1.3 Statement of authority

Ross Macklin PhD (candidate), B.Sc. (Hons) MCIEEM., MIFM, HDip GIS, PDip IPM Ross is an aquatic, fisheries and mammalian ecologist with 18 years' professional experience in Ireland. He is director of Triturus Environmental Ltd. Ross has a BSc in Applied Ecology and diplomas in integrated Pest Management and GIS. He is currently completing his PhD in fisheries ecology. He has considerable experience in a wide range of ecological and environmental projects including EIAR, EclA, CEMP and AA/NIS reporting, as well as biodiversity, water quality monitoring, invasive species, mammalian surveys and fisheries management. He also has expert identification skills in fisheries, macrophytes, freshwater invertebrates, protected species and habitats. His diverse project experience includes work on renewable energy developments, flood relief schemes, road schemes, waste management, blueways/greenways, biodiversity projects, non-volant mammal monitoring, fisheries management projects and catchment wide water quality management. He has worked extensively within the catchment of Cork Harbour on mammal monitoring projects for Pfizer, Irving Oil, Cork LNG and Transport Infrastructure Ireland and is an expert in his field. He recently completed and was lead author of numerous catchment wide otter surveys including the Lower Lee FRS Otter Survey, Dublin City Otter Survey, Dún Laoghaire Rathdown Otter Survey and Tullamore Otter Survey which are among the largest urban otter surveys conducted in Ireland. He also recently completed an otter management plan for Grand Canal Harbour in Dublin and is currently developing a standard detail for artificial holt construction in conjunction with Dublin City Council for otter habitat enhancement projects. Further otter work currently being undertaken by Ross are two city wide otter population genetic studies using DNA extracted from spraint in Cork and Dublin in conjunction with Bio-ID.

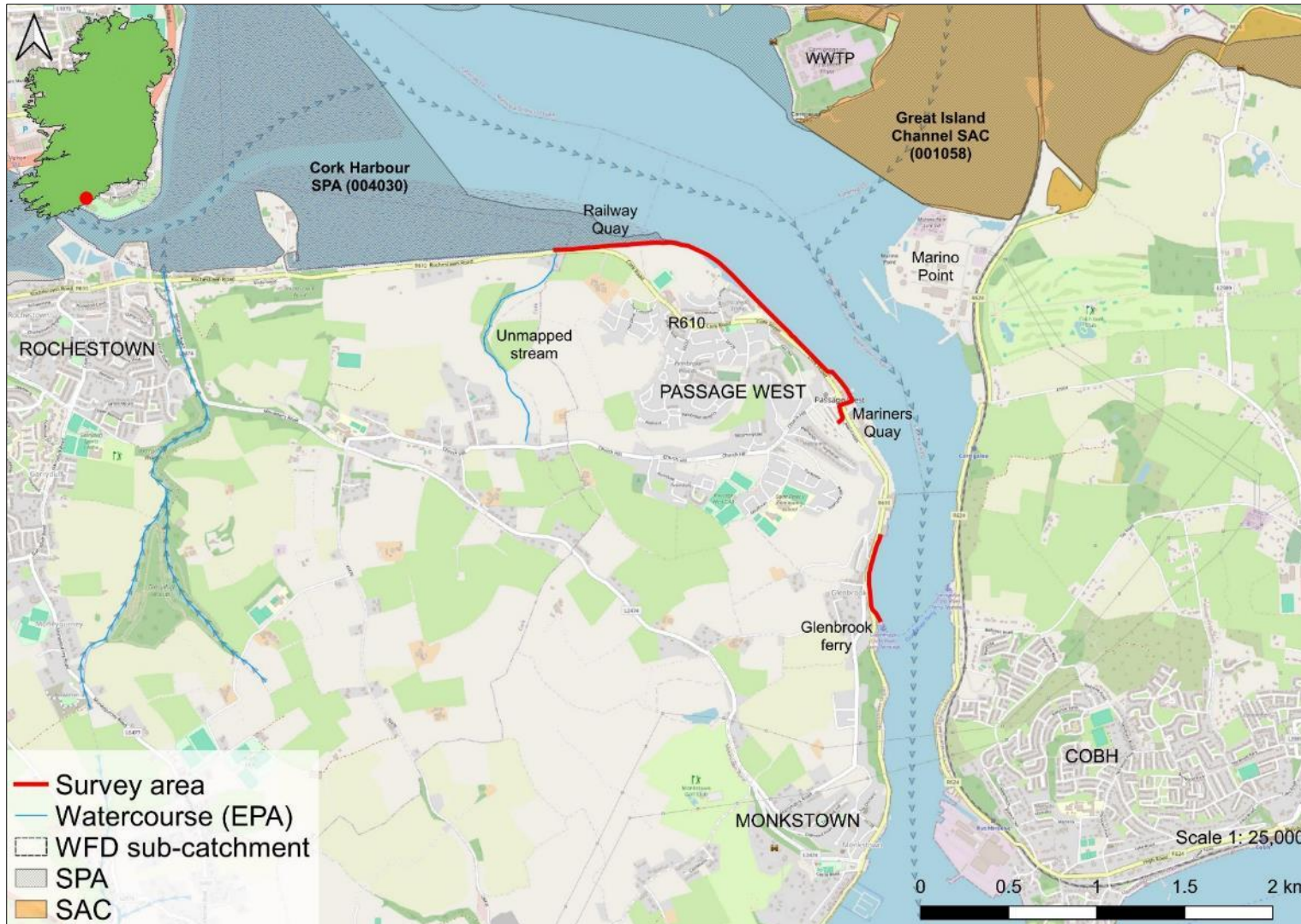


Figure 1.1 Otter survey study area location between Glenbrook and Railway Quay, Passage West, Cork

2. Methodology

2.1 Otter sign surveys

A walkover otter survey of the study area was conducted on the 2nd and 3rd February 2024. The survey was completed between Glenbrook and the Cork Harbour Greenway car park, Co. Cork (**Figure 1.1**).

The survey was completed during dry, mild, bright and settled conditions which ensured that a good representation of habitat marked by otter could be recorded in the field, including territorial marking or marking of feeding areas. The survey also deliberately coincided with prolonged dry periods to not minimise rain washout of otter signs (spraint, smears etc.).

Each otter sign was logged by type, location (handheld GPS), condition and approximate age for later interpretation to distinguish differences in habitat use and activity. Spraints were subjectively assessed as either fresh (very recent), mixed-age (recent and older spraints typically indicative of a regular sprainting site) or old (spraint breaking down and not recently deposited). Furthermore, indicative counts of spraint (i.e. number of individual spraints) and the number of sprainting sites (often separate clusters in one area) were noted. This helped indicate the frequency of otter marking that would support preferential use of habitat temporally by otter and often demarcates important territory where marking frequency is high. This technique was first utilised in the Dublin City Otter Survey (Macklin et al. 2019) and has been applied in other largescale otter surveys (Brazier & Macklin, 2020).

2.2 Total corridor otter survey (TCOS) methodology

The survey broadly followed the best practice survey methodology for otter as recommended by Lenton et al. (1980), Chanin (2003) and Bailey & Rochford (2006). However, methodology differed in that the entire waterline was surveyed rather than the standard 500-600m sections from accessible points (e.g. bridges). The novel survey technique, known as a total corridor otter survey (TCOS) (Macklin et al., 2019), encompassed the full intertidal zone adjoining the study area inclusive of connecting tidal lagoons and freshwater stream confluences with the intertidal.

Total corridor survey methodology typically involves the one or two surveyors working independently (in tandem) along the full corridor of the study area. This also facilitates one to work from a more elevated position (e.g. bank top) with one surveying (with appropriate PPE such as a dry suit or chest waders) from within the channel or along mean high tide mark to increase the likelihood of otter sign detection. This is especially true of more cryptic signs such as holts, which can be located in undercut banks, under tree root systems etc. out of the view of traditional surveys. Surveyors can alternate between waterside locations and banks depending on surveyor knowledge and experience of preferential areas of habitat likely to be used by otter.

3. Results

3.1 Study Area

The survey area between Glenbrook, Mariner’s Quay and Railway Quay at Passage West, Co. Cork covered a mosaic of intertidal and bordering terrestrial habitats (**Figure 3.1**). These comprised areas of intertidal mixed sediment/ rocky intertidal habitat, costal boulder revetments, scrub, treelines, mixed broadleaved woodland plantation, upper saltmarsh, tidal lagoons and streams that bordered the study area between Glenbrook and the Cork Harbour Greenway area at Passage West. The fringes of semi-natural habitats, despite a high degree of disturbance and impingement from developed lands and or existing walkways, contained areas of lower disturbance with vegetation cover and poorer access to people that benefitted otter.

3.2 Otter records



A total of $n=16$ otter signs were recorded within the survey area during the survey conducted during February 2024. This equated to a density of 4.9 otter signs per linear kilometre of habitat over the 3.25km habitat survey area including tidal lagoons. The signs recorded comprised fourteen spraint sites, a single couch and a single holt site (**Table 3.1; Figure 3.1**). The potential breeding area (i.e. holt)  and couch site (resting area)  are shown on **Figure 3.1**. A photographic audit of the survey area inclusive of the identified holt and couch area are presented in **Plates 3.1-3.12** below.

Table 3.1 Summary of the otter signs recorded in the study area at Passage West

Otter sign	Total no.
Spraint site	14
Holt	1
Couch (with jelly)	1
Total	16
Density signs per linear km	4.9



Plate 3.1 Otter couch (resting area) under eroded tidal wall with otter jelly on rocks with freshwater bathing area [REDACTED], bathing areas are extremely important for coastal otter to wash salt off their coats



Plate 3.2 Open boulder revetment at Glenbrook with high human disturbance that did not have any otter signs, these open disturbed areas are not typically marked by otters



Plate 3.3 Open mixed sediment and shingle intertidal between Passage and Glenbrook facing south from Granary Wharf



Plate 3.4 The old quay wall at Granary Wharf, Passage West

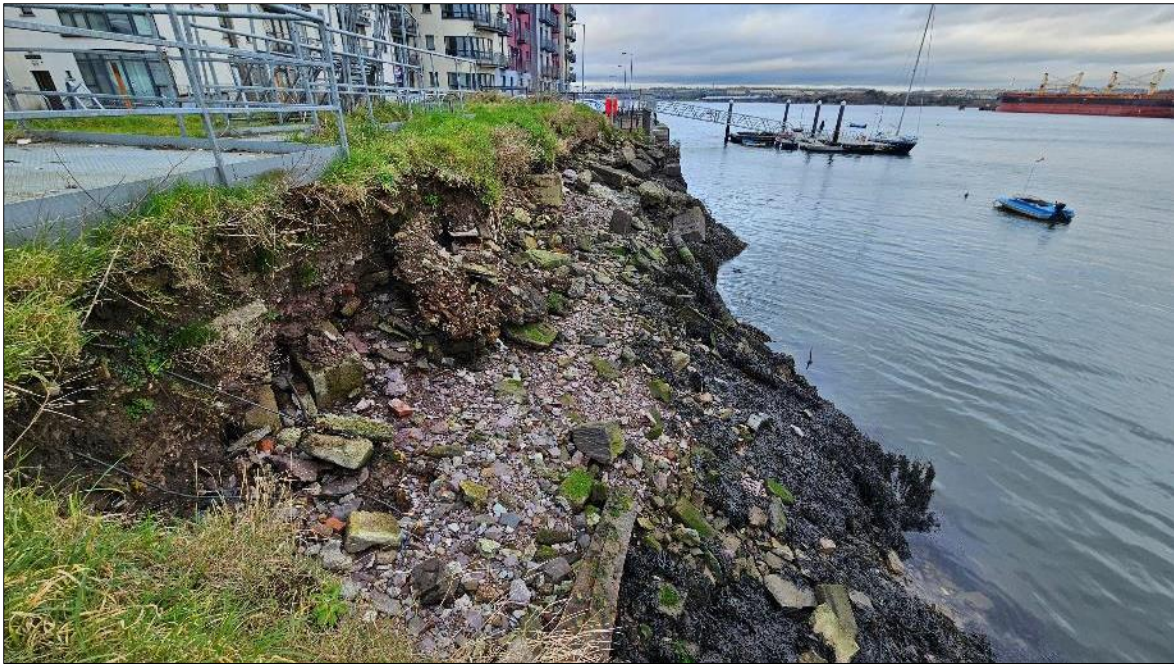


Plate 3.5 Eroded bank at Mariner's Quay, Passage West

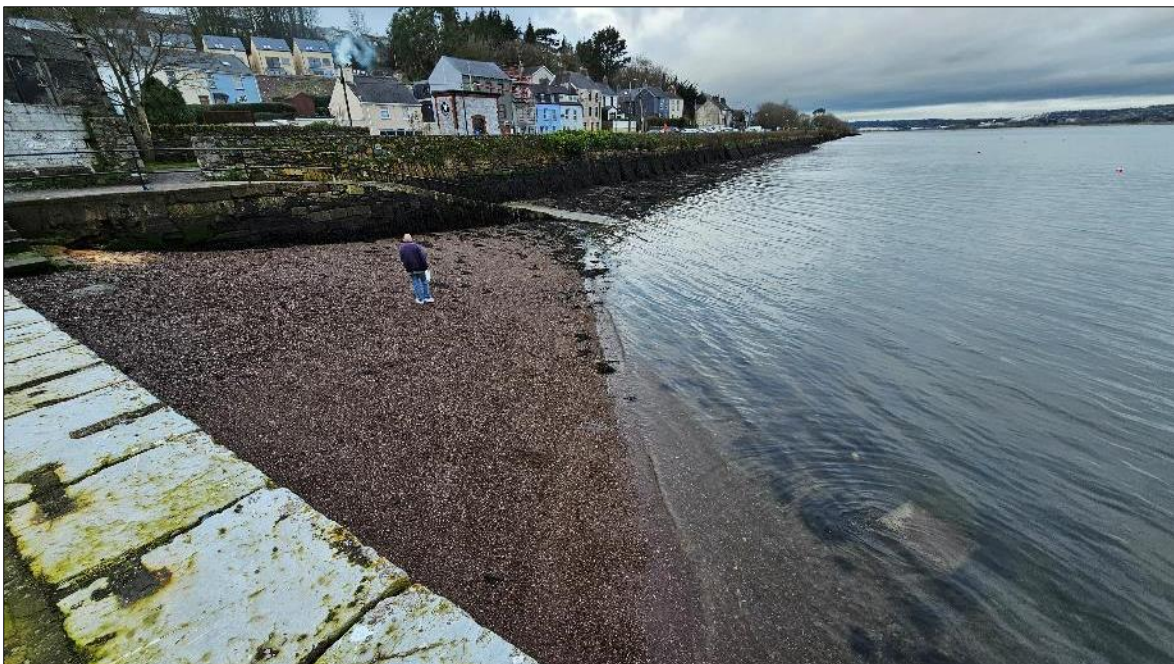


Plate 3.6 The old quay wall facing northwest from the Passage West Maritime Museum



Plate 3.7 Tidal lagoon at Horsehead, Passage West showing undercut banks that supported no otter signs despite have some suitability as potential couch areas



Plate 3.8 Large crevice under sycamore root system but no otter scent spraint or signs of use, therefore not a holt site (many of these crevices existed at Railway Quay and were examined thoroughly)



Plate 3.9 Spraint site at Railway Quay, Passage on the high tide mark on historical collapsed pier below quay wall



Plate 3.10 Example of the typical habitat along Railway Quay with scrub bordering walkway, boulder revetment and mixed sediment intertidal grading into open estuarine mudflat

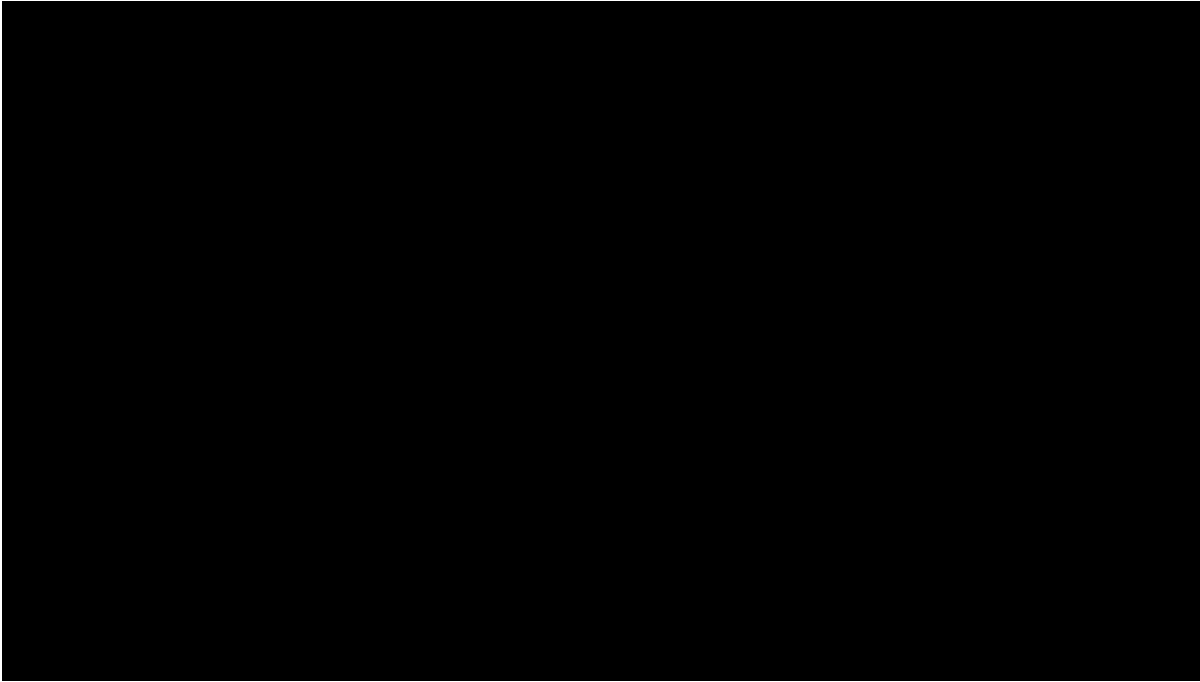


Plate 3.11



Plate 3.12 Boulder revetments and freshwater stream with regular spraint site at Railway Quay, supporting the known importance of freshwater sources for coastal otters

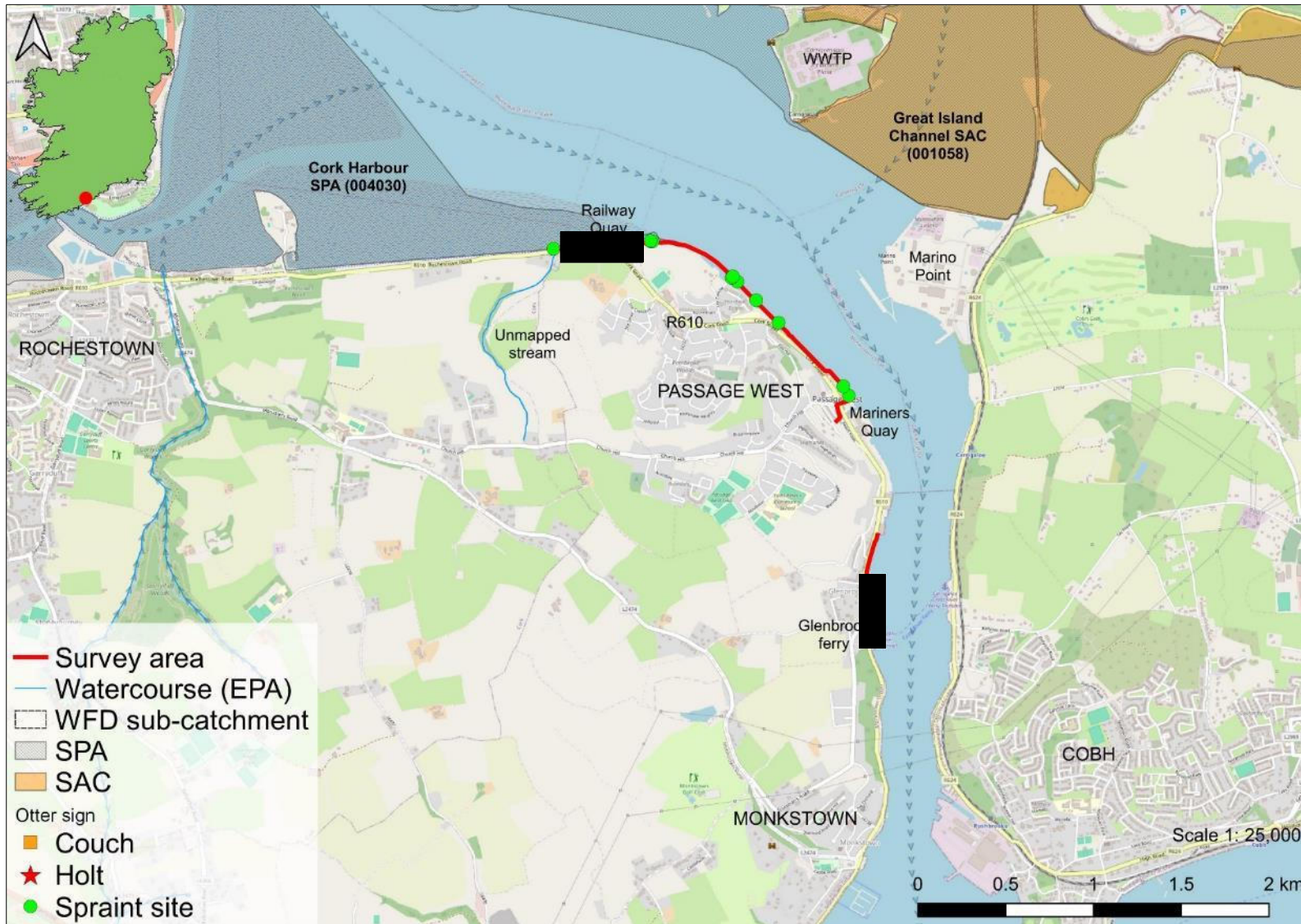


Figure 3.1 Otter sign distribution map showing otter signs inclusive of couch and holt sites in the study area



Figure 3.2 Otter sign distribution map showing the location of the active holt in the boulder revetment [redacted] with 150m buffer

4. Discussion

This survey recorded a total of $n=14$ otter signs, the majority of which were associated with the faecal depositions of otter (i.e. spraint and jelly sites). Important depositional spraint areas were clearly associated with freshwater sources representative of territorial marking of these important bathing areas.

Legally protected breeding ($n=1$ holt site) and resting areas ($n=1$ couch site) were also recorded in the study area. A single couch area [REDACTED] was evidently used as a frequent resting and bathing area. This small enclave [REDACTED] was secluded from human disturbance and had a small stream of freshwater spilling over intertidal boulders that acted as an ideal bathing and resting area (**Plate 3.1 & Figure 3.1**). No other clearly definitive couch areas were identified in the study area.

A single holt [REDACTED] was also identified (**Plate 3.11 & Figure 3.2**) This holt as with the couch area [REDACTED], was close to a regularly used freshwater stream source. The holt was heavily marked with mixed age spraint and was associated with a tunnel system under the boulders into the adjoining embankment indicating it as a definitive holt site. This potential breeding holt area was secluded from the existing walkway by dense bramble scrub and limited access from the walkway to the intertidal area.

Otter breeding areas (holts) are widely accepted as being especially sensitive to direct human disturbance (Mason & Macdonald, 2009; Macklin et al. 2019), with otter reproductive success known to be higher in less disturbed habitat; hence their preferential fidelity for low disturbance areas of habitat (Brazier & Macklin, 2020; Macklin et al. 2019; Scorpio et al., 2016; Ruiz-Olmo et al., 2011; Loy et al., 2009; Kruuk, 2006). The location of the identified holt in a more poorly accessible boulder revetment helped minimise disturbance to otter by people and dog walkers. It is very important to maintain the observed low disturbance levels during greenway construction works given continued fragmentation of otter habitats in Cork Harbour with increased suburbanisation pressures. Furthermore, the existing scrub vegetation provides extra separation between dog walkers and the intertidal which should be preserved where practical. This separation also benefits waterbirds that feed on the exposed mudflats.

Otters, along with their breeding and resting places, are protected under provisions of the Irish Wildlife Acts 1976-2021 and also pursuant to the requirements of Articles 12, 13 and 16 of the Habitats Directive (92/43/EEC) as an Annex V species. The identified holt and couch areas are in close proximity (contiguous) with to the proposed development area. Despite the study area being an active thoroughfare for patrons of Cork City, construction activity and or increased activity once the greenway becomes operational may directly or indirectly disturb otter breeding/resting areas. Consequentially a derogation licence will be required from the National Parks and Wildlife Service (NPWS) in advance of any works in these areas. Recent guidance on the derogation process for otter is summarised in the NPWS document, *'Guidance on the Strict Protection of Certain Animal and Plant Species under the Habitats Directive in Ireland'* (NPWS, 2021) and should be adhered to in the derogation application. It is recommended that acoustic barriers be used during construction in the vicinity of breeding and resting areas. In addition trail camera monitoring that is a standard component of mitigation as part of derogation requirements, should be implemented during the construction period to establish

patterns of otter utilisation and potential disturbance related impacts in order to apply corrective action. Additional landscape planting with trees and scrub should also be considered adjoining the intertidal to screen the holt and couch areas. The local ranger of the NPWS should also be contacted to agree on the final appropriate schedule of mitigation in accordance with the conditions of the derogation licence.

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6. Appendix A – otter signs database

Table 6.1 Summary of the $n=16$ otter signs recorded in the study area during February 2024 (breeding and resting areas marked in bold)

Sign no.	Type	No. spraint sites & total no. spraints in parenthesis	Age	Description	ITM x	ITM y
PG01	*Couch & spraint	2(5)	Fresh	Mixed age spraint on boulders at top of intertidal zone under ivy hedgerow [REDACTED]. The couch area is likely freshwater bathing area given freshwater feed flowing from wall near boulders increasing importance.	[REDACTED]	[REDACTED]
PG02	Spraint	3(7)	Mixed age	Mixed age spraint on boulders at top of intertidal zone under Grisilinea hedgerow near Glenbrook Ferry Terminal.	577113	567510
PG03	Spraint	1(5)	Mixed age	Mixed age spraint at top of quayside steps at Mariners Quay.	576968	568841
PG04	Spraint	1(1)	Old	Old spraint at top of quayside steps at Mariners Quay.	576937	568894
PG05	Spraint	1(2)	Fresh	Fresh spraint on old slipway near Haven Marine Boatyard.	576568	569257
PG06	Spraint	1(1)	Fresh	Very fresh spraint on old quayside wall below high tide mark at Railway Quay.	576440	569385
PG07	Spraint	1(7)	Mixed age	Mixed age spraint on corner of boulder revetment south of lagoon outfall.	576333	569491
PG08	Spraint	2(5)	Mixed age	Mixed age spraint on concrete retaining wall inside tidal lagoon (near outfall).	576299	569513
PG09	Spraint	1(1)	Old	Old spraint on boulders at outfall from large tidal lagoon.	576307	569521
PG10	Spraint	1(3)	Fresh	Fresh spraint site on boulder east of outfall from tidal lagoon at Railway Quay.	575839	569721
PG11	Spraint	3(6)	Mixed age	Regular spraint sites on boulders east of outfall from tidal lagoon at Railway Quay.	575850	569721
PG12	Spraint	1(1)	Old	Single old spraint on boulder east of outfall from tidal lagoon at Railway Quay.	575838	569724

Sign no.	Type	No. spraint sites & total no. spraints in parenthesis	Age	Description	ITM x	ITM y
PG13	Spraint	3(8)	Mixed age	Regular spraint site on boulders near outfall at carpark (Robert's Bridge) area at Railway Quay.	575546	569713
PG14	Spraint	1(1)	Fresh	Spraint under boulders at Railway Quay.	575456	569695
PG15	*Holt & spraint	3(14)	Mixed age	Holt in boulder revetment above high tide mark with very regular spraint site [REDACTED]. Tunnel under boulders.	[REDACTED]	[REDACTED]
PG16	Spraint	2(6)	Mixed age	Regular spraint site west of unnamed freshwater stream on boulders at Railway Quay.	575285	569679

* **Conservation value:** Otters, along with their breeding and resting places (i.e. holts and couches respectively), are protected under provisions of the Irish Wildlife Act 1976-2021. Otters are also listed under Annex II and IV of the Habitats Directive [92/42/EEC].



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Appendix E. Waterbird Survey Report



**PASSAGE WEST PEDESTRIAN AND
CYCLE ROUTE: WATERBIRD SURVEY,
WINTER 2023/24**

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**REPORT NUMBER: 2319-F1
STATUS OF REPORT: Revision 1
DATE OF REPORT: 25 March 2024**

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SUMMARY

This report presents the results of a waterbird survey of a section of the southern shore of the Lough Mahon, and the northern section of the West Passage Channel, in Cork Harbour between December 2023 and March 2024. The objective of the survey was to contribute towards the environmental assessment of the proposed upgrade of the Passage West Pedestrian and Cycle Route.

Four low tide and two high tide counts were carried out between December 2023 and March 2024. Waterbirds were counted in four count sectors as well as in 0-300 m distance bands from the shoreline.

The survey recorded 31 waterbird species, including 16 Qualifying Interest species of the Cork Harbour SPA.

Lough Mahon supports large populations of waterbirds that feed on the extensive areas of intertidal habitat that are exposed at low tide and mainly roost in the Douglas Estuary at high tide. These waterbirds use the mudflats on the southern shore of Lough Mahon east of Hop Island as part of the overall intertidal habitat complex in Lough Mahon. The birds using these mudflats appear to be habituated to disturbance from pedestrians and cyclists on the existing greenway that runs along the shoreline.

The proposed upgrade to the Passage West Pedestrian and Cycle Route runs along the easternmost section of the southern shoreline of Lough Mahon, where the Lough Mahon mudflats narrow, and then along the confluence of Lough Mahon with the West Passage Channel where the intertidal zone is negligible. These areas did not support significant numbers of any waterbird species.

Glenbrook Bay is a small bay on the western side of the West Passage Channel just to the north of the Glenbrook Ferry Port. This area did not support significant numbers of any waterbird species.

There are no known high tide roosts in this section of Cork Harbour and no high tide roosts were recorded in these surveys. A Cormorant day roost was recorded on a concrete platform offshore from an old quay to the south of Marino Point. A large Herring Gull night roost was recorded in the West Passage Channel on one count which coincided with dusk.

1. INTRODUCTION

1.1. SCOPE OF REPORT

This report presents the results of a waterbird survey of a section of the southern shore of the Lough Mahon, and the northern section of the West Passage Channel, in Cork Harbour between December 2023 and March 2024.

The survey was commissioned by Atkins to contribute towards the environmental assessment of the proposed upgrade of the Passage West Pedestrian and Cycle Route.

1.2. SURVEY DATA

The full survey data is included in the database that accompanies this report. Details of this database are provided in Appendix 1.

1.3. STATEMENT OF COMPETENCE

All the survey work, data analysis and assessment presented in this report was carried out by Tom Gittings.

Tom Gittings is an ecologist with 28 years' experience in professional consultancy work and research. Tom specialises in ecological surveying, monitoring and evaluation, ecological impact assessment, habitat management, and avian, invertebrate, wetland and woodland ecology. He is currently working as an independent ecological consultant. His previous experience includes working for the RPS Group (a multi-disciplinary environmental consultancy) and carrying out research into forest and wetland biodiversity in the Department of Zoology, Ecology and Plant Science at University College Cork. He has a BSc (Hons) and a PhD in Ecology and is a member of the Chartered Institute of Ecology and Environmental Management and has extensive professional experience in project management and ecological assessment. His recent consultancy work includes assessments for planning applications (including Appropriate Assessments, Environmental Impact Statements, and expert witness work at oral hearings), large-scale habitat surveys, preparation of management plans, contributions to multi-disciplinary conservation plans, and specialist ecological survey and research.

2. METHODOLOGY

2.1. SURVEY AREA AND COUNT SECTORS

I defined a survey area that covered the section of Lough Mahon and the West Passage Channel adjacent to the Passage West Pedestrian and Cycle Route, as well as the section of Lough Mahon to the west of the western end of the route and the section of the West Passage Channel to the south of the southern end of the route (Map 2.1). This survey area included all the intertidal habitat on the southern shore of Lough Mahon and in the West Passage Channel between Hop Island and Glenbrook. In Lough Mahon, the survey area extended out to the navigation channel.

I divided the survey area into four count sectors (Map 2.1). Two of the sectors comprised the tidal habitat on the southern side of Lough Mahon east of Hop Island (RW and RE). The other two sectors comprised the tidal habitat in the northern half of the West Passage Channel (PN and PS). The RE sector was divided into eastern and western sections (Map 2.1) with the eastern section representing the part of the sector that is adjacent to the proposed upgrade of the Passage West Pedestrian and Cycle Route.

I used navigation buoys to define the outer limits of the RW, RE and PN (western section) sectors, and a bearing line to a navigation buoy to define the boundary between the RW and RE sectors of these sectors. The boundary between the RE and PN sector was defined by the eastern edge of the car park on the Rochestown Road. The boundary between the PN and PS sector was defined by the start of the quay behind Passage West library. The southern boundary of the PS sector was defined by the ramp at the Glenbrook Ferry Port. The PN sector included the impounded tidal pools on the southern / western side of the greenway.

In addition to the above four tidal sectors, I also covered a section of fields on the southern side of the Rochestown Road where it turns inland (Map 2.1; FIELDS).

The RW and RE sectors were also covered in my waterbird surveys for the Passage Railway Greenway project, where they were called the HIE and PA sectors (Gittings, 2021b), while the PN sector was also covered in my waterbird surveys for the Carrigaline to Glenbrook / Ringaskiddy Greenway project (Gittings, 2021a). The outer boundaries of the RE and PN sectors were designed to match those of sectors that I have previously surveyed on the northern side of Lough Mahon (Gittings, 2022, 2023b).

The sectors also show a broad correspondence to those used for the NPWS Waterbird Survey Programme Cork Harbour counts (Cummins and Crowe, 2011). The differences between the respective boundaries were due to divisions of subsites that I used to provide count sectors relevant to the present survey, definitions of the sectors that followed the morphology of the tidal habitat, and/or use of clearly defined features to demarcate the boundaries (Table 2.1).

Table 2.1. Correspondence between the count sectors used in this survey, and the subsites used for the NPWS Waterbird Survey Programme Cork Harbour counts.

WSP subsite	Count sectors from this survey	Notes
0L537	RW and RE	The western boundary of the RW sector extended around 150 m west of 0L537 boundary to the shoreline of Hop Island. The eastern boundary of the RE sector was defined by the edge of the car park. The outer boundary of the 0L537 subsite is poorly defined. The outer boundaries of the RW and RE were defined by the Douglas Estuary tidal channel and the navigation channel.
0L510 (south)	PM	The 0L510 subsite extends to the northern shoreline of Lough Mahon. The PS sector covered the section of this subsite to the south of the navigation channel.
0L532 (north)	PS	The 0L532 subsite covers the full length of the West Passage Channel. The PS sector covered the northern half of this subsite.

2.2. SURVEY DATES AND TIMINGS

I carried out monthly low tide counts between December 2023 and March 2024, and high tide counts in January and February 2024 (Table 2.2). Each count was carried out during the three-hour periods centred on high tide or low tide, as appropriate (Table 2.2).

Table 2.2. Survey dates and timings.

Month	Date	Tide	Start time	Finish time	HT/LT time
Dec	13/12/2023	LT	10:47	13:03	11:53
Jan	24/01/2024	LT	10:15	12:36	11:16
Jan	24/01/2024	HT	15:23	17:00	16:50
Feb	12/02/2024	LT	12:29	14:47	13:38
Feb	19/02/2024	HT	12:09	13:53	13:29
Mar	22/03/2024	LT	09:22	11:21	10:44

Tide times are the predicted times for Cork City from the UKHO tide tables.

2.3. SURVEY METHODS

I carried out the counts of the RW, RE and PN sectors by cycling along the greenway and stopping as required to count. I counted the PS sector from vantage points on the eastern shore at the northern and southern ends of the sector. I counted the FIELDS sector from the adjacent section of the greenway.

I counted birds separately in each sector. I also classified birds by the tidal zone in which they occurred (subtidal, intertidal, supratidal, or terrestrial; see Lewis and Tierney, 2014) and behaviour (Table 2.3). In the RW, RE and PN sectors, I counted birds separately in the following distance bands from the shoreline: 0-50 m, 50-100 m, 100-200 m, 200-300 m and > 300 m. On the high tide surveys, I also counted birds separately at each high tide roost location. In the RE sector, I counted birds separately in the eastern and western sub-divisions. In the PS sector, I counted birds separately in the two discrete areas of intertidal habitat: the bay on the eastern shore south of Marino Point, and the bay on the western shore at Glenbrook (Map 2.1).

I mapped the locations of significant flocks.

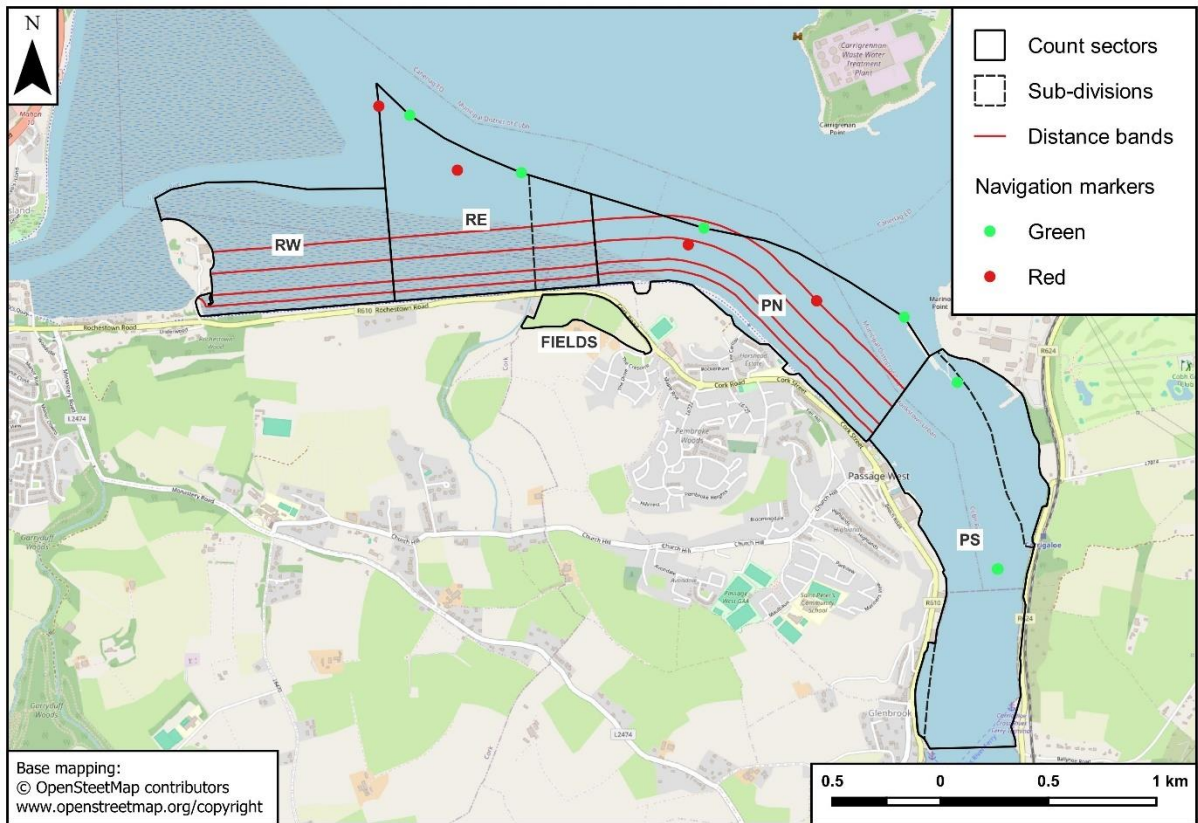
On the low tide counts, I mapped the extent of exposure of intertidal habitat in each sector.

I used a laser rangefinder (Leupold RX-1300i TBR) to measure distances, for the purposes of distance band classification and mapping tidal exposure.

I recorded potentially disturbing activities and impacts using the disturbance recording protocol from Lewis and Tierney (2014). I did not record pedestrian or cyclist activity on the greenway, or pedestrians and traffic on the roads along the edges of the PS sector. These activities occurred on every count and did not produce observable disturbance responses.

Table 2.3. Behavioural categories used for the waterbird survey.

Category	Behaviour
F	Feeding
R	Non-feeding behaviour, excluding Y1, Y2 and H categories
Y1	Flying bird that is using the sector: e.g., a bird that was present in the site, but flew off before its behaviour could be categorised
Y2	Flying bird that is not using the sector: e.g., a bird commuting across the sector
H	Bird flushed by the observer before its behaviour was categorised



Map 2.1. Survey area and count sectors.

3. SURVEY RESULTS

3.1. TIDAL EXPOSURE

Over 300 m of intertidal habitat was exposed in most / all of the RW sector on each low tide count (Map 3.1). The width of the intertidal habitat narrowed in the RE sector, with only around 200 m exposed during the January and March counts (Map 3.1).

The tideline reached the shoreline in the westernmost section of the PN sector (Map 3.1). In the remainder of the PN sector, there was minimal exposure of intertidal habitat. There was around 20-30 m exposed on the December and February counts, less than 10 m exposed on the March count, and no intertidal habitat exposed on the January count (except at the extreme southern end).

In the PS sector, the only significant exposure of soft sediment intertidal habitat was in the bay to the south of Marino Point (Marino Point Bay; Map 3.2) and in the bay on the western shore at Glenbrook (Glenbrook Bay; Map 3.2). During the low tide counts, the width of the intertidal habitat exposed in Marino Point Bay varied from around 60 – 120 m, while the width of intertidal habitat exposed in Glenbrook Bay varied from around 40 – 60 m. To the south of Marino Point Bay, a strip of littoral rock intertidal habitat around 30 m wide was exposed on the eastern shore during the low tide counts.

3.2. OVERALL WATERBIRD NUMBERS

I recorded 16 Qualifying Interest species and another 15 non-Qualifying Interest waterbird species (Table 3.1 and Table 3.2). The most abundant species were Dunlin and Black-headed Gull while Teal, Black-tailed Godwit and Herring Gull numbers were also high in a Cork Harbour context.

3.3. SECTOR DISTRIBUTION

The distribution of dabbling ducks between the sectors varied across the counts (Figure 3.1). On the January and February low tide counts, the highest numbers occurred in the RE and/or RW sectors, which mainly involved Teal feeding along the tideline. In the February low tide count, relatively high numbers were also recorded in the PS sector: these were Teal feeding in the bay on the eastern shore to the south of Marino Point. Much lower numbers were recorded on the December and March low tide counts and on all the high tide counts.

The highest numbers of diving waterbirds occurred in the PN sector, which partly reflected the fact that this sector had a very narrow intertidal zone. The main species involved were Cormorant and Shag. Note that Cormorants roosting at Marino Point are excluded from the totals in Figure 3.1 (see Section 3.5).

Very small numbers of herons and egrets (Grey Heron and Little Egret) were recorded, and they were widely distributed across the sectors (Figure 3.1).

The waders mainly occurred in the RE and RW sectors at low tide (Figure 3.1). These were the only sectors with significant areas of intertidal habitat. The higher numbers on the January and February low tide counts were due to the presence of large Dunlin flocks. The numbers recorded at high tide in all the sectors were very small due to the absence of any high tide roosts. On the December low tide count, a mixed flock of 28 Oystercatchers, 45 Curlews and 153 Black-tailed Godwits were recorded in the FIELDS sector, but there were no waders in this sector on any of the other counts.

High numbers of gulls usually occurred in the PS sector and, on some counts, in the RE and/or RW sectors. The commonest species was Black-headed Gull, which was mainly recorded feeding on intertidal habitat in the RE and RW sectors, and in the bay to the south of Marino Point in the PS sector. In the PS sector, there was a high count of 231 Herring Gulls on the December high tide count, which represented a nocturnal roost (see Section 3.5).

3.4. DISTANCE BAND DISTRIBUTION

Figure 3.2 shows that, in the low tide counts of the RE and RW sectors, most waders and gulls were widely distributed across the distance bands, with no evidence of avoidance of the distance bands close to the greenway. Note that the 0-50 m and 50-100 m distance bands contained less intertidal habitat than the 100-200 m and 200-300 m distance bands, while the > 300 m distance bands contained variable amounts of intertidal habitat depending on the tideline alignment. The numbers of the other waterbird groups were generally too small, or too variable, for consistent patterns to emerge (but see below).

In my analysis of the waterbird surveys that I carried out for the Passage Railway Greenway project (Gittings, 2021b), I examined the distance band distribution of selected species in the RW sector (called the HIE sector in that report) on ebb/flood tides in relation to the availability of intertidal habitat. In most cases there was again no evidence of avoidance of areas close to the greenway, and, in fact, some species showed higher than expected numbers in the 0-50 m distance band.

At low tide, the diving waterbirds mainly occurred in the > 300 m distance band, reflecting the distribution of subtidal habitat at low tide (Figure 3.2). However, while at high tide, subtidal habitat occupied all the distance bands, the diving waterbirds still mainly occurred in the > 300 m distance band (Figure 3.3). This reflects the pattern that I observed in the waterbird surveys along the southern shore of Little Island, when the highest densities of Cormorants and Shags occurred in the > 300 m distance band (Gittings, 2023b).

3.5. PASSAGE WEST PEDESTRIAN AND CYCLE ROUTE

The proposed upgrade on the Passage West Pedestrian and Cycle Route will run along the entire length of the PN sector and the eastern sub-division of the RE sector. The total numbers of waterbirds recorded in these sections are shown in Table 3.3. Overall numbers were low with only the gull species regularly occurring in double figures.

3.6. GLENBROOK BAY

Glenbrook Bay is a small bay on the eastern shore at the southern end of the PS sector (Map 3.2). Cork County Council requested specific information on waterbird numbers in this bay. The total numbers of waterbirds recorded in these sections are shown in Table 3.4. This bay usually held small flocks of roosting gulls, which occurred both on the intertidal and on boats moored just below the tideline. Apart from gulls, very few waterbirds occurred in this bay.

3.7. ROOSTS

There are not any previously recorded regular high tide roosts along the southern shore of Lough Mahon east of Hop Island, and in the northern section of the West Passage Channel. So, it was not surprising that I did not record any high tide roosts during the present survey.

There was a regular Cormorant day roost on a concrete platform offshore from the old quay in the bay to the south of Marino Point (Map 3.2). I recorded Cormorant roosting here on most counts with numbers varying from 24 – 37 birds. I did not record any Cormorant here on the January high tide count, but this was carried out in the late afternoon when the birds had probably departed for their night roost. I also recorded single Cormorant roosting on the Marino Point jetty on two counts; I have previously recorded large Cormorant roosts on this jetty.

On the January high tide count, I recorded a total of 217 Herring Gull in the PS sector, which is a high count for Cork Harbour; the most recent mean annual peak I-WeBS count for this species in Cork Harbour was 165 birds (Gittings, 2023a). These birds appeared to be assembling in a night roost, with birds roosting in subtidal habitat in the middle of the channel and flying around above the channel. This gull roost does not appear to have been previously recorded. The main gull roost in Cork Harbour is along the western shore of Lough Mahon, but that roost is mainly used by Black-headed Gulls and Lesser Black-backed Gulls.

There is a Great Crested Grebe night roost in the northern section of Lough Mahon (Gittings, 2017). However, this roost occurs to the north of the navigation channel. I did not record any evidence of roosting Great Crested Grebes in the sectors that I covered during the present survey, and, in fact, overall numbers of Great Crested Grebes were low.

Table 3.1. Total counts of Qualifying Interest waterbird species.

Species	Tide	Dec	Jan	Feb	Mar
Shelduck	HT	-	13	0	-
	LT	11	35	21	25
Wigeon	HT	-	5	11	-
	LT	2	2	4	2
Teal	HT	-	0	14	-
	LT	19	56	111	5
Red-breasted Merganser	HT	-	4	0	-
	LT	0	5	0	0
Cormorant	HT	-	4	47	-
	LT	28	34	31	23
Grey Heron	HT	-	1	3	-
	LT	0	6	6	1
Great Crested Grebe	HT	-	1	0	-
	LT	2	3	0	0
Oystercatcher	HT	-	2	1	-
	LT	50	49	46	18
Curlew	HT	-	3	4	-
	LT	109	51	73	1
Black-tailed Godwit	HT	-	0	0	-
	LT	161	11	83	304
Bar-tailed Godwit	HT	-	0	0	-
	LT	0	42	3	0
Dunlin	HT	-	0	0	-
	LT	2	903	1317	0
Redshank	HT	-	9	2	-
	LT	16	15	24	16
Black-headed Gull	HT	-	352	42	-
	LT	239	494	604	45
Common Gull	HT	-	18	54	-
	LT	31	80	63	10
Lesser Black-backed Gull	HT	-	52	4	-
	LT	17	33	85	22

High tide counts were not carried out in December or March.

Table 3.2. Total counts of other waterbird species.

Species	Tide	Dec	Jan	Feb	Mar
Mallard	HT	-	0	0	-
	LT	0	6	2	0
Shag	HT	-	0	1	-
	LT	6	0	4	3
Little Egret	HT	-	0	2	-
	LT	1	3	1	3
Turnstone	HT	-	4	8	-
	LT	0	2	40	3
Herring Gull	HT	-	231	15	-
	LT	38	51	69	112
Great Black-backed Gull	HT	-	4	5	-
	LT	9	7	5	7

High tide counts were not carried out in December or March. Additional species: Mute Swan (2 records), Long-tailed Duck (1 record), Great Northern Diver (2 records), Moorhen (1 record), Greenshank (1 record), Black Guillemot (2 records), Mediterranean Gull (2 records), Yellow-legged Gull (2 records), and Iceland Gull (1 record).

Table 3.3. Waterbird counts in the sections of the survey area corresponding to the proposed upgrade of the Passage West Pedestrian and Cycle Route.

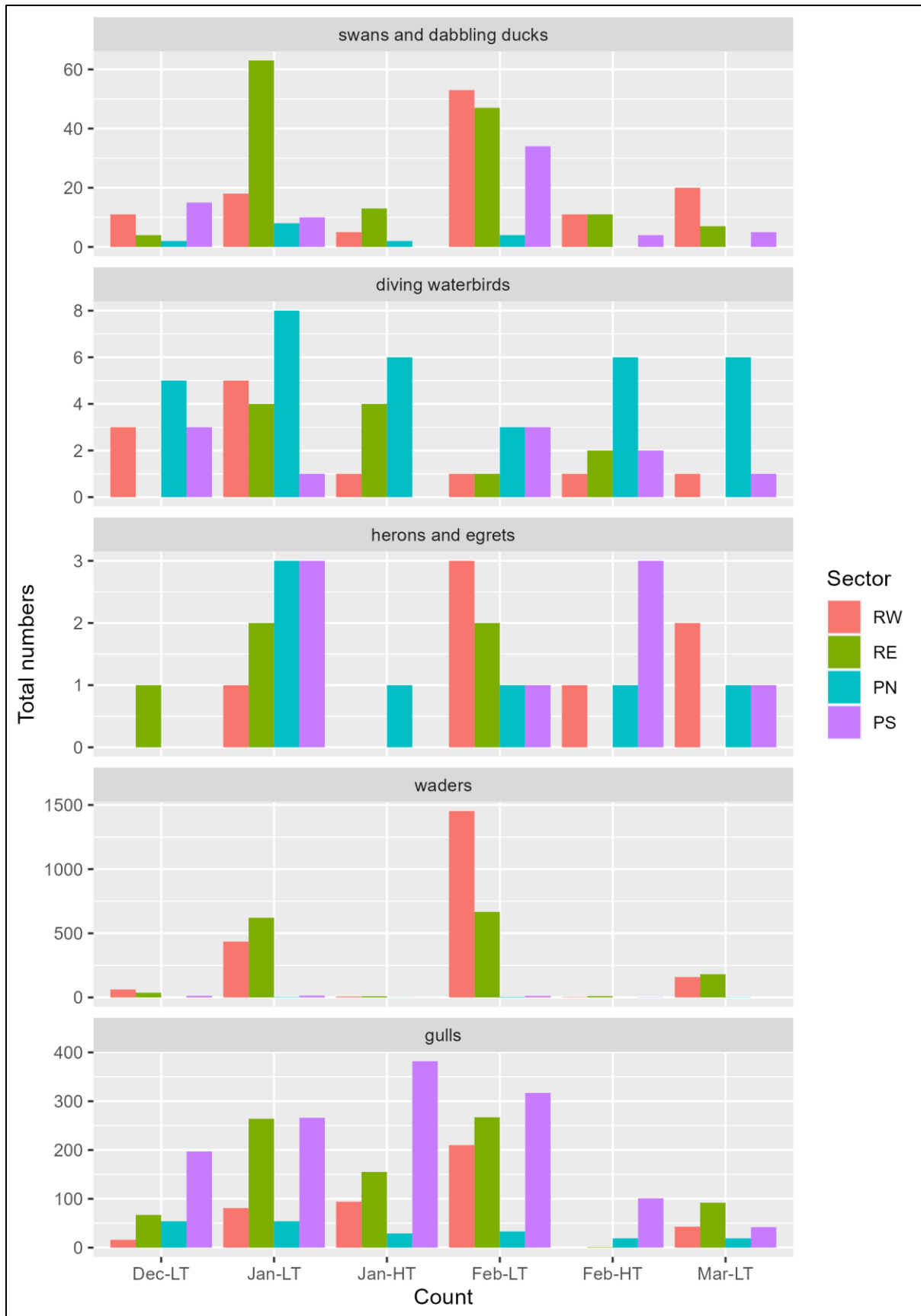
Species	Dec LT	Jan HT	Jan LT	Feb HT	Feb LT	Mar LT
Mute Swan	0	2	0	0	0	0
Wigeon	2	0	2	0	4	2
Mallard	0	0	6	0	0	0
Red-breasted Merganser	0	4	2	0	0	0
Great Northern Diver	0	0	1	0	0	0
Cormorant	1	3	6	7	2	3
Shag	5	0	0	0	2	3
Little Egret	0	0	2	1	0	1
Grey Heron	0	1	1	0	1	0
Great Crested Grebe	0	0	1	0	0	0
Moorhen	0	0	0	0	0	1
Oystercatcher	0	0	1	0	1	0
Curlew	1	0	3	0	3	0
Black-tailed Godwit	0	0	0	0	0	12
Turnstone	0	4	2	8	1	3
Redshank	1	0	2	0	1	0
Black Guillemot	0	1	1	0	0	0
Black-headed Gull	59	21	26	11	13	14
Mediterranean Gull	0	1	0	0	0	0
Common Gull	0	4	15	0	6	7
Lesser Black-backed Gull	2	0	11	1	28	0
Herring Gull	9	12	17	5	21	11
Great Black-backed Gull	0	2	0	2	1	0

The area covered by the counts included in this table were the PN sector and the eastern sub-division of the RE sector.

Table 3.4. Waterbird counts in Glenbrook Bay.

Species	Dec LT	Jan HT	Jan LT	Feb HT	Feb LT	Mar LT
Shag	0	0	0	1	0	0
Oystercatcher	1	0	0	0	0	0
Curlew	0	0	0	0	1	0
Redshank	0	0	0	1	1	0
Black-headed Gull	46	0	24	17	20	0
Common Gull	28	0	33	7	17	0
Lesser Black-backed Gull	1	0	0	0	1	0
Herring Gull	0	0	4	6	5	1
Yellow-legged Gull	0	0	0	1	0	0

The area covered by the counts included in this table were the intertidal zone in Glenbrook Bay and the subtidal zone extending out to around 150 m from the shoreline.



The diving waterbirds totals do not include Cormorant roosting on the Marino Point jetty and quay in the PS sector (see text).

Figure 3.1. Distribution between sectors of the total numbers of waterbird groups recorded on each count.

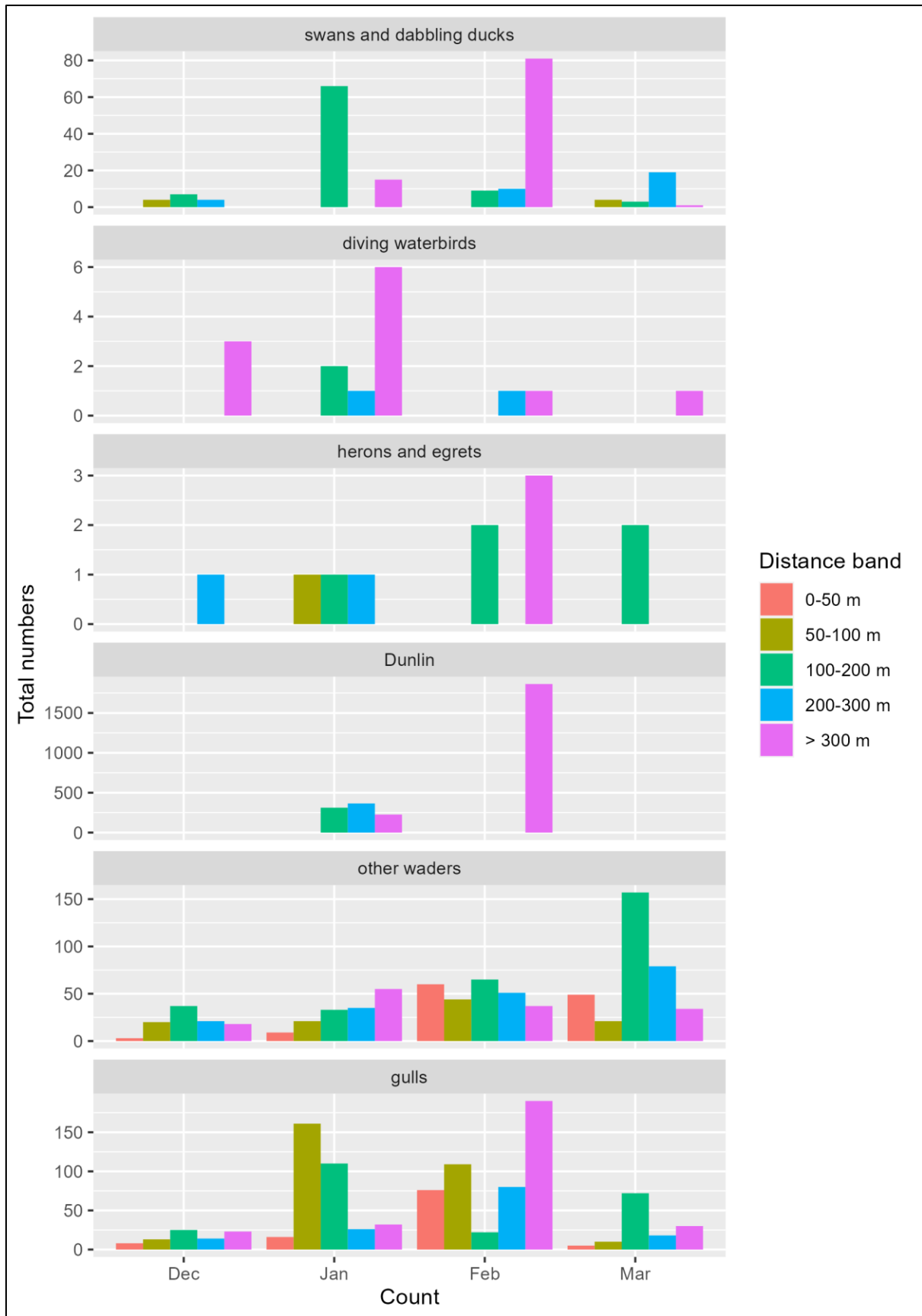


Figure 3.2. Distance band distribution on the low tide counts in the RE and RW sectors.

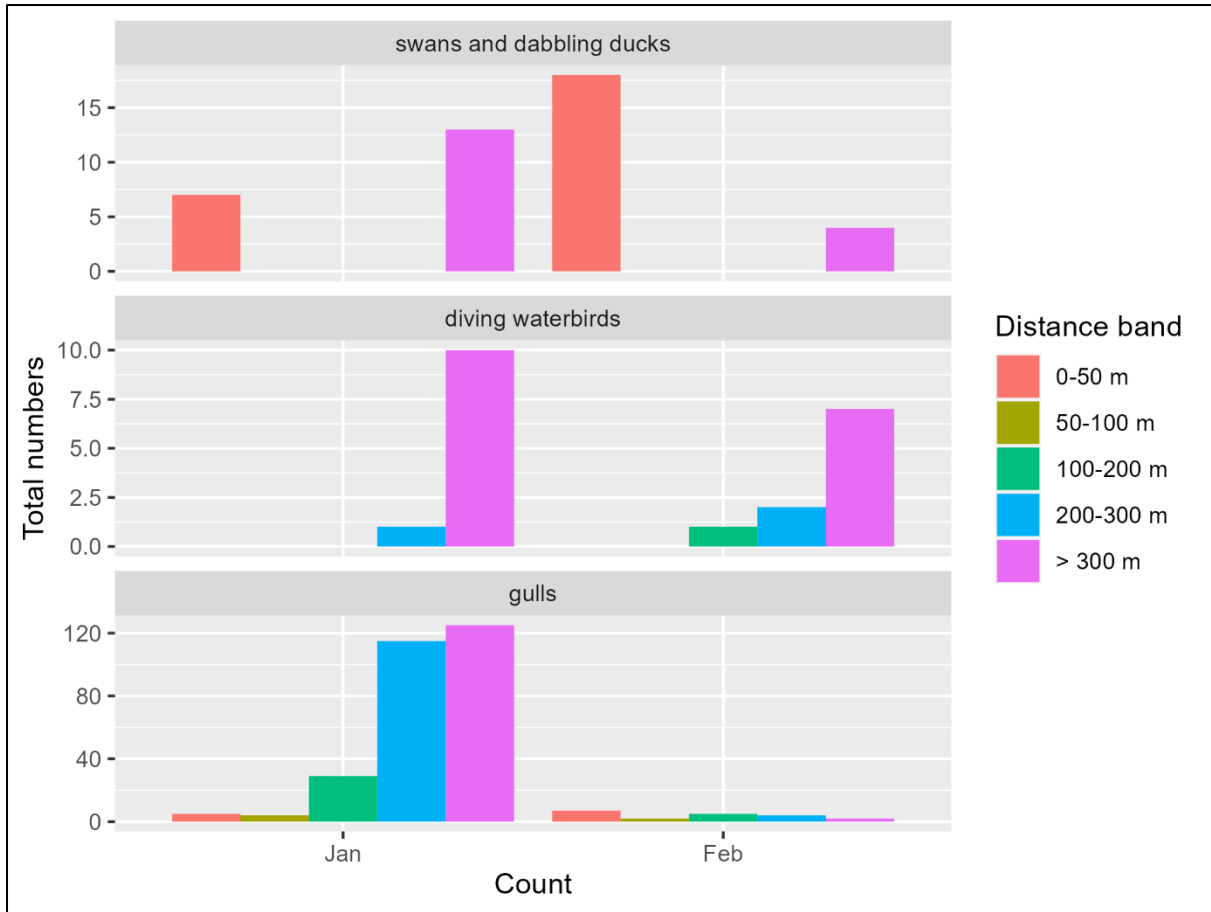
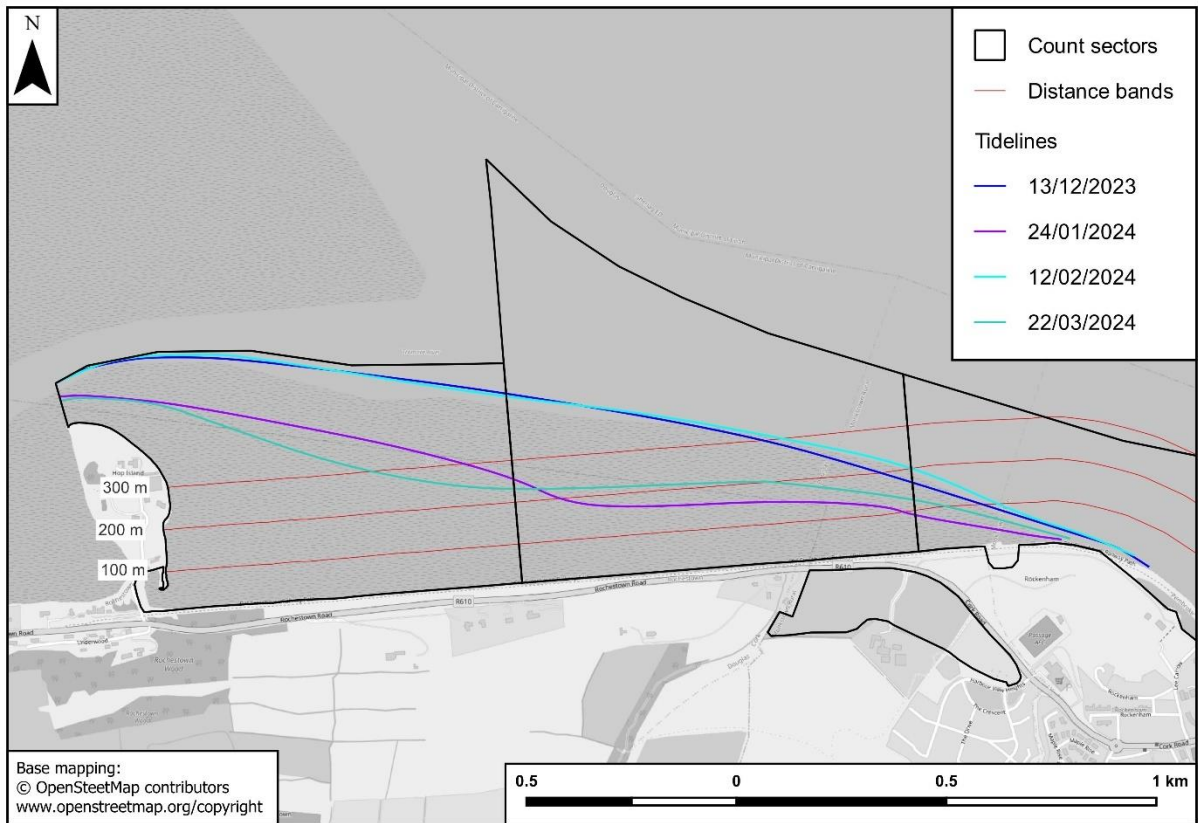
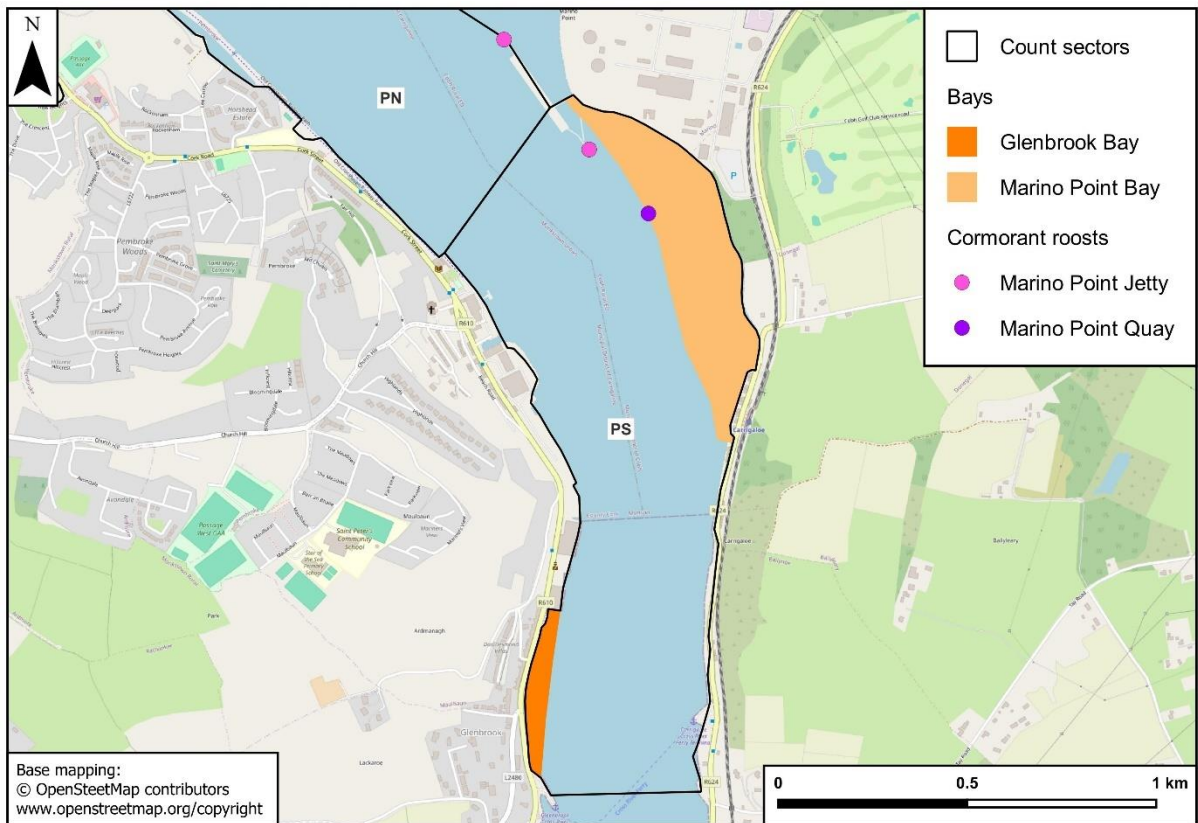


Figure 3.3. Distance band distribution on the high tide counts in the RE, RW and PN sectors.



Map 3.1. Tidelines in the RW, RE and PN (western end) count sectors during the low tide counts.



Map 3.2. Locations of Glenbrook and Marino Point Bays, and the Cormorant roosts.

4. CONCLUSIONS

Lough Mahon supports large populations of waterbirds that feed on the extensive areas of intertidal habitat that are exposed at low tide and mainly roost in the Douglas Estuary at high tide. These waterbirds use the mudflats on the southern shore of Lough Mahon east of Hop Island as part of the overall intertidal habitat complex in Lough Mahon. The birds using these mudflats appear to be habituated to disturbance from pedestrians and cyclists on the existing greenway that runs along the shoreline.

The proposed upgrade to the Passage West Pedestrian and Cycle Route runs along the easternmost section of the southern shoreline of Lough Mahon, where the Lough Mahon mudflats narrow, and then along the confluence of Lough Mahon with the West Passage Channel where the intertidal zone is negligible. These areas did not support significant numbers of any waterbird species.

Glenbrook Bay is a small bay on the western side of the West Passage Channel just to the north of the Glenbrook Ferry Port. This area did not support significant numbers of any waterbird species.

There are no known high tide roosts in this section of Cork Harbour and no high tide roosts were recorded in these surveys. A Cormorant day roost was recorded on a concrete platform offshore from an old quay to the south of Marino Point. A large Herring Gull night roost was recorded in the West Passage Channel on one count which coincided with dusk.

REFERENCES

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Appendix 1 Waterbird survey datasets

WATERBIRD SURVEY DATA TABLES ACCOMPANYING THIS REPORT

Filename: PWPCR_2023_24_count_data.csv		
Contents: Waterbird count data		
Field	Data type	Details
Date	Date	Count date
Tide	Text	HT = high tide LT = low tide
Sector	Text	Count sector
Division	Text	Sub-divisions of the RE and PS sectors E = eastern sub-division of RE sector W = western sub-division of RE sector GL = Glenbrook Bay in the PS sector MPB = Marino Point Bay in the PS sector
Distance	Text	Distance band from the shoreline: 0 = 0-50 m 50 = 50-100 m 100 = 100-200 m 200 = 200-300 m 300 = > 300 m X = not assessed Note: distance bands were not recorded for the PS sector or for birds with behaviour classified as Y2
Zone	Text	INT = intertidal SUB = subtidal SUP = supratidal TERR = terrestrial AQU = terrestrial (aquatic) See Lewis and Tierney (2014) for definitions
Roost	Text	Code identifying Cormorant roost locations: MPQ = Marino Point quay MPJ = Marino Point jetty
Species	Text	BTO species code Mammals: OTTE = Otter
Number	Integer	Species count
Behaviour	Text	F = feeding R = roosting H = flushed Y1 = flying (included in count totals) Y2 = flying (not included in count totals)
Quality	Text	Count quality: OK or LOW
DC_count	Text	Overall count double-count: YES or NO
DC_sector	Text	Sector double count: YES or NO
DC_distance	Text	Distance band double-count: YES or NO
Ref	Integer	Identifier for cross-referencing to flock maps
Notes	Text	Free-form field for any additional notes: e.g., location details, movements, behaviour, etc.

Filename: PWPCR_2023_24_count_details.csv		
Contents: Waterbird count timings and conditions		
Field	Data type	Details
Date	Date	Count date
Tide	Text	HT = high tide LT = low tide
Sector	Text	Count sector
Time_start	Time	Start time of sector count
Time_finish	Time	End time of sector count
Cloud	Integer	Cloud cover during count: 1 = 0-33% 2 = 34-66% 3 = 67-100%
Rain	Integer	Rainfall during count: 1 = no rain 2 = light showers/drizzle 3 = heavy shows/rain 4 = heavy rain
Wind_direction	Text	Compass bearing
Wind_speed	Integer	Beaufort scale
Visibility	Integer	Visibility during count: 1 = good 2 = moderate 3 = poor 4 = very poor
Waterbirds	Text	YES = waterbirds recorded NO = no waterbirds recorded
Notes	Text	Free-form field for any relevant additional details: e.g., further details when reduced visibility was recorded

WATERBIRD SURVEY GIS DATASETS ACCOMPANYING THIS REPORT

Filename: PWPCR_2023_24_count_sectors_polygon.shp		
Contents: Count sector boundaries		
Field	Data type	Details
Code	Text	Count sector code
Sector	Text	Count sector name

Filename: PWPCR_2023_24_count_sector_divisions_polygon.shp		
Contents: Count sector boundaries		
Field	Data type	Details
Code	Text	Count sector code
Sector	Text	Count sector name
Division	Text	Sub-division used in counts

Filename: PWPCR_2023_24_distance_bands_polyline.shp		
Contents: Distance bands from the shoreline		
Field	Data type	Details
Distance_m	Integer	Distance from the shoreline (m)

Filename: PWPCR_2023_24_tidelines_polyline.shp		
Contents: Low tide tidelines		
Field	Data type	Details
Date	Date	Count date

Filename: PWPCR_2023_24_flocks_polygon.shp		
Contents: Low tide tidelines		
Field	Data type	Details
Date	Date	Count date
Ref	Integer	Identifier for cross-referencing to count data

REFERENCE

Lewis, L.J. & Tierney, T.D. (2014). Low Tide Waterbird Surveys: Survey Methods and Guidance Notes. Irish Wildlife Manuals, No. 80. National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht, Ireland.

Appendix F. Breeding Bird Survey Results (Ryan Hanley)



Appendix 1

Breeding Bird survey data

Table 1. Breeding bird survey April visit (Early Visit)

Transect Number	Bird Species	BTO Code	0-25m	25-100m	>100m	Flying (F)	Number in total
1	Magpie	MG	1				1
	Wren	WR		1			1
	Cormorant	CA	1			1	1
	Blackbird	B.	1				1
	Wren	WR		1			1
	Rook	RO	1				1
	Cormorant	CA			1	1	1
	Robin	R.		1			1
	Wren	WR		2			2
	Rook	RO			20		20
	Woodpigeon	WP		1			1
	Wren	WR		1			1
	Jay	J.			1		1
	Goldfinch	GO	1				1
	Rook	RO	1				1
	Blackbird	B.	1			1	1
	Robin	R.		1			1
	Blackcap	BC		1			1
Wren	WR		1			1	
2	Rook	RO	1				1
	Wren	WR	1				1
	Dunnock	D.	1				1
	Woodpigeon	WP	1				1
	Chiffchaff	CC	1				1
	Jay	J.		1			1
	Blackcap	BC		1			1
	Robin	R.	1				1
	Chiffchaff	CC		2			2
	Jay	J.			1		1
	Robin	R.		1			1
	Wren	WR		1			1
	Rook	RO			5		5
	Chiffchaff	CC		1			1
	Woodpigeon	WP			1		1
	Blackbird	B.		1			1
	Blackcap	BC		1			1
	Turnstone	TT	1				1
	Robin	R.	2			2	2
	Wren	WR		1			1
Robin	R.			1		1	
3	Woodpigeon	WP	2				2
	Dunnock	D.		1			1
	Robin	R.		1			1

	Rook	RO			1		1
	Wren	WR		1			1
	Chiffchaff	CC	1				1
	Robin	R.		1			1
	Chiffchaff	CC			1		1
	Blackbird	B.	2				2
	Woodpigeon	WP	1				1
	Rook	RO	2			2	2
	Chiffchaff	CC	1				1
	Herring gull	HG			4	4	4
	Woodpigeon	WP			1		1
	Dunnock	D.		1			1
	Chiffchaff	CC		1			1
	Blackcap	BC		1			1
	Robin	R.		1			1
	Dunnock	D.		1			1
	Chiffchaff	CC			1		1
	Rook	RO			1		1
	Woodpigeon	WP	1				1
	Dunnock	D.		1			1
	Robin	R.		1			1
	Woodpigeon	WP			1		1
4	Chiffchaff	CC	1				1
	Blackcap	BC	1				1
	Dunnock	D.		1			1
	Woodpigeon	WP		2			2
	Robin	R.	1				1
	Wren	WR	1				1
	Chiffchaff	CC		1			1
	Wren	WR		1			1
	Rook	RO			1		1
	Chiffchaff	CC	1				1
	Blackcap	BC		1			1
	Robin	R.	1				1
	Chiffchaff	CC			1		1
	Wren	WR		1			1
	Chaffinch	CH	1				1
	Jackdaw	JD			1		1
	Chaffinch	CH		1			1
	Robin	R.		1			1
	Blackcap	BC	1				1
	Chiffchaff	CC		1			1
	Woodpigeon	WP			2		2
	Wren	WR		1			1
	Dunnock	D.		1			1
	Robin	R.	1				1

	Chaffinch	CH		1			1
	Robin	R.		1			1
	Woodpigeon	WP			1		1
	Woodpigeon	WP	1				1
	Wren	WR		1			1
	Blackcap	BC		1			1
5	Wren	WR		1			1
	Dunnock	D.		1			1
	Robin	R.		1			1
	Woodpigeon	WP			1		1
	Blackcap	BC		1			1
	Chiffchaff	CC			1		1
	Wren	WR		1			1
	Blackcap	BC		1			1
	Wren	WR			1		1
	Woodpigeon	WP	1				1
	Song thrush	ST			1		1
	Robin	R.	1				1
	Blackcap	BC		1			1
	Blue tit	BT		1			1
	Chaffinch	CH		1			1
	Song thrush	ST		1			1
	Chiffchaff	CC		1			1
	Willow warbler	WW		1			1
	Goldfinch	GO			1		1
	Robin	R.		1			1
	Robin	R.			1		1
	Song thrush	ST			1		1
	Robin	R.	1				1
Dunnock	D.		1			1	
Chiffchaff	CC		1			1	
House sparrow	HS			1		1	
6	Chiffchaff	CC		1			1
	Robin	R.	1				1
	Dunnock	D.		1			1
	Wren	WR		1			1
	Jackdaw	JD			1		1
	Herring gull	HG	2			2	2
	Blue tit	BT		1			1
	Robin	R.	1				1
	Wren	WR		1			1
	Jackdaw	JD			2		2
	Goldfinch	GO			1		1
	Grasshopper warbler	GH		1			1
	Blue tit	BT		1			1
	Robin	R.	1				1

	Goldfinch	GO			1		1
	Goldfinch	GO		1			1
	Jackdaw	JD			1		1
	Robin	R.	1				1
	Song thrush	ST		1			1
	Grasshopper warbler	GH			1		1
	Great tit	GT	1				1
	Goldfinch	GO		1			1
	Blue tit	BT	1				1
	Great tit	GT	1				1
	Great tit	GT		1			1
	Woodpigeon	WP	1				1
	Robin	R.		1			1
	Robin	R.	1				1
	Grasshopper warbler	GH		1			1
	Robin	R.	2			2	2
	Chaffinch	CH		1			1
	Rook	RO		1		1	1
	Chiffchaff	CC			1		1
7	Chiffchaff	CC	1				1
	Wren	WR	1				1
	Chiffchaff	CC		1			1
	Wren	WR	1				1
	Goldfinch	GO		1			1
	Teal	T.	2				2
	Wren	WR		1			1
	Woodpigeon	WP			1		1
	Jackdaw	JD		1			1
	Wren	WR	1				1
	Woodpigeon	WP			1		1
	House sparrow	HS		4			4
	Robin	R.	1				1
	Goldfinch	GO			1		1
	Collared dove	CD			1		1
	Chiffchaff	CC		1			1
	Jackdaw	JD			1	1	1
	Wren	WR		2			2
	Wren	WR		1			1
	Jackdaw	JD	1			1	1
	Robin	R.		1			1
	Chiffchaff	CC			1		1
8	Wren	WR		1			1
	Jackdaw	JD			1		1
	House sparrow	HS		1			1
	Hooded crow	HC			1		1
	House sparrow	HS	4			4	4

	Starling	SG		5		5	5
	House sparrow	HS		10			10
	Woodpigeon	WP		1			1
	Wren	WR	1				1
	Robin	R.		1			1
	Starling	SG		1			1
	Blackcap	BC		2			2
	House sparrow	HS		4			4
	Wren	WR		1			1
	Starling	SG		1			1
	Wren	WR	1				1
	House sparrow	HS	1				1
9	House sparrow	HS		1			1
	Wren	WR	1				1
	Starling	SG		1			1
	Robin	R.	1				1
	Robin	R.		1			1
	Robin	R.	1				1
	Jackdaw	JD		1			1
10	Chiffchaff	CC		1			1
	Wren	WR		1			1
	Chiffchaff	CC		1			1
	Robin	R.	1				1
	Jackdaw	JD				1	1
	Chiffchaff	CC				1	1

Table 2 - Breeding bird survey May visit (Late visit)

Transect Number	Bird Species	BTO Code	0-25m	25-100m	>100m	Flying (F)	Number in total
1	Cormorant	CA	1				1
	Wren	WR		1			1
	Blue tit	BT	1				1
	Magpie	MG		1			1
	Jackdaw	JD				1	1
	Robin	R.	1				1
	Rook	RO		1			1
	Blackcap	BC		1			1
	Rook	RO				8	8
	Blackbird	B.	1				1
	Mistle thrush	M.		1			1
	Blackbird	B.		1			1
	Wren	WR		1			1
	Hooded crow	HC	2				2
	Magpie	MG	1				1
Chiffchaff	CC		1			1	

	Magpie	MG	1				1
	Grey wagtail	GL	1				1
	Blackcap	BC		1			1
	Wren	WR		1			1
	Hooded crow	HC	1				1
	Goldfinch	GO	1				1
	Hooded crow	HC	5			5	5
	Blackbird	B.	1				1
	Cormorant	CA		1			1
	Goldfinch	GO	1				1
	Wren	WR		1			1
	Hooded crow	HC		1			1
	Woodpigeon	WP	2			2	2
	Chiffchaff	CC			1		1
2	Woodpigeon	WP		1			1
	Hooded crow	HC		1			1
	Blackbird	B.		1			1
	Magpie	MG			1		1
	Blue tit	BT	1				1
	Chiffchaff	CC		1			1
	Woodpigeon	WP			1		1
	Goldcrest	GC		1			1
	Jackdaw	JD			1		1
	Wren	WR		1			1
	Woodpigeon	WP	1				1
	Wren	WR		1			1
	Robin	R.		1			1
	Woodpigeon	WP			2		2
	Robin	R.	1				1
	Woodpigeon	WP		2		2	2
	Blackbird	B.	1				1
	Wren	WR		1			1
	Long-tailed tit	LT		1			1
	Herring gull	HG			1	1	1
	Wren	WR		1			1
3	Woodpigeon	WP			1		1
	Wren	WR		1			1
	Teal	T.	1				1
	Duncock	D.		1			1
	Woodpigeon	WP			1	1	1
	Long-tailed tit	LT		1			1
	Woodpigeon	WP	1			1	1
	Blackbird	B.		1			1
	Woodpigeon	WP			1		1
	Woodpigeon	WP			1		1
	Woodpigeon	WP		1			1

	Wren	WR		1			1
	Woodpigeon	WP			1		1
	Long-tailed tit	LT		1			1
	Magpie	MG			1	1	1
	Cormorant	CA			1	1	1
	Robin	R.		1			1
	Bullfinch	BF		1			1
	Dunnock	D.		1			1
	House sparrow	HS		3			3
	Hooded crow	HC			1	1	1
4	House sparrow	HS		1			1
	Bullfinch	BF		1			1
	Chaffinch	CH		1			1
	Dunnock	D.		1			1
	Hooded crow	HC	1			1	1
	Blackbird	B.			1		1
	Chaffinch	CH		1			1
	Woodpigeon	WP	1			1	1
	Jackdaw	JD			1		1
	Woodpigeon	WP			1		1
	Woodpigeon	WP	1			1	1
	Common Tern	CN		1		1	1
	Chaffinch	CH	1				1
	Woodpigeon	WP	1				1
	Wren	WR		1			1
	Robin	R.		1			1
	Blackbird	B.			1		1
5	Woodpigeon	WP	1				1
	Robin	R.		1			1
	Jackdaw	JD			1		1
	Woodpigeon	WP	1				1
	Wren	WR		1			1
	Hooded crow	HC			1	1	1
	Chaffinch	CH	1				1
	Wren	WR		1			1
	Robin	R.		1			1
	House sparrow	HS	1				1
	Chaffinch	CH	1				1
	Robin	R.	1				1
	Wren	WR		1			1
	Rook	RO		1			1
	Herring gull	HG			1	1	1
	Wren	WR		1			1
6	Chaffinch	CH		1			1

	Wren	WR		1			1
	Blackbird	B.	1				1
	House sparrow	HS	1				1
	Chaffinch	CH	3			3	3
	Teal	T.	2			2	2
	House sparrow	HS		1			1
	House sparrow	HS	1				1
	House sparrow	HS		5			5
	Wren	WR		1			1
	Chaffinch	CH	1				1
	House sparrow	HS		1			1
	Hooded crow	HC		1		1	1
	Woodpigeon	WP	2			2	2
7	Woodpigeon	WP		1			1
	House sparrow	HS		1			1
	Wren	WR		1			1
	Jackdaw	JD		1			1
	Woodpigeon	WP			2	2	2
	House sparrow	HS			1		1
	Woodpigeon	WP	1				1
	Woodpigeon	WP	1			1	1
	Woodpigeon	WP			1		1
	Hooded crow	HC		1			1
	Blackbird	B.		1			1
	Cormorant	CA			1		1
	Robin	R.		1			1
	Woodpigeon	WP			1		1
	House sparrow	HS		1			1
	Chaffinch	CH	1				1
	Jackdaw	JD	1			1	1
8	Woodpigeon	WP			1		1
	Jackdaw	JD		1			1
	Rook	RO			1		1
	Chaffinch	CH		1			1
	House sparrow	HS		1			1
	Woodpigeon	WP			1		1
	Wren	WR		1			1
	Robin	R.		1			1
	Chaffinch	CH		1			1

	Blackbird	B.	1				1
	Woodpigeon	WP	1				1
	Woodpigeon	WP	1			1	1
	Jackdaw	JD		1		1	1
9	Chaffinch	CH	4				4
	Woodpigeon	WP			1		1
	Woodpigeon	WP	1			1	1
	Jackdaw	JD		1		1	1
	House sparrow	HS	1				1
	Jackdaw	JD	1			1	1
	Chaffinch	CH	1				1
	Wren	WR		1			1
	House sparrow	HS		1			1
	Chaffinch	CH	1				1
10	Jackdaw	JD	1			1	1
	Wren	WR		1			1
	Chiffchaff	CC		1			1
	Woodpigeon	WP			1	1	1
	Chaffinch	CH	1				1
	Blackbird	B.		1			1
	Jackdaw	JD		1			1
	House martin	HM		2		2	2
Woodpigeon	WP			1		1	

Dunnoek	0	0	2	1	0	0	0	0	0	0	3
Chiffchaff	2	1	0	0	0	0	0	0	0	1	4
Herring gull	0	1	0	0	1	0	0	0	0	0	2
Chaffinch	0	0	0	3	2	5	1	2	6	1	20
Jackdaw	1	1	0	1	1	0	2	2	2	2	12
Blue tit	1	1	0	0	0	0	0	0	0	0	2
House sparrow	0	0	3	1	2	9	3	1	2	0	21
Teal	0	0	1	0	0	2	0	0	0	0	3
Hooded crow	9	1	1	1	1	1	1	0	0	0	15
Mistle thrush	1	0	0	0	0	0	0	0	0	0	1
Grey wagtail	1	0	0	0	0	0	0	0	0	0	1
Goldcrest	0	1	0	0	0	0	0	0	0	0	1
Long-tailed tit	0	1	2	0	0	0	0	0	0	0	3
Bullfinch	0	0	1	1	0	0	0	0	0	0	2
Common Tern	0	0	0	1	0	0	0	0	0	0	1
House martin	0	0	0	0	0	0	0	0	0	2	2

Table 5 – Summary table including Early and Late Breeding bird survey data & conservation status.

Common Name	Scientific name	Total n. in April	Breeding Status recorded in April	Total n. in May	Breeding Status recorded in May	Conservation status – Green, Amber & Red listed species
Magpie	<i>Pica pica</i>	1	S	5	S,F	Green
Wren	<i>Troglodytes troglodytes</i>	33	S	21	S	Green
Cormorant	<i>Phalacrocorax carbo</i>	2	F	4	F	Amber
Blackbird	<i>Turdus merula</i>	5	S,F	12	S,FL	Green
Rook	<i>Corvus frugilegus</i>	34	S,H,F	11	H,F	Green
Robin	<i>Erithacus rubecula</i>	35	S,H,F	10	H,S	Green
Woodpigeon	<i>Columba palumbus</i>	21	S,H	39	H,S,F	Green
Jay	<i>Garrulus glandarius</i>	3	S	0	-	Green
Goldfinch	<i>Carduelis carduelis</i>	8	S,H	2	S	Green
Blackcap	<i>Sylvia atricapilla</i>	12	H,S	2	H	Green
Dunnoek	<i>Prunella modularis</i>	10	S,H	3	S	Green
Chiffchaff	<i>Phylloscopus collybita</i>	26	H	4	H	Green

Turnstone	<i>Arenaria interpres</i>	1	Fo.	0	-	Green
Herring gull	<i>Larus argentatus</i>	6	F	2	F	Amber
Chaffinch	<i>Fringilla coelebs</i>	5	H,S	20	S,FL	Green
Jackdaw	<i>Corvus monedula</i>	11	F,S	12	H,F	Green
Song thrush	<i>Turdus philomelos</i>	4	S	0	-	Green
Blue tit	<i>Cyanistes caeruleus</i>	4	S,H	2	S,H	Green
Willow warbler	<i>Phylloscopus trochilus</i>	1	S	0	-	Green
House sparrow	<i>Passer domesticus</i>	26	S,F	21	H,S	Amber
Grasshopper warbler	<i>Locustella naevia</i>	3	S	0	-	Amber
Great tit	<i>Parus major</i>	3	S,H	0	-	Green
Teal	<i>Anas crecca</i>	2	Fo.*	3	Fo.	Amber
Collared dove	<i>Streptopelia decaocto</i>	1	S	0	-	Green
Hooded crow	<i>Corvus cornix</i>	1	H	15	H,F	Green
Starling	<i>Sturnus vulgaris</i>	8	S,F	0		Amber
Mistle thrush	<i>Turdus viscivorus</i>	0	-	1	S	Green
Grey wagtail	<i>Motacilla cinerea</i>	0	-	1	H	Red
Goldcrest	<i>Regulus regulus</i>	0	-	1	S	Green
Long-tailed tit	<i>Aegithalus caudatus</i>	0	-	3	H	Green
Bullfinch	<i>Pyrrhula pyrrhula</i>	0	-	2	S	Green
Common Tern	<i>Sterna hirundo</i>	0	-	1	F	Amber
House martin	<i>Delichon urbicum</i>	0	-	2	F	Amber

*Fo. – Foraging

Transect 1- This transect is located at the most western section of the proposed works route. It is surrounded by treelines and grassy verges to the south and grassy verges and the estuary habitat to the north. Birds exhibiting breeding activity, primarily singing males or the presence of species in suitable nesting habitat, within this transect included a range of common passerine and corvids species including magpie, jay, wren, blackbird, rook, robin, blackcap, mistle thrush, goldfinch and chiffchaff. The proposed works footprint along transect 1 and its immediate environs do not provide suitable breeding habitat for waterbird species.

Transect 2- This transect is located following on from Transect 1, with the Passage West Greenway carpark to the south, followed by treelines and broadleaved woodland. Treelines, grassy verges and estuarine habitat is to the north of this transect. Birds exhibiting breeding activity, primarily singing males or the presence of species in suitable nesting habitat, within this transect included similar species to Transect 1, woodpigeon, hooded crow, blackbird, magpie, blue tit, chiffchaff, goldcrest,

jackdaw, jay, wren, robin and long-tailed tit. The proposed works footprint along transect 2 and its immediate environs do not provide suitable breeding habitat for waterbird species.

Transect 3- This transect is located following on from Transect 2, with broadleaved woodland habitat to the south and treelines, broadleaved woodland, grassy verges and estuarine habitat to the north. Birds exhibiting breeding activity, primarily singing males or the presence of species in suitable nesting habitat, within this transect included similar species to Transect 1 & 2, woodpigeon, dunnock, robin, wren, chiffchaff, blackbird, blackcap, rook, long-tailed tit and bullfinch. The proposed works footprint along Transect 3 and its immediate environs do not provide suitable breeding habitat for waterbird species.

Transect 4- This transect is located following on from Transect 3, with broadleaved woodland habitat to the south and treelines and estuarine habitats to the north. Birds exhibiting breeding activity, primarily singing males or the presence of species in suitable nesting habitat, within this transect included chiffchaff, blackcap, dunnock, woodpigeon, robin, wren, rook, jackdaw, bullfinch and chaffinch. The common tern was recorded flying on the estuary side of the transect. The proposed works footprint along Transect 4 and its immediate environs do not provide suitable breeding habitat for waterbird species, but common terns can be found nesting/breeding on the other side of the estuary.

Transect 5- This transect is located following on from Transect 4, with treeline, grassy verges and sea inlets and bays habitat to the south and grassy verges, treelines and estuarine habitats to the north. Birds exhibiting breeding activity, primarily singing males or the presence of species in suitable nesting habitat, within this transect included wren, dunnock, robin, woodpigeon, blackcap, song thrush, blue tit, chaffinch, willow warbler, goldfinch, house sparrow, jackdaw and rook.

Transect 6- This transect is located following on from Transect 5, with treeline, grassy verges and sea inlets and bays habitat to the south and grassy verges, treelines and estuarine habitats to the north. Birds exhibiting breeding activity, primarily singing males or the presence of species in suitable nesting habitat, within this transect included chiffchaff, robin, dunnock, wren, jackdaw, blue tit, goldfinch, song thrush, grasshopper warbler, great tit, woodpigeon, blackbird, house sparrow, and chaffinch. Teal was recorded foraging within the sea inlet and bays habitat.

Transect 7- This transect is located following on from Transect 6, with treeline, grassy verges and sea inlets and bays habitat to the south and estuarine habitat to the north. Birds exhibiting breeding activity, primarily singing males or the presence of species in suitable nesting habitat, within this transect included chiffchaff, wren, goldfinch, woodpigeon, jackdaw, house sparrow, robin, blackbird, collared dove and hooded crow. Teal was again recorded foraging within the sea inlet and bays habitat, further east. Cormorant was recorded foraging within the estuarine habitat. The proposed works footprint along Transect 7 and its immediate environs do not provide suitable breeding habitat for waterbird species. Most breeding waterbird species breed further west, outside the proposed works route or on the opposite site of the estuary.

Transect 8- This transect is located following Transect 7, with grassy verges, treelines and parkland/amenity grassland to the south and estuarine habitat to the north. Birds exhibiting breeding activity, primarily singing males or the presence of species in suitable nesting habitat, within this transect included wren, jackdaw, house sparrow, hooded crow, woodpigeon, robin, starling, blackcap, rook, chaffinch, and blackbird. Transect 8 and its immediate environs do not provide suitable breeding habitat for waterbird species.

Transect 9- This transect follows on from Transect 8, with amenity grassland, parkland, treelines and built land (car park) to the south and estuarine habitat to the north. Birds exhibiting breeding activity, primarily singing males or the presence of species in suitable nesting habitat, within this transect included house sparrow, wren, starling, robin, jackdaw, chaffinch and woodpigeon. Transect 9 and its immediate environs do not provide suitable breeding habitat for waterbird species.

Transect 10- This transect follows on from Transect 9, with amenity grassland, parkland, treelines and built land (carpark, café and buildings) to the south and estuarine habitat and built land (pier) to the south. Birds exhibiting breeding activity, primarily singing males or the presence of species in suitable nesting habitat, within this transect included chiffchaff, wren, robin, jackdaw, woodpigeon and blackbird. House martins were recorded flying overhead in this transect, it is assumed they may be nesting/breeding within the surrounding built land. Transect 10 and its immediate environs do not provide suitable breeding habitat for waterbird species.

Breeding Status Codes

Non-breeding	
F	Flying over
M	Species observed but suspected to be still on M igration
U	Species observed but suspected to be sU mmering non-breeder
Possible breeder	
H	Species observed in breeding season in suitable nesting H abitat
S	S inging male present (or breeding calls heard) in breeding season in suitable breeding habitat
Probable breeding	
P	P air observed in suitable nesting habitat in breeding season
T	Permanent T erritory presumed through registration of territorial behaviour (song etc) on at least two different days a week or more part at the same place or many individuals on one day
D	Courtship and D isplay (judged to be in or near potential breeding habitat; be cautious with wildfowl)
N	Visiting probable N est site
A	A gitated behaviour or anxiety calls from adults, suggesting probable presence of nest or young nearby
I	Brood patch on adult examined in the hand, suggesting I ncubation
B	Nest B uilding or excavating nest-hole
Confirmed breeding	
DD	D istraction- D isplay or injury feigning
UN	U sed N est or eggshells found (occupied or laid within period of survey)
FL	Recently F Ledged young (nidicolous species) or downy young (nidifugous species). Careful consideration should be given to the likely provenance of any fledged juvenile capable of significant geographical movement. Evidence of dependency on adults (e.g. feeding) is helpful. Be cautious, even if the record comes from suitable habitat.
ON	Adults entering or leaving nest-site in circumstances indicating O ccupied N est (including high nests or nest holes, the contents of which can not be seen) or adults seen incubating
FF	Adult carrying F aecal sac or F ood for young
NE	N est containing E ggs
NY	N est with Y oung seen or heard

Figure 1. Breeding bird Status Codes.

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