CARRIGANARRA LRD

VOLUME II | EIAR

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CARRIGANARRA LRD

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CHAPTER ONE

INTRODUCTION

CHAPTER ONE

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CHAPTER 1 | Introduction

1.1 Background Context

This Environmental Impact Assessment Report (EIAR) has been prepared on behalf of MOS Homes Limited, to assess the environmental effects of a proposed residential development at Carriganarra, Carrigrohane & Maglin (townlands), Ballincollig, Cork.

The EIAR has been completed in accordance with Directive 2011/92/EU (as amended by 2014/52/EU) and relevant Irish legislation as well as in conformity with guidance in the European Commission's 'Environmental Impact Assessment of Projects Guidance on the preparation of the Environmental Impact Assessment Report' 2017 and guidance in the 'Guidelines on the Information to be contained in Environmental Impact Assessment Reports' 2022 (Environmental Protection Agency).

The proposed development consists of the demolition of existing agricultural building and the construction of a residential development of 300 no. residential units consisting of 128 no. dwellings houses, 172 no. apartment/duplex units, a two storey creche facility and all ancillary site development works. The proposed 128 no. dwelling houses will include 42 no. bedroom detached/semi-detached dwelling houses and 84 no. 3 bedroom semi-detached/townhouse dwelling houses. The proposed development also provides for the restoration of an existing vernacular farm building on site which will accommodate 2 no. 2 bedroom semi-detached units. The proposed 172 no. apartment/duplex units will include 18 no. 3 bedroom units, 109 no. 2 bedroom units and 45 no. 1 bedroom units, to be provided in 20 no. apartment/duplex buildings ranging in height from 3-4 storeys over basement level.

Vehicular access to the proposed development will be provided via the existing junction from the Killumney road serving the Heathfield residential development and existing sections of the Maglin Sustainable Access Corridor to the north. The proposed development provides for the extension of Maglin Sustainable Access Corridor and the provision of 4 no. pedestrian/cycle connections to the Heathfield residential development to the north which is under construction. Ancillary site works include the raising of existing ground levels on site, the provision of bicycle parking and bin storage facilities serving the proposed apartment/duplex and creche buildings, the delivery of active travel infrastructure, landscaping and servicing proposals including a temporary pumping station, and the undergrounding/diversion of an existing 38KV overhead ESB line which traverses the site.

A full description of the proposed development is provided in Chapter 2 of this EIAR.

1.2 The Applicant

The Murnane & O'Shea Group (MOS) was founded in 1958 and is one of Ireland's leading building contractors. MOS have a proven track record and played a leading role in the provision of new of housing, particularly in the Cork Metropolitan Area having delivered residential developments which include Crawford Woods and Springmount Woods (Glanmire), Clarendon Brook (Douglas), Ard Na Ri, (Banduff), Crann Darach (Montenotte) Cork and the North West Regeneration in Knocknaheeny amongst a wide variety of residential schemes. MOS are currently delivering the 'Elmbury', 'Heathfield' and 'Carleton' residential developments at Carrigtwohill, Ballincollig and Castletreasure respectively and are committed to the continued delivery of residential accommodation at sustainable locations, positively contributing to the realisation of population and housing growth targets of the Cork Metropolitan Area into the future.



Figure 1.1 'Heathfield' residential development at Ballincollig under construction.



Figure 1.2 Site Location & Context within the settlement of Ballincollig

1.3 Purpose and Background of EIA Process

EIA requirements are now governed by Directive 2014/52/EU, which amends Directive 2011/92/EU ("the EIA Directive"). The primary function of the EIA Directive is to ensure that projects that are likely to have significant effects on the environment are subjected to an assessment of their likely impacts.

EIA Directives have been transposed into Irish law and the planning consent process through the Planning & Development Acts 2000 (as amended), and the Planning & Development Regulations, 2001 (as amended). The European Union (Planning and Development) (Environmental Impact Assessment) Regulations 2018 (S.I. No. 296/2018) commuted the 2014 Directive into Irish law.

Article 1(1)(g) of the 2014 EIA Directive (2014/52/EU) outlines the stages and steps taken when completing an EIA.

(i) the preparation of an environmental impact assessment report by the developer, as referred to in Article 5(1) and (2);

(ii) the carrying out of consultations as referred to in Article 6 and, where relevant, Article 7;

(iii) the examination by the competent authority of the information presented in the environmental impact assessment report and any supplementary information provided, where necessary, by the developer in accordance with Article 5(3), and any relevant information received through the consultations under Articles 6 and 7;

(iv) the reasoned conclusion by the competent authority on the significant effects of the project on the environment, taking into account the results of the examination referred to in point (iii) and, where appropriate, its own supplementary examination; and

(v) the integration of the competent authority's reasoned conclusion into any of the decisions referred to in Article 8a.

This is reflected in Article 171A of the European Union (Planning and Development) (Environmental Impact Assessment) Regulations 2018 which states that 'Environmental Impact Assessment' means a process—

(a) consisting of—

(i) the preparation of an environmental impact assessment report by the applicant in accordance with this Act and regulations made thereunder,

(ii) the carrying out of consultations in accordance with this Act and regulations made thereunder,

(iii) the examination by the planning authority or the Board, as the case may be, of—

(I) the information contained in the environmental impact assessment report,

(II) any supplementary information provided, where necessary, by the applicant in accordance with section 172(1D) and (1E), and

(III) any relevant information received through the consultations carried out pursuant to subparagraph (ii)

(iv) the reasoned conclusion by the planning authority or the Board, as the case may be, on the significant effects on the environment of the proposed development, taking into account the results of the examination carried out pursuant to subparagraph (iii) and, where appropriate, its own supplementary examination, and

(v) the integration of the reasoned conclusion of the planning authority or the Board, as the case may be, into the decision on the proposed development, and

(b) which includes—

(i) an examination, analysis and evaluation, carried out by the planning authority or the Board, as the case may be, in accordance with this Part and regulations made thereunder, that identifies, describes and assesses, in an appropriate manner, in the light of each individual case, the direct and indirect significant effects of the proposed development on the following:

(I) population and human health;

(II) biodiversity, with particular attention to species and habitats protected under the Habitats Directive and the Birds Directive;

(III) land, soil, water, air and climate;

(IV) material assets, cultural heritage and the landscape;

(V) the interaction between the factors mentioned in clauses (I) to (IV), and

(ii) as regards the factors mentioned in subparagraph (i)(I) to (V), such examination, analysis and evaluation of the expected direct and indirect significant effects on the environment derived from the vulnerability of the proposed development to risks of major accidents or disasters, or both major accidents and disasters, that are relevant to that development;

This EIAR has been prepared in accordance with guidance contained in the Directive 2011/92/EU (as amended by Directive 2014/52/EU), the Planning & Development Acts 2000 (as amended), the Planning & Development Regulations, 2001 (as amended), Annex IX of the 2014/52/EU Directive and Schedule 6 of the European Union (Planning and Development) (Environmental Impact Assessment) (Regulations) 2018 (S.I. No. 296/2018), which identifies the specific information to be assessed in an EIAR.

The purpose of these Directives to ensure that projects likely to have significant effects on the environment are subject to a comprehensive and systematic assessment of environmental effects prior to development consent being given. The amended Directive (Directive 2014/52/EU) uses the term environmental impact assessment report (EIAR) rather than environmental impact statement (EIS). Where current national guidelines and regulations refer to an environmental impact statement or an EIS, this can be taken to be the same as an environmental impact assessment report (EIAR).

The guidelines provide practical guidance to planning authorities, An Bord Pleanála, and other relevant stakeholders, on procedural issues and the EIA process, and outline the key changes introduced by Directive 2014/52/EU.

The EPA 2022 Guidelines list the following fundamental principles to be followed when preparing an EIAR:

- Anticipating, avoiding and reducing significant effects.
- Assessing and mitigating effects,
- Maintaining objectivity.
- Ensuring clarity and quality.
- Providing relevant information to decision makers and
- Facilitating better consultation.

The amended EIA Directive prescribes a range of environmental factors which are used to organise descriptions of the environment and the environmental impact assessment should identify, describe and assess in an appropriate manner, in the light of each individual case, the direct and indirect significant effects of a project on the prescribed environmental factors which are:

(a) population and human health;

(b) biodiversity, with particular attention to species and habitats protected under Directive 92/43/EEC and Directive 2009/147/EC;

(c) land, soil, water, air and climate;

(d) material assets, cultural heritage and the landscape;

(e) the interaction between the factors referred to in points (a) to (d).

This EIAR documents the assessment process of the prescribed environmental factors in relation to the proposed development.

1.4 EIA Methodology

As per Article 5(1) of the 2014 Directive, an EIAR should provide the following information:

- Description of Project.
- Description of Baseline Scenario.
- Description of Likely Significant Effects.
- Description of Avoidance / Mitigation Measures.
- Description of Reasonable Alternatives (and rationale for chosen option) and
- A Non-Technical Summary.

Annex IV of the Directive sets out a more detailed outline of the information required in an EIAR. The subject EIAR has been prepared in full accordance with these stated requirements of Annex IV.

In addition to the 2014 Directive, this EIAR has been informed by, but not limited to:

- Guidelines for Planning Authorities and An Bord Pleanála on carrying out Environmental Impact Assessment, (Department of Housing, Local Government and Heritage, August 2018).
- Guidelines on the Information to be contained in Environmental Impact Assessment Reports (Environmental Protection Agency 2022).
- Environmental Impact Assessment of Projects: Guidance on Screening (European Commission, 2017).
- Environmental Impact Assessment of Projects: Guidance on Scoping (European Commission, 2017).
- Environmental Impact Assessment of Projects: Guidance on the Preparation of the Environmental Impact Assessment Report (European Commission, 2017).
- Advice Notes for Preparing Environmental Impact Statements, Draft, (EPA, September 2015).
- Guidance on Integrating Climate Change and Biodiversity into Environmental Impact Assessment (European Union, 2013).
- Transposition of 2014 EIA Directive (2014/52/EU) in the Land Use Planning and EPA Licensing Systems - Key Issues Consultation Paper, Department of Housing, Planning, Community and Local Government, 2017.
- Circular letter PL 1/2017 - Advice on Administrative Provisions in Advance of Transposition (2017).

We would also note that the pre-application discussions with the Planning Authority informed the content/ scoping of the EIAR. The EIA process has been project managed to ensure that the EIAR documentation and relevant analysis are confined to topics which are explicitly described in the legislation, and where environmental impacts may arise. Evaluation and analysis have been limited to topics where the indirect, secondary or cumulative impacts are either wholly or dominantly due to the project or development under consideration.

The EIA process can be broadly described as containing the following steps.

- EIA Screening.
- EIA Scoping.
- Preparation of an EIAR which informs planning consent process.

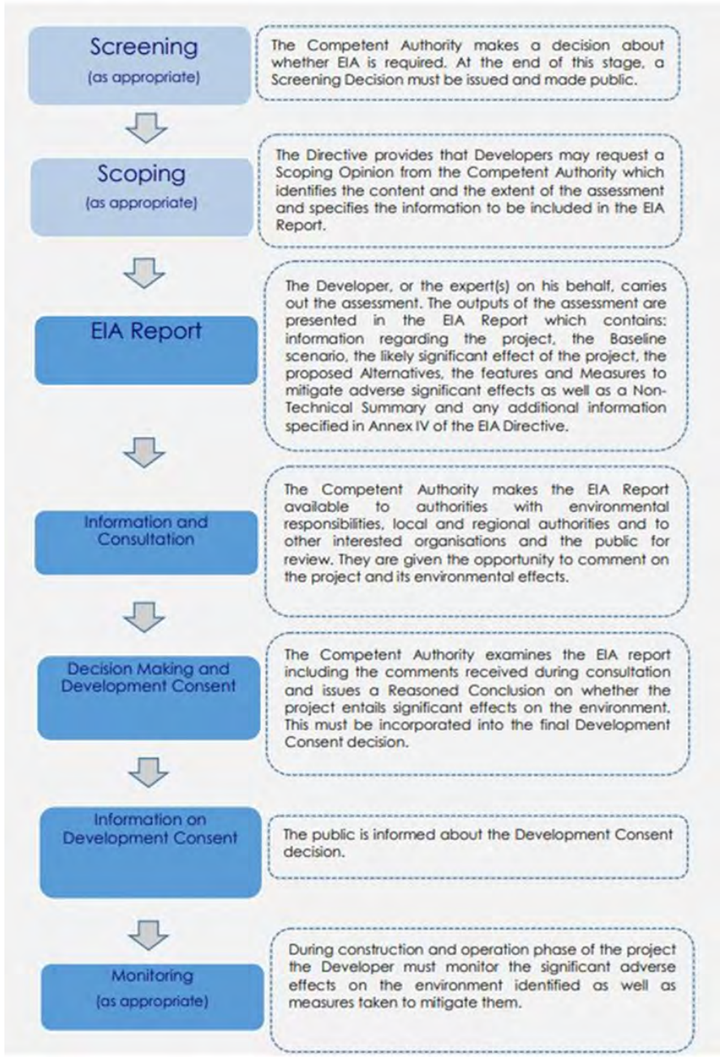


Figure 1.3 EIA Process (Source: Page 12 of Preparation of guidance documents for the implementation of EIA Directive (Directive 2011/92/EU as amended by 2014/52/EU).

1.5 EIA Screening

Screening is the term used to describe the process for determining whether a proposed development requires an EIA by reference to mandatory legislative threshold requirements or by reference to the type and scale of the proposed development and the significance or the environmental sensitivity of the receiving baseline environment.

Article 93 and Schedule 5 of the Planning and Development Regulations, 2001 sets out the classes of development for which a planning application must be accompanied by an environmental impact assessment report (EIAR).

Part 1 and Part 2 Schedule 5 of the Planning and Development Regulations, 2001 prescribes the categories of, and thresholds for, prescribed development requiring EIA.

The subject proposal does not come under any of the prescribed development contained in Part 1 of Schedule 5.

Paragraph 10(b) of Part 2 of Schedule 5, which refers to Infrastructure Projects refers to the thresholds where a Mandatory EIAR is required.

> *"b) (i) Construction of more than 500 dwellings*
>
> *(ii) Construction of a car-park providing more than 400 spaces, other than a car-park provided as part of, and incidental to the primary purpose of, a development.*
>
> *(iii) Construction of a shopping centre with a gross floor space exceeding 10,000 square metres.*
>
> *(iv) Urban development which would involve an area greater than 2 hectares in the case of a business district, 10 hectares in the case of other parts of a built-up area and 20 hectares elsewhere.*
>
> *(In this paragraph, "business district" means a district within a city or town in which the predominant land use is retail or commercial use.)"*

As the proposed development comprises the construction of an urban development at site of 13.5 hectares, an EIAR is required as prescribed by Classes 10(b)(iv) of the Regulations.

1.6 EIA Scoping

Scoping is the process of determining the content and extent of the matters which should be covered in the environmental information to be submitted in the EIAR. The primary objective of the EIAR is to identify baseline environmental and socio-economic conditions in the area of the proposed development, predict potential beneficial and/or adverse effects of the development during both construction and operational phases and propose appropriate mitigation measures where necessary. This EIAR also assesses the inter relationship between these aspects and the cumulation of effects with other existing and/or approved projects in the area.

The EPA 2022 Guidelines state that scoping is a process of deciding what information should be contained in an EIAR and what methods should be used to gather and assess that information. Scoping is defined in the European Commission EIAR guidance (EC, 2017) as:

> *"The process of identifying the content and extent of the information to be submitted to the Competent Authority under the EIA process."*

The content of this EIAR was informed by an informal scoping process carried out by the applicant, the design team and appointed EIAR consultants to identify the core issues likely to be most important during the Environmental Impact Assessment process.

Scoping for this EIAR involved an assessment of all relevant guidance as outlined in Section 1.3 of this report and Pre-Planning consultation meetings held with Cork City Council in accordance with Sections 247 and Section 32B of the Planning and Development Act 2000 (as amended) in April 2025 and September 2025. The recorded minutes of the 'Stage 1' Section 247 and 'Stage 2' Section 32 LRD meetings are included as Appendix 1-1, with the LRD Meeting Opinion issued by Cork City Council on the 28th of October 2025, contained in Appendix 1-2 of this EIAR. A series of meetings have taken place with the technical staff of Cork City Council which assisted in the preparation of this EIAR and the planning application. Scoping also included notifying the following prescribed bodies of the extent of the proposed development and that an EIAR regarding same was being prepared.

1. An Taisce
2. Cork City Childcare
3. Department of Education
4. Department of Local Government, Housing and Heritage
5. Department of Tourism, Culture, Arts, Gaeltacht, Sport and Media
6. Eirgrid
7. Environmental Protection Agency
8. Electricity Supply Board
9. Gas Networks Ireland
10. Geological Survey Ireland
11. Heritage Council
12. Inland Fisheries Ireland
13. Uisce Eireann
14. Department of the Environment, Climate and Communications.
15. National Monuments Service
16. National Parks and Wildlife Service
17. National Transport Authority
18. Office of Public Works
19. Teagasc
20. Transport Infrastructure Ireland
21. Health & Safety Authority
22. Department of Agriculture Food and the Marine
23. Irish Farmers Association
24. Cork County Council

The particulars sent to the above bodies are contained in Appendix 1-3 with any responses received contained in Appendix 1-4.

1.7 Structure of the EIAR

The EIAR is divided into 3 volumes:

- The main report consisting of 15 chapters as outlined in the table of contents.
- The Appendices numbered in accordance with the chapter they relate.
- A set of non-technical summaries for each relevant chapter.

Each chapter includes the following elements:

Introduction and Methodology

Description of Existing Environment

Impact Assessment which considers the following effects as necessary.

- Indirect Effects
- Cumulative Effects.
- Do-Nothing Effects
- Worst Case Effects
- Indeterminable Effects
- Irreversible Effects
- Residual Effects
- Synergistic Effects

Mitigation Measures, Monitoring & Residual Impacts – Description of mitigation measures proposed for both construction and operational phases of the proposed development and identify any residual impacts.

Difficulties in Compiling Information - Any difficulties/restrictions on gathering information if applicable is stated.

References - Any external references in the report cited and listed at the end of each chapter.

Non-technical Summary. The non-technical summary is a brief summary of each chapter, including summary of significant impacts, proposed mitigation and residual impacts. In compiling these summaries every effort have been made to present findings using non-technical language, which is clear to the general public.

All impacts or effects are described in following terms as in accordance with the EPA 2022 Guidelines.

Quality: Positive, Neutral, Negative

Significance: Imperceptible, Not Significant, Slight, Moderate, Significant, Very Significant, Profound

Extent and Context: Size of area, population etc.

Probability: Likely, unlikely

Duration: Momentary (seconds to minutes); Brief (less than a day), Temporary <1 yr; Short-term 1-7 yrs, Medium Term 7-15yrs, Long Term 15-60 yrs, Permanent >60 yrs, Reversible (can be undone), Frequency (once, rarely, occasionally, frequently, constantly or hourly, daily, weekly, monthly, annually).

Figure 3.4 of the 2022 guidelines below, shows how comparing the character of the predicted effect to the sensitivity of the receiving environment can determine the significance of the effect.

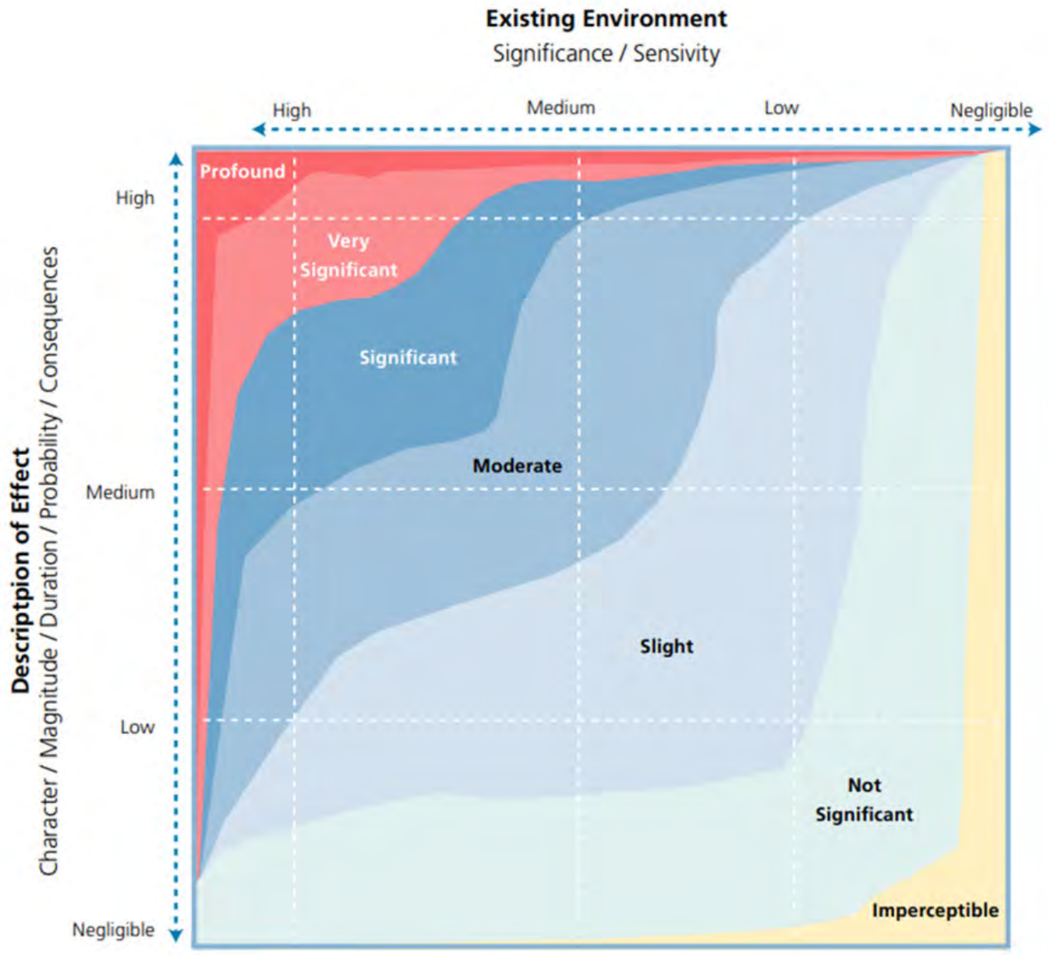


Figure 1.4 Chart Showing Typical Classifications of the Significance of Effects (Figure 3.4 of the 2022 EPA Guidelines)

A Natura Impact Statement has also been prepared for the proposed development and is included as Appendix 8-4 of this EIAR. Following a comprehensive evaluation of the potential direct, indirect and cumulative impacts on the qualifying interests of the SAC and SPA and the implementation of the proposed mitigation measures, it has been concluded by the authors of this report that there will be no residual impacts and the proposed project will not have an adverse effect on the integrity of the Great Island Channel Special Area of Conservation (SAC) and Cork Harbour Special Protection Area (SPA).

1.8 EIAR Team & Qualifications

HW Planning have coordinated the subject EIAR. Environmental specialist consultants were also commissioned for the various technical chapters of the EIAR document which are mandatorily required as per the EIA Directive and Planning and Development Regulations 2018.

The amended EIA Directive (Directive 2014/52/EU) states the following in relation to the persons responsible for preparing the environmental impact assessment reports:

> *'Experts involved in the preparation of environmental impact assessment reports should be qualified and competent. Sufficient expertise, in the relevant field of the project concerned, is required for the purpose of its examination by the competent authorities in order to ensure that the information provided by the developer is complete and of a high level of quality".*

Each environmental specialist was required to characterise the receiving baseline environment; evaluate its significance and sensitivity; predict how the receiving environment will interact with the proposed development and to work with the EIA project design team to devise measures to mitigate any adverse environmental impacts identified.

In accordance with the EIA Directive 2014/52/EU, we confirm that the EIAR has been carried out by fully qualified and competent experts in their relevant fields as outlined in this chapter. A full list of all consultants and the corresponding chapters that have been prepared is detailed below.

Planning Consultants: HW Planning.

Address: 5 Joyce House, Barrack Square, Ballincollig, Cork, P31 KP84.

Chapters Prepared: Chapter 1 – Introduction, Chapter 2 - Project Description & Alternatives Considered (in conjunction with Deady Gahan Architects), Chapter 13 - Population & Human Health, Chapter 14 - Interaction of Impacts and Chapter 15 - Summary of Mitigation & Monitoring Measures.

Personnel: Harry Walsh, (BA HONS, Master of Regional and Urban Planning, MIPI), Director at HW Planning. Harry has over 25 years experience in the planning profession comprising Local Authority roles and private practice. Harry has acted as planning lead on a wide variety of projects which have required EIAR's including a variety of Strategic Housing Developments (SHD's), the development of the 'Castletreasure Urban Expansion Area' in Douglas, Cork on behalf of the applicants, the expansion of the whiskey maturation facility at Ballymona North, Dungourney, Co. Cork and the proposed Midleton Distillery Expansion Project, on behalf of Irish Distillers Limited.

Landscape & Visual: Modelworks.

Address: The Old Courtyard, Newtownpark Ave, Blackrock, Co. Dublin, A94 YD61

Chapters Prepared: Chapter 3 – Landscape & Visual

Personnel. Richard Butler (MIPI MILI) Qualifications: MSc (Spatial Planning), BLArch(Hons) (Landscape Architecture), Dip Proj Mgmt. Memberships: Member of the Irish Planning Institute, Member of the Irish Landscape Institute. Richard has 25+ years' in development and environmental planning, specialising in Landscape and Visual Impact Assessment (LVIA). Recent LVIA experience includes: (1) Cartron LRD, Oranmore, Galway, (2) O'Devaney Gardens, Dublin, (3) Project Montrose LRD, Dublin, (4) Sandford Road LRD, (5) St Vincent's Hospital and Residential Development, Fairview, Dublin, (6) the Guinness Quarter, Dublin, (7) Phases 1, 1B and 2 of the Pembroke Quarter (former Irish Glass Bottle site, Dublin), (8) Augustine Hill, Galway, (9) Emmet Road SHD, Inchicore, Dublin, (10) Newtownpark Avenue SHD, Blackrock, Co. Dublin.

Traffic Consultants: Egis.

Address: 3 Eastgate Road, Eastgate Business Park, Little Island, Co Cork, T45KH74.

Chapters Prepared: Chapter 4 - Material Assets – Traffic & Transportation.

Personnel: This assessment was prepared by Kwok Chuen Lam, Chartered Engineer who is a Senior Traffic Engineer with EGIS. Kwok Chuen Lam has 19 years' experience specialising in the field of Traffic and Transport Engineering. He has been engaged as team member on a variety of Transportation and Traffic projects. His experience includes the design and management of road improvement projects, preparation of mobility management plans and traffic impact assessments.

This chapter has been reviewed by Tara O'Leary a chartered Transport Planning Professional with over 20 years' experience.

Civil Engineers: DOSA Consulting Engineers.

Address: Joyce House, Barrack Square, Ballincollig, Cork, P31 KP84.

Chapters Prepared: Chapter 5 - Material Assets – Services, Infrastructure & Utilities.

Personnel: Liam O'Toole (BE CEng (Hons) MIEI), Director at Denis O Sullivan & Associates (DOSA) Consulting Engineers. Liam is a Chartered Civil Engineer and has over 25 years' experience in the industry working locally, nationally and internationally.

Geology & Hydrology: Keohane Geological & Environmental Consultancy

Address: Ivy House, Clash, Carrigrohane, Cork.

Chapters Prepared: Chapter 6 – Land, Soils & Geology, Chapter 7 - Water (Hydrology & Hydrogeology)

Personnel: Dan Keohane of Keohane Geological & Environmental Consultancy (KGEC). KGEC is a Cork-based consultancy, established in 2004, and specialising in geological and environmental sciences. Mr. Keohane has over 30 years' experience in environmental assessment. In the past 20 years, KGEC has prepared planning applications, EIARs and/or geotechnical assessments for commercial, industrial and residentials developments throughout Ireland and UK. Mr. Keohane (BSc Hons Geology; MSc Applied Geophysics) received an honours degree in Geology from UCC in 1989, and a Master's Degree in Applied Geophysics from UCG in 1991. Mr. Keohane has been working on environmental impact assessment for residential/ commercial developments, roads, quarries, waste management facilities and wind farms for the past twenty years. Areas of expertise include geological assessment, landslide risk assessment, groundwater assessment, surface water, hydrology and erosion control during construction. He has practical experience in project construction, performing environmental oversight and monitoring during the construction phase.

Project Ecologist: Dixon Brosnan - Environmental Consultants.

Address: Lios Ri Na hAoine, 1 Redemption Road, Cork.

Chapters Prepared: Chapter 8 - Biodiversity

Personnel: Carl Dixon MSc (Ecology) is a senior ecologist who has over 25 years' experience in ecological and water quality assessments. Carl holds an Honours Degree (BSc) in Ecology and a Masters (MSc) in Ecological Monitoring from UCC. He is a senior ecologist who has over 25 years' experience in ecological assessment. Prior to setting up DixonBrosnan Environmental Consultants in 2000, Carl set up and ran Core Environmental Services which included REPS planning for landowners and ecological assessments. Carl has particular experience in freshwater ecology, including electrofishing fish stock assessments and water quality assessments. He also has considerable experience in habitat mapping and mammal ecology including survey work and reporting in relation to Badgers and bats. Other competencies include surveys for invasive species and bird surveys. Carl has extensive experience with regards to EIAR and NIS mitigation and impact assessment. He has experience in large-scale industrial developments with extensive experience in complex assessments as part of multi-disciplinary teams. Such projects include gas pipelines, incinerators, electrical cable routes, oil refineries and quarries. Carl has considerable experience in bat survey and bat mitigation measures/roost design. Carl was the primary coordinator and surveyor for a heritage council-

funded project serving all the river bridges in County Waterford for bats. He has designed bat roosts for Lesser horseshoe in conjunction with the NPWS for sites in West Cork. Carl has completed specialized training courses relating to bats in Ireland and the UK and has considerable experience in using a variety of bat survey equipment and subsequent software analysis of data.

Dr. Sorcha Sheehy PhD (ecology/ornithology) is an experienced ecological consultant specialising in bird behaviour. Sorcha received a BSc in Applied Ecology from UCC and subsequently went on to receive a PhD in behavioural ornithology at UCC. During her PhD research, Sorcha studied bird-aircraft collision with a particular focus on bird behaviour. Sorcha has worked for over 15 years in a professional ecology role and specialises in the coordination of ecology projects and assessments. She has coordinated and contributed to Habitats Directive Assessments (AA screenings and NIS) and Environmental Impact Assessment Reports (EIAR) for a range of small and large-scale projects with particular expertise in assessing impacts on birds. She has particular experience in large-scale developments, including residential and industrial developments with extensive experience in complex assessments as part of multi-disciplinary teams.

Mark Donnelly (Forestry) holds a BSc. Hons in Forestry from Bangor University, Wales, and is a member of the Institute of Chartered Foresters. He worked as an arboricultural consultant for the National Trust in Wales for 22 years and was a lecturer in Forest Ecology at Bangor University. In Ireland, he has completed landscape assessments for a range of projects including wind farms, quarries, local authorities, housing developments, roads and pipelines.

Built Heritage/Archaeology: Lane Purcell Archaeology

Address: 64 Father Mathew Road, Turners Cross, Cork,

Chapters Prepared: Chapter 9 - Cultural Heritage

Personnel: Avril Purcell, (MA Archaeology, NUI Cork, 1994, BA Archaeology and History, NUI Cork, 1992, Licence eligible by National Monuments Service since 1997). Avril is the director of Lane Purcell Archaeology (LPA) and is a licensed archaeologist with 28 years' experience in research, consultancy, surveying and excavation. Avril has been involved in a large number of diverse EIAR projects throughout the country. In some cases, her involvement has been from the initial constraint study stage through pre-development investigations, resolution and construction. Avril has presented expert witness evidence at An Bord Pleanála oral hearings.

Musetta O'Leary (MA Archaeology, NUI Cork, 2000, BA Archaeology and Geography, NUI Cork, 1998). Musetta has over 15 years of experience in all aspects of archaeological consultancy and primarily manages the archaeological and cultural heritage components of projects at the pre-planning consultancy stage. She has co-ordinated and written the Cultural Heritage section of a large number of diverse EIAR/EIS projects for road construction, industrial, residential and sporting developments, energy delivery and quarrying. Musetta has presented expert witness evidence at An Bord Pleanála oral hearings.

Environmental Consultant: AWN Consulting/ Trinity Consultants.

Address: The Tecpro Building, Clonshaugh Business & Technology Park, Dublin 17

Chapters Prepared: Chapter 10 - Noise & Vibration, Chapter 11 – Air Quality, Chapter 12 - Climate

Personnel: Sarah Berry, a Principal Climate Consultant in the Air Quality & Climate section of AWN Consulting. Sarah holds a BSc in Physical Geography from the University of Leeds. She has 9 years' experience in the climate change and sustainability sectors, with expertise in greenhouse gas accounting and verification. She also has experience in greenhouse gas permitting. Her experience includes conducting strategic sector-specific GHG audits across a range of industries including data centres, industrial facilities, hospitals, manufacturing, power stations, wastewater treatment works and airports.

Caolán Leneghan, Senior Climate Change Consultant at AWN Consulting. Caolán holds degrees in Geography and International Development (Maynooth University) and Disaster Risk Management & Climate Change Adaptation (Lund University, Sweden). With over five years' experience, he specialises in climate risk assessment, adaptation strategy, and advisory services across sectors including infrastructure (including residential), transport, energy, urban planning, and water. He has also supported international development and climate resilience advising The World Bank, MDBs and UK government on climate adaptation and delivering guidance for assessment.

Carl Ramskill, Principal Air Quality Consultant at AWN Consulting. Carl has a BSC in Chemistry and an MSc in Air Pollution Management and Control from the University of Birmingham, as well as 8 years' experience in air quality. He has worked on various projects in the UK and Ireland, including road schemes, residential developments, mixed-use developments, energy centres and data centres.

Ciara Nolan, Principal Environmental Consultant in the Air Quality & Climate section of AWN Consulting. She holds a BSc in Energy Systems Engineering from University College Dublin and has also completed an MSc in Applied Environmental Science at UCD. She is a Member of the Institute of Air Quality Management (MIAQM) and the Institution of Environmental Sciences (MIEnvSc). She has over 8 years of experience in undertaking air quality and climate assessments. She has prepared air quality and climate impact assessments as part of EIARs for residential developments including Woodbrook, Shankill (Planning Application Ref. ABP30584419), Ballygossan Park, Skerries (Planning Application Ref. LRD0010/S3), SHD Ratoath (Planning Application Ref. SH305196), SHD Rathmullen, Drogheda (Planning Application Ref. SH305552), commercial and industrial developments by Dublin Airport Authority, Abbvie, Mountpark, Pfizer, Takeda, as well as renewable energy developments such as Crockahenny Windfarm, Upperchurch Windfarm, Knocknamona Windfarm and Keerglen Windfarm.

Abe Scheele holds the Institute of Acoustics Diploma in Acoustics and Noise Control, along with City & Guilds Level 1 and 2 in Sound Engineering and City & Guilds Music Technology. Abe has been working in the field of acoustics since 2016. He is experienced in environmental, building and architectural acoustics. He has extensive experience of environmental surveying, noise modelling, impact assessment of environmental noise and architectural acoustic assessments for various sectors, including industrial, commercial and residential.

Project Architects: Deady Gahan Architects.

Address: Eastgate Village, Little Island, Co. Cork / Thompson House, MacCurtain Street, Cork, T23 A5RN

Chapters Prepared: Chapter 2 - Project Description & Alternatives Considered (in conjunction with HW Planning).

Personnel: Eamonn Gahan, Director - Architects Registration No. 04148 - Eamonn is a founding director of Deady Gahan Architects, set up in 2004 and has over 20 years architectural experience. He is a registered RIAI Architect, is an RIAI Grade 3 Conservation Architect and a qualified Passive House Designer.

1.9 Cumulative Impacts

The potential environmental effects of the proposed development have not been assessed in isolation. The potential impacts of this project have been considered in combination with other relevant permitted or proposed projects in the vicinity of the site and plans for the area, which may result in cumulative environmental impacts.

The geographical boundaries for cumulative projects were developed within the wider design team having regard to the location of the Project; defined EIAR boundary; the nature of the proposed development works; the receiving environment; and the potential for cumulative impacts to arise relative to each individual EIAR topic chapter. In relation to the latter, this included consideration of the following practical elements:

Population and Human Health: In defining the EIA study area for this chapter a focused analysis of Census boundaries was undertaken, including both Electoral Divisions (ED) and Census Small Areas (SA) which are a sub-division of the ED units and generally cover 65-90 households. Using a combination of these units a study area was defined that:

- Includes the smaller settlements, established and planned residential areas and employment areas served by the Urban Town of Ballincollig. This takes the form of a belt of urban areas built up along the R608 regional road.
- The area is largely delimited by the physical barrier of the River Lee to the north and the and N22/N40 Road to the south.

- Prior to Cork City Boundary extension in 2019 the traditional catchment area of the then County 'Main Town' of Ballincollig was all located within the administrative area of Cork County Council. This catchment now straddles the boundary of Cork City and County Councils, with the Urban Town of Ballincollig and lands to the east falling within the Cork City area. However, Ballincollig and its traditional catchment has remained a relatively discrete and self-contained area, and this is reflected in the study area in terms of population, urban amenities and services and employment.

The study area comprises of two Census 2022 Electoral Divisions (EDs); Ballincollig ED (Ref. 4701619) and Ovens ED (Ref. 4727019). These EDs have been chosen as they most accurately represent the functional urban area of Ballincollig. The population of this study area was 20,854 persons in the 2022 Census.

Biodiversity: Consideration of terrestrial ecology habitats and survey work within the environs of the site and Natura 2000 European designated sites.

Air Quality: Sensitive receptor locations (residential housing, schools, hospitals, places of worship, sports centres and shopping areas), i.e. locations where members of the public are likely to be regularly present within 200 metres of stated impacted road links (TII criteria) and potential sensitive dust receptors within 250 metres of the site boundary.

Climate: The study area with respect to the Greenhouse Gas Emissions Assessment (GHGA) is Ireland's Climate budget. The study area with respect to the Climate Change Vulnerability Assessment (CCRA) is the project boundary and its assets.

Noise & Vibration: The extent to which the proposed development could interact with other projects in the area and identified potential sensitive receptors in the area.

Cultural Heritage: An appraisal of all sites listed in the Record of Monuments and Places (RMP) within a 1km radius of the proposed development site. In addition, the assessment considers all assets designated as Protected Structures (PS) in both the Cork City and Cork County Development Plans 2022–2028, as well as entries in the National Inventory of Architectural Heritage (NIAH) within the same 1km study area.

Water: Stated surface water catchments and hydrological cumulative impact potential based on the proposed development.

Material Assets: Potential for cumulative telecoms, broadcast and aviation impacts, and impact of proposed development on traffic volumes in the area, inclusive of other known projects and having regard to the delivery route for construction traffic.

Landscape and Visual: An assessment of statutory landscape related designations in the wider area including scenic routes, protected views and areas of high landscape value. Aerial imagery, OSI Discovery series mapping were also reviewed to gather accurate information on the wider study area.

Land and Soils: Assessment of underlying geological conditions of the site and its environs and sites of geological interest in the wider Cork Metropolitan Area.

1.9.1 Projects

Each of the projects listed in Table 1.1 and Figure 1.5 have been assessed for potential cumulative impacts. These projects were identified by using both Cork City Council and Cork County Council Planning Enquiry Systems, An Bord Pleanála's website and the Department of Housing, Local Government and Heritage's EIA Portal.

Application Ref (Cork City Council).	Applicant(s)	Date Received	Description	Outcome/Current Status
26/44475	MOS Homes Ltd	20/01/2026	Construction of 11 no. dwellings at Heathfield, Ballincollig.	Currently being assessed by Cork City Council.
25/44222	O Flynn Construction Co. Unlimited Company	10/10/2025	LRD for the construction of 1,150 no. residential units, 1 no. creche, 3 no. retail units at Maglin, Ballincollig.	Currently being assessed by Cork City Council.
25/44048 (ACP 324030-26).	Murnane & O Shea Limited	28/07/2025	LRD of 544 no. residential units, creche facility, commercial/retail unit at Greenfield, Ballincollig.	Permitted by Cork City Council in December 2025. Currently being assessed by An Coimisiún Pleanála.
-	-	-	Cork Luas Project	Emerging Preferred Route (EPR) - Initial Public Consultation Phase
24/43308	Coleman New Homes (Blarney) Limited	7/10/2024	The construction of a two-storey creche at Maglin Road, Ballincollig, Cork.	Development permitted.
23/42446	Coleman New Homes (Blarney) Limited	14/11/2023	LRD of 162 no. residential units at Maglin Road, Ballincollig, Cork. (Cois Caislean Phase 2)	Development permitted and under construction
22/41644	MOS Homes Limited	16/12/2022	Construction of 98 no. dwelling at Heathfield, Ballincollig, Cork.	Development permitted and under construction

Table 1.1 Cumulative Impacts – Projects Considered

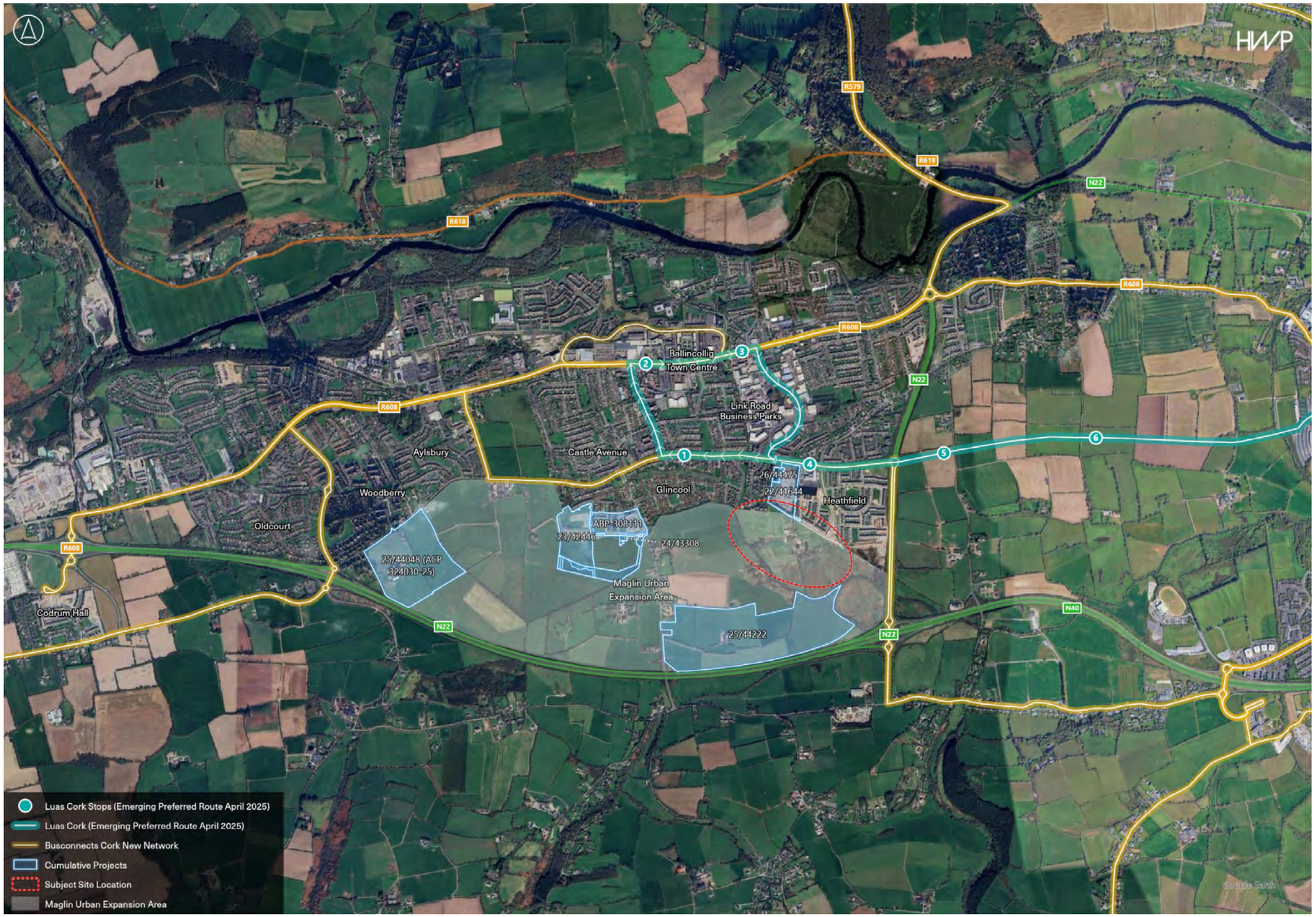


Figure 1.5 Evolving Site Context -Cumulative Impacts

1.9.2 Plans

The Cork City Development Plan 2022-2028 (CDP) outlines policies and objectives for housing development in the Cork City administrative area. The CDP is underpinned by a number of key principles which include sustainability, social inclusion, high quality design and climate change adaptation. The Plan establishes a hierarchical network of settlements in the County, allocating related population and housing growth projections. Chapter 2 of the CDP outlines the Core Strategy for the City over the lifetime of the Plan. The strategy identifies a hierarchy in the network of settlements and divides the city into different strategic areas to focus growth in appropriate locations and ensure a sustainable, plan-led future for the city.

The site is situated within the South Ballincollig/Maglin Urban Expansion Area (MUEA) as defined in the Core Strategy of the CDP. The CDP 'Environmental Reports' appendices contains the SEA Statement and Natura Impact Report. These describe the different development scenarios that were assessed by Cork City Council as part of the preparation of the Development Plan and the SEA process and the reasons for choosing the plan as adopted, in the light of the reasonable alternatives dealt with in accordance with Article 9 of the European Directive (2001/42/EC) on the Assessment of the Effects of Certain Plans and Programmes on the Environment (the SEA Directive).

Three alternative scenarios were considered during the preparation of the 2022-2028 CDP. Alternative/Scenario 3 'Compact Liveable Growth' was identified as the preferred scenario following the evaluation of the three proposed alternative scenarios for their respective impacts on the environment was undertaken. The potential impact on the environment of the CDP was assessed for cumulative impacts and were considered in the preparation of this EIAR.

1.10 Difficulties Encountered

No particular difficulties were encountered in compiling any of the specified information contained in the EIAR, such that that the prediction of impacts has not been possible. The relevant chapters of the EIAR, identify any specific difficulties which were encountered during preparation of this EIAR.

1.11 Availability of EIAR Documentation

This EIAR will be available in printed form at the offices of Cork City Council (City Hall, Anglesea Street, Cork, T12 T997). The EIAR will also be available to view electronically at Cork City Councils online planning enquiry system and at the following website. **www.CarriganarraLRD.ie.**

1.12 EIAR Quality Control & Review

HW Planning oversaw the preparation of this EIAR. A key aspect of the EIAR has been to make the documentation as accessible and clear as possible to the public and other relevant stakeholders. This EIAR has been prepared in accordance with the relevant legislation.

1.13 Typographical Errors

Every effort has been made to ensure that the content and findings of this EIAR is consistent and error free. However, it is acknowledged that some minor grammatical/spelling and typographical errors may occur. These typographical minor inconsistencies are unlikely to result in any material impacts on the overall findings and conclusions of the EIAR.

1.14 Chapter Appendices

Appendix 1-1 – Minutes of Section 247 & Section 32 LRD Meetings.

Appendix 1-2 – Cork City Council LRD Opinion dated 28th October 2025.

Appendix 1-3 – Scoping Letters to Statutory Bodies.

Appendix 1-4 - Scoping Responses from Statutory Bodies.

CHAPTER TWO

PROJECT DESCRIPTION & ALTERNATIVES CONSIDERED

CHAPTER TWO

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CHAPTER 2 | Project Description & Alternatives Considered

2.1 Introduction

The EIA Directive requires that an EIAR should provide an overview of:

- the location, site, design, size, etc.;
- the physical characteristics of Project (including any demolition or land-use requirements);
- the characteristics of the operational phase of the Project;
- any residues, emissions, or waste expected during either the construction or the operational phase.

As the European Commission's EIAR Guidelines state, the requirement to include a description of the project in the EIA Report is not new, however, the key difference brought about by the 2014 amendments is the inclusion of relevant requisite demolition works during the construction and operational phases. In addition, an estimate of residues and emissions during the construction phase is to be included, where previously such estimates concerned only the operational phase. Article 5 requires other relevant features of the Project to be included. In addition, a description of the location of the Project is now specifically required by Annex IV. Finally, the operational phase of the Project is not limited to production processes, as it was previously.

In addition, the lists of characteristics given in Annex IV, have been expanded upon:

- any requisite demolition works must now be described, where relevant;
- energy demand and energy used should be described in context of the operational phase;
- natural resources must now be described in the context of the operational phase
- the list of expected residue and emission estimates is no longer exhaustive, and subsoil has been added as type of pollution;
- estimates of quantities and types of waste produced must now be given.

This chapter describes the nature, location and specific characteristics of the proposed development during construction and operational phases in accordance with the 2014 Directive.

This chapter has been prepared by Harry Walsh, Director at HW Planning.

2.2 Existing Environment/Baseline Scenario

The subject lands of 13.5 hectares in area are situated in the townlands of Carriganarra/Carrigrohane to the southeast of Ballincollig. The greenfield lands are bound to the north by the 'Heathfield' and 'Limeworth' residential developments and by the existing established urban footprint of Ballincollig, with undeveloped agricultural lands to the west and south. Heathfield serves as an initial gateway to the eastern areas of the Maglin Urban Expansion Area (MUEA) as identified in the Cork City Development Plan 2022-2028 (CDP). Heathfield delivers the first eastern section of the MUEA Sustainable Access Corridor (SAC) spine road which facilitates access to the subject development lands, which were previously landlocked. The subject lands are situated in a strategically important location in the future expansion of Ballincollig. The lands are the next sequential lands for development in the eastern MUEA and are situated within a 15 minute walking/10 minute cycle distance of the following services and amenities.

- **Public Transport Opportunities** - A 15 minute walking distance from Ballincollig Main Street and bus stops serving the existing 220 no. 24 hour bus route which runs from Ovens-Carrigaline (via Ballincollig Main Street) operates a peak frequency of every 15 minutes. The site is also within 15 minutes walk of bus stop locations to serve 'Sustainable Transport Corridors' (STC) E, Ballincollig to City in Draft BusConnects. The lands are also situated approximately 400 metres (equivalent to 1.5 kilometres, equivalent to approximately 5 minutes walk of the potential future 'Killumney Road' stop as identified on the Emerging Preferred Route of the Luas Cork project.
- **Retail Opportunities -** The site is within 15-20 minutes walking distance and 10 minutes cycle from all areas in Ballincollig Town centre including main street and the Castlewest Shopping Centre which provides a wide variety of retail and commercial opportunities including supermarkets, comparison retail, service stations, and beauticians/ hairdressers. Link Road/Leo Murphy Road, which connects the Killumney Road to Main Street, also provides a broad range of retail and service opportunities with the Link Road Business Centre, Ballincollig Commercial Park, Westpoint Business Park and other mixed-use commercial areas accommodating fitness centres, mechanics, retail warehousing, car sales, retail, retail/trade warehousing, light industry and other commercial services for Ballincollig's population and catchment.
- **Educational Facilities** – Ballincollig is well served by several primary and secondary schools and other educational outlets. Gaelscoil Ríordáin on the Killumney Road and Colaiste Choilm on Ballincollig Main Street is situated within 15 minutes walking distance from the site. Other educational outlets including Scoil Eoin and Scoil Mhuire on Station Road, Scoil Barra, Ballincollig Community School, Le Chéile Secondary School and Our Lady of Good Counsel School situated at Innishmore and Gaelscoil an Chaisleain will all be easily accessible on foot or bicycle for future occupants of the scheme. The subject lands are also well placed to benefit from future schools to be delivered in Ballincollig as identified by the ZO 12 'Education' zoning objectives for Ballincollig, which includes lands at Coolroe, and two separate educational outlets to be delivered in the MUEA to the southwest of the lands.
- **Recreational Outlets** – Ballincollig is home a wide variety of recreational, sporting and amenities which are within 10 minutes cycle and 15 minutes walking distance from the subject site including bars and restaurants. Other amenities within this distance include Ballincollig GAA Club, Ballincollig Soccer Club, Ballincollig Community Centre and Ballincollig Regional Park. The Talbot Hotel which serves an important local amenity is also situated within a 10 minute cycle from the subject site.
- **Employment Opportunities** - DELL Technologies facility at Ovens is situated approximately to the west of Ballincollig within a short distance of the site. Due to the excellent public transport opportunities and established local economy, Ballincollig is a self-sufficient town with a wide range of employment and commercial opportunities with Main Street, the Barrack Square office campus and the various commercial/industrial estates on the Link Road/Leo Murphy Road in particular serving as important employment centres for the town's population.
- **Essential Service/Healthcare –** The subject site is situated within a 15 minutes walking distance/10 minute cycle of Ballincollig town centre where there are several existing GP practices, pharmacies, physiotherapists and a variety of healthcare and essential services including the Westfield Integrated Care Centre, Ballincollig Primary Care Centre, dentists, chiropractors, additional GP surgeries, pharmacies etc.



Figure 2.1 Site Context within wider settlement of Ballincollig.

Due to the sites location within the defined MUEA, and the evolving developmental context, the lands can be described as being within a transitional urban expansion area. Most of the subject lands are zoned within the 'ZO 1 Sustainable Residential Neighbourhoods' in the CDP, with southern areas of the site included within the 'ZO 15 Public Open Space' zoning objective which state respectively.

> *ZO 01 – 'To protect and provide for residential uses and amenities, local services and community, institutional, educational and civic uses.*
>
> *ZO 15 – 'To protect, retain and provide for passive and active recreational uses, open space, green networks, natural areas and amenity facilities.'*

A 'Walkways & Cycleways' development objective is also identified in the CDP along the site's northern boundary, which reflects the route of the historical Great Southern Railway line.

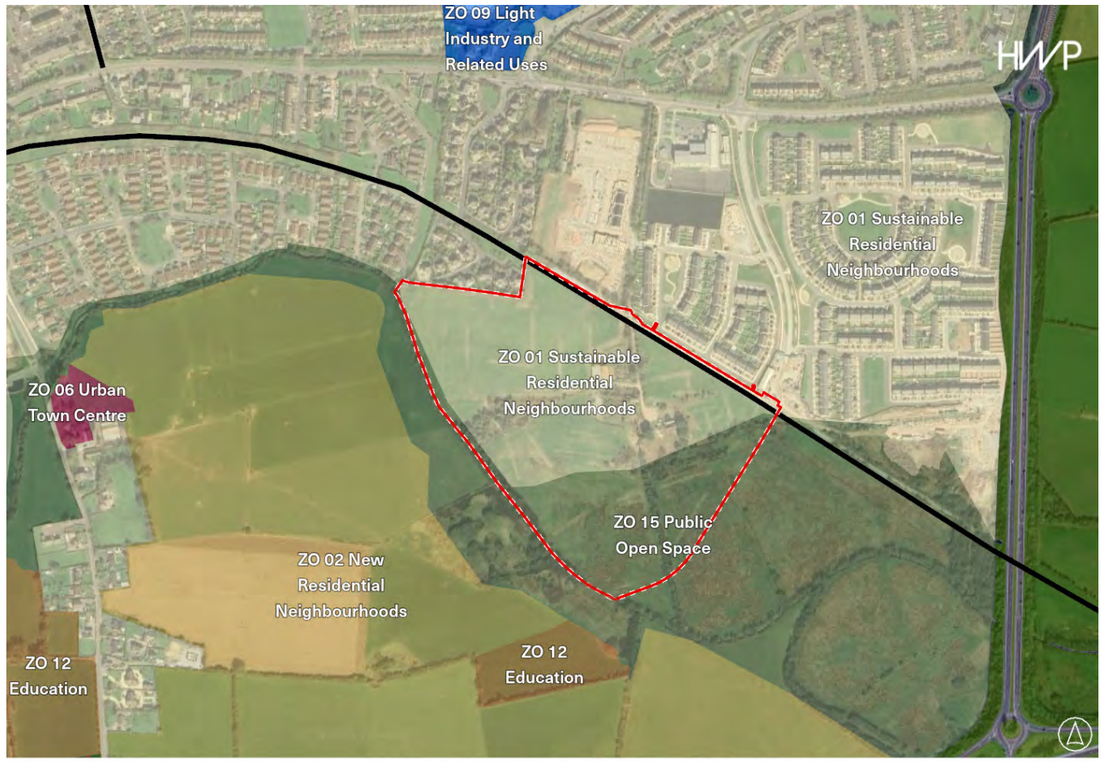


Figure 2.2 CDP Zoning Map demonstrating site zoning objectives.

The site currently comprises of a number of existing field parcels which have been in long term agricultural use with a disused farmyard with ruinous dwelling house and agricultural outbuildings situated in north/central areas of the site which are accessed via an existing laneway linking the site to Killumney Road to the north. Northern areas of the site include a mix of mature broadleaf trees along the site's boundaries with the former route of the Great Southern Railway line running along the site's northern boundary. The Maglin North River runs along the site's western boundary. Most of the site's land is under improved grassland with some encroachment of gorse and other scrub occurring on the areas of grassland which haven't been intensively managed in recent times, while on the lower-lying fields in the far south and south-east of the site, rushes are prevalent.



Figure 2.3 Disused agricultural dwelling house at the site.



Figure 2.4 Ruinous and overgrown agricultural building at the site.



Figure 2.5 Former route of the Great Southern Railway line along the sites northern boundary.



Figure 2.6 Existing agricultural laneway linking the site to the Killumney Road to the north.



Figure 2.7 Constructed phase of the 'Heathfield' residential development to the immediate north of the lands.



Figure 2.8 Maglin North River which flows along the sites southern boundary.



Figure 2.9 Existing agricultural shed.



Figure 2.10 Existing agricultural she at the site.

As described in greater detail in Chapter 6 of this EIAR, the lands are primarily agricultural in nature comprising of several individual field parcels, separated by existing field boundaries and hedgerows. The dominant soil type of the site and immediate area is Acid Brown Earths (70%). Associated soils are grey-brown podzolics (15%) and gleys (15%). The site geology consists of a thin layer of topsoil overlying between approximately 0.5m and 6.4m of glacial tills (and thickening to the south), resting on karstified limestone bedrock. The topography of the site is gently sloping from north to south with a brake-in-slope near the southern end of the site. The lands slope from approximately 22.5mOD along its northern boundary to approximately 16mOD along its southern boundary. Towards its western boundary it slopes to the Maglin North river. There is a break-in-slope, more pronounced at the western side, running east-west through the site marking by a change in land quality from well drained grassland to wet grassland. According to the GSI mapping, there is one bedrock outcrop (exposure) at the site. This occurs just west of the derelict farmyard and buildings and at the location of a disused lime kiln, as shown on the historic 25-inch maps. Evidence of quarrying, associated with an former lime kiln on site, was noted just north of the kiln during site surveys.

As summarised in EIAR Chapter 7, areas to the south of the site (broadly corresponding with the sites 'ZO 15 Public Open Space' zoning objective) are identified as being at risk of fluvial flooding in the Strategic Flood Risk Assessment of the CDP and CFRAM mapping of the OPW. The areas of the site within the 'ZO 1 Sustainable Residential Neighbourhoods' zoning objective in the CDP are not identified as being at risk of flooding. The source of potential flooding at the site is the Maglin North River. Pluvial flooding is not considered an issue at the site.

As detailed in EIAR Chapter 8, the subject lands are not located within any European designated sites. The Cork Harbour SPA is situated 9.8km east (15.5km downstream from the site with the Ballincollig Cave pNHA and Lee Valley pNHA both located circa 1-2 kilometres of the site boundary. Full details of the sites baseline biodiversity and ecological context is provided in Chapter 8 of this EIAR.

The majority of the site is in GA 1 (Improved Agricultural Grassland), with a mix of dry calcareous and neutral grassland (GS1) in northeastern areas and wet grassland (GS4) in southern areas which are of local ecological importance (Lower value). Due to the presence of Maglin North watercourse along the site's western boundary higher value eroding river habitat (FW1) hedgerows WL1 and treelines (WL2) are present with a mixed broadleaved woodland (WD1) also in western areas of the site. No third schedule invasive species were recorded at the site, however two other invasive non-native species (Buddleia Buddleia davidii and Wild clematis Clematis virginiana) were recorded.

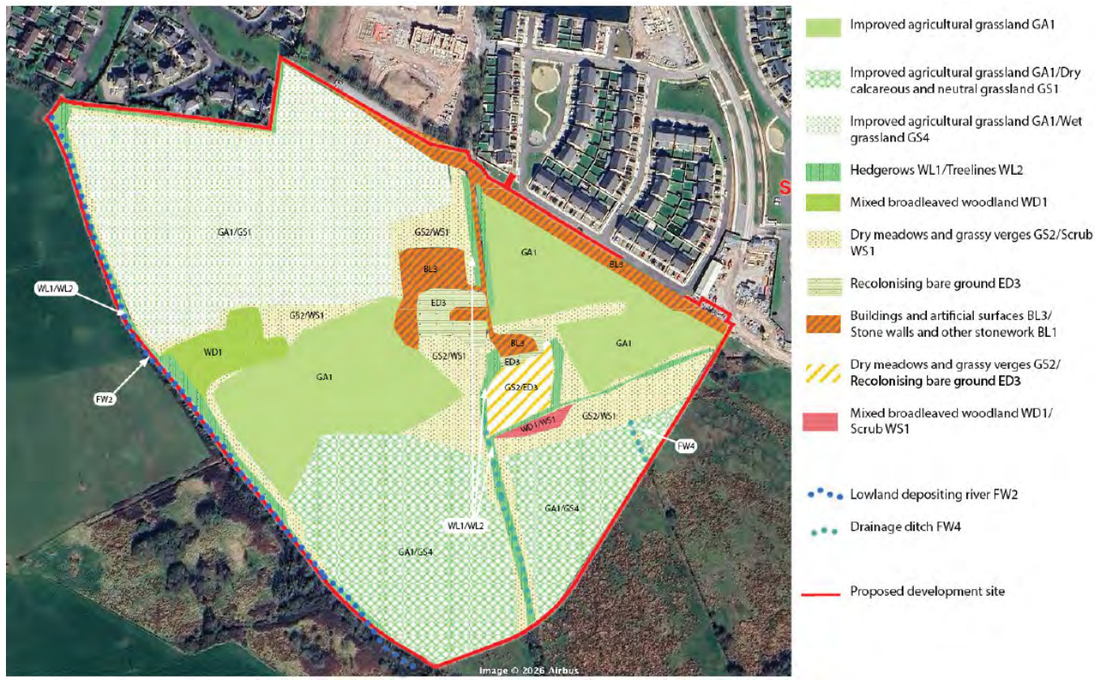


Figure 2.11 Site Habitats Map – (Dixon Brosnan Ecology)

As summarised in Chapter 9 (Cultural Heritage) there are no Protected Structures (PS) in the CDP or structures listed in the National Inventory of Architectural Heritage (NIAH) within the proposed development site. The former farmyard includes the former dwelling house. A roofed, two-storey stone-built structure corresponding to a footprint of this building is shown on the 1841 OS 6-inch map (See Fig 2.3). The structure is interpreted as a former dwelling, later adapted for agricultural use, and represents a legible example of 19th century vernacular architecture despite its ruinous condition. Another ruinous agriculture structure, likely in previous use as farm outbuilding (shown in Fig 2.4), is not present on the 1841 OS map, but is depicted on the 1903 edition. Other existing ruinous structures at the farmyard cluster are more recent and of lower cultural heritage value.

There is one Recorded Monument on the proposed site, a former standing stone in western areas of the site (RMP CO073-103), however this feature is no longer present at the site. There is also a former unregistered limekiln in western areas of the site. Geophysical survey and archaeological testing at the lands identified prehistoric remains. Geophysical surveys and subsequent archaeological testing at the site identified a number of archaeological anomalies, particularly concentrated in northern areas of the site which included a circular enclosure (Anomaly A) measuring c. 16m in diameter which was considered to be possibly prehistoric or early historic in date. Surveys/archaeological testing along in the area of the former railway line also confirmed the presence of archaeological deposits, most notably the remains of a prehistoric ring ditch (Anomaly F) exhibiting at least two phases of construction and subsequent re-use for burial. The ring ditch, associated human remains, and artefactual evidence indicate activity spanning from the Bronze/Iron Age through to the early medieval period. Full details of the sites cultural heritage and archaeological investigations are outlined in Chapter 9 of this EIAR.

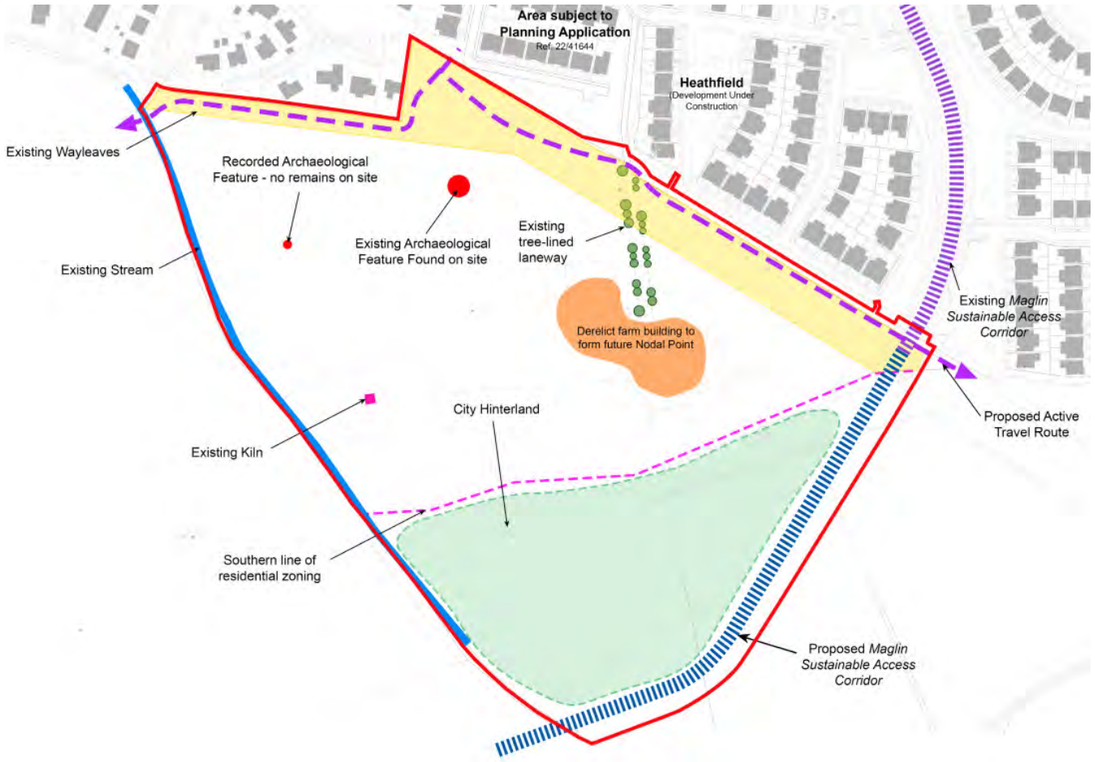


Figure 2.12 Existing Site Context, features & characteristics.

2.3 Evolving Development Context

2.3.1 Strategic Policy Context

As previously stated, the subject lands are situated within an evolving developmental area both locally and within the wider Cork Metropolitan Area, being within the MUEA of the CDP. Section 2.47 of the Core Strategy of the CDP identifies the MUEA as one of seven strategic consolidation and expansion areas in the city which will need to accommodate significant levels of housing and population growth during the lifetime of the plan. Tables 2.2 and 2.3 of the CDP's Core Strategy outline the population and growth targets of the various areas of the city, in order to promote compact and sustainable growth. Ballincollig is identified to accommodate significant growth in population and housing by 2028. The CDP sets a population target of 27, 987 no. people in Ballincollig by 2028, an increase of over 54% from 2016 figures to be accommodated in an additional 3,947 units.

Core Strategy 2028: Compact Liveable Growth[1]

Cork City	Baseline Populations (2016)		Future Population Growth (2028)		Targeted Population Growth (2028)	
	Existing Population	% of Total Population	Future Population	% of Total Growth	Targeted Population Growth	Proportionate Growth Rate Target
Ballincollig	18,159	8.6%	27,987	19.3%	9,828	54.1%

Growth Strategy 2028[3]

Location	Underutilised Sites (Net Hectare's)	Potential Tier 1 & 2 Yield (Units)	Tier 1 Potential Yield (Units)	Tier 2 Potential Yield (Units)	Longterm Strategic Development
Ballincollig	141.2	3,947	2,026	1,921	573

Figure 2.13 Growth Targets for Ballincollig in Core Strategy of CDP

The delivery of large-scale residential development within the seven strategic consolidation and expansion areas is critical for Cork City to meet its ambitious growth targets within the lifetime of the CDP but also to reach longer term targets for Cork set out in the Regional Spatial & Economic Strategy for the Southern Region (RSES) and the National Planning Framework 2040 (NPF). Ballincollig's ability to deliver the housing growth required to enable the town to fulfil its strategic functions within the RSES is heavily dependent on the timely delivery of the MUEA to meet its housing targets. Of the 4,582 no. additional residential units required for the settlement by 2031, 78% are to be provided within the MUEA.

Location	Brief Description and Indicative Yield: Yields are indicative only, will be revised in the context of compact growth targets, departmental guidelines and development plans.	Infrastructure Priorities subject to required appraisal, planning and environmental assessment processes
Ballincollig	Ballincollig is the largest and fastest growing town in Cork, building on its IT specialism and potential for improved public transport links to the City via the Cork Science and Innovation Park. Urban Expansion Area of Maglin. ***Potential Residential Yield:*** **4582 (includes Maglin UEA 3,570).**	As per Chapter 3 Objective on investment for holistic infrastructure for metropolitan areas. • Maglin Urban Expansion Area Phased Infrastructure Packages. • CMATS recommendations re road network / public transport (LRT in particular). • Waste Water Infrastructure upgrades. • Water Supply Upgrades. • Local Road improvements (Killumney Road Upgrade, Maglin Road realignment). • Delivery of Cork Northern Ring Road. • Sustainable Urban Drainage Strategy. • Investment in retrofitting infrastructure and services (physical, social and recreational) to improve quality of life for communities.

Figure 2.14 The future of Ballincollig as identified in Section 7.2 of the RSES.

2.4 Project Description – Construction Phase

This section provides an overview of the construction and demolition phases of the proposed development. In addition, a Construction and Environmental Waste Management Plan (CEWMP) prepared by DOSA Consulting Engineers is included as Appendix 2-1 of this EIAR. All measures set out in this section of the EIAR, and the CEWMP will be implemented during the construction phase of the project.

2.4.1 Construction Programme and Phasing

It is envisaged that the construction phase of the project will be for a period of approximately 5 years. The project will be constructed in three sequential phases comprising.

- **Phase 1 –** Demolition of ruinous dwelling house and agricultural buildings, establishment of site compound, delivery of sections of active travel paths along the sites northern boundary and initial section of the Maglin SAC and the construction of 118 no. dwelling units and a proposed creche facility in northern areas of the site.
- **Phase 2 –** Completion of the remainder of the Maglin SAC within the site, enabling /infilling works and the construction of 79 no. residential units in southern areas of the site.
- **Phase 3 -** 103 no. residential units in western area of the site.

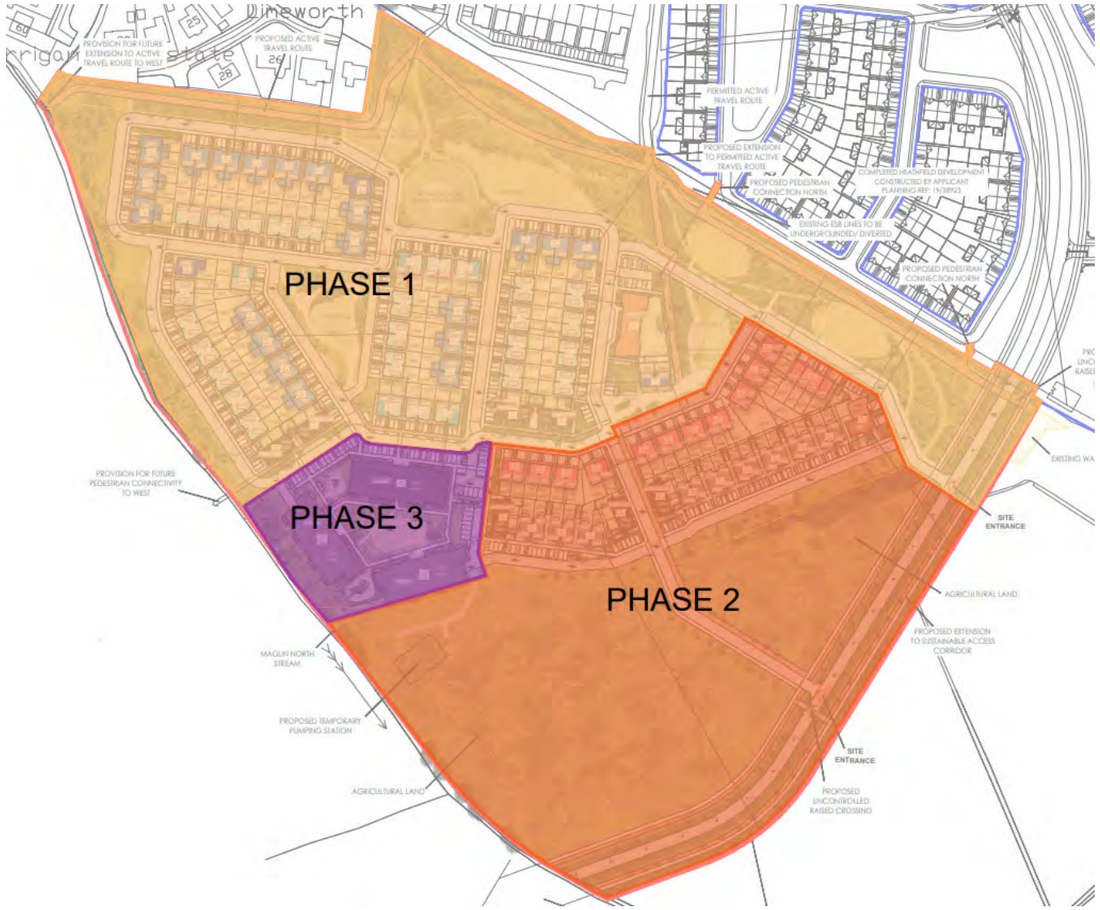


Figure 2.15 Construction Phasing Strategy

As detailed CEWMP the sequence of construction activities will include.

- Erection of stock-proof fencing around site permitter.
- Establishment of a site compound.
- Site Excavations/Earthworks.
- Site Establishment works at the site compound including erection of site offices, canteen, toilets, changing facilities, temporary water services and construction parking areas.
- Demolition of existing structures on-site.
- Landscaping works including the implementation of protective measures for existing trees and hedgerows.
- Site Infrastructure and residential unit construction.

2.4.2 Raising Ground Levels in Southern Areas of the Site

The delivery of a further section of the MUEA SAC in tandem with the delivery of housing has been a critical component of the proposed development since its inception. The exact route of the SAC has been the subject of detailed discussions with the Planning Authority. Having regard to existing ground conditions and for urban design reasons it was initially proposed to deliver a portion of the SAC further north on a different alignment than the route initially identified by Cork City Council and infill the area between the proposed residential development and the proposed SAC. While Cork City Council had no objection to the principle of the proposed realignment from a planning policy or flood risk management perspective, in response to the Council's request in the LRD Opinion it has been decided to revert to the route of the SAC based upon the design originally defined by Cork City Council. Reverting to the original SAC Route has increased the area between the SAC and the residential development and which forms part of the 'ZO 15 Public Open Space' zoning objective in this area and which is identified as being at risk of flooding.

The provision of the SAC and the access road to the site will require the raising of levels in these areas which will leave an area of low-lying land between the roads and the development effectively cutting off this area from lands to the South. Consistent with the previously proposed approach, it is proposed to fill the remaining areas between the proposed residential development and the proposed SAC. As highlighted in Section 6.3 of the EIAR this will be done using inert soil and stone engineering fill.

The filling of this will have no adverse impacts on adjoining lands not within the control of the applicants in terms of flood risk and as demonstrated in the accompanying Flood Risk Assessment prepared by Malachy Walsh & Partners. The proposed filling of this area has significant engineering benefits in that it allows for a more efficient manner of dealing with surface water in this area, which when the area is filled can be drained to the existing watercourse to the west of the site. Without the filling of this area surface water would continue to flow in its current manner to the south and which will require the construction of culverts under the proposed SAC. The proposed construction of culverts under the SAC will complicate the construction of the SAC and increases the risk of clashes with Uisce Eireann and other utilities which will be constructed within the proposed new SAC. Therefore, it is considered that the original strategy of filling the remaining land between the proposed residential development and the SAC continues to be the most appropriate strategy and one that will ensure the efficient delivery of the SAC.

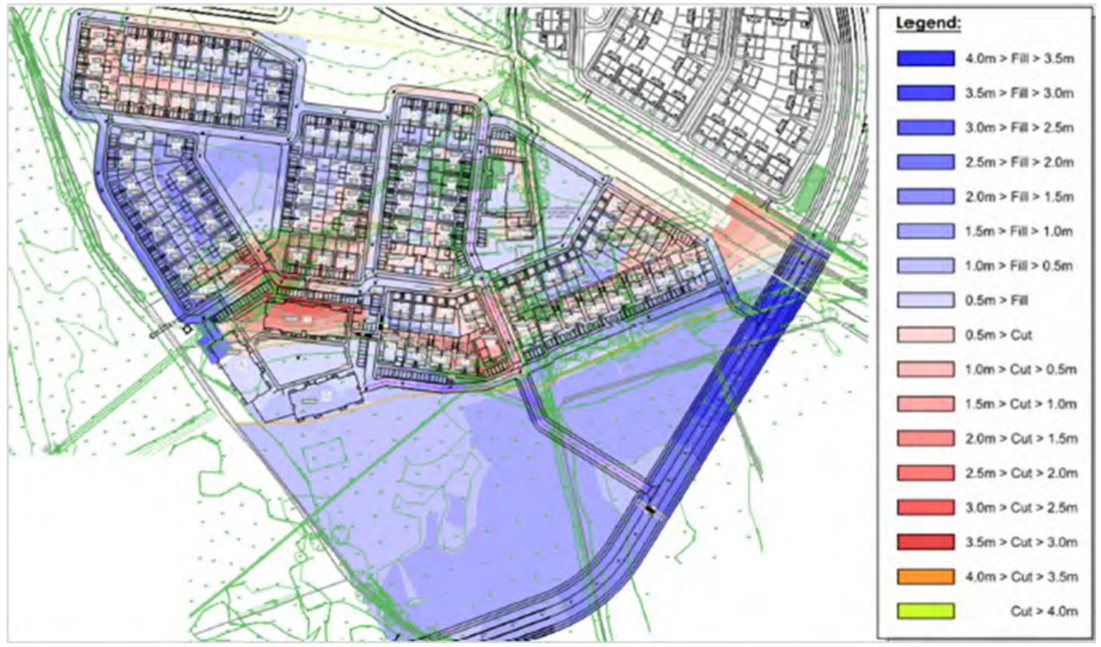


Figure 2.16 Proposed Raising of Levels in Southern areas of the subject site

2.4.3 Construction Compounds/Site Facilities During Construction

The CEWMP 'Site Facilities / Compound' plan prepared by DOSA Consulting Engineers details the location of the proposed construction compound during the phased delivery of the project. The construction compound will provide a construction office, canteen, toilets, changing facilities, temporary water services and construction parking areas.

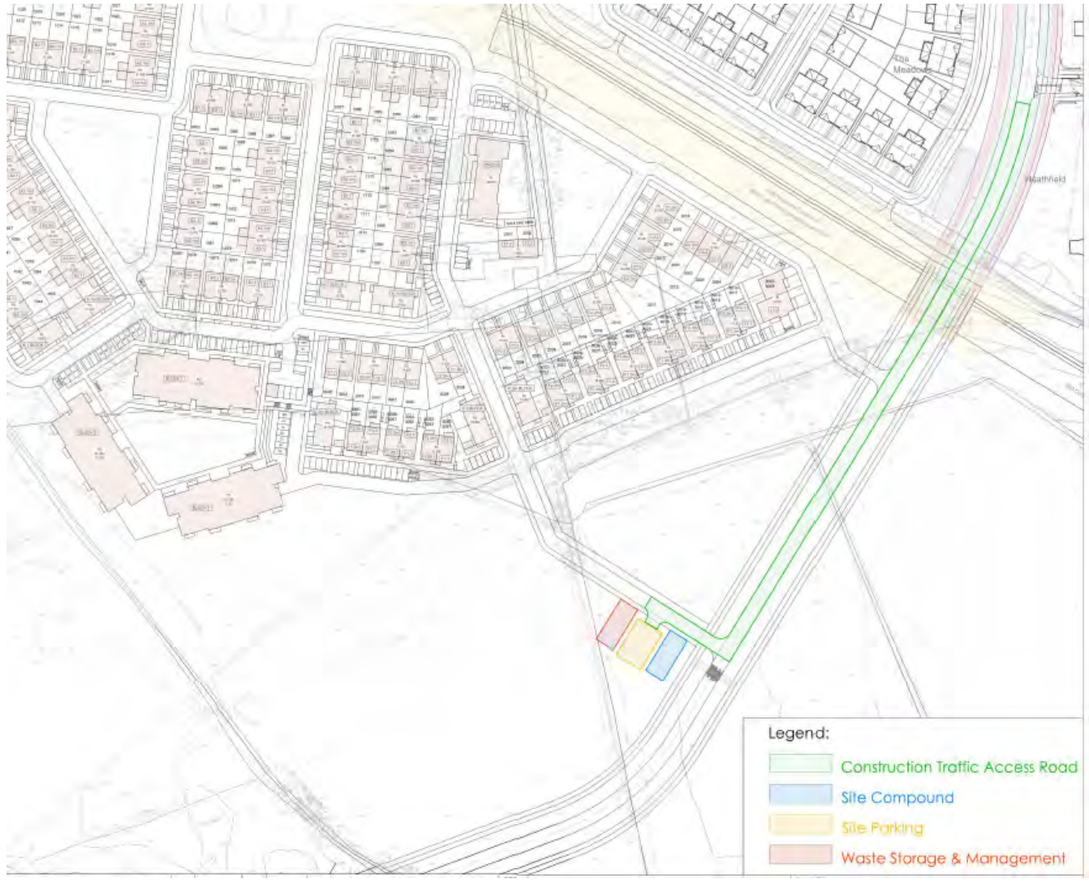


Figure 2.17 Construction Compound Location & Facilities

2.4.4 Construction Traffic Management Plan

A Construction Phase Traffic Management Plan (CTMP) has been prepared and is included as Appendix 2-2 of this EIAR. The CTMP details the traffic management procedures, identification of haulage routes, predicted construction traffic levels during various phases of the development and mitigation/monitoring measures to be implemented during the construction stage of the project.

2.4.5 Demolition and Waste Management

Section 5.11 of the CEWMP (Appendix 2.1) details measures that will be implemented to address waste arising from construction and demolition phases of the proposed development. The proposed development involves the demolition of disused agricultural buildings totalling circa 596 sqm in the northern/central area of the site. The demolition of these structures will occur in the initial construction Phase 1.



Figure 2.18 Aerial photo of Buildings to be Demolished.

2.4.6 Working Hours

Construction works will occur within the hours outlined below.

- Monday to Friday: 08.00 to 18:00hrs
- Saturdays: 08:00 to 14:00
- Sundays & Bank Holidays: No construction works will be carried out on Sundays or Bank Holidays, without the specific agreement of Cork City Council and workings hours will be confirmed by Cork City Council.

It is anticipated that occasionally and with the prior agreement of the planning authority, working hours may be extended and/or works may take place on a Sunday and/or Bank Holiday at times when critical elements of work need to be advanced. Accordingly, traffic generated by core construction personnel will be mainly during the off-peak times reducing potential impacts on the road network.

2.5 Project Description - Operational Phase

2.5.1 Development Description

The proposed development comprises a Large-Scale Residential Development (LRD) at Carriganarra, Carrigrohane & Maglin (townlands), Ballincollig, Cork.

The proposed development consists of the demolition of existing agricultural buildings and the construction of a residential development of 300 no. residential units consisting of 128 no. dwellings houses, 172 no. apartment/duplex units, a two storey creche facility and all ancillary site development works. The proposed 128 no. dwelling houses will include 42 no. bedroom detached/semi-detached dwelling houses and 84 no. 3 bedroom semi-detached/townhouse dwelling houses. The proposed development also provides for the restoration of an existing vernacular farm building on site which will accommodate 2 no. 2 bedroom semi-detached units.

The proposed 172 no. apartment/duplex units will include 18 no. 3 bedroom units, 109 no. 2 bedroom units and 45 no. 1 bedroom units, to be provided in 20 no. apartment/duplex buildings ranging in height from 3-4 storeys over basement level.

Vehicular access to the proposed development will be provided via the existing junction from the Killumney road serving the Heathfield residential development and existing sections of the Maglin Sustainable Access Corridor to the north. The proposed development provides for the extension of Maglin Sustainable Access Corridor and the provision of 4 no. pedestrian/cycle connections to the Heathfield residential development to the north which is under construction.

Ancillary site works include the raising of existing ground levels on site, the provision of bicycle parking and bin storage facilities serving the proposed apartment/duplex and creche buildings, the delivery of active travel infrastructure, landscaping and servicing proposals including a temporary pumping station, and the undergrounding/diversion of an existing 38KV overhead ESB line which traverses the site. The proposed development also provides for a bridge crossing of the Maglin North stream to the south of the site.

The proposed development also provides for a clear-span bridge crossing of the Maglin North river to the south of the site.



Figure 2.19 Proposed Site Layout Plan – Deady Gahan Architects

2.5.2 MUEA Sustainable Access Corridor

The proposed development provides for the construction of the next eastern section of the MUEA Sustainable Access Corridor (SAC). This is consistent with the strategy developed successfully by the applicants at Heathfield. The route and design of the SAC provides for a 6 metre wide carriageway, with 3.5 metre landscape strip (which can accommodate future widening of the SAC, to provide for dedicated public transport lanes as required), and an additional 2 metre landscape strip. The proposed route of the MUEA SAC within the site represents the initial envisaged route of the SAC as determined in response to the 'South Ballincollig Drainage Study' prepared by Malachy Walsh & Partners (MWP) which informed the CDP and the framework for the realisation of the MUEA.

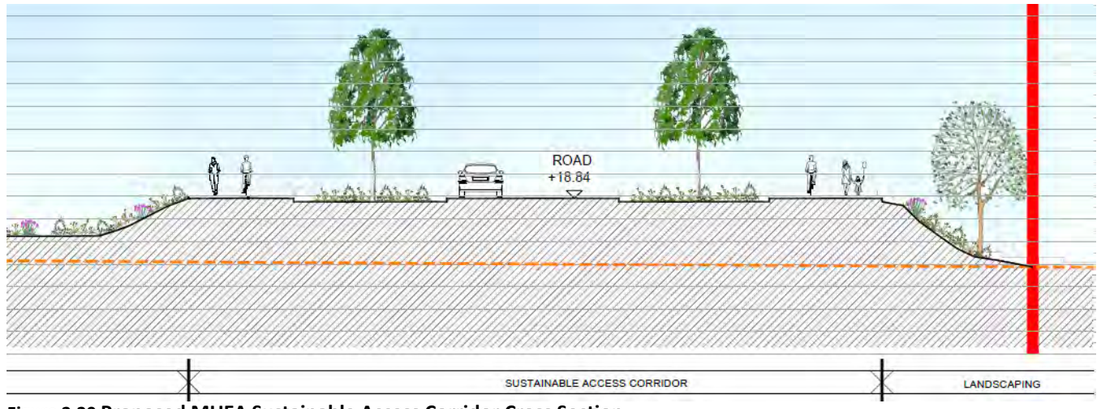


Figure 2.20 Proposed MUEA Sustainable Access Corridor Cross Section



Figure 2.21 Existing initial section of the Eastern MUEA Sustainable Access Corridor at Heathfield.

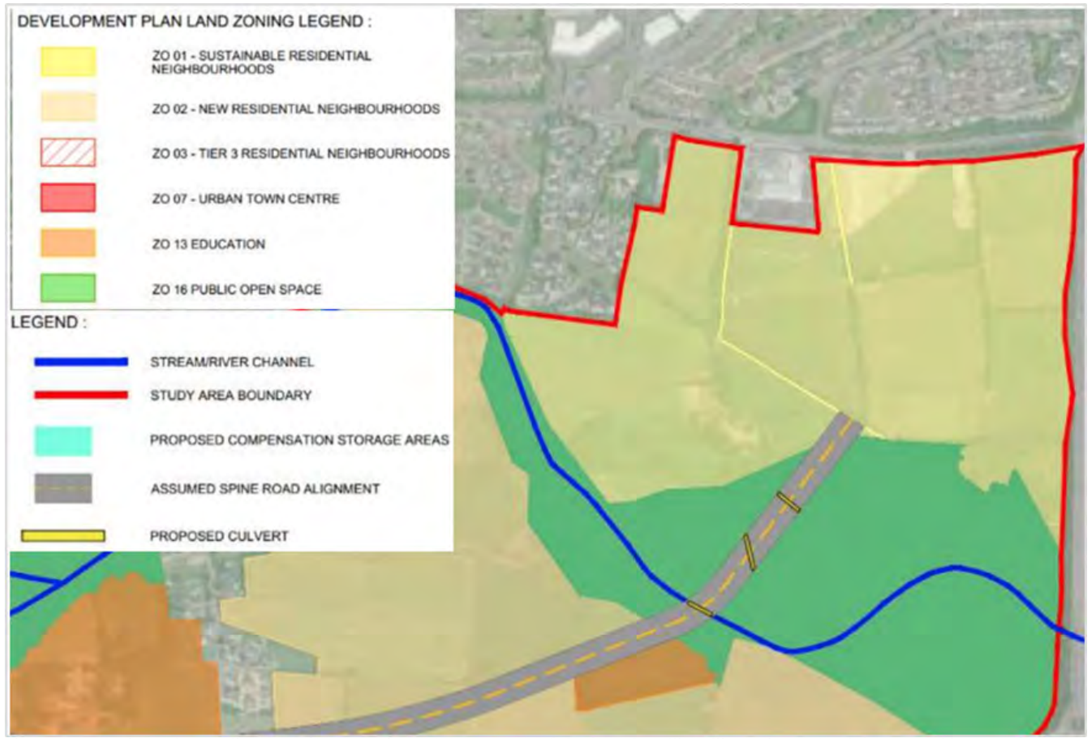


Figure 2.22 Envisaged SAC Alignment (Source: Figure 8.8 - Page 62 of the 'South Ballincollig Drainage Study' prepared by MWP).

2.5.3 Access & Connectivity

The extension of the SAC will serve as primary access to the lands with 2 no. priority-controlled junctions providing direct pedestrian and vehicular access to/from the SAC to serve the proposed development. As previously stated, the subject lands are situated immediately south of the Heathfield residential development being delivered by MOS, the most recent phase of which (Planning Reference 22/41644) is under construction and nearing completion. The development permitted in 22/41644 utilises the existing eastern boundary agricultural laneway to serve as a 4-metre wide 'north-south' shared pedestrian/cycle route, linking Killumney Road with the subject lands. The proposed development provides for the extension of this pedestrian/cycle route into the site in addition to the delivery of the proposed 'east-west' greenway represented by the 'Walkways & Cycleways' development objective identified in the CDP, reflecting an integrated and coherent approach to the delivery of active travel routes in the MUEA.

The proposed development is also strategically located to capitalise on permitted active travel/public realm upgrades in the wider area. The Killumney Road will benefit from the 'Active Travel Measures at Leo Murphy Road' Section 38 scheme (Section 38 of the Road Traffic Act 1994), approved by Cork City Council in September 2022, which will enhance pedestrian and cyclist connectivity from the site to the town centre. The Section 38 includes the provision of two-way segregated cycle facilities on the Killumney Road, creating a safer cycling route to Gaelscoil Uí Ríordáin and improved footpaths.

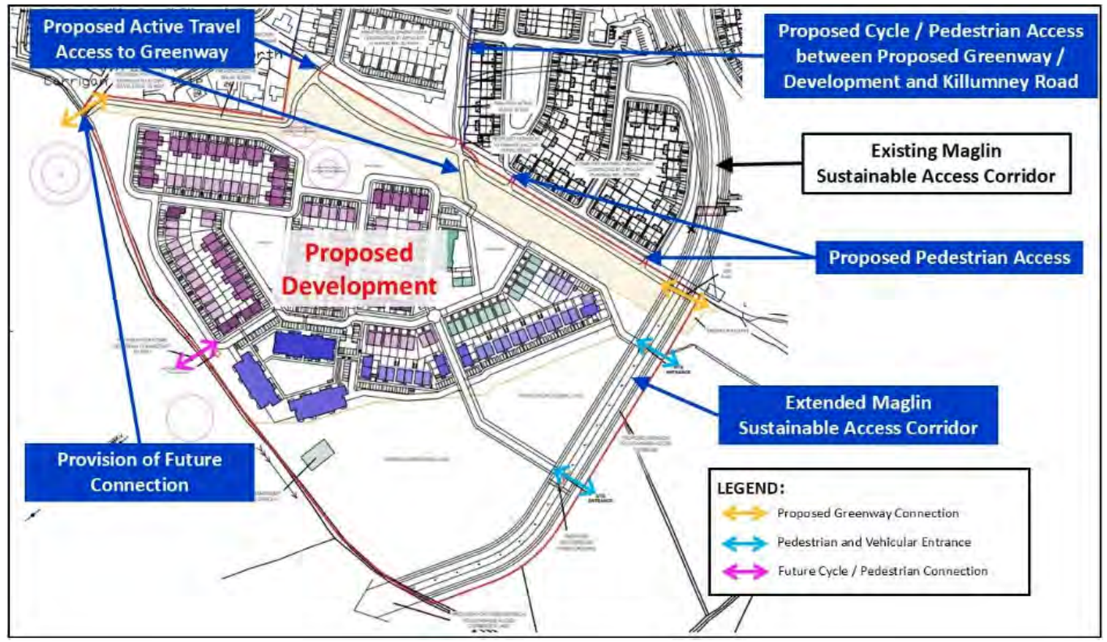


Figure 2.23 Site Access Strategy

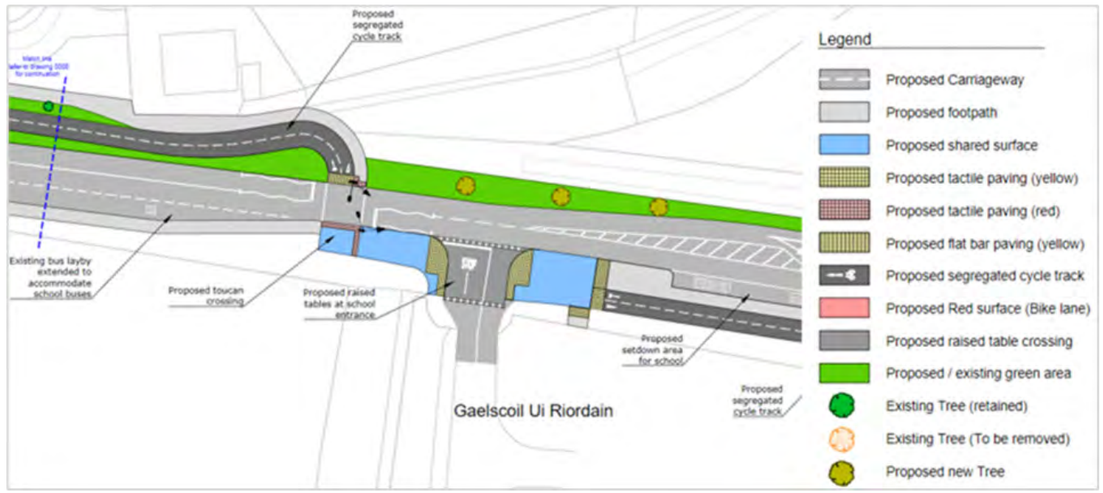


Figure 2.24 Section 38 Upgrades in vicinity of site along Killumney Road

2.5.4 Proposed Layout & Landscape Strategy

The design rationale for the proposed development has been 'landscape led', with the site topography and setting in its local and wider contexts forming a critical component of the development strategy of the lands. The proposed landscape, recreation and amenity strategy is based on a number of key principles including

- The promotion of a sense of place by providing attractive and distinctive environments throughout the proposed residential neighbourhoods.
- To prioritise pedestrian and cyclist permeability and connectivity within the site and in its local context.
- To provide a hierarchy of public open spaces.
- To promote a child-centred approach to play provision, based on 'home–zone' principles that enable children of all ages to play safely around their neighbourhood; play within sight of their home; play at purposefully designed play elements; and encourage interactive play.
- To provide legible routes, focal points and clear delineation of public, semi-private and private spaces.
- To integrate the proposed development into the local landscape setting.
- To provide robust boundary treatments which will promote biodiversity and respect the existing character of the area. the adoption of a collaborative approach between the sites landscape, ecological and drainage strategies. Where feasible the proposed development has sought to retain existing field hedgerows within the site and integrate within the proposed developments natural/public open space areas.
- The proposed layout, pedestrian links, amenity areas/walks and landscaping treatments will result that the proposed development will not only provide for the amenities of future residents of the scheme, but also serve as a local 'destination' in its own right, benefiting the existing residents of the settlement.
- The recognition of the sites cultural heritage assets and in particular the opportunity to restore the former farmhouse in central areas of the site to form a distinctive and unique urban character area within the wider development.



Figure 2.25 Site Landscape Strategy

2.5.5 Creche Facility

The proposed development includes a two-storey crèche facility with a capacity for 100 no. children in the north/central area of the proposed development.

2.5.6 Bridge Crossing of the Maglin North River

The route of the proposed MUEA SAC, traverses the Maglin North River to the southwest of the site. A clear-span bridge will be used to accommodate the river under the proposed road. Abutments will be set back 2.5m from the riverbank to allow unobstructed passage of fish and wildlife. Silt fences will be erected between any earthworks and the river during ground investigation and construction works. Further details are provided in Chapter 7, Water (Hydrology & Hydrogeology).

2.5.7 Utilities and Servicing

Full details of all utilities and servicing proposals relating to the proposed development are detailed in Chapter 5 of this EIAR 'Material Assets – Services, Infrastructure & Utilities' and the Infrastructure Report included as Appendix 2-4 of this EIAR prepared by DOSA Consulting Engineers. Impact Assessment.

2.6 Impact Assessment

2.6.1 Do-nothing Scenario

A 'do nothing scenario' will result in no predicted impacts at the subject lands, and the site would remain in its existing undeveloped, agricultural use. Over time, in the 'do nothing scenario' the subject lands would remain undeveloped and in agricultural use. It is considered the do-nothing scenario will result in an inefficient use of zoned, serviced lands, which will have convenient access to active travel opportunities and local amenities.

2.6.2 Construction Phase

The construction phase will be temporary in nature and will be implemented in accordance with the requirements of the accompanying construction management plans. Without the implementation of the proposed mitigation measures, the construction stage of the development could result in potential significant indirect, cumulative and residual effects on the surrounding environment such as impacts on the local road network, potential ground/water contamination, noise, vibration, dust, air quality, pollution and waste management.

2.6.3 Operational Phase

Once operational, the proposed development will result in several long-term positive impacts for Metropolitan Cork and the local area. The proposed development will result in the provision of an additional 300 no. residential units and a creche at a location which is identified as an expansion area of Cork City in the Core Strategy of the CDP. The proposed development will contribute to an increase in population and housing supply, which can support public transport services and local businesses in the Ballincollig area. The proposed creche will provide additional childcare provision for the settlement.

The proposed delivery of the next eastern section of the MUEA Sustainable Access Corridor reflects an integrated approach between the provision of enabling infrastructure, compact urban development, community/social infrastructure, future public transport upgrades and the promotion of walking and cycling as viable modes of transport. The proposed development presents an opportunity to deliver a residential community which will not only achieve the creation of a new '15 minute neighbourhood' at a location identified for compact growth in the CDP Core Strategy, but also facilitate the delivery of development at the MUEA in tandem with the delivery of strategic walking/cycling infrastructure which can have considerable benefits for the town.

The proposed landscape/recreation and amenity strategy capitalises on the sites natural resources and setting by incorporating existing natural features into the wider layout. This includes the provision of a variety of public open spaces, green spaces, greenway, and play areas located throughout the scheme layout which will positively contribute to human health of future residents and visitors to the scheme.

The proposed evolution of the site, from existing agricultural to proposed mixed-use, will result in an increase in energy consumption and demand on local infrastructural services. The proposed buildings have been designed to incorporate sustainable building methods and materials, to reduce unnecessary energy usage.

2.7 Mitigation, Monitoring & Residual Impacts

Chapter 15 of this EIAR, 'Summary of Mitigation Measures' provides a list of all proposed mitigation and monitoring procedures to be implemented during the operational and construction phases of the project.

2.8 Alternatives Considered

2.8.1 Introduction

Article 5(1) of the Directive 2011/92/EU, as amended by Directive 2014/52/EU states that.

> *d) a description of the reasonable alternatives studied by the developer, which are relevant to the project and its specific characteristics, and an indication of the main reasons for the option chosen, taking into account the effects of the project on the environment;*
>
> *f) any additional information specified in Annex IV relevant to the specific characteristics of a particular project or type of project and to the environmental features likely to be affected.*

Annex IV point 2 expands further.

> *2) A description of the reasonable alternatives (for example in terms of project design, technology, location, size and scale) studied by the developer, which are relevant to the proposed project and its specific characteristics, and an indication of the main reasons for selecting the chosen option, including a comparison of the environmental effects.*

Article 94 and Schedule 6, paragraph 1(d) of the Planning and Development Regulations 2001, as amended, requires the following information to be furnished in relation to alternatives:

> *"(d) A description of the reasonable alternatives studied by the person or persons who prepared the EIAR, which are relevant to the proposed development and its specific characteristics, and an indication of the main reasons for the option chosen, taking into account the effects of the proposed development on the environment."*

The purpose of this section is to describe the reasonable alternatives considered by the developer, including alternatives considered through the design and consultation phases of the project, taking into account and comparing environmental effects and illustrating the manner in which, and reasons for, choosing the proposed development.

Regarding 'Reasonable Alternatives', the Guidelines for Planning Authorities and An Bord Pleanála on carrying out Environmental Impact Assessment' (2018) states that:

> *''The Directive requires that information provided by the developer in an EIAR shall include a description of the reasonable alternatives studied by the developer. These are reasonable alternatives which are relevant to the project and its specific characteristics. The developer must also indicate the main reasons for the option chosen taking into account the effects of the project on the environment.*
>
> *Reasonable alternatives may relate to matters such as project design, technology, location, size and scale. The type of alternatives will depend on the nature of the project proposed and the characteristics of the receiving environment. For example, some projects may be site specific so the consideration of alternative sites may not be relevant. It is generally sufficient for the developer to provide a broad description of each main alternative studied and the key environmental issues associated with each.* ***A 'mini- EIA' is not required for each alternative studied.''***

Further the EPA's 2022 EIA Guidelines are also instructive in stating:

> *'Analysis of high-level or sectoral strategic alternatives should not be expected within a project level EIAR. It should be borne in mind that the amended Directive refers to 'reasonable alternatives… which are relevant to the proposed project and its specific characteristics.'*

This section provides an outline of the main alternatives examined throughout the design and consultation process to indicate the primary reasons for choosing the proposed development, considering and providing a comparison of the environmental effects.

2.8.2 'Do-Nothing' Alternative

The 'do nothing' scenario would reflect that serviced and zoned greenfield lands, within the defined MUEA, would remain undeveloped and in agricultural use. The 'do nothing' scenario would also result in the proposed next section SAC which is to serve the wider MUEA not being delivered. Over time, in the 'do nothing scenario', the subject lands would remain undeveloped and in agricultural use. The do-nothing scenario would also result in the existing ruinous farmyard and associated outbuildings remaining. A "do-nothing" scenario is considered to represent an inappropriate unsustainable and inefficient use of these serviced residential zoned lands within the defined MUEA of Cork City.

2.8.3 Alternative Locations

As stated above, regarding alternative locations, Section 3.4.1 of the 2022 EPA Guidelines, recognise that

> *'in some instances some of the alternatives described below will not be applicable' – e.g. there may be no relevant 'alternative location'…".*

The majority of the subject lands are situated within the ZO 1 'Sustainable Residential Neighbourhoods' in the CDP, with southern areas of the site included within the 'ZO 15 Public Open Space in CDP. The CDP has been subject to Strategic Environmental Assessment which will have taken into account of environmental considerations associated, for example, with the cumulative impact of an area zoned for development on a sensitive landscape.

We note the 2022 EPA Guidelines, which state.

> *'Analysis of high-level or sectoral strategic alternatives cannot reasonably be expected within a project level EIAR… It should be borne in mind that the amended Directive refers to 'reasonable alternatives… which are relevant to the proposed project and its specific characteristics.'*

2.8.4 Alternative Uses

Most of the subject lands are zoned within the '*ZO 1 Sustainable Residential Neighbourhoods*' in the CDP which aims to

> *'To protect and provide for residential uses and amenities, local services and community, institutional, educational and civic uses'.*

Paragraphs ZO 1.1 and ZO 1.2 of the CDP state of future development in 'ZO 1 Sustainable Residential Neighbourhoods' that.

> *ZO 1.1- The provision and protection of residential uses and residential amenity is a central objective of this zoning. This zone covers large areas of Cork City's built-up area, including inner-city and outer suburban neighbourhoods. While they are predominantly residential in character these areas are not homogenous in terms of land uses and include a mix of uses. The vision for sustainable residential development in Cork City is one of sustainable residential neighbourhoods where a range of residential accommodation, open space, local services and community facilities are available within easy reach of residents.*

> *ZO 1.2 – 'Development in this zone should generally respect the character and scale of the neighbourhood in which it is situated. Development that does not support the primary objective of this zone will be resisted.'*

The southern areas of the site are within the 'ZO 15 Public Open Space' zoning objective, which aims

> *'To protect, retain and provide for passive and active recreational uses, open space, green networks, natural areas and amenity facilities.'*

Paragraphs ZO 15.1, 15.2, 15.3 and 15.4 expand further on the vision for ZO 15 zoned lands

> *ZO 15.1 - 'This zone includes strategic public open space and amenity lands. Lands in this zone comprise a wide range of passive and active recreational and amenity resources for the community including parks, sport and water sports, leisure facilities, amenity areas and natural areas including ecological networks, woodlands and other habitats. The primary purpose of this zone is to preserve all land in this zone for open space and amenity use.'*

> *ZO 15.2 - 'There is a presumption against developing land zoned Public Open Space for alternative purposes.'*

> *ZO 15.3 '- Ancillary and incidental uses such as small cafés and other amenities that add to the vitality and support the public open space and public recreational infrastructural role of an appropriate public open space, such as a park, may be open for consideration. Such ancillary and incidental service facilities shall be commensurate to the nature and scale of the public open space and must integrate with the public open space and not conflict with the primary zoning objectives.'*

> *ZO 15.4 - 'Many green areas in residential housing estates throughout the City function as public open spaces and amenity areas but are zoned ZO 1 Sustainable Residential Neighbourhoods (or another land use zoning objective). For zoning objectives relating to these areas, refer to ZO 1 Sustainable Residential Neighbourhoods above, and to the paragraph on 'Open Space in Residential Areas' above.'*

The lands are also situated within the MUEA as defined in the CDP. CDP Objective 10.57 and Section 2.47 of the Core Strategy of the CDP identify the MUEA as one of seven strategic consolidation and expansion areas in the city which will need to accommodate significant levels of housing and population growth during the lifetime of the plan. It is also considered that an alternative consisting of only open space, recreation, community or education uses would not be in accordance with the zoning objectives, reflect the most efficient use of the lands, and that a development which contributes to MUEA's residential growth targets comprises the most appropriate land-use alternative of the lands and is in accordance with the proper planning and sustainable development of the area.

2.8.5 Alternative Layouts and Designs

Since the inception of the project, the developer considered several different layouts and options for the development of the subject lands. Each stage of the project required a reappraisal of the design strategy of the project, and an evaluation of how each proposed layout responded to the site's context. The design rationale for the proposed development adopted several key principles which underpinned the wider development strategy for the lands including.

- That the scale of residential development is reflective of the site's existing and evolving contexts within MUEA and that delivers on the ambitious housing and population targets for Ballincollig, set out in the CDP and RSES.
- That the proposed MUEA Sustainable Access Corridor, which will provide access to the lands, is designed to accommodate a two-way cycle path and makes provision for potential future public transport corridors.
- That any layout directly responds to the site's topography, natural features and receiving environment.
- That the residential amenities of existing residents in the area is respected during both construction and operational phases of the project.
- That high quality public open spaces and communal areas are provided, which will benefit the wider community and the creation of enhanced public realm and pedestrian/cyclist upgrades, which will not only serve the proposed development, but the wider Ballincollig area.

2.8.5.1 Alternative Layout A – S.247 Meeting Layout – January 2024

Alternative A comprised a scheme of 232 no. residential units, an 80 child creche facility at the subject lands and was presented to Cork City Council during an initial 'Stage 1' Section 247 Consultation meeting which took place in January 2024. The development reflected a density of circa 40 no. residential units per hectare containing 114 no. dwelling houses and 118 no. duplex/apartment units and provided for approx. 10% useable public open space. Alternative A provided for the construction of the next section of the eastern SAC to connect with the constructed section of the SAC at Heathfield.

Alternative A aimed to retain as many of the existing hedgerows and trees on the site as possible, particularly along the existing north south laneway. The layout also included the repurposing of the derelict vernacular stone farmhouse to accommodate 2 no. of the proposed residential units (subject to additional survey work to take place). The layout provided for an urban edge in the form of 3 storey duplex units to the west, facing south along proposed SAC route with active travel routes proposed throughout the site and along old railway line to the north. Dwellings were orientated to passively survey public open spaces throughout the site and allowed for adequate distances between dwellings to limit overlooking.

Key Figures of Alternative A Layout	
No. of residential units	232
Net Residential Density	40 units per ha
Housing Mix	30 no. 4 beds (13%) 80 no. 3 beds (34%) 86 no. 2 beds (37%) 36 no.1 beds (16%)
Creche	Creche located in south central area of the site overlooking the proposed SAC route.
Public Open Space	10% useable public open space (of developable site area).

Table 2.1 Alternative A -Key Statistics



Figure 2.26 Alternative A Layout – January 2024

Following an assessment of the scheme, it was recognised that enhancements/amendments should be adopted to create a more inclusive scheme of higher quality urban design and form. In advancing the scheme from Alternative A it was considered that, further assessment was required as to the route of the SAC within the wider MUEA and integration with adjacent zoned lands. It was also concluded that a stronger urban edge and more appropriate interrelationship between buildings and the SAC could be achieved and would benefit the urban design approach to scheme. It was also acknowledged that the layout could better accommodate pedestrian and cycle mobility and the hierarchy of active travel routes needed further refinement and development.

Due to the presence of archaeological features on the site, it was accepted that the urban form of Alternative A was fragmented, and further investigation would be needed to determine if some may be recorded and removed to facilitate a more coherent urban design. It was also concluded that a residential development of this site could accommodate a development of increased density in accordance with the policies and objectives of the CDP and the National Compact Settlement Guidelines 2024 (CSG's) and that there were opportunities to relocate higher scale apartment blocks to western areas of the site to better reflect the existing and evolving urban contexts of the MUEA and the route of the SAC.

2.8.5.2 Alternative B – April 2025

Alternative B comprised a residential development of 297 no. residential no. units and creche facility at the subject lands. Alternative B was a working layout which sought to address the comments of the Planning Authority outlined during the previous Section 247 pre-consultation meeting. An overview of the proposed Alternative B is summarised as follows.

Key Figures of Alternative B Layout	
No. of residential units	297
Net Residential Density	44.3 units per hectare
Housing Mix	60 no. 4 beds (20%) 96 no. 3 beds (32%) 88 no. 2 beds (30%) 103 no.1 beds (18%)
Creche & Retail/shop unit	Creche & retail unit relocated to northcentral area of the site.
Public Open Space	15% useable public open space

Table 2.2 Alternative B -Key Statistics



Figure 2.27 Alternative B Layout – April 2025

It was considered that the proposed in Alternative B reflected an improvement that previously proposed in Alternative A in many aspects, including.

- That a density of circa 44 units per hectare was more appropriate at the lands and more consistent with local and national policy objectives.
- A clearer street hierarchy of active travel routes within the site.
- The development provided for a more diverse housing/accommodation mix addressing a broader cohort of the housing need of the area.
- A greater quantity of open space provided – 15%.
- The relocation of the 80 child creche facility to north/central areas of the site in closer proximity to the active travel infrastructure to be delivered in this area and to form part of a distinctive character area in the area of the site of the former farmyard.
- More coherent urban form created overall due to improved integration of archaeological features within the scheme.
- Stronger edge provided to south facing Sustainable Access Corridor in the form of 3-storey houses, duplex units and 4 storey apartment blocks.
- Higher scale apartments relocated to the west, with 2-storey units to the east to better reflect the existing grain to the north.

The Alternative B internal layout retained many of the core objectives of Alternative A including the retention and incorporation of existing hedgerows and vegetation within the scheme and the extension of the MUEA SAC route, although a realigned northern route of the SAC was explored.

However, following a review of the detailed design, it was considered that further improvements/amendments could be achieved in the evolution of the layout including.

- Further assessment of the impacts of the layout on archaeological features in the site. Further consideration needed around the retained stone farm building. Buildings bordering this area to emulate the form, materials and detailing of vernacular style
- A stronger urban form could be still achieved at the junction of the Sustainable Access Corridor.
- Further detail relating to the site's biodiversity enhancement, SuDS, flood risk and landscaping strategies was required.

2.8.5.3 Alternative C – LRD Meeting Layout – September 2025

Alternative C comprised of a scheme of 307 no. residential unit and creche facility at the subject lands and was presented to Cork City Council during second 'Stage 2 LRD Meeting which place in September 2025. An overview of the proposed Alternative C is summarised as follows.

Key Figures of Alternative C Layout	
No. of residential units	307
Net Residential Density	45.1 units per hectare
Housing Mix	58 no. 4 beds (19%) 92 no. 3 beds (30%) 94 no. 2 beds (31%) 63 no.1 beds (20%)
Creche	100 no. child facility in similar location to Alternative B.
Public Open Space	15% useable public open space

Table 2.3 Alternative C -Key Statistics



Figure 2.28 Alternative C Layout – September 2025

Alternative C provided for an increase in density and the number of residential units from that previously presented in Alternatives A and B. The layout was altered to include higher density nodal points throughout the scheme. These units include 3 storey corner units, feature 3 storey duplex units and 4 storey apartment blocks strategically placed to provide an urban edge along the active travel route to the north and Sustainable Access Corridor to the south. Alternative C also provided for a redesigned and larger capacity creche from that proposed in previous layouts following consultation with Cork City Childcare. (See appendices 1-3 and 1-4 of this EIAR).

In order to provide a more coherent urban form overall, further investigations were undertaken of the existing features on site. It was deemed satisfactory to record the site of a standing stone to the west, the archaeological feature to the north and kiln to the south, and use these areas to facilitate development, aiding a desirable built form. This, along with utilising more of the site, allowed for strong urban edges to be created with urban blocks orientated around central open spaces than previous alternative layout. The Alternative route of the SAC remained the same as that of previous Alternative B.

2.8.5.4 Alternative D – The Proposed Development

A full description of the proposed development for which permission is sought pursuant to this application is provided in the 'Project Description' section of this EIAR Chapter. The end result of the various alterations and layout revisions is the proposed development as illustrated in Figure 2.19.

Site Statistics		
Total Number of Units Proposed	300 no residential units + 1 no creche (100 Child).	
Total Red Line (Gross) Site Area	13.5 hectares	
Total Net Site Area (Developable Area)	6.67 hectares	
% Useable Public Open Space	15% useable.	
Overall Net Density	45 units per hectare	
Schedule of Accommodation		
4 Beds	42 no. units	14%
3 Beds	102 no. units	34%
2 Beds	111 no. units	37%
1 Beds	45 no. units	15%
TOTAL	**300 no. units**	**100%**
Unit Type Schedule		
Detached	2 no. units	0.5%
Semi-Detached	122 no. units	41%
Townhouse	4 no. units	1.5%
Duplex Apartment	69 no. units	23%
Apartment Block	103 no. units	34%
TOTAL	**300 no. units**	100%

Table 2.4 Alternative D – Proposed Development Key Statistics

The layout and detailed design of the proposed development has been advanced in response to the LRD Opinion issued by Cork City Council dated 1st May 2025 (Included as Appendix 1.2) of this EIAR. Proposed Alternative Layout D evolved from that previously proposed in Alternative Layout C, including.

- Various minor alterations to the scheme resulted in an overall reduction of 7 no. units from that previously proposed in Alternative C. The proposed scale and density of development is more consistent with achieving compact growth and sustainability, the evolving development context of the area and the policies and objectives of the CDP and the 2024 Compact Settlement Guidelines.
- Further clarification on the proposed surface water drainage strategy for the site has been provided which has led to the enhancement of the site's biodiversity and landscape strategies.
- Details of the phased delivery of the project and of various architectural character areas within the layout.
- Detailed design of the Vernacular Design and Farmstead Character. The central nodal point has been reconfigured to respect the historic character of the farmstead, reinforcing its role as the heart of the scheme. The proposal draws inspiration from traditional farmstead arrangements or 'clachán', where buildings were positioned in a strategic yet organic manner to form a courtyard or clearly defined shared space. The form, materials and detailing of the proposed farm building, crèche and surrounding residential development reflect vernacular architecture, ensuring a cohesive and contextually appropriate response.
- Further refinement between the design and scale of buildings and the Maglin Sustainable Access Corridor creating a strong urban frontage.
- The route of the proposed MUEA SAC has been amended and represents the initial envisaged route as determined in response to the 'South Ballincollig Drainage Study'. Ground levels in the areas of the site to north of the SAC and to the south of the proposed residential footprint will be raised through insert soil, stone and engineering fill (See Sections 2.4.2 and 6.3 of this EIAR for details).
- Revised Apartment Block Design and Open Space Strategy - The apartment buildings have been comprehensively revised, with the number of blocks reduced from four to three. This rationalisation has improved the spatial relationship between buildings, allowing for clearer, more legible connections and the creation of higher-quality open spaces between the blocks.
- A clear span bridge over the River Maglin North to allow the proposed SAC to serve adjacent lands to the west/ southwest.
- Further rationalisation and justification of the design and locations of pedestrian crossings on the SAC and the incorporation of the final recommendations of a Road Safety Audit.

2.8.6 Alternative Processes

As described above, various access/design strategies and layouts were considered which would have impacted alternative processes. The final design and layout of the scheme has been arrived at following a salient assessment of all aspects of construction and operational phase considerations.

2.8.7 Alternative Mitigation Measures

During the evolution of the proposed alternative layouts, alternative mitigation measures were under considered with an emphasis on adopting 'Mitigation by Design' principles where possible. In preparation of this EIAR and throughout the scheme design process, the mitigation and monitoring measures recommended by project sub-consultants during both construction and operational phases will be implemented.

2.8.8 Comparison of Environmental Impacts – Construction Phase

This section provides a summary of the comparison of environmental impacts during the construction phase between the various alternatives outlined above. Due to the evolution of the site access strategy in later alternative layouts, a comparison of environmental impacts evolved considerably throughout the design stage of the project.

2.8.8.1 Landscape & Visual

The construction phase will result in the evolution of landscape aspects. The increase of residential units between various alternatives would have resulted in potentially increased impacts, however the objective of reducing cut and fill across the site and the maximization of retention of existing site boundaries would likely have offset these increases, resulting in similar impacts.

2.8.8.2 Traffic & Transportation

The increase in the number of residential units in the various alternatives, will reflect a likely increase of construction traffic during this phase of the project. However, throughout the evolution of the project greater focus has been placed in implementing effective construction phase mitigation measures including a traffic management plan. It is considered that construction phase traffic impacts across all alternatives assessed would be similar.

2.8.8.3 Services, Infrastructure & Utilities

It is not considered that Services, Infrastructure & Utilities considerations differ significantly between the various alternatives described. The increase in the number of residential units across alternatives may have resulted in increased demand for these services during the construction phase. However, there is sufficient infrastructural capacity locally to accommodate the development. In accordance with the Cork City Councils LRD Opinion, greater natural drainage and SUDs measures are proposed in Alternative D than previous Alternative layouts.

2.8.8.4 Land, Soils & Geology

Following an assessment of various alternative layouts, it is not considered that land and soils considerations differ significantly between the various alternatives described.

Although Alternative D provides for the infilling/raising of lands in southern areas, it is not considered that this will result in any significant additional construction phase environmental impacts from previous Alternatives.

2.8.8.5 Water - Hydrology & Hydrogeology

It is not considered that water (hydrology & hydrogeology) considerations differ significantly between the various alternatives described.

2.8.8.6 Biodiversity

Due to the evolution of the site layout and focused construction phase mitigation measures recommended by the project ecologist, which will be implemented in the final CEWMP for the project, it is considered that biodiversity impacts during the construction phase improved incrementally across all alternative proposals at the site.

2.8.8.7 Cultural Heritage

It is considered that cultural heritage considerations have improved incrementally throughout the evolution of the project. Focused archaeological mitigation measures (As recommended in Chapter 9) will be adopted throughout the construction phase of the project.

2.8.8.8 Noise & Vibration

Following an assessment of various alternative layouts, it is not considered that noise or vibration considerations differ significantly between the various alternatives described

2.8.8.9 Air Quality

It is not considered that air quality considerations differ significantly between the various alternatives described.

2.8.8.10 Climate

It is not considered that climate considerations differ significantly between the various alternatives described.

2.8.8.11 Population & Human Health

It is not considered that there would be significant differences between the various alternatives impacting population and human health. During the construction phase, impacts such as additional traffic, noise, dust could negatively impact human health in the absence of appropriate mitigation measures. However, the evolution of the scheme layout has also been developed in response to more detailed construction management procedures and mitigation measures which have evolved throughout the alternatives considered.

2.8.8.12 Comparison of Environmental Impacts – Construction Phase Summary

Table 2.5 as shown provides an objective comparison analysis of the evolution of the proposed development in context of the categories outlined above.

Criteria	Alternative A	Alternative B	Alternative C	Alternative D
Landscape & Visual	=	=	=	=
Traffic & Transportation	-	x	=	✓
Services, Infrastructure & Utilities	=	=	=	=
Land, Soils & Geology	=	=	=	=
Water & Hydrology	=	=	=	=
Biodiversity	x	✓	✓	✓
Noise & Vibration	=	=	x	✓
Cultural Heritage	=	✓	✓	✓
Air Quality	=	=	=	=
Climate	=	=	=	=
Population & Human Health	x	✓	✓	✓

✓ Where it has been considered that there has been an improvement from the previous alternative

= Where the impact is considered similar for all options

X Where a particular option is considered to have a more negative impact on a particular aspect of the environment than other alternatives.

Table 2.5 Comparison of Impacts - Construction Phase

2.8.9 Comparison of Environmental Impacts – Operational Phase

This section provides a summary of the comparison of environmental impacts during the operational phase between the various alternatives outlined above.

2.8.9.1 Landscape & Visual

It is considered that evolution of the landscape and visual impacts have improved significantly throughout all alternative layouts. The evolution of the site layout through the design phase of the project has resulted in more appropriate building heights, the creation of more useable public open spaces and more comprehensive replacement and supplementary planting proposals. As noted in Chapter 3 of this EIAR 'Landscape & Visual', the site is situated within an evolving landscape setting in the context of the delivery of the wider MUEA.

2.8.9.2 Traffic & Transportation

The increase in the number of residential units in the various alternatives, will reflect a likely increase of operational phase traffic. However, the incremental improvement and amendments to the layout which include the improvement of permeability within the scheme and to surrounding areas and the delivery of the next section of the eastern MUEA Sustainable Access Corridor will result in considerable strategic benefits to the town.

2.8.9.3 Services, Infrastructure & Utilities

The proposed servicing and utility strategies evolved throughout the design phase of the project. As requested by Cork City Council, the final layout provides for increased levels of natural drainage and SUDs measures which will reduce the pressures on the surface water network in the area.

2.8.9.4 Land & Soils

It is not considered that land and soils considerations differ significantly between the various alternatives described.

Although Alternative D provides for the infilling/raising of lands in southern areas, it is not considered that this will result in any significant additional operational phase environmental impacts from previous Alternatives.

2.8.9.5 Water - Hydrology & Hydrogeology

It is not considered that water related considerations differ significantly between the various alternatives described.

2.8.9.6 Biodiversity

The enhancement of biodiversity measures in the form of more detailed landscaping proposals, natural drainage and proposals have all contributed to an enhanced biodiversity and ecological context as the scheme has evolved.

2.8.9.7 Cultural Heritage

It is considered that cultural heritage considerations have considerably improved throughout all phases of the project. The site strategy has prioritised and adapted to the retention where appropriate of archaeological features in the site following the recommendations of the project archaeologist and discussions with Cork City Councils archaeologist. The restoration and incorporation of the derelict vernacular farmhouse within the scheme will be a significant cultural heritage benefit to the area.

2.8.9.8 Noise & Vibration

It is not considered that air quality considerations differ significantly between the various alternatives described.

2.8.9.9 Air Quality

It is not considered that air quality considerations differ significantly between the various alternatives described.

2.8.9.10 Climate

It is not considered that climate considerations differ significantly between the various alternatives described.

2.8.9.11 Population & Human Health

The evolution of the proposed layout has resulted in a continuous improvement in terms of human health and impacts on the local population. The proposed public realm upgrades, public open spaces, connectivity strategy in addition to the delivery of new housing, community, commercial and childcare uses have evolved since project inception stage.

2.8.9.12 Comparison of Environmental Impacts – Operational Phase Summary

Table 2.6 as shown provides an objective comparison analysis of the evolution of the proposed development in context of the categories outlined above.

Criteria	Alternative A	Alternative B	Alternative C	Alternative D
Landscape & Visual	=	✓	✓	✓
Traffic & Transportation	-	=	=	✓
Services, Infrastructure & Utilities	=	=	=	=
Land, Soils & Geology	=	=	=	=
Water & Hydrology	=	=	=	=
Biodiversity	x	✓	✓	✓
Noise & Vibration	=	=	=	=
Cultural Heritage	=	✓	✓	✓
Air Quality	=	=	=	=
Climate	=	=	=	=
Population & Human Health	x	✓	✓	✓

✓ Where it has been considered that there has been an improvement from the previous alternative

= Where the impact is considered similar for all options

X Where a particular option is considered to have a more negative impact on a particular aspect of the environment than other alternatives.

Table 2.6 Comparison of Impacts – Operational Phase

2.8.10 Reasons for Chosen Alternative

When all construction and operational aspects are assessed, it is objectively considered that 'Alternative D', consisting of 300 no. residential units, creche, is the most appropriate and efficient alternative layout assessed.

Alternative D reflects the observations of Cork City Council during Section 247 and Section 32 LRD discussions, and represents a more efficient development than that previously proposed in Alternatives A-C.

- Alternative D provides for an improvement in terms of urban design useable public open spaces, natural drainage and the promotion of active travel from previous alternatives. Alternative D also incorporates the recommendations of Cork City Council in Section 247 and Section 32 Meetings
- Alternative D provides for an efficient density of residential development, reflective of the site's location relative to Heathfield, Limeworth and the prevailing urban character of the area and the sites ZO 01 and Z0 15 CDP zoning objectives. Alternative D provides for greater interactions and permeability with the wider area and provides a diverse housing mix accommodating a diverse new residential neighbourhood in Ballincollig.
- Alternative D represents the most efficient route and delivery of the MUEA SAC route and will stimulate development at other zoned lands in the MUEA.
- It is considered that the proposed layout has incrementally improved across all alternative layouts considered and will positively contribute to the future residential and economic growth of the settlement. Once operational the proposed development will result in several positive environmental and socio-economic impacts to the locality.

2.9 References

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https://www.corkcoco.ie/en/planning/planning-enquiry-online-submissions

http://planning.corkcity.ie/searchtypes

https://busconnects.ie/busconnects-cork/

Cork Metropolitan Area Transport Strategy 2040 (CMATS)

Cork City Development Plan 2022-2028

CycleConnects – National Transport Authority

2.10 List of Chapter Appendices

Appendix 2-1 – Construction & Environmental Waste Management Plan – DOSA Consulting Engineers.

Appendix 2-2 – Construction Traffic Management Plan – DOSA Consulting Engineers

Appendix 2-3 – Proposed Site Layout – Deady Gahan Architects.

Appendix 2-4 - Infrastructure Report – DOSA Consulting Engineers.

Appendix 2-5 – Construction Resource Waste Management Plan - – DOSA Consulting Engineers

Appendix 2-6 – Landscape Masterplan – Simon Ronan Landscape Architecture.

CHAPTER THREE

LANDSCAPE & VISUAL

CHAPTER THREE

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CHAPTER 3 | Landscape & Visual

3.1 Introduction

This chapter assesses the potential impacts of the proposed development on the landscape character and visual amenity of the receiving environment. The chapter should be read in conjunction with the book of verified photomontages included at the rear of this chapter.

3.2 Methodology

The LVIA was carried out with reference to:

- *Guidelines for Landscape and Visual Impact Assessment*, 3rd edition, 2013 (GLVIA), published by the Landscape Institute;
- *Guidelines on the Information to be Contained in Environmental Impact Assessment Reports*, 2022, published by the EPA;
- *Guidelines for Planning Authorities and An Bord Pleanála on Carrying out Environmental Impact Assessment*, 2018, published by the Department of Housing, Planning and Local Government.

The EPA guidelines 2022 provide a general methodology and impact ratings for all EIA topics. The GLVIA provides specific guidelines for landscape and visual impact assessment. Therefore, a combination of the EPA guidelines and the GLVIA has informed the methodology for this assessment.

3.2.1 Key Principles of the GLVIA

3.2.1.1 Assessment of Both Landscape and Visual Effects

The GLVIA requires that effects on views and visual amenity be assessed separately from the effects on landscape, although the two topics are inherently linked.

- 'Landscape' results from the interplay between the physical, natural and cultural components of our surroundings. Different combinations and spatial distribution of these elements create variations in landscape character. Landscape impact assessment identifies the changes to this character which would result from the proposed development and assesses the significance of those effects on the landscape as a resource.
- Visual impact assessment is concerned with changes that arise in the composition of available views, the response of people to these changes and the overall effects on the area's visual amenity.

3.2.2 Assessment of Landscape Effects

Assessment of potential landscape effects involves (a) classifying the sensitivity of the landscape resource, and (b) describing and classifying the magnitude of landscape change which would result from the development. These factors are then combined to arrive at a classification of significance of the effects.

3.2.2.1 Landscape Sensitivity

The sensitivity of the landscape is a function of its character, which may be determined by its land use pattern, field pattern or urban grain, building typologies and architecture, cultural and natural heritage elements (including topography, vegetation and drainage features), and the quality of the public realm. These factors determine the value that is placed on the landscape. The policy pertaining to the area (e.g. the land use zoning), and any related trend of change, are taken into account. The nature and scale of the proposed development are also considered (a particular landscape can have varying sensitivity to different development types). Five categories are used to classify sensitivity, as set out in Table 3.1.

Sensitivity	Description
Very High	Areas where the landscape exhibits very strong, positive character with valued elements, features and characteristics that combine to give an experience of unity, richness and harmony. The landscape character is such that its capacity to accommodate change is very low. These attributes are recognised in policy or designations as being of national or international value and the principal management objective for the area is protection of the existing character from change.
High	Areas where the landscape exhibits strong, positive character with valued elements, features and characteristics. The landscape character is such that it has limited/low capacity to accommodate change. These attributes are recognised in policy or designations as being of national, regional or county value and the principal management objective for the area is the conservation of existing character.
Medium	Areas where the landscape has certain valued elements, features or characteristics but where the character is mixed or not particularly strong, or has evidence of alteration, degradation or erosion of elements and characteristics. The landscape character is such that there is some capacity for change. These areas may be recognised in policy at local or county level and the principal management objective may be to consolidate landscape character or facilitate appropriate, necessary change.
Low	Areas where the landscape has few valued elements, features or characteristics and the character is weak. The character is such that it has capacity for change; where development would make no significant change or would make a positive change. Such landscapes are generally unrecognised in policy and the principal management objective may be to facilitate change through development, repair, restoration or enhancement.
Negligible	Areas where the landscape exhibits negative character, with no valued elements, features or characteristics. The character is such that its capacity to accommodate change is high; where development would make no significant change or would make a positive change. Such landscapes include derelict industrial lands, as well as sites or areas that are designated for a particular type of development. The principal management objective for the area is to facilitate change in the landscape through development, repair or restoration.

Table 3.1 Categories of Landscape Sensitivity

3.2.2.2 Magnitude of Landscape Change

Magnitude of change is a factor of the scale, extent and degree of change imposed on the landscape by a development, with reference to its key elements, features and characteristics and the affected surrounding character areas (collectively termed 'landscape receptors'). Five categories are used to classify magnitude of change, as set out in Table 3.2.

Magnitude	Description
Very High	Change that is large in extent, resulting in the loss of or major alteration to key elements, features or characteristics of the landscape, and/or introduction of large elements considered totally uncharacteristic in the context. Such development results in fundamental change in the character of the landscape.
High	Change that is moderate to large in extent, resulting in major alteration to key elements, features or characteristics of the landscape, and/or introduction of large elements considered uncharacteristic in the context. Such development results in change to the character of the landscape.
Medium	Change that is moderate in extent, resulting in partial loss or alteration to key elements, features or characteristics of the landscape, and/or introduction of elements that may be prominent but not necessarily substantially uncharacteristic in the context. Such development results in change to the character of the landscape.
Low	Change that is moderate or limited in scale, resulting in minor alteration to key elements, features or characteristics of the landscape, and/or introduction of elements that are not uncharacteristic in the context. Such development results in minor change to the character of the landscape.
Negligible	Change that is limited in scale, resulting in no alteration to key elements features or characteristics of the landscape, and/or introduction of elements that are characteristic of the context. Such development results in no change to the landscape character.

Table 3.2 Categories of Magnitude of Landscape Change

3.2.2.3 Significance of Effects

To classify the significance of effects (for both landscape and visual impacts) the magnitude of change is measured against the sensitivity of the receiving environment/receptor using the guide in Table 3.3 below.

		Sensitivity of the Landscape/View				
		Very High	High	Medium	Low	Negligible
Magnitude of Landscape/ Visual Change	Very High	Profound	Profound to Very Significant	Very Significant to Significant	Moderate	Slight
	High	Profound to Very Significant	Very Significant	Significant	Moderate to Slight	Slight to Not Significant
	Medium	Very Significant to Significant	Significant	Moderate	Slight	Not Significant
	Low	Moderate	Moderate to Slight	Slight	Not significant	Imperceptible
	Negligible	Slight	Slight to Not Significant	Not significant	Imperceptible	Imperceptible

Table 3.3 Guide to Classification of Significance of Landscape and Visual Effects

This matrix is derived from the EPA's *Guidelines on the Information to be Contained in Environmental Impact Assessment Reports*, 2022 (specifically Figure 3.4 of the Guidelines).

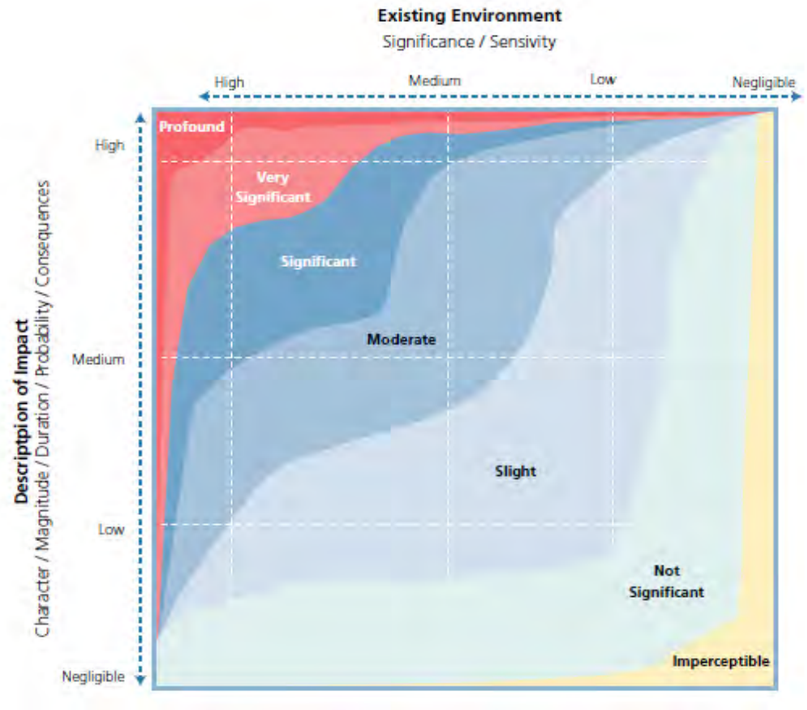


Figure 3.1 'Chart showing typical classifications of the significance of impacts' (Source: Figure 3.4 of the EPA's Guidelines on the Information to be Contained in Environmental Impact Assessment Reports, 2022)

The matrix (Table 3.3) and the EPA's chart (Figure 3.1) are only a guide to the classification of impact significance. The assessor also uses professional judgement informed by their expertise, experience and common sense to arrive at a classification of significance that is reasonable and justifiable. In the EPA Guidelines 2022 the chart is accompanied by a footnote that states:

> *"The depiction of significance classifications is indicative and should not be relied on as being definitive. It is provided for general guidance purposes." (EPA Guidelines 2022, Section 3, page 53)*

The matrix and chart are therefore used as a starting point for the impact significance classification – with the assessor using their judgement to arrive at a classification that is reasonable and sensible. For example, according to the EPA chart a change of high magnitude affecting a receptor of medium sensitivity may be classified as either 'significant' or 'moderate'. That judgement must be made by the assessor. The impact significance classifications are taken from the EPA Guidelines 2022, which defines the classifications as follows (Table 3.4):

Significance	Description
Imperceptible	An effect capable of measurement but without significant consequences.
Not significant	An effect which causes noticeable changes in the character of the environment but without significant consequences.
Slight	An effect which causes noticeable changes in the character of the environment without affecting its sensitivities.
Moderate	An effect that alters the character of the environment in a manner that is consistent with existing and emerging baseline trends.
Significant	An effect which, by its character, magnitude, duration or intensity alters a sensitive aspect of the environment.
Very Significant	An effect which, by its character, magnitude, duration or intensity significantly alters most of a sensitive aspect of the environment.
Profound	An effect which obliterates sensitive characteristics.

Table 3.4 Impact Significance Classifications

3.2.3 Assessment of Visual Effects

Assessment of visual effects involves identifying a number of key/representative viewpoints in the site's receiving environment, and for each of these: (a) classifying the viewpoint sensitivity, and (b) classifying the magnitude of change which would result in the view (informed by verified photomontages). These factors are combined to arrive at a classification of significance of the effects on each viewpoint.

3.2.3.1 Viewpoint Sensitivity

Viewpoint sensitivity is a function of two main considerations:

- Susceptibility of the visual receptor to change. This depends on the occupation or activity of the people experiencing the view, and the extent to which their attention is focused on the views or visual amenity they experience at that location. Visual receptors most susceptible to change include residents at home, people engaged in outdoor recreation focused on the landscape (e.g. trail users), and visitors to heritage attractions and places of congregation where the setting contributes to the experience. Visual receptors less sensitive to change include travellers on road, rail and other transport routes (unless on recognised scenic routes), people engaged in outdoor recreation where the surrounding landscape does not influence the experience, and people in their place of work or shopping.
- Value attached to the view. This depends to a large extent on the subjective opinion of the visual receptor but also on factors such as policy and designations (e.g. scenic routes, protected views), or the view or setting being associated with a heritage asset, visitor attraction or having some other cultural status (e.g. appearing in arts).

Five categories are used to classify a viewpoint's sensitivity, as set out in Table 3.5.

Sensitivity	Description
Very High	Iconic viewpoints (views towards or from a landscape feature or area) that are recognised in policy or otherwise designated as being of national value. The composition, character and quality of the view are such that its capacity for change is very low. The principal management objective for the view is its protection from change.
High	Viewpoints that are recognised in policy or otherwise designated as being of value, or viewpoints that are highly valued by people that experience them regularly (e.g. views from houses or outdoor recreation amenities focused on the landscape). The composition, character and quality of the view may be such that its capacity to accommodate change may or may not be low. The principal management objective for the view is its protection from change that reduces visual amenity.
Medium	Views that may not have features or characteristics that are of particular value, but have no major detracting elements, and which thus provide some visual amenity. These views may have capacity for appropriate change and the principal management objective is to facilitate change to the composition that does not detract from visual amenity, or which enhances it.
Low	Views that have no valued feature or characteristic, and where the composition and character are such that there is capacity for change. This category includes views experienced by people involved in activities with no particular focus on the landscape. For such views the principal management objective is to facilitate change that does not detract from visual amenity or enhances it.
Negligible	Views that have no valued feature or characteristic, or in which the composition may be unsightly (e.g. in derelict landscapes). For such views the principal management objective is to facilitate change that repairs, restores or enhances visual amenity.

Table 3.5 Categories of Visual Sensitivity

3.2.3.2 Magnitude of Visual Change

Classification of the magnitude of change takes into account the size or scale of the intrusion of development into the view (relative to the other elements and features in the composition, i.e. its relative visual dominance), the degree to which it contrasts or integrates with the other elements and the general character of the view, and the way in which the change will be experienced (e.g. in full view, partial or peripheral view, or in glimpses). It also takes into account the geographical extent of the change, as well as the duration and reversibility of the visual effects. Five categories are used to classify magnitude of visual change to a view, as set out in Table 3.6.

Magnitude	Description
Very High	Full or extensive intrusion of the development in the view, or partial intrusion that obstructs valued features or characteristics, or introduction of elements that are completely out of character in the context, to the extent that the development becomes dominant in the composition and defines the character of the view and the visual amenity.
High	Extensive intrusion of the development in the view, or partial intrusion that obstructs valued features, or introduction of elements that may be considered uncharacteristic in the context, to the extent that the development becomes co-dominant with other elements in the composition and affects the character of the view and the visual amenity.
Medium	Partial intrusion of the development in the view, or introduction of elements that may be prominent but not necessarily uncharacteristic in the context, resulting in change to the composition but not necessarily the character of the view or the visual amenity.
Low	Minor intrusion of the development into the view, or introduction of elements that are not uncharacteristic in the context, resulting in minor alteration to the composition and character of the view but no change to visual amenity.
Negligible	Barely discernible intrusion of the development into the view, or introduction of elements that are characteristic in the context, resulting in slight change to the composition of the view and no change in visual amenity.

Table 3.6 Categories of Magnitude of Visual Change

3.2.3.3 Significance of Effects

As for landscape effects, to classify the significance of visual effects the magnitude of change to the view is measured against the sensitivity of the viewpoint using the guidance in Table 3.3 and Figure 3.1 above.

3.2.4 Quality of Effects

In addition to predicting the significance of the effects, EIA methodology requires that the quality of the effects (for both landscape and visual effects) be classified as positive/beneficial, neutral, or negative/adverse. For landscape to a degree, but particularly for visual effects, this is an inherently subjective exercise. This is because landscape and visual amenity are perceived by people and are therefore subject to variations in the attitude and values - including aesthetic preferences - of the receptor. One person's attitude to a development may differ from another person's, and thus their response to the effects of a development on a landscape or view may vary.

Additionally, in certain situations there might be policy encouraging a particular development in an area, in which case the policy is effectively prescribing landscape and visual change. (This is relevant because, in the case of land use, the policy is written by the democratically elected local government). Therefore, the policy can be assumed to reflect the values of the local population). If a development achieves the policy objective, the resulting effect might be considered positive, even if the landscape character or views are profoundly changed. The classification of quality of landscape and visual effects should seek to take these variables into account and provide a reasonable and robust assessment.

3.3 Receiving Environment

3.3.1 Site Location

The site is located within the settlement boundary of Ballincollig, in the area between the existing urban area and the N22 Ballincollig Bypass, which forms the southern boundary of the town. The site is part of the South Ballincollig (i.e. Maglin) strategic land bank, which is identified in the Cork City Development Plan 2022-2028 (CCDP) as one of seven strategic areas for consolidation and expansion of Cork City.

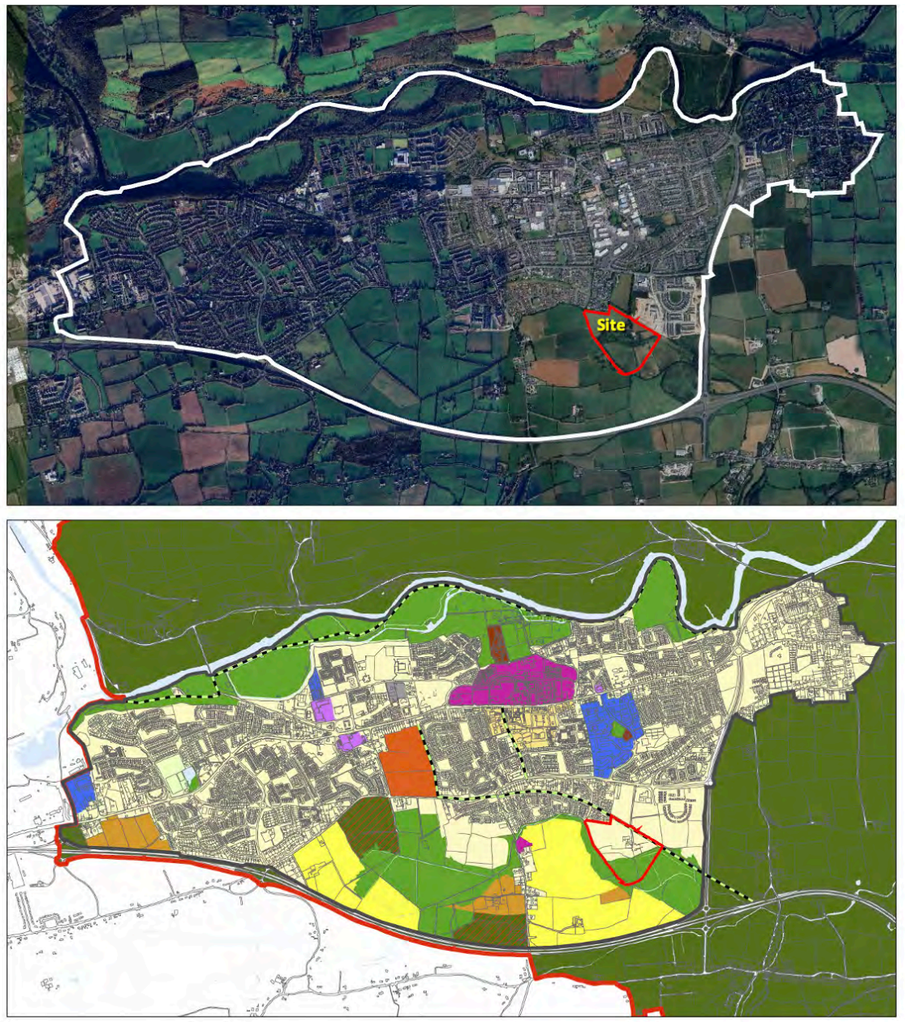


Figure 3.2 Site location in the context of Ballincollig (a) Aerial photograph and (b) CCDP 2022-2028 Zoning Map

3.3.2 The Site

The site is comprised of several fields, and subsections of former fields, centred around a derelict farmyard at the southern edge of the Ballincollig urban area. This farm was historically accessed from the north by a long treelined lane from the Link Road to the north. This access lane is now enclosed on both sides by recent residential developments (and a school fronting the Link Road). The site boundaries are varied:

- The northwestern end of the site is bounded by a mix of mature broadleaf trees along its field edges. These are further backed by more ornamental tree planting to the rear of houses and small open space within the adjoining Limeworth residential estate.
- The Maglin River is a narrow river which runs along the western boundary edge. A continuous mature broadleaf treeline aligns the Maglin River, beneath which fern, ivy and briar are common. These trees are locally significant landscape (and biodiversity) assets.
- The south-eastern site boundary diverts from the river to cross three low-lying, flood-prone fields. A section of the eastern boundary is intersected by two field boundaries, one of which is a treelined hedgerow. Marginal vegetation (e.g. rushes) populates the fields at the south and south-eastern ends of the site.
- Running next to the northern site boundary is an existing right of way. This once formed part of the former Great Southern Railway line. The route is distinguished by a raised temporary construction access trackway edged by temporary barriers/fencing. The route currently provides construction access into 'The Orchard' adjoining residential lands currently under construction.
- The immediate north of a section of the site's northern boundary is contained by a tall mature tree line that encloses the same under construction development lands (i.e. north of and outside the site). The remaining section of the site's northern boundary is contained by a paladin fencing with a young hedge in front which marks the adjoining occupied Heathfield residential estate's southern boundary.



Figure 3.3 The site's immediate environs

There are lines of mature trees and self-seeded, scrub vegetation in the vicinity of the derelict farm buildings at the centre of the site, as well as some internal field boundary hedgerows.

The old laneway, which once served the farmstead, runs from the Link Road southwards for approx. 450m to the old farmhouse now in ruins. Much of the lane is enclosed by an inconsistent, mature broadleaf treeline. The dilapidated stone farmhouse once formed part of an established farmstead that has been altered and expanded over time but are now in a dilapidated state. While the farmhouse is not listed as a protected structure within the Cork County Development Plan, it is still recognised and valued for its local vernacular history and cultural heritage value. A small standing stone located within the middle of the site's northern field is the only protected monument in the site, being listed as a Record Monument Place (RMP) (CO073-103).

Most of the site's land is under improved grassland with some encroachment of gorse and other scrub occurring on the areas of grassland which haven't been intensively managed in recent times, while on the lower-lying fields in the far south and south-east of the site, rushes are prevalent. Hedgerows and tree lines on the field boundaries give structure to the landscape, provide visual amenity, and form part of the local green infrastructure network.

The site's most significant topographical feature is the Maglin River, which also forms a townland boundary. The landform falls to the south, southwest and southeast across the site, towards the river, with the site's elevation ranging between approx. 17m to 23m Above Ordnance Datum (AOD).

In the centre of the site, the disused farmstead is characterised by dilapidation. Aside from the farmhouse, a series of 20th Century agricultural sheds are in an advanced and unsightly start of disrepair (see Figure 3.9), while in other areas, crumbling concrete foundations and low, ruined concrete walls are discernible.

In addition, there are a number of large mature leylandii/cypress trees and other invasive conifers present in areas near the farmstead (see Figure 3.6 and 3.11), which are of negligible benefit to the ecology or aesthetics of the site. Furthermore, there is decaying farm machinery and storage containers present, which are gradually being colonised by unmanaged vegetation, as well as large piles of rocks or fill present (see Figure 3.12).

Overall, the landscape character of this central subsection of the site is not compatible with the:

- Traditional, intensively managed agricultural operations of this rich lowland valley;
- Residential, amenity and ecological Values of 21st Century Ballincollig;
- Wider, appreciable aesthetics of the broader lowland valley, replete with distant rolling ridgelines;
- Ecological/biodiversity value provided by several treelines in the wider site, and the River Maglin corridor.



Figure 3.4 View looking southeast along the former railway line inside the site boundary, with the Heathfield estate to the left



Figure 3.5 View west along the old railway line, showing the tree line along the lane leading to the farmstead (hidden by the Leyland cypress trees) at the centre of the site



Figure 3.6 A view from the site towards the Heathfield estate



Figure 3.7 The derelict farmhouse among trees at the centre of the site, with Heathfield in the distance



Figure 3.8 An area of degraded landscape beside the derelict farm buildings



Figure 3.9 A view from within the site towards the neighbouring Limeworth estate, showing the screening effect of the existing vegetation on the boundary



Figure 3.10 The tree line on the Maglin River bank on the site's west boundary



Figure 3.11 The Maglin River in a narrow, steep-sided channel on the site's west boundary



Figure 3.12 Character areas in the wider receiving environment

3.3.3 Surrounding Landscape Character and Potential Receptors of Change

The receiving environment can be divided into three main character areas. These are:

- The existing suburban landscape, including under construction and recent housing developments of Heathfield directly to the north and east of the site and other established housing estates including Limeworth and Carriganarra Estate to the north and northwest of the site.
- The greenfield, but zoned, lands to the west and south of the site, lying between the existing urban area, Maglin Road and the N22, in which the site is located. Ballincollig Castle is also located in this area (see Section 3.3.3.4 below)
- The peri-urban landscape south of the N22.

3.3.3.1 Suburban Landscape of Heathfield to the Northeast of Site

Heathfield is a large estate of mostly two storey, semi-detached houses lying between the site and the Link Road to the north. Heathfield forms part of the plan-led southern expansion of Ballincollig towards the town boundary along the N22, and brings the urban area to the northern boundary of the site.

There are still areas within the Heathfield estate under construction, and the Maglin Sustainable Access Corridor (MSAC – the main vehicular route into the estate from the Link Road) terminates at the site boundary. These areas of incomplete development in the expanding urban area give the landscape an unfinished appearance in places.

The row of houses along The Meadows (within Heathfield) are the nearest residential receptors to the site. The houses are c. 17m from the site boundary and the views from their front doors, windows and gardens are towards the site.



Figure 3.13 The houses along The Meadows to the north of the site



Figure 3.14 The Meadows houses facing the site



Figure 3.15 The hoarding enclosing a site compound at the southern edge of Heathfield, adjacent to the site, showing the landscape's unfinished appearance in places

3.3.3.2 Limeworth residential estate to Northwest of Site

Limeworth is a longer established estate to the north west of the site. Four of the large, detached houses are positioned close to the site boundary, and present their rear facades towards the site. The combination of the mix of planting in their gardens and the hedgerow and trees on the shared boundary will help to mitigate the visual impact of any development on the site for these receptors.



Figure 3.16 The Limeworth estate to the north west of the site



Figure 3.17 A view towards the site from the Limeworth estate

3.3.3.3 Zoned Land to East, South and West of Site

The lands to the east, south and west of the site are of similar use and character to the site itself, i.e. primarily pasture. Like the site, these lands are zoned for development in the Cork County Development Plan (CCDP), including:

- Residential use. The 'New Residential Neighbourhoods' zoning includes a large area of greenfield land to the west and south of the site, extending to the N22. This indicates that an urban edge is intended to be created along the bypass.
- Public open space. A large area of open space zone land extend to the south east of the site, and in a corridor along the Magline River outside the site's west boundary. The scale of this area indicates it will have a recreation/ Green Infrastructure function of town-wide importance. This adds value to the site as a residential land use resource.
- City Hinterland/Long Term Strategic Development Land. The area directly to the east and south on the opposite sides of the N22 road are zoned City Hinterland with an additional designation of Long Term Strategic Development Land to the southwest off Maglin Road.
- Urban Town Centre. There is a small area zoned for Urban Town Centre to the west of the site off Maglin Road.
- Education. There is a small area to the south of the site and a larger area on the western side of Maglin Road both zoned for Education. This indicates the intention to provide additional educational services to support the new residential areas within the urban expansion.

None of the land use zonings to the east, south and west of the site is sensitive to development of the type proposed. The zonings do, however, require consideration in the design of the proposed development, to ensure that the site's development is complementary to any likely future development on the neighbouring zoned lands.

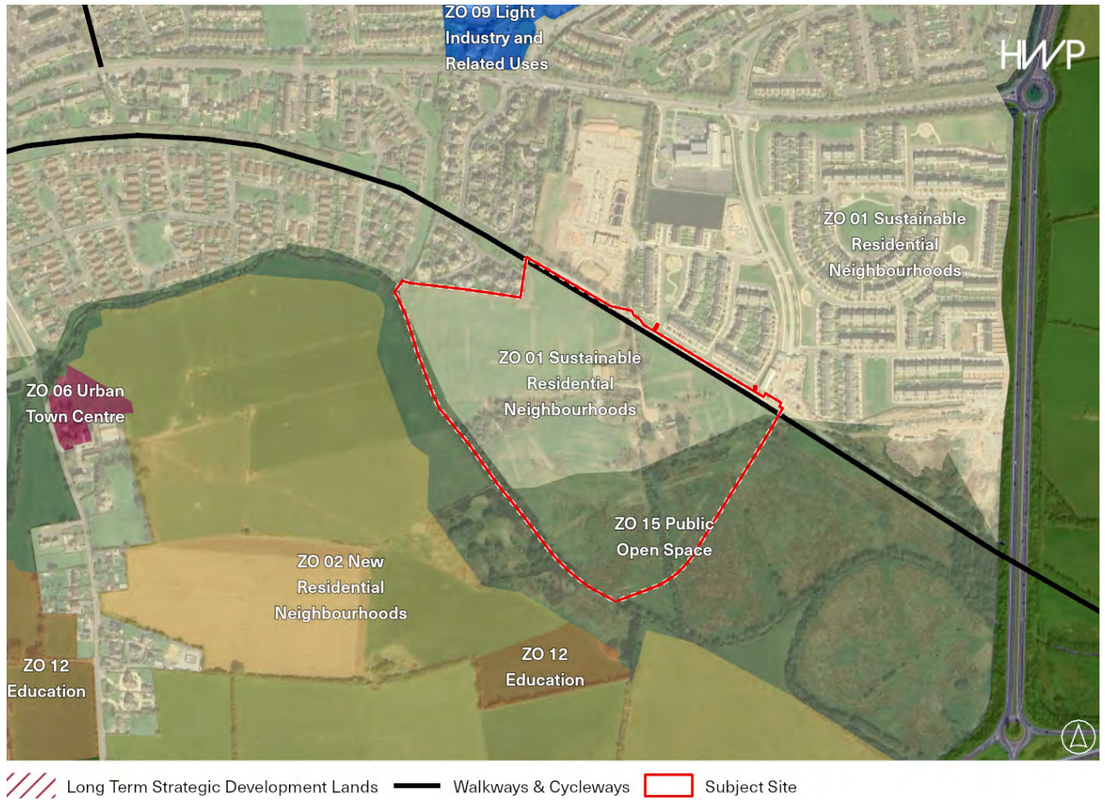


Figure 3.18 CCDP land use zoning in the site environs

3.3.3.4 Ballincollig Castle

Ballincollig Castle is a recognised sensitivity in the South Ballincollig area, although the castle is to be enclosed within the urban area as the town expands to the south, as planned in the CCDP. The castle nonetheless requires consideration in the planning and design of any development in its vicinity.

In this case, the site is over 1km to the east of Ballincollig Castle. While the tower is partially and distantly discernible in views from the site, there is existing and permitted urban development between the castle and the site, as well as extensive remaining farmland with tree lines on the field boundaries. Much of this farmland is to be developed as Public Open Space, and it can be expected that the field boundary vegetation will be retained. Given the separation distance of over 1km, and the ongoing urban development between the site and the castle, there is no potential for the proposed development to cause any significant landscape or visual impacts on Ballincollig Castle.



Figure 3.19 Ballincollig Castle approximately 1km to the west of the site



Figure 3.20 Ballincollig Castle visible in the distance from the site

3.3.3.5 N22 Ballincollig Bypass

The users of the N22 Ballincollig Bypass are a large cohort of potential visual receptors. Multi-storey development on the site could be visible over the roadside embankments and vegetation.

Beng a National Road where road users tend to be travelling at high speeds and who should not be concentrating on the surrounding landscape, the N22 road users are not sensitive to change. Visibility of development from a road serving an urban area is not inappropriate; it can have benefits such as place-identification and improved legibility, improved delineation between the urban and rural areas, etc.



Figure 3.21 A view towards the site and the expanding Ballincollig urban area from the bypass at Junction 1

3.3.3.6 Peri-Urban Area South and East of the N22

To the south and east of the N22 is an area not zoned for urban development, but in which urban elements and influences are present, with a relatively high density of rural housing some light industrial premises along the roads.

The topography of these lands rises to the south of the N22. The L2222 (Ballynora) runs parallel to the N22, approx. 225m up the hillside. There is a concentration of houses along this local road and also along other roads on the hill including Maglin Road and Chapel Road. In places, these roads affords views north over the N22 towards the site and the urban area of Ballincollig. Views in the direction of the site from houses along local roads to the east of the N22, including the Clash Road, are more contained by the hedgerows on flatter lands. The roofscape of the Heathfield estate is however occasionally visible over the hedgerows.

If the proposed development were visible in this area to the east or south of the N22, it would be seen against the backdrop of the wider urban area and would have no significant impact on the character or quality of the view. It would constitute a minor expansion of the town, in accordance with the development strategy for South Ballincollig.

3.3.4 Relevant Policy - Cork City Development Plan 2022-2028 (CCDP)

The following policy in the CCDP is most relevant to this assessment.

3.3.4.1 Core Strategy and Land Use Zoning

In the Core Strategy (CCDP p.47) South Ballincollig (Maglin) is identified as one of seven 'strategic areas' within and adjoining Cork city, in which compact growth will be delivered through consolidation and expansion. The site is located in this area and is zoned ZO.01 Sustainable Residential Neighbourhoods

ZO 1 "Sustainable Residential Neighbourhoods". The CCDP states:

> *"Development in this zone should generally respect the character and scale of the neighbourhood in which it is situated. Development that does not support the primary objective of this zone will be resisted."*

The site is thus designated for residential use. Residential development should include a mix of housing types in addition to the amenity, social, community and physical infrastructure required for a sustainable residential neighbourhood.

Land extending along the southern boundary of the site and a narrow strip of land along the western boundary edge are zoned ZO 15 "Public Open Space".

> *"This zone includes strategic public open space and amenity lands. Lands in this zone comprise a wild range of passive and active recreational and amenity resources for the community including parks, sport and water sports, leisure facilities, amenity areas and natural areas including ecological networks, woodlands and other habitats. The primary purpose of this zone is to preserve all land in this zone for open space and amenity use."*

3.3.4.2 Residential Density and Building Height

The density strategy for Cork city is structured around four sub-areas (i.e. City Centre and Docklands; City Centre Fringe / key transport corridors / key urban centres; Inner Urban Suburbs; Outer Suburbs).

Although not specifically covered by any of the above designations, the site - being within the Ballincollig settlement boundary and zoned for residential use - can be classified as 'outer suburbs' for the purpose of determining appropriate building height for new development. Table 11.1 of the CCDP specifies a lower and upper target height of 2-4 No. storeys for development in outer suburb areas.

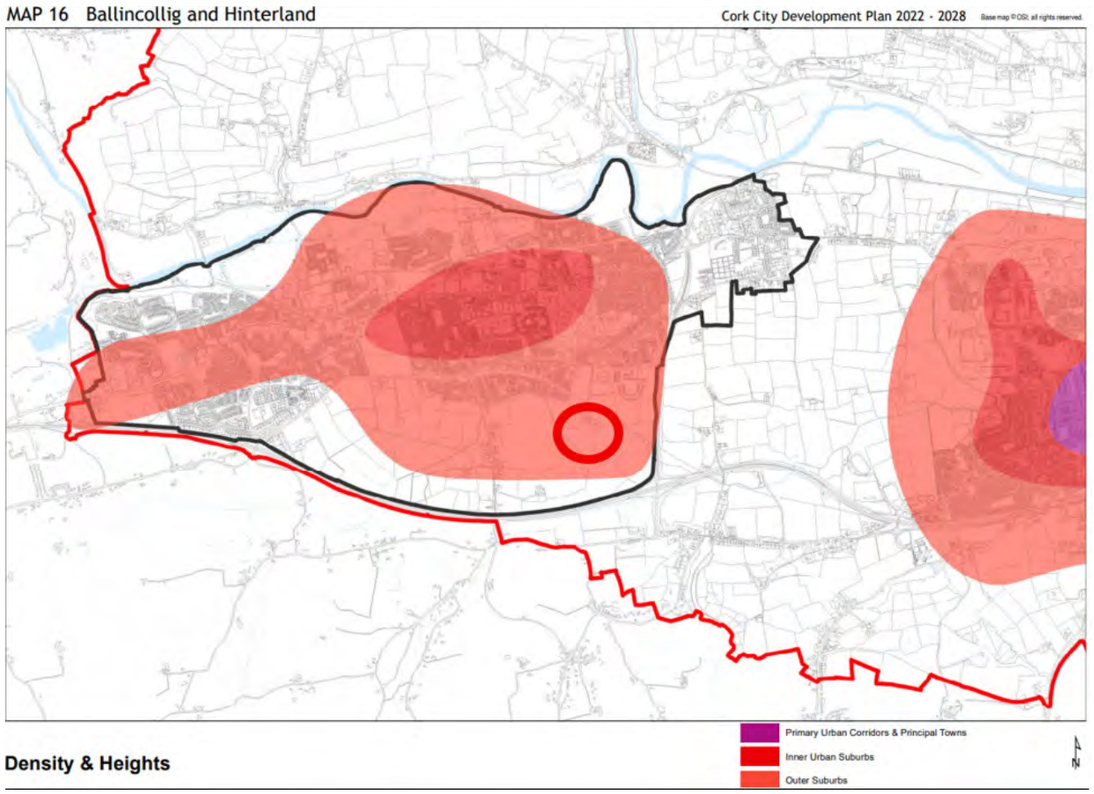


Figure 3.22 CCDP density and height strategy map for Ballincollig

Additionally, in paragraph 11.33, the CCDP states:

> *"The building height of development will respond directly to the proposed density of development, the character of an area, as well as block development typologies, site coverage and a range of other factors."*

3.3.4.3 Landscape and Development

The CCDP states (Paragraph 6.17):

> *Cork City Council seeks to protect and enhance the landscape character of the City by protecting the significant landscape elements that contribute to the general amenity of cork City. This is achieved through a number of land use mechanisms in this Plan, including the designation of Land Preservation Zones (LPZ) and Areas of High Landscape Value (AHLV).*

The site does not fall into any LPZ or AHLV.

Objective 6.9 of the CCDP states:

> *a. To preserve and enhance Cork's landscape character, key landscape assets and views and prospects of special amenity value;*
>
> *b. Landscape will be an important factor in all development proposals, ensuring that a proactive view of development is undertaken while maintaining respect for the environment and heritage generally in line with the principle of sustainability;*
>
> *c. To ensure that new development meets the highest standards of placemaking, siting and design;*
>
> *d. To protect those prominent open hilltops, valley sides and ridges that define the character of the Cork City Hinterland and those areas which form strategic, largely undeveloped gaps between the main Hinterland settlements from development;*
>
> *e. To discourage proposals necessitating the removal of extensive amounts of trees, hedgerows and historic walls or other distinctive boundary treatments;*
>
> *f. To support, as appropriate, any relevant recommendations contained in the National Landscape Strategy for Ireland 2015-2025.*
>
> [emphasis added]

Regarding Item (a), although currently in agricultural use, the site is contiguous with the Ballincollig urban area, located within the settlement boundary, and zoned for residential use. Residential development of the site can therefore be considered in keeping with the local landscape character.

The key consideration is whether the realisation of this land use objective – by the proposed development - would be achieved with 'respect for the environment and heritage' and preservation of the site's 'key landscape assets'. The site's key landscape assets are its river, hedgerows and trees – with the western boundary hedgerow of particular value as it marks a townland boundary. The layout of the proposed development preserves the site's west boundary hedgerow and large parts of the internal hedgerows including those along the old laneway, incorporating them into green corridors or open spaces. The proposal is thus compliant with Items (b) and (e) of CCDP Objective 6.9.

Objective 6.11 of the CCDP states:

> *To ensure that the management of development throughout Cork City will have regard for the value of the landscape, its character, distinctiveness and sensitivity in order to minimize the visual and environmental impact of development, particularly in designated areas of high landscape value where higher development standards (layout, design, landscaping, materials) are required.*

While minimising visual impact is an appropriate objective in some situations/areas (e.g. LPZs and AHLVs), in other areas (e.g. designated urban expansion areas) visual impact can be positive.

Locally, the proposed development would have visual impact. This is unavoidable in the development of greenfield land. The key question for this assessment is whether the proposals' visual impact would be positive. This can be achieved by measures such as:

- Retention of existing hedgerows and trees in open space, and using these retained assets to give structure to the new development/neighbourhood;
- Built frontage to streets and open spaces, for a legible urban structure;
- Variations in building typology and height to give different status to streets, spaces and places;
- Consideration of topography in the location of building height (e.g. by locating taller buildings in the lower-lying parts of a site, unless a prominent landmark building is the objective);
- Variety in built form and architectural treatment to generate sub-areas of character within a neighbourhood.

3.3.4.4 Neighbourhood Design

Objective 2.17 of the CCDP states:

> *The design and siting of development shall create a sense of community and identity, enhance connectivity, incorporate creative approaches to urban design, enhance landscape character and green and blue infrastructure and respect the local context and character of the area.*

3.3.4.5 View Management Framework

The CCDP includes a View Management Framework to ensure that development does not detract from Cork's distinctive character or visual amenity. The Plan includes six View Management Framework maps in Volume 2 (Chapter C). The maps do not extend to Ballincollig (being mostly focussed on the city centre). Therefore, there are no Strategic Landmark Buildings, Local Landmark Buildings, Strategic Viewing Locations, Strategic Linear Views, or Viewing Locations identified in Ballincollig.

However, Ballincollig Castle can be considered a local landmark building. The site is approximately 1km to the east of the castle. There are no 'strategic linear views' or 'viewing locations' to the west or east of the site that might be impacted by development on the site (e.g. by development blocking the view). While future development on neighbouring lands between the castle and the site will further block any 'non-strategic' views of the castle.

3.4 Proposed Development

The proposal is described in detail in the architectural and landscape design statements and Chapter 2 of the EIAR. The proposed development description is outlined below:

The development will consist of the demolition of existing agricultural building and the construction of a residential development of 300 no. residential units consisting of 128 no. dwellings houses, 172 no. apartment/duplex units, a two storey creche facility and all ancillary site development works. The proposed 128 no. dwelling houses will include 42 no. bedroom detached/semi-detached dwelling houses and 84 no. 3 bedroom semi-detached/townhouse dwelling houses. The proposed development also provides for the restoration of an existing vernacular farm building on site which will accommodate 2 no. 2 bedroom semi-detached units.

The proposed 172 no. apartment/duplex units will include 18 no. 3 bedroom units, 109 no. 2 bedroom units and 45 no. 1 bedroom units, to be provided in 20 no. apartment/duplex buildings ranging in height from 3-4 storeys over basement level.

Vehicular access to the proposed development will be provided via the existing junction from the Link road serving the Heathfield residential development and existing sections of the Maglin Sustainable Access Corridor to the north. The proposed development provides for the extension of Maglin Sustainable Access Corridor and the provision of 4 no. pedestrian/cycle connections to the Heathfield residential development to the north which is under construction.

Ancillary site works include the raising of existing ground levels on site, the provision of bicycle parking and bin storage facilities serving the proposed apartment/duplex and creche buildings, the delivery of active travel infrastructure, landscaping and servicing proposals including a temporary pumping station, and the undergrounding/diversion of an existing 38KV overhead ESB line which traverses the site.

The following aspects of the proposal are most relevant to the assessment of landscape and visual impacts.

3.4.1 Layout

Being within gently undulating topography, with no watercourse dissecting it, the site is relatively unconstrained as regards the potential layout of development. The key determinants of the proposed layout and arrangement of built form – including height – are therefore as follows:

- The objective to retain key natural and built elements as far as possible, including boundary and internal hedgerows, trees along the old laneway, old farm buildings and archaeology features. These features will be preserved and enhanced and will be used to give both structure and maturity to the new neighbourhood, providing local amenity value and their heritage characteristics blended with the contemporary development.
- The objective to establish a rational/efficient, permeable, legible urban structure on the previously greenfield land.
- The requirement to respond to the surrounding urban grain, including the mix of established residential estates to the northwest and recent completed and under-construction residential estates to the north and northeast. It also includes the Maglin Sustainable Access Corridor, which will continue from Heathfield estate outside the east/south part of the site, as well as the N22 Bypass, which together frame the greenfield areas within the settlement limits of Ballincollig.
- The objective to minimise – as far as possible - negative visual impacts as a result of the development. (This is inherently difficult in situations of urban expansion into greenfield areas. Existing houses and other receptors at the urban edge enjoy views of agricultural lands, and the replacement of green fields with built form is often considered to detract from visual amenity.)



Figure 3.23 (a & b) - Key determinants of proposed layout: (a) response to surrounding roads/urban grain and development, and (b) retention of western and internal boundary hedgerows in open space network

The previous figure shows that the trees along the old laneway and agricultural lands to the south would be retained in a framework of open space/green infrastructure. The townland boundary hedgerow and trees on the western side of Maglin River are outside of the site. The treeline would not be affected by the proposed development and would contain/enclose the proposed development along its western boundary.

The proposed layout is an orthogonal grid, with junctions offset (in line with DMURS) to slow vehicular traffic and create people-friendly streets. The grid layout is the most efficient use of space/land and promotes navigability and legibility. The grid is also derived from, and therefore aligned with, the existing field pattern.



Figure 3.24 Proposed layout

3.4.2 Built Form and Height – Response to Context

The proposed development incorporates a variety of housing/building typologies. This is in accordance with the ZO 1 Sustainable Residential Neighbourhoods zoning (which requires a 'mix of housing types') and allows the development to address/respond to the surrounding landscape in different ways. The proposal's varying interface with the surroundings is discussed below.

Generally, there is an increase in density/intensity across the site's lower topography to the south where the apartment blocks and duplexes are located nearer to the Maglin Sustainable Access Corridor. These varied building heights, and feature corner units, provide visual interest and aid wayfinding within the proposed development, while the layout also responds to the site's existing buildings, landform, ecological features.

3.4.2.1 Heathfield and Limeworth Residential Estates to the North

Heathfield is a large new residential estate which forms part of the strategic southern expansion of Ballincollig towards the settlement boundary along the N22. A linear park is proposed inside the northern site boundary, functioning as both a spatial/visual buffer and a shared amenity between Heathfield and the new estate. The linear park includes the Active Travel Route along the former railway line, retained hedgerows and trees, new woodland planting, lawn kickabout areas and a play area, seating areas, and the standing stone as a feature in the landscape.

The proposed new houses are set well back (c. 44m) from the Heathfield boundary, and at lower elevation than Heathfield, to the south of the linear park. The new houses will combine with the houses of Heathfield to provide definition to the park, while avoiding any sense of excessive enclosure of Heathfield. As the numerous proposed trees in the linear park mature, the visual effects of the new houses will reduce further.



Figure 3.25 A photomontage view along the boundary between The Meadows (Heathfield) to the left and the proposed development to the right, showing the linear park functioning as a spatial/visual buffer and shared amenity

In the north west corner of the site, the proposed houses are set back from the boundary of the Limeworth estate behind the retained boundary vegetation, the Active Travel Route, a wide green verge with trees, and an internal access road. The houses are also at lower elevation than Limeworth, and limited to two storeys. These measures will minimise visual impacts on the nearest houses and open space in Limeworth.



Figure 3.26 CGI view showing the setback of the proposed houses from the Limeworth boundary (to the left out of view)



Figure 3.27 Photomontage view from the open space in Limeworth, showing how the separation distance and the limited height (two storeys) of the houses in north west corner of the site would minimise their visual impact

3.4.2.2 Maglin Sustainable Access Corridor to the East and South

A section of the Maglin Sustainable Access Corridor (MSAC) has been built between the Link Road to the north and the site. The road curves through Heathfield and terminates at the site boundary. The proposed development includes the next section of the MSAC, traversing the site's eastern and southern area, providing th vehicular access to the proposed development and to the future development lands to the west of the Maglin River.

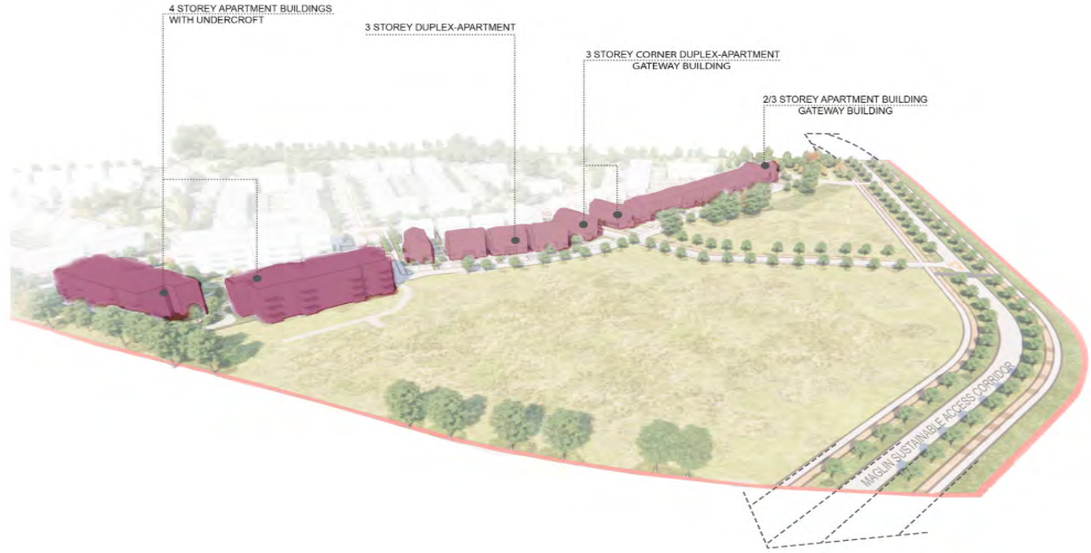


Figure 3.28 Proposed location of the apartments and duplex blocks to form a legible urban edge to the MSAC corridor

The higher density typology buildings (three storey duplex and 4/5 storey apartments) are positioned in the southern part of the site's developable area, facing the MSAC corridor. This is intended to (a) establish a legible urban edge, and (b) take maximum advantage of the amenity value of the open space in the southern part of the site.

The proposed development's layout, detailing and material finishes are consistent with other greenfield developments along the MSAC corridor, to ensure they create a cohesive urban frontage. This unified approach strengthens the relationship between the developments and reinforces a clear and legible urban edge along the MSAC. Similarly, the tree planting along the corridor is consistent throughout, allowing for potential future uses of the MSAC (e.g. bus corridor), ensuring long-term adaptability and continuity of the streetscape.



Figure 3.29 A CGI view from a position near the MSAC in the southern part of the site, showing the built frontage of the proposed apartments and duplex blocks to form a strong urban edge

3.4.3 Architecture and Materials

The varying design response to the context (described above) results in variations in architectural character across the scheme. This variety is reinforced by the detail design of the buildings, with the objective of creating sub-neighbourhoods of distinct identity over three character areas:

- Character Area 1 – Crescent Park
- Character Area 2 – Hamlet Square
- Character Area 3 – Maglin View



Figure 3.30 Variations in architectural character across the scheme

The facade materials across the proposed development include a mix of red, buff and white bricks combined with off-white render, along with slate roof tiles. Accent elements in different coloured brick and render are used across different buildings to introduce variety and articulate the facades. There will be a similarity in the architectural language of the higher density buildings located along the MSAC with that of other developments on the MSAC, to ensure a harmonious and consistent streetscape in the wider context, while retaining a distinct identity that supports a strong sense of place within the proposed development.



Figure 3.31 CGI view showing variations in building typology and design, with a unifying architectural language and materials palette

The Hamlet Square character area features the retained, re-purposed and refurbished farm building as its central feature, along with a section of the tree-lined lane that led to the farmhouse.



Figure 3.32 CGI view showing the reused farm building (central building in view) and the surrounding two storey housing within Hamlet Square, reflecting a simple vernacular architectural language and materials palette

3.4.4 Landscape Proposals

The key elements of the landscape proposals are as follows:

- The northern boundary will contain a large linear park, which will also serve as an active travel and ecological corridor. It will contain a network of pedestrian and cycle paths (including an Active Travel Route) providing connections through the proposed development, the surrounding estates and the MSAC. This landscape corridor would function as a buffer between the proposed development and the existing houses of Heathfield. A narrower landscape buffer, also with the same Active Travel Route, runs inside the north west boundary shared with the Limeworth estate.
- The western townland boundary next to the River Maglin will remain unaffected by the proposed development, forming a buffer between the proposed development and adjoining zoned public open space. Groups of trees will be planted through the area of meadow between the river channel and the proposed development access road. The existing hedgerow retained will enclose and form a soft green edge to the western end of the apartments.
- A large part of the site's southern area's existing agricultural lands, tree and scrub cover will be retained to form a large open space area, creating a wider landscape buffer between the proposed development's buildings and the MSAC route. This road corridor will be lined with street trees, creating a formal tree lined avenue that reflects the landscape strategy across the length of the route. Similarly, landscaping measures provided through the proposed development ensure consistency with the landscaping of other developments across the southern expansion of Ballincollig.
- The existing tree-lined hedgerow along the old farm's laneway will be retained and the lane will form a new Active Travel Route (pedestrian/cycling path). This will connect with the other Active Travel Routes and pathways throughout the proposed development, allowing ease of access throughout the site and onto the surrounding existing/future residential estates and the MSAC.
- A range of open spaces including small pocket parks, larger communal open spaces throughout each neighbourhood and the linear park to the north. These spaces promote physical activity, social interaction and a strong sense of community belonging. The mix of planting will enhance and the connect up the green infrastructure through the site supporting biodiversity across the site and surroundings.
- The landscape design integrates the site's archaeological and historic assets into the scheme by elevating them as valued features within the landscaped open spaces.
- Tree, hedging and shrub planting will help visually break up and soften the appearance of the proposed buildings and vehicles within the proposed development.
- A variety of SUDS features are proposed throughout the scheme, including rain gardens, infiltration basins, filter drains and green roofs on the apartment blocks.



Figure 3.33 Landscape masterplan

3.5 Visual Impact Assessment

Based on the analysis of the receiving environment in Section 3.3, the key potential receptors of change are as follows:

- The Heathfield residential estate.
- The Limeworth residential estate.
- The greenfield - but zoned – lands of South Ballincollig.
- The N22 Ballincollig Bypass, which passes to the south of the site.

8 no. viewpoints were selected to assess the visual impacts on these receptors.



Figure 3.34 Viewpoints for visual impact assessment

The viewpoints are individually assessed below. For the methodology, terms and criteria used in the assessment refer to Section 3.2 above.

The assessments should be read in conjunction with the verified photomontages. These are included below, and also in A3 format the end of this chapter.

3.5.1 Viewpoint 1 – Southern roundabout of N22 and N40 Junction 1 intersection

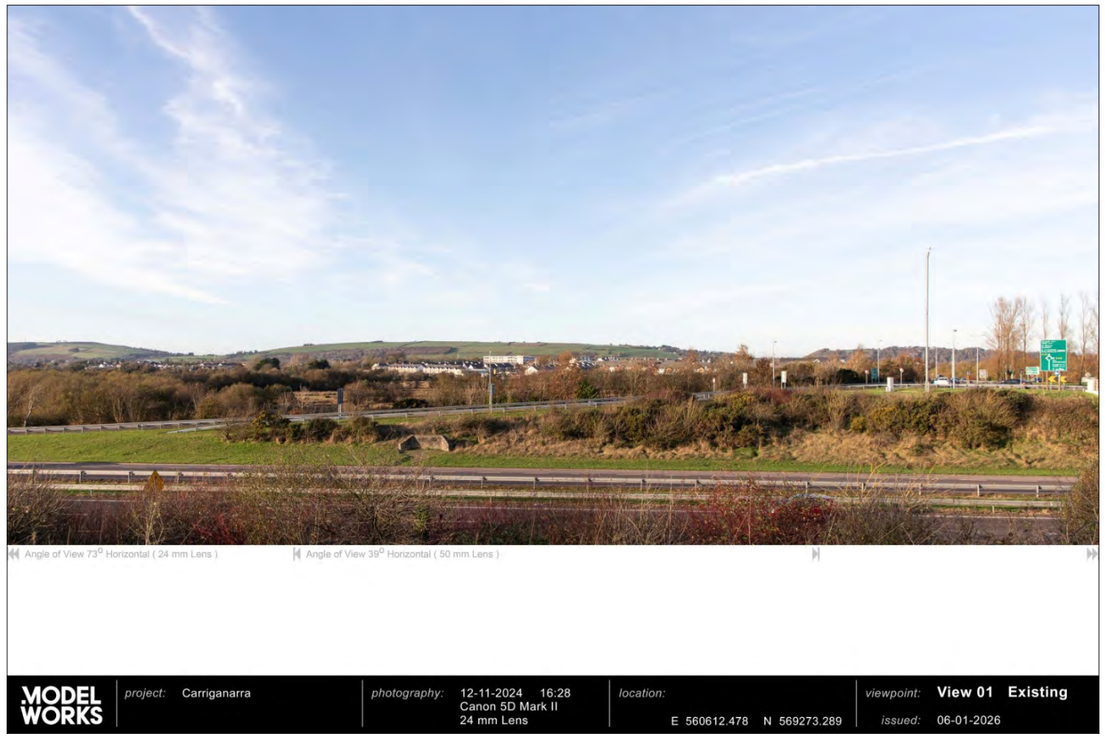
3.5.1.1 Existing View

The view is taken from the roundabout at the southern end of N22 and N40 intersection. Traffic from the N22 Ballincollig Bypass is channelled into Ballincollig via this roundabout. It is thus a gateway to the town.

Beyond the wide road corridor in the foreground, the urban area of Ballincollig is visible in the distance across an area of low-lying agricultural land (zoned for open space and residential development). A variety of buildings are visible in the distant urban landscape, with the school building of Gaelscoil Uí Ríordáin among the most prominent.

Some of the larger trees on the site (the dense, evergreen leylandii cypress in particular) identify the site location in the view.





Viewpoint sensitivity: Low. The view is from a busy motorway corridor and a large part of the urban area is exposed to view. There is a high capacity for change.

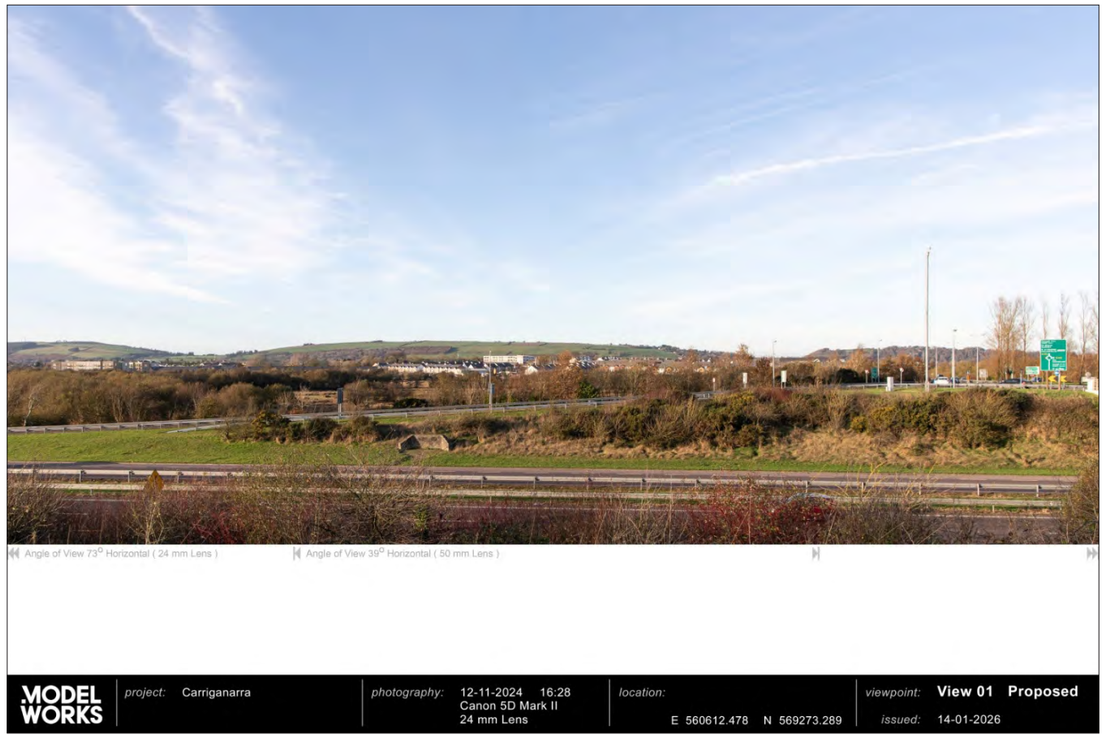
3.5.1.2 Proposed View

The upper floors of the proposed apartment blocks and the roofline of the three-storey duplexes are visible in the distance above the trees in the intervening landscape, at the urban edge.

Magnitude of change: Low. The development would slightly expand and diversify the urban area in view, but in the broad panorama this amounts to a low magnitude of change.

3.5.1.3 Significance and Quality of Effect

Not Significant neutral. The development would contribute to the planned/ongoing expansion of Ballincollig towards the bypass (which is the settlement boundary). There would be no significant change to the character of the landscape in view from the motorway corridor, or to the visual amenity experienced by the road users.



3.5.2 Viewpoint 2 – Next to No.14 The Meadows, Heathfield

3.5.2.1 Existing View

This view is representative of the nearest group of houses in the Heathfield estate beside the site.

The houses orientate south towards the site, and the former farmland – including grassland fields, lines of mature trees, and clusters of disused farm buildings are visible through/ above the young Beech hedgerow on the site boundary.

The mature trees on the site, including along the old laneway, constrains more distant views.





Viewpoint sensitivity: Medium. The disused agricultural land and the trees on the site generate a high level of visual amenity. However, the area falls within the Ballincollig settlement boundary, and the site is zoned for residential development. Heathfield itself is part of this planned southern expansion. As a residential estate within the urban area, where plan-led urban expansion is ongoing, Heathfield is of medium sensitivity to development/change of similar type.

3.5.2.2 Proposed View

The nearest proposed houses (of similar type to the houses of Heathfield) can be seen on the far side of the linear park, partially screened/filtered by the young boundary hedge and the proposed trees in the park. The two storey houses are at lower elevation than Heathfield, and this combines with the separation distance and the vegetation screening to limit their visual presence.

The linear park forms a spatial and visual buffer and a shared landscape/green infrastructure asset between the two estates. The visual effect and amenity value of the park will increase over time as the planting matures.

Magnitude of change: Medium. The new buildings and open space cause a shift in character from a suburban/ rural edge to a more urban condition (integrated within the expanded urban area).

3.5.2.3 Significance and Quality of Effect

Moderate neutral. During construction and in the early years of operation, there would be a minor loss of visual amenity as the currently disused agricultural lands in the view are integrated into the expanded residential neighbourhood. This change is appropriate given the land's zoning and 'strategic site' designation in the CCDP. The setback of the housing from the Heathfield boundary, the modest height of the houses two storeys), and the falling topography to the south ensure that there would be no significant increase in built/visual enclosure. In the medium term, the visual effect would neutralise as the planting in the linear park matures, resulting in a pleasant outlook for the Heathfield houses.



3.5.3 Viewpoint 3 – Next to side of No. 21 The Meadows, Heathfield

3.5.3.1 Existing View



Similar to Viewpoint 2, the view looks over the young hedge and fencing on the Heathfield estate boundary directly into the northern part of the site. The trees and the old farm house within the site within the site partially close the vista, but the distant ridgeline south of the town can be seen (in winter only).

Viewpoint sensitivity: Medium-High. The disused agricultural land, the trees and the distant hills generate a high level of visual amenity. However, the area falls within the Ballincollig settlement boundary, and the site is zoned for residential development. Heathfield itself is part of this planned southern expansion of the town. As a residential estate within the urban area, where plan-led urban expansion is ongoing, Heathfield is of medium sensitivity to development/change of similar type.

3.5.3.2 Proposed View

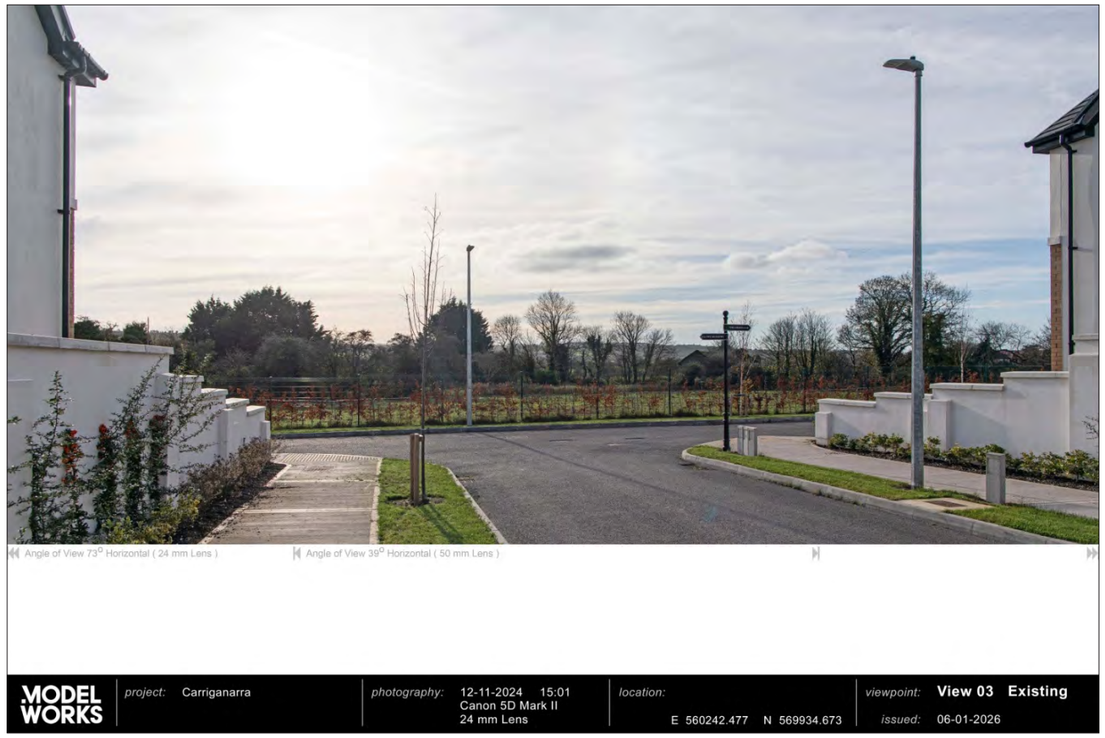
The proposed houses are visible above/between the young trees in the linear park inside the site boundary. The retained and re-purposed farmhouse is just discernible, and a number of large retained trees can be seen within the site, to the right in the view. The upper floor of the apartment block on the far side of the site is just discernible between the trees. The houses and increased density of vegetation on the site largely screen the distant hill from view.

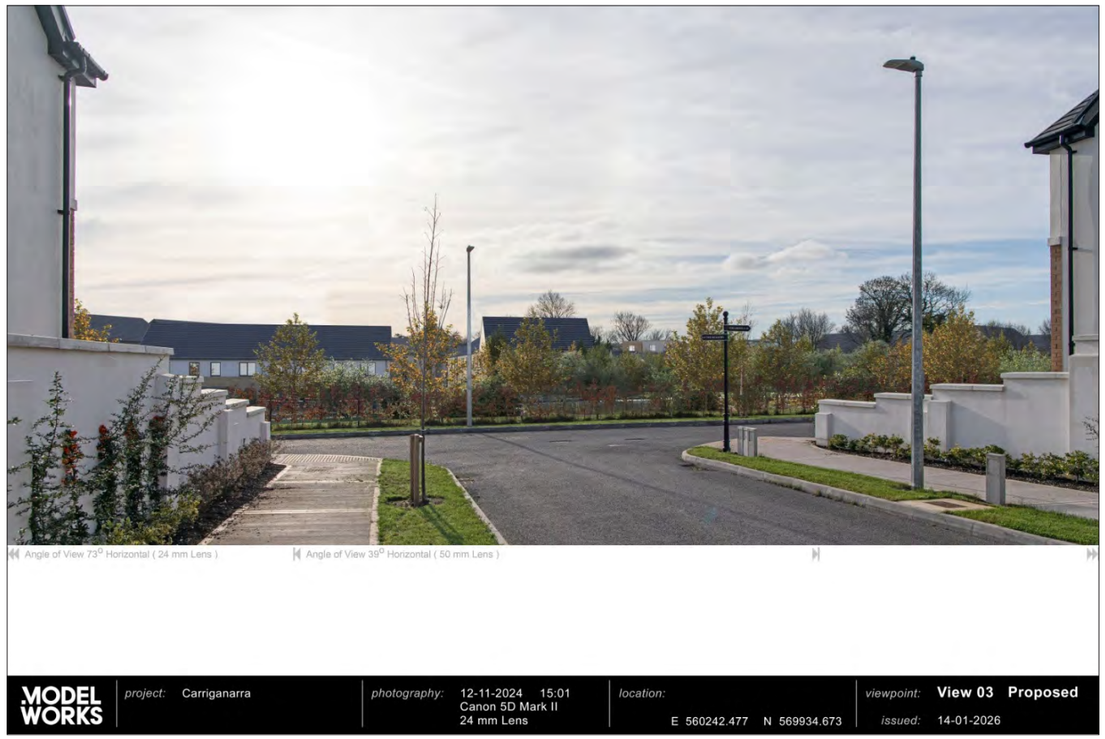
The linear park inside the site boundary forms a spatial and visual buffer between the Heathfield houses and the new houses, as well as a shared landscape/green infrastructure asset between the two estates. The visual effect and amenity value of the linear park will increase over time as the proposed planting matures. (A photomontage showing the park vegetation semi-mature (c. 15 years after planting) is provided in the photomontage booklet at the end of this chapter.)

Magnitude of change: Medium. The new buildings and open space cause a shift in landscape character from a suburban/rural edge to a more urban condition (integrated within the expanded urban area).

3.5.3.3 Significance and Quality of Effect

Moderate neutral. During construction and in the early years of operation there would be some loss of visual amenity, as the currently disused agricultural lands are developed and integrated into the expanded residential neighbourhood. This change is appropriate given the land's zoning and 'strategic site' designation in the CCDP. The setback of the houses from the Heathfield boundary, their modest height (two storeys), and the falling topography to the south ensure that there would be no significant increase in built/visual enclosure. As the planting in the linear park matures, the visual effect would neutralise, resulting in a pleasant outlook for the Heathfield houses.





3.5.4 Viewpoint 4 – Next to No. 11 The Lane, Heathfield

3.5.4.1 Existing View

This view is taken from further west, near the end of the Heathfield estate houses, next to a small open space.

The view is looking south easterly, towards the site's disused agricultural lands, which are partially visible behind the paladin fencing and young Beech hedgerow on the estate boundary.

The falling topography in the middle distance provides views of the hills to the south of Ballincollig.





Viewpoint sensitivity: Medium-High. The disused agricultural land, the trees and the distant hills generate a high level of visual amenity. However, the area falls within the Ballincollig settlement boundary, and the site is zoned for residential development. Heathfield itself is part of this planned southern expansion of the town. As a residential estate within the urban area, where plan-led urban expansion is ongoing, Heathfield is of medium sensitivity to development/change of similar type.

3.5.4.2 Proposed View

In the foreground, visible through the estate boundary hedgerow, is the new linear park, which broadens at this point, extending into the centre of the site (as far as the retained farmhouse). The park features a network of paths (with one connecting to Heathfield), seating, lawn and meadow areas and numerous trees.

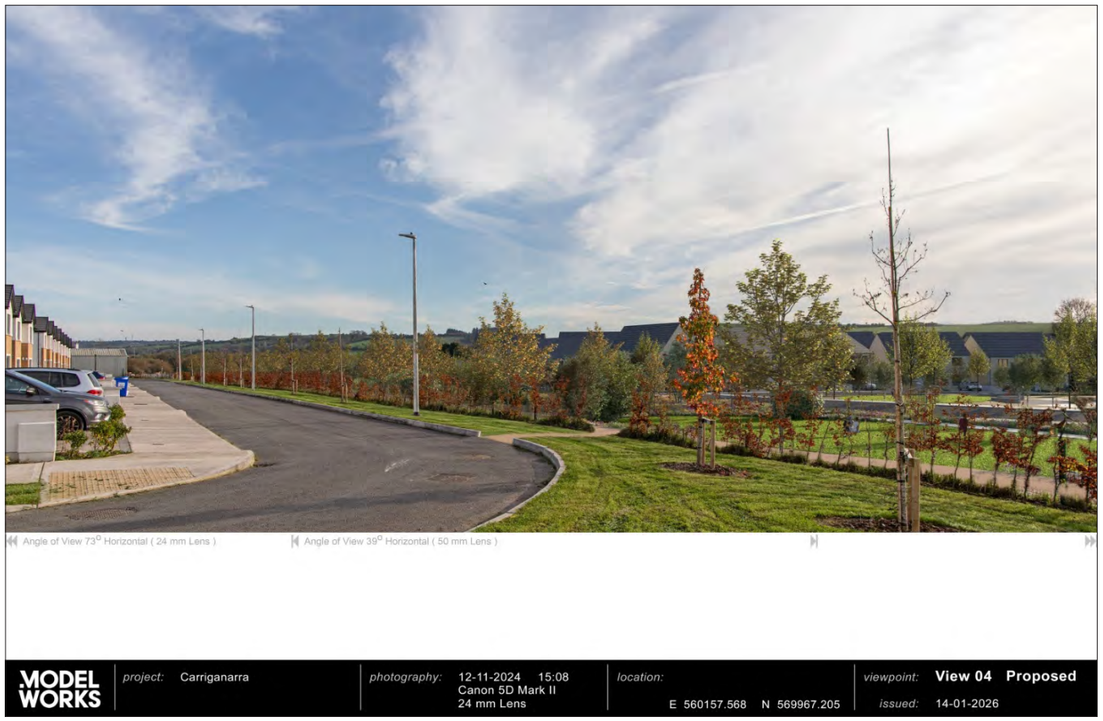
The two storey houses of the estate can be seen (filtered by the trees in the park) defining the far edge of the park, enclosing the open space. The houses are of similar typology and height to the houses of Heathfield to the left of the view, and their roofline reflects the topography of the site, falling to the right.

While a part of the distant ridgeline is screened by the roofs of the houses, the ridgeline can still be seen to the left and right of this cluster of houses.

Magnitude of change: Medium. The new buildings and open space cause a shift in character from a suburban/ rural edge to a more urban condition (integrated within the expanded urban area).

3.5.4.3 Significance and Quality of Effect

Moderate positive. The development would result in a pleasant outlook for the Heathfield houses, with a broad, well vegetated green space in the foreground, functioning as a spatial and visual buffer – and a shared recreation amenity – between Heathfield and the new houses. Due to the separation distance between the houses, there would be no sense of excessive built/visual enclosure. The distant hills would remain a feature of the view, complementing the attractive open space and expanded neighbourhood in the foreground.



3.5.5 Viewpoint 5 – Open Space at The Lane, Heathfield

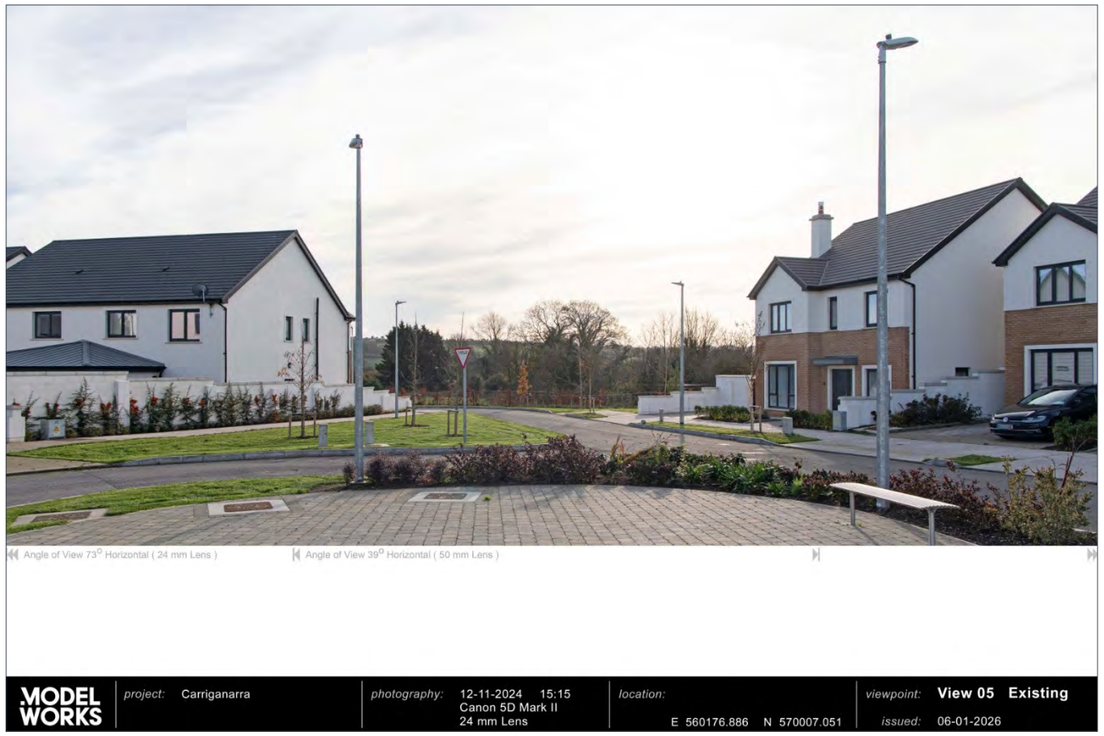
3.5.5.1 Existing View

The view is taken from an open space within the Heathfield estate. The open space is elevated, affording a view across the site towards the hills south of Ballincollig.

The large houses of Heathfield frame the view.

A number of tall trees on the site (a mix of deciduous and evergreen) are prominent in the view, with the distant hills visible between their canopies.





Viewpoint sensitivity: Medium. As a residential estate within the urban area, where plan-led urban expansion is ongoing, Heathfield is of medium sensitivity to development/change of similar type – although there are elements of value in the view (the foreground open space, the mature trees on the site, and the distant ridgeline).

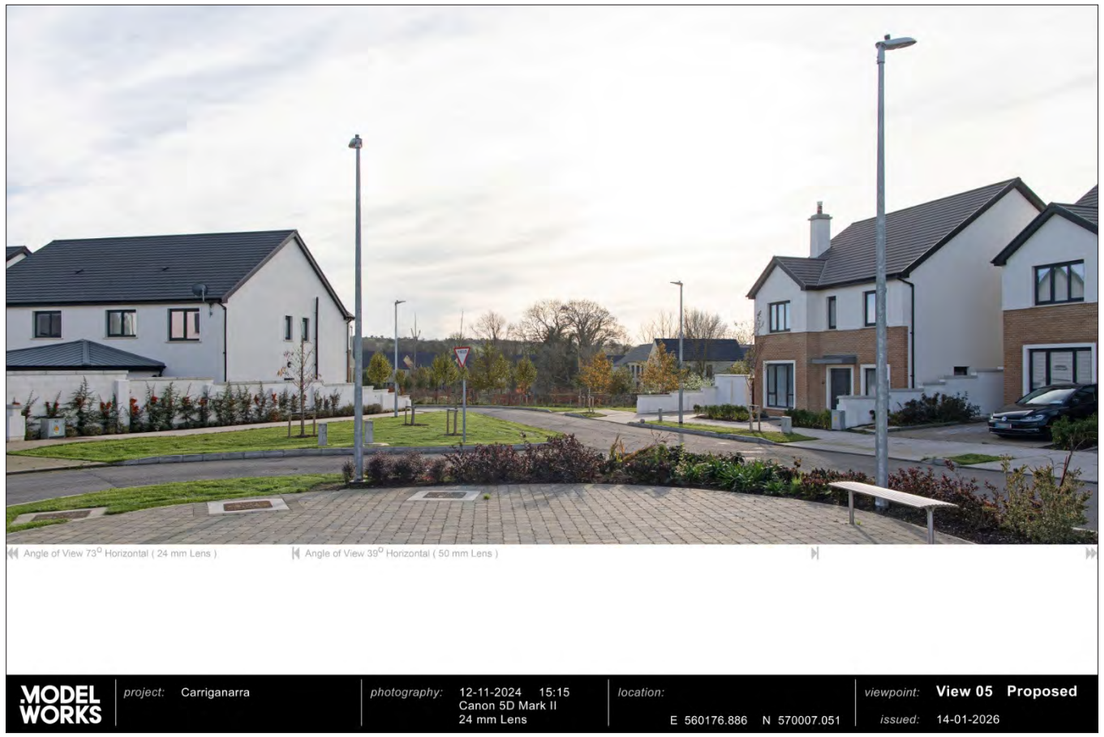
3.5.5.2 Proposed View

Framed by the foreground houses, a number of the proposed buildings, including two storey houses, the repurposed farmhouse and the creche, are discernible in the middle distance, through the trees in the linear park, among the retained trees along the former farm access track. (A photomontage showing the park vegetation semi-mature (c. 15 years after planting) is provided in the photomontage booklet at the end of this chapter.)

Magnitude of change: Low. Due to the falling topography to the south, the buildings are at lower elevation (than the viewpoint in Heathfield), and therefore their roofline is mostly below the distant ridgeline. In combination with the screening effect of the retained and proposed vegetation on the site, this limits the buildings' visual presence.

3.5.5.3 Significance and Quality of Effect

Slight neutral. The proposed buildings would take their place comfortably in the expanded urban neighbourhood, while the elements that generate visual amenity – the foreground open space, the mature deciduous trees on the site, and the distant ridgeline – would all be retained.



3.5.6 Viewpoint 6 – Open Space at Limeworth

3.5.6.1 Existing View

The viewpoint represents the established estate of Limeworth to the north west of the site. The view is taken from an open space close to the boundary shared with the site.

The large houses and the boundary vegetation enclose the view, so that the adjacent site is not visible. (To the left just outside the frame of view, another new estate under construction is just visible through the trees.)

Viewpoint sensitivity: Medium. As a residential estate within the urban area, where plan-led expansion is ongoing, Limeworth is of medium sensitivity to development/change of similar type.





MODEL WORKS | project: Carriganarra | photography: 12-11-2024 15:57 Canon 5D Mark II 24 mm Lens | location: E 559960.800 N 570068.900 | viewpoint: View 06 Existing | issued: 06-01-2026

3.5.6.2 Proposed View

The proposed development is largely hidden from view by the houses and garden and boundary vegetation of the Limeworth estate.

The roofs of the nearest houses in the development would just be discernible between the Limeworth houses (and in places through the hedgerow), but they are well removed, of modest height, and at lower elevation, which limits their visibility. In time, the proposed vegetation inside the site's north boundary will mature to fully screen the new houses from view.

Magnitude of change: Negligible.

3.5.6.3 Significance and Quality of Effect

Not significant neutral.



MODEL WORKS | project: Carriganarra | photography: 12-11-2024 15:57 Canon 5D Mark II 24 mm Lens | location: E 559960.800 N 570068.900 | viewpoint: View 06 Proposed | issued: 14-01-2026

3.5.7 Viewpoint 7 – Next to No. 25 Limeworth

3.5.7.1 Existing View

The view is taken from the Limeworth estate access road where it ends in a cul-de-sac against the site boundary. The view represents the houses in the Limeworth estate closest to the site.

To the left is the garden boundary wall and Laurel hedge (evergreen) of one of the houses. This shows the visual enclosure of the house. To the right is a similar tall, dense hedge on the boundary shared with the site.

Viewpoint sensitivity: Medium. As a residential estate within the urban area, where plan-led urban expansion is ongoing, Limeworth is of medium sensitivity to development/change of similar type.



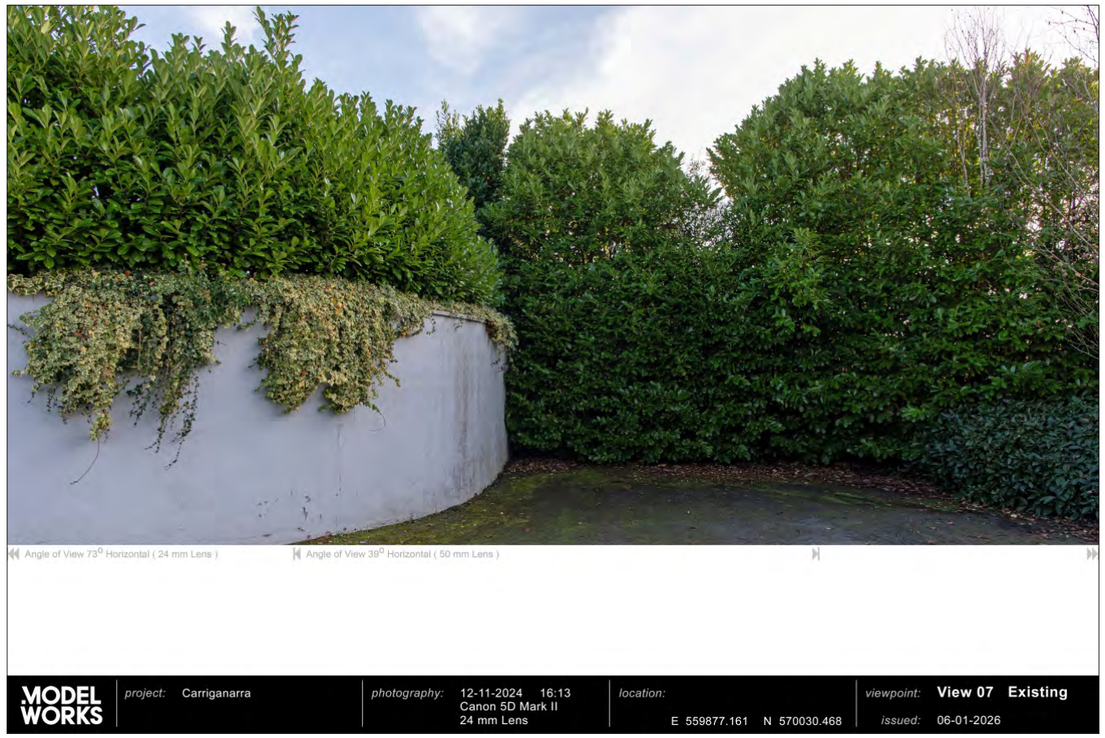
3.5.7.2 Proposed View

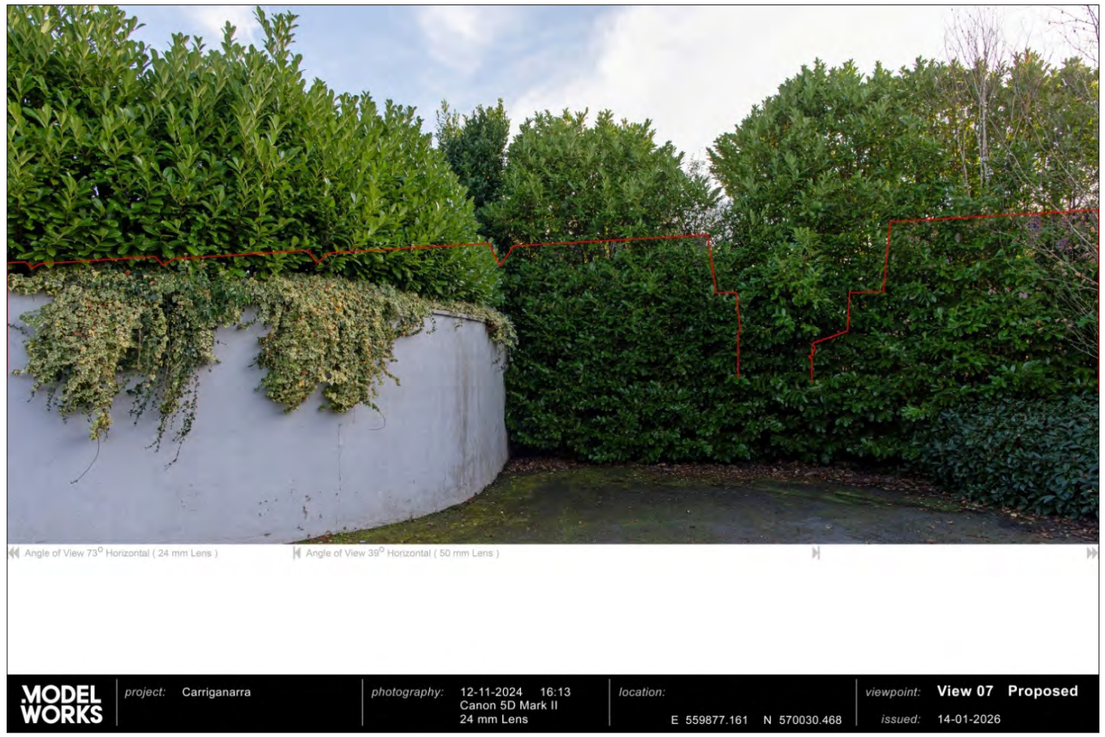
The proposed development is screened by the foreground vegetation retained along the boundary. The proposed houses in the north west corner of the site are set well back from the boundary (behind the Active Travel route, a wide green verge with trees, and an internal access road) and at lower elevation to the houses of Limeworth. Therefore, they will not protrude above the boundary vegetation and may only just be discernible through the hedge.

Magnitude of change: Negligible.

3.5.7.3 Significance and Quality of Effect

Imperceptible neutral.





3.5.8 Viewpoint 8 – Next to No.14 The Avenue, Heathfield

3.5.8.1 Existing View

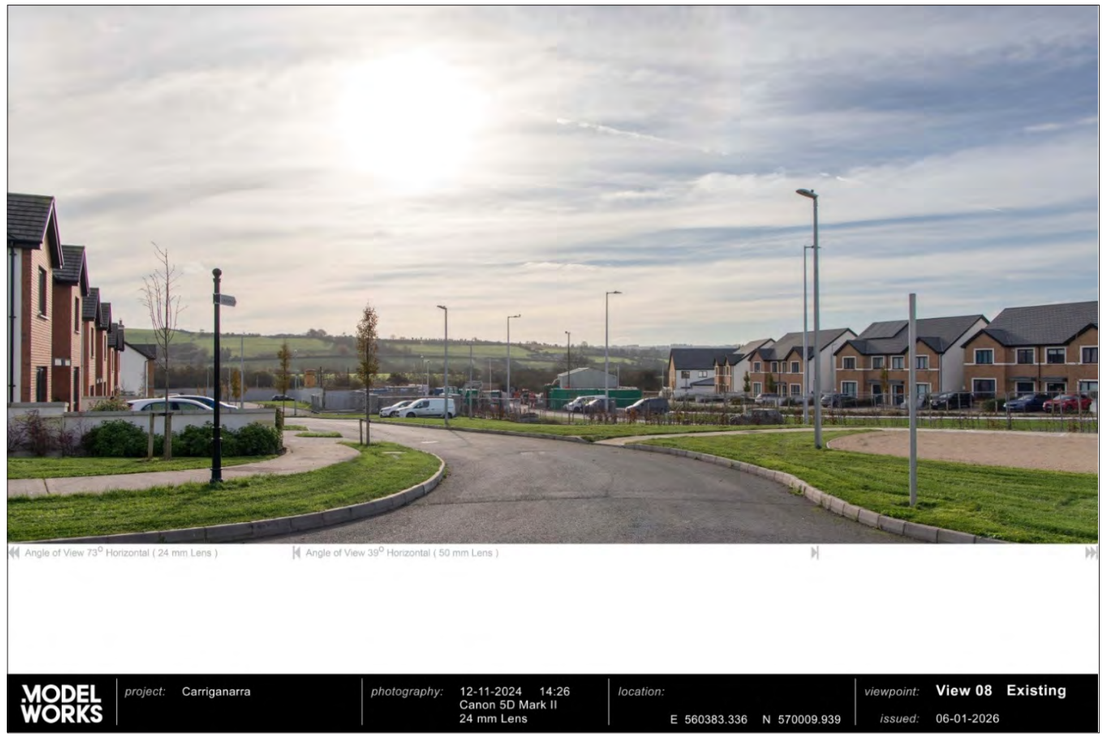
This view is taken from an elevated position in the Heathfield estate to the north east of the site. This is another recently completed part of Ballincollig's planned southern expansion.



The Maglin Sustainable Access Corridor passes to the right, forming part of a wide corridor of space traversing the new neighbourhood. Large semi-detached houses frame this space and the view south towards the lower-lying site and the hills to the south of the town.

A site compound in the middle distance (beside the site) shows that the urban expansion is ongoing, the transformation of the previously pastoral landscape not yet complete.

Viewpoint sensitivity: Medium. As a residential estate within the urban area, where plan-led urban expansion is ongoing, Heathfield is of medium sensitivity to development/change of similar type.



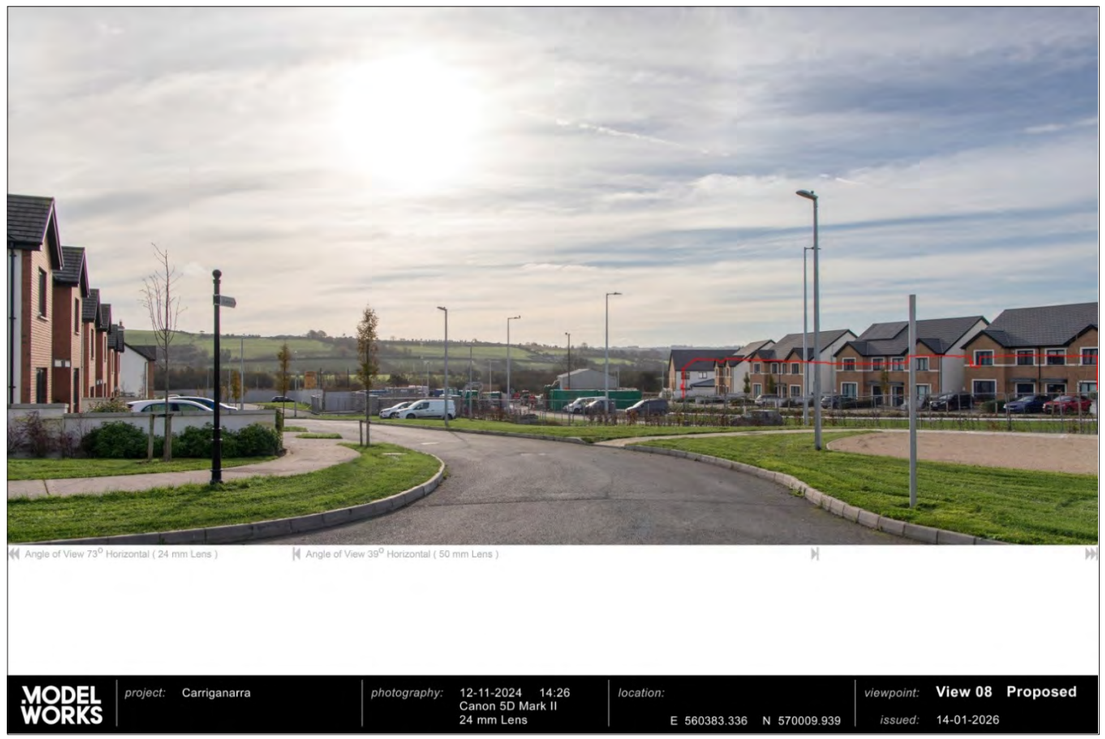
3.5.8.2 Proposed View

The proposed buildings are screened from view by the existing houses of Heathfield. The extension of the Maglin sustainable Access Corridor from the Heathfield estate across the site will just be discernible - but would constitute a minor change in a landscape undergoing a planned transformation.

Magnitude of change: Negligible.

3.5.8.3 Significance and Quality of Effect

Imperceptible / neutral.



3.5.9 Summary of Visual Impact Assessment

The potential visual impacts on the 8 no. representative viewpoints are summarised in Table 3.8, below. The assessment includes both the construction and operational phases of the proposed development.

No.	Viewpoint Location	Viewpoint Sensitivity	Magnitude of Change		Significance of Visual Effects	
			Construction (temporary)	Operation (long term)	Construction (temporary)	Operation (long term)
1	Southern roundabout of N22 and N40 Junction 1 intersection	Low	Low	Low	Not significant / negative	Not Significant/ neutral
2	Next to No.14 The Meadows, Heathfield	Medium	Medium	Medium	Moderate / negative	Moderate/ neutral
3	Next to side of No. 21 The Meadows, Heathfield	Medium	Medium	Medium	Moderate / negative	Moderate/ neutral
4	Next to No. 11 The Lane, Heathfield	Medium	Medium	Medium	Moderate / negative	Moderate/ positive
5	Open Space at The Lane, Heathfield	Medium	Low	Low	Slight / negative	Slight/ neutral
6	Open Space at Limeworth	Medium	Low	Negligible	Imperceptible/ neutral	Imperceptible/ neutral
7	Next to No. 25 Limeworth	Medium	Negligible	Negligible	Imperceptible/ neutral	Imperceptible/ neutral
8	Next to No.14 The Avenue, Heathfield	Medium	Negligible-low	Negligible	Not significant/ neutral	Imperceptible/ neutral

Table 3.7 Summary of visual impact assessment

3.6 Landscape Impact Assessment

3.6.1 Landscape Sensitivity

The sensitivity of the landscape is a function of its character, which may be determined by its land use pattern, field pattern or urban grain, building typologies and architecture, cultural and natural heritage elements (including topography, vegetation and drainage features) and the quality of the public realm. These factors determine the value that is placed on the landscape. The policy pertaining to the area (e.g. the land use zoning), and any related trend of change, are also taken into account. Finally, the nature and scale of the proposed development are considered since a particular landscape can have varying sensitivity to different development types.

It is important to recognise that the classification of landscape sensitivity applies to the receiving environment, not just to the site itself.

Based on the analysis of the receiving environment and relevant policy, **the landscape sensitivity of the receiving environment can be classified 'low-medium'**

(Medium landscape sensitivity definition: *Areas where the landscape has certain valued elements, features or characteristics but where the character is mixed or not particularly strong, or has evidence of alteration, degradation or erosion of elements and characteristics. The landscape character is such that there is some capacity for change. These areas may be recognised in policy at local or county level and the principle management objective may be to consolidate landscape character or facilitate appropriate, necessary change.*

Low landscape sensitivity definition: *Areas where the landscape has few valued elements, features or characteristics and the character is weak. The character is such that it has capacity for change; where development would make no significant change or would make a positive change. Such landscapes are generally unrecognised in policy and the principle management objective may be to facilitate change through development, repair, restoration or enhancement.*)

The low-medium sensitivity classification is based on the following factors:

- The site is an area of disused agricultural land located at the edge of Ballincollig, within the settlement boundary inside the N22 Bypass.
- The site contains a number of valued landscape features, including the Maglin River which runs along its west boundary, a number of mature trees and sections of hedgerow, an old farmhouse, and archaeological remains. These give structure to the landscape, provide visual amenity and (potentially) screening, and form part of the local green infrastructure network.
- However, the site falls into the South Ballincollig/Maglin lands area, one of seven 'strategic areas for consolidation and expansion of Cork City' identified in the CCDP, and the majority of the site is zoned ZO 1 'Sustainable Residential Neighbourhoods. The CCDP land use objective for these lands is as follows "Development in this zone should generally respect the character and scale of the neighbourhood in which it is situated. Development that does not support the primary objective of this zone will be resisted". A part of the site (the southern area and western edge along the river) is zoned ZO 15 "Public Open Space".
- The plan-led southern expansion of Ballincollig into the Maglin lands is in progress. There are residential estates (and roads) under construction or recently completed adjacent to the site. The landscape is thus in a transitional condition, and visibly disturbed/incomplete in places.
- Ballincollig Castle lies over 1km to the west of the site. This castle is of significant cultural heritage value, and it features prominently in views across the landscape of south Ballincollig. Given the separation distance of over 1km, and the ongoing urban development between the site and the castle, there is no potential for the proposed development to cause any significant landscape or visual impacts on Ballincollig Castle.

In conclusion, while the site is currently greenfield and of some visual amenity value, the land is designated for residential use, the former agricultural use has ceased, and the immediate landscape context is an emerging urban residential neighbourhood. There is thus capacity to accommodate change of the type proposed, and the landscape could benefit from that change (e.g. by contributing to the completion of the planned urban neighbourhood/district, while respecting and utilising the site's landscape assets).

3.6.2 Magnitude of Lanscape Change

Magnitude of change is a factor of the scale, extent and degree of change imposed on the landscape by a development, with reference to its key elements, features and characteristics.

The magnitude of landscape change that would result from the proposed development can be classified 'medium' (definition: *Change that is moderate in extent, resulting in partial loss or alteration to key elements, features or characteristics of the landscape, and/or introduction of elements that may be prominent but not necessarily substantially uncharacteristic in the context. Such development results in change to the character of the landscape.*).

This classified magnitude of change is based on the following factors:

- With a site area of 13.5 ha and comprising. 300 no. residential units, the proposed development is of substantial scale/spatial extent. However, at the 'landscape scale' (i.e. considered in the context of its wider receiving environment, the urban area of Ballincollig), the landscape change would be (a) moderate, and (b) and in keeping with the ongoing, plan-led urban expansion into the South Ballincollig/Maglin lands.



Figure 3.35 Spatial extent of the proposed development in the context of the Ballincollig urban area

- The proposal includes a range of residential building types, including semi-detached houses and townhouses, duplex terraces and four storey apartment buildings. This would diversify the housing/ building typologies in the landscape locally, although this is in keeping with the trend of urban consolidation and densification in Ballincollig and Cork City generally.
- The visual impact assessment reveals that any significant visual effects would be confined to the adjacent residential estate ('Heathfield') directly to the north of the site. This estate is currently at the urban edge, and the development would see Heathfield incorporated into an expanded urban neighbourhood, changing its landscape context.
- There are no other receptors that would experience visual effects of any significance. Even the other established neighbouring estate, 'Limeworth' to the north west, would experience only negligible little change. This is due to a considered, responsive layout and arrangement of built form/height.

3.6.3 Significance and Quality Landscape Impact

Measuring the magnitude of change against the sensitivity of the receiving environment, **the significance of the landscape impact would be 'moderate'** (EPA definition: *An effect that alters the character of the environment in a manner that is consistent with existing and emerging baseline trends*).

The urban area would be expanded locally, and the housing/building typologies diversified with an associated increase in density. This would cause a shift in character towards a more urban condition, but the shift would be consistent with the existing, plan-led trend of change in south Ballincollig.

The key consideration is whether the effects would be positive, neutral or negative. In this regard:

- The key landscape and historic assets of the site – including perimeter and internal boundary hedgerows, tree lines, the old farmhouse and the standing stone - would be retained, lending character, maturity and visual amenity to the new neighbourhood.
- A new linear park would be created inside the site's northern boundary, functioning as both a spatial/visual buffer and a shared amenity between the new estate and the neighbouring estates to the north (Heathfield, Limeworth). The linear park includes the Active Travel Route along the former railway line, retained hedgerows and trees, new woodland planting, lawn kickabout areas and a play area, seating areas, and the standing stone as a feature in the landscape.
- In the southern part of the site, a large area of former agricultural fields would be provided as public open space, to form part of a broad wedge of open space along the Maglin River.
- Inside the western boundary, the proposed buildings are set back from the Maglin River, retaining a belt of open space along the river – while utilising the river corridor as a visual amenity for the new houses and apartments that face the river.
- The arrangement of built form and height responds to (a) the topography of the site, (b) the sensitivity of the neighbouring estates, and (c) the site's position/function in the expanding and evolving urban landscape. The taller apartment buildings are positioned in the south west corner of the site. This ensures maximum separation distance from existing houses, and uses the larger form to provide built enclosure/definition and passive surveillance to the southern open space and the river corridor. The apartments will form part of a legible new urban edge in views from the Maglin Sustainable Access Corridor.
- Inside the northern site boundary, closest to the existing neighbouring estates, two storey houses are proposed, set well back from the boundary behind the linear park or the Active Travel Route to avoid significant visual impacts. Retained hedgerows and trees will be supplemented by new planting to further soften the visual impact of the development.
- A variety of SUDS features are proposed as part of the development, including rain gardens, infiltration basins, filter drains and green roofs on the apartment blocks.
- The varying design response to the context results in variations in character across the scheme. This variety would be reinforced by the detail design of the buildings, creating sub-neighbourhoods/character areas of distinct identity – but with a unified design theme. The verified photomontages and CGIs illustrate that the high quality of design and the high quality materials proposed.

In conclusion, the proposed development's landscape effects would be overwhelmingly positive. It would (a) deliver key elements of the planned local green infrastructure network (the linear park and Active Travel Route inside the northern boundary, a large area of public open space to the south, and an open space corridor along the river to the west) - to the benefit

of the scheme and its future residents, and the wider Maglin area; (b) provide a high quality new residential neighbourhood of mixed housing typologies, thereby realising the land use objective for the site; and (c) avoid any negative landscape or visual impacts on the existing residential area to the north, or any other receptors.

3.6.4 Construction Phase Impacts

Over the course of the estimated five year construction period, the site and immediate environs would be disturbed by construction activities including the erection of site hoarding, site clearance and levelling, haulage and storage of materials, general construction activity and the incremental growth of buildings on site. The magnitude of landscape change would be greatest in the immediate environs (e.g. the adjacent roads and nearby houses), reducing with distance from the site.

Construction is inherently and unavoidably disturbing of the landscape, and unsightly. Therefore the landscape and visual impacts during construction would be negative. However, the impacts would be temporary.

3.7 Do Nothing Impacts

The former agricultural lands would become increasingly fallow/unkempt, and the buildings increasingly derelict. The CCDP's residential land use objective for the land would remain unrealised. The site would not contribute to the ongoing, plan-led expansion of Ballincollig into the Maglin area, and the landscape would continue to appear disturbed/incomplete in places (e.g. where the Maglin Sustainable Access Corridor terminates at the site boundary).

3.8 Cumulative Impacts

The assessment of landscape and visual effects has taken account of the policy of the Cork City Development Plan 2022-2028 (CCDP) for the area (specifically the identification of the South Ballincollig/Maglin lands as one of seven 'strategic areas for consolidation and expansion of Cork City', and the associated zoning of the lands), as this has significant implications for the landscape of the receiving environment. The CCDP effectively prescribes that the landscape of South Ballincollig, between the existing town and the settlement boundary along the N22 Bypass, is to be transformed from agricultural/peri-urban to urban in character.

This process of urban expansion is underway and set to continue. The assessment has taken account of various recently completed developments (e.g. Heathfield), developments under construction, permitted developments, and applications currently being assessed by Cork City Council. The most relevant projects are listed in Table 1.1 of the EIAR. In combination, these developments, would realise the land use (and related landscape change) objectives of the CCDP.

The proposed development would be an important part of the emerging urban area, providing (a) elements of the local green infrastructure network (a linear park inside the northern boundary, a large area of public open space to the south, and an open space corridor along the river to the west); (b) providing a high quality new residential neighbourhood of mixed housing typologies; (c) concentrating the higher density residential development at the southern edge of the site's developable area, forming a legible urban edge to the public open space along the Maglin River; (d) contributing sections of the area's infrastructure (e.g. sections of the Maglin Sustainable Access Corridor and the Active Travel Route along the former railway line).

The proposed development would thus complement the 'cumulative developments' listed in Table 1.1, and contribute to the established/ongoing, plan-led trend of landscape change in South Ballincollig/Maglin. The significance of the landscape effects of these developments in combination is 'significant', positive and direct.

The potential cumulative impacts of the relevant plan for the area (the Cork City Development Plan 2022-2028 – 'CCDP') were assessed. The assessment of the potential impacts on the environment was undertaken utilising the Strategic Environmental Objectives (SEOs) which are detailed in Table 5.1 of the CCDP's Strategic Environmental Assessment. The potential cumulative impacts of the Plan were assessed having regard to these SEO's. Table 5.1 of the SEA identifies the SEO's for 'Landscape' as being:

"To implement the Plan's framework for identification, assessment, protection, management and planning of landscapes having regard to the European Landscape Convention."

Table 7.5 of the CCDP's Strategic Environmental Assessment, 'Comparative Assessment of each of the Alternatives against Strategic Environmental Objectives' indicates that Alternative/Scenario 3 'Compact Liveable Growth', the 'Selected Scenario' has positive interactions with the status of the SEO's for 'Landscape'.

3.9 Avoidance, Remedial and Mitigation Measures

3.9.1 Operation Phase

The overall landscape impact of the proposed development has been classified 'moderate positive'.

The visual impacts have been classified as ranging from imperceptible to moderate in significance, and neutral or positive in quality (see Table 3.7 above). The impacts will be greatest on the residential receptors nearest to the site within the current urban fringe of Ballincollig, but the change is not inappropriate, and the new buildings and public realm would themselves be of high design and material quality. Therefore, no mitigation measures for landscape or visual impacts are required.

3.9.2 Construction Phase

The negative landscape and visual impacts of construction are an unavoidable consequence of development and there is limited potential for mitigation. Site hoarding would screen ground level activity, material stockpiles, vehicles, etc. but once the buildings grow above ground floor level they would be visible above the hoarding, as would cranes, scaffolding and construction activity on the buildings themselves. No landscape or visual-specific mitigation is recommended other than standard best practice construction site management, which should include the erection and maintenance of hoarding on the site boundaries.

The above assumes that the hedgerow and tree protection measures recommended in the Tree Survey by County Tree Care Ltd (Appendix 3-1) would be fully implemented. The retention of the hedgerows and certain trees on the site is an important part of the proposed development, and any loss of this vegetation would constitute a negative landscape impact.

3.10 Monitoring

No monitoring of landscape or visual impacts is required.

3.11 Reinstatement

No reinstatement is required assuming the proposed development would be carried out and completed in accordance with the plans.

3.12 Interactions

- **Population and Human Health**. The proposed development would deliver a large new residential neighbourhood providing a mix of housing along with amenity, community and physical infrastructure - as well as access to the facilities, services and amenities provided by the self-sustaining town of Ballincollig. The related change to landscape character, i.e. the planned expansion and consolidation of the urban area, would have significant positive population and human health benefits (by providing homes offering a high level of residential amenities).
- **Biodiversity**. The proposed development would largely retain the site's key landscape elements/features, the hedgerows and hedgerow trees, a corridor of open space along the Maglin River, and large parts of the low-lying fields in the southern part of the site. As well as being of landscape and visual amenity value, these are important habitats, and their retention and protection, along with extensive new planting throughout the new neighbourhood, would have biodiversity benefits.
- **Cultural Heritage**. The proposed development would retain the site's key heritage assets, the standing stone, old farm building and townland boundary. The existing rural character setting of these features will be changed with " the shift of the site's character to an area of urban expansion on the edges of Ballincollig, but landscaping measures are proposed to incorporate these assets sensitivity into the proposed development.

3.13 Difficulties Encountered in Compiling the LVIA Chapter

No difficulties were encountered in carrying out the assessment.

3.14 References

- Cork City Development Plan 2022-2028, Cork City Council.
- Guidelines for Landscape and Visual Impact Assessment, 3rd edition, 2013 (GLVIA), published by the Landscape Institute.
- Guidelines on the Information to be Contained in Environmental Impact Assessment Reports, 2022, published by the EPA.
- Guidelines for Planning Authorities and An Bord Pleanála on carrying out Environmental Impact Assessment, 2018, published by the Department of Housing, Planning and Local Government.
- Townscape Character Assessment, Technical Information Note 05/2017, Landscape Institute.
- Urban Design Manual – A Best Practice Guide, Department of Environment, Heritage and Local Government, 2009.
- Urban Development and Building Height Guidelines for Planning Authorities, December 2018, Department of Housing, Planning and Local Government.

Verified Photomontages

Proposed Residential Redevelopment

Carriganarra LRD

Ballincollig

Co. Cork

Prepared by Model Works Ltd

January 2026

MODEL WORKS



MODEL WORKS

project: Carriganarra LRD

Photomontages

View Location Map



Angle of View 73° Horizontal (24 mm Lens)

Angle of View 39° Horizontal (50 mm Lens)

MODEL WORKS	*project:*	Carriganarra LRD	*photography:*	12-11-2024 16:28 Canon 5D Mark II 24 mm Lens	*location:*	E 560612.478 N 569273.289	*viewpoint:* **View 01 Existing** *issued:* 14-01-2026

Angle of View 73° Horizontal (24 mm Lens)

Angle of View 39° Horizontal (50 mm Lens)

.MODEL WORKS	*project:* Carriganarra LRD	*photography:* 12-11-2024 16:28 Canon 5D Mark II 24 mm Lens	*location:* E 560612.478 N 569273.289	*viewpoint:* **View 01 Proposed** *issued:* 14-01-2026



Angle of View 73° Horizontal (24 mm Lens)

Angle of View 39° Horizontal (50 mm Lens)

MODEL WORKS

project: Carriganarra LRD

photography: 12-11-2024 14:54
Canon 5D Mark II
24 mm Lens

location:
E 560290.989 N 569885.268

viewpoint: **View 02 Existing**

issued: 14-01-2026



Angle of View 73° Horizontal (24 mm Lens)

Angle of View 39° Horizontal (50 mm Lens)

.MODEL WORKS	*project:*	Carriganarra LRD	*photography:*	12-11-2024 14:54 Canon 5D Mark II 24 mm Lens	*location:*	E 560290.989 N 569885.268	*viewpoint:* **View 02 Proposed** *issued:* 14-01-2026



Angle of View 73° Horizontal (24 mm Lens)

Angle of View 39° Horizontal (50 mm Lens)

MODEL WORKS

project: Carriganarra LRD

photography: 12-11-2024 15:01
Canon 5D Mark II
24 mm Lens

location:
E 560242.477 N 569934.673

viewpoint: **View 03 Existing**

issued: 14-01-2026

Angle of View 73° Horizontal (24 mm Lens)

Angle of View 39° Horizontal (50 mm Lens)

.MODEL WORKS	*project:*	Carriganarra LRD	*photography:*	12-11-2024 15:01 Canon 5D Mark II 24 mm Lens	*location:*	E 560242.477 N 569934.673	*viewpoint:* **View 03 Proposed** *issued:* 14-01-2026



Angle of View 73° Horizontal (24 mm Lens)

Angle of View 39° Horizontal (50 mm Lens)

.MODEL WORKS	*project:* Carriganarra LRD	*photography:* 12-11-2024 15:01 Canon 5D Mark II 24 mm Lens	*location:* E 560242.477 N 569934.673	*viewpoint:* **View 03**	**Proposed 15 Years**
				issued: 21-01-2026	



Angle of View 73° Horizontal (24 mm Lens)

Angle of View 39° Horizontal (50 mm Lens)

.MODEL WORKS	*project:*	Carriganarra LRD	*photography:*	12-11-2024 15:08 Canon 5D Mark II 24 mm Lens	*location:*	E 560157.568 N 569967.205	*viewpoint:* **View 04 Existing** *issued:* 14-01-2026



Angle of View 73° Horizontal (24 mm Lens)

Angle of View 39° Horizontal (50 mm Lens)

MODEL WORKS

project: Carriganarra LRD

photography: 12-11-2024 15:08
Canon 5D Mark II
24 mm Lens

location:
E 560157.568 N 569967.205

viewpoint: **View 04 Proposed**

issued: 14-01-2026



Angle of View 73° Horizontal (24 mm Lens)

Angle of View 39° Horizontal (50 mm Lens)

MODEL WORKS	*project:* Carriganarra LRD	*photography:* 12-11-2024 15:15 Canon 5D Mark II 24 mm Lens	*location:* E 560176.886 N 570007.051	*viewpoint:* **View 05 Existing**	*issued:* 14-01-2026



Angle of View 73° Horizontal (24 mm Lens)

Angle of View 39° Horizontal (50 mm Lens)

MODEL WORKS	*project:*	Carriganarra LRD	*photography:*	12-11-2024 15:15 Canon 5D Mark II 24 mm Lens	*location:*	E 560176.886 N 570007.051	*viewpoint:* **View 05 Proposed** *issued:* 14-01-2026



Angle of View 73° Horizontal (24 mm Lens)

Angle of View 39° Horizontal (50 mm Lens)

MODEL WORKS	*project:* Carriganarra LRD	*photography:* 12-11-2024 15:15 Canon 5D Mark II 24 mm Lens	*location:* E 560176.886 N 570007.051	*viewpoint:* **View 05**	**Proposed 15 Years**
				issued: 21-01-2026	



Angle of View 73° Horizontal (24 mm Lens)

Angle of View 39° Horizontal (50 mm Lens)

MODEL WORKS

project: Carriganarra LRD

photography: 12-11-2024 15:57
Canon 5D Mark II
24 mm Lens

location:
E 559960.800 N 570068.900

viewpoint: **View 06 Existing**

issued: 14-01-2026



Angle of View 73° Horizontal (24 mm Lens)

Angle of View 39° Horizontal (50 mm Lens)

MODEL WORKS

project: Carriganarra LRD

photography: 12-11-2024 15:57
Canon 5D Mark II
24 mm Lens

location:
E 559960.800 N 570068.900

viewpoint: **View 06 Proposed**

issued: 14-01-2026



Angle of View 73° Horizontal (24 mm Lens)

Angle of View 39° Horizontal (50 mm Lens)

.MODEL WORKS	*project:*	Carriganarra LRD	*photography:*	12-11-2024 16:13 Canon 5D Mark II 24 mm Lens	*location:*	E 559877.161 N 570030.468	*viewpoint:* **View 07 Existing** *issued:* 14-01-2026



Angle of View 73° Horizontal (24 mm Lens)

Angle of View 39° Horizontal (50 mm Lens)

.MODEL WORKS	*project:*	Carriganarra LRD	*photography:*	12-11-2024 16:13 Canon 5D Mark II 24 mm Lens	*location:*	E 559877.161 N 570030.468	*viewpoint:* **View 07 Proposed** *issued:* 14-01-2026



Angle of View 73° Horizontal (24 mm Lens)

Angle of View 39° Horizontal (50 mm Lens)

MODEL WORKS

project: Carriganarra LRD

photography: 12-11-2024 14:26
Canon 5D Mark II
24 mm Lens

location:
E 560383.336 N 570009.939

viewpoint: **View 08 Existing**

issued: 14-01-2026



Angle of View 73° Horizontal (24 mm Lens)

Angle of View 39° Horizontal (50 mm Lens)

MODEL WORKS

project: Carriganarra LRD

photography: 12-11-2024 14:26
Canon 5D Mark II
24 mm Lens

location:
E 560383.336 N 570009.939

viewpoint: **View 08 Proposed**

issued: 14-01-2026

CHAPTER FOUR

MATERIAL ASSETS – TRAFFIC & TRANSPORTATION

CHAPTER FOUR

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CHAPTER 4 | Material Assets – Traffic & Transportation

4.1 Introduction

4.1.1 Background

This chapter of the Environmental Impact Assessment Report (EIAR) provides an assessment of the existing environmental setting and the likely significant impacts on the surrounding transport network, associated with the proposed residential development (Carriganarra LRD) at lands in Ballincollig, Co. Cork as shown in Figure 4.1. The characteristics of the potential and predicted impacts during the Construction and Operational Phases of the proposed development are assessed and evaluated. Where an impact is identified, appropriate mitigation measures to avoid any identified significant effects to the surrounding transport network are recommended and the residual impacts of the proposed development post-mitigation are assessed. A detailed description of the proposed development is provided in Chapter 2: Project Description & Alternatives.

This assessment was prepared by Kwok Chuen Lam, Chartered Engineer who is a Senior Traffic Engineer with EGIS. Kwok Chuen Lam has 19 years' experience specialising in the field of Traffic and Transport Engineering. He has been engaged as team member on a variety of Transportation and Traffic projects. His experience includes the design and management of road improvement projects, preparation of mobility management plans and traffic impact assessments. This chapter has been reviewed by Tara O'Leary a chartered Transport Planning Professional with over 20 years' experience.

4.1.2 Permissions Granted

At the time of writing, three other developments (refer to Figure 4.1) and one creche development in the vicinity of proposed development have obtained planning permission. The assessment of this chapter has considered those permitted developments, and the description of those permitted developments is listed as follows.

4.1.2.1 Permitted Stonecrest Phase 1 Development

Under planning application with ABP Case Number: ABP-308111-20, permission was granted for construction of 113 no. residential units (comprising of 59 no. houses and 54 no. apartment units) and a 60 pupil creche. As part of the development, the Applicant is carrying out road upgrade works to the adjacent Maglin Road to include dedicated walking and cycling facilities from the proposed entrance to the junction of Maglin Road/Castle Road/Sunningdale. At the time of traffic count surveys on 16th April 2024, 44 houses were occupied, and the remaining 15 houses have since been occupied. Construction has yet to commence on the permitted 59 no. apartments or the creche. The location of permitted Stonecrest Phase 1 development is illustrated in Figure 4.1.

4.1.2.2 Permitted Stonecrest Phase 2 Development

Under planning application with Reference: 23/42446, for which the applicant was Coleman New Homes (Blarney) Limited, permission was granted for construction of 162 no. residential units (comprising of 84 no. houses, and 78 no. apartment and duplex units) in August 2024. It is anticipated that the Stonecrest Phase 2 development will be completed in 2029. The location of permitted Stonecrest/Coleman New Homes (Blarney) Limited Phase 2 development is illustrated in Figure 4.1.

4.1.2.3 Permitted Stonecrest/Coleman New Homes (Blarney) Limited Creche Development

Under planning application Reference 24/43308, Coleman New Homes (Blarney) Limited were granted planning permission for the construction of a new two-storey creche within their overall development site and adjacent to Phase 1. Construction has yet to commence on the permitted creche and it is expected to be completed by 2027.

4.1.2.4 Permitted Heathfield Phase 4 Development

Under planning application with Reference: 22/41611, permission was granted for construction of 98 no. residential units (comprising of 74 no. houses, and 24 no. apartment and duplex units) in January 2024. Construction is underway and it is anticipated that the Heathfield Phase 4 development will be completed during 2026 and this development makes provision for the upgrade of an existing laneway to a 4 metres wide Pedestrian/Cycle path and which will provide direct pedestrian and cycling connectivity from Killumney Road to the proposed development. In January 2026, a planning application was submitted for an additional 11 no. houses at Heathfield (Planning Reference: 26/44475), which is currently being assessed by Cork City Council. The location of permitted Heathfield Phase 4 development is illustrated in Figure 4.1.

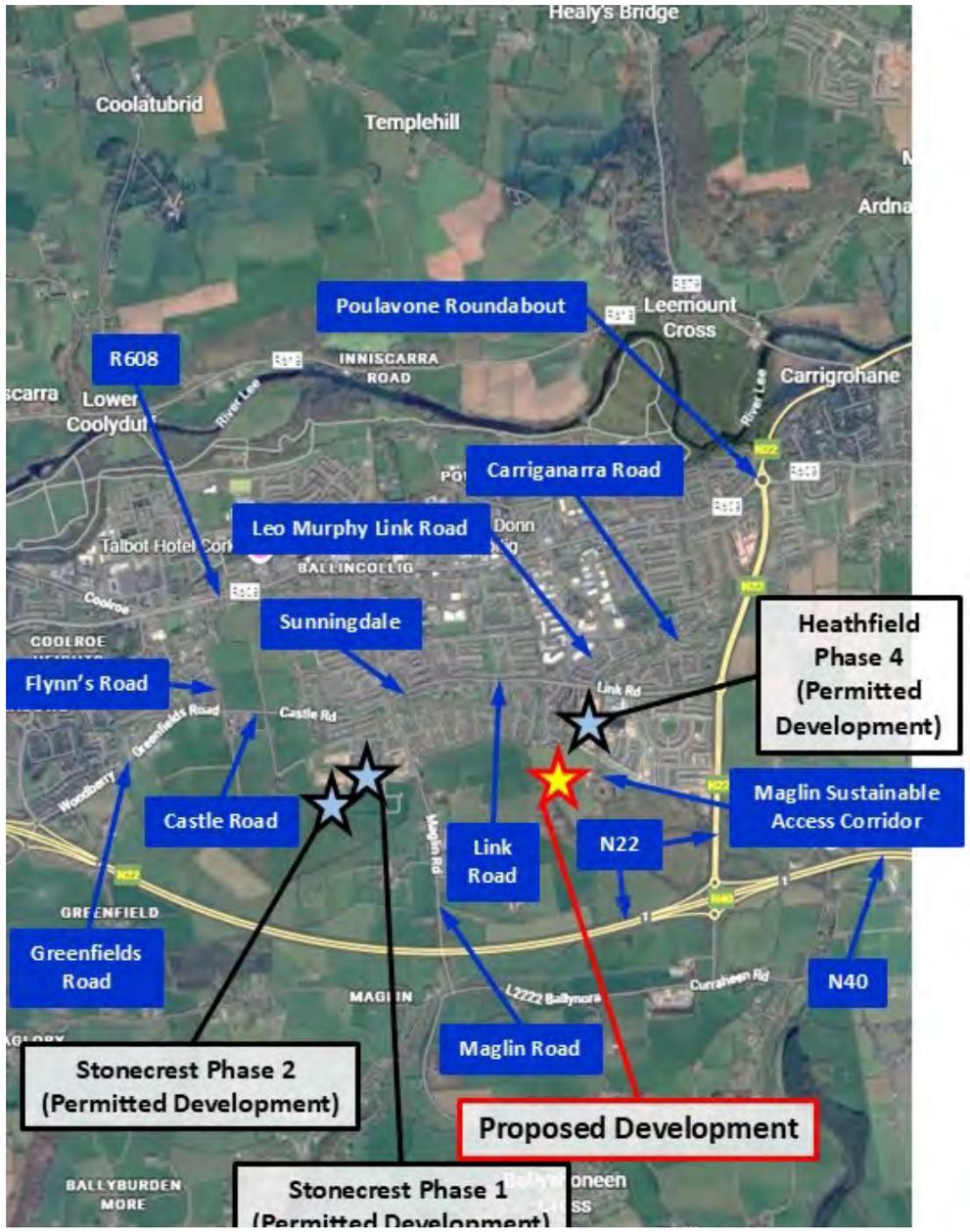


Figure 4.1 Location of the Proposed Development (Source: Google Maps, Annotation by EGIS)

4.1.3 Other Planning Applications Currently Being Assessed

4.1.3.1 Maglin LRD by O'Flynn Construction Co. Unlimited Company

In October 2025, a planning application for the "Proposed Residential Development, Maglin, Ballincollig, Cork" (hereinafter called "Maglin LRD ") with reference no. 25/44222 was submitted by O'Flynn Construction Co. Unlimited Company. This development comprises 1,150 no. residential units, 1 no. creche, 3 no. commercial units and all other ancillary development. At the time of writing, the aforementioned planning application is awaiting further information .

It should be noted that the proposed road layout as part of the Maglin LRD will not directly connect to the extended Maglin Sustainable Access Corridor (refer to Figure 4.19), which will be constructed under the proposed development. Therefore, the trip generation from the O'Connell Development will only be able to travel to/from Maglin Road. In view of above, the trip generation from the Maglin LRD will not be considered in modelling as it travels in a different direction .

4.1.3.2 Greenfield LRD by Murnane & O'Shea Limited

In July 2025, a planning application for the "Proposed Residential Development (Greenfields) at Ballincollig, Co. Cork" (hereinafter called "Greenfield LRD") with reference no. 25/44048 was submitted by Murnane & O'Shea Limited. This development is a mixed-use residential development of 544 no. residential units. Cork City Council granted conditional permission on 18th December 2025.

This decision was subsequently appealed to An Coimisiún Pleanála (Reference 324030-26) who are currently assessing the Greenfield LRD. A decision on the appeal is expected by mid-2026. In view of above, the trip generation from the Greenfield LRD will not be considered in modelling as this planning application is awaiting final decision.

4.1.4 Consultation and Scoping Study

Initial scoping discussions were held with Mr. Tony Lynch, Senior Executive Transport Officer of Cork City Council to discuss and agree:

- Trip rates;
- Modal split;
- Parking rates;
- Methodology for the junction assessments focusing on the year of opening and including committed developments only; and
- Applying low level of background growth for future years due to including the details of the committed developments.

The proposed development is located on lands on the southeast side of Ballincollig town centre and the west side of N22. Following analysis of the surrounding area, it was determined that the initial study area would include the following three junctions surrounding the development.

- Junction 1 – Leo Murphy Link Road / Link Road / Limeworth;
- Junction 2 – Carriganarra Road / Link Road / Maglin Sustainable Access Corridor; and
- Junction 3 – Killumney Link East Roundabout.

These junctions were selected as they are considered the junctions most likely to be affected by traffic associated with the proposed development. As a result, these three junctions will form the study area for this assessment. The locations of the three junctions are illustrated in Figure 4.2.



FIgure 4.2 Concerned Junctions within the Study Area (Source: Google Maps, Annotation by EGIS)

An assessment of the relevant surrounding link roads (i.e. Link Road) was also carried out to identify the capacity of these routes.

4.2 Assessment Methodology

4.2.1 Objectives

The assessment reviews the existing road network, including pedestrian/cycle and public transport provision in the vicinity of the site, estimates the traffic generated by the permitted developments and proposed development, and outlines the access strategy for the site. The predicted traffic impact on the local road network will be assessed and possible mitigation measures, where appropriate, will be discussed.

To summarise, this assessment includes the following tasks:

- Review of the existing infrastructure and traffic conditions;
- Review of the proposed development;
- Estimate the trips generated from the permitted developments and proposed development in the AM and PM peak hours and the distribution onto the local road network;
- Estimate the traffic growth rates and calculation of predicted future traffic volumes;
- Assess the impacted junctions and link roads surrounding the proposed development; and
- Propose mitigation measures (if required) to offset any impact the development may have.

The assessment is based on the findings of site visits, traffic observations, on-site traffic counts, architectural plans, and discussions with the Design Team.

4.2.2 Methodology

The transport assessment is prepared based on TII's 'Traffic and Transportation Assessment Guidelines' (2014) and is developed using data from commissioned traffic counts at concerned junctions, the 'Trip Rate Information Computer System' (TRICS) database and 2022 Census. Other relevant documents referenced include:

- TII Traffic and Transport Assessment Guidelines;
- TII PE-PAG-02017 - Project Appraisal Guidelines for National Roads Unit 5.3 - Travel Demand Projections (issued in October 2021);
- Design Manual for Urban Roads and Streets (DMURS);
- Cork City Development Plan 2022-2028;
- Cork Metropolitan Area Transport Strategy (CMATS);
- Cork Cycle Network Plan;
- Draft Cycle Design Manual (September 2023); and
- Smarter Travel – A New Transport Policy for Ireland 2009-2020.

To assess the operational traffic implications of the proposed development on the local road network, the following methodology is adopted, which incorporates a number of key inter-related stages. These following steps are used to identify and assess traffic and transport impacts:

- **Background Review**: This important exercise incorporates a number of tasks which include an examination of the local regulatory and development management documentation, namely the Cork City Development Plan 2022-2028, and CMATS, and an analysis of previous 'transport' related, strategic and site-specific studies of development and transport infrastructure in the Cork area.
- **Site Layout**: Reference was made to site layout drawings issued by the design team and the proposed plans for the site.
- **Site Audit**: A site audit was undertaken to quantify any existing road network issues and identify local infrastructure characteristics, in addition to establishing the level of accessibility to the site in terms of walking, cycling and public transport.
- **Traffic Counts**: Traffic counts were completed for the 'affected junctions' with the objective of establishing local traffic characteristics in the immediate area of the proposed residential development.
- **Trip Generation**: A trip generation exercise was carried out to establish the potential level of vehicle trips generated by the proposed residential development.
- **Trip Distribution**: Based on both existing and future (following development completion) network characteristics, a distribution exercise was undertaken to assign site generated vehicle trips across the local road network.
- **Network Analysis**: Further to quantifying the predicted impact of vehicle movements across the local road network and the proposed site accesses, traffic modelling is undertaken to assess the operational performance of the key junctions in the post-development years.

4.3 Receiving Environment

4.3.1 Site Location and Land Use

The proposed site is located at Ballincollig, situated approximately 1.5km southeast of the town centre. It is currently characterised as a greenfield site. This is currently zoned as ZO 01, 'Sustainable Residential Neighbourhoods' in the Cork City Development Plan 2022-2028 (See Figure 4.3) and forms part of the Maglin Urban Expansion Area. The subject site is bound to the east by Maglin Sustainable Access Corridor/N22, to the south by N22, to the west by Maglin Road and to the north by Link Road as shown in Figure 4.1. See Section 4.4.2 below for further details of the development access and road network.

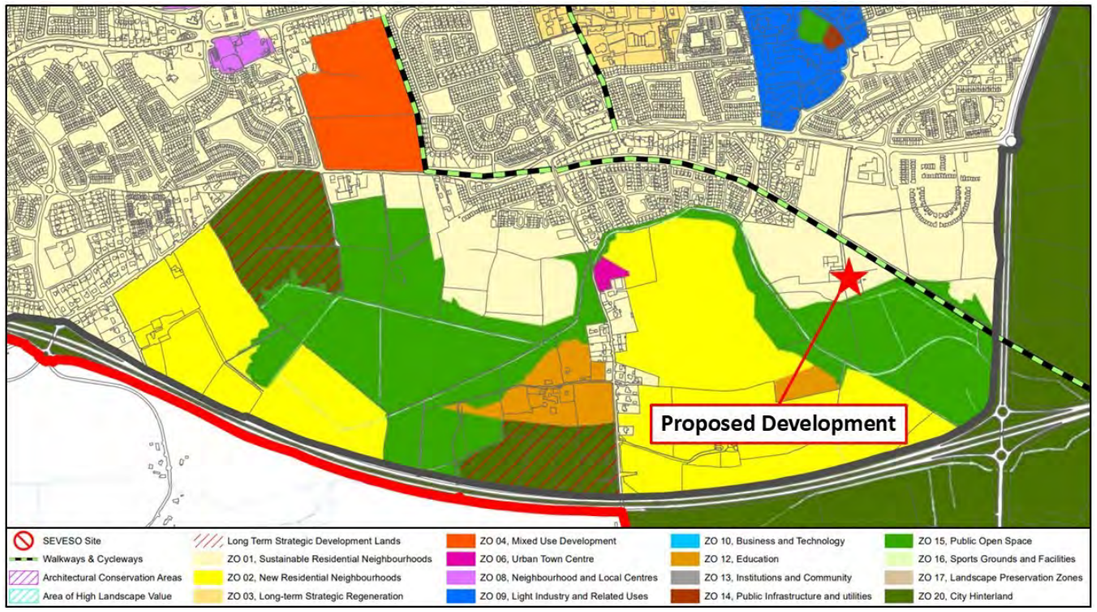


Figure 4.3 Ballincollig and Hinterland Zoning Map from Cork City Development Plan (Source: Map 16 from Cork City Development Plan 2022-2028, Annotation by EGIS)

4.3.2 Road Network

The local road network in the vicinity of the subject site is illustrated graphically in Figure 4.1. The nature of the area/road network towards the town centre is semi-urban, with roads comprising mainly of local residential streets. The streetscape changes from residential to commercial/retail closer to the town centre. To the south and west of the site, the landscape is more rural, bounded by the N22 and Maglin Road. Two accesses to the site will be gained directly on the extended Maglin Sustainable Access Corridor, which connects between the Link Road and the proposed development (refer to Figure 4.2). The details of development access arrangement can be referred to the Section 4.4.2.

Figure 4.1 illustrates the principal vehicular access routes surrounding the proposed development site. The routes can be categorised into national, regional and local access routes as listed below.

4.3.2.1 N22

This is a national route connecting Tralee, Co. Kerry to Cork City. Locally, it is a dual carriageway between the Poulavone Roundabout and the interchange on the western side of Ballincollig (known as the Ballincollig by-pass) (refer to Figure 4.4). The N22 then merges to a bi-directional single carriageway route westbound after this interchange and forms a bi-directional single carriageway eastbound, with some cycle facilities along the route, towards the city after the Poulavone Roundabout as shown in Figure 4.5. Additionally, a pedestrian footpath is present along north side of road.



Figure 4.4 N22 Dual Carriageway Section (Source: Google Maps)



Figure 4.5 N22 Single Carriageway Section (Source: Google Maps)

4.3.2.2 R608

The R608 is a bi-directional single carriageway regional route linking Ballincollig to Cork city centre as shown in Figure 4.6. It serves the Model Farm Road, Dennehy's Cross, Magazine Road and Barrack Street. Due to the length of the route and the different areas served, the carriageway varies in width over the length of the route. Some pedestrian and cycle facilities are provided along the route, particularly in Ballincollig town centre and in the vicinity of Cork Institute of Technology. The route generally has a speed limit of 50km/h due to the urban areas it services.



Figure 4.6 R608 (Source: Google Maps)

4.3.2.3 Killumney Link Road

It should be known that Castle Road and Sunningdale (refer to Figure 4.7) are jointly known locally as Killumney Link Road. This route runs east-west, parallel to Ballincollig Main Street (R608) and with some pedestrian footpaths. It ties in with the N22 at the 'Killumney Link East Roundabout' and at the Ballincollig west interchange. The route serves numerous residential developments. It is a bi-directional single carriageway road with some turning inbound flares at junctions and with a speed limit of 50km/h. There are numerous bus stops located along the route with good walking and cycling facilities.



Figure 4.7 Link Road (Source: Google Maps)

4.3.2.4 Maglin Sustainable Access Corridor

Maglin Sustainable Access Corridor is located to the east of the proposed development and it provides direct accesses to the proposed development. This road is orientated in a north/south direction passing the site and provides a connection between the site and Killumney Link Road. This road is a bi-directional single carriageway with a one-way cycle track and footpath along both sides of the road (refer to Figure 4.8). The speed limit on this road is 50km/h.



Figure 4.8 Maglin Sustainable Access Corridor (Source: Google Maps)

4.3.3 Existing Pedestrian and Cycling Facilities

4.3.3.1 Existing Pedestrian Facilities

The site is connected to the surrounding public footpath network via the footpaths on the existing Maglin Sustainable Access Corridor and Link Road. Generally, from the proposed site towards the town centre, the pedestrian facilities (i.e. crossing points) are good. Figure 4.9 illustrates the varied pedestrian facilities at the Link Road / Maglin Sustainable Access Corridor Junction.



Figure 4.9 Link Road / Maglin Sustainable Access Corridor Junction (Source: Google Maps)

4.3.3.2 Existing Cycling Facilities

The existing Maglin Sustainable Access Corridor contains a one-way cycle track along both sides of the road and this corridor will be further extended and provides a direct access between the Link Road and proposed development. Additionally, majority of Leo Murphy Link Road contains a one-way cycle lane along both sides of road. However, there are no existing dedicated cycle tracks/lanes from the Link Road/Maglin Sustainable Access Corridor Junction to the town centre in some area. Thus, cyclists are expected to share the carriageway with motorists along Killumney Link Road, Leo Murphy Link Road and Ballincollig Main Street (R608). It should be also noted that the accessibility to the proposed development will improve significantly after completion of the proposed and planned road upgrading works as mentioned in Section 4.3.5.4 to Section 4.3.5.7.

4.3.4 Existing Public Transport

The existing public transport facilities in the area surrounding the proposed development are detailed following.

4.3.4.1 Bus Services

There are two bus stops located on Ballincollig Main Street (R608) near the Leo Murphy Link Road, which are within 1.8 kilometres walking distance (approximately 22-minute walk to 9-minute cycle) from the proposed development (refer to Figure 4.10). Figure 4.10 also presents the potential walking routes between the proposed development and bus stops on R608. Bus Eireann provides three services linking Ballincollig to Cork City and the surrounding areas daily. The bus routes servicing the area are listed in Table 4.1.

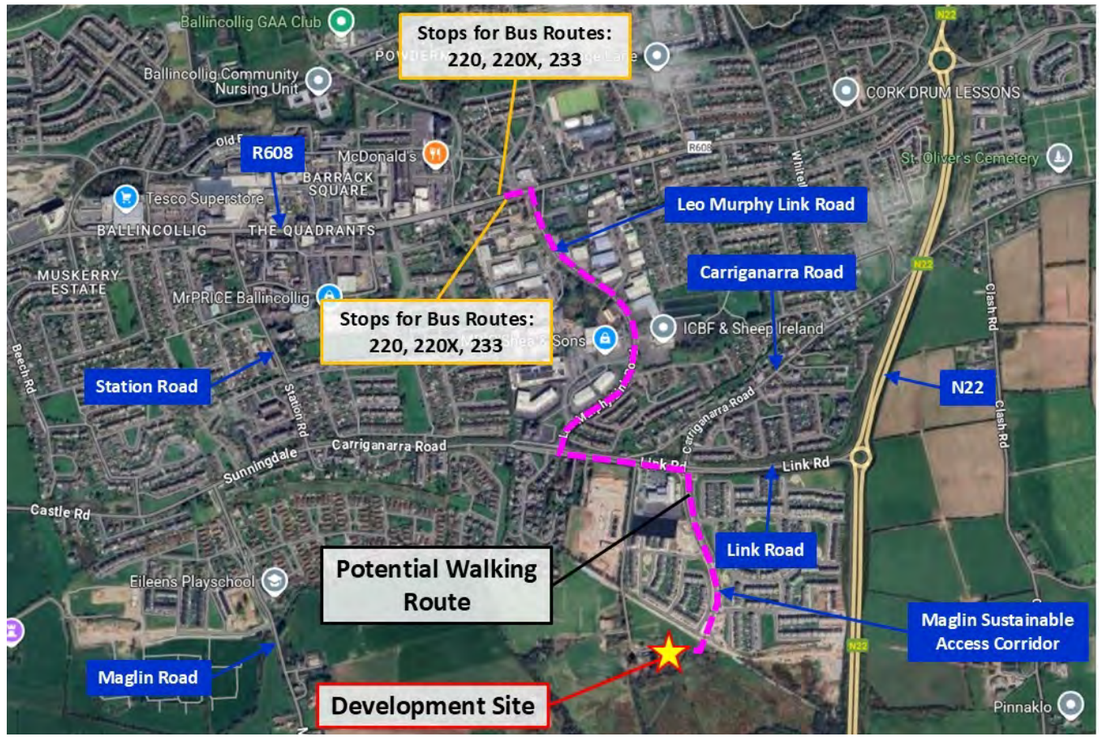


Figure 4.10 Bus Stop Locations and Potential Walking Routes (Source: Google Maps, Annotation by EGIS)

Route No.	Route Direction	Frequency of Services			Bus Stops
		Mon – Fri	Sat	Sun	
220	Ovens to Crosshaven via Carrigaline	78 services (05:30 – 04:30)	73 services (05:30 – 04:30)	70 services (05:30 – 04:30)	Stop 244301 on R608 near Leo Murphy Link Road
	Crosshaven to Ovens via Carrigaline	79 services (05:25 – 04:30)	74 services (05:25 – 04:30)	71 services (05:30 – 04:30)	Stop 244201 on R608 near Leo Murphy Link Road
220X	Ovens to Crosshaven via South Mall	14 services (07:00 – 19:20)	13 services (07:10 – 19:20)	No service	Stop 244301 on R608 near Leo Murphy Link Road
	Crosshaven to Ovens via Grand Parade	13 services (06:30 – 17:55)	12 services (07:35 – 17:45)	No service	Stop 244201 on R608 near Leo Murphy Link Road
233	Cork – Macroom	9 services (07:25 – 22:30)	No service	No service	Stop 244201 on R608 near Leo Murphy Link Road
	Macroom – Cork	10 services (06:15 – 18:45)	No service	No service	Stop 244301 on R608 near Leo Murphy Link Road

Note: 1) The bus time can be referenced here: https://www.buseireann.ie/routes-and-timetables.

Table 4.1 Bus Routes Serving the Area

4.3.4.2 Car Clubs and Car Sharing

Car clubs or car sharing (i.e. “Yuko” and “GoCar”) is a model of car rental where people rent cars for short periods of time, often by the hour. It differs from traditional car rental in that as noted above rental periods are shorter, the owners of the cars are sometimes private individuals themselves, and the carsharing facilitator is generally distinct from the car owners. Carsharing is part of a larger trend of shared mobility. Benefits include cost saving, convenience (no responsibility for insurance, tax, fuel, maintenance), less traffic congestion and less parking pressure. At the time of writing, one GoCar (GoBase) is available at the Tesco Ballincollig (refer to Figure 4.11) which is approximately 2.2 kilometres walking distance (approximately 26-minute walk and 11-minute cycle) from the proposed development.

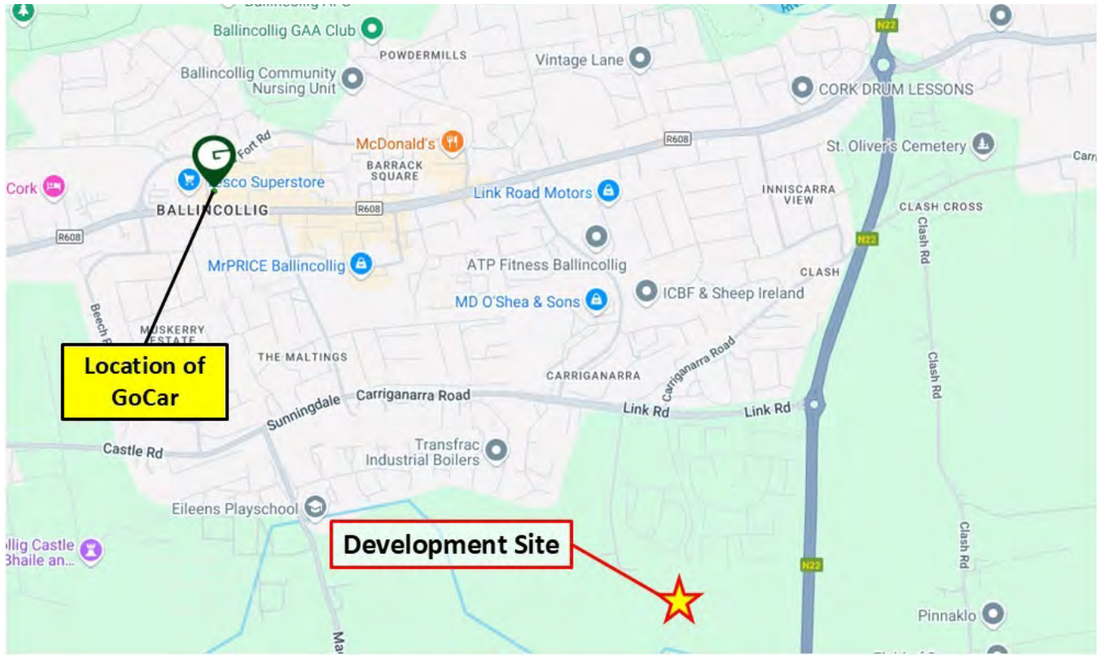


Figure 4.11 Location of GoCar (Source: https://www.gocar.ie/locations, Annotation by EGIS)

4.3.4.3 Taxi Services

Taxi is also a common form of transport in Ireland. Currently, passengers can order / book taxi services in advance via online / phone / apps (i.e. Free Now, Lynk, Taxy, etc.). By using these software, the passengers can order their nearest taxi so as to reduce the waiting time.

4.3.5 Emerging Transport Developments

4.3.5.1 Introduction

To accommodate the target population growth in Ballincollig and the wider Cork City area, the Maglin Valley has been designated an urban expansion area, including provision for a new residential neighbourhood. As outlined in the Cork City Development Plan 2022-2028, future housing and population growth in Ballincollig will be concentrated in the Maglin Area to the south of the town.

Future transport and connectivity in Ballincollig will be guided by the Cork Metropolitan Area Transport Study (CMATS). The National Transport Authority (NTA) published CMATS in 2020. The proposals for Ballincollig include a new light rail service, high frequency and local feeder bus services and enhanced walking and cycling infrastructure.

4.3.5.2 Vehicular Infrastructure

The roads infrastructure and parking facilities in Ballincollig are good with good access to the National Road network. The town also has a relatively good internal road network however as the town grows it is important that other roads are improved to keep pace with the additional traffic volumes particularly from new development areas to the south. Ballincollig will form the western terminus of the proposed N40 Cork Northern Relief Road and the preferred route corridor will be protected from inappropriate development once the route has been finalised.

Ballincollig area is linked on the design of a distributor road (i.e. Maglin Sustainable Access Corridor). Some of this road has been built from the north through the Heathfield development (to the east). The route cross section incorporates active travel and would tie into the proposed development access road in the future. The proposed development allows for the construction of an additional 380m of this distributor road.

It is necessary to acknowledge the proposed infrastructural upgrades as part of the Cork City Development Plan 2022-2028, as such to identify the proposed flows at the existing junctions taking account of the future link roads and Maglin by-pass. After completion of those elements of vehicular infrastructure, it is anticipated that traffic along Killumney Road (i.e. Castle Road, Sunningdale, Link Road, etc.) will reduce.

4.3.5.3 Proposed Public Transport

a) BusConnects

Prior to the publishing of the Cork City Development Plan 2022-2028, CMATS outlined details for both BusConnects and Light Rail in the Ballincollig area. The Cork City Development Plan 2022-2028 makes reference to a proposed BusConnects' Route 6 (see Figure 4.12) connects West of Ballincollig to City Centre via Mardyke. The route of such a system is yet to be determined and will require a detailed feasibility study, however, tying in with the key principles outlined in Section 4.3.5.1, a quality bus corridor could be provided on Killumney Link Road.

The current Bus Route 220 route (referred to Section 4.3.4.1) is earmarked for further improvement as Sustainable Transport Corridor E in the National Transport Authority's Draft BusConnects Plan, with frequency of service rising to every 10 minutes. Furthermore, Bus Route 233 which currently serves Main Street, Ballincollig providing connectivity to Killumney, Ovens, Macroom, Farran and Coachford, is to be re-routed along the Killumney Road (Castle Road, Sunningdale, Link Road) just to the north of the site with an increased service of every 30 minutes. Refer to Figure 4.13.

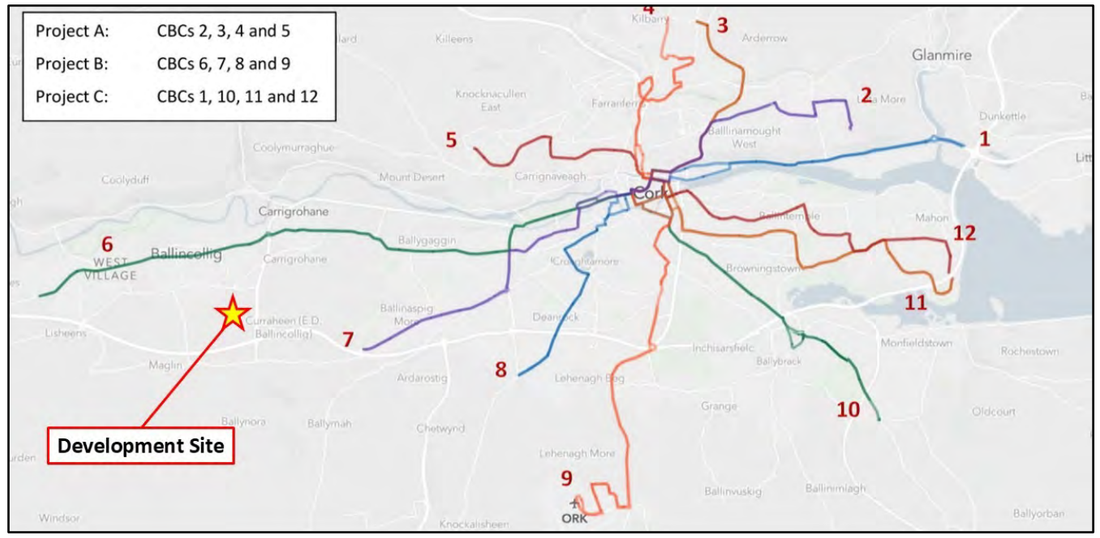


Figure 4.12 Core Bus Network Plan and Routes (Source: Figure 4.4 of Cork City Development Plan 2022-2028, Annotation by EGIS)

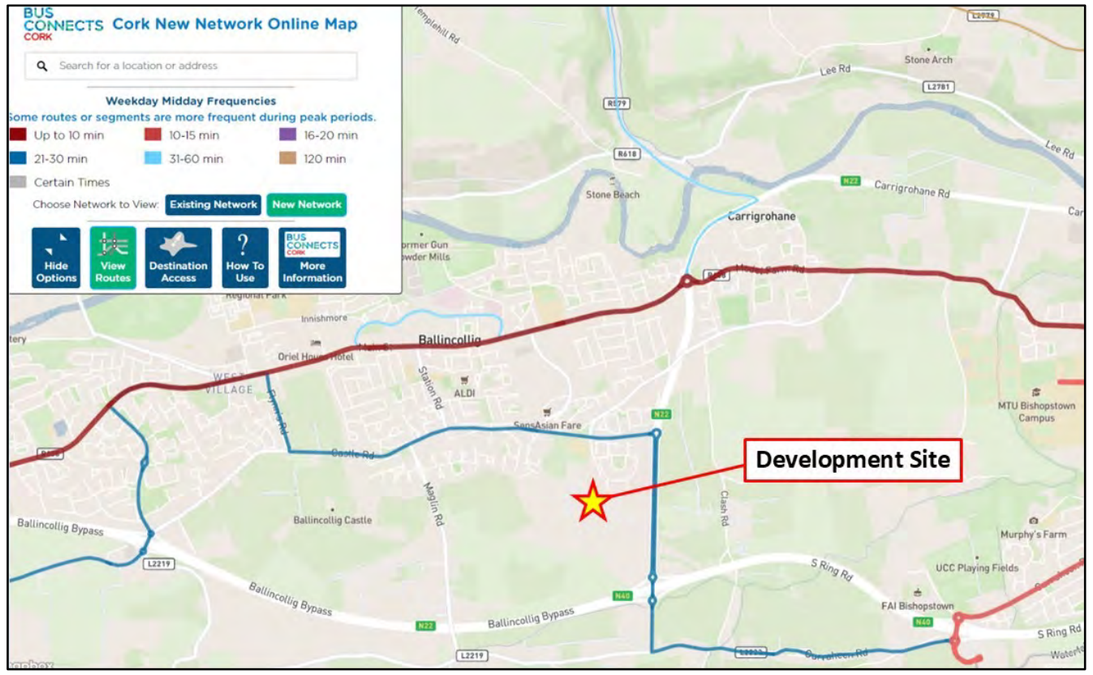


Figure 4.13 BusConnects Network Online Map – Bus Route and Service Frequency Improvements (Source: https://corknewnetwork.s3.amazonaws.com/index.html, Annotation by EGIS)

According to the new design for the Cork Metropolitan Bus Network in June 2022 launched by NTA, the new network, part of BusConnects Cork, is intended to transform the public transport network across the Cork Metropolitan Area by involving the creation of new bus routes and improving bus frequencies to help transform the public transport network to meet anticipated growth and future demand in the region. As part of the BusConnects Scheme, it is proposed to introduce two new bus routes in close proximity to the proposed development. Figure 4.14 taken from the latest BusConnects proposal, illustrates these new routes in the vicinity of the proposed development. It is proposed to introduce bus route 1, which operates between Ovens/ Dell EMC and Mahon Point, and will pass via R608. Additionally, it is proposed to introduce bus route 2B, which operates between Grange Manor and Ashmount, and will pass via Greenfields, Coolroe Meadows, R608, Flynn's Road, Link Road and N22.

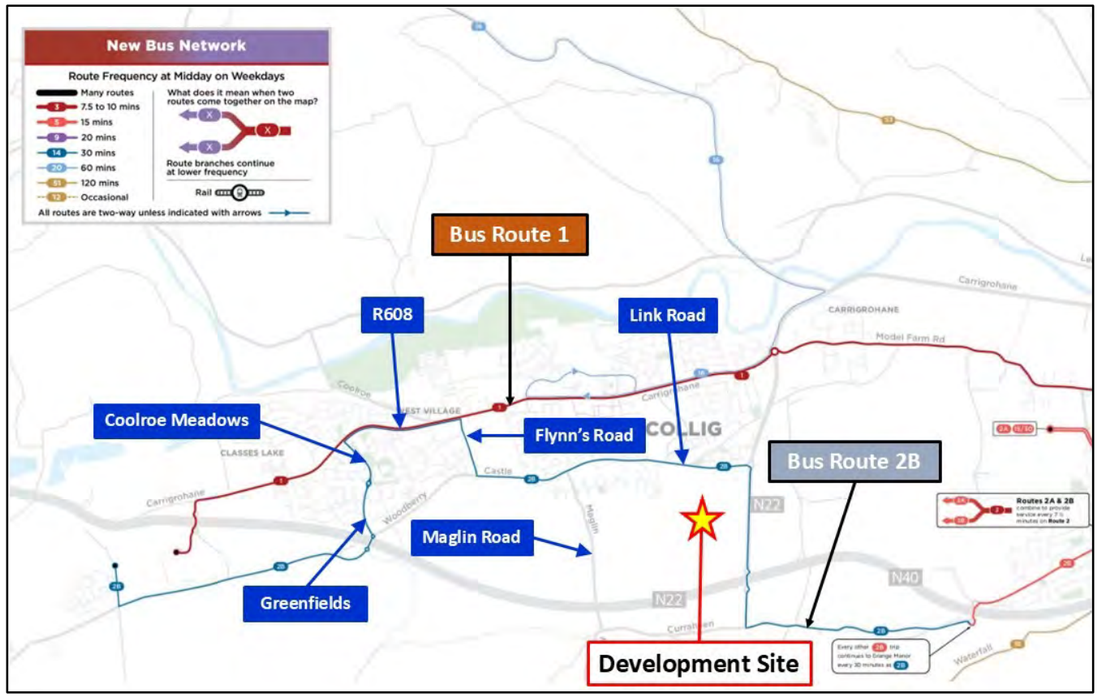


Figure 4.14 Proposed Bus Connects Routes in the vicinity of the Proposed Development (Source: Network Map – Cork Outer West from the New Bus Network Report, Annotation by EGIS)

b) Light Rail Transit / Luas Cork

The Cork City Development Plan (2022-2028) also makes specific references to a proposed Light Rail Transit (LRT) to connect Ballincollig to Mahon via Cork City Centre. Although the route outlined in CMATS, which indicatively identifies Killumney Road as the route for light rail, consultants have been appointed to determine a more specific route. It nonetheless highlights that the location for this proposed development is close to proposed public transport infrastructure and associated public transport nodes. CMATS also indicates a proposed Light Rail stop near the Junction 2 – Carriganarra Road / Link Road / Maglin Sustainable Access Corridor. (See Figure 4.15).

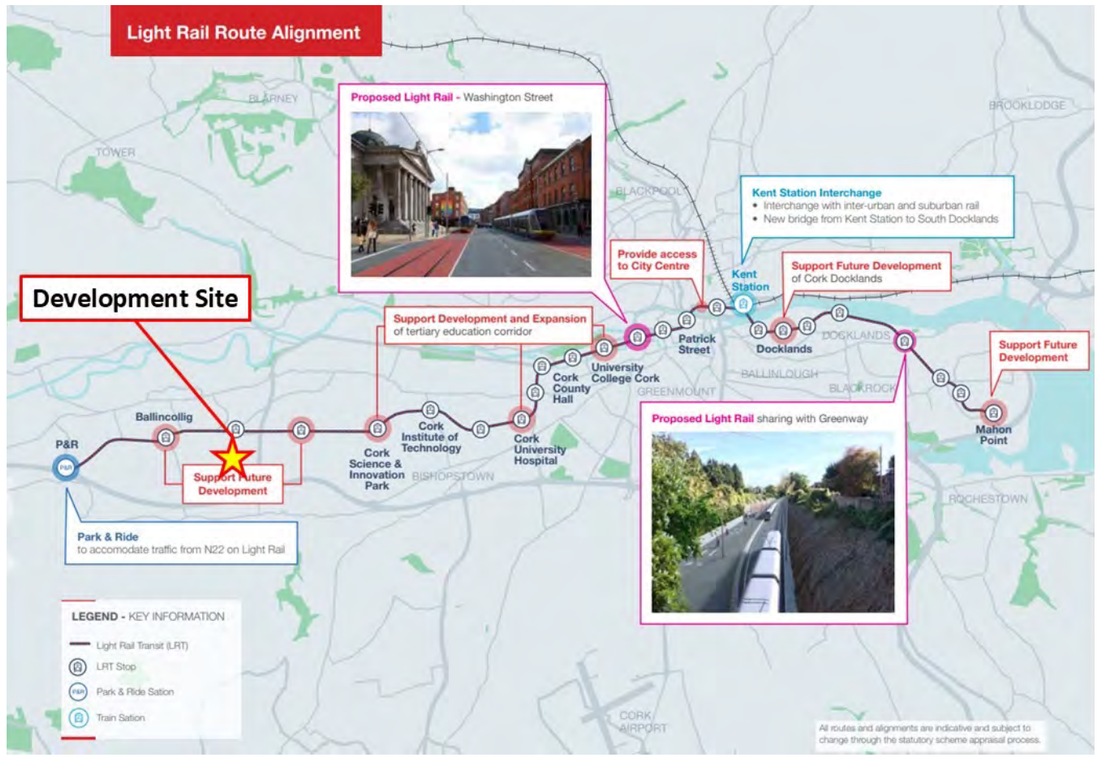


Figure 4.15 Proposed Light Rail Route and Stops (Source: Figure 4.7 of Cork City Development Plan 2022-2028, Annotation by EGIS)

To increase the viability of the light rail system, it is necessary to develop lands along the route corridor. This has recently been outlined by the National Transport Authority (NTA) to Cork City Council. The proposed development is ideally situated to promote the need for light rail in Cork. This type of development, close to existing and proposed future sustainable transport links, will assist in creating the modal shift required from private vehicle to public transport, walking and cycling.

Given that Light Rail is a medium-long term objective in CMATS, a BusConnects service along the same route could be a precursor to light rail.

After analysing a range of options, Transport Infrastructure Ireland (TII) published the Emerging Preferred Route for Luas Cork in April 2025 and an 8 week public consultation period was open until June 2025. The Emerging Preferred Route extends from the west of the city to the east – from Ballincollig to Mahon Point. The proposed Luas Cork Emerging Preferred Route (EPR) begins in Ballincollig and a single-track loop through Ballincollig connects Leo Murphy Road to Station Road to Main Street and back to Leo Murphy Road, at which point the arrangement changes to a more typical double-track configuration and continues eastwards towards the city centre.

The location of the site in the context of the BusConnects corridor and Emerging Preferred Route for Luas Cork is illustrated on Figure 4.16 prepared by HW Planning.

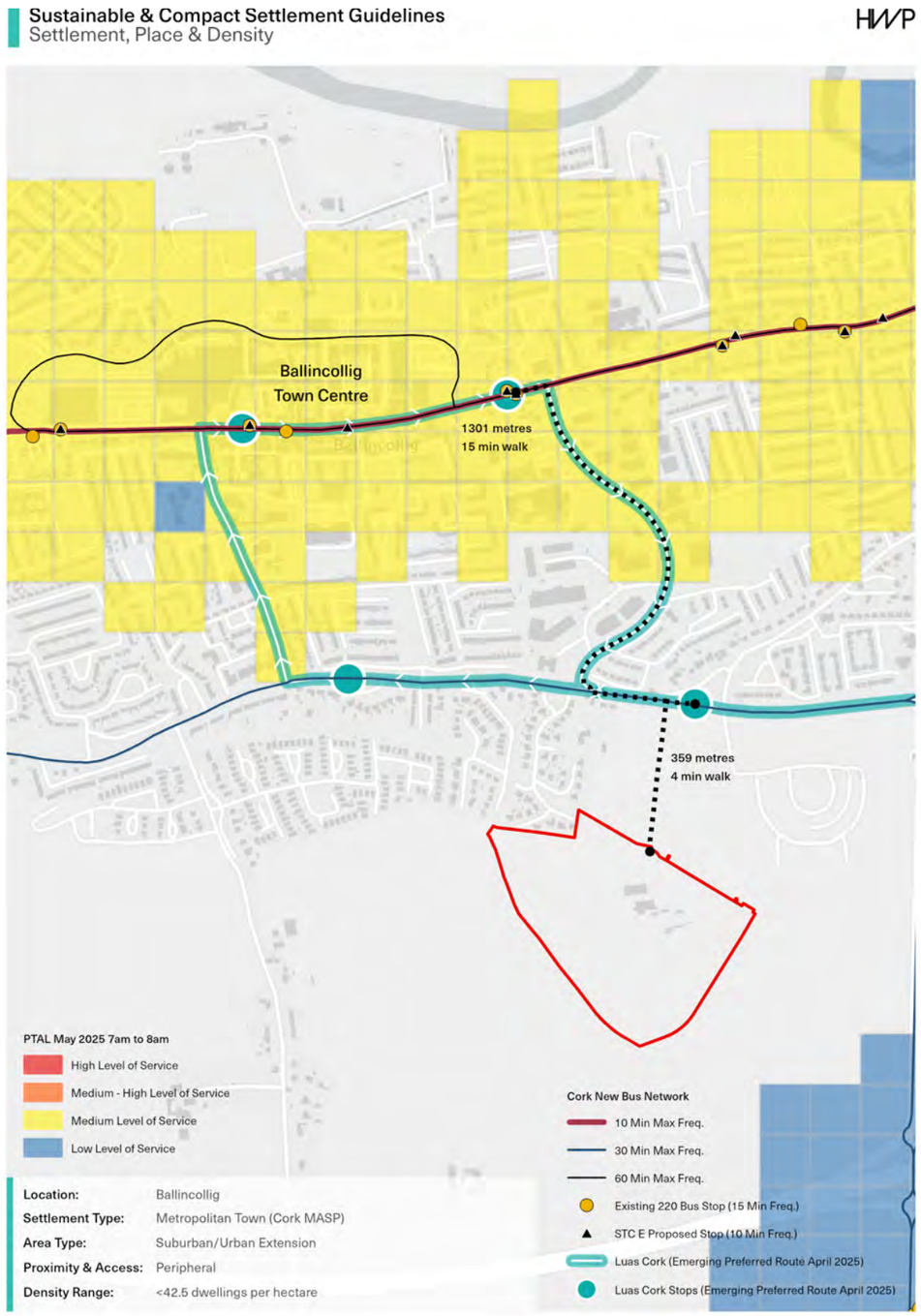


Figure 4.16 BusConnects Corridor and Emerging Preferred Route for Luas Cork

4.3.5.4 Proposed Cycle Network

The Cycling Network Plan for the Cork City Metropolitan Area and surrounding towns was finalised and published in 2020. CMATS takes cognisance of the 2017 cycle network plan and for the Ballincollig area, the plan envisages a network of primary, secondary and greenway cycle routes. The cycling proposals for the site environs are illustrated in Figure 4.17.

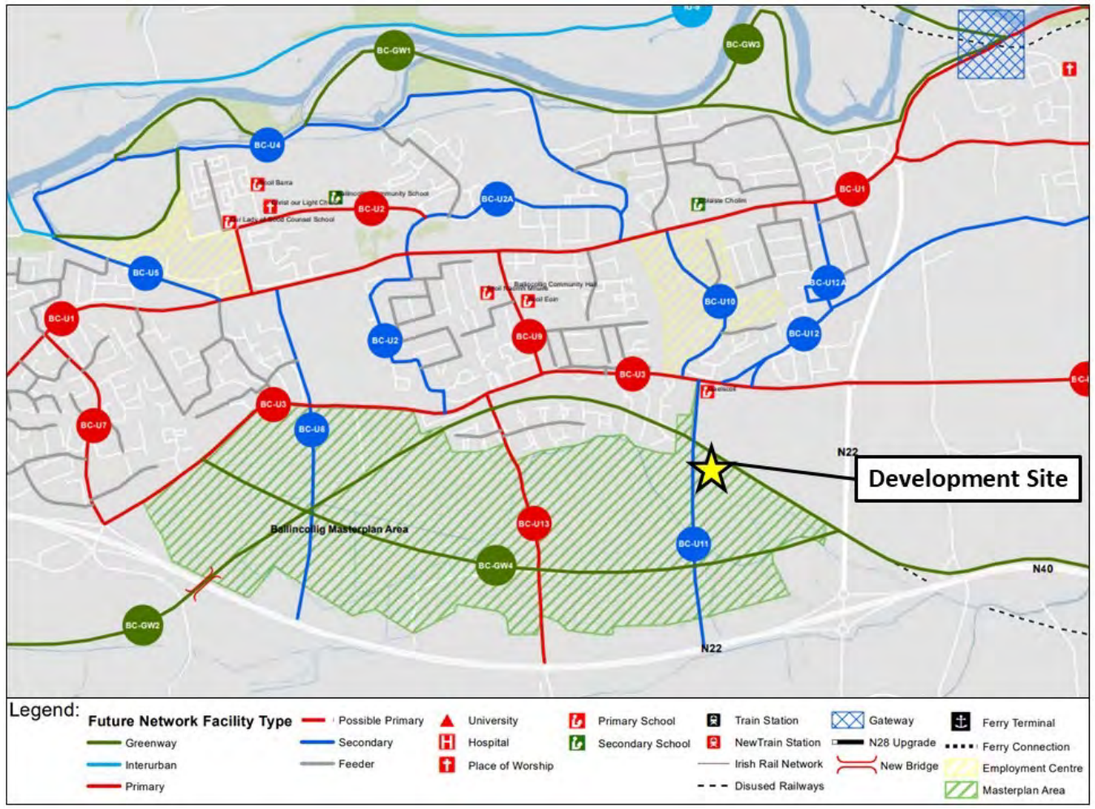


Figure 4.17 Cycling Proposal for the Site Environs (Source: Ballincollig Area from Cork Cycle Network Plan, Annotation by EGIS)

As outlined in the Plan, primary cycle corridors (shown in red) are proposed along Killumney Road (i.e. Greenfields Road, Castle Road, Sunningdale, Link Road) (BC-U3), Station Road (BC-U9), the Main Street-R608 (BC-U1) and Maglin Road (BC-U13). Although dedicated cycle facilities partially exist on Killumney Road and the R608, improvements to both are proposed. The primary routes inter link with the secondary routes (outlined in blue) along Carriganarra Road (BC-U12), Leo Murphy Link Road (BC-U10) and a road between Link Road and N22 (BC-U11) which provide a collector function from surrounding residential areas, schools and employment centres. The proposed pedestrian/cycle infrastructure under construction as part of Heathfield Phase 4 will be the commencement of the BC-U11 route which will continue into the proposed development and provides direct access from the proposed development to Killumney Road.

Two proposed greenway routes are envisaged in close proximity to the proposed site - one proposed route (BC-GW4) comprises a two-way cycle track along the proposed Western and Eastern Link roads to the south of the proposed site. The other proposed route will travel close to the north of the site (BC-GW2) along the abandoned rail line linking the area directly to the Curraheen Science Park. Approximate 570 metres of the proposed greenway (BC-GW2) located to the north of the site will be constructed as part of the proposed development.

Cork City Council have included the BC-GW2 (part of) Greenway and BC-U9 Primary Cycle Route in the Cork City Development Plan 2022-2028 as shown in Figure 4.18.

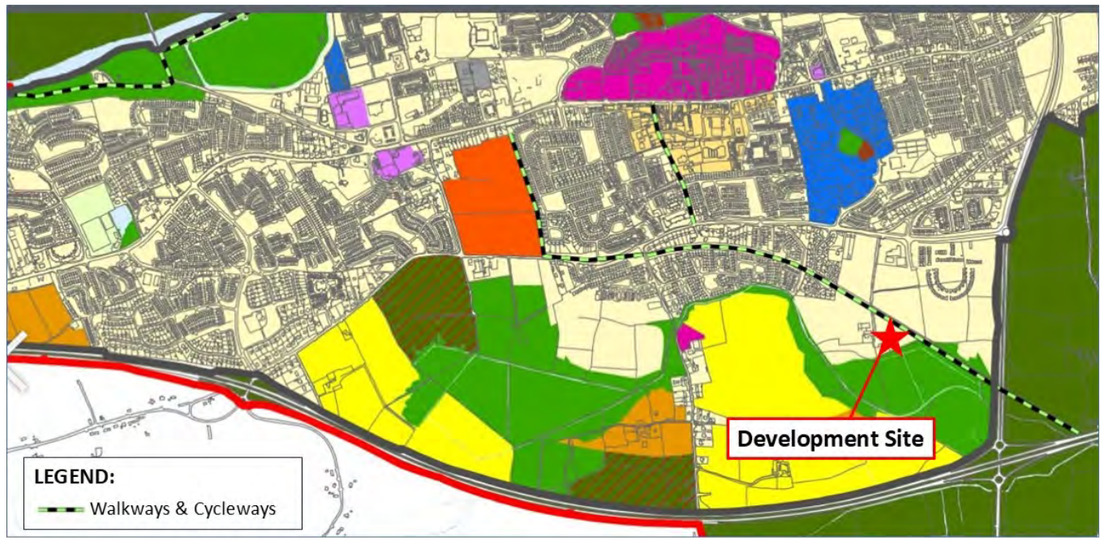


Figure 4.18 Cycling Proposal in Cork City Development Plan 2022-2028

4.3.5.5 nfrastructure Proposed by Stonecrest Phase 1 Development at Maglin Road

As part of the permitted Stonecrest Phase 1 development, a footpath/cycle track is proposed to be constructed on both sides of Maglin Road as far as the junction with Castle Road/Sunningdale (Killumney Link Road). This improves connectivity on both sides of the carriageway and connect with the existing footpath at the junction. It is also proposed to include a crossing on Sunningdale to provide a safe crossing point for pedestrians and cyclists from the existing estates and Stonecrest developments. The road upgrade works on the Maglin Road under Stonecrest Phase 1 development (refer to Appendix 4A) was completed.

4.3.5.6 Infrastructure Proposed by Heathfield Phase 4

Heathfield Phase 4 which is a 98 no . residential unit development currently under construction to the north of the proposed development makes provision for the upgrade of an existing laneway to a 4 metres wide Pedestrian/Cycle path and which will provide direct pedestrian and cycling connectivity from Killumney Road to the proposed development.

4.3.5.7 Proposed Infrastructure with Proposed Residential Development

The Applicant propose to carry out the following works as part of the proposed development:

- Construction/Extension of approximately 380 metres Maglin Sustainable Access Corridor (with one-way cycle track and pedestrian footpath on both sides of the road) connecting between the proposed development and Link Road;
- Construction of two new priority junctions providing direct pedestrian and vehicular access to/from the extended Maglin Sustainable Access Corridor; and
- Construction of a greenway and shared space for pedestrians/cyclists within the proposed development.

It should be also noted that the proposed greenway on the north side of proposed development is part of the proposed greenway route (BC-GW2) as mentioned in Section 4.3.5.4. The proposed road works is illustrated in Appendix 4B.

4.4 Characteristics of the Proposed Development

4.4.1 Schedule of Accommodation

The proposed residential development includes 300 units. The 300 residential units are a mix of semi-detached dwellings, townhouses, duplex apartment units and apartment (block) units. Table 4.2 for a breakdown of these units. Appendix 4B contains a drawing showing the proposed site layout.

No. of Bedrooms per Unit	House	Duplex Apartment	Apartment (Block)	Total
1-bed	-	32	13	**45**
2-bed	2	19	90	**111**
3-bed	84	18	-	**102**
4-bed	42	-	-	**42**
Total	**128**	**69**	**103**	**300**

Table 4.2 Breakdown of Proposed Development of Residential Units

It should be also noted that the proposed development also includes a creche with a capacity of 100 no. children.

4.4.2 Access Arrangements

As part of the proposed development, the existing Maglin Sustainable Access Corridor (with a one-way cycle track and pedestrian footpath on both sides of the road) as shown in Figure 4.19 will be extended of approximately 380 metres to the east of site. The proposed development will be served by two new priority-controlled junctions providing direct pedestrian and vehicular access to/from the aforementioned road as shown in Figure 4.19. According to the Design Manual for Urban Roads and Street, a forward visibility on bus routes of 49 metres shall be provided for a 50km/h speed limit. After checking, adequate sightlines (at least 49 metres) are available commensurate to the 50km/h speed limit on the Maglin Sustainable Access Corridor.

With reference to the Figure 4.19, it should be noted that a proposed greenway running in a west/east direction will be provided at the north side of the site to facilitate the pedestrian/cyclist movements. The proposed greenway will provide a connection amongst the extended Maglin Sustainable Access Corridor, a future connection to other zoned lands within the Maglin Urban Expansion Area located to the west of the site and the proposed development. Four additional accesses, inclusive two pedestrian access and two pedestrian/cyclist accesses, will also provide a connection between the proposed greenway and the adjacent developments located to the north of the site and provide direct access pedestrian and cycle access to Killumney Road. Moreover, one future cycle/pedestrian connection located to the southwest of the site will be reserved for future connection to other developments.

It is also proposed to include two crossings on the extended Maglin Sustainable Access Corridor to provide safe crossing points for pedestrians and cyclists.

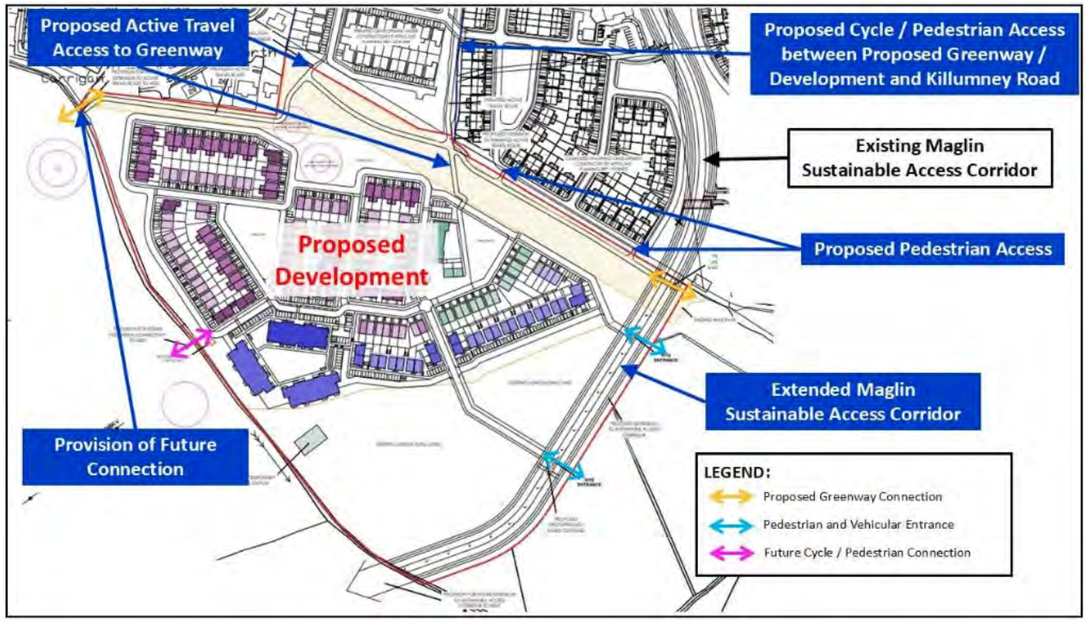


Figure 4.19 Access Arrangements for the Proposed Development

4.4.3 Proposed Internal Site Access Roads

All main pedestrian crossing points will be raised by either a table-top junction or by a flat-top ramp. Tight corner radii and chicanes have been introduced with only short straight sections of access road proposed in order to introduce traffic calming by design within the development. Corner radii have been reduced to a minimum in accordance with DMURS. A strong sense of enclosure is also provided by minimal distances between building blocks, road-side trees and road-side parking.

4.4.4 Parking Provision

4.4.4.1 Proposed Car Parking

As the site is located at urban towns of Ballincollig (excluding the Town Centre), it will be classified as Zone 3 in accordance with the Table 4.6 of Cork City Development Plan 2022-2028. With reference to Table 11.13 of the Cork City Development Plan 2022-2028, a summary of the car parking required is presented in Table 4.3.

Proposed Development	Cork City Development Plan 2022-2028		Factor	Max. Car Parking Required	Proposed Car Parking
	Land Use Category	Max. Car Parking Required			
For Residential Development					
2 bedrooms House	Residential (1-2 bedrooms)	1.25 space per unit	2 units	2	-
3-4 bedrooms House	Residential (3 or above bedrooms)	2.25 space per unit	126 units	283	-
Sub-total Car Parking Spaces for Houses:				**285**	**252**
1-2 bedrooms Duplex Apartment Unit	Residential (1-2 bedrooms)	1.25 space per unit	51 units	63	-
3 bedrooms Duplex Apartment Unit	Residential (3 or above bedrooms)	2.25 space per unit	18 units	40	-
Sub-total Car Parking Spaces for Duplex Apartment Unit:				**103**	**69**
1-2 bedrooms Apartment (Block) Unit	Residential (1-2 bedrooms)	1.25 space per unit	103 units	128	-
Sub-total Car Parking Spaces for Apartment (Block) Unit:				**128**	**103**
Visitors	-	-	-	-	9
Total Car Parking Spaces for the Proposed Residential Development:				**516**	**433**
For Non-Residential Development					
Creche	Creches	1 space per 6 pupils	100 pupils	17	-
Total Car Parking Spaces for the Proposed Non-Residential Development:				**17**	**10**

Note: 1) No motorcycle parking space is required for houses as stated in the Cork City Development Plan 2022-2028.

Table 4.3 Car Parking Compliance

For residential development, it is proposed to provide 433 car parking spaces, of which 252 car parking spaces for houses, 69 car parking spaces for duplex apartment units, 103 car parking spaces for apartment (block) units and 9 car parking spaces for visitors. This is less than the maximum car parking spaces (i.e. 516 car parking spaces) for residential development as required in the Cork City Development Plan 2022-2028 and as shown in Table 4.3. Included in the 103 car parking spaces provided for residential units (i.e. apartment (block) units) with not in-curtilage parking, 5 accessible parking spaces will be provided in order to meet the requirements of Cork City Development Plan 2022-2028 (i.e. 5% of car parking spaces provided should be set aside for disabled car parking).

For non-residential development, it is proposed to provide 10 car parking spaces for the proposed creche. This is also less than the maximum car parking spaces (i.e. 17 car parking spaces) for creche as required in the Cork City Development Plan 2022-2028 and as shown in Table 4.3. Included in the 10 car parking spaces provided for the proposed creche, one accessible parking space will be provided in order to meet the requirements of Cork City Development Plan 2022-2028 (i.e. 5% of car parking spaces provided should be set aside for disabled car parking).

Additionally, it is proposed to provide 12 motorcycle parking spaces for the residential units (i.e. apartment (block) units) with not in-curtilage parking and 2 motorcycle parking spaces for the proposed creche, as required in the Cork City Development Plan 2022-2028 (i.e. one motorcycle parking bay per 10 car parking spaces provided).

4.4.4.2 Electric Vehicle (EV) Charging

Provision of appropriate infrastructure (i.e. ducting) will be made for the fitting of car charging points to all proposed car parking spaces for all residential units (including houses, duplex apartment units and apartment (block) units) to facilitate non-disruptive retro fitting of EV charging points. Additionally, the Developer will provide 20 parking spaces with functioning EV charging points from completion of the residential units (i.e. apartment (block) units) with not in-curtilage parking, which can meet the recommended EV charging points as required in the Section 11.245 of Cork City Development Plan 2022-2028 (i.e. a minimum of one EV equipped parking spaces per five car parking for multi-unit residential development).

From completion of the non-residential development, the Developer will provide 4 car parking spaces with functioning EV charging point for the proposed creche.

4.4.4.3 Proposed Bicycle Parking

According to Table 11.14 in the Cork City Development Plan 2022-2028, a summary of the bicycle parking required is presented in Table 4.4.

Proposed Development	Cork City Development Plan 2022-2028		Factor	Min. Bicycle Parking Required	Proposed Bicycle Parking
	Land Use	Min. Bicycle Parking Required			
For Residential Development					
Houses*	-	-	128 units	-	-
Duplex Apartment / Apartment (Block) Unit	Standard Apartments	0.5 per unit	172 units	86	227
Visitor	-	-	-	-	60
Total Bicycle Parking Spaces for the Proposed Residential Development:				86	287
For Non-Residential Development					
Creche	Creches	1 space per 25 pupils	100 pupils	4	10
Visitor	-	-	-	-	12
Total Bicycle Parking Spaces for the Proposed Non-Residential Development:				4	22

Note: * No bicycle parking space is required for houses as stated in the Cork City Development Plan 2022-2028.

Table 4.4 Bicycle Parking Compliance

For the residential development, it is proposed to provide 287 bicycle parking spaces, of which 227 bicycle parking spaces for the duplex apartment / apartment (block) units and 60 bicycle parking spaces for visitors. This exceeds the minimum bicycle parking requirement of 86 bicycle parking spaces as required in the Cork City Development Plan 2022-2028 and as shown in Table 4.4. Additionally, it is assumed that bicycle parking for houses will be accommodated in each rear garden space.

For the non-residential development, it is proposed to provide 22 bicycle parking spaces, inclusive of 12 bicycle parking spaces for visitor, for the proposed creche. This exceeds the minimum bicycle parking requirements of 4 bicycle parking spaces for the proposed creche as required in the Cork City Development Plan 2022-2028 and as shown in Table 4.4.

4.5 Potential Impacts

4.5.1 Construction Phase for the Proposed Development

4.5.1.1 Trip Generation – Construction Phase

The construction phase of the development is expected to generate lower vehicle movements than the operational phase. However, a greater number of Heavy Goods Vehicles (HGVs) are expected during the construction phase. The Applicants have extensive experience of construction in this area and construction will be carried out in accordance with the Construction and Environmental Management Plan (CEMP) developed for the site (Appendix 2-1).

The proposed residential development will initially involve some earthworks, the site is relatively level thus there will be limited cut and fill balance required. All parking associated with site works will be provided within the curtilage of the site as outlined in the CEMP.

To reach the operational phase of the new development, the following works will be required to be carried out:

- Provision of a temporary construction access, a safe and secure site compound and the erection of temporary boundary fencing;
- Trenching for underground services including foul sewer, surface water drains, water mains, gas, telecommunications, electricity and lighting;
- Connection of underground services to existing underground services where available;
- Construction of houses throughout the site;
- Construction of the access roads, footpaths, and paved areas in the car parking areas; and
- Erection of permanent boundary fencing, landscaping, signage, and lighting.

Each of the activities outlined above will generate a level of vehicle movement to and from the site as well as internally within the subject site. The developer will concentrate on sections of the site at a time to limit HGV movements on the road network.

The typical plant used on site, including but not limit to, will be as follows:

- Excavator (with a rock breaker if required);
- JCB site master;
- (40T) dumper trucks;
- (<6T) dumper trucks;
- 20T roller;
- Small roller or/and heavy compaction plate;
- Road Sprayer/Scraper/Sweeper;
- Cement Mixer; and
- Water Pump.

The start and finishing times are based on the winter period as this is more concentrated than during the summer period, between 8.00a.m. and 6.00p.m., five days per week, with some working on Saturday mornings, subject to any conditions set down by the Local Authority. It is expected that most workers will be on-site prior to the AM peak hour of 08:00-09:00. On average we would expect approximately 100 staff on site, this will vary over the life of the construction phase.

The construction workers are expected to arrive to the site mainly by private vehicle or there may be opportunities to car share. The level of traffic generation is expected to be less than the operational phase. Therefore, the analysis in the following sections focuses on the operational phase.

4.5.1.2 Traffic Impact During the Construction Phase

Normal working hours will typically be between 7.30 am to 6.00 pm, Monday to Friday, 7.30 am to 12.00 noon on Saturdays and 8.00 am to 12.00 noon periodically and if required on Sundays and Bank Holidays, subject to any conditions set down by the Local Authority. It is expected that most workers will be on-site prior to the AM peak hour of 08:00-09:00. It should be also noted that generally, construction traffic generated during the construction phase tends to be outside of AM and PM peak hours. Therefore, it is considered that construction traffic generated during the construction phase would not cause a significant traffic impacts on the surrounding roads. There is a school located at the Carriganarra Road / Link Road / Maglin Sustainable Access Corridor thus construction would avoid busy school drop off (08:30-09:00) and pick up times (15:00). A Construction Traffic Management Plan prepared by DOSA Consulting Engineers is included within Appendix 2-2 of this EIAR.

4.5.2 Operational Phase for the Proposed Development

4.5.2.1 Traffic Survey

To determine current traffic behaviour in the vicinity of the subject site, a vehicle turning movement survey for the following three junctions (location can be referred to Figure 4.2) was carried out on Tuesday, 16th April 2024. These junctions included:

- Junction 1 – Leo Murphy Link Road / Link Road / Limeworth;
- Junction 2 – Carriganarra Road / Link Road / Maglin Sustainable Access Corridor; and
- Junction 3 – Killumney Link East Roundabout.

A classified traffic count was undertaken on Tuesday, 16th April 2024. The count was carried out over 12-hour period from 07:00 hours to 19:00 hours, and included both the morning and evening peak periods. The date was chosen while schools were open to ensure that realistic and valid volumes of traffic were included. The count was designed to identify the critical peak hour periods of traffic flow through the adjacent junctions. Data was collected in 15-minute intervals and the following count classifications were employed.

- Pedal Cycles (P/C);
- Motorcycles (M/C);
- Cars;
- Light Goods Vehicles (LGV);
- Oversize Goods Vehicles 1 (OGV 1);
- Oversize Goods Vehicles 2 (OGV 2);
- Public Service Vehicles (PSV); and
- Caravan.

The morning peak hour was identified as 08:00-09:00 for Junction 1 to Junction 3. The evening peak hour was identified as 16:00-17:00 at Junction 1 and Junction 3, and 17:00-18:00 at Junction 2.

A summary of the 2024 vehicle turning movement surveys for Junction 1 to Junction 3 in the morning and evening peak hours is shown in Figure 4.20 and Figure 4.21.

A full transcription of the turning movement survey for Junction 1 to Junction 3 is included in Appendix 4C herein.

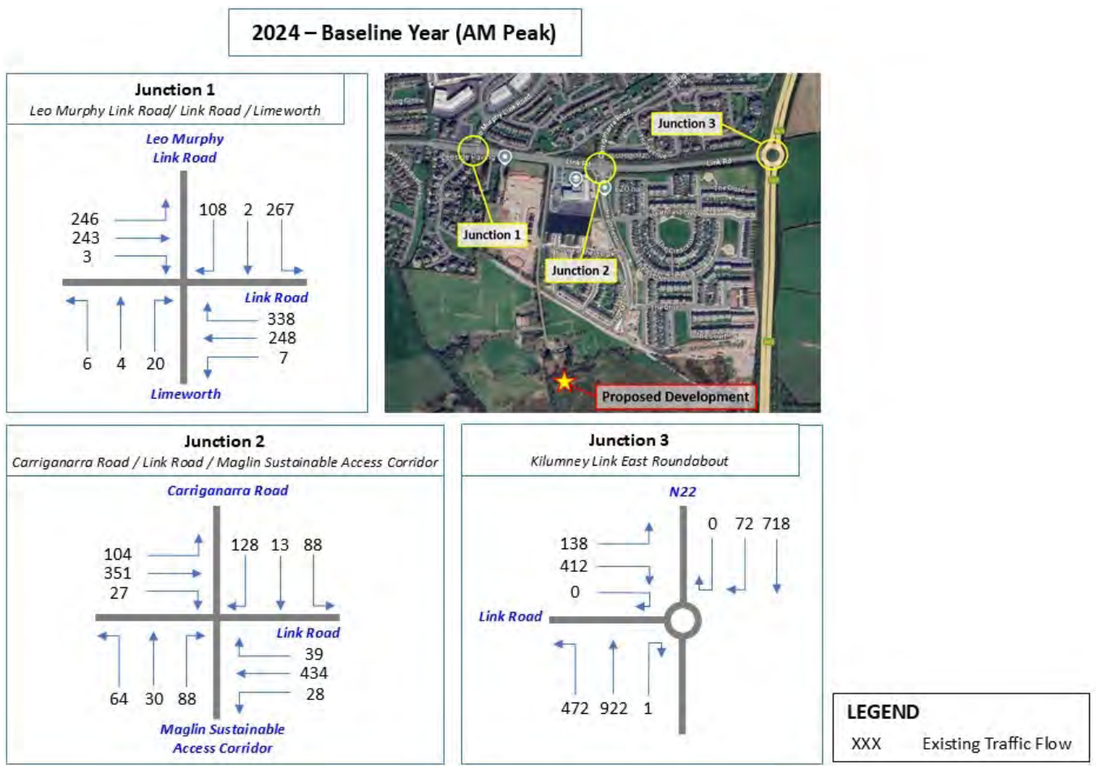


Figure 4.20 2024 Baseline Year Traffic Flow in the Morning Peak Hour

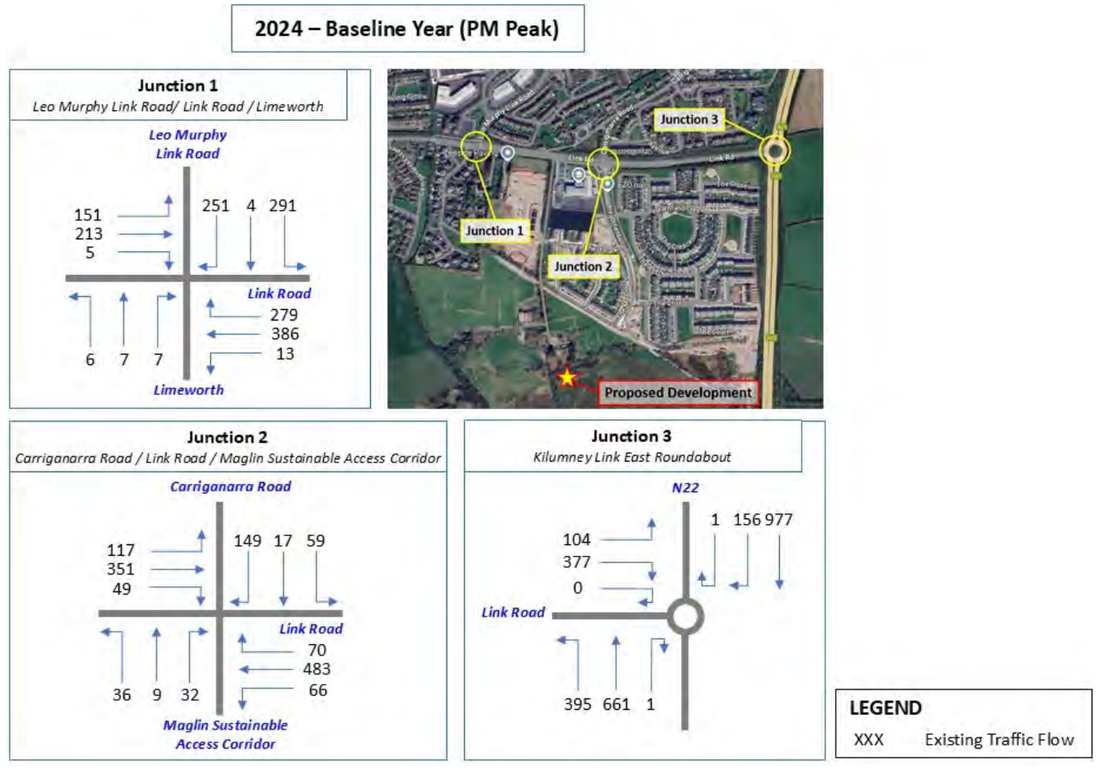


Figure 4.21 2024 Baseline Year Traffic Flow in the Evening Peak Hour

4.5.2.2 Trip Generation for the Permitted Developments

At the time of writing, three other developments (including Stonecrest Phase 1 development, Stonecrest Phase 2 development and Heathfield Phase 4 development) in the vicinity of proposed development have obtained planning permission. Those permitted developments shall be considered for this study in both the "without" and "with" development scenarios. This is because whether or not the proposed development is built, the trips generated by those permitted developments will still apply.

a) Permitted Stonecrest Phase 1 Development

With reference to the planning application with ABP Case Number: ABP-308111-20, Table 4.5 below details the estimated trip generation for the permitted Stonecrest Phase 1 development during the morning and evening peak hours. At the time of traffic count surveys on 16th April 2024, 44 dwellings were occupied for the captioned development. Therefore, the outstanding portions of the permitted development (i.e. 69 dwellings and creche) as shown in Table 4.5 has been considered for this study.

	Time	Factor	Arrival Rate*	Departure Rate*	Adopted Hourly Trips for Assessment	
					Trips In	Trips Out
Stonecrest Phase 1 Development (Residential)	AM Peak Hour	69 units**	0.310 *(per unit)*	0.905 *(per unit)*	21	62
	PM Peak Hour		0.560 *(per unit)*	0.500 *(per unit)*	39	35
Stonecrest Phase 1 Development (Creche)	AM Peak Hour	60 pupils	0.404 *(per pupil)*	0.250 *(per pupil)*	24	15
	PM Peak Hour		0.261 *(per pupil)*	0.314 *(per pupil)*	16	19
Total	**AM Peak Hour**	-	-	-	**45**	**77**
	PM Peak Hour	-	-	-	**55**	**54**

Note: * The arrival and departure rates *for Stonecrest Phase 1 development were extracted from the planning application with ABP Case Number: ABP-308111-20.*

** *At the time of traffic count surveys on 16th April 2024, 44 dwellings were occupied, and 69 dwellings of the captioned residential development were still not completed. Therefore, only 69 dwellings and creche have been considered for this study.*

Table 4.5 Trip Generation for Permitted Stonecrest Phase 1 Development

b) Permitted Stonecrest Phase 2 Development

With reference to the planning application with Reference: 23/42446, Table 4.6 below details the estimated trip generation for the permitted Stonecrest Phase 2 development during the morning and evening peak hours being considered for this study.

	Time	Factor	Arrival Rate*	Departure Rate*	Hourly Trips	
					Trips In	Trips Out
Stonecrest Phase 2 Development	AM Peak Hour	162 units	0.381 (per unit)	0.952 (per unit)	61	153
	PM Peak Hour		0.571 (per unit)	0.262 (per unit)	92	42

Note: * *The arrival and departure rates for Stonecrest Phase 2 development were extracted from the planning application with Reference: 23/42446.*

Table 4.6 Trip Generation for Permitted Stonecrest Phase 2 Development

c) Permitted Stonecrest/Coleman New Homes (Blarney) Limited Creche Development

With reference to the planning application with Reference 24/43308, the permitted creche development is mainly served the residents from the permitted Stonecrest Phase 1 Development and permitted Stonecrest Phase 2 Development. It is likely that many residents of the aforementioned developments will use the permitted creche facilities which can be used without the need to drive to the facility or is a by-pass trips (i.e. a large proportion of creche drop-offs will be by traffic already accounted for in the residential rates, on their way to work). In view of above reasons. It was assumed that the trip generation for the permitted creche will not cause an impact on the surrounding road networks and have not been considered for the assessment.

d) Permitted Heathfield Phase 4 Development

With reference to the planning application with Reference: 22/41611, Table 4.7 below details the estimated trip generation for the permitted Heathfield Phase 4 development during the morning and evening peak hours being considered for this study.

	Time	Factor	Arrival Rate*	Departure Rate*	Hourly Trips (For Whole Development)		Adopted Hourly Trips** (Modal Shift Increase from 19% to 40%)	
					Trips In	Trips Out	Trips In	Trips Out
Heathfield Phase 4 Development	AM Peak Hour	98 units	0.137 *(per unit)*	0.482 *(per unit)*	13	47	10	35
	PM Peak Hour		0.480 *(per unit)*	0.274 *(per unit)*	47	27	35	20

Note: * *The arrival and departure rates for Heathfield Phase 4 development were extracted from the planning application with Reference: 22/41611.*

** *0.74 factor was applied for increase to 40% modal split in accordance with the planning application with Reference: 22/41611.*

Table 4.7 Trip Generation for Permitted Heathfield Phase 4 Development

4.5.2.3 Trip Generation for the Proposed Development

In order to establish the level of traffic likely to be generated by the proposed development, trip rates from the Trip Rate Information Computer System (TRICS) database were used. TRICS is the system of trip generation analysis for the UK and Ireland and consists of an online repository of survey data collected for various land uses and provides information on trip rates seen.

a) Proposed Residential Development

As agreed with the Cork City Council, people trip rates from TRICS and modal split for the Electoral Division of Ballincollig from 2022 Census has been used to estimate the trip generation for the proposed residential development.

People trip rates for the land use classified as “Residential Mixed Private Flats and Houses” have been used and 22 sites across Ireland and the UK, excluding Greater Dublin and Greater London, were included from the TRICS database (7.11.4) to determine the people trip rates for the proposed residential development. The detail is set out in Appendix 4D.

As agreed with the Cork City Council, the following assumptions were adopted to estimate the modal split:

- In order to avoid some double counting, car passenger's number have been reduced by 20% in our assessment;
- The modal split (in total) should exclude both "Work mainly at or from home" and "Not Stated" to provide a more correct calculation;
- The modal split (by car driver) should include the reduced "Car Passenger" + "Car Driver" + "Van"; and
- To reflect the delivery of the proposed active and sustainable transport measures included for in CMATS, additional 12% reduction in modal share (by car drive) was applied to calculate trip rate.

Table 4.8 presents the modal split for the Electoral Division of Ballincollig, as obtained from the 2022 Census and the calculation of vehicle mode share adopted in this study.

Mean of Travel	Number			
	Work	School or College	Sub-total (Work, School or College)	%
On Foot	493	950	1,443	10%
Bicycle	115	75	190	1%
Bus, Minibus or Coach	441	529	970	7%
Train, DART or LUAS	10	5	15	0%
Motorcycle or Scooter	25	3	28	0%
Car Driver	5,631	240	5,871	42%
Car Passenger	370	2,969	3,339	24%
Van	373	8	381	3%
Other (incl. lorry)	20	5	25	0%
Work mainly at or from home	1,174	26	1,200	9%
Not stated	295	227	522	4%
Total	8,947	5,037	13,984	-
Modal Split (in Total) excluding the "Work mainly at or from home" and "Not stated":			**12,262**	-
Modal Split (By Car Drive) including the 20% reduction on "Car Passenger" + "Car Driver" + "Van":			**8,923**	-
Vehicle Mode Share:			**73%**	-
Adopted Vehicle Mode Share (with additional 12% reduction):			**64%**	-

Table 4.8 Mean of Travel in Ballincollig from 2022 Census and Calculation of Vehicle Mode Share

Table 4.8 indicates that about 64% of people for the year of opening in this area are using vehicles as agreed with Cork City Council. Therefore, this vehicle mode share of 64% has been applied to the people trip rates obtained from the TRICS database (7.11.4). Table 4.9 details the estimated trip generation for the proposed residential development during the morning and evening peak hours being considered for this study.

Proposed Development	Time	Factor	TRICS People Trip Rate		Adopted Vehicle Trip Rate (With Vehicle Mode Share of 64%)		Hourly Trips	
			Arrival	Departure	Arrival	Departure	Trips In	Trips Out
Residential Development	AM Peak Hour*	307** units	0.216 *(per unit)*	0.608 *(per unit)*	0.138 *(per unit)*	0.389 *(per unit)*	42	119
	PM Peak Hour*		0.464 *(per unit)*	0.245 *(per unit)*	0.297 *(per unit)*	0.157 *(per unit)*	91	48

Note: * *The highest trip rates between 07:00 and 10:00 and between 16:00 and 19:00 from TRICS database were adopted for estimation of the AM and PM peak trip rates for the proposed residential development.*

** 307 units, which is greater than the proposed residential units (i.e. 300 units), was adopted for analysis and it represents the worst-case scenario.

Table 4.9 Trip Generation for the Proposed Residential Development

b) Proposed Non-Residential Development

The expected trip generation for the proposed creche was estimated utilising the vehicle trip rates from TRICS database (7.11.4) only, excluding Greater Dublin and Greater London. Table 4.10 details the estimated trip generation for the proposed creche during the morning and evening peak hours being considered for this study. The full TRICS output files for the proposed creche is also contained in Appendix 4D. It is likely that the trip rates utilised for creche land uses is higher than what will occur once proposed development is complete. Much of the trips to this land use will be generated internally as people attending this facility will also live within the proposed development. Additionally, large proportion of "Pass-by" trips (i.e. a large proportion of creche drop-offs trips will be by traffic already accounted for in the residential rates, on their way to work) will be expected for the proposed creche. In view of above reasons, it was assumed that 70% of trip generation for the proposed creche will be by-pass trips, and the remaining 30% of trip generation will travel between the proposed creche and area outside the proposed development. This 30% of trip generation for the proposed creche will cause an impact on the surrounding road networks and have been considered for the assessment.

Proposed Development	Time	Factor	TRICS Arrival Rate	TRICS Departure Rate	Hourly Trips		Adopted Hourly Trips due to Trip Reduction**	
					Trips In	Trips Out	Trips In	Trips Out
Creche	AM Peak Hour*	100 pupils	0.224 *(per pupil)*	0.195 *(per pupil)*	22	20	7	6
	PM Peak Hour#		0.180 *(per pupil)*	0.228 *(per pupil)*	18	23	5	7

Note: * *The highest trip rates between 07:00 and 10:00 and between 16:00 and 19:00 from TRICS database were adopted for estimation of the AM and PM peak trip rates for the proposed creche.*

** *70% trip reduction was applied for the proposed creche as by-pass trips.*

Table 4.10 Trip Generation for the Proposed Creche

c) ***Total Trip Generation for the Proposed Development***

Table 4.11 details the estimated total trip generation for the proposed development (including residential units and creche) during the morning and evening peak hours being considered for this study.

Proposed Development	Time	Factor	Adopted Arrival Rate	Adopted Departure Rate	Hourly Trips		Adopted Hourly Trips*	
					Trips In	Trips Out	Trips In	Trips Out
Residential Development	AM Peak Hour	307** units	0.138 *(per unit)*	0.389 *(per unit)*	42	119	42	119
	PM Peak Hour		0.297 *(per unit)*	0.157 *(per unit)*	91	48	91	48
Creche	AM Peak Hour	100 pupils	0.224 *(per pupil)*	0.195 *(per pupil)*	22	20	7	6
	PM Peak Hour		0.180 *(per pupil)*	0.228 *(per pupil)*	18	23	5	7
Total	AM Peak Hour	-	-	-	**64**	**139**	**49**	**125**
	PM Peak Hour	-	-	-	**109**	**71**	**96**	**55**

Note: * *70% trip reduction was applied for the proposed creche as by-pass trips.*

** 307 units, which is greater than the proposed residential units (i.e. 300 units), was adopted for analysis and it represents the worst-case scenario.

Table 4.11 Vehicle Trip Generation for the Proposed Development

Based on Table 4.11, expected trip generation for the proposed development was estimated utilising the TRICS database and was revealed to be in total 49 trips inbound and 125 trips outbound in the morning peak hour, and 96 trips inbound and 55 trips outbound in the evening peak hour.

4.5.2.4 Modal Choice

In order to produce a conservative and robust assessment of the traffic impact of the proposed development, this study assumes that 64% of the people trip rates generated by the development will be by private car as set out in Table 4.8.

4.5.2.5 Trip Distribution and Assessment Years

a) Permitted Developments – Trip Distribution

It is anticipated that the permitted developments , including Stonecrest Phase 1 development, Stonecrest Phase 2 development and Heathfield Phase 4 development, will be completed prior to completion of the proposed development. Therefore, those permitted developments shall be considered for this study in both the "without" and "with" development scenarios.

The trip distribution for those permitted developments to the concerned junctions will be extracted from their respective TTA report, if any. Otherwise, existing traffic patterns (i.e. development generated flows will be split through the junction proportionally to existing flows) will be adopted for traffic distribution of those permitted developments. Appendix 4E and Appendix 4F illustrate the trip distribution and trip generation of those permitted developments.

b) Proposed Development – Trip Distribution and Assessment Years

The future development traffic distribution is likely to mirror existing traffic patterns (i.e. development generated flows will be split through the junction proportionally to existing flows).

On the assumption that planning permission is granted for the proposed development in 2025, and the construction will commence in 2026, then it is estimated that the proposed development will be fully operational by the year 2030.

For the purpose of this study, we will take 2030 as the Opening Year. Consequently, traffic analysis associated with this study will focus on the following future development operational scenarios:

- 2024 Baseline Year;
- 2030 Opening Year ("without" and "with" development scenarios); and
- 2045 Design Year Horizon (Opening Year + 15 Years) ("without" and "with" development scenarios).

c) Future Traffic Flows for the "Without" and "With" Development Scenarios

The projected 2030 and 2045 background traffic flows have been calculated by factoring up the 2024 recorded traffic flows in accordance with the TII Publications Project Appraisal Guidelines for National Roads document 'Unit 5.3 Travel Demand Projections, Table 6.1: Link-Based Growth Rates: Metropolitan Area Annual Growth Rates'. The majority of lands located at Maglin Valley are zoned as "New Residential Neighbourhoods" or "Sustainable Residential Neighbourhoods" in the Cork City Development Plan 2022-2028 and it is expected that the majority of traffic growth in this area will be generated by these residential developments. For this reason, low sensitivity traffic growth rates, which was agreed with the Cork City Council, were assigned to the 2024 base traffic for the future scenarios. Table 4.12 illustrates the low sensitivity growth rates adopted in this study.

Metropolitan Area	Vehicle Category	Low Sensitivity Growth Rates		
		2016-2030	2030-2040	2040-2050
Cork	Light Vehicle (LV)	1.0153	1.0072	1.0065
	Heavy Vehicle (HV)	1.0279	1.0128	1.0164

Table 4.12 Low Sensitivity Growth Rates

The 2030 Opening Year and 2045 Design Year traffic flows are equal to the sum of their respective year background traffic flows (as derived above) and the trips generated from those permitted developments to create the "without" development scenario. Additional traffic flows due to the proposed development is then applied to these respective year flows to create the "with" development scenario. Table 4.13 presents the traffic flows included for each scenario.

Scenario	Traffic Flows Included				
	Background Traffic (+low growth)	Stonecrest Phase 1 Development	Stonecrest Phase 2 Development	Heathfield Phase 4 Development	Proposed Development
2024 Baseline Year	✓	Partially*	X	X	X
2030 Opening Year (Without Development)	✓	✓	✓	✓	X
2030 Opening Year (With Development)	✓	✓	✓	✓	✓
2045 Design Year (Without Development)	✓	✓	✓	✓	X
2045 Design Year (With Development)	✓	✓	✓	✓	✓

Note: * *2024 Traffic Counts included 44 occupied units for Stonecrest Phase 1 development.*

Table 4.13 Scenarios Modelled

The generated traffic has been distributed onto the surrounding road network based on the current directional splits of traffic associated with the local road network (based on the Junction Turn Counts undertaken as part of the traffic survey). Appendix 4G and Appendix 4H illustrate the trip distribution and trip generation respectively, arriving and departing the proposed developments during the morning and evening peak periods.

4.5.2.6 Trip Generation as a Percentage of Existing Traffic

In order to assess the future traffic impact of the proposed development the NRA Traffic and Transport Assessment Guidelines were assessed to determine the threshold requirements for a traffic impact assessment.

Expected trip generation for the proposed development was estimated utilising the TRICS database and was revealed to be in total 49 trips inbound and 125 trips outbound in the morning peak hour, and 96 trips inbound and 55 trips outbound in the evening peak hour. An exercise was carried out to quantify the expected development trip generation as a proportion of existing traffic flows on the surrounding road network to determine if a detailed traffic impact assessment is required for all of the junctions included within the scoping study.

It is anticipated that the future background traffic flows shall be factored up in accordance with 'Unit 5.3 Travel Demand Projections, Table 6.1: Link-Based Growth Rates: Metropolitan Area Annual Growth Rates' under low sensitivity growth rates. In view of above reasons, the existing traffic flows will be used instead of future traffic flows in order to provide a robust analysis and a "worst-case" scenario.

All trip generation from the proposed development will travel between the site and Link Road via the Maglin Sustainable Access Corridor and Junction 2 – Carriganarra Road / Link Road / Maglin Sustainable Access Corridor. Utilising trip distributions proportionally to the existing flows, 16.3%, 35.2% and 48.5% of vehicles at Junction 2 currently go ahead (towards Carriganarra Road), turn westward (towards Junction 1) and turn eastward (towards Junction 3) respectively from the Maglin Sustainable Access Corridor to Link Road/Carriganarra Road, while 18.7%, 39.7% and 41.6% of vehicles at Junction 2 currently go ahead (i.e. arriving from Carriganarra Road), turn right (i.e. arriving from Junction 1) and turn left (i.e. arriving from Junction 3) respectively from Link Road/Carriganarra Road to the Maglin Sustainable Access Corridor in the morning peak period. In the evening peak period, 11.7%, 46.9% and 41.5% of vehicles at Junction 2 currently go ahead (towards Carriganarra Road), turn westward (towards Junction 1) and turn eastward (towards Junction 3) respectively from the Maglin Sustainable Access Corridor to Link Road/Carriganarra Road, while 12.9%, 37.1% and 50% of vehicles at Junction 2 currently go ahead (i.e. arriving from Carriganarra Road), turn right (i.e. arriving from Junction 1) and turn left (i.e. arriving from Junction 3) respectively from Link Road/Carriganarra Road to the Maglin Sustainable Access Corridor.

The result of this trip distribution and assignment exercise is presented in Table 4.14 and Table 4.15.

Junction	Junction AM Peak Traffic	Proposed Development Generated Traffic	Percentage Change
Junction 1 – Leo Murphy Link Road / Link Road / Limeworth	1,493	64	4.3%
Junction 2 – Carriganarra Road / Link Road / Maglin Sustainable Access Corridor	1,392	174	**12.5%**
Junction 3 – Killumney Link East Roundabout	2,735	82	3.0%

Table 4.14 Development Morning Peak Hour Trip Generation as a Percentage of Existing Road Network Traffic Flow

As demonstrated by Table 4.14, the estimated trips associated with the proposed development to the existing traffic flows in 2024 is less than 5% for Junction 1 and Junction 3 inclusive in the morning peak hour.

Junction	Junction PM Peak Traffic	Proposed Development Generated Traffic	Percentage Change
Junction 1 – Leo Murphy Link Road / Link Road / Limeworth	1,613	62	3.8%
Junction 2 – Carriganarra Road / Link Road / Maglin Sustainable Access Corridor	1,438	151	**10.5%**
Junction 3 – Killumney Link East Roundabout	2,672	71	2.7%

Table 4.15 Development Evening Peak Hour Trip Generation as a Percentage of Existing Road Network Traffic Flow

As demonstrated by Table 4.15, the estimated trips associated with the proposed development to the existing traffic flows in 2024 is less than 5% for Junction 1 and Junction 3 inclusive in the evening peak hour.

In view of above robust analysis for Junction 1 and Junction 3, the estimated trips associated with the proposed development represent a small proportion of existing traffic flows on the surrounding road network and less than the thresholds for traffic impact assessment as stated in the Table 2.1 of TII Traffic and Transport Assessment Guidelines (i.e. 10% of the traffic flow on the existing road network and 5% in sensitive environments or where congestion exists) during the morning and evening peak hours.

As a result of this negligible increase in traffic volumes on the surrounding road network, it is not required to undertake any traffic capacity assessments for Junction 1 and Junction 3 in this study. It is reasonable to assume that the number of net trips generated by the proposed development will remain close to a constant number in future years while background traffic levels will show a steady increase. This will result in the traffic impact of the proposed development decreasing even further in future years.

However, it is acknowledged that Junction 2 is greater than the 5% of the traffic flow on the existing road network where congestion exists or the location is sensitive. Therefore, a capacity assessment on Junction 2 was undertaken by using the Transport Research Laboratory's (TRL) analysis software: Optimised Signal Capacity and Delay (OSCADY) for signalized junction.

Junction 2 was modelled for the 2024 Baseline Year, 2030 Opening Year and 2045 Design Year (Opening Year plus 15 years) in the morning and evening peak hours.

4.5.2.7 Network Traffic Flows – Operational Stage

Refer to Figure 4.22 to Figure 4.25 inclusive for the estimated future traffic flows in the morning and evening peak hours for Junction 2.

a) 2030 Opening Year Traffic Flows

Figure 4.22 and Figure 4.23, demonstrate the 2030 Opening Year traffic flows Junction 2 in the morning and evening peak hours for the "without" development and "with" development scenarios.

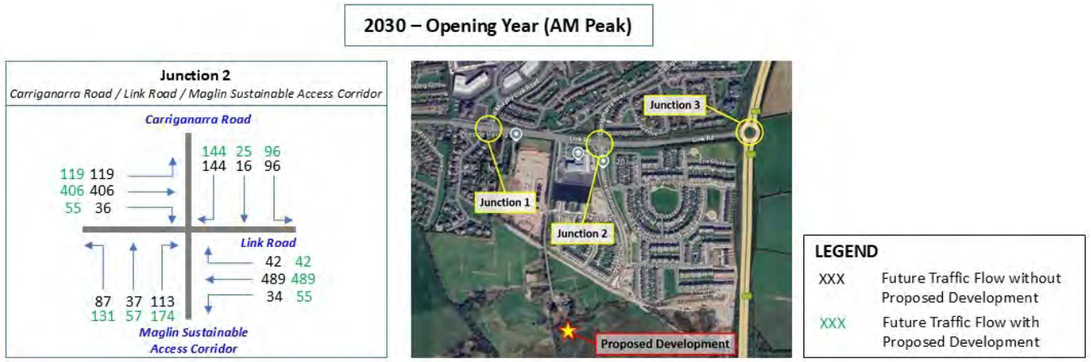


Figure 4.22 2030 Opening Year Traffic Flows for Junction 2 in the Morning Peak Hour

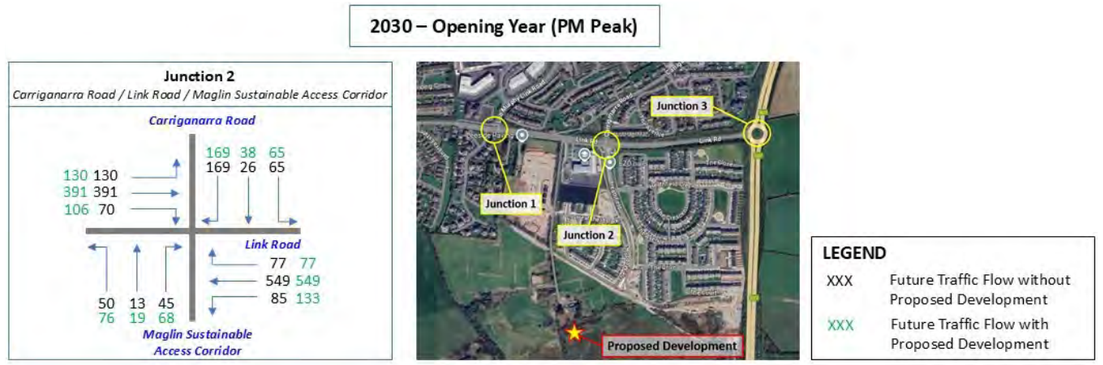


Figure 4.23 2030 Opening Year Traffic Flows for Junction 2 in the Evening Peak Hour

b) 2045 Design Year Traffic Flows

Figure 4.24 and Figure 4.25, illustrate the 2045 Design Year Horizon traffic flows for Junction 2 in the morning and evening peak hours for the "without" development and "with" development scenarios.

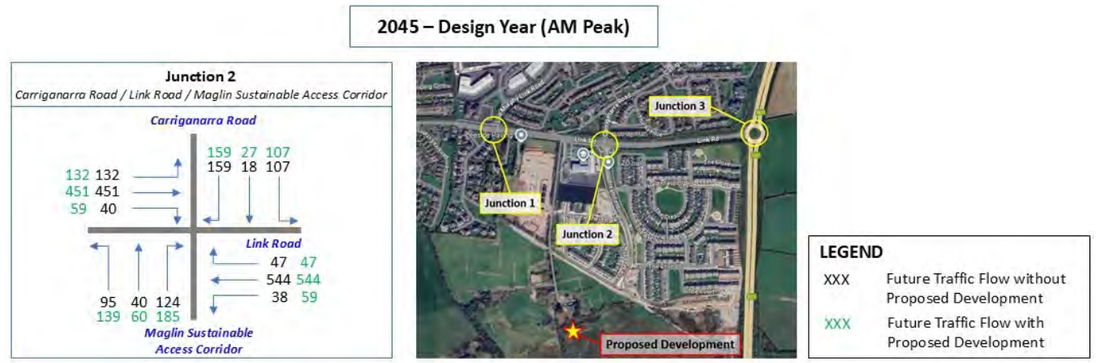


Figure 4.24 2045 Design Year Traffic Flows for Junction 2 in the Morning Peak Hour

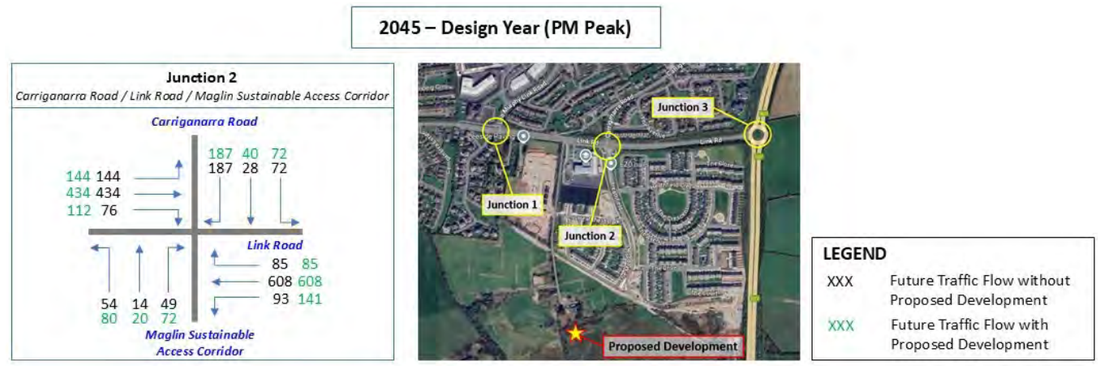


Figure 4.25 2045 Design Year Traffic Flows for Junction 2 in the Evening Peak Hour

4.5.2.8 Traffic Impact During the Operational Stage

The capacity of existing and proposed junctions in the vicinity of the development is the key determinant of the transport network operation. Traffic assessments therefore focus on the influence of traffic generated by the proposed development on junctions in the surrounding road network. As mentioned in Section 4.5.2.6, a capacity assessment on Junction 2 is required due to the estimated trips associated with the proposed development to the existing traffic flows on Junction 2 greater than 5%. TRL's OSCADY traffic modelling software has been used to analyse the signalised junction. This program determines the capacity of the junctions based on a variety of geometric parameters and assess the extent to which the flow of traffic through that junction approaches capacity. The traffic capacity assessments have been carried out for the Junction 2 – Carriganarra Road / Link Road / Maglin Sustainable Access Corridor.

The criteria utilised for the assessment of signalised junction capacity is Degree of Saturation (DOS). The DOS provides a basis for judging the acceptability of junction designs. Typically, a DOS of less than 0.9 normal design threshold for signalised junction is considered to indicate satisfactory performance (i.e. operating in an efficient and stable condition). A DOS of between 0.9 and 1 for signalised junction represents variable operation, and may be said to be operating adequately, if the queue and delay are deemed acceptable. DOS values in excess of 1 represents an oversaturated condition.

Junction 2 was modelled for the 2024 Baseline Year, 2030 Opening Year and 2045 Design Year Horizon for the morning and evening peak hours using the flow diagrams as shown in Figure 4.20 to Figure 4.25 in the previous section herein.

To demonstrate the direct traffic impact associated with the proposed development, the traffic modelling exercise was carried out for the "without" development and "with" development scenarios.

a) Junction Capacity Assessment for 2024 Baseline Year

A traffic capacity assessment of the Junction 2 was undertaken utilising the flows illustrated in Figure 4.20 and Figure 4.21, and the TRL's OSCADY traffic modelling software for signalized junction. As summary of the results of the analysis for the 2024 Baseline Year, during the morning and evening peak hours is shown below in Table 4.16.

Junction 2 – Carriganarra Road / Link Road / Maglin Sustainable Access Corridor

Approach Arm	Max. DOS		Max. Queue (PCU[1])	
	AM	PM	AM	PM
With calling an all-red stage for pedestrian movements				
Carriganarra Road	0.65	0.66	9	8
Link Road East	0.63	0.65	13	15
Maglin Sustainable Access Corridor	0.40	0.35	6	3
Link Road West	0.63	0.57	12	12

Table 4.16 2024 Baseline Year Junction Capacity Analysis for Junction 2

The normal design threshold for the degree of saturation (DOS) is 0.9 for a signalised junction. The results shown in Table 4.16 demonstrate that Junction 2 is currently operating within the normal design threshold in the morning and evening peak hours in 2024 baseline scenario.

1 PCU means Passenger Car Unit. A passenger car equivalent is essentially the impact that a mode of transport has on traffic variables (such as headway, speed, density) compared to a single car. For example, 1 private car is equal to 1 pcu and 1 HGV is equal to 2.3 pcu.

b) Link Capacity Assessment for 2024 Baseline Year

It is also necessary to assess the capacity of the Link Road. The '*UK DMRB Advice Note TA 79/99 – Traffic Capacity of Urban Roads'* was used to estimate the maximum one-way hourly capacity these streets. From *Table 1– "Types of Urban roads and the features that distinguish them"* of the above Advice Note, UAP2 categorisation has been assigned to the Link Road. A UAP2 road type is categorised as one with 'Good standard single/dual carriageway road with frontage access and more than two side roads per km'.

Table 3 of the Advice Note provides 'Capacities of Urban Roads - One-way hourly flows in each direction' for each road type. This table assumes a 60:40 directional split and the max capacity provided is for the busiest flow (i.e. 60% of the AADT).

In accordance with the Advice Note, Table 4.17 outlines the maximum road capacity (vehicle/hour) in the one direction for UAP2 type roads for 2024 Baseline Year Flow. It also includes the one-way peak flow of the existing traffic based on the traffic surveys. For example, the maximum capacity of Link Road West arm at Junction 2 in one direction is 1,260 vehicles per hour based on the Advice Note, and the morning peak hour traffic on Link Road West arm at Junction 2 are 481 vehicles/hr (eastbound) and 626 vehicles/hr (westbound). Therefore, the highest current traffic volume of 626 vehicles/hr westbound is below the capacity of Link Road West arm at Junction 2 at 1,260 vehicles/hr in the busiest direction. A summary of the results of the analysis of relevant link roads for the 2024 Baseline Year during the morning and evening peak hours is shown in Table 4.17.

Link Road	Road Type	No. of Lanes	Road Width	Max. Capacity (Veh/hr)	AM Peak Flow	PM Peak Flow	Outcome
Link Road West arm at Junction 2	UAP2	2	6.75m	1,260	626 (WB)	669 (WB)	Within Capacity
Link Road East arm at Junction 2	UAP2	2	6.75m	1,260	528 (EB)	619 (WB)	Within Capacity

Table 4.17 2024 Baseline Year Link Capacity Analysis

Table 4.17 demonstrates that Link Road West and East arms at Junction 2 are currently operating within the normal design threshold in both the morning and evening peak hours under 2024 Baseline Year.

c) Operational Phase 2030 Opening Year – Junction Capacity

A traffic capacity assessment of the Junction 2 was undertaken utilising the flows illustrated in Figure 4.22 and Figure 4.23 and the TRL's OSCADY traffic modelling software for signalized junction. A summary of the results of the analysis for the 2030 Opening Year, "without" development and "with" development scenarios, during the morning and evening peak hours is shown below in Table 4.18.

Junction 2 – Carriganarra Road / Link Road / Maglin Sustainable Access Corridor

Approach Arm	Scenario	Max. DOS		Max. Queue (PCU)	
		AM	PM	AM	PM
With calling an all-red stage for pedestrian movements					
Carriganarra Road	Without Development	0.73	0.77	10	10
	With Development	0.75	0.80	10	11
Link Road East	Without Development	0.71	0.75	14	17
	With Development	0.74	0.82	15	19
Maglin Sustainable Access Corridor	Without Development	0.52	0.49	8	4
	With Development	0.80	0.75	14	7
Link Road West	Without Development	0.73	0.63	14	14
	With Development	0.73	0.81	15	17

Table 4.18 2030 Opening Year Junction Capacity Analysis for Junction 2

The normal design threshold for the degree of saturation (DOS) is 0.9 for a signalised junction. The results shown in Table 4.18 demonstrate that Junction 2 will operate within the normal design threshold in both the morning and evening peak hours in 2030 for both the "without" development and "with" development scenarios.

d) Operational Phase 2030 Opening Year – Link Capacity Assessment

A summary of the results of the analysis of relevant link roads for the 2030 Opening Year during the morning and evening peak hours is shown in Table 4.19.

Link Road	Road Type	No. of Lanes	Road Width	Max. Capacity (Veh/hr)	Scenario	AM Peak Flow	PM Peak Flow	Outcome
Link Road West arm at Junction 2	UAP2	2	6.75m	1,260	Without Development	720 (WB)	768 (WB)	Within Capacity
					With Development	764 (WB)	794 (WB)	Within Capacity
Link Road East arm at Junction 2	UAP2	2	6.75m	1,260	Without Development	616 (EB)	711 (WB)	Within Capacity
					With Development	677 (EB)	759 (WB)	Within Capacity

Table 4 19 2030 Opening Year Link Capacity Analysis

Table 4.19 demonstrates that Link Road West and East arms at Junction 2 will operate within the normal design threshold in both the morning and evening peak hours in 2030 for both the "without" development and "with" development scenarios.

The expected impact of the construction traffic on the surrounding road network is expected to be well below the operational vehicle numbers. As such, the analysis focuses on the operational traffic volumes as a worst-case scenario.

e) Operational Phase 2045 Design Year – Junction Capacity

A traffic capacity assessment of the Junction 2 was undertaken utilising the flows illustrated in Figure 4.24 and Figure 4.25 and the TRL's OSCADY traffic modelling software for signalized junction. A summary of the results of the analysis for the 2045 Design Year, "without" development and "with" development scenarios, during the morning and evening peak hours is shown below in Table 4.20.

Junction 2 – Carriganarra Road / Link Road / Maglin Sustainable Access Corridor

Approach Arm	Scenario	Max. DOS		Max. Queue (PCU)	
		AM	PM	AM	PM
With calling an all-red stage for pedestrian movements					
Carriganarra Road	Without Development	0.81	0.85	12	12
	With Development	0.83	0.88	12	14
Link Road East	Without Development	0.79	0.83	17	20
	With Development	0.82	0.89	18	23
Maglin Sustainable Access Corridor	Without Development	0.57	0.54	9	5
	With Development	0.85	0.79	16	8
Link Road West	Without Development	0.81	0.70	17	16
	With Development	0.81	0.86	18	19
Without calling an all-red stage for pedestrian movements					
Carriganarra Road	Without Development	0.71	0.72	8	8
	With Development	0.73	0.74	8	9
Link Road East	Without Development	0.69	0.75	11	13
	With Development	0.71	0.80	11	14
Maglin Sustainable Access Corridor	Without Development	0.54	0.44	7	3
	With Development	0.79	0.64	11	5
Link Road West	Without Development	0.70	0.63	11	10
	With Development	0.70	0.69	11	12

Table 4.20 2045 Design Year Junction Capacity Analysis for Junction 2

The normal design threshold for the degree of saturation (DOS) is 0.9 for a signalised junction. Table 4.20 demonstrates that with calling an all-red stage for pedestrian movements, Junction 2 will marginally operate within the normal design threshold in both the morning and evening peak hours in 2045 for both the "without" development and "with" development scenarios.

Moreover, the above results present a "worst-case" situation because the assessment has included on-demand stage (i.e. all red stage), which may appear occasionally in a cycle, for pedestrian movement phasing. Without calling an all-red stage for pedestrian movements, the junction performance will be improved with the highest DOS for AM at 0.79 on Maglin Sustainable Access Corridor arm and PM at 0.80 on Link Road East arm for the "with" development scenario.

Additionally, the likely development of infrastructure (i.e. upgrading Killumney Road, construction of Eastern Link road, Western Link Road and Maglin By-Pass), the provision of public transport infrastructure (BusConnects and light rail) and the provision of the Maglin Greenway to encourage increased modal shift away from the use of the private car as mentioned in Section 4.3.5 will result in a decrease in the traffic at the exiting junctions along Killumney Road (i.e. Greenfields Road, Castle Road, Sunningdale, Link Road, etc.). After completion of these improvements, the performance of this junction could be further improved.

f) Operational Phase 2045 Design – Link Capacity Assessment

A summary of the results of the analysis of relevant link roads for the 2045 Design Year during the morning and evening peak hours is shown in Table 4.21.

Link Road	Road Type	No. of Lanes	Road Width	Max. Capacity (Veh/hr)	Scenario	AM Peak Flow	PM Peak Flow	Outcome
Link Road West arm at Junction 2	UAP2	2	6.75m	1,260	Without Development	799 (WB)	849 (WB)	Within Capacity
					With Development	843 (WB)	875 (WB)	Within Capacity
Link Road East arm at Junction 2	UAP2	2	6.75m	1,260	Without Development	682 (EB)	786 (WB)	Within Capacity
					With Development	743 (EB)	834 (WB)	Within Capacity

Table 4.21 2045 Design Year Link Capacity Analysis

Table 4.21 demonstrates that Link Road West and East arms at Junction 2 will operate within the normal design threshold in both the morning and evening peak hours in 2045 for both the "without" development and "with" development scenarios.

4.6 Mitigation Measures and Monitoring

With the objective of mitigating the potential impact of the proposed development during both its construction and operational phases, the following proposals (mitigation measures) have been identified and form an integral part of the subject development proposals.

4.6.1 Construction Phase

A Construction and Environmental Management Plan (CEMP) and Construction Traffic Management Plan (CTMP) have been prepared (Appendix 2-1 and Appendix 2-2 of this EIAR) by the Applicant to ensure that proper procedures are put in place to minimise the impact of the construction stage on public roads and the surrounding environment in general. This CEMP is being submitted as part of this Planning Application to Cork City Council, which includes, inter alia, indicative phasing of the works, hours of operation, a traffic management plan, noise and dust mitigation measures, etc. A Construction Manager will be appointed to liaise directly with the various sections of Cork City Council and develop the plan as required.

The construction management plan will take into account construction vehicle routing and timing to mitigate any issues with vehicles on public roads. The development will be progressed in three phases as shown in Figure 4.26 to further manage the construction traffic:

Phase 1

- Demolition of existing farm sheds;
- Completion of 118 no. units;
- Completion of active travel route along north of the development;
- Completion of creche; and
- Completion of portion of the Maglin Sustainable Access Corridor.

Phase 2

- Completion of 79 no. units; and
- Completion of the remaining Maglin Sustainable Access Corridor.

Phase 3

- Completion of the remaining 103 no. units.

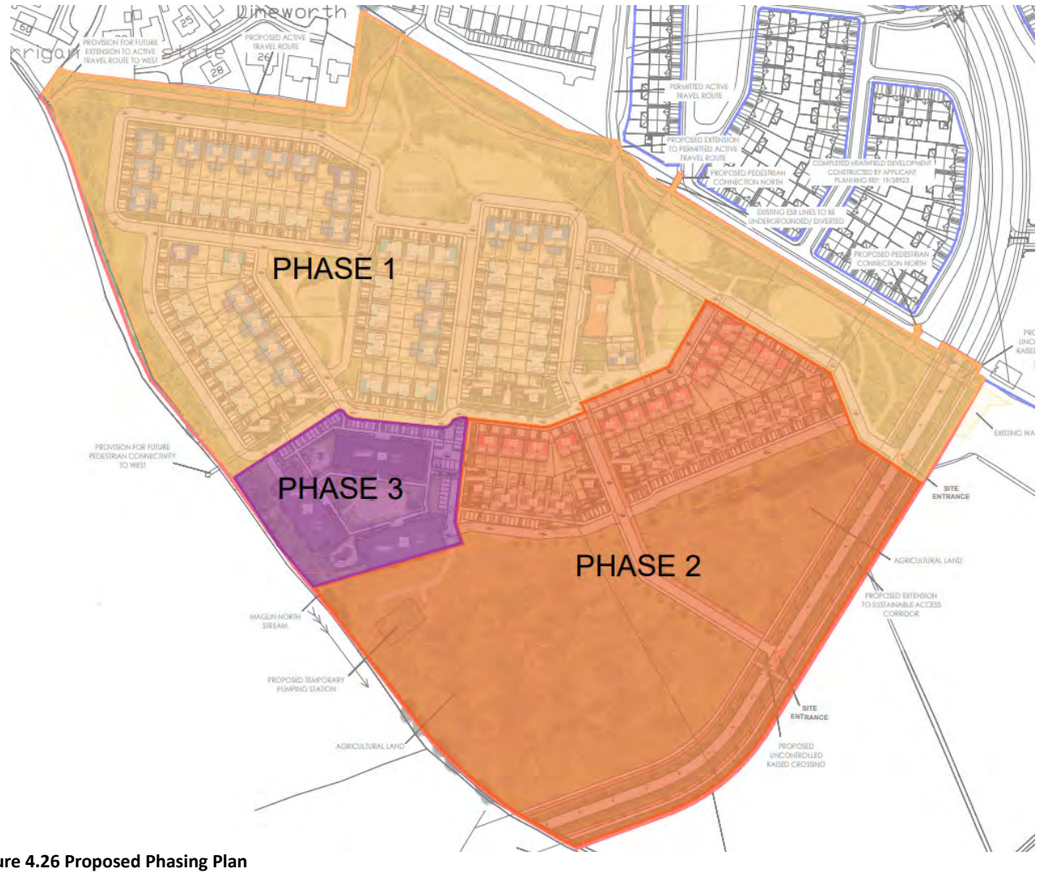


Figure 4.26 Proposed Phasing Plan

The following mitigation measures shall be provided to minimise the impacts to the public road network during the construction phase:

- Good construction management practices will be employed such as fencing the site off from the public and neighbouring sites, adequate external/internal signage, secure internal site offices, dedicated construction access points all to facilitate the safety of construction staff and the public;
- Appropriate levels of staff parking and compounding will be provided to ensure no potential overflow or haphazard parking in the area. The site will be able to accommodate employee and visitor parking throughout;
- Set construction traffic routes to and from the site will be agreed with Cork City Council prior to the commencement of construction activities on site. Where necessary the time of day permittable for such routes will also be agreed upon and outside of the morning/evening peak hours;
- Tracked excavators will be moved to and from the site on low-loaders and will not be permitted to drive on the street pavements;
- Wheel washers / judder bars will be placed at all site access points to minimise the migration of detritus onto the public roads. The roads will be inspected and cleaned on a regular basis; and
- Haul vehicles will be covered after loading to ensure there is no risk of construction material falling.

4.6.2 Operational Phase

4.6.2.1 Proposed Infrastructure under Proposed Development

The proposed road works under proposed development are illustrated in Appendix 4B. The works provide dedicated walking and cycling facilities from the development access to the proposed greenway (BC-GW2) as shown in Figure 4.17 and the Link Road via the Maglin Sustainable Access Corridor. The proposed development also provides for connection to the pedestrian/ cycle infrastructure under construction as part of Heathfield Phase 4 to the north providing direct access to Killumney Road.

The proposed design took cognisance of the Design Manual for Urban Roads and Streets (DMURS). At the site entrances to the proposed development, priority will be given to pedestrian and cyclists. Raised areas at the site entrances will indicate priority for crossing pedestrians and cyclists. Corner radii have been reduced to shorten crossing points for pedestrians and slow vehicles further when making turning manoeuvres. The proposed footpaths tie in with existing footpaths on the Maglin Sustainable Access Corridor.

The dedicated segregated cycle track will provide cyclists with a one-way cycle track on both sides of the extended Maglin Sustainable Access Corridor. The proposed road works will also tie-in to the proposed greenway route (BC-GW2) as mentioned in Section 4.3.5.4. Additionally, the proposed development will provide shared spaces for pedestrians/cyclists within the site. Dropped kerbs and transition areas will be provided to enable easy and safe access for cyclists to/from the cycle track. Dropped kerbs (where appropriate) and tactile paving have been designed in at the pedestrian crossing points.

The proposed road works will encourage a shift to more sustainable modes of transport and provide safer facilities particularly for children walking and cycling to school, but also travelling to and from the town centre and beyond.

4.6.2.2 Maglin Urban Expansion Area

As detailed in Section 4.3.5.2, to accommodate the target population growth in Ballincollig, the Maglin Valley has been designated an urban expansion area, including the provision for a new residential neighbourhood.

Under the Cork City Development Plan 2022-2028, there are several road projects to be developed as part of the Maglin Urban Expansion Area. These off-site infrastructure projects are associated with the proposed number of housing units to be developed in the area. These include upgrading the Killumney Road, providing new link roads, and improving walking and cycling facilities.

After completion of those elements of vehicular infrastructure, it is anticipated that traffic along Killumney Road (i.e. Castle Road, Sunningdale, Link Road, etc.) will reduce.

4.6.2.3 CMATS

The Cork Metropolitan Area Transport Strategy (CMATS) represents a coordinated land use and transport strategy for Cork Metropolitan Area (CMA). It sets out a framework for the planning and delivery of transport infrastructure and services to support the CMA's development in the period up to 2040.

As part of CMATS, there are a number of improvements to public transport, walking and cycling facilities in the immediate vicinity of the proposed development. The land use distribution chapter of CMATS indicates the proposed development is located adjacent to a proposed residential area. See Figure 4.27.

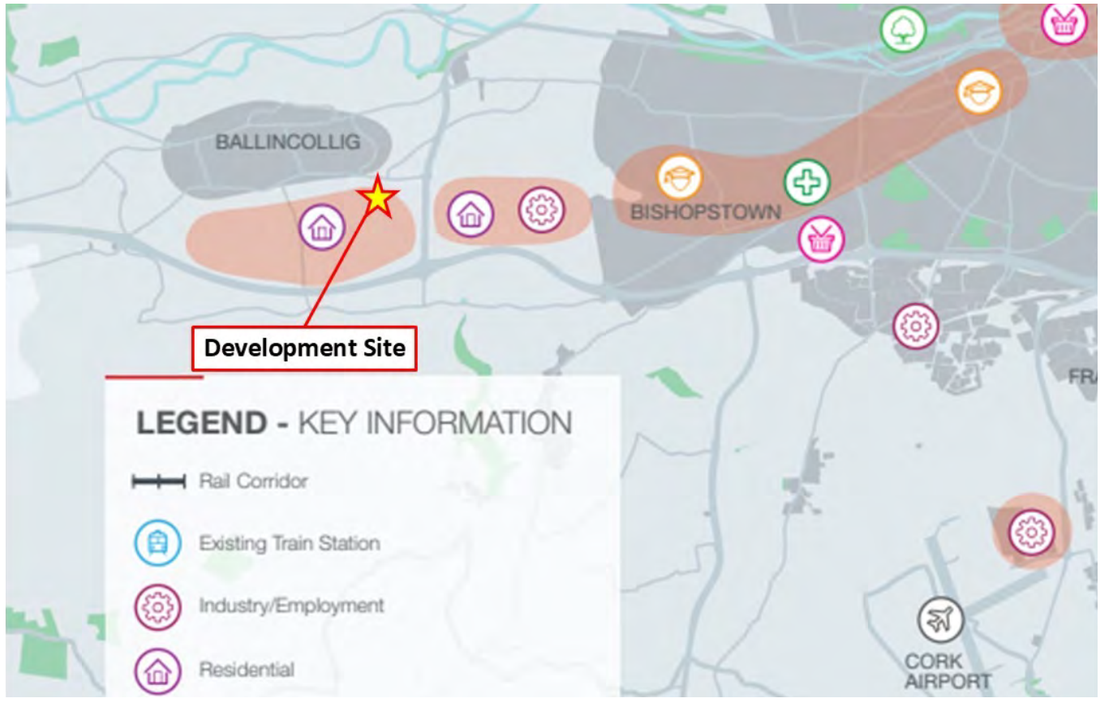


Figure 4.27 CMATS Land Distribution

Further to this, measures are outlined in CMATS to provide appropriate transit options for the proposed residential area. Included in CMATS is an indicative route showing Light Rail along the Killumney Road, just north of the proposed site and a proposed station nearby. BusConnects could be a precursor to Light Rail but either way, this development will be well served by these future public transport services.

Additionally, this development, can support the case for BusConnects/Light Rail along this route by improving its viability due to the potential increase in passengers from this area. These future projects will further assist in the modal shift from private car to public transport, walking and cycling.

4.6.2.4 Other Measures

A number of measures have been and will be implemented prior to the subject scheme opening which include:

- **Parking**: All car parking and bicycle parking within the development will comply with the Development Plan. The residential development and non-residential development (i.e. creche) also provide with cycle parking in excess of the Development Plan requirements. This leads to a strong emphasis on bicycle parking, thus reducing the need for private single occupancy vehicles.
- **Mobility Management Plan (MMP)**: A MMP will be rolled out with the aim of guiding the delivery and management of coordinated initiatives by the scheme promoter. The MMP ultimately seeks to encourage sustainable travel practices for all journeys to and from the developments. Details of the MMP are contained below.

4.6.3 Mobility Management Plan

Mobility management plans (MMP) for developments have the potential to help achieve more sustainable communities by improving accessibility and travel choice. This MMP should be considered as guidance and an available resource which identifies objectives and measures aimed at improving sustainability and choice. The effectiveness of the MMP will be increased if adopted by a residents group or committee. The benefits of a MMP can be summarised as follows:

- Reducing the need for car use and carbon emissions;
- Education with respect to sustainable travel;
- Improve accessibility and travel choice for reaching local facilities and amenities;
- Complement nearby existing Travel Plans;
- Achieving a more attractive and safer development by reducing car use;
- Increasing marketability of the development as more households seek to change their travel behaviour;
- Improving the health of residents; and
- Improve knowledge of residents in relation to travel routes and locations of facilities.

The proposed development will have a management company who will make available the necessary travel information for residents on how to access a number of key destinations within and surrounding the Cork City. The aim of the measures of a MMP would be to minimise single-occupancy car-based travel and to encourage residents and visitors to use more sustainable modes of travel such as walking, cycling, public transport and car sharing.

4.6.3.1 Specific Measures

In order to achieve the long-term objectives and modal split targets, a number of specific measures are proposed to be put in place.

a) Management of Co-ordination

A Mobility Management Plan Co-ordinator will be appointed as part of a residential committee or management agent. This may be a group of keen likeminded people that can assist in promoting. The implementation and management of the MMP will be the responsibility of the Mobility Management Plan Co-ordinator team on site. The role will be to assist in proving travel information and be a point of contact for any travel issues for all events and ensure the MMP is monitored and updated as required. The duties of a Mobility Management Plan Co-ordinator are:

- Liaising with Cork City Council and developers in progressing the future measures for the area;
- Support the implementation of various schemes aimed at encouraging the use of more sustainable travel methods;
- Use noticeboards to keep people up to date with accessible public transport provision, walking/cycling opportunities and available schemes. These can also be used in open spaces for residential information such in local commercial unit; and
- Potential to provide residential packs to new residents highlighting the bus routes, walking and cycling routes.

b) Car Sharing

Initial contact has also been made with Go-Car (https://www.gocar.ie/). This is a membership based program where, once you join, you can rent a car or van for as little as an hour and up to a year. The service aims to reduce car dependency by promotion on demand cars near where you live, work and play so you can have a car close to hand should you need one. Once you've signed up you simply book the car you want for the time you need, unlock it using our app/membership card, take the keys from the glovebox and drive it as normal. To finish your booking, you just drop the car back to where you picked up. There are approximately 700 go car locations in Ireland where cars can be collected or dropped with numerous locations in Cork. There are currently 1 go-car located in Tesco Ballincollig as shown in Figure 4.11.

c) Cycle/Pedestrian Facilities

There are a range of walking and cycle facilities in the area with links from the proposed development to these. Additional walking and cycling routes will be provided throughout the development.

4.7 Residual Effects

4.7.1 Construction Phase

There will be minor impacts on the safety or operation of the road network as a result of the construction phase of the development. Having consideration for the mitigation measures outlined above, any impacts during the construction phase will be negligible. All construction related traffic will be outside the morning and evening peak hours and will not have a significant impact the operation of the adjoining junctions. Furthermore, they will be temporary in nature and of relatively short duration. The overall residual impact during the construction phase of the proposed development on traffic and transportation, after the implementation of mitigations measures outlined above, will be neutral (i.e. short term and not significant).

4.7.2 Operational Phase

4.7.2.1 2030 Opening Year

Typically, a DOS of less than 0.9 normal design threshold for signalised junction is considered to indicate satisfactory performance (i.e. operating in an efficient and stable condition). A DOS of between 0.9 and 1 for signalised junction represents variable operation, and may be said to be operating adequately, if the queue and delay are deemed acceptable. DOS values in excess of 1 represents an oversaturated condition.

In 2030 with calling an all-red stage for pedestrian movements, Junction 2 will operate within the normal design threshold in both the morning and evening peak hours in 2030 for both the "without" development and "with" development scenarios.

4.7.2.2 2045 Design Year

In 2045 with calling an all-red stage for pedestrian movements, Junction 2 marginally operate within the normal design threshold in both the morning and evening peak hours in 2045 for both the "without" development and "with" development scenarios. It should be noted that the likely development of infrastructure (i.e. upgrading Killumney Road, construction of Eastern Link road, Western Link Road and Maglin By-Pass), the provision of public transport infrastructure (BusConnects and light rail) and the provision of the Maglin Greenway to encourage increased modal shift away from the use of the private car will result in a decrease in the traffic at the exiting junctions along Killumney Road (i.e. Greenfields Road, Castle Road, Sunningdale, Link Road, etc.). After completion of these improvements, the performance of this junction could be further improved.

The mitigation measures, future public road and transport infrastructure improvement works and the likely modal shift away from the use of the private car will all further reduce the impact that this development has on the surrounding road network.

The location of the proposed development is ideally situated to take advantage of the existing and proposed public transport and active travel options planned for the area - BusConnects and Light Rail, Maglin Greenway, cycle infrastructure, etc as detailed in the Cork City Development Plan (2022-2028) and CMATS.

4.7.2.3 Conclusion

In view of the above analysis, the overall residual impact during the operational phase of the proposed development on traffic and transportation, after the implementation of mitigations measures outlined above, will be neutral (i.e. long term and slight).

4.8 Cumulative Effects

4.8.1 Construction Phase

As per Section 4.7.1.

4.8.2 Operational Phase

Cumulative impacts are the potential combined impacts from the other committed developments in conjunction with the proposed development. At the time of writing, three other developments (including Stonecrest Phase 1 development, Stonecrest Phase 2 development and Heathfield Phase 4 development) in the vicinity of proposed development were obtained planning permission from the An Bord Pleanála. Those permitted developments shall be considered for this study in both the "without" and "with" development scenarios. This is because whether or not the proposed development is built, the trips generated by those permitted developments will still apply. The overall cumulative impact during the operational phase of the proposed development on traffic and transportation can be reference to the Section 4.7.2.

4.8.3 Potential Cumulative Effects with Local Plan

The potential cumulative impacts of the relevant plan for the area were assessed, which is considered to be the Cork City Development Plan 2022. The assessment of the potential impacts on the environment of the Cork City Development Plan 2022 was undertaken utilising the Strategic Environmental Objectives (SEOs) which are detailed in Table 5.1 of the CDP's Strategic Environmental Assessment. The potential cumulative impacts of the Plan were assessed having regard to these SEO's. Table 5.1 of the SEA identifies the SEO's for 'Material Assets' as including:

Optimise existing infrastructure and provide new infrastructure to match population distribution proposals - this includes transport infrastructure.

Table 7.5 of the CDP's Strategic Environmental Assessment, 'Comparative Assessment of each of the Alternatives against Strategic Environmental Objectives' indicates that Alternative/Scenario 3 'Compact Liveable Growth', the 'Selected Scenario' has positive interactions with the status of the SEO's for ''Material Assets''.

4.9 Difficulties Encountered

No difficulties were encountered in completing this chapter of the EIAR.

4.10 References

- TII Traffic and Transport Assessment Guidelines;
- TII PE-PAG-02017 - Project Appraisal Guidelines for National Roads Unit 5.3 - Travel Demand Projections (issued in October 2021);
- Design Manual for Urban Roads and Streets (DMURS);
- Cork City Development Plan 2022-2028;
- Cork Metropolitan Area Transport Strategy (CMATS);
- Cork Cycle Network Plan;
- Draft Cycle Design Manual (September 2023); and
- Smarter Travel – A New Transport Policy for Ireland 2009-2020.

CHAPTER FIVE

MATERIAL ASSETS – SERVICES, INFRASTRUCTURE & UTILITIES

CHAPTER FIVE

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CHAPTER 5 | Material Assets – Services, Infrastructure & Utilities.

5.1 Introduction

This section of the Environmental Impact Assessment Report (EIAR) document has been prepared by Liam O'Toole, DOSA Consulting Engineers.

This chapter assesses the material assets that could potentially be impacted by the proposed development including services, utilities, and infrastructure, within and around the site during the construction and operational phases. Impacts can be both positive and negative, direct and indirect, temporary and permanent in nature. This chapter assesses the impacts on the existing environment to include the following:

- foul sewerage,
- surface water drainage,
- water supply,
- electricity supply,
- ESB Networks
- public lighting
- open Eir/ broadband.
- Gas Networks Ireland

5.2 Methodology

The significance of the impact of the proposed development on the existing environment will be described in this chapter. A desktop study investigating existing services, infrastructure, and utilities serving the development area was conducted. This involved the examination of recorded material gathered from the following sources.

- Cork City Council Stormwater Asset Records
- Uisce Eireann Asset Records (Foul Sewer and Watermain Networks).
- Site Survey (Feature & Topographical Data)
- ESB Networks Records (Electricity Supply).
- Telecommunications Providers - Eir,
- Ordnance Survey Ireland (OSI) Mapping.
- Aerial Photography.
- Office of Public Works (OPW) Flood Hazard Mapping; (floodinfo.ie)
- Gas Networks Ireland Records

Information received was further supplemented by a series of site visits/investigations and consultations with the Local Authority – Cork City Council.

The assessment of the elements within this chapter has been completed in line with the relevant standards and guidelines associated with each element. In addition to EPA guidelines, the following standards and guidelines have informed the assessment process:

The proposed surface water drains have been designed in accordance with the

- Greater Dublin Strategic Drainage Study (GDSDS) Volume 2 – New Developments
- Sustainable Drainage Strategy – South Ballincollig Drainage Study (December 2021)
- CIRIA report C753 The SuDS Manual-v6
- Nature-based Solutions to the Management of Rainwater and Surface Water Runoff in Urban Areas – Water Sensitive Urban Design
- Department of the Environment's Recommendations for Site Development Works for Housing Areas
- Department of the Environment's Building Regulations, "Technical Guidance Document Part H Drainage and Wastewater Disposal"
- BS EN 752: 2008 Drain and Sewer Systems Outside Buildings Part 4: Hydraulic Design and Environmental Considerations.
- Uisce Eireann Code of Practice for Wastewater Management Doc IW-CDS-5030-03.
- Uisce Eireann Code of Practice for Water Infrastructure Doc IW-CDS-5020-03.
- Wastewater Pumping Stations & Rising Main Doc IW-TEC-800-02
- EN 13201 Road Lighting – European Standard.
- BS 5489 Design of Road Lighting – British Standard.
- Housing Schemes: Guidebook for ESB Networks Standards for Electrical Services.

5.3 Existing Environment

5.3.1 Description of the Existing Environment

The subject site is located approximately 8.0km southeast of Cork City Centre in Carriganarra on the southern side of Ballincollig to the south of the Killumney Road with a cluster of derelict agriculture buildings to the north of the site. The lands form part of the South Ballincollig/Maglin Urban Expansion Area as identified in the Cork City Development Plan 2022 (CDP). Most of the subject lands are zoned within the 'ZO 1 Sustainable Residential neighbourhoods' in the CDP, with southern areas of the site included within the 'ZO 15 Public Open Space' zoning objective. The existing Limeworth and Heathfield estate which is currently being constructed runs along the site's northern boundary with the site bound to the south, east and west by other lands identified within the wider South Ballincollig/Maglin Urban expansion area.

5.3.2 Access

Access to the site is from a proposed extension to the already constructed section of "Maglin UEA Sustainable Access Corridor" which was constructed as part of the Heathfield Development directly to the north of the said lands (which is nearing completion).

5.3.3 Surface Water Drainage

The site is within hydrometric area19 (Lee, Cork Harbour and Youghal Bay). Hydrometric area No19 includes the surface catchment drained by the River Lee and all streams entering tidal water in Cork Harbour and Youghal Bay and between Knockaverry and Templebreedy. The site is in the sub catchment of Glasheen(Corkcity)_SC_010 (EPA Segment Code 19_17). The surface water catchment divide is shown on Figure 5.1.

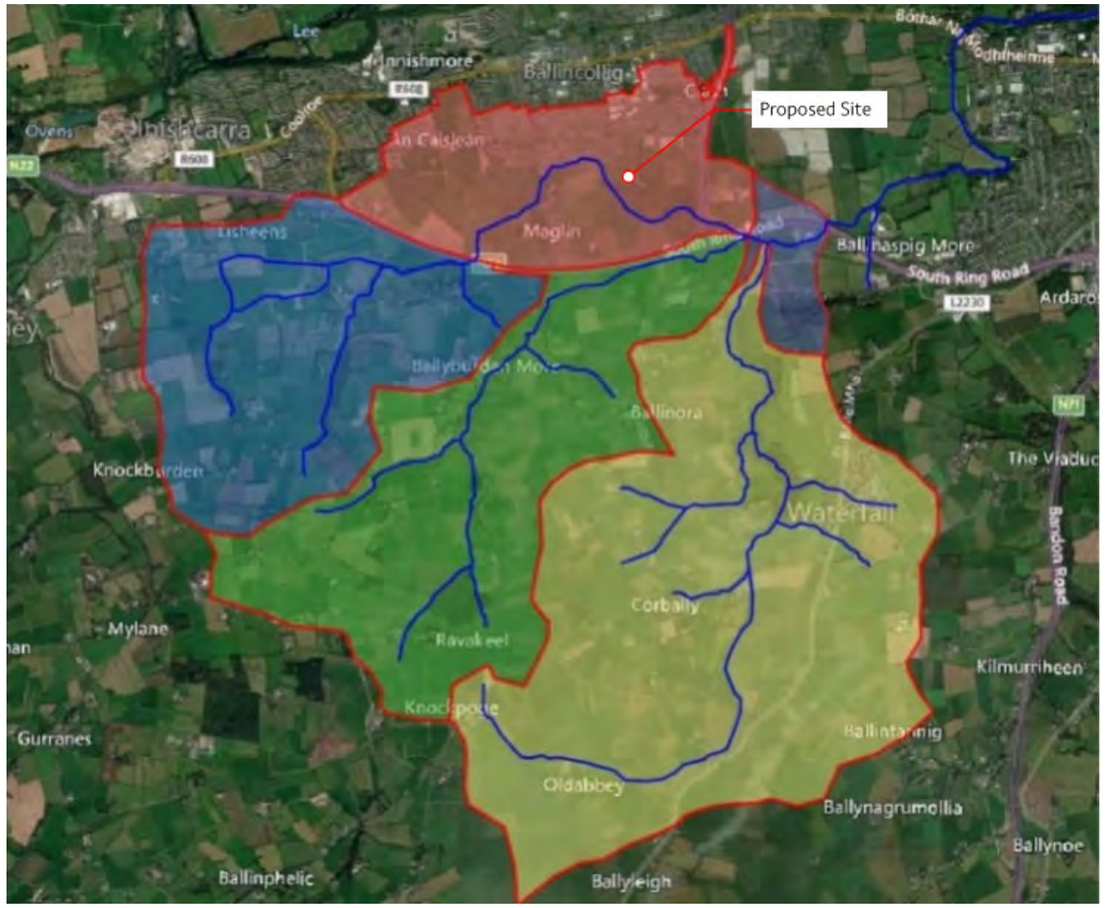


Figure 5.1 Hydrological Features of the Area

The main hydrological features of the area are the "Lisheens Stream" and "Maglin" networks. Both of these watercourse's flow in a westerly direction. The Maglin North watercourse is joined by the Maglin South approximately 2km downstream from the subject site before discharging to the Curragheen River, which is approximately a further 2km downstream. The Curragheen River then flows in a north-easterly direction and joins the River Lee before ultimately discharges to Cork harbour. Figure 5.2 below illustrates the main hydrological features associated with the site.

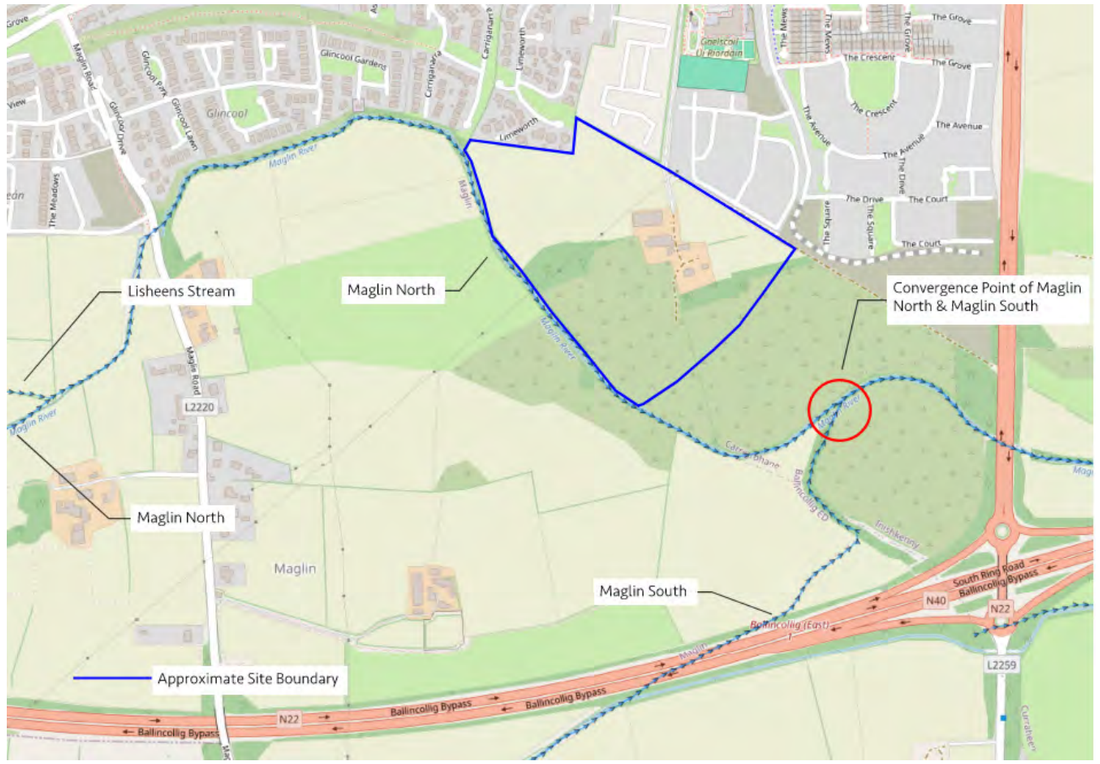


Figure 5.2 Hydrological Features of the Area

5.3.4 Foul Water Drainage

There are no records or evidence indicating the presence of any constructed foul water drainage infrastructure within the site.

The nearest foul water drainage system to the site is the network constructed as part of the adjoining Heathfield development to the north of the site. This is currently nearing completion. Existing foul sewer asset drawings have been obtained from Uisce Eireann and are depicted in Figure 5.3 below



Figura 5.3 Uisce Eireann Foul Assets



Figure 5.4 Uisce Eireann Watermain Assets

5.3.5 Potable Water

From available water main records and liaison with Uisce Eireann, the following existing watermains have been identified within the vicinity of the site:

- 1 No. 150mm diameter watermain located in the "Maglin UEA Sustainable Access Corridor" constructed as part of the Heathfield Development to the north.
- 1500mm City & Harbour Watermain Supply from Inniscarra to Ringaskiddy traverses the site. This is protected by a wayleave. It is not proposed to connect to or interfere with this asset.

The nearest potatble water drainage system to the site is the network constructed as part of the adjoining Heathfield development to the north of the site. This is currently nearing completion. Existing watermain asset drawings have been obtained from Uisce Eireann and are depicted in Figure 5.4.

5.3.6 Electrical Supply

Based on information received from ESB Networks, the areas adjacent to the proposed development are served by extensive networks of Low Voltage and Medium Voltage power supplies, routed both overhead and under- ground. There is currently a

- 10KV/20KV Medium Voltage overhead Line from the southwest serving the derelict farm
- 38KV overhead Line traversing the site from the southwest

These are depicted in Figure 5.5.

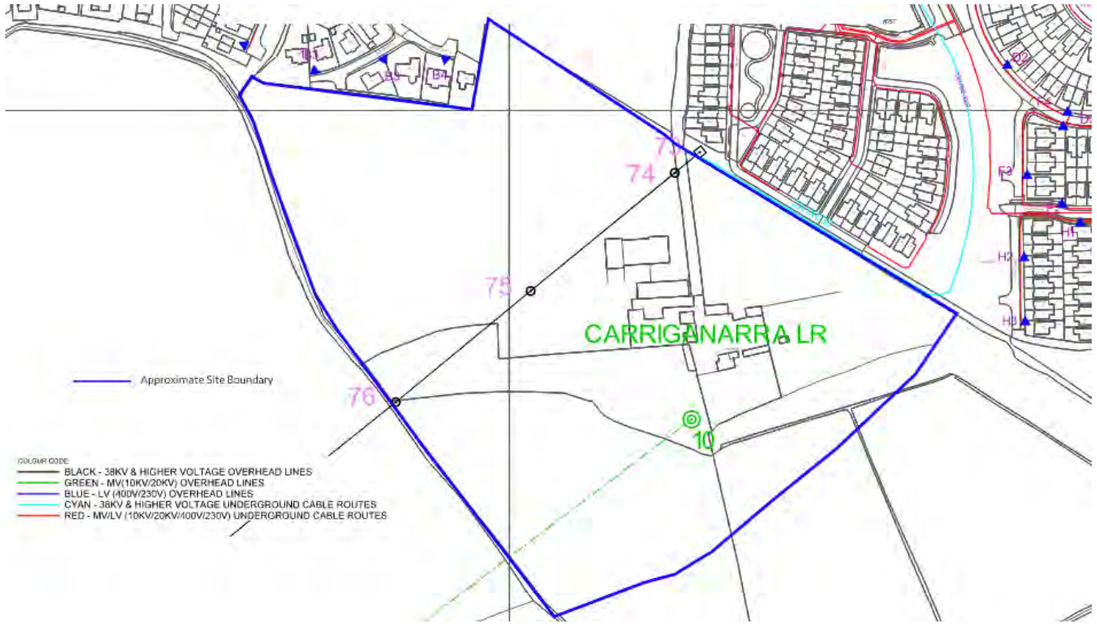


Figure 5.5 Low & Medium Voltage Infrastructure

5.3.7 Telecommunications

From utility maps received from EIR, there are telecommunications networks in the vicinity of the proposed development. Refer to Figure 5.6



Figure 5.6 Open Eir Network

The National Broadband Ireland online network mapping indicates that the site is served by commercial providers with the remainder lying within the National Broadband Plans intervention area details which are highlighted in Figure 5.7.

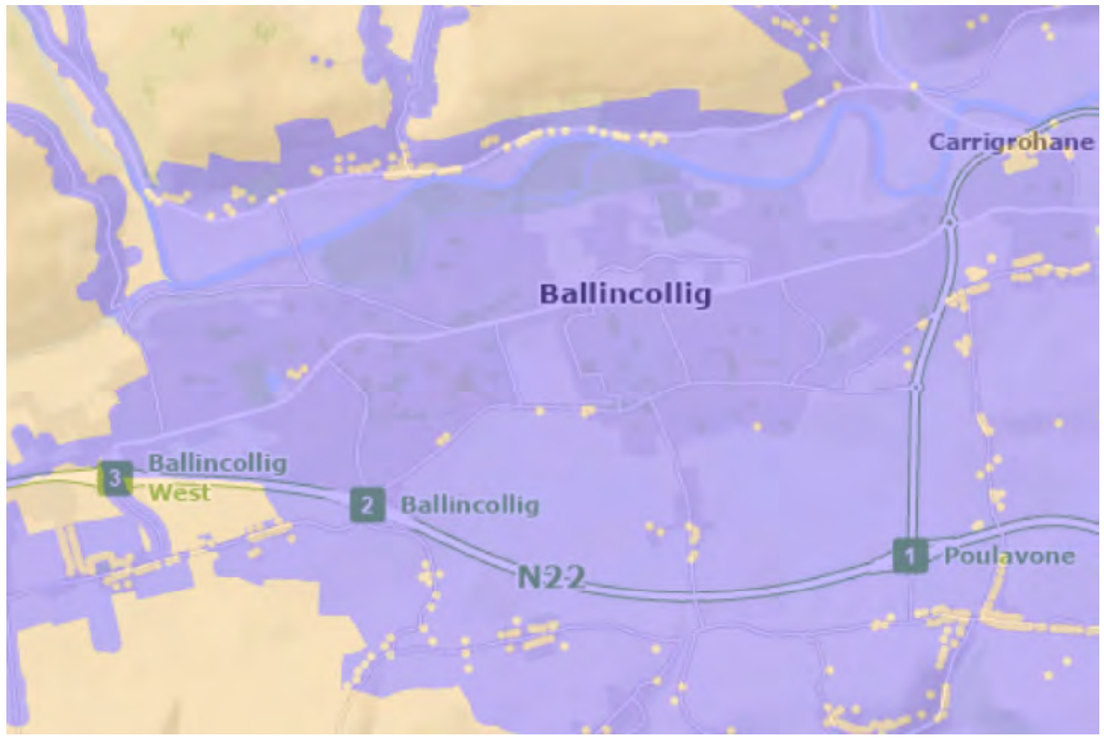


Figure 5.7 National Broadband Plans intervention area

5.3.8 Public Lighting

There is currently no Public Lighting serving the subject site. The existing "Maglin UEA Sustainable Access Corridor" to the north (interface area between proposed site access /adjoining development and Killumney Road) is currently served by public lighting with the columns positioned generally on both the eastern & western side of the road. Details are which are highlighted in Figure 5.8.



Figure 5.8 Existing Public Lighting Infrastructure at junction of Maglin UEA Sustainable Access Corridor and Killumney Road

5.3.9 Gas Networks Ireland

From utility maps received from Gas Networks Ireland, there is an existing gas supply network in the vicinity of the proposed development. Refer to Figure 5.9.



Figure 5.9 Gas Networks Ireland

5.4 Proposed Development

The proposed project description is described in detail in Chapter 2 of the EIAR.

5.4.1 Proposed Storm Water Drainage

The proposed surface water drainage system, refer to Appendix 5-1, is in accordance with Sustainable Urban Drainage Systems (SUDS) principles.

The development site is a single overall catchment subdivided into a no. of sub catchments for design purposes. Groundwater flow direction is interpreted to be from the northwest / southeast, providing baseflow to the Lisheens Stream /Maglin North Watercourse.

The runoff from the entire developed site will however discharge to the existing drainage network as detailed below in Figure 5.10.



Figure 5.10 Stormwater Discharge Location

The increased runoff flows will be attenuated to greenfield runoff rates prior to discharging to the watercourse. There are no anticipated negative impacts from the proposed design methodology.

Discharge from the site will be from two locations along the south-western boundary. One single discharge point will facilitate the overall development. The second will facilitate the runoff from the proposed extension of the "Maglin UEA Sustainable Corridor". Discharges will be via a headwall to dissipate energy and avoid bank erosion / scouring in the streambed.

The proposed storm water drainage system has been designed to cater for all surface water runoff from all hard surfaces within the proposed development including roadways, roofs, parking areas etc. The development has been split into several catchment areas.

Surface water generated from the proposed residential development will be conveyed through a proposed surface water network including SuDS and attenuated / managed on site prior to final discharge at the agreed run-off rates.

Surface water discharge rates from the proposed surface water drainage network will be controlled by a vortex flow control devices (Hydrobrakes or equivalent) and associated attenuation tanks along with SuDS measures. Surface water discharge will also pass via a full retention fuel / oil separators (sized in accordance with permitted discharge from the site). The storm sewer

network was designed using Innovyze MicroDrainage modelling software. Outputs from the storm sewer design can be found in the Appendices of the Infrastructure Report in Appendix 2-4.

The proposed surface water drainage network will collect surface water runoff from the site via a piped network prior to discharging off site via the attenuation tanks, flow control devices and separator arrangement as noted above. Prior to entering the system, the stormwater generated will be treated through a number of nature-based solutions in line with adopted SuDs measures. Design details of the proposed SuDS measures are contained in the Drainage Impact Assessment contained in Appendix 7-4

All flow velocities within the network fall within the limits of 0.75 and 3m/sec as set out in "Recommendations for Site Development Works" as published by the Department of Environment. The storm water network and the attenuation system is designed to accommodate the 100-year return period plus an additional 20% to account for the effects of climate change. A schematic overview of the proposed stormwater network is depicted in Figure 5.11 below Drawings for the proposed Storm Water Network are contained in Appendix 5-1.



Figure 5.11 Proposed Storm Water Network

5.4.2 Proposed Foul Sewer Drainage

The proposed development will require a new separate drainage network to collect and convey the effluent generated by the proposed development. Gravity sewers are designed using Micro-Drainage WINDES design software to ensure self-cleansing velocities will be achieved on all pipe runs. For each pipe run the accumulative number of households contributing to that section of pipework is used to calculate the design flow. The drainage network for the proposed development has been designed in accordance with:

- Uisce Eireann Code of Practice for Wastewater Infrastructure Doc IW-CDS-5030-03.
- Wastewater Infrastructure Standard Details (Uisce Eireann)
- Wastewater Pumping Stations & Rising Main Doc IW-TEC-800-02
- Building Regulations, Technical Guidance Document Part H 'Drainage and Wastewater Disposal'
- IS EN752, "Drain and Sewer Systems Outside Buildings"

Within that area of the development, 225mm and 150mm diameter sewers will collect discharges from houses and apartments and flow by gravity to the southwestern corner of the site. It is proposed to install a pumping station which will collect, store and pump to the existing Uisce Eireann drainage system to the existing foul sewer network located in Killumney Road

Final details will be at Connection Agreement stage and in accordance with the issued Confirmation of Feasibility(COF) as issued by Uisce Eireann (IW).

A schematic overview of the proposed site Foul Sewer network is depicted in Figure 5.12 below



Figure 5.12 Proposed Foul Sewer Network

A Pre-Connection Enquiry (COF) was lodged with Uisce Eireann to allow an assessment of the local & regional infrastructure to accommodate the proposed development. Uisce Eireann reverted to this enquiry confirming feasibility to connect (Ref:CDS25007329).

A Statement of Design Acceptance letter has been received from Uisce Eireann for the proposed network.

Refer to the Infrastructure Design Report in Appendix 2-4 for copies of both the Confirmation of Feasibility and Letter of Design Acceptance from Uisce Eireann. The proposed Wastewater Drainage Drawings for the development are contained in Appendix 5-1.

5.4.3 Proposed Water Supply

The proposed development will require a new separate watermain network to serve the proposed development. The network for the proposed development has been designed in accordance with:

- Uisce Eireann Code of Practice for Water Infrastructure Doc IW-CDS-5020-03
- Building Regulations, Technical Guidance Document Park B 'Fire Safety'

Uisce Eireann Assets indicate a public watermain running in the public road "Killumney Road"to the north of the adjoining development which is currently nearing completion. The proposed development will be served by a network of 200mm, 150mm and 100mm diameter watermains laid out as shown on the engineering drawings in Appendix 5-2. The mains will be connected to the existing watermain in the adjoining Heathfield development to the north which is in turn connected to the public watermain in the Killumney Road.

The new site watermain network has been designed to adequately serve the firefighting requirements of the development. Fire hydrants will be provided such that each house will be within 45m of a hydrant and these hydrants will be provided so as to be fully accessible to the fire service. Sluice valves will be installed on all principal watermain connections to ensure that sections of the development can be isolated for maintenance and repaired as required. Appropriate positioning of scour valves is at low points within the design.

A water-meter will be installed on the main connections, subject to detailed agreement with Uisce Eireann/Cork City Council.

A schematic overview of the proposed Watermain network is depicted in Figure 5.13 below.



Figure 5.13 Proposed Watermain Network

A Pre-Connection Enquiry (COF) was lodged with Uisce Eireann to allow an assessment of the local & regional infrastructure to accommodate the proposed development. Uisce Eireann reverted to this enquiry confirming feasibility to connect (Ref:CDS25007329).

A Statement of Design Acceptance letter has been received from Uisce Eireann for the proposed water network.

Refer to the Infrastructure Design Report in Appendix 2-4 for copies of both the Confirmation of Feasibility and Letter of Design Acceptance from Uisce Eireann. The proposed Watermain Drawings for the development are contained in Appendix 5-2.

5.4.4 Proposed Electrical Supply

The proposed development is to be served by the ESB via a new network connection to be agreed upon with the ESB prior to construction. An underground LV network will be provided for by the developer along with the supply of any substations and mini pillars required to serve all units within the development.

The existing 10KV/20KV Medium Voltage overhead Line from the southwest serving the derelict farm will become redundant and be removed. The 38KV overhead Line traversing the site from the southwest will be diverted via the construction of a new mast and underground ducting.

5.4.5 Proposed Telecommunications

The proposed development is to be served by a new telecommunications network. This network with be constructed in a series of underground cabling and chambers (located primarily within footpaths and under roads) All buildings will be connected to this system with appropriate ancillary ducting.

5.4.6 Proposed Public Lighting

The scheme proposes public lighting to all roads and paths within the development.

The public road lighting is designed to EN 13201 and British Standard BS 5489 utilising the software package "Lighting Reality Pro". This design package is used to select an appropriate lantern type and to optimise the lighting design. The selected lantern is designed and manufactured to comply with EN 13201 with IP65 optic, and 10 joules shock resistant gear housing. The proposed Lighting Strategy prepared by Molloy Engineering is included in Appendix 5-3 of this EIAR.

The primary lighting mitigation which will be implemented for this project relates to bats, as these are considered the most sensitive species in relation to night-time lighting. It is noted however that the mitigation proposed will also lessen in the impact in relation other nocturnal species such as Badger and Otter. The lighting scheme has considered best practice, as published by the UK Bat Conservation Trust (2018), in respect of mitigation strategies, to minimise the impact of outdoor lighting upon bat populations. The external lighting design concept is to illuminate lighting levels outlined within BS EN 17037:2018 external lighting. The following mitigation measures have been incorporated into the site lighting plan

- Warm White type, have been specified, with a Colour Temperature of 2,700 kelvin, as is considered least disruptive to the emergence of bats from roosts at dusk, and subsequent movement from habitats to foraging locations.
- LED luminaires have been specified due to their sharp cut-off, lower intensity, good colour rendition and dimming capability;
- Column heights have been carefully considered to minimise light spill. Specialist bollard and ground recessed lighting have been included where possible;
- Lanterns are of the fully cut off type with no light output above the horizontal plane;
- Screening by existing trees and newly planted trees will prevent light spillage onto boundary habitats; and
- Exterior lighting will be controlled from a timeclock, daylight sensor and manual switching that will be located within the external mini pillars.

5.5 Impact Assessment

Four headings are used to consider the potential impact of the proposed development on the existing material assets. These can be categorised as follows

- Do Nothing Scenario.
- Construction Phase.
- Operation Phase.
- Cumulative Impacts.

5.5.1 Do Nothing Scenario

The 'Do Nothing' scenario refers to what would occur should the proposed development not be progressed. In this scenario, the impacts described in this chapter would not emerge meaning that the 'Do Nothing' scenario is considered to have a neutral effect with regards to utilities. The 'Do Nothing' scenario is therefore not addressed any further in this chapter.

5.5.2 Potential Construction Phase Impacts

The construction phase of the proposed development has the potential to result in slight and temporary impacts to the existing population in the local area.

5.5.2.1 Earthworks & Civil Works

The bulk earthworks and excavations required within the development will result in both the importation and exportations of some material. It is anticipated fill quantities will be greater than the expected cut material to be generated within the development from excavation. Excavation for grading within the development will disturb the existing ground and has potential to introduce suspended solids into water run-off from the site.

5.5.2.2 Asset Installation

The construction of below-ground services such as watermain, storm & foul pipeline, telecommunication conduits, ESB conduit will require excavation works for trenching. Similar to bulk earthworks, the excavation work required for the trenches has the potential to introduce suspended solids to water run-off from the site.

Road openings and associated licenses will not be required to connect the proposed watermain, and foul, networks to the existing public networks on the adjoining Heathfield development as the road infrastructure hasn't been taken in charge. All legal agreements are in place. Connection works will require minor local traffic management measures for the duration of the works.

Regarding the surface water run-off from the site, there is potential for this to become contaminated from construction activities leading directly to a negative impact on the receiving waters to the south of the development. This could result in a moderate short-term negative impact on the water quality in the Maglin Watercourse.

5.5.2.3 Construction Personnel

The activities during the construction phase will generate effluent and sanitary waste from workforce facilities provided for the duration of the proposed works. A site compound will be provided, and a temporary foul connection and potable water connection will be required for the duration of construction works. These have the potential for a direct negative impact on the existing water/wastewater infrastructure in the area of the development and may result in a slight short-term impact on the capacity of the existing water/wastewater networks.

5.5.3 Potential Operation Phase Impacts

5.5.3.1 Foul and Water

The operation of the proposed development will result in the generation of additional foul effluent an increase in water demand. This has the potential, in the absence of any mitigation, to have a direct negative impact on the water/ wastewater infrastructure serving the development resulting in a significant long-term impact on the capacity of the water/wastewater infrastructure.

5.5.3.2 Surface Water

Surface water run-off from the development site during the operation phase has the potential to be contaminated with extra organic material. Inadequate control measures within the development could result in large quantities of surface water discharge from the development lands into the Maglin Watercourse. This could lead to significant long-term negative impacts on the water quality and quantity entering the surrounding watercourses.

5.5.3.3 Potential Cumulative Impacts

The potential cumulative impacts of the relevant plan for the area were assessed, which is considered to be the Cork City Development Plan 2022. The assessment of the potential impacts on the environment of the Cork City Development Plan 2022 was undertaken utilising the Strategic Environmental Objectives (SEOs) which are detailed in Table 5.1 of the CDP's Strategic Environmental Assessment. The potential cumulative impacts of the Plan were assessed having regard to these SEO's. Table 5.1 of the SEA identifies the SEO's for 'Material Assets' as being to.

- Optimise existing infrastructure and provide new infrastructure to match population distribution proposals - this includes transport infrastructure.
- Ensure access to affordable, reliable, sustainable and modern energy for all which encourages a broad energy generation mix to ensure security of supply – wind, solar, hydro, biomass, energy from waste and traditional fossil fuels.
- Promote the circular economy, reduce waste and increase energy efficiencies.
- Ensure there is adequate sewerage and drainage infrastructure in place to support new development.

Table 7.5 of the CDP's Strategic Environmental Assessment, 'Comparative Assessment of each of the Alternatives against Strategic Environmental Objectives' indicates that Alternative/Scenario 3 'Compact Liveable Growth', the 'Selected Scenario' has positive interactions with the status of the SEO's for ''Material Assets'.

The potential cumulative impacts on material assets have been assessed having considered other permitted and planned developments in the surrounding area. The nearby proposed and permitted developments considered are highlighted in Table 1.1.

The cumulative operational impact of the proposed development and other consented development are considered to be slight with regards to services, infrastructure, and utilities With the proposed mitigation measures being implemented and monitored.

5.6 Mitigation Measures

This section addresses the measures to be implemented during the construction and operational phases of the development to mitigate the potential impacts outlined earlier in this chapter.

5.6.1 Construction Phase

A Construction and Environmental Management Plan (CEMP) has been prepared and has been appended to this EIAR in Appendix 2-1. The final CEMP, which will include any additional construction phase mitigation measures required pursuant to conditions attached to any grant of permission, along with all measures currently set out in the CEMP, will be implemented in full. Site inductions for all construction staff and sub-contractors aim to ensure all are aware of the procedures and best practices as outlined in the CEMP.

Control measures shall be put in place to protect surface waters from contamination prior to the commencement of any site works. Control measures will also be provided to control surface run-off during the construction phase. These proposed measures follow best practice and are set out in full in the CEMP.

For ease of reference, the principal mitigation proposed in relation to the type of construction activities to facilitate the development of material assets on the site include:

- Surface water shall be directed to settlement ponds where topographically feasible. Where this is not practicable the surface water shall be allowed to percolate to ground and/or be removed by tanker to a designated waste-water treatment plant if excessive build-up of surface water on site occurs.
- Protection of surface water gullies or drains using silt fences
- Use on-site bund structures (including incorporating existing ditches) on site to retain surface waters on site and to prevent runoff from the site.
- Minimal and short-term storage and the removal of excess materials (soil, stones, and construction wastes) off site in an efficient manner.
- Daily checks of surface water regime on site and logging of same.
- Works associated with excavations or earth moving not to be undertaken in periods of forecasted bad weather.
- Drainage channels beside construction roadways to direct surface water to settlement areas and allow for natural percolation to ground.
- Ensure good site management is maintained at all times during the construction phase including regular site clean-ups and use of appropriate bins.
- Chemicals or fuel/oils shall be stored in temporary bunded storage areas and plant is re-fuelled via delivery trucks in specific bunded re-fuelling areas, rather than the storage of large quantities of fuel on site in a designated bunded area.
- The pouring of concrete, application of chemicals, painting or any other activity that has the possibility of being toxic to aquatic life shall be undertaken in a controlled and isolated manner, preventing the possibility of any pathway to a surface water source.
- Construction of works of assets (foul, storm, watermain, telecommunications, ESB ducting/ structures and any other utilities insofar as possible will be constructed outside the riparian zone of the Maglin River

The construction compound will be adequately served regarding foul drainage and water supply for construction staff. Effluent generated on site from the contractors' sanitary facilities will be discharged to a holding tank and removed off site by a licenced removal contractor in accordance with Cork City Council and Uisce Eireann requirements. The potable water supply to the compound shall be agreed between the site contractor and Uisce Eireann and shall be protected from possible contamination by construction activities.

The connection of all proposed utilities to existing infrastructure shall be in accordance with the relevant code of practice as listed below and coordinated by the relevant utility provider. Where the standards and codes below refer to or rely on additional codes, then these additional codes are deemed to apply to these works where they are relevant to the matter under consideration.

- "Code of Practice for Water Infrastructure", Doc No. IW-CDS-5020-03, July 2020 (Revision 2) – Uisce Eireann
- "Code of Practice for Wastewater Infrastructure", Doc No. IW-CDS-5030-03, July 2020 (Revision 2) – Uisce Eireann.
- Wastewater Pumping Stations & Rising Main Doc IW-TEC-800-02
- ESB Networks: "National Code of Practice for the Customer Interface", Doc No. DOC-030303-AEN April 2021.

Construction Waste generated during the construction phase shall be managed in line with the CRWMP "Construction Resource & Wast Management Plan" Report appended to this EIAR in Appendix 2-5.

Best practice noise and vibration control measures will be employed by the contractor during the construction phase in order to avoid exceedance of the adopted construction noise threshold values at the nearest NSLs. The best practice measures set out in BS 5228 (2009 +A1 2014) Parts 1 and 2 will be complied with. This includes guidance on several aspects of construction site mitigation measures, including, but not limited to:

- Selection of quiet plant
- Control of noise sources
- Screening
- Hours of work
- Liaison with the public

Noise control measures that will be considered include the selection of quiet plant, enclosures and screens around noise sources, limiting the hours of work and noise monitoring.

5.6.2 Operational Phase

All installed assets including watermain, foul, storm and utility services will be and surveyed prior to being made operational. In relation to stormwater assets this will include pressure testing. Uisce Eireann assets (i.e. – foul sewer and watermain) will be tested in accordance with the codes of practice prior to being commissioned by Uisce Eireann. The purpose of this will be to identify any possible defects. Any defects will be made good prior to operation.

Waste generated by the development during operation will be removed by licensed waste contractors only and in accordance with the Operational Waste Management Plan compiled by AWN Consulting. Refer to Appendix 5-4.

Water conservation measures such as the use of low flush toilets and low flow taps will be incorporated into the proposed dwellings to reduce water volumes entering the foul water network. This measure will also reduce the demand on the public water supply.

The proposed storm water drainage system has been designed to cater for all surface water runoff from all hard surfaces within the proposed development including roadways, roofs, parking areas etc.

Surface water generated from the proposed residential development will be conveyed through a proposed surface water network including SuDS measures and an attenuation system on site prior to final agreed run-off rates. Surface water discharge will also pass via a full retention fuel / oil separators (sized in accordance with permitted discharge from the site). Surface water discharge rates from the proposed surface water drainage network will be controlled by a vortex flow control devices (Hydrobrakes or equivalent) The storm water network and attenuation system are designed to accommodate the 100-year return period plus an additional 20% to account for the effects of climate change.

5.7 Monitoring

5.7.1 Construction Phase

Regular site audits will be undertaken during the construction phase to visually monitor the works and ensure compliance with all measures as set out in the CEMP.

Daily checks of the surface water regime put in place during the construction phase will be undertaken with detailed logs maintained.

Communications with utility providers will be maintained during construction. Supervision of work by the respective utility operator as required will be accommodated during the works.

5.7.2 Operational Phase

Watermain and foul sewer assets become the property of Uisce Eireann at operational phase and responsibility for same reverts to them. Water usage within the proposed development will be monitored by Uisce Eireann utilising water meters. The monitored water usage will be utilised to locate and isolate any leaks which may develop over time or are present within the network.

The relevant service providers regarding power supply and telecommunications will be responsible for monitoring their respective services.

5.8 Residual Impacts

5.8.1 Predicted Impacts of The Proposed Development

This section allows for a qualitative description of the resultant specific direct, indirect, secondary, cumulative, short, medium and long-term permanent, temporary, positive and negative effects as well as impact interactions which the proposed development may have, assuming all mitigation measures are fully and successfully applied.

5.8.2 Construction Phase

In the absence of mitigation, potential impacts associated with the construction phase of the proposed development would be expected to include potential disruption to local natural and human material assets resulting in both short-term and long-term impacts. In circumstances where the proposed mitigation measures referenced in this chapter are effectively implemented for this development, the residual impacts on material assets will be short term and slight during the construction phase.

5.8.3 Operation Phase

The proposed development will have a long-term positive impact on the existing environment by creating high quality residential units to cater for the needs of a growing population and responding to a significant housing need and demand in the locality and the region, while occupying a presently underutilised zoned site at an appropriate location for sustainable development.

The predicted wastewater generation of the proposed development will be adequately accommodated in the local foul sewer network, as confirmed in the Confirmation of Feasibility from Uisce Eireann. No additional planning permissions or other third-party consents are required to deliver this infrastructure.

In relation to water supply, the Confirmation of Feasibility from Uisce Eireann confirms a water connection is feasible. No additional planning permissions or other third-party consents are required to deliver this infrastructure.

A 'Design Acceptance Statement' from Uisce Eireann has been received for both the foul sewer design and water supply design and is submitted with the application.

In relation to stormwater the proposed development is designed to comply with the provision of SUDS and is therefore unlikely to have any residual impacts in terms of the impact on surface water drainage.

The proposed development is unlikely to have any significant impact on the local electricity, telecommunications, or public lighting supply

Where the proposed mitigation measures referenced in this chapter are effectively implemented for this development, the residual impacts on these material assets will be long-term and neutral.

5.8.4 Cumulative Impacts

Cumulatively with other surrounding, permitted, planned and existing development, it is predicted that the proposed development will contribute to the improvement of the overall urban structure and fabric and will benefit the surrounding area through improvements to the public realm and both cyclist and pedestrian infrastructure. Where the mitigation measures referenced in this chapter have been implemented the cumulative effects of development on electrical supply, telecoms, wastewater generation, water supply and stormwater runoff and any other utilities are anticipated to be long-term and neutral.

5.9 Difficulties in Compiling Information

The were no notable difficulties encountered when compiling information.

CHAPTER SIX

LAND, SOILS & GEOLOGY

CHAPTER SIX

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CHAPTER 6 | Land, Soils & Geology

6.1 Introduction

This Chapter was prepared by Dan Keohane of Keohane Geological & Environmental Consultancy (KGEC). Mr. Keohane (BSc Hons Geology; MSc Applied Geophysics) received an honors degree in Geology from UCC in 1989, and a Master's degree in Applied Geophysics from UCG in 1991. Mr. Keohane has been working on environmental impact assessment for a wide range of project types for the past 30 years. Areas of expertise include geological assessment, groundwater and surface water assessment for various developments including rock quarries, sand & gravel pits, water supply, wind farms, waste management facilities, housing developments, and roads projects.

This Chapter addresses the potential significant direct, indirect and cumulative impacts on land, soils and geology resulting from the proposed large-scale residential development (LRD) at Carriganarra, Carrigrohane, Ballincollig, Cork. The existing land use, soils and geological setting are described, potential impacts on these environmental aspects assessed and evaluated, and where appropriate, measures recommended to avoid, reduce or mitigate potential impacts. The residual impacts following mitigation are then summarised.

A full description of the proposed development is provided in Chapter 2. In summary, the proposed development comprises a LRD at Carriganarra, Carrigrohane, Ballincollig, Cork. The proposed development consists of the demolition of an existing farmyard and associated agricultural buildings and the construction of a residential development of 300 No. units (128 no. dwelling houses and 172 no. apartment/duplex units). Vehicular access to the proposed development will be provided via 2 no. entrances from the proposed extension of the sustainable access corridor (from Heathfield), which will extend to the western side of the site. Several separate pedestrian entrances will also be provided to adjoining residential developments. Ancillary site works include the provision of bicycle parking and bin storage facilities serving the proposed apartment/duplex buildings, a creche facility, open spaces, raising of ground levels between the proposed residential units and the sustainable access corridor, and undergrounding of an existing overhead powerline.

6.1.1 Scope & Purpose

This chapter of the EIAR provides details of the land use and geological environment in which the development is proposed. It identifies and describes the unconsolidated deposits, their land uses and bedrock geology underlying the site. The hydrogeology of the site is discussed in Chapter 7 (Water).

The purpose of the assessment is to identify the potential direct impacts of the proposed development on geology and land use within the site and potential indirect impacts beyond the site boundary; and to assess the potential impacts in the context of other developments (proposed / completed) to determine cumulative effects. Having identified and quantified the potential impacts, to recommend measures to avoid, mitigate and/or reduce significant potential negative impacts for the construction of the development and during its lifespan, where relevant. To audit the effectiveness of the mitigation measures, a construction monitoring programme is also outlined as set out in the CEMP (Construction & Environmental Management Plan) - Appendix 2-1.

6.1.2 Policies & Guidelines

There are several local, national and international policies and guidelines relied upon in the preparation of this chapter. In addition to the EIAR guidelines (as referenced in Chapter 1), those specific to the land and soils aspect of the environment include:

- Cork City Development Plan 2022-2028 (CDP).
- Environmental Protection Agency, May 2022 guidelines.
- Office of the Planning Regulator, 2022.
- European Commission, 2017 EIA guidelines.
- European Commission, 2017 EIA scoping.
- European Commission, 2013 EIA incorporating climate change.
- Department of Housing, Planning and Local Government 2018 EIA guidelines.
- Institute of Geologists of Ireland, 2013 EIS (EIA) guidelines.
- National Roads Authority 2008 guidelines for geology and hydrogeology assessments.

6.1.2.1 Cork City Development Plan 2022-2028 (CDP)

Chapter 6 of the CDP 2022-2028 addresses Green and Blue Infrastructure, Open Space and Biodiversity. In Sections 6.72 and 6.73, the geological heritage of the city is recognised. Two County Geological Sites are listed within the city, at Blackrock and the Lee Road. Objective 6-27 Areas of Geological Importance states:

Objective 6.27: '*To seek the conservation of important features of geological interest in Cork City'*.

Chapter 7 of the CDP 2022-2028 addresses Economy and Employment. Section 7.68 address Quarries and Aggregate Resources. There are no quarries registered under Section 261 of the Planning & Development Act 2000 within the functional area of Cork City Council, and given its built-up nature, opportunities for quarry development are limited. Objective 7.23 Quarries and Aggregate Resources states:

Objective 7.23: '*To recognise the importance role the mineral extraction and aggregate industry can play by protecting any reserves of aggregates and minerals from development that might impact on their utilisation, Extraction that would result in a reduction of the visual amenity of areas of high amenity or damage to areas of scientific importance or of geological, botanical, zoological and other natural significance including all designated European Sites or have a detrimental impact on residential amenity will not be permitted. The Planning Authority will have regard to the Guidelines for Planning Authorities for Quarries and Ancillary Activities (DoEHLG, 2004) when assessing applications relating to the extraction industry*'.

Chapter 13 of the CDP 2022-2028 outlines Implementation of the Plan. Table 13.3 sets out the contributions of the strategic environmental objectives. In relation to Soil and Land, the guiding principle is to ensure the long-term sustainable management of land. The strategic environmental objectives are:

- Protect soils against pollution, and prevent degradation of the soil resource.
- Promote the sustainable use of infill and brownfield sites over the use of greenfield sites.
- Safeguard areas of prime agricultural land and designated geological sites.

6.1.3 Sources of Baseline Data

The main sources of baseline data and information relating to land, soils and geology include:

- Soils, bedrock, hydrogeology, heritage etc - Geological Survey of Ireland - www.gsi.ie
- Archived maps and reports - Department of Climate, Energy & the Environment - https://secure.decc.gov.ie/goldmine/index.html
- Land use - Environmental Protection Agency - www.epa.ie
- Designated sites – National Parks & Wildlife Service www.npws.ie
- Cork City Development Plan – list of geological heritage sites in Cork City.
- Priority Geotechnical Ltd - Ground Investigation Borehole Logs, provided in Appendix 6-1.
- Hydro Survey - Geophysical Survey Report, also provided in Appendix 6-1.
- KGEC - Ground Investigation Trial Pit Logs, also provided in Appendix 6-1.
- Borehole logs for Ballincollig By-pass site investigation locations near the project site.

The literature reviewed as part of the desk study included:

- Geology of South Cork.
- Soils Association of Ireland and their Land Use Potential.
- Directory of Active Quarries, Pits, and Mines in Ireland, GSI 2001.
- 2022 Cork City Development Plan.
- Memoir of Localities of Minerals of Economic Importance and Metalliferous Mines in Ireland, 1998.
- CAAS Environmental Services Ltd, May 1999. Ballincollig By-Pass EIS.
- Geotech, 1995. Ballincollig By-Pass Site Investigation.

6.1.4 Assessment Methodology

The assessment of geology was carried out with reference to relevant policies, regulations and guidelines (listed above) and following this general methodology:

- The preliminary design of the proposed development was reviewed to identify elements which could have the potential to impact on land and soils.
- Consultation was carried out with agencies with an interest in the geological environment, including Geological Survey of Ireland (GSI).
- A literature review was carried out to determine any policies and / or guidelines to which the proposal should have regard.
- A desk-based assessment of the land use and geological setting relevant to the proposed development was undertaken. It was confirmed that the site is underlain by rock susceptible to karstification. As such, a detailed ground investigation was carried out to evaluate the overburden and bedrock at the project site.
- Field surveys were conducted to collect geological and geotechnical data. A ground investigation was carried out across the site, consisting of geophysical surveys (seismic and resistivity), the excavation of 2 No. trial pits, drilling of 8 No. cable percussion boreholes and drilling of 5 No. rotary boreholes.
- Review of the Biodiversity chapter (Chapter 8) prepared for the project by Dixon Brosnan Ltd to assess the interaction of land use and soils with ecology.
- Findings from the desk-based study, field surveys and ground investigations were used to modify the site layout and inform preliminary foundations design.

The site walkovers and collection of data were carried out on several occasions between July 2023 and December 2025. Initial data collection was used to identify areas that might be unsuitable for development (e.g., poor quality, low-lying areas). There were no land use or geological constraints identified within the site affecting the layout.

The aspects considered in the assessment were soils, land use, slope stability, bedrock geology, and the interaction of these with other aspects of the environment. These are discussed in the sub-sections below.

The information collected during the desk-based assessment, site walkovers and ground investigations were used to establish the importance, quality and sensitivity of the receiving geological environment. This follows the NRA (2008) guidelines as summarised in Table 6-1.

Importance	Criteria	Typical Examples
Very High	Attribute has a high quality, significance or value on a regional or national scale Degree or extent of soil contamination is significant on a national or regional scale Volume of peat and/or soft organic soil underlying route is significant on a national or regional scale	Geological feature rare on a regional or national scale (NHA) Large existing quarry or pit Proven economically extractable mineral resource
High	Attribute has a high quality, significance or value on a local scale Degree or extent of soil contamination is significant on a local scale Volume of peat and/or soft organic soil underlying route is significant on a local scale	Contaminated soil on site with previous heavy industrial usage Large recent landfill site for mixed wastes Geological feature of high value on a local scale (County Geological Site) Well drained and/or highly fertility soils Moderately sized existing quarry or pit Marginally economic extractable mineral resource
Medium	Attribute has a medium quality, significance or value on a local scale Degree or extent of soil contamination is moderate on a local scale Volume of peat and/or soft organic soil underlying route is moderate on a local scale	Contaminated soil on site with previous light industrial usage Small recent landfill site for mixed wastes Moderately drained and/or moderate fertility soils Small existing quarry or pit Sub-economic extractable mineral resource
Low	Attribute has a low quality, significance or value on a local scale Degree or extent of soil contamination is minor on a local scale Volume of peat and/or soft organic soil underlying route is small on a local scale.	Large historical and/or recent site for construction and demolition wastes Small historical and/or recent landfill site for construction and demolition wastes Poorly drained and/or low fertility soils Uneconomically extractable mineral resource

Table 6.1 Estimation of Importance of Soil & Geology Attributes

6.1.5 Consultation

As part of the EIA process, consultation was carried out with organisations and individuals who might have an interest in the soils / geology and land use aspects of the project. The information package sent, and the consultation responses received, are provided in Appendices 1-3 and 1-4 of this EIAR. The response from GSI is summarised here and incorporated, where appropriate, into the avoidance, mitigation and monitoring proposals for the proposed development. In addition, Uisce Éireann's response included a comment on the requirement for using clean inert soil as backfill.

6.1.5.1 Geological Survey of Ireland

The GSI responded to the consultation in correspondence dated 12 May 2025. The GSI advised of its programmes focused on the various geological aspects, such as geological heritage, quaternary geology, bedrock geology, landslide susceptibility, aggregate potential etc. The GSI recommended use of its on-line data and information services. GSI also requested copies of any ground investigation reports prepared for the project.

6.1.5.2 Uisce Éireann (Irish Water)

Uisce Éireann responded on 29 May 2025. It raised the following point in relation to soils:

- Any material used as backfill to raise land levels should be inert and soil testing is required to demonstrate this.

6.2 Receiving Environment

The site is located on relatively flat low-lying agricultural land to the south of Ballincollig and extends to an area of 13.5 hectares (ha). It slopes from approximately 22.5mOD along its northern boundary to approximately 16mOD along its southern boundary. Towards its western boundary it slopes to the river. There is a break-in-slope, more pronounced at the western side, running east-west through the site marking by a change in land quality from well drained grassland to wet grassland. The valley is drained by the Maglin North River (EPA name - Grange Hill Stream). The site consists of several fields and the old derelict farmyard and buildings. The farmhouse was demolished following a fire several years ago. Fields are separated by sod & stone ditch typically with dense hedgerow. Many of the field boundaries mapped in the historic OSI maps are still present. The route of the former railway (Cork & Macroom Direct Railway) forms the north-eastern boundary of the site. The southern end of the farm lane, consisting of tree-lined sod & stone ditches, is included within the site. Limeworth, an existing residential development, forms the north-western boundary of the site. Heathfield residential development (under construction) adjoins the site to the north. The Maglin North River forms the western site boundary. Poor quality agricultural grazing land adjoins the southern boundary of the site. The Ballincollig By-pass is located approximately 500m to the south.

The regional terrain is controlled by the underlying bedrock geology, which has been folded to form northeast-southwest orientated ridges and valleys; ridges being underlain by the older Devonian sedimentary rocks and valleys, such as at the project site, underlain by younger Carboniferous limestones. According to the GSI mapping, there is one bedrock outcrop (exposure) at the site. This occurs just west of the derelict farmyard and buildings and at the location of a disused lime kiln, as shown on the historic 25-inch maps. Evidence of quarrying, associated with the lime kiln, was noted just north of the kiln during site surveys.

The farmyard was access by a farm lane leading from the Killumney Road. This lane is now blocked off to facilitate on-going housing development on the landholding. The sustainable access corridor, servicing Heathfield, will be extended as part of the proposed development to access the site. Site location maps and layout plans are provided in Chapter 2. Images 6.1 to 6.4 show the general topography across the site.



Image 6.1 Views of General Topography – from Southwest Corner Looking North & East



Image 6.2 View of General Topography – from near Lime Kiln Looking East & Southeast Showing Break-In-Slope



Image 6.3 View of General Topography - from Northwest Corner Looking East & South



Image 6.4 View of General Topography – from Northeast Corner Looking Southwest & West

6.2.1 Geological Heritage Site

The GSI - Irish Geological Heritage Section (IGH) and NPWS (National Parks and Wildlife Service) has been conducting a programme since 1998 to identify and select important geological and geomorphological sites throughout the country for designation as NHAs (Natural Heritage Areas) – the Irish Geological Heritage Programme. This is being addressed under 16 different geological themes such as economic geology, karst, Devonian, coastal, Quaternary, etc. For each theme, a larger number of sites from which to make the NHA selection are being examined, in order to identify the most significant scientifically. The criteria of designating the minimum number of sites to exemplify the theme means that many sites of national importance are not selected as the very best examples. However, a second tier of County Geological Sites (CGS) (as per the National Heritage Plan) means that many of these can be included in County / City Development Plans and receive a measure of recognition and protection through inclusion in the planning system. Cork City Council includes two CGS in the 2022 CDP. As noted above, it is an objective of the CDP to conserve these features. The audit for County Cork commenced in 2021 and is now completed as indicated in the GSI web-mapping.

The 2022 CDP lists two sites of geological interest in Cork City (Blackrock diamond quarry and Saint Joesph's section on the Lee Road), however, there are eight in total listed by the GSI within the City. These are:

- Blackrock Diamond Quarry – IGH 6 (mineralogy), IGH 1 (karst) and IGH 7 (Quaternary). This is a County Geological Site, recommended for Geological NHA. This historical quarry is located between Monaghan Road and Blackrock Road, where amethyst was found, has largely been built over, though some portions of quarry walls are still visible.
- St Joseph's Section - IGH 8 (Lower Carboniferous) and IGH 10 (Devonian). This is a County Geological Site, recommended for Geological NHA. It consists of a roadside outcrop showing sub-vertical bedding planes and includes the transition from the Devonian to the Carboniferous.
- St Fin Barre's Cathedral - IGH 15 (economic geology) and IGH 3 (Carboniferous-Pliocene palaeontology). This is a County Geological Site, designated as it was built primarily from several local lithologies, and exhibiting rock sourced internationally.
- Ballinlough Fields - IGH 7 (Quaternary), IGH 1 (karst) and IGH 15 (economic geology). This is a County Geological Site, designated for the presence of carboniferous crinoidal limestone exhibiting karst features, some of which have been infilled by Quaternary diamict.
- Beaumont Quarry – IGH 1 (karst), IGH 8 (Lower Carboniferous) and IGH 15 (economic geology). This is a County Geological Site, designated as the limestone quarry is of historical importance in the city having been the source of stone for many of its buildings. It also has accessible cave systems.
- Patrick's Hill - IGH 10 (Devonian). This is a County Geological Site, consisting of an Old Red Sandstone outcrop incorporated into a roadside wall.
- Shandon Tower - IGH 15 (economic geology), IGH 8 (Lower Carboniferous) and IGH 10 (Devonian). This is a County Geological Site, consisting of alternating walls of red Devonian sandstone and white Carboniferous limestone, likely quarried locally, highlighting the key lithologies of Cork City.
- Inniscarra Bar - IGH 7 (Quaternary). This is a County Geological Site, consisting of outwash gravel deposits, found high up the margin of the valley. It assists in the understanding of glacial deposition during the Quaternary.

The Carriganarra site is not listed as being an area of geological interest. The closest geological heritage sites are the Inniscarra Bar gravel deposits (approximately 3km to the northwest) and St Joseph's Section on the Lee Road (approximately 3.4km to the northeast). They are shown on Figure 6.1; the other heritage sites within Cork City are outside the map coverage. The Killumney Moraine (in the County) is located approximately 5km to the west of the Carriganarra site. The other sites in the City are greater than 5km distance with no connectivity. As such the development will have no direct or indirect impact on any geological heritage sites.

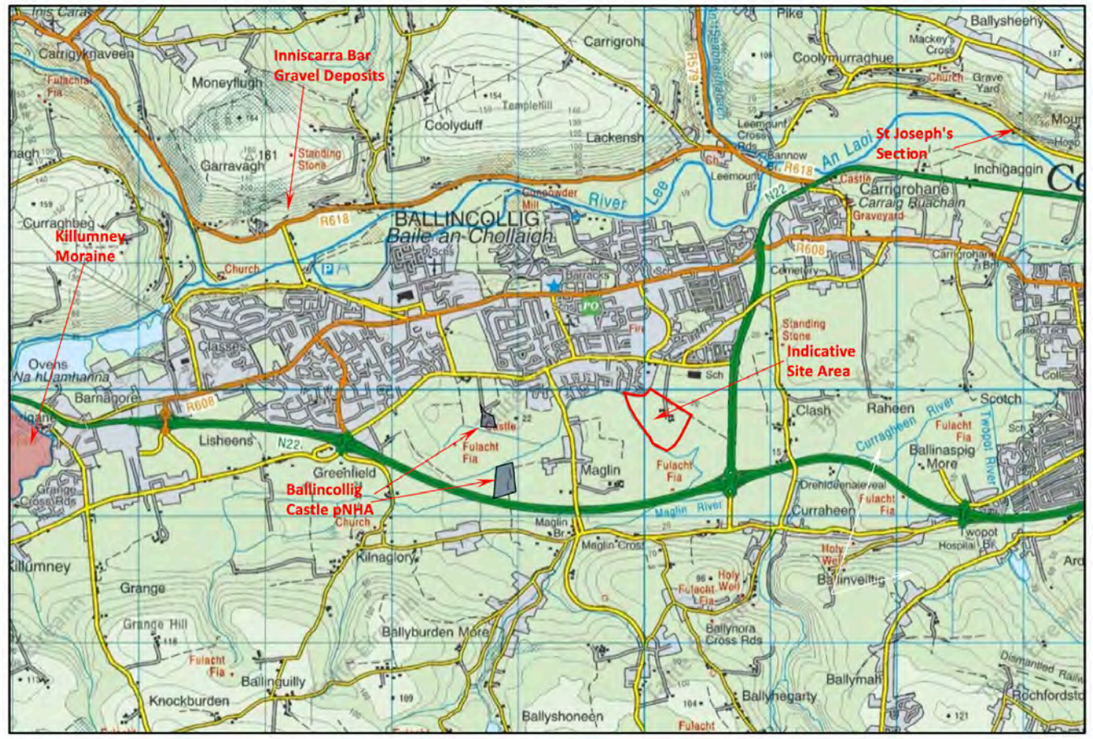


Figure 6.1 Geological Heritage Sites

In addition to the geological heritage sites, the Ballincollig Caves, located to the west of the Carriganarra site, are proposed Natural Heritage Area (pNHAs) for flora assemblages – refer to Chapter 8 (Biodiversity).

6.2.2 Economic Geology

According to the Directory of Active Quarries, Pits and Mines in Ireland, there are no active quarries within the immediate vicinity of the site. As noted in Section 6.2, there is a small historic limestone quarry at the site, and several other historic limestone quarries, often with associated lime kilns, along the valley to the south of Ballincollig. The small historic quarry at the site is not listed in GSI web-mapping. The closest historic quarries are located in Maglin (260m to the southwest) and in Clash (approximately 800m to the east). There are also several gravel pits (exhausted and active) to the west of Ballincollig along the valley of the Bride River, including:

- Classes gravel pit – gravel extraction now ceased. Facility is used for gravel washing and concrete manufacture.
- Knockanemore gravel pit – active pit near Casey's Cross.
- Garryhesty gravel pit – active gravel pit.
- Classes South Quarry – active gravel pit, with extension recently opened (2024) on the eastern side of the pit.

The GSI's aggregate potential mapping (https://dcenr.maps.arcgis.com/apps/webappviewer) indicates that the site:

- Is not mapped for its granular aggregate potential. Although encountered during drilling, the overburden is not mapped as being sand / gravel, so it has no aggregate potential.
- Has Very High potential for crushed rock aggregate across the entire site.

Based on drilling and geophysical survey, bedrock is close to surface (i.e., typically within 3m) across the northern two thirds of the site, making economic extraction viable.

The site and immediate environs are not listed in the Memoir of Localities of Minerals of Economic Importance. There is no known history of mining within the site or within the immediate vicinity of the site.

6.2.3 Overburden Geology

According to the Soils Associations of Ireland and Their Potential Land Use, the soils at the site are Acid Brown Earths (70%) belonging to the Rolling Lowlands physiographical division. Associated soils are grey-brown podzolics (15%) and gleys (15%). The parent material is mixed sandstone – limestone glacial till, with the underlying rock consisting of Carboniferous limestone. It accounts for approximately 1.69% of the Country (excluding major lakes and rivers), i.e., approximately 115,900ha. They occur mainly in Cork and Waterford but also occur in Kilkenny and south Tipperary. These soils have a wide use range and are suitable for both tillage and grazing. Due to their sandy loam texture, free drainage and good structure, they are easy to cultivate and can produce a wide range of crops. The climate in their southern location increases yields for both crops and pasture. These soils are also well suited to apple production, seen particularly in south Kilkenny and Waterford. The use range of the associated grey-brown podzolic soil is similar to the principal soil, but that of the gley soil is limited due to impedance.

From the GSI web-mapping, the project site is covered by till derived from Devonian sandstones. [Based on site investigation findings, the description of the till as mixed sandstone and limestone (per the Soils Associations of Ireland and Their Potential Land Use) is more appropriate]. Rock outcrop / sub-crop occurs in the central western side of the site. Gravels derived from Devonian sandstones occur along the Maglin South River just south of the Ballincollig By-pass and to the west along the Bride River valley. Rock outcrop / sub-crops also occur to the west along the valley of the Maglin North River, and along the hills to the south and north of the site, which are underlain by Devonian sedimentary rocks. Urban soils occur to the north in the developed areas of Ballincollig and alluvium occurs along the valley of the Lee and Curraheen rivers. Figure 6.2 shows the overburden geology of the area.

Based on the GSI aquifer vulnerability ranking of Extreme (E and X) in the western part of the site, the overburden would be interpreted to be up to 3m thick. The northern and eastern margins of the site have an aquifer vulnerability ranking of High (H) suggesting an overburden thickness of between 3m and 5m. The eastern most margins of the site have an aquifer vulnerability ranking of Moderate (M) suggesting an overburden thickness of between 5m and 10m. Two site investigation boreholes were drilled for the Ballincollig By-pass just south of the site. Depths drilled ranged from 4.16m to 6.01m. Neither borehole encountered bedrock. Trial pits excavated as part of the ground investigation for the project didn't encounter bedrock. Rotary drilling, carried out for the project, indicated bedrock depths of between 0.9m and 5.5m, with depth to bedrock increasing from north to south. The drilling indicates Extreme vulnerability across the northern part of the site and Moderate aquifer vulnerability on the low-lying southern part of the site. The ground investigation report is provided in Appendix 6.1 and discussed further in Section 6.2.9.

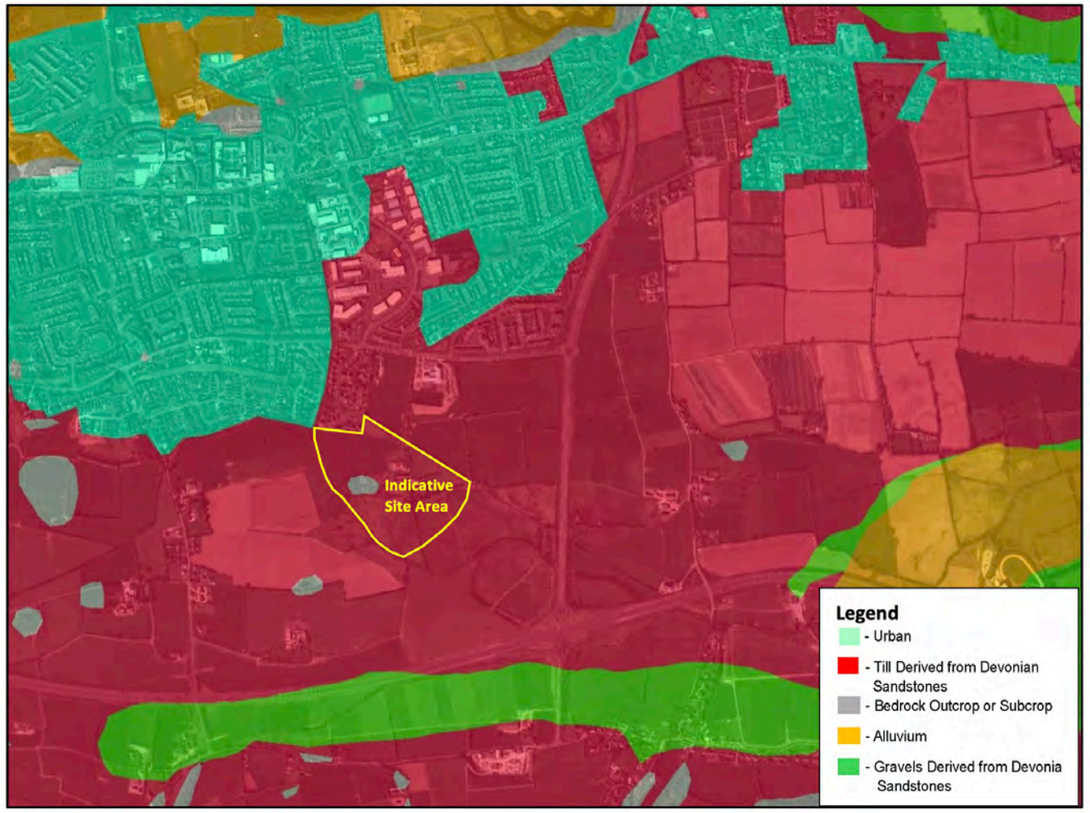


Figure 6.2 Overburden Geology Map

6.2.4 Land Use

The EPA Corine (2018) land use indicates that the project site is mostly in an agricultural area (Pasture). This land use is mapped extending along the Maglin River valley, and while mapped as pasture, is, in part, currently being developed for residential housing. The lands to the north are mapped as Artificial Surfaces with an urban fabric (i.e., the housing estates around Ballincollig), with the town centre mapped as industrial, commercial and transport units.

The current land use at the project site is agricultural, with the entire site in grazing. Most of it is zoned in the 2022 CDP as ZO 01, Sustainable Residential Neighbourhoods. The western margins of the site along the Maglin North River and the flood plains at the southern part of the site (and extending to the southeast) are zoned in the 2022 CDP as ZO 15, Public Open Space. The lands zoned as Public Open Space approximate the extent of the 100-year flood of the Maglin North River. The Corine land use map is provided as Figure 6.3 and the 2022 CDP land zoning map is provided as Figure 6.4.

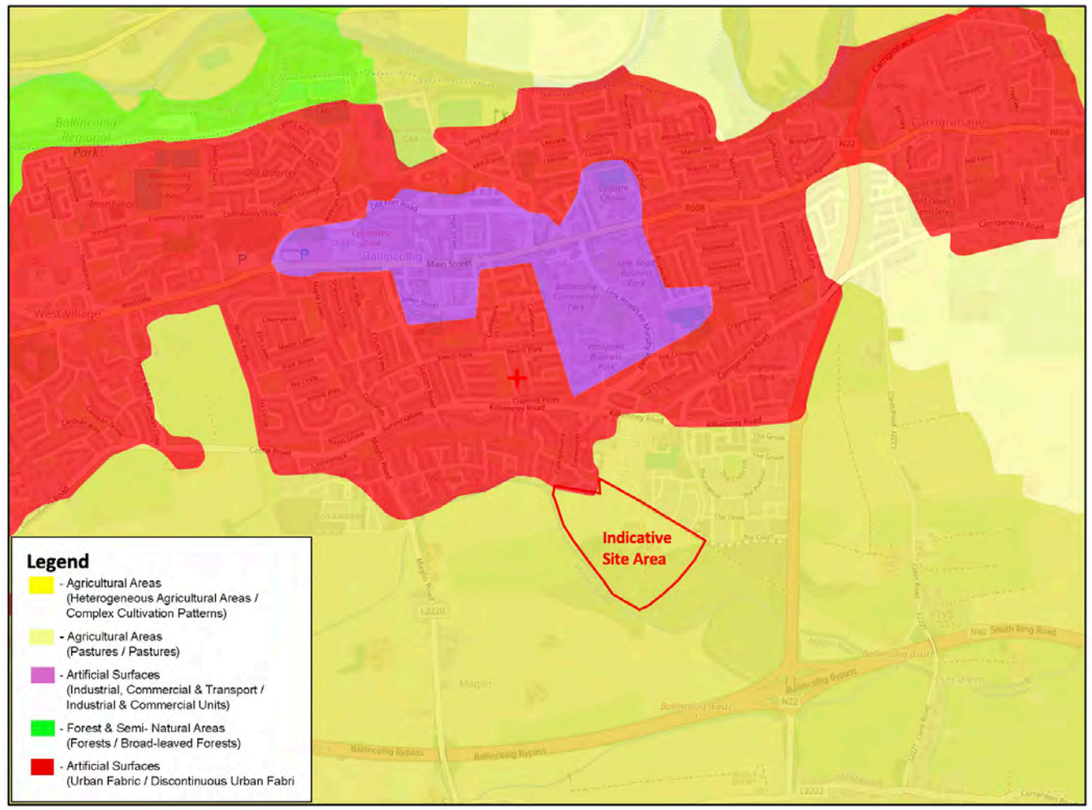


Figure 6.3 Corine Land Use Map

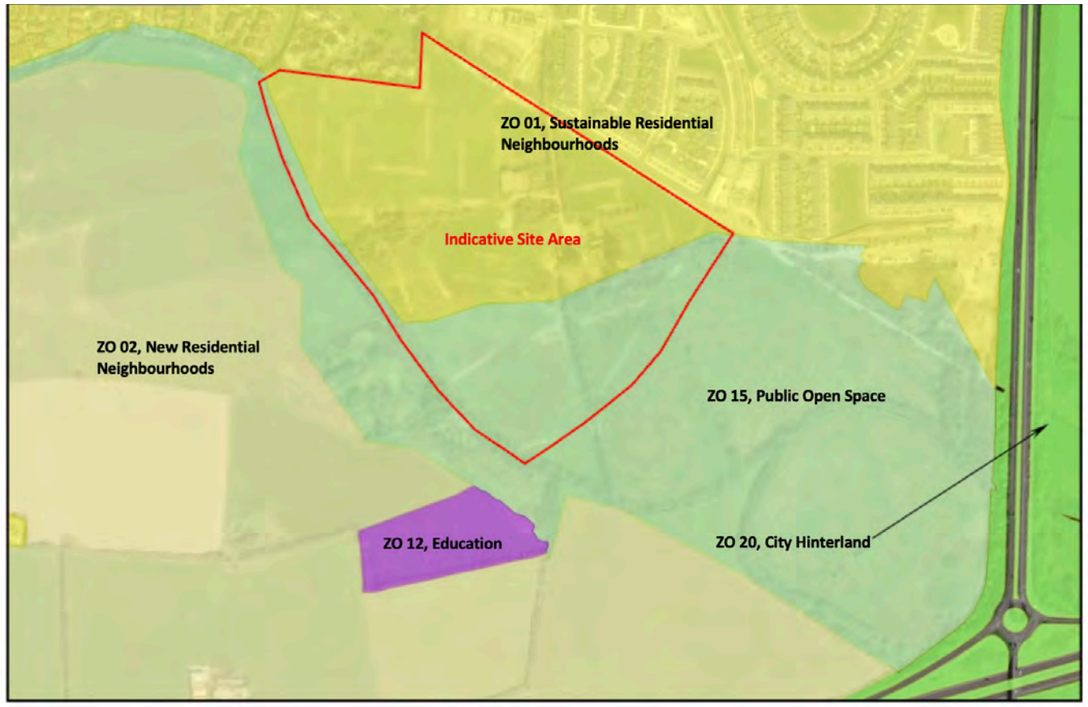


Figure 6.4 Land Zoning Map CDP 2022-2028

6.2.5 Regional Bedrock Geology

According to the GSI – Geology of South Cork, the area is underlain by Carboniferous-aged limestones. The formations underlying the site are the Little Island Formation (most of the site) and the Waulsortian Limestone Formation (southern margin of the site). The Little Island Formation consists of massive calcilutite[1] (mudbank facies) and crinoidal calcilutite limestones. The formation extends from Crookstown to Youghal at the eastern end of the Cork Syncline. The Waulsortian Limestone Formation consists of calcareous mudstone, wackestone[2] and packstones[3]. Regional cleavage has affected the limestone such that in some areas there are zones of intense fracture cleavage. The regional bedrock geology is shown on Figure 6.4. As noted above, rock outcrop / subcrop is present at the western side of the site (i.e., around the small historic limestone quarry and kiln).

Following deposition, the bedrock was uplifted and compressed during the Variscan Orogeny resulting in the folding and faulting seen today. This is dominated by northeast-southwest trending anticlines and synclines. Younger Carboniferous-aged rocks (mainly limestone) lie in the synclines (such as the limestones running through Ballincollig and Cork City) and older Devonian rocks in the hills to the south and north.

1 Limestone consisting of predominantly of clay-sized particles.
2 Fine-grained limestone in which grains float in a lime-mud matrix.
3 Limestone with a self-supporting framework of calcareous mud.

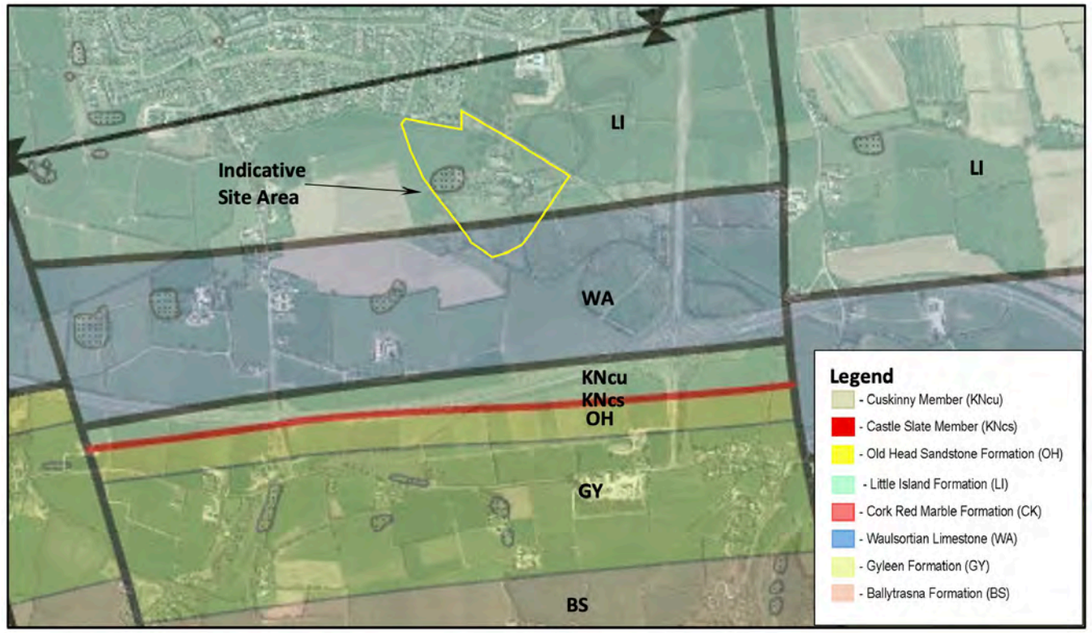


Figure 6.5 Bedrock Geology Map

6.2.6 Existing Slope Stability

Based on available data from the GSI, there are no records of slope failure within the project site or within 10km of it.

Landslide susceptibility mapping has been carried out by the GSI, based on slope and soil cover. Eight classifications for landslide susceptibility are mapped, ranging from Low to High. The majority of the Carriganarra site has been mapped as 'Low' with the area around the lime kiln mapped as 'Low (inferred)'.

There were no indications of slope stability issues evident within the site during the walkovers.

6.2.7 Contaminated Land

According to EPA web-mapping, there are no land uses within or adjacent to the site that could give rise to contaminated land. There were no potential contaminated land issues identified during the site walkovers. The former farmhouse used home heat oil. No signs of leaks or spillages of hydrocarbons were identified during site surveys.

6.2.8 Radon

Radon is a radioactive element which occurs naturally in earth materials. It can accumulate in buildings where elevated concentrations can increase risk of lung cancer. The EPA has produced a radon risk map for the country, indicating areas of high, medium and low risk. The risk levels for high, medium and low risk equate to 1 in 5, 1 in 10 and 1 in 20 houses that are likely to have high radon levels, respectively. The map is based on an analysis of indoor radon measurements plus geological information including, bedrock type, quaternary geology, soil permeability and aquifer type. The entire Carriganarra site is in an area where 1 in 5 homes is likely to have high radon levels, as is most of Cork City, apart from areas underlain by alluvial deposits along the River Lee (and tributaries). In these areas, 1 in 10 homes is likely to have high radon levels.

6.2.9 Ground Investigations

Walkover surveys of the site and surrounding area were carried out on several occasions between July 2023 and December 2025. Observations in relation to soils, land use and geology are summarised as follows:

- The fields are used for grazing cattle and slope gently, and reasonably evenly, generally from north to south. A break-in-slope running east-west through the site marks a change in land quality from well drained grassland to poor quality wet grassland, dominated by rushes.
- Lands in the southern part of the site and extending to the southeast of the project site are flat and form part of the flood plain of the Maglin North River.
- Bedrock outcrops were observed around the disused lime kiln and near the farmyard.

Hydro Survey (Priority Geotechnical Ltd) were engaged to carry out geophysical surveys. The purpose of the surveys was to estimate depth to bedrock, identify overburden type, identify areas of karstification and / or fracturing, and to inform locations of further ground investigation boreholes. This consisted of five electrical resistivity and seismic profiles. A copy of the report is provided in Appendix 6.1. The survey identified several areas of fracturing and associated potential karstification at the site.

KGEC carried out trial pit excavations at the site along the proposed sustainable access corridor alignment options. These two trial pits at the southern end of the site where only excavated to between 1.6m and 2m. The typical soil profile consisted of 100mm of topsoil overlying layers of stiff silty clay, dense fine sand and loose gravel. Bedrock was not encountered. The trial pit logs are provided in Appendix 6.1.

Between May and July 2025, Priority Geotechnical Ltd drilled 8 No. cable percussion boreholes and 5 No. rotary boreholes across the site. Monitoring wells were installed in four of the rotary boreholes. Borehole logs are provided in Appendix 6.1. The boreholes indicate depth to bedrock ranges between 0.9m and 5.5m. Bedrock consisted of limestone. The bedrock at the northern side of the site consisted of strong pale grey limestone, representing the Little Island Formation. All rotary borehole locations were to the north of the Waulsortian Limestone.

Ground investigation locations are shown on Figure 6.6.

The geological conceptual site model is summarised in Table 6.2.

Strata Name	Description	Thickness Range (m)
Topsoil	Brown organic sandy silty clay	0.15 to 0.4
Overburden	Brown sandy gravely clayey tills with • soft silt / clay layers • loose gravel layers	0.5 to 8.3
Weathered Bedrock	Strong to very strong fractured blue limestone	3.6 to 5.5m drilled

Table 6.2 Geological Conceptual Site Model

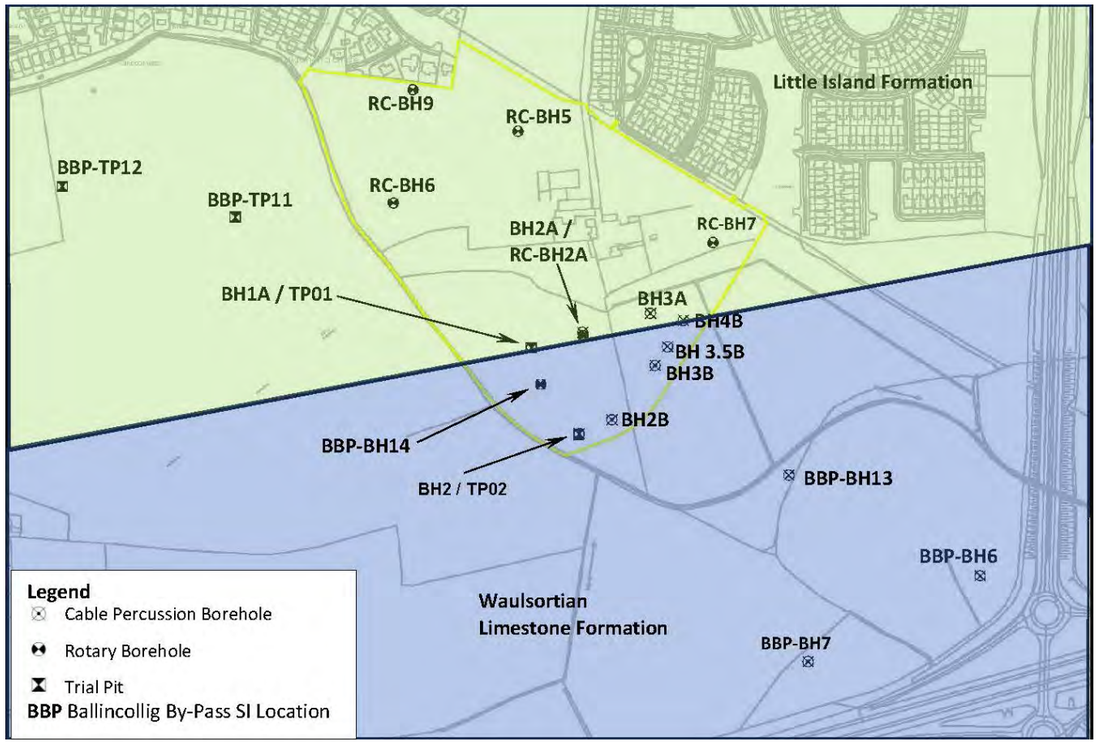


Figure 6.6 Ground Investigation Location Map

6.2.10 Importance of Soils & Geology Attributes

Based on the NRA Guidelines, the importance of the site in terms of soils and geology is rated Low to High. This is based on the presence of poorly drained and low fertility soils on the southern part of the site, and well drained and high fertility soils on the northern part of the site. There are no active quarries or pits on the site and while the site is mapped as having high potential for crushed rock aggregate, the development of a quarry at this location is constrained by its location within lands zoned for residential development. There are no landfills, evidence of land contamination or geological heritage sites present.

6.3 Characteristics of the Proposed Development

The main characteristics of the proposed development that could impact on land, soils, and geology are:

- Stripping of topsoil: Site development works will require the stripping of topsoil over a development footprint of approximately 13.5ha. Based on ground investigation works (both geotechnical and archaeological testing), topsoil depth is between 0.15 and 0.4m. Using a worse-case depth of 0.4m and taking the entire site area, it is estimated that approximately 47,710m^3 of topsoil will be stripped for the residential areas, open areas, lands being raised and sustainable access road. [Note that part of the site is already developed (farmyard), so topsoil will not be generated from this area]. Figure 6.7 is DOSA's drawing (No. 4208-0214) showing the bulk earthworks cut / fill for the proposed development (blue areas indicate fill and red indicates cut).
- Excavation of subsoil: Although the site is mostly gently sloping, excavations / cuts extending through the overburden and bedrock are required. The deepest excavations of up to 4m occur in the area around the lime kiln, where bedrock will be encountered. It is estimated that approximately 16,216m^3 of subsoil and rock will be excavated to achieve the required profiles.
- Raising levels: Inert soil & stone and engineering fill will be required to raise levels across the site. It is estimated that 29,215m^3 will be needed for the residential area, 33,685m^3 for the open area and 21,881m^3 for the sustainable access road (Total = 84,781m^3). Some of this will be sourced from on-site excavations (cuts), but much of it (68,565m^3) will need to be imported.
- Construction over karst bedrock: Construction over karst bedrock could result in subsidence resulting from changes in the hydrological regime, depending on the approach taken to stormwater runoff management.
- Demolition of existing buildings: The existing farm sheds will be demolished as part of the proposed development. The old farmhouse was previously demolished following a fire and its remains are still on site. This will result in approximately 1,000m^3 of construction and demolition (C&D) waste.
- Demand on quarries: Aggregate, concrete and concrete products will be used in the construction of foundations, roads, footpaths and buildings placing a demand on local quarries.
- Land use change: The residential development will change the land use from agricultural to urban.



Figura 6.7 Bulk Earth Works (Cut / Fill) Depths

Note – Blue shading indicates areas of fill and brown/red shading indicates areas of cut.

6.4 Impacts Assessment

6.4.1 Impact Assessment Methodology

The criteria in the EPA Guidelines (2022) are used to evaluate and describe the potential impacts in terms of quality, significance, extent, probability and duration as set out in Chapter 1. The NRA guidelines are used to further rate the magnitude of the impact - these are set out in Table 6.3. Determining the significance of the impact on the feature (geology attribute) based on the Importance of the feature and the magnitude of the impact is given in Table 6.4.

Magnitude of Impact	Criteria	Typical Examples
Large Adverse	Results in loss of attribute	Loss of high proportion of future quarry or pit reserves. Irreversible loss of high proportion of local high fertility soils. Removal of entirety of geological heritage feature. Requirement to excavate / remediate entire waste site. Requirement to excavate and replace high proportion of peat, organic soils and/or soft mineral soils beneath alignment.
Moderate Adverse	Results in an impact on attribute but of insufficient magnitude to affect either use or integrity	Loss of moderate proportion of future quarry or pit reserves. Removal of part of geological heritage feature Irreversible loss of moderate proportion of local high fertility soils. Requirement to excavate / remediate significant proportion of waste site. Requirement to excavate and replace moderate proportion of peat, organic soils and/or soft mineral soils beneath alignment.
Small Adverse	Results in minor impact on integrity of attribute or loss of small part of attribute	Loss of small proportion of future quarry or pit reserves. Removal of small part of geological heritage feature. Irreversible loss of small proportion of local high fertility soils and/or high proportion of local low fertility soils. Requirement to excavate / remediate small proportion of waste site. Requirement to excavate and replace small proportion of peat, organic soils and/or soft mineral soils beneath alignment.
Negligible	Results in an impact on attribute but of insufficient magnitude to affect either use or integrity	No measurable changes in attributes.
Minor Beneficial	Results in minor improvement of attribute quality	Minor enhancement of geological heritage feature.
Moderate Beneficial	Results in moderate improvement of attribute quality	Moderate enhancement of geological heritage feature.
Major Beneficial	Results in major improvement of attribute quality	Major enhancement of geological heritage feature.

Table 6.3 Estimation of Magnitude of Impact on Hydrology Attribute

For the Carriganarra site, the magnitude of impact on the soils / geology attribute is rated as small adverse - Irreversible loss of small proportions of local high fertility soils and/or high proportion of local low fertility soils.

Importance of Attribute	Magnitude of Impact			
	Negligible	Small	Moderate	Large
Extremely High	Imperceptible	Significant	Profound	Profound
Very High	Imperceptible	Significant / Moderate	Profound / Significant	Profound
High	Imperceptible	Moderate / Slight	Significant / Moderate	Severe / Significant
Medium	Imperceptible	Slight	Moderate	Significant
Low	Imperceptible	Imperceptible	Slight	Slight / Moderate

Table 6.4 Rating of Significant Environmental Impacts

Using Table 6.4, the significance of environmental impacts of land / soils / geology is Slight.

The following sections detail the potential impacts, prior to mitigation, which have been identified from the assessment methodology presented above.

6.4.2 Do Nothing Scenario

In the 'do-nothing' scenario, the lands would continue in agricultural use, with the lands used for grazing. Over-working of the lands could lead to erosion of the topsoil layer. The application of fertilizers and agricultural chemicals could impact on soil quality. However, with good farm management, the continued farming of the lands will have a neutral imperceptible effect on land use, soils and geology.

6.4.3 Construction Phase

The potential impacts of the proposed development on land, soils and geology during the construction phase are discussed below.

6.4.3.1 Re-profiling of the Site Topography to Achieve Design Levels

Re-profiling of the site topography to achieve design levels. This will involve excavation of soils / bedrock to lower high parts of the site, and the use of fill (engineered and inert soil & stone) to raise low parts of the site to reach design levels for the proposed development. Based on the design levels required, it is estimated that 47,710m^3 of topsoil and 16,216m^3 of overburden / bedrock will need to be excavated. Approximately 84,781m^3 of fill will be required to raise low parts of the site. Unmitigated, these earthworks would likely have permanent, slight, negative local / site effects. With the requirement to import insert soil & stone, there is potential for indirect beneficial effects at other construction sites which have surplus soil & stone.

6.4.3.2 Removal of Surplus Soils off Site

It is envisioned that some of the excavated topsoil is likely to be removed off site. Unmitigated, this would likely have an indirect, permanent, slight, beneficial effect on land use at off-site locations; soil recovery sites are typically associated with raising of levels to improve agricultural potential and restoration of quarries to improve land use potential. There are likely cumulative effects if soil is moved offsite from the other residential and infrastructure projects in the area.

6.4.3.3 Demolition of Existing Buildings

There are existing farm sheds on the site that will be demolished as part of the proposed development, with one stone shed saved and rehabilitated. The farmhouse was demolished following a fire several years ago, and the demolished building remains on site. It was of stone rubble construction. The other farm sheds are of concrete block and mass concrete construction with mostly sheet metal roofs. One lean-to shed has asbestos-containing corrugated roof sheeting (280m^2 of sheeting). There are also large areas (approximately 2,500m^2, including shed floors) of concrete yards. It is estimated that approximately 1,000m^3 of C&D waste (concrete rubble) will result from these demolition works. The demolition works will have a direct, neutral, not significant, temporary effect at the local / site scale on the land use and soils. It could result in indirect, not significant, permanent negative off-site effects depending on its deposal / reuse management.

6.4.3.4 Slope & Ground Stability

The re-profiling of the site topography is not predicted to result in any unstable cut slopes.

6.4.3.5 Geological Heritage

No direct or indirect impact on geological heritage sites, or the Ballincollig Caves pNHA, is predicted.

6.4.3.6 Soils Exposed to Erosion

During construction, soils will be exposed in excavations and in stockpiles. These soils will be subject to erosion by wind and rain. Unmitigated this would be a short-term, slight, negative effect, with eroded soils potentially carried to the Maglin North River.

6.4.3.7 Use of Quarry Products

Concrete, concrete products (blocks, curbing etc.) and aggregates will be required for the construction of housing units and roads at the development. Table 6.5 summarises the approximate volumes of quarry products needed to complete the development. These materials will be sourced from local quarries.

Product	Per Dwelling	No of Dwellings*	Per Apartment	No of Apartments	Total (tonnes)
Stone – Annex E	78 tonnes	133	15.6 tonnes	172	13,353
Stone Annex E – Apportioned to site works	956 tonnes	133	191.2 tonnes	172	160,034
Concrete	95 m^3	133	19 m^3	172	38,167
Concrete Blocks	6,500 No.	133	1,300 No.	172	21,762
Bricks	1,745 No.	133	349 No.	172	876
Concrete Tiles	1,300 No.	133	0	172	778
Concrete Kerbs	50m	133	10 No.	172	502
Concrete Cappings	20m	133	4m	172	151
TOTAL (Aggregate)					173,092
TOTAL (Concrete)					62,236

Table 6.5 Estimate of Quarry Products Requirements

Note: * - There are 300 housing units proposed. A figure of 305 units is used in Table 6.5 to account for the materials needed for the creche.

The use of products from authorised quarries is considered a likely, indirect, slight, medium-term positive local effect as these facilities are exploiting a recognised natural resource and will have appropriate environmental controls. The demand will be cumulative with the other residential and infrastructural projects in the region.

6.4.3.8 Soil Contamination

Hydrocarbons will be stored and used at the site for construction machinery. There is potential for leaks and spillages which would impact on soil (and water) quality. The potential impact would depend on the volume and location of a fuel spill / leak. Fuel storage tanks on construction sites are typically no larger than 1,300 litres. Unmitigated, this would be an unlikely short-term, not significant, negative, local effect.

6.4.3.9 Land Use Change

The development of the site will result in a likely, permanent, slight, negative affect in terms of the loss of agricultural lands. However, it is also viewed as a likely, permanent, positive, slight, local affect in terms of development of zoned lands within the City.

6.4.4 Operational Phase

The operational phase of the development is not expected to present significant impacts to soils and geology. The impacts on land use will have already been realised with the construction of the project. The aspects of the proposed development that potentially have operational-related impacts on soils and geology are:

- The parking of cars and the storage of home-heating fuel (if used) within the development may result in the leakage of small amounts of oil resulting in contamination of soils. Any leaks or spillage is likely to be small in scale. Unmitigated, this potential impact would likely have a long-term imperceptible negative local effect.
- Leakage from the foul or storm water sewer could potentially result in soil (and groundwater) contamination and / or soil erosion. Unmitigated, this potential impact would likely have a long-term, slight, negative, local effect.
- Discharges of stormwater to ground using SuDS infrastructure could affect the underlying karst bedrock. Concentrated flows could erode soils resulting in subsidence. Depending on the size of the underlying karst feature and unmitigated, this potential impact would likely have a long-term, significant, negative, local effect on the built infrastructure.
- The sustainable access corridor passes across lands where there is deep overburden with soft silt / clay layers. The loading from the road could result in consolidation of the clay leading to subsidence and damage to the road / utilities. Unmitigated, this potential impact would likely have a long-term slight negative local reversible effect.
- The Carriganarra site is in a high-risk area for radon levels. Unmitigated, this potential impact would likely have a permanent, very significant, negative, effect on residents of the development.

The land use will be permanently changed from rural agricultural use to a residential urban land use.

6.5 Avoidance, Remedial or Reductive Measures

The avoidance and mitigation measures for the construction and operational phases are presented in the subsection below. Most relate to the construction phase.

6.5.1 Construction Phase

Measures to be employed during the construction stage to avoid, reduce and minimise the potential impacts on land, soil and geology are:

- A Construction Environmental Management Plan (CEMP) and a Construction Resource Waste Management Plan (CRWMP) have been prepared for the development. These will be updated and finalised prior to the commencement of construction. They are included in Appendix 2-1 and 2-5 of this EIAR, respectively.
- The stripping of topsoil will be carried out in phases to minimise the areas exposed to wind and rain erosion. Topsoil will be carefully stored for later reuse in landscaping. Best practice will be employed in the stripping and stockpiling of topsoil. This will include:
  - » Careful selection of stockpile locations to: - avoid, as far as practical, double handling of materials; avoid steep slopes; avoid natural overland flow paths of stormwater runoff; provide shelter from the prevailing wind direction.
  - » Blading off the vegetative layer (for separate storage). Vegetation will not be incorporated in the stripped topsoil.
  - » Avoid stripping in inclement wet weather conditions. Wet soils are more difficult to work and handle, and it is more likely to damage soil structure.
  - » Avoid extending topsoil stripping into the mineral soil layer.
  - » Limiting height of stockpiles to avoid anaerobic conditions occurring.
  - » Profiling of stockpiles to promote rainwater runoff and placement of silt fencing downgradient of stockpiles to catch any fines carried by storm water runoff.
  - » Stockpiles will be allowed vegetate naturally, which will reduce erosion by wind and water.
- Where practical, stripped topsoil will be taken directly to on-site reuse locations for landscaping. It is estimated that 40% of the stripped topsoil will be reused in gardens and green spaces (i.e., 24,320m^3 of topsoil reused on site).
- Where it is apparent that there will be an excess of topsoil on the site, the Site Manager will identify an off-site destination so the topsoil can be taken directly off site and so avoid stockpiling and double handling. This could be another construction site where a topsoil shortfall is experienced or a permitted soil recovery site. It is estimated that 60% of the topsoil will be taken off site either as a waste or, where appropriate, as a by-product. Where the material is to be reused on another site as a by-product (and not as a waste), this will be done in accordance with Article 27 of the European Communities (Waste Directive) Regulations 2011 and following EPA guidelines. Where material cannot be reused off site, it will be sent for recovery or disposal at an appropriately authorised facility.
- The profiling of the site is such that off-site removal of subsoil or rock is not predicted. However, should off-site removal of overburden be necessary it will be managed in the same manner as outlined above for surplus topsoil.
- Excavated mineral soils will be managed in a similar manner to topsoil as outlined above. Excavated mineral soils will be:
  - » Stored on site where a later on-site reuse has been identified. Mineral soils will be stored separately from topsoil.
  - » Taken directly to their on-site reuse location when these locations are prepared to receive the fill material.
  - » Although unlikely, if excess to on-site requirements, taken directly off-site, with the appropriate authorisations in place, for beneficial reuse at another construction site.
  - » Reused immediately on site, if suitable, in, for example, trench backfill for utilities, such as water lines, sewers and the undergrounding of the ESB powerline.
- Vehicles and plant will use haul roads to avoid compaction of soil. This will include tipper trucks removing excess topsoil off-site and the delivery of building materials to site. Where vehicles (dumper trucks and HGVs) need to access areas not yet serviced by haul roads, they will follow a demarcated route along which the haul road will later be constructed.
- To minimise soil erosion, earthworks will be suspended during extreme weather conditions. An extreme rainfall event will be classified as an event that corresponds to the Met Éireann Orange – Weather Alert for rainfall. The Site Manager will monitor the weather forecast to make preparations ahead of adverse weather conditions.

Met Eireann Orange Weather Alert for Rainfall
50 mm – 80 mm in 24 hrs
40 mm – 60 mm in 12 hrs or less
30 mm – 50 mm in 6 hrs or less

- Hydrocarbons (oils, diesel and chemicals) will be stored and managed in an appropriate manner to ensure no negative effects. Specific measures will include:
  - » Any storage of oils and diesel on site will be in steel or plastic tanks of good integrity and bunded to 110 % of tank capacity. All fuel and hydraulic fluids will be stored in the site COSHH store located in the site compound.
  - » Refuelling of site (wheel-mounted) plant will be carried out at the site compound where a concrete refuelling pad will be provided adjacent to the fuel storage tank. When refuelling takes place directly from self-bunded mobile refuelling bowsers or road tankers, spill kits will be readily available (kept in the machine). Refuelling of mobile plant will not take place within 50m of any sensitive receptor (e.g., watercourses). Toolbox talks on refuelling will be given to delivery drivers in addition to plant operatives.

  - » Fuels, lubricants and hydraulic fluids for equipment used on the construction site will be carefully handled to avoid spillage, properly secured against unauthorised access or vandalism, and provided with spill containment according to best codes of practice.
  - » Any spillage of fuels, lubricants or hydraulic oils will be immediately contained, and the contaminated soil removed from the site and properly disposed of.
  - » Waste oils and hydraulic fluids will be collected in leak-proof containers and removed from the site for disposal or re-cycling.
  - » Appropriate spill control equipment, such as oil soakage pads, will be kept in the site plant to deal with any accidental spillage. Spare spill kits will be kept at the construction site compound in the container adjacent to the fuel storage.
- Surface water management infrastructure will be installed as detailed in Chapter 7, which will avoid / reduce soil erosion.
- The sustainable access corridor crosses land with depth to bedrock greater than 6m typical with the underlying overburden consisting of soft silt / clay layers. Additional ground investigation will be carried out along the road alignment to inform its detailed design.
- Concrete, concrete products and aggregates needed for the construction will only be sourced from authorised quarries, at which appropriate environmental controls are implemented per planning conditions.
- Monitoring and inspection of the soil stockpiles, slope cuts, fuel storage, refuelling operations, etc, will be carried out by the Client's Engineer and improvement made as required. Load testing of sustainable access corridor sub-base will be carried out to ensure it meets design criteria. Temporary supports for excavations will be used where considered necessary by the Client's Engineer.

6.5.2 Operational Phase

The mitigation measures to be employed during the operational phase to address the identified potential impacts are:

- To avoid potential subsidence arising from stormwater management, use of infiltrating SuDS features will be minimal. Engineering solutions (6 No. attenuation tanks) will be the primary mechanism for controlling stormwater runoff to greenfield rates. The discharge from the tanks will be to the Maglin North River via a drain with rip-rap to avoid bank erosion. This is in accordance with the recommendations in the Ballincollig drainage study.
- In addition to the SuDS approach, the foundations design will further reduce potential impacts of subsidence. Subject to detail design, foundations will be reinforced concrete rafts on end-bearing bored piles, if required.
- Spillage and leaks of oil from cars parked in the development during the operational phase is unavoidable. To reduce the potential impacts, hydrocarbon interceptors will be incorporated into the site drainage design. The parking areas will also be paved, so impacts on soils and geology are unlikely. The hydrocarbon interceptors will be maintained by the Management Company during the operational phase.
- With regard to home heating, it is noted that heat pumps will be used at the development. The use of home heating oil should therefore not arise. It is, however, possible that some homeowners will use oil. Any leaks or spillage is likely to be small in scale. Although the likelihood is reduced, the potential impact remains, with long-term slight negative effects.
- Storm water and foul sewers will be tested as part of their commissioning. Any leaks would therefore be identified and repaired prior to being put into service. They will be maintained by the Management Company / Local Authority. Leakage, and subsequent pollution of the underlying geology, is therefore unlikely.
- Radon barriers and venting are standard construction best practices to prevent radon gas ingress into buildings. This risk of radon ingress into living spaces is greatly reduced and unlikely to occur.

6.5.3 Monitoring

Monitoring of the works will be carried out by the Client's Engineer, project engineer and geotechnical engineer. This will involve visual inspection of the works for soil storage, deep excavations and general site operations. During construction, monitoring will be conducted at excavations and fill areas, and within the soil stockpile areas. Inspections and testing of roads and foundations will be carried out during their construction to ensure that they can accommodate the design loadings. Excavations will be inspected to ensure no stability issues arise. Remedial measures, if required, will be implemented as appropriate.

6.5.4 Worst-Case Scenario

The worst-case scenario would be a slippage of stockpiled soil, or an excavation cut that could impact on worker safety, property and potentially water quality in the Maglin North River. However, with appropriate design solutions, management of stockpiles, monitoring and inspections, and good construction practices this scenario is unlikely to occur.

6.5.5 Predicted Impacts

With the implementation of these avoidance and mitigation measures, the predicted impacts of the proposed development are:

- The excavation of topsoil, overburden and bedrock cannot be avoided to reprofile the site contours. This will result in large volumes of excavated soil. A materials balance has been carried out to reuse on site all of the overburden, bedrock and 40% of the topsoil.
- The use of concrete, concrete products and aggregate from local quarries is also unavoidable.

6.6 Cumulative Impacts

The permitted/proposed projects in the site's vicinity, which have been assessed for cumulative impacts, are detailed in Table 1.1 of this EIAR (Chapter 1 - Introduction). The seven projects include five housing schemes, a creche and the Cork Luas Project. The publicly available documents and drawings for these projects were reviewed to determine whether in-combination effects could potentially occur. One of the projects (Cork Luas - Luas Cork | Public Consultation Emerging Preferred Route 2024) is still at route selection stage, so any cumulative impacts are indeterminant at this time. While the western section of the preferred route is close to the Carriganarra site, the construction stages for both projects are very unlikely to coincide.

In terms of land use, the housing projects will have a cumulative effect in increasing the transition of agricultural lands to an urban use. According to the planning documentation for these projects, the land area involved totals approximately 37.8ha. This is in addition to the project site which extends to an area of 13.5ha.

Five of the projects involve large-scale earthworks, namely the housing schemes. Four projects are subthreshold for EIA, and the planning documentation doesn't provide the information to fully assess the cumulative effects of earthworks.

The three sub-threshold EIA housing developments (Cois Caisleán, Phase 2, in Maglin, Heathfield Phase 2 and Phase 2 Extension in Carriganarra) include CEMPs but do not give estimates of excavated soil / subsoil quantities. They indicate that most of the excavated soils will be reused on site. Surplus will preferentially be taken off site as a by-product subject to meeting the requirements of the Article 27 provisions of the Waste Management Act. If beneficial use at another construction site is not identified, and as a last resort, the inert soil will be taken to an authorised facility for recovery (i.e., a facility permitted

by the Local Authority or licenced by the EPA). Cois Caisleán, Phase 2 is being developed by Coleman New Homes Ltd who are also developing the creche, so it is likely that the same approach will be taken for its construction. It is noted that Cois Caisleán, Phase 2 and Heathfield Phase 2 housing developments have commenced construction and are likely to be close to completion prior to commencement of construction at the Carriganarra LRD. The overlap of their construction phase with the Carriganarra LRD will be minimal. The Heathfield Phase 2 Extension (of 11 no. units, planning reference number 26/44475) has recently been lodged, and so there is likely to be overlap in its construction phase with the Carriganarra LRD.

Cork City Council made a decision to grant conditional permission for the Greenfield LRD on 18 December 2025 - Cork City Council planning number 25/44048 refers. Third-party appeals have been lodged with An Coimisiún Pleanála against the Council's decision. A final decision is not expected until mid-2026. The EIAR for that project indicates that most of the subsoil will be reused on site, but that 60% of the topsoil (36,480m^3) will be surplus. The Maglin LRD project (planning reference number 25/44222) was at the further information stage in the planning process at the time of writing this EIAR. This LRD consists of the construction of 1,150 housing units, creche, retail units and a section of the Maglin sustainable access corridor. The EIAR for the Maglin LRD indicates a surplus of excavated soil of 37,000m^3. There will therefore be a cumulative impact between these projects in term of reuse / recovery of surplus soil and topsoil. Both Greenfield and Carriganarra will have a topsoil surplus which could be put to beneficial use at a soil recovery facility to improve agricultural output. Depending on timing of construction, there may be an opportunity to use the surplus overburden to raise the levels at the Carriganarra site.

There will be a cumulative impact in terms of demand for quarry products, and it is likely that there will be extensive overlap in the construction phases of these projects.

The potential cumulative impacts of the relevant plan for the area were assessed, which is considered to be the Cork City Development Plan 2022. The assessment of the potential impacts on the environment of the Cork City Development Plan 2022 was undertaken utilising the Strategic Environmental Objectives (SEOs) which are detailed in Table 5.1 of the CDP's Strategic Environmental Assessment. The potential cumulative impacts of the Plan were assessed having regard to these SEO's. Table 5.1 of the SEA identifies the SEO's for 'Soil (and Land)' as being to:

- Protect soils against pollution, and prevent degradation of the soil resource.
- Promote the sustainable use of infill and brownfield sites over the use of greenfield sites.
- Safeguard areas of prime agricultural land and designated geological sites.

Table 7.5 of the CDP's Strategic Environmental Assessment, 'Comparative Assessment of each of the Alternatives against Strategic Environmental Objectives' indicates that Alternative/Scenario 3 'Compact Liveable Growth', the 'Selected Scenario' has positive interactions with the status of the SEO's for 'Soil (and Land)'.

There are no significant cumulative impacts predicted for soils and geology during the operational phase.

6.7 Risk of Major Accidents or Disasters

The risk of major accidents or disasters arising from the land, soil or geological aspects of the proposed development is negligible. While the limestone underlying the site is susceptible to karstification, there are no recorded karst features on the site. A precautionary approach to foundation design is adopted with the use of end-bearing bored piles and raft foundation. The occurrence of a major accident or disaster during project construction or its lifetime is therefore unlikely.

6.8 Difficulties Encountered in Compiling

No difficulties were encountered during the preparation of this EIAR chapter.

6.9 Interactions

Interactions associated with land and soils with other aspects of the environment include:

- Water (Hydrology & Hydrogeology) - management of soil (stripping and storage) will interact with surface water quality in terms of potential soil erosion and siltation of the receiving surface water environment. Filling of the southern part of the site will include filling and alteration of drains affecting drainage from this part of the site (i.e., sustainable access corridor and lands between this road and the residential units). The risk of soil contamination from hydrocarbons also presents a risk to the groundwater and surface water environments.
- Air Quality - fugitive dust emissions from the management of soils (stripping and storage) could affect air quality locally. Removal of excess topsoil and importation of quarry products / inert fill will increase emissions from HGVs, affecting air quality locally.
- Traffic - the reprofiling of the site will require the removal of excess topsoil off site and the importation of clean inert fill, increasing HGV traffic and noise locally. The importation of concrete and aggregate will also increase HGV traffic and noise locally.
- Noise - reprofiling of the site using large plant will increase noise levels during the construction stage. Much of this work will be completed with excavators. The removal of excess topsoil offsite and the importation of clean inert fill will increase HGV traffic noise.

6.10 Conclusions on Land, Soils & Geology

The site geology consists of a thin layer of topsoil overlying between approximately 0.5m and 6.4m of glacial tills (and thickening to the south), resting on karstified limestone bedrock. The topography of the site is gently sloping from north to south with a brake-in-slope near the southern end of the site. Relatively minor re-profiling is required for the development of the housing scheme. There are no significant geology-related impacts identified at the site that can't be addressed with good design and construction management.

The land use will be permanently changed from rural agricultural use to an urban residential neighbourhood.

Impact	Affected Attribute	Importance	Potential Effects	Mitigation	Residual Impact
Bulk Excavations	Soil	Low to High	Permanent removal of topsoil & overburden	Phased removal. Proper handling and storage. On-site reuse. Off-site beneficial reuse of surplus.	Imperceptible
	Bedrock	Low to High	Permanent removal of small volumes of rock	Phased removal. Proper handling and storage. On-site reuse.	Imperceptible

Impact	Affected Attribute	Importance	Potential Effects	Mitigation	Residual Impact
Contamination	Soil	Low to High	Fuel spillage or leaks presenting a short-term, not significant, negative, local effect.	Proper storage and dispensing. Proper emergency response to spillage. Removal & off-site disposal of contaminated soil.	Imperceptible
	Bedrock	Low to High			
Slope Stability	Soil	Low to High	Stability of excavations, cuts, and stockpiles presents a potential temporary slight localised negative effect.	Cuts designed with safe slopes (batter). Temporary supports as required for workers' safety. Engineering supports for long-term stability. Proper stockpile storage.	Imperceptible
Bedrock Stability	Bedrock	Low to High	Influence on existing karst features resulting in subsidence	Use of piles supporting raft foundations. Selection of SuDS features compatible with karst regions – i.e., non-infiltrating features near structures	Imperceptible
Wind & Water Erosion	Soil	Low to High	Soil erosion from stockpiles and stripped areas presents short-term, slight, negative effect, with eroded soils potentially carried to the Maglin North River.	Phased removal. Proper handling and storage. Erosion control measures. Buffer set back of 10m for the residential development.	Imperceptible
Land Use	Land	Low to High	Development will result in: permanent, imperceptible, negative affect in terms of the loss of agricultural lands. permanent, positive, slight, local affect in terms development of zones lands within the City.	Suitable housing density. Provision of section of local greenway amenity providing connectivity and beneficial land use of residents.	Imperceptible -agriculture Slight beneficial - provision of residential housing

Table 6.6 Summary of Potential Effects & Mitigation

6.11 References

- Environmental Protection Agency, May 2022. *Guidelines on the information to be contained in Environmental Impact Statement Reports*.
- Office of the Planning Regulator, September 2022. *Environmental Assessments and Planning in Ireland. Planning Leaflet 11*.
- European Commission, 2017. *Environmental Impact Assessment of Projects: Guidance on the Preparation of the Environmental Impact Assessment Report*.
- European Commission, 2017. *Environmental Impact Assessment of Projects: Guidance on Scoping*.
- European Commission, 2013. *Guidance on Integrating Climate Change and Biodiversity into Environmental Impact Assessment*.
- Department of Housing, Planning and Local Government, August 2018. *Guidelines for Planning Authorities and An Bord Pleanála on carrying out Environmental Impact Assessment*.
- Institute of Geologists of Ireland, 2013. *Guidelines for the Preparation of Soils, Geology and Hydrogeology Chapters of Environmental Impact Statements*.
- National Road Authority, 2008. *Guidelines on Procedures for Assessment and Treatment of Geology, Hydrology and Hydrogeology for National Road Schemes*.
- Sleeman, A.G, Pracht, M, et al, 1994. *Geology of South Cork. Geological Survey of Ireland*.
- M. J. Gardiner and T. Radford, 1980. *Soils Association of Ireland and their Land Use Potential. National Soil Survey of Ireland*.
- Geological Survey of Ireland, 2001. *Directory of Active Quarries, Pits, and Mines in Ireland*.
- The Mining Heritage Society of Ireland, 1998. *Memoir of Localities of Minerals of Economic Importance and Metalliferous Mines in Ireland*.
- CAAS Environmental Services Ltd, May 1999. *Ballincollig By-Pass Environmental Impact Statement*.
- Environmental Protection Agency, 2019. *Guidance on Soil and Stone By-products in the Context of Article 27 of the European Communities (Waste Directive) Regulations 2011*.

CHAPTER SEVEN

WATER (HYDROLOGY & HYDROGEOLOGY)

CHAPTER SEVEN

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CHAPTER 7 | Water (Hydrology & Hydrogeology)

7.1 Introduction

This Chapter of the EIAR was prepared by Dan Keohane of Keohane Geological & Environmental Consultancy (KGEC). Mr. Keohane (BSc Hons Geology; MSc Applied Geophysics) received an honors degree in Geology from UCC in 1989, and a Master's degree in Applied Geophysics from UCG in 1991. Mr. Keohane has been working on environmental impact assessment for a wide range of project types for the past 30 years. Areas of expertise include geological assessment, groundwater and surface water assessment for various developments including rock quarries, sand & gravel pits, water supply, wind farms, waste management facilities, housing developments, and roads projects.

This chapter addresses the potential significant direct, indirect and cumulative impacts on hydrology (surface water) and hydrogeology (groundwater) resulting from the proposed large-scale residential development (LRD) at Carriganarra, Carrigrohane, Ballincollig, Cork. The existing water environments are described, potential impacts on these environmental aspects assessed and evaluated, and where appropriate, measures recommended to avoid, reduce or mitigate potential impacts. The residual impacts following mitigation are then summarised. Aquatic ecology of the site was assessed by Dixon Brosnan Ltd and is presented in Chapter 8. Sustainable Drainage Systems (SuDS) was designed by Denis O'Sullivan Associates, Consulting Engineers (DOSA). SuDS is discussed in detail in the Drainage Impact Assessment Report, which is appended to this EIAR. It is summarised in this chapter where appropriate. Malachy Walsh & Partners (MWP) prepared the flood risk assessment report, which is also summarised in this chapter where appropriate and appended to this EIAR.

A full description of the proposed development is provided in Chapter 2. In summary, the proposed development comprises a Large-Scale Residential Development (LRD) at Carriganarra, Carrigrohane (townland), Ballincollig, Cork. The proposed development consists of the demolition of an existing farmyard and associated agricultural buildings and the construction of a residential development of 300 no. units (128 no. dwelling houses and 172 no. apartment/duplex units). Vehicular access to the proposed development will be provided via 2 no. entrances from the proposed extension of the sustainable access corridor (from Heathfield), which will extend to the western side of the site. Several separate pedestrian entrances will also be provided to adjoining residential developments. Ancillary site works include the provision of bicycle parking and bin storage facilities serving the proposed apartment/duplex buildings, a creche facility, open spaces, raising of ground levels between the proposed residential units and the sustainable access corridor, and undergrounding of an existing overhead powerline. It will also include provision for future crossings (pedestrian and vehicular) of the Maglin North River.

7.1.1 Scope & Purpose

This chapter of the EIAR provides details of the surface water and groundwater environments in which the development is proposed. It identifies the surface water catchment(s), drainage patterns, surface water uses, runoff characteristics, flooding potential, groundwater users and hydrogeology. It provides baseline water quality data based on publicly available information and monitoring carried out as part of this assessment.

The purpose of the assessment is to identify the potential direct impacts of the proposed development on the hydrology (surface water quality, runoff characteristics etc.) and hydrogeology (groundwater quality, uses etc.) within the site and potential indirect impacts beyond the site boundary; and to assess the potential impacts in the context of other developments (proposed / completed) to determine cumulative effects. Having identified and quantified the potential impacts, to detail measures to avoid, mitigate and / or reduce significant potential negative impacts for the construction of the development and during its lifespan, where relevant. To audit the effectiveness of the construction phase mitigation measures, a site-specific water quality monitoring programme is also outlined.

7.1.2 Policies & Guidelines

There are several local, national and international policies and guidelines relied upon in the preparation of this chapter. These include:

- Water Framework Directive (2000/60/EC).
- Cork City Development Plan 2022 - 2028.
- Environmental Protection Agency, May 2022 guidelines.
- Office of the Planning Regulator, 2022.
- European Commission, 2017 EIA guidelines.
- European Commission, 2017 EIA scoping.
- European Commission, 2013 EIA incorporating climate change.
- Department of Housing, Planning and Local Government 2018 EIA guidelines.
- Office of Public Works (OPW), 2009 flood risk assessment (FRA) guidelines.
- Department of the Environment, Community and Local Government, 2014 FRA guidelines clarification.
- Institute of Geologists of Ireland, 2013 EIS (EIA) guidelines.
- National Roads Authority 2008 guidelines for geology and hydrogeology assessments.
- National Roads Authority, 2005 guidelines for crossing watercourses during construction.
- Construction Industry Research and Information Association (CIRIA), 2015 SuDS handbook.
- CIRIA, 2017 SuDS manual.
- CIRIA, 2006 guidance on control of water pollution from linear construction projects.
- CIRIA, 2001 guidance on control of water pollution from construction sites.
- Inland Fisheries Ireland, 2016 guidelines on protection of fisheries during construction works.
- Inland Fisheries Ireland, 2020 guidelines on planning for watercourses in the urban environment.
- Malachy Walsh and Partners, 2021 Ballincollig drainage study.

7.1.2.1 Cork City Development Plan 2022-2028 (CDP)

Chapter 9 of the City Development Plan 2022-2028 sets out the objectives for the protection of surface water quality and compliance with the Water Framework Directive and River Basin Management Planning. Objectives in Chapter 9 address water supply, wastewater, private wells, SuDS, water quality, flood risk etc.

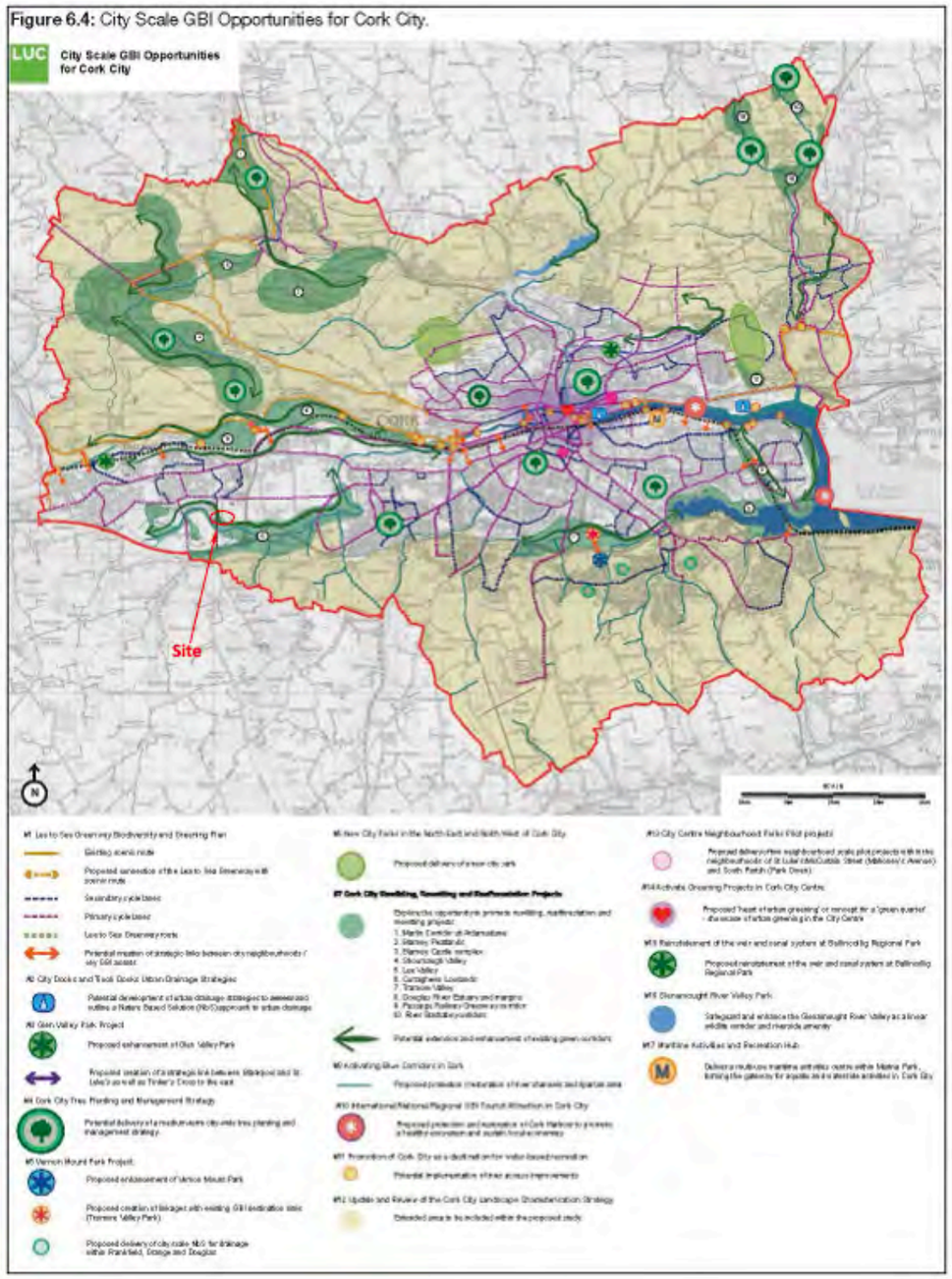


Figure 7.1 CDP GBI Opportunities Map

There are some cross-cutting themes in Chapter 6 of the CDP - Green and Blue Infrastructure, Open Space and Biodiversity. This chapter of the CDP highlights the importance of the water environmental as an integral component of Green-Blue Infrastructure. The Curraheen Lowlands (close to the project site) is identified on Figure 6.4 (City Scale GBI Opportunities for Cork City) of the CDP as one of the 'Cork City Rewilding, Rewetting and Reafforestation Projects' to be explored. The site is also adjacent to a green corridor with potential for extension and enhancement - refer to Figure 7.1. Objective 6.6 relates to the protection of rivers, waterway and wetlands, and Objective 6.21 relates to the development of a river use management plan for the River Lee.

7.1.3 Sources of Baseline Data

The main sources of baseline data and information relating to the water environment include:

- Surface water data including catchments, flows, surface water quality etc - Environmental Protection Agency www.epa.ie , www.catchments.ie and http://www.wfdireland.ie/maps.html . For the purposes of this assessment, watercourses shown on the EPA web-mapping are defined as streams / rivers, and watercourses not shown are referred to as drains (these are generally man-made field-boundary drains).
- Historical flood information and flood risk maps - Office of Public Works www.opw.ie , www.cframs.ie and www.floodinfo.ie
- Rainfall data - Met Eireann www.met.ie
- Designated sites – National Parks & Wildlife Service www.npws.ie
- Groundwater, wells, aquifers, etc - Geological Survey of Ireland - www.gsi.ie

7.1.4 Assessment Methodology

The assessment was carried out with reference to relevant policies, regulations and guidelines, as listed above, and following this general methodology:

- The preliminary design of the proposed development was reviewed to identify elements which could have the potential to impact or change the water environment.
- Consultation was carried out with agencies with an interest in the water environment, including Inland Fisheries Ireland (IFI), Office of Public Works (OPW), Uisce Éireann, Geological Survey of Ireland (GSI), National Parks & Wildlife " Service (NPWS) and Transport Infrastructure Ireland (TII).
- A literature review was carried out to determine any policies and / or guidelines to which the proposal should have regard.
- A desk-based assessment of the water quality, flows, drainage pattern and uses in the catchment relevant to the proposed development, was undertaken. Any particularly sensitive receptors were identified – water abstractions for drinking water, sensitive aquatic habitats or fauna, flooding, etc. The water management proposals in the planning documentation for nearby developments were reviewed.
- Field surveys were conducted to identify any significant water features.
- Site specific flood risk assessments were carried out by MWP to inform the potential for flooding at the site and adjacent lands.
- Review of the biodiversity chapter prepared for the project by Dixon Brosnan Ltd to assess the interaction of surface / groundwater with ecology. Review of the Drainage Impact Assessment Report prepared by DOSA to assess the surface water management proposals for the development.
- Findings from the desk-based study and field surveys were used to modify the site layout. Further field surveys were then carried out to assess any modifications to the site layout.

The site walkovers and collection of data were carried out on several occasions between July 2023 and December 2025. Data collected included:

- Mapping of surface water drainage.
- Collection of surface water samples for analysis.
- Search for local users of surface water for drinking water supply.
- Search for local users of groundwater for drinking water supply.
- Measurement of groundwater levels.

The information collected during the desk-based assessment and site walkovers were used to establish the importance, quality and sensitivity of the receiving surface water (Table 7.1) / groundwater (Table 7.2) environments. This follows the NRA Guidelines (2008).

Importance	Criteria	Typical Examples
Extremely High	Attribute has a high quality or value on an international scale	River, wetland or surface water body ecosystem protected by EU legislation e.g. 'European sites' designated under the Habitats Regulations or 'Salmonid waters' designated pursuant to the European Communities (Quality of Salmonid Waters) Regulations, 1988.
Very High	Attribute has a high quality or value on a regional or national scale.	River, wetland or surface water body ecosystem protected by national legislation – NHA status. Regionally important potable water source supplying >2500 homes. Quality Class A (Biotic Index Q4, Q5) Flood plain protecting more than 50 residential or commercial properties from flooding. Nationally important amenity site for wide range of leisure activities.
High	Attribute has a high quality or value on a local scale	Salmon fishery. Locally important potable water source supplying >1000 homes. Quality Class B (Biotic Index Q3-4). Flood plain protecting between 5 and 50 residential or commercial properties from flooding. Locally important amenity site for wide range of leisure activities.
Medium	Attribute has a medium quality or value on a local scale	Coarse fishery. Local potable water source supplying >50 homes. Quality Class C (Biotic Index Q3, Q2-3). Flood plain protecting between 1 and 5 residential or commercial properties from flooding.
Low	Attribute has a low quality or value on a local scale	Locally important amenity site for small range of leisure activities. Local potable water source supplying <50 homes. Quality Class D (Biotic Index Q2, Q1) Flood plain protecting 1 residential or commercial property from flooding. Amenity site used by small numbers of local people.

Table 7.1 Estimation of Importance of Hydrology Attributes

Importance	Criteria	Typical Examples
Extremely High	Attribute has a high quality or value on an international scale	Groundwater supports river, wetland or surface water body ecosystem protected by EU legislation e.g. SAC or SPA status
Very High	Attribute has a high quality or value on a regional or national scale	Regionally Important Aquifer with multiple wellfields Groundwater supports river, wetland or surface water body ecosystem protected by national legislation – NHA status Regionally important potable water source supplying >2500 homes Inner source protection area for regionally important water source
High	Attribute has a high quality or value on a local scale	Regionally Important Aquifer Groundwater provides large proportion of baseflow to local rivers Locally important potable water source supplying >1000 homes Outer source protection area for regionally important water source Inner source protection area for locally important water source
Medium	Attribute has a medium quality or value on a local scale	Locally Important Aquifer Potable water source supplying >50 homes Outer source protection area for locally important water source
Low	Attribute has a low quality or value on a local scale	Poor Bedrock Aquifer Potable water source supplying <50 homes

Table 7.2 Estimation of Importance of Hydrogeology Attributes

7.1.5 Consultation

As part of the EIA process, consultation was carried out with organisations and individuals regarding the proposed development, namely IFI, OPW, Uisce Éireann, GSI, NPWS and TII. The information package sent, and the consultation responses received, are provided in Appendices 1-3 and 1-4 of this EIAR. The relevant responses are summarised here and incorporated, where appropriate, into the avoidance, mitigation and monitoring proposals for the proposed development. The OPW didn't provide a consultation response.

7.1.5.1 Inland Fisheries Ireland (IFI)

IFI responded by email to on 30 April 2025 raising the following points / queries:

- Disposal of septic effluent to the public sewer. IFI requested that Uisce Éireann confirm sufficient capacity in its wastewater treatment infrastructure, and if this is not the case, provide alternative treatment and disposal options.
- There should be no interference with, bridging, draining, or culverting of the Maglin River to facilitate the development, without the prior approval of IFI and that full cognisance is given to IFI '*Guidelines on protection of fisheries during construction works in and adjacent to waters*'.
- There should be no loss of flood plain.

7.1.5.2 Transport Infrastructure Ireland (TII)

TII responded by email on 12 May 2025. In relation to surface water drainage it commented '*it should be noted that national road surface water drainage regimes are constructed with the objective of disposing of national road surface water only. It is important that capacity in the national roads surface water drainage regime is retained to address this essential function. TII advises it would not support any private development application accessing the national road drainage regime and the Council should ensure that this does not occur. TII expects that this will be demonstrated by the future applicant*'.

It is noted that the discharge of stormwater from the proposed development will be to the Maglin North River at the south-western boundary of the site through a 300mm diameter culvert and hydro-brake to control flow rates. A second discharge for the runoff from the sustainable access corridor and filled lands will be located approximately 120m further downstream. Figure 7.4 shows the drainage network of the proposed development along with the drainage of the nearby N22. This clearly demonstrates that the proposed development will not access the national road drainage regime.

TII also responded to the Council's LRD consultation on 12 September 2025. It reiterated the point that the drainage for the proposed development should not interfere with the national road drainage network. In this regard it requested confirmation that the development drainage will not outfall to any national road drains (which should be protected). As noted above, it is confirmed that the drainage from the proposed development will not outfall to any national road drains.

TII also advised that it expects that the planning application will include a flood risk assessment addressing both fluvial and pluvial flood risk. The site-specific flood risk assessment was prepared by MWP; it is included in Appendix 7.3; and its findings and conclusions are summarised in Section 7.2.5.

7.1.5.3 Uisce Éireann (Irish Water)

Uisce Éireann responded on 21 October 2025. It raised the following points in relation to water:

- A 1.5m diameter watermain (an Uisce Éireann's asset) runs through the project site. The project team is aware of the watermain and has designed around it. Uisce Éireann recommends its minimum standards be adopted for any works in the vicinity of the watermain.
- Protection of drinking water sources should be implemented, where appropriate, to ensure that the development does not give rise to deterioration of water quality of supply sources (surface or ground water). Hydrological / hydrogeological pathways between the site and receiving waters should be identified.
- Any material used as backfill to raise land levels should be inert and soil testing is required to demonstrate this.
- Potential impacts on Uisce Éireann's assets should be assessed, including storm water discharges, sewer network, drinking water distribution network, drinking water sources, drinking water abstraction catchments, reservoirs etc. The assessment should also have regard to sensitive environment receptors.
- It confirmed that there is capacity for both water and wastewater connections for the proposed development is feasible without infrastructure upgrades. It noted that connections to both the existing water and foul networks are feasible without upgrades. For water supply, a connection is required to the water main on Carriganarra Road, approximately 260m to the north. For wastewater, it advised that suitably sized gravity infrastructure should be provided and located to facilitate the decommissioning of the existing Heathfield / The Square WWPS (wastewater pumping station). All flows (existing and proposed) through the development shall discharge to the existing Maglin WWPS.

Uisce Éireann also responded to the Council's LRD consultation on 29 September 2025. It advised that a new pre-connection enquiry (PCE) should be submitted due to the changes in the proposed development and the time (19 months) since the original confirmation of feasibility (COF). As noted, and discussed above, the COF for the project has been updated. In the LRD consultation, it reiterated restrictions on development on / near its assets, protection requirements for drinking water sources and its request for EIAR consultation.

7.1.5.4 Geological Survey of Ireland (GSI)

The GSI responded to the consultation in correspondence dated 12 May 2025. The GSI advised of its programmes focused on the various geological aspects, such as geological heritage, groundwater, flood monitoring, locations of wells and spring, etc. The GSI recommended use of its on-line data and information services. GSI also requested copies of any ground investigation reports prepared for the project.

7.1.5.5 National Parks & Wildlife Services (NPWS)

NPWS responded on 12 June 2025. Most of its submission dealt with the assessment of biodiversity. In relation to the water environment, it noted the following:

- A Construction Management Plan (CMP) should be prepared for the project. This should set out measures to ensure that construction works do not impact on water quality and measures to prevent sediment and/or fuel runoff from getting into watercourses should be detailed.
- County Development Plan Objective WM 11-11: River Channel Protection a) Ensure adequate protection measures along watercourses, keeping them free from development by ensuring development is kept 10m or other appropriate distance from stream and riverbanks in line with best practice for riparian corridors. Development altering the hydro morphology of a watercourse will not normally be permitted, where it may result in the deterioration in the status of a water body through for example, impacts on water quality, quantity or flow rate, riparian habitat or protected species.
- There will be a presumption against the use of culverts and opportunities to actively remove existing culverts and re-naturalise / daylighting watercourses will be encouraged in development proposals. Where river crossings are considered necessary, clear span river crossing structures shall be used on fisheries waters where possible. There should be engagement with Inland Fisheries Ireland in relation to any such proposals.

7.2 Hydrology in the Receiving Environment

The site is within hydrometric area 19 (Lee, Cork Harbour and Youghal Bay). Hydrometric area No 19 includes the surface catchment drained by the River Lee and all streams entering tidal water in Cork Harbour and Youghal Bay and between Knockaverry and Templebreedy, extending to an area of 2,153km^2.

The surface water catchments and drainage networks are shown on Figure 7.2. The site is in the Curraheen (Cork City)_010 WFD River sub-basin; Glasheen (Cork City)_SC_010 WFD sub-catchment; and River Lee WFD catchment. The Maglin North[1] is a second order watercourse that rises in the townland of Grange, to the southwest of the site. It flows north for approximately 1.3km, then turns east, passing under the Ballincollig By-pass in Kilnaglory, flowing generally in an easterly direction. The

1 The EPA name for the Maglin North River is the Grange Hill Stream. The stream is named Maglin North River in the Ballincollig Drainage Study and this nomenclature is used in this EIAR.

Lisheens Stream[2] (a first order stream) joins the Maglin North River just east of Ballincollig Castle. The Maglin North River flows in a southerly direction along the western site boundary, then flows east joining the Maglin South River just west of Clash Road and just south of the Ballincollig By-pass. It is noted that the Maglin South River was diverted as part of the Ballincollig By-pass construction. The river now flows along the southern side of the motorway. The new channel and location of the former channel are shown on Figures 7.2 and 7.5. The Maglin River meets the Curraheen River just east of Clash Road and flows east towards Bishopstown, turns north and then east again, joining with the Glasheen River near Victoria Lodge on the Wilton Road. The Glasheen River joins the south channel of the River Lee near Victoria Cross. The local drainage is shown on Figure 7.3. Figure 7.4 shows the N22 drainage infrastructure near the site.

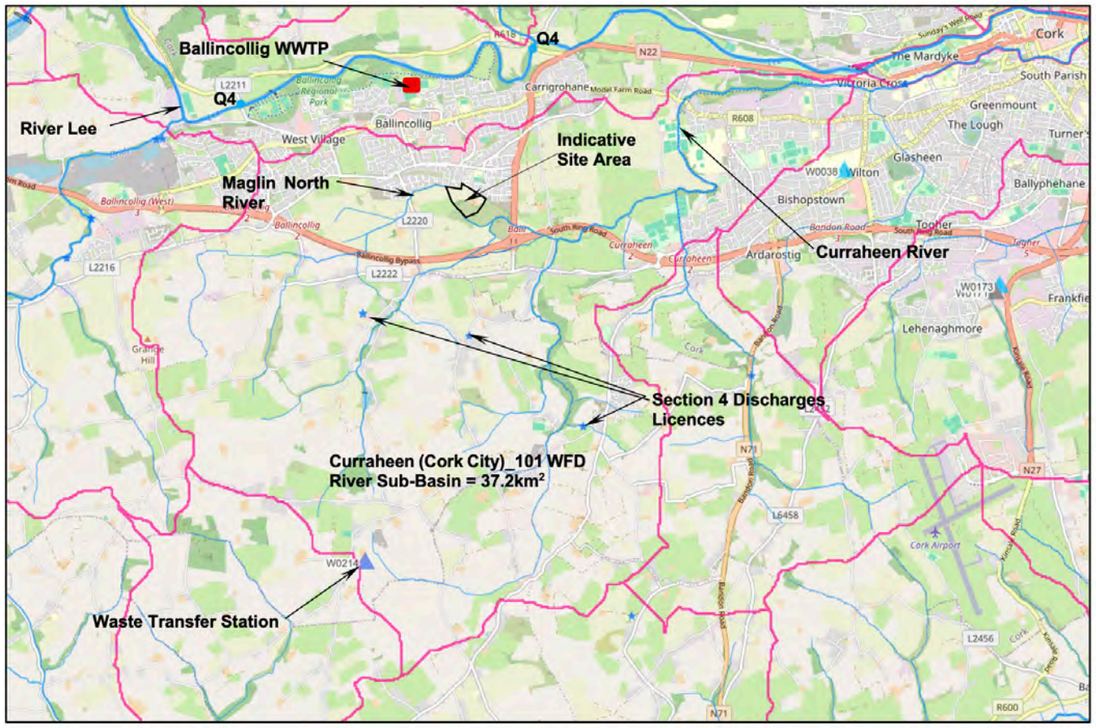


Figure 7.2 Surface Water Features + River Sub-bas

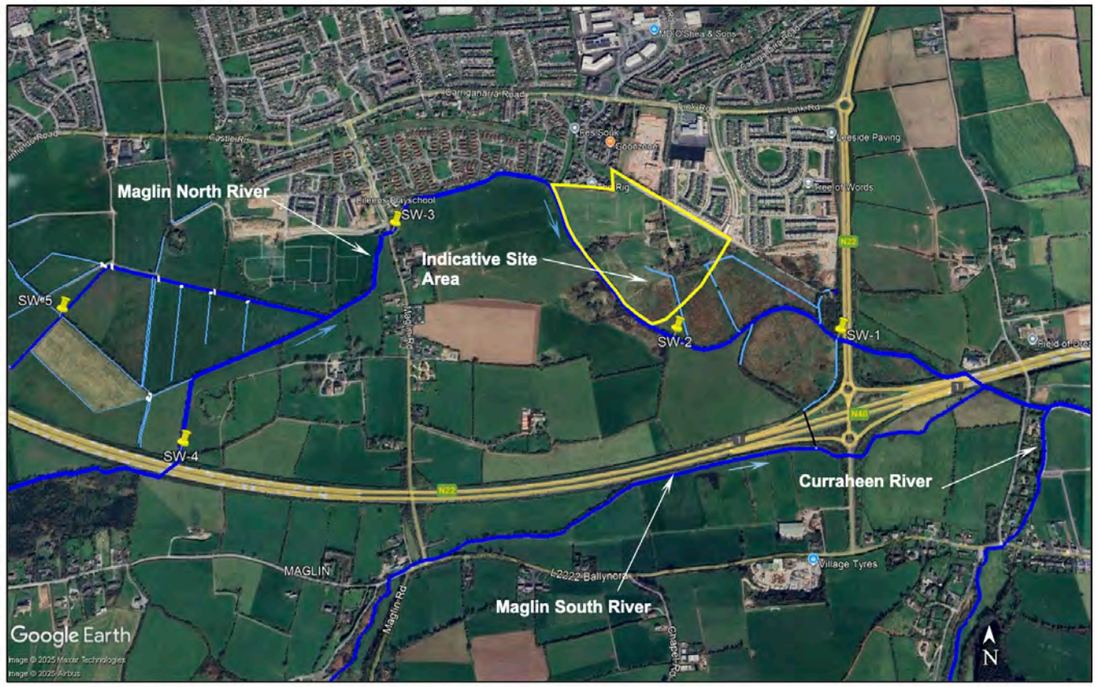


Figure 7.3 Local Surface Water Drainage

2 The EPA name 'Lisheens Stream' is used in this EIAR. This watercourse is referred to as 'Artificial Drain' in the Ballincollig Drainage Study. Lisheens Stream is used in this EIAR to distinguish this watercourse from the other artificial drains in the study area.

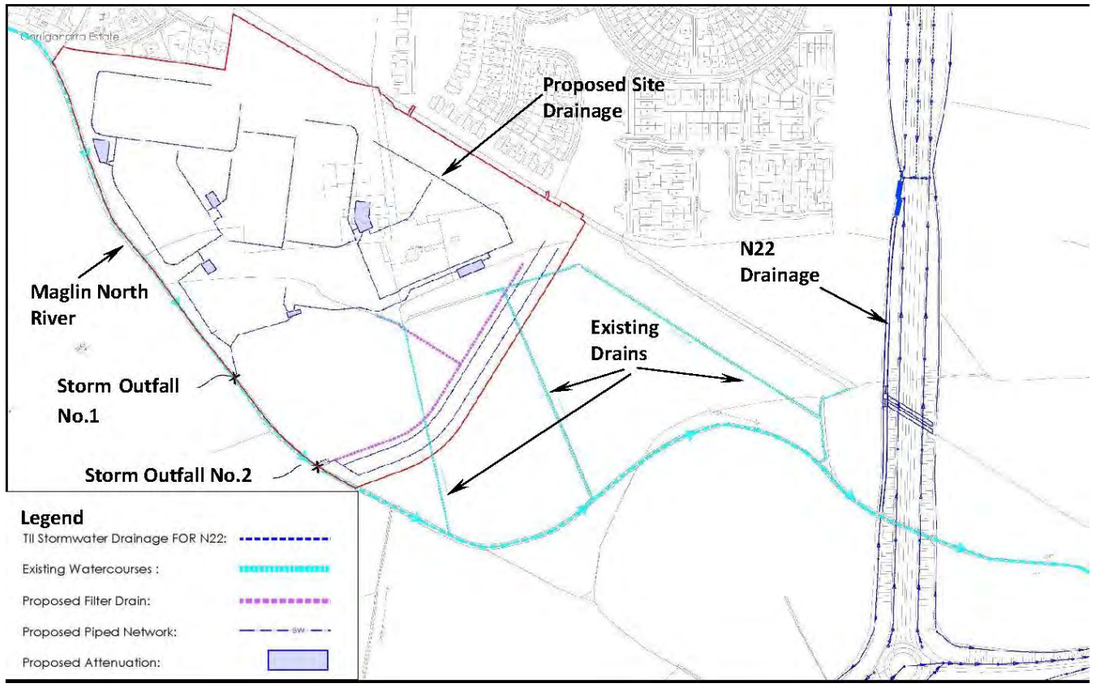


Figure 7.4 N22 Drainage Infrastructure Near Carriganarra Site



Image 7.1 Maglin North River at Western Site Boundary Near Proposed Crossing – Looking North (Upstream)



Image 7.2 Maglin North River near Southern Site Boundary at SW2 – Looking West (Upstream)



Image 7.3 Maglin North River at N22 Bridge at SW1 – Looking East (Downstream)

The River Lee is designated downstream of Blackrock as a Special Protection Area (SPA) - Cork Harbour SPA.

7.2.2 Runoff Estimates

The nearest synoptic weather station to the site is Cork Airport (W665662), approximately 6.9km to the southeast of the site at an elevation of 154mOD. The mean monthly rainfall for Cork Airport synoptic station is summarised in Table 7.3. The long-term average rainfall for Cork Airport is 1,239 mm/annum for 1991 to 2020. An extreme rainfall event of 73.2mm/day was recorded during that 30-year period. The 30-year (1991 to 2020) rainfall 1km x 1km grid data available from Met Eireann indicates a rainfall of 1,094mm/year for the Carriganarra site.

Cork Airport													
Period	**Jan**	**Feb**	**Mar**	**Apr**	**May**	**Jun**	**Jul**	**Aug**	**Sep**	**Oct**	**Nov**	**Dec**	**Annual**
1961-1990	148	116	97	70	84	68	65	90	97	126	109	137	1,207
1981-2010	131.4	97.8	97.6	76.5	82.3	80.9	78.8	96.8	94.6	138.2	120	133.1	**1,228**
1991-2020	131.3	97.2	91.5	86.5	80.8	83.3	87.2	94.6	92	131.2	127	136.6	**1,239**
Greatest Daily Total – Cork Airport													
1991 – 2020	39.3	39	55.2	37.7	34.9	51.3	73.2	59	58.9	52.1	47.9	61.4	**73.2**
1km x 1km Grid - Carriganarra													
1991 - 2020	119	88	80	77	69	72	73	81	80	117	116	124	1,094

Table 7.3 Monthly and Annual Average Rainfalls (mm)

The catchment characteristics are quantified as soil type 2 (high winter rain acceptance potential). The soils are well drained and on gentle to moderate slopes on the northern development area of the site. The southern part of the site is near flat with poor drainage. Based on the mean annual gridded rainfall data for 1km x 1km grid 160,000/70000, Q_{BAR} for the 13.5ha site is estimated at 41.5 l/sec (or 3.07 l/sec/ha). The development area of the site, excluding the sustainable access corridor, is 6.65ha.

There are no active gauging stations on the Maglin North or Curraheen rivers. There is an inactive station on the Curraheen River at Bishopstown House. The EPA Hydrotool gives flow estimates for the Maglin North to the former confluence with the Maglin South River [as noted in Section 7.2 above, the Maglin South was diverted as part of the Ballincollig By-pass construction]. The catchment area extends to 9.806km^2 at the modelling node - refer to Figure 7.5. The EPA Hydrotool gives the long average rainfall for the catchment as 1,223mm and the dry weather flow is given at 0.029m^3/sec (i.e., 95%tile flow). Much of this catchment is within a rural setting with the northern parts of the catchment (approximately 1km^2) within the urban area of Ballincollig.

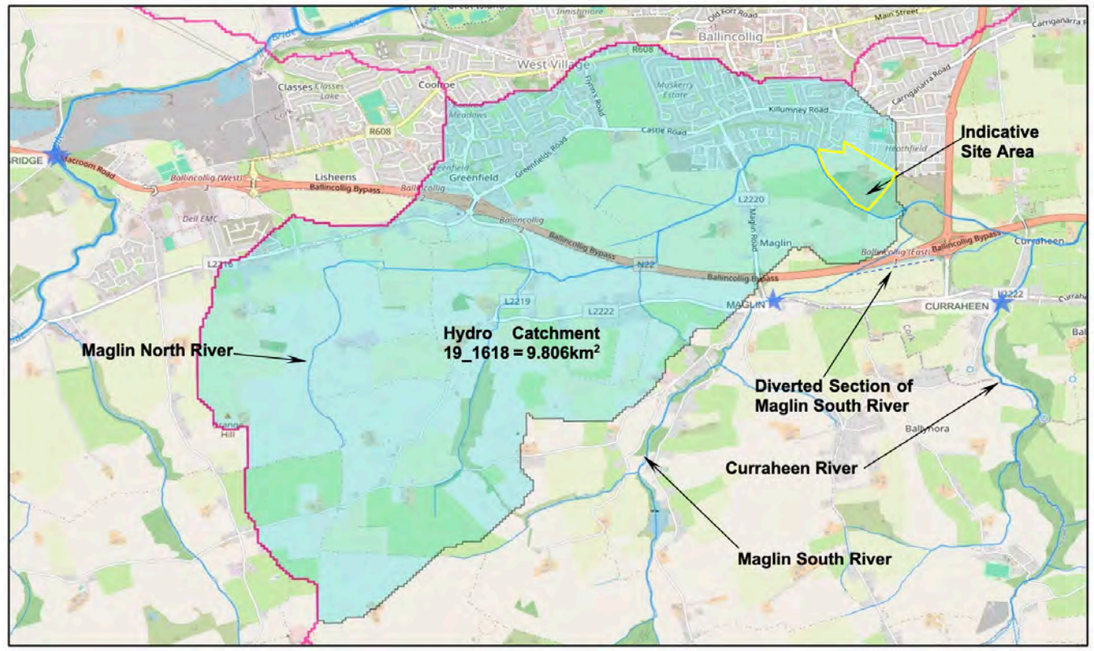


Figure 7.5 Catchment of Maglin North River (Pre-diversion) – EPA Hydrotool

7.2.3 Surface Water Quality

The EPA monitors water quality in the rivers and streams across the country – refer to https://gis.epa.ie/EPAMaps/ for most recent data. However, there are no water quality (Q-value) monitoring points on the Maglin North River or rivers further downstream of the site. There are National Water Monitoring Stations downstream of the site on the Curraheen River. The closest to the site are on the Model Farm Road at Inchagaggin (Carrigrohane Bridge).

The river waterbody WFD status 2016 – 2021 and 2019 – 2024 for the Maglin North River, Curraheen River and all streams draining this WFD River sub-basin is Moderate. This is based on 'expert judgement' (i.e., in the absence of water quality data). All waterbodies in this WFD River sub-basin are assigned 'At Risk'. It is noted that the Curraheen River is coming under anthropogenic pressures. There is one EPA licenced facility (W0214) in the Curraheen (Cork City)_010 WFD River sub-basin, located in Waterfall. This is a privately-operated waste transfer station located near the upper reaches of the Curraheen River – it has no surface water discharges. There are three Section 4 discharge licences in the sub-basin. All three (Ballyburden Meat Processors Ltd, Norwood Grange Nursing Home and the WWTP for a housing estate) are in Waterfall and effectively downstream of the Carriganarra site – refer to Figure 7.2.

The wastewater treatment plant (WWTP) for the area, operated by Uisce Éireann, is located in Ballincollig near the GAA grounds. The treated water is discharged to the River Lee. This stretch of the River Lee (Lee (Cork)_090) was assigned Good WFD river waterbody status for 2016-2021 but has now been assigned Moderate for 2019 – 2024, reverting to the 2013-2018 WFD river waterbody status. It is assigned 'Not At Risk'. The latest (2023) Q-values upstream (Inniscarra Bridge) and downstream (Leemount Bridge) of the WWTP discharge point is Q4, indicating Good status – refer to Figure 7-2 for sample locations.

Five surface water samples (SW1 to SW5) were collected from the river / stream along the valley. Samples were collected on 14 February 2024, 07 May and 09 September 2025. The sample locations are shown on Figure 7.3. Results are summarised in Table 7.4. Photographs of the sampling locations are provided in Appendix 7.1; laboratory certificates are provided in Appendix 7.2.

Parameter	Units	SW1			SW2			SW3			SW4			SW5		
		14/02/24	07/06/25	09/09/2025	14/02/24	07/06/25	09/09/25	14/02/24	07/06/25	09/09/25	14/02/24	07/06/25	09/09/25	14/02/24	07/06/25	09/09/25
Total Alkalinity	mg $CaCO_3$/l	144	145	63	145	135	62	131	123	92	112	103	90	275	235	226
Total Nitrogen	mg N/l	4.95	5.964	1.014	5.12	6.479	1.544	5.15	6.193	3.222	5.58	6.221	3.777	4.56	6.539	4.566
Nitrate	mg N/l	3.987	5.429	0.557	4.155	5.674	1.083	4.309	5.639	2.53	4.75	5.863	3.058	3.899	6.110	3.892
Nitrite	mg N/l	0.031	0.013	0.007	0.029	0.012	0.012	0.023	0.009	0.017	0.02	0.006	0.01	0.008	0.008	0.202
Total Ammonia	mg N/l	0.097	0.038	0.03	0.09	0.020	0.035	0.078	0.027	0.096	0.077	0.021	0.04	0.033	0.034	0.045
Unionised Ammonia	mg N/l	0.004	<0.001	0.001	0.003	<0.001	0.001	0.003	<0.001	0.003	0.002	<0.001	0.002	0.001	0.001	0.001
Ortho-Phosphate	mg P/l	0.055	0.034	0.043	0.054	0.032	0.064	0.05	0.033	0.142	0.054	0.040	0.104	0.02	0.014	0.026
Total Phosphorus	mg P/l	0.139	0.055	0.074	0.127	0.055	0.099	0.118	0.045	0.189	0.106	0.049	0.153	0.042	0.023	0.063
BOD	mg O_2/l	1.7	0.8	1.7	1.3	0.8	1.8	1.0	0.6	3.2	1.2	0.8	2.4	0.3	1.2	3.4
COD	mg O_2/l	24.4	9.2	13.6	21.8	11.8	19.2	22.2	9.2	28.3	19.2	7.9	30.9	15.3	8.8	16.6
Chloride	mg Cl/l	20.0	20.7	7.8	20.2	21.0	12.1	20.5	21.0	22.1	21.1	20.2	24.4	26.5	24.7	26.1
Suspended Solids	mg/l	13.3	6.0	3.2	11.8	8.0	4.0	11.5	2.5	4.5	9.8	2.8	5.0	3.8	12.3	16.8
Conductivity @ 25°C	µS/cm	394	415	166	397	395	185	377	378	3.1	364	342	318	656	587	566
Turbidity	NTU	14.83	6.67	6.44	13.63	7.99	6.8	13.19	3.82	8.29	9.93	2.79	9.14	3.89	7.82	17.06

Table 7.4 Surface Water Results

The results indicate varying water quality along the channel, but with no consistent pattern:

- BOD concentrations range from 0.3 to 3.4mg/l. BOD concentrations ≤1.5 mg/l indicate good status and concentrations ≤1.3mg/l indicate high status. BOD exceeded 1.5 mg/l on several occasions and at all sampling locations in the September 2025 sampling event. Flows were low during this sampling event.
- Total ammonia concentrations ranged from 0.02 to 0.097mg/l. Total ammonia concentrations ≤0.065mg/l indicate good status and concentrations ≤0.040mg/l indicate high status. The concentrations in SW-1 to SW-4 were all above 0.065mg/l in February 2024, so the waters didn't achieve good status for this parameter. However, the total ammonia results for May and September 2025 were (apart from SW3 in September 2025) all below 0.065mg/l indicating good status.
- Total phosphorus concentrations ranged from 0.023 to 0.189mg/l. Total phosphorus concentrations ≤0.025mg/l indicate good status and concentrations ≤0.010mg/l indicate high status. The concentrations were all above 0.025mg/l for all sampling events at most locations, indicating that the waters didn't achieve good status for this parameter. The only result less than 0.25mg/l occurred at SW-5 in May 2025.
- Turbidity and TSS concentrations are low in all samples.

The EPA Phosphorus Pollution Impact Potential[3] at the site is ranked 6 and 7. The EPA Nitrate Pollution Impact Potential[4] at the site is ranked 2 and 3.

7.2.4 Surface Water Usage

The immediate area around the site is serviced by mains water, which is sourced from the Inniscarra Reservoir. There are no known surface water abstractions downstream of the site.

7.2.5 Flood Risk Assessment

A review of the available flood risk assessment carried out in the Ballincollig area include:

- The OPW CFRAM river flood extents mapping shows that the southern-most fringes of the site floods. Flooding occurs to the west of the site along the channel of the Maglin North River. The CFRAM river flood extents mid-range future scenario is shown on Figure 7.6. Low probability (AEP of 0.1%), medium probability (AEP of 1%) and high probability (AEP of 10%) are shown.
- The OPW CFRAM coastal flood extents mid-range future scenario shows a similar flooding pattern along the Maglin North River. The CFRAM coastal flood extents mid-range future scenario is shown on Figure 7.7.
- As the site is modelled as part of the CFRAM project, it is not covered by the OPW National Indicative Fluvial Mapping (NIFM). NIFM maps show flooding to occur to the southwest of the site associated with the Maglin North and Maglin South rivers – refer to Figure 7.8.
- The Ballincollig drainage study indicates that the 0.1% AEP high end future scenario flooding will extend into the southern periphery of the site – see Figure 7.9. This flood extents maps indicates that the flooding extends slightly further north than the CFRAM map.

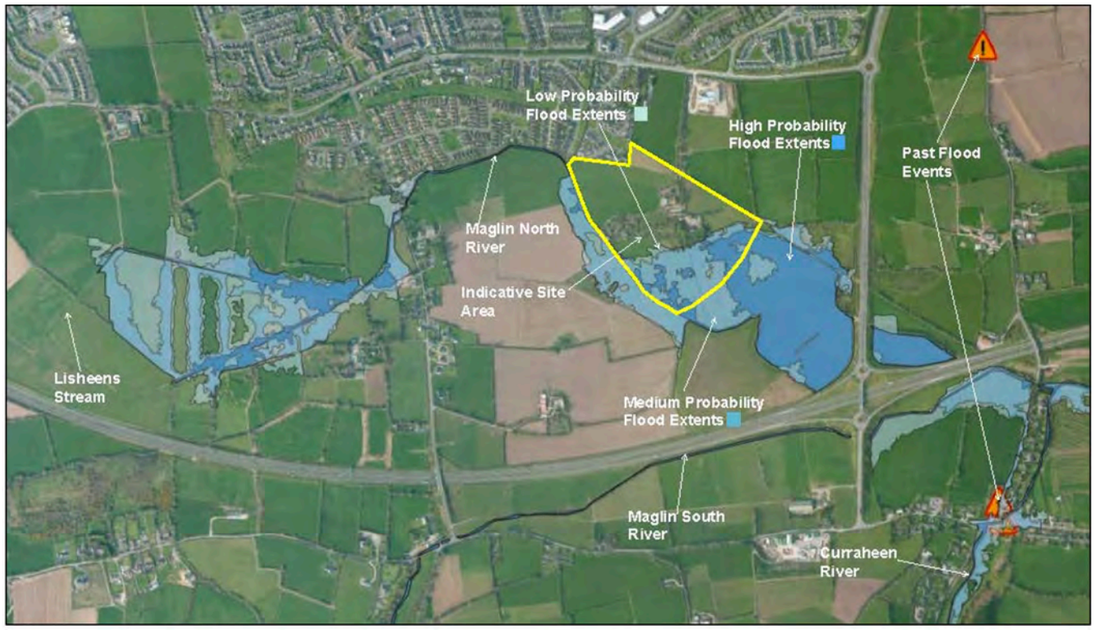


Figure 7.6 OPW CFRAM River Flood Extents

3 Pollutant Impact Potential for Phosphorus has 7 rankings from PIP-P-1 to PIP-P-7. PIP-P-1 is the highest ranking - i.e., highest potential to cause pollution.

4 Pollutant Impact Potential for Nitrates has 5 rankings from PIP-N-1 to PIP-N-5. PIP-N-1 is the highest ranking - i.e., highest potential to cause pollution.



Figure 7.7 OPW NIFM River Flood Extent

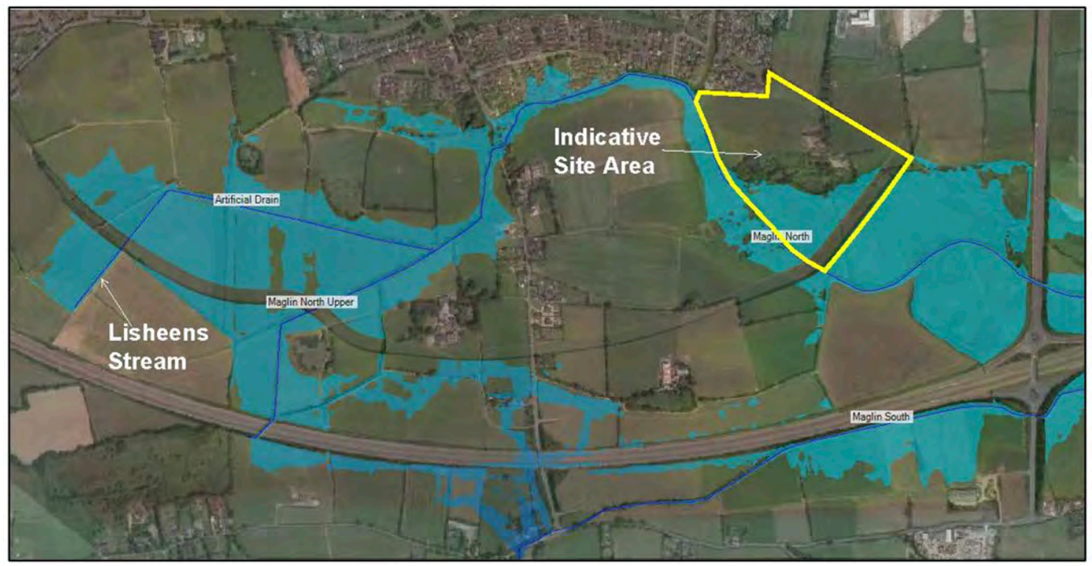


Figure 7.8 Ballincollig Drainage Study – River Flood Extent

As there is a risk of flooding affecting the project site, a Site-Specific Flood Risk Assessment (FRA) was carried out by Malachy Walsh & Partners Consulting Engineers (MWP) in accordance with the OPW's Guidelines[7]. A copy of the FRA is provided in Appendix 7.3. The conclusions of the MWP FRA are that:

- A hydraulic model was created to predict the flood zones and flood levels at the site. This demonstrated that the majority of the proposed residential development is located in Flood Zone C and therefore has a low probability of flooding. The southern area of the site which includes a small portion of the proposed residential area and the proposed sustainable access corridor is located in Flood Zone A/B and therefore has a high/moderate probability of flooding.
- The source of potential flooding at the Carriganarra site is the Maglin North River, which bounds the western side of the site. Pluvial flooding is not considered an issue at the site.
- A Justification Test is required for the proposed residential development, as it encroaches into Flood Zone A and B, and the proposed sustainable access corridor. A Justification Test was carried out which demonstrates that the proposed development of the sustainable access corridor is compliant with Department Guidelines and the Objectives of Cork City Development Plan 2022 – 2028.
- To ensure that there is no unacceptable flood risk, the following mitigation measures are recommended:
  - » The finished floor level (FFL) of all buildings should be set above the 1% AEP flood level for the medium range future scenario plus 500mm freeboard. On this basis, the design flood level ranges from 16.50mOD to 17.09mOD at the downstream and upstream end of the site respectively. The proposed minimum FFL of the residential units ranges from 17.25mOD to 22.50mOD, and any proposed FFL is over 500mm above the adjacent design flood level.
  - » The land within the site will be raised to a minimum ground level of 17.00mOD which places it above the design flood level.
  - » The sustainable access corridor will be raised to a level ranging from 17.0mOD at the southwestern end of the road to 20.00mOD at the northeastern end of the road which places it above the design flood level.
- It was also concluded that, once these mitigation measures are implemented, the proposed development would not have an adverse impact on flooding on third party lands downstream of the sustainable access corridor when compared to the South Ballincollig Drainage Study SFRA.
- It was demonstrated that the risk to occupants of the site would be low.
- Residual risks associated with the development were also assessed and are considered to be acceptable

7.2.6 Importance of Surface Water / Hydrology Attributes

Based on the NRA Guidelines, the importance of the site in terms of surface water and hydrology is rated as Very High. As noted in Chapter 8 (Biodiversity), the Maglin North River is of Local Importance (Higher Value). The Maglin North River, into which the site drains, also flows to Cork Harbour SPA, which is protected by EU legislation.

7.2.7 Hydrogeology / Groundwater

As discussed in Chapter 6 (Land, Soil & Geology), the site is underlain by the Little Island Formation and Waulsortian Limestone Formation, both consisting predominately of limestones. These formations form part of the Ballincollig WFD ground waterbody. The ground waterbody WFD status 2016 - 2021 and 2019 – 2024 are Good. It is categorised at 'Not at Risk'.

The GSI has classified these formations as Regionally Important Aquifer - Karstified (diffuse) (Rkd) - refer to Figure 7.9. It is noted that in the Groundwater Protection Scheme for County Cork, karstification in the Little Island Formation is uncommon

and it is classified as a Regionally Important Aquifer - Fissured (Rf). However, the GSI has confirmed that the bedrock aquifers were reclassified since the publication of the County Cork Groundwater Protection Scheme and that the classification of these bedrock formations as Rkd is correct.

Regionally important karstified (Rkd) aquifers generally are capable for providing sufficient water for public, commercial and industrial purposes. Transmissivity values of up to 1,100m^2/day are recorded. Borehole productivity class is generally III - IV, where class I is the best and V being the worst. Class III - IV have specific capacities of between 10 and 100m^3/day/m.

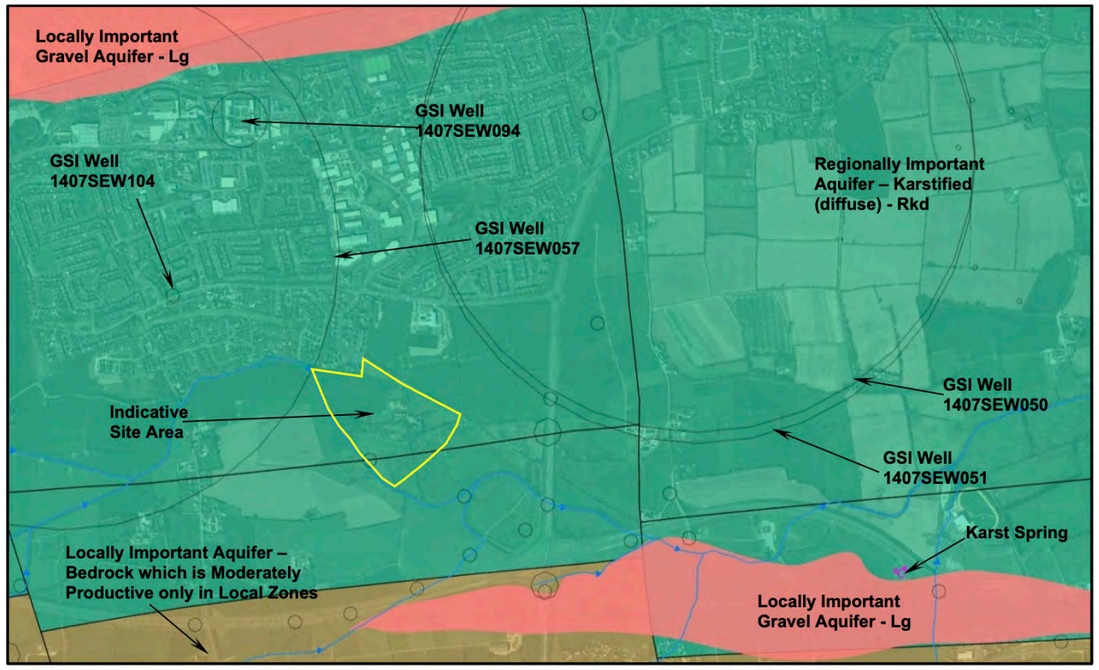


Figure 7.9 iAquifer Classification & GSI Well Location Map

There are no groundwater wells at the site. The former farmhouse and farm were supplied by mains water, as is the wider area. According to the GSI well database, there are several wells near the site, but many of these are site investigation boreholes drilled for the Ballincollig By-pass in the 1990s. The available data on wells in the immediate area, as shown on Figure 7.9, is summarised as follows:

- Dug well in Carrigrohane (1407SEW050), 8.8m deep with bedrock encountered at 0.8m. There is no information on the well yield or use. Well co-ordinates 161230 / 70730 but location is known only to a 2km accuracy.
- Borehole located in Carrigrohane (1407SEW051). The well is 36.6m deep with bedrock encountered at 3m. The well is located at co-ordinates 161230 / 70690 but location is known only to a 2km accuracy. It has a poor yield of 16.4m^3/day. There is no information on the well use
- Borehole located in Ballincollig (1407SEW057) with location known only to a 2km accuracy. The well is 36.6m deep with a good yield of 327.3m^3/day. The well is centred at co-ordinates 158940 / 70380.
- Borehole located along Castle Road in Ballincollig for industrial use (1407SEW104). The well is 36m deep. No information on yield is provided. The well is located at co-ordinates 159340 / 70220. It was likely associated with the former maltings in Ballincollig, which is now a residential development.
- Borehole located in former military barracks in Ballincollig (1407SEW094). No drilling details are provided. The well is located at co-ordinates 159580 / 70850. It has a good yield class with a reported average daily abstraction of 226m^3/day.

There are no groundwater abstractions for public or group water supply schemes near the site. The closest are located greater than 11km to the west at Farran, Crookstown and Coachford.

The groundwater vulnerability across most of the site is extreme (E - bedrock within 3m of ground surface) - refer to Figure 7.10. An area west of the old farmyard (near the lime kiln) is rated as extreme (X - bedrock at / near ground surface or karst), corresponding to an area of outcrop. Vulnerability decreases radially away from the rock outcrop to high along the northern, southern and eastern site extents, and decreasing to moderate at the eastern boundaries of the site. Drilling carried out at the site (refer to Chapter 6), confirms the GSI vulnerability ranking.

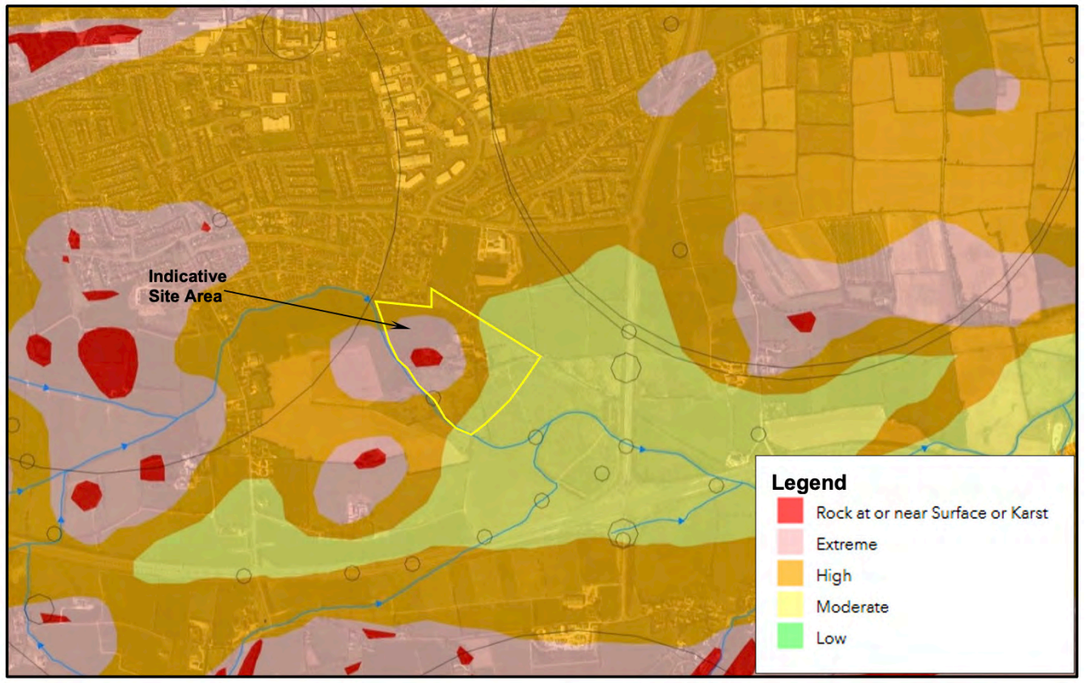


Figure 7.10 Aquifer Vulnerability Map

Priority Geotechnical Ltd drilled 8 No. cable percussion boreholes and 5 No. rotary boreholes across the site to establish depth to bedrock, nature of overburden deposits and bedrock quality. Monitoring wells were installed in four of the rotary boreholes to monitor groundwater level. Well locations are shown on Figure 7.11. Groundwater elevation data is summarised in Table 7.5.

Well ID	Total Depth (m)	Top of Well Liner Elev. (mOD)	Depth to GW (m)				GW Elev. (mOD)			
			10 April '25	31 May '25	09 Sept. '25	24 Oct '25	10 April '25	31 May '25	09 Sept. '25	24 Oct '25
RC-BH2A	9.1	16.380	1.25	1.38	1.45	0.86	15.130	15.000	14.930	15.520
RC-BH5	6.4	22.023	6.09	6.20	6.54	6.41	15.933	15.823	15.483	15.613
RC-BH6	5.7	19.980	3.42	3.52	3.65	3.21	15.560	15.460	15.330	15.770
RC-BH7	6.9	16.655	1.85	1.97	1.89	1.29	14.805	14.685	14.765	15.365

Table 7.5 Groundwater Elevation Data

Based on the groundwater elevation measurements, groundwater flow direction is estimated to generally be to the southeast – refer to figure 7.11. As the groundwater is providing baseflow to the Maglin North River, it is interpreted that there are local variations in the flow direction in proximity to the river, which is influenced by the river stage. For instance, the groundwater level in RC-BH5 is generally higher than that in RC-BH6, but on 24 October 2025, this is reversed.

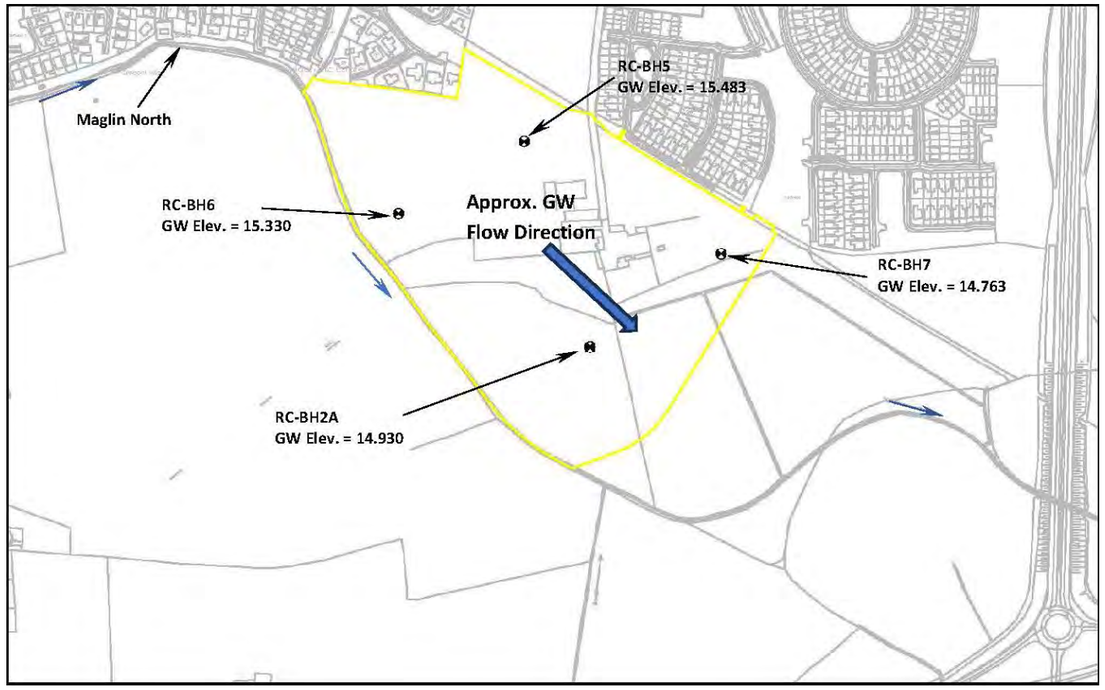


Figure 7.11 Groundwater Flow Direction Map – September 2025

7.2.8 Importance of Groundwater / Hydrogeology Attributes

Based on the NRA Guidelines, the importance of the site in terms of groundwater and hydrogeology is rated as High. The bedrock aquifer is classified as regionally important.

7.3 Characteristics of the Proposed Development

A detailed project description is provided in Chapter 2 of this EIAR and its characteristics that could potentially have an impact on surface water quality, hydrology and hydrogeology include:

- Construction of site roads, housing units and infrastructure. This work will involve:
  - » Stripping of topsoil / soft subsoils to formation levels.
  - » Temporary stockpiling of excavated material.
  - » Importing and stockpiling of fill material.
- Use of potentially polluting materials.
  - » Plant and machinery on site use diesel. This is either stored on site or delivered to site in tanker trucks. There is potential for leaks or spills which could impact surface water and groundwater quality. The risk is present primarily during the construction phase.
  - » Use of concrete in buildings' foundations. Concrete has a high pH and if released into the surface water environment, could change its pH and affect aquatic fauna locally.
- Changes to hydraulic characteristics of the project site. As the site gets developed, its hydraulic characteristics will change. This could increase runoff rates and volumes, increasing flood risk downstream of the site.
- The southern margin of the site is within the flood extents area as mapped in the Ballincollig drainage study and as identified in the site-specific flood risk assessment – refer to Section 7.2.5. The sustainable access corridor to serve the development goes through the flood plain; the residential-zoned lands, to be raised, extend into the flood plain; and the open space between the proposed road and housing, to be filled, are in the flood plain. As such, the development will reduce / displace flood storage capacity, potentially increasing flood extents elsewhere.
- The sustainable access corridor will extend to the Maglin North River. A clear-span bridge will be used to accommodate the river under the proposed road. Works associated with the bridge could impact surface water quality, including drilling of ground investigation boreholes and construction of foundations (earthworks and pouring of concrete). When constructed, the presence of the bridge could potentially cause restrictions during high flows and influence the flooding pattern in the area.
- Increased demand on water services. The site will be serviced by mains water and the mains foul sewer network. The development will place increased demands on these Uisce Éireann assets.
- Removal of the existing septic tank and percolation area serving the former farmhouse and removal of the underground slurry tanks, which are discharging to the groundwater environment.

The potential direct impacts associated with the above works are deterioration of surface water quality on and leaving the site, a potential increase in volume and rates of runoff leaving the site and changes to flood extents on and / or downstream of the site. Unmitigated, deterioration in water quality could potentially result in indirect impacts to downstream aquatic habitats and users of surface water and / or groundwater. Unmitigated, increased runoff rates could potentially result in indirect impacts downstream such as increased erosion along the river channel. Unmitigated, the displacement of flood storage capacity could potentially result in increased flood levels / extents elsewhere in the catchment. There could be indirect impacts at drinking water supply sources and increased pressures on the receiving water from the WWTP servicing the development.

7.4 Impacts Assessment

7.4.1 Impact Assessment Methodology

The criteria in the EPA Guidelines (2022) are used to evaluate and describe the potential impacts in terms of quality, significance, extent, probability and duration as set out in Chapter 1. The NRA guidelines are used to further rate the magnitude of the impact - these are set out in Table 7-6 (Hydrology) and Table 7-7 (Hydrogeology). Determining the significance of the impact on the feature (hydrology / hydrogeological attribute) based on the Importance of the feature and the magnitude of the impact is given in Table 7.8.

Magnitude of Impact	Criteria	Typical Examples
Large Adverse	Results in loss of attribute and / or quality and integrity of attribute	Loss or extensive change to a waterbody or water dependent habitat. Increase in predicted peak flood level >100mm. Extensive loss of fishery. Calculated risk of serious pollution incident >2% annually. Extensive reduction in amenity value.
Moderate Adverse	Results in impact on integrity of attribute or loss of part of attribute	Increase in predicted peak flood level >50mm. Partial loss of fishery. Calculated risk of serious pollution incident >1% annually. Partial reduction in amenity value.
Small Adverse	Results in minor impact on integrity of attribute or loss of small part of attribute	Increase in predicted peak flood level >10mm. Minor loss of fishery. Calculated risk of serious pollution incident >0.5% annually. Slight reduction in amenity value.
Negligible	Results in an impact on attribute but of insufficient magnitude to affect either use or integrity	Negligible change in predicted peak flood level. Calculated risk of serious pollution incident <0.5% annually.
Minor Beneficial	Results in minor improvement of attribute quality	Reduction in predicted peak flood level >10mm. Calculated reduction in pollution risk of 50% or more where existing risk of 50% or more where existing risk is <1% annually.
Moderate Beneficial	Results in moderate improvement of attribute quality	Reduction in predicted peak flood level >50mm. Calculated reduction in pollution risk of 50% or more where existing risk is >1% annually.
Major Beneficial	Results in major improvement of attribute quality	Reduction in predicted peak flood level >100mm.

Table 7.6 Estimation of Magnitude of Impact on Hydrology Attribute

For the Carriganarra site, the magnitude of impact on the hydrology attribute is rated as Negligible - negligible change in predicted peak flood level and negligible risk of serious pollution incident.

Magnitude of Impact	Criteria	Typical Examples
Large Adverse	Results in loss of attribute and /or quality and integrity of attribute	Removal of large proportion of aquifer. Changes to aquifer or unsaturated zone resulting in extensive change to existing water supply springs and wells, river baseflow or ecosystems. Potential high risk of pollution to groundwater from routine run-off1 Calculated risk of serious pollution incident >2% annually.
Moderate Adverse	Results in impact on integrity of attribute or loss of part of attribute	Removal of moderate proportion of aquifer. Changes to aquifer or unsaturated zone resulting in moderate change to existing water supply springs and wells, river baseflow or ecosystems. Potential medium risk of pollution to groundwater from routine run-off. Calculated risk of serious pollution incident >1% annually.
Small Adverse	Results in minor impact on integrity of attribute or loss of small part of attribute	Removal of small proportion of aquifer. Changes to aquifer or unsaturated zone resulting in minor change to water supply springs and wells, river baseflow or ecosystems. Potential low risk of pollution to groundwater from routine run-off. Calculated risk of serious pollution incident >0.5% annually.
Negligible	Results in an impact on attribute but of insufficient magnitude to affect either use or integrity	Calculated risk of serious pollution incident <0.5% annually.

Table 7.7 Estimation of Magnitude of Impact on Hydrogeology Attribute

For the Carriganarra site, the magnitude of impact on the hydrogeology attribute is rated as Negligible - negligible risk of serious pollution incident.

Using Table 7.8, the significance of environmental impacts on water (hydrology / hydrogeology) is Imperceptible.

Importance of Attribute	Magnitude of Impact			
	Negligible	Small	Moderate	Large
Extremely High	Imperceptible	Significant	Profound	Profound
Very High	Imperceptible	Significant / Moderate	Profound / Significant	Profound
High	Imperceptible	Moderate / Slight	Significant / Moderate	Severe / Significant
Medium	Imperceptible	Slight	Moderate	Significant
Low	Imperceptible	Imperceptible	Slight	Slight / Moderate

Table 7.8 Rating of Significant Environmental Impacts

The following sections detail the potential impacts, prior to mitigation, which have been identified from the assessment methodology presented above. The main potential direct impacts of the development on the surface water and groundwater environments are:

- Deterioration of water quality from silt, concrete and / or hydrocarbons.
- Increase in runoff from a rainstorm event. This would increase the peak flow to the receiving watercourse - the Maglin North River. The possible increase in runoff results from a change in the surface runoff coefficient due to hard surfacing of parts of the site.
- Loss of flood storage capacity at the southern margins of the site. Displacing flood waters could increase flood levels and / or flood extents elsewhere in the catchment.

Potential indirect impacts would be associated with deterioration of aquatic habitats resulting from pollution, potential for increased flooding (extends and levels) and impacts on users of surface water downstream of the project site. There could also be indirect impacts at the water supply source, in this case the Inniscarra Reservoir on the River Lee, where abstraction will need to increase to meet demands. In addition, there will be increased pressure on the receiving water from the WWTP discharge. The foul sewer from the Carriganarra site will connect to the Ballincollig WWTP. Treated wastewater is discharged to the River Lee.

7.4.2 Do Nothing Scenario

In the 'do-nothing' scenario, the lands would continue in agricultural use, being used for grazing of cattle. The surface water and groundwater environments would remain largely unchanged. Surface water sampling at the site doesn't indicate any enrichment from current agricultural activities.

7.4.3 Construction Phase

The ground investigation carried out across the site (refer to Section 6.2.9) is sufficient to inform the foundations for houses and apartments. While further ground investigations may be carried out, in particular for the sustainable access corridor and bridge, (likely trial pit excavation and drilling), no significant direct / indirect impact on the water environment is predicted from these works.

7.4.3.1 Surface Water

The housing development will be built in three phases over an approximate 5-year period. There is potential for direct and indirect impacts on surface water quality during construction activity from several sources. These are:

- Increased sediment loading in the surface water runoff from the site and entering the Maglin North River via the existing man-made drains, or directly along the western site boundary. Earthworks for the housing development will take place greater than 10m from the riverbank – the sustainable access corridor and bridge will be the closest works to the river. Earthworks will also take place at / near the drains on the site, with road construction and raising of ground levels. Unmitigated, sediment loading presents a short-term direct negative moderate localised impact on water quality and a short to medium-term indirect slight negative impact on habitats downstream of the site (e.g., if silt were to accumulate in the few gravel beds downstream of the site in the Maglin North River. Once the earthworks and landscaping are completed, the risk of sediment loading of watercourses is significantly reduced.
- Potential spillage of oil and diesel used on site for plant and equipment. During construction there would be typically 8 to 10 machines on site (excavators, dump trucks, teleporters, generators etc.). These would be refuelled every 2 to 3 days. This is either done using refuelling bowsers owned by the plant hire contractors or at the site compound where fuel will be stored. The machines also use hydraulic oils and motor oils. There is potential for leaks and spillages of diesel or oils during refuelling, breakdowns (e.g., breaking of a hydraulic hose) etc. Unmitigated and depending on the volume released, hydrocarbons reaching the surface water environment would have a local short-term direct slight negative impact on water quality and a short term indirect slight negative impact on habitats downstream. Hydrocarbons attenuate naturally in the environment, so any negative impacts are reversible.
- Release of cement to watercourses during concrete pours for apartment and housing foundations. Some of these will be near the field boundary drains discharging to the Maglin North River, so concrete spillages could reach the river. In addition, the construction of the sustainable access corridor bridge will be in close proximity to the river. Unmitigated, this would be a short-term direct moderate negative localised impact on surface water quality.
- In addition, the chutes of concrete trucks are typically rinsed down on site. There will be approximately 1,988 concrete loads brought to site over the construction period. If not carried out properly, concrete washdown water could reach watercourses, affecting its pH. Unmitigated, this would be a short-term direct moderate negative localised impact on surface water quality.

Phase 2 of the development will include the construction of the sustainable access corridor and the raising of ground level between this road and the residential development. These works will affect the flows in the site's drains, and the bridging of the Maglin North River could affect the river hydraulics. The potential hydraulic effects of these works will be experienced during the operational phase and are discussed in Section 7.4.4 below.

7.4.3.2 Groundwater

The potential impacts on groundwater quality are of a similar nature to the surface water environment as discussed above. This includes potential impacts on groundwater quality from hydrocarbon spills or leaks from construction machinery.

Based on the ground investigations conducted, dewatering of excavations (pumping of groundwater) on the housing development is not predicted.

Groundwater (aquifer) vulnerability will be increased with the removal of topsoil and overburden. While this will not change the current aquifer vulnerability rating (extreme to moderate), the depth of protection provided by the topsoil / overburden will be reduced in areas of cut. This presents a likely, imperceptible, temporary negative local effect. It is reversible with the construction of foundations and roads which will provide a barrier to downward migration of any pollutants.

During the construction phase foul effluent will be generated at the welfare facilities. The number of workers on site during the construction phase will vary depending on site activities. During peak activity, there would be approximately 100 workers on site. This would generate up to approximately $3m^3$ of foul sewage per day. Depending on how this is managed, it could present a slight temporary negative local effect on the underlying aquifer (or receiving surface water body).

The decommissioning of the septic tank servicing the former farmhouse and underground slurry tank will have a permanent imperceptible positive effect on the groundwater environment.

7.4.4 Operational Phase

7.4.4.1 Surface Water

There is less potential for direct and indirect impacts on surface water quality during the operational phase of the residential development. The site would be fully landscaped, there would be no earthworks, no concrete pours and comparably little hydrocarbons used or stored. The potential sources of surface water contamination during the operational phase are:

- The parking of cars and the storage of home-heating fuel within the development may result in the leakage of small amounts of oil resulting in contamination of surface water. Any leaks or spillage is likely to be small in scale. Unmitigated, this would present a local long-term imperceptible negative effect.
- The underlying bedrock formations are susceptible to karstification, which could result in subsidence. Inappropriate management of runoff from the site could affect underlying karst bedrock. Depending on the magnitude and unmitigated, ground subsidence would present significant localised negative reversible effects on site infrastructure.
- The development will be serviced by mains sewer which will be treated at Ballincollig WWTP. This WWTP has tertiary treatment with nitrogen and phosphorous removal. Discharge of treated water is to the River Lee. The increased volumes of wastewater associated with the development (approximately 143m^3/day) will increase the loading to the receiving water and increase pressure on its assimilative capacity. Unmitigated, this would present a regional permanent imperceptible negative effect.

The proposed development will increase the hardstanding areas with roads and housing units constructed. The runoff characteristics of the developed site will be different to the greenfield site conditions, with increases in runoff volumes and rates. The changes in runoff are primarily associated with the operational phase. These potential direct and indirect impacts on hydrology are:

- The development site extends to approximately 13.5ha. Of this, approximately 6.5ha will be finished with hard paving (including sustainable access corridor) or roofing, with the remaining 7ha landscaped and green space. The runoff from the entire developed site will discharge to the Maglin North River. Unmitigated, this increased runoff would represent a permanent, significant negative catchment wide effect. It could increase flood risk along the Maglin Valley.
- The proposed sustainable access corridor will extend across the flood plain as mapped in the Ballincollig drainage study. It will displace flood storage capacity and the bridge across the river could affect the river hydraulics depending on design. During flooding events over the operational phase of the development, the flood waters that would have occupied that space will be displaced to other locations, potentially increasing flood levels and / or extents. By itself and unmitigated, this change in the flood water distribution (caused by backwater from the bridge and displacement of flood storage capacity) could represent permanent (but intermittent), slight negative catchment wide effects during heavy prolonged rainfall events. It could result in cumulative effects with the changes in runoff rates (if unmitigated). Raising of ground levels by approximately 0.5m between the sustainable access corridor and the residential units will have similar potential impacts. These works will also affect the flows in the site's drains within the planning boundary.
- In addition to the surface water quality and hydrology effects, the development will place additional pressure on the water supply resources in Cork. As noted, the development will be serviced by mains water. On-site groundwater wells are not proposed. The drinking water supply for the proposed development is sourced from the Inniscarra Reservoir – a man-made reservoir on the River Lee. The development will therefore place an increased demand on this surface water supply. When completed, residents of the development will use approximately 163m^3/day. Un-mitigated, this would present a county-level permanent imperceptible negative effect. According to the EPA web-mapping the Inniscarra Reservoir is not identified as being under river abstraction pressure and Uisce Eireann has confirmed capacity in the existing potable water infrastructure to service the site.

7.4.4.2 Groundwater

The potential impacts on groundwater quality are of a similar nature to the surface water environment as discussed above. This includes potential impacts on groundwater quality from hydrocarbon spills or leaks from parked cars and home heating oil (if used). Leakage from the foul sewer could also affect groundwater quality during the operation phase.

Interception of incident rainfall will reduce the volume of water entering the groundwater environment. This could result in lower groundwater recharge and subsequently lowering of groundwater levels. Unmitigated, this reduced recharge would represent a permanent, not significant negative local effect. There would also be a reduction in stream baseflow from the aquifer, a permanent, imperceptible negative local effect.

As noted, the development will be serviced by mains sewer with no direct discharge for foul effluent to groundwater or surface water. However, leakage from the sewer pipework at the development could impact on groundwater quality. Unmitigated this would present a local permanent imperceptible negative effect.

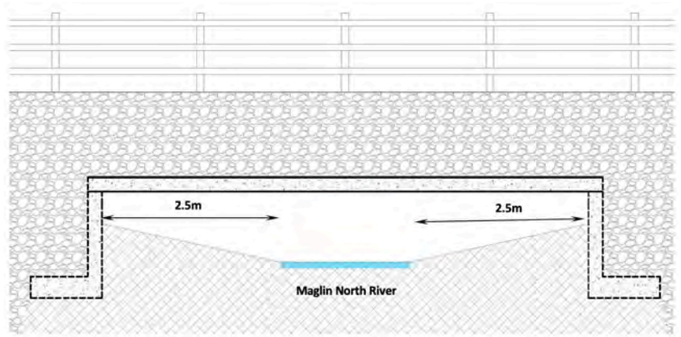
7.5 Avoidance, Remedial or Reductive Measures

The avoidance and mitigation measures for the construction and operational phases are presented in the subsection below. Most relate to the construction phase. Surface water and groundwater are discussed together as there is substantial crossover of the mitigation approach between these two aspects of the environment.

7.5.1 Construction Phase

The mitigation measures to be implemented for the construction phase are set out below:

- Design considerations in the site layout to avoid and reduce impacts to surface water include the provision of a minimum 10m buffer setback of the housing units from the Maglin North River.
- The infilling of the lands between the sustainable access corridor and the residential units will also be set back 10m from the riverbank.
- The bridge to be constructed at part of the sustainable access corridor will be a clear-span structure - as illustrated below. Inland Fisheries Ireland will be consulted on the proposed design for agreement. Its construction will follow current guidelines on work in the riparian zone, including IFI (2016) and NRA (2005). Its construction will require Section 50 consent from the OPW (a process to ensure that the structure doesn't interfere with river hydraulics). Abutments will be set back 2.5m from the riverbank to allow unobstructed passage of fish and wildlife. Silt fences will be erected between any earthworks and the river during ground investigation and construction works.



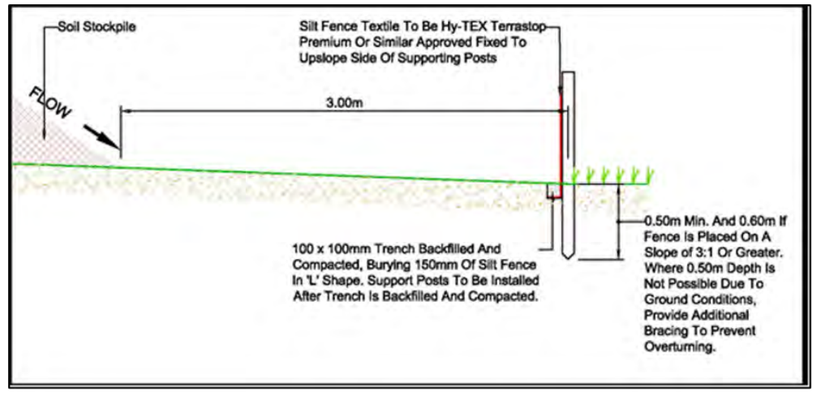
- Following mobilisation to site, surface water management infrastructure will be the first works carried out. Additional controls will be installed as needed as construction progresses through the site, and/or as identified during site inspections of surface water management infrastructure.
- The attenuation tanks required for phase 1 of the development will be installed early in the construction sequencing to control runoff rates as the site gets developed. The attenuation infrastructure will be progressively expanded through the site ahead of housing construction. This will ensure that there is always adequate capacity in the system to deal with design flows.
- Foul sewage generated at the welfare facilities during the early construction phases will be piped to a sealed tank and collected by a waste collection contractor (with the appropriate waste collection permit) for discharge at a licensed WWTP. Once the development is connected to the Uisce Eireann network, the workers' welfare facilities will be piped to the on-site foul sewer network.
- During the construction phase, best practices will be employed to minimise the release of sediment laden storm water runoff, including;
  - » Areas stripped of vegetation will be kept to a minimum; enough to keep pace with house construction. On-going landscaping and restoration of completed units will be carried out. This will reduce areas of soil exposed to erosion.
  - » Stripped and excavated soils will be managed as described in Section 6.5.1. Soil stockpiles will be setback a minimum of 50m from any watercourse. Silt fencing will be erected downgradient to stockpiles to filter runoff water.
  - » Silt fencing will be erected along the western boundary of the site where topography slopes towards the river. This fencing will be maintained for the construction phase until development (storm water drains / paving / landscaping) is complete in adjacent areas.
  - » Construction phase settlement ponds will be constructed to hold runoff water from earthworks areas. These will be located and moved as the development progresses through the site.
  - » Check dams, sandbags and / or straw bales will be installed along the field boundary drains to slow flows and remove silt. Additional check dams will be installed during filling of area between the sustainable access corridor and the residential units. Check dams will be constructed using clean stone and geotextile spanning across the drainage channel.
  - » Alterations to the drains during filling of the areas between the sustainable access corridor and the residential units will be carried out in dry summer months, when there is little or no flow. Flows in the existing drains will be accommodated using filter drains as shown on Figure 7.4.
  - » The public road serving the site will be kept clean of mud and debris. A street sweeper will attend site regularly to clean the road when there are truck movements in and out of the site.
  - » Earthworks will be suspended during extreme weather conditions. An extreme rainfall event will be classified as an event that corresponds to the Met Éireann Orange – Weather Alert for rainfall. The Site Manager will monitor the weather forecast to make preparations ahead of adverse weather conditions.

Met Eireann Orange Weather Alert for Rainfall
50 mm – 80 mm in 24 hrs
40 mm – 60 mm in 12 hrs or less
30 mm – 50 mm in 6 hrs or less

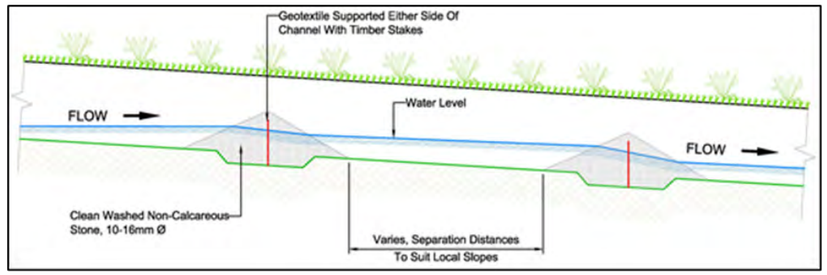
- If required, dewatering of the excavations will be to temporary silt traps. Flow from the silt traps, placed upgradient of the silt fencing protecting watercourses, will be diffuse.
- The release of cement to watercourses will be prohibited. Concrete pours will occur in contained areas using shuttering. Rinsing down of concrete trucks will be done at a dedicated location on site – adjacent to the construction site compound, or at a suitable alternative location, a minimum distance of 75m from any watercourse. Signage will be erected at each concrete pour location directing drivers to the rinse down area. This rinse down area will be removed at the end of the construction phase.
- Hydrocarbons (oils, diesel and chemicals) will be stored and managed in an appropriate manner to ensure no negative effects. These are detailed in Section 6.5.1.

The infrastructure to be used to manage and treat surface water, and to control erosion at the construction site are:

- To reduce the volume of water to be treated during construction and to reduce the erosion potential of exposed soils, clean surface water runoff will be diverted around earthworks areas. This will be done with the use of diversion channels. Diversion channels are shallow interceptor drains to divert overland flows.
- Silt fences will be erected on the downslope side of any earthworks areas to intercept any overland flows that could potentially be carrying silt / fines. These are constructed with geotextile embedded in the topsoil and supported with wooden pegs. See example below.



- Check dams will be installed at appropriate locations along the field boundary drains. These will be constructed using geotextile supported by two wooden pegs, sandwiched by clean washed filter gravel, as illustrated. Alternatively, straw bales will be used.



7.5.2 Operational Phase

Mitigation measures to be employed during the operation phase are:

- The runoff from the site will be controlled and managed using a suite of SuDS and engineering controls designed for a 1:100-year storm event plus a 20% allowance for climate change. These will include rainwater harvesting (water butts – to be retrofitted by homeowners), infiltration basins, filter drains, tree pits, raingarden / bioretention tree pits, blue / green roofs, and attenuation tanks fitted with flow control devices. Hydrocarbon interceptors will also be installed upstream of each attenuation tank. SuDS features to management runoff from the sustainable access corridor and filled areas include filter strips, filter drains and bioretention strips. The filled areas will be graded to direct overland flow to the filter drains to bring surface water to the west. The overall management will limit discharge from the site to greenfield rates – 21.8 l/sec for the residential area (outfall No.1) and 2.9 l/sec for the sustainable access corridor (outfall No.2) – refer to Figure 7.4. The detail of the SuDS infrastructure is provided in the Drainage Assessment Report, prepared by DOSA and included in Appendix 7.4. Engineering details are provided in the Infrastructure Report, prepared by DOSA, and provided in Appendix 2.4.
- With the potential for oil spills and leaks from cars parked in the development, hydrocarbon interceptors and grit traps are included in the drainage design to protect the water quality in the Maglin North River. The hydrocarbon interceptors will be cleaned and maintained by the management company.
- The SuDS infrastructure proposed has regard to the underlying karst limestone bedrock. Infiltration to the subsurface has been minimised. Engineering solutions are proposed to manage stormwater runoff – 6 No. tanks are proposed. Discharge from the site will be to 2 No. areas of stone riprap at the head of constructed open drains with setbacks of approximately 10m from the river. These will dissipate energy and avoid bank erosion / scouring in the drains and riverbed. Discharge locations are shown on Figure 7.4.
- The foul sewer for the facility will connect into the Uisce Eireann sewer network, which discharges to the Ballincollig WWTP – EPA license number D0049-01. This is a tertiary treatment plant with a capacity of 33,000 PE. According to the latest Annual Environment Report for this facility, the quality of the treated water discharged to the River Lee is compliant for all test parameters. Uisce Eireann has confirmed capacity in the Ballincollig WWTP to treat sewage from the Carriganarra site – refer to Appendix A of the Infrastructure Report (provided in Appendix 2.4 of this EIAR).
- MWP has carried out a Site-Specific Flood Risk Assessment (SSFRA) for the proposed development. The SSFRA is provided in Appendix 7.3. The SSFRA had regard to findings of the Ballincollig drainage study, which identified flooding extending into the southern portion of the site for a 1:100-year rainstorm event. The conclusion of the SSFRA is that, with the recommended mitigation (refer to Section 7.2.5), the development is at low risk of flooding for the design event and that it will result in only slight changes to the flood levels in adjoining lands. It concluded that there will be higher flood levels upstream of the sustainable access corridor of up 360mm extending approximately 350m upstream. Downstream of the sustainable access corridor increases of up to 50mm extending for 250m would be experienced. These increase flood levels occur in areas already identified as being at risk of flooding, with only a slight increase in extents on the upstream side of the sustainable access corridor.
- Groundwater (aquifer) vulnerability will be temporary increased as the site is stripped and reprofiled for development. The progressive construction of paved roads, foundations and landscaping will provide protection to the aquifer.
- To conserve water usage (and consequently reduce the volume of foul sewerage generated), each house will be fitted with a water meter, aerated shower heads, aerated strainers in taps, duel flush cisterns etc.

7.5.3 Monitoring

The Site Manager will undertake inspections at all outfalls from the construction works. Inspections will be carried out during and following heavy rainfall events. The Site Manager will organise monitoring of surface water quality at monitoring points SW1, SW2 and SW3, as shown on Figure 7.3. Samples will be collected monthly and tested for turbidity and suspended solids. All sample results will be input to a database and compared to baseline monitoring data.

7.5.4 Worst-Case Scenario

The worst-case scenario would be a slippage of stockpiled soil or release of concrete into the field boundary drains discharging to the Maglin North River (or directly to the river) impacting on water quality, habitats, and aquatic flora / fauna. However, with appropriate management of stockpiles, monitoring and inspections, and good construction practices this scenario is unlikely to occur.

In the very unlikely event of this occurring, the following emergency response will be implemented:

- Safety of site personnel and any potentially affected neighbours will be checked as a priority and appropriate action taken.
- The appropriate authorities will be notified. This will include the City Council Environment Section, IFI, etc.
- The Site Manager will assess the situation and carry out a risk assessment to inform the appropriate mitigation to be undertaken. The priority will be to prevent any further release of pollution to the watercourses.
- Remedial works will be carried out at the location of the incident. The rest of the site will be inspected, and similar remedial works carried out where appropriate.
- Surveys of the affected watercourses will be carried out and remedial measures carried out, where possible.

7.5.5 Predicted Impacts

With the implementation of these avoidance and mitigation measures, the predicted impacts of the proposed development on the water environment are:

- The impacts on surface water quality are predicted to have not significant, localised temporary negative effects during the construction phase and imperceptible, localised brief negative effects during the operational phase. No significant indirect impact is predicted on the aquatic habitats and fauna downstream of the site.
- The impacts on hydrology / runoff characteristics of the site are predicted to have imperceptible, local, permanent negative effects during the operational phase.
- The impacts on groundwater / aquifers are predicted to have imperceptible, localised, permanent negative effects.
- The impacts on water infrastructure (drinking water treatment and WWTP) are predicted to have likely imperceptible, regional, permanent negative effects.
- The stormwater infrastructure for the development will not connect to the N22 drainage infrastructure. Drainage from the N22 is distant from the Carriganarra site. Runoff from the N22 near the site discharges to the Maglin North River at SW1. No impact on the N22 drainage infrastructure is predicted.

7.6 Cumulative Impacts

The permitted/proposed projects in the site's vicinity, which have been assessed for cumulative impacts, are detailed in Table 1.1 of this EIAR (Chapter 1 - Introduction). The seven projects include five housing schemes, a creche and the Cork Luas Project. The publicly available documents and drawings for these projects were reviewed to determine whether in-combination effects could potentially occur. One of the projects (Cork Luas - Luas Cork | Public Consultation Emerging Preferred Route 2024) is still at route selection stage, so any cumulative impacts are indeterminant at this time. While the western section of the preferred route is in the same WFD River sub-basin (Curraheen (Cork City)_010), the construction stages for both projects are very unlikely to coincide.

The other projects will have a cumulative effect in increasing the hard paved surfaces within the local catchment and so potentially increase runoff rates and volumes, and flood risk in the Maglin catchment. In reviewing the available documentation for these projects, it is stated that SuDS infrastructure will be installed and discharge from the sites will be limited to greenfield rates. Apart from a small section of the sustainable access corridor of the Greenfield LRD, these projects are located entirely outside the flood extents areas of the Maglin North River. For the Greenfield LRD, compensation has been included to maintain the current flood levels and extents, so no cumulative effects are predicted in this regard. The runoff from the Carriganarra site will be maintained at greenfield rates and increased flooding arising from this aspect of the development is not predicted. As such, no cumulative effect is predicted in terms of runoff rates and flood risk.

These projects will involve large-scale earthworks, which could result in silt-laden stormwater reaching watercourses. The housing development at Carriganarra (planning Ref. No. 22/41644) and its extension (planning Ref. No. 26/44475) have no on-site watercourses / drains and are distant from the Maglin North River. As such, the risk of silt-laden stormwater reaching the Maglin North is low. Visits to the Carriganarra site during construction works confirms that stormwater runoff is trapped on site by temporary berms, forming silt traps. In the CEMP of the housing development at Maglin LRD (being proposed by O'Flynn Construction - planning Ref. No. 25/44222), Greenfield (being proposed by Murnane & O'Shea Ltd - planning Ref. No. 25/44048) and Cois Caisleán (being proposed by Coleman New Homes Ltd - planning Ref. No. 23/42446) stormwater runoff controls are proposed, including silt traps and siltbusters. Coleman New Homes Ltd are also developing the creche (planning Ref. No. 24/43308), so similar surface water management controls are assumed. As such, no cumulative effect is predicted with regard to water quality.

The potential cumulative impacts of the relevant plan for the area were assessed, which is considered to be the Cork City Development Plan 2022. The assessment of the potential impacts on the environment of the Cork City Development Plan 2022 was undertaken utilising the Strategic Environmental Objectives (SEOs) which are detailed in Table 5.1 of the CDP's Strategic Environmental Assessment. The potential cumulative impacts of the Plan were assessed having regard to these SEO's. Table 5.1 of the SEA identifies the SEO's for 'Water' as being to:

- Ensure that the status of water bodies is protected, maintained and improved in line with the requirements of the Water Framework Directive.
- Ensure water resources are sustainably managed to deliver proposed regional and City growth targets in the context of existing and projected water supply and wastewater capacity constraints ensuring the protection of receiving environments.
- Avoid inappropriate zoning and development in areas at risk of flooding and areas that are vulnerable to current and future erosion.
- Integrate sustainable water management solutions (such as SuDS, porous surfacing and green roofs) into development proposals.

Table 7.5 of the CDP's Strategic Environmental Assessment, 'Comparative Assessment of each of the Alternatives against Strategic Environmental Objectives' indicates that Alternative/Scenario 3 'Compact Liveable Growth', the 'Selected Scenario' has positive interactions with the status of the SEO's for 'Water'.

There are no significant cumulative effects predicted for surface water, hydrology or groundwater during the operational phase.

7.7 Risk of Major Accidents or Disasters

The risk of major accidents or disasters arising from the water aspects of the proposed development is negligible. A SSFRA was completed for the project, and the results indicate minor changes in flood levels and negligible changes in flood extents. Catchment-wide maintenance of the river channel would mitigate risk of flooding.

7.8 Difficulties Encountered in Compiling

There were no difficulties encountered in the compiling the water chapter.

7.9 Interactions

Interactions associated with surface water, hydrology and hydrogeology with other aspects of the environment include:

- Soils & Geology - The thickness of soil over the bedrock aquifer informs the vulnerability ranking. Reprofiling of the site topography requires the removal of soil which will temporarily increase the aquifer vulnerability. Areas of fill will decrease aquifer vulnerability.
- Soils & Geology - management of soil (stripping and storage) will interact with surface water quality in terms of potential soil erosion and siltation of the receiving surface water environment.
- Biodiversity - The quality of the surface water environment influences the quality of the aquatic habitats and the health of flora / fauna populations they support.

7.10 Conclusions on Water

The site consists of a farm holding currently used for grazing cattle. The farmyard is unused and in a state of disrepair. The site drains to the Maglin North River through several man-made field boundary drains and overland flows. The main impacts associated with water occur during the construction stage. Appropriate mitigation is proposed to avoid and reduce potential impacts on water quality. Surface water runoff will be controlled during the operational phase such that the runoff volumes and water quality closely match those of the greenfield runoff. The construction of the sustainable access corridor, bridge and infilling of part of the floodplain will change the local hydraulics. This has been assessed and quantified by hydraulic modelling as not being significant. No significant impacts on groundwater are identified. A Water Framework Directive Assessment report is provided in Appendix 7.5. It concludes that the proposed Carriganarra development will not put at risk any good status waterbody; negatively affect any protected site; inhibit any waterbody from achieving good statis; and is not in conflict with the objectives of the River Basin Management Plan. As such, the proposed development is compliant with the Water Framework Directive.

7.11 References

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- Office of the Planning Regulator, September 2022. *Environmental Assessments and Planning in Ireland. Planning Leaflet 11*.
- European Commission, 2017. *Environmental Impact Assessment of Projects: Guidance on the Preparation of the Environmental Impact Assessment Report*.
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- European Commission, 2013. *Guidance on Integrating Climate Change and Biodiversity into Environmental Impact Assessment*.
- Department of Housing, Planning and Local Government, August 2018. *Guidelines for Planning Authorities and An Bord Pleanála on carrying out Environmental Impact Assessment*.
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- Inland Fisheries Ireland, 2020. *Planning for Watercourses in The Urban Environment. A Guide to the Protection of Watercourses through the Use of Buffer Zones, Sustainable Drainage Systems, Instream Rehabilitation, Climate / Flood Risk and Recreational Planning*.
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- European Union Environmental Objectives (Surface Waters) (Amendment) Regulations 2019. S.I. No. 77 of 2019.
- Cork County Council, 07 December 2007. *Wastewater Discharge License Under S.I. 684 of 2007 Regulation - Scheme / Agglomerate Name: Ballincollig. Application*.

CHAPTER EIGHT

BIODIVERSITY

CHAPTER EIGHT

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CHAPTER 8 | Biodiversity

8.1 Introduction

This chapter describes the likely significant effects of the proposed development on biodiversity, including flora (plants), fauna (animals), and habitats in both the terrestrial and aquatic environment. Mitigation measures are also described, where applicable or appropriate, that avoid or minimise adverse biodiversity effects.

Chapter 2 Project Description and Alternatives Considered provides a full description of the proposed development. An Appropriate Assessment (AA) Screening and Natura Impact Statement (NIS) has also been prepared for the project, is included as Appendix 8-4 of this EIAR, and these will be submitted to the planning authority as part of the planning application documentation.

The potential effects on biodiversity in this chapter should be considered in conjunction with the other chapters of the EIAR including Chapter 3 Landscape and Visual, Chapter 6 Land, Soils and Geology, Chapter 7 Water (Hydrology & Hydrogeology), Chapter 10 Noise and Vibration, Chapter 11. Air Quality and Chapter 14 Interaction of Impacts as well as the Construction Environmental Waste Management Plan (CEMP) included as Appendix 2-1 of this EIAR.

This chapter was prepared by Carl Dixon MSc (Ecological Monitoring) and Dr. Sorcha Sheehy PhD (Ecology/ornithology). Site surveys were completed by Carl Dixon MSc, Sorcha Sheehy PhD and Mark Donnelly BSc (Forestry). Details of Carl, Sorcha and Mark's relevant qualifications and experience are included in Chapter 1 Introduction.

8.2 Assessment methodology

8.2.1 General

The biodiversity assessment addresses the potential likely significant direct, indirect and cumulative effects of the proposed development on terrestrial and aquatic biodiversity, including flora, fauna, and habitats in proximity to the proposed development site. The assessment has been carried out in three stages:

1. Desktop assessment to determine existing information and records in relation to:
   - Sites, species, and habitats protected under Council Directive 92/43/EEC (Habitats Directive), and sites and species protected under Council Directive 2009/147/EC (Birds Directive), within the zone of influence of the proposed development and more distant hydrologically linked sites. The Zone of Influence (ZoI) comprises the area within which the proposed development may potentially affect the conservation objectives (or qualifying interests) of a Natura 2000 site;
   - Biodiversity, habitats, and species present near the proposed development.

2. Site visits and field surveys by the specialist ecologists to establish the existing ecological conditions within the footprint of the proposed development and within the vicinity of all the proposed development elements.

3. Evaluation of the proposed development and determination of the scale and extent of potential likely direct and indirect significant effects on biodiversity (i.e., flora, fauna, and habitats) and the identification of appropriate mitigation and monitoring which may be required.

8.2.2 Relevant Legislation

Flora and fauna in Ireland are protected at a national level by the Wildlife Act 1976, as amended, and the European Communities (Birds and Natural Habitats) Regulations 2011. They are also protected at a European level by the EU Habitats Directive (92/43/EEC) and the EU Birds Directive (2009/147/EC).

Under this legislation, sites of nature conservation importance are then designated in order to legally protect faunal and floral species and important/vulnerable habitats.

The relevant categories of designation are as follows:

- Special Areas of Conservation (SAC) are designated under the European Communities (Birds and Natural Habitats) Regulations 2011 to meet the EU Habitats Directive (92/43/EEC);
- Special Protection Areas (SPAs) are designated under the EU Birds Directive (79/409/EEC) amended in 2009 as the Directive 2009/147/EC; and
- Natural Heritage Areas (NHAs) and Proposed Natural Heritage Areas (pNHA) are listed under the Wildlife (Amendment) Act 2000. A NHA is designated for its wildlife value and receives statutory protection. A list of proposed NHAs (pNHAs) was published on a non-statutory basis in 1995, but these have not since been statutorily proposed or designated.

Relevant European Legislation

- Council Directive 92/43/EEC of 21 May 1992 on the conservation of natural habitats and of wild fauna and flora (The Habitats Directive);
- Directive 2009/147/EC of the European Parliament and of the Council on the conservation of wild birds (The Birds Directive);
- Directive 2000/60/EC of the European Parliament and of the Council establishing a framework for the Community action in the field of water policy (The Water Framework Directive);
- Directive 2006/44/EC of the European Parliament and of the Council of 6 September 2006 on the quality of fresh waters needing protection or improvement in order to support fish life (The Fish Directive (consolidated)).

Relevant Irish Legislation

- The Wildlife Act 1976, as amended by the Wildlife Act 1976 (Protection of Wild Animals) Regulations, 1980, the Wildlife (Amendment) Act 2000, the Wildlife (Amendment) Act 2010, Wildlife (Amendment) Act 2012, European Communities (Wildlife Act, 1976) (Amendment) Regulations 2017. (The Wildlife Act);
- European Communities (Conservation of Wild Birds) Regulations 1985 (S.I. 291/1985) as amended by S.I. 31/1995;
- European Communities (Natural Habitats) Regulations, S.I. 94/1997 as amended by S.I. 233/1998 & S.I. 378/2005 (The Habitats Regulations);
- Fisheries (Consolidation) Act, 1959 (as amended), hereafter referred to as the Fisheries Act;
- European Communities (Birds and Natural Habitats) Regulations 2011 (S.I. 477/2011);
- Flora (Protection) Order, 2022 (S.I. No. 235/2022).

In addition to the above, in assessing the likely significant effects on the prevailing biodiversity arising from the proposed works (including decommissioning works), due regard, where relevant, has been given to relevant legislation and guidance, including the following:

- EIA Directive (2014/52/EU)
- Planning and Development Acts 2000, as amended and the Planning and Development Regulations 2001, as amended

- EU Water Framework Directive 2000/60/EC
- European Communities (Birds and Natural Habitats) Regulations 2011 (as amended)
- EU Biodiversity Strategy for 2030 (EU, 2020)
- EU Strategy on Green Infrastructure (EU, 2013)
- Ireland's 4th National Biodiversity Action Plan 2023–2030
- National Parks and Wildlife Service (NPWS) Threat Response Plans (NPWS, Various) and
- Cork City Development Plan 2022-2028 (Cork City Council 2022).

8.2.3 Guidance

This chapter of the EIAR follows the Environmental Protection Agency's *Guidelines on the information to be contained in Environmental Impact Assessment Reports* (EPA 2022). It also takes account of the *Guidelines for Planning Authorities and An Bord Pleanála on carrying out Environmental Impact Assessment* (Department of Environment, Community and Local Government, August 2018), *Guidelines on Ecological Impact Assessment in the UK and Ireland, 2nd edition* (Chartered Institute of Ecology and Environmental Management CIEEM 2016) and *Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater and Coastal, Version 1.3* (CIEEM, 2024).

Reference was also made to the following documents where relevant:

- 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) (European Union (EU), 2017);
- Managing Natura 2000 Sites: The Provision of Article 6 of the Habitats Directive 92/43/EEC (EC Environment Directorate-General, 2018);
- Guidance on integrating climate changes and biodiversity into environmental impact assessment (EU Commission 2013);
- Assessment of plans & projects in relation to N2K sites – Methodological Guidance (EC 2021);
- Biodiversity Net Gain Good practice principles for development (CIEEM 2019)
- Biodiversity Net Gain. A practical guide. (CIEEM 2016);
- Guidelines on Protection of Fisheries During Construction Works in and Adjacent to Waters Inland Fisheries Ireland (2016);
- Guidance document on the strict protection of animal species of Community interest under the Habitats Directive (EC 2021);
- Guidelines for Assessment of Ecological Impacts of National Road Schemes (National Roads Authority (TII) 2009);
- Best Practice Guidance for Habitat Survey and Mapping (Heritage Council, 2011);
- A Guide to Habitats in Ireland (Fossitt, 2000);
- Guidelines for the treatment of Badgers prior to the construction of National Road Schemes. National Roads Authority, Dublin (National Roads Authority (TII) 2005a);
- Best Practice Guidelines for the Conservation of Bats in the Planning of National Road Schemes (National Roads Authority (TII) 2005b).
- Guidelines for the treatment of bats during the construction of national road schemes (National Roads Authority (TII) 2005c);
- Guidelines for the protection and preservation of trees, hedgerows and scrub prior to, during and post construction of national road schemes. (National Roads Authority (TII) 2006).
- Guidelines for the treatment of Otters prior to the construction of National Road Schemes (National Roads Authority (TII) 2008);
- Bird Census Techniques (Bibby, C.J., Burgess, N.D., Hill, D.A. & Mustoe, S.H. 2000)
- Bird Monitoring Methods - a Manual of Techniques for Key UK Species. (Gilbert, G., Gibbons, D.W. & Evans, J. (1998))
- Bat Surveys for Professional Ecologists: Good Practice Guidelines (4th ed)' (Collins, 2023) and
- Bat Mitigation Guidelines for Ireland Volume 2. (F. Marnell, C. Kelleher and E. Mullen NPWS (2022)).

8.2.4 Desktop Study

A desktop study was carried out to collate the available information on the local ecological environment. The purpose of the desktop study was to identify features of ecological value occurring within the proposed development site and those occurring near to it which have the potential to be affected by the proposed development. A desktop review also allows the key ecological issues to be identified early in the assessment process and facilitates the planning of surveys. Sources of information utilised for this report include the following:

- National Parks and Wildlife Service (NPWS) - www.npws.ie
- Environmental Protection Agency (EPA) – www.epa.ie
- National Biodiversity Data Centre (NBDC) – www.biodiversityireland.ie
- Bat Conservation Ireland - www.batconservationireland.org
- Birdwatch Ireland - www.birdwatchireland.ie
- National Biodiversity Action Plan 2023 – 2030 (Government of Ireland).
- Cork City Development Plan 2022-2028 (Cork City Council 2022)
- Cork City Heritage and Biodiversity Plan (2021-2026)

8.2.5 Site Surveys

This assessment is based on surveys at the proposed development site. Site surveys were largely carried out between January 2024 to January 2026 as outlined below. It is noted that DixonBrosnan also previously surveyed this site in August and September 2022.

Table 8.1 Dates of Site Surveys

Surveys	Dates
Habitats (including hedgerows, botanical and invasive species)	14th May 2024, 22nd August 2024, 11th September 2025, 17th December 2025, 30th January 2026
Non-volant mammals	22nd August 2024, 11th September 2025, 17th December 2025, 5th January 2025
Bats	24th August 2024, 27th August 2024, 11th September 2025, 25th September 2025 (31st August 2022, 1st September 2022)
Winter birds	29th January 2024, 12th February 2024, 27th February 2024, 22nd January 2025, 7th February 2025, 27th February 2025, 27th October 2025, 3rd November 2025, 12th December 2025
Breeding birds	14th May 2024, 16th June 2024.
Aquatic	25th September 2025, 26th January 2026 and 5th February 2026

8.2.5.1 Habitats

Habitats were mapped according to the classification scheme outlined in the Heritage Council publication *A Guide to Habitats in Ireland* (Fossitt, 2000) and following the guidelines contained in *Best Practice Guidance for Habitat Survey and Mapping* (Heritage Council, 2011). Habitats were cross referenced with Habitats Directive Annex I habitats. Dates of the main habitat surveys are included in **Table 8-1**. During these surveys, the site was also surveyed for invasive species and rare floral species (Wyse *et al*., 2016; Stace 2019). It is noted that a considerable number of site visits were carried during the overall assessment process including winter bird surveys, bat surveys and breeding birds. Observations in relation to habitats made during these site visits are included in the habitat descriptions where relevant.

8.2.5.2 Non-volant Mammals

A general mammal survey was carried out in conjunction with the habitat survey following TII guidelines (TII 2005a, TII 2006, TII 2009). Potential habitats, including grassland, scrub and woodland, to a minimum of 150m from the site boundary were systematically checked for signs of mammal activity or habitation.

8.2.5.3 Bats

Bat activity surveys were conducted within the proposed development site under suitable weather conditions on dates included in **Table 8-1**. The surveys were carried out 15 minutes before sunset (Collins 2023). Surveys used Elekon Batloggers, Batbox Duet, EchoMeter Touch 2 PRO bat detectors and Bat box duet. Emergence surveys using a Pulsar Helion 2 XP50 Pro Thermal Imaging Camera were also carried out to identify potential emergence points from buildings within the survey area. The primary purpose of bat surveys was to assess usage of trees and habitats, located within or in close proximity to the site boundary. Activity surveys were also carried out to identify foraging and/or commuting routes within the proposed development site boundary (i.e., buildings, hedgerows, treelines, drainage ditch, etc.).

A building inspection was carried out to identify potential access points, 'potential roosting features (PRFs)' and any evidence indicating the presence of bats using the buildings within the proposed development site. A preliminary roost assessment was carried at ground level on all trees earmarked for removal within the proposed development site. These assessments followed the guidelines set out in *'Bat Surveys for Professional Ecologists: Good Practice Guidelines (4th ed)'* (Collins, 2023).

8.2.5.4 Breeding Birds

The breeding bird survey was carried out on dates included in **Table 8-1** and based on the BTO Common Bird Census (CBC) methodology (Bibby *et al.,* 2000 and Gilbert , 1998) which aims to capture a snapshot of breeding bird activity within the study area.

The study area focused on terrestrial habitats within the Proposed Development site. The aim of the breeding bird surveys was to identify any valuable bird habitats within the Site boundary and to identify birds present within the Proposed Development site and surrounding landscape. This survey area encompassed terrestrial habitats along the survey route including hedgerows, treelines and agricultural fields.

During breeding bird surveys the site was walked so that all habitats within 50m of potential nesting features were surveyed. The ornithological surveyor slowly walked through the Site, stopping at regular intervals to scan with binoculars and to listen for bird calls or song. Birds were identified by sight and song, and observations were plotted on a map. Survey visits were made in the early morning to coincide with the peak period of bird activity and all species seen or heard in the study area and immediate environs were recorded including those in flight. Visits were made during favourable weather conditions.

All species encountered during the survey were mapped and coded using standard BTO species codes and activity recorded using the BTO status codes for breeding evidence. In an effort to minimise potential disturbance, no attempts were made to locate nests as such behaviours are generally sufficient to determine probable or confirmed breeding.

8.2.5.5 Wintering Birds

Winter bird surveys were carried out in winter 2024 and 2025 on dates included in **Table 8-1**. These surveys focused on grassland habitats within the proposed development site as well as grassland habitats on the boundary of the site which could provide potential foraging or roosting habitats for wintering waterbirds and waders.

The survey methodology was based on that used by the British Trust for Ornithology (BTO), Wetland Bird Survey (WeBS) and also that for the Irish Wetland Bird Survey (I-WeBS), as outlined in Gilbert *et al.* (1998). The winter bird survey was undertaken using 8.5×45 binoculars and a Hawke Endurance Ed Spotting Scope 15-45×60 spotting scope, using a combination of transect and vantage point counts.

8.2.5.6 Aquatic Survey

Aquatic surveys were undertaken on dates included in **Table 8-1**. Biological sampling was carried out at each station using the kick-sampling technique as per Environmental Protection Authority (EPA) methodology (Feeley *et al*., 2020). This biotic index is used by the EPA and allows river quality to be compared under standardized guidelines.

The kick-sampling technique involved using a 'D' shaped hand net (mesh size 0.5 mm; 350 mm diameter). Sweeps through the sediment and deep sediment was carried out. The substrate immediately upstream of the net was kicked for two minutes to dislodge invertebrates. Stone washings were not carried out as there was no suitable substrate within the survey area. Samples are transferred to plastic containers and preserved using 70% alcohol. Samples are subsequently sieved and sorted using a white sorting tray. Identification was undertaken in the laboratory using a high-powered binocular microscope and using standard identification keys.

It is noted that the Maglin North is generally considered as unsuitable for biological monitoring using EPA methodology as it is a depositing watercourse i.e. deep fine sediment, minimal flows with an absence of riffle habitat and dense detritus which clogs the channel. An assessment was also made of the fisheries value of the watercourse and macrophytes were recorded. Full details of this aquatic assessment are included in **Appendix 8.3** of this EIAR.

8.2.5.7 Amphibian Surveys

Surveys for Common Frog were carried out alongside other site surveys (i.e. habitat, Otter, breeding birds etc.) as per Reid *et al* (2013). A visual assessment for signs of frog spawn or adult frogs in all suitable habitat onsite i.e. ponded water in wet grassland and drainage ditches.

8.2.6 Consultation

As part of the EIA process, consultation was carried out with organisations and individuals regarding the proposed development, namely Inland Fisheries Ireland (IFI), Office of Public Works (OPW), Uisce Éireann, Geological Survey of Ireland (GSI), NPWS and TII. The information package sent, and the consultation responses received, are provided in Appendices 1-3 and 1-4 of this EIAR. The responses relevant to this Biodiversity Chapter are as follows:

8.2.6.1 IFI

IFI responded by email to on 30th April 2025 raising the following points / queries:

- Disposal of septic effluent to the public sewer. IFI requested that Uisce Éireann confirm sufficient capacity in its wastewater treatment infrastructure, and if this is not the case, provide alternative treatment and disposal options.
- There should be no interference with, bridging, draining, or culverting of the Maglin River to facilitate the development, without the prior approval of IFI and that full cognisance is given to IFI 'Guidelines on protection of fisheries during construction works in and adjacent to waters'.
- There should be no loss of flood plain.

8.2.6.2 NPWS

NPWS responded on 12th June 2025. A summary of responses relevant to this Biodiversity Chapter are as follows:

- Where there are impacts on protected species and their habitats, resting or breeding places, licenses may be required under the Wildlife Act 1976-2018 or derogations under the EC (Birds and Natural Habitats) Regulations 2011, as amended.
- Very suitable bird nesting habitat is present including the wet/agricultural grassland habitat towards the south of the site and in addition birds are currently nesting at the old buildings and farmyard.
- Regarding this specific site it should be noted that signs of mammal activity (including burrows) are evident (for example at the old lime kiln but hedgerow, scrub, woodland, rubble habitat all present too). The site provides a relatively undisturbed location for species in the area with lots of suitable habitat. Therefore it is important that a dedicated mammal survey take place as well as bird survey work. Due to the presence of good quality wet/agricultural grassland, the Maglin River and drainage ditches frogs are likely to be present and should be surveyed for with impact, mitigation and licensing considered.
- A bat survey and report will be very important due to the potential building and tree roosting sites and the semi-natural woodland and good quality hedgerow presence in particular. It is noted that it appears from the map provided that it is not proposed to retain the existing hedgerows and the existing woodland that occurs in the centre of the site. It appears from the maps provided that all internal hedgerows and the semi-natural woodland is proposed for removal.
- The hedgerow and woodland removal should be reconsidered if possible with hedgerows and the woodland instead incorporated into the design of the estate (as has been done elsewhere for other sites). As the site is currently composed of High Nature Value extensively managed farmland (with hedgerows, woodland, wet/agricultural grassland etc.) maximising the retention of semi-natural habitats will be very important in terms of net biodiversity loss.
- The area towards the centre of the site is actually a wet woodland (Alder, Ash, Willow etc.) and it is evident from old maps that it is long established (for example see old 6 inch maps). It may possibly have links with the annexed habitat Alluvial forests with *Alnus glutinosa* and Fra*xinus excelsior (Alno-padion, Alnion incanae, woodland Salicion albae*) (91E0) and therefore this should be assessed. The Department has reporting obligations under Article 17 of the Directive to the European Commission on details of losses and degradation of annexed habitat and the EPA Environmental Liability Regulations may apply. Alder and Willow also dominate along the watercourse on the western side that leads to this area.
- To allow the most successful retention possible of habitat proposed to be retained the EIA should address and specify the methodology during design and construction which will be used to protect and retain the hedgerows (for example temporary fencing). The wider the buffer/headland beside the hedgerows and woodland (as realistic and possible) provided the better from a biodiversity viewpoint. In addition the EIA should address lighting of and light spill onto retained hedgerows and woodland (with reducing and eliminating lighting of the retained hedgerows and woodland as much as possible the best aim from a biodiversity viewpoint).
- The hedgerows on site are of very good quality with multiple species and all appear on the first 6 inch maps. They are likely to be at least approx. 200-300 years old.
- Any fencing proposals should consider and propose future mammal access mitigation.
- Disturbance from lighting, noise, human access etc. should be fully assessed and addressed in the EIA. TII Guidelines should be referenced. Regarding Lighting the procedures outlined in 'Guidance Note 08/18 Bats and Artificial Lighting in the UK' and Eurobats 'Guidelines for Consideration of Bats in Lighting Projects' provide useful guidance with respect to lighting design in ecologically sensitive locations, such as along treelines and hedgerows.
- The landscape plan should have regard to the All-Ireland Pollinator Plan for 2021-2025. Regarding the choice of any proposed wildflower mix reference should be made to the data in the recent paper Barry, C.; Hodge, S. 'You Reap What You Sow: A Botanical and Economic Assessment of Wildflower Seed Mixes Available in Ireland'. Conservation 2023, 3, 73–87 (https://doi.org/10.3390/conservation3010007).
- Net Biodiversity loss should be calculated.

8.2.7 Limitations

Standard survey methods were followed and surveys were completed over a 24 month period to ensure that surveys were completed within the appropriate season. However, any biases or limitations associated with these methods could potentially affect the results collected. Although every effort was made to provide a full assessment and comprehensive description of the study area, natural fluctuations in populations may not be fully reflected due to the instantaneous nature of the field surveys. Given the extended survey window over multiple seasons, the use of specialist ecologists and appropriate methodologies, this assessment provides a robust representation of the baseline for the habitats and species within the zone of influence.

8.3 Baseline environment

8.3.1 General Landscape

The proposed development is located on the southern side of Ballincollig town approximately 8km southwest of Cork City. The Ballincollig Link Road is located c.375m north of the site and the National route N22 is located approximately 375m east of the site. The existing Limeworth and Heathfield estate which is currently under construction run along the site's northern edge. Lands to the south, east and west are largely agricultural.

The topography of the site gently slopes from the north to a low point on the south-eastern boundary which is approximately +15.87m AOD. The elevation height along the perimeter from the north, west and southern side varies from +22.21m to +15.87m AOD. The Maglin North River runs along the western boundary of the site.

8.3.2 Designated Sites/Conservation Areas

8.3.2.1 European sites

Special Areas of Conservation (SACs) and candidate SACs are protected under the Habitats Directive 92/43/EEC and the European Communities (Birds and Natural Habitats) Regulations 2011, as amended. Special Protection Areas (SPAs) are protected under the Birds Directive 2009/147/EC and European Communities (Birds and Natural Habitats) Regulations 2011, as amended. Collectively, these sites are referred to as Natura 2000 or European sites.

The proposed development site does not form part of any SPA or SAC (or cSAC). Determination of this project's likely Zone of Impact (ZoI) was achieved by assessing all elements of the proposed project against the ecological receptors within the project footprint, in addition to all ecological receptors that could be connected to and subsequently impacted by the proposed project through impact pathways. To this end, the ZoI extends outside of the proposed development footprint to include ecological receptors connected to the project through overlap /intersection, proximity and connectivity to features such as waterbodies. The proposed development site is located within the likely ZoI of one designated site i.e. Cork Harbour SPA (**Table 8-2** and **Figure 8-1**).

Cork Harbour SPA is located 9.8km east of the proposed development site. The Maglin North stream (EPA name Grange Hill; River waterbody code IE_SW_19C120740), a tributary of Curraheen Stream, runs along the western boundary of the proposed development site. During operation, the proposed surface water drainage network will discharge to this stream. Cork Harbour SPA is located 15.5km downstream of this point. Therefore, although unlikely, surface water run-off/discharges during the construction or operational phases could potentially impact on water quality within the Cork Harbour SPA via the Maglin North Stream.

Wastewater from the site will ultimately discharge into River Lee via the Ballincollig Wastewater treatment plant (WWTP) approximately 14.6km upstream of Cork Harbour SPA. This could potentially impact on water quality within the Cork Harbour SPA.

Although unlikely given the distance involved, surface water run-off/discharges during the construction or operational phases as well as wastewater discharges from the proposed development could potentially impact on Cork Harbour SPA via the Maglin North stream. Habitats within or near the proposed development area could also potentially provide *ex-situ* foraging grounds for SCI species outside the Cork Harbour SPA.

Cork Harbour SPA is a large, sheltered bay system, with several river estuaries - principally those of the Rivers Lee, Douglas, Owenboy and Owennacurra. The SPA site comprises most of the main intertidal areas of Cork Harbour, including all of the North Channel, the Douglas River Estuary, inner Lough Mahon, Monkstown Creek, Lough Beg, the Owenboy River Estuary, Whitegate Bay, Ringabella Creek and the Rostellan and Poulnabibe inlets. Cork Harbour is of major ornithological significance, being of international importance both for the total numbers of wintering birds (i.e., > 20,000) and also for its populations of Black-tailed Godwit and Redshank. In addition, it supports nationally important wintering populations of 22 species, as well as a nationally important breeding colony of Common Tern. Several of the species which occur regularly are listed on Annex I of the E.U. Birds Directive.

Table 8.2 European sites and their location relative to the proposed development site

European sites name and code	Distance from site boundary (at closest point) and potential source-pathway-receptor link	Qualifying interests (QI)/ Special Conservation Interests (SCI)
Special Protection Area (SPA)		
Cork Harbour SPA (site code 004030)	9.8km (15.5km downstream). The Maglin North stream (EPA name Grange Hill; Riverwaterbody code IE_SW_19C120740), a tributary of Curraheen Stream, runs along the western boundary of the proposed development site. During operation, the proposed surface water drainage network will discharge to this stream. The Cork Harbour SPA is located 9.8km east of the proposed development site. The Maglin North stream (EPA name Grange Hill; River waterbody code IE_SW_19C120740), a tributary of Curraheen Stream, runs along the western boundary of the proposed development site. During operation, the proposed surface water drainage network will discharge to this stream. The Cork Harbour SPA is located 15.5km downstream of this point. Wastewater from the site will ultimately discharge into River Lee via the Ballincollig Wastewater treatment plant (WWTP) approximately 14.6km upstream of Cork Harbour SPA. This could potentially impact on water quality within the Cork Harbour SPA. Although unlikely given the distance involved, surface water run-off/discharges during the construction or operational phases as well as wastewater discharges from the proposed development could potentially impact on Cork Harbour SPA via the Maglin North stream. Habitats within or near the proposed development area could also potentially provide ex-situ foraging grounds for SCI species outside the Cork Harbour SPA.	Birds A193 Common Tern (*Sterna hirundo*) A028 Grey Heron (*Ardea cinerea*) A130 Oystercatcher (*Haematopus ostralegus*) A140 Golden Plover (*Pluvialis apricaria*) A157 Bar-tailed Godwit (*Limosa lapponica*) A056 Shoveler (*Anas clypeata*) A156 Black-tailed Godwit (*Limosa limosa*) A052 Teal (*Anas crecca)* A183 Lesser Black-backed Gull (*Larus fuscus)* A054 Pintail (*Anas acuta*) A149 Dunlin (*Calidris alpina*) A017 Cormorant (*Phalacrocorax carbo*) A162 Redshank (*Tringa totanus*) A004 Little Grebe (*Tachybaptus ruficollis*) A050 Wigeon (*Anas penelope*) A160 Curlew (*Numenius arquata*) A005 Great Crested Grebe (*Podiceps cristatus*) A069 Red-breasted Merganser (*Mergus serrator*) A048 Shelduck (*Tadorna tadorna*) A142 Lapwing (*Vanellus vanellus*) A179 Black-headed Gull (*Chroicocephalus ridibundus*) A182 Common Gull (*Larus canus*) A141 Grey Plover (*Pluvialis squatarol*a) Habitats Wetlands

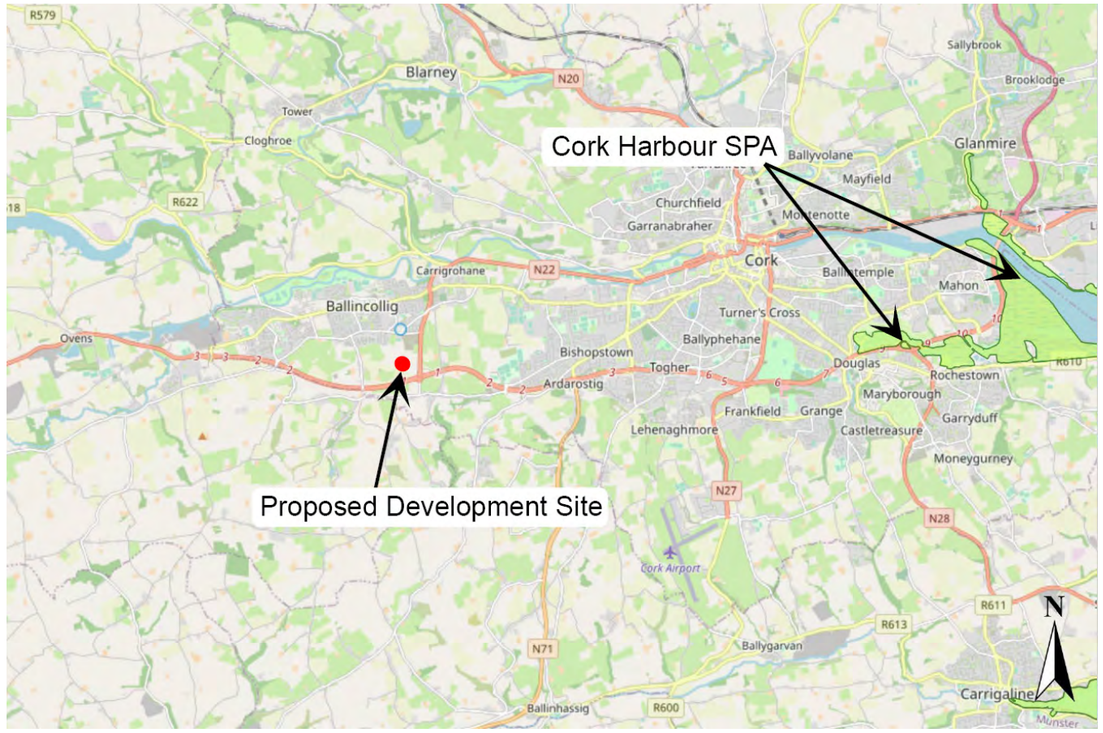


Figure 8.1 European sites within likely zone of impact of proposed development site | Source EPA Envision mapping | Not to scale

8.3.2.2 National Sites

Natural Heritage Areas (NHAs) and proposed Natural Heritage Areas (pNHAs) are national designations under the Wildlife Act 1976, as amended. A Natural Heritage Area (NHA) is designated for its wildlife value and receives statutory protection. These areas are considered nationally important for the habitats present or which holds species of plants and animals whose habitats needs protection. Under the Wildlife Amendment Act (2000), NHAs are legally protected from damage from the date they are formally proposed for designation.

Proposed Natural Heritage Areas (pNHA) were published on a non-statutory basis in 1995 and have not since been statutorily proposed or designated. These sites are also of significance for wildlife and habitats. Prior to statutory designation, pNHAs are still subject to limited protection, in the form of:

- Agri-environmental farm planning schemes support the objective of maintaining and enhancing the conservation status of pNHAs;
- There is a requirement for the Forest Service to gain NPWS approval before they will pay afforestation grants on pNHA lands; and,
- A recognition of the ecological value of pNHAs by Planning and Licensing Authorities.

The NHAs and pNHAs located in the vicinity of the proposed development site are listed in **Table 8.3** and are shown in **Figure 8.2**.

The proposed development site is located c.1.1km east of Ballincollig Cave pNHA. However, no pathway for impact has been identified to the qualifying habitats for which this pNHA is proposed for designation. It is noted there are no records of Lesser Horseshoe Bat in Ballincollig caves and the closest known roost is located over 3km from the proposed development site (Source NPWS Data request). The value of the proposed development site for bats is discussed in detail in **Section 8.3.7** of the EIAR.

Effluent from the proposed development will ultimately be conveyed to Ballincollig WWTP for treatment prior to discharging into the waters of the River Lee. Large sections of the River Lee, upstream and downstream of the primary discharge point from the Ballincollig WWTP, form part of the Lee Valley pNHA. Therefore, there is a potentially hydrological connection to this pNHA via wastewater discharges.

Table 8.3 National sites and their location relative to the proposed development site

NHAs & NHAs/ pNHAs	Site Code	Overlaps with European site	Site Description	Distance at closest point and potential source-pathway-receptor link
Ballincollig Cave pNHA	001249	No	Ballincollig lies in the limestone valley of the Bride River which runs parallel to the Lee. The cave occurs under and beside the castle and is apparently short. However, it seems likely to contain some fossil material as it has a natural and accessible opening. Above ground there are several interesting features in the grassland vegetation. The occurrence of *Chelidonium majus* (greater celandine), *Veronica agrestis* (a speedwell) and Silybum marianum (milk thistle) show the long habitation of the site while, of the native species, *Calamintha ascendens* (calamint) grows near the rock outcrops, *Orobanche hederae* (ivy broomrape) on ivy roots and *Spiranthes spiralis* (lady's tresses) amongst the short grasses. Evaluation: The cave is thought to contain deposits of scientific interest though as far as is known it has not yet been excavated. The flora is also well developed though over quite a small area. Vulnerability & Recommendations: Cave exploration except by specialists should not be encouraged in this area as this could damage any remaining scientific interest."	1.1km west. No potential pathway identified.

NHAs & NHAs/ pNHAs	Site Code	Overlaps with European site	Site Description	Distance at closest point and potential source-pathway-receptor link
Lee Valley pNHA	000094	No	The Lee Valley pNHA occupies five different sections of the River Lee valley and is of regional conservation importance for the diverse range of semi-natural habitats that occur. The site supports wet broadleaved woodland, wet/agricultural grassland, dry broadleaved woodland, unimproved dry grassland, freshwater marsh. A number of wetland bird species are known to breed in the site including Mallard, Heron, Sedge and Grasshopper warblers and Reed bunting. Small blue and White wood butterfly, both locally distributed species also occur	1.7km northwest A source-pathway-receptor link has been identified between the source (proposed development) and the receptor (Lee Valley pNHA) via a potential pathway (wastewater discharges)
Shournagh Valley pNHA	000103	No	Shournagh Valley pNHA includes two sections of the Shournagh River and comprises areas of wet woodland, scrub, scrub woodland and old estate mixed woodland. Dippers (*Cinclus hibernicus*) and Grey wagtail (*Motacilla cinerea*) are known to feed along and around the river channel.	2.3km northeast. No potential pathway.
Cork Lough pNHA	001081	No		6.3km east. No potential pathway

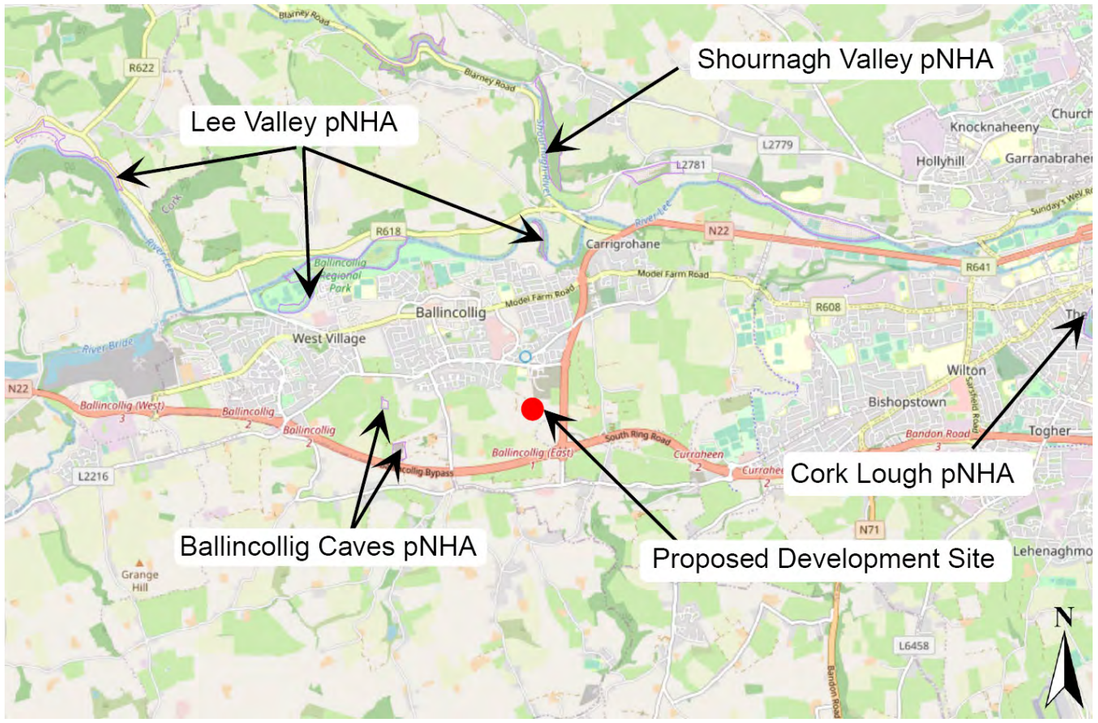


Figure 8.2 Proposed Natural Heritage Areas (pNHAs) in the vicinity of the proposed development site | Source: EPA Envision mapping https://gis.epa.ie/EPAMaps/) | Not to scale

8.3.2.3 Salmonid Waters – River Lee

The River Lee main channel from source to Cork City waterworks at Lee Road is a designated salmonid fishery under the EC (Quality of Salmonid Waters) Regulations of 1988 (SI 84 of 1988), implementing the Freshwater Fish Directive (78/659/EEC). The section of the River Lee into which the Ballincollig WWTP discharges to forms part of this designation. The River Lee and its larger tributaries are known to support Atlantic Salmon *Salmo salar* as well as other Annex II species such as Lamprey. The River Lee is known to contain populations of Brown Trout *Salmo trutta* and European Eel *Anguilla anguilla*. The Maglin North and Curraheen Streams are tributaries of the River Lee.

8.3.2.4 Ramsar Sites

The Convention on Wetlands, called the Ramsar Convention, is an intergovernmental treaty that provides the framework for national action and international cooperation for the conservation and wise use of wetlands and their resources. A key commitment of Ramsar Contracting Parties is to identify and place suitable wetlands onto the List of Wetlands of International Importance. Cork Harbour is listed as a Ramsar site, which is a non-statutory designation.

8.3.2.5 Important Bird Areas – Cork Harbour

Important Bird and Biodiversity Areas (IBAs) are sites selected as important for bird conservation because they regularly hold significant populations of one or more globally or regionally threatened, endemic or congregator bird species or highly representative bird assemblages. The European IBA programme aims to identify, monitor and protect key sites for birds all over the continent. It aims to ensure that the conservation value of IBAs in Europe (now numbering more than 5,000 sites or about 40% of all IBAs identified globally to date) is maintained, and where possible enhanced. The programme aims to guide the implementation of national conservation strategies, through the promotion and development of national protected-area programmes. Through their designation they aim to form a network of sites ensuring that migratory species find suitable breeding, stop-over and wintering places along their respective flyways.

The function of the Important Bird Area (IBA) Programme is to identify, protect and manage a network of sites that are important for the long-term viability of naturally occurring bird populations, across the geographical range of those bird species for which a site-based approach is appropriate. The proposed development site has a potential hydrological connection via the River Lee and Lee Estuary to the Cork Harbour IBA (Site Code: IE088).

The site qualifies for designation under the IBA Criteria (2000) listed in **Table 8.4**:

- A4iii - The site is known or thought to hold, on a regular basis, ≥ 20,000 waterbirds or ≥ 10,000 pairs of seabird of one or more species.
- B1i - The site is known or thought to hold ≥ 1% of a flyway or other distinct population of a waterbird species
- B2 - The site is one of the most important in the country for a species with an unfavourable conservation status in Europe and for which the site-protection approach is thought to be appropriate.
- C3 - The site is known to regularly hold at least 1% of a flyway population or of the EU population of a species threatened at the EU level (not listed on Annex 1 of The Birds Directive).
- C4 - The site is known to regularly hold at least 20,000 migratory waterbirds and/or 10,000 pairs of migratory species of one or more species.
- C6 - The site is one of the five most important in the European region in question for a species or subspecies considered threatened in the European Union.

Table 8.4 Summary of the Cork Harbour IBA trigger species.

Species	Current IUCN Red List Category	Season	Year(s) of estimate	Population estimate	IBA Criteria Triggered
Eurasian Curlew (*Numenius arquata*)	NT	winter	1995	1,669 individuals	B2
Bar-tailed Godwit (*Limosa lapponica*)	NT	winter	1996	456 individuals	B2
Black-tailed Godwit (*Limosa limosa*)	NT	winter	1996	1,399 individuals	B1i, C3
Dunlin (*Calidris alpine*)	LC	winter	1995	12,050 individuals	B1i, B2, C3
Common Redshank (*Tringa tetanus*)	LC	winter	1996	1,344 individuals	B1i, C3
Common Tern (*Sterna hirundo*)	LC	breeding	1995	102 breeding pairs	C6
A4iii Species group - waterbirds	n/a	winter	-	20,000 individuals	A4iii, C4

8.3.3 Flora

The site of the proposed development lies within Ordnance Survey National Grid 10km square W66. The National Biodiversity Data Centre's (NBDC) online database provides data on the distribution of species within 10km grid squares.

The NBDC lists some 438 flora species as being present within grid square W66. Endangered and protected species recorded by the NBDC are listed in **Table 8.5**. No species listed under the Flora (Protection) Order 2022 (S.I. No. 235 of 2022) have been recorded within W66. No rare, notable or protected plant species were recorded during the site surveys.

Table 8.5 NBDC listed endangered and protected flowering species for hectad W66.

Species name	Title of dataset	Designation
Greater Knapweed (*Centaurea scabiosa*)	Vascular plants: Online Atlas of Vascular Plants 2012 Onwards	Threatened Species: Near threatened
Little-robin (*Geranium purpureum*)	Vascular plants: Online Atlas of Vascular Plants 2012 Onwards	Threatened Species: Near threatened
Meadow Crane's-bill (*Geranium pratense*)	Vascular plants: Online Atlas of Vascular Plants 2012 Onwards	Threatened Species: Vulnerable
Vervain (*Verbena officinalis*)	Vascular plants: Online Atlas of Vascular Plants 2012 Onwards	Threatened Species: Near threatened

NBDC 05/01/26

A detailed botanical survey was carried out at the site in May 2024 and September 2025 and the results of this survey are included in **Appendix 8.2** of this chapter. No rare, uncommon or red list species were recorded during the site survey, nor are they expected to occur given that the habitats within the proposed development site are dominated by managed agricultural habitats.

8.3.4 Habitats

Habitat surveys, were carried out the 14th May 2024, 22nd August 2024, 11th September 2025, 17th December 2025 and 30th January 2026. Habitat mapping was carried out in line with the methodology outlined in the Heritage Council Publication, *Best Practice Guidance for Habitat Survey and Mapping* (Heritage Council, 2011). The terrestrial and aquatic habitats within or adjacent to the proposed development site was classified using the classification scheme outlined in the Heritage council publication *A Guide to Habitats in Ireland* (Fossitt, 2000) and cross referenced with Annex I Habitats where required.

A current overview of habitats recorded within the site is shown in **Figure 8.3** and the habitats recorded on site are described in **Table 8.6.** Photographs of the site are also included below. The ecological value of habitats has been defined using the classification scheme outlined in the *Guidelines for Assessment of Ecological Impacts of National Road Schemes* (National Roads Authority, 2009) which is included in **Appendix 8.1**. It should be noted that the value of a habitat is site specific and will be partially related to the amount of that habitat in the surrounding landscape. Habitats that are considered to be good examples of Annex I and Priority habitats are classed as being of International or National Importance. Semi-natural habitats with high biodiversity in a county context and that are vulnerable, are considered to be of County Importance. Habitats that are semi-natural, or locally important for wildlife, are considered to be of Local Importance (higher value) and sites containing small areas of semi-natural habitat or maintain connectivity between habitats are considered to be of Local Importance (lower value).

The proposed development site is dominated by improved agricultural grassland (used by grazing cattle), which has been extensively managed for approximately 20 years. There has been limited maintenance of hedgerows/treelines, which has resulted in scrub encroachment along the boundary of the grassland in many areas.

The former farmyard and farm buildings are derelict and in an advanced state of disrepair. The farmhouse is located to the west of the access track and corresponds to a footprint shown on the 1841 OS. More modern buildings are located to the south of the old farmhouse. Older outbuildings (dating from c.1903) are located at the southeast of the site. There is a partially intact lime kiln to the west of the farmyard on the edge of an area of woodland.

A review of the historical mapping indicates some areas of trees along the access track are mature, as well as an area of woodland/scrub around the lime kiln (dating back to 1st edition 1829 to 1834). However, the 25" edition mapping (1987-1913) shows a smaller area of woodland/scrub alongside marginal grassland suggesting that this area had been largely cleared for the historical quarry operations onsite. A number of field boundaries along the Maglin North stream and at the south of the site are visible on the first edition mapping.

The site slopes gently to the south, with distinct dry, higher ground at the north of the site and lower lying wet/agricultural grassland areas to the south.

Table 8.6. Habitats recorded within the proposed development site boundary and their ecological value

Habitats	Comments	Ecological value (TII Guidelines)
Improved agricultural grassland GA1	All of the grassland within the proposed development site has been improved in the past. However, these are extensively managed and it is unlikely that there has been limited fertiliser input in many years. This habitat is dominated by typical grass species including Perennial ryegrass, Meadow grass and Common bent. Herbaceous species include Curled dock, Ribwort plantain, Dandelion, Creeping buttercup and Sorrell.  **Plate 1. Improved agricultural grassland at northeast of the site**	Local importance (Lower value)
Improved agricultural grassland GA1/ Dry calcareous and neutral grassland GS1	This grassland is located on dryer areas at the north of the site. It has poor species diversity. Species present include Plantain, Red bartsia, Yarrow, Clovers, Poa sp., Timothy and Crested dogstail. Calcareous grasslands with either high numbers or diversity of orchids correspond to the priority habitat, 'semi-natural dry grasslands and scrubland facies on calcareous substrates (Festuco-Brometea) (*important orchid sites) (6210)'. The low diversity grassland within the proposed development site is not an Annex I habitat.  **Plate 2. Semi-natural grassland adjoining woodland/scrub habitat (looking south)**	Local importance (Lower value)

Habitats	Comments	Ecological value (TII Guidelines)
Improved agricultural grassland GA1/ Wet grassland GS4	Poorly drained agricultural grassland at the southeast of the site has allowed areas of Rush to develop. This habitat has poor species diversity. Rushes dominate this habitat with Sharp flowered rush and Soft rush. Broadleaved herbaceous species include Marsh foxtail, Meadowsweet, Angelica and Creeping buttercup are also present. Wet grassland has links with the Annex I: Wet grassland may contain examples of the annexed habitat, 'Molinia meadows on calcareous, peaty or clayey-silt-laden soils (*Molinion caeruleae*) (6410)'. The wet/agricultural grassland at the proposed development site has low diversity is not representative of Annex I habitat.  **Plate 3. Wet/agricultural grassland mosaic**	Local importance (Lower value)
Dry meadows and grassy verges GS2/ Scrub WS1	Semi-natural grassland has developed along the field boundaries where grazing has been reduced or prevented by electric fencing. This is developing into scrub (dominated by Bramble) in some areas. Cocksfoot and Sweet meadow grass are the dominant species as well as Hogweed, Nettle, Bush vetch, Knapweed and Great willowherb. Mullein was recorded in the vicinity of the Lime kiln. Several areas of scrub have developed along hedgerows where field margins have been abandoned. This habitat is dominated by Blackthorn, Willow, Gorse and Bramble. Wild clematis and Buddleia were recorded around the farmyard. At the south-west of the site, near the woodland and stream, scrub is developing into immature woodland WS2. This habitat classification includes naturally regenerated Ash, Alder, Willow and Sycamore which has developed from scrub on the margins of field boundaries. GS2 corresponds to the annexed habitat, 'lowland hay meadows (*Alopecurus pratensis, Sanguisorba officinalis*) (6510)'. However, the grassland mosaic within the proposed development site is not an example of the is Annex I habitat.  **Plate 4. Dry meadows and grassy verge along field boundary**	Local importance (Higher value)

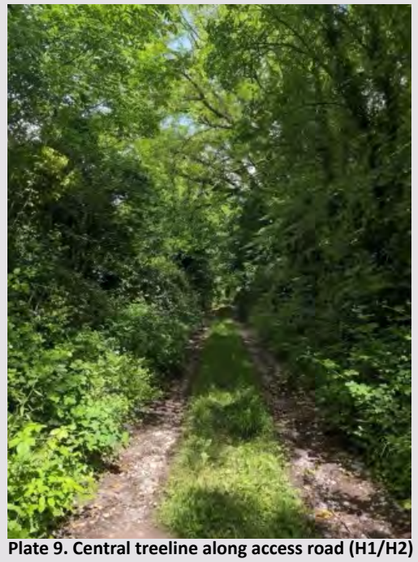
Habitats	Comments	Ecological value (TII Guidelines)
	 **Plate 5. Dry meadows and grassy verge around farm house**  **Plate 6. Scrub/grassy verge adjoining woodland (and lime kiln) at west of site**	

Habitats	Comments	Ecological value (TII Guidelines)
Dry meadows and grassy verges GS2/ Recolonising bare ground ED3	Around the farm buildings at the southeast of the site, an area of what appears to have been formerly bare earth/spoil has been recolonised by a mixture of dry meadows/grassy verge. Species recorded include Spear thistle, Creeping buttercup, Hogweed, Curled dock, Bramble, Cocksfoot, Herb Robert, Buddleia, and False oat grass GS2 corresponds to the annexed habitat, 'lowland hay meadows (*Alopecurus pratensis, Sanguisorba officinalis*) (6510)'. However, the grassland mosaic within the proposed development site is not an example of the is Annex I habitat.  **Plate 7. Recolonising bare ground/dry meadows developing around the southeast farm buildings.**	Local importance (Lower value)

Habitats	Comments	Ecological value (TII Guidelines)
Mixed broadleaved woodland WD1	A small area of woodland is located adjacent to the lime kiln, to the east of the Maglin North Stream. This area, which was previously associated with a quarry facility, now comprises of mature and semi-mature Ash, Sycamore, Beech, with low growing Alder, Hawthorn, Willow, Blackthorn and Elder. Ground flora included Ivy and Remote sedge. Understorey species include Hart's tongue fern, Nettle, Bramble, Ground ivy, Soft shield fern, Remote sedge, Cleavers. Although this habitat adjoins the Maglin North Stream, there is no evidence of flooding of this habitat. The remainder of the area has old Hawthorn scrub with some semi-mature trees scattered throughout. There are thickets of Elder and Bramble. However, there is no evidence that this area has been continuously wooded. A review of the historical mapping indicates some areas of trees along the access track are mature, as well as an area of woodland/scrub around the lime kiln (dating back to 1st edition 1829 to 1834). However, the 25" edition mapping (1987-1913) shows a smaller area of woodland/scrub alongside marginal grassland suggesting that this area had been largely cleared for the historical quarry operations onsite. A review of flood extents (OPW) found that this woodland is located outside the flood extents of the Maglin North Stream (See **Figure 7.6**). No evidence of regular flooding or permanent waterlogging which would be consistent with wet woodland (or riparian woodland) was recorded within this habitat. While Alder and Willow are present, this woodland lacks the characteristics of wet woodland (and alluvial woodland) habitat.  **Plate 8. Woodland habitat at west of site**	Local importance (Higher value)

Habitats	Comments	Ecological value (TII Guidelines)
Hedgerows WL1/ Treelines WL2	In the absence of management, traditional planted Hawthorn hedgerows in the vicinity of the farmyard and field boundaries, have become colonised with other species including Blackthorn and Willow. Larger tree species have also established including Ash, Sycamore and Alder, any some hedgerows have developed into treelines. Hedgerows are largely along earth banks with old stone wall in some areas. Ivy is in the understorey common as well as Cow parsley. Residual understorey species are present on several field boundaries including Lords and ladies, Dog violet and Lesser celandine. A full floral list for the treeline/hedgerow habitats is included in Appendix 8-2. Note that an assessment of the hedgerows/ treelines based on the Heritage Council Appraisal System (Foulkes *et al.* 2013) is included in the GeoTree Arboricultural assessment (Tree Report). A review of the historical mapping indicates some areas of trees along the access track are mature (H1 and H2) (dating back to 1st edition 1829 to 1834). A number of the hedgerows/ treelines at the west of the site (along the Maglin North stream) and at the south of the site are visible on the 1st edition mapping, indicating that these are mature habitats. Treelines run along both sides of the access road (H1 and H2 in arboricultural assessment). These are a prominent features within the site and historical mapping indicates these are long-established features, dating back to the 1st edition mapping (1829–1834). These treelines are patchy with several mature and semi-mature trees including one large mature Ash as well as mature Hawthorn, Elder and Semi-mature Ash. Scrub habitat runs along the western boundary, which has developed in the absence of management and the understorey supports rank grassland species including Cocksfoot and Cow Parsley. **Local importance (Higher value)** Lower growing hedgerows, with occasional mature trees, run along the north-western boundary of the site (H3, H4, H6). This forms the boundary with adjoining houses and gardens to the north of the site. This habitat is dominated by Hawthorn and Blackthorn with occasional Ash. These hedgerows have developed over an old stone wall and sod embankments with limited understorey. **Local importance (Higher value).** A short section of Griselinia hedgerow runs along the north-western boundary of the site (H5). This is a low value non-native hedgerow **Local importance (Lower value).** Along the western boundary and adjoining the stream, a treeline/hedgerow mosaic has developed along an overgrown hedgerow which is dominated by Hawthorn (H6 and H7 in arboricultural assessment). This boundary is visible on the 1st edition mapping (1829–1834). Trees are generally low growing and dominated by mature Hawthorn, Blackthorn, Willow and Elder. The understorey is shaded and dominated by mixed ferns. The boundary is directly associated with the Lowland Depositing River (FW2) (Maglin North Stream), creating a riparian complex. The steep earth banks along the stream create a shaded environment dominated by ferns, including Soft Shield-fern and Hart's-tongue Fern. This hedgerow/treeline is contiguous with the Mixed broadleaved woodland around the lime kiln. **Local importance (Higher value)**	Local importance (Higher value) to Local importance (Lower value)

Habitats	Comments	Ecological value (TII Guidelines)
	Moving south along the western site boundary the hedgerow/treeline habitat transitions into a more distinct treeline, which has matured in the absence of significant management. This boundary is visible on the 1st edition mapping (1829–1834). This treeline includes several mature and semi-mature Alder, as well as mature and semi-mature Sycamore, Willow, Ash and Elder (G7 and G8 in arboricultural assessment). **Local importance (Higher value)** At the southeast of the site, adjoining the derelict farm buildings, a treeline runs east to west with mature Ash and Hawthorn (H12 and H13). This boundary is visible on the 1st edition mapping (1829–1834). This treeline is gappy along its western extent, becoming more dense moving east. Areas of dead wood area also present where trees have fallen over. The understorey includes deadwood, Willow, immature Elm, Mixed ferns (Hart's tongue, Soft shield), Ivy and Herb Robert. **Local importance (Higher value)** Mature Hawthorn and Blackthorn hedgerow runs along the centre of the site, south of the farm buildings (H9 and H10). This is a dense good quality native hedgerow which is visible on the 1st edition mapping (1829–1834). Understory species include Bramble and Yellow flag. It adjoins a drainage ditch which connects to the Maglin North. **Local importance (Higher value)** A short section of patchy hedgerow is located at the centre of the site (H11). This is dominated by Hawthorn, with occasional dead trees. **Local importance (Lower value)**	

Habitats	Comments	Ecological value (TII Guidelines)
	 **Plate 9. Central treeline along access road (H1/H2)**  **Plate 10. Treeline along Maglin stream (G7/G8)**	

Habitats	Comments	Ecological value (TII Guidelines)
	 **Plate 11. Short section of treeline at north-western corner of site (H6)**  **Plate 12. Treeline at south-east of site (H13)**	

Habitats	Comments	Ecological value (TII Guidelines)
	 **Plate 13. Hedgerow/treeline along southern drain (H10)**	

Habitats	Comments	Ecological value (TII Guidelines)
Mixed broadleaved woodland WD1/ Scrub WS1	An area at the southeast of the site has developed into a mosaic of the mature woodland and scrub (dominated by bramble). This habitat is of relatively recent origin. The trees, which are largely semi-mature and immature, include Hawthorn Willow and occasional mature Ash. Understorey species include Ivy, Creeping buttercup, Nettle, Hogweed and Elder. Areas of waterlogged ground have allowed Remote sedge to establish. While Alder and Willow are present and seasonal waterlogging occurs, the habitat lacks the hydrological regime, floristic mix/structural complexity and flood dependency characteristic of Annex I alluvial woodland (91E0). The woodland is episodically waterlogged rather than flood-driven .  **Plate 14. Area of woodland scrub at southeast of site**	
Recolonising bare ground ED3	Includes areas around former farmyard where abandoned bare ground is developing into semi-natural grassland and low growing scrub.	Local importance (Lower value)

Habitats	Comments	Ecological value (TII Guidelines)
Stone walls and other stonework BL1/Buildings and artificial surfaces BL3	Derelict farm buildings as well as the old lime kiln are included in this classification. The walls in some areas support Herb Robert, Ivy, Hart's tongue fern, Sow thistle. The former farmyard and farm buildings are derelict and in an advanced state of disrepair. The farmhouse is located to the west of the access track and corresponds to a footprint shown on the 1841 OS. More modern buildings are located to the south of the old farmhouse. Older outbuildings (dating from c.1903) are located at the southeast of the site, alongside some sections of old stone wall (largely beneath trees). There is a partially intact lime kiln to the west of the farmyard on the edge of an area of woodland. Tracks runs through the site providing access to farm buildings. These buildings are described in more detail in **Table 8.11**.  **Plate 15. Derelict farm buildings at centre of the site**	Local importance (Lower value)

Habitats	Comments	Ecological value (TII Guidelines)
	 **Plate 16. Derelict farm buildings and scrub at southeast**  **Plate 17. Derelict farm buildings at centre of the site**	

Habitats	Comments	Ecological value (TII Guidelines)
	 **Plate 18. Sections of old stone wall at southeast of site**	

Habitats	Comments	Ecological value (TII Guidelines)
Lowland depositing river (FW2)	The Maglin North Stream runs along the western boundary of the site. This stream is heavily channelised with a straightened channel, soft mud substrate and large volumes of woody detritus. Flow is generally laminar with no significant riffle glide sequences or deep pools. The high earth banks are lined, predominantly with Alder but Willow is also common. Shade levels are generally high, which suppresses macrophyte growth and as a consequence there is no significant aquatic vegetation. Some Fools watercress is present where light levels are higher. There is sufficient flow within this stream to support permanent fish populations. Species such as Stickleback and European eel likely to occur. Brown Trout is also likely to occur, although there is an absence of spawning gravels and high value nursery habitat.  **Plate 19. Maglin North Stream along western boundary**	Local importance (Higher value)

Habitats	Comments	Ecological value (TII Guidelines)
Drainage ditch FW4	There are a number of small land drains within the site. The most prominent drainage ditch is located at the south of the site. This drainage ditch runs south from the centre of the site meeting the Maglin North Stream just south of the site boundary. This drainage ditch is shaded and channelized with Blackthorn and Hawthorn along its length. Standing water and rush are present in some areas of the drain, which is likely to dry up during the summer months. The drain is heavily clogged with leaf litter. A smaller drainage ditch is located at the southeast of the site. This is heavily overgrown with grasses and less distinct that the main drainage ditch.  **Plate 20. Drainage ditch at south of site**	Local importance (Lower value)

Habitats	Comments	Ecological value (TII Guidelines)
	 **Plate 21. Smaller drainage ditch at south-east of site**	



Improved agricultural grassland GA1

Improved agricultural grassland GA1/Dry calcareous and neutral grassland GS1

Improved agricultural grassland GA1/Wet grassland GS4

Hedgerows WL1/Treelines WL2

Mixed broadleaved woodland WD1

Dry meadows and grassy verges GS2/Scrub WS1

Recolonising bare ground ED3

Buildings and artificial surfaces BL3/ Stone walls and other stonework BL1

Dry meadows and grassy verges GS2/ Recolonising bare ground ED3

Mixed broadleaved woodland WD1/ Scrub WS1

Lowland depositing river FW2

Drainage ditch FW4

Proposed development site

Figure 8.3 Habitats recorded within proposed development site boundary

8.3.5 Invasive Species

Non-native plants are defined as those plants which have been introduced outside of their native range by humans and their activities, either purposefully or accidentally. Invasive non-native species are so-called as they typically display one or more of the following characteristics or features: (1) prolific reproduction through seed dispersal and/or re-growth from plant fragments; (2) rapid growth patterns; and, (3) resistance to standard weed control methods.

Where a non-native species displays invasive qualities and is not managed it can potentially: (1) out compete native vegetation, affecting plant community structure and habitat for wildlife; (2) cause damage to infrastructure including road carriageways, footpaths, walls and foundations; and, (3) have an adverse effect on landscape quality. The NBDC lists a number of high impact invasive species which have been recorded within hectad W66 (**Table 8.7**).

Table 8.7 NBDC list of high impact invasive species recorded in W66

Species group	Species name
Bird	Canada Goose (*Branta canadensis*)
Flatworm (Turbellaria)	New Zealand Flatworm (*Arthurdendyus triangulatus*)
Flowering plant	Canadian Waterweed (*Elodea canadensis*)
Flowering plant	Cherry Laurel (*Prunus laurocerasus*)
Flowering plant	Japanese Knotweed (*Fallopia japonica*)
Flowering plant	*Rhododendron ponticum*
Insect - beetle (Coleoptera)	Harlequin Ladybird (*Harmonia axyridis*)
Terrestrial mammal	American Mink (*Neovison vison*)
Terrestrial mammal	Brown Rat (*Rattus norvegicus*)
Terrestrial mammal	Coypu (*Myocastor coypus*)
Terrestrial mammal	Ferret (*Mustela putorius subsp. furo*)
Terrestrial mammal	Raccoon (*Procyon lotor*)
Terrestrial mammal	Sika Deer (*Cervus nippon*)

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The Birds and Natural Habitats Regulations 2011 (SI 477 of 2011), Section 49(2) prohibits the introduction and dispersal of species listed in the Third Schedule, which includes Japanese Knotweed and Himalayan Balsam, as follows: *"any person who plants, disperses, allows or causes to disperse, spreads or otherwise causes to grow [….] shall be guilty of an offence*."

No third invasive schedule species were recorded within the proposed development site. Two other invasive non-native species Buddleia *Buddleia davidii* and Wild clematis *Clematis vitalba* were recorded within the proposed development site. These species were recorded largely within scrub and recolonising areas within the site. Both are listed as medium impact species by the NBDC. These species are not listed in SI 477 of 2011 and therefore there is no statutory obligation to remove them. Both have been included in the TII Guidelines on the Management of Noxious Weeds and Non-native Species on National Roads (TII, 2010) as they have been shown to have an adverse impact on landscape quality, native biodiversity or infrastructure; and are likely to be encountered during road schemes.

8.3.6 Non-volant Mammals

Eight non-volant mammals species which are protected by the Irish Wildlife Act (1976) as amended have been recorded within W66, namely Badger (*Meles meles*), Hedgehog (*Erinaceus europaeus*), Irish Hare (*Lepus timidus subsp. hibernicus*), Irish Stoat (*Mustela erminea subsp. hibernica*), Red Squirrel (*Sciurus vulgaris*), Otter (*Lutra lutra*), Pine Marten (Martes martes) and Sika Deer (*Cervus nippon*). It is noted Fox *Vulpes vulpes* (not included in the Irish Wildlife Act (1976) as amended, was recorded during site surveys.

8.3.6.1 Otters

Otters, along with their breeding and resting places are protected under the provisions of the Wildlife Act 1976, as amended by the Wildlife (Amendment) Act, 2000. Otters have additional protection because of their inclusion in Annex II and Annex IV of the Habitats Direct which is transposed into Irish law in the European Communities (Natural Habitats) Regulations (S.I 94 of 1997), as amended. Otters are also listed as requiring strict protection in Appendix II of the Berne Convention on the Conservation of European Wildlife and Natural Habitats and are included in the Convention on International Trade of Endangered species (CITES).

Although rare in parts of Europe they are widely distributed in the Irish countryside in both marine and freshwater habitats. Otters are solitary and nocturnal and as such are rarely seen. Thus, surveys for Otters rely on detecting signs of their presence. These include spraints (faeces), anal gland secretions, paths, slides, footprints and remains of prey items. Spraints are of particular value as they are used as territorial markers and are often found on prominent locations such as grass tussocks, stream junctions and under bridges.

Otters occasionally dig out their own burrows but generally they make use of existing cavities as resting placing or for breeding sites. Suitable locations include eroded riverbanks, under trees along rivers, under fallen trees, within rock piles or in dry drainage pipes or culverts etc. If ground conditions are suitable the holt may consist of a complex tunnel and chamber system. Otters often lie out above ground especially within reed beds where depressions in the vegetation called "couches" are formed (TII, 2008). Generally, holts or resting areas can be located by detecting signs such as spraints or tracks.

In contrast natal holts which are used by breeding females can be extremely difficult to locate. They are often located a considerable distance from any aquatic habitats and Otters may also use habitats adjoining small streams with minimal or no fish populations. In addition, natal holts are usually carefully hidden and without obvious sprainting sites. Otters do not have a well-defined breeding season. It is noted that Otters are largely nocturnal, particularly in areas subject to high levels of disturbance as evidenced by the presence of Otters in the centre of Cork City (Sleeman and Moore 2005).

A review of existing records showed that Otter or signs of Otter have been recorded on 15 occasions within grid square W66, the most recent being in March 2017 (Source NBDC January 2026). While Otter are known to occur with the River Lee catchment, no published records of Otters along the Maglin North stream were found. However, a recent study by Cork Nature Network recorded a number of sprainting sites for Otter along the Curraheen main channel downstream of the proposed development site.

Otters are known to occur within the catchment and therefore there is the potential for Otter to commute along and feed within the Maglin North Stream in proximity to the proposed development site. The main drainage ditch onsite has regular flows and could potentially support fish/amphibians and provide foraging habitat for Otter. However, no signs of Otter were noted during site surveys and/or within 150m of the proposed development site.

8.3.6.2 Badger

Badgers and their setts are protected under the provisions of the Wildlife Act 1976, as amended, and it is an offence to intentionally, knowingly or unknowingly kill or injure a protected species, or to wilfully interfere with or destroy the breeding site or resting place of a protected wild animal. Badger setts are formed by a complex group of interlinked tunnels, and therefore works in proximity to setts can potentially cause damage a protected species. Badgers are also protected under Appendix III of the Berne. Badgers are known to occur within the wider landscape (NBDC) with 61 records of Badger within W66.

Badger surveys were carried out within all suitable habitat within 50m of the proposed development site boundary including grassland, woodland and scrub. While the grasslands within the proposed development site could potentially provide habitat for Badger, no signs of Badger were recorded during site surveys.

8.3.6.3 Irish Hare

Irish Hare is one of three lagomorphs found on the Island of Ireland and the only native lagomorph. It is listed on Appendix III of the Berne Convention, Annex V(a) of the EC Habitats Directive (92/43/EEC) and as an internationally important species in the Irish Red Data Book.

There are seven records of Irish Hare in W66. The grassland habitats at the site could potentially be used by Irish Hare, in particular around areas where grassland habitat is not intensively managed i.e. Dry meadows and grassy verge habitats. However, no signs of Irish hare were recorded onsite.

8.3.6.4 Hedgehog

Hedgehog is also listed on Appendix III of the Berne Convention can be found throughout Ireland, with male hedgehogs having an annual range of around 56 hectares. Hedgehogs have been recorded in W66 52 times. Generally, hedgehogs prefer edge habitat and pasture but in recent years have begun to colonize urban areas. The treelines/hedgerows, scrub, woodland etc within the proposed development site are likely to provide breeding habitats for Hedgehog. However, no signs of Hedgehog were recorded onsite.

8.3.6.5 Irish Stoat

Irish Stoat is one of the species protected under regulations (Protection of Wild Animals) in 1980 which enabled Ireland to comply with the provisions of the Bern Convention of European Wildlife and Natural Habitats, which was ratified by Ireland in April 1982. It has been recorded in W66 on 17 occasions.

Given its broad habitat use, Irish Stoat could potentially occur in the proposed development site. Due to the habitats recorded within the proposed development site i.e. treelines/hedgerows, scrub, woodland etc, and their broad habitat use Irish Stoat is likely to occur. However, no signs of Irish stoat were recorded onsite.

8.3.6.6 Red Squirrel

Red Squirrel is also listed on Appendix III of the Berne Convention can be found throughout Ireland. Red squirrels feed mainly on tree seeds, although they can utilise fungi, fruit and buds as they become available in the woodland. They have been recorded on 18 occasions within W66. While there are mature trees onsite, the absence of connectivity to woodland within this urban setting means the habitats onsite are sub-optimal for Red Squirrel and they are unlikely to occur. No signs of Red Squirrel were recorded onsite.

8.3.6.7 Sika Deer

Sika Deer is a non-native species to Ireland. They prefer forest with dense understorey, thickets, natural woodlands and commercial plantations, but will also forage in open grassy areas with dense cover nearby. Sika Deer are highly opportunistic feeders, foraging on grasses to a range of shrubs and tree species. This species has been recorded on one occasion within W66. The surrounding road network and urban development means Sika Deer is not likely to occur within or in the vicinity of the proposed development site, although it is noted that this species is expanding its range around County Cork. No signs of deer were recorded onsite.

8.3.6.8 Pine Marten

Pine Marten are habitat specialists, requiring forest or scrub habitat to exist in an area. They are adept at climbing trees as they have powerful non-retractable claws. The species is primarily active at night and individuals live in territories that can vary in size from 50 hectares to 400 hectares. Males typically have bigger territories than females and there can be partial overlap between adjacent territories. There are two records of Pine Marten in W66. No signs of Pine Marten were recorded during site surveys and given the habitats onsite, the proposed development site is of negligible value for this species. No signs of Pine Marten were recorded onsite.

8.3.7 Volant Mammals - Bats

8.3.7.1 Bat Background Data

In Ireland, nine species of bat are currently known to be resident. These are classified into two Families: *Rhinolophidae* (Horseshoe bats) and *Vespertilionidae* (Common bats). The Lesser Horseshoe Bat *Rhinolophus hipposideros* is the only representative of the former Family in Ireland. All the other Irish bat species are of the latter Family and these include three pipistrelle species: Common *Pipistrellus pipistrellus*, Soprano *Pipistrellus pygmaeus* and Nathusius' *Pipistrellus nathusii*, four *Myotids*: Natterer's *Myotis nattereri*, Daubenton's *Myotis daubentonii*, Whiskered *Myotis mystacinus*, Brandt's *Myotis brandtii*, the Brown Long-eared *Plecotus auritus* and Leisler's *Nyctalus leisleri* bats.

A review of existing bat records within grid squares W66 (sourced NBDC) showed that five of the nine Irish bat species have been recorded within this hectad (**Table 8.8)**.

Table 8.8. Presence of Irish bat species within W66

Common name	Scientific name	Presence
Brown Long Eared Bat	*Plecotus auritus*	Present
Daubenton's Bat	*Myotis daubentoniid*	Present
Leisler's Bat/ Lesser Noctule	*Nyctalus leisleri*	Present
Lesser Horseshoe Bat	*Rhinolophus hipposideros*	Absent
Nathusius' Pipistrelle	*Pipistrellus nathusii*	Absent
Natterer's Bat	*Myotis nattereri*	Absent
Pipistrelle	*Pipistrellus pipistrellus sensu lato*	Present
Soprano Pipistrelle	*Pipistrellus pygmaeus*	Present
Whiskered Bat	*Myotis mystacinus*	Absent

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It is noted that other species which have not been included within this database could potentially occur. The Lesser Horseshoe Bat is the only species of bat listed on Annex II of the Habitats Directive (Directive 92/43/EEC). There are records of Lesser Horseshoe Bat roost at Ovens, approximately 3.9km west of the proposed development site (undisclosed location). Lesser Horseshoe Bats normally forage in woodlands/scrub within 2.5km of their roosts (Bontadina *et al.* 2002); Consequently, in order to link roosting and foraging sites, linear features such as hedgerows, treelines and stone walls provide vital connectivity for this species, most importantly within 2.5km around each roost (Schofield, 2008).

A data request was submitted to the NPWS to identify if there are any known roosts within 5km of the proposed development site. With the exception of the Ovens site, there are no known roosts within this area. It is noted that a personal communication from Tom O'Donnell of O'Donnell Environmental has confirmed that signs of roosting Lesser Horseshoe have been recorded in the Blarney Castle Grounds, c.5.5km north of the proposed development site. In a recent study carried out by Cork City Council to identify core areas for Lesser Horseshoe Bat within the Blarney to Ballincollig area, the proposed development site and its surrounding lands were not identified in the connectivity or core areas of study (O'Donnell Environmental 2024).

A study by Lundy *et al.* (2011) examined the relative importance of landscape and habitat associations across Ireland. Maximum Entropy Models (MEM) were constructed for each bat species using records from the National Bat Database from 2000-2009. This method allows species' records that have not been collected in a systematic survey to be analysed. The results help explain patterns of species' occurrence and predict where species might occur. Landcover (CORINE), topography, climate, soil pH, riparian habitat and human bias factors were incorporated into the models. The analyses provide a picture of the broad scale geographic patterns of occurrence and local roosting habitat requirements for Irish bat species. This also provides a 'habitat suitability' index. The index ranges from 0 to 100, with 0 being least favourable and 100 most favourable for bats. The habitat indices for all Irish bats for the landscape around the proposed development site is shown in **Table 8.9**.

Table 8.9 Model Predicted Habitat suitability indices for All Irish bat species

Bat species	Common Name	Habitat indices
All Bats		26.67
Pipistrellus pygmaeus	Soprano pipistrelle	40
Plecotus auratus	Brown long-eared bat	37
Pipistrellus pipistrellus	Common pipistrelle	37
Rhinolophus hipposideros	Lesser horseshoe	1
Nyctalus leisleri	Leisler's bat	35
Myotis mystacinus	Whiskered bat	25
Myotis daubentoniid	Daubenton's bat	28
Pipistrellus nathusii	Nathusius' pipistrelle	4
Myotis nattereri	Natterer's bat	33

Source: NBDC 06/01/25

8.3.7.2 Bat tree/building survey

A preliminary roost assessment of trees within the proposed development trees found that while mature trees are present, these lack the structural elements that would provide significant roosting habitat for bats. A description of trees with the potential to support roosting bats are included in **Table 8.8**. Other trees onsite are classified as no or no/negligible potential and therefore are not described in further detail.

Although foraging activity was observed, no activity indicative of emergence or direct emergence of bats was recorded from any trees within the site. However, bats can use trees as temporary roosts and therefore the presence of occasional bats cannot be altogether excluded. Small roosts within mature trees with dense ivy can be difficult to detect and may be used sporadically.

There are number of buildings earmarked for demolition. The farmhouse will be restored. All other buildings onsite including the lime kiln will be demolished. A preliminary roost assessment of the buildings onsite found no evidence of roosting bats. These buildings are classified as low to negligible potential for roosting bats. Further detail on the site buildings is provided in **Table 8.10.**

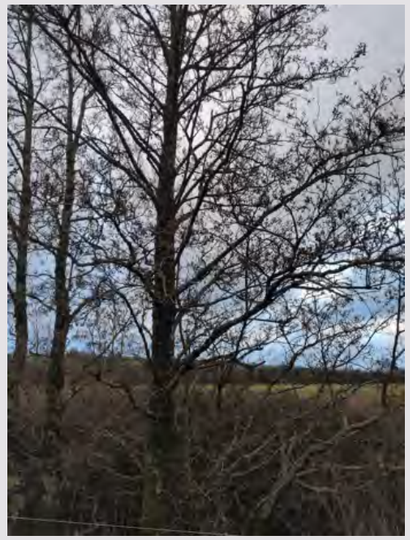
No bat roosts were identified within buildings or trees located within the proposed development site. All assessed trees and structures were classified as having either negligible or low potential for supporting bat roosts, in accordance with NPWS (2022) and Collins (2023).

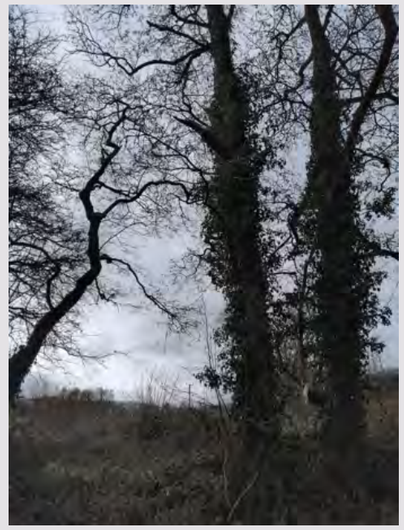
Table 8.10 Preliminary roost assessment of trees within the site

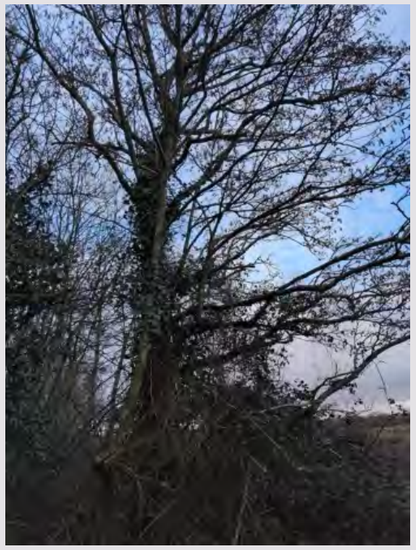
Tag. No/Tree group/Hedgerow number(CF with arboricultural survey)/Building description	Species/comments	Photograph
T402 Proposed for removal	Semi mature sycamore very limited Ivy coverage Negligible potential for roosting bat.	
T404 Proposed for removal	Large mature Ash. Moderate ivy coverage Low potential for roosting bats.	
T410 Proposed for retention	Semi mature Ash. Limited, patchy Ivy coverage Low potential for roosting bats.	
T411 Proposed for retention	Large mature Ash. Moderate ivy coverage Low potential for roosting bats.	

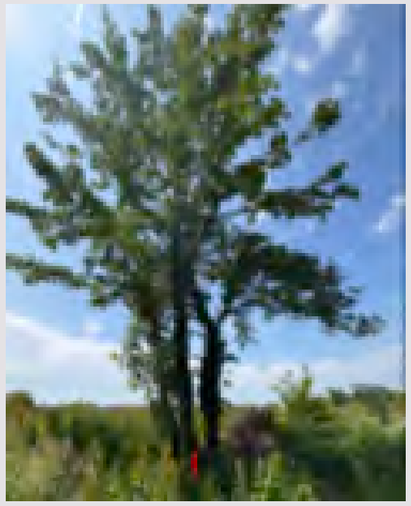
Tag. No/Tree group/Hedgerow number(CF with arboricultural survey)/Building description	Species/comments	Photograph
T423 Proposed for removal	Semi-mature Sycamore. Multi-stemmed with patchy ivy in lower section Negligible potential for roosting bats	
T422 Proposed for removal	Semi-mature Sycamore. Multi-stemmed with patchy ivy in lower section Negligible potential for roosting bats	

Tag. No/Tree group/Hedgerow number(CF with arboricultural survey)/Building description	Species/comments	Photograph
T442 In Group Proposed for removal	Mature alder. No Ivy, multi-stemmed from base, no cracks and crevices Negligible potential for roosting bats	
T443 in group Proposed for removal	Mature alder. No Ivy, multi-stemmed from base, no cracks and crevices Negligible potential for roosting bats	

Tag. No/Tree group/Hedgerow number(CF with arboricultural survey)/Building description	Species/comments	Photograph
T444 Proposed for removal	Mature alder. No Ivy, multi-stemmed from base, no cracks and crevices Negligible potential for roosting bats	
T445 Proposed for removal	Early mature alder. No Ivy, multi-stemmed from base, no cracks and crevices. On riverbank Negligible potential for roosting bats	

Tag. No/Tree group/Hedgerow number(CF with arboricultural survey)/Building description	Species/comments	Photograph
T458 Proposed for removal	Mature Alder on raised stonewall. Moderate ivy coverage but low stem diameter. Low potential for bats	
T459 Proposed for removal	Mature Alder on raised stonewall. Moderate ivy coverage but low stem diameter. Low potential for bats	

Tag. No/Tree group/Hedgerow number(CF with arboricultural survey)/Building description	Species/comments	Photograph
T453 Proposed for removal	Early mature alder. Very light covering of ivy. No significant cracks of crevices Low potential for bats	

Tag. No/Tree group/Hedgerow number(CF with arboricultural survey)/Building description	Species/comments	Photograph
T454 Proposed for removal	Mature Hawthorn. Limited ivy from base to crown Low potential for bats	
T455 Proposed for removal	Early mature Sycamore. Limited Ivy covering. Some cracked limbs but no significant cracks or crevices lord and eligible potential Low to negligible potential for roosting bats	

Tag. No/Tree group/Hedgerow number(CF with arboricultural survey)/Building description	Species/comments	Photograph
T456 Proposed for removal	Mature hawthorn with most of the growth now confined to the top of the canopy. Ivy limited. Low to negligible potential for roosting bats	
T457 Proposed for removal	Mature Elder. Large mature elder isolated on patchy treeline. Dense ivy coverage. Some rotting beams. Low potential for roosting bats.	

Tag. No/Tree group/Hedgerow number(CF with arboricultural survey)/Building description	Species/comments	Photograph
T432 Proposed for retention	Large multi-stemmed Elder. Light ivy coverage. Low potential for roosting bats.	
T462 Proposed for retention	Large mature Sycamore. No cracks or crevices. Negligible potential for roosting bat.	

Tag. No/Tree group/Hedgerow number(CF with arboricultural survey)/Building description	Species/comments	Photograph
T463 Proposed for removal	Mature Elm. Moderately dense ivy coverage. There is considerable dead wood on this tree. Low potential for roosting bats.	
T417 Proposed for removal	Mature Ash. Light covering of ivy on the lower section of the tree. No significant cracks of crevices some patches of loose bark. Low to negligible potential for roosting bats.	

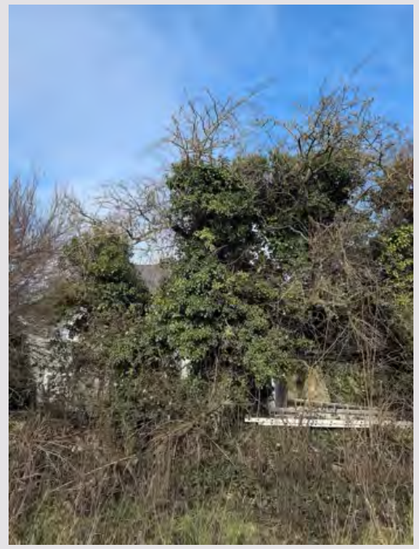
Tag. No/Tree group/Hedgerow number(CF with arboricultural survey)/Building description	Species/comments	Photograph
T418 Proposed for retention	Early mature Ash very light ivy coverage. No obvious cracks or crevices. Low potential for roosting bats	
T419 Proposed for retention	Alder on the edge of the stream close to woodland. Some ivy from base to top of canopy No significant cracks of crevices Low potential for roosting bats	

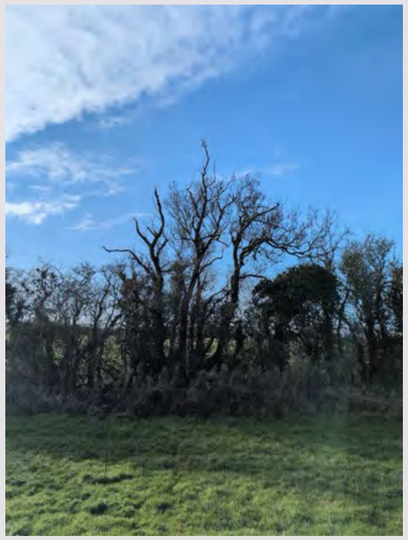
Tag. No/Tree group/Hedgerow number(CF with arboricultural survey)/Building description	Species/comments	Photograph
T460 Proposed for retention	Mature Hawthorn. Moderate ivy with low stem diameter. Low potential for roosting bats.	
T465 Proposed for retention	Mature multi-stemmed Ash. Moderate Ivy. Low potential for roosting bats	

Tag. No/Tree group/Hedgerow number(CF with arboricultural survey)/Building description	Species/comments	Photograph
T458-T461 T458/T459 Proposed for removal T460/T461 Proposed for retention	Mature Hawthorn and Alder. Some moderate density of ivy coverage. No significant cracks or crevices. Low to negligible potential for roosting bats.	
T467 Proposed for retention	Semi mature ash. Limited ivy coverage. Negligible potential for roosting bats	

Tag. No/Tree group/Hedgerow number(CF with arboricultural survey)/Building description	Species/comments	Photograph
T469 Proposed for removal	Mature Ash. Minimal ivy coverage. One large crevice (at c.12ft) No evidence about usage. Low potential for bats	
T470 Proposed for removal	Semi-mature Ash. Poor quality tree. Limited ivy coverage. Low potential for bats	

Tag. No/Tree group/Hedgerow number(CF with arboricultural survey)/Building description	Species/comments	Photograph
T471 Proposed for removal	Semi-mature Ash Limited ivy coverage. On raised earth bank. Low potential for bats	

Tag. No/Tree group/Hedgerow number(CF with arboricultural survey)/Building description	Species/comments	Photograph
Hedgerow 4 Proposed for retention	Three mature Hawthorn. Moderately dense Ivy. One over mature Hawthorn with low roost potential Low to negligible potential for roosting bats	 
Hedgerow 3 Proposed for retention	Mature hawthorn with dense ivy coverage. Low to negligible potential for roosting bats	
Hedgerow 6 Proposed for removal	A native hedgerow at north west of site. Dense ivy coverage on a number of trees. Low potential for roosting bats.	

Tag. No/Tree group/Hedgerow number(CF with arboricultural survey)/Building description	Species/comments	Photograph
Hedgerow 6 Proposed for removal	Multi-Stemmed mature Alder growing in the external close to the stream. Quite an old tree but no significant cracks or crevices. Light ivy at the base Low potential for roosting bats.	
Tree group 7 Proposed for retention	This tree line includes some mature Alder as well as immature Alder and Blackthorn. However, most of the trees are relatively young and no significant potential. Negligible potential for roosting bats	

Tag. No/Tree group/Hedgerow number(CF with arboricultural survey)/Building description	Species/comments	Photograph
Tree group 6 and Hedgerow 8 (WD1 woodland habitat) Proposed for removal	Woodland is a mixture of mature Elder and mature Hawthorn. Dense ivy on some trees but small trunks an branches. Low potential for roosting bats.	
Tree group 16 Proposed for removal	Large Leylandii trees. Negligible potential for roosting bats	
Tree group 17 Proposed for retention	Mature Hawthorn and Ash. Moderately dense ivy Low potential for roosting bats	

Table 8.11 Preliminary roost assessment of buildings within the site

Building	Description	Photo
Lime kiln	Historical lime production is evidenced by the many limekilns recorded in the region. There is an unregistered lime kiln within the proposed development site (at the south of the woodland). It is depicted on the OS map of 1841-42 as a circular feature east of the road and is annotated “Lime Kiln (Disused)” on the 2nd edition (1903, indicating that it had gone out of use by the late 19th century. Field inspection confirmed that the kiln survives as a substantial stone-built structure, rectangular in plan and largely intact on its south, east, and west sides, while the north side is obscured by dense vegetation. The walls stand to near their original height, and the form of the draw-shaft kiln, typical of 18th–19th century rural lime production, remains clearly legible. This lime kiln was fully sealed within the past 10-12 years as a health and safety measure. The roof of the structure is heavily overgrown but the walls are intact. It was briefly unsealed for archaeological investigations and subsequently resealed. Therefore the lime kiln is not accessible for roosting or hibernating bats. An endoscope survey was carried out from a small gap at the base of the structure. However, no signs of access to the interior of the main structure was identified and no signs of bats were recorded.	  
Agricultural shed	Includes slatted unit. Residual manure on floor. Open on all sides Negligible value for roosting bats.	
Agricultural shed	Open front and rear. Negligible value for roosting bats. Residual manure on floor. Foraging Natterer’s bat was recorded in this shed.	
Agricultural shed	Open front. Residual manure on floor. Negligible value for roosting bats.	
Old structure	Walls of old shed. No roof. Negligible value for roosting bats.	

Farm dwelling (in ruins) 5	This building is in ruins. Holes in walls and only part of roof remaining. Ivy on exterior walls. Cold and draughty interior. Interior has been significantly modified with internal concrete walls etc for farming use. Low to moderate potential for roosting bats.	
Old cattle shed 6	Disused cattle shed. Drafty cold. Extensive ivy. Low potential for roosting bats.	
Farm building disused. 7	Some remaining old stonewall with conventional block work more recently constructed. Sections of external structure open with collapsing roof. Open drafty and cold. Low potential for roosting bats.	

8.3.7.3 Bat Activity/Emergence Surveys

Bat activity and/or emergence surveys were completed at the site in 2022, 2024 and 2025 (See **Table 8-1**).

8.3.7.3.1 Bat surveys 2022

Bat surveys were carried out at an adjoining site in 2022 and this development is now under construction (Planning file CCC #2241611). Two bat surveys was carried out during the summer period (May to September inclusive) to assess bat usage. Night time emergence/activity surveys were carried out on the 31st of August, 2022 and 1st of September,2022 using an Echotouch Touch 2 PRO bat detector and a Pulsar Helion 2 XP50 Pro Thermal Imaging Camera. A day time assessment of tree suitability for roosting bats and Potential Roost Features (PRFS) was carried out on the 31st of August 2022.

The following results were recorded (CCC #22/41644):

Foraging by Common Pipistrelle (1-2 individuals recorded approx.) and Soprano Pipistrelle (1-2 individuals approx.) were recorded along the eastern treeline/track. Foraging was relatively constant in this area. Common Pipistrelle (2 individuals) was recorded foraging along the southern boundary, although activity was sporadic.

Sporadic signals for Leisler's Bat (1-2 individuals approx.) were also recorded along the northern section of the treeline along the eastern boundary of the proposed development site. The signals were short in duration and were indicative of bats overflying the site with no prolonged foraging recorded. A single signal for Leisler's Bat along the eastern boundary was probably indicative on one bat commuting through the wider landscape to the east.

Overall the external boundaries along the eastern and southern boundaries are considered of moderate local value for foraging Common and Soprano Pipistrelle. Both species are relatively common in the Irish landscape. Some Leisler's Bat activity was recorded although most of the activity was recorded outside the site boundary. The proposed development site is considered of low, local value for this species. No Myotis species, which were recorded foraging in a farmyard to the south, were recorded within the proposed development site. No Lesser Horseshoe Bat which is listed on Annex II of the Habitats Directive were recorded. No emergence from any of the trees along the site boundary was recorded. No significant commuting activity which would suggest that trees along the external boundaries provide significant commuting roosts were recorded. It is noted that the land to the north and west is dominated by housing and new housing is being developed to the east.

Although the farm complex within the current project was not within the scope of this project it was included within the study area. During these 2022 surveys, one myotis bat was recorded foraging around the farm buildings. Common and Soprano Pipistrelle were also recorded foraging around the farmyard complex.

8.3.7.3.2 Bat surveys 2024 and 2025

Bat activity and/or emergence surveys were completed at the proposed development site in 2024 and 2025 (**See Table 8-1**). Surveys were carried out using Echotouch Pro 2 and Elekon M2 bat detectors and a Haleon thermal imaging camera. The surveys included static and emergence surveys within the farm buildings and activity transect surveys along vegetated boundaries and woodland.

A complex of farm buildings (farmyard) is located at the centre of the site, which includes the old farmhouse and a mixture of more modern sheds (all in an advanced state of disrepair). There is a small Lime kiln located to the west of the existing farmyard adjacent to small wooded copse. An area of old farm buildings is also locate at the southeast of the site. These buildings are almost fully collapsed, with only walls remaining in. Hedgerows and treelines around the external boundaries are of moderate quality for foraging/commuting bats.

2024 Surveys

The primary purpose of the survey was to determine if bats were using any of the structures within the proposed development site for roosting and to assess general activity patterns within the woodland and along linear features such as hedgerows and treelines within the proposed development site.

Three Elekon detectors were put *in situ* on the 24th of August 2024 and an active emergence/activity survey was carried out on the same night. The static detectors were collected on the 27th of August 2024 and a repeat active/emergence survey was carried out. Analysis of the survey data did not indicate that the buildings were being utilised as roosts and no emergence by bats were recorded. In general, the modern farm buildings are open and draughty and are considered low potential value for roosting bats.

Leisler's activity was recorded on both survey dates in 2024 with approximately three individuals recorded. The sporadic signals were indicative of a small number of bats foraging at height in the wider landscape.

Common Pipistrelle were recorded foraging within the farmyard complex, along the edge of the woodland and along sections of the western hedgerow/treelines. One Soprano Pipistrelle and one Common Pipistrelle were observed foraging around the farmyard.

Natterer's Bat was recorded foraging in one of the large agricultural sheds (**CF with Table 8.11**) and therefore a second emergence survey was carried out on the 27th of August 2024, using a thermal imaging camera, to confirm if bats were roosting within this structure. The thermal imaging camera indicated that one bat entered the building post emergence. One Common Pipistrelle was also recorded foraging. It is noted that there was old manure within the shed. This sheltered environment is likely to provide areas of invertebrates and subsequently foraging habitat for bats. In general, the complex of derelict buildings alongside the western woodland habitat and the external hedgerows provide suitable foraging for a number of relatively common bat species.

Overall, the results were indicative of moderate levels of bat activity. Common Pipistrelle, Soprano Pipistrelle and Leisler's bat are typically recorded in this type of agricultural landscape. The most common species recorded was Soprano Pipistrelle with lower numbers of Common Pipistrelle. Leisler's bat was recorded early in the survey period, which is typical for this species, with sporadic activity detected throughout the survey period. Natterer's Bat are less commonly recorded, and the results indicate opportunistic foraging within a disused cattle shed.

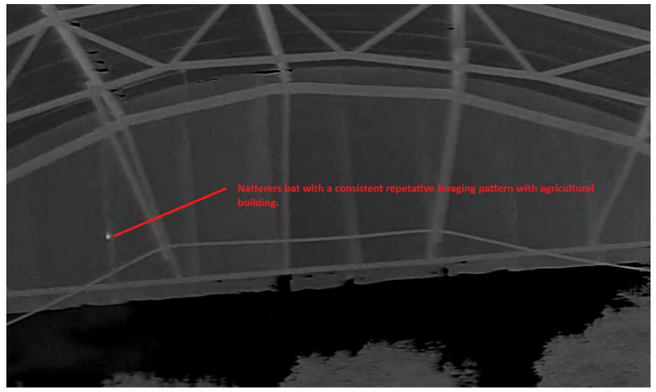


Plate 22. Natterers Bat consistently foraging within a large modern agricultural building.

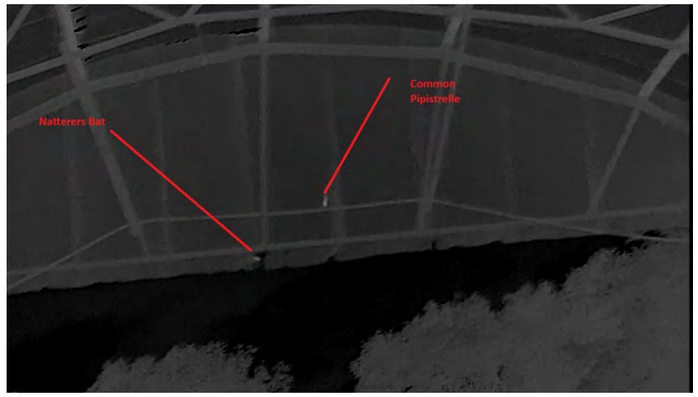


Plate 23. Natterers bat briefly harassed by one Common Pipistrelle within agricultural building

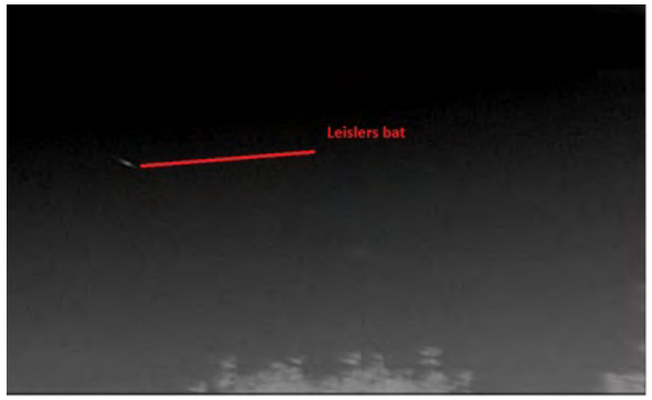


Plate 24. Leisler's bat foraging around treelines to south of farmyard

2025 Surveys

Bat emergence and activity surveys were carried out on the 11th and 25th of September 2025 to assess emergence and activity patterns. As per previous surveys no emergence was recorded from any of the structures on site including the farmyard complex and lime kiln. In general the surveys indicated similar activity patterns to those recorded during the 2024 surveys, with Common Pipistrelle and Soprano Pipistrelle the most numerous species recorded. Activity for Common and Soprano Pipistrelle was recorded around the farmyard complex, along hedgerows along the western boundary and northern boundary hedges and along the periphery of the woodland area. Leisler's activity was detected along the western boundary and around the farmyard complex, although levels of activity were generally lower. In addition, a brief signal for Brown Long-eared bat was recorded on the southern boundary of the woodland area. It is probably indicative of one bat foraging within the woodland area.

A notable change was the absence of prolonged foraging by Natterer's Bat which was previously recorded foraging within a large modern farm building within the farmyard complex. Some brief sporadic signals for this species were recorded on the periphery of the farmyard however no prolonged foraging was recorded.

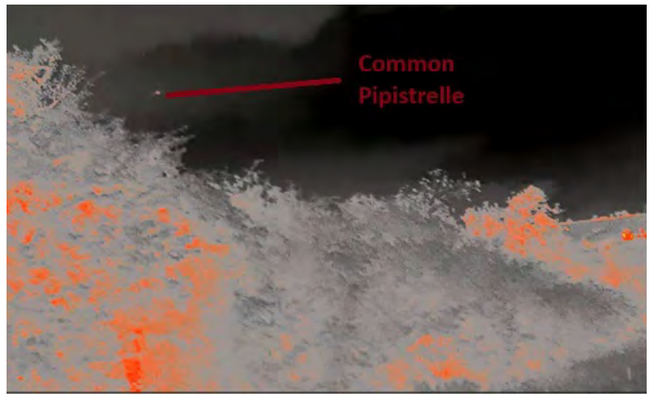


Plate 25. Common Pipistrelle foraging on northern boundary of woodland

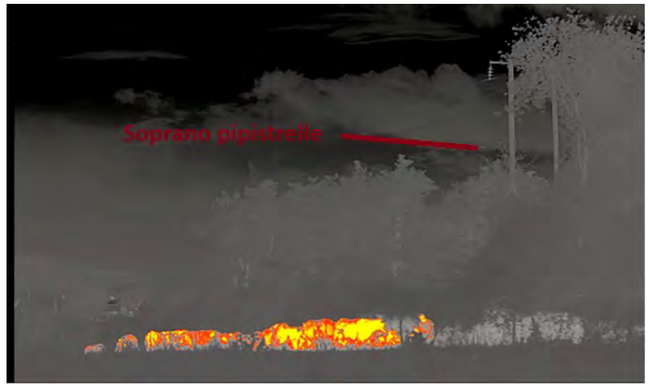


Plate 20. Soprano Pipistrelle observed foraging on northern boundary of woodland close to lime kiln.

8.3.7.3.3 Summary of bat surveys and usage

In general the site is dominated by improved agricultural grassland with = patches of scrub/woodland and hedgerow/treelines along external boundaries. The farm is under agricultural management is similar to large areas of similar landscape in the surrounding landscape.

No evidence of roosting bats was recorded in any of the buildings during the preliminary roost assessments and the older buildings on site are generally in poor state of repair and are draughty and cold. The more modern farm structures are constructed using corrugated iron roofing and concrete blocks, which are considered of low potential as roosting site overall.

The lime kiln was completely sealed and therefore there was no access for bats to the fireplace of chimney structure. This structure was sealed for health and safety purposes approximately 10-12 years and became overgrown by the adjoining scrub habitats. It was briefly unsealed for archaeological investigations and subsequently resealed. Therefore the lime kiln is not accessible for roosting or hibernating bats.

Emergence/activity surveys did not record bat emergence from any of the buildings on site, including the older farmhouse building and sheds, more modern sheds and/or the lime kiln. One Natterers Bat and one Common pipistrelle was recorded foraging within a modern farm building in 2024 (Agricultural building 2). However no foraging activity was recorded within the farm buildings in during latest survey in 2025. Some old manure remained within these buildings in 2024/2025 although the building is not in active agricultural usage. Overtime the value of this building as potential foraging habitat would be expected to drop as it continues to fall into further disrepair.

Within the remainder of the landholding activity/foraging patterns indicate that bats foraged primarily along treelines and hedgerows with Soprano and Common Pipistrelle the most common species recorded. In addition, a brief signal for Brown Long-eared bat was recorded on the southern boundary of the woodland habitat (at west of site). It is probably indicative of one bat foraging within the woodland habitat.

Overall the site provides moderate value foraging habitat in the context of a conventionally farmed agricultural landscape. Most of the activity is concentrated along western and northern boundary hedgerow/treeline, along the internal treeline along lane that leads to the existing farmyard and along the edges of scrub/woodland habitats. Although numbers are not exact and the survey was extended over multiple survey seasons it is estimated that overall the site was used for foraging by 6 Common Pipistrelle, 5 Soprano Pipistrelle, by 1 Brown Long Eared bat, by 1 Natterers bat and with sporadic foraging at height by 4 Leisler's Bat during the site surveys.

8.3.8 Amphibians and Reptiles

According to records held by the NBDC, Common Frog *Rana temporaria* and Smooth Newt *Lissotriton vulgaris* have been recorded within hectad W66.

Common Frog is listed on Annex V of the EU Habitats Directive and is protected under the Wildlife Acts. The drainage ditch and wet/agricultural grassland onsite could potentially support this species, in particular along slow flowing/stagnant areas. Surveys were carried out in all suitable habitat during the spring and summer months when signs of Common frog breeding would be evident. However, no signs of Common frog were recorded during site surveys. The wet/agricultural grassland at the site, which is used by grazing cattle and the drainage ditches adjoining this type of farmed, agricultural land is sub-optimal habitat for Common Frog. Drainage ditches are shaded and/or heavily overgrown with low flows, making them largely unsuitable for Common Frog.

The Smooth Newt is the only member of the Urodela (the tailed amphibians) found in Ireland. While commonly encountered near water bodies, adult newts are actually terrestrial, only returning to water bodies to breed. There is no suitable habitat for this species within the site boundary.

Common Lizard (*Zootoca vivipara*) is Ireland's only native terrestrial reptile and is so protected under the Wildlife Act. Ideal habitats for the species are south-facing, damp tussocky grassland, scrub covered hillsides, dunes or banks, and woodland tracks, and it also resides in peat bogs, dry grasslands and heathlands. The species has not been recorded in the surrounding landscape (NBDC) and it is unlikely that the species occurs within or in proximity to the proposed development site. The site of negligible value for reptiles and they have not been recorded in W66.

8.3.9 Birds

8.3.9.1 Breeding birds

The National Biodiversity Centre online data base lists 123 species of bird recorded within grid square W66. Of these 123 species, four of which are listed under Annex I of the Birds Directive, namely, Bar-tailed Godwit (*Limosa lapponica*), Chough (*Pyrrhocorax pyrrhocorax*), Golden Plover (*Pluvialis apricaria*), Hen Harrier (*Circus cyaneus*), Kingfisher (*Alcedo atthis*), Little Egret (*Egretta garzetta*), Mediterranean Gull (*Ichthyaetus melanocephalus*), Merlin (*Falco columbarius*), Nightjar (*Caprimulgus europaeus*), Peregrine *(Falco peregrinus*), Red Kite (*Milvus milvus*) and Ruff (*Calidris pugnax*). There is no suitable breeding habitat for these Annex I species within the proposed development site boundary.

Breeding bird surveys were carried out in May and June 2024 based on the Common Bird Census (CBC) methodology (Balmer *et al* 2013 and Gilbert *et al.,* 1998). CBS is an annual survey carried out exclusively during the breeding season. Bird counts are undertaken during two visits. The first visit is in the early part of the breeding season (April to mid-May) and the second at least four weeks later (from mid-May to the end of June). This reflects the abundance of residents and early migrants which tend to be more easily detected during the first visit, and later migrants which are more abundant during the second visit. The study area focused on terrestrial habitats within the proposed development site. The aim of the breeding bird surveys was to identify any valuable bird habitats within the site boundary and to identify birds present within the proposed development site and surrounding landscape. This survey area encompassed terrestrial habitats along the survey route including hedgerows/ treelines woodland and agricultural fields. The site was walked so that all habitats within 50m of potential nesting features were surveyed. The surveyor slowly walked through the site, stopping at regular intervals to scan with binoculars and to listen for bird calls or song. Birds were identified by sight and song, and observations were plotted on a map. Survey visits were made in the early morning to coincide with the peak period of bird activity and all species seen or heard in the study area and immediate environs were recorded including those in flight. Visits were made during favourable weather conditions.

All species encountered during the survey were mapped and coded using standard BTO species codes and activity recorded using the BTO codes for breeding evidence. In an effort to minimise potential disturbance, no attempts were made to locate nests as such behaviours are generally sufficient to determine probable or confirmed breeding.

The results of the breeding bird survey are shown in **Table 8.11.**

Table 8.11 Bird Species recorded during breeding bird surveys

Species		Breeding Status	Highest evidence of breeding	Estimated number of territories	Conservation Status: Annex I of Birds Directive or Red/Amber List*
Blackbird	*Turdus merula*	Possible	Singing male	3	
Blackcap	*Sylvia atricapilla*	Probable	Pair observed	2	
Blue tit	*Cyanistes caeruleus*	Possible	Singing male	2	
Bullfinch	*Pyrrhula pyrrhula*	Probable	Pair observed	1	
Buzzard	*Buteo buteo*	Non-breeding	Flying over		
Chaffinch	*Fringilla coelebs*	Possible	Singing male	2	
Chiffchaff	*Phylloscopus collybita*	Possible	Singing male	2	
Dunnock	*Prunella modularis*	Possible	Singing male	2	
Feral pigeon	*Columba livia domestica*	Non-breeding	Flying over		
Goldfinch	*Carduelis carduelis*	Probable	Pair observed	1	
Great tit	*Parus major*	Possible	Singing male	1	
House martin	*Delichon urbicum*	Non-breeding	Flying over		Amber List
House sparrow	*Passer domesticus*	Possible	Singing male	1	Amber List
Jackdaw	*Corvus monedula*	Probable	Pair observed	1	
Linnet	*Linaria cannabina*	Non-breeding	Overflying		Amber List
Magpie	*Pica pica*	Possible	Singing male	1	
Pheasant	*Phasianus colchicus*	Probable	Pair observed in suitable nesting habitat in breeding season	1	
Robin	*Erithacus rubecula*	Possible	Singing male	1	
Rook	*Corvus frugilegus*	Non-breeding	Flying over	NA	
Spotted flycatcher	*Musciapa striata*				
Starling	*Sturnus vulgaris*	Non-breeding	Overflying	1	Amber List
Swallow	*Hirundo rustica*	Confirmed	Nesting within farm building	1	Amber list
Treecreeper	*Certhia familiaris*	Possible	Species observed in breeding season in suitable nesting Habitat	1	
Woodpigeon	*Columba palumbus*	Possible	Singing male		
Wren	*Troglodytes troglodytes*	Possible	Singing male	2	

No Annex I bird species were recorded during the site survey. A total of 25 species were recorded during the breeding bird surveys. The majority of birds recorded as considered common, woodland edge species which will nest in the mature treelines and hedgerow onsite. However, the mix of habitats onsite provides locally valuable habitats for a range of breeding birds. The proposed development site is dominated by grassland with patchy treelines/hedgerow. Native hedgerow provide valuable feeding/nesting resources for birds i.e. Hawthorn, Elder, Blackthorn, Willow. The grassland within the proposed development size is managed conventionally for cattle grazing. This is a low diversity habitat which does not provide significant resources for breeding birds. Although there is some ponded surface water on grassland and in scrub/woodland during peak rainfall events, these ephemeral habitats do not provide significant breeding resources for birds. There are also heavily channelised

drains within the proposed development site boundary, but likewise they do not provide high value breeding resources for local bird populations.

Five species of conservation concern (Amber list) were recorded during the breeding birds surveys i.e. House martin *Delichon urbicum,* House sparrow *Passer domesticus*, Linnet *Linaria cannabina*, Starling *Sturnus vulgaris* and Swallow *Hirundo rustica.* A Swallow nest was recorded within one of the old farm buildings.

During the survey period, which extended between 2024 and 2026, the management of grassland varied between longer, unmanaged grassland and shorter, managed grassland. However, with the exception of Pheasant, no grassland nesting species were recorded during the site survey.

8.3.9.2 Wintering birds

Winter Bird surveys were carried out in the period in 2024 and 2025. The primary purpose of the study was to assess usage of pasture land within the proposed development site by birds listed as SCI species for the Cork Harbour SPA.

The lands within the proposed development site are used by grazing cattle. But this grassland is not intensively grazed and/or enriched with fertiliser input. The grassland management has varied through the field surveys. The site slopes gently to the south, but there is distinct higher ground that is dry (at the north of the site) and lower lying wet/agricultural grassland areas to the south. While the shorter grassland within the site could potentially provide habitat for wading birds or waterfowl, no such birds were recorded during any of the site surveys.

Birds recorded during winter bird surveys are listed in **Table 8.12**. Most species recorded during the winter bird surveys were common, Green List (Gilbert *et al.* 2021), passerine species such as Wren, Robin, Blackbird, etc. These species were recorded within the grassland and hedgerow/treelines within the proposed development site.

A number of BOCC species were recorded during the winter surveys including Snipe, Meadow Pipit and Starling. Snipe, a red list BOCCI species, was recorded within wet/agricultural grassland habitat at the south of the site. Small-scale ongoing drainage and reclamation of marginal farmland and bog habitats likely to be a key factor in their continued decline of this species. Meadow pipit (a Red list BOCCI species), was recorded within grassland. The main cause of declines is thought to be agricultural intensification. Starling (an Amber list BOCCI species). were recorded foraging within grassland habitats. No SCI species were recorded during the winter surveys. There is no habitat within the red line boundary which would be considered of particularly high value for wintering birds.

Table 8.12 Birds recorded during winter bird survey

Species		SCI Species Cork Harbour SPA	Birds Directive Annex	BOCCI		Notes
			I	Red List	Amber List	
Blackbird	*Turdus merula*					
Blue Tit	*Cyanistes caeruleus*					
Hooded Crow	*Corvus cornix*					
Jackdaw	Corvus monedula					
Meadow pipit	*Anthus pratensis*			x		
Pheasant	*Phasianus colchicus*					
Robin	*Erithacus rubecula*					
Rook	*Corvus frugilegus*					
Snipe	*Gallinago gallinago*			x		
Starling	*Sturnus vulgaris*				x	

8.3.10 Other Species

A search of the NBDC database was carried out to determine if any protected, rare or notable species of invertebrates within 2km of the proposed development site (W66E).

Two rare/threated invertebrates have been recorded within W66E i.e. Minor Shoulder-knot (*Brachylomia viminalis*) and Common Whorl Snail (*Vertigo (Vertigo) pygmaea*) by the NBDC. Whilst no site is without invertebrate interest, it is considered unlikely, given the managed agricultural grassland which dominates the site, that the proposed development site would provide valuable habitat for protected invertebrate species.

The Maglin North Stream is heavily channelised with a straightened channel, a soft mud substrate and large volumes of woody detritus. Flow is generally laminar, with no significant riffle glide sequences or deep pools. The high earth banks are lined, predominantly with Alder. Willow also common. Shade levels are generally high, which suppresses macrophyte growth and as a consequence there is no significant instream aquatic vegetation. Some Fools watercress was recorded where light levels are higher. There is sufficient flow within the stream to support permanent fish populations. Species such as Stickleback and European eel are likely to occur. Brown trout is also likely to occur, although there is an absence of spawning gravels or high value nursery habitat. In general the stream provides sub-optimal habitat for Brown trout with populations likely to be sparse and localised.

Aquatic surveys were completed at two sites downstream of the proposed development site. In general the watercourse has a deep silt substrate and the EPA methodology for ascribing Q values is considered inappropriate. A number of invertebrate species were recorded namely *Tipulidae*, *Lymnea* sp, *Chironomidae, Oligocheate, Asellus sp*. and limited numbers of *Gammerus* sp. Full details of this aquatic assessment are included in **Appendix 8.3** of this EIAR.

A review of the water quality data, which is detailed in the Chapter 7 Hydrology of this EIAR suggests that water quality is generally satisfactory but with considerable variation.

A number of drainage ditches connect to this stream. One prominent drainage ditch runs through the proposed development site, meeting the Maglin North Stream c.60m downstream of the proposed development site. This drainage ditch is shaded and channelized with Willow and Alder along its length. Standing water and rush are present in some areas of the drain, which is likely to dry up during the summer months. This drainage ditch (and other drainage ditches onsite) is unlikely to support permanent fish populations.

8.4 Potential impacts

Annex III of the amended Directive 2014/52/EU requires that the EIAR should assess:

- The magnitude and spatial extent of the impact (for example geographical area and size of the population likely to be affected)
- The nature of the impact
- The transboundary nature of the impact
- The intensity and complexity of the impact
- The probability of the impact
- The expected onset, duration, frequency and reversibility of the impact
- The cumulation of the impact with the impacts of other existing and/or approved projects and
- The possibility of effectively reducing the impact.

Potential effects of the construction, operational and decommissioning phases of proposed development on terrestrial and aquatic biodiversity include:

- Potential effects on habitats
- Potential effects on Badgers
- Potential effects on bats
- Potential effects on Otter
- Potential effects on other mammals
- Potential effects on birds (breeding and wintering)
- Potential effects on amphibians and reptiles
- Potential effects on other species
- Potential effects from non-native invasive species.

When describing changes/activities and impacts on ecosystem structure and function, important elements to consider include positive/negative, extent, magnitude, duration, frequency and timing, and reversibility.

Section 3.7 of the *Guidelines on the Information to be Contained in Environmental Impact Assessment Reports',* (EPA 2022) provides standard definitions which have been used to classify the effects in respect of ecology. This classification scheme is outlined in **Chapter 1** Table 1.1.

8.4.1 Do-nothing Scenario

While there has been no development/significant changes to the site is over 20 years, most of the habitats to be affected have been significantly modified from the natural state by human activity. Grassland habitats at the interior of the site are managed (albeit extensively), through grazing (cattle) and have low ecological value. A more diverse grassland has developed on the margins of the site where grazing is absent. If grassland habitats were left unmanaged a general pattern of succession from grassland to scrub would be expected to occur in areas where grazing is limited. If sufficient time elapsed without development, the unused areas of the proposed development area would be expected to develop a covering of woodland with a mix of native and introduced species. However, in the absence of development, agricultural use would continue and the grassland habitats which dominate the site would continue to be of low ecological value.

8.4.2 Construction Phase

8.4.2.1 Designated sites

Dixon Brosnan have prepared a screening for Appropriate Assessment (AA) and Natura Impact Statement (NIS) report (which accompanies this planning application). This report investigated the potential for the proposed development to have significant effects on European (Natura 2000) sites (SAC/cSAC/SPA) either alone or in combination with other plans or projects. The screening report identified the potential for significant effects on Cork Harbour SPA arising from the proposed development in the absence of mitigation via impacts on water quality during construction.

No pathway for construction effects on NHAs or pNHAs have been identified.

8.4.2.2 Habitats/Flora

Direct impacts on habitats as a result of construction works are described in **Table 8.13**. It should be noted that the value of a habitat is site specific and will be partially related to the amount of that habitat in the surrounding landscape. The classification scheme below for the value of habitats is detailed in the TII publication *Guidelines for assessment of ecological impacts of National Road Schemes* (See **Appendix 8.1**).

The floral species recorded during the botanical survey (See **Appendix 8.2**) are common species which are typical of managed grassland alongside unmanaged areas of scrub and treeline/hedgerow present at the site. No rare species were recorded. The habitats earmarked for removal do not contain specialist flora.

It is noted the construction phase of the Carriganarra LRD will be carried out over a period of approximately 5 years.

Table 8.13 Potential impacts on habitats during construction

Habitats	Ecological value (TII Guidelines)	Potential impacts
Improved agricultural grassland GA1	Local importance (Lower value)	This habitat will be removed to facilitate construction. Neutral, imperceptible, long-term at a local level
Improved agricultural grassland GA1/ Dry calcareous and neutral grassland GS1	Local importance (Lower value)	This habitat will be removed to facilitate construction. Negative, not significant, long-term at a local level
Improved agricultural grassland GA1/ Wet grassland GS4	Local importance (Lower value)	This habitat will be removed to facilitate construction. Negative, not significant, long-term at a local level
Dry meadows and grassy verges GS2/Scrub WS1	Local importance (Higher value)	This habitat will be removed to facilitate construction. Negative, slight, long-term at a local level
Mixed broadleaved woodland WD1	Local importance (Higher value)	This habitat will be removed to facilitate construction. While this is not a mature woodland, this does provide locally valuable habitat to foraging bats (and potentially small mammals such as Hedgehog) and breeding birds. Negative, moderate, long-term at a local level
Dry meadows and grassy verges GS2/ Recolonising bare ground ED3	Local importance (Lower value)	This habitat will be removed to facilitate construction. Negative, slight, long-term at a local level
Hedgerows WL1/ Treelines WL2	Local importance (Higher value)	Some areas of this habitat will be removed to facilitate development. Most treelines/hedgerows at the site are classified as local importance (higher value). A number of treelines/hedgerows within the site will be removed as outlined in SRLA drawing (Existing and proposed tree plan). A number of these treelines/hedgerows are visible on the edition mapping indicating that these are mature boundary habitats, they provide locally valuable habitat to foraging bats (and potentially small mammals such as Hedgehog, Pygmy Shrew etc) and breeding birds. Negative, moderate, long-term at a local level
	H1 Local importance (Higher value) – Partially remove H2 Local importance (Higher value) - Partially remove H3 Local importance (Higher value) - Retain H4 Local importance (Higher value) - Retain H5 Local importance (Lower value) - Remove H6 Local importance (Higher value) - Remove H7 Local importance (Higher value) - Retain H9 Local importance (Higher value) - Remove H10 Local importance (Higher value) - Remove H11 Local importance (Lower value) - Remove H12 Local importance (Higher value) - Retain H13 Local importance (Higher value) - Partially remove G7 Local importance (Higher value) - Retain G8 Local importance (Higher value) - Retain	
Mixed broadleaved woodland WD1/ Scrub WS1	Local importance (Higher value)	This habitat will be removed to facilitate development. While these are largely semi-mature habitats, they provide locally valuable habitat to foraging bats (and potentially small mammals such as Hedgehog, Pygmy Shrew etc) and breeding birds. Negative, moderate, long-term at a local level
Recolonising bare ground ED3	Local importance (Lower value)	This habitat will be removed to facilitate construction. Neutral, imperceptible, long-term at a local level

Habitats	Ecological value (TII Guidelines)	Potential impacts
Stone walls and other stonework BL1/Buildings and artificial surfaces BL3	Local importance (Lower value)	This habitat will be removed to facilitate construction. Negative, slight, long-term at a local level
Lowland depositing river (FW2)	Local importance (Higher value)	Minor works to the banks of the stream will be carried out to facilitate to surface water outfall for the site. The proposed development will connect to the sustainable access corridor extending across the Maglin North Stream. A clear-span bridge will be used to accommodate the stream under the proposed road. Works associated with the bridge could impact surface water quality, including drilling of ground investigation boreholes and construction of foundations (earthworks and pouring of concrete). When constructed, the presence of the stream could potentially cause restrictions during high flows and influence the flooding pattern in the area. Negative, moderate, long-term
Drainage ditch FW4	Local importance (Lower value)	The area between the road (sustainable access corridor) will be raised. This will ultimately change the drainage patterns onsite and drains will be removed as part of the ground clearance works. Negative, slight, long-term

8.4.2.3 Invasive species

No third schedule invasive species were recorded within the proposed development site boundary. Two other invasive species i.e. Buddleia and Wild clematis were recorded at the site. These species were recorded in a scattered distribution, but mainly around scrub areas adjoining the derelict farm buildings. While these species are not listed in SI 477 of 2011 and therefore there is no statutory obligation to remove them, they have been shown to have an adverse impact on landscape quality and native biodiversity. In the absence of mitigation measures, these species could spread further within the site and impact on retained habitats.

8.4.2.4 Non-volant mammals

Otters

The Maglin North stream and (to a lesser extent) the onsite drainage ditch onsite could support fish and amphibians (i.e. Common Frog). However, no signs of Otter activity were recorded within 150m of the proposed development site and there is no evidence that this site is of value for Otter. Otter could potentially pass through the site while travelling between feeding grounds. However the site is surrounded by a busy road network and urban development and is unlikely to be of significant value for Otter. Therefore, no significant disturbance effects on Otter have been identified during construction works.

Construction works (including the bridge construction works) could potentially indirectly affect fish stocks and aquatic invertebrates within the Maglin North Stream and other watercourses downstream, which could potentially provide a food source for Otter. However, bridge construction works will be set back 10m from the stream corridor and there will be no barrier to movement for Otter during construction works. Potential impacts on surface water is discussed in further detail in *Chapter 7 Water (Hydrology & Hydrogeology)*.

The impact on Otter from construction works is predicted to be negative, slight and medium-term at a local geographic level due to construction works.

Other non-volant Mammals

Red fox was recorded onsite. No other mammal species were recorded within the proposed development site. While there were no confirmed field signs of Irish Stoat, Hedgehog or Pygmy Shrew, these species are largely nocturnal, and field signs are less frequently observed than for other mammals. Given the habitats onsite these species are likely to occur within the proposed development site. No signs of Badger were recorded and there is no evidence that this species uses the site.

The habitats to be affected are common and there is no evidence to indicate that the proposed development areas are of particular value for terrestrial mammal species in the context of the surrounding countryside. However, construction works could potentially impact on mammal within the site as well as potentially on commuting routes around the site. Effects on these species during construction due to loss of habitat, habitat fragmentation and increased noise and disturbance are predicted to be negative, slight and medium to long-term at a local geographic level in the absence of mitigation.

8.4.2.5 Volant Mammals (Bats)

The buildings within the proposed development site are in an advanced state of disrepair and there is no evidence of roosting bats within any of these buildings. The more modern farm sheds do however provide some sheltered foraging habitat for local bats i.e. Natterer's bat and Common pipistrelle recorded foraging.

No trees with potential to support significant bat roosts were recorded within the site boundary, although a number of trees provide low to negligible value roosting potential. Whilst no bat roosts were detected, the presence of occasional bats in semi-mature/mature trees earmarked for removal cannot altogether be excluded and in the absence of mitigation and therefore direct impacts on bats cannot be ruled out.

Linear features within the proposed development site boundary, including treelines/hedgerows as well as an area of woodland habitat have moderate local value as bat foraging/commuting areas, linking roost sites outside the site to foraging areas and facilitating the dispersal of bats into the wider landscape. Treelines and mature trees in particular are an important linear

landscape features for commuting bats, as bats prefer to travel in the shelter of such features to reduce predation. Loss of such habitats affects the ability of bats to travel safely from roosting sites to foraging areas.

The results of the bat surveys indicate that low to moderate numbers of bats forage within the internal areas of vegetation (and buildings) which are earmarked for removal. In the absence of mitigation, the construction phase of the proposed development will result in the long-term loss of moderate value bat foraging and commuting habitat. Habitat fragmentation due to the loss of the foraging and commuting habitat has the potential to impact local bat populations.

Construction works will be largely carried out during daylight hours and therefore no significant disturbance impacts from lighting during construction works have been identified. During the winter months, where lighting may be required during daytime hours, bats will be in hibernation and no impact is predicted to occur.

Overall, the loss of a foraging/commuting habitat for bats will reduce the foraging/commuting habitats available for bats. The impact on foraging bats will be negative, slight to moderate in the medium to long term at a local geographic level.

8.4.2.5 Amphibians and reptiles

While the wet/agricultural grassland and drainage ditches onsite could in theory provide potential habitat for Common frog, no signs of Common frog were recorded during the site surveys. The grassland is in active agricultural usage. The drainage ditches are heavily shaded, with slow flows and are unlikely to be of significant value for Common frogs. Given the absence of Common frog from the proposed development site, the impact is predicted to be neutral, imperceptible and long-term at a local level.

There is no suitable habitat for reptiles onsite. No impact on reptiles have been identified.

8.4.2.7 Birds

Breeding birds

The most significant impacts on breeding birds will be the potential for direct impacts during the construction phase through habitat loss, fragmentation and modification. As noted above, the mosaic of extensively managed grassland, alongside areas of hedgerow/treelines, scrub and woodland habitat provides locally valuable habitat for a range of common breeding birds. No ground nesting birds were recorded within the proposed development site. However, Pheasant were recorded onsite as well as Snipe and Meadow pipit during the winter months.

Nesting habitat within woodland, scrub and internal treeline/hedgerow areas will be removed to facilitate development. Buildings which currently hold breeding Swallows will also be removed. In the absence of mitigation, potential impacts include disturbance and injury to eggs, young and nests, and long-term loss of potential nesting sites habitat.

During the construction phase increased noise and disturbance is likely to disturb and/or displace some breeding birds from the site. The duration of works (5 years) means that works will overlap with several breeding bird seasons. During construction works, noise levels will fall off quickly outside the site boundary. The majority of species recorded within the site are woodland edge species which are typically recorded on this urban fringe habitat. These species are likely to continue to breed and/or forage within the retained treeline/hedgerow habitats. Many of these species may be habituated to human activity and disturbance. Given the mobile nature of birds, the common nature of habitats within the site and the availability of alternative foraging habitat in the immediate vicinity, the impact from disturbance will be slight to moderate during the construction phase at a local level.

In the absence of mitigation, potential impacts on breeding birds include medium-term disturbance and injury to eggs, young and nests, and long-term loss of potential nesting sites and foraging habitat. The impact on breeding birds will be negative, slight to moderate and medium-term at a local level.

Wintering birds

Based on surveys conducted during 2024 and 2025, the proposed development site does not provide significant habitat for wintering wading birds or waterbirds.

Common resident birds, such as Blackbird, Robin and Wren, which use habitats within the proposed development site during the winter months are already subject to disturbance from urban development in the vicinity and are likely to be habituated to low levels of human disturbance. However, Red list species such as Snipe and Meadow pipit are unlikely to use the site following removal of wet/agricultural grassland/semi-natural grassland habitats.

During the construction stage, there may be short-medium term increases in disturbance, but these will be confined to the proposed development site and will not cause significant disturbance in the surrounding area. However, there will be a short-medium term disturbance of wintering habitat for these local bird species during construction works.

Impacts on wintering birds (resident birds) during construction will be negative, slight and medium-term at a local level.

8.4.2.8 Other species

During construction, there is potential for siltation and pollution of the Maglin North Stream and the onsite drainage ditch, from runoff during construction works in the absence of mitigation. In particular the bridge construction works could impact on water quality and bank stability around the stream. This could result in impacts on water quality and aquatic ecology downstream of the proposed development site. It is noted no instream works are required.

The removal of areas of woodland, scrub, treeline/hedgerows and semi-natural grassland will remove areas of habitat for terrestrial invertebrate species. Areas of native and non-native treelines and hedgerows at the site will be retained within the north and west of the site. The impacts on terrestrial invertebrates will be negative, slight and medium-term at a local level.

8.4.3 Operational Phase

8.4.3.1 Designated sites

DixonBrosnan prepared a screening for Appropriate Assessment (AA) and Natura Impact Statement (NIS) report (which accompanies this planning application). This report investigated the potential for the proposed development to have significant effects on Natura 2000 sites (SAC/cSAC/SPA) either alone or in combination with other plans or projects. The screening report identified the potential for significant effects on Cork Harbour SPA arising from the proposed development in the absence of mitigation via impacts on water quality during operation.

No significant effects from wastewater discharges have been identified (See AA/NIS) and therefore, there is no potential for adverse effects on the Lee Valley pNHA.

8.4.3.2 Habitats/Flora

A landscape masterplan has been prepared regarding the proposed development and is included as Appendix 2-6 of this EIAR, which includes a diverse mix of native species ensures year-round habitat availability.

Areas of new and replacement habitat has been created, considering the local flora and fauna, to provide biodiversity enhancement that is valuable locally as well as making important contributions towards regional and national priorities for nature conservation.

8.4.3.3 Invasive species

No operational impacts identified.

8.4.3.4 Non-volant mammals

Increased activity and human presence and additional lighting has the potential to disturb or displace other mammal species such as Hedgehog, Pygmy Shrew and Irish Stoat from favoured foraging habitats during the operational phases. The landscape scheme, including extensive tree planting, meadows and pollinator friendly plants, which will create additional areas of cover for small mammal species. These linear features also function as essential mammal corridors, facilitating the safe movement of species such as Hedgehogs and small mammals between feeding and nesting areas. Maintaining dense, continuous ground vegetation within these hedgerows further enhances cover and reduces habitat fragmentation across the landscape.

However, increased activity and disturbance from residential areas within the site will mean that these habitats are less valuable for non-volant mammals. Impacts on other mammals during operation are predicted to be negative, slight and long-term at a local level.

8.4.3.5 Volant mammals

Habitat fragmentation due to the loss of the foraging and commuting habitat has the potential to impact local bat populations during the operational phase of the proposed development. The landscape plan is an integral part of the project design and has followed ecological best practice to create connectivity with the wider landscape.

The tree planting strategy, which includes , native tree and hedgerow planting will enhance retained habitats, create new linear foraging habitats within the site and retain connectivity with the wider landscape in the long-term. New habitats within the proposed development site are likely to retain bat foraging/commuting habitat at the site in the medium to long term. However, in the short term, there will be a loss of habitat with the removal of woodland, scrub, treeline/hedgerow.

Lighting deters some bat species in particular Myotis species such as Daubenton's Bat, from foraging (Azam *et al.* 2018). Studies have shown that illumination levels as low as 0.06 lux can influence the behaviour of bats. Even a full moon night (0.02 lux) can reduce bat activity within more sheltered, darker wildlife corridors and foraging areas (e.g., woodlands). It is noted that Pipistrelle species appear to be more tolerant of light and disturbance (Speakman 1991; Stones et al. 2009; Haffner 1986). Leisler's Bats will also opportunistically feed on such insect gatherings in lit areas (Bat Conservation Ireland 2010). However, it is noted that more recently research suggests that even in light opportunistic foraging species, foraging activity may be impacted by increased lighting (Hooker *et al*. 2022).

The lighting scheme for the proposed development (Appendix 5-3 of this EIAR), has considered best practice, as published by the UK Bat Conservation Trust (2018) to minimise the impact of outdoor lighting upon bat populations. However, lighting requirements for this development will mean that light spillage along internal habitats in particular, will reduce their habitat value for foraging and roosting bats. The lighting scheme has been designed to retain dark areas around the external boundaries.

Overall, the loss of areas of internal habitats within the site will have a slight impact on local bat populations. The impact on bats during the operational phase is predicted to be negative, slight to moderate and long-term at a local level.

8.4.3.6 Amphibians and Reptiles

The removal of the drainage ditches and/or areas of wet/agricultural grassland will remove potential habitat for Common frog. However, as discussed above, no signs of Common frog were recorded during the 2-year survey period and therefore impacts on Common Frog are unlikely.

The creation of infiltration basins within the site will provide some potential replacement habitat within the site. However, increased activity and disturbance from residential areas within the site will mean that these habitats are less valuable for amphibians. Overall, the drainage of the site will have a neutral, imperceptible and long-term impact on Common frog at a local level.

No operational impact on reptiles has been identified.

8.4.3.7 Birds

The landscape plan is an integral part of the project design and has followed ecological best practice to prevent habitat fragmentation, create connectivity with the wider landscape and retain breeding and foraging habitat for a range of bird species. The tree planting strategy, which includes Oak, Scots pine, Birch, Hawthorn, Blackthorn, Holly, will enhance and create nesting and foraging areas for breeding birds. New habitats within the proposed development site are likely to retain breeding bird diversity at the site in the medium to long term. However, in the short term, there will be a loss of habitat with the removal of nesting habitat i.e. woodland, scrub, treeline/hedgerow.

Increased activity and human presence and additional lighting has the potential to disturb or displace other birds from retained habitats during the operational phases. However, the majority of species recorded during the site surveys are typical of the urban landscape e.g. Robin, Blackbird, Chaffinch, House sparrow etc. These species are likely to habituate to the residential setting and continue to use habitats within the proposed development site.

Based on winter surveys the proposed development site does not provide significant habitat for wintering wading birds and waterbirds. No SCI birds were recorded during the site surveys. However, the removal of wet/improved grassland and unmanaged areas of undisturbed grassland will remove wintering habitat for small numbers of Snipe and Meadow pipit.

Operational impacts on birds are predicted to be a negative, slight to moderate and long-term at a local level.

8.4.3.8 Other Species

SuDS measures as outlined in *Chapter 7 Water (Hydrology & Hydrogeology)* have been designed to ensure that there will be no change in runoff rates to the local watercourses. During operation, any hydrocarbons released from site will pass through a hydrocarbon interceptor before being discharged to the Maglin North Stream. Silt control measures will also be implemented during operation. The surface-water drainage network will include the installation of dedicated attenuation facilities, as well as an infiltration basin, filter drains and tree pits upstream of the proposed outfall to the Maglin North Stream, to attenuate discharges to the undeveloped greenfield run-off rates with the operation of proprietary hydro-brake flow-control devices.

The attenuation facility is sized on the basis of a design storm with a 100-year return period and an additional 20% allowance for the effect of climate change.

The Maglin North Stream is of low to moderate value for fish species. The proposed sustainable access corridor will extend across the flood plain as mapped in the Ballincollig drainage study. It will displace flood storage capacity and the bridge across the river could affect the river hydraulics. When constructed, the presence of the stream could potentially cause restrictions during high flows and influence the flooding pattern in the area. However as detailed in *Chapter 7 Water (Hydrology & Hydrogeology)* the operational design measures, will ensure the impacts on fish and aquatic invertebrate species downstream are neutral, imperceptible and long-term at a local level.

Slight impacts on terrestrial invertebrates has been identified during operation, following the removal of internal habitats. However, new habitats created in the landscape design will have a neutral, imperceptible and long-term impact at a local level.

8.5 Mitigation

8.5.1 Construction Phase

The mitigation measures have been drawn up in line with current best practice and include an avoidance of sensitive habitats at the design stage and mitigation measures will function effectively in preventing significant ecological impacts. The following mitigation measures will be implemented.

8.5.1.1 Water protection

Water protection measures are included in Chapter 6 Lands, Soils and Geology and in *Chapter 7 Water (Hydrology & Hydrogeology).*

8.5.1.2 Lighting

Lighting mitigation measures will follow *Bats & Lighting Guidance Notes for: Planners, engineers, architects and developers* (Bat Conservation Ireland, 2010). The following measures will be applied in relation to construction works lighting:

Lighting will be provided with the minimum luminosity necessary for safety and security purposes. Where possible, lighting will be restricted to the working area and using the cowl and angling noted above, will minimise overspill and shadows on sensitive habitats outside the construction area

During construction, lighting will be positioned and directed so that it does not to unnecessarily intrude on adjacent ecological receptors and structures used by protected species. The primary area of concern is the potential impact on the retained treelines and hedgerows.

Site lighting will typically be provided by tower mounted temporary portable construction floodlights. The floodlights will be cowled and angled downwards to minimise spillage to surrounding properties. The following measures will be applied in relation to site lighting:

- Lighting will be provided with the minimum luminosity sufficient for safety and security purposes. Where practicable, precautions will be taken to avoid shadows cast by the site hoarding on surrounding footpaths, roads and amenity areas;
- Where possible, construction lights will be switched off when not in use; and
- Lighting will be positioned and directed so that it does not to unnecessarily intrude on adjacent ecological receptors and structures used by protected species. The primary area of concern is the potential impact on the retained treelines and hedgerows. There will be no directional lighting focused towards these sensitive habitats and cowling and focusing lights downwards will minimise light spillage.

Works will primarily take place during hours of daylight to minimise disturbance to any nocturnal mammal species.

8.5.1.3 Protection of habitats

The Wildlife Act 1976, as amended, provides that it is an offence to cut, grub, burn or destroy any vegetation on uncultivated land or such growing in any hedge or ditch from the 1st March to the 31st August. Exemptions include the clearance of vegetation in the course of road or other construction works or in the development or preparation of sites on which any building or other structure is intended to be provided. Where possible, vegetation will be removed outside of the breeding season and in particular, removal during the peak-breeding season (April-June inclusive) will be avoided.

The Maglin North Stream runs along the full extent of the western site boundary and it is important that construction activities do not result in pollution of this watercourse, either through siltation, which interferes with water flow, vegetation growth and aquatic fauna, or pollution (e.g. chemical). Refer to *Chapter 7 Water (Hydrology & Hydrogeology)* for further details on mitigation measures for water.

To prevent incidental damage by machinery or by the deposition of spoil during site works, treelines and hedgerows which are located in close proximity to working areas will be clearly marked and fenced off to avoid accidental damage during excavations and site preparation. Detailed tree protection measures are included in Tree Survey (Geotree) which accompanies this application. Tree protection measures will follow BS 5837: 2012 and the 'Tree Constraints Plan' included in Tree Survey (Geotree) will ensure that root protection areas (RPAs) are identified and protected throughout construction works. All tree protection measures will be installed prior to the commencement of any construction works.

8.5.1.4 Bats

During the site works, general mitigation measures for bats will follow Marnell *et al.* (2022), Kelleher and Marnell (2006) and TII (2005c). These documents outline the requirements that will be met in the pre-construction (site clearance) stage to minimise negative effects on roosting bats or prevent avoidable effects resulting from significant alterations to the immediate landscape. All mitigation measures including detailed method statements will be agreed with the NPWS prior to commencement of works, which could affect any bat populations on site.

All buildings onsite will require demolition/refurbishment to facilitate the development. No signs of bats were recorded within these buildings. However, as a precautionary measure, the following measures will be implemented prior to and/or during demolition. Mitigation measures will be agreed with the NPWS prior to any demolition works and will include the following:

- In all cases immediately in advance of demolition/refurbishment works a bat specialist will undertake an examination of the buildings. If bats are present at the time of examination it is essential to determine the nature of the roost (i.e., number, species, whether it is a breeding population) as well as its exact location.
- If bats are recorded in building earmarked for demolition/refurbishment, special mitigation measures to protect bats will be put in place and a license to derogate from the conservation legislation will be sought from the NPWS.

- The contractor will take all required measures to ensure works do not harm individuals by altering working methods or timing to avoid bats, if necessary.
- If roosting habitat for bats is removed, replacement habitat will be provided.

A number of trees will be removed prior to construction (See SRLA drawing (Existing and proposed tree plan). No signs of roosting bats were recorded in any of the trees onsite. While it is noted that mature/semi-mature trees with the potential to be of significant value as bat roosts are absent from the site, it is noted that small roosts within mature trees with dense ivy can be difficult to detect and may be used sporadically. Bats can use trees as temporary roosts and therefore the presence of occasional bats cannot be altogether excluded. Therefore, the following measures will be implemented during the removal of semi-mature and mature trees.

- The project ecologist will work with the contractor to ensure that trees earmarked for retention are adequately protected (as per Detailed tree protection measures are included in Tree Survey (Geotree) which accompanies this application).
- Tree-felling will ideally be undertaken in the period September to late October/early November. During this period bats are capable of flight and may avoid the risks of tree-felling if proper measures are undertaken.
- Soft-felling will be implemented i.e. Felled trees will not be mulched immediately. Such trees will be left lying several hours and preferably overnight before any further sawing or mulching. This will allow any bats within the tree to emerge and avoid accidental death. The bat specialist will be on-hand during felling operations to inspect felled trees for bats. If bats are seen or heard in a tree that has been felled, work will cease and the local NPWS Conservation Ranger will be contacted.
- Tree will be retained where possible and no 'tidying up' of dead wood and spilt limbs on tree specimens will be undertaken unless necessary for health and safety.
- Treelines outside the proposed development area but adjacent to it and thus at risk, will be clearly marked by a bat specialist to avoid any inadvertent damage.
- During construction directional lighting will be employed to minimise light spill onto adjacent areas. Where practicable during night-time works, there will be no directional lighting focused towards watercourses or boundary habitats and focusing lights downwards will be utilised to minimise light spillage.
- If bats are recorded by the bat specialist within any trees no works will proceed without a relevant derogation licence from the NPWS.

As noted in **Section 8.5.1.2**, lighting mitigation measures will follow recommendations outlined in Bat Conservation Ireland (2010) and Bat Conservation Trust (2018).

8.5.1.5 Birds

As noted in **Section 8.5.1.3**, where possible, vegetation (and building where Swallows/other birds are nesting in buildings) will be removed outside of the breeding season and in particular, removal during the peak-breeding season (April-June inclusive) will be avoided. This will also minimise the potential disturbance of breeding birds outside of the proposed development site boundary. If works are carried out during the breeding season, a pre-construction survey will be carried out by the project ecologist and if birds are detected appropriate mitigation measures will be implemented. Where possible, vegetation will be removed outside of the breeding season and in particular, removal during the peak-breeding season (April-June inclusive) will be avoided. This will also minimise the potential disturbance of breeding birds outside of the proposed development site boundary.

8.5.1.6 Biodiversity Enhancement Measures

8.5.1.6.1 Bats

Although there are mature/semi-mature trees within the proposed development site, generally they lack the structural elements that would make them suitable for roosting bats. Therefore, the provision of bat boxes suitable for the species recorded within the site are recommended. The boxes have been selected to provide a range of roosting opportunities for different species and colony sizes. They will be sited on existing trees. The boxes will be installed by the project ecologist considering relevant factors including foraging resources, commuting routes, future landscape development, and lighting and will be regularly checked for usage as part of an ongoing ecological monitoring programme. The location of these bat boxes are detailed in the Landscape Masterplan prepared by Simon Ronan Landscape Architecture included in Appendix 2-6 of this EIAR.

Vincent Pro Bat Box

Two Vincent Pro bat boxes will be provided. This box features three vertical chambers of different sizes, providing ideal roosting space for a variety of species. Beneath the crevice entrances is a ladder which provides a rough surface for bats to land. Limited cleaning is required for these boxes as the droppings will fall out of the bottom of the chambers. The front and top of the box are black which helps the box to absorb heat. This bat box can be used by Leisler's, Common Pipistrelle, Soprano Pipistrelle, Brown long-eared, Natterer's and Whiskered Bat.



Vincent pro bat box



Improved Roost-Maternity Bat Box



Bat Box 1FF



Bat Colony Box 3FF



Hedgehog dome



Hedgehog highway example



Example of installed Swift bricks in use.

Improved Roost-Maternity Bat Box

Two improved Roost-Maternity Bat Box will be provided. This box is suitable for larger roosts or maternity groups of the small crevice-dwelling bats such as pipistrelles. This has three separate crevices, each with different temperature characteristics and a wide entrance with accurately sized opening. Ideal for Pipistrelles and deters unwelcome birds etc. Internal ceramic heat sinks ensure improved temperature stability in crevices.

Bat Box 1FF

Two Bat Box 1FF will be provided. Schwegler's 1FF Bat Box provides crevice-like roosting conditions for all crevice-inhabiting bat species (such as the Pipistrelle bat). This box has proven to be highly effective where it has been used, from gardens and forests to urban buildings and balconies. With a radial recess as well as four additional support points, the 1FF is adaptable enough to be secured to houses, garages, tree trunks, towers or walls. This bat box does not need to be cleaned regularly, as the open bottom allows droppings to fall out. There is also a large inspection flap provided.

Bat Colony Box 3FF

Three Bat Colony Boxes (3FF) will be provided. The Schwegler 3FF Bat Colony Box is made with durable 'woodcrete' and comes with a galvanized steel wire hanger. Suitable for a wide range of bat species common in Ireland. This large box can accommodate even cave dwelling species and offers plenty of room for large colonies to move freely within the box. This lets them regulate the temperature in the box (huddling close together in cold and spreading out in higher temperatures). It is self-cleaning as droppings can freely fall out even if the box is densely occupied. If inspections are then the inspection hatch allows for easy access without disturbing the colony.

8.5.1.6.2 Other Mammals

Hedgehog boxes/highways.

Hedgehog highways will be provided between the properties to allow free movement of small mammals through the gardens/ development. This requires a small hole (c. 13cm by 13cm square) to be included at the base of garden fencing to provide passage for Hedgehogs along the boundary of development site.

Four SCHWEGLER Hedgehog Dome (or similar) will be provided. These will be located under the retained hedgerow/treeline habitat the west and south of the site. This dome encourages Hedgehogs to settle in a particular area and provides year-round shelter, including during the winter months. This will be located somewhere protected from wind and rain. Ideally this will be filled with hay (supplied with the dome) but alternatively use dry leaves and straw, as well as cut up newspaper and wood shavings.

These will be located adjacent or within suitable habitat but will not be situated near internal or external roads. The location of hedgehog boxes is shown in the Landscape Masterplan included as **Appendix 2-6** of this EIAR.

Birds

Swift

The swift is a Red List bird of conservation concern in Ireland because its population has declined by over 40% in the last 15 years. Conservation actions across the country are helping to recover populations. Swifts are faithful to their nest sites. Nest box projects, especially built-in nest boxes, can provide safe long-term homes for new breeding pairs of Swifts.

Commercial Swift nest bricks are made from hollow brick or concrete composite designed to allow access by Swifts and manufactured to modern building regulation standards. They can be integrated into the walls of buildings during the construction phase.

Swifts look for nest sites at locations with established colonies. Swifts are known to occur in the Ballincollig area (Source NBDC), although none were recorded during the site surveys.

Twenty swift bricks will be positioned on two apartment buildings at the south-east of the proposed development site as per the *Proposed bird nesting locations* plan prepared by Deady Gahan Architects (See **Appendix 8-5** of this EIAR. Manthorpe swift bricks will be used.

- Bricks will be located at a minimum of 5m above the ground
- There will be no overhanging vegetation or obstacles in front of the bricks
- Bricks will be grouped, to form a colony style layout.

Swift bricks are designed to fit alongside standard building materials and will be fitted by the existing onsite personnel. However, an ecologist will discuss the positioning of bricks within site personnel prior to installation.

To increase the chances of attracting Swifts to a new nest location, a recording of a Swift call should be played. Swift calls can be broadcast from a small speaker placed as close as possible to the nest box or brick. New nest box sites where no lures are played are less likely to be successful in attracting nesting Swifts. This will be carried out under licence of the National Parks and Wildlife Service (NPWS). A proven call recording is available from Swift Conservation Ireland.

The following procedures will be followed during the playing of calls:

- Volume will be set at a 'normal' noise level. Playing the call too loudly will distort the sound.
- Swifts look for nest sites during two specific time periods: in May and June (to nest that year) and in June and July (to nest the following year). The latter group are younger birds.

The following recommended times will be used:

- from dawn, for 3-6 hours
- in the evening, from 6.00pm to dark.

Swifts will only look for nest sites in fine weather. Playing the calls in cold, wet weather is ineffective.

Nest boxes used by swifts do not require the cleaning and maintenance required by some other species. However, every few years check the bricks will be checked for signs of possible damage.



1B Schwegler nest box



1ZA Schwegler wren roundhouses



Treecreeper FSC Nest Box



Log pile example



Examples of insect hotels



Examples of insect hotels

Swallow/House Martin

Ten house martin artificial nest cups and ten Swallow nest cups will be installed onsite on a number of dwellings and duplexes (See Proposed bird nesting locations plan prepared by Deady Gahan Architects (See **Appendix 8-5** of this EIAR. Details will follow the guidance as per House Martin Conservation UK & Ireland *'Artificial nest cup installation guide'*.

- All nest cups will be placed at a minimum height of 3m.
- Nest cups will be installed under the apex, soffits and/or eaves of the buildings.
- Nest cups will have a north, east or westerly aspect.
- House martins and Swallows leave droppings which can be an issue for some households, but they are easily removed with a hosepipe or brush.

Other breeding birds

In order to enhance the site for nesting birds eight nesting bird boxes (a range of bird box types) will be installed at the proposed development site. Three 1B Schwegler nest box will be installed high on retained trees. The 1B nest boxes will be installed at a height of 1.5 metres whilst the large bird nest boxes should be positioned at least 3m in height. Three 1ZA Schwegler wren roundhouses will be located in hedgerows, thickets and overgrown areas. The 1ZA will be hung in hedgerows along the northern and western boundaries.

Treecreepers like to nest in narrow gaps or clefts such as behind the bark in mature trees. Many woodlands and gardens do not possess suitable habitats such as these due to changes in woodland management, so the addition of a specialist nest box such as this Treecreeper FSC Nest Box provides an excellent alternative. Two Treecreeper FSC Nest Box will be provided. This box is manufactured from FSC certified wood and has a hinged lid for inspection or cleaning. The shape of the box is specially designed to be suitable for this particular bird, fitting snugly against a tree trunk with an entrance right next to the bark. The location of these breeding bird boxes are shown in **Appendix 8-5** of this EIAR.

Log Piles/Loggeries

Building invertebrate habitats can provide shelter to many beneficial insects and offer a great foraging habitat for birds and other mammals.

Dead wood is one of the most valuable habitats for urban wildlife. The decline of the availability of deadwood is linked to the decline of many woodland birds due to the loss of foraging opportunities provided by this habitat.

Key points

- Install the logs vertically
- Site the loggery in a shaded part of a site
- Do not use concrete to bed the logs in. The beetles require the logs to be in contact with the soil
- Do not use well-rotted logs as they will have little wood left as food

Four log piles will be installed under retained hedgerow and treeline habitats. Log piles are suitable for invertebrates, small mammals and birds and can be easily installed in wooded areas of parks or open spaces. They are really just stacks of logs piled up and allowed to rot down. Left undisturbed they will support a good range of biodiversity. The location of log piles is shown in the Landscape Masterplan included as **Appendix 2-6** of this EIAR.

Insect hotels

Three insect hotels will be installed within the meadow grassland areas. Insect hotels are excellent for attracting a wide range of invertebrate species. Perforations allow for insect access and a chamber with bamboo below for solitary bees. This can be positioned anywhere in the site where pollination is to be encouraged. The nesting tubes are ideal for solitary bees to build their nests in, the vertical slots are designed to encourage butterflies, other refuge holes are perfect for ladybirds and lacewings and the pinecones offer an excellent habitat for a range of other species. The location of insect hotels is shown in the Landscape Masterplan included as **Appendix 2-6** of this EIAR.

03.3 Ecological Connectivity



Preserving ecologies through strengthening existing green connections

The continuity of the hedgerows on the site plays a vital role in maintaining ecological connectivity, supporting wildlife movement, and enhancing biodiversity. By preserving and extending these natural corridors, the site provides critical habitats for various species, while offering residents a unique opportunity to engage with nature.

These linear features also function as essential mammal corridors, facilitating the safe movement of species such as hedgehogs and small mammals between feeding and nesting areas. Maintaining dense, continuous ground vegetation within these hedgerows further enhances cover and reduces habitat fragmentation across the landscape.

Legend:

Hedgehog Domes







Figure 8.4 Proposed Ecological Connectivity Strategy

03.4 Species Mitigation



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Species-specific mitigation measures have been incorporated into the design to avoid, reduce, and offset potential impacts on local biodiversity. These measures include the provision of artificial roosts and nesting units, enhancement of habitats through sensitive planting, and careful siting of ecological features to ensure their effectiveness and long-term sustainability.

Legend:

- Bat Boxes
- Bird Boxes
- Bee Boxes
- Insect Hotels
- Log Piles
- Existing trees to be retained
- Proposed trees
- Existing Hedgerow to be retained
- Proposed Native Hedgerow







Figure 8.5 Proposed Species Mitigation Strategy

8.5.1.6.3 Common Frog

Prior to any works being a carried out on drainage ditches and/or wet/agricultural grassland , a search of suitable areas shall be carried out by the supervising ecologist prior to the works. If frog spawn/tadpoles are found, a licence from NPWS will be obtained to translocate the frog spawn to alternative habitat.

8.5.1.6.4 Invasive species

Mitigation measures are summarized here. Detailed measures are included in Appendix 8.6. Invasive species management plan.

Buddleia Removal

As noted in **Section 8.3.5**, there is no statutory obligation to remove Buddleia. However, Buddleia will be removed as part of the pre-construction/construction works.

Buddleia is straightforward to control using a mixture of mechanical removal and herbicide treatment.

Buddleia is a plant that favours disturbed sites, physical grubbing of plants can provide ideal conditions for the germination of seeds. Therefore, care needs to be taken to ensure re-vegetation of controlled areas is undertaken swiftly. The branches of Buddleia are capable of rooting as cuttings, so care should also be taken to ensure material is disposed of in a manner to avoid this risk.

As mature plants occur within the proposed works area, the preferred method of treatment is cutting back to a basal stump or grubbing out followed by chemical treatment. Herbicide applications will take into account sensitive receptors such as watercourses and locally important habitats such as woodland and must only be applied in line with manufacturers recommendations.

Recommended practice for the application of herbicides requires cutting back of plants to a basal stump during active growth (late spring to early summer) which is then treated (brushed on) immediately with a systemic weed killer mix. Foliar application of triclopyr or glyphosate may be adequate for limited infestations of younger plants but should be followed up at 6 monthly interval until the supervising ecologist can certify that the plant is no longer extant within the works area. An Invasive Species Management Plan prepared by DixonBrosnan is included as **Appendix 8-6** of this EIAR.

Wild Clematis Removal

As noted in **Section 8.3.5**, there is no statutory obligation to remove Wild Clematis. It is noted that this plant is present on a number of mature and semi-mature trees earmarked for retention and removal of Wild Clematis within these areas will be made on a case-by-case basis with the aim of protecting mature and semi-mature trees. However, should it be concluded that Wild Clematis at the proposed development site should be removed, the following treatment methods will be used.

Wild Clematis is straightforward to control using a mixture of mechanical removal and herbicide treatment. Alternative methods of control are discussed below.

This species can be controlled by both mechanical control and herbicides, though typically its control relies on a combination of both i.e., cut-stump application.

Small seedlings can be readily pulled by hand. Larger stems have to be cut, the roots grubbed out and the material placed off the ground so it cannot take root again.

A number of chemicals have been used effectively against Wild Clematis in New Zealand, including glyphosate, though control invariably takes more than one year. Control should be undertaken during active growth. For mature plants, the vines should be cut back to ground level or waist height in winter or spring and the subsequent re- growth can be then foliar sprayed. This method will avoid impacting on the host plant the vine may be covering.

For larger specimens, the plant can be cut at the base with a straight horizontal cut. Herbicide is then applied immediately to the wound with a paint brush, eye dropper or small squeeze bottle. On larger stems it is only necessary to wipe herbicide around the outer rim of the cut. The plants should be left in situ until they are dead. Where plants are not killed in a single application, wait until re growth before re spraying.

Triclopyr can also be used as a foliar spray or as a spot treatment. This should be applied in summer during active growth before senescence, when it is not very hot or during drought. Following control, regular monitoring will be required with appropriate follow-up to deal with re- growth or new seedling germination over a period of 2–3 years.

8.5.2 Operational Phase

8.5.2.1 Lighting

The scheme proposes public lighting to all roads and paths within the development. The public road lighting is designed to EN 13201 and British Standard BS 5489 utilising the lighting design software package *Lighting Reality*. This design package is used to select appropriate lantern types and to optimise the lighting design. The selected lanterns are designed and manufactured to comply with EN 13201 and incorporate IP-rated optical compartments and robust gear housings suitable for public lighting applications. The proposed Lighting Strategy prepared by Molloy Consulting Engineers is included in **Appendix 5-3** of this EIAR.

The primary lighting mitigation which will be implemented for this project relates to bats, as these are considered the most sensitive species in relation to night-time lighting. It is noted however that the mitigation proposed will also lessen potential impacts in relation to other nocturnal species such as Badger and Otter. The lighting scheme has been developed having regard to best practice guidance, including that published by the UK Bat Conservation Trust (2018), in respect of mitigation strategies to minimise the impact of outdoor lighting upon bat populations. The following mitigation measures have been incorporated into the site lighting plan as specified in the lighting drawings and supporting calculations:

- The location of lighting within the greenfield area has been confined to internal roads and footpaths only;
- Warm white LED luminaires with a correlated colour temperature of 2,700 kelvin have been specified to reduce potential disturbance to bat activity while maintaining appropriate levels of public safety;

  LED luminaires have been specified due to their sharp cut-off optics, good colour rendition, energy efficiency and dimming capability;
- Column heights and luminaire positions have been carefully considered to minimise light spill beyond the site boundary;
- Lanterns are of the fully cut-off type with no light output above the horizontal plane;
- Screening by existing vegetation and proposed planting will assist in limiting light spill towards boundary habitats; and
- Exterior lighting will be controlled via photocell and time-based control systems located within the public lighting supply infrastructure.

8.6 Cumulative impacts

A search of the Cork City Council and An Bord Pleanála planning databases was carried out to identify any potential cumulative effects on biodiversity. The proposed development site is located on the edge of Ballincollig town. Outside the site, lands are dominated by improved agricultural grasslands with a largely rural landscape.

The cumulative impacts of the planned, proposed development and nearby consented projects are discussed in **Table 1.1** of this EIAR. Based on this, no significant cumulative impacts with the proposed development have been identified.

The potential cumulative impacts of the relevant plan for the area were assessed, which is considered to be the Cork City Development Plan 2022. The assessment of the potential impacts on the environment of the Cork City Development Plan 2022 was undertaken utilising the Strategic Environmental Objectives (SEOs) which are detailed in Table 5.1 of the CDP's Strategic Environmental Assessment. The potential cumulative impacts of the Plan were assessed having regard to these SEO's. Table 5.1 of the SEA identifies the SEO's for 'Biodiversity, Flora and Fauna' as being to.

- To preserve, protect, maintain and, where appropriate, enhance the terrestrial, aquatic and soil biodiversity, particularly EU designated sites and protected species.
- Ensure no adverse effects on the integrity of any European site, with regard to its qualifying interests, associated conservation status, structure and function.
- Safeguard national, regional and local designated sites and supporting features which function as stepping stones for migration, dispersal and genetic exchange of wild species
- Enhance biodiversity in line with the National Biodiversity Action Plan and its targets.
- To protect, maintain and conserve the City's natural capital.

Table 7.5 of the CDP's Strategic Environmental Assessment, 'Comparative Assessment of each of the Alternatives against Strategic Environmental Objectives' indicates that Alternative/Scenario 3 'Compact Liveable Growth', the 'Selected Scenario' has positive interactions with the status of the SEO's for 'Biodiversity, Flora and Fauna'.

8.7 Residual Effects

8.7.1 Designated sites

Potential impacts on designated Natura 2000 sites (SAC/cSAC/SPA) are specifically addressed in a Report for Screening for Appropriate Assessment (AA) and Natura Impact Statement (NIS) which has been submitted as part of this application. This report concluded the following:

It has been objectively concluded following an examination, analysis and evaluation of the relevant information, including in particular the nature of the predicted effects from the proposed development and with the implementation of the mitigation measures proposed, that the construction, operation and decommissioning of the proposed development will not adversely affect (either directly or indirectly) the integrity of any European site, either alone or in combination with other plans or projects. There is no reasonable scientific doubt in relation to this conclusion. The competent authority will make the final determination in this regard.

Similarly, following the implementation of mitigation measures, no adverse effects on NHAs/pNHAs will occur.

8.7.2 Habitats/Flora

Habitat protection measures will be implemented throughout construction works to protect habitats earmarked for retention. A 10m buffer zone will be implemented along the Maglin North Stream to ensure there is no impact on aquatic habitats and adjoining treelines/hedgerows. The use of a clear-span bridge to connect to the Maglin Sustainable Access Corridor will prevent direct impacts on the Maglin North Stream and operational surface water design/SuDS measures will ensure that no significant effects on local hydrology will occur.

A range of biodiversity enhancements have been specified to provide replacement habitat for existing species e.g. Hedgehog, Robin, Swallow etc and new habitats for other species e.g. Swift, bats etc.

Areas of new and replacement habitat has been created, considering the local flora and fauna, to provide biodiversity gain that is valuable locally as well as making important contributions towards regional and national priorities for nature conservation. Based on SRLA calculations, an area of 8003.2m2 of tree group will be removed but the creation of an ecological buffer of 8016.8m2 will replace this habitat in the long-term leading to a net gain of 119.8m2. There will also be a net gain of trees, with 2,101 trees planted and 18 trees removed. A net gain of hedgerow will be achieved; 355.9m removed and 355.4m proposed (and 385.2m retained). Net Biodiversity loss/gain calculations are provided in **Appendix 2.6** of this EIAR. Native planting schemes are designed to support pollinators and maintain ecological health throughout the year. In the long-term, as newly planted habitats mature, they will provide replacement habitats within the site.

Mitigation measures, outlined in **Section 8.5** will be implemented and inspected by a suitably qualified and experienced project ecologist to ensure that no adverse impacts on aquatic habitats during construction works.

In the short to medium term, the impacts from habitat loss will be negative, moderate and local. As newly created habitats mature, the impact will be reduced to negative, slight and local.

8.7.3 Invasive species

No residual impacts have been identified.

8.7.4 Non-volant mammals

Some areas of locally valuable habitat will be removed including woodland, scrub and hedgerow/treelines. While there is no evidence to indicate that the proposed development is of particular value for mammal species in the context of the surrounding countryside, the loss of habitat combined with increased operational disturbance from occupied dwellings is likely to reduce the value of the site for mammal. During the construction phase, disturbance and site clearance works are predicted to have a negative, slight and medium to long-term impact on other mammal species.

Mammals are generally nocturnal in habit and in many circumstances can tolerate high levels of human presence and disturbance.

The retention and enhancement of significant areas of valuable habitats such as treelines and hedgerows will mean that small mammal species such as Hedgehog and Pygmy Shrew are likely to quickly recolonise the area following construction works. The creation of new semi-natural habitats, including retention of understorey habitats alongside additional planting will continue to provide areas of cover for small mammals.

Overall, the residual impact on other mammals is predicted to be negative, slight and long-term at a local level.

8.7.5 Volant Mammals

In the short to medium term there will be a slight to moderate impact on bat foraging and commuting habitat at the proposed development site with the removal of woodland, scrub and hedgerow/treelines. Protection measures for retained habitats, alongside the landscape plan, will ensure that in the long-term that bat foraging/connectivity within the site is retained.

No bat roosts were identified within buildings or trees located within the proposed development site. All assessed trees and structures were classified as having either negligible or low potential for supporting bat roosts, in accordance with NPWS (2022) and Collins (2023).

Bat activity surveys confirmed the use of hedgerows/treelines and woodland for commuting and foraging, particularly by Common and Soprano pipistrelle (with smaller numbers of Brown long-eared and Myositis). No significant roosting features will be affected by the proposed development.

As no roosts will be impacted, no derogation licence under the Wildlife Act or the European Communities (Birds and Natural Habitats) Regulations 2011 is required. Standard best-practice mitigation measures will be implemented, including the retention of key boundary hedgerows, control of lighting spill, and timing of vegetation clearance.

The tree planting strategy, which includes Oak, Scots pine, Birch, Hawthorn, Blackthorn, Holly, will replace foraging/commuting habitat for bats in the long-term. Biodiversity enhancements, including a range of bat boxes, will create roosting opportunities for bats within the proposed development site, where roosting habitat is currently largely absent.

Lighting plans for the site have been designed in line with Bat Conservation Guidelines. However, light levels will increase at the site during operation. It is noted that the bat species which currently use the site are largely more common and/or light tolerant species which are likely to continue to forage along retained habitats i.e. Common and Soprano Pipistrelle, Leisler's. Other less light tolerant species i.e. Brown long-eared and Natterer's bat may continue to forage along dark areas around the site.

Overall, the residual impact of the proposed development will be negative, slight and long-term at a local level.

8.7.6 Amphibians and reptiles

No residual effects.

8.7.7 Birds

8.7.7.1 Winter birds

The grassland area of the proposed development site is of low value for wintering wading birds and waterbirds. Residual impacts on SCI birds will be imperceptible. However, the removal of wet/improved grassland and unmanaged areas of undisturbed grassland will remove wintering habitat for small numbers of Snipe and Meadow pipit.

In the short to medium term, the loss of common habitats associated with site clearance works and disturbance will have a slight, negative impact on wintering passerines which use the proposed development site. However, as newly planted and enhanced habitats within the proposed development site mature, this impact will be reduced.

The landscape plan includes newly planted hedgerows and treelines and native meadow. Native berry producing plants, such as Holly have been included in the planting scheme to ensure that foraging opportunities for birds continue throughout the winter period. Residual impacts on resident winter birds will be neutral, not significant and long-term at a local level.

8.7.7.2 Breeding birds

In the short to medium term, the loss of common habitats associated with site clearance works and disturbance will have a slight, negative impact on breeding birds. However, as newly planted and enhanced habitats within the proposed development site mature, this impact will be reduced.

The landscape plan will provide additional breeding and foraging habitat for red list, amber list species and other common bird species. New habitats within the proposed development site are likely to increase breeding bird diversity at the site. Biodiversity enhancements have been designed to attract new species to the site, such as Swift as well as providing replacement nesting opportunities for existing species such as Treecreeper and Swallow. Native berry producing plants, such as Blackthorn and Hawthorn, have been included in the planting scheme to provide additional foraging habitat for breeding birds.

Residual impacts on breeding birds will be positive, not significant and long-term at a local level.

8.7.8 Other species

Following construction mitigation and operational design measures, residual impacts on fish and aquatic invertebrates will be neutral, imperceptible and long-term at a local level.

Additional habitats, both natural and artificial, will be created for terrestrial invertebrates. Native wildflower meadow and native tree planting will provide considerable areas of new habitat for terrestrial invertebrates. SuDS areas will also provide new habits for a range of terrestrial invertebrates. Biodiversity enhancements including insect hotels and loggeries will create breeding sites for a range of terrestrial invertebrates.

Residual impacts will be positive, not significant and long-term at a local level.

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CHAPTER NINE

CULTURAL HERITAGE

CHAPTER NINE

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CHAPTER 9 | Cultural Heritage

9.1 Introduction

This chapter presents an assessment of the likely effects of the proposed development—a Large Residential Development (LRD) incorporating a Greenway along its northern boundary—on the archaeological, architectural, and cultural heritage environment. A detailed description of the proposed development is provided in Chapter 2: Description of the Proposed Development.

9.1.1 Author Competency and Information

Musetta O'Leary has over 20 years of experience in all aspects of archaeological consultancy. She specialises in managing the archaeological and cultural heritage components of developments at the pre-planning stage. Musetta has coordinated and authored the Cultural Heritage sections of Environmental Impact Assessment Reports (EIARs) for a wide range of development types, including residential, infrastructure (roads and utilities), industrial, energy, and extractive industries. She has presented expert witness evidence at numerous oral hearings.

Avril Purcell is the director of Lane Purcell Archaeology (LPA) and is a licensed archaeologist with 30 years of experience in research, consultancy, surveying and excavation. She has contributed to a wide range of EIAR projects across the country, often from the initial constraint study stage through pre-development investigations, resolution and construction-phase monitoring. Avril has presented expert witness evidence at An Bord Pleanála oral hearings.

9.1.2 Some Terms Used in this Chapter

Archaeological Heritage

Archaeological heritage can be described as the study of past human societies through their material remains and artefactual assemblages. The Valetta Treaty (or the European Convention on the Protection of the Archaeological Heritage, 1992) defines archaeological heritage as "all remains and objects and any other traces of humankind from past times". This includes "structures, constructions, groups of buildings, developed sites, moveable objects, monuments of other kinds as well as their context, whether situated on land or under water".

Cultural heritage

Cultural heritage is understood as the inherited expressions of community life passed down through generations. It includes customs, traditions, places, objects, artistic practices, and values. The Environmental Protection Agency (EPA) Guidelines (2003) define cultural heritage as encompassing archaeological heritage, architecture, history, landscape and garden design, folklore and tradition, geological features, language and dialect, religion, settlements, inland waterways (e.g., rivers), and place names. The more recent EPA Guidelines (2022) consolidate these into three main categories: archaeology, architectural heritage, and folklore and history.

In this assessment cultural heritage encompasses the following; the history of the development site; the history of Ballincollig, the closest settlement. It also encompasses the placenames and history of the proposed development site and study area.

Architectural Heritage

Architectural heritage is defined in the Architectural Heritage (National Inventory) and Historic Monuments (Miscellaneous Provisions) Act, 1999 as structures and buildings together with their settings and attendant grounds, fixtures and fittings, groups of such structures and buildings, and sites, which are of architectural, historic, archaeological, artistic, cultural, scientific, social or technical interest.

The assessment includes an appraisal of all buildings of architectural, historical and social interest within or adjacent to the proposed development site.

Study Area

To obtain a comprehensive assessment of the Archaeological, Architectural and Cultural Heritage Environment, a study area within a 1km offset of the proposed development site boundary was chosen. The study area includes the following townlands: Carrigrohane, Ballincollig, Maglin, Curraheen and Ballynora.

9.2 Methodology

The methodology used to compile the archaeological, architectural, and cultural heritage section of the EIAR comprised the following components:

- **Legislation and Guidelines:** A review of the relevant legislation, policy and guidance documents relating to archaeological, architectural and cultural heritage;
- **Desktop Study:** A desk-based assessment of the proposed development site and wider Study Area, drawing on cartographic, documentary and aerial sources;
- **Geophysical Survey:** A geophysical survey of the proposed development site was undertaken in November 2022 (Nicholls, 2022) (Figs. 9.7a and 9.7b). A summary of the survey results is presented in Section 9.3.6, with the full report provided in **Appendix 9.1, Volume 3**.
- **Archaeological Testing:** In consultation with the City Archaeologist, two phases of archaeological testing were undertaken following the geophysical survey results: one across the proposed residential site (under licence 24E0785; Purcell, May 2025) and another along the proposed greenway at the northern end of the residential site (under licence 23E1029; Purcell and O'Leary, August 2025) (Figs. 9.8a and 9.8b). A summary of the testing results is provided in Section 9.3.7, with the full reports included in **Appendix 9.2, Volume 3**.
- **Walkover Survey:** Walkover inspections of the proposed development site were carried out in November 2021 and April 2025. The results are presented in Section 9.3.8, with supporting photographs in **Appendix 9.3, Volume 3**;
- **Impact Assessment:** An evaluation of the likely impacts of the proposed development on the archaeological, architectural, and cultural heritage resource was undertaken in line with the Guidelines on the Information to be Contained in Environmental Impact Assessment Reports (EPA, 2022). The results are given in 9.4.
- **Mitigation Measures and Residual Impacts:** Proposed mitigation measures to avoid, reduce or offset potential impacts on the archaeological, architectural and cultural heritage are outlined in Section 9.5, while residual impacts are detailed in Section 9.6.
- **References and Sources:** References and sources consulted are listed in Section 9.8.

9.2.1 Relevant Legislation and Guidelines

In Ireland, the principal legislative measures protecting cultural heritage assets are the National Monument (Amendments) Acts 1930 to 2014, the Heritage Act 1995, the relevant provisions of the National Cultural Institutions Act 1997, the Architectural Heritage (National Inventory) and Historic Monuments (Miscellaneous Provisions) Act 1999 and the Planning and Development Act 2000. Moreover, policies for both the archaeological and architectural heritage are relayed in a series of specific published guidelines.

In Ireland, the primary means of protecting Cultural Heritage are the National Monument (Amendments) Acts 1930 to 2014, The Heritage Act 1995, the relevant provisions of the National Cultural Institutions Act 1997, The Architectural Heritage (National Inventory) and Historic Monument (Misc. Provisions) Act 1999 and the Local Government (Planning and Development) Act 2000. The government's policies for both the archaeological and architectural heritage are relayed in a series of specific published guidelines.

A new Heritage Bill, sponsored by the Minister for Housing, Local Government and Heritage was enacted by both Seanad Éireann and Dáil Éireann on October 13th, 2023. The Act encompasses laws and provisions aimed at preserving, protecting, and managing sites of historical, cultural, and archaeological significance. The Historical and Archaeological Heritage and Miscellaneous Provisions Act 2023 will replace the National Monuments Acts 1930 to 2014 and other related legislation with provision for the protection of heritage. It will introduce new measures to protect archaeological structures and sites including; the establishment of a single Register of Monuments, a statutory reporting scheme for newly discovered monuments and provisions to prevent the illicit import and possession of stolen cultural property. The Act is all encompassing covering licensing, a reporting system, and a single Register of Monuments and will strengthen the protection of archaeological and built heritage. In the meantime, the existing legislation will remain in place while the new act is implemented through a series of commencements over the coming years.

This chapter is prepared having regard to the following guidelines:

- Guidelines on the information to be contained in Environmental Impact Assessment Reports, 2022 (Environmental Protection Agency);
- Advice Notes on Current Practice in the Preparation of Environmental Impact Statements, 2003 (Environmental Protection Agency);
- Framework & Principles for the Protection of the Archaeological Heritage, 1999 (Department of Arts, Heritage, Gaeltacht & the Islands).
- Policy & Guidelines on Archaeological Excavation, 1999 (Department of Arts, Heritage, Gaeltacht & the Islands).
- Architectural Heritage Protection, Guidelines for Planning Authorities, 2004 (Department of the Environment, Heritage, and Local Government).

The proposed development is located within the administrative boundary of Cork City Council and is subject to the archaeological heritage policies outlined in the Cork City Development Plan 2022–2028. The plan demonstrates a strong commitment to the protection, preservation, and appropriate management of both designated and undesignated archaeological resources, guided by 29 specific objectives. Key objectives relevant to this proposal include:

- Objective 8.1 - Strategic Archaeology Objective

  To protect and preserve archaeological monuments as listed in the Sites and Monuments Record (SMR), Record of Monuments and Places (RMP) and the Wreck Inventory of Ireland Database (WIID). All sites can be accessed on the Historic Environment Viewer (www.archaeology.ie). The National Monuments Service will be informed of all development proposals which relate to Sites and Zones of Archaeological Interest. Cork City Council will have regard to the relevant national statutory policies and guidelines, including Frameworks and Principles for the Protection of the Archaeological Heritage and to best practice guidance documents published by the Heritage Council and the Institute of Archaeologists of Ireland.

- Objective 8.2 - Protection of the Archaeological Resource

  Cork City Council will protect and enhance the archaeological value of the sites (and their settings) listed in the RMP and the Historic Environment Viewer.

  Cork City Council will ensure that development proposals will protect and preserve archaeological sites discovered since the publication of the RMP.

  To ensure the preservation of archaeological remains *in-situ*, in accordance with national policy (and in the interest of sustainability), impacts on the buried archaeological environment should be avoided where possible.

- Objective 8.3 - The Value of Archaeological Knowledge

  To require that all appropriate archaeological excavation should be undertaken to the highest possible standards and the information made publicly available. The acquisition and dissemination of knowledge is a core principle for the protection of the archaeological heritage of the city. Cork City Council will endeavour to ensure public dissemination through publications and public lectures.

- Objective 8.8 - Underwater Archaeology

  Cork City Council requires that all development proposals which will impact on marine, riverine, lacustrine, intertidal/sub-tidal environments, and areas of former reclaimed land, shall be subject to appropriate archaeological assessment.

- Objective 8.9 - Preservation of Archaeology within Open Space in Developments

  In development proposals where archaeology is to be retained *in-situ* the archaeological remains will be protected, safeguarded and, where suitable, be interpreted in an accessible manner. Where the archaeology being preserved is located in open space, then this will be in addition to the overall open space provisions.

9.2.2 Desktop Study

The desktop study aims to provide a thorough understanding of the archaeological, architectural, and cultural heritage environment of the proposed development site and Study Area by utilising the following sources;

Record of Monuments and Places (RMP)

This record was established under Section 12 (1) of the National Monuments (Amendment) Act 1994. It lists all monuments and places believed to be of archaeological importance in the County. The numbering system consists of two parts: the first part is the county code (CO for Cork) followed by the Ordnance Survey map number (six inch to the mile scale); the second part is the number of a circle surrounding the site on the RMP map, e.g. (CO073-103) refers to circle 103 on OS sheet 073 for County Cork. The area within the circle is referred to as the Zone of Archaeological Potential (ZAP) or zone of notification for that site. Its diameter can vary depending on the size and shape of the site but it averages out at approximately 180m. The RMP for County Cork was published in 1998. All RMP sites within the Study Area are listed in **Table 9.1** below.

Sites and Monuments Record (SMR) Database of the Archaeological Survey of Ireland (ASI)

The purpose of the ASI is to compile a base-line inventory of the known archaeological monuments in the State - the SMR. It contains details of all monuments and places or sites known to the ASI which pre-date AD 1700, and a selection of monuments which post-date 1700. The large record archive and databases resulting from the survey are continually updated. Archaeological sites which are added to the database are proposed to be included in the next published edition of the RMP and will then be afforded its protection. This database, complete with maps, is available for consultation via the National monuments Service (NMS) website. All SMR sites within the Study Area are listed in **Table 9.1** below.

Archaeological Inventory

The inventories for each county are follow-ons by the ASI, to the RMPs. They give a written description of each archaeological site in the county. The archaeological inventory for Mid Cork, Volume 3 (Power, Byrne, Egan, Lane & Sleeman, 1994) was published in 1994 and a follow up volume, Volume 5 (Ronan, Egan & Byrne, 2009), was published in 2009.

Consultations

During the compilation of the EIAR consultation was held with Ms. Ciara Brett, Cork City Archaeologist. Her recommendations are detailed and incorporated in the mitigation measures in Section 9.5 below.

Protection and Designation of Monuments

Information relating to the protection and designation of archaeological monuments was sourced from the National Monuments Service (NMS) website (www.archaeology.ie). These records were consulted to identify any Recorded Monuments (RMP sites) within the study area that have been afforded additional statutory protection. This includes:

- National Monuments in the ownership or guardianship of the state – None in the Study Area
- National Monuments in the ownership or guardianship of the local authority – None in the Study Area
- Monuments subject to Preservation Orders and Temporary Preservation Orders – None in the Study Area
- Monuments listed in the Register of Historic Monuments –None in the Study Area

Files of the National Museum of Ireland (NMI)

The topographical files of the NMI contain the reports, including correspondence, present location and occasionally illustrations, of archaeological material recovered throughout the country. No finds are recorded for the townlands within the study area up to and including 2025.

Database of Irish Excavation Reports (www.excavations.ie)

This website provides a database of summary accounts of archaeological excavations and investigations in Ireland undertaken between 1970 and 2025. The database was queried for any investigations undertaken in any of the townlands in the Study Area and are listed in **Table 9.2** below.

National Inventory of Architectural Heritage (NIAH)

The NIAH was set up under the Convention for the Protection of the Architectural Heritage of Europe or the Granada Convention of 1985. It was established on a statutory basis under Section 2 of the Architectural Heritage (National Inventory) and Historic Monuments (Miscellaneous Provisions) Act 1999. The work of the NIAH involves identifying and recording the architectural heritage of Ireland, from 1700 to the present day, in a systematic and consistent manner. It is divided into two parts; The Building Survey and The Historic Garden Survey (www.buildingsofireland.ie). The main function of both is to identify and evaluate the State's architectural heritage in a uniform and consistent manner, so as to aid its protection and conservation. The NIAH carried out a survey of the buildings of County Cork between 2006 and 2011. Under Section 53 of the Planning and Development Act 2000, all structures considered of regional, national or international Importance within the survey are recommended for inclusion in the Record of Protected Structures (RPS) by the Minister for Arts Heritage and the Gaeltacht. If this is not adopted by the local authority, the reasons must be communicated to the Department. The Building and Historic Garden Survey for County Cork is available online. The NIAH for County Cork includes approximately 6,500 items of architectural importance in the County. All PS in the Study Area are listed in **Table 9.3** below.

Aerial photographs

The Ordnance Survey of Ireland (OSI) and Google maps have posted several online aerial photographs dating from 1995 (OSI; 1995, 1996-2000, 2001-2005, 2006-2012, 2011-2013, 2013-2018 and 2024/25). These were examined to identify any previously unrecorded features of archaeological/cultural heritage significance that may only be visible from the air. No potential archaeological features were noted in the photographs.

LiDAR

LiDAR data was available only for the eastern portion of the proposed development site. Analysis of the digital terrain models (DTMs) highlighted prominent features, such as modern farm outbuildings, but did not detect more subtle archaeological sites (e.g. the nearby fulacht fia CO073-101). While LiDAR offers valuable landscape-scale insight, its limitations in identifying low-relief features highlight the need to integrate results with complementary methods such as geophysical survey and targeted excavation.

Cartographic Sources

OS 6-inch maps; the three editions of the 6-inch to one mile scale maps were consulted, the first edition published in 1841-1842, the second edition published in 1897-1904 and the third edition published in 1938. In addition the OS 25-inch to one mile scale map was consulted, from which the second edition 6-inch map was derived in 1902.

9.2.3 Geophysical Survey

A pre-planning geophysical survey was commissioned by Murnane & O'Shea Group and undertaken by J. Nicholls in November 2022 under licence 22R0331 (Nicholls, 2022). The survey covered one large agricultural field with sections of a second field (**Figs. 9.7a and 9.7b**; Section 9.3.6). The southern and eastern portions of the site could not be investigated due to the presence of upstanding buildings (Carriganarra farm complex) and rough, low-lying ground. A summary of the geophysical survey is provided in Section 9.3.6, with the full report included in **Appendix 9.1; Volume 3**.

9.2.4 Archaeological Testing

In consultation with the City Archaeologist, two phases of archaeological testing were undertaken following the geophysical survey: one on the proposed LRD site and the other along the route of the proposed Greenway.

- The LRD site testing took place on the 26th of September and on the 1st and 2nd of October 2024 under licence 24E0785, during which twenty-six trenches (Trenches 1–26) were excavated (**Fig. 9.8a**; Section 9.3.7) (Purcell, May 2025).
- Greenway testing was undertaken under license 23E1029 during which five trenches (Trenches 35–39) were excavated, targeting geophysical anomalies D–G (**Fig. 9.8b**; Section 9.3.7) (Purcell and O'Leary, August 2025).

A summary of the testing results is provided in Section 9.3.7, with the full report included in **Appendix 9.2; Volume 3**.

9.2.5 Walkover Site Inspection

The primary purpose of the walkover survey was to assess the physical environment of the proposed development site and to identify any potential archaeological features, Areas of Archaeological Potential (AAP), or other elements of cultural heritage interest. The survey included an assessment of current land use, local topography, and environmental conditions in order to develop a comprehensive understanding of the site's character.

Walkover inspections were carried out in September 2024 and September 2025, both under dry and bright weather conditions. The findings from the walkover survey are presented in Section 9.3.8, with accompanying photographic plates included in **Appendix 9.3; Volume 3.**

9.3 Existing Environmental

9.3.1 Cultural Landscape Context

The pace of landscape change in Ireland accelerated during the second half of the 20th century, with many archaeological sites levelled or obscured by modern agricultural, industrial, and infrastructural development. As a result, the present-day archaeological landscape does not fully represent the long span of human occupation, extending back c.10,000 years.

While numerous archaeological sites survive as partially upstanding features — including earthworks, enclosures, and stone monuments — many more remain as subsurface traces, long forgotten and concealed from view. Physical evidence of past societies has often been modified or overwritten by subsequent communities, each leaving its own imprint on the landscape. These buried features are typically revealed only through archaeological investigation in advance of development, representing discrete locations of past human activity now framed within a modern context.

At a broader scale, historic patterns of land use and organisation remain visible in the landscape. These can be identified with the help of early cartographic sources (such as the first-edition OS maps), as well as through LiDAR, geophysical surveys, and aerial photography. Together, these sources provide a layered view of past landscapes preserved within the present one. Over time, population growth has left increasingly permanent marks on the land, while the small-scale and often mobile nature of early prehistoric settlement has left only faint and sometimes imperceptible traces.

The proposed development site lies in a fertile lowland valley of the Maglin River. It is bounded to the north by residential developments and to the south, east, and west by agricultural land. Aerial photography from 1995 to the present (www.osi.ie) shows that the site has primarily remained in pasture. The underlying limestone geology has long supported quarrying activity, traceable to at least the mid-19th century. Several small-scale quarries are depicted in the surrounding landscape on the OS 6-inch (1841) and 25-inch (1903) maps, while large-scale limestone extraction continues today at the Roadstone Quarry, c.4 km northwest of the site in the townlands of Classis and Barnagore.

The exploitation of limestone also supported lime production, as evidenced by the many limekilns recorded in the region. There is one limekiln on the proposed development site in an area of rough ground, while another (RMP CO073-064) is situated c.270m to the southwest in the townland of Maglin.

9.3.2 Baseline Environment

The proposed development site is situated in the townland of Carrigrohane, Ballincollig, Co. Cork (ITM 560000, 569924). It comprises three pasture fields (Fields 1–3), the area occupied by the Carriganarra farm complex (Field 4) and portions of two additional fields (Fields 5 and 6) at the south-western end of the townland, adjacent to the Maglin River (**Fig. 9.1**). The remains of a former farm complex survive towards the centre of the site.

There is one Recorded Monument on the proposed development footprint: the site of a standing stone (RMP CO073-103). This was first recorded by the ASI in 1995, when it was described as a thin upright slab measuring 0.6 m × 0.17 m and standing to a height of 1.2 m. The stone was orientated east–west and noted to be leaning heavily to the north. It was not evident when the site was inspected for this EIAR in 2024. Purcell (2025) suggested that a circular feature identified during archaeological testing (see Section 9.3.7) may have been the socket for the removed stone or, alternatively, a posthole of archaeological origin.

The subsurface archaeological potential of the site has been further informed by a programme of pre-development geophysical survey and archaeological testing; the results of both are summarised in Sections 9.3.6 and 9.3.7, respectively.



Figure 9.1: Proposed development site (outlined in red) on Google Satellite imagery (2026). Field numbers F1 - F5 are indicated. RMP/ SMR monuments in red (to be prefixed with CO073).

Within a 1km radius of the proposed development site (the Study Area), a total of thirty-four recorded archaeological sites are listed in the RMP and the SMR database (**Table 9.1; Fig. 9.2**). These sites span a broad chronological range, providing evidence of settlement and activity in the area from at least the Neolithic period (c. 4000–2400 BC).

A significant number of these sites were uncovered and excavated during the construction of the N22 Ballincollig Bypass in the early 2000s, which runs approximately 330m to the east and 460m to the south of the proposed development site (Hanley & Hurley, 2013). Further discoveries have been made in more recent years, during the continued urban expansion of Ballincollig. Collectively, these sites highlight the high archaeological potential of the proposed development area. Distances to registered archaeological sites (as listed in **Table 9.1**) are approximate and are taken from the nearest boundary of the proposed residential development area.

RMP/SMR	Site Type	Townland	Distance from site
CO085-029	Quarry	Ballynora	900m to S
CO073-062 CO073-062001 CO073-062002	Ballincollig Castle Bawn Cave	Ballincollig	1.1km to W
CO073-063	Bridge	Ballynora, Maglin	930m to SW
CO073-064	Lime kiln	Maglin	290m to W
CO073-065	Fulacht fia	Maglin	375m to S
CO073-066	Standing stone	Carrigrohane	905m to NE
CO073-074	Standing stone	Ballincollig	755m to W
CO073-082	Ringfort	Carrigrohane	570m to N
CO073-082001-	Souterrain	Carrigrohane	570m to N
CO073-097	Country house	Maglin	420m to SW
CO073-100	Fulacht fia	Maglin	40m to W
CO073-101	Fulacht fia	Maglin	35m to W
CO073-103	Standing stone	Carrigrohane	Within site
CO073-104	Fulacht fia	Carrigrohane	270m to E
CO085-127	Fulacht fia	Maglin	1km to SW
CO073-130	Fulacht fia	Maglin	500m to S
CO073-132	Excavation	Carrigrohane	525m to NE
CO073-134	Fulacht fia	Curraheen	615m to S
CO073-135	Fulacht fia	Curraheen	415m to SE
CO073-136	Fulacht fia	Curraheen	470m to SE
CO073-137	Burnt mound	Curraheen	644m to SE
CO073-138	Excavation	Curraheen	660m to SE
CO073-139	Fulacht fia	Curraheen	650m to SE
CO073-140	Burnt mound	Curraheen	670m to SE
CO073-141	Fulacht fia	Curraheen	660m to SE
CO073-142	Fulacht fia	Curraheen	670m to SE
CO073-143	Fulacht fia	Curraheen	670m to SE
CO073-146	Habitation site	Curraheen	615m to S
CO073-150	Enclosure	Carrigrohane	275m to NE
CO073-161	Burnt spread	Ballincollig	560m to W
CO085-136	Church	Ballynora	845m to S
CO085-136001-	Graveyard	Ballynora	845m to S

Table 9.1 RMP/SMR within a 1km radius of the proposed development site Sample

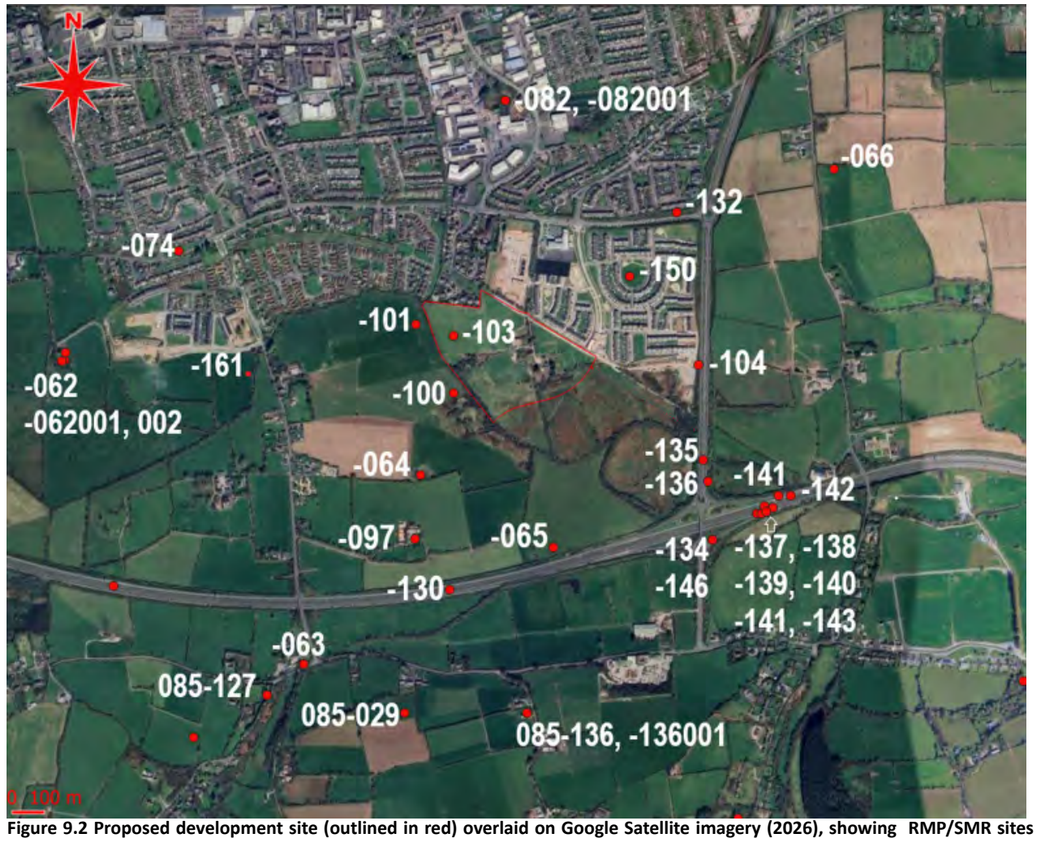


Figure 9.2 Proposed development site (outlined in red) overlaid on Google Satellite imagery (2026), showing RMP/SMR sites located within a 1km radius.

The following account of the archaeological and cultural heritage of the Study Area is presented chronologically. The archaeological timescale may be divided into three principal periods, each with sub-sections:

- **Prehistoric period:** Mesolithic - (circa 8000 to 4000 BC); Neolithic - (circa 4000 to 2400 BC); Chalcolithic c. 2450-2200; Bronze Age (circa 2200 to 700 BC) – Iron Age (circa 700 BC to AD 400).
- **Medieval period:** Early medieval 5th – 12th century; high medieval 12th century – circa 1400; late medieval circa 1400 – 16th century.
- **Post medieval period:** 17th century onwards

Information on the recorded archaeological sites in the Study Area is taken from the ASI database which derives its data from the Archaeological Inventories of County Cork, Volume 3: Mid Cork (Power *et al*., 1997) and Volume 5 (Ronan *et al*., 2009) with some entries updated because of more recent research.

Prehistoric Period

The earliest evidence for human colonisation and settlement in Cork can be dated to 8000 BC, the Mesolithic Period. People of this era were hunter-gatherers, entirely dependent on what food could be obtained through hunting, fishing and foraging, including edible plants, and shellfish. The transition of these early settlers from hunter/gatherers to a farming way of life in the Neolithic Period brought about more permanent settlements and a more complex and structured social hierarchy. The Neolithic period is particularly noted for the construction of megalithic tombs, reflecting increased social complexity and the growing importance of communal ritual activities. The Chalcolithic, meaning the 'Copper and Stone Age' represents a transitional phase between the Neolithic and Bronze Age in Ireland. It is characterised by the gradual adoption of copper metallurgy prior to the widespread use of bronze. This period is often identified archaeologically by the widespread appearance of Beaker Ware, a distinct form of pottery associated with this cultural phase.

The Irish Bronze Age is characterised by the widespread use of bronze, the emergence of distinctive pottery styles, changing burial traditions, and increasing population. Burial practices became simpler than the elaborate megalithic tombs of the Neolithic, though such tombs were sometimes reused. Most Bronze Age burials, whether cremations or inhumations, were placed in stone-lined cists or simple earth-cut pits, often accompanied by grave goods. Some were marked by stone cairns or earthen barrows. Many of these monuments are now visible only as ring-ditches in the archaeological record.

Geophysical survey and archaeological testing on the proposed development site identified prehistoric remains dating to this period.

In the LRD area geophysical survey identified a circular enclosure (Anomaly A) measuring *c.* 16m in diameter which was considered to be possibly prehistoric or early historic in date. This feature will be preserved *in situ* and was not subject to archaeological testing.

In the proposed Greenway corridor geophysical survey and subsequent targeted archaeological testing revealed Anomaly F as a probable prehistoric ring-ditch with at least two phases of construction and evidence for later re-use for burial. Associated human remains and artefacts indicated activity spanning the Bronze/Iron Age through to the early medieval period. This feature will be preserved *in situ.* The survey also identified two nearby features corresponding to weak curvilinear trends (Anomaly G), one of which was tentatively linked to Anomaly F by the fact that it consisted of gravel-rich charcoal-flecked clay comparable in character to that in the ring-ditch These features will also be preserved *in situ*. Collectively, these findings demonstrate that the proposed Greenway route intersects an area of substantial archaeological importance. A summary of the geophysical survey and archaeological testing results is provided in Sections 9.3.6 and 9.3.7, respectively, with full reports included in Appendices 9.1 and 9.2.

Recent investigations in the immediate vicinity of the proposed development site have also revealed previously unrecorded archaeological remains, which will be added to the SMR record in due course. In 2023, archaeological testing and subsequent excavation was carried out c.200m to the north of the proposed development site, in advance of an extension to the Heathfield development (Purcell, 2023). A cluster of anomalies identified during geophysical survey (Nicholls, 2022b) were confirmed by archaeological testing to be archaeological in nature. Over twenty large pits of prehistoric date, together with associated stake-holes and post-holes were excavated (Purcell, in prep.).

In the adjoining townland of Maglin, to the west of the proposed development site two small pits containing pottery sherds and charcoal-flecked soil were found to be prehistoric in date (Purcell & O'Leary, 2024).

The earliest recorded site in the vicinity of the proposed development site was identified and excavated during the construction of the N22 Ballincollig By-pass. A habitation site (CO073-146) was excavated on the road corridor in Curraheen to the southeast of the proposed development site. It revealed evidence of a multi-phased settlement dating to the Late Neolithic/Beaker Period and later activity from the early medieval period. Thirty five sherds of Beaker pottery, flint debitage, charcoal and charred seeds were recovered from a single pit on this site. Charcoal from the pit was dated to the 2580–2200 BC (Danaher, 2002b). Two enclosing fosses were also excavated at the site, the larger of the two would appear to have been the settlement area while the smaller may have functioned as an animal compound. Radiocarbon dating of both fosses gave an early medieval date (AD 400-900). Over 100 features consisting of post-holes, stake-holes and pits were excavated within the larger enclosure and a post and wattle oval house (c. 8m E-W; 6m N-S) was identified in the NE quadrant (*ibid.*). In Carrigrohane to the northeast of the proposed development site, three pits (CO073-132) were excavated, also in advance of road construction. The pits contained inclusions of heat-shattered stones. A sherd of possible Bronze Age pottery, flint and chert debitage and a miniature stone (porcellanite) axe were recovered from this site (Danaher, 2002a). An isolated semi-circular pit (CO073-138) was identified in Curraheen which contained heat-shatter stones and charcoal (Russell, 2002).

The majority of recorded sites in the vicinity of the proposed development site are fulachtaí fia (totaling thirteen in number) along with three burnt mounds or spreads. Two (CO073-100 and CO073-101) of these lie just outside the proposed development site on the western side of the Maglin River. Fulachtaí fia are generally interpreted as ancient cooking sites, but could have been used for any purpose that required large quantities of hot or boiling water. They usually survive as a spread, or mound, of heat-shattered and burnt stone. The burnt stone generally fills and covers one or more troughs or pits cut into the ground. The trough, which was sometimes lined with timber, wattle or stone, would have been excavated below the water table, near a spring or stream and allowed to fill with water. A fire was set adjacent to the trough, to heat stones, and the water was then heated or boiled by immersing the fire-heated stones in it. Experiments have shown that large quantities of water can be boiled in this way in about twenty minutes and joints of meat wrapped in straw can be cooked over several hours. After each use the burnt and heat-shattered stones would have to be cleaned out of the trough. Over time this material accumulated to form a crescent-shaped mound of burnt material around the trough. Fulachtaí fia are usually dated to the Bronze Age (2400-500BC). Although they are generally interpreted as cooking sites they were also used for bathing, processing textiles, tanning, brewing, extraction of fats from meat, and soap making, or even a combination of these functions (Ó Drisceoil, 1988; Monk, 2007; Quinn & Moore, 2007). Burnt mounds and spreads are usually the levelled remains of ploughed out fulachtaí fia.

Standing stones are another distinctive prehistoric monument type in the Study Area. One such monument (CO073-103) was formerly located on the development site but is no longer extant (see above). Two further examples are recorded nearby: CO073-066 in Carrigrohane and CO073-074 in Ballincollig, the latter removed during housing construction c. 1980 (Power *et al.*, 1997). These monuments may have served multiple functions in the prehistoric landscape, including route markers, boundary indicators, burial markers, or ritual focal points. They were often erected in prominent or elevated positions and frequently display a north-east to south-west orientation. The surviving Carrigrohane example (CO073-066) follows this pattern, whereas the standing stone that stood on the proposed development site (CO073-103) was aligned east–west. It is also possible that some standing stones of more recent date were erected for practical purposes, such as scratching posts for livestock. The presence of ring-ditches, fulachtaí fia, and standing stones within and around the Study Area highlights the enduring ritual, social, and territorial importance of this landscape from prehistory onwards.

Early Medieval Period

A small number of recorded archaeological sites in the vicinity of the proposed development site date to the early medieval period including a ringfort and souterrain in Carrigrohane (073-082 and CO073-082001-). These monuments date to the historic, early medieval period, also known as the Early Christian period (5th to the 12th century AD), when Christianity was introduced to the country. Ringforts (also known by the names rath, lios, cathair or caiseal/cashel) are defended farmsteads and are the most characteristic monument of this period. Their main phase of construction and occupation dates from the beginning of the 7th century AD to the end of the 9th century. They are generally circular or oval in plan, defined by an earthen bank with an external ditch or fosse. Some ringforts have associated souterrains (underground chambers connected by narrow creepways) as defensive features which may have also been used for storage. Others have associated corn-drying kilns and sometimes external structures. Generally, it has been speculated that the elite of society occupied ringforts and that the less wealthy lived in undefended settlements scattered across the landscape. In more recent archaeological investigations, particularly on road infrastructure projects in Co. Cork, the number and type of unenclosed medieval settlements identified has been growing, suggesting more diversity in contemporary settlement patterns (Monk, 2019) and challenging the perceived importance of ringforts in the early medieval landscape. The ringfort and souterrain in Carrigrohane (CO073-082 and CO073-082001-) to the north were investigated in advance of a proposed development (Moloney, 2003). Both the inner and outer ditches were identified as well as internal and external features and evidence for a possible souterrain.

Souterrains also date to the early medieval period and in many cases are associated with ringforts but can also be found in isolation. They are underground structures generally earth- or rock-cut, comprising chamber(s) connected by narrow creepways. The term souterrain derives from the French *sous* meaning under and *terre* meaning earth. When in contemporary use they would have been called *óin* or *uam* (*uaimh* in modern Irish) and on cartographic sources are often noted as caves (Clinton, 2001 and Power, 1992). They were probably used for as defensive features and also as storage (*ibid.*).

The term enclosure is frequently applied to ringforts which have been levelled and no visible surface trace remains. The enclosure in Carrigrohane (CO073-150) to the northeast was identified by geophysical survey in 2008 (Nicholls, 2008) in advance of the Heathfield residential development and the surrounding area was subsequently archaeologically tested (Cummins, 2008). The enclosure was preserved *in situ* within the development and subsequent archaeological monitoring of the surrounding area, during construction, revealed no features or finds of archaeological significance (Purcell and O'Leary, 2019).

In 2024, archaeological testing of the proposed Greenway in the northern section of the development site revealed an inhumation burial of probable Iron Age or early medieval date, likely positioned within the ditch of the earlier ring-ditch enclosure (Anomaly F; see Prehistoric Section) (Purcell, in prep.). The burial, contained in a grave cut into the earlier ditch, comprised the remains of a single individual (Sk1). Osteological analysis indicates a probable female aged 17–25 years, with evidence of a chronic ear infection and moderate dental health (Ní Challanáin, 2025). The body was laid supine and extended, oriented east–west, a rite commonly adopted in the 5th–6th centuries. A single monochrome blue glass bead of squat barrel form, semi-translucent in colour, was recovered with the burial. Comparable beads are known from Iron Age funerary contexts (O'Sullivan, 2025) and may have served as a talisman. This evidence suggests that the earlier ring-ditch retained visibility and ritual significance over time, being re-used as a locus for burial activity into the early medieval period. Radiocarbon dating of the remains will be undertaken, subject to approval by the National Museum of Ireland.

Medieval Period

Ballincollig Castle (CO073-062), along with its associated bawn (CO073-062001) and cave (CO073-062002), occupies a steep-sided limestone outcrop (c. 40m E-W; c. 55m N-S) in the Maglin Valley, located 1.1km to the west of the proposed development site. It consists of a tall rectangular 4-storey tower (4.5m N-S; 5.3m E-W) standing on the eastern side of an area enclosed by a high bawn wall that is intact except for a 20m gap mid-way along the eastern side (Power *et al.*, 1997). The area enclosed within the bawn wall contains a visible break in slope down to the south resulting in the bawn wall being at a higher level (H. c. 5.5m) to the south than to the north (H. c. 3.5m), though the top of the wall is roughly level throughout. The 4-storey rectangular tower is situated in the southeastern corner of the bawn wall. A mural tower stood inside the northeast corner of the bawn and another stood along the south, both of which are missing inside walls. The tower was repaired by the Wyse family in the 19th century and there is a stone plaque on the east wall inscribed 'W 1857' (*ibid.*).

Post Medieval Period

Recorded post-medieval sites within the Study Area include Maglin House (CO073-097), located *c*. 420m to the southwest; a lime kiln (CO073-064) *c*. 290m to the west and Maglin Bridge (CO073-063), approximately 930m to the southwest. All three sites are located in the townland of Maglin.

Maglin House is a late 18th- or early 19th-century two-storey, L-shaped residence. Its principal (south) elevation is four bays wide with an off-centre porch entrance. The side (west) bay features Wyatt windows, while the remaining windows are sash. A gabled rear addition on the west side creates the distinctive L-shaped plan, complemented by a shallow, central, gabled stairway projection at the rear. Associated farm buildings and a cobbled yard are located behind the house, with a walled garden to the south (Power *et al*., 1997).

The lime kiln is depicted on all three editions of the OS maps as part of a former quarry complex. Power *et al*. (1997) describe the kiln as a well-preserved rectangular structure, measuring c. 7m (N–S) by 5.5m (E–W), built into a natural break in the slope. Although now heavily overgrown, it survives as a substantial example of this once-common industrial feature. Lime kilns were widespread in the Irish rural landscape from the 18th to 20th centuries, producing lime by burning limestone at temperatures between 900°C and 1000°C. Lime had multiple uses: as a fertiliser and soil improver, a disinfectant wash for farmyards, a natural repellent against pests such as slugs, snails, and ants, and for protecting stored potatoes from frost. It was also a key component in mortar production. Many lime kilns have since become overgrown, dilapidated, or destroyed, leaving them difficult to identify within the present landscape.

There is an unregistered lime kiln on the proposed development site. It is depicted on the OS map of 1841-42 (See **Fig. 9.3**) as a circular feature east of the road and is annotated “Lime Kiln (Disused)” on the 2nd edition (1903) (**Fig. 9.4**), indicating that it had gone out of use by the late 19th century, consistent with the wider decline of small-scale rural lime burning. Field inspection confirmed that the kiln survives as a substantial stone-built structure, rectangular in plan and largely intact on its south, east, and west sides, while the north side is obscured by dense vegetation. The walls stand to near their original height, and the form of the draw-shaft kiln, typical of 18th–19th century rural lime production, remains clearly legible. Despite localised collapse around the draw-holes and heavy overgrowth, the kiln represents a well-preserved example of its type. A drawn survey of the limekiln is included in **Appendix 9.4.**

Maglin Bridge, spanning the Maglin River between the townlands of Maglin and Ballynora, measures 7.33m in length and incorporates two semicircular arches which have undergone repair. A bluntly pointed breakwater is present on the upstream side, while niches at the base of the piers likely served as supports for timber centring during construction. The area beneath the bridge is paved (Power *et al.*, 1997).

Archaeological investigations undertaken in proximity to the proposed development site are summarised in Table 9-2 below (www.excavations.ie).

Reference	Townland	Details
2002:0332	Maglin 3, Cork	During work associated with the construction of the N22 archaeological testing was carried out in adjoining land in advance of establishing a permanent soil dump. Four trenches were excavated in a large flat field all of which revealed burnt mound material. Once this material was identified, the trenches were not continued. After these deposits were photographed and recorded, the trenches were backfilled. The maximum measurements of the fulacht fiadh was 19m east–west by 18m. On completion of the testing, a buffer zone was established to protect the site. This was done by excavating four trenches around the site at a distance of 6m from its perimeter (Danaher, 2002).
2003:0188	Carrigrohane, Cork	Testing was undertaken at Carrigrohane, Ballincollig, Co. Cork, as part of a pre-planning archaeological impact assessment for the construction of the Cork Fire Services headquarters. The site of the proposed development is situated in the zone of archaeological potential for a circular enclosure (CO073-082), noted on an aerial photograph. The cropmarks consist of two concentric rings with a maximum diameter of approximately 60m and an enclosed area with an estimated diameter of 40–45m. Both the inner and outer ditches were identified in the test-trenches. A fragment of souterrain ware was recovered from the upper fill of the external ditch. Evidence for a possible souterrain was identified within the enclosure, as were a number of further internal features interpreted as rubbish pits and post-holes. Evidence for activity outside the defences of the ringfort was also identified in the form of cultivation furrows and pits (Moloney, 2003).
2008:159	Ballincollig, Cork	Ten test-trenches were excavated to subsoil levels on the footprint of a proposed nursing unit to the north of Ballincollig town centre and south of the National Monument Ballincollig Gunpowder Mills (CO073–043). No archaeological features or finds were recorded (Ní Loingsigh, 2008).
2008:183	Carrigrohane, Cork	A geophysical survey and test-trenching were carried out in advance of a housing scheme on the south-east outskirts of Ballincollig. The survey (Licence 08R227, Target Archaeological Geophysics) identified a levelled circular enclosure (CO073-150), c. 40m in diameter, in the north-east of the site, though no surface traces survive and ploughing has caused severe disturbance. No other clear archaeological anomalies were detected. Subsequent test-trenching and metal-detector survey (Licence 08R255) around the enclosure produced no features or artefacts. Elsewhere, a single pit (200m north-west) and two small pits (80m south) were recorded. The development design incorporates a buffer zone to preserve the enclosure *in situ,* with excavation of the pits recommended prior to construction (Cummins, 2008).
2010:108	Ballincollig	Four test trenches were excavated on the site of a proposed medical centre. No features or finds were revealed (Lane, 2010).

Reference	Townland	Details
2017:288	Maglin, Ballincollig, Cork	Fifteen test trenches were mechanically excavated across the site following geophysical survey. No features or finds of archaeological significance were revealed (Purcell, 2017).
2018:495	Ballincollig (adjoining Maglin Estate)	Two phases of testing were carried out across two adjoining fields following geophysical survey. A total of twenty-three trenches were excavated. A spread of burnt mound material (CO073-161) was revealed measuring 8m north-south by 3.5m. Its eastern extent was not determined as it extended into a field boundary adjoining a stream along the eastern site boundary. It is proposed to preserve the burnt spread *in situ* within a buffer zone (Purcell. 2018).
2019:354	Ballincollig (adjoining Maglin Estate), Cork	Monitoring was carried out on a residential development which was tested in 2017. A small isolated pit measuring 0.8m by 0.75m by 0.29m deep was found which contained 8 sherds of prehistoric pottery, probably of Beaker type (Helen Roche pers. comm.) Charred apple pips and hazel nut shell fragments were also found. No other features were revealed (Purcell. 2019).
2019:361	Carrigrohane, Carriganarra, Cork	Monitoring was carried out during construction of a residential development. No features or finds of archaeological significance were revealed. Further monitoring will be undertaken as the development progresses (Purcell, 2019).
2020:293	Carrigrohane, Carriganarra, Cork	Further archaeological monitoring was carried out on this residential development. No features or finds of archaeological significance were identified (Purcell, 2020).
2021:473	Carrigrohane, Carriganarra, Cork	The final stage of topsoil stripping for this residential development was completed during 2021. No features or finds of archaeological significance were identified (Purcell, 2021).
2022:709	Ballincollig Maglin Road	Fourteen trenches were mechanically excavated across a circular enclosure and adjoining ground identified in a geophysical survey undertaken in 2017. The enclosure appears to be defined by a pair of slot trenches set on a limestone outcrop. A small number of additional features were identified in adjoining ground including possible pits and deposits. No finds were revealed. Outcropping bedrock and drainage features were also identified in the trenches. (Purcell, 2022)
2023:723	Maglin Road, Ballincollig, Cork	Fifteen trenches were excavated across two fields to the east and south of an enclosure identified in 2022. No archaeological features or finds were identified (Purcell, 2023).
2023:463	Carrigrohane, Carriganarra Road, Ballincollig, Cork	Ten trenches were excavated across the site in advance of a proposed residential development and following geophysical survey. Seven features of archaeological significance were identified in three trenches at the northern end of the proposed development site. Limited hand investigation of them suggested the presence of six probable prehistoric pits up to 1m in diameter and a larger spread. Approximately 80m to the south an eighth feature was identified. This was another possible pit but was a shallow feature and may be modern in date relating to a now-removed field boundary. No finds were recovered (Purcell, 2023).
2024:712	Heathfield, Carrigrohane, Ballincollig, Cork	Archaeological monitoring of topsoil removal was carried out during development. Eight small features were identified during the monitoring, of which seven were in close proximity and the eighth was isolated and approximately 100m to the north. The isolated pit was a rounded shallow feature 0.9m diameter x 0.2m deep. The seven features were closely clustered; two were evenly cut rounded pits (0.6m diameter and 0.35m deep and 0.7m x 0.6m x 0.3m deep) and the others were irregular and generally quite shallow and of limited significance (Purcell, 2024).
2024:649	Maglin, Ballincollig, Cork	Nine trenches were excavated across two curving anomalies identified as potential enclosures in a geophysical survey. The test trenching verified the presence of archaeological features indicating the presence of two separate semi-circular ditches (Anomaly 5 at the west and Anomaly 9 240m to its east), the southern portion of both cut by a field boundary and farm trackway. The curving ditch of the western enclosure (2.3m to 3.5m wide) was identified as well as a probable post-hole and two linear features, possible slot trenches. The curving ditch of the eastern enclosure (1.7m to 2.5m wide) was identified; no associated features were revealed (Purcell, 2024).

Table 9.2 Archaeological investigations undertaken in proximity to the proposed development site

9.3.3 Cultural Heritage of the Study Area

9.3.3.1 Townland Names

The proposed development site is located in the townland of Carrigrohane, in the parish of Carrigrohane and the barony of Muskerry East. The Maglin River forms the western boundary of the site and also marks the townland boundary between Carrigrohane and Maglin. The organisation of land has always been closely tied to the economy of past societies, influenced by environmental, social, and political factors. One of the most effective ways of assessing this organisation is through the study of land enclosure and division. Townland boundaries, in particular, represent a fundamental unit of the Irish landscape. Often aligned with natural topographic features such as rivers and streams, they provide enduring evidence of historical landholding patterns.

Ireland's landscape is divided into over 62,000 townlands, a system that is unique in Western Europe for both its scale and antiquity. Many townlands are pre-Anglo-Norman in origin, and Irish historical sources consistently use townland names throughout the historic period to describe places and to locate events within their geographical context.

The townland names and boundaries were standardised across the country in the nineteenth century when the Ordnance Survey began to produce large-scale maps of the country. Townlands existed long before the parishes and counties. The original Irish names were eventually written down in anglicised form as they sounded to English court scribes. The social customs or history of the people who have lived in a particular place can also be reflected in the name of the townland. Many townlands throughout Ireland took their names from early habitation sites, both ecclesiastical and secular while others are descriptive of the surrounding landscape.

The townland name Carrigrohane derives from the Irish *Carraig Ruacháin*, meaning "rock of the round hill" (www.logainm.ie). Its earliest known reference dates to 1299, when it appears as *Carrigohan* in the *Calendar of Justiciary Rolls, Ireland, 1295–1307*. These rolls, compiled across three volumes, record the proceedings of the chief justiciar's court — the principal royal court in medieval Ireland — including criminal trials, land disputes, and administrative matters, and represent an important

primary source for the study of Anglo-Norman governance and society in the late 13th and early 14th centuries (*ibid*.). The modern spelling "Carrigrohane" is first recorded in 1840 in the Ordnance Survey Parish Name Books, which accompanied the first large-scale mapping of the country.

The endurance of the placename from the medieval period through to the first Ordnance Survey mapping (1841-42), demonstrates the long continuity of settlement and landholding in the Carrigrohane area, reflecting its significance within the wider cultural landscape.

The Irish forms of other townland names in the Study Area are as follows; Maglin appears in two Irish forms: Maigh Lainne, meaning 'plain of the enclosure' and Maigh an Ghiolla Fhinn, meaning 'plain of the fair-haired lad'. Ballincollig, in Irish 'Baile an Chollaigh' meaning town of An Collach, from the surname Coll or Baile an Cholaig meaning town of the boar. Curraheen, in Irish 'An Curraichín' meaning a marshy or wet plain. Ballynora, in Irish 'Baile an Óraigh' meaning Honora's town (www.loganim.ie).

9.3.3.2 Railway Line

The northeastern boundary of the proposed development site is defined by the former Cork and Macroom Direct Railway (CMDR), later incorporated into the Great Southern and Western Railway (GS&WR). Constructed in the mid-19th century, the CMDR was a 24-mile (39 km) line linking Cork City to the market town of Macroom. Opened on 12 May 1866, it offered a faster and more direct route than competing companies (Shepherd, 1994), playing a key role in improving communication, reducing travel times, and supporting regional trade and commerce.

Although initially operated independently, the CMDR relied on the GS&WR for rolling stock and operational support. Despite moderate passenger and freight traffic, the line struggled financially throughout its existence. In 1925 it was absorbed into the newly formed Great Southern Railways (GSR) as part of the nationwide amalgamation of rail companies, and in 1945 it came under the control of Córas Iompair Éireann (CIÉ). Passenger services ceased in 1935, and the line was permanently closed in 1953.

Remnants of the Cork and Macroom Direct Railway (CMDR) — including embankments, cuttings, bridges, and former station buildings — remain visible across the wider landscape, forming an important component of the area's industrial and transport heritage. Locally, the disused railway defined the northeastern boundary of the proposed development site, although no upstanding remains survive on the site itself. The proposed greenway is designed to follow this historic alignment, thereby repurposing the former railway corridor for contemporary recreational use while retaining its historic route within the landscape.

9.3.3.3 Ballincollig Town

The town of Ballincollig is situated less than 1km to the north of the proposed development site. The name, Ballincollig, derives from Baile an Chollaigh, interpreted as either 'town of An Collach' (a personal name) or 'town of the boar' (www.loganim.ie). The earliest known reference to Ballincollig dates back to the 14th century, when the Colla family, Anglo-Norman settlers, established a castle there. Ballincollig Castle, which remains partially standing today, was likely built around 1468 by the Barrett family, a prominent Norman lineage. Over the centuries, the castle and its surrounding lands passed through several owners, including the Coppingers and Colthursts (O'Brien, 1909).

Ballincollig remained a small rural settlement until the late 18th century, when a significant transformation occurred with the establishment of the Ballincollig Royal Gunpowder Mills in 1794 by Charles Henry Leslie. The British Government purchased the mills in 1805, developing them into one of the largest gunpowder manufacturing facilities in the British Isles. At their peak, the mills employed hundreds of workers and played a crucial role in military and industrial supply chains during the Napoleonic Wars and subsequent conflicts (Power, 1987).

By 1837, Ballincollig was described by Lewis (1837) as 'chiefly distinguished as a military depot and for its extensive gunpowder mills… the artillery barracks form an extensive quadrangular pile of buildings… which contain accommodation for 18 officers and 242 non-commissioned officers and privates…. Immediately adjoining the barracks, and occupying a space of nearly four miles in extent, are the gunpowder mills, 16 in number' (*ibid*.). During this period, Ballincollig evolved into a company town, with housing, shops, and schools developed to support the workforce. The mills continued operations until 1903, after which the site fell into decline. Today, the remnants of this industrial heritage site are preserved in the Ballincollig Regional Park.

Throughout much of the 20th century, Ballincollig remained a relatively quiet village until substantial urban development began in the 1970s and 1980s, transforming it into a major suburb of Cork City. In 2019, the town officially became part of the Cork City Council administrative area, reflecting its integration into the wider metropolitan region.

9.3.4 Cartographic Information

The area of the proposed development site is depicted on the 1842 OS 6-inch map (**Fig. 9.3**) as comprising all or part of nine fields set around an unnamed settlement or farm complex, elements of which remain extant. The complex consisted of six, mostly rectangular, buildings at the southern end of a laneway extending southwards from the Carrigrohane-Killumney road. The most northerly of these buildings, situated on the western side of the laneway, survives in a ruinous state and a walkover inspection confirmed this to have been the principal dwelling house at the time (see Section 9.3.8). The lane terminated at the complex and recommenced immediately to the south, continuing downslope to the Maglin River. A well is depicted near the commencement of the lane in the field to the south of the complex, while a lime kiln is shown close to the western site boundary in an area of overgrowth. A parliamentary boundary line is depicted following the line of the Maglin River, which defines the western and southwestern sides of the proposed development site. The standing stone (CO073-103) is neither named nor depicted.

By the time of the 1903 OS 25-inch map (**Fig. 9.4**) the area of the proposed development site had been substantially altered by the construction of the CMDR, the line of which defines the northern and northeastern site boundary (**Fig. 9.4**). A level crossing now cuts through the lane from the Carrigrohane to Killumney road providing access to the settlement complex to the south. The complex itself had been expanded and modified and is named "Carriganarra". A new house had been constructed at the southern end of the laneway, accompanied by a rectangular farm building to the east. This dwelling replaced the earlier house shown on the 1842 edition and is now no longer extant; the associated farm building survives in partial form (see Section 9.3.8). To the south of the complex, the overall layout remained largely unchanged other than the removal of the south-running lane. The well is again depicted and annotated as "Well," while the lime kiln is marked "Lime Kiln (disused)." The standing stone (CO073-103) is once more not shown.

The 1939 revision of the OS 6-inch map (**Fig. 9.5**) depicts only minor changes within the development area. Field boundaries are broadly consistent with earlier editions, while limited modifications are evident within the Carriganarra settlement complex. The standing stone (CO073-103) is not depicted.



Figure 9.3 Extract from OS 6-inch map (1842) showing proposed development site (www.archaeology.ie)



Figure 9.4 Extract from OS 25-inch map (1903) showing proposed development site www.archaeology.ie

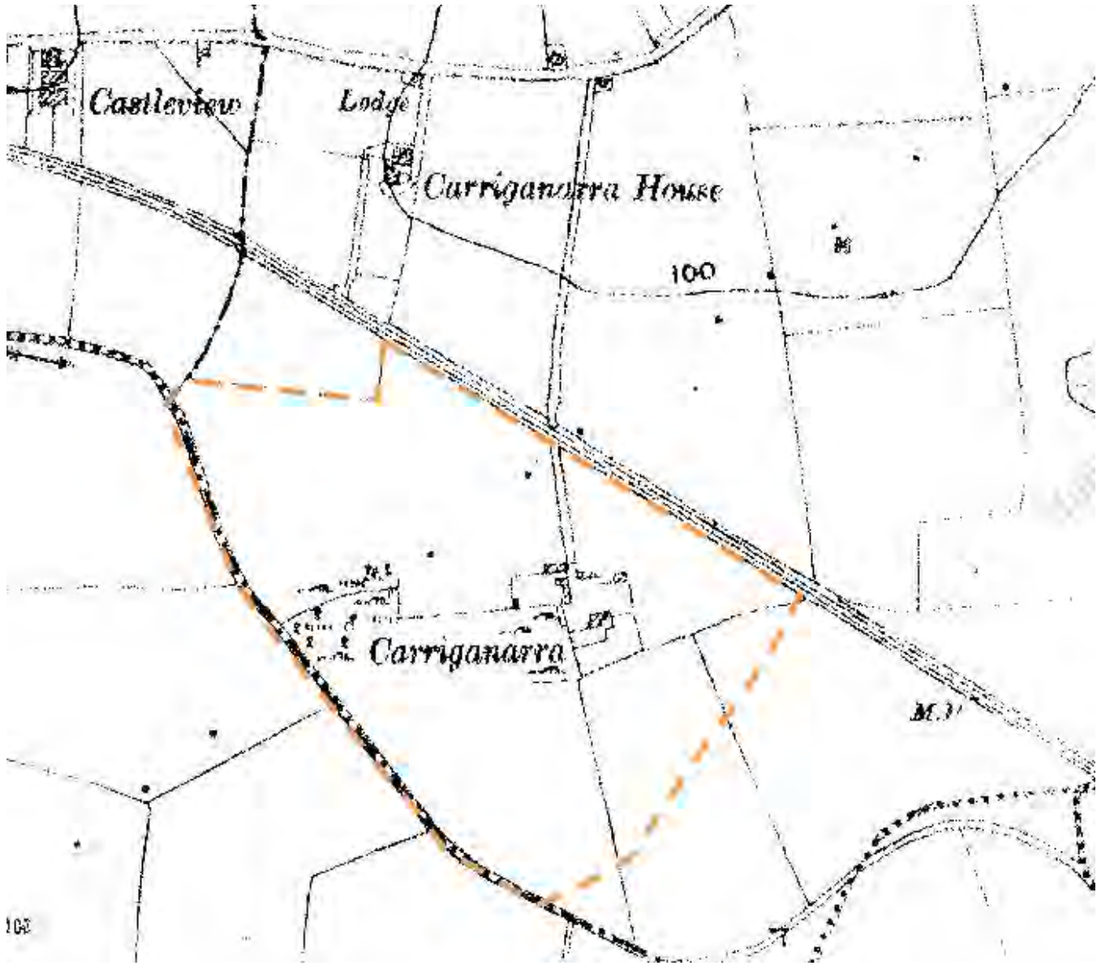


Figure 9.5 Extract from OS 6-inch map (1939) showing proposed development site www.archaeology.ie

9.3.5 Architectural Heritage

There are no Protected Structures (PSs) or other designated architectural heritage features located within the proposed development site. However, two surviving stone-built structures on the site form part of a historic complex first depicted on the 1841 OS 6-inch map (**Fig. 9.3)** and later labelled "Carriganarra" on the 1902 and 1939 OS maps (**Figs. 9.4 and 9.5**). A number of modern agricultural sheds are also present on the site.

For the purposes of this assessment, the two surviving historic buildings have been labelled B1 and B2 (see **Fig. 9.9**) and are described in detail in the walkover survey (Section 9.3.8). Both structures are of rubble limestone construction with lime mortar bonding. Building B1 retains evidence of both domestic and agricultural functions, reflecting the layered use and gradual adaptation of the Carriganarra complex over time.

In addition, the remains of a limekiln survive on the proposed development site, located between Fields 1 and 3 in an area of dense overgrowth (Section 9.3.8). Although in poor condition, the kiln retains its basic form with the west elevation retaining a partially collapsed arched draw-hole at the base. A drawn and photographic record of the kiln is provided in **Appendix 9.4**.

The nearest PS to the proposed development site is a limekiln (PS1226), which is also a Recorded Monument (CO073-064), located c.290m to the west in the townland of Maglin. This kiln, depicted on all editions of the OS maps, originally formed part of a quarry complex. Described by Power *et al*. (1997) as a well-preserved rectangular structure measuring 7m north–south by c.5.5m east–west, it is built into a break in the slope and is now heavily overgrown.

Within a 1km radius of the proposed development site, a number of PSs and NIAH-listed buildings reflect the multi-period architectural development of Ballincollig and its environs, encompassing medieval, industrial, military, religious, and domestic contexts (Fig. 9.6; Table 9.3). Ballincollig Castle (PS1225; RMP CO073-060001-), located c.1.1km west of the site, is a 15th-century tower house originally constructed by the Barrett family, later held by the McCarthys and the Earls of Clancarty. Although ruinous by the 18th century, its keep, sections of bawn wall, and associated remains survive and constitute a prominent landmark of regional archaeological and architectural significance.

The Ballincollig Gunpowder Mills, located approximately 1.6km to the north and now incorporated into Ballincollig Regional Park, represent one of Ireland's most significant industrial archaeological complexes. Established in 1794 and expanded under the British Board of Ordnance, the complex extended for c.2.4km along the River Lee and, at its peak, comprised approximately 100 buildings. While the mills lie outside the 1km study area, the associated Ballincollig Cavalry Barracks (PS1232; NIAH 20842005), located c.900m north of the site, was constructed to house the military garrison responsible for protecting the mills. The barracks complex comprises multiple ranges, stables, and ancillary buildings (NIAH 20842007–20842012; 20842014–20842018) and represents a defining example of 19th-century military architecture.

Religious and community architecture within the study area is represented by St Mary and St John's Catholic Church (PS1233; NIAH 20842021), located c.720m northwest of the site. Constructed c.1865 in a cruciform Gothic Revival style, the church occupies a prominent elevated position and reflects the religious and social development of 19th-century Ballincollig. The adjoining presbytery (NIAH 20842022), built c.1870, is a substantial detached three-bay, two-storey residence with decorative platbands and hood mouldings. A number of associated 19th-century houses and ancillary structures (NIAH 20842015–20842020; 20842023) further contribute to the architectural character of the area.

Collectively, these architectural heritage assets illustrate the diverse historic character of the wider Ballincollig area, ranging from medieval fortification to 19th-century industrial, military, religious, and domestic development. Their presence underscores the layered cultural landscape within which the proposed development site is situated.



Figure 9.6 Proposed development site (outlined in red) overlaid on Google Satellite imagery (2026), with PS (in red) and NIAH-listed structures (in white) located within a 1km radius.

PS, NIAH	Site Type	Townland	Distance
PS1225	Ballincollig Castle	Ballincollig	1.1km to W
PS1226	Limekiln	Maglin	255m to SW
PS1232 20842005	Cavalry Barracks	Ballincollig	900m to N
PS1233 20842021	St Mary & St John's Catholic Church	Ballincollig	720m to NW
20842019	House	Ballincollig	900m to NW
20842020	House	Ballincollig	880m to NW
20842022	Ballincollig Presbytery	Ballincollig	690m to NW
20842012	Outbuilding	Ballincollig	970m to NW
20842014	Store/warehouse	Ballincollig	900m to NW
20842015	House	Ballincollig	850m to NW
20842016	House	Ballincollig	850m to NW
20842017	Gates/railings/walls	Ballincollig	870m to N
20842018	House	Ballincollig	870m to N
20842023	Ard na Laoi House	Carrigrohane	1km to NE
20842008	Parnell house – Barracks	Ballincollig	980m to N
20842009	Emmet House – Barracks	Ballincollig	980m to N
20842007	Beckett House – Barracks	Ballincollig	980m to N
20842011	Pearce House – Barracks	Ballincollig	980m to N
20842005	Stables – Barracks	Ballincollig	1km to N
20842006	Stables – Barracks	Ballincollig	1km to N

Table 9.3 PS and NIAH-Listed Structures within a 1km radius of the proposed development site

9.3.6 Geophysical Survey

A pre-planning geophysical survey was commissioned by Murnane & O'Shea Group and undertaken by J. Nicholls in November 2022 under licence 22R0331 (Nicholls, 2022). At the time of survey, the development site boundary encompassed Fields 1 and 2, together with the northern half of Field 3 and Field 4. Geophysical survey was carried out within Fields 1 and 2 only; the northern half of Field 3 was excluded due to low-lying, rough ground conditions, while Field 4 was excluded due to the presence of the Carriganarra farm complex.

Following subsequent revisions to the red-line boundary, the proposed development site has been extended to include the southern half of Field 3 and northern section of Field 5. These areas were not included in the 2022 geophysical survey.

The results of the geophysical survey are illustrated on **Fig. 9.7a** and overlaid on the proposed development layout on **Fig. 9.7b**. The survey identified a circular ditched enclosure (Anomaly A), measuring approximately 16m in diameter and featuring an east-facing entrance. This feature is located c.40m southeast of the proposed greenway alignment.

Additional anomalies recorded during the survey include:

- Anomaly B: A possible associated pit situated to the southeast of Anomaly A.
- Anomaly C: Traces of early field systems to the south and west.
- Anomaly D: A sub-rectangular positive anomaly identified within an area of cultivation and geological variation.
- Anomaly E: A possible trackway, alongside other responses relating to former agricultural use, including ferrous debris, traces of field boundaries, and cultivation patterns.
- Anomalies F and G: Weak curvilinear trends, also linked to past agricultural activity.
- Anomaly H: Irregular positive responses, which may reflect either archaeological features or natural soil/geological variation.

Of the anomalies identified, Anomaly A was highlighted as being of particular archaeological significance. Its form and characteristics suggest a possible enclosure site of prehistoric or early historic date, warranting further investigation and consideration within the assessment.

Strong magnetic variation recorded to the north–northeast of the survey area corresponds with the former Great Southern Railway line. The full geophysical survey report is included in **Appendix 9.1, Volume 3**.

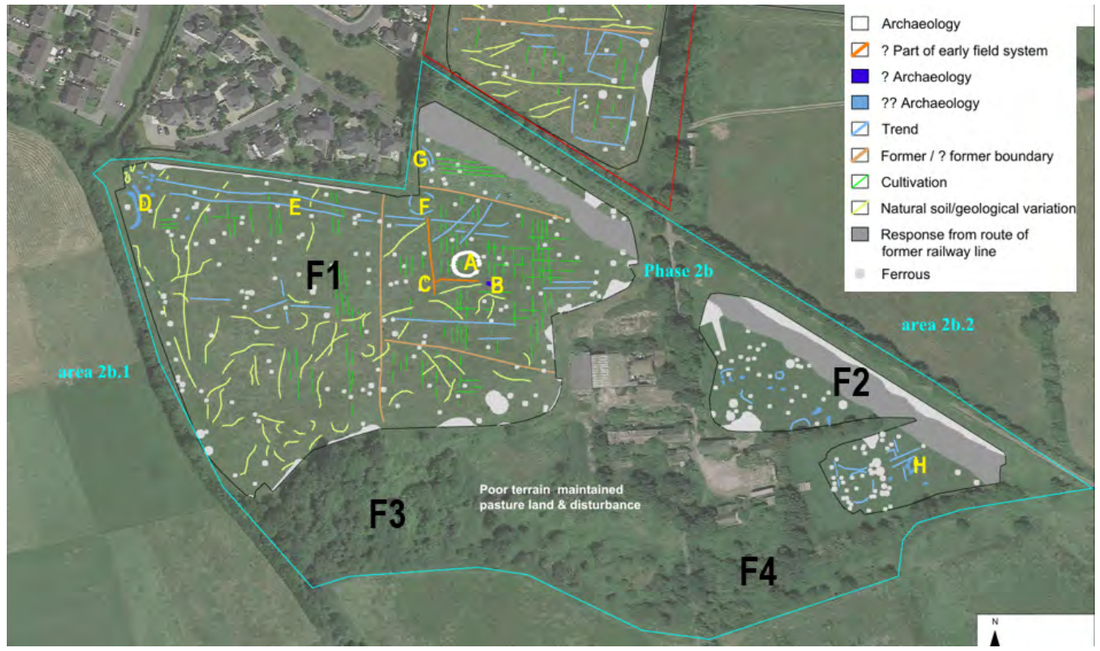


Figure 9.7a Geophysical Interpretation of the proposed development site with Anomalies A-H shown (Nicholls, 2022). Fields are numbered 1-4

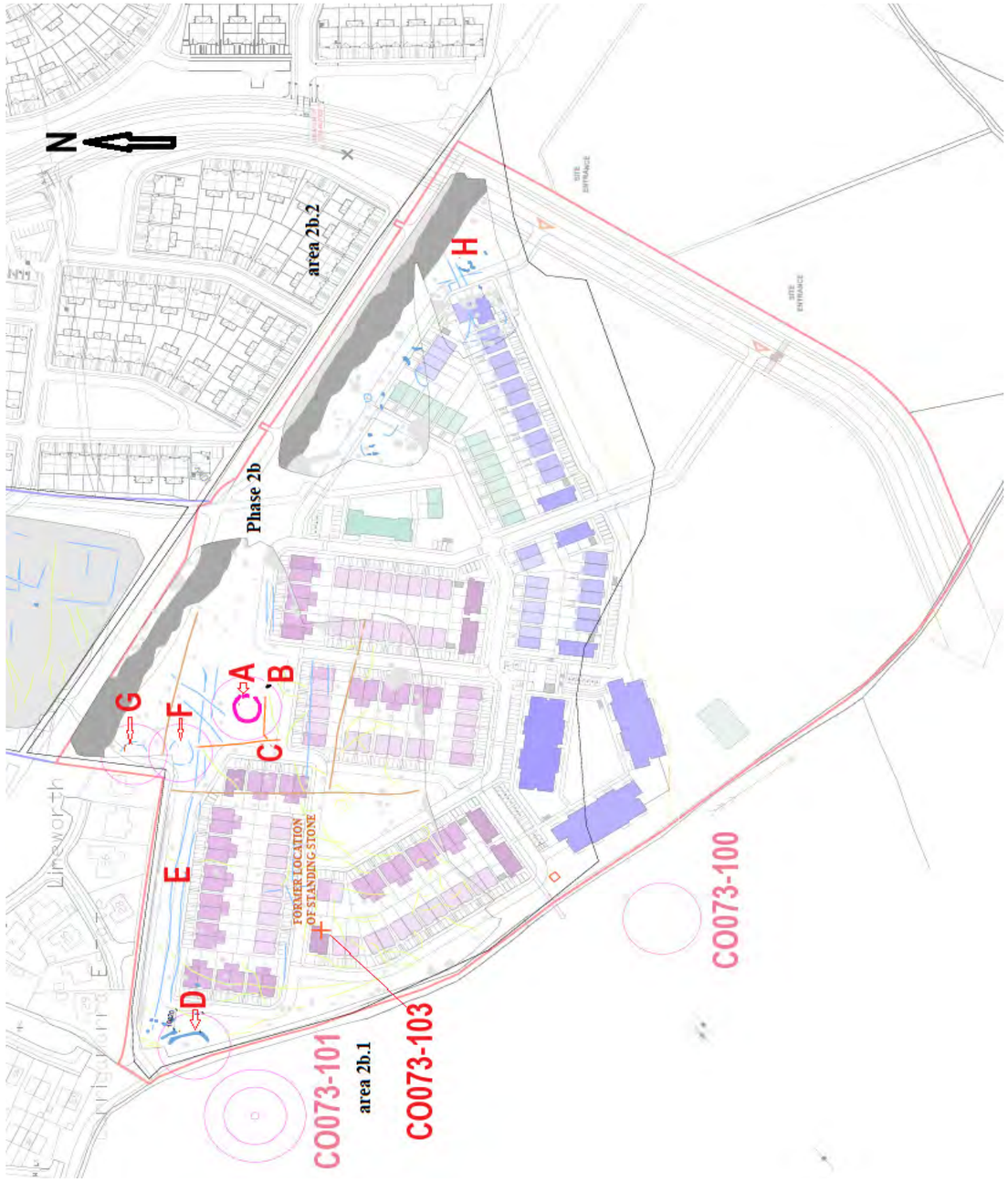


Figure 9.7b Proposed development site layout showing the location of the recorded site of the standing stone (CO073-103) and geophysical anomalies A to H (Source: Deady Gahan Architects).

9.3.7 Archaeological Testing

In consultation with the City Archaeologist, two phases of archaeological testing were undertaken following the geophysical survey: one across the proposed LRD site and a second along the proposed Greenway at the northern end of the site.

LRD Testing

Archaeological testing of the LRD lands was carried out on the 26th of September and the 1st and 2nd of October 2024 under licence 24E0785 (Purcell, May 2025). Twenty-six trenches (Trenches 1–26; **Fig. 9.8a**) were excavated with particular attention given to the geophysical anomalies. Weather conditions were generally dry and overcast. All trenches were mechanically excavated using a grading bucket and measured 2.2 m in width.

Archaeological testing was undertaken across four fields (Fields 1, 2, 3, and 5) within the development site. Fields 1 and 2 had previously been subject to geophysical survey. Although adverse ground conditions had precluded geophysical survey in the northern half of Field 3, this area, together with the southern half of the field, was subsequently subject to test trenching. Field 5 was also tested. Field 4 was not tested due to the presence of upstanding buildings associated with the Carriganarra farm complex.

The character of the tested fields is summarised as follows;

- **Field 1:** Fairly level pasture where the standing stone (CO073-103) had been previously located. Trench 7 was positioned to investigate the recorded location of this stone. The southeastern portion of the field, adjacent to a settlement complex, showed evidence of disturbance, including several piles of stone and redeposited material.
- **Field 2:** Rough pasture, partially divided by discontinuous dense hedgerows and bounded to the west by the laneway to and the grounds of the Carriganarra complex.
- **Field 3:** Heavily overgrown ground sloping southwards towards boggy terrain with dense reed and bog grass cover. The overgrown remains of a limekiln are located at the northern end of this field.
- **Field 5:** Low-lying, boggy ground, also densely overgrown with reeds and bog grasses.

Testing was undertaken to inform the proposed LRD layout. No trenches were excavated across Anomaly A, which will be preserved *in situ*. Trench 7 was specifically designed to investigate the recorded location of the removed standing stone (CO073-103). No definitive evidence for the former stone was identified. Purcell (*ibid.*) suggested that a circular feature identified in the trench may represent its former position; however, given that the stone is described by the ASI as a narrow slab 0.6 m × 0.17 m and orientated east–west, the feature was considered more likely to represent a posthole rather than a socket.

Two postholes: Two additional features of possible archaeological significance were identified in Field 1: a posthole in Trench 2 and a second in Trench 3. These features, along with the circular feature in Trench 7, are considered to be of archaeological origin. A linear feature identified in Trench 18 may related to the former uprooting of limestone; however, an archaeological interpretation cannot be excluded. No features of archaeological potential were identified in either Field 3 or 4.

Summary: Archaeological features of note were confined to Field 1, where three possible postholes were identified, together with a further linear feature of uncertain origin in Trench 18. Overall, the testing results indicate limited archaeological potential across the LRD lands, with the principal focus of archaeological interest centred on the recorded location of the former standing stone (CO073-103). The full archaeological testing report for the LRD area is included in **Appendix 9.2a; Volume 3.**



Figure 9.8a Test trenches excavated across the proposed development site, overlaid on the preliminary development layout and red line boundary prepared by Deady Gahan Architects (layout current at time of testing, October 2024). Trench layout by Lane Purcell Archaeology. Fields F1-F5 labelled.

Greenway Testing

Archaeological testing along the greenway was undertaken in September 2024 under licence 23E1029 (Purcell, August 2025). A total of five trenches (Trenches 35–39; **Fig. 9.8b**) were excavated to investigate anomalies identified during geophysical survey (Anomalies D–G). Trenches measured 2.2m in width, with the exception of Trench 38, which was extended to the northern field boundary. Weather conditions during testing were mixed, with periods of heavy rain.

The trenches were positioned to the south of a dense hedgerow extending east from the Maglin River for c.150m, before turning north and then southeast along the former Cork–Macroom Railway line.

- **Trench 35 (Anomaly D):** Anomaly D was identified during the geophysical survey as a sub-rectangular positive response, initially interpreted as potentially representing part of an enclosure extending beyond the site boundary. Its location on a steep west-facing slope, in proximity to former cultivation patterns and areas of natural soil and geological variation, suggested that a non-archaeological origin was also possible. Targeted archaeological testing revealed no archaeological features or deposits. The anomaly was determined to correspond to sterile, stony and gritty bands within the subsoil, interpreted as natural variation influenced by slope processes or historical land use. As Anomaly D lies outside both the LRD and Greenway footprints, it was not comprehensively tested and a tentative archaeological origin cannot be entirely discounted. No further intrusive investigation was considered warranted, as the anomaly lies fully outside the proposed development footprint and will remain undisturbed.
- **Trenches 36 and 37 (Anomaly E):** Anomaly E was poorly defined and, following archaeological testing, was found to correspond with natural geological or soil variation. No archaeological features were identified.
- **Trench 38 (Anomaly F):** Revealed the levelled remains of a shallow ring-ditch, which re-cut an earlier and more substantial ditch or deposit, likely representing an earlier phase of the same monument. Only a limited section of the feature was excavated, with the interior left undisturbed. The curvature of the ditch corresponded closely with that recorded in the geophysical survey, which described the feature as comprising "weakly magnetic curvilinear trends… barely visible above the magnetic background" (Nicholls, 2022). Although less distinct than Anomaly A, Anomaly F is similar in overall form. A third phase of activity was represented by a grave cut into the ditch containing the remains of a single individual (Sk1). Osteological analysis identified the individual as a probable female aged between 17 and 25 years, with evidence of a chronic ear infection and moderate dental health (Ní Challanáin, 2025). The burial was supine and extended, oriented east–west, a rite commonly adopted in the 5th–6th centuries AD. A single monochrome blue glass bead of squat barrel form and semi-translucent appearance was recovered from the burial. Comparable beads are known from Iron Age funerary contexts (O'Sullivan, 2025) and may have functioned as a talisman. The stratigraphy and sequence of deposits suggest that the monument retained visibility and ritual significance over an extended period, with re-use for burial during the early medieval period. Radiocarbon dating of the remains will be undertaken to establish a calibrated date for the burial.
- **Trench 39 (Anomaly G):** Trench 39 exposed two features corresponding with weak curvilinear trends identified during the geophysical survey. The northern feature (Anomaly G) comprised a 2.6 m wide band of gravel-rich, charcoal-flecked clay, similar in character to the ring ditch recorded in Trench 38. Neither feature was subject to further investigation, as the archaeological significance of the area had already been established.

Summary: Archaeological testing along the greenway confirmed the presence of significant archaeological deposits, most notably the remains of a prehistoric ring ditch (Anomaly F) exhibiting at least two phases of construction and subsequent re-use for burial. The ring ditch, associated human remains, and artefactual evidence indicate activity spanning from the Bronze/Iron Age through to the early medieval period. These findings demonstrate that the proposed greenway route intersects an area of substantial archaeological importance. The full archaeological testing report for the Greenway area is provided in **Appendix 9.2b; Volume 3** and includes an Osteological Report (Appendix 1) detailing the inhumation excavated within Anomaly F together with a report on the glass bead recovered from the burial (Appendix 2).



Figure 9.8b Trenches 35-39 overlaid on geophysical survey interpretation (Nicholls 2022), with trench locations added by Lane Purcell Archaeology

9.3.8 Walkover Survey

The proposed development site is situated in the fertile lowland valley of the Maglin River, in the townland of Carrigrohane, Ballincollig, Co. Cork. The site is bounded to the north by modern residential development, while the surrounding lands to the south, east, and west remain in agricultural use. It comprises three pasture fields (Fields 1–3), the area of the Carriganarra farm complex (Field 4) and a portion of one additional field (Field 5) at the southwestern extent of the townland, adjacent to the Maglin River. The N22 Ballincollig Bypass, constructed in the early 2000s, lies c.330m to the east and c.460m to the south.

The site was inspected in May 2024, and again in May and September 2025, in dry, bright weather conditions. The purpose of the walkover survey was to assess the physical environment in which the development will take place and to identify any features of cultural heritage significance or Areas of Archaeological Potential (AAP). Current land use, local topography, and environmental conditions were examined to provide an overall picture of the area. The proposed development site is outlined on the aerial photograph in **Figure 9.9**, with photographs from the survey included in **Appendix 9.3**. Each of the five fields which comprise the proposed development site are described below.

Field 1

Field 1 is a fairly level, irregularly shaped pasture field. The northern boundary adjoins the Limeworth and Heathfield residential developments, while the northeastern boundary follows the former line of the CMDR (later GS&WR). Modern farm buildings associated with the Carriganarra complex lie to the southeast, and rough ground containing a limekiln is present to the south.

The recorded site of a standing stone (CO073-103) is located in the western portion of this field. Archaeological testing carried out in May 2025 (Purcell, 2025) investigated the location of this removed monument. No definitive evidence for the stone was identified; however, a circular feature recorded within Trench 7 may represent its former location. Given that the stone was described in the ASI Database as a narrow slab measuring 0.6m × 0.17m and orientated east–west, the feature was considered more plausibly to represent a posthole rather than a stone socket.

The western boundary of Field 1 is defined by the Maglin River, which marks the historic division between the townlands of Carrigrohane and Maglin. This boundary also separates the civil parishes of Carrigrohane and St Nicholas and coincides with the boundary of the Barony of East Muskerry. On the 1841 OS map, the river is additionally shown as a parliamentary boundary, reflecting its role in defining 19th century electoral constituencies, a function that lapsed following boundary revisions in the late 19th century and became obsolete after the establishment of the Irish Free State in 1922. This layering of administrative designations illustrates the long-standing use of rivers as territorial boundaries within the landscape.

Field 2

Field 2 is a fairly level, roughly triangular pasture field located between the Heathfield residential development to the northeast and the Carriganarra farm complex to the southwest. The field is partially subdivided by an internal boundary. Its northeastern edge follows the former CMDR alignment, while the western boundary is defined by the access track leading to the Carriganarra complex, with part of the complex forming the field edge. The southern and southeastern boundaries are enclosed by a hedgerow.

Field 3

Field 3 is a roughly square pasture field located on the western side of the site. The northern half comprises rough pasture with heavy weed growth (including dock and thistle) and slopes steeply downwards into the southern half, which consists of low-lying boggy grassland characterised by rushes, indicative of poor drainage.

Archaeological testing (Purcell, May 2025) demonstrated that the raised northern portion of the field has been subject to previous disturbance and artificial build-up. Trenches 9–12 revealed fill deposits comprising clay mixed with concrete, plastic, and wood to depths of up to 1.5m at their northern ends. In contrast, the southern ends of these trenches appeared largely undisturbed, aside from a machine-cut trench crossing the southern portion of the field. Trenches 13, 14 and 15, excavated in the southern half of Field 3, revealed silty clay subsoil which rapidly filled with water during excavation, confirming the low-lying and poorly drained nature of this area.

The western boundary of Field 3 is formed by the Maglin River, again marking the historic townland and parish boundary between Carrigrohane and Maglin (parish of St Nicholas). The northern boundary contains rough ground within which a limekiln is located, while the eastern boundary is defined by a hedgerow to the south and the Carriganarra complex to the north.

The limekiln is constructed of locally quarried limestone rubble bonded with lime mortar. Rectangular in external plan, its east, south, and west elevations survive to near full height. The west elevation retains a partially collapsed arched draw-hole at the base, showing cracking, displacement, and vegetation damage. The south elevation is largely intact but exhibits bulging at the base, displaced corners, and dense overgrowth, while the east elevation is heavily weathered with significant loss of pointing. Despite its poor condition, the kiln retains its overall form and represents a typical example of a vernacular field limekiln, once widespread across rural Ireland during the 18th and 19th centuries.

The kiln will be removed to facilitate development. A drawn and photographic record of the structure is provided in **Appendix 9.4.** The low-lying southern portion of Field 3 is considered an Area of Archaeological Potential, given the environmental conditions conducive to the survival of fulachtaí fia.

Field 4

Field 4 comprises an overgrown, irregularly-shaped parcel containing the remains of the Carriganarra farm complex, accessed via a tree-lined laneway from Heathfield. Dense vegetation, including nettles, thistle, tall grasses, obscures much of the ground surface. Two derelict stone-built structures survive within this field (Buildings 1 and 2; **Fig. 9.9**).

- Building 1: A roofed, two-storey stone-built structure corresponding to a footprint shown on the 1841 OS 6-inch map (**Fig. 9.3**). Constructed of random rubble limestone with lime mortar pointing, the gable-ended building retains a pitched slate roof, much of which remains intact though obscured by vegetation. The south-facing elevation includes a central doorway flanked by ground-floor window openings, with smaller openings above, consistent with a domestic plan form. Several openings have been blocked or altered, and the east gable was adapted in the 20th century using corrugated sheeting and blockwork for agricultural purposes. Traces of limewash and internal plaster survive in poor condition. Loss of pointing, vegetation growth, and structural cracking, particularly around openings, are evident. The structure is interpreted as a former dwelling, later adapted for agricultural use, and represents a legible example of 19th century vernacular architecture despite its ruinous condition
- Building 2: A rectangular rubble-limestone outbuilding located southeast of Building 1. This roofless structure is heavily overgrown and does not appear on the 1841 OS map, but is depicted on the 1903 edition. Its southern wall survives to full height and contains slit vents characteristic of a hay barn or storage building. Upper courses were rebuilt in blockwork during the 20th century, reflecting later modification. Vegetation growth and the absence of a roof have left the structure vulnerable to ongoing deterioration.

To the west of B2 are the overgrown rubble remains of a later house, shown on the 1903 OS map at the eastern end of the laneway. The house was reportedly demolished following a fire, though its collapsed fabric remains visible.

Field 5: Field 5 comprises the northern portion of a large field sloping southwest from the Carriganarra complex. The ground is low-lying and boggy, characterised by reeds and coarse grasses. These wet ground conditions render the field an Area of Archaeological Potential, with an environment favourable to the preservation of fulachtaí fia.

No sites or features of archaeological potential were noted in the course of the field inspection.



Figure 9.9 Proposed development site (outlined in red) on Google Satellite imagery (2026). Fields (F1-F5) and Buildings (B1-B2) shown with closest RMP sites in red (to be prefixed with (CO073).

9.4 Assessment of Impacts

The assessment of potential impacts, both direct and indirect, arising during the construction and operational phases of the proposed development has been carried out in accordance with Guidelines on the Information to be contained in Environmental Impact Assessment Reports (EPA 2022).

9.4.1 Do-Nothing Impacts

If the proposed development does not proceed, the landscape will remain in its current condition. Any subsurface archaeological features present would remain undisturbed.

9.4.2 Construction Phase Impacts

9.4.2.1 Direct Impacts

9.4.2.1.1 Archaeological Heritage - Registered Monuments

Standing Stone (CO073-103)

This monument was recorded by the Archaeological Survey of Ireland (ASI) in 1995 as a thin upright slab measuring 0.6 m × 0.17m and standing to a height of 1.2m. The stone was no longer present at the time of inspection for this EIAR in 2024, indicating the visible element had been removed prior to this assessment. Archaeological testing (Trench 7) did not identify definitive evidence for a stone socket or associated features (Purcell, May 2025); a circular feature recorded in the trench was considered more likely to represent a posthole than a stone socket.

Although the stone itself has been removed, the site remains a Recorded Monument (CO073-103), and the potential for subsurface archaeological remains associated with the monument's former location and its wider prehistoric landscape context cannot be entirely discounted, particularly given the presence of ring-ditch features (A, F and G) identified within the same field.

Effect: Direct, Moderate Negative, Permanent - reflecting the loss of any surviving archaeological context associated with the recorded monument site, noting that the above-ground element had already been removed prior to the proposed development.

9.4.2.1.2 Archaeological Heritage - Unregistered Monuments

Prehistoric Ring-ditch (Anomaly A)

Anomaly A was identified during the geophysical survey as a possible prehistoric ring-ditch but was not subject to archaeological testing. The feature will be preserved *in situ,* with a 10m buffer zone incorporated into the LRD design layout, ensuring that no ground disturbance occurs within its extent.

- **Effect:** Indirect, Neutral, Permanent – due to full preservation *in situ* with an appropriate buffer zone.

Prehistoric Ring-ditch (Anomaly F)

Archaeological testing along the Greenway corridor confirmed the presence of a prehistoric ring-ditch with evidence for subsequent early medieval reuse, including a human burial (Sk1) accompanied by a glass bead. The burial was excavated under licence (23E1029) and preserved by record.

The LRD development layout has been revised to maintain a buffer distance of 10m from the ring-ditch. While the proposed Greenway will traverse part of the site, it will be constructed on a no-dig basis, ensuring that the monument is preserved *in situ* with no disturbance to underlying archaeological deposits.

- **Effect on the ring-ditch:** Indirect, Slight Negative, Long-term, Not Significant – due to preservation *in situ*.
- **Effect on the excavated human remains:** Direct, Moderate Negative, Permanent – due to preservation by record.

Prehistoric Ring-ditch (Anomaly G)

Archaeological testing identified two curvilinear features interpreted as elements of a possible ring ditch. These features were not fully excavated and will be preserved *in situ* within the footprint of the proposed Greenway. Construction of the Greenway will be undertaken on a no-dig basis, ensuring no disturbance to the underlying archaeological deposits.

- **Effect:** Indirect, Neutral, Permanent – due to preservation *in situ*.

Two postholes and a possible linear feature

Archaeological testing in Field 1 identified two isolated postholes, one located in Trench 2 and another in Trench 3. A linear feature recorded in Trench 18 may relate to the former uprooting of limestone, although an archaeological origin could not be fully excluded. These features lie within the footprint of the proposed LRD development and will be directly impacted.

- **Effect:** Direct, Slight Negative, Permanent – due to their removal and loss of archaeological context.

Possible Archaeological site (Anomaly D)

Anomaly D was identified during geophysical survey but targeted archaeological testing (Trench 35) identified no archaeological features or deposits. The anomaly was interpreted as most likely representing natural soil or geological variation. As Anomaly D lies outside both the LRD and Greenway footprints, no direct impacts will occur. While a tentative archaeological origin cannot be entirely discounted, the absence of ground disturbance in this area ensures preservation *in situ*.

- **Effect:** Indirect, Neutral, Permanent

9.4.2.2 Indirect Impacts

No significant indirect impacts are anticipated. The ring-ditches identified as Anomalies A, F and G have been incorporated into the development layout and are protected within designated buffer zones, ensuring their preservation *in situ*.

9.4.2.3 Potential for Previously Unknown Archaeological Sites or Features

Ground reduction, topsoil stripping, and associated construction works have the potential to impact previously unrecorded archaeological remains. Given the site's greenfield character and its established moderate–high archaeological potential, additional discoveries are possible.

- **Effect:** Potential direct, Negative, of uncertain magnitude and significance – dependant on the nature and extent of any previously unknown archaeological deposits encountered during construction.

9.4.2.4 Architectural Heritage – Registered Structures

There are no PSs listed in the CCDP or NIAH-listed structures located on the proposed development site.

- **Effect:** No direct effect on registered architectural heritage.

9.4.2.5 Architectural Heritage – Unregistered Structures

Building 1 (vernacular house)

The vernacular dwelling, currently in disrepair, will be retained and sensitively repurposed into two residential units, ensuring the preservation of its character and historic footprint within the development.

Effect: Direct, Positive, Long-Term.

Building 2 (roofless outbuilding with later blockwork)

This structure, which has undergone later modifications and retains limited architectural significance, will be demolished to facilitate the development.

- **Effect:** Direct, Slight Negative, Permanent

Limekiln

A limekiln, recorded on all three editions of the Ordnance Survey maps. This limekiln will be demolished in advance of development.

- **Effect:** Direct, Moderate Negative, Permanent.

9.4.3 Operational Phase Impacts

The ring-ditches (Anomalies A, F, and G) identified through geophysical survey and archaeological testing will be preserved in situ within the completed development. Anomaly A will be incorporated into publicly accessible green space, while Anomalies F and G will remain protected beneath the no-dig Greenway. Anomaly D also lies outside the development footprint and will remain in situ.

During the operational phase, no significant direct or indirect archaeological impacts are anticipated. The agreed mitigation measures, developed in consultation with the Cork City Council Archaeologist, will ensure the sensitive integration of these monuments into the landscape and support their long-term protection within the final scheme.

9.4.4 Visual Impact Assessment

9.4.4.1 Registered Archaeological and Architectural Heritage

One recorded archaeological monument lies within the footprint of the proposed development: the site of a standing stone (CO073-103). As the stone is no longer extant and has no above-ground visibility, it makes no contribution to the existing visual environment.

The nearest recorded archaeological sites consist of two fulachtai fia (CO073-100 and CO073-101), neither of which has surface expression or any visual presence in the contemporary landscape. The limekiln (CO073-064) survives as an upstanding structure; however, it is heavily overgrown and is not visible from the proposed development site.

Maglin House (CO073-097), a late 18th/early 19th-century residence, is similarly screened from the site by intervening farm buildings and dense hedgerows. Accordingly, no significant visual impacts on Maglin House, the limekiln, or any other recorded archaeological or architectural heritage assets are anticipated as a result of the proposed development.

9.4.4.2 Ballincollig Castle

The most visually prominent heritage site in the area is Ballincollig Castle (CO073-062, CO073-062001), its enclosing bawn, and an associated cave (CO073-062002), located approximately 1.1km to the west. A Landscape and Visual Impact Assessment conducted by Model Works Ltd (Chapter 3), concluded that views to and from the castle are very limited due to intervening hedgerow vegetation.

- **Effect:** Neutral, Not Significant.

9.4.4.3 Other Registered Monuments in the Study Area

There are a total of 26 other registered archaeological monuments in the Study Area. Of these, 14 sites were excavated and preserved by record in advance of the N22 Ballincollig Bypass construction, and no longer form part of the visible cultural landscape. Of the remaining 12 monuments:

- Nine sites - including a church (CO085-136), graveyard (CO085-136001), standing stone (CO073-074), a ringfort and souterrain (CO073-082, CO073-08200), two fulachtai fia (CO085-127 and CO073-065), an enclosure (CO073-150) and a burnt spread (CO073-161) – survive entirely as subsurface features with no visible surface expression.
- One site, a quarry (CO073-029), is listed in the RMP but is not considered an archaeological monument in the ASI database.
- Two sites, a standing stone (CO073-066) and Maglin Bridge (CO073-063), are located at a sufficient distance from the proposed development site that no visual impacts will arise.

None of these monuments are intervisible with the proposed development site and their settings are screened by topography, mature vegetation, and surrounding built form.

9.4.4.4 Visual Impact Conclusion

The proposed development will not result in any significant visual impact on the archaeological or architectural heritage of the area for the following reasons:

- The subsurface or removed nature of nearby archaeological features;
- The lack of visual connectivity between the site and significant heritage assets;
- The effective screening provided by topography, vegetation, and existing development.

9.4.5 Worst Case Scenario

In the absence of mitigation, the worst-case scenario would involve the accidental disturbance, damage, or destruction of archaeological features identified during geophysical survey and archaeological testing or of previously unrecorded archaeological features encountered during construction. Such impacts would constitute a significant adverse effect, resulting in the permanent loss of irreplaceable archaeological evidence and a reduced understanding of the area's historical development.

9.4.6 Cumulative Impacts

One registered archaeological monument – the site of a standing stone (CO073-103) – lies within the proposed development site. No protected architectural structures are present. However, geophysical survey and targeted archaeological testing have identified three archaeologically significant features (Anomalies A, F and G) and there remains a potential for further discoveries during construction.

Cumulative effects may arise in combination with:

- The proposed LRD and Greenway development in the adjacent townland of Maglin, where archaeological testing identified two prehistoric pits and geophysical survey identified a double ditched enclosure c. 45m in diameter, a probable ring ditch and confirmed the presence of the two recorded fulachtaí fia/ burnt spreads (CO073-100 and CO073-101) (Purcell and O'Leary 2024 and Dowling 2022).

While the scheme contributes to the ongoing urbanisation of the area, the implementation of appropriate mitigation measures — including preservation by record, archaeological monitoring, and targeted excavation where required — will ensure that cumulative impacts on the cultural heritage resource remain not significant.

The potential cumulative impacts of the relevant plan for the area was assessed, which is considered to be the Cork City Development Plan 2022. The assessment of the potential impacts on the environment of the Cork City Development Plan 2022 was undertaken utilising the Strategic Environmental Objectives (SEOs) which are detailed in Table 5.1 of the CDP's Strategic Environmental Assessment. The potential cumulative impacts of the Plan were assessed having regard to these SEO's. Table 5.1 of the SEA identifies the SEO' for 'Cultural Heritage' as being to.

'Protect places, features, buildings and landscapes of cultural archaeological or architectural heritage. '

Table 7.5 of the CDP's Strategic Environmental Assessment, 'Comparative Assessment of each of the Alternatives against Strategic Environmental Objectives' indicates that Alternative/Scenario 3 'Compact Liveable Growth', the 'Selected Scenario' has positive interactions with the status of the SEO for ''Cultural Heritage'.

9.5 Mitigation Measures

9.5.1 Incorporated Design Mitigation

9.5.1.1 Archaeological Heritage – Registered Monuments

Standing Stone (CO073-103)

The circular feature identified during archaeological testing will be excavated in advance of construction to confirm whether it represents the former socket of the standing stone. The surrounding area will be subject to targeted topsoil stripping and archaeological inspection to identify any associated features. Should further remains be identified, mitigation will be agreed in consultation with the Cork City Archaeologist.

9.5.1.2 Archaeological Heritage – Unregistered Monuments

Prehistoric Ring-ditch (Anomaly A)

Anomaly A, interpreted as a prehistoric ring-ditch, will be preserved *in situ* within the open-space zone of the proposed development.

- A minimum 10m buffer zone will be maintained from the edge of the site as defined by the geophysical survey, within which no ground disturbance, construction activity, or installation of services will occur.
- The monument and buffer zone will be securely fenced during construction, clearly marked on drawings, and communicated to contractors and landscape teams.
- No service runs, drainage cuts, temporary works compounds, or machinery laydown areas will be permitted within the buffer zone.
- The ring ditch will remain as a grassed area within the public open space.
- Discreet heritage interpretation, such as a low-level information panel, will be incorporated to acknowledge the enclosure's significance and provide educational and amenity value to the local community. The scale, design and placement of any interpretation will be agreed in advance in consultation with the City Archaeologist.

These measures will ensure that the ring-ditch is physically protected, visually respected, and meaningfully integrated into the overall public realm, in accordance with guidance from the National Monuments Service and Cork County Council.

Prehistoric Ring-ditch (Anomaly F)

Anomaly F, comprising a prehistoric ring-ditch with evidence for later reuse, will be preserved *in situ* beneath the proposed Greenway.

- A minimum 10m buffer zone will be maintained from the edge of the monument, as defined by geophysical survey, within which no ground disturbance, service installation, or construction activity will occur.
- The monument and buffer zone will be securely fenced, clearly shown on drawings, and communicated to all contractors and landscape teams.
- The Greenway will be constructed using a no-dig, floating road/path methodology to ensure preservation in situ, including;
  - » Avoidance of excavation and ground reduction
  - » Retention of existing vegetation and topsoil
  - » Use of load-distributing surfacing materials

  - » Prevention of loading on underlying deposits
  - » Exclusion of drainage cuts, service trenches, or subsurface works
- Discreet heritage interpretation, such as a low-level information panel, will be installed to acknowledge the significance of the ring-ditch and provide educational and placemaking value for the local community. The scale, design and placement of any interpretation will be agreed in advance in consultation with the City Archaeologist.

These measures will ensure full physical protection and sensitive integration of Anomaly F within the proposed Greenway, while maintaining legibility and public awareness of the site's archaeological importance. Full technical details of the greenway methodology are provided in **Appendix 9.5**.

Prehistoric Ring-Ditch (Anomaly G)

Anomaly G, comprising two curvilinear features interpreted as elements of a possible ring ditch, will be preserved *in situ* beneath the proposed Greenway.

- A minimum 10m buffer zone will be maintained from the edge of the site, as defined in the geophysical survey, within which no ground disturbance, construction activity, or installation of services will occur.
- The monument and buffer zone will be securely fenced during construction, clearly marked on drawings, and communicated to all contractors and landscape teams.
- As with Anomaly F, this section of the Greenway will be constructed using a no-dig floating road/path methodology (**Appendix 9.5**) to ensure no direct or indirect disturbance to archaeological remains.
- Discreet heritage interpretation, such as a low-level information panel, will be installed to acknowledge the significance of the ring-ditch and provide educational and placemaking value for the local community. The scale, design and placement of any interpretation will be agreed in advance in consultation with the City Archaeologist.

These mitigation measures will ensure the preservation *in situ* of Anomaly G, protecting the monument from construction and operational impacts and integrating it meaningfully into the completed Greenway.

Two postholes and a possible linear feature

Archaeological testing in Field 1 identified two isolated postholes (in Trenches 2 and 3) and a possible linear feature (in Trench 18). These features will be fully excavated in advance of construction, and the surrounding areas will be subject to targeted topsoil stripping to establish whether any associated features are present. If additional archaeological remains are identified, appropriate mitigation will be agreed in consultation with the Cork City Archaeologist.

Possible Archaeological Site (Anomaly D)

Anomaly D, originally identified during geophysical survey as a sub-rectangular positive response, will be preserved in situ within an area of open ground located outside the LRD and Greenway footprints.

- A 10m buffer zone will be maintained from the edge of the site as defined by the geophysical survey, within which no ground disturbance, construction activity, or installation of services will occur.
- The buffer zone will be securely fenced, clearly shown on drawings, and communicated to all contractors and landscape teams.
- As the feature is not affected by construction and will remain undisturbed, no further archaeological investigation is proposed at this time. The area will be retained as open ground and preserved in situ.

These measures will ensure the continued protection of Anomaly D and avoid any direct or indirect impacts arising from the proposed development.

9.5.1.3 Indirect Impacts

No significant indirect effects on the newly identified ring-ditches are anticipated. These monuments have been incorporated into the development layout and will be protected within designated buffer zones, ensuring their preservation *in situ*.

9.5.1.4 Potential for Previously Unknown Archaeological Sites

Much of Ireland's archaeological resource survives as unrecorded subsurface remains. The proposed construction involves topsoil stripping and ground reduction, which may directly impact such features. Given the greenfield nature of the site and its moderate–high archaeological potential:

- Licensed archaeological monitoring of all topsoil removal will be undertaken during construction.
- If archaeological features or deposits are revealed, the NMS and the Planning Authority will be consulted in line with *Framework and Principles for the Protection of the Archaeological Heritage* (1999).
- Newly identified archaeological sites will be preserved *in situ* or by record, with sufficient time and resources allowed to resolve archaeological matters.
- Preservation by record will involve full excavation of archaeological material, carried out to professional standards of practice (*Policy Guidelines on Archaeological Excavation* – DAHGI).
- All costs will be met by the developer.

9.5.1.5 Architectural Heritage – Registered Structures

There are no PSs, NIAH-listed structures, or ACAs located within the proposed development site. Accordingly, no specific mitigation measures are required in respect of registered architectural heritage.

9.5.1.6 Architectural Heritage – Unregistered Structures

Building 1

The proposal seeks to sensitively repurpose the existing vernacular stone farmhouse which is in significant disrepair into 2 no. 2-bed semi-detached dwellings located in the historic heart of the proposed residential development.

The design strategy specifically:

- Prioritises the retention and reuse of the original stone fabric where possible, preserving the building's character and embodied heritage
- Draws form, scale, and materiality directly from the historic farmhouse and cluster of associated farm buildings, with subtle references to traditional detailing
- Incorporates a roughcast or lime render to complement the traditional character of the building
- Places new and adapted openings in alignment with existing openings where possible
- Provides traditional-style windows and doors to reinforce the vernacular appearance and ensure the development responds positively to the building's overall context.

These measures ensure the building's survival, safeguard its historic character and secure long-term viable use, representing an enhancement to the built heritage resource within the development site.

Vegetation will be cleared from the building under archaeological supervision and a full photographic and written record of the structure will be undertaken in advance of any intervention.

Building 2

This structure will be demolished. Prior to demolition, vegetation will be cleared and a comprehensive photographic record will be undertaken to professional standards. Archaeological monitoring will be carried out during demolition to record any subsurface remains or features revealed.

Limekiln (between Fields 1 and 3)

This structure will be demolished. A full and comprehensive drawn and photographic record (**Appendix 9.4**) has been undertaken to professional standards. Archaeological monitoring will be undertaken during demolition to document the structure and identify any associated subsurface deposits.

9.5.2 Operational Phase Mitigation

The archaeological features identified within the proposed development, namely the prehistoric ring ditches (Anomalies A, F and G), will be subject to long-term protection measures designed to ensure their continued preservation in situ and appropriate integration within the completed scheme.

Prehistoric Ring-ditch (Anomaly A) – Public Open Space within LRD

Anomaly A will be retained within an area of public open space where:

- Following completion of construction, the monument footprint and its 10m buffer zone will be retained as protected open space and managed to prevent any future ground disturbance.
- The area will be maintained as grassed open space, avoiding deep-rooting vegetation that could impact subsurface deposits.
- Any future maintenance or upgrading works within this zone will be subject to consultation with the Planning Authority and, where required, archaeological supervision.
- Discreet heritage interpretation (e.g. low-level information signage) will promote public awareness while ensuring no physical impact on the monument.

Prehistoric Ring-ditches (Anomalies F and G) – Greenway Section

Anomalies F and G will remain preserved beneath the Greenway, which has been specifically designed using a no-dig, load distributing construction methodology. During operation:

- The completed Greenway structure will continue to function as a non-intrusive floating construction and future maintenance works will be limited to surface works only.
- Such maintenance works will be limited to surface repairs that do not disturb underlying deposits.
- Any proposed future alteration or upgrade within these areas will require prior consultation with the Planning Authority and the National Monuments Service, and may require archaeological supervision.

Possible Archaeological Site (Anomaly D)

Anomaly D lies outside the development footprint and will remain as open ground. No operational impacts are anticipated and no ground disturbance will occur in this area.

General Long-Term Protection Measures

The archaeological features identified as Anomalies A, F and G, through geophysical survey and archaeological testing, as probable prehistoric ring-ditch monuments, will be formally reported to the National Monuments Service (NMS). The sites will be submitted for inclusion in the Archaeological Survey of Ireland records and will be assigned SMR numbers in due course.

9.6 Residual Effects

Three ring-ditches identified through pre-development geophysical survey and archaeological testing will be preserved *in situ* within the completed development. The recorded standing stone (CO073-103) is no longer extant; however, the circular feature identified during archaeological testing will be fully resolved by excavation in advance of construction to confirm whether it represents the former socket of the standing stone. The surrounding area will be subject to targeted topsoil stripping and archaeological inspection to identify any associated features. This will ensure that any surviving archaeological evidence associated with the monument is appropriately identified and recorded.

No direct or indirect effects will occur on any Protected Structures, NIAH-listed buildings, or Architectural Conservation Areas (ACAs).

Building 1 will be reused as part of the development, representing a Long-term Positive effect on local architectural heritage. Building 2 will be removed; however, its demolition will be preceded by a full photographic recording. The limekiln will be removed; however, a full and comprehensive drawn and photographic record (Appendix 9.4) has been undertaken to professional standards. Archaeological monitoring will be carried out during demolition to document the structure and identify any associated subsurface deposits.

Given the subsurface character of nearby archaeological sites, the absence of visual connectivity, and the screening provided by intervening vegetation and existing built form, potential residual visual effects on surrounding heritage assets are considered Not Significant.

Overall, the preservation in situ of the three ring-ditches (A, F and G), together with licensed archaeological monitoring during topsoil stripping and construction, will ensure that both known and previously unknown archaeological material is appropriately managed in accordance with national policy and professional standards. Accordingly, no significant residual effects on the archaeological or architectural heritage resource are anticipated.

9.7 Difficulties Encountered

No difficulties were encountered during compilation of this EIAR chapter.

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9.9 Chapter Appendices

Appendix 9-1- Geophysics Report – John Nicholls MSc.

Appendix 9-2 - Archaeological Testing Reports – Lane Purcell Archaeology.

Appendix 9-3 - Walkover Survey Photographs – Lane Purcell Archaeology.

Appendix 9.4 - Photographic and Drawn Survey of the Limekiln - Lane Purcell Archaeology and Keohane Geological & Environmental Consultancy

Appendix 9.5 - Typical detail for "Floating Road/Path" and Greenway Construction Methodology - DOSA Consulting Engineers

CHAPTER TEN

NOISE & VIBRATION

CHAPTER TEN

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CHAPTER 10 | Noise & Vibration

10.1 Introduction

This chapter was prepared to assess the potential significant effects of the proposed development with respect to noise and vibration. The proposed development involves the construction of a Residential Development at Carriganarra, Ballincollig, Co. Cork. A full description of the development is presented in Chapter 2. The assessment for noise and vibration is based on the most up to date applicable guidance and assessment documents available both nationally and internationally.

Noise and vibration will be considered in terms of two aspects. The first is the outward effect of the development on its surrounding environment, and the second is the inward effect of the existing noise sources in the surrounding environment on the development itself.

This chapter of the EIAR has been prepared by Abe Scheele (Acoustic Consultant) with AWN Consulting Ltd.

10.2 Proposed Development

The full description of the proposed development is outlined in Chapter 2 'Project Description and Alternative Considered' of this EIAR.

For the purposes of this Chapter the proposed development is a Residential Development which includes a mix of residential houses, duplexes and apartments and will also include a creche.

10.2.1 Construction Stage

During the construction phase, the main site activities are demolition of existing farm structures on site and site clearance and bulk excavation, foundations, building construction, road works, and landscaping. This phase has the greatest potential noise and vibration impacts on its surrounding environment, however this phase will be of short-term impact. The construction noise and vibration impact assessment will consider the potential impacts on noise sensitive locations (NSLs) external to the proposed development.

NSLs include areas where people spend significant periods of time and where concentration, sleep, and amenity are important considerations. Examples of these sensitive locations include residential dwellings, schools and other educational establishments, hospitals and nursing homes, hotels and other short-term accommodation buildings, buildings of religious sensitivity, recreational and noise-sensitive amenity areas, and offices.

10.2.2 Operational Stage

During the operational phase of the development, no significant sources of noise or vibration are expected with the development. The primary source of outward noise in the operational context relates to any changes in traffic flows along the local road network and any operational plant noise used to serve the ancillary elements within the creche buildings and amenity spaces.

10.3 Methodology

The assessment has been undertaken using the following methodology:

- A review of the most applicable standards and guidelines has been conducted in order to set a range of acceptable noise and vibration criteria for the construction and operational phases of the proposed development;
- An environmental noise survey has been undertaken in the vicinity of the subject site in order to characterise the existing baseline noise environment;
- Predictive calculations have been performed to estimate the likely noise emissions during the construction phase of the proposed development at the nearest NSLs to the site;
- Predictive calculations have been performed to assess the potential impacts associated with the operation of the development at NSLs surrounding the development site;
- An assessment has been completed of potential cumulative impacts that may arise as a result of the proposed development and other existing or proposed plans and projects;
- A schedule of mitigation measures has been proposed, where relevant, to control the noise and vibration emissions associated with both the construction and operational phases of the proposed development; and
- The inward effect of noise from the surrounding environment into the proposed residential buildings has also been assessed to determine the requirements, for additional noise mitigation, where required, to ensure a suitable internal noise environment for residential amenity.

10.3.1 Relevant Legislation & Guidance

The assessment of impacts has been undertaken with reference to the most appropriate guidance documents relating to environmental noise and vibration which are set out within the relevant sections of this chapter. In addition to specific guidance documents for the assessment of noise and vibration impacts which are discussed further in the relevant sections, the EPA *Guidelines on the Information to be contained in Environmental Impact Assessment Reports* (May 2022) (EPA EIAR Guidelines) were considered and consulted for the purposes of this chapter.

10.3.2 Construction Phase Methodology

10.3.2.1 Criteria for Assessing Construction Phase - Noise Impacts

There is no published statutory Irish guidance relating to the maximum permissible noise level that may be generated during the construction phases of a project. Local authorities normally control construction activities by imposing limits on the hours of operation and consider noise limits at their discretion.

In the absence of specific noise limits, appropriate criteria relating to permissible construction noise levels for a development of this scale is considered to be the British Standard BS 5228 – 1: 2009+A1:2014: *Code of practice for noise and vibration control on construction and open sites – Noise.*

The approach adopted here requires the designation of a NSL into a specific category (A, B or C) based on existing ambient noise levels in the absence of construction noise. This then sets a Construction Noise Threshold (CNT) that, if exceeded, indicates a potential significant noise impact associated with the construction activities, depending on context.

The table below sets out the values which, when exceeded, signify a potential significant effect at the façades of residential receptors, as recommended by BS 5228-1:2009+A1:2014.

Assessment Category and Threshold Value Period	Threshold Value (dB)		
	Category A [A]	Category B [B]	Category C [C]
Night-time (23:00 – 07:00)	45	50	55
Evenings and weekends [D]	55	60	65
Daytime (07:00 – 19:00) and Saturdays (07:00 – 13:00)	65	70	75

A) Category A: threshold values to use when ambient noise levels (when rounded to the nearest 5 dB) are less than these values.

B) Category B: threshold values to use when ambient noise levels (when rounded to the nearest 5 dB) are the same as category A values.

C) Category C: threshold values to use when ambient noise levels (when rounded to the nearest 5 dB) are higher than category A values.

D) 19:00–23:00 weekdays, 13:00–23:00 Saturdays and 07:00–23:00 Sundays.

Table 10.1 Example Threshold of Potential Significant Effect at Dwellings

It should be noted that this assessment method is only valid for residential properties, and if applied to commercial premises without consideration of other factors, may result in an excessively onerous thresholds being set.

Proposed Threshold Levels for Noise

Taking into account the proposed document outlined above and making reference to the baseline noise environment monitored around the proposed development site (referred to in Section 10.6.1), CNTs are set using Category A for the closest NSLs to the proposed development.

Interpretation of the Construction Noise Levels (CNL)

In order to assist with interpretation of the significance of a CNL, guidance as to the likely magnitude of impact associated with construction activities, relative to the CNT, is taken from the UK document Design Manual for Roads and Bridges (2020) LA 111 Sustainability & Environmental Appraisal. Noise and Vibration Rev 2 (DMRB: Noise and Vibration - UKHE 2020) and adapted to include the EPA 2022 EIAR Guidelines.

CNL per Period	Magnitude of Impact (DMRB)	EPA EIAR Guidelines	Determination
Below or equal Baseline Noise Level	Negligible	Not Significant	Depending on range of CNL, baseline noise level and duration
Above Baseline and below or equal to CNT	Minor	Slight to Moderate	
Above CNT and below or equal to CNT + 5dB	Moderate	Moderate to Significant	
Above CNT + 5dB	Major	Significant to Very Significant	

Table 10.2 Interpretation of CNL at Dwelling

The adapted DMRB guidance outlined will be used to assess the predicted construction noise levels at NSLs and comment on the likely impacts during the construction stages.

10.3.2.2 Criteria for Assessing Construction Phase - Vibration Impacts

There are two aspects to the issue of vibration that are considered for this development: the risk of cosmetic or structural damage to buildings; and human response to vibration. In the case of this development, vibration levels used for the purposes of evaluating building protection and human response are expressed in terms of Peak Particle Velocity (PPV) in mm/s.

There is no published statutory Irish guidance relating to the maximum permissible vibration levels for either building response. The following standards are the most widely accepted in this context and are referenced here in relation to cosmetic or structural damage to buildings:

- British Standard BS 5228-2: 2009+A1:2014: Code of practice for noise and vibration control on construction and open sites – Vibration (BS 5228 – 2); and
- British Standard BS 7385: 1993: Evaluation and measurement for vibration in buildings. Part 2: Guide to damage levels from ground borne vibration (BS 7385-2).

Cosmetic or Structural Damage to Buildings

BS 5228-2 and BS 7385 define the following thresholds for cosmetic damage to residential or light commercial buildings: PPV should be below 15 mm/s at 4 Hz to avoid cosmetic damage. This increases to 20 mm/s at 15 Hz and to 50 mm/s at 40 Hz and above. At frequencies below 4 Hz, a maximum displacement of 0.6 mm (zero to peak) is not to be exceeded.

The standard also notes that below 12.5mm/s PPV, the risk of damage tends to be zero. Historically important buildings that are difficult to repair might require special consideration on a case by case basis, but buildings of historical importance should not be assumed to be more sensitive unless they are structurally unsound. If a building is in an unstable state, then it will tend to be more vulnerable to the possibility of damage arising from vibration or any other ground borne disturbance. The vibration limit range for protected and historical buildings are equal to or up to 50% of those for light framed buildings, depending on their structural integrity. Where no structural defects are noted, the same limit to those for light framed buildings apply. This is summarised in Table 10.3 below.

Type of Building	Peak Component Particle Velocity in Frequency Range of Predominant Pulse	
	4 Hz to 15 Hz	15 Hz and above
Unreinforced or light framed structures. Residential or light commercial buildings.	15 mm/s at 4 Hz increasing to 20 mm/s at 15 Hz	20 mm/s at 15 Hz increasing to 50 mm/s at 40 Hz and above
Unsound or Vulnerable Structures	6mm/s	

Note 1: Values referred to are at the base of the building.

Note 2: At frequencies below 4 Hz, a maximum displacement of 0.6 mm (zero to peak) is not to be exceeded.

Table 10.3 Transient Vibration Guide Values for Cosmetic Damage

Human Perception

Humans are sensitive to vibration stimuli, and perception of vibration at high magnitudes may cause concern to building occupants. BS 5228-2:2009+A1:2014 notes that vibration typically becomes perceptible at around 0.15 to 0.3 mm/s and may become disturbing or annoying at higher magnitudes. Higher levels of vibration are typically tolerated for single events or events of short-term duration, particularly during construction projects and when the origin of vibration is known.

Table 10.4 presents the significance table relating to potential impacts to building occupants during construction based on guidance from BS5228-2:2009+A1:2014 and the DMRB Noise and Vibration (UKHE 2020) document and the associated EPA significant ratings.

Criteria	DMRB Impact Magnitude	EPA Significance Rating
≥10 mm/s PPV	Very High	Very Significant
≥1 mm/s PPV	High	Moderate to Significant
≥0.3 mm/s PPV	Medium	Slight to Moderate
≥0.14 mm/s PPV	Low	Not significant to Slight
<0.14 mm/s PPV	Very Low	Imperceptible to Not significant

Table 10.4 Guidance on Effects of Human Response to PPV Magnitudes

10.3.2.3 Criteria for Assessing Construction Phase – Traffic

Vehicular movement to and from the construction site for the proposed development will make use of the existing road network. In order to assess the potential impact of additional traffic on the human perception of noise, the following two guidelines are referenced: DMRB Noise and Vibration 2020 and the EPA Guidelines on the Information to be Contained in Environmental Impact Assessment Reports (EPA, 2022). For construction traffic, due to the short-term period over which this impact occurs, the magnitude of impacts is assessed against the 'short term' period in accordance with the DMRB document. Table 10.5 relates changes in traffic noise levels to impact on human perception based on the guidance contained in these documents.

Change in Sound Level (dB)	Subjective Reaction	DMRB Magnitude of Impact (Short-term)	EPA Significance of Effect
Less than 1 dB	Inaudible	Negligible	Imperceptible
1 – 2.9	Barely Perceptible	Minor	Not Significant
3 – 4.9	Perceptible	Moderate	Slight, Moderate
≥ 5	Up to a doubling of loudness	Major	Significant

Table 10.5 Classification of Magnitude of Noise Impacts in the Short-Term

The DMRB guidance outlined will be used to assess the predicted increases in traffic levels on public roads associated with the proposed development and comment on the likely impacts during the construction stage.

For both construction noise, vibration and construction traffic, a significant effect is deemed to occur where a moderate or major impact is likely to occur for a period of greater that 10 days/nights over 15 consecutive day/nights, or greater than 40 days over 6 consecutive months.

10.3.3 Operational Phase Methodology

10.3.3 Criteria for Assessing Operational Outward Noise Impacts

The main potential source of outward noise from the proposed development will be limited to traffic flows to and from the development site onto the public roads. There will also be an element of mechanical and electrical plant required to service creche and apartment buildings. The relevant guidance documents used to assess potential operational noise and vibration impacts on the surrounding environment are summarised in the following sections.

Change in Traffic Noise Levels

In the absence of any Irish guidelines or standards describing the effects associated with changes in road traffic noise levels, reference has been made to the DMRB Noise and Vibration (UKHE 2020) document. This document provides magnitude rating tables relating to changes in road traffic noise. For the operational phase of the development, changes in traffic noise are assessed against the long-term magnitude criteria for traffic flows along the surrounding road network. In summary, the assessment looks at the impact with and without development at the nearest noise sensitive locations.

Change in Noise Level (dB L_{A10})	DMRB Long-Term Term Magnitude	EPA Classification Magnitude of Impact
<0.1	Negligible	Imperceptible
0.1 – 2.9		Not significant
3 – 4.9	Minor	Slight to Moderate
5 – 9.9	Moderate	Moderate to Significant
10+	Major	Significant to Very Significant

Table 10.6 Likely Impact Associated with Long-term Change in Traffic Noise Level (DMRB 2020)

The criteria above reflect the key benchmarks that relate to human perception of sound. A change of 3 dB(A) is generally considered to be the smallest change in environmental noise that is perceptible to the human ear. A 10 dB(A) change in noise represents a doubling or halving of the noise level. The difference between the minimum perceptible change and the doubling or halving of the noise level is split to provide greater definition to the assessment of changes in noise level.

Mechanical and Electrical Plant

The proposed development is largely residential in nature comprising a mixture of houses, duplex and apartments. There is one creche located to the east of the site. There will be minimal mechanical and/ or electrical plant items required to service the development that will generate noise levels outside of the site boundary or at the developments buildings themselves. Plant contained within plant rooms has the least potential for impact, once consideration is given to appropriate design of the space.

The closest NSLs to any operational plant items are the residential dwellings within the proposed development. To ensure there is no adverse impact on the future inhabitants of the proposed development itself, it is appropriate to refer to internal noise targets derived from BS 8233: 2014: *Guidance on Sound Insulation and Noise Reduction for Buildings*. The recommended indoor ambient noise levels and derived external noise levels are set out in Table 10.7 and are based on annual average data.

The derived external levels are based on the approximate attenuation provided by a partially open window of 15 dB, as advised in BS 8233 (BSI 2014c), and represent the appropriate noise level at the external façade of the building. For mechanically ventilated buildings, higher external noise levels will achieve the same internal noise levels with closed windows.

Activity	Location	Internal Noise Design Range dB $L_{Aeq,T}$	Derived External Levels dB $L_{Aeq,T}$
Residential Day	Living room	35	50
	Dining room/area	40	55
	Bedroom	35	50
Residential Night	Living room	35	50
	Dining room/area	40	55
	Bedroom	30	45

Table 10.7 Internal Noise Design Range for Residential Buildings (BS 8233:2014)

10.3.3.2 Criteria for Assessing Inward Noise Impacts

Cork Agglomeration Noise Action Plan (NAP) 2024-2028

The Cork Agglomeration Noise Action Plan was revised in 2024. To assist local authorities and in the absence of Irish planning guidance the Draft Interim National Guidance for the Consideration of Transportation Noise in the Design of New Residential Development was compiled in 2021 by the NIECE Local Authority Noise Subgroup, recommends:

> *"consideration is given to the potential impact of transportation noise in line with Professional Planning Guidance (ProPG) on Planning & Noise: New Residential Development (ProPG, 2017)."*

Section 7.5 of the NAP sets out the approach for minimising the adverse impacts of noise without placing unreasonable restrictions on development. For the scenario where new developments are developed close to existing noise sources, e.g. new housing, hospitals, school, nursing home etc developments near to existing road, rail, industry etc. The NAP notes:

> *"to effectively employ the planning process for consistent noise exposure avoidance or mitigation, it is deemed beneficial to incorporate guidelines on noise exposure levels during the initial proposal and design phase of planning applications. Descriptions of guidance adopted in the Agglomeration is set out below"*

The guidance documents referred to in 7.5.1 to 7.5.4 of the NAP relate to residential development to control noise levels both within internal noise sensitive areas and within external amenity areas. The relevant standards and guidance for the consideration of noise where there is proposed new residential development near major transportation sources (roads and railways) include:

- the Professional Planning Guidance on Planning & Noise: New Residential Development (ProPG, 2017),
- Acoustic Ventilation and Overheating, Residential Design Guide (AVO, 2021),
- BS 8233:2014 Guidance on sound Insulation and Noise Reduction for Buildings and
- ISO 19488:2021 Acoustics: Acoustic classification of dwellings.

The NAP also states the following:

> *"Applications for new residential developments in the Agglomeration will be assessed in accordance with the policies and goals outlined in the relevant City and County Development Plans. Where applicable, these include adoption of the principles of Professional Planning Guidance (ProPG) on Planning & Noise: New Residential Development, as described in Section 7.5.1.*
>
> *Where the assessment outcome determines the likelihood of an adverse noise impact, planning applications should be supplemented by an Acoustic Design Statement carried out by appropriately qualified acousticians and competent persons. The Acoustic Design Statement should demonstrate that all facets of ProPG have been followed."*

In accordance with this NAP policy, the *Professional Practice Guidance on Planning & Noise* (ProPG) guidance has been adopted to inform the inward impact of the assessment and is described in further detail below.

Professional Practice Guidance on Planning & Noise (ProPG 2017)

The *Professional Practice Guidance on Planning & Noise* (ProPG 2017)[1] has been generally considered best practice guidance adopted in Ireland, in the absence of equivalent Irish guidance for inward noise impact assessments.

The ProPG outlines a systematic risk based 2-stage approach for evaluating noise exposure on prospective sites for residential development. The two primary stages of the approach can be summarised as follows: -

- *Stage 1:* Comprises a high-level initial noise risk assessment of the proposed site considering either measured and or predicted noise levels.
- *Stage 2:* Involves a full detailed appraisal of the Proposed Development covering four "key elements" that include: -

  Element 1 – Good Acoustic Design Process

  Element 2 – Noise Level Guidelines

  Element 3 – External Amenity Area Noise Assessment

  Element 4 – Other Relevant Issues

The initial noise risk assessment is intended to provide an early indication of any acoustic issues that may be encountered. It calls for the categorisation of the site as a negligible, low, medium or high risk, based on the pre-existing noise environment. Figure 10.1 presents the basis of the initial noise risk assessment; it provides appropriate risk categories for a range of continuous noise levels either measured and / or predicted on site.

1 Association of Noise Consultants (ANC), the Institute of Acoustics (IOA) and the Chartered Institute of Environmental Health (CIEH).

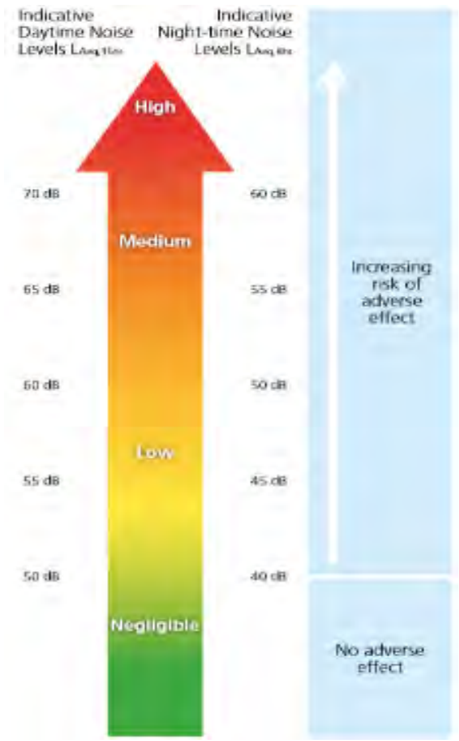


Figure 10.1 ProPG Stage 1 - Initial Noise Risk Assessment

It should be noted that a site should not be considered a negligible risk if more than 10 no. L_{AFMax} events exceed 60 dB during the night period, and the site should be considered a high risk if the L_{AFMax} events exceed 80 dB more than 20 times a night.

Element 2 of the ProPG document sets out recommended internal noise targets derived from BS 8233: 2014. The recommended indoor ambient noise levels are set out in Table 10.7 previously and are based on annual average data.

In addition to these absolute internal noise levels, ProPG provides guidance on flexibility of these internal noise level targets. For instance, in cases where the development is considered necessary or desirable, and noise levels exceed the external noise guidelines, then a relaxation of the internal L_{Aeq} values by up to 5 dB can still provide reasonable internal conditions.

ProPG provides the following advice with regards to external noise levels for amenity areas in the development: -

> *"The acoustic environment of external amenity areas that are an intrinsic part of the overall design should always be assessed and noise levels should ideally not be above the range 50 – 55 dB $L_{Aeq,16hr}$."*

Appendix 10.1 Acoustic Design Statement presents the ProPG assessment for the Proposed Development. Mitigation measures identified from the ProPG assessment are presented in Section 10.9.2.3 of this EIAR chapter.

10.3.3.3 Operational Phase – Vibration

The development is residential in nature and there are no vibration sources associated with the proposed development. Therefore, there will be no outward impacts associated with vibration for the operational phase, and accordingly such impacts have been scoped out.

10.4 Difficultie Encountered

There were no difficulties encountered in compiling this assessment.

10.5 Description of Existing Environment

The proposed development site is a Carriganarra site located in Carriganarra, Ballincollig, County Cork, directly bound on the north by the existing residences at Limeworth and permitted development Planning Ref. 22/41644 (currently under construction) and the constructed Heathfield residential developments to the north and to the west and south by farmland. For the Proposed Development the existing noise and vibration environments across the sites and in the vicinity of the nearest existing NSLs are dictated by transportation sources in the study area.

10.6 Baseline Noise Survey

10.6.1 Survey Locations and Periods

The monitoring locations for this survey are described below and illustrated in Table 10.8 and Figure 10.2.

Ref	Description	Survey Period
UN1	Unattended Noise meter installed along southern site boundary, approximately 450m from N22 road. Microphone was positioned to a height of 4m. Representative of the southern façades of the proposed development, the facades likely to experience the highest levels of noise.	10 to 15 September 2025, logged over 15 minute intervals
AN1	Attended daytime noise survey location. The measurement position was along the north western site boundary, representative of the nearest noise sensitive residential dwellings located to the north west of site. The microphone was positioned to a height of 1.5m.	3 x 15 minute daytime attended measurements, 10 September 2025
AN2	Attended daytime noise survey location at northern site boundary, representative of the nearest noise sensitive residential dwellings to the north of site. The microphone was positioned to a height of 1.5m.	3 x 15 minute daytime attended measurements, 10 September 2025
AN3	Attended daytime noise survey location at northeastern site boundary, representative of the nearest noise sensitive residential dwellings to the north-east of site. The microphone was positioned to a height of 1.5m.	3 x 15 minute daytime attended measurements, 10 September 2025

Table 10.8 Survey Locations and Periods



Figure 10.2 Noise Monitoring Locations (Source Google Earth January 2026, approximate site boundary)

10.6.2 Survey Procedures

Baseline noise monitoring has been undertaken across the development site from 10th to 15th September 2025 to determine the range of noise levels at varying locations across the development site and to establish the existing noise climate the nearest existing NSLs as outlined in Table 10.8 and detailed in Figure 10.5.

The survey was conducted in general accordance with ISO 1996: 2017: *Acoustics – Description, measurement and assessment of environmental noise.*

10.6.3 Survey Parameters

The following measurement parameters were measured and are discussed within this chapter.

$L_{Aeq,T}$ is the A-weighted equivalent continuous steady sound level during the sample period and effectively represents an average value over the defined measurement period, T.

L_{AFmax} is the instantaneous maximum sound level measured during the sample period using the 'F' time weighting.

$L_{A90,T}$ is the A-weighted sound level that is exceeded for 90% of the sample period; generally used to quantify background noise. The T is the sample period the parameter is measured over.

The "A" suffix denotes the fact that the sound levels have been "A-weighted" in order to account for the non-linear nature of human hearing. All sound levels in this report are expressed in terms of decibels (dB) relative to $2x10^{-5}$Pa.

10.6.4 Survey Equipment and Personnel

The unattended and attended noise surveys were undertaken by AWN Consulting using Rion NL-52 sound level meters and were calibrated using a Rion NC-75 type calibrator. The specific equipment details are summarised in Table 10.9.

Equipment	Serial Number	Calibration Date
Rion NL-52	586940	20/02/2024
Rion NL-52	976162	19/09/2024
Rion NC-75	34313057	28/11/2024

Table 10.9 Noise Monitoring Equipment

For unattended noise surveys, a Rion WS-15 Outdoor Microphone Protection System was used with microphone extension cable and outdoor peli-case.

10.6.5 Weather Conditions

Weather conditions during the unattended and attended surveys were calm and dry and did not adversely affect noise measurements.

10.6.6. Survey Results

10.6.6.1 Attended Survey Results

The survey results for the attended monitoring locations are presented in Table 10.10.

Date	Location	Start Time	Measured Noise Levels (dB re.2x10-5Pa)		
			L_{Aeq}	L_{AMax}	L_{A90}
10 September2025	AN1	18:30	46	56	44
		19:27	47	65	44
		20:27	45	58	43
	AN2	18:04	51	68	48
		19:07	48	57	46
		20:05	47	57	44
	AN3	17:47	52	71	50
		18:50	50	59	48
		19:48	49	76	47

Table 10.10 Noise Monitoring Results at AN1, AN2 and AN3

Distant traffic noise from N40, birdsong and noise related to residential activities were the dominant noise sources at AN1. Ambient noise levels ranged between 45 to 47 dB L_{Aeq}. Background noise levels ranged between 43 to 44 dB L_{A90}.

At monitoring location AN2, distant road traffic noise from N40 and N22 were noted as the dominant noise sources, with intermittent local traffic, kids playing and dogs barking also contributing to the measurements . Ambient noise levels ranged between 47 to 51 dB L_{Aeq}. Background noise levels ranged between 44 to 48 dB L_{A90}.

Distant Road traffic from the N22 and N40 were dominant, with birdsong and leaves rustling also heard at AN3. Occasional kids playing contributed to the measurements. Ambient noise levels ranged between 49 to 52 dB L_{Aeq}. Background noise levels ranged between 47 to 50 dB L_{A90}.

10.6.6.2 Unattended Survey Results

Unattended measurements at location UN1 were carried out between 14:15hrs on 10 September 2025 to 17:00hrs on 15 September 2025.

Road traffic from the N22 and N40 was the main source of noise at this location. Other noise sources recorded were intermittent cows in nearby fields and distant construction noise. Noise levels measured at UN1 are presented in Figure 10.3.

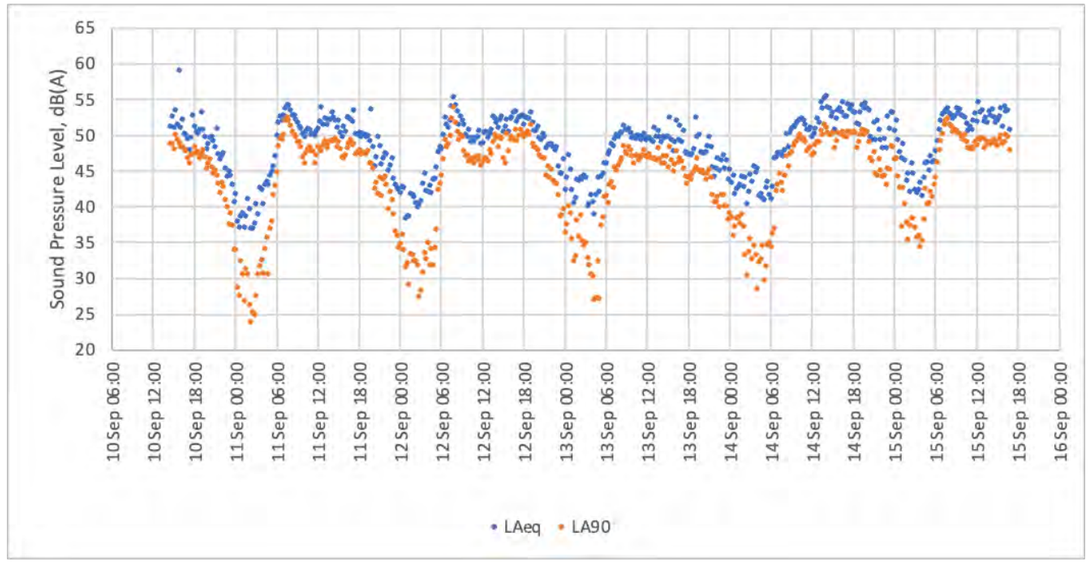


Figure 10.3 UN1 Survey Noise Levels (L_{Aeq} and L_{A90})

The average L_{Aeq} and L_{A90} survey results and maximum L_{AMax} noise level for each date measured at U01 are summarised in Table 10.11. The results are presented in terms of the average 16 hour daytime (07:00 to 23:00hrs) and 8 hour night-time (23:00 to 07:00hrs). Subjective observations during the setup and removal of the monitoring equipment noted that the primary contributor to noise build-up was road traffic noise.

Date	Time	Measured Noise Levels (dB re.2x10-5Pa)		
		$L_{Aeq,T}$	L_{Amax}	$L_{A90,T}$
10 September 2025	L_{Day} (07:00 – 19:00)	50	80	46
	L_{Night} (23:00 – 07:00)	43	65	34
11 September 2025	L_{Day} (07:00 – 19:00)	51	75	47
	L_{Night} (23:00 – 07:00)	44	63	36
12 September 2025	L_{Day} (07:00 – 19:00)	51	70	48
	L_{Night} (23:00 – 07:00)	44	61	36
13 September 2025	L_{Day} (07:00 – 19:00)	49	71	46
	L_{Night} (23:00 – 07:00)	44	62	36
14 September 2025	L_{Day} (07:00 – 19:00)	52	70	48
	L_{Night} (23:00 – 07:00)	47	70	42
15 September 2025	L_{Day} (07:00 – 19:00)	53	73	50
Average	$L_{Aeq\ 16hr}$ (07:00-23:00)	51	60	48
	L_{night} (23:00 – 07:00)	46	55	37

Table 10.11 Unattended Noise Monitoring Results

10.7 The 'Do Nothing' Scenario

The Do Nothing scenario includes retention of the current site without the proposed development in place. In this scenario, noise levels at the site will remain as per the baseline and will change in accordance with trends within the wider area (including influences from potential new developments in the surrounding area, changes in road traffic, etc).

In the absence of the proposed development it is likely that a development of a similar nature would be constructed in the future in line with national policy and the development plan objectives. Therefore, the construction and operational phase impacts outlined in this assessment are likely to occur in the future even in the absence of the implementation of the development proposed in this EIAR.

10.8 Potential Significant Effects

The general commentary presented in the following sections are the same across the proposed development, unless otherwise indicated under the relevant headings.

10.8.1 Demolition & Construction Phase

10.8.1.1 Noise

A variety of items of plant will be in use for the purpose of demolition, site clearance and construction works. There will also be vehicular movements to and from the site that will make use of existing roads. Due to the nature of these activities, there is potential for the generation of elevated levels of noise in the vicinity of existing NSLs. It is estimated that the construction period will be completed over three phases and hence impacts are temporary to short-term in nature at any one NSL as outlined in Figure 10.4.

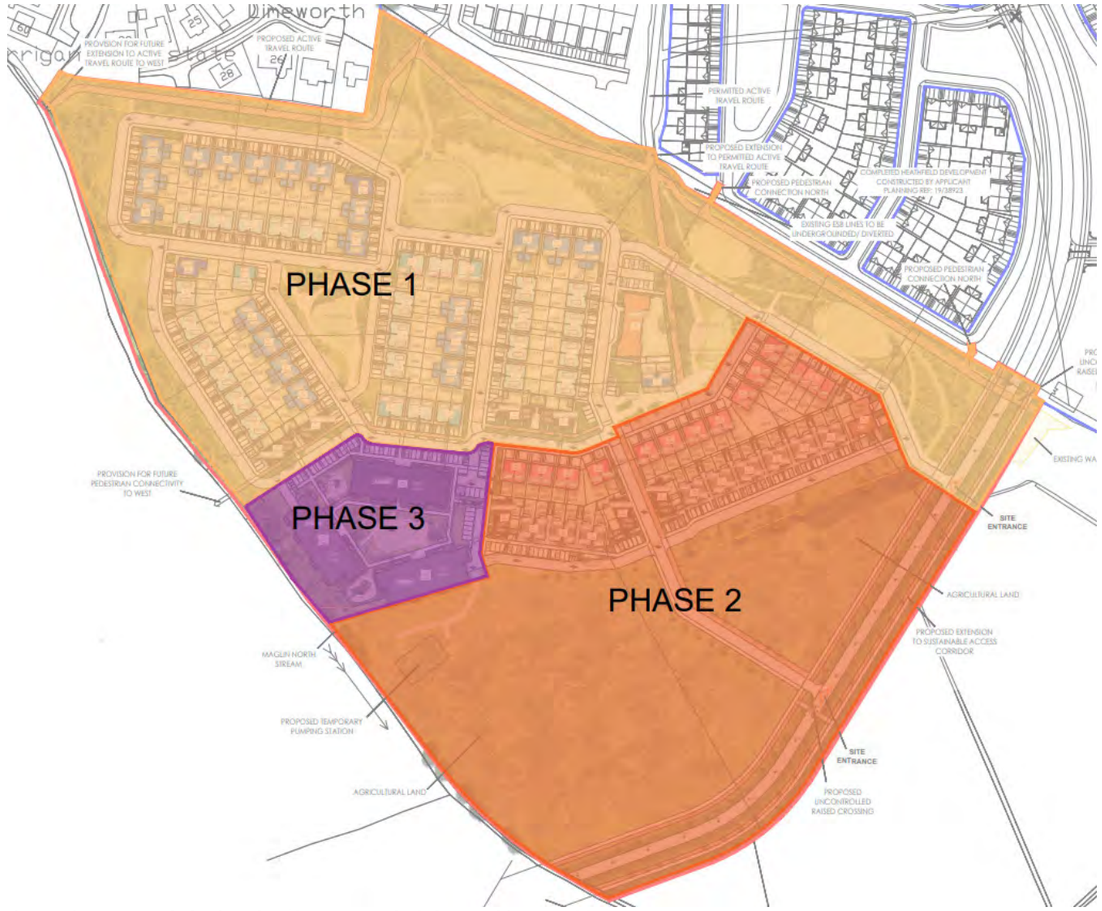


Figure 10.4 Proposed Phasing Plan (Source: Deady Gahan Architects/DOSA)

The proposed general construction hours are 08:00 to 18:00 hrs, Monday to Friday and 08:00 to 14:00 hrs on Saturdays. On occasions it may prove necessary to carry out noisy activities outside of normal working hours. In such instances prior consultation will be carried out with Cork City Council and local residents outlining the nature and reason for the works and their likely duration.

As discussed in Section 10.3.2, the construction noise threshold (CNT)s are set using Category A from BS 8233-1 for the closest NSLs which sets the following threshold values.

- Daytime (07:00 – 19:00hrs weekdays) /Saturday AM: 65 dB $L_{Aeq,12hr}$
- Evening and Weekends: 55 dB $L_{Aeq,12hr}$

The main stages of construction will be progressed in three successive phases. As the construction programme has been established in outline form only, construction noise associated with activities on site during this phase are reviewed for the purposes of determining the likely significant effects. Indicative ranges of noise levels associated with construction may be calculated in accordance with the methodology set out in BS 5228-1:2009+A1:2014. This standard sets out sound power and sound pressure levels for plant items normally encountered on construction sites, which in turn enables the prediction of noise levels. However, it is not possible to conduct detailed accurate prediction calculations for the construction phase of a project due to the level of variability during different construction stages over short periods of time.

The following activities have been assessed to determine the likely potential noise impacts associate with the planned works across the three construction phases of the site.

Rock Excavation

As per the CEMP, it is likely the volume of rock to be removed will be minimal and localised and should not require a rock-breaker. Therefore the construction assessment for noise does not include for rock excavation.

Site Clearance, Bulk Excavation, Foundations and Road Works

For site clearance, bulk excavations and fill work, foundation and road works using excavators, loaders, dozers, concreting works, mobile cranes, generators, noise source levels are quoted in the range of 70 to 80 dB L_{Aeq} at distances of 10 m within BS 5228-1.

For ongoing construction activity associated with the above activities, a total construction noise level of 85 dB L_{Aeq} at 10m has been used for the purposes of indicative calculations representing a variety of plant items and activities over this stage. This would include, for example two items of plant at 80 dB L_{Aeq} and three items of plant at 75 dB L_{Aeq} operating simultaneously within one work area resulting in a total noise level of 85 dB L_{Aeq}.

This scenario is a robust assumption made for a development of this size, on the basis that it is unlikely that more than 5 no. items of such plant/equipment would be operating simultaneously in such close proximity to each other at all times. In reality items of construction plant and machinery will be operating at varying distances from any one NSL.

Superstructure and Landscaping Works

Given the nature of the proposed construction phases which will include standard residential house building techniques across the site, once the ground preparation and foundation works have been completed, a large portion of the work will involve manual labour and cranes with lower overall noise levels. For this phase of work, smaller items of mobile plant (excavators, cranes, dozers), landscaping and concreting works with lower noise emissions, a total construction noise level of 78 dB L_{Aeq} at 10m has been used for the purposes of indicative calculations. This would include, for example one item of plant at 75 dB L_{Aeq} and three items of plant at 70 dB L_{Aeq} operating simultaneously within a work area.

Indicative Construction Noise Calculations at Distance from Works

The closest NSLs to the proposed development are residential dwellings to the north west of the site boundary at Limeworth (NSL01). NSL02 are located to the north and northeast of the proposed development at distances of approximately 25m from the site boundary. The closest house construction works are within 35m of the closest NSL (NSL01).

Figure 10.5 illustrates the closest NSLs externally located to the proposed development site. During Phase 2 and Phase 3 NSLs within the proposed development may be within comparable distances to the construction works as the external NSLs to the site. Therefore comments related to the external NSLs are also applicable to those NSLs occupied during the Phase 2 and phase 3 works.



Figure 10.5 Closest NSLs to Proposed Development

Construction noise levels (CNL) have been calculated at the closest NSLs, assuming the construction noise activities and source noise levels discussed previously. The calculations assume that the equipment will operate for 66% of the working time. Table 10.12 summarises the result of this assessment.

Demolition and Construction Phase	Sound Pressure Level at Demolition and Construction Works, dB L_{Aeq}	Calculated Noise Levels at Varying Distances, dB $L_{Aeq,T}$					
		10m	15m	25m	35m	60m	75m
Demolition and Site Clearance, Bulk Excavation, Foundations, and Road Works	85	82	78	73	70	65	63
Superstructure, Compounds and Landscaping Works	78	75	71	66	63	58	56

Table 10.12 Indicative CNLs at Closest Distances

Demolition, Site Clearance, Bulk Excavation and Foundations

The conservative predictions detailed in Table 10.12 indicate that construction activities can operate within the adopted construction noise thresholds of 65 dB $L_{Aeq,T}$ at the closest NSLs located at greater than 60m from building works with higher noise emissions associated with demolition, site clearance, excavations, road works etc, thus resulting in a negative, significant to very significant and temporary effect at NSLs immediately northwest, north and northeast of the proposed development (NSL01 to NSL02), when noisy works occur within 35m of the nearest noise sensitive locations. At all remaining NSLs the CNT will not be exceeded, thus resulting in a negative, not significant to slight and short-term effect at distances of 60m and beyond.

Superstructure and Landscaping Works

During the general construction working associated with house construction, compounds and landscaping works etc. the calculated noise levels in Table 10.12 indicate that construction activities can operate within the adopted construction noise thresholds of 65 dB $L_{Aeq,T}$ at distances greater than 25m from the general construction works. Therefore resulting in a negative, not significant to slight and short-term effect at distances of 25m and beyond at NSLs immediately northeast, northwest and north of the proposed development (NSL01, NSL02) during landscaping works immediately along the site boundary.

The construction phase will be controlled through the use of construction noise threshold values which the contractor will be required to work within as much as is practicable. In this regard, the choice of plant, scheduling of works on site, provision of screening and other best practice control measures will be employed. Further discussion on construction noise and vibration control measures are included in Section 10.9.1.

10.8.1.2 Vibration

During site clearance and excavations activities, there is the potential for vibration to be generated through the ground. Empirical data for this activity is not provided in BS 5228–2, however the likely levels of vibration from this activity will be significantly below the vibration criteria for building damage based on monitoring data and experience from other sites. AWN Consulting has previously conducted vibration measurements under controlled conditions, during trial construction works on a sample site where concrete slab breaking was carried out. The trial construction works consisted of the use of the following plant and equipment when measured at various distances:

- 3 tonne hydraulic breaker on small CAT tracked excavator; and
- 6 tonne hydraulic breaker on large Liebherr tracked excavator.

Vibration measurements were conducted during various staged activities and at various distances.

Peak vibration levels during staged activities using the 3 tonne breaker ranged from 0.48 to 0.25 PPV (mm/s) at distances of 10 to 50m respectively from the breaking activities. Using a 6 tonne breaker, measured vibration levels ranged between 1.49 to 0.24 PPV (mm/s) at distances of 10 to 50m respectively.

Whilst these measurements relate to a solid concrete slab, the range of values recorded provides some context in relation to typical ranges of vibration generated by general construction activity.

With respect to the potential vibration impact, the only significant source of vibration is expected to be due to excavations and foundation activities. The distance between the areas where these activities are to occur and the nearest NSLs are such that all vibration transmission would be orders of magnitude below recommended guideline criteria for building response in Table 10.3.

In terms of human response within buildings, there is potential for vibration magnitudes during breaking to be perceptible at low level at NSLs within 50m (NSL01 to NSL03). Therefore, it is expected in the absence of specific mitigation measures that there will be a negative, slight to moderate and temporary impact at the closest NSLs within 50m and a negative, not significant and temporary impact at NSLs at further distances.

Mitigation measures and recommended good practices have been outlined in Section 10.9.1.

10.8.1.3 Construction Traffic

Based on the construction traffic data provided by DOSA Consulting Engineers it is anticipated that during the busiest period onsite, namely the groundworks element of the works, an estimated 60 no. HGV's will deliver to the site on a daily basis for the duration of this work element. Therefore as a conservative estimate it has been assumed that no more than 15 no. HGV peak vehicle movements will be carried out in a one hour period during the construction works. It is assumed that all of the HGVs will enter / exit the site via existing junction from the Killumney Road to the north of the site. The nearest NSL to the site entrance is at 25m (NSL02).

The noise level associated with an event of short duration, such as a passing vehicle movement, may be expressed in terms of its Sound Exposure Level (L_{AX}). The mean value of Sound Exposure Level (SEL) for a truck at low to moderate speeds (i.e. 15 to 45km/hr) is of the order of 85 dB L_{Ax} at a distance of 10 metres from the vehicle. This figure is based on a series of measurements conducted under controlled conditions. The SEL can be used to calculate the contribution of an event or series of events to the overall noise level in a given period.

The appropriate formula is given below.

$$L_{Aeq,T} = L_{AX} + 10Log_{10}(N) - 10Log_{10}(T) + 20Log_{10}\left(\frac{r_1}{r_2}\right) dB$$

where: -

$L_{Aeq,T}$ is the equivalent continuous sound level over the time period T in seconds).
L_{AX} is the "A-weighted" Sound Exposure Level of the event considered (dB).
N is the number of events over the course of time period T.
r_1 is the distance at which L_{AX} is expressed.
r_2 is the distance to the assessment location.

The predicted noise level at the nearest residential NSLs (25m) is in the order of 60 dB $L_{Aeq,1hr}$ and is therefore below the CNT of 65 dB $L_{Aeq,1hr}$ at the closest residential NSLs along the Killumney Road. This above baseline monitoring results that were in the range between 47 to 52 dB $L_{Aeq,15\ mins}$ from the road side and remains below the CNT of 65 dB $L_{Aeq,1hr.}$

Therefore, it is expected in the absence of specific mitigation measures that there will be a negative, slight to moderate and short-term impact at the closest receptors.

No further mitigation measures would therefore be required.

10.8.2 Operational Phase

Once the proposed development is operational, the potential noise impacts to the surrounding environment are predicted to be minimal. The residential aspect of the development is not expected to generate any significant noise sources over and above those which form part of the existing environment at neighbouring residential areas (road traffic noise, estate vehicle movements, children playing, etc.) and, hence, no significant impact are predicted in this regard.

The main potential noise impact associated with the proposed development is considered, therefore, to relate to the generation of additional traffic to and from the site as a result of the new residential buildings. Potential noise impacts from the Proposed Development also relate to operational plant serving the creche building.

Once operational, there are no noteworthy sources of vibration associated with the development site.

10.8.2.1 Additional Vehicular Traffic on Surrounding Roads

For the purposes of assessing the potential noise impact, it is appropriate to consider the relative increase in noise level associated with traffic movements on existing roads and junctions with and without the proposed development, given that traffic from the development will make use of the existing road network.

A traffic impact assessment relating to the proposed development has been prepared by Egis Group as part of this EIAR and the junctions are illustrated in Figure 10.6.

Traffic flows along the surrounding road network in terms of Annual Average Daily Traffic (AADT) for the Do Nothing (DN) and Do Something (DS) scenarios have been reviewed to calculate the change in traffic noise.



Figure 10.6 Operational Traffic Junctions Assessed Relative to Proposed Development (Source: Egis Group)

Table 10.13 summarises the AADT for the Proposed Development DN and DS scenarios across the various junctions and links for opening year (OY) 2030.

Junction	Arm	DN 2030 (OY)		DS 2030 (OY)		Increase in Noise Level dB
		AADT	% HGV	AADT	% HGV	
Junction 1	Arm A - Leo Murphy Link Road	11,395	3.6%	11,776	3.5%	+0.1
	Arm B - Link Road	14,761	2.7%	15,477	2.6%	+0.1
	Arm C - Limeworth	407	0.7%	418	0.6%	+0.0
	Arm D - Carriganarra Rd	11,853	1.4%	12,177	1.4%	+0.1
Junction 2	Arm A - Carriganarra Road	4,536	1.5%	4,783	1.4%	+0.1
	Arm C - Maglin Sustainable Access Corridor	2,852	2.0%	4,563	1.2%	+1.1
	Arm D - Link Road (West)	14,457	2.8%	15,115	2.6%	0.0
Junction 3	Arm A - N22 North	21,339	4.4%	21,549	4.3%	0.0
	Arm B - N22 South	29,236	4.5%	29,896	4.4%	0.0
	Arm C - Link Road	13,158	3.3%	14,028	3.1%	+0.1

Table 10.13 Summary of Change in Noise Level, for 2030 OY

The predicted increase in AADT traffic levels along the local road network surrounding the Proposed Development range between 0.0 to 0.1 dB(A) for the opening year 2030. Reference to Table 10.6 confirms that the traffic noise level increases for the opening year OY are neutral to negative, imperceptible to not significant and long-term.

Table 10.14 summarises the AADT for the Proposed Development DN and DS scenarios across the various junctions and links for design year (DY) 2045.

Junction	Arm	DN 2047 (DY)		DS 2047(DY)		Increase in Noise Level dB
		AADT	% HGV	AADT	% HGV	
Junction 1	Arm A - Leo Murphy Link Road	12,651	4.0%	13,032	3.9%	+0.1
	Arm B - Link Road	16,351	3.0%	17,067	2.9%	+0.1
	Arm C - Limeworth	451	0.7%	462	0.6%	-0.1
	Arm D - Carriganarra Rd	13,079	1.6%	13,403	1.5%	0.0
Junction 2	Arm A - Carriganarra Road	5,023	1.7%	5,270	1.6%	+0.1
	Arm C - Maglin Sustainable Access Corridor	3,109	2.2%	4,820	1.4%	+1.0
	Arm D - Link Road (West)	16,020	3.1%	16,678	2.9%	0.0
Junction 3	Arm A - N22 North	23,781	4.8%	23,991	4.8%	0.0
	Arm B - N22 South	32,556	4.9%	33,216	4.8%	0.0
	Arm C - Link Road	14,593	3.7%	15,463	3.5%	+0.1

Table 10.14 Summary of Change in Noise Level, for 2045 DY

The predicted increase in AADT traffic levels along the local road network surrounding the proposed development range between 0.0 to 1.0 dB(A) for the design year 2045. Reference to Table 10.6 confirms that the traffic noise level increases for the design year OY are neutral to negative, imperceptible to not significant and long-term.

No further mitigation measures would therefore be required.

10.8.2.2 Building Services Plant

Once operational, there will be building services plant items required to serve the residential and crèche building aspects of the proposed development. The specific requirements for mechanical and electrical plant items for each element of the residential buildings and crèche building have not yet been finalised at this stage of the design. Most of this plant will be capable of generating noise to some degree and may operate 24 hours a day. It would, therefore, be most noticeable during quiet periods (i.e. overnight). Noisy plant with a direct line-of-sight to noise sensitive properties as well as louder plant areas on roofs would potentially have the greatest impact.

Plant items will be selected, designed and located so that there is no adverse impact on sensitive receivers within the development itself. The cumulative operational noise level from building services plant at the nearest noise sensitive location within the Proposed Development will be designed/attenuated to not exceed the internal noise levels discussed in Table 10.7.

Taking into account that sensitive receptors within the proposed development are much closer than off-site sensitive receptors, once the relevant noise criteria are achieved within the proposed development, it is expected that there will be no significant negative impact to sensitive receptors off site.

10.8.3 Cumulative Effects

A review of approved and proposed developments in the local area which are external to the cumulative site, as summarised in Chapter 1 of this EIAR.

During the construction phase of the proposed development, construction noise on site will be localised and will therefore likely be the primary noise source at the nearest noise sensitive receivers.

Depending on the proximity of the construction works to the nearest NSLs it is possible that cumulative impacts could occur at the nearest receptors to the proposed development should all sites progress construction simultaneously. The closest development (Planning Ref: 22/41644) is located to the north at 25m from the closest site boundary, currently under construction. There is a potential for cumulative impacts associated with construction, with an increase of +3 dB representing the worst case scenario of a two sites operating equidistant to a noise source and producing the same noise levels when compared to either site operating in isolation. The more likely scenario is that construction of the various sites will take place sequentially thereby reducing the risk of cumulative noise impacts.

Cumulative impacts will need to be considered and managed during the construction phase. It is recommended that liaison between construction sites is on-going throughout the duration of the construction phase. Contractors should schedule work in a co-operative effort to limit the duration and magnitude of potential cumulative impacts on nearby sensitive receptors. Cumulative construction noise impacts are expected to be moderate impact, moderate significance and short-term.

The contractor will be required to control noise impacts associated with this development in line with the guidance levels included in Table 10.1. and follow the best practice control measures within BS 5228 -1 set out in Section 10.9.

Any large scale future projects that are not yet proposed or permitted would also need to be the subject of EIA in turn, to ensure that no significant impacts resulting from noise and vibration will occur as a result of those developments.

10.9 Mitigation Measures

The following mitigation measures are outlined for the Proposed Development.

10.9.1 Demolition & Construction Phase Mitigation

Mitigation measures for the demolition and construction phases are set out below in order to reduce potential impacts as far as practicable to within the adopted design goals for noise and vibration.

The assessment detailed in Section 10.8.1 has determined that construction activities can typically operate within the adopted construction noise threshold levels at the closest off-site NSLs when carried out at distances greater than 60m from the main phases of the construction works.

Vibration levels at the closest neighbouring buildings are expected to be orders of magnitude below the limits set out in Table 10.3 to avoid any cosmetic damage to buildings.

Best practice noise and vibration control measures will be employed by the contractor during the construction phase in order to avoid exceedance of the adopted construction noise threshold values at the nearest NSLs. The best practice measures set out in BS 5228 (2009 +A1 2014) Parts 1 and 2 will be complied with. This includes guidance on several aspects of construction site mitigation measures, including, but not limited to:

- Selection of quiet plant
- Control of noise sources
- Screening
- Hours of work
- Liaison with the public

Further comment is offered on these items in the following paragraphs.

Noise control measures that will be considered include the selection of quiet plant, enclosures and screens around noise sources, limiting the hours of work and noise monitoring.

Selection of Quiet Plant

This practice is recommended in relation to static plant such as compressors and generators. It is recommended that these units be supplied with manufacturers' proprietary acoustic enclosures. The potential for any item of plant to generate noise will be assessed prior to the item being brought onto the site. The least noisy item will be selected wherever possible. Should a particular item of plant already on the site be found to generate high noise levels, the first action will be to identify whether said item can be replaced with a quieter alternative.

Noise Control at Source

If replacing a noisy item of plant is not a viable or practical option, consideration will be given to noise control at source. This refers to the modification of an item of plant or the application of improved sound reduction methods in consultation with the supplier. For example, resonance effects in panel work or cover plates can be reduced through stiffening or application of damping compounds; rattling and grinding noises can often be controlled by fixing resilient materials in between the surfaces in contact.

The following best practice migration measures will be considered:

- Site compounds will be located away from noise sensitive boundaries within the site constraints.
- The use of lifting bulky items, dropping and loading of materials within these areas will be restricted to normal working hours.
- For mobile plant items such as cranes, dump trucks, excavators and loaders, maintaining enclosure panels closed during operation can reduce noise levels over normal operation. Mobile plant will be switched off when not in use and not left idling.
- For steady continuous noise, such as that generated by diesel engines, it may be possible to reduce the noise emitted by fitting a more effective exhaust silencer system.
- For concrete mixers, control measures will be employed during cleaning to ensure no impulsive hammering is undertaken at the mixer drum.
- For all materials handling, ensure that materials are not dropped from excessive heights, lining drops chutes and dump trucks with resilient materials.
- For compressors, generators and pumps, these can be surrounded by acoustic lagging or enclosed within acoustic enclosures providing air ventilation.
- All items of plant will be subject to regular maintenance. Such maintenance can prevent unnecessary increases in plant noise and can serve to prolong the effectiveness of noise control measures.

Screening

Typically screening is an effective method of reducing the noise level at a receiver location and can be used successfully as an additional measure to other forms of noise control. The effectiveness of a noise screen will depend on the height and length of the screen, its mass, and its position relative to both the source and receiver.

The length of the screen should in practice be at least five times the height, however, if shorter sections are necessary then the ends of the screen will be wrapped around the source. BS 5228 *-1:2009+A1* states that on level sites the screen should be placed as close as possible to either the source or the receiver. The construction of the barrier will be such that there are no gaps or openings at joints in the screen material. In most practical situations the effectiveness of the screen is limited by the sound transmission over the top of the barrier rather than the transmission through the barrier itself. In practice, screens constructed of materials with a mass per unit of surface area greater than 10kg/m^2 will give adequate sound insulation performance.

Post-mitigation construction noise calculations assume a partial line of sight (-5dB) is achieved using a solid 2.4m high standard construction site hoarding.

Annex B of *BS 5228-1:2009+A1:2014* (Figures B1, B2 and B3) provide typical details for temporary and mobile acoustic screens, sheds and enclosures that can be constructed on site from standard materials.

In addition, careful planning of the site layout will also be considered. The placement of temporary site buildings such as offices and stores between the site and sensitive locations can provide a good level of noise screening during the phasing of works.

Liaison with the Public

A designated Community Liaison Officer (CLO) will be appointed to site during construction works. Any noise complaints will be logged and followed up in a prompt fashion by the CLO. In addition, prior to particularly noisy construction activity the CLO will inform the nearest noise sensitive locations of the time and expected duration of the noisy works.

Vibration Mitigation

On review of the likely vibration levels associated with construction activities, it may be concluded that the construction of the proposed development is not expected to give rise to vibration that is either significantly intrusive or capable of giving rise to structural or cosmetic damage to adjacent buildings.

In the case of vibration levels giving rise to human discomfort, in order to minimise such impacts, the following measures shall be implemented during the construction period: -

- A clear communication programme will be established to inform adjacent building occupants in advance of any potential intrusive works which may give rise to vibration levels likely to exceed perceptible levels. The nature and duration of the works will be clearly set out in all communication circulars;
- Appropriate vibration isolation shall be applied to plant, where feasible;
- Monitoring will be undertaken at identified sensitive buildings, where proposed works have the potential to be at or exceed the vibration limit values.

Project Programme

The phasing programme will be arranged so as to control the amount of disturbance in noise and vibration sensitive areas at times that are considered of greatest sensitivity. The potential for cumulative works occurring both within the site and at any external sites with potential to generate significant noise effects will be reviewed in terms of limiting the duration and scale of these effects.

10.9.2 Operational Phase Mitigation

Mitigation measures for the operational phase are set out below.

10.9.2.1 Additional Traffic on Adjacent Roads

During the operational phase of the development, noise mitigation measures with respect to the impact of traffic from the development are not deemed necessary.

10.9.2.2 Mechanical Services Plant

Proprietary noise and vibration control measures will be employed as part of the detailed design in order to ensure that noise emissions from building services plant do not exceed the relevant internal noise criteria within Table 10.7 for residential dwellings within the proposed development. In addition, noise emissions should be broadband in nature and should not contain any tonal or impulsive elements. Considering that sensitive receptors within the development are much closer than off-site sensitive receptors, once the relevant noise criteria is achieved within the development, there are no mitigation requirements to control building services and plant at off-site NSLs.

10.9.2.3 Inward Noise

In terms of the inward noise impact of road traffic on the development buildings and amenity areas, Appendix 10.1 sets out the approach for controlling noise levels across the site.

The proposed development site has been categorised as a ***Negligible to Low Risk*** in accordance with ProPG. (see further details in Appendix 10.1). Review has been undertaken of the location of residential buildings on site and the external noise levels. The assessment has determined that no specific noise mitigation measures are required to the site boundary or site buildings to control noise intrusion to internal spaces.

10.9.3 Cumulative Mitigation

In this instance, there are no additional noise mitigation measures over and above those set out in Sections 10.9.1 and 10.9.2 for the construction and operational phases.

10.10 Residual Impact Assessment

This section assesses potential significant environmental impacts which remain after mitigation measures are implemented.

10.10.1 Demolition & Construction Phase

10.10.1.1 Noise

During the demolition and construction phases of the project there is the potential for temporary to short-term noise effects on nearby noise sensitive locations due to noise emissions from site activities. The application of binding noise limits and hours of operation, along with implementation of appropriate noise and vibration control measures, will ensure that noise and vibration impact is kept to a minimum as far as practicable. For the duration of the construction period, construction noise impacts will be short-term and negative, depending on the proximity of the works to the site boundary.

During site clearance the residual effect is **negative, significant to very significant and temporary** noise impact at distances up to 25m for NSL01 and NSL02 if all plant items were assumed to work simultaneously while adjacent to the closest boundary to the site. In line with DMRB Noise and Vibration (UKHE 2020) document, a significant effect relating to construction noise is deemed to occur where a moderate or major impact is likely to occur for a period of greater that 10 days/nights over 15 consecutive day/nights, or greater than 40 days over 6 consecutive months. In the case of this activity, it is unlikely the durations will be exceeded and hence the overall residual effect is categorised as **negative, moderate and temporary**. At all other NSLs at greater distances than 60m from noisy works the CNT would not be exceeded and the residual significance of effect and is **negative, slight to moderate and temporary**.

During super structure, compounds and landscaping the residual effect is **negative, slight to moderate and short term** at all NSLs (greater than 25m from works) during all phases of the construction.

10.10.1.2 Vibration

Likely noise and vibration effects during the construction phase will be **negative, slight to moderate and temporary**.

10.10.2 Operational Phase

10.10.2.1 Additional Vehicular Traffic on Surrounding Roads

In the context of the existing noise environment, the overall contribution of traffic is not considered to pose any significant impact to nearby residential locations. The resulting residual effect is **neutral to negative, imperceptible to not significant, and long-term.**

10.10.2.2 Building Services Plant

There are no sources of mechanical or electrical plant associated with the building types across the development with potential to emit audible noise levels beyond the site boundary at off-site NSLs. Any required plant items will be selected, designed and located so that there is no negative impact on sensitive receivers within the development itself.

In this instance, best practice is to set appropriate noise limits that will inform the detailed design during the selection and layout of building services for the proposed development. The cumulative operational noise level from building services plant at the nearest noise sensitive location within the proposed development will be designed/attenuated to not exceed the internal noise levels discussed in Table 10.7. Once the relevant noise criteria are not exceeded within the proposed development, the related noise impact to existing NSLs offsite will be **negative, not significant and long-term.**

10.10.2.3 Inward Noise

The results of the baseline survey (see Appendix 10.1 for full details) indicate that with and with standard double glazing good and reasonable internal noise levels can be achieved with windows partially open for all dwellings. The resultant residual inward noise effect will be of **neutral, not significant and long term**.

10.11 Risk of Major Accidents or Disasters

There are no likely risks of major accidents and disasters in relation to noise and vibration associated with the proposed development and the cumulative development.

10.12 Worst Case Scenario

In terms of construction phase impacts, worst-case assumptions regarding volumes of excavation materials and number of vehicle movements have been used in order to determine the highest level of mitigation required in relation to potential noise impacts (see Section 10.8.1). The proposed development is the worst-case scenario in terms of noise emissions, emissions from each individual phase will be lower than the cumulative proposed development.

Worst-case traffic data was used in the assessment of construction and operational phase impacts. In addition, conservative background concentrations were used in order to ensure a robust assessment. Thus, the predicted results of the construction and operational stage assessment are worst-case and the significance of effects is most likely overestimated.

10.13 Significant Interactions

The potential interaction between noise and vibration and other specialist chapters in the EIAR is primarily limited to Chapter 4 (Material Assets - Traffic & Transportation), Chapter 8 (Biodiversity) and Chapter 13 (Population & Human Health). This chapter has been prepared in consideration of and in conjunction with the relevant elements of these chapters. For example noise and vibration impacts associated with the proposed development have been fully considered within this Chapter of the EIA Report. However, commentary on the impact assessment and related noise levels are also summarised specifically with respect to potential human health impacts in Chapter 13. The traffic flow projections associated with the development provided by the traffic consultants in Chapter 4 (Material Assets - Traffic & Transportation) has been utilised in the construction and operational noise calculations in this Chapter of the EIAR report.

10.14 Cumulative Impact of the Relevant Plan for the Area

The potential cumulative impact of the relevant plan for the area was assessed, which is considered to be the Cork City Development Plan 2022. The assessment of the potential impacts on the environment of the Cork City Development Plan 2022 was undertaken utilising the Strategic Environmental Objectives (SEOs) and are detailed in Table 5.1 of the CDP's Strategic Environmental Assessment. The potential cumulative impacts of the Plan were assessed with regard to these SEO's. Table 5.1 of the SEA identifies the SEO's for 'Air' includes to

'Significantly decrease noise pollution by 2020 and move closer to WHO recommended levels.

Table 7.5 of the CDP's Strategic Environmental Assessment, 'Comparative Assessment of each of the Alternatives against Strategic Environmental Objectives' indicates that Alternative/Scenario 3 'Compact Liveable Growth', the 'Selected Scenario' has positive interactions with the status of the SEO's for 'Air'.

10.15 Monitoring

The following monitoring measures are required to be implemented at the site for the project to ensure that construction activities do not cause excessive nuisance to receptors in the vicinity of the site.

10.15.1 Noise Monitoring

During the demolition and construction phase, the appointed contractor will monitor noise at representative NSLs to evaluate and inform the requirement and / or implementation of noise management measures. Noise will be monitored in accordance with ISO 1996–1 (ISO 2016) and ISO 1996–2 (ISO 2017).

The selection of monitoring locations will be based on the closest NSLs to the proposed works which have the potential to exceed the CNT, i.e., at NSL01, NSL02 and NSL04 to the southwest, west and north site boundaries.

Any Noise Monitoring Terminal (NMT) (number and locations to be agreed post-consent with Local Authority), to be installed will have the following specifications (or similar approved):

- Logging of two concurrent periods, e.g., 15-minute & hourly.
- Daily automated Charge Injection Calibration (CIC).
- E-mail alert on threshold exceedance.

- E-mail alert on low battery and low memory.
- Remote access to measured data.
- Live display of noise levels.

In addition, it is recommended that spot-check noise measurements are conducted on a monthly basis. These spot checks can be organised to coincide with works that have the potential to generate high levels of noise on site in order to confirm the potential extent of effects.

A monthly noise-monitoring report should be prepared by the contractor. Reports should identify any exceedances above nominal limit values and attempts to clarify the causes. Where remedial measures are required and identifiable, these should also be clearly stated.

10.15.2 Vibration Monitoring

Where the excavation works take place within 50m of vibration-sensitive locations (VSLs) e.g. NSL01, NSL02 and NSL04 vibration monitoring shall be installed, with the number and locations to be agreed with Local Authority.

Vibration monitoring stations should continually log vibration levels using the Peak Particle Velocity parameter (PPV, mm/s) in the X, Y and Z directions, in accordance with ISO 4866: 2010: *Mechanical vibration and shock – Vibration of fixed structures – Guidelines for the measurement of vibrations and evaluation of their effects on structures.*

The mounting of the transducer to the vibrating structure will need to comply with BS ISO 5348: 2021: *Mechanical vibration and shock – Mechanical mounting of accelerometers.*

In summary, the following ideal mounting conditions apply:

- The transducer and its mountings should be as rigid as possible;
- The mounting surfaces should be as clean and flat as possible;
- Simple symmetric mountings are best;
- The mass of the mounting should be small in comparison to that of the structure under test;
- The monitoring equipment should be set to monitor vibration in 5-minute periods;
- E-mail alert on threshold exceedance;
- E-mail alert on low battery and low memory;
- Remote access to measured data;
- Live display of vibration levels.

In addition, it is recommended that spot-check vibration measurements are conducted on a monthly basis. These spot checks can be organised to coincide with works that have potential to generate high levels of vibration on site in order to confirm the potential extent of effects.

A monthly vibration monitoring report should be prepared by the contractor. Reports should identify any exceedances above nominal limit values and attempts to clarify the causes. Where remedial measures are required and identifiable, these should also be clearly stated.

No monitoring is required for the operational phase.

10.16 Conclusion

AWN Consulting have undertaken an assessment of the potential noise and vibration impacts as a result of the proposed development. A range of mitigation measures have been specified for the construction stages, with no specific mitigation required for the operational stage. Noise and vibration monitoring has been identified during the demolition and construction phase to ensure the construction and vibration thresholds are not exceed at the closest receptors. Overall, no significant noise and vibration impacts are predicted during the construction or operational phases of the proposed development or cumulative development.

The ProPG inward impact assessment has identified that the proposed units will achieve suitable internal noise levels with standard double glazing. The resultant residual inward noise effect will be of neutral, not significant and long term.

10.17 References and Sources

- Cork Agglomeration Noise Action Plan 2024-2028.
- ANC, IOA & CIEH (2017). ProPG: Planning & Noise – Professional Practice Guidance on Planning & Noise – New Residential Development.
- British Standard BS 8233: 2014: Guidance on sound insulation and noise reduction for buildings.
- British Standard BS 5228: 2009 +A1:2014: Code of Practice for Control of Noise and Vibration on Construction and Open Sites Part 1: Noise & Part 2: Vibration.
- British Standard BS 7385: 1993: Evaluation and measurement for vibration in buildings Part 2: Guide to damage levels from ground borne vibration.
- Department of Transport Welsh Office, HMSO (1988). Calculation of Road Traffic Noise.
- EPA (2022). Guidelines on the Information to be contained in Environmental Impact Assessment Reports.
- ISO 1996: 2017: Acoustics – Description, measurement and assessment of environmental noise.
- ISO 9613-2: 2024: Acoustics – Attenuation of sound during propagation outdoors, Part 2: General method of calculation.
- United Kingdom Highways England (now National Highways) (UKHE) Design Manual for Roads and Bridges (DMRB) Sustainability & Environment Appraisal LA 111 Noise and Vibration Revision 2 (UKHE, 2020).

10.18 List of Chapter Appendices

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CHAPTER ELEVEN

AIR QUALITY

CHAPTER ELEVEN

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CHAPTER 11 | Air Quality

11.1 Introduction

This chapter identifies, describes and assesses the likely air quality impacts of the proposed large-scale residential development (LRD) located at Carriganarra, Ballincollig, Co. Cork.

A full description of the development is available in Chapter 2. This Chapter should be read in conjunction with Chapter 4 Material Assets - Traffic and Transportation.

This chapter has been prepared by Carl Ramskill, Principal Air Quality Consultant at AWN Consulting. Carl has a BSC in Chemistry and an MSc in Air Pollution Management and Control from the University of Birmingham, as well as 8 years' experience in air quality. He has worked on various projects in the UK and Ireland, including road schemes, residential developments, mixed-use developments, energy centres and data centres.

11.2 Assessment Methodology

11.2.1 Relevant Legislation & Guidance

The principal guidance and best practice documents used to inform the assessment of potential impacts on air quality are summarised below.

- Guidance on the Assessment of Dust from Demolition and Construction v2.2 (Institute of Air Quality Management [IAQM] (hereafter referred to as the IAQM Guidelines) (IAQM, 2024);
- A Guide To The Assessment Of Air Quality Impacts On Designated Nature Conservation Sites (Version 1.1) (IAQM, 2020); and
- PE-ENV-01106: Air Quality Assessment of Specified Infrastructure Projects (Transport Infrastructure Ireland [TII], 2022).

In addition to specific air quality guidance documents, the following guidelines were considered and consulted in the preparation of this chapter:

- Guidelines on the Information to be Contained in Environmental Impact Assessment Reports (hereafter referred to as the Environmental Protection Agency (EPA) Guidelines) (EPA, 2022);
- Guidelines for Planning Authorities and An Bord Pleanála on carrying out Environmental Impact Assessment (Department of Housing, Planning & Local Government, 2018); and
- Environmental Impact Assessment (EIA) Directive Guidance on the Preparation of the Environmental Impact Assessment Report (European Commission, 2017).

11.2.2 Criteria for Rating of Impacts

11.2.2.1 Ambient Air Quality Standards

National and European statutory bodies, the Department of the Environment, Heritage and Local Government in Ireland and the European Parliament and Council of the European Union, have set limit values in ambient air for a range of air pollutants to reduce the risk to health from poor air quality. These limit values or *"Air Quality Standards"* are health or environmental-based levels for which additional factors may be considered. For example, natural background levels, environmental conditions and socio-economic factors may all play a part in the limit value which is set.

Air quality significance criteria are assessed on the basis of compliance with the appropriate standards or limit values. The applicable standards in Ireland are set out in Directive (EU) 2024/2881 *of the European Parliament and of the Council of 23 October 2024 on ambient air quality and cleaner air for Europe (recast)*. This directive supersedes EU Directive 2008/50/EC *of the European Parliament and of the Council of 21 May 2008 on ambient air quality and cleaner air for Europe* (CAFE Directive). It sets out new air quality standards for pollutants to be reached by 2030 which are more closely aligned with the World Health Organisation (WHO) air quality guidelines and also includes limit values applicable until 2030.

The Ambient Air Quality Standards Regulations 2022 (S.I. 739 of 2022) (the Air Quality Standards Regulations 2022) further transposed the CAFE Directive and revoked the Air Quality Standards Regulations 2011, as amended. With the adoption of Directive (EU) 2024/2881, Ireland must similarly transpose this directive into national law, i.e. update the Air Quality Standards Regulations, before December 2026.

The ambient air quality limit values for pollutants are set out in Annex I of Directive (EU) 2024/2881. Table 1 of Annex I in Directive (EU) 2024/2881 sets out the updated air quality limit values for pollutants to be achieved by 1 January 2030, these are more closely aligned with the WHO air quality guidelines. Table 2 of Annex I in Directive (EU) 2024/2881 sets out the limit values for air pollutants which are to be achieved by 11 December 2026 and are also applicable up to 2030. The limit values in Table 2 of Annex I are the same as the limits set under Directive 2008/50/EC and the Air Quality Standards Regulations 2022.

In relation to the proposed development, the applicable limit values are for nitrogen dioxide (NO_2) and particulate matter (PM_{10} and $PM_{2.5}$). Table 11.1outlines the limit values pre-2030 and post-2030 for the specified pollutants.

Pollutant	Directive (EU) 2024/2881 Annex I Table 2		Directive (EU) 2024/2881 Annex I Table 1	
	Limit Type	Limit Value (to be attained by 2026 and applicable until 2030)	Limit Type	Limit Value (to be attained by 2030)
Nitrogen Dioxide (NO_2)	Hourly limit for protection of human health - not to be exceeded more than 18 times/ year	200 µg/m³	Hourly limit for protection of human health - not to be exceeded more than 3 times/year	200 µg/m³
	N/A	N/A	24-hour limit for protection of human health - not to be exceeded more than 18 times/year	50 µg/m³
	Annual limit for protection of human health	40 µg/m³	Annual limit for protection of human health	20 µg/m³
Particulate Matter (as PM_{10})	24-hour limit for protection of human health - not to be exceeded more than 35 times/ year	50 µg/m³	24-hour limit for protection of human health - not to be exceeded more than 18 times/year	45 µg/m³
	Annual limit for protection of human health	40 µg/m³	Annual limit for protection of human health	20 µg/m³
Particulate Matter (as $PM_{2.5}$)	N/A	N/A	24-hour limit for protection of human health - not to be exceeded more than 18 times/year	25 µg/m³
	Annual limit for protection of human health	25 µg/m³	Annual limit for protection of human health	10 µg/m³

Table 11.1 Ambient Air Quality Limit Values

11.2.2.2 WHO Air Quality Guidelines & Clean Air Strategy

In April 2023, the Government of Ireland published the *Clean Air Strategy for Ireland* (Government of Ireland, 2023), which provides a high-level strategic policy framework needed to reduce air pollution. The strategy commits Ireland to achieving the 2021 WHO Air Quality Guidelines Interim Target 3 (IT3) by 2026, the IT4 targets by 2030 and the final targets by 2040 (Table 11.2). The strategy notes that a significant number of EPA monitoring stations observed air pollution levels in 2021 above the WHO targets; 80% of these stations would fail to meet the final $PM_{2.5}$ target of 5 µg/m³. The strategy also acknowledges that "*meeting the WHO targets will be challenging and will require legislative and societal change, especially with regard to both $PM_{2.5}$ and NO_2*".

Annex II of Directive (EU) 2024/2881 gives assessment thresholds which align with the clean air strategy final 2040 WHO targets. Directive (EU) 2024/2881 states that *"Member States shall endeavour to achieve and preserve the best ambient air quality and a high level of protection of human health and the environment, with the aim of achieving a zero-pollution objective as referred to in Article 1(1), in line with WHO recommendations, and below the assessment thresholds laid down in Annex II."*

These assessment thresholds relate to monitoring of ambient air quality by Member States, where *"exceedances of the assessment thresholds specified in Annex II shall be determined on the basis of concentrations during the previous 5 years where sufficient data are available. An assessment threshold shall be deemed to have been exceeded if it has been exceeded during at least 3 separate years out of those previous 5 years."*

Pollutant	Limit Type	IT3 (2026)	IT4 (2030)	Final Target (2040)
NO_2	24-hour limit for protection of human health	-	-	25 µg/m³
	Annual limit for protection of human health	20 µg/m³	-	10 µg/m³
PM (as PM_{10})	24-hour limit for protection of human health	75 µg/m³	50 µg/m³	45 µg/m³
	Annual limit for protection of human health	30 µg/m³	20 µg/m³	15 µg/m³
PM (as $PM_{2.5}$)	24-hour limit for protection of human health	37.5 µg/m³	25 µg/m³	15 µg/m³
	Annual limit for protection of human health	15 µg/m³	10 µg/m³	5 µg/m³

Table 11.2 WHO Air Quality Guidelines 2021

The applicable air quality limit values for the purposes of this assessment are those set out in Table 11.1. The limit values stipulated in Table 2 of Annex I of Directive (EU) 2024/2881 are applicable for the construction phase and Opening Year 2030 for the proposed development. The limit values stipulated in Table 1 of Annex I of Directive (EU) 2024/2881 are applicable for the construction phase, Opening Year 2030 and Design Year 2045 for the proposed development.

11.2.2.3 Dust Deposition Guidelines

The concern from a health perspective is focused on particles of dust that are less than 10 microns (PM_{10}) and less than 2.5 microns ($PM_{2.5}$). The EU ambient air quality standards outlined in Table 11.1 have set ambient air quality limit values for PM_{10} and $PM_{2.5}$.

With regards to larger dust particles that can give rise to dust soiling, there are no statutory guidelines regarding the maximum dust deposition levels that may be generated during the construction phase of a development in Ireland. Furthermore, no specific criteria have been stipulated for dust soiling in respect of this development.

With regard to dust deposition, the German TA-Luft standard for dust deposition (non-hazardous dust) (German VDI, 2002) sets a maximum permissible emission level for dust deposition of 350 mg/m^2/day averaged over a one-year period at any receptors outside the site boundary. The TA-Luft standard has been applied for the purpose of this assessment based on recommendations from the EPA in Ireland in the document titled *Environmental Management Guidelines - Environmental Management in the Extractive Industry (Non-Scheduled Minerals)* (EPA, 2006). The document recommends that the TA-Luft limit of 350 mg/m^2/day be applied to the site boundary of quarries. This limit value can be implemented with regard to dust impacts from construction of the proposed development.

11.2.2.4 Air Quality & Traffic Significance Criteria

The Transport Infrastructure Ireland (TII) guidance document Air Quality Assessment of Specified Infrastructure Projects – PE-ENV-01106 (TII, 2025) details a methodology for determining air quality impact significance criteria for road schemes which can be applied to any project that causes a change in traffic. The degree of impact is determined based on the percentage change in pollutant concentrations relative to the Do-Nothing scenario. The TII significance criteria are outlined in Table 4.9 of Air Quality Assessment of Specified Infrastructure Projects – PE-ENV-01106 (TII, 2025) and reproduced in Table 11.3 below. These criteria have been adopted for the proposed development to predict the impact of NO_2, PM_{10} and $PM_{2.5}$ emissions as a result of the proposed development.

Long-term average concentration at receptor in assessment year	% Change in concentration relative to Air Quality Limit Value (AQLV)			
	1%	2-5%	6-10%	>10%
75% or less of AQLV	Neutral	Neutral	Slight	Moderate
76 – 94% of AQLV	Neutral	Slight	Moderate	Moderate
95 – 102% of AQLV	Slight	Moderate	Moderate	Substantial
103 – 109% of AQLV	Moderate	Moderate	Substantial	Substantial
110% or more of AQLV	Moderate	Substantial	Substantial	Substantial

Table 11.3 Air Quality & Traffic Significance Criteria

As per Table 11.3 a neutral effect is one where a change in concentration at a receptor is:

- 5% or less where the Opening Year, without the proposed development, annual mean concentration is 75% or less of the standard; or
- 1% or less where the Opening Year, without the proposed development, annual mean concentration is 94% or less of the standard.

Where an effect does not meet the criteria for neutral, as described above, the effect can either be positive or negative. The TII guidance (TII, 2025) states that "*the evaluation of significance of effects for the operational phase should be undertaken for the Opening Year only as the Design Year is likely to show lower total pollutant concentrations and changes in concentration*" (TII, 2025).

Non-significant effects (i.e. of local importance only) are 'neutral' or 'slight' changes in concentrations while significant effects can be changes in pollutant concentrations that are either 'moderate' or 'substantial'. However, the TII guidance (TI, 2022) states that these must be considered in the context of the project and 'moderate' or 'substantial' increases are not necessarily always significant effects.

The impact descriptors in Table 11.3 are used to describe the impact at each modelled receptor location, and the significance of the impacts is then determined, aligning with the terminology in the EPA guidelines (EPA, 2022). Whilst it may be determined that there are 'slight', 'moderate' or 'substantial' impacts at one or more receptors, an overall judgement should be made of whether the proposed development is 'significant' or 'not significant' in terms of air quality. Factors to consider when determining the overall significance of a proposed development are provided in Table 4.10 of the TII guidance (TII, 2025).

11.2.3 Construction Phase

11.2.3.1 Construction Dust Assessment

The Institute of Air Quality Management in the UK (IAQM) guidance document '*Guidance on the Assessment of Dust from Demolition and Construction*' (IAQM, 2024) outlines an assessment method for predicting the impact of dust emissions from construction activities based on the scale and nature of the works and the sensitivity of the area to dust impacts. The IAQM methodology has been applied to the construction phase of this development to predict the likely risk of dust impacts in the absence of mitigation measures and to determine the level of site-specific mitigation required. The use of UK guidance is recommended by Transport Infrastructure Ireland in their guidance document *Air Quality Assessment of Specified Infrastructure Projects – PE-ENV-01106* (TII, 2025).

The major dust generating activities are divided into four types within the IAQM guidance (IAQM, 2024) to reflect their different potential impacts. These are:

- Demolition;
- Earthworks;
- Construction; and
- Trackout (transport of dust and dirt from the construction site onto the public road network).

The magnitude of each of the four categories is divided into large, medium or small scale depending on the nature of the activities involved. The criteria for determining the category for the works involved are outlined in Table 11.4, these are based on the IAQM guidance (IAQM, 2024). The magnitude of each activity is combined with the overall sensitivity of the area to determine the risk of dust impacts from site activities. This allows the level of site-specific mitigation to be determined.

Dust Emission Magnitude		
Small	**Medium**	**Large**
Demolition		
• Total building volume <12,000 m^3 • Construction material with low potential for dust release (e.g. metal cladding or timber) • Demolition activities <6 m above ground • Demolition during wetter months	• Total building volume 12,000 - 75,000 m^3 • Potentially dusty construction material • Demolition activities 6 – 12 m above ground level	• Total building volume >75,000 m^3 • Potentially dusty construction material (e.g. concrete) • On-site crushing and screening • Demolition activities >12 m above ground level
Earthworks		
• Total site area <18,000 m^2 • Soil type with large grain size (e.g. sand) • <5 heavy earth moving vehicles active at any one time • Formation of bunds <3 m in height • Earthworks during wetter months	• Total site area 18,000 m2 - 110,000 m^2 • Moderately dusty soil type (e.g. silt) • 5 – 10 heavy earth moving vehicles active at any one time • Formation of bunds 3 – 6 m in height	• Total site area >110,000 m^2 • Potentially dusty soil type (e.g. clay, which will be prone to suspension when dry due to small particle size) • >10 heavy earth moving vehicles active at any one time • Formation of bunds >6 m in height
Construction		
• Total building volume <12,000 m^3 • Construction material with low potential for dust release (e.g. metal cladding or timber)	• Total building volume 12,000 - 75,000 m^3 • Potentially dusty construction material (e.g. concrete) • On-site concrete batching	• Total building volume >75,000 m^3 • On-site concrete batching • Sandblasting
Trackout (Truck Movements)		
• <20 HDV (>3.5 t) outward movements in any one day • Surface material with low potential for dust release • Unpaved road length <50 m	• 20 – 50 HDV (>3.5 t) outward movements in any one day • Moderately dusty surface material (e.g. high clay content) • Unpaved road length 50 – 100 m	• >50 HDV (>3.5 t) outward movements in any one day • Potentially dusty surface material (e.g. high clay content) • Unpaved road length >100 m

Table 11.4 IAQM Criteria to Determine Dust Emissions Magnitude

The sensitivity of the area must then be assessed as outlined below. Both receptor sensitivity and proximity to proposed works areas are taken into consideration. For the purposes of this assessment, high sensitivity receptors are regarded as residential properties where people are likely to spend the majority of their time. Commercial properties and places of work are regarded as medium sensitivity while low sensitivity receptors are places where people are present for short periods or do not expect a high level of amenity. Table 11.5 outlines the criteria for determining the sensitivity of the area to dust soiling, dust-related human health effects and ecological impacts as per the IAQM guidance (IAQM, 2024).

Sensitivity of the Area to Dust Soiling Effects on People and Property					
Receptor Sensitivity	**Number of Receptors**	**Distance from Source (m)**			
		<20	**<50**	**<100**	**<250**
High	>100	High	High	Medium	Low
	10 - 100	High	Medium	Low	Low
	1 - 10	Medium	Low	Low	Low
Medium	>1	Medium	Low	Low	Low
Low	>1	Low	Low	Low	Low

Sensitivity of the Area to Human Health Impacts						
Receptor Sensitivity	**Annual Mean PM_{10} Concentration**	**Number of Receptors**	**Distance from Source (m)**			
			<20	**<50**	**<100**	**<250**
High	< 24 µg/m^3	>100	Medium	Low	Low	Low
		10 - 100	Low	Low	Low	Low
		1 - 10	Low	Low	Low	Low
Medium	< 24 µg/m^3	>10	Low	Low	Low	Low
		1 - 10	Low	Low	Low	Low
Low	< 24 µg/m^3	>1	Low	Low	Low	Low

Sensitivity of the Area to Ecological Impacts			
Receptor Sensitivity	**Receptor Sensitivity Description**	**Distance**	
		<20m	**<50m**
High	International or national designation, with particularly dust sensitive species present. Examples include Special Area of Conservation (SAC) or Special Protection Area (SPA).	High	Medium
Medium	National designation where the features may be affected by dust deposition. Examples include Site of Special Scientific Interest (SSSI).	Medium	Low
Low	Local designation where the features may be affected by dust deposition. Examples include local wildlife sites or county wildlife sites.	Low	Low

Table 11.5 Criteria for Determining the Sensitivity of the Area

Once the dust emission magnitude and sensitivity of the area have been determined the next step, according to the IAQM guidance (IAQM, 2024), is to establish the level of risk by combining the magnitude with the overall sensitivity of the area to dust soiling, human health and ecological effects. The level of risk associated with each activity is determined using the criteria in Table 11.6.

Sensitivity of Area	Dust Emission Magnitude		
	Large	Medium	Small
Demolition			
High	High risk	Medium risk	Medium risk
Medium	High risk	Medium risk	Low risk
Low	Medium risk	Low risk	Negligible
Earthworks			
High	High risk	Medium risk	Low risk
Medium	Medium risk	Medium risk	Low risk
Low	Low risk	Low risk	Negligible
Construction			
High	High risk	Medium risk	Low risk
Medium	Medium risk	Medium risk	Low risk
Low	Low risk	Low risk	Negligible
Trackout			
High	High risk	Medium risk	Low risk
Medium	Medium risk	Medium risk	Low risk
Low	Low risk	Low risk	Negligible

Table 11.6 IAQM Criteria to Determine Risk of Dust Impacts

11.2.3.2 Construction Phase Traffic Assessment

Construction phase traffic also has the potential to impact air quality. The TII guidance *Air Quality Assessment of Specified Infrastructure Projects – PE-ENV-01106* (TII, 2025), states that road links meeting one or more of the following criteria can be defined as being '*affected*' by a proposed development and should be included in the local air quality assessment. While the guidance is specific to infrastructure projects, the approach can be applied to any development that causes a change in traffic.

- Annual average daily traffic (AADT) changes by 1,000 or more;
- Heavy duty vehicle (HDV) AADT changes by 200 or more;
- Daily average speed change by 10 kph or more;
- Peak hour speed change by 20 kph or more;
- A change in road alignment by 5 m or greater.

EGIS have prepared Chapter 4 (Material Assets – Traffic and Transportation) of this EIAR. As per Chapter 4, it has been determined that the Construction Phase traffic will not increase by 1,000 AADT, or 200 HDV AADT, or that the development will not result in speed changes or changes in road alignment. Therefore, the traffic does not meet the above scoping criteria. A detailed air quality assessment of Construction Phase traffic emissions has been scoped out from any further assessment as there is no potential for significant impacts to air quality with respect with human or ecological receptors.

11.2.4 Operational Phase

11.2.4.1 Operational Phase Traffic Assessment

Operational phase traffic has the potential to impact local air quality as a result of increased vehicle movements associated with the proposed development. The TII scoping criteria detailed in Section 11.2.3.2 were used to determine if any road links are affected by the proposed development and require inclusion in a detailed air dispersion modelling assessment. EGIS has prepared Chapter 4 Material Assets – Traffic and Transportation of this EIAR. The proposed development will result in a greater than 1000 AADT increase on a single road link in the vicinity of the proposed development site. As a result, an assessment of traffic related emissions was conducted. Additionally, traffic associated with other cumulative developments in the vicinity of the proposed development was included in the figures supplied to ensure a full cumulative assessment was conducted. See Chapter 4 Material Assets – Traffic and Transportation of this EIAR for further details.

The impact of traffic emissions on air quality is assessed for both human and ecological receptors within 200 m of impacted roads as per the TII PE-ENV-01106 guidance (TII, 2025). The following sections describe the methodology for each assessment.

The impact to air quality as a result of changes in traffic is assessed at sensitive human receptors in the vicinity of affected roads. These are discussed in further detail within Section 11.6.2 and shown graphically in Figure 11.3.

The TII guidance (2022) states that modelling should be conducted for NO_2, PM_{10} and $PM_{2.5}$ for the Base, Opening and Design Years for both the Do Nothing, i.e. assuming the proposed development is not in place, and Do Something (with the proposed development in place) scenarios. Modelling of operational NO_2, PM_{10} and $PM_{2.5}$ concentrations has been conducted for the Do Nothing and Do Something scenarios using the TII Road Emissions Model (REM) online calculator tool (TII, 2025).

The following inputs are required for the REM tool: receptor locations, light duty vehicle (LDV) annual average daily traffic movements (AADT), heavy duty vehicles (HDV) AADT (HDV AADT), annual average traffic speeds, road link lengths, road type, project county location and pollutant background concentrations. The Default fleet mix option was selected along with the Intermediate Case fleet data for cars, ICE Sales Ban for LGVs and EU target projections for HGVs, as per TII Guidance (TII 2022, TII 2025). The Intermediate Case assumes a linear interpolation between the Business-as-Usual case – where current trends in vehicle ownership continue and the Climate Action Plan (CAP) case – where adoption of low emission light duty vehicles occurs. The ICE Sales Ban 2035 option for LGVs presents a sales ban on new combustion engine vehicles to be implemented by 2035. The EU Targets projections for HGVs represents interim targets for emissions from sales of new HGVs. The TII REM uses county-based Irish fleet composition for different road types, for different European emission standards from pre-Euro to Euro 6/VI with scaling factors to reflect improvements in fuel quality, retrofitting, and technology conversions. The TII REM also includes emission factors for PM_{10} emissions associated with brake and tyre wear (TII 2025).

Using this input data the model predicts the road traffic contribution to ambient ground level concentrations at the identified sensitive receptors using generic meteorological data. The predicted road contributions are then added to the existing background concentrations to give the predicted ambient concentrations. The ambient concentrations are then compared with the relevant ambient air quality standards to assess the compliance of the proposed development with these ambient air quality standards.

Proposed receptors, representative of worst-case sensitive receptors introduced with the development, were also included in the assessment. However, for these receptors no impacts can be described, as the receptors do not exist in a DN scenario. For the proposed receptors, only predicted concentrations for the DS scenario are reported and compared with the relevant limit values.

The TII guidance (2022) also states that impacts to sensitive ecology due to traffic emissions should be considered. Consideration should be given to designated sites within 2 km of the proposed development. However, a detailed assessment is only required at a local level, where there is a designated site within 200 m of impacted road links. The TII guidance (TII, 2025) notes that only sites that are sensitive to nitrogen and acid deposition need to be included in the assessment. It is not necessary to include sites, for example that have been designated as a geological feature or water course. There are no designated ecological sites within 200 m of the site or impacted road links and therefore no assessment was required as there is no potential for significant impacts to the designated sites due to changes in air quality.

11.2.4.2 Traffic Data used in Modelling Assessment

Traffic flow information is detailed in Table 11.7 as obtained from EGIS for the purposes of this assessment. Data for the Do Nothing and Do Something scenarios for the Opening Year 2030 and Design Year 2045 were provided. The traffic data included traffic associated with the development site and other cumulative sites as relevant (see Chapter 4 for further details).

The modelling assessment has been undertaken for road links that were within 200 m of receptors. Background concentrations have been included as per Section 11.3.2 of this chapter based on available EPA background monitoring data (EPA, 2025).

Road Name	Speed (kph)	Base Year	Opening Year		Design Year	
			Do Nothing	Do Something	Do Nothing	Do Something
		LDV AADT (HDV AADT)	LDV AADT (HDV AADT)	LDV AADT (HDV AADT)	LDV AADT (HDV AADT)	LDV AADT (HDV AADT)
Arm C - Maglin Sustainable Access Corridor	50	2033 (48)	2795 (57)	4508 (57)	3041 (68)	4753 (68)

Table 11.7 Traffic Data used in Operational Phase Air Quality Assessment

11.3 Receiving Environment

11.3.1 Meteorological Data

A key factor in assessing temporal and spatial variations in air quality is the prevailing meteorological conditions. Depending on wind speed and direction, individual receptors may experience very significant variations in pollutant levels under the same source strength (i.e. traffic levels) (WHO, 2006). Wind is of key importance in dispersing air pollutants and for ground level sources, such as traffic emissions, pollutant concentrations are generally inversely related to wind speed. Thus, concentrations of pollutants derived from traffic sources will generally be greatest under very calm conditions and low wind speeds when the movement of air is restricted. In relation to PM_{10}, the situation is more complex due to the range of sources of this pollutant. Smaller particles (less than $PM_{2.5}$) from traffic sources will be dispersed more rapidly at higher wind speeds. However, fugitive emissions of coarse particles ($PM_{2.5}$ - PM_{10}) will actually increase at higher wind speeds. Thus, measured levels of PM_{10} will be a non-linear function of wind speed.

The nearest representative weather station collating detailed weather records is Cork Airport meteorological station, which is located approximately 6.7 km southeast of the site. Cork Airport met data has been examined to identify the prevailing wind direction and average wind speeds over a five-year period (Table 11.1). For data collated during five representative years (2020 - 2024), the predominant wind direction is westerly to south-westerly; the mean wind speed over the long term 30-year averaging period 1991 - 2020 is 5.0 m/s (Met Éireann, 2025).

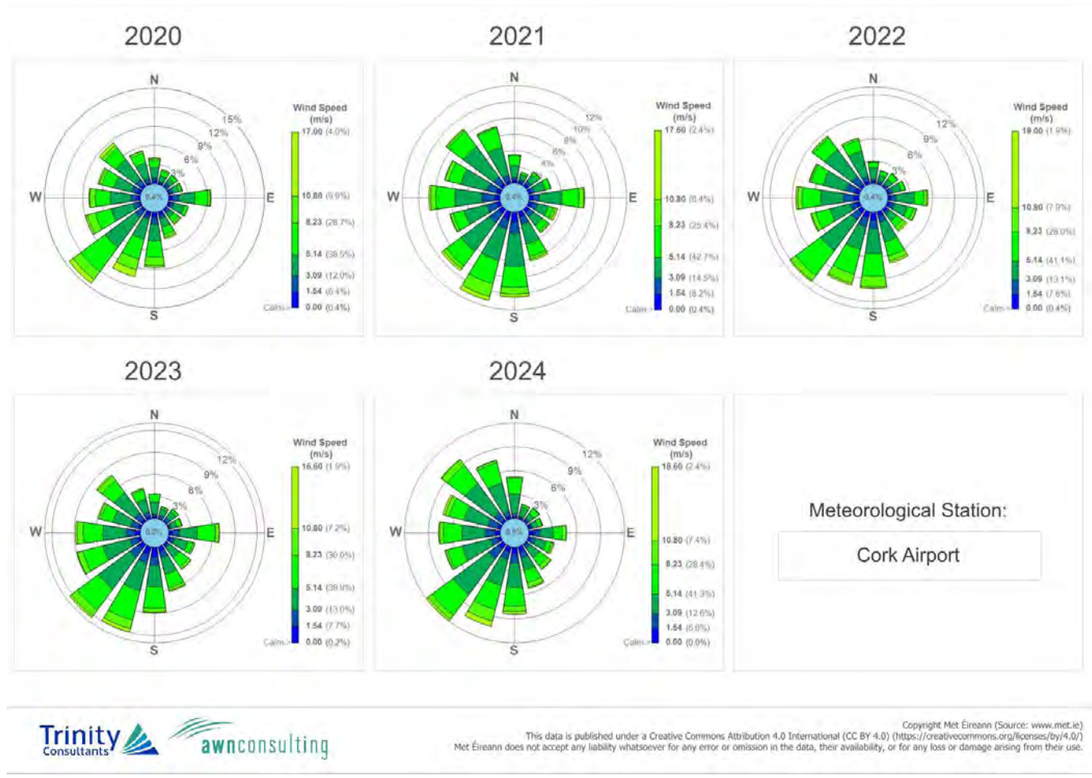


Figure 11.1 Wind Roses for Cork Airport Meteorological Station

11.3.2 Baseline Air Quality

Air quality monitoring programs have been undertaken in recent years by the EPA. The most recent annual report on air quality in Ireland is '*Air Quality In Ireland 2024*' (EPA, 2025). The EPA website details the range and scope of monitoring undertaken throughout Ireland and provides both monitoring data and the results of previous air quality assessments.

As part of the implementation of the Air Quality Standards Regulations 2022 (S.I. No. 739 of 2022), as amended, four air quality zones have been defined in Ireland for air quality management and assessment purposes (EPA, 2025). Dublin is defined as Zone A and Cork as Zone B. Zone C is composed of 23 towns with a population of greater than 15,000. The remainder of the country, which represents rural Ireland and all towns with a population of less than 15,000, is defined as Zone D.

In terms of air monitoring and assessment, the proposed development site is within Zone B (EPA, 2025). The long-term monitoring data has been used to determine background concentrations for the key pollutants in the region of the proposed

development. The background concentration accounts for all non-traffic derived emissions (e.g. natural sources, industry, home heating etc.). The use of publicly available long-term datasets is recommended by TII in their PE-ENV-0016 guidance (2022). This use of long-term data sets is preferred over on-site baseline air monitoring surveys as it gives a better indication of long-term trends in air quality.

Continuous monitoring by the EPA is carried out at a number of monitoring stations within Zone B; these include urban background sites, roadside (traffic) sites and suburban background sites. It is necessary to select monitoring stations that are representative of the site location. Not all monitoring stations are considered suitable for determining background pollutant concentrations and must be reviewed on a case-by-case basis to determine the most appropriate EPA monitoring sites for the current assessment.

The EPA, on their website (EPA, 2025), state that background sites generally represent overall area-wide exposure more closely than roadside sites. Roadside monitoring sites are heavily influenced by traffic emissions and are not considered representative of area-wide pollutant levels.

The full suite of EPA Zone B monitoring locations were reviewed. These included urban traffic (Cork Glanmire Road), suburban traffic (South Link Road) and suburban background (Heatherton Park, UCC Distillery Fields, Bishopstown MTU) locations. Suburban background was determined to be the most representative background for the area of the proposed development. Influences from traffic emissions will be captured within the traffic modelling assessment and therefore, suburban background concentrations give the best indication of other, non-traffic derived sources of pollutants.

11.3.2.1 NO_2

Long-term NO_2 monitoring was carried out at the representative Zone B suburban background location of UCC Distillery Fields over the period 2020 – 2024 (EPA, 2025).

Long term average NO_2 concentrations are significantly below the annual average limit of 40 µg/m³ (see Table 11.8). Average results range from 7 – 9 µg/m³ over the period 2020 – 2024. The 5-year average NO_2 concentration suggests a background concentration of 8 µg/m³. Based on this, a conservative estimate of the current background NO_2 concentration for the region of the proposed development is 8 µg/m³.

Station	Averaging Period	Year				
		2020	2021	2022	2023	2024
UCC Distillery Fields (Zone B Suburban Background)	Annual Mean NO_2 (µg/m³)	8	9	9	8	7
	1-hr Mean > 200 µg/m³ (days)	0	0	0	0	0

Table 11.8 Trends In Air Quality - Nitrogen Dioxide (NO_2)

11.3.2.2 PM_{10}

Continuous PM_{10} monitoring was carried out at the representative Zone B suburban background locations of Bishopstown MTU and Heatherton Park over the period 2020 – 2024 (EPA, 2025).

Long-term PM_{10} concentrations are in compliance with the annual average limit value of 40 µg/m³. Levels range from 11 - 15 µg/m³ over the five-year period at the Zone B sites, with at most 2 exceedances (in Heatherton Park) of the 24-hour limit value of 50 µg/m³ (35 exceedances are permitted per year) (EPA, 2025). The 5-year average PM_{10} concentration at the sites suggests an average concentration of no more than 13 µg/m³ (Table 11.9). Based on the EPA data, a conservative estimate of the current background PM_{10} concentration in the region of the proposed development is 13 µg/m³.

Station	Averaging Period	Year				
		2020	2021	2022	2023	2024
Bishopstown MTU (Zone B Suburban Background)	Annual Mean PM_{10} (µg/m³)	14	13	14	11	11
	24-hr Mean > 50 µg/m³ (days)	0	1	0	-	0
Heatherton Park (Zone B Suburban Background)	Annual Mean PM_{10} (µg/m³)	11	11	12	11	12
	24-hr Mean > 50 µg/m³ (days)	2	1	0	-	0

Table 11.9 Trends In Air Quality - PM_{10}

11.3.2.3 $PM_{2.5}$

Continuous $PM_{2.5}$ monitoring was carried out at the representative Zone B suburban background locations of Heatherton Park, UCC Distillery Fields and Bishopstown MTU over the period 2020 – 2024 (EPA, 2025).

$PM_{2.5}$ concentrations range from 5 - 8 µg/m³ over the five-year period at the Zone B sites (EPA, 2025). The 5-year average $PM_{2.5}$ concentration at the sites suggests an average concentration of no more than 6 µg/m³ (Table 11.10). Based on the EPA data, a conservative estimate of the current background PM_{10} concentration in the region of the proposed development is 6 µg/m³.

Station	Averaging Period	Year				
		2020	2021	2022	2023	2024
Heatherton Park (Zone B Suburban Background)	Annual Mean $PM_{2.5}$ (µg/m³)	8	8	5	6	5
UCC Distillery Fields (Zone B Suburban Background)	Annual Mean $PM_{2.5}$ (µg/m³)	7	7	5	-	-
Bishopstown MTU (Zone B Suburban Background)	Annual Mean $PM_{2.5}$ (µg/m³)	-	-	-	7	7

Table 11.10 Trends In Air Quality - $PM_{2.5}$

11.3.2.4 Summary

Based on the above information the air quality at suburban background sites in the Zone B area is generally good, with concentrations of the key pollutants generally well below the relevant limit values set out in Table 2 of Annex I of Directive (EU) 2024/2881. The current pollutant concentrations at all of the monitoring sites are also in compliance with the 2030 limit values set out in Table 1 of Annex I in Directive (EU) 2024/2881 and the clean air strategy.

11.3.3 Sensitivity of the Receiving Environment

11.3.3.1 Construction Phase

The impact to air quality due from construction phase activities is assessed at sensitive receptors within 250 m of the development boundary. In terms of receptor sensitivity to dust soiling, there are a number of highly sensitive residential properties within 100 m of the proposed development boundary (Figure 11.2). There are more than 10 high sensitivity residential properties within 20 m of the site boundary, and there are a further 10-100 within 50 m and 10-100 properties within 100 m of the site boundary.

Figure 11.2 shows the sensitive receptors in the construction dust study area within 250 m of the site.

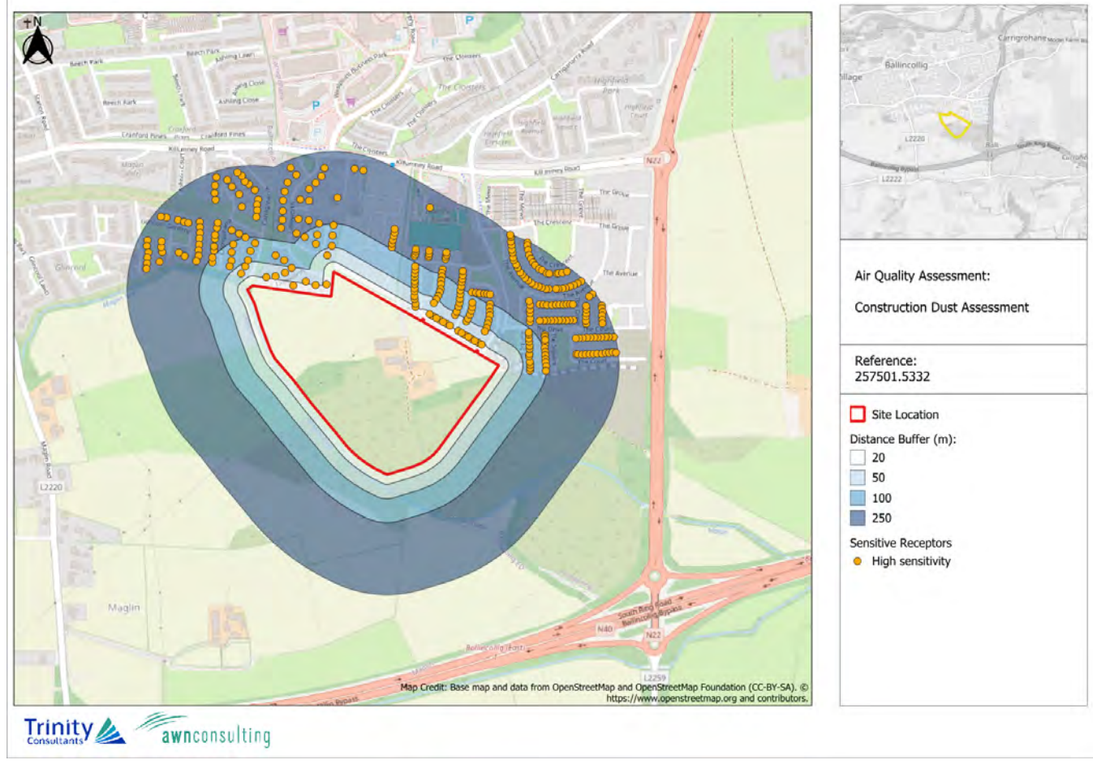


Figure 11.2 Construction Dust Sensitive Receptors within 250 m of Site

11.3.3.2 Operational Phase

The impact to air quality due to changes in traffic is assessed at sensitive receptors in the vicinity of affected roads. The TII guidance (2022) states that a proportionate number of representative receptors, which are located in areas which will experience the highest concentrations or greatest improvements because of the proposed development, are to be included in the modelling. The TII criteria state that receptors within 200 m of impacted road links should be assessed; roads which are greater than 200 m from receptors will not impact pollutant concentrations at that receptor (TII, 2025). The TII guidance (2022) defines sensitive receptor locations for the purposes of modelling annual mean pollutant concentrations as: residential housing, schools, hospitals, care homes and short term-accommodation such as hotels, i.e. locations where members of the public are likely to be regularly present for 24 hours. A total of 3 no. high sensitivity residential receptors (R1 – R3) were included in the modelling assessment (see Figure 11.3). 1 potential development receptor (P1) was included in the assessment to determine concentration levels at the development in the opening and design years.

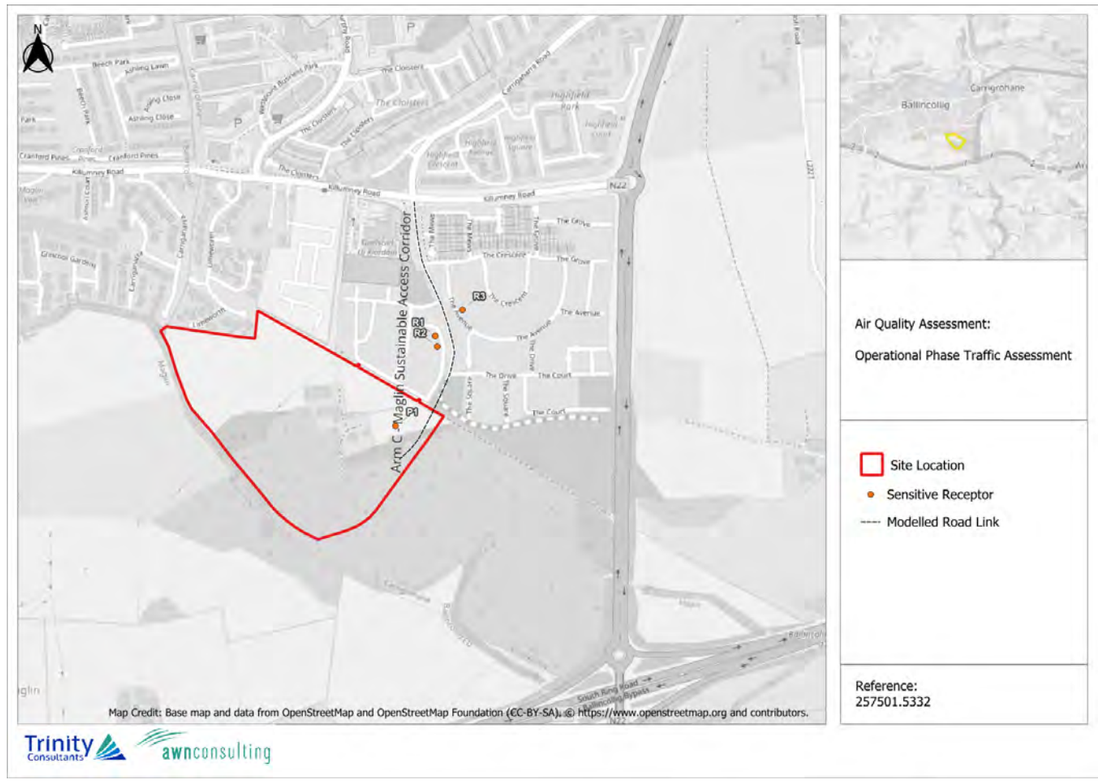


Figure 11.3 Location of Sensitive Receptors used in Operational Phase Air Quality Assessment

11.4 Characteristics of the Proposed Development

The proposed development consists of the demolition of existing agricultural buildings and the construction of a residential development consisting of dwelling houses, apartment/duplex units, a two storey creche facility and all ancillary site development works.

For a full description of the development, see Chapter 2 Project Description.

11.5 The 'Do Nothing' Scenario

In the Do-Nothing scenario, ambient air quality at the site will remain as per the baseline and will change in accordance with trends within the wider area (including influences from potential new developments in the surrounding area, changes in road traffic, etc).

The Do-Nothing scenario associated with the operational phase of the development is assessed within Section 11.6.2 and it was found to be **long-term, direct, localised, neutral** and overall **not significant**.

11.6 Potential Impact of the Proposed Development

11.6.1 Construction Phase

11.6.1.1 Construction Dust Assessment

The greatest potential impact on air quality during the construction phase of the proposed development is from construction dust emissions and the potential for dust soiling. While construction dust tends to be deposited within 250 m of a construction site, the majority of the deposition occurs within the first 50 m (IAQM, 2024). The extent of any dust generation depends on the nature of the dust (soils, peat, sands, gravels, silts etc.) and the nature of the construction activity. In addition, the potential for dust dispersion and deposition depends on local meteorological factors such as rainfall, wind speed and wind direction. A review of Cork Airport meteorological data indicates that the prevailing wind direction is westerly to south-westerly and wind speeds are generally moderate in nature (Section 11.3.1). A review of historical 30-year average data for Cork Airport indicates that on average 218 days per year have rainfall over 0.2 mm (Met Éireann, 2025a). Therefore, it can be determined that over 59% of the time dust generation will be negligible.

To determine the level of dust mitigation required during the proposed works, the potential dust emission magnitude for each dust generating activity needs to be taken into account, in conjunction with the previously established sensitivity of the area (Section 11.3.3). The major dust generating activities are divided into four types within the IAQM (IAQM, 2024) guidance to reflect their different potential impacts. These are: demolition, earthworks, construction and trackout (movement of heavy vehicles).

11.6.1.2 Determining the Potential Dust Emission Magnitude

The magnitude of the works under each category can be classified as either small, medium or large depending on the scale of the works involved. The magnitude of each activity (Table 11.11) has been determined below for the proposed development using the criteria in Table 11.4.

Activity	Dust Emission Magnitude	Justification
Demolition	Small	Demolition volume less than 12,000 m^3
Earthworks	Large	Site area is greater than 110,000 m^2
Construction	Large	More than 75,000 m^3 of buildings to be constructed
Trackout	Large	Worst case of >50 outward HDV movements in any one day, and approximately 1500 m of unpaved roads within the site

Table 11.11 Potential Dust Emission Magnitude

11.6.1.3 Determining the Sensitivity of the Area

The impact to air quality due from construction phase activities is assessed at sensitive receptors within 250 m of the development boundary. In terms of receptor sensitivity to dust soiling, there are a number of highly sensitive residential properties within 100 m of the proposed development boundary (Figure 11.2). There are more than 10 high sensitivity residential properties within 20 m of the site boundary, and there are a further 10-100 within 50 m and 10-100 properties within 100 m of the site boundary. Based on these receptor numbers and using the IAQM criteria in Table 11.5, the sensitivity of the area to dust soiling impacts from the proposed development for construction activities on site is high. There are less than 100 sensitive receptors within 50m of public routes used by construction vehicles up to 250m from the site entrance, so for trackout the sensitivity of the area is medium.

In addition to sensitivity to dust soiling, the IAQM guidelines also outline the assessment criteria for determining the sensitivity of the area to human health impacts. The criteria take into consideration the current annual mean PM_{10} concentration, receptor sensitivity based on type (residential receptors are classified as high sensitivity) and the number of receptors affected within various distance bands from the construction works. A conservative estimate of the current annual mean PM_{10} concentration in the vicinity of the proposed development is 13 µg/m^3. There are more than 10 high sensitivity receptors within 20 m of the proposed development boundary. Based on the IAQM criteria outlined in Table 11.5 the worst-case sensitivity of the area to dust-related human health effects is low.

The IAQM guidelines also outline the assessment criteria for determining the sensitivity of the area to dust-related ecological impacts. Dust emissions can coat vegetation leading to a reduction in the photosynthesising ability of the plant, as well as other effects. The guidance states that dust impacts to vegetation can occur up to 50 m from the site, and 50 m from site access roads, up to 250 m for the site entrance. The sensitivity of the area is determined based on the distance to the source, the designation of the site, (European, National or local designation) and the potential dust sensitivity of the ecologically important species present. There are no sensitive ecological receptors that meet these criteria within the study area and there is no potential for impacts to sensitive ecology from construction dust emissions and no further assessment is required.

Potential Impact	Sensitivity of the Surrounding Area			
	Demolition	Earthworks	Construction	Trackout
Dust Soiling	High	High	High	Medium
Human Health	Low	Low	Low	Low

Table 11.12 Sensitivity of the Area

11.6.1.4 Determining the Risk of Dust Impacts

As detailed in Table 11.6, the predicted dust emission magnitude has been combined with the defined sensitivity of the area to determine the risk of impacts during the construction phase, prior to mitigation. Table 11.13 below provides a summary of the risk of dust impacts for the proposed development.

There is at most a high risk of dust soiling impacts and a low risk of dust-related human health impacts associated with the proposed works. Without mitigation in place, construction dust will have a ***short-term, direct, localised, negative,*** and ***slight*** impact on air quality, which is overall potentially significant. Therefore, best practice dust mitigation measures associated with high risk works will be implemented to ensure there are no significant impacts at nearby sensitive receptors (see Section 11.7.1).

Potential Impact	Sensitivity of the Surrounding Area			
	Demolition	Earthworks	Construction	Trackout
Dust Soiling	Medium Risk	High Risk	High Risk	Medium Risk
Human Health	Negligible	Low Risk	Low Risk	Low Risk

Table 11.13 Risk of Dust Impacts used to Define Site-Specific Mitigation

11.6.1.5 Construction Phase Traffic Assessment

There is also the potential for traffic emissions to impact air quality with respect to human health in the short-term over the construction phase, particularly, due to the increase in HGVs accessing the site. The construction phase traffic has been reviewed, and a detailed air quality assessment has been scoped out as none of the road links impacted by the proposed development satisfy the TII assessment criteria in Section 11.2.3.2.

Therefore, it can be determined that the Construction Phase traffic will have a ***short-term, direct, localised, negative*** impact on air quality, and the effect will be ***not significant***.

11.6.2 Operational Phase

11.6.2.1 Operational Phase Traffic Assessment

The potential impact of the proposed development has been assessed by modelling emissions from the traffic generated due to the development. The traffic data has included specific cumulative developments within the area to provide for a worst-case assessment and to assess potential cumulative impacts (see Chapter 4 Material Assets Traffic and Transportation, prepared by EGIS, for further details).

The traffic data includes the Do Nothing (DN) scenario and Do Something (DS) scenario. The impact of NO_2, PM_{10} and $PM_{2.5}$ emissions for the Opening and Design Years was predicted at the nearest sensitive receptors to the impacted road links. This assessment allows the significance of the development, with respect to both relative and absolute impacts, to be determined. A proposed receptor, representative of worst-case sensitive receptors introduced with the development, were also included in the assessment. However, for this receptor no impacts can be described, as the receptor does not exist in a DN scenario. For the proposed receptor, only predicted concentrations for the DS scenario are reported and compared with the relevant limit values.

The TII guidance PE-ENV-01106 (TII, 2025) details a methodology for determining air quality impact significance criteria for TII road schemes and infrastructure projects. However, this significance criteria can be applied to any development that causes a change in traffic. The degree of impact is determined based on both the absolute and relative impact of the proposed development. Results are compared against the 'Do Nothing' scenario, which assumes that the proposed development is not in place in future years, to determine the degree of impact.

Traffic related air emissions have the potential to impact air quality which can affect human health. The following details the results of the air dispersion modelling assessment of traffic emissions to determine the impact to human health. The predicted pollutant concentrations have been compared against the ambient air quality limit values set out in Table 11.1. The limit values set out in Table 1 of Annex I in Directive (EU) 2024/2881 are applicable to the Opening Year 2030 and Design Year 2045 as both assessment years are post-2030.

11.6.2.1.1 NO_2

The results of the NO_2 modelling are shown in Table 11.14. In the Opening Year 2030, predicted annual mean NO_2 concentrations at both the existing and proposed modelled receptors are in compliance with the annual mean limit value of 20 µg/m³, reaching at most 42% of the limit. In addition, the TII guidance (2022) states that the hourly limit value for NO_2 of 200 µg/m³ is unlikely to be exceeded at roadside locations unless the annual mean is above 60 µg/m³. As predicted NO_2 concentrations are significantly below 60 µg/m³, it can be concluded that the short-term NO_2 limit value will be complied with at all receptor locations. An increase in NO_2 concentrations is predicted at the worst-case receptor assessed in the Opening Year when compared with the Do-Nothing scenario. Concentrations are predicted to increase by 0.12 µg/m³ at receptor R1. When comparing the change in concentration with the air quality limit value, it results in a maximum change of 0.60% at receptor R1. This increase is considered 'neutral' as per the TII criteria in Table 11.3.

In the Design Year 2045, predicted annual mean NO_2 concentrations are in compliance of the limit value of 20 µg/m³ at all modelled receptors, reaching at most 60% of the limit. The proposed development will result in a 'neutral' increase in NO_2 concentrations according to the TII significance criteria in Table 11.3, with concentrations increasing by 0.02 µg/m³ at receptor R1 and R2 as a result of the proposed development, which is an increase of 0.10% when compared with the applicable annual mean limit value for NO_2. Therefore, the impact of the proposed development on NO_2 concentrations is neutral.

Receptor	Impact Opening Year						
	DN	% of AQLV	DS	% of AQLV	DS-DN	% Change of AQLV	Description
R1	8.2	41%	8.3	42%	0.12	0.60%	Neutral
R2	8.2	41%	8.3	42%	0.11	0.55%	Neutral
R3	8.2	41%	8.3	41%	0.10	0.50%	Neutral
P1	N/A	N/A	8.2	41%	N/A	N/A	N/A
Receptor	**Impact Design Year**						
	DN	% of AQLV	DS	% of AQLV	DS-DN	% Change of AQLV	Description
R1	12.0	60%	12.0	60%	0.02	0.10%	Neutral
R2	12.0	60%	12.0	60%	0.02	0.10%	Neutral
R3	12.0	60%	12.0	60%	0.01	0.05%	Neutral
P1	N/A	N/A	12.0	60%	N/A	N/A	N/A
Note: As P1 is a potential development receptor, no associated DN concentrations or impacts have been predicted as they will not exist without the development in place.							

Table 11.14 Predicted Annual Mean NO_2 Concentrations (µg/m³)

11.6.2.1.2 PM_{10}

The results of the PM_{10} modelling can be seen in Table 11.15 for the Opening Year 2030 and Design Year 2045. In both the Opening Year 2030 and the Design Year 2045, annual mean PM_{10} concentrations at both the existing and proposed modelled receptors are in compliance with the annual mean limit value of 20 µg/m³ reaching at most 68% of the limit. The proposed development will not result in any days of exceedance of the daily PM_{10} limit value in both the opening and design years.

The changes in PM_{10} concentrations as a result of the proposed development can be assessed relative to the DN levels. In the Opening Year 2030 annual PM_{10} concentrations will increase by at most 0.22 µg/m³ at receptor R1, this is a 1.10% increase when compared with the annual mean limit value of 20 µg/m³. This increase is considered 'neutral' as per the TII criteria in Table 11.3.

In the Design Year 2045 the proposed development will result in a maximum increase of 0.21 µg/m³ at receptor R1, which is a 1.05% increase when compared with the annual mean limit of 20 µg/m³. The changes in concentrations in the Design Year are considered 'neutral' based on the TII criteria in Table 11.3.

Receptor	Impact Opening Year						
	DN	% of AQLV	DS	% of AQLV	DS-DN	% Change of AQLV	Description
R1	13.4	67%	13.6	68%	0.22	1.10%	Neutral
R2	13.4	67%	13.6	68%	0.21	1.05%	Neutral
R3	13.3	67%	13.5	68%	0.19	0.95%	Neutral
P1	N/A	N/A	13.4	67%	N/A	N/A	N/A
Receptor	**Impact Design Year**						
	DN	% of AQLV	DS	% of AQLV	DS-DN	% Change of AQLV	Description
R1	13.4	67%	13.6	68%	0.21	1.05%	Neutral
R2	13.4	67%	13.6	68%	0.20	1.00%	Neutral
R3	13.4	67%	13.5	68%	0.18	0.90%	Neutral
P1	N/A	N/A	13.4	67%	N/A	N/A	N/A
Note: As P1 is a potential development receptor, no associated DN concentrations or impacts have been predicted as they will not exist without the development in place.							

Table 11.15 Predicted Annual Mean PM_{10} Concentrations (µg/m³)

11.6.2.1.3 $PM_{2.5}$

In relation to changes in $PM_{2.5}$ concentrations as a result of the proposed development, the results of the assessment can be seen Table 11.16 for the modelled Opening Year 2030 and Design Year 2045.

In the Opening Year 2030, predicted annual mean concentrations of $PM_{2.5}$ at both the existing and proposed modelled receptors are in compliance with the annual mean limit value of 10 µg/m³ reaching at most 63% of the limit. There is predicted to be an increase in $PM_{2.5}$ concentrations at the worst-case receptor assessed in the Opening Year when compared with the Do-Nothing scenario. Concentrations are predicted to increase by 0.12 µg/m³ at receptor R1. When comparing the change in concentration with the air quality limit value, it results in a maximum change of 1.10% at receptor R1. This increase is considered 'neutral' as per the TII criteria in Table 11.3.

In the Design Year 2045, predicted annual mean $PM_{2.5}$ concentrations at both the existing and potential development modelled receptors are in compliance with the limit value of 10 µg/m³ at all receptors assessed. Concentrations reach at most 63% of the annual mean limit value. The proposed development will result in a 'neutral' increase in $PM_{2.5}$ concentrations according to the TII significance criteria in Table 11.3, with concentrations increasing by 0.11 µg/m³ at receptor R1 as a result of the proposed development, which is an increase of 1.10% when compared with the annual mean limit value of 10 µg/m³ for $PM_{2.5}$.

Receptor	Impact Opening Year						
	DN	% of AQLV	DS	% of AQLV	DS-DN	% Change of AQLV	Description
R1	6.2	62%	6.3	63%	0.12	1.20%	Neutral
R2	6.2	62%	6.3	63%	0.11	1.10%	Neutral
R3	6.2	62%	6.3	63%	0.10	1.00%	Neutral
P1	N/A	N/A	6.2	62%	N/A	N/A	N/A
Receptor	**Impact Design Year**						
	DN	% of AQLV	DS	% of AQLV	DS-DN	% Change of AQLV	Description
R1	6.2	62%	6.3	63%	0.11	1.10%	Neutral
R2	6.2	62%	6.3	63%	0.10	1.00%	Neutral
R3	6.2	62%	6.3	63%	0.09	0.90%	Neutral
P1	N/A	N/A	6.2	62%	N/A	N/A	N/A
Note: As P1 is a potential development receptor, no associated DN concentrations or impacts have been predicted as they will not exist without the development in place.							

Table 11.16 Predicted Annual Mean $PM_{2.5}$ Concentrations (µg/m³)

11.6.2.2 Significance of Predicted Changes in NO_2, PM_{10} and $PM_{2.5}$ Concentrations

As outlined in Section 11.2.2.4, the TII guidance (2022) states that the significance of effects should be assessed based on the opening year only. Non-significant effects are 'neutral' or 'slight' changes in concentrations while significant effects can be changes in pollutant concentrations that are either 'moderate' or 'substantial'. However, the TII guidance (2022) states that these must be considered in the context of the project and 'moderate' or 'substantial' increases are not necessarily always significant effects.

In relation to NO_2, PM_{10} and $PM_{2.5}$ the predicted changes in concentrations are 'neutral' at the worst-case receptor assessed. Therefore, according to the TII criteria as outlined in Section 11.2.2.4, the impact is not significant.

For the purposes of this assessment, it has been assumed that the current estimated background pollutant concentrations are applicable for both the opening and design years, with no decreases in future background concentrations allowed for. There will be some decreases in background concentrations in future years. However, at present there is no guidance-based methodology available for estimating future year background concentrations and therefore, as a conservative approach, the current estimated background concentrations have been applied to future years.

Due to the large uncertainty in future improvements in fleet composition and emissions, such as projected changes to vehicle registration and electric vehicle uptake, the future year emission rates utilised by the TII REM tool do not account for the full implementation of these measures. Predicted design year concentrations are therefore currently overly conservative as future

emissions improvements are not fully taken into account, as well as no improvement in background concentrations being assumed.

As a result, the opening year predicted concentrations are the most appropriate for determining the significance of effects as per Section 11.2.2.4.

It can be concluded that the impact of traffic emissions on air quality and human health during the operational phase is ***long-term, direct, localised, negative*** and ***not significant*** in EIA terms.

The measures set out in the Clean Air Strategy for Ireland (Government of Ireland 2023) aim to work towards solutions to ensure that air pollution concentrations are reduced in order to comply with the future changes in limit values. Ireland will need to continue to implement and develop measures to ensure continuing improvements in air quality in future years in order to meet the objectives of the Clean Air Strategy for Ireland (Government of Ireland, 2023) and to ensure the ambient air quality limit values set out in Directive (EU) 2024/2881 are achieved. The estimated background concentrations used in the assessment are the largest contribution to predicted pollutant concentrations, rather than pollutant contributions associated with the proposed development. Strategies to improve air quality at a national level in future years will contribute to reducing background concentrations and therefore it is envisioned that air quality will improve in the future.

11.6.3 Cumulative

11.6.3.1 Construction Phase

There is the potential for cumulative construction dust impacts to nearby sensitive receptors if the construction phase of the proposed development coincides with that of other large-scale developments in the vicinity of the site.

A review of the planned and permitted projects within the vicinity of the site was undertaken in order to identify developments with the potential for cumulative construction phase impacts. There are several sites identified which may have coinciding construction phases with that of the proposed development. These are detailed in Table 1 in Chapter 1.

There is a high risk of dust impacts associated with the proposed development (see Table 11.13). The dust mitigation measures outlined in Section 11.7.1 applied during the construction phase will avoid significant cumulative impacts on air quality. With appropriate mitigation measures in place, the predicted cumulative impacts on air quality associated with the construction phase of the proposed development and the aforementioned developments are deemed **short-term, localised, direct, negative** and **not significant**.

11.6.3.2 Operational Phase

There is the potential for cumulative impacts to air quality during the operational phase as a result of traffic associated with other existing and permitted developments within the area. The traffic data provided for the Operational Phase air quality assessment included specific cumulative developments within the area (see Chapter 4 Material Assets – Traffic and Transportation for further details).

The cumulative operational phase impact is assessed within Section 11.6.2.1 and was found to have a neutral impact on air quality as per the TII significance criteria (Table 11.3). The cumulative Operational Phase impact is **long-term, localised, direct, negative** and **not significant**.

11.7 Mitigation Measures

11.7.1 Construction Phase

Based on the assessment results in Section 11.6.1.4, mitigation associated with a high risk of construction dust impacts is required. Mitigation measures for high risk sites as recommended by IAQM construction dust guidance are detailed in Table 11.17.

Mitigation Measure
Communications
Develop and implement a stakeholder communications plan that includes community engagement before work commences on site.
Display the name and contact details of person(s) accountable for air quality and dust issues on the site boundary. This may be the environment manager/engineer or the site manager.
Display the head or regional office contact information
Site Management
Record all dust and air quality complaints, identify cause(s), take appropriate measures to reduce emissions in a timely manner, and record the measures taken.
Make the complaints log available to the local authority when asked.
Record any exceptional incidents that cause dust and/or air emissions, either on- or offsite, and the action taken to resolve the situation in the log book.
Hold regular liaison meetings with other high risk construction sites within 500 m of the site boundary, to ensure plans are co-ordinated and dust and particulate matter emissions are minimised. It is important to understand the interactions of the off-site transport/deliveries which might be using the same strategic road network routes.
Monitoring
Undertake daily on-site and off-site inspection, where receptors (including roads) are nearby, to monitor dust, record inspection results, and make the log available to the local authority when asked. This will include regular dust soiling checks of surfaces such as street furniture, cars and window sills within 100 m of site boundary, with cleaning to be provided if necessary.
Carry out regular site inspections to monitor compliance with the DMP, record inspection results, and make an inspection log available to the local authority when asked
Increase the frequency of site inspections by the person accountable for air quality and dust issues on site when activities with a high potential to produce dust are being carried out and during prolonged dry or windy conditions.
Agree dust deposition, dust flux, or real-time PM_{10} continuous monitoring locations with the Local Authority. Where possible commence baseline monitoring at least three months before work commences on site or, if it a large site, before work on a phase commences. Further guidance is provided by IAQM on monitoring during demolition, earthworks and construction.

Mitigation Measure
Preparing and Maintaining the Site
Plan site layout so that machinery and dust causing activities are located away from receptors, as far as is possible.
Erect solid screens or barriers around dusty activities or the site boundary that are at least as high as any stockpiles on site.
Fully enclose site or specific operations where there is a high potential for dust production and the site is actives for an extensive period
Avoid site runoff of water or mud.
Keep site fencing, barriers and scaffolding clean using wet methods.
Remove materials that have a potential to produce dust from site as soon as possible, unless being re-used on site. If they are being re-used on-site cover as described below.
Cover, seed or fence stockpiles to prevent wind whipping.
Operating vehicle/machinery and sustainable travel
Ensure all vehicles switch off engines when stationary – no idling vehicles.
Avoid the use of diesel- or petrol-powered generators and use mains electricity or battery powered equipment where practicable.
Impose and signpost a maximum-speed-limit of 25 kmph on surfaced and 15 kmph on unsurfaced haul roads and work areas (if long haul routes are required these speeds may be increased with suitable additional control measures provided, subject to the approval of the nominated undertaker and with the agreement of the local authority, where appropriate)
Produce a Construction Logistics Plan to manage the sustainable delivery of goods and materials.
Implement a Travel Plan that supports and encourages sustainable travel (public transport, cycling, walking, and car-sharing)
Operations
Only use cutting, grinding or sawing equipment fitted or in conjunction with suitable dust suppression techniques such as water sprays or local extraction, e.g. suitable local exhaust ventilation systems
Ensure an adequate water supply on the site for effective dust/particulate matter suppression/mitigation, using non-potable water where possible and appropriate
Use enclosed chutes and conveyors and covered skips.
Minimise drop heights from conveyors, loading shovels, hoppers and other loading or handling equipment and use fine water sprays on such equipment wherever appropriate.
Ensure equipment is readily available on site to clean any dry spillages and clean up spillages as soon as reasonably practicable after the event using wet cleaning methods.
Waste management
Bonfires and burning of waste materials are legally prohibited.
Measures Specific to Demolition
Soft strip inside buildings before demolition (retaining walls and windows in the rest of the building where possible to provide a screen against dust
Ensure effective water suppression is used during demolition operations. Handheld sprays are more effective than hoses attached to equipment as the water can be directed to where it is needed. In addition, high volume water suppression systems, manually controlled, can produce fine water droplets that effectively bring the dust particles to the ground.
Avoid explosive blasting, using appropriate manual or mechanical alternatives.
Bag and remove any biological debris or damp down such material before demolition.
Measures Specific to Earthworks
Re-vegetate earthworks and exposed areas/soil stockpiles to stabilise surfaces as soon as practicable
Use Hessian, mulches or trackifiers where it is not possible to re-vegetate or cover with topsoil, as soon as is practicable.
Only remove the cover in small areas during work and not all at once.
Measures Specific to Construction
Avoid scabbling (roughening of concrete surfaces) if possible.
Ensure sand and other aggregates are stored in bunded areas and are not allowed to dry out, unless this is required for a particular process, in which case ensure that appropriate additional control measures are in place.
Ensure bulk cement and other fine powder materials are delivered in enclosed tankers and stored in silos with suitable emission control systems to prevent escape of material and overfilling during delivery.
For smaller supplies of fine powder materials, ensure bags are sealed after use and stored appropriately to prevent dust.
Measures Specific to Trackout
Use water-assisted dust sweeper(s) on the access and local roads, to remove, as necessary, any material tracked out of the site. This may require the sweeper being continuously in use.
Avoid dry sweeping of large areas.
Ensure vehicles entering and leaving sites are covered to prevent escape of materials during transport.
Inspect on-site haul routes for integrity and instigate necessary repairs to the surface as soon as reasonably practicable.
Record all inspections of haul routes and any subsequent action in a site logbook.
Install hard surfaced haul routes, which are regularly damped down with fixed or mobile sprinkler systems, or mobile water bowsers and regularly cleaned.
Implement a wheel washing system (with rumble grids to dislodge accumulated dust and mud prior to leaving the site where reasonably practicable).
Ensure there is an adequate area of hard surfaced road between the wheel wash facility and the site exit, wherever site size and layout permits.
Access gates to be located at least 10 m from receptors where possible.

Table 11.17 Construction Phase Dust Mitigation Measures

11.7.2 Operational Phase

The impact of the operational traffic associated with proposed development on air quality is predicted to be not significant with respect to the operational phase in the long term. Therefore, no site-specific mitigation measures are required.

11.8 Residual Impact of the Proposed Development

11.8.1 Construction Phase

11.8.1.1 Air Quality

Once the dust mitigation measures outlined in Section 11.7.1 are implemented, the impact of the proposed development in terms of dust soiling will be **short-term, direct, localised, negative** and **not significant** at nearby receptors.

11.8.1.2 Human Health

Best practice mitigation measures are proposed for the construction phase of the proposed development which will focus on the pro-active control of dust and other air pollutants to minimise generation of emissions at source. The mitigation measures that will be put in place during construction of the proposed development will ensure that the impact of the development complies with all EU ambient air quality legislative limit values which are based on the protection of human health. Therefore, the impact of construction of the proposed development will be **short-term, direct, localised, negative** and **not significant** with respect to human health.

11.8.2 Operational Phase

11.8.2.1 Air Quality

Air dispersion modelling of operational traffic emissions associated with the proposed development was carried out using the TII REM tool. The modelling assessment determined that the change in emissions of NO_2, PM_{10} and $PM_{2.5}$ at nearby sensitive receptors as a result of the proposed development will be 'neutral' in line with the TII assessment criteria (Table 11.3). Therefore, the operational phase impact to air quality is **long-term, direct, localised, negative** and **not significant**.

11.8.2.2 Human Health

Dispersion modelling of traffic emissions at sensitive receptors in proximity to impacted road links during the operational phase indicate pollutant emissions will be in compliance with the TII assessment criteria which is based on the impacts in the opening year. Section 11.6.2.1 determined that the impact to air quality as a result of increased traffic volumes during the operational phase of the proposed development will be **long-term, direct, localised, negative** and **not significant** for the opening year. However, Ireland will need to develop measures to ensure continuing improvements in air quality in future years in order to meet the objectives of the Clean Air Strategy for Ireland (Government of Ireland, 2023) and to ensure the ambient air quality limit values set out in Directive (EU) 2024/2881 are achieved.

11.8.3 Cumulative

11.8.3.1 Construction Phase

According to the IAQM guidance (2024) should the construction phase of the proposed development coincide with the construction phase of any other developments within 500 m then there is the potential for cumulative construction dust related impacts to nearby sensitive receptors. However, provided the mitigation measures outlined in Section 9.7.1, are implemented throughout the construction phase of the proposed development significant cumulative dust impacts are not predicted. Impacts are predicted to be **short-term, direct, localised, negative** and **not significant**.

11.8.3.2 Operational Phase

Air dispersion modelling of operational traffic emissions associated with the proposed development and cumulative developments in the wider area was carried out using the TII REM tool. The modelling assessment determined that the change in emissions of NO_2, PM_{10} and $PM_{2.5}$ at nearby sensitive receptors as a result of the proposed development in combination with cumulative developments will be neutral as per the TII descriptors in Table 9-3. Therefore, the operational phase impact to air quality is **long-term, direct, localised, negative** and **not significant**.

11.8.3.3 Cumulative Impact of the Relevant Plan for the Area

The potential cumulative impact of the relevant plan for the area was assessed, which is considered to be the Cork City Development Plan 2022. The assessment of the potential impacts on the environment of the Cork City Development Plan 2022 was undertaken utilising the Strategic Environmental Objectives (SEOs) and are detailed in Table 5.1 of the CDP's Strategic Environmental Assessment. The potential cumulative impacts of the Plan were assessed with regard to these SEO's. Table 5.1 of the SEA identifies the SEO's for 'Air' as:

- To avoid, prevent or reduce harmful effects on human health and the environment as a whole resulting from emissions to air from all sectors with particular reference to emissions from transport, residential heating, industry and agriculture.
- Maintain and promote continuing improvement in air quality through the reduction of emissions and promotion of renewable energy and energy efficiency.
- Promote continuing improvement in air quality.
- Reduction of emissions of sulphur dioxide, nitrogen oxides, volatile organic compounds, ammonia and fine particulate matter which are responsible for acidification, eutrophication and ground-level ozone pollution.
- Meet Air Quality Directive standards for the protection of human health — Air Quality Directive.
- Significantly decrease noise pollution by 2020 and move closer to WHO recommended levels.

Table 7.5 of the CDP's Strategic Environmental Assessment, 'Comparative Assessment of each of the Alternatives against Strategic Environmental Objectives' indicates that Alternative/Scenario 3 'Compact Liveable Growth', the 'Selected Scenario' has positive interactions with the status of the SEO's for 'Air The impact of the proposed development on ambient air quality has been assessed against the Air Quality Standards set out under S.I. 739 of 2022 as well as those set out in Directive (EU) 2024/2881. Air emissions associated with the proposed development are in compliance with the relevant ambient air quality limit values which are set for the protection of human health and the environment and is in line with the SEOs of the Cork City Development Plan 2022 as referenced above. The impact to air quality from the proposed development is direct, negative, and not significant. Impacts in the construction phase are short-term, whereas operational phase impacts are long-term in duration.

11.9 Monitoring

11.9.1.1 Construction Phase

The following monitoring measures are proposed to ensure the dust mitigation measures are working satisfactorily:

- Undertake daily on-site and off-site inspections, where receptors (including roads) are nearby, to monitor dust, record inspection results in the site inspection log. This should include regular dust soiling checks of surfaces such as street furniture, cars and windowsills within 100 m of site boundary, with cleaning to be provided if necessary.
- Increase the frequency of site inspections by the person accountable for air quality and dust issues on site when activities with a high potential to produce dust are being carried out and during prolonged dry or windy conditions.
- Monitoring of construction dust deposition along the site boundary to nearby sensitive receptors during the construction phase of the proposed development is recommended to ensure mitigation measures are working satisfactorily. This can be carried out using the Bergerhoff method in accordance with the requirements of the German Standard VDI 2119. The Bergerhoff Gauge consists of a collecting vessel and a stand with a protecting gauge. The collecting vessel is secured to the stand with the opening of the collecting vessel located approximately 2 m above ground level. The TA Luft limit value is 350 mg/m^2/day during the monitoring period of 30 days (+/- 2 days). Monitoring shall ensure that the dust mitigation measures are working satisfactorily as construction works progress.

11.9.1.2 Operational Phase

There is no monitoring recommended for the operational phase of the proposed development as impacts to air quality with no mitigation are predicted to be not significant.

11.10 Reinstatement

This is not relevant to air quality.

11.11 Difficulties Encountered

There were no difficulties encountered when undertaking this assessment.

11.12 Conclusion

This chapter has assessed the predicted impacts of the construction and operational phases of the proposed development on air quality. The cumulative impacts of the proposed development and surrounding developments have also been considered.

Provided all mitigation measures as set out in this chapter, the overall predicted effect of the proposed development is not significant.

11.13 Risk of Major Accidents or Disasters

There are no likely risks of major accidents and disasters in relation to air quality associated with the proposed development due to the nature and scale of the development. The proposed development is residential in nature and will not require large scale quantities of hazardous materials or fuels.

11.14 Worst Case Scenario

Reasonable worst-case estimates have been used as part of this assessment. As a result, Section 11.8 details the worst-case residual effect of the proposed development.

11.15 Interactions and Interrelationships

Air quality does not have a significant number of interactions with other topics. The most significant interactions are between population and human health and air quality. An adverse impact due to air quality in either the construction or operational phase has the potential to cause health and dust soiling issues. The mitigation measures that will be put in place at the proposed development will ensure that the impact of the proposed development complies with all ambient air quality legislative limits. Therefore, the predicted impact is ***short-term, direct, localised, negative*** and ***not significant*** with respect to population and human health during construction and ***long-term, direct, localised, negative*** and ***not significant*** during operation phase. No significant impacts to human health are predicted in relation to air quality.

Construction phase activities such as land clearing, excavations, stockpiling of materials etc. have the potential for interactions between air quality and land and soils in the form of dust emissions. With the appropriate mitigation measures to prevent fugitive dust emissions, it is predicted that there will be no significant interactions between air quality and land and soils.

Dust generation can occur during extended dry weather periods as a result of construction traffic. Dust suppression measures (e.g. dampening down) will be implemented as necessary during dry periods and vehicle wheel washes will be installed, for example. The works involve stripping of topsoil and excavations, which will remove some vegetation such as trees and scrub. It will also generate dust and potentially impact on the air quality in the locality. However, the generation of dust will be temporary during construction phase and is not anticipated to have a significant impact on biodiversity.

The impact of the interactions between land, climate, soils and geology, biodiversity and air quality are considered to be ***short-term, neutral*** and ***imperceptible***.

No other significant interactions with air quality have been identified.

11.16 References

Environmental Protection Agency (2006) Environmental Management Guidelines - Environmental Management in the Extractive Industry (Non-Scheduled Minerals)

Environmental Protection Agency (2022) Guidelines on the Information to be Contained in Environmental Impact Assessment Reports

Environmental Protection Agency (2025) Air Quality in Ireland 2024 (& previous annual reports)

German VDI (2002) Technical Guidelines on Air Quality Control – TA Luft

Government of Ireland (2023) Clean Air Strategy for Ireland

Institute of Air Quality Management (IAQM) (2020) A Guide To The Assessment Of Air Quality Impacts On Designated Nature Conservation Sites (Version 1.1)

Institute of Air Quality Management (IAQM) (2024) Guidance on the Assessment of Dust from Demolition and Construction (Version 2.2)

Met Éireann (2025) Met Éireann website: https://www.met.ie/

Transport Infrastructure Ireland (2022) Air Quality Assessment of Specified Infrastructure Projects – PE-ENV-01106

Transport Infrastructure Ireland (2025) TII Road Emissions Model (REM): Model Development Report – GE-ENV-01107

World Health Organisation (2021) Air Quality Guidelines (and previous Air Quality Guideline Reports 1999 & 2000 & 2006)

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CLIMATE

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CHAPTER 12 | Climate

12 Introduction

This chapter assesses the likely climate impacts associated with the proposed residential development at Carriganarra, Ballincollig, Co. Cork. A full description of the development is available in Chapter 2.

The climate assessment is divided into two distinct sections – a greenhouse gas assessment (GHGA) and a climate change risk assessment (CCRA).

- Greenhouse Gas Emissions Assessment (GHGA) – Quantifies the GHG emissions from a project over its lifetime. The assessment compares these emissions to relevant carbon budgets, targets and policy to contextualise magnitude.
- Climate Change Risk Assessment (CCRA) – Identifies the impact of a changing climate on a project and receiving environment. The assessment considers a projects vulnerability to climate change and identifies adaptation measures to increase project resilience.

This chapter was prepared by Sarah Berry, a Principal Climate Consultant in the Air Quality & Climate section of AWN Consulting and Caolán Leneghan, Senior Climate Change Consultant at AWN Consulting.

12.1 Aspects Relevant to this Assessment

Construction and operational phase greenhouse gas (GHG) emissions have been assessed with respect to this project. The embodied carbon within the construction materials makes up the greatest proportion of emissions and therefore has the highest potential to impact climate through the release of CO_2e. Other relevant aspects include transport of materials to site, clearance, demolition and excavation of existing land, construction waste and disposal and emissions associated with the transport of workers over the construction period. Impacts to climate are assessed against Ireland's obligations under the EU 2030 GHG targets and sectoral emissions ceilings.

During the operational phase, materials required for maintenance of the site emit GHG emissions. Engine emissions from vehicles accessing the site also have the potential to impact climate during the operational phase of the development through the release of CO_2. Operational phase impacts will be long-term in duration. In addition, the vulnerability of the proposed development in relation to future climate change must be considered during the operational phase. The proposed development has been designed to minimise the impact on climate where possible in line with the most recent development guidelines (Part L of the Building Regulations 2022) and in reference to measures within the Climate Action Plan 2025 (Government of Ireland, 2025).

12.2 Methodology

12.2.1 Relevant Guidance, Legislation & Policy

12.2.1.1 Guidance

The principal guidance and best practice documents used to inform the assessment of potential impacts on climate are summarised below. In addition to specific climate guidance documents, the following guidelines were considered and consulted in the preparation of this chapter:

- Guidelines on the Information to be Contained in Environmental Impact Assessment Reports (hereafter referred to as the Environmental Protection Agency (EPA) Guidelines) (EPA, 2022); and
- Environmental Impact Assessment of Projects – Guidance on the preparation of the Environmental Impact Assessment Report (European Commission, 2017).

The assessment has made reference to national guidelines where available, in addition to international standards and guidelines relating to the assessment of climate impacts. These are summarised below:

- Environmental Protection Agency (2024) National Climate Change Risk Assessment Technical Guidance for Sectoral Assessment;
- Transport Infrastructure Ireland (TII) PE-ENV-01104: Climate Guidance for National Roads, Light Rail and Rural Cycleways (Offline & Greenways) – Overarching Technical Document (TII, 2022a);
- Transport Infrastructure Ireland (TII) GE-ENV-01106: TII Carbon Assessment Tool for Road and Light Rail Projects and User Guidance Document (TII, 2024);
- International Standards Organisation (2021) ISO 14091:2021 'Adaptation to Climate Change
- IEMA Environmental Impact Assessment Guide to: Assessing GHG Emissions and Evaluating their Significance (hereafter referred to as the ISEP 2022 GHG Guidance) (Institute of Sustainability and Environmental Professionals (ISEP) formerly the Institute of Environmental Management and Assessment (IEMA), 2022);
- IEMA Environmental Impact Assessment Guide to: Climate Change Resilience and Adaptation (hereafter referred to as the ISEP 2020 EIA Guide) (IEMA, 2020a);
- IEMA GHG Management Hierarchy (hereafter referred to as the ISEP 2020 GHG Management Hierarchy) (IEMA, 2020b);
- IEMA Principles Series: Climate Change Mitigation & EIA (ISEP, 2010);
- Carbon Management in Infrastructure and Built Environment - PAS 2080 (BSI, 2023); and
- Technical Guidance on the Climate Proofing of Infrastructure in the Period 2021-2027 (European Commission, 2021a).

12.2.1.2 Legislation

In 2015, the Climate Action and Low Carbon Development Act 2015 (No. 46 of 2015) (as amended) (the 2015 Act) (Government of Ireland, 2015) was enacted. The purpose of the 2015 Act was to enable Ireland '*to pursue, and achieve, the transition to a low carbon, climate resilient and environmentally sustainable economy by the end of the year 2050*' (3.(1) of No. 46 of 2015). This is referred to in the 2015 Act as the '*national transition objective*'. The 2015 Act made provision for a national mitigation plan, and a national adaptation framework. In addition, the 2015 Act (as amended) provided for the establishment of the Climate Change Advisory Council with the function to advise and make recommendations on the preparation of the national mitigation and adaptation plans and compliance with existing climate obligations.

The first Climate Action Plan (CAP) was published by the Irish Government in June 2019 (Government of Ireland, 2019). The Climate Action Plan 2019 outlined the current status across key sectors including Electricity, Transport, Built Environment, Industry and Agriculture and outlined the various broadscale measures required for each sector to achieve ambitious decarbonisation targets. The 2019 CAP also detailed the required governance arrangements for implementation including carbon-proofing of policies, establishment of carbon budgets, a strengthened Climate Change Advisory Council and greater accountability to the Oireachtas. The Government published the second Climate Action Plan in November 2021 (Government of Ireland, 2021a) with further updated CAPs in December 2022 (Government of Ireland, 2022) and December 2023 (DECC, 2023a). The fifth and most recent CAP, was published in April 2025 (Government of Ireland, 2025).

Following on from Ireland declaring a climate and biodiversity emergency in May 2019, and the European Parliament approving a resolution declaring a climate and environment emergency in Europe in November 2019, the Government approved the publication of the General Scheme in December 2019, followed by the publication of the Climate Action and Low Carbon Development (Amendment) Act 2021 (hereafter referred to as the 2021 Climate Act), in March 2021, which amended the 2015 Act. The 2021 Climate Act was signed into Law on the 23rd July 2021, giving statutory effect to the core objectives stated within the CAP.

The purpose of the 2021 Climate Act (Government of Ireland, 2021) is to provide for the approval of plans "*for the purpose of pursuing the transition to a climate resilient, biodiversity rich and climate neutral economy by no later than the end of the year 2050*". The 2021 Climate Act also provides for "*carbon budgets and a decarbonisation target range for certain sectors of the economy*". The 2021 Climate Act defines the carbon budget as "*the total amount of greenhouse gas emissions that are permitted during the budget period*".

In relation to carbon budgets, the 2015 Act states 'A carbon budget, consistent with furthering the achievement of the national climate objective, shall be proposed by the Climate Change Advisory Council, finalised by the Minister and approved by the Government for the period of 5 years commencing on the 1 January 2021 and ending on 31 December 2025 and for each subsequent period of 5 years (in this Act referred to as a 'budget period')'. The carbon budget is to be produced for 3 sequential budget periods (Table 12.1). The carbon budget can be revised where new obligations are imposed under the law of the European Union or international agreements or where there are significant developments in scientific knowledge in relation to climate change. In relation to the sectoral emissions ceiling, the Minister for the Environment, Climate and Communications (the Minister for the Environment) shall prepare and submit to government the maximum amount of GHG emissions that are permitted in different sectors of the economy during a budget period and different ceilings may apply to different sectors. The sectorial emission ceilings for 2030 were published in the Climate Action Plan 2024 (CAP24) (DECC, 2023a) (Table 12.2).

Budget Period	Carbon Budget	Reduction Required
2021-2025	295 Mt CO_2e	Reduction in emissions of 4.8% per annum for the first budget period.
2026-2030	200 Mt CO_2e	Reduction in emissions of 8.3% per annum for the second budget period.
2031-2035	151 Mt CO_2e	Reduction in emissions of 3.5% per annum for the third provisional budget.

Table 12.1 5-Year Carbon Budgets

Sector	Baseline ($MtCO_2e$)	Carbon Budgets ($MtCO_2e$)		2030 Emissions ($MtCO_2e$)	Indicative Emissions % Reduction in Final Year of 2025 – 2030 Period (Compared to 2018)
	2018	2021-2025	2026-2030		
Electricity	10	40	20	3	75
Transport	12	54	37	6	50
Built Environment – Residential	7	29	23	4	40
Built Environment – Commercial	2	7	5	1	45
Industry	7	30	24	4	35
Agriculture	23	106	96	17.25	25
Other (F-gases, waste, petroleum refining)	2	9	8	1	50
Land Use, Land-use Change and Forestry (LULUCF)	5	Reflecting the continued volatility for LULUCF baseline emissions to 2030 and beyond, CAP24 puts in place ambitious activity targets for the sector reflecting an EU-type approach.			
Total	68				
Unallocated Savings	-	-	26	-5.25	-
Legally Binding Carbon Budgets and 2030 Emission Reduction Targets	-	295	200	-	51

Table 12.2 Sectoral Emission Ceilings 2030

12.2.1.3 Policy

Greenhouse Gas Assessment Policy

National Policy

In 2024, the Government published its *Long-Term Strategy on Greenhouse Gas Emissions Reductions* (DECC, 2024). This strategy provides a long-term plan on how Ireland will transition towards net carbon zero by 2050, achieving the interim targets set out in the CAP.

In December 2023, CAP24 was published, establishing key actions to deliver a 51% reduction in GHG emissions by 2030 (compared to 2018 levels) and achieve climate neutrality by 2050 (DECC, 2023a). The updated and current CAP25, published in April 2025, builds on the progress of the previous four iterations of the CAP, with CAP23 first publishing carbon budgets and sectoral emission ceilings. It also reaffirms Ireland's climate ambition, with a focus on delivery, implementation and measurable outcomes, particularly ahead of the second carbon budget period (2026–2030). 2025 is the last year in the first 5-year carbon budget period. During the initial 5-year budget period the average annual reduction required was 4.8%, this increases to 8.3% in the second budget period (2026-2030). CAP25 retains the high-impact sectors where the biggest savings can be achieved, while emphasising public sector leadership and green procurement. These sectors include renewable energy, energy efficiency of buildings, transport, sustainable farming, sustainable business and land-use change.

CAP25 also includes targeted actions to decarbonise industrial heat and support the transition to carbon-neutral manufacturing processes. Public sector leadership is strengthened through a new Buying Greener: Green Public Procurement Strategy and Action Plan (2024–2027), the development of mandatory Climate Action Roadmaps, and enhanced emissions monitoring and reporting across government operations. To support innovation and ensure future economic resilience, IDA Ireland continues to attract and support businesses investing in climate technologies and low-carbon solutions.

CAP25 highlights a significant 17% reduction in electricity emissions in early 2024, with wind power supplying nearly 40% of Ireland's total electricity demand and over 100,000 rooftop microgenerators connected to the grid. Investments are ongoing in grid reinforcement, offshore wind development, and interconnectors with France and the UK to enhance renewable generation capacity. EirGrid, Enterprise Ireland and IDA Ireland have recently signed an MoU to collectively support offshore wind development in Ireland.

CAP25 also reinforces targets first outlined in CAP24 to reduce the embodied carbon of construction materials, with a 10% reduction by 2025 and 30% reduction by 2030 for materials produced and used in Ireland. Cement and high embodied carbon construction materials can be reduced through product substitution, reduced clinker content in cement and uptake of low-carbon construction methods, including those outlined in the Construction Industry Federation 2021 report Modern Methods of Construction (Construction Industry Federation, 2021). There also remains scope for the construction industry to use more timber in construction. In 2022, 24% of new construction in Ireland was built using timber frames to satisfy the demand for housing. Public bodies are now required under the Public Sector Mandate to use best practice project design to reduce embodied carbon; procure concretes with clinker replacements (lower carbon); and require that large construction projects produce a whole life cycle GHG emissions assessment.

Furthermore, CAP25 advances sector-specific measures in green procurement, electrification of transport and heat, and just transition (with the introduction of a Just Transition Commission) to support vulnerable communities. Transport emissions increased by 0.3%. Electric vehicles and the use of biofuels are stated as the best means of transport emission reductions in the medium term.

Local Authority Policy

The *Cork City Council (CCC) Climate Action Plan 2024-2028* (CCC, 2024) outlines the Council's commitment to achieving significant reductions in GHG emissions while preparing for the impacts of climate change. The plan is informed by Cork's participation in the EU Mission for Climate-Neutral and Smart Cities, which sets ambitious goals, including a transition to net-zero emissions by 2030.

A key focus of the Cork City Climate Action Plan is sustainable new developments:

"*Proposals for new development in Cork City will strive to reduce carbon footprints by carbon emission reductions, sustainable energy consumption, sustainable transport, use of renewable energy sources, green construction methods including passive solar design, and flood risk mitigation and adaptation and use of nature-based solutions, through design, layout, implementation and operation.*"

Climate Change Vulnerability Policy

National Policy

The Second National Adaptation Framework (NAF) (Government of Ireland, 2024c), published in June 2024 under the Climate Action and Low Carbon Development Act 2015, outlines a comprehensive, whole-of-government and whole-of-society approach to climate adaptation. Its core objective is to enhance Ireland's resilience to a wide range of climate risks, including extreme weather events, flooding, drought, biodiversity loss, sea level rise, and rising temperatures.

Building on the principles of a "Just Transition", the NAF introduces the concept of "Just Resilience'', envisioning a climate-resilient Ireland that ensures fairness, equity, and inclusivity in adaptation planning and implementation. It promotes reduced reliance on fossil fuels, the expansion of electrified and accessible public transport, and the integration of sustainability and climate resilience across all sectors. These include energy, water, wastewater, agriculture, transport, health, built environment, and biodiversity, with a strong emphasis on mainstreaming adaptation practices into policy, planning, and operations.

With respect to the housing and infrastructure sectors, the 2nd NAF highlights several potential climate impacts and risks and adaptation measures:

- **Increased frequency and intensity of rainfall** may damage homes and surrounding infrastructure, requiring integration of flood risk management into spatial planning, use of sustainable drainage systems, and elevation or relocation of housing in highly vulnerable areas.
- **Temperature increases** in homes call for passive cooling design, improved ventilation, and retrofitting measures to maintain thermal comfort and protect health during heatwaves.
- **Power outages during extreme weather events** can disrupt heating and cooling systems, highlighting the need for backup power solutions and emergency response protocols for residential areas.

The National Climate Change Risk Assessment Technical Guidance (NCCRA) was published in 2024 (EPA, 2024a). The NCCRA was required to be developed under Action 457 from the 2021 CAP (Government of Ireland, 2021). Action 457 seeks to "Further develop Ireland's national climate change risk assessment capacity to identify the priority physical risks of climate change to Ireland'. The NCCRA uses definitions of the risk determinants from the Intergovernmental Panel on Climate Change (IPCC) Risk Framework (IPCC, 2023):

- **Hazard** - the potential occurrence of a natural or human-induced physical event or trend or physical impact that may cause loss of life, injury, or other health impacts, as well as damage and loss to property, infrastructure, livelihoods, service provision, ecosystems, and environmental resources
- **Exposure** - the presence of people, livelihoods, species or ecosystems, environmental functions, services, and resources, infrastructure, or economic, social, or cultural assets in places and settings that could be adversely affected
- **Sensitivity** - refers to the degree to which a system or asset is affected by climate hazards. It reflects how vulnerable something is to changes such as temperature extremes, flooding, or drought, based on its physical, functional, or ecological characteristics.
- **Vulnerability** - the propensity or predisposition to be adversely affected. Vulnerability encompasses a variety of concepts including sensitivity
- **Risk** - the potential for adverse consequences for human or ecological systems.

When considering risk, the NCCRA assess exposure and vulnerability for two future climate change scenarios or Representative Concentration Pathways (RCPs):

- **RCP4.5** was selected as it represents a scenario aligned with the global temperature trajectory
- **RCP8.5** was selected as it represents a high-emissions scenario and achieves the highest level of modelled temperature increases by the end of the century. Consequently, this scenario will result in the highest level of physical risk for Ireland, and therefore the greatest requirement for adaptation.

These scenarios align with a conservative approach to assess risks to Ireland and assumes global emission reduction targets are not met. This aligns with the principle of precaution as stated in the NAF (Government of Ireland, 2024c). In addition to the future climate scenarios, the NCCRA assesses the risk from the future climate during the following timeframes:

- Present (~2030)
- Medium term (2040-2070) (~ 2050)
- Long term (2070-2100) (~2100)

It is recommended that the Environmental Impact Assessment (EIA) for climate risk and vulnerability evaluates risks across the lifecycle of the proposed development—construction and operational phases. For this project, future climate risk has been assessed using the 2050s timeframe.

Local Policy

The *Cork City Climate Action Plan 2024-2028 (Cork City Council, 2024)* highlights the increasing risks posed by climate change to the city's infrastructure, residents, and businesses, particularly from extreme weather events such as flooding, heatwaves, and droughts. Pluvial, fluvial, and coastal flooding are identified as significant risks due to rising sea levels and more intense rainfall events. Without mitigation, these events are projected to lead to the inundation of properties, damage to infrastructure, and disruptions to transport networks.

Flood-relief measures, including both engineered and nature-based solutions, such as Sustainable Urban Drainage Systems (SuDS), have been incorporated into city planning. Recent and ongoing works, including those in Togher, Douglas, and the Lower Lee flood protection schemes, will enhance Cork's resilience to future flooding risks.

12.2.2 Greenhouse Gas Assessment

As per the EU guidance document *Guidance on Integrating Climate Change and Biodiversity into Environmental Impact Assessment* (European Commission, 2013) the climate baseline is first established with reference to EPA data on annual GHG emissions (see Section 12.4.1).

12.2.2.1 Construction Phase

The GHG assessment accounts for various components relating to the project during different life stages to determine the total impact of the development on climate. The reference study period (i.e. the assumed building life expectancy) for the purposes of the assessment is 60 years. Embodied carbon emissions are attributed to four main categories, taken from BS EN 15978. The categories are:

- **Product Stages (Category A1 to A3)** The carbon emissions generated at this stage arise from extracting the raw materials from the ground, their transport to a point of manufacture and then the primary energy used (and the associated carbon impacts that arise) from transforming the raw materials into construction products.
- **Construction (Category A4 to A5)** These carbon impacts arise from transporting the construction products to site, and their subsequent processing and assembly into the building.
- **Use Stage (Category B1 to B7)** This covers a wide range of sources from the GHG emissions associated with the operation of the building (B1), maintenance (B2), repair (B3), refurbishment (B4) and replacement (B5) of materials, and operational energy use (B6) and water use (B7).
- **End of Life Stages (Category C1 to C4)** The eventual deconstruction and disposal of the existing building at the end of its life takes account of the on-site activities of the demolition contractors. No 'credit' is taken for any future carbon benefit associated with the reuse or recycling of a material into new products.

PE-ENV-01104 (TII, 2022a) recommends the calculation of the construction stage embodied carbon using the TII Online Carbon Tool (TII, 2025a) or an appropriate alternative tool. Embodied carbon refers to the sum of the carbon needed to produce a good or service. It incorporates the energy needed in the mining or processing of raw materials, the manufacturing of products and the delivery of these products to site. The purpose of the embodied carbon assessment is to engage the design team in the consideration of embodied carbon at an early stage in the development and mitigate embodied carbon. This engagement aims to ensure carbon savings are made and to assist in aligning the project to Ireland's CAP goal of Net Carbon Zero by 2050. TII also state that the use of other, alternative carbon tools is permissible for developments.

The TII Online Carbon Tool (TII, 2025a) has been commissioned by TII to assess GHG emissions associated with road or rail projects in Ireland. The TII Carbon Tool (TII, 2025a) uses emission factors from recognised sources including the Civil Engineering Standard Method of Measurement (CESSM) Carbon and Price Book database (CESSM, 2013), which can be applied to a variety of developments, not just road or rail. The tool aligns with PAS 2080.

The TII Carbon Tool was utilised to estimate the GHG emissions associated with the non-building elements of the proposed development including non-building materials i.e. for roads and pavements and for transport used during construction.

For the building elements of the proposed development, the OneClick LCA tool was utilised. OneClick LCA is certified to EN 15978, EN 15978, ISO 21931 – 1 & ISO 21929, and data requirements of ISO 14040 & EN 15804, and is LEED, BREEAM and PAS 2080 aligned. It allows users to assess the carbon impact of buildings at various stages of design. The tool includes a detailed product and material list based on Irish materials as well as materials from the UK and Europe. Data was obtained from the project design team in terms of estimated material types and quantities. Where an exact material type or quantity was not known, as it will not be chosen until detailed design, an estimate value or alternative material was used within the tool to complete the GHG assessment. The tool allows for optioneering and optimization of the carbon impact, it highlights the key areas within the building with the highest carbon impact and provides options for lower carbon intensive materials.

Reasonable conservative estimates have been used in this assessment where necessary to provide an estimate of the GHGs associated with the proposed development.

12.2.2.2 Operational Phase

Traffic Emissions

Emissions from road traffic associated with the proposed development have the potential to emit carbon dioxide (CO_2) which will impact climate.

The TII guidance *Air Quality Assessment of Specified Infrastructure Projects – PE-ENV-01106* (TII, 2022b), states that road links meeting one or more of the following criteria can be defined as being 'affected' by a proposed development and should be included in the local air quality assessment, and also the climate assessment.

- Annual average daily traffic (AADT) changes by 1,000 or more;
- Heavy duty vehicle (HDV) AADT changes by 200 or more;
- Daily average speed change by 10 kph or more;
- Peak hour speed change by 20 kph or more;
- A change in road alignment by 5 m or greater.

While the guidance is specific to infrastructure projects the approach can be applied to any development that causes a change in traffic.

There are a number of road links that will experience a change of over 1,000 in the AADT during the operational phase due to the proposed development. As a result, a detailed assessment of traffic related carbon dioxide (CO_2) emissions was conducted.

PE-ENV-01104 (TII, 2022a) states that road traffic related emissions information should be calculated using the TII Road Emissions Model (REM) online calculator tool (TII, 2025b). The TII guidance (TII, 2022b) states that modelling should be conducted for the Base, Opening and Design Years for both the Do Nothing and Do Something scenarios. The output is provided in terms of CO_2e.

The following inputs are required for the REM tool: receptor locations, light duty vehicle (LDV) annual average daily traffic movements (AADT), annual average daily heavy-duty vehicles (HDV AADT), annual average traffic speeds, road link lengths, road type, project county location and pollutant background concentrations. The *Default* fleet mix option was selected along with the *Intermediate Case* fleet data base selection for cars, the *ICE Sales Ban 2035* fleet data base for LGVs and the *EU Target* for the HGV fleet data base, as per TII Guidance (TII, 2024; 2025). The Intermediate Case assumes a linear interpolation between the Business-as-Usual case – where current trends in vehicle ownership continue and the Climate Action Plan (CAP) case – where adoption of low emission light duty vehicles occurs. The ICE Sales Ban 2035 represents a sales ban on new combustion engine vehicles to be implemented by 2035, and the EU Target for HGV represents interim targets for emissions from sales of new HGVs.

Traffic flow information was obtained from EGIS, the traffic engineers, for the purposes of this assessment, see Chapter 4 of this EIAR, Material Assets – Traffic & Transportation. Data was provided for the Base Year 2024 and the Do Nothing and Do Something scenarios for the Opening Year 2030 and Design Year 2045 (see Traffic and Transport Assessment for further details). Both the Do Nothing and Do Something scenarios are quantified to determine the degree of change in emissions due to the proposed development. A total of 2 no. scenarios were assessed, these include:

- The Do Nothing scenario – this scenario assumes the proposed development is not in place in future years but includes traffic associated with cumulative developments in the wider area.
- The Proposed scenario – this is the "Do Something" scenario and includes traffic from the Do Nothing scenario and traffic associated with the proposed development as well as traffic associated with cumulative developments in the wider area.

Further detail on the modelling scenarios can be found in the Traffic and Transport Assessment prepared by EGIS and included within Chapter 4 of this EIAR. The traffic data is detailed in Table 12.3. Only the one road link that met the TII scoping criteria was included in the modelling assessment. Inputs include light duty vehicle (LDV) annual average daily traffic movements (AADT), annual average daily heavy-duty vehicles (HDV AADT), annual average traffic speeds, road link lengths, road type and project county location.

Road Name	Speed (kph)	Base Year	Opening Year		Design Year	
			Do Nothing	Do Something	Do Nothing	Do Something
		LDV AADT (HDV AADT)	LDV AADT (HDV AADT)	LDV AADT (HDV AADT)	LDV AADT (HDV AADT)	LDV AADT (HDV AADT)
Arm C - Maglin Sustainable Access Corridor	50	2033 (48)	2795 (57)	4508 (57)	3041 (68)	4753 (68)

Table 12.3 Traffic Data used in Operational Phase GHG Assessment

Operational Phase Energy Use

The EU guidance (European Commission, 2013) also states indirect GHG emissions as a result of a development must be considered, which includes emissions associated with energy usage. Information on the proposed energy strategy for the development was obtained from the Scheme Sustainability & Climate Resilience Statement prepared by DOSA Consulting Engineers and used to inform this assessment (See Appendix 12-1 of this EIAR). A number of measures in relation to sustainable energy usage have been incorporated into the overall design of the development which will have the benefit of reducing the impact to climate where possible during operation.

12.2.2.3 Significance Criteria for GHGA

The Transport Infrastructure Ireland (TII) guidance document entitled PE-ENV-01104 Climate Guidance for National Roads, Light Rail and Rural Cycleways (Offline & Greenways) – Overarching Technical Document (TII, 2022a) outlines a recommended approach for determining the significance of both the construction and operational phases of a development.

The significance of GHG effects set out in PE-ENV-01104 (TII, 2022a) is based on ISEP guidance (ISEP, 2022) which is consistent with the terminology contained within Figure 3.4 of the EPA's (2022) 'Guidelines on the information to be contained in Environmental Impact Assessment Reports'.

The 2022 ISEP Guidance (ISEP, 2022) sets out the following principles for significance:

- When evaluating significance, all new GHG emissions contribute to a negative environmental impact; however, some projects will replace existing development or baseline activity that has a higher GHG profile. Therefore, the significance of a project's emissions should be based on its net impact over its lifetime, which may be positive, negative or negligible;
- Where GHG emissions cannot be avoided, the goal of the EIA process should be to reduce the project's residual emissions at all stages; and
- Where GHG emissions remain significant, but cannot be further reduced, approaches to compensate the project's remaining emissions should be considered.

The criteria for determining the significance of effects are a two-stage process that involves defining the magnitude of the impacts and the sensitivity of the receptors (i.e. Ireland's National GHG targets). In relation to climate, there is no project

specific assessment criteria, but the project will be assessed against the recommended TII significance determination. This takes account of any embedded or committed mitigation measures that form part of the design which should be considered.

TII (TII 2022a) states that professional judgement must be taken into account when contextualising and assessing the significance of a project's GHG impact. TII reference the ISEP guidance (2022) which states that the crux of assessing significance is "*not whether a project emits GHG emissions, nor even the magnitude of GHG emissions alone, but whether it contributes to reducing GHG emissions relative to a comparable baseline consistent with a trajectory towards net zero by 2050".*

Significance is determined using the criteria outlined in Table 12.4 (derived from Table 6.7 of PE-ENV-01104 (TII 2022a)) along with consideration of the following two factors:

- The extent to which the trajectory of GHG emissions from the project aligns with Ireland's GHG trajectory to net zero by 2050; and
- The level of mitigation taking place.

Effects	Significance Level	Description
Significant adverse	Major adverse	• The project's GHG impacts are not mitigated. • The project has not complied with do-minimum standards set through regulation, nor provided reductions required by local or national policies; and • No meaningful absolute contribution to Ireland's trajectory towards net zero.
	Moderate adverse	• The project's GHG impacts are partially mitigated. • The project has partially complied with do-minimum standards set through regulation, and have not fully complied with local or national policies; and • Falls short of full contribution to Ireland's trajectory towards net zero.
Not significant	Minor adverse	• The project's GHG impacts are mitigated through 'good practice' measures. • The project has complied with existing and emerging policy requirements; and • Fully in line to achieve Ireland's trajectory towards net zero.
	Negligible	• The project's GHG impacts are mitigated beyond design standards. • The project has gone well beyond existing and emerging policy requirements; and • Well 'ahead of the curve' for Ireland's trajectory towards net zero.
Beneficial	Beneficial	• The project's net GHG impacts are below zero and it causes a reduction in atmosphere GHG concentration. • The project has gone well beyond existing and emerging policy requirements; and • Well 'ahead of the curve' for Ireland's trajectory towards net zero, provides a positive climate impact.

Table 12.4 Significance Criteria for GHGA

Ireland's carbon budgets can also be used to contextualise the magnitude of GHG emissions from the proposed development (TII, 2022a). The approach is based on comparing the net proposed development GHG emissions to the relevant carbon budgets (DECC, 2023a). With the publication of the Climate Action Act in 2021 and the Climate Action Plan 2024 and 2025, sectoral carbon budgets have been published for comparison with the net GHG emissions from the proposed development over its lifespan. The aim of the carbon budgets is to ensure we are on a trajectory to meet the National Climate Objective of Net Zero by 2050.

12.2.3 Climate Change Risk Assessment

An initial screening of risk during the operational phase is conducted, according to the TII guidance PE-ENV-01104. This is carried out by determining the sensitivity of proposed development assets (i.e. receptors) and their exposure to climate change hazards.

The proposed development asset categories must be assigned a level of sensitivity to climate hazards. PE-ENV-01104 (TII, 2022a) provides the list of asset categories and climate hazards to be considered. The asset categories will vary for development type and need to be determined on a development-by-development basis.

- **Asset Categories:** Pavements; drainage; structures; utilities; landscaping; signs, light posts, buildings, and fences.
- **Climate Hazards:** Flooding (coastal, pluvial, fluvial); extreme heat; extreme cold; wildfire; drought; extreme wind; lightning and hail; landslides; fog.

First an initial screening of physical hazards is carried out based on the proposed site location. This is a qualitative screening which intends to only proceed with relevant hazards (e.g., sea level rise is not an applicable hazard to inland areas or wildfire is not considered a hazard in an urban location). Following this, all relevant hazards will continue to be assessed on their exposure under future climate change.

The sensitivity is based on a High, Medium or Low rating with a score of 1 to 3 assigned as per the criteria below.

- **High Sensitivity -** The climate hazard will or is likely to have a major impact on the asset category. This is a sensitivity score of 3.
- **Medium Sensitivity** - It is possible or likely the climate hazard will have a moderate impact on the asset category. This is a sensitivity score of 2.
- **Low Sensitivity** - It is possible the climate hazard will have a low or negligible impact on the asset category. This is a sensitivity score of 1.

Once the sensitivities have been identified the exposure analysis is undertaken. The exposure analysis involves determining the level of exposure of each climate hazard at the project location irrespective of the project type. For example, flooding could be a risk if the project location is next to a river in a floodplain. Exposure is assigned a level of High, Medium or Low as per the below criteria.

- **High Exposure:** It is almost certain or likely this climate hazard will occur at the project location, i.e. might arise once to several times per year. This is an exposure score of 3.
- **Medium Exposure:** It is possible this climate hazard will occur at the project location, i.e. might arise a number of times in a decade. This is an exposure score of 2.
- **Low Exposure:** It is unlikely or rare this climate hazard will occur at the project location, i.e. might arise a number of times in a generation or in a lifetime. This is an exposure score of 1.

Once the sensitivity and exposure are categorised, a vulnerability analysis is conducted by multiplying the sensitivity and exposure to calculate the vulnerability.

12.2.3.1 Significance Criteria for CCRA

The CCRA involves an initial screening assessment to determine the vulnerability of the proposed development to various climate hazards. The vulnerability is determined by combining the sensitivity and the exposure of the proposed development to various climate hazards.

Vulnerability = Sensitivity x Exposure

The vulnerability assessment takes any proposed mitigation into account. Table 12.5 details the vulnerability matrix; vulnerabilities are scored on a high, medium and low scale.

TII guidance (TII, 2022a) and the EU technical guidance (European Commission, 2021a) note that if all vulnerabilities are ranked as low in a justified manner, no detailed climate risk assessment may be needed. Therefore, the impact from climate change on the proposed development can be considered as not significant.

However, where residual medium or high vulnerabilities exist the assessment may need to be progressed to a detailed climate change risk assessment and further mitigation implemented to reduce risks. An assessment of construction phase CCRA impacts is only required according to the TII guidance (TII, 2022a) if a detailed CCRA is required.

		Exposure		
		High (3)	Medium (2)	Low (1)
Sensitivity	High (3)	9 - High	6 – High	3 - Medium
	Medium (2)	6 - High	4 - Medium	2 - Low
	Low (1)	3 - Medium	2 – Low	1 - Low

Table 12.5 Vulnerability Matrix

The screening CCRA, detailed in Section12.6.4, did not identify any residual medium or high risks to the proposed development as a result of climate change. Therefore, a detailed CCRA for the construction and operational phase were scoped out. While a CCRA for the construction phase was not required, best practice mitigation against climate hazards is still recommended as outlined in Section 12.7

12.3 Difficulties Encountered

The proposed development is still in the design stage and therefore materials used, construction and operational activities are subject to change. Data assumption for the GHG assessment are set out in the Table 12.6 below. All assumptions follow a conservative approach.

Activity	Assumptions
A1- A3 Materials	Building materials calculated through OneClick. Non-building materials calculated in TII.
A4 Transport	Calculated in TII tool- HGV trips during construction. Assumed 50km travel distance round trip.
A5 Construction	Included in OneClick results
B4-B5 Replacement	Estimated within OneClick based on default values

Table 12.6 GHG Assessment Assumptions

Categories B1 (use), B2 (maintenance) and B3 (repair) have been excluded from the assessment as there is too much variability in user consumption and maintenance and repair requirements to quantify estimated GHG emissions. This assessment only assesses construction and operational phase emissions and does not consider end of life emissions for the proposed development.

12.4 Baseline Environment

PE-ENV-01104 (TII, 2022a) states that a baseline climate scenario should identify, consistent with the study area for the project, GHG emissions without the project for both the current and future baseline.

Ireland declared a climate and biodiversity emergency in May 2019 and in November 2019 there was European Parliament approval of a resolution declaring a climate and environment emergency in Europe. This, in addition to Ireland's current failure to meet its EU binding targets under Regulation 2018/842 (European Union, 2018) results in changes in GHG emissions either beneficial or adverse being of more significance than previously considered prior to these declarations.

Climate impacts are assessed at a national level and in relation to national targets and sectoral emission ceilings. The study area for climate is the Republic of Ireland and the baseline is determined in relation to this study area.

12.4.1 Current GHG Baseline

Data published in July 2025 (EPA, 2025a), indicates that Ireland exceeded, without the use of flexibilities, its 2024 annual limit set under EU's Effort Sharing Decision (ESD) (EU 2018/842) by 1.03 Mt CO_2e. However, the 2024 emissions represent the second consecutive year in which Ireland's emission were below (-4.2%) 1990 levels. ETS (Emissions Trading Scheme) emissions decreased (-7.4%) and ESR (Effort Sharing Regulation) emissions decreased (-0.5%). Ireland's target is an emission reduction of 626 kt of CO_2e by 2030 on an average baseline of 2016 to 2018.

The EPA estimate that 2024 total national GHG emissions, excluding LULUCF, have decreased by 2.0% on 2023 levels to 53.75 Mt CO_2e, with a 0.7 Mt CO_2e (-8.9%) reduction in electricity industries alone. This was driven by a 39.6% share of energy from renewables in 2024 and the complete phase-out of peat for electricity generation. Manufacturing combustion and industrial processes decreased by 4.6% to 6.0 Mt CO_2e in 2024 due to declines in fossil fuel usage. The sector with the highest emissions in 2024 was agriculture at 38% of the total, followed by transport at 21.7%. For 2024, total national emissions (including LULUCF) were 57.64 Mt CO_2e (EPA, 2025a) (Table 12.7).

The current estimates of National greenhouse gas emissions (including LULUCF) in 2024 are 12.0% below 2018, well off the National Climate ambition of a 51% reduction by 2030. The data indicate that from 2021- 2024 Ireland has used 82.8% of the 295 Mt CO_2e Carbon Budget for the five-year period 2021-2025. This leaves 17.5% of the budget available for 2025, requiring a substantial 10.3% annual emissions reduction for 2025 to stay within budget.

Sector *Note 1*	2021	2022	2023	2024	Total Budget (Mt CO_2e) (2021-2025)	% Budget 2021-2025 Used	Annual Change 2023 to 2024
Electricity	9.89	9.69	7.57	6.95	40	85.25%	-8.19%
Transport	11.09	11.76	11.80	11.65	54	85.74%	-1.27%
Buildings (Residential)	6.87	5.75	5.35	5.61	29	81.31%	4.86%
Buildings (Commercial and Public)	1.44	1.45	1.39	1.49	7	82.43%	7.19%
Industry	7.09	6.62	6.31	6.01	30	86.77%	-4.75%
Agriculture	21.94	21.78	20.72	20.41	106	80.05%	-1.50%
Other *Note 2*	1.86	1.93	1.81	1.63	9	80.33%	-9.94%
LULUCF	4.63	3.98	3.89	3.89	–	–	0
Total including LULUCF	64.82	62.99	58.83	57.64	295	82.81%	-2.04%

Note 1 Reproduced from latest emissions data on the EPA website May 2025 (EPA, 2025).

Note 2 Other includes Petroleum refining, F-Gases and Waste (emissions from solid waste disposal on land, solid waste treatment (composting and anaerobic digestion), wastewater treatment, waste incineration and open burning of waste).

Table 12.7 Trends in Total National GHG Emissions 2021 – 2023

12.4.2 Future GHG Baseline

The future baseline with respect to the GHGA can be considered in relation to the future climate targets which the assessment results will be compared against. In line with TII (TII, 2022a) and ISEP Guidance (ISEP, 2022) the future baseline is a trajectory towards net zero by 2050, "*whether it* [the project] *contributes to reducing GHG emissions relative to a comparable baseline consistent with a trajectory towards net zero by 2050*".

The future baseline will be determined by Ireland meeting its targets set out in the CAP25, and future CAPs, alongside binding 2030 EU targets. The European Union (EU) enacted *'Regulation (EU) 2018/842 on binding annual GHG emission reductions by Member States from 2021 to 2030 contributing to climate action to meet commitments under the Paris Agreement and amending Regulation (EU) No. 525/2013'* (hereafter referred to as the Regulation) (European Union, 2018) to meet the commitments under the Paris Agreement. The Regulation aims to deliver, collectively by the EU in the most cost-effective manner possible, reductions in GHG emissions from the Emission Trading Scheme (ETS) and non-ETS sectors amounting to 43% and 30%, respectively, by 2030 compared to 2005. The Regulation was amended in April 2023 and Ireland must now limit its ETS and non-ETS greenhouse gas emissions by at least 42% by 2030. The ETS is an EU-wide scheme which regulates the GHG emissions of larger industrial emitters including electricity generation, cement manufacturing and heavy industry. The non-ETS sector includes all domestic GHG emitters which do not fall under the ETS scheme and includes GHG emissions from transport, residential and commercial buildings and agriculture.

In May 2025, the EPA released the report Ireland's Greenhouse Gas Emissions Projections 2024-2055 (EPA, 2025b), which includes total projected emissions and a breakdown of projected emissions per sector under the 'With Existing Measures' and 'With Additional Measures' scenarios. The EPA projections indicate that currently implemented measures (With Existing Measures) will achieve a reduction of 10% on 2005 levels by 2030, significantly short of the 42% reduction target. If measures in the higher ambition (With Additional Measures) scenario are implemented, EPA projections show that Ireland can achieve a reduction of 22% by 2030, still short of the 42% reduction target.

12.4.3 Current CCRA Baseline

The region of the proposed development has a temperate, oceanic climate, resulting in mild winters and relatively cooler summers when compared with continental Europe. This baseline data is derived from the European Centre for Medium-Range Weather Forecasts (ECMWF) ERA5 data reanalysis (ECMWF, 2023) which includes observed data from individual meteorological weather stations across Ireland from 1950-2023 such as that at Cork Airport, a representative meteorological station located 10 km from the proposed development. This data is reanalysed to model a complete picture of Irelands historical climate. This method has been chosen to ensure data can be analysed at the daily level and harmoniously compared with future scenarios. The baseline time-period referred to in this assessment was from 1991-2020 and is specific to the County Cork.

Figure 12.1 below shows the climatology for county Cork across the 30-year period from 1991 to 2020 indicating the wettest months are from October through to January with December (109mm) being the wettest on average. Late Spring and Summer are markedly drier compared to the wettest months with average monthly precipitation 85mm-78mm respectively. The driest month on average was June (78mm), with March and September also experiencing lower than average rainfall (~80mm). Ireland's and Cork's precipitation patterns are strongly influenced by its oceanic climate, with the wettest months typically coinciding with periods of frequent low-pressure Atlantic storm systems.

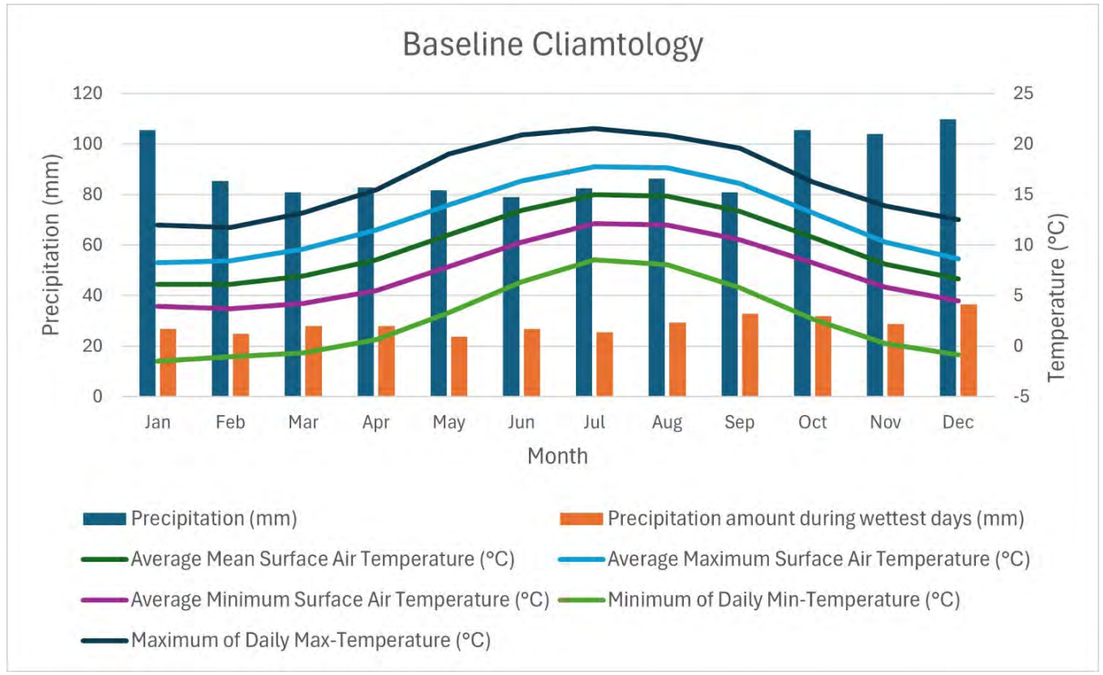


Figure 12.1 Baseline Climatology (1991-2020)

July was the warmest month with a mean temperature of 14.9°C with average mean surface temperatures across the summer months (July – August) >17°C. July is also the warmest month for maximum daily temperatures (21°C) which showcases the higher value ranges recorded during a particular month. Across May – September average maximum daily temperatures exceed 19°C.

January and February are the coldest months with average mean surface air temperatures of 6.1°C and average minimum temperatures of 3.7-3.9°C. For daily minimum temperatures which reference the lowest range values (10th percentile range) of the data, January (-1.5°C) and February (-1.0°C) also remain the coldest with marginal difference. Several other winter and early spring months (November - March) also experience minimums of below 0°C.

Historical records show Cork has experienced several severe storms, with wind speeds exceeding 100 km/h. Storm activity is concentrated in winter (December–February), with an average of eight named storms annually (Met Éireann, 2025).

Analysis of data from Cork Airport (1962–2020) indicates a mean 10m wind speed of 10 knots (18 km/hr) and an average maximum gust speed ≥60 knots (111 km/h).

Overall, the baseline climatology for the proposed development location and region shows evidence of a high frequency of precipitation across the year with instances of very wet days (≥30mm) occurring across October and December. Mild winters with average minimums >0°C and relatively mild summers with average maximums of +17°C but not significant for extreme heat or prolonged drought.

12.4.4 Future CCRA Baseline

Ireland is already experiencing increased annual rainfall in the north and west, with more variable patterns in the south and east including the area of the proposed development (EPA, 2021b). Key risks identified by the EPA relevant to the proposed development include:

- Increased likelihood of more frequent and intense North Atlantic low-pressure systems bringing high rainfall and high winds.
- More intense rainfall periods which may lead to pluvial flooding and elevated fluvial levels.
- Longer dry spells and increased temperatures will elevate the risk of wildfire.

Climate Modelling and Planning

International best practice and national policy, such as the NCCRA (2024a), and Transport Infrastructure Ireland (TII, 2022a), recommends using two emission scenarios to project future climate change. This includes a moderate and high emission scenarios (RCP4.5 and RCP8.5) for future planning. These Representative Concentration Pathways (RCPs) reflect varying levels of global climate mitigation explained below.

- RCP 4.5 (a 'moderate' scenario) represents an approximate 2.4°C increase in global average temperatures (1.7-3.2°C). It assumes moderate mitigation efforts leading to stabilisation of emissions by mid-century and is generally aligned with current policies for emission reduction.
- RCP 8.5 (a 'worst case' / high emissions scenario) represents an approximate 4.3°C increase in global average temperatures (3.2-5.4°C) and assumes continued high emissions with minimal mitigation. This high-end scenario is useful for understanding potential impacts of current emission trends continue. Consequently, this scenario will result in the highest level of physical risk for Ireland, and therefore the greatest requirement for adaptation.

This climate change assessment uses the latest climate change projections standardised and bias corrected for Ireland available through the EPA and the TRANSLATE project (EPA, 2025c).

12.4.4.1 Key Findings from Future Climate Projections

Table 12.8 below provides key climate change projections. A summary of projected changes include:

- Summer temperatures rising by over 2°C and overall mean temperatures increasing 1.7°C and 2.1°C by mid-century under RCP4.5 and RCP8.5 respectively.
- Summer rainfall is decreasing while winter rainfall increasing sharply, attributing to an overall increase in rainfall annually for the site location.
- Fewer cold winter nights and more frequent short heatwaves (≥5 days >25°C), likelihood of a heatwave is still low with 0.4 rate of occurrence annually under RCP8.5.
- Increased likelihood of dry spells and drought which may elevate the risk of wildfire.
- Increased likelihood of more storms which may increase the risk of coastal flooding.

Climate Hazard	Indicator	Baseline	RCP4.5 (2040-2070)	RCP8.5 (2040-2070)
Temperature	Mean temp (°C)	10.0	11.7 (+1.7)	12.1 (+2.1)
	Mean Max temp (°C)	12.6	15.1	15.6
	Mean Min temp (°C)	7.4	8.2	8.7
	Average of Daily Max temp (°C)	21.5 (July)	26.7	27.6
Precipitation and Flooding	Annual precipitation (mm)	1084	1168 (+84)	1187 (+103)
	Max 1-day (mm)	36	47	48
Storms and high winds	Number of Storms Qualitative (Description)	On Average 8 named storms annually with speeds exceeding 100km/hr (N.1)	Winter storm frequency is projected to increase, with a possible extension of the storm season. While the intensity of individual storms cannot be accurately projected, wind speeds are likely to remain above 100 km/hr.	
	Average Max Gust Speed (Knots)	60		
Drought	Absolute Drought (≥15 days with less than 1mm)	Rare	Marginal increase	Limited Likelihood
Lightning	Qualitative (Descriptive)	Occurring during summer periods	This hazard may modestly increase in the future due to more favourable conditions, such as rising temperatures and extended warm periods beyond the traditional summer season	
Note 1	Data from combined Met Éireann, UK Met Office and Dutch Meteorological services.			

Table 12.8 Site Specific - Future Climate Change Summary of Projections under both RCP scenarios for 2050 period (2040-2070) taken from the EPA climate Ireland Translate Projections.

Impacts resulting from climate change hazards will evolve and have the potential to include increases in global temperatures and increases in the intensity and frequency of rainfall days per year combined with increases in the intensity and frequency of low-pressure systems in the north Atlantic during the winter storm period. Therefore, it is expected that the climate over the proposed development location in Cork will evolve over time and consideration is needed with respect to this within the design of the proposed development.

12.5 Potential Impacts of the Proposed Development

12.5.1 The 'Do Nothing' Scenario

In the Do-Nothing scenario, the site will remain as per the baseline and will change in accordance with trends within the wider area (including influences from potential new developments in the surrounding area, changes in road traffic, etc).

As the site is zoned for development, it is likely that in the absence of the proposed development a development of a similar nature would occur. Therefore, the predicted climate impacts within this report are likely to occur even in the absence of the proposed development.

12.5.2 Greenhouse Gas Assessment

12.5.2.1 Construction Phase

The most significant proportion of GHG emissions tend to occur during the construction phase as a result of embodied carbon in construction materials and emissions from construction activities. Therefore, the assessment has been included in the construction phase assessment for the purposes of the EIAR. The assessment is broken down into the following stages:

- Product stage: Materials (A1 – A3);
- Construction Activities: Transportation to site (A4), Site operations (A5)
- Material replacement & refurbishment (B4 – B5).

The construction phase GHG emissions comprise stages A1 – A5 which includes the construction materials, the transport of the materials to site and the construction activities or site operations. Ongoing material refurbishment and replacement throughout the lifetime of the development is included within category B4 – B5, these are default values based on the typical maintenance requirements for the chosen material types over the assumed 60-year lifetime.

It is estimated that the proposed development will result in total embodied carbon emissions of 38,445 tonnes CO_2e (see Table 12.9). All excavated material is due to be re-used on site which will prevent 505 tonnes CO_2e associated with its disposal via landfill (see Table 12.9).

Stage	GHG Assessment Category	Predicted GHG Emissions (tCO_2e)	Emissions as % of Project Total	Relevant Sector for Carbon Budget Comparison
A1-A3	Materials	26,684	69%	Industry
A4	Transport	3,872	10%	Transport
A5	Construction	1,996	5%	Industry
B4 - B5	Replacement	5,892	15%	Industry
Total		**38,445**		
Avoided emissions	Re-use of excavated material on site	-505		

Table 12.9 GHG Assessment Results

Construction materials make up the majority of GHG emissions for the proposed development making up approximately 69% of the total emissions. Construction activities, including transport to site makes up the second highest contribution at 15% of the total. The rest of the emissions are associated with the use stage: material replacement and refurbishment.

The GHG emissions from the development as a total cannot be compared against one specific sector 2030 carbon budget, the emissions are broken down into different assessment categories and these must be compared separately to the relevant

sectoral emissions budget which are detailed in Table 12.10. The relevant sectoral emissions for the proposed development comparison include the Industry sector and Transport sector.

The predicted emissions for the proposed development are annualised over the assumed 60-year lifespan and then compared to the relevant sector 2030 carbon budgets. Annualising the full carbon emissions over the lifetime of the development allows for appropriate comparison with annual GHG targets.

In Table 12.10, GHG emissions have been compared against the carbon budget for the industry and transport sectors in 2030 (DECC, 2024), against Ireland's total GHG emissions in 2024 and against Ireland's EU 2030 target of a 30% reduction in non-ETS sector emissions based on 2005 levels (27.7 Mt CO_2e) (set out in Regulation EU 2018/842 of the European Parliament and of the Council).

The estimated total GHG emissions, when annualised over the 60-year proposed development lifespan, are equivalent to 0.001% of Ireland's total GHG emissions in 2024 and 0.002% of Ireland's non-ETS 2030 emissions target. The estimated GHG emissions associated with transport-related activities are 0.001% of the 2030 Transport budget and industry-related activities are 0.01% of the 2030 Industry budget.

Target/Sectoral Budget (tCO_2e)		Annualised Development GHG Emissions		% of Relevant Target/Budget
Ireland's 2024 Total GHG Emissions (existing baseline)	57,640,000	641	Total GHG Emissions	0.001%
Non-ETS 2030 Target	27,721,670			0.002%
2030 Sectoral Budget (Industry Sector)	4,000,000	576	Total Industry Emissions	0.01%
2030 Sectoral Budget (Transport Sector)	6,000,000	65	Total Transport Emissions	0.001%

Table 12.10 Estimated GHG Emissions Relative to Sectoral Budgets and GHG Baseline

12.5.2.2 Operational Phase

Operational Energy Usage

The proposed development has been designed to reduce the impact to climate where possible. A number of measures have been incorporated into the design to ensure the operational phase emissions are minimised. The primary elements with respect to reducing climate impacts and optimising energy usage are summarised in Section 12.7.1 and are based on information provided by the project building engineers and the Scheme Sustainability & Climate Resilience Statement prepared by DOSA (Appendix 12-1 of this EIAR).

Operational Traffic Emissions

There is the potential for increased traffic volumes to impact climate during the operational phase. To provide for a worst-case assessment and to assess potential cumulative impacts, the traffic data has included specific cumulative developments within the area (see Chapter 4 of this EIAR for further details).

The predicted concentrations of CO_2e for the future years of 2030 and 2045 are detailed in Table 12.11. These are significantly less than Ireland's national 2030 target set out under EU legislation (targets beyond 2030 are not available) and the 2030 sectoral emissions ceilings. It is predicted that in 2030 the proposed development will increase CO_2 emissions by 28 tonnes CO_2e. This equates to 0.00007% of the 2030 national emission ceiling or 0.0005% of the 2030 Transport sector emissions ceiling. Similarly low increases in CO_2 emissions are predicted to occur in 2045 with emissions increasing by 38 tonnes CO_2e. This equates to 0.00008% of the 2030 national emission ceiling or 0.0003% of the 2030 Transport sector emissions ceiling.

In addition, bicycle parking and electric vehicle parking and charging infrastructure will be provided as part of the parking requirements at the proposed development which will promote the use of more sustainable methods of transport.

Year	Scenario	CO_2e (tonnes/annum)
2030	Do Nothing	**49**
	Do Something	**77.49**
2045	Do Nothing	**38**
	Do Something	59.01
Increment Change in 2032		28.07
National Emission Ceiling 2030 (Tonnes) Note 1		37,869,352
Impact in 2032 (as % of national emissions ceiling)		0.00007%
Transport Sector 2030 Emission Ceiling		6,000,000
Impact in 2032 (as % of transport sector emissions ceiling)		0.0005%
Increment Change in 2045		20.86
National Emission Ceiling 2030 (Tonnes) Note 1		27,722,000
Impact in 2045 (as % of national emissions ceiling)		0.00008%
Impact in 2045 (as % of transport sector emissions ceiling)		0.0003%

Note 1 Target under Commission Implementing Decision (EU) 2020/2126 of 16 December 2020 on setting out the annual emission allocations of the Member States for the period from 2021 to 2030 pursuant to Regulation (EU) 2018/842 of the European Parliament and of the Council.

Table 12.11 Traffic emissions GHG impact assessment

12.5.2.3 GHGA Significance of Effects

The TII guidance states that the following two factors should be considered when determining significance:

- The extent to which the trajectory of GHG emissions from the project aligns with Ireland's GHG trajectory to net zero by 2050; and
- The level of mitigation taking place.

The level of mitigation described in Section 12.7 has been taken into account when determining the significance of the proposed development's GHG emissions.

According to the TII significance criteria described in Section 12.2.3.1 and Table 12.3 the significance of the GHG emissions during the construction and operational phase is minor adverse.

The ISEP GHG guidance (ISEP, 2022) (which has been embraced by the updated TII Guidance (TII, 2022) in Section 6.7.2) defines minor adverse as follows:

"A minor adverse not significant impact is described with: A project that is compatible with the budgeted, science based 1.5°C trajectory (in terms of rate of emissions reduction) and which complies with up-to-date policy and 'good practice' reduction measures to achieve that has a minor adverse effect that is not significant. The project may have residual impacts but is doing enough to align with and contribute to the relevant transition scenario. A 'minor adverse' or 'negligible' non-significant effect conclusion does not necessarily refer to the magnitude of GHG emissions being carbon neutral (i.e. zero on balance) but refers to the likelihood of avoiding severe climate change and achieving net zero by 2050. A 'minor adverse' effect or better is a high bar and indicates exemplary performance where a project meets or exceeds measures to achieve net zero earlier than 2050."

The proposed development aligns with the following GHG significance criteria as per Table 12.3:

- The project's GHG impacts are mitigated through 'good practice' measures.
- The project has complied with existing and emerging policy requirements; and
- Fully in line to achieve Ireland's trajectory towards net zero.

In accordance with the EPA guidelines (EPA, 2022), the above significance equates to a significance of effect of GHG emissions during the construction, operational and decommissioning phase which is **direct, long-term, negative** and **not significant**.

12.5.3 Climate Change Risk Assessment

12.5.3.1 Construction Phase

A detailed CCRA of the construction phase has been scoped out. However, consideration has been given to the proposed development's vulnerability to the following climate change hazards with best practice mitigation measures proposed in Section 12.7.2

- Flood Risk due to increased precipitation, and intense periods of rainfall. This includes fluvial and pluvial flooding.
- Increased temperatures potentially causing water scarcity and prolonged periods of hot weather
- Reduced temperatures resulting in ice or snow and [possible hazard to working conditions].
- Major Storm Damage, including wind damage and coastal flooding from storm surge.
- Wildfire resulting from dry spells and elevated temperatures

12.5.3.2 Operational Phase

To determine the vulnerability of the proposed development to climate change the sensitivity and exposure of the development to various climate hazards must first be determined. Table 12.12 presents the initial qualitative climate hazards screening relevant to the proposed development and discusses the rationale for screening them in or out of further assessment based on the proposed development location.

Climate-related Hazard	Hazard Screening Rationale	Screening
Extreme Heat temperatures	High temperatures are a key consideration for both construction and long-term operation of the proposed development. Historical data shows rising temperatures in Ireland. Heat and thermal expansion can damage buildings, materials, and road surfaces, and affect the lifecycle of assets.	Screen in
Extreme Cold Temperature	Snow and ice events pose significant risks to health, safety, and site operations. Road access may be disrupted, and low temperatures can affect assets such as fuel tankers, workers, and infrastructure. Freeze-thaw cycles may cause cracking in concrete and road surfaces, requiring snow clearance and ice management.	Screen in
High precipitation and pluvial flooding	Surface water remains a key vulnerability for the proposed development during both construction and operational phases due to the sensitivity of construction materials, site access, and site assets to water exposure.	Screen in
Fluvial flooding	The development site is not deemed at risk from a fluvial watercourse, and this is not considered a hazard for the site.	Screen out
Drought	Droughts have occurred across Ireland, previously impacting water supply. Future reductions in availability would directly impact the proposed development and landscaping.	Screen in
Wildfire	The area surrounding the site is largely urban and wildfire is not considered a risk to screen in for this development.	Screen out
High winds and storms	Existing and proposed assets and design components may be exposed to high winds. Historically, Ireland has experienced several notable storm events including Storm Éowyn and Storm Darragh (2024), which caused widespread damage across Ireland. These storms often bring heavy rainfall and flood warnings, increasing overall risk.	Screen in
Fog	Fog is not considered a significant hazard for this development, as it does not involve transport, aviation, or activities requiring high visibility.	Screen out
Lightning	The proposed building design is not significantly elevated, and no extra risk is considered above what currently exists under the existing design of the site and buildings	Screen out
Landslides and Subsidence	The Geological Society of Ireland (GSI) landslide susceptibility mapping database (GSI, 2025) was reviewed to determine the low risk from landslides at the proposed development location. Consideration has been given to subsidence and adequate engineering measures are in place to ensure stability.	Screen out
Sea level rise and coastal flooding	The location of the development is not coastal therefore sea level rise and coastal flooding are not a risk.	Screen out

Table 12.12 Climate Hazard Screening

Climate Vulnerability Assessment

The sensitivity and exposure of the development to the screened in climate hazards (as per Table 12.11) must first be determined to then determine the vulnerability of the proposed development to climate change. Flooding (pluvial), extreme heat, extreme cold, drought, and extreme wind, have been considered as climate hazards in the context of the proposed development.

The sensitivity of the proposed development to the climate hazards is assessed irrespective of the project location. Table 12.13 details the sensitivity of the proposed development on a scale of high (3), medium (2) and low (1). Once the sensitivity has been determined, the exposure of the proposed development to each of the climate hazards is determined, this reflects on the possible likelihood of the climate hazard occurring at the project location and is also scored on a scale of high (3), medium (2) and low (1). The product of the sensitivity and exposure is then used to determine the overall vulnerability of the proposed development to each of the climate hazards. The results of the vulnerability assessment are detailed in Table 12.13.

Climate Hazard	Sensitivity	Exposure	Vulnerability
Flooding (Pluvial & Fluvial)	1 (Low)	2 (Medium)	2 (Low)
Extreme Heat	1 (Low)	2 (Medium)	2 (Low)
Extreme Cold	1 (Low)	1 (Low)	1 (Low)
Drought	2 (Medium)	1 (Low)	2 (Low)
Extreme Wind	1 (Low)	2 (Medium)	2 (Low)

Table 12.13 Climate Change Vulnerability Assessment

The sensitivity and exposure of the area was determined with reference to several online tools and with input from the various discipline specialists on the project team. It was concluded that the proposed development does not have any significant vulnerabilities to the identified climate hazards as described in the below sections. All vulnerabilities are classified as low.

Flooding

A Flood Risk Assessment (FRA) was undertaken by Malachy Walsh & Partners (2025) for the proposed development (Appendix 7-3 of this EIAR). This document was reviewed to inform the climate change vulnerability assessment and assess the potential for flooding at the proposed development site. The FRA determined the site is largely within Flood Zone C and at a low risk to flooding. Noncritical areas of the site amore at risk and mitigation measures have been integrated into the design to accommodate for future climate change rainfall and flooding.

The proposed minimum finished floor levels for all buildings range from approximately 17.60 mOD to 21.50 mOD, which is safely above the predicted design flood level of 16.50 mOD to 17.09 mOD for the 1% AEP MRFS event. Two apartment blocks include basement levels at 17.25 mOD, still above the adjacent design flood level of 16.58 mOD, meaning the flood risk to occupants remains low. Ground levels across the site will be raised to a minimum of 17.00 mOD, and the proposed distributor road will be elevated from around 17.00 mOD at the southwestern end to approximately 20.00 mOD at the northeastern end, further reducing flood vulnerability.

Working in tandem with grey infrastructure and design changes, green space and landscaping will support drainage and reduce flow rates to accommodate more intense rainfall events and support stormwater drainage further enhancing resilience

Extreme Temperatures (Heat & Cold)

In relation to extreme temperatures, both extreme heat and extreme cold, these have the potential to impact the building materials and some related infrastructure. However, building materials will be selected which meet the relevant design standards and which are account for extreme temperatures. The likelihood of extreme cold events in the future is projected to decrease reducing their overall exposure and risk. Therefore, both extreme temperatures (cold and heat) are not considered a significant risk.

Drought

Landscaping has been designed with water scarcity in consideration, and the possible impacts vegetation die off may have on SuDs operation and support for urban cooling. Native plant species have been chosen with mix of vegetation to ensure irrigation demand is not high across all landscaping.

Extreme Wind

In relation to extreme winds, the buildings shall be designed to the appropriate standards to account for the relevant wind loadings events for RCP4.5 and RCP8.5. If required as part of the building design, lightning protection shall be provided but this assessment concludes that lightning is not considered a risk to the site.

Summary

Overall, the proposed development has at most low vulnerabilities to the identified climate hazards. Therefore, no detailed risk assessment is required.

12.5.3.3 CCRA Significance of Effects

With design mitigation in place, there are no significant risks to the proposed development as a result of climate change. In accordance with the EPA Guidelines (EPA, 2022), the significance of effect of the impacts to the proposed development as a result of climate change are **direct**, **long-term**, **negative** and **not significant** which is overall **not significant** in EIA terms.

12.6 Cumulative Impacts

With respect to the requirement for a cumulative assessment the ISESP (ISEP, 2022) and TII (TII, 2022a) guidance on which the assessment is based states that:

"the identified receptor for the GHG Assessment is the global climate and impacts on the receptor from a project are not geographically constrained, the normal approach for cumulative assessment in EIA is not considered applicable. By presenting the GHG impact of a project in the context of its alignment to Ireland's trajectory of net zero and any sectoral carbon budgets, this assessment will demonstrate the potential for the project to affect Ireland's ability to meet its national carbon reduction target. This assessment approach is considered to be inherently cumulative".

The traffic data used for the operational phase assessment included cumulative traffic from existing and permitted developments in the surrounding area. Therefore, this impact assessment is cumulative.

As per the above, the cumulative impact of the proposed development in relation to GHG emissions is considered ***direct, long-term, negative*** and ***not significant***.

12.7 Mitigation Measures

12.7.1 Incorporated Design Mitigation

A number of measures have been incorporated into the design of the development to mitigate against the impacts of future climate change. For example, adequate drainage and raised floor and ground levels to accommodate additional flood risk have been incorporated into the design of the development to avoid potential flooding impacts as a result of increased rainfall events in future years. These measures have been considered when assessing the vulnerability of the proposed development to climate change (Section 12.5.5.2).

In relation to operational energy usage, information as detailed in the Scheme Sustainability & Climate Resilience Statement prepared by DOSA (Appendix 12-1 of this EIAR), has been used to inform this assessment. The development has been designed in line with the requirements of Nearly Zero Energy Buildings (NZEB) Standards and the requirements of the Cork City Development Plan 2022 – 2028. Section 3 of the Scheme Sustainability & Climate Resilience Statement for the proposed development outlines the relevant climate specific objectives of the development plan for the area. The incorporated design measures as part of the proposed development's sustainability strategy are outlined below:

- Design Longevity and Passive Performance: The development will feature a flexible, futureproof design aimed at maximising its lifecycle. Passive design strategies, such as optimal façade orientation and enhanced building fabric (with U-values exceeding regulatory standards), will be employed to reduce energy demands. The design will also prioritise airtightness to achieve excellent air permeability performance.
- Daylighting and Visual Comfort: Natural daylight will be maximised in accordance with European, CIBSE, and BRE guidance. High-performance glazing will be used to improve visual comfort and support occupant well-being.
- Façade Optimisation: Advanced computer modelling will be used in collaboration with the project Architect to optimise façade design, enhancing daylight penetration, natural ventilation, and solar benefits specific to the site context.
- Whole-Site Sustainability: Sustainable practices will extend beyond the building envelope to encompass site-wide construction, commissioning, and handover processes, reinforcing environmental performance throughout the development lifecycle.
- Resource Efficiency – Reduce, Reuse, Recycle: Circular economy principles will be integrated across all project phases—design, construction, and operation—to minimise waste and environmental impact.
- Thermal Modelling and Climate Resilience: Dynamic Thermal and Energy Simulations will be conducted to ensure a low-carbon, low-energy design. Residential units will prioritise natural ventilation and undergo compliance assessments for overheating under Part L and long-term climate impacts using CIBSE 2020/2050 weather files.
- Energy Efficient Building Services: Mechanical and electrical systems will be designed to minimise energy use while maintaining high air quality. Measures include:
  - » Efficient use of natural light to reduce artificial lighting;
  - » Use of high-efficiency LED fittings with dimming, daylight sensing, and occupancy detection;
  - » A Lighting Management Plan in common areas to reduce unnecessary energy use;
  - » Elimination of fossil-fuel-based systems in favour of heat pumps and other low carbon heating technologies;
  - » Selection of Triple E-registered products to ensure high-performance, energy efficient installations.
- Renewable Energy Integration: Where technically and economically feasible, renewable energy solutions will be incorporated, such as roof-mounted photovoltaic (PV) arrays and heat pump systems, to offset primary energy use and further reduce emissions.
- Building Energy Rating (BER) Target: All residential units will be designed to achieve an 'A-rated' BER, ensuring high energy efficiency and offering future residents predictable, low operating costs and environmental assurance.
- Water Conservation and Management: The development will include a water-efficient design, utilising low-flow sanitary appliances (e.g. dual-flush toilets, spray taps), leak detection linked to the Building Management System (BMS), and measures to reduce potable water consumption.
- Sustainable Transport Infrastructure: The strategy encourages a modal shift away from private car usage by integrating access to public transport and active travel modes. EV charging infrastructure will be installed in accordance with Policy in CAP27 and Part L 2022 to support the transition to electric vehicles.
- Material and System Lifecycle Optimisation: A whole life-cycle approach will inform the selection of building materials and plant. Embodied carbon will be reduced through the avoidance of heavy or high-carbon components, minimisation of mechanical systems where possible, and careful selection of materials with strong environmental credentials. Low-GWP refrigerants with minimal leakage rates will be used to mitigate environmental impacts.

These identified measures will aid in reducing the impact to climate during the operational phase of the proposed development in line with the goals of the Climate Action Plan and the Cork City Development Plan 2022-2028 and Cork City Climate Action Plan 2024-2028.

In addition to the above, in relation to promoting a modal shift and more sustainable methods of transport, the proposed development is located in Ballincollig which is particularly well served by several existing bus routes which provide the area with regular public transport links to all areas of Cork City. Additionally, Ballincollig is included as a key location on one of the twelve new 'Sustainable Transport Corridors' in the Draft BusConnects Cork (STC Route E – Ballincollig to City) which in turn links with STC F Bishopstown to City.

Further, Transport Infrastructure Ireland (TII) also published the 'Emerging Preferred Route' for Luas Cork in April 2025 and an 8-week public consultation period was open until June 2025. The Emerging Preferred Route begins in Ballincollig and a single-track loop through Ballincollig connects Leo Murphy Road to Station Road to Main Street and back to Leo Murphy Road, at which point the arrangement changes to a more typical double-track configuration and continues eastwards towards the city centre. The Emerging Preferred Route identifies a potential future 'Killumney Road' Luas stop near Gaelscoil Uí Ríordáin, approximately 360 metres north of the subject site.

The publication of the 'Luas Cork Emerging Preferred Route' does not confirm TII's final preferred route for the Luas Cork project and the route may be subject to amendment following further assessment and rounds of public consultation.

Locating the proposed development in an area with connectivity to more sustainable transport methods will promote a modal shift away from private passenger cars which will benefit climate through a reduction in transport related GHG emissions.

12.7.2 Construction Phase Mitigation

Embodied carbon of materials and construction activities will be the primary source of climate impacts during the construction phase. In order to reduce carbon impacts from the proposed development, the use of alternative materials with lower embodied carbon emissions such as timber frame walls rather than traditional concrete block walls or concrete with a 50% recycled cement content for example will help to reduce the impact of the development on climate. Alternative material types with lower embodied carbon should be investigated during the detailed design phase of the proposed development.

Other mitigation strategies which should be considered as part of the Construction Environmental Management Plan include:

- Prevention of on-site or delivery vehicles from leaving engines idling, even over short periods.
- Appointing a suitably competent contractor who will undertake waste audits detailing resource recovery best practice and identify materials can be reused/ recycled.

- Ensure all plant and machinery are well maintained and inspected regularly.
- Minimising waste of materials due to poor timing or over ordering on site will aid to minimise the embodied carbon footprint of the site.
- Sourcing materials locally where possible to reduce transport-related CO_2 emissions.
- Target embodied carbon rates for detailed design (LETI, 2020).

In terms of impact on the proposed development due to climate change, during construction the Contractor will be required to mitigate against the effects of extreme rainfall/flooding through site risk assessments and method statements. The Contractor will also be required to mitigate against the effects of extreme wind/storms, temperature extremes through site risk assessments and method statements. All materials used during construction will be accompanied by certified datasheets which will set out the limiting operating temperatures. Temperatures can affect the performance of some materials, and this will require consideration during construction. During construction, the Contractor will be required to mitigate against the effects of fog, lighting and hail through site risk assessments and method statements.

Throughout detailed design and construction phase, guidance documents to inform with design detail decisions shall be reviewed e.g. the EU Commission *Technical Guidance on Adapting Buildings to Climate Change* (European Commission (2021a), LETI emergency design guide (LETI, 2020), and the latest IPCC report.

12.7.3 Operational Phase Mitigation

The proposed development has been designed to reduce the impact on climate as a result of energy usage during operation. These measures are outlined in Section 12.7.1 above as incorporated design mitigation. No further operational phase mitigation is proposed.

12.8 Residual Impact Assessment

12.8.1 Construction and Operational Phase

The impact to climate as a result of a proposed development must be assessed as a whole for all phases. The proposed development will result in some impacts to climate through the release of GHGs. TII reference the ISEP guidance which states that the crux of assessing significance is "*not whether a project emits GHG emissions, nor even the magnitude of GHG emissions alone, but whether it contributes to reducing GHG emissions relative to a comparable baseline consistent with a trajectory towards net zero by 2050*". The proposed development has proposed some best practice mitigation measures and is committing to reducing climate impacts where feasible and aligning with Ireland's net-zero by 2050 trajectory. As per the TII significance criteria in Table 12.3 the residual impact of the proposed development in relation to GHG emissions is considered minor adverse, this equates to a ***direct, long-term, negative*** and ***not significant*** climate impact.

In relation to climate change vulnerability, it has been assessed that there are no significant risks to the proposed development as a result of climate change. The residual effect of climate change on the proposed development is considered ***direct, long-term, negative*** and ***not significant***, which is overall ***not significant*** in EIA terms.

12.8.2 Cumulative Residual Impacts

With respect to the requirement for a cumulative assessment the ISEP (ISEP, 2022) and TII (TII, 2022a) guidance on which the assessment is based states that:

"*the identified receptor for the GHG Assessment is the global climate and impacts on the receptor from a project are not geographically constrained, the normal approach for cumulative assessment in EIA is not considered applicable. By presenting the GHG impact of a project in the context of its alignment to Ireland's trajectory of net zero and any sectoral carbon budgets, this assessment will demonstrate the potential for the project to affect Ireland's ability to meet its national carbon reduction target. This assessment approach is considered to be inherently cumulative*".

The traffic data used for the operational phase assessment included cumulative traffic from existing and permitted developments in the surrounding area. Therefore, this impact assessment is cumulative.

As per the above, the cumulative impact of the proposed development in relation to GHG emissions is considered ***direct, long-term, negative*** and ***not significant.***

12.8.3 Cumulative Impact of the Relevant Plan for the Area

The potential cumulative impacts of the relevant plan for the area, which is considered to be the Cork City Development Plan 2022, was assessed. The assessment of the potential impacts on the environment of the Cork City Development Plan 2022 was undertaken utilising the Strategic Environmental Objectives (SEOs) which are detailed in Table 5.1 of the CDP's Strategic Environmental Assessment. The potential cumulative impacts of the Plan were assessed having regard to these SEO's. Table 5.1 of the SEA identifies the SEO's for 'Climatic Factors' as being to.

- To minimise emissions of greenhouse gasses
- Integrate sustainable design solutions into the City's infrastructure(e.g. energy efficient buildings; green infrastructure)
- Contribute towards the reduction of greenhouse gas emissions in line with national targets
- Promote development resilient to the effects of climate change.
- Promote the use of renewable energy, energy efficient development and increased use of public transport.

Table 7.5 of the CDP's Strategic Environmental Assessment, 'Comparative Assessment of each of the Alternatives against Strategic Environmental Objectives' indicates that Alternative/Scenario 3 'Compact Liveable Growth', the 'Selected Scenario' has positive interactions with the status of the SEO's for 'Climatic Factors'.

12.9 Risk of Major Accidents or Disasters

As detailed in Section 12.5.3, climate change has the potential to alter weather patterns and increase the frequency of rainfall in future years. However, the potential for flooding on site has been reviewed and adequate attenuation and drainage have been provided for to account for increased rainfall in future years. All climate change related risks were categorised as 'low' as per Section 12.5.3.2.

12.10 Worst Case Scenario

Conservative assumptions have been made throughout the assessment. Specifically, as part of the GHG assessment, where specific materials were not available conservative equivalent material types were used instead. Additionally, in places, where exact material types were not known for the GHG assessment, the standard average material was assumed which can have a higher embodied carbon associated with it. Therefore, the assessment has been conservative in nature and is likely worst-case.

12.11 Interactions

Climate has the potential to interact with a number of other environmental attributes.

12.11.1 Land, Soils, Geology and Hydrology

The impact of flood risk has been assessed and the surface water drainage network will be designed to cater for increased rainfall in future years as a result of climate change. The effect of the interactions between climate and land, soils, geology and hydrology are *direct, short-term, negative* and *imperceptible* during the construction phase and *direct, long-term, negative* and *imperceptible* during the operational phase, which is overall *not significant* in EIA terms.

12.11.2 Air Quality

Air quality and climate have interactions due to the emissions from the burning of fossil fuels during the construction and operational phases generating both air quality and climate impacts. Air quality modelling outputs are utilised within the Climate Chapter. There is no impact on climate due to air quality. However, the sources of impacts on air quality and climate are strongly linked.

12.11.3 Traffic and Transportation

During the construction and operational phase, there is the potential for interactions between climate and traffic. Vehicles accessing the site will result in emissions of CO_2, a greenhouse gas. The effects of the proposed development on climate are assessed by reviewing the change in annual average daily traffic on roads close to the site. In this assessment, the effects of the interactions between traffic and climate are considered to be *direct, short-term, negative* and *not significant* during the construction phase and *direct, long-term, negative* and *not significan*t during the operational phase, which is overall *not significant* in EIA terms.

12.11.4 Waste

Waste management measures will be put in place to minimise the amount of waste entering landfill, which has higher associated embodied carbon emissions than other waste management such as recycling. The effect of the interactions between waste and climate are considered to be *direct, short-term, negative* and *not significant* during the construction phase and *direct, long-term, negative* and *not significan*t during the operational phase, which is overall *not significant* in EIA terms.

12.12 Monitoring

Monitoring and reporting of the embodied carbon in the construction phase will be conducted. The aim of monitoring will be to seek further ways to minimise climate impacts. Monitoring will include contractual obligations, in line with the most recent Climate Action Plan and sectoral targets, for the successful tenderer to ensure that the proposed development stays in line with updated aims. Commitments to monitor GHG emissions during the construction phase will also be secured through the final Construction Environmental Management Plan (CEMP). Monitoring will include embodied carbon of construction materials, water usage, power and fuel usage, and waste generation (including reuse and recycling rates). Where monitoring shows that the proposed development is not meeting its targets, further mitigation will be put in place.

Monitoring should also include reviewing potential for extreme weather events which may cause damage during construction. Contractors' Environmental Management System (EMS) will include measures to address risks during such events i.e. flooding

12.13 References

Civil Engineering Standard Method of Measurement (CESSM) (2013) Carbon and Price Book database.

Construction Industry Federation (2021) Modern Methods of Construction

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Government of Ireland (2025) Climate Action Plan (CAP) 2025

Government of Ireland Climate Action Plan (CAP) 2024

Government of Ireland Long-term Strategy on Greenhouse Gas Emissions Reductions (draft)

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Environmental Protection Agency (2020b) Research 339: High-resolution Climate Projections for Ireland – A Multi-model Ensemble Approach'

Environmental Protection Agency (EPA) (2021a) Critical Infrastructure Vulnerability to Climate Change Report No. 369

Environmental Protection Agency (2022) Guidelines on the Information to be Contained in Environmental Impact Assessment Reports

Environmental Protection Agency (2024a) National Climate Change Risk Assessment (NCCRA)

Environmental Protection Agency (2024e) Ireland's Climate Change Assessment Synthesis Report

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Environmental Protection Agency (2025c) Climate Ireland Data Explore - TRANSLATE Database

European Commission (2014) 2030 Climate and Energy Policy Framework

European Commission (2017) Environmental Impact Assessment of Projects: Guidance on the preparation of the Environmental Impact Assessment Report

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Government of Ireland (2019) Climate Action Plan 2019

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12.14 Chapter Appendices

Appendix 12-1 - Scheme Sustainability & Climate Resilience Statement - DOSA Consulting Engineers

CHAPTER THIRTEEN

POPULATION & HUMAN HEALTH

CHAPTER THIRTEEN

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CHAPTER 13 | Population & Human Health

13.1 Introduction

13.1.1 Chapter Author

This Chapter has been prepared by Harry Walsh, (BA HONS, Master of Regional and Urban Planning, MIPI), Director at HW Planning.

13.1.2 Chapter Context

The European Commission's 'Environmental Impact Assessment of Projects Guidance on the preparation of the Environmental Impact Assessment Report' 2017 specifies the following in relation to the assessment of population and human health.

> *"Human health a very broad factor that would be highly project dependent. The notion of human health should be considered in the context of the other factors in Article 3(1) of the EIA Directive and thus environmentally related health issues (such as health effects caused by the release of toxic substances to the environment, health risks arising from major hazards associated with the Project, effects caused by changes in disease vectors caused by the Project, changes in living conditions, effects on vulnerable groups, exposure to traffic noise or air pollutants) are obvious aspects to study. In addition, these would concern the commissioning, operation, and decommissioning of a Project in relation to workers on the Project and surrounding population."*

As noted in Figure 13.1 below, there are several inter-related environmental topics such as the potential impacts of the proposed development on air quality and climate, noise and vibration, water, traffic and access, construction and waste management, which are of intrinsic direct and indirect consequence to human health. While the baseline scenario for these environmental topics is not duplicated in this section, in line with the EPA guidance, the assessment of impacts on population and human health refers to those environmental topics under which human health effects might occur.

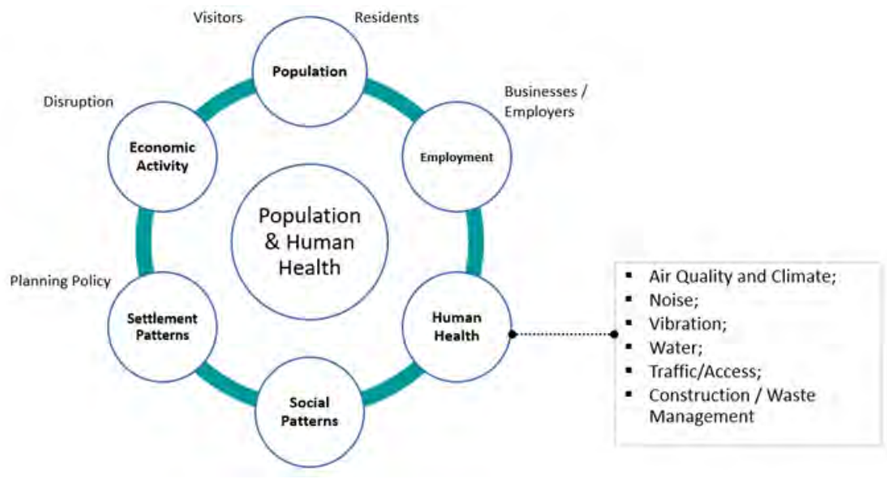


Figure 13.1 Potential Impacts on Population and Human Health

13.1.3 Assessment Methodology

This chapter of the EIAR document has been prepared with reference to the Guidelines on the information to be contained in Environmental Impact Assessment Reports, published by the EPA in 2022, as well as European Commission's 'Environmental Impact Assessment of Projects Guidance on the preparation of the Environmental Impact Assessment Report' 2017. A desktop study of the following published policy documents and data was undertaken to appraise the location and likely and significant potential impact upon population and human health receptors and to assess population trends in the subject site and in the wider hinterland:

- Central Statistics Office (CSO) Census 2011 & 2016 and 2022 data.
- Cork City Development Plan 2022-2028

This assessment is a study of the potential indirect and direct socio-economic impacts of the construction phase and the operational phases of the development. Effects on receptors were assessed in terms of magnitude, quality, significance and duration.

13.2 Description of Existing Baseline Environment

13.2.1 Demographics

13.2.1.1 Settlement Context and EIA Study Area

The study area for the Population and Human Health chapter has been defined to reflect the scale, location, and nature of the proposed Large-scale Residential Development (LRD), and to ensure that potential impacts, both direct and indirect, on human health and population can be comprehensively assessed.



Figure 13.2 EIA Study Area for Population and Human Health

In defining the EIA study area for this chapter a focused analysis of Census boundaries was undertaken, including both Electoral Divisions (ED) and Census Small Areas (SA) which are a sub-division of the ED units and generally cover 65-90 households. The study area has been defined as follows:

- Includes the smaller settlements, established and planned residential areas and employment areas served by the Urban Town of Ballincollig. This takes the form of a belt of urban areas built up along the R608 regional road.
- The area is largely delimited by the physical barrier of the River Lee to the north and the and N22/N40 Road to the south.
- Prior to Cork City Boundary extension in 2019 the traditional catchment area of the then County 'Main Town' of Ballincollig was all located within the administrative area of Cork County Council. This catchment now straddles the boundary of Cork City and County Councils, with the Urban Town of Ballincollig within the Cork City area. However, Ballincollig and its traditional catchment has remained a relatively discrete and self-contained area, and this is reflected in the study area in terms of population, urban amenities and services and employment.

The study area comprises of two Census 2022 Electoral Divisions (EDs); Ballincollig ED (Ref. 4701619) and Ovens ED (Ref. 4727019). These EDs have been chosen as they most accurately represent the functional urban area of Ballincollig. The population of this study area was 20,854 persons in the 2022 Census.

13.2.1.2 Population

Area	1991	1996	2002	2006	2011	2016	2022[1]	% Change 1991 - 2022
Ballincollig ED	12,562	13,760	15,119	16,308	17,989	18,621	20,538	+63%
Ovens ED	993	976	1,047	1,703	2,086	2,342	2,829	+185%
Cork City	178,716	184,502	191,277	195,478	200,373	210,853	224,004	+ 25.3%
Cork	410,369	420,510	447,829	481,295	519,032	542,868	584,156	+ 42.3%
State	3,525,719	3,626,087	3,917,203	4,239,848	4,588,252	4,761,865	5,149,139	+ 46%

Table 13.1 Historic Population Growth Trends –CSO Census Data 1991 - 2022

Given that the ED boundaries have changed in the most recent Census 2022, and that the SA data was only introduced in the 2011 Census, it is not possible to accurately present population change over time for the study area. However, it is possible to compare population change within the Ballincollig and Ovens area EDs which remain largely the same and provide an indication of the rate of population growth in the area. Over the 31-year period between 1991 and 2022, the EDs of Ballincollig and Ovens have experienced 63% and 185% population growth respectively. In contrast, Cork City experienced a 25.3% growth in population.

Percentage growth rates for County Cork and the State were 42.3% and 46% respectively. A primary driver of this significant population growth within the study area can be attributed to the development of new residential areas, such as at Heathfield, Woodfield, Highfield, Maglin View/Green, Cois Caisleán, Lisheen Woods and Bothar An Crann during this period.

01. 1 While this ED Boundary changed between 2016 – 2022 this figure based on CSO Table FP009 provides 2022 data for based on the 2016 ED boundary. The population for the 2022 ED boundary is 19,069.

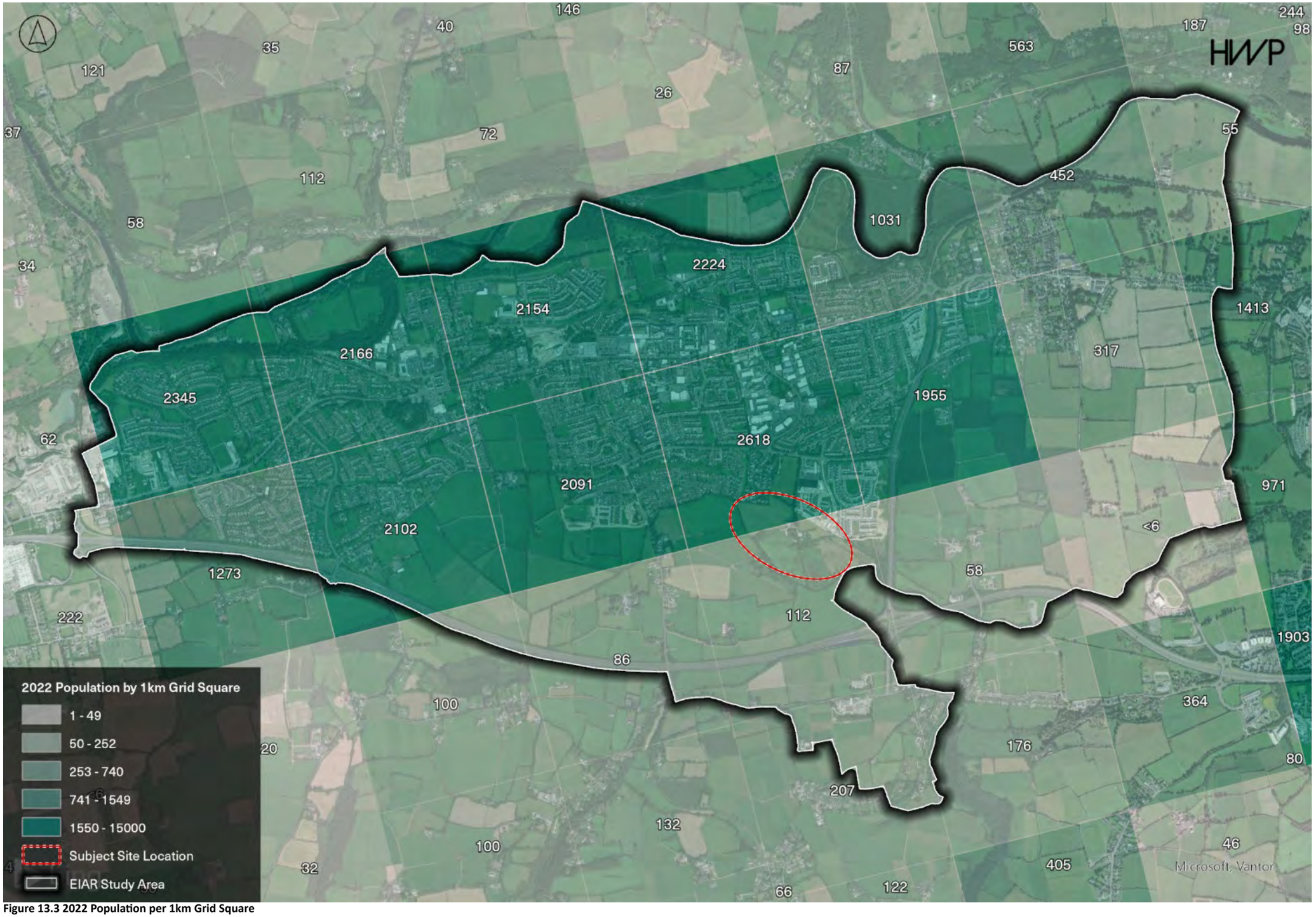


Figure 13.3 2022 Population per 1km Grid Square

The study area comprises mostly of the Urban Town of Ballincollig and its built-up footprint, including an area of largely open agriculture fields in arable and grazing use with interspersed rural housing to the south and east.

Figure 13.3 indicates that higher population densities are experienced in the central and western portion of the study area. This reflects the presence of the belt of residential and built-up areas of the Urban Town of Ballincollig. The highest population concentration, reflecting recent national policy for compact settlements, is within the newer development of Heathfield (2,618).

From Table 13.2 it can be seen that the study area demographic is generally in line with that of the Cork City Council area reflecting a national trend of an ageing population, declining birth rates, long life expectancy and low death rates. However, the population pyramid in Figure 13.4 indicates that, while the study area broadly reflects the overall age structure of Cork City, there are notable differences in the distribution of specific age cohorts. The study area has a younger population profile, with 28% of residents aged under 20, compared to 23% within the wider Cork City Council administrative area.

In contrast, older age cohorts are underrepresented within the study area, with those aged 70 and over accounting for 8% of the population, compared to 11% across Cork City. Conversely, Cork City Council displays a higher concentration of young adults, with 32% of its population aged 20–39, compared to 25% within the study area.

When compared with Cork County and national trends, the study area aligns more closely with the County and State profiles, particularly in its higher proportions of children and middle-aged adults. This suggests a more family-oriented population structure, in contrast to the younger adult–dominated profile of the Cork City Council area.

	Study Area	Cork City Council Area	Cork County Council Area	State
0 to 9 years	14%	11%	13%	12%
10 to 19 years	14%	12%	15%	14%
20 to 29 years	10%	16%	9%	12%
30 to 39 years	15%	16%	12%	14%
40 to 49 years	17%	14%	16%	15%
50 to 59 years	12%	12%	13%	13%
60 to 69 years	10%	10%	10%	10%
70 to 79 years	6%	7%	7%	7%
80 + years	2%	4%	4%	4%

Table 13.2 Census 2022: Population age group within study area, Cork City and Cork County and State

13.2.1.3 Households

The demographic profile of the study area indicates a strong presence of family households, including those with teenage and younger children. This is reflected in the average household size of 2.85 persons, which is higher than the corresponding averages for Cork City (2.6), Cork County (2.8) and the State (2.7).

Area	Number of Households	Population	Average Household Size
Study Area	7,308	20,803	2.85
Cork City and Suburbs	82,817	217,296	2.6
Cork County Council Administrative Area	127,971	356,714	2.8
State	1,841,152	5,046,681	2.7

Table 13.3 Average Household Size in the Study Area, Cork City and County and the State

The higher average household size figure within the study area reflects the higher percentages of households with children at pre-school, early school, pre-adolescent and adolescent family cycle stages within the study area, when compared with Cork City and State averages. Notable also is the fact that there are proportionately fewer pre-family, empty nest and retired households.

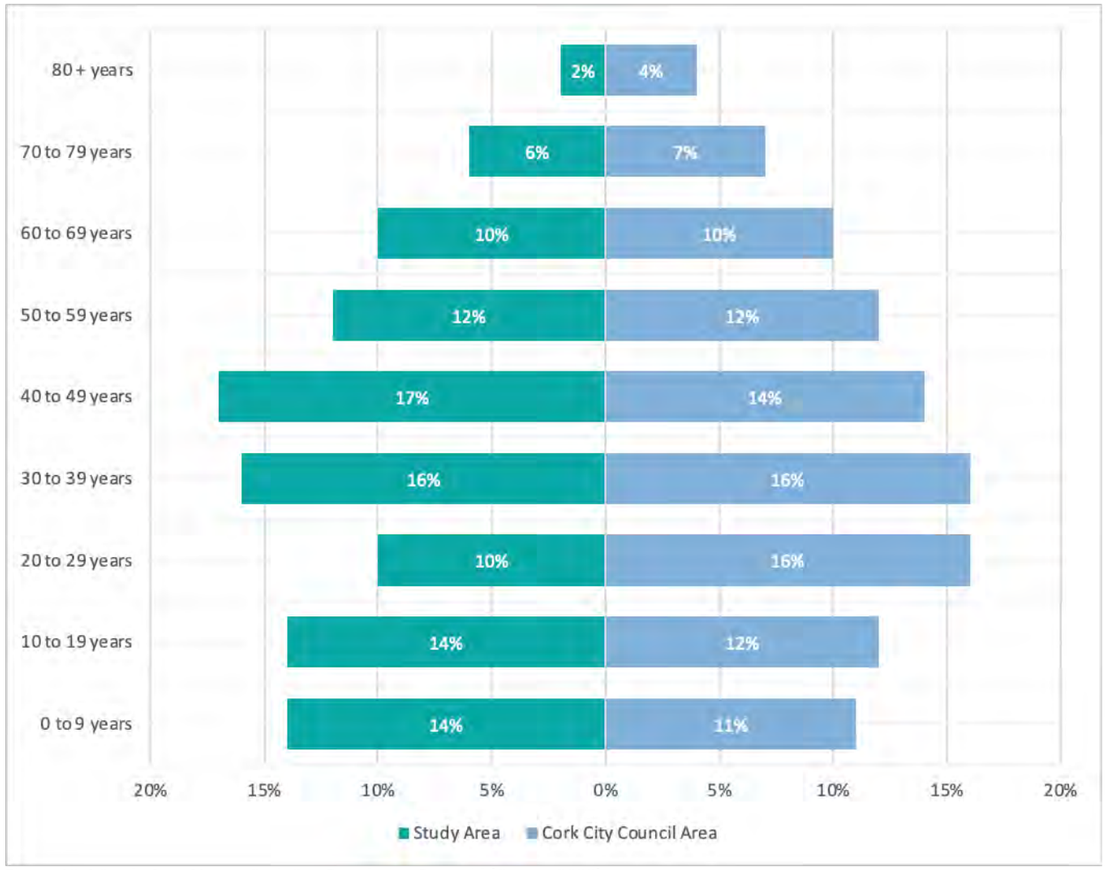


Figure 13.4 Study Area Versus Cork City Population Pyramid (Census 2022).

Family Cycle	Study Area	Cork City Council Area	State
Pre-Family	10.4%	12.9%	9.3%
Pre-School	10.2%	8.1%	8.1%
Early School	11.2%	9.2%	9.9%
Pre-Adolescent	13.5%	10.3%	11.9%
Adolescent	11.3%	10.7%	12.3%
Adult	25.3%	28.2%	27%
Empty-Nest	7.5%	8.4%	9.4%
Retired	10.6%	12.2%	12%

Table 13.4 Percentage of Population by Family Cycle Stage in the Study Area, Cork City and State

13.2.1.4 Travel Patterns

Table 13.5 below outlines travel mode statistics for commuting journeys to school, college and work. 72% of journeys use private motor vehicles, which is higher than the city and State averages. Conversely, fewer journeys are made using public transport and active modes of travel. These figures reflect the suburban nature of the study area.

Commute Mode	Study Area	Cork City and Suburbs	State
On-foot or Bicycle	12%	19%	15%
Public Transport	8%	9%	11%
Car, Motorbike, or Van	72%	56%	59%
Work From Home	9%	8%	7%

Table 13.5 Commuting Modes for Persons aged 5+ in the Study Area to Work, School or College

The Census POWSCAR data provides detailed information on commuter patterns between workers' places of residence and workplaces. While this has been captured for the 2022 Census the data is not publicly available. However, Cork City Council published the POWSCAR data from the 2016 Census in the Cork City Neighbourhood Profile Study, undertaken in support of the Development Plan Review Process.

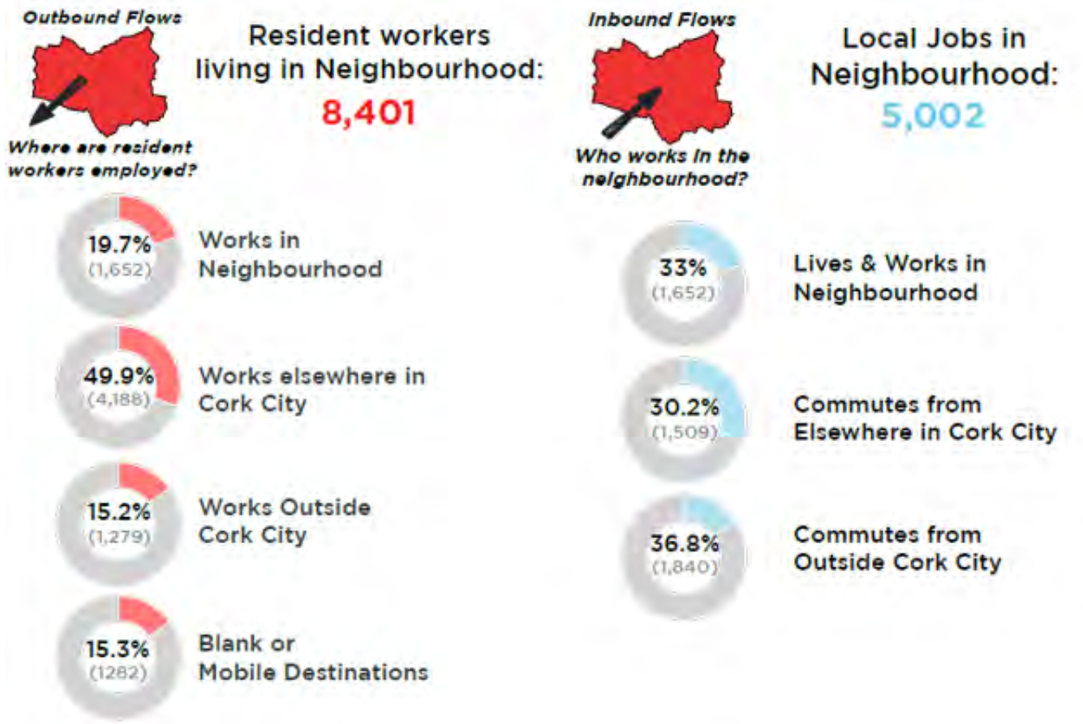


Figure 13.5 Commuter Flows in Ballincollig Neighbourhood – POWSCAR 2016 Data

Figure 13.5 is extracted from this study[2]. and indicates provides a detailed view of commuter flows in and out of the neighbourhood of Ballincollig at the time of the 2016 Census. There was a net outflow from the neighbourhood of 3,399 workers. Just 1,652 people lived and worked in Ballincollig (20% of the Ballincollig residents who were at work), whereas almost 50% commuted to work in the rest of Cork City. Conversely 67% of the jobs in Ballincollig were carried out by the 3,349 workers who commuted into Ballincollig from either the rest of the city or outside the city.

13.2.1.5 Employment

As noted in Figure 13.5 within the Ballincollig neighbourhood of the study area there were 5,002 jobs recorded in the 2016 Census and 8,401 resident workers, giving a job to worker ratio of 0.595, representing an overall outflow of workers. The jobs ratio is notably lower than that of the Cork City average in both 2016 and 2022 as would be expected of a rural/suburban area.

	Ballincollig Neighbourhood (2016)	Cork City and Suburbs (2016)	Cork City and Suburbs (2022)
Labour Force (A)	8,401	87,354	89,992
Number of Jobs (B)	5,002	102,139	113,067
Jobs Ratio (B/A)	0.595	1.169	1.256

Table 13.6 Jobs Ratio in the Ballincollig Neighbourhood 2016 and Cork City 2016 and 2022

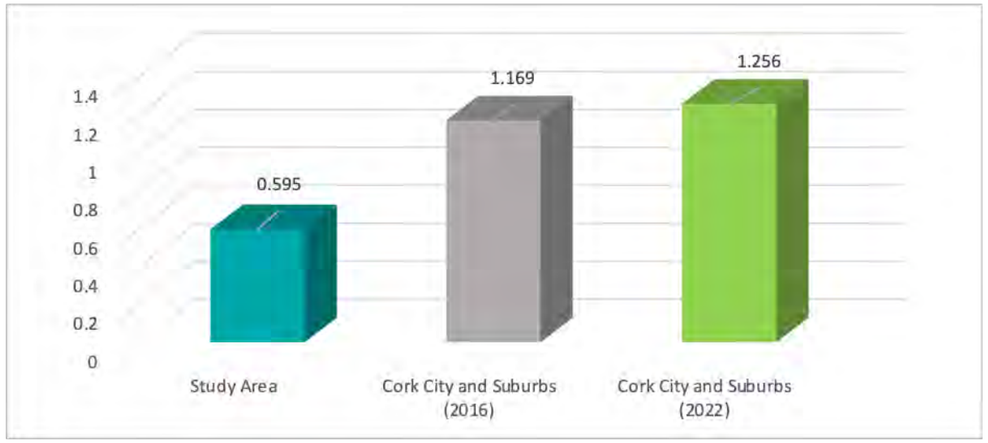


Figure 13.6 Jobs Ratio (Jobs to Resident Workers) 2016 and 2022

Residents in Area	At Work	Unemployed	Total Pop 15 year +	Labour Force	Labour Force Participation Rate
Study Area	9,952	454	16,296	16,296	61%
Cork City	103,249	8,991	186,939	112,240	60%
Cork County	161,174	10,452	283,550	171,626	61%
State	2,320,297	210,802	4,136,850	2,531,099	61%

Table 13.7 Labour Force Statistics – CSO F7005

Alongside this the 2022 Labour Force Participation Rate (the number of persons in the labour force expressed as a percentage of the total population aged 15 or over) in the Study Area was 61%, reflecting that of Cork City, County and State averages which were 60-61%.

13.2.1.6 Affluence and Deprivation

The Pobal Deprivation Index shows the level of affluence and deprivation at CSO 2022 Small Area level. The Index is calculated using ten metrics from the Census data. These include educational attainment, employment status and the numbers living in individual households (ref Figure 13.7). Almost 19,000 small areas (comprising 50-200 households) were indexed leading to the development of a detailed map of the relative affluence and disadvantage.

2 – Extracted from p223 of the Cork City Neighbourhood Profile Study, a Supporting Study for the Cork City Development Plan 2022

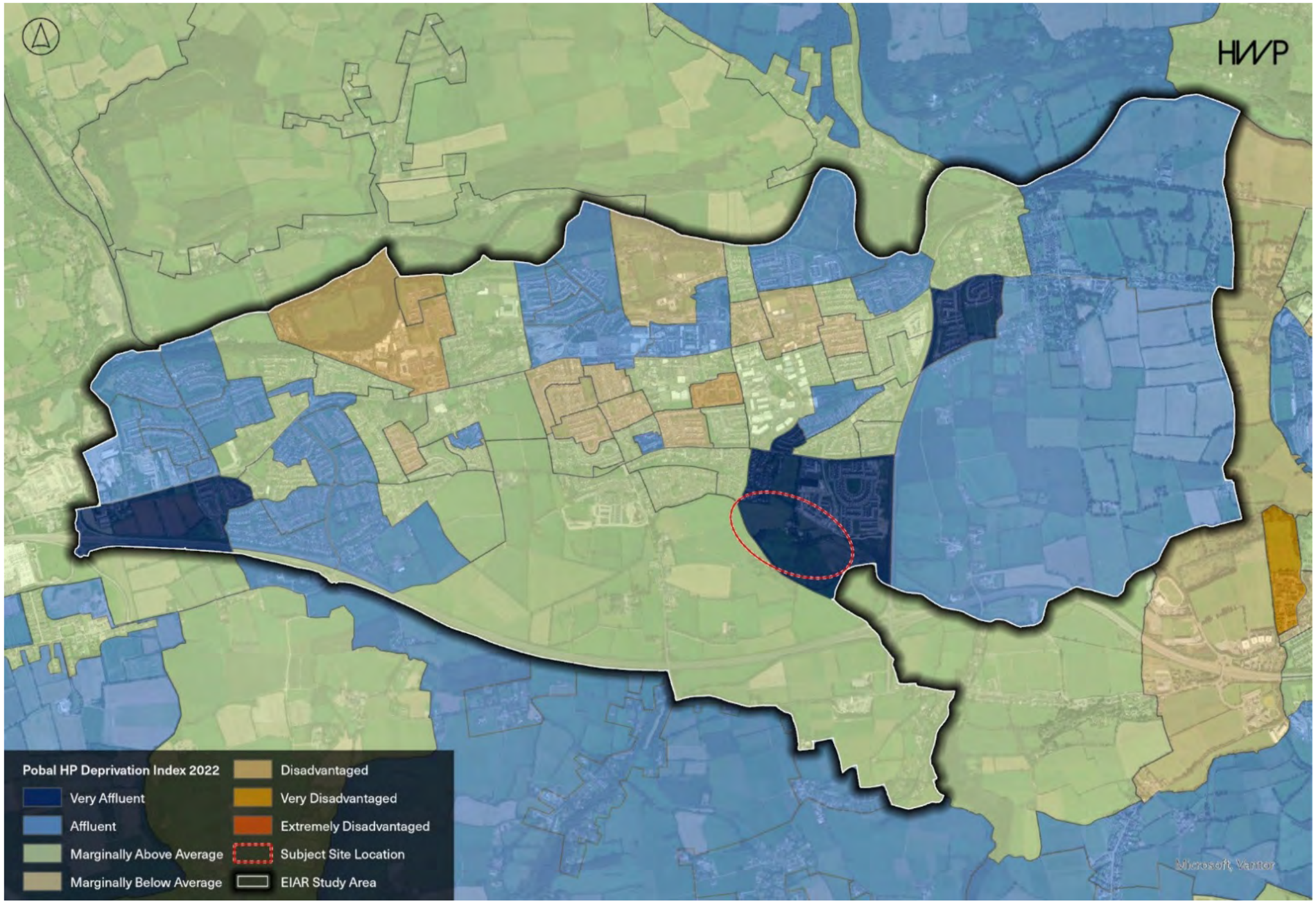


Figure 13.7 2022 Pobal Deprivation Index Indicators

An analysis of population distribution by deprivation category indicates that the study area is characterised by predominantly positive socio-economic conditions (Figure 13.7). Approximately 82% of the study area population resides within Small Areas classified as "Very Affluent", "Affluent" or "Marginally Above Average". A smaller proportion of the population (18%) is located within areas categorised as "Marginally Below Average" or "Disadvantaged", with just 4% of residents living in areas classified as "Disadvantaged". No population within the study area resides in areas identified as "Very Disadvantaged" or "Extremely Disadvantaged". Pobal[3] notes that disadvantage remains a spatially entrenched phenomenon and is disproportionately experienced in small pockets in Dublin city centre, north and west suburbs, on the outskirts of Cork, Waterford and Limerick and in a small number of rural towns. However, as noted in the study area, Pobal identifies that in the commuter belts surrounding Dublin, Cork and Galway, new housing developments are leading to new areas of affluence being recorded outside of traditional suburban areas.

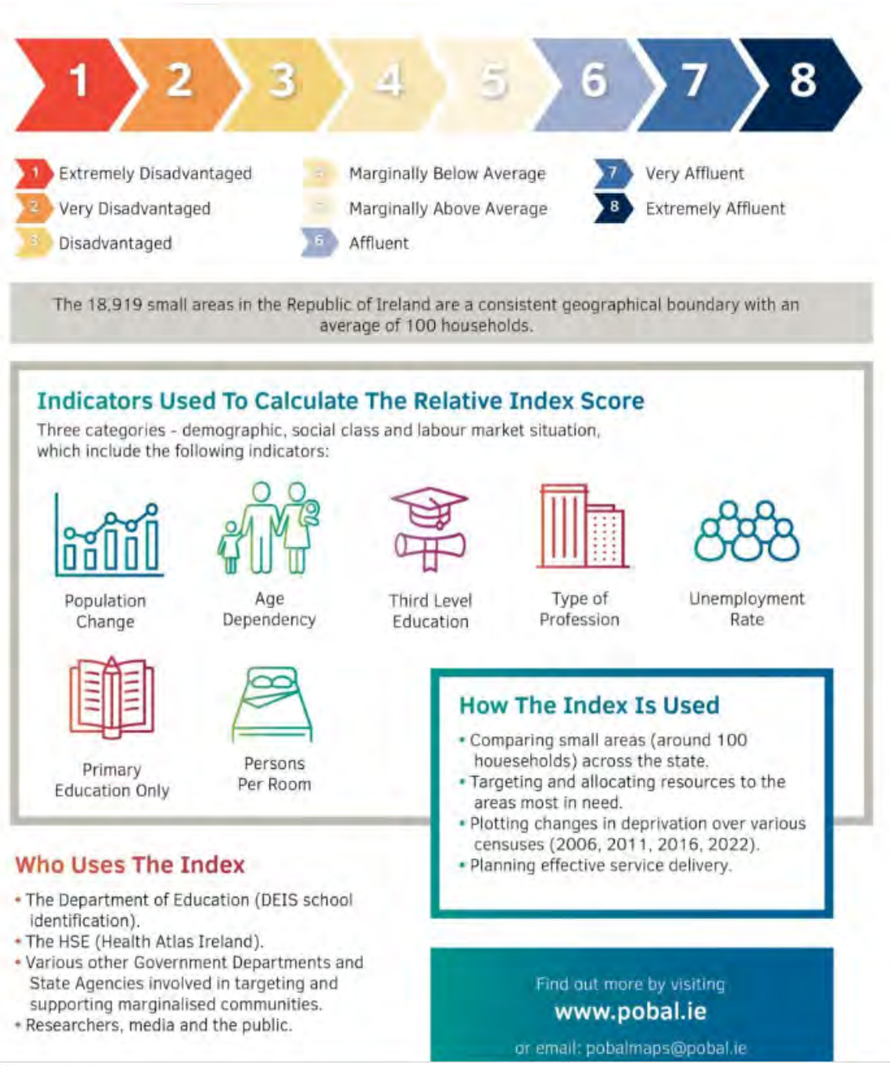


Figure 13.8 Affluency Index

13.2.1.7 Major Accidents/Seveso

The subject lands are not situated within or in close proximity to any designated Seveso/Major Accidents Establishments. A review of the Health and Safety Authority's list of upper and lower tier Seveso establishments confirms that the most proximate Seveso establishments are the Irish Oxygen Co. Ltd. (lower tier) site at Waterfall Road, Cork, approximately 2.6km to the south-east and the Grassland AGRO facility (upper tier) located on Carrigrohane Road approximately 3.3 kilometres north-east.

3 Presentation on 02/11/2023 by Martin Quigley, Director of Data and Analytics, Pobal

13.3 Community and Social Infrastructure

The existing community and social infrastructure assets in the local area has been identified in accordance with the categories outlined in the Table 13.8 below.

Category	Description
Amenity, Open Space and Sports	Parks, Playgrounds, Amenity Walks/Greenways, Pitches, Green Areas, Golf Courses, Sports Pitches, Sports Centres, Swimming Pools, Gyms
Childcare and Education	Childcare, Primary Schools, Post Primary Schools, Special Schools, Third Level Universities, Other Educational Institutions
Community facilities	Community Centres, Religious Facilities, Post Offices, Libraries.
Retail services	Supermarkets, Convenient Shops, Specialty Services, Restaurants/Take-aways, ATM, Petrol Station
Health	Hospitals, Health Centres, Clinics, Pharmacies, Addiction Services, GPs, Mental Health Services
Emergency	Fire Station, Garda Station
Public Transport	Bus and Train Routes

Table 13.8 Community and Social Infrastructure Categories

In general, the defined study area for this chapter was used for the purposes of assessing the community and social infrastructure serving the area of Ballincollig. However, where specific social infrastructure types have established catchments, as is the case with schools[4], these have been used instead.

13.3.2 Amenity, Open Space and Sports

The study area and its surrounding areas are well served by a variety of recreational, amenity and sporting facilities. The area benefits from the presence of the Ballincollig Regional Park, a strategic recreational and amenity asset to the wider city which includes a skate park, multi-use games area and playground. The proximity to the Lee River to the north provides opportunities for water-based recreation with the Inniscarra Sailing and Kayaking Centre located to the north-west of the study area and the National Rowing Centre located beside Farran Wood and Zipit Forest Adventure, about 8 km to the west of the study area. In addition, the Lee Walk Forest Park and Lee River Walk provide riverside amenity areas, with the Curragheen Amenity Walk and Kilumney Park adding to the recreational options.

There is a wide variety of sporting facilities and organisations in the area including Ballincollig GAA, Ballincollig Soccer Club, Lakewood AFC, Dripsey GAA and Ballincollig Rugby Club and Éire Óg GAA Clubs. Other sports clubs in the area include Ballincollig RFC, Cork City FC, Lakewood Sports & Social Club and UCC Sports Grounds Curaheen to the east of the study area. There is a range of golf related facilities including: Driving Ranges in Inniscarra and Killumney, Ranges Pitch & Putt and Lee Valley Golf Club.

There are also several gyms, yoga and leisure facilities in the area including the Talbot Hotel, which also has a swimming pool, RB Fitness Adventure Centre and the Yoga Den. Local heritage amenity sites include St Senans Abbey and Kilcrea Castle and Friary. In addition to the facilities provided in the Regional Park children's recreational facilities also include the Ballincollig Playground at Innismore, Murphy's Farm and The Reel Cinema. Other important local amenities include the Curraheen Park Greyhound Stadium and Greenfields Allotments.

4 School demand is nationally planned based on Department of Education and Youth school catchments

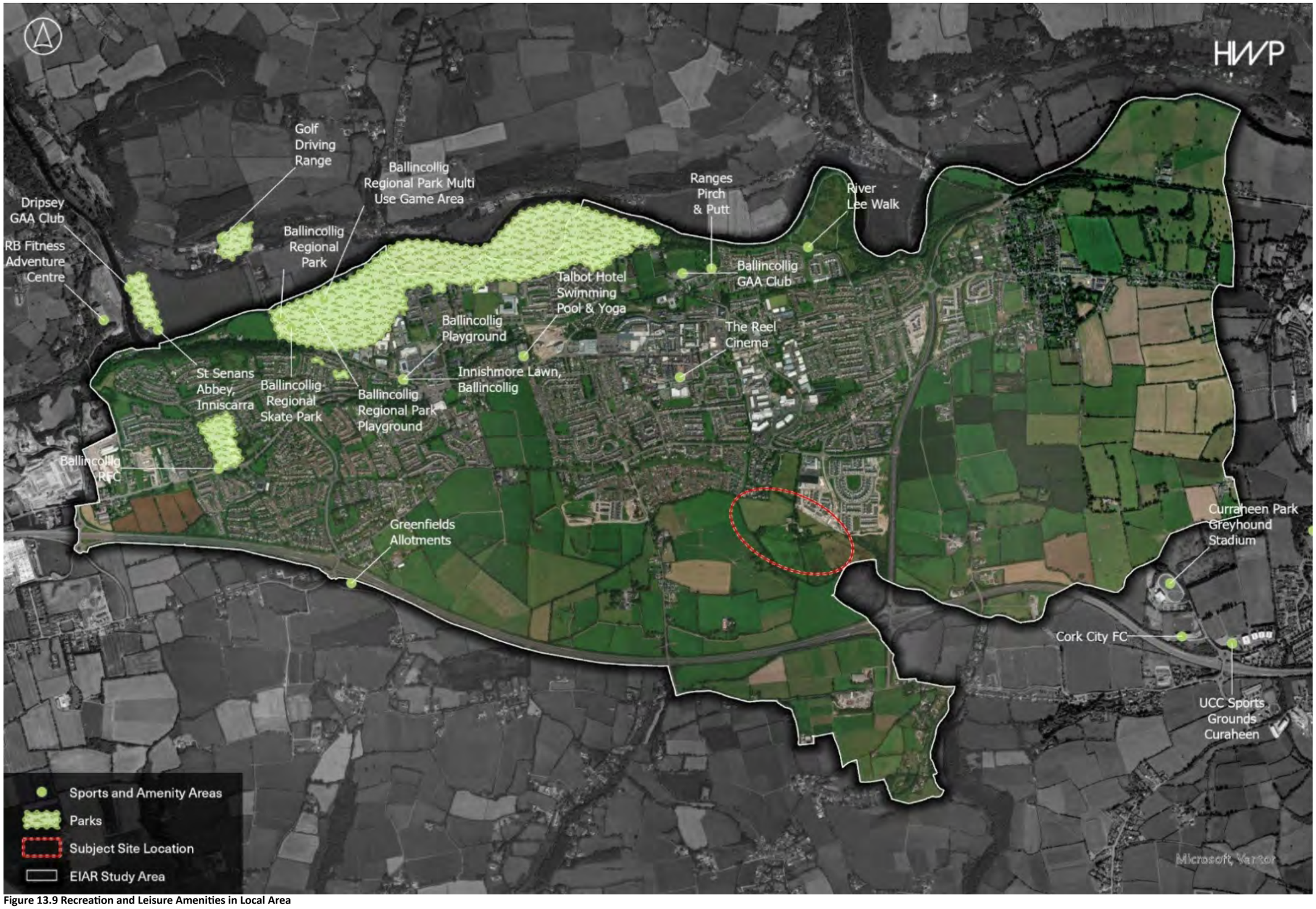


Figure 13.9 Recreation and Leisure Amenities in Local Area

13.3.3 Childcare and Education

13.3.3.1 Primary Schools

The application is supported by a Schools Demand Assessment prepared by HW Planning (included as Appendix 13.1). This assessment is based on the established Department of Education and Youth School Planning Area for Ballincollig rather than the EIA Study Area. An overview of the primary schools within the School Planning Area is provided in Table 13.9. The information in Table 13.9 was obtained from a review of the Primary schools' enrolment figures 2024/2025/2026 database of the Department of Education and Youth[5].

School	Address	2024/2025 Enrolment	2025/2026 Enrolment
Cloghroe Mixed N S	Cloghroe	519	537
Gogginshill N S	Goggins Hill	223	227
Clogheen Mxd N S	Kerry Pike	169	181
Ovens N S	Knockanemore	442	466
S N Naomh Eoin B	Station Road	391	352
Scoil Naomh Mhuire C	Ballincollig	447	437
S N Baile Nora	Ballynora	307	328
Scoil Barra	Innishmore	448	449
Gael Scoil Ui Riordain	Carraig an Earra	731	724
Gaelscoil An Chaisleáin	Cumann Rugbaí Bhaile an Chollaigh	205	205* (500) [6]
Total		3,882	3,906 *(4,201)

Table 13.9 Summary of Existing Primary Schools in Study Area

In total there are 3,906 no. primary school places in the School Planning Area. Although the development of a School Campus at Lisheens to permanently accommodate Gaelscoil An Chaisleáin is progressing which will increase that school's enrolment from 205 students to 500 primary students at the new school site. Once this is delivered there will be 4,201 primary school places within the area.

13.3.3.2 Existing Post-Primary/Secondary Schools

Post-primary schools by their nature are generally of a larger scale with fewer located within each School Planning Area and more inflow and outflows between areas. This is particularly so given Ballincollig's location within Cork City and proximity to other education service areas in the western suburbs of the city and the City Centre. Good public transport connectivity with the City Centre, presents existing residents of Ballincollig with a greater selection of post-primary schools than many comparable areas. However, for consistency and the purposes of this assessment, only the post-primary schools within the School Planning Area have been assessed. An overview of the post-primary schools within the study area is provided in Table 13.10. The information in Table 13.10 was obtained from a review of the Post-Primary schools' enrolment figures 2024/2025/2026 database of the Department of Education and Youth.

It indicated that in total there are currently 2,598 no. post-primary school places in the School Planning Area. Again, the development of a School Campus at Lisheens to permanently accommodate Le Chéile students is progressing which will increase that school's enrolment from 254 students to 1,000 post-primary students at the new school site. Once this is delivered there will be 3,344 post-primary school places within the area.

School	Address	2024/2025 Enrolment	2025/2026 Enrolment
Ballincollig Community School	Ballincollig	980	987
Coláiste Choilm	Ballincollig	1,364	1,357
Le Chéile	Ballincollig	195	254 (1,000)*[7]
Total		2,539	2,598 (3,344)*

Table 13.10 Summary of Existing Secondary Schools in Study Area

The location of existing primary and secondary schools in the area are identified in Figure 13.10. All of these facilities are situated within approximately 15 minutes driving distance from the subject site.

13.3.3.3 Potential Future Schools

In the Cork City Development Plan 2022-2028 (CDP), in addition to the 15 acre site at Lisheens, Ballincollig where the planned school campus is to be located, there are two further sites zoned for educational use within the Maglin Urban Expansion Area, as identified in Figure 13.9. It is planned that these two sites will accommodate two new primary schools and one new secondary school to serve the area.

13.3.3.4 Special Schools

Our Lady of Good Counsel School, Innishmore Drive, Ballincollig, Cork, is a special primary school within the defined study area. According to the enrolment figures database of the Department of Education and Youth it had 68 no pupils attending in the 2025/2026 academic year.

Other Special Schools in the wider area include.

- St Gabriels Special School, Murphy's Farm, Curraheen Rd., Bishopstown, with 54 pupils enrolled

The Marvel Club, based in Westcourt, Ballincollig operates as a social club and support centre for children with special needs. Similarly, the Field of Dreams and the Enable Ireland Lavanagh Centre, both located in Curraheen, immediately to the east of the study area, offer special needs support services.

5 https://www.gov.ie/en/collection/primary-schools/

6 The development of a School Campus to accommodate Gaelscoil An Chaisleáin is progressing that will make provision for 500 primary students at this new school site. It is expected that planning permission will be lodged for same in 2026.

7 The development of a School Campus to accommodate Le Cheile is progressing that will make provision for 1,000 secondary students at this new school site



Figure 13.10 Existing Schools in the School Planning Area

The School Demand Assessment considers that the Ballincollig SPA is well serviced by the existing and proposed primary and secondary school provision. It notes that the 2022 Census figures indicate a decline in the pre-school age cohort since the 2016 Census, which reduced from 2,243 children in 2016 to 2,194 children in 2022.

Although, there was a slight increase in primary school enrolments between the 2024/25 and 2025/26 academic years, this reduced pre-school age population will likely result in a decline in future primary school enrolments. The Department of Education and Youth's projection[8] is that primary school enrolment peaked nationally in 2018. A minor reversal in this trend was evident in 2022 due to increased inward migration, including enrolments of Ukrainian pupils who arrived since the crisis began. However, a continuous decline in new enrolments is now expected until 2036. Given the decline in the pre-school population evident in the 2022 census in Ballincollig, it is reasonable to expect the primary-school figures will fall as projected.

While there was a slight increase evident in the secondary school enrolment figures between the last two academic years, the Department of Education and Youth predicts that nationally enrolment in secondary level establishments is set to decrease after a peak in 2024/2025, indicating a lag before the pattern currently exhibited nationally in the primary school enrolments is evident in post-primary schools. While Ballincollig is a designated strategic growth area it experienced relatively modest growth since the last census. The planned school campus in Lisheens will have an overall capacity to accommodate 1,500 students. Additional lands in the Maglin Urban Expansion Area have been zoned for educational use to make provision for the continued future growth of this area, which is planned to accommodate two new primary schools and a new secondary school.

13.3.3.5 Third Level Institutions

There are no third level institutions such as colleges or universities with the study area. However, given Ballincollig's location in the western environs of Cork City, both University College Cork (UCC) and Munster Technological University (MTU) (formerly Cork Institute of Technology) are both within approximately 15-20 minutes journey time by frequent public transport and between 15 – 30 minutes journey time by bicycle.

13.3.3.6 Childcare

In addition to the proposed childcare facility in this application, there are also several other existing and permitted childcare facilities in the study area. The Planning Authority will note that MOS also recently submitted a separate LRD for a project of 544 no. units at Greenfield, Ballincollig. Cork City Council planning reference 25/44048 refers (Greenfield LRD). During consultations with Cork City Childcare in advance of submission of the Greenfield LRD and the proposed Carriganarra LRD, Cork City Childcare provided a list of early year providers in the wider area. In addition, a review of the Tusla Childcare Register of Early Years Services by County (February 2026) and Tusla Inspection Reports was carried out to ensure the assessment was up-to-date. Based on this information and including a review of recent permissions in the study area it appears there are approximately 1,041 no. available childcare places across 16 no. childcare facilities in the study area.

Typically, attendances at childcare facilities can fluctuate significantly given the time of year with lower attendances likely during summer holidays and school mid-term breaks etc. The Cork City Childcare submission stated that across their study area only 2 no. of the identified 1,048 available places at the time were available.

It should be noted that one additional creche has been granted planning permission since 2020 in the study area which is not yet operational:

> **Ref. 24/43308** – for a 120 space creche off Maglin Road, Ballincollig. This creche may replace a 40- 50 space creche permitted under application ref 23/42446 (Cork City Council).

8 Based on the Department of Education and Youth publication in 2025 - 'National Projections of fulltime enrolment Primary & Post-Primary Level 2025/26 – 2044/45'

The delivery of this permission would increase the childcare spaces within the study area by 120 spaces. A Childcare Needs Assessment prepared by HW Planning accompanies this application (included here as Appendix 13-2). Given the proposed provision of a 100 capacity creche as part of the subject application it concludes that the proposed development will not cause any undue pressure on the existing and planned childcare facilities. This is particularly so in the context of the decline in the pre-school age population cohort within the study area in the last intercensal period.

Map Ref	Ref No.	Facility Name	Address1	Town	Age	Capacity	Places Available
1	TU2015CC423	The Willows Montessori	The Willows	Cork	2 - 6 years	22	2
2	TU2015CC204	Kindercare Childcare	Unit 5	Ovens	0- 6 years	190	0
2	TU2015CC204	Kindercare Childcare	Unit 5	Ovens	4 - 12 years	22	0
3	TU2015CC295	Naionra na n'Óga - Lighthouse Centre	Unit 3a The Link Road Business Park	Ballincollig	3 - 6 years	12	-
4	TU2015CC093	Child Vision Pre-School	c/o Guide Dogs	Ballincollig	2 - 6 years	11	0
5	TU2015CC182	Positive Ideas T/A Highcare Childcare	Caisleaín Drive	Ballincollig	0- 6 years	160	0
5	TU2015CC182	Positive Ideas T/A Highcare Childcare	Caisleaín Drive	Ballincollig	4-12 years	60	0
6	TU2025CC009	Cocoon Childcare	Heathfield	Ballincollig	0- 6 years	118	0
7	TU2015CC089	Cheeky Cherubs Early Years Schools - Ballincollig	Highfield Park	Ballincollig	0 - 6 years	108	0
7	TU2015CC089	Cheeky Cherubs	Highfield Park	Ballincollig	4- 10 years	24	0
8	TU2015CC188	Innishmore Family Resource Centre	Innishmore	Ballincollig	2 - 6 years	68	0
9	TU2015CC281	Na Seoda Oga	Ballincollig Community Hall	Ballincollig	2 - 6 years	38	0
9	TU2015CC281	Na Seoda Oga	Ballincollig Community Hall	Ballincollig	4 - 12 years	25	0
10	TU2015CC374	Spraoi Pre-school	9 The Paddocks	Ballincollig	2 - 6 years	19	0
11	TU2015CC076	Brothers of Charity Early Intervention Services	2 Glincool Drive	Ballincollig			-
12	TU2016CC015	Rainbow Rascals Montessori School	22 Hawthorn Ave	Ballincollig	2 - 6 years	11	0
13	TU2015CC142	Eileen's Playschool	8 Glincool Drive	Ballincollig	2 - 6 years	22	0
14	TU2015CC033	Ballincollig Early Years Pre-School	The Village Centre	Cork	2 - 6 years	54	0
15		Sherpa Kids	Gaelscoil an Chaisleáin	Ballincollig	4 - 12 years	48	0
16	TU2015CC271	Ballincollig Montessori School	85 Beech Rd., Muskerry Estate	Ballincollig	2 - 6 years	29	-
Total Spaces						1,041	2

Table 13.11 Existing Childcare Services in the Study Area (informed by Cork City Childcare Submission Information and Tusla data)



Figure 13.11 Existing Community Facilities in the Study Area

13.3.4 Community Facilities & Emergency Services

Due to its traditional service function as a Main Town in the County before becoming an Urban Town within the City, Ballincollig contains a wide-range of community-oriented facilities. These comprise a cluster of community facilities including Family Resource Centres at both Ballincollig and Innishmore, with Foróige based in Ballincollig Community Hall and Scout Hall. The town has several churches, banks, credit union, a post office, a library, a fire station and a garda station. There is an Age Action service and a number of elder care homes located in the town, and the Westgate Housing Project provides sheltered housing for the elderly. There is a Cork City Council Office and Regional Training Centre also located in the area. The previously referenced local sports clubs and schools form focal points of the local community and serve as key community assets. The study area benefits from its location proximate to Cork University Hospital, in the western suburbs of the city.

13.3.5 Retail

Due to its strategic designation as an 'Urban Town' in the Cork City Development Plan 2022, Ballincollig provides for a wide range convenience, and comparison retail facilities. These include a range of units along Main Street and within the Ballincollig Shopping Centre, West Village Shopping Centre, Westpoint Trade Centre, Westpoint Business Park and Link Road Business Park. The study area also includes a some retail outlets at Hobb's Yard, Waterfall to the south.

Supermarkets in the study area include Aldi, Tesco, Lidl, Dunnes Stores and Supervalu amongst a wide variety of retail opportunities. There is also a broad range of cafes, restaurants and pubs in the area which support the local daytime and nighttime economies and typifies the self-contained nature of the settlement.



Figure 13.12 Existing Retail Outlets in the Study Area

13.3.6 Healthcare

The Urban Town of Ballincollig includes a range of local healthcare services and facilities for the surrounding area. Ballincollig provides a Primary Care Centre, several General Practitioner services, pharmacies, dentists, physiotherapists, chiropractors, opticians and chiropodists, counselling/mental health services as well as holistic practitioners.

There are also a number of nursing homes in the study area according to HIQA's records[9], specifically.

- Rosenalee Care Centre – Ballincollig (Capacity 66 residents),
- Powdermill Nursing Home - Ballincollig (Capacity 40 residents),
- Ballincollig Community Nursing Unit, Ballincollig (Capacity 100 residents)
- Norwood Grange Care Home, Waterfall (Capacity 30 residents)
- Bons Secours Care Centre and Village/ St Josephs, Lee Road (Capacity 103 residents).

9 https://www.hiqa.ie/find-a-centre



Figure 13.13 Existing Healthcare Facilities in the Study Area

13.3.7 Public Transport

Ballincollig is particularly well served by several existing bus routes which provide the area with regular public transport links to all areas of Cork City. As tabulated in Table 13.12, Ballincollig Urban Town and strategic growth location is reflected in the settlement being one of the best served areas of the City in terms of public transport provision, with the 220 route offering a 24 hour service to the City Centre. The majority of bus services (220, 220X and 233) run along the Ballincollig Main Street, though the 233 also serves Carriganarra Raad/Station Cross to the south of the settlement, in proximity to the Maglin Urban Expansion Area. The 40 route travels along the N40 national road to the south, with a stop in Curraheen at the Maryborough Hospice Site, along the western periphery of the study area. The 208 service, a high frequency bus route also serving the hospice and City Centre, is not included in Table 13.12 however as the route is tangential to the study area.

Route No.	Route	Via	Frequency	Route Operating	No. of Services Daily
220/220	Ovens (EMC) - Crosshaven	Ballincollig, Mode; Farm Road, UCC, City Centre, Douglas, Maryborough Hill, Carrigaline.	Mon-Fri (Peak): Service every circa 15 mins. Weekends Service every 15 mins.	24-hour route	Mon-Fri: 78 no. services. Sat: 65 no. services Sun: 63 no. services
220X	Ovens to Crosshaven via South Mall	Ballincollig, Carrigrohane Road, City Centre, Douglas, Maryborough Hill, Carrigaline.	Mon-Fri (Peak): Service every circa 60 mins Weekends Service every 60 mins.	Mon-Fri: 6.50am – 23.20pm. Weekends 7.20pm – 23.20pm	Mon-Fri: 13 no. services. Sat: 13 no. services Sun: 0 no. services
233	Cork to Macroom and Ballingeary	Ballincollig, Ovens, Killumney, Crookstown.	Mon-Fri (Peak): Service every circa 60 mins Weekends Occasional Service.	Mon-Fri: 7.25am – 22.30pm. Weekends 7.10pm – 22.30pm	Mon-Fri: 14 no. services. Sat: 6 no. services Sun: 3 no. services
40	Tralee - Rosslare	Cork – Waterford	Mon-Fri (Peak): Service every circa 60 mins Weekends Service every circa 60 mins	Mon-Fri: 6.15am – 17.50pm. Weekends 6.15am – 17.50pm.	Mon-Fri: 11 no. services. Sat: 11 no. services Sun: 9 no. services

Table 13.11 Existing Bus Services in Study Area[10]

Ballincollig is included as a key location on one of the twelve new 'Sustainable Transport Corridors' in the Draft BusConnects Cork (STC Route E – Ballincollig to City' which in turn links with STC F (Bishopstown to City). The BusConnects New Network for the Cork Metropolitan Area envisages that the bus service along the STC E corridor will have a 7.5m to 10 minute frequency, almost doubling the existing 15 minute frequency of the 220 route. In addition, a 30 minute frequency service will run along Carriganarra Road, similarly doubling frequency of the existing 233 route.

The Cork Metropolitan Area Transport Strategy (CMATS) 2040 envisages a Light Rail Transit for Cork with terminuses in Ballincollig and Mahon and serving the City Centre. The Luas Cork – Preferred Route Public Consultation closed on the 9th of June 2025. This includes a single track loop around Ballincollig, with 4 potential Luas stops, one along Killumney Road and Carrignarra Road and two along Main Street. Once BusConnects and the Cork Luas are fully realised, the Ballincollig to City Centre Corridor will benefit significantly from a high frequency public transport service.

10 www.buseireann.ie



Figure 13.14 Existing Public Transport Services in the Study Area

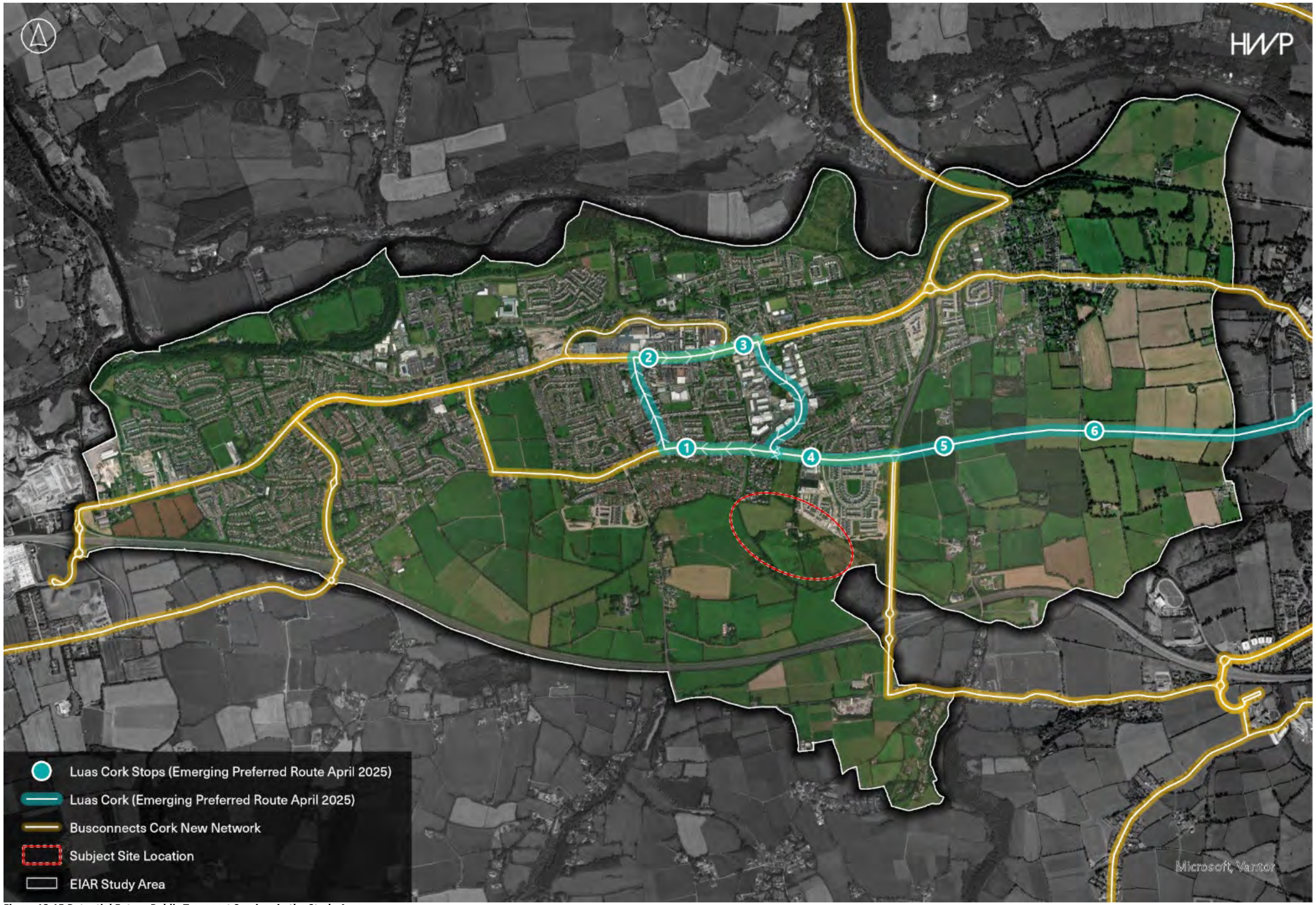


Figure 13.15 Potential Future Public Transport Services in the Study Area

13.4 Impact Assessment

13.4.1 Do-Nothing Scenario

In the 'do nothing' scenario, the subject lands will remain undeveloped and there will be no additional impacts on population and human health factors. The development of the BusConnects and the Cork Luas plans will progress. Over time it is considered the do-nothing scenario will result in the inefficient use of serviced lands, which are identified for strategic growth, being part of the Maglin Urban Expansion Area in the Cork City Development Plan 2022. It will also represent a missed opportunity to integrate land use and transport planning and maximised the benefit from the infrastructural investment in the LRT.

13.4.2 Impacts on Population and Human Health

13.4.2.1 Construction Phase

It is envisaged that the works will be carried out in phases over a period of circa 5 years. Therefore, there will be some overlap between operational and construction traffic journeys. Chapter 4 of this EIAR considers that with appropriate mitigation the potential impacts on the safety or operation of the road network will be negligible during the construction phase. The construction methods employed, and the hours of construction proposed will be designed to minimise potential impacts to nearby residents and on the operation of nearby road junctions. Construction of the proposed development will be implemented in accordance with the CEMP and CTMP which are included in Appendices 2-1 and 2-2 of this EIAR. These documents describe a suite of mitigation measures to be implemented and monitored during the construction phase of the development.

It is expected that the construction workers will travel from their existing residence rather than taking temporary accommodation in the local area. Impacts are likely to be associated with construction traffic and possible nuisances associated with construction access requirements. The mitigation measures identified in the CEMP and CTMP, will minimise traffic and transportation impacts on the locality and minimise the numbers of HGV's and construction related vehicles accessing the site. It is predicted that the residual traffic and transportation impacts of the proposed construction phase will be negative, short-term, and not significant with respect to human health.

As described in Chapter 3 of this EIAR (Landscape and Visual) the construction phase of the development will require the erection of site hoarding, demolition, site clearance and levelling, haulage and storage of materials, general construction activity and the incremental growth of buildings on site. It is noted however that the proposed development would largely retain the site's key landscape elements/features, the hedgerows and hedgerow trees.

The magnitude of landscape change would be greatest in the immediate environs (e.g. the adjacent roads and nearby houses), reducing with distance from the site and site clearance works. The landscape sensitivity of the receiving environment is classified as 'low-medium' overall, with sensitivity across the 8 viewpoints ranging from one low viewpoint sensitivity at VP 1 (Southern roundabout of N22 and N40 Junction 1 intersection) with the remaining 7 viewpoints classified as medium. Care has been taken with the design to minimise landscape impacts from these more sensitive viewpoints. Arising from this approach Chapter 3 considers that the significance of the temporary visual effects at the 8 viewpoints during the construction phase ranges from 'Imperceptible/neutral' on the viewpoint from Limeworth (VP6 and 7) to 'moderate / negative' from places along The Meadows, Heathfield (VP 3 and 4) to the north of the subject site.

While the construction phase is likely to result in these short term, negative landscape impacts for the duration of the construction phase, these will be relatively localised to the site and the immediate vicinity. The adoption of standard best practice construction site management and the retention of the majority of hedgerows and certain trees on the site will mitigate these short-term negative impacts. The site is situated within an evolving developmental context with the construction ongoing at the permitted Stonecrest Phase 1 and Phase 2 and Heathfield Phase 4 residential developments reflecting a changing landscape context in the vicinity of the lands. It is concluded that the residual impacts of the proposed construction phase will be negative, short-term, and slight to imperceptible with respect to the visual impact on residents in the vicinity of the proposed development.

Chapter 5 of the EIAR, assess the potential impacts on human health by the implementation of services and utilities. Potential negative impacts on existing services such as water, communications, electrical infrastructure may occur to existing local services arising from connection works for the proposed development. The Chapter concludes however, that with the implementation of the proposed mitigation measures, the residual impacts on material assets will be short term and slight during the construction phase.

As detailed in EIAR Chapter 6 (Land, Soils and Geology), in the absence of appropriate mitigation measures, potential moderate negative construction related impacts affecting human health include contamination of soils through construction activity from spillages. However, with the mitigation measures proposed being enforced to reduce and/or avoid these potential impacts, and to address any potential waste soil management issues it is predicted that any interactions with population and human health considerations will be not significant, localised and temporary/short term in duration during the construction phase.

As detailed in EIAR Chapter 7 'Water (Hydrology & Hydrogeology)', with the proposed mitigation and monitoring measures adopted, it is predicted that any impacts on water quality, impacting human health, arising from the construction works will be localised, temporary in duration and not significant during the construction phase.

Chapter 10 of this EIAR prepared by AWN Consulting assesses the potential impacts of noise and vibration during the demolition and construction phase. A range of noise and vibration monitoring has been identified during the demolition and construction phase to ensure the construction and vibration thresholds are not exceed at the closest receptors. Overall, no significant noise and vibration impacts are predicted during the construction or operational phases of the proposed development or cumulative development.

As described in Chapter 11 of the EIAR the most significant interactions are between Population and Human Health and Air Quality. An adverse air quality impact during the construction phase can cause health and dust nuisance issues. There is a low risk of dust-related human health impacts during the construction phase of the proposed development. Best practice mitigation measures will be implemented during the construction phase to ensure that the impact of the proposed development complies with all ambient air quality legislative limits. Therefore, the predicted impact is direct, short-term, negative, localised and not significant with respect to Population and Human Health during the construction phase.

As predicted in Chapter 12 of the EIAR, 'Climate', there is potential for an increase in greenhouse gas emissions to atmosphere during the construction of the development. However subject to the adoption of the recommended mitigation measures, climatic impacts corresponding to human health will be direct, long-term, negative and not significant.

13.4.2.2 Operational Phase

Once constructed, the proposed development will be permanent and non-reversible. The proposed development will result in several significant long-term and permanent positive impacts for the local population including.

- The proposed development will provide a diverse range of housing and apartments which will positively serve all aspects of the current housing and rental markets and address the current accommodation shortage in the Metropolitan Cork Area.

- The proposed development will contribute towards the delivery of the long-held Council objective for the development of the Maglin Urban Expansion Area. This will result in the creation of a more compact settlement and assist in providing a critical mass of population to support planned strategic public transport investment, alongside local services and the local economy.
- The proposed development will deliver a portion of the Maglin Sustainable Access Corridor in accordance with Cork City Council strategic vision for the servicing of the wider Maglin Urban Expansion Area.
- The proposed pedestrian and cycling connectivity enhancements being delivered within the proposed scheme will enhance accessibility to active travel and recreational infrastructure for the locality.
- The proposed layout provides for landscaped open space areas throughout the site, including adjacent to the proposed creche facility and a linear park along the northern site boundary. This will assist in achieving positive 'place-making' and 'on-site' services for future residents and surrounding areas.

As detailed in EIAR Chapter 3 (Landscape and Visual), the potential overall landscape impact of the operational phase of the proposed development has been classified as 'positive'. Given the high-quality design of the scheme, comprehensive mitigation/replacement planting measures and the urbanising landscape character of the area it is considered these changes to the receiving environment are not inappropriate and offset by enhancements to the public realm. The delivery of the section of the Greenway/Linear Park along the northeastern perimeter of the subject site will not only serve as a valuable amenity for existing residents of the wider area but also as a high-quality visual amenity for future residents and to the scheme. The sites public open space, amenity and connectivity strategies will provide for attractive natural spaces for the local population contributing to significant, positive and permanent interactions with population and human health.

Chapter 4 of this EIAR (Material Assets - Traffic & Transportation) confirms that the overall residual impact during the construction phase of the proposed development on traffic and transportation, after the implementation of the identified mitigations measures, will be neutral (i.e. short term and not significant). With the delivery of the planned new roads and upgrades to existing roads within the Maglin Urban Expansion Area it is anticipated that the performance of these junctions will be further improved. It is also anticipated that BusConnects will be delivered prior to the operational phase of the proposed development, resulting in a modal shift towards walking, cycling and public transport and leading to a reduction in dependency on private car single-occupancy use. This will also result in improvements in the performance of the junctions. In view of the above Chapter 4 considers that with the implementation of appropriate mitigation the overall impact on the local population arising from increased traffic congestion during the operational phase of the proposed development will be long term and slight.

As detailed in Chapter 5 of this EIAR (Material Assets – Services, Infrastructure & Utilities) the operational phase of the proposed development will result in the increase of generation of effluent and sanitary waste and result in the increase in water demand and service infrastructure. Irish Water have confirmed that will be sufficient capacity to accommodate the proposed development and it is predicted that residual impacts on human health will be neutral following the implementation of the stated mitigation and monitoring measures.

Chapter 6 (Land, Soils and Geology), states that with the mitigation measures proposed being enforced to avoid the potential for subsidence arising from stormwater, and the potential risk of contamination arising from spillage and leaks it is predicted that the potential impact on population and human health will be imperceptible.

Chapter 7 (Water (Hydrology & Hydrogeology)) of this EIAR, notes that with the implementation of the recommended mitigation measures, which have been incorporated into the site design, no increased flood risk is predicted elsewhere in the catchment. No significant impacts on groundwater are identified. Therefore, in terms of potential impacts on population and human beings, it is anticipated that any operational phase negative impacts on surface water quality will be imperceptible, localised and temporary and potential impact of groundwater/aquifers to be imperceptible, localised and permanent.

As detailed in EIAR Chapter 10 (Noise & Vibration), in the context of the existing noise environment, the overall contribution of traffic is not considered to pose any significant impact to nearby residential locations. The resulting residual effect is neutral to negative, imperceptible to not significant, and long-term.

Chapters 11 (Air Quality) notes that vehicles accessing the site will emit pollutants which may impact air quality and human health. However, the increased number of vehicles associated with the proposed development will not cause a significant change in air pollutant emissions in the locality. It has been assessed that emissions will be in compliance with the ambient air quality standards which are set for the protection of human health. Impacts will be long-term, localised, direct, negative and not significant.

Chapter 12 (Climate) considers the impact of the proposed development on climate change. The operational phase of a mixed-use residential development emits CO^2 through vehicular traffic into and out of the development and energy usage within the buildings. As evidenced by 2022 census information in Figure 13.5, Ballincollig's inward commuter flows are disproportionately car-dependant. The proposed development represents the concentration of growth on an undeveloped site within walking/cycling distance of this Urban Town that is a significant employment hub. The public realm upgrades proposed will promote sustainable commuting patterns and reduce car dependency and overall CO^2 emissions. Energy reduction measures from the buildings also forms a significant potential source of emissions. All buildings however are designed in compliance with the NZEB building regulations enforcing energy reductions of 70% and CO^2 reduction of 60% and mitigating the overall potential effects of the operational phase of the proposed development. It concluded that the residual climatic impacts on human health will be direct, long-term, negative and not significant.

13.4.3 Impacts on Local Economy and Retail

13.4.3.1 Construction Phase

The duration of the construction phase is likely to result in moderate, short term positive impacts to the local economy. Construction workers will avail of local retail outlets and food establishments for refreshments in mornings and lunchtimes in particular. Supplies and materials for proposed construction works may also be supplied locally further resulting in positive impacts on the local economy. The construction phase will also provide for both direct and indirect construction related employment opportunities.

13.4.3.2 Operational Phase

The proposed development will result in moderate, permanent and positive impacts on the local economy. The 2022 Census indicates that the average household size the study area is approximately 2.85 no. persons per household. The proposed development of 300 no. dwellings will accommodate approximately 855 no. persons. The projected increase in population of Ballincollig will create additional demand for local retail and service provision, providing increased local employment opportunities. The proposed development will provide a diverse range of housing and apartments which will serve all aspects of the current housing market and address the current housing shortage in the Metropolitan Cork Area.

The location of the proposed creche facility will provide a communal node focused close to the central open space area at the heart of the scheme, to meet the needs of the area's growing population.

13.4.4 Impacts on Amenity, Open Space and Sports

13.4.4.1 Construction Phase

It is predicted that the proposed development will result in slight, negative short-term impacts on amenity, open space or sports facilities during the construction phase. The subject lands are in private agricultural use and are not publicly accessible. As detailed in the CEMP prepared by DOSA Consulting Engineers, earthworks will occur which will necessitate the removal of a number of existing trees from the site, resulting in some potential slight, short-term, negative visual impacts.

13.4.4.2 Operational Phase

Once operational, the projected increase in population may result in some short-term, slight negative impacts relating to an additional demand for the use of local amenities, open spaces and sports facilities. However, as described in Section 13.3 in this chapter, Ballincollig and the defined study area is well equipped with sufficient facilities to serve the existing and proposed population and benefits in particular from the presence of the Ballincollig Regional Park. Local sports clubs and centres such as Ballincollig Soccer Club, Ballincollig GAA, Drispsey GAA, Éire Óg GAA, Ballincollig RFC, Cork City FC, Lakewood Sports and Social Club, Ranges Pitch & Putt, Lee Valley Golf Club, Inniscarra Sailing and Kayaking Centre will likely benefit from increased volunteers and participation resulting in increased membership and financial/social benefits.

The proposed development provides for the delivery of part of the proposed greenway route (BC-GW2) as set out in the Cork Cycle Network Plan which will comprise a two-way cycle track along the proposed Western and Eastern Link roads to the north of the proposed site.

The proposed development also provides for retaining significant areas of hedgerow and replacement and additional tree planting in publicly accessible amenity areas, public open spaces and public realm which will result in significant permanent and positive impacts to the visual and amenity context of the settlement. The public realm upgrades including the proposed Greenway through a linear park along the northern boundary of the site will all positively contribute to walking and cycling in the area. It is concluded that the proposed development will result in significant, long-term, positive impacts on amenity, open space and sports provision in the area.

13.4.5 Impacts on Childcare and Education

13.4.5.1 Construction Phase

Childcare and Education

In the absence of appropriate traffic management and mitigation measures, the construction phase may result in some short-term, slight, negative impacts for the Gaelscoil Uí Ríordáin on Carriganarra Road, Cocoon Childcare at Heathfield and Eileen's Playschool off Maglin Road. Potential impacts include additional traffic congestion at drop-off/collection times, however given the distances involved there is limited risk of noise and dust emission impacts. The CEMP and CTMP prepared by DOSA Consulting Engineers details a suite of construction management and mitigation measures including procedures for the co-ordination of deliveries to ensure that vehicular movements occur at off-peak times where possible and not during drop-off and collection times of the school or childcare facility. It is concluded that the impacts of proposed construction phase will be not significant and neutral and not significantly negatively impact the operations of any existing schools or childcare facilities in the area subject the specified mitigation measures as described in the CEMP and CTMP being implemented.

13.4.5.2 Operational Phase

Childcare

The proposed development provides for a two storey 100 no. space childcare creche facility in a north-eastern area of the site, adjacent to the main proposed public open space/linear park.

The creche will benefit from pedestrian and cycle connections throughout the site, promoting both accessibility and safety for future users. The proposed creche will result in a significant, positive, long-term impact, as the proposed creche will not only cater for the childcare needs of the proposed development but also the wider Ballincollig areas.

Given the above, the Childcare Needs Assessment prepared by HW Planning (included here as Appendix 13-2) concludes that the proposed development will not cause any undue pressure on the existing and planned childcare facilities. This is particularly so in the context of the decline in the pre-school age population cohort within the study area in the last intercensal period.

Schools

A School Demand Assessment has been prepared for the proposed development (re. Appendix 13.1). The assessment is based on the Dept. of Education and Skills Schools Planning Area (SPA) rather than the EIA study area as this is the established catchment type used for such assessments. The demographic breakdown by school-going age cohort provided in Table 13.13 differs from that provided in Table 13.2 as this is based on the wider SPA and the age categories are different to the 10 year interval used in Table 13.2.

School Cohort	Ballincollig SPA (%)	Cork City (%)	County Cork (%)	State (%)
Pre-school (0-4 year olds)	2,194 (7%)	5%	6%	6%
1y School (5-12 year olds)	3,926 (12%)	9%	12%	11%
2y School (13-18 year olds)	2,709 (8%)	7%	9%	8%

Table 13.12 2022 Census Data for Pre-school, Primary and Secondary School Age Cohorts – in the Ballincollig School Planning Area

From this it can be seen that within the Ballincollig SPA, 7% of the population are of pre-school age, 12% are of primary school age and 8% are of secondary school age.

Of the proposed 300 no. residential units, 45 no. units (15%) are 1 bedroom units and are considered less likely to generate a demand or school places. It is also acknowledged that it takes a time period of multiple years for residential developments to become established and that the development will initially be occupied by younger couples, young professionals and empty nesters. Due to this, it is envisaged that demand initially will be primarily for childcare services and as the development becomes more established demand for primary and secondary will increase.

However, for the purposes of this assessment, the 'worst case scenario' has been assessed. According to 2022 Census figures, 12% of the study areas resident population is of primary school age (4-12 years) with approximately 8% of the population of secondary school age (13-18 years). Given the average household size in the wider study area is approximately 2.85 persons per household, the population uplift generated from the proposed 300 no. units would be circa 855 no. people. Taking the

conservative figure based on all the units and the more realistic figure based on the exclusion of the 1 bedroom units the following school age population ranges are anticipated to be generated by the proposed development:

- An additional circa 87 - 103 no. children (12%) of primary school age, and
- An additional circa 61 - 68 no. children (8%) of secondary school age in future years.

Projections from the Department of Education and Youth estimate that enrolment levels in schools will decrease in the coming years, initially in primary schools and subsequently in post-primary schools. The Department of Education and Youth[11] published the 'National Projections of fulltime enrolment Primary & Post-Primary Level 2025/26 – 2044/45 (2025) which outlines various scenarios of future intake for both primary and post-primary schools. The report demonstrates that primary school enrolment peaked in 2018 and following a minor reversal in this trend in 2022 reflecting the enrolment of Ukrainian pupils, a continuous decline in new enrolments is expected until 2036.

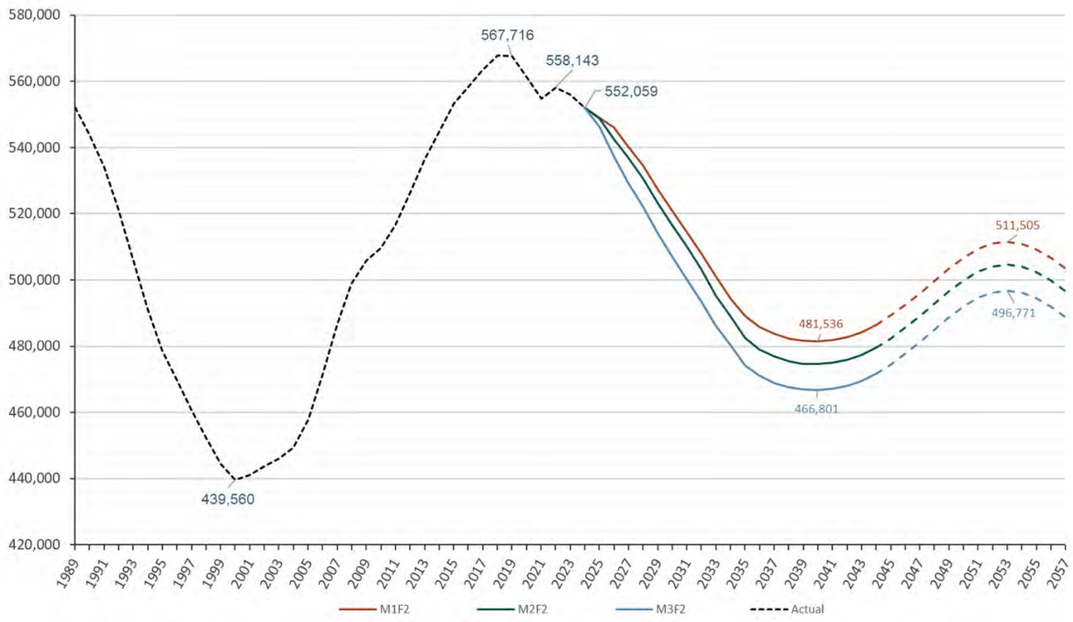


Figure 13.16 Past and projected enrolments (M1F2) in primary schools, 1989/90 – 2057/58[12]

This projection is in line with the census data in Table 13.13 (extracted from Table 04 of the Schools Demand Assessment, which shows that despite a 12% population increase in the area there was a 2% decline in the pre-school age cohort between 2016 and 2022.

Age	2016	2022	% of Population in 2022	% Change 2016 - 2022
0-4	2,243	2,194	7%	-2%

Table 13.13 Pre-school Population in Ballincollig School Planning Area 2016 – 2022 Census

Post-primary school enrolment is not envisaged to peak until 2024/2025. Similar to trends for primary schools, a continuous decline in post-primary enrolment is then expected until 2036.

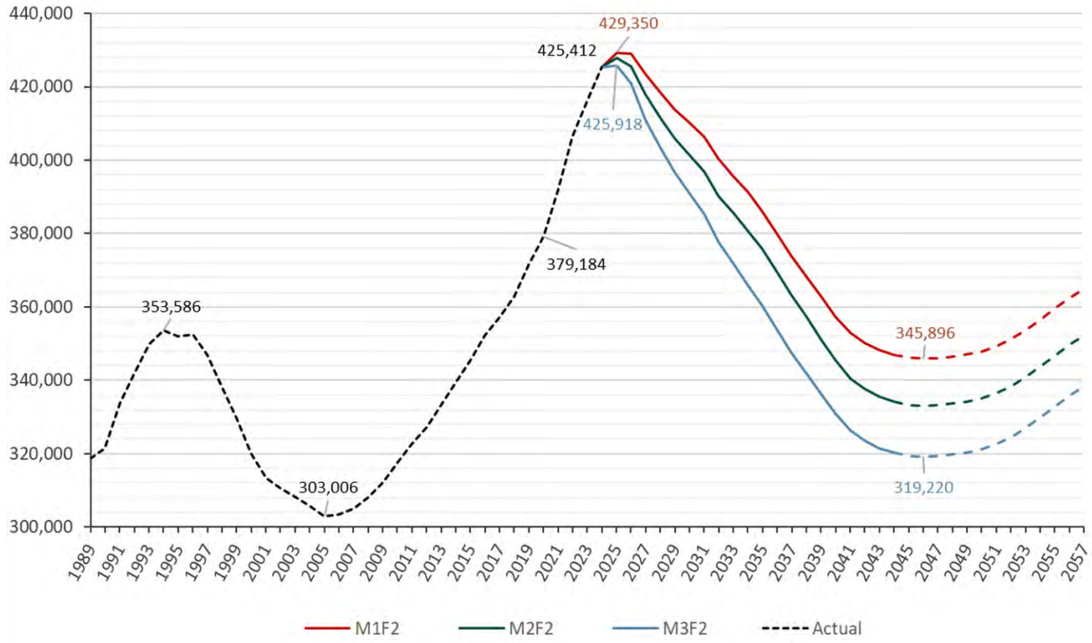


Figure 13.17 Past and projected enrolments (M1F2) in post-primary schools, 1989/90 – 2057/58 [10]

In advance of preparation of this LRD and EIAR, HW Planning contacted the Department of Education and Youth to query if there were any comments regarding the proposed development. At the time of preparation of this EIAR, no response was provided by the Department of Education and Youth.

The School Demand Assessment (Appendix 13.1) provides a capacity assessment for both primary and secondary level schools within the Ballincollig SPA. Based on 2025/2026 enrolment data and planned school provision, including the planned relocation of Gaelscoil An Chaisleáin to a 500-pupil capacity facility and Le Chéile Secondary School to a 1,000-pupil capacity facility, the existing and planned capacity for primary schools in the study area is 4,201 no. places, while for secondary schools the figure is 3,344 no. places.

11 Previously called the Department of Education

12 (Source: 'National Projections of fulltime enrolment Primary & Post-Primary Level 2025/26 – 2044/45', Department of Education and Youth)

	Primary School	Secondary School
School-Age Population in Ballincollig SPA (2022 Census)	3,926	2,709
Potential Demand Generated by Proposed Development	87 – 103	61 – 68
Cumulative Demand from Permitted/Under Construction Projects	231 – 274	154 – 183
Cumulative Demand from Projects Under Assessment	317 – 397	211 – 264
Total Aggregate Future Demand	4,561 – 4,700	3,135 – 3,224
Existing and Planned Capacity (2025/2026 Enrolments)	4,201	3,344
Surplus / (Deficit) – Existing and Planned Capacity	(360) – (499)	120 – 209
Additional Capacity from Zoned Education Sites	1,000	1,000
Existing and Planned Capacity incl. additional zoned lands within Maglin UEA	5,201	4,344
Surplus – Including Magline UEA Zoned Sites	501 – 640	1,120 – 1,209

Table 13.14 School Capacity Assessment for the Ballincollig Schools Planning Area

As demonstrated in Table 13.15, when the proposed development is considered in isolation, existing and planned capacity is sufficient to accommodate the projected demand at both primary and secondary level. When cumulative developments are factored in, including those which are permitted and under construction as well as those currently under assessment by Cork City Council and An Coimisiún Pleanála, a deficit of between 360 and 499 no. primary school places is identified, while secondary school capacity remains in surplus (between 120 and 209 no. places). It is important to note that a significant proportion of this cumulative demand arises from developments which have not yet been permitted, including a 1,150 no. unit scheme (Ref. 25/44222) which is currently being assessed by Cork City Council. When projects under assessment are excluded, the cumulative primary school deficit reduces considerably.

Furthermore, the Cork City Development Plan 2022-2028 identifies a further two sites for educational use within the Maglin Urban Expansion Area, in addition to the 15-acre site at Lisheens where the planned school campus is to be located. Based on the planned capacity of comparable new school facilities in the area (500 no. pupils for primary and 1,000 no. pupils for secondary), the delivery of schools on these zoned sites would provide an estimated additional 1,000 no. primary school places and 1,000 no. secondary school places. When this additional planned provision is taken into account, a surplus of between 501 and 640 no. primary school places and between 1,120 and 1,209 no. secondary school places is identified, demonstrating that there is sufficient capacity to accommodate the cumulative demand arising from all identified developments in the study area. It is also noted that some outflows from the Ballincollig SPA catchment to the wide range of schools available in nearby Cork City and its suburban areas are to be expected and have not been factored into the above calculations, meaning the actual demand on schools within the study area is likely to be lower than estimated.

In view of the existing and planned capacity, the additional zoned education sites, and the projected future decline in student numbers, the potential school place demand generated by the proposed development, both in isolation and on a cumulative basis, would be unlikely to cause any undue pressure on school capacity in the Ballincollig School Planning Area.

13.4.6 Impacts on Community Facilities

13.4.6.1 Construction Phase

Without appropriate mitigation measures, some noise/dust pollution and traffic congestion may occur, which could result in some slight, short -term, negative impacts on local community uses. However, due to the nature of the uses/operations of the neighbouring community uses and the effective implementation of suite of mitigation measures proposed in the CEMP, any impacts will be short-term, neutral and imperceptible.

13.4.6.2 Operational Phase

Once operational the proposed development will likely result in an increased demand for local community services such as the local post office, community centre, churches and banks amongst other similar uses. The proposed development provides for various public open spaces, play areas, creche and the amenity asset of the proposed Greenway and linear park serving as community assets to future occupiers of the development. It is predicted that that the operational phase will result in permanent, slight, neutral impacts on community facilities in the area.

13.4.7 Impacts on Health Services

13.4.7.1 Construction Phase

The subject site is not in immediate proximity to the nearest health outlet/service, therefore it is envisaged that the construction phase of the development will result in neutral, imperceptible and short-term impacts.

13.4.7.2 Operational Phase

Once operational, the population increase generated by the proposed development will result in increased demand for local healthcare services, particularly in the Ballincollig area. Given the wide variety of medical facilities in the study area, including a Primary Care Centre and the predicted demographics of the proposed scheme it is considered that the proposed development will result in permanent, neutral, and imperceptible impacts on local health services.

13.4.8 Impacts on Emergency Services

13.4.8.1 Construction Phase

The Garda Station is not located in proximity to the proposed development therefore no impacts are anticipated. The Ballincollig Fire Station is located on the Link Road, accessed via the Carriganarra Road. Without appropriate mitigation measures, the construction phase of the proposed development could give risk to increased traffic congestion on this road and nearby junctions, which could result in some slight, short -term, negative impacts on emergency uses. However, with the effective implementation of the suite of mitigation measures proposed in the CEMP and CTMP any impacts will be short-term, neutral and imperceptible for local emergency services.

13.4.8.2 Operational Phase

Ballincollig is well served by emergency services with Ballincollig Garda Station on Main Street and Ballincollig Fire Station on the Link Road. The closest hospitals to the lands include Cork University Hospital and the Bons Secours Hospital in the western suburbs of Cork City. Due to the scale and nature of the proposed development in addition to the availability of emergency services in the area, it is envisaged the proposed development will result in neutral, long-term and not significant impacts on emergency service provision.

13.4.9 Impacts on Public Transport

13.4.9.1 Construction Phase

During construction, the proposed development may result in some temporary disruption and slight, negative short-term impacts to local public transport services due to increase amounts of traffic on the local road network. However, with the adoption of the mitigation measures identified in the CEMP and CTMP, it is envisaged the proposed development will result in no significant impacts on public transport provision.

13.4.9.2 Operational Phase

Once operational, it is predicted that the proposed development will initially result in slight, positive impacts on public transport provision. The proposed development will support the continued viability of public transport services and planned improvement of services in the area including BusConnects and Cork Luas which will both serve the subject site. The proposed development aims to reduce car dependency and support active travel and hybrid travel modes by prioritising walking and cycling mobility through the delivery of part of the BC-GW2 Greenway as set out in the Cork Cycle Network Plan.

13.5 Mitigation Measures & Monitoring

13.5.1 Mitigation & Monitoring

Full details of all mitigation and monitoring procedures during the construction phase are described in the various chapters of this EIAR and the CEMP which accompanies this LRD. The CEMP has been developed in response to the site-specific context with robust mitigation and monitoring measures being adopted to ensure that any negative impacts arising from the construction phase of the development on neighbouring properties or surrounding areas are minimised. Chapter 15 of this EIAR 'Summary of Mitigation Measures' details all proposed mitigation/monitoring measures to be implemented during construction and operational phases of the project.

The site layout responds to the site's topography and the evolving development context in the Maglin area of Ballincollig. The delivery of a section of the BC-GW2 Greenway and provision of pedestrian/cyclist connections throughout the residential development will result in significant positive and permanent impacts to pedestrian and cyclist mobility in the settlement. The proposed public open spaces and creche will all significantly positively and permanently contribute to the communal and public facilities in the area.

13.6 Residual Impacts

Residual impacts refer to those impacts that remain following the implementation of mitigation measures. It is considered that subject to the mitigation measures outlined in the CEMP and EIAR being implemented the proposed development will result in many positive and permanent residual impacts including.

- The creation of a new community in the Maglin Urban Expansion Area of Ballincollig will develop in tandem with the delivery of a portion of the Maglin Sustainable Access Corridor in addition to pedestrian and cycle infrastructure. These will take the form of a number of proposed and planned greenways which provides dedicated walking and cycle connectivity within the Urban Town of Ballincollig. The proposed layout provides for high quality public open spaces promoting outdoor activities and exercise which will benefit existing and future residents of the settlement.
- The delivery of a new creche will positively contribute to Ballincollig's childcare and community facilities.
- The delivery of a diverse range of housing, duplexes and apartments positively contributing to housing supply for all aspects of the housing market.
- The provision of active recreational infrastructure in the form of the Greenway and linear park will provide real opportunities for modal shift and the promotion of walking and cycling as viable modes of transport in the wider Ballincollig area.

13.7 Cumulative Impacts

13.7.1 Construction Phase

Assessing the cumulative impacts of the construction phase of the development is contingent on the construction schedules of the permitted developments in the area identified in Chapter 1. For the purposes of this assessment of impacts a 'worst case' scenario has been assessed based on the projects stated in Chapter 1.

The subject site is situated within the evolving development context of the designated strategic growth area of the Maglin Urban Expansion Area. As referenced in the CEMP, the construction phase of the proposed development will be subject to strict mitigation and monitoring procedures. It is predicted that subject to the implementation of mitigation measures proposed, that the proposed development will result in no significant impacts relating to air quality, noise, vibration or traffic. Any negative impacts or nuisances experienced from construction activities which affect human health will be temporary/ short term in nature.

13.7.2 Operational Phase

Once constructed, the proposed development will be permanent and non-reversible. It is considered that any negative cumulative impacts relating to human health factors including traffic, road safety, air quality, landscape and visual, water quality, noise and vibration will be not significant.

The delivery of an additional 300 no. residential units to the private and social housing stock of the area, a creche and pedestrian/cycle infrastructure upgrades is predicted to result in significant positive and permanent benefits in terms of wider human health considerations.

The potential cumulative impact of the relevant Plans for the area were assessed in the context of the policies and objectives of the Cork City Development Plan 2022-2028. The assessment of the potential impacts on the environment was undertaken utilising the Strategic Environmental Objectives (SEOs) detailed in the Table 5.1 of the 'Strategic Environmental Assessment Report' (SEA) for the Cork City Development Plan 2022-2028.

SEO PHH relating to 'Population and Human Health' aims to

- Promote economic growth to encourage retention of working age population and funding of sustainable development and environmental protection and management.
- Ensure that existing population and planned growth is matched with the required public infrastructure and the required services.
- Safeguard the City's citizens from environment related pressures and risks to health and well-being.

The SEA considered 3 no. alternative scenarios for growth with the selected 'Alternative 3 Compact Liveable Growth' described as

> *'This alternative seeks to develop Cork City as a compact, sustainable city of scale and the regional driver of growth by creating sustainable, liveable, integrated communities and neighbourhoods while ensuring that at least half (50%) of all new homes are delivered in the existing built up footprint.*
>
> *A tiered approach to land use zoning us applied ensuring that new homes are provided at appropriate densities in brownfield and infill locations and in greenfield locations within and contiguous to existing City footprint.'*

Section 7 of the SEA of the Cork City Development Plan 2022-2028 indicates that preferred alternative Scenario 3 'Compact Liveable Growth' has a positive interaction with the status of SEO 'PHH'.

13.8 Difficulties in Compiling Information

There were no significant difficulties in terms of compiling information in preparation of this chapter. We consider that the data collected, and analyses outlined reflects an accurate representation of the population and human health considerations with respect of the proposed development.

13.9 References

- Central Statistics Office (CSO) Census 2016 and 2022 data.
- Cork City Development Plan 2022-2028.
- Cork City Council's Planning Enquiry System.
- Projections of Full-Time Enrolment Primary and Post-primary Level 2023-2042 - Department of Education and Youth (previously called the Department of Education).
- 2022 Pobal Deprivation Index.
- https://www.gov.ie/en/collection/primary-schools/
- https://www.gov.ie/en/collection/post-primary-schools/#20232024 and /#2024025
- Tusla Childcare Register of Early Years Services by County (June 2025)
- Cork Childcare Committee Submission to the Stage 2 LRD Process
- www.hiqa.ie/find-a-centre
- www.buseireann.ie
- www.hsa.ie

13.10 Appendices

Appendix 13.1 - Schools Demand Assessment prepared by HW Planning

Appendix 13-2 - Childcare Needs Assessment prepared by HW Planning

CHAPTER FOURTEEN

INTERACTION OF IMPACTS

CHAPTER FOURTEEN

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CHAPTER 14 | Interaction of Impacts

14.1 Chapter Author

This Chapter has been prepared by Harry Walsh, (BA HONS, Master of Regional and Urban Planning, MIPI), Director at HW Planning.

14.2 Chapter Context

Article 3(1) of the EIA Directive states.

The environmental impact assessment shall identify, describe and assess in an appropriate manner, in the light of each individual case, the direct and indirect significant effects of a project on the following factors:

(a) population and human health;

(b) biodiversity, with particular attention to species and habitats protected under Directive 92/43/EEC and Directive 2009/147/EC;

(c) land, soil, water, air and climate;

(d) material assets, cultural heritage and the landscape;

(e) the interaction between the factors referred to in points (a) to (d).”

Annex IV of the amended Directive states that a description of impacts should include:

“…the direct effects and any indirect, secondary, cumulative, short, medium and long-term, permanent and temporary, positive and negative effects of the project”

Table 14.1 as shown summarises the relevant interactions and interdependencies between specific environmental aspects.

14.3 Description of Significant Interactions

14.3.1 Landscape & Visual

14.3.1.1 Construction Phase

Chapter 3 of this EIAR assesses landscape impacts resultant from the proposed development. During the construction phase of the proposed development, in the absence of the effective implementation of appropriate mitigation measures, the following aspects may give rise to potential interactions with landscape impacts.

Population and Human Health - Potential temporary impacts to visual amenity in the area as a result from construction works, include the necessary removal of existing trees, construction traffic and earthworks. The construction phase of the development provides for mitigation/replacement planting which will mitigate the long-term impacts of the removal of existing vegetation and land cover.

Biodiversity – Site excavation works and the removal of existing tree cover, hedgerows and grassland habitat during the construction phase will result in interactions with biodiversity considerations and potential short term negative impacts on local flora/fauna species and the displacement of habitats.

Material Assets – Services /Water– The necessary earthworks/excavations to facilitate the proposed development including the proposed attenuation/drainage strategies will result in the permanent loss of the existing landscape of the site, representing an interaction between landscape and material assets impacts during the construction phase. Visual impacts will be mitigated through appropriate site management measures and work practices including the fencing off, of trees being retained and the phasing of construction activities being staggered.

Material Assets – Traffic and Transportation – The construction of the internal road network and extension of the eastern SAC result in landscape and visual impacts. As described in the EIAR Chapter 3, the lands are situated within an evolving landscape both in terms of the delivery of other housing projects and the urban expansion of Ballincollig.

Cultural Heritage – The altering of the landscape character of the site including earthworks, tree/plant removal and the setting of the replacement/supplementary planting regime may potentially impact currently undiscovered archaeology features. As noted in Chapter 9 (Cultural Heritage), there are a number of archaeological features within the site, which the site layout and landscape strategy has had full regard to, most notably the preservation in situ of the three ring-ditches (A, F and G) which will form part of a wider amenity area for future residents. Ballincollig Castle is situated approximately 1.1 metres west of the site. The Landscape & Visual Impact Assessment concludes that the impact of the proposed development on the setting of the Castle will be not significant/neutral.

Land and Soils – Bulk excavations will be required for the installation of foundations, service trenching and proposed landscaping measures. This will result in a permanent relocation of soil and subsoil. The excavations and earthworks during the construction phase will result in interactions with the existing landscape. The CEMP describes a suite of mitigation measures including stripped topsoil being re-used and incorporated within the landscaping strategy and features of the development to be delivered during the construction phase.

14.3.1.2 Operational Phase

During the operational phase of the development potential interactions are.

Population and Human Health/Traffic & Transport– The proposed development would deliver a large new residential neighbourhood providing a mix of housing along with amenity, community and physical infrastructure - as well as access to the facilities, services and amenities provided by the self-sustaining town of Ballincollig. The related change to landscape character, i.e. the planned expansion and consolidation of the urban area, public realm/road upgrades would have significant positive population and human health benefits (by providing homes offering a high level of residential amenities).

Biodiversity – The proposed development would largely retain the site’s key landscape elements/features, the hedgerows and hedgerow trees. As well as being of landscape and visual amenity value, these are important habitats, and their retention and protection, along with extensive new planting throughout the new neighbourhood, would have biodiversity benefits.

Material Assets – Services /Water/Land and Soils – The proposed landscape strategy seeks to capitalise on the site-specific context as a visual and recreational amenity. The landscape strategy for the site also incorporates natural drainage and Sustainable Urban Drainage (SUDs) measures, reflecting a positive integrated approach between the sites landscape, servicing and ecological strategies.

Cultural Heritage – As stated previously, Ballincollig Castle is situated approximately 1.1 km metres west of the site and as detailed in Chapters 3 and 9 of this EIAR, the proposed layout and form of development will not negatively impact the setting of Ballincollig Castle or any other cultural heritage assets in the area. The preservation in situ of archaeological features within the site, provides an opportunity to enhance both the landscape/amenity and cultural heritage contexts of the site.

Climate/Air Quality – The incorporation of walking and cycling routes within the sites landscape and connectivity strategies and the extensive replacement and supplementary planting proposals will enhance the local climate and air quality of the local area.

Potential impacts of landscape have been assessed and considered within each chapter/discipline of this EIAR. With the proposed mitigation measures in place, no significant residual negative impacts/interactions are predicted.

14.3.2 Material Assets – Traffic & Transportation

14.3.2.1 Construction Phase

Chapter 4 of this EIAR assesses traffic and transportation impacts resultant from the proposed development. During the construction phase of the proposed development, in the absence of the effective implementation of appropriate mitigation measures, the following aspects may give rise to potential interactions with traffic/transportation impacts.

Population and Human Health – Construction traffic has potential to result in temporary negative impacts on local residents, businesses, schools and other uses in area by way of increased traffic volumes. As detailed in this document, the CEMP and CTMP which are both appended to this EIAR outline a suite of mitigation measures and traffic management measures for construction phase traffic.

Noise and Vibration - Construction traffic may give rise to local noise and vibration which may have an impact on the amenity of local residents and businesses.

Air Quality and Climate - Emissions from construction traffic may result in a decrease in local air quality. Increased greenhouse gas emissions from construction traffic may contribute to climate change.

Water (Hydrology and Hydrogeology) – In the absence of appropriate mitigation measures, construction vehicles at the site may give rise to hydrocarbon spills and other pollutants, potentially impacting on local water quality. However, with the proposed suite of mitigation measures detailed in the CEMP, no significant interactions are envisaged.

Land and Soils – Site excavations and earthworks will require HGV's, heavy machinery and vehicles to access the site during the construction phase. Increased traffic associated with the construction works would have the effect of compacting existing subsoil layers within the site. In the absence of appropriate construction management mitigation procedures, the regular movement of heavy machinery and plant to and from the site would also result in an increased risk to the integrity of the surrounding road network, as well as facilitating the unwelcome transfer of mud and dust to surrounding access routes. However, with the mitigation measures and traffic management measures proposed in the CEMP and CTMP, it is predicted that any interactions will not be significant, with any negative interactions being slight and short term.

Biodiversity – Any vehicular spillages or incidents resultant from refuelling on site would result in negative impacts on biodiversity. However, with the suite of mitigation and construction management measures identified in the CEMP, which will prioritise the minimisation of any potential negative impacts on existing ecology, it is not considered likely that there will be any significant interactions.

Material Assets – Services, Infrastructure & Utilities – During construction, interactions between Material Assets and traffic /transportation, may include road openings to install project utilities.

14.3.2.2 Operational Phase

During the operational phase of the development potential interactions are.

Population and Human Health – Once operational the proposed development will result in increased traffic volumes accessing the site and on the surrounding road network. Users of the local road network may experience increased delays in car journeys. However, it is considered that the proposed greenway and pedestrian connections with Heathfield, and the delivery of the next section of the MUEA Sustainable Access Corridor will represent significant asset to the wider area facilitating walking and cycling as viable modes of travel. The proposed extension of the MUEA Sustainable Access Corridor can also accommodate any potential future public transport corridor which may serve the subject lands and the wider Maglin Urban Expansion Area.

Noise and Vibration – The proposed increase in traffic volumes during the operational phase of the development may result in some instances of local noise and vibration effecting the amenity of neighbouring properties and future residents of the development. In the context of the existing noise environment, as detailed in Chapter 10, the overall contribution of traffic is not considered to pose any significant impact to nearby residential locations. The resulting residual effect is neutral to negative, imperceptible to not significant, and long-term.

Air Quality – There is the potential for traffic emissions to impact air quality in the short-term over the construction phase, particularly due to the increase in HGVs accessing the site. The construction stage traffic has been reviewed, and a detailed air quality assessment has been scoped out as none of the road links impacted by the proposed development satisfy the TII scoping assessment criteria in Chapter 11 of the EIAR. It can therefore be determined that the construction stage traffic will not be significant.

Climate - The increase in traffic volumes in the area resultant from the proposed development will impact the local climate. However, the predicted overall magnitude of the changes on climate will not be significant.

Water (Hydrology and Hydrogeology) - Increased traffic and parking at the site may give rise to hydrocarbon spills from vehicles. However, with the proposed mitigation measures outlined in the CEMP, it is not predicted such instances will occur.

Landscape – The proposed extension of the MUEA Sustainable Access Corridor will result in interactions between landscape and traffic and transport impacts. As detailed in EIAR Chapter 3, the evolution of the landscape of the Ballincollig area is evolving in accordance with zoning objectives in the Cork City Development Plan providing for residential development, schools, recreational green routes and road infrastructure upgrade and the proposed development is in accordance with the evolving development context of the area.

Potential impacts of Material Assets – Traffic have been assessed and considered within each chapter/discipline of this EIAR. With the proposed mitigation measures in place, no significant residual negative impacts/interactions are predicted.

14.3.3 Material Assets – Services, Infrastructure and Utilities

14.3.3.1 Construction Phase

Chapter 5 of this EIAR assesses servicing impacts resultant from the proposed development. During the construction phase of the proposed development, in the absence of the effective implementation of appropriate mitigation measures, the following aspects may give rise to potential interactions with 'Material Assets – Services, Infrastructure and Utilities' impacts.

Population and Human Health – Potential impacts on existing services such as water, communications, electrical infrastructure resultant from connections from the proposed development to existing local services. However, with the proposed mitigation measures outlined, it is not expected that these impacts will be significant.

Material Assets – Traffic and Transportation - During construction, interactions between Material Assets and traffic / transportation include necessary periods of road openings to deliver utilities. During these times minor local traffic management measures will be implemented, resulting in slight temporary negative impacts. As referenced previously, the CEMP and CTMP detail the management of construction traffic matters. Due to the nature of the proposed development and that the majority of the utilises/service infrastructure is being delivered within the development site, it is not considered that there will be significant inconveniences caused or interactions between Material Assets and traffic /transportation considerations.

Water (Hydrology and Hydrogeology) - Works to provide connections to utilities and services, such as foul and surface water sewer, may have negative impacts on groundwater if spills of fuels or other contaminants occur. Stockpiling of materials or works may to drainage system may lead to temporary localised flooding if drains become blocked. However, with the mitigation measures proposed in the CEMP, it is predicted that any interactions will not be significant and temporary in nature.

Landscape/Land and Soils - The necessary earthworks/excavations to facilitate the proposed development will result in the permanent change of the existing landscape setting. Visual impacts during the construction will be mitigated through appropriate site management measures and work practices including the fencing off, of trees being retained and the phasing of construction activities being staggered to minimise negative impacts.

Biodiversity – During construction, in the absence of appropriate mitigation measures the necessary works to accommodate service infrastructure including vegetation removal, earthworks/excavation and refuelling on site may result in the displacement, deterioration or destruction of habitats, flora/fauna species and European sites As detailed in EIAR Chapter 8, with the proposed mitigation measures in place, any negative impacts will be localised and restricted to the development site during construction. A Natura Impact Assessment has also been prepared with respect of the proposed development (appended to Chapter 8) which concludes that no significant adverse effects arising from the proposed development are likely to occur in relation to the Natura 2000 sites.

Noise and Vibration – The implementation of service infrastructure and utilities may result in noise and vibration emissions during construction. The mitigation measures stated in the CEMP and EIAR Chapter 10, will mitigate any potential negative impacts relating the noise and vibration interactions during construction.

Air Quality and Climate - In the absence of appropriate mitigation measures, the installation of material assets including necessary excavation works and connections may result in temporary nuisances such as dust emissions which would negatively impact on air quality. However, with the proposed suite of mitigation and monitoring measures enforced, it is predicted that any negative impacts/interactions relating to air quality/climate will not be significant and temporary in nature.

14.3.3.2 Operational Phase

During the operational phase of the development potential interactions are.

Water (Hydrology and Hydrogeology) – Due to the increase in population generated from the proposed development and mixed-uses including the creche and community/commercial units, there will be increased demand for local water services. As referenced previously, Irish Water have confirmed via a Statement of Design Acceptance, that there will be capacity in the local water network to facilitate the proposed development.

Biodiversity– During the operational phase, in the absence of appropriate mitigation measures, potential negative interactions may occur including the potential disturbance to bats arising from artificial light spillage from the proposed public lighting scheme. Other potential interactions include impacts with European designated sites, resultant from the service/ water infrastructure proposed and the permeant displacement, deterioration, or destruction of habitats. It is predicted in EIAR Chapter 8, that the proposed development/servicing proposals will result in no significant negative impacts relating to biodiversity. A Natura Impact Assessment has been prepared with respect of the proposed development (appended to Chapter 8) which concludes that no significant adverse effects arising from the proposed development are likely to occur in relation to the Natura 2000 sites.

Landscape – The proposed utility/servicing proposals will result in an altered landscape with public lighting and proposed tree/ vegetation planting having an interdependency. The proposed public open spaces will be served by public lighting resulting in more useable communal areas of the development. The landscape strategy for the site also includes the provision of a variety of open spaces and recreational areas which have been incorporated within the sites drainage/SUDs strategies.

Population and Human Health – Interactions between population and human beings and material assets during the operational phase of the development will include the generation of effluent and sanitary waste and result in the increase in water demand and service infrastructure including telecommunications. Irish Water have confirmed, via a Statement of Design Acceptance that there will be sufficient capacity to accommodate the proposed development.

Potential impacts of Material Assets – Services have been assessed and considered within each chapter/discipline of this EIAR. With the proposed mitigation measures in place, no significant residual negative impacts/interactions are predicted.

14.3.4 Land, Soils & Geology

14.3.4.1 Construction Phase

Chapter 7 of this EIAR assesses 'Land, Soils & Geology' impacts resultant from the proposed development. During the construction phase of the proposed development, in the absence of the effective implementation of appropriate mitigation measures, the following aspects may give rise to potential interactions with Land, Soils & Geology impacts.

Population and Human Health – In the absence of appropriate mitigation measures, construction activities including construction traffic, demolition and site clearance/excavations may result in increased dust and noise levels in the locality as well as potential soil contamination interacting with population and human beings. Hydrocarbons will be used onsite during construction.

Water (Hydrology and Hydrogeology) - management of soil (stripping and storage) will interact with surface water quality in terms of potential soil erosion and siltation of the receiving surface water environment. The risk of soil contamination from hydrocarbons also presents a risk to the groundwater and surface water environments.

Biodiversity - The proposed development provides for site clearance, rock breaking excavations, earthworks and tree/hedgerow removal which may result in disturbance/displacement of existing habitats/flora during the construction phase.

Cultural Heritage - There may be an impact to Cultural Heritage and Archaeology if previously undiscovered sub-surface remains are damaged or destroyed during site clearance and/or construction.

Air Quality - Fugitive dust emissions from the management of soils (stripping and storage) could affect air quality locally. Removal of excess soils and importation of quarry products will increase emissions from HGVs, affecting air quality locally.

Material Assets – Traffic and Transportation – The reprofiling of the site will require the removal of excess topsoil offsite, increasing HGV traffic and noise locally. The importation of concrete and aggregate will also increase HGV traffic and noise locally.

Landscape - The necessary earthworks/excavations to facilitate the proposed development will result in permanent changes to the existing landscape setting of the site. Soil and bedrock excavations will be required for site levelling, the installation of foundations, service trenching and proposed landscaping measures reflecting interactions between both areas. This will result in a permanent relocation of soil and subsoil at most excavation locations. The CEMP describes a suite of mitigation measures including stripped topsoil being re-used and incorporated within the landscaping strategy and features of the development to be delivered during the construction phase.

Material Assets – Services, Infrastructure and Utilities – To accommodate in the installation of utilities and service infrastructure during construction land excavations, site clearance/excavations. However, with the proposed mitigation measures to be enforced, it is not predicated that there will be significant negative interactions.

Noise & Vibration – The reprofiling of the site using large plant will increase noise levels during the construction stage. Much of this work will be completed with excavators, but rock breaker may be required in some of the deeper excavations.

14.3.4.2 Operational Phase

During the operational phase of the development potential interactions are.

Landscape - The proposed landscape strategy responds to the site's topography, with cut and fill generated from the site utilised elsewhere in the development where possible and incorporated into the landscape strategy for the site. The proposed landscape strategy seeks to respond to the site-specific context including by utilising appropriate areas for public open space and incorporating Sustainable Urban Drainage (SUDs) where appropriate.

Population and Human Health – It is not considered that there will be significant interactions between population/human health and land and soils during the operational phase.

Potential impacts of Land and Soils have been assessed and considered within each chapter/discipline of this EIAR. With the proposed mitigation measures in place, no significant residual negative impacts are predicted.

14.3.5 Water (Hydrology and Hydrogeology)

14.3.5.1 Construction Phase

Chapter 7 of this EIAR assesses Water (Hydrology and Hydrogeology) impacts resultant from the proposed development. During the construction phase of the proposed development, in the absence of the effective implementation of appropriate mitigation measures, the following aspects may give rise to potential interactions with Water (Hydrology and Hydrogeology) impacts.

Population and Human Health – In the absence of appropriate mitigation measures, any negative impacts or contamination affecting local watercourses or water supply could result in negative impacts relating to human health. Other potential health effects are associated with flooding. The proposed site design and mitigation measures ensures that the potential for impacts on the water environment is not significant.

Material Assets – Services, Infrastructure & Utilities – In the absence of appropriate mitigation measures, works to provide connections to utilities and services such as foul and surface water, may have negative impacts on groundwater if spills of fuels or other contaminants occur.

Biodiversity – Any negative impacts affecting water quality during construction activities may result in negative impacts on local biodiversity and wildlife. These include potential surface water run-off/discharge, wastewater/foul effluent from construction activities impacting the Cork Harbour SPA and Great Island Channel SAC and local watercourses. Chapter 8 of the EIAR (Biodiversity), predicts that with the proposed mitigation and monitoring measures in place, that there will be no significant negative interactions between biodiversity/ecology and Water (Hydrology & Hydrogeology) impacts.

Land and Soils – The thickness of soil over the bedrock aquifer informs the vulnerability ranking. Reprofiling of the site topography requires the removal of soil which will increase the aquifer vulnerability. Management of soil (stripping and storage) will interact with surface water quality in terms of potential soil erosion and siltation of the receiving surface water environment. However, it is predicted that with the suite of relevant mitigation measures proposed in the CEMP and this EIAR that there will be no significant interactions.

14.3.5.2 Operational Phase

During the operational phase of the development potential interactions are.

Population and Human Health – Increased demand for local water services. As referenced previously, Irish Water have confirmed via a Statement of Design Acceptance, that there will be capacity in the local water network to facilitate the proposed development.

Biodiversity – Any potential contamination of the western boundary watercourse and other watercourses in the area may result in negative effects on local biodiversity and wildlife.

Potential impacts of Water (Hydrology) have been assessed and considered within each chapter/discipline of this EIAR. With the proposed mitigation measures in place, no significant residual negative impacts/interactions are predicted.

14.3.6 Biodiversity

14.3.6.1 Construction Phase

Chapter 8 of this EIAR assesses Biodiversity impacts resultant from the proposed development. During the construction phase of the proposed development, in the absence of the effective implementation of appropriate mitigation measures, the following aspects may give rise to potential interactions with Biodiversity impacts.

Material Assets – Services/Water – Any negative impact on water quality arising from accidental spillages may impact local biodiversity.

Material Assets – Traffic and Transportation –. Any vehicular spillages or incidents resultant from refuelling on site would result in negative impacts on biodiversity. However, with the suite of mitigation and construction management measures identified in the CEMP which prioritises the minimisation of potential negative impacts on existing ecology, it is not considered likely that there will be any significant interactions between biodiversity and traffic and transportation impacts during the construction phase.

Land and Soils/Landscape – The proposed site excavations/groundworks and removal of existing trees/grassland will result in the disturbance of existing habitats.

Noise and Vibration – Noise and vibration resultant from the construction phase may result in the disturbance of local habitats.

Air Quality and Climate – As detailed in EIAR Chapter 10, demolition and earthworks during construction phase present a risk of ecological impacts prior to mitigation measures being adopted. The dust emission magnitude from construction associated with the proposed development works can be classified as large. It is predicted that the proposed mitigation measures identified in the CEMP including dust management procedures will mitigate any significant negative interactions during construction.

14.3.6.2 Operational Phase

During the operational phase of the development potential interactions are.

Material Assets – Services/Water – In the absence of appropriate mitigation measures, the proposed development may result in negative impacts on local flora/fauna/habitats. The sites drainage strategy provides for natural drainage and SUDS measures which can provide opportunities for biodiversity enhancement. Mitigation measures include the provision of appropriate public lighting conducive with bats in the vicinity of the site.

Potential impacts of Biodiversity have been assessed and considered within each chapter/discipline of this EIAR. With the proposed mitigation measures in place, no significant residual negative impacts/interactions are predicted.

14.3.7 Cultural Heritage

14.3.7.1 Construction Phase

Chapter 9 of this EIAR assesses Cultural Heritage impacts resultant from the proposed development. During the construction phase of the proposed development, in the absence of the effective implementation of appropriate mitigation measures, the following aspects may give rise to potential interactions with Cultural Heritage impacts.

Land & Soils/Landscape – In the event an archaeological discovery is found during construction phase, archaeological investigations will take place which may have knock on effects relating the proposed land use/landscape of the scheme.

14.3.7.2 Operational Phase

Landscape - As stated previously, the proposed layout and form of development will not negatively impact the setting of Ballincollig Castle or any other cultural heritage assets in the area.

Regarding the preservation in situ of the three ring-ditches (A, F and G), together with licensed archaeological monitoring during topsoil stripping and construction, will ensure that both known and previously unknown archaeological material is appropriately managed in accordance with national policy and professional standards. Accordingly, no significant residual effects on the archaeological or architectural heritage resource are anticipated.

Potential impacts of cultural heritage and archaeology have been assessed and considered within each chapter/discipline of this EIAR. With the proposed mitigation measures in place, no significant residual negative impacts/interactions are predicted.

14.3.8 Noise & Vibration

14.3.8.1 Construction Phase

Chapter 10 of this EIAR assesses Noise and Vibration impacts resultant from the proposed development. During the construction phase of the proposed development, in the absence of the effective implementation of appropriate mitigation measures, the following aspects may give rise to potential interactions with Noise and Vibration impacts.

Population and Human Health - Increased levels of noise and vibration during construction activities may result in negative impacts to the amenity of local residents. Noise and vibration sources from construction phase include demolition and piling, site clearance and ground preparation works and general construction activities. The application of binding noise limits and hours of operation, along with implementation of appropriate noise and vibration control measures, will ensure that noise and vibration impact is kept to a minimum as far as practicable. For the duration of the construction period, construction noise impacts will be short-term and negative, depending on the proximity of the works to the site boundary.

During site clearance the residual effect is negative, significant to very significant and temporary noise impact at distances up to 25m for NSL01 and NSL02 if all plant items were assumed to work simultaneously while adjacent to the closest boundary to the site. In line with DMRB Noise and Vibration (UKHE 2020) document, a significant effect relating to construction noise is deemed to occur where a moderate or major impact is likely to occur for a period of greater that 10 days/nights over 15 consecutive day/nights, or greater than 40 days over 6 consecutive months. In the case of this activity, it is unlikely the durations will be exceeded and hence the overall residual effect is categorised as negative, moderate and temporary. At all other NSLs at greater distances than 60m from noisy works the CNT would not be exceeded and the residual significance of effect and is negative, slight to moderate and temporary.

During super structure, compounds and landscaping the residual effect is negative, slight to moderate and short term at all NSLs (greater than 25m from works) during all phases of the construction. Likely noise and vibration effects during the construction phase will be negative, slight to moderate and temporary.

Material Assets – Services, Infrastructure & Utilities – The installation of utilities and services during construction may result in some interactions with noise and vibration emissions. However, with the proposed mitigation measures enforced it is not predicted that any significant interactions will take place during construction.

Material Assets – Traffic and Transportation –Noise and vibration generated from plant machinery and HGV movements may give rise to nuisances impacting the amenities of residents and businesses. It is predicted that with the proposed suite of mitigation measures, including the Construction Traffic Management Plan and CEMP, that the interactions between construction traffic and noise and vibration will not be significant and short term in nature.

Air Quality and Climate – Emissions such as dust and other nuisances may arise as a result of noise and vibration occurrences during construction, negatively impacting the local air quality and microclimate. However, it is not predicted that these interactions will result in any significant impacts given the mitigation measures proposed during construction regarding these areas.

Biodiversity – Noise and Vibration during construction may result in disturbance of flora/fauna and existing habitats during construction working hours.

14.3.8.2 Operational Phase

During the operational phase of the development potential interactions are.

Population and Human Health – As outlined in Chapter 10 of this EIAR, no significant noise and vibration impacts are predicted during the construction or operational phases of the proposed development.

Material Assets – Traffic and Transportation – As detailed in EIAR Chapter 10, the main potential sources of outward noise from the development during the operational phase is from additional traffic on surrounding roads, deliveries and waste collections.

Potential impacts of Noise & Vibration have been assessed and considered within each chapter/discipline of this EIAR. With the proposed mitigation measures in place, no significant residual negative impacts/interactions are predicted.

14.3.9 Air Quality

14.3.9.1 Construction Phase

Chapter 11 of this EIAR assesses Air Quality impacts resultant from the proposed development. During the construction phase of the proposed development, in the absence of the effective implementation of appropriate mitigation measures, the following aspects may give rise to potential interactions with Air Quality impacts.

Population and Human Health – Population and Human Health and Air Quality. An adverse air quality impact during the construction phase can cause health and dust nuisance issues. There is a low risk of dust-related human health impacts during the construction phase of the proposed development. Best practice mitigation measures will be implemented during the construction phase to ensure that the impact of the proposed development complies with all ambient air quality legislative limits. Therefore, the predicted impact is direct, short-term, negative, localised and not significant with respect to Population and Human Health during the construction phase.

Climate - Air Quality and Climate have interactions as the emissions from the burning of fossil fuels during the construction and operational phases generate both air quality and climate impacts. There is no impact on climate due to air quality. However, the sources of impacts on air quality and climate are strongly linked.

Land & Soils - Construction phase activities such as land clearing, excavations, stockpiling of materials etc. have the potential for interactions between Air Quality and Land & Soils in the form of dust emissions. With the appropriate mitigation measures to prevent fugitive dust emissions, it is predicted that there will be no significant interactions between air quality and land and soils during the construction phase.

Biodiversity – Dust generation can occur during extended dry weather periods due to construction traffic along haul routes and construction activities such as excavations and infilling works. Dust emissions can coat vegetation leading to a reduction in the photosynthesising ability as well as other effects. There are no designated ecological sites within 250 m of the proposed development site area. Significant dust impacts are not predicted beyond this distance. Dust mitigation measures will be implemented on site as set out in Chapter 11 of this EIAR. With the implementation of these mitigation measures dust emissions will be minimised and impacts will be direct, short-term, negative, localised and not significant with respect to biodiversity.

Material Assets – Traffic – Interactions between Air Quality and Traffic can be significant. With increased traffic movements and reduced engine efficiency, i.e. due to congestion, the emissions of vehicles increase. The impacts of the proposed development on air quality are assessed by reviewing the change in annual average daily traffic on roads close to the site. In this assessment, the impact of the interactions between Traffic and Air Quality are linked but there is no potential for significant impacts from traffic on air quality. The effects are considered to be direct, short-term, neutral, localised and not significant during the construction phase.

Noise and Vibration – Emissions such as dust and other nuisances may arise as a result of noise and vibration occurrences during construction, negatively impacting the local air quality and microclimate. However, it is not predicted that these interactions will result in any significant impacts given the mitigation measures proposed during construction regarding these areas.

14.3.9.2 Operational Phase

During the operational phase of the development potential interactions are.

Population and Human Health /Material Assets – Traffic – Vehicles accessing the site will emit pollutants which may impact Air Quality and Human Health. However, the increased number of vehicles associated with the proposed development will not cause a significant change in air pollutant emissions in the locality. It has been assessed that emissions will be in compliance with the ambient air quality standards which are set for the protection of human health. Impacts will be long-term, localised, direct, negative and not significant. The operational phase of the development will result additional vehicular traffic in the area potentially resulting in an increase in emissions and negative impact on local air quality. However, the provision of pedestrian and cycle upgrades the delivery of internal walkways, greenways and the MUEA Sustainable Access Corridor will provide significant benefits to the local population and provide for enhanced opportunities for sustainable modes of travel.

Climate - Air Quality and Climate have interactions as the emissions from the burning of fossil fuels during the construction and operational phases generate both air quality and climate impacts. There is no impact on climate due to air quality. However, the sources of impacts on air quality and climate are strongly linked.

Potential impacts on Air Quality have been assessed and considered within each chapter/discipline of this EIAR. With the proposed mitigation measures in place, no significant residual negative impacts/interactions are predicted.

14.3.10 Climate

14.3.10.1 Construction Phase

Chapter 12 of this EIAR assesses Climate impacts resultant from the proposed development. During the construction phase of the proposed development, in the absence of the effective implementation of appropriate mitigation measures, the following aspects may give rise to potential interactions with Climate impacts.

Population and Human Health/ Material Assets – Traffic – Increased greenhouse gas emissions from construction traffic may contribute to climate change. The effects of the proposed development on climate are assessed by reviewing the change in annual average daily traffic on roads close to the site. In this assessment, the effects of the interactions between traffic and climate are considered to be direct, short-term, negative and not significant during the construction phase.

Waste management measures will be put in place to minimise the amount of waste entering landfill, which has higher associated embodied carbon emissions than other waste management such as recycling. The effect of the interactions between waste and climate are considered to be direct, short-term, negative and not significant during the construction phase.

Land, Soils, Geology and Hydrology - The impact of flood risk has been assessed and the surface water drainage network will be designed to cater for increased rainfall in future years as a result of climate change. The effect of the interactions between climate and land, soils, geology and hydrology are not significant in EIA terms.

Air Quality - Air quality and climate have interactions due to the emissions from the burning of fossil fuels during the construction and operational phases generating both air quality and climate impacts. Air quality modelling outputs are utilised within the Climate Chapter. There is no impact on climate due to air quality. However, the sources of impacts on air quality and climate are strongly linked.

14.3.10.2 Operational Phase

During the operational phase of the development potential interactions are.

Population and Human Health/ Material Assets – Traffic – The increase in traffic volumes in the area resultant from the proposed development will impact the local climate. However, the predicted overall magnitude of the changes on climate will not be significant. The incorporation of walking and cycling routes within the sites landscape and connectivity strategies and the extensive replacement and supplementary planting proposals will enhance the local climate and air quality of the local area. Waste management measures will be put in place to minimise the amount of waste entering landfill, which has higher associated embodied carbon emissions than other waste management such as recycling. The effect of the interactions between waste and climate are considered to be direct, long-term, negative and not significant during the operational phase, which is overall not significant in EIA terms.

Air Quality - Air quality and climate have interactions due to the emissions from the burning of fossil fuels during the construction and operational phases generating both air quality and climate impacts. Air quality modelling outputs are utilised within the Climate Chapter. There is no impact on climate due to air quality. However, the sources of impacts on air quality and climate are strongly linked.

Potential impacts on Climate have been assessed and considered within each chapter/discipline of this EIAR. With the proposed mitigation measures in place, no significant residual negative impacts/interactions are predicted.

14.3.11 Population and Human Health

14.3.11.1 Construction Phase

Chapter 13 of this EIAR assesses Population and Human Health impacts resultant from the proposed development. During the construction phase of the proposed development, in the absence of the effective implementation of appropriate mitigation measures, the following aspects may give rise to potential interactions with Population and Human Health impacts.

Air Quality and Climate – In the absence of appropriate mitigation measures the construction phase of the proposed development may result in some temporary negative impacts on air quality and microclimate including noise, vibrations, dust and emissions from construction vehicles. It is considered that the proposed mitigation measures detailed in this EIAR and the project CEMP will ensure that these impacts will not be significant.

Landscape – The construction phase of the project will result in the evolution of the local landscape and the existing visual character of the area.

Material Assets – Traffic and Transportation – Construction traffic has potential to result in temporary negative impacts on local residents, businesses, schools and other uses in area by way of increased traffic volumes. As detailed in this document, the CEMP and CTMP which are both appended to this EIAR outline a suite of mitigation measures and traffic management measures for construction phase traffic.

Material Assets – Services - Potential slight and temporary negative impacts on existing services such as water, communications, electrical infrastructure resultant from connections, may occur from the proposed development to existing local services. The implementation of the proposed surface water/foul sewer upgrades to serve the development may result in some temporary disruption to the local road network.

Land and Soils - In the absence of appropriate mitigation measures, potential negative construction related impacts affecting human health include contamination of soils through construction activity from spillages. However, with the mitigation measures proposed being enforced to reduce and/or avoid these potential impacts, and to address any potential waste soil management issues.

Water (Hydrology and Hydrogeology) – In the absence of appropriate mitigation measures, any negative impacts or contamination affecting local watercourses or water supply could result in negative impacts relating to human health.

Noise and Vibration - Increased levels of noise and vibration during construction activities may result in negative impacts to the amenity of local residents. Noise and vibration sources from construction phase include demolition and piling, site clearance and ground preparation works, general construction activities. The application of binding noise limits and hours of operation, along with implementation of appropriate noise and vibration control measures, will ensure that noise and vibration impact is kept to a minimum as far as practicable. For the duration of the construction period, construction noise impacts will be short-term and negative, depending on the proximity of the works to the site boundary.

14.3.11.2 Operational Phase

During the operational phase of the development potential interactions are.

Landscape - Potential temporary impacts to visual amenity in the area as a result from construction works, include the necessary removal of existing trees, construction traffic and earthworks. The construction phase of the development provides

for mitigation/replacement planting which will mitigate the long-term impacts of the removal of existing vegetation and land cover.

Air Quality and Climate/Noise and Vibration – During the operational phase the proposed residential, and creche uses may result in impacts on local noise and air quality resultant from matters including additional traffic in the area and an increase of population. Due to the sites location within the defined boundary of the Ballincollig Urban Expansion Area and the variety of existing land-uses in the sites immediate vicinity, it is not considered that these impacts will be significant and are consistent with the urbanisation of the area as outlined in the Cork City Development Plan.

Material Assets – Traffic and Transportation - Once operational the proposed development will result in increased traffic volumes accessing the site and on the surrounding road network. Users of the local road network may experience increased delays in car journeys. However, it is considered that the proposed pedestrian/cucle upgrades including dedicated footpaths/ cycle lanes of the SAC, delivery of the greenway along the sites northern boundary and connection to the existing pedestrian infrastructure at Heathfield will represent significant asset to the wider area facilitating walking and cycling as viable modes of travel. The proposed section of the MUEA Sustainable Access Corridor can also accommodate any potential future public transport corridor which may serve the subject lands and the wider Maglin Urban Expansion Area.

Material Assets – Services, Infrastructure & Utilities – The proposed development will result in additional demand for local water and services infrastructure. As referenced previously, Irish Water have confirmed via a Statement of Design Acceptance, that there will be capacity in the local water network to facilitate the proposed development.

Potential impacts on Population and Human Health have been assessed and considered within each chapter/discipline of this EIAR. With the proposed mitigation measures in place, no significant residual negative impacts are predicted.

14.4 Summary of Significant Interactions

Table 14.1 Potential Interaction of Effects Matrix (Con = Construction, Op= Operational. If there is considered to be no potential for an effect, the box is left blank.)

Interaction	Landscape	Material Assets – Traffic & Transport	Material Assets – Services, Infrastructure & Utilities	Land & Soils	Water (Hydrology & Hydrogeology)	Biodiversity	Noise & Vibration	Cultural Heritage	Air Quality	Population & Human Health	Climate
Landscape		Op	Con & Op	Con & Op	-	-	-	Con & Op	-	Con & Op	-
Material Assets – Traffic & Transport	Con & Op		Con	Con	-	Con	Con & Op	-	Con & Op	Con & Op	Con & Op
Material Assets – Services, Infrastructure & Utilities	Con & Op	Con		Con	Con	Con & Op	Con		-	Con & Op	-
Land, Soils & Geology	Con & Op	Con	Con		Con	Con & Op	-	Con	Con	Con	Con
Water (Hydrology & Hydrogeology)	Con & Op	Con & Op	Con & Op	Con		Con & Op	-	-	-	Con	Con
Biodiversity	Con & Op	Con	Con & Op	Con	Con & Op		Con	-	Con	-	-
Noise & Vibration	-	Con & Op	Con	Con	-	Con		-	Con	Con & Op	Con
Cultural Heritage	Con & Op	Op	-	Con	-	-	-		-	-	-
Air Quality	Op	Con & Op	Con	Con	-	Con	Con	-		Con & Op	Con & Op
Population & Human Health	Con & Op	Con & Op	Con & Op	Con	Con & Op	-	Con & Op	-	Con & Op		Con & Op
Climate	Op	Con & Op	Con	-	-	Con	Con	-	Con & Op	Con & Op	

CHAPTER FIFTEEN

SUMMARY OF MITIGATION MEASURES

CHAPTER FIFTEEN

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CHAPTER 15 | Summary of Mitigation Measures

15.1 Introduction

15.1.1 Chapter Author

This Chapter has been prepared by Harry Walsh, (BA HONS, Master of Regional and Urban Planning, MIPI), Director at HW Planning.

15.1.2 Chapter Context

The 2022 EPA Guidelines regarding information to be contained in EIAR's, identifies the following strategies for the mitigation of effects.

Mitigation by Avoidance: Avoidance, usually referring to strategic issues – such as site selection, site configuration or selection of process technology - is generally the fastest, cheapest and most effective form of effect mitigation. Environmental effects and the consideration of alternatives need to be taken into account at the earliest stage in the site / route selection and project design processes. For example, the realignment of a transport corridor to avoid residential property, avoid habitat destruction or to reduce agriculture severance, etc. In many situations, mitigation by avoidance may be viewed as part of the 'consideration of alternatives'.

Mitigation by Prevention: This usually refers to technical measures. Where a potential exists for unacceptable significant effects to occur (such as noise or emissions) then measures are put in place to limit the source of effects to a permissible and acceptable level. Examples include the specification of process technology standards or building design to minimise height or contrasts of materials. Prevention measures are also put in place to prevent the effects of accidental events from giving rise to significant adverse effects. The installation of a fire-water retention basin is an example of mitigation against such risk by prevention.

Mitigation by Reduction: This is a very common strategy for dealing with effects which cannot be avoided. It tends to concentrate on the emissions and effects and seeks to limit the exposure of the receptor. It is generally regarded as the 'end of pipe' approach because it tends not to affect the source of the problems. As such this is regarded as a less sustainable, though still effective, approach.

Mitigation by Offsetting: This is a strategy used for dealing with significant adverse effects which cannot be avoided, prevented or reduced. It includes measures to compensate for adverse effects.

15.2 Mitigation & Monitoring Measures Proposed

15.2.1 Landscape & Visual

15.2.1.1 Construction Phase - Mitigation Measures

- Full implementation of the hedgerow and tree protection measures recommended in the Tree Survey by County Tree Care Ltd.
- No landscape or visual-specific mitigation is recommended other than standard best practice construction site management, which should include the erection and maintenance of hoarding on the site boundaries.

15.2.1.2 Operational Phase - Mitigation Measures

No operational mitigation measures recommended.

15.2.2 Material Assets – Traffic & Transportation

15.2.2.1 Construction Phase - Mitigation Measures

A Construction and Environmental Management Plan (CEMP) and Construction Traffic Management Plan (CTMP) have been prepared (Appendix 2-1 and Appendix 2-2 of this EIAR) by the Applicant to ensure that proper procedures are put in place to minimise the impact of the construction stage on public roads and the surrounding environment in general. This CEMP is being submitted as part of this Planning Application to Cork City Council, which includes, inter alia, indicative phasing of the works, hours of operation, a traffic management plan, noise and dust mitigation measures, etc. A Construction Manager will be appointed to liaise directly with the various sections of Cork City Council and develop the plan as required.

The construction management plan will take into account construction vehicle routing and timing to mitigate any issues with vehicles on public roads. The development will be progressed in three phases as shown in Figure 4.26 to further manage the construction traffic:

Phase 1

- Demolition of existing farm sheds;
- Completion of 118 no. units;
- Completion of active travel route along north of the development;
- Completion of creche; and
- Completion of portion of the Maglin Sustainable Access Corridor.

Phase 2

- Completion of 79 no. units; and
- Completion of the remaining Maglin Sustainable Access Corridor.

Phase 3

- Completion of the remaining 103 no. units.

The following mitigation measures shall be provided to minimise the impacts to the public road network during the construction phase:

- Good construction management practices will be employed such as fencing the site off from the public and neighbouring sites, adequate external/internal signage, secure internal site offices, dedicated construction access points all to facilitate the safety of construction staff and the public;
- Appropriate levels of staff parking and compounding will be provided to ensure no potential overflow or haphazard parking in the area. The site will be able to accommodate employee and visitor parking throughout;
- Set construction traffic routes to and from the site will be agreed with Cork City Council prior to the commencement of construction activities on site. Where necessary the time of day permittable for such routes will also be agreed upon and outside of the morning/evening peak hours;
- Tracked excavators will be moved to and from the site on low-loaders and will not be permitted to drive on the street pavements;
- Wheel washers / judder bars will be placed at all site access points to minimise the migration of detritus onto the public roads. The roads will be inspected and cleaned on a regular basis; and
- Haul vehicles will be covered after loading to ensure there is no risk of construction material falling.

15.2.2.2 Operational Phase – Mitigation Measures

Proposed Infrastructure under Proposed Development

The proposed road works under proposed development are illustrated in Appendix 4B. The works provide dedicated walking and cycling facilities from the development access to the proposed greenway (BC-GW2) as shown in Figure 4.17 and the Link Road via the Maglin Sustainable Access Corridor. The proposed development also provides for connection to the pedestrian/ cycle infrastructure under construction as part of Heathfield Phase 4 to the north providing direct access to Killumney Road.

The proposed design took cognisance of the Design Manual for Urban Roads and Streets (DMURS). At the site entrances to the proposed development, priority will be given to pedestrian and cyclists. Raised areas at the site entrances will indicate priority for crossing pedestrians and cyclists. Corner radii have been reduced to shorten crossing points for pedestrians and slow vehicles further when making turning manoeuvres. The proposed footpaths tie in with existing footpaths on the Maglin Sustainable Access Corridor.

The dedicated segregated cycle track will provide cyclists with a one-way cycle track on both sides of the extended Maglin Sustainable Access Corridor. The proposed road works will also tie-in to the proposed greenway route (BC-GW2) as mentioned in Section 4.3.5.4. Additionally, the proposed development will provide shared spaces for pedestrians/cyclists within the site. Dropped kerbs and transition areas will be provided to enable easy and safe access for cyclists to/from the cycle track. Dropped kerbs (where appropriate) and tactile paving have been designed in at the pedestrian crossing points.

The proposed road works will encourage a shift to more sustainable modes of transport and provide safer facilities particularly for children walking and cycling to school, but also travelling to and from the town centre and beyond.

Maglin Urban Expansion Area

As detailed in Section 4.3.5.2, to accommodate the target population growth in Ballincollig, the Maglin Valley has been designated an urban expansion area, including the provision for a new residential neighbourhood.

Under the Cork City Development Plan 2022-2028, there are several road projects to be developed as part of the Maglin Urban Expansion Area. These off-site infrastructure projects are associated with the proposed number of housing units to be developed in the area. These include upgrading the Killumney Road, providing new link roads, and improving walking and cycling facilities.

After completion of those elements of vehicular infrastructure, it is anticipated that traffic along Killumney Road (i.e. Castle Road, Sunningdale, Link Road, etc.) will reduce.

CMATS

The Cork Metropolitan Area Transport Strategy (CMATS) represents a coordinated land use and transport strategy for Cork Metropolitan Area (CMA). It sets out a framework for the planning and delivery of transport infrastructure and services to support the CMA's development in the period up to 2040. As part of CMATS, there are a number of improvements to public transport, walking and cycling facilities in the immediate vicinity of the proposed development. The land use distribution chapter of CMATS indicates the proposed development is located adjacent to a proposed residential area.

Further to this, measures are outlined in CMATS to provide appropriate transit options for the proposed residential area. Included in CMATS is an indicative route showing Light Rail along the Killumney Road, just north of the proposed site and a proposed station nearby. BusConnects could be a precursor to Light Rail but either way, this development will be well served by these future public transport services.

Additionally, this development, can support the case for BusConnects/Light Rail along this route by improving its viability due to the potential increase in passengers from this area. These future projects will further assist in the modal shift from private car to public transport, walking and cycling.

Other Measures

A number of measures have been and will be implemented prior to the subject scheme opening which include:

- ***Parking:*** All car parking and bicycle parking within the development will comply with the Development Plan. The residential development and non-residential development (i.e. creche) also provide with cycle parking in excess of the Development Plan requirements. This leads to a strong emphasis on bicycle parking, thus reducing the need for private single occupancy vehicles.
- ***Mobility Management Plan (MMP):*** A MMP will be rolled out with the aim of guiding the delivery and management of coordinated initiatives by the scheme promoter. The MMP ultimately seeks to encourage sustainable travel practices for all journeys to and from the developments. Details of the MMP are included in Chapter 4 of this EIAR.

Specific Measures

In order to achieve the long-term objectives and modal split targets, a number of specific measures are proposed to be put in place.

- ***Management of Co-ordination –*** A Mobility Management Plan Co-ordinator will be appointed as part of a residential committee or management agent. This may be a group of keen likeminded people that can assist in promoting. The implementation and management of the MMP will be the responsibility of the Mobility Management Plan Co-ordinator team on site. The role will be to assist in proving travel information and be a point of contact for any travel issues for all events and ensure the MMP is monitored and updated as required. The duties of a Mobility Management Plan Co-ordinator are:
  - » Liaising with Cork City Council and developers in progressing the future measures for the area;

  - » Support the implementation of various schemes aimed at encouraging the use of more sustainable travel methods;
  - » Use noticeboards to keep people up to date with accessible public transport provision, walking/cycling opportunities and available schemes. These can also be used in open spaces for residential information such in local commercial unit; and
  - » Potential to provide residential packs to new residents highlighting the bus routes, walking and cycling routes.
- ***Car Sharing –*** Initial contact has also been made with Go-Car (https://www.gocar.ie/). This is a membership based program where, once you join, you can rent a car or van for as little as an hour and up to a year. The service aims to reduce car dependency by promotion on demand cars near where you live, work and play so you can have a car close to hand should you need one. Once you've signed up you simply book the car you want for the time you need, unlock it using our app/membership card, take the keys from the glovebox and drive it as normal. To finish your booking, you just drop the car back to where you picked up. There are approximately 700 go car locations in Ireland where cars can be collected or dropped with numerous locations in Cork.
- ***Cycle/Pedestrian Facilities -*** There are a range of walking and cycle facilities in the area with links from the proposed development to these. Additional walking and cycling routes will be provided throughout the development.

15.2.3 Material Assets – Services, Infrastructure & Utilities

15.2.3.1 Construction Phase - Mitigation Measures

A Construction and Environmental Management Plan (CEMP) has been prepared has been appended to this EIAR in Appendix 2-1. The final CEMP, which will include any additional construction phase mitigation measures required pursuant to conditions attached to any grant of permission, along with all measures currently set out in the CEMP, will be implemented in full. Site inductions for all construction staff and sub-contractors aim to ensure all are aware of the procedures and best practices as outlined in the CEMP.

Control measures shall be put in place to protect surface waters from contamination prior to the commencement of any site works. Control measures will also be provided to control surface run-off during the construction phase. These proposed measures follow best practice and are set out in full in the CEMP.

For ease of reference, the principal mitigation proposed in relation to the type of construction activities to facilitate the development of material assets on the site include:

- Surface water shall be directed to settlement ponds where topographically feasible. Where this is not practicable the surface water shall be allowed to percolate to ground and/or be removed by tanker to a designated waste-water treatment plant if excessive build-up of surface water on site occurs.
- Protection of surface water gullies or drains using silt fences
- Use on-site bund structures (including incorporating existing ditches) on site to retain surface waters on site and to prevent runoff from the site.
- Minimal and short-term storage and the removal of excess materials (soil, stones, and construction wastes) off site in an efficient manner.
- Daily checks of surface water regime on site and logging of same.
- Works associated with excavations or earth moving not to be undertaken in periods of forecasted bad weather.
- Drainage channels beside construction roadways to direct surface water to settlement areas and allow for natural percolation to ground.
- Ensure good site management is maintained at all times during the construction phase including regular site clean-ups and use of appropriate bins.
- Chemicals or fuel/oils shall be stored in temporary bunded storage areas and plant is re-fuelled via delivery trucks in specific bunded re-fuelling areas, rather than the storage of large quantities of fuel on site in a designated bunded area.
- The pouring of concrete, application of chemicals, painting or any other activity that has the possibility of being toxic to aquatic life shall be undertaken in a controlled and isolated manner, preventing the possibility of any pathway to a surface water source.

The construction compound will be adequately served regarding foul drainage and water supply for construction staff. Effluent generated on site from the contractors' sanitary facilities will be discharged to a holding tank and removed off site by a licenced removal contractor in accordance with Cork City Council and Uisce Eireann requirements. The potable water supply to the compound shall be agreed between the site contractor and Uisce Eireann and shall be protected from possible contamination by construction activities.

The connection of all proposed utilities to existing infrastructure shall be in accordance with the relevant code of practice as listed below and coordinated by the relevant utility provider. Where the standards and codes below refer to or rely on additional codes, then these additional codes are deemed to apply to these works where they are relevant to the matter under consideration.

- "Code of Practice for Water Infrastructure", Doc No. IW-CDS-5020-03, July 2020 (Revision 2) – Uisce Eireann
- "Code of Practice for Wastewater Infrastructure", Doc No. IW-CDS-5030-03, July 2020 (Revision 2) – Uisce Eireann.
- Wastewater Pumping Stations & Rising Main Doc IW-TEC-800-02
- ESB Networks: "National Code of Practice for the Customer Interface", Doc No. DOC-030303-AEN, April 2021.

Construction Waste generated during the construction phase shall be managed in line with the CEMP "Construction & Demolition Waste Management on Site" Report appended to this EIAR in Appendix 2-1.

Best practice noise and vibration control measures will be employed by the contractor during the construction phase in order to avoid exceedance of the adopted construction noise threshold values at the nearest NSLs. The best practice measures set out in BS 5228 (2009 +A1 2014) Parts 1 and 2 will be complied with. This includes guidance on several aspects of construction site mitigation measures, including, but not limited to:

- Selection of quiet plant
- Control of noise sources
- Screening
- Hours of work
- Liaison with the public

Noise control measures that will be considered include the selection of quiet plant, enclosures and screens around noise sources, limiting the hours of work and noise monitoring.

Regular site audits will be undertaken during the construction phase to visually monitor the works and ensure compliance with all measures as set out in the CEMP. Daily checks of the surface water regime put in place during the construction phase will be undertaken with detailed logs maintained. Communications with utility providers will be maintained during construction. Supervision of work by the respective utility operator as required will be accommodated during the works.

15.2.3.2 Operational Phase – Mitigation Measures

All installed assets including watermain, foul, storm and utility services will be and surveyed prior to being made operational. In relation to stormwater assets this will include pressure testing. Uisce Eireann assets (i.e. – foul sewer and watermain) will be tested in accordance with the codes of practice prior to being commissioned by Uisce Eireann. The purpose of this will be to identify any possible defects. Any defects will be made good prior to operation.

Waste generated by the development during operation will be removed by licensed waste contractors only and in accordance with the Operational Waste Management Plan compiled by AWN Consulting. Refer to Appendix 5-4.

Water conservation measures such as the use of low flush toilets and low flow taps will be incorporated into the proposed dwellings to reduce water volumes entering the foul water network. This measure will also reduce the demand on the public water supply.

The proposed storm water drainage system has been designed to cater for all surface water runoff from all hard surfaces within the proposed development including roadways, roofs, parking areas etc.

Surface water generated from the proposed residential development will be conveyed through a proposed surface water network including SuDS measures and an attenuation system on site prior to final discharge at Qbar greenfield run-off rates. Surface water discharge will also pass via a full retention fuel / oil separators (sized in accordance with permitted discharge from the site). Surface water discharge rates from the proposed surface water drainage network will be controlled by a vortex flow control devices (Hydrobrakes or equivalent) The storm water network and attenuation system are designed to accommodate the 100-year return period plus an additional 20% to account for the effects of climate change.

Watermain and foul sewer assets become the property of Uisce Eireann at operational phase and responsibility for same reverts to them. Water usage within the proposed development will be monitored by Uisce Eireann utilising water meters. The monitored water usage will be utilised to locate and isolate any leaks which may develop over time are present within the network.

The relevant service providers regarding power supply and telecommunications will be responsible for monitoring their respective services.

15.2.4 Land Soils & Geology

15.2.4.1 Construction Phase - Mitigation Measures

Measures to be employed during the construction stage to avoid, reduce and minimise the potential impacts on land, soil and geology are:

- A Construction Environmental Management Plan (CEMP) and a Construction Resource Waste Management Plan (CRWMP) have been prepared for the development. These will be updated and finalised prior to the commencement of construction. They are included in Appendix 2-1 and 2-5 of this EIAR, respectively.
- The stripping of topsoil will be carried out in phases to minimise the areas exposed to wind and rain erosion. Topsoil will be carefully stored for later reuse in landscaping. Best practice will be employed in the stripping and stockpiling of topsoil. This will include:
  - » Careful selection of stockpile locations to: - avoid, as far as practical, double handling of materials; avoid steep slopes; avoid natural overland flow paths of stormwater runoff; provide shelter from the prevailing wind direction.
  - » Blading off the vegetative layer (for separate storage). Vegetation will not be incorporated in the stripped topsoil.
  - » Avoid stripping in inclement wet weather conditions. Wet soils are more difficult to work and handle, and it is more likely to damage soil structure.
  - » Avoid extending topsoil stripping into the mineral soil layer.
  - » Limiting height of stockpiles to avoid anaerobic conditions occurring.
  - » Profiling of stockpiles to promote rainwater runoff and placement of silt fencing downgradient of stockpiles to catch any fines carried by storm water runoff.
  - » Stockpiles will be allowed vegetate naturally, which will reduce erosion by wind and water.
- Where practical, stripped topsoil will be taken directly to on-site reuse locations for landscaping. It is estimated that 40% of the stripped topsoil will be reused in gardens and green spaces (i.e., 24,320m^3 of topsoil reused on site).
- Where it is apparent that there will be an excess of topsoil on the site, the Site Manager will identify an off-site destination so the topsoil can be taken directly off site and so avoid stockpiling and double handling. This could be another construction site where a topsoil shortfall is experienced or a permitted soil recovery site. It is estimated that 60% of the topsoil will be taken off site either as a waste or, where appropriate, as a by-product. Where the material is to be reused on another site as a by-product (and not as a waste), this will be done in accordance with Article 27 of the European Communities (Waste Directive) Regulations 2011 and following EPA guidelines. Where material cannot be reused off site, it will be sent for recovery or disposal at an appropriately authorised facility.
- The profiling of the site is such that off-site removal of subsoil or rock is not predicted. However, should off-site removal of overburden be necessary it will be managed in the same manner as outlined above for surplus topsoil.
- Excavated mineral soils will be managed in a similar manner to topsoil as outlined above. Excavated mineral soils will be:
  - » Stored on site where a later on-site reuse has been identified. Mineral soils will be stored separately from topsoil.
  - » Taken directly to their on-site reuse location when these locations are prepared to receive the fill material.
  - » Although unlikely, if excess to on-site requirements, taken directly off-site, with the appropriate authorisations in place, for beneficial reuse at another construction site.
  - » Reused immediately on site, if suitable, in, for example, trench backfill for utilities, such as water lines, sewers and the undergrounding of the ESB powerline.
- Vehicles and plant will use haul roads to avoid compaction of soil. This will include tipper trucks removing excess topsoil off-site and the delivery of building materials to site. Where vehicles (dumper trucks and HGVs) need to access areas not yet serviced by haul roads, they will follow a demarcated route along which the haul road will later be constructed.
- To minimise soil erosion, earthworks will be suspended during extreme weather conditions. An extreme rainfall event will be classified as an event that corresponds to the Met Éireann Orange – Weather Alert for rainfall. The Site Manager will monitor the weather forecast to make preparations ahead of adverse weather conditions.

Met Eireann Orange Weather Alert for Rainfall
50 mm – 80 mm in 24 hrs
40 mm – 60 mm in 12 hrs or less
30 mm – 50 mm in 6 hrs or less

- Hydrocarbons (oils, diesel and chemicals) will be stored and managed in an appropriate manner to ensure no negative effects. Specific measures will include:
  - » Any storage of oils and diesel on site will be in steel or plastic tanks of good integrity and bunded to 110 % of tank capacity. All fuel and hydraulic fluids will be stored in the site COSHH store located in the site compound.
  - » Refuelling of site (wheel-mounted) plant will be carried out at the site compound where a concrete refuelling pad will be provided adjacent to the fuel storage tank. When refuelling takes place directly from self-bunded mobile refuelling bowsers or road tankers, spill kits will be readily available (kept in the machine). Refuelling of mobile plant will not take place within 50m of any sensitive receptor (e.g., watercourses). Toolbox talks on refuelling will be given to delivery drivers in addition to plant operatives.
  - » Fuels, lubricants and hydraulic fluids for equipment used on the construction site will be carefully handled to avoid spillage, properly secured against unauthorised access or vandalism, and provided with spill containment according to best codes of practice.
  - » Any spillage of fuels, lubricants or hydraulic oils will be immediately contained, and the contaminated soil removed from the site and properly disposed of.
  - » Waste oils and hydraulic fluids will be collected in leak-proof containers and removed from the site for disposal or re-cycling.
  - » Appropriate spill control equipment, such as oil soakage pads, will be kept in the site plant to deal with any accidental spillage. Spare spill kits will be kept at the construction site compound in the container adjacent to the fuel storage.
- Surface water management infrastructure will be installed as detailed in Chapter 7, which will avoid / reduce soil erosion.
- The sustainable access corridor crosses land with depth to bedrock greater than 6m typical with the underlying overburden consisting of soft silt / clay layers. Additional ground investigation will be carried out along the road alignment (and bridge location) to inform its detailed design.
- Concrete, concrete products and aggregates needed for the construction will only be sourced from authorised quarries, at which appropriate environmental controls are implemented per planning conditions.
- Monitoring and inspection of the soil stockpiles, slope cuts, fuel storage, refuelling operations, etc, will be carried out by the Client's Engineer and improvement made as required. Load testing of sustainable access corridor sub-base will be carried out to ensure it meets design criteria. Temporary supports for excavations will be used where considered necessary by the Client's Engineer.

Monitoring of the works will be carried out by the Client's Engineer, project engineer and geotechnical engineer. This will involve visual inspection of the works for soil storage, deep excavations and general site operations. During construction, monitoring will be conducted at excavations and fill areas, and within the soil stockpile areas. Inspections and testing of roads and foundations will be carried out during their construction to ensure that they can accommodate the design loadings. Excavations will be inspected to ensure no stability issues arise. Remedial measures, if required, will be implemented as appropriate.

15.2.4.2 Operational Phase - Mitigation Measures

The mitigation measures to be employed during the operational phase to address the identified potential impacts are:

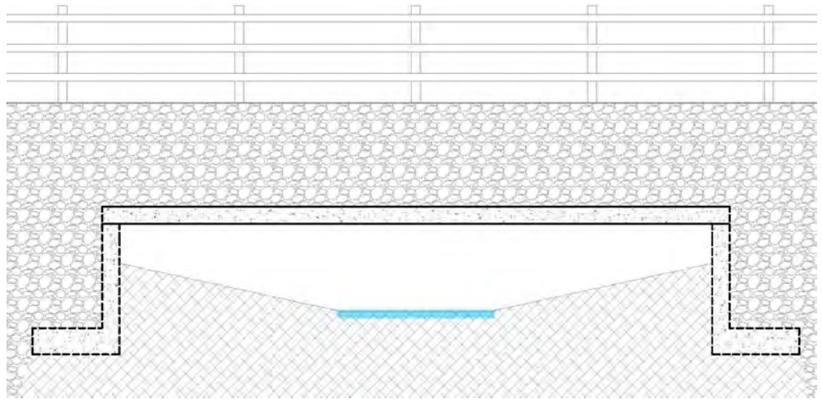
- To avoid potential subsidence arising from stormwater management, use of infiltrating SuDS features will be minimal. Engineering solutions (6 No. attenuation tanks) will be the primary mechanism for controlling stormwater runoff to greenfield rates. The discharge from the tanks will be to the Maglin North River via a drain with rip-rap to avoid bank erosion. This is in accordance with the recommendations in the Ballincollig drainage study.
- In addition to the SuDS approach, the foundations design will further reduce potential impacts of subsidence. Subject to detail design, foundations will be reinforced concrete rafts on end-bearing bored piles, if required.
- Spillage and leaks of oil from cars parked in the development during the operational phase is unavoidable. To reduce the potential impacts, hydrocarbon interceptors will be incorporated into the site drainage design. The parking areas will also be paved, so impacts on soils and geology are unlikely. The hydrocarbon interceptors will be maintained by the Management Company during the operational phase.
- With regard to home heating, it is noted that heat pumps will be used at the development. The use of home heating oil should therefore not arise. It is, however, possible that some homeowners will use oil. Any leaks or spillage is likely to be small in scale. Although the likelihood is reduced, the potential impact remains, with long-term slight negative effects.
- Storm water and foul sewers will be tested as part of their commissioning. Any leaks would therefore be identified and repaired prior to being put into service. They will be maintained by the Management Company / Local Authority. Leakage, and subsequent pollution of the underlying geology, is therefore unlikely.
- Radon barriers and venting are standard construction best practices to prevent radon gas ingress into buildings. This risk of radon ingress into living spaces is greatly reduced and unlikely to occur.

15.2.5 Water (Hydrology & Hydrogeology)

15.2.5.1 Construction Phase - Mitigation Measures

The mitigation measures to be implemented for the construction phase are set out below:

- Design considerations in the site layout to avoid and reduce impacts to surface water include the provision of a minimum 10m buffer setback of the housing units from the Maglin North River.
- The infilling of the lands between the sustainable access corridor and the residential units will also be set back 10m from the riverbank.
- The bridge to be constructed at part of the sustainable access corridor will be a clear-span structure - as illustrated below. Inland Fisheries Ireland will be consulted on the proposed design for agreement. Its construction will follow current guidelines on work in the riparian zone, including IFI (2016) and NRA (2005). Its construction will require Section 50 consent from the OPW (a process to ensure that the structure doesn't interfere with river hydraulics). Abutments will be set back 2.5m from the riverbank to allow unobstructed passage of fish and wildlife. Silt fences will be erected between any earthworks and the river during ground investigation and construction works.



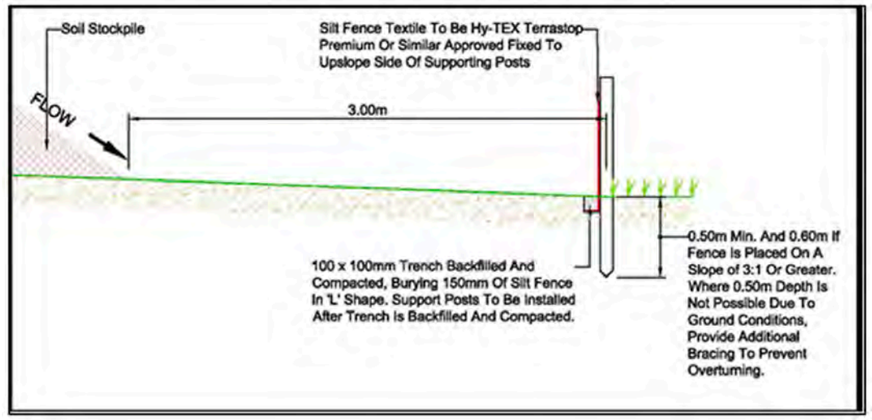
- Following mobilisation to site, surface water management infrastructure will be the first works carried out. Additional controls will be installed as needed as construction progresses through the site, and/or as identified during site inspections of surface water management infrastructure.
- The attenuation tanks required for phase 1 of the development will be installed early in the construction sequencing to control runoff rates as the site gets developed. The attenuation infrastructure will be progressively expanded through the site ahead of housing construction. This will ensure that there is always adequate capacity in the system to deal with design flows.
- Foul sewage generated at the welfare facilities during the early construction phases will be piped to a sealed tank and collected by a waste collection contractor (with the appropriate waste collection permit) for discharge at a licensed WWTP. Once the development is connected to the Uisce Eireann network, the workers' welfare facilities will be piped to the on-site foul sewer network.
- During the construction phase, best practices will be employed to minimise the release of sediment laden storm water runoff, including;
  - » Areas stripped of vegetation will be kept to a minimum; enough to keep pace with house construction. On-going landscaping and restoration of completed units will be carried out. This will reduce areas of soil exposed to erosion.
  - » Stripped and excavated soils will be managed as described in Section 6.5.1. Soil stockpiles will be setback a minimum of 50m from any watercourse. Silt fencing will be erected downgradient to stockpiles to filter runoff water.
  - » Silt fencing will be erected along the western boundary of the site where topography slopes towards the river. This fencing will be maintained for the construction phase until development (storm water drains / paving / landscaping) is complete in adjacent areas.
  - » Construction phase settlement ponds will be constructed to hold runoff water from earthworks areas. These will be located and moved as the development progresses through the site.
  - » Check dams, sandbags and / or straw bales will be installed along the field boundary drains to slow flows and remove silt. Additional check dams will be installed during filling of area between the sustainable access corridor and the residential units. Check dams will be constructed using clean stone and geotextile spanning across the drainage channel.
  - » Alterations to the drains during filling of the areas between the sustainable access corridor and the residential units will be carried out in dry summer months, when there is little or no flow. Flows in the existing drains will be accommodated using filter drains as shown on Figure 7.4.
  - » The public road serving the site will be kept clean of mud and debris. A street sweeper will attend site regularly to clean the road when there are truck movements in and out of the site.
  - » Earthworks will be suspended during extreme weather conditions. An extreme rainfall event will be classified as an event that corresponds to the Met Éireann Orange – Weather Alert for rainfall. The Site Manager will monitor the weather forecast to make preparations ahead of adverse weather conditions.

Met Eireann Orange Weather Alert for Rainfall
50 mm – 80 mm in 24 hrs
40 mm – 60 mm in 12 hrs or less
30 mm – 50 mm in 6 hrs or less

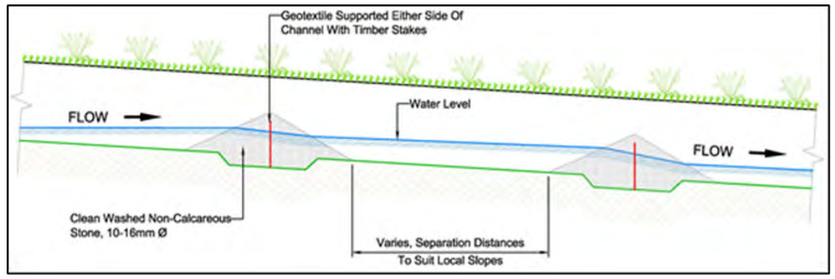
- If required, dewatering of the excavations will be to temporary silt traps. Flow from the silt traps, placed upgradient of the silt fencing protecting watercourses, will be diffuse.
- The release of cement to watercourses will be prohibited. Concrete pours will occur in contained areas using shuttering. Rinsing down of concrete trucks will be done at a dedicated location on site – adjacent to the construction site compound, or at a suitable alternative location, a minimum distance of 75m from any watercourse. Signage will be erected at each concrete pour location directing drivers to the rinse down area. This rinse down area will be removed at the end of the construction phase.
- Hydrocarbons (oils, diesel and chemicals) will be stored and managed in an appropriate manner to ensure no negative effects. These are detailed in Section 6.5.1.

The infrastructure to be used to manage and treat surface water, and to control erosion at the construction site are:

- To reduce the volume of water to be treated during construction and to reduce the erosion potential of exposed soils, clean surface water runoff will be diverted around earthworks areas. This will be done with the use of diversion channels. Diversion channels are shallow interceptor drains to divert overland flows.
- Silt fences will be erected on the downslope side of any earthworks areas to intercept any overland flows that could potentially be carrying silt / fines. These are constructed with geotextile embedded in the topsoil and supported with wooden pegs. See example below.



- Check dams will be installed at appropriate locations along the field boundary drains. These will be constructed using geotextile supported by two wooden pegs, sandwiched by clean washed filter gravel, as illustrated. Alternatively, straw bales will be used.



- The Site Manager will undertake inspections at all outfalls from the construction works. Inspections will be carried out during and following heavy rainfall events. The Site Manager will organise monitoring of surface water quality at monitoring points SW1, SW2 and SW3, as shown on Figure 7.3. Samples will be collected monthly and tested for turbidity and suspended solids. All sample results will be input to a database and compared to baseline monitoring data.

15.2.5.2 Operational Phase - Mitigation Measures

Mitigation measures to be employed during the operation phase are:

- The runoff from the site will be controlled and managed using a suite of SuDS and engineering controls designed for a 1:100-year storm event plus a 20% allowance for climate change. These will include rainwater harvesting (water butts – to be retrofitted by homeowners), infiltration basins, filter drains, tree pits, raingarden / bioretention tree pits, blue / green roofs, and attenuation tanks fitted with flow control devices. Hydrocarbon interceptors will also be installed upstream of each attenuation tank. SuDS features to management runoff from the sustainable access corridor and filled areas include filter strips, filter drains and bioretention strips. The filled areas will be graded to direct overland flow to the filter drains to bring surface water to the west. The overall management will limit discharge from the site to greenfield rates – 21.8 l/sec for the residential area (outfall No.1) and 2.9 l/sec for the sustainable access corridor (outfall No.2) – refer to Figure 7.4. The detail of the SuDS infrastructure is provided in the Drainage Assessment Report, prepared by DOSA and included in Appendix 7.4. Engineering details are provided in the Infrastructure Report, prepared by DOSA, and provided in Appendix 2.4.
- With the potential for oil spills and leaks from cars parked in the development, hydrocarbon interceptors and grit traps are included in the drainage design to protect the water quality in the Maglin North River. The hydrocarbon interceptors will be cleaned and maintained by the management company.
- The SuDS infrastructure proposed has regard to the underlying karst limestone bedrock. Infiltration to the subsurface has been minimised. Engineering solutions are proposed to manage stormwater runoff – 6 No. tanks are proposed. Discharge from the site will be to 2 No. areas of stone riprap at the head of constructed open drains with setbacks of approximately 10m from the river. These will dissipate energy and avoid bank erosion / scouring in the drains and riverbed. Discharge locations are shown on Figure 7.4.
- The foul sewer for the facility will connect into the Uisce Eireann sewer network, which discharges to the Ballincollig WWTP – EPA license number D0049-01. This is a tertiary treatment plant with a capacity of 33,000 PE. According to the latest Annual Environment Report for this facility, the quality of the treated water discharged to the River Lee is compliant for all test parameters. Uisce Eireann has confirmed capacity in the Ballincollig WWTP to treat sewage from the Carriganarra site – refer to Appendix A of the Infrastructure Report (provided in Appendix 2.4 of this EIAR).
- MWP has carried out a Site-Specific Flood Risk Assessment (SSFRA) for the proposed development. The SSFRA is provided in Appendix 7.3. The SSFRA had regard to findings of the Ballincollig drainage study, which identified flooding extending into the southern portion of the site for a 1:100-year rainstorm event. The conclusion of the SSFRA is that, with the recommended mitigation (refer to Section 7.2.5), the development is at low risk of flooding for the design event and that it will result in only slight changes to the flood levels in adjoining lands. It concluded that there will be higher flood levels upstream of the sustainable access corridor of up 360mm extending approximately 350m upstream. Downstream of the sustainable access corridor increases of up to 50mm extending for 250m would be experienced. These increase flood levels occur in areas already identified as being at risk of flooding, with only a slight increase in extents on the upstream side of the sustainable access corridor.
- Groundwater (aquifer) vulnerability will be temporary increased as the site is stripped and reprofiled for development. The progressive construction of paved roads, foundations and landscaping will provide protection to the aquifer.
- To conserve water usage (and consequently reduce the volume of foul sewerage generated), each house will be fitted with a water meter, aerated shower heads, aerated strainers in taps, duel flush cisterns etc.

12.2.6 Biodiversity

15.2.8.1 Construction Phase - Mitigation Measures

The mitigation measures have been drawn up in line with current best practice and include an avoidance of sensitive habitats at the design stage and mitigation measures will function effectively in preventing significant ecological impacts. The following mitigation measures will be implemented.

Water protection

Water protection measures are included in Chapter 6 Lands, Soils and Geology and in *Chapter 7 Water (Hydrology & Hydrogeology).*

Lighting

Lighting mitigation measures will follow *Bats & Lighting Guidance Notes for: Planners, engineers, architects and developers* (Bat Conservation Ireland, 2010). The following measures will be applied in relation to construction works lighting:

Lighting will be provided with the minimum luminosity necessary for safety and security purposes. Where possible, lighting will be restricted to the working area and using the cowl and angling noted above, will minimise overspill and shadows on sensitive habitats outside the construction area

During construction, lighting will be positioned and directed so that it does not to unnecessarily intrude on adjacent ecological receptors and structures used by protected species. The primary area of concern is the potential impact on the retained treelines and hedgerows.

Site lighting will typically be provided by tower mounted temporary portable construction floodlights. The floodlights will be cowled and angled downwards to minimise spillage to surrounding properties. The following measures will be applied in relation to site lighting:

- Lighting will be provided with the minimum luminosity sufficient for safety and security purposes. Where practicable, precautions will be taken to avoid shadows cast by the site hoarding on surrounding footpaths, roads and amenity areas;
- Where possible, construction lights will be switched off when not in use; and
- Lighting will be positioned and directed so that it does not to unnecessarily intrude on adjacent ecological receptors and structures used by protected species. The primary area of concern is the potential impact on the retained treelines and hedgerows. There will be no directional lighting focused towards these sensitive habitats and cowling and focusing lights downwards will minimise light spillage.

Works will primarily take place during hours of daylight to minimise disturbance to any nocturnal mammal species.

Protection of habitats

The Wildlife Act 1976, as amended, provides that it is an offence to cut, grub, burn or destroy any vegetation on uncultivated land or such growing in any hedge or ditch from the 1st March to the 31st August. Exemptions include the clearance of vegetation in the course of road or other construction works or in the development or preparation of sites on which any building or other structure is intended to be provided. Where possible, vegetation will be removed outside of the breeding season and in particular, removal during the peak-breeding season (April-June inclusive) will be avoided.

The Maglin North Stream runs along the full extent of the western site boundary and it is important that construction activities do not result in pollution of this watercourse, either through siltation, which interferes with water flow, vegetation growth and aquatic fauna, or pollution (e.g. chemical). Refer to *Chapter 7 Water (Hydrology & Hydrogeology)* for further details on mitigation measures for water.

To prevent incidental damage by machinery or by the deposition of spoil during site works, treelines and hedgerows which are located in close proximity to working areas will be clearly marked and fenced off to avoid accidental damage during excavations and site preparation. Detailed tree protection measures are included in Tree Survey (Geotree) which accompanies this application. Tree protection measures will follow BS 5837: 2012 and the 'Tree Constraints Plan' included in Tree Survey (Geotree) will ensure that root protection areas (RPAs) are identified and protected throughout construction works. All tree protection measures will be installed prior to the commencement of any construction works.

Bats

During the site works, general mitigation measures for bats will follow Marnell *et al.* (2022), Kelleher and Marnell (2006) and TII (2005c). These documents outline the requirements that will be met in the pre-construction (site clearance) stage to minimise negative effects on roosting bats or prevent avoidable effects resulting from significant alterations to the immediate landscape. All mitigation measures including detailed method statements will be agreed with the NPWS prior to commencement of works, which could affect any bat populations on site.

All buildings onsite will require demolition/refurbishment to facilitate the development. No signs of bats were recorded within these buildings. However, as a precautionary measure, the following measures will be implemented prior to and/or during demolition. Mitigation measures will be agreed with the NPWS prior to any demolition works and will include the following:

- In all cases immediately in advance of demolition/refurbishment works a bat specialist will undertake an examination of the buildings. If bats are present at the time of examination it is essential to determine the nature of the roost (i.e., number, species, whether it is a breeding population) as well as its exact location.
- If bats are recorded in building earmarked for demolition/refurbishment, special mitigation measures to protect bats will be put in place and a license to derogate from the conservation legislation will be sought from the NPWS.
- The contractor will take all required measures to ensure works do not harm individuals by altering working methods or timing to avoid bats, if necessary.
- If roosting habitat for bats is removed, replacement habitat will be provided.

A number of trees will be removed prior to construction (See SRLA drawing (Existing and proposed tree plan). No signs of roosting bats were recorded in any of the trees onsite. While it is noted that mature/semi-mature trees with the potential to be of significant value as bat roosts are absent from the site, it is noted that small roosts within mature trees with dense ivy can be difficult to detect and may be used sporadically. Bats can use trees as temporary roosts and therefore the presence of occasional bats cannot be altogether excluded. Therefore, the following measures will be implemented during the removal of semi-mature and mature trees.

- The project ecologist will work with the contractor to ensure that trees earmarked for retention are adequately protected (as per Detailed tree protection measures are included in Tree Survey (Geotree) which accompanies this application).
- Tree-felling will ideally be undertaken in the period September to late October/early November. During this period bats are capable of flight and may avoid the risks of tree-felling if proper measures are undertaken.
- Soft-felling will be implemented i.e. Felled trees will not be mulched immediately. Such trees will be left lying several hours and preferably overnight before any further sawing or mulching. This will allow any bats within the tree to emerge and avoid accidental death. The bat specialist will be on-hand during felling operations to inspect felled trees for bats. If bats are seen or heard in a tree that has been felled, work will cease and the local NPWS Conservation Ranger will be contacted.
- Tree will be retained where possible and no 'tidying up' of dead wood and spilt limbs on tree specimens will be undertaken unless necessary for health and safety.
- Treelines outside the proposed development area but adjacent to it and thus at risk, will be clearly marked by a bat specialist to avoid any inadvertent damage.
- During construction directional lighting will be employed to minimise light spill onto adjacent areas. Where practicable during night-time works, there will be no directional lighting focused towards watercourses or boundary habitats and focusing lights downwards will be utilised to minimise light spillage.
- If bats are recorded by the bat specialist within any trees no works will proceed without a relevant derogation licence from the NPWS.

As noted in **Section 8.5.1.2**, lighting mitigation measures will follow recommendations outlined in Bat Conservation Ireland (2010) and Bat Conservation Trust (2018).

Birds

As noted in **Section 8.5.1.3**, where possible, vegetation (and building where Swallows/other birds are nesting in buildings) will be removed outside of the breeding season and in particular, removal during the peak-breeding season (April-June inclusive) will be avoided. This will also minimise the potential disturbance of breeding birds outside of the proposed development site boundary. If works are carried out during the breeding season, a pre-construction survey will be carried out by the project ecologist and if birds are detected appropriate mitigation measures will be implemented. Where possible, vegetation will be removed outside of the breeding season and in particular, removal during the peak-breeding season (April-June inclusive) will be avoided. This will also minimise the potential disturbance of breeding birds outside of the proposed development site boundary.

15.2.6.2 Biodiversity Enhancement Measures

Bats

Although there are mature/semi-mature trees within the proposed development site, generally they lack the structural elements that would make them suitable for roosting bats. Therefore, the provision of bat boxes suitable for the species recorded within the site are recommended. The boxes have been selected to provide a range of roosting opportunities for different species and colony sizes. They will be sited on existing trees. The boxes will be installed by the project ecologist considering relevant factors including foraging resources, commuting routes, future landscape development, and lighting and will be regularly checked for usage as part of an ongoing ecological monitoring programme. The location of these bat boxes are detailed in the Landscape Masterplan prepared by Simon Ronan Landscape Architecture included in Appendix 2-6 of this EIAR.

Vincent Pro Bat Box

Two Vincent Pro bat boxes will be provided. This box features three vertical chambers of different sizes, providing ideal roosting space for a variety of species. Beneath the crevice entrances is a ladder which provides a rough surface for bats to land. Limited cleaning is required for these boxes as the droppings will fall out of the bottom of the chambers. The front and top of the box are black which helps the box to absorb heat. This bat box can be used by Leisler's, Common Pipistrelle, Soprano Pipistrelle, Brown long-eared, Natterer's and Whiskered Bat.



Vincent pro bat box



Improved Roost-Maternity Bat Box



Bat Box 1FF



Bat Colony Box 3FF



Hedgehog dome



Example of installed Swift bricks in use.



Hedgehog highway example

Improved Roost-Maternity Bat Box

Two improved Roost-Maternity Bat Box will be provided. This box is suitable for larger roosts or maternity groups of the small crevice-dwelling bats such as pipistrelles. This has three separate crevices, each with different temperature characteristics and a wide entrance with accurately sized opening. Ideal for Pipistrelles and deters unwelcome birds etc. Internal ceramic heat sinks ensure improved temperature stability in crevices.

Bat Box 1FF

Two Bat Box 1FF will be provided. Schwegler's 1FF Bat Box provides crevice-like roosting conditions for all crevice-inhabiting bat species (such as the Pipistrelle bat). This box has proven to be highly effective where it has been used, from gardens and forests to urban buildings and balconies. With a radial recess as well as four additional support points, the 1FF is adaptable enough to be secured to houses, garages, tree trunks, towers or walls. This bat box does not need to be cleaned regularly, as the open bottom allows droppings to fall out. There is also a large inspection flap provided.

Bat Colony Box 3FF

Three Bat Colony Boxes (3FF) will be provided. The Schwegler 3FF Bat Colony Box is made with durable 'woodcrete' and comes with a galvanized steel wire hanger. Suitable for a wide range of bat species common in Ireland. This large box can accommodate even cave dwelling species and offers plenty of room for large colonies to move freely within the box. This lets them regulate the temperature in the box (huddling close together in cold and spreading out in higher temperatures). It is self-cleaning as droppings can freely fall out even if the box is densely occupied. If inspections are then the inspection hatch allows for easy access without disturbing the colony.

Hedgehog boxes/highways.

Hedgehog highways will be provided between the properties to allow free movement of small mammals through the gardens/ development. This requires a small hole (c. 13cm by 13cm square) to be included at the base of garden fencing to provide passage for Hedgehogs along the boundary of development site.

Four SCHWEGLER Hedgehog Dome (or similar) will be provided. These will be located under the retained hedgerow/treeline habitat the west and south of the site. This dome encourages Hedgehogs to settle in a particular area and provides year-round shelter, including during the winter months. This will be located somewhere protected from wind and rain. Ideally this will be filled with hay (supplied with the dome) but alternatively use dry leaves and straw, as well as cut up newspaper and wood shavings.

These will be located adjacent or within suitable habitat but will not be situated near internal or external roads. The location of hedgehog boxes is shown in the Landscape Masterplan included as **Appendix 2-6** of this EIAR.

Birds

Swift

The swift is a Red List bird of conservation concern in Ireland because its population has declined by over 40% in the last 15 years. Conservation actions across the country are helping to recover populations. Swifts are faithful to their nest sites. Nest box projects, especially built-in nest boxes, can provide safe long-term homes for new breeding pairs of Swifts.

Commercial Swift nest bricks are made from hollow brick or concrete composite designed to allow access by Swifts and manufactured to modern building regulation standards. They can be integrated into the walls of buildings during the construction phase.

Swifts look for nest sites at locations with established colonies. Swifts are known to occur in the Ballincollig area (Source NBDC), although none were recorded during the site surveys.

Twenty swift bricks will be positioned on two apartment buildings at the south-east of the proposed development site as per the *Proposed bird nesting locations* plan prepared by Deady Gahan Architects (See **Appendix 8-5** of this EIAR. Manthorpe swift bricks will be used.

- Bricks will be located at a minimum of 5m above the ground
- There will be no overhanging vegetation or obstacles in front of the bricks
- Bricks will be grouped, to form a colony style layout.

Swift bricks are designed to fit alongside standard building materials and will be fitted by the existing onsite personnel. However, an ecologist will discuss the positioning of bricks within site personnel prior to installation.

To increase the chances of attracting Swifts to a new nest location, a recording of a Swift call should be played. Swift calls can be broadcast from a small speaker placed as close as possible to the nest box or brick. New nest box sites where no lures are played are less likely to be successful in attracting nesting Swifts. This will be carried out under licence of the National Parks and Wildlife Service (NPWS). A proven call recording is available from Swift Conservation Ireland.

The following procedures will be followed during the playing of calls:

- Volume will be set at a 'normal' noise level. Playing the call too loudly will distort the sound.
- Swifts look for nest sites during two specific time periods: in May and June (to nest that year) and in June and July (to nest the following year). The latter group are younger birds.

The following recommended times will be used:

- from dawn, for 3-6 hours
- in the evening, from 6.00pm to dark.

Swifts will only look for nest sites in fine weather. Playing the calls in cold, wet weather is ineffective.

Nest boxes used by swifts do not require the cleaning and maintenance required by some other species. However, every few years check the bricks will be checked for signs of possible damage.



1B Schwegler nest box



1ZA Schwegler wren roundhouses



Treecreeper FSC Nest Box



Log pile example



Examples of insect hotels



Examples of insect hotels

Swallow/House Martin

Ten house martin artificial nest cups and ten Swallow nest cups will be installed onsite on a number of dwellings and duplexes (See Proposed bird nesting locations plan prepared by Deady Gahan Architects (See **Appendix 8-5** of this EIAR. Details will follow the guidance as per House Martin Conservation UK & Ireland *'Artificial nest cup installation guide'*.

- All nest cups will be placed at a minimum height of 3m.
- Nest cups will be installed under the apex, soffits and/or eaves of the buildings.
- Nest cups will have a north, east or westerly aspect.
- House martins and Swallows leave droppings which can be an issue for some households, but they are easily removed with a hosepipe or brush.

Other breeding birds

In order to enhance the site for nesting birds eight nesting bird boxes (a range of bird box types) will be installed at the proposed development site. Three 1B Schwegler nest box will be installed high on retained trees. The 1B nest boxes will be installed at a height of 1.5 metres whilst the large bird nest boxes should be positioned at least 3m in height. Three 1ZA Schwegler wren roundhouses will be located in hedgerows, thickets and overgrown areas. The 1ZA will be hung in hedgerows along the northern and western boundaries.

Treecreepers like to nest in narrow gaps or clefts such as behind the bark in mature trees. Many woodlands and gardens do not possess suitable habitats such as these due to changes in woodland management, so the addition of a specialist nest box such as this Treecreeper FSC Nest Box provides an excellent alternative. Two Treecreeper FSC Nest Box will be provided. This box is manufactured from FSC certified wood and has a hinged lid for inspection or cleaning. The shape of the box is specially designed to be suitable for this particular bird, fitting snugly against a tree trunk with an entrance right next to the bark. The location of these breeding bird boxes are shown in **Appendix 8-5** of this EIAR.

Log Piles/Loggeries

Building invertebrate habitats can provide shelter to many beneficial insects and offer a great foraging habitat for birds and other mammals.

Dead wood is one of the most valuable habitats for urban wildlife. The decline of the availability of deadwood is linked to the decline of many woodland birds due to the loss of foraging opportunities provided by this habitat.

Key points

- Install the logs vertically
- Site the loggery in a shaded part of a site
- Do not use concrete to bed the logs in. The beetles require the logs to be in contact with the soil
- Do not use well-rotted logs as they will have little wood left as food

Four log piles will be installed under retained hedgerow and treeline habitats. Log piles are suitable for invertebrates, small mammals and birds and can be easily installed in wooded areas of parks or open spaces. They are really just stacks of logs piled up and allowed to rot down. Left undisturbed they will support a good range of biodiversity. The location of log piles is shown in the Landscape Masterplan included as **Appendix 2-6** of this EIAR.

Insect hotels

Three insect hotels will be installed within the meadow grassland areas. Insect hotels are excellent for attracting a wide range of invertebrate species. Perforations allow for insect access and a chamber with bamboo below for solitary bees. This can be positioned anywhere in the site where pollination is to be encouraged. The nesting tubes are ideal for solitary bees to build their nests in, the vertical slots are designed to encourage butterflies, other refuge holes are perfect for ladybirds and lacewings and the pinecones offer an excellent habitat for a range of other species. The location of insect hotels is shown in the Landscape Masterplan included as **Appendix 2-6** of this EIAR.

Common Frog

Prior to any works being a carried out on drainage ditches and/or wet/agricultural grassland , a search of suitable areas shall be carried out by the supervising ecologist prior to the works. If frog spawn/tadpoles are found, a licence from NPWS will be obtained to translocate the frog spawn to alternative habitat.

Invasive species

Buddleia Removal

As noted in Section 8.3.5, there is no statutory obligation to remove Buddleia. However, Buddleia will be removed as part of the pre-construction/construction works.

Buddleia is straightforward to control using a mixture of mechanical removal and herbicide treatment.

Buddleia is a plant that favours disturbed sites, physical grubbing of plants can provide ideal conditions for the germination of seeds. Therefore, care needs to be taken to ensure re-vegetation of controlled areas is undertaken swiftly. The branches of Buddleia are capable of rooting as cuttings, so care should also be taken to ensure material is disposed of in a manner to avoid this risk.

As mature plants occur within the proposed works area, the preferred method of treatment is cutting back to a basal stump or grubbing out followed by chemical treatment. Herbicide applications will take into account sensitive receptors such as watercourses and locally important habitats such as woodland and must only be applied in line with manufacturers recommendations.

Recommended practice for the application of herbicides requires cutting back of plants to a basal stump during active growth (late spring to early summer) which is then treated (brushed on) immediately with a systemic weed killer mix. Foliar application of triclopyr or glyphosate may be adequate for limited infestations of younger plants but should be followed up at 6 monthly interval until the supervising ecologist can certify that the plant is no longer extant within the works area. An Invasive Species Management Plan prepared by DixonBrosnan is included as Appendix 8-6 of this EIAR.

Wild Clematis Removal

As noted in Section 8.3.5, there is no statutory obligation to remove Wild Clematis. It is noted that this plant is present on a number of mature and semi-mature trees earmarked for retention and removal of Wild Clematis within these areas will be made on a case-by-case basis with the aim of protecting mature and semi-mature trees. However, should it be concluded that Wild Clematis at the proposed development site should be removed, the following treatment methods will be used.

Wild Clematis is straightforward to control using a mixture of mechanical removal and herbicide treatment. Alternative methods of control are discussed below.

This species can be controlled by both mechanical control and herbicides, though typically its control relies on a combination of both i.e., cut-stump application.

Small seedlings can be readily pulled by hand. Larger stems have to be cut, the roots grubbed out and the material placed off the ground so it cannot take root again.

A number of chemicals have been used effectively against Wild Clematis in New Zealand, including glyphosate, though control invariably takes more than one year. Control should be undertaken during active growth. For mature plants, the vines should be cut back to ground level or waist height in winter or spring and the subsequent re- growth can be then foliar sprayed. This method will avoid impacting on the host plant the vine may be covering.

For larger specimens, the plant can be cut at the base with a straight horizontal cut. Herbicide is then applied immediately to the wound with a paint brush, eye dropper or small squeeze bottle. On larger stems it is only necessary to wipe herbicide around the outer rim of the cut. The plants should be left in situ until they are dead. Where plants are not killed in a single application, wait until re growth before re spraying.

Triclopyr can also be used as a foliar spray or as a spot treatment. This should be applied in summer during active growth before senescence, when it is not very hot or during drought. Following control, regular monitoring will be required with appropriate follow-up to deal with re- growth or new seedling germination over a period of 2–3 years.

15.2.6.3 Operational Phase – Mitigation Measures

Lighting

The scheme proposes public lighting to all roads and paths within the development.

The public road lighting is designed to EN 13201 and British Standard BS 5489 utilising the lighting design software package Lighting Reality. This design package is used to select appropriate lantern types and to optimise the lighting design. The selected lanterns are designed and manufactured to comply with EN 13201 and incorporate IP-rated optical compartments and robust gear housings suitable for public lighting applications. The proposed Lighting Strategy prepared by Molloy Consulting Engineers is included in Appendix 5-3 of this EIAR.

The primary lighting mitigation which will be implemented for this project relates to bats, as these are considered the most sensitive species in relation to night-time lighting. It is noted however that the mitigation proposed will also lessen potential impacts in relation to other nocturnal species such as Badger and Otter. The lighting scheme has been developed having regard to best practice guidance, including that published by the UK Bat Conservation Trust (2018), in respect of mitigation strategies to minimise the impact of outdoor lighting upon bat populations. The following mitigation measures have been incorporated into the site lighting plan as specified in the lighting drawings and supporting calculations:

- The location of lighting within the greenfield area has been confined to internal roads and footpaths only;
- Warm white LED luminaires with a correlated colour temperature of 2,700 kelvin have been specified to reduce potential disturbance to bat activity while maintaining appropriate levels of public safety;

LED luminaires have been specified due to their sharp cut-off optics, good colour rendition, energy efficiency and dimming capability;

- Column heights and luminaire positions have been carefully considered to minimise light spill beyond the site boundary;
- Lanterns are of the fully cut-off type with no light output above the horizontal plane;
- Screening by existing vegetation and proposed planting will assist in limiting light spill towards boundary habitats; and
- Exterior lighting will be controlled via photocell and time-based control systems located within the public lighting supply infrastructure.

15.2.7 Cultural Heritage

15.2.7.1 Construction Phase – Mitigation Measures

Incorporated Design Mitigation

Archaeological Heritage – Registered Monuments

Standing Stone (CO073-103) - The circular feature identified during archaeological testing will be excavated in advance of construction to confirm whether it represents the former socket of the standing stone. The surrounding area will be subject to targeted topsoil stripping and archaeological inspection to identify any associated features. Should further remains be identified, mitigation will be agreed in consultation with the Cork City Archaeologist.

Archaeological Heritage – Unregistered Monuments

Prehistoric Ring-ditch (Anomaly A) - Anomaly A, interpreted as a prehistoric ring-ditch, will be preserved *in situ* within the open-space zone of the proposed development.

- A minimum 10m buffer zone will be maintained from the edge of the site as defined by the geophysical survey, within which no ground disturbance, construction activity, or installation of services will occur.
- The monument and buffer zone will be securely fenced during construction, clearly marked on drawings, and communicated to contractors and landscape teams.
- No service runs, drainage cuts, temporary works compounds, or machinery laydown areas will be permitted within the buffer zone.
- The ring ditch will remain as a grassed area within the public open space.
- Discreet heritage interpretation, such as a low-level information panel, will be incorporated to acknowledge the enclosure's significance and provide educational and amenity value to the local community. The scale, design and placement of any interpretation will be agreed in advance in consultation with the City Archaeologist.

These measures will ensure that the ring-ditch is physically protected, visually respected, and meaningfully integrated into the overall public realm, in accordance with guidance from the National Monuments Service and Cork County Council.

Prehistoric Ring-ditch (Anomaly F) - Anomaly F, comprising a prehistoric ring-ditch with evidence for later reuse, will be preserved *in situ* beneath the proposed Greenway.

- A minimum 10m buffer zone will be maintained from the edge of the monument, as defined by geophysical survey, within which no ground disturbance, service installation, or construction activity will occur.
- The monument and buffer zone will be securely fenced, clearly shown on drawings, and communicated to all contractors and landscape teams.
- The Greenway will be constructed using a no-dig, floating road/path methodology to ensure preservation in situ, including;
- Avoidance of excavation and ground reduction
- Retention of existing vegetation and topsoil
- Use of load-distributing surfacing materials
- Prevention of loading on underlying deposits
- Exclusion of drainage cuts, service trenches, or subsurface works
- Discreet heritage interpretation, such as a low-level information panel, will be installed to acknowledge the significance of the ring-ditch and provide educational and placemaking value for the local community. The scale, design and placement of any interpretation will be agreed in advance in consultation with the City Archaeologist.

These measures will ensure full physical protection and sensitive integration of Anomaly F within the proposed Greenway, while maintaining legibility and public awareness of the site's archaeological importance. Full technical details of the greenway methodology are provided in **Appendix 9.5**.

Prehistoric Ring-Ditch (Anomaly G) - Anomaly G, comprising two curvilinear features interpreted as elements of a possible ring ditch, will be preserved in situ beneath the proposed Greenway.

- A minimum 10m buffer zone will be maintained from the edge of the site, as defined in the geophysical survey, within which no ground disturbance, construction activity, or installation of services will occur.
- The monument and buffer zone will be securely fenced during construction, clearly marked on drawings, and communicated to all contractors and landscape teams.
- As with Anomaly F, this section of the Greenway will be constructed using a no-dig floating road/path methodology (Appendix 9.5) to ensure no direct or indirect disturbance to archaeological remains.
- Discreet heritage interpretation, such as a low-level information panel, will be installed to acknowledge the significance of the ring-ditch and provide educational and placemaking value for the local community. The scale, design and placement of any interpretation will be agreed in advance in consultation with the City Archaeologist.

These mitigation measures will ensure the preservation in situ of Anomaly G, protecting the monument from construction and operational impacts and integrating it meaningfully into the completed Greenway.

Two postholes and a possible linear feature - Archaeological testing in Field 1 identified two isolated postholes (in Trenches 2 and 3) and a possible linear feature (in Trench 18). These features will be fully excavated in advance of construction, and the surrounding areas will be subject to targeted topsoil stripping to establish whether any associated features are present. If additional archaeological remains are identified, appropriate mitigation will be agreed in consultation with the Cork City Archaeologist.

Possible Archaeological Site (Anomaly D) - Anomaly D, originally identified during geophysical survey as a sub-rectangular positive response, will be preserved in situ within an area of open ground located outside the LRD and Greenway footprints.

- A 10m buffer zone will be maintained from the edge of the site as defined by the geophysical survey, within which no ground disturbance, construction activity, or installation of services will occur.
- The buffer zone will be securely fenced, clearly shown on drawings, and communicated to all contractors and landscape teams.
- As the feature is not affected by construction and will remain undisturbed, no further archaeological investigation is proposed at this time. The area will be retained as open ground and preserved in situ.

These measures will ensure the continued protection of Anomaly D and avoid any direct or indirect impacts arising from the proposed development.

Potential for Previously Unknown Archaeological Sites

Much of Ireland's archaeological resource survives as unrecorded subsurface remains. The proposed construction involves topsoil stripping and ground reduction, which may directly impact such features. Given the greenfield nature of the site and its moderate–high archaeological potential:

- Licensed archaeological monitoring of all topsoil removal will be undertaken during construction.
- If archaeological features or deposits are revealed, the NMS and the Planning Authority will be consulted in line with Framework and Principles for the Protection of the Archaeological Heritage (1999).
- Newly identified archaeological sites will be preserved in situ or by record, with sufficient time and resources allowed to resolve archaeological matters.
- Preservation by record will involve full excavation of archaeological material, carried out to professional standards of practice (Policy Guidelines on Archaeological Excavation – DAHGI).
- All costs will be met by the developer.

Architectural Heritage – Registered Structures

There are no PSs, NIAH-listed structures, or ACAs located within the proposed development site. Accordingly, no specific mitigation measures are required in respect of registered architectural heritage.

Architectural Heritage – unregistered Structures

Building 1 - The proposal seeks to sensitively repurpose the existing vernacular stone farmhouse which is in significant disrepair into 2 no. 2-bed semi-detached dwellings located in the historic heart of the proposed residential development. The design strategy specifically:

- Prioritises the retention and reuse of the original stone fabric where possible, preserving the building's character and embodied heritage
- Draws form, scale, and materiality directly from the historic farmhouse and cluster of associated farm buildings, with subtle references to traditional detailing
- Incorporates a roughcast or lime render to complement the traditional character of the building
- Places new and adapted openings in alignment with existing openings where possible
- Provides traditional-style windows and doors to reinforce the vernacular appearance and ensure the development responds positively to the building's overall context.

These measures ensure the building's survival, safeguard its historic character and secure long-term viable use, representing an enhancement to the built heritage resource within the development site.

Vegetation will be cleared from the building under archaeological supervision and a full photographic and written record of the structure will be undertaken in advance of any intervention.

Building 2 - This structure will be demolished. Prior to demolition, vegetation will be cleared and a comprehensive photographic record will be undertaken to professional standards. Archaeological monitoring will be carried out during demolition to record any subsurface remains or features revealed.

Limekiln (between Fields 1 and 3) - This structure will be demolished. A full and comprehensive drawn and photographic record (**Appendix 9.4**) has been undertaken to professional standards. Archaeological monitoring will be undertaken during demolition to document the structure and identify any associated subsurface deposits.

15.2.7.2 Operational Phase – Mitigation Measures

The archaeological features identified within the proposed development, namely the prehistoric ring ditches (Anomalies A, F and G), will be subject to long-term protection measures designed to ensure their continued preservation in situ and appropriate integration within the completed scheme.

Prehistoric Ring-ditch (Anomaly A) – Public Open Space within LRD

Anomaly A will be retained within an area of public open space where:

- Following completion of construction, the monument footprint and its 10m buffer zone will be retained as protected open space and managed to prevent any future ground disturbance.
- The area will be maintained as grassed open space, avoiding deep-rooting vegetation that could impact subsurface deposits.
- Any future maintenance or upgrading works within this zone will be subject to consultation with the Planning Authority and, where required, archaeological supervision.
- Discreet heritage interpretation (e.g. low-level information signage) will promote public awareness while ensuring no physical impact on the monument.

Prehistoric Ring-ditches (Anomalies F and G) – Greenway Section

Anomalies F and G will remain preserved beneath the Greenway, which has been specifically designed using a no-dig, load distributing construction methodology. During operation:

- The completed Greenway structure will continue to function as a non-intrusive floating construction and future maintenance works will be limited to surface works only.
- Such maintenance works will be limited to surface repairs that do not disturb underlying deposits.
- Any proposed future alteration or upgrade within these areas will require prior consultation with the Planning Authority and the National Monuments Service, and may require archaeological supervision.

Possible Archaeological Site (Anomaly D)

Anomaly D lies outside the development footprint and will remain as open ground. No operational impacts are anticipated and no ground disturbance will occur in this area.

General Long-Term Protection Measures

The archaeological features identified as Anomalies A, F and G, through geophysical survey and archaeological testing, as probable prehistoric ring-ditch monuments, will be formally reported to the National Monuments Service (NMS). The sites will be submitted for inclusion in the Archaeological Survey of Ireland records and will be assigned SMR numbers in due course.

15.2.8 Noise & Vibration

15.2.8.1 **Construction Phase - Mitigation Measures**

Mitigation measures for the demolition and construction phases are set out below in order to reduce potential impacts as far as practicable to within the adopted design goals for noise and vibration.

The assessment detailed in Section 10.8.1 has determined that construction activities can typically operate within the adopted construction noise threshold levels at the closest off-site NSLs when carried out at distances greater than 60m from the main phases of the construction works.

Vibration levels at the closest neighbouring buildings are expected to be orders of magnitude below the limits set out in Table 10.3 to avoid any cosmetic damage to buildings.

Best practice noise and vibration control measures will be employed by the contractor during the construction phase in order to avoid exceedance of the adopted construction noise threshold values at the nearest NSLs. The best practice measures set out in BS 5228 (2009 +A1 2014) Parts 1 and 2 will be complied with. This includes guidance on several aspects of construction site mitigation measures, including, but not limited to:

Selection of quiet plant

- Control of noise sources
- Screening
- Hours of work
- Liaison with the public

Further comment is offered on these items in the following paragraphs.

Noise control measures that will be considered include the selection of quiet plant, enclosures and screens around noise sources, limiting the hours of work and noise monitoring.

Selection of Quiet Plant

This practice is recommended in relation to static plant such as compressors and generators. It is recommended that these units be supplied with manufacturers' proprietary acoustic enclosures. The potential for any item of plant to generate noise will be assessed prior to the item being brought onto the site. The least noisy item will be selected wherever possible. Should a particular item of plant already on the site be found to generate high noise levels, the first action will be to identify whether said item can be replaced with a quieter alternative.

Noise Control at Source

If replacing a noisy item of plant is not a viable or practical option, consideration will be given to noise control at source. This refers to the modification of an item of plant or the application of improved sound reduction methods in consultation with the supplier. For example, resonance effects in panel work or cover plates can be reduced through stiffening or application of damping compounds; rattling and grinding noises can often be controlled by fixing resilient materials in between the surfaces in contact.

The following best practice migration measures will be considered:

- Site compounds will be located away from noise sensitive boundaries within the site constraints.
- The use of lifting bulky items, dropping and loading of materials within these areas will be restricted to normal working hours.
- For mobile plant items such as cranes, dump trucks, excavators and loaders, maintaining enclosure panels closed during operation can reduce noise levels over normal operation. Mobile plant will be switched off when not in use and not left idling.
- For steady continuous noise, such as that generated by diesel engines, it may be possible to reduce the noise emitted by fitting a more effective exhaust silencer system.
- For concrete mixers, control measures will be employed during cleaning to ensure no impulsive hammering is undertaken at the mixer drum.
- For all materials handling, ensure that materials are not dropped from excessive heights, lining drops chutes and dump trucks with resilient materials.
- For compressors, generators and pumps, these can be surrounded by acoustic lagging or enclosed within acoustic enclosures providing air ventilation.
- All items of plant will be subject to regular maintenance. Such maintenance can prevent unnecessary increases in plant noise and can serve to prolong the effectiveness of noise control measures.

Screening

Typically screening is an effective method of reducing the noise level at a receiver location and can be used successfully as an additional measure to other forms of noise control. The effectiveness of a noise screen will depend on the height and length of the screen, its mass, and its position relative to both the source and receiver.

The length of the screen should in practice be at least five times the height, however, if shorter sections are necessary then the ends of the screen will be wrapped around the source. BS 5228 -1:2009+A1 states that on level sites the screen should be placed as close as possible to either the source or the receiver. The construction of the barrier will be such that there are no gaps or openings at joints in the screen material. In most practical situations the effectiveness of the screen is limited by the sound transmission over the top of the barrier rather than the transmission through the barrier itself. In practice, screens constructed of materials with a mass per unit of surface area greater than 10kg/m2 will give adequate sound insulation performance.

Post-mitigation construction noise calculations assume a partial line of sight (-5dB) is achieved using a solid 2.4m high standard construction site hoarding.

Annex B of BS 5228-1:2009+A1:2014 (Figures B1, B2 and B3) provide typical details for temporary and mobile acoustic screens, sheds and enclosures that can be constructed on site from standard materials.

In addition, careful planning of the site layout will also be considered. The placement of temporary site buildings such as offices and stores between the site and sensitive locations can provide a good level of noise screening during the phasing of works.

Liaison with the Public

A designated Community Liaison Officer (CLO) will be appointed to site during construction works. Any noise complaints will be logged and followed up in a prompt fashion by the CLO. In addition, prior to particularly noisy construction activity the CLO will inform the nearest noise sensitive locations of the time and expected duration of the noisy works.

Vibration Mitigation

On review of the likely vibration levels associated with construction activities, it may be concluded that the construction of the proposed development is not expected to give rise to vibration that is either significantly intrusive or capable of giving rise to structural or cosmetic damage to adjacent buildings.

In the case of vibration levels giving rise to human discomfort, in order to minimise such impacts, the following measures shall be implemented during the construction period: -

- A clear communication programme will be established to inform adjacent building occupants in advance of any potential intrusive works which may give rise to vibration levels likely to exceed perceptible levels. The nature and duration of the works will be clearly set out in all communication circulars;
- Appropriate vibration isolation shall be applied to plant, where feasible;
- Monitoring will be undertaken at identified sensitive buildings, where proposed works have the potential to be at or exceed the vibration limit values.

Project Programme

The phasing programme will be arranged so as to control the amount of disturbance in noise and vibration sensitive areas at times that are considered of greatest sensitivity. The potential for cumulative works occurring both within the site and at any external sites with potential to generate significant noise effects will be reviewed in terms of limiting the duration and scale of these effects.

15.2.8.2 Operational Phase - Mitigation Measures

Mitigation measures for the operational phase are set out below.

Additional Traffic on Adjacent Roads

During the operational phase of the development, noise mitigation measures with respect to the impact of traffic from the development are not deemed necessary.

Mechanical Services Plant

Proprietary noise and vibration control measures will be employed as part of the detailed design in order to ensure that noise emissions from building services plant do not exceed the relevant internal noise criteria within Table 10.7 for residential dwellings within the proposed development. In addition, noise emissions should be broadband in nature and should not contain any tonal or impulsive elements. Considering that sensitive receptors within the development are much closer than off-site sensitive receptors, once the relevant noise criteria is achieved within the development, there are no mitigation requirements to control building services and plant at off-site NSLs.

Inward Noise

In terms of the inward noise impact of road traffic on the development buildings and amenity areas, Appendix 10.1 sets out the approach for controlling noise levels across the site.

The proposed development site has been categorised as a Negligible to Low Risk in accordance with ProPG. (see further details in Appendix 10.1). Review has been undertaken of the location of residential buildings on site and the external noise levels. The assessment has determined that no specific noise mitigation measures are required to the site boundary or site buildings to control noise intrusion to internal spaces.

15.2.9 Air Quality

15.2.9.1 Construction Phase - Mitigation Measures

Communications

- Develop and implement a stakeholder communications plan that includes community engagement before work commences on site.
- Display the name and contact details of person(s) accountable for air quality and dust issues on the site boundary. This may be the environment manager/engineer or the site manager.
- Display the head or regional office contact information

Site Management

- Record all dust and air quality complaints, identify cause(s), take appropriate measures to reduce emissions in a timely manner, and record the measures taken.
- Make the complaints log available to the local authority when asked.
- Record any exceptional incidents that cause dust and/or air emissions, either on- or offsite, and the action taken to resolve the situation in the log book.
- Hold regular liaison meetings with other high risk construction sites within 500 m of the site boundary, to ensure plans are co-ordinated and dust and particulate matter emissions are minimised. It is important to understand the interactions of the off-site transport/deliveries which might be using the same strategic road network routes.

Monitoring

- Undertake daily on-site and off-site inspection, where receptors (including roads) are nearby, to monitor dust, record inspection results, and make the log available to the local authority when asked. This will include regular dust soiling checks of surfaces such as street furniture, cars and window sills within 100 m of site boundary, with cleaning to be provided if necessary.
- Carry out regular site inspections to monitor compliance with the DMP, record inspection results, and make an inspection log available to the local authority when asked
- Increase the frequency of site inspections by the person accountable for air quality and dust issues on site when activities with a high potential to produce dust are being carried out and during prolonged dry or windy conditions.
- Agree dust deposition, dust flux, or real-time PM10 continuous monitoring locations with the Local Authority. Where possible commence baseline monitoring at least three months before work commences on site or, if it a large site, before work on a phase commences. Further guidance is provided by IAQM on monitoring during demolition, earthworks and construction.

Preparing and Maintaining the Site

- Plan site layout so that machinery and dust causing activities are located away from receptors, as far as is possible.
- Erect solid screens or barriers around dusty activities or the site boundary that are at least as high as any stockpiles on site.
- Fully enclose site or specific operations where there is a high potential for dust production and the site is actives for an extensive period
- Avoid site runoff of water or mud.
- Keep site fencing, barriers and scaffolding clean using wet methods.
- Remove materials that have a potential to produce dust from site as soon as possible, unless being re-used on site. If they are being re-used on-site cover as described below.
- Cover, seed or fence stockpiles to prevent wind whipping.

Operating Vehicles / Machinery and Sustainable Travel

- Ensure all vehicles switch off engines when stationary – no idling vehicles.
- Avoid the use of diesel- or petrol-powered generators and use mains electricity or battery powered equipment where practicable.
- Impose and signpost a maximum-speed-limit of 25 kmph on surfaced and 15 kmph on unsurfaced haul roads and work areas (if long haul routes are required these speeds may be increased with suitable additional control measures provided, subject to the approval of the nominated undertaker and with the agreement of the local authority, where appropriate)
- Produce a Construction Logistics Plan to manage the sustainable delivery of goods and materials.
- Implement a Travel Plan that supports and encourages sustainable travel (public transport, cycling, walking, and car-sharing)

Operations

- Only use cutting, grinding or sawing equipment fitted or in conjunction with suitable dust suppression techniques such as water sprays or local extraction, e.g. suitable local exhaust ventilation systems
- Ensure an adequate water supply on the site for effective dust/particulate matter suppression/mitigation, using non-potable water where possible and appropriate
- Use enclosed chutes and conveyors and covered skips.
- Minimise drop heights from conveyors, loading shovels, hoppers and other loading or handling equipment and use fine water sprays on such equipment wherever appropriate.
- Ensure equipment is readily available on site to clean any dry spillages and clean up spillages as soon as reasonably practicable after the event using wet cleaning methods.

Waste Management

- Bonfires and burning of waste materials are legally prohibited.

Measures Specific to Demolition

- Soft strip inside buildings before demolition (retaining walls and windows in the rest of the building where possible to provide a screen against dust
- Ensure effective water suppression is used during demolition operations. Handheld sprays are more effective than hoses attached to equipment as the water can be directed to where it is needed. In addition, high volume water suppression systems, manually controlled, can produce fine water droplets that effectively bring the dust particles to the ground.
- Avoid explosive blasting, using appropriate manual or mechanical alternatives.
- Bag and remove any biological debris or damp down such material before demolition.

Measures Specific to Earthworks

- Re-vegetate earthworks and exposed areas/soil stockpiles to stabilise surfaces as soon as practicable
- Use Hessian, mulches or trackifiers where it is not possible to re-vegetate or cover with topsoil, as soon as is practicable.
- Only remove the cover in small areas during work and not all at once.

Measures Specific to Construction

- Avoid scabbling (roughening of concrete surfaces) if possible.
- Ensure sand and other aggregates are stored in bunded areas and are not allowed to dry out, unless this is required for a particular process, in which case ensure that appropriate additional control measures are in place.
- Ensure bulk cement and other fine powder materials are delivered in enclosed tankers and stored in silos with suitable emission control systems to prevent escape of material and overfilling during delivery.
- For smaller supplies of fine powder materials, ensure bags are sealed after use and stored appropriately to prevent dust.

Measures Specific to Trackout

- Use water-assisted dust sweeper(s) on the access and local roads, to remove, as necessary, any material tracked out of the site. This may require the sweeper being continuously in use.
- Avoid dry sweeping of large areas.
- Ensure vehicles entering and leaving sites are covered to prevent escape of materials during transport.
- Inspect on-site haul routes for integrity and instigate necessary repairs to the surface as soon as reasonably practicable.
- Record all inspections of haul routes and any subsequent action in a site logbook.
- Install hard surfaced haul routes, which are regularly damped down with fixed or mobile sprinkler systems, or mobile water bowsers and regularly cleaned.
- Implement a wheel washing system (with rumble grids to dislodge accumulated dust and mud prior to leaving the site where reasonably practicable).
- Ensure there is an adequate area of hard surfaced road between the wheel wash facility and the site exit, wherever site size and layout permits.
- Access gates to be located at least 10 m from receptors where possible.

Monitoring

The following monitoring measures are proposed to ensure the dust mitigation measures are working satisfactorily:

- Undertake daily on-site and off-site inspections, where receptors (including roads) are nearby, to monitor dust, record inspection results in the site inspection log. This should include regular dust soiling checks of surfaces such as street furniture, cars and windowsills within 100 m of site boundary, with cleaning to be provided if necessary.
- Increase the frequency of site inspections by the person accountable for air quality and dust issues on site when activities with a high potential to produce dust are being carried out and during prolonged dry or windy conditions.
- Monitoring of construction dust deposition along the site boundary to nearby sensitive receptors during the construction phase of the proposed development is recommended to ensure mitigation measures are working satisfactorily. This can be carried out using the Bergerhoff method in accordance with the requirements of the German Standard VDI 2119. The Bergerhoff Gauge consists of a collecting vessel and a stand with a protecting gauge. The collecting vessel is secured to the stand with the opening of the collecting vessel located approximately 2 m above ground level. The TA Luft limit value is 350 mg/m2/day during the monitoring period of 30 days (+/- 2 days). Monitoring shall ensure that the dust mitigation measures are working satisfactorily as construction works progress.

15.2.9.2 Operational Phase - Mitigation Measures

The impact of the operational traffic associated with proposed development on air quality is predicted to be not significant with respect to the operational phase in the long term. Therefore, no site-specific mitigation measures are required.

15.2.10 Climate

15.2.10.1 Incorporated Design Mitigation

A number of measures have been incorporated into the design of the development to mitigate against the impacts of future climate change. For example, adequate drainage and raised floor and ground levels to accommodate additional flood risk have been incorporated into the design of the development to avoid potential flooding impacts as a result of increased rainfall events in future years. These measures have been considered when assessing the vulnerability of the proposed development to climate change (Section 12.5.5.2).

In relation to operational energy usage, information as detailed in the Scheme Sustainability & Climate Resilience Statement prepared by DOSA (Appendix 12-1 of this EIAR), has been used to inform this assessment. The development has been designed in line with the requirements of Nearly Zero Energy Buildings (NZEB) Standards and the requirements of the Cork City Development Plan 2022 – 2028. Section 3 of the Scheme Sustainability & Climate Resilience Statement for the proposed development outlines the relevant climate specific objectives of the development plan for the area. The incorporated design measures as part of the proposed development's sustainability strategy are outlined below:

- Design Longevity and Passive Performance: The development will feature a flexible, futureproof design aimed at maximising its lifecycle. Passive design strategies, such as optimal façade orientation and enhanced building fabric (with U-values exceeding regulatory standards), will be employed to reduce energy demands. The design will also prioritise airtightness to achieve excellent air permeability performance.
- Daylighting and Visual Comfort: Natural daylight will be maximised in accordance with European, CIBSE, and BRE guidance. High-performance glazing will be used to improve visual comfort and support occupant well-being.
- Façade Optimisation: Advanced computer modelling will be used in collaboration with the project Architect to optimise façade design, enhancing daylight penetration, natural ventilation, and solar benefits specific to the site context.
- Whole-Site Sustainability: Sustainable practices will extend beyond the building envelope to encompass site-wide construction, commissioning, and handover processes, reinforcing environmental performance throughout the development lifecycle.
- Resource Efficiency – Reduce, Reuse, Recycle: Circular economy principles will be integrated across all project phases—design, construction, and operation—to minimise waste and environmental impact.
- Thermal Modelling and Climate Resilience: Dynamic Thermal and Energy Simulations will be conducted to ensure a low-carbon, low-energy design. Residential units will prioritise natural ventilation and undergo compliance assessments for overheating under Part L and long-term climate impacts using CIBSE 2020/2050 weather files.
- Energy Efficient Building Services: Mechanical and electrical systems will be designed to minimise energy use while maintaining high air quality. Measures include:
  - » Efficient use of natural light to reduce artificial lighting;
  - » Use of high-efficiency LED fittings with dimming, daylight sensing, and occupancy detection;

  - » A Lighting Management Plan in common areas to reduce unnecessary energy use;
  - » Elimination of fossil-fuel-based systems in favour of heat pumps and other low carbon heating technologies;
  - » Selection of Triple E-registered products to ensure high-performance, energy efficient installations.
- Renewable Energy Integration: Where technically and economically feasible, renewable energy solutions will be incorporated, such as roof-mounted photovoltaic (PV) arrays and heat pump systems, to offset primary energy use and further reduce emissions.
- Building Energy Rating (BER) Target: All residential units will be designed to achieve an 'A-rated' BER, ensuring high energy efficiency and offering future residents predictable, low operating costs and environmental assurance.
- Water Conservation and Management: The development will include a water-efficient design, utilising low-flow sanitary appliances (e.g. dual-flush toilets, spray taps), leak detection linked to the Building Management System (BMS), and measures to reduce potable water consumption.
- Sustainable Transport Infrastructure: The strategy encourages a modal shift away from private car usage by integrating access to public transport and active travel modes. EV charging infrastructure will be installed in accordance with Policy in CAP27 and Part L 2022 to support the transition to electric vehicles.
- Material and System Lifecycle Optimisation: A whole life-cycle approach will inform the selection of building materials and plant. Embodied carbon will be reduced through the avoidance of heavy or high-carbon components, minimisation of mechanical systems where possible, and careful selection of materials with strong environmental credentials. Low-GWP refrigerants with minimal leakage rates will be used to mitigate environmental impacts.

These identified measures will aid in reducing the impact to climate during the operational phase of the proposed development in line with the goals of the Climate Action Plan and the Cork City Development Plan 2022-2028 and Cork City Climate Action Plan 2024-2028.

In addition to the above, in relation to promoting a modal shift and more sustainable methods of transport, the proposed development is located in Ballincollig which is particularly well served by several existing bus routes which provide the area with regular public transport links to all areas of Cork City. Additionally, Ballincollig is included as a key location on one of the twelve new 'Sustainable Transport Corridors' in the Draft BusConnects Cork (STC Route E – Ballincollig to City) which in turn links with STC F Bishopstown to City.

Further, Transport Infrastructure Ireland (TII) also published the 'Emerging Preferred Route' for Luas Cork in April 2025 and an 8-week public consultation period was open until June 2025. The Emerging Preferred Route begins in Ballincollig and a single-track loop through Ballincollig connects Leo Murphy Road to Station Road to Main Street and back to Leo Murphy Road, at which point the arrangement changes to a more typical double-track configuration and continues eastwards towards the city centre. The Emerging Preferred Route identifies a potential future 'Killumney Road' Luas stop near Gaelscoil Uí Ríordáin, approximately 360 metres north of the subject site.

The publication of the 'Luas Cork Emerging Preferred Route' does not confirm TII's final preferred route for the Luas Cork project and the route may be subject to amendment following further assessment and rounds of public consultation.

Locating the proposed development in an area with connectivity to more sustainable transport methods will promote a modal shift away from private passenger cars which will benefit climate through a reduction in transport related GHG emissions.

15.2.10.2 Construction Phase - Mitigation Measures

Embodied carbon of materials and construction activities will be the primary source of climate impacts during the construction phase. In order to reduce carbon impacts from the proposed development, the use of alternative materials with lower embodied carbon emissions such as timber frame walls rather than traditional concrete block walls or concrete with a 50% recycled cement content for example will help to reduce the impact of the development on climate. Alternative material types with lower embodied carbon should be investigated during the detailed design phase of the proposed development.

Other mitigation strategies which should be considered as part of the Construction Environmental Management Plan include:

- Prevention of on-site or delivery vehicles from leaving engines idling, even over short periods.
- Appointing a suitably competent contractor who will undertake waste audits detailing resource recovery best practice and identify materials can be reused/ recycled.
- Ensure all plant and machinery are well maintained and inspected regularly.
- Minimising waste of materials due to poor timing or over ordering on site will aid to minimise the embodied carbon footprint of the site.
- Sourcing materials locally where possible to reduce transport-related CO_2 emissions.
- Target embodied carbon rates for detailed design (LETI, 2020).

In terms of impact on the proposed development due to climate change, during construction the Contractor will be required to mitigate against the effects of extreme rainfall/flooding through site risk assessments and method statements. The Contractor will also be required to mitigate against the effects of extreme wind/storms, temperature extremes through site risk assessments and method statements. All materials used during construction will be accompanied by certified datasheets which will set out the limiting operating temperatures. Temperatures can affect the performance of some materials, and this will require consideration during construction. During construction, the Contractor will be required to mitigate against the effects of fog, lighting and hail through site risk assessments and method statements.

Throughout detailed design and construction phase, guidance documents to inform with design detail decisions shall be reviewed e.g. the EU Commission *Technical Guidance on Adapting Buildings to Climate Change* (European Commission (2021a), LETI emergency design guide (LETI, 2020), and the latest IPCC report.

15.2.10.3 Operational Phase Mitigation

The proposed development has been designed to reduce the impact on climate as a result of energy usage during operation. These measures are outlined in Section 15.10.2.1 as incorporated design mitigation. No further operational phase mitigation is proposed.