ARUP

Cork County Council

Carrigaline Transportation and Public Realm Enhancement Plan (TPREP) – Phase 1b

Ecological Impact Assessment

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Ove Arup & Partners Limited
Bedford House
3rd Floor
16-22 Bedford Street
Belfast BT2 7FD
United Kingdom
arup.com

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1. Introduction

1.1 Overview

Ove Arup and Partners Ltd have been commissioned by Cork County Council to undertake an Ecological Impact Assessment (EcIA) of the Carrigaline Transportation and Public Realm Enhancement Plan (TPREP) in Carrigaline, County Cork, hereby referred to as the 'Proposed Development'.

The Proposed Development currently comprises a widening of footpaths, construction of cycling paths and creation of public realm space.

1.2 Scope of Report

The purpose of this assessment is to quantify and evaluate the potential effects of the development on habitats, species and ecosystems. This involves an assessment of the habitats present within the footprint of the works, the potential for the site to support protected species, the need for further surveys and reporting and to make recommendations for mitigation and enhancement (if appropriate) to be incorporated into the Proposed Scheme.

The report is written with reference to the Guidelines for Ecological Impact Assessment in the UK and Ireland[1], and Guidelines for Ecological Report Writing[2].

1.3 Structure of Report

The report follows the following structure:

- Section 1 provides an introduction to the Proposed Scheme and purpose of this assessment;
- Section 2 outlines legislation, policy and guidance material for the purposes of this assessment;
- Section 3 provides information on the data and methodology used in the desk study and field survey and the methodology to value the ecological receptors as well as to assess impacts;
- Section 4 reports the baseline information and survey results and assesses the value of ecological receptors within the study area;
- Section 5 outlines the likely impacts of the construction and operational phases of the scheme
- Section 6 assesses the likely impacts and effects of the scheme on ecological receptors before and after mitigation measures are applied and what mitigation measures are required;
- Section 7 outlines additional measures that should be taken so the project delivers a Biodiversity Net Gain;
- Section 8 outlines what monitoring is required to ensure recommended measures are carried out; and
- Section 9 summarises the findings of the assessment.

1.4 Statement of Competency

This report was prepared by Conor McKinney, a Senior Ecologist with Arup. Conor has 15 years' experience as an ecologist with the public, private and third sector. His range of experience includes carrying out various ecological surveys and assessments including Ecological Impact Assessments (EcIA), Appropriate

[1] Chartered Institute of Ecology and Environmental Management (CIEEM) (2018) Guidelines for Ecological Impact Assessment in the UK and Ireland Terrestrial, Freshwater, Coastal and Marine (September 2018)

[2] Chartered Institute of Ecology and Environmental Management (CIEEM) (2018) Guidelines for Ecological Report Writing, Second Edition (December 2018).

Assessments (AAs), Environmental Statements and species specific surveys and reporting incorporating the majority of Fifth Schedule and European Protected Species, as well as a range of notable species. Conor has a BSc (Hons) in Environmental Science and a MSc (Distinction) in Ecological Management and Conservation Biology and is a full member of the Chartered Institute of Ecology and Environmental Management (CIEEM).

This report has been reviewed by Donncha Madden (BSc, PGDip, MCIEEM, CEcol) who is a Senior Ecologist at Arup. Donncha has over 20 years' experience in EcIA, including AAs, throughout the island of Ireland. Donncha has prepared EcIAs, AA Reports and EIAR Biodiversity Chapters for a variety of projects and plans from local to national scale.

This report has been reviewed by Fraser Maxwell (BSc, MSc, MCIEEM, CEnv). Fraser is an Associate Director consultant at Arup, leading the Nature team for Arup's North and North West and Yorkshire Region (Belfast, Leeds, Manchester, Glasgow, Edinburgh, and Newcastle offices) with over 23 years' experience carrying out EcIAs and over 15 years of undertaking AAs. He is an experienced leader of technical projects including high profile projects and has provided expertise internationally. Fraser is a member of the Scottish CIEEM Committee.

2. Legislation, Planning Policy and Guidance

2.1 Legislation

A number of legislative acts, directives and international conventions aim to conserve biodiversity and nature conservation interest in Ireland. Relevant legislation and international agreements are listed below:

- The Bonn Convention;
- The Bern Convention;
- The Convention on Biological Diversity (CoP15);
- The Habitats Directive (Council Directive 92/43/EEC);
- The Water Framework Directive (Directive 2000/60/EC);
- The Birds Directive (Directive 2009/147/EC);
- EU Regulation on Invasive Alien Species (1143/2014);
- Wildlife Acts 1976 to 2021;
- The European Communities (Birds and Natural Habitats Regulations 2011 (S. I. No. 477 of 2011);
- Heritage Act 2018 (no.15 of 2018), Part 3;
- Planning and Development Acts 2000 to 2019; and
- Flora (Protection) Order 2022.

These pieces of legislation include offences relating to protected species, habitats and designated sites and requirements for mitigation and licences to allow construction works to proceed. The EC Birds and Natural Habitats Regulations set out the requirement for the consideration of the potential effects of a proposed development on Special Areas of Conservation (SACs) and Special Protection Areas (SPAs).

For the purposes of this report, all sites designated as an SAC or SPA shall be referred to as a Natura 2000 site.

2.2 Planning Policy

2.2.1 Statutory Planning Policy

2.2.1.1 Project Ireland 2040 – National Planning Framework

The National Planning Framework (NPF) is the Irish Government's high-level strategic plan for shaping the future growth and development of Ireland to the year 2040. It is a framework to guide public and private investment, to create and promote opportunities for the country's citizens, and to protect and enhance the environment. Two objectives are directly relevant to the Proposed Development.

Table 1. Relevant Policy Objectives Project Ireland 2040.

National Policy Objective 59
Enhance the conservation status and improve the management of protected areas and protected species by: • Implementing relevant EU Directives to protect Ireland's environment and wildlife; • Integrating policies and objectives for the protection and restoration of biodiversity in statutory development plans; • Developing and utilising licensing and consent systems to facilitate sustainable activities within Natura 2000 sites; • Continued research, survey programmes and monitoring of habitats and species.
National Policy Objective 60
Conserve and enhance the rich qualities of natural and cultural heritage of Ireland in a manner appropriate to their significance.

2.2.1.2 Cork County Development Plan

The relevant local planning policies have been extracted from the Cork County Development Plan 2022, specifically Volume 1 – Chapter 12: Transport and Mobility and Volume 1 - Chapter 15: Biodiversity and Environment).

Transport Demand Management

Liveable Towns

Active travel infrastructure includes hard measures such as infrastructure design (foot and cycle paths) as well as measures such as safety, attractive environment, greening of routes and a high quality public realm. Some locations, due to their sensitivity, might not accommodate minimum active travel standards such as minimum cycleway widths. This may be due to environmental, nature conservation, landscape or other heritage considerations. The identification, design and construction of new cycling and walking routes will be subject to an Ecological Impact Assessment at the project inception stage.

Managing Local Authority Developments and Projects

Cork County Council is a significant developer within the county and is responsible for delivering new housing and infrastructure projects, sustainable transport networks and projects to improve the public realm of towns and villages. The Council also supports tourism, recreational and amenity projects including the development of new greenways and blueways, many of which are located within areas of high biodiversity value. As a developer, Cork County Council has a responsibility to ensure that new development it progresses is carried out in a manner which is sustainable and does not harm our natural resources.

Table 2a. Relevant Policy Objectives Cork County Development Plan.

County Development Plan Objective
BE15-4: Local Authority Development and Projects
a) Ensure that biodiversity protection is considered at design stage for works and development planned and progressed by Cork County Council and that all such projects comply with nature conservation legislation and policy as required; b) Fulfil Appropriate Assessment and Environmental Impact Assessment requirements and carry out Ecological Impact Assessment in relation to Local Authority plans and projects as appropriate.
b) Fulfil Appropriate Assessment and Environmental Impact Assessment requirements and carry out Ecological Impact Assessment in relation to Local Authority plans and projects as appropriate.

Biodiversity Considerations for New Development or Other Activities

Cork County Council has a significant role to play in the protection of biodiversity through its roles in the management and control of new development as well as its roles in licensing discharges to water courses and issuing waste management permits. This role emanates from legal requirements as set out in planning and nature conservation legislation which provide strict protection to European and nationally important sites, wetlands, protected species as well as protection to features of the countryside which act as ecological stepping stones linking designated areas. The Planning Authority has produced a useful guidance document 'Biodiversity and the Planning Process – guidance for developments on the management of biodiversity issues during the planning process'.

Table 2b. Relevant Policy Objectives Cork County Development Plan.

County Development Plan Objective
BE15-6: Biodiversity and New Development
Provide for the protection and enhancement of biodiversity in the development management process and when licensing or permitting other activities by: *a) Providing ongoing support and guidance to developers on incorporating biodiversity considerations into new development through preplanning communications and the Council's guidance document 'Biodiversity and the Planning Process – guidance for developments on the management of biodiversity issues during the planning process' and any updated versions of this advice;* *b) Encouraging the retention and integration of existing trees, hedgerows and other features of high natural value within new developments;* *c) Requiring the incorporation of primarily native tree and other plant species, particularly pollinator friendly species in the landscaping of new developments;* *d) Fulfilling Appropriate Assessment and Environmental Impact Assessment obligations and carrying out Ecological Impact Assessment in relation to development and activities, as appropriate;* *e) Ensuring that an appropriate level of assessment is completed in relation to wetland habitats subject to proposals which would involve drainage or reclamation. This includes lakes and ponds, watercourses, springs and swamps, marshes, heath, peatlands, some woodlands as well as some coastal and marine habitats;* *f) Ensuring that the implementation of appropriate mitigation (including habitat enhancement, new planting or other habitat creation initiatives) is incorporated into new development, where the implementation of such development would result in unavoidable impacts on biodiversity - supporting the principle of biodiversity net gain*

2.2.2 Non-Statutory Planning Policy

2.2.2.1 Ireland's 4 National Biodiversity Action Plan (NBAP)

Ireland's 4th National Biodiversity Action Plan (NBAP) will set the national biodiversity agenda for the period 2023-2027 and aims to deliver the transformative changes required to the ways in which we value and protect nature. While the Plan is currently out for consultation it has the following objectives:

1) Adopt a Whole of Government, Whole of Society Approach to Biodiversity;
2) Meet Urgent Conservation and Restoration Needs;
3) Secure Nature's Contribution to People;
4) Embed Biodiversity at the Heart of Climate Action;
5) Enhance the Evidence Base for Action on Biodiversity

This plan will operate across statutory and non-statutory policy realms.

2.2.2.2 The All-Ireland Pollinator Plan 2021-2025

The All-Ireland Pollinator Plan 2021-2025 has been adapted by many statutory and non-statutory bodies throughout the island of Ireland, including Cork County Council and promotes the importance of native pollinator species and habitats in Ireland.

2.3 Guidance

The guidance used in the preparation of this report is listed below:

- CIEEM - Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater and Coastal[3];
- Department of Environment, Housing and Local Government - Appropriate Assessment of Plans and Projects in Ireland - Guidance for Planning Authorities[4];
- European Commission - Assessment of plans and projects significantly affecting Natura 2000 sites[5];
- Environment Protection Agency - Guidelines on the Information to be Contained in Environmental Impact Assessment Reports 2017[6];
- European Commission Guidance on the Preparation of the EIA Report (2017)[7] as well as the European Commission Guidance on Integrating Climate Change and Biodiversity into Environmental Impact Assessment (2013)[8];
- Fossitt - A Guide to Habitats in Ireland. Heritage Council[9];
- European Commission - Managing Natura 2000 Sites. Guidance document on Article 6(4) of the Habitats Directive 92/43/EEC (EC, 2018)[10];
- Heritage Council - Best Practice Guidance for Habitat Survey and Mapping - Heritage Council[11]; and
- NRA - Guidelines for Assessment of Ecological Impacts of National Road Schemes[12].

[3] CIEEM (2018) Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater and Coastal, 2nd Edition

[4] Department for Environment, Housing and Local Government. (2010). Appropriate Assessment of Plans and Projects in Ireland - Guidance for Planning Authorities

[5] European Commission (2002) Assessment of plans and projects significantly affecting Natura 2000 sites;

[6] Environment Protection Agency Guidelines on the Information to be Contained in Environmental Impact Assessment Reports 2017;

[7] European Commission, Directorate-General for Environment, McGuinn, J., Lukacova, Z., McNeill, A. et al., *Environmental impact assessment of projects – Guidance on the preparation of the environmental impact assessment report (Directive 2011/92/EU as amended by 2014/52/EU)*, Publications Office, 2017, **https://data.europa.eu/doi/10.2779/41362**

[8] European Commission, Directorate-General for Environment, *Guidance on integrating climate change and biodiversity into environmental impact assessment*, Publications Office, 2013, **https://data.europa.eu/doi/10.2779/11735**

[9] Fossitt, J. (2000) A Guide to Habitats in Ireland. The Heritage Council.

[10] European Commission. (2019). Managing Natura 2000 Sites. The Provisions of Article 6 of the 'Habitats' Directive 92/43/EEC. Commission Notice C 92018) 7621 Final, Brussels.

[11] Smith, G.F., O'Donoghue, P., O'Hora, K. and E. Delaney (2011) Best Practice Guidance for Habitat Survey and Mapping. The Heritage Council

[12] NRA (2009) Guidelines for Assessment of Ecological Impacts of National Road Schemes. Dublin: National Roads Authority. Available at: http://www.nra.ie/Environment/

3. Methodology

This EcIA has been undertaken in accordance with guidance from the CIEEM[13] which states that an EcIA should include:

- identifying the zone of influence arising from the whole lifespan of the project;
- a background data search to obtain archival records of sites and species, and to gain information to focus the field surveys;
- identifying ecological features (e.g. habitats, species, ecosystems, and to gain information to focus the field surveys;
- determination of the ecological features (e.g., habitats, species, ecosystems and their functions / processes, previously known as ecological receptors) through field surveys and the background data search;
- determination of the ecological value / importance of the ecological features;
- identification of the potential impacts and assessment of effects on the integrity or conservation status of the ecological features in terms of their extent, magnitude, duration, reversibility, timing and frequency;
- identify any cumulative impacts;
- identify significant effects of impact in the absence of any mitigation;
- incorporation of ecological mitigation measures to avoid or reduce effects; and compensation measures to balance any unavoidable significant effects, and enhancement to provide net benefits for biodiversity over and above requirements for avoidance, mitigation and compensation; and
- assessment of the significance of any residual ecological effects remaining after the implementation of mitigation and compensation measures

Plant nomenclature in this report follows Stace (2019)[14] for native and naturalised species of vascular plant. Plant names in the text are given with common names first, followed by the scientific name in brackets. Where species are referred to as "priority species" this is defined as a species known to be of conservation concern (e.g. listed in a relevant red list).

Where ecological features are scoped in they may be done so on the basis of the evidence base developed in the desktop review. This process is informed by the field survey which may amend the scoping assessment depending on the judgement of the ecologist based on the likelihood of the species occurring on site, or it is considered likely to be impacted by the development.

3.1 Scope of the Assessment

The Zone of Influence (ZoI) for a project is the area over which ecological features may be subject to significant effects as a result of the proposed development and associated activities.

The proposed development is for the construction of new cycleways and a widening of footpaths within the Proposed Development area. The ZOI was based on the scope and scale of the project and the sensitivity of receiving habitats and distances were determined using the judgement of the author and the use of best practice guidance. Given the scale of this proposed development, the potential to affect off-site ecological features is moderate. As such the maximum ZoI of the proposed development upon ecological features is anticipated to be:

- International statutory designations – up to 15km from the Proposed Development;

[13] Chartered Institute of Ecology and Environmental Management (CIEEM) (2018) Guidelines for Ecological Impact Assessment in the UK and Ireland Terrestrial, Freshwater, Coastal and Marine (September 2018)

[14] Stace, C.A. (2013). A New Flora of the British Isles (3rd Edition). C&M Floristics, Middlewich Green.

- National statutory and non-statutory designations – up to 2km from the Proposed Development;
- EU Annex I habitat – up to 500m from the Proposed Development;
- Protected and notable fauna – up to 2km from the Proposed Development; and

3.2 Desk Study

A desk study was undertaken on the 4th July and 30th August 2023 which included a review of available information to determine the baseline conditions in the Study Area. The following data sources have been reviewed:

- Google Maps aerial photography;
- National Biodiversity Data Centre (NBDC) species records[15];
- National Parks and Wildlife Service (NPWS) Article 17 GIS data; and
- NPWS protected sites viewer and protected sites shapefiles.

A search was carried out for information on internationally statutory designated sites within 15km, nationally statutory and non-statutory designated sites within 2km and EU Annex I habitat within 500m. A search was also carried out for records of notable species within 2km of the site. Species included in the search parameters were:

- European protected species;
- Nationally protected species;
- Species listed as Critically Endangered, Endangered or Vulnerable on the IUCN Red list;
- Birds listed as Amber or Red listed on the Birdwatch Ireland Birds of Conservation Concern;
- Nationally Red listed species;
- Local Biodiversity Action Plan priority species; and
- Invasive species listed as Species of Union Concern.

3.3 Field Survey

3.3.1 Fossitt's Habitat Survey

An extended Fossitt's habitat survey was undertaken on the 6th and 7th of July 2023 and 6th September 2023. Habitats were identified in accordance with Fossitt's Guide to Habitats in Ireland[16]. The site was surveyed in accordance with the Heritage Council's Best Practice Guidance for Habitat Survey and Mapping[17]. As part of the field survey, habitats were assessed for their potential to support protected or notable species in accordance with the CIEEM guidelines. Habitats are classified based principally on vegetation, and the survey allows for the location, extent, and distribution of these habitats to be recorded.

The occurrence of any invasive and non-native species (INNS) was recorded if identified.

As part of the field survey, habitats were also assessed for their potential to support protected or notable species in accordance with the CIEEM guidelines[18]. Habitats are classified based principally on vegetation, and the survey allows for the location, extent, and distribution of these habitats to be recorded.

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[15] Available at http://www.biodiversityireland.ie/. Accessed in August 2023

[16] https://www.npws.ie/sites/default/files/publications/pdf/A%20Guide%20to%20Habitats%20in%20Ireland%20-%20Fossitt.pdf

[17] https://www.heritagecouncil.ie/content/files/best_practice_guidance_habitat_survey_mapping_onscreen_version_2011_8mb.pdf

[18] Chartered Institute of Ecology and Environmental Management (CIEEM) (2018) Guidelines for Ecological Impact Assessment in the UK and Ireland Terrestrial, Freshwater, Coastal and Marine (September 2018)

3.3.2 Fauna

The desktop survey was used to inform site walkovers which were orientated accordingly to survey for features or indications of protected or notable species which were likely to be found on site. Examples of these features or indications are outlined below.

3.3.2.1 Amphibians

Any indications that the site might be used by notable amphibians including:

- records of amphibians on or within 2km of the site;
- ponds suitable for breeding or hibernating amphibians;
- spawn;
- suitable hibernacula;
- signs of predated amphibians e.g. carcasses or regurgitated oviducts ("star jelly"); and
- live specimens or carcasses.

3.3.2.2 Birds

Any indications that the site might be used by notable birds including:

- records of birds on or within 2km of the site;
- bird song or calls;
- signs of breeding birds such as:
    - nests;
    - bird eggs or remains;
    - breeding behaviour such as food deliveries or carrying nest materials;
- indicative whitewash i.e. raptor whitewash;
- pellets;
- signs of carcasses predated by raptors;
- live specimens or carcasses

3.3.2.3 Invertebrates

Any indications that the site might be used by notable invertebrates including:

- records of invertebrates on or within 2km of the site
- audible calls / noise e.g., stridulation;
- signs of breeding invertebrates such as:
    - web nurseries;
    - mining colonies;
    - eggs / larval forms;
- parasitoids;
- live specimens or carcasses.

3.3.2.4 Non-volant mammals

An assessment of the site was carried out to identify areas that might be used by foraging, commuting and resting non-volant mammals within the site and within a 5m buffer of the site boundary. Evidence that was systematically searched for included:

- records of non-volant mammals on or within 2km of the site
- droppings;
- vocalisations;
- mammal trails;
- feeding signs such as predated carcasses, stripped cones, snuffle holes;

- indications of nests, setts, hovers, dreys or other forms of shelter; and
- live specimens or carcasses.

3.3.2.5 Volant mammals (Bats)

The habitats within the proposed development site were examined for their potential to support bats and informed by the desktop survey. Any trees and structures within the proposed development site red line boundary were assessed for their suitability during the field survey and categorised according to their potential to support roosting bats, as outlined in the Bat Conservation Trust (BCT) best practice guidelines[19].

The trees and buildings were inspected for potential roost features (PRFs) such as:

- missing roof tiles, gables, soffits, or any other roofing material;
- gaps in, or damage to brickwork, stonework, or between roofing material;
- gaps in, or damage to window frames and door frames; and
- cracks, knot holes and other holes that have the potential to be entered by bats.

If any PRFs were identified, they would be inspected for signs of bat presence including:

- bat droppings;
- scratch and grease marks;
- live or dead bats; and
- noises of bats calling from within the roost.

- Table 3. Bat roost suitability categories, adapted from best practice guidelines[19].

Habitat Value	Roosting habitats	Commuting and foraging habitats
High suitability	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 (temp, humidity, height above ground level, light levels or levels of disturbance) and surrounding habitat.	Continuous, high-quality habitat that is well connected to the wider landscape that is likely to be used regularly by commuting bats such as river valleys, streams, hedgerows, lines of trees and woodland edge. High-quality habitat that is well connected to the wider landscape that is likely to be used regularly by foraging bats such as broadleaved woodland, tree lined watercourses and grazed parkland. Site is close to and connected to known roosts.
Moderate suitability	A structure or tree with one or more potential roost sites that could be used by bats due to their size, shelter, protection, conditions and surrounding habitat but unlikely to support a roost of high conservation status (with respect to roost type only – the assessments in this table are made irrespective of species conservation status, which is established after presence is confirmed).	Continuous habitat connected to the wider landscape that could be used by bats for commuting such as lines of trees and scrub or linked back gardens. Habitat that is connected to the wider landscape that could be used by bats for foraging such as trees, scrub, grassland or water.

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

Habitat Value	Roosting habitats	Commuting and foraging habitats
Low suitability	A structure with one or more potential roost sites that could be used by individual bats opportunistically. However, these potential roost sites do not provide enough space, shelter, protection, 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 suitability.	Habitat that could be used by small numbers of commuting bats such as a gappy hedgerow or unvegetated stream, but isolated, i.e., not very well connected to the surrounding landscape by another habitat. Suitable, but isolated habitat that could be used by small numbers of foraging bats such as a lone tree (not in a parkland situation) or a patch of scrub.
Negligible suitability	Negligible habitat features on site likely to be used by roosting bats.	Negligible habitat features on site likely to be used by commuting or foraging bats.

This assessment also included a review of Biodiversity Ireland's National Bat Landscape database based on Lundy *et al* 2011[20] Maximum Entropy modelling which provides the likelihood of finding bat species in the landscape. The habitat suitability index generated ranges from 0 to 100, with 100 being most suitable for bats.

3.3.2.6 Marine mammals

Any indications were noted that marine mammals were utilising or adjacent to the site, including:

- records of marine mammals on or within 2km of the site;
- noting any haul outs;
- vocalisations;
- recording observations of live animals or carcasses.

3.4 Hedgerow Appraisal System

An appraisal of Hedgerow (WL1) and Treeline (WL2) habitat was undertaken in accordance with best practice guidance[21]. This appraisal was undertaken to help ascertain the significance of hedgerow and treeline features and inform the impact assessment with the aim of creating an evidenced baseline of the quality of the hedgerow and treeline habitats on site and support attempts to achieve Biodiversity Net Gain as required in the Cork County Council Local Development Plan.

In this appraisal system hedgerow features are given a score between zero (low significance) and four (highly significant) to assess the importance of hedgerows for historical, woody species diversity, ground flora diversity, associated structural features and habitat connectivity and landscape significance. A score of four in any category indicates a hedge of high significance (a *Heritage Hedgerow*). Hedges can also be considered of high significance (a *Heritage Hedgerow*) if they record a cumulative score of six or greater in the Historical, Species Diversity and Structural Categories, or a cumulative score of 16- or greater over the five categories. These hedges should be considered as a high priority in terms of retention, management action, etc. Hedges recording lower scores may still be of value depending on the context.

[20] Lundy, M.G., Aughney, T., Montgomery, W.I., & Roche, N., (2011) Landscape conservation for Irish bats & species specific roosting characteristics. Bat Conservation Ireland.

[21] Foulkes et al (2013) Hedgerow Appraisal System – Best Practice Guidance on Hedgerow Surveying, Data Collation and Appraisal. Woodlands of Ireland, Dublin. https://www.woodlandsofireland.com/wp-content/uploads/hedgerow-survey.pdf

3.5 Ecological Impact Assessment

3.5.1 Site Evaluation

Site evaluation followed the methodology set out under "The Guidelines for Assessment of Ecological Impacts of National Road Schemes[22]" and the Guidelines for Ecological Impact Assessment in the UK and Ireland[23].

3.5.2 Significance Criteria

The assessment of likely significant effects as a result of the Proposed Development has taken into account the construction and operational stages. The significance level attributed to each effect has been assessed based on the magnitude of change due to the Proposed Development and has the sensitivity of the affected ecological feature. Magnitude of change and the sensitivity of the affected ecological feature are both assessed on a scale of high, medium, low and negligible. The overall significance of an effect has been determined qualitatively by measuring the magnitude of change effect against:

- The number of ecological features affected and their 'value', which will consider the scale of an effect (i.e., whether it is local of regional);
- The reversibility and duration of the effect;
- The type and sensitivity of the ecological feature affected; and
- The type of effect

3.5.2.1 Identifying and Evaluating the Value / Importance of Ecological Features

Ecological Impact Assessment (EcIA) firstly involves determining the value of ecological features / receptors with an emphasis on different aspects of ecological value including designations, biodiversity value, potential value, secondary or supporting value, social value, economic value, legal protection and multi-functional features. These values are applied to the receptors within a defined geographical context as set out in Table 4.

[22] NRA (2009) Guidelines for Assessment of Ecological Impacts of National Road Schemes. Dublin: National Roads Authority. Available at: http://www.nra.ie/Environment/

[23] CIEEM (2019) Guidelines for Ecological Impact Assessment in the UK And Ireland Terrestrial, Freshwater, Coastal and Marine September 2018 Version 1.1 - Updated September 2019.

Value of Ecological Features	Example Criteria
International importance	• European site including Special Area of Conservation (SAC), Special Protection Area (SPA), • Site that fulfils the criteria for designation as a "European Site" see Annex III of the Habitats Directive, as amended. • Features essential to maintaining the coherence of the Natura 2000 network. • Ramsar Site • World Heritage Site

National importance	• Sites designated, or proposed as a Natural Heritage Area (NHA/pNHA)
	• Statutory Nature Reserve or National Park
	• Refuge for Fauna and Flora protected under the Wildlife Acts.
	• Resident or regularly occurring populations (assessed to be important at the national level) of the following:
	  • Species protected under the Wildlife Acts; and/or
	  • Species listed on the relevant Red Data list.

County importance	• Area of Special Amenity • Area subject to a Tree Preservation Order • County important populations of species, or viable areas of semi-natural habitats or natural heritage features identified in the National or Local BAP

Local importance (higher value)	• Locally important populations of priority species or habitats or natural heritage features identified in the Local BAP, if this has been prepared;
	• Resident or regularly occurring populations (assessed to be important at the Local level) of the following:
	  • Species of bird, listed in Annex I and/or referred to in Article 4(2) of the Birds Directive;
	  • Species of animal and plants listed in Annex II and/or IV of the Habitats Directive;
	  • Species protected under the Wildlife Acts; and/or
	  • Species listed on the relevant Red Data list

Local importance (lower 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

Table 4: Ecological features evaluation criteria

It is accepted that any development will have an impact on the receiving environment, but the significance of the impact will depend on the importance of the ecological features that would be affected. The following is outlined in the CIEEM guidelines:

"*one of the key challenges in an EcIA is to decide which ecological features (habitats, species, ecosystems and their functions/processes) are important and should be subject to detailed assessment. Such ecological features will be those that are considered to be important and potentially affected by the project. It is not necessary to carry out detailed assessment of features that are sufficiently widespread, unthreatened and resilient to impacts from the development, and that will remain viable and sustainable.*"

For this report we have only assessed impacts on ecological features of Local importance or higher (refer to Table 4), or those that receive legal protection. These features are termed 'important ecological features' and are listed in Section 4.6. Impacts on features of Local Importance (Lower Value) ecological importance (e.g., amenity grasslands) that do not receive legal protection are not considered to be significant, so they are not included in the impact assessment.

Once the ecological features have been identified and their value defined, a judgement is made as to whether the Proposed Development is likely to result in impacts upon each of the identified features and, if appropriate, the nature of those impacts. Each potential ecological impact has a number of characteristics that need to be adequately described before effect significance can be assessed.

A number of key factors have been considered when describing and assessing the nature of ecological impacts, including:

Table 5: Ecological features evaluation criteria

Factors Considered Characterising Impacts

• Positive or negative impacts/effects in accordance with nature conservation objectives and policy;
• Extent (area or distance);
• Magnitude (the size of an impact i.e., departure from baseline, described in quantitative terms where possible, amount or level of effect). Definitions of the levels of magnitude of impact are described below:
  ○ High magnitude impacts include those where there is the potential to affect the integrity of a significant area by substantially changing in the long term its ecological features, structures and functions, across its whole area, which enable it to sustain the habitat, complex of habitats and/or population levels of species that makes it important;
  ○ Medium magnitude impacts include those where the ecological integrity of the site is predicted to not be adversely affected in the long term but where the project is likely to affect some, if not all, of the area's ecological features, structures and functions in the short or medium term. The site may be able to recover through natural regeneration and restoration; and
  ○ Low magnitude impacts which include those which have the potential to cause some minor impacts of limited extent to an ecological feature and/or its quality. This level of impact can include limited changes over the medium term, noticeable changes over the short term, or barely discernible changes for any length of time. Impacts at this level are often temporary in nature and the site can recover through natural regeneration.
• Duration (in time as short-term (0-2 years), medium-term (2-10 years), long-term (where the effect occurs for 10 years or more and includes permanent effects (normally greater than 25 years) or related to species' life-cycles);
• Timing and frequency/ intermittent (where the effect occurs for short periods of time and may re-occur occasionally at regular or irregular intervals, e.g. related to life cycles and breeding seasons); and
• Reversibility (whether the effect is permanent (where the effect represents a long-lasting change of an ecological feature) or temporary (where the effect occurs for a limited period of time and change at a defined ecological feature can be reversed).

Direct, indirect, residual and cumulative impacts are also considered:

Table 6: Ecological impacts considered

Impacts Considered
• Direct impacts are changes directly attributable to a defined action of the Proposed Development such as the physical loss of a habitat or the immediate mortality of an individual of a particular species; • Indirect impacts are attributable to an action which affects ecological resources through effects on an intermediary ecosystem, process or receptor, e.g. a loss of food resources for a species downstream of a site due to fish-kill by polluted runoff entering a river. • After assessing the impacts of the proposal all attempts should be made to avoid and mitigate ecological impacts. Once measures to avoid and mitigate ecological impacts have been finalised, assessment of the residual impacts should be undertaken to determine the significance of their effects on ecological features. • Cumulative impacts are the collective effects of changes that may be insignificant individually but in combination, often over time, have the potential to be significant.

Where these parameters were unknown, this has been stated.

For each potentially significant impact attempts have been made to assess the likelihood that the change will occur as anticipated and that the impact on ecological structure and function will manifest as predicted.

Wherever possible, this is based on previous evidence and applied to according to the following scale:

- Near-certain: >95% chance of occurring as predicted
- Probable: 50-95% chance of occurring as predicted
- Unlikely: 5-50% chance of occurring as predicted
- Extremely unlikely <5% chance of occurring as predicted

3.5.2.2 Significance of Effects and Geographical Scale

Once each of these factors has been considered, a judgment on the significance of the effect on a particular ecological feature is made. This significance depends on both the characteristics and magnitude of the impact and the value of the ecological feature. CIEEM states that for the purposes of EcIA a 'significant effect' is an effect that either supports or undermines biodiversity conservation objectives for 'important ecological features' or for biodiversity in general, it can be positive or negative. Significant effects encompass impacts on structure and function of defined sites or habitats and the conservation status of habitats and species and can be considered significant at a wide range of scales from international to local (CIEEM 2018).

Once an effect is identified, the geographic scale at which it will take effect is established. For example, an effect may not be significant at a national scale but may be significant at a county or local scale. All of these judgments are based, wherever possible, on quantitative evidence; however, in some cases the professional judgment of an experienced ecologist may also be required.

3.5.2.3 Mitigation Hierarchy

Where possible significant ecological effects will be avoided through careful design and the mitigation hierarchy will be applied:

- Avoidance – seek options that avoid harm to ecological features.
- Mitigation – adverse effects should be avoided or minimised through mitigation measures, either through the design of the project or subsequent measures that can be guaranteed. Mitigation is relevant for negative impacts assessed as being potentially significant (before mitigation) or where required to ensure compliance with legislation.
- Compensation – where there are significant residual adverse ecological effects despite the mitigation proposed, these should be offset by appropriate compensatory measures.
- Enhancements – seek to provide net benefits for biodiversity over and above requirements for avoidance, mitigation or compensation.

3.6 Assumptions and Limitations

Ecological surveys are limited by factors which affect the presence of plants and animals, such as the time of year, migration patterns and behaviour. The field survey was undertaken at an optimal time for habitat classification. Conditions on the afternoon of the 6th July were poor for ecological surveying with heavy rain which will have suppressed fauna activity levels.

Some areas of the Proposed Development where not surveyed on account of land being private or dangerous to access. These areas were predominantly viewable from publicly accessible land and land that was inaccessible or considered too dangerous to survey was limited to less than 5% of the Proposed Development Area but generally limited to the extent to what was surveyable to a buffer of *c*.5m.

As a result of the project programme dedicated surveys for breeding birds, amphibians and other species groups was not undertaken, however site walkovers were orientated to collect information on notable species during the site walkover which was informed by the desktop survey. Professional judgement and experience of the ecologist allows for the presence of most notable species to be predicted with sufficient certainty as to not significantly limit the validity of these findings, though heavy rain on the 6th July may have resulted in a decreased evidence load for more cryptic species on site.

4. Baseline Ecological Conditions

This section describes the ecological baseline that has been determined through the desktop and field surveys, the ecological baseline being those conditions that currently exist within the Proposed Development area in the absence of the proposed development. The importance of these ecological features is discussed and considered within a defined geographical context and recommendation is made as to whether the ecological feature should be "scoped in" for further assessment.

4.1 Designated Sites

4.1.1 International and European Designated Sites

The desk study identified two European designated sites within 15km of the Proposed Development. These sites are summarised in Table 7. The boundaries of these designated sites are illustrated in Appendix A.12 of this report.

Table 7: International and European designated sites within 15km of the proposed development site

Site name	Size (ha)	Qualifying interests (QIs) and Special Conservation Interests (SQIs)	Approximate distance to proposed development (km)
Cork Harbour SPA (004030)	2660	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*) [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] Wetland and Waterbirds [A999]	<0.1
Great Island Channel SAC (001058)	1437.5	Mudflats and sandflats not covered by seawater at low tide [1140] Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*) [1330]	7.7

A separate AA document has been prepared by Arup on behalf of Cork County Council to assist the competent authority in fulfilling its duties in accordance with Regulation 6 (3) of the Habitats Directive 92/43/EEC. The AA objectively concluded:

- there is no potential for the Proposed Development site to significantly impact on Natura 2000 sites.

- the Proposed Development site is not directly connected with, or necessary to the conservation management of any Natura 2000 sites; and
- the Proposed Development, alone or in combination with other projects, is not likely to have significant effects on Natura 2000 sites in view of their conservation objectives.
- It has been determined by Arup that it is possible to rule out likely significant effects (LSE) on any Natura 2000 sites. It is the view of Arup that it is not necessary to undertake any further stage of the AA process.

The Great Island Channel SAC and Cork Harbour SPA are both considered to be of *international importance.* Given the proximity of the Cork Hour SPA to the Proposed Development this protected site is **scoped in** to the EcIA.

4.1.2 Nationally Designated Sites

There is one nationally designated site within 2km of the proposed development; Owenboy River pNHA. This is listed below in Table 8 and can be seen in Appendix A.2.

Table 8: Nationally designated sites within 2km of the proposed development site

Site name	Size (ha)	Qualifying interests (QIs) and Special Conservation Interests (SQIs)	Approximate distance to proposed development (km)
Owenboy River pNHA	134	Waterfowl and wetlands.	<0.1

This site is considered to be of *national importance*. Given the proximity of the Owenboy River pNHA to the Proposed Development this site is **scoped in**.

4.1.3 EU Annex I Habitats

There are two EU Annex I habitats within 2km of the site Owenboy River Estuary and includes estuary and mudflat habitat. A summary is given below in Table 9 and can be seen in Appendix A.3.

Table 9: Non-statutory designated sites within 2km of the proposed development site

Site Name	Habitats	Approximate distance to proposed development (km)
Owenboy Estuary	Estuary	<0.1
Owenboy Estuary	Mudflat	<0.1

These sites are considered to be of *county importance*. Given the proximity of these habitats to the Proposed Development these EU Annex I habitats are **scoped in**.

4.2 Habitats

A Fossitt's habitat map detailing the findings of the habitat survey is provided in Appendix A.3 of this report. Photographs of the habitats records are provided in Appendix B. The following habitats were recorded within the proposed development site boundary:

- Flower Beds and Borders (BC4);
- Stone Walls and Other Stonework (BL1);
- Buildings and Artificial Surfaces (BL3);
- Tidal Rivers (CW2);
- Amenity Grassland (Improved) (GA2);

- Dry Meadows and Grassy Verges (GS2);
- Scattered Trees and Parklands (WD5);
- Hedgerow (WL1);
- Treeline (WL2);
- Riparian Woodland (WN5); and
- Ornamental Non Native Shrub (WS3);

These habitat types are described below in greater detail and are illustrated in Appendix A4.

Treeline (WL2) and Hedgerow (WL1) habitat were also appraised utilising the Hedgerow Appraisal System, the results of which are laid out in Section 4.3.

4.2.1 Flower Beds and Borders (BC4)

This habitat existed occurs on roundabouts and private gardens, specifically in small parcels totalling less than 0.1ha to the north and east of the Proposed Development along Church Road and Crosshaven Road. This habitat comprises ornamental cultivars typical of gardens such as Nasturtiums (*Tropaeolum* sp.), Hydrangeas (*Hydrangea* sp.), African Lily (*Agapanthus africanus*), Shrubby Cinquefoil (*Dasiphora fruticosa*), Rose-of-Sharon (*Hypericum calycinum*) and Silver Ragwort (*Senecio cineraria*).

Where this habitat occurs it is usually accompanied by bare soil, gravel or wood chip that is intensively managed to prevent other species from colonising. This habitat and the species it comprises are considered to have negligible value to wildlife and comprise species that are common and widespread across Ireland. On this basis it is considered to be of *local importance (local value)*.

4.2.2 Stone Walls and Other Stonework (BL1)

The habitat is restricted to one small parcel of less than 0.1ha that can be found bordering hedgerow habitat alongside a private garden to the south of the Proposed Development. The habitat consists of stone with voids filled in with bare, sandy substrate and partially overgrown with species typical of recolonising bare ground such as Dandelion (*Taraxacum* sp.), Red Fescue (*Festuca rubra*) and Yorkshire-Fog (*Holcus lunatus*) as well as species associated with Hedgerow (WL1) such as Ivy (*Hedera helix*) and Herb-Robert (*Geranium robertianum*). Due to the absence of voids the feature was not considered to be suitable for nesting small mammals or birds. The habitat was also too well vegetated to offer suitable nesting habitat for mining invertebrates.

Stone Walls and Other Stonework (BL1) habitat also occurs elsewhere in the Proposed Development where it is substantially overgrown by mature treeline and hedgerow, in particular along sections of the Lower Kilmoney Road, however there it was considered to be Hedgerow (WL1) or Treeline (WL2) in accordance with Fossitt (2000)[24] and therefore is considered under the relevant habitats assessment below.

As this habitat consists of common and widespread species and offers a lack of nesting habitat for birds, small mammals and invertebrates it is considered to be of *local importance (local value)*.

4.2.3 Buildings and Artificial Surfaces (BL3)

This habitat comprises the road, footpath and other types of hardstanding associated with urban areas equating to c. 7.2ha and forms the dominant habitat type throughout the Proposed Development. This habitat type has negligible conservation value for flora and fauna and is therefore considered to be *local importance (local value)*.

[24] Fossitt, J. (2000) A Guide to Habitats in Ireland. The Heritage Council.

4.2.4 Tidal Rivers (CW2)

This habitat occurred east of the bridge at Bóthar Guidel between the Strand Road and Owenabue Car Park and the comprises part of the mouth of Owenboy River, part of the Owenboy River pNHA. Construction works are anticipated to occur immediately adjacent this section of habitat, but not within the body of water. Given the nature of this habitat no vegetation was noted.

Tidal rivers correspond approximately to the annexed habitat 'estuaries (1130)' for which the Cork County Council Local Development Plan states under Objective MCI 7-4: Coastal Protection

(a) *Ensure the County's natural coastal defences, such as beaches, sand dunes, salt marshes and estuary lands, are protected and are not compromised by inappropriate works or development.*

On the basis of the above this habitat is considered to be of *county importance*.

4.2.5 Amenity Grassland (Improved) (GA2)

This habitat, totalling *c.* 0.81ha occurs throughout the Proposed Development and was consistent with landscaped areas under private and public management; such as road verges fronting residential properties, council managed green spaces and verges bordering pedestrian footpaths and cycleways. This habitat is also often found within Scattered Trees and Parkland (WD5) associated in particular with ornamental planting in front of developments and within communal green spaces. This intensively managed habitat was often recorded mown with arisings on site.

This habitat consists of grasses associated with high fertility levels such as Cock's-foot (*Dactylis glomerata*), Creeping Bent (*Agrostis stolonifera*), Yorkshire-fog and Perennial Rye-grass (*Lolium perenne*). In addition a variety of herbaceous plants synonymous with fertile conditions were identified in this habitat including Common Nettle (*Urtica dioica*), Dandelion, Daisy (*Bellis perennis*), Greater Plantain (*Plantago major*), Red Clover (*Trifolium pratense*), Ribwort Plantain (*Plantago lanceolota*), Self-heal (*Prunella vulgaris*) and White Clover (*Trifolium repens*).

At boundaries this habitat shares with building and artificial surfaces habitat, specifically the pedestrian and road network, this habitat transitions to include species that commonly occur in recolonising bare ground ED3) such as Annual Meadow-grass (*Poa annua*), Fat-hen (*Chenopodium album*), Hairy Willowherb (*Epilobium hirsutum*), Prickly Sowthistle (*Sonchus asper*) and Pineappleweed (*Matriaca discoidea*).

On the basis of the above this habitat is considered to be of *local importance (local value)*.

4.2.6 Dry Meadows and Grassy Verges (GS2)

This habitat is limited to certain sections of road verge that borders the Ballea and Church Roads to the north of the Proposed Development. This habitat totals *c.* .015ha and consists of ungrazed, unmown grassland that generally occurs on sloping roadside verge.

This habitat comprises of grasses such as False Oat-grass (*Arrhenatherum elatius*), Perennial Rye-grass, Sweet Vernal-grass (*Anthoxanthum odoratum*) and Yorkshire-fog as well as herbaceous plants such as Common Ragwort (*Senecio jacobaea*), Creeping Cinquefoil (*Potentilla reptans*), Cut-leafed Crane's-bill (*Geranium dissectum*), Red Clover, Guernsey Fleasbane (*Conyza sumatrensis*), Purple Ramping-fumitory (*Fumaria purpurea*), Ribwort Plantain, Scarlet Pimpernel (*Anagallis arvensis*), Scentless Mayweed (*Tripleurospermum inodorum)*, Silverweed (*Potentilla anserina*) and Yarrow (*Achillea millefolium*).

An objective in the Local County Development Plan (BE 15-2: Protect sites, habitats and species) relates to this habitat:

a) *Protect and where possible enhance areas of local biodiversity value, ecological corridors and habitats that are features of the County's ecological network. This includes rivers, lakes, streams and ponds, peatland and other wetland habitats, woodlands, hedgerows, tree lines, veteran trees, natural and semi-natural grasslands as well as coastal and marine habitats. It particularly includes habitats of special conservation significance in Cork as listed in Volume 2 of the Plan.*

On the basis of the above and the fact that this habitat supports some notable invertebrates it is considered to be *local importance (higher value)*.

4.2.7 Scattered Trees and Parklands (WD5)

This habitat totalled around 0.5ha and the majority, *c*.0.4ha consisted of small parcels and linear sections of ornamental green space that occurs primarily to the north of the site in communal green space along the Ballea and Church Road and to a lesser extent the Cork Road, Rock Road, Strand Road and Lower Kilmoney Road. This habitat was composed of amenity grassland habitat in which scattered trees grew as a structural or prominent feature managed and landscaped for communal use.

This habitat consisted of a combination of native species such as; Common Ash (*Fraxinus excelsior*), Pendunculate Oak (*Quercus robur*), Silver Birch (*Betula pendula*), Small-leaved Lime (*Tilia cordata*), Wild Cherry (*Prunus avium*) and non-native species such as Japanese Cherry (*Prunus serrulata*) and Sycamore (*Acer pseudoplatanus*).

One parcel of *c*.0.1ha Scattered Trees and Parklands (WD5) habitat occurred at the Carrigaline Lions Youth Centre and consisted of Veteran Oak Parkland. This parcel of habitat also supports bat roosting potential having two moderate suitability Potential Roost Features (PRFs) and two high suitability PRFs.

Several objectives in the Local County Development Plan related to this habitat:

> *BE 15-2: Protect sites, habitats and species.*
>
> *c) Protect and where possible enhance areas of local biodiversity value, ecological corridors and habitats that are features of the County's ecological network. This includes rivers, lakes, streams and ponds, peatland and other wetland habitats, woodlands, hedgerows, tree lines, veteran trees, natural and semi-natural grasslands as well as coastal and marine habitats. It particularly includes habitats of special conservation significance in Cork as listed in Volume 2 of the Plan.*
>
> *BE 15-8: Trees and Woodlands*
>
> *a) Protect trees the subject of Tree Preservation Orders.*
>
> *b) Make use of Tree Preservation Orders to protect important trees or groups of trees which may be at risk or any tree(s) that warrants an order given its important amenity or historic value.*
>
> *c) Encourage the provision of trees for urban shading and cooling in developments in urban environments and as an integral part of the public realm.*
>
> *d) Preserve and enhance the general level of tree cover in both town and country. Ensure that development proposals do not compromise important trees and include an appropriate level of new tree planting.*
>
> *e) Where appropriate, to protect mature trees/groups of mature trees and mature hedgerows that are not formally protected under Tree Preservation Orders*
>
> *GI 14-1: Countywide Green and Blue Infrastructure Objectives*
>
> *c) Recognise rivers and streams (and their wider riparian corridors) as one of the natural foundations for multi-functional green and blue infrastructure corridors. Seek to strengthen ecological linkages which watercourses have with other water dependent habitats as well as with hedges/treelines, woodland and scrub in the wider landscape.*

Predominantly the vast majority of this habitat is considered to be *local importance (higher value)*, however the parcel of veteran oak parkland complete with accompanying potential roost features is considered to be of *local importance (higher value).*

4.2.8 Hedgerow (WL1)

Sections of this habitat occur throughout the Proposed Development to a total area of c. 0.15ha. In particular it occurs as a boundary feature of private gardens and other type of developments where it generally comprises of non-native species consisting of Buddleia (*Buddleia* sp.) Cherry laurel (*Prunus laurocerasus*), Clematis (*Clematis* sp.), Leylandii (*Leylandii* sp.) and New Zealand Broadleaf (*Griselina littoralis*).

In agricultural boundaries this habitat tends to consist primarily of native species, with some minor presence of the above non-native species or non-native trees such as Sycamore. Native species found within the

agricultural boundaries are dominated by Hawthorn (*Crataegus monogyna*) and Bramble (*Rubus fruticosus* agg.) with occasional Elder (*Sambucus nigra*), European Hornbeam (*Carpinus betulus*), European Plum (*Prunus domestica*) and Wild Cherry (*Prunus avium*) and sporadically interspersed with trees such as Beech (*Fagus sylvatica*), Common Ash, Silver Birch and Sycamore.

The ground flora of this habitat tended to consist of species typical of woodland edge habitats or shade tolerant species, albeit a richer diversity of species occurred in hedgerows boasting a greater composition of native species. Ground flora included Common Nettle (*Urtica dioica*), Cow Parsley (*Anthriscus sylvestris*), Herb-Robert, Hogweed (*Heracleum sphondylium*), Red Dead-nettle (*Lamium purpureum*) and Spear Thistle (*Cirsium vulgare*). In addition to ground flora a number of climbers were identified such as Hedge Bindweed (*Calystegia sepium*), Honeysuckle (*Lonicera periclymenum*) and Ivy.

Several objectives in the Local County Development Plan related to this habitat:

PL 3-1: Building Design, Movement and Quality of the Public Realm

b) Create a design that is sensitive to the history and heritage context of a town / village setting and provides for protection of heritage features and non structural heritage that are important and intrinsic part of the distinctiveness and character of the settlement such as historic boundaries (stone and earthen), pillars and gates, street furnishing, paving and kerbing, trees, hedgerows;

BE 15-2: Protect sites, habitats and species

c) Protect and where possible enhance areas of local biodiversity value, ecological corridors and habitats that are features of the County's ecological network. This includes rivers, lakes, streams and ponds, peatland and other wetland habitats, woodlands, hedgerows, tree lines, veteran trees, natural and semi-natural grasslands as well as coastal and marine habitats. It particularly includes habitats of special conservation significance in Cork as listed in Volume 2 of the Plan.

BE 15-6: Biodiversity and New Development

b) Encouraging the retention and integration of existing trees, hedgerows and other features of high natural value within new developments;

BE 15-8: Trees and Woodlands

a) Protect trees the subject of Tree Preservation Orders.

b) Make use of Tree Preservation Orders to protect important trees or groups of trees which may be at risk or any tree(s) that warrants an order given its important amenity or historic value.

c) Encourage the provision of trees for urban shading and cooling in developments in urban environments and as an integral part of the public realm.

d) Preserve and enhance the general level of tree cover in both town and country. Ensure that development proposals do not compromise important trees and include an appropriate level of new tree planting.

e) Where appropriate, to protect mature trees/groups of mature trees and mature hedgerows that are not formally protected under Tree Preservation Orders

GI 14-1: Countywide Green and Blue Infrastructure Objectives

d) Recognise rivers and streams (and their wider riparian corridors) as one of the natural foundations for multi-functional green and blue infrastructure corridors. Seek to strengthen ecological linkages which watercourses have with other water dependent habitats as well as with hedges/treelines, woodland and scrub in the wider landscape.

GI 14-9: Landscape

e) Discourage proposals necessitating the removal of extensive amounts of trees, hedgerows and historic walls or other distinctive boundary treatment.

HE 16-21: Design and Landscaping of New Buildings

e) Require the appropriate landscaping and screen planting of proposed developments by using predominantly indigenous/local species and groupings and protecting existing hedgerows and historic boundaries in rural areas. Protection of historical/commemorative trees will also be provided for.

On the basis of the above sections of this habitat bordering residential properties and developments are considered to be *local importance (lower value)* and sections of the habitat bordering fields are considered to be *local importance (higher value)*.

4.2.9 Treeline (WL2)

This habitat consisted of *c.* 0.7ha of habitat which occurred in large sections of around 150 -200m along the Ballea Road, Church Road and Rose Hill, however the largest extent occurs along the Lower Kilmoney Road where an extent of 550m of this habitat occurs totalling *c.* 0.2ha of habitat.

This habitat was generally dominated by Ash, Beech, Scot's Pine (*Pinus sylvestris*), Silver Birch and Sycamore) and interspersed with shrubs such as Bramble, Buddleia, Cherry Laurel, Dogwood (*Cornus* sp.), Elder and Hawthorn.

Ground flora of this habitat consisted of species typical of woodland edge habitats or shade tolerant species, including; Common Nettle, Cow Parsley, Herb-Robert, Hogweed, Red Dead-nettle and Spear Thistle. The non native invasive Winter Heliotrope (*Petasites fragrens)* also occurred as part of the ground flora of this habitat type. In addition to ground flora a number of climbers were identified, particularly the non-native Clematis as well as native Honeysuckle and Ivy.

Several objectives in the Local County Development Plan relate to this habitat:

PL 3-1: Building Design, Movement and Quality of the Public Realm

b) Create a design that is sensitive to the history and heritage context of a town / village setting and provides for protection of heritage features and non structural heritage that are important and intrinsic part of the distinctiveness and character of the settlement such as historic boundaries (stone and earthen), pillars and gates, street furnishing, paving and kerbing, trees, hedgerows;

BE 15-2: Protect sites, habitats and species

c) Protect and where possible enhance areas of local biodiversity value, ecological corridors and habitats that are features of the County's ecological network. This includes rivers, lakes, streams and ponds, peatland and other wetland habitats, woodlands, hedgerows, tree lines, veteran trees, natural and semi-natural grasslands as well as coastal and marine habitats. It particularly includes habitats of special conservation significance in Cork as listed in Volume 2 of the Plan.

BE 15-6: Biodiversity and New Development

b) Encouraging the retention and integration of existing trees, hedgerows and other features of high natural value within new developments;

BE 15-8: Trees and Woodlands

a) Protect trees the subject of Tree Preservation Orders.

b) Make use of Tree Preservation Orders to protect important trees or groups of trees which may be at risk or any tree(s) that warrants an order given its important amenity or historic value.

c) Encourage the provision of trees for urban shading and cooling in developments in urban environments and as an integral part of the public realm.

d) Preserve and enhance the general level of tree cover in both town and country. Ensure that development proposals do not compromise important trees and include an appropriate level of new tree planting.

e) Where appropriate, to protect mature trees/groups of mature trees and mature hedgerows that are not formally protected under Tree Preservation Orders

GI 14-1: Countywide Green and Blue Infrastructure Objectives

f) Recognise rivers and streams (and their wider riparian corridors) as one of the natural foundations for multi-functional green and blue infrastructure corridors. Seek to strengthen ecological linkages which watercourses have with other water dependent habitats as well as with hedges/treelines, woodland and scrub in the wider landscape.

GI 14-9: Landscape

f) Discourage proposals necessitating the removal of extensive amounts of trees, hedgerows and historic walls or other distinctive boundary treatment.

HE 16-21: Design and Landscaping of New Buildings

g) Require the appropriate landscaping and screen planting of proposed developments by using predominantly indigenous/local species and groupings and protecting existing hedgerows and historic boundaries in rural areas. Protection of historical/commemorative trees will also be provided for.

On the basis of the above this habitat is considered to be *local importance (higher value)*.

4.2.10 Riparian Woodland (WN5)

This block of <0.1ha occurs at Owenabue Sail Garden which is dominated by Willow (*Salix* sp.), Alder (*Alnus glutinosa*) as well as various non-native ornamental species. Ground flora includes Common Nettle, Broad-leaved Dock (*Rumex obtusifolius*) and Creeping Buttercup (*Ranunculus repens*). This area of woodland is heavily modified and intensely managed with ground flora recently mown and a close proximity to ornamentals planting that occurs throughout the remainder of the park.

Several objectives in the Local County Development Plan related to this habitat:

PL 3-1: Building Design, Movement and Quality of the Public Realm

b) Create a design that is sensitive to the history and heritage context of a town / village setting and provides for protection of heritage features and non structural heritage that are important and intrinsic part of the distinctiveness and character of the settlement such as historic boundaries (stone and earthen), pillars and gates, street furnishing, paving and kerbing, trees, hedgerows;

BE 15-2: Protect sites, habitats and species

c) Protect and where possible enhance areas of local biodiversity value, ecological corridors and habitats that are features of the County's ecological network. This includes rivers, lakes, streams and ponds, peatland and other wetland habitats, woodlands, hedgerows, tree lines, veteran trees, natural and semi-natural grasslands as well as coastal and marine habitats. It particularly includes habitats of special conservation significance in Cork as listed in Volume 2 of the Plan.

BE 15-6: Biodiversity and New Development

b) Encouraging the retention and integration of existing trees, hedgerows and other features of high natural value within new developments;

BE 15-8: Trees and Woodlands

a) Protect trees the subject of Tree Preservation Orders.

b) Make use of Tree Preservation Orders to protect important trees or groups of trees which may be at risk or any tree(s) that warrants an order given its important amenity or historic value.

c) Encourage the provision of trees for urban shading and cooling in developments in urban environments and as an integral part of the public realm.

d) Preserve and enhance the general level of tree cover in both town and country. Ensure that development proposals do not compromise important trees and include an appropriate level of new tree planting.

e) Where appropriate, to protect mature trees/groups of mature trees and mature hedgerows that are not formally protected under Tree Preservation Orders

GI 14-1: Countywide Green and Blue Infrastructure Objectives

h) Recognise rivers and streams (and their wider riparian corridors) as one of the natural foundations for multi-functional green and blue infrastructure corridors. Seek to strengthen ecological linkages which watercourses have with other water dependent habitats as well as with hedges/treelines, woodland and scrub in the wider landscape.

GI 14-9: Landscape

g) Discourage proposals necessitating the removal of extensive amounts of trees, hedgerows and historic walls or other distinctive boundary treatment.

HE 16-21: Design and Landscaping of New Buildings

i) Require the appropriate landscaping and screen planting of proposed developments by using predominantly indigenous/local species and groupings and protecting existing hedgerows and historic boundaries in rural areas. Protection of historical/commemorative trees will also be provided for.

On the basis of the above this habitat is considered to be *local importance (higher value)*.

4.2.11 Ornamental Non Native Shrub (WS5)

This habitat totals <0.1ha and is confined to the border around the Carrigaline Court hotel, ornamental planting in communal green spaces and private gardens that front onto the Proposed Development.

This habitat comprised a wide range of ornamental shrub such as Bay Laurel (*Laurus nobilis*), Black Locust (*Robinia pseudoacacia*), Christmas Berry (*Photinia arbutifolia*), Clematis, Cotonester (*Cotonester* sp.), Easter Tree (*Forsythias* sp.), Escallonia (*Escallonia* sp.), Golden Privet (*Ligustrum ovalifolium*), Japanese Skimmia (*Skimmia japonica*), New Zealand Broadleaf and Shrubby Cinquefoil (*Dasiphoria fruticosa*).

On the basis of the above this habitat is considered to be *local importance (lower value).*

4.3 Hedgerow Appraisal

An appraisal of the significance of Hedgerow (WL1) and Treeline (WL2) habitat proposed for removal by the project was undertaken. Twenty-two sections are proposed for removal by the development – these sections are illustrated in Appendix A5.

The appraisal of these sections of habitat are tabulated below.

Table 10: Appraisal of sections of hedgerow and treeline habitat proposed for removal.

Feature		Heritage Significance						Total
	Length (m)	Historical	Species Diversity	Ground Flora Diversity	Structure, Construction and Associated Features	Habitat Connectivity	Landscape Significance	
1	25	2	1	0	2	1	2	**8**
2	30	0	0	0	0	1	0	**1**
3	30	2	1	0	0	0	0	**3**
4	10	0	0	0	0	0	0	**0**
5	10	2	1	1	2	1	0	**7**
6	50	0	0	0	2	0	0	**2**
7	10	0	0	0	0	0	0	**0**
8	30	0	0	0	0	0	0	**0**

Feature		Heritage Significance						Total
	Length (m)	Historical	Species Diversity	Ground Flora Diversity	Structure, Construction and Associated Features	Habitat Connectivity	Landscape Significance	
9	**Feature does not meet hedgerow or treeline habitat description**							
10	50	4	1	1	1	1	2	**10**
11	55	4	1	1	1	1	0	**8**
12	20	0	0	0	0	0	0	**0**
13	15	0	0	0	0	0	0	**0**
14	10	0	0	0	0	0	2	**2**
15	20	0	1	0	0	0	2	**3**
16	25	0	2	0	0	2	0	**4**
17	25	0	0	0	2	2	2	**6**
18	30	2	1	1	2	2	2	**10**
19	5	0	0	0	0	1	0	**1**
20	5	0	0	0	0	0	0	**0**
21	**Feature does not meet hedgerow or treeline habitat description**							
22	**Feature does not meet hedgerow or treeline habitat description**							

From this it is concluded that there are no hedgerows or treelines deemed to be "*Heritage Hedgerows*" in the Proposed Development although features 10 and 18 are of moderate significance. In addition it can concluded that features 1, 5, 11 and 17 are of low to moderate significance and the remaining features to be removed can be considered to be of low – negligible significance.

It is therefore considered that *c.*200m of treeline and hedgerow habitat considered as low to moderate significance can be considered *lower value (higher importance)* and is **scoped in** whilst 350m of negligible value habitat can be **scoped out**.

4.4 Protected and Notable Species

4.4.1 Overview

Records of protected or notable species within 2km of the Proposed Development Site are included in Table 11. Any records over 15 years old have been omitted as these are not considered to reflect the current species assemblage of the proposed development site and surrounding area.

Records of species outlined in this section include the following designations:

- Red and amber Birds of Conservation Concern (BoCC);
- Species identified as "Near Threatened" or at greater conservation risk on the Irish Red Data Lists;
- Scheduled species of the Wildlife Acts 1976 to 2021; and
- Scheduled species of the Flora (Protection) Act 2022.

The search identified records of notable species of amphibian, birds, bony fish, flowering plant, insects, marine mammals and terrestrial mammals. These are discussed further below.

Table 11: Biodiversity Ireland biological records of protected and priority species within 2km of the proposed development site

Taxonomic Group	Species Common Name	Species Latin Name	Number of Records within 2km	Most Recent Record	Designation
Amphibian	Common Frog	*Rana temporaria*	7	14/02/2020	Protected Species
Bird	Barn Owl	*Tyto alba*	1	11/09/2021	Red
	Black-headed Gull	*Larus ridibundu*	11	17/12/2021	Amber
	Black-tailed Godwit	*Limosa limosa*	3	02/12/2017	Amber
	Chough	*Pyrrhocorax pyhocorrax*	1	11/07/2016	Red
	Common Greenshank	*Tringa nebularia*	2	02/12/2017	Amber
	Common Kingfisher	*Alcedo atthis*	2	31/12/2011	Amber
	Common Linnet	*Carduelis cannabina*	1	31/12/2011	Amber
	Common Redshank	*Tringa totanus*	1	31/12/2011	Red
	Common Shelduck	*Tadorna tadorna*	1	19/11/2016	Amber
	Common Starling	*Sturnus vulgaris*	3	31/12/2011	Amber
	Dunlin	*Calidris alpina*	2	19/11/2016	Red
	Eurasian Curlew	*Numenius arquata*	4	16/10/2019	Red
	Eurasian Oystercatcher	*Haematopus ostralegus*	3	02/12/2017	Red
	Eurasian Teal	*Anas crecca*	2	27/03/2016	Amber
	Eurasian Tree Sparrow	*Passer montanus*	1	19/11/2016	Amber
	Great Black-backed Gull	*Phalacrocorax carbo*	5	02/12/2017	Amber
	Great Cormorant	*Phalacrocorax*	5	02/12/2017	Amber
	Herring Gull	*Larus argentatus*	1	19/11/2016	Amber
	House Sparrow	*Passer domesticus*	4	31/12/2011	Red
	Lesser Black-backed Gull	*Larus fuscus*	1	31/12/2011	Amber
	Mute Swan	*Cygnus olor*	2	31/12/2011	Amber
	Northern Lapwing	*Vanellus vanellus*	2	11/01/2016	Red
Bony Fish	European Eel	*Anguilla anguilla*	1	08/10/2008	Threatened Species: Critically Endangered
Flowering Plant	Yellow Bartsia	*Parentucellia viscosa*	1	03/07/2016	Threatened Species: Near Threatened
Insect	Dark Green Fritillary	*Argynnis aglaja*	1	30/07/2017	Threatened Species: Vulnerable
	Gatekeeper	*Pyronia tithonis*	6	11/08/2020	Threatened Species: Near threatened
	Wall	*Lasiommata megera*	4	16/05/2017	Threatened Species: Endangered

Taxonomic Group	Species Common Name	Species Latin Name	Number of Records within 2km	Most Recent Record	Designation
	Scarce Blue-tailed Damselfly	*(Ischnura pumilio*	2	18/08/2013	Threatened Species: Vulnerable
	Large Red Tailed Bumble Bee	*Bombus (Melanobombus) lapidarius*	10	09/05/2023	Threatened Species: Near threatened
	Patchwork Leafcutter Bee	*Megachile (Megachile) centuncularis*	1	08/07/2022	Threatened Species: Near threatened
	Moss Carder-bee	*Bombus (Thoracombus) muscorum*	1	29/07/2022	Threatened Species: Near threatened
Marine Mammals	Common Seal	*Phoca vitulina*	1	27/08/2023	Protected Species
	Grey Seal	*Halichoerus grypus*	1	19/11/2016	Protected Species
Terrestrial Mammals	Brown Long-eared Bat	*Plecotus auritus*	1	04/09/2008	Protected Species
	Common Pipistrelle	*Pipistrellus pipistrellus sensu lato*	2	04/09/2008	Protected Species
	Daubenton's Bat	*Myotis daubentonii*	4	20/08/2012	Protected Species
	Eurasian Badger	*Meles meles*	10	05/07/2018	Protected Species
	European Otter	*Lutra lutra*	3	23/02/2016	Protected Species
	Eurasian Red Squirrel	*Sciurus vulgaris*	5	01/06/2022	Protected Species
	Lesser Noctule	*Nyctalus leisleri*	2	04/09/2008	Protected Species
	Natterer's Bat	*Myotis nattereri*	1	04/09/2008	Protected Species
	Pine Marten	*Martes martes*	2	13/03/2021	Protected Species
	Soprano Pipistrelle	*Pipistrellus pygmaeus*	6	27/07/2012	Protected Species
	West European Hedgehog	*Erinaceus europaeus*	40	22/09/2022	Protected Species

4.4.2 Amphibians

Seven records for common frog, a widespread and abundant protected species, have been recorded in the last 15 years with the most recent record occurring in 2020.

Table 12: List of notable amphibians and status recorded within 2km of the Proposed Development.

Taxonomic Group	Species Common Name	Species Latin Name	Number of Records within 2km	Most Recent Record	Designation
Amphibian	Common Frog	*Rana temporaria*	7	14/02/2020	Protected Species

As the works will be carried out mainly adjacent to public road, the majority of the site is not considered optimal for common frogs. No pond habitat suitable for breeding frogs was recorded on site however several habitats were deemed suitable for foraging and hibernating frogs, those being:

- Stone Walls and Other Stonework (BL1)
- Dry Meadows and Grassy Verges (GS2)
- Scattered Trees and Parkland (WD5)
- Hedgerow (WL1)
- Treeline (WL2)
- Riparian Woodland (WN5)

It is considered possible that common frog utilise habitat types within the Proposed Development outside of the breeding habitat for foraging and commuting. Though ponds were not identified on site common frog can disperse up to 1km from breeding ponds[25], therefore common frog has been **scoped in**.

4.4.3 Birds

Desk and field study data of bird species recorded in close proximity to the site consisted of widespread and common passerines such as great tit (*Parus major*), chaffinch (*Fringilla coelebs*), blackbird (*Turdus merula*) and wren (*Troglodytes troglodytes*) as well as species of conservation concern consisting of both amber listed and red listed species. These species are listed below followed by a discussion on what breeding species are actually likely to be present on site:

Table 13: List of notable birds and status recorded within 2km of the Proposed Development – in bold if identified on field survey.

Taxonomic Group	Species Common Name	Species Latin Name	Number of Records within 2km	Most Recent Record	Designation
Bird	Barn Owl	*Tyto alba*	1	11/09/2021	Red
	Black-headed Gull	***Larus ridibundu***	**12**	**10/07/2023**	**Amber**
	Black-tailed Godwit	*Limosa limosa*	3	02/12/2017	Amber
	Chough	*Pyrrhocorax pyhocorrax*	1	11/07/2016	Red
	Common Greenshank	*Tringa nebularia*	2	02/12/2017	Amber
	Common Kingfisher	*Alcedo atthis*	2	31/12/2011	Amber
	Common Linnet	*Carduelis cannabina*	1	31/12/2011	Amber
	Common Redshank	*Tringa totanus*	1	31/12/2011	Red
	Common Shelduck	*Tadorna tadorna*	1	19/11/2016	Amber
	Common Starling	***Sturnus vulgaris***	**4**	**10/07/2023**	**Amber**
	Dunlin	*Calidris alpina*	2	19/11/2016	Red
	Eurasian Curlew	*Numenius arquata*	4	16/10/2019	Red
	Eurasian Oystercatcher	*Haematopus ostralegus*	3	02/12/2017	Red
	Eurasian Teal	*Anas crecca*	2	27/03/2016	Amber
	Eurasian Tree Sparrow	*Passer montanus*	1	19/11/2016	Amber
	Great Black-backed Gull	*Larus marinus*	5	02/12/2017	Amber
	Great Cormorant	*Phalacrocorax carbo*	5	02/12/2017	Amber
	Grey Wagtail	***Motacilla cinerea***	**1**	**10/07/2023**	**Red**
	Herring Gull	*Larus argentatus*	1	19/11/2016	Amber
	House Sparrow	***Passer domesticus***	**5**	**10/07/2023**	**Red**
	Lesser Black-backed Gull	*Larus fuscus*	1	31/12/2011	Amber
	Mallard	***Anas platyrhynchos***	**1**	**10/07/2023**	**Amber**
	Mute Swan	*Cygnus olor*	2	31/12/2011	Amber
	Northern Lapwing	*Vanellus vanellus*	2	11/01/2016	Red

[25] Baker, J.M.R and Halliday, T.R. (1999) Amphibian colonisation of new ponds in an agricultural landscape. Herpetological Journal. **Vol 9** pp55-63.

Regarding the records above it is considered that freshwater, marine and mudflat specialists are likely to be occasionally associated with the Tidal River (CW2). Use of this habitat by these species is likely to be limited on account of the varying tidal ranges influencing habitat suitability, the large extent of similar habitat in the area and the current human disturbance in the area. In addition this habitat is not likely to be directly affected by the works as it lies outside of the Proposed Site Area and though indirect impacts may occur from pollution or disturbance, this is not anticipated to be likely or significant. Accordingly, species associated with habitat Tidal River CW2 are **scoped out**, those being waders, gulls, ducks, grey wagtail, kingfisher, mute swan and great cormorant.

Scattered Trees and Parkland (WD5), Hedgerow (WL1), Treeline (WL2) and Riparian Woodland (WN5) are considered to have limited potential for nesting barn owl, common linnet, common starling, Eurasian tree sparrow and house sparrow. The Proposed Development also offers suitable foraging potential for these species, specifically Scattered Trees and Parkland (WD5), Hedgerow (WL1), Treeline (WL2), Riparian Woodland (WN5) and Dry Meadows and Grassy Verges (GS2) habitats. In addition, it is considered that the Proposed Development Area has suitable nesting habitat on site for these species and that nesting birds are protected under the Wildlife Acts (as amended) 1976-2023. Accordingly, these species have been **scoped in** for further assessment.

The Proposed Development is deemed as having negligible suitability for foraging or breeding chough, a species that requires low intensity livestock farming systems with suitable nesting sites in old buildings, caves and rock faces. This species is therefore **scoped out** of further assessment.

In addition to the records received grey heron are known to utilise a tree on the Crosshaven road approximately 2.1km outside of the Proposed Development Area however this is not anticipated to be affected.

4.4.4 Bony Fish

The following records of notable bony fish were recorded from the desktop study:

Table 14: List of notable bony fish recorded within 2km of the Proposed Development.

Taxonomic Group	Species Common Name	Species Latin Name	Number of Records within 2km	Most Recent Record	Designation
Bony Fish	European Eel	*Anguilla anguilla*	1	08/10/2008	Threatened Species: Critically Endangered

This record is considered to be associated with the Tidal River CW2 habitat which lies adjacent to the Proposed Development. Due to the infrequency of sightings for the species and the migratory lifestyle of the species it is considered that the Tidal River CW2 habitat in the Proposed Development will be used very infrequently and therefore the species has been **scoped out** of further assessment.

4.4.5 Flowering Plant

The following records of notable flowering plants were recorded from the desktop study:

Table 15: List of notable flowering plants and status recorded within 2km of the Proposed Development.

Taxonomic Group	Species Common Name	Species Latin Name	Number of Records within 2km	Most Recent Record	Designation
Flowering Plant	Yellow Bartsia	*Parentucellia viscosa*	1	03/07/2016	Threatened Species: Near Threatened

This record arose from a nearby limestone quarry supporting dry calcareous grassland. It is considered that the Proposed Development hosts fertile habitats with flora species that are too aggressive to facilitate the occurrence of this species and therefore it is considered unlikely that this species occurs within the Proposed Development. As a result, this species is **scoped out** of further assessment.

4.4.6 Invertebrates

Desk and field study data of invertebrate species recorded in close proximity to the site consisted of widespread and common bumblebees such as the white-tailed bumblebee (*Bombus locorum* agg.) and the common carder bee (*Bombus pascuorum*) but also species of conservation concern such as the large red-tailed bumblebee and dark green fritillary. In addition, various mining bee colonies were identified throughout the site and whilst these bees were not surveyed the mines were found to be in use. Notable invertebrates are listed below followed by a discussion on what species are actually likely to be present on site:

Table 16: List of notable birds and status recorded within 2km of the Proposed Development – in bold if identified on field survey.

Taxonomic Group	Species Common Name	Species Latin Name	Number of Records within 2km	Most Recent Record	Designation
Insect	Dark Green Fritillary	*Argynnis aglaja*	1	30/07/2017	Threatened Species: Vulnerable
	Gatekeeper	*Pyronia tithonis*	6	11/08/2020	Threatened Species: Near threatened
	Wall	*Lasiommata megera*	4	16/05/2017	Threatened Species: Endangered
	Scarce Blue-tailed Damselfly	*(Ischnura pumilio*	2	18/08/2013	Threatened Species: Vulnerable
	Large Red Tailed Bumble Bee	***Bombus (Melanobombus) lapidarius***	**10**	**09/05/2023**	**Threatened Species: Near threatened**
	Patchwork Leafcutter Bee	*Megachile (Megachile) centuncularis*	1	08/07/2022	Threatened Species: Near threatened
	Moss Carder-bee	*Bombus (Thoracombus) muscorum*	1	29/07/2022	Threatened Species: Near threatened
	Mining bees	*Andrena / Lassioglossum etc*	N/A	N/A	Various red listed species

Dark green fritillary favour flower rich habitats, patches of scrub, acid grassland and whose larvae prefer flowers in the *Viola* genus which were not noted in the field or desk top survey. The gatekeeper is a species of field edges and hedgerows, within which the adult prefers to visit flowering bramble and whose larvae prefer common grasses such as *Agrostis* species and *Festuca* species, both which were confirmed on site during the field survey. The wall butterfly prefers short flower rich grassland and utilises rocky or stony habitats to bask in sunny weather, the larvae use various common grasses as foot-plants, particularly Cock's-foot and Yorkshire-fog. It is considered on the basis of designation and of habitat preference that the Proposed Development is likely to support gatekeeper which has been **scoped in** for further assessment and unlikely to support wall and dark green fritillary which have been **scoped out**.

Scarce blue-tailed damselfly is a species usually found in shallow wetland sites such as bog pools or flushes and temporary ponds. None of these habitats occur on or near the Proposed Development so this species can be **scoped out** of this assessment. Large red-tailed bumblebee, patchwork leafcutter bee, mining bees and moss carder bees are widely distributed species associated with foraging a wide variety of native and ornamental flowers and nesting habitat encompassing rodent holes, vegetative cavities, sandy clay soil and overgrown vegetation respectively which are associated with the habitats on site. Accordingly, these four species / species groups are **scoped in** for further assessment.

4.4.7 Marine Mammals

The following records of notable marine mammals were recorded from the desktop study:

Table 17: List of marine mammals and status recorded within 2km of the Proposed Development.

Taxonomic Group	Species Common Name	Species Latin Name	Number of Records within 2km	Most Recent Record	Designation
Marine Mammals	Common Seal	*Phoca vitulina*	1	27/08/2023	Protected Species
	Grey Seal	*Halichoerus grypus*	1	19/11/2016	Protected Species

These species are most likely to be associated with occasional commuting or foraging use of the Tidal Rivers CW2 habitat. Potential impacts of the proposed development will be limited to indirect pathways which these species are not considered to be susceptible to. Accordingly, both species are **scoped out** of further assessment.

4.4.8 Terrestrial Mammals

4.4.8.1 Bats

4.4.8.1.1 Foraging and commuting suitability

The data search returned the following records of bat species within 2km of the proposed development site:

Table 18: List of bats recorded within 2km of the Proposed Development.

Taxonomic Group	Species Common Name	Species Latin Name	Number of Records within 2km	Most Recent Record	Designation
Terrestrial Mammals	Brown Long-eared Bat	*Plecotus auritus*	1	04/09/2008	Protected Species
	Common Pipistrelle	*Pipistrellus pipistrellus sensu lato*	2	04/09/2008	Protected Species
	Daubenton's Bat	*Myotis daubentonii*	4	20/08/2012	Protected Species
	Lesser Noctule	*Nyctalus leisleri*	2	04/09/2008	Protected Species
	Natterer's Bat	*Myotis nattereri*	1	04/09/2008	Protected Species
	Soprano Pipistrelle	*Pipistrellus pygmaeus*	6	27/07/2012	Protected Species

A review of the Bat Landscape Database[26] identified the following habitat suitability for bats within the 10 x 10 km tetrad in which the site occurs.

Key to Habitat Suitability Index				
Least Suitable				Most Suitable

Bat Species Common Name	Species Latin Name	Bat Suitability Index	
All bats	*N/A*	34.22	
Brown long-eared bat	*Plecotus auritus*	45	
Common Pipistrelle	*Pipistrellus pipistrellus*	45	
Soprano Pipistrelle	*Pipistrellus pygmaeus*	53	
Nathusius' Pipistrelle	*Pipistrellus nathusii*	7	
Lesser Horseshoe Bat	*Rhinolophus hipposideros*	0	
Leisler's Bat	*Nyctalus leisleri*	49	

[26] Lundy, M.G., Aughney, T., Montgomery, W.I., & Roche, N., (2011) Landscape conservation for Irish bats & species specific roosting characteristics. Bat Conservation Ireland.

Bat Species Common Name	Species Latin Name	Bat Suitability Index	
Daubenton's Bat	*Myotis daubentonii*	32	
Whiskered Bat	*Myotis mystacinus*	40	
Natterer's Bat	*Myotis nattereri*	37	

Table 19: Landscape suitability of survey area for bats

From this that we can deduce the following likelihood of each species occurring within this tetrad, namely:

- a high likelihood for Leisler's bat and soprano pipistrelle;
- a moderate to high likelihood of brown long-eared bat, common pipistrelle, Daubenton's bat, whiskered bat and Natterer's bat;
- a low to moderate likelihood of Nathusius' pipistrelle; and
- a low likelihood of lesser horseshoe bat.

4.4.8.1.2 Roosting suitability

All trees and structures on site were identified as having negligible suitability for roosting bats. Therefore, there was no requirements for bat re-entry, emergence or tree climbing assessments.

During the field survey, nine suitable roosting locations were identified immediately adjacent the Proposed Development Site, these were photographed and mapped in Appendix C and details of each feature are outlined in Table 20 and illustrated in Appendix C.

Table 20: PRF suitability bats

PRF Name	PRF Description	PRF Assessed Suitability
PRF1	Large cavity in oak tree approximately 2m high that forms part of a linear scattered tree habitat amidst wider landscape of maintained amenity grassland.	Moderate
PRF2	Large cavity in alder, part of linear scattered tree habitat amidst wider landscape of maintained amenity grassland. Approximately 1.5m high.	Low
PRF3	Large cavity on edge of veteran oak parkland approximately 2m high on Church Road.	Moderate
PRF4	Large cavity on edge of veteran oak parkland approximately 4m high on Church Road beside bird box.	High
PRF5	Numerous large cavities in veteran oak parkland habitat approximately 4m high on Church Road.	High
PRF6	Numerous large cavities in veteran oak parkland habitat approximately 4m high on Church Road.	High
PRF7	Multiple gaps and crevices in stone wall opposite Ballea Park on the Ballea Road. Several cavities noted for having suitability for individual bats, height between 1.5 and 2m.	Low
PRF8	Sycamore tree in scattered tree habitat alongside Ballea Road. PRF rotted cavity of former branch at height of 3m that could provide roost site for individual bats.	Low
PRF9	Large cavity in ash tree on edge of treeline habitat approximately 3m high on Ballea Road.	Moderate

As a result of the above it, the lack of records and their very limited distribution, it is considered that Nathusius' pipistrelle and lesser horseshoe are unlikely to occur in the Proposed Development and can be **scoped out**. Leisler's bat, soprano pipistrelle, brown long-eared bat, common pipistrelle, Daubenton's bat,

whiskered bat and Natterer's bat have been **scoped in** on the basis the Proposed Development is considered suitable for foraging and roosting, their wider distribution, and the fact that records occur of most of these species in the vicinity of the Proposed Development.

4.4.8.2 Badgers

The following records were noted for badger within 2km from the Proposed Development:

Taxonomic Group	Species Common Name	Species Latin Name	Number of Records within 2km	Most Recent Record	Designation
Terrestrial Mammal	Eurasian Badger	*Meles meles*	10	05/07/2018	Protected Species

Table 21: Records of badger within 2km of the Proposed Development

In addition the badger sett database[27] did not have any records of badger setts within 1km of the Proposed Development.

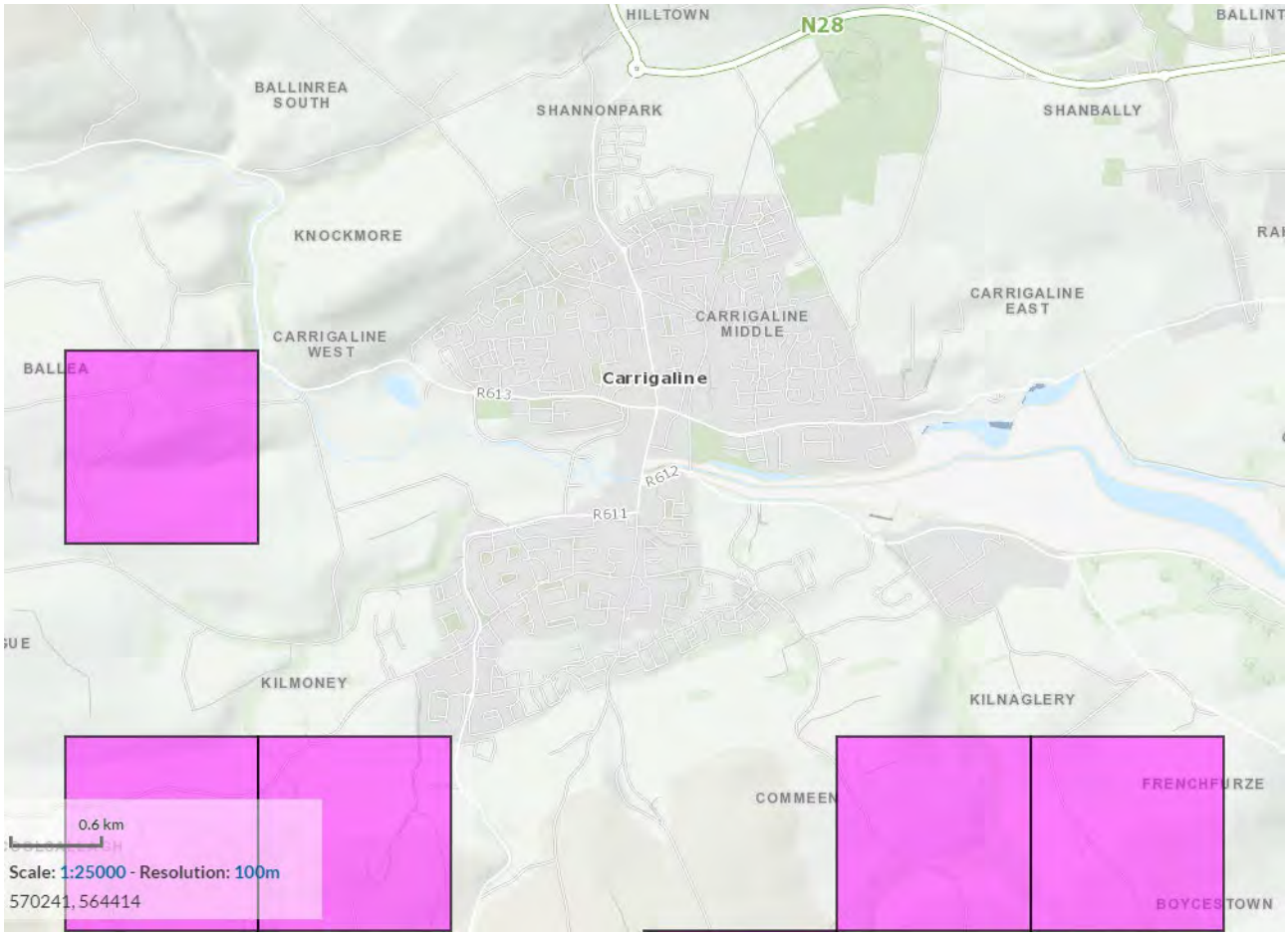


Figure 1: Records of badger setts within 2km of the Proposed Development[26]

The Proposed Development is mostly Buildings and Artificial Surfaces (BL3) which is unsuitable foraging and resting habitat for badgers. Grassland and wooded habitat recorded is considered suitable for foraging and commuting badgers however the Proposed Development Area is over 2km from any known badger sett. While badgers may use parts of the Proposed Development Area for forays this is expected; considering the context of the site, the habitats on site, the lack of evidence of foraging badgers and the distance from any

[27] https://maps.biodiversityireland.ie/Map/Terrestrial/Dataset/30

known setts, that this use is likely to be infrequent. Consequently, it is considered that badger is **scoped out** of further assessment.

4.4.8.3 Otters

The following records were noted for otter within 2km from the Proposed Development:

Taxonomic Group	Species Common Name	Species Latin Name	Number of Records within 2km	Most Recent Record	Designation
Terrestrial Mammal	European Otter	*Lutra lutra*	3	23/02/2016	Protected Species

Table 22: Records of otters within 2km of the Proposed Development

The construction phase will result in the removal of *c.*550m Hedgerow WL1 and Treeline WL2 habitat suitable for use by resting otters as hovers, couches or holts and will occur adjacent to Tidal Waters (CW2). The context of the site however is primarily urban and suburban road network with considerable levels of human activity. The Tidal Waters (CW2) habitat is suitable for foraging otters however given human disturbance at the area this is considered likely to occur only occasionally. Consequently, it is considered that otter activity will be limited to occasional forays in the Proposed Development. This is supported by the paucity of records of the species in the area.

It is considered the site is unsuitable for resting otters setts given urban activity and traffic associated with the town of Carrigaline. In addition, the site has high levels of collision risk for the species and it is therefore considered that **otters can be scoped out of further assessment**.

4.4.8.4 Red Squirrel

The following records were noted for red squirrel within 2km from the Proposed Development:

Taxonomic Group	Species Common Name	Species Latin Name	Number of Records within 2km	Most Recent Record	Designation
Terrestrial Mammal	Eurasian Red Squirrel	*Sciurus vulgaris*	5	01/06/2022	Protected Species

Table 23: Records of red squirrels within 2km of the Proposed Development

Habitats, in particular Hedgerow WL1 and Treeline WL2 are suitable for foraging and commuting red squirrels and for the construction of dreys. Large areas of connected woodland exist in the proximity of the Proposed Development that are a sufficient size for red squirrel territories. Red squirrels are therefore **scoped in** for further assessment.

4.4.8.5 Pine Marten

The following records were noted for pine marten within 2km from the Proposed Development:

Taxonomic Group	Species Common Name	Species Latin Name	Number of Records within 2km	Most Recent Record	Designation
Terrestrial Mammal	Pine Marten	*Martes martes*	2	13/03/2021	Protected Species

Table 24: Records of pine marten within 2km of the Proposed Development

Habitats in the Proposed Development, in particular Hedgerow WL1 and Treeline WL2 are suitable for commuting pine marten and the construction of dens. The majority of this habitat is within the urban footprint of Carrigaline and all of it is in the immediate vicinity of a road network. Roads are a source of collision risk and act as a barrier to pine marten dispersal and as a result it is considered unlikely that dens will occur in the immediate environs of the network. Foraging and commuting red squirrels are likely to utilise this habitat in particular in the Lower Kilmoney Road area which is in close proximity to a parcel of mature woodland and therefore red squirrel has been **scoped in**.

4.4.8.6 *West European Hedgehog*

The following records were noted for hedgehog within 2km from the Proposed Development:

Taxonomic Group	Species Common Name	Species Latin Name	Number of Records within 2km	Most Recent Record	Designation
Terrestrial Mammal	West European Hedgehog	*Erinaceus europaeus*	40	22/09/2022	Protected Species

Table 25: Records of hedgehog within 2km of the Proposed Development

Habitats in the Proposed Development, in particular Dry Meadows and Grassy Verges GS2, Hedgerow WL1, Treeline WL2, Riparian Woodland WN5 and to a lesser degree Ornamental Non-Native Shrub are suitable for nesting, commuting and foraging hedgehog. Though roads are a source of collision risk there is an abundance of suitable habitat for the species in the suburban and rural vicinity of the Proposed Development. Based on the reasoning above and the copious records hedgehog is **scoped in**.

4.4.9 Invasive Species

Thirteen invasive species were recorded on site, five of these are Third Schedule species under the European Communities Regulations 2011[28] or as Species of Union Concern[29]. Species identified during the field survey are highlighted in bold.

Species name	Species Latin Name	Number of Records within 2km	Most Recent Record	High or Medium Impact Species
Flora				
Butterfly-bush	***Buddleja davidii***	**1**	**03/07/2016**	**Medium**
Himalayan Honeysuckle	*Leycesteria formosa*	2	05/09/2021	Medium
Japanese Knotweed	*Fallopia japonica*	9	25/07/2016	High
Rhododendron	*Rhododendron ponticum*	1	13/04/2021	High
Sycamore	***Acer pseudoplatanus***	**1**	**08/10/2008**	**Medium**
Three-cornered Garlic	*Allium triquetrum*	1	25/03/2022	Medium
Traveller's-joy	***Clematis vitalba***	**2**	**29/01/2018**	**Medium**
Fauna				
Brown Rat	*Rattus norvegicus*	2	13/12/2015	High
European Rabbit	*Oryctolagus cuniculus*	6	28/06/2018	Medium
Harlequin Ladybird	*Harmonia axyridis*	1	27/06/2020	High
Jenkins' Spire Snail	*Potamopyrgus antipodarum*	5	22/06/2017	Medium
Rose-ringed Parakeet	*Psittacula krameri*	1	31/12/2011	High

Table 26: Records of invasive species within 2km of the Proposed Development

No Third Schedule or "High Impact" species were recorded on site therefore invasive species can be **scoped out**.

[28]S.I. No.477/2011 – European Communities (Birds and Natural Habitats) Regulations 2011 https://www.irishstatutebook.ie/eli/2011/si/477/made/en/print

[29] 1143/2014 Invasive Alien Species Regulation https://eur-lex.europa.eu/legal-content/EN/TXT/?qid=1483614313362&uri=CELEX:32014R1143

4.4.10 Summary of Key Ecological Receptors

A summary of sensitive receptors considered at risk of impact by the construction and/ or operational phase of the project are outlined below:

Feature	Level of Importance	Justification
Protected sites and Article 17 habitats		
Cork Harbour SPA	International	Site <0.1km from proposed site development area and susceptible to indirect impact from the development.
Feature	Level of Importance	Justification
Protected sites and Article 17 habitats		
Owenboy River pNHA	National	Site <0.1km from proposed site development area and susceptible to indirect impact from the development.
Owenboy Estuary 1140	County	Habitat <0.1km from proposed site development area and susceptible to indirect impact from the development.
Owenboy Mudflat 1130	County	Habitat <0.1km from proposed site development area and susceptible to indirect impact from the development.
Habitats		
Hedgerow (WL1) and Treeline Habitat (WL2)	Local Importance (Higher value)	Habitat that may be used as ecological commuting corridors and foraging habitats for wildlife. These habitats are essential in maintaining connectivity to the wider landscape and to species of higher ecological value.
Scattered Trees and Parkland (WD5)	Local Importance (Higher value)	Habitat that may be used as ecological commuting corridors and foraging habitats for wildlife. These habitats are essential in maintaining connectivity to the wider landscape and to species of higher ecological value.
	County	Habitat that contains various veteran oak trees with potential to support substantial numbers of species of a higher conservation value. These habitats are essential in maintaining connectivity to the wider landscape and to species of higher ecological value.
Tidal Rivers (CW2)	National	Habitat that consists of Article 17 habitat and is designated as a Proposed Natural Heritage Area (pNHA).
Species		
Common Frog	Protected	Suitable foraging and commuting habitat on site that might be affected. Protected species under the Wildlife Acts.
Breeding Birds:	Protected	Suitable foraging and nesting habitat on site that for a variety of species that will be affected. Protected species under the Wildlife Acts.
Invertebrates: - Gatekeeper; - Moss Carder Bee; - Large Red-Tailed Bumblebee; - Patchwork Leafcutter Bee; - Mining bees.	Local Importance (Higher value)	Suitable nesting and foraging habitat in the general environs of the site that will be affected, where applicable larval foodplants recorded. All species are red listed as at “Near Threated” or greater risk on Irish Red Data List.

Feature	Level of Importance	Justification
Bats. - Leisler's bat, - Soprano Pipistrelle; - Brown Long-eared Bat; - Common Pipistrelle; - Daubenton's Bat; - Whiskered Bat; and - Natterer's Bat.	Protected	Suitable foraging, commuting and roosting habitat on site for a variety of bat species that will be affected. Protected species under the Wildlife Acts.
Red Squirrel	Protected	Suitable foraging and commuting habitat on site that will be affected. Protected species under the Wildlife Acts.
Pine Marten	Protected	Suitable foraging and commuting habitat on site that will be affected. Protected species under the Wildlife Acts.
West European Hedgehog	Protected	Suitable foraging and commuting habitat on site hedgehog that will be affected. Protected species under the Wildlife Acts.

Table 27: Summary of Key Ecological Receptors scoped in for further assessment.

5. Likely Significant Impacts

5.1 Overview of Proposed Development

The Proposed Development area occurs to the north and south of Carrigaline town centre. To the north of Carrigaline town centre it runs parallel to the Ballea Road and Church Road and northwards from intersects with these roads along the Cork Road and Rock Road. To the south of the town centre the Proposed Development runs west to east along the Strand Road as far as the Owenabue Sail Garden and south along Church Hill as far as the Castle Heights Roundabout. Finally, the development leads west and south from Church Hill to Wheatfields along the Kilmoney Road Lower. The northern section of the Proposed Development is centred at Irish National Grid Reference (INGR) W 73066 62730, and the southern section is centred at INGR W 72281 62110. An overview of the Proposed Development Area can be found in Appendix A.6

The roads included within the Proposed Development include the following:

- Area 1- Cork Road from the Ballinrea Road Roundabout at the northern edge south to the Ballea Road Roundabout;
- Area 2 - Rose Hill from the Kilmoney Road Upper Junction in the north to the Rose Hill Junction to the south;
- Area 3 - Ballea Road from the Mill Road Roundabout (to the west) to Cork Road Junction (in the east);
- Area 4 - Church Road from the Cork Road/R612 Junction (to the west) to the Junction with an unnamed road east of The Estuary. This section also extends from the Junction at Church Road and Rock Road in the south to the Junction of Fernhill Road and Laurelmount Drive in the north;
- Area 5 - Kilmoney Road from the Junction at Church Hill to the new junction with Pottery Road and roundabout in the south at Castle Heights to the junction with Kilmoney Road Upper; and
- Area 6 -Strand Road from Dunnes Stores to the southern edge of Bóthar Guidel Bridge and east to Owenabue Sail Garden

The development will include the following works:

- Area 1 - Cork Road from the Ballinrea Road Roundabout at the northern edge south to the Ballea Road Roundabout;
  - Provision of a quiet street treatment along Glenwood Estate;
  - Provision of a segregated shared space on the western side of the road;
  - Provision of entry treatment at the junction of Main Street / Ballea Road / Church Road and Cork Road; and
  - Provision of raised entry treatments along Cork Road.
- Area 2 – Along Rose Hill Area
  - Provision of a segregated cycle track southbound on Rose Hill;
  - Adjustment to roundabout to negate northbound traffic from travelling on to Rose Hill;
  - Provision of raised entry treatments along Rose Hill; and
  - Provision of a quiet street treatment along Whiteoaks / Clover Hill
- Area 3 – Along Ballea Road
  - Provision of segregated cycle tracks on both sides of the road;
  - Introduction of formalised car parking outside Carrigaline AFC;

- Provision of raised entry treatments along Ballea Road; and
- Provision of continuous footpaths on both sides of road for entire Ballea Road section.

- Area 4 – Along Church Road / Rock Road
  - Provision of segregated cycle tracks on both sides of the road for majority of route, including provision of shared space infrastructure at pinch points on Church Road;
  - Provision of continuous footpaths on both sides of road for Church Road section and majority of Rock Road section;
  - Introduction of formalised and reconfigured car parking outside Church and School on Church Road;
  - Provision of raised entry treatments along Church Road / Rock Road; and
  - Introduction of formalised parking along Kilmoney Road Lower.
- Area 5 – Kilmoney Road Lower Area
  - Provision of segregated cycle tracks on both sides of the road for sections of route, including provision of shared space infrastructure at pinch points on Kilmoney Road Lower;
  - Provision of continuous footpaths on both sides of road for sections of Kilmoney Road Lower;
  - Provision of raised entry treatments along Kilmoney Road Lower; and
  - Provision of protected style junction on Kilmoney Road Lower / Pottery Road
- Area 6 – Strand Road Area
  - Provision of segregated cycle track on north side of the road for majority of route, including provision of shared space infrastructure upon entry on to Main Street; and
  - Provision of signalised junction at Owenabue Bridge / Strand Road junction.

5.2 Characteristics of Development

5.2.1 Construction

Construction works for the Proposed Development will include excavation of the street surfacing and sub-base, removal of existing surface materials and repaving of the street to include installation of new footpaths and cycle-tracks. The works will result in vegetation removal throughout the site including trees, shrubs, herbs and grasses and any resting, commuting or foraging potential those habitats have for fauna. Treeline and hedgerow habitat anticipated to be impacted by the development can see in Appendix A.5. The works will also install new utilities including additional drainage into the existing drainage network, street lighting and involve the planting of native trees and plants.

The maximum depth of excavation will be 1,000mm below existing surface level, with the majority of the excavations approximately 500mm below the existing surface level. The detailed design stage will inform the exact location of trees and structural supports (i.e., for street lighting) to outline where possible that these are not impacted during the installation of the necessary foundations.

Barriers and hoardings will be installed to restrict access and to provide safety measures for workers and pedestrians. Excavation works will be carried out on a phased basis to limit the impact on the activity of the street. This phasing will be set out in detail in an agreed Construction Environmental Management Plan (CEMP) and Traffic Management Plan (TMP), which will be prepared by the contractor prior to construction and implemented for the duration of the construction phase.

Access to the properties where construction works are proposed will be maintained at all times during the construction phase. This may require night works for final surfacing, utility installation in the vicinity of property entrances, etc. Details of this scheduling will be confirmed as part of the CEMP and TMP.

The scale of construction proposed will require the temporary closure of traffic lanes to facilitate a safe working area. However, to limit the impact, the road closure will occur in sections and one lane will always be available for traffic.

Some localised dust, surface-water and noise emissions may be generated during the construction phase however these will not be significant due to the relatively short duration of the works (approximately six to eight months), the low level of construction vehicles/plant and construction staff required to carry out the works, the nature of the works proposed and the narrow construction footprint along trafficked roads.

It is envisaged that a construction compound which will operate as the main compound with associated office space. The exact location of the construction compound will be established during detailed design and will be agreed with Cork County Council (CCC) and restrictions on the location included in the CEMP. It is envisaged that this will be located away from the Owenboy river and the Cork Harbour SPA.

Surface water run-off will either enter the existing drainage system for eventual treatment at Shanbally Wastewater Treatment Plant (WwTP) or will be discharged via the stormwater network. The extent of the works (in an urbanised area) is relatively small, excavations are shallow (max 1,000mm), dewatering is not envisaged and any construction run-off that is generated will be minor and will enter the existing surface water drainage system. The type of construction works proposed are not complex in nature, they are well understood, therefore significant environmental emissions are not predicted.

5.2.1.1 Demolition and Excavation

During the construction phase, the breaking of kerbs will be undertaken. Excavations are shallow (maximum of 1,000mm in depth), and dewatering is not envisaged. Aside from these activities, there are no demolition works required for the completion of the Proposed Development.

5.2.1.2 Lighting

Limited construction lighting will be required given the hours of work will be predominantly within daylight hours. However, where night working is required, artificial lighting will be required, and this will be agreed in advance with CCC. It is anticipated that any lighting required for night working will be managed in line with best practice methods to reduce the visual disturbance to residential receptors within the Proposed Development boundaries.

5.2.1.3 Noise and Vibration

Noise will be generated during the construction of the Proposed Development due to construction traffic, construction machinery, excavation works etc. There are several residential receptors located near or adjacent to the Proposed Development, as mentioned in Section 5.2.1.

Noise emissions will be controlled by the implementation of best construction practice. Examples of measures to be employed include the selection of quiet plant, not leaving plant idling and maintenance of plant to minimise noise generation.

Significant rock breaking is not required, however where localised kerb breaking is required this will be managed appropriately. The main vibration source during the construction phase will be from the proposed excavation/milling works. A variety of potential vibration causing items of plant are likely to be used such as excavators, lifting equipment and dumper trucks. Vibration effects will be controlled by the implementation of best construction practice. Examples of measures to be employed include the use of suitable vibration isolators in equipment mountings and ensuring that materials are lowered rather than dropped from heights.

Construction operations as part of the Proposed Development, deliveries to site and construction shift times will be managed to ensure minimal disruption and noise. Working hours will be limited to the hours of 0700 – 1800 Monday to Friday and 0800-1400 on Saturday will apply to all works. Night-time and Sunday working may be required to facilitate street works that cannot be undertaken during daytime / evening conditions.

5.2.1.4 Water Management

Excavations are shallow (max 1,000mm) and dewatering is not envisaged. Any construction run-off that is generated will enter the existing drainage systems and will be diluted as it travels approximately 2.5km

northeast before treatment at Shanbally WwTP or filtered through the stormwater drainage and ground prior to entering the Owenboy River. Best practice construction measures such as silt and sediment controls will be detailed with the CEMP and installed prior to the commencement of any construction works.

Although these best practice construction measures will involve the removal of contaminants and therefore may have the effect of reducing harmful effects of the Proposed Development, these measures have been incorporated into that Proposed Development as standard features, inherent the project and irrespective of any effect on the Cork Harbour SPA. This includes:

Construction Machinery

No fuels will be stored on site. All fuels will be stored within a bunded compound within the construction compound. Best practice construction practices will be implemented throughout the duration of the construction phase.

Construction Site Drainage

Depth of any excavation works is shallow (maximum 1,000mm) so ground water infiltration is not expected. Wastewater collected from the Proposed Development will be discharged to Shanbally WwTP, with treated effluent discharged to Cork Lower Harbour, as is currently the normal practice. There are existing stormwater drainage systems in place on Strand Road. However, where excess surface water is discharged via the stormwater drainage system, any remaining minimal pollutants will be adequately diluted and dispersed resulting in no significant effects.

In the unlikely event that groundwater is encountered during the excavations, this will be collected from the Proposed Development will be discharged into the existing surface water network and treated at Shanbally WwTP before the treated effluent is discharged in Cork Lower Harbour.

5.2.2 Operation

5.2.2.1 Air and Dust Management

During the operational phase, there will be no negative impact to air quality as the proposed development is located on a pre-existing road. The Proposed Development will serve to extend cycling and pedestrian facilities that will not emit dust or reduce air quality. Such operation aims to reduce motorised vehicle use and thus reduce carbon emissions.

5.2.2.2 Lighting

The only structures which will be placed above ground as part of the proposed development will be a number of street columns. The proposed lighting will replicate the existing lighting in the area and these structures will be approximately 10m high and will not be increased above the existing baseline.

5.2.2.3 Noise Management

The Proposed Development will improve cycling and pedestrian facilities to encourage active travel, potentially reducing noise from motorised vehicles.

5.2.2.4 Resource and Waste Management

During the operational phase, there will be no change to waste or resources as a result of the Proposed Development. No impacts on land use or material assets are predicted during the operation phases of the proposed development.

5.2.2.5 Water Management

Surface water run-off will be managed as is currently in place. Any surface run-off that is generated will be minor and will enter the existing surface water drainage system and will be diluted before eventual discharge to the Owenabue River or Estuary, or treatment at Shanbally WwTP and ultimate discharge of treated effluent in Cork Lower Harbour. Due to the implementation of Sustainable Drainage Systems (SuDS), it is anticipated there will be a decrease in surface water runoff during operation.

5.3 Likely Significant Impacts

Direct and indirect likely significant impacts on KERS (i.e., habitats flora and fauna) that may occur as a result of the proposed development are identified in this section.

Construction projects may potentially impact on the natural environment (habitats, flora, fauna, water quality and fisheries). The construction phase is likely to have the most significant effect. Possible construction phase impacts include;

- Habitat loss / degradation;
- Water quality impacts;
- Disturbance / displacement of species.

Once the construction phase ceases, any species temporarily displaced during the construction phase are expected to utilise the habitats in the vicinity of the proposed works, shortly after the construction phase. It is anticipated however that the carrying capacity of these habitats will be reduced on account of the removal of habitat and therefore returning population levels will be at lower levels that anticipated in the status quo.

During the operational phase, there may be some slight disturbance owing to increased noise and human activity arising from periodic maintenance and use of the proposed infrastructure. Habitat removal will result in increased fragmentation of potential foraging and commuting corridors, in particular for non-volant mammals resulting in increased collision risk with traffic. Reduced species productivity resulting from the decreased carrying capacity of habitats is also anticipated.

6. Assessment of Impacts, Effects and Mitigation

This section of the assessment involves identifying and characterising impacts, incorporating measures to avoid and mitigate these impacts, and assessing the significance of any residual effects after mitigation.

6.1 Avoidance

The extent of the scheme has been reduced with a large section of the proposed development removed between the junction of Kilmoney Road Lower and Pottery Road and the junction of Kilmoney Road Upper and Kilmoney Road Lower to avoid impact on sensitive surrounding environmental receptors, in particular hedgerow and treeline habitat. Removing this section of the project has prevented the removal in *c.*400m of treeline and hedgerow habitat.

Figure 2 Comparison of initial project footprint (left hand image) and current project footprint (right hand image)

6.2 Impacts, effects and mitigation

6.2.1 Designated Sites and Article 17 Habitat

A screening for Appropriate Assessment has been prepared for the proposed development and concluded:

"*There is no potential for the Proposed Development site to significantly impact on Natura 2000 sites.*

- *the Proposed Development site is not directly connected with, or necessary to the conservation management of any Natura 2000 sites; and*
- *the Proposed Development, alone or in combination with other projects, is not likely to have significant effects on Natura 2000 sites in view of their conservation objectives.*

It has been determined by Arup that it is possible to rule out LSE on any Natura 2000 sites. It is the view of Arup that it is not necessary to undertake any further stage of the Appropriate Assessment process".

There is no overlap between the subject site and Cork Harbour SPA therefore it is not anticipated that there will loss of habitat within the site.

There is limited potential for indirect habitat alteration Cork Harbour SPA due to the potential for adverse water quality impacts from the proposal. However, the potential for significant water quality effects on coastal habitats is lessened by a number of factors including dilution by the receiving waters, drainage infrastructure that flows into Shanbally Wastewater Treatment Works and embedded best practice.

During its construction phase the proposed development is anticipated to result in significant increase of personnel which may result in increased disturbance to QIs, however this is anticipated to be short term and

temporary. In addition, the proposed development will result in loss of habitat in the vicinity of the SPA, however this does not include habitat likely to be used by the QIs of the Cork Harbour SPA.

During its operational phase, the proposed development is not anticipated to result in a significant increase of the local population or number of road users, therefore visitor numbers and associated recreational pressures at the statutory designated sites are not anticipated to be impacted.

It can then be concluded that the proposed works will not result in significant effects to the Cork Harbour SPA.

In addition Owenboy River and associated EU Annex I habitat (mudflats and estuaries) either:

a) underlie the Cork Harbour SPA and share the same features of interest; and/or

b) are subject to the same sources and pathways as the Cork Harbour SPA.

The reasoning stated above in concluding that there will not be significant effects to the Cork Harbour SPA can also be applied to the Owenboy River pNHA and associated EU Annex I habitat (mudflats and estuaries).

Therefore it can be concluded that the **proposed development will not result in significant effects to designated sites or EU Annex I habitats and no mitigation measures are required**.

6.2.1.1 Habitat Loss / Degradation

The works will involve the complete removal of habitat from the affected areas coupled with paving and creation of new Built and Artificial surfaces habitat that will be maintained as such during the operational phase.

The proposed development will result in the following habitat loss:

Habitat type	Extent Affected (m^2 unless otherwise given)	Geographical Importance	Phase of Impact	Significance of Effects	Mitigation	Residual Effects
Tidal Rivers (CW2)	No habitat loss though indirect degradation of the 1km of riverbank could occur due to water pollution events.	National	Construction	No habitat loss required, potential for construction phase water quality degradation. **No adverse effects are anticipated.**	Water protection measures will be implemented in the CEMP to prevent water quality issues arising from the construction phase.	Subject to strict implementation of the above safeguards, no direct loss of habitat is anticipated upon the Tidal Rivers (CW2) habitat in the short-term.
Scattered Trees and Parkland (WD5)	490m^2 with a loss of 67 mature trees (locations shown in Appendix A.5 and A.9)	Local Importance (Higher Value)	Construction	Permanent loss of mature treeline habitat, in the absence of mitigation this effect is likely to be larger than the extent identified due to damage that might occur to adjacent tree and shrub root zones. **Near certain high impact, with permanent, negative effect.**	Any trees felled will be replaced and will comprise species that are native. Mitigation will be based on Bristol City Council's new or compensatory tree planting[30] New tree and hedgerow planting / habitat creation measures which will also contribute to ecological connectivity in the landscape are shown in landscape drawings in Appendix A.8.	Subject to strict implementation of the above safeguards no adverse effects are anticipated upon the Scattered Trees and Parkland (WD5) habitat over the long-term.

[30] https://www.bristol.gov.uk/files/documents/81-spd-final-doc-dec2012/file

<table>
<tr><th>Habitat type</th><th>Extent Affected (m^2 unless otherwise given)</th><th>Geographical Importance</th><th>Phase of Impact</th><th>Significance of Effects</th><th>Mitigation</th><th>Residual Effects</th></tr>
<tr><td>Scattered Trees and Parkland (WD5)</td><td></td><td></td><td></td><td></td><td>
<table>
<tr><th>Trunk Diameter of tree lost to development.

(Cm measured at 1.5 m)</th><th>No of replacement trees</th></tr>
<tr><td>0-15</td><td>0-1</td></tr>
<tr><td>15-19.9</td><td>1</td></tr>
<tr><td>20-29.9</td><td>2</td></tr>
<tr><td>30-39.9</td><td>3</td></tr>
<tr><td>40-49.9</td><td>4</td></tr>
<tr><td>50-59.9</td><td>5</td></tr>
<tr><td>60-69.9</td><td>6</td></tr>
<tr><td>70-79.9</td><td>7</td></tr>
<tr><td>80+</td><td>8</td></tr>
</table>

Examples of the species that can undertake this are outlined in guidance from the All-Ireland Pollinator Plan[31] and the Clúid Housing Landscaping and Biodiversity Guide for New Developments[32].

Where works are anticipated adjacent to trees to be retained these will be undertaken in accordance with</td><td></td></tr>
</table>

[31] All Ireland Pollinator Plan (2023). Planting Trees for Pollinators. https://pollinators.ie/wp-content/uploads/2022/03/Native-Irish-Trees-Guide.pdf

[32] Clúid Housing (2023). Landscaping and Biodiversity Guide for New Developments. https://www.cluid.ie/wp-content/uploads/2023/05/Landscaping-and-Biodiversity-Guide-for-web.pdf

Habitat type	Extent Affected (m^2 unless otherwise given)	Geographical Importance	Phase of Impact	Significance of Effects	Mitigation	Residual Effects
Scattered Trees and Parkland (WD5)					BS 5837:2012[33]. This will include, but is not limited to: • Avoiding excavations, storage of materials, vehicle movement and other construction activities within the tree's root protection areas; • Installation of suitable protective fencing will be erected around all on-site trees during the construction phase to prevent accidental damage; and • Production and adherence to a site specific Arboricultural Method Statement, provided by a suitably qualified Arboricultural Consultant. These measures should be detailed within a Construction Environment Management Plan (CEMP) and Landscaping Plan.	
Hedgerow (WL1) and Treeline (WL2) Hedgerow (WL1)	Linear: *c.*200m (locations shown in Appendix A.5 and A.9)	Local Importance (Higher Value)	Construction	Permanent loss of mature treeline habitat. **Near certain high impact, with permanent, negative effect.**	Planting of new treelined hedgerow habitat should be undertaken according to best practice guidance such as Teagasc [34]. One tree shall be planted every 10m and shall be semi-mature, one tree every 40m shall be mature. Replacement habitat shall equate to the length lost (i.e. 200m) and should at least equate to hedgerow species and will comprise species that are native and typical of the area. New tree and hedgerow planting / habitat creation measures which will also contribute to ecological	Subject to strict implementation of the above safeguards, no adverse effects are anticipated upon the Hedgerow (WL1) habitat over the long-term.

[33] British Standards Institution (2012). Trees in relation to design, demolition and construction. Recommendations. BS 5837:2012, April 2012.

[34] https://assets.gov.ie/231749/39dd9ce0-fb95-4619-bd8e-8ff53b752d08.pdf

Habitat type	Extent Affected (m^2 unless otherwise given)	Geographical Importance	Phase of Impact	Significance of Effects	Mitigation	Residual Effects
and Treeline (WL2)					connectivity in the landscape are shown in landscape drawings in Appendix A.8. Examples of the species that can undertake this are outlined in guidance from the All-Ireland Pollinator Plan[35] and the Clúid Housing Landscaping and Biodiversity Guide for New Developments[36]. Mitigation of larger trees and shrubs will be based on Bristol City Council's new or compensatory tree planting[37] Where works are anticipated adjacent to trees to be retained these will be undertaken in accordance with BS 5837:2012[38]. This will include, but is not limited to: • Avoiding excavations, storage of materials, vehicle movement and other construction activities within the tree's root protection areas; • Installation of suitable protective fencing will be erected around all on-site trees during the construction phase to prevent accidental damage; and	

[35] All Ireland Pollinator Plan (2023). Planting Trees for Pollinators. https://pollinators.ie/wp-content/uploads/2022/03/Native-Irish-Trees-Guide.pdf

[36] Clúid Housing (2023). Landscaping and Biodiversity Guide for New Developments. https://www.cluid.ie/wp-content/uploads/2023/05/Landscaping-and-Biodiversity-Guide-for-web.pdf

[37] https://www.bristol.gov.uk/files/documents/81-spd-final-doc-dec2012/file

[38] British Standards Institution (2012). Trees in relation to design, demolition and construction. Recommendations. BS 5837:2012, April 2012.

Habitat type	Extent Affected (m^2 unless otherwise given)	Geographical Importance	Phase of Impact	Significance of Effects	Mitigation	Residual Effects
					• Production and adherence to a site specific Arboricultural Method Statement, provided by a suitably qualified Arboricultural Consultant. These measures should be detailed within a Construction Environment Management Plan (CEMP) and Landscape Plan.	
Dry Meadows and Grassy Verges GS2	200m^2.	Local Importance (Lower Value)	Construction	Permanent loss of Dry Meadows and Grassy Verges habitat. **Near certain high impact, with permanent, negative effect.**	All dry meadow and grassy verge habitat lost will be replaced by pollinator planting mix and meadow mix throughout the scheme with more than 1 to 1 replacement ratio. Native, local provenance seed mix to be used, where available, planted on low nutrient soil. Proposed replacement grassland planting is shown in Appendix A.8.	

Table 28: Summary of scope in habitat loss / degradation from the proposed development.

6.2.1.2 Tree assessment

In line with the mitigation outlined in Table 28 an assessment of tree species and their diameters was undertaken for any trees that are anticipated to be removed. This is outlined in Table 29 below. All tree and hedgerow replacement planting will be native with species to be identified by a qualified ecologist.

Table 29: Summary of scope in habitat loss / degradation from the proposed development.

Field ID	Common name	Scientific name	Circumference (cm)	Diameter (cm)	Number of trees required to mitigate
236	Large-leaved Lime	*Tilia platyphyllos*	63.5	20	2
128	Felled				0
166	Norway Maple	*Acer platanoides*	81	26	2
164	Ash	*Fraxinus excelsior*	64	20	2
162	Sycamore	*Acer pseudoplatanus*	134	43	4

Field ID	Common name	Scientific name	Circumference (cm)	Diameter (cm)	Number of trees required to mitigate
160	Eucalyptus sp.	*Eucalyptus sp.*	255	81	8
158	Ash	*Fraxinus excelsior*	60	19	1
156	Ash	*Fraxinus excelsior*	72	23	2
154	Ash	*Fraxinus excelsior*	53	17	1
150	Ash	*Fraxinus excelsior*	63	20	2
148	Liquidambar sp.	*Liquidambar sp.*	35	11	1
146	Liquidambar sp.	*Liquidambar sp.*	37	12	1
152	Umbrella Pine	*Sciadopitys verticillata*	10	3	1
131	Cherry Laurel	*Prunus laurocerasus*	12	4	1
130	Beech	*Fagus sylvatica*	145	46	4
234	Beech	*Fagus sylvatica*	134	43	4
232	Beech	*Fagus sylvatica*	65	21	2
230	Sycamore	*Acer pseudoplatanus*	41	13	1
228	Common Pear	*Pyrus communis*	144	46	4
226	Sycamore	*Acer pseudoplatanus*	102	32	3
224	Whitebeam	*Sorbus aria*	57	18	1
222	Sycamore	*Acer pseudoplatanus*	101	32	3
220	Sycamore	*Acer pseudoplatanus*	105	33	3
216	Sycamore	*Acer pseudoplatanus*	55	18	1
218	Sycamore	*Acer pseudoplatanus*	45	14	1
214	Norway Maple	*Acer platanoides*	68	22	2
212	Norway Maple	*Acer platanoides*	35	11	1

Field ID	Common name	Scientific name	Circumference (cm)	Diameter (cm)	Number of trees required to mitigate
210	Sycamore	*Acer pseudoplatanus*	107	34	3
208	Sycamore	*Acer pseudoplatanus*	104	33	3
206	Sycamore	*Acer pseudoplatanus*	99	32	3
136	Hawthorn	*Crataegus monogyna*	32	10	1
238	Hawthorn	*Crataegus monogyna*	37	12	1
134	Hawthorn	*Crataegus monogyna*	54	17	1
194	Hawthorn	*Crataegus monogyna*	55	18	1
196	Hawthorn	*Crataegus monogyna*	55	18	1
198	Crack Willow	*Salix fragilis*	262	83	8
202	Goat Willow	*Salix caprea*	270	86	8
204	Alder	*Alnus glutinola*	85	27	2
200	European Plum	*Prunus domestica*	65	21	2
192	Ash	*Fraxinus excelsior*	82	26	2
190	Ash	*Fraxinus excelsior*	88	28	2
186	Ash	*Fraxinus excelsior*	102	32	3
188	Small-leaved Lime	*Tilia cordata*	184	59	5
182	Ash	*Fraxinus excelsior*	122	39	3
184	Hawthorn	*Crataegus monogyna*	74	24	2
178	Yew	*Taxxus baccata*	40	13	1
180	Sycamore	*Acer pseudoplatanus*	145	46	4
176	Sycamore	*Acer pseudoplatanus*	175	56	5
174	Sycamore	*Acer pseudoplatanus*	102	32	3

Field ID	Common name	Scientific name	Circumference (cm)	Diameter (cm)	Number of trees required to mitigate
172	Sycamore	*Acer pseudoplatanus*	165	53	5
170	Ash	*Fraxinus excelsior*	240	76	7
168	Ash	*Fraxinus excelsior*	Unable to measure	64	6
140	Japanese Flowering Cherry	*Prunus sp.*	55	18	1
238	Silver Birch	*Betula pendula*	108	34	3
240	Felled				0
242	Sycamore	*Acer pseudoplatanus*	141	45	4
244	Wild Cherry	*Prunus avium*	65	21	2
246	Norway Maple	*Acer platanoides*	126	40	4
248	Norway Maple	*Acer platanoides*	154	49	4
144	Ash	*Fraxinus excelsior*	126	40	4
126	Japanese Flowering Cherry	*Prunus sp.*	198	63	6
250	Ash	*Fraxinus excelsior*	46	15	1
252	Ash	*Fraxinus excelsior*	Unable to measure	80	8
142	Ash	*Fraxinus excelsior*	182	58	5
254	Rowan	*Sorbus aucuparia*	94	30	2
256	Small-leaved Lime	*Tilia cordata*	54	17	1
258	Small-leaved Lime	*Tilia cordata*	49	16	1
124	Small-leaved Lime	*Tilia cordata*	47	15	1
Total number of trees required to mitigate project					187

6.2.2 Fauna

6.2.2.1 Common Frog

6.2.2.1.1 Impacts

The main impacts likely to affect common frog during the construction phase are habitat removal. Hedgerow and treeline habitat offer some suboptimal suitability for foraging and hibernating common frog. The construction phase would remove c. 550m of suboptimal habitat for this species with reduced recruitment for common frog prey guild, greater predation of common frogs as a result of less predation and reduced productivity for common frog over the long-term. Given the absence of breeding habitat nearby however it is considered unlikely that there will be large numbers of common frog that utilise the site and any that do likely do so irregularly and without fidelity.

The operational phase is not anticipated to impact common frog. While suitable the habitat to be lost is not considered to be significant for commuting or foraging common frog. Impact of the development on common frog is determined to be the near-certain loss of low potential foraging habitat resulting in a local, negative permanent impact. The operational phase is not anticipated to result in a significant loss on account of the paucity of breeding habitat for the species in the area and the low mobility the species has. This negative permanent impact is determined to be **not significant at the local level**.

6.2.2.1.2 Mitigation

Habitat removed will be reinstated as outlined in Table 28 to mitigate the impact of the project. This will replace suitable foraging and commuting habitat over the short to medium term and support the creation of hibernacula over the long term.

Identify options to create habitat piles using deciduous woodland felled by the project within the red line boundary to create new common frog hibernacula.

6.2.2.1.3 Residual Effects

Subject to implementation of the above safeguards, no adverse effects are anticipated upon common frog in the long-term.

6.2.2.2 Breeding Birds

6.2.2.2.1 Impacts

The main impacts likely to affect breeding birds during the construction phase are habitat removal – specifically of c. 550m Hedgerow WL1 and Treeline WL2 habitat. This habitat is considered to be optimal for breeding and foraging for a range of species. Primarily species impacted are species of low conservation concern, however the red listed house sparrow and amber listed starling and grey wagtail are likely to be impacted by the removal of the treeline and hedgerow habitat and the stonewalls associated with these habitats throughout the site. In addition removal of this habitat has the potential to disturb breeding birds throughout the site.

Impact of the development is determined to be the near-certain loss of foraging and nesting habitat determined to have a **significant negative effect at the local level**.

6.2.2.2.2 Mitigation

Nesting boxes will be provided on a like for like basis (i.e. using boxes with a minimum of 25 year span in the field as might be expected from trees removed) under the direction of an Ecological Clerk of Works for the following species of conservation concern:

- Grey Wagtail;
- House Sparrow; and
- Starling.

House sparrow and starling will utilise different specifications of boxes so where numbers of boxes are noted this is box per species rather than number of boxes total. It is recommended that new boxes are erected for house sparrow and starling at a density of one box for every 15m of moderate significance hedgerow and treeline habitat, one box for every 30m of low to moderate significance hedgerow and treeline habitat and

one box for every 50m of low to negligible significance hedgerow. This equates to six boxes for each species to mitigate against the felling of moderate significance hedgerow, four boxes for each species to mitigate against low to moderate significance hedgerow and six boxes to mitigate against low to negligible significance hedgerow equating to a total of 16 boxes for each species. Both of these species prefer to nest in loose colonies so it is recommended that starling boxes are split into two disparate locations erected at a suitable location within 30m of one another but separate from the house sparrow boxes which should also be split into disparate locations and erected within 30m of one another but separate from the starling boxes.

In addition grey wagtail nesting habitat is likely to be impacted due to the loss of walls within hedgerow on site. Assuming a high density of grey wagtail in the area using the precautionary principle grey wagtail have been known to have breeding densities of one pair per 0.25 miles. This site is adjacent to approximately one mile of river meaning that mitigation should also include an assumption that four pairs of nesting grey wagtail might be affected and therefore mitigation should include four nest boxes for this species.

Appropriate sites will be chosen for all bird boxes by a Suitably Qualified Ecologist (SQE) who will also review their installation.

Habitat removed will be reinstated as outlined in Table 28 to mitigate the impact of the project and ensure future foraging and breeding habitat in the long-term.

Vegetation removal works will be undertaken outside of the breeding birds season (1st March to 1st August), unless under the supervision of and prior survey by a SQE. Boxes will be erected prior to the initiation of any vegetation removal works.

6.2.2.2.3 Residual Effects

Subject to implementation of the above safeguards, it is anticipated that there will be a significant negative effect for foraging birds at the site level over the medium term but over the long-term it is considered that there will be no adverse residual effects..

6.2.2.3 Invertebrates

6.2.2.3.1 Impacts

The construction phase will result in the removal of *c.*550m Hedgerow WL1 and Treeline WL2 habitat and *c.* 200m^2 of native Dry Meadow and Grassy Verge habitat with a resultant loss near-certain loss of flower rich foraging habitat for gatekeeper, moss carder bee, large red-tailed bumblebee, patchwork leafcutter bee and the mining bee species group. .The loss of these habitat types will also result in the loss of larval food plants required by the gatekeeper and the nesting habitats required by the moss carder bee, large red tailed bumblebee, patchwork leafcutter bee. In addition, the construction phase of the project is anticipated to remove various Dry Meadow and Grassy Verge habitat with several active mining bee colonies. The operational phase is not anticipated to impact this group.

The gatekeeper butterfly and various bees of this group are considered to be of special conservation significance in the most recent Cork County Council LBAP[39] however it is not possible to robustly justify a conclusion of no significant effect. Given the high level of uncertainty and in keeping with the precautionary principle it is considered that the project will result in a **significant negative effect** for this group **at the County level** and mitigation measures have been identified in line with best practice guidance[40]..

6.2.2.3.2 Mitigation

Two bee posts[41] will be installed in suitable sites within public green space adjacent to the proposed development to replace Patchwork Leafcutter Bee nesting habitat. One bee bank will be installed in suitable sites to replace mining bee colonies of a minimum area of 20m^2. These installations will be in the vicinity of the species rich grassland, with a suitable southerly aspect and will adhere to the habitat management plan.

Dry Meadow and Grassy Verge (GS2) habitat on site includes species suitable for foraging adult and larval forms of these species. This habitat type equates to .0137ha or 137 m^2. As well as the treeline and hedgerow

[39] http://www.globalislands.net/greenislands/docs/ireland_734358998.pdf

[40] https://cieem.net/wp-content/uploads/2019/02/Combined-EclA-guidelines-2018-compressed.pdf

[41] https://www.greenandblue.co.uk/products/beepost

habitat dry meadow and grassy verge type habitats should be reinstated on site to mitigate this loss. Habitat piles created using deciduous woodland felled by the project will support various species of cavity nesting bees, such as the Patchwork Leafcutter Bee in the medium to long-term that will benefit from the burrows left by beetle larvae and other wood boring species.

6.2.2.3.3 Residual Effects

Subject to implementation of the above safeguards, no significant adverse effects are anticipated upon invertebrates over the long-term.

6.2.2.4 Bats

6.2.2.4.1 Impacts

The construction phase will result in the removal of *c.*550m Hedgerow WL1 and Treeline WL2 habitat and *c.* 200m^2 of native Dry Meadow and Grassy Verge habitat with a resultant loss near-certain loss of suitable foraging and a probable loss of future roosting habitat for bats, in particular this loss will be starker at hedgerows or treeline habitat considered to be low or moderate significance due to the greater prevalence of native deciduous vegetation.

The construction phase of the project is anticipated to result in fragmentation of commuting corridors though this will be most likely to occur in suburban areas that affect low to negligible quality hedgerow which is not anticipated to be important for bats. It is not anticipated that fragmentation will occur between roost sites and potential core sustenance areas (e.g., woodland at Lower Kilmoney Road).

The operational phase has the potential to result in additional disturbance to the species group, including their commuting zones, should light not be sensitively managed and for this reason the project is anticipated to result in a **significant negative effect** for this species group **at the local level**.

6.2.2.4.2 Mitigation

Habitat removed will be reinstated as outlined in Table 28 to mitigate the impact of the project to support commuting and foraging bats and provide future PRFs over the long-term.

It is considered that 1 box for every 15m of moderate significance hedgerow and treeline habitat, 1 box for every 30m of low to moderate significance hedgerow and treeline habitat and 1 box for every 50m of low to negligible significance hedgerow is sufficient mitigation. This equates to 6 boxes to mitigate against the felling of moderate significance hedgerow, 4 boxes to mitigate against low to moderate significance hedgerow and 6 boxes to mitigate against low to negligible significance hedgerow, resulting in a total installation of 16 bat boxes.

Bat boxes selected for use will be installed in areas that are not subject to light pollution under the supervision of a SQE to mitigate against the loss of future roosting habitat for bats. To ensure mitigation boxes will have a minimum life span of 25 years (such as offered by woodcrete boxes), as would be the case for potential future roost sites prior to the removal of hedgerow and treeline habitat and cater for the range of roosting behaviours for the following species:

- Brown long-eared bat[42]
- Common Pipistrelle[43]
- Daubenton's Bat[44]
- Lesser Noctule[47]
- Natterer's Bat[47]
- Soprano Pipistrelle[47]

[42] e.g Large Multi Chamber Woodstone Bat Box

[43] e.g. Beaumaris Woodstone Bat Box

[44] e.g. Schwegler 2f Bat Box

Lighting plans for the operational phase will be undertaken in accordance with the "Bats and Artificial Lighting at Night" guidance note[45].

6.2.2.4.3 Residual Effects

Subject to implementation of the above safeguards the project will deliver a **significant positive effect** for **roosting bats** in the **short term** due to an expansion in the number of roost sites within the Proposed Development Area with **no adverse effects for roosting bats over the long-term**. This is due to the fact that trees on site do not seem to have bat roosting potential, but this would be expected to chance over the long-term as trees experience fungal infection, lose limbs and develop roosting potential.

The Proposed Development will result in a medium negative impact on foraging bats over the medium-term due to the loss of foraging habitat, transitioning to a net benefit for bats over the long term as habitat restoration works mature. **No significant adverse effects** are anticipated for commuting bats over the long-term while there will be a **significant negative and permanent effect for foraging bats at the local level over the long-term**.

6.2.2.5 Red Squirrel

6.2.2.5.1 Impacts

The construction phase will result in the removal of *c.*550m Hedgerow WL1 and Treeline WL2 habitat suitable for foraging, commuting and resting red squirrels. The majority of this habitat is within the urban footprint of Carrigaline and all of it is in the immediate vicinity of a road network. Roads are a source of collision risk and act as a barrier to red squirrel dispersal and as a result it is considered unlikely that dreys will occur in the immediate environs of the road network. Foraging and commuting red squirrels are likely to make infrequent use of treeline and hedgerow habitat on site. . This use is not considered to be prolific however as it is providing a link from woodland likely to support red squirrels (north of the Lower Kilmoney Road) to suburban and urban habitat types, that are not considered to be of substantial foraging or resting benefit to red squirrels. In addition, the quality of the hedgerow and treeline habitat indicated for removal in the vicinity is anticipated to be of suboptimal quality for red squirrel so impacts on productivity and carrying capacity of the region is not considered likely.

It is therefore that the project will have a reversible local, negative permanent impact for foraging red squirrel and a short-term adverse impact for commuting red squirrel determined to be **not significant at the local level**.

6.2.2.5.2 Mitigation

Habitat removed will be reinstated as outlined in Table 28 to mitigate the impact of the project on foraging and commuting red squirrel.

6.2.2.5.3 Residual Effects

Subject to implementation of the above safeguards, no adverse effects are anticipated upon red squirrels.

6.2.2.6 Pine Marten

6.2.2.6.1 Impacts

The construction phase will result in the removal of *c.*550m Hedgerow WL1 and Treeline WL2 and associated wall habitat suitable for foraging, commuting and resting pine marten. The majority of this habitat is within the urban footprint of Carrigaline and all of it is in the immediate vicinity of a road network. Roads are a source of collision risk and act as a barrier to pine marten dispersal and as a result it is considered unlikely that dens will not occur in the immediate environs of the road network.

Foraging and commuting pine marten are likely to make infrequent use of treeline and hedgerow habitat on site. This use is not considered to be prolific however as it is providing a link from woodland likely to support pine marten (north of the Lower Kilmoney Road) to suburban and urban habitat types, that are not considered to be of substantial foraging or resting benefit to pine marten. In addition, the hedgerow and treeline habitat indicated for removal in the vicinity is anticipated to have some potential for foraging pine marten due to the resting and foraging potential it provides to the pine marten prey guild, in particular small rodents and birds. The habitat also supports berrying species such as bramble and ivy which will be foraged

[45] https://www.theilp.org.uk/documents/guidance-note-8-bats-and-artificial-lighting/

on by pine marten. However, the proximity of the road to traffic and pedestrians will reduce the suitability of the habitat to pine marten. In addition, the hedgerow and treeline habitat are considered to be of moderate significance or less, therefore use of the site by pine marten is anticipated to be infrequent and impacts on productivity of the species is not considered likely. Therefore, the project will have a short-term adverse impact for commuting pine marten determined to be **not significant at the local level**.

6.2.2.6.2 Mitigation

Habitat removed will be reinstated as outlined in Table 28 to mitigate the impact of the project for foraging and commuting pine marten.

6.2.2.6.3 Residual Effects

It is considered that the project will have a reversible local, negative permanent impact for foraging pine marten and a short-term adverse impact for commuting pine marten determined to be **not significant at the local level.**

6.2.2.7 West European Hedgehog

6.2.2.7.1 Impacts

The construction phase will result in the removal of *c.*550m Hedgerow WL1 and Treeline WL2 habitat suitable for foraging, commuting and nesting hedgehog. The majority of this habitat is within the urban footprint of Carrigaline. It is therefore that the project will have a local, negative permanent impact determined to be **not significant at the local level**.

6.2.2.7.2 Mitigation

Habitat removed will be reinstated as outlined in Table 28 to mitigate the impact of the project. A habitat management plan is required to ensure responsible bodies and persons are identified to undertaken appropriate measures to mitigate the impact of the project for a period of 5 years post construction.

Identify options to create 15m^2 habitat piles, appropriate for nesting hedgehogs using deciduous woodland felled by the project within the red line boundary, in particular within green spaces within the urban footprint of the town where suburban gardens offer suitable habitat and low road speeds decrease the risk of collision.

6.2.2.7.3 Residual Effects

Subject to implementation of the above safeguards, no adverse effects are anticipated upon hedgehogs.

6.2.2.8 Habitat Management Plan

A habitat management plan is required to ensure responsible bodies and persons are identified to undertake the necessary measures to manage, maintain and monitor mitigation measures for a period of five years post construction.

6.2.2.9 Landscape Plan

All mitigation measures will be outlined in a project landscape plan.

6.2.2.10 Summary of Mitigation Measures for Fauna

Species / Species Group	Mitigation Measure	Reasoning
Amphibians	1) Create 15m^2 of habitat piles suitable for nesting hedgehog within urban green space; 2) Restore habitat in accordance with Table 28.	To restore hibernating habitat for common frogs. To restore foraging and commuting habitat for common frogs.
Breeding Birds	1) Install 16 nest boxes for starlings (min 25 years life expectancy); 2) Install 16 nest boxes for house sparrows (min 25 years life expectancy); 3) Install 4 boxes for grey wagtail (min 25 years life expectancy); 4) Vegetation removal will be undertaken outside of breeding season; and 5) Restore habitat in accordance with Table 28.	To restore nesting habitat for breeding birds To prevent disturbance of breeding birds. To restore foraging and breeding habitat for breeding birds.
Invertebrates	1) Install two bee posts; 2) Install bee banks totalling 20m^2; 3) Restore 137m^2 dry meadows and grassy verges habitat; and 4) Restore habitat in accordance with Table 28.	To restore nesting habitat for bees To restore nesting and foraging habitat for adult forms of invertebrates and foraging habitat for larval forms.
Bats	1) Restore habitat in accordance with Table 28; 2) Install 16 bat boxes to replace potential roosts sites across the site; 3) Lighting will be undertaken across the site in accordance with ILM best practice guidance	To restore roosting, foraging and commuting habitat removed by the project. To ensure future PRF development in trees are mitigated for. To prevent habitat degradation to adjacent habitat and prevent disturbance to commuting, roosting and foraging bats.
Red Squirrels	1) Restore habitat in accordance with Table 28;	To restore resting, foraging and commuting habitat removed by the project.
Pine Marten	1) Restore habitat in accordance with Table 28.	To restore denning, foraging and commuting habitat removed by the project.
West European Hedgehog	1) Restore habitat in accordance with Table 28; 2) Create 15m^2 of habitat piles suitable for nesting hedgehog within urban green space.	To restore nesting, foraging and commuting habitat removed by the project.
All	1) Create a habitat management plan; 2) Measures should be drawn up and incorporated into the detail of any future Landscape Plans.	To identify responsible organisations and persons for management, maintenance and monitoring of mitigation measures five years.

Table 30: Summary of mitigation measures for fauna.

7. Biodiversity Net Gain

In addition to the mitigation measures outlined in Section 6 above the following measures are recommended to achieve Biodiversity Net Gain (BNG). In the absence of a BNG metric a qualitative approach will be taken with regards to ascertaining whether BNG has been achieved. This has been agreed in liaison with relevant representatives from Cork County Council.

7.1 Habitats

The project is anticipated to remove 300m of low-negligible significant hedgerow habitat consisting primarily of non-native species, some of which are considered medium impact invasive species. New treelined hedgerow habitat planted in accordance with best practice guidance such as Teagasc [46] would allow for BNG on hedging and treeline habitat over the long-term.

There are two options to undertake this:

1) Plant 150m of native hedgerow habitat incorporating trees at a distance of no more than 15m apart using whips at least two years old, or 70cm in height.

2) Plant a shorter length of 75m of native hedging using whips at least two years old, or 70cm in height, using mature native tree specimens planted no more than 15m apart.

Proposed new hedgerow planting is shown in figures in Appendix A.8.

Any proposed tree, hedgerow and grassland planting as shown in Appendix A.8, which is in addition to the area being replaced will contribute to biodiversity net gain of the project.

The proposed SuDS planting as shown in Appendix A.8 will have a suitable seed mix for areas which are to be frequently inundated. The final seed mix for SuDS areas will be developed in consultation with a qualified ecologist and will be prioritised for maximum biodiversity benefit with see sourced from local provenance, if possible.

7.2 Fauna

In addition to measures outlined above measures for the following receptors is recommended to enhance the quality of the habitat in the area, these measures cannot be screened utilising (MECC). All proposed measures below are show in drawings in Appendix A.8.

7.2.1 Breeding Birds

Limited breeding potential is present for cavity nesting bird species across the Project Development Area. A wider range of boxes for nesting birds should be erected at a similar density as that prescribed for breeding birds depending on hedgerow significance. Accordingly 32 boxes made of woodstone or woodcrete should be installed to cater for various cavity nesting birds species, 16 of which should have a 32mm hole and 16 of which should have a 26mm hole[47]. Woodcrete or woodstone boxes have been specified to ensure a minimum 25 year life expectancy in keeping with what would have been expected had the treeline and hedgerow habitat been maintained.

7.2.2 Invertebrates

The mitigations section recommended reinstatement of 137m^2 Dry Meadows and Grassy Verges (GS2) habitat which has been recommended to be reinstated as part of mitigation measures in the project. If the project was to install one extra bee post, one extra bee bank and create habitat consisting of 137m^2 native Lowland Hay Meadow (6510)[48] habitat instead of Dry Meadows and Grassy Verges this would be

[46] https://assets.gov.ie/231749/39dd9ce0-fb95-4619-bd8e-8ff53b752d08.pdf

[47] https://www.nhbs.com/1b-schwegler-nest-box

[48] https://www.ecoseeds.co.uk/

considered a biodiversity benefit for invertebrates if considered alongside other treelined and hedgerow habitat creation recommended as part of the mitigation measures.

7.2.3 Bats

Five additional bat boxes could be installed to complement those areas where moderate or high potential roost features already exist. This would be supplementary to bat boxes already recommended in the mitigation section. These should follow the same specs as outlined in 6.2.2.4.

7.2.4 Red Squirrels, Pine Marten and West European Hedgehog.

Assuming habitat outlined in Section 7.1 are planted it can be considered that the project has delivered BNG for red squirrels and pine marten over the medium term.

7.2.5 West European Hedgehog.

An additional 15m^2 of habitat pile could be created that is suitable for nesting hedgehog in suburban public realm green space. Assuming that the habitat outlined in Section 7.1 is also planted it can be considered that the project has delivered BNG for West European Hedgehog over the medium term.

These measures should be detailed within any future Landscaping Plan.

8. Monitoring

The following mitigation and enhancement measures require monitoring by a SQE or other suitable qualified person:

Prior to Commencement of Works:

- Agree suggested species mix to ensure delivery of mitigate loss of Treeline and Hedgerow habitat over the long term, to be agreed between supplier and Cork County Council Heritage Officer.
- Recommend siting and oversee installation of:
    - 4x Grey Wagtail boxes;
    - 16x House Sparrow boxes;
    - 16x Starling boxes;
    - 32x Other bird boxes if applicable;
    - 1-2 Bee bank(s);
    - 2/3 Bee Posts;
    - Creation of 137m^2 grassland / species rich grassland habitat; and
    - 15/30m^2 Dead wood habitat piles
- Recommend siting and oversee installation of 16-21 bat roosting boxes to cater for each of the following species:
    - Brown long-eared bat[49]
    - Common Pipistrelle
    - Daubenton's Bat
    - Lesser Noctule
    - Natterer's Bat
    - Soprano Pipistrelle
- Creation of a habitat management plan to ensure responsible bodies and persons are identified to undertaken appropriate measures to mitigate the impact of the project for a period of five years post construction;
- An ECoW should oversee the installation of the construction compound to ensure that it is located away from the Owenboy river and the Cork Harbour Special Protection Area (SPA).

During construction:

- Checks to ensure CEMP water quality measures are being implemented;
- Ensure that Tree Root Protection works are being undertaken in line with the project CEMP;
- Monitor tree and hedgerow planting comprises of suitable species mix and spacing of trees and is being undertaken in accordance with best practice;

Post-construction:

Monitoring should be undertaken after 1, 2, 3, 5 and 10 years to oversee the condition of newly planted tree and hedgerow habitat, bee posts, bird boxes and roost boxes. Where any of these have failed they should be replaced.

9. Conclusions

9.1 Designated Sites

9.1.1 Statutory Protected Sites

The proposed development is located immediately adjacent to Cork Harbour SPA.

An Appropriate Assessment has been carried out and concluded that there was no potential for the Proposed Development site to significantly impact on Natura 2000 sites.

9.1.2 Non-statutory Protected Sites

The conclusion in the Habitat Regulation Assessment (HRA) also allows the conclusion that there will not be significant effects to the Cork Harbour SPA and this can also be applied to the Owenboy River and associated habitats.

9.2 Habitats

9.2.1 EU Annex I Habitats

Two EU Annex I habitats were recorded immediately adjacent to the site. These were:

- Estuaries (1140)
- Tidal Mudflats (1130)

The conclusion in the Habitat Regulation Assessment (HRA) also allows the conclusion that there will not be significant effects to the Cork Harbour SPA can also be applied to associated EU Annex I habitat (mudflats (1130) and estuaries (1140).

9.2.2 Habitats

A total of 11 habitats, none of which are considered notable habitats, within the Proposed Developments RLB. Habitats that are identified for removal / degradation include:

- dry meadows and grassy verges (GS2) (137m^2);
- hedgerow (120m) (WL1);
- treeline (80m) (WL2); and
- ornamental non-native shrub (120m) (WS3).

Mitigation for habitats on site include planting of 200m of new treelined hedgerow. BNG for habitats on the site shall comprise an additional 150m new species rich treelined hedging using plants at least 2 years old, or 75m of new species rich treelined hedging using whips at least 2 years old with mature trees no more than 15m apart.

The 67 trees demarcated for felling shall be replaced according to the following standard:

Trunk Diameter of tree lost to development (cm measured at 1.5 m)	No of replacement trees
0-15	0-1
15-19.9	1
20-29.9	2
30-39.9	3
40-49.9	4
50-59.9	5
60-69.9	6
70-79.9	7
80+	8

Table 31: Specifications for replacement of scattered trees habitat.

This equates to a minimum of 187 new, native trees being planted to mitigate tree removal.

Dry Grassy Meadows and Verges habitat will be replaced to benefit notable invertebrates, BNG can be achieved through modifying the mitigation measures by creating species rich habitat consisting of species reflective of native Lowland Hay Meadow (6510).

9.3 Protected & Notable Species

9.3.1 Birds

The proposed development is anticipated to remove *c.*550m of suitable breeding and foraging habitat for three priority bird species. These being the red listed house sparrow and amber listed starling and grey wagtail.

Recommendations have been made for mitigating the effects of the proposed development for priority bird comprising of:

- Installation of nesting boxes for house sparrow, startling and grey wagtail on a like for like basis (i.e. using boxes with a minimum of 25 year span in the field) under the direction of an Ecological Clerk of Works;
- Reinstating treeline and hedgerow habitat to benefit breeding and foraging breeding birds; and
- Vegetation removal works will be undertaken outside of the breeding birds season (1st March to 1st August).

9.3.2 Common Frog

Habitat was identified on site that is suitable for foraging and commuting common frog.

Recommendations to mitigate the impacts of the development on this species consist of:

- Habitat removed will be reinstated as outlined in Table 28 to mitigate the impact of the project on foraging and commuting common frog.
- Identify options to create habitat piles using deciduous woodland felled by the project within urban green space, potential sites include the green space outside of Carrigaline Youth Centre.

9.3.3 Invertebrates

The site is deemed suitable for gatekeeper, moss carder bee, large red-tailed bumblebee, patchwork leafcutter bee and various mining bee species.

Recommendations have been made for this group and are outlined below:

- 2 (3 for BNG) Bee posts[50] will be installed to replace Patchwork Leafcutter Bee nesting habitat. Bee banks will be installed in suitable sites to replace mining bee colonies. Suitable sites for both these features include the green space at Carrigaline Youth Centre.
- 137m^2 of Dry Meadows and Grassy Verge habitat will be replaced to mitigate the loss of this habitat, BNG can be achieved by creating species rich habitat instead of the mitigation measures consisting of species reflective of native Lowland Hay Meadow (6510).
- Identify options to create 15 m^2 (30m^2 for BNG) dead wood habitat piles using deciduous woodland felled by the project within urban green space.

9.3.4 Bats

Trees on site are not considered to be suitable for roosting bats. However, the site is considered suitable for foraging and commuting bats. Various potential roost features were identified immediately adjacent the Proposed Development, though these are not anticipated to be affected.

Recommendations have been made for mitigating the effects of the proposed development for bat species most likely to be impacted. These being:

- Leisler's bat;
- soprano pipistrelle;
- brown long-eared bat;
- common pipistrelle;
- Daubenton's bat;
- whiskered bat; and
- Natterer's bat.

The following mitigation measures are recommended:

- Habitat removed will be reinstated as outlined in Table 28 to mitigate the impact of the project on foraging and commuting bats.
- Lighting plans for the operational phase will ensure accordance with the "Bats and Artificial Lighting at Night" guidance note[51].
- 16 (21 for BNG) bat boxes will be erected on a like for like basis under the supervision of a SQE to create future roosting habitat for bats. These boxes will have a life span of 25 years and be suitable for the species noted above.

9.3.4.1 Red Squirrel

The construction phase will result in the removal of *c.*550m^2 habitat suitable for foraging and commuting red squirrels.

Habitat removed will be reinstated as outlined in Table 28 to mitigate the impact of the project and in accordance with Section 7 to achieve BNG.

9.3.4.2 Pine Marten

The construction phase will result in the removal of *c.*550m^2 habitat suitable for foraging and commuting pine marten.

[50] https://www.greenandblue.co.uk/products/beepost

[51] https://www.theilp.org.uk/documents/guidance-note-8-bats-and-artificial-lighting/

Habitat removed will be reinstated as outlined in Table 28 to mitigate the impact of the project and in accordance with Section 7 to achieve a BNG.

9.3.4.3 West European Hedgehog

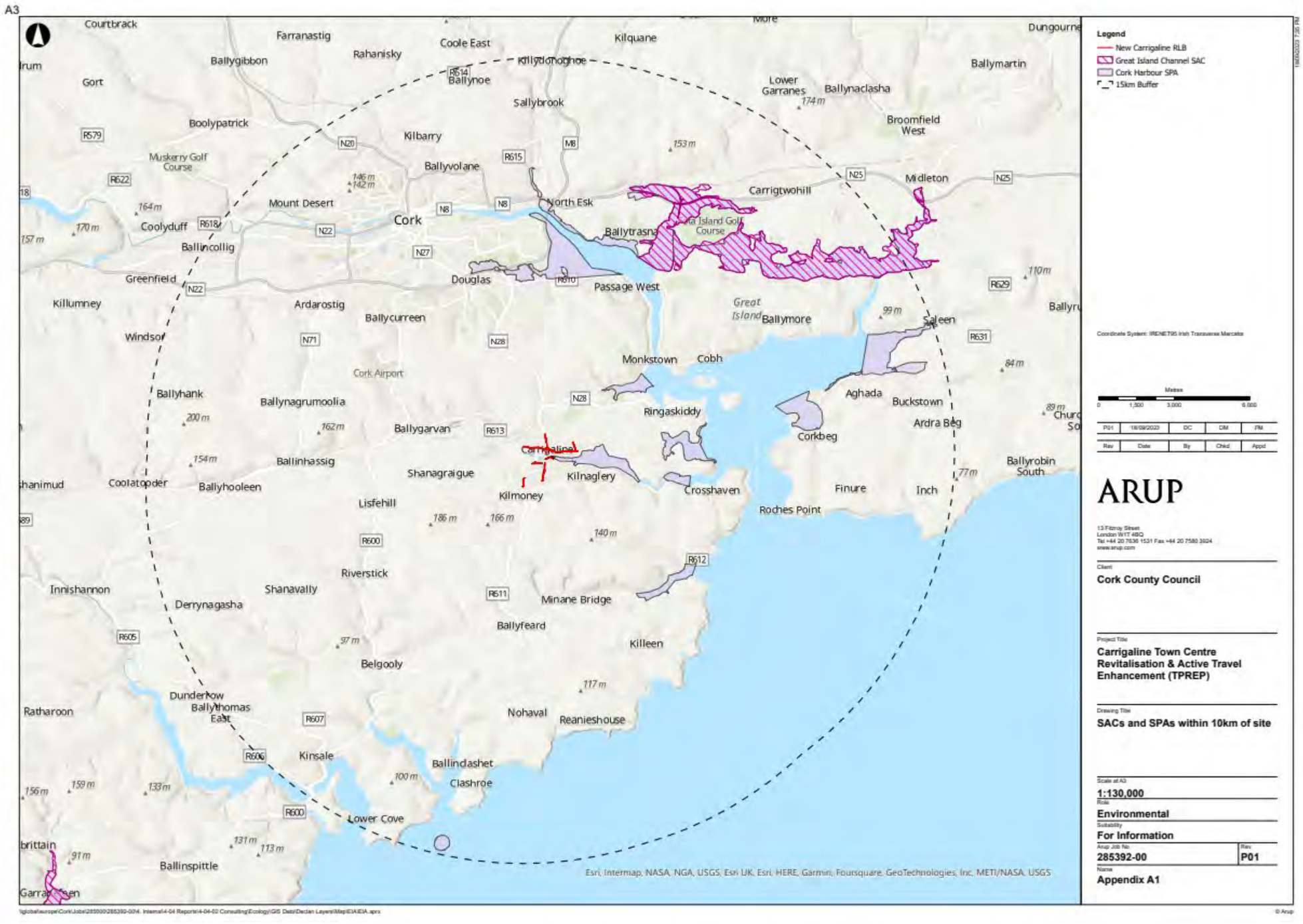
The construction phase will result in the removal of *c.*550m^2 habitat suitable for foraging and commuting west European hedgehog.

Habitat removed will be reinstated as outlined in Table 28 to mitigate the impact of the project and in accordance with Section 7 to achieve a BNG. In addition, options should be identified to create habitat piles using deciduous woodland felled by the project within the red line boundary, in particular in the urban footprint of the town where suburban gardens offer suitable habitat and low road speeds decrease the risk of collision.

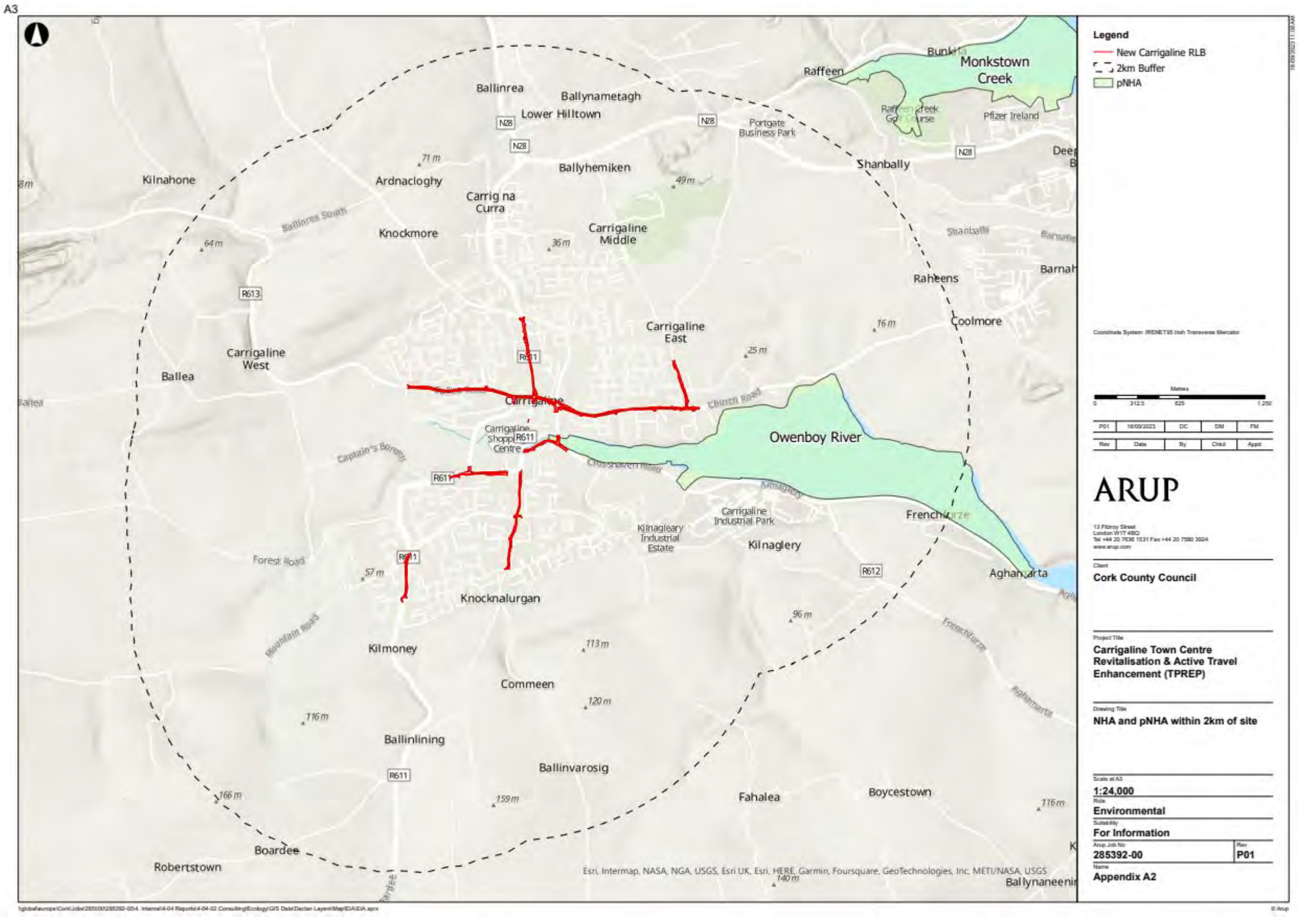
Appendix A

Maps and Drawings

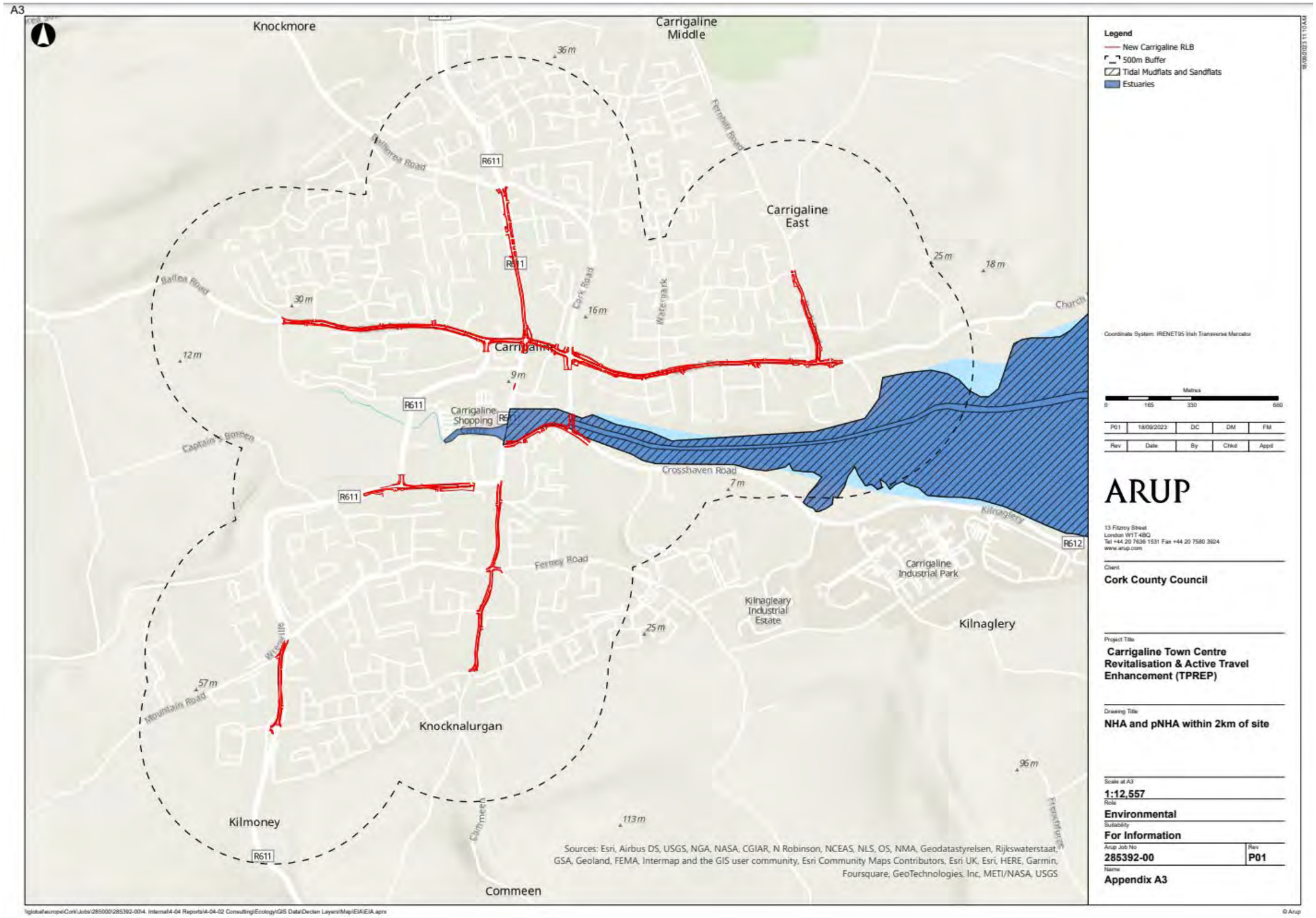
A.1 International Statutory Designated Sites within 15km of the Proposed Development Site



A.2 National Statutory and Non Statutory Designated Sites within 2km of the Proposed Development Site



A.3 EU Annex I Habitat within 500m of the Proposed Development Site



A.4 Fossitts Habitat Map with Target Notes

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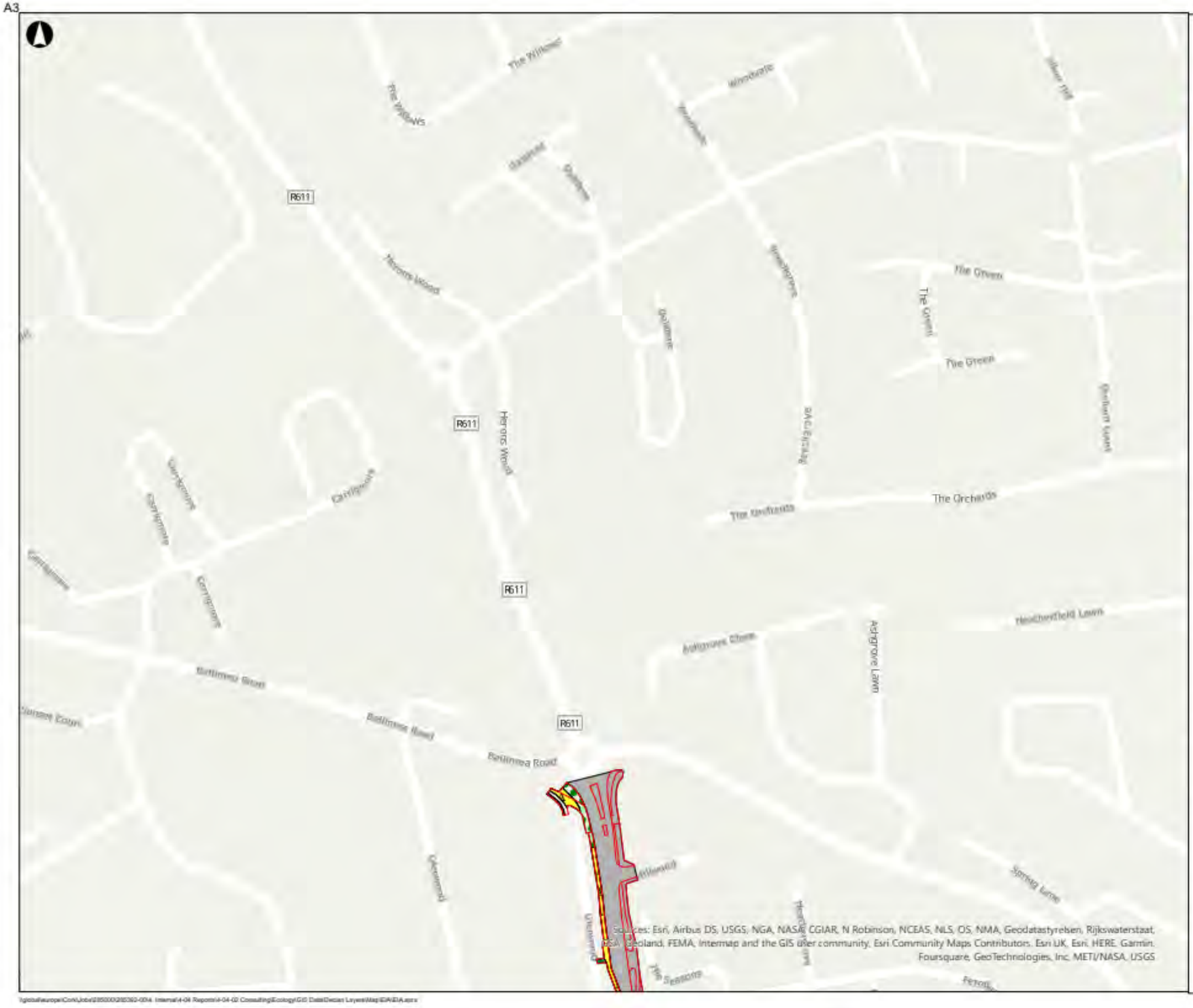

Legend

New Carrigaline RLB

Fossits Habitats

- Riparian Woodland Wn5
- Scattered Trees and Parkland WD5
- Dry Meadows and Grassy Verges GS2
- Improved Grassland GA1
- Flower beds and borders BC4
- Tidal Rivers CW2
- Amenity Grassland (Improved) GA2
- Ornamental Non native Shrub WS3
- Hedgerow WL1
- Treeline WL2
- Buildings and Artificial Surfaces BL3

Coordinate System: IRENET95 Irish Transverse Mercator

Metres: 0, 25, 50, 100

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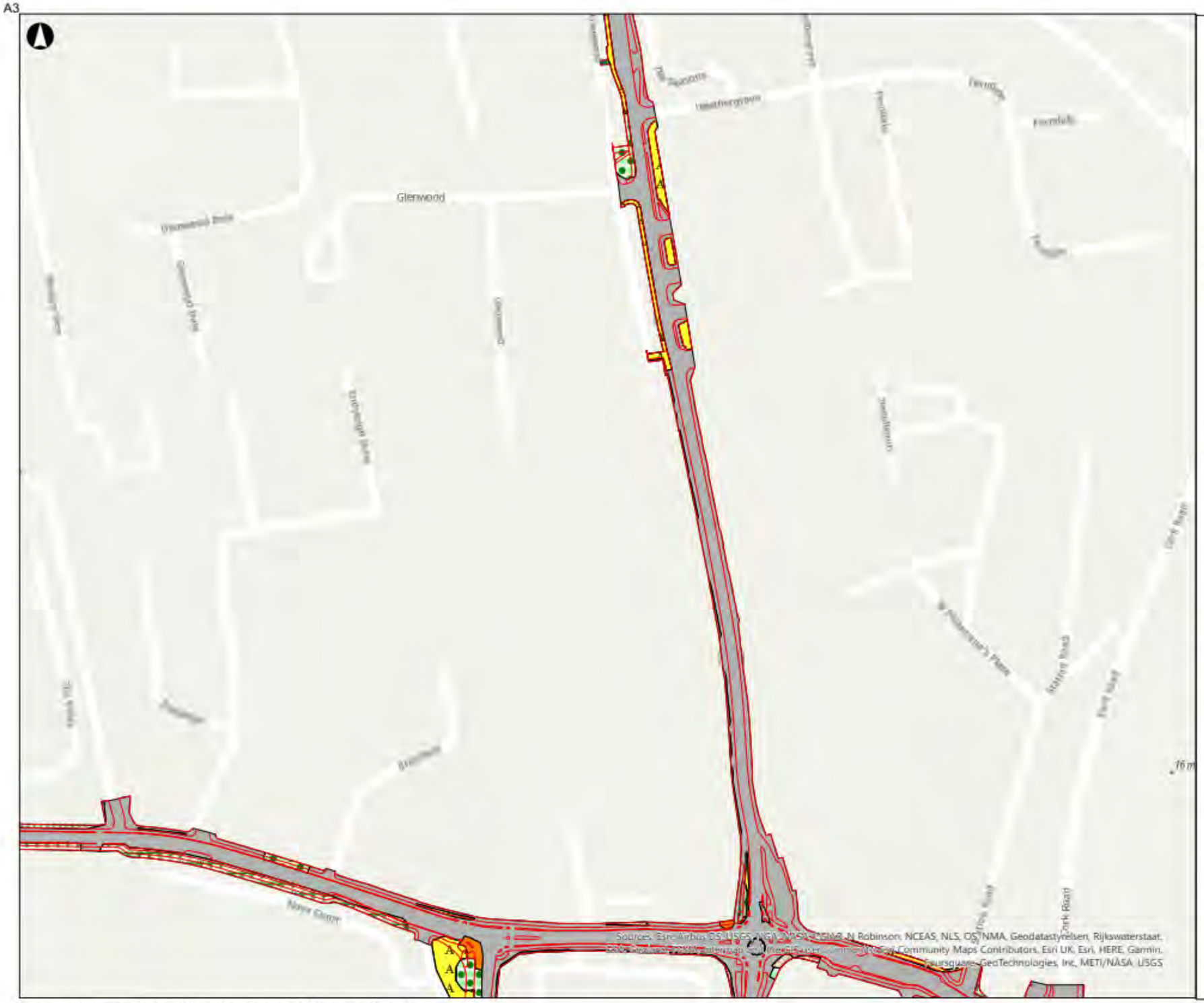

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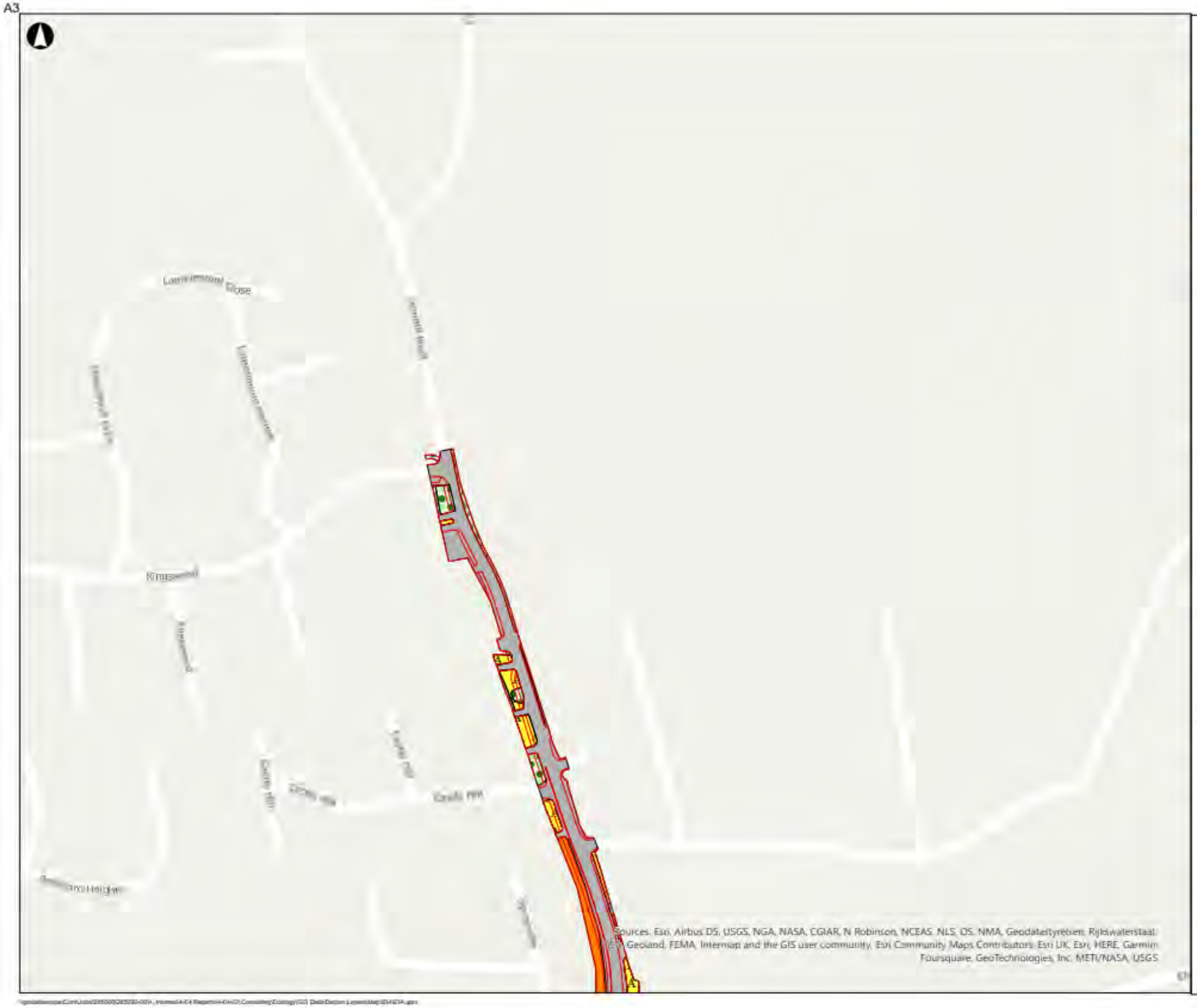

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Windsor Court
The Close
The Grove
The Close
Riverside
Crosshaven Road
Crosshaven Road
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Sources: Esri, Airbus DS, USGS, NGA, NASA, CGIAR, N Robinson, NCEAS, NLS, OS, NMA, Geodatastyrelsen, Rijkswaterstaat, GSA, Geoland, FEMA, Intermap and the GIS user community, Esri Community Maps Contributors, Esri UK, Esri, HERE, Garmin, Foursquare, GeoTechnologies, Inc, METI/NASA, USGS
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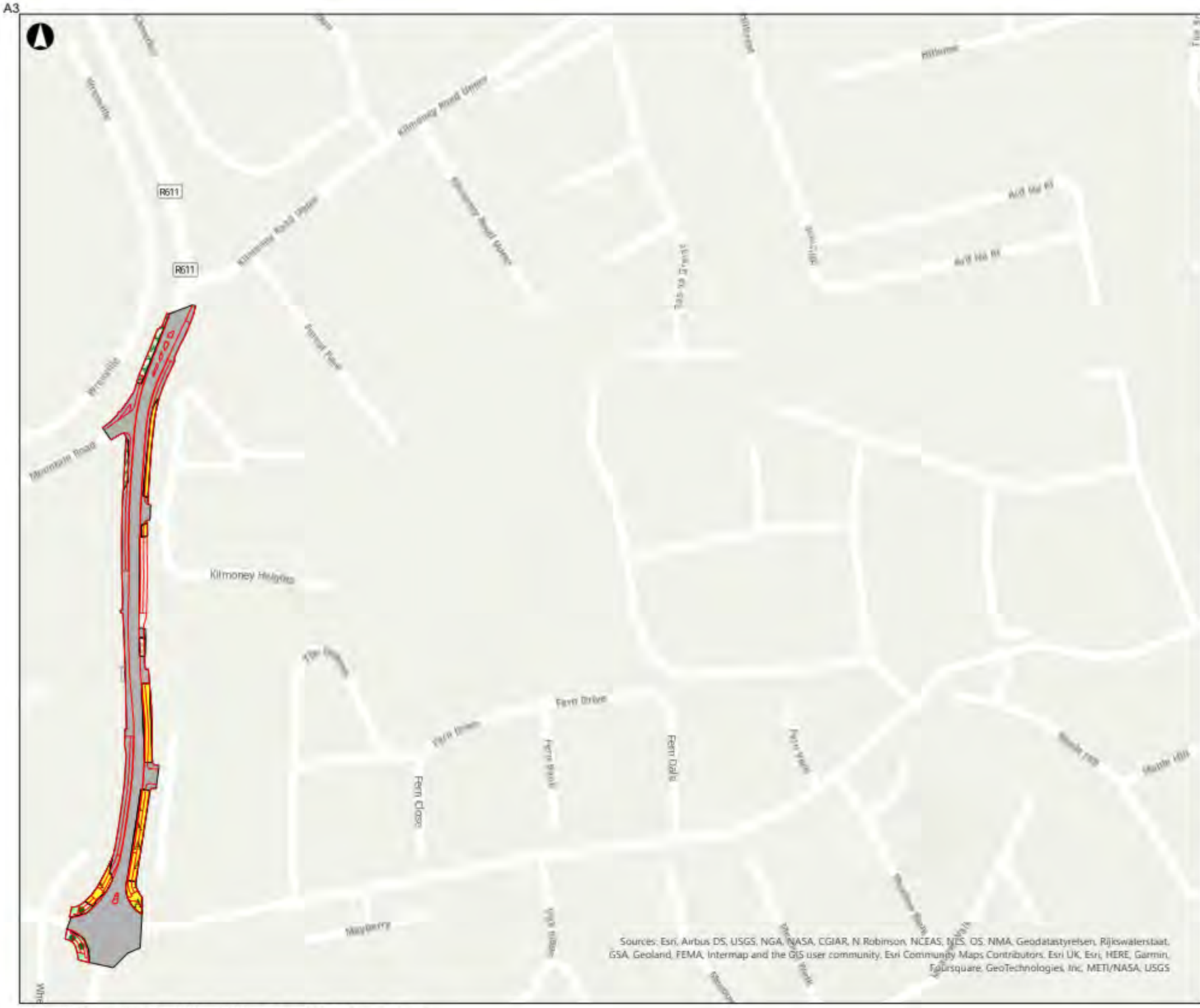

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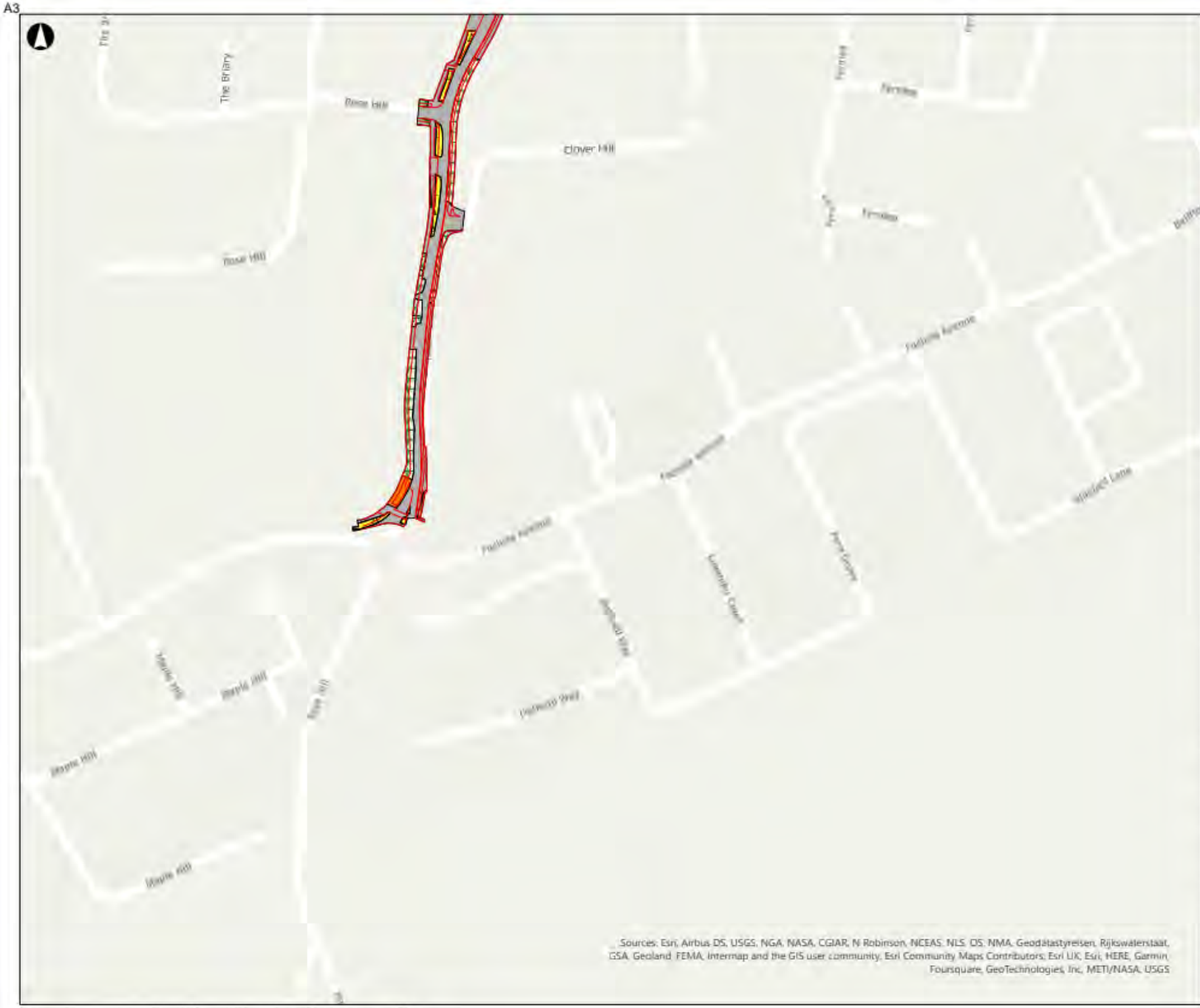

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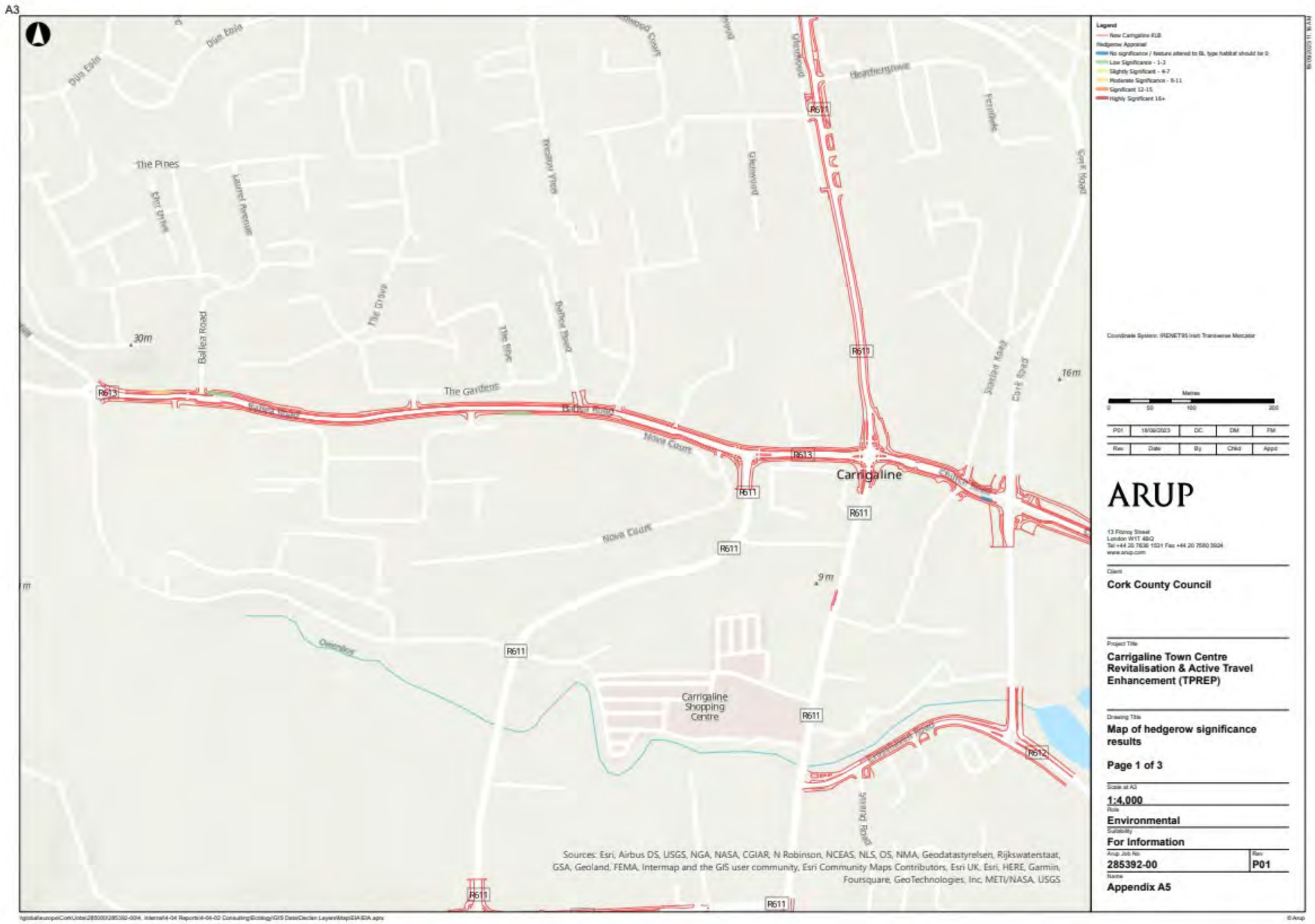
Arup Job No: **285392-00** | Rev: **P01**

Name: **Appendix A4**

A.5 Map of Significance of Treeline and Hedgerow Habitat to be Impacted by Development



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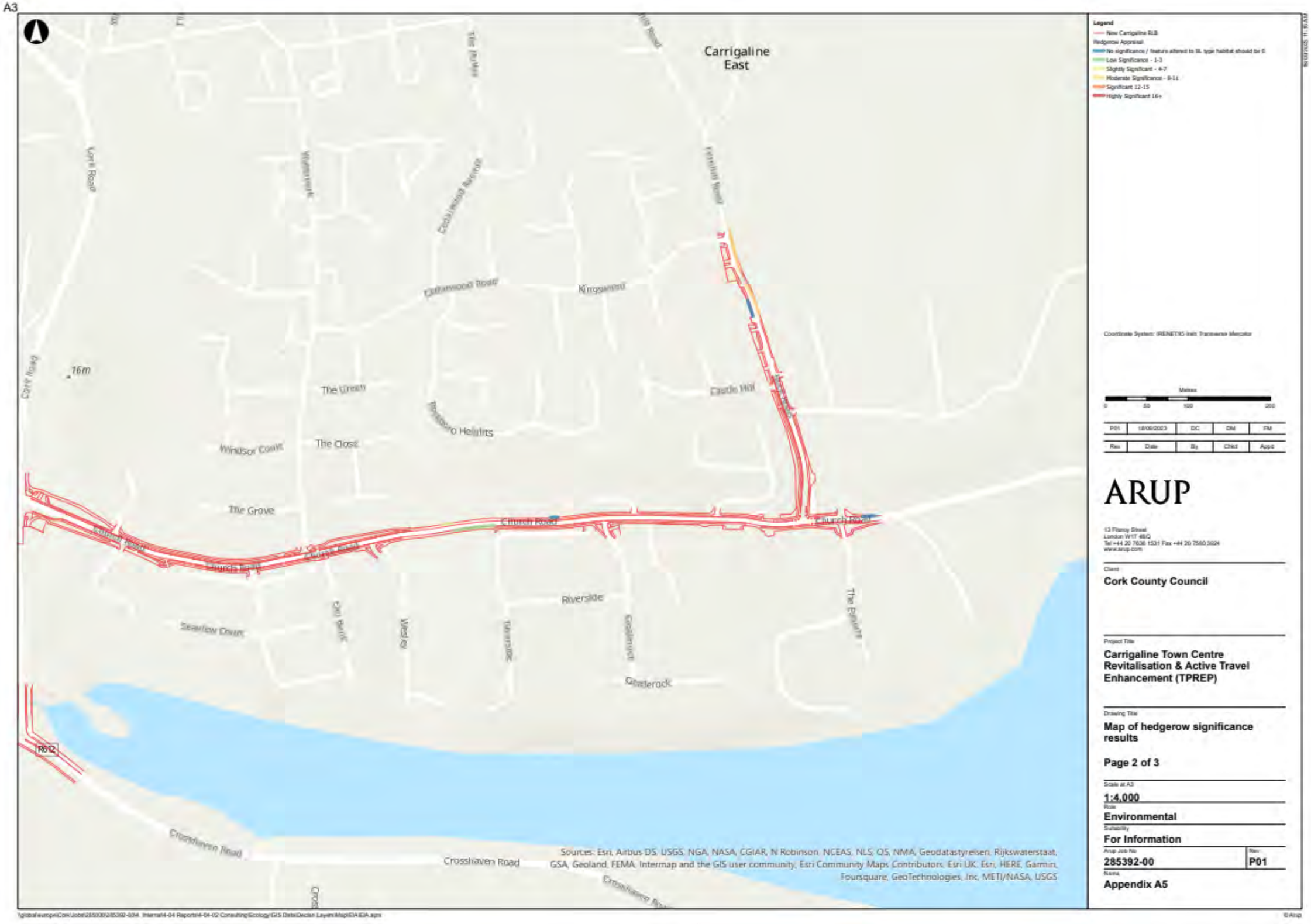

P01	08/08/2023	DC	DM	PM
Rev	Date	By	Chkd	Appd

ARUP

13 Fitzroy Street
London W1T 4BQ
Tel +44 20 7636 1531 Fax +44 20 7580 3924
www.arup.com

Client
Cork County Council

Project Title
Carrigaline Town Centre Revitalisation & Active Travel Enhancement (TPREP)

Drawing Title
Map of hedgerow significance results

Page 2 of 3

Scale at A3
1:4,000
Role
Environmental
Suitability
For Information
Arup Job No
285392-00
Rev
P01
Name
Appendix A5

\\globalarupnet\Cork\Jobs\285000\285392-00\4. Internal\4-04 Reports\4-04-02 Consulting\Ecology\GIS Data\Deckon Layers\Map\EIA\EIA.aprx

A3

Legend
- New Carrigaline RLB
- Hedgerow Appraisal
- No significance / feature altered to BL type habitat should be 0
- Low Significance - 1-3
- Slightly Significant - 4-7
- Moderate Significance - 8-11
- Significant 12-15
- Highly Significant 16+

Coordinate System: IRENET95 Irish Tranmverse Mercator

Metres
0 50 100 200

Rev	Date	By	Chkd	Appd
P01	18/09/2023	DC	DM	RM

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13 Fitzroy Street
London W1T 4BQ
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Drawing Title
Map of hedgerow significance results

Page 3 of 3

Scale at A3
1:4,000
Role
Environmental
Suitability
For Information
Arup Job No.
285392-00
Rev
P01
Name
Appendix A5

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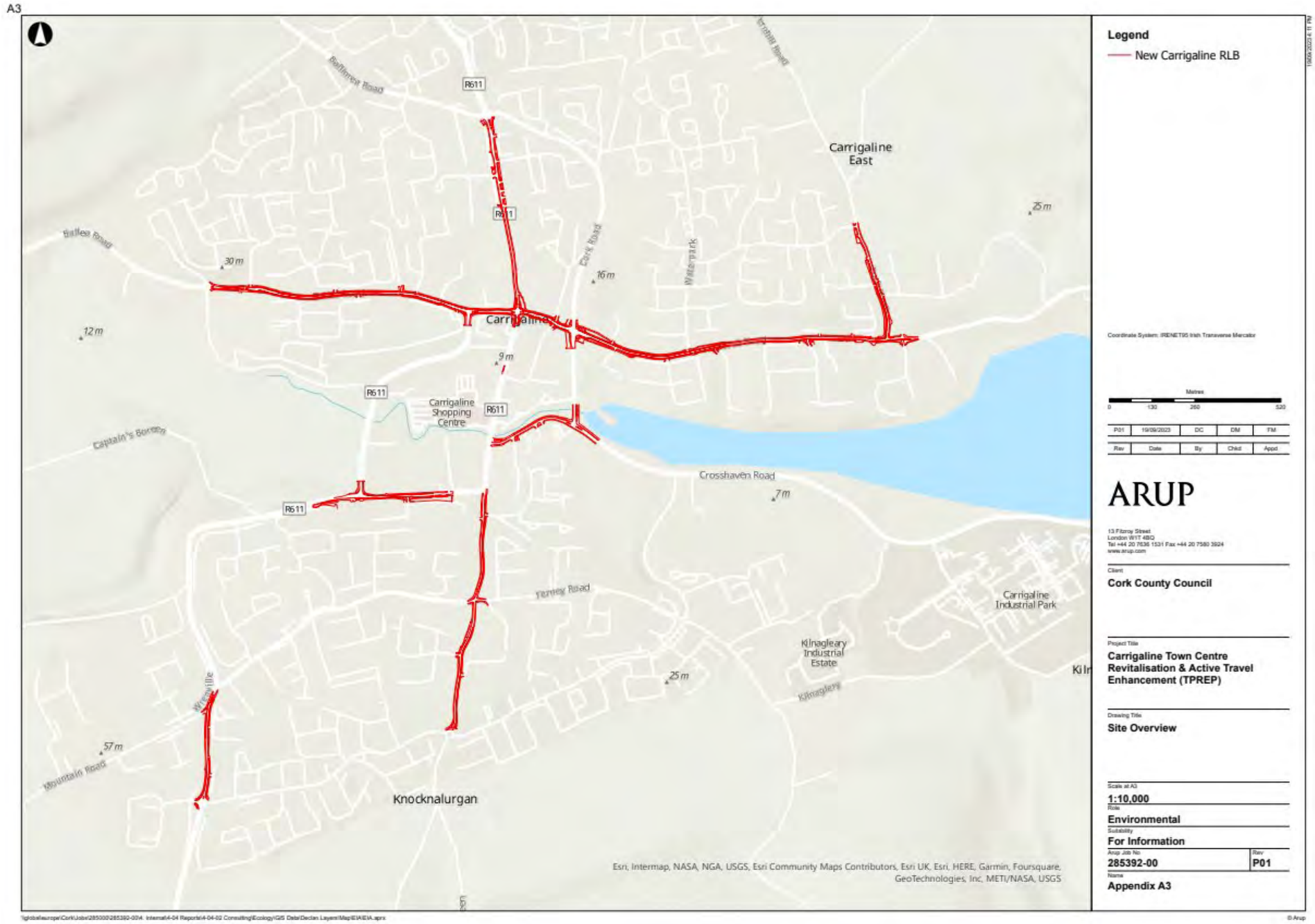
A.6 Site Overview



A.7 Species ID and Diameters of Trees Proposed for Removal

Red Line Boundary
Trees to be removed

A3

Common & Scientific Name

- Alder - Alnus glutinola
- Ash - Fraxinus excelsior
- Beech - Fagus sylvatica
- Cherry Laurel - Prunus laurocerasus
- Common Pear - Pyrus communis
- Crack Willow - Salix fragilis
- Eucalyptus sp - Eucalyptus sp.
- European Plum - Prunus domestica
- Goat Willow - Salix caprea
- Hawthorn - Crataegus monogyna
- Japanese Flowering Cherry - Prunus sp.
- Large-leaved Lime - Tilia platyphyllos
- Liquidambar sp - Liquidambar sp.
- Norway Maple - Acer platanoides
- Rowan - Sorbus aucuparia
- Silver Birch - Betula pendula
- Small-leaved Lime - Tilia cordata
- Sycamore - Acer pseudoplatanus
- Umbrella Pine - Sciadopitys verticillata
- Whitebeam - Sorbus aria
- Wild Cherry - Prunus avium
- Yew - Taxus baccata

Rev	Date	By	Chkd	Appd	Authd
P01	17/10/2023	ACAR			

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Drawing Title
Species ID and diameter of trees proposed for removal
Page 1 of 5

Scale at A3
1:4,000

Role
Environmental

Suitability
For Information

Project Number	Rev
285392-00	P01

Drawing Number
Appendix A7

Red Line Boundary

Trees to be removed

A3

Common & Scientific Name

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Drawing Title
Species ID and diameter of trees proposed for removal
Page 2 of 5

Scale at A3
1:4,000

Role
Environmental

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For Information

Project Number
285392-00

Rev
P01

Drawing Number
Appendix A7

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Trees to be removed

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- Liquidambar sp - Liquidambar sp.
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- Rowan - Sorbus aucuparia
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Drawing Title
Species ID and diameter of trees proposed for removal
Page 3 of 5

Scale at A3
1:4,000

Role
Environmental

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Project Number
285392-00

Rev
P01

Drawing Number
Appendix A7

Red Line Boundary

Trees to be removed

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Drawing Title
Species ID and diameter of trees proposed for removal
Page 4 of 5

Scale at A3
1:4,000

Role
Environmental

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For Information

Project Number
285392-00

Rev
P01

Drawing Number
Appendix A7

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Page 5 of 5

Scale at A3
1:4,000

Role
Environmental

Suitability
For Information

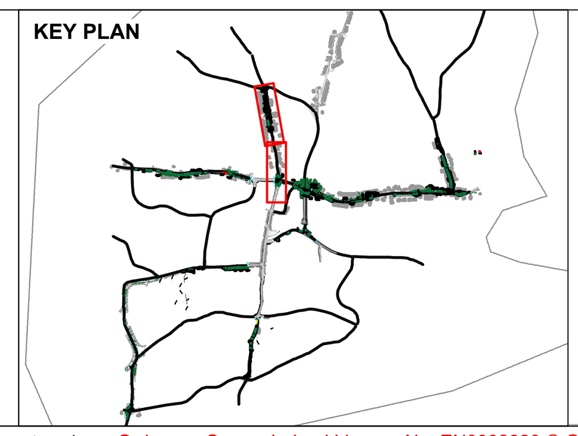
Project Number
285392-00

Rev
P01

Drawing Number
Appendix A7

A.8 Landscape Drawings

KEY PLAN



Landscape General Arrangement Legend
Soft Landscape

- Planting mix 1 - Pollinator Planting Mix - on min.450mm depth of topsoil on free draining subgrade.
- Planting mix 2 - Area to be managed as meadow - selective mowing regime with maintained/ mown 1m width to all edge interfaces
- Planting mix 3 - Native Hedgerow mix - on min. 600mm depth of topsoil on free draining subgrade.
- Planting mix 4 - SuDS planting mix - on min. 450mm depth of topsoil on free draining subgrade.
- Proposed grass seeding - on min.150mm depth of topsoil on free draining subgrade.
- Existing area to be protected and retained
- Proposed Native Tree Planting - on min.1.2m3 topsoil on free draining subgrade. Clearstem height for street trees to be min. 2.5m

Ecology Mitigation Measures-
Refer to Ecologists documenters for detail - Locations are indicative only, Ecologist to advise on final locations during construction stage

- Habitat piles - min 15m2
- Bee banks - min 20m2
- 16 starling nest boxes (in pairs)
- 16 house sparrow boxes (near mature trees)
- 4 grey wagtail boxes (near river/water course)
- 2 bee posts
- 16 Bat boxes - adjacent to areas of woodland
- Existing tree -To be protected and retained. Note: Trees/vegetation to be protected and retained as per arborists instructions and details - Arborist to advise on all proposed works within tree root protection zone

0 5 10 20m
Scale 1:500

Rev	Date	By	Chkd	Appd
P02	08/11/23	NC	BV	SvJ
P01	26/10/23	NC	BV	SvJ

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Arup, 50 Ringsend Road
Dublin, D04 T6X0
www.arup.ie
Tel +353(0)1 233 4455 Fax +353(0)1 668 3169

Client
Cork County Council

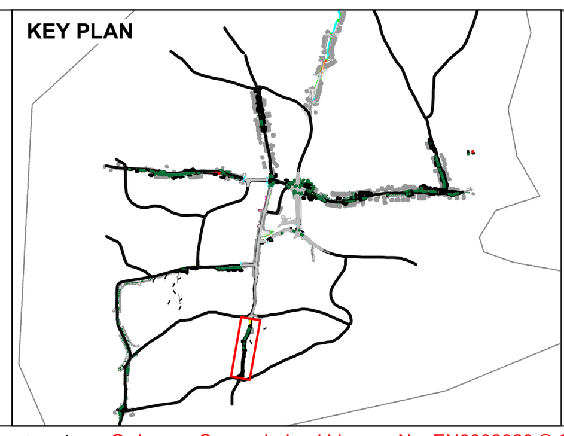
Project Title
Carrigaline TPREP Phase 1B

Drawing Title
Active Travel Concept Planning
Cork Road
Route 1

Scale at A1: 1:500 @ A1 (1:1000 @ A3)
Role: Landscape Architecture
Suitability: S2 - Suitable for Information
Job No: 285392-00
Rev: P02
Drawing No: 285392-ARP-1B-XX-DR-L-200

Do not scale

KEY PLAN



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0 5 10 20m
Scale 1:500

Rev	Date	By	Chkd	Appd
P02	08/11/23	NC	BV	SvJ
P01	26/10/23	NC	BV	SvJ

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Client
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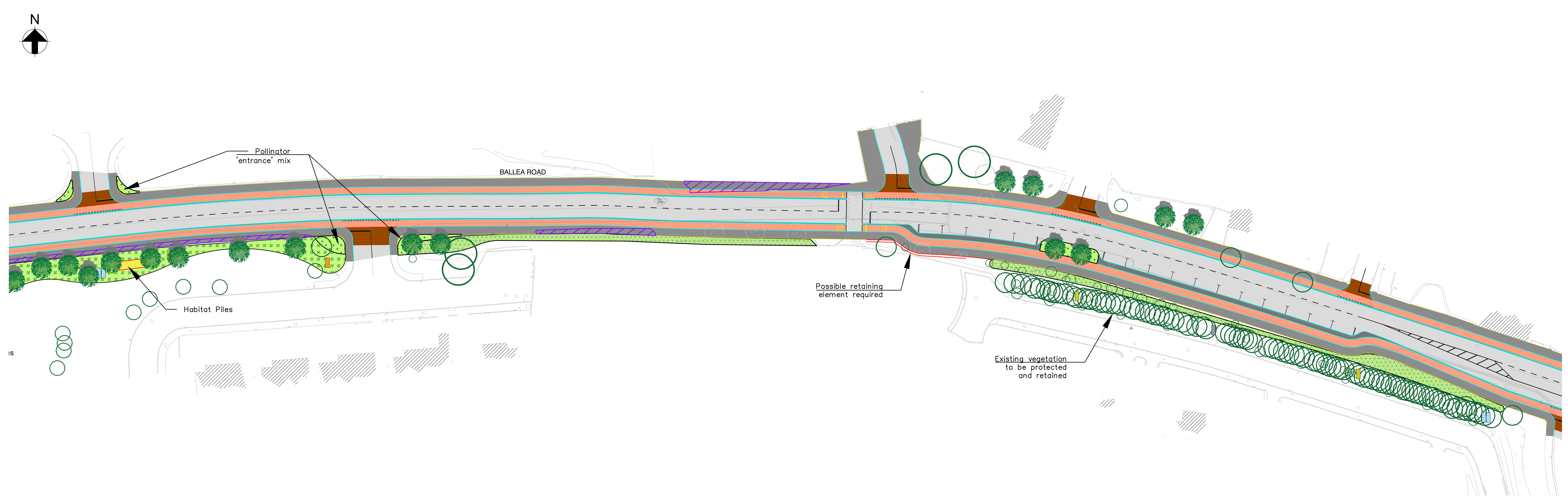
Project Title
Carrigaline TPREP Phase 1B

Drawing Title
Active Travel Concept Planning
Cork Road
Route 1

Scale at A1: 1:500 @ A1 (1:1000 @ A3)
Role: Landscape Architecture
Suitability: S2 - Suitable for Information
Job No: 285392-00
Rev: P02
Drawing No: 285392-ARP-1B-XX-DR-L-0202

Do not scale



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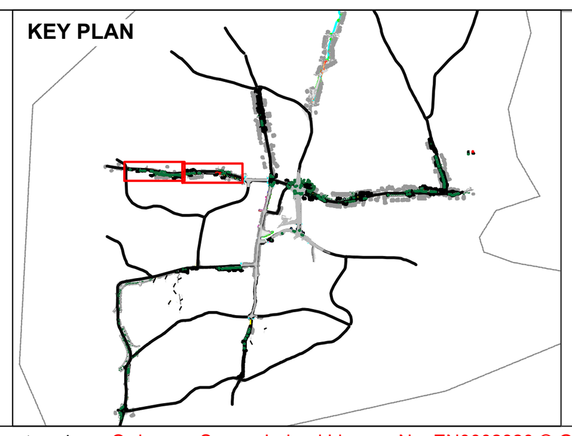

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0 5 10 20m
Scale 1:500

Rev	Date	By	Chkd	Appd
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P01	26/10/23	NC	BV	SvJ

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Arup, 50 Ringsend Road
Dublin, D04 T6X0
www.arup.ie
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Client
Cork County Council

Project Title
Carrigaline TPREP Phase 1B

Drawing Title
Active Travel Concept Planning
Cork Road
Route 1

Scale at A1: 1:500 @ A1 (1:1000 @ A3)
Role: Landscape Architecture
Suitability: S2 - Suitable for Information
Job No: **285392-00**
Rev: **P02**
Drawing No: **285392-ARP-1B-XX-DR-L-0203**

Do not scale

KEY PLAN

Landscape General Arrangement Legend
Soft Landscape

- Planting mix 1 - Pollinator Planting Mix - on min.450mm depth of topsoil on free draining subgrade.
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0 5 10 20m
Scale 1:500

Rev	Date	By	Chkd	Appd
P02	08/11/23	NC	BV	SvJ
P01	26/10/23	NC	BV	SvJ

ARUP

Arup, 50 Ringsend Road
Dublin, D04 T6X0
www.arup.ie
Tel +353(0)1 233 4455 Fax +353(0)1 668 3169

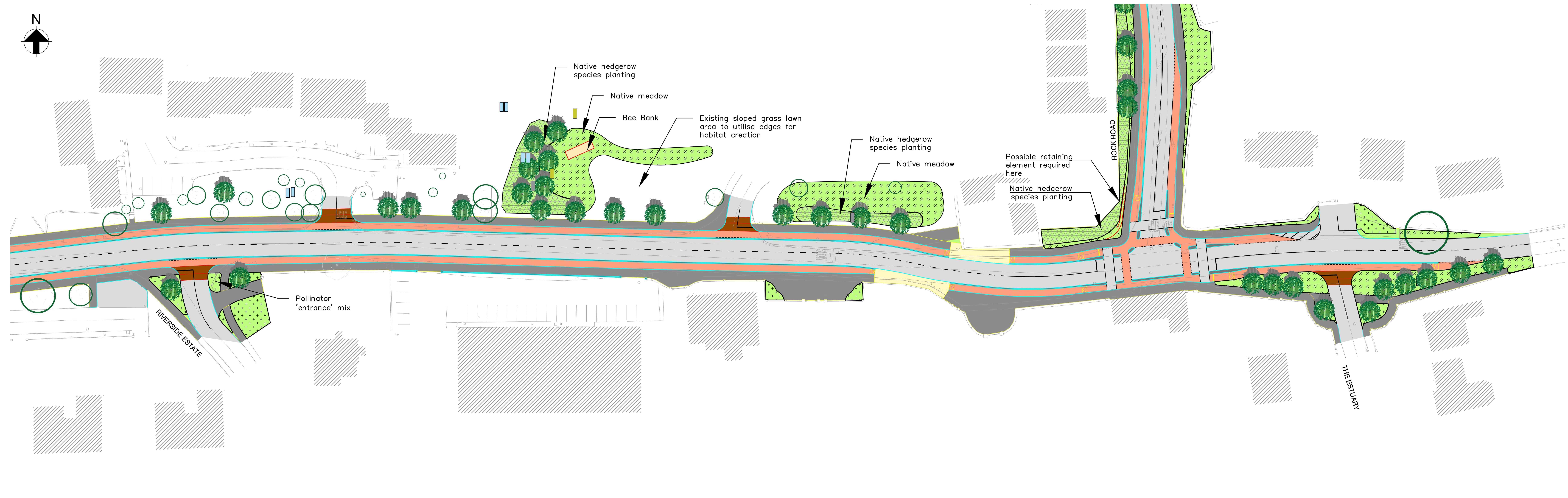
Client
Cork County Council

Project Title
Carrigaline TPREP Phase 1B

Drawing Title
Active Travel Concept Planning
Cork Road
Route 1

Scale at A1: 1:500 @ A1 (1:1000 @ A3)
Role: Landscape Architecture
Suitability: S2 - Suitable for Information
Job No: 285392-00
Rev: P02
Drawing No: 285392-ARP-1B-XX-DR-L-0204

Do not scale



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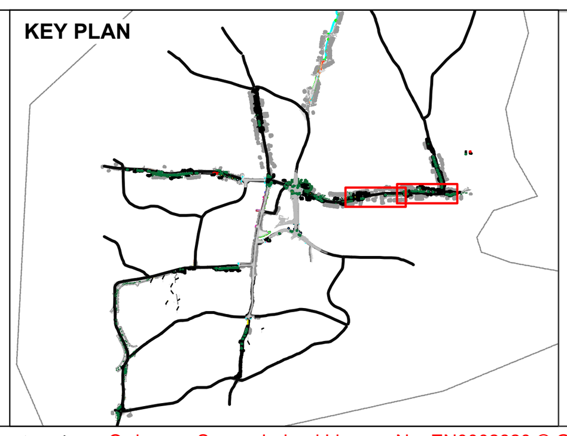

Landscape General Arrangement Legend
Soft Landscape

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0 5 10 20m
Scale 1:500

Rev	Date	By	Chkd	Appd
P02	08/11/23	NC	BV	SvJ
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Arup, 50 Ringsend Road
Dublin, D04 T6X0
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Tel +353(0)1 233 4455 Fax +353(0)1 668 3169

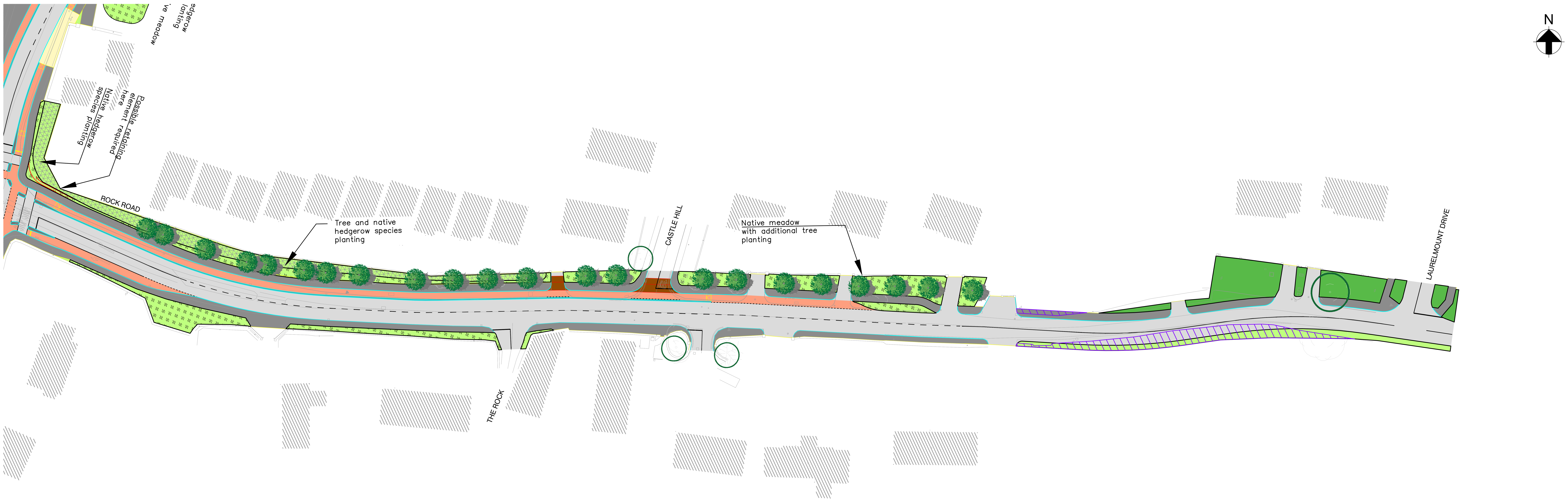
Client
Cork County Council

Project Title
Carrigaline TPREP Phase 1B

Drawing Title
Active Travel Concept Planning
Cork Road
Route 1

Scale at A1: 1:500 @ A1 (1:1000 @ A3)
Role: Landscape Architecture
Suitability: S2 - Suitable for Information
Job No: 285392-00
Rev: P02
Drawing No: 285392-ARP-1B-XX-DR-L-0205

Do not scale



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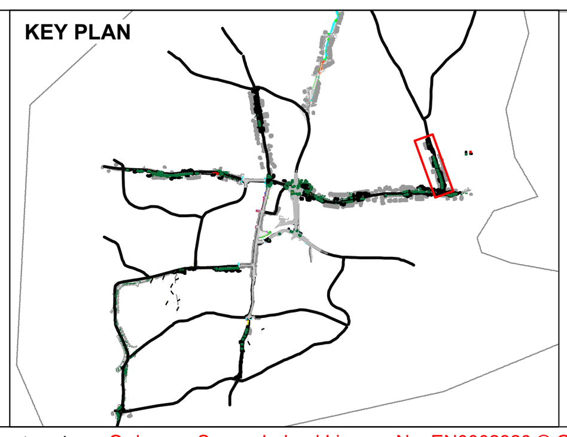

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0 5 10 20m
Scale 1:500

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Arup, 50 Ringsend Road
Dublin, D04 T6X0
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Tel +353(0)1 233 4455 Fax +353(0)1 668 3169

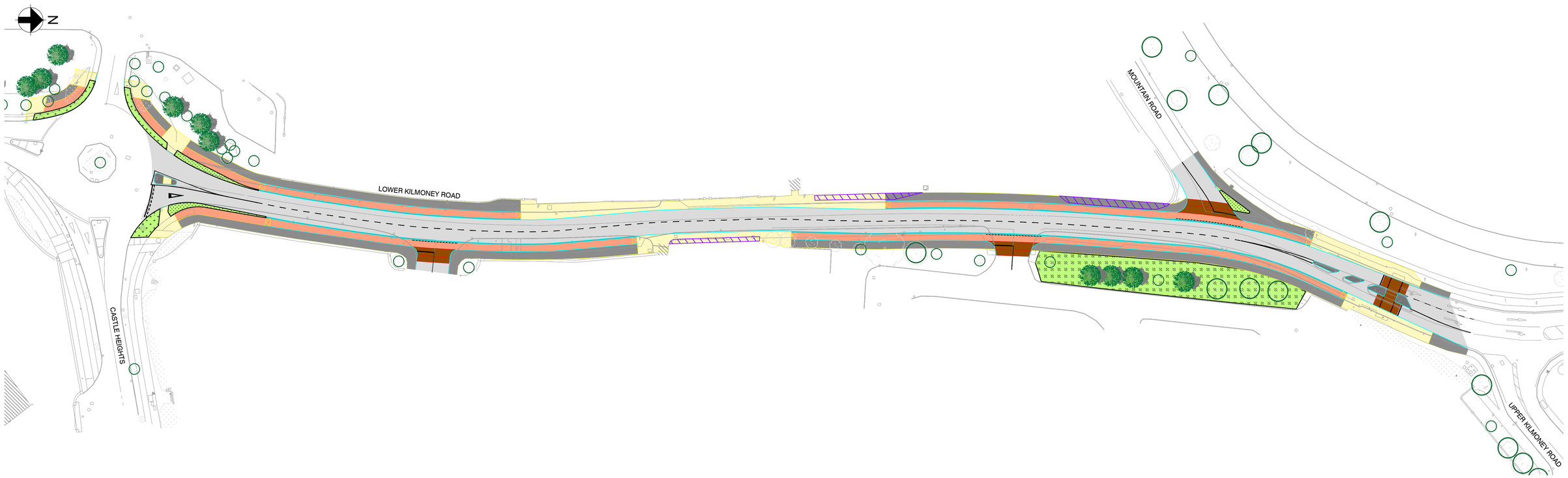
Client
Cork County Council

Project Title
Carrigaline TPREP Phase 1B

Drawing Title
Active Travel Concept Planning
Cork Road
Route 1

Scale at A1: 1:500 @ A1 (1:1000 @ A3)
Role: Landscape Architecture
Suitability: S2 - Suitable for Information
Job No: 285392-00
Rev: P02
Drawing No: 285392-ARP-1B-XX-DR-L-0206

Do not scale



KEY PLAN

Landscape General Arrangement Legend
Soft Landscape

- Planting mix 1 - Pollinator Planting Mix - on min.400mm depth of topsoil on free draining subgrade.
- Planting mix 2 - Area to be managed as meadow - selective mowing regime with maintained mown 1m width to all edge interfaces
- Planting mix 3 - Native Hedgerow mix - on min. 600mm depth of topsoil on free draining subgrade.
- Planting mix 4 - SuDS planting mix - on min. 450mm depth of topsoil on free draining subgrade.
- Proposed grass seeding - on min.150mm depth of topsoil on free draining subgrade.
- Existing area to be protected and retained
- Proposed Native Tree Planting - on min.1.2m3 topsoil on free draining subgrade. Clearstem height for street trees to be min. 2.5m

Ecology Mitigation Measures-
Refer to Ecologists documenters for detail -
Locations are indicative only, Ecologist to advise on final locations during construction stage

- Habitat piles - min 10m2
- Bee banks - min 20m2
- 16 starling nest boxes (in pairs)
- 16 house sparrow boxes (near mature trees)
- 4 grey wagtail boxes (near river/water course)
- 2 bee posts
- 16 Bat boxes - adjacent to areas of woodland
- Existing tree -To be protected and retained Note: Treeo/vegetation to be protected and retained as per arborists instructions and details - Arborist to advise on all proposed works within tree root protection zone

0 5 10 20m
Scale 1:500

Rev	Date	By	Chkd	Appd
P02	08/11/23	NC	BV	SvJ
P01	26/10/23	NC	BV	SvJ

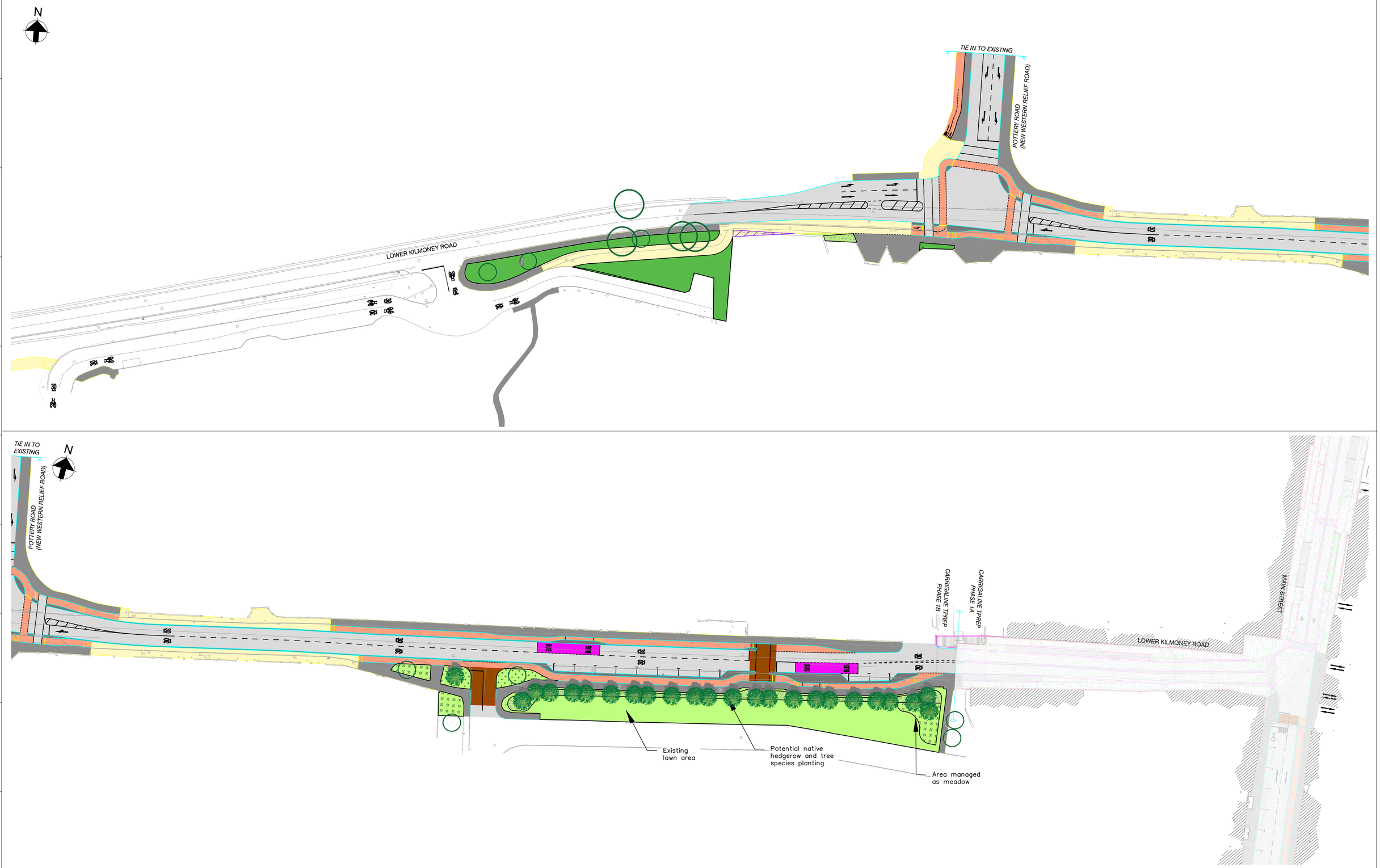
ARUP
Arup, 50 Ringsend Road
Dublin, D04 T6X0
www.arup.ie
Tel +353(0)1 233 4455 Fax +353(0)1 668 3169

Client
Cork County Council

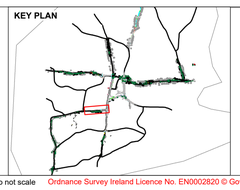
Project Title
Carrigaline TPREP Phase 1B

Drawing Title
Active Travel Concept Planning
Cork Road
Route 1

Scale at A1 1:500 @ A1 (1:1000 @ A3)
Role Landscape Architecture
Suitability S2 - Suitable for Information
Job No **285392-00**
Rev **P02**
Drawing No **285392-ARP-1B-XX-DR-L-0207**



KEY PLAN



Landscape General Arrangement Legend

Soft Landscape

- Planting mix 1 - Pollinator Planting Mix - on min.400mm depth of topsoil on free draining subgrade.
- Planting mix 2 - Area to be managed as meadow - selective mowing regime with maintained mown 1m width to all edge interfaces
- Planting mix 3 - Native Hedgerow mix - on min. 400mm depth of topsoil on free draining subgrade.
- Planting mix 4 - SuDS planting mix - on min. 400mm depth of topsoil on free draining subgrade.
- Proposed grass seeding - on min.100mm depth of topsoil on free draining subgrade.
- Existing area to be protected and retained
- Proposed Native Tree Planting - on min.1.2m3 topsoil on free draining subgrade. Clearstem height for street trees to be min. 2.5m

Ecology Mitigation Measures-
Refer to Ecologists documenters for detail - Locations are indicative only. Ecologist to advise on final locations during construction stage

- Habitat piles – min 10m2
- Bee banks – min 20m2
- 16 starling nest boxes (in pairs)
- 16 house sparrow boxes (near mature trees)
- 4 grey wagtail boxes (near river/water course)
- 2 bee posts
- 16 Bat boxes – adjacent to areas of woodland
- Existing tree -To be protected and retained. Note: Trees/vegetation to be protected and retained as per arborists instructions and details - Arborist to advise on all proposed works within tree root protection zone

0 5 10 20m
Scale 1:500

Rev	Date	By	Chkd	Appd
P02	08/11/23	NC	BV	SvJ
P01	26/10/23	NC	BV	SvJ

ARUP
Arup, 50 Ringsend Road
Dublin, D04 T6X0
www.arup.ie
Tel +353(0)1 233 4455 Fax +353(0)1 668 3169

Client
Cork County Council

Project Title
Carrigaline TPREP Phase 1B

Drawing Title
Active Travel Concept Planning
Cork Road
Route 1

Scale at A1 1:500 @ A1 (1:1000 @ A3)
Role Landscape Architecture
Suitability S2 - Suitable for Information
Job No 285392-00
Rev P02
Drawing No 285392-ARP-1B-XX-DR-L-0208

A.9 Proposed Vegetation Removal Drawings

A3

Red Line Boundary

Hedges proposed for removal

Trees proposed for removal

Rev	Date	By	Chkd	Appd	Authd
P01	05/10/2023	ACAR			

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16-22 Bedford Street,
Belfast, BT2 7FD
www.arup.com

Client
Cork County Council

Project Name
Carrigaline Town Centre Revitalisation & Active Travel Enhancement (TPREP)

Drawing Title
Map of Tree and Hedgerows proposed for removal
Page 1 of 5

Scale at A3
1:4,000

Role
Environmental

Suitability
For Information

Project Number	Rev
285392-00	P01

Drawing Number
Appendix A7

A3

- Red Line Boundary
- Hedges proposed for removal
- Trees proposed for removal

Rev	Date	By	Chkd	Appd	Authd
P01	05/10/2023	ACAR			

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16-22 Bedford Street,
Belfast, BT2 7FD
www.arup.com

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Cork County Council

Project Name
Carrigaline Town Centre Revitalisation & Active Travel Enhancement (TPREP)

Drawing Title
Map of Tree and Hedgerows proposed for removal
Page 2 of 5

Scale at A3
1:4,000
Role
Environmental
Suitability
For Information
Project Number
285392-00
Rev
P01
Drawing Number
Appendix A7

05/10/2023 20:40

A3

Red Line Boundary

Hedges proposed for removal

Trees proposed for removal

Rev	Date	By	Chkd	Appd	Authd
P01	05/10/2023	ACAR			

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16-22 Bedford Street,
Belfast, BT2 7FD
www.arup.com

Client
Cork County Council

Project Name
Carrigaline Town Centre Revitalisation & Active Travel Enhancement (TPREP)

Drawing Title
Map of Tree and Hedgerows proposed for removal
Page 3 of 5

Scale at A3
1:4,000

Role
Environmental

Suitability
For Information

Project Number	Rev
285392-00	**P01**

Drawing Number
Appendix A7

A3

Red Line Boundary

Hedges proposed for removal

Trees proposed for removal

Rev	Date	By	Chkd	Appd	Authd
P01	05/10/2023	ACAR			

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16-22 Bedford Street,
Belfast, BT2 7FD
www.arup.com

Client
Cork County Council

Project Name
Carrigaline Town Centre Revitalisation & Active Travel Enhancement (TPREP)

Drawing Title
Map of Tree and Hedgerows proposed for removal
Page 4 of 5

Scale at A3
1:4,000

Role
Environmental

Suitability
For Information

Project Number	Rev
285392-00	P01

Drawing Number
Appendix A7

A3

Red Line Boundary

Hedges proposed for removal

Trees proposed for removal

Rev	Date	By	Chkd	Appd	Authd
P01	05/10/2023	ACAR			

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16-22 Bedford Street,
Belfast, BT2 7FD
www.arup.com

Client
Cork County Council

Project Name
Carrigaline Town Centre Revitalisation & Active Travel Enhancement (TPREP)

Drawing Title
Map of Tree and Hedgerows proposed for removal
Page 5 of 5

Scale at A3
1:4,000

Role
Environmental

Suitability
For Information

Project Number
285392-00

Rev
P01

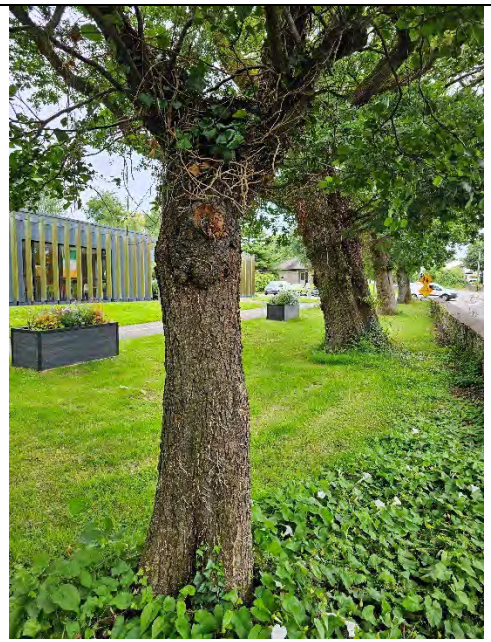
Drawing Number
Appendix A7

Appendix B

Photographs

B.1 Fossitts Habitat Survey

Habitat	Photograph
Flower Beds and Borders (BC4)	
Stonewalls and Other Stonework (BL1)	

Scattered trees and Parkland (WD5)	
Ornamental Non Native Shrub (WS3)	

Tidal Rivers (CW2) and Buildings and Artificial Surfaces (BL3)	
Amenity Grassland (Improved) (GA2)	

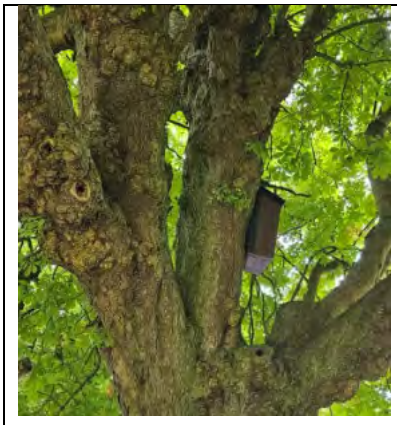
Dry Meadows and Grassy Verges (GS2)	
Hedgerow (WL1)	

Treeline (WL2)	
Riparian Woodland (WN5)	

Appendix C

C.1 Bat photographs and Maps

Photograph of feature	Suitability	Photograph of feature	Suitability
	Low – PRF8		Low – PRF 7
	Moderate – PRF1		Moderate – PRF 9
	Moderate – PRF3		Moderate – PRF4

	High – PRF6		High – PRF 5
	Low – PRF2		